

DIAGNOSIS



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TROUBLE DIAGNOSIS TABLE

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0100	Air Mass Flow (HFM) Malfunction	<ul style="list-style-type: none"> - The external power supply is faulty. <ul style="list-style-type: none"> • Check the external power supply. • Check the sensor wiring harness (open, short, poor contact). - Actual air mass flow vs. Output voltages. <ul style="list-style-type: none"> • -20 Kg/h: 0.47 V • 0 Kg/h: 0.99 V • 10 Kg/h: 1.2226 ~ 1.2398 V • 15 Kg/h: 1.3552 ~ 1.3778 V • 30 Kg/h: 1.6783 ~ 1.7146 V • 60 Kg/h: 2.1619 ~ 2.2057 V • 120 Kg/h: 2.7215 ~ 2.7762 V • 250 Kg/h: 3.4388 ~ 3.5037 V • 370 Kg/h: 3.8796 ~ 3.9511 V • 480 Kg/h: 4.1945 ~ 4.2683 V • 640 Kg/h: 4.5667 ~ 4.6469 V - Replace the ECU if required. 					
P0102	Low HFM Sensor Signal (Circuit Open)	<ul style="list-style-type: none"> - HFM sensing values are lower than minimum sensing values. - Check the resistance in HFM sensor. - Check the ECU wiring harness (open and poor contact). <ul style="list-style-type: none"> • Check the ECU pin #82 and #84 for open circuit. - Actual air mass flow vs. Output voltages. <ul style="list-style-type: none"> • -20 Kg/h: 0.47 V • 0 Kg/h: 0.99 V • 10 Kg/h: 1.2226 ~ 1.2398 V • 15 Kg/h: 1.3552 ~ 1.3778 V • 30 Kg/h: 1.6783 ~ 1.7146 V • 60 Kg/h: 2.1619 ~ 2.2057 V • 120 Kg/h: 2.7215 ~ 2.7762 V • 250 Kg/h: 3.4388 ~ 3.5037 V • 370 Kg/h: 3.8796 ~ 3.9511 V • 480 Kg/h: 4.1945 ~ 4.2683 V • 640 Kg/h: 4.5667 ~ 4.6469 V - Replace the ECU if required. 					

ECU

TCU

BRAKE

A/BAG

TC

RK-STICS

FFH

R/SENSOR

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0103	High HFM Sensor Signal (Circuit Short)	<ul style="list-style-type: none"> - HFM sensing values are higher than maximum sensing values. - Check the resistance in HFM sensor. - Check the ECU wiring harness (open and poor contact). <ul style="list-style-type: none"> • Check the ECU pin #82 and #84 for open circuit. - Actual air mass flow vs. Output voltages. <ul style="list-style-type: none"> • -20 Kg/h: 0.47 V • 0 Kg/h: 0.99 V • 10 Kg/h: 1.2226 ~ 1.2398 V • 15 Kg/h: 1.3552 ~ 1.3778 V • 30 Kg/h: 1.6783 ~ 1.7146 V • 60 Kg/h: 2.1619 ~ 2.2057 V • 120 Kg/h: 2.7215 ~ 2.7762 V • 250 Kg/h: 3.4388 ~ 3.5037 V • 370 Kg/h: 3.8796 ~ 3.9511 V • 480 Kg/h: 4.1945 ~ 4.2683 V • 640 Kg/h: 4.5667 ~ 4.6469 V - Replace the ECU if required. 					
P0105	Supply Voltage Fault to Booster Pressure Sensor	<ul style="list-style-type: none"> - Out of range of supply voltages about boost pressure sensor at Ignition key-On and Engine Stop (Higher than specified values). - Check the supply voltage to sensor. - Actual boost pressure vs. Output voltages <ul style="list-style-type: none"> • Raw Signal Range: 0.545 ~ 2.490 bar • 0.4 bar: 0.6120 V • 1.4 bar: 2.6520 V • 2.4 bar: 4.6920 V - Check the sensor wiring harness for ECU pin #100 and #108 (open, poor contact). - Visually check sensor and replace if required. - Replace the ECU if required. - Check whether existing or not about turbo boosting control malfunction (P1235) simultaneously. - If there is turbo boost control fault, Should be checked followings also; <ul style="list-style-type: none"> • Leakage before turbo system • Vacuum pump malfunction • Waste gate' solenoid valve • Turbo charger system defect or malfunction itself • Air inlet restriction • Exhaust system restriction 					

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0106	High Booster Pressure Sensor Signal	<ul style="list-style-type: none"> - Out of signal range about boost pressure sensor at Ignition key-On and Engine Stop (Higher than specified values). - Check the supply voltage to sensor. - Actual boost pressure vs. Output voltages. <ul style="list-style-type: none"> • Raw Signal Range: 0.545 ~ 2.490 bar • 0.4 bar: 0.6120 V • 1.4 bar: 2.6520 V • 2.4 bar: 4.6920 V - Check the sensor wiring harness for ECU pin #99 and #100 (open, poor contact). - Visually check sensor and replace if required. - Replace the ECU if required. - Check whether existing or not about turbo boosting control malfunction (P1235) simultaneously. - If there is turbo boost control fault, Should be checked followings also; <ul style="list-style-type: none"> • Leakage before turbo system • Vacuum pump malfunction • Waste gate' solenoid valve • Turbo charger system defect or malfunction itself • Air inlet restriction • Exhaust system restriction 					
P0107	Booster Pressure Sensor Open/GND Short	<ul style="list-style-type: none"> - Out of signal range about boost pressure sensor at Engine running condition (Lower than specified values). - Check the supply voltage to sensor. - Actual boost pressure vs. Output voltages <ul style="list-style-type: none"> • Raw Signal Range: 0.545 ~ 2.490 bar • 0.4 bar: 0.6120 V • 1.4 bar: 2.6520 V • 2.4 bar: 4.6920 V - Check the sensor wiring harness for ECU pin #99 and #100 (open, poor contact). - Visually check sensor and replace if required. - Replace the ECU if required. - Check whether existing or not about turbo boosting control malfunction (P1235) simultaneously. - If there is turbo boost control fault, Should be checked followings also; <ul style="list-style-type: none"> • Leakage before turbo system • Vacuum pump malfunction • Waste gate' solenoid valve • Turbo charger system defect or malfunction itself • Air inlet restriction • Exhaust system restriction 					

ECU-DSL

ECU-GSL

ECU-CDPF

TCU

BRAKE

AIR-BAG

TC

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RAIN SENSOR

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P-TRUNK

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0108	Booster Pressure Sensor Short	<ul style="list-style-type: none"> - Out of signal range about boost pressure sensor at Engine running condition (Higher than specified values). - Check the supply voltage to sensor. - Actual boost pressure vs. Output voltages <ul style="list-style-type: none"> • Raw Signal Range: 0.545~2.490 bar • 0.4 bar: 0.6120 V • 1.4 bar: 2.6520 V • 2.4 bar: 4.6920 V - Check the sensor wiring harness for ECU pin #99 and #100 (open, poor contact). - Visually check sensor and replace if required. - Replace the ECU if required. - Check whether existing or not about turbo boosting control malfunction (P1235) simultaneously. - If there is turbo boost control fault, Should be checked followings also; <ul style="list-style-type: none"> • Leakage before turbo system • Vacuum pump malfunction • Waste gate' solenoid valve • Turbo charger system defect or malfunction itself • Air inlet restriction • Exhaust system restriction 					
P0109	Low Booster Pressure Sensor Signal	<ul style="list-style-type: none"> - Out of signal range about boost pressure sensor at Ignition key-On and Engine Stop (Lower than specified values). - Check the supply voltage to sensor. - Actual boost pressure vs. Output voltages. <ul style="list-style-type: none"> • Raw Signal Range: 0.545 ~ 2.490 bar • 0.4 bar: 0.6120 V • 1.4 bar: 2.6520 V • 2.4 bar: 4.6920 V - Check the sensor wiring harness for ECU pin #99 and #100 (open, poor contact). - Visually check sensor and replace if required. - Replace the ECU if required. - Check whether existing or not about turbo boosting control malfunction (P1235) simultaneously. - If there is turbo boost control fault, Should be checked followings also; <ul style="list-style-type: none"> • Leakage before turbo system • Vacuum pump malfunction • Waste gate' solenoid valve • Turbo charger system defect or malfunction itself • Air inlet restriction • Exhaust system restriction 					

DIAGNOSIS

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0110	Intake Air Temperature Circuit Malfunction - Source Power Problem	<ul style="list-style-type: none"> - The intake air temperature sensing value is lower than minimum value or higher than maximum value, or the external power to HFM sensor is faulty. - Check the supply voltage to sensor. <ul style="list-style-type: none"> • Actual air temperature vs. Voltages • 20°C: 2.65 Ω • 30°C: 2.18 Ω • 50°C: 1.40 Ω • Recovery values when intake air temperature sensor failure: 50°C - Check the sensor wiring harness. <ul style="list-style-type: none"> • Check the source power circuit for short to ground. - Check the sensor resistance. <ul style="list-style-type: none"> • Actual air temperature vs. Resistance • -40°C: 39.260 Ω • -20°C: 13.850 Ω • 0°C: 5.499 Ω • 20°C: 2.420 Ω • 40°C: 1.166 Ω • 60°C: 0.609 Ω • 80°C: 0.340 Ω • 100°C: 0.202 Ω • 120°C: 0.127 Ω • Recovery values when intake air temperature sensor failure: 50°C - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #64 and #84 for open and short. - Replace the ECU if required. 					

ECU-DSL

ECU-GSL

ECU-CDPF

TCU

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TC

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FFH

RAIN SENSOR

FATC

TGS LEVER

P-TRUNK

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0112	Intake Air Temperature Circuit Malfunction - Open	<ul style="list-style-type: none"> - The intake air temperature sensing value is lower than maximum value of 150°C: Open - Check the supply voltage to sensor. <ul style="list-style-type: none"> • Actual air temperature vs. Voltages • 20°C: 2.65 Ω • 30°C: 2.18 Ω • 50°C: 1.40 Ω • Recovery values when intake air temperature sensor failure: 50°C - Check the sensor wiring harness. <ul style="list-style-type: none"> • Check the source power circuit for short to ground. - Check the sensor resistance. <ul style="list-style-type: none"> • Actual air temperature vs. Resistance • -40°C: 39.260 Ω • -20°C: 13.850 Ω • 0°C: 5.499 Ω • 20°C: 2.420 Ω • 40°C: 1.166 Ω • 60°C: 0.609 Ω • 80°C: 0.340 Ω • 100°C: 0.202 Ω • 120°C: 0.127 Ω • Recovery values when intake air temperature sensor failure: 50°C - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #64 and #84 for open. - Replace the ECU if required. 					

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0113	Intake Air Temperature Circuit Malfunction - Short	<ul style="list-style-type: none"> - The intake air temperature sensing value is lower than maximum value of 150°C: Open - Check the supply voltage to sensor. <ul style="list-style-type: none"> • Actual air temperature vs. Voltages • 20°C: 2.65 Ω • 30°C: 2.18 Ω • 50°C: 1.40 Ω • Recovery values when intake air temperature sensor failure: 50°C - Check the sensor wiring harness. <ul style="list-style-type: none"> • Check the source power circuit for short to ground. - Check the sensor resistance. <ul style="list-style-type: none"> • Actual air temperature vs. Resistance • -40°C: 39.260 Ω • -20°C: 13.850 Ω • 0°C: 5.499 Ω • 20°C: 2.420 Ω • 40°C: 1.166 Ω • 60°C: 0.609 Ω • 80°C: 0.340 Ω • 100°C: 0.202 Ω • 120°C: 0.127 Ω • Recovery values when intake air temperature sensor failure: 50°C - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #64 and #84 for open. - Replace the ECU if required. 					
P0115	Supply Voltage Fault to Coolant Temperature Sensor	<ul style="list-style-type: none"> - Check if the supply voltage of approx. 12 V is applied. 					
P0117	Coolant Temperature Sensor Malfunction - Open	<ul style="list-style-type: none"> - Malfunction in recognition of coolant temperature <ul style="list-style-type: none"> • Less than minimum values (Circuit Open) • External power supply malfunction - If Fuel temperature is invalid, the previous coolant temperature is retained. - Check the supply voltage to sensor. - Actual air temp. vs. Resistance <ul style="list-style-type: none"> • 20°C: 2449 Ω • 50°C: 826.3 Ω • 80°C: 321.4 Ω • 100°C: 112.9 Ω - Check the wiring harness (open and poor contact). <ul style="list-style-type: none"> • ECU pin #101 and #102 - Visually check the sensor and replace if required. - Replace the ECU if required. 					

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0118	Coolant Temperature Sensor Malfunction - Short	<ul style="list-style-type: none"> - Malfunction in recognition of coolant temperature <ul style="list-style-type: none"> • More than maximum values (Circuit Short) • External power supply malfunction - If Fuel temperature is invalid, the previous coolant temperature is retained. - Check the supply voltage to sensor. - Actual air temp. vs. Resistance <ul style="list-style-type: none"> • 20°C: 2449 Ω • 50°C: 826.3 Ω • 80°C: 321.4 Ω • 100°C: 112.9 Ω - Check the wiring harness (short and poor contact). <ul style="list-style-type: none"> • ECU pin #101 and #102 - Visually check the sensor and replace if required. - Replace the ECU if required. 					
P0120	Accelerator Pedal Sensor #1 Malfunction - Supply Voltage Fault	<ul style="list-style-type: none"> - The supply voltage is faulty. - Check the supply voltage to sensor. - Check the wiring harness. <ul style="list-style-type: none"> • Check the circuit for open and short. • Check the ECU pin #72, #53 for open and short. - Check the accelerator pedal. - Check the ECU wiring harness. - Replace the ECU if required. 	O				
P0122	Accelerator Pedal Sensor #1 Malfunction - Open	<ul style="list-style-type: none"> - Out of range about potentiometer 1 of pedal sensor: lower than specified values - Check the supply voltage to sensor. - Check the wiring harness. <ul style="list-style-type: none"> • Check the circuit for open and short. • Check the ECU pin #71, #53 for open and poor contact. - Check the accelerator pedal. - Check the ECU wiring harness. - Replace the ECU if required. 	O				
P0123	Accelerator Pedal Sensor #1 Malfunction - Short	<ul style="list-style-type: none"> - Out of range about potentiometer 1 of pedal sensor: higher than specified values - Check the supply voltage to sensor. - Check the wiring harness. <ul style="list-style-type: none"> • Check the circuit for open and short. • Check the ECU pin #71, #53 for short and poor contact. - Check the accelerator pedal. - Check the ECU wiring harness. - Replace the ECU if required. 	O				

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0147	Impossible to Learn Idle MDP	<ul style="list-style-type: none"> - Causes (Idle range MDP learning) <ul style="list-style-type: none"> • The MDP is not learned again until driving over 50,000 km after the MDP is learned. - Conditions for MDP learning (Idle) <ul style="list-style-type: none"> • Learning twice for each cylinder (attempt every 5 sec.) • Initial MDP learning: coolant temperature > 60°C • Fuel temperature: 0 ~ 80°C • Vehicle speed: Idle. • The tachometer's needle vibrates while learning idle MDP. • Replace ECU after learning. 					
P0148	Impossible to Learn Drive MDP	<ul style="list-style-type: none"> - Causes <ul style="list-style-type: none"> • It occurs twice for each cylinder if MDP is not learned again until driving over 50,000 km after the MDP is learned. - Actions <ul style="list-style-type: none"> • Check knock sensor and wiring. • Check injector specification. • Check C3I/C2I. 					
P0171	Insufficient MDP of Injector #1	<ul style="list-style-type: none"> - MDP learning value is decreased due to aged injector #1. 					
P0172	Insufficient MDP of Injector #2	<ul style="list-style-type: none"> - MDP learning value is decreased due to aged injector #2. 					
P0173	Insufficient MDP of Injector #3	<ul style="list-style-type: none"> - MDP learning value is decreased due to aged injector #3. 					
P0174	Insufficient MDP of Injector #4	<ul style="list-style-type: none"> - MDP learning value is decreased due to aged injector #4. 					
P0175	Insufficient MDP of Injector #5	<ul style="list-style-type: none"> - MDP learning value is decreased due to aged injector #5. 					
P0180	Fuel Temperature Sensor - Malfunction	<ul style="list-style-type: none"> - The power source circuit is faulty for fuel temperature sensor. (Fuel temperature sensor is mounted in high pressure pump) - Actual fuel temp. vs. Resistance <ul style="list-style-type: none"> • -40°C: 75.780 Ω -20°C: 21.873 Ω • -10°C: 12.462 Ω 0°C: 7.355 Ω • 10°C: 4.481 Ω 20°C: 2.812 Ω • 25°C: 2.252 Ω 30°C: 1.814 Ω • 40°C: 1.199 Ω 50°C: 0.811 Ω • 70°C: 0.394 Ω 90°C: 0.206 Ω • 120°C: 0.087 Ω - Recovery values when fuel temperature sensor failure: 95°C - Check the supply voltage to sensor. - Check the wiring harness for open, short and poor contact. <ul style="list-style-type: none"> • ECU pin: #109, #110 - Check the ECU wiring and replace the ECU if required. 					

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0182	Fuel Temperature Sensor - Short to Ground	<ul style="list-style-type: none"> - The sensing values are higher than specified values for fuel temperature sensor. (More than maximum sensing values 140°C - Circuit Short) - Actual fuel temp. vs. Resistance <ul style="list-style-type: none"> • -40°C: 75.780 Ω -20°C: 21.873 Ω • -10°C: 12.462 Ω 0°C: 7.355 Ω • 10°C: 4.481 Ω 20°C: 2.812 Ω • 25°C: 2.252 Ω 30°C: 1.814 Ω • 40°C: 1.199 Ω 50°C: 0.811 Ω • 70°C: 0.394 Ω 90°C: 0.206 Ω • 120°C: 0.087 Ω - Recovery values when fuel temperature sensor failure: 95°C - Check the supply voltage to sensor. - Check the wiring harness for open, short and poor contact. <ul style="list-style-type: none"> • ECU pin: #109, #110 - Check the ECU wiring and replace the ECU if required. 					
P0183	Fuel Temperature Sensor - Short to B+	<ul style="list-style-type: none"> - The sensing values are lower than specified values for fuel temperature sensor. (Less than maximum sensing values - 40°C - Circuit Open) - Actual fuel temp. vs. Resistance <ul style="list-style-type: none"> • -40°C: 75.780 Ω -20°C: 21.873 Ω • -10°C: 12.462 Ω 0°C: 7.355 Ω • 10°C: 4.481 Ω 20°C: 2.812 Ω • 25°C: 2.252 Ω 30°C: 1.814 Ω • 40°C: 1.199 Ω 50°C: 0.811 Ω • 70°C: 0.394 Ω 90°C: 0.206 Ω • 120°C: 0.087 Ω - Recovery values when fuel temperature sensor failure: 95°C - Check the supply voltage to sensor. - Check the wiring harness for open, short and poor contact. <ul style="list-style-type: none"> • ECU pin: #109, #110 - Check the ECU wiring and replace the ECU if required. 					

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0190	Supply Voltage Fault to Fuel Rail Pressure Sensor	<ul style="list-style-type: none"> - The supply voltage to fuel rail pressure sensor is faulty. - Check the supply voltage to sensor. <ul style="list-style-type: none"> • Output voltage at 1600 bar: $4.055 \pm 0.125V$ • Output voltage at atmospheric pressure: $0.5 \pm 0.04V$ - Check the sensor and ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #6, #26 for open and short. • Check the fuel rails and high pressure pipes for leaks. - Check the fuel rail pressure sensor. - Replace the ECU if required. 	O				
P0191	Fuel Rail Pressure Sensor Signal Fault	<ul style="list-style-type: none"> - The rail pressure drop is too high. - Check the supply voltage to sensor. <ul style="list-style-type: none"> • Output voltage at 1600 bar: $4.055 \pm 0.125 V$ • Output voltage at atmospheric pressure: $0.5 \pm 0.04 V$ - Check the sensor and ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #6, #26 for open and short. • Check the fuel rails and high pressure pipes for leaks. - Check the fuel rail pressure sensor. - Replace the ECU if required. 	O				
P0192	Fuel Rail Pressure Sensor Malfunction - Open	<ul style="list-style-type: none"> - The fuel rail pressure sensing values are lower than specified values. <ul style="list-style-type: none"> • Minimum sensing values: - 112 bar (Open) - Check the supply voltage to sensor. <ul style="list-style-type: none"> • Output voltage at 1600 bar: $4.055 \pm 0.125 V$ • Output voltage at atmospheric pressure: $0.5 \pm 0.04 V$ - Check the sensor and ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #25, #26 for open and poor contact. • Check the fuel rails and high pressure pipes for leaks. - Check the fuel rail pressure sensor. - Replace the ECU if required. 	O				

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0193	Fuel Rail Pressure Sensor Malfunction - Short	<ul style="list-style-type: none"> - The fuel rail pressure sensing values are higher than specified values. <ul style="list-style-type: none"> • Maximum sensing values: 1,600 bar (Short) - Check the supply voltage to sensor. <ul style="list-style-type: none"> • Output voltage at 1600 bar: 4.055± 0.125V • Output voltage at atmospheric pressure: 0.5±0.04V - Check the sensor and ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #25, #26 for short and poor contact. • Check the fuel rails and high pressure pipes for leaks. - Check the fuel rail pressure sensor. - Replace the ECU if required. 	O				
P0201	Injector #1 Circuit Open	<ul style="list-style-type: none"> - Injector #1 circuit malfunction: Open. <ul style="list-style-type: none"> • If the injector pin is defective, perform C2I coding and check again. • If the injector pin is normal, check the ECU wiring harness (ECU pin: #117, #114). - Replace the ECU if required. 					
P0202	Injector #2 Circuit Open	<ul style="list-style-type: none"> - Injector #2 circuit malfunction: Open. <ul style="list-style-type: none"> • If the injector pin is defective, perform C2I coding and check again. • If the injector pin is normal, check the ECU wiring harness (ECU pin: #118, #121). - Replace the ECU if required. 					
P0203	Injector #3 Circuit Open	<ul style="list-style-type: none"> - Injector #3 circuit malfunction: Open. <ul style="list-style-type: none"> • If the injector pin is defective, perform C2I coding and check again. • If the injector pin is normal, check the ECU wiring harness (ECU pin: #117, #116). - Replace the ECU if required. 					
P0204	Injector #4 Circuit Open	<ul style="list-style-type: none"> - Injector #4 circuit malfunction: Open. <ul style="list-style-type: none"> • If the injector pin is defective, perform C2I coding and check again. • If the injector pin is normal, check the ECU wiring harness (ECU pin: #117, #115). - Replace the ECU if required. 					
P0205	Injector #5 Circuit Open	<ul style="list-style-type: none"> - Injector #5 circuit malfunction: Open. <ul style="list-style-type: none"> • If the injector pin is defective, perform C2I coding and check again. • If the injector pin is normal, check the ECU wiring harness (ECU pin: #118, #120). - Replace the ECU if required. 					

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0215	Main Relay Fault - Stuck	<ul style="list-style-type: none"> - The main relay is stuck ; Shut down. - Resistance of main relay: $92 \Omega \pm 9 \Omega$ (at 20°C) - Check the main relay wiring harness. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #3, 4, 5 for open and short. - If the forced operation is not available, replace the ECU. - Check the fuse for main relay 					
P0219	Too Small Clearance of Crank Angle Sensor	<ul style="list-style-type: none"> - Crank angle signal faults or clearance too close. - Check the sensor wiring harness for ECU pin #90 and #82 (open, short, poor contact). - Check the resistance of crank angle sensor: $1090 \Omega \pm 15 \%$. - Measure the air gap: 0.3 ~ 1.3 mm <ul style="list-style-type: none"> • 1.3 mm of air gap: outputs 1.0 V at 40 rpm • 0.3 mm of air gap: outputs 150 V at 7000 rpm - Check the teeth condition. <ul style="list-style-type: none"> • Drive plate (A/T), DMF (M/T) - Replace the ECU if required. 					
P0220	Accelerator Pedal Sensor #2 Malfunction - Supply Voltage Fault	<ul style="list-style-type: none"> - The supply voltage is faulty. - Check the supply voltage to sensor. - Check the wiring harness. <ul style="list-style-type: none"> • Check the circuit for open and short. • Check the ECU pin #57, #14 for open and short. - Check the accelerator pedal. - Check the ECU wiring harness. - Replace the ECU if required. 	O				
P0222	Accelerator Pedal Sensor #2 Malfunction - Open	<ul style="list-style-type: none"> - Out of range about potentiometer 2 of pedal sensor: lower than specified values - Check the supply voltage to sensor. - Check the wiring harness. <ul style="list-style-type: none"> • Check the circuit for open and short. • Check the ECU pin #32, #14 for open and poor contact. - Check the accelerator pedal. - Check the ECU wiring harness. - Replace the ECU if required. 	O				
P0223	Accelerator Pedal Sensor #2 Malfunction - Short	<ul style="list-style-type: none"> - Out of range about potentiometer 2 of pedal sensor: higher than specified values - Check the supply voltage to sensor. - Check the wiring harness. <ul style="list-style-type: none"> • Check the circuit for open and short. • Check the ECU pin #32, #14 for short and poor contact. - Check the accelerator pedal. - Check the ECU wiring harness. - Replace the ECU if required. 	O				

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0243	VGT Turbocharger Actuator Circuit Short	<ul style="list-style-type: none"> - Causes <ul style="list-style-type: none"> • There is electric problem in the vacuum modulator drive module of turbocharger. - Check pin for the followings (Vacuum Modulator): <ul style="list-style-type: none"> • Power (Main Relay) • GND (ECU Pin #A71) - Actions <ul style="list-style-type: none"> • Check the unit's resistance (15.4 +/- 0.7 Ω) and wiring. • Check the input voltage (12V). • Visually check the unit and replace if necessary. 					
P0245	Turbo Charger Actuator Circuit Fault - Short	<ul style="list-style-type: none"> - The waste gate driver circuit is short to ground or open - Check the actuator wiring harness. - Check the solenoid valve. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #95 for open and short. - Replace the ECU if required. 	O				
P0246	Turbo Charger Actuator Circuit Fault - Short to B+	<ul style="list-style-type: none"> - The turbo charger actuator power source circuit is short. - Check the actuator wiring harness. - Check the solenoid valve. - Check the ECU wiring harness for short and poor contact. - Replace the ECU if required. 	O				
P0251	IMV Driver Circuit Malfunction - Short	<ul style="list-style-type: none"> - IMV driver circuit malfunction: Short - Check the IMV wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #87 for short. - Check the ECU wiring harness. - Check the IMV resistance. <ul style="list-style-type: none"> • When out of specified value: replace high pressure pump and IMV - Replace the ECU if required. 			O		
P0253	IMV Driver Circuit Malfunction - Short to Ground	<ul style="list-style-type: none"> - IMV driver circuit malfunction: Short to ground - Check the IMV wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #87 for short to ground. - Check the ECU wiring harness. - Check the IMV resistance. <ul style="list-style-type: none"> • When out of specified value: replace high pressure pump and IMV - Replace the ECU if required. 			O		
P0255	IMV Driver Circuit Malfunction - Open	<ul style="list-style-type: none"> - IMV driver circuit malfunction: Open - Check the IMV wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #87 for open. - Check the ECU wiring harness. - Check the IMV resistance. <ul style="list-style-type: none"> • When out of specified value: replace high pressure pump and IMV - Replace the ECU if required. 			O		

DIAGNOSIS

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0263	Injector #1 Balancing Fault	<ul style="list-style-type: none"> - Injector #1 cylinder balancing faults (Injector stuck closed). - Check the injector circuit for open. - Check the glow plug. - Check the inlet tube for clogging. - Check the EGR. - Replace the ECU if required (perform C2I coding after replacement). 					
P0266	Injector #2 Balancing Fault	<ul style="list-style-type: none"> - Injector #2 cylinder balancing faults (Injector stuck closed). - Check the injector circuit for open. - Check the glow plug. - Check the inlet tube for clogging. - Check the EGR. - Replace the ECU if required (perform C2I coding after replacement). 					
P0269	Injector #3 Balancing Fault	<ul style="list-style-type: none"> - Injector #3 cylinder balancing faults (Injector stuck closed). - Check the injector circuit for open. - Check the glow plug. - Check the inlet tube for clogging. - Check the EGR. - Replace the ECU if required (perform C2I coding after replacement). 					
P0272	Injector #4 Balancing Fault	<ul style="list-style-type: none"> - Injector #4 cylinder balancing faults (Injector stuck closed). - Check the injector circuit for open. - Check the glow plug. - Check the inlet tube for clogging. - Check the EGR. - Replace the ECU if required (perform C2I coding after replacement). 					
P0275	Injector #5 Balancing Fault	<ul style="list-style-type: none"> - Injector #5 cylinder balancing faults (Injector stuck closed). - Check the injector circuit for open. - Check the glow plug. - Check the inlet tube for clogging. - Check the EGR. - Replace the ECU if required (perform C2I coding after replacement). 					
P0325	Accelerometer #1 (Knock Sensor) Malfunction	<ul style="list-style-type: none"> - The signal / noise ratio is too low about accelerometer # 1. - Check the accelerometer wiring harness and tightening torque. <ul style="list-style-type: none"> • Tightening torque: 20 ± 5 Nm - Check the ECU wiring harness for open and short. <ul style="list-style-type: none"> • ECU pin #45 and #46 - If the trouble still exists even after replacing the accelerometer, replace the ECU. 					

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0325	Accelerometer #1 (Knock Sensor) Malfunction	<ul style="list-style-type: none"> - The signal / noise ratio is too low about accelerometer # 1. - Check the accelerometer wiring harness and tightening torque. <ul style="list-style-type: none"> • Tightening torque: 20 ± 5 Nm - Check the ECU wiring harness for open and short. <ul style="list-style-type: none"> • ECU pin #45 and #46 - If the trouble still exists even after replacing the accelerometer, replace the ECU. 					
P0335	No Crank Signals	<ul style="list-style-type: none"> - Refer to P0372. 					
P0336	Too Large Clearance of Crank Angle Sensor	<ul style="list-style-type: none"> - Air gap of crank angle sensor is abnormal. - Check the sensor wiring harness for ECU pin #90 and #82 (open, short, poor contact). - Check the resistance of crank angle sensor: 1090 Ω ± 15 %. - Measure the air gap: 0.3 ~ 1.3 mm <ul style="list-style-type: none"> • 1.3 mm of air gap: outputs 1.0 V at 40 rpm • 0.3 mm of air gap: outputs 150 V at 7000 rpm - Check the teeth condition. <ul style="list-style-type: none"> • Drive plate (A/T), DMF (M/T) - Replace the ECU if required. 					
P0341	Cam Position Sensor Malfunction (Poor Synchronization)	<ul style="list-style-type: none"> - Not synchronized with Crank angle signal. - Check the source voltage of cam position sensor (specified value: 4.5 ~ 12 V). - Check the sensor wiring harness for ECU pin #103 and #104 (open, short, poor contact). - Check the cam position sensor. - Measure the air gap: 0.2 ~ 1.8 mm - Replace the ECU if required. 					
P0344	Cam Position Sensor Malfunction	<ul style="list-style-type: none"> - No cam recognition signal (missing events). - Check the source voltage of cam position sensor (ECU pin #111) (specified value: 4.5 ~ 12 V). - Check the sensor wiring harness for ECU pin #103 and #104 (open, short, poor contact). - Check the cam position sensor. - Measure the air gap: 0.2 ~ 1.8 mm - Replace the ECU if required. 					

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0372	Crank Angle Sensor Malfunction	<ul style="list-style-type: none"> - Even though cam position recognition is normal, no crank angle signal recognition (missing tooth). - Check the sensor wiring harness for ECU pin #90 and #82 (open, short, poor contact). - Check the resistance of crank angle sensor: $1090 \Omega \pm 15 \%$. - Measure the air gap: $0.3 \sim 1.3 \text{ mm}$ <ul style="list-style-type: none"> • 1.3 mm of air gap: outputs 1.0 V at 40 rpm • 0.3 mm of air gap: outputs 150 V at 7000 rpm - Check the teeth condition. <ul style="list-style-type: none"> • Drive plate (A/T), DMF (M/T) - Replace the ECU if required. 					
P0400	EGR Control Valve Fault	<ul style="list-style-type: none"> - When the EGR emission is more than specified value. <ul style="list-style-type: none"> • The EGR controller circuit is open or short to ground. • The EGR controller is short to battery. - Check the EGR actuator wiring harness. - Check the supply voltage to EGR solenoid valve. - Check if the EGR valve is stuck. - Check the resistance of EGR valve: 15.4Ω. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #96 for open and short. 					
P0401	EGR Control Valve Fault (Low)	<ul style="list-style-type: none"> - When the EGR emission is more than specified value. <ul style="list-style-type: none"> • The EGR controller circuit is open or short to ground. • The EGR controller is short to battery. - Check the EGR actuator wiring harness. - Check the supply voltage to EGR solenoid valve. - Check if the EGR valve is stuck. - Check the resistance of EGR valve: 15.4Ω. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #96 for open and short. 					
P0402	EGR Valve Stuck in Open Position	<ul style="list-style-type: none"> - Causes <ul style="list-style-type: none"> • The EEGR valve is stuck with it open. - Check pin (refer to the page 1407) - Actions <ul style="list-style-type: none"> • Check EEGR valve and sensor wiring. • Visually check the unit and replace if necessary. • Replace the ECU if required. • Refer to DTCs (P0407 and P0408). 					

ECU-DSL

ECU-GSL

ECU-CDPF

TCU

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0405	High EGR Open Position Deviation	- Causes <ul style="list-style-type: none"> The difference between E-EGR position demand (MAP) value and E-EGR position feedback signal value is over 15% (the sensor output indicates E-EGR is open over 15% in the close status). - Actions <ul style="list-style-type: none"> Measure the resistance of E-EGR valve sensor. Check the sensor and actuator wiring harness. Check the unit. 					
P0406	High EGR Close Position Deviation	- Causes <ul style="list-style-type: none"> The difference between E-EGR position demand (MAP) value and E-EGR position feedback signal value is over 15% (the sensor output indicates E-EGR is closed over 15% in the open status). - Actions <ul style="list-style-type: none"> Measure the resistance of E-EGR valve sensor. Check the sensor and actuator wiring harness. Check the unit. 					
P0407	Low EGR Position Signal	- Diagnosis of E-EGR signal for the followings: <ul style="list-style-type: none"> Sensor signal is high or low. Total resistance value: $4\Omega \pm 40\%$ Sensor output range: 1.2 ~ 4.0 V Total sensor resistance: $4\text{ k}\Omega \pm 40\%$ Total motor resistance: $8.0\Omega \pm 0.5\Omega$ - Check pin for the followings: <ul style="list-style-type: none"> Check sensor reference voltage (5V) - ECU Pin #A33 Sensor signal - ECU Pin #A82 Sensor GND - ECU Pin #A09 - Actions <ul style="list-style-type: none"> Measure the resistance of E-EGR valve sensor. Check the sensor and actuator wiring harness. Check the unit. 					

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0408	High EGR Position Signal	<ul style="list-style-type: none"> - Diagnosis of E-EGR signal for the followings: <ul style="list-style-type: none"> • Sensor signal is high or low. • Total resistance value: $4\Omega \pm 40\%$ • Sensor output range: 1.2 ~ 4.0 V • Total sensor resistance: $4\text{ k}\Omega \pm 40\%$ • Total motor resistance: $8.0\Omega \pm 0.5\Omega$ - Check pin for the followings: <ul style="list-style-type: none"> • Check sensor reference voltage (5V) - ECU Pin #A33 • Sensor signal - ECU Pin #A82 • Sensor GND - ECU Pin #A09 - Actions <ul style="list-style-type: none"> • Measure the resistance of E-EGR valve sensor. • Check the sensor and actuator wiring harness. • Check the unit. 					
P0480	PWM Electric Fan Malfunction (Open circuit) (Only for D27DTP (POWER UP) model)	<ul style="list-style-type: none"> - The communication line between PWM electric fan and ECU is open. - The PWM electric fan's own malfunction cannot be identified. 					
P0481	PWM Electric Fan Malfunction(Short to B+) (Only for D27DTP (POWER UP) model)	<ul style="list-style-type: none"> - The communication line between PWM electric fan and ECU has a short to battery. - The PWM electric fan's own malfunction cannot be identified. 					
P0482	PWM Electric Fan Malfunction (Short to GND) (Only for D27DTP (POWER UP) model)	<ul style="list-style-type: none"> - The communication line between PWM electric fan and ECU has a short to ground. - The PWM electric fan's own malfunction cannot be identified. 					
P0483	Fan PWM motor out have short to GND	<ul style="list-style-type: none"> - Motor out have short to GND 					
P0484	Fan PWM Stall motor	<ul style="list-style-type: none"> - Stall motor 					
P0485	Fan PWM motor have over load	<ul style="list-style-type: none"> - Motor have over load 					
P0487	Faulty Maximum Throttle Closing Value	<ul style="list-style-type: none"> - Causes <ul style="list-style-type: none"> • The throttle is not fully closed when learning the full open value after stopping the engine. - Check pin (refer to P213C). - Sensor specification: Refer to P213C. - Actions <ul style="list-style-type: none"> • Check the throttle valve and sensor wiring harnesses. • Visually check the unit and replace if necessary. 					

ECU-DSL

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ECU-CDPF

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0488	Faulty Maximum Throttle Opening Value	<ul style="list-style-type: none"> - Causes <ul style="list-style-type: none"> • The throttle is not fully open when learning the full open value after initial ignition on. - Check pin (refer to P213C). - Sensor specification: Refer to P213C. - Actions <ul style="list-style-type: none"> • Check the throttle valve and sensor wiring harnesses. • Visually check the unit and replace if necessary. 					
P0530	Air Conditioner Refrigerant Sensor Supply Power Fault	<ul style="list-style-type: none"> - Causes <ul style="list-style-type: none"> • There is electric problem in the air conditioner's pressure sensor. - Check the sensor's specifications and ECU pin. <ul style="list-style-type: none"> • Power: 5V ECU Pin #B29 • Sensor signal ECU Pin #B41 • Sensor GND ECU Pin #B36 • Actual range: 2.0 kgf/cm² (0.75V) ~ 32 kgf/cm² (4.5V) • Resistance: 51KΩ (signal terminal and ground) • Output signal <ul style="list-style-type: none"> 0.5V 0.0 kgf/cm² 4.5V 32.0 kgf/cm² - Actions <ul style="list-style-type: none"> • Check the sensor's resistance and wiring. • Visually check the unit and replace if necessary. 					
P0532	Air Conditioner Refrigerant Pressure Signal Circuit Short	<ul style="list-style-type: none"> - Causes <ul style="list-style-type: none"> • There is electric problem in the air conditioner's pressure sensor. - Check the sensor's specifications and ECU pin. <ul style="list-style-type: none"> • Power: 5V ECU Pin #B29 • Sensor signal ECU Pin #B41 • Sensor GND ECU Pin #B36 • Actual range: 2.0 kgf/cm² (0.75V) ~ 32 kgf/cm² (4.5V) • Resistance: 51KΩ (signal terminal and ground) • Output signal <ul style="list-style-type: none"> 0.5V 0.0 kgf/cm² 4.5V 32.0 kgf/cm² - Actions <ul style="list-style-type: none"> • Check the sensor's resistance and wiring. • Visually check the unit and replace if necessary. 					

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0533	Excessive Air Conditioner Refrigerant Pressure	<ul style="list-style-type: none"> - Causes <ul style="list-style-type: none"> • There is electric problem in the air conditioner's pressure sensor. - Check the sensor's specifications and ECU pin. <ul style="list-style-type: none"> • Power: 5V ECU Pin #B29 • Sensor signal ECU Pin #B41 • Sensor GND ECU Pin #B36 • Actual range: 2.0 kgf/cm² (0.75V) ~ 32 kgf/cm² (4.5V) • Resistance: 51KΩ (signal terminal and ground) • Output signal <ul style="list-style-type: none"> 0.5V 0.0 kgf/cm² 4.5V 32.0 kgf/cm² - Actions <ul style="list-style-type: none"> • Check the sensor's resistance and wiring. • Visually check the unit and replace if necessary. 					
P0560	Battery Voltage Malfunction	<ul style="list-style-type: none"> - Malfunction in recognition of system source voltage (A/D converter faults). <ul style="list-style-type: none"> • Less than minimum 8 Volts in 2000 rpm below • Less than 10 Volts in 2000 rpm above. - Check the battery wiring harness for ECU pin #3, #4 and #5 (open, short, poor contact). - Check the battery main relay and fuse. - Check the body ground. - Measure the resistance between body ground and ECU ground. <ul style="list-style-type: none"> • Repair the ECU ground if the resistance is high. - Replace the ECU if required. 	O				
P0562	Low Battery Voltage	<ul style="list-style-type: none"> - Malfunction in recognition of system source voltage (Lower than threshold). <ul style="list-style-type: none"> • Less than minimum 8 Volts in 2000 rpm below • Less than 10 Volts in 2000 rpm above. - Check the battery wiring harness for ECU pin #3, #4 and #5 (open, short, poor contact). - Check the battery main relay and fuse. - Check the body ground. - Measure the resistance between body ground and ECU ground. <ul style="list-style-type: none"> • Repair the ECU ground if the resistance is high. - Replace the ECU if required. 	O				

ECU-DSL

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ECU-CDPF

ECU-CDPF

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0563	High Battery Voltage	<ul style="list-style-type: none"> - Malfunction in recognition of system source voltage (Higher than threshold). <ul style="list-style-type: none"> • More than minimum 16 Volts in 2000 rpm below - Check the battery wiring harness for ECU pin #3, #4 and #5 (open, short, poor contact). - Check the alternator. - Check the body ground. - Measure the resistance between body ground and ECU ground. <ul style="list-style-type: none"> • Repair the ECU ground if the resistance is high. - Replace the ECU if required. 	O				
P0571	Brake Pedal Switch Fault	<ul style="list-style-type: none"> - The brake pedal switch or light switch is faulty. <ul style="list-style-type: none"> • Brake pedal switch: Normal Close (NC) • Light switch: Normal Open (NO) • When operating the brake switch, one signal (NO) is sent to auto cruise and the other (NC) is sent to brake lamp. - Check the brake and light switch wiring harness. - Check the supply voltage to brake and light switch (12 V). - Check the brake and light switch for contact. - Check the ECU wiring harness for ECU pin #77 and #58 (short, poor contact). - Replace the ECU if required. 					
P0602	Faulty Vehicle Speed Sensor Coding	<ul style="list-style-type: none"> - The vehicle signal is inputted via CAN communication without ESP or TCCU. - The CAN communication between units is malfunctioning. 					
P0606	ECU Watchdog Fault	<ul style="list-style-type: none"> - The ECU is defective. - Check the chassis ground wiring harness. - Check the ECU. - Replace the ECU if required. 					

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0608	Faulty ABS/ESP Coding	- The ABS/ESP variant coding is faulty. - The CAN communication is malfunctioning.					
P0611	No Data for C3I	- C3I • There is no C3I data in ECU or the checksum is faulty.					
P0612	Internal Error in C3I Data	- C3I • The error is occurred while sending C3I data in ECU to RAM.					
P0613	Faulty TCU Coding	- The TCU variant coding is faulty. - The CAN communication between units is malfunctioning.					
P0614	TCCU Coding Failt	- Occurred if TCCU variant coding is faulty. - Occurred when there is CAN communication error between units.					
P0618	Multi calibration not performed	- Perform multi calibration again.					
P0619	Multi calibration performing error	- Perform multi calibration again.					
P062D (former P1611)	Injector Bank #1 Malfunction - Low Voltage	- Malfunction of injector (#1, #4, #3) circuit (Low): Short to Ground or to Battery. - Operating voltage: 6 ~ 18 V - Check the injector bank #1: Open and poor contact - Check if the trouble recurs with the injectors removed and the ignition key "OFF". • If recurred, check the injector and ECU wiring harness. - Check if the trouble recurs while installing the injectors one by one with the ignition key "ON". • If recurred, replace the injector (perform C2I coding after replacement). • Check the other injectors with same manner. - Check the ECU wiring harness. • ECU pin #44 and #63 - Replace the ECU if required.					
P062E (former P1618)	Injector Bank #2 Malfunction - Low Voltage	- Malfunction of injector (#2, #5) circuit (Low): Short to Ground or to Battery. - Operating voltage: 6 ~ 18 V - Check the injector bank #2: Open and poor contact - Check if the trouble recurs with the injectors removed and the ignition key "OFF". • If recurred, check the injector and ECU wiring harness. - Check if the trouble recurs while installing the injectors one by one with the ignition key "ON". • If recurred, replace the injector (perform C2I coding after replacement). • Check the other injectors with same manner. - Check the ECU wiring harness. • ECU pin #44 and #63 - Replace the ECU if required.					

ECU-DSL

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P062F	Multi calibration memory error	- Perform multi calibration again.					
P0630	Variant Coding is not done	- Variant coding is not done					
P0631	Variant Coding writing error	- Variant coding writing error					
P0633	Immobilizer Fault (refer to immobilizer section)	<ul style="list-style-type: none"> - Key memory is not available (permissible - 5). - Perform the immobilizer coding again. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #34 for open and short. - Check the immobilizer unit for open and short or check the supply voltage. - Check the immobilizer antenna and transponder for damage. - Replace the ECU if required. 					
P0641	ECU Supply Voltage 1 Fault (5 V)	<ul style="list-style-type: none"> - Malfunction reference supply voltage from ECU <ul style="list-style-type: none"> • Supply voltage: 5 V - Check the supply voltage to each sensor <ul style="list-style-type: none"> • Supply voltage (5 V): accelerator pedal sensor 1, HFM sensor, rail pressure sensor, booster pressure sensor, cam sensor - Check the wiring harnesses. - Replace the ECU if required. 					
P0642	ECU Supply Voltage 1 Fault - Low (5 V)	<ul style="list-style-type: none"> - Malfunction reference supply voltage from ECU <ul style="list-style-type: none"> • Supply voltage: 5 V - Check the supply voltage to each sensor <ul style="list-style-type: none"> • Supply voltage (5 V): accelerator pedal sensor 1, HFM sensor, rail pressure sensor, booster pressure sensor, cam sensor - Check the wiring harnesses. - Replace the ECU if required. 					
P0643	ECU Supply Voltage 1 Fault - High (5 V)	<ul style="list-style-type: none"> - Malfunction reference supply voltage from ECU <ul style="list-style-type: none"> • Supply voltage: 5 V - Check the supply voltage to each sensor <ul style="list-style-type: none"> • Supply voltage (5 V): accelerator pedal sensor 1, HFM sensor, rail pressure sensor, booster pressure sensor, cam sensor - Check the wiring harnesses. - Replace the ECU if required. 					
P0649	Diag Lamp Drive Open Circuit	Open circuit					
P0650	Diag Lamp Drive Short to BATT	Short to batt					

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0651	ECU Supply Voltage 2 Fault (5 V)	<ul style="list-style-type: none"> - Malfunction reference supply voltage from ECU <ul style="list-style-type: none"> • Supply voltage: 5 V - Check the supply voltage to each sensor <ul style="list-style-type: none"> • Supply voltage (5 V): accelerator pedal sensor 1, HFM sensor, rail pressure sensor, booster pressure sensor, cam sensor - Check the wiring harnesses. - Replace the ECU if required. 			O		O
P0652	ECU Supply Voltage 2 Fault - Low (5 V)	<ul style="list-style-type: none"> - Malfunction reference supply voltage from ECU <ul style="list-style-type: none"> • Supply voltage: 5 V - Check the supply voltage to each sensor <ul style="list-style-type: none"> • Supply voltage (5 V): accelerator pedal sensor 1, HFM sensor, rail pressure sensor, booster pressure sensor, cam sensor - Check the wiring harnesses. - Replace the ECU if required. 			O		O
P0653	ECU Supply Voltage 2 Fault - High (5 V)	<ul style="list-style-type: none"> - Malfunction reference supply voltage from ECU <ul style="list-style-type: none"> • Supply voltage: 5 V - Check the supply voltage to each sensor <ul style="list-style-type: none"> • Supply voltage (5 V): accelerator pedal sensor 1, HFM sensor, rail pressure sensor, booster pressure sensor, cam sensor - Check the wiring harnesses. - Replace the ECU if required. 			O		O
P066A	Internal malfunction in #1 glow plug controller	<ul style="list-style-type: none"> - Cylinder #1 (Glow Plug #1) - Details: refer to P2673. 					
P066B	Internal short in #1 glow plug controller	<ul style="list-style-type: none"> - Cylinder #1 (Glow Plug #1) - Details: refer to P2673. 					
P066C	Internal malfunction in #2 glow plug controller	<ul style="list-style-type: none"> - Cylinder #2 (Glow Plug #2) - Details: refer to P2673. 					
P066D	Internal short in #2 glow plug controller	<ul style="list-style-type: none"> - Cylinder #2 (Glow Plug #2) - Details: refer to P2673. 					
P066E	Internal malfunction in #3 glow plug controller	<ul style="list-style-type: none"> - Cylinder #3 (Glow Plug #3) - Details: refer to P2673. 					
P066F	Internal short in #3 glow plug controller	<ul style="list-style-type: none"> - Cylinder #3 (Glow Plug #3) - Details: refer to P2673. 					
P0670	Defective power supply of glow plug controller	<ul style="list-style-type: none"> - Details: refer to P2673. 					

