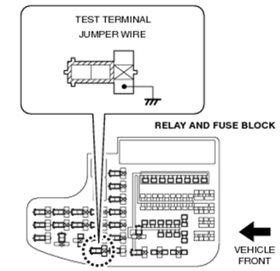
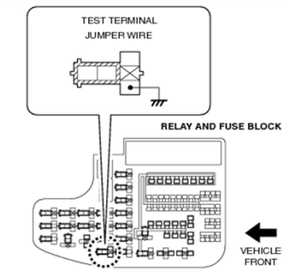
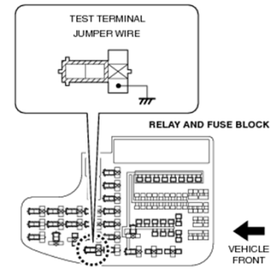
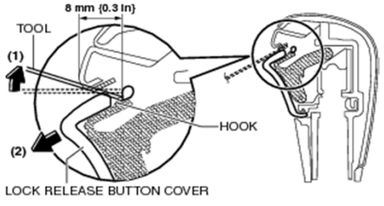
Section	Title	Purpose of Adoption	Service Point	Common Inquiry	Other
Review	Wiring harness repair (Various cautions on servicing wiring harness systems)	Servicing improvement by use of repair-use connectors.	Cut off approx. 10 to 20 mm {0.394 to 0.787 in} of the insulation from the ends of the wiring harness on the vehicle side and the wiring harness of the repair-use connector and apply solder. Set the heat shrinkable tubing to the soldered area and shrink the heat shrinkable tubing at a temperature of approx. 100 °C using a drier.	Not applicable	Not applicable
Engine SKYACTIV-G	Oil filter	To deliver a sufficient amount of oil over a wide area, the oil filter flow amount has been increased.	Use SKYACTIV-G unique oil filter (oil filter for the Z-series engines is the same shape but cannot be used)	Not applicable	The internal structure is different from the conventional oil filter.
	Ion sensor	If the ion sensor detects pre-ignition, the fuel amount is increased and the intake camshaft is retarded to prevent pre-ignition.	The ion sensor cannot be replaced as a single unit. If replacement is required, replace the appropriate ignition coil (with built-in ion sensor). To examine, perform the inspection following the service manual (DTC inspection, damage to ignition coil/ion sensor, visual inspection for connector corrosion, damage). (North America only) In addition, if pre-ignition is not suppressed even though the pre-ignition avoidance control operates, the MIL is illuminated due to the possibility of poor emission performance.	Not applicable	Not applicable
	HLA (Hydraulic Lash Adjuster)	To reduce sliding resistance, rocker arms with a needle roller bearing have been adopted. The needle roller bearing contacts and rolls thus it has less sliding resistance compared to the conventional cam and rocker arm which contacts and slides. HLA has been adopted to prevent hammering noise and to realize maintenance-free valve clearance, maintaining constant "zero" valve clearance.	When installing the HLA, fill it with oil and lightly press the internal check ball using a round bar (1.0 mm diameter) to bleed air.	If clatter is heard when the engine is started right after replacing the oil, air infiltration in the HLA can be considered. Perform the following air bleeding steps (1) and (2), and if the noise still occurs, inspect the HLA. (1) Run the engine for 10 minutes at 2,000 to 3,000 rpm. (2) Let the engine idle and check for noise for 30 seconds	Not applicable
	Electric variable timing actuator	The valve timing varies according to the driving conditions to improve engine output, fuel economy, and emission performance. (High load range: advance (increases charging efficiency), Low load range: retard (reduces pumping loss), knocking/pre-ignition: retard (decreases temperature inside cylinder). Electric Variable valve timing has been adopted to change the valve timing even when the engine is stopped so that the needs of both cold engine starts, which require a lot of air, and warm engine starts which require decreased temperature inside the cylinder to prevent pre-ignition are met.	Before installation, rotate the joint part at the end of the electric variable valve timing motor so that it is aligned to the joint groove on the electric variable valve timing actuator side. The electric variable valve timing motor/driver can be assembled with the joint groove of the eccentric shaft at any position. (It does not cause vehicle damage or performance degradation.) To examine, drive the vehicle (acceleration, deceleration, and at normal speed) and verify that the data monitor item VT_IN_ACT value changes in conjunction with the VT_IN_DES value. Rotate the joint part of the electric variable valve timing motor to the left and right using the tips of your fingers and verify that it rotates smoothly in 15 degree increments.	After the engine is stopped, the valve timing is changed in preparation for the next engine start causing a gear engaging sound when the Variable valve timing (gear lowering device) operates. However, it does not indicate a malfunction.	Regarding the Variable valve timing operation after the engine is stopped, the valve timing is monitored while the PCM is activated, and if the valve timing deviates from the target value while the engine is stopped, it is returned to the target value. The phase of the Variable valve timing is kept at the intermediate position while the engine is stopped by balancing the cam torque and motor torque, different from a hydraulic Variable valve timing which uses a lock pin to secure the phase. Therefore, if torque is input to the Variable valve timing while the engine is stopped, the torque balance is lost and the phase is deviated.
	Engine oil solenoid valve	To decrease oil pump drive resistance, the engine oil solenoid valve prevents the oil pressure from increasing to the set pressure or more.	To examine, verify that the oil pressure gauge value changes under the following conditions, and if the value does not change perform part inspection on the engine oil solenoid valve. -Engine warming condition (engine coolant temperature less than 98 °C) -Engine speed 4,000 rpm or more -PID item OIL_P_SOL turned from ON to OFF The engine oil solenoid valve has a built in oil pressure switch.	Not applicable	The oil pump adjusts the oil pressure in two steps (low oil pressure setting, high oil pressure setting) by operating the engine oil solenoid valve to switch the oil passage.
	Fuel injectors	To assure durability under high compression and temperature of the SKYACTIV-G, a teflon seal has been adopted. To prevent engine knocking, multi-hole injectors have been adopted which evenly spray fuel into the cylinder to lower the gas temperature inside the cylinder, realizing rapid combustion.	An SST is required to assemble the teflon seal.	Not applicable	Not applicable
	Balancer unit	The balancer unit eliminates the secondary inertia force occurring in the in-line, 4-cylinder engine which largely suppresses booming noise (low frequency noise causing the feeling of compression in the ears) due to engine vibration, achieving a high-level of quietness.	Not applicable	Not applicable	Not applicable
	Engine oil temperature control (DTC P117A:00)	To prevent the engine oil temperature from increasing at continuous high engine speeds, the throttle valve opening angle is decreased to control the engine speed temporarily.	If an engine speed of 6,100 rpm [1.5L/2.0 L], 5,800 rpm [2.5 L] continues for 6 minutes with the gear in 5th gear or lower, the engine speed is restricted for 120 seconds. At the same time, a DTC is stored. Warning light is not illuminated. Operation of this function does not indicate a malfunction. A protection control has operated to keep the engine in good condition. The engine speed control lowers the vehicle speed slightly, and the vehicle speed can be maintained by shifting up and selecting a suitable gear position.	This control temporarily restricts the engine speed at 6,000 rpm [1.5L/2.0 L], 5,700 rpm [2.5 L]. If there is a claim from a user concerning drive performance deterioration, and if the use condition indicated on the left is determined by asking the user, clear the DTC and give the user appropriate advice in driving operations (such as selection of gears, and how to use the manual mode).	After the engine speed restriction is completed a DTC is recorded in the PCM as a past record, and it is automatically cleared after 40 normal drive cycles have been completed.
	High engine coolant temperature torque control (DTC P111A:00)	To prevent the engine coolant temperature from rising due to a problem such as overloaded towing, severe high-load driving, or the engine coolant opening being blocked, the engine coolant warning light flashes and output control is applied simultaneously to lower heat generation.	If the engine coolant temperature exceeds 122 °C, the throttle valve opening is decreased and engine output is restricted according to the engine coolant temperature. At the same time, a DTC is stored. Engine coolant temperature warning light (red) flashes/is illuminated. Engine output restriction is canceled if the engine coolant temperature decreases below 117 °C.	If there is a claim from a user concerning drive performance deterioration because of the temporary output restriction, explain the contents of the repair order form and give the user appropriate advice.	After the engine speed restriction is completed a DTC is recorded in the PCM as a past record, and it is automatically cleared after 40 normal drive cycles have been completed.
	Oil pressure switch	For the purpose of protecting the engine, a higher set oil pressure for the oil pressure switch warning light than the previous has been established so that a deficient oil pressure condition can be accurately detected.	If the oil pressure is deficient, or there is a switch malfunction or open circuit, a DTC is stored. The oil pressure warning light is illuminated for any of these conditions.	Not applicable	Not applicable
	Drive belt	To reduce mechanical resistance, tension is applied to the crank pulley in two directions, from the A/C compressor side and W/P side.	Use a rag when removing the belt. When assembling, rotate the crankshaft pulley clockwise while pressing the belt up from the smaller circumference pulley into the groove of the larger circumference pulley.	Not applicable	Not applicable

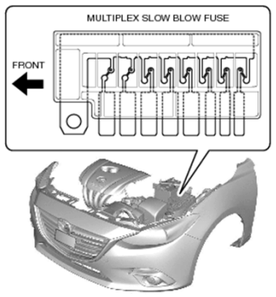
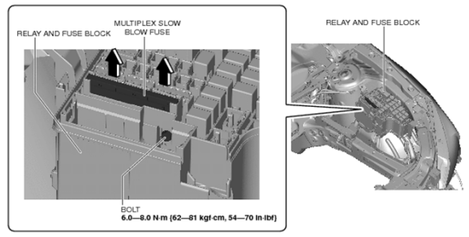
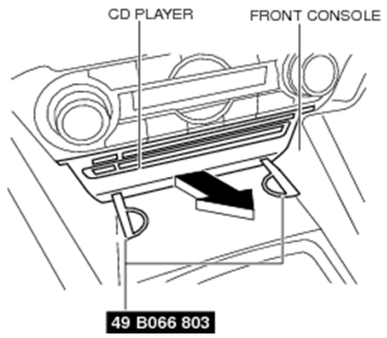
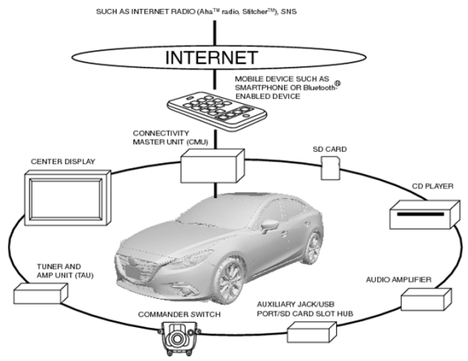
Section	Title	Purpose of Adoption	Service Point	Common Inquiry	Other
Engine SKYACTIV-G	Current sensor	A current sensor has been adopted which determines the battery condition to charge the battery to the required minimum level (no excess/deficiency).	When installing the current sensor, connect the negative battery cable first, then install the current sensor connector. If the current sensor connector is installed first, the PCM may mistakenly recognize a signal from the current sensor, causing interference with engine control. If a DTC related to the current sensor is stored, the engine is stopped by i-stop control and a part of the generator output is inhibited as the fail-safe. If a DTC is stored due to the user disconnecting/connecting the negative battery cable, clear the DTC and verify that the engine-stop by i-stop control and a part of the generator output control are restored. If a malfunction has occurred, repair the malfunction and clear the DTC, then verify that the fail-safe is finished.	If the user disconnects/connects the negative battery cable, the i-stop may be disabled temporarily. If the user claims that the i-stop does not operate, verify if the user disconnected/connected the negative battery cable, perform the battery condition initial setting, then tell the user that the i-stop does not operate for a while after disconnecting/connecting the negative battery cable, or ask the user to bring the vehicle to the dealer.	Previously, after the engine was started, power generation/discharge by the generator was performed until the battery was fully charged.
