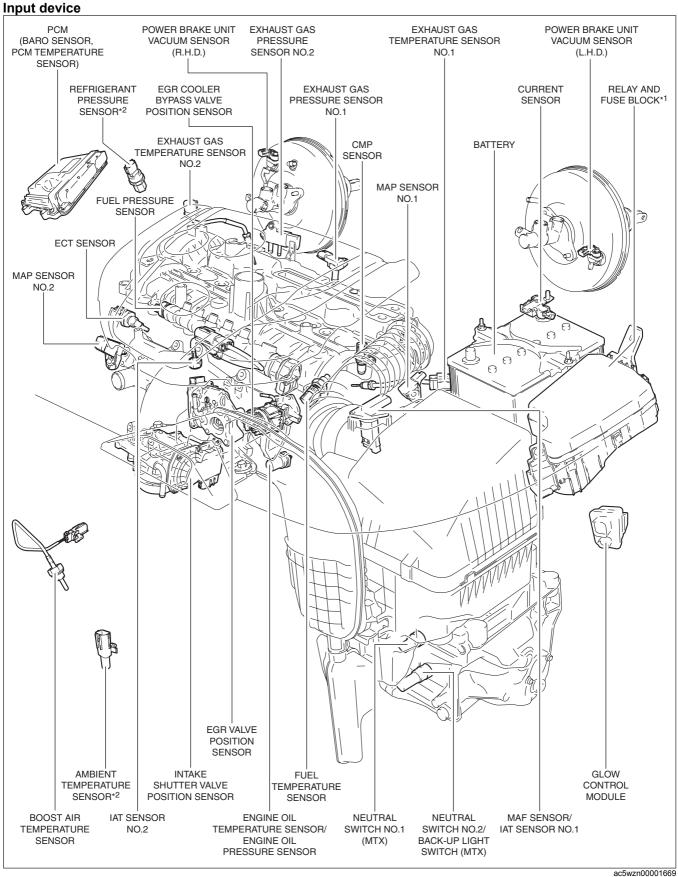
ENGINE CONTROL SYSTEM [SKYACTIV-D 2.2]

id0140z7139900

Outline

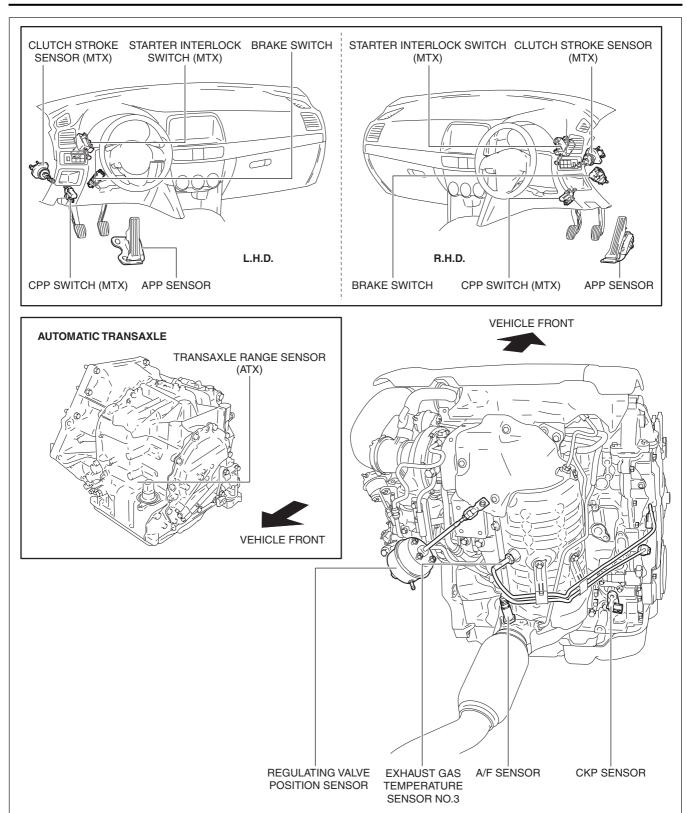
- Two-step boost control has been adopted, realizing low emission, low fuel consumption, high torque, and high response.
 - Compressor bypass solenoid valve adopted
 - Regulating solenoid valve adopted
 - Wastegate solenoid valve adopted
- Intake stroke EGR using double exhaust valve actuation system (IDEVA) control has been adopted, realizing combustion stability at cold temperatures.
 - OCV adopted
- Glow control has been adopted to improve engine startability and diesel particulate filter regeneration performance.
 - Glow control module adopted
- Engine hydraulic pressure switching control has been adopted reducing engine load.
 - Engine oil solenoid valve adopted
- DC-DC converter control has been adopted for improved power supply stability.
 - DC-DC converter adopted
- Generator output control adopted, fuel economy/idling stability improved.
 - Current sensor adopted

