INDEX



## DIAGNOSIS

# ECU-DIESEL

0000-00

## DIAGNOSIS

## 1. ECU-DIESEL

| DTC | Trouble | Help | Torque Reduction (max.50%) | Torque Reduction (max.20%) | Delayed Engine Stop | Immediately Engine Stop | Limp Home Mode | Engine Check Warning Lamp |
|---|---|---|---|---|---|---|---|---|
| P0100 | Air Mass Flow (HFM) Malfunction | - The external power supply is faulty.<br>• Check the external power supply.<br>• Check the sensor wiring harness (open, short, poor contact).<br>- Actual air mass flow vs. Output voltages.<br>• -20 Kg/h: 0.47 V<br>• 0 Kg/h: 0.99 V<br>• 10 Kg/h: 1.2226 ~ 1.2398 V<br>• 15 Kg/h: 1.3552 ~ 1.3778 V<br>• 30 Kg/h: 1.6783 ~ 1.7146 V<br>• 60 Kg/h: 2.1619 ~ 2.2057 V<br>• 120 Kg/h: 2.7215 ~ 2.7762 V<br>• 250 Kg/h: 3.4388 ~ 3.5037 V<br>• 370 Kg/h: 3.8796 ~ 3.9511 V<br>• 480 Kg/h: 4.1945 ~ 4.2683 V<br>• 640 Kg/h: 4.5667 ~ 4.6469 V<br>- Replace the ECU if required. | | | | | | |
| P0102 | Low HFM Sensor Signal (Circuit Open) | - HFM sensing values are lower than minimum sensing values.<br>- Check the resistance in HFM sensor.<br>- Check the ECU wiring harness (open and poor contact).<br>- Actual air mass flow vs. Output voltages.<br>• -20 Kg/h: 0.47 V<br>• 0 Kg/h: 0.99 V<br>• 10 Kg/h: 1.2226 ~ 1.2398 V<br>• 15 Kg/h: 1.3552 ~ 1.3778 V<br>• 30 Kg/h: 1.6783 ~ 1.7146 V<br>• 60 Kg/h: 2.1619 ~ 2.2057 V<br>• 120 Kg/h: 2.7215 ~ 2.7762 V<br>• 250 Kg/h: 3.4388 ~ 3.5037 V<br>• 370 Kg/h: 3.8796 ~ 3.9511 V<br>• 480 Kg/h: 4.1945 ~ 4.2683 V<br>• 640 Kg/h: 4.5667 ~ 4.6469 V<br>- Replace the ECU if required. | | | | | | |

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| P0103 | High HFM Sensor Signal (Circuit Short) | - HFM sensing values are higher than maximum sensing values.<br>- Check the resistance in HFM sensor.<br>- Check the ECU wiring harness (open and poor contact).<br>- Actual air mass flow vs. Output voltages.<br>• -20 Kg/h: 0.47 V<br>• 0 Kg/h: 0.99 V<br>• 10 Kg/h: 1.2226 ~ 1.2398 V<br>• 15 Kg/h: 1.3552 ~ 1.3778 V<br>• 30 Kg/h: 1.6783 ~ 1.7146 V<br>• 60 Kg/h: 2.1619 ~ 2.2057 V<br>• 120 Kg/h: 2.7215 ~ 2.7762 V<br>• 250 Kg/h: 3.4388 ~ 3.5037 V<br>• 370 Kg/h: 3.8796 ~ 3.9511 V<br>• 480 Kg/h: 4.1945 ~ 4.2683 V<br>• 640 Kg/h: 4.5667 ~ 4.6469 V<br>- Replace the ECU if required. | | | | | | |
| P0105 | Supply Voltage Fault to Booster Pressure Sensor | - Out of range of supply voltages about boost pressure sensor at Ignition key-On and Engine Stop (Higher than specified values).<br>- Check the supply voltage to sensor.<br>- Actual boost pressure vs. Output voltages<br>• Raw Signal Range: 0.545 ~ 2.490 bar<br>• 0.4 bar: 0.6120 V<br>• 1.4 bar: 2.6520 V<br>• 2.4 bar: 4.6920 V<br>- Check the sensor wiring harness (open, poor contact).<br>- Visually check sensor and replace if required.<br>- Replace the ECU if required.<br>- Check whether existing or not about turbo boosting control malfunction (P1235) simultaneously.<br>- If there is turbo boost control fault, Should be checked followings also;<br>• Leakage before turbo system<br>• Vacuum pump malfunction<br>• Waste gate' solenoid valve<br>• Turbo charger system defect or malfunction itself<br>• Air inlet restriction<br>• Exhaust system restriction | | o | | | | o |



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| P0106 | High Booster Pressure Sensor Signal | - Out of signal range about boost pressure sensor at Ignition key-On and Engine Stop (Higher than specified values).<br>- Check the supply voltage to sensor.<br>- Actual boost pressure vs. Output voltages.<br>• Raw Signal Range: 0.545 ~ 2.490 bar<br>• 0.4 bar: 0.6120 V<br>• 1.4 bar: 2.6520 V<br>• 2.4 bar: 4.6920 V<br>- Check the sensor wiring harness (open, poor contact).<br>- Visually check sensor and replace if required.<br>- Replace the ECU if required.<br>- Check whether existing or not about turbo boosting control malfunction (P1235) simultaneously.<br>- If there is turbo boost control fault, Should be checked followings also;<br>• Leakage before turbo system<br>• Vacuum pump malfunction<br>• Waste gate' solenoid valve<br>• Turbo charger system defect or malfunction itself<br>• Air inlet restriction<br>• Exhaust system restriction | | | | | | o |
| P0107 | Booster Pressure Sensor Open/GND Short | - Out of signal range about boost pressure sensor at Engine running condition (Lower than specified values).<br>- Check the supply voltage to sensor.<br>- Actual boost pressure vs. Output voltages<br>• Raw Signal Range: 0.545 ~ 2.490 bar<br>• 0.4 bar: 0.6120 V<br>• 1.4 bar: 2.6520 V<br>• 2.4 bar: 4.6920 V<br>- Check the sensor wiring harness (open, poor contact).<br>- Visually check sensor and replace if required.<br>- Replace the ECU if required.<br>- Check whether existing or not about turbo boosting control malfunction (P1235) simultaneously.<br>- If there is turbo boost control fault, Should be checked followings also;<br>• Leakage before turbo system<br>• Vacuum pump malfunction<br>• Waste gate' solenoid valve<br>• Turbo charger system defect or malfunction itself<br>• Air inlet restriction<br>• Exhaust system restriction | | o | | | | o |

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| P0108 | Booster Pressure Sensor Short | - Out of signal range about boost pressure sensor at Engine running condition (Higher than specified values).<br>- Check the supply voltage to sensor.<br>- Actual boost pressure vs. Output voltages<br>• Raw Signal Range: 0.545~2.490 bar<br>• 0.4 bar: 0.6120 V<br>• 1.4 bar: 2.6520 V<br>• 2.4 bar: 4.6920 V<br>- Check the sensor wiring harness (open, poor contact).<br>- Visually check sensor and replace if required.<br>- Replace the ECU if required.<br>- Check whether existing or not about turbo boosting control malfunction (P1235) simultaneously.<br>- If there is turbo boost control fault, Should be checked followings also;<br>• Leakage before turbo system<br>• Vacuum pump malfunction<br>• Waste gate' solenoid valve<br>• Turbo charger system defect or malfunction itself<br>• Air inlet restriction<br>• Exhaust system restriction | | o | | | | o |
| P0109 | Low Booster Pressure Sensor Signal | - Out of signal range about boost pressure sensor at Ignition key-On and Engine Stop (Lower than specified values).<br>- Check the supply voltage to sensor.<br>- Actual boost pressure vs. Output voltages.<br>• Raw Signal Range: 0.545 ~ 2.490 bar<br>• 0.4 bar: 0.6120 V<br>• 1.4 bar: 2.6520 V<br>• 2.4 bar: 4.6920 V<br>- Check the sensor wiring harness (open, poor contact).<br>- Visually check sensor and replace if required.<br>- Replace the ECU if required.<br>- Check whether existing or not about turbo boosting control malfunction (P1235) simultaneously.<br>- If there is turbo boost control fault, Should be checked followings also;<br>• Leakage before turbo system<br>• Vacuum pump malfunction<br>• Waste gate' solenoid valve<br>• Turbo charger system defect or malfunction itself<br>• Air inlet restriction<br>• Exhaust system restriction | | | | | | o |