	Engine coolant fan control (After-cooling control)	After-cooling has been adopted due to the possibility that the engine may not restart as a result of a fuel supply malfunction caused by high temperature.	If the ignition is switched off directly after continuous high engine-load travel, the PCM operates (demand airflow volume: Low) the cooling fan for a maximum of 9 minutes when all of the following conditions are met due to the possibility that the engine may not restart as a result of a fuel supply malfunction caused by the high temperature. -Engine coolant temperature: 90 °C or more -Accumulated amount of engine heat is extremely high -Driving record for vehicle speed of 25 km/h {15.54 mph} or more available	Not applicable	From SKYACTIV, the operation frequency of the cooling fan has been reduced more than previously because the temperature estimation control for each part necessary to after-cooling has been reinforced to keep the cooling fan operation frequency to the minimum.
	Brake override system (Drive-by-wire control)	Gives priority to the brake operation if a malfunction occurs with the accelerator pedal such as if the accelerator pedal is depressed and does not return. The throttle valve is closed if the brake pedal is depressed while the accelerator pedal is in a depressed condition until the vehicle is safely decelerated and comes to a complete stop.	If either one of the following conditions is met with the brake pedal depressed for the specified period *1 or more while the accelerator pedal is depressed, the PCM adjusts the throttle valve opening angle so that the engine speed is the specified value *2. <While driving vehicle> -Accelerator pedal opening angle: 5% or more from full-close -Vehicle speed: 10 km/h {6.2 mph} or more -Engine speed: 875 rpm or more <While vehicle stopped> -Accelerator pedal opening angle: 5% or more from full-close -Shift lever position: neutral (MTX) -Selector lever position: N position (ATX) -Engine speed: 875 rpm or more *1: 0.6 to 10 seconds corresponding to braking force. *2: 1,200 rpm while vehicle is stopped, 1,100 rpm while vehicle is driven. If servicing is implemented in which the brake pedal and accelerator pedal are depressed simultaneously, the brake override system can be stopped according to need. <Cancel conditions>After switching the ignition ON (KOEO), the cancel procedure is implemented when the following conditions are met within 30 seconds. -Shift lever position: neutral (MTX) -Selector lever position: N position (ATX) -Vehicle speed: 0 km/h {0 mph} <Releasing procedure> 1. Depress the brake pedal for 10 s with the accelerator pedal released. 2. Fully depress and fully release the accelerator pedal repeatedly three times with the brake pedal depressed. 3. Release the brake pedal. <System restore condition>By switching the ignition off while the brake override system is canceled, the cancel conditions are reset making the brake override system operable.	If the accelerator pedal and brake pedal are operated simultaneously, acceleration does not occur. If there is a claim from a user concerning drive performance due to the temporary output restriction, explain the contents of the repair order form and give the user appropriate advice.	Not applicable
	Drive belt auto tensioner	To lower the drive belt set tension and reduce sliding resistance, an oil pressure type drive belt auto tensioner has been adopted. The oil pressure damper absorbs the change in tension.	When assembling the drive belt auto tensioner, air needs to be bled from the oil damper. If excessive torque is applied to the hexagon area during belt removal/installation, damage could occur to the tool installation area.	Not applicable	Not applicable
	Kickdown switch (A/T vehicles only)	A kickdown switch has been adopted which fully opens the throttle when the driver fully depresses the accelerator pedal intentionally.	The kickdown switch is a part which generates resistance mechanically rather than by outputting an electric signal (ON/OFF).	There is a load step prior to a full-stroke depression of the accelerator pedal (before kickdown stroke). If there is a claim from a user such as the accelerator pedal catching or some malfunction from this load step, explain the content of the repair order form and give the user appropriate advice.	Not applicable
Engine SKYACTIV-D	Oil filter	An oil filter with an O-ring made from reconfigured material has been adopted to assure high sealing performance even in extremely cold areas.	Shape size and filter performance are the same as the oil filter for the L-series.	Not applicable	Not applicable
	Fuel filter	Not applicable	When the wrench indicator light is illuminated, drain water by loosening the drain plug under the fuel filter.	If the amount of water is the specified value or more, the wrench indicator light flashes.	Not applicable
	HLA (Hydraulic Lash Adjuster)	To reduce sliding resistance, rocker arms with a needle roller bearing have been adopted. The needle roller bearing contacts and rolls thus it has less sliding resistance compared to the conventional cam and rocker arm which contacts and slides. HLA has been adopted to prevent hammering noise and to realize maintenance-free valve clearance, maintaining constant "zero" valve clearance.	When installing the HLA, fill it with oil and lightly press the internal check ball using a round bar (1.0 mm diameter) to bleed air.	If clatter is heard when the engine is started right after replacing the oil, air infiltration in the HLA can be considered. Perform the following air bleeding steps (1) and (2), and if the noise still occurs, inspect the HLA. (1) Run the engine for 10 minutes at 2,000 to 3,000 rpm. (2) Let the engine idle and check for noise for 30 seconds	Not applicable
	IDEVA (intake process EGR system by opening exhaust valve twice)	To enhance ignition stability and emission performance during cold engine starts by increasing air temperature inside the cylinder, an "intake process EGR system by opening exhaust valve twice"has been adopted for exhaust gas improvement which uses internal EGR to return some amount of exhaust gas to the cylinder during the intake process.	Not applicable	Not applicable	Not applicable

Section	Title	Purpose of Adoption	Service Point	Common Inquiry	Other
Engine SKYACTIV-D	Fuel line air bleeding	Not applicable	After removing/installing the fuel line parts, air bleeding is required. If air cannot be bled by cranking, use a manual vacuum pump.	Not applicable	Not applicable
	Fuel check valve and fuel feed valve	To keep the return fuel pressure of the injector within a certain range and precisely control the fuel injection amount and timing, the return fuel pressure is adjusted by the fuel check valve and fuel feed valve (lower case).	The check valve and feed back valve cannot be removed or inspected as a single unit. If replacing, replace the lower case. If there is a malfunction in the check valve or fuel feed valve, an output decrease malfunction may appear due to the possibility of insufficient fuel injection.	Not applicable	Not applicable
	Fuel injection amount learning	To realize stable fuel injection, deviation in the fuel amount due to deterioration over time is corrected.	After replacing the PCM, fuel indicator, airflow sensor, timing chain, or DPF, fuel injection amount learning is required. In addition, fuel injection amount learning is required in scheduled inspection/service. For the fuel injection learning, one method uses the M-MDS and the other method is performed by short circuiting the check connector terminal as indicated below. <Fuel injection amount learning procedure> 1. Switch the ignition ON. 2. Start the engine and let it warms up. 3. Ground the tester terminal to the body 5 times within 5 seconds. 4. Verify that the glow indicator light is illuminated (When learning is completed, the glow indicator light flashes numerous times）. Depending on whether i-ELOOP is equipped or not, the engine speed behavior varies slightly during fuel amount learning, but this does not indicate a malfunction.	The fuel injection amount learning, which is performed automatically during idling, is performed while i-stop is not operating (congested traffic, i-stop inhibit switch is ON) because, in principle, i-stop takes precedence. However, if the drive distance without learning reaches its limit, the fuel injection amount learning takes precedence, and when the vehicle decelerates to 10 km/h {6.2 mph} or less, the i-stop lamp turns off and learning is performed when the engine idles. If the learning value for very small injection amounts such as pilot, pre-injection is off by a large amount, problems such poor as idling, poor ignition, air suction, surge, knocking, and poor i-stop engine restarting could occur. For this reason, scheduled maintenance (12-month inspection) and implementation of fuel injection amount learning while the vehicle is in the shop is necessary. During idling after driving a certain distance, auto learning is performed, but if the learning conditions are not correct (low ambient/engine coolant temperature) and depending on how the customer drives the vehicle (no idling), automatic learning may not take place at all. For this reason, scheduled maintenance (12-month inspection) and implementation of fuel injection amount learning while the vehicle is in the shop is necessary. The engine sound changes slightly during fuel injection amount learning, but this does not indicate a malfunction.	
	Cylinder head	To realize weight reduction and a compact layout, a cylinder head with integrated exhaust manifold has been adopted which has the exhaust gas passage inside the cylinder head.	Not applicable	Not applicable	Not applicable
	Turbocharger	To provide high torque and response in all engine-speed ranges, a two-stage turbocharger has been adopted in which one small and one large turbocharger are selectively operated according to driving conditions. To restrict the emission of NOx and carbon, a two-stage turbocharger has been adopted which can assure oxygen even under a low-compression ratio and high EGR (exhaust gas recirculation) condition. Because of the low-compression ratio, ignition worsens during cold periods, however, the small-type turbocharger compresses and heats the intake air for improved ignition stability.	As a water pipe No.2 installation note (positioning for installation), pinch the flange nut (M10: Approx. 9 mm) and tighten water pipe No.2 (turbocharger side). Measure the distance between water pipes No.2 and No.3 and verify that they are installed correctly. When assembling the turbocharger sub component to the engine, follow the engaging order at the cylinder head engaging part. Store the turbocharger sub component with the turbine inlet flange facing upward. Store the turbocharger with the turbine wheel spindle horizontal. Do not hold the turbocharger actuator rod. In addition, do not touch the turbocharger actuator rod adjustment nut. Connect the vacuum pipe (pipe hose solenoid valve) correctly (marking color should be matched). Connect the solenoid valve harness correctly.	Not applicable	When installing to the engine, the water pipe could be installed incorrectly. If the water pipe is forcefully assembled, it may be damaged and water leakage may occur. If the turbocharger sub component is not stored in the correct posture, excessive force may be applied to the water pipe, oil pipe, and actuator pipe and they may be deformed or damaged. If the turbocharger is stored with its spindle in the vertical direction, oil inside the center housing may run down the spindle into the turbine compressor housing. The actuator rod may be deformed or damaged, or if the adjustment of the actuator is out of tune, the drive performance may be lowered or the turbocharger may be damaged. If the vacuum pipe is connected incorrectly or it is not connected, the drive performance may be lowered or the turbocharger may be damaged. Be very careful because the same two solenoid valves are positioned closely. If connected incorrectly, the drive performance may be lowered or the turbocharger may be damaged.
