DTC P0299:00 [SKYACTIV-D 2.2]

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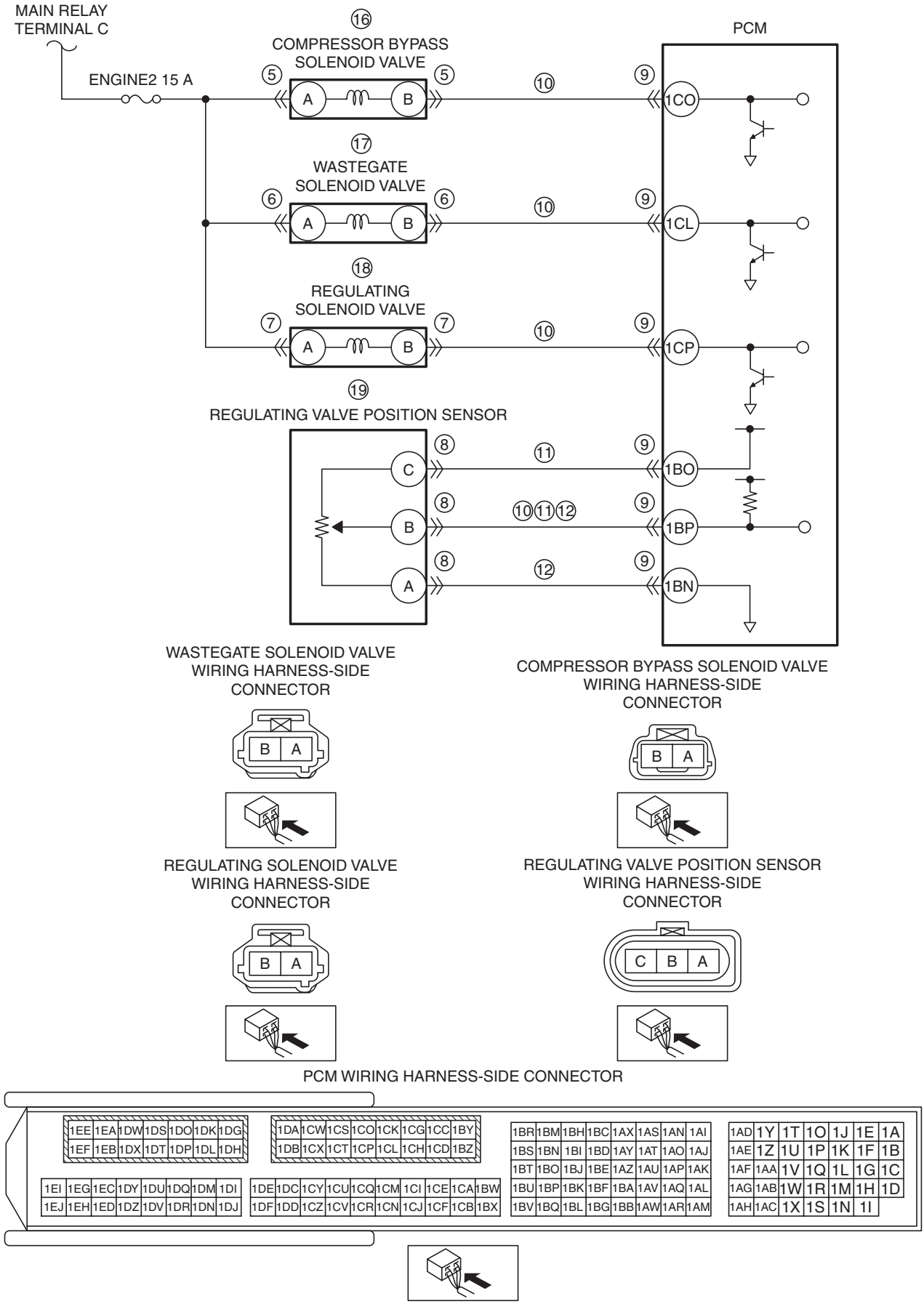
DTC P0299:00	Small-type turbocharger underboost condition
DETECTION CONDITION	• The difference between the target intake air pressure and the actual intake air pressure in the range of the small-type turbocharger exceeds the specified value for a continuous **7 s** when the following conditions are met: **MONITORING CONDITIONS** — Small-type turbocharger is operating — Diesel particulate filter regeneration control is not performed — Engine speed: **2,000 rpm or more** — Fuel injection amount: **25 mm^3/stroke or more** **Diagnostic support note** • This is a continuous monitor (CCM). • The check engine light illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2)/Snapshot data is available. • DTC is stored in the PCM memory.
FAIL-SAFE FUNCTION	• Inhibits the EGR control. • Inhibits engine-stop by operating the i-stop function. • PCM restricts engine-transaxle integration control.
POSSIBLE CAUSE	• Exhaust system leakage • Compressor bypass solenoid valve connector or terminals malfunction • Wastegate solenoid valve connector or terminals malfunction • Regulating solenoid valve connector or terminals malfunction • Regulating valve position sensor connector or terminals malfunction • PCM connector or terminals malfunction • Short to power supply in wiring harness between the following terminals: — Compressor bypass solenoid valve terminal B—PCM terminal 1CO — Wastegate solenoid valve terminal B—PCM terminal 1CL — Regulating solenoid valve terminal B—PCM terminal 1CP — Regulating valve position sensor terminal B—PCM terminal 1BP • Regulating valve position sensor power supply circuit and signal circuit are shorted to each other • Open circuit in wiring harness between the following terminals: — Regulating valve position sensor terminal B—PCM terminal 1BP — Regulating valve position sensor terminal A—PCM terminal 1BN • Vacuum piping or positive pressure piping of compressor bypass valve malfunction • Vacuum piping or positive pressure piping of wastegate valve malfunction • Vacuum piping or positive pressure piping of regulating valve malfunction • Compressor bypass solenoid valve malfunction • Wastegate solenoid valve malfunction • Regulating solenoid valve malfunction • Regulating valve position sensor malfunction • Turbocharger malfunction (Small turbine, small compressor, large turbine, large compressor) • PCM malfunction