Structural View

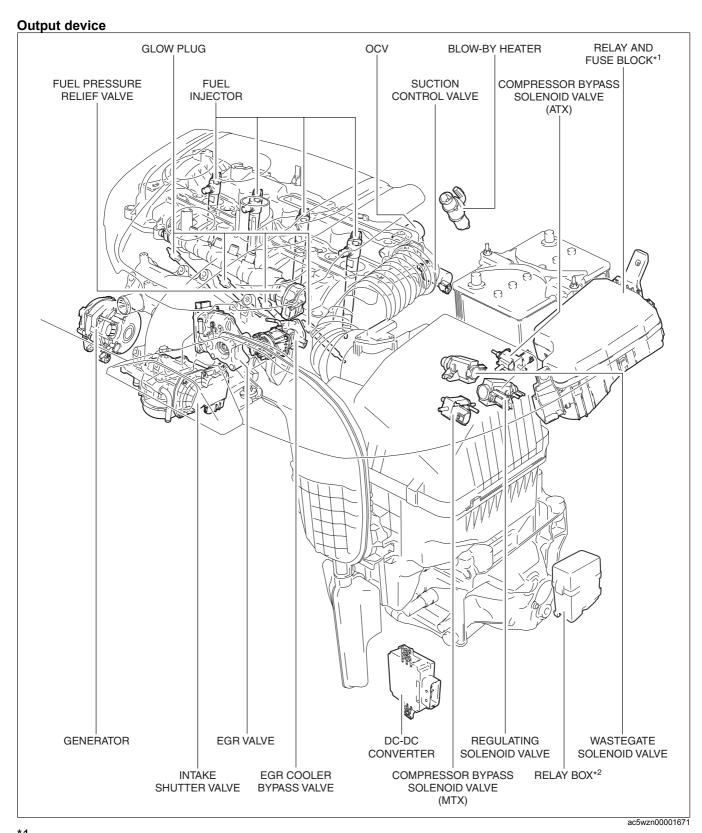


 *1 : Check connector, IG1 relay

*2: With air conditioner

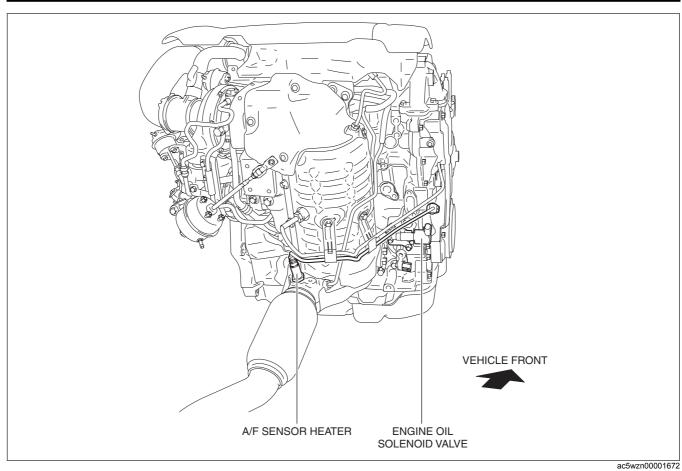


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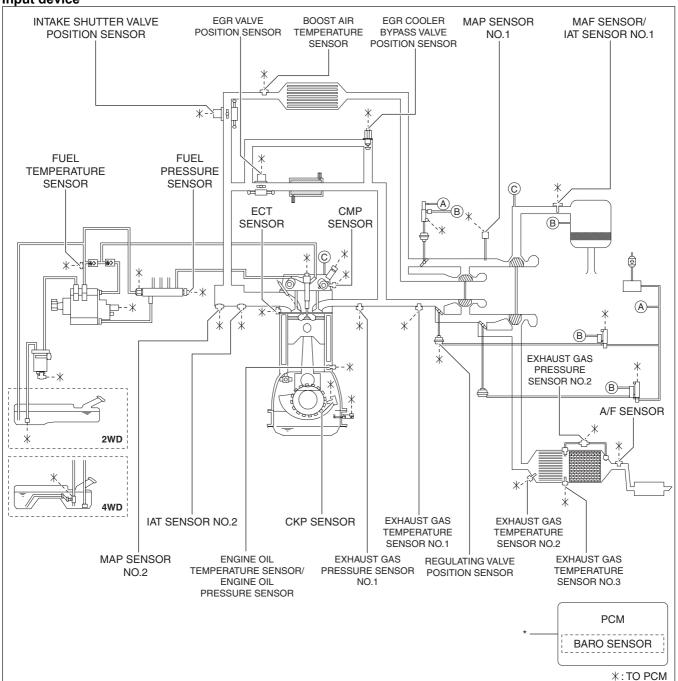