	Engine oil pressure sensor	To prevent an engine malfunction due to abnormal high and low switching of the oil pump, a malfunction detection in the oil pump high and low switching based on the engine oil pressure sensor information has been added.	Not applicable	Not applicable	Not applicable
	Engine oil temperature sensor	If the combustion chamber reaches a high temperature from continuous use at high load with the engine speed at 2,000 rpm or less, the engine output is restricted to prevent engine damage due to poor lubrication if the engine oil reaches the standard temperature or more while at 2,000 rpm or less, and the driver is urged to shift down, engine speed is raised, and engine oil lubrication is promoted.	The engine oil temperature sensor is integrated with the engine oil pressure sensor.	If there is a claim from a user concerning drive performance deterioration because of the temporary output restriction, explain the contents of the repair order form and give the user appropriate advice.	Not applicable
	Engine oil dilution determination (DTC P246C:00)	If the engine oil dilution amount (amount estimated by calculating the amount of fuel adhered to cylinder wall mixed into engine oil) exceeds the specified value, the engine oil warning light is illuminated and the user is notified that engine oil replacement is required.	Two methods are available for the engine oil dilution data reset. One is to use the M-MDS, and the other is to short the test terminal as follows. [Engine oil dilution data reset procedure] 1. Switch the ignition ON (engine off). 2. Ground the test terminal. 3. Perform engine racing 5 times within 5 seconds by fully closing/opening the accelerator pedal. 4. Verify that the glow indicator light flashes 5 times.	If the oil dilution amount increases and the calculated estimation value exceeds the specified value, the oil replacement period is determined and the engine oil warning light is illuminated. After the engine oil is replaced, it is necessary to perform the dilution data reset regardless of whether or not the engine oil warning light was illuminated. If it is not reset, it could result in a mis-estimation of the oil dilution.	

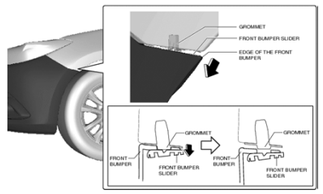
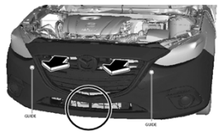
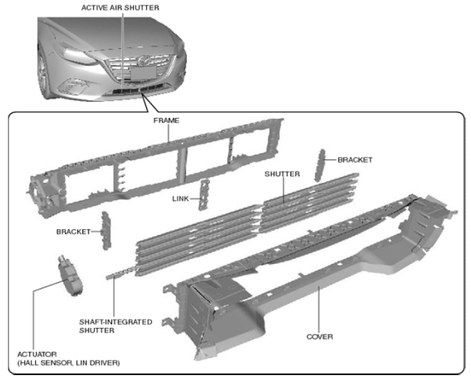
Section	Title	Purpose of Adoption	Service Point	Common Inquiry	Other
Engine SKYACTIV-D	EGR (Exhaust gas recirculation)	To prevent rapid increases/decreases in intake air temperature by the exhaust gas temperature affecting the combustion temperature, opening/closing of the EGR valve and EGR cooler bypass valve is controlled.	After replacing the EGR valve, initialization is required. Perform initialization using the M-MDS.	Not applicable	Not applicable
	DPF	To remove particle matter (PM) in the exhaust gas, the DPF collects and burns PM.	When the DPF indicator light is on, compulsory DPF regeneration is required. Additionally, after exchanging the DPF, DPF data reset and fuel injection learning is required. For the compulsory DPF regeneration and data reset, there is a method using the M-MDS and another method performed by short circuiting the check connector terminal. (Compulsory DPF regeneration procedure) Switch the ignition ON. 2. Start the engine and warm it up. 3. Ground the test terminal. 4. Within 5 seconds, race the engine by fully depressing/releasing the accelerator pedal two times. 5. Verify that the engine speed increases. (When the regeneration is completed, the engine speed decreases.) 6. Disconnect the grounded test terminal. 7. Switch the ignition OFF.	If the DPF indicator light is illuminated, advice the user on driving in accordance with the instructions in the owner's manual.	
	Exhaust gas temperature sensor	Exhaust gas temperature sensors have been adopted which monitor the exhaust gas temperature before the oxidation catalytic converter and before the DPF.	When installing the exhaust gas temperature sensor, the sensor must be installed to the specified angle.	Not applicable	Not applicable
	Blow-by heater	To separate engine oil in the blow-by gas passage and blow-by gas, a cylinder head cover with a built-in baffle plate has been adopted. The blow-by heater is operated at an extremely low temperature (ambient temperature 0 °C or less) to prevent freezing of the moisture in the blow-by gas in the blow-by gas passage and blocking of the passage.	When replacing the blow-by heater, be careful as the end of the copper pipe may be hot.	Not applicable	Not applicable
	Drive belt auto tensioner	To lower the drive belt set tension and reduce sliding resistance, an oil pressure type drive belt auto tensioner has been adopted. The oil pressure damper absorbs the change in tension.	When assembling the drive belt auto tensioner, air needs to be bled from the oil damper. If excessive torque is applied to the hexagon area during belt removal/installation, damage could occur to the tool installation area.	Not applicable	Not applicable
	Current sensor	A current sensor has been adopted which determines the battery condition to charge the battery to the required minimum level (no excess/deficiency).	When installing the current sensor, connect the negative battery cable first, then install the current sensor connector. If the current sensor connector is installed first, the PCM may mistakenly recognize a signal from the current sensor, causing interference with engine control. If a DTC related to the current sensor is stored, the engine is stopped by i-stop control and a part of the generator output is inhibited as the fail-safe. If a DTC is stored due to the user disconnecting/connecting the negative battery cable, clear the DTC and verify that the engine-stop by i-stop control and a part of the generator output control are restored. If a malfunction has occurred, repair the malfunction and clear the DTC, then verify that the fail-safe is finished.	If the user disconnects/connects the negative battery cable, the i-stop may be disabled temporarily. If the user claims that the i-stop does not operate, verify if the user disconnected/connected the negative battery cable, perform the battery condition initial setting, then tell the user that the i-stop does not operate for a while after disconnecting/connecting the negative battery cable, or ask the user to bring the vehicle to the dealer.	Previously, after the engine was started, the generator performed power generation/discharge until the battery was fully charged.
	Brake override system (fuel injection amount learning)	Gives priority to the brake operation if a malfunction occurs with the accelerator pedal such as if the accelerator pedal is depressed and does not return. The throttle valve is closed if the brake pedal is depressed while the accelerator pedal is in a depressed condition until the vehicle is safely decelerated and comes to a complete stop.	If either one of the following conditions is met with the brake pedal depressed for the specified period *1 or more while the accelerator pedal is depressed, the PCM adjusts the throttle valve opening angle so that the engine speed is the specified value *2. <While driving vehicle> -Accelerator pedal opening angle: 5 % or more from full-close -Vehicle speed: 10 km/h {6.2 mph} or more -Engine speed: 875 rpm or more <While vehicle stopped> - Accelerator pedal opening angle: 5 % or more from full-close -Shift lever position: neutral (MTX) -Selector lever position: N position (ATX) -Engine speed: 875 rpm or more *1: 0.6 to 10 seconds corresponding to braking force. *2: 1,200 rpm while vehicle is stopped, 1,100 rpm while vehicle is driven. If servicing is implemented in which the brake pedal and accelerator pedal are depressed simultaneously, the brake override system can be stopped according to need. <Cancel conditions> After switching the ignition ON (KOEO), the cancel procedure is implemented when the following conditions are met within 30 seconds. -Shift lever position: neutral (MTX) -Selector lever position: N position (ATX) -Vehicle speed: 0 km/h {0 mph} Releasing procedure 1. Depress the brake pedal for 10 s with the accelerator pedal released. 2. Repeatedly depress and release the accelerator pedal fully three times with the brake pedal depressed. 3. Release the brake pedal. <Restored condition>By switching the ignition off while the brake override system is canceled, the cancel conditions are reset making the brake override system operable.	If the accelerator pedal and brake pedal are operated simultaneously, acceleration does not occur. If there is a claim from a user concerning drive performance due to the temporary output restriction, explain the contents of the repair order form and give the user appropriate advice.	Not applicable

Section	Title	Purpose of Adoption	Service Point	Common Inquiry	Other
Engine SKYACTIV-D	Kickdown switch (A/T vehicles only)	A kickdown switch has been adopted which fully opens the throttle when the driver fully depresses the accelerator pedal intentionally.	The kickdown switch is a part which generates resistance mechanically rather than by outputting an electric signal (ON/OFF).	There is a load step prior to a full-stroke depression of the accelerator pedal (before kickdown stroke). If there is a claim from a user such as the accelerator pedal catching or some malfunction from this load step, explain the content of the repair order form and give the user appropriate advice.	Not applicable
Suspension	TPMS	A tire pressure monitoring system (TPMS) has been adopted which warns the driver if tire pressure is too low.	The tire pressure monitoring system (TPMS) monitors the tire pressure of the four tires , and warns the driver if the pressure is too low on one tire or more. A tire pressure monitoring system (TPMS) has been adopted which indirectly detects the tire pressures and warns the driver. A switch for initializing the tire pressure monitoring system (TPMS) after the tire pressures have been adjusted is installed to the dashboard. Alert due to low pressure detection (not system malfunction) illuminates the warning light. TPMS system problem (system malfunction) flashes the warning light.	If tire rotation or air pressure adjustment is performed, the system will function normally by pressing the TPMS initialization switch. If the initialization is not performed the warning light is illuminated earlier or later than normal. If the system is not initialized with the specified tire pressure, the warning light may not be illuminated when the pressure is low, or it may be illuminated even when the tire pressure is normal. The TPMS functions even with non-specified tires installed. However, depending on the tire characteristics, the alert may be illuminated earlier or later. If the tire pressures are set for light loads with the warning light left illuminated from when the tire pressure was initialized under a loaded condition, the warning light may be re-illuminated. In the initialization, the warning light flashes 2 times, and the initialization switch needs to be long-pressed until the beep sounds once (answer-back).	If the tire pressures are not periodically adjusted, the tire pressures will decrease even if there is no tire malfunction. (Air particles will permeate the tire rubber and escape, or tire pressure will decrease due to a decrease in ambient temperature) The tire pressure monitoring system (TPMS) has a mis-use prevention logic which illuminates the tire pressure monitoring warning light if the tire pressure monitoring system is initialized without adjusting the tire pressures even though the tire pressure monitoring warning light was illuminated. The tire pressure when the tire pressure monitoring warning light was illuminated is compared with the pressure when the tire pressure monitoring system was initialized, and if the difference in pressure is within the specification, the tire pressure monitoring warning light is illuminated. This mis-use prevention logic operates two times. The tire pressure monitoring system (TPMS) illuminates the tire pressure monitoring warning light to notify the driver that the tire pressure is lower than the specified value set by the initialization.