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0671	#3 Glow Plug Fault - Open	<ul style="list-style-type: none"> - The glow plug circuit is open. - Check the communication line between ECU and each glow plug. - Check each glow plug wiring harness. - Check the resistance of each glow plug: below 1 Ω. - Check each glow plug relay. - Check the ECU wiring harness. - Replace the ECU if required. 					
P0672	#4 Glow Plug Fault - Open	<ul style="list-style-type: none"> - The glow plug circuit is open. - Check the communication line between ECU and each glow plug. - Check each glow plug wiring harness. - Check the resistance of each glow plug: below 1 Ω. - Check each glow plug relay. - Check the ECU wiring harness. - Replace the ECU if required. 					
P0673	#5 Glow Plug Fault - Open	<ul style="list-style-type: none"> - The glow plug circuit is open. - Check the communication line between ECU and each glow plug. - Check each glow plug wiring harness. - Check the resistance of each glow plug: below 1 Ω. - Check each glow plug relay. - Check the ECU wiring harness. - Replace the ECU if required. 					
P0674	#1 Glow Plug Fault - Open	<ul style="list-style-type: none"> - The glow plug circuit is open. - Check the communication line between ECU and each glow plug. - Check each glow plug wiring harness. - Check the resistance of each glow plug: below 1 Ω. - Check each glow plug relay. - Check the ECU wiring harness. - Replace the ECU if required. 					
P0675	#2 Glow Plug Fault - Open	<ul style="list-style-type: none"> - The glow plug circuit is open. - Check the communication line between ECU and each glow plug. - Check each glow plug wiring harness. - Check the resistance of each glow plug: below 1 Ω. - Check each glow plug relay. - Check the ECU wiring harness. - Replace the ECU if required. 					
P067A	Internal malfunction in #4 glow plug controller	<ul style="list-style-type: none"> - Cylinder #4 (Glow Plug #4) - Details: refer to P2673. 					
P067B	Internal short in #4 glow plug controller	<ul style="list-style-type: none"> - Cylinder #4 (Glow Plug #4) - Details: refer to P2673. 					
P067C	Internal malfunction in #5 glow plug controller	<ul style="list-style-type: none"> - Cylinder #5 (Glow Plug #5) - Details: refer to P2673. 					
P067D	Internal short in #5 glow plug controller	<ul style="list-style-type: none"> - Cylinder #5 (Glow Plug #5) - Details: refer to P2673. 					
P0683	Defective CAN communication of glow plug controller	<ul style="list-style-type: none"> - GCU's CAN signal is intermittently defective. 					

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P0685	Main Relay Malfunction	<ul style="list-style-type: none"> - The the main relay is unexpectedly high/low state (ECU is supplied after 3 seconds). - Relay resistance: $92 \pm 9 \Omega$ (at 20°C) - Check the relay wiring harness (open, short and poor contact). <ul style="list-style-type: none"> • Check for open and short: ECU pin #9. - If the forced operation is not available, replace the ECU. 					
P0697	ECU Supply Voltage Fault (2.5 V)	<ul style="list-style-type: none"> - Malfunction reference supply voltage from ECU <ul style="list-style-type: none"> • Supply voltage: 2.5 V - Check the supply voltage to each sensor <ul style="list-style-type: none"> • Supply voltage (2.55 V): accelerator pedal sensor 2 - Check the wiring harnesses. - Replace the ECU if required. 					
P0698	ECU Supply Voltage Fault - Low (2.5 V)	<ul style="list-style-type: none"> - Malfunction reference supply voltage from ECU <ul style="list-style-type: none"> • Supply voltage: 2.5 V - Check the supply voltage to each sensor <ul style="list-style-type: none"> • Supply voltage (2.5 V): accelerator pedal sensor 2 - Check the wiring harnesses. - Replace the ECU if required. 					
P0699	ECU Supply Voltage Fault - High (2.5 V)	<ul style="list-style-type: none"> - Malfunction reference supply voltage from ECU <ul style="list-style-type: none"> • Supply voltage: 2.5 V - Check the supply voltage to each sensor <ul style="list-style-type: none"> • Supply voltage (2.55 V): accelerator pedal sensor 2 - Check the wiring harnesses. - Replace the ECU if required. 					
P0700	TCU Signal Fault	<ul style="list-style-type: none"> - The communication between ECU and TCU is faulty. - Check the communication line between ECU and TCU. - Check the ECU pin #54, 73 for open and short. - Replace the ECU if required. 					
P0704	Clutch switch malfunction	<ul style="list-style-type: none"> - The clutch switch is faulty (Manual Transmission Only). - Check the switch wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #38 for open, short and poor contact. - Check the switch supply voltage and operations. - Replace the ECU if required. 					
P0805	Neutral Signal Input Malfunction (Only for D27DT M/T model)	<ul style="list-style-type: none"> - The neutral signal of M/T is sent to CAN cluster which is then sent to ECU via CAN communication. - The ECU cannot detect whether signal is missing due to the malfunction in neutral signal and wiring or due to the line malfunction. - Check the wiring related to neutral switch. 					

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1102	HFM Sensor - High Characteristic Value (Only for D27DT model)	- The characteristic value of HFM sensor is over the specified value (not wiring malfunction).					
P1103	HFM Sensor - Low Characteristic Value (Only for D27DT model)	- The characteristic value of HFM sensor is below the specified value (not wiring malfunction).					
P1105	Barometric Sensor Circuit Short	- Out of range about barometric sensor (over voltage). - Actual barometric pressure vs. Output voltages. <ul style="list-style-type: none"> 15 Kpa: 0 V 35 Kpa: 1.0 V 55 Kpa: 2.0 V 80 Kpa: 3.0 V 100 Kpa: 4.0 V 110 Kpa: 4.5 V - Replace the ECU.					
P1106	Booster Pressure Sensor Malfunction	- Out of range of supply voltages about boost pressure sensor at Ignition key-On and Engine Stop (Higher than specified values). - Check the supply voltage to sensor. - Actual boost pressure vs. Output voltages. <ul style="list-style-type: none"> Raw Signal Range: 0.545 ~ 2.490 bar 0.4 bar: 0.6120 V 1.4 bar: 2.6520 V 2.4 bar: 4.6920 V - Check the sensor wiring harness for ECU pin #99 and #100 (open, poor contact). - Visually check sensor and replace if required. - Replace the ECU if required. - Check whether existing or not about turbo boosting control malfunction (P1235) simultaneously. - If there is turbo boost control fault, Should be checked followings also; <ul style="list-style-type: none"> Leakage before turbo system Vacuum pump malfunction Waste gate' solenoid valve Turbo charger system defect or malfunction itself Air inlet restriction Exhaust system restriction 					
P1107	Barometric Sensor Circuit Short/GND Short	- Out of range about barometric sensor (short to ground). - Actual barometric pressure vs. Output voltages. <ul style="list-style-type: none"> 15 Kpa: 0 V 35 Kpa: 1.0 V 55 Kpa: 2.0 V 80 Kpa: 3.0 V 100 Kpa: 4.0 V 110 Kpa: 4.5 V - Replace the ECU.					
P1108	Barometric Sensor Circuit Short	- Out of range about barometric sensor (short to B+). - Actual barometric pressure vs. Output voltages. <ul style="list-style-type: none"> 15 Kpa: 0 V 35 Kpa: 1.0 V 55 Kpa: 2.0 V 80 Kpa: 3.0 V 100 Kpa: 4.0 V 110 Kpa: 4.5 V - Replace the ECU.					

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1109	Booster Pressure Sensor Initial Check Fault	<ul style="list-style-type: none"> - Implausible signal values or range about boost pressure sensor at Engine running condition (Higher than specified values). - Check the supply voltage to sensor. - Actual boost pressure vs. Output voltages <ul style="list-style-type: none"> • Raw Signal Range: 0.545 ~ 2.490 bar • 0.4 bar: 0.6120 V • 1.4 bar: 2.6520 V • 2.4 bar: 4.6920 V - Check the sensor wiring harness for ECU pin #99 and #100 (open, poor contact). - Visually check sensor and replace if required. - Replace the ECU if required. - Check whether existing or not about turbo boosting control malfunction (P1235) simultaneously. - If there is turbo boost control fault, Should be checked followings also; <ul style="list-style-type: none"> • Leakage before turbo system • Vacuum pump malfunction • Waste gate' solenoid valve • Turbo charger system defect or malfunction itself • Air inlet restriction • Exhaust system restriction 					
P110A	AMF OBD High Sigal	- High signal					
P110B	AMF OBD Low Sigal	- Low signal					
P1115	Coolant Temperature Sensor Malfunction	<ul style="list-style-type: none"> - Implausible values of coolant temperature (If the temperature is below the limits values after warm up). - If Fuel temperature is invalid, the previous coolant temperature is retained. - Check the supply voltage to sensor. - Actual air temp. vs. Resistance <ul style="list-style-type: none"> • 20°C: 2449 Ω • 50°C: 826.3 Ω • 80°C: 321.4 Ω • 100°C: 112.9 Ω - Check the wiring harness (open, short and poor contact). <ul style="list-style-type: none"> • ECU pin #101 and #102 - Visually check the sensor and replace if required. - Check the thermostat, water pump radiator related coolant route (thermostat stuck). - Replace the ECU if required. 					

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1120	Accelerator Pedal Sensor #1 Malfunction	<ul style="list-style-type: none"> - The potentiometer 1 is not plausible with potentiometer 2. - Check the supply voltage to sensor. - Check the wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #72, 53 and #32, 14 for open and short. - Check the accelerator pedal module. - Check the ECU wiring harness. - Replace the ECU if required. 	O				
P1121	Accelerator Pedal Sensor #2 Malfunction	<ul style="list-style-type: none"> - The potentiometer 1 is not plausible with potentiometer 2. - Check the supply voltage to sensor. - Check the wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #72, 53 and #32, 14 for open and short. - Check the accelerator pedal module. - Check the ECU wiring harness. - Replace the ECU if required. 	O				
P1122	Accelerator Pedal Sensor Malfunction (Limp Home Mode)	<ul style="list-style-type: none"> - When triggering limp home mode. - Check the supply voltage to sensor. - Check the wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #72, 71, 53 and #57, 32, 14 for open and short. - Check the accelerator pedal module. - Check the ECU wiring harness. - Replace the ECU if required. 					
P1123	Accelerator Pedal Sensor Malfunction (Torque Mode)	<ul style="list-style-type: none"> - When triggering reduced torque mode. - Check the supply voltage to sensor. - Check the wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #72, 71, 53 and #57, 32, 14 for open and short. - Check the accelerator pedal module. - Check the ECU wiring harness. - Replace the ECU if required 	O				
P1124	Accelerator Pedal Sensor Malfunction - Stuck	<ul style="list-style-type: none"> - The accelerator pedal sensor is stuck. - Check the brake switch wiring harness and operations. - Check the accelerator pedal operations. - Check the accelerator pedal module. - Check the ECU wiring harness. - Replace the ECU if required. 					O
P1148	Accelerometer (Knock Sensor) Learning Fault	<ul style="list-style-type: none"> - Check if the MDP is successful. - Check the accelerometer (knock sensor) sensor and wiring harness. - Replace the ECU if required. 		O			
P1149	Too High Water Level in Fuel Filter	<ul style="list-style-type: none"> - Drain the water from fuel filter. 					
P1170	Torque Trim Fault - High	<ul style="list-style-type: none"> - Refer to P0372. 					
P1171	#1 Injector MDP Malfunction	<ul style="list-style-type: none"> - The #1 injector MDP is faulty. - Replace the injector and perform C2I coding again. 					
P1172	#2 Injector MDP Malfunction	<ul style="list-style-type: none"> - The #2 injector MDP is faulty. - Replace the injector and perform C2I coding again. 					

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1173	#3 Injector MDP Malfunction	<ul style="list-style-type: none"> - The #3 injector MDP is faulty. - Replace the injector and perform C2I coding again. 					
P1174	#4 Injector MDP Malfunction	<ul style="list-style-type: none"> - The #4 injector MDP is faulty. - Replace the injector and perform C2I coding again. 					
P1175	#5 Injector MDP Malfunction	<ul style="list-style-type: none"> - The #5 injector MDP is faulty. - Replace the injector and perform C2I coding again. 					
P1190	Fuel Rail Pressure Sensor Initial Signal Fault	<ul style="list-style-type: none"> - The rail pressure sensor initial values are higher or lower than specified values with the ignition "ON". <ul style="list-style-type: none"> • Maximum sensing values: 90 bar (Short) • Minimum sensing values: <ul style="list-style-type: none"> - 90 bar (Open) - Check the supply voltage to sensor. <ul style="list-style-type: none"> • Output voltage at 1600 bar: 4.055 ± 0.125 V • Output voltage at atmospheric pressure: 0.5 ± 0.04 V - Check the sensor and ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #25, #26 for open and short. • Check the fuel rails and high pressure pipes for leaks. - Check the fuel rail pressure sensor. - Replace the ECU if required. 	O				
P1191	Pressure Build Up - Too Slow	<ul style="list-style-type: none"> - The pressure build up during cranking is too slow. - Check the IMV wiring harness. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #87 for open and short. - Check the rail pressure sensor. <ul style="list-style-type: none"> • Supply voltage: 5 ± 0.1 V • Output voltage at 1600 bar: 4.055 ± 0.125 V • Output voltage at atmospheric pressure: 0.5 ± 0.04 V - Check the transfer pressure fuel lines. <ul style="list-style-type: none"> • Check the fuel level in fuel tank. Check the fuel system for air influx. • Check the fuel filter specification. - Check the high pressure fuel system. <ul style="list-style-type: none"> • Check the fuel rails and high pressure pipes for leaks. - Check the IMV resistance: 5.44Ω <ul style="list-style-type: none"> • When out of specified value: replace high pressure pump and IMV - Replace the ECU if required. 					

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1192	Fuel Rail Pressure Sensor Initial Signal Fault - Low	<ul style="list-style-type: none"> - The rail pressure sensor initial values are lower than specified values with the ignition "ON". <ul style="list-style-type: none"> • Minimum sensing values: <ul style="list-style-type: none"> - 90 bar (Open) - Check the supply voltage to sensor. <ul style="list-style-type: none"> • Output voltage at 1600 bar: 4.055 ± 0.125 V • Output voltage at atmospheric pressure: 0.5 ± 0.04 V - Check the sensor and ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #25, #26 for open and poor contact. • Check the fuel rails and high pressure pipes for leaks. - Check the fuel rail pressure sensor. - Replace the ECU if required. 	O				
P1193	Fuel Rail Pressure Sensor Initial Signal Fault - High	<ul style="list-style-type: none"> - The rail pressure sensor initial values are higher than specified values with the ignition "ON". <ul style="list-style-type: none"> • Maximum sensing values: 90 bar (Short) - Check the supply voltage to sensor. <ul style="list-style-type: none"> • Output voltage at 1600 bar: 4.055 ± 0.125 V • Output voltage at atmospheric pressure: 0.5 ± 0.04 V - Check the sensor and ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #25, #26 for short and poor contact. • Check the fuel rails and high pressure pipes for leaks. - Check the fuel rail pressure sensor. - Replace the ECU if required. 	O				
P1201	Injector #1 Circuit Short	<ul style="list-style-type: none"> - Injector #1 circuit malfunction: Short. <ul style="list-style-type: none"> • If the trouble recurs with the injector removed, replace the injector. Perform C2I coding and check again. • If the trouble does not recur, check the wiring harness between the injector and ECU (ECU pin: #117, #114). - Replace the ECU if required. 					
P1202	Injector #2 Circuit Short	<ul style="list-style-type: none"> - Injector #2 circuit malfunction: Short. <ul style="list-style-type: none"> • If the trouble recurs with the injector removed, replace the injector. Perform C2I coding and check again. • If the trouble does not recur, check the wiring harness between the injector and ECU (ECU pin: #118, #121). - Replace the ECU if required. 					

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1203	Injector #3 Circuit Short	<ul style="list-style-type: none"> - Injector #3 circuit malfunction: Short. <ul style="list-style-type: none"> • If the trouble recurs with the injector removed, replace the injector. Perform C2I coding and check again. • If the trouble does not recur, check the wiring harness between the injector and ECU (ECU pin: #117, #116). - Replace the ECU if required. 					
P1204	Injector #4 Circuit Short	<ul style="list-style-type: none"> - Injector #4 circuit malfunction: Short. <ul style="list-style-type: none"> • If the trouble recurs with the injector removed, replace the injector. Perform C2I coding and check again. • If the trouble does not recur, check the wiring harness between the injector and ECU (ECU pin: #117, #115). - Replace the ECU if required. 					
P1205	Injector #5 Circuit Short	<ul style="list-style-type: none"> - Injector #5 circuit malfunction: Short. <ul style="list-style-type: none"> • If the trouble recurs with the injector removed, replace the injector. Perform C2I coding and check again. • If the trouble does not recur, check the wiring harness between the injector and ECU (ECU pin: #118, #120). - Replace the ECU if required. 					
P1234	VGT Operation Fault (High)	<ul style="list-style-type: none"> - The boost pressure control is faulty. - Check the air intake system. - Check the supply voltage to sensor. - Check the wiring harness and the ECU wiring harness. - Replace the ECU if required. 	O				
P1235	VGT Operation Fault	<ul style="list-style-type: none"> - The boost pressure control is faulty. - Check the air intake system. - Check the supply voltage to sensor. - Check the wiring harness and the ECU wiring harness. - Replace the ECU if required. 	O				
P1252	Too High IMV Pressure	<ul style="list-style-type: none"> - The rail pressure is excessively high. - Check the IMV wiring harness. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #87 for open and short. - Check the rail pressure sensor. <ul style="list-style-type: none"> • Supply voltage: 5 ± 0.1 V • Output voltage at 1600 bar: 4.055 ± 0.125 V • Output voltage at atmospheric pressure: 0.5 ± 0.04 V - Check the transfer pressure fuel lines. <ul style="list-style-type: none"> • Check the fuel level in fuel tank. Check the fuel system for air influx. • Check the fuel filter specification. - Check the high pressure fuel system. <ul style="list-style-type: none"> • Check the fuel rails and high pressure pipes for leaks. - Check the IMV resistance: 5.44Ω <ul style="list-style-type: none"> • When out of specified value: replace high pressure pump and IMV - Replace the ECU if required. 					

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1253	Minimum Rail Pressure Control Malfunction (IMV Fault)	<ul style="list-style-type: none"> - Rail pressure faults: Too low - Check the IMV wiring harness. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #87 for open and short. - Check the high pressure fuel lines, fuel rails and high pressure pipes for leaks. - Check the rail pressure sensor. <ul style="list-style-type: none"> • Supply voltage: 5 ± 0.1 V • Output voltage at 1600 bar: 4.055 ± 0.125 V • Output voltage at atmospheric pressure: 0.5 ± 0.04 V - Check the transfer pressure fuel pressure lines. <ul style="list-style-type: none"> • Check the fuel level in fuel tank. Check the fuel system for air influx. • Check the fuel filter specification. - Check the IMV resistance: 5.44Ω <ul style="list-style-type: none"> • When out of specified value: replace high pressure pump and IMV - Replace the ECU if required. 					
P1254	Maximum Rail Pressure Control Malfunction (IMV Fault)	<ul style="list-style-type: none"> - Rail pressure faults: Too high - Check the IMV wiring harness. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #87 for open and short. - Check the high pressure fuel lines, fuel rails and high pressure pipes for leaks. - Check the rail pressure sensor. <ul style="list-style-type: none"> • Supply voltage: 5 ± 0.1 V • Output voltage at 1600 bar: 4.055 ± 0.125 V • Output voltage at atmospheric pressure: 0.5 ± 0.04 V - Check the transfer pressure fuel pressure lines. <ul style="list-style-type: none"> • Check the fuel level in fuel tank. Check the fuel system for air influx. • Check the fuel filter specification. - Check the IMV resistance: 5.44Ω <ul style="list-style-type: none"> • When out of specified value: replace high pressure pump and IMV - Replace the ECU if required. 					

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1256	Too Small Transfer Pressure Fuel in Rail Pressure System	<ul style="list-style-type: none"> - Rail pressure fault: IMV current trim too high, drift. - Check the IMV wiring harness. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #87 for open and short. - Check the rail pressure sensor. <ul style="list-style-type: none"> • Supply voltage: 5 ± 0.1 V • Output voltage at 1600 bar: 4.055 ± 0.125 V • Output voltage at atmospheric pressure: 0.5 ± 0.04 V - Check the transfer pressure fuel pressure lines. <ul style="list-style-type: none"> • Check the fuel level in fuel tank. Check the fuel system for air influx. • Check the fuel filter specification. - Check the high pressure fuel system. <ul style="list-style-type: none"> • Check the fuel rails and high pressure pipes for leaks. - Check the IMV resistance: 5.44Ω <ul style="list-style-type: none"> • When out of specified value: replace high pressure pump and IMV - Replace the ECU if required. 					
P1257	Too Large Transfer Pressure Fuel in Rail Pressure System	<ul style="list-style-type: none"> - Rail pressure fault: IMV current trim too high, drift. - Check the IMV wiring harness. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #87 for open and short. - Check the rail pressure sensor. <ul style="list-style-type: none"> • Supply voltage: 5 ± 0.1 V • Output voltage at 1600 bar: 4.055 ± 0.125 V • Output voltage at atmospheric pressure: 0.5 ± 0.04 V - Check the transfer pressure fuel pressure lines. <ul style="list-style-type: none"> • Check the fuel level in fuel tank. Check the fuel system for air influx. • Check the fuel filter specification. - Check the high pressure fuel system. <ul style="list-style-type: none"> • Check the fuel rails and high pressure pipes for leaks. - Check the IMV resistance: 5.44Ω <ul style="list-style-type: none"> • When out of specified value: replace high pressure pump and IMV - Replace the ECU if required. 					

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1258	Too Small High Pressure Fuel in Rail Pressure System	<ul style="list-style-type: none"> - Rail pressure fault: IMV current trim too high, drift. - Check the IMV wiring harness. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #87 for open and short. - Check the rail pressure sensor. <ul style="list-style-type: none"> • Supply voltage: 5 ± 0.1 V • Output voltage at 1600 bar: 4.055 ± 0.125 V • Output voltage at atmospheric pressure: 0.5 ± 0.04 V - Check the transfer pressure fuel lines. <ul style="list-style-type: none"> • Check the fuel level in fuel tank. Check the fuel system for air influx. • Check the fuel filter specification. - Check the high pressure fuel system. <ul style="list-style-type: none"> • Check the fuel rails and high pressure pipes for leaks. - Check the IMV resistance: 5.44Ω <ul style="list-style-type: none"> • When out of specified value: replace high pressure pump and IMV - Replace the ECU if required. 					
P1259	Too Large High Pressure Fuel in Rail Pressure System	<ul style="list-style-type: none"> - Rail pressure fault: IMV current trim too high, drift. - Check the IMV wiring harness. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #87 for open and short. - Check the rail pressure sensor. <ul style="list-style-type: none"> • Supply voltage: 5 ± 0.1 V • Output voltage at 1600 bar: 4.055 ± 0.125 V • Output voltage at atmospheric pressure: 0.5 ± 0.04 V - Check the transfer pressure fuel lines. <ul style="list-style-type: none"> • Check the fuel level in fuel tank. Check the fuel system for air influx. • Check the fuel filter specification. - Check the high pressure fuel system. <ul style="list-style-type: none"> • Check the fuel rails and high pressure pipes for leaks. - Check the IMV resistance: 5.44Ω <ul style="list-style-type: none"> • When out of specified value: replace high pressure pump and IMV - Replace the ECU if required. 					

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1260	Too high IMV Driving Current	<ul style="list-style-type: none"> - Abnormal rail pressure, IMV CURRENT TRIM TOO HIGH, DRIFT - Check the IMV wiring harnesses. - Check the ECU wiring harnesses. <ul style="list-style-type: none"> • Check ECU's pin A76 for open and short. - Check the Rail pressure sensor. <ul style="list-style-type: none"> • Supply voltage: $5 \pm 0.1V$ • Output voltage at 1600 bar: $4.055 \pm 0.125V$ • Output voltage at atmospheric pressure: $0.5 \pm 0.04V$ - Check low-pressure fuel system. <ul style="list-style-type: none"> • Check fuel in fuel reservoir and air penetration. • Check fuel filter's specification. - Check high-pressure fuel system. <ul style="list-style-type: none"> • Check fuel rail and high-pressure pipe for leaks. - Check IMV's resistance (5.44Ω). <ul style="list-style-type: none"> • If the resistance is out of specification, replace the high-pressure pump and IMV. 					
P1286	Low Resistance for Injector #1 wiring harness	<ul style="list-style-type: none"> - Out of range about wiring harness resistance for Injector #1. <ul style="list-style-type: none"> • Low: Less than 0.150Ω (injector circuit open) - Check the injector #1 wiring harness and electric isolation. - Check the injector #1 wiring harness for open circuit. <ul style="list-style-type: none"> • If the pin in injector #1 is defective, replace injector #1 and perform C2I coding, then check again. • If the pin in injector #1 is not defective, check the ECU wiring harness. - Replace the ECU if required. 					
P1287	High Resistance for Injector #1 wiring harness	<ul style="list-style-type: none"> - Out of range about wiring harness resistance for Injector #1. <ul style="list-style-type: none"> • High: More than 0.573Ω (injector circuit short) - Check the injector #1 wiring harness and electric isolation. - Check the injector #1 wiring harness for short circuit. <ul style="list-style-type: none"> • If the trouble still exists after removing the injector connector, replace injector #1 and perform C2I coding, then check again. • If the trouble is fixed after removing the injector connector, check the wiring harness between ECU and injector. - Replace the ECU if required. 					

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1288	Low Resistance for Injector #2 wiring harness	<ul style="list-style-type: none"> - Out of range about wiring harness resistance for Injector #2. <ul style="list-style-type: none"> • Low: Less than 0.150 Ω (injector circuit open) - Check the injector #2 wiring harness and electric isolation. - Check the injector #2 wiring harness for open circuit. <ul style="list-style-type: none"> • If the pin in injector #2 is defective, replace injector #2 and perform C2I coding, then check again. • If the pin in injector #2 is not defective, check the ECU wiring harness. - Replace the ECU if required. 					
P1289	High Resistance for Injector #2 wiring harness	<ul style="list-style-type: none"> - Out of range about wiring harness resistance for Injector #2. <ul style="list-style-type: none"> • High: More than 0.573 Ω (injector circuit short) - Check the injector #2 wiring harness and electric isolation. - Check the injector #2 wiring harness for short circuit. <ul style="list-style-type: none"> • If the trouble still exists after removing the injector connector, replace injector #2 and perform C2I coding, then check again. • If the trouble is fixed after removing the injector connector, check the wiring harness between ECU and injector. - Replace the ECU if required. 					
P1290	Low Resistance for Injector #3 wiring harness	<ul style="list-style-type: none"> - Out of range about wiring harness resistance for Injector #3. <ul style="list-style-type: none"> • Low: Less than 0.150 Ω (injector circuit open) - Check the injector #3 wiring harness and electric isolation. - Check the injector #3 wiring harness for open circuit. <ul style="list-style-type: none"> • If the pin in injector #3 is defective, replace injector #3 and perform C2I coding, then check again. • If the pin in injector #3 is not defective, check the ECU wiring harness. - Replace the ECU if required. 					

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1291	High Resistance for Injector #3 wiring harness	<ul style="list-style-type: none"> - Out of range about wiring harness resistance for Injector #3. <ul style="list-style-type: none"> • High: More than 0.573 Ω (injector circuit short) - Check the injector #3 wiring harness and electric isolation. - Check the injector #3 wiring harness for short circuit. <ul style="list-style-type: none"> • If the trouble still exists after removing the injector connector, replace injector #3 and perform C2I coding, then check again. • If the trouble is fixed after removing the injector connector, check the wiring harness between ECU and injector. - Replace the ECU if required. 					
P1292	Low Resistance for Injector #4 wiring harness	<ul style="list-style-type: none"> - Out of range about wiring harness resistance for Injector #4. <ul style="list-style-type: none"> • Low: Less than 0.150 Ω (injector circuit open) - Check the injector #4 wiring harness and electric isolation. - Check the injector #4 wiring harness for open circuit. <ul style="list-style-type: none"> • If the pin in injector #4 is defective, replace injector #4 and perform C2I coding, then check again. • If the pin in injector #4 is not defective, check the ECU wiring harness. - Replace the ECU if required. 					
P1293	High Resistance for Injector #4 wiring harness	<ul style="list-style-type: none"> - Out of range about wiring harness resistance for Injector #4. <ul style="list-style-type: none"> • High: More than 0.573 Ω (injector circuit short) - Check the injector #4 wiring harness and electric isolation. - Check the injector #4 wiring harness for short circuit. <ul style="list-style-type: none"> • If the trouble still exists after removing the injector connector, replace injector #4 and perform C2I coding, then check again. • If the trouble is fixed after removing the injector connector, check the wiring harness between ECU and injector. - Replace the ECU if required. 					

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1294	Low Resistance for Injector #5 wiring harness	<ul style="list-style-type: none"> - Out of range about wiring harness resistance for Injector #5. <ul style="list-style-type: none"> • Low: Less than 0.150 Ω (injector circuit open) - Check the injector #5 wiring harness and electric isolation. - Check the injector #5 wiring harness for open circuit. <ul style="list-style-type: none"> • If the pin in injector #5 is defective, replace injector #5 and perform C2I coding, then check again. • If the pin in injector #5 is not defective, check the ECU wiring harness. - Replace the ECU if required. 					
P1295	High Resistance for Injector #5 wiring harness	<ul style="list-style-type: none"> - Out of range about wiring harness resistance for Injector #5. <ul style="list-style-type: none"> • High: More than 0.573 Ω (injector circuit short) - Check the injector #5 wiring harness and electric isolation. - Check the injector #5 wiring harness for short circuit. <ul style="list-style-type: none"> • If the trouble still exists after removing the injector connector, replace injector #5 and perform C2I coding, then check again. • If the trouble is fixed after removing the injector connector, check the wiring harness between ECU and injector. - Replace the ECU if required. 					
P1405	EGR Solenoid Valve Malfunction - Short to ground	<ul style="list-style-type: none"> - Out of range about EGR gas: High. <ul style="list-style-type: none"> • EGR controller circuit: Open or short to ground - Check the EGR actuator wiring harness. - Check the supply voltage to EGR solenoid valve. - Check the EGR solenoid valve. - Check the EGR valve for stick. - Check the resistance of EGR actuator: 15.4 Ω. - Check the ECU wiring harness for open and short. <ul style="list-style-type: none"> • ECU pin #96 					
P1406	EGR Solenoid Valve Malfunction - Short to +Batt	<ul style="list-style-type: none"> - Out of range about EGR gas: Low. <ul style="list-style-type: none"> • EGR controller circuit: Short to battery - Check the EGR actuator wiring harness. - Check the supply voltage to EGR solenoid valve. - Check the EGR solenoid valve. - Check the EGR valve for stick. - Check the resistance of EGR actuator: 15.4 Ω - Check the ECU wiring harness for open and short. <ul style="list-style-type: none"> • ECU pin #96 					

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1407	Faulty EGR Close Position	<ul style="list-style-type: none"> - Causes <ul style="list-style-type: none"> • The EGR position is not closed when EGR is not operated within 50 seconds with the engine idling. - Check pin for the followings: <ul style="list-style-type: none"> • EEGR #1: Valve power (Main relay) • EEGR #2: Sensor (Reference voltage) ECU #A33 • EEGR #4: Sensor (Ground) ECU #A09 • EEGR #5: Valve drive (PWM) ECU #A48 • EEGR #6: Sensor (Signal) ECU #A82 - Actions <ul style="list-style-type: none"> • Check EEGR valve and sensor wiring. • Visually check the unit and replace if necessary. • Refer to DTCs (P0407 and P0408). 					
P1409	EGR Valve Circuit Short	<ul style="list-style-type: none"> - Check pin for the followings: <ul style="list-style-type: none"> • The EEGR valve wiring is open. • EEGR Pin #1: Power(Main Relay) • EEGR Pin #5: ECU Pin #A48 - Actions <ul style="list-style-type: none"> • Check EEGR valve wiring. • Visually check the unit and replace if necessary. • Refer to DTCs (P0407 and P0408). 					
P1480	Condenser Fan #1 Circuit Malfunction - Open	<ul style="list-style-type: none"> - Condenser fan #1: Open - Check the relay and relay wiring harness. - Check the ECU wiring harness for open and short. <ul style="list-style-type: none"> • ECU pin #80 - If the forced operation is not available after replacing the relay, replace the ECU. 					
P1481	Condenser Fan #1 Circuit Malfunction - Short	<ul style="list-style-type: none"> - Condenser fan #1: Short - Check the relay and relay wiring harness. - Check the ECU wiring harness for open and short. <ul style="list-style-type: none"> • ECU pin #80 - If the forced operation is not available after replacing the relay, replace the ECU. 					
P1482	Condenser Fan #1 Circuit Malfunction - Short to Ground	<ul style="list-style-type: none"> - Condenser fan #1: Short to ground. - Check the relay and relay wiring harness. - Check the ECU wiring harness for open and short. <ul style="list-style-type: none"> • ECU pin #80 - If the forced operation is not available after replacing the relay, replace the ECU. 					

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1500	Vehicle Speed Fault	<ul style="list-style-type: none"> - The vehicle speed signal through CAN communication is faulty. - Check the CAN communication line for open and short. - Check the ABS/ESP and TCU communication lines. - Check the ECU wiring harness. - Replace the ECU if required. 					
P1501	Faulty Variant Coding (Vehicle Speed)	<ul style="list-style-type: none"> - If the vehicle sensor coding is set to YES (for vehicle with ABS), the vehicle speed input is faulty when the vehicle speed is below 15 km/h with the engine running at 1,600 rpm. - If the vehicle sensor coding is set to NO (for vehicle with CAN and ABS/ESP), the corresponding DTC is not shown. - Check the vehicle speed sensor coding. 					
P1503	Faulty Vehicle Speed Sensor Input	<ul style="list-style-type: none"> - If the vehicle sensor coding is set to YES (for vehicle with ABS), the amount of pulses of the speed pulse ring for vehicle speed detection is more than the specified value. - Specified pulse: 52 pulses/rev. - Check the vehicle speed sensor coding. 					
P1526	Condenser Fan #2 Circuit Malfunction - Open	<ul style="list-style-type: none"> - Condenser fan #2: Open - Check the relay and relay wiring harness. - Check the ECU wiring harness for open and short. <ul style="list-style-type: none"> • ECU pin #81 - If the forced operation is not available after replacing the relay, replace the ECU. 					
P1527	Condenser Fan #2 Circuit Malfunction - Short	<ul style="list-style-type: none"> - Condenser fan #2: Short - Check the relay and relay wiring harness. - Check the ECU wiring harness for open and short. <ul style="list-style-type: none"> • ECU pin #81 - If the forced operation is not available after replacing the relay, replace the ECU. 					

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1528	Condenser Fan #2 Circuit Malfunction - Short to Ground	<ul style="list-style-type: none"> - Condenser fan #2: Short to ground - Check the relay and relay wiring harness. - Check the ECU wiring harness for open and short. <ul style="list-style-type: none"> • ECU pin #81 - If the forced operation is not available after replacing the relay, replace the ECU. 					
P1530	#1 Heater Operating Circuit - Open	<ul style="list-style-type: none"> - #1 heater circuit malfunction: Open. - Check the wiring harness for open. <ul style="list-style-type: none"> • ECU pin #61 - Check the heater relay operations. - If the forced operation is not available, replace the ECU. - Check the ECU wiring and replace the ECU if required. 					
P1531	#1 Heater Operating Circuit - Short	<ul style="list-style-type: none"> - #1 heater circuit malfunction: Short. - Check the wiring harness for short. <ul style="list-style-type: none"> • ECU pin #61 - Check the heater relay operations. - If the forced operation is not available, replace the ECU. - Check the ECU wiring and replace the ECU if required. 					
P1532	#1 Heater operating circuit - Short to Ground	<ul style="list-style-type: none"> - #1 heater circuit malfunction: Short to ground. - Check the wiring harness for short. <ul style="list-style-type: none"> • ECU pin #61 - Check the heater relay operations. - If the forced operation is not available, replace the ECU. - Check the ECU wiring and replace the ECU if required. 					
P1534	#2 Heater Operating Circuit - Open	<ul style="list-style-type: none"> - #2 heater circuit malfunction: Open. - Check the wiring harness for open. <ul style="list-style-type: none"> • ECU pin #62 - Check the heater relay operations. - If the forced operation is not available, replace the ECU. - Check the ECU wiring and replace the ECU if required. 					

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1535	#2 Heater Operating Circuit - Short	<ul style="list-style-type: none"> - #2 heater circuit malfunction: Short. - Check the wiring harness for short. <ul style="list-style-type: none"> • ECU pin #62 - Check the heater relay operations. - If the forced operation is not available, replace the ECU. - Check the ECU wiring and replace the ECU if required. 					
P1536	#2 Heater Operating Circuit - Short to Ground	<ul style="list-style-type: none"> - #2 heater circuit malfunction: Short to ground. - Check the wiring harness for short. <ul style="list-style-type: none"> • ECU pin #62 - Check the heater relay operations. - If the forced operation is not available, replace the ECU. - Check the ECU wiring and replace the ECU if required. 					
P1540	Air Conditioner Operating Circuit Fault - Open	<ul style="list-style-type: none"> - Check the air conditioner sensors and wiring harnesses. - Check the ECU wiring harness. - Check the ECU if required. 					
P1541	Air Conditioner Operating Circuit Fault - Short	<ul style="list-style-type: none"> - Check the air conditioner sensors and wiring harnesses. - Check the ECU wiring harness. - Check the ECU if required. 					
P1542	Air Conditioner Operating Circuit Fault - Short to Ground	<ul style="list-style-type: none"> - Check the air conditioner sensors and wiring harnesses. - Check the ECU wiring harness. - Check the ECU if required. 					
P1564	Auto Cruise Switch Fault (power)	<ul style="list-style-type: none"> - Applied to vehicle with auto cruise, occurred due to coding error for vehicle without auto cruise - Auto cruise switch SPEC <ul style="list-style-type: none"> • Reference voltage: 5V (ECU Pin #B11) • Switch signal: ECU Pin #B15 • Switch GND: ECU Pin #B16 • Switch signal voltage level <ul style="list-style-type: none"> * Resistance when accelerating: $220\Omega \pm 1\%$ * Resistance when decelerating: $560\Omega \pm 1\%$ * Resumed resistance: $1200\Omega \pm 1\%$ * Resistance with switch OFF: $75\Omega \pm 1\%$ 					
P1565	Auto Cruise Switch Malfunction (Acceleration)	<ul style="list-style-type: none"> - The auto cruise accelerator switch or related wiring is malfunctioning. 					
P1566	Auto Cruise Switch Malfunction (OFF)	<ul style="list-style-type: none"> - The auto cruise OFF switch or related wiring is malfunctioning. 					
P1567	Auto Cruise Switch Malfunction (Return)	<ul style="list-style-type: none"> - The auto cruise switch or related wiring is malfunctioning. 					
P1568	Auto Cruise Switch Fault (when accelerating)	<ul style="list-style-type: none"> - Auto cruise switch fault (accelerating) 					
P1568	Auto Cruise Switch Malfunction (Deceleration)	<ul style="list-style-type: none"> - The auto cruise decelerator switch or related wiring is malfunctioning. 					
P1569	Auto Cruise Switch Fault (when decelerating)	<ul style="list-style-type: none"> - Auto cruise switch fault (decelerating) 					
P1569	Auto Cruise Switch Malfunction (Safety)	<ul style="list-style-type: none"> - The auto cruise safety switch or related wiring is malfunctioning. 					

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1570	Auto Cruise Switch Fault (Signal)	<ul style="list-style-type: none"> - Applied to vehicle with auto cruise, occurred due to coding error for vehicle without auto cruise - Auto cruise switch SPEC <ul style="list-style-type: none"> • Reference voltage: 5V (ECU Pin #B11) • Switch signal: ECU Pin #B15 • Switch GND: ECU Pin #B16 • Switch signal voltage level <ul style="list-style-type: none"> * Resistance when accelerating: $220\Omega \pm 1\%$ * Resistance when decelerating: $560\Omega \pm 1\%$ * Resumed resistance: $1200\Omega \pm 1\%$ * Resistance with switch OFF: $75\Omega \pm 1\%$ 					
P1571	Brake Lamp Signal Fault	<ul style="list-style-type: none"> - The brake pedal switch is faulty. <ul style="list-style-type: none"> • Brake pedal switch: Normal Close (NC) • Light switch: Normal Open (NO) • When operating the brake pedal switch, one signal (NO) is sent to auto cruise and the other (NC) is sent to brake lamp. - Check the brake pedal switch wiring harness. - Check the supply voltage to brake pedal switch (12 V). - Check the brake pedal switch for contact. - Check the ECU wiring harness for ECU pin #77 (open, short, poor contact). - Replace the ECU if required. 					
P1572	Brake Lamp Signal Fault	<ul style="list-style-type: none"> - The brake pedal switch or light switch is faulty. <ul style="list-style-type: none"> • Brake pedal switch: Normal Close (NC) • Light switch: Normal Open (NO) • When operating the brake pedal switch, one signal (NO) is sent to auto cruise and the other (NC) is sent to brake lamp. - Check the brake pedal and light switch wiring harness. - Check the supply voltage to brake pedal and light switch (12 V). - Check the brake pedal and light switch for contact. - Check the ECU wiring harness for ECU pin #58 (open, short, poor contact). - Replace the ECU if required. 					

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1573	Auto Cruise Switch Fault (short)	<ul style="list-style-type: none"> - Applied to vehicle with auto cruise, occurred due to coding error for vehicle without auto cruise - Auto cruise switch SPEC <ul style="list-style-type: none"> • Reference voltage: 5V (ECU Pin #B11) • Switch signal: ECU Pin #B15 • Switch GND: ECU Pin #B16 • Switch signal voltage level <ul style="list-style-type: none"> * Resistance when accelerating: $220\Omega \pm 1\%$ * Resistance when decelerating: $560\Omega \pm 1\%$ * Resumed resistance: $1200\Omega \pm 1\%$ * Resistance with switch OFF: $75\Omega \pm 1\%$ 					
P1578	Auto Cruise Switch Fault (Circuit Short)	<ul style="list-style-type: none"> - Applied to vehicle with auto cruise, occurred due to coding error for vehicle without auto cruise - Auto cruise switch SPEC <ul style="list-style-type: none"> • Reference voltage: 5V (ECU Pin #B11) • Switch signal: ECU Pin #B15 • Switch GND: ECU Pin #B16 • Switch signal voltage level <ul style="list-style-type: none"> * Resistance when accelerating: $220\Omega \pm 1\%$ * Resistance when decelerating: $560\Omega \pm 1\%$ * Resumed resistance: $1200\Omega \pm 1\%$ * Resistance with switch OFF: $75\Omega \pm 1\%$ 					
P1600	ECU Shut Down Fault	<ul style="list-style-type: none"> - The ECU is defective. - Check the chassis ground wiring harness. - Check the ECU. - Replace the ECU if required. 					
P1601	ECU Fault	<ul style="list-style-type: none"> - The ECU is defective. - Check the chassis ground wiring harness. - Check the ECU. - Replace the ECU if required. 					
P1602	ECU Fault	<ul style="list-style-type: none"> - The ECU is defective. - Check the chassis ground wiring harness. - Check the ECU. - Replace the ECU if required. 					
P1603	ECU Fault	<ul style="list-style-type: none"> - The ECU is defective. - Check the chassis ground wiring harness. - Check the ECU. - Replace the ECU if required. 					
P1604	ECU Fault	<ul style="list-style-type: none"> - The ECU is defective. - Check the chassis ground wiring harness. - Check the ECU. - Replace the ECU if required. 					

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1605	ECU Fault	<ul style="list-style-type: none"> - The ECU is defective. - Check the chassis ground wiring harness. - Check the ECU. - Replace the ECU if required. 					
P1606	ECU Fault	<ul style="list-style-type: none"> - The ECU is defective. - Check the chassis ground wiring harness. - Check the ECU. - Replace the ECU if required. 					O
P1607	ECU Injector Cut Fault	<ul style="list-style-type: none"> - The ECU is defective. - Check the chassis ground wiring harness. - Check the ECU. - Replace the ECU if required. 					
P1608	ECU Fault	<ul style="list-style-type: none"> - The ECU is defective. - Check the chassis ground wiring harness. - Check the ECU. - Replace the ECU if required. 					
P1614	ECU C2I/MDP Fault	<ul style="list-style-type: none"> - The ECU is defective. - Check the chassis ground wiring harness. - Check the ECU. - Replace the ECU if required. 					O
P1615	ECU Fault	<ul style="list-style-type: none"> - The ECU is defective. - Check the chassis ground wiring harness. - Check the ECU. - Replace the ECU if required. 					O
P1616	ECU Fault	<ul style="list-style-type: none"> - The ECU is defective. - Check the chassis ground wiring harness. - Check the ECU. - Replace the ECU if required. 					O
P1620	ECU Fault	<ul style="list-style-type: none"> - The ECU is defective. - Check the chassis ground wiring harness. - Check the ECU. - Replace the ECU if required. 					O
P1621	ECU Fault	<ul style="list-style-type: none"> - The ECU is defective. - Check the chassis ground wiring harness. - Check the ECU. - Replace the ECU if required. 					O
P1622	ECU Fault	<ul style="list-style-type: none"> - The ECU is defective. - Check the chassis ground wiring harness. - Check the ECU. - Replace the ECU if required. 					O

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P162D (former P1612)	Injector Bank #1 Malfunction - High Voltage	<ul style="list-style-type: none"> - Malfunction of injector (#1, #4, #3) circuit (High): Short to Ground or to Battery. - Operating voltage: 6 ~ 18 V - Check the injector bank #1: Short and poor contact - Check if the trouble recurs with the injectors removed and the ignition key "OFF". <ul style="list-style-type: none"> • If recurred, check the injector and ECU wiring harness. - Check if the trouble recurs while installing the injectors one by one with the ignition key "ON". <ul style="list-style-type: none"> • If recurred, replace the injector (perform C2I coding after replacement). • Check the other injectors with same manner. - Check the ECU wiring harness. <ul style="list-style-type: none"> • ECU pin #44 and #63 - Replace the ECU if required. 					
P162E (former P1619)	Injector Bank #2 Malfunction - High Voltage	<ul style="list-style-type: none"> - Malfunction of injector (#2, #5) circuit (High): Short to Ground or to Battery. - Operating voltage: 6 ~ 18 V - Check the injector bank #2: Short and poor contact - Check if the trouble recurs with the injectors removed and the ignition key "OFF". <ul style="list-style-type: none"> • If recurred, check the injector and ECU wiring harness. - Check if the trouble recurs while installing the injectors one by one with the ignition key "ON". <ul style="list-style-type: none"> • If recurred, replace the injector (perform C2I coding after replacement). • Check the other injectors with same manner. - Check the ECU wiring harness. <ul style="list-style-type: none"> • ECU pin #44 and #63 - Replace the ECU if required. 					
P1630	Wrong response from Immobilizer (refer to immobilizer section)	<ul style="list-style-type: none"> - The invalid key is inserted or no communication between transponder and immobilizer (no response from transponder). - Perform the immobilizer coding again. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #34 for open and short. - Check the immobilizer unit for open and short or check the supply voltage. - Check the immobilizer antenna and transponder for damage. - Replace the ECU if required. 					

