

[\[Previous\]](#) [\[Next\]](#)

Abbreviation List

The following **ABBREVIATIONS** are used:

A

ABBREVIATION	DESCRIPTION
A/C	Air conditioner
A/C	Air conditioning
ADCM	AdBlue® dosing control module
A/F sensor	Air fuel ratio sensor
A/T	Automatic transaxle/transmission
ABS	Anti-lock braking system
ACCS	Advance climate control system
ACL	Air cleaner
AP	Accelerator pedal
APP	Accelerator pedal position
ATF	Automatic transmission fluid
AV	Audio visual
AWD	All wheel drive

note

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B

ABBREVIATION	DESCRIPTION
BARO	Barometric pressure
BCI	Back-up collision intervention
BCM	Body control module
BLSD	Brake limited slip differential
BPP	Brake pedal position
BSW	Blind spot warning

C

ABBREVIATION	DESCRIPTION
CGW	Can Gateway
CKP	Crankshaft position

ABBREVIATION	DESCRIPTION
CL	Closed loop
CMP	Camshaft position
CPP	Clutch pedal position
CTP	Closed throttle position
CVT	Continuously variable transaxle/transmission

D

ABBREVIATION	DESCRIPTION
D ₁	Drive range first gear
D ₂	Drive range second gear
D ₃	Drive range third gear
D ₄	Drive range fourth gear
DCA	Distance control assist
DDS	Downhill drive support
DFI	Direct fuel injection system
DLC	Data link connector
DTC	Diagnostic trouble code

E

ABBREVIATION	DESCRIPTION
E/T	Exhaust temperature
EBD	Electric brake force distribution
EC	Engine control
ECL	Engine coolant level
ECM	Engine control module
ECT	Engine coolant temperature
ECV	Electrical control valve
EEPROM	Electrically erasable programmable read only memory

ABBREVIATION	DESCRIPTION
EFT	Engine fuel temperature
EGR	Exhaust gas recirculation
EGRT	Exhaust gas recirculation temperature
EGT	Exhaust gas temperature
EOP	Engine oil pressure
EP	Exhaust pressure
EPR	Exhaust pressure regulator
EPS	Electronically controlled power steering
	Electric power steering
ESP	Electronic stability program system
EVAP canister	Evaporative emission canister
EVSE	Electric vehicle supply equipment
EXC	Exhaust control

F

ABBREVIATION	DESCRIPTION
FC	Fan control
PFCW	Forward collision warning
FEB	Forward emergency braking
FIC	Fuel injector control
FP	Fuel pump
FR	Front
FRP	Fuel rail pressure
FRT	Fuel rail temperature

ABBREVIATION	DESCRIPTION
FTP	Fuel tank pressure
FTT	Fuel tank temperature

G

ABBREVIATION	DESCRIPTION
GND	Ground
GPF	Gasoline particulate filter
GPS	Global positioning system
GST	Generic scan tool

H

ABBREVIATION	DESCRIPTION
HBMC	Hydraulic body-motion control system
HDD	Hard disk drive
HO2S	Heated oxygen sensor
HOC	Heated oxidation catalyst
HPCM	Hybrid power train control module

I

ABBREVIATION	DESCRIPTION
I/M	Inspection and maintenance
IA	Intake air
IAC	Idle air control
IAT	Intake air temperature
IBA	Intelligent brake assist
IC	Ignition control
ACC	Intelligent cruise control
ICM	Ignition control module
IPDM E/R	Intelligent power distribution module engine room

ABBREVIATION	DESCRIPTION
ISC	Idle speed control
ISS	Input shaft speed

K

ABBREVIATION	DESCRIPTION
KS	Knock sensor

L

ABBREVIATION	DESCRIPTION
LBC	Li-ion battery controller
LCD	Liquid crystal display
LCU	Local control unit
LDP	Lane departure prevention
LDW	Lane departure warning
LED	Light emitting diode
LH	Left-hand
LIN	Local interconnect network

M

ABBREVIATION	DESCRIPTION
M/T	Manual transaxle/transmission
MAF	Mass airflow
MAP	Manifold absolute pressure
MDU	Multi display unit
MI	Malfunction indicator
MIL	Malfunction indicator light

N

ABBREVIATION	DESCRIPTION
NOX	Nitrogen oxides

O

ABBREVIATION	DESCRIPTION
O2	Oxygen
O2S	Oxygen sensor
OBD	On board diagnostic

ABBREVIATION	DESCRIPTION
OC	Oxidation catalytic converter
OD	Overdrive
OL	Open loop
OSS	Output shaft speed

P

ABBREVIATION	DESCRIPTION
P/S	Power steering
PBR	Potential balance resistor
PCV	Positive crankcase ventilation
PFCW	Predictive forward collision warning
PNP	Park/Neutral position
PSP	Power steering pressure
PTC	Positive temperature coefficient
PTO	Power takeoff
PWM	Pulse width modulation

R

ABBREVIATION	DESCRIPTION
RAM	Random access memory
RAS	Rear active steer
RH	Right-hand
ROM	Read only memory
RPM	Engine speed
RR	Rear

S

ABBREVIATION	DESCRIPTION
SAE	Society of Automotive Engineers, Inc.
SCK	Serial clock

ABBREVIATION	DESCRIPTION
SCR	Selective Catalytic Reduction
SDS	Service Data and Specifications
SRT	System readiness test
SST	Special Service Tools

T

ABBREVIATION	DESCRIPTION
TC	Turbocharger
TCM	Transmission control module
TCS	Traction control system
TCU	Telematics communication unit
TP	Throttle position
TPMS	Tire pressure monitoring system
TSS	Turbine shaft speed
TWC	Three way catalytic converter

U

ABBREVIATION	DESCRIPTION
USS	Uphill start support

V

ABBREVIATION	DESCRIPTION
VCM	Vehicle control module
ASC	Vehicle dynamics control system
VIN	Vehicle identification number
VSS	Vehicle speed sensor

W

ABBREVIATION	DESCRIPTION
WOT	Wide open throttle

1

ABBREVIATION	DESCRIPTION
1 ₁	1st range first gear
1 ₂	1st range second gear
1GR	First gear

2

ABBREVIATION	DESCRIPTION
2 ₁	2nd range first gear
2 ₂	2nd range second gear
2GR	Second gear
2WD	2-wheel drive

3

ABBREVIATION	DESCRIPTION
3GR	Third gear

4

ABBREVIATION	DESCRIPTION
4GR	Fourth gear
4WAS	Four wheel active steer
4WD	Four wheel drive

5

ABBREVIATION	DESCRIPTION
5GR	Fifth gear

6

ABBREVIATION	DESCRIPTION
6GR	Sixth gear

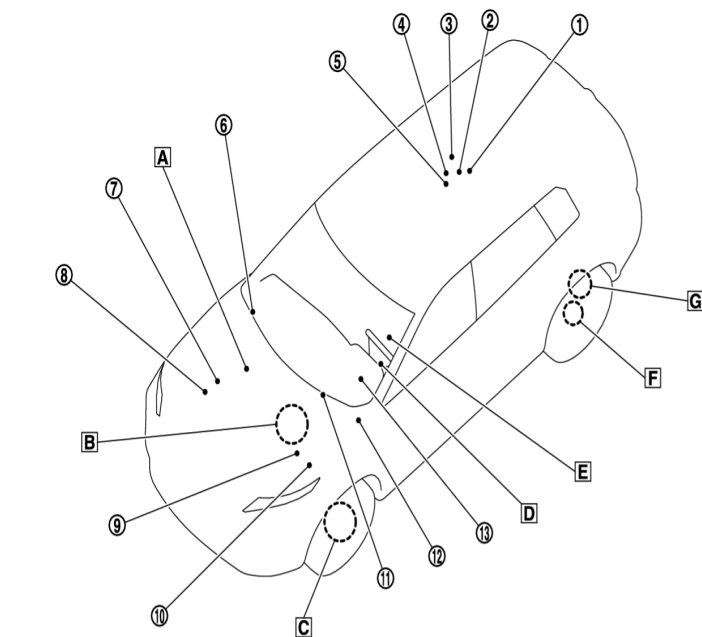
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ABBREVIATION	DESCRIPTION
7GR	Seventh gear



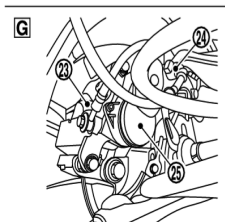
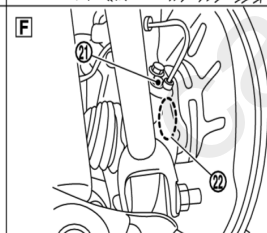
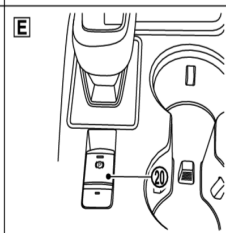
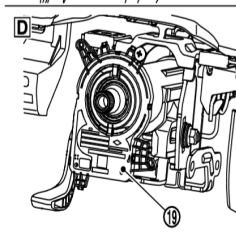
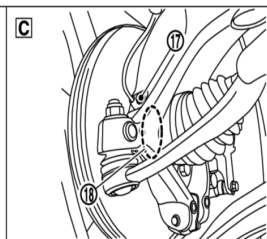
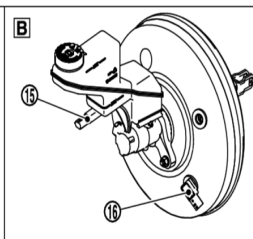
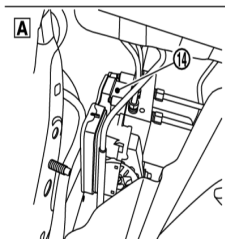
Component Parts Location

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A	Engine room (RH side)	B	Engine room (LH side)	C	Steering knuckle
D	Back of spiral cable assembly	E	Center console	F	Rear axle housing
G	Rear axle housing				

① Parking brake actuator harness (RH)	② Parking brake actuator (RH)	③ Rear brake caliper assembly (RH) Chassis control module Refer to Component
④ Rear RH sensor rotor	⑤ Rear RH wheel sensor	⑥ Parts Location for detailed installation location. ECM Refer to Component
⑦ Front RH wheel sensor	⑧ Front RH sensor rotor	⑨ Parts Location for detailed installation location. BCM Refer to Component
⑩ Parts Location for detailed installation location. IPDM E/R Refer to Component	⑪ Parts Location for detailed installation location. TCM Refer to Component	⑫ Parts Location for detailed installation location. BCM Refer to Component
⑬ Parts Location (full TFT meter), Component (7 inch information display) for detailed installation location. Combination meter Refer to Component	⑭ ABS actuator and electric unit (control unit)	⑮ Brake fluid level switch
⑯ Brake vacuum sensor	⑰ Front LH wheel sensor	⑱ Front LH sensor rotor
⑲ Steering angle sensor	⑳ Parking brake switch	㉑ Rear LH wheel sensor



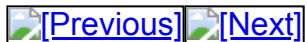
②② Rear LH sensor rotor

②③ Rear brake caliper
assembly (LH)

②④ Parking brake actuator
harness (LH)

②⑤ Parking brake actuator
(LH)

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M.U.T.-III SE Function

APPLICATION ITEMS

M.U.T.-III SE can display each diagnostic item using the diagnostic test modes as follows.

Diagnosis mode	Description
Self Diagnostic Result	Display DTC which ABS actuator and electric unit (control unit) memorizes
Data List	Displays ABS actuator and electric unit (control unit) input/output data in real time
Special Function *1	• Enables an operational check of a load by transmitting a driving signal from the ABS actuator and electric unit (control unit) to the load • Displays ABS actuator and electric unit (control unit) part number • Displays causes of automatic system cancellation occurred during system control
Configuration *1	The vehicle specification can be written when ABS actuator and electric unit (control unit) is replaced

*1: After work, perform self-diagnosis for "Read All DTCs" and erase self-diagnosis result.

SELF DIAGNOSTIC RESULT

Refer to [DTC Index](#) 

When “Active DTC” is displayed on self-diagnosis result

- The system is presently malfunctioning.

When “Stored DTC” is displayed on self-diagnosis result

- System malfunction in the past is detected, but the system is presently normal.

Freeze frame data (FFD)

When DTC is detected, a vehicle state shown below is recorded and displayed on M.U.T.-III SE.

Item	Unit	Description
ODO/TRIP METER	km	Displays the total mileage (Odometer value) of the moment a particular.
DTC count	Count	Displays the number of times DTC is detected.

DATA MONITOR

note	The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to M.U.T.-III SE display items.
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Item (Unit)	Note
Steering angle (deg)	Displays the steering angle.
Battery voltage (V)	Displays the voltage value applied to ABS actuator and electric unit (control unit).
FR LH wheel speed (km/h)	Displays the wheel speed calculated by front LH wheel sensor.
FR RH wheel speed	Displays the wheel speed calculated by front RH wheel sensor.

Item (Unit)	Note
(km/h)	
RR LH wheel speed (km/h)	Displays the wheel speed calculated by rear LH wheel sensor.
RR RH wheel speed (km/h)	Displays the wheel speed calculated by rear RH wheel sensor.
Vehicle speed (km/h)	Displays the vehicle speed.
Odometer (m)	Displays the odometer.
Decel G sensor (m/s ²)	Displays the decel G.
Side G sensor (G)	Displays the side G.
Yaw rate sensor (deg/s)	Displays the yaw rate.
Mastewr cylinder pressure (bar)	Displays the brake fluid pressure.
Valve, pump motor (Off / On)	Displays the valve amd pimp moter status.
FL/RR valve (On / Off)	Displays the front LH and rear RH valve status.
FR/RL valve (On / Off)	Displays the front RH and rear LH valve status.
FL/RR pump (On / Off)	Displays the front LH and rear RH pump motor status.
FR/RL pump (On / Off)	Displays the front RH and rear LH pump motor status.
RR RH ABS OUT valve (On / Off)	Displays the ABS OUT valve status of rear RH.
RR RH AND IN valve (On / Off)	Displays the ABS IN valve status of rear RH.
RR LH ABS OUT valve (On / Off)	Displays the ABS OUT valve status of rear LH.

Item (Unit)	Note
RR LH ABS IN valve (On / Off)	Displays the ABS IN valve status of rear LH.
FR RH ABS OUT valve (On / Off)	Displays the ABS OUT valve status of front RH.
FR RH ABS IN valve (On / Off)	Displays the ABS IN valve status of front RH.
FR LH ABS OUT valve (On / Off)	Displays the ABS OUT valve status of front LH.
FR LH ABS IN valve (On / Off)	Displays the ABS IN valve status of front LH.
Front tire diameter (mm)	Displays the front tire diameter.
Transmission type (M/T / A/T / CVT / DCT / Not)	Displays the Transmission type.
Parking brake type (1 / 2 / 3 / 4 / 5)	Displays the parking brake type.
Stop light (On / Off)	Displays the Stop light status.
AEB/IEB max torque 4 (Nm)	Displays the maximum permissible braking torque of automatic emergency braking (moderate mode).
AEB/IEB max torque 3 (Nm)	Displays the maximum permissible braking torque of automatic emergency braking (strong mode).
AEB/IEB max torque 2 (Nm)	Displays the maximum permissible braking torque of automatic emergency braking (city mode).
AEB/IEB max torque 1 (Nm)	Displays the maximum permissible braking torque of automatic emergency braking (pedestrian mode).
Electric parking mode (Mode1 / Mode2)	Displays the electric parking mode.
ACTUATOR VOLT (RH) (V)	Displays the voltage value applied to the parking brake actuator (RH side).
ACTUATOR VOLT (LH) (V)	Displays the voltage value applied to the parking brake actuator (LH side).
ACTUATOR CURRENT (RH)	Displays the current value applied to the parking brake actuator (RH side).

Item (Unit)	Note
(A)	
ACTUATOR CURRENT (LH) (A)	Displays the current value applied to the parking brake actuator (LH side).
SLOPE RATIO (%)	Displays the slope ratio.
BR FORCE EST (RH) (KN)	Displays the estimated braking force applied to the rear brake (RH side).
BR FORCE EST (LH) (KN)	Displays the estimated braking force applied to the rear brake (LH side).
PB SW (PULL / N / PUSH / MALF)	Displays the parking brake switch status.
MALF LEVEL (NORMAL / REPAIR / STOP)	Displays the malfunction level of electric parking brake system.
BRAKE STATUS (LH) (ACT 1 / ACT 2 / ACT 3 / RLS 1 / RLS 2 / RLS 3 / RLS 4 / UNKNO / INT)	Displays the electric parking brake system status (LH side).
BRAKE STATUS (RH) (ACT 1 / ACT 2 / ACT 3 / RLS 1 / RLS 2 / RLS 3 / RLS 4 / UNKNO / INT)	Displays the electric parking brake system status (RH side).
BR DISC TEMP 1 (°C)	Displays the (current) temperature of the brake disc rotor.
BR DISC TEMP 2 (—)	Displayed but not used.
PB ACTIVE STATUS DISP (REL / ACT 1 / ACT 2 / UNCON)	Displays the active status of electric parking brake system.
PB MALF DISP (NORMAL / MALF 1 / MALF 2)	Displays the malfunction status of electric parking brake system displayed on the information display in the combination meter.
VEHICLE STATUS (NOT / WARN)	Displays the vehicle status.

Item (Unit)	Note
EPB warning 1 (Warning / Off)	Displays the information display in the combination meter displaying status.
PB WARNING 1 (NO / WARN 1 / WARN 2)	Displays the information display in the combination meter displaying status.
PB WARNING 2 (NO / WARN 1 / WARN 2)	Displays the information display in the combination meter displaying status.
PB WARNING 3 (NO / WARN)	Displays the information display in the combination meter displaying status.
PB WARNING 4 (NO / WARN 1 / WARN 2)	Displays the information display in the combination meter displaying status.
PB SW indicator (On / Blink / Off)	Displays the status of parking brake switch indicator.
EPB warning 2 (Not / Warn 1 / Warn 2 / Warn 3)	Displays the information display in the combination meter displaying status.

ACTIVE TEST

The active test is used to determine and identify details of a malfunction, based on self-diagnosis test results and data obtained in the data monitor. In response to instructions from M.U.T.-III SE, instead of those from ABS actuator and electric unit (control unit) on the vehicle, a drive signal is sent to the actuator to check its operation.

caution	• Never perform active test while driving the vehicle. • Always bleed air from brake system before active test. • Never perform active test when system is malfunctioning.
note	• "TEST IS STOPPED" is displayed approximately 10 seconds after operation start. • When performing active test again after "TEST IS STOPPED" is displayed, select "BACK". • ABS warning light, brake warning light and ASC warning light may turn ON during active test. This is not a malfunction.

ABS MOTOR

When “On” or “Off” is selected on display screen, the following items are displayed when system is normal.

Test item	Display item	Display	
ABS MOTOR	MOTOR RELAY	On	Off
	ACTUATOR RLY	On	On

PARKING BRAKE SWITCH INDICATOR

When “On” or “Off” is selected on display screen, the following items are displayed when system is normal.

Test item	Display item	Description
PB SW indicator ON	On	Parking brake switch indicator is turned ON.
	Off	Parking brake switch indicator is turned OFF.

ELECTRIC PARKING BRAKE OPERATION

When “On” or “Off” is selected on display screen, the following items are displayed when system is normal.

Test item	Display item	Description
BRAKE OPERATION	On	Electric parking brake is applies.
	Off	Electric parking brake is stops.

ELECTRIC PARKING BRAKE RELEASE

When “On” or “Off” is selected on display screen, the following items are displayed when system is normal.

Test item	Display item	Description
BRAKE RELEASE	On	Electric parking brake is releases.
	Off	Electric parking brake is stops.

WORK SUPPORT

Function name	Item	Description
ECU Information	—	Displays ABS actuator and electric unit (control unit) part number
Actuator Test	—	Enables an operational check of a load by transmitting a driving signal from the ABS actuator and electric unit (control unit) to the load
Learning	INITIALIZATION POSITION ADJUSTMENT	Perform the initial position adjustment of the piston of the rear caliper assembly.
	START BRAKE PAD REPLACEMENT	Return the piston of the brake caliper assembly before replacing rear brake pad.
	FINISH BRAKE PAD REPLACEMENT	Push out the piston of the brake caliper assembly after replacing rear brake pad.
Sensor calibration	ST ANGLE SENSOR ADJUSTMENT	Perform neutral position adjustment of steering angle sensor.
	DECEL G SEN CALIBRATION	Perform decel G sensor calibration.
	SIDE G SEN CALIBRATION	Perform side G sensor calibration.

ECU IDENTIFICATION

ABS actuator and electric unit (control unit) part number can be read.

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[\[Previous\]](#) [\[Next\]](#)

DTC Index

Self Diagnostic Result

DTC	Display item	ASC warning light	ABS warning light	Brake warning light	Electric parking brake warning light	Refer to
C1040-63	Emergency brake					DTC Description ➡
C1040-64	Emergency brake					DTC Description ➡
C1040-92	Emergency brake					DTC Description ➡
C1041-55	Configuration		○			DTC Description ➡
C1042-04	Cut valve 1	○	○	○		DTC Description ➡
C1043-04	Cut valve 2	○	○	○		DTC Description ➡
C1046-04	Suction valve 1	○	○	○		DTC Description ➡

DTC	Display item	ASC warning light	ABS warning light	Brake warning light	Electric parking brake warning light	Refer to
C1047-04	Suction valve 2	○	○	○		DTC Description 
C1048-04	Valve relay	○	○	○		DTC Description 
C1048-11	Valve relay	○	○	○		DTC Description 
C1048-92	Valve relay	○	○	○		DTC Description 
C1049-04	FR LH ABS IN valve	○	○	○		DTC Description 
C104A-04	FR LH ABS OUT valve	○	○	○		DTC Description 
C104B-04	FR RH ABS IN valve	○	○	○		DTC Description 
C104C-04	FR RH ABS OUT valve	○	○	○		DTC Description 
C104D-04	RR LH ABS IN valve	○	○	○		DTC Description 
C104E-04	RR LH ABS OUT valve	○	○	○		DTC Description 
C104F-04	RR RH ABS IN valve	○	○	○		DTC Description 
C1050-04	RR RH ABS OUT valve	○	○	○		DTC Description

DTC	Display item	ASC warning light	ABS warning light	Brake warning light	Electric parking brake warning light	Refer to
						
C1051-04	Pump motor	○	○	○		DTC Description 
C1051-13	Pump motor	○	○	○		DTC Description 
C1051-1C	Pump motor	○	○	○		DTC Description 
C1054-89	Control unit	○	○	○	○	DTC Description 
C1056-13	Battery power supply					DTC Description 
C1056-16	Battery power supply	○	○	○	○	DTC Description 
C1056-17	Battery power supply	○	○	○	○	DTC Description 
C1058-04	Control unit	○	○	○	○	DTC Description 
C1058-42	Control unit	○	○	○	○	DTC Description 
C1058-44	Control unit	○	○	○	○	DTC Description 
C1058-49	Control unit	○	○			DTC Description 

DTC	Display item	ASC warning light	ABS warning light	Brake warning light	Electric parking brake warning light	Refer to
C1058-51	Control unit	○	○	○	○	DTC Description 
C1058-92	Control unit	○	○	○	○	DTC Description 
C105A-92	Control unit	○	○	○		DTC Description 
C105D-7B	Brake fluid level low	○				DTC Description 
C105F-85	Control unit					DTC Description 
C105F-92	Control unit					DTC Description 
C1061-02	FR LH wheel sensor	○	○			DTC Description 
C1061-07	FR LH wheel sensor	○	○			DTC Description 
C1061-09	FR LH wheel sensor	○	○			DTC Description 
C1061-11	FR LH wheel sensor	○	○			DTC Description 
C1061-12	FR LH wheel sensor	○	○			DTC Description 
C1061-13	FR LH wheel sensor	○	○			DTC Description

DTC	Display item	ASC warning light	ABS warning light	Brake warning light	Electric parking brake warning light	Refer to
						
C1061-1C	FR LH wheel sensor	○	○		○	DTC Description 
C1061-38	FR LH wheel sensor	○	○			DTC Description 
C1061-4A	FR LH wheel sensor	○	○			DTC Description 
C1061-64	Wheel sensor FL	○	○			DTC Description 
C1063-02	FR RH wheel sensor	○	○			DTC Description 
C1063-07	FR RH wheel sensor	○	○			DTC Description 
C1063-09	FR RH wheel sensor	○	○			DTC Description 
C1063-11	FR RH wheel sensor	○	○			DTC Description 
C1063-12	FR RH wheel sensor	○	○			DTC Description 
C1063-13	FR RH wheel sensor	○	○			DTC Description 
C1063-1C	FR RH wheel sensor	○	○		○	DTC Description 

DTC	Display item	ASC warning light	ABS warning light	Brake warning light	Electric parking brake warning light	Refer to
C1063-38	FR RH wheel sensor	○	○			DTC Description 
C1063-4A	FR RH wheel sensor	○	○			DTC Description 
C1063-64	Wheel sensor FR	○	○			DTC Description 
C1065-02	RR LH wheel sensor	○	○			DTC Description 
C1065-07	RR LH wheel sensor	○	○			DTC Description 
C1065-09	RR LH wheel sensor	○	○			DTC Description 
C1065-11	RR LH wheel sensor	○	○			DTC Description 
C1065-12	RR LH wheel sensor	○	○			DTC Description 
C1065-13	RR LH wheel sensor	○	○			DTC Description 
C1065-1C	RR LH wheel sensor	○	○		○	DTC Description 
C1065-38	RR LH wheel sensor	○	○			DTC Description 
C1065-4A	RR LH wheel sensor	○	○			DTC Description

DTC	Display item	ASC warning light	ABS warning light	Brake warning light	Electric parking brake warning light	Refer to
						
C1065-64	Wheel sensor RL	○	○			DTC Description 
C1067-02	RR RH wheel sensor	○	○			DTC Description 
C1067-07	RR RH wheel sensor	○	○			DTC Description 
C1067-09	RR RH wheel sensor	○	○			DTC Description 
C1067-11	RR RH wheel sensor	○	○			DTC Description 
C1067-12	RR RH wheel sensor	○	○			DTC Description 
C1067-13	RR RH wheel sensor	○	○			DTC Description 
C1067-1C	RR RH wheel sensor	○	○		○	DTC Description 
C1067-38	RR RH wheel sensor	○	○			DTC Description 
C1067-4A	RR RH wheel sensor	○	○			DTC Description 
C1067-64	Wheel sensor RR	○	○			DTC Description 

DTC	Display item	ASC warning light	ABS warning light	Brake warning light	Electric parking brake warning light	Refer to
C1068-95	Front wheel sensor	○	○			DTC Description 
C1069-95	Rear wheel sensor	○	○			DTC Description 
C106A-04	Wheel sensor	○	○	○	○	DTC Description 
C106A-55	Wheel sensor		○			DTC Description 
C106A-62	Wheel sensor	○	○	○	○	DTC Description 
C106A-64	Wheel sensor	○	○	○	○	DTC Description 
C106B-64	Stop light SW	○			○	DTC Description 
C106C-01	Pressure sensor	○				DTC Description 
C106C-02	Pressure sensor	○				DTC Description 
C106C-16	Pressure sensor	○				DTC Description 
C106C-17	Pressure sensor	○				DTC Description 
C106D-01	Brake booster					DTC Description

DTC	Display item	ASC warning light	ABS warning light	Brake warning light	Electric parking brake warning light	Refer to
						
C106E-54	Steering angle sensor	○				DTC Description 
C106E-55	Steering angle sensor	○				DTC Description 
C106E-64	Steering angle sensor	○				DTC Description 
C106F-54	Steering angle sensor	○				DTC Description 
C1070-01	Side G sensor	○	○			DTC Description 
C1070-54	Side G sensor	○	○			DTC Description 
C1070-64	Side G sensor	○	○			DTC Description 
C1071-54	Decel G sensor		○			DTC Description 
C1071-61	Decel G sensor	○	○			DTC Description 
C1071-64	Decel G sensor	○	○			DTC Description 
C1072-01	Yaw rate sensor	○				DTC Description 

DTC	Display item	ASC warning light	ABS warning light	Brake warning light	Electric parking brake warning light	Refer to
C1072-64	Yaw rate sensor	○				DTC Description 
C1072-83	Yaw rate sensor	○	○			DTC Description 
C1073-01	Vacuum sensor			○		DTC Description 
C1073-1C	Vacuum sensor		○			DTC Description 
C1073-55	Vacuum sensor		○			DTC Description 
C1073-64	Vacuum sensor					DTC Description 
C1076-55	Not configured	○	○	○		DTC Description 
C1077-55	TCM		○			DTC Description 
C1077-92	TCM					DTC Description 
C1078-55	Not configuration		○			DTC Description 
C1079-55	Not configuration		○			DTC Description 
C107A-55	Not configuration		○			DTC Description

DTC	Display item	ASC warning light	ABS warning light	Brake warning light	Electric parking brake warning light	Refer to
						
C107B-53	ASC function					DTC Description 
C107C-53	Not configuration					DTC Description 
C1080-86	ECM	○			○	DTC Description 
C1082-86	CAN comm err (TCM)				○	DTC Description 
C1083-86	Steering angle sensor	○				DTC Description 
C1085-86	Combination meter	○				DTC Description 
C1086-86	CAN comm err (BCM)	○			○	DTC Description 
C1087-86	IPDM E/R				○	DTC Description 
C1088-86	AV system					DTC Description 
C1090-86	ADAS control unit					DTC Description 
C1092-86	4WD invalid data					DTC Description 

DTC	Display item	ASC warning light	ABS warning light	Brake warning light	Electric parking brake warning light	Refer to
C1096-86	Chassis control module				○	DTC Description 
C1098-86	AVM control unit					DTC Description 
C10AA-63	Pump motor					DTC Description 
C10AC-54	Calibration incomplete	○				DTC Description 
C10AF-01	Pressure sensor					DTC Description 
C10B0-01	Parking brake actuator (RH)				○	DTC Description 
C10B0-09	Parking brake actuator (RH)				○	DTC Description 
C10B1-01	Parking brake actuator (LH)				○	DTC Description 
C10B1-09	Parking brake actuator (LH)				○	DTC Description 
C10B2-01	Parking brake switch				○	DTC Description 
C10B2-64	Parking brake switch				○	DTC Description 
C10B3-44	Parking brake control module				○	DTC Description

DTC	Display item	ASC warning light	ABS warning light	Brake warning light	Electric parking brake warning light	Refer to
						
C10B3-49	Parking brake control module				○	DTC Description 
C10B3-53	Parking brake control module				○	DTC Description 
C10B3-55	Parking brake control module				○	DTC Description 
C10B3-68	Parking brake control module				○	DTC Description 
C10B4-98	Overheat				○	DTC Description 
C10B5-76	Parking brake assembly check				○	DTC Description 
C10B6-68	Parking brake system					DTC Description 
C10B7-16	Parking brake power supply				○	DTC Description 
C10B7-17	Parking brake power supply				○	DTC Description 
C10B8-77	Parking brake system				○	DTC Description 
C10B9-77	Parking brake system				○	DTC Description 

Network-DTC

DTC	Display item	ASC warning light	ABS warning light	Brake warning light	Electric parking brake warning light	Refer to
U0073-88	Control module comm Bus D Off	○			○	DTC Description 
U0076-00	Control module comm Bus D Off	○				DTC Description 
U0076-88	Control module comm Bus D Off	○			○	DTC Description 
U2140-87	CAN comm err (ECM)					DTC Description 
U214E-87	CAN comm err (combination meter)					DTC Description 
U214F-87	CAN comm err (BCM)	○			○	DTC Description 
U2152-87	CAN comm err (ADAS control unit)					DTC Description 
U2156-87	CAN comm err (steering angel sensor)	○				DTC Description 
U2240-87	CAN comm err (ECM)	○			○	DTC Description 

DTC	Display item	ASC warning light	ABS warning light	Brake warning light	Electric parking brake warning light	Refer to
U2241-87	CAN comm err (TCM)				○	DTC Description 
U224A-87	CAN comm err (AWD/4WD)					DTC Description 
U224E-87	CAN comm err (combination meter)					DTC Description 
U2252-87	CAN comm err (ADAS control unit)					DTC Description 
U225B-87	CAN comm err (IPDM E/R)				○	DTC Description 
U2275-87	CAN comm err (AVM)					DTC Description 
U2276-87	CAN comm err (CCM)				○	DTC Description 

[\[Previous\]](#) [\[Next\]](#)

Reference Value

VALUES ON THE DIAGNOSIS TOOL

note	The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to M.U.T.-III SE display items.
-------------	--

Item	Condition	Reference valve in normal operation
Steering angle	When driving straight	$\pm 2.5^\circ$ deg
	When steering wheel is steered to RH by 90°	Approx. $+90^\circ$ deg
	When steering wheel is steered to LH by 90°	Approx. -90° deg
Battery voltage	Ignition switch ON	10 – 16 V
FR LH wheel speed	Vehicle stopped	0.00 km/h (MPH)
	When driving ^{*1}	Nearly matches the speedometer display (within $\pm 10\%$)
FR RH wheel speed	Vehicle stopped	0.00 km/h (MPH)
	When driving ^{*1}	Nearly matches the speedometer display (within $\pm 10\%$)

Item	Condition	Reference value in normal operation
RR LH wheel speed	Vehicle stopped	0.00 km/h (MPH)
	When driving ^{*1}	Nearly matches the speedometer display (within $\pm 10\%$)
RR RH wheel speed	Vehicle stopped	0.00 km/h (MPH)
	When driving ^{*1}	Nearly matches the speedometer display (within $\pm 10\%$)
Vehicle speed	Vehicle stopped	0.00 km/h (MPH)
	When driving ^{*1}	Nearly matches the speedometer display (within $\pm 10\%$)
Odometer	Always	Nearly matches the odometer display
Decel G sensor	When stopped	Approx. 0 m/s^2
	During acceleration	Positive value
	During deceleration	Negative value
Side G sensor	Vehicle stopped	Approx. 0 G
	Right turn	Negative value
	Left turn	Positive value
Yaw rate sensor	Vehicle stopped	Approx. 0 deg/s
	Turning right	Negative value
	Turning left	Positive value
Master cylinder pressure	Brake pedal not depressed	Approx. 0 bar
	Brake pedal depressed	(-40) – 300 bar (Pressure increases according to pedal effort)

Item	Condition	Reference valve in normal operation
Valve, pump motor	Active	On
	Inactive	Off
FL/RR valve	Active	On
	Inactive	Off
FR/RL valve	Active	On
	Inactive	Off
FL/RR pump	Active	On
	Inactive	Off
FR/RL pump	Active	On
	Inactive	Off
RR RH ABS OUT valve ^{*2}	Active	On
	Inactive	Off
RR RH AND IN valve ^{*2}	Active	On
	Inactive	Off
RR LH ABS OUT valve ^{*2}	Active	On
	Inactive	Off
RR LH ABS IN valve ^{*2}	Active	On
	Inactive	Off
FR RH ABS OUT valve ^{*2}	Active	On
	Inactive	Off
FR RH ABS IN valve ^{*2}	Active	On
	Inactive	Off
FR LH ABS OUT valve ^{*2}	Active	On
	Inactive	Off
FR LH ABS IN valve ^{*2}	Active	On
	Inactive	Off
Front tire diameter	Always	Tire diameter (mm)

Item	Condition	Reference valve in normal operation
Transmission type	M/T models	M/T
	A/T models	A/T
	CVT models	CVT
	DCT models	DCT
	Type is not configuration	Not
Parking brake type	Manual parking models	1
	Electric parking brake models (Cable type)	2
	Electric parking brake models (drum brake type)	3
	Electric parking brake models (disc brake type)	4
	Type is not configuration	5
Stop light	Stop light is turned ON	On
	Stop light is turned OFF	Off
AEB/IEB max torque 4	When moderate mode	Depends on the vehicle status
AEB/IEB max torque 3	When strong mode	Depends on the vehicle status
AEB/IEB max torque 2	When city mode	Depends on the vehicle status
AEB/IEB max torque 1	When pedestrian mode	Depends on the vehicle status
Electric parking mode	Customer mode	Mode 1
	Factory mode	Mode 2
ACTUATOR VOLT (RH)	Ignition switch ON	10 - 16 V
ACTUATOR VOLT (LH)	Ignition switch ON	10 - 16 V
ACTUATOR CURRENT (RH)	Active	Approx. 16.9 A
	Inactive	Approx. 0 A

Item	Condition	Reference value in normal operation
ACTUATOR CURRENT (LH)	Active	Approx. 16.9 A
	Inactive	Approx. 0 A
SLOPE RATIO	When on a level road	0 %
	When on a sloping road	(-90) % - 90 %
BR FORCE EST (RH)	Active	0 KN
	Inactive	9 - 25.0 kN
BR FORCE EST (LH)	Active	0 KN
	Inactive	9 - 25.0 kN
PB SW	Parking brake switch is pulled	PULL
	Parking brake switch is not operated	N
	Parking brake switch is pushed	PUSH
	Parking brake switch is malfunctioning	MALF
MALF LEVEL	Normal	NORMAL
	Malfunctioning (part replacement required)	REPAIR
	Malfunctioning (function stopped)	STOP
BRAKE STATUS (LH)	Apply (start)	ACT 1
	Apply (during)	ACT 2
	Apply (end)	ACT 3
	Release (start)	RLS 1
	Release (during)	RLS 2
	Release (end)	RLS 3
	When replacing brake pad	RLS 4
	Unknnon	UNKNO
	Initialize	INT

Item	Condition	Reference value in normal operation
BRAKE STATUS (RH)	Apply (start)	ACT 1
	Apply (durnig)	ACT 2
	Apply (end)	ACT 3
	Release (start)	RLS 1
	Release (during)	RLS 2
	Release (end)	RLS 3
	When replacing brake pad	RLS 4
	Unknon	UNKNO
	Initialize	INT
BR DISC TEMP 1	Always	Changes according to (current) temperature of disc rotor
BR DISC TEMP 2	Displayed but not used	—
PB ACTIVE STATUS DISP	Release	REL
	Apply (when the parking brake switch is pulled once)	ACT 1
	Apply (when the parking brake switch is pulled twice ore more)	ACT 2
	Not confirmed	UNCON
PB MALF DISP	Normal	NORMAL
	Malfunction	MALF 1
	Displays but not used	MALF 2
VEHICLE STATUS	No warning	NOT
	Vehicle is move backward	WARN
EPB warning 1	No warning	Off
	When the driver gets out of the vehicle without activating electric parking brake system.	Warning

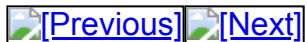
Item	Condition	Reference valve in normal operation
PB WARNING 1	No warning	NO
	When the condition that the electric parking brake system is turned ON under the condition that it is unable to be activated. (Displays the “Press brake pedal” by information display in the combination meter)	WARN 1
	When the condition that the electric parking brake system is turned ON again under the condition that it is unable to be activated. (Displays the “Press brake pedal” by information display in the combination meter)	WARN 2
PB WARNING 2	No warning	NO
	When the parking brake switch is pressed without depressing the brake pedal. (Displays the “Press brake pedal” by information display in the combination meter)	WARN 1
	When the parking brake switch is pressed again without depressing the brake pedal. (Displays the “Press brake pedal” by information display in the combination meter)	WARN 2
PB WARNING 3	No warning	NO
	When the parking brake switch is continued to be pulled while the vehicle is travelling. (Displays the “Release parking brake” by information display in the combination meter, master warning light turns ON and buzzer is operate)	WARN

Item	Condition	Reference value in normal operation
PB WARNING 4	No warning	NO
	When the electric parking brake system cannot be cancelled automatically after trying this without fastening the seat belt. (Displays the "Release parking brake" by information display in the combination meter)	WARN 1
	When the electric parking brake system cannot be cancelled automatically after trying this again without fastening the seat belt. (Displays the "Release parking brake" by information display in the combination meter)	WARN 2
PB SW indicator ^{*3}	Parking switch indicator light is ON	On
	Parking switch indicator light is blinking	Blink
	Parking switch indicator light is OFF	Off
EPB warning 2	When electric parking brake system is normal.	Not
	When the malfunctioning of electric parking brake system is detected.	Warn 1
	When the critical malfunctioning of electric parking brake system is being detected.	Warn 2
	When the malfunctioning of electric parking brake signal is detected.	Warn 3

*1: Confirm tire pressure is standard value.

*2: Display occasionally changes On/Off for a moment after ignition switch is turned ON. This is operation for checking purposes and is not a malfunction.

*3: Refer to [System Description](#)  for ON/OFF/BRINK conditions of each warning light and each indicator light, buzzer and information display in the combination meter.



A/C Compressor Control

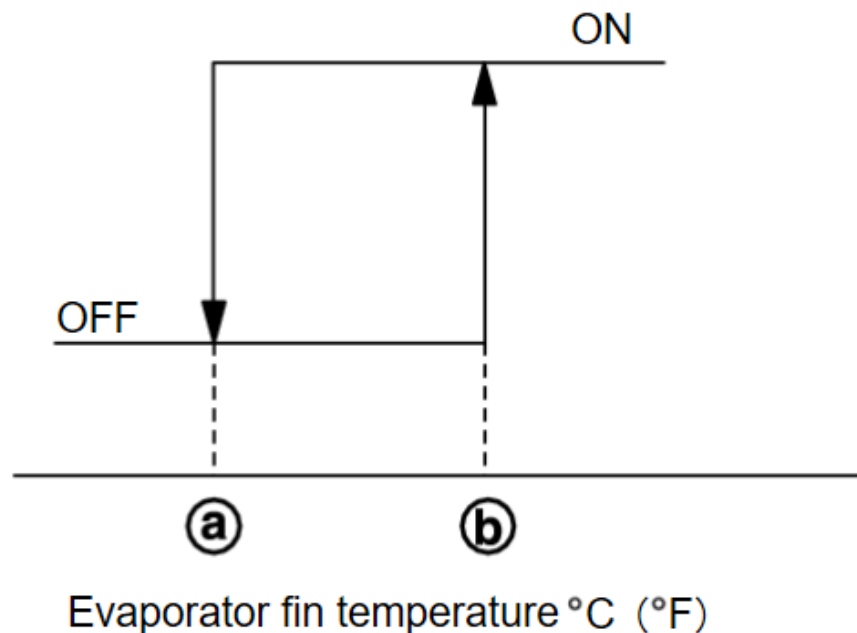
DESCRIPTION

- When the A/C compressor activation condition is satisfied while front blower motor is activated, A/C amp. transmits A/C ON signal and blower fan ON signal to ECM.
- ECM judges the conditions of each sensor (Refrigerant pressure sensor signal, accelerator position signal, etc.), and transmits the A/C compressor request signal to IPDM E/R via CAN communication line.
- By receiving the A/C compressor request signal from ECM, IPDM E/R turns the smart FET to ON, and activates the A/C compressor. Refer to [System Description](#) .

CONTROL BY A/C amp.

Low Temperature Protection Control

When intake sensor detects that evaporator fin temperature is ^(a) $[-5.0^{\circ}\text{C} (23.0^{\circ}\text{F})]$ or less, A/C amp. requests ECM to turn the A/C compressor OFF, and stops the A/C compressor.



When the air temperature returns to ⑥ [−2.0°C (28.4°F)] or more, the A/C compressor is activated.

Refrigerant Discharge Amount Control

- A/C amp. transmits the ECV control signal via CAN communication. IPDM E/R transmits the control signal to ECV according to the received ECV control signal.
- ECV is controlled according to change in the duty ratio of the transmitted control signal.
- Except when temperature setting is full cold or outlet is DEF, A/C amp. controls the refrigerant discharge amount according to the required cooling capacity.
- A/C amp. increases the refrigerant discharge amount when evaporator temperature is higher than the target temperature upper limit, and reduces the refrigerant discharge amount when evaporator temperature is at or below the target temperature upper limit.

note

Target temperature upper limit value of evaporator can be changed using “TARGET EVAPORATOR TEMP UPPER LIMIT SETTING” in “Work support” mode of M.U.T.-III SE. Refer to M.U.T.-III SE Function [CONSULT Function](#) .

A/C Compressor Oil Circulation Control

When the engine starts, A/C amp. activates the A/C compressor for a few seconds and circulates the A/C compressor oil once.

CONTROL BY ECM

A/C Compressor Protection Control at Pressure Malfunction

The high-pressure side value that is detected by refrigerant pressure sensor is excessively low or high, ECM requests IPDM E/R to turn smart FET OFF and stop the A/C compressor.

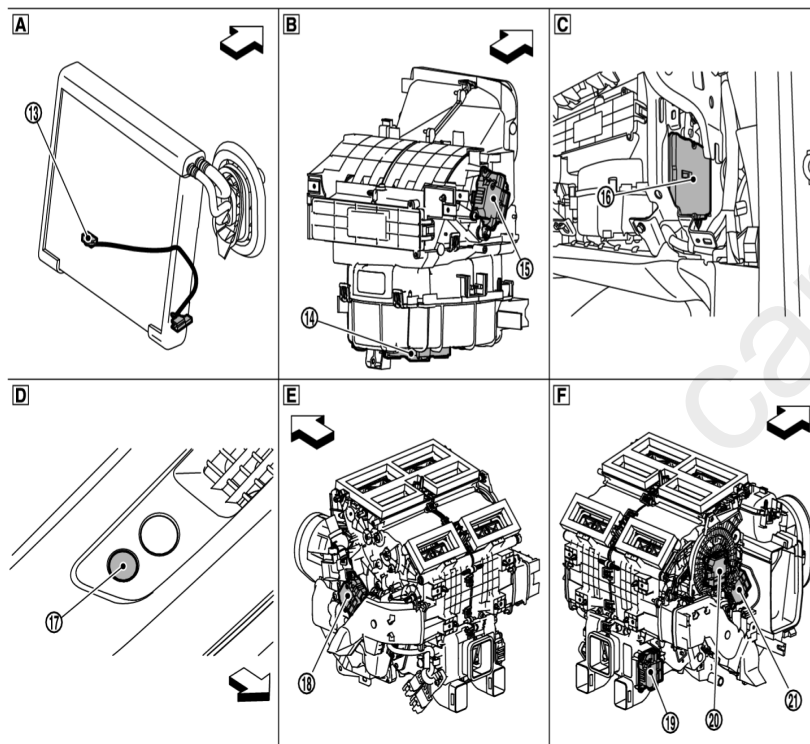
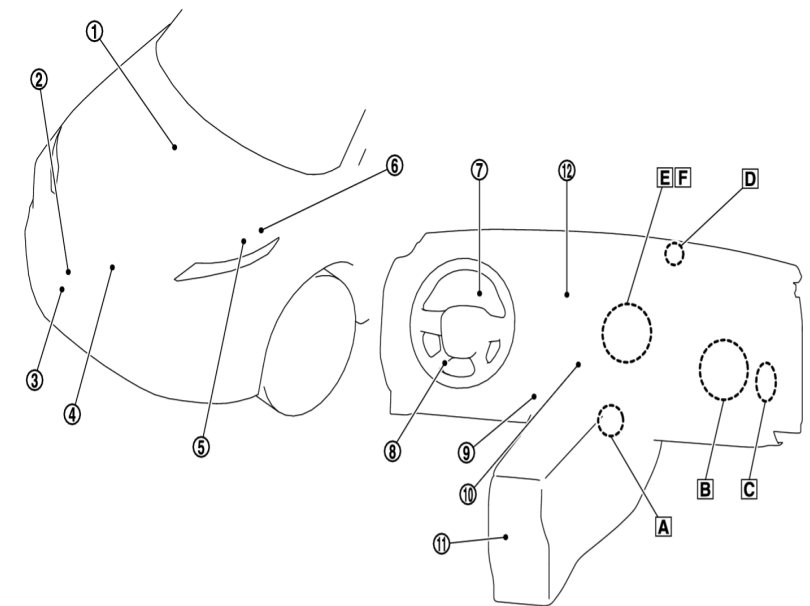
Air Conditioning Cut Control

When the engine condition is high load, ECM transmit smart FET OFF request to IPDM E/R, and stops the A/C compressor.



Component Parts Location

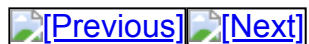
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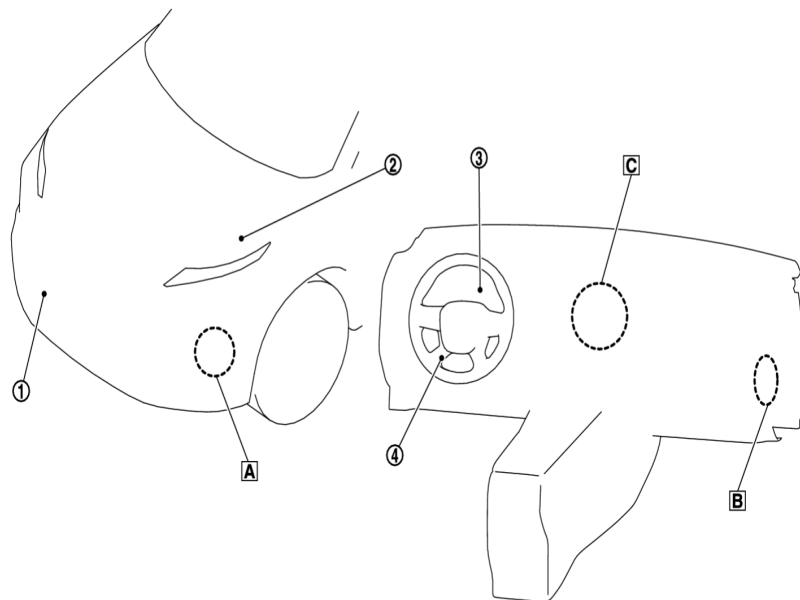
ABS actuator and electric unit (control unit) ① Refer to Component Parts Location for detailed installation location.	② Refrigerant pressure sensor	③ Ambient sensor
④ A/C compressor	ECM Refer to Component Parts Location for detailed installation location. ⑤	IPDM E/R Refer to Component Parts Location for detailed installation location. ⑥
⑦ Combination meter	BCM Refer to Component Parts Location for detailed installation location. ⑧	⑨ In-vehicle sensor
⑩ A/C switch assembly	⑪ Rear air control*	AV control unit Refer to Component Parts Location for detailed installation location. ⑫
⑬ Intake sensor	⑭ Front blower motor	⑮ Intake door motor
⑯ Air mix door motor (rear)*	⑰ Sunload sensor	⑱ Air mix door motor LH
⑲ Air mix door motor (rear)*	⑳ Mode door motor	㉑ Air mix door motor RH
A Evaporator	B Right side of blower unit assembly	C Glove box is removed
D Right side of instrument garnish	E Left side of heater & cooling unit assembly	F Right side of heater & cooling unit assembly
← Vehicle front		

*: With rear air control

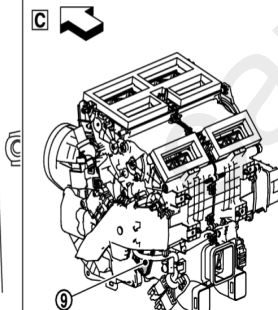
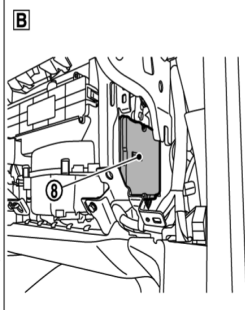
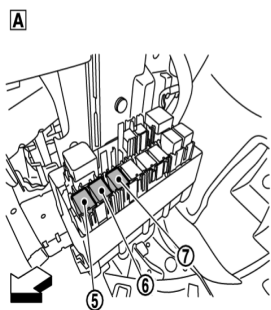
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Component Parts Location

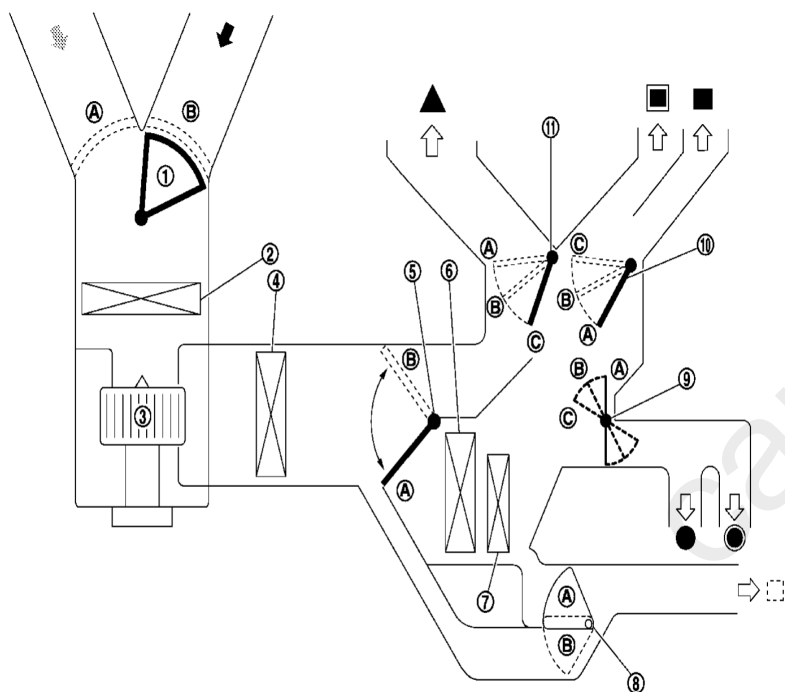


① Ambient sensor	② ECM Refer to Component Parts Location for detailed installation location.	③ Combination meter
④ BCM Refer to Component Parts Location for detailed installation location.	⑤ PTC heater relay 3	⑥ PTC heater relay 2
⑦ PTC heater relay 1	⑧ A/C amp.	⑨ PTC heater
A Relay box (behind of front bumper)	B Glove box is removed	C Left side of heater & cooling unit assembly
← : Vehicle front		



Door Control

SWITCH AND THEIR CONTROL FUNCTION



① Intake door	② In-cabine microfilter	③ Front blower motor
④ Evaporator	⑤ Front air mix door (driver side/passenger side)	⑥ Heater core
⑦ PTC heater	⑧ Rear air mix door*	⑨ Foot door
⑩ Ventilator door	⑪ Defroster door	
← Fresh air	← Recirculation air	← Discharge air
▲ Defroster	■ Center ventilator	■ Side ventilator
□ Rear ventilator	● Front foot	● Rear foot

*: With rear air control

Switch/dial position			Door position						
			Mode door			Intake door	Front air mix door		Rear air mix door ^{*2}
			Ventilator door	Foot door	Defroster door		Driver side	Passenger side	
AUTO switch			AUTO			—	—	—	—
MODE switch			(A)	(A)	(A)				
			(B)	(B)	(A)				
			(C)	(C)	(B) ^{*4} or (A) ^{*5}				
			(C)	(B)	(B)				
DEF switch			(C)	(A)	(C)				

Switch/dial position				Door position						
				Mode door			Intake door	Front air mix door		Rear air mix door ^{*2}
				Ventilator door	Foot door	Defroster door		Driver side	Passenger side	
Intake switch ^{*1, *3}	REC			—	—	—	Ⓐ			
	FRE		Ⓑ							
REC switch ^{*1, *2}							Ⓐ			
FRE switch ^{*1, *2}							Ⓑ			

Switch/dial position			Door position									
			Mode door			Intake door	Front air mix door		Rear air mix door*2			
			Ventilator door	Foot door	Defroster door		Driver side	Passenger side				
Temperature control dial (driver side)	SYNC switch: ON	Full cold "Lo"	—				Ⓐ					
		18.0°C – 32.0°C (61°F – 89°F)					AUTO					
		Full hot "Hi"					Ⓑ					
Temperature control dial (driver side)	SYNC switch: OFF	Full cold "Lo"					Ⓐ	—	—			
		18.0°C – 32.0°C (61°F – 89°F)					AUTO					
		Full hot "Hi"					Ⓑ					
Temperature control dial (passenger side)		Full cold "Lo"					—	Ⓐ		—		
		18.0°C – 32.0°C (61°F – 89°F)						AUTO				
		Full hot "Hi"						Ⓑ				
Temperature control switch (rear side)*2		—					Full cold "Lo"	—	Ⓐ		—	
							18.0°C – 32.0°C (61°F – 89°F)		AUTO			
							Full hot "Hi"		Ⓑ			
ON·OFF switch		OFF					Ⓒ	Ⓒ	(Ⓑ)*4 or (A)*5			—

*1: Air inlet status is displayed by indicator during activating automatic control

*2: With rear air control

*3: Without rear air control

*4: Default setting

*5: It can be changed using "BLOW SET" in "Work support" mode of M.U.T.-III SE. Refer to M.U.T.-III SE Function [CONSULT Function](#) .