	Repair Agent Removal	A emergency puncture repair kit has been equipped in place of the temporary spare tire. This kit enables temporary repair of a puncture without tire removal.	Different from the previous puncture repair kit, the solvent amount has been reduced because solvent and air are injected simultaneously. The tire replacement procedure is different when removing the tire from the wheel because the solvent does not spill even if it is not first withdrawn from the air valve. (Repair agent removal on workshop manual)	* It is necessary to explain to the user that the vehicle is equipped with an emergency puncture repair kit (vehicles with no jack). At that time, verify with the customer that a jack and handle purchase is not required, however for those desiring to purchase them, explain where they are stored in the trunk. * :For European spec.	Not applicable
Driveline /Axle	Driveshaft	To decrease vibration and abnormal noise while driving, the front drive shaft on the right side and the joint shaft are integrated.	Insert the drive shaft into the transaxle until the drive shaft bearing contacts the bracket stopper.	Not applicable	Not applicable
	Wheel hub, steering knuckle	The front axle hub is integrated with the bearing and they are connected by the steering knuckle and bolts.	The wheel hub installation bolts are tightened to specified torque and angle but they are not plastic tightening bolts. Therefore, inspection of the bolt length is not required.	Not applicable	Not applicable
Brakes	Secondary Collision Reduction System	SCR brakes have been adopted which reduce so-called secondary collision damage such as that occurring when a vehicle is hit by another vehicle while stationary, sending it into motion under the force of the collision causing the vehicle to hit surrounding vehicles or buildings. SCR hazard lights have been adopted which are flashed automatically to warn surrounding drivers if the vehicle is hit by another vehicle. The secondary collision reduction system is adopted on SBS equipped vehicles or destination models equipped with SCBS.	If the vehicle is hit several times such as in a multiple impact accident, the SCR (Secondary Collision Reduction) implements control if the conditions are met. The SCR does not operate if the system does not detect an impact strong enough to deploy the air bags. If the front BCM receives an air bag deployment signal from the air bag controller, the hazard warning lights are flashed.	The purpose of the secondary collision reduction system is to assist the driver. Even if the conditions for operating the system are met, or the system is operating, if the driver operates the steering wheel, accelerator pedal or brake pedal, the system operation is canceled and the driver operations take precedence.	The secondary collision reduction system operates automatically when certain conditions are met, however, the system cannot assure avoidance of a collision before it happens. There are limitations to the speed reduction by the brake control (SCR brakes). On vehicles with curtain air bags, the SCR system operates due to a side collision. If a collision occurs in the low-speed range or the impact from the collision is small, they do not deploy.
	Hill Launch Assist (HLA)	HLA has been adopted to facilitate driver operation when starting on up-slopes.	If a malfunction occurs in the DSC system, the HLA may be inhibited.	The HLA only functions to hold the brakes for approx. 2 seconds when the driver switches from depressing the brake pedal to depressing the accelerator pedal. When the HLA operates, a slight valve operation sound (squeal sound) coming from near the brake pedal may be heard. The sound can be easily heard particularly when releasing the brake pedal.	Not applicable
Transmission /Transaxle	AUTOMATIC TRANSAXLE SHIFT MECHANISM	Not applicable	Removal of the lock release cover is required to remove/install the lever knob. Release the cover by pushing down the knob (position shown in the figure) on the upper part of the cover using a precision flathead screwdriver.  	Because the structure of the conventional lever knob required rotating the knob to remove it, if the user tries to replace the current lever knob with a non-genuine knob they may not know how to do it.	Not applicable
	AT shift lock	An AT shift lock has been adopted to prevent an accident by driver mis-operation.	The shift lock can be cancelled only when the ignition is switched ON and the brake pedal is depressed. It cannot be canceled by the ACC.	If a system malfunction occurs and the shift lock cannot be cancelled by normal operation, the shift lock can be cancelled manually.	Not applicable
	ATF [FW6A-EL]	Special ATF [ATF FZ] has been adopted with low viscosity which contributes to improved fuel economy.	A blue-colored fluid has been adopted to prevent mistakenly adding the previous type of ATF. The ATF is maintenance free.	Not applicable	Not applicable
	ATF level inspection [FW6A-EL]	Not applicable	Because the ATF is maintenance free, the ATF inspection during the periodic inspection is an inspection for ATF leakage from the transmission.	Not applicable	Not applicable
	AT oil temperature control [FW6A-EL]	To reduce load on the transaxle, an ATF temperature control during manual shift control has been added.	If the ATF temperature is 132 °C or more during manual shift control, manual shift control is forcibly switched to automatic shift control (D position pattern), and the gear position indicator light is turned off. In addition, if a certain period of time has elapsed with the ATF temperature at 122 °C or less, manual shift control is restored and the gear indicator light is turned on at the same time.	If the temperature reaches 132 °C and the shift lever is fixed in the M position, it transitions to the D pattern (warning light is not illuminated in this case) ・If the temperature reaches 135 °C or more, compulsory torque control is performed (in this case, MIL and AT malfunction lamp are illuminated). If there is a claim from a user concerning drive performance due to the temporary output restriction, explain the contents of the repair order form and give the user appropriate advice.	Not applicable

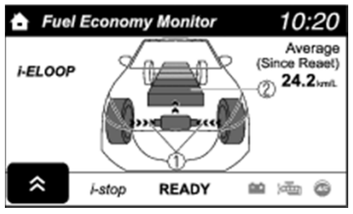
Section	Title	Purpose of Adoption	Service Point	Common Inquiry	Other
Transmission /Transaxle	Engine torque control during AT throttle (SKYACTIV-D only)	If a stall condition in the D or M position is determined, the engine output is restricted to protect the transaxle.	During a stall speed test, the engine speed decreases gradually after increasing once (only SKYACTIV-D), however this does not indicate a malfunction. Perform the stall speed measurement within 5 seconds as damage to the transaxle may occur.	Not applicable	Not applicable
	Shift point control [FW6A-EL]	For effective use of engine braking, engine speed is increased during manual down shifting with the accelerator fully open, during strong braking while in D position, and while braking on down slopes, without having to depress the accelerator. To improve responsiveness during re-acceleration, if the accelerator is suddenly released such as when merging onto highways or when cornering, up-shifting is put on standby for several seconds. If a lack of drive force relative to the drive resistance on an up-slope is calculated, shift-up is suppressed even if the accelerator pedal is released, to assure vehicle speed performance and to prevent frequent shifting. If a lack of engine braking force relative to the increase in vehicle speed on a down- slope is calculated, down-shifting is implemented in conjunction with the brake pedal operation to assure engine braking force and reduce the frequency in which the brake pedal is operated. If cornering in which comparatively high lateral G-force occurs is determined, up-shifting is temporarily inhibited to improve responsiveness during re-acceleration when exiting a corner. When decelerating using strong brake force upon entering a corner, down-shifting is performed to improve responsiveness during re-acceleration when exiting the corner. To improve fuel economy, the transmission is put into pseudo-N position while the vehicle is stopped and in D position. However, on a grade exceeding +/- 5%, the control is not operated.	Not applicable	If there is a claim from a user concerning engine idling for increasing the engine speed without having to depress the accelerator, such as during manual down-shifting with the accelerator fully open, during strong braking while in D position, and while braking on down- slopes, explain the content of the repair order form and give the user appropriate advice.	Not applicable
	TCM [FW6A-EL]	Not applicable	The TCM cannot be replaced as a single unit because it is integrated with the control valve body. Replace the control valve body and component.	Not applicable	Not applicable
	DMF (SKYACTIV-D,D66M-R only)	In addition to the flywheel function, the DMF suppresses fluctuation in engine speed, stabilizes the transmission rotation, and reduces vibration and noise related to the added drive type.	If the installation bolt hole positions for the DMF are not appropriate (deviated), use the SSTs (49 S120 710 and 49 E011 1A0) to repair the hole positions and implement the bolt removal. After removing the bolts, insert the bolts into the holes to fix the SST (49 G033 102) against rotation, appropriately fix the hole positions, and remove the remaining bolts.	Not applicable	Not applicable
	Clutch disc (SKYACTIV-D, D66M-R only)	Not applicable	Because a pilot bearing is equipped to the crankshaft, the centering work during the clutch disc removal/installation requires attaching the new SST (49 SE01 311) to the existing SST (49 SE01 310A). Because a clutch disc with a wear compensatory function has been adopted, when removing/installing the clutch cover or clutch disc, newly replace the clutch cover.	Not applicable	Not applicable
Steering	Absolute steering angle learning function (estimated absolute steering angle)	For system simplification, the steering angle sensor has been eliminated and the absolute steering angle function has been adopted. The steering angle sensor is set on vehicles with AFS（ADAPTIVE FRONT LIGHTING SYSTEM), SCBS（SMART CITY BRAKE SUPPORT）, and PAM.	The EPS control module performs the absolute steering angle learning every drive cycle. No special operation or service is required because the absolute steering angle learning is performed automatically while driving. The system may learn the wrong absolute steering angle temporarily even if the system is normal. In this case, switch the ignition off and leave the vehicle in this condition for approx. 5 minutes, and the absolute steering angle will be re-learned on the next drive cycle. The absolute steering angle may be difficult to learn if the road surface is in poor condition (gravel road, bumps and potholes), even if the system is operating normally. Snow covered roads and brick-laid roads are possible.	If a user makes a claim that the steering force required for left and right turns is different, the absolute steering angle may not have been learned correctly. Stop the engine, and the absolute steering angle we be re-learned on the next drive cycle.	Not applicable
Heater and A/C /Ventilation	Blower fan controller	To improve the actual-use fuel economy, the actual-use range of the blower power consumption for the blower fan is reduced.	The inspection method differs because the blower speed adjustment (airflow amount) has been changed from the previous resistance type to the switching type. (Refer to the workshop manual)	Not applicable	Not applicable
SRS air bags and seat belts	Air bags	Servicing improvement	The driver's air bag module is fixed by three hook pins on the module side and 3 snap springs on the steering wheel side. The driver's air bag module can be installed easily because a tool is not required. When removing the driver's air bag module, first disconnect the negative battery cable, and then with the steering shaft tilted down, pull it out and place it on the passenger side. Insert the rod-like parts into the core cover holes on the surface of the spoke side, and press the snap springs to remove the pins. With the pins removed, remove the horn and inflator wiring harnesses because the wiring harnesses are still connected.	Not applicable	Not applicable

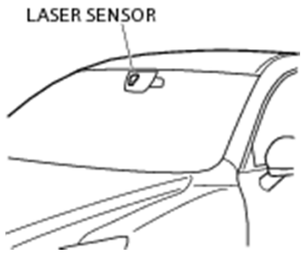
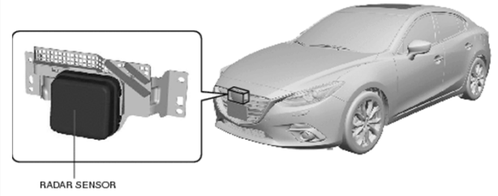
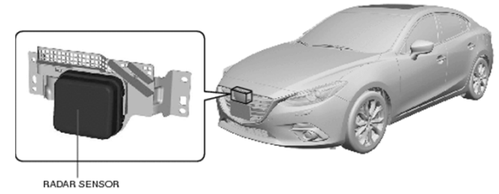
Section	Title	Purpose of Adoption	Service Point	Common Inquiry	Other
Body and Electrical	Multiplex slow blow fuse	A fuse cluster has been adopted due to the size reduction of the main fuse box. 	When replacing the multiplex slow blow fuse, it is necessary to pull out the FBCM and remove the fuse tightening bolt. The applicable fuses are established as genuine parts. 	Not applicable	The multiplex slow blow fuse connections are as follows: - FUSE1 50A CABIN+B - FUSE2 50A ABS/DSC M - FUSE3 40A ENG.MAIN - FUSE4 40A HEATER - FUSE5 40A DEFOG - FUSE6 30A INJECTOR - FUSE7 30A ADD FAN GE - FUSE8 30A FAN GE
	Entertainment system (with center display)	A center display, commander, and voice recognition have been adopted in which communication tools such as Internet radio, Email, SMS (Short Message Service), and SNS (Social Networking Service) added to the conventional audio can be used safely and comfortably by the user even while driving. A center display, commander, and voice recognition have been adopted in which communication tools such as Internet radio, Email, SMS (Short Message Service), and SNS (Social Networking Service) added to the conventional audio can be used safely and comfortably	Malfunction diagnosis using DTCs is possible using the diagnostic assist function and M-MDS equipped to the CMU (Connectivity Master Unit) The SD card slot can only be used with the navigation system on vehicles equipped with the center display. The SD card slot cannot be used on vehicles without the center display. An SST is required to remove/install the CD player. Press the SST into the service hole as shown in the figure until a click is felt. Then, the CD player can pulled out. 	The radio wave reception level indication and remaining battery charge indication on mobile devices such as user smartphones and tablets may differ from that indicated on the center display (CMU). This is because before the mobile device processes the display information for the received radio waves and the remaining battery charge, it is sent to the CMU and the received information is also processed by the CMU internally. If the following special warnings are detected, the warning guidance pop-up screen is displayed regardless of the commander or screen operation. Charging system malfunction During i-ELOOP pre-charge Overheat If the phone and data transmission do not seem normal, verify if transmission is possible on the mobile phone itself and its placement. Issues may occur such as inability to connect or connection cut-off due to compatibility issues with the user's device and smartphone software update status conducted by the user.	The system outline is as follows:  The phonebook, incoming call record, and e-mail information in the user's mobile phone can be obtained and the information displayed and used by a vehicle-equipped device. This information can only be displayed while the phone is connected and it is not displayed when the phone is disconnected. However, because the user's private information is stored in the CMU, it is recommended that the information be cleared using the factory reset function if the vehicle is resold or scrapped. Concerning handling of stored information using the Favorites function, the following information can be stored on a vehicle-equipped device (specifically, the CMU). Audio related: Preset programming Contact list: Contacts to which phone calls are frequently made. NAVI position programming, Home programming If the user's device had been previously connected to Bluetooth (paired) and is within a 10 m {32.8 ft} radius of the vehicle, the user's mobile phone may be connected when the engine is started.