*1 : Main relay, blow-by heater relay, starter relay, A/C relay

 *2 : Cooling fan relay No.1, cooling fan relay No.2

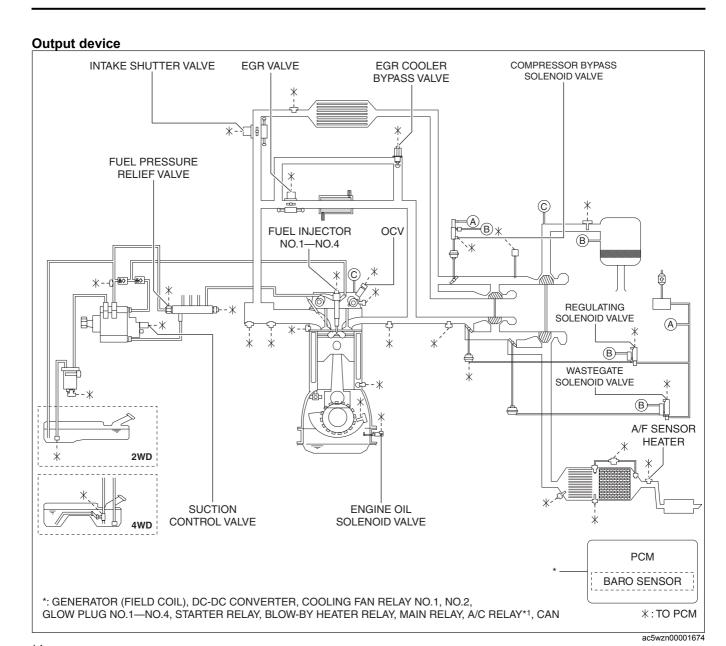


System Diagram Input device



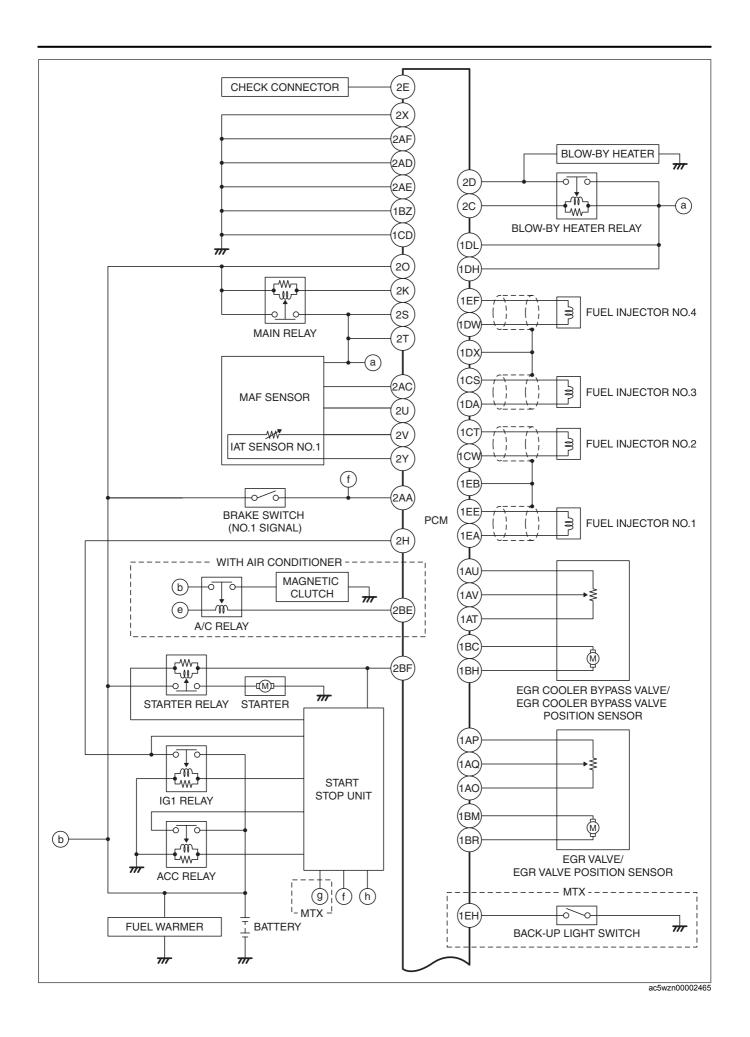
*: CHECK CONNECTOR, GLOW CONTROL MODULE, APP SENSOR NO.1, NO.2, POWER BRAKE UNIT VACUUM SENSOR, BATTERY, TRANSAXLE RANGE SENSOR (ATX), REFRIGERANT PRESSURE SESNSOR*1, AMBIENT TEMPERATURE SENSOR*1, BRAKE SWITCH (NO.1 SIGNAL), (NO.2 SIGNAL), IG1 RELAY, BACK-UP LIGHT SWITCH (MTX), STARTER INTERLOCK SWITCH (MTX), NEUTRAL SWITCH NO.1 (MTX), NEUTRAL SWITCH NO.2 (MTX), CPP SWITCH (MTX), CLUTCH STROKE SENSOR (MTX), CAN