AIR DISTRIBUTION

With rear air control

Discharge air flow						
MODE position	Air outlet/distribution					
	Ventilator			Foot		Defroster
	Front		Rear	Front	Rear	
	Center	Side				
	44%	44%	12%	—	—	—
	23%	23%	15%	30%	9%	—
	—	11%	9%	43%	12%	25%
	—	9%	9%	34%	11%	37%
	—	9%	10%	—	—	81%

Without rear air control

Discharge air flow						
MODE position	Air outlet/distribution					
	Ventilator			Foot		Defroster
	Front		Rear	Front	Rear	
	Center	Side				
	45%	43%	12%	—	—	—
	23%	27%	14%	30%	6%	—
	—	9%	18%	36%	12%	25%
	—	8%	15%	30%	11%	36%
	—	6%	15%	—	—	79%

[\[Previous\]](#) [\[Next\]](#)

DTC Index

Self Diagnostic Result

×: Applicable

DTC	Items (M.U.T.-III SE screen terms)	Fail-safe	Reference
B2480-93	Rear air mix door motor	—	DTC Description 
B2490-13	Blower motor assembly FL	—	DTC Description 
B2490-19	Blower motor assembly FL	—	DTC Description 
B2492-13	Blower motor assembly FR	—	DTC Description 
B2492-19	Blower motor assembly FR	—	DTC Description 
B2495-13	Blower motor assembly RL	—	DTC Description 
B2495-19	Blower motor assembly RL	—	DTC Description 
B2496-13	Blower motor assembly RR	—	DTC Description 
B2496-19	Blower motor assembly RR	—	DTC Description 
B24A0-49	A/C AUTO AMP.	—	DTC Description 
B24A1-16	A/C AUTO AMP. POWER SUPPLY	—	DTC Description 
B24A1-17	A/C auto AMP.	—	DTC Description 
B24A2-55	Configuration not implement	—	DTC Description 
B24A4-11	INTAKE SENSOR	—	DTC Description 
B24A4-15	INTAKE SENSOR	—	DTC Description 

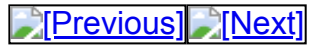
DTC	Items (M.U.T.-III SE screen terms)	Fail-safe	Reference
B24A6-11	IN-VEHICLE SENSOR	×	DTC Description ➔
B24A6-15	IN-VEHICLE SENSOR	×	DTC Description ➔
B24B4-02	A/C CONTROL COMM	—	DTC Description ➔
B24F4-12	Heated steering wheel relay	—	DTC Description ➔
B24F4-14	Heated steering wheel relay	—	DTC Description DTC Description ➔
B24F5-93	Mode door motor	—	DTC Description ➔
B24F6-93	Intake door motor	—	DTC Description ➔
B24F7-93	Air mix door motor 1	—	DTC Description ➔
B24F8-93	Air mix door motor 2	—	DTC Description ➔
U1CA1-08	LIN communication 2	—	DTC Description ➔
U1CA2-08	LIN communication 3	—	DTC Description ➔
U1CA3-08	LIN communication 4	—	DTC Description ➔
U1CA6-02	Blower motor assembly FR comm	—	DTC Description ➔
U1CA7-02	Blower motor assembly FL comm	—	DTC Description ➔
U1CA8-02	Blower motor assembly RR comm	—	DTC Description ➔
U1CA9-02	Blower motor assembly RL comm	—	DTC Description ➔
U1CAA-02	Mode door motor	—	DTC Description ➔
U1CAB-02	Intake door motor	—	DTC Description ➔
U1CAC-02	Air mix door motor 1	—	DTC Description ➔

DTC	Items (M.U.T.-III SE screen terms)	Fail-safe	Reference
U1CAD-02	Air mix door motor 2	—	DTC Description 
U1CAE-02	Rear air mix door motor	—	DTC Description 
U1CB1-02	A/C control 2 communication	—	DTC Description 

Network-DTC

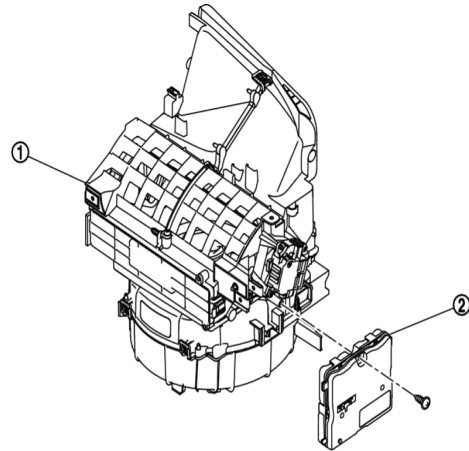
×: Applicable

DTC	Items (M.U.T.-III SE screen terms)	Fail-safe	Reference
U2140-87	CAN comm err (ECM)	—	DTC Description 
U2148-87	CAN comm err (brake control unit)	—	DTC Description 
U214E-87	CAN comm err (combination meter)	—	DTC Description 
U214F-87	CAN comm err (BCM)	—	DTC Description 
U2154-87	CAN comm err (MIU)	—	DTC Description 
U215B-87	CAN comm err (IPDM E/R)	—	DTC Description 



Exploded View

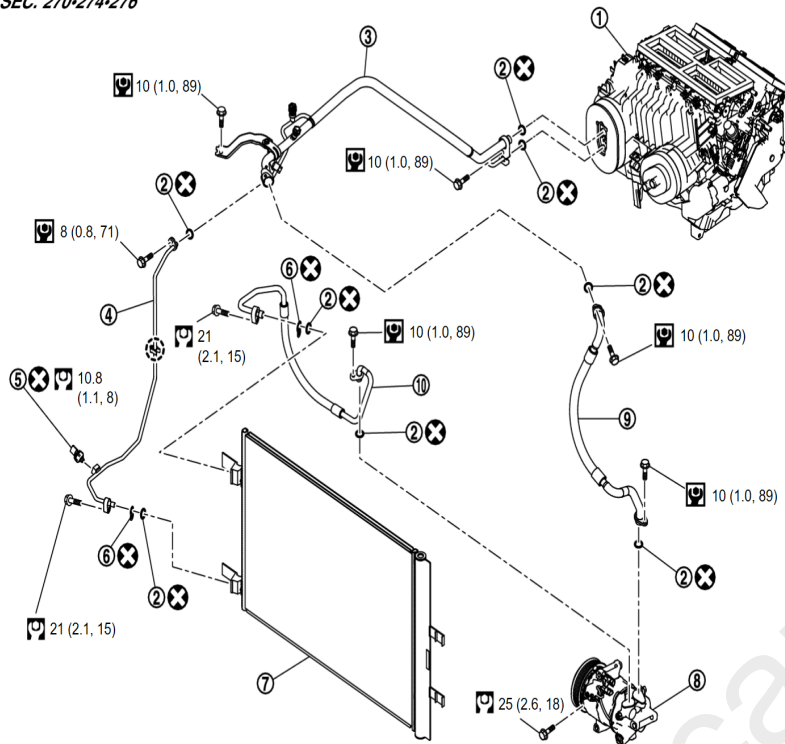
SEC. 270-272



①	Blower unit	②	A/C amp.		
←	: Vehicle front				

Exploded View

SEC. 270-274-276



①	Heater & cooling unit assembly	②	O-ring	③	Internal heat exchanger pipe
④	High-pressure pipe	⑤	Refrigerant pressure sensor	⑥	Washer seal
⑦	Condenser & liquid tank assembly	⑧	A/C compressor	⑨	Low-pressure flexible hose
⑩	High-pressure flexible hose				
○	: Clip				
⊗	: Always replace after every disassembly.				
Ⓜ	: N·m (kg-m, in-lb)				
Ⓜ	: N·m (kg-m, ft-lb)				

[\[Previous\]](#) [\[Next\]](#)

Fail-safe

FAIL-SAFE FUNCTION

- A/C amp. performs fail-safe control when any DTC are detected.

DTC	M.U.T.-III SE screen terms (Trouble diagnosis content)	Fail-safe
B24A6-11	IN-VEHICLE SENSOR	In-vehicle temperature is calculated as 25°C (77°F) and air conditioning system is controlled.
B24A6-15	IN-VEHICLE SENSOR	

- If a CAN communication error exists between the A/C amp., ECM, IPDM E/R, BCM and combination meter for 2 seconds or longer, air conditioning is controlled under the following conditions:

A/C compressor : OFF

- If a LIN communication error exists between the A/C amp. and A/C switch assembly for 30 seconds or longer, air conditioning is controlled under the following conditions:

A/C compressor : ON

Air outlet	: AUTO
Air inlet	: FRE (fresh air intake)
Front blower fan speed	: AUTO
Set temperature	: Setting before communication error occurs

[\[Previous\]](#) [\[Next\]](#)

Reference Value

M.U.T.-III SE DATA MONITOR REFERENCE VALUES

note

The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to M.U.T.-III SE display items.

Monitor item	Condition	Value/Status
IN-VEH TEMP	Ignition switch ON	Equivalent to in-vehicle temperature (Display range: -40 - 215° C)
INT TEMP SEN	Ignition switch ON	Equivalent to evaporator fin temperature (Display range: -40 - 215° C)
SUNLOAD SEN	Ignition switch ON	Equivalent to sunload amount (Display range: 0 - 1045 W/m ²)
AMB SEN CAL	Ignition switch ON	Equivalent to ambient temperature (Display range: -40 - 215° C)
IN-VEH CAL	Ignition switch ON	Equivalent to in-vehicle temperature (Display range: -40 - 215° C)

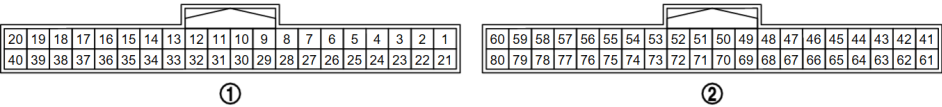
Monitor item	Condition		Value/Status
PASS IN CAL	Ignition switch ON		Equivalent to passenger side in-vehicle temperature (Display range: -40 - 215° C)
INT TEMP CAL	Ignition switch ON		Equivalent to evaporator fin temperature (Display range: -40 - 215° C)
SUNL SEN CAL	Ignition switch ON		Equivalent to sunload amount (Display range: 0 - 1045 W/m ²)
XM	Ignition switch ON		Value according to target air flow temperature (driver side) (Display range: -100 - 150)
FAN REQ SIG	Engine: Run at idle after warming up	Front blower motor: ON	On
		Front blower motor: OFF	Off
COMP REQ SIG	Engine: Run at idle after warming up	A/C switch: ON	On
		A/C switch: OFF	Off
A/C comp clutch status	Engine: Run at idle after warming up	A/C switch: ON	On
		A/C switch: OFF	Off
RR XM	Ignition switch ON		Value according to target air flow temperature (rear) (Display range: -100 - 150° C)
Assist seat target air temperature	Ignition switch ON		Value according to target air flow

Monitor item	Condition		Value/Status
			temperature (passenger side) (Display range: -100 - 150)
Blower fan duty	Engine: Run at idle after warming up	Front blower motor: ON	• 16 – 61%^{*1} • 16 – 66%^{*2} (Display range: 0 - 100%)
		Front blower motor: OFF	0
AMB TEMP SEN	Ignition switch ON		Equivalent to ambient temperature (Display range: -50 - 70° C)
Vehicle speed	When driving the vehicle		Equivalent to speedometer reading
ODO/TRIP METER	Ignition switch ON		Equivalent to odometer reading
Engine RPM	Engine: Running		Equivalent to tachometer reading
ENG COOL TEMP	Ignition switch ON		Equivalent to engine coolant temperature

*1: With rear air control

*2: Without rear air control

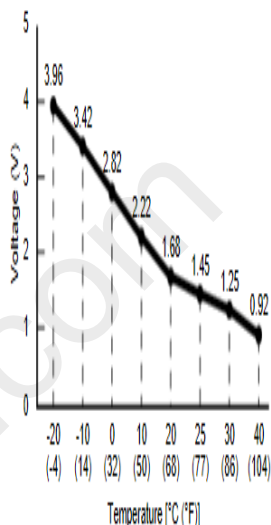
TERMINAL LAYOUT



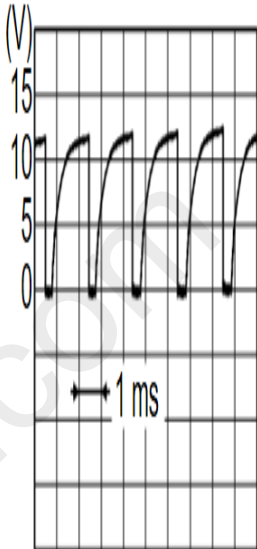
Gray Black

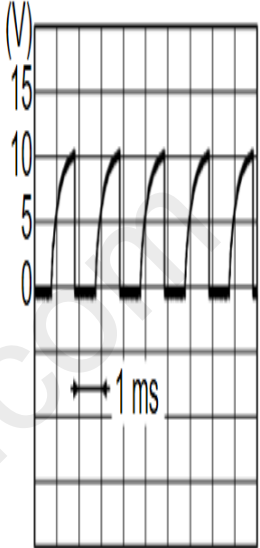
PHYSICAL VALUES

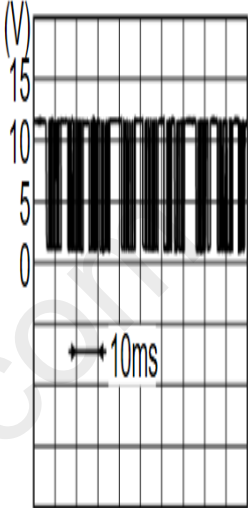
Terminal No. (Wire color)		Description		Condition	Value
+	-	Signal name	Input/Output		
1 (LA/LG)	58 (B)	Door motor power supply	Output	Ignition switch ON	10.5 – 16 V
2 (LA/G)	58 (B)	LIN (door motor)	Input/Output	Ignition switch ON	

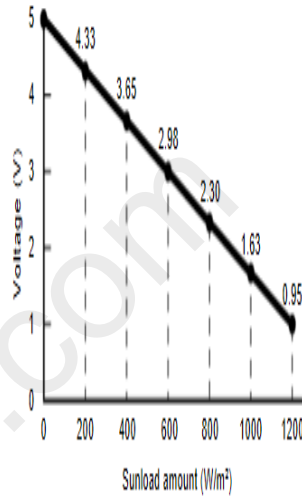
Terminal No. (Wire color)		Description		Condition	Value
+	—	Signal name	Input/Output		
23 (LA/SB)	26 (BR)	Intake sensor signal	Input	Ignition switch ON	
26 (BR)	Ground	Sensor ground (intake)	—	Ignition switch ON	0 – 0.1 V
27 (LA/B)	Ground	Door motor ground	—	Ignition switch ON	0 – 0.1 V

Terminal No. (Wire color)		Description		Condition		Value
+	-	Signal name	Input/Output			
34 (G)	58 (B)	Blower motor control	Output	Ignition switch ON	Front blower motor: OFF	10.5 – 16 V
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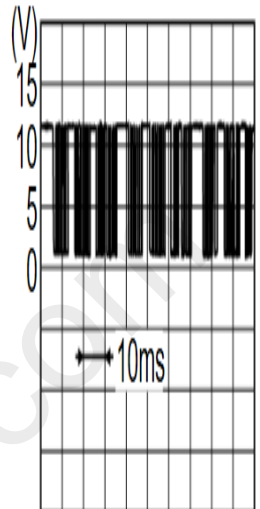
Terminal No. (Wire color)		Description		Condition	Value
+	-	Signal name	Input/Output		
				Front blower motor: 1st speed (manual)	

Terminal No. (Wire color)		Description		Condition	Value
+	-	Signal name	Input/Output		
				Front blower motor: 7th speed (manual)	

Terminal No. (Wire color)		Description		Condition	Value
+	-	Signal name	Input/Output		
45 (LA/G)	58 (B)	LIN (heated seat)	Input/Output	Ignition switch ON	

Terminal No. (Wire color)		Description		Condition	Value																
+	-	Signal name	Input/Output																		
47 (G)	78 (W)	Sunload sensor signal	Input	Ignition switch ON	 <table><caption>Sunload Sensor Characteristic Data</caption><thead><tr><th>Sunload amount (W/m²)</th><th>Voltage (V)</th></tr></thead><tbody><tr><td>0</td><td>5.00</td></tr><tr><td>200</td><td>4.33</td></tr><tr><td>400</td><td>3.65</td></tr><tr><td>600</td><td>2.98</td></tr><tr><td>800</td><td>2.30</td></tr><tr><td>1000</td><td>1.63</td></tr><tr><td>1200</td><td>0.95</td></tr></tbody></table>	Sunload amount (W/m²)	Voltage (V)	0	5.00	200	4.33	400	3.65	600	2.98	800	2.30	1000	1.63	1200	0.95
Sunload amount (W/m²)	Voltage (V)																				
0	5.00																				
200	4.33																				
400	3.65																				
600	2.98																				
800	2.30																				
1000	1.63																				
1200	0.95																				

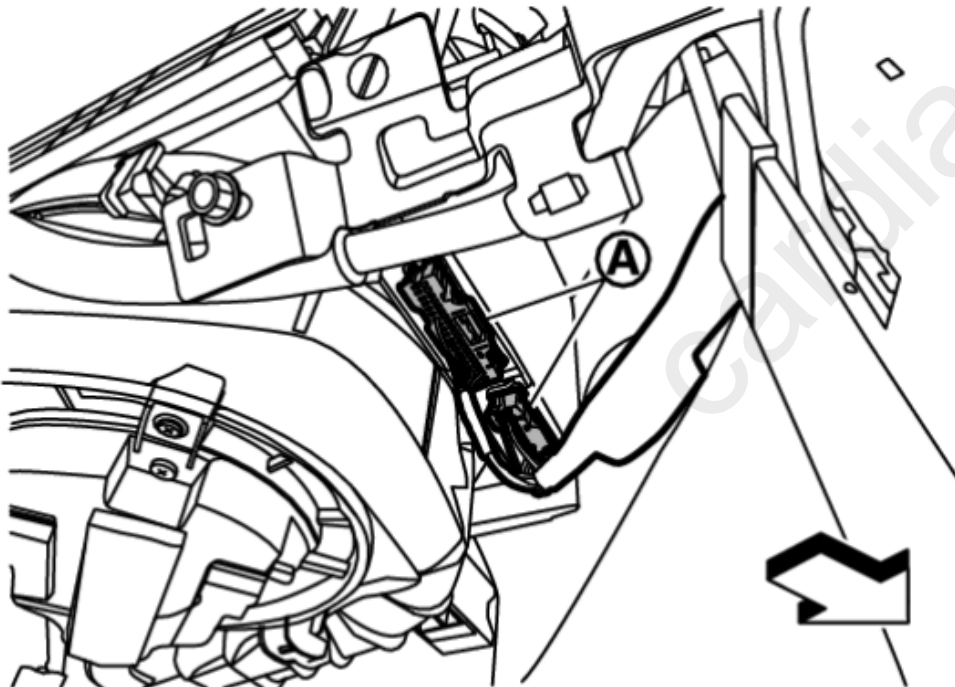
Terminal No. (Wire color)		Description		Condition		Value
+	—	Signal name	Input/Output			
48 (Y)	78 (W)	In-vehicle sensor signal	Input	Ignition switch ON		
50 (LA/L)	—	CAN-H	Input/Output	—		—
56 (BG)	58 (B)	Heated steering wheel relay control signal	Output	Engine running	Heated steering wheel switch: ON	0 – 0.1 V
					Other than the above	10.5 – 16 V
58 (B)	Ground	Ground	—	Ignition switch ON		0 – 0.1 V
60 (LA/R)	58 (B)	Accessory power supply	Input	Ignition switch OFF (auto ACC status) or ON	10.5 – 16 V	
				Ignition switch OFF (not auto ACC status)	0 – 0.1 V	

Terminal No. (Wire color)		Description		Condition	Value
+	—	Signal name	Input/Output		
68 (LA/P)	58 (B)	LIN (A/C control)	Input/Output	Ignition switch ON	
70 (LA/P)	—	CAN-L	Input/Output	—	—
78 (W)	Ground	Sensor ground (in-vehicle, sunload)	—	Ignition switch ON	0 – 0.1 V

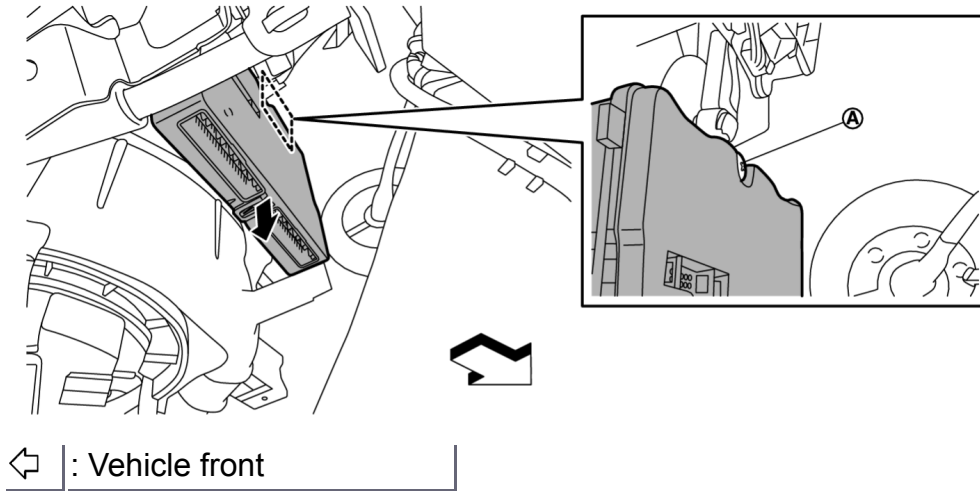
Removal and Installation

REMOVAL

1. Remove glove box. Refer to [Removal and Installation](#) .
2. Disconnect A/C amp. harness connectors .



3. Remove fixing screw (A), and then slide A/C amp. in the direction indicated by arrow as shown in the figure and remove it.



INSTALLATION

Note the following item, and then install in the reverse order of removal.

caution

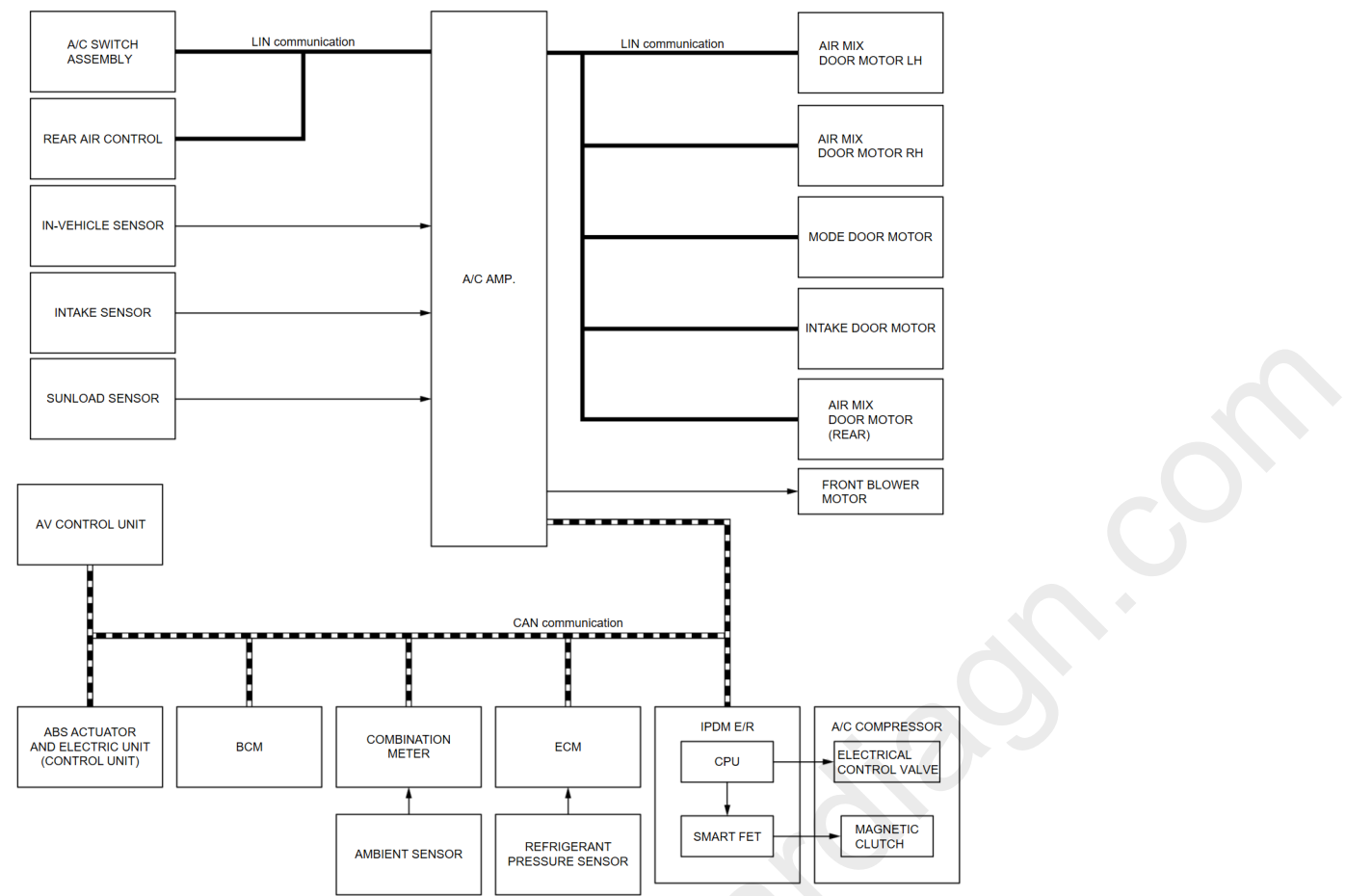
Be sure perform ADDITIONAL SERVICE WHEN REPLACING A/C AMP. when replacing A/C amp. Or not doing so, A/C amp. control function does not operate normally. Refer to [Description](#) ➡.



System Description

SYSTEM DIAGRAM

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Component	Function
ABS actuator and electric unit (control unit)	ABS actuator and electric unit (control unit) transmits vehicle speed signal to A/C amp. via CAN communication line.
AV control unit	AV control unit transmits blower reduction request signal to A/C amp. via CAN communication line.
A/C amp.	A/C Amp. ➡
BCM	BCM transmits remote engine start status signal to A/C amp. via CAN communication line.

Component	Function
Combination meter	Combination meter transmits ambient temperature signal to A/C amp. via CAN communication line.
ECM	- ECM, when receiving A/C ON signal and blower fan ON signal from A/C amp., transmits A/C compressor request signal to IPDM E/R via CAN communication line according to status of the engine and refrigerant pressure. - ECM transmits engine coolant temperature signal and refrigerant pressure sensor signal to A/C amp. via CAN communication line. - ECM controls the cooling fan based on the cooling fan request signal received from the A/C amp.
IPDM E/R	- Smart FET is integrated in IPDM E/R. - IPDM E/R operates smart FET when receiving A/C compressor request signal from ECM via CAN communication line. - IPDM E/R controls ECV when receiving ECV control signal from A/C amp. via CAN communication line.
A/C switch assembly	A/C Switch Assembly 
Rear air control*	Rear Air Control 
Ambient sensor	Ambient Sensor 
Intake sensor	Intake Sensor 
In-vehicle sensor	In-vehicle Sensor 
Refrigerant pressure sensor	Refrigerant Pressure Sensor 
Sunload sensor	Sunload Sensor 

Component	Function
Air mix door motor LH	Air Mix Door Motor LH 
Air mix door motor RH	Air Mix Door Motor RH 
Air mix door motor (Rear)*	Air Mix Door Motor (Rear) 
Front blower motor	Front Blower Motor 
Intake door motor	Intake Door Motor 
Mode door motor	Mode Door Motor 
A/C compressor	A/C Compressor 

*: With rear air control

INPUT/OUTPUT SIGNAL

Control unit	Signal status
ABS actuator and electric unit (control unit)	Transmits the vehicle speed signal to A/C amp. via CAN communication.
AV control unit	Transmits the blower reduction request signal to A/C amp. via CAN communication.
BCM	Transmits the remote engine start status signal to A/C amp. via CAN communication.
Combination meter	Transmits the ambient temperature signal to A/C amp. via CAN communication.
ECM	- Transmits the following signal to A/C amp. via CAN communication. - Engine coolant temperature signal - Refrigerant pressure sensor signal - Transmits the A/C compressor request signal to IPDM E/R via CAN communication.

Control unit	Signal status
	- Receives mainly the following signal from A/C amp. via CAN communication. - A/C ON signal - Blower fan ON signal - Cooling fan request signal
IPDM E/R	Receives mainly the ECV control signal from A/C amp. via CAN communication.
A/C switch assembly	- Transmits the A/C control signal to A/C amp. via LIN communication. - Receives mainly the A/C display signal from A/C amp. via LIN communication.
Rear air control*	- Transmits the rear A/C control signal to A/C amp. via LIN communication. - Receives mainly the rear A/C display signal from A/C amp. via LIN communication.
Air mix door motor LH	- Transmits the door position feedback signal to A/C amp. via LIN communication. - Receives mainly the door motor request signal to A/C amp. via LIN communication.
Air mix door motor RH	
Air mix door motor (Rear)*	
Intake door motor	
Mode door motor	

*: With rear air control

DESCRIPTION

- Automatic air conditioning system is controlled by each function of A/C amp., ECM and IPDM E/R.
- Each operation of air conditioning system can be controlled by the A/C switch assembly.

CONTROL BY A/C amp.

- [Temperature Control](#) →
 - [Air Outlet Control](#) →
 - [Air Inlet Control](#) →
 - [Door Control](#) →
 - [Air Flow Control](#) →
 - [A/C Compressor Control](#) →
 - [Cooling Fan Operation Request Control](#) →
 - [Remote Engine Start Control](#) →
-

CORRECTION FOR INPUT VALUE

- Ambient temperature correction
 - A/C amp. inputs the temperature detected by ambient temperature signal received from combination meter via CAN communication as the ambient temperature.
 - A/C amp. performs the correction of the temperature detected by ambient sensor for air conditioning control.
 - A/C amp. selects and uses the initial value of ambient temperature data depending on the engine coolant temperature when turning the ignition switch from OFF to ON. The detection temperature of the ambient sensor is used when engine coolant temperature is low [less than approximately 56°C (133°F)]. The memory data (before the ignition switch is OFF) when the engine is warmed up [approximately 56°C (133°F) or more].
 - The correction of the ambient temperature is not performed when the detection temperature of the ambient temperature is less than approximately -20°C (-4°F).
- In-vehicle temperature correction
 - A/C amp. inputs the temperature detected by in-vehicle sensor as the in-vehicle temperature.
 - A/C amp. performs the correction of the temperature detected by in-vehicle sensor for air conditioning control.
 - A/C amp. performs the correction so that the recognition passenger room temperature changes depending on the difference between the detected passenger room temperature and the recognition passenger room temperature. If the difference is large, the changing is

early. The changing becomes slow as the difference becomes small.

- Intake temperature correction
 - A/C amp. inputs the temperature detected by intake sensor as the intake temperature (evaporator temperature).
 - A/C amp. performs the correction of the temperature detected by intake sensor for air conditioning control.
 - A/C amp. performs the correction so that the recognition intake temperature changes depending on the difference between the detected intake temperature and the recognition intake temperature. If the difference is large, the changing is early. The changing becomes slow as the difference becomes small.
 - Sunload amount correction
 - A/C amp. inputs the sunload amount detected by sunload sensor.
 - A/C amp. performs the correction of the sunload amount detected by sunload sensor for air conditioning control.
 - When the sunload amount suddenly changes, for example when entering a tunnel, perform the correction so that the recognition sunload amount of the A/C amp. changes slowly.
 - Set temperature correction
 - A/C amp. performs the correction to the target temperature set by the A/C switch assembly so as to match the temperature felt by the passengers depending on the ambient temperature detected by ambient sensor and controls it so that the in-vehicle temperature is always the most suitable.
-

CONTROL BY ECM

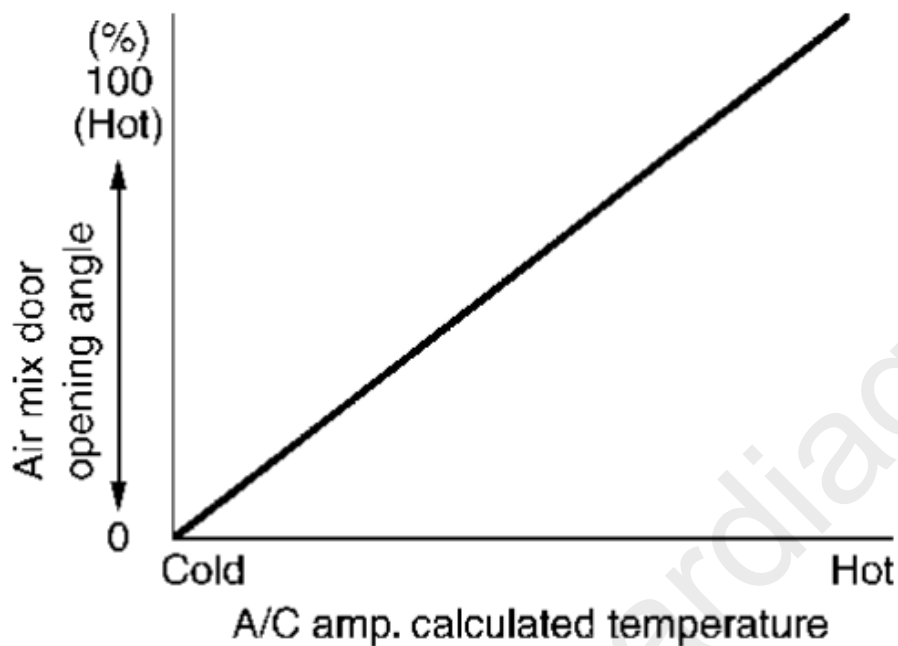
[A/C Compressor Control](#) 

CONTROL BY IPDM E/R

[A/C Compressor Control](#) 

Temperature Control

- When ignition switch is in the ON position, A/C amp. always automatically controls temperature regardless of air conditioner operational state.



- A/C amp. calculates the target air mix door opening angle depending on set temperature, in-vehicle temperature, ambient temperature, and sunload.
- Air mix door is controlled depending on the comparison of current air mix door opening angle and target air mix door opening angle.
- Regardless of in-vehicle temperature, ambient temperature, and sunload, air mix door is fixed at the fully cold position when set temperature is "Lo", and at the fully hot position when set temperature is "Hi".

[\[Previous\]](#) [\[Next\]](#)

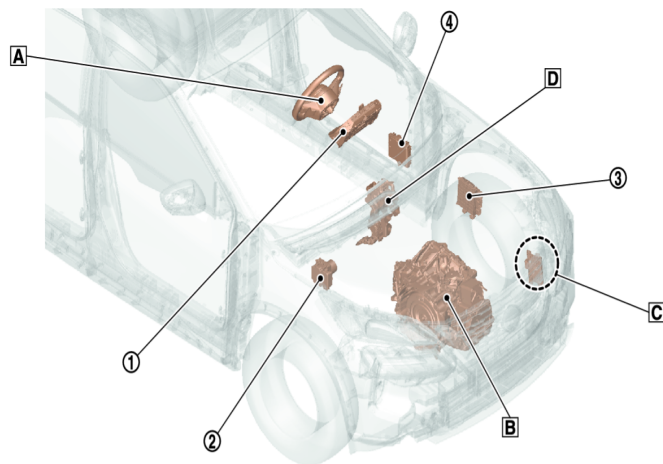
Component Description

Part name	Function
Torque converter	Increases engine torque and transmits it to the transaxle.
Oil pump	Utilizes a vane-type oil pump that is driven by the engine through the oil pump drive chain in order to increase efficiency of pump discharge volume in low-speed zone and optimize pump discharge volume in high-speed zone. Discharged oil from oil pump is transmitted to control valve. It is used as the oil of primary and secondary pulley operation, the oil of clutch operation, and the lubricant for each part.
Forward clutch	The forward clutch is wet and multiple plate type clutch that consists of clutch drum, piston, drive plate, and driven plate. It is a clutch to move the vehicle forward by activating piston hydraulically, engaging plates, and directly connecting sun gear and input shaft.
Reverse brake	The reverse brake is a wet multiple-plate type brake that consists of transaxle case, piston, drive plate, and driven plate. It is a brake to move the vehicle in reverse by activating piston hydraulically, engaging plates, and fixing planetary gear.
Internal gear	The internal gear is directly connected to forward clutch drum. It is a gear that moves the outer edge of pinion planet of planet carrier. It transmits power to move the vehicle in reverse when the planet carrier is fixed.
Planet carrier	Composed of a carrier, pinion planet, and pinion shaft. This gear fixes and releases the planet carrier in order to switch between forward and reverse driving.
Sun gear	Sun gear is a set part with planet carrier and internal gear. It transmits transmitted force to primary fixed sheave. It rotates in forward or reverse direction according to activation of either forward clutch or reverse brake.
Input shaft	The input shaft is directly connected to forward clutch drum and transmits traction force from torque converter. In shaft center, there are holes for hydraulic distribution to primary pulley and hydraulic distribution for lockup ON/OFF.

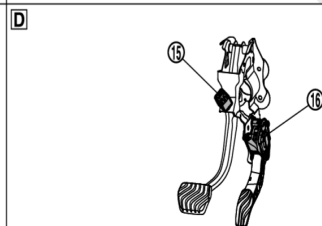
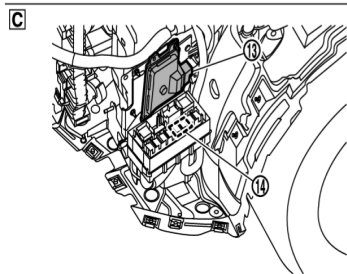
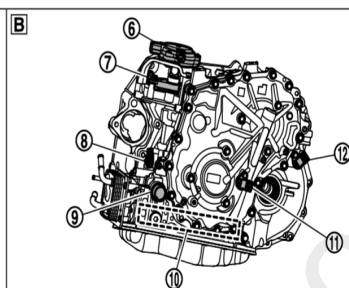
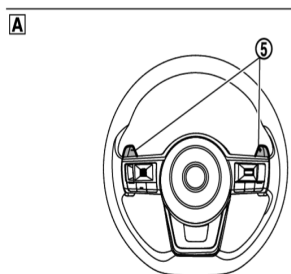
Part name	Function
Primary pulley	It is composed of a pair of pulleys (the groove width is changed freely in the axial direction) and the steel belt. The groove width changes according to wrapping radius of steel belt and pulley from low status to overdrive status continuously with non-step. It is controlled with the oil pressures of primary pulley and secondary pulley.
Secondary pulley	
steel belt	
Manual shaft	When the manual shaft is in the P position, the parking rod that is linked to the manual shaft rotates the parking pole. When the parking pole rotates, it engages with the parking gear, fixing the parking gear. As a result, the secondary pulley that is integrated with the parking gear is fixed.
Parking rod	
Parking pawl	
Parking gear	
Output gear	The deceleration gears are composed of 2 stages: primary deceleration (output gear, idler gear pair) and secondary deceleration (reduction gear, final gear pair). All of these gears are helical gears.
Idler gear	
Reduction gear	
Differential	
Torque converter regulator valve	Adjusts the feed pressure to the torque converter to the optimum pressure corresponding to the driving condition.
Pressure regulator valve	Adjusts the discharge pressure from the oil pump to the optimum pressure (line pressure) corresponding to the driving condition.
Torque converter clutch control valve	Adjusts the torque converter engage and disengage pressures.
Manual valve	Distributes the clutch operation pressure to each circuit according to the shift position.
Secondary reducing valve	Reduces line pressure and adjusts secondary pressure.
Primary reducing valve	Reduces line pressure and adjusts primary pressure.
Pilot valve A	Reduces line pressure and adjusts pilot pressure to the solenoid valves listed below. • Primary pressure solenoid valve • Secondary pressure solenoid valve • Select solenoid valve • Line pressure solenoid valve

Part name	Function
Pilot valve B	Reduces pilot pressure and adjusts pilot pressure to the torque converter clutch solenoid valve.

Component Parts Location

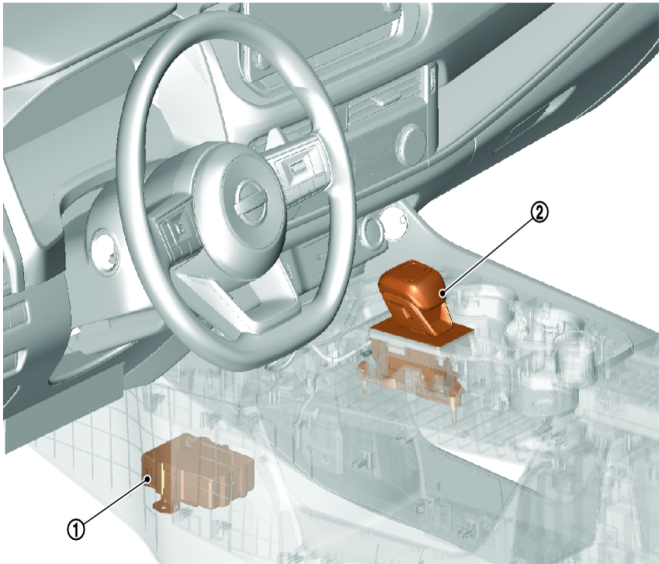


① Combination meter Refer to Removal and Installation ➡.	② ABS actuator and electronic unit (control unit) Refer to Component Parts Location ➡.	③ ECM Refer to Component Parts Location ➡.
④ BCM Refer to Component Parts Location ➡.	⑤ Paddle shifter	⑥ Electric shift actuator
⑦ Transmission range switch	⑧ Input speed sensor	⑨ CVT unit connector
⑩ Control valve	⑪ Primary speed sensor	⑫ Output speed sensor
⑬ TCM	⑭ Shift actuator relays (A and B)	⑮ Stop light switch
⑯ Accelerator pedal position switch		
A Steering wheel	B Side of transaxle assembly	C Left front of vehicle
D Brake pedal periphery		

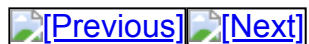


INTERIOR SIDE

①	Electric shift control module	②	Electric shift selector		
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M.U.T.-III SE Function

APPLICABLE ITEM

Diagnosis mode	Description
Self Diagnostic Result	Display DTC which TCM memorizes
Data List	Displays TCM input/output data in real time
Special Function	• Displays TCM part number • This mode enables a technician to adjust some devices faster and more accurately
CALIB DATA	The calibration data status of TCM can be checked

SELF DIAGNOSTIC RESULTS

Display Item List

Refer to [DTC Index](#) .

How to Read DTC

DTC is displayed on “Self Diagnostic results” of M.U.T.-III SE.

When DTC is currently detected, “Active DTC” is displayed. If “Stored DTC” is displayed, it shows a malfunction occurred in the past.

How to Erase DTC

note

If the ignition switch is left ON after repair, turn OFF the ignition switch and wait for 10 seconds or more. Then, turn the ignition ON again. (Engine stop)

1. Touch “SHIFT” of M.U.T.-III SE.
 2. Touch “Self Diagnostic Result”.
 3. Touch “Erase DTCs”. (DTC memorized in electric shift control module is erased.)
-

Freeze Frame Data (FFD)

The following vehicle status is recorded when DTC is detected and is displayed on M.U.T.-III SE.

Monitored item	Displayed contents
ODO/TRIP METER	Displays the mileage at the time the malfunction is detected.
DTC count (Count)	Displays the number of times DTC is detected.

DATA MONITOR

note

The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to M.U.T.-III SE display items.

Monitored item	(Unit)	Remarks
Range position		Displays the position recognized by the electric shift control module
Shift position judgment		Displays the shift input position recognized by the electric shift control module
Target shift position		Displays the target shift position recognized by the electric shift control module
Actual shift position		Displays the shift position signal received from TCM
Vehicle state		Displays the status of vehicle • State1: Ignition switch OFF • State2: Ignition switch is ACC • State3: Ignition switch is ON (Engine is stopped) • State4: While engine starting • State5: Engine started
Shift sensor 1		Displays the signal value of electric shift sensor No. 1
Shift sensor 2		Displays the signal value of electric shift sensor No. 2
Shift sensor 3		Displays the signal value of electric shift sensor No. 3
Shift sensor 4		Displays the signal value of electric shift sensor No. 4
Shift sensor 5		Displays the signal value of electric shift sensor No. 5
Shift sensor 6		Displays the signal value of electric shift sensor No. 6
Shift sensor 7		Displays the signal value of electric shift sensor No. 7
Shift sensor 8		Displays the signal value of electric shift sensor No. 8
Shift switch 1		Displays the signal value of P position switch No. 1
Shift switch 2		Displays the signal value of P position switch No. 2
Power supply relay A		Displays the command value from the electric shift control module to shift actuator relay A
Power supply relay B		Displays the command value from the electric shift control module to shift actuator relay B
Ignition switch		Displays the input status of the ignition switch

Monitored item	(Unit)	Remarks
Power supply voltage		Displays the status of battery voltage
ECU power 1		Monitors the power supply of electric shift control module and displays the status
Main power voltage	(V)	Monitors the voltage value of the main power supply for the electric shift control module and displays the monitored value
ECU power 2		Monitors the power supply of electric shift control module and displays the status
Motor A U voltage	(V)	Displays the motor A U-phase terminal voltage A/D converted value
Motor A V voltage	(V)	Displays the motor A V-phase terminal voltage A/D converted value
Motor A W voltage	(V)	Displays the motor A W-phase terminal voltage A/D converted value
Motor B U voltage	(V)	Displays the motor B U-phase terminal voltage A/D converted value
Motor B V voltage	(V)	Displays the motor B V-phase terminal voltage A/D converted value
Motor B W voltage	(V)	Displays the motor B W-phase terminal voltage A/D converted value
Shift sensor 1 voltage	(V)	Displays the voltage value of electric shift sensor No. 1
Shift sensor 2 voltage	(V)	Displays the voltage value of electric shift sensor No. 2
Shift sensor 3 voltage	(V)	Displays the voltage value of electric shift sensor No. 3
Shift sensor 4 voltage	(V)	Displays the voltage value of electric shift sensor No. 4
Shift sensor 5 voltage	(V)	Displays the voltage value of electric shift sensor No. 5
Shift sensor 6 voltage	(V)	Displays the voltage value of electric shift sensor No. 6
Shift sensor 7 voltage	(V)	Displays the voltage value of electric shift sensor No. 7
Shift sensor 8 voltage	(V)	Displays the voltage value of electric shift sensor No. 8
Shift switch 1 voltage	(V)	Displays the voltage value of P position switch No. 1
Shift switch 2 voltage	(V)	Displays the voltage value of P position switch No. 2

WORK SUPPORT

Function name	Item name	Description
ECU Information	-	Displays TCM part number
Learned value clear	ACTUATOR LERNING VALVE ELIMINATION	Erases learning value memorized by electric shift control module.

[\[Previous\]](#) [\[Next\]](#)

M.U.T.-III SE Function

caution

After disconnecting the M.U.T.-III SE vehicle interface (VI) from the data link connector, the ignition must be cycled OFF → ON (for at least 5 seconds) → OFF. If this step is not performed, the BCM may not go to “sleep mode”, potentially causing a discharged battery and a no-start condition.

APPLICABLE ITEM

Diagnosis mode	Description
Self Diagnostic Result	Display DTC which TCM memorizes
Data List	Displays TCM input/output data in real time
Special Function	• Displays TCM part number • This mode enables a technician to adjust some devices faster and more accurately
CALIB DATA	The calibration data status of TCM can be checked

SELF DIAGNOSTIC RESULTS

Refer to [DTC Index](#) .

DTC at 1st trip and method to read DTC

- DTC (P0705, P0711, P0720, etc.) is specified by SAE J2012/ISO 15031-6.
 - DTC and DTC at 1st trip are displayed on “Self Diagnostic results” of M.U.T.-III SE.
When DTC is currently detected, “Active DTC” is displayed. If “Stored DTC” is displayed, it shows a malfunction occurred in the past.
 - When the DTC at the 1st trip is detected, “1t” is displayed.
-

DTC deletion method

note

If the ignition switch is left ON after repair, turn OFF the ignition switch and wait for 10 seconds or more. Then, turn the ignition ON again. (Engine stop)

1. Touch “TRANSMISSION” of M.U.T.-III SE.
 2. Touch “Self Diagnostic Result”.
 3. Touch “Erase DTCs”. (DTC memorized in TCM is erased.)
-

Freeze Frame Data (FFD)

The following vehicle status is recorded when DTC is detected and is displayed on M.U.T.-III SE.

Monitored item	Displayed contents
ODO/TRIP METER	Displays the mileage at the time the malfunction is detected.
DTC count (Count)	Displays the number of times DTC is detected.

DATA MONITOR

note

The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to M.U.T.-III SE display items.

Monitored item	(Unit)	Remarks
L POSITION SW	(On/Off)	- Displays the operation status of the transmission range switch (L position). - This monitor item do not use.
SPORT MODE SW	(On/Off)	- Displays the reception status of the overdrive control switch signal received through CAN communication. - This monitor item do not use.
ECO MODE SW	(On/Off)	- Displays the reception status of the ECO mode switch signal received through CAN communication. - This monitor item do not use.
SPORT MODE IND	(On/Off)	- Displays the transaxle status of the O/D OFF indicator light signal transmitted through CAN communication. - This monitor item do not use.
MANU MODE SIGNAL	(On/Off)	Displays the transaxle status of the manual mode signal transmitted through CAN communication.
Ds mode signal		- Displays whether it is the Ds mode. - This monitor item do not use.
ECO MODE SIGNAL	(On/Off)	- Displays the transaxle status of the ECO mode signal transmitted through CAN communication. - This monitor item do not use.
M GEAR POS		Display the target gear of manual mode
ENGBRKLVL	(On/Off)	Displays the setting of "ENGINE BRAKE ADJ" in "Special Function".

Monitored item	(Unit)	Remarks
AIR BLDING STATE	(INCOMP/COMP)	- Displays the status of “ELECTRIC O.P. AIR BLEEDING” in “Special Function”. - This monitor item do not use.
2WD/4WD identification		Displays the axle type of the vehicle.
T/M warning indicator DTC		Displays the first DTC when CVT system warning is displayed.
T/M warning indicator mileage		Displays the total mileage when CVT system warning is displayed at first time.
D POSITION SW	(On/Off)	Displays the operation status of the transmission range switch (D position).
N POSITION SW	(On/Off)	Displays the operation status of the transmission range switch (N position).
R POSITION SW	(On/Off)	Displays the operation status of the transmission range switch (R position).
P POSITION SW	(On/Off)	Displays the operation status of the transmission range switch (P position).
IDLE SW	(On/Off)	Displays the reception status of the closed throttle position signal received through CAN communication.
STRDWSW	(On/Off)	Displays the operation status of the paddle shifter (down switch).
STRUPSW	(On/Off)	Displays the operation status of the paddle shifter (up switch).
DOWNLVR	(On/Off)	- Displays the operation status of the selector lever (down switch). - This monitor item do not use.
UPLVR	(On/Off)	- Displays the operation status of the selector lever (up switch). - This monitor item do not use.

Monitored item	(Unit)	Remarks
NONMMODE	(On/Off)	- Displays if manual mode is not activated. - This monitor item do not use.
MMODE	(On/Off)	- Displays if manual mode is activated. - This monitor item do not use.
Tow mode switch	(On/Off)	- Displays the reception status of the TOW mode switch signal received through CAN communication. - This monitor item do not use.
CVT LIGHT	(On/Off)	- Displays the transaxle status of the CVT warning light signal transmitted through CAN communication. - This monitor item do not use.
ASC ON	(On/Off)	Displays the reception status of the ASC operation signal received through CAN communication.
TCS ON	(On/Off)	Displays the reception status of the TCS operation signal received through CAN communication.
ABS FAIL SIGNAL	(On/Off)	Displays the reception status of the ABS malfunction signal received through CAN communication.
ABS ON	(On/Off)	Displays the reception status of the ABS operation signal received through CAN communication.
G SEN CALIBRATION	(YET/DONE)	Displays the status of "G SENSOR CALIBRATION" in "Special Function".
N IDLE STATUS	(On/Off)	- Displays idle neutral status. - This monitor item do not use.
SNOW MODE	(On/Off)	- Displays whether it is the SNOW mode. - This monitor item do not use.

Monitored item	(Unit)	Remarks
ECO MODE	(On/Off)	- Displays whether it is the ECO mode. - This monitor item do not use.
NORMAL MODE	(On/Off)	- Displays whether it is the NORMAL mode. - This monitor item do not use.
SPORT MODE	(On/Off)	- Displays whether it is the SPORT mode. - This monitor item do not use.
ELECTRIC OP RELAY	(On/Off)	- Displays the command status from TCM to the electric oil pump relay. - This monitor item do not use.
E-OP RELAY MON	(On/Off)	- Monitors the command status from TCM to the oil pump relay and displays the monitored value. - This monitor item do not use.
Exchange transmission		This monitor item do not use.
Exchange oil pressure C/V		This monitor item do not use.
CVTF DETERIORATION DATE		This monitor item do not use.
Select - Initial learning temp		This monitor item do not use.
Lock-up - Initial learning temp		This monitor item do not use.
Select (N-D) - Initial learn press		This monitor item do not use.
Select (N-D) - Initial learn time		This monitor item do not use.

Monitored item	(Unit)	Remarks
Select (N-R) - Initial learn press		This monitor item do not use.
Select (N-R) - Initial learn time		This monitor item do not use.
Lock-up - Initial learning 1		This monitor item do not use.
SLIP REV	(rpm)	Displays the speed difference between the input shaft speed of CVT and the engine speed.
ELECTRIC OP DUTY	(%)	- Displays the command signal value (duty) of the electric oil pump transmitted from TCM. - This monitor item do not use.
Slip revolution absolute value	(rpm)	This monitor item do not use.
Target transmission speed	(sec)	This monitor item do not use.
E-OP DUTY MON	(%)	- Monitors the status signal value (duty) transmitted from the electric oil pump and displays the monitored value. - This monitor item do not use.
Input speed sensor	(rpm)	Displays the input speed calculated from the pulse signal of the input speed sensor.
PRI SPEED SEN	(rpm)	Displays the primary pulley speed calculated from the pulse signal of the primary speed sensor.
SEC REV SENSOR	(rpm)	Displays the secondary pulley speed calculated from the pulse signal of the output speed sensor.
ENG SPEED SIG	(rpm)	Displays the engine speed received through CAN communication.
SEC PRESSURE SEN	(V)	Displays the signal voltage of the secondary pressure sensor.
PRI PRESSURE SEN	(V)	Displays the signal voltage of the primary pressure sensor.

Monitored item	(Unit)	Remarks
ATF TEMP SEN	(V)	Displays the signal voltage of the CVT fluid temperature sensor.
G SENSOR	(V)	Displays the signal voltage of the G sensor.
TRQ RTO		Display the torque ratio of torque converter.
G sensor (TCM)	(V)	- Displays the voltage signal of G sensor for TCM. - This monitor item do not use.
BRAKESW	(On/Off)	Displays the reception status of the stop light switch signal received through CAN communication.
SHIFT IND SIGNAL		Displays the transaxle value of shift position signal transmitted via CAN communication.
RANGE		Displays the gear position recognized by TCM.
VSP SENSOR	(km/h or mph)	Displays the vehicle speed calculated from the CVT output shaft speed.
ESTM VSP SIG	(km/h or mph)	- Displays the vehicle speed signal (ABS) received through CAN communication. - Models with ABS are displayed.
VIGN SEN	(V)	Displays the battery voltage applied to TCM.
PVIGN VOLT	(V)	Displays the backup voltage of TCM.
VEHICLE SPEED	(km/h or mph)	Displays the vehicle speed recognized by TCM.
INPUT REV	(rpm)	Displays the input shaft speed of CVT recognized by TCM.
PRI SPEED	(rpm)	Displays the primary pulley speed recognized by TCM.
SEC SPEED	(rpm)	Displays the secondary pulley speed recognized by TCM.
ENG SPEED	(rpm)	Displays the engine speed recognized by TCM.
PULLEY GEAR RATIO		Displays the pulley gear ratio calculated from primary pulley speed/secondary pulley speed.
G SPEED	(G)	Displays the acceleration and deceleration speed of the vehicle calculated from vehicle speed change.
ACCEL POSI SEN 1	(deg)	Displays the estimated throttle position received through CAN communication.

Monitored item	(Unit)	Remarks
VENG TRQ	(Nm)	Display the engine torque recognized by TCM.
PRI TRQ	(Nm)	Display the input shaft torque of CVT.
SEC PRESSURE	(MPa)	Displays the secondary pressure calculated from the signal voltage of the secondary pressure sensor.
PRI PRESSURE	(MPa)	Displays the primary pressure calculated from the signal voltage of the primary pressure sensor.
FLUID TEMP	(°C or °F)	Displays the CVT fluid temperature calculated from the signal voltage of the CVT fluid temperature sensor.
DSR REV	(rpm)	Displays the target primary pulley speed calculated from processing of gear shift control.
TRGT GEAR RATIO		Displays the target gear ratio of the pulley from processing of gear shift control.
LU PRS	(MPa)	Displays the target oil pressure of the torque converter clutch solenoid valve calculated from oil pressure processing of gear shift control.
LINE PRS	(MPa)	Displays the target oil pressure of the line pressure solenoid valve calculated from oil pressure processing of gear shift control.
TRGT PRI PRESSURE	(MPa)	Displays the target oil pressure of the primary pressure solenoid valve calculated from oil pressure processing of gear shift control.
Target select pressure	(MPa)	Displays the target oil pressure of the select solenoid valve calculated from oil pressure processing of gear shift control.
TARGET SEC PRESSUR	(MPa)	Displays the target oil pressure of the secondary pressure solenoid valve calculated from oil pressure processing of gear shift control.
ISOLT1	(mA)	Displays the command current from TCM to the torque converter clutch solenoid valve.
ISOLT2	(mA)	Displays the command current from TCM to the line pressure solenoid valve.
PRI SOLENOID	(mA)	Displays the command current from TCM to the primary pressure solenoid valve.
SEC SOLENOID CURRENT	(mA)	Displays the command current from TCM to the secondary pressure solenoid valve.

Monitored item	(Unit)	Remarks
SELECT SOLENOID CURRENT	(mA)	Displays the command current from TCM to the select solenoid valve.
SOLMON1	(mA)	Monitors the command current from TCM to the torque converter clutch solenoid valve and displays the monitored value.
SOLMON2	(mA)	Monitors the command current from TCM to the line pressure solenoid valve and displays the monitored value.
PRI SOL MON	(mA)	Monitors the command current from TCM to the primary pressure solenoid valve and displays the monitored value.
SEC SOL MON CURRENT	(mA)	Monitors the command current from TCM to the secondary pressure solenoid valve and displays the monitored value.
SELECT SOL MON CURRENT	(mA)	Monitors the command current from TCM to the select solenoid valve and displays the monitored value.
G SEN SLOPE	(%)	Displays the gradient angle calculated from the G sensor signal voltage.
CVT-B		• Displays CVT fluid temperature count. • This monitor item do not use.
CVT-A		• Displays CVT fluid temperature count. • This monitor item do not use.

WORK SUPPORT

Function name	Item name	Description
ECU Information	-	Displays TCM part number.
Clear	ERASE LEARNING VALUE	• Erases learning value memorized by TCM.

Function name	Item name	Description
		This monitor item do not use.
Learning	FWD CLUTCH POINT LEARNING	Allow learning of the forward clutch engagement point.
Engine brake adjustment	ENGINE BRAKE ADJ.	Although there is no malfunction on the transaxle and the CVT system, if a customer make a complaint like "I do not feel comfortable with automatic operation of the engine brake on downhill", the engine brake may be cancelled with "engine brake adjustment".
Confirm CVTF deterioration (clear)	CONFORM CVTF DETERIORATION	Checks the degradation level of the CVT fluid under severe conditions.
G sensor calibration	G SENSOR CALIBRATION	Compensates the G sensor.
IP characteristics data writing	WRITE IP CHARA - REPLACEMENT AT/CVT	Writes IP characteristics when transaxle assembly is replaced.
	READ IP CHARA - REPLACEMENT TCM	Reads IP characteristics when TCM is replaced.
	WRITE IP CHARA - REPLACEMENT TCM	Writes IP characteristics when TCM is replaced.
MAC KEY writing	-	Write MAC key to TCM.

Engine brake adjustment

ENGINE BRAKE LEVEL	
ON	: Turn ON the engine brake control.
OFF	: Turn OFF the engine brake control.

[\[Previous\]](#) [\[Next\]](#)

DTC Index

note

- If multiple malfunction codes are detected at the same time, check each code according to the “DTC check priority list”. [DTC Inspection Priority Chart](#) .