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1631	Immobilizer Fault (refer to immobilizer section)	<ul style="list-style-type: none"> - The immobilizer is not operating. - Perform the immobilizer coding again. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #34 for open and short. - Check the immobilizer unit for open and short or check the supply voltage. - Check the immobilizer antenna and transponder for damage. - Replace the ECU if required. 					
P1632	Immobilizer Fault (refer to immobilizer section)	<ul style="list-style-type: none"> - No response from immobilizer. - Perform the immobilizer coding again. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #34 for open and short. - Check the immobilizer unit for open and short or check the supply voltage. - Check the immobilizer antenna and transponder for damage. - Replace the ECU if required. 					
P1633	Immobilizer Fault (refer to immobilizer section)	<ul style="list-style-type: none"> - No key coding. - Perform the immobilizer coding again. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #34 for open and short. - Check the immobilizer unit for open and short or check the supply voltage. - Check the immobilizer antenna and transponder for damage. - Replace the ECU if required. 					
P1634	Immobilizer Fault (refer to immobilizer section)	<ul style="list-style-type: none"> - No response from immobilizer. - Perform the immobilizer coding again. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #34 for open and short. - Check the immobilizer unit for open and short or check the supply voltage. - Check the immobilizer antenna. - Replace the ECU if required. 					
P1635	No response from Immobilizer (refer to immobilizer section)	<ul style="list-style-type: none"> - No response from immobilizer. - Perform the immobilizer coding again. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #34 for open and short. - Check the immobilizer unit for open and short or check the supply voltage. - Check the immobilizer antenna. - Replace the ECU if required. 					

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1636	Immobilizer Fault (refer to immobilizer section)	<ul style="list-style-type: none"> - Severe trouble is not defined. - Perform the immobilizer coding again. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #34 for open and short. - Check the immobilizer unit for open and short or check the supply voltage. - Check the immobilizer antenna and transponder for damage. - Replace the ECU if required. 					
P1650	AMF OBD Short to GND	<ul style="list-style-type: none"> - Short to GND 					
P1657	Engine Mount Control Malfunction (Open)	<ul style="list-style-type: none"> - The wiring for engine mount level control is malfunctioning. - Standard level: - Operating condition: 					
P1658	Engine Mount Control Malfunction (Short to B+)	<ul style="list-style-type: none"> - The wiring for engine mount level control is short to battery. - ECU pin No. 23, relay control - Engine speed : Over 1,200 rpm (30 km/h for vehicle speed) 					
P1659	Engine Mount Control Malfunction (Short to GND)	<ul style="list-style-type: none"> - The wiring for engine mount level control is short to ground. - ECU pin No. 23, relay control - Engine speed : Over 1,200 rpm (30 km/h for vehicle speed) 					
P1671	#3 Glow Plug Fault - Short	<ul style="list-style-type: none"> - The glow plug circuit is short. - Check the communication line between ECU and each glow plug. - Check each glow plug wiring harness. - Check the resistance of each glow plug: below 1 Ω - Check each glow plug relay. - Check the ECU wiring harness. - Replace the ECU if required. 					
P1672	#4 Glow Plug Fault - Short	<ul style="list-style-type: none"> - The glow plug circuit is short. - Check the communication line between ECU and each glow plug. - Check each glow plug wiring harness. - Check the resistance of each glow plug: below 1 Ω - Check each glow plug relay. - Check the ECU wiring harness. - Replace the ECU if required. 					
P1673	#5 Glow Plug Fault - Short	<ul style="list-style-type: none"> - The glow plug circuit is short. - Check the communication line between ECU and each glow plug. - Check each glow plug wiring harness. - Check the resistance of each glow plug: below 1Ω - Check each glow plug relay. - Check the ECU wiring harness. - Replace the ECU if required. 					

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1674	#1 Glow Plug Fault - Short	<ul style="list-style-type: none"> - The glow plug circuit is short. - Check the communication line between ECU and each glow plug. - Check each glow plug wiring harness. - Check the resistance of each glow plug: below 1 Ω. - Check each glow plug relay. - Check the ECU wiring harness. - Replace the ECU if required. 					
P1675	#2 Glow Plug Fault - Short	<ul style="list-style-type: none"> - The glow plug circuit is short. - Check the communication line between ECU and each glow plug. - Check each glow plug wiring harness. - Check the resistance of each glow plug: below 1 Ω - Check each glow plug relay. - Check the ECU wiring harness. - Replace the ECU if required. 					
P1676	Glow Plug Communication Fault	<ul style="list-style-type: none"> - The communication between ECU and glow plug is faulty. - Check the communication line between ECU and glow plug. - Check the glow plug wiring harness. - Check the resistance of glow plug: below 1 Ω. - Check the glow plug relay. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #113 for short to ground. - Replace the ECU if required. 					
P1677	Glow Plug Controller Fault	<ul style="list-style-type: none"> - The communication between ECU and glow plug is faulty. - Check the communication line between ECU and glow plug. - Check the glow plug wiring harness. - Check the resistance of glow plug: below 1Ω. - Check the glow plug relay. - Check the ECU wiring harness. <ul style="list-style-type: none"> • Check the ECU pin #113 for short to ground. - Replace the ECU if required. 					
P1678	Glow Plug Malfunction - Open	<ul style="list-style-type: none"> - Glow plug circuit malfunction: Open. - Check the glow plug wiring harness for open. <ul style="list-style-type: none"> • ECU pin #113 - Check the glow plug relay operations. - Check the glow plug power supply. - Check the ECU wiring and replace the ECU if required. 					

ECU-DSL

ECU-GSL

ECU-CDPF

ECU-CDPF

TCU

BRAKE

AIR-BAG

TC

RK-STICS

FFH

RAIN SENSOR

FATC

TGS LEVER

P-TRUNK

CCCS

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P1679	Glow Plug Malfunction - Short	<ul style="list-style-type: none"> - Glow plug circuit malfunction: Short. - Check the glow plug wiring harness for open. <ul style="list-style-type: none"> • ECU pin #113 - Check the glow plug relay operations. - Check the glow plug power supply. - Check the ECU wiring and replace the ECU if required. 					
P1680	Glow Plug Malfunction - Short to Ground	<ul style="list-style-type: none"> - Glow plug circuit malfunction: Short to ground. - Check the glow plug wiring harness for open. <ul style="list-style-type: none"> • ECU pin #113 - Check the glow plug relay operations. - Check the glow plug power supply. - Check the ECU wiring and replace the ECU if required. 					
P1683	Defective CAN communication of glow plug controller	<ul style="list-style-type: none"> - No GCU CAN signal - Details: refer to P2673. 					
P2100	Throttle Drive Circuit Short	<ul style="list-style-type: none"> - Perform the diagnosis when the ignition is turned on. - Defective intake throttle drive circuit (ECU pin #A75, A77) - Check pin (refer to P213C). - Sensor specification: Refer to P213C. - Actions <ul style="list-style-type: none"> • Check the throttle valve and sensor wiring harnesses. • Visually check the unit and replace if necessary. 					
P2101	Throttle Drive Ground Short	<ul style="list-style-type: none"> - Perform the diagnosis when the ignition is turned on. - Defective intake throttle drive circuit (ECU pin #A75, A77) - Check pin (refer to P213C). - Sensor specification: Refer to P213C. - Actions <ul style="list-style-type: none"> • Check the throttle valve and sensor wiring harnesses. • Visually check the unit and replace if necessary. 					
P2102	Throttle Drive Short	<ul style="list-style-type: none"> - Perform the diagnosis when the ignition is turned on. - Defective intake throttle drive circuit (ECU pin #A75, A77) - Check pin (refer to P213C). - Sensor specification: Refer to P213C. - Actions <ul style="list-style-type: none"> • Check the throttle valve and sensor wiring harnesses. • Visually check the unit and replace if necessary. 					

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P2103	Throttle Drive Battery Short	<ul style="list-style-type: none"> - Perform the diagnosis when the ignition is turned on. - Defective intake throttle drive circuit (ECU pin #A75, A77) - Check pin (refer to P213C). - Sensor specification: Refer to P213C. - Actions <ul style="list-style-type: none"> • Check the throttle valve and sensor wiring harnesses. • Visually check the unit and replace if necessary. 					
P2104	Throttle Drive Overheat	<ul style="list-style-type: none"> - Perform the diagnosis when the ignition is turned on. - Defective intake throttle drive circuit (ECU pin #A75, A77) - Check pin (refer to P213C). - Sensor specification: Refer to P213C. - Actions <ul style="list-style-type: none"> • Check the throttle valve and sensor wiring harnesses. • Visually check the unit and replace if necessary. 					
P213B	Abnormal Throttle Control	<ul style="list-style-type: none"> - Causes <ul style="list-style-type: none"> • The difference between throttle position demand (MAP) and throttle position feedback signal is out of +5% or -13%. - Defective throttle control (P213B) - Defective throttle signal (P213C, P213D) - Defective throttle drive (P2103, P2101, P2102, P2104, P2100) - Check pin (refer to P213C). - Sensor specification: Refer to P213C. - Actions <ul style="list-style-type: none"> • Check the throttle valve and sensor wiring harnesses. • Visually check the unit and replace if necessary. 					

ECU-DSL

ECU-GSL

ECU-CDPF

TCU

BRAKE

AIR-BAG

TC

RK-STICS

FFH

RAIN
SENSOR

FATC

TGS
LEVER

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P213C	Low Throttle Signal	<ul style="list-style-type: none"> - Causes <ul style="list-style-type: none"> • The throttle valve position sensor signal is stuck low. - Check pin for the followings: <ul style="list-style-type: none"> • Throttle valve #1: sensor (Power) ECU #A20 • Throttle valve #2: sensor (Signal) ECU #A22 • Throttle valve #3: sensor (GND) ECU #A81 • Throttle valve #4: valve (Positive) ECU #A75 • Throttle valve #5: valve (Positive) ECU #A77 - Sensor & Motor SPEC <ul style="list-style-type: none"> • Motor <ul style="list-style-type: none"> * Power: 12V * Max. current : 6.8A (Normal: 3.6 ~ 0.2) * Motor resistance: 4.3Ω • Sensor <ul style="list-style-type: none"> * Power: 5V - Actions <ul style="list-style-type: none"> • Check the throttle valve and sensor wiring harnesses. (The signal output of throttle valve is below than 0.24 V.) • Visually check the unit and replace if necessary. 					
P213D	High Throttle Signal	<ul style="list-style-type: none"> - Causes <ul style="list-style-type: none"> • The throttle valve position sensor signal is stuck high. - Check pin (refer to P213C). - Sensor specification: Refer to P213C. - Actions <ul style="list-style-type: none"> • Check the throttle valve and sensor wiring harnesses. • Visually check the unit and replace if necessary. 					

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P2671	#3 Glow Plug Short (Battery)	<ul style="list-style-type: none"> - NGK glow module (AQGS: Advanced Quick Glowing System) - It is detected by AQGS which then sends the message to ECU through CAN. - The electrical problem is occurred in AQGS. - Diagnosis criteria in AQGS <ul style="list-style-type: none"> • Plug short: voltage > 6V, current = 0A • Plug short (GND): voltage = 0V • Plug short (battery): voltage = Battery voltage • FET defective, FET short (GND): voltage = 0V, current = 0A • Abnormal input voltage: 6V < input voltage < 16V • Abnormal communication: Communication error for over 1 sec., abnormal data - Actions <ul style="list-style-type: none"> • Check glow plug for defect (measure the resistance of unit). • Check the connector and wiring harnesses. • Visually check the unit. • Replace the unit if necessary. • Check the CAN line. • Check the IG1 voltage. • Check the battery voltage. 					
P2672	#4 Glow Plug Short (Battery)	<ul style="list-style-type: none"> - NGK glow module (AQGS: Advanced Quick Glowing System) - It is detected by AQGS which then sends the message to ECU through CAN. - The electrical problem is occurred in AQGS. - Diagnosis criteria in AQGS <ul style="list-style-type: none"> • Plug short: voltage > 6V, current = 0A • Plug short (GND): voltage = 0V • Plug short (battery): voltage = Battery voltage • FET defective, FET short (GND): voltage = 0V, current = 0A • Abnormal input voltage: 6V < input voltage < 16V • Abnormal communication: Communication error for over 1 sec., abnormal data - Actions <ul style="list-style-type: none"> • Check glow plug for defect (measure the resistance of unit). • Check the connector and wiring harnesses. • Visually check the unit. • Replace the unit if necessary. • Check the CAN line. • Check the IG1 voltage. • Check the battery voltage. 					

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P2673	#5 Glow Plug Short (Battery)	<ul style="list-style-type: none"> - NGK glow module (AQGS: Advanced Quick Glowing System) - It is detected by AQGS which then sends the message to ECU through CAN. - The electrical problem is occurred in AQGS. - Diagnosis criteria in AQGS <ul style="list-style-type: none"> • Plug short: voltage > 6V, current = 0A • Plug short (GND): voltage = 0V • Plug short (battery): voltage = Battery voltage • FET defective, FET short (GND): voltage = 0V, current = 0A • Abnormal input voltage: 6V < input voltage < 16V • Abnormal communication: Communication error for over 1 sec., abnormal data - Actions <ul style="list-style-type: none"> • Check glow plug for defect (measure the resistance of unit). • Check the connector and wiring harnesses. • Visually check the unit. • Replace the unit if necessary. • Check the CAN line. • Check the IG1 voltage. • Check the battery voltage. 					
P2674	#1 Glow Plug Short (Battery)	<ul style="list-style-type: none"> - NGK glow module (AQGS: Advanced Quick Glowing System) - It is detected by AQGS which then sends the message to ECU through CAN. - The electrical problem is occurred in AQGS. - Diagnosis criteria in AQGS <ul style="list-style-type: none"> • Plug short: voltage > 6V, current = 0A • Plug short (GND): voltage = 0V • Plug short (battery): voltage = Battery voltage • FET defective, FET short (GND): voltage = 0V, current = 0A • Abnormal input voltage: 6V < input voltage < 16V • Abnormal communication: Communication error for over 1 sec., abnormal data - Actions <ul style="list-style-type: none"> • Check glow plug for defect (measure the resistance of unit). • Check the connector and wiring harnesses. • Visually check the unit. • Replace the unit if necessary. • Check the CAN line. • Check the IG1 voltage. • Check the battery voltage. 					

DIAGNOSIS

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode
P2675	#2 Glow Plug Short (Battery)	<ul style="list-style-type: none"> - NGK glow module (AQGS: Advanced Quick Glowing System) - It is detected by AQGS which then sends the message to ECU through CAN. - The electrical problem is occurred in AQGS. - Diagnosis criteria in AQGS <ul style="list-style-type: none"> • Plug short: voltage > 6V, current = 0A • Plug short (GND): voltage = 0V • Plug short (battery): voltage = Battery voltage • FET defective, FET short (GND): voltage = 0V, current = 0A • Abnormal input voltage: 6V < input voltage < 16V • Abnormal communication: Communication error for over 1 sec., abnormal data - Actions <ul style="list-style-type: none"> • Check glow plug for defect (measure the resistance of unit). • Check the connector and wiring harnesses. • Visually check the unit. • Replace the unit if necessary. • Check the CAN line. • Check the IG1 voltage. • Check the battery voltage. 					
P3040	ECU Internal Malfunction	<ul style="list-style-type: none"> - The internal sector of ECU is malfunctioning. 					
P3041	ECU Internal Malfunction	<ul style="list-style-type: none"> - The internal sector of ECU is malfunctioning. 					

ECU-DSL

ECU-GSL

ECU-CDPF

ECU-CDPF

TCU

BRAKE

AIR-BAG

TC

RK-STICS

FFH

RAIN SENSOR

FATC

TGS LEVER

P-TRUNK

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GASOLINE

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TROUBLE DIAGNOSIS TABLE

O : Turning on when the condition is occurred twice consecutively

● : Turning on when the condition is occurred once

Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Variable Valve Timing System	P0010	Cam Actuator - Short circuit to B+	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - Variable valve timing system circuit: short circuit to battery • Actions <ol style="list-style-type: none"> 1. Check the actual operating condition using SCAN-100. 2. Inspect the circuit and terminal of ECU pin No. 73. 3. Check the cam actuator's power circuit for short and open. 4. Check the magnet and hardware. 5. Check the ECU. 	O
		Cam Actuator - Short or Open circuit to Ground	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - Variable valve timing system circuit: short or open circuit to ground • Actions <ol style="list-style-type: none"> 1. Check the actual operating condition using SCAN-100. 2. Inspect the circuit and terminal of ECU pin No. 73. 3. Check the cam actuator's power circuit for short and open. 4. Check the magnet and hardware. 5. Check the ECU. 	O
	P0011	Cam Actuator - Fixed to Advance Position	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The noise occurred by valve timing (advance/retard) in each range is over than the specified value. • Actions <ol style="list-style-type: none"> 1. Check the actual operating condition using SCAN-100. 2. Inspect the circuit and terminal of ECU pin No. 73. 3. Check the cam actuator's power circuit for short and open. 4. Check the magnet and hardware. 5. Check the ECU. 	O
	P0012	Cam Actuator - Fixed to Retard Position	<ul style="list-style-type: none"> • Actions <ol style="list-style-type: none"> 1. Check the actual operating condition using SCAN-100. 2. Inspect the circuit and terminal of ECU pin No. 73. 3. Check the cam actuator's power circuit for short and open. 4. Check the magnet and hardware. 5. Check the ECU. 	O
HFM Sensor	P0101	Faulty HFM Sensor Signal	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - Improper air volume is detected. • Specification <ul style="list-style-type: none"> - 20 kg/h - 0.47 V 0 kg/h - 0.99 V 10 kg/h - 1.2226 ~ 1.2398 V 15 kg/h - 1.3552 ~ 1.3778 V 30 kg/h - 1.6783 ~ 1.7146 V 60 kg/h - 2.1619 ~ 2.2057 V 120 kg/h - 2.7215 ~ 2.7762 V 250 kg/h - 3.4388 ~ 3.5037 V 370 kg/h - 3.8796 ~ 3.9511 V 480 kg/h - 4.1945 ~ 4.2683 V 640 kg/h - 4.5667 ~ 4.6469 V • Actions <ol style="list-style-type: none"> 1. Measure the actual air volume using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 92 and 116. 3. Inspect HFM sensor. 4. Check the ECU. 	O

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O : Turning on when the condition is occurred twice consecutively

● : Turning on when the condition is occurred once

Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
HFM Sensor	P0102	Low HFM Sensor Signal	• Condition <ul style="list-style-type: none"> - The signal is below the minimum engine load (0.02). - Related circuit: open circuit • Specification <ul style="list-style-type: none"> - 20 kg/h - 0.47 V 0 kg/h - 0.99 V 10 kg/h - 1.2226 ~ 1.2398 V 15 kg/h - 1.3552 ~ 1.3778 V 30 kg/h - 1.6783 ~ 1.7146 V 60 kg/h - 2.1619 ~ 2.2057 V 120 kg/h - 2.7215 ~ 2.7762 V 250 kg/h - 3.4388 ~ 3.5037 V 370 kg/h - 3.8796 ~ 3.9511 V 480 kg/h - 4.1945 ~ 4.2683 V 640 kg/h - 4.5667 ~ 4.6469 V • Actions <ol style="list-style-type: none"> 1. Measure the actual air volume using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 92 and 116. 3. Inspect HFM sensor. 4. Check the ECU. 	O
	P0103	High HFM Sensor Signal	• Condition <ul style="list-style-type: none"> - The signal is over the maximum engine load (0.02). - Related circuit: short circuit • Specification <ul style="list-style-type: none"> - 20 kg/h - 0.47 V 0 kg/h - 0.99 V 10 kg/h - 1.2226 ~ 1.2398 V 15 kg/h - 1.3552 ~ 1.3778 V 30 kg/h - 1.6783 ~ 1.7146 V 60 kg/h - 2.1619 ~ 2.2057 V 120 kg/h - 2.7215 ~ 2.7762 V 250 kg/h - 3.4388 ~ 3.5037 V 370 kg/h - 3.8796 ~ 3.9511 V 480 kg/h - 4.1945 ~ 4.2683 V 640 kg/h - 4.5667 ~ 4.6469 V • Actions <ol style="list-style-type: none"> 1. Measure the actual air volume using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 92 and 116. 3. Inspect HFM sensor. 	O
MAP Sensor (G23 only)	P0105	Defective Intake Manifold Pressure Sensor Signal		

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Intake Air Temperature Sensor	P0111	Faulty Intake Air Temperature Sensor Signal	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The temperature change of over 20 °C is occurred more than 5 times. • Specification <ul style="list-style-type: none"> 20°C - 2420 Ω - 2.65 V 30°C - 1662 Ω - 2.18 V 50°C - 853 Ω - 1.40 V • Actions <ol style="list-style-type: none"> 1. Measure the actual temperature using SCAN-100. 2. Inspect the circuits of ECU pin No. 80 and 116. 3. Inspect intake air temperature sensor (ATS-HFM6.0 integrated). 4. Check the ECU. 	O
	P0112	Intake Air Temperature Sensor Malfunction - Open circuit	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The sensor value is less than minimum specified value (0.1 V). - Related circuit: open circuit • Specification <ul style="list-style-type: none"> 20°C - 2420 Ω - 2.65 V 30°C - 1662 Ω - 2.18 V 50°C - 853 Ω - 1.40 V • Actions <ol style="list-style-type: none"> 1. Measure the actual temperature using SCAN-100. 2. Inspect the circuits of ECU pin No. 80 and 116. 3. Inspect intake air temperature sensor (ATS-HFM6.0 integrated). 4. Check the ECU. 	O
	P0113	Intake Air Temperature Sensor Malfunction - Short circuit	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The sensor value is over the maximum specified value (4.9 V). - Related circuit: short circuit • Specification <ul style="list-style-type: none"> 20°C - 2420 Ω - 2.65 V 30°C - 1662 Ω - 2.18 V 50°C - 853 Ω - 1.40 V • Actions <ol style="list-style-type: none"> 1. Measure the actual temperature using SCAN-100. 2. Inspect the circuits of ECU pin No. 80 and 116. 3. Inspect intake air temperature sensor (ATS-HFM6.0 integrated). 4. Check the ECU. 	O
Coolant Temperature Sensor	P0116	Faulty Coolant Temperature Sensor Signal	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The coolant temperature is below 50 °C after engine warmed up. • Specification <ul style="list-style-type: none"> 20°C - 2.50 kΩ - 3.57 V 80°C - 0.32 kΩ - 1.22 V 100°C - 0.18 kΩ - 0.78 V • Actions <ol style="list-style-type: none"> 1. Measure the actual temperature using SCAN-100. 2. Inspect the circuits of ECU pin No. 78 and 79. 3. Check the coolant temperature sensor. 4. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Coolant Temperature Sensor	P0117	Coolant Temperature Sensor Malfunction - Open circuit	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The sensor value is less than minimum specified value (0.11 V). - Related circuit: open circuit • Specification <ul style="list-style-type: none"> 20°C - 2.50 kΩ - 3.57 V 80°C - 0.32 kΩ - 1.22 V 100°C - 0.18 kΩ - 0.78 V • Actions <ol style="list-style-type: none"> 1. Measure the actual temperature using SCAN-100. 2. Inspect the circuits of ECU pin No. 78 and 79. 3. Check the coolant temperature sensor. 4. Check the ECU. 	O
	P0118	Coolant Temperature Sensor Malfunction - Short circuit	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The sensor value is over the maximum specified value (4.96 V). - Related circuit: short circuit • Specification <ul style="list-style-type: none"> 20°C - 2.50 kΩ - 3.57 V 80°C - 0.32 kΩ - 1.22 V 100°C - 0.18 kΩ - 0.78 V • Actions <ol style="list-style-type: none"> 1. Measure the actual temperature using SCAN-100. 2. Inspect the circuits of ECU pin No. 78 and 79. 3. Check the coolant temperature sensor. 4. Check the ECU. 	O
Throttle Body Control	P0120	No.1 Throttle Position Sensor - Low Voltage	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.1 throttle position sensor circuit: short or open circuit to ground. • Specification <ul style="list-style-type: none"> - Connection between No.1 throttle position sensor and No.2 throttle position sensor <ul style="list-style-type: none"> No.1 TPS's pull-down resistance: 464 kΩ No.2 TPS's pull-up resistance: 464 kΩ - Potentiometer voltage: 5 V - Potentiometer resistance: 1 kΩ ± 20 % - Permissible current for wiper arms: below 15 μA - Protective resistance for wiper arms: 320 Ω ± 20 % - Motor voltage/max. current : 12 V / below 1.7 A • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 67, 68, 84, 85, 87 and 112. 3. Inspect the electric throttle controller. 4. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Throttle Body Control	P0120	No.1 Throttle Position Sensor - High Voltage	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.1 throttle position sensor's main power is grounded. • Specification <ul style="list-style-type: none"> - Connection between No.1 throttle position sensor and No.2 throttle position sensor No.1 TPS's pull-down resistance: 464 kΩ No.2 TPS's pull-up resistance: 464 kΩ - Potentiometer voltage: 5 V - Potentiometer resistance: 1 kΩ ± 20 % - Permissible current for wiper arms: below 15 μA - Protective resistance for wiper arms: 320 Ω ± 20 % - Motor voltage/max. current : 12 V / below 1.7 A • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 67, 68, 84, 85, 87 and 112. 3. Inspect the electric throttle controller. 4. Check the ECU. 	O
		No.2 Throttle Position Sensor - Low Voltage	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.2 throttle position sensor circuit: short or open circuit to ground. • Specification <ul style="list-style-type: none"> - Connection between No.1 throttle position sensor and No.2 throttle position sensor No.1 TPS's pull-down resistance: 464 kΩ No.2 TPS's pull-up resistance: 464 kΩ - Potentiometer voltage: 5 V - Potentiometer resistance: 1 kΩ ± 20 % - Permissible current for wiper arms: below 15 μA - Protective resistance for wiper arms: 320 Ω ± 20 % - Motor voltage/max. current : 12 V / below 1.7 A • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 67, 68, 84, 85, 87 and 112. 3. Inspect the electric throttle controller. 4. Check the ECU. 	O
		No.2 Throttle Position Sensor - High Voltage	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.2 throttle position sensor's main power is grounded. • Specification <ul style="list-style-type: none"> - Connection between No.1 throttle position sensor and No.2 throttle position sensor No.1 TPS's pull-down resistance: 464 kΩ No.2 TPS's pull-up resistance: 464 kΩ - Potentiometer voltage: 5 V - Potentiometer resistance: 1 kΩ ± 20 % - Permissible current for wiper arms: below 15 μA - Protective resistance for wiper arms: 320 Ω ± 20 % - Motor voltage/max. current : 12 V / below 1.7 A • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 67, 68, 84, 85, 87 and 112. 3. Inspect the electric throttle controller. 4. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Throttle Body Control	P0120	Throttle Actuator - Insufficient Supply Power	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - Actuator circuit: short circuit • Specification <ul style="list-style-type: none"> - Connection between No.1 throttle position sensor and No.2 throttle position sensor No.1 TPS's pull-down resistance: 464 kΩ No.2 TPS's pull-up resistance: 464 kΩ - Potentiometer voltage: 5 V - Potentiometer resistance: 1 kΩ \pm 20 % - Permissible current for wiper arms: below 15 μA - Protective resistance for wiper arms: 320 Ω \pm 20 % - Motor voltage/max. current : 12 V / below 1.7 A • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 67, 68, 84, 85, 87 and 112. 3. Inspect the electric throttle controller. 4. Check the ECU. 	O
		TPS Valve Inconsistent with HFM Sensor Value	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The potentiometer is defective. • Specification <ul style="list-style-type: none"> - Connection between No.1 throttle position sensor and No.2 throttle position sensor No.1 TPS's pull-down resistance: 464 kΩ No.2 TPS's pull-up resistance: 464 kΩ - Potentiometer voltage: 5 V - Potentiometer resistance: 1 kΩ \pm 20 % - Permissible current for wiper arms: below 15 μA - Protective resistance for wiper arms: 320 Ω \pm 20 % - Motor voltage/max. current : 12 V / below 1.7 A • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 67, 68, 84, 85, 87 and 112. 3. Inspect the electric throttle controller. 4. Check the ECU. 	O
		Both Throttle Position Sensors Malfunction	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The potentiometer is defective. • Specification <ul style="list-style-type: none"> - Connection between No.1 throttle position sensor and No.2 throttle position sensor No.1 TPS's pull-down resistance: 464 kΩ No.2 TPS's pull-up resistance: 464 kΩ - Potentiometer voltage: 5 V - Potentiometer resistance: 1 kΩ \pm 20 % - Permissible current for wiper arms: below 15 μA - Protective resistance for wiper arms: 320 Ω \pm 20 % - Motor voltage/max. current : 12 V / below 1.7 A • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 67, 68, 84, 85, 87 and 112. 3. Inspect the electric throttle controller. 4. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Throttle Body Control	P0120	Inconsistent Signals of No.1 and No.2 Throttle Position Sensors	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The difference in amount of 1/2 is occurred in potentiometer. • Specification <ul style="list-style-type: none"> - Connection between No.1 throttle position sensor and No.2 throttle position sensor No.1 TPS's pull-down resistance: 464 kΩ No.2 TPS's pull-up resistance: 464 kΩ - Potentiometer voltage: 5 V - Potentiometer resistance: 1 kΩ ± 20 % - Permissible current for wiper arms: below 15 μA - Protective resistance for wiper arms: 320 Ω ± 20 % - Motor voltage/max. current : 12 V / below 1.7 A • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 67, 68, 84, 85, 87 and 112. 3. Inspect the electric throttle controller. 4. Check the ECU. 	O
		Throttle Actuator Control Malfunction	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The wiring or actuator is defective. • Specification <ul style="list-style-type: none"> - Connection between No.1 throttle position sensor and No.2 throttle position sensor No.1 TPS's pull-down resistance: 464 kΩ No.2 TPS's pull-up resistance: 464 kΩ - Potentiometer voltage: 5 V - Potentiometer resistance: 1 kΩ ± 20 % - Permissible current for wiper arms: below 15 μA - Protective resistance for wiper arms: 320 Ω ± 20 % - Motor voltage/max. current : 12 V / below 1.7 A • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 67, 68, 84, 85, 87 and 112. 3. Inspect the electric throttle controller. 4. Check the ECU. 	O
		Intake Air Flow Sensor and Throttle Sensor Malfunction	<ul style="list-style-type: none"> • Specification <ul style="list-style-type: none"> - Connection between No.1 throttle position sensor and No.2 throttle position sensor No.1 TPS's pull-down resistance: 464 kΩ No.2 TPS's pull-up resistance: 464 kΩ - Potentiometer voltage: 5 V - Potentiometer resistance: 1 kΩ ± 20 % - Permissible current for wiper arms: below 15 μA - Protective resistance for wiper arms: 320 Ω ± 20 % - Motor voltage/max. current : 12 V / below 1.7 A • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 67, 68, 84, 85, 87 and 112. 3. Inspect the electric throttle controller. 4. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Accelerator Pedal Sensor	P0120	Accelerator Pedal Sensor Malfunction - Supply Voltage Fault	• Specification <ul style="list-style-type: none"> - SPS 1/2 pull-down resistance: 464 kΩ - Potentiometer 1/2 voltage: 5 / 2.5 V • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 31, 32, 47, 48, 50 and 51. 3. Check the electric throttle controller. 	O
		Accelerator Pedal Sensor #1 Malfunction - Low Voltage	• Specification <ul style="list-style-type: none"> - SPS 1/2 pull-down resistance: 464 kΩ - Potentiometer 1/2 voltage: 5 / 2.5 V • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 31, 32, 47, 48, 50 and 51. 3. Check the electric throttle controller. 	O
		Accelerator Pedal Sensor #1 Malfunction - High Voltage	• Specification <ul style="list-style-type: none"> - SPS 1/2 pull-down resistance: 464 kΩ - Potentiometer 1/2 voltage: 5 / 2.5 V • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 31, 32, 47, 48, 50 and 51. 3. Check the electric throttle controller. 	O
		Accelerator Pedal Sensor #2 Malfunction - Low Voltage	• Specification <ul style="list-style-type: none"> - SPS 1/2 pull-down resistance: 464 kΩ - Potentiometer 1/2 voltage: 5 / 2.5 V • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 31, 32, 47, 48, 50 and 51. 3. Check the electric throttle controller. 	O
		Accelerator Pedal Sensor #2 Malfunction - High Voltage	• Specification <ul style="list-style-type: none"> - SPS 1/2 pull-down resistance: 464 kΩ - Potentiometer 1/2 voltage: 5 / 2.5 V • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 31, 32, 47, 48, 50 and 51. 3. Check the electric throttle controller. 	O
		Accelerator Pedal Sensor #1 & #2 - Defective Signal	• Specification <ul style="list-style-type: none"> - SPS 1/2 pull-down resistance: 464 kΩ - Potentiometer 1/2 voltage: 5 / 2.5 V • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 31, 32, 47, 48, 50 and 51. 3. Check the electric throttle controller. 	O
		Accelerator Pedal Sensor #1 & #2 Malfunction	• Specification <ul style="list-style-type: none"> - SPS 1/2 pull-down resistance: 464 kΩ - Potentiometer 1/2 voltage: 5 / 2.5 V • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 31, 32, 47, 48, 50 and 51. 3. Check the electric throttle controller. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Throttle Body Control	P0121	Throttle Position Sensor Actuator's Learning Control Malfunction	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The actuator is not properly adjusted and the conditions are not satisfied. • Specification <ul style="list-style-type: none"> - Connection between No.1 throttle position sensor and No.2 throttle position sensor No.1 TPS's pull-down resistance: 464 kΩ No.2 TPS's pull-up resistance: 464 kΩ - Potentiometer voltage: 5 V - Potentiometer resistance: 1 kΩ ± 20 % - Permissible current for wiper arms: below 15 μA - Protective resistance for wiper arms: 320 Ω ± 20 % - Motor voltage/max. current : 12 V / below 1.7 A • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 67, 68, 84, 85, 87 and 112. 3. Inspect the electric throttle controller. 4. Check the ECU. 	O
		Faulty Throttle Body Return Spring	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The return spring of actuator is defective. • Specification <ul style="list-style-type: none"> - Connection between No.1 throttle position sensor and No.2 throttle position sensor No.1 TPS's pull-down resistance: 464 kΩ No.2 TPS's pull-up resistance: 464 kΩ - Potentiometer voltage: 5 V - Potentiometer resistance: 1 kΩ ± 20 % - Permissible current for wiper arms: below 15 μA - Protective resistance for wiper arms: 320 Ω ± 20 % - Motor voltage/max. current : 12 V / below 1.7 A • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 67, 68, 84, 85, 87 and 112. 3. Inspect the electric throttle controller. 4. Check the ECU. 	O
Coolant Temperature Sensor	P0125	Low coolant temperature while controlling air/fuel ratio	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The coolant temperature is below the specified temperature for controlling air/fuel ratio after engine warmed up. • Specification <ul style="list-style-type: none"> 20°C - 2.50 kΩ - 3.57 V 80°C - 0.32 kΩ - 1.22 V 100°C - 0.18 kΩ - 0.78 V • Actions <ol style="list-style-type: none"> 1. Measure the actual temperature using SCAN-100. 2. Inspect the circuits for ECU pin No. 78 and 79. 3. Check the coolant temperature sensor. 4. Check the ECU. 	O
Thermostat	P0128	Thermostat Fully Open	<ul style="list-style-type: none"> • Condition <ol style="list-style-type: none"> 1. The actual coolant temperature is lower than the coolant temperature calculated by ECU due to the slow preheat. • Actions <ol style="list-style-type: none"> 1. Check the thermostat. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
No.1 Oxygen Sensor (Installed Before Catalytic Converter)	P0131	No.1 Oxygen Sensor - Below the Minimum Permissible Voltage	• Specification <ul style="list-style-type: none"> - Operating current: below 1.6 A - Initial current: below 6.0 A for 2 seconds (refer to P0133) • Actions <ol style="list-style-type: none"> 1. Check the heating condition using SCAN-100. 2. Inspect the circuit and terminal of the ECU pin No. 9. 3. Inspect the heating power supply. 4. Inspect the heating circuit of oxygen sensor. 5. Check the ECU. 	O
	P0132	No.1 Oxygen Sensor - Overvoltage	• Condition <ul style="list-style-type: none"> - No.1 oxygen sensor is defective. Output voltage > 1.05 V The sensing voltage is not in the specified range. • Specification <ul style="list-style-type: none"> - Specified voltage: 100 ~ 900 mV - Insulating resistance: $\geq 10 \text{ M}\Omega$ (350°C) $\geq 300 \text{ k}\Omega$ (850°C) Resistance between heater and sensor: $\geq 10 \text{ k}\Omega$ (850°C) - Between sensor circuit and housing - Operating temperature: 850°C Gas temperature at ceramic tip - Internal resistance: $\geq 1 \text{ k}\Omega$ • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of the ECU pin No. 16 and 17. 3. Inspect the oxygen sensor. 4. Check the ECU. 	O
	P0133	No.1 Oxygen Sensor - Poor Performance	• Condition <ul style="list-style-type: none"> - No.1 oxygen sensor is defective. The response to the sensor signal is delayed. Closed loop interval of air/fuel ratio control > 1500 ms • Specification <ul style="list-style-type: none"> - Specified voltage: 100 ~ 900 mV - Insulating resistance: $\geq 10 \text{ M}\Omega$ (350°C) $\geq 300 \text{ k}\Omega$ (850°C) Resistance between heater and sensor: $\geq 10 \text{ k}\Omega$ (850°C) - Between sensor circuit and housing - Operating temperature: 850°C Gas temperature at ceramic tip - Internal resistance: $\geq 1 \text{ k}\Omega$ • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of the ECU pin No. 16 and 17. 3. Inspect the oxygen sensor. 4. Check the ECU. 	O

NOTE

- The No.1 oxygen sensor is located before the catalytic converter (for exhaust manifold 1/2/3) and no.2 oxygen sensor is located after the catalytic converter.
- The No.3 oxygen sensor is located before the catalytic converter (for exhaust manifold 4/5/6) and no.4 oxygen sensor is located after the catalytic converter.

O : Turning on when the condition is occurred twice consecutively

● : Turning on when the condition is occurred once

Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
No.1 Oxygen Sensor (Installed Before Catalytic Converter)	P0134	No.1 Oxygen Sensor - Malfunction	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.1 oxygen sensor is defective. The sensor does not operate. • Specification <ul style="list-style-type: none"> - Specified voltage: 100 ~ 900 mV - Insulating resistance: $\geq 10 \text{ M}\Omega$ (350°C) $\geq 300 \text{ k}\Omega$ (850°C) Resistance between heater and sensor: $\geq 10 \text{ k}\Omega$ (850°C) - Between sensor circuit and housing - Operating temperature: 850°C Gas temperature at ceramic tip - Internal resistance: $\geq 1 \text{ k}\Omega$ • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of the ECU pin No. 16 and 17. 3. Inspect the oxygen sensor. 4. Check the ECU. 	O
		No.1 Oxygen Sensor - Lean Indication (When Decelerating)	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.1 oxygen sensor is defective. There is no "LEAN" signal after shutting off the fuel. • Specification <ul style="list-style-type: none"> - Specified voltage: 100 ~ 900 mV - Insulating resistance: $\geq 10 \text{ M}\Omega$ (350°C) $\geq 300 \text{ k}\Omega$ (850°C) Resistance between heater and sensor: $\geq 10 \text{ k}\Omega$ (850°C) - Between sensor circuit and housing - Operating temperature: 850°C Gas temperature at ceramic tip - Internal resistance: $\geq 1 \text{ k}\Omega$ • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of the ECU pin No. 16 and 17. 3. Inspect the oxygen sensor. 4. Check the ECU. 	O
	P0135	No.1 Oxygen Sensor - Faulty Heating Current, Heater Circuit is Open or Short circuit or Short circuit to Ground	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.1 oxygen sensor is improperly heated. The heating current is below or over the specified range (below 0.2 A or over 2 A). • Specification <ul style="list-style-type: none"> - Operating current: below 1.6 A - Initial current: below 6.0 A for 2 seconds • Actions <ol style="list-style-type: none"> 1. Check the heating condition using SCAN-100. 2. Inspect the circuit and terminal of the ECU pin No. 9. 3. Inspect the heating power supply. 4. Inspect the heating circuit of oxygen sensor. 5. Check the ECU. 	O

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O : Turning on when the condition is occurred twice consecutively

● : Turning on when the condition is occurred once

Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
No.1 Oxygen Sensor (Installed Before Catalytic Converter)	P0135	No.1 Oxygen Sensor Heater - Short circuit to B+	• Condition <ul style="list-style-type: none"> No.1 oxygen sensor is improperly heated. The heating current is below or over the specified range (below 0.2 A or over 2 A). • Specification <ul style="list-style-type: none"> Operating current: below 1.6 A Initial current: below 6.0 A for 2 seconds • Actions <ol style="list-style-type: none"> Check the heating condition using SCAN-100. Inspect the circuit and terminal of the ECU pin No. 9. Inspect the heating power supply. Inspect the heating circuit of oxygen sensor. Check the ECU. 	O
		No.1 Oxygen Sensor Heater - Open or Short circuit to Ground	• Condition <ul style="list-style-type: none"> No.1 oxygen sensor is improperly heated. The heating current is below or over the specified range (below 0.2 A or over 2 A). • Specification <ul style="list-style-type: none"> Operating current: below 1.6 A Initial current: below 6.0 A for 2 seconds • Actions <ol style="list-style-type: none"> Check the heating condition using SCAN-100. Inspect the circuit and terminal of the ECU pin No. 9. Inspect the heating power supply. Inspect the heating circuit of oxygen sensor. Check the ECU. 	O
No.2 Oxygen Sensor (Installed After Catalytic Converter)	P0137	No.2 Oxygen Sensor - Below the Minimum Permissible Voltage	• Condition <ul style="list-style-type: none"> No.2 oxygen sensor is defective. The sensor does not operate. • Specification <ul style="list-style-type: none"> Specified voltage: 100 ~ 900 mV Insulating resistance: $\geq 10 \text{ M}\Omega$ (350°C) $\geq 300 \text{ k}\Omega$ (850°C) Resistance between heater and sensor: $\geq 10 \text{ k}\Omega$ (850°C) Between sensor circuit and housing Operating temperature: 850°C Gas temperature at ceramic tip Internal resistance: $\geq 1 \text{ k}\Omega$ • Actions <ol style="list-style-type: none"> Measure the actual output value using SCAN-100. Inspect the circuits and terminals of the ECU pin No. 19 and 20. Inspect the oxygen sensor. Check the ECU. 	O

O : Turning on when the condition is occurred twice consecutively

● : Turning on when the condition is occurred once

Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
No.2 Oxygen Sensor (Installed After Catalytic Converter)	P0138	No.2 Oxygen Sensor - Overvoltage	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.2 oxygen sensor is defective. The output value is not within the specified range. The sensing voltage is not in the specified range. • Specification <ul style="list-style-type: none"> - Specified voltage: 100 ~ 900 mV - Insulating resistance: $\geq 10 \text{ M}\Omega$ (350°C) $\geq 300 \text{ k}\Omega$ (850°C) Resistance between heater and sensor: $\geq 10 \text{ k}\Omega$ (850°C) Between sensor circuit and housing - Operating temperature: 850°C Gas temperature at ceramic tip - Internal resistance: $\geq 1 \text{ k}\Omega$ • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of the ECU pin No. 19 and 20. 3. Inspect the oxygen sensor. 4. Check the ECU. 	O
	P0140	No.2 Oxygen Sensor - Lean Indication (When Decelerating)	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.2 oxygen sensor is defective. There is no "LEAN" signal after shutting off the fuel. • Specification <ul style="list-style-type: none"> - Specified voltage: 100 ~ 900 mV - Insulating resistance: $\geq 10 \text{ M}\Omega$ (350°C) $\geq 300 \text{ k}\Omega$ (850°C) Resistance between heater and sensor: $\geq 10 \text{ k}\Omega$ (850°C) Between sensor circuit and housing - Operating temperature: 850°C Gas temperature at ceramic tip - Internal resistance: $\geq 1 \text{ k}\Omega$ • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of the ECU pin No. 19 and 20. 3. Inspect the oxygen sensor. 4. Check the ECU. 	O
	P0141	No.2 Oxygen Sensor Heater - Short circuit to B+	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.2 oxygen sensor is improperly heated. The heating current is below or over the specified range (below 0.2 A or over 2 A). • Specification <ul style="list-style-type: none"> - Operating current: below 1.6 A - Initial current: below 6.0 A for 2 seconds • Actions <ol style="list-style-type: none"> 1. Check the heating condition using SCAN-100. 2. Inspect the circuit and terminal of the ECU pin No. 7. 3. Inspect the heating power supply. 4. Inspect the heating circuit of oxygen sensor. 5. Check the ECU. 	O

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O : Turning on when the condition is occurred twice consecutively

● : Turning on when the condition is occurred once

Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
No.2 Oxygen Sensor (Installed After Catalytic Converter)	P0141	No.2 Oxygen Sensor Heater - Open or Short circuit to Ground	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.2 oxygen sensor is improperly heated. The heating current is below or over the specified range (below 0.2 A or over 2 A). • Specification <ul style="list-style-type: none"> - Operating current: below 1.6 A - Initial current: below 6.0 A for 2 seconds • Actions <ol style="list-style-type: none"> 1. Check the heating condition using SCAN-100. 2. Inspect the circuit and terminal of the ECU pin No. 7. 3. Inspect the heating power supply. 4. Inspect the heating circuit of oxygen sensor. 5. Check the ECU. 	O
		No.2 Oxygen Sensor - Poor Heating	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.2 oxygen sensor is defective. The response to the sensor signal is delayed. • Specification <ul style="list-style-type: none"> - Operating current: below 1.6 A - Initial current: below 6.0 A for 2 seconds • Actions <ol style="list-style-type: none"> 1. Check the heating condition using SCAN-100. 2. Inspect the circuit and terminal of the ECU pin No. 7. 3. Inspect the heating power supply. 4. Inspect the heating circuit of oxygen sensor. 5. Check the ECU. 	O
No.3 Oxygen Sensor (Installed Before Catalytic Converter)	P0151	No.3 Oxygen Sensor - Below the Minimum Permissible Voltage	<ul style="list-style-type: none"> • Specification <ul style="list-style-type: none"> - Specified voltage: Below 100 ~ 900 mV - Insulating resistance: $\geq 10 \text{ M}\Omega$ (350°C) $\geq 300 \text{ k}\Omega$ (850°C) Resistance between heater and sensor: $\geq 10 \text{ k}\Omega$ (850°C) Between sensor circuit and housing - Operating temperature: 850°C Gas temperature at ceramic tip - Internal resistance: $\geq 1 \text{ k}\Omega$ • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of the ECU pin No. 22 and 23. 3. Inspect the oxygen sensor. 4. Check the ECU. 	O