DTC P0299:00	Small-type turbocharger underboost condition



Diagnostic Procedure

STEP	INSPECTION		ACTION
1	**VERIFY FREEZE FRAME DATA (MODE 2)/ SNAPSHOT DATA HAS BEEN RECORDED** • Has the FREEZE FRAME DATA (Mode 2)/ snapshot data been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 2)/snapshot data on the repair order, then go to the next step.
2	**VERIFY RELATED SERVICE INFORMATION AVAILABILITY** • Verify related Service Information availability. • Is any related Service Information available?	Yes	Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	**VERIFY RELATED PENDING CODE AND/OR DTC** • Switch the ignition off, then ON (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-D 2.2].) • Are any other PENDING CODEs and/or DTCs present?	Yes	Go to the applicable PENDING CODE or DTC inspection. (See DTC TABLE [SKYACTIV-D 2.2].)
		No	Go to the next step.
4	**INSPECT EXHAUST SYSTEM FOR LEAKAGE** • Visually inspect for exhaust leakage in the exhaust system. • Is there any leakage?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Go to the next step.
5	**INSPECT COMPRESSOR BYPASS SOLENOID VALVE CONNECTOR CONDITION** • Switch the ignition off. • Disconnect the compressor bypass solenoid valve connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector and/or terminals, then go to Step 21.
		No	Go to the next step.
6	**INSPECT WASTEGATE SOLENOID VALVE CONNECTOR CONDITION** • Disconnect the wastegate solenoid valve connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector and/or terminals, then go to Step 21.
		No	Go to the next step.
7	**INSPECT REGULATING SOLENOID VALVE CONNECTOR CONDITION** • Disconnect the regulating solenoid valve connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector and/or terminals, then go to Step 21.
		No	Go to the next step.
8	**INSPECT REGULATING VALVE POSITION SENSOR CONNECTOR CONDITION** • Disconnect the regulating valve position sensor connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector and/or terminals, then go to Step 21.
		No	Go to the next step.
9	**INSPECT PCM CONNECTOR CONDITION** • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/ pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector and/or terminals, then go to Step 21.
		No	Go to the next step.