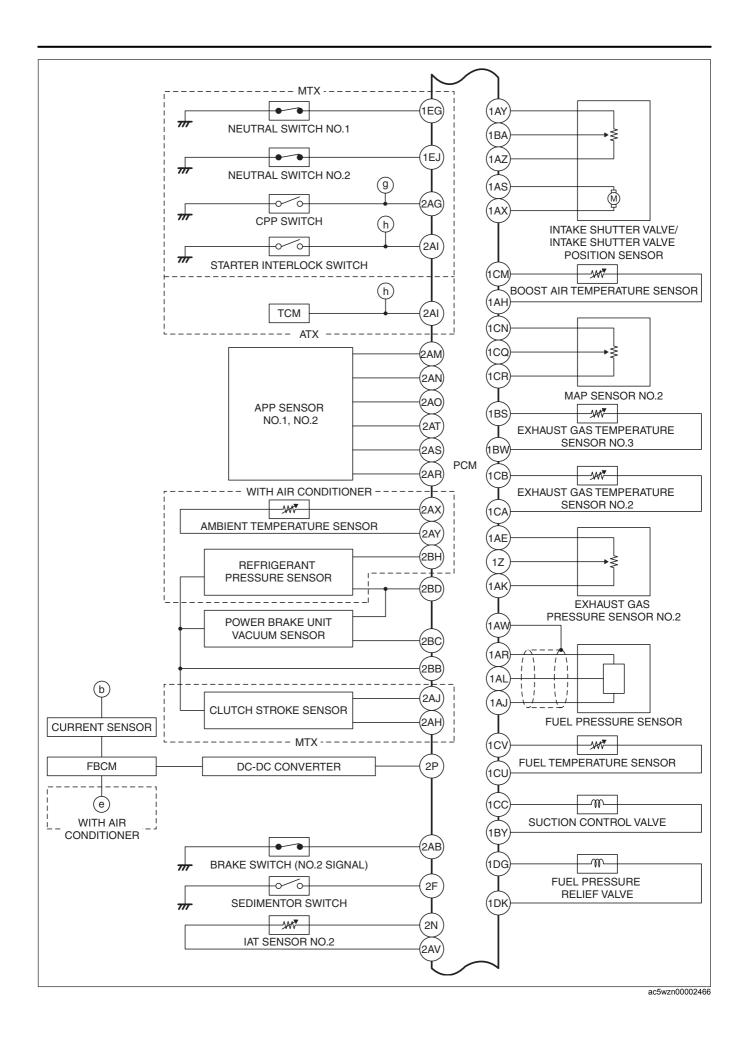
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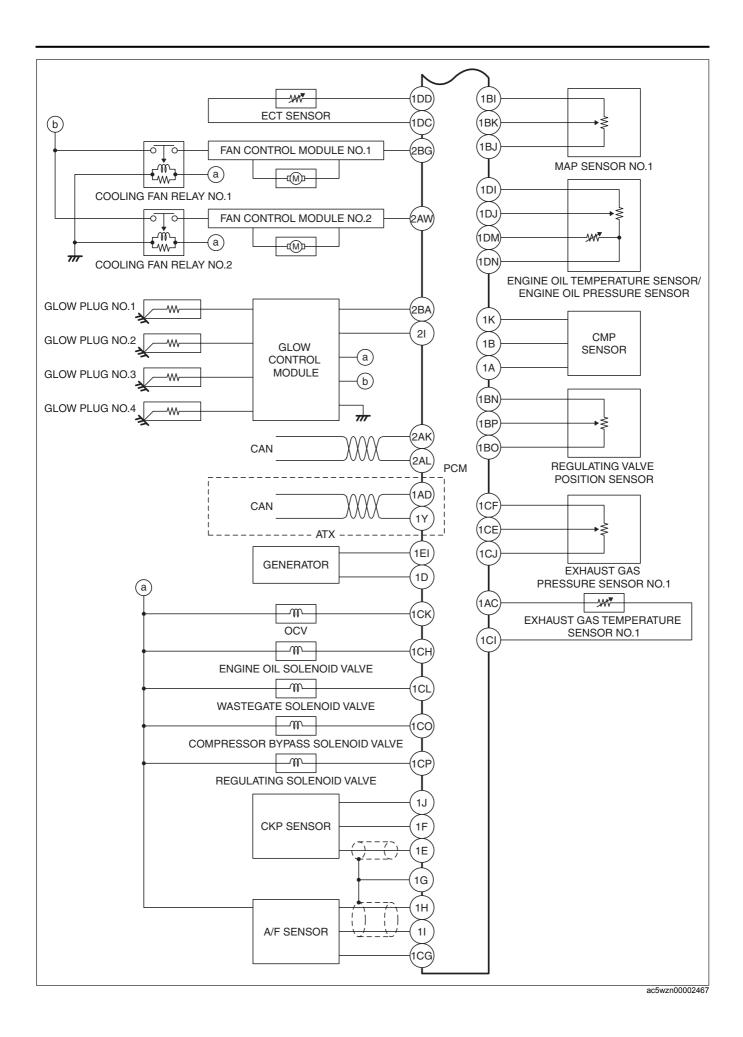