O : Turning on when the condition is occurred twice consecutively

● : Turning on when the condition is occurred once

Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
No.3 Oxygen Sensor (Installed Before Catalytic Converter)	P0152	No.3 Oxygen Sensor - Overvoltage	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.3 oxygen sensor is defective. The output value is not within the specified range. The sensing voltage is not in the specified range. • Specification <ul style="list-style-type: none"> - Specified voltage: Below 100 ~ 900 mV - Insulating resistance: $\geq 10 \text{ M}\Omega$ (350°C) $\geq 300 \text{ k}\Omega$ (850°C) Resistance between heater and sensor: $\geq 10 \text{ k}\Omega$ (850°C) Between sensor circuit and housing - Operating temperature: 850°C Gas temperature at ceramic tip - Internal resistance: $\geq 1 \text{ k}\Omega$ • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of the ECU pin No. 22 and 23. 3. Inspect the oxygen sensor. 4. Check the ECU. 	O
	P0153	No.3 Oxygen Sensor - Poor Performance	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.3 oxygen sensor is defective. The response to the sensor signal is delayed. • Specification <ul style="list-style-type: none"> - Specified voltage: Below 100 ~ 900 mV - Insulating resistance: $\geq 10 \text{ M}\Omega$ (350°C) $\geq 300 \text{ k}\Omega$ (850°C) Resistance between heater and sensor: $\geq 10 \text{ k}\Omega$ (850°C) Between sensor circuit and housing - Operating temperature: 850°C Gas temperature at ceramic tip - Internal resistance: $\geq 1 \text{ k}\Omega$ • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of the ECU pin No. 22 and 23. 3. Inspect the oxygen sensor. 4. Check the ECU. 	O
	P0154	No.3 Oxygen Sensor - Malfunction	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.3 oxygen sensor is defective. The sensor does not operate. • Specification <ul style="list-style-type: none"> - Specified voltage: Below 100 ~ 900 mV - Insulating resistance: $\geq 10 \text{ M}\Omega$ (350°C) $\geq 300 \text{ k}\Omega$ (850°C) Resistance between heater and sensor: $\geq 10 \text{ k}\Omega$ (850°C) Between sensor circuit and housing - Operating temperature: 850°C Gas temperature at ceramic tip - Internal resistance: $\geq 1 \text{ k}\Omega$ • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of the ECU pin No. 22 and 23. 3. Inspect the oxygen sensor. 4. Check the ECU. 	O

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● : Turning on when the condition is occurred once

Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
No.3 Oxygen Sensor (Installed Before Catalytic Converter)	P0154	No.3 Oxygen Sensor - Lean Indication (When Decelerating)	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.3 oxygen sensor is defective. There is no "LEAN" signal after shutting off the fuel. • Specification <ul style="list-style-type: none"> - Specified voltage: Below 100 ~ 900 mV - Insulating resistance: $\geq 10 \text{ M}\Omega$ (350°C) $\geq 300 \text{ k}\Omega$ (850°C) Resistance between heater and sensor: $\geq 10 \text{ k}\Omega$ (850°C) Between sensor circuit and housing - Operating temperature: 850°C Gas temperature at ceramic tip - Internal resistance: $\geq 1 \text{ k}\Omega$ • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of the ECU pin No. 22 and 23. 3. Inspect the oxygen sensor. 4. Check the ECU. 	O
	P0155	No.3 Oxygen Sensor - Faulty Heating Current	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.3 oxygen sensor is improperly heated. The heating current is below or over the specified range (below 0.2 A or over 2 A). • Specification <ul style="list-style-type: none"> - Operating current: below 1.6 A - Initial current: below 6.0 A for 2 seconds • Actions <ol style="list-style-type: none"> 1. Check the heating condition using SCAN-100. 2. Inspect the circuit and terminal of the ECU pin No. 6. 3. Inspect the heating power supply. 4. Inspect the heating circuit of oxygen sensor. 5. Check the ECU. 	O
		No.3 Oxygen Sensor Heater - Short circuit to B+	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.3 oxygen sensor is improperly heated. The heating current is below or over the specified range (below 0.2 A or over 2 A). • Specification <ul style="list-style-type: none"> - Operating current: below 1.6 A - Initial current: below 6.0 A for 2 seconds • Actions <ol style="list-style-type: none"> 1. Check the heating condition using SCAN-100. 2. Inspect the circuit and terminal of the ECU pin No. 6. 3. Inspect the heating power supply. 4. Inspect the heating circuit of oxygen sensor. 5. Check the ECU. 	O
		No.3 Oxygen Sensor Heater - Open or Short circuit to Ground	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.3 oxygen sensor is improperly heated. The heating current is below or over the specified range (below 0.2 A or over 2 A). • Specification <ul style="list-style-type: none"> - Operating current: below 1.6 A - Initial current: below 6.0 A for 2 seconds • Actions <ol style="list-style-type: none"> 1. Check the heating condition using SCAN-100. 2. Inspect the circuit and terminal of the ECU pin No. 6. 3. Inspect the heating power supply. 4. Inspect the heating circuit of oxygen sensor. 5. Check the ECU. 	O

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● : Turning on when the condition is occurred once

Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
No.4 Oxygen Sensor (Installed After Catalytic Converter)	P0157	No.4 Oxygen Sensor - Below the Minimum Permissible Voltage	• Specification <ul style="list-style-type: none"> - Specified voltage: 100 ~ 900 mV - Insulating resistance: $\geq 10 \text{ M}\Omega$ (350°C) $\geq 300 \text{ k}\Omega$ (850°C) Resistance between heater and sensor: $\geq 10 \text{ M}\Omega$ (850°C) Between sensor circuit and housing - Operating temperature: 850 °C Gas temperature at ceramic tip - Internal resistance: $\geq 1 \text{ k}\Omega$ • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of the ECU pin No. 25 and 26. 3. Inspect the oxygen sensor. 4. Check the ECU. 	O
	P0158	No.4 Oxygen Sensor - Overvoltage	• Condition <ul style="list-style-type: none"> - No.4 oxygen sensor is defective. The output value is not within the specified range. The sensing voltage is not in the specified range. • Specification <ul style="list-style-type: none"> - Specified voltage: 100 ~ 900 mV - Insulating resistance: $\geq 10 \text{ M}\Omega$ (350°C) $\geq 300 \text{ k}\Omega$ (850°C) Resistance between heater and sensor: $\geq 10 \text{ M}\Omega$ (850°C) Between sensor circuit and housing - Operating temperature: 850°C Gas temperature at ceramic tip - Internal resistance: $\geq 1 \text{ k}\Omega$ • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of the ECU pin No. 25 and 26. 3. Inspect the oxygen sensor. 4. Check the ECU. 	O
	P0160	No.4 Oxygen Sensor - Lean Indication (When Decelerating)	• Condition <ul style="list-style-type: none"> - No.4 oxygen sensor is defective. There is no "LEAN" signal after shutting off the fuel. • Specification <ul style="list-style-type: none"> - Specified voltage: 100 ~ 900 mV - Insulating resistance: $\geq 10 \text{ M}\Omega$ (350°C) $\geq 300 \text{ k}\Omega$ (850°C) Resistance between heater and sensor: $\geq 10 \text{ M}\Omega$ (850°C) Between sensor circuit and housing - Operating temperature: 850 °C Gas temperature at ceramic tip - Internal resistance: $\geq 1 \text{ k}\Omega$ • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of the ECU pin No. 25 and 26. 3. Inspect the oxygen sensor. 4. Check the ECU. 	O

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O : Turning on when the condition is occurred twice consecutively

● : Turning on when the condition is occurred once

Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
No.4 Oxygen Sensor (Installed After Catalytic Converter)	P0161	No.4 Oxygen Sensor - Poor Heating	• Specification <ul style="list-style-type: none"> - Operating current: below 1.6 A - Initial current: below 6.0 A for 2 seconds • Actions <ol style="list-style-type: none"> 1. Check the heating condition using SCAN-100. 2. Inspect the circuit and terminal of the ECU pin No. 3. 3. Inspect the heating power supply. 4. Inspect the heating circuit of oxygen sensor. 5. Check the ECU. 	O
		No.4 Oxygen Sensor Heater - Short circuit to B+	• Specification <ul style="list-style-type: none"> - Operating current: below 1.6 A - Initial current: below 6.0 A for 2 seconds • Actions <ol style="list-style-type: none"> 1. Check the heating condition using SCAN-100. 2. Inspect the circuit and terminal of the ECU pin No. 3. 3. Inspect the heating power supply. 4. Inspect the heating circuit of oxygen sensor. 5. Check the ECU. 	O
		No.4 Oxygen Sensor Heater - Open or Short circuit to Ground	• Specification <ul style="list-style-type: none"> - Operating current: below 1.6 A - Initial current: below 6.0 A for 2 seconds • Actions <ol style="list-style-type: none"> 1. Check the heating condition using SCAN-100. 2. Inspect the circuit and terminal of the ECU pin No. 3. 3. Inspect the heating power supply. 4. Inspect the heating circuit of oxygen sensor. 5. Check the ECU. 	O
No.1 Oxygen Sensor (Installed Before Catalytic Converter)	P0171	Short-term Learning Control of Air/Fuel Ratio: Fuel Rich	• Specification <ul style="list-style-type: none"> - Specified voltage: 100 ~ 900 mV - Insulating resistance: $\geq 10 \text{ M}\Omega$ (350°C) $\geq 300 \text{ k}\Omega$ (850°C) Resistance between heater and sensor: $\geq 10 \text{ k}\Omega$ (850°C) - Between sensor circuit and housing - Operating temperature: 850°C Gas temperature at ceramic tip - Internal resistance: $\geq 1 \text{ k}\Omega$ • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of the ECU pin No. 16 and 17. 3. Inspect the oxygen sensor. 4. Check the ECU. 	O

O : Turning on when the condition is occurred twice consecutively

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Fuel Correction	P0171	Air/Fuel Ratio Control Malfunction - Fuel Rich	• Actions <ol style="list-style-type: none"> 1. Check the oxygen sensor signal and heating line. 2. Check the purge valve unit and circuit. 3. Check the coolant temperature sensor. 4. Check the ignition coil and spark plug. 5. Check the HFM sensor's intake air temperature. 	●
		Learning Control Malfunction - Rich at Idling	• Actions <ol style="list-style-type: none"> 1. Check the oxygen sensor signal and heating line. 2. Check the purge valve unit and circuit. 3. Check the coolant temperature sensor. 4. Check the ignition coil and spark plug. 5. Check the HFM sensor's intake air temperature. 	●
		Learning Control Malfunction - Rich under Low Load	• Actions <ol style="list-style-type: none"> 1. Check the oxygen sensor signal and heating line. 2. Check the purge valve unit and circuit. 3. Check the coolant temperature sensor. 4. Check the ignition coil and spark plug. 5. Check the HFM sensor's intake air temperature. 	●
		Learning Control Malfunction - Rich under High Load	• Actions <ol style="list-style-type: none"> 1. Check the oxygen sensor signal and heating line. 2. Check the purge valve unit and circuit. 3. Check the coolant temperature sensor. 4. Check the ignition coil and spark plug. 5. Check the HFM sensor's intake air temperature. 	●
	P0172	Air/Fuel Ratio Control Malfunction - Fuel Lean	• Actions <ol style="list-style-type: none"> 1. Check the oxygen sensor signal and heating line. 2. Check the purge valve unit and circuit. 3. Check the coolant temperature sensor. 4. Check the ignition coil and spark plug. 5. Check the HFM sensor's intake air temperature. 	●
		Learning Control Malfunction - Lean at Idling	• Actions <ol style="list-style-type: none"> 1. Check the oxygen sensor signal and heating line. 2. Check the purge valve unit and circuit. 3. Check the coolant temperature sensor. 4. Check the ignition coil and spark plug. 5. Check the HFM sensor's intake air temperature. 	●
		Learning Control Malfunction - Lean under Low Load	• Actions <ol style="list-style-type: none"> 1. Check the oxygen sensor signal and heating line. 2. Check the purge valve unit and circuit. 3. Check the coolant temperature sensor. 4. Check the ignition coil and spark plug. 5. Check the HFM sensor's intake air temperature. 	●
		Learning Control Malfunction - Lean under High Load	• Actions <ol style="list-style-type: none"> 1. Check the oxygen sensor signal and heating line. 2. Check the purge valve unit and circuit. 3. Check the coolant temperature sensor. 4. Check the ignition coil and spark plug. 5. Check the HFM sensor's intake air temperature. 	●

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DIAGNOSIS

ECU-DSL

ECU-GSL

ECU-CDPF

TCU

BRAKE

AIR-BAG

TC

RK-STICS

FFH

RAIN SENSOR

FATC

TGS LEVER

P-TRUNK

CCCS

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
No.2 Oxygen Sensor (Installed After Catalytic Converter)	P0172	Short-term Learning Control of Air/Fuel Ratio: Fuel Lean	• Specification <ul style="list-style-type: none"> - Specified voltage: 100 ~ 900 mV - Insulating resistance: $\geq 10 \text{ M}\Omega$ (350°C) $\geq 300 \text{ k}\Omega$ (850°C) Resistance between heater and sensor: $\geq 10 \text{ k}\Omega$ (850°C) Between sensor circuit and housing - Operating temperature: 850°C Gas temperature at ceramic tip - Internal resistance: $\geq 1 \text{ k}\Omega$ • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of the ECU pin No. 19 and 20. 3. Inspect the oxygen sensor. 4. Check the ECU. 	O
Fuel Correction	P0174	Air/Fuel Ratio Control Malfunction - Fuel Rich	• Actions <ol style="list-style-type: none"> 1. Check the oxygen sensor signal and heating line. 2. Check the purge valve unit and circuit. 3. Check the coolant temperature sensor. 4. Check the ignition coil and spark plug. 5. Check the HFM sensor's intake air temperature. 	O
		Fuel Rich at Idling	• Actions <ol style="list-style-type: none"> 1. Check the oxygen sensor signal and heating line. 2. Check the purge valve unit and circuit. 3. Check the coolant temperature sensor. 4. Check the ignition coil and spark plug. 5. Check the HFM sensor's intake air temperature. 	O
		Fuel Rich under Low Load	• Actions <ol style="list-style-type: none"> 1. Check the oxygen sensor signal and heating line. 2. Check the purge valve unit and circuit. 3. Check the coolant temperature sensor. 4. Check the ignition coil and spark plug. 5. Check the HFM sensor's intake air temperature. 	O
		Fuel Rich under High Load	• Actions <ol style="list-style-type: none"> 1. Check the oxygen sensor signal and heating line. 2. Check the purge valve unit and circuit. 3. Check the coolant temperature sensor. 4. Check the ignition coil and spark plug. 5. Check the HFM sensor's intake air temperature. 	O
No.3 Oxygen Sensor (Installed Before Catalytic Converter)	P0174	Short-term Learning Control of Air/Fuel Ratio: Fuel Rich	• Specification <ul style="list-style-type: none"> - Specified voltage: Below 100 ~ 900 mV - Insulating resistance: $\geq 10 \text{ M}\Omega$ (350°C) $\geq 300 \text{ k}\Omega$ (850°C) Resistance between heater and sensor: $\geq 10 \text{ k}\Omega$ (850°C) Between sensor circuit and housing - Operating temperature: 850 °C Gas temperature at ceramic tip - Internal resistance: $\geq 1 \text{ k}\Omega$ • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of the ECU pin No. 22 and 23. 3. Inspect the oxygen sensor. 4. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Fuel Correction	P0175	Air/Fuel Ratio Control Malfunction - Fuel Lean	• Actions <ol style="list-style-type: none"> 1. Check the oxygen sensor signal and heating line. 2. Check the purge valve unit and circuit. 3. Check the coolant temperature sensor. 4. Check the ignition coil and spark plug. 5. Check the HFM sensor's intake air temperature. 	O
		Fuel Lean at Idling	• Actions <ol style="list-style-type: none"> 1. Check the oxygen sensor signal and heating line. 2. Check the purge valve unit and circuit. 3. Check the coolant temperature sensor. 4. Check the ignition coil and spark plug. 5. Check the HFM sensor's intake air temperature. 	O
		Fuel Lean under Low Load	• Actions <ol style="list-style-type: none"> 1. Check the oxygen sensor signal and heating line. 2. Check the purge valve unit and circuit. 3. Check the coolant temperature sensor. 4. Check the ignition coil and spark plug. 5. Check the HFM sensor's intake air temperature. 	O
		Fuel Lean under High Load	• Actions <ol style="list-style-type: none"> 1. Check the oxygen sensor signal and heating line. 2. Check the purge valve unit and circuit. 3. Check the coolant temperature sensor. 4. Check the ignition coil and spark plug. 5. Check the HFM sensor's intake air temperature. 	O
No.4 Oxygen Sensor (Installed After Catalytic Converter)	P0175	Short-term Learning Control of Air/Fuel Ratio: Fuel Lean	• Specification <ul style="list-style-type: none"> - Specified voltage: 100 ~ 900 mV - Insulating resistance : $\geq 10 \text{ M}\Omega$ (350°C) $\geq 300 \text{ k}\Omega$ (850°C) Resistance between heater and sensor: $\geq 10 \text{ M}\Omega$ (850°C) Between sensor circuit and housing - Operating temperature: 850°C Gas temperature at ceramic tip - Internal resistance: $\geq 1 \text{ k}\Omega$ • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of the ECU pin No. 25 and 26. 3. Inspect the oxygen sensor. 4. Check the ECU. 	O
Throttle Body Safety Function	P0221	Deceleration Over Limit (CPU2)	• Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the electric throttle controller. 3. Check the ECU. 	O
		Acceleration Over Limit (CPU2)	• Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the electric throttle controller. 3. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Throttle Body Safety Function	P0221	Control Lever Double Action (CPU2)	• Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the electric throttle controller. 3. Check the ECU. 	O
		Control Lever Safety Terminal Malfunction (CPU2)	• Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the electric throttle controller. 3. Check the ECU. 	O
		Pedal Position Change Fault (CPU2)	• Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the electric throttle controller. 3. Check the ECU. 	O
		Throttle Position Change Fault (CPU2)	• Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the electric throttle controller. 3. Check the ECU. 	O
		Defective Constant Speed Driving Control Data (CPU2)	• Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the electric throttle controller. 3. Check the ECU. 	O
		Faulty Pedal Position Detected (CPU2)	• Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the electric throttle controller. 3. Check the ECU. 	O
		Faulty Throttle Position Detected (CPU2)	• Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the electric throttle controller. 3. Check the ECU. 	O
		Faulty CAN Communication Detected (CPU2)	• Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the electric throttle controller. 3. Check the ECU. 	O
		Faulty Configuration Detected (CPU2)	• Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the electric throttle controller. 3. Check the ECU. 	O
		Faulty A/D Converter Detected (CPU2)	• Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the electric throttle controller. 3. Check the ECU. 	O
		CPU #1 and #2 - Pedal Position Signal Fault	• Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the electric throttle controller. 3. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Throttle Body Safety Function	P0221	CPU #1 and #2 - TP Valve Position Signal Fault	• Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the electric throttle controller. 3. Check the ECU. 	O
		CPU #1 and #2 - MSR Signal Fault	• Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the electric throttle controller. 3. Check the ECU. 	O
		CPU #1 and #2 - Idle Control	• Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the electric throttle controller. 3. Check the ECU. 	O
		AD Converter Overflow Detected (CPU2)	• Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the electric throttle controller. 3. Check the ECU. 	O
		ROM Malfunction (CPU2)	• Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the electric throttle controller. 3. Check the ECU. 	O
		RAM Malfunction (CPU2)	• Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the electric throttle controller. 3. Check the ECU. 	O
		CPU Recognition Malfunction (CPU2)	• Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the electric throttle controller. 3. Check the ECU. 	O
Fuel Pump Relay	P0231	Fuel Pump Relay - Open circuit to Ground	• Condition <ul style="list-style-type: none"> - Fuel pump circuit: short or open circuit to ground • Specification <ul style="list-style-type: none"> - The voltage drop of pin No. 33 and ground: Below 1 V (current = 150 mA) • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and terminal of ECU pin No. 33. 2. Inspect the fuel pump relay. 3. Check the ECU. 	O
	P0232	Fuel Pump Relay - Short circuit to B+	• Condition <ul style="list-style-type: none"> - Fuel pump: short circuit to battery • Specification <ul style="list-style-type: none"> - The voltage drop of pin No. 33 and ground: Below 1 V (current = 150 mA) • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and terminal of ECU pin No. 33. 2. Inspect the fuel pump relay. 3. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Fuel Injection System	P0261	No.1 Injector - Short or Open circuit to Ground	• Condition <ul style="list-style-type: none"> - No.1 injector is defective. No.1 injector circuit: short circuit to ground • Specification <ul style="list-style-type: none"> - Electric resistance: $14.5 \Omega \pm 0.7 \Omega$ at 20°C - Operating pressure: 380 Kpa - Supply voltage: 6 ~ 16 V • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and terminal of the ECU pin No. 63. 2. Inspect the injector. 3. Check the ECU. 	O
	P0262	No.1 Injector - Short circuit to B+	• Condition <ul style="list-style-type: none"> - No.1 injector is defective. No.1 injector circuit: short circuit to battery • Specification <ul style="list-style-type: none"> - Electric resistance: $14.5 \Omega \pm 0.7 \Omega$ at 20°C - Operating pressure: 380 Kpa - Supply voltage: 6 ~ 16 V • Actions <ol style="list-style-type: none"> 1. Check the No.1 injector's power supply and terminal. 2. Inspect the injector. 3. Check the ECU. 	O
	P0264	No.2 Injector - Short or Open circuit to Ground	• Condition <ul style="list-style-type: none"> - No.2 injector is defective. No.2 injector circuit: short circuit to ground • Specification <ul style="list-style-type: none"> - Electric resistance: $14.5 \Omega \pm 0.7 \Omega$ at 20°C - Operating pressure: 380 Kpa - Supply voltage: 6 ~ 16 V • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and terminal of the ECU pin No. 61. (For G23D, ECU pin No.64) 2. Inspect the injector. 3. Check the ECU. 	O
	P0265	No.2 Injector - Short circuit to B+	• Condition <ul style="list-style-type: none"> - No.2 injector is defective. No.2 injector circuit: short circuit to battery • Specification <ul style="list-style-type: none"> - Electric resistance: $14.5 \Omega \pm 0.7 \Omega$ at 20°C - Operating pressure: 380 Kpa - Supply voltage: 6 ~ 16 V • Actions <ol style="list-style-type: none"> 1. Check the No.2 injector's power supply and terminal. 2. Inspect the injector. 3. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Fuel Injection System	P0267	No.3 Injector - Short or Open circuit to Ground	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.3 injector is defective. No.3 injector circuit: short circuit to ground • Specification <ul style="list-style-type: none"> - Electric resistance: $14.5 \Omega \pm 0.7 \Omega$ at 20°C - Operating pressure: 380 Kpa - Supply voltage: 6 ~ 16 V • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and terminal of the ECU pin No. 66. (For G23D, ECU pin No.64) 2. Inspect the injector. 3. Check the ECU. 	O
	P0268	No.3 Injector - Short circuit to B+	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.3 injector is defective. No.3 injector circuit: short circuit to battery • Specification <ul style="list-style-type: none"> - Electric resistance: $14.5 \Omega \pm 0.7 \Omega$ at 20°C - Operating pressure: 380 Kpa - Supply voltage: 6 ~ 16 V • Actions <ol style="list-style-type: none"> 1. Check the No.3 injector's power supply and terminal. 2. Inspect the injector. 3. Check the ECU. 	O
	P0270	No.4 Injector - Short or Open circuit to Ground	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.4 injector is defective. No.4 injector circuit: short circuit to ground • Specification <ul style="list-style-type: none"> - Electric resistance: $14.5 \Omega \pm 0.7 \Omega$ at 20°C - Operating pressure: 380 Kpa - Supply voltage: 6 ~ 16 V • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and terminal of the ECU pin No. 62. (For G23D, ECU pin No.64) 2. Inspect the injector. 3. Check the ECU. 	O
	P0271	No.4 Injector - Short circuit to B+	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.4 injector is defective. No.4 injector circuit: short circuit to battery • Specification <ul style="list-style-type: none"> - Electric resistance: $14.5 \Omega \pm 0.7 \Omega$ at 20°C - Operating pressure: 380 Kpa - Supply voltage: 6 ~ 16 V • Actions <ol style="list-style-type: none"> 1. Check the No.4 injector's power supply and terminal. 2. Inspect the injector. 3. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Fuel Injection System	P0273	No.5 Injector - Short or Open circuit to Ground	• Condition <ul style="list-style-type: none"> - No.5 injector is defective. No.5 injector circuit: short circuit to ground • Specification <ul style="list-style-type: none"> - Electric resistance: $14.5 \Omega \pm 0.7 \Omega$ at 20°C - Operating pressure: 380 Kpa - Supply voltage: 6 ~ 16 V • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and terminal of the ECU pin No. 65. 2. Inspect the injector. 3. Check the ECU. 	O
	P0274	No.5 Injector - Short circuit to B+	• Condition <ul style="list-style-type: none"> - No.5 injector is defective. No.5 injector circuit: short circuit to battery • Specification <ul style="list-style-type: none"> - Electric resistance: $14.5 \Omega \pm 0.7 \Omega$ at 20°C - Operating pressure: 380 Kpa - Supply voltage: 6 ~ 16 V • Actions <ol style="list-style-type: none"> 1. Check the No.5 injector's power supply and terminal. 2. Inspect the injector. 3. Check the ECU. 	O
	P0276	No.6 Injector - Short or Open circuit to Ground	• Condition <ul style="list-style-type: none"> - No.6 injector is defective. No.6 injector has a short circuit to ground. • Specification <ul style="list-style-type: none"> - Electric resistance: $14.5 \Omega \pm 0.7 \Omega$ at 20°C - Operating pressure: 380 Kpa - Supply voltage: 6 ~ 16 V • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and terminal of the ECU pin No. 64. 2. Inspect the injector. 3. Check the ECU. 	O
	P0277	No.6 Injector - Short circuit to B+	• Condition <ul style="list-style-type: none"> - No.6 injector is defective. No.6 injector circuit: short circuit to battery • Specification <ul style="list-style-type: none"> - Electric resistance: $14.5 \Omega \pm 0.7 \Omega$ at 20°C - Operating pressure: 380 Kpa - Supply voltage: 6 ~ 16 V • Actions <ol style="list-style-type: none"> 1. Check the No.6 injector's power supply and terminal. 2. Inspect the injector. 3. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Poor Ignition (Misfire)	P0300	Cylinder - Poor Ignition	• Condition <ul style="list-style-type: none"> - Misfire is occurred in more than one cylinder causing excessive exhaust gas and catalyst deterioration. • Actions <ol style="list-style-type: none"> 1. Check the ignition system. 2. Check the fuel injection system. 3. Check the fuel pressure. 4. Check the compression pressure. 5. Check the valve timing and clearance. 6. Check the intake air flow sensor. 7. Check the crank angle sensor and air cap. 8. Check the engine wiring harness. 9. Check the ECU. 	●
	P0301	No.1 Cylinder - Poor Ignition	• Condition <ul style="list-style-type: none"> - Misfire is occurred in No.1 cylinder causing excessive exhaust gas and catalyst deterioration. • Actions <ol style="list-style-type: none"> 1. Check the ignition system. 2. Check the fuel injection system. 3. Check the fuel pressure. 4. Check the compression pressure. 5. Check the valve timing and clearance. 6. Check the intake air flow sensor. 7. Check the crank angle sensor and air cap. 8. Check the engine wiring harness. 9. Check the ECU. 	●
	P0302	No.2 Cylinder - Poor Ignition	• Condition <ul style="list-style-type: none"> - Misfire is occurred in No.2 cylinder causing excessive exhaust gas and catalyst deterioration. • Actions <ol style="list-style-type: none"> 1. Check the ignition system. 2. Check the fuel injection system. 3. Check the fuel pressure. 4. Check the compression pressure. 5. Check the valve timing and clearance. 6. Check the intake air flow sensor. 7. Check the crank angle sensor and air cap. 8. Check the engine wiring harness. 9. Check the ECU. 	●

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Poor Ignition (Misfire)	P0303	No.3 Cylinder - Poor Ignition	• Condition <ul style="list-style-type: none"> - Misfire is occurred in No.3 cylinder causing excessive exhaust gas and catalyst deterioration. • Actions <ol style="list-style-type: none"> 1. Check the ignition system. 2. Check the fuel injection system. 3. Check the fuel pressure. 4. Check the compression pressure. 5. Check the valve timing and clearance. 6. Check the intake air flow sensor. 7. Check the crank angle sensor and air cap. 8. Check the engine wiring harness. 9. Check the ECU. 	●
	P0304	No.4 Cylinder - Poor Ignition	• Condition <ul style="list-style-type: none"> - Misfire is occurred in No.4 cylinder causing excessive exhaust gas and catalyst deterioration. • Actions <ol style="list-style-type: none"> 1. Check the ignition system. 2. Check the fuel injection system. 3. Check the fuel pressure. 4. Check the compression pressure. 5. Check the valve timing and clearance. 6. Check the intake air flow sensor. 7. Check the crank angle sensor and air cap. 8. Check the engine wiring harness. 9. Check the ECU. 	●
	P0305	No.5 Cylinder - Poor Ignition	• Condition <ul style="list-style-type: none"> - Misfire is occurred in No.5 cylinder causing excessive exhaust gas and catalyst deterioration. • Actions <ol style="list-style-type: none"> 1. Check the ignition system. 2. Check the fuel injection system. 3. Check the fuel pressure. 4. Check the compression pressure. 5. Check the valve timing and clearance. 6. Check the intake air flow sensor. 7. Check the crank angle sensor and air cap. 8. Check the engine wiring harness. 9. Check the ECU. 	●

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Poor Ignition (Misfire)	P0306	No.6 Cylinder - Poor Ignition	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - Misfire is occurred in No.6 cylinder causing excessive exhaust gas and catalyst deterioration. • Actions <ol style="list-style-type: none"> 1. Check the ignition system. 2. Check the fuel injection system. 3. Check the fuel pressure. 4. Check the compression pressure. 5. Check the valve timing and clearance. 6. Check the intake air flow sensor. 7. Check the crank angle sensor and air cap. 8. Check the engine wiring harness. 9. Check the ECU. 	●
Knock Sensor	P0325	#1 Knock Sensor Malfunction (1, 2, 3 CYL) (For G23D, 1, 2, 3 CYL)	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.1 knock sensor is defective. The value is not within the specified range when the engine temperature is over 75°C, the engine speed is over 3000 rpm and other units are properly operated (for cylinder No. 1, 2 and 3). (For G23D, 1, 2, 3 CYL) • Specification <ul style="list-style-type: none"> - Sensitivity: approx. 26 ± 8 mV/g Resistance > 10 MΩ • Actions <ol style="list-style-type: none"> 1. Inspect the circuits and terminals of the ECU pin No. 117 and 118. 2. Inspect the No.1 knock sensor. 3. Check the ECU. 	O
	P0330	#2 Knock Sensor Malfunction (4, 5, 6 CYL)	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - No.2 knock sensor is defective. The value is not within the specified range when the engine temperature is over 75°C, the engine speed is over 3000 rpm and other units are properly operated (for cylinder No. 4, 5 and 6). • Specification <ul style="list-style-type: none"> - Sensitivity: approx. 26 ± 8 mV/g Resistance > 10 MΩ • Actions <ol style="list-style-type: none"> 1. Inspect the circuits and terminals of the ECU pin No. 114 and 115. 2. Inspect the No.2 knock sensor. 3. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Crank Position Sensor	P0335	Faulty Crank Position Sensor Signal - No Engine RPM	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The crank angle signals cannot be detected even the cam position is properly detected. • Specification <ul style="list-style-type: none"> - Sensor's internal resistance : 700 ~ 1050 Ω • Actions <ol style="list-style-type: none"> 1. Measure the crankshaft rpm using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 100 and 99. 3. Inspect the crank angle sensor. 4. Inspect air gap between sensor and drive plate. 5. Check the drive plate's teeth. 6. Check the ECU. 	O
		Faulty Crank Position Sensor Signal - Faulty Recognition of Gap	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The cam and crank angle signal is improperly recognized or not recognized. • Specification <ul style="list-style-type: none"> - Sensor internal resistance: 700 ~ 1050 Ω • Actions <ol style="list-style-type: none"> 1. Measure the crankshaft rpm using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 100 and 99. 3. Inspect the crank angle sensor. 4. Inspect air gap between sensor and drive plate. 5. Check the drive plate's teeth. 6. Check the ECU. 	O
		Crank Position Sensor Adaptation Malfunction - Poor Initialization	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The crank angle sensor is faulty initialized. • Specification <ul style="list-style-type: none"> - Sensor internal resistance: 700 ~ 1050 Ω • Actions <ol style="list-style-type: none"> 1. Measure the crankshaft rpm using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 100 and 99. 3. Inspect the crank angle sensor. 4. Inspect air gap between sensor and drive plate. 5. Check the drive plate's teeth. 6. Check the ECU. 	O
	P0336	Crank Position Sensor - Excessive Engine RPM	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The engine rpm is over the proper amount or improper. • Specification <ul style="list-style-type: none"> - Sensor internal resistance: 700 ~ 1050 Ω • Actions <ol style="list-style-type: none"> 1. Measure the crankshaft rpm using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 100 and 99. 3. Inspect the crank angle sensor. 4. Inspect air gap between sensor and drive plate. 5. Check the drive plate's teeth. 6. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Cam Position Sensor	P0340	#1 Cylinder Synchronization Malfunction	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The cam position sensor is defective. The No.1 cylinder is poorly synchronized. • Specification <ul style="list-style-type: none"> - Sensor supply voltage: 4.5 V - 24 V • Actions <ol style="list-style-type: none"> 1. Measure the set voltage of cam position sensor. 2. Inspect the circuits and terminals of ECU pin No. 106 and 104. 3. Inspect the cam position sensor. 4. Check the cam sensor and sprocket for damage. 5. Check the ECU. 	O
	P0341	#1 Cylinder Recognition Malfunction	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - There is no cam recognition signal. • Specification <ul style="list-style-type: none"> - Sensor supply voltage: 4.5 V - 24 V • Actions <ol style="list-style-type: none"> 1. Measure the set voltage of cam position sensor. 2. Inspect the circuits and terminals of ECU pin No. 106 and 104. 3. Inspect the cam position sensor. 4. Check the cam sensor and sprocket for damage. 5. Check the ECU. 	O
Ignition Coil	P0351	#1 Ignition Coil - Faulty Output Voltage	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The ignition unit is defective (for No. 2 and 5 cylinders). (For G23D, No.1 and 4 cylinders) Ignition circuit: short circuit to primary and secondary current • Specification <ul style="list-style-type: none"> - Primary resistance: 0.36 Ω Secondary resistance: 5.9 kΩ - Secondary voltage: 38 KV - Ignition output <ul style="list-style-type: none"> Primary current: 7.0 A Primary voltage: 380 V • Actions <ol style="list-style-type: none"> 1. Inspect the circuits and terminals of the ECU pin No. 70, 71 and 72. 2. Inspect the power supply of ignition coil. 3. Inspect the ignition coil and high-voltage cable. 4. Inspect the spark plug for moisture, crack, wear, improper cap and excessive burnt electrode residue. 5. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Ignition Coil	P0352	#2 Ignition Coil - Faulty Output Voltage	• Condition <ul style="list-style-type: none"> - The ignition unit is defective (for No. 3 and 4 cylinders). (For G23D, No.2 and 3 cylinders) Ignition circuit: short circuit to primary and secondary current • Specification <ul style="list-style-type: none"> - Primary resistance: 0.36 Ω - Secondary resistance: 5.9 kΩ - Secondary voltage: 38 KV - Ignition output - Primary current: 7.0 A - Primary voltage: 380 V • Actions <ol style="list-style-type: none"> 1. Inspect the circuits and terminals of the ECU pin No. 70, 71 and 72. 2. Inspect the power supply of ignition coil. 3. Inspect the ignition coil and high-voltage cable. 4. Inspect the spark plug for moisture, crack, wear, improper cap and excessive burnt electrode residue. 5. Check the ECU. 	O
	P0353	#3 Ignition Coil - Faulty Output Voltage	• Condition <ul style="list-style-type: none"> - The ignition unit is defective (for No. 1 and 6 cylinders). Ignition circuit: short circuit to primary and secondary current • Specification <ul style="list-style-type: none"> - Primary resistance: 0.36 Ω - Secondary resistance: 5.9 kΩ - Secondary voltage: 38 KV - Ignition output - Primary current: 7.0 A - Primary voltage: 380 V • Actions <ol style="list-style-type: none"> 1. Inspect the circuits and terminals of the ECU pin No. 70, 71 and 72. 2. Inspect the power supply of ignition coil. 3. Inspect the ignition coil and high-voltage cable. 4. Inspect the spark plug for moisture, crack, wear, improper cap and excessive burnt electrode residue. 5. Check the ECU. 	O
Secondary Air Supply System	P0411	Defective Secondary Air Pump - Insufficient Air Volume	• Condition <ul style="list-style-type: none"> - The secondary air injection pump relay and air pump valve/ hose are defective. • Specification <ul style="list-style-type: none"> - The voltage drop of pin No. 76 and ground: Below 1 V (current = 1000 mA) • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and terminal of ECU pin No. 76. 2. Inspect the secondary air pump relay. 3. Inspect the arrangement of secondary air pump's valve and hose. 4. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Secondary Air Supply System	P0413	Secondary Air Pump - Open circuit to Ground	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - Secondary air injection pump relay circuit: short or open circuit to ground • Specification <ul style="list-style-type: none"> - The voltage drop of pin No. 76 and ground: Below 1 V (current = 1000 mA) • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and terminal of ECU pin No. 76. 2. Inspect the secondary air pump relay. 3. Check the ECU. 	O
	P0414	Secondary Air Pump - Short circuit to B+	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - Secondary air injection pump relay circuit: short circuit to battery • Specification <ul style="list-style-type: none"> - The voltage drop of pin No. 76 and ground: Below 1 V (current = 1000 mA) • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and terminal of ECU pin No. 76. 2. Inspect the secondary air pump relay. 3. Check the ECU. 	O
Catalytic Monitoring Device	P0420	Faulty Catalyst 1 Purification Rate (1, 2, 3 Cylinder lines) (For G23D, 1, 2, 3, 4 CYL)	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The calculated purification rate for bank 1 is below the specified range. (Bank 1 - Cylinder 1/2/3) (For G23D, 1, 2, 3, 4 cylinders) • Actions <ol style="list-style-type: none"> 1. Inspect the exhaust gas for leaks. 2. Inspect the oxygen sensor and its signal. 3. Inspect the actual efficiency of exhaust gas through the exhaust gas test. 4. Inspect the catalyst. 5. Check the ECU. 	O
	P0430	Faulty Catalyst 2 Purification Rate (4, 5, 6 Cylinder lines)	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The calculated purification rate for bank 2 is below the specified range. (Bank 2 - Cylinder 4/5/6) • Actions <ol style="list-style-type: none"> 1. Inspect the exhaust gas for leaks. 2. Inspect the oxygen sensor and its signal. 3. Inspect the actual efficiency of exhaust gas through the exhaust gas test. 4. Inspect the catalyst. 5. Check the ECU. 	O
Evaporated Gas Control System	P0442	Fuel Tank: Oil Leakage	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - Minute leak of evaporated gas is occurred (below 1 mm). • Actions <ol style="list-style-type: none"> 1. Inspect the fuel tank and connecting route for the followings: <ul style="list-style-type: none"> - Fuel tank cap for crack or damage - Vacuum hose for crack, puncture and clogging - Fuel tank for crack, puncture and damage - Canister for crack, puncture and damage - Fuel tank pressure sensor - Canister shut-off valve 2. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Purge Control Solenoid Valve	P0443	Purge Control Solenoid Valve Malfunction - Faulty closing	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The purge control circuit is defective. The purge control is not available. • Specification <ul style="list-style-type: none"> - Duty ratio: 0 ~ 100 % <ul style="list-style-type: none"> Below 20 % - 7.5 Hz 20 ~ 30 % - 15 Hz 30 ~ 75 % - 30 Hz - Internal resistance $\geq 26 \Omega$ • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and terminal of the ECU pin No. 34. 2. Inspect the power of the solenoid valve. 3. Inspect the purge control solenoid valve. 4. Check the ECU. 	O
	P0444	Purge Control Solenoid Valve Malfunction - Short or Open circuit to Ground	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - Power supply circuit: short or open circuit to ground • Specification <ul style="list-style-type: none"> - Duty ratio: 0 ~ 100 % <ul style="list-style-type: none"> below 20 % - 7.5 Hz 20 ~ 30 % - 15 Hz 30 ~ 75 % - 30 Hz - Internal resistance $\geq 26 \Omega$ • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and terminal of the ECU pin No. 34. 2. Inspect the power of the solenoid valve. 3. Inspect the purge control solenoid valve. 4. Check the ECU. 	O
	P0445	Purge Control Solenoid Valve Malfunction - Short circuit to B+	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - Power supply circuit: short circuit to battery • Specification <ul style="list-style-type: none"> - Duty ratio: 0 ~ 100 % <ul style="list-style-type: none"> below 20 % - 7.5 Hz 20 ~ 30 % - 15 Hz 30 ~ 75 % - 30 Hz - Internal resistance $\geq 26 \Omega$ • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and terminal of the ECU pin No. 34. 2. Inspect the power of the solenoid valve. 3. Inspect the purge control solenoid valve. 4. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Canister Shut-off Valve	P0447	Canister Shut-off Valve Malfunction - Short or Open circuit to Ground	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - Fuel system shut-off valve circuit: short or open circuit to ground • Specification <ul style="list-style-type: none"> - Duty ratio: 0 ~ 100 % <ul style="list-style-type: none"> below 20 % → 7.5 Hz 20 ~ 30 % → 15 Hz 30 ~ 75 % → 30 Hz - Internal resistance $\geq 26 \Omega$ • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and terminal of the ECU pin No. 36. 2. Inspect the power of the solenoid valve. 3. Inspect the purge control solenoid valve. 4. Check the ECU. 	O
	P0448	Canister Shut-off Valve: Short circuit to B+	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - Fuel system shut-off valve circuit: short circuit to battery • Specification <ul style="list-style-type: none"> - Duty ratio: 0 ~ 100 % <ul style="list-style-type: none"> below 20 % → 7.5 Hz 20 ~ 30 % → 15 Hz 30 ~ 75 % → 30 Hz - Internal resistance $\geq 26 \Omega$ • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and terminal of the ECU pin No. 36. 2. Inspect the power of the solenoid valve. 3. Inspect the purge control solenoid valve. 4. Check the ECU. 	O
Fuel tank pressure sensor	P0450	Fuel Tank Pressure Sensor Malfunction	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - Improper fuel tank pressure is detected. • Specification <ul style="list-style-type: none"> 37.5 mbar → 4.51 V 30.0 mbar → 3.90 V 20.0 mbar → 3.10 V 10.0 mbar → 2.30 V 0 mbar → 1.50 V 10.0 mbar → 0.60 V 12.5 mbar → 0.49 V • Actions <ol style="list-style-type: none"> 1. Measure the actual fuel tank pressure using SCAN-100. 2. Inspect the circuits of ECU pin No. 18 and 41 and check pin No. 42. 3. Check the fuel tank pressure sensor. 4. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Fuel tank pressure sensor	P0452	Low Fuel Tank Pressure Sensor Signal	• Condition <ul style="list-style-type: none"> - The fuel tank pressure signal is below the minimum fuel tank pressure (0.1V). - Related circuit: open circuit • Specification <ul style="list-style-type: none"> 37.5 mbar → 4.51 V 30.0 mbar → 3.90 V 20.0 mbar → 3.10 V 10.0 mbar → 2.30 V 0 mbar → 1.50 V 10.0 mbar → 0.60 V 12.5 mbar → 0.49 V • Actions <ol style="list-style-type: none"> 1. Measure the actual fuel tank pressure using SCAN-100. 2. Inspect the circuits of ECU pin No. 18 and 41 and check pin No. 42. 3. Check the fuel tank pressure sensor. 4. Check the ECU. 	O
	P0453	High Fuel Tank Pressure Sensor Signal	• Condition <ul style="list-style-type: none"> - The fuel tank pressure signal is over the maximum fuel tank pressure (4.9 V). - Related circuit: open circuit • Specification <ul style="list-style-type: none"> 37.5 mbar → 4.51 V 30.0 mbar → 3.90 V 20.0 mbar → 3.10 V 10.0 mbar → 2.30 V 0 mbar → 1.50 V 10.0 mbar → 0.60 V 12.5 mbar → 0.49 V • Actions <ol style="list-style-type: none"> 1. Measure the actual fuel tank pressuring using SCAN-100. 2. Inspect the circuits of ECU pin No. 18 and 41 and check pin No. 42. 3. Check the fuel tank pressure sensor. 4. Check the ECU. 	O
Evaporated Gas Control System	P0455	Fuel Tank: Large Oil Leakage	• Condition <ul style="list-style-type: none"> - The evaporated gas in the fuel tank is leaked. Diagnosis for large leaks • Actions <ol style="list-style-type: none"> 1. Inspect the fuel tank and connecting route for the followings: <ul style="list-style-type: none"> - Fuel tank cap for crack or damage - Vacuum hose for crack, puncture and clogging - Fuel tank for crack, puncture and damage - Canister for crack, puncture and damage - Fuel tank pressure sensor - Canister shut-off valve 2. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Fuel Level Detection Sensor	P0460	Faulty Fuel Pump Fuel Level Sensor Indication	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The fuel level or the changed amount of fuel after driving for certain distance is improper. • Specification <ul style="list-style-type: none"> 67.29 liters - 38.0 Ω 62.48 liters - 48.2 Ω 58.28 liters - 56.8 Ω 52.23 liters - 67.0 Ω 45.34 liters - 83.3 Ω 37.41 liters - 99.5 Ω 30.10 liters - 122.5 Ω 21.36 liters - 150.0 Ω 6.45 liters - 268.2 Ω • Actions <ol style="list-style-type: none"> 1. Measure the actual fuel level using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 102 and 75. 3. Check the external resistance (200 Ω). 4. Inspect the fuel sender unit. 5. Check the ECU. 	O
	P0462	Faulty Fuel Pump Fuel Level Transmission	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The FF (hexadecimal) is inputted to ECU from cluster. • Specification <ul style="list-style-type: none"> 67.29 liters - 38.0 Ω 62.48 liters - 48.2 Ω 58.28 liters - 56.8 Ω 52.23 liters - 67.0 Ω 45.34 liters - 83.3 Ω 37.41 liters - 99.5 Ω 30.10 liters - 122.5 Ω 21.36 liters - 150.0 Ω 6.45 liters - 268.2 Ω • Actions <ol style="list-style-type: none"> 1. Measure the actual fuel level using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 102 and 75. 3. Check the external resistance (200 Ω). 4. Inspect the fuel sender unit. 5. Check the ECU. 	O
Cooling fan system (PWM electric fan)	P0480	PWM electric fan - Short circuit to power supply	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The cooling fan's output wiring has a short circuit to power supply. • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and the terminal of No. 39 ECU pin. 2. Inspect the power supply. 3. Inspect the cooling fan. 4. Check the ECU. 	

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Cooling fan system (PWM electric fan)	P0480	PWM electric fan - Open/Short circuit to ground	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The cooling fan's output wiring has a short circuit to power supply. • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and the terminal of No. 39 ECU pin. 2. Inspect the power supply. 3. Inspect the cooling fan. 4. Check the ECU. 	
Condenser Fan Unit	P0481	Condenser Fan (Low) Relay - Short circuit to B+	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - Power supply wiring: short circuit • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and terminal of ECU pin No. 35. 2. Inspect the power supply. 3. Inspect the cooling fan. 4. Check the ECU. 	
		Condenser Fan (Low) Relay - Open circuit to Ground	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - Short or open circuit to ground • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and terminal of ECU pin No. 35. 2. Inspect the power supply. 3. Inspect the cooling fan. 4. Check the ECU. 	
Cooling fan system (PWM electric fan)	P0483	PWM electric fan - Motor overloaded	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The cooling fan's output wiring has a short circuit to power supply. • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and the terminal of No. 39 ECU pin. 2. Inspect the power supply. 3. Inspect the cooling fan. 4. Check the ECU. 	
	P0484	PWM electric fan - Motor stalled	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The cooling fan's output wiring has a short circuit to power supply. • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and the terminal of No. 39 ECU pin. 2. Inspect the power supply. 3. Inspect the cooling fan. 4. Check the ECU. 	
	P0485	PWM electric fan - Short circuit	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The cooling fan's output wiring has a short circuit to power supply. • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and the terminal of No. 39 ECU pin. 2. Inspect the power supply. 3. Inspect the cooling fan. 4. Check the ECU. 	