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| P0110 | Intake Air Temperature Circuit Malfunction - Source Power Problem | - 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.<br>- Check the supply voltage to sensor.<br>• Actual air temperature vs. Voltages<br>• 20°C: 2.65 Ω<br>• 30°C: 2.18 Ω<br>• 50°C: 1.40 Ω<br>• Recovery values when intake air temperature sensor failure: 50°C<br>- Check the sensor wiring harness.<br>• Check the source power circuit for short to ground.<br>- Check the sensor resistance.<br>• Actual air temperature vs. Resistance<br>• -40°C: 39.260 Ω<br>• -20°C: 13.850 Ω<br>• 0°C: 5.499 Ω<br>• 20°C: 2.420 Ω<br>• 40°C: 1.166 Ω<br>• 60°C: 0.609 Ω<br>• 80°C: 0.340 Ω<br>• 100°C: 0.202 Ω<br>• 120°C: 0.127 Ω<br>• Recovery values when intake air temperature sensor failure: 50°C<br>- Check the ECU wiring harness.<br>- Replace the ECU if required. | | o | | | | |

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| P0112 | Intake Air Temperature Circuit Malfunction - Open | - The intake air temperature sensing value is lower than maximum value of 150°C: Open<br>- Check the supply voltage to sensor.<br>• Actual air temperature vs. Voltages<br>• 20°C: 2.65 Ω<br>• 30°C: 2.18 Ω<br>• 50°C: 1.40 Ω<br>• Recovery values when intake air temperature sensor failure: 50°C<br>- Check the sensor wiring harness.<br>• Check the source power circuit for short to ground.<br>- Check the sensor resistance.<br>• Actual air temperature vs. Resistance<br>• -40°C: 39.260 Ω<br>• -20°C: 13.850 Ω<br>• 0°C: 5.499 Ω<br>• 20°C: 2.420 Ω<br>• 40°C: 1.166 Ω<br>• 60°C: 0.609 Ω<br>• 80°C: 0.340 Ω<br>• 100°C: 0.202 Ω<br>• 120°C: 0.127 Ω<br>• Recovery values when intake air temperature sensor failure: 50°C<br>- Check the ECU wiring harness.<br>- Replace the ECU if required. | | o | | | | |



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| P0113 | Intake Air Temperature Circuit Malfunction - Short | - The intake air temperature sensing value is lower than maximum value of 150°C: Open<br>- Check the supply voltage to sensor.<br>• Actual air temperature vs. Voltages<br>• 20°C: 2.65 Ω<br>• 30°C: 2.18 Ω<br>• 50°C: 1.40 Ω<br>• Recovery values when intake air temperature sensor failure: 50°C<br>- Check the sensor wiring harness.<br>• Check the source power circuit for short to ground.<br>- Check the sensor resistance.<br>• Actual air temperature vs. Resistance<br>• -40°C: 39.260 Ω<br>• -20°C: 13.850 Ω<br>• 0°C: 5.499 Ω<br>• 20°C: 2.420 Ω<br>• 40°C: 1.166 Ω<br>• 60°C: 0.609 Ω<br>• 80°C: 0.340 Ω<br>• 100°C: 0.202 Ω<br>• 120°C: 0.127 Ω<br>• Recovery values when intake air temperature sensor failure: 50°C<br>- Check the ECU wiring harness.<br>- Replace the ECU if required. | | o | | | | |
| P0115 | Supply Voltage Fault to Coolant Temperature Sensor | - Check if the supply voltage of approx. 12 V is applied. | | | | | | |
| P0117 | Coolant Temperature Sensor Malfunction - Open | - Malfunction in recognition of coolant temperature<br>• Less than minimum values (Circuit Open)<br>• External power supply malfunction<br>- If Fuel temperature is invalid, the previous coolant temperature is retained.<br>- Check the supply voltage to sensor.<br>- Actual air temp. vs. Resistance<br>• 20°C: 2449 Ω<br>• 50°C: 826.3 Ω<br>• 80°C: 321.4 Ω<br>• 100°C: 112.9 Ω<br>- Check the wiring harness (open and poor contact).<br>• ECU pin #A01, A02<br>- Visually check the sensor and replace if required.<br>- Replace the ECU if required. | | | | | | |

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| P0118 | Coolant Temperature Sensor Malfunction - Short | - Malfunction in recognition of coolant temperature<br>• More than maximum values (Circuit Short)<br>• External power supply malfunction<br>- If Fuel temperature is invalid, the previous coolant temperature is retained.<br>- Check the supply voltage to sensor.<br>- Actual air temp. vs. Resistance<br>• 20°C: 2449 Ω<br>• 50°C: 826.3 Ω<br>• 80°C: 321.4 Ω<br>• 100°C: 112.9 Ω<br>- Check the wiring harness (short and poor contact).<br>• ECU pin #A01, A02<br>- Visually check the sensor and replace if required.<br>- Replace the ECU if required. | | | | | | |
| P0120 | Accelerator Pedal Sensor #1 Malfunction - Supply Voltage Fault | - The supply voltage is faulty.<br>- Check the supply voltage to sensor.<br>- Check the wiring harness.<br>• Check the circuit for open and short.<br>- Check the accelerator pedal.<br>- Check the ECU wiring harness.<br>- Replace the ECU if required. | o | | | | | o |
| P0122 | Accelerator Pedal Sensor #1 Malfunction - Open | - Out of range about potentiometer 1 of pedal sensor: lower than specified values<br>- Check the supply voltage to sensor.<br>- Check the wiring harness.<br>• Check the circuit for open and short.<br>- Check the accelerator pedal.<br>- Check the ECU wiring harness.<br>- Replace the ECU if required. | o | | | | | o |
| P0123 | Accelerator Pedal Sensor #1 Malfunction - Short | - Out of range about potentiometer 1 of pedal sensor: higher than specified values<br>- Check the supply voltage to sensor.<br>- Check the wiring harness.<br>• Check the circuit for open and short.<br>- Check the accelerator pedal.<br>- Check the ECU wiring harness.<br>- Replace the ECU if required. | o | | | | | o |



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| P0147 | Impossible to Learn Idle MDP | - Causes (Idle range MDP learning)<br>• The MDP is not learned again until driving over 50,000 km after the MDP is learned.<br>- Conditions for MDP learning (Idle)<br>• Leaning twice for each cylinder (attempt every 5 sec.)<br>• Initial MDP learning: coolant temperature > 60°C<br>• Fuel temperature: 0 ~ 80°C<br>• Vehicle speed: Idle.<br>• The tachometer's needle vibrates while learning idle MDP.<br>• Replace ECU after learning. | | | | | | |
| P0148 | Impossible to Learn Drive MDP | - Causes<br>• It occurs twice for each cylilnder if MDP is not learned again until driving over 50,000 km after the MDP is learned.<br>- Actions<br>• Check knock sensor and wiring.<br>• Check injector specification.<br>• Check C3I/C2I. | | | | | | |
| P0171 | Insufficient MDP of Injector #1 | - MDP learning value is decreased due to aged injector #1. | | | | | | |
| P0172 | Insufficient MDP of Injector #2 | - MDP learning value is decreased due to aged injector #2. | | | | | | |
| P0173 | Insufficient MDP of Injector #3 | - MDP learning value is decreased due to aged injector #3. | | | | | | |
| P0174 | Insufficient MDP of Injector #4 | - MDP learning value is decreased due to aged injector #4. | | | | | | |
| P0175 | Insufficient MDP of Injector #5 | - MDP learning value is decreased due to aged injector #5. | | | | | | |
| P0180 | Fuel Temperature Sensor - Malfunction | - The power source circuit is faulty for fuel temperature sensor. (Fuel temperature sensor is mounted in high pressure pump)<br>- Actual fuel temp. vs. Resistance<br>• -40°C: 75.780 Ω -20°C: 21.873 Ω<br>• -10°C: 12.462 Ω 0°C: 7.355 Ω<br>• 10°C: 4.481 Ω 20°C: 2.812 Ω<br>• 25°C: 2.252 Ω 30°C: 1.814 Ω<br>• 40°C: 1.199 Ω 50°C: 0.811 Ω<br>• 70°C: 0.394 Ω 90°C: 0.206 Ω<br>• 120°C: 0.087 Ω<br>- Recovery values when fuel temperature sensor failure: 95°C<br>- Check the supply voltage to sensor.<br>- Check the wiring harness for open, short and poor contact.<br>• ECU pin #A09, A10<br>- Check the ECU wiring and replace the ECU if required. | | | | | | |