*1 : With air conditioner

System Wiring Diagram







Block Diagram PCM APP SENSOR NO.1, NO.2 FUEL INJECTOR NO.1-NO.4 MAIN RELAY CONTROL BOOST AIR TEMPERATURE SENSOR MAIN RELAY MAF SENSOR GLOW PLUG NO.1-NO.4 IDLE SPEED CONTROL IAT SENSOR NO.1, NO.2 SUCTION CONTROL VALVE TWO-STAGE MAP SENSOR NO.1, NO.2 TURBO CONTROL OCV **CKP SENSOR** FUEL PRESSURE RELIEF VALVE INTAKE STROKE EGR USING CMP SENSOR DOUBLE EXHAUST VALVE INTAKE SHUTTER VALVE **ACTUATION SYSTEM (IDEVA) FCT SENSOR** CONTROL COOLING FAN RELAY NO.1 **FUEL PRESSURE SENSOR** COOLING FAN RELAY NO.2 **FUEL INJECTION** BARO SENSOR AMOUNT CONTROL A/F SENSOR HEATER EGR COOLER BYPASS VALVE POSITION SENSOR COMPRESSOR BYPASS MULTIPLE FUEL POWER BRAKE UNIT VACUUM SENSOR SOLENOID VALVE INJECTION CONTROL **FGR VALVE** EXHAUST GAS PRESSURE SENSOR NO.1 **FUEL INJECTION** A/C RELAY*2 EXHAUST GAS PRESSURE SENSOR NO.2 **TIMING CONTROL** A/F SENSOR STARTER RELAY FUEL PRESSURE CONTROL REFRIGERANT PRESSURE SENSOR*2 GENERATOR (FIELD COIL) **IG1 RELAY** INTAKE SHUTTER DC-DC CONVERTER VALVE CONTROL **EXHAUST GAS TEMPERATURE FNGINE OIL SOLFNOID VALVE** SENSOR NO.1 **EXHAUST GAS TEMPERATURE GLOW CONTROL** EGR COOLER BYPASS VALVE SENSOR NO.2 EXHAUST GAS TEMPERATURE WASTEGATE SOLENOID VALVE **EGR CONTROL** SENSOR NO.3 REGULATING SOLENOID VALVE TRANSAXLE RANGE SENSOR (ATX) AIR FUEL RATIO (A/F) SENSOR HEATER CONTROL **BLOW-BY HEATER RELAY BATTERY** CHECK CONNECTOR DIESEL PARTICULATE FILTER REGENERATION CONTROL REGULATING VALVE POSITION SENSOR BRAKE SWITCH (NO.1 SIGNAL) A/C CUT-OFF CONTROL GLOW CONTROL MODULE **ELECTRICAL FAN CONTROL** AMBIENT TEMPERATURE SENSOR*2 BRAKE SWITCH (NO.2 SIGNAL) STARTER CUT-OFF CONTROL ENGINE OIL TEMPERATURE SENSOR. ENGINE OIL PRESSURE SENSOR GENERATOR CONTROL INTAKE SHUTTER VALVE POSITION SENSOR **RUN DRY PREVENTION** FUEL TEMPERATURE SENSOR (RDP) CONTROL EGR VALVE POSITION SENSOR **BLOW-BY HEATER CONTROL** CLUTCH STROKE SENSOR (MTX) STARTER INTERLOCK SWITCH (MTX) i-stop CONTROL **NEUTRAL SWITCH NO.1 (MTX)** DC-DC CONVERTER **NEUTRAL SWITCH NO.2 (MTX)** CONTROL

ENGINE OIL CONTROL

CPP SWITCH (MTX)

BACK-UP LIGHT SWITCH (MTX)

CAN*1

Relation Chart

																	>	κ: A	ppl	lica	ble	