	Power seat system	Memory operation conditions have been reviewed in consideration of safety.	Not applicable	If any one of the following conditions (1) or (2) is met, automatic seat positioning of the recorded seat position is possible with one touch (MT vehicles). (1) Ignition is switched off (2) Ignition is switched ON, vehicle speed is less than 3 km/h {2 mph}, and parking brake is applied If any one of the following conditions (1) or (2) is met, automatic seat positioning of the recorded seat position is possible with one touch (AT vehicles) (1) Ignition is switched off (2) Ignition is switched ON, vehicle speed is less than 3 km/h {2 mph}, and shift lever is in P position	Not applicable

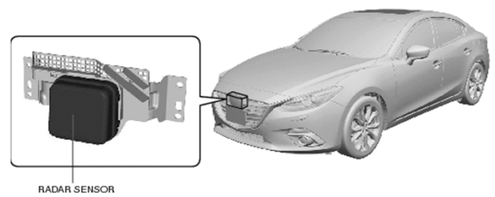
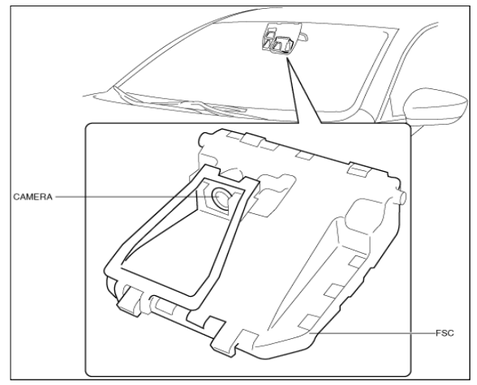
Section	Title	Purpose of Adoption	Service Point	Common Inquiry	Other
Body and Electrical	Master warning light	If only the display in the instrument cluster indicates "Malfunction", the master warning light is illuminated.	Not applicable	System malfunctions and abnormalities are indicated via the master warning lamp, however depending on the display specification in the instrument cluster, the measures to be taken by the user when the lamp illuminates differ. Instrument cluster with segment display: Vehicle needs to be taken to dealership because a certain system malfunction is occurring. Instrument cluster with multi-display: Driver needs to verify details indicated on the display because a certain system malfunction or abnormal condition is occurring. Measures are taken in accordance with the display indication and instructions in the owner's manual. Vehicles with center display: Because a certain system malfunction or abnormal condition is occurring, the driver needs to verify details by selecting Application --> Warning Guidance from the home screen of the center display. Measures are taken in accordance with the display indication and instructions in the owner's manual.	When the master warning light is illuminated, the vehicle needs to be inspected at a dealership as a malfunction has occurred.
	Oil maintenance monitor	Estimates the level of oil deterioration based on the driving conditions and environment in which the vehicle is driven and informs the driver of the appropriate oil replacement period.	The initial setting of the oil maintenance monitor is OFF at the time of shipment. Turn the system on using the diagnostic tester. After oil replacement, a system reset procedure needs to be performed. For diesel engine vehicles, if the Flexible function of the oil maintenance monitor is off, the oil dilution determination system data needs to be reset. If the PCM determines that the oil has deteriorated, or it has reached the set maximum distance traveled, it illuminates the oil replacement lamp. The maximum period which can be set is 12 months, and the distance is 20,000 km. The lamp does not illuminate at 10,000 km or less from the previous reset. For vehicles with the center display, the oil life is indicated as a percentage in the center display. The condition of newly replaced oil (at reset) is defined as 100%, and the value decreases according to the driving conditions and environment in which the vehicle is driven. The display indicates increments of 10%. Oil Change Due is displayed when the remaining travel distance to the oil replacement period is 500 miles or 15 days prior to it.	Depending on the driving conditions and environment in which the vehicle is driven, the lamp may illuminate at a shorter distance than the fixed maintenance interval under normal conditions. Example: Gasoline engine: Frequent amount of short-distance travel Diesel engines: High frequency driving under conditions of high soot occurrence (frequent accelerator on/off), and high frequency of driving under highly diluted fuel conditions (high frequency of short-distance driving) No reset after previous oil replacement (Oil is replaced when oil replacement lamp was not illuminated, and the possibility that reset was not performed)	Not applicable
	Battery discharge suppression function	To suppress battery power discharge, the electrical load operation is restricted and battery discharge is suppressed.	When the room fuse is removed, the Battery discharge suppression function when all of the following conditions are met. 1) Accumulated traveled distance is less than 20 km 2) Number of times ignition switched from ON to off is less than 60 times 2) Traveled distance during one ignition ON period is less than 8 km	Not applicable	Battery discharge suppression function conditions 1) When ignition is switched off, room lamp/door courtesy lamp/cargo room lamp turn off in 5 minutes 2) While ignition is switched to ACC (IG off), all off after 25 minutes have elapsed. However, for AT vehicles, only when in P position. 3) When ignition is switched ON (engine off) all off after 25 minutes have elapsed. However, for AT vehicles, only when in P position. 4) When ignition is switched ON (engine off), running lights turn off in 5 minutes.
	SSU steering lock	Theft prevention	Because the SSU cannot be removed from the steering shaft with the steering lock applied, it is necessary to disengage the steering lock (steering wheel can be turned) before replacing the SSU. If the bottom and side covers of the start-stop unit (SSU) are removed, the internal area could be damaged and installation/removal of the start-stop unit will not be possible because the steering lock cannot be disengaged. If this occurs, the SSU will require replacement.	Not applicable	The bottom and side covers of the start-stop unit (SSU) employ special screws which do not allow them to be removed easily.
	Push button start	Push button start has been adopted on all vehicles to realize comfortable engine starting/operability.	Because the number of keyless antennas differs between vehicles with the keyless entry system and those with the advanced keyless entry system, it may not be possible to start the engine with the key in locations where it was once possible previously. *However, this is only a difference in the possible locations from which the engine can be started, and there is no change from the previous vehicles in terms of assured engine starting locations. If the drive wheels are rotated on a 2-wheel speed tester without rotating the driven wheels, a vehicle speed malfunction DTC is stored and the ignition cannot be switched off even if the push button start is pressed. To turn the ignition off, long-press the button or press it repeatedly.	There may be claims that the engine cannot be started with the key placed in areas where it was possible to start the engine previously. The assured operation area is unchanged from the previous vehicles. The reason why the operation area in which previous vehicles could be started was wider is because of the necessity to prevent the key from being left in the vehicle when using the smart entry function. The assured engine starting operation area (operation not assured on dashboard, in cargo compartment) is the same as that for previous MC advanced keyless vehicles and other manufacturer smart keyless vehicles.	Not applicable
	Engine starting function by depressing clutch pedal (push button start system), MT vehicles with i-stop	If the engine stalls due to a driver the operating the clutch incorrectly, the engine can be restarted by only depressing the clutch pedal. (except engine-stop by i-stop.)	Component parts of the push button start system are used to operate the applicable function.	Engine restarting using the clutch pedal, due to determination that the driver intends to restart the engine, is possible only under the following conditions: Within a period of 3 seconds from the engine stopping and the clutch pedal being released, the clutch pedal is depressed completely. The driver's seat belt is fastened The driver's door is closed.	Not applicable
	Remote transmitter	To provide push button start on all vehicles, the key slot was eliminated, and the engine starting method in an emergency implemented by other manufacturers has been adopted (touching the transmitter against the push button start).	There is no key cylinder for engine starting in the vehicle. Engine starting using the auxiliary key is not possible because the transponder for the immobilizer system is not built into the auxiliary key.	If the engine cannot be started for reasons such as a dead transmitter battery, depress the brake pedal, and touch the transmitter (with built-in transponder) against the push button start (with built-in coil antenna) to perform immobilizer system ID verification, then press the push button start to start the engine.	Not applicable
	Parking sensor system	For product improvement	When inspecting the system, caution is required because the operation range and functions are different than the previous parking sensor system. (Refer to the workshop manual)	Not applicable	Not applicable
	Floor-use coating type damping material	Not applicable	This damping material can only be applied on the production line. When repairing, install the damping sheets used with the previous specification.	Not applicable	"Floor silencer" name is described in EPC.