Self Diagnostic Result

×:Applicable —: Not applicable

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light *4	CVT system warning *5	Electric shift warning *6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
P0571	P0571	00	BRAKE SWITCH A	1	×	—	A	—	DTC Description 
P0602	P0602	00	CONT PROGRAMMING	1	×	—	A	—	DTC Description 
P0605	P0605	00	CONTROL MODULE ROM	1	×	—	A	—	DTC Description 
—	P060B	00	CONTROL MODULE	1	—	—	—	—	DTC Description 

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light*4	CVT system warning *5	Electric shift warning*6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
P062F	P062F	00	EEPROM	1	×	—	A	—	DTC Description 
P0705	P0705	00	T/M RANGE SENSOR A	2	×	—	A	—	DTC Description 
P0706	P0706	00	T/M RANGE SENSOR A	2	×	—	A	—	DTC Description 
P0711	P0711	00	FLUID TEMP SENSOR A	2	×	—	A	—	DTC Description 
P0712	P0712	00	FLUID TEMP SENSOR A	2	×	—	A	—	DTC Description 
P0713	P0713	00	FLUID TEMP SENSOR A	2	×	—	A	—	DTC Description 
P0715	P0715	00	INPUT SPEED SENSOR A	2	×	—	A	—	DTC Description 
P0716	P0716	00	INPUT SPEED SENSOR A	2	×	—	A	—	DTC Description 
P0717	P0717	00	INPUT SPEED SENSOR A	2	×	—	A	—	DTC Description 

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light *4	CVT system warning *5	Electric shift warning *6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
P0718	P0718	00	INPUT SPEED SENSOR A	2	×	—	A	—	DTC Description 
P0740	P0740	00	TORQUE CONVERTER	2	×	—	A	—	DTC Description 
P0741	P0741	00	TORQUE CONVERTER	2	×	—	A	—	DTC Description 
P0742	P0742	00	TORQUE CONVERTER	1	×	—	A	—	DTC Description 
P0743	P0743	00	TORQUE CONVERTER	2	×	—	A	—	DTC Description 
P0746	P0746	00	PC SOLENOID A	2	×	—	A	—	DTC Description 
P0776	P0776	00	PC SOLENOID B	2	×	—	A	—	DTC Description 
P0778	P0778	00	PC SOLENOID B	2	×	—	A	—	DTC Description 
P0779	P0779	00	PC SOLENOID B	2	×	—	A	—	DTC Description 

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light*4	CVT system warning *5	Electric shift warning*6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
P0780	P0780	00	SHIFT ERROR	1	×	×	A or B [More than 7.5 km/h (4.7 MPH)]	×	DTC Description 
P0791	P0791	00	INTERMEDIATE SPEED SENSOR A	2	×	—	A	—	DTC Description 
P0792	P0792	00	INTERMEDIATE SPEED SENSOR A	2	×	—	A	—	DTC Description 
P0793	P0793	00	INTERMEDIATE SPEED SENSOR A	2	×	—	A	—	DTC Description 
P0794	P0794	00	INTERMEDIATE SPEED SENSOR A	2	×	—	A	—	DTC Description 
P0841	P0841	00	FLUID PRESS SEN/SW A	2	×	—	A	—	DTC Description 
P0847	P0847	00	FLUID PRESS SEN/SW B	2	×	—	A	—	DTC Description 
P0848	P0848	00	FLUID PRESS SEN/SW B	2	×	—	A	—	DTC Description 

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light *4	CVT system warning *5	Electric shift warning *6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
P084C	P084C	00	FLUID PRESS SEN/SW H	2	×	—	A	—	DTC Description 
P084D	P084D	00	FLUID PRESS SEN/SW H	2	×	—	A	—	DTC Description 
P0863	P0863	00	CONTROL UNIT (CAN)	1	×	—	A	—	DTC Description 
P0890	P0890	00	TCM	1	×	—	A	—	DTC Description 
P0962	P0962	00	PC SOLENOID A	2	×	—	A	—	DTC Description 
P0963	P0963	00	PC SOLENOID A	2	×	—	A	—	DTC Description 
P0965	P0965	00	PC SOLENOID B	2	×	—	A	—	DTC Description 
P0966	P0966	00	PC SOLENOID B	2	×	—	A	—	DTC Description 
P0967	P0967	00	PC SOLENOID B	2	×	—	A	—	DTC Description 

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light *4	CVT system warning *5	Electric shift warning *6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
—	P17F0	07	CVT JUDDER (T/M INSPECTION)	1	—	—	—	—	DTC Description 
—	P17F1	07	CVT JUDDER (C/V INSPECTION)	1	—	—	—	—	DTC Description 
—	P17F2	07	CVT JUDDER (T/C INSPECTION)	1	—	—	—	—	DTC Description 
—	P187E	00	T/M SYSTEM MULFUNCTION	1 or 2	—	—	A or B	—	DTC Description 
—	P18AB	00	IGNITION SW (ELECTRIC SHIFT)	1	—	× [Less than 5 km/h (3 MPH)]	A [More than 5 km/h (3 MPH)]	× [Less than 5 km/h (3 MPH)]	DTC Description 
P2758	P2758	00	TCC PRESSURE CONT SOLENOID	1	×	—	A	—	DTC Description 
P2765	P2765	00	INPUT SPEED SENSOR B	2	×	—	A	—	DTC Description 
P2766	P2766	00	INPUT SPEED SENSOR B	2	×	—	A	—	DTC Description 
P2767	P2767	00	INPUT SPEED SENSOR B	2	×	—	A	—	DTC Description 

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light*4	CVT system warning *5	Electric shift warning*6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
									
P2768	P2768	00	INPUT SPEED SENSOR B	2	×	—	A	—	DTC Description 
P2813	P2813	00	SELECT SOLENOID	2	×	—	A	—	DTC Description 
P2814	P2814	00	SELECT SOLENOID	2	×	—	A	—	DTC Description 
P2815	P2815	00	SELECT SOLENOID	2	×	—	A	—	DTC Description 
U0100	U0100	00	LOST COMM (ECM A)	1	×	—	—	—	DTC Description 
U0103	U0103	00	SHIFT CONT MODULE A	1	×	× [Less than 5 km/h (3 MPH)]	B [More than 7.5 km/h (4.7 MPH)]	× [Less than 5 km/h (3 MPH)]	DTC Description 
U0115	U0115	00	LOST COMM (ECM/PCM B)	1	×	—	—	—	DTC Description 
—	U0300	00	CAN COMM DATA	1	—	—	—	—	DTC Description 

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light *4	CVT system warning *5	Electric shift warning *6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
—	U1112	24	DECELERATION REQUEST SIGNAL	1	—	—	—	—	DTC Description 

*1: These numbers are specified by SAE J2012/ISO 15031-6.

*2: The DTC number of the 1st trip is the same as the DTC number.

*3: Refer to Malfunction Indicator Light (MIL)[Malfunction Indicator Lamp \(MIL\)](#).

*4: Refer to Electric Shift Warning Light[Electric Shift Warning Lamp](#) (FULL TFT METER) or Electric Shift Warning Light[Electric Shift Warning Lamp](#) (7 INCH INFORMATION DISPLAY).

*5: Refer to CVT system warning[CVT System Warning](#).

*6: Refer to [Electric Shift Warning](#).

Network-DTC

×:Applicable —: Not applicable

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light*4	CVT system warning*5	Electric shift warning*6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
U0073	U0073	00	Control module comm Bus A Off	1	×	—	—	—	DTC Description 
U007A	U007A	00	Control module comm Bus H Off	1	×	—	—	—	DTC Description 
—	U2140	87	CAN comm err (ECM)	1	—	—	—	—	DTC Description 

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL*3	Electric shift warning light*4	CVT system warning*5	Electric shift warning*6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
—	U2148	87	CAN comm err (brake control unit)	1	—	—	—	—	DTC Description ➡
—	U214A	87	CAN comm err (AWD/4WD)	1	—	—	—	—	DTC Description ➡
—	U214F	87	CAN comm err (BCM)	1	—	× [Less than 5 km/h (3 MPH)]	A [More than 5 km/h (3 MPH)]	× [Less than 5 km/h (3 MPH)]	DTC Description ➡
—	U2152	87	CAN comm err (ADAS control unit)	1	—	—	—	—	DTC Description ➡
—	U2153	87	CAN comm err (HVAC)	1	—	—	—	—	DTC Description ➡
—	U215B	87	CAN comm err (IPDM E/R)	1	—	× [Less than 5 km/h (3 MPH)]	A [More than 5 km/h (3 MPH)]	× [Less than 5 km/h (3 MPH)]	DTC Description ➡
—	U2240	87	CAN comm err (ECM)	1	—	—	—	—	DTC Description ➡
—	U2247	87	CAN comm err (electric shift)	1	—	—	—	—	DTC Description ➡
—	U2248	87	CAN comm err (brake control unit)	1	—	—	—	—	DTC Description ➡
—	U2252	87	CAN comm err (ADAS control unit)	1	—	—	—	—	DTC Description ➡

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light*4	CVT system warning *5	Electric shift warning*6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
—	U2276	87	CAN comm err (CCM)	1	—	—	—	—	DTC Description 

*1: These numbers are specified by SAE J2012/ISO 15031-6.

*2: The DTC number of the 1st trip is the same as the DTC number.

*3: Refer to Malfunction Indicator Light (MIL) [Malfunction Indicator Lamp \(MIL\)](#) .

*4: Refer to Electric Shift Warning Light [Electric Shift Warning Lamp](#)  (FULL TFT METER) or Electric Shift Warning Light [Electric Shift Warning Lamp](#)  (7 INCH INFORMATION DISPLAY).

*5: Refer to CVT system warning [CVT System Warning](#) .

*6: Refer to [Electric Shift Warning](#) .

MAC Diagnosis

×:Applicable —: Not applicable

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL*3	Electric shift warning light*4	CVT system warning*5	Electric shift warning*6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
—	U1327	52	MAC key update	1	—	—	—	—	DTC Description 
—	U1327	54	MAC key update	1	—	—	—	—	DTC Description 
—	U2140	57	CAN comm err (ECM)	1	—	—	—	—	DTC Description

DTC*1, *2			Items (M.U.T.-III SE screen terms)	Trip	MIL *3	Electric shift warning light*4	CVT system warning *5	Electric shift warning*6	Reference
GST	M.U.T.-III SE (TRANSMISSION)								
									
—	U214F	57	CAN comm err (BCM)	1	—	—	—	—	DTC Description 
—	U2152	57	CAN comm err (ADAS control unit)	1	—	—	—	—	DTC Description 
—	U2176	57	CAN comm err (CCM)	1	—	—	—	—	DTC Description 

*1: These numbers are specified by SAE J2012/ISO 15031-6.

*2: The DTC number of the 1st trip is the same as the DTC number.

*3: Refer to Malfunction Indicator Light (MIL) [Malfunction Indicator Lamp \(MIL\)](#) .

*4: Refer to Electric Shift Warning Light [Electric Shift Warning Lamp](#)  (FULL TFT METER) or Electric Shift Warning Light [Electric Shift Warning Lamp](#)  (7 INCH INFORMATION DISPLAY).

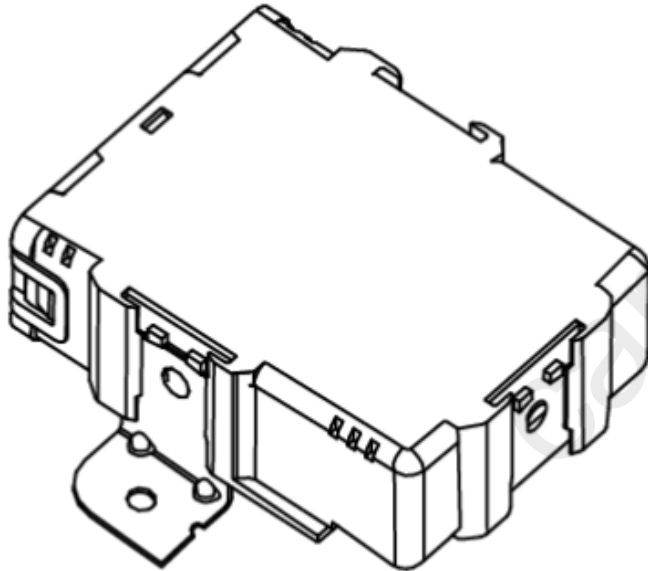
*5: Refer to CVT system warning [CVT System Warning](#) .

*6: Refer to [Electric Shift Warning](#) .

Electric Shift Control Module

FUNCTIONS WITHIN THE SYSTEM

The electric shift control module actuates the shift actuator according to the signals transmitted from electric shift sensor, P position switch and various ECUs.



INDIVIDUAL FUNCTION WITHIN THE SYSTEM

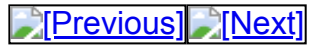
- The electric shift control module consists of the microcomputer and input/output connectors for signal and power supply.
 - The electric shift control module includes a self-diagnosis function for simplifying trouble diagnosis.
-

INDIVIDUAL OPERATION

The electric shift control module is started by the ignition switch signal.

COMPONENT PARTS LOCATION

The electric shift control module is installed below the center console.

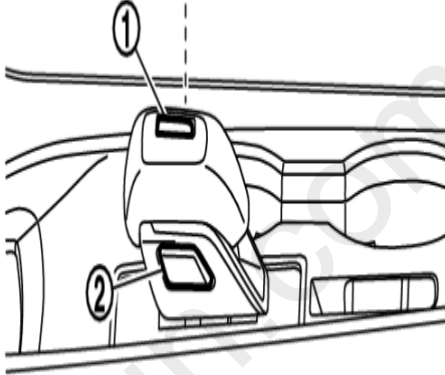


Electric Shift Selector

FUNCTIONS WITHIN THE SYSTEM

The electric shift selector sends the shift request of the driver to the electric shift control module as an electric signal.

INDIVIDUAL FUNCTION WITHIN THE SYSTEM

Shift selector position	Operation/Function	
H (Home position)	The selector lever automatically moves back to the home position after it is operated.	R ← ■ Nr ⇄ H ⇄ Nd ⇄ D/M  ■: Press the button ② to shift ⇄: Shift without pressing the button ②

Shift selector position	Operation/Function	
P (P position switch ①)	Completely stop the vehicle and press the P position switch while depressing the brake pedal. The shift position changes to P.	
R	While depressing the brake pedal, press the selector knob button and shift the selector lever to R position. The shift position changes to R.	
Nr	When shift position is D or M, while depressing the brake pedal, shift the selector lever to the Nr position and hold it for approx. 0.5 second. The shift position changes to N.	note Even if selector lever is shifted to the Nr position when shift position is R, the shift position does not change to N and the shift position warning buzzer sounds.
Nd	When shift position is R, while depressing the brake pedal, shift the selector lever to the Nd position and hold it for approx. 0.5 second. The shift position changes to N.	note Even if selector lever is shifted to the Nd position when shift position is D or M, the shift position does not change to N and the shift position warning buzzer sounds.
D/M	While depressing the brake pedal, shift the selector lever	

Shift selector position	Operation/Function
	to D/M position. The shift position changes to D. - While driving in the D position, shift the selector lever to D/M position again. The shift position changes to M (manual mode) - To switch from M (manual mode) to the D driving, shift the selector lever to D/M position again.

OPERATIONAL CONDITIONS FOR SHIFT

■: Hold ●: Current shift position ○: Be able to shift here

POWER SW	Operation	Vehicle speed	Stop light switch	Shift position					Remarks
				P	R	N	D	M	
OFF/ACC	Selector lever	—	—	■			—		—
	P position SW	—	—	■			—		—

POWER SW	Operation	Vehicle speed	Stop light switch	Shift position					Remarks
				P	R	N	D	M	
ON (Engine stop)	Selector lever	—	ON	●	—	○	—	—	- Shifted to N position even when shifted to R or D position - Shift position warning buzzer: Two short beeps
		—	OFF	■	—				Shift position warning buzzer: Two short beeps
	P position SW	—	—	○	—	●	—	—	—
ON (Engine running)	Selector lever	—	ON	●	○	○	○	○*	—
		—	OFF	■	—				Shift position warning buzzer: Two short beeps
	P position SW	3 km/h (1.86 MPH) or less	—	○	●	●	●	●	—
		3 km/h (1.86 MPH) or more	—	—	■	■	■	■	Shift position warning buzzer: Two short beeps

*: Direct shifting to the M position from the P position is not possible.

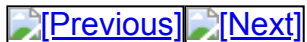
INDIVIDUAL OPERATION

The electric shift selector sends a signal to the electric shift control module by shifting.

COMPONENT PARTS LOCATION

The electric shift selector is installed on the center console.

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Electric Shift Sensor

FUNCTIONS WITHIN THE SYSTEM

The electric shift control module determines the shift selector position from the combination of the electric shift sensor ON/OFF signals.

INDIVIDUAL FUNCTION WITHIN THE SYSTEM

The electric shift sensor has 8 non-contact sensors (Hall IC) built in. Each sensor switches ON/OFF according to the selector lever position.

SELECTOR LEVER position judgement Table

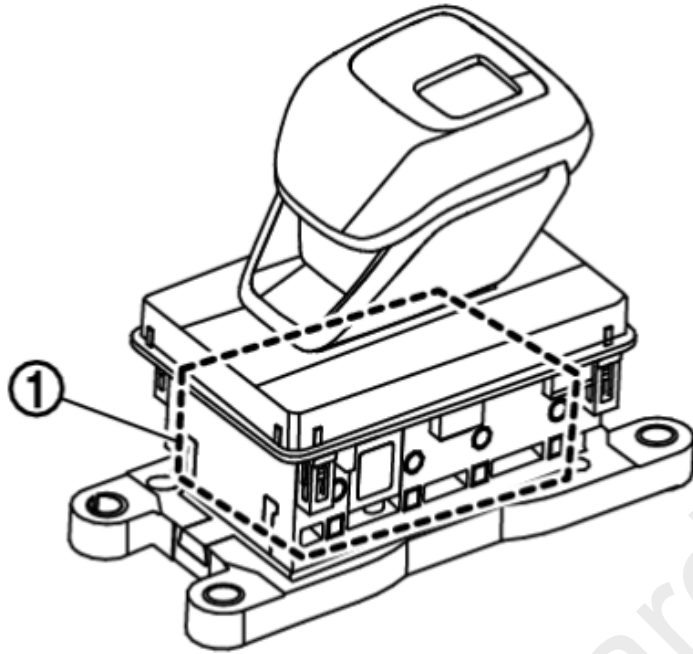
Selector lever position	Electric shift sensor							
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
R	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
Nr	ON	ON	ON	ON	ON	OFF	OFF	OFF
H	ON	ON	ON	ON	ON	ON	ON	ON
Nd	OFF	OFF	OFF	ON	ON	ON	ON	ON
D/M	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON

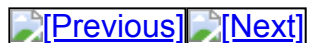
INDIVIDUAL OPERATION

The electric shift sensor transmits ON/OFF signals according to the selector lever position to the electric shift control module.

COMPONENT PARTS LOCATION

The electric shift sensor ① is installed to the electric shift selector.





Reference Value

M.U.T.-III SE DATA MONITOR STANDARD VALUE

- In M.U.T.-III SE, electric shift timing or lock-up timing, i.e. operation timing of each solenoid valve, is displayed. Therefore, if there is an obvious difference between the shift timing estimated from a shift shock (or engine speed variations) and that shown on the M.U.T.-III SE, the mechanism parts (including the hydraulic circuit) excluding the solenoids and sensors may be malfunctioning. In this case, check the mechanical parts following the appropriate diagnosis procedure.
- Shift point (gear position) displayed on M.U.T.-III SE slightly differs from shift pattern described in Service Manual. This is due to the following reasons.
 - Actual shift pattern may vary slightly within specified tolerances.
 - While shift pattern described in Service Manual indicates start of each shift, M.U.T.-III SE shows gear position at end of shift.
 - The solenoid display (ON/OFF) on M.U.T.-III SE is changed at the start of gear shifting. In contrast, the gear position display is changed at the time when gear shifting calculated in the control unit is completed.

note The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to M.U.T.-III SE display items.

Monitor item	Condition	Value/Status (Approx.)
L POSITION SW	Always	Off
SPORT MODE SW	Always	Off
ECO MODE SW	Always	Off
SPORT MODE IND	Always	Off
MANU MODE SIGNAL	Driving with manual mode	On
	Other than the above	Off
Ds mode signal*	—	—
ECO MODE SIGNAL	Always	Off
M GEAR POS	Manual mode: 1st – 8th	1 to 8

Monitor item	Condition	Value/Status (Approx.)
ENGBRKLVL	When the engine brake level of "ENGINE BRAKE ADJ". in "Special Function" is ON	On
	When the engine brake level of "ENGINE BRAKE ADJ". in "Special Function" is OFF	Off
AIR BLDING STATE	Always	COMP
2WD/4WD identification	—	2WD/4WD
T/M warning indicator DTC	Ignition switch ON	Displays the first DTC when CVT system warning is displayed.
T/M warning indicator mileage	Ignition switch ON	Displays the total mileage when CVT system warning is displayed at first time.
D POSITION SW	Sift position: "D" position	On
	Other than the above	Off
N POSITION SW	Sift position: "N" position	On
	Other than the above	Off
R POSITION SW	Sift position: "R" position	On
	Other than the above	Off
P POSITION SW	Sift position: "P" position	On
	Other than the above	Off
IDLE SW	Accelerator pedal is released	On
	Accelerator pedal is fully depressed	Off
STRDWNSW	Paddle shifter (-) is pulled	On
	Other than the above	Off
STRUPSW	Paddle shifter (+) is pulled	On
	Other than the above	Off
DOWNLVR	Always	Off
UPLVR	Always	Off
NONMMODE	Always	On

Monitor item	Condition	Value/Status (Approx.)
MMODE	Always	Off
Tow mode switch	Always	Off
CVT LIGHT	Always	Off
ASC ON	ASC is activated	On
	Other than the above	Off
TCS ON	TCS is activated	On
	Other than the above	Off
ABS FAIL SIGNAL	When ABS malfunction signal is received	On
	Other than the above	Off
ABS ON	ABS is activated	On
	Other than the above	Off
G SEN CALIBRATION	When G sensor calibration is completed	DONE
	When G sensor calibration is not completed	YET
N IDLE STATUS	Always	Off
SNOW MODE	Always	Off
ECO MODE	Always	Off
NORMAL MODE	Always	Off
SPORT MODE	Always	Off
ELECTRIC OP RELAY	Always	Off
E-OP RELAY MON	Always	Off
Exchange transmission*	—	—
Exchange oil pressure C/V*	—	—
CVTF DETERIORATION DATE*	—	—
Select - Initial learning temp*	—	—
Lock-up - Initial learning temp*	—	—
Select (N-D) - Initial learn press*	—	—

Monitor item	Condition	Value/Status (Approx.)
Select (N-D) - Initial learn time*	—	—
Select (N-R) - Initial learn press*	—	—
Select (N-R) - Initial learn time*	—	—
Lock-up - Initial learning 1*	—	—
SLIP REV	While driving	Engine speed – Input speed
ELECTRIC OP DUTY	Always	0%
E-OP DUTY MON	Always	0%
Slip revolution absolute value*	—	—
Target transmission speed*	—	—
Input speed sensor	In driving (lock-up ON)	Approximately matches the engine speed.
PRI SPEED SEN	In driving (lock-up ON)	Approximately matches the engine speed.
SEC REV SENSOR	While driving	VSP SENSOR × 40
ENG SPEED SIG	Engine running	Almost same reading as tachometer
SEC PRESSURE SEN	• After engine warm up • Shift position: “N” position • At idle	1.2 – 1.3V
PRI PRESSURE SEN	• After engine warm up • Shift position: “N” position • At idle	0.7 – 0.9V
ATF TEMP SEN	CVT fluid: Approx. 20°C (68°F)	2.01 – 2.05 V
	CVT fluid: Approx. 50°C (122°F)	1.45 – 1.50 V
	CVT fluid: Approx. 80°C (176°F)	0.90 – 0.94 V

Monitor item	Condition	Value/Status (Approx.)
G SENSOR	- Vehicle stopped - Vehicle is level	0 G
	During acceleration	The value changes to the positive side along with acceleration.
	During deceleration	The value changes to the positive side along with deceleration.
TRQ RTO	While driving	The value changes along with acceleration/deceleration.
G sensor (TCM)	Always	0 V
BRAKESW	Brake pedal is depressed	On
	Brake pedal is released	Off
SHIFT IND SIGNAL	When the selector lever is positioned in between each position.	OFF
	Shift position: P position	P
	Shift position: R position	R
	Shift position: N position	N
	Shift position: D position	D
	Manual mode: 1st	M1
	Manual mode: 2nd	M2
	Manual mode: 3rd	M3
	Manual mode: 4th	M4
	Manual mode: 5th	M5
	Manual mode: 6th	M6
	Manual mode: 7th	M7
	Manual mode: 8th	M8

Monitor item	Condition	Value/Status (Approx.)
RANGE	Shift position: P and N positions	N/P
	Shift position: R position	R
	Shift position: D position	D
	Shift position: M position	
VSP SENSOR	While driving	Almost same as the speedometer display.
ESTM VSP SIG	While driving	Almost same as the speedometer display.
VIGN SEN	Ignition switch: ON	10.0 – 16.0 V
PVIGN VOLT	Ignition switch: ON	10.0 – 16.0 V
VEHICLE SPEED	While driving	Almost same as the speedometer display.
INPUT REV	In driving (lock-up ON)	Almost same as the engine speed.
PRI SPEED	In driving (lock-up ON)	Approximately matches the engine speed.
SEC SPEED	While driving	VSP SENSOR × 40
ENG SPEED	Engine running	Almost same reading as tachometer
PULLEY GEAR RATIO	In driving (forward)	2.63 – 0.38
	In driving (reverse)	2.63
G SPEED	Vehicle stopped	0.00 G
	During acceleration	The value changes to the positive side along with acceleration.
	During deceleration	The value changes to the positive side along with deceleration.
ACCEL POSI SEN 1	Accelerator pedal released	0.00 deg
	Accelerator pedal fully depressed	80.00 deg

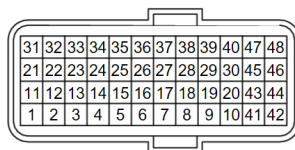
Monitor item	Condition	Value/Status (Approx.)
VENG TRQ	While driving	The value changes along with acceleration/deceleration.
PRI TRQ	While driving	The value changes along with acceleration/deceleration.
SEC PRESSURE	• After engine warm up • Shift position: "N" position • At idle	1.100 MPa
PRI PRESSURE	• After engine warm up • Shift position: "N" position • At idle	0.500 MPa
FLUID TEMP	Ignition switch ON.	Displays the CVT fluid temperature.
DSR REV	While driving	It varies along with the driving condition.
TRGT GEAR RATIO	In driving (forward)	2.63 – 0.38
	In driving (reverse)	2.63
LU PRS	• Engine started • Vehicle is stopped.	–0.50 MPa
	• Shift position: "D" position • Accelerator pedal position: 1/8 or less • Vehicle speed: 20 km/h (12 MPH) or more	0.6 MPa

Monitor item	Condition	Value/Status (Approx.)
LINE PRS	• After engine warm up • Shift position: "N" position • At idle	1.100 MPa
	• After engine warm up • Shift position: "N" position • Depress the accelerator pedal fully	5.750 – 6.000 MPa
TRGT PRI PRESSURE	• After engine warm up • Shift position: "N" position • At idle	0.500 MPa
Target select pressure	• After engine warm up • Shift position: "N" position • At idle	0.000 MPa
TARGET SEC PRESSUR	• After engine warm up • Shift position: "N" position • At idle	1.100 MPa
ISOLT1	—	—
ISOLT2	—	—
PRI SOLENOID	—	—
SEC SOLENOID CURRENT	—	—
SELECT SOLENOID CURRENT	—	—
SOLMON1	—	—
SOLMON2	—	—
PRI SOL MON	—	—

Monitor item	Condition	Value/Status (Approx.)
SEC SOL MON CURRENT	—	—
SELECT SOL MON CURRENT	—	—
G SEN SLOPE	Flat road	0%
	Uphill gradient	The value changes to the positive side along with uphill gradient. (Maximum 40.45%)
	Downhill gradient	The value changes to the negative side along with downhill gradient. (Minimum -40.45%)
CVT-B*	—	—
CVT-A*	—	—

*: This monitor item does not use.

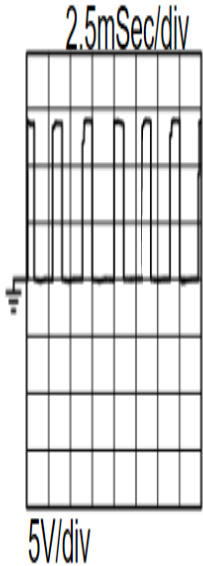
TERMINAL LAYOUT

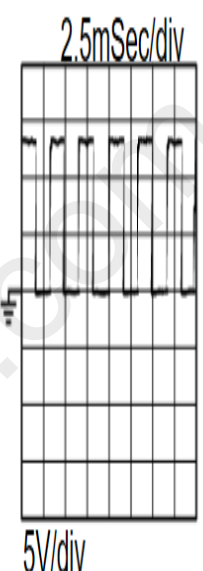


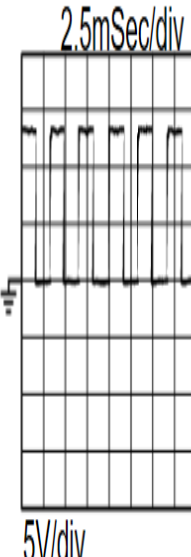
INPUT/OUTPUT SIGNAL STANDARD

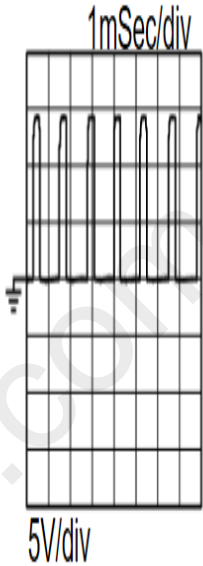
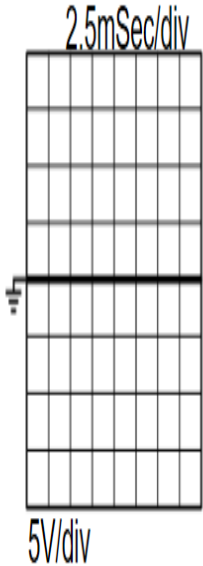
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	—	Signal	Input/Output			
2* (BR)	Ground	—	—	Ignition switch ON	—	—
4 (W)	Ground	D position switch	Input		Shift position: "D" position	10 – 16 V
					Other than the above	0 V
5 (Y)	Ground	N position switch	Input		Shift position: "N" position	10 – 16 V
					Other than the above	0 V
6 (G)	Ground	R position switch	Input		Shift position: "R" position	10 – 16 V
					Other than the above	0 V
7 (L)	Ground	P position switch	Input		Shift position: "P" position	10 – 16 V
					Other than the above	0 V
8 (GR)	—	CAN-H	Input/Output	—		—
9 (R)	—	CAN-L	Input/Output	—		—
11 (Y)	Ground	Sensor ground	—	Always		0 V
12 (SB)	Ground	CVT fluid temperature sensor	Input	Ignition switch ON	CVT fluid: Approx. 20°C (68°F)	2.01 – 2.05 V
					CVT fluid: Approx. 50°C (122°F)	1.45 – 1.50 V
					CVT fluid: Approx. 80°C 176°F)	0.90 – 0.94 V

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal	Input/Output		
16 (P)	Ground	Secondary pressure sensor	Input	- Shift position: "N" position - At idle	1.2 – 1.3 V
17 (BR)	Ground	Primary pressure sensor	Input	- Shift position: "N" position - At idle	0.70 – 0.85 V
23 (R)	—	CAN-L	Input/Output	—	—
24 (V)	Ground	Input speed sensor	Input	- Shift position: "M1" position - Vehicle speed: 20 km/h (12 MPH)	880 Hz
26 (R)	Ground	Sensor power supply	Output	Ignition switch: ON	5.0 V
				Ignition switch: OFF	0 V

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal	Input/Output		
30 (Y)	Ground	Line pressure solenoid valve	Output	• After engine warming up • Shift position: "N" position • At idle	
				• After engine warming up • Shift position: "N" position • Depress the accelerator pedal fully	

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal	Input/Output		
33 (GR)	—	CAN-H	Input/Output	—	—
34 (R)	Ground	Output speed sensor	Input	- Shift position: "M1" position - Vehicle speed: 20 km/h (12 MPH)	200 Hz 
35 (BG)	Ground	Primary speed sensor	Input	- Shift position: "M1" position - Vehicle speed: 20 km/h (12 MPH)	700 Hz

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal	Input/Output		
					
37 (L)	Ground	Select solenoid valve	Output	• Engine started • Vehicle is stopped • Shift position: "N" position	

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal	Input/Output		
38 (LG)	Ground	Torque converter clutch solenoid valve	Output	- Shift position: "D" position - Accelerator pedal position: 1/8 or less - Vehicle speed: 20 km/h (12 MPH) or more	
				- Engine started - Vehicle is stopped	

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal	Input/Output		
39 (G)	Ground	Secondary pressure solenoid valve	Output	- Shift position: "M1" position - Vehicle speed: 20 km/h (12 MPH)	
40 (W)	Ground	Primary pressure solenoid valve	Output	- Shift position: "M1" position - Vehicle speed: 20 km/h (12 MPH)	

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal	Input/Output		
41 (B)	Ground	Ground	—	Always	0 V
42 (B)	Ground	Ground	—	Always	0 V
45 (V)	Ground	Battery power supply (Memory backup)	Input	Always	10 – 16 V
46 (V)	Ground	Battery power supply (Memory backup)	Input	Always	10 – 16 V
47 (LG)	Ground	Ignition power supply	Input	Ignition switch: ON	10 – 16 V
				Ignition switch: OFF	0 V
48 (LG)	Ground	Ignition power supply	Input	Ignition switch: ON	10 – 16 V
				Ignition switch: OFF	0 V

*: This harness does not use.

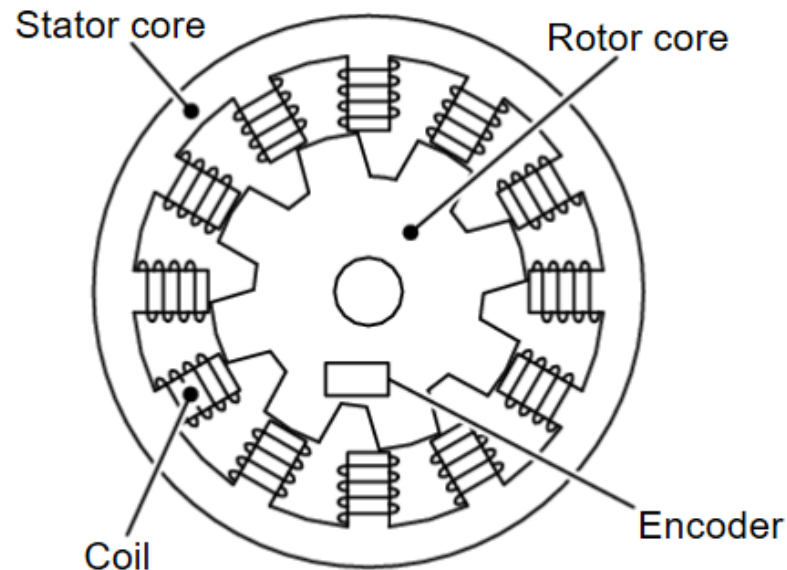


Shift Actuator

FUNCTIONS WITHIN THE SYSTEM

The shift actuator operates according to the output signal from the electric shift control module and changes the shift position of the transaxle.

INDIVIDUAL FUNCTION WITHIN THE SYSTEM



- Motor
 - A 3-phase SR motor is used.
 - Coil is placed on the stator core around the motor and the current that passes through the coil in sequence generates the rotating force for the inner rotor core.
- Encoder
 - The Hall IC type rotation angle sensor is used for higher accuracy in the detection of the rotor rotation angle.
 - It detects the rotor rotation angle and outputs pulse signals to the electric shift control module.
 - The electric shift control module controls the timing of the current feed to the coils optimally based on the signal from the encoder.
- Actuator Reduction Gear

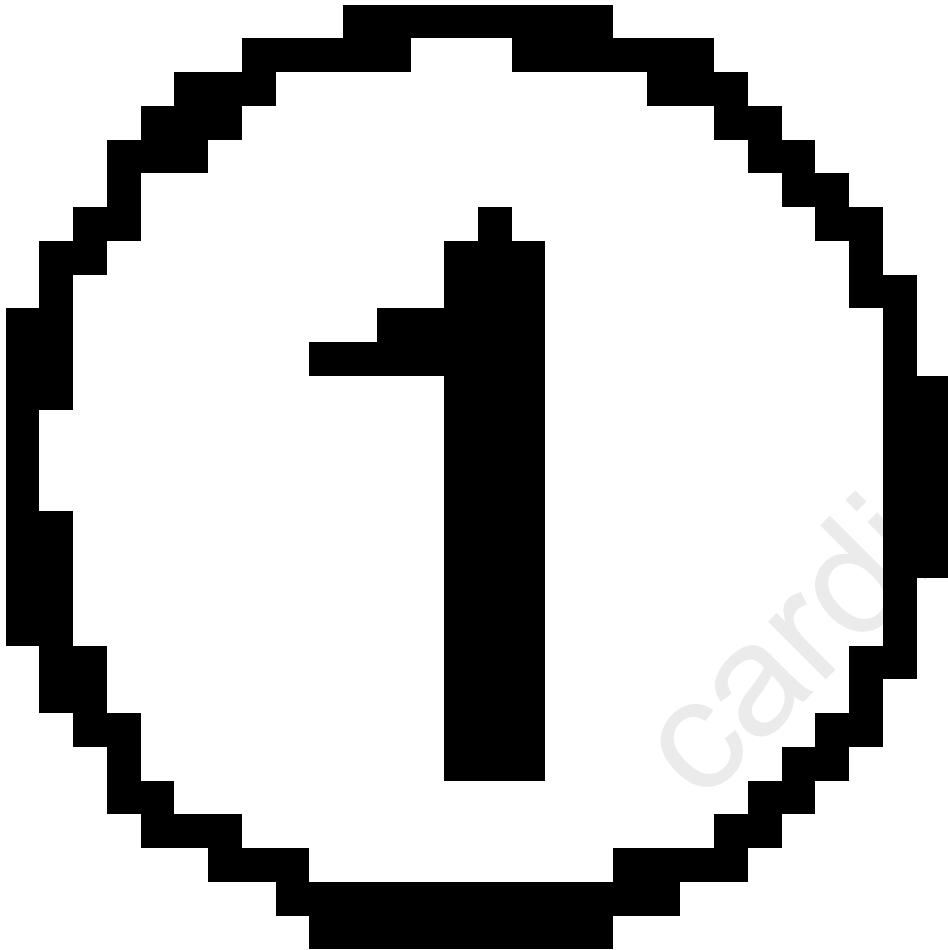
The actuator reduction gear consists of a cycloidal gear and includes a motor with its torque amplified for secure operation under high torque-requiring conditions.

INDIVIDUAL OPERATION

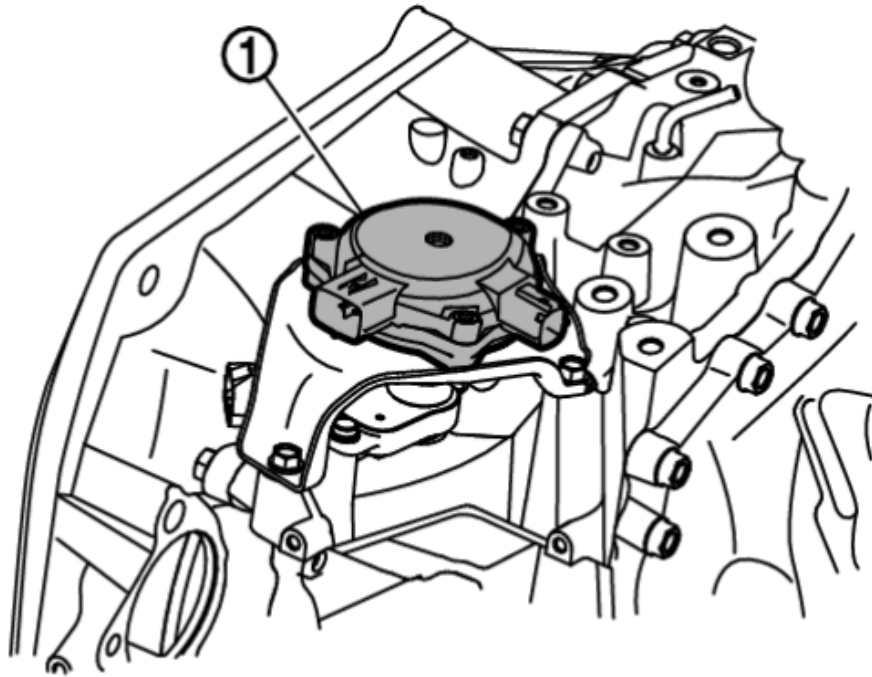
The shift actuator moves the manual shaft of transaxle and changes shift position.

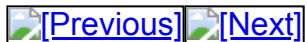
COMPONENT PARTS LOCATION

The shift actuator



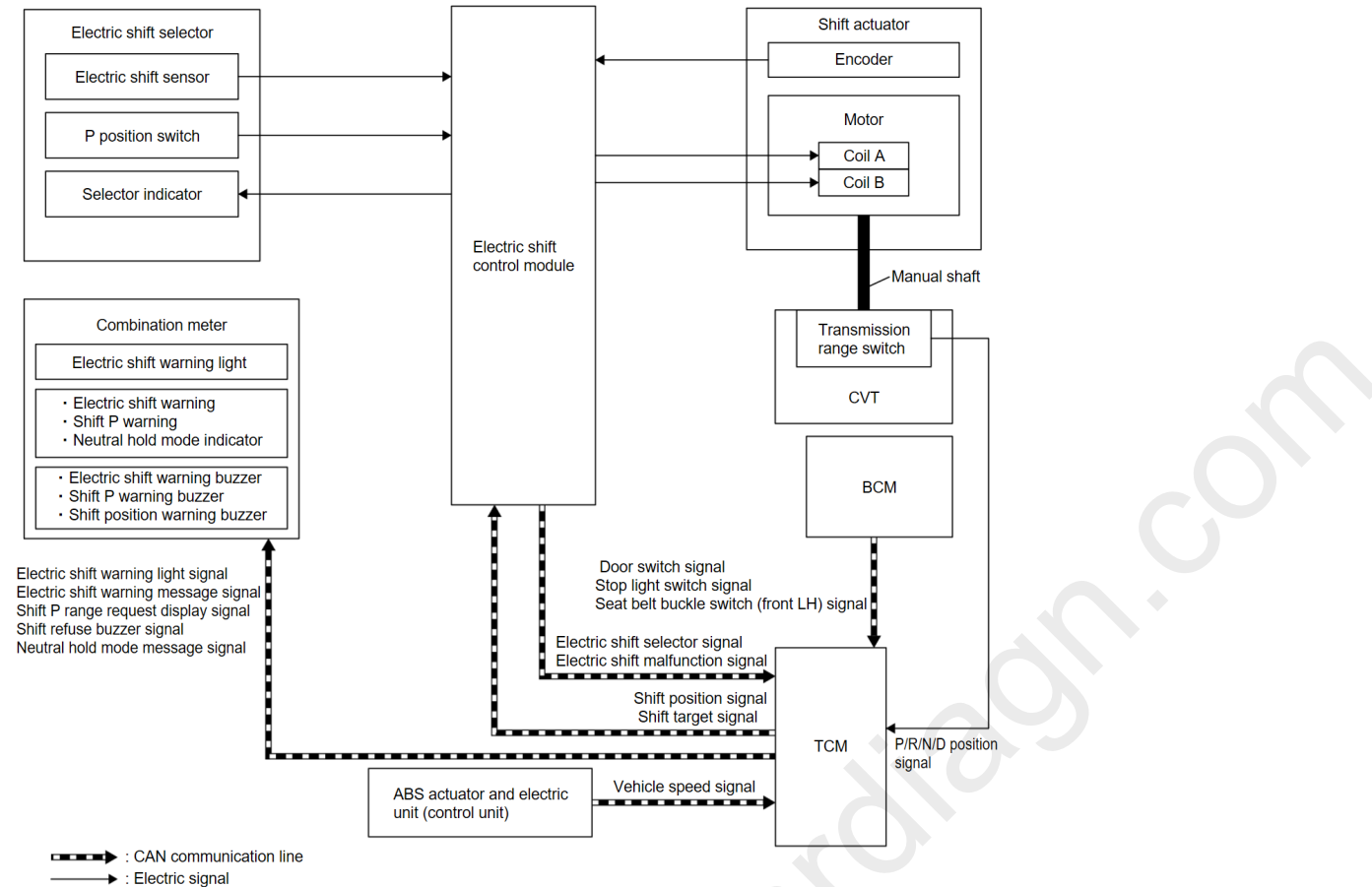
is installed above the transaxle.





System Description

- The electric shift system detects each shift position electrically. In addition, in P position, the electric shift system activates the shift actuator, according to electrical signals received from the P position switch and brings the vehicle into the parking state.
- In the event of a malfunction in the electric shift system, the selector indicator of electric shift selector turns OFF and only the shift indicator (on the combination meter) indicates the shift position.
- In the event of a malfunction in the electric shift system, the system enters fail-safe mode. Refer to [Fail-safe](#) .



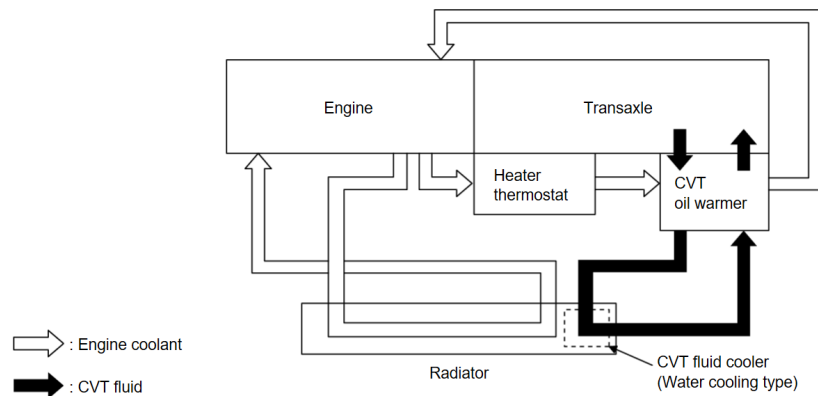
Component	Function
Electric shift control module	Mainly transmits the following signal to TCM via CAN communication • Electric shift selector signal • Electric shift malfunction signal Mainly receives the following signals from TCM via CAN communication • Shift position signal • Shift target signal

Component	Function
Electric shift selector	Refer to Electric Shift Selector  .
Electric shift sensor	Refer to Electric Shift Sensor  .
P position switch	Refer to P Position Switch  .
Selector indicator	Refer to Selector Indicator Selector Indicator  .
Shift actuator	Refer to Shift Actuator  .
Transmission range switch	Refer to Transmission Range Switch Transmission Range Switch  .
TCM	Mainly transmits the following signal to electric shift control module via CAN communication • Shift position signal • Shift target signal Mainly receives the following signals from electric shift control module via CAN communication • Electric shift selector signal • Electric shift malfunction signal
BCM	Mainly transmits the following signal to TCM via CAN communication • Stop light switch signal • Door switch signal • Seat belt buckle switch (front LH) signal
ABS actuator and electric unit (control unit)	Mainly transmits the following signal to TCM via CAN communication • Vehicle speed signal

Component	Function
Combination meter	Mainly receives the following signal from TCM via CAN communication • Electric shift warning light signal • Electric shift warning message signal • Shift refuse buzzer signal • Shift P range request display signal • Neutral hold mode message signal

System Description

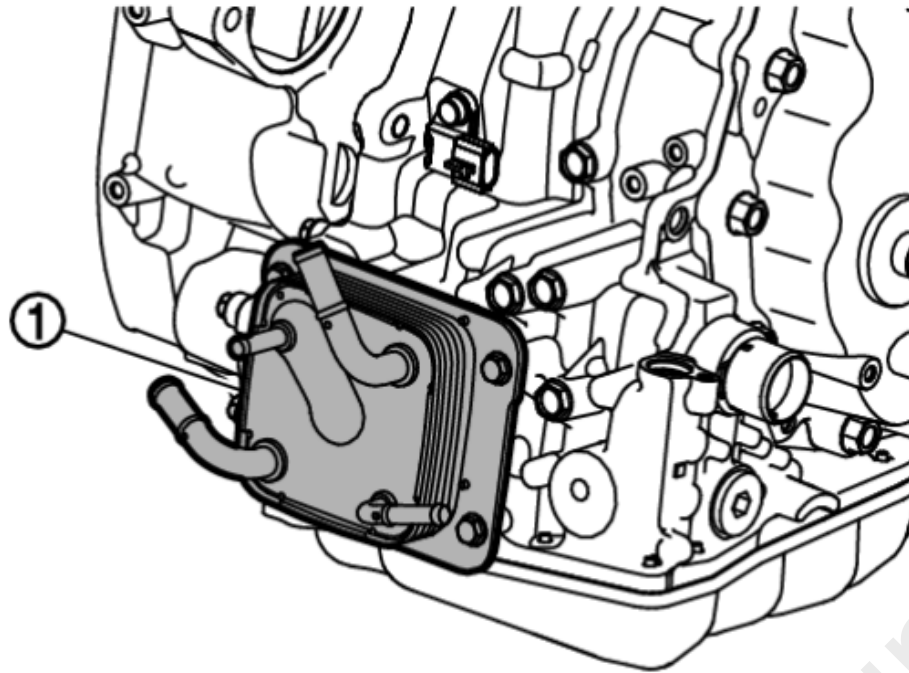
CVT FLUID COOLER SCHEMATIC



COMPONENT DESCRIPTION

CVT Oil Warmer

- The CVT oil warmer ① is installed on the front part of transaxle assembly.



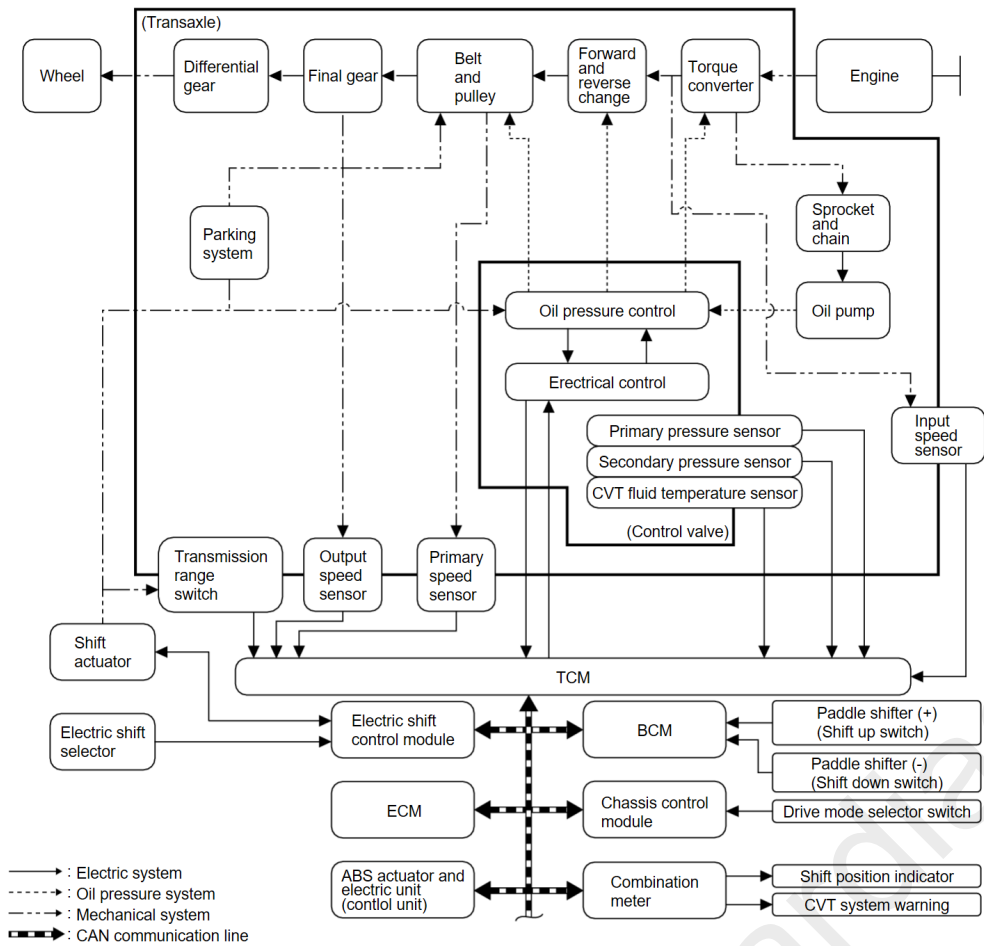
- When engine is started while engine and CVT are cold, engine coolant temperature rises more quickly than CVT fluid temperature. CVT oil warmer is provided with two circuits for CVT and engine coolant respectively so that warmed engine coolant warms CVT quickly. This helps shorten CVT warming up time, improving fuel economy.
- A cooling effect is obtained when CVT fluid temperature is high.

 [\[Previous\]](#)  [\[Next\]](#)

System Description

SYSTEM DIAGRAM

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Component	Function
ECM	Mainly transmits the following signal to TCM via CAN communication. • Engine and CVT integrated control signal note General term for the communication (torque-down permission, torque down request, etc.) exchanged between the ECM and TCM. • Engine speed signal • Engine coolant temperature signal

Component	Function
	• Accelerator pedal position signal • Closed throttle position signal Mainly receives the following signals from TCM via CAN communication. • Malfunction indicator light signal
TCM	TCM 
BCM	Mainly transmits the following signal to TCM via CAN communication • Stop light switch signal • Paddle shifter shift up signal • Paddle shifter shift down signal
ABS actuator and electronic unit (control unit)	Mainly transmits the following signal to TCM via CAN communication • Vehicle speed signal • ABS operation signal • TCS operation signal • ASC operation signal • Decel G sensor signal
Combination meter	Mainly receives the following signals from TCM via CAN communication. • Shift position signal • CVT warning message signal
Malfunction indicator light (MIL)	Malfunction Indicator Light (MIL) Malfunction Indicator Lamp (MIL)  (FULL TFT METER) or Malfunction Indicator Light (MIL) Malfunction Indicator Lamp (MIL)  (7 INCH INFORMATION DISPLAY)

Component		Function
Shift position indicator		Shift position indicator Shift Position Indicator 
Drive mode select switch		Drive Mode Select Switch System Description 
Transmission range switch		Transmission Range Switch Transmission Range Switch 
Input speed sensor		Input Speed Sensor 
Output speed sensor		Output Speed Sensor Output Speed Sensor 
CVT unit connector		—
Primary speed sensor		Primary Speed Sensor Primary Speed Sensor 
Control valve	CVT fluid temperature sensor*	CVT Fluid Temperature Sensor CVT Fluid Temperature Sensor 
	Primary pressure sensor*	Primary Pressure Sensor Primary Pressure Sensor 
	Secondary pressure sensor*	Secondary Pressure Sensor Secondary Pressure Sensor 
	Line pressure solenoid valve*	Line Pressure Solenoid Valve Line Pressure Solenoid Valve 
	Primary pressure solenoid valve*	Primary Pressure Solenoid Valve 
	Secondary pressure solenoid valve*	Secondary Pressure Solenoid Valve 
	Torque converter clutch solenoid valve*	Torque Converter Clutch Solenoid Valve 
	Select solenoid valve*	Select Solenoid Valve 
Paddle shifter		Paddle Shifter 
Shift actuator		Shift Actuator 
Electric shift selector		Electric Shift Selector Electric Shift Selector 

Component	Function
Electric shift control module	Mainly transmits the following signal to TCM via CAN communication • Electric shift selector signal

These components are included in control valve assembly.

MAIN CONTROL CONTENTS OF TCM

Controls	Reference
Line pressure control	System Description ➡
Shift control	System Description ➡
Select control	System Description System Description ➡
Lock-up control	System Description ➡
Drive Mode Selector	System Description ➡
Fail-safe	Fail-safe Fail-safe ➡
Self-diagnosis function	M.U.T.-III SE Function CONSULT Function ➡
Communication function with M.U.T.-III SE	M.U.T.-III SE Function CONSULT Function ➡

For electric shift system, refer to [System Description](#) ➡.

LIST OF CONTROL ITEMS AND INPUT/OUTPUT

Control Item		Shift control	Line pressure control	Select control	Lock-up control	Fail-safe function*
Input	Engine torque signal (CAN communication)	x	x	x	x	x
	Engine speed signal (CAN communication)	x	x	x	x	x
	Accelerator pedal position signal (CAN communication)	x	x	x	x	
	Closed throttle position signal (CAN communication)	x	x		x	
	Stop light switch signal (CAN communication)	x	x	x	x	
	Primary pressure sensor					x
	Secondary pressure sensor	x	x			x
	CVT fluid temperature sensor	x	x	x	x	x
	Primary speed sensor	x	x	x	x	x
	Output speed sensor	x	x		x	x
	Input speed sensor	x	x	x	x	x
	Transmission range switch	x	x	x	x	x
	Electric shift selector signal (CAN communication)	x	x		x	
	Paddle shifter shift up/down signal (CAN communication)	x				

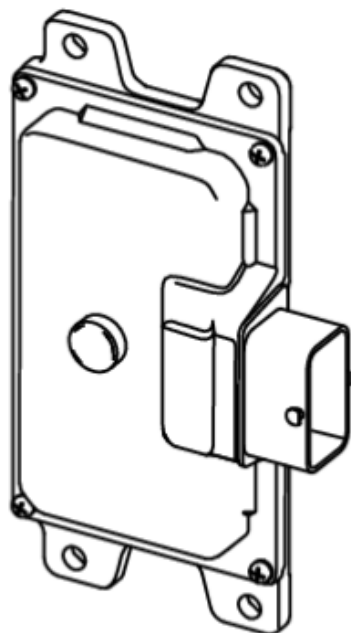
Control Item		Shift control	Line pressure control	Select control	Lock-up control	Fail-safe function*
Output	Line pressure solenoid valve	x	x	x		x
	Primary pressure solenoid valve	x	x			x
	Torque converter clutch solenoid valve				x	x
	Secondary pressure solenoid valve	x	x			x
	Select solenoid valve	x		x		x
	Shift position indicator (CAN communication)			x		

*: If these input/output signals show errors, TCM activates the fail-safe function.

TCM

FUNCTIONS WITHIN THE SYSTEM

TCM judges the vehicle driving status based on the signals from the sensors, switches, and other control units, and the optimal transaxle control is performed.



INDIVIDUAL FUNCTION WITHIN SYSTEM

The TCM consists of a microcomputer and connectors for signal input and output and for power supply.

INDIVIDUAL OPERATION

- CVT control system. Refer to [System Description](#) .
 - Line pressure control system. Refer to [System Description](#) .
 - Shift control system. Refer to [System Description](#) .
 - Select control system. Refer to System Description [System Description](#) .
 - Lock-up control system. Refer to [System Description](#) .
 - Drive mode selector system. Refer to [System Description](#) .
-

COMPONENT PARTS LOCATION

The TCM is installed on the front side of battery.