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Auto Cruise Control	P0500	CAN signal Fault: Auto Cruise Malfunction	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The auto cruise is defective. 	O
		Auto Cruise Acceleration Function Fault	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The acceleration signal is faulty. 	O
		Auto Cruise Deceleration Function Fault	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The deceleration signal is faulty. 	O
	P0501	Defective Vehicle Speed Sensor Signal	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The vehicle speed signal is faulty. 	O
		Defective Vehicle Speed Sensor Signal	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The vehicle speed signal is faulty. 	O
Battery Voltage	P0562	Low Battery Voltage	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The voltage of ECU is faulty. * Less than minimum 8 Volts in 2000 rpm below * Less than 10 Volts in 2000 rpm above • Specification <ul style="list-style-type: none"> Over 8 V • Actions <ol style="list-style-type: none"> 1. Measure the actual battery voltage using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 12, 11, 10 and 5. 3. Check the power supply relay. 4. Check the battery and the ECU. 	O
Auto Cruise Control	P0564	Defective Auto Cruise Control Lever	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The auto cruise lever is defective. 	O
CAN Communication	P0600	CAN Communication Malfunction: ASR	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The CAN communication with ASR is defective. • Specification <ul style="list-style-type: none"> - Transfer rate: 500 K Baud • Actions <ol style="list-style-type: none"> 1. Check the CAN communication line of relevant unit. 2. Inspect the circuits and terminals of ECU pin No. 37 and 38. 3. Check the ECU. 	O
		CAN Communication Malfunction: ABS	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The CAN communication with ABS is defective. • Specification <ul style="list-style-type: none"> - Transfer rate: 500 K Baud • Actions <ol style="list-style-type: none"> 1. Check the CAN communication line of relevant unit. 2. Inspect the circuits and terminals of ECU pin No. 37 and 38. 3. Check the ECU. 	O
		Defective Immobilizer System	<ul style="list-style-type: none"> • Specification <ul style="list-style-type: none"> - Transfer rate: 500 K Baud • Actions <ol style="list-style-type: none"> 1. Check the CAN communication line of relevant unit. 2. Inspect the circuits and terminals of ECU pin No. 37 and 38. 3. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
CAN Communication	P0600	CAN Communication Malfunction: TCU	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The CAN communication with TCU is defective. • Specification <ul style="list-style-type: none"> - Transfer rate: 500 K Baud • Actions <ol style="list-style-type: none"> 1. Check the CAN communication line of relevant unit. 2. Inspect the circuits and terminals of ECU pin No. 37 and 38. 3. Check the ECU. 	O
		CAN Communication Malfunction: TOD (Not used)	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The CAN communication with TOD is defective. • Specification <ul style="list-style-type: none"> - Transfer rate: 500 K Baud • Actions <ol style="list-style-type: none"> 1. Check the CAN communication line of relevant unit. 2. Inspect the circuits and terminals of ECU pin No. 37 and 38. 3. Check the ECU. 	O
		CAN Communication Malfunction: Shift Lever	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The CAN communication with TGS lever is defective. • Specification <ul style="list-style-type: none"> - Transfer rate: 500 K Baud • Actions <ol style="list-style-type: none"> 1. Check the CAN communication line of relevant unit. 2. Inspect the circuits and terminals of ECU pin No. 37 and 38. 3. Check the ECU. 	O
		CAN Communication Malfunction: ABS Speed Sensor (FR)	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The ABS front speed sensor's signal is defective. • Specification <ul style="list-style-type: none"> - Transfer rate: 500 K Baud • Actions <ol style="list-style-type: none"> 1. Check the CAN communication line of relevant unit. 2. Inspect the circuits and terminals of ECU pin No. 37 and 38. 3. Check the ECU. 	O
		CAN Communication Malfunction: ABS Speed Sensor (RR)	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The ABS rear speed sensor's signal is defective. • Specification <ul style="list-style-type: none"> - Transfer rate: 500 K Baud • Actions <ol style="list-style-type: none"> 1. Check the CAN communication line of relevant unit. 2. Inspect the circuits and terminals of ECU pin No. 37 and 38. 3. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
CAN Communication	P0600	CAN Communication Malfunction: Faulty Initialization	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The communication network data is not initialized. • Specification <ul style="list-style-type: none"> - Transfer rate: 500 K Baud • Actions <ol style="list-style-type: none"> 1. Check the CAN communication line of relevant unit. 2. Inspect the circuits and terminals of ECU pin No. 37 and 38. 3. Check the ECU. 	O
		CAN Communication Malfunction: MSR Transmission Signal	<ul style="list-style-type: none"> • Specification <ul style="list-style-type: none"> - Transfer rate: 500 K Baud • Actions <ol style="list-style-type: none"> 1. Check the CAN communication line of relevant unit. 2. Inspect the circuits and terminals of ECU pin No. 37 and 38. 3. Check the ECU. 	O
		CAN Communication Malfunction: ASR Transmission Signal	<ul style="list-style-type: none"> • Specification <ul style="list-style-type: none"> - Transfer rate: 500 K Baud • Actions <ol style="list-style-type: none"> 1. Check the CAN communication line of relevant unit. 2. Inspect the circuits and terminals of ECU pin No. 37 and 38. 3. Check the ECU. 	O
Throttle Body Control	P0601	Throttle Position Sensor - Faulty Learning Signal	<ul style="list-style-type: none"> – Specification <ul style="list-style-type: none"> - Connection between No.1 throttle position sensor and No.2 throttle position sensor No.1 TPS's pull-down resistance: 464 kΩ No.2 TPS's pull-up resistance: 464 kΩ - Potentiometer voltage: 5 V - Potentiometer resistance: 1 kΩ ± 20 % - Permissible current for wiper arms: below 15 μA - Protective resistance for wiper arms: 320 Ω ± 20 % - Motor voltage/max. current : 12 V / below 1.7 A • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 67, 68, 84, 85, 87 and 112. 3. Inspect the electric throttle controller. 4. Check the ECU. 	O
ECU	P0601	Auto Cruise Shutdown Memory Malfunction	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The ECU's internal circuit is defective. • Actions <ol style="list-style-type: none"> 1. Check the ECU connector for contact. 2. Check the ECU. 	O
		ECU Malfunction (Call Monitor)	<ul style="list-style-type: none"> • Actions <ol style="list-style-type: none"> 1. Check the ECU connector for contact. 2. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
ECU	P0601	Servo Motor's Voltage Output Stopped	• Actions <ol style="list-style-type: none"> 1. Check the ECU connector for contact. 2. Check the ECU. 	O
		Servo Motor - Short or Open circuit	• Actions <ol style="list-style-type: none"> 1. Check the ECU connector for contact. 2. Check the ECU. 	O
		ECU Malfunction (CPU not compatible)	• Actions <ol style="list-style-type: none"> 1. Check the ECU connector for contact. 2. Check the ECU. 	O
		ECU Malfunction (Faulty CPU Communication)	• Actions <ol style="list-style-type: none"> 1. Check the ECU connector for contact. 2. Check the ECU. 	O
		ECU Malfunction (Faulty CPU (2) Environment)	• Actions <ol style="list-style-type: none"> 1. Check the ECU connector for contact. 2. Check the ECU. 	O
		ECU Malfunction (CPU (2) Malfunction)	• Actions <ol style="list-style-type: none"> 1. Check the ECU connector for contact. 2. Check the ECU. 	O
		ECU Malfunction (Faulty CPU run-time)	• Actions <ol style="list-style-type: none"> 1. Check the ECU connector for contact. 2. Check the ECU. 	O
		Communication Malfunction (CPU2)	• Actions <ol style="list-style-type: none"> 1. Check the ECU connector for contact. 2. Check the ECU. 	O
	P0602	ECU Not Coded	• Condition <ul style="list-style-type: none"> - The ECU coding is incorrect. • Actions <ol style="list-style-type: none"> 1. Check the ECU connector for contact. 2. Check the ECU. 	O
Incorrect Coding	P0602	Incorrect Transmission Coding	• Condition <ul style="list-style-type: none"> - TCU (Variant) coding is faulty. • Actions <ol style="list-style-type: none"> 1. Check the current coding using SCAN-100. 2. Check ECU and TCU. 3. Check the CAN line. 	O
Incorrect Coding	P0603	Incorrect VIN ECU Coding	• Actions <ol style="list-style-type: none"> 1. Check the current coding using SCAN-100. 2. Check ECU and TCU. 3. Check the CAN line. 	O
ECU	P0604	ECU Fault (RAM)	• Condition <ul style="list-style-type: none"> - The memory function of ECU RAM is defective. • Actions <ol style="list-style-type: none"> 1. Check the ECU connector for contact. 2. Check the ECU. 	O

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Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
ECU	P0605	ECU Fault (EPROM)	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The memory function of ECU is defective. • Actions <ol style="list-style-type: none"> 1. Check the ECU connector for contact. 2. Check the ECU. 	O
		ECU Fault (Faulty NVRAM Checksum)	<ul style="list-style-type: none"> • Actions <ol style="list-style-type: none"> 1. Check the ECU connector for contact. 2. Check the ECU. 	O
		ECU Fault (Faulty Coding ID Checksum)	<ul style="list-style-type: none"> • Actions <ol style="list-style-type: none"> 1. Check the ECU connector for contact. 2. Check the ECU. 	O
		ECU Fault (Faulty Coding Checksum)	<ul style="list-style-type: none"> • Actions <ol style="list-style-type: none"> 1. Check the ECU connector for contact. 2. Check the ECU. 	O
		ECU Fault (Faulty Programming Checksum)	<ul style="list-style-type: none"> • Actions <ol style="list-style-type: none"> 1. Check the ECU connector for contact. 2. Check the ECU. 	O
Engine CHECK Warning Lamp	P0650	Engine CHECK Warning Lamp - Short circuit to B+	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - Lamp circuit: short circuit to battery • Actions <ol style="list-style-type: none"> 1. Check the actual operating condition using SCAN-100. 2. Inspect the circuit and terminal of ECU pin No. 29. 	O
		Engine CHECK Warning Lamp - Open or Short circuit to Ground	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - Lamp circuit: short or open circuit to ground • Actions <ol style="list-style-type: none"> 1. Check the actual operating condition using SCAN-100. 2. Inspect the circuit and terminal of ECU pin No. 29. 	O
Variable Air Intake System	P0661	Variable Air Intake Valve - Open or Short circuit to Ground	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - Variable air intake valve circuit: short or open circuit to ground • Specification <ul style="list-style-type: none"> - ON/OFF flip range: approx. 3500 rpm - Operating current: 0.4 - 0.6 A - Solenoid internal resistance: $25 \pm 5 \Omega$ (20°C) • Actions <ol style="list-style-type: none"> 1. Check the actual operation condition using SCAN-100. 2. Inspect the circuit and terminal of ECU pin No. 97. 3. Check the resonance flap's power supply. 4. Check the resonance flap solenoid and unit for damage. 5. Check the ECU. 	O

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● : Turning on when the condition is occurred once

Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Variable Air Intake System	P0662	Variable Air Intake Valve - Short circuit to B+	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - Variable air intake valve circuit: short circuit to battery • Specification <ul style="list-style-type: none"> - ON/OFF flip range: approx. 3500 rpm - Operating current: 0.4 - 0.6 A - Solenoid internal resistance: $25 \pm 5 \Omega$ (20°C) • Actions <ol style="list-style-type: none"> 1. Check the actual operating condition using SCAN-100. 2. Inspect the circuit and terminal of ECU pin No. 97. 3. Check the resonance flap's power supply. 4. Check the resonance flap solenoid and unit for damage. 5. Check the ECU. 	O
TCU	P0702	TCU Fault	<ul style="list-style-type: none"> • Actions <ul style="list-style-type: none"> - Check DTC codes for TCU. 	O
		Transmission Malfunction: Solenoid Valve Voltage	<ul style="list-style-type: none"> • Actions <ul style="list-style-type: none"> - Check DTC codes for TCU. 	O
Auto Cruise Control	P0703	CAN Communication Fault: Stop Lamp Switch	<ul style="list-style-type: none"> • Condition <ul style="list-style-type: none"> - The brake switch is defective. 	O
TCU	P0705	Transmission Malfunction: Shift Lever	<ul style="list-style-type: none"> • Actions <ul style="list-style-type: none"> - Check DTC codes for TCU. 	O
	P0715	Transmission Malfunction: Vehicle Speed Sensor	<ul style="list-style-type: none"> • Actions <ul style="list-style-type: none"> - Check DTC codes for TCU. 	O
	P0720	Transmission Malfunction: Faulty Speed to Output	<ul style="list-style-type: none"> • Actions <ul style="list-style-type: none"> - Check DTC codes for TCU. 	O
	P0730	Transmission Malfunction: Hydraulic System	<ul style="list-style-type: none"> • Actions <ul style="list-style-type: none"> - Check DTC codes for TCU. 	O
		Transmission Malfunction: Faulty Gear Recognition	<ul style="list-style-type: none"> • Actions <ul style="list-style-type: none"> - Check DTC codes for TCU. 	O
	P0734	A/T Control Malfunction	<ul style="list-style-type: none"> • Actions <ul style="list-style-type: none"> - Check DTC codes for TCU. 	O
	P0740	Transmission Malfunction: TCC Head Control	<ul style="list-style-type: none"> • Actions <ul style="list-style-type: none"> - Check DTC codes for TCU. 	O
	P0743	Transmission Malfunction: Lockup Converter Clutch	<ul style="list-style-type: none"> • Actions <ul style="list-style-type: none"> - Check DTC codes for TCU. 	O
	P0748	Transmission Malfunction: Modulator Pressure	<ul style="list-style-type: none"> • Actions <ul style="list-style-type: none"> - Check DTC codes for TCU. 	O
	P0753	Transmission Malfunction: Solenoid Valve 1-2/4-5	<ul style="list-style-type: none"> • Actions <ul style="list-style-type: none"> - Check DTC codes for TCU. 	O
	P0758	Transmission Malfunction: Solenoid Valve 2-3	<ul style="list-style-type: none"> • Actions <ul style="list-style-type: none"> - Check DTC codes for TCU. 	O
	P0763	Transmission Malfunction: Solenoid Valve 3-4	<ul style="list-style-type: none"> • Actions <ul style="list-style-type: none"> - Check DTC codes for TCU. 	O
	P0778	Transmission Malfunction: Transmission Pressure	<ul style="list-style-type: none"> • Actions <ul style="list-style-type: none"> - Check DTC codes for TCU. 	O
	P0836	Transmission Malfunction: Transfer Case	<ul style="list-style-type: none"> • Actions <ul style="list-style-type: none"> - Check DTC codes for TCU. 	O

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O : Turning on when the condition is occurred twice consecutively

● : Turning on when the condition is occurred once

Related Item	DTC	Trouble	Help	Engine CHECK warning lamp
Incorrect Coding	P1570	Immobilizer Not Coded	• Actions <ol style="list-style-type: none"> 1. Check the current coding using SCAN-100. 2. Check ECU and TCU. 3. Check the CAN line. 	O
Throttle Body Control	P1590	Safety Fuel Shut-off Time Expired	• Specification <ul style="list-style-type: none"> - Connection between No.1 throttle position sensor and No.2 throttle position sensor No.1 TPS's pull-down resistance: 464 kΩ No.2 TPS's pull-up resistance: 464 kΩ - Potentiometer voltage: 5 V - Potentiometer resistance: 1 kΩ ± 20 % - Permissible current for wiper arms: below 15 μA - Protective resistance for wiper arms: 320 Ω ± 20 % - Motor voltage/max. current : 12 V / below 1.7 A • Actions <ol style="list-style-type: none"> 1. Measure the actual output value using SCAN-100. 2. Inspect the circuits and terminals of ECU pin No. 67, 68, 84, 85, 87 and 112. 3. Inspect the electric throttle controller. 4. Check the ECU. 	O
Starter Signal	P1609	Starter Signal Recognition Malfunction	• Condition <ul style="list-style-type: none"> - The starter signal is improperly recognized. • Specification <ul style="list-style-type: none"> - Over 9.6 V (for 1 seconds) • Actions <ol style="list-style-type: none"> 1. Inspect the circuit and terminal of the ECU pin No. 2. 2. Check the ECU. 	O

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TROUBLE DIAGNOSIS TABLE FOR CDPF

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode	Engine CHECK Warning Lamp
P0425	Temperature Sensor #1 - Open/Short	<ul style="list-style-type: none"> - There is an electric problem in sensor. - The electric circuit has an open circuit. - The electric circuit has a short circuit to ground. - The electric circuit has a short circuit to battery. - The recycling mode cannot be activated. <p>※ Recycling mode: Recycling CDPF by combusting soot accumulated in CDPF</p>						O
P0427	Temperature Sensor #1 - Low Input Value	<ul style="list-style-type: none"> - An error is generated which is related to input voltage of sensor (5V). - The temperature is below -16°C (min. temperature) or, - The sensor signal has a short circuit to ground. 						
P0428	Temperature Sensor #1 - High Input Value	<ul style="list-style-type: none"> - The sensor signal has a short circuit to battery. - The temperature is over 846°C (max. temperature). - Check the wiring for open/short circuit. 						
P0426	Temperature Sensor #1 - Noise in Input	<ul style="list-style-type: none"> - Noise is generated due to the poor contact of connector. - The temperature change of sensor is over 30°C. (It is to check whether there is noise in signal.) 						
P0429	Temperature Sensor #1 - Poor Response	<ul style="list-style-type: none"> - The difference between the calculated input temperature value and the value from sensor is over 30°C. - The change value of the air temperature is below 3°C when not in recycling mode. 						
P0435	Temperature Sensor #2 - Open/Short	<ul style="list-style-type: none"> - There is an electric problem in sensor. - The electric circuit has an open circuit. - The electric circuit has a short circuit to ground. - The electric circuit has a short circuit to battery. - The recycling mode cannot be activated. 						O
P0437	Temperature Sensor #2 - Low Input Value	<ul style="list-style-type: none"> - The input voltage of sensor (5V) is abnormal. - The temperature is below -16°C (min. temperature) or, - The sensor signal has a short circuit to ground. 						

DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode	Engine CHECK Warning Lamp
P0438	Temperature Sensor #2 - High Input Value	<ul style="list-style-type: none"> - The input voltage of sensor (5V) is abnormal. - The temperature is over 846°C (max. temperature) or, - The sensor signal has a short circuit to battery. - If the temperature is at the max. limit, check wiring for short circuit. 						
P0436	Temperature Sensor #2 - Noise in Input	<ul style="list-style-type: none"> - Noise is generated due to the poor contact of connector. - The temperature change of sensor is over 30°C. (It is to check whether there is noise in signal.) 						
P0430	Temperature Sensor #2 - Poor Response	<ul style="list-style-type: none"> - Check the output difference between front and rear side of DOC. - Check condition for error: <ul style="list-style-type: none"> * Normal driving condition (non-recycling mode) * No error related to input/output * 255 seconds after initial engine starting - The difference between the actual output value and the calculated value is over 50°C. - Check the temperature sensor and replace if necessary. 						
P0470	Differential Pressure Sensor - Max./Min. Output	<ul style="list-style-type: none"> - Specification for output value of pressure sensor : 0.5 ~4.5V - The output value of sensor is over 4.5 V or below 0.5 V. - Check the pressure sensor wiring for open or short circuit. 						O
P0471	Differential Pressure Sensor - Abnormal Differential Pressure	<ul style="list-style-type: none"> - The actual (measured) pressure difference (actual pressure) is different from the calculated pressure difference (pressure difference between front and rear side of CDPF). (Possible cause : malfunctioning pressure sensor, leakage in pressure tube, parts removed) 						O
P0475	CDPF - Pressure Leakage	<ul style="list-style-type: none"> - There is pressure leakage at front or rear side of CDPF. - The pressure is dropped below -15 Kpa for over 10 seconds due to soot. 						O
P0432	CDPF - Excessive Soot Accumulated	<ul style="list-style-type: none"> - The pressure is over 23 Kpa for over 960 seconds due to the resistance by soot. - If P0432 is generated without error in pressure sensor, the torque is reduced. - Remove CDPF and clean it by blowing it from the opposite side of discharged side. Then, install it again and check it for soot. 	O					O

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DTC	Trouble	Help	Torque Reduction (max.50%)	Torque Reduction (max.20%)	Delayed Engine Stop	Immediately Engine Stop	Limp Home Mode	Engine CHECK Warning Lamp
P1430	CDPF - Soot Accumulated Over the Limit	<ul style="list-style-type: none"> - The recycling mode cannot be activated. - The pressure is over 23 Kpa for over 960 seconds due to the resistance by soot. - <u>When the engine CHECK warning lamp flashes, drive the vehicle at over 50 km/h for 20 minutes so that the soot in CDPF is combusted.</u> 						Flashing
P0431	DOC Temperature Measured Value - Too Low	<ul style="list-style-type: none"> - The measured DOC temperature is below the limit for recycling (below 0.5 times). - Cause: Old/worn DOC - The recycling mode cannot be activated. 						O
P1432	Torque Reduction Mode	<ul style="list-style-type: none"> - Operating condition : When the amount of soot is over the specified range (P1430 error stored) and the recycling mode cannot be operated (related error occurred), <u>the torque reduction mode is activated so that the driver let the system inspected as soon as possible.</u> - In operation: torque reduction, engine CHECK warning lamp ON 	O					O
P1407	Throttle Valve Vacuum Modulator - Open/Short	<ul style="list-style-type: none"> - The vacuum modulator of throttle valve has an electrical problem. - The electric circuit has an open circuit. - The electric circuit has a short circuit to ground. - The electric circuit has a short circuit to battery. 						O
P0488	Throttle Valve - Seized	<ul style="list-style-type: none"> - The vacuum modulator of throttle valve has an open circuit. - The throttle valve is seized (mechanically). - Check condition for seizing: <ul style="list-style-type: none"> * No error in HFM and EGR * Engine running 						O
P242F	Change Interval for CDPF Filter - Warning	<ul style="list-style-type: none"> - The vehicle is driven for approx. 500,000 km (CDPF change interval). 						O

TCU

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DIAGNOSTIC TROUBLE CODES FOR ION (BTRA) AUTO TRANSMISSION

DTC Code	Defective	Cause and Action
P0707	Low gear position sensor input	<p>Cause:</p> <ul style="list-style-type: none"> - Gear position sensor signal of the inhibitor switch is lower than the normal value (defective gear position sensor) - Specified value of gear position sensor signal: 0.87 V <p>Symptom:</p> <ul style="list-style-type: none"> - Cannot shift to 1st, 3rd and 4th gear. - Torque converter clutch stops from its operation. <p>Action:</p> <ul style="list-style-type: none"> - Check gear position sensor for short to ground. - Check inhibitor switch and TCU connector for proper connection. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 30 seconds.
P0708	High gear position sensor input	<p>Cause:</p> <ul style="list-style-type: none"> - Gear position sensor signal of the inhibitor switch is higher than the normal value (defective inhibitor switch) - Specified value of inhibitor switch: 4.12 V <p>Symptom:</p> <ul style="list-style-type: none"> - Cannot shift to 1st, 3rd and 4th gear position. - Torque converter clutch stops from its operation. <p>Action:</p> <ul style="list-style-type: none"> - Check gear position sensor for short to B+. - Check inhibitor switch and TCU connector for proper connection. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 30 seconds.
P0741	Torque converter clutch cannot be engaged	<p>Cause:</p> <ul style="list-style-type: none"> - Torque converter clutch cannot be engaged even when solenoid valve (S7) is operated. - The rpm of engine and output shaft is not consistent with the selected shift's gear ratio. • Allowable slip rpm of torque converter: 100 rpm <p>Symptom:</p> <ul style="list-style-type: none"> - Torque converter clutch cannot be locked <p>Action:</p> <ul style="list-style-type: none"> - Check solenoid valve (S7) wiring for short to ground or open circuit. - Replace solenoid valve (S7) if necessary. - Check T/M connector TCU connector for their proper connection. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 30 seconds.

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DTC Code	Defective	Cause and Action
P0742	Torque converter clutch engaged	<p>Cause:</p> <ul style="list-style-type: none"> - Torque converter clutch is engaged when solenoid valve (S7) is not operated. - The rpm of engine and output shaft is not consistent with the characteristic under the condition with torque converter not engaged. • Allowable slip rpm of torque converter < 50 rpm <p>Symptom:</p> <ul style="list-style-type: none"> - Torque converter clutch is locked. <p>Action:</p> <ul style="list-style-type: none"> - Check solenoid valve (S7) wiring for short to B+. - Replace solenoid valve (S7) if necessary. - Check T/M connector TCU connector for their proper connection. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 30 seconds.
P0710	Defective T/M oil temperature sensor	<p>Cause:</p> <ul style="list-style-type: none"> - Oil temperature of T/M exceeds the specified value. • Oil temperature sensor voltage > 4.88 V • Oil temperature sensor voltage < 0.21 V <p>Symptom:</p> <ul style="list-style-type: none"> - Oil temperature is fixed to 120°C - Shifting impression is poor. <p>Action:</p> <ul style="list-style-type: none"> - Check T/M oil temperature sensor for short or open circuit. - Check T/M connector and TCU connector for proper connection. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 3 seconds.
P0790	Defective W/N/P mode switch	<p>Cause:</p> <ul style="list-style-type: none"> - The W/N/P mode switch's connection is intermittently disconnected (the input of the mode switch changes rapidly). <p>Symptom:</p> <ul style="list-style-type: none"> - The switch is fixed to normal mode. <p>Action:</p> <ul style="list-style-type: none"> - Check W/N/P mode switch input circuit for short or open circuit. - Check W/N/P mode switch wiring. - Replace W/N/P mode switch if necessary. - Returns to the normal operation if the failure does not occur within 3 seconds.

DTC Code	Defective	Cause and Action
P1703	Abnormal engine rpm (CAN)	<p>Cause:</p> <ul style="list-style-type: none"> - The engine rpm signal (CAN) is out of specified value or there is no engine rpm signal. • Engine rpm < 0 rpm • Engine rpm > 7000 rpm <p>Symptom:</p> <ul style="list-style-type: none"> - The engine rpm corresponding to the max. engine torque is applied to the shifting condition. <p>Action:</p> <ul style="list-style-type: none"> - Check ECU and TCU connectors for poor contact. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 3 seconds.
P1704	Abnormal output shaft rpm (CAN)	<p>Cause:</p> <ul style="list-style-type: none"> - The output shaft signal (CAN) is out of specified value or there is no output shaft signal. • Output shaft rpm < 0 rpm • Output shaft rpm > 9000 rpm - The actual vehicle speed is 0 while other signals indicate that vehicle is moving. <p>Symptom:</p> <ul style="list-style-type: none"> - Cannot shift down by limiting the engine rpm to prevent the engine from overrunning. <p>Action:</p> <ul style="list-style-type: none"> - Check ECU and TCU connectors for poor contact. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 3 seconds and the rpm is over 0.
P1708	Low TCU supply voltage	<p>Cause:</p> <ul style="list-style-type: none"> - The TCU supply voltage is low or there is no measured voltage value. <p>Symptom:</p> <ul style="list-style-type: none"> - Cannot shift to 1st gear position. - Cannot shift to other gear positions due to the low supply voltage. - No. 6 solenoid valve (S6) stops from its operation. <p>Action:</p> <ul style="list-style-type: none"> - Check TCU terminal for poor contact, bending or deformation. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 30 seconds.
P1709	High TCU supply voltage	<p>Cause:</p> <ul style="list-style-type: none"> - The TCU supply voltage is high. • TCU supply voltage > 16.5 V <p>Symptom:</p> <ul style="list-style-type: none"> - All solenoid valves stop from their operation when high battery voltage is detected. - Enters into the emergency mode. <p>Action:</p> <ul style="list-style-type: none"> - Check TCU terminal for short to B+ or short to ground. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 30 seconds.

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DTC Code	Defective	Cause and Action
P1713	Defective accelerator pedal signal (CAN)	<p>Cause:</p> <ul style="list-style-type: none"> - The accelerator pedal signal (CAN) is out of the specified value. <ul style="list-style-type: none"> • Accelerator pedal signal < 0 % • Accelerator pedal signal > 100 % <p>Symptom:</p> <ul style="list-style-type: none"> - Cannot shift to 4th gear position. - Torque converter clutch stops from its operation. - The interior default value is applied for shift determination (if the accelerator pedal signal is defective, ECU selects the default value and sends it and error message to TCU via CAN line). - The accelerator pedal signal is not used for P, R, N B2. <p>Action:</p> <ul style="list-style-type: none"> - Check ECU and TCU connectors for poor contact and their terminals for bend or deformation. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 30 seconds.
P1714	Defective vehicle coding	<p>Cause:</p> <ul style="list-style-type: none"> - The vehicle coding stored in EEPROM is defective (self-test when IGN ON). <p>Symptom:</p> <ul style="list-style-type: none"> - Determines the vehicle coding value via CAN communication or selects 0 for the coding value. - Shifting impression is poor. <p>Action:</p> <ul style="list-style-type: none"> - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1715	Abnormal VPS offset	<p>Cause:</p> <ul style="list-style-type: none"> - VPS (Variable pressure solenoid valve) is used for controlling clutch and band pressure while shifting. - The VPS offset stored in EEPROM is incorrect (self-test when IGN ON). <ul style="list-style-type: none"> • VPS offset > 120 mA <p>Symptom:</p> <ul style="list-style-type: none"> - Shifting impression is poor. <p>Action:</p> <ul style="list-style-type: none"> - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1717	Defective RAM	<p>Cause:</p> <ul style="list-style-type: none"> - RAM operates abnormally. (self-test when IGN ON) <p>Symptom:</p> <ul style="list-style-type: none"> - No output signal. - Enters into the emergency mode. <p>Action:</p> <ul style="list-style-type: none"> - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1718	Defective ROM	<p>Cause:</p> <ul style="list-style-type: none"> - The program memory is defective (self-test when IGN ON). - The calculated checksum value is not consistent with the stored checksum value. <p>Symptom:</p> <ul style="list-style-type: none"> - No output signal. - Enters into the emergency mode. <p>Action:</p> <ul style="list-style-type: none"> - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.

DTC Code	Defective	Cause and Action
P1719	Abnormal CAN communication	Cause: - Cannot use information necessary for TCU via CAN communication. Symptom: - The default value is used for all CAN signals. - Enters into the emergency mode. Action: - Check ECU and TCU connectors wiring for poor contact. - Check ECU and TCU connectors' terminals for bend or deformation. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 30 seconds.
P1720	Defective EEPROM	Cause: - EEPROM memory is defective. - The calculated checksum value is not consistent with the stored checksum value or the error occurs in EEPROM communication. (self-test when IGN ON) Symptom: - Determines the vehicle coding value via CAN communication or selects 0 for the coding value. - Shifting impression is poor. Action: - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1722	Incorrect vehicle model	Cause: - Cannot detect the vehicle coding through EEPROM or CAN communication. Symptom: - Selects 0 for the coding value. - Enters into the emergency mode. Action: - Check TCU connector and terminals for poor contact. - DTC disappears after turning ignition from OFF to ON.
P1733	No. 1 solenoid valve open	Cause: - The No. 1 solenoid valve operates with the No. 2 solenoid valve to control the oil flow for the 1-2 shift valve. - The No.1 solenoid valve internal circuit or solenoid valve wiring is open. - The solenoid valve connection is short to B+. Symptom: - The No. 1 solenoid valve is OFF. - Enters into the emergency mode. Action: - Check No. 1 solenoid valve wiring and connector (especially its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No.1 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.

ECU-DSL
ECU-GSL
ECU-CDPF
TCU
BRAKE
AIR-BAG
TC
RK-STICS
FFH
RAIN SENSOR
FATC
TGS LEVER
P-TRUNK
CCCS

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DTC Code	Defective	Cause and Action
P1734	No. 2 solenoid valve open	<p>Cause:</p> <ul style="list-style-type: none"> - The No. 2 solenoid valve operates with the No. 1 solenoid valve to control the oil flow for the 2-3 shift valve. - The No. 2 solenoid valve circuit is open. - The solenoid valve connection is short to B+. <p>Symptom:</p> <ul style="list-style-type: none"> - The No. 2 solenoid valve is OFF. - Enters into the emergency mode. <p>Action:</p> <ul style="list-style-type: none"> - Check No. 2 solenoid valve wiring and connector (especially, its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No.2 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1735	No. 3 solenoid valve open	<p>Cause:</p> <ul style="list-style-type: none"> - The No. 3 solenoid valve operates with the No. 4 solenoid valve to shift smoothly and control the shifting order. - The No. 3 solenoid valve turns the clutch regulator valve ON and OFF. - The No. 3 solenoid valve circuit is open. - The solenoid valve connection is short to B+. <p>Symptom:</p> <ul style="list-style-type: none"> - The No. 3 solenoid valve is OFF. - Shifting impression is poor. <p>Action:</p> <ul style="list-style-type: none"> - Check No. 3 solenoid valve wiring and connector (especially, its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No.3 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.

DTC Code	Defective	Cause and Action
P1736	No. 4 solenoid valve open	<p>Cause:</p> <ul style="list-style-type: none"> - The No. 4 solenoid valve operates with the No. 3 solenoid valve to shift smoothly and control the shifting order. - The No. 4 solenoid valve turns the clutch regulator valve ON and OFF. - The No. 4 solenoid valve circuit is open. - The solenoid valve connection is short to B+. <p>Symptom:</p> <ul style="list-style-type: none"> - The No. 4 solenoid valve is OFF or ON. - Shifting impression is poor. <p>Action:</p> <ul style="list-style-type: none"> - Check No. 4 solenoid valve wiring and connector (especially, its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No.4 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1737	No. 5 solenoid valve open	<p>Cause:</p> <ul style="list-style-type: none"> - The No. 5 solenoid valve is a variable solenoid valve to change the pressure for shifting. - The No. 5 solenoid valve circuit is open. - The solenoid valve connection is short to B+. <p>Symptom:</p> <ul style="list-style-type: none"> - The No. 4 solenoid valve is always OFF. - Shifting impression is poor. <p>Action:</p> <ul style="list-style-type: none"> - Check No. 5 solenoid valve wiring and connector (especially, its ground condition). - Specified resistance value: 3.6 ~ 5.5Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No.5 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1738	No. 6 solenoid valve open	<p>Cause:</p> <ul style="list-style-type: none"> - The No. 6 solenoid valve is used to set the hydraulic line pressure to HIGH/LOW level. - The No. 6 solenoid valve circuit is open. - The solenoid valve connection is short to B+. <p>Symptom:</p> <ul style="list-style-type: none"> - The hydraulic line pressure is high. (No. 6 solenoid valve stops its operation) - Cannot to shift to 1st gear position. <p>Action:</p> <ul style="list-style-type: none"> - Check No. 6 solenoid valve wiring and connector (especially, its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No. 6 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.

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DTC Code	Defective	Cause and Action
P1739	No. 7 solenoid valve open	<p>Cause:</p> <ul style="list-style-type: none"> - The No. 7 solenoid valve controls the operation of the torque converter clutch. - The No. 7 solenoid valve circuit is open. - The solenoid valve connection is short to B+. <p>Symptom:</p> <ul style="list-style-type: none"> - The No. 7 solenoid valve stops its operation (OFF). - The torque converter clutch cannot be locked. <p>Action:</p> <ul style="list-style-type: none"> - Check No. 7 solenoid valve wiring and connector (especially, its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No. 7 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1741	No. 1 solenoid valve short	<p>Cause:</p> <ul style="list-style-type: none"> - The No. 1 solenoid valve operates with the No. 2 solenoid valve to control the oil flow for the 1-2 shift valve. - The No. 1 solenoid valve circuit is short to ground. <p>Symptom:</p> <ul style="list-style-type: none"> - The No. 1 solenoid valve is OFF. - Enters into the emergency mode. <p>Action:</p> <ul style="list-style-type: none"> - Check No. 1 solenoid valve wiring and connector (especially its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No.1 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1742	No. 2 solenoid valve short	<p>Cause:</p> <ul style="list-style-type: none"> - The No. 2 solenoid valve operates with the No. 1 solenoid valve to control the oil flow for the 2-3 shift valve. - The No. 2 solenoid valve circuit is short to ground. <p>Symptom:</p> <ul style="list-style-type: none"> - The No. 2 solenoid valve is OFF. - Enters into the emergency mode. <p>Action:</p> <ul style="list-style-type: none"> - Check No. 2 solenoid valve wiring and connector (especially its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No. 2 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.

DTC Code	Defective	Cause and Action	
P1743	No. 3 solenoid valve short	Cause: <ul style="list-style-type: none"> - The No. 3 solenoid valve operates with the No. 4 solenoid valve to shift smoothly and control the shifting order. - The No. 3 solenoid valve turns the clutch regulator valve ON and OFF. - The No. 3 solenoid valve circuit is short to ground. Symptom: <ul style="list-style-type: none"> - The No. 3 solenoid valve is OFF. - Shifting impression is poor. Action: <ul style="list-style-type: none"> - Check No. 3 solenoid valve wiring and connector (especially its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No. 3 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON. 	
P1744	No. 4 solenoid valve short	Cause: <ul style="list-style-type: none"> - The No. 4 solenoid valve operates with the No. 3 solenoid valve to shift smoothly and control the shifting order. - The No. 4 solenoid valve turns the clutch regulator valve ON and OFF. - The No. 4 solenoid valve circuit is short to ground. Symptom: <ul style="list-style-type: none"> - The No. 4 solenoid valve is OFF. - Shifting impression is poor. Action: <ul style="list-style-type: none"> - Check No. 4 solenoid valve wiring and connector (especially its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No. 4 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON. 	
P1745	No. 5 solenoid valve short	Cause: <ul style="list-style-type: none"> - The No. 5 solenoid valve is a variable solenoid valve to change the pressure for shifting. - The No. 5 solenoid valve circuit is short to ground. Symptom: <ul style="list-style-type: none"> - The No. 4 solenoid valve is always OFF. - Shifting impression is poor. Action: <ul style="list-style-type: none"> - Check No. 5 solenoid valve wiring and connector (especially, its ground condition). - Specified resistance value: 3.6 ~ 5.5Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No.5 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON. 	

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DTC Code	Defective	Cause and Action
P1746	No. 6 solenoid valve short	<p>Cause:</p> <ul style="list-style-type: none"> - The No. 6 solenoid valve is used to set the hydraulic line pressure to HIGH/LOW level. - The No. 6 solenoid valve circuit is short to ground. <p>Symptom:</p> <ul style="list-style-type: none"> - The hydraulic line pressure is high. (No. 6 solenoid valve stops its operation) - Cannot to shift to 1st gear position. <p>Action:</p> <ul style="list-style-type: none"> - Check No. 6 solenoid valve wiring and connector (especially, its ground condition). - Specified resistance value : 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No. 6 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1747	No. 7 solenoid valve short	<p>Cause:</p> <ul style="list-style-type: none"> - The No. 7 solenoid valve controls the operation of the torque converter clutch. - The No. 7 solenoid valve circuit is short to ground. <p>Symptom:</p> <ul style="list-style-type: none"> - The No. 7 solenoid valve stops its operation (OFF). - The torque converter clutch cannot be locked. <p>Action:</p> <ul style="list-style-type: none"> - Check No. 7 solenoid valve wiring and connector (especially, its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No. 7 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.

DIAGNOSIS TROUBLE CODE OF DC5AT

Trouble Code	Defectives	Action
P2000	Faulty TCU internal watchdog test	<ul style="list-style-type: none"> Self-diagnosis with IGN ON. Cycle the IGN switch from OFF to ON. Check and replace TCU if the trouble still exists.
P2001	Faulty TCU internal watchdog function	<ul style="list-style-type: none"> Self-diagnosis. Cycle the IGN switch from OFF to ON. Check and replace TCU if the trouble still exists.
P2002	Faulty TCU external watchdog test	<ul style="list-style-type: none"> Self-diagnosis with IGN ON. Cycle the IGN switch from OFF to ON. Check and replace TCU if the trouble still exists.
P2003	Faulty TCU external watchdog function	<ul style="list-style-type: none"> Self-diagnosis. Cycle the IGN switch from OFF to ON. Check and replace TCU if the trouble still exists.
P2004	Faulty TCU Clock	<ul style="list-style-type: none"> Self-diagnosis. Cycle the IGN switch from OFF to ON. Check and replace TCU if the trouble still exists.
P2005	Faulty TCU RAM	<ul style="list-style-type: none"> Self-diagnosis with IGN ON. Cycle the IGN switch from OFF to ON. Check and replace TCU if the trouble still exists.
P2006	Faulty TCU RAM CAN-Controller 1	<ul style="list-style-type: none"> Self-diagnosis with IGN ON. Cycle the IGN switch from OFF to ON. Check and replace TCU if the trouble still exists.
P2007	Faulty TCU RAM CAN-Controller 2	<ul style="list-style-type: none"> Self-diagnosis with IGN ON. Cycle the IGN switch from OFF to ON. Check and replace TCU if the trouble still exists.
P2008	Faulty TCU ROM	<ul style="list-style-type: none"> Self-diagnosis with IGN ON. When the TCU internal checksum is different from scanner checksum. Cycle the IGN switch from OFF to ON. Check and replace TCU if the trouble still exists.
P200A	Faulty TCU EEPROM	<ul style="list-style-type: none"> Self-diagnosis with IGN ON. Cycle the IGN switch from OFF to ON. Check and replace TCU if the trouble still exists.
P200B	Faulty TCU CPU (internal)	<ul style="list-style-type: none"> Self-diagnosis. Check harness contact.
P200C	Faulty TCU program control	<ul style="list-style-type: none"> Self-diagnosis. Check harness contact.
P2010	No TCU variant coding	<ul style="list-style-type: none"> Self-diagnosis with IGN ON. When the TCU coding is not exist. Check again after TCU coding.

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Trouble Code	Defectives	Action
P2011	Faulty TCU variant coding	<ul style="list-style-type: none"> • Self-diagnosis with IGN ON. • When the TCU coding is faulty. • Check again after TCU coding.
P2012	Faulty TCU checksum	<ul style="list-style-type: none"> • Self-diagnosis with IGN ON. • Cycle the IGN switch from OFF to ON. Check and replace TCU if the trouble still exists.
P2013	Faulty TCU (internally)	<ul style="list-style-type: none"> • Self-diagnosis with IGN ON. • Cycle the IGN switch from OFF to ON. Check and replace TCU if the trouble still exists.
P2100	Defective 1-2, 4-5 shift solenoid valve	<ul style="list-style-type: none"> • When 1-2 or 4-5 shift solenoid valve is defective. • Measure the resistance of 1-2 or 4-5 shift solenoid valve (turn the IGN OFF, then and disconnect TCU connector). <ul style="list-style-type: none"> - TCU connector terminals: B12 (14), B3 (38) - Specified value: $3.8 \pm 0.2 \Omega$ • Triggered emergency mode when the defective is detected. <ul style="list-style-type: none"> - Fixed at 2nd gear in "D" range. • Check the related harness for open, short and contact.
P2101	1-2, 4-5 shift solenoid valve - short	<ul style="list-style-type: none"> • When 1-2 or 4-5 shift solenoid valve is defective. • Measure the resistance of 1-2 or 4-5 shift solenoid valve (turn the IGN OFF, then disconnect TCU connector). <ul style="list-style-type: none"> - TCU connector terminals: B12 (14), B3 (38) - Specified value: $3.8 \pm 0.2 \Omega$ • Triggered emergency mode when the defective is detected. <ul style="list-style-type: none"> - Fixed at 2nd gear in "D" range. • Check the related harness for open, short and contact.
P2102	Defective 2-3 shift solenoid valve	<ul style="list-style-type: none"> • When 2-3 shift solenoid valve is defective. • Measure the resistance of 2-3 shift solenoid valve (turn the IGN OFF, then disconnect TCU connector). <ul style="list-style-type: none"> - TCU connector terminals: B12 (14), B3 (38) - Specified value: $3.8 \pm 0.2 \Omega$ • Triggered emergency mode when the defective is detected. <ul style="list-style-type: none"> - Fixed at 2nd gear in "D" range. • Check the related harness for open, short and contact.
P2103	2-3 shift solenoid valve - short	<ul style="list-style-type: none"> • When 2-3 shift solenoid valve is defective. • Measure the resistance of 2-3 shift solenoid valve (turn the IGN OFF, then disconnect TCU connector). <ul style="list-style-type: none"> - TCU connector terminals: B12 (14), B3 (38) - Specified value: $3.8 \pm 0.2 \Omega$ • Triggered mechanical emergency mode when the defective is detected. <ul style="list-style-type: none"> - Fixed at 2nd gear in "D" range. • Check the related harness for open, short and contact.

Trouble Code	Defectives	Action
P2104	Defective 3-4 shift solenoid valve	<ul style="list-style-type: none"> When 3-4 shift solenoid valve is defective. Measure the resistance of 3-4 shift solenoid valve (turn the IGN OFF, then disconnect TCU connector). <ul style="list-style-type: none"> TCU connector terminals: B11 (15), B3 (38) Specified value: $3.8 \pm 0.2 \Omega$ Triggered mechanical emergency mode when the defective is detected. <ul style="list-style-type: none"> Fixed at 2nd gear in "D" range. Check the related harness for open, short and contact.
P2105	3-4 shift solenoid valve - short	<ul style="list-style-type: none"> When 3-4 shift solenoid valve is defective. Measure the resistance of 3-4 shift solenoid valve (turn the IGN OFF, then disconnect TCU connector). <ul style="list-style-type: none"> TCU connector terminals: B11 (15), B3 (38) Specified value: $3.8 \pm 0.2 \Omega$ Triggered mechanical emergency mode when the defective is detected. <ul style="list-style-type: none"> Fixed at 2nd gear in "D" range. Check the related harness for open, short and contact.
P2106	Defective lockup clutch solenoid valve	<ul style="list-style-type: none"> Measure the resistance of lockup clutch solenoid valve (turn the IGN OFF, then disconnect TCU connector). <ul style="list-style-type: none"> TCU connector terminals: B9 (17), B3 (38) Specified value: $2.5 \pm 0.2 \Omega$ Triggered emergency mode when the defective is detected. <ul style="list-style-type: none"> Fixed at 2nd gear in "D" range. Check the related harness for open, short and contact.
P2107	Defective modulator pressure solenoid valve	<ul style="list-style-type: none"> Measure the resistance of modulator pressure solenoid valve (turn the IGN OFF, then disconnect TCU connector). <ul style="list-style-type: none"> TCU connector terminals: B5 (36), B3 (38) Specified value: $5.0 \pm 0.2 \Omega$ Triggered emergency mode when the defective is detected. <ul style="list-style-type: none"> Fixed at 2nd gear in "D" range. Check the related harness for open, short and contact.
P2108	Defective shift pressure solenoid valve	<ul style="list-style-type: none"> Measure the resistance of shift pressure solenoid valve (turn the IGN OFF, then disconnect TCU connector). <ul style="list-style-type: none"> TCU connector terminals: B4 (37), B3 (38) Specified value: $5.0 \pm 0.2 \Omega$ Triggered emergency mode when the defective is detected. <ul style="list-style-type: none"> Electrical error: Fixed at 2nd gear in "D" range. Check the related harness for open, short and contact.