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| P0182 | Fuel Temperature Sensor - Short to Ground | - The sensing values are higher than specified values for fuel temperature sensor. (More than maximum sensing values 140°C - Circuit Short)<br>- Actual fuel temp. vs. Resistance<br>• -40°C: 75.780 Ω -20°C: 21.873 Ω<br>• -10°C: 12.462 Ω 0°C: 7.355 Ω<br>• 10°C: 4.481 Ω 20°C: 2.812 Ω<br>• 25°C: 2.252 Ω 30°C: 1.814 Ω<br>• 40°C: 1.199 Ω 50°C: 0.811 Ω<br>• 70°C: 0.394 Ω 90°C: 0.206 Ω<br>• 120°C: 0.087 Ω<br>- Recovery values when fuel temperature sensor failure: 95°C<br>- Check the supply voltage to sensor.<br>- Check the wiring harness for open, short and poor contact.<br>• ECU pin #A09, A10<br>- Check the ECU wiring and replace the ECU if required. | | | | | | |
| P0183 | Fuel Temperature Sensor - Short to B+ | - The sensing values are lower than specified values for fuel temperature sensor. (Less than maximum sensing values - 40°C - Circuit Open)<br>- Actual fuel temp. vs. Resistance<br>• -40°C: 75.780 Ω -20°C: 21.873 Ω<br>• -10°C: 12.462 Ω 0°C: 7.355 Ω<br>• 10°C: 4.481 Ω 20°C: 2.812 Ω<br>• 25°C: 2.252 Ω 30°C: 1.814 Ω<br>• 40°C: 1.199 Ω 50°C: 0.811 Ω<br>• 70°C: 0.394 Ω 90°C: 0.206 Ω<br>• 120°C: 0.087 Ω<br>- Recovery values when fuel temperature sensor failure: 95°C<br>- Check the supply voltage to sensor.<br>- Check the wiring harness for open, short and poor contact.<br>- Check the ECU wiring and replace the ECU if required. | | | | | | |



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| P0190 | Supply Voltage Fault to Fuel Rail Pressure Sensor | - The supply voltage to fuel rail pressure sensor is faulty.<br>- Check the supply voltage to sensor.<br>• Output voltage at 1600 bar: 4.055± 0.125V<br>• Output voltage at atmospheric pressure: 0.5±0.04V<br>- Check the sensor and ECU wiring harness.<br>• Check the fuel rails and high pressure pipes for leaks.<br>- Check the fuel rail pressure sensor.<br>- Replace the ECU if required. | O | | | | | O |
| P0191 | Fuel Rail Pressure Sensor Signal Fault | - The rail pressure drop is too high.<br>- Check the supply voltage to sensor.<br>• Output voltage at 1600 bar: 4.055 ± 0.125 V<br>• Output voltage at atmospheric pressure: 0.5 ± 0.04 V<br>- Check the sensor and ECU wiring harness.<br>• Check the fuel rails and high pressure pipes for leaks.<br>- Check the fuel rail pressure sensor.<br>- Replace the ECU if required. | O | | | | | O |
| P0192 | Fuel Rail Pressure Sensor Malfunction - Open | - The fuel rail pressure sensing values are lower than specified values.<br>• Minimum sensing values: - 112 bar (Open)<br>- Check the supply voltage to sensor.<br>• Output voltage at 1600 bar: 4.055 ± 0.125 V<br>• Output voltage at atmospheric pressure: 0.5 ± 0.04 V<br>- Check the sensor and ECU wiring harness.<br>• Check the fuel rails and high pressure pipes for leaks.<br>- Check the fuel rail pressure sensor.<br>- Replace the ECU if required. | O | | | | | O |

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| P0193 | Fuel Rail Pressure Sensor Malfunction - Short | - The fuel rail pressure sensing values are higher than specified values.<br>• Maximum sensing values: 1,600 bar (Short)<br>- Check the supply voltage to sensor.<br>• Output voltage at 1600 bar: 4.055± 0.125V<br>• Output voltage at atmospheric pressure: 0.5±0.04V<br>- Check the sensor and ECU wiring harness.<br>• Check the fuel rails and high pressure pipes for leaks.<br>- Check the fuel rail pressure sensor.<br>- Replace the ECU if required. | O | | | | | O |
| P0201 | Injector #1 Circuit Open | - Injector #1 circuit malfunction: Open.<br>• If the injector pin is defective, perform C2I/C3I coding and check again.<br>• If the injector pin is normal, check the ECU wiring harness .<br>- Replace the ECU if required. | | | | | | O |
| P0202 | Injector #2 Circuit Open | - Injector #2 circuit malfunction: Open.<br>• If the injector pin is defective, perform C2I/C3I coding and check again.<br>• If the injector pin is normal, check the ECU wiring harness.<br>- Replace the ECU if required. | | | | | | O |
| P0203 | Injector #3 Circuit Open | - Injector #3 circuit malfunction: Open.<br>• If the injector pin is defective, perform C2I/C3I coding and check again.<br>• If the injector pin is normal, check the ECU wiring harness.<br>- Replace the ECU if required. | | | | | | O |
| P0204 | Injector #4 Circuit Open | - Injector #4 circuit malfunction: Open.<br>• If the injector pin is defective, perform C2I/C3I coding and check again.<br>• If the injector pin is normal, check the ECU wiring harness.<br>- Replace the ECU if required. | | | | | | O |
| P0205 | Injector #5 Circuit Open | - Injector #5 circuit malfunction: Open.<br>• If the injector pin is defective, perform C2I/C3I coding and check again.<br>• If the injector pin is normal, check the ECU wiring harness.<br>- Replace the ECU if required. | | | | | | O |



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| P0215 | Main Relay Fault - Stuck | - The main relay is stuck ; Shut down.<br>- Resistance of main relay: 92 Ω ± 9 Ω (at 20°C)<br>- Check the main relay wiring harness.<br>- Check the ECU wiring harness.<br>- If the forced operation is not available, replace the ECU.<br>- Check the fuse for main relay | | | | | | |
| P0219 | Too Small Clearance of Crank Angle Sensor | - Crank angle signal faults or clearance too close.<br>- Check the sensor wiring harness (open, short, poor contact).<br>- Check the resistance of crank angle sensor: 1090 Ω ± 15 %.<br>- Measure the air gap: 0.3 ~ 1.3 mm<br>• 1.3 mm of air gap: outputs 1.0 V at 40 rpm<br>• 0.3 mm of air gap: outputs 150 V at 7000 rpm<br>- Check the teeth condition.<br>• Drive plate (A/T), DMF (M/T)<br>- Replace the ECU if required. | | | | | | o |
| P0220 | Accelerator Pedal Sensor #2 Malfunction - Supply Voltage Fault | - The supply voltage is faulty.<br>- Check the supply voltage to sensor.<br>- Check the wiring harness.<br>• Check the circuit for open and short.<br>- Check the accelerator pedal.<br>- Check the ECU wiring harness.<br>- Replace the ECU if required. | o | | | | | o |
| P0222 | Accelerator Pedal Sensor #2 Malfunction - Open | - Out of range about potentiometer 2 of pedal sensor: lower than specified values<br>- Check the supply voltage to sensor.<br>- Check the wiring harness.<br>• Check the circuit for open and short.<br>- Check the accelerator pedal.<br>- Check the ECU wiring harness.<br>- Replace the ECU if required. | o | | | | | o |
| P0223 | Accelerator Pedal Sensor #2 Malfunction - Short | - Out of range about potentiometer 2 of pedal sensor: higher than specified values<br>- Check the supply voltage to sensor.<br>- Check the wiring harness.<br>• Check the circuit for open and short.<br>- Check the accelerator pedal.<br>- Check the ECU wiring harness.<br>- Replace the ECU if required. | o | | | | | o |