[\[Previous\]](#) [\[Next\]](#)

DTC Index

note	The details of time display are as follows • CRNT: A malfunction is detected now • PAST: A malfunction was detected in the past
-------------	---

Self diagnostic result

×:Applicable

M.U.T.-III SE display	Fail-safe	Freeze Frame Data	Reference
B2C20-12: Starter control relay	—	—	DTC Description 
B2C20-14: Starter control relay	—	—	DTC Description 
B2C20-23: Starter control relay	—	—	DTC Description 
B2C20-24: Starter control relay	—	—	DTC Description 
B2C40-04: Power window main switch	—	—	DTC Description 
B2C41-04: Power window motor FL	—	—	DTC Description 
B2C95-01: Combination switch	×	—	DTC Description 
B2C95-64: Combination switch	×	—	DTC Description 
B2C96-49: Light sensor	×	—	DTC Description 
B2CB5-64: Rear wiper	×	—	DTC Description 
B2CCF-04: Passenger door mirror control module	—	—	DTC Description 
B2F06-11: Power liftgate/trunk opener switch	—	—	DTC Description 
B2F06-15: Power liftgate/trunk opener switch	—	—	DTC Description 
B2F60-55: Seat belt buckle switch (driver side)	—	—	DTC Description 
B2F70-01: Stop light	—	—	DTC Description 
B2F70-02: Stop light	—	—	DTC Description 
B2F71-23: Stop light	—	—	DTC Description 
B2F71-24: Stop light	—	—	DTC Description 
B2F72-23: Stop light	—	—	DTC Description 
B2F72-24: Stop light	—	—	DTC Description 
B2F98-04: Sunshade motor	—	—	DTC Description 

M.U.T.-III SE display	Fail-safe	Freeze Frame Data	Reference
B2F99-04: Sunroof motor	—	—	DTC Description 
B2FAC-12: Accessory relay	—	—	DTC Description 
B2FAC-14: Accessory relay	—	—	DTC Description 
B2FAE-12: Ignition relay-1	×	—	DTC Description 
B2FAE-14: Ignition relay-1	×	—	DTC Description 
B2FAF-12: Ignition relay-2	—	—	DTC Description 
B2FAF-14: Ignition relay-2	—	—	DTC Description 
B2FB0-12: Ignition relay-3	—	—	DTC Description 
B2FB0-14: Ignition relay-3	—	—	DTC Description 
C1700-54: Control unit	—	—	DTC Description 
C1700-55: Control unit	—	—	DTC Description 
C1700-86: Control unit	—	—	DTC Description 
C1711-7B: Low tire pressure FL	—	×	DTC Description 
C1712-7B: Low tire pressure FR	—	×	DTC Description 
C1713-7B: Low tire pressure RR	—	×	DTC Description 
C1714-7B: Low tire pressure RL	—	×	DTC Description 
C1731-16: Tire pressure sensor FL	—	×	DTC Description 
C1731-68: Tire pressure sensor FL	—	×	DTC Description 
C1732-16: Tire pressure sensor FR	—	×	DTC Description 
C1732-68: Tire pressure sensor FR	—	×	DTC Description 
C1733-16: Tire pressure sensor RR	—	×	DTC Description 
C1733-68: Tire pressure sensor RR	—	×	DTC Description 
C1734-16: Tire pressure sensor RL	—	×	DTC Description 
C1734-68: Tire pressure sensor RL	—	×	DTC Description 
C1741-21: Tire pressure sensor no data FL	—	×	DTC Description 
C1742-21: Tire pressure sensor no data FR	—	×	DTC Description 
C1743-21: Tire pressure sensor no data RR	—	×	DTC Description 
C1744-21: Tire pressure sensor no data RL	—	×	DTC Description 

M.U.T.-III SE display	Fail-safe	Freeze Frame Data	Reference
U1C01-08: LIN communication	—	×	DTC Description 
U1C02-08: LIN communication	—	×	DTC Description 

Network-DTC

×:Applicable

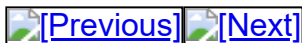
M.U.T.-III SE display	Fail-safe	Freeze Frame Data	Reference
U0073-00: Control module comm Bus A Off	—	—	DTC Description 
U0075-00: Control module comm Bus C Off	—	—	DTC Description 
U20C5-87: CAN comm err (audio amp.)	—	—	DTC Description 
U2140-87: CAN comm err (ECM)	—	—	DTC Description 
U2141-87: CAN comm err (TCM)	—	—	DTC Description 
U2148-87: CAN comm err (brake control unit)	—	—	DTC Description 
U2152-87: CAN comm err (ADAS control unit)	—	—	DTC Description 
U2154-87: CAN comm err (MIU)	—	—	DTC Description 
U216B-87: CAN comm err (front camera)	—	—	DTC Description 
U2175-87: CAN comm err (Multi Around Monitor)	—	—	DTC Description 
U2176-87: CAN comm err (CCM/ST angle sensor)	—	—	DTC Description 
U2218-87: CAN comm err (Keyless operation key)	—	—	DTC Description 
U2250-87: CAN comm err (AIRBAG)	—	—	DTC Description 
U2253-87: CAN comm err (HVAC)	—	—	DTC Description 
U225B-87: CAN comm err (IPDM E/R)	—	—	DTC Description 
U2314-87: CAN comm err (ANC)	—	—	DTC Description 
U234E-87: CAN comm err (combination meter)	—	—	DTC Description 
U2369-87: CAN comm err (PSD/MHB)	—	—	DTC Description 
U237C-87: CAN comm err (seat)	—	—	DTC Description 
U2A06-88: Comm Bus Off V-FD	—	—	DTC Description 

MAC Diagnosis

×:Applicable

M.U.T.-III SE display	Fail-safe	Freeze Frame Data	Reference
U1327-52: MAC key update	—	—	DTC Description 
U1327-54: MAC key update	—	—	DTC Description 
U2140-57: CAN comm err (ECM)	—	—	DTC Description 
U2152-57: CAN comm err (ADAS control unit)	—	—	DTC Description 
U2175-57: CAN comm err (Multi Around Monitor)	—	—	DTC Description 
U2176-57: CAN comm err (CCM/ST angle sensor)	—	—	DTC Description 

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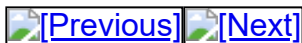


DTC Inspection Priority Chart

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	DTC
1	U1327-54: MAC key update
2	U1327-52: MAC key update
3	• U0073-00: Control module comm Bus A Off • U0075-00: Control module comm Bus C Off • U20C5-87: CAN comm err (audio amp.) • U2140-57: CAN comm err (ECM) • U2140-87: CAN comm err (ECM) • U2141-87: CAN comm err (TCM) • U2148-87: CAN comm err (brake control unit) • U2152-57: CAN comm err (ADAS control unit) • U2152-87: CAN comm err (ADAS control unit) • U2154-87: CAN comm err (MIU) • U216B-87: CAN comm err (front camera) • U2175-57: CAN comm err (Multi Around Monitor) • U2175-87: CAN comm err (Multi Around Monitor) • U2176-57: CAN comm err (CCM/ST angle sensor) • U2176-87: CAN comm err (CCM/ST angle sensor) • U2218-87: CAN comm err (Keyless operation key) • U2250-87: CAN comm err (AIRBAG) • U2253-87: CAN comm err (HVAC) • U225B-87: CAN comm err (IPDM E/R) • U2314-87: CAN comm err (ANC) • U234E-87: CAN comm err (combination meter) • U2369-87: CAN comm err (PSD/MHB) • U237C-87: CAN comm err (seat) • U2A06-88: Comm Bus Off V-FD
4	• B2C40-04: Power window main switch • B2C41-04: Power window motor FL • B2C95-01: Combination switch • B2C95-64: Combination switch • B2F60-55: Seat belt buckle switch (driver side) • B2F98-04: Sunshade motor • B2F99-04: Sunroof motor • B2FAE-12: Ignition relay-1 • B2FAE-14: Ignition relay-1 • U1C01-08: LIN communication • U1C02-08: LIN communication
5	• B2C20-12: Starter control relay • B2C20-14: Starter control relay • B2C20-23: Starter control relay • B2C20-24: Starter control relay • B2FAC-12: Accessory relay

Priority	DTC
	• B2FAC-14: Accessory relay • B2FAF-12: Ignition relay-2 • B2FAF-14: Ignition relay-2 • B2FB0-12: Ignition relay-3 • B2FB0-14: Ignition relay-3
6	• B2C96-49: Light sensor • B2CB5-64: Rear wiper • B2CCF-04: Passenger door mirror control module • B2F06-11: Power liftgate/trunk opener switch • B2F06-15: Power liftgate/trunk opener switch • B2F70-01: Stop light • B2F70-02: Stop light • B2F71-23: Stop light • B2F71-24: Stop light • B2F72-23: Stop light • B2F72-24: Stop light
7	• C1700-54: Control unit • C1700-55: Control unit • C1700-86: Control unit • C1711-7B: Low tire pressure FL • C1712-7B: Low tire pressure FR • C1713-7B: Low tire pressure RR • C1714-7B: Low tire pressure RL • C1731-16: Tire pressure sensor FL • C1731-68: Tire pressure sensor FL • C1732-16: Tire pressure sensor FR • C1732-68: Tire pressure sensor FR • C1733-16: Tire pressure sensor RR • C1733-68: Tire pressure sensor RR • C1734-16: Tire pressure sensor RL • C1734-68: Tire pressure sensor RL • C1741-21: Tire pressure sensor no data FL • C1742-21: Tire pressure sensor no data FR • C1743-21: Tire pressure sensor no data RR • C1744-21: Tire pressure sensor no data RL



Reference Value

note

The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to M.U.T.-III SE display items.

M.U.T.-III SE MONITOR ITEM

Monitor Item	Condition	Value/Status
SET AIR PRESSURE 1 FL	Displays the standard air pressure of front left tire	mBar
SET AIR PRESSURE 1 FR	Displays the standard air pressure of front right tire	
SET AIR PRESSURE 1 RR	Displays the standard air pressure of rear right tire	
SET AIR PRESSURE 1 RL	Displays the standard air pressure of rear left tire	
Set temperature-FL	Displays the standard temperature of front left tire	°C
Set temperature-FR	Displays the standard temperature of front right tire	
Set temperature-RR	Displays the standard temperature of rear right tire	
Set temperature-RL	Displays the standard temperature of rear left tire	
TPMS SET SWITCH	Tire pressure monitor system reset switch not depressed	Off
	Tire pressure monitor system reset switch depressed	On
Tire status-FL	Displays the front left tire status	Normal
		MALF 1
		MALF 2
		MALF 3
		MALF 4
Tire status-FR	Displays the front right tire status	Normal
		MALF 1
		MALF 2
		MALF 3
		MALF 4
Tire status-RR	Displays the rear right tire status	Normal
		MALF 1
		MALF 2
		MALF 3
		MALF 4
Tire status-RL	Displays the rear left tire status	Normal
		MALF 1
		MALF 2
		MALF 3
		MALF 4
Paddle shift switch (-)	paddle shifter (shift-down switch) not depressed	Off
	paddle shifter (shift-down switch) depressed	On
Paddle shift switch (+)	paddle shifter (shift-up switch) not depressed	Off
	paddle shifter (shift-up switch) depressed	On

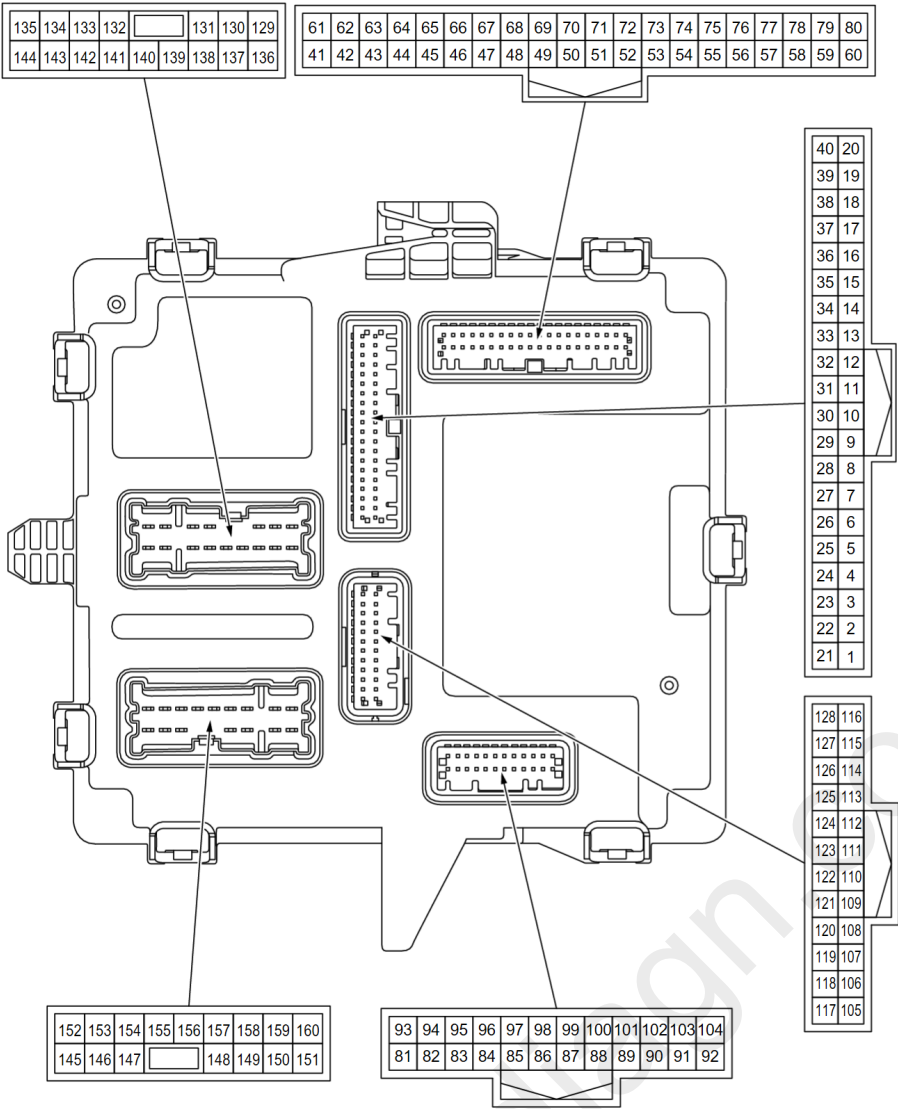
Monitor Item	Condition	Value/Status
HAZARD SW	hazard switch not depressed	Off
	hazard switch depressed	On
Door switch AS	Front door RH closed	Off
	Front door RH opened	On
Optical sensor	Display the value of outside brightness input from the optical sensor	—
Power liftgate/trunk opener switch	note This item is displayed, but cannot be monitored.	Off
Request switch BD/TR	Power liftgate opener switch not pressed	Off
	Power liftgate opener switch pressed	On
Power liftgate/trunk lid switch	Power liftgate closed	Off
	Power liftgate opened	On
Brake switch 1	Brake pedal depressed	Off
	Brake pedal not depressed	On
Brake switch 2	Brake pedal not depressed	Off
	Brake pedal depressed	On
Check diode 1	Combination switch check diode 1 OFF	Off
	Combination switch check diode 1 ON	On
High beam switch	Any position other than lighting switch HI	Off
	Lighting switch HI position	On
Passing switch	Any position other than lighting switch PASS	Off
	Lighting switch PASS position	On
Rear fog switch	note This item is displayed, but cannot be monitored.	Off
Front fog switch	Any position other than front fog light switch ON	Off
	Front fog light switch ON position	On
INT volume 1	Combination switch INT volume 1 OFF	Off
	Combination switch INT volume 1 ON	On
Check diode 2	Combination switch check diode 2 OFF	Off
	Combination switch check diode 2 ON	On
Low beam switch	Any position other than lighting switch 2ND	Off
	Lighting switch 2ND position	On
AUTO light switch*	Any position other than lighting switch AUTO	Off
	Lighting switch AUTO position	On
Tail light switch	Any position other than lighting switch 1ST	Off
	Lighting switch 1ST position	On
Front washer switch	Any position other than front washer switch ON	Off
	Front washer switch ON position	On
Rear washer switch	Any position other than rear washer switch ON	Off
	Rear washer switch ON position	On
Check diode 3	Combination switch check diode 3 OFF	Off
	Combination switch check diode 3 ON	On
Turn signal LH	Any position other than turn signal switch LH	Off
	Turn signal switch LH position	On

Monitor Item	Condition	Value/Status
Turn signal RH	Any position other than turn signal switch RH	Off
	Turn signal switch RH position	On
Front wiper LO	Any position other than front wiper switch LO	Off
	Front wiper switch LO position	On
Front wiper HI	Any position other than front wiper switch HI	Off
	Front wiper switch HI position	On
Front wiper INT	Any position other than front wiper switch INT	Off
	Front wiper switch INT position	On
Check diode 4	Combination switch check diode 4 OFF	Off
	Combination switch check diode 4 ON	On
Light OFF switch	- Any position other than lighting switch OFF (Except for Canada models) - Any position other than lighting switch AUTO (For Canada models)	Off
	- Lighting switch OFF position (Except for Canada models) - Lighting switch AUTO position (For Canada models)	On
INT volume 2	Combination switch INT volume 2 OFF	Off
	Combination switch INT volume 2 ON	On
INT volume 3	Combination switch INT volume 3 OFF	Off
	Combination switch INT volume 3 ON	On
Rear wiper INT	Any position other than rear wiper switch INT	Off
	Rear wiper switch INT position	On
Rear wiper ON	Any position other than rear wiper switch ON	Off
	Rear wiper switch ON position	On
Check diode 5	Combination switch check diode 5 OFF	Off
	Combination switch check diode 5 ON	On
Front wiper OFF	Any position other than front wiper switch OFF	Off
	Front wiper switch OFF position	On
Front wiper MIST	Any position other than front wiper switch MIST	Off
	Front wiper switch MIST position	On
CDL LOCK SW	Any position other than LOCK	Off
	Door lock/unlock switch LOCK position	On
CDL UNLOCK SW	Any position other than UNLOCK	Off
	Door lock/unlock switch UNLOCK position	On
DOOR SW-DR	Front door LH closed	Off
	Front door LH opened	On
Unlock sensor	Front door LH LOCK status	Off
	Front door LH UNLOCK status	On
ECO mode switch	Other than drive mode switch ECO mode position	Off
	Drive mode switch ECO mode position	On

Monitor Item	Condition	Value/Status
Clutch end SW	note This item is displayed, but cannot be monitored.	Off
IGN SW	Any position other than ON	Off
	Ignition switch ON position	On
Battery voltage (door lock 1)	Front door lock battery power supply OFF	Off
	Front door lock battery power supply ON	On
Battery voltage (door lock 2)	Rear door lock battery power supply OFF	Off
	Rear door lock battery power supply ON	On
Battery voltage (ECU)	Display the BCM battery power supply	—
Battery voltage (flasher)	Flasher battery power supply OFF	Off
	Flasher battery power supply ON	On
Battery voltage (stop light)	Stop light battery power supply OFF	Off
	Stop light battery power supply ON	On
Battery voltage (wiper)	Rear wiper battery power supply OFF	Off
	Rear wiper battery power supply ON	On
DOOR SW-RL	Rear door LH closed	Off
	Rear door LH opened	On
DOOR SW-RR	Rear door RH closed	Off
	Rear door RH opened	On
Seat belt switch (driver)	Front seat belt LH is released	Off
	Front seat belt LH is fastened	On
Sport mode switch	Other than drive mode switch SPORT mode position	Off
	Drive mode switch SPORT mode position	On
Clutch start SW	note This item is displayed, but cannot be monitored.	Off
START SW	note This item is displayed, but cannot be monitored.	Off
STOP/START SW	note This item is displayed, but cannot be monitored.	Off
Detention/Cancel switch	note This item is displayed, but cannot be monitored.	Off
Rear wiper auto stop switch	Any position other than rear wiper stop position	Off
	When rear wiper stop position	On
Vehicle speed	Display the vehicle speed	—
AIR PRESS FL	Displays the air pressure of front left tire	—
AIR PRESS FR	Displays the air pressure of front right tire	
AIR PRESS RR	Displays the air pressure of rear right tire	
AIR PRESS RL	Displays the air pressure of rear left tire	
TIRE TEMPERATURE FL	Displays the temperature of front left tire	°C
TIRE TEMPERATURE FR	Displays the temperature of front right tire	
TIRE TEMPERATURE RR	Displays the temperature of rear right tire	
TIRE TEMPERATURE RL	Displays the temperature of rear left tire	

Monitor Item		Condition	Value/Status
SET AIR PRESSURE 2 FL		Displays the standard air pressure of front left tire	—
SET AIR PRESSURE 2 FR		Displays the standard air pressure of front right tire	
SET AIR PRESSURE 2 RR		Displays the standard air pressure of rear right tire	
SET AIR PRESSURE 2 RL		Displays the standard air pressure of rear left tire	
WARNING AIR PRESSURE FL		Displays the warning air pressure of front left tire	mBar
WARNING AIR PRESSURE FR		Displays the warning air pressure of front right tire	
WARNING AIR PRESSURE RR		Displays the warning air pressure of rear right tire	
WARNING AIR PRESSURE RL		Displays the warning air pressure of rear left tire	
note	*: This item is displayed, but cannot be monitored. (For Canada models)		

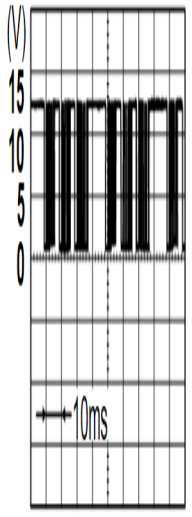
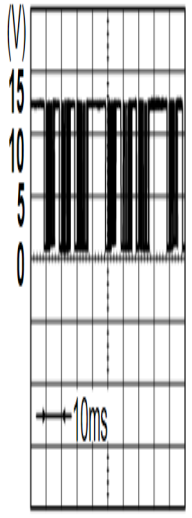
TERMINAL LAYOUT



PHYSICAL VALUES

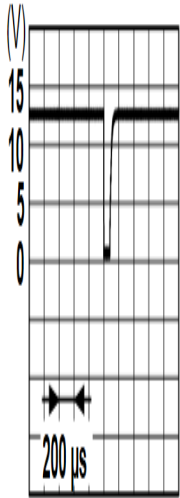
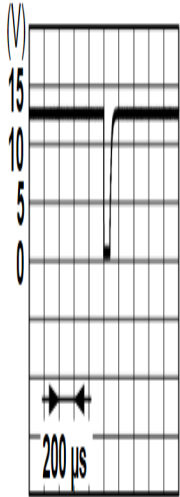
note		Waveform reference				
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
1 (LA/GR)	Ground	Turn signal RH output (side)	Output	Ignition switch ON	Turn signal light [side turn signal light (right side)] ON	9 – 16 V (Blinking : 0 V <– > 9 – 16 V)
					Turn signal light [side turn signal light (right side)] OFF	0 V

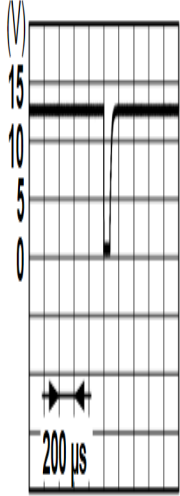
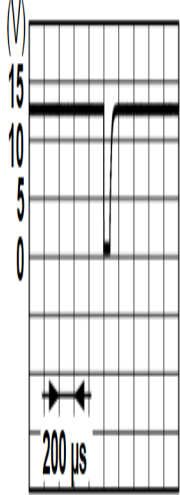
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
7 (LA/V)	Ground	Extended storage fuse switch	Input	Ignition switch OFF	Extended storage fuse switch push in	9 – 16 V
					Extended storage fuse switch pull out	0 V
8 (G)	Ground	Optical sensor	Input	Ignition switch ON	When bright outside of the vehicle	Close to 5 V
					When dark outside of the vehicle	Close to 0 V
10 (Y)	Ground	Door unlock sensor	Input	Ignition switch ON	Driver door LOCK status (unlock sensor switch OFF)	9 – 16 V
					Driver door UNLOCK status (unlock sensor switch ON)	0 V
11 (V)	Ground	Door lock/unlock switch (LOCK)	Input	Ignition switch ON	Door lock/unlock switch NEUTRAL position	9 – 16 V
					Door lock/unlock switch LOCK position	0 V
13 (LA/Y)	Ground	Hazard switch	Input	Ignition switch ON	Hazard switch not pressed	9 – 16 V
					Hazard switch pressed	0 V
14 (W)	Ground	Door lock/unlock switch (UNLOCK)	Input	Ignition switch ON	Door lock/unlock switch NEUTRAL position	9 – 16 V
					Door lock/unlock switch UNLOCK position	0 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
17 (W)	Ground	Seat belt buckle switch (front LH)	Input	Ignition switch ON	Front seat belt buckle switch LH ON (seat belt is fastened)	9 – 16 V
					Front seat belt buckle switch LH OFF (seat belt is released)	0 V
21 (LA/LG)	Ground	Turn signal LH output (side)	Output	Ignition switch ON	Turn signal light [side turn signal light (left side)] ON	9 – 16 V (Blinking : 0 V <– > 9 – 16 V)
					Turn signal light [side turn signal light (left side)] OFF	0 V
24 (BR)	Ground	LIN communication (power window)	Input/output	Ignition switch ON		
25 (BG)	Ground	LIN communication (drive mode switch)	Input/Output	Ignition switch ON		

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
26 (LA/L)	Ground	CAN-H (CAN communication circuit)	Input/Output	Ignition switch ON		—
27 (LA/P)	Ground	CAN-L (CAN communication circuit)	Input/Output	Ignition switch ON		—
28 (R)	Ground	Optical sensor power supply	Output	Ignition switch ON		4.65 – 5.5 V
29 (BR)	Ground	Optical sensor ground	Output	Ignition switch ON		0 V
30 (LA/G)	Ground	Luggage room light control	Output	Ignition switch ON	Luggage room light OFF (when power liftgate is closed)	9 – 16 V
					Luggage room light ON (when power liftgate is opened)	0 V
32 (GR)	Ground	Power window relay control	Output	Ignition switch OFF (retained power finished)		9 – 16 V
				Ignition switch OFF (auto ACC status) or ON		0 V
33 (BG)	Ground	Ignition relay-2 [FUSE BLOCK (J/B)] control	Output	Ignition switch	OFF	9 – 16 V
					ON	0 V
34 (LG)	Ground	Accessory relay control	Output	Ignition switch OFF (not auto ACC status)		9 – 16 V
				Ignition switch OFF (auto ACC status) or ON		0 V
37 (Y)	Ground	Interior room light relay control	Output	Interior room light battery saver is activated		9 – 16 V
				Interior room light battery saver is not activated		0 V
40 (LA/BR)	Ground	Ignition relay-3 [FUSE BLOCK (J/B)] control	Output	Other than following		9 – 16 V
				Engine running		0 V
45 (L)	Ground	CAN-H (CAN communication circuit)	Input/Output	Ignition switch ON		—
46 (P)	Ground	CAN-L (CAN communication circuit)	Input/Output	Ignition switch ON		—

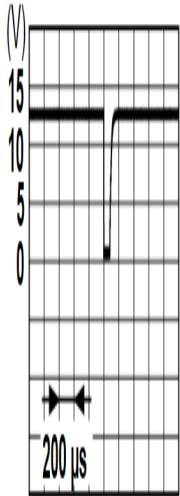
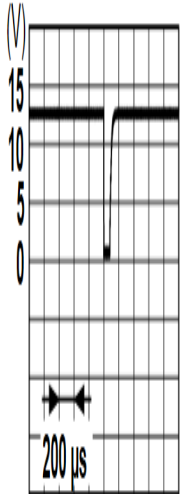
Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
48 (SB)	Ground	Combination switch OUTPUT 1	Output	Ignition switch ON	
49 (BR)	Ground	Combination switch OUTPUT 2	Output	Ignition switch ON	

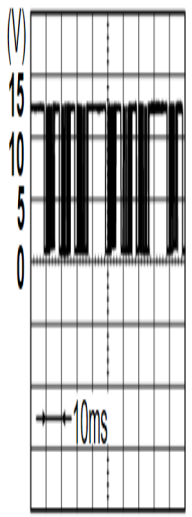
Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
50 (Y)	Ground	Combination switch OUTPUT 5	Output	Ignition switch ON	
51 (V)	Ground	Combination switch OUTPUT 6	Output	Ignition switch ON	

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
52 (BG)	Ground	Combination switch OUTPUT 4	Output	Ignition switch ON		
53 (GR)	Ground	Combination switch OUTPUT 3	Output	Ignition switch ON		
57 (W)	Ground	Drive mode switch (SPORT)	Input	Ignition switch ON	Other than following Drive mode switch SPORT position	9 – 16 V 0 V
63 (LA/SB)	Ground	Rear window defogger relay control	Output	Engine running	Rear window defogger is not active Rear window defogger is active	9 – 16 V 0 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
67 (R)	Ground	Combination switch INPUT 1	Input	Ignition switch ON	All combination switches OFF	
68 (W)	Ground	Combination switch INPUT 2	Input	Ignition switch ON	All combination switches OFF (Wiper volume dial 3)	

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
69 (G)	Ground	Combination switch INPUT 3	Input	Ignition switch ON	All combination switches OFF	
70 (P)	Ground	Combination switch INPUT 4	Input	Ignition switch ON	Lighting switch 2ND	

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
71 (LG)	Ground	Combination switch INPUT 5	Input	Ignition switch ON	All combination switches OFF (Wiper volume dial 3)	
72 (L)	Ground	Combination switch INPUT 6	Input	Ignition switch ON	Front wiper switch INT	
78 (G)	Ground	Puddle shifter (shift-up)	Input	Ignition switch ON	Puddle shifter (shift-up switch) not pressed	9 – 16 V
					Puddle shifter (shift-up switch) pressed	0 V
79 (V)	Ground	Puddle shifter (shift-down)	Input	Ignition switch ON	Puddle shifter (shift-down switch) not pressed	9 – 16 V
					Puddle shifter (shift-down switch) pressed	0 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
80 (LG)	Ground	Drive mode switch (ECO)	Input	Ignition switch ON	Other than following	9 – 16 V
					Drive mode switch ECO position	0 V
81 (LA/SB)	Ground	Door switch (front LH)	Input	Ignition switch ON	Door switch (front LH) OFF (when door is closed)	9 – 16 V
					Door switch (front LH) ON (when door is opened)	0 V
83 (LA/GR)	Ground	LIN communication (hands free sensor control unit)	Input/Output	Ignition switch ON		
86 (LA/R)	Ground	CAN-L (CAN communication circuit)	Input/Output	Ignition switch ON		—
87 (LA/L)	Ground	CAN-H (CAN communication circuit)	Input/Output	Ignition switch ON		—
93 (GR)	Ground	Door switch (front RH)	Input	Ignition switch ON	Door switch (front RH) OFF (when door is closed)	9 – 16 V
					Door switch (front RH) ON (when door is opened)	0 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
94 (R)	Ground	Door switch (rear LH)	Input	Ignition switch ON	Door switch (rear LH) OFF (when door is closed)	9 – 16 V
					Door switch (rear LH) ON (when door is opened)	0 V
95 (P)	Ground	Door switch (rear RH)	Input	Ignition switch ON	Door switch (rear RH) OFF (when door is closed)	9 – 16 V
					Door switch (rear RH) ON (when door is opened)	0 V
96 (BG)	Ground	Door switch (power liftgate)	Input	Ignition switch ON	Door switch (power liftgate) OFF (when power liftgate closed)	9 – 16 V
					Door switch (power liftgate) ON (when power liftgate opened)	0 V
98 (Y)	Ground	Power liftgate opener switch	Input	Ignition switch ON	Power liftgate opener switch (outside) not pressed	9 – 16 V
					Power liftgate opener switch (outside) pressed	0 V
103 (LA/G)	Ground	Rear wiper stop position	Output	Ignition switch ON	Any position other than rear wiper stop position	9 - 16 V
					Rear wiper stop position	0 V
105 (LA/Y)	Ground	Ignition relay-1 [FUSE BLOCK (J/B)] control	Output	Ignition switch	OFF	9 – 16 V
					ON	0 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
110 (LG)	Ground	Stop light switch 2	Input	Ignition switch ON	Stop light switch 2 ON (brake pedal is depressed)	9 – 16 V
					Stop light switch 2 OFF (brake pedal is not depressed)	0 V
111 (W)	Ground	Stop light switch 1	Input	Ignition switch ON	Stop light switch 1 ON (brake pedal is not depressed)	9 – 16 V
					Stop light switch 1 OFF (brake pedal is depressed)	0 V
116 (G)	Ground	Turn signal RH output (front)	Output	Ignition switch ON	Turn signal light (front right side) ON	9 – 16 V (Blinking : 0 V <– > 9 – 16 V)
					Turn signal light (front right side) OFF	0 V
117 (LA/R)	Ground	CAN-L (CAN communication circuit)	Input/Output	Ignition switch ON		—
118 (LA/L)	Ground	CAN-H (CAN communication circuit)	Input/Output	Ignition switch ON		—
119 (BR)	Ground	Back-up light relay control	Output	Engine running	Other than following	9 – 16 V
					Selector lever in “R” position	0 V
123 (R)	Ground	Starter cut relay control	Output	Other than following		9 – 16 V
				At engine cranking		0 V
125 (V)	Ground	PTC heater relay 1 control	Output	Active test of AIR CONDITONER (PTC RELAY- 1)	Off	9 – 16 V
					On	0 V
126 (L)	Ground	PTC heater relay 3 control	Output	Active test of AIR CONDITONER (PTC RELAY- 3)	Off	9 – 16 V
					On	0 V
127 (BG)	Ground	PTC heater relay 2 control	Output	Active test of AIR CONDITONER (PTC RELAY- 2)	Off	9 – 16 V
					On	0 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
128 (P)	Ground	Turn signal LH output (front)	Output	Ignition switch ON	Turn signal light (front left side) ON	9 – 16 V (Blinking : 0 V <– > 9 – 16 V)
					Turn signal light (front left side) OFF	0 V
129 (B)	Ground	Ground	—	Ignition switch ON		0 V
130 (LA/Y)	Ground	Interior room light control	Output	Ignition switch ON	When all doors are closed [map light and room light (Door position) are turned OFF]	9 – 16 V
					Any doors opens [map light and room light (Door position) are turned ON]	0 V
132 (LA/L)	Ground	Front door RH UNLOCK	Output	Ignition switch ON	Front door RH UNLOCK (actuator is activated)	9 – 16 V
					Other than above (actuator is not activated)	0 V
133 (LA/Y)	Ground	Battery power supply (FUSE)	Input	Ignition switch ON		9 – 16 V
134 (LA/G)	Ground	Front door LH UNLOCK	Output	Ignition switch ON	Front door LH UNLOCK (actuator is activated)	9 – 16 V
					Other than above (actuator is not activated)	0 V
135 (LA/P)	Ground	Battery power supply (front door lock actuator)	Input	Ignition switch ON		9 – 16 V
136 (LA/L)	Ground	Battery power supply (turn signal light)	Input	Ignition switch ON		9 – 16 V
137 (B)	Ground	Ground	—	Ignition switch ON		0 V
138 (LG)	Ground	Battery power supply (rear wiper)	Input	Ignition switch ON		9 – 16 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
139 (LA/LG)	Ground	Battery power supply (stop light)	Input	Ignition switch ON		9 – 16 V
142 (V)	Ground	Front/rear doors LH LOCK	Output	Front/rear doors LH LOCK (actuator is activated)		9 – 16 V
				Other than above (actuator is not activated)		0 V
144 (LA/GR)	Ground	Battery power supply (rear door lock actuator)	Input	Ignition switch ON		9 – 16 V
145 (V)	Ground	Power liftgate opener actuator	Output	Ignition switch ON	Power liftgate opener switch pressed (actuator is activated)	9 – 16 V
					Other than above (actuator is not activated)	0 V
148 (LA/R)	Ground	Rear wiper motor	Output	Ignition switch ON	Rear wiper activated	9 – 16 V
					Rear wiper stopped	0 V
150 (LA/B)	Ground	Mood light control	Output	Ignition switch ON	When all doors are closed (mood lamps are turned OFF)	9 – 16 V
					Any doors opens (mood lamps are turned ON)	0 V
151 (LA/GR)	Ground	Turn signal LH output (rear)	Output	Ignition switch ON	Turn signal light (rear left side) ON	9 – 16 V (Blinking : 0 V <– > 9 – 16 V)
					Turn signal light (rear left side) OFF	0 V
154 (L)	Ground	Front/rear doors RH LOCK	Output	Ignition switch ON	Front/rear doors RH LOCK (actuator is activated)	9 – 16 V
					Other than above (actuator is not activated)	0 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
155 (G)	Ground	Rear doors UNLOCK	Output	Ignition switch ON	Rear doors UNLOCK (actuator is activated)	9 – 16 V
					Other than above (actuator is not activated)	0 V
157 (LA/W)	Ground	Stop light RH output	Output	Ignition switch ON	Brake pedal depressed	9 – 16 V
					Brake pedal not depressed	0 V
159 (V)	Ground	Turn signal RH output (rear)	Output	Ignition switch ON	Turn signal light (rear right side) ON	9 – 16 V (Blinking : 0 V <– > 9 – 16 V)
					Turn signal light (rear right side) OFF	0 V
160 (LA/Y)	Ground	Stop light LH and high- mounted stop light output	Output	Ignition switch ON	Brake pedal depressed	9 – 16 V
					Brake pedal not depressed	0 V

Fail-safe

FAIL-SAFE CONTROL BY DTC

BCM performs fail-safe control when any DTC are detected.

Display contents of M.U.T.-III SE	Fail-safe
B2C95-01: Combination switch	Turns ON the headlight (LO)
B2C95-64: Combination switch	Turns ON the headlight (LO)
B2C96-49: Light sensor	Turns ON the headlight (LO)
B2CB5-64: Rear wiper	Stop rear wiper power supply for 1min
B2FAE-12: Ignition relay-1	Inhibit engine cranking
B2FAE-14: Ignition relay-1	Inhibit engine cranking

DTC Description

DTC DETECTION LOGIC

DTC No.	M.U.T.-III SE screen items (Trouble diagnosis content)	DTC Detection Condition	
U1327-52	MAC key update (Message Authentication Code key update)	Diagnosis condition	-
		Signal (terminal)	-
		Threshold	MAC key writing is incomplete.
		Diagnosis delay time	-

POSSIBLE CAUSE

- Network communication error between M.U.T.-III SE and BCM
- BCM used in other vehicles is installed in the vehicle
- BCM

FAIL-SAFE

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC U1327-52 is displayed with DTC U1327-54, first perform the trouble diagnosis for DTC U1327-54.

Q.Is DTC U1327-54 detected?

Yes

Refer to [DTC Description](#) 

No



2.PERFORM DTC CONFIRMATION PROCEDURE

 With M.U.T.-III SE

1. Ignition switch ON.
2. Perform "MAC key writing". Refer to [Description](#) .
3. Perform "MAC Diagnosis" of "BCM" using M.U.T.-III SE.

Q.Is DTC U1327-52 detected as the current malfunction?

Yes

Refer to [Diagnosis Procedure](#) .

No

-1To check malfunction symptom before repair: Refer to Intermittent Incident [Intermittent Incident](#) .

No

-2Confirmation after repair: INSPECTION END

Work Procedure

1.REPLACE BCM

Replace BCM. Refer to [Removal and Installation](#) .

: 

2.WRITING VEHICLE SPECIFICATION

Perform configuration (BCM). Refer to [Description](#) .

: 

3.PAIRING OF BCM AND INTELLIGENT KEY UNIT

caution

When before pairing of BCM and Keyless operation key unit, always writing the BCM configuration. Or not doing so, BCM control function does not operate normally.

Perform the pairing of BCM and Keyless operation key unit. Press UNLOCK button of Keyless operation key.

: 

4.REGISTER OF VEHICLE IDENTIFICATION NUMBER

Ⓜ With M.U.T.-III SE

1. Select "VIN REGISTRATION" of BCM (BCM) work support item.
2. Refer to M.U.T.-III SE and follow the on-screen instructions.

: 

5.WRITING MAC KEY

caution

When replacing BCM in relation with ECM replacement, replace ECM before writing MAC KEY. Refer to [Description](#) .

Perform MAC key writing. Refer to [Description](#) .

: 

6.TIRE PRESSURE SENSOR ID REGISTRATION (IF EQUIPPED)

Perform the initialization and registration of tire pressure sensor ID.

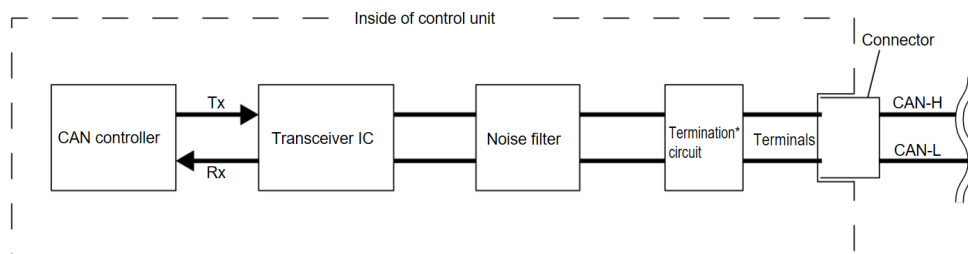
Refer to [Description](#) .

: WORK END

[\[Previous\]](#) [\[Next\]](#)

CAN Communication Control Circuit

CAN communication control circuit is incorporated into the control unit and transmits/receives CAN communication signals.



Tx: Transmit
Rx: Receive

Component	System description
CAN controller	It controls CAN communication signal transmission and reception, error detection, etc.
Transceiver IC	It converts digital signal into CAN communication signal, and CAN communication signal into digital signal.
Noise filter	It eliminates noise of CAN communication signal.
Termination circuit* (Resistance of approx. 120 Ω)	Generates a potential difference between CAN-H and CAN-L.

*: These are the only control units wired with both ends of CAN communication system.

[\[Previous\]](#) [\[Next\]](#)

CAN Communication Signal Chart

Refer to How to Use CAN Communication Signal Chart [How to Use CAN Communication Signal Chart](#)  for how to use CAN communication signal chart.

note Refer to [Abbreviation List](#)  for the abbreviations of the connecting units.

Signal name	ECM	ABS	IPDM-E	TCM	M&A	A-BAG	HVAC	8ch GW 2	HFM	EPS/DAST 3	BCM	SONAR	A-AMP.	LANE	ACC 2	LASER	CCM	Multi Around Monitor	RDR-R	RDR-L	AV	IVC	4WD	ADP	E-HUD	WL CHG	PWBD	E-SHIFT	STRG	EVTC
A/C compressor request signal	T		R																											
A/C relay control signal	T		R																											
Accelerator pedal position signal	T	R		R											R		R						R							
ASCD status signal	T																								R					
Battery warning request signal (ECM)	T				R																									
Brake torque request signal	T																R													
		R															T													
Closed throttle position signal	T			R											R															
Cooling fan control signal	T		R																											
Cooling fan speed request signal	T		R																											
Cranking enable (ECM) signal	T		R																											

Signal name	ECM	ABS	IPDM-E	TCM	M&A	A-BAG	HVAC	8ch GW 2	HFM	EPS/DAST 3	BCM	SONAR	A-AMP.	LANE	ACC 2	LASER	CCM	Multi Around Monitor	RDR-R	RDR-L	AV	IVC	4WD	ADP	E-HUD	WL CHG	PWBD	E-SHIFT	STRG	EVTC
ECO mode indicator signal	T				R																									
ECO pedal guide signal	T				R																									
Electrical power cut freeze signal	T										R																			
Engine and CVT integrated control signal	T			R																										
	R			T																										
Engine coolant temperature signal	T			R	R		R				R																			
Engine oil pressure warning light signal	T				R																	R								
Engine speed signal	T	R		R	R		R				R		R		R								R							
Engine status signal	T				R					R	R											R	R							
Engine torque signal	T	R															R													
EPS assist request signal	T									R																				
Fuel consumption monitor signal	T				R																									
Malfunction indicator light signal	T																					R								
	R			T																										
MI-PILOT Assist permission signal	T														R															
										T					R															
MI-PILOT Assist steering switch signal	T														R															
Refrigerant pressure	T						R																							

Signal name	ECM	ABS	IPDM-E	TCM	M&A	A-BAG	HVAC	8ch GW 2	HFM	EPS/DAST 3	BCM	SONAR	A-AMP.	LANE	ACC 2	LASER	CCM	Multi Around Monitor	RDR-R	RDR-L	AV	IVC	4WD	ADP	E-HUD	WL CHG	PWBD	E-SHIFT	STRG	EVTC
sensor signal																														
Remaining distance signal	T				R																									
Starter cut relay request signal	T										R																			
Stop/Start status signal	T									R																				
Valve timing target position	T																													R
Wheel torque signal	T																						R							
																	R						T							
ABS malfunction signal		T		R											R		R													
ABS operation signal		T		R											R		R						R							
ABS warning light signal		T			R										R							R								
Automatic brake hold status signal		T															R													
Battery voltage signal		T																							R					
			T										R																	
Brake fluid pressure signal		T													R		R													
Brake hold status signal		T															R													
Brake warning light signal		T			R																	R								
Brake wheel torque signal		R													T															
															R							T								

Signal name	ECM	ABS	IPDM-E	TCM	M&A	A-BAG	HVAC	8ch GW 2	HFM	EPS/DAST 3	BCM	SONAR	A-AMP.	LANE	ACC 2	LASER	CCM	Multi Around Monitor	RDR-R	RDR-L	AV	IVC	4WD	ADP	E-HUD	WL CHG	PWBD	E-SHIFT	STRG	EVTC
Buzzer output signal		T			R																									
					R				T																					
					R						T																			
					R										T															
					R													T												
Decel G sensor signal		T		R													R						R							
Driver brake signal		T															R													
Electric parking brake indicator light signal		T			R																									
Electric parking brake malfunction signal		T															R													
Electric parking brake operation signal		T													R															
Electric parking brake operation signal (switch)		T															R													
Electric parking brake status signal		T			R												R													
Electric parking brake warning light signal		T			R												R													
Front LH wheel speed signal		T															R	R					R							
Front RH wheel speed signal		T															R	R					R							
Odometer signal		T			R		R						R										R		R					
					T																	R								

Signal name	ECM	ABS	IPDM-E	TCM	M&A	A-BAG	HVAC	8ch GW 2	HFM	EPS/DAST 3	BCM	SONAR	A-AMP.	LANE	ACC 2	LASER	CCM	Multi Around Monitor	RDR-R	RDR-L	AV	IVC	4WD	ADP	E-HUD	WL CHG	PWBD	E-SHIFT	STRG	EVTC
Rear LH wheel speed signal		T															R	R					R							
Rear RH wheel speed signal		T															R	R					R							
Side G sensor signal		T													R		R						R							
TCS malfunction signal		T													R		R													
TCS operation signal	R	T		R											R		R						R							
ASC malfunction signal		T													R		R													
ASC OFF indicator light signal		T			R																									
ASC OFF signal		T													R		R													
ASC operation signal	R	T		R											R		R						R							
ASC status signal		T															R													
ASC warning light signal		T			R																	R								
Vehicle speed signal		T	R	R			R		R	R	R	R			R		R	R			R	R		R						
	R				T				R		R						R													
	T					R																								
														R	T	R			R	R										
Yaw rate signal		T													R								R							
A/C compressor feedback signal			T				R																							
Auto ACC status signal			T																		R									
											T														R					
Battery warning request			T		R																									

Signal name	ECM	ABS	IPDM-E	TCM	M&A	A-BAG	HVAC	8ch GW 2	HFM	EPS/DAST 3	BCM	SONAR	A-AMP.	LANE	ACC 2	LASER	CCM	Multi Around Monitor	RDR-R	RDR-L	AV	IVC	4WD	ADP	E-HUD	WL CHG	PWBD	E-SHIFT	STRG	EVTC
signal (IPDM E/R)																														
Front wiper status signal			T								R																			
Front wiper stop position signal			T								R																			
Generator voltage request signal	R		T																											
Headlight warning signal			T		R																									
Hood switch signal			T								R																			
Ignition ON signal			T								R																			
			R								T						R							R						
Ignition switch ON signal		R	T																						R					
Reverse position signal			T								R																			
Sleep-ready signal			T								R																			
					T						R																			
									T		R																			
											R						T													
											R														T					
											R																			
											R																			
											R																			
Starter cut relay status signal			T								R																			
Starter relay status signal			T		R																									
Cranking enable (TCM) signal			R	T																										
Current gear position signal		R		T											R		R						R							

Signal name	ECM	ABS	IPDM-E	TCM	M&A	A-BAG	HVAC	8ch GW 2	HFM	EPS/DAST 3	BCM	SONAR	A-AMP.	LANE	ACC 2	LASER	CCM	Multi Around Monitor	RDR-R	RDR-L	AV	IVC	4WD	ADP	E-HUD	WL CHG	PWBD	E-SHIFT	STRG	EVTC
CVT accept permission signal		R		T																										
CVT warning message signal				T	R																									
Electric shift warning light signal				T	R																									
Electric shift warning message signal				T	R																									
G sensor signal	R			T																										
Input speed signal				T											R															
Neutral hold mode signal				T	R																									
Output shaft revolution signal	R			T											R													R		
Shift position signal		R	R	T	R				R		R	R			R			R			R	R		R				R		
Shift P range request display signal				T	R																									
Shift refuse buzzer signal				T	R																									
Shift target signal				T																								R		
Ambient temperature signal					T		R				R																			
Automatic power liftgate setting signal					T																						R			
Brake fluid level switch signal		R			T																									

Signal name	ECM	ABS	IPDM-E	TCM	M&A	A-BAG	HVAC	8ch GW 2	HFM	EPS/DAST 3	BCM	SONAR	A-AMP.	LANE	ACC 2	LASER	CCM	Multi Around Monitor	RDR-R	RDR-L	AV	IVC	4WD	ADP	E-HUD	WL CHG	PWBD	E-SHIFT	STRG	EVTC
Driver seat belt switch signal					T										R															
HUD setting signal					T																				R					
MOD setting signal					T												R													
Parking brake status signal					T						R											R	R							
Seat belt buckle switch (driver side) signal											T						R													
System selection signal					T										R															
Vehicle speed display signal					T																				R					
	T				R																									
Car crush information signal						T					R											R								
Occupant detection signal					R	T																								
SRS air bag warning light signal					R	T																								
Seat belt buckle switch (rear) signal					R	T																								
Seat belt warning (front RH) signal					R	T																								
A/C ON signal	R						T																							
Blower fan ON signal	R						T				R																			
Cooling fan request signal	R						T																							
ECV control signal			R				T																							

Signal name	ECM	ABS	IPDM-E	TCM	M&A	A-BAG	HVAC	8ch GW 2	HFM	EPS/DAST 3	BCM	SONAR	A-AMP.	LANE	ACC 2	LASER	CCM	Multi Around Monitor	RDR-R	RDR-L	AV	IVC	4WD	ADP	E-HUD	WL CHG	PWBD	E-SHIFT	STRG	EVTC
Idle up request signal	R						T																							
PTC thermal request signal							T				R																			
Rear window defogger request signal							T				R																			
Charge stop request signal									T																	R				
Door lock/unlock request signal									T		R																			
Key ID verification completed signal									T																		R			
Meter display signal					R				T																					
					R										T															
					R												T													
Push-button ignition switch status signal									T		R																			
User identification signal									T																	R				
Battery supply current signal	R									T																				
EPS operation signal	R									T																				
Power steering warning light signal					R					T																				
Steering torque signal										T					R															
Power liftgate open											T																R			

Signal name	ECM	ABS	IPDM-E	TCM	M&A	A-BAG	HVAC	8ch GW 2	HFM	EPS/DAST 3	BCM	SONAR	A-AMP.	LANE	ACC 2	LASER	CCM	Multi Around Monitor	RDR-R	RDR-L	AV	IVC	4WD	ADP	E-HUD	WL CHG	PWBD	E-SHIFT	STRG	EVTC
request signal																														
Power liftgate switch signal											T							R												
Brake pedal position switch signal											T				R															
Brake pedal status signal		R									T						R													
Daytime running light request signal			R								T																			
Dimmer signal					R						T				R															
Door lock status signal											T											R		R						
Door switch (driver side) signal		R									T																			
Door switch signal				R	R				R		T		R		R			R						R						
Drive mode switch signal											T						R													
ECO advice signal					R						T																			
Front fog light request signal			R								T							R												
Front fog light status signal					R						T																			
Front wiper request signal			R								T											R								
Front washer motor request signal			R								T																			
Hazard warning light status signal			R								T																			
High beam assist indicator signal					R						T																			

Signal name	ECM	ABS	IPDM-E	TCM	M&A	A-BAG	HVAC	8ch GW 2	HFM	EPS/DAST 3	BCM	SONAR	A-AMP.	LANE	ACC 2	LASER	CCM	Multi Around Monitor	RDR-R	RDR-L	AV	IVC	4WD	ADP	E-HUD	WL CHG	PWBD	E-SHIFT	STRG	EVTC
High beam request signal			R								T							R												
High beam status signal					R						T																			
Horn request signal			R								T																			
Key ID signal											T													R						
Key ID verification request signal									R		T																			
Light reminder warning signal					R						T																			
Low beam request signal			R								T							R												
Low beam status signal					R						T																			
Low tire pressure warning light signal					R						T																			
Low tire pressure wheel location signal					R						T																			
Paddle shifter shift down signal				R							T																			
Paddle shifter shift up signal				R							T																			
Passing request signal			R								T																			
Position light request signal			R								T							R												
Position light status signal					R						T																			
Rear washer motor			R								T																			

Signal name	ECM	ABS	IPDM-E	TCM	M&A	A-BAG	HVAC	8ch GW 2	HFM	EPS/DAST 3	BCM	SONAR	A-AMP.	LANE	ACC 2	LASER	CCM	Multi Around Monitor	RDR-R	RDR-L	AV	IVC	4WD	ADP	E-HUD	WL CHG	PWBD	E-SHIFT	STRG	EVTC
request signal																														
Rear window defogger feedback signal							R				T																			
Remote engine start status signal							R				T																			
Seat belt buckle switch (front LH) signal				R	R	R					T																			
				R	T																									
Sleep wake up signal		R	R		R				R		T		R								R	R		R			R	R		
Stop light switch signal		R		R					R		T				R								R							
TPMS malfunction warning light signal					R						T																			
Turn indicator signal			R								T				R			R												
													R	T																
Vehicle status signal		R	R								T														R					
Parking sensor error signal					R							T																		
Sonar indicator signal					R							T						R												
Sonar sensor signal												T			R															
Detected lane condition signal														T	R															
Driver assistance buzzer signal														T	R															
															R				T											
															R					T										
Motor operation signal														T	R															

Signal name	ECM	ABS	IPDM-E	TCM	M&A	A-BAG	HVAC	8ch GW 2	HFM	EPS/DAST 3	BCM	SONAR	A-AMP.	LANE	ACC 2	LASER	CCM	Multi Around Monitor	RDR-R	RDR-L	AV	IVC	4WD	ADP	E-HUD	WL CHG	PWBD	E-SHIFT	STRG	EVTC
Pedestrian ahead signal														T	R															
Vehicle ahead signal														T	R															
AEB warning light signal					R										T															
Brake fluid pressure control signal		R													T															
BSW indicator dimmer signal															T				R	R										
BSW indicator signal															T				R	R										
Display signal															T											R				
														T											R					
MI-PILOT Assist operation signal	R									R					T															
RAB warning light signal					R										T															
Target yaw moment signal		R													T															
Wheel torque request signal	R														T															
Yaw moment request signal															T		R													
		R															T													
Distance sensor signal															R	T														
Active ride control signal		R															T													
Automatic brake hold					R												T													

Signal name	ECM	ABS	IPDM-E	TCM	M&A	A-BAG	HVAC	8ch GW 2	HFM	EPS/DAST 3	BCM	SONAR	A-AMP.	LANE	ACC 2	LASER	CCM	Multi Around Monitor	RDR-R	RDR-L	AV	IVC	4WD	ADP	E-HUD	WL CHG	PWBD	E-SHIFT	STRG	EVTC
indicator light signal																														
Automatic brake hold operation request signal		R															T													
Automatic brake hold release request signal		R															T													
Chassis control module malfunction signal		R															T													
Engine brake request signal				R													T													
Drive mode signal	R	R		R	R					R					R		T						R							
Electric parking brake operation request signal		R															T													
Intelligent engine brake signal		R															T													
Intelligent trace control signal		R															T													
Language setting signal																		T			R									
MOD setting status signal					R													T												
View change signal																		T			R									
Vehicle detection signal															R				T											
															R					T										
Auto ACC request signal											R										T									
											R											T								

Signal name	ECM	ABS	IPDM-E	TCM	M&A	A-BAG	HVAC	8ch GW 2	HFM	EPS/DAST 3	BCM	SONAR	A-AMP.	LANE	ACC 2	LASER	CCM	Multi Around Monitor	RDR-R	RDR-L	AV	IVC	4WD	ADP	E-HUD	WL CHG	PWBD	E-SHIFT	STRG	EVTC
Blower reduction request signal							R														T									
Camera switch signal																		R			T									
Curve signal															R						T									
Key link activation status signal																					T				R					
Door lock/unlock signal											R											T								
Engine start request signal											R											T								
Panic alarm request signal											R											T								
AWD warning display signal					R																		T							
Torque distribution indicator signal					R																		T							
Memory guidance display request signal					R																			T						
Mirror control signal											R													T						
CVT warning message request signal				R																								T		
Electric shift malfunction signal				R																								T		
Electric shift selector signal				R																								T		
Steering angle															R														T	

Signal name	ECM	ABS	IPDM-E	TCM	M&A	A-BAG	HVAC	8ch GW 2	HFM	EPS/DAST 3	BCM	SONAR	A-AMP.	LANE	ACC 2	LASER	CCM	Multi Around Monitor	RDR-R	RDR-L	AV	IVC	4WD	ADP	E-HUD	WL CHG	PWBD	E-SHIFT	STRG	EVTC
sensor malfunction signal																														
Steering angle sensor signal									R						R						R		R						T	
		T													T	R														
Steering angle speed signal															R														T	
Valve timing position trouble detection signal	R																													T

[\[Previous\]](#) [\[Next\]](#)

CAN System Specification Chart

Determine CAN system type from the following specification chart.

note

Refer to [Trouble Diagnosis Flow Chart](#)  for how to use CAN system specification chart.