STEP	INSPECTION		ACTION
10	**INSPECT EACH CIRCUIT FOR SHORT TO POWER SUPPLY** • Verify that the compressor bypass solenoid valve and wastegate solenoid valve and regulating solenoid valve and regulating valve position sensor and PCM connectors are disconnected. • Switch the ignition ON (engine off). • Measure the voltage at the following terminals (wiring harness-side): — Compressor bypass solenoid valve terminal B — Wastegate solenoid valve terminal B — Regulating solenoid valve terminal B — Regulating valve position sensor terminal B • Is the voltage **B+**?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible short to power supply, then go to Step 21.
11	**INSPECT REGULATING VALVE POSITION SENSOR POWER SUPPLY CIRCUIT AND SIGNAL CIRCUIT FOR SHORT TO EACH OTHER** • Verify that the compressor bypass solenoid valve and wastegate solenoid valve and regulating solenoid valve and regulating valve position sensor and PCM connectors are disconnected. • Switch the ignition off. • Inspect for continuity between regulating valve position sensor terminals C and B (wiring harness-side). • Is there continuity?	Yes	Repair or replace the wiring harness for a possible short to each other, then go to Step 21.
		No	Go to the next step.
12	**INSPECT REGULATING VALVE POSITION SENSOR CIRCUIT FOR OPEN CIRCUIT** • Verify that the compressor bypass solenoid valve and wastegate solenoid valve and regulating solenoid valve and regulating valve position sensor and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side): — Regulating valve position sensor terminal B—PCM terminal 1BP — Regulating valve position sensor terminal A—PCM terminal 1BN • Is there continuity?	Yes	Go to the next step.
		No	Repair or the replace the wiring harness for a possible open circuit, then go to Step 21.
13	**INSPECT VACUUM PIPING AND POSITIVE PRESSURE PIPING OF COMPRESSOR BYPASS VALVE** • Inspect vacuum piping and positive pressure piping of compressor bypass valve. (See TURBOCHARGER REMOVAL/ INSTALLATION [SKYACTIV-D 2.2].) • Is there hose leakage or damage in the vacuum piping and positive pressure piping?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Go to the next step.
14	**INSPECT VACUUM PIPING AND POSITIVE PRESSURE PIPING OF WASTEGATE VALVE** • Inspect vacuum piping and positive pressure piping of wastegate valve. (See TURBOCHARGER REMOVAL/ INSTALLATION [SKYACTIV-D 2.2].) • Is there hose leakage or damage in the vacuum piping and positive pressure piping?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Go to the next step.

STEP	INSPECTION		ACTION
15	**INSPECT VACUUM PIPING AND POSITIVE PRESSURE PIPING OF REGULATING VALVE** • Inspect vacuum piping and positive pressure piping of regulating valve. (See TURBOCHARGER REMOVAL/ INSTALLATION [SKYACTIV-D 2.2].) • Is there hose leakage or damage in the vacuum piping and positive pressure piping?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 21.
		No	Go to the next step.
16	**INSPECT COMPRESSOR BYPASS SOLENOID VALVE** • Inspect the compressor bypass solenoid valve. (See COMPRESSOR BYPASS SOLENOID VALVE INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the compressor bypass solenoid valve, then go to Step 21. (See COMPRESSOR BYPASS SOLENOID VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
17	**INSPECT WASTEGATE SOLENOID VALVE** • Inspect the wastegate solenoid valve. (See WASTEGATE SOLENOID VALVE INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the wastegate solenoid valve, then go to Step 21. (See WASTEGATE SOLENOID VALVE REMOVAL/ INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
18	**INSPECT REGULATING SOLENOID VALVE** • Inspect the regulating solenoid valve. (See REGULATING SOLENOID VALVE INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the regulating solenoid valve, then go to Step 21. (See REGULATING SOLENOID VALVE REMOVAL/ INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
19	**INSPECT REGULATING VALVE POSITION SENSOR** • Reconnect all disconnected connectors. • Inspect the regulating valve position sensor. (See REGULATING VALVE POSITION SENSOR INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the regulating valve actuator, then go to Step 21. (See TURBOCHARGER REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
20	**INSPECT TURBOCHARGER** • Inspect the turbocharger. (See TURBOCHARGER INSPECTION [SKYACTIV-D 2.2].) • Is there any malfunction?	Yes	Replace the turbocharger, then go to the next step. (See TURBOCHARGER REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
		No	Go to the next step.
21	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Always reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See AFTER REPAIR PROCEDURE [SKYACTIV-D 2.2].) • Start the engine and warm it up completely. **Caution** **• While performing this step, always operate the vehicle in a safe and lawful manner.** **• When the M-MDS is used to observe monitor system status while driving, be sure to have another technician with you, or record the data in the M-MDS using the PID/DATA MONITOR AND RECORD capturing function and inspect later.** • Drive the vehicle under the FREEZE FRAME DATA (Mode 2)/snapshot data condition. • Perform the Pending Trouble Code Access Procedure. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-D 2.2].) • Is the PENDING CODE for this DTC present?	Yes	Repeat the inspection from Step 1. • If the malfunction recurs, replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-D 2.2].) Go to the next step.
		No	Go to the next step.

STEP	INSPECTION		ACTION
22	**VERIFY AFTER REPAIR PROCEDURE** • Perform the “AFTER REPAIR PROCEDURE”. (See AFTER REPAIR PROCEDURE [SKYACTIV-D 2.2].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [SKYACTIV-D 2.2].)
		No	DTC troubleshooting completed.