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Trouble Code	Defectives	Action
P2200	Faulty speed sensor N2 signal	<ul style="list-style-type: none"> When the speed sensor N2 detects 0 rpm of front sun gear speed. Check the related harness for open, short and contact. <ul style="list-style-type: none"> - TCU connector terminal B14: rectangular wave signal B8: signal ground B13: 6V
P2203	Faulty speed sensor N3 signal	<ul style="list-style-type: none"> When the speed sensor N3 detects 0 rpm of planetary gear carrier speed. Check the related harness for open, short and contact. <ul style="list-style-type: none"> - TCU connector terminal B6: rectangular wave signal B8: signal ground B13: 6V
P220A	Abnormal speed sensor output signal (N2, N3)	<ul style="list-style-type: none"> When the rpm difference between speed sensor N2 and N3 is over 150 rpm. Check the related harness for open, short and contact.
P2220	T/M Oil temperature sensor - short	<ul style="list-style-type: none"> Turn the IGN OFF, then disconnect TCU connector. Selector lever position: R or D T/M Measure the resistance of oil temperature sensor. TCU connector terminals B7, B8 Check the related harness for open, short and contact.
P2221	Abnormal T/M oil temperature sensor signal	<ul style="list-style-type: none"> Turn the IGN OFF, then disconnect TCU connector. Selector lever position: R or D Measure the resistance of T/M oil temperature sensor. TCU connector terminals: B7, B8 Check the related harness for open, short and contact.
P2222	Abnormal T/M oil temperature sensor signal	<ul style="list-style-type: none"> Turn the IGN OFF, then disconnect TCU connector. Selector lever position : R or D Measure the resistance of T/M oil temperature sensor. TCU connector terminals: B7, B8 Check the related harness for open, short and contact.
P2300	Faulty CAN communication	<ul style="list-style-type: none"> Turn the IGN OFF, then disconnect TCU connector. Check the communication line for open, short and contact. Measure the resistance of CAN line: B1, B2 Specified value : approx. 120 W
P2301	Faulty CAN communication	<ul style="list-style-type: none"> Turn the IGN OFF, then disconnect TCU connector. Check the communication line for open, short and contact. Measure the resistance of CAN line: B1, B2 Specified value : approx. 120 W
P2310	CAN: Faulty brake system communication	<ul style="list-style-type: none"> Check CAN communication line H and L. Check ABS/ESP unit. Check the related harness for open, short and contact.

Trouble Code	Defectives	Action
P2311	CAN: Faulty ECU communication	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check engine ECU. • Check the related harness for open, short and contact.
P2312	CAN: Faulty ECU communication	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check engine ECU. • Check the related harness for open, short and contact.
P2313	CAN: Faulty selector lever control communication	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check selector lever. • Check the related harness for open, short and contact.
P2315	CAN: Faulty instrument panel communication	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check instrument cluster. • Check the related harness for open, short and contact.
P2317	CAN: Faulty communication between TCCU/TOD and CAN (For 4WD only)	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check TCCU/TOD unit. • Check the related harness for open, short and contact.
P2330	CAN: Faulty brake system signal	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check ABS/ESP unit. • Check the related harness for open, short and contact.
P2331	CAN: Faulty ECU message	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check engine ECU. • Check the related harness for open, short and contact.
P2332	CAN: Faulty ECU message	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check engine ECU. • Check the related harness for open, short and contact.
P2333	CAN: Faulty selector lever signal	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check selector lever. Check selector lever. • Check the related harness for open, short and contact.
P2335	CAN: Faulty instrument cluster signal	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check instrument cluster. • Check the related harness for open, short and contact.
P2337	CAN: Faulty TCCU/TOD (For 4WD only)	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check TCCU/TOD unit. • Check the related harness for open, short and contact.
P2400	CAN: Faulty rear RH wheel speed sensor signal	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check ABS/ESP unit. <ul style="list-style-type: none"> - Check wheel speed sensor connector. - Check the air gap between tooth wheel and wheel speed sensor. (Air gap: 0.309 ~ 0.958 mm) - Check the numbers of tooth wheel: 48 • Check the related harness for open, short and contact.

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Trouble Code	Defectives	Action
P2401	CAN: Faulty rear LH wheel speed sensor signal	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check ABS/ESP unit. <ul style="list-style-type: none"> - Check wheel speed sensor connector. - Check the air gap between tooth wheel and wheel speed sensor. (Air gap: 0.309 ~ 0.958 mm) - Check the numbers of tooth wheel: 48 • Check the related harness for open, short and contact.
P2402	CAN: Faulty front RH wheel speed sensor signal	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check ABS/ESP unit. <ul style="list-style-type: none"> - Check wheel speed sensor connector. - Check the air gap between tooth wheel and wheel speed sensor. (Air gap: 0.335 ~ 0.945 mm) - Check the numbers of tooth wheel: 48
P2403	CAN: Faulty front LH wheel speed sensor signal	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check ABS/ESP unit. <ul style="list-style-type: none"> - Check wheel speed sensor connector. - Check the air gap between tooth wheel and wheel speed sensor. (Air gap: 0.335 ~ 0.945 mm) - Check the numbers of tooth wheel: 48
P2404	CAN: No brake signal	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check ABS/ESP unit. • Check the related harness for open, short and contact.
P2405	CAN: No accelerator pedal signal	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check engine ECU. • Check the related harness for open, short and contact.
P2406	CAN: No engine torque signal	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check engine ECU. • Check the related harness for open, short and contact.
P2407	CAN: No ESP signal	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check engine ECU. • Check the related harness for open, short and contact.
P2408	CAN: No minimum engine torque signal	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check engine ECU. • Check the related harness for open, short and contact.
P2409	CAN: No maximum engine torque signal	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check engine ECU. • Check the related harness for open, short and contact.
P240A	CAN: No engine rpm signal	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check engine ECU. • Check the related harness for open, short and contact.

Trouble Code	Defectives	Action
P240B	CAN: No engine coolant temperature signal	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check engine ECU. • Check the related harness for open, short and contact.
P240C	CAN: No selector lever position signal	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check selector lever. • Check the related harness for open, short and contact.
P240D	CAN: No transfer case position signal (For 4WD only)	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check TCCU/TOD unit. • Check the related harness for open, short and contact.
P2500	Invalid transmission gear ratio	<ul style="list-style-type: none"> • Cycle the IGN switch from OFF to ON. Check A/T system again after a certain period of driving. • If the trouble still exists, replace A/T assembly. • To protect transmission, any shift is not available.
P2501	Excessive engine rpm	<ul style="list-style-type: none"> • Check CAN communication line H and L. • Check engine ECU. • Check the related harness for open, short and contact.
P2503	Faulty recognition of currently selected gear	<ul style="list-style-type: none"> • Check selector lever. • Check the related harness for open, short and contact.
P220B	Excessive N2, N3 rpm	<ul style="list-style-type: none"> • Check speed sensor N2 and N3.
P2510	Torque converter lockup clutch stuck	<ul style="list-style-type: none"> • Check the hydraulic lines for leaks (valve No.22 in valve body). • Check the resistance of lockup clutch solenoid valve (Turn the IGN OFF, then disconnect TCU connector). <ul style="list-style-type: none"> - TCU connector terminals B9 (17), B3 (18) - Specified value : $2.5 \pm 0.2 \text{ W}$ • Triggered emergency mode when the defective is detected. <ul style="list-style-type: none"> - Fixed at 2nd gear in "D" range. • Check the related harness for open, short and contact.
P2511	Faulty torque converter lockup heat control	<ul style="list-style-type: none"> • Check the hydraulic lines for leaks.
P2520	Faulty recognition of torque reduction	<ul style="list-style-type: none"> • Check ECU.
P2502	Poor gear mesh, transmission slip	<ul style="list-style-type: none"> • Check the hydraulic lines for leaks. • Check oil filter.
P2600	Too low TCU supply voltage	<ul style="list-style-type: none"> • Check TCU supply voltage.
P2601	Too high TCU supply voltage	<ul style="list-style-type: none"> • Check TCU supply voltage.
P2602	Abnormal solenoid valve supply voltage	<ul style="list-style-type: none"> • Check solenoid supply voltage.
P2603	Abnormal speed sensor supply voltage	<ul style="list-style-type: none"> • Check speed sensor supply voltage. <ul style="list-style-type: none"> - TCU connector terminals B13 (13) : 6V

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MEMO

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BRAKE

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SELF-DIAGNOSIS LIST (ABS, ABD, ASR 5.3)

Fault code	Defects	Application			Service hint
		ABS	ABD	ASR	
01	No defects	0	0	0	-
02	ECU	0	0	0	Internal fault of ECU. Replace the ECU.
03	Front/left speed sensor (defective wiring)	0	0	0	1. Check resistance between wiring harness and wheel speed sensor : 1.280KW - 1.920KW. 2. Check for wire ground and B+ OPEN. 3. If there is no defect on above, replace sensor.
04	Front/right speed sensor (defective wiring)	0	0	0	1. Check resistance between wiring harness and wheel speed sensor : 1.280KW - 1.920KW. 2. Check for wire ground and B+ OPEN. 3. If there is no defect on above, replace sensor.
05	Rear/left speed sensor (defective wiring)	0	0	0	1. Check resistance between wiring harness and wheel speed sensor : 1.280KW - 1.920KW. 2. Check for wire ground and B+ OPEN. 3. If there is no defect on above, replace sensor.
06	Rear/right speed sensor (defective wiring)	0	0	0	1. Check resistance between wiring harness and wheel speed sensor : 1.280KW - 1.920KW. 2. Check for wire ground and B+ OPEN. 3. If there is no defect on above, replace sensor.
07	Front/left speed sensor (defective wiring)	0	0	0	1. Check that connector pin arrangement on the relevant wire is correct. 2. Check for wire ground and B+ open. 3. Check air gap between wheel rotor and wheel speed sensor : 0.377 - 1.229 mm. 4. Check proper contact of wheel speed sensor connector and ECU connector. 5. Check sensor output voltage while shaking wiring harness by turning wheel 1/2 to 1 revolution per second (Voltage should be over 70mV when checked by multimeter and over 120mV/P-P when checked by oscilloscope). 6. If there is no defect on above, replace sensor.
08	Front/right speed sensor (abnormal signal)	0	0	0	1. Check that connector pin arrangement on the relevant wire is correct. 2. Check for wire ground and B+ open. 3. Check air gap between wheel rotor and wheel speed sensor : 0.377 - 1.229 mm. 4. Check proper contact of wheel speed sensor connector and ECU connector. 5. Check sensor output voltage while shaking wiring harness by turning wheel 1/2 to 1 revolution per second (Voltage should be over 70mV when checked by multimeter and over 120mV/P-P when checked by oscilloscope). 6. If there is no defect on above, replace sensor.
09	Rear/left speed sensor (abnormal signal)	0	0	0	1. Check that connector pin arrangement on the relevant wire is correct. 2. Check for wire ground and B+ open. 3. Check air gap between wheel rotor and wheel speed sensor : 0.369 - 1.213 mm. 4. Check proper contact of wheel speed sensor connector and ECU connector. 5. Check sensor output voltage while shaking wiring harness by turning wheel 1/2 to 1 revolution per second (Voltage should be over 70mV when checked by multimeter and over 120mV/P-P when checked by oscilloscope). 6. If there is no defect on above, replace sensor.

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Fault code	Defects	Application			Service hint
		ABS	ABD	ASR	
10	Rear/right speed sensor (abnormal signal)	0	0	0	1. Check that connector pin arrangement on the relevant wire is correct. 2. Check for wire ground and B+ open. 3. Check air gap between wheel rotor and wheel speed sensor : 0.369 - 1.213mm 4. Check proper contact of wheel speed sensor connector and ECU connector. 5. Check sensor output voltage while shaking wiring harness by turning wheel 1/2 to 1 revolution per second (Voltage should be over 70mV when checked by multimeter and over 120mV/P-P when checked by oscilloscope). 6. If there is no defect on above, replace sensor.
11	Wheel rotor teeth	0	0	0	1. This code will appear if a wheel rotor teeth of four wheels is defective. 2. Check the teeth number of wheel rotor and condition.
13	Front/left inlet valve	0	0	0	1. If this code appear together with the items related with valve relay failure, check the items related with valve failure first and repair defective causes. 2. Check each valve using a over-riding function of tester on sole noid valve diagnosis function. 3. Replace hydraulic modulator.
14	Front/left outlet valve	0	0	0	↑
15	Front/right inlet valve	0	0	0	↑
16	Front/right outlet valve	0	0	0	↑
17	Rear/left inlet valve	-	0	0	↑
18	Rear/left outlet valve	-	0	0	↑
19	Rear/right inlet valve	-	0	0	↑
20	Rear/right outlet valve	-	0	0	↑
17	Rear axle inlet valve	0	-	-	↑
18	Rear axle outlet valve	0	-	-	↑
21	Switching valve	-	0	0	1. If this code appear together with the items related with valve relay failure, check the items related with valve failure first and repair defective causes. 2. Check each valve using a over-riding function of tester on sole noid valve diagnosis function. 3. Check contact of ECU and hydraulic modulator connectors and terminals. 4. Check terminals for open or short (When connector is removed). 5. Replace hydraulic modulator if there is no defect on above.

Reference

- Internal resistance of each solenoid valve on fault code 13-20; Inlet valve : 8.5-10W, outlet valve : 4.0-5.5W
- Internal resistance of each valve on fault code 21 and 22; ASV (prime) valve, USV (pilot) valve: 8.5-10.0W

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Fault code	Defects	Application			Service hint
		ABS	ABD	ASR	
22	Shut-off valve	-	0	0	1. If this code appear together with the items related with valve relay failure, check the items related with valve failure first and repair defective causes. 2. Check each valve using a over-riding function of tester on solenoid valve diagnosis function. 3. Check contact of ECU and hydraulic modulator connectors and terminals. 4. Check terminals for open or short (When connector is removed). 5. Replace hydraulic modulator if there is no defect on above.
24	Motor relay/ return pump	0	0	0	1. Check using a over-riding function of tester on pump motor diagnosis function 2. Check resistance between pump motor ground terminal and battery negative terminal : less than 15mW. 3. Check body ground point. 4. Check relay coil internal resistance:40-80W. 5. Replace hydraulic modulator if there is no defect on above.
27	Stop lamp switch	0	0	0	1. Check using stop lamp switch diagnosis function from sensor value output function of tester. 2. Check contact of stop lamp switch terminals on ECU connector. 3. Check other wires for open and short (more than 80% of ECU supply voltage). 4. Check stop lamp switch function and replace if defective (when switch knob (plunger) is pressed by 3mm, resistance between each switch end will be infinite and if not pressed, it will be less than 200mW). 5. Voltage on No.11 when brake pedal is depressed : 11-14V Voltage on No.4 when brake pedal is released : 11-14V
28	Battery voltage low	0	0	0	1. Check battery voltage. 2. Check resistance between relevant voltage terminal of connector and each battery terminal (positive & negative). 3. Check that normal voltage is applied on each pin on connector when ignition switch is turned 'ON' or 'OFF'. 4. Check 10A and 60A fuses for ABS. 5. Replace hydraulic modulator if there is no defect on above.
30	CAN signal (TCU)	-	-	0	1. Check related CAN line for open, short. 2. Check poor contact of related CAN connector. 3. ECU is defective, replace ECU .
31	EMS (Engine)	-	-	0	1. Check related CAN line for open, short. 2. Check poor contact of related CAN connector. 3. ECU is defective, replace ECU . 4. Check EMS using special tool of self-diagnosing.
33	CAN communication	-	-	0	1. Check related CAN line for open, short. 2. Check poor contact of related CAN connector. 3. ECU is defective, replace ECU .
34	Brake over heating	0	0	0	

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ABS/ESP TROUBLE DIAGNOSIS

o: Applied x: N/A

Function	Defective Components	Trouble Code	Descriptions	System	
Sensor Monitoring	Front LH Wheel speed sensor	C1011 (5011) C1012 (5012)	Wheel speed sensor front left-electrical Wheel speed sensor front left-other	ABS	ESP
	1. C1011 (5011) <u>Cause</u> <ul style="list-style-type: none"> - Defective front LH wheel speed sensor - Short or poor contact wire to sensor <u>Action</u> <ul style="list-style-type: none"> - Check the wheel speed sensor connector - Check HECU connector - Check the harness connection 2. C1012 (5012) <u>Cause</u> <ul style="list-style-type: none"> - Defective front LH wheel speed sensor - No signals from wheel speed sensor and tooth wheel - Too large air gap between wheel speed sensor and tooth wheel - Different number of teeth in tooth wheel <u>Action</u> <ul style="list-style-type: none"> - Check the wheel speed sensor connector - Check HECU connector - Check air gap and tooth wheel mounting (Specified air gap: 0.335 ~ 0.945 mm) - Check the number of teeth (48) in tooth wheel 			O	O
	Front RH Wheel speed sensor	C1021 (5021) C1022 (5022)	Wheel speed sensor front right-electrical Wheel speed sensor front right-other		
	1.C1021 (5021) <u>Cause</u> <ul style="list-style-type: none"> - Defective front RH wheel speed sensor - Short or poor contact wire to sensor <u>Action</u> <ul style="list-style-type: none"> - Check the wheel speed sensor connector - Check HECU connector - Check the harness connection 2.C1022 (5022) <u>Cause</u> <ul style="list-style-type: none"> - Defective front RH wheel speed sensor - No signals from wheel speed sensor and tooth wheel - Too large air gap between wheel speed sensor and tooth wheel - Different number of teeth in tooth wheel <u>Action</u> <ul style="list-style-type: none"> - Check the wheel speed sensor connector and HECU connector - Check air gap and tooth wheel mounting (Specified air gap: 0.335 ~ 0.945 mm) - Check the number of teeth (48) in tooth wheel 			O	O

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Function	Defective Components	Trouble Code	Descriptions	System	
Sensor Monitoring	Rear RH Wheel speed sensor	C1031 (5031) C1032 (5032)	Wheel speed sensor rear left-electrical Wheel speed sensor rear left-other	ABS	ESP
	1. C1031 (5031) <u>Cause</u> <ul style="list-style-type: none"> - Defective rear RH wheel speed sensor - Short or poor contact wire to sensor <u>Action</u> <ul style="list-style-type: none"> - Check the wheel speed sensor connector - Check the HECU connector - Check the harness connection 2. C1032 (5032) <u>Cause</u> <ul style="list-style-type: none"> - Defective rear RH wheel speed sensor - No signals from wheel speed sensor and tooth wheel - Too large air gap between wheel speed sensor and tooth wheel - Different number of teeth in tooth wheel <u>Action</u> <ul style="list-style-type: none"> - Check the wheel speed sensor connector - Check the HECU connector - Check air gap and tooth wheel mounting (Specified air gap: 0.309 ~ 0.958 mm) - Check the number of teeth (48) in tooth wheel 			O	O
	Rear LH Wheel speed sensor	C1041 (5041) C1042 (5042)	Wheel speed sensor rear left-electrical Wheel speed sensor rear left-other		
	1. C1041 (5041) <u>Cause</u> <ul style="list-style-type: none"> - Defective rear LH wheel speed sensor - Short or poor contact wire to sensor <u>Action</u> <ul style="list-style-type: none"> - Check the wheel speed sensor connector - Check the HECU connector - Check the harness connection 2. C1042 (5042) <u>Cause</u> <ul style="list-style-type: none"> - Defective rear LH wheel speed sensor - No signals from wheel speed sensor and tooth wheel - Too large air gap between wheel speed sensor and tooth wheel - Different number of teeth in tooth wheel <u>Action</u> <ul style="list-style-type: none"> - Check the wheel speed sensor connector and HECU connector - Check air gap and tooth wheel mounting (Specified air gap: 0.309 ~ 0.958 mm) - Check the number of teeth (48) in tooth wheel 			O	O

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Function	Defective Components	Trouble Code	Descriptions	System	
Sensor Monitoring	Pressure sensor	C1051 (5051)	Defective input sensor	ABS	ESP
	Cause <ul style="list-style-type: none"> - Abnormal signals from pressure sensor - Defective pressure sensor or harness Action <ul style="list-style-type: none"> - Check the pressure sensor connector 			X	O
	Steering wheel angle sensor	C1061 (5061)	Defective steering wheel angle sensor		
	Cause <ul style="list-style-type: none"> - Internally defective steering wheel angle sensor - Abnormal signals from steering wheel angle sensor - Short circuit between supplying voltage output and ground - Abnormal signal voltage from steering wheel angle sensor - Poor installation of steering wheel angle sensor and abnormal signal Action <ul style="list-style-type: none"> - Check the supplying voltage: (Specified voltage: 9 ~ 16 V) - Check the output voltage: Check voltage between ESP unit terminals with ignition ON <ul style="list-style-type: none"> • ST1 voltage check: between ESP unit terminal No. 5 and ground (Specified voltage: 1.3 ~ 4.1V) • ST2 voltage check: between ESP unit terminal No. 2 and ground (Specified voltage: 1.3 ~ 4.1V) • STN voltage check: between ESP unit terminal No.12 and ground (Specified voltage: 1.3 ~ 4.1V) 			X	O
	Sensor cluster	C1073 (5073) C1074 (5074)	Sensor cluster -electrical Sensor cluster-internal		
	1. C1073 (5073) Cause <ul style="list-style-type: none"> - Operating voltage exceeds specified range (Hi: 18.0 ± 1.0 V / Lo: 6.5 ± 0.5 V) - Poor contact or installation of harness Action <ul style="list-style-type: none"> - Check the sensor cluster connector - Replace the sensor cluster 2. C1074 (5074) Cause <ul style="list-style-type: none"> - Internally defective HECU - Abnormal A/D converter voltage: 5.0 ± 3 % - Abnormal supplying voltage (4.580 ~ 4.960 V) to sensor cluster <ul style="list-style-type: none"> → Short circuit between supplying voltage output of sensor cluster and ground - Poor ground of sensor cluster (0.0 ~ 0.5 V) <ul style="list-style-type: none"> → Short to ground on sensor cluster - Abnormal signals from lateral acceleration sensor - Abnormal signals from yawing sensor - Poor installation of sensor - Defective sensor cluster - Defective or short circuit of CAN communication line Action <ul style="list-style-type: none"> - Replace the sensor 			X	O

Function	Defective Components	Trouble Code	Descriptions	System	
Battery Voltage Monitoring	Battery	C1101 (5101) C1102 (5102)	Battery under voltage Battery over voltage	ABS	ESP
	1. C1101 (5101) <u>Cause</u> - Low voltage out of specified range (9.7 ± 0.3 V) <u>Action</u> - Check the supplying voltage 2. C1102 (5102) <u>Cause</u> - Over voltage out of specified range (18.0 ± 1.0 V) <u>Action</u> - Check the supplying voltage			O	O
Brake Monitoring	Brake disc	C1111 (5111)	Disk temperature is high		
	<u>Cause</u> - Overheated brake disk due to braking force: over 500°C <u>Action</u> - Stop driving for a period of time after turning off the ESP			X	O
	Brake lamp switch ESP OFF switch	C1201 (5201) C1202 (5202)	Defective brake lamp switch Defective ESP OFF switch		
Valve Monitoring	1. C1201 (5201) <u>Cause</u> - Mechanical defective in brake switch - Defective brake switch harness <u>Action</u> - Check the harness and connector 2. C1202 (5202) <u>Cause</u> - Mechanical defective in ESP OFF switch - Defective ESP OFF switch harness (short to ground) <u>Action</u> - Check the harness and connector for ESP OFF switch			X	O
	Valve, valve relay	C1301 (5301)	Defective valve, valve relay in HECU		
Valve Monitoring	<u>Cause</u> - Abnormal supplying voltage to valve solenoid - Internally defective HECU <u>Action</u> - Replace the HECU - Check the battery voltage - Check the HECU connector			O	O

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Function	Defective Components	Trouble Code	Descriptions	System	
Pump Monitoring	Motor pump	C1302 (5302)	Defective motor pump	ABS	ESP
	Cause <ul style="list-style-type: none"> - Too low (below 6.0 V) or no supplying voltage to pump motor - Over 0.93 V from pump motor voltage - Poor contact in pump motor connector - Poor ground Action <ul style="list-style-type: none"> - Check the supplying voltage - Check the HECU connector - Replace the HECU 			O	O
HECU and Sensor Monitoring	HECU	C1401 (5401)	HECU hardware		
	Cause <ul style="list-style-type: none"> - Internally defective HECU - Defective A/D converter, internal voltage regulator, and controller - Defective sensor and short to supplying voltage line - Abnormal temperature sensor signal Action <ul style="list-style-type: none"> - Replace the HECU 			O	O
	Sensor initialization	C1501 (5501)	Abnormal sensor initialization		
	Cause <ul style="list-style-type: none"> - Abnormal signals from sensors - Abnormal sensor data Action <ul style="list-style-type: none"> - Check the sensors - Initialize the sensors 			O	O
	Vehicle coding	C1170 (5170)	Variant coding error, or misinstallation HECU		
	Cause <ul style="list-style-type: none"> - Discrepancy between HECU coding and vehicle coding - Defective CAN communication line - Misinstallation HECU Action <ul style="list-style-type: none"> - Check the HECU coding and vehicle coding - Perform vehicle coding - Replace the exact HECU - Check engine ECU variant coding 			(O)	O

Function	Defective Components	Trouble Code	Descriptions	System	
	CAN communication	C1601 (5601)	CAN communication error	ABS	ESP
	Cause <ul style="list-style-type: none"> - Short or open to CAN communication line - Poor connection of CAN communication line Action <ul style="list-style-type: none"> - Check the CAN communication line - Check the HECU connector 			(O)	O
	CAN communication	C1602 (5602) C1603 (5603) C1604 (5604) C1605 (5605)	Communication error between engine ECU and HECU Communication error between TCU and HECU Communication error between TCCU (4WD) and HECU Communication error between cluster (Meter) and HECU		
	1. C1602 (5602) Cause <ul style="list-style-type: none"> - Short to CAN communication line - Overload to CAN communication Action Action <ul style="list-style-type: none"> - Check the engine ECU - Check the CAN communication line - Check the engine ECU connector 2. C1603 (5603) Cause <ul style="list-style-type: none"> - Short to CAN communication line - Overload to CAN communication Action Action <ul style="list-style-type: none"> - Check the TCU - Check the CAN communication line - Check the TCU connector 3. C1604 (5604) Cause <ul style="list-style-type: none"> - Short to CAN communication line - Overload to CAN communication Action Action <ul style="list-style-type: none"> - Check the TCCU - Check the CAN communication line - Check the TCCU connector 4. C1605 (5605) Cause <ul style="list-style-type: none"> - Short to CAN communication line - Overload to CAN communication Action Action <ul style="list-style-type: none"> - Check the cluster (meter) - Check the CAN communication line - Check the cluster (meter) connector 			X	O

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Function	Defective Components	Trouble Code	Descriptions	System	
CAN Communica- tion Monitoring	CAN signal error EMS	C1612 (5612)	Signal from engine ECU is abnormal	ABS	ESP
	<u>Cause</u> <ul style="list-style-type: none">- Engine ECU is defective- Signal from engine ECU error <u>Action</u> <ul style="list-style-type: none">- Check engine ECU- Check ECU S/W version			X	O

AIR-BAG

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DIAGNOSIS (SRE-6)

Possible Cause		Action	
Ignition "ON" Check warning lamp on I/P	Does the warning lamp blink at seven times for 7 seconds and then turn off?	Yes	System OK
		No	Connect the scan tool to diagnostic connector (ALDL). Select the fault code display menu and clear code menu.
	Does the fault code display on the scan tool display?	Yes	Perform "Diagnostic System Check".
		No	Check any fuse open. Replace fuse.
	Is there any open in fuse?	Yes	Disconnect wiring connector.
		No	Check any wiring short between fuse and wiring connector.
	Is there any short in fuse?	Yes	Repair wiring.
		No	Disconnect SDM wiring connector. Check wiring short between connector terminal and SDM connector terminal.
	Is there any short in wiring?	Yes	Replace airbag wiring.
		No	Check any open between ALDL connector No.4, No. 5 terminal and ground.
	Is there any open in wiring?	Yes	Repair wiring
		No	Ignition "ON" Measure voltage at the cigar lighter socket.
	Does the voltage indicate 11 ~ 14 V?	Yes	Check any open or short between ALDL connector terminal and wiring connector terminal.
		No	Repair the wiring of the cigar lighter socket.
	Is there any open or short in wiring?	Yes	Repair wiring
		No	Check any open or short between SDM connector terminal and wiring connector terminal.
	Is there any open or short in wiring?	Yes	Replace the airbag wiring.
		No	Replace the SDM.

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DIAGNOSTIC TROUBLE CODES (SRE-6)

Code	Fault Contents	Check
01h	Driver airbag circuit, resistance too high	Check the connection of the driver airbag connector. Check the wiring condition of the driver airbag. (including clock spring) Check the bending of the airbag terminal.
02h	Driver airbag circuit, resistance too low	Check the connection of the driver airbag connector. Check the wiring condition of the driver airbag. (including clock spring) Check the bending of the airbag terminal.
03h	Driver airbag circuit, short to ground	Check the connection of the driver airbag connector. Check the wiring condition of the driver airbag. (including clock spring) Check the bending of the airbag terminal.
04h	Driver airbag circuit, short to battery voltage	Check the connection of the driver airbag connector. Check the wiring condition of the driver airbag. (including clock spring) Check the bending of the airbag terminal.
05h	Passenger airbag circuit, resistance too high	Check the connection of the passenger airbag connector. Check the wiring condition of the passenger airbag. Check the bending of the airbag terminal.
06h	Passenger airbag circuit, resistance too low	Check the connection of the passenger airbag connector. Check the wiring condition of the passenger airbag. Check the bending of the airbag terminal.
07h	Passenger airbag circuit, short to ground	Check the connection of the passenger airbag connector. Check the wiring condition of the passenger airbag. Check the bending of the airbag terminal.
08h	Passenger airbag circuit, short to battery voltage	Check the connection of the passenger airbag connector. Check the wiring condition of the passenger airbag. Check the bending of the airbag terminal.
09h	Driver pretensioner circuit, resistance too high	Check the connection of the driver pretensioner connector. Check the wiring condition of the driver pretensioner. Check the bending of the airbag terminal.
0Ah	Driver pretensioner circuit, resistance too low	Check the connection of the driver pretensioner connector. Check the wiring condition of the driver pretensioner. Check the bending of the airbag terminal.
0Bh	Driver pretensioner circuit, short to ground	Check the connection of the driver pretensioner connector. Check the wiring condition of the driver pretensioner. Check the bending of the airbag terminal.
0Ch	Driver pretensioner circuit, short to battery voltage	Check the connection of the driver pretensioner connector. Check the wiring condition of the driver pretensioner. Check the bending of the airbag terminal.

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Code	Fault Contents	Check
0Dh	Passenger pretensioner circuit, resistance too high	Check the connection of the passenger pretensioner connector. Check the wiring condition of the passenger pretensioner. Check the bending of the airbag terminal.
0Eh	Passenger pretensioner circuit, resistance too low	Check the connection of the passenger pretensioner connector. Check the wiring condition of the passenger pretensioner. Check the bending of the airbag terminal.
0Fh	Passenger pretensioner circuit, short to ground	Check the connection of the passenger pretensioner connector. Check the wiring condition of the passenger pretensioner. Check the bending of the airbag terminal.
10h	Passenger pretensioner circuit, short to battery voltage	Check the connection of the passenger pretensioner connector. Check the wiring condition of the passenger pretensioner. Check the bending of the airbag terminal.
34h	Driver side airbag circuit, resistance too high	Check the connection of the driver side airbag connector. Check the wiring condition of the driver side airbag. Check the bending of the airbag terminal.
35h	Driver side airbag circuit, resistance too low	Check the connection of the driver side airbag connector. Check the wiring condition of the driver side airbag. Check the bending of the airbag terminal.
36h	Driver side airbag circuit, short to ground	Check the connection of the driver side airbag connector. Check the wiring condition of the driver side airbag. Check the bending of the airbag terminal.
37h	Driver side airbag circuit, short to battery voltage	Check the connection of the driver side airbag connector. Check the wiring condition of the driver side airbag. Check the bending of the airbag terminal.
38h	Passenger side airbag circuit, resistance too high	Check the connection of the passenger side airbag connector. Check the wiring condition of the passenger side airbag. Check the bending of the airbag terminal.
39h	Passenger side airbag circuit, resistance too low	Check the connection of the passenger side airbag connector. Check the wiring condition of the passenger side airbag. Check the bending of the airbag terminal.
3Ah	Passenger side airbag circuit, short to ground	Check the connection of the passenger side airbag connector. Check the wiring condition of the passenger side airbag. Check the bending of the airbag terminal.
3Bh	Passenger side airbag circuit, short to battery voltage	Check the connection of the passenger side airbag connector. Check the wiring condition of the passenger side airbag. Check the bending of the airbag terminal.
50h	Driver side airbag sensor, open/short to battery voltage	Check the connection of the driver side airbag sensor connector. Check the wiring condition of the driver side airbag sensor. Check the bending of the airbag terminal.
51h	Passenger side airbag circuit, short to ground	Check the connection of the driver side airbag sensor connector. Check the wiring condition of the driver side airbag sensor. Check the bending of the airbag terminal.

ECU-DSL

ECU-GSL

ECU-CDPF

TCU

BRAKE

AIR-BAG

TC

RK-STICS

FFH

RAIN
SENSOR

FATC

TGS
LEVER

P-TRUNK

CCCS

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Code	Fault Contents	Check
52h	Communication malfunction of the driver side airbag	Check the connection of the driver side airbag sensor connector. Check the wiring condition of the driver side airbag sensor. Check the bending of the airbag terminal.
53h	Internal fault of the driver side airbag sensor	Check the connection of the driver side airbag sensor connector. Check the wiring condition of the driver side airbag sensor. Check the bending of the airbag terminal.
54h	Passenger side airbag sensor, open/short to battery voltage	Check the connection of the passenger side airbag sensor connector. Check the wiring condition of the passenger side airbag sensor. Check the bending of the airbag terminal.
55h	Passenger side airbag sensor, short to ground	Check the connection of the passenger side airbag sensor connector. Check the wiring condition of the passenger side airbag sensor. Check the bending of the airbag terminal.
56h	Communication malfunction of the passenger side airbag	Check the connection of the passenger side airbag sensor connector. Check the wiring condition of the passenger side airbag sensor. Check the bending of the airbag terminal.
57h	Internal fault of the passenger side airbag sensor	Check the connection of the passenger side airbag sensor connector. Check the wiring condition of the passenger side airbag sensor. Check the bending of the airbag terminal.
17h	Battery voltage too high	Check generator output voltage. Check the battery voltage. Check the bending of the airbag terminal.
18h	Battery voltage too low	Check generator output voltage. Check the battery voltage. Check the bending of the airbag terminal.
1Eh	SDM internal fault (Initialization fault)	Replace the SDM.
1Fh	SDM internal fault	Replace the SDM.

Notice

- **Use only the scan tool to check the airbag module and the sensing and diagnostic module (SDM). Never measure the resistance of an airbag module with an ohmmeter. An ohmmeter's battery can deploy the airbag and cause injury.**
- **Before testing, disconnect the negative battery cable. Wait 1 minute for the SDM capacitor to discharge. The capacitor supplies reserve power to deploy the airbags, even if the battery is disconnected. Unintentional deployment of the airbags can cause injury.**
- **Do not attempt to repair the supplemental inflatable restraints (SIR) wiring harness. An SIR repair can create a high-resistance connection which can keep the airbags from deploying when needed, resulting in injury.**

DIAGNOSIS (SRE-NCS)

Trouble Code	Defections	Action
1101	High battery voltage	<ul style="list-style-type: none"> • Check alternator output voltage. • Check battery condition (over 21.4 V for 16 seconds). • Check air bag unit terminals for damage.
1102	Low battery voltage	<ul style="list-style-type: none"> • Check alternator output voltage. • Check battery condition (below 7.2 V for 16 seconds, resumes when the voltage is normal level for 9.6 seconds) • Check air bag unit terminals for damage.
1103	Low communication voltage for curtain air bag sensor	<ul style="list-style-type: none"> • Check curtain air bag sensor connector. • Check curtain air bag sensor wiring. • Check air bag unit terminals for damage. • Check if curtain air bag sensor is short to battery voltage or ground. • Check if curtain air bag sensor is defective. • Check battery condition (below 10.6 V for 16 seconds, resumes when the voltage is normal level for 9.6 seconds).
1346	Driver's air bag circuit resistance is too high	<ul style="list-style-type: none"> • Check driver air bag connector. • Check driver air bag wiring (including clock spring). • Check air bag unit terminals for damage. • Resistance of squib: over 6.1 Ω
1347	Driver's air bag circuit resistance is too low	<ul style="list-style-type: none"> • Check driver air bag connector. • Check driver air bag connector (including clock spring). • Check air bag unit terminals for damage. • Resistance of squib: below 1.1 Ω
1348	Driver's air bag circuit is short to ground	<ul style="list-style-type: none"> • Check driver air bag connector. • Check driver air bag wiring (including clock spring). • Check air bag unit terminals for damage. • Resistance of Firing Loop: below 2 kΩ
1349	Drivers air bag circuit is short to battery voltage	<ul style="list-style-type: none"> • Check driver air bag connector. • Check driver air bag wiring (including clock spring). • Check the air bag unit terminals for damage. • Resistance of Firing Loop: below 2 kΩ
1352	Passengers air bag circuit resistance is too low	<ul style="list-style-type: none"> • Check passenger air bag connector. • Check passenger air bag wiring. • Check the air bag unit terminals for damage. • Resistance of squib: below 0.8 Ω
1353	Passengers air bag circuit resistance is too high	<ul style="list-style-type: none"> • Check passenger air bag connector. • Check passenger air bag wiring. • Check air bag unit terminals for damage. • Resistance of squib: over 4.0 Ω
1354	Passengers air bag circuit is short to ground	<ul style="list-style-type: none"> • Check passenger air bag connector. • Check passenger air bag wiring. • Check the air bag unit terminals for damage. • Resistance of Firing Loop: below 2 kΩ

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Trouble Code	Defections	Action
1355	Passenger's air bag circuit is short to battery voltage	<ul style="list-style-type: none"> • Check passenger air bag connector. • Check passenger air bag wiring. • Check air bag unit terminals for damage. • Resistance of squib: below 2 kΩ
1361	Driver's pretensioner circuit resistance is too high	<ul style="list-style-type: none"> • Check driver pretensioner connector. • Check driver pretensioner wiring. • Check air bag unit terminals for damage. • Resistance of squib: over 4.2 Ω
1362	Driver's pretensioner circuit resistance is too low	<ul style="list-style-type: none"> • Check driver pretensioner connector. • Check driver pretensioner wiring. • Check air bag unit terminals for damage. • Resistance of squib: below 0.8 Ω
1363	Driver's pretensioner circuit is short to ground	<ul style="list-style-type: none"> • Check driver pretensioner connector. • Check driver pretensioner wiring. • Check air bag unit terminals for damage. • Resistance of squib: below 2 kΩ
1364	Driver's pretensioner circuit is short to battery voltage	<ul style="list-style-type: none"> • Check driver pretensioner connector. • Check driver pretensioner wiring. • Check air bag unit terminals for damage. • Resistance of squib: below 2 kΩ
1367	Passenger's pretensioner circuit resistance is too high	<ul style="list-style-type: none"> • Check passenger pretensioner connector. • Check passenger pretensioner wiring. • Check air bag unit terminals for damage. • Resistance of squib: over 4.2 W
1368	Passenger's pretensioner circuit resistance is too low	<ul style="list-style-type: none"> • Check passenger pretensioner connector. • Check passenger pretensioner wiring. • Check air bag unit terminals for damage. • Resistance of squib: below 0.8 Ω
1369	Passenger's pretensioner circuit is short to ground	<ul style="list-style-type: none"> • Check passenger pretensioner connector. • Check passenger pretensioner wiring. • Check air bag unit terminals for damage. • Resistance of squib: below 2 kΩ
1370	Passenger's pretensioner circuit is short to battery voltage	<ul style="list-style-type: none"> • Check passenger pretensioner connector. • Check passenger pretensioner wiring. • Check air bag unit terminals for damage. • Resistance of squib: below 2 kΩ
1378	Driver's curtain air bag circuit resistance is too high	<ul style="list-style-type: none"> • Check driver curtain air bag connector. • Check driver curtain air bag wiring. • Check the air bag unit terminals for damage. • Resistance of squib: over 4.3 Ω
1379	Driver's curtain air bag circuit resistance is too low	<ul style="list-style-type: none"> • Check driver curtain air bag connector. • Check driver curtain air bag wiring. • Check the air bag unit terminals for damage. • Resistance of squib: below 0.6 Ω

Trouble Code	Defections	Action
1380	Driver's curtain air bag is short to ground	<ul style="list-style-type: none"> • Check driver curtain air bag connector. • Check driver curtain air bag wiring. • Check air bag unit terminals for damage. • Resistance: below 2 kΩ
1381	Driver's curtain air bag is short to battery voltage	<ul style="list-style-type: none"> • Check driver curtain air bag connector. • Check driver curtain air bag wiring. • Check air bag unit terminals for damage. • Resistance: below 2 kΩ
1382	Passenger's curtain air bag circuit resistance is too high	<ul style="list-style-type: none"> • Check passenger curtain air bag connector. • Check passenger curtain air bag wiring. • Check air bag unit terminals for damage. • Resistance of squib: over 4.3 Ω
1383	Passenger's curtain air bag circuit resistance is too low	<ul style="list-style-type: none"> • Check passenger curtain air bag connector. • Check passenger curtain air bag wiring. • Check air bag unit terminals for damage. • Resistance of squib: below 0.6 Ω
1384	Passenger's curtain air bag is short to ground	<ul style="list-style-type: none"> • Check passenger curtain air bag connector. • Check passenger curtain air bag wiring. • Check air bag unit terminals for damage. • Resistance: below 2 kΩ
1385	Passenger's curtain air bag is short to battery voltage	<ul style="list-style-type: none"> • Check passenger curtain air bag connector. • Check passenger curtain air bag wiring. • Check air bag unit terminals for damage. • Resistance: below 2 kΩ
1395	Air bag connector problem	<ul style="list-style-type: none"> • Check passenger curtain air bag connector. • Check passenger curtain air bag wiring. • Check air bag unit terminals for damage.
1400	Driver's curtain air bag sensor problem	<ul style="list-style-type: none"> • Check driver curtain air bag connector. • Check driver curtain air bag wiring. • Check air bag unit terminals for damage.
1401	Driver's curtain air bag sensor circuit is short to ground	<ul style="list-style-type: none"> • Check driver curtain air bag connector. • Check driver curtain air bag wiring. • Check the air bag unit terminals for damage. • Resistance: below 250 Ω
1402	Driver's curtain air bag sensor circuit is short to battery voltage	<ul style="list-style-type: none"> • Check driver curtain air bag connector. • Check driver curtain air bag wiring. • Check air bag unit terminals for damage. • Resistance: below 25 Ω
1409	Communication error in driver's curtain air bag	<ul style="list-style-type: none"> • Check driver curtain air bag connector. • Check driver curtain air bag wiring. • Check air bag unit terminals for damage. • If the voltage drops below 10.6 V during normal system operation, the trouble code is generated. This trouble code is linked with B1 400, B1 401, B1 402, B1 414.

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Trouble Code	Defections	Action
1414	Wrong driver's curtain air bag sensor	<ul style="list-style-type: none"> • Check driver curtain air bag connector. • Check driver curtain air bag wiring. • Check air bag unit terminals for damage.
1403	Passenger's curtain air bag sensor	<ul style="list-style-type: none"> • Check passenger curtain air bag connector. • Check passenger curtain air bag wiring. • Check air bag unit terminals for damage.
1404	Passenger's curtain air bag sensor circuit is short to ground	<ul style="list-style-type: none"> • Check passenger curtain air bag connector. • Check passenger curtain air bag wiring. • Check air bag unit terminals for damage. • Resistance: below 250 Ω
1405	Passenger's curtain air bag sensor circuit is short to battery voltage	<ul style="list-style-type: none"> • Check passenger curtain air bag connector. • Check passenger curtain air bag wiring. • Check air bag unit terminals for damage. • Resistance: below 25 Ω
1410	Communication error in passenger's curtain air bag	<ul style="list-style-type: none"> • Check passenger curtain air bag connector. • Check passenger curtain air bag wiring. • Check the air bag unit terminals for damage. • If the voltage drops below 10.6 V during normal system operation, the trouble code is generated. This trouble code is linked with B1 403, B1 404, B1 405, B1 415.
1415	Wrong driver's curtain air bag sensor	<ul style="list-style-type: none"> • Check passenger curtain air bag connector. • Check passenger curtain air bag wiring. • Check air bag unit terminals for damage.
1620	SDM internal fault	<ul style="list-style-type: none"> • Replace SDM.
1650	Frontal impact record	<ul style="list-style-type: none"> • Replace SDM.
1651	Driver's curtain air bag impact record	<ul style="list-style-type: none"> • Replace SDM.
1652	Passenger's curtain air bag impact record	<ul style="list-style-type: none"> • Replace SDM.
1657	Belt pretensioner operation record	<ul style="list-style-type: none"> • Replace SDM.
2500	Warning lamp error	<ul style="list-style-type: none"> • Check wiring to warning lamp. • Check warning lamp bulb. • Check SDM unit terminal.

T/C

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GENERAL DIAGNOSIS (TOD)

Symptoms	Check	Action
Electric shift problems	• Faulty or damaged TCCU, speed sensor, motor, clutch or internal wirings	• Overhaul and check, replace if necessary
	• Damaged or worn shift cam, hub, fork and rail shift	• Overhaul and check for wear and damage.
	• Binding shift fork, hub collar or gear	• Check sliding parts, replace if necessary.
Cannot drive front wheel when shifting to 4H, 4L	• Broken drive chain	• Check internal parts and replace drive chain.
Noise in 4WD operation	• Improper or low oil	• Drain and replace with specified oil.
	• Loosened bolts or mounted parts	• Retighten as specified.
	• Noisy T/C bearing	• Disassemble bearings and parts and check for wear or damage. Replace if necessary.
Noise in 4H or 4L	• Gear abnormal noise	• Check for wear and damage including speedometer gear. Replace if necessary.
	• Worn or damaged sprockets or drive chain	• Disassemble and check for wear and damage. Replace if necessary.
	• Incorrect tire pressure	• Adjust tire pressure.
Transfer case oil leakage	• Cracked transfer case	• Replace the case.
	• Leakage from other parts	• Clean case and parts and check for leakage.
	• Breather clogging	• Remove breather hose and clean. Replace if necessary.
	• Improper or too much oil	• Use specified oil and adjust oil level.
	• Loosened sealing bolts	• Retighten.
	• Improperly applied sealant	• Use specified sealant and retighten.
	• Worn or damaged oil seal	• Replace oil seal.

TCCU periodically monitors the input and output while the system is in operation. When a fault is detected, the trouble code is stored into TCCU memory.

If the ignition switch is turned to "OFF", TCCU stops monitoring for input and output, however, when the ignition switch is turned to "OFF" before shifting completes, TCCU continues monitoring for input and output required for the shifting.

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DIAGNOSTIC TROUBLE CODE (TOD)

Code	Description	Action
P1806	Detective CAN communication	<ul style="list-style-type: none"> • Check communication line. • Replace TCCU if necessary.
P1805	Defective mode switch	<ul style="list-style-type: none"> • When the mode switch is defective • Check TCCU pin No.4 and 16. • Mode change <ul style="list-style-type: none"> - 2H (Pin No. 4: Ground) - 4H (No contact: Open) - 4L (Pin No.16: Ground)
P1821	Open or short to ground in magnetic clutch coil circuit	<ul style="list-style-type: none"> • Voltage at TCCU pin No.11: 11 ~ 15 V • EMC resistance: 2.5 Ω • Check the relevant connectors for contact. • Replace TCCU if necessary.
P1822	Open or short to ground in hub control circuit	<ul style="list-style-type: none"> • When the hub control circuit is open or short to ground over 0.2 second • Replace TCCU if necessary.
P1841	Open to ground in shift motor circuit	<ul style="list-style-type: none"> • When TCCU detects the motor failure for 1 second • Check the relevant harnesses for contact. • Replace TCCU if necessary.
P1842	Short to ground in shift motor output circuit	<ul style="list-style-type: none"> • When TCCU detects the motor failure for 1 second • Check the relevant harnesses for contact. • Replace TCCU if necessary.
P1843	Defective position sensor in motor	<ul style="list-style-type: none"> • 2H-4H: after 1.5 seconds • 4H-4L: after 3 seconds • Check the relevant harnesses for contact. • Replace TCCU if necessary.
P1844	Stuck in 4L mode	<ul style="list-style-type: none"> • When no shifting operation from 4L to 4H, even though the shift conditions are satisfied and no error. • Replace TCCU if necessary.