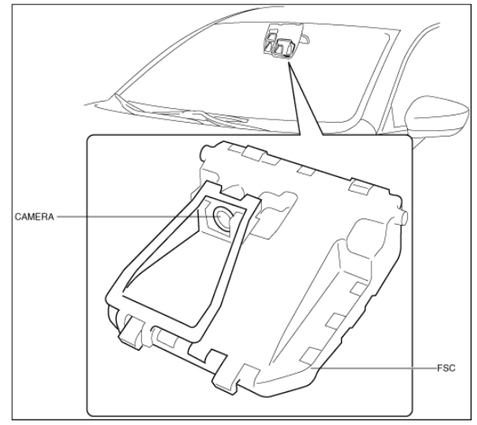
Section	Title	Purpose of Adoption	Service Point	Common Inquiry	Other
Body and Electrical	Front bumper	Not applicable	If the bumper face is pulled to the sides with extreme force, the tightening holes of the bumper face will be damaged, therefore when removing the front bumper, remove the mudguards, and after firmly removing the damping screws of the fender tightening areas on the bumper ends, lower the front bumper retainer while pulling downward, and disengage the hard plastic tabs by pulling the bumper face out at the sides.	Not applicable	Not applicable 
	Front bumper	If the front bumper contacts a pedestrian, the entire grille area absorbs the impact to lessen effects on the pedestrian's body.	The area in the illustration circled in red has low rigidity because the upper structure of the grille is large and the area of the lower part of the bumper is small. Therefore, when removing the bumper, hold the areas on the upper part of the bumper shown by the arrows below so that the grille/bumper does not deform. Care is also required during installation. 	Not applicable	Not applicable
	Active air shutter	The active air shutter (front opening area) opens and closes in accordance with the environment and driving conditions resulting in improved fuel economy. By closing the opening and shutting off airflow, the vehicle air resistance is reduced, improving the fuel economy. If cooling is required, the active air shutter opens to allow airflow.	If the shutter becomes stuck, DTC P05A0 is stored. The conditions are as follows: If the PCM receives a malfunction signal for a continuous 5 seconds from the active air shutter, it determines a temporary malfunction. At the point when the signal is received continuously for 2 drive cycles, a DTC is stored However, when the ambient temperature is 5 °C or more *Even if foreign matter is stuck in the shutter with the shutter stuck in a position close to open, DTC P05A0 is stored. If DTC P05A0 has been stored, first verify if there is foreign matter stuck in the shutter. The frame, actuator, shutter and link of the active air shutter cannot be disassembled, however, the cover can be replaced. 	If the calibration drive has been completed, the shutter may operate depending on the water temperature or change in A/C refrigerant pressure, even if the vehicle is not moving, because the system transfers to the normal control mode. After switching the ignition off and LIN communication is halted, and a maximum of 11 seconds (10 seconds +1.0/-0 seconds) have elapsed, the shutter opens automatically by the actuator fail-safe function.	The following can be considered as reasons for the shutter failing to move. (1)Foreign matter stuck-->Active air shutter detects a malfunction and DTC P05A0 is stored. (2) Freezing-->Grille shutter detects malfunction and sends a signal to the PCM, however, due to the adverse effect on vehicle performance, conditions for storing DTC P05A0 (refer to applicable servicing pointers) are established to prevent a DTC from being stored every drive cycle. (3) Shutter shaft damage-->If the shaft is damaged due to chipping, the shutter does not open and close, however, because the actuator itself operates normally, the grille shutter does not detect a malfunction. As for countermeasures, a fail-safe structure is incorporated on the hard side of the active air shutter. Because the fail-safe structure is designed such that the flaps move in the open direction under their own weight, they will all open automatically at a vehicle speed of 20 to 30 km/h even if the shutter shaft is damaged and sticking/free spin is not detected. (4) Sand/dust trapped in the bearing area-->If the trapped amount overcomes the motor drive torque of the actuator, the shutter will not open/close. Because the actuator itself cannot move, sticking is detected (DTC P05A0 is stored). (5) If (3) and (4) have occurred and a malfunction goes undetected, and the vehicle is driven under high engine load/high engine speed conditions with the shutter remaining closed, the PCM applies engine output control as a vehicle protection function.
	RVM (Rear Vehicle Monitoring)	To aid in verifying the conditions surrounding the vehicle while driving, the driver is alerted to obstructions (vehicles) in the mirror blind spot area to the rear of the vehicle using the indicator in the outer mirrors and the buzzer in the instrument panel.	Personalization of the warning alarm sound volume can be set to high, low or off (Previous: High, low only) To broaden the application scenario of the system, such as in cities and towns, the system is on when the vehicle speed is 30 km/h or more, off when 25 km/h or less (previous: 60 km/h, 55 km/h)--> No warning if the speed drops below 30 km/h. To prevent operation at small-radius curves and at intersections, the system is on at a minimum turn radius R=110 m or more, and off at R= 90 m or less (previous: R=170 m/150 m) *Note: Only the domestic specification differs.To broaden the application scenario of the system, such as in cities and towns, the system is on when the vehicle speed is 15 km/h or more, off when 10 km/h or less --> No warning if the speed drops below 15 km/h. Because the system does not operate at small-radius curves and intersections, the system is on at minimum turn radius R=70 m or more, off at R=50 m or less.	Not applicable	Not applicable

Section	Title	Purpose of Adoption	Service Point	Common Inquiry	Other
Multiplex communication system	CAN (Controller Area Network) system	To contribute to system simplification and wiring harness reduction, a front body control module (FBCM), start-stop unit (SSU), and rear body control module (RBCM) to which parts such as the lights, wipers, switches, and door locks are connected have been installed to each location in the vehicle's front, dashboard, and rear, and the 3 modules are connected by CAN.	If a vehicle with a malfunction in a system controlled by a CAN system related module is brought in, verify the repair order form and the malfunctioning symptom first, then perform CAN malfunction diagnosis to determine if the malfunction cause is in the CAN system or not. For CAN malfunction diagnosis, the voltage at the CAN connection terminal on the DLC-2 is measured, and based on the measured value, the CAN circuit can be examined or the malfunction symptom can be determined. If the malfunction symptom is not an open circuit, inspect the voltage or continuity at the CAN circuit and determine the malfunctioning part. If the occurring malfunction is an open circuit, determine the location of the open circuit using the displayed transmission error DTC and the module in which transmission failed.	Not applicable	Not applicable
i-stop	i-stop warning light	An i-stop indicator light has been adopted: For green illumination, an engine-stop by the i-stop control is permitted with the i-stop (engine stop control) permit conditions met. For amber flashing/illumination, the i-stop control is inhibited.	If the following DTCs related to the i-stop are stored, the i-stop warning light (amber) flashes and the i-stop control inhibits the operation. (for details on the DTCs, refer to the Workshop Manual)-PCM DTC, TCM DTC, DSC HU/CM DTC, EPS control module DTC If the i-stop warning light (amber) remains illuminated while the engine is running, i-stop is inhibited. The following malfunctions may occur: -i-stop OFF signal error -Short to ground in wiring harness -Malfunction in i-stop warning light (amber) illumination circuit -Communication error between instrument cluster and PCM When any of the following conditions is met, the i-stop warning light (amber) is illuminated and the i-stop control inhibits the operation. -Check of i-stop control system -i-stop OFF switch is on -Engine stalls while engine is stopped by i-stop control -Communication error between PCM and instrument cluster -When the i-stop warning light (amber) flashes Because a malfunction in the i-stop component part is detected (i-stop related module detects DTC), if i-stop operation is inhibited, the following malfunctions may occur. -Battery malfunction (deterioration) -PCM -DC-DC converter -Current sensor -Battery malfunction (deterioration) -Generator malfunction -DSC HU/CM -SAS control module -TCM Any of the following i-stop component parts exceeds assured operation amount. -Starter relay -Starter -Number of times i-stop function operates For the illumination of the i-stop indicator light (green), the i-stop (engine stop control) permit conditions (40 items: For details, refer to the new vehicle technical guide) are met while the vehicle is being driven, and an engine-stop by the i-stop control is permitted. If the i-stop indicator light (green) flashes, insufficient brake depression (fluid pressure) is recognized due to a brake fluid pressure sensor malfunction, and the i-stop initiation conditions are not met. For the flashing of the i-stop indicator light (green), the i-stop control inhibits the operation because the brake fluid pressure is less than 1.35 MPa (SKYACTIV-G 1.5, SKYACTIV-G 2.0, SKYACTIV-G 2.5), 1.7 MPa (SKYACTIV-D 2.2) while the vehicle is driven in D or M range (other than 2nd gear fixed mode).	There are 40 permit condition items for stopping the engine by i-stop control. (For details, refer to the new vehicle technical guide)	If the following system controls are not completed, i-stop is inhibited because of fuel consumption loss. -DPF regeneration -Fuel injection amount learning The i-stop lamp does not illuminate and i-stop does not operate under conditions of a lack of battery power, A/C operation, or during engine warming because various conditions such as the vehicle's power consumption balance, comfort in the cabin, and engine/emission warming need to be met to permit i-stop operation. To prevent the vehicle from moving during engine servicing or when the driver is not in the vehicle, the engine does not restart and is stalled if the bonnet is opened or a seat belt is unfastened while i-stop is operating (D/R position). To prevent vehicle theft, the engine stalls if a seat belt is unfastened and a door is opened while in D position and i-stop is operating. The engine is restarted in the N and P positions. To prevent the steering wheel from being operated, if the steering wheel is held in the straight ahead position (force is applied), i-stop does not operate. Because the system is set at a brake depression force level in which the vehicle will not lurch when the engine is restarted, i-stop operates with a light pedal depression while the i-stop indicator light (green) flashes. Even after the engine ends up being restarted by unintended brake operation, i-stop is re-operated in N position without the vehicle being driven so that i-stop can be operated.
	Battery	Not applicable	If the battery charge condition (SOC) is less than 65%, i-stop is prohibited and charges when the SOC is 85% or more (i-stop starts at 65% or more). (1) If the vehicle is delivered to the customer in a low battery SOC condition due to dark current consumption while the vehicle was in transport for a long period of time, the SOC will not restore sufficiently depending on how the customers uses the vehicle, i-stop will not operate after delivery, and the fuel economy may continue to worsen. (2) If the user leaves the vehicle undriven for long periods, the battery SOC will decrease from dark current consumption, and the same conditions may continue. An i-stop dedicated battery has been adopted. If a normal battery is installed in an i-stop-equipped vehicle, the system will determine that the battery is deteriorated which could cause early i-stop inhibition.	Not applicable	If the battery SOC is 55% or less, there may insufficient current supply to start the engine in low ambient temperatures. In particular, the SOC will rapidly decrease while i-stop is operating because electric current is supplied to each electrical device only from the battery. If i-stop continues to operate with a low SOC, the SOC will decrease further and the battery condition cannot be restored to its original condition even by charging (if SOC is less than 30%). If it decreases further, dendrite (lead dissolved in battery fluid) occurs and charging the battery under this condition will cause a dendrite short (battery internal short). The frequency of repeated charging/discharging with i-stop has increased compared to conventional vehicles. To prevent low battery life from battery depletion by this repeated charging/discharging, the electrode plate specification has been optimized resulting in a battery internal resistance that is lower than a normal battery. By contrast, the internal resistance increases as the battery continues to deteriorate. To detect a battery deterioration condition by this internal resistance, the PCM determines battery deterioration and inhibits i-stop if a normal battery with high internal resistance is installed.