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| P0243 | VGT Turbocharger Actuator Circuit Short | - Causes<br>• There is electric problem in the vacuum modulator drive module of turbocharger.<br>- Check pin for the followings (Vacuum Modulator):<br>• Power (Main Relay)<br>• GND<br>- Actions<br>• Check the unit's resistance (15.4 +/- 0.7 Ω) and wiring.<br>• Check the input voltage (12V).<br>• Visually check the unit and replace if necessary. | | | | | | |
| P0245 | Turbo Charger Actuator Circuit Fault - Short | - The waste gate driver circuit is short to ground or open<br>- Check the actuator wiring harness.<br>- Check the solenoid valve.<br>- Check the ECU wiring harness.<br>- Replace the ECU if required. | O | | | | | O |
| P0246 | Turbo Charger Actuator Circuit Fault - Short to B+ | - The turbo charger actuator power source circuit is short.<br>- Check the actuator wiring harness.<br>- Check the solenoid valve.<br>- Check the ECU wiring harness for short and poor contact.<br>- Replace the ECU if required. | O | | | | | O |
| P0251 | IMV Driver Circuit Malfunction - Short | - IMV driver circuit malfunction: Short<br>- Check the IMV wiring harness.<br>- Check the ECU wiring harness.<br>- Check the IMV resistance.<br>• When out of specified value: replace high pressure pump and IMV<br>- Replace the ECU if required. | | | O | | O | O |
| P0253 | IMV Driver Circuit Malfunction - Short to Ground | - IMV driver circuit malfunction: Short to ground<br>- Check the IMV wiring harness.<br>- Check the ECU wiring harness.<br>- Check the IMV resistance.<br>• When out of specified value: replace high pressure pump and IMV<br>- Replace the ECU if required. | | | O | | O | O |
| P0255 | IMV Driver Circuit Malfunction - Open | - IMV driver circuit malfunction: Open<br>- Check the IMV wiring harness.<br>- Check the ECU wiring harness.<br>- Check the IMV resistance.<br>• When out of specified value: replace high pressure pump and IMV<br>- Replace the ECU if required. | | | O | | 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 |
|---|---|---|---|---|---|---|---|---|
| P0263 | Injector #1 Balancing Fault | - Injector #1 cylinder balancing faults (Injector stuck closed).<br>- Check the injector circuit for open.<br>- Check the glow plug.<br>- Check the inlet tube for clogging.<br>- Check the EGR.<br>- Replace the ECU if required (perform C2I/C3I coding after replacement). | | | | | | |
| P0266 | Injector #2 Balancing Fault | - Injector #2 cylinder balancing faults (Injector stuck closed).<br>- Check the injector circuit for open.<br>- Check the glow plug.<br>- Check the inlet tube for clogging.<br>- Check the EGR.<br>- Replace the ECU if required (perform C2I/C3I coding after replacement). | | | | | | |
| P0269 | Injector #3 Balancing Fault | - Injector #3 cylinder balancing faults (Injector stuck closed).<br>- Check the injector circuit for open.<br>- Check the glow plug.<br>- Check the inlet tube for clogging.<br>- Check the EGR.<br>- Replace the ECU if required (perform C2I/C3I coding after replacement). | | | | | | |
| P0272 | Injector #4 Balancing Fault | - Injector #4 cylinder balancing faults (Injector stuck closed).<br>- Check the injector circuit for open.<br>- Check the glow plug.<br>- Check the inlet tube for clogging.<br>- Check the EGR.<br>- Replace the ECU if required (perform C2I/C3I coding after replacement). | | | | | | |
| P0275 | Injector #5 Balancing Fault | - Injector #5 cylinder balancing faults (Injector stuck closed).<br>- Check the injector circuit for open.<br>- Check the glow plug.<br>- Check the inlet tube for clogging.<br>- Check the EGR.<br>- Replace the ECU if required (perform C2I/C3I coding after replacement). | | | | | | |
| P0325 | Accelerometer #1 (Knock Sensor) Malfunction | - The signal / noise ratio is too low about accelerometer # 1.<br>- Check the accelerometer wiring harness and tightening torque.<br>• Tightening torque: 20 ± 5 Nm<br>- Check the ECU wiring harness for open and short.<br>- 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 | Engine Check Warning Lamp |
|---|---|---|---|---|---|---|---|---|
| P0325 | Accelerometer #1 (Knock Sensor) Malfunction | - The signal / noise ratio is too low about accelerometer # 1.<br>- Check the accelerometer wiring harness and tightening torque.<br>• Tightening torque: 20 ± 5 Nm<br>- Check the ECU wiring harness for open and short.<br>- If the trouble still exists even after replacing the accelerometer, replace the ECU. | | | | | | |
| P0335 | No Crank Signals | - Refer to P0372. | | | | | | O |
| P0336 | Too Large Clearance of Crank Angle Sensor | - Air gap of crank angle sensor is abnormal.<br>- Check the sensor wiring harness (open, short, poor contact).<br>- Check the resistance of crank angle sensor: 1090 Ω ± 15 %.<br>- Measure the air gap: 0.3 ~ 1.3 mm<br>• 1.3 mm of air gap: outputs 1.0 V at 40 rpm<br>• 0.3 mm of air gap: outputs 150 V at 7000 rpm<br>- Check the teeth condition.<br>• Drive plate (A/T), DMF (M/T)<br>- Replace the ECU if required. | | | | | | O |
| P0341 | Cam Position Sensor Malfunction (Poor Synchronization) | - Not synchronized with Crank angle signal.<br>- Check the source voltage of cam position sensor (specified value: 4.5 ~ 12 V).<br>- Check the sensor wiring harness (open, short, poor contact).<br>- Check the cam position sensor.<br>- Measure the air gap: 0.2 ~ 1.8 mm<br>- Replace the ECU if required. | | | | | | O |
| P0344 | Cam Position Sensor Malfunction | - No cam recognition signal (missing events).<br>- Check the source voltage of cam position sensor (specified value: 4.5 ~ 12 V).<br>- Check the sensor wiring harness (open, short, poor contact).<br>- Check the cam position sensor.<br>- Measure the air gap: 0.2 ~ 1.8 mm<br>- Replace the ECU if required. | | | | | | O |



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| Modification basis | |
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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 |
|---|---|---|---|---|---|---|---|---|
| P0372 | Crank Angle Sensor Malfunction | - Even though cam position recognition is normal, no crank angle signal recognition (missing tooth).<br>- Check the sensor wiring harness (open, short, poor contact).<br>- Check the resistance of crank angle sensor: 1090 Ω ± 15 %.<br>- Measure the air gap: 0.3 ~ 1.3 mm<br>• 1.3 mm of air gap: outputs 1.0 V at 40 rpm<br>• 0.3 mm of air gap: outputs 150 V at 7000 rpm<br>- Check the teeth condition.<br>• Drive plate (A/T), DMF (M/T)<br>- Replace the ECU if required. | | | | | | o |
| P0400 | EGR Control Valve Fault | - When the EGR emission is more than specified value.<br>• The EGR controller circuit is open or short to ground.<br>• The EGR controller is short to battery.<br>- Check the EGR actuator wiring harness.<br>- Check the supply voltage to EGR solenoid valve.<br>- Check if the EGR valve is stuck.<br>- Check the resistance of EGR valve: 15.4 Ω.<br>- Check the ECU wiring harness. | | | | | | |
| P0401 | EGR Control Valve Fault (Low) | - When the EGR emission is more than specified value.<br>• The EGR controller circuit is open or short to ground.<br>• The EGR controller is short to battery.<br>- Check the EGR actuator wiring harness.<br>- Check the supply voltage to EGR solenoid valve.<br>- Check if the EGR valve is stuck.<br>- Check the resistance of EGR valve: 15.4 Ω.<br>- Check the ECU wiring harness. | | | | | | |
| P0402 | EGR Valve Stuck in Open Position | - Causes<br>• The E-EGR valve is stuck with it open.<br>- Check pin (refer to the page 1407)<br>- Actions<br>• Check E-EGR valve and sensor wiring.<br>• Visually check the unit and replace if necessary.<br>• Replace the ECU if required.<br>• Refer to DTCs (P0407 and P0408). | | | | | | |

| DTC | Trouble | Help | Torque Reduction (max.50%) | Torque Reduction (max.20%) | Delayed Engine Stop | Immediately Engine Stop | Limp Home Mode | Engine Check Warning Lamp |
|---|---|---|---|---|---|---|---|---|
| P0405 | High EGR Open Position Deviation | - Causes<br>• 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).<br>- Actions<br>• Measure the resistance of E-EGR valve sensor.<br>• Check the sensor and actuator wiring harness.<br>• Check the unit. | | | | | | o |
| P0406 | High EGR Close Position Deviation | - Causes<br>• The difference between E-EGR position demand (MAP) value and E-EGR position feedback signal value is over 15% (the sensor output indicates EEGR is closed over 15% in the open status).<br>- Actions<br>• Measure the resistance of E-EGR valve sensor.<br>• Check the sensor and actuator wiring harness.<br>• Check the unit. | | o | | | | |
| P0407 | Low EGR Position Signal | - Diagnosis of E-EGR signal for the followings:<br>• Sensor signal is high or low.<br>• Total resistance value: 4Ω +/-40%<br>• Sensor output range: 1.2 ~ 4.0 V<br>• Total sensor resistance: 4 kΩ ± 40%<br>• Total motor resistance: 8.0Ω ± 0.5Ω<br>- Check pin for the followings:<br>• Check sensor reference voltage (5V) - ECU Pin #A33<br>• Sensor signal - ECU Pin #A82<br>• Sensor GND - ECU Pin #A09<br>- Actions<br>• Measure the resistance of E-EGR valve sensor.<br>• Check the sensor and actuator wiring harness.<br>• Check the unit. | | | | | | |