Code	Description	Action
P1850	Defective position encoder	<ul style="list-style-type: none"> • When the position encoder is defective • Check the relevant harnesses. • Check the relevant connectors for contact. • Check the shift motor.
P1851	Short to ground for position encoder 1	<ul style="list-style-type: none"> • Short to ground for position encoder 1 in shift motor • Check the relevant harnesses for short. <ul style="list-style-type: none"> - TCCU pin No.18 • Check the relevant connectors for contact. • Check the shift motor.
P1852	Short to ground for position encoder 2	<ul style="list-style-type: none"> • Short to ground for position encoder 2 in shift motor • Check the relevant harnesses for short. <ul style="list-style-type: none"> - TCCU pin No.5 • Check the relevant connectors for contact. • Check the shift motor.
P1853	Short to ground for position encoder 3	<ul style="list-style-type: none"> • Short to ground for position encoder 2 in shift motor • Check the relevant harnesses for short. <ul style="list-style-type: none"> - TCCU pin No.19 • Check the relevant connectors for contact. • Check the shift motor.
P1854	Short to ground for position encoder 4	<ul style="list-style-type: none"> • Short to ground for position encoder 4 in shift motor • Check the relevant harnesses for short. <ul style="list-style-type: none"> - TCCU pin No.17 • Check the relevant connectors for contact. • Check the shift motor.
P1815	Abnormal CAN neutral signal	<ul style="list-style-type: none"> • No neutral signal from automatic transmission over 1 second through CAN. • Check CAN communication line. • Check TCU.

ECU-DSL

ECU-GSL

ECU-CDPF

TCU

BRAKE

AIR-BAG

TC

RK-STICS

FFH

RAIN SENSOR

FATC

TGS LEVER

P-TRUNK

CCCS

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DIAGNOSIS (AWD)

Symptoms		Cause	Action
Noise	Noise in all ranges	- Low oil level	- Check major components (bearing surface) for excessive wear - Replenish oil
		- Improper oil	- Drain oil and replenish the specified oil
		- Worn or broken chain	- Replace chain or sprocket
	Growling	- Broken bearing	- Replace transfer case housing
		- Low oil level	- Check major components (bearing surface) for excessive wear - Replenish oil
	Noise when cornering	- Worn pinion gear teeth	- Replace differential carrier assembly
	Low frequency noise and vibration	- Missing shaft support snap ring	- Visually check the relevant parts for wear and replace if necessary
	Howling	- Abnormal friction in drive system	- Disassemble drive system, check rotating parts for wear and replace the worn parts.
Clunking	Clunking (when starting and stopping)	- Excessive backlash in T/C (over 3°)	- Check backlash and replace if necessary
		- Improper mounting	- Excessive backlash in drive system - Check drive system
		- Excessive backlash in other parts	- Excessive backlash in drive system
			- Check drive system
Undrivable	Cannot deliver forward/reverse driving force	- Worn or broken chain	- Replace chain or sprocket
		- Broken sprocket	- Replace chain or sprocket
		- Broken differential carrier	- Replace differential carrier assembly
		- Broken shaft	- Replace shaft
Binding	Dragging in front wheels or rear wheels	- Differential carrier stuck	- Replace differential carrier
Leakage	Leakage at transmission connection	- Damaged oil seal in T/C	- Replace oil seal
		- Clogged breather	- Check breather for clogging - Replace connecting hose
	Leakage at front and rear shafts	- Foreign material in oil seal	- Remove any foreign material, check oil seal for damage and replace oil seal
		- Broken oil seal	- Replace oil seal
		- Clogged breather	- Check breather for clogging - Replace connecting hose
	Leakage at case or cover body	- Cracked case or cover	- Replace transfer case
		- Air bubbles inside	
	Leakage at drain plug	- Bubbles no mounting bolt	- Replace drain plug
		- Uneven or missing plug coating	
	Leakage at filler plug	- Bubbles no mounting bolt	- Replace filler plug
		- Uneven or missing plug coating	
	Leakage at body connection	- Improperly applied sealant	- Disassemble T/C, apply sealant and reassemble it - Tighten to the specified torque
		- Loose bolt around the leaking area	

RK-STICS

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DIAGNOSIS TROUBLE CODE AND HELP TIPS

Fault Code	Malfunction	Descriptions
01	Dr Door Lock Knob	Driver's door lock knob is not operated when locking/unlocking doors.
02	Ps Door Lock Knob	Passenger's door lock knob is not operated when locking/unlocking doors.
03	Rr Door Lock Knob	Rear door lock knob is not operated when locking/unlocking doors.
04	T/Gate Lock Knob	Tailgate lock knob is not operated when locking/unlocking doors.
05	Door Lock Output	All door lock knob are not moved to lock position even when the door lock relay is activated.
06	Door Unlock Output	All door lock knob are not moved to unlock position even when the door unlock relay is activated.
07	C/DR Lock Output	Doors are locked by central door lock switch while the engine is running.
08	DR Lock Output	Doors are locked by driver's door lock switch while the engine is running.
09	PS Lock Output	Doors are locked by passenger's door lock switch while the engine is running.
10	Auto Door Lock Output	Door lock knob is not moved to lock position when the system outputs auto door lock signal while the ignition switch is in ON position and the vehicle speed is over 50 km/h.
11	Auto Door Unlock Output	Door lock knob is not moved to unlock position after receiving the output from collision sensor.
12	Wiper Output	The WIPER P-POS signal is not detected when the wiper relay is activated.
13	SPEED SIGNAL	The vehicle speed over 3 km/h is detected at the speed signal area while the ignition switch is in ON position and the alternator signal is "D" LOW.
14	INT WIPER Volume	The circuit is open (over 4.5 V) when changing the INT volume in the speed sensitive INT wiper (saved as history error).
15	SPEED SENSOR	The vehicle speed over 200 km/h is detected (saved as history error).
16	A/BAG COLLISION SENSOR INPUT	A signal is sent to the collision sensor input area while the ignition switch is in OFF position (saved as history error unconditionally).
17	A/BAG COLLISION SENSOR OUTPUT	The RKSTICS outputs UNLOCK signal after receiving collision sensor input while the ignition switch is in ON position (saved as history error).
18	A/BAG COLLISION MONITOR	The STICS outputs the Door Unlock signal due to the collision sensor and the feedback value is in proper range (saved as history error).
19	Door Ajar Warning IND	The door warning indicator blinks when the vehicle speed is over 10 km/h (saved as history error).
20	PARKING BRAKE IND	The parking brake indicator blinks when the vehicle speed is over 10 km/h (saved as history error).
21	Auto Washer Out	The auto washer output is not sent to the front washer (saved as history error).
22	WASHER RELAY	The front washer switch receives the input signal for more than 10 seconds (saved as history error).

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Fault Code	Malfunction	Descriptions
23	REMOCON VOLTAGE CHECK	The voltage from remote control key is saved as history error.
24	SBR S/BELT SW (Only EU)	When the seat belt switch circuit is OPEN (HIGH) in KEY OUT & ARMED MODE, the system recognizes it as FAIL and saves it as History error (Normal Close (GND)).
25	SBR SENSOR (Only EU)	When the sensor value is recognized in KEY OUT & ARMED MODE, the system saves it as History error.
26	SBR CONNECTION (Only EU)	When the seat belt switch circuit maintains OPEN (HIGH) in KEY OUT & ARMED MODE while the vehicle speed is over 50 km/h, the system saves it as History error.

FFH

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DIAGNOSIS

Trouble Code	Trouble Description	Remedies
0	No faults	-
10	Shutdown for overvoltage	Measure battery voltage (must be < 15.9V). Check alternator and overvoltage.
11	Shutdown for undervoltage	Measure battery voltage (must be > 10.2V under load). Check alternator, wiring and undervoltage.
12	Overheating (abnormal reference value)	Temperature at overheating sensor > 125°C: check cooling system. Check temperature sensor and overheating sensor, replace if necessary.
14	Overheating (difference evaluation-1)	Difference in temperature values between surface sensor and control overheating sensor is too large. (Prerequisite for this trouble code display is that the heater is in operation and the water temperature at the overheating sensor has reached min. 80°C): check cooling system. Check temperature sensor and overheating sensor, replace if necessary
15	Overheating (abnormal heater operation)	Heater does not operate (The controller is locked.) Delete trouble code to release controller lock: check cooling system. Check temperature sensor and overheating sensor, replace if necessary
16	Overheating (difference evaluation-2)	If the surface sensor has a far higher temperature value than the control overheating sensor, then the system proceeds with a fault shutdown.
17	Overheating (defective hardware-2)	Temperature at control overheating sensor > 130°C: check cooling system. Check temperature sensor and overheating sensor, replace if necessary.
20	Open glow plug circuit	Check plug cable for damage, replace if necessary
21	Overload or short circuit of glow plug	Check plug cable for damage, replace if necessary
22	Short circuit of glow plug	Check plug cable for damage, replace if necessary
23	-	-
24	-	-
25	Short circuit of communication line	Check the communication line.
30	Abnormal speed of combustion fan motor	Defective fan wheel or combustion air fan motor (frozen, contaminated, stiff, damaged cable)
31	Defective combustion fan motor	Check cable harness for damage, replace if necessary.
32	Overload or short circuit of combustion fan motor	Defective fan wheel or combustion air fan motor (contaminated, stiff) Check cable harness for damage, replace if necessary.
34	Abnormal output of combustion fan motor	Check the ground and short of combustion air fan motor circuit, replace if necessary.
36	-	-
38	-	-
39	-	-
41	Abnormal water pump operation	Check connector.
42	Overload or short circuit of water pump	Check connector.

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Trouble Code	Trouble Description	Remedies
43	Abnormal output of water pump	-
47	Overload or short circuit of fuel pump	Check cable harness for damage, replace if necessary.
48	Abnormal fuel pump operation	Check cable harness for damage, replace if necessary. Check plug-in connection, replace if necessary.
49	Short circuit of fuel pump (B+)	Check cable harness for open to battery voltage, replace if necessary.
50	Improper operation	The controller is locked due to excessive starting problem.
51	Delayed heating time	During start (no flame formed yet), the flame sensor reports temperature value too high for too long, check exhaust gas, combustion air and flame sensor.
52	Time exceeded for cold blowing	Check exhaust gas and combustion air. Check fuel quantity and fuel supply. Clean or replace filter in fuel pump.
53	Flame aborted from "large" stage	Fault (no more starting attempt allowed). Check exhaust gas and combustion air system. Check fuel quantity and fuel supply. Check flame sensor - see trouble code 64 and 65.
54	Flame aborted from "small" stage	Fault (no more starting attempt allowed). Check exhaust gas and combustion air system. Check fuel quantity and fuel supply. Check flame sensor - see trouble code 64 and 65.
60	Abnormal overheating sensor operation	Check cable harness for damage, check plug-in connection, replace if necessary. Check sensor resistance value, replace if necessary.
61	Short circuit or ground of overheating sensor	Check cable harness, replace if necessary. Check sensor resistance value, replace if necessary.
64	Abnormal flame sensor operation	Check cable harness for damage, check plug-in connection, replace if necessary. Check sensor resistance value, replace if necessary.
65	Short circuit of flame sensor	Check cable harness, replace if necessary. Check sensor resistance value, replace if necessary.
71	Defective surface sensor	Check cable harness for damage, check plug-in connection, replace if necessary. Check sensor resistance value, replace if necessary.
72	Short circuit of surface sensor	Check cable harness, replace if necessary. Check sensor resistance value, replace if necessary.
74	Defective overheating prevention device	-
87	-	-
88	-	-
89	-	-
90	Watchdog reset	Replace controller.
91	Abnormal reset function	If too many resets occurs, replace controller
92	ROM error	Replace controller.
93	RAM error	Replace controller.
94	Defective transistor	Replace controller.

DIAGNOSIS

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Trouble Code	Trouble Description	Remedies
95	Software error	Check cable harness for open to battery voltage, replace if necessary. Replace controller.
96	Abnormal process operation	Replace controller.
97	Wrong processor cycle	Replace controller.
98	Defective main relay	Replace controller.
99	EEPROM error	Replace controller.

► Trouble Diagnosis

	Causes	Remedies
Low coolant level	<ul style="list-style-type: none"> Leakage in radiator Leakage in coolant auxiliary tank Leakage in heater core 	<ul style="list-style-type: none"> Change radiator. Change coolant auxiliary tank Change heater core.
	<ul style="list-style-type: none"> Leakage in joint junction of coolant hose Leakage in defective coolant hose 	<ul style="list-style-type: none"> Check hose or replace clamp. Change hose.
	<ul style="list-style-type: none"> Leakage in water pump gasket Leakage in water pump sealing 	<ul style="list-style-type: none"> Change gasket. Change water pump.
	<ul style="list-style-type: none"> Leakage in water inlet cap Leakage in thermostat housing 	<ul style="list-style-type: none"> Change water inlet cap gasket. Change thermostat sealing.
	<ul style="list-style-type: none"> Insufficient tightening torque of cylinder head bolt Damaged cylinder head gasket 	<ul style="list-style-type: none"> Tighten bolt to specified torque. Change cylinder head gasket.
Abnormally high coolant temperature	<ul style="list-style-type: none"> The coolant leakage (Check the coolant level) Excessive anti-freezer Poor coolant hose condition 	<ul style="list-style-type: none"> Add coolant Check density of coolant (Anti-freezer). Check bent of hose, replace if necessary.
	<ul style="list-style-type: none"> Defective thermostat Defective water pump Defective radiator Defective coolant auxiliary tank or tank cap 	<ul style="list-style-type: none"> Change thermostat Change water pump. Change radiator. Change coolant auxiliary tank or tank cap.
	<ul style="list-style-type: none"> Crack in cylinder head or in cylinder block Clogged water flow in cylinder head or block 	<ul style="list-style-type: none"> Change cylinder head or cylinder block. Clean coolant flow line.
	<ul style="list-style-type: none"> Clogged water flow in radiator core 	<ul style="list-style-type: none"> Clean radiator core.
	<ul style="list-style-type: none"> Defective cooling fan 	<ul style="list-style-type: none"> Change or check cooling fan.
	<ul style="list-style-type: none"> Defective temp. sensor, wiring, and lamp cluster 	<ul style="list-style-type: none"> Change sensor or check relevant wiring.
Abnormally low coolant temperature	<ul style="list-style-type: none"> Defective thermostat 	<ul style="list-style-type: none"> Change thermostat.
	<ul style="list-style-type: none"> Defective cooling fan 	<ul style="list-style-type: none"> Change or check cooling fan.
	<ul style="list-style-type: none"> Defective temp. sensor, wiring, and lamp cluster 	<ul style="list-style-type: none"> Change sensor or check relevant wiring.

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RAIN SENSOR

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TROUBLE SHOOTING

Symptom 1. The wiper does not operate one cycle when turning the multifunction wiper switch to the "AUTO" from the "OFF" position or starting the engine while the wiper switch is in the "AUTO" position.

1. When starting the engine with the multifunction wiper switch in the "AUTO" position, the wiper operates one cycle to remind a driver that the wiper switch is in the "AUTO" position.
2. When the wiper switch is turned to "AUTO" from "OFF", the wiper operates one cycle. It always operates one cycle for the initial operation, however, the wiper does not operate afterwards to prevent the wiper blade wear if not raining when turning the wiper switch to "AUTO" from "OFF". However, the wiper operates **up to 5 minutes** after rain stops. If this function does not occur, check No. 8 pin. If the pin is normal, check the wiper relay related terminals in the ICM box.

Symptom 2. It rains but the system does not work in the "AUTO" position.

1. Check whether the multifunction wiper switch is in the "AUTO" position.
2. Check the power to the sensor. Check the conditions of the pin 3 (Ground) and the pin 4 (IGN).
3. Check the wiper relay for defective.

Symptom 3. The wiper operates 3 or 4 times at high speed abruptly.

Check whether the variable resistance knob on the multifunction wiper switch is set in "FAST". The "FAST" is the highest stage of the sensitivity and very sensitive to small amount of rain drops. Therefore, change the knob to the low sensitivity.

Symptom 4. The wiper operates continuously even on the dry glass.

1. Check the wiper blade for wear. If the wiper blade cannot wipe the glass uniformly and clearly, this problem could be occurred. In this case, replace the wiper blade with a new one.
2. Check whether the variable resistance knob on the multifunction wiper switch is set in "FAST". The "FAST" is the highest stage of the sensitivity and very sensitive to small amount of rain drops. Therefore, change the knob to the low sensitivity.

Symptom 5. The wiper does not operate at high speed even in heavy rain.

Check if the wiper operates at high speed when grounding pin 1 and pin 2.

Symptom 6. The wiper responses are too fast or slow.

Check whether the variable resistance knob on the wiper switch is set in "FAST" or "SLOW".

Notify that the customer can select the sensitivity by selecting the variable resistance value. And, select a proper stage.

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SELF DIAGNOSIS (ONLY FOR FATC AIR CONDITIONER)

► Self Diagnosis

1. Starting Self Diagnosis

Turn the ignition switch to ON position and press OFF switch for more than 5 seconds within 10 seconds.

2) Check LED segments on the vacuum fluorescent display (VFD).



1) Press OFF switch more than 5 seconds.

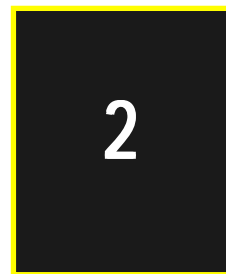
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2. Set in Trouble Diagnosis Step 2

In this step, check the air mix door and sensors for defect.

Once the system starts diagnosis step 2, the digit "2" is displayed, implying step 2, on the display window and the trouble diagnosis for sensors is executed. If no failure exists, "20" is displayed. If any failure exists, the appropriate trouble code is displayed as below.

- 1) Slightly turn the TEMP dial to the right to set in the trouble diagnosis step 2



- 2) Indication of Step 2.
Starting self diagnosis

10 ~ 20
seconds



- 3) Sensor failure
code blinking



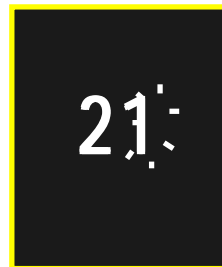
NOTICE

- The symbol "-" in front of step number "2" means a short circuit of the blinking sensor.



Short-circuit in the ambi-
ent air temperature sensor

When two sensors are
defective



First sensor failure
code blinks twice



Second sensor failure
code blinks twice

Trouble Code

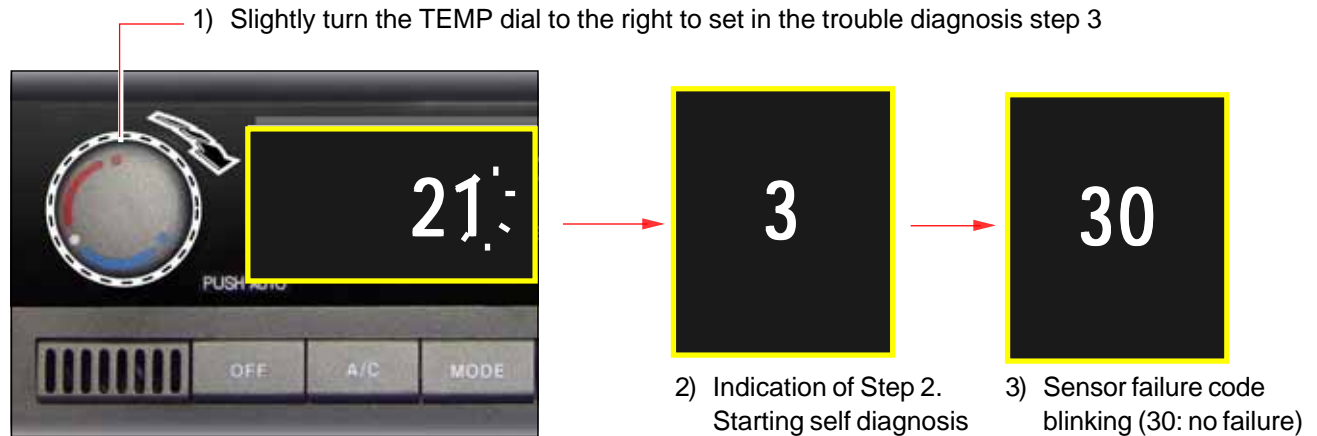
Code	Malfunction	Remark	Code	Malfunction	Remark
0	VDF segments are OK		5	Defective sun sensor	
1	Defective ambient temperature sensor		6	Check Air mix door	
2	Defective interior temperature sensor		7	Defective humidity sensor	
3	Defective duct temperature sensor		8	-	
4	Defective intake sensor		9	-	

3. Set in Trouble Diagnosis Step 3

In this step, check the position and conditions of recirculation air door and mode door.

Slightly turn the TEMP switch until "3" is displayed on the display window.

If no failure exists, "30" is displayed. If any failure exists, the appropriate trouble code is displayed.




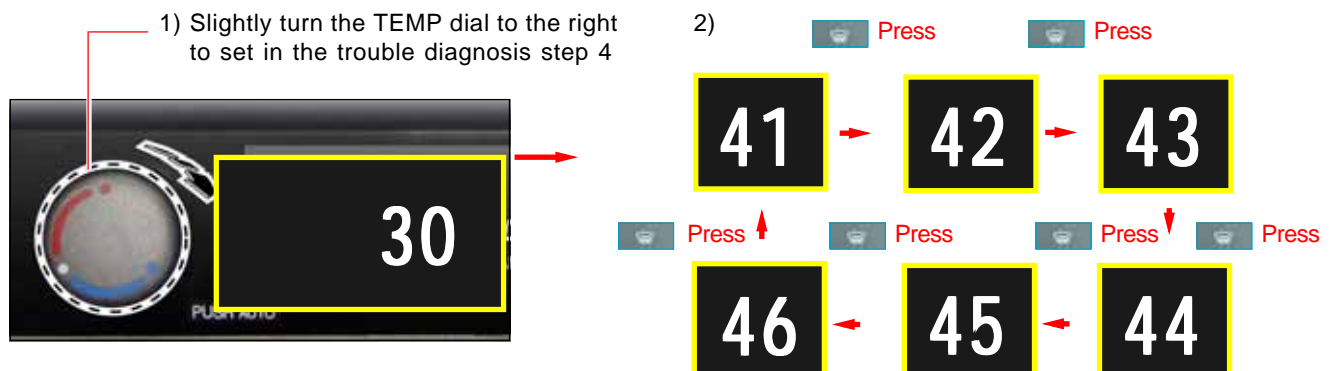
Trouble Code

Code	Malfunction	Remark	Code	Malfunction	Remark
1	Defective VENT		6	DEF	
2	Defective B/L		7	FRE	
3	-		8	20% FRE	
4	FOOT		9	REC	
5	D/F		0	All door OK	

4. Set in Trouble Diagnosis Step 4

In this step, check the position of actuator door, check the fan speed, and check the compressor operation.

Slightly turn the TEMP switch in step 3 until "41" is displayed on the display window. When pressing DEF switch , mode changes as shown below in turns to check each function.




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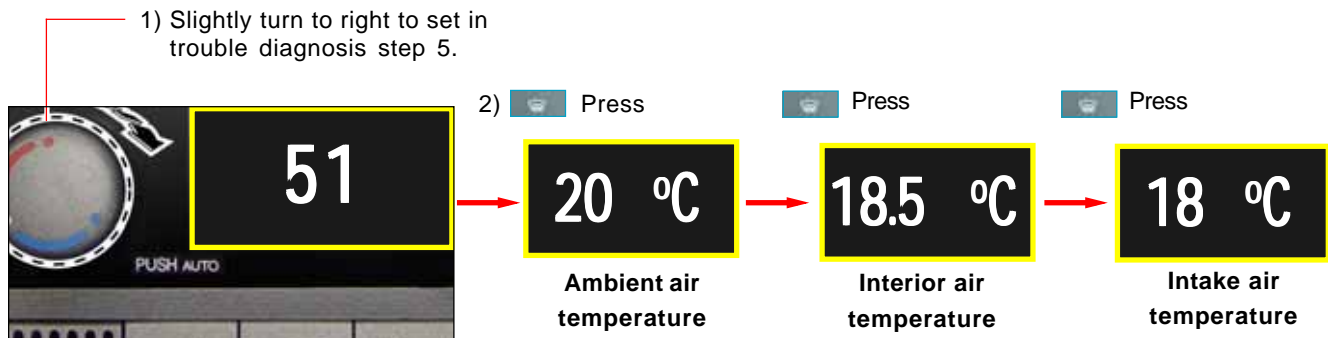
Function Check

Displayed Number	41	42	43	44	45	46
Mode door	VENT	B/L	B/L	FOOT	D/F	DEF
Interior/Ambient door	REC	REC	20%FRE	FRE	FRE	FRE
Air mix door	F/COOL	F/COOL	F/HOT	F/HOT	F/HOT	F/HOT
Blower	4.5 V	10.5 V	8.5 V	8.5 V	8.5 V	MAX
Compressor	ON	ON	OFF	OFF	ON	ON

5. Set in Trouble Diagnosis Step 5

In this step, check the conditions of temperature related sensors.

Slightly turn the TEMP switch in step 4 until "51" is displayed on the display window. When pressing DEF switch , displayed temperature changes as shown below in turns.



6. Set in Trouble Diagnosis Step 6

In this step, the temperature can be compensated within the range of -3°C to 3°C in the control process according to the temperature to air conditioner controller. The step 6 initiates when slightly rotating the fan speed switch (other than TEMP switch) in step 5.



7. Canceling the Trouble Diagnosis

Turn the AUTO switch ON or turn the ignition key OFF.

DIAGNOSIS

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TGS LEVER

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DTC AND DIAGNOSIS

► DTC for Selector Lever

DTC	Malfunction	Help tips	
P1000-1	Defective program memory	Cause: The calculated checksum value is not consistent with the stored checksum value.	
		Symptom: - Solenoid valve is inoperative. - Backup lamp is OFF. - CAN bus is OFF. - All shift lever position indicators are OFF.	
		Action: Reset the unit by cycling the ignition switch (OFF → ON) several times.	
P1000-2	Defective data memory	Cause: The malfunction is occurred during the RAM memory test with the ignition ON.	
		Symptom: - Solenoid valve is inoperative. - Backup lamp: OFF - CAN bus: OFF - All shift lever position indicators: OFF	
		Action: If the malfunction stays after turning the ignition switch from OFF to ON, replace the TGS lever.	
P1000-3	Faulty MCU reset	Cause: The malfunction is occurred during the microprocessor test with the ignition ON.	
P1000-4	Faulty MCU data process	Symptom: - Solenoid valve is inoperative. - Backup lamp is OFF. - CAN bus is OFF. - All shift lever position indicators are OFF.	
P1000-5	Faulty MCU watchdog function		
P1000-6	Too long MCU data throughput time		
		Action: Reset the unit by cycling the ignition switch (OFF → ON) several times.	
P1750-2	Low battery voltage	Cause: The battery voltage is low. (Specified value: less than 8.0 ± 0.3 V for 50 ms)	
		Symptom: All shift lever position indicators are OFF.	
		Action: - The operation is automatically resumed if the battery voltage is over 8.7 ± 0.3 V for 50 ms. - Check the shift lever connector and power line for contact.	
P1817-1	Faulty backup lamp operating current	Cause: The operating current is over 14 ~ 36 A for 50 ms when the backup lamp is in ON condition.	
		Symptom: - Backup lamp is OFF. - Current shift lever indicator is flashing. - Indicator "R" is flashing in "R" position.	
		Action: Check the input and output wirings of backup lamp for open and short.	
P1832-1	Faulty solenoid operating current	Cause: The solenoid valve operating current is over 3 ~ 5 A when the solenoid is operating.	
		Symptom: - Solenoid valve is OFF. - Current shift lever indicator is flashing.	
		Action: The operation is automatically resumed since the interior temperature is normally within the solenoid operating temperature range. If the problem stays, check the power to the shift lever.	

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DTC	Malfunction	Help tips
P1833-2	Open solenoid valve circuit	<p>Cause: The solenoid valve circuit is open or short to battery for 50 ms when the solenoid valve is OFF.</p> <p>Symptom: - Solenoid valve is OFF. - Current shift lever indicator is flashing.</p> <p>Action: Check the power terminal to the shift lever.</p>
P1856-1	Short shift lever position signal (to B+)	<p>Cause: The shift lever position sensor or the power supply is malfunctioning.</p> <p>Symptom: - All shift lever position indicators are flashing.. - The incorrect lever position signal is transmitted through the CAN line.</p> <p>Action: - The operation is automatically resumed if the fault is not detected for 100 ms. - Check the power supply terminal to the shift lever.</p>
P1856-2	Open or short shift lever position signal (to GND)	<p>Cause: The shift lever position sensor is open or short to ground.</p> <p>Symptom: - All shift lever position indicators: flashing. - The incorrect lever position signal is transmitted through the CAN line.</p> <p>Action: - The operation is automatically resumed if the fault is not detected for 100 ms. - Check the power supply terminal to the shift lever.</p>
P1856-3	Abnormal shift lever position signal	<p>Cause: The shift lever position sensor signal is incorrect.</p> <p>Symptom: - All shift lever position indicators are flashing. - The incorrect lever position signal is transmitted through the CAN line.</p> <p>Action: - The operation is automatically resumed if the fault is not detected for 100 ms. - Check the power supply terminal to the shift lever.</p>
P1856-4	Incorrect shift lever position sensor coding	<p>Cause: The calibration value of shift lever position sensor is not stored or not consistent with the stored value.</p> <p>Symptom: - All shift lever position indicators are flashing. - The incorrect lever position signal is transmitted through the CAN line.</p> <p>Action: - Reset the unit by cycling the ignition switch (OFF → ON) several times. - Check the shift lever and replace it if necessary.</p>
P1860-2	Faulty vehicle speed signal	<p>Cause: The vehicle speed is detected as 300 km/h.</p> <p>Symptom: - The gear is shifted as for the vehicle speed is 0 km/h. - Current shift lever position indicator is flashing.</p> <p>Action: - The operation is automatically resumed if the fault is not detected. * For the shift lever, the vehicle speed data is needed to the solenoid valve operation for R/P lock and N lock function.</p>
P1875-3	Faulty CAN bus OFF signal	<p>Cause: The CAN bus OFF condition of the CAN controller is detected for 3 times in the unit.</p> <p>Symptom: - Cannot send the CAN message. - Current shift lever position indicator is flashing.</p> <p>Action: - Check the CAN communication line for open or short. - Check the shift lever and replace it if necessary. * CAN Bus OFF: The status that the CAN communication is totally interrupted if there is an error in the sent/received data through the CAN communication in the unit.</p>

DIAGNOSIS

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DTC	Malfunction	Help tips
P1876-1	Abnormal CAN communication (vehicle speed)	Cause: There is no vehicle speed signal via CAN communication for 500 ms. Symptom: - The gear is shifted as for the vehicle speed is 0 km/h. - Current shift lever position indicator is flashing. Action: Check the CAN communication line.
P1910-1	High battery voltage	Cause: The battery voltage is too high. (Specified value: Over 16.3 ± 0.3 V for 50 ms) Symptom: All shift lever position indicators: OFF Action: - The operation is automatically resumed if the battery voltage is over 16.3 ± 0.3 V for 50 ms. - Check the shift lever power supply line.
P1912-1	Open/Short shift lever tip switch signal (to B+)	Cause: The shift lever tip switch signal is open or short to B+. Symptom: - Indicator "M" is flashing due to malfunction when the shift lever is in manual mode position. - If the shift lever is not in "M" position, the malfunction is overridden. Action: - The operation is automatically resumed if the fault is not detected for 50 ms. - Check the shift lever tip switch.
P1912-2	Short shift lever tip switch signal s(to GND)	Cause: The shift lever tip switch signal is open or short to ground. Symptom: - Indicator "M" is flashing due to malfunction when the shift lever is in the manual mode position. - If the shift lever is not in "M", the malfunction is overridden. Action: - The operation is automatically resumed if the fault is not detected for 50 ms. - Check the shift lever tip switch.
P1912-3	Abnormal shift lever tip switch signal	Cause: The shift lever tip switch signal is faulty. Symptom: - Indicator "M" is flashing due to malfunction when the shift lever is in the manual mode position. - If the shift lever is not in "M" position, the malfunction is overridden. Action: - The operation is automatically resumed if the fault is not detected for 50 ms. - Check the shift lever tip switch.
P1912-4	Open/Short steering wheel tip switch signal (to B+)	Cause: The steering wheel tip switch signal is open or short to B+. Symptom: - Indicator "M" is flashing due to malfunction when the shift lever is in the manual mode position. - If the shift lever is not in "M" position, the malfunction is overridden. Action: - The operation is automatically resumed if the fault is not detected for 50 ms. - Check the steering wheel's tip switch.
P1912-5	Open/Short steering wheel tip switch signal (to GND)	Cause: The steering wheel tip switch signal is open or short to ground. Symptom: - Indicator "M" is flashing due to malfunction when the shift lever is in the manual mode position. - If the shift lever is not in "M" position, the malfunction is overridden. Action: - The operation is automatically resumed if the fault is not detected for 50 ms. - Check the steering wheel tip switch.

ECU-DSL

ECU-GSL

ECU-CDPF

TCU

BRAKE

AIR-BAG

TC

RK-STICS

FFH

RAIN SENSOR

FATC

TGS LEVER

P-TRUNK

CCCS

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DTC	Malfunction	Help tips
P1912-6	Abnormal steering wheel tip switch signal	<p>Cause: The steering wheel tip switch signal is faulty.</p> <p>Symptom: - Indicator "M" is flashing due to malfunction when the shift lever is in the manual mode position.</p> <p>- If the shift lever is not in "M" position, the malfunction is overridden.</p> <p>Action: - The operation is automatically resumed if the fault is not detected for 50 ms.</p> <p>- Check the steering wheel tip switch.</p>
P1912-7	Defective tip switch	<p>Cause: The manual mode switch operates for 50 ms when the shift lever is P, R or N positions.</p> <p>Symptom: - Indicator "M" flashes if the shift lever is in D.</p> <p>- The mode is recognized as the manual mode even if the shift lever is in "D" position.</p> <p>Action: The operation is automatically resumed if the fault is not detected for 50 ms and the shift lever is in P, R or N positions.</p>
P1927-8	Faulty TCU shift	Check the TCU if there is errors related to the A/T shift.
P1928-4	Defective TCU CAN communication	<p>Cause: - The up/down shift command is not delivered to the TCU (faulty tip switch).</p> <p>- There is no CAN signal for 500 ms.</p> <p>Symptom: - Indicator "M" is flashing due to malfunction when the shift lever is in the manual mode position.</p> <p>- If the shift lever is not in "M" position, the malfunction is overridden.</p> <p>Action: Check the CAN communication line.</p>

P/TRUNK

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DTC

Function	System component	DTC	Description
Power Trunk Monitoring	Power striker	0	Faulty power striker
	Causes <ul style="list-style-type: none"> - The related wiring is damaged. - The connector is poorly connected or damaged. - The micro switch is malfunctioning. - The power striker'motor is malfunctioning. Actions <ul style="list-style-type: none"> - Check the related wiring and connector for proper connection. - Replace the power striker. 		
	Power latch	1	Faulty power latch
	Causes <ul style="list-style-type: none"> - The related wiring is damaged. - The connector is poorly connected or damaged. - The micro switch is malfunctioning. - The power latch motor is malfunctioning. Actions <ul style="list-style-type: none"> - Check the related wiring and connector for proper connection. - Replace the power latch. 		
	DC-Gear motor	2	Faulty DC-gear motor
	Causes <ul style="list-style-type: none"> - The related wiring is damaged. - The connector is poorly connected or damaged. - The hall sensor is malfunctioning. - The DC-gear motor is malfunctioning. Actions <ul style="list-style-type: none"> - Check the related wiring and connector for proper connection. - Replace the DC-gear motor. 		
	Power trunk lid	3	Faulty power trunk lid
	Causes <ul style="list-style-type: none"> - The related wiring is damaged. - The connector is poorly connected or damaged. - The PTL ECU is malfunctioning. Actions <ul style="list-style-type: none"> - Check the related wiring for proper connection. - Replace the PTL ECU. 		

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Function	System component	DTC	Description
Power Trunk Monitoring	Battery	4	Low battery voltage
	Causes <ul style="list-style-type: none"> - The related wiring is damaged. - The connector is poorly connected or damaged. - The battery is defective. Actions <ul style="list-style-type: none"> - Check the related wiring for proper connection. - Check the battery and replace it if necessary. 		
	CAN communication	5	Faulty CAN communication
	Causes <ul style="list-style-type: none"> - The related wiring is damaged. - The connector is poorly connected or damaged. - The CAN communication is malfunctioning. - The PTL ECU is malfunctioning. Actions <ul style="list-style-type: none"> - Check the related wiring for proper connection. - Replace the PTL ECU. 		
	Power trunk	6	Faulty usage
	Cause <ul style="list-style-type: none"> - If the DC-gear motor is operated 7 times within 2 minutes, it is considered as misuse and overheated DC-gear motor. Action <ul style="list-style-type: none"> - The system resumes its operation in 90 seconds. 		
	PTL ECU	7	Faulty temperature detection of unit
	Causes <ul style="list-style-type: none"> - The related wiring is damaged. - The connector is poorly connected or damaged. - The internal temperature sensor in the PTL ECU is malfunctioning. - The PTL ECU is malfunctioning. Actions <ul style="list-style-type: none"> - Check the related wiring for proper connection. - Replace the PTL ECU. 		
	PTL ECU	8	Faulty temperature detection of unit
	Causes <ul style="list-style-type: none"> - The related wiring is damaged. - The connector is poorly connected or damaged. - The power trunk lamp is malfunctioning. - The PTL ECU is malfunctioning. Actions <ul style="list-style-type: none"> - Check the related wiring for proper connection. - Replace the power trunk lamp. - Replace the PTL ECU. 		

CCCS

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CCCS DIAGNOSIS

Code	Malfunction	Help
0 X 01	Driver door lock knob does not lock	<ul style="list-style-type: none"> - Check the driver side door actuator - Check the sensor values <ul style="list-style-type: none"> • Driver side door open switch (STICS sensor value: No. 5) • Door lock switch (STICS sensor value: No. 21) • Driver door lock switch (STICS sensor value: No. 37) • Door lock switches other than the driver side door (STICS sensor value: No. 38) • Door lock (DICS-Main: No. 30) • Key lock (DICS-Main: No. 32) - Check the driver side door wires and connectors
0 X 02	Passenger door lock knob does not lock	<ul style="list-style-type: none"> - Check the passenger side door actuator - Check the sensor values <ul style="list-style-type: none"> • Passenger side door open switch (STICS sensor value: No. 6) • Door lock switch (STICS sensor value: No. 21) • Door lock switches other than the driver side door (STICS sensor value: No. 38) • Door lock (DICS-Sub: No. 3) • Key lock (DICS-Sub: No. 5) - Check the passenger side door wires and connectors
0 X 03	Rear door lock knob does not lock	<ul style="list-style-type: none"> - When one of the two rear seat door knobs is defective - Check the rear seat door actuator - Check the sensor values <ul style="list-style-type: none"> • Rear door knob switch (STICS sensor value: No. 7) • Rear right door open switch (STICS sensor value: No. 8) • Door lock switch (STICS sensor value: No. 21) • Rear door open switch (STICS sensor value: No. 23) • Door lock switches other than the driver side door (STICS sensor value: No. 38) • Door lock switch (DICS-Main sensor value: No. 32) • Key lock (DICS-Main sensor value: No. 32) • Door lock (DICS-Sub sensor value: No. 3) • Key lock (DICS-Sub sensor value: No. 5) - Check the rear door wires and connectors
0 X 04	Defective tail lamp auto off function (Battery save function)	<ul style="list-style-type: none"> - Check the tail lamp relay connector - Check the sensor values <ul style="list-style-type: none"> • Tail lamp switch (STICS sensor value: No. 3) • Tail lamp signal input status (STICS sensor value: No. 20) • Tail lamp relay (STICS sensor value: No. 47) - Check the tail lamp wires and connectors - The defective code of signals coming from ABS/ESP which senses the vehicle speed incorrectly due to the exterior noises - Current vehicle speed (STICS sensor value: No. 58)
0 X 05	Incorrect indication of the vehicle speed (Detects as over 300 km/h)	<ul style="list-style-type: none"> - Check the speed sensor connector - Check the other units (ABS) that use speed signal - Does not receive the vehicle speed signal from STICS when the ignition switch is turned off

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Code	Malfunction	Help
0 X 06	Vehicle speed indicates over 0 km/h when the ignition switch is turned off	<ul style="list-style-type: none"> - Current vehicle speed (STICS sensor value: No. 58) - Check the speed sensor connector - Check the other units (ABS) that use speed signal
0 X 07	Tail lamp turns OFF without any signals when the tail lamp switch is turned on	<ul style="list-style-type: none"> - Check the tail lamp relay connector - Check the sensor values <ul style="list-style-type: none"> • Tail lamp switch (STICS sensor value: No. 3) • Tail lamp signal input status (STICS sensor value: No. 20) • Tail lamp relay (STICS sensor value: No. 47)
0 X 08	IGN 2 SW is detected as OFF when IGN 1 SW is ON	<ul style="list-style-type: none"> - Check the tail lamp wires and connectors - Check the sensor values <ul style="list-style-type: none"> • Key reminder switch (STICS sensor value: No. 13) • Ignition 1 switch (STICS sensor value: No. 17) • Ignition 2 switch (STICS sensor value: No. 18) • Ignition 1 switch (DICS-Main sensor value: No. 60) • Ignition 2 switch (DICS-Main sensor value: No. 59) • Key reminder (DICS-Main sensor value: No. 62)
0 X 09	Driver side door lock knob does not unlock	<ul style="list-style-type: none"> - Check the driver side door actuator - Check the sensor values <ul style="list-style-type: none"> • Door open switch (STICS sensor value: No. 5) • Door unlock switch (STICS sensor value: No. 22) • All door unlock switches (STICS sensor value: No. 39) • Key unlock (Main-DICS: No. 31) - Check the driver side door wires and connectors
0 X 0A	Passenger side door lock knob does not unlock	<ul style="list-style-type: none"> - Check the passenger side door actuator - Check the sensor values <ul style="list-style-type: none"> • Passenger side door open switch (STICS sensor value: No. 6) • Door unlock switch (STICS sensor value: No. 22) • All door unlock switches (STICS sensor value: No. 39) • Key unlock (DICS-Main: No. 31) • Key unlock (Main-DICS: No. 04) - Check the driver side door wires and connectors
0 X 0B	Rear door lock knob does not unlock	<ul style="list-style-type: none"> - When one of the two rear seat door knobs is defective - Check the rear seat door actuator - Check the sensor values <ul style="list-style-type: none"> • Rear door knob switch (STICS sensor value: No. 7) • Rear right door open switch (STICS sensor value: No. 8) • Door unlock switch (STICS sensor value: No. 22) • Rear door open switch (STICS sensor value: No. 23) • All door unlock switches (STICS sensor value: No. 39) • Key unlock (DICS-Main sensor value: No. 31) • Key unlock (DICS-Sub sensor value: No. 4) - Check the rear seat door wires and connectors

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► STICS Input/Output Monitoring Data

No.	Input/Output	Sensor value item	Information				Help
1	Input	Reverse lever detection	Not detected	GND	Detected	12 V	1. Sensor signal detects when the reverse gear signal in A/T equipped vehicle 2. Ground level when not operating 3. Battery level when operating 4. This signal is used when outside rearview mirror in DICS Main/Sub is linked with 5°C. It is linked only when the outside rearview mirror selection switch in DICS Main is not in center position.
2	Input	Driver side seatbelt switch	Unfasten	GND	Fastened	12 V	1. Switch signal checks the driver side seatbelt has been fastened 2. Ground level when unfastened 3. Battery level when fastened
3	Input	Tail lamp switch	OFF	12 V	ON	GND	1. Switch that turns ON or OFF tail lamp switch 2. Battery level when tail lamp switch is OFF 3. Ground level when tail lamp switch is ON
4	Input	Trunk lid open switch	Close	GND	Open	12 V	1. When equipped with PTL, no input data is transmitted from trunk lid open switch to STICS 2. Battery level when open 3. Ground level when close
5	Input	Front left door open switch	Close	12 V	Open	GND	1. Ground level when door is open 2. Battery level when door is close
6	Input	Front right door open switch	Close	12 V	Open	GND	1. Ground level when door is open 2. Battery level when door is close
7	Input	Rear door knob switch	Open	GND	Close	12 V	1. Operating conditions <ul style="list-style-type: none"> When the central door lock and unlock function is in operation When the doors are locked by the driver's door lock knob When receiving signal from DICS via CAN communication in auto door lock/unlock operation at vehicle speed of 50 km/h. 2. Ground level when rear door knob is open 3. Battery level when rear door knob is close
8	Input	Rear right door open switch	Close	12 V	Open	GND	1. Ground level when door is open 2. Battery level when door is close
9	Input	Parking brake switch	Not operating	12 V	Operating	GND	1. Switch detects the parking brake engagement 2. Ground level when parking brake is engaged 3. Battery level when not operating
10	Input	Auto windshield wiper switch	OFF	12 V	ON	GND	1. Auto windshields wiper switch. No inputs to STICS when the vehicle is equipped with the rain sensor 2. Ground level when ON 3. Battery level when OFF
11	Input	Hood open switch	Close	12 V	Open	GND	1. Hood open detection switch 2. Ground level when open 3. Battery level when close

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No.	Input/ Output	Sensor value item	Information				Help
12	Input	Trunk unlock switch	Not operating	GND	Operating	12 V	1. Switch detects the trunk lid unlock from the glove compartment <ul style="list-style-type: none"> • With the power trunk: Communication between PTL and CAN • Without the power trunk: Controlled by STICS 2. OFF: GND 3. ON: 12 V
13	Input	Key reminder switch	Not detected	GND	Detected	12 V	1. Key reminder detection switch 2. Battery level when operating 3. Ground level when not operating
14	Input	KEY ACC switch	Not detected	GND	Detected	12 V	1. Key accessory detection switch 2. Battery level when operating 3. Ground level when not operating
15	Input	Alternator switch	Not detected	GND	Detected	12 V	1. Alternator charging detection switch 2. Battery level when operating 3. Ground level when not operating
16	Input	P/N switch	Not detected	GND	Detected	12 V	1. Parking (P) or neutral (N) position of A/T detection switch 2. Battery level when operating 3. Ground level when not operating
17	Input	IGN1 switch	Not detected	GND	Detected	12 V	1. Ignition 1 detection switch 2. Battery level when operating 3. Ground level when not operating
18	Input	IGN2 switch	Not detected	GND	Detected	12 V	1. Ignition 2 detection switch 2. Battery level when operating 3. Ground level when not operating
19	Input	Windshield Wiper position switch	Not detected	12 V	Detected	GND	1. Windshield wiper position switch detects the wiper position when the operation stops. With the rain sensor equipped vehicle, no inputs are transmitted to STICS 2. Ground level when in the original position (operating) 3. Battery level when not operating 4. Cannot detect when equipped with the rain sensor
20	Input	Tail lamp operation signal	No input	12 V	Input	GND	1. Tail lamp operation signal (monitoring) is the function that detects the auto light operation of the tail lamp 2. With signal input 3. Without signal input
21	Input	Central door lock switch	Not detected	12 V	Detected	GND	1. Locking door knob switch (Can be detected when the lock switch is in operation) 2. Battery level during door unlock 3. Ground level during door lock
22	Input	Central door unlock switch	Not detected	12 V	Detected	GND	1. Unlocking door knob switch (Can be detected when the unlock switch is in operation) 2. Battery level during door lock 3. Ground level during door unlock