Item	MAIN RELAY CONTROL	IDLE SPEED CONTROL	TWO-STAGE TURBO CONTROL	IDEVA*1 CONTROL	FUEL INJECTION AMOUNT CONTROL	MULTIPLE FUEL INJECTION CONTROL	FUEL INJECTION TIMING CONTROL	FUEL PRESSURE CONTROL	INTAKE SHUTTER VALVE CONTROL	GLOW CONTROL	EGR CONTROL	AIR FUEL RATIO (A/F) SENSOR HEATER CONTROL	DIESEL PARTICULATE FILTER REGENERATION CONTROL	A/C CUT-OFF CONTROL	ELECTRICAL FAN CONTROL	STARTER CUT-OFF CONTROL	GENERATOR CONTROL	RUN DRY PREVENTION (RDP) CONTROL	BLOW-BY HEATER CONTROL	i-stop CONTROL	DC-DC CONVERTER CONTROL	ENGINE OIL CONTROL
Input device																						
Check connector													×	×								
IG1 relay	×		×						×	×							×			×	×	
Brake switch (No.1 signal)			×																	×		
Brake switch (No.2 signal)																				×		
Glow control module										×												
MAP sensor No.2		×	×		×	×	×		×		×		×									
IAT sensor No.1	-				×	×	×		×		×		×								_	_
MAP sensor No.1			×										×									_
ECT sensor		×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×			×		×
Fuel temperature sensor					×			×														
IAT sensor No.2		×	×		×	×	×		×	×	×	×	×				×			×		-
Boost air temperature sensor	-		×		U.		u,				L.		×				×			×		-
APP sensor No.1, No.2 MAF sensor	+	×	×		×	×	×	×	×		×	\vdash	×	×		-	^	\vdash		^		-
Fuel pressure sensor	-		^		×	<u> </u>	^	×	_		_		×									-
Intake shutter valve position sensor			×		<u> </u>			^	×		×		×			-				×		-
EGR cooler bypass valve position sensor			×						×		×		×							×		<u> </u>
EGR valve position sensor			×						×		×		×							×		
Exhaust gas pressure sensor No.2		×								×			×									
BARO sensor		×	×		×	×	×	×	×	×	×		×							×		
Battery		L	×							×		×			×		×			×		
Refrigerant pressure sensor*3		×												×	×							
Exhaust gas pressure sensor No.1		×	×						×		×		×									
Exhaust gas temperature sensor No.1			×						×		×		×									
Exhaust gas temperature sensor No.2					×	×	×						×									
Exhaust gas temperature sensor No.3												×	×									
Engine oil temperature sensor		×		×									×									×
Engine oil pressure sensor		×		×									×								<u> </u>	<u> </u>
Regulating valve position sensor			×										×							×	<u> </u>	<u> </u>
Ambient temperature sensor*3																			×			\perp
A/F sensor					×	×	×		×		×											