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<table>
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<tr><td>P0408</td><td>High EGR Position Signal</td><td>- Diagnosis of E-EGR signal for the followings:<br>• Sensor signal is high or low.<br>• Total resistance value: 4Ω +/-40%<br>• Sensor output range: 1.2 ~ 4.0 V<br>• Total sensor resistance: 4 kΩ ± 40%<br>• Total motor resistance: 8.0Ω ± 0.5Ω<br>- Check pin for the followings:<br>• Check sensor reference voltage (5V)<br>• Sensor signal - ECU pin #A82<br>• Sensor GND - ECU pin #A09<br>- Actions<br>• Measure the resistance of E-EGR valve sensor.<br>• Check the sensor and actuator wiring harness.<br>• Check the unit.</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>P0430</td><td>Front and Rear Exhaust Gas Temperature Sensors - Excessive Temperature Value Difference</td><td>- The value difference between the front exhaust gas temperature sensor on the exhaust manifold and the rear exhaust gas temperature sensor on the CDPF is out of the specified range.<br>- Measure the resistance of the exhaust gas temperature sensors by temperature and the supplied voltage.<br>- Check the ECU terminal No. A06 and A30 for connecting the front exhaust gas temperature sensor as well as the sensor terminal No. 1 and 2.<br>- Check the ECU terminal No. A23 and A42 for connecting the rear exhaust gas temperature sensor as well as the sensor terminal No. 1 and 2.
<table>
<tr><th>CDPF temperature (°C)</th><th>Resistance (Ω)</th></tr>
<tr><td>-40</td><td>169.18</td></tr>
<tr><td>-20</td><td>184.64</td></tr>
<tr><td>0</td><td>200.0</td></tr>
<tr><td>25</td><td>219.07</td></tr>
<tr><td>50</td><td>237.99</td></tr>
<tr><td>100</td><td>275.4</td></tr>
<tr><td>150</td><td>312.2</td></tr>
<tr><td>200</td><td>348.5</td></tr>
<tr><td>250</td><td>384.1</td></tr>
<tr><td>300</td><td>419.2</td></tr>
<tr><td>350</td><td>453.7</td></tr>
<tr><td>400</td><td>487.6</td></tr>
<tr><td>450</td><td>520.9</td></tr>
<tr><td>500</td><td>553.6</td></tr>
<tr><td>600</td><td>617.3</td></tr>
<tr><td>700</td><td>678.7</td></tr>
<tr><td>800</td><td>737.7</td></tr>
<tr><td>830</td><td>754.9</td></tr>
<tr><td>850</td><td>766.3</td></tr>
</table></td><td></td><td></td><td></td><td></td><td></td><td>o</td></tr>
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<tr><td>P0431</td><td>DOC malfunction</td><td>- The measured DOC temperature is below the limit for recycling (below 0.5 times).<br>- Cause: Old/worn DOC<br>- The recycling mode cannot be activated.<br>- Check and clear the DTC using SCAN-100.<br>- Replace the CDPF.</td><td></td><td></td><td></td><td></td><td></td><td>O</td></tr>
<tr><td>P0432</td><td>CDPF - Excessive Soot Accumulated</td><td>- The pressure is over 23 Kpa for over 960 seconds due to the resistance by soot.<br>- If P0432 is generated without error in pressure sensor, the torque is reduced.<br>- Remove CDPF and clean it by blowing it from the opposite side of discharged side. Then, install it again and check it for soot.</td><td></td><td></td><td></td><td></td><td></td><td>O</td></tr>
<tr><td>P0436</td><td>Rear exhaust gas temperature sensor - faulty signal</td><td>- The signal value from the rear exhaust gas temperature sensor is over the specified range.<br>- See P0437 and P0438 for more information and inspection.</td><td></td><td></td><td></td><td></td><td></td><td>O</td></tr>
<tr><td>P0437</td><td>Rear exhaust gas temperature sensor - low signal</td><td>- The signal value from the rear exhaust gas temperature sensor is below the specified range.<br>- Check the ECU terminal No. A23 and A42 for connecting the rear exhaust gas temperature sensor as well as the sensor terminal No. 1 and 2.
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<tr><th>CDPF temperature (°C)</th><th>Resistance (Ω)</th></tr>
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<tr><td>P0438</td><td>Rear exhaust gas temperature sensor - high signal</td><td>- The signal value from the rear exhaust gas temperature sensor is over the specified range.<br>- Check the ECU terminal No. A23 and A42 for connecting the rear exhaust gas temperature sensor as well as the sensor terminal No. 1 and 2.<br><table><tr><th>CDPF temperature (°C)</th><th>Resistance (Ω)</th></tr><tr><td>-40</td><td>169.18</td></tr><tr><td>-20</td><td>184.64</td></tr><tr><td>0</td><td>200.0</td></tr><tr><td>25</td><td>219.07</td></tr><tr><td>50</td><td>237.99</td></tr><tr><td>100</td><td>275.4</td></tr><tr><td>150</td><td>312.2</td></tr><tr><td>200</td><td>348.5</td></tr><tr><td>250</td><td>384.1</td></tr><tr><td>300</td><td>419.2</td></tr><tr><td>350</td><td>453.7</td></tr><tr><td>400</td><td>487.6</td></tr><tr><td>450</td><td>520.9</td></tr><tr><td>500</td><td>553.6</td></tr><tr><td>600</td><td>617.3</td></tr><tr><td>700</td><td>678.7</td></tr><tr><td>800</td><td>737.7</td></tr><tr><td>830</td><td>754.9</td></tr><tr><td>850</td><td>766.3</td></tr></table></td><td></td><td></td><td></td><td></td><td></td><td>O</td></tr>
<tr><td>P043A</td><td>Rear exhaust gas temperature sensor - faulty voltage supply</td><td>- The supplied voltage of the rear exhaust gas temperature sensor is out of the specified range.<br>- Check the ECU terminal No. A42 for connecting the rear exhaust gas temperature sensor as well as the sensor terminal No. 1.</td><td></td><td></td><td></td><td></td><td></td><td>O</td></tr>
<tr><td>P0470</td><td>Differential Pressure Sensor - Max./Min. Output</td><td>- Specification for output value of pressure sensor : 0.5 ~4.5V<br>- The output value of sensor is over 4.5 V or below 0.5 V.<br>- Check the pressure sensor wiring for open or short circuit.</td><td></td><td></td><td></td><td></td><td></td><td>O</td></tr>
<tr><td>P0471</td><td>Differential Pressure Sensor - Abnormal Differential Pressure</td><td>- The actual (measured) pressure difference (actual pressure) is different from the calculated pressure difference (pressure difference between front and rear side of CDPF).<br>(Possible cause : malfunctioning pressure sensor, leakage in pressure tube, parts removed)</td><td></td><td></td><td></td><td></td><td></td><td>O</td></tr>
<tr><td>P0480</td><td>PWM Electric Fan Malfunction (Open circuit)<br>(Only for D27DTP (POWER UP) model)</td><td>- The communication line between PWM electric fan and ECU is open.<br>- The PWM electric fan's own malfunction cannot be identified.</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
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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 |
|---|---|---|---|---|---|---|---|---|
| P0481 | PWM Electric Fan Malfunction(Short to B+)<br>(Only for D27DTP (POWER UP) model) | - The communication line between PWM electric fan and ECU has a short to battery.<br>- The PWM electric fan's own malfunction cannot be identified. | | | | | | |
| P0482 | PWM Electric Fan Malfunction (Short to GND)<br>(Only for D27DTP (POWER UP) model) | - The communication line between PWM electric fan and ECU has a short to ground.<br>- The PWM electric fan's own malfunction cannot be identified. | | | | | | |
| P0483 | Fan PWM motor out have short to GND | - Motor out have short to GND | | | | | | |
| P0484 | Fan PWM Stall motor | - Stall motor | | | | | | |
| P0485 | Fan PWM motor have over load | - Motor have over load | | | | | | |
| P0487 | Faulty Maximum Throttle Closing Value | - Causes<br>• The throttle is not fully closed when learning the full open value after stopping the engine.<br>- Check pin (refer to P213C).<br>- Sensor specification: Refer to P213C.<br>- Actions<br>• Check the throttle valve and sensor wiring harnesses.<br>• Visually check the unit and replace if necessary. | | | | | | |
| P0488 | Throttle Valve - Seized | - The vacuum modulator of throttle valve has an open circuit.<br>- The throttle valve is seized (mechanically).<br>- Check condition for seizing:<br>* No error in HFM and EGR<br>* Engine running | | | | | | o |
| P0488 | Faulty Maximum Throttle Opening Value | - Causes<br>• The throttle is not fully open when learning the full open value after initial ignition on.<br>- Check pin (refer to P213C).<br>- Sensor specification: Refer to P213C.<br>- Actions<br>• Check the throttle valve and sensor wiring harnesses.<br>• Visually check the unit and replace if necessary. | | | | | | |