No.	Input/ Output	Sensor value item	Information				Help
23	Input	Rear left door open switch	Close	12 V	Open	GND	1. Rear left door open switch 2. Ground level when door is open 3. Battery level when door is close
24	Input	Heating grid switch	Not detected	12 V	Detected	GND	1. Heating grid operation switch (Blink once when the switch is operated) 2. Battery level when not operating (OFF) 3. Ground level when operating (ON)
25	-	-	-	-	-	-	-
26	Input	Washer switch	OFF	GND	ON	12 V	1. Windshield washer operating switch When equipped with the rain sensor, no inputs are transmitted to STICS 2. Battery level when operating (ON) 3. Ground level when not operating (OFF)
27	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-
32		Armed mode operation	Operating	GND	Not operating	12 V	1. Informs on armed mode 2. Electrical signals cannot be found 3. Battery level when operating 4. Ground level when not operating
33	Output	Rear left P/WDW UP relay	Not operating	12 V	Operating	GND	1. Relay for raising the rear left power window (The value changes when it operates within DICS-Main) 2. Ground level when operating 3. Battery level when not operating
34	Output	Rear left P/WDW DN relay	Not operating	12 V	Operating	GND	1. Relay for lowering the rear left power window (The value changes when it operates within DICS-Main) 2. Ground level when operating 3. Battery level when not operating
35	Output	Rear right P/WDW UP relay	Not operating	12 V	Operating	GND	1. Relay for raising the rear right power window (The value changes when it operates within DICS-Main) 2. Ground level when operating 3. Battery level when not operating
36	Output	Rear right P/WDW DN relay	Not operating	12 V	Operating	GND	1. Relay for lowering the rear right power window (The value changes when it operates within DICS-Main) 2. Ground level when operating 3. Battery level when not operating
37	Output	Driver side door lock relay	Not operating	12 V	Operating	GND	1. Driver side door knob lock relay (Locks all doors) The value appears only when the relay is connected 2. Ground level when operating 3. Battery level when not operating

ECU-DSL

ECU-GSL

ECU-CDPF

TCU

BRAKE

AIR-BAG

TC

RK-STICS

FFH

RAIN SENSOR

FATC

TGS LEVER

P-TRUNK

CCCS

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No.	Input/ Output	Sensor value item	Information				Help
38	Output	All door lock other than driver side	Not operating	12 V	Operating	GND	1. All door knob lock relays other than the driver side The value appears only when the relay is connected 2. Ground level when operating 3. Battery level during normal
39	Output	Driver side door unlock relay	Not operating	12 V	Operating	GND	1. All door knob unlock relays (Cannot operate with driver side lock knob) The value appears only when the relay is connected 2. Ground level when operating 3. Battery level when not operating
40	Output	Windshield wiper relay	Not operating	GND	Operating	12 V	1. Windshield wiper operation switch When equipped with the rain sensor, no inputs are transmitted to STICS 2. Battery level when operating 3. Ground level when not operating
41	Output	Siren operation	Not operating	12 V	Operating	GND	1. Siren operation signal 2. Ground level when operating 3. Battery level when not operating
42	Output	Parking brake headlamp	Not operating	12 V	Operating	GND	1. Parking brake headlamp 2. Ground level when operating 3. Battery level when not operating
43	Output	Buzzer operation	Not operating	12 V	Operating	GND	1. Buzzer operation 2. Ground level when operating 3. Battery level when not operating
44	Output	Door open headlamp	Not operating	12 V	Operating	GND	1. Door open and driving warning 2. Ground level when operating 3. Battery level when not operating
45	Output	Heating grid relay	Not operating	12 V	Operating	GND	1. Heating grid operation relay drive output 2. Ground level when operating 3. Battery level when not operating
46	Output	Hazard warning relay	Operating	GND	Not operating	12 V	1. Heating grid operation relay drive output (Operates when in armed mode) 2. Ground level when operating 3. Battery level when not operating
47	Output	Tail lamp relay	Not operating	12 V	Operating	GND	1. Tail lamp relay drive output (Blink once when operating the tail lamp switch) 2. Ground level when operating 3. Battery level when not operating
48	-	-	-	-	-	-	-
49	Output	Front left foot lamp	Not operating		Operating		1. Driver side foot lamp (Operating value delays as per dimming time) 2. Pulse signal between the battery and ground when operating. → Refer to operation signal STICS specifications

No.	Input/Output	Sensor value item	Information				Help
50	Output	Front right foot lamp	Not operating		Operating		1. Passenger side foot lamp (Operating value delays as per dimming time) 2. Pulse signal between the battery and ground when operating. → Refer to operation signal STICS specifications
51	Output	Rear foot lamp	Not operating		Operating		1. Rear door foot lamp (Operating value delays as per dimming time) 2. Pulse signal between the battery and ground when operating. → Refer to operation signal STICS specifications
52	Output	Room lamp	Not operating		Operating		1. Room lamp (Operating value delays as per dimming time) 2. Pulse signal between the battery and ground when operating. → Refer to operation signal STICS specifications
53	Output	Rheostat lamp	Not operating		Operating		1. Brightness changes according to the rheostat volume when the tail lamp is turned on 2. Pulse signal between the battery and ground when operating. Pulse width may change by 20% ~ 100% (based on GND). → Refer to operation signal STICS specifications
54	Output	Fixed rate dimming control	Not operating		Operating		1. Fixed rate dimming light (Operating value changes periodically) 2. Pulse signal between the battery and ground when operating. Pulse width maintains 50% of the duty rate. → Refer to operation signal STICS specifications
55	-	-	-	-	-	-	-
56	-	-	-	-	-	-	-
57	-	-	-	-	-	-	-
58	Output	Current vehicle speed	A km/h				
59	Output	Dimming control	A %				Controls the dimming by 20 ~ 100%
60	Output	Windshield wiper operating resistance stages	A kohn				1. Windshield wiper volume value: 0 ~ 10 kΩ → Value between 0 ~ Vcc For the rain sensor equipped vehicle, no inputs are transmitted to STICS
61	Output	Intermittent time	A · 10 ms				1. The unit time of the windshield wiper intermittent intervals For the rain sensor equipped vehicle, no inputs are transmitted to STICS

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DIAGNOSIS OF MAIN DICS

Code	Malfunction	Help
0 X 21	Power window limiter switch open	<ul style="list-style-type: none"> - The inputs have more than 30 edge hall pulses under the limiter switch off recognized as the upper position condition during the power window up or down outputs - Check the limiter switch - Check the sensor values <ul style="list-style-type: none"> • Power window anti-trap (DICS-Main: No. 50) • Power window limiter switch (DICS-Main: No. 56)
0 X 22	Defective power window motor hall sensor	<ul style="list-style-type: none"> - When the power window motor is under load, the auto-stop orders the power window to disengage auto-up function regardless ON or OFF inputs (no pulse signals) - No inputs of hall pulse exceeding 700 milliseconds during the power window motor down outputs under the limiter switch OFF (the upper position of the window) conditions or no inputs of pulse exceeding 100 milliseconds during the up outputs under the limit switch ON (the lowest position of the window) conditions. - Replace the power window motor
0 X 23	Inactive key door lock actuator	<ul style="list-style-type: none"> - Check the driver side door actuator - Check the sensor value <ul style="list-style-type: none"> • Key lock (DICS-Main: No. 32)
0 X 24	Inactive key door unlock actuator	<ul style="list-style-type: none"> - Check the driver side door actuator <ul style="list-style-type: none"> • Check the method of the actuator operation - Check the sensor value <ul style="list-style-type: none"> • Key unlock (DICS-Main: No. 31)
0 X 25	Memory switch input during no mirror UP or DN input	<ul style="list-style-type: none"> - When the outside rearview mirror has no UP or DOWN sensor values, DICS-Main recognizes and disables the vehicle memory function. However, when the memory input has detected, it means the sensor is open-circuited or has different mirror has been installed. - Check the outside rearview mirror UP or DOWN sensor wires - Measure sensor values and check the accordance position <ul style="list-style-type: none"> • Internal DOWN switch of the outside rearview mirror (DICS-Main: No. 21) • Internal UP switch of the outside rearview mirror (DICSMain:No. 22) • Internal DOWN motor of the outside rearview mirror (DICS-Main: No. 37) • Internal UP motor of the outside rearview mirror (DICSMain:No. 38) • Internal sensor of the outside rearview mirror (DICS-Main: No. 49) • Internal operation of the outside rearview mirror (DICSMain:No. 53)
0 X 26	Memory switch input during no mirror LT or RT input	<ul style="list-style-type: none"> - When the outside rearview mirror has no LEFT or RIGHT sensor values, DICS-Main recognizes and disables the vehicle memory function. However, when the memory input has detected, it means the sensor is open-circuited or has different mirror has been installed. - Check the outside rearview mirror LEFT or RIGHT sensor wires. - Measure the sensor values and check the relevant position <ul style="list-style-type: none"> • Internal RIGHT switch of the outside rearview mirror (DICS-Main: No. 19) • Internal LEFT switch of the outside rearview mirror (DICSMain: No. 20) • Internal RIGHT motor of the outside rearview mirror (DICSMain: No. 35) • Internal LEFT motor of the outside rearview mirror (DICSMain: No. 36) • Internal sensor of the outside rearview mirror (DICS-Main: No. 49) • Internal operation of the outside rearview mirror (DICSMain: No. 53)
0 X 27	Defective auto-stop	<ul style="list-style-type: none"> - The window does not lower to the certain range when autostop is detected during the driver side window auto-up operation. - Check the power window motor wires - Measure the sensor values and check the relevant position <ul style="list-style-type: none"> • Power window anti-trap (DICS-Main: No. 50) • Replace the power window motor

► Main DICS Input/Output Monitoring Data

No.	Input/Output	Sensor value item	Information				Help
1	Input	Rear left P/WDW UP S/W	Not operating		Operating		1. Switch the input signal to raise the rear left window 2. Internal input 3. Input signal transmits to STICS through CAN
2	Input	Front right P/WDW DN S/W	Not operating		Operating		1. Switch the input signal to lower the passenger's window 2. Internal input 3. Input signal transmits to DICS-Sub through CAN
3	Input	Front right P/WDW AUTO DN S/W	Not detected		Detected		1. Switch the input signal to lower the passenger's window automatically 2. Internal input 3. Input signal transmits to DICS-Sub through CAN
4	Input	Front right P/WDW UP S/W	Not operating		Operating		1. Switch the input signal to raise the passenger's window 2. Internal input 3. Input signal transmits to DICS-Sub through CAN
5	Input	Front left P/WDW DN S/W	Not operating		Operating		1. Switch the input signal to lower the driver side window 2. Internal input 3. DICS-Main has direct drive circuit
6	Input	Front left P/WDW AUTO DN S/W	Not detected		Detected		1. Switch the input signal to lower the driver side window automatically 2. Internal input 3. MICOM drives based on the signal
7	Input	Front left P/WDW UP S/W	Not operating		Operating		1. Switch input signal to raise the driver side window 2. Internal input 3. DICS-Main has direct drive circuit
8	Input	Front left P/WDW AUTO UP S/W	Not operating		Operating		1. Switch input signal to raise the driver side window automatically (operates only when the engine is running) 2. Internal input 3. MICOM drives based on the signal 4. When the obstruction is found (detects as hall pulse signal), the auto-stop engages the window to be lowered by 150 mm from its position
9	Input	Detecting driver's P/WDW detention	Not detected		Detected		1. Input signal of the motor protection is engaged by cutting the motor output when detects the increasing in currency when the motor is stopped at the lowest position of the driver side's window 2. Internal input
10	Input	Detecting 3 km/h of vehicle speed	Not detected		Detected		1. Input signal coming from STICS 2. Outside rearview mirrors will not fold when the signal comes on while outside rearview mirror is folding.

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No.	Input/ Output	Sensor value item	Information				Help
11	Input	The driver side window status (limit switch)	Closed		Open		<ol style="list-style-type: none"> 1. A signal that informs when the driver side window is opened. 2. When the window is at upper position, it is OFF (close) and when it's not in upper position by lowering, it is ON (open). 3. VCC 5 V level when window is opened: Operating 4. Ground level when window is closed: Not operating
12	Input	Easy access switch	Not operating		Operating		<ol style="list-style-type: none"> 1. The steering column and electrical seat moves automatically during riding ON or OFF when this signal is ON. 2. Internal input 3. Input signal transmits to ESIMS and MSDOS through CAN
13	Input	P/WDW lock switch	Not operating		Operating		<ol style="list-style-type: none"> 1. Only the driver side window is operational when this signal is ON. 2. Internal input 3. Input signal transmits to STICS and DICS Sub through CAN
14	Input	Rear right P/WDW DN S/W	Not operating		Operating		<ol style="list-style-type: none"> 1. Switch input signal to lower the rear right window 2. Internal input 3. Input signal transmits to STICS through CAN
15	Input	Rear right P/WDW UP S/W	Not operating		Operating		<ol style="list-style-type: none"> 1. Switch input signal to raise the rear right window 2. Internal input 3. Input signal transmits to STICS through CAN
16	Input	Rear left P/WDW DN S/W	Not operating		Operating		<ol style="list-style-type: none"> 1. Switch input signal to lower the rear left window 2. Internal input 3. Input signal transmits to STICS through CAN
17	Input	Passenger side outside rearview mirror selection switch	Not detected		Detected		<ol style="list-style-type: none"> 1. Signal that operates the driver side mirror, passenger side mirror and inside rearview mirror has selected the passenger side outside rearview mirror 2. Internal input 3. The signal transmits to DICS SUB and ESIMS through CAN
18	Input	Driver side outside rearview mirror selection switch	Not detected		Detected		<ol style="list-style-type: none"> 1. Signal that operates the driver side mirror, passenger side mirror and inside rearview mirror has selected the passenger side outside rearview mirror 2. Internal input 3. When both left and right mirror selection signals are OFF, the signal selects inside rearview mirror and then ESIMS controls the inside rearview mirror 4. The signal transmits to DICS SUB and ESIMS through CAN

No.	Input/Output	Sensor value item	Information				Help
19	Input	Driver side outside rearview mirror right-turn switch	Not operating		Operating		1. Switch input to raise the mirror toward right 2. Internal input 3. This signal transmits to DICS SUB and ESIMS through CAN
20	Input	Driver side outside rearview mirror left-turn switch	Not operating		Operating		1. Switch input to move the mirror toward left 2. Internal input 3. This signal transmits to DICS SUB and ESIMS through CAN
21	Input	Driver side outside rearview mirror down switch	Not operating		Operating		1. Switch input to lower the mirror 2. Internal input 3. This signal transmits to DICS SUB through CAN
22	Input	Driver side outside rearview mirror up switch	Not operating		Operating		1. Switch input to raise the mirror upward 2. Internal input 3. This signal transmits to DICS SUB through CAN
23	Input	Driver side outside rearview mirror unfolding switch	Not operating		Operating		1. Switch input to unfold the mirror 2. Internal input 3. This signal transmits to DICS SUB through CAN
24	Input	Driver side outside rearview mirror folding switch	Not operating		Operating		1. Switch input to fold the mirror 2. Internal input 3. This signal transmits to DICS SUB through CAN
25	Input	Memory switch 3	Not detected		Detected		1. Signal that selects No. 3 memory position 2. When the memory switch is pressed for more than 2 seconds under P/N signal ON condition, MSDOS receives memorized position of the mirror through CAN and then moves the mirror to memorized position. 3. When the memory position switch is pressed after memory set switch input under the P/N signal ON condition, the current position value of the mirror (sensor value) transmits to MSDOS 4. Analog input when operating (about 3.8V) 5. VCC 5V when not operating
26	Input	Memory switch 2	Not detected		Detected		1. Signal that selects number 2 memory position 2. Analog input when operating (about 2.4V) 3. VCC 5V level when not operating
27	Input	Memory switch 1	Not detected		Detected		1. Signal that selects number 1 memory position 2. Analog input when operating (about 1.3V) 3. VCC 5 V level when not operating
28	Input	Memory stop switch	Not detected		Detected		1. Switch signal to stop the memory return 2. Ground level when operating 3. VCC 5 V level when not operating
29	Input	Memory SET switch	Not detected		Detected		1. Switch input to store the positions of the memory related mechanisms. When one of the memory switch among 3 is pressed after this signal, position value of the outside rear-view mirrors will be transmitted to MSDOS through CAN 2. Analog input when operating (about 0V) 3. VCC 5 V level when not operating

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No.	Input/ Output	Sensor value item	Information				Help
31	Input	Driver side door key unlock	Not operating		Operating		1. ON when the driver side door key fob is unlocked 2. Ground level when operating 3. VCC 5 V level when not operating
32	Input	Driver side door key lock	Not operating		Operating		1. ON when the driver side door key fob is locked 2. Ground level when operating 3. VCC 5 V level when not operating
33	Output	Driver side outside rearview mirror unfolding motor	Not operating		Operating		1. Unfolding operation of the driver side outside rearview mirror motor 2. Battery level when operating 3. Ground level when not operating
34	Output	Driver side outside rearview mirror folding motor	Not operating		Operating		1. Folding operation of the driver side outside rearview mirror motor 2. Battery level when operating 3. Ground level when not operating
35	Output	Driver side outside rearview mirror right-turn motor	Not operating		Operating		Operates the driver side outside rearview mirror motor toward right
36	Output	Driver side outside rearview mirror left-turn motor	Not operating		Operating		Operates the driver side outside rearview mirror motor toward left
37	Output	Driver side outside rearview mirror down motor	Not operating		Operating		Operates the driver side outside rearview mirror motor down
38	Output	Driver side outside rearview mirror up motor	Not operating		Operating		Operates the driver side outside rearview mirror motor up
39	Output	Driver side P/WDW DN MTR	Not operating		Operating		1. Driver side power window motor down 2. Battery level when operating 3. Ground level when not operating
40	Output	Driver side P/WDW UP MTR	Not operating		Operating		1. Driver side power window motor up 2. Battery level when operating 3. Ground level when not operating
41	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-
43	Output	Memory LED	Not operating		Operating		1. Indicates when the LED lamp blinks during the memory set or when the return operation is ON 2. 2 V level when operating 3. Ground level when not operating
44	Output	Output power (5V)	Not operating		Operating		1. 5 V of power supplies each of the power window switch, outside rearview mirror sensor and power window motor hall sensor 2. 5 V level when operating 3. Ground level when not operating
45	Output	Driver side outside rearview mirror operating power	Not operating		Operating		1. Supplying power for the mirror LED lamp 2. 5 V level when operating 3. Ground level when not operating
46	Output	Easy access LED	Not operating		Operating		1. LED lamp turns on when easy access switch is pressed and turns off when pressed again.

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No.	Input/Output	Sensor value item	Information				Help
47	Output	Driver side P/WDW S/W LED					1. LED lamp for power window switch illumination
48	Output	Driver side P/WDW LOCK S/W LED					1. LED lamp turns on when the window lock button is pressed and turns off when pressed again.
49	Status	Yes or No of the driver side outside rearview mirror sensor					1. ON when the driver side outside rearview mirror has no sensor detected or sensor is open-circuited
50	Status	Anti-trap operation status					1. Anti-trap activates when the obstruction is found during auto-up operation of the driver side power window with ignition ON.
51	Status	Side rearview mirror time lag					1. Indicates the outside rearview mirror can be controlled for a certain period of time after ignition key has been removed.
52	Status	Power window time lag					1. Indicates the power window can be controlled for a certain period of time after ignition key has been removed.
53	Status	Possibility of the side rearview mirror operation					1. Indicates the mirror can be controlled when ignition key is in ACC or IGN 1 or when mirror is in time lag
54	Status	Possibility of the power window operation					1. Indicates the power windows can be controlled when ignition key is in IGN 1 or when power windows is in time lag
55	Status	Hall sensor malfunction					1. When the signal coming from a hall sensor in the power window is abnormal
56	Status	Limit switch malfunction					1. When the signal coming from a limit switch in the power window regulator is abnormal
57	Input (CAN)	Armed mode operation state					1. Receives the signal from STICS when the vehicle enters the armed mode by REKES by locking the door. REKES linked power window and outside rearview mirror operation is possible only under the armed status.
58	Input (CAN)	Key ACC power					1. Ignition key ACC status receives from STICS
59	Input (CAN)	IGN 2 power					1. Ignition key IGN 2 status receives from STICS
60	Input	IGN 1 power					1. Ignition key IGN 1 status receives from STICS or DICS receives directly
61	Input (CAN)	Alternator operation status					1. Status of the engine under starting receives from STICS
62	Input (CAN)	Key reminder switch					1. Receives from STICS and indicates when the ignition key is inserted
63	Input (CAN)	Input status of the P/N signals					1. Receives from STICS and indicates the P/N status of transmission
64	Input (CAN)	Input status of the reverse signal					1. Receives from STICS and indicates the reverse status of transmission
65	Input	Lateral sensor value of the driver side outside rearview mirror (HI)	Sensor value (increase or decrease by 1)				1. Vertical sensor upper value of the outside rearview mirror 2. Sensor value when turned right: Increase 3. Sensor value when turned left: Decrease

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No.	Input/ Output	Sensor value item	Information	Help
66	Input	Lateral sensor value of the driver side outside rearview mirror (LOW)	Sensor value [value changes within 8 bit (1~255)]	1. Vertical sensor upper value of the outside rearview mirror 2. Sensor value when turned right: Increase 3. Sensor value when turned left: Decrease * HI value increases or decreases by 1 if exceeded 8 bit (1~255)
67	Input	Vertical sensor value of the driver side outside rearview mirror (HI)	Sensor value (increase or decrease by 1)	1. Lateral sensor upper value of the outside rearview mirror 2. Sensor value when moved up: Increase 3. Sensor value when moved down: Decrease
68	Input	Vertical sensor value of the driver side outside rearview mirror (LOW)	Sensor value [value changes within 8 bit (1~255)]	1. Lateral sensor upper value of the outside rearview mirror 2. Sensor value when moved up: Increase 3. Sensor value when moved down: Decrease * HI value increases or decreases by 1 when exceeds 8 bit (1~255)
69	Input	Software version		Indicates current software version

DIAGNOSIS OF SUB DICS

Code	Malfunction	Help
0 X 07	Operates when power window is locked	<ul style="list-style-type: none"> - When the power window is locked, the window can be operated from the passenger side. (Passenger switch input during the control by DICS-Main while power window is locking) - Defective CAN communication
0 X 08	Door lock key actuator does not operate	<ul style="list-style-type: none"> - Check the passenger side door actuator <ul style="list-style-type: none"> • Check the method of actuator operation status - Check the sensor value <ul style="list-style-type: none"> • Key lock (DICS-Sub: No. 5)
0 X 09	Door unlock key actuator does not operate	<ul style="list-style-type: none"> - Check the passenger side door actuator <ul style="list-style-type: none"> • Checking the method of actuator operation status - Check the sensor value <ul style="list-style-type: none"> • Key unlock (DICS-Sub: No. 4)
0 X 0A	No mirror UP or DN inputs correspondence to the memory switch inputs	<ul style="list-style-type: none"> - When the outside rearview mirror has no UP or DOWN sensor values, DICS-Main recognizes and disables the vehicle memory function. However, when the memory input has detected, it means the sensor is open-circuited or has different mirror has been installed. - Check the outside rearview mirror UP or DOWN sensor wires - Measure the sensor values and check the relevant position <ul style="list-style-type: none"> • Internal DOWN motor of the outside rearview mirror (DICS-Sub: No. 13) • Internal UP motor of the outside rearview mirror (DICS-Sub: No. 14) • Internal sensor of the outside rearview mirror (DICS-Sub: No. 44)
0 X 0B	No mirror LEFT or RIGHT inputs correspondence to the memory switch inputs	<ul style="list-style-type: none"> - When the outside rearview mirror has no LEFT or RIGHT sensor values, DICS-Main recognizes and disables the vehicle memory function. However, when the memory input has detected, it means the sensor is open-circuited or has different mirror has been installed. - Check the outside rearview mirror LEFT or RIGHT sensor wires - Measure the sensor values and check the relevant position <ul style="list-style-type: none"> • Internal RIGHT motor of the outside rearview mirror (DICS-Sub: No. 11) • Internal LEFT motor of the outside rearview mirror (DICS-Sub: No. 12) • Internal sensor of the outside rearview mirror (DICS-Sub: No. 17)

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► Sub DICS Input / Output Data

No.	Input/Output	Sensor value item	Information				Help
1	Input	Detecting passenger side P/WDW detention	Not operating		Operating		1. Input signal for the motor protection is transmitted. The motor output detects increasing current when the motor is stopped at the lowest position of the passenger side window. 2. Internal input
2	-	-	-	-	-	-	-
3	Input	Passenger side door lock knob	Not operating		Operating		1. Status of the door lock actuator monitors ring switch on(passenger side) door trim 2. Ground level when the lock is detected 3. VCC 5V level when the unlock is detected
4	Input	Passenger side door key unlock	Not operating		Operating		1. ON when the passenger side door key fob is unlocked 2. Ground level when operating (unlock) 3. VCC 5V level when not operating (lock)
5	Input	Passenger side door key lock	Not operating		Operating		1. ON when the passenger side door key fob is locked 2. Ground level when operating 3. VCC 5V level when not operating
6	Input	Front left P/WDW DN S/W	Not detected		Detected		1. Switch input signal to lower the passenger side window 2. DICS SUB drives directly with the circuit
7	Input	Front right P/WDW auto DN S/W	Not detected		Detected		1. Switch input signal to lower the passenger side window automatically 2. MICOM drives directly according to the above signal
8	Input	Front right P/WDW UP S/W	Not detected		Detected		1. Switch input signal to raise the passenger side window 2. DICS SUB drives directly with the circuit
9	Output	Passenger side outside rearview mirror unfolding MTR	Not detected		Detected		1. Motor operates the passenger side's outside rearview mirror to unfold
10	Output	Passenger side outside rearview mirror folding MTR	Close		Open		1. Motor operates the passenger side's outside rearview mirror to fold
11	Output	Passenger side outside rearview mirror left-turn MTR	Not operating		Operating		1. Motor operates the passenger side's outside rearview mirror towards right
12	Output	Passenger side outside rearview mirror right-turn MTR	Not operating		Operating		1. Motor operates the passenger side's outside rearview mirror towards left
13	Output	Passenger side outside rearview mirror down MTR	Not operating		Operating		1. Motor operates the passenger side's outside rearview mirror down
14	Output	Passenger side outside rearview mirror up MTR	Not operating		Operating		1. Motor operates the passenger side's outside rearview mirror up
15	Output	Passenger side P/WDW down MTR	Not operating		Operating		1. Passenger side's power window motor down 2. Battery level when operating 3. Ground level when not operating

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No.	Input/ Output	Sensor value item	Information				Help
16	Output	Passenger side P/ WDW up MTR	Not operating		Operating		1. Passenger side's power window motor up 2. Battery level when operating 3. Ground level when not operating
17	State	Yes or No of the passenger side outside rearview mirror sensor	Yes		No		1. ON when the passenger side's outside rearview mirror has no sensor or sensor is open-circuited
18	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-
20	Output	Output power (5V) VDD	Not operating		Operating		1. 5 V is supplied to the power window switch and outside rearview mirror sensor 2. 5 V of level when operating 3. Ground level when not operating
21	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-
23	Output	Passenger side P/ WDW SW LED Lamp	Not operating		Operating		1. LED lamp for the power window switch illu- mination (Value changes when the window is locked)
24	-	-	-	-	-	-	-
25	Input	Lateral sensor value of the driver side outside rearview mirror (HI)	Sensor value (increase or decrease by 1)				1. Lateral sensor upper value of the outside rearview mirror Sensor value when moves up: Increase Sensor value when moves down: Decrease
26	Input	Lateral sensor value of the driver side outside rearview mirror (LOW)	Sensor value [value changes within 8 bit (1~255)]				1. Lateral sensor lowers value of the outside rearview mirror Sensor value when moves up: Increase Sensor value when moves down: Decrease
27	Input	Vertical sensor value of the driver side outside rearview mirror (HI)	Sensor value (increase or decrease by 1)				1. Vertical sensor raises value of the outside rearview mirror Sensor value when turns right: Increase Sensor value when turns left: Decrease
28	Input	Vertical sensor value of the driver side outside rearview mirror (LOW)	Sensor value [value changes within 8 bit (1~255)]				1. Vertical sensor raises value of the outside rearview mirror Sensor value when turns right: Increase Sensor value when turns left: Decrease
29	Input	Software version					Indicates the current software version

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DIAGNOSIS OF MS-DOS

Code	Malfunction	Help
0 X 61	Defective driver side seat sliding	<ul style="list-style-type: none"> MSDOS continuously monitors the sensor values when the driver operates the seat sliding switch or when the memory return is in action. When the seat sliding operation is engaged but the sensor value remains unchanged, the seat motor sensor may be malfunction. <div> NOTE <ul style="list-style-type: none"> When it's operated continuously at the seat stall position, it can be recognized as an error and the motor may not respond. You should erase the stored errors then test the seat at the mid position. </div> <ul style="list-style-type: none"> Measure the sensor values and check the relevant position Driver side seat slides-backward (MSDOS sensor value: No. 7) Driver side seat slides-forward (MSDOS sensor value: No. 8) Driver side seat backward slide motor (MSDOS sensor value: No. 15) Driver side seat forward slide motor (MSDOS sensor value: No. 16)
0 X 62	Defective driver side seat tilting	<ul style="list-style-type: none"> MSDOS continuously monitors the sensor values when the driver operates the seat tilting or the memory return is in motion. When the seat tilting operation is engaged but the sensor value remains unchanged, the seat motor sensor may be malfunction. <div> NOTE <ul style="list-style-type: none"> When it's operated continuously at the seat stall position, it can be recognized as an error and the motor may not respond. You should erase the stored errors then test the seat at the mid position. </div> <ul style="list-style-type: none"> Measure the sensor values and check the relevant position Driver side seat tilt-down (MSDOS sensor value: No. 5) Driver side seat tilt-up (MSDOS sensor value: No. 6) Driver side seat tilt-down motor (MSDOS sensor value: No. 13) Driver side seat tilt-up motor (MSDOS sensor value: No. 14)
0 X 63	Defective driver side seat height adjustment	<ul style="list-style-type: none"> MSDOS continuously monitors the sensor values when the driver operates the seat height adjustment or the memory return is in motion. When the seat height adjustment operation is engaged but the sensor value remains unchanged, the seat motor sensor may be malfunction. <div> NOTE <ul style="list-style-type: none"> When it's operated continuously at the seat stall position, it can be recognized as an error and the motor may not respond. You should erase the stored errors then test the seat at the mid position. </div> <ul style="list-style-type: none"> Measure the sensor values and check the relevant position Driver side seat height-lowers (MSDOS sensor value: No. 3) Driver side seat height-raises (MSDOS sensor value: No. 4) Driver side seat height-lowering motor (MSDOS sensor value: No. 11) Driver side seat height-raising motor (MSDOS sensor value: No. 12)

Code	Malfunction	Help
0 X 64	Defective driver side seatback angle adjustment	<ul style="list-style-type: none"> MSDOS continuously monitors the sensor values when the driver operates the seat reclining or the memory return is in motion. When the seat recline operation is engaged but the sensor value remains unchanged, the seat motor sensor may be malfunction. <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>NOTE</p> <ul style="list-style-type: none"> When it's operated continuously at the seat stall position, it can be recognized as an error and the motor may not respond. You should erase the stored errors then test the seat at the mid position. </div> <ul style="list-style-type: none"> Measure the sensor values and check the relevant position Driver side seatback angle-declination (MSDOS sensor value: No. 1) Driver side seatback angle-inclination (MSDOS sensor value: No. 2) Driver side seatback angle-declination motor (MSDOS sensor value: No. 10) Driver side seatback angle-inclination motor (MSDOS sensor value: No. 11)
0 X 65	No position data input from DICSMain	<ul style="list-style-type: none"> When MSDOS sends memory setting order, all DICS_MAIN, DICS-SUB and ESIMS send the position data to MSDOS. If no position data has received from DICS_MAIN, then it will be recognized as an error. Input data from a respective unit when resetting the memory switch Check CAN communication between DICS_MAIN and MSDOS
0 X 66	No position data input from DICSSub	<ul style="list-style-type: none"> When MSDOS sends memory setting order, all DICS_MAIN, DICS-SUB and ESIMS send the position data to MSDOS. If no position data has received from DICS_MAIN, then it will be recognized as an error. Input data from a respective unit when resetting the memory switch Check CAN communication between DICS_SUB and MSDOS
0 X 67	No position data input from ESIMS	<ul style="list-style-type: none"> When MSDOS sends memory setting order, all DICS_MAIN, DICS-SUB and ESIMS send the position data to MSDOS. If no position data has received from DICS_MAIN, then it will be recognized as an error. Input data from a respective unit when resetting the memory switch Check CAN communication between ESIMS and MSDOS
0 X 68	No return data input from DICS-Main	<ul style="list-style-type: none"> During the memory return, DICS_MAIN, DICS-SUB and ESIMS send the memory return operation signals continuously through CAN communication. MSDOS recognizes malfunction and then determines as an error when no data has been received from DICS_MAIN during the memory return. Input data from a respective unit when operating the memory switch Check CAN communication between DICS_MAIN and MSDOS During the memory return, DICS_MAIN, DICS-SUB and ESIMS send the memory return operation signals continuously through CAN communication. MSDOS recognizes malfunction and then determines as an error when no data has been received from DICS_MAIN during the memory return.
0 X 69	No return data input from DICS-Sub	<ul style="list-style-type: none"> Input data from a respective unit when operating the memory switch Check CAN communication between DICS_SUB and MSDOS During the memory return, DICS_MAIN, DICS-SUB and ESIMS send the memory return operation signals continuously through CAN communication. MSDOS recognizes malfunction and then determines as an error when no data has been received from ESIMS during the memory return.
0 X 70	No return data input from ESIMS	<ul style="list-style-type: none"> Input data from a respective unit when operating the memory switch Check CAN communication between ESIMS and MSDOS

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► MSDOS Input / Output Data

No.	Input/ Output	Sensor value item	Information				Help
1	Input	Driver side seatback reverse switch	Not operating	Vcc	Operating	GND	<ul style="list-style-type: none"> • A driver operates the seat recliner (seatback angle adjustment) switch backward • Ground level when operating • Vcc level when not operating
2	Input	Driver side seatback forward switch	Not operating	Vcc	Operating	GND	<ul style="list-style-type: none"> • A driver operates the seat recliner (seatback angle adjustment) switch forward • Ground level when operating • Vcc level when not operating
3	Input	Driver side seat height down switch	Not operating	Vcc	Operating	GND	<ul style="list-style-type: none"> • A driver operates the seat height (rear part of the seat bottom) adjustment switch downward • Ground level when operating • Vcc level when not operating
4	Input	Driver side seat height up switch	Not operating	Vcc	Operating	GND	<ul style="list-style-type: none"> • A driver operates the seat height (rear part of the seat bottom) adjustment switch upward • Ground level when operating • Vcc level when not operating
5	Input	Driver side seat tilt-down switch	Not operating	Vcc	Operating	GND	<ul style="list-style-type: none"> • A driver operates the seat tilting (front part of the seat bottom) switch downward • Ground level when operating • Vcc level when not operating
6	Input	Driver side seat tilt-up switch	Not operating	Vcc	Operating	GND	<ul style="list-style-type: none"> • A driver operates the seat tilting (front part of the seat bottom) switch upward • Ground level when operating • Vcc level when not operating
7	Input	Driver side seat slide-backward switch	Not operating	Vcc	Operating	GND	<ul style="list-style-type: none"> • A driver operates the seat slide switch backward • Ground level when operating • Vcc level when not operating
8	Input	Driver side seat slide-forward switch	Not operating	Vcc	Operating	GND	<ul style="list-style-type: none"> • A driver operates the seat slide switch forward • Ground level when operating • Vcc level when not operating
9	Input	Driver side seatback declining MTR	Not operating	GND	Operating	12 V	<ul style="list-style-type: none"> • When the recliner (seatback) is moving backward • Battery level when operating • Ground level when not operating <p>However, when the recliner motor is operated by the driver side switch operation, this information does not appear on the ECU. It is because the switch drives the motor directly. For more information, go to "Easy access and memory switch operation" where ECU internal software drives the motor directly.</p>

No.	Input/ Output	Sensor value item	Information				Help
10	Output	Driver side seatback inclining MTR	Not operating	GND	Operating	12 V	<ul style="list-style-type: none"> When the recliner (seatback) is moving forward Battery level when operating Ground level when not operating <p>However, when the recliner motor is operated by the driver side switch operation, this information does not appear on the ECU. It is because the switch drives the motor directly. For more information, go to "Easy access and memory switch operation" where ECU internal software drives the motor directly.</p>
11	Output	Driver side seat height down MTR	Not operating	GND	Operating	12 V	<ul style="list-style-type: none"> When the seat height adjustment (rear part of the seat bottom) is moving downward Battery level when operating Ground level when not operating <p>However, when the recliner motor is operated by the driver side switch operation, this information does not appear on the ECU. It is because the switch drives the motor directly. For more information, go to "Easy access and memory switch operation" where ECU internal software drives the motor directly.</p>
12	Output	Driver side seat height up MTR	Not operating	GND	Operating	12 V	<ul style="list-style-type: none"> When the seat height adjustment (rear part of the seat bottom) is moving upward Battery level when operating Ground level when not operating <p>However, when the recliner motor is operated by the driver side switch operation, this information does not appear on the ECU. It is because the switch drives the motor directly. For more information, go to "Easy access and memory switch operation" where ECU internal software drives the motor directly.</p>
13	Output	Driver side seat tilt-down MTR	Not operating	GND	Operating	12 V	<ul style="list-style-type: none"> When the seat tilts (front part of the seat bottom) downward Battery level when operating Ground level when not operating <p>However, when the recliner motor is operated by the driver side switch operation, this information does not appear on the ECU. It is because the switch drives the motor directly. For more information, go to "Easy access and memory switch operation" where ECU internal software drives the motor directly.</p>

ECU-DSL

ECU-GSL

ECU-CDPF

TCU

BRAKE

AIR-BAG

T C

RK-STICS

FFH

RAIN SENSOR

FATC

TGS LEVER

P-TRUNK

CCCS

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No.	Input/ Output	Sensor value item	Information				Help
14	Output	Driver side seat tilt-up MTR	Not operating	GND	Operating	12 V	<ul style="list-style-type: none"> When the seat tilts (front part of the seat bottom) upward Battery level when operating Ground level when not operating <p>However, when the recliner motor is operated by the driver side switch operation, this information does not appear on the ECU. It is because the switch drives the motor directly. For more information, go to "Easy access and memory switch operation" where ECU internal software drives the motor directly.</p>
15	Output	Driver side seat slide-backward MTR	Not operating	GND	Operating	12 V	<ul style="list-style-type: none"> When the seat (forward/backward movement of seat) slides backward Battery level when operating Ground level when not operating <p>However, when the recliner motor is operated by the driver side switch operation, this information does not appear on the ECU. It is because the switch drives the motor directly. For more information, go to "Easy access and memory switch operation" where ECU internal software drives the motor directly.</p>
16	Output	Driver side seat slide-forward MTR	Not operating	GND	Operating	12 V	<ul style="list-style-type: none"> When the seat (forward/backward movement of seat) slides forward Battery level when operating Ground level when not operating <p>However, when the recliner motor is operated by the driver side switch operation, this information does not appear on the ECU. It is because the switch drives the motor directly. For more information, go to "Easy access and memory switch operation" where ECU internal software drives the motor directly.</p>
17	Output	Driver side seat slide sensor value	Sensor value				<ul style="list-style-type: none"> Sensor value when seat slides (forward or backward movement of the seat) is moving Sensor value when moving forward: Increase Sensor value when moving backward: Decrease
18	Input	Driver side seat tilting sensor value	Sensor value				<ul style="list-style-type: none"> Sensor value when seat tilting (front part of the seat bottom) is moving Sensor value when moving upward: Increase Sensor value when moving downward: Decrease
19	Input	Driver side seat height sensor value	Sensor value				<ul style="list-style-type: none"> Sensor value when seat height (rear part of the seat bottom) is moving Sensor value when moving upward: Increase Sensor value when moving downward: Decrease
20	Input	Driver side seatback sensor value	Sensor value				<ul style="list-style-type: none"> Sensor value when seat recliner (seatback) is moving Sensor value when moving forward: Increase Sensor value when moving backward: Decrease

DIAGNOSIS OF ESIMS

Code	Malfunction	Help
0 X 81	Defective steering column tilt	<ul style="list-style-type: none"> - ESIMS continuously monitors the sensor values when the driver operates the steering column or the steering column is in motion. When the steering wheel column operation is engaged but the sensor value remains unchanged, the motor or the sensor may be malfunction. - Measure the sensor values and check the relevant position <ul style="list-style-type: none"> • Steering column tilt-up (ESIMS sensor value: No. 1) • Steering column tilt-down (ESIMS sensor value: No. 2) • Steering column tilt-up motor (ESIMS sensor value: No. 13) • Steering column tilt-down motor (ESIMS sensor value: No. 14)
0 X 82	Defective steering column telescope	<ul style="list-style-type: none"> - ESIMS continuously monitors the sensor values when the driver operates the steering column or the steering column is in motion. When the steering wheel column operation is engaged but the sensor value remains unchanged, the motor or the sensor may be malfunction. - Measure the sensor values and check the relevant position <ul style="list-style-type: none"> • Steering column tilt-up (ESIMS sensor value: No. 3) • Steering column tilt-down (ESIMS sensor value: No. 4) • Steering column tilt-up motor (ESIMS sensor value: No. 15) • Steering column tilt-down motor (ESIMS sensor value: No. 16)
0 X 83	Defective inside rearview mirror left or right movement	<ul style="list-style-type: none"> - ESIMS continuously monitors the sensor values when the driver adjusts the inside rearview mirror horizontally or the inside rearview mirror is in motion. When the inside rearview mirror horizontal operation is engaged but the sensor value remains unchanged, the motor or the sensor may be malfunction. <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>NOTE</p> <ul style="list-style-type: none"> • When it's operated continuously at the stall position, it can be recognized as an error and the motor may not respond. You should erase the stored errors then test the inside rearview mirror from the mid position. </div> <ul style="list-style-type: none"> - Measure the sensor values and check the relevant position <ul style="list-style-type: none"> • Inside rearview mirror moves right (ESIMS sensor value: No. 5) • Inside rearview mirror moves left (ESIMS sensor value: No. 6) • Inside rearview mirror left movement motor (ESIMS sensor value: No. 11) • Inside rearview mirror right movement motor (ESIMS sensor value: No. 12)
0 X 84	Defective inside rearview mirror up or down functions	<ul style="list-style-type: none"> - ESIMS continuously monitors the sensor values when the driver adjusts the inside rearview mirror vertically or the inside rearview mirror is in motion. When the inside rearview mirror vertical operation is engaged but the sensor value remains unchanged, the motor or the sensor may be malfunction. <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>NOTE</p> <ul style="list-style-type: none"> • When it's operated continuously at the stall position, it can be recognized as an error and the motor may not respond. You should erase the stored errors then test the inside rearview mirror from the mid position. </div> <ul style="list-style-type: none"> - Measure the sensor values and check the relevant position <ul style="list-style-type: none"> • Inside rearview mirror moves down (ESIMS sensor value: No. 7) • Inside rearview mirror moves up (ESIMS sensor value: No. 8) • Inside rearview mirror down movement motor (ESIMS sensor value: No. 10) • Inside rearview mirror up movement motor (ESIMS sensor value: No. 9)

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► ESIMS Input / Output Data

No.	Input/ Output	Sensor value item	Information				Help
1	Input	Steering wheel tilt-up switch	Not operating	Vcc	Operating	GND	1. A driver operates the tilt switch at the steering column upward 2. Ground level when operating 3. Vcc level when not operating
2	Input	Steering wheel tilt-down switch	Not operating	Vcc	Operating	GND	1. A driver operates the tilt switch at the steering column downward 2. Ground level when operating 3. Vcc level when not operating
3	Input	Steering wheel telescope up switch	Not operating	Vcc	Detected	GND	1. A driver operates the telescopic switch on the steering column toward extract 2. Ground level when operating 3. Vcc level when not operating
4	Input	Steering wheel telescope down switch	Not operating	Vcc	Operating	GND	1. A driver operates the telescopic switch on the steering column toward retract 2. Ground level when operating 3. Vcc level when not operating
5	Input	Inside rearview mirror right moving switch	Not operating	Vcc	Operating	GND	1. A driver presses the right side of the mirror operation switch when the mirror selector switch is in the neutral position (center) (at this moment, the mirror can be adjusted) 2. Ground level when operating 3. Vcc level when not operating 4. When this switch is detected, the mirror moves right (*Note: The mirror operates when the ignition switch is in ACC or other position) 5. Receives CAN data from DICS-Main
6	Input	Inside rearview mirror left moving switch	Not operating	Vcc	Detected	GND	1. A driver presses the left part of the mirror operation switch when the mirror selector switch is in center position (at this moment, the mirror can be adjusted) 2. Ground level when operating 3. Vcc level when not operating 4. When this switch is detected, the mirror moves left (*Note: The mirror operates when the ignition switch is in ACC or other position) 5. Receives CAN data from DICS-Main
7	Input	Inside rearview mirror down moving switch	Not operating	Vcc	Operating	GND	1. A driver presses the lower part of the mirror operation switch when the mirror selector switch is in center position (at this moment, the mirror can be adjusted) 2. Ground level when operating 3. Vcc level when not operating 4. When this switch is detected, the mirror tilts down (*Note: The mirror operates if ignition switch is in ACC or more) 5. Receives CAN data from DICS-Main
8	Input	Inside rearview mirror up moving switch	Not operating	Vcc	Operating	GND	1. A driver presses the upper part of the mirror operation switch when the mirror selector switch is in center position (at this moment, the mirror can be adjusted) 2. Ground level when operating 3. Vcc level when not operating 4. When this switch is detected, the mirror tilts up (*Note: The mirror operates if ignition switch is in ACC or more) 5. Receives CAN data from DICS-Main

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No.	Input/ Output	Sensor value item	Information				Help
9	Output	Inside rearview mirror up motor	Not operating	GND	Operating	12 V	1. When the mirror (motor for vertical movement) is moving upward 2. Battery level when operating 3. Ground level when not operating
10	Output	Inside rearview mirror down motor	Not operating	GND	Operating	12 V	1. When the mirror (motor for vertical movement) is moving downward 2. Battery level when operating 3. Ground level when not operating
11	Output	Inside rearview mirror left moving motor	Not operating	GND	Operating	12 V	1. When the mirror (motor for vertical movement) is moving downward 2. Battery level when operating 3. Ground level when not operating
12	Output	Inside rearview mirror right moving motor	Not operating	GND	Operating	12 V	1. When the mirror (motor for horizontal movement) is moving right side 2. Battery level when operating 3. Ground level when not operating
13	Output	Steering wheel tilt-up motor	Not operating	GND	Operating	12 V	1. When the tilt motor on the steering column is moving upward 2. Battery level when operating 3. Ground level when not operating
14	Output	Steering wheel tilt-down motor	Not operating	GND	Operating	12 V	1. When the tilt motor on the steering column is moving downward 2. Battery level when operating 3. Ground level when not operating
15	Output	Steering wheel telescope up MTR	Not operating	GND	Operating	12 V	1. When the telescopic motor on the steering column is moving towards the driver 2. Battery level when operating 3. Ground level when not operating
16	Output	Steering wheel telescope down MTR	Not operating	GND	Operating	12 V	1. When the telescopic motor on the steering column is moving away from the driver 2. Battery level when operating 3. Ground level when not operating
17	Input	Steering wheel column tilting sensor	Sensor value				1. Sensor value when the tilt motor on the steering column is moving up/down 2. Sensor value when moving up: Decrease 3. Sensor value when moving down: Increase
18	Input	Steering wheel column telescope sensor	Sensor value				1. Sensor value when the telescopic motor on the steering column is moving up/down 2. Sensor value when moving long extraction : Decrease 3. Sensor value when moving short retraction : Increase
19	Input	Inside rearview mirror left and right movement sensor	Sensor value				1. Sensor value when the longitudinal motor in the mirror moves left or right 2. Sensor value when moving toward right: Increase 3. Sensor value when moving toward left: Decrease
20	Input	Inside rearview mirror up and down movement sensor	Sensor value				1. Sensor value when the vertical motor in the mirror moves up or down 2. Sensor value when moving upward: Increase 3. Sensor value when moving downward: Decrease

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