 $^{^{*1}}$: TCM (ATX), DSC HU/CM, front body control module (FBCM), rear body control module (RBCM), instrument cluster, start stop unit, EPS control module *2 : With air conditioner

Item	MAIN RELAY CONTROL	IDLE SPEED CONTROL	TWO-STAGE TURBO CONTROL	IDEVA*1 CONTROL	FUEL INJECTION AMOUNT CONTROL	MULTIPLE FUEL INJECTION CONTROL	FUEL INJECTION TIMING CONTROL	FUEL PRESSURE CONTROL	INTAKE SHUTTER VALVE CONTROL	GLOW CONTROL	EGR CONTROL	FUEL RATIO (A/F) SENSOR HEATER CONTROL	PARTICULATE FILTER REGENERATION CONTROL	A/C CUT-OFF CONTROL	ELECTRICAL FAN CONTROL	STARTER CUT-OFF CONTROL	GENERATOR CONTROL	RUN DRY PREVENTION (RDP) CONTROL	BLOW-BY HEATER CONTROL	i-stop CONTROL	DC-DC CONVERTER CONTROL	ENGINE OIL CONTROL
Dower broke unit vacuum concer			×									AIR FL	DIESEL PA							×		
Power brake unit vacuum sensor	-																					
CKP sensor	×	×	×	×	×	×	×	×	×	×	×	×	×	×		×	×		×	×		×
CMP sensor	-				×	×	×	×	×		×	_					×			×		
Transaxle range sensor (ATX)	-	×			×	×	×		×				×			×				×		
Back-up light switch (MTX)	-	×			×	×	×		×			_	×			×				×		
Neutral switch No.1 (MTX)		×			×	×	×		×				×	×		×	×			×		
CPP switch (MTX)		×			×	×	×		×				×			×	×			×		
Starter interlock switch (MTX)	-										_	_								×		
Neutral switch No.2 (MTX)	-																			×		
Clutch stroke sensor (MTX)	-																			×		
CAN*2		×	×		×	×	×		×	×	×		×	×	×	×	×	×		×	×	
Output device																						
Intake shutter valve									×				×							×		
EGR cooler bypass valve											×		×							×		
EGR valve											×		×							×		
Fuel pressure relief valve								×												×		
Main relay	×																					
Regulating solenoid valve			×										×							×		
Wastegate solenoid valve			×										×							×		
Compressor bypass solenoid valve			×										×						Ш	×		
A/F sensor heater												×								×		
Starter relay																×			Ш	×		
Generator (Field coil)		×															×			×		
A/C relay*3														×								
Cooling fan relay No.1															×							
Cooling fan relay No.2															×							
Engine oil solenoid valve				×									×									×
Suction control valve								×												×		
Fuel injector No.1—No.4		×			×	×	×						×					×		×		
Blow-by heater relay																			×			
OCV				×									×									
DC-DC converter																	×				×	
Glow plug No.1—No.4										×			×									

^{*1 :} Intake stroke EGR using double exhaust valve actuation system
*2 : TCM (ATX), DSC HU/CM, front body control module (FBCM), rear body control module (RBCM), instrument cluster, start stop unit, EPS control module
*3 : With air conditioner