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| P0530 | Air Conditioner Refrigerant Sensor Supply Power Fault | - Causes<br>• There is electric problem in the air conditioner's pressure sensor.<br>- Check the sensor's specifications and ECU pin.<br>• Power: 5V ..... ECU Pin #B29<br>• Sensor signal ..... ECU Pin #B41<br>• Sensor GND ..... ECU Pin #B36<br>• Actual range: 2.0 kgf/cm$^2$ (0.75V) ~ 32 kgf/cm$^2$ (4.5V)<br>• Resistance: 51KΩ (signal terminal and ground)<br>• Output signal<br>0.5V ..... 0.0 kgf/cm$^2$<br>4.5V ..... 32.0 kgf/cm$^2$<br>- Actions<br>• Check the sensor's resistance and wiring.<br>• Visually check the unit and replace if necessary. | | | | | | |
| P0532 | Air Conditioner Refrigerant Pressure Signal Circuit Short | - Causes<br>• There is electric problem in the air conditioner's pressure sensor.<br>- Check the sensor's specifications and ECU pin.<br>• Power: 5V ..... ECU Pin #B29<br>• Sensor signal ..... ECU Pin #B41<br>• Sensor GND ..... ECU Pin #B36<br>• Actual range: 2.0 kgf/cm$^2$ (0.75V) ~ 32 kgf/cm$^2$ (4.5V)<br>• Resistance: 51KΩ (signal terminal and ground)<br>• Output signal<br>0.5V ..... 0.0 kgf/cm$^2$<br>4.5V ..... 32.0 kgf/cm$^2$<br>- Actions<br>• Check the sensor's resistance and wiring.<br>• 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 | Engine Check Warning Lamp |
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| P0533 | Excessive Air Conditioner Refrigerant Pressure | - Causes<br>• There is electric problem in the air conditioner's pressure sensor.<br>- Check the sensor's specifications and ECU pin.<br>• Power: 5V ..... ECU Pin #B29<br>• Sensor signal ..... ECU Pin #B41<br>• Sensor GND ..... ECU Pin #B36<br>• Actual range: 2.0 kgf/cm$^2$ (0.75V) ~ 32 kgf/cm$^2$ (4.5V)<br>• Resistance: 51KΩ (signal terminal and ground)<br>• Output signal<br>0.5V ..... 0.0 kgf/cm$^2$<br>4.5V ..... 32.0 kgf/cm$^2$<br>- Actions<br>• Check the sensor's resistance and wiring.<br>• Visually check the unit and replace if necessary. | | | | | | |
| P0560 | Battery Voltage Malfunction | - Malfunction in recognition of system source voltage (A/D converter faults).<br>• Less than minimum 8 Volts in 2000 rpm below<br>• Less than 10 Volts in 2000 rpm above.<br>- Check the battery wiring harness (open, short, poor contact).<br>- Check the battery main relay and fuse.<br>- Check the body ground.<br>- Measure the resistance between body ground and ECU ground.<br>• Repair the ECU ground if the resistance is high.<br>- Replace the ECU if required. | O | | | | | O |
| P0562 | Low Battery Voltage | - Malfunction in recognition of system source voltage (Lower than threshold).<br>• Less than minimum 8 Volts in 2000 rpm below<br>• Less than 10 Volts in 2000 rpm above.<br>- Check the battery wiring harness (open, short, poor contact).<br>- Check the battery main relay and fuse.<br>- Check the body ground.<br>- Measure the resistance between body ground and ECU ground.<br>• Repair the ECU ground if the resistance is high.<br>- Replace the ECU if required. | O | | | | | O |



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|---|---|---|---|---|---|---|---|---|
| P0563 | High Battery Voltage | - Malfunction in recognition of system source voltage (Higher than threshold).<br>• More than minimum 16 Volts in 2000 rpm below<br>- Check the battery wiring harness (open, short, poor contact).<br>- Check the alternator.<br>- Check the body ground.<br>- Measure the resistance between body ground and ECU ground.<br>• Repair the ECU ground if the resistance is high.<br>- Replace the ECU if required. | O | | | | | O |
| P0571 | Brake Pedal Switch Fault | - The brake pedal switch or light switch is faulty.<br>• Brake pedal switch: Normal Close (NC)<br>• Light switch: Normal Open (NO)<br>• When operating the brake switch, one signal (NO) is sent to auto cruise and the other (NC) is sent to brake lamp.<br>- Check the brake and light switch wiring harness.<br>- Check the supply voltage to brake and light switch (12 V).<br>- Check the brake and light switch for contact.<br>- Check the ECU wiring harness (short, poor contact).<br>- Replace the ECU if required. | | | | | | |
| P0602 | Faulty Vehicle Speed Sensor Coding | - The vehicle signal is inputted via CAN communication without ESP or TCCU.<br>- The CAN communication between units is malfunctioning. | | | | | | |
| P0606 | ECU Watchdog Fault | - The ECU is defective.<br>- Check the chassis ground wiring harness.<br>- Check the ECU.<br>- 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 | Engine Check Warning Lamp |
|---|---|---|---|---|---|---|---|---|
| P0608 | Faulty ABS/ESP Coding | - The ABS/ESP variant coding is faulty.<br>- The CAN communication is malfunctioning. | | | | | | |
| P0611 | No Data for C3I | - C3I<br>• There is no C3I data in ECU or the checksum is faulty. | | | | | | O |
| P0612 | Internal Error in C3I Data | - C3I<br>• The error is occurred while sending C3I data in ECU to RAM. | | | | | | |
| P0613 | Faulty TCU Coding | - The TCU variant coding is faulty.<br>- The CAN communication between units is malfunctioning. | | | | | | |
| P0614 | TCCU Coding Failt | - Occurred if TCCU variant coding is faulty.<br>- 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<br><br>4-cylinder engine<br>: 1nd and 4rd cylinders<br>5-cylinder engine<br>: 1nd, 4rd and 3rdcylinders | - Malfunction of injector (#1, #4, #3) circuit (Low): Short to Ground or to Battery.<br>- Operating voltage: 6 ~ 18 V<br>- Check the injector bank #1: Open and poor contact<br>- Check if the trouble recurs with the injectors removed and the ignition key “OFF”.<br>• If recurred, check the injector and ECU wiring harness.<br>- Check if the trouble recurs while installing the injectors one by one with the ignition key “ON”.<br>• If recurred, replace the injector (perform C2I/C3I coding after replacement).<br>• Check the other injectors with same manner.<br>- Check the ECU wiring harness.<br>- Replace the ECU if required. | | | | | | O |
| P062E (former P1618) | Injector Bank #2 Malfunction - Low Voltage<br><br>4-cylinder engine<br>: 2nd and 3rd cylinders<br>5-cylinder engine<br>: 2nd and 5rd cylinders | - Malfunction of injector (#2, #5) circuit (Low): Short to Ground or to Battery.<br>- Operating voltage: 6 ~ 18 V<br>- Check the injector bank #2: Open and poor contact<br>- Check if the trouble recurs with the injectors removed and the ignition key “OFF”.<br>• If recurred, check the injector and ECU wiring harness.<br>- Check if the trouble recurs while installing the injectors one by one with the ignition key “ON”.<br>• If recurred, replace the injector (perform C2I/C3I coding after replacement).<br>• Check the other injectors with same manner.<br>- Check the ECU wiring harness.<br>- 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 | Engine Check Warning Lamp |
|---|---|---|---|---|---|---|---|---|
| P062F | Multi calibration memory error | - Perform multi calibration again. | | | | | | |
| P0630 | Variant Coding is not done | - Variant coding is not done | | | | | | O |
| P0631 | Variant Coding writing error | - Variant coding writing error | | | | | | O |
| P0633 | Immobilizer Fault (refer to immobilizer section) | - Key memory is not available (permissible - 5).<br>- Perform the immobilizer coding again.<br>- Check the ECU wiring harness.<br>- Check the immobilizer unit for open and short or check the supply voltage.<br>- Check the immobilizer antenna and transponder for damage.<br>- Replace the ECU if required. | | | | | | |
| P0641 | ECU Supply Voltage 1 Fault (5 V) | - Malfunction reference supply voltage from ECU<br>• Supply voltage: 5 V<br>- Check the supply voltage to each sensor<br>• Supply voltage (5 V): accelerator pedal sensor 1, HFM sensor, rail pressure sensor, booster pressure sensor, cam sensor<br>- Check the wiring harnesses.<br>- Replace the ECU if required. | | | | | | |
| P0642 | ECU Supply Voltage 1 Fault - Low (5 V) | - Malfunction reference supply voltage from ECU<br>• Supply voltage: 5 V<br>- Check the supply voltage to each sensor<br>• Supply voltage (5 V): accelerator pedal sensor 1, HFM sensor, rail pressure sensor, booster pressure sensor, cam sensor<br>- Check the wiring harnesses.<br>- Replace the ECU if required. | | | | | | |
| P0643 | ECU Supply Voltage 1 Fault - High (5 V) | - Malfunction reference supply voltage from ECU<br>• Supply voltage: 5 V<br>- Check the supply voltage to each sensor<br>• Supply voltage (5 V): accelerator pedal sensor 1, HFM sensor, rail pressure sensor, booster pressure sensor, cam sensor<br>- Check the wiring harnesses.<br>- 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 | Engine Check Warning Lamp |
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| P0651 | ECU Supply Voltage 2 Fault (5 V) | - Malfunction reference supply voltage from ECU<br>• Supply voltage: 5 V<br>- Check the supply voltage to each sensor<br>• Supply voltage (5 V): accelerator pedal sensor 1, HFM sensor, rail pressure sensor, booster pressure sensor, cam sensor<br>- Check the wiring harnesses.<br>- Replace the ECU if required. | | | o | | o | o |
| P0652 | ECU Supply Voltage 2 Fault - Low (5 V) | - Malfunction reference supply voltage from ECU<br>• Supply voltage: 5 V<br>- Check the supply voltage to each sensor<br>• Supply voltage (5 V): accelerator pedal sensor 1, HFM sensor, rail pressure sensor, booster pressure sensor, cam sensor<br>- Check the wiring harnesses.<br>- Replace the ECU if required. | | | o | | o | o |
| P0653 | ECU Supply Voltage 2 Fault - High (5 V) | - Malfunction reference supply voltage from ECU<br>• Supply voltage: 5 V<br>- Check the supply voltage to each sensor<br>• Supply voltage (5 V): accelerator pedal sensor 1, HFM sensor, rail pressure sensor, booster pressure sensor, cam sensor<br>- Check the wiring harnesses.<br>- Replace the ECU if required. | | | o | | o | o |
| P066A | Internal malfunction in #1 glow plug controller | - Cylinder #1 (Glow Plug #1)<br>- Details: refer to P2673. | | | | | | |
| P066B | Internal short in #1 glow plug controller | - Cylinder #1 (Glow Plug #1)<br>- Details: refer to P2673. | | | | | | |
| P066C | Internal malfunction in #2 glow plug controller | - Cylinder #2 (Glow Plug #2)<br>- Details: refer to P2673. | | | | | | |
| P066D | Internal short in #2 glow plug controller | - Cylinder #2 (Glow Plug #2)<br>- Details: refer to P2673. | | | | | | |
| P066E | Internal malfunction in #3 glow plug controller | - Cylinder #3 (Glow Plug #3)<br>- Details: refer to P2673. | | | | | | |
| P066F | Internal short in #3 glow plug controller | - Cylinder #3 (Glow Plug #3)<br>- Details: refer to P2673. | | | | | | |
| P0670 | Defective power supply of glow plug controller | - 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 | Engine Check Warning Lamp |
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| P0671 | #3 Glow Plug Fault - Open | - The glow plug circuit is open.<br>- Check the communication line between ECU and each glow plug.<br>- Check each glow plug wiring harness.<br>- Check the resistance of each glow plug: below 1 Ω.<br>- Check each glow plug relay.<br>- Check the ECU wiring harness.<br>- Replace the ECU if required. | | | | | | |
| P0671 | #3 Glow Plug - Open Circuit<br>(applied for D27DT engine, Not applied for AQGS model) | D27DT: Preheat control relay<br>- The glow plug has an open circuit.<br>- Check the communication line between ECU and glow plug.<br>- Check the glow plug wiring.<br>- Check the resistance of glow plug.<br>- Check the relay of glow plug.<br>- Check the ECU wiring harness.<br>- Replace the ECU if required.<br>D27DTP: AQGS unit<br>- NGK glow module (AQGS: Advanced Quick Glowing System)<br>- Its condition is sent to ECU through CAN after detected by AQGS.<br>- The AQGS has an electrical problem.<br>- Diagnosis criteria of AQGS<br>• Plug short circuit: voltage > 6V, current = 0A<br>• Plug short circuit (GND): voltage = 0V<br>• Plug short circuit (batt.): voltage = battery voltage<br>• FET malfunction, FET short circuit (GND): voltage = 0V, current = 0A<br>• Input voltage fault: 6V < input voltage < 16V<br>• Communication fault: Abnormal data for over 1 second<br>- Actions<br>• Check the glow plug for malfunction (measuring its resistance).<br>• Check the connector and wiring.<br>• Visually check the glow plug.<br>• Replace the glow plug if required.<br>• Check the CAN line.<br>• Check the IG1 power.<br>• Check the battery power. | | | | | | |