Body type	4-Door Wagon											
Axle	2WD						AWD					
Engine	PR25DD											
Transmission	CVT											
Brake control	ASC											
Intelligent around view monitor		X	X	X	X	X		X	X	X	X	X
Automatic power power liftgate system			X	X	X	X			X	X	X	X
Automatic drive positioner				X	X	X				X	X	X
BOSE audio					X	X					X	X
Head Up Display						X						X
CAN system type	1	2	3	4	5	6	7	8	9	10	11	12
Vehicle CAN communication unit												
BCM	X	X	X	X	X	X	X	X	X	X	X	X
Air bag diagnosis sensor unit	X	X	X	X	X	X	X	X	X	X	X	X
Intelligent key unit	X	X	X	X	X	X	X	X	X	X	X	X
A/C amp.	X	X	X	X	X	X	X	X	X	X	X	X
IPDM E/R	X	X	X	X	X	X	X	X	X	X	X	X
Combination meter	X	X	X	X	X	X	X	X	X	X	X	X
Automatic power liftgate control unit			X	X	X	X			X	X	X	X

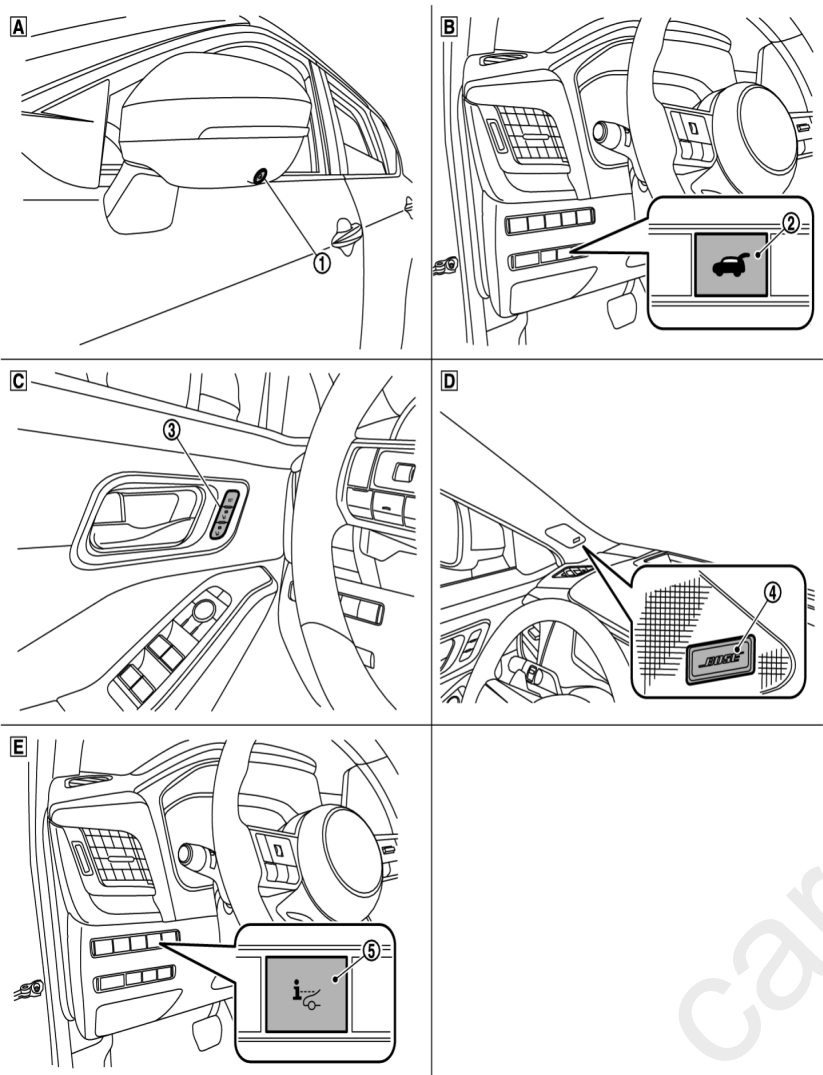
Driver seat control unit				X	X	X				X	X	X
8CH CAN gateway	X	X	X	X	X	X	X	X	X	X	X	X
ITS CAN communication unit												
8CH CAN gateway	X	X	X	X	X	X	X	X	X	X	X	X
ADAS control unit 2	X	X	X	X	X	X	X	X	X	X	X	X
Around view monitor control unit		X	X	X	X	X		X	X	X	X	X
Distance sensor	X	X	X	X	X	X	X	X	X	X	X	X
Front camera unit	X	X	X	X	X	X	X	X	X	X	X	X
Side radar LH	X	X	X	X	X	X	X	X	X	X	X	X
Side radar RH	X	X	X	X	X	X	X	X	X	X	X	X
Sonar control unit	X	X	X	X	X	X	X	X	X	X	X	X
Chassis CAN communication unit												
Chassis control module	X	X	X	X	X	X	X	X	X	X	X	X
AWD control unit							X	X	X	X	X	X
Power steering control module	X	X	X	X	X	X	X	X	X	X	X	X
Head up display unit						X						X
Steering angle sensor	X	X	X	X	X	X	X	X	X	X	X	X
ABS actuator and electric unit (control unit)	X	X	X	X	X	X	X	X	X	X	X	X
8CH CAN gateway	X	X	X	X	X	X	X	X	X	X	X	X
Drivetrain CAN communication unit												
ECM	X	X	X	X	X	X	X	X	X	X	X	X
TCM	X	X	X	X	X	X	X	X	X	X	X	X
Electric shift control module	X	X	X	X	X	X	X	X	X	X	X	X
Chassis control module	X	X	X	X	X	X	X	X	X	X	X	X
8CH CAN gateway	X	X	X	X	X	X	X	X	X	X	X	X
IT CAN communication unit												
8CH CAN gateway	X	X	X	X	X	X	X	X	X	X	X	X
AV control unit	X	X	X	X	X	X	X	X	X	X	X	X
TCU		X	X	X	X	X		X	X	X	X	X
Wireless charger unit						X						X

BOSE speaker amp.					X	X					X	X
Engine CAN communication unit												
ECM	X	X	X	X	X	X	X	X	X	X	X	X
Electric intake valve timing control module	X	X	X	X	X	X	X	X	X	X	X	X
Diagnostic CAN communication unit												
8CH CAN gateway	X	X	X	X	X	X	X	X	X	X	X	X
Data link connector	X	X	X	X	X	X	X	X	X	X	X	X

×: Applicable

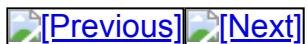
Vehicle Equipment Identification Information

note	Check CAN system type from the vehicle shape and equipment.
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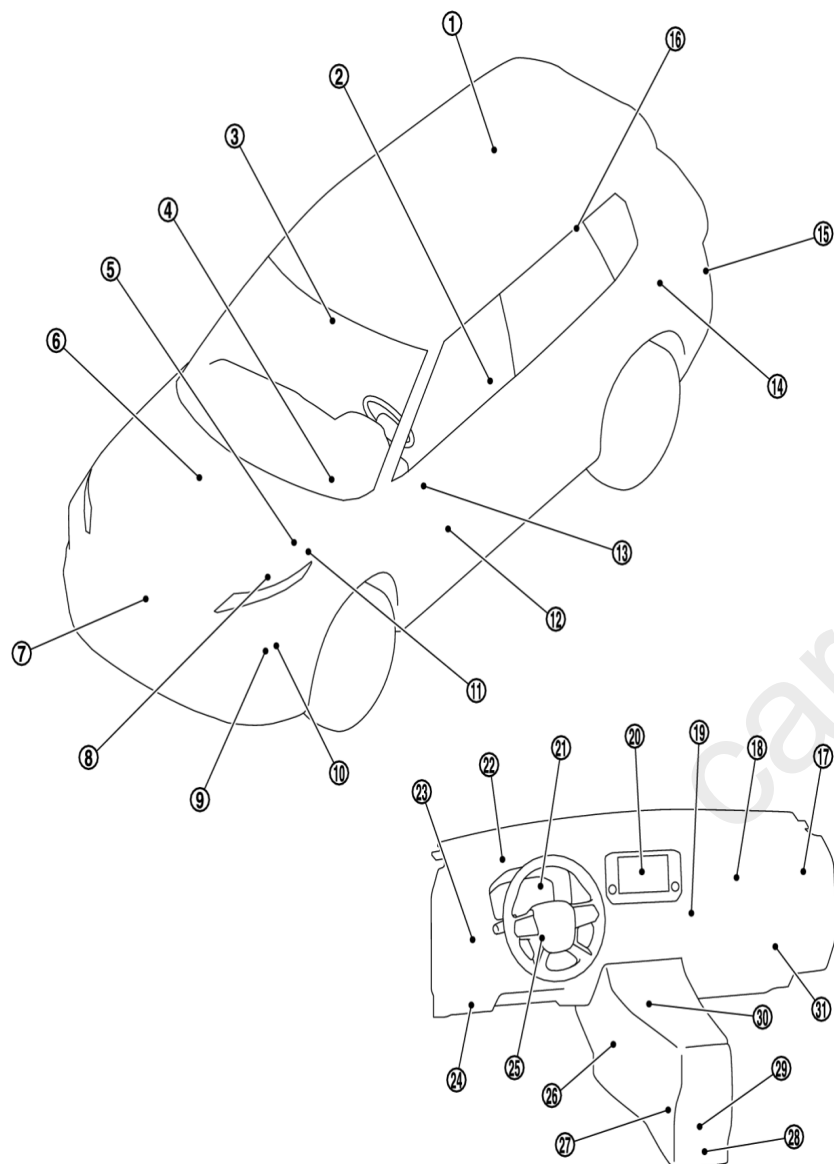


①	Side camera LH	②	Automatic power back switch	③	Seat memory switch
④	BOSE logo	⑤	Head Up Display main switch		
A	With intelligent around view monitor	B	With automatic power power liftgate system	C	With automatic drive positioner
D	With BOSE audio	E	With Head Up Display		

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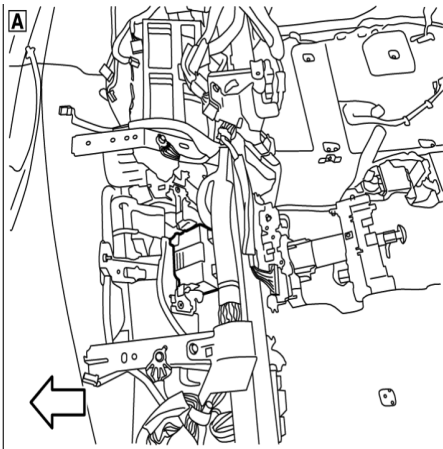
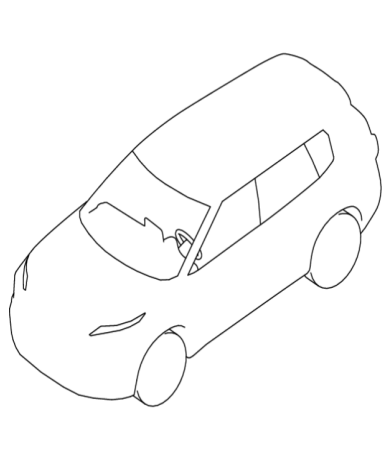


Component Parts Location



①	Side radar RH	②	AWD control unit	③	Front camera unit
④	8CH CAN gateway	⑤	ECM	⑥	ABS actuator and electric unit (control unit)
⑦	Distance sensor	⑧	Power steering control module	⑨	Electric intake valve timing control module
⑩	TCM	⑪	IPDM E/R	⑫	BOSE speaker amp.
⑬	Driver seat control unit	⑭	Automatic power liftgate control unit	⑮	Side radar LH
⑯	Sonar control unit	⑰	Chassis control module	⑱	Keyless operation key unit
⑲	TCU	⑳	AV control unit	㉑	Combination meter
㉒	Head Up Display unit	㉓	BCM	㉔	Data link connector
㉕	Steering angle sensor	㉖	Electric shift control module	㉗	Air bag diagnosis sensor unit
㉘	ADAS control unit 2	㉙	Around view monitor control unit	㉚	Wireless charger unit
㉛	A/C amp.				

Component Parts Location



①	8CH CAN gateway				
A	Instrument panel assembly removed condition	←	Vehicle front		

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[\[Previous\]](#) [\[Next\]](#)

Removal and Installation

note

Perform ADDITIONAL SERVICE WHEN REPLACING 8CH CAN GATEWAY. Refer to [Work Procedure](#) .

REMOVAL

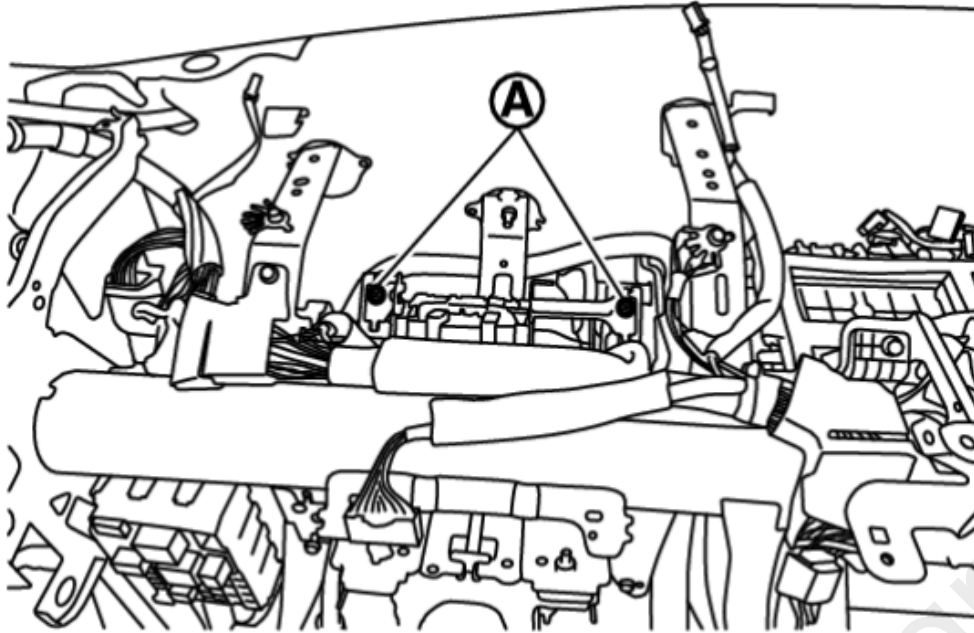
1. Remove combination meter. Refer to the following.

- Full TFT meter: [Removal and Installation](#) 
- 7 inch information display: [Removal and Installation](#) 

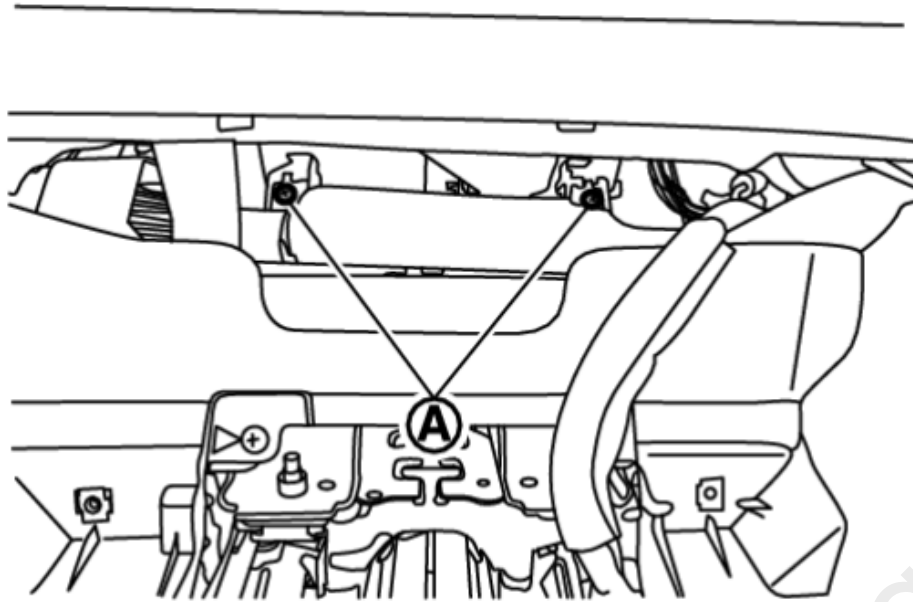
2. Remove instrument lower panel LH. Refer to [Removal and Installation](#) .

3. Remove mounting screw .

- Without ethernet harness connector

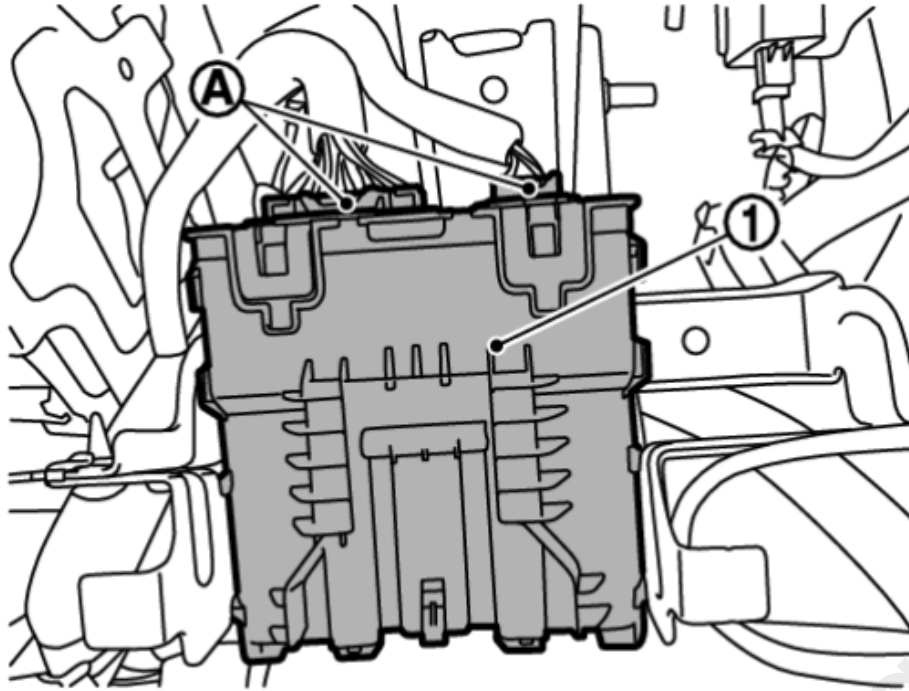


- With ethernet harness connector

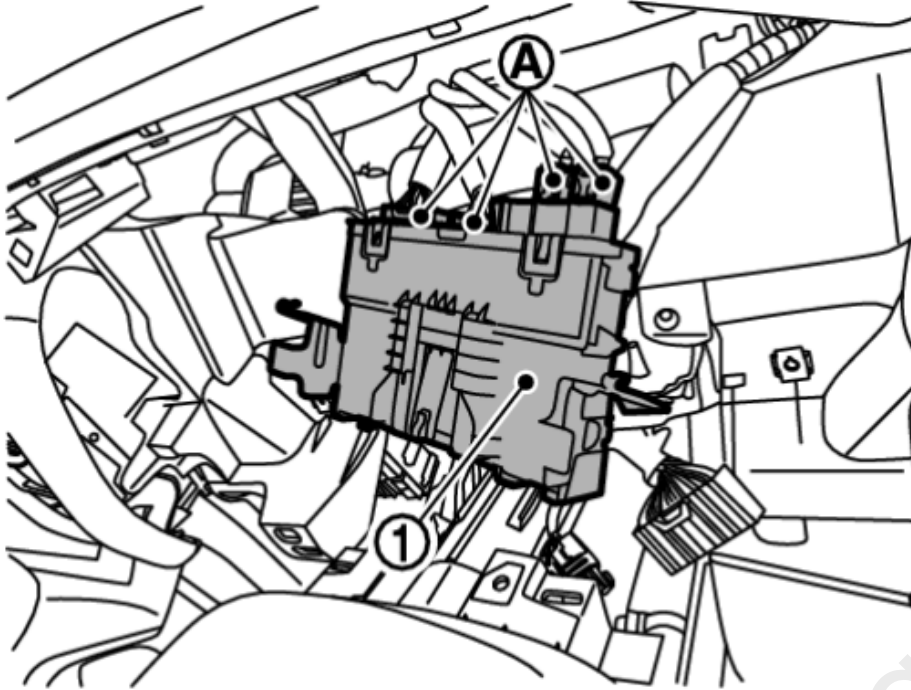


4. Remove harness connector^A to remove 8CH CAN gateway¹.

- Without ethernet harness connector



- With ethernet harness connector



INSTALLATION

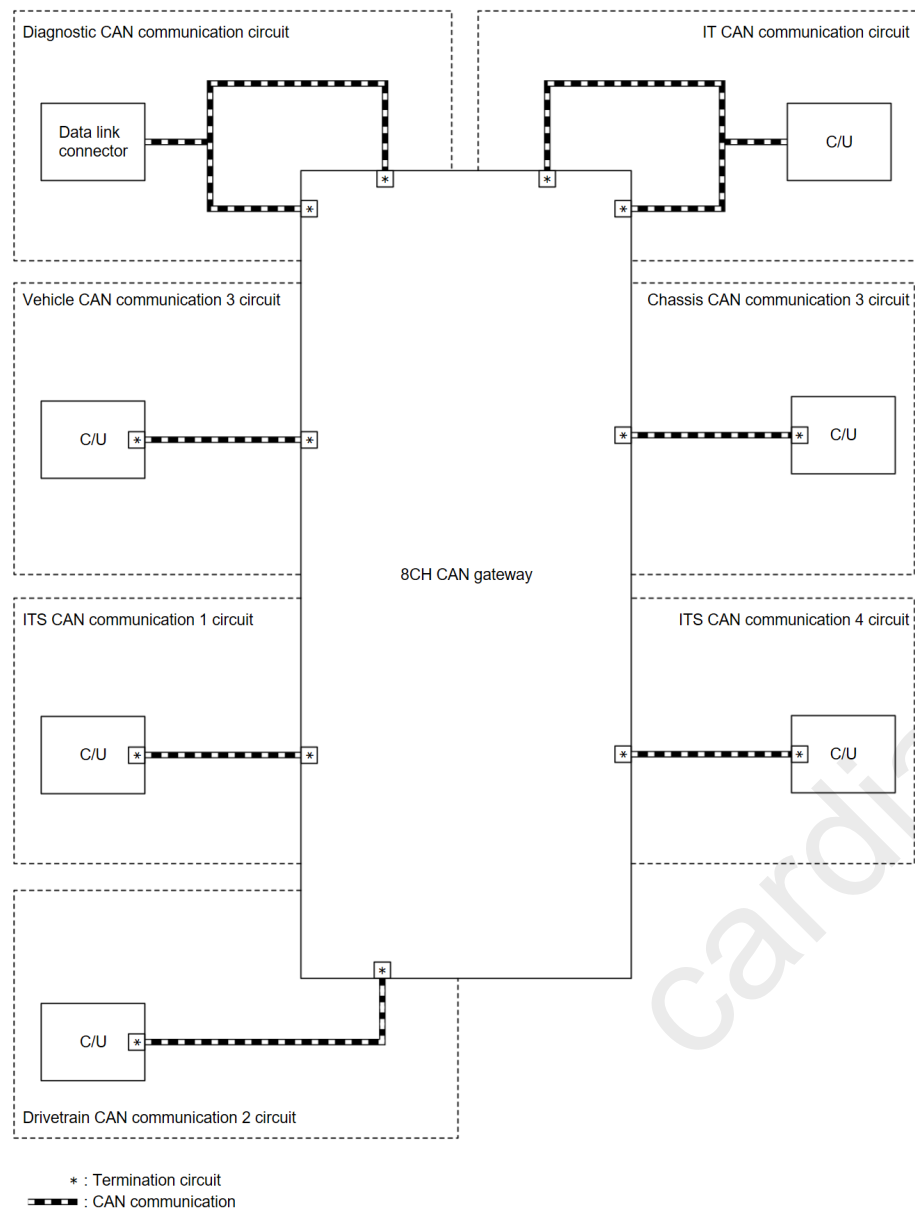
Install in the reverse order of removal.

 [\[Previous\]](#)  [\[Next\]](#)

System Description

8CH CAN GATEWAY

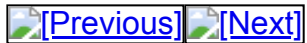
System Diagram



System Description

- The 8CH CAN gateway system communicates between vehicle CAN communication circuits, ITS CAN communication circuits, chassis CAN communication circuits, IT CAN communication circuit, Drivetrain CAN communication circuit, and diagnostic CAN communication circuit.
- This system selects and transmits only necessary information.

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Component Description

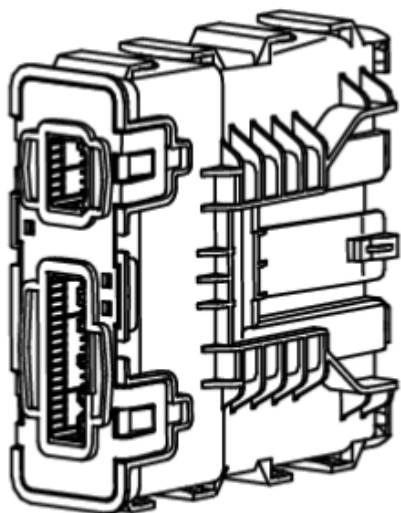
EXPLANATIONS OF COMPONENT PARTS

Component Function Within The System

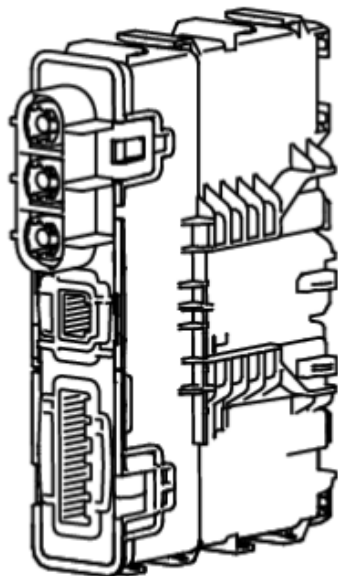
Individual Component Function

8CH CAN gateway transmits CAN signals from each network.

- Without ethernet harness connector



- With ethernet harness connector



Component Operation

Refer to [System Description](#) .

Component Parts Location

8CH CAN gateway is installed at behind the instrument panel. Refer to [Component Parts Location](#) .

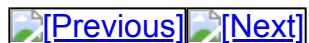
[\[Previous\]](#) [\[Next\]](#)

Self-Diagnosis

If communication signals cannot be transmitted or received among units communicating via CAN communication line, CAN communication-related DTC is displayed on the M.U.T.-III SE “Self Diagnostic Result” screen.

note The following table shows examples of CAN communication-related DTC. For other DTC, refer to the applicable sections.

DTC	Self-diagnosis item (M.U.T.-III SE indication)	DTC detection condition		Inspection/Action
U1000	CAN COMM CIRCUIT	ECM	When ECM is not transmitting or receiving CAN communication signal of OBD (emission-related diagnosis) for 2 seconds or more.	Start the inspection. Refer to the applicable section of the indicated control unit.
		Except for ECM	When a control unit (except for ECM) is not transmitting or receiving CAN communication signal for 2 seconds or more.	
U1001	CAN COMM CIRCUIT	When ECM is not transmitting or receiving CAN communication signal other than OBD (emission-related diagnosis) for 2 seconds or more.		
U1002	SYSTEM COMM	When a control unit is not transmitting or receiving CAN communication signal for 2 seconds or less.		
U1010	CONTROL UNIT(CAN)	When an error is detected during the initial diagnosis for CAN controller of each control unit.		



Symptom When Error Occurs in CAN Communication System

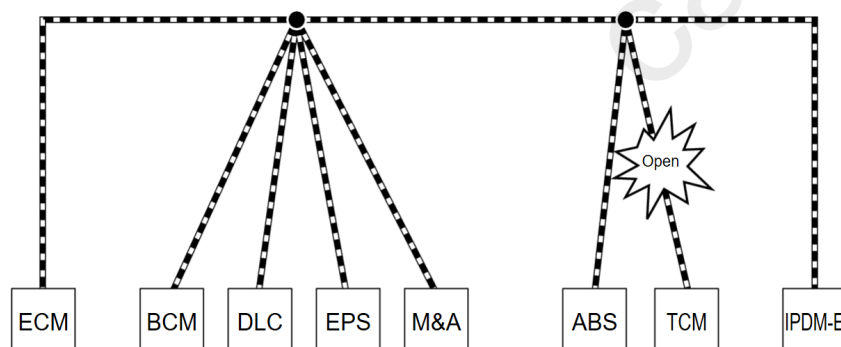
In CAN communication system, multiple units mutually transmit and receive signals. Each unit cannot transmit and receive signals if any error occurs on CAN communication line. Under this condition, multiple control units related to the root cause malfunction or go into fail-safe mode.

ERROR EXAMPLE

note

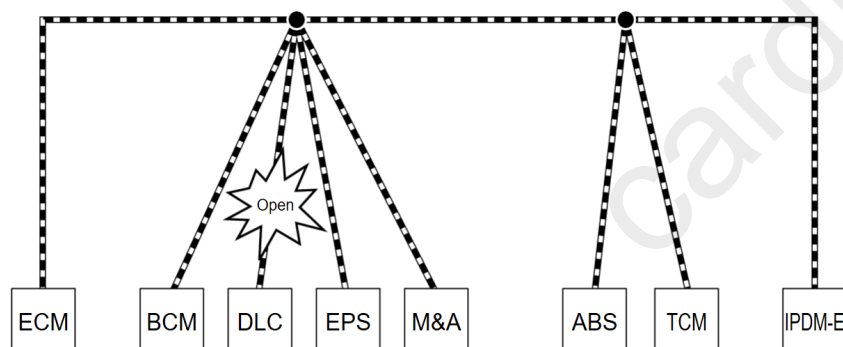
- Each vehicle differs in symptom of each unit under fail-safe mode and CAN communication line wiring.
- Refer to [Abbreviation List](#)  for the unit abbreviation.

Example: TCM branch line open circuit



Unit name	Symptom
ECM	Engine torque limiting is affected, and shift harshness increases.
BCM	Reverse warning chime does not sound.
EPS control unit	Normal operation.
Combination meter	- Shift position indicator and OD OFF indicator turn OFF. - Warning lamps turn ON.
ABS actuator and electric unit (control unit)	Normal operation.
TCM	No impact on operation.
IPDM E/R	Normal operation.

Example: Data link connector branch line open circuit

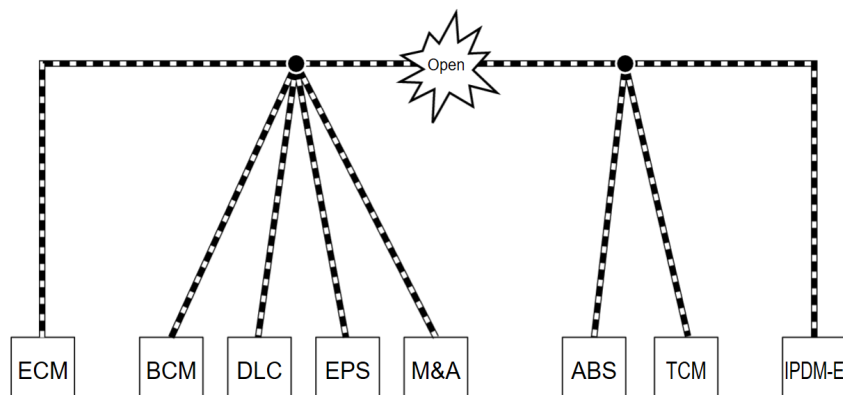


Unit name	Symptom
ECM	Normal operation.
BCM	
EPS control unit	
Combination meter	
ABS actuator and electric unit (control unit)	
TCM	
IPDM E/R	

note	- When data link connector branch line is open, transmission and reception of CAN communication signals are not affected. Therefore, no symptoms occur. However, be sure to repair malfunctioning circuit. - The model (all units on CAN communication system are Diag on CAN) cannot perform CAN diagnosis with M.U.T.-III SE if the following error occurs. The error is judged by the symptom.
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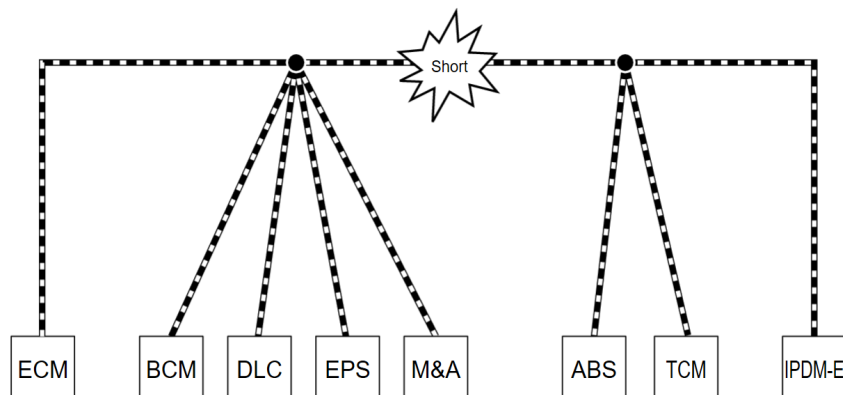
Error	Difference of symptom
Data link connector branch line open circuit	Normal operation.
CAN-H, CAN-L harness short-circuit	Most of the units which are connected to the CAN communication system enter fail-safe mode or are deactivated.

Example: Main Line Between Data Link Connector and ABS Actuator and Electric Unit (Control Unit) Open Circuit



Unit name	Symptom
ECM	Engine torque limiting is affected, and shift harshness increases.
BCM	• Reverse warning chime does not sound. • The front wiper moves under continuous operation mode even though the front wiper switch being in the intermittent position.
EPS control unit	The steering effort increases.
Combination meter	• The shift position indicator and OD OFF indicator turn OFF. • The speedometer is inoperative. • The odometer stops.
ABS actuator and electric unit (control unit)	Normal operation.
TCM	No impact on operation.
IPDM E/R	When the ignition switch is ON, • The headlamps (Lo) turn ON. • The cooling fan continues to rotate.

Example: CAN-H, CAN-L Harness Short Circuit



Unit name	Symptom
ECM	• Engine torque limiting is affected, and shift harshness increases. • Engine speed drops.
BCM	• Reverse warning chime does not sound. • The front wiper moves under continuous operation mode even though the front wiper switch being in the intermittent position. • The room light does not turn ON. • The engine does not start (if an error or malfunction occurs while turning the ignition switch OFF.) • The steering lock does not release (if an error or malfunction occurs while turning the ignition switch OFF.)
EPS control unit	The steering effort increases.

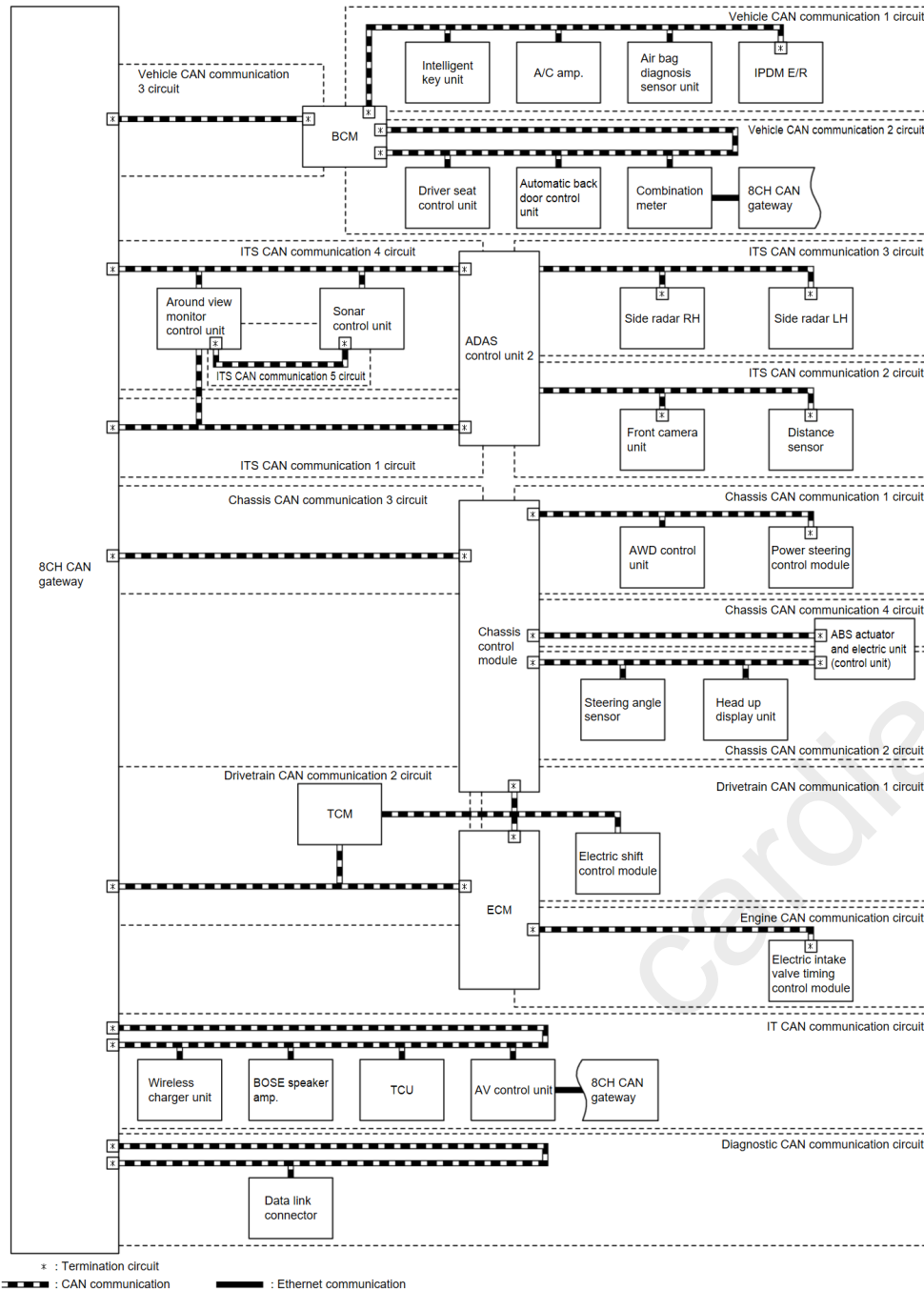
Unit name	Symptom
Combination meter	• The tachometer and the speedometer do not move. • Warning lamps turn ON. • Indicator lamps do not turn ON.
ABS actuator and electric unit (control unit)	Normal operation.
TCM	No impact on operation.
IPDM E/R	When the ignition switch is ON, • The headlamps (Lo) turn ON. • The cooling fan continues to rotate.



System Description

SYSTEM DIAGRAM

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DESCRIPTION

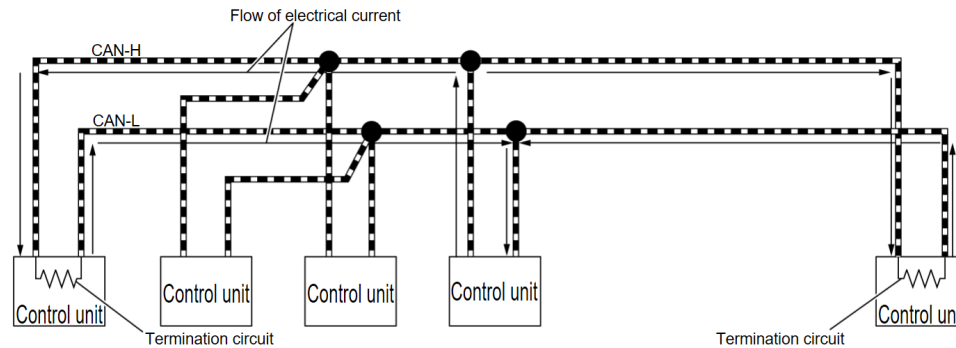
- CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
- The following control units include a gateway function and communicate signals between the different CAN communication circuits.

CAN communication circuit	Gateway control unit	Reference
Between the following circuits. - Vehicle CAN communication 1 circuit - Vehicle CAN communication 2 circuit - Vehicle CAN communication 3 circuit	BCM	System Description 
Between the following circuits. - Vehicle CAN communication 3 circuit - ITS CAN communication 1 circuit - ITS CAN communication 4 circuit - Chassis CAN communication 3 circuit - Drivetrain CAN communication 2 circuit - IT CAN communication circuit - Diagnostic CAN communication circuit	8CH CAN gateway	8CH CAN Gateway Component Description 
Between the following circuits. - ITS CAN communication 1 circuit - ITS CAN communication 2 circuit - ITS CAN communication 3 circuit - ITS CAN communication 4 circuit	ADAS control unit 2	ADAS Control Unit 2 
Between the following circuits. - Chassis CAN communication 1 circuit - Chassis CAN communication 2 circuit - Chassis CAN communication 3 circuit - Chassis CAN communication 4 circuit	Chassis control module	System Description 

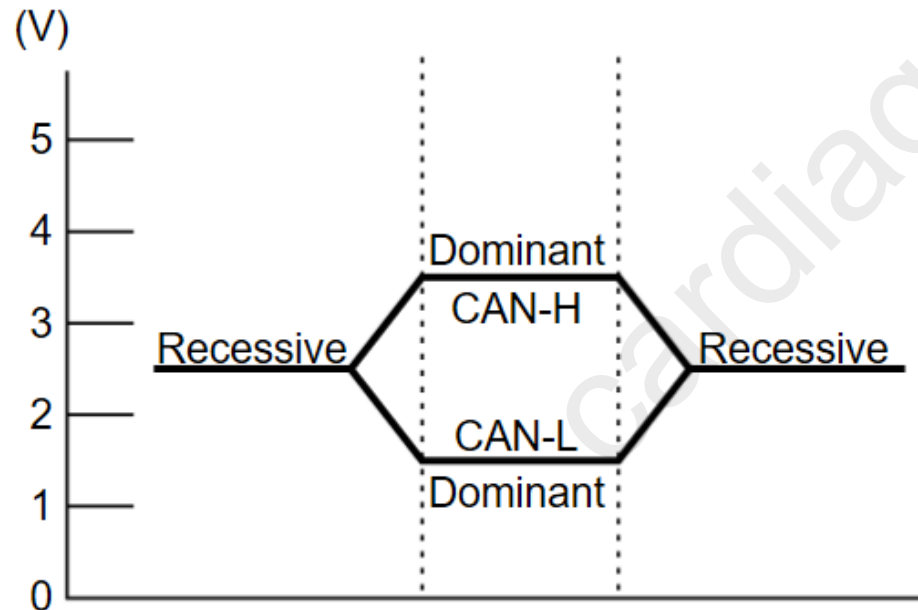
CAN communication circuit	Gateway control unit	Reference
Drivetrain CAN communication 1 circuit		
Between the following circuits. (with Intelligent around view monitor system) - ITS CAN communication 1 circuit - ITS CAN communication 4 circuit - ITS CAN communication 5 circuit	Around view monitor control unit	Around View Monitor Control Unit 
ITS CAN communication 4 circuit ↔ ITS CAN communication 5 circuit	Sonar control unit	Sonar Control Unit 
Chassis CAN communication 2 circuit ↔ Chassis CAN communication 4 circuit	ABS actuator and electric unit (control unit)	System Description 
Between the following circuits. - Drivetrain CAN communication 1 circuit - Drivetrain CAN communication 2 circuit - Engine CAN communication circuit	ECM	System Description 
Drivetrain CAN communication 1 circuit ↔ Drivetrain CAN communication 2 circuit	TCM	TCM 

CAN Communication Signal Generation

- Termination circuits (resistors) are connected across the CAN communication system. When transmitting a CAN communication signal, each control unit passes a current to the CAN-H line and the current returns to the CAN-L line.

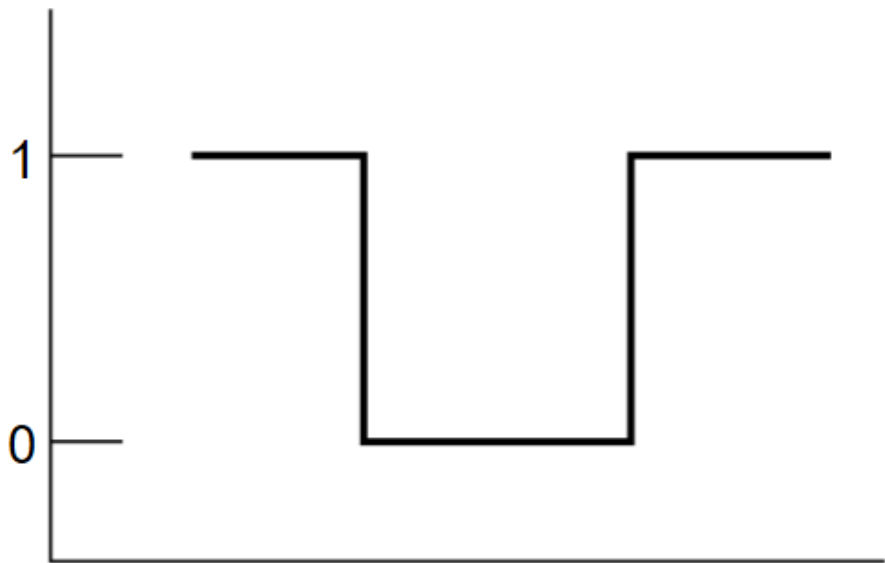


- The current flows separately into the termination circuits connected across the CAN communication system and the termination circuits drop voltage to generate a potential difference between the CAN-H line and the CAN-L line.



note A signal with no current passage is called “Recessive” and one with current passage is called “Dominant”.

- The system produces digital signals for signal communications, by using the potential difference.



The Construction of CAN Communication Signal (Message)

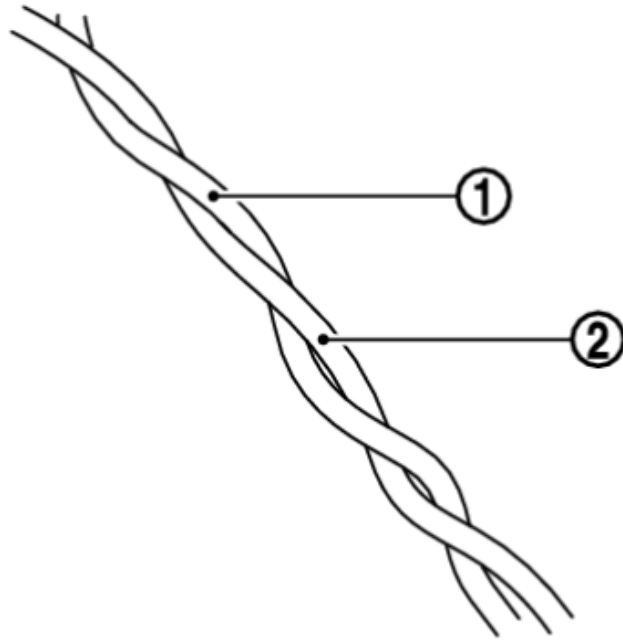
1	2	3	4	5	6	7
---	---	---	---	---	---	---

No.	Message name	Description
1	Start of frame (1 bit)	Start of message.
2	Arbitration of field (11 bit)	Priorities of message-sending are shown when there is a possibility that multiple

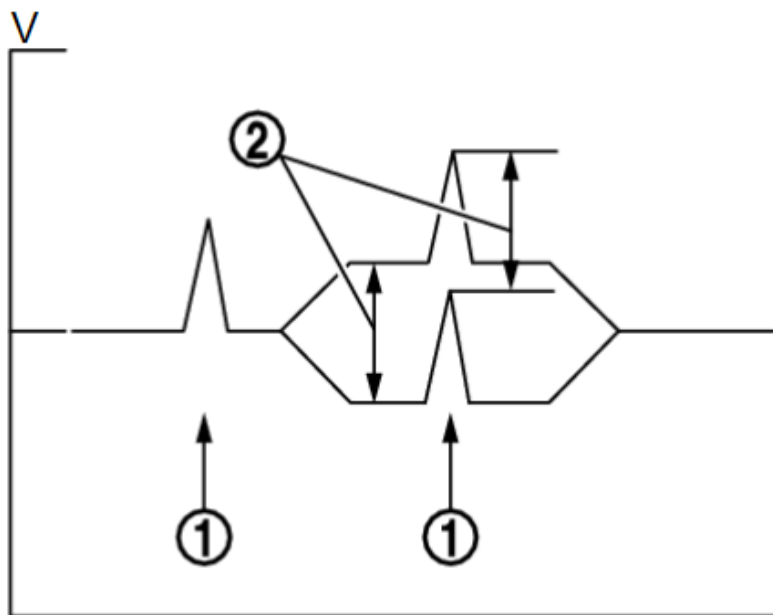
No.	Message name	Description
		messages are sent at the same time.
3	Control field (6 bit)	Signal quantity in data field is shown.
4	Data field (0-64 bit)	Actual signal is shown.
5	CRC field (16 bit)	• The transmitting control unit calculates sending data in advance and writes the calculated value in a message. • The receiving control unit calculates received data and judges that the data reception is normal when the calculated value is the same as the value written in the sent data.
6	ACK field (2 bit)	The completion of normal reception is sent to the transmitting unit.
7	End of frame (7 bit)	End of message.

CAN Communication Line

The CAN communication line is a twisted pair wire consisting of strands of CAN-H ① and CAN-L ② and has noise immunity.

**note**

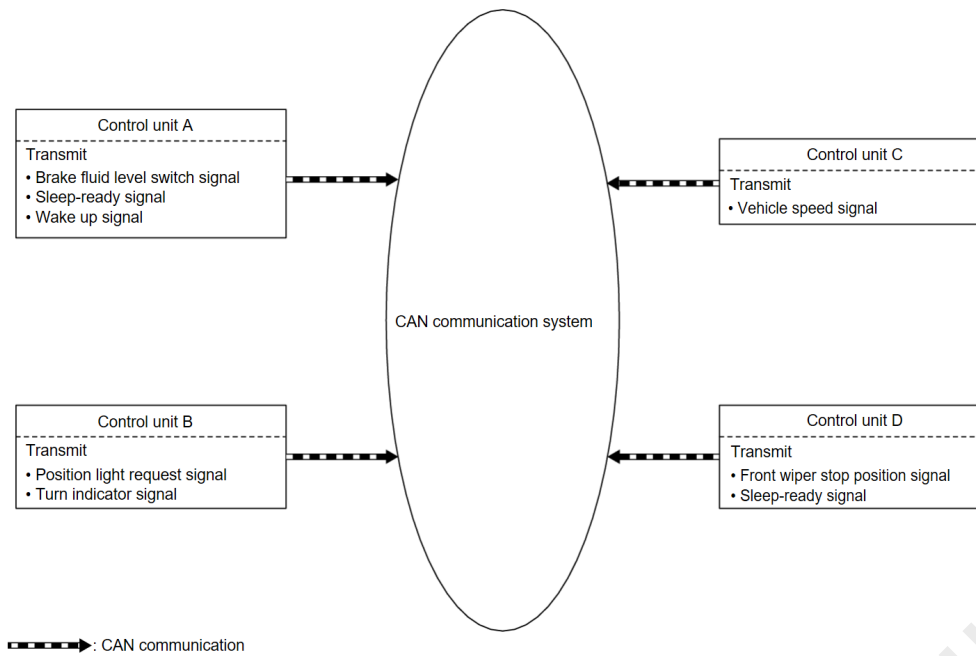
The CAN communication system has the characteristics of noise-resistant because this system produces digital signals by using the potential difference between the CAN-H line and the CAN-L line and has the twisted pair wire structure. Since the CAN-H line and the CAN-L line are always adjacent to each other, the same degree of noise occurs, respectively, when a noise ① occurs. Although the noise changes the voltage, the potential difference ② between the CAN-H line and the CAN-L line is insensitive to noise. Therefore, noise-resistant signals can be obtained.



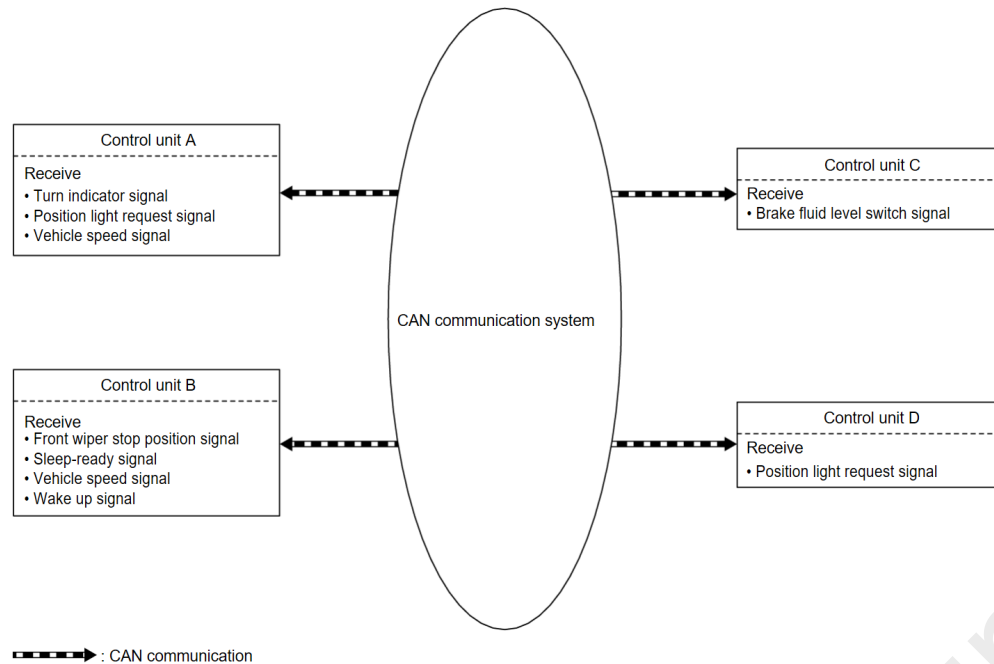
CAN Signal Communications

Each control unit of the CAN communication system transmits signals through the CAN communication control circuit included in the control unit and receives only necessary signals from each control unit to perform various kinds of control.

- Example: Transmitted signals

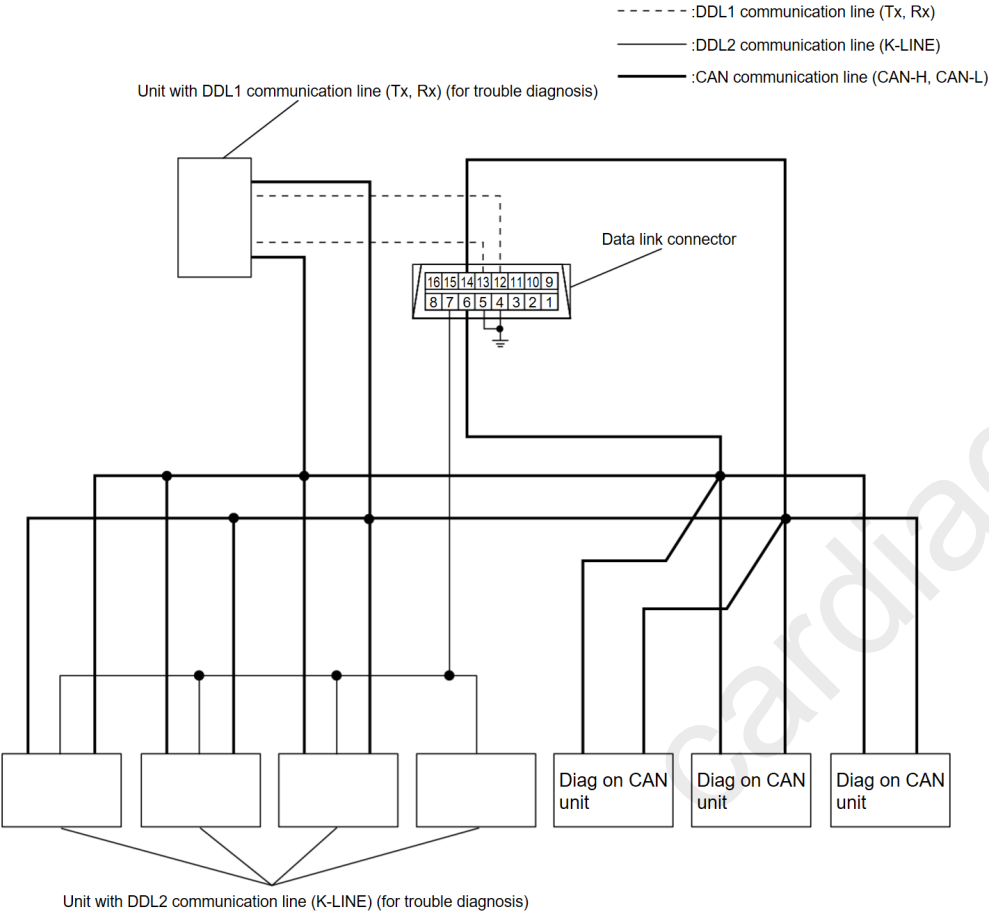


- Example: Received signals

**note**

The above signal names and signal communications are provided for reference purposes. For CAN communications signals of this vehicle, refer to [CAN Communication Signal Chart](#) .

System Diagram



Name	Harness	Description
DDL1	Tx Rx	It is used for trouble diagnosis. (CAN-H and CAN-L are used for controlling)

Name	Harness	Description
DDL2	K-LINE	It is used for trouble diagnosis. (CAN-H and CAN-L are used for controlling)
Diag on CAN	CAN-H CAN-L	It is used for trouble diagnosis and control.

Component Inspection

1.CHECK ACC STEERING SWITCH

1. Disconnect combination switch (spiral cable) harness connector.
2. Check the resistance between combination switch harness connector terminals as per the following conditions.

Combination switch (Spiral cable)			Condition	Resistance (Approx.)
Connector	+	-		
	Terminals			
M154	21	36	MAIN switch: Pressed	Approx. 0
			CANCEL switch: Pressed	Approx. 310
			DISTANCE switch: Pressed	Approx. 740
			SET- switch: Pressed	Approx. 1,410
			RES+ switch: Pressed	Approx. 2,590
			NOT OPERATE	Approx. 5,456

Q.Is the inspection result normal?

Yes

INSPECTION END

No

Replace ACC steering switch. Refer to [Exploded View](#) .

Component Inspection

1.CHECK AIR FUEL RATIO (A/F) SENSOR 1

1. Turn ignition switch OFF.
2. Disconnect A/F sensor 1 harness connector.
3. Check resistance between A/F sensor 1 terminals as per the following.

A/F sensor 1		Resistance
+	-	
Terminal		
3	4	1.8 - 2.44 Ω [at 20°C (68°F)]
	1	$\infty\Omega$ (Continuity should not exist)
	2	
4	1	$\infty\Omega$ (Continuity should not exist)
	2	

Q.Is the inspection result normal?

Yes INSPECTION END

No 

2.REPLACE AIR FUEL RATIO (A/F) SENSOR 1

Replace air fuel ratio (A/F) sensor 1. Refer to [Exploded View](#) .
: INSPECTION END

Component Inspection

1.CHECK ACCELERATOR PEDAL POSITION SENSOR

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Turn ignition switch ON.
4. Check the voltage between ECM harness connector terminals as per the following condition.

ECM				Condition		Voltage
Connector		+	-			
		Terminal				
Sensor 1	E16	158	159	Accelerator pedal	Fully released	0.76 V
					Fully depressed	4.57 V
Sensor 2		151	152		Fully released	0.39 V
					Fully depressed	2.3 V

Q.Is the inspection result normal?

Yes

INSPECTION END

No

Replace accelerator pedal assembly. Refer to [Removal and Installation](#) .

Component Inspection

1.CHECK ASCD STEERING SWITCH

1. Disconnect combination switch (spiral cable) harness connector.
2. Check the resistance between combination switch harness connector terminals as per the following conditions.

Combination switch (Spiral cable)			Condition	Resistance (Approx.)
Connector	+	-		
	Terminals			
M154	21	36	MAIN switch: Pressed	0 Ω
			CANCEL switch: Pressed	250 Ω
			SET- switch: Pressed	660 Ω
			RES+ switch: Pressed	1,480 Ω
			All ASCD steering switches: Released	4,000 Ω

Q.Is the inspection result normal?

Yes INSPECTION END

No Replace ASCD steering switch. Refer to [Component Parts Location](#) .

Component Inspection (Active Grille Shutter)

1.CHECK ACTIVE GRILLE SHUTTER

 With M.U.T.-III SE

1. Start the engine.
2. Select "ACTIVE GRILLE SHUTTER" in "Special Function" of "ENGINE" using M.U.T.-III SE.
3. Touch "CALIBRTN".
4. After the calibration completes, check the operation of active grille shutter as follows.

Condition	Active grille shutter
Select "CLOSE"	Open → Close
Select "OPEN"	Close → Open

 Without M.U.T.-III SE

1. Turn ignition switch OFF.
2. Operate shutter by hands to close position.
3. Check the operation of active grille shutter as follows.

Condition	Active grille shutter
Ignition switch: ON	Close → Open

Q.Is the inspection result normal?