Section	Title	Purpose of Adoption	Service Point	Common Inquiry	Other
i-stop	Starter	Not applicable	If the number of times the vehicle has been started reaches 180,000 times, the amber light flashes to advice starter replacement and a DTC is stored.	Not applicable	The starter has been reinforced for i-stop, however, when the number of times that the engine has been started reaches 180,000 times (*1), the internal brushes will have become worn and the starter motor will no longer rotate.
	Current sensor	A current sensor has been adopted which determines the battery condition to charge the battery to the required minimum level (no excess/deficiency).	If the following conditions are met. P058A:00 is stored, engine stopping by i-stop control and a part of the generator power generation control are inhibited. -Malfunction in current sensor -Incorrect battery positive voltage -Battery fluid temperature malfunction If a DTC (P058A:00, U1007:00) related to the current sensor is stored, repair the malfunctioning location according to the applicable DTC. PCM detects a current sensor information transmission error from the FBCM. U1007:00 is stored, engine stopping by i-stop control and a part of the generator power generation control are inhibited. Verify that there is no damage to the current sensor and no corrosion and damage to the connector.	If a DTC is stored due to the customer disconnecting/connecting the negative battery cable themselves, the DTC is cleared and engine stopping by i-stop control and a part of the generator power generation control are inhibited.	Disconnect the current sensor connector before disconnecting the negative battery cable terminal. If the negative battery cable terminal is disconnected first, the current sensor detects a charging system malfunction according to the PCM internal power supply and engine stop by i-stop control may be inhibited.
	Electric AT oil pump	To realize smooth startability after the engine is restarted, an electric AT oil pump has been adopted which generates hydraulic pressure in the oil line of the automatic transaxle when the i-stop (engine-stop control) permit conditions are met and the engine is stopped.	The electric AT oil pump cannot be disassembled. If it is disassembled, replace it. Make sure that there is no silicone sealant or foreign matter in the electrical AT oil pump and transaxle. Otherwise, it could cause a malfunction. Verify the following items related to the electric AT oil pump operation: -Electric AT oil pump and pump relay circuit -Pump and relay connector or terminal condition -TCM connector or terminal condition -MAIN 200 A fuse -AT PUMP 15 A fuse If the TCM detects the following for a continuous 5 s, P181F:00 is stored. -Electric AT oil pump circuit malfunction -Electric AT oil pump relay circuit malfunction If the actual electric AT oil pump rotation speed under the following conditions is 100 rpm or less for a continuous 10 s, P0C2C:00 is stored. -Pump rotation speed command value is 500 rpm or more -Electric AT oil pump relay is on -P181F:00 has not been stored	If there is an electric AT oil pump malfunction, the following symptoms occur as an acceleration malfunction. -Acceleration from i-stop is not smooth. -Shock when accelerating vehicle from i-stop. -Engine vibration increases when engine is restarted. -Vehicle reverses when accelerating from standstill on an up slope.	Not applicable
i-ELOOP	i-ELOOP	For improved fuel economy, electrical power is generated instantly using kinetic energy during deceleration and retrieved as electrical energy, which decreases the amount of fuel used for supplying power (approx. 10%).	The electrical system has differing power supply voltages. In particular, for removal/installation/replacement of 13 V to 25 V system parts (capacitor, DCDC converter, generator), always remove the negative battery cable and capacitor safety plug. After replacing the capacitor and connecting the battery, the system goes into pre-charge mode because charging of the capacitor is required. The display during pre-charge mode is as follows depending on the instrument cluster type and audio system grade. i-ELOOP warning in the instrument cluster illuminates “i-ELOOP charging” is indicated in the multi-display of the instrument cluster “i-ELOOP energy Pre-charging” is indicated in the warning guidance screen pop-up menu of the center display. *However, if there is no equipment because of the instrument cluster type and audio system grade, the above messages are not displayed. If the integrity of the capacitor cannot be determined using the tester or i-ELOOP Store the capacitor in an upright position. However, the capacitor may be tilted for short periods during assembly. If the capacitor is dropped and danage or deformation is visible, replace it with a new one (no damage or deformation visible) The service part is delivered with a short wire installed to prevent static charge. Remove the wire before installing the part to the vehicle. When jump-starting the vehicle due to battery depletion from leaving the vehicle undriven for a long period, the i-ELOOP system will be in Pre-cahrge mode. While pre-charging mode, do not disconnect the jumper cables until the message indicating "i-ELOOP charging. Do not drive. This will take less than 3 minutes" is turned off. For battery depletion other than when the vehicle is left undriven for long periods, pre-charging does not occur. After starting the engine, the jumper cables can be For vehicles with a capacitor and having the following sticker adhered to the top of the bumper (actually the sticker is hidden by hood so it is not visible when hood is closed) perform electrical discharging of the capacitor before disposal using the discharge resistance box. After discharging, dispose of the capacitor the same as other parts. 	The “i-ELOOP” lamp illuminates in the instrument cluster while the capacitor is being charged by i-ELOOP. If the vehicle remains un-driven for long periods and the capacitor voltage is reduced, the system enters pre-charge mode. This mode is for producing a power supply (capacitor is charged) when there is an insufficient power supply to the vehicle. Therefore, while pre-charging is being performed, it is recommended that the vehicle not be driven until the indication is no longer displayed (maximum 30 seconds). Under the following conditions, “i-ELOOP” does not illuminate in the instrument cluster because there is no power generated using deceleration energy regeneration. The vehicle’s electrical load (power consumption) is 50A or more Ambient temperature is less than 0 °C Battery charge condition is less than 65%	For vehicles with the center display, indication of the deceleration energy regeneration is also possible as shown below. To display, select Application-->Fuel Economy Monitor-->Control Status from the home screen of the center display. 1. Displays the level of electricity generated by regenerative braking. 2. Displays the amount of the electricity stored in the capacitor 

Section	Title	Purpose of Adoption	Service Point	Common Inquiry	Other
Safety equipment	・SCBS	A low-speed brake control (operates at vehicle speed of 30 km/h or less) has been adopted to reduce damage to the vehicle (with SCBS system) by a collision with another vehicle in front.	The laser sensor cannot be disassembled, and adjustment such as aiming during removal/installation is unnecessary. Caution is required as the windshield will need to be replaced if the lens sensor installation area on the upper part of the windshield is damaged. The Smart City Brake Support (SCBS) control could be inhibited if a malfunction occurs in the following parts and systems. -DSC system -EPAS system -Laser sensor -Engine control equipment -Instrument cluster -Body control module	In the following cases, the system does not operate or the system cancels during operation (1) Accelerator operation is specified value or more (2) Steering angle is specified angle or more (3) DSC/TCS is off (DSC switch is off) (4) After vehicle is stopped by SCBS auto braking, maximum 2 seconds elapsed (5) Vehicle speed is 4 km or less, or 30 km/h or more *Not displayed with exception of malfunction or possible glass soiling detected. Under the following conditions, non-operation may occur or it may not be possible to obtain sufficient effect. (1) Weather conditions Heavy rain, snow, blizzard, heavy fog (2) Road conditions Road grade (slope), steam rising from manhole (3) Detection target Low vehicles, non-four-wheeled vehicles (two-wheeled vehicles, pedestrians), soiled vehicles (license plate, reflector soiling), vehicle covered in snow, vehicle ahead splashes water from the wheels, other than rear-facing vehicles. (4) Detecting vehicle conditions Windshield soiling, load condition, wiper non-operation during rainfall, washer operation, frosted windshield, tire puncture, or low tire pressure, high temperature in sensor installation area (5) Other Grass, vehicle exhaust emission Under the following conditions, a mis-operation may occur (1) Weather conditions Heavy rain, snow, blizzard (2) Road conditions Manholes, road grade (slope), road work such as reflectors set on the road, steam from manholes, curtains obstructing visibility in parking garages (downward passage) (3) Detecting vehicle conditions Load condition, tire puncture or low tire pressure (4) Other Grass, intersecting vehicle (vehicle cross-cut), vehicle exhaust emission	If the DCS is turned off using the DCS OFF switch, the DCS OFF indicator light is illuminated and the SCBS function is off, but nothing is indicated in the display. The laser sensor is installed to the upper part of the windshield and detects vehicles in front and obstructions 6 meters from the front of the vehicle. Sensor type: Laser sensor 
	Smart City Brake Support (SBS)	If a collision is predicted, collision damage is mediated. Operates at speeds of 15 km/h to 145 km/h. (Europe only) Operates at 15 km/h to 200 km/h, warning functions for a moving vehicle only.	Radar is emitted from the radar set in the front of the vehicle to detect vehicles and obstructions ahead and perform control. If the radar or SBS control unit is replaced, always perform the aiming procedure. Auto aiming adjustment is only in the up/down directions. Left/right direction aiming is required. When air bags are replaced, it is necessary to perform the yaw rate 0-point command for the SBS control unit. Collision damage is mediated by the following steps. Step 1: If a collision is predicted, the driver is notified by a warning sound. At the same time, the brake assist force is increased. (Strong braking occurs by the driver only lightly depressing the brakes) Step 2: If it is determined that a collision is unavoidable, a signal is output to the DSC and the brakes are applied to mediate the collision. (However, if SCBS is equipped, the SCBS takes priority with the speed at 30 km/h or less. In this case, a collision is avoided)	Under the following conditions, system non-operation may occur or it may not be possible to obtain sufficient effect. (1) Weather conditions Heavy rain, snow, blizzard, heavy fog (2) Road conditions Road grade (slope) curves, narrow roads, poor roads (3) Detection target Low vehicles, small vehicles, round vehicles, vehicles with material that reflects radio waves poorly (canvas, hard plastic liftgate, empty trailer), vehicle ahead throws water/snow/sand from tires into the air, other than 4-wheel vehicles (2-wheel vehicles, pedestrians, standing trees, pylons) on-coming vehicles, vehicles in radar blind spot. (4) Detecting vehicle conditions Load condition, frost on protective cover (Radome), tire puncture, or low tire pressure, looseness in sensor installation area, scratching/soiling on protective cover (Radome) (5) Other Under the following conditions, the system could operate by mistake. (1) Road conditions Road grade (slope), curves, tunnels, iron bridges, gates, entrance to underground parking area, poor roads, object projects from road surface (manhole, cat-eye, rail tracks), grass foliage(3) Detection target Other than 4-wheeled vehicles (2-wheeled vehicles, pedestrians, standing trees, pylons), on-coming vehicles(4) Detecting vehicle conditions Load condition, looseness in sensor installation area(5) Other Low battery voltage, vehicle ahead is rapidly approached	Radar is emitted from the radar set in the front of the vehicle and vehicles and obstructions ahead are detected, however, the radar reflected from the target may be weak and go undetected, or the target may not be in the radar emitting area, and thus the system may determine that there is no vehicle or obstruction ahead. The system on/off and the SBS warning/brake operation sensitivity level can be changed by instrument cluster personalization. (Europe only) Operation sensitivity cannot be changed. Sensor type: Radar sensor 