| DTC | Trouble | Help | Torque Reduction (max.50%) | Torque Reduction (max.20%) | Delayed Engine Stop | Immediately Engine Stop | Limp Home Mode | Engine Check Warning Lamp |
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| P0672 | #4 Glow Plug Fault - Open | - The glow plug circuit is open.<br>- Check the communication line between ECU and each glow plug.<br>- Check each glow plug wiring harness.<br>- Check the resistance of each glow plug: below 1Ω.<br>- Check each glow plug relay.<br>- Check the ECU wiring harness.<br>- Replace the ECU if required. | | | | | | |
| P0672 | #4 Glow Plug - Open Circuit<br>(applied for D27DT engine, Not applied for AQGS model) | D27DT: Preheat control relay<br>- The glow plug has an open circuit.<br>- Check the communication line between ECU and glow plug.<br>- Check the glow plug wiring.<br>- Check the resistance of glow plug.<br>- Check the relay of glow plug.<br>- Check the ECU wiring harness.<br>- Replace the ECU if required.<br>D27DTP: AQGS unit<br>- NGK glow module (AQGS: Advanced Quick Glowing System)<br>- Its condition is sent to ECU through CAN after detected by AQGS.<br>- The AQGS has an electrical problem.<br>- Diagnosis criteria of AQGS<br>• Plug short circuit: voltage > 6V, current = 0A<br>• Plug short circuit (GND): voltage = 0V<br>• Plug short circuit (batt.): voltage = battery voltage<br>• FET malfunction, FET short circuit (GND): voltage = 0V, current = 0A<br>• Input voltage fault: 6V < input voltage < 16V<br>• Communication fault: Abnormal data for over 1 second<br>- Actions<br>• Check the glow plug for malfunction (measuring its resistance).<br>• Check the connector and wiring.<br>• Visually check the glow plug.<br>• Replace the glow plug if required.<br>• Check the CAN line.<br>• Check the IG1 power.<br>• Check the battery power. | | | | | | |



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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 |
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| P0673 | #5 Glow Plug Fault - Open | - The glow plug circuit is open.<br>- Check the communication line between ECU and each glow plug.<br>- Check each glow plug wiring harness.<br>- Check the resistance of each glow plug: below 1 Ω.<br>- Check each glow plug relay.<br>- Check the ECU wiring harness.<br>- Replace the ECU if required. | | | | | | |
| P0673 | #5 Glow Plug - Open Circuit<br>(applied for D27DT engine, Not applied for AQGS model) | D27DT: Preheat control relay<br>- The glow plug has an open circuit.<br>- Check the communication line between ECU and glow plug.<br>- Check the glow plug wiring.<br>- Check the resistance of glow plug.<br>- Check the relay of glow plug.<br>- Check the ECU wiring harness.<br>- Replace the ECU if required.<br>D27DTP: AQGS unit<br>- NGK glow module (AQGS: Advanced Quick Glowing System)<br>- Its condition is sent to ECU through CAN after detected by AQGS.<br>- The AQGS has an electrical problem.<br>- Diagnosis criteria of AQGS<br>• Plug short circuit: voltage > 6V, current = 0A<br>• Plug short circuit (GND): voltage = 0V<br>• Plug short circuit (batt.): voltage = battery voltage<br>• FET malfunction, FET short circuit (GND): voltage = 0V, current = 0A<br>• Input voltage fault: 6V < input voltage < 16V<br>• Communication fault: Abnormal data for over 1 second<br>- Actions<br>• Check the glow plug for malfunction (measuring its resistance).<br>• Check the connector and wiring.<br>• Visually check the glow plug.<br>• Replace the glow plug if required.<br>• Check the CAN line.<br>• Check the IG1 power.<br>• Check the battery power. | | | | | | |

| DTC | Trouble | Help | Torque Reduction (max.50%) | Torque Reduction (max.20%) | Delayed Engine Stop | Immediately Engine Stop | Limp Home Mode | Engine Check Warning Lamp |
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| P0674 | #1 Glow Plug Fault - Open | - The glow plug circuit is open.<br>- Check the communication line between ECU and each glow plug.<br>- Check each glow plug wiring harness.<br>- Check the resistance of each glow plug: below 1 Ω.<br>- Check each glow plug relay.<br>- Check the ECU wiring harness.<br>- Replace the ECU if required. | | | | | | |
| P0674 | #1 Glow Plug - Open Circuit | D27DT: Preheat control relay<br>- The glow plug has an open circuit.<br>- Check the communication line between ECU and glow plug.<br>- Check the glow plug wiring.<br>- Check the resistance of glow plug.<br>- Check the relay of glow plug.<br>- Check the ECU wiring harness.<br>- Replace the ECU if required.<br>D27DTP: AQGS unit<br>- NGK glow module (AQGS: Advanced Quick Glowing System)<br>- Its condition is sent to ECU through CAN after detected by AQGS.<br>- The AQGS has an electrical problem.<br>- Diagnosis criteria of AQGS<br>• Plug short circuit: voltage > 6V, current = 0A<br>• Plug short circuit (GND): voltage = 0V<br>• Plug short circuit (batt.): voltage = battery voltage<br>• FET malfunction, FET short circuit (GND): voltage = 0V, current = 0A<br>• Input voltage fault: 6V < input voltage < 16V<br>• Communication fault: Abnormal data for over 1 second<br>- Actions<br>• Check the glow plug for malfunction (measuring its resistance).<br>• Check the connector and wiring.<br>• Visually check the glow plug.<br>• Replace the glow plug if required.<br>• Check the CAN line.<br>• Check the IG1 power.<br>• Check the battery power. | | | | | | |