Yes INSPECTION END

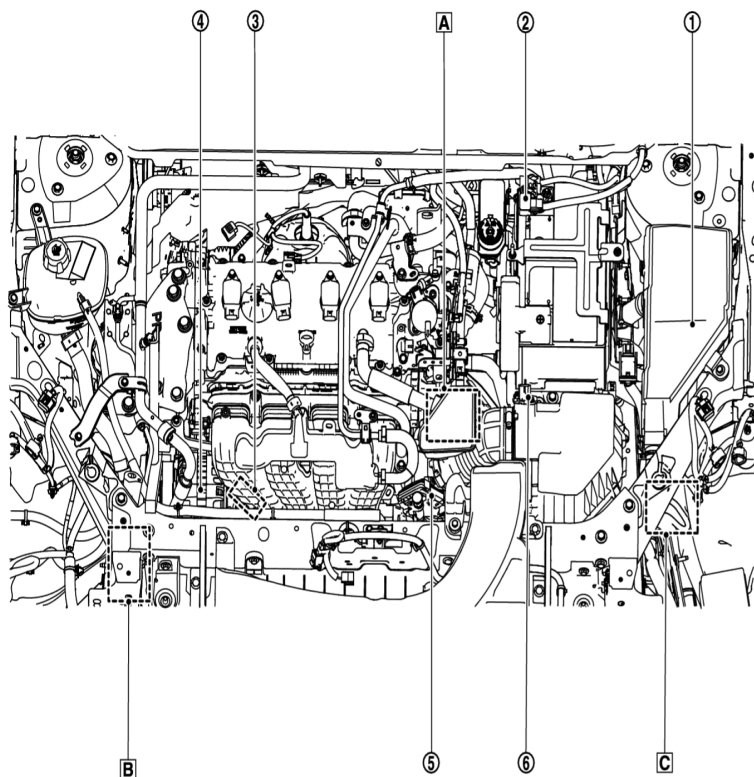
No Replace active grille shutter. Refer to [Removal and Installation](#) .



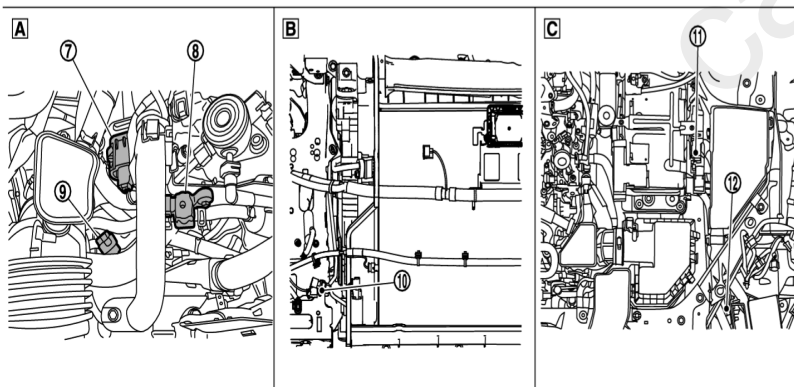
Component Parts Location

ENGINE ROOM COMPARTMENT

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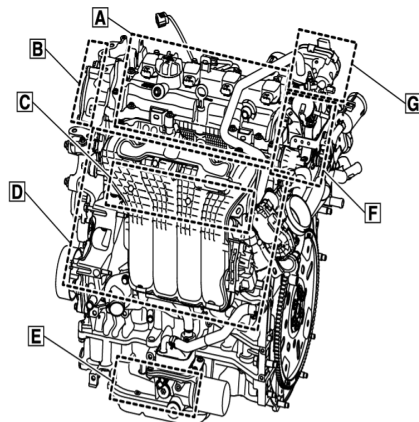


A Left center of engine compartment	B Right front of vehicle	C Left front of engine compartment
① IPDM E/R Component Parts Location ➡	② 12 V battery current sensor	③ Manifold absolute pressure (MAP) sensor
④ Generator Component Parts Location ➡	⑤ Electric throttle control actuator (with built in throttle position sensor and throttle control motor)	⑥ Mass air flow sensor (with intake air temperature sensor)
⑦ Intake manifold runner control valve actuator	⑧ EVAP canister purge volume control solenoid valve	⑨ Transmission range switch
⑩ Refrigerant pressure sensor • AUTOMATIC AIR CONDITIONING SYSTEM: Component Parts Location ➡ • MANUAL AIR CONDITIONING SYSTEM: Component Parts Location ➡	⑪ ECM	⑫ Electric intake valve timing control module

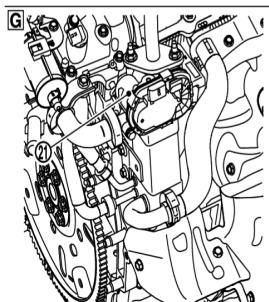
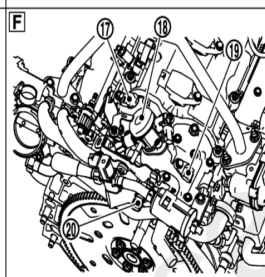
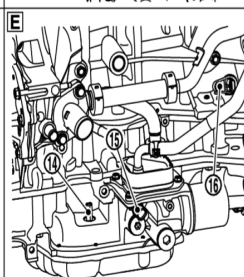
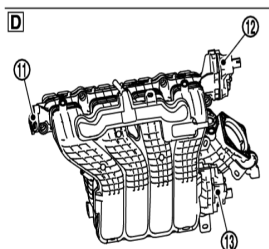
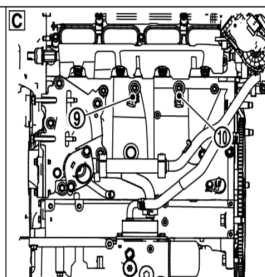
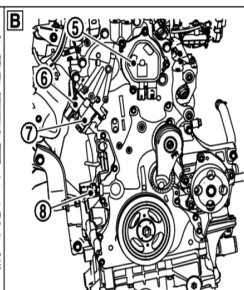
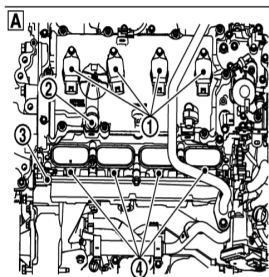


ENGINE COMPARTMENT

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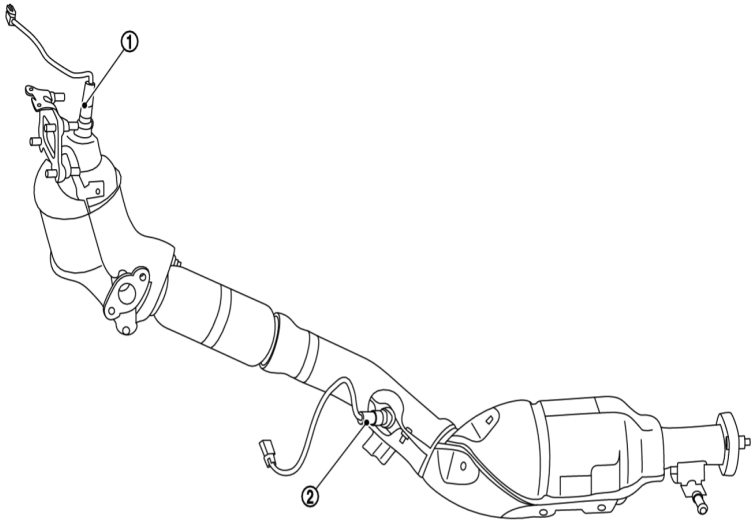


A	Top of engine	B	Top front of engine	C	Left side of engine
D	Air intake	E	Lower front of engine	F	Rear of engine
G	Rear of engine				
①	Ignition coil (with power transistor)	②	PCV valve	③	Fuel rail pressure sensor
④	Fuel injector	⑤	Electric intake valve timing control actuator	⑥	Exhaust valve timing intermediate lock control solenoid valve
⑦	Exhaust valve timing control solenoid valve	⑧	Engine oil pressure sensor	⑨	Knock sensor 1
⑩	Knock sensor 2	⑪	Intake manifold runner control valve position sensor	⑫	Intake manifold runner control valve actuator
⑬	Intake manifold tuning valve	⑭	Engine oil pressure control solenoid valve	⑮	Engine oil temperature sensor
⑯	Crankshaft position sensor	⑰	Intake camshaft position sensor	⑱	High pressure fuel pump
⑲	Exhaust camshaft position sensor	⑳	Engine coolant temperature sensor	㉑	EGR volume control valve

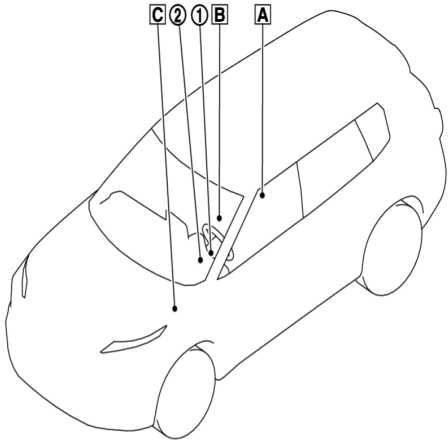


EXHAUST COMPARTMENT

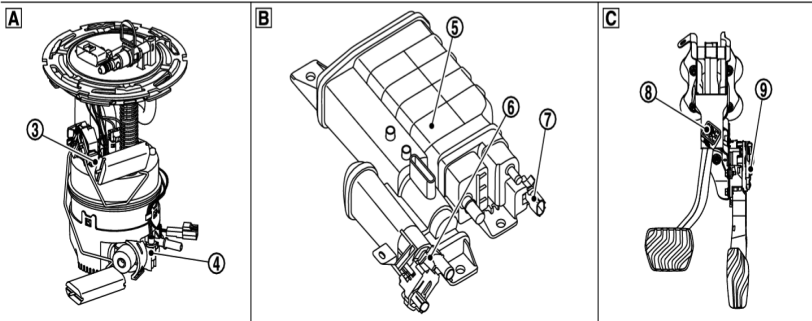
①	Air fuel ratio (A/F) sensor 1	②	Heated oxygen sensor 2		
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BODY COMPARTMENT



A	Inside fuel tank area	B	Front of fuel tank area	C	Pedal periphery area
①	ASCD/ACC steering switch	②	Combination meter [Malfunction indicator light (MIL), Information display]	③	EVAP canister
④	EVAP control system pressure sensor	⑤	EVAP canister vent control valve	⑥	Fuel level sensor unit and fuel pump
⑦	Fuel tank temperature sensor	⑧	Stop light switch	⑨	Accelerator pedal position sensor



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M.U.T.-III SE Function

FUNCTION

Diagnostic test mode	Function
Self Diagnostic Result	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*1 Display DTC which ECM memorizes.
Data List	Input/Output data in the ECM can be read.
Special Function	- Diagnostic Test Mode in which M.U.T.-III SE drives some actuators apart from the ECMs and also shifts some parameters in a specified range. - ECM part number can be read. - This mode enables a technician to adjust some devices faster and more accurately by following the indications on the M.U.T.-III SE unit.

*1: The following emission-related diagnostic information is cleared when the ECM memory is erased.

1. DTC (Diagnostic trouble codes)
2. 1st trip diagnostic trouble codes
3. Freeze frame data
4. 1st trip freeze frame data
5. System readiness test (SRT) codes
6. Test values

SELF DIAGNOSTIC RESULT MODE

Self Diagnostic Item

Regarding items of DTC and 1st trip DTC ,Refer to [DTC Index](#) .

How to Read DTC and 1st Trip DTC

DTCs and 1st trip DTCs related to the malfunction are displayed in "Self-diagnosis" mode with M.U.T.-III SE. Status of DTCs is displayed as follows.

- When ECM has detected a current DTC, "Active DTC" is displayed.
 - When ECM memorizes a 1st trip DTC, "1t" is displayed.
 - For a DTC other than the above, "Stored DTC" is displayed.
-

How to Erase DTC

note	If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
-------------	---

Freeze Frame Data and 1st Trip Freeze Frame Data

Freeze frame data item*1	Description
Detected DTC [PXXXX]	The engine control component part/control system has a trouble code displayed as PXXXX. (DTC Index  .)
ODO/TRIP METER	The ODO/TRIP at the moment a malfunction is detected is displayed.
Warm up cycle counter	
FUEL SYS-B1	• “Fuel injection system status” at the moment a malfunction is detected is displayed. • One of the following mode is displayed. • MODE 2: Open loop due to detected system malfunction • MODE 3: Open loop due to driving conditions (power enrichment, deceleration enrichment) • MODE 4: Closed loop - using oxygen sensor(s) as feedback for fuel control • MODE 5: Open loop - has not yet satisfied condition to go to closed loop
FUEL SYS-B2	
CAL/LD VALUE [%]	The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C]	The engine coolant temperature at the moment a malfunction is detected is displayed.
L-FUEL TRM-B1 [%]	• “Long-term fuel trim” at the moment a malfunction is detected is displayed. • The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.
L-FUEL TRM-B2 [%]	
S-FUEL TRM-B1 [%]	• “Short-term fuel trim” at the moment a malfunction is detected is displayed. • The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.
S-FUEL TRM-B2 [%]	

Freeze frame data item*1	Description
ENGINE SPEED [rpm]	The engine speed at the moment a malfunction is detected is displayed.
VEHICL SPEED [km/h] or [mph]	The vehicle speed at the moment a malfunction is detected is displayed.
INT MANI PRES [kPa]	• Constant value is displayed. • These items are displayed but are not applicable to this model.
ABSOL TH·P/S [%]	The throttle valve opening angle at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	The intake air temperature at the moment a malfunction is detected is displayed.
COMBUST CONDITION	• Constant value is displayed. • These items are displayed but are not applicable to this model.
FUEL RAIL PRESSURE [MPa]	The fuel rail pressure at the moment a malfunction is detected is displayed.
TARGET FUEL RAIL PRESSURE [MPa]	The target fuel rail pressure at the moment a malfunction is detected is displayed.
BATTERY VOLTAGE [V]	The battery voltage at the moment a malfunction is detected is displayed.
FUEL LEVEL [%]	The fuel level at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [msec]	The base fuel schedule at the moment a malfunction is detected is displayed.

*1: The items are the same as those of 1st trip freeze frame data.

DATA MONITOR MODE

note

- The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to M.U.T.-III SE display items.
- For reference values of the following items, Refer to Values On The Diagnosis Tool [Values on the Diagnosis Tool](#) .

Monitored Item

Monitored item	Unit	Description	Remarks
ATOM PRES SEN 2	V	The signal voltage from the manifold absolute pressure (MAP) sensor is displayed.	—
INT/V TIM(B1)	°CA	Indicates [°CA] of intake camshaft advance angle.	—
COOLANT TEMP/S	°C or °F	The engine coolant temperature (determined by the signal voltage of the engine outlet coolant temperature sensor) is displayed.	When the engine coolant temperature sensor is open or short-circuited, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.
VHCL SPEED SE	km/h or mph	The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.	—

Monitored item	Unit	Description	Remarks
BATTERY VOLT	V	The power supply voltage of ECM is displayed.	—
INT/A TEMP SE	°C or °F	The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated.	—
Ignition timing 1	BTDC	Indicates the ignition timing computed by ECM according to the input signals.	When the engine is stopped, a certain value is indicated.
PURG VOL C/V	%	- Indicates the control value of the EVAP canister purge volume control solenoid valve computed by the ECM according to the input signals. - The opening becomes larger as the value increases.	—
FUEL T/TMP SE	°C or °F	The fuel temperature (determined by the signal voltage of the	—

Monitored item	Unit	Description	Remarks
		fuel tank temperature sensor) is displayed.	
FUEL LEVEL SE	V	The signal voltage of the fuel level sensor is displayed.	—
EVAP SYS PRES	V	The signal voltage of EVAP control system pressure sensor is displayed.	—
CAL/LD VALUE	%	“Calculated load value” indicates the value of the current air flow divided by peak air flow.	—
HO2S2 (B1)	V	The signal voltage of the heated oxygen sensor 2 is displayed.	—
ENG OIL TEMP	°C or °F	The engine oil temperature (determined by the signal voltage of the engine oil temperature sensor) is displayed.	—
A/F ALPHA-B1	%	The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.	- When the engine is stopped, a certain value is indicated. - This data also includes the data for the air-

Monitored item	Unit	Description	Remarks
			fuel ratio learning control. • Specification value is indicated on monitor screen under the following conditions. • Reference: Select • Display type: Line graph
MAP SENSOR	V	The manifold absolute pressure sensor signal voltage is displayed,	—
A/F S1 HTR (B1)	%	• Indicates the duty ratio of the Air fuel ratio (A/F) sensor 1 heater computed by ECM according to the input signals. • The current flow to the heater becomes larger as the value increases.	—

Monitored item	Unit	Description	Remarks
EXH/V TIM B1	°CA	Indicates [°CA] of exhaust camshaft advance angle.	—
EGR VALVE POSITION	deg	ECM-calculated EGR valve position is displayed.	—
FAN DUTY	%	Indicates a command value for cooling fan. The value is calculated by ECM based on input signals.	—
A/GRLL SHTR POSITION	F/CLOSE MOVING F/OPEN UNIDTF	Indicates the status of active grille shutter. • F/CLOSE: Active grille shutter is fully closed. • MOVING: Active grille shutter is in motion. • F/OPEN: Active grille shutter is fully opened. • UNIDTF: Unable to specify the shutter position.	—

Monitored item	Unit	Description	Remarks
ENG SPEED	rpm	Indicates the engine speed computed from the signal of the crankshaft position sensor and camshaft position sensor.	Accuracy becomes poor if engine speed drops below the idle rpm.
TRVL AFTER MIL	km or mile	Distance traveled while MIL is activated.	—
B/FUEL SCHDL	ms	“Base fuel schedule” indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	Specification value is indicated on monitor screen under the following conditions. • Reference: Select • Display type: Line graph
MASS AIRFLOW	g/s	These items are displayed but not used.	—
FUEL PRES SEN	MPa	Indicates the fuel rail pressure computed by ECM according to the input signals.	—
ACCEL SEN 1	V	The signal voltage of the accelerator pedal position sensor 1 is displayed.	—
ACCEL SEN 2	V	The converted value of the accelerator pedal position	ACCEL SEN 2 signal is converted by ECM internally. Thus, they differs from ECM

Monitored item	Unit	Description	Remarks
		sensor signal voltage is displayed.	terminal voltage signal.
TP SEN 1-B1	V	The signal voltage of the throttle position sensor 1 B1 is displayed.	—
TP SEN 2-B1	V	The value converted from the signal voltage of the throttle position sensor 2 B1 is displayed.	TP SEN 2-B1 signal is converted by ECM internally. Thus, they differs from ECM terminal voltage signal.
I/P PULLY SPD	rpm	Indicates the engine speed computed from the input shaft revolution signal.	—
VEHICLE SPEED	km/h or mph	The vehicle speed computed from the vehicle speed signal sent from TCM is displayed.	—
TUMBLE POS SEN	V	The intake manifold runner control valve position sensor signal voltage is displayed.	—
AC PRESS SEN	V	The signal voltage from the refrigerant pressure sensor is displayed.	—
A/F SEN1 (B1)	V	The A/F signal voltage computed from the input signal of the air fuel ratio	—

Monitored item	Unit	Description	Remarks
		(A/F) sensor 1 is displayed.	
VHCL SPEED SE	km/h or mph	The vehicle speed computed from the vehicle speed signal sent from combination meter is displayed.	—
SET VHCL SPD	km/h	The preset vehicle speed is displayed.	—
A/F ADJ-B1	—	Indicates the correction of a factor stored in ECM. The factor is calculated from the difference between the target air-fuel ratio stored in ECM and the air-fuel ratio calculated from A/F sensor 1 signal.	—
H/P FUEL PUMP DEG	deg	Displays ECM-calculated fuel discharge position of the high pressure fuel pump.	—
FUEL PRES SEN V	V	The signal voltage of FRP sensor is displayed.	—
EOP SENSOR	V	The signal voltage of EOP sensor is displayed.	—
MASS AIR FLOW	g/s	The signal flow rate of the mass air flow sensor is displayed.	When the engine is

Monitored item	Unit	Description	Remarks
SENSOR (g/s) B1			stopped, a certain value is indicated. • Specification value is indicated on monitor screen under the following conditions. • Reference: Select • Display type: Line graph
EGR VALVE POSITION SEN	V	The signal voltage of EGR valve position sensor is displayed.	—
TOTAL DISTNC-OCS RST 1	km	The Multi-way Control Valve position detected by the position sensor is displayed.	—
TOTAL DISTNC-OCS RST 2	km	Total travel distance of odd meter when Oil Control System is reset.	—
TOTAL DISTNC-OCS RST 3	km	Total travel distance of odd meter when Oil Control System is reset. (two times ago)	—
DETERIORTN VL-OCS RST 1	—	Total travel distance of odd meter when	—

Monitored item	Unit	Description	Remarks
		Oil Control System is reset. (three times ago)	
DETERIORTN VL-OCS RST 2	—	Indicates deterioration condition of the engine oil when Oil Control System is reset.	—
DETERIORTN VL-OCS RST 3	—	Indicates deterioration condition of the engine oil when Oil Control System is reset. (three times ago)	—
TOTAL DISTNC-OCS WRN 1	km	Total travel distance of odd meter when Oil Control System remaining distance is zero.	—
TOTAL DISTNC-OCS WRN 2	km	Total travel distance of odd meter when Oil Control System remaining distance is zero. (two times ago)	—
TOTAL DISTNC-OCS WRN 3	km	Total travel distance of odd meter when Oil Control System remaining distance is zero. (two times ago)	—
DETERIORTN VL-OCS WRN		Indicates deterioration	—

Monitored item	Unit	Description	Remarks
1		condition of the engine oil when Oil Control System remaining distance is zero.	
DETERIORATION VL-OCS WRN 2		Indicates deterioration condition of the engine oil when Oil Control System remaining distance is zero. (two times ago)	—
DETERIORATION VL-OCS WRN 3		Indicates deterioration condition of the engine oil when Oil Control System remaining distance is zero. (three times ago)	—
CURRENT DETERIORATION VAL	—	Indicates deterioration condition of the engine oil.	—
LOAD SIGNAL	On/Off	Indicates [On/Off] condition of the electrical load signal. • ON...Rear window defogger switch is ON or lighting switch	—

Monitored item	Unit	Description	Remarks
		is in 2nd position. • OFF...Both rear window defogger switch and lighting switch are OFF.	
AIR COND SIG	On/Off	Indicates [On/Off] condition of the air conditioner switch as determined by the air conditioner signal.	—
PW/ST SIGNAL	On/Off	Indicates [On/Off] condition of the power steering system (determined by the signal voltage of the power steering pressure sensor signal).	—
P/N POSI SW	On/Off	Indicates [On/Off] condition from the reverse/neutral position signal.	—
START SIGNAL	On/Off	Indicates start signal status [On/Off] computed by the ECM according to the signals of engine speed and battery voltage.	After starting the engine, [Off] is displayed regardless of the starter signal.
CLSD THL POS	On/Off	Indicates idle position [On/Off] computed by ECM	—

Monitored item	Unit	Description	Remarks
		according to the accelerator pedal position sensor signal.	
HO2S2 MNTR(B1)	RICH/LEAN	Display of heated oxygen sensor 2 signal: • RICH: means the amount of oxygen after three way catalyst is relatively small. • LEAN: means the amount of oxygen after three way catalyst is relatively large.	When the engine is stopped, a certain value is indicated.
IGNITION SW	On/Off	Indicates [On/Off] condition from ignition switch signal.	—
HEATER FAN SW	On/Off	Indicates [On/Off] condition from the heater blower ON signal.	—
IDL A/V LEARN	YET/CMPLT	Displays the condition of Idle Air Volume Learning. • YET...Idle air volume	—

Monitored item	Unit	Description	Remarks
		learning has not been performed yet. • DONE...Idle air volume learning has already been performed successfully.	
BRAKE SW	On/Off	Indicates [On/Off] condition from the stop light switch signal.	—
COMBUSTION	—	These items are displayed but not used.	—
VIAS S/V-1	On/Off	The control condition of the VIAS control solenoid valve 1 (determined by ECM according to the input signals) is indicated. • On: VIAS control solenoid valve 1 is operating. • Off: VIAS control solenoid valve 1 is not operating.	—

Monitored item	Unit	Description	Remarks
AIR COND RLY	On/Off	The air conditioner relay control condition (determined by ECM according to the input signals) is indicated.	—
FUEL PUMP RLY	On/Off	Indicates the fuel pump relay control condition determined by ECM according to the input signals.	—
VENT CONT/V	On/Off	The control condition of the EVAP canister vent control valve (determined by ECM according to the input signals) is indicated. • ON: Closed • OFF: Open	—
HO2S2 HTR (B1)	On/Off	Indicates [On/Off] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals.	—
DIST SW	On/Off	Indicates [On/Off] condition from DISTANCE switch signal.	—

Monitored item	Unit	Description	Remarks
BRAKE SW2	On/Off	Indicates [On/Off] condition of stop light switch signal.	—
BRAKE SW1	On/Off	Indicates [On/Off] condition from brake pedal position switch signal.	—
SET SW	On/Off	Indicates [On/Off] condition from SET – switch signal.	—
RESUME/ACC SW	On/Off	Indicates [On/Off] condition from RES + switch signal.	—
CANCEL SW	On/Off	Indicates [On/Off] condition from CANCEL switch signal.	—
MAIN SW	On/Off	Indicates [On/Off] condition from MAIN switch signal.	—
CRUISE LIGHT	On/Off	Indicates [On/Off] condition of CRUISE indicator determined by the ECM according to the input signals.	—
A/GRLL SHTTR CALIBRATION	INCMP/CMPLT	Indicates initial position learning status of active grille shutter. • CMPLT: The leaning is complete.	—

Monitored item	Unit	Description	Remarks
		INCOMP: The learning is incomplete.	
A/GRLL SHTTR CIRCUIT DIAG	OK/NG	Indicates the diagnosis result of active grille shutter circuit. - OK: Normal - NG: Malfunction detected.	—
A/GRLL SHTTR TEMP DIAG	OK/NG	Indicates the diagnosis result of active grille shutter actuator temperature status. - OK: Normal - NG: Abnormal temperature detected.	—
A/GRLL SHTTR OVER RUN	OK/NG	Indicates active grille shutter moves beyond normal moving limit. - OK: Normal - NG: Malfunction detected.	—
A/GRLL SHTTR STUCK	OK/NG	Indicates the diagnosis result of active grille shutter	—

Monitored item	Unit	Description	Remarks
		stuck or the operation range less than normal. • OK: Normal • NG: Malfunction detected.	
A/GRLLSHTTR CALIBDIAG	OK/NG	Indicates the diagnosis result of initial position learning of active grille shutter. • OK: Normal • NG: Deficiency detected.	—
HO2 S2 DIAG1 (B1)	INCMP/CMPLT	Indicates DTC P0139 self-diagnosis (delayed response) condition. • INCMP: Self-diagnosis is incomplete. • CMPLT: Self-diagnosis is complete.	—
HO2 S2 DIAG2 (B1)	INCMP/CMPLT	Indicates DTC P0139 self-diagnosis (slow response) condition.	—

Monitored item	Unit	Description	Remarks
		• INCMP: Self-diagnosis is incomplete. • CMPLT: Self-diagnosis is complete.	
EVAP LEAK DIAG	YET/CMPLT	Indicates the condition of EVAP leak diagnosis. • YET: EVAP leak diagnosis has not been performed yet. • CMPLT: EVAP leak diagnosis has been performed successfully.	—
EVAP DIAG READY	On/Off	Indicates the ready condition of EVAP leak diagnosis. • ON: Diagnosis has been ready condition. • OFF: Diagnosis has not been ready condition.	—
SYSTEM 1 DIAGNOSIS A	INCMP/CMPLT	Indicates DTC P219A self-	—

Monitored item	Unit	Description	Remarks
B1		diagnosis condition. • INCMP: Self-diagnosis is incomplete. • CMPLT: Self-diagnosis is complete.	
A/F SEN1 DIAG1 (B1)	INCMP/CMPLT	Indicates DTC P015A or P015B self-diagnosis condition. • INCMP: Self-diagnosis is incomplete. • CMPLT: Self-diagnosis is complete.	—
A/F SEN1 DIAG2(B1)	INCMP/CMPLT	Indicates DTC P014C or P014D self-diagnosis condition. • INCMP: Self-diagnosis is incomplete. • CMPLT: Self-diagnosis is complete.	—
SYSTEM 1 DIAGNOSIS B B1	ABSNT/PRSNT	• Indicates DTC P219A self-	—

Monitored item	Unit	Description	Remarks
		diagnosis condition. • ABSNT: Self-diagnosis standby • PRSNT: Under self-diagnosis	
A/F IMBALNC DIAG-CPS STAT	ABSNT/PRSNT	Indicates DTC P219C - P219F self diagnosis condition. • ABSNT: The vehicle condition is not within the diagnosis range. • PRSNT: The vehicle condition is not within the diagnosis range.	—
A/F SEN1 DIAG3(B1)	ABSNT/PRSNT	Indicates DTC P014C, P014D, P015A or P015B self-diagnosis condition. • ABSNT: The vehicle condition is not within the	—

Monitored item	Unit	Description	Remarks
		diagnosis range. • PRSNT: The vehicle condition is within the diagnosis range.	
A/F IMBLNC DIAG-CPS CMPLT	INCMP/CMPLT	Indicates DTC P219C - P219F self diagnosis condition. • INCMP: Self-diagnosis is incomplete. • CMPLT: Self-diagnosis is incomplete.	—
Di inj pulse B1	ms	ECM-calculated injection pulse width of the direct fuel injector on the bank 1 side.	—
DI timing SOI multi inj step1	BTDC	These items are displayed but not used.	—

WORK SUPPORT MODE

Work Item

Function name	Work Item	Condition	Usage
ECU Information	—	—	—
Actuator Test	—	—	—
Misfire count	Misfire count (real-time)	These items are displayed but not used.	—
	Misfire count (past)	These items are displayed but not used.	—
FUEL PRESSURE RELEASE	FUEL PRESSURE RELEASE	- Fuel pump will stop by touching “START” during idling. - Crank a few times after engine stops.	When releasing fuel pressure from fuel line
EVAP SYSTEM CLOSE	—	Close the EVAP canister vent control valve in order to make EVAP system close under the following conditions. - Ignition switch ON - Engine not running - Ambient temperature is above 0°C (32°F). - No vacuum and no high pressure in EVAP system - Fuel tank temp. is more than 0°C (32°F). - Within 10 minutes after starting “EVAP SYSTEM CLOSE” - When trying to execute “EVAP SYSTEM CLOSE” Under the condition except above, M.U.T.-III SE will discontinue it and display appropriate instruction.	When detecting EVAP vapor leak in the EVAP system

Function name	Work Item	Condition		Usage
			note When starting engine, M.U.T.-III SE may display “Battery voltage is low. Charge battery”, even when using a charged battery.	
Adjustment	TARGET IGN TIM ADJ*	Idle condition		When adjusting target ignition timing
	TARGET IDLE RPM ADJ*	Idle condition		When setting target idle speed
SAVING DATA FOR REPLC CPU	—	In this mode, save data that is in ECM.		When ECM is replaced.
WRITING DATA FOR REPLC CPU	—	In this mode, write data stored by “SAVE DATA FOR CPU REPLC” in work support mode to ECM.		When ECM is replaced.
IDLE AIR VOL LEARN	IDLE AIR VOL LEARN	The idle air volume that keeps the engine speed within the specified range is memorized in ECM.		When learning the idle air volume

Function name	Work Item	Condition	Usage
Learning	CLSD THL POS LEARN	Ignition switch ON and engine stopped.	When learning the throttle valve closed position
	SELF-LEARNING CONT	The coefficient of self-learning control mixture ratio returns to the original coefficient.	When clearing mixture ratio self-learning value
	A/F INITIAL LEARNING	Air fuel ratio learning frequency is low while idling, learning the air fuel ratio of the idling domain in ECM.	When learning the air fuel ratio.
	EGR CONTROL VALVE CLOSED POSITION LEARNING	Ignition switch: ON	When learning closed position of the EGR volume control valve.
Chassis No./VIN Registration	—	In this mode, VIN is registered in ECM.	When registering VIN in ECM
ELECTRIC INTAKE VALVE TIMING CONTROL LEARNING	—	Ignition switch ON and engine stopped.	After the following parts are replaced. • Electric intake valve timing control actuator • Electric intake valve timing control module • camshaft, timing chain, camshaft sprocket • piston, connecting rod, crankshaft • position sensor

Function name	Work Item	Condition	Usage
Data Recorder	Stop/Start prohibit cause data recorder	These items are displayed but not used.	—
	Stop/Start engine restart cause data recorder	These items are displayed but not used.	—
	Stop/Start engine stall cause data recorder	These items are displayed but not used.	—
MAC KEY writing	—	Ignition switch: ON	Write MAC key to ECM.

ACTIVE TEST MODE

Test Item

TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)
ENG COOLANT TEMP	Change the engine coolant temperature using M.U.T.-III SE.	If malfunctioning symptom disappears, see CHECK ITEM.	• Harness and connectors • Engine coolant temperature sensor • Fuel injector

TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	Change the amount of fuel injection using M.U.T.-III SE.	If malfunctioning symptom disappears, see CHECK ITEM.	• Harness and connectors • Fuel injector • Air fuel ratio (A/F) sensor 1
IGNITION TIMING	• Timing light: Set • Retard the ignition timing using M.U.T.-III SE.	If malfunctioning symptom disappears, see CHECK ITEM.	Perform Idle Air Volume Learning.
PURG VOL CONT/V	• Engine: After warming up, run engine at 1,500 rpm. • Change the EVAP canister purge volume control solenoid valve opening percent using M.U.T.-III SE.	Engine speed changes according to the opening percent.	• Harness and connectors • EVAP canister purge volume control solenoid valve
FUEL/T TEMP SEN	Change the fuel tank temperature using M.U.T.-III SE.		
POWER BALANCE	• Engine: After warming up, idle the engine. • A/C switch OFF • Selector lever: N position • Cut off each injector signal one at a time using M.U.T.-III SE.	Engine runs rough or stops. (Works for accidental fire.)	• Harness and connectors • Compression • Direct fuel injector • Power transistor • Spark plug • Ignition coil

TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)
INT V/T ASSIGN ANGLE	Changes intake valve timing using M.U.T.-III SE.	If malfunctioning symptom disappears, see CHECK ITEM.	• Harness and connectors • Intake valve timing control solenoid valve
EXH V/T ASSIGN ANGLE	Changes exhaust valve timing using M.U.T.-III SE.	If malfunctioning symptom disappears, see CHECK ITEM.	Fuel pump speed changes or stops.
VIAS S/V-1	• Ignition switch: ON • Turn solenoid valve "ON" and "OFF" using M.U.T.-III SE and listen to operating sound.	Solenoid valve makes the operating sound.	• Harness and connectors • Solenoid valve
VENT CONTROL/V	• Ignition switch: ON (Engine stopped) • Turn EVAP canister vent control valve ON and OFF with the M.U.T.-III SE and listen to operating sound.	EVAP canister vent control valve makes an operating sound.	• Harness and connectors • EVAP canister vent control valve
EGR CONTROL VALVE	• Ignition switch: ON • Engine stopped • Change valve target angle using M.U.T.-III SE	Valve opening angle changes according to target angle (from 0deg to 70deg)	• Harness and connectors • EGR valve
FAN DUTY CONTROL*	• Ignition switch: ON • Change duty ratio using M.U.T.-III SE.	Cooling fan speed changes.	• Harness and connectors • Cooling fan motor

TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)
			IPDM E/R
ACTIVE GRILLE SHUTTER	To check the operation of the active grille shutter, follow the steps below: 1. Park the vehicle in a safe area and apply the parking brake. 2. Start the engine or bring the vehicle into READY state. 3. Press the "CALIBRTN" button. 4. Select the "OPEN" or "CLOSE" button to check the operation.	Active grille shutter fully opens or fully closes.	- Harness or connector - Active grille shutter actuator - Active grille shutter
FUEL PUMP RELAY	- Ignition switch: ON (Engine stopped) - Turn the fuel pump relay "ON" and "OFF" using M.U.T.-III SE and listen to operating sound.	Fuel pump relay makes the operating sound.	- Harness and connectors - Fuel pump relay
TUMBLE CONTROL VALVE	- Ignition switch: ON (Engine stopped) - Turn the intake manifold runner control valve "ON" and "OFF" using M.U.T.-III SE to open or close.	Touch the intake manifold runner control valve motor and check the operating vibration and sound.	- Harness and connectors - Intake manifold runner control valve - Intake manifold runner control valve motor

*: Leaving cooling fan OFF with M.U.T.-III SE while engine is running may cause the engine to overheat.

SRT STATUS Mode

- For items whose SRT codes are set, “CMPLT” is displayed on the M.U.T.-III SE screen; for items whose SRT codes are not set, “INCMP” is displayed.
 - “SRT STATUS” provides the presence or absence of permanent DTCs stored in control module memory.
-

PERMANENT DTC STATUS Mode

How to Display Permanent DTC Status

1. Turn ignition switch OFF and wait at 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at 10 seconds.
4. Turn ignition switch ON.
5. Select “PERMANENT DTC STATUS” in “ENGINE” with M.U.T.-III SE.

note

Permanent DTCs stored in control module memory are displayed on the M.U.T.-III SE screen to show if a driving pattern required for erasing permanent DTCs is complete (CMPLT) or incomplete (INCMP).

caution

Since the “PERMANENT DTC STATUS” screen displays the previous trip information, repeat the following twice to update the information: “Ignition switch OFF”, “Wait for more than 10 seconds” and “Ignition switch ON”.

note

This mode is not used in regions that permanent DTCs are not regulated by law.

DTC Description

DTC DETECTION LOGIC

DTC		M.U.T.-III SE screen terms (Trouble diagnosis content)	DTC detection condition	
C053C	00	Wheel speed sensor (Wheel speed sensor generic range/performance)	Diagnosis condition	Engine running
			Signal	Vehicle speed signal
			Threshold	Wheel sensor signal is invalid.
			Diagnosis delay time	5 seconds

POSSIBLE CAUSE

- Wheel sensor
- ABS actuator and control unit (control unit)

FAIL-SAFE

Engine operating condition in fail-safe mode		
Fail safe mode		Vehicle behavior
Traveling control mode	Accelerator angle variation control	ECM controls the accelerator pedal depression speed to make it slower than actual speed. This causes a drop in accelerating performance and encourages the driver to repair malfunction.
		note ECM does not control the accelerator pedal releasing speed.
Combustion control mode	Stratified charge combustion control at starting	No stratified charge combustion at starting (cold start).

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DTC Confirmation Procedure

1.CHECK DTC PRIORITY

If DTC C053C is displayed with other DTC, first perform the confirmation procedure (trouble diagnosis) for other DTC.

Q.Is applicable DTC detected?

Yes

Perform diagnosis of applicable. Refer to [DTC Index](#) .

No .

2.PRECONDITIONING

If DTC Confirmation Procedure has been previously conducted, always perform the following procedure before conducting the next test.

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and leave the vehicle for 1 hour.

caution Never turn ignition switch ON during this procedure.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 9 V at idle.



3.PERFORM DTC CONFIRMATION PROCEDURE

1. Start the engine and let it idle for at least 5 seconds.
2. Check DTC.

Q.Is DTC detected?

YesRefer to DTC [Diagnosis Procedure](#) .**No**-1To check malfunction symptom before repair: Refer to Intermittent Incident [Intermittent Incident](#) .**No**

-2Confirmation after repair: INSPECTION END

[\[Previous\]](#) [\[Next\]](#)

DTC Index

×:Applicable —: Not applicable

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
C053C	00	C053C	Wheel speed sensor	—	2	×	A + B	DTC Description 
U0101	00	U0101	LOST COMM (TCM)	—	2	×	A + B	DTC Description 
U0122	00	U0122	ASC MDL	—	2	×	A + B	DTC Description 
U012E	00	U012E	Communication error (lost)	—	2	×	A + B	DTC Description 
U0146	00	U0146	Lost communication (GW) A	—	2	×	A + B	DTC Description 
U0155	00	U0155	LOST COMM (METER)	—	2	×	A + B	DTC Description 
U0284	00	U0284	LOST COMM (A/GRLL SHTTR MDL A)	—	2	×	A + B	DTC Description 

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE		GST *2						
U042F	00	U042F	Communication error (invalid)	—	2	×	A + B	DTC Description 
U1040	00	U1040	ENG COMM CIRCUIT	—	2	—	—	DTC Description 
U1050	00	U1050	LIN COMMUNICATION	—	2	—	—	DTC Description 
U1051	00	U1051	LIN COMMUNICATION	—	2	—	—	DTC Description 
U2148	83	U2148	CAN comm err (brake control unit)	—	2	—	—	DTC Description 
U214A	83	U214A	CAN comm err (AWD/4WD)	—	2	—	—	DTC Description 
U214F	83	U214F	CAN comm err (BCM)	—	2	—	—	DTC Description 
U2150	83	U2150	CAN comm err (AIRBAG)	—	2	—	—	DTC Description 
U2152	83	U2152	CAN comm err (ADAS control unit)	—	2	—	—	DTC Description 

DTC *1		Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2						
U215B	83	U215B	CAN comm err (IPDM E/R)	—	2	—	DTC Description 
U2165	83	U2165	CAN comm err (sonar)	—	2	—	DTC Description 
U2241	83	U2241	CAN comm err (TCM)	—	2	—	DTC Description 
U2248	83	U2248	CAN comm err (brake control unit)	—	2	—	DTC Description 
U2252	83	U2252	CAN comm err (ADAS control unit)	—	2	—	DTC Description 
U2276	83	U2276	CAN comm err (CCM)	—	2	—	DTC Description 
U2384	83	U2384	CAN comm err (eVTC)	—	2	—	DTC Description 
P0010	00	P0010	A camshaft position actuator B1	—	2	A + B	DTC Description 
P0011	00	P0011	INT/V TIM CONT- B1	×	2	A	DTC Description 

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
P0012	00	P0012	A camshaft position B1	×	2	×	A	DTC Description 
P0014	00	P0014	EXH/V TIM CONT- B1	×	2	×	A	DTC Description 
P0015	00	P0015	B camshaft position B1	×	2	×	A	DTC Description 
P0016	00	P0016	Crankshaft position B1 sensor A	—	2	×	A + B	DTC Description 
P0017	00	P0017	Crankshaft position B1 sensor B	—	2	×	A + B	DTC Description 
P0030	00	P0030	HO2S1 HTR B1	—	2	×	A + B	DTC Description 
P0031	00	P0031	HO2S1 HTR (B1)	—	2	×	A + B	DTC Description 
P0032	00	P0032	HO2S1 HTR (B1)	—	2	×	A + B	DTC Description 
P0036	00	P0036	HO2S1 HTR (B1)	—	2	×	A + B	DTC Description 

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
P0037	00	P0037	HO2S1 HTR (B1)	—	2	×	A + B	DTC Description 
P0038	00	P0038	HO2S2 HTR (B1)	—	2	×	A + B	DTC Description 
P0053	00	P0053	HO2S1 HTR B1	x*4	2	×	A + B	DTC Description 
P0078	00	P0078	EX V/T ACT/CIRC- B1	—	2	×	A + B	DTC Description 
P0079	00	P0079	Exhaust valve control solenoid	—	2	×	A + B	DTC Description 
P0080	00	P0080	Exhaust valve control solenoid	—	2	×	A + B	DTC Description 
P0087	00	P0087	LOW FUEL PRES	—	2	×	A + B	DTC Description 
P0088	00	P0088	HIGH FUEL PRES	—	2	×	A + B	DTC Description 
P0090	00	P0090	FUEL PUMP	—	2	×	A + B	DTC Description 

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
P0091	00	P0091	Fuel pressure regulator 1	—	2	×	A + B	DTC Description 
P0092	00	P0092	Fuel pressure regulator 1	—	2	×	A + B	DTC Description 
P00D2	00	P00D2	Heated O2 sensor heater B1 sensor 2	×	2	×	A + B	DTC Description 
P00FE	00	P00FE	EVAP system vapor line	×	2	×	A + B	DTC Description 
P0101	00	P0101	MAF SEN/CIRCUIT-B1	—	1 or 2	×	A + B or —	DTC Description 
P0102	00	P0102	MAF SEN/CIRCUIT-B1	—	1	×	A + B	DTC Description 
P0103	00	P0103	MAF SEN/CIRCUIT-B1	—	1	×	A + B	DTC Description 
P0106	00	P0106	ABSL PRES SEN/CIRC	—	2	×	A + B	DTC Description 
P0107	00	P0107	ABSL PRES SEN/CIRC	—	2	×	A + B	DTC Description 

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
P0108	00	P0108	ABSL PRES SEN/CIRC	—	2	×	A + B	DTC Description 
P0111	00	P0111	IAT SENSOR 1 B1	—	2	×	A + B	DTC Description 
P0112	00	P0112	IAT SEN/CIRCUIT- B1	—	2	×	A + B	DTC Description 
P0113	00	P0113	IAT SEN/CIRCUIT- B1	—	2	×	A + B	DTC Description 
P0116	00	P0116	ECT SENSOR	—	2	×	A + B	DTC Description 
P0117	00	P0117	ECT SEN/CIRC	—	1 or 2	×	A + B	DTC Description 
P0118	00	P0118	ECT SEN/CIRC	—	1 or 2	×	A + B	DTC Description 
P0122	00	P0122	TP SEN 2/CIRC- B1	—	1	×	A + B	DTC Description 
P0123	00	P0123	TP SEN/CIRCUIT	—	1	×	A + B	DTC Description 

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
P0125	00	P0125	ECT SENSOR	—	2	×	A + B	DTC Description 
P0127	00	P0127	IAT SENSOR-B1	—	2	×	A + B	DTC Description 
P0128	00	P0128	THERMSTAT FNCTN	—	2	×	A + B	DTC Description 
P0130	00	P0130	HO2S1 (B1)	×	2	×	A + B	DTC Description 
P0131	00	P0131	HO2S1 (B1)	×	2	×	A + B	DTC Description 
P0132	00	P0132	HO2S1 (B1)	×	2	×	A + B	DTC Description 
P0136	00	P0136	HO2S2 (B1)	—	2	×	A + B	DTC Description 
P0137	00	P0137	HO2S2 (B1)	—	2	×	A + B	DTC Description 
P0138	00	P0138	HO2S2 (B1)	—	2	×	A + B	DTC Description 

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE		GST *2						
P0139	00	P0139	HO2S2 (B1)	×	2	×	A + B	DTC Description 
P014C	00	P014C	A/F SENSOR1 (B1)	×	2	×	A	DTC Description 
P014D	00	P014D	A/F SENSOR1 (B1)	×	2	×	A	DTC Description 
P015A	00	P015A	A/F SENSOR1 (B1)	×	2	×	A	DTC Description 
P015B	00	P015B	A/F SENSOR1 (B1)	×	2	×	A	DTC Description 
P0171	00	P0171	FUEL SYS-LEAN- B1	—	2	×	A + B	DTC Description 
P0172	00	P0172	FUEL SYS-RICH- B1	—	2	×	A + B	DTC Description 
P0181	00	P0181	FTT SENSOR	—	2	×	A + B	DTC Description 
P0182	00	P0182	FTT SEN/CIRCUIT	—	2	×	A + B	DTC Description 

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
P0183	00	P0183	FTT SEN/CIRCUIT	—	2	×	A + B	DTC Description 
P0191	00	P0191	FRP SENSOR A	—	2	×	A + B	DTC Description 
P0192	00	P0192	FRP SEN/CIRC	—	1	×	A + B	DTC Description 
P0193	00	P0193	FRP SEN/CIRC	—	1	×	A + B	DTC Description 
P0196	00	P0196	EOT SENSOR	—	2	×	A + B	DTC Description 
P0197	00	P0197	EOT SEN/CIRK	—	2	×	A + B	DTC Description 
P0198	00	P0198	EOT SEN/CIRK	—	2	×	A + B	DTC Description 
P01F0	00	P01F0	Coolant temperature	—	2	×	A + B	DTC Description 
P0201	00	P0201	INJECTOR CIRC- CYL1	—	2	×	A + B	DTC Description 

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
P0202	00	P0202	INJECTOR CIRC- CYL2	—	2	×	A + B	DTC Description 
P0203	00	P0203	INJECTOR CIRC- CYL3	—	2	×	A + B	DTC Description 
P0204	00	P0204	INJECTOR CIRC- CYL4	—	2	×	A + B	DTC Description 
P0222	00	P0222	TP SEN 1/CIRC- B1	—	1	×	A + B	DTC Description 
P0223	00	P0223	TP SEN 1/CIRC- B1	—	1	×	A + B	DTC Description 
P025A	00	P025A	FUEL PUMP MODULE A	—	2	×	A + B	DTC Description 
P025C	00	P025C	Fuel pump module A	—	2	×	A + B	DTC Description 
P025D	00	P025D	Fuel pump module A	—	2	×	A + B	DTC Description 
P0261	00	P0261	CYL1 INJECTOR	—	2	×	A + B	DTC Description 

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
P0262	00	P0262	CYL1 INJECTOR	—	2	×	A + B	DTC Description 
P0264	00	P0264	CYL2 INJECTOR	—	2	×	A + B	DTC Description 
P0265	00	P0265	CYL2 INJECTOR	—	2	×	A + B	DTC Description 
P0267	00	P0267	CYL3 INJECTOR	—	2	×	A + B	DTC Description 
P0268	00	P0268	CYL3 INJECTOR	—	2	×	A + B	DTC Description 
P026B	00	P026B	Injection timing	—	2	×	A + B	DTC Description 
P0270	00	P0270	CYL4 INJECTOR	—	2	×	A + B	DTC Description 
P0271	00	P0271	CYL4 INJECTOR	—	2	×	A + B	DTC Description 
P0300	00	P0300	MULTI CYL MISFIRE	—	2	×	A + B	DTC Description 

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
P0301	00	P0301	CYL 1 MISFIRE	—	2	×	A + B	DTC Description 
P0302	00	P0302	CYL 2 MISFIRE	—	2	×	A + B	DTC Description 
P0303	00	P0303	CYL 3 MISFIRE	—	2	×	A + B	DTC Description 
P0304	00	P0304	CYL 4 MISFIRE	—	2	×	A + B	DTC Description 
P0315	00	P0315	Crankshaft position	—	2	×	A + B	DTC Description 
P0326	00	P0326	KNOCK SENSOR 1 B1	—	2	×	A + B	DTC Description 
P0327	00	P0327	KNOCK SEN/CIRC-B1	—	2	×	A + B	DTC Description 
P0328	00	P0328	KNOCK SEN/CIRC-B1	—	2	×	A + B	DTC Description 
P032B	00	P032B	Knock/combustion vibration sen 3 B1	—	2	×	A + B	DTC Description 

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE		GST *2						
P032C	00	P032C	Knock/combustion vibration sen 3 B1	—	2	×	A + B	DTC Description 
P032D	00	P032D	Knock/combustion vibration sen 3 B1	—	2	×	A + B	DTC Description 
P0335	00	P0335	CKP SEN/CIRCUIT	—	2	×	A + B	DTC Description 
P0340	00	P0340	CMP SEN/CIRC- B1	—	2	×	A + B	DTC Description 
P0365	00	P0365	CAMSHAFT POSITION SENSOR B B1	—	2	×	A + B	DTC Description 
P0401	00	P0401	EGR A FLOW INSUFFICIENT	×	2	×	A	DTC Description 
P0402	00	P0402	EGRC-BPT VALVE	×	2	×	A	DTC Description 
P0404	00	P0404	EGR A CONTROL	—	2	×	A + B	DTC Description 
P0420	00	P0420	TW CATALYST SYS-B1	×	2	×	A	DTC Description 

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
P0441	00	P0441	EVAP PURG FLOW/MON	×	2	×	A + B	DTC Description 
P0443	00	P0443	PURG VOLUME CONT/V	—	2	×	A + B	DTC Description 
P0444	00	P0444	PURG VOLUME CONT/V	—	2	×	A + B	DTC Description 
P0445	00	P0445	PURG VOLUME CONT/V	—	2	×	A + B	DTC Description 
P0446	00	P0446	VENT CONTROL VALVE	—	2	×	A + B	DTC Description 
P0447	00	P0447	VENT CONTROL VALVE	—	2	×	A + B	DTC Description 
P0448	00	P0448	VENT CONTROL VALVE	—	2	×	A + B	DTC Description 
P044A	00	P044A	EGR SENSOR C	—	2	×	A + B	DTC Description 
P044B	00	P044B	EGR SENSOR C	—	2	×	A + B	DTC Description 

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
P044C	00	P044C	EGR SENSOR C	—	2	×	A + B	DTC Description 
P044D	00	P044D	EGR SENSOR C	—	2	×	A + B	DTC Description 
P044E	00	P044E	EGR SENSOR C	—	2	×	A + B	DTC Description 
P0450	00	P0450	EVAP O SYS PRES SEN	—	2	×	A + B	DTC Description 
P0451	00	P0451	Barometric pressure sensor A/B	—	2	×	A + B	DTC Description 
P0452	00	P0452	EVAP SYS PRES SEN	—	2	×	A + B	DTC Description 
P0453	00	P0453	EVAP SYS PRES SEN	—	2	×	A + B	DTC Description 
P0454	00	P0454	EVAP SYS PRES SEN	—	2	×	A + B	DTC Description 
P0456	00	P0456	EVAP VERY SML LEAK	x*4	2	×	A	DTC Description 

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
P0460	00	P0460	FUEL LEV SEN SLOSH	—	2	×	A + B	DTC Description 
P0461	00	P0461	FUEL LEVEL SENSOR	—	2	×	A + B	DTC Description 
P0462	00	P0462	FUEL LEVL SEN/CIRC	—	2	×	A + B	DTC Description 
P0463	00	P0463	FUEL LEVL SEN/CIRC	—	2	×	A + B	DTC Description 
P0500	00	P0500	VEHICLE SPEED SEN A *5	—	2	×	A + B	DTC Description 
P0501	00	P0501	VEHICLE SPEED SEN A	—	2	×	A + B	DTC Description 
P0506	00	P0506	ISC SYSTEM	—	2	×	A + B	DTC Description 
P0507	00	P0507	ISC SYSTEM	—	2	×	A + B	DTC Description 
P050A	00	P050A	COLD START CONTROL	—	2	×	A + B	DTC Description 

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE		GST *2						
P050B	00	P050B	COLD START CONTROL	—	2	×	A + B	DTC Description 
P050E	00	P050E	COLD START CONTROL	—	2	×	A + B	DTC Description 
P0520	00	P0520	EOP SENSOR/SWITCH	—	2	×	A + B	DTC Description 
P0522	00	P0522	Engine oil pressure sensor/switch	—	2	×	A + B	DTC Description 
P0523	00	P0523	Engine oil pressure sensor/switch	—	2	×	A + B	DTC Description 
P0524	00	P0524	ENGINE OIL PRESSURE	—	2	×	A + B	DTC Description 
P052A	00	P052A	CAMSHAFT POSITION TIMING B1	×	2	×	A	DTC Description 
P052B	00	P052B	CAMSHAFT POSITION TIMING B1	×	2	×	A	DTC Description 
P0531	00	P0531	REFRIGERANT PRESS SENSOR A	—	2	×	A + B	DTC Description 

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE		GST *2						
P0532	00	P0532	REFRIGERANT PRESS SENSOR A	—	2	×	A + B	DTC Description 
P0533	00	P0533	REFRIGERANT PRESS SENSOR A	—	2	×	A + B	DTC Description 
P054A	00	P054A	Cold start B camshaft position bank 1	×	2	×	A	DTC Description 
P054B	00	P054B	Cold start B camshaft position bank 1	×	2	×	A	DTC Description 
P059F	00	P059F	ACTIVE GRILLE AIR SHUTTER A	—	2	×	A + B	DTC Description 
P05EC	00	P05EC	COLD START CONTROL	—	2	×	A + B	DTC Description 
P0604	00	P0604	ECM	—	1	×	A + B	DTC Description 
P0605	00	P0605	ECM	—	1	×	A + B	DTC Description 
P0606	00	P0606	CONTROL MODULE	—	1 or 2	×	A + B or —	DTC Description 

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
P0607	00	P0607	ECM	—	1 or 2	×	A + B	DTC Description 
P060A	00	P060A	CONTROL MODULE	—	1	×	A + B	DTC Description 
P060B	00	P060B	CONTROL MODULE	—	1	×	A + B	DTC Description 
P060C	00	P060C	Control module	—	1	×	A + B	DTC Description 
P061B	00	P061B	Internal control module	—	1	×	A + B	DTC Description 
P062B	00	P062B	ECM	—	2	×	A + B	DTC Description 
P062D	00	P062D	Fuel injector driver bank 1	—	2	×	A + B	DTC Description 
P062F	00	P062F	CONTROL MODULE	—	1 or 2	×	A + B	DTC Description 
P0641	00	P0641	Sensor reference voltage A	—	2	×	A + B	DTC Description 

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
P064D	00	P064D	Internal Control Module O2 Sensor Processor Performance (bank 1)	—	2	×	A + B	DTC Description 
P0660	00	P0660	INT Manifold Tuning Valve Control B1	—	2	—	—	DTC Description 
P0661	00	P0661	INT Manifold Tuning Valve Control B1	—	2	—	—	DTC Description 
P0662	00	P0662	INT Manifold Tuning Valve Control B1	—	2	—	—	DTC Description 
P06B0	11	P06B1	Sensor Power Supply A	—	1	×	A + B	DTC Description 
	12	P06B2	Sensor Power Supply A	—	1	×	A + B	
P06B3	11	P06B4	Sensor Power Supply B	—	1	×	A + B	DTC Description 
	12	P06B5	Sensor Power Supply B	—	1	×	A + B	
P06DA	00	P06DA	ENGINE OIL PRESSURE CONTROL	—	2	—	—	DTC Description 
P06DB	00	P06DB	ENGINE OIL PRESSURE CONTROL	—	2	—	—	DTC Description 
P06DC	00	P06DC	Engine oil pressure control	—	2	—	—	DTC Description

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
								
P06E6	11	P06E7	Internal control module	—	1	×	A + B	DTC Description
	12	P06E8	Internal control module	—	1	×	A + B	
P0850	00	P0850	P-N POS SW/CIRCUIT	—	2	×	A + B	DTC Description 
P10C8	00	P10C8	Cylinder1 injector A	—	2	×	A + B	DTC Description 
P10C9	00	P10C9	Cylinder2 injector A	—	2	×	A + B	DTC Description 
P10CA	00	P10CA	Cylinder3 injector A	—	2	×	A + B	DTC Description 
P10CB	00	P10CB	Cylinder4 injector A	—	2	×	A + B	DTC Description 
P1148	00	P1148	CLOSED LOOP- B1	—	1	×	A + B	DTC Description 
P1197	00	P1197	FUEL RUN OUT	—	2	—	—	DTC Description 
P119A	00	P119A	FUEL PRESSURE SENSOR	—	2	×	A + B	DTC Description

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
								
P119B	00	P119B	FUEL PRESSURE SENSOR	—	2	×	A + B	DTC Description 
P119C	00	P119C	FUEL PRESSURE SENSOR	—	2	×	A + B	DTC Description 
P119D	00	P119D	FRP SEN/CIRC	—	2	×	A + B	DTC Description 
P119E	00	P119E	FRP SEN/CIRC	—	2	×	A + B	DTC Description 
P1217	00	P1217	OVER HEAT	—	1	×	A + B	DTC Description 
P1225	00	P1225	CTP LEARNING- B1	—	2	—	—	DTC Description 
P1226	00	P1226	CTP LEARNING- B1	—	2	—	—	DTC Description 
P14C1	00	P14C1	CCS brake pedal SW (BCM)	—	1	—	—	DTC Description 
P1526	00	P1526	Vehicle speed sensor	—	1	—	—	DTC Description

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
								
P1536	00	P1536	Auto Cruise Control	—	1	—	—	DTC Description 
P1538	00	P1538	Auto Cruise Control	—	1	—	—	DTC Description 
P155B	00	P155B	Electrical energy management system	—	2	—	—	DTC Description 
P155D	00	P155D	GENERATOR	—	2	—	—	DTC Description 
P155E	00	P155E	GENERATOR VOLTAGE	—	2	—	—	DTC Description 
P155F	00	P155F	GENERATOR VOLTAGE	—	2	—	—	DTC Description 
P1564	00	P1564	ASCD SW	—	1	—	—	DTC Description  (With ASCD), DTC Description  (With ACC)

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE		GST *2						
P1568	00	P1568	ACC COMMAND VALUE	—	1	—	—	DTC Description 
P1572	00	P1572	ASCD BRAKE SW	—	1	—	—	DTC Description 
P1574	00	P1574	ASCD VHL SPD SEN	—	1	—	—	DTC Description 
P1575	00	P1575	BRAKE SW	—	2	×	A + B	DTC Description 
P159F	00	P159F	ACTIVE GRILLE AIR SHUTTER A	—	2	—	—	DTC Description 
P1603	00	P1603	CONTROL MODULE	—	2	—	—	DTC Description 
P161D	00	P161D	IMMOBILIZER	—	2	—	—	DTC Description 
P161E	00	P161E	IMMOBILIZER	—	2	—	—	—
P161F	00	P161F	IMMOBILIZER	—	2	—	—	DTC Description 
P1800	00	P1800	VIAS S/V CIRCB1	—	2	—	—	DTC Description

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
								
P1805	00	P1805	BRAKE SW/CIRCUIT	—	1	—	—	DTC Description 
P1A10	00	P1A10	ECM initial learning Incomplete	—	2	—	—	DTC Description 
P2004	00	P2004	SWIRL CONT/V (B1)	—	2	×	A + B	DTC Description 
P2008	00	P2008	SWIRL CONT/V (B1)	—	2	×	A + B	DTC Description 
P2009	00	P2009	Intake manifold runner control	—	2	×	A + B	DTC Description 
P2010	00	P2010	Intake manifold runner control	—	2	×	A + B	DTC Description 
P2014	00	P2014	SWIRL CONT SEN/SW	—	2	×	A + B	DTC Description 
P2015	00	P2015	Intake manifold runner posi sen/sw B1	—	2	×	A + B	DTC Description 
P2016	00	P2016	IN/MANIFOLD RUNNER POS	—	2	×	A + B	DTC Description

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
			SEN B1					
P2017	00	P2017	IN/MANIFOLD RUNNER POS SEN B1	—	2	×	A + B	DTC Description 
P2018	00	P2018	IN/MANIFOLD RUNNER POS SEN B1	—	2	×	A + B	DTC Description 
P2096	00	P2096	POST CATALYST FUEL TRIM SYS B1	×	2	×	A	DTC Description 
P2097	00	P2097	POST CATALYST FUEL TRIM SYS B1	×	2	×	A	DTC Description 
P2100	00	P2100	ETC MOT PWR- B1	—	1	×	A + B	DTC Description 
P2101	00	P2101	ETC FNCTN/CIRC-B1	—	1	×	A + B	DTC Description 
P2103	00	P2103	ETC MOT PWR- B1	—	1	×	A + B	DTC Description 
P2119	00	P2119	ETC ACTR-B1	—	1	×	A + B or —	DTC Description 
P2121	00	P2121	Throttle/pedal position sen/sw D	—	1	×	A + B	DTC Description

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
								
P2122	00	P2122	APP SEN 1/CIRC	—	1	×	A + B	DTC Description 
P2123	00	P2123	APP SEN 1/CIRC	—	1	×	A + B	DTC Description 
P2126	00	P2126	Throttle/pedal position sen/sw E	—	1	×	A + B	DTC Description 
P2127	00	P2127	APP SEN 2/CIRC	—	1	×	A + B	DTC Description 
P2128	00	P2128	APP SEN 2/CIRC	—	1	×	A + B	DTC Description 
P2135	00	P2135	TP SENSOR-B1	—	1	×	A + B	DTC Description 
P2138	00	P2138	APP SENSOR	—	1	×	A + B	DTC Description 
P2159	00	P2159	VEHICLE SPEED SEN B	—	2	×	A + B	DTC Description 
P219A	00	P219A	AIR FUEL RATIO IMBALANCE B1	×	2	×	A	DTC Description

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
								
P2227	00	P2227	Barometric pressure sensor A	—	2	×	A + B	DTC Description 
P2237	00	P2237	O2 sensor bank 1 sensor 1	—	2	×	A + B	DTC Description 
P2238	00	P2238	O2 sensor bank 1 sensor 1	—	2	×	A + B	DTC Description 
P2239	00	P2239	O2 sensor bank 1 sensor 1	—	2	×	A + B	DTC Description 
P2251	00	P2251	O2 sensor bank 1 sensor 1	—	2	×	A + B	DTC Description 
P2252	00	P2252	O2 sensor bank 1 sensor 1	—	2	×	A + B	DTC Description 
P2253	00	P2253	O2 sensor bank 1 sensor 1	—	2	×	A + B	DTC Description 
P2270	00	P2270	O2 sensor signal bank 1 sensor 2	×	2	×	A + B	DTC Description 
P2271	00	P2271	O2 sensor signal bank 1 sensor 2	×	2	×	A	DTC Description

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
								
P2297	00	P2297	O2 SENSOR 1 B1	×	2	×	A	DTC Description 
P2413	00	P2413	EGR SYSTEM	—	2	×	A + B	DTC Description 
P2610	00	P2610	ECM/PCM INTERNAL ENG OFF TIMER	—	2	×	A + B	DTC Description 
P2614	00	P2614	A camshaft posi signal B1	—	2	×	A + B	DTC Description 
P2615	00	P2615	A camshaft posi signal B1	—	2	×	A + B	DTC Description 
P2616	00	P2616	A camshaft posi signal B1	—	2	×	A + B	DTC Description 
P2617	00	P2617	Crankshaft position signal	—	2	×	A + B	DTC Description 
P2618	00	P2618	Crankshaft position signal	—	2	×	A + B	DTC Description 
P2619	00	P2619	Crankshaft position signal	—	2	×	A + B	DTC Description

DTC *1			Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2							
								
P2A01	00	P2A01	O2 sensor bank 1 sensor 2	×	2	×	A + B	DTC Description 
P2B95	00	P2B95	COLD START CONTROL	—	2	×	A + B	DTC Description 
P2B96	00	P2B96	Injection pulse	—	2	×	A + B	DTC Description 
P34AC	00	P34AC	A camshaft posi actuator posi sens B1	—	2	×	A + B	DTC Description 
P34AD	00	P34AD	A camshaft posi actuator posi sens B1	—	2	×	A + B	DTC Description 
P34AE	00	P34AE	A camshaft posi actuator posi sens B1	—	2	×	A + B	DTC Description 
P34AF	00	P34AF	A camshaft posi actuator posi sens B1	—	2	×	A + B	DTC Description 
P34C8	00	P34C8	Camshaft position control module	—	2	×	A + B	DTC Description 

*1: 1st trip DTC No. is the same as DTC No.

*2: This number is prescribed by SAE J1979/ ISO 15031-5.

*3: Refer to Description [Description](#) .

*4: This DTC is not displayed in “SRT STATUS” function on M.U.T.-III SE.

*5: When the fail-safe operations for both self-diagnoses occur, the MIL illuminates.

Network-DTC

×:Applicable —: Not applicable

DTC *1		Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2						
U2118	87	U2118	CAN comm err (Keyless operation key)	—	2	—	DTC Description 
U2148	87	U2148	CAN comm err (brake control unit)	—	2	—	DTC Description 
U214A	87	U214A	CAN comm err (AWD/4WD)	—	2	—	DTC Description 
U214E	87	U214E	CAN comm err (combination meter)	—	2	—	DTC Description 
U214F	87	U214F	CAN comm err (BCM)	—	2	—	DTC Description 
U2150	87	U2150	CAN comm err (AIRBAG)	—	2	—	DTC Description 
U2152	87	U2152	CAN comm err (ADAS control unit)	—	2	—	DTC Description 

DTC *1		Items (M.U.T.-III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE	GST *2						
U215B	87	U215B	CAN comm err (IPDM E/R)	—	2	—	DTC Description 
U2165	87	U2165	CAN comm err (sonar)	—	2	—	DTC Description 
U2241	87	U2241	CAN comm err (TCM)	—	2	—	DTC Description 
U2248	87	U2248	CAN comm err (brake control unit)	—	2	—	DTC Description 
U2252	87	U2252	CAN comm err (ADAS control unit)	—	2	—	DTC Description 
U2259	87	U2259	CAN comm err (steering control unit)	—	2	—	DTC Description 
U226B	87	U226B	CAN comm err (front camera)	—	2	—	DTC Description 
U2276	87	U2276	CAN comm err (CCM)	—	2	—	DTC Description 

*1: 1st trip DTC No. is the same as DTC No.

*2: This number is prescribed by SAE J1979/ ISO 15031-5.

*3: Refer to Description [Description](#) .

MAC-DTC

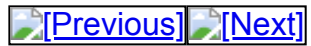
×:Applicable —: Not applicable

DTC *1			Items (M.U.T.- III SE screen terms)	SRT code	Trip	MIL	Permanent DTC group *3	Reference page
M.U.T.-III SE		GST*2						
U1327	52	U1327	MAC Key update	—	1	—	—	DTC Description 
U1327	54	U1327	MAC Key update	—	1	—	—	DTC Description 
U214F	57	U214F	CAN comm err (BCM)	—	2	—	—	DTC Description 
U2152	57	U2152	CAN comm err (ADAS control unit)	—	2	—	—	DTC Description 
U2165	57	U2165	CAN comm err (sonar)	—	2	—	—	DTC Description 
U2176	57	U2176	CAN comm err (CCM)	—	2	—	—	DTC Description 

*1: 1st trip DTC No. is the same as DTC No.

*2: This number is prescribed by SAE J1979/ ISO 15031-5.

*3: Refer to Description [Description](#) .

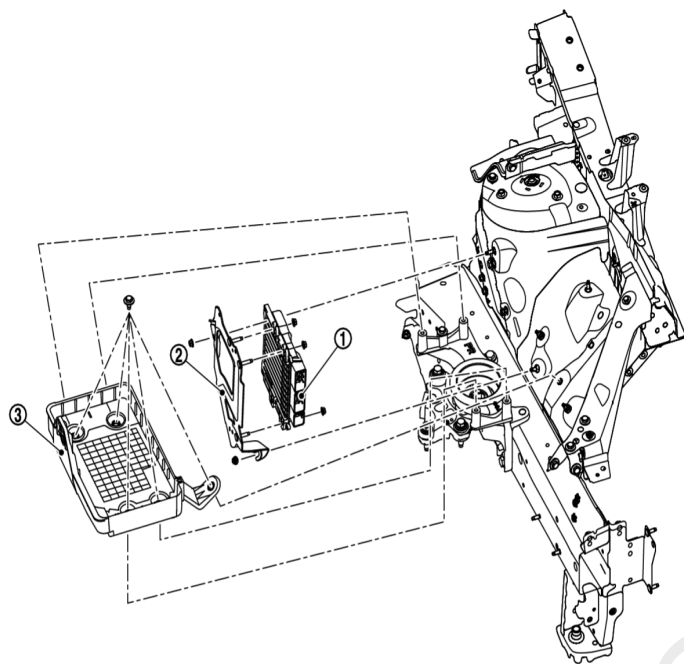


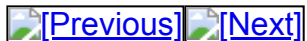
ECM : Exploded View

1. ECM

2. Bracket

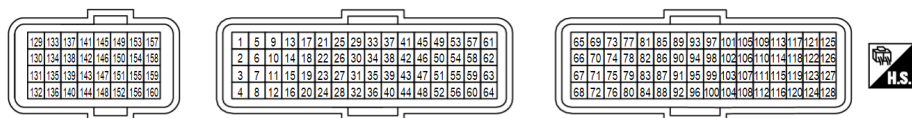
3. Battery tray 2





Reference Value

TERMINAL LAYOUT



PHYSICAL VALUES

note	- ECM is located in the engine room left side near battery. - Specification data are reference values and are measured between each terminal and ground. - Pulse signal is measured by M.U.T.-III SE.
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Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
1 (R)	160 (B)	Fuel injector driver power supply 1	Input	[Engine is running]	BATTERY VOLTAGE (11 – 14 V)

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/Output		
				• Engine: Warm-up condition • Idle speed	

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
2 (Y)	160 (B)	High pressure fuel pump (LO)	Output	[Engine is running] • Engine: Warm-up condition • Idle speed note The pulse cycle changes depending on rpm at idle.	2.5 V 

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/Output		
					3.5 V
				[Engine is running] Engine speed: 2,500 rpm	
4 (B)	—	Fuel injector driver ground 1	—	—	—
5 (G)	160 (B)	ECM power supply	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
6 (P)	160 (B)	A/F sensor 1 heater	Input	[Engine is running] - Engine: Warm-up condition - Idle speed (More than 260 seconds after starting engine)	5.24 V

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
					

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Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
7 (BR)	160 (B)	High pressure fuel pump (HI)	Output	[Engine is running] note The pulse cycle changes depending on rpm at idle. - Engine: Warm-up condition - Idle speed	3.1 V 20mSec/div  5V/div

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
				[Engine is running] Engine speed: 2,500 rpm	4.3 V
					

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/Output		
9 (W)	160 (B)	Fuel injector No. 1, 4 (HI)	Output	[Engine is running] - Engine: Warm-up condition - Idle speed note The pulse cycle changes depending on rpm at idle	

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/Output		
12 (SB)	160 (B)	Fuel injector No. 2, 3 (HI)	Output	[Engine is running] - Engine: Warm-up condition - Idle speed note The pulse cycle changes depending on rpm at idle	
13 (L)	14 (W)	EGR volume control valve (-)	Output	[Ignition switch: ON] [Engine is running] - Engine: after warming up - Idle speed	BATTERY VOLTAGE (11 - 14 V) 0.1 – 0.2 V

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/Output		
14 (W)	13 (L)	EGR volume control valve (+)	Output	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
				[Engine is running] - Engine: after warming up - Idle speed	0.13 V
17 (G)	160 (B)	Fuel injector No. 1 (LO)	Output	[Engine is running] - Engine: Warm-up condition - Idle speed note The pulse cycle changes depending on rpm at idle.	
18 (Y)		Fuel injector No. 3 (LO)			
19 (R)		Fuel injector No. 4 (LO)			
20 (V)		Fuel injector No. 2 (LO)			
21 (LG)	—	LIN	Input/ Output	—	—

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/Output		
24 (LG)	160 (B)	ECM relay (Self shut-off)	Input	[Engine is running] [Ignition switch: OFF] A few seconds after turning ignition switch OFF	0 – 1.0 V
			Output	[Ignition switch: OFF] More than a few seconds after turning ignition switch OFF	0 V
29 (BR)	160 (B)	Fuel pump relay	Input	[Ignition switch: ON] For 1 second after turning ignition switch ON [Engine is running]	0 - 1.0 V
30 (GR)	—	Drivetrain CAN communication - H	Input/ Output	—	—
31 (R)	—	Drivetrain CAN communication - L	Input/ Output	—	—

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/Output		
33 (P)	160 (B)	Ignition signal No. 3	Output	[Engine is running] • Engine: Warm-up condition • Idle speed	
34 (LA/L)	160 (B)	Intake air temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with intake air temperature.

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/Output		
35 (G)	160 (B)	Ignition signal No. 1	Output	[Engine is running] • Engine: Warm-up condition • Idle speed	

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
				[Engine is running] - Engine: Warm-up condition - Engine speed: 2,500 rpm	

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
36 (V)	160 (B)	Ignition signal No. 4	Output	[Engine is running] • Engine: Warm-up condition • Idle speed	50mSec/div 2V/div

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/Output		
				[Engine is running] • Engine: Warm-up condition • Engine speed: 2,500 rpm	
41 (LA/G)	—	Sensor ground (Fuel rail pressure sensor, engine oil pressure sensor, and refrigerant pressure sensor)	—		—

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/Output		
44 (LG)	160 (B)	Ignition signal No. 2	Output	[Engine is running] • Engine: Warm-up condition • Engine speed: 2,500 rpm	
45 (W/L)	—	Sensor ground (Throttle position sensor 1 and 2)	—	—	—
46 (B)	—	Sensor ground (A/F sensor 1 shield)	—	—	—

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/Output		
47 (LA/W)	160 (B)	Mass air flow sensor	Input	[Ignition switch: ON] Engine stopped	Approx. 3,700 Hz
				[Engine is running] - Engine: Warm-up condition - Engine speed: 1,500 rpm	5,400 – 5,900 Hz
				[Engine is running] - Engine: Warm-up condition - Engine speed: 2,500 rpm	5,800 – 6,500 Hz
				[Engine is running] - Engine: Warm-up condition - Engine speed: 4,000 rpm	6,400 – 7200 Hz
49 (GR)	160 (B)	Knock sensor 1	Input	[Engine is running] Idle speed	1.97 V
50 (LA/Y)	—	Sensor ground (Mass air flow sensor and Intake air temperature sensor)	—	—	—
51 (W)	160 (B)	Knock sensor 2	Input	[Engine is running]	2 V

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/Output		
				- Engine: Warm-up condition - Idle speed	
52 (L/Y)	160 (B)	Throttle position sensor 2	Input	[Engine is running] - Selector lever: P - Accelerator pedal: Fully released	4.47 V
				[Engine is running] - Selector lever: P - Engine speed: 2,500 rpm	4.3 V
53 (B)	—	Sensor ground (Knock sensor 1 and 2)	—	—	—
54 (B)	—	Sensor ground (Throttle position sensor shield)	—	—	—
56 (W)	160 (B)	A/F sensor 1	Input	[Ignition switch: ON]	2.89 V

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/Output		
57 (L/G)	160 (B)	Throttle position sensor 1	Input	[Engine is running] • Selector lever: P • Accelerator pedal: Fully released	0.64 V
				[Engine is running] • Selector lever: P • Engine speed: 2,500 rpm	0.86 V
58 (LA/R)	160 (B)	Fuel rail pressure sensor	Input	[Engine is running] • Engine: after warming up • Idle speed	1 V
				[Engine is running] • Engine: after warming up • Revving engine from idle to 4,000 rpm	1.1 V
60 (B)	160 (B)	A/F sensor 1	Input	[Engine is running] • Engine speed: 2,500 rpm	2.53 V Output voltage varies with air fuel ratio.
61 (LA/SB)	160 (B)	Sensor power supply (Fuel rail pressure sensor and engine oil pressure sensor)	—	[Ignition switch: ON]	5 V

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/Output		
62 (O/L)	160 (B)	Sensor power supply (Throttle position sensor 1 and 2)	—	[Ignition switch: ON]	5 V
64 (LA/R)	160 (B)	Sensor power supply (Mass air flow sensor)	—	[Ignition switch: ON]	5 V
65 (V)	160 (B)	Engine oil pressure control solenoid valve	Output	[Engine is running] • Engine: Warm-up condition • Engine speed: no more than 4,000 rpm	BATTERY VOLTAGE (11 - 14 V)
				[Engine is running] • Engine: Warm-up condition • Engine speed: 4,000 rpm or more	14.2 V
66 (W)	160 (B)	Battery power supply	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
67 (R)	160 (B)	Throttle control motor (Open)	Output	[Ignition switch: ON] • Engine stopped • Selector lever: D • Accelerator pedal: Fully depressed	2.0 - 2.3 V
68 (G)	160 (B)	Throttle control motor (Close)	Output	[Ignition switch: ON] • Selector lever: P • Accelerator pedal: Fully released	0 V

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
70 (Y)	160 (B)	Heated oxygen sensor 2 heater	Output	[Engine is running] - Engine speed: Below 3,600 rpm after the following conditions are met - Engine: after warming up - Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	14.3 V
				[Ignition switch: ON] - Engine stopped [Engine is running] - Engine speed: Above 3,600 rpm	BATTERY VOLTAGE (11 - 14 V)

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/Output		
71 (BR)	160 (B)	Intake manifold tuning valve actuator (open)	Output	[Engine is running] - Engine: Warm-up condition - Idle speed	0 V
				[Engine is running] - Engine: Warm-up condition - No load - Revvng engine from idle to 5,000 rpm	Generates a voltage for a moment (11 – 14 V)
72 (Y)	160 (B)	Intake manifold tuning valve actuator (close)	Output	[Engine is running] - Engine: Warm-up condition - Idle speed	0 V
				[Engine is running] - Engine: Warm-up condition - No load - When the engine speed is decreased from 3,000 rpm to idle speed (Accelerator pedal is released)	Generates a voltage for a moment (11 – 14 V)
74 (L)	160 (B)	Refrigerant pressure sensor	Input	[Engine is running]	0.3 - 4.5 V

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/Output		
				• Engine: Warm-up condition • Idle speed • Both air conditioner switch: ON (Compressor operates)	
77 (LA/SB)	103 (LA/G)	Sensor power supply (Engine oil pressure sensor)	—	[Ignition switch: ON]	5 V
78 (LA/R)	160 (B)	Sensor power supply (Crankshaft position sensor)	—	[Ignition switch: ON]	5 V
79 (W)	105 (R)	Sensor power supply (Refrigerant pressure sensor)	—	[Ignition switch: ON]	5 V
80 (LA/P)	160 (B)	Sensor power supply [Manifold absolute pressure (MAP) sensor]	—	[Ignition switch: ON]	5 V
84 (LA/W)	160 (B)	Sensor power supply (Intake manifold runner control valve position sensor and EGR volume control valve)	—	[Ignition switch: ON]	5 V
86 (LA/Y)	100 (LA/R)	Sensor power supply (Intake camshaft position sensor)	—	[Ignition switch: ON]	5 V

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/Output		
88 (W)	160 (B)	Crankshaft position sensor (Electric intake valve timing control signal)	Output	[Engine is running] note The pulse cycle changes depending on rpm at idle. 5msec/div 2V/div	4.9 V

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
					3.52 V
				[Engine is running] • Engine: after warming up • Engine speed: 2,000 rpm	

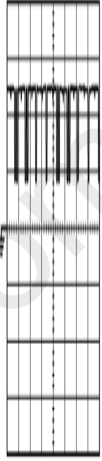
Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/Output		
90 (LA/SB)	160 (B)	Exhaust camshaft position sensor	Input	[Engine is running] • Engine: after warming up • Idle speed note The pulse cycle changes depending on rpm at idle. 	4.3 V

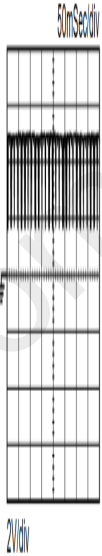
Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/Output		
					5 V
				[Engine is running] • Engine: after warming up • Engine speed: 2,000 rpm	
92 (SB)	160 (B)	Heated oxygen sensor 2	Input	[Engine is running] • Revving engine from idle to 3,000 rpm quickly after the following conditions are met • Engine: after warming up	0 - 1.0 V
94 (LA/G)	160 (B)	Sensor power supply (Exhaust camshaft position sensor)	—	[Ignition switch: ON]	5 V
95 (V)	160 (B)	Engine oil temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
96 (LA/Y)	160 (B)	Crankshaft position sensor	Input	[Engine is running] • Engine: after warming up • Idle speed note The pulse cycle changes depending on rpm at idle.	4.0 V 

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/Output		
					0.73 V
				[Engine is running] • Engine: after warming up • Engine speed: 2,500 rpm	
97 (BG)	—	Sensor ground (Heated oxygen sensor 2)	—	—	—
100 (LA/R)	—	Sensor ground (Intake camshaft position sensor)	—	—	—
101 (SB)	160 (B)	Engine coolant temperature sensor	Input	[Engine is running]	0 - 4.8 V Output voltage varies with Engine coolant temperature.
102 (W)	—	Sensor ground	—	—	—

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/Output		
		(Engine coolant temperature sensor)			
103 (LA/G)	—	Sensor ground (Engine oil pressure sensor)	—	—	—
104 (LA/LG)	160 (B)	Intake manifold runner control valve position sensor	Input	[Key switch: ON]	0.8 V
				[Engine is running] • Engine: after warming up • Idle speed	4.3 V
105 (R)	—	Sensor ground (Refrigerant pressure sensor)	—	—	—
106 (LA/G)	160 (B)	Sensor ground [Manifold absolute pressure (MAP) sensor]	—	—	—
107 (LA/L)	—	Sensor ground (Intake manifold runner control valve position sensor and EGR volume control valve)	—	—	—
108 (LA/W)	—	Sensor ground (Crankshaft position sensor)	—	—	—

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
109 (LA/W)	100 (LA/R)	Intake camshaft position sensor	Input	[Engine is running] note The pulse cycle changes depending on rpm at idle.	4.3V 50mSec/div  2V/div

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
				[Engine is running] • Engine: after warming up • Engine speed: 2,500 rpm	4.3 V
					
110 (LA/B)	—	Sensor ground (Exhaust camshaft position sensor)	—	—	—

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
114 (LA/R)	160 (B)	Engine oil pressure sensor	Input	[Engine is running] • Engine: after warming up • Idle speed	1.53 V 5mSec/div  2V/div

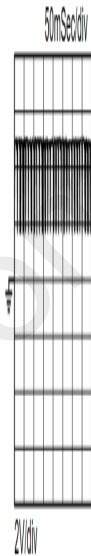
Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
					1.84 V
				[Engine is running] Engine speed: 2,000 rpm	
116 (B)	107 (LA/L)	EGR volume control valve position sensor	Input	[Ignition switch: ON]	0.5 V
117 (W)	160 (B)	Exhaust valve timing intermediate lock control solenoid valve	Output	[Engine is running] - Warm-up condition ON - Idle speed	BATTERY VOLTAGE (11 - 14 V)
				[Engine is running] - Cold condition [Engine coolant temperature: below 50°C (122°F)] ON - Idle speed	0.67 V

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/Output		
120 (LA/R)	160 (B)	Manifold absolute pressure (MAP) sensor	Input	[Ignition switch: ON]	4.28 V Output voltage varies with atmospheric pressure.
121 (LA/L)	160 (B)	Intake manifold runner control valve motor (close)	Output	[Engine is running] • Engine: after warming up • Idle speed	0 V
				[Engine is running] • Engine: after warming up • No load • When the engine speed is decreased from 3,000 rpm to idle speed (Accelerator pedal is released)	Generates a voltage for a moment (11 – 14 V)

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/Output		
122 (LA/P)	160 (B)	Intake manifold runner control valve motor (open)	Output	[Engine is running] - Engine: after warming up - Idle speed	0 V
				[Engine is running] - Engine: after warming up - No load - Revvng engine from idle to 5,000 rpm	Generates a voltage for a moment (11 – 14 V)
125 (SB)	160 (B)	Exhaust valve timing control solenoid valve	Output	[Engine is running] - Engine: Warm-up condition - Idle speed	BATTERY VOLTAGE (11 - 14 V)
				[Engine is running] - Engine: Warm-up condition - Engine speed: 2,500 rpm	9.0 - 10.5 V

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
126 (L)	160 (B)	EVAP canister purge volume control solenoid valve	Output	[Engine is running] - Idle speed - Accelerator pedal: Not depressed even slightly, after engine starting	BATTERY VOLTAGE (11 - 14 V)
				[Engine is running] Engine speed: 2,500 rpm (More than 100 seconds after starting engine.)	Battery voltage (11 - 14 V) 

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
127 (Y)	160 (B)	Intake camshaft position sensor (Electric intake valve timing control signal)	Input	[Engine is running] • Engine: after warming up • Idle speed note The pulse cycle changes depending on rpm at idle. 	4.99 V

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/Output		
				[Engine is running] • Engine: after warming up • Engine speed: 2,000 rpm	4.07 V
					
129 (G)	160 (B)	EVAP control system pressure sensor	Input		4.13 V
131 (R)	—	Drivetrain CAN communication - L	Input/Output		—
132 (GR)	—	Drivetrain CAN communication - H	Input/Output		—
133 (LA/SB)	160 (B)	Sensor power supply (EVAP control system pressure sensor)	—	[Ignition switch: ON]	5 V
136 (LA/BR)	160 (B)	Fuel tank temperature sensor	Input	[Engine is running]	3.3 V

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/Output		
141 (LG)	160 (B)	Ignition switch	Input	[Ignition switch: OFF]	0 V
				[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/Output		
142 (LA/V)	160 (B)	ASC D steering switch	Input	[Ignition switch: ON] • ASC D steering switch: OFF	4.23 V

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/Output		
				[Ignition switch: ON] • MAIN switch: Pressed	0 V
				[Ignition switch: ON] • CANCEL switch: Pressed	1.19 V
				[Ignition switch: ON] • RES+ switch: Pressed	3.61 V
				[Ignition switch: ON] • SET- switch: Pressed	2.93 V

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/Output		
		ACC steering switch	Input	[Ignition switch: ON] • ACC steering switch: OFF	4.23 V
				[Ignition switch: ON] • MAIN switch: Pressed	0 V
				[Ignition switch: ON] • CANCEL switch: Pressed	1.19 V
				[Ignition switch: ON] • DISTANCE switch: Pressed	2.15 V
				[Ignition switch: ON] • SET- switch: Pressed	2.93 V
				[Ignition switch: ON] • RES+ switch: Pressed	3.61 V
143 (LA/BR)	—	Sensor ground (ASCD/ACC steering switch)	—	—	—
145 (P)	—	Engine CAN communication - L	Input/ Output	—	—

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/Output		
146 (GR)	—	Engine CAN communication - H	Input/ Output	—	—
148 (GR)	160 (B)	Stop light switch	Input	[Ignition switch: OFF] • Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14 V)
				[Ignition switch: OFF] • Brake pedal: Fully released	0 V
149 (LA/V)	160 (B)	EVAP canister vent control valve	Output	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
150 (LA/P)	160 (B)	Sensor power supply (Accelerator pedal position sensor 2)	—	[Ignition switch: ON]	5 V
151 (LA/G)	160 (B)	Accelerator pedal position sensor 2	Input	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	2.0 - 2.5 V
				[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.25- 0.5 V
152 (LA/Y)	—	Sensor ground (Accelerator pedal position sensor 2)	—	—	—

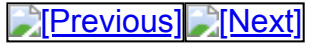
Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	—	Signal name	Input/Output		
153 (V)	160 (B)	Power supply for ECM	Input	[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14 V)
154 (LG)	160 (B)	Sensor power supply (Accelerator pedal position sensor 1)	—	[Ignition switch: ON]	5 V
155 (V)	—	Sensor ground (EVAP control system pressure sensor and fuel tank temperature sensor)	—	—	—
156 (B)	—	ECM ground	—	—	—
157 (B)	—	ECM ground	—	—	—
158 (L)	160 (B)	Accelerator pedal position sensor 1	Input	[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully released	0.5 - 1.0 V
				[Ignition switch: ON] • Engine stopped • Accelerator pedal: Fully depressed	4.2 - 4.8 V
159 (Y)	—	Sensor ground (Accelerator pedal position sensor 1)	—	—	—
160 (B)	—	ECM ground	—	—	—

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

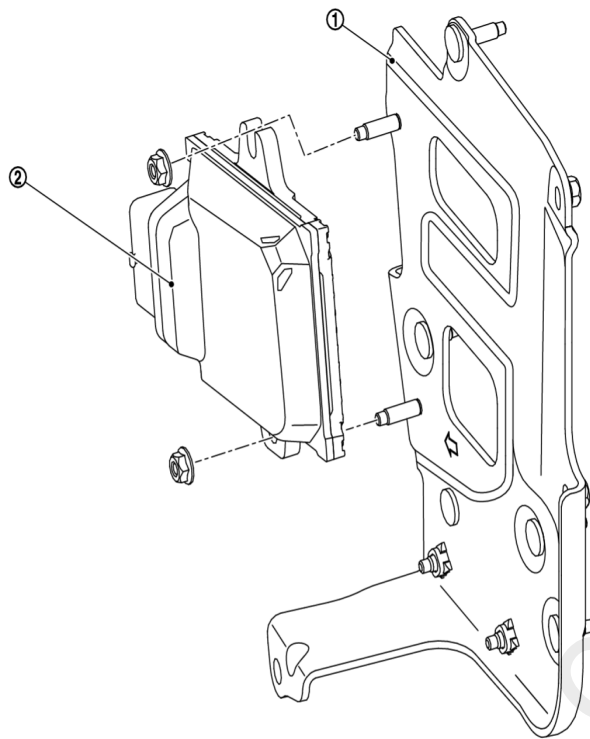
*1: With ACC/ASCD models

*2: Without ACC/ASCD models

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ELECTRIC INTAKE VALVE TIMING CONTROL MODULE : Exploded View



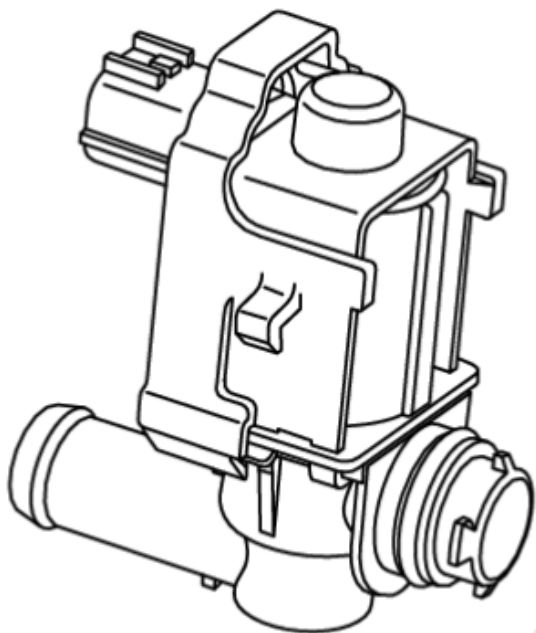
1. Bracket

2. Electric intake valve
timing control module

[\[Previous\]](#) [\[Next\]](#)

EVAP Canister Vent Control Valve

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.



This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

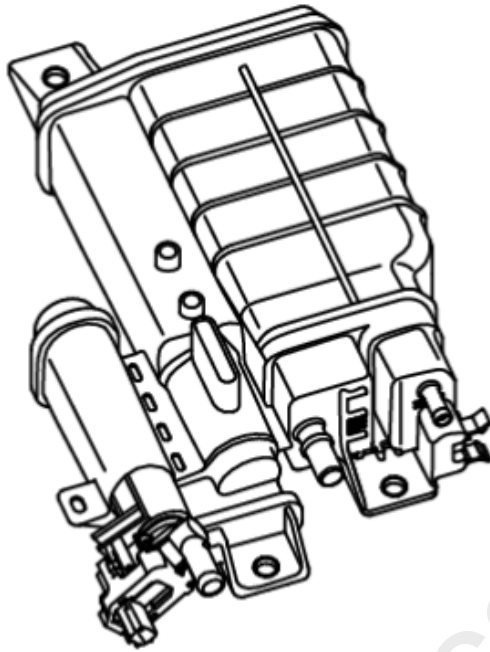
This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows “EVAP Control System” diagnosis.

[\[Previous\]](#) [\[Next\]](#)

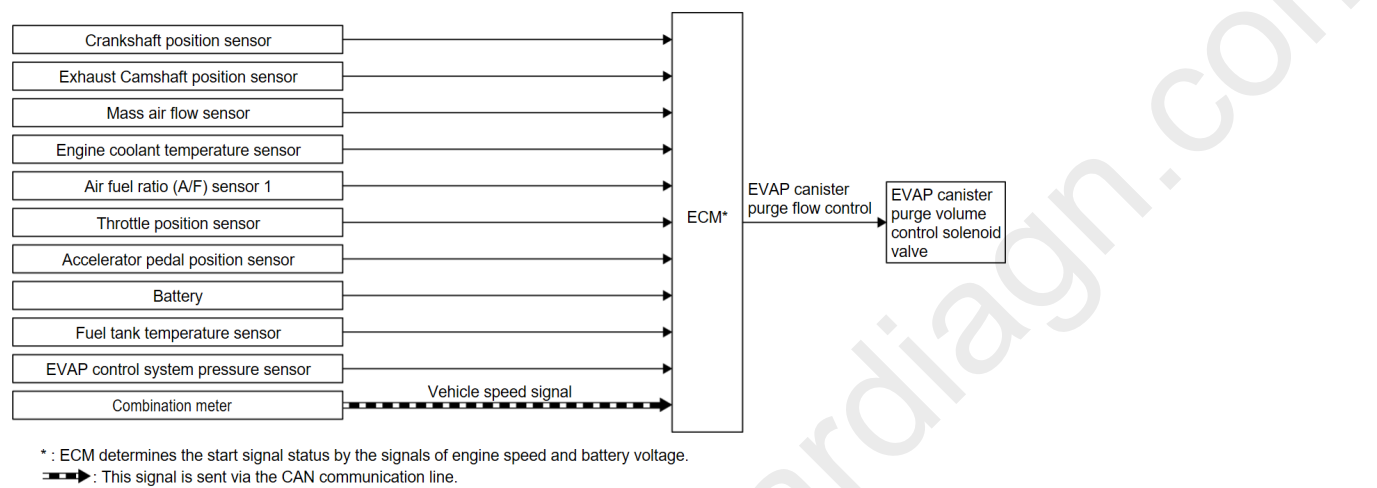
EVAP Canister

EVAP canister stores the generated fuel vapors in the sealed fuel tank to activated charcoals of EVAP canister when the engine is not operating or when refueling to the fuel tank.



System Description

SYSTEM DIAGRAM



Component parts	Function
Crankshaft position sensor	Refer to Crankshaft Position Sensor  .
Exhaust camshaft position sensor	Refer to Exhaust Camshaft Position Sensor  .
Mass air flow sensor (With intake air temperature sensor)	Refer to Mass Air Flow Sensor (With Intake Air Temperature Sensor)  .
Engine coolant temperature sensor	Refer to Engine Coolant Temperature Sensor  .

Component parts	Function
Air fuel ratio (A/F) sensor 1	Refer to Air Fuel Ratio (A/F) Sensor 1  .
Throttle position sensor	Refer to Electric Throttle Control Actuator  .
Accelerator pedal position sensor	Refer to Accelerator Pedal Position Sensor  .
Battery	ECM detects the battery voltage.
Fuel tank temperature sensor	Refer to Fuel Tank Temperature Sensor  .
EVAP control system pressure sensor	Refer to EVAP Canister Vent Control Valve  .
Combination meter	It transmits the vehicle speed signal to ECM via CAN communication.
ECM	Refer to ECM  .
EVAP canister purge volume control solenoid valve	Refer to EVAP Canister Purge Volume Control Solenoid Valve  .

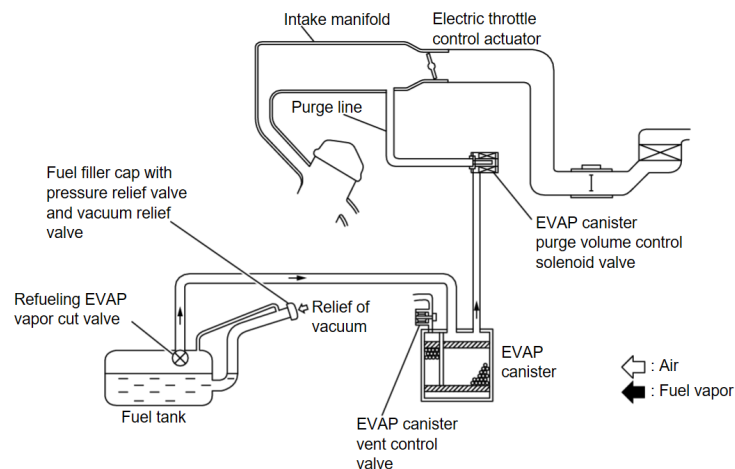
INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor Camshaft position sensor	Engine speed* ¹	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage* ¹		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
EVAP control system pressure sensor	Pressure in purge line		
Combination meter	Vehicle speed* ²		

*1: ECM determines the start signal status by the signals of engine speed and battery voltage.

*2: This signal is sent to the ECM through CAN communication line.

SYSTEM DESCRIPTION



The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister.

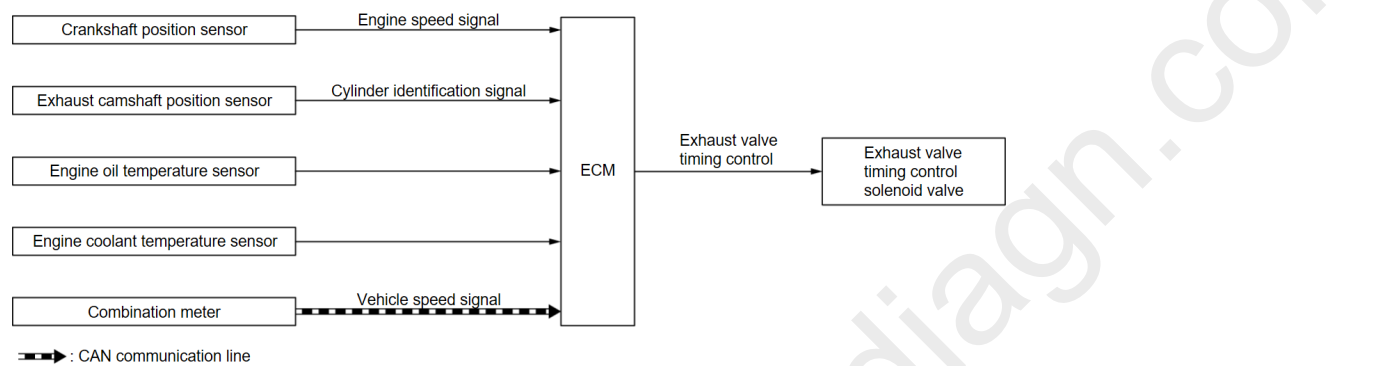
The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank.

The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating. EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow rate of vapor controlled by EVAP canister purge volume control solenoid valve is proportionally regulated as the air flow increases.

EVAP canister purge volume control solenoid valve also shuts off the vapor purge line during decelerating.

System Description

SYSTEM DIAGRAM



Component parts	Function
Crankshaft position sensor	Refer to Crankshaft Position Sensor ➡.
Exhaust camshaft position sensor	Refer to Exhaust Camshaft Position Sensor ➡.
Engine oil temperature sensor	Refer to Engine Oil Temperature Sensor ➡.
Engine coolant temperature sensor	Refer to Engine Coolant Temperature Sensor ➡.
Combination meter	ECM receives vehicle speed signal via CAN communication.

Component parts	Function
ECM	Refer to ECM  .
Exhaust valve timing control solenoid valve	Refer to Exhaust Valve Timing Control Solenoid Valve  .

SYSTEM DESCRIPTION

With the exhaust valve timing controller which controls the phase of exhaust camshaft to optional position continuously, ECM improves both low-middle speed torque and high speed performance, emission and fuel efficiency by optimizing the exhaust valve open/close timing according to driving conditions.

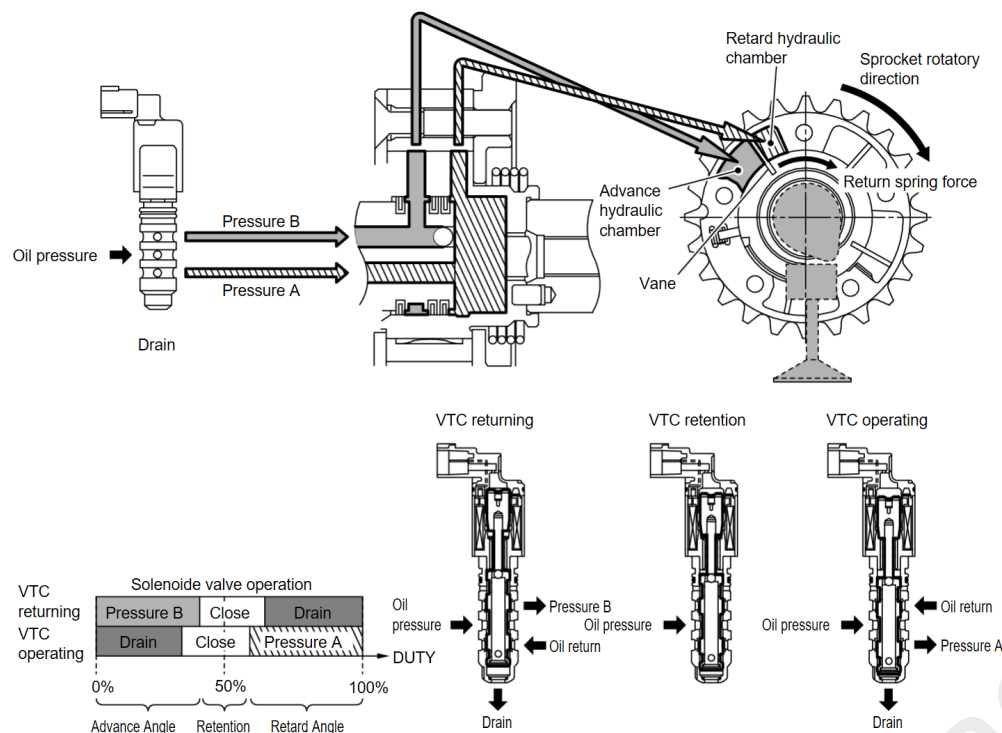
The exhaust valve timing controller is hydraulically controlled by the exhaust valve timing control solenoid valve.

This mechanism hydraulically controls cam phases continuously with the fixed operating angle of the exhaust valve.

The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine oil temperature. Then, the ECM sends ON/OFF pulse duty signals to the exhaust valve timing control solenoid valve depending on driving status. This makes it possible to control the shut/open timing of the exhaust valve to increase engine torque and output in a range of high engine speed.

EXHAUST VALVE TIMING CONTROL SOLENOID VALVE CONTROL

The exhaust valve timing control solenoid valve is driven ON-OFF (duty control) by ECM output signal, and controls the open/close timing of the exhaust valve to the optimum by changing its duty ratio according to the vehicle's driving condition.



Exhaust valve timing control solenoid valve condition	Exhaust valve timing controller operation
Engine OFF	When starting the engine, the controller vane and sprocket are fixed in full advanced position by the reaction force of return spring, improving the starting performance of the engine.
Active (Retard angle)	When the energization rate to the control solenoid valve is increased, the oil pressure from the oil pump is conveyed to the retard angle chamber of the controller. And advanced angle chamber oil is drained. Accordingly, the controller vane rotates leftward and the phase of camshaft becomes retard angle. This condition brings about the greater overlap with the intake valve, enabling the exhaust gas cleaning by the internal EGR effect and the fuel consumption improvement by the reduction in pumping loss.
Neutral (Maintained)	When it is the target valve timing, the energization rate to the control solenoid valve is adjusted to the intermediate state. The solenoid valve

Exhaust valve timing control solenoid valve condition	Exhaust valve timing controller operation
	is positioned at the neutral position and the oil path is interrupted to maintain the cam shaft phase.
Return (Advanced angle)	When the energization rate to the control solenoid valve is decreased, the oil pressure from the oil pump is conveyed to the advanced chamber of the controller. And retard angle chamber oil is drained. Accordingly, the controller vane rotates rightward and the phase of camshaft becomes advanced angle.

EXHAUST VALVE TIMING CONTROL FEEDBACK CONTROL

Cam Position Detection

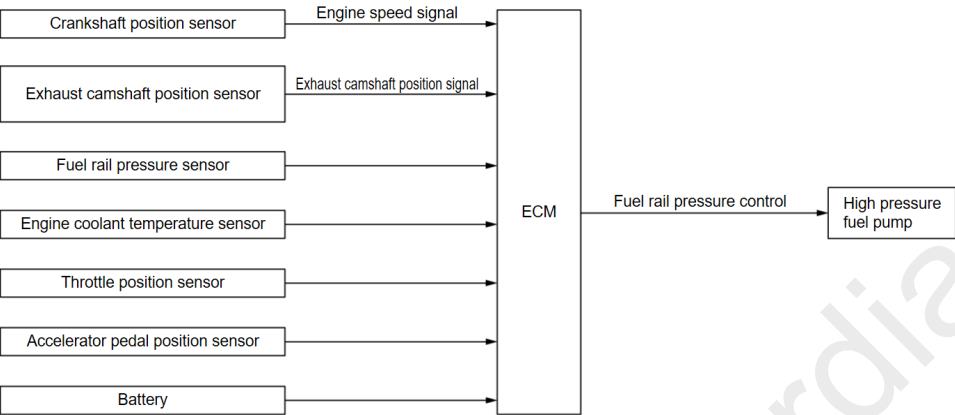
The exhaust camshaft position sensor mounted at the rear of the cylinder head detects a cam position, by using the groove on the plate located at the rear of the exhaust camshaft.

Feedback Control

The exhaust camshaft position sensor feeds back an actual cam position signal to ECM. Based on the signal, ECM controls the exhaust valve timing control solenoid valve to satisfy the optimum target valve opening/closing timing according to a driving condition.

System Description

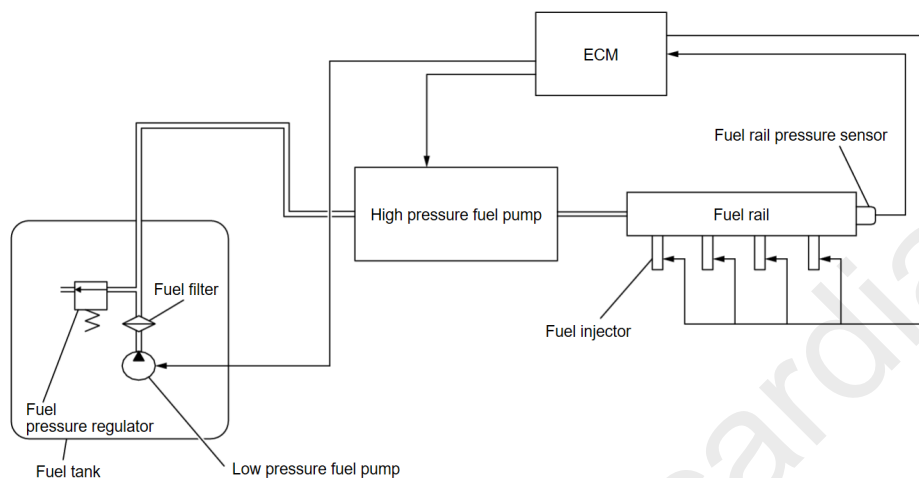
System Diagram



Component parts	Function
Crankshaft position sensor	Refer to Crankshaft Position Sensor ➡.
Exhaust camshaft position sensor	Refer to Exhaust Camshaft Position Sensor ➡.
Fuel rail pressure sensor	Refer to Fuel Rail Pressure Sensor ➡.
Engine coolant temperature sensor	Refer to Engine Coolant Temperature Sensor ➡.
Throttle position sensor	Refer to Electric Throttle Control Actuator ➡.

Component parts	Function
Accelerator pedal position sensor	Refer to Accelerator Pedal Position Sensor ➡.
Battery	ECM detects the battery voltage.
ECM	Refer to ECM ➡.
High pressure fuel pump	Refer to High Pressure Fuel Pump ➡.

SYSTEM DESCRIPTION



Low fuel pressure control

- The low fuel pressure pump is controlled by ECM and pumps fuel according to a driving condition. The pumped fuel passes through the fuel filter and is sent to the high pressure fuel pump.
- Low fuel pressure is adjusted by the fuel pressure regulator.

High fuel pressure control

- The high pressure fuel pump is actuated by the cam of camshaft (EXH).
- The high pressure fuel pump activates the high pressure fuel pump solenoid based on a signal received from ECM, and adjusts the amount of discharge by changing the timing of closing the inlet checkvalve to control fuel rail pressure.

For details about operation, Refer to [High Pressure Fuel Pump](#) .

Component Inspection

1.CHECK FUEL RAIL PRESSURE (FRP) SENSOR

① With M.U.T.-III SE

1. Turn ignition switch OFF.
2. Reconnect harness connector disconnected.
3. Start engine and warm it up to normal operating temperature.
4. Select "FUEL PRES SEN V" in "DATA MONITOR" mode of "ENGINE" using M.U.T.-III SE and check the indication under the following condition.

Monitor item	Condition		Indication
FUEL PRES SEN V	• Engine: After warming up • Selector lever: P or N position • A/C switch: OFF • No load	Engine speed: Idle	0.820 – 1.160 V
		Revving engine from idle to 4,000 rpm quickly	0.820 – 2.900 V

② Without M.U.T.-III SE

1. Turn ignition switch OFF.
2. Reconnect harness connector disconnected.
3. Start engine and warm it up to normal operating temperature.
4. Check FRP sensor signal voltage.

ECM			Condition	Voltage
Connector	+	-		
	Terminal			
F51	58	41	[Engine is running] • Engine warm-up condition • Engine speed: Idle	1 V
			[Engine is running] • Engine warm-up condition • Revving engine from idle to 4,000 rpm quickly	1.1 V

Q.Is inspection result normal?

Yes

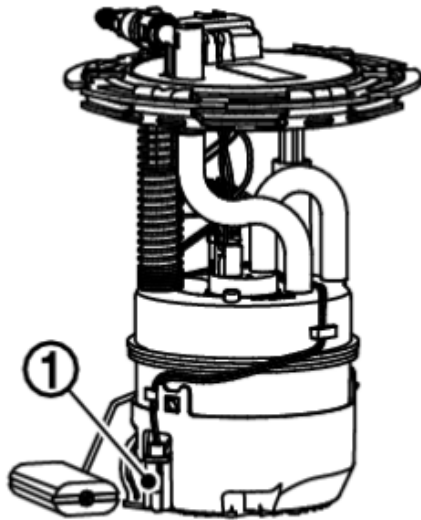
INSPECTION END

No

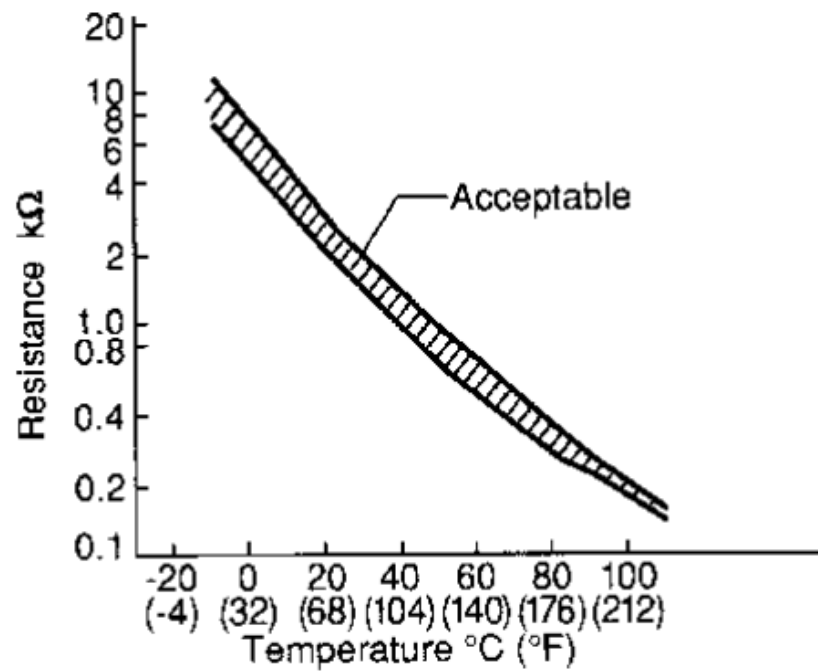
Replace FRP sensor. Refer to [Exploded View](#) .

Fuel Tank Temperature Sensor

The fuel tank temperature sensor ① is used to detect the fuel temperature inside the fuel tank.



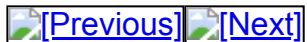
The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

Fluid temperature [°C (°F)]	Voltage* (V)	Resistance (kΩ)
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: These data are reference values and are measured between ECM terminals.



Heated Oxygen Sensor 2

FUNCTIONS WITHIN THE SYSTEM

Heated oxygen sensor 2 detects the oxygen concentration in the exhaust gases, converts it to a voltage signal, and transmits the signal to the ECM. Heated oxygen sensor 2 contains a heater for maintaining its activation.

INDIVIDUAL FUNCTION WITHIN THE SYSTEM

Heated Oxygen Sensor 2

Under normal conditions, heated oxygen sensor 2 is not used for engine control. When A/F sensor 1 is malfunctioning, the signal from heated oxygen sensor 2 is used to control the A/F ratio to the stoichiometric ratio.

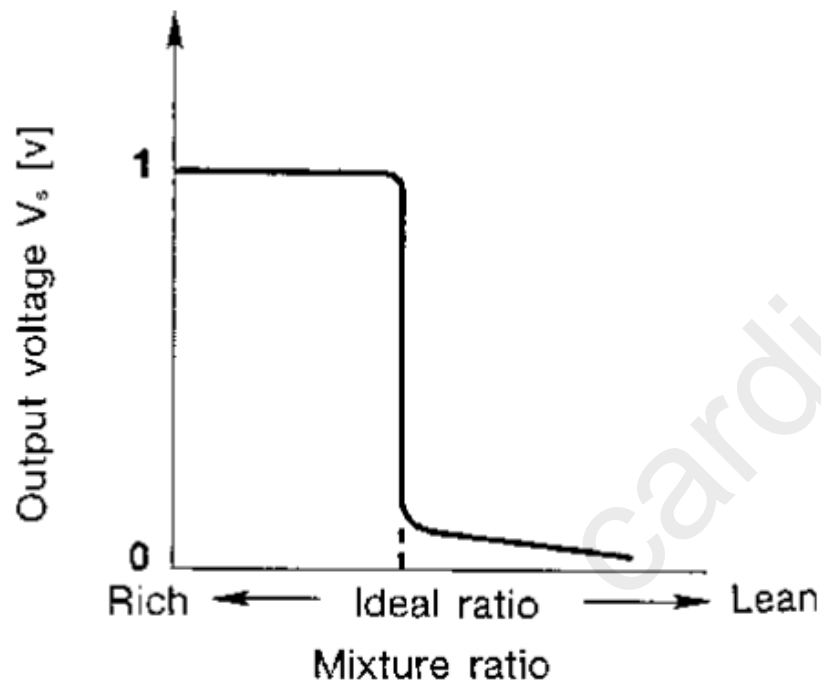
Heated Oxygen Sensor 2 Heater

The heated oxygen sensor 2 heater activates heated oxygen sensor 2.

INDIVIDUAL OPERATION

Heated Oxygen Sensor 2

Heated oxygen sensor 2 is composed of a zirconia element in a test tube shape, and is exposed to the atmosphere on the inside and the exhaust gases on the outside. When there is a difference in the oxygen concentration between the inside and outside, electromotive force is generated. When the A/F ratio is leaner than the stoichiometric ratio, the voltage is approximately 0 V. When it is richer, the voltage is approximately 1 V.



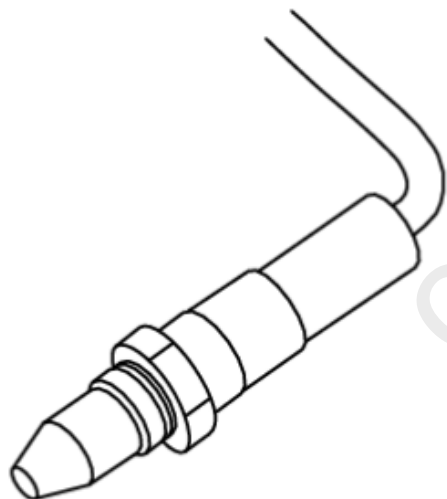
Heated Oxygen Sensor 2 Heater

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater corresponding to the engine speed, amount of intake air and engine coolant temperature.