	Mazda Radar Cruise Control (MRCC)	To decrease the driving load on the driver, the MRCC system emits radio waves from the radar to recognize the distance and speed of a vehicle ahead, and controls engine braking automatically to maintain headway control with the vehicle ahead.	Radar is emitted from the radar set in the front of the vehicle to detect vehicles and obstructions ahead and perform control. If the radar or SBS control unit is replaced, always perform the aiming procedure. Auto aiming adjustment is only in the up/down directions. Left/right direction aiming is required. When air bags are replaced, it is necessary to perform the yaw rate 0-point command for the SBS control unit. (For details, refer to the workshop manual) Operates at 30 to 200 km/h (Europe), 30 to 100 km/h (Japan), 20 mph (30 km/h) to 90 mph (145 km/h.) (North America and other)	In the following cases, determination of a vehicle ahead may be delayed or the vehicle ahead may be approached too closely. (1) Weather conditions Heavy rain, snow, blizzard, heavy fog (2) Road conditions Road conditions (slope), curves (3) Detection target Low vehicles, small vehicles, round vehicles, vehicles with material that reflects radio waves poorly (canvas, hard plastic liftgate, empty trailer), vehicle ahead throws water/snow/sand from tires into the air, vehicles in radar blind spot. (4) Detecting vehicle conditions Load condition, frost on protective cover (Radome), looseness in sensor installation area, scratching/soiling on protective cover (Radome) (5) Other If a vehicle cuts into driving lane suddenly directly after turning on turn signal	Sensor type: Radar sensor 

Section	Title	Purpose of Adoption	Service Point	Common Inquiry	Other
Safety equipment	Distance Recognition Support System (DRSS)	The DRSS system emits radio waves from the radar to recognize the distance and speed of a vehicle ahead and displays the distance from the vehicle ahead in steps.	Radar is emitted from the radar set in the front of the vehicle to detect vehicles and obstructions ahead and perform control. If the radar or SBS control unit is replaced, always perform the aiming procedure. Auto aiming adjustment is only in the up/down directions. Left/right direction aiming is required. When air bags are replaced, it is necessary to perform the yaw rate 0-point command for the SBS control unit. (For details, refer to the workshop manual)	In the following cases, determination of a vehicle ahead may be delayed or it may not be possible to correctly display the distance between vehicles. (1) Weather conditions Heavy rain, snow, blizzard, heavy fog (2) Road conditions Road conditions (slope), curves (3) Detection target Low vehicles, small vehicles, round vehicles, vehicles with material that reflects radio waves poorly (canvas, hard plastic liftgate, empty trailer), vehicle ahead throws water/snow/sand from tires into the air, vehicles in radar blind spot. (4) Detecting vehicle conditions Load condition, frost on protective cover (Radome), looseness in sensor installation area, scratching/soiling on protective cover (Radome) (5) Other If a vehicle cuts into driving lane suddenly directly after turning on turn signal	The system on/off and the DRSS warning indication sensitivity level can be changed by instrument cluster personalization. Sensor type: Radar sensor 
	LDW (Lane Departure Warning)	To prevent an accident from occurring due to a lane departure, a monocular camera installed in the windshield detects the driving lanes and predicts a possible lane departure and warns the driver, encouraging the driver to take measures against a lane departure.	1. System operation conditions If a lane departure is predicted while driving, and the following conditions (1) to (6) are met, the warning is operated. (1) Vehicle is traveling in center of driving lane and white lines, even on one side, are detected (2) Vehicle speed is 65 km/h or more (Japan 40 km/h) (3) LDWS switch (*1) is ON (4) Turn switch, turn lights are not operated.(To handle driver forgetting to switch turn signal off, LDWS does not operate if turn signal is left on for long period) (5) Steering angle is within specified value (6) No sudden acceleration/deceleration. (Accelerator opening angle is specified value or less, brake pedal is depressed) (*1) The LDWS switch can be turned on/off by the user 2. System cancel (operation stop) conditions If any of the following conditions (1) to (4) are met, the system goes on standby automatically,and the warning does not operate. (1) Warning is activated directly after a lane departure, and the vehicle continues to travel near a white line without returning to the center of the driving lane. (2) Vehicle speed is 60 km/h or less (Japan: 35 km/h or less) (3) LDWS switch is off (4) Turn switch and turn light are operated (To handle driver forgetting to switch turn signal off, LDWS does not operate if turn signal is left on for long period) (5) Steering angle is the specified value or more (6) During sudden acceleration/deceleration (Accelerator opening angle is specified value or more, brake pedal is depressed) 3. The LDWS system has the following personalization features.(*2) (1) Warning distance: Distance at which warning activates when vehicle approaches white line closely can be changed. (2) Warning activation sensitivity: The frequency at which the warning activation is canceled can be changed for when the system determines the vehicle's behavior by the driver's intention to depart from the driving lane (passing, lane changing).(*3） (3) Source of warning sound: LDWS warning sound source (instrument cluster buzzer or rumble sound from audio unit) (*4) (4) Warning sound volume: The volume of the LDWS warning sound can be changed.(*5) (*2) User personalization possible only on instrument cluster with center display equipped. Otherwise, personalization can be done at dealership. (*3) Activates easily: Always activates if lane departure is made without turn signal operation. Not easily activated: Does not activate if driver intentionally departs from driving lane without operating turn signal. The estimation of intentional lane departure is based on the steering angle and sudden acceleration/deceleration (accelerator opening angle, brake pedal depressed/not depressed). (*4) If a Mazda genuine audio unit is installed, the warning sound (rumble sound) from the audio can be selected. (*5) The selectable audio volume varies depending on the audio source selected. Two levels for the instrument cluster buzzer; and 3 levels for the rumble sound.	There is a temporary system operation stop indication. If there is a malfunction, "System check FSC or System check LDW" is indicated. If the area of the windshield in front of the FSC is fogged, LDWS function is stopped and "Clear fogging from windshield in front of FSC" is displayed. In this case, operate the defogger (defroster). Part replacement is unnecessary. If the area of the windshield in front of the FSC is soiled, LDWS function is stopped and "Clean windshield in front of FSC" is displayed. In this case, clean the windshield (outer and inner) in front of the FSC. Part replacement is unnecessary. *FSC: Forward Sensing Camera. Electrical unit with a camera that detects white lines integrated with LDWS system. Under the following conditions, non-operation or insufficient effect may occur. Weather conditions Heavy rain, snow, blizzard, heavy fog Road conditions Background light. Wet surface of road reflects light after rain stops. Winding road, narrow driving lane, wide driving lane. White lines are difficult to detect due to shadows, rain, remaining snow ruts. Detected objects Cracks and soiling of white lines (yellow lines), temporary lane lines or remaining lane lines from road construction, 2 or more adjacent white lines (yellow lines), road surface and lane line colors are similar (blue). Detecting vehicle conditions Windshield soiling, load condition, frosted windshield, tire puncture, or low tire pressure, high temperature in sensor installation location Other Brightness of surrounding area changes suddenly such as at the entrance to and exit from a tunnel. In the following cases, the system may operate by mistake Weather conditions Heavy rain, snow, blizzard Road conditions White lines are difficult to detect due to shadows, rain, remaining snow ruts. White lines are difficult to detect due to shadows, rain, remaining snow ruts. Detecting vehicle conditions Load condition, tire puncture or low tire pressure Other Objects placed on the dashboard are reflected on the windshield and picked up by the camera. When accelerating from a stop at an intersection, the left/right turning lane marks are mistaken.	Sensor type Forward sensing camera 

Section	Title	Purpose of Adoption	Service Point	Common Inquiry	Other
Safety equipment	HBC (High Beam Control)	The HBC system recognizes headlights (on-coming vehicles), taillights (vehicles ahead), and street lights (travel through cities/towns) using the monocular camera installed in the windshield and automatically switches the headlights between high and low beams for improved use-frequency of the high beams and assured visibility while driving at night.	1. System operation conditions When the following conditions (1) to (3) are met simultaneously while driving, the headlights are switched automatically between high and low beams. (1) Headlight switch is in AUTO and HI position (2) Headlights are illuminated by the auto-light function (3) System determines that it is night by the surrounding level of brightness * When conditions (1) to (3) are met, the headlights are switched between high and low beams as follows. Low beam illumination conditions 1. Vehicle speed is less than 25 km/h 2. Forward sensing camera detects lamp types of vehicles ahead and on-coming vehicles 3. When driving in areas with continuos line of street lamps, or in cities where the road surface is bright. High beam illumination condition 1. Vehicle speed is 30 km/h or more and the low beam illumination conditions are not met	Operation may be delayed due to the narrower camera angle compared to the driver's eyesight In particular, if an oncoming vehicle suddenly appears from around a tight corner, the on-coming vehicle may not be in the camera's angle of view and headlight switching from high to low may not be performed. High to low switching cannot be performed against pedestrians. This is because high/low switching is performed by detection of light source	Sensor type Forward sensing camera 
			2. System cancel (operation stop) conditions If any of the following conditions (1) to (3) are met, the automatic control is canceled. (1) Headlight switch is position other than AUTO or HI (2) Headlights are turned off by auto-light function (3) System determines that it is not night by the surrounding brightness	The system may not operate correctly Weather conditions: -Rain, fog, blizzards, snow-covered roads, wet roads (light is reflected), full moon (moonlight is reflected off road surface), lightening (mistaken as light source). -Large amount of pitching while driving on a wet road (light distribution unstable). -Light distribution of detecting vehicle is not correct (malfunction, bulb change, eye-line installation, change in vehicle height) -Mistaken switching from high to low beams. -Mis-operation due to confusing light from which camera cannot discern vehicles (light emitting object*, reflecting object*).* -Light-emitting object: Street lights, light-emitting street signs, traffic signals, driving lane border lines, corner guidance lights, factories, vending machines, signs, distant street lights* -Light reflecting objects: Reflectors, reflecting signs, cat-eyes, markers, highly luminous white lines or road paint, mirrors, stopped vehicles.	
			3. The HBC system functions can be personalized as follows.(*1) Non-operation of HBC function: HBC system does not operate even if system operation conditions indicated in 1. above are met(*1) User personalization possible only on instrument cluster with center display equipped. Otherwise, personalization can be performed at dealerships.	High to low switching delay/No high to low switching Detection delay or no detection of on-coming vehicle/vehicle ahead due to headlight/taillight abnormality (not illuminated, dark, bulb burned out, use of colored bulbs, light distribution deviation, light axis deviation, weak reflection from reflector).Two-wheeled vehicles/bicycles may not be detected even if headlight and taillight are illuminated. Low to high beam switching delay/No low to high beam switching Road surface is bright from street lights even if not in a city/town areaReflectors or reflecting signs even though there are no street lights	