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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 |
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| P0675 | #2 Glow Plug Fault - Open | - The glow plug circuit is open.<br>- Check the communication line between ECU and each glow plug.<br>- Check each glow plug wiring harness.<br>- Check the resistance of each glow plug: below 1 Ω.<br>- Check each glow plug relay.<br>- Check the ECU wiring harness.<br>- Replace the ECU if required. | | | | | | |
| P0675 | #2 Glow Plug - Open Circuit<br>(applied for D27DT engine, Not applied for AQGS model) | D27DT: Preheat control relay<br>- The glow plug has an open circuit.<br>- Check the communication line between ECU and glow plug.<br>- Check the glow plug wiring.<br>- Check the resistance of glow plug.<br>- Check the relay of glow plug.<br>- Check the ECU wiring harness.<br>- Replace the ECU if required.<br>D27DTP: AQGS unit<br>- NGK glow module (AQGS: Advanced Quick Glowing System)<br>- Its condition is sent to ECU through CAN after detected by AQGS.<br>- The AQGS has an electrical problem.<br>- Diagnosis criteria of AQGS<br>• Plug short circuit: voltage > 6V, current = 0A<br>• Plug short circuit (GND): voltage = 0V<br>• Plug short circuit (batt.): voltage = battery voltage<br>• FET malfunction, FET short circuit (GND): voltage = 0V, current = 0A<br>• Input voltage fault: 6V < input voltage < 16V<br>• Communication fault: Abnormal data for over 1 second<br>- Actions<br>• Check the glow plug for malfunction (measuring its resistance).<br>• Check the connector and wiring.<br>• Visually check the glow plug.<br>• Replace the glow plug if required.<br>• Check the CAN line.<br>• Check the IG1 power.<br>• Check the battery power. | | | | | | |

| DTC | Trouble | Help | Torque Reduction (max.50%) | Torque Reduction (max.20%) | Delayed Engine Stop | Immediately Engine Stop | Limp Home Mode | Engine Check Warning Lamp |
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| P067A | Internal malfunction in #4 glow plug controller | - Cylinder #4 (Glow Plug #4)<br>- Details: refer to P2673. | | | | | | |
| P067B | Internal short in #4 glow plug controller | - Cylinder #4 (Glow Plug #4)<br>- Details: refer to P2673. | | | | | | |
| P067C | Internal malfunction in #5 glow plug controller | - Cylinder #5 (Glow Plug #5)<br>- Details: refer to P2673. | | | | | | |
| P067D | Internal short in #5 glow plug controller | - Cylinder #5 (Glow Plug #5)<br>- Details: refer to P2673. | | | | | | |
| P0683 | Defective CAN communiction of glow plug controller | - GCU's CAN signal is intermittently defective. | | | | | | |
| P0685 | Main Relay Malfunction | - The the main relay is unexpectedly high/low state (ECU is supplied after 3 seconds).<br>- Relay resistance: 92 ± 9 Ω (at 20°C)<br>- Check the relay wiring harness (open, short and poor contact).<br>- If the forced operation is not available, replace the ECU. | | | | | | |
| P0697 | ECU Supply Voltage Fault (2.5 V) | - Malfunction reference supply voltage from ECU<br>• Supply voltage: 2.5 V<br>- Check the supply voltage to each sensor<br>• Supply voltage (2.55 V): accelerator pedal sensor 2<br>- Check the wiring harnesses.<br>- Replace the ECU if required. | | | | | | |
| P0698 | ECU Supply Voltage Fault - Low (2.5 V) | - Malfunction reference supply voltage from ECU<br>• Supply voltage: 2.5 V<br>- Check the supply voltage to each sensor<br>• Supply voltage (2.5 V): accelerator pedal sensor 2<br>- Check the wiring harnesses.<br>- Replace the ECU if required. | | | | | | |
| P0699 | ECU Supply Voltage Fault - High (2.5 V) | - Malfunction reference supply voltage from ECU<br>• Supply voltage: 2.5 V<br>- Check the supply voltage to each sensor<br>• Supply voltage (2.55 V): accelerator pedal sensor 2<br>- Check the wiring harnesses.<br>- Replace the ECU if required. | | | | | | |
| P0700 | TCU Signal Fault | - The communication between ECU and TCU is faulty.<br>- Check the communication line between ECU and TCU.<br>- 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 | Engine Check Warning Lamp |
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| P0704 | Clutch switch malfunction | - The clutch switch is faulty (Manual Transmission Only).<br>- Check the switch wiring harness.<br>- Check the switch supply voltage and operations.<br>- Replace the ECU if required. | | | | | | |
| P0805 | Neutral Signal Input Malfunction<br>(Only for D27DT M/T model) | - The neutral signal of M/T is sent to CAN cluster which is then sent to ECU via CAN communication.<br>- The ECU cannot detect whether signal is missing due to the malfunction in neutral signal and wiring or due to the line malfunction.<br>- Check the wiring related to neutral switch. | | | | | | |
| 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).<br>- Actual barometric pressure vs. Output voltages.<br>• 15 Kpa: 0 V 35 Kpa: 1.0 V<br>• 55 Kpa: 2.0 V 80 Kpa: 3.0 V<br>• 100 Kpa: 4.0 V 110 Kpa: 4.5 V<br>- Replace the ECU. | | | | | | o |
| 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).<br>- Check the supply voltage to sensor.<br>- Actual boost pressure vs. Output voltages.<br>• Raw Signal Range: 0.545 ~ 2.490 bar<br>• 0.4 bar: 0.6120 V<br>• 1.4 bar: 2.6520 V<br>• 2.4 bar: 4.6920 V<br>- Check the sensor wiring harness (open, poor contact).<br>- Visually check sensor and replace if required.<br>- Replace the ECU if required.<br>- Check whether existing or not about turbo boosting control malfunction (P1235) simultaneously.<br>- If there is turbo boost control fault, Should be checked followings also;<br>• Leakage before turbo system<br>• Vacuum pump malfunction<br>• Waste gate' solenoid valve<br>• Turbo charger system defect or malfunction itself<br>• Air inlet restriction<br>• Exhaust system restriction | | o | | | | |

| DTC | Trouble | Help | Torque Reduction (max.50%) | Torque Reduction (max.20%) | Delayed Engine Stop | Immediately Engine Stop | Limp Home Mode | Engine Check Warning Lamp |
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| P1107 | Barometric Sensor Circuit Short/GND Short | - Out of range about barometric sensor (short to ground).<br>- Actual barometric pressure vs. Output voltages.<br>• 15 Kpa: 0 V 35 Kpa: 1.0 V<br>• 55 Kpa: 2.0 V 80 Kpa: 3.0 V<br>• 100 Kpa: 4.0 V 110 Kpa: 4.5 V<br>- Replace the ECU. | | | | | | |
| P1108 | Barometric Sensor Circuit Short | - Out of range about barometric sensor (short to B+).<br>- Actual barometric pressure vs. Output voltages.<br>• 15 Kpa: 0 V 35 Kpa: 1.0 V<br>• 55 Kpa: 2.0 V 80 Kpa: 3.0 V<br>• 100 Kpa: 4.0 V 110 Kpa: 4.5 V<br>- Replace the ECU. | | | | | | |
| P1109 | Booster Pressure Sensor Initial Check Fault | - Implausible signal values or range about boost pressure sensor at Engine running condition (Higher than specified values).<br>- Check the supply voltage to sensor.<br>- Actual boost pressure vs. Output voltages<br>• Raw Signal Range: 0.545 ~ 2.490 bar<br>• 0.4 bar: 0.6120 V<br>• 1.4 bar: 2.6520 V<br>• 2.4 bar: 4.6920 V<br>- Check the sensor wiring harness (open, poor contact).<br>- Visually check sensor and replace if required.<br>- Replace the ECU if required.<br>- Check whether existing or not about turbo boosting control malfunction (P1235) simultaneously.<br>- If there is turbo boost control fault, Should be checked followings also;<br>• Leakage before turbo system<br>• Vacuum pump malfunction<br>• Waste gate' solenoid valve<br>• Turbo charger system defect or malfunction itself<br>• Air inlet restriction<br>• Exhaust system restriction | | | | | | |



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