Engine speed	Heated oxygen sensor 2 heater
Above 3,600 rpm	OFF
Below 3,600 rpm after the following conditions are met. • Engine: After warming up • Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	ON

COMPONENT PARTS LOCATION

The heated oxygen sensor 2 is installed on the downstream side of three way catalyst (manifold).



[\[Previous\]](#) [\[Next\]](#)

Component Inspection

1.CHECK HIGH PRESSURE FUEL PUMP-1

1. Turn ignition switch OFF.
2. Disconnect high pressure fuel pump harness connector.
3. Check the resistance between high pressure fuel pump terminals as follows.

High pressure fuel pump		Condition	Resistance
+	-		
Terminal			
1	2	Temperature °C (°F)	20 – 30 (68 – 86) 0.46 - 0.51 Ω

Q.Is the inspection result normal?

Yes 

No

Replace high pressure fuel pump. Refer to [Removal and Installation](#) .

2.CHECK HIGH PRESSURE FUEL PUMP-2

 WITH M.U.T.-III SE

1. Reconnect high pressure fuel pump harness connector.
2. Start the engine.
3. Check “FUEL PRES SEN” in “DATA MONITOR” of “ENGINE” with M.U.T.-III SE.

Data monitor item	Condition	Voltage (Approx.)
FUEL PRESS V	Engine speed: idle	0.820 - 1.160 V
	Engine speed: Revving engine from idle to 4,000 rpm	0.820 – 2.900 V

⊗ WITHOUT M.U.T.-III SE

1. Start the engine.
2. Check fuel rail pressure sensor signal voltage.

+		Ground	Condition	Voltage (Approx.)
Fuel rail pressure sensor				
Connector	Terminal			
F79	2	Ground	Engine speed: idle	1 V
			Engine speed: Revving engine from idle to 4,000 rpm	1.1 V

Q.Is the inspection result normal?

Yes

INSPECTION END

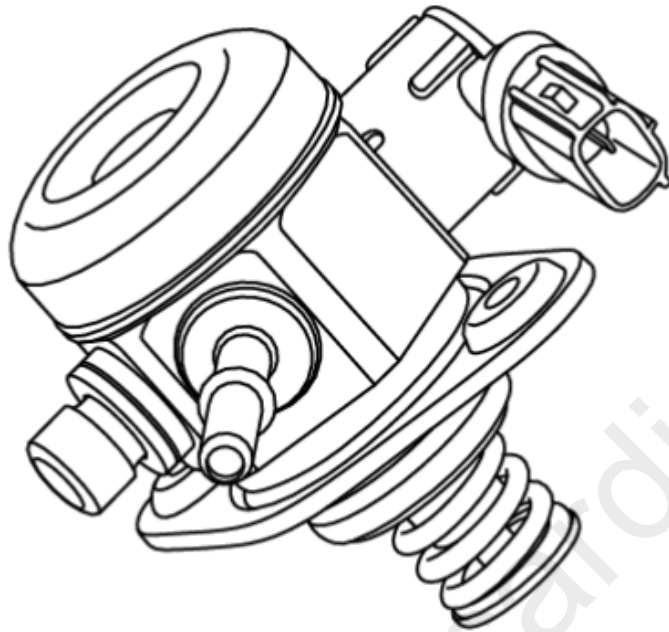
No

Replace high pressure fuel pump. Refer to [Removal and Installation](#) ➡.

[\[Previous\]](#) [\[Next\]](#)

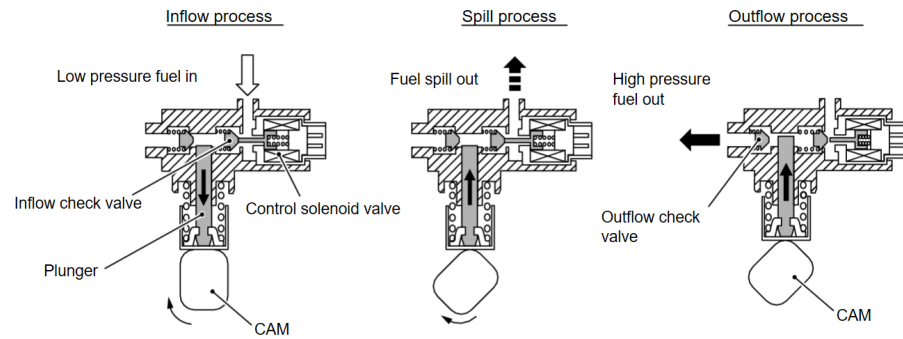
High Pressure Fuel Pump

- Balanced flow volume control type single cylinder high pressure fuel pump, which approximately equalize the amount of injection and pump output, is adopted.

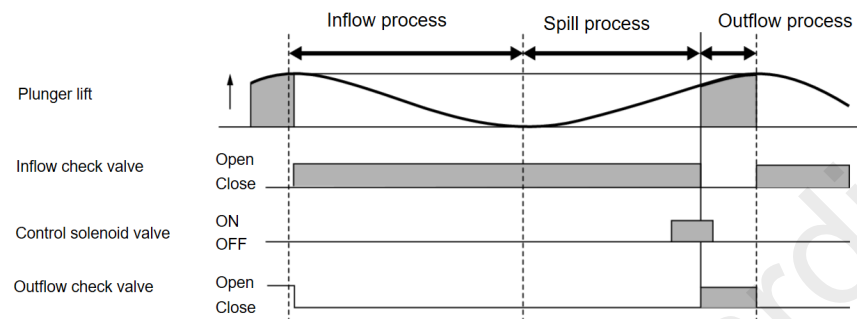


- The high pressure fuel pump is activated by the exhaust camshaft. ECM controls the high pressure fuel pump control solenoid valve built into the high pressure fuel pump and adjusts the amount of discharge by changing the suction timing of the low pressure fuel.
 - Inflow process: Cam driven lowering plunger let the fuel from low pressure fuel pump induced into high pressure fuel pump.
 - Spill process: Although the cam driven plunger start moving upward, inflow check valve still at open position due to the control solenoid valve, so the fuel is not pressurized and spilled out to low pressure fuel pump side. By changing the amount of this spill out volume changes the amount of injection.
 - Outflow process: When the control solenoid valve turns ON, the inflow check valve is closed, fuel is pressurized and when the pressure exceeds certain point discharge check valve is pushed open to discharge fuel into fuel rail.

Operating Description



Operating Chart





IDLE SPEED : Service Data

Condition	Specification
No load* (in P or N position)	650 ± 50 rpm

*: Under the following conditions

1. A/C switch: OFF
2. Electric load: OFF (Lights, heater fan & rear window defogger)
3. Steering wheel: Kept in straight-ahead position



IGNITION TIMING : Service Data

Condition	Specification
No load* (in P or N position)	5 ± 5° BTDC

*: Under the following conditions

1. A/C switch: OFF
2. Electric load: OFF (Lights, heater fan & rear window defogger)
3. Steering wheel: Kept in straight-ahead position

Component Inspection

1.CHECK INTAKE MANIFOLD RUNNER CONTROL VALVE

 With M.U.T.-III SE

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with M.U.T.-III SE.
3. Fully release accelerator pedal and make sure that "TUMBLE POS SEN" indicates between 2.1 V to 4.1 V.
4. Depress accelerator pedal and make sure that "TUMBLE POS SEN" indicates between 0.2 V to 1.4 V.
5. Check 1st trip DTC.

 With GST

Following the procedure "With M.U.T.-III SE" above.

Q.Is 1st trip DTC detected?

Yes

Replace intake manifold assembly. Refer to [Removal and Installation](#) .

No .

2.CHECK INTAKE MANIFOLD RUNNER CONTROL VALVE MOTOR

1. Turn ignition switch OFF.
2. Disconnect intake manifold runner control valve motor harness connector.
3. Check the resistance between intake manifold runner control valve motor terminals as per the following.

Intake manifold runner control valve motor		Resistance (Approx.)
+	-	
Terminals		
1	2	3 - 8 Ω [at 25°C (77°F)]

Q.Is the inspection result normal?

Yes

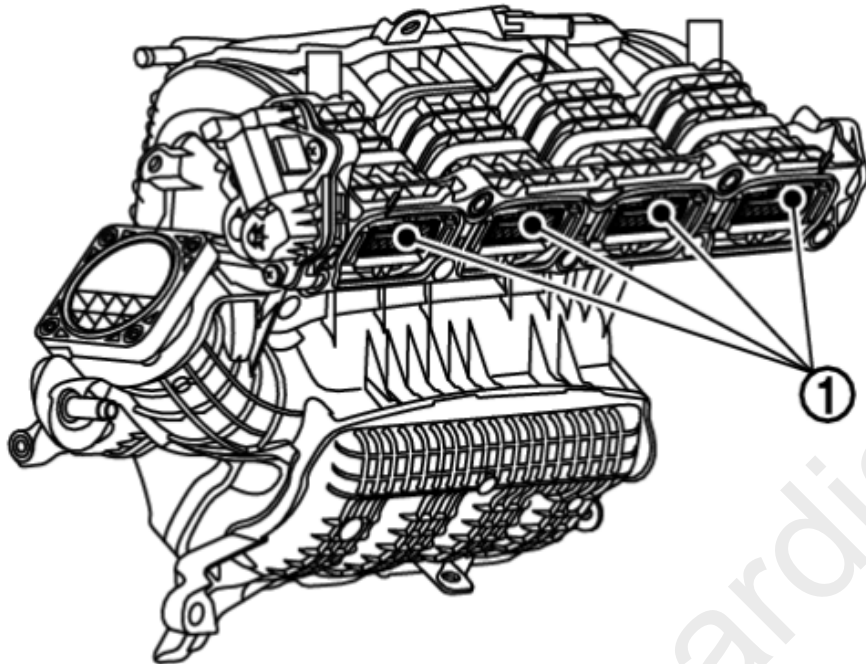
INSPECTION END

No

Replace intake manifold assembly. Refer to [Removal and Installation](#) .

Intake Manifold Runner Control Valve

Intake manifold runner control valve ① is integrated to intake manifold.

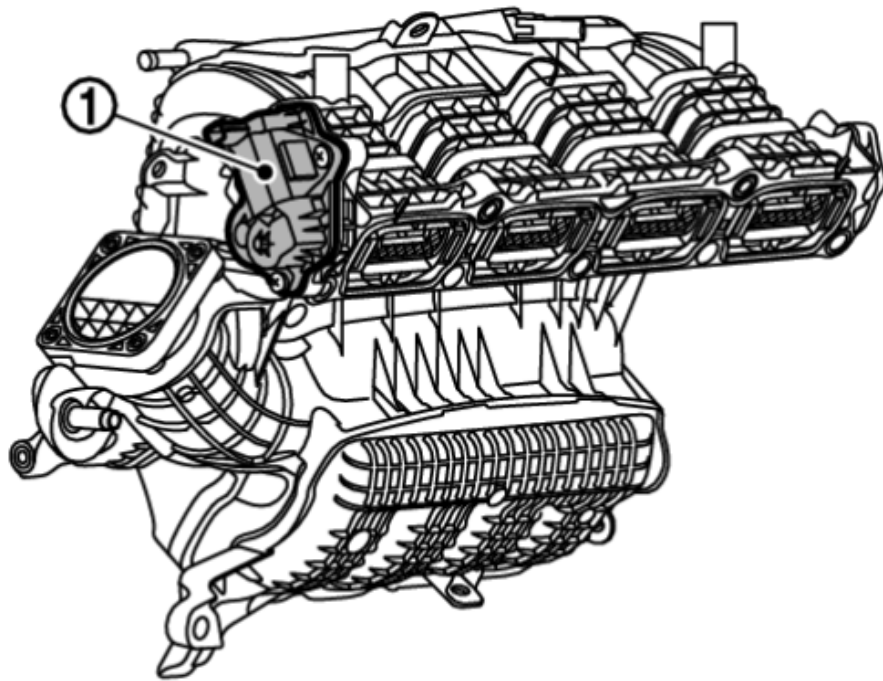


Intake manifold runner control valve is mounted each port of the intake manifold and opened/closed by the intake manifold runner control valve motor.

ECM controls the intake manifold runner control valve motor, according to signals of engine speed, water temperature, etc. and stabilizes combustion by generating a strong tumble flow.

INTAKE MANIFOLD RUNNER CONTROL VALVE MOTOR

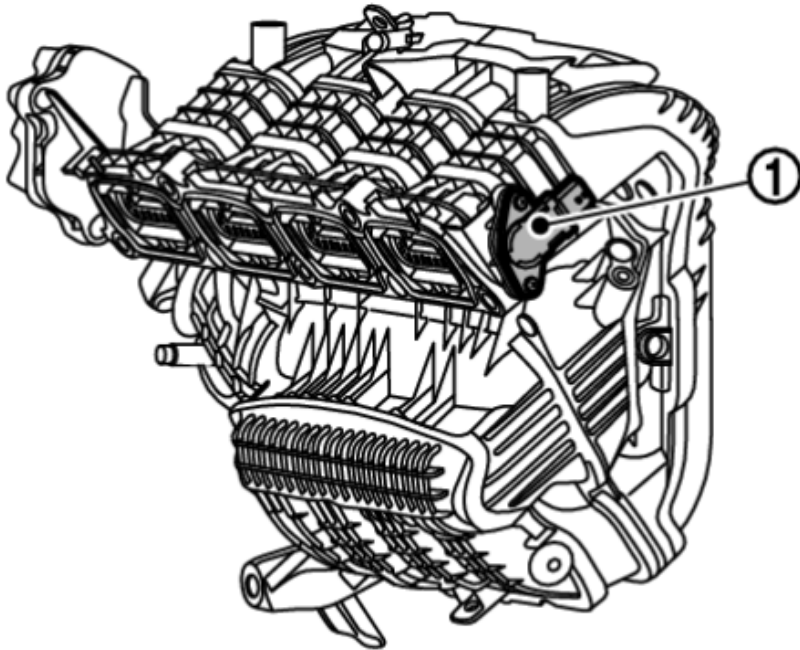
Intake manifold runner control valve motor ① is connected to the rear end of the valve shaft.



The motor opens or closes the valve by the output signal of the ECM.

INTAKE MANIFOLD RUNNER CONTROL VALVE POSITION SENSOR

Intake manifold runner control valve position sensor ① is connected to the front end of the valve shaft.



The sensor consists of variable resistor. It senses the valve shaft movement and feeds the voltage signals to the ECM.

Component Inspection

1.CHECK INTAKE MANIFOLD TUNING VALVE ACTUATOR

1. Turn ignition switch OFF.
2. Disconnect intake manifold tuning valve actuator harness connector.
3. Check the resistance between intake manifold tuning valve actuator terminals as per the following.

Intake manifold tuning valve actuator		Resistance (Approx.)
+	-	
Terminals		
1	2	3 - 8 Ω [at 25°C (77°F)]

Q.Is the inspection result normal?

Yes

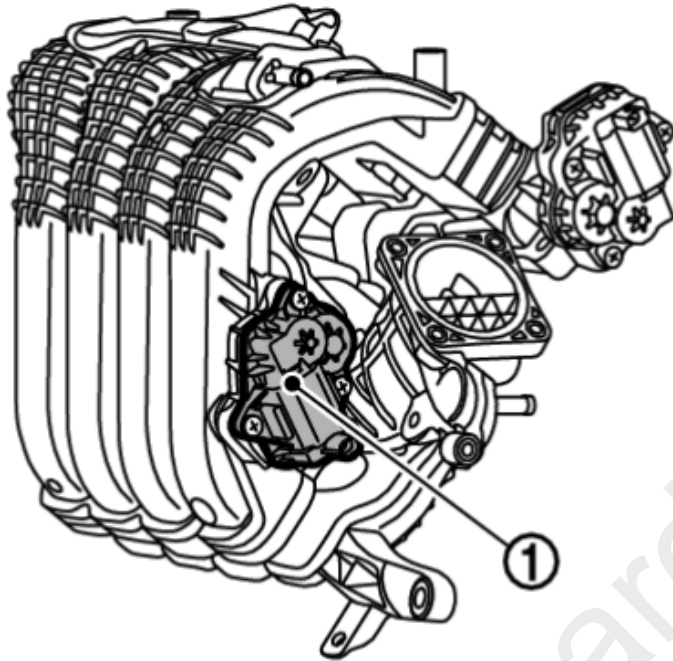
INSPECTION END

No

Replace intake manifold assembly. Refer to [Removal and Installation](#) .

Intake Manifold Tuning Valve

Intake manifold tuning valve ① is integrated to intake manifold.



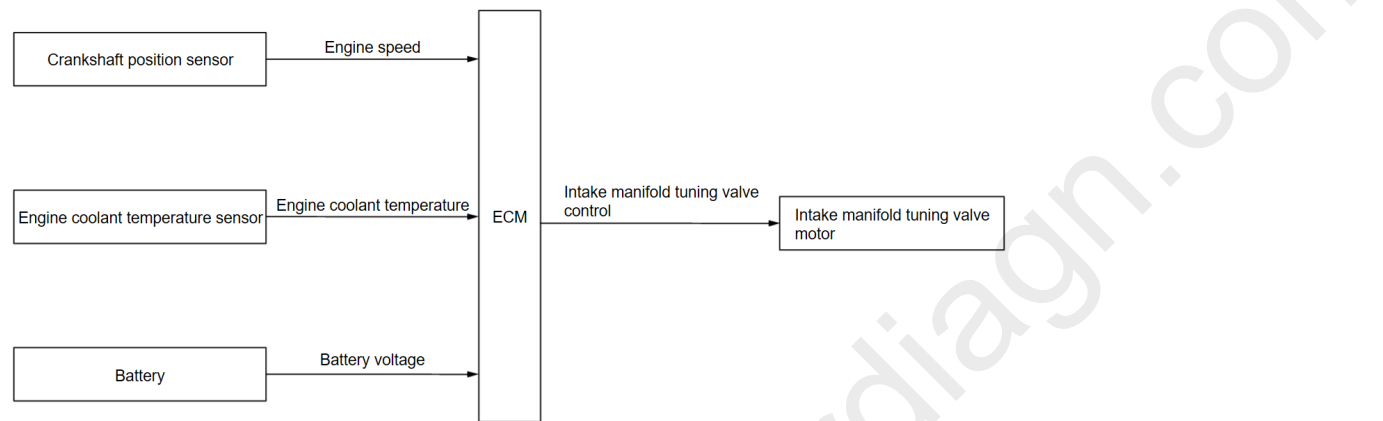
Intake manifold tuning valve consists of valve and motor.
Intake manifold tuning valve is used to control the suction passage of the intake manifold tuning system.

INTAKE MANIFOLD TUNING VALVE MOTOR

Intake manifold tuning valve motor is connected to the rear end of the valve shaft.
The motor is operated by the ECM and it opens and closes the intake manifold tuning valve.

System Description

SYSTEM DIAGRAM



Component parts	Function
Crankshaft position sensor	Refer to Crankshaft Position Sensor ➡.
Engine coolant temperature sensor	Refer to Engine Coolant Temperature Sensor ➡.
Battery	ECM detects the battery voltage.
ECM	Refer to ECM ➡.
Intake manifold tuning valve motor	Refer to Intake Manifold Tuning Valve ➡.

SYSTEM DESCRIPTION

This system switches the length of intake air path according to the low-to-medium speed range or high speed range. Torque is increased in the low-to-medium speed range and the engine output is improved in the high speed range.

Engine speed: Low and medium speed range

Since the intake manifold tuning (IMT) valve is closed when the engine speed is less than 5,000 rpm, the length of the effective intake air path is from the mouth of intake manifold collector to the intake valve. This long path brings the inertia effect of intake air, contributing to the improvement in intake air efficiency and the generation of high torque.

Engine speed: High speed range

When engine speed is 5,000 rpm or more, ECM turns ON the intake manifold tuning valve motor to open the intake manifold tuning valve. The length of the effective intake air path at this time is from the intake manifold tuning valve to the intake valve. This short path brings the inertia effect of intake air in the high speed range, contributing to the torque improvement while the engine is running at high speeds. (The highest engine output is improved.)

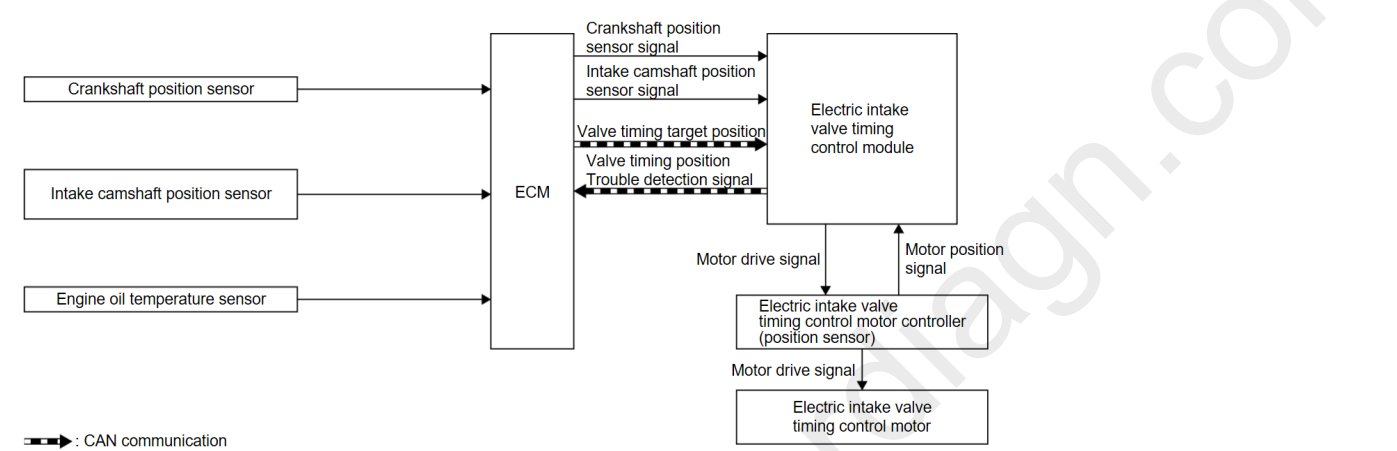
Intake Manifold Tuning Valve Operating Condition

ECM opens the intake manifold tuning valve when all of the following conditions are satisfied.

- Engine speed: 5,000 rpm or more
- Engine coolant temperature: -30°C (-22°F) or more
- Battery voltage: 16 V or less

System Description

SYSTEM DIAGRAM



Component parts	Function
Crankshaft position sensor	Crankshaft Position Sensor 
Intake camshaft position sensor	Intake Camshaft Position Sensor 
Engine oil temperature sensor	Engine Oil Temperature Sensor 
ECM	ECM 
Electric intake valve timing control module	Electric Intake Valve Timing Control Module 

Component parts	Function
Electric intake valve timing control actuator	Electric Intake Valve Timing Control Actuator
Electric intake valve timing control motor*	

*: Electric intake valve timing control motor is built in to the cam sprocket (INT).

SYSTEM DESCRIPTION

Electric VTC responds faster than hydraulic VTC and can extend the operation angle of the camshaft. This improves the fuel economy, engine output, and exhaust performance.

This mechanism continuously controls the phase of camshaft by the electric intake valve timing (IVT) control motor with the amount of intake valve operation held constant.

ECM transmits a target position of the electric IVT control motor to electric IVT control module via CAN communication.

The electric IVT control module controls the electric IVT control motor according to a signal from ECM and changes the opening and closing timing of intake valve.

Furthermore, the electric IVT control module has a diagnostic function and transmits a DTC detection signal to ECM via engine communication when detecting a system error.

Intake camshaft condition	Electric intake valve timing control actuator operation
Advanced angle	The electric intake valve timing control motor rotates the intake camshaft to advanced angle.
Maintained	Stop rotating the electric intake valve timing control motor to keep the intake camshaft position (cam phase).
Retard angle	The electric intake valve timing control motor rotates the intake camshaft to retard angle.

[\[Previous\]](#) [\[Next\]](#)

Component Inspection

1.CHECK KNOCK SENSOR 1

1. Turn ignition switch OFF.
2. Disconnect knock sensor 1 harness connector.
3. Check resistance between knock sensor 1 terminals as per the following.

note It is necessary to use an ohmmeter which can measure more than 10 MΩ.

Knock sensor 1		Resistance
Terminals		
1	2	Approx. 532 - 588 kΩ [at 20°C (68°F)]

caution Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.

Q.Is the inspection result normal?

Yes 

No Replace knock sensor 1. Refer to [Exploded View](#) .

2.CHECK KNOCK SENSOR 2

1. Turn ignition switch OFF.
2. Disconnect knock sensor 2 harness connector.
3. Check resistance between knock sensor 2 terminals as per the following.

note It is necessary to use an ohmmeter which can measure more than 10 MΩ.

Knock sensor 2		Resistance
Terminals		
1	2	Approx. 532 - 588 kΩ [at 20°C (68°F)]

caution

Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.

Q.Is the inspection result normal?

Yes

INSPECTION END

No

Replace knock sensor. Refer to [Exploded View](#) .

Component Inspection

1.CHECK MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR-1

1. Turn ignition switch OFF.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF, wait at least 5 seconds and then turn ON.
4. Check the voltage between ECM harness connector terminals as follows.

ECM		
Connector	Terminal	
F52	120	106

note

- To avoid the influence of intake manifold vacuum, check the voltage 1 or more minutes past after engine is stopped.
- Because the sensor is absolute pressure sensor, output value may differ depending on atmospheric pressure and altitude.

5. Measure the atmospheric pressure.

note

As the atmospheric pressure described on the synoptic chart is the value at sea level, compensate the pressure with the following chart.

Altitude (m)	Compensated pressure (hPa)
0	0
200	-24
400	-47
600	-70
800	-92
1000	-114
1500	-168
2000	-218

6. Check the manifold absolute pressure sensor value corresponding to the atmospheric pressure.

Atmospheric pressure (hPa)	Voltage (V)
800	3.1 – 3.7
850	3.3 – 3.9
900	3.5 – 4.1
950	3.8 – 4.3
1000	4.0 – 4.6
1050	4.2 – 4.8

Q.Is the inspection result normal?

Yes 

No

Replace MAP sensor. Refer to Removal and Installation [Exploded View](#) .

2.CHECK MAP SENSOR-2

1. Start engine and let it idle.
2. Check intake manifold vacuum.
3. Check the voltage between ECM harness connector terminals as follows.

ECM		
Connector	Terminal	
F52	120	106

4. Confirm the difference of the voltage when engine is stopped and at idling is within the values shown in the following chart.

Intake manifold vacuum [kPa (mmHg)]	Voltage difference
-40 (-300)	1.5 – 2.0 V
-53.3 (-400)	2.0 – 2.6 V
-66.7 (-500)	2.6 – 3.2 V
-80 (-600)	3.2 – 3.8 V

Q.Is the inspection result normal?**Yes**

INSPECTION END

NoReplace MAP sensor. Refer to Removal and Installation [Exploded View](#) .

[\[Previous\]](#) [\[Next\]](#)

MASS AIR FLOW SENSOR : Service Data

Supply voltage	5 V
Output voltage/frequency at ignition SW ON (Engine stopped)	Approx. 3,700 Hz
Mass air flow (Using M.U.T.-III SE or GST)	3.1 – 5.3 g/s 1,500 rpm* 4.9 – 9.7 g/s 2,500 rpm*

*: Engine is warmed up to normal operating temperature and running under no load.

Component Inspection

1.CHECK MASS AIR FLOW SENSOR-1

 With M.U.T.-III SE

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Start engine and warm it up to normal operating temperature.
4. Connect M.U.T.-III SE and select "DATA MONITOR" mode of "ENGINE".
5. Select "MASS AIR FLOW SENSOR (g/s)" and check indication.

Monitor item	Condition	Indication
MASS AIR FLOW SENSOR (g/s)	Ignition switch ON (Engine stopped.)	0 g/s
	At 1,500 rpm (Engine is warmed-up to normal operating temperature.)	3.1- 5.3 g/s
	At 2,500 rpm (Engine is warmed-up to normal operating temperature.)	4.9 - 9.7 g/s
	At 4,000 rpm (Engine is warmed-up to normal operating temperature.)	9.7 - 19.3 g/s

 Without M.U.T.-III SE

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Start engine and warm it up to normal operating temperature.
4. Check the frequency between ECM harness connector terminals under the following conditions.

ECM			Condition	Frequency
Connector	+	-		
	Terminal			
F51	47	50	Ignition switch ON (Engine stopped.)	Approx. 3,700 Hz
			At 1,500 rpm (Engine is warmed-up to normal operating temperature.)	5,400 - 5,900 Hz
			At 2,500 rpm (Engine is warmed-up to normal operating temperature.)	5,800 - 6,500 Hz
			At 4,000 rpm (Engine is warmed-up to normal operating temperature.)	6,400 - 7,200 Hz

Q.Is the inspection result normal?

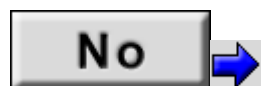
Yes INSPECTION END

No ➡

2.CHECK FOR THE CAUSE OF UNEVEN AIR FLOW THROUGH MASS AIR FLOW SENSOR

1. Turn ignition switch OFF.
2. Check for the cause of uneven air flow through mass air flow sensor. Refer to the following.
 - Crushed air ducts
 - Malfunctioning seal of air cleaner element
 - Uneven dirt of air cleaner element
 - Intake valve deposits
 - Improper specification of intake air system parts

Q.Is the inspection result normal?



3.CHECK MASS AIR FLOW SENSOR-2

With M.U.T.-III SE

1. Repair or replace malfunctioning part.
2. Start engine and warm it up to normal operating temperature.
3. Connect M.U.T.-III SE and select "DATA MONITOR" mode of "ENGINE".
4. Select "MASS AIR FLOW SENSOR (g/s)" and check indication.

Monitor item	Condition	Indication
MASS AIR FLOW SENSOR (g/s)	Ignition switch ON (Engine stopped.)	0 g/s
	At 1,500 rpm (Engine is warmed-up to normal operating temperature.)	3.1- 5,3 g/s
	At 2,500 rpm (Engine is warmed-up to normal operating temperature.)	4.9 - 9.7 g/s
	At 4,000 rpm (Engine is warmed-up to normal operating temperature.)	9.7 - 19.3 g/s

Without M.U.T.-III SE

1. Repair or replace malfunctioning part.
2. Start engine and warm it up to normal operating temperature.
3. Check the frequency between ECM harness connector terminals under the following conditions.

ECM			Condition	Frequency
Connector	+	-		
	Terminal			
F51	47	50	Ignition switch ON (Engine stopped.)	Approx. 3,700 Hz
			At 1,500 rpm (Engine is warmed-up to normal operating temperature.)	5,400 - 5,900 Hz
			At 2,500 rpm (Engine is warmed-up to normal operating temperature.)	5,800 - 6,500 Hz
			At 4,000 rpm (Engine is warmed-up to normal operating temperature.)	6,400 - 7,200 Hz

Q.Is the inspection result normal?

Yes INSPECTION END

No ➡

4.CHECK MASS AIR FLOW SENSOR-3

Ⓜ With M.U.T.-III SE

1. Turn ignition switch OFF.
2. Disconnect mass air flow sensor harness connector and reconnect it again.
3. Start engine and warm it up to normal operating temperature.
4. Connect M.U.T.-III SE and select "DATA MONITOR" mode of "ENGINE".
5. Select "MASS AIR FLOW SENSOR (g/s)" and check indication.

Monitor item	Condition	Indication
MASS AIR FLOW SENSOR (g/s)	Ignition switch ON (Engine stopped.)	0 g/s
	At 1,500 rpm (Engine is warmed-up to normal operating temperature.)	3.1- 5.3 g/s
	At 2,500 rpm (Engine is warmed-up to normal operating temperature.)	4.9 - 9.7 g/s
	At 4,000 rpm (Engine is warmed-up to normal operating temperature.)	9.7 - 19.3 g/s

⊗ Without M.U.T.-III SE

1. Turn ignition switch OFF.
2. Disconnect MAF sensor harness connector and reconnect it again.
3. Start engine and warm it up to normal operating temperature.
4. Check the frequency between ECM harness connector terminals under the following conditions.

ECM			Condition	Frequency
Connector	+	-		
	Terminal			
F51	47	50	Ignition switch ON (Engine stopped.)	Approx. 3,700 Hz
			At 1,500 rpm (Engine is warmed-up to normal operating temperature.)	5,400 - 5,900 Hz
			At 2,500 rpm (Engine is warmed-up to normal operating temperature.)	5,800 - 6,500 Hz
			At 4,000 rpm (Engine is warmed-up to normal operating temperature.)	6,400 - 7,200 Hz

Q.Is the inspection result normal?

Yes

INSPECTION END

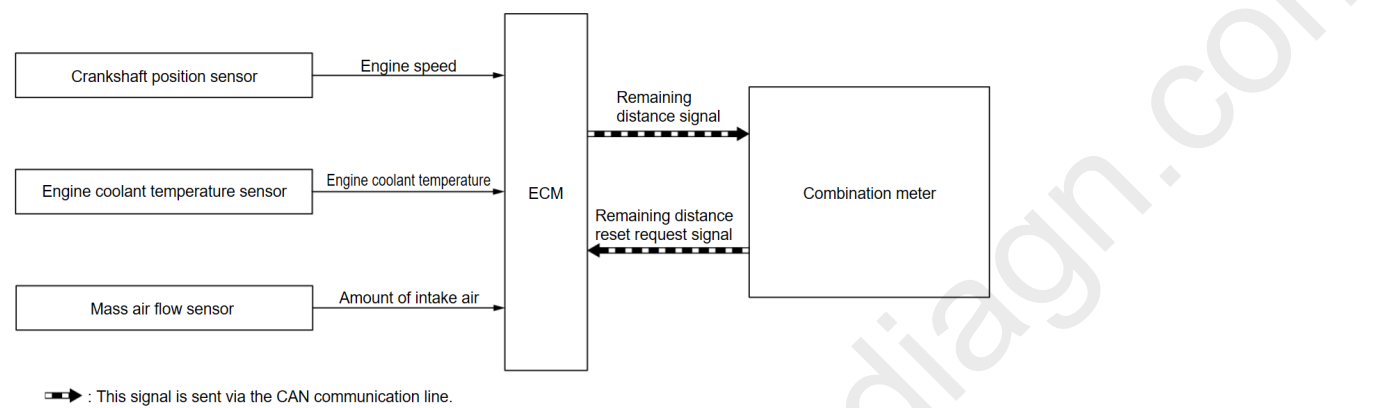
No

Clean or replace mass air flow sensor. Refer to [Exploded View](#) .

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System Description

SYSTEM DIAGRAM



Component parts	Function
Crankshaft position sensor	Crankshaft Position Sensor ➡
Engine coolant temperature sensor	Engine Coolant Temperature Sensor ➡
Mass Air Flow Sensor (With Intake Air Temperature Sensor)	Mass Air Flow Sensor (With Intake Air Temperature Sensor) ➡
ECM	ECM ➡
Combination meter	ECM receives the vehicle speed signal via CAN communication.

SYSTEM DESCRIPTION

ECM calculates engine load, engine coolant temperature, and engine speed based on signals from the mass air flow sensor, engine coolant temperature sensor, and crankshaft position sensor and monitors the deterioration state of engine oil.

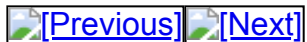
When the mileage before engine oil change comes to approximately 1,500 km or less, pre-alert message is displayed to inform the driver that the maintenance timing is close as shown in the following table.

Remaining mileage to the engine oil change timing	Alert timing
1,000 km < the mileage ≤ 1,500 km (630 mile < the mileage ≤ 940 mile)	The first IGN ON after reaching 1,500 km (940 mile)
500 km < the mileage ≤ 1,000 km (310 mile < the mileage ≤ 630 mile)	The first IGN ON after reaching 1,000 km (630 mile)
500 km or less (310 mile or less)	The first IGN ON every 100 km (60 mile)

Furthermore, when the timing is passed, alert message is displayed every time when ignition switch is turned ON to inform the driver that engine oil change is necessary.

At oil change, the mileage must be reset using vehicle information display function.

note	Alerted mileage might be different from actual mileage.
-------------	---



Work Procedure

1.START

1. Turn ignition switch ON.
2. Check information display of the combination meter.

Q.Is Distance to Engine Oil Change displayed?



2.SELECT OIL CONTROL SYSTEM MODE

Push the Display next switch and select oil control system mode.



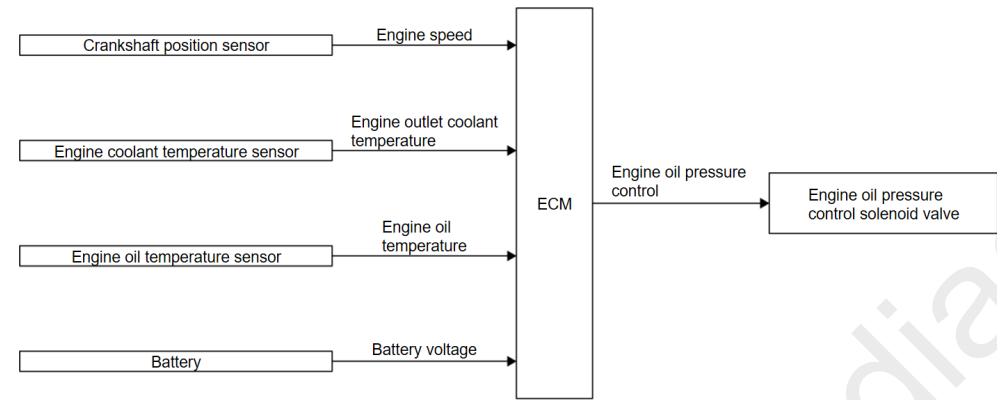
3.RESET ENGINE OIL DATA

1. Press and hold the Display Next switch at least 1 second while Distance to Engine Oil Change is displayed.
2. Stop pressing the Display Next switch, and a few seconds later, check that the value of Distance to Engine Oil Change is reset.

: END

System Description

SYSTEM DIAGRAM



Component parts	Function
Crankshaft position sensor	Crankshaft Position Sensor 
Engine coolant temperature sensor	Engine Coolant Temperature Sensor 
Engine oil temperature sensor	Engine Oil Temperature

Component parts	Function
	Sensor 
Battery	ECM receives the battery voltage signal.
ECM	ECM 
Engine oil pressure control solenoid valve	Engine Oil Pressure Control Solenoid Valve 

SYSTEM DESCRIPTION

ECM performs the variable hydraulic control (low oil pressure control and high oil pressure control) based on signals from each sensor according to oil temperature and engine load. ECM activates the engine oil pressure control solenoid valve and switches to the low oil pressure control and high oil pressure control. ECM uses the low oil pressure control for 80-90 % of the operating area to maintain low oil pressure and stops piston cooling jet (i.e. achievement of less than or equal to jet injection valve opening pressure).

High oil pressure control start condition

- High oil pressure control start condition
- High engine speed
- Coolant temperature is 60°C (140°F) or more under high engine load condition

Low oil pressure control start condition

- Coolant temperature is less than 60°C (140°F) under low engine speed condition
- Coolant temperature is 60°C (140°F) or more under low engine load and low engine speed conditions

Component Inspection

1.CHECK HEATED OXYGEN SENSOR 2 HEATER

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 (HO2S2) harness connector.
3. Check resistance between HO2S2 terminals as per the following.

Heated oxygen sensor 2		Resistance
Terminal		
1	2	5.4 - 7.3 Ω [at 25°C (77°F)]
4	1	$\infty \Omega$ (Continuity should not exist)
	2	
	3	
3	4	
	1	
	2	

Q.Is the inspection result normal?

Yes INSPECTION END

No 

2.REPLACE HEATED OXYGEN SENSOR 2

Replace heated oxygen sensor 2. Refer to [Exploded View](#) .

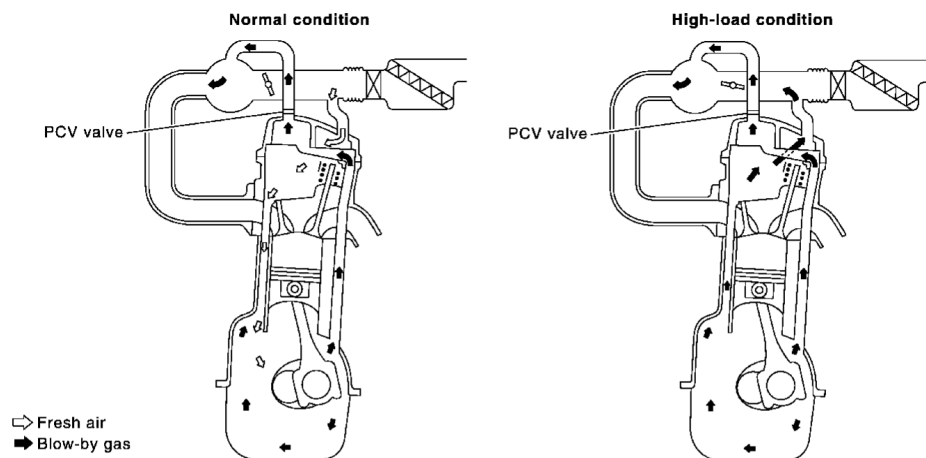
caution

- Discard any sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

- Before installing new sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner [commercial service tool (J-43897-18 or J43897-12)] and approved Anti-seize Lubricant (commercial service tool).

: INSPECTION END

Positive Crankcase Ventilation



This system returns blow-by gas to the intake manifold.

The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.

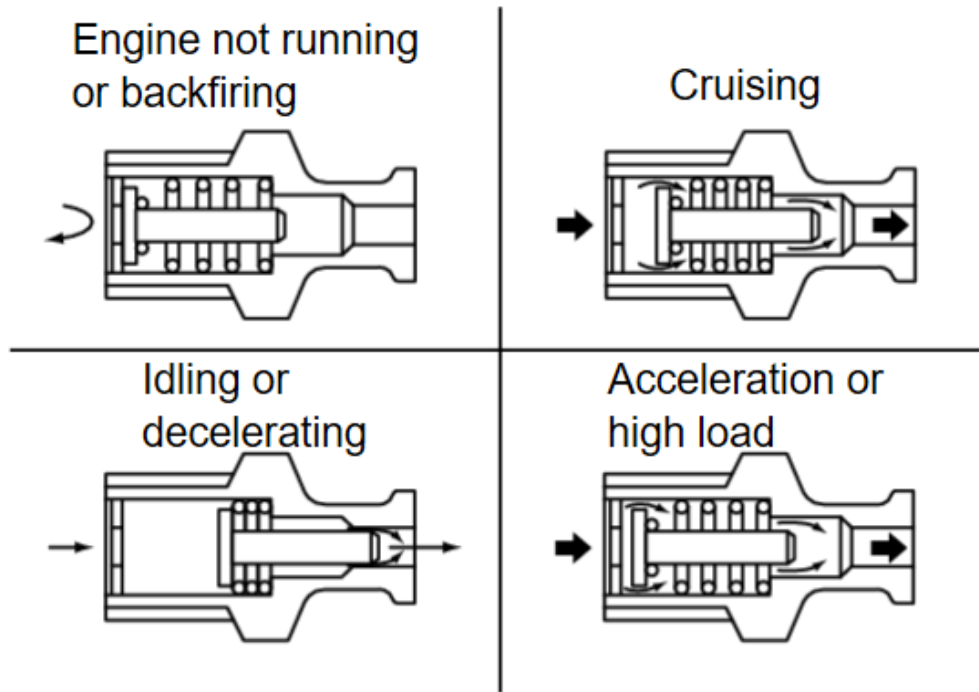
During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air.

The ventilating air is then drawn from the air inlet tubes into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover.

Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.

On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the air inlet tubes under all conditions.





System Description

DESCRIPTION

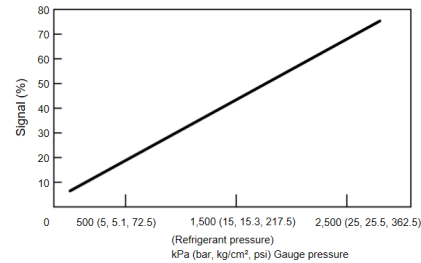
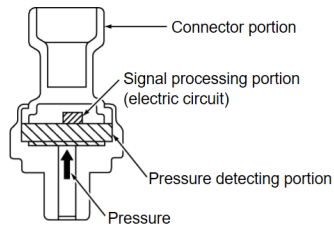
ECM transmits a target power generation voltage signal received from IPDM E/R to the generator via LIN communication. The generator includes a self-diagnosis function and transmits a diagnosis signal to ECM via LIN communication when detecting a malfunction. When ECM receives a diagnosis signal, ECM detects DTC and transmits a charge warning light request signal to the combination meter to turn ON the charge warning light.

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Refrigerant Pressure Sensor

The refrigerant pressure sensor is installed at the condenser of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.

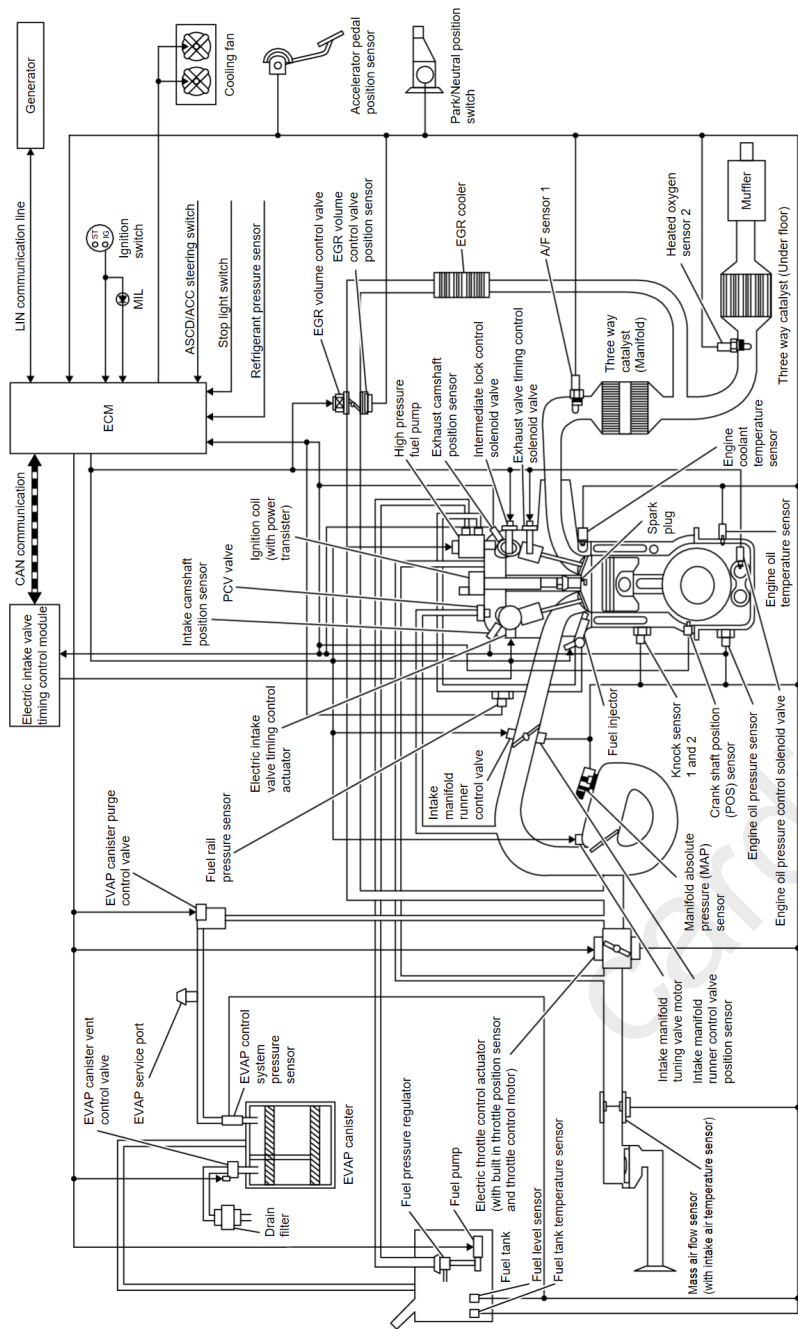




System Description

SYSTEM DIAGRAM

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Component parts	Function
Accelerator pedal position sensor	Accelerator Pedal Position Sensor 
Air fuel ratio (A/F) sensor 1	Air Fuel Ratio (A/F) Sensor 1 
ASCD steering switch	Steering Switch 
ACC steering switch	
Cooling fan	Cooling Fan 
Crankshaft position sensor	Crankshaft Position Sensor 
ECM	ECM 
EGR system	System Description 
EGR volume control valve	EGR Volume Control Valve 
Electric intake valve timing control actuator	Electric Intake Valve Timing Control Actuator 
Electric intake valve timing control module	Electric Intake Valve Timing Control Module 
Electric throttle control actuator	Electric Throttle Control Actuator 
Engine coolant temperature sensor	Engine Coolant Temperature Sensor 
Engine oil pressure sensor	Engine Oil Pressure Sensor 
Engine oil pressure control solenoid valve	Engine Oil Pressure Control Solenoid Valve 
Engine oil pressure control system	Warning Light/Indicator Light Warning lamps/Indicator lamps 
Engine oil temperature sensor	Engine Oil Temperature Sensor 
EVAP canister	EVAP Canister 
EVAP canister purge volume control solenoid valve	EVAP Canister Purge Volume Control Solenoid Valve 

Component parts	Function
EVAP canister vent control valve	EVAP Canister Vent Control Valve ➡
EVAP control system pressure sensor	EVAP Control System Pressure Sensor ➡
Exhaust camshaft position sensor	Exhaust Camshaft Position Sensor ➡
Exhaust valve timing control solenoid valve	Exhaust Valve Timing Control Solenoid Valve ➡
Exhaust valve timing intermediate lock control solenoid valve	Exhaust Valve Timing Intermediate Lock Control Solenoid Valve ➡
Fuel injector	Fuel Injector ➡
Fuel level sensor unit and fuel pump	Fuel Level Sensor Unit And Fuel Pump Fuel Level Sensor Unit and Fuel Pump ➡
Fuel pressure control	System Description ➡
Fuel rail pressure sensor	Fuel Rail Pressure Sensor ➡
Fuel tank temperature sensor	Fuel Tank Temperature Sensor ➡
Heated oxygen sensor 2	Heated Oxygen Sensor 2 ➡
High pressure fuel pump	High Pressure Fuel Pump ➡
Ignition coil with power transistor	Ignition Coil With Power Transistor ➡
Intake camshaft position sensor	Intake Camshaft Position Sensor ➡
Intake manifold runner control valve	Intake Manifold Runner Control Valve ➡
Intake manifold tuning valve	Intake Manifold Tuning Valve ➡
Knock sensor	Knock Sensor ➡
Malfunction indicator light (MIL)	Malfunction Indicator Light (MIL) Malfunction Indicator Lamp (MIL) ➡ (Full TFT meter)

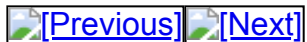
Component parts	Function
	Malfunction Indicator Light (MIL) Malfunction Indicator Lamp (MIL) (7 inch information display) 
Manifold absolute pressure sensor	Manifold Absolute Pressure Sensor 
Mass air flow sensor (With intake air temperature sensor)	Mass Air Flow Sensor (With Intake Air Temperature Sensor) 
Power generation voltage variable control system	System Description 
Refrigerant pressure sensor	Refrigerant Pressure Sensor 
Stop light switch	Stop Light Switch Stop Lamp Switch 

SYSTEM DESCRIPTION

ECM controls the engine by various functions.

Function	Reference
Dig (direct injection gasoline) system	System Description 
Electric ignition system	System Description 
Intake valve timing control	System Description 
Exhaust valve timing control	System Description 
Intake manifold runner control	System Description 
Intake manifold tuning system	System Description 
Engine protection control	System Description 
Air conditioning cut control	System Description 

Function	Reference
Cooling fan control	System Description 
Evaporative emission system	System Description 
Automatic speed control device (ASCD)	System Description 
CAN communication	System Description 
Active grille shutter system	System Description System Description 



Test Value and Test Limit

The following is the information specified in Service \$06 of SAE J1979/ISO 15031-5.

The test value is a parameter used to determine whether a system/circuit diagnostic test is OK or NG while being monitored by the ECM during self-diagnosis. The test limit is a reference value which is specified as the maximum or minimum value and is compared with the test value being monitored.

These data (test value and test limit) are specified by On Board Monitor ID (OBDMID), Test ID (TID), Unit and Scaling ID and can be displayed on the GST screen.

The items of the test value and test limit will be displayed with GST screen which items are provided by the ECM. (e.g., if bank 2 is not applied on this vehicle, only the items of bank 1 are displayed)

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
HO2S	01H	Air fuel ratio (A/F) sensor 1 (Bank 1)	P0131	83H	0BH	Minimum sensor output voltage for test cycle
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Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	

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Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
			P0131	84H	0BH	Maximum sensor output voltage for test cycle
			P0130	85H	0BH	Minimum sensor output voltage for test cycle
			P0130	86H	0BH	Maximum sensor output voltage for test cycle
			P0133	87H	04H	Response rate: Response ratio (lean to rich)
			P0133	88H	04H	Response rate: Response ratio (rich to lean)
			P2A00 or P2096	89H	84H	The amount of shift in air fuel ratio (too lean)
			P2A00 or P2097	8AH	84H	The amount of shift in air fuel ratio (too rich)
			P0130	8BH	0BH	Difference in sensor output voltage
			P0133	8CH	83H	Response gain at the limited frequency
			P014C	8DH	04H	O2 sensor slow response - Rich to lean bank 1 sensor 1
			P014C	8EH	04H	O2 sensor slow response - Rich to lean bank 1 sensor 1
			P014D	8FH	84H	O2 sensor slow response - Lean to rich bank 1 sensor 1
			P014D	90H	84H	O2 sensor slow response - Lean to rich bank 1 sensor 1
			P015A	91H	01H	O2 sensor delayed response - Rich to lean

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
	02H	Heated oxygen sensor 2 (Bank 1)				bank 1 sensor 1
			P015A	92H	01H	O2 sensor delayed response - Rich to lean bank 1 sensor 1
			P015B	93H	01H	O2 sensor delayed response - Lean to rich bank 1 sensor 1
			P015B	94H	01H	O2 sensor delayed response - Lean to rich bank 1 sensor 1
			P0133	95H	04H	Response rate: Response ratio (lean to rich)
			P0133	96H	84H	Response rate: Response ratio (rich to lean)
			P2297	97H	0BH	A/F Sensor IL High Gain Monitor
			P2297	98H	0BH	A/F Sensor IL Low Gain Monitor
			P0138	07H	0CH	Minimum sensor output voltage for test cycle
			P0137	08H	0CH	Maximum sensor output voltage for test cycle
			P0138	80H	0CH	Sensor output voltage
			P0139	81H	0CH	Difference in sensor output voltage
			P0139	82H	11H	Rear O2 sensor delay response diagnosis

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
	03H	Heated oxygen sensor 3 (Bank 1)	P0143	07H	0CH	Minimum sensor output voltage for test cycle
			P0144	08H	0CH	Maximum sensor output voltage for test cycle
			P0146	80H	0CH	Sensor output voltage
			P0145	81H	0CH	Difference in sensor output voltage

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
	05H	Air fuel ratio (A/F) sensor 1 (Bank 2)	P0151	83H	0BH	Minimum sensor output voltage for test cycle

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Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
			P0151	84H	0BH	Maximum sensor output voltage for test cycle
			P0150	85H	0BH	Minimum sensor output voltage for test cycle
			P0150	86H	0BH	Maximum sensor output voltage for test cycle
			P0153	87H	04H	Response rate: Response ratio (lean to rich)
			P0153	88H	04H	Response rate: Response ratio (rich to lean)
			P2A03 or P2098	89H	84H	The amount of shift in air fuel ratio (too lean)
			P2A03 or P2099	8AH	84H	The amount of shift in air fuel ratio (too rich)
			P0150	8BH	0BH	Difference in sensor output voltage
			P0153	8CH	83H	Response gain at the limited frequency
			P014E	8DH	04H	O2 sensor slow response - Rich to lean bank 2 sensor 1
			P014E	8EH	04H	O2 sensor slow response - Rich to lean bank 2 sensor 1
			P014F	8FH	84H	O2 sensor slow response - Lean to rich bank 2 sensor 1
			P014F	90H	84H	O2 sensor slow response - Lean to rich bank 2 sensor 1
			P015C	91H	01H	O2 sensor delayed response - Rich to lean

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
	06H	Heated oxygen sensor 2 (Bank 2)				bank 2 sensor 1
			P015C	92H	01H	O2 sensor delayed response - Rich to lean bank 2 sensor 1
			P015D	93H	01H	O2 sensor delayed response - Lean to rich bank 2 sensor 1
			P015D	94H	01H	O2 sensor delayed response - Lean to rich bank 2 sensor 1
			P0153	95H	04H	Response rate: Response ratio (lean to rich)
			P0153	96H	84H	Response rate: Response ratio (rich to lean)
			P2298	97H	0BH	A/F Sensor IL High Gain Monitor
			P2298	98H	0BH	A/F Sensor IL Low Gain Monitor
			P0158	07H	0CH	Minimum sensor output voltage for test cycle
			P0157	08H	0CH	Maximum sensor output voltage for test cycle
			P0158	80H	0CH	Sensor output voltage
			P0159	81H	0CH	Difference in sensor output voltage
			P0159	82H	11H	Rear O2 sensor delay response diagnosis

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
CATALYST	07H	Heated oxygen sensor 3 (Bank2)	P0163	07H	0CH	Minimum sensor output voltage for test cycle
			P0164	08H	0CH	Maximum sensor output voltage for test cycle
			P0166	80H	0CH	Sensor output voltage
			P0165	81H	0CH	Difference in sensor output voltage
	21H	Three way catalyst function (Bank1)	P0420	80H	01H	O2 storage index
			P0420	82H	01H	Switching time lag engine exhaust index value
			P2423	83H	0CH	Difference in 3rd O2 sensor output voltage
			P2423	84H	84H	O2 storage index in HC trap catalyst
	22H	Three way catalyst function (Bank2)	P0430	80H	01H	O2 storage index
			P0430	82H	01H	Switching time lag engine exhaust index value
			P2424	83H	0CH	Difference in 3rd O2 sensor output voltage
			P2424	84H	84H	O2 storage index in HC trap catalyst

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
EGR SYSTEM	31H	EGR function	P0400	80H	96H	Low flow faults: EGR temp change rate (short term)
			P0400	81H	96H	Low flow faults: EGR temp change rate (long term)
			P0400	82H	96H	Low flow faults: Difference between max EGR temp and EGR temp under idling condition
			P0400	83H	96H	Low flow faults: Max EGR temp
			P1402	84H	96H	High Flow Faults: EGR temp increase rate
			P0402	85H	FCH	EGR differential pressure high flow
			P0401	86H	37H	EGR differential pressure low flow
			P2457	87H	96H	EGR temperature
			P0402	87H	FCH	Delta intake pressure of EGR high flow monitor
			P0401	88H	FCH	Delta intake pressure of EGR low flow monitor
			P0402	89H	FCH	Intake manifold pressure as parameter of HP-EGR high flow monitor

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
VVT SYSTEM	35H	VVT Monitor (Bank1)	P100A	84H	10H	VEL slow response diagnosis

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Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
			P1090	85H	10H	VEL servo system diagnosis
			Advanced: P052A Retarded: P052B	87H	9DH	VTC intake intermediate lock system diagnosis (VTC intermediate lock position check diagnosis)
			P0011	88H	9DH	VTC function failure diagnosis (Intake ADV side)
			P0012	89H	9DH	VTC function failure diagnosis (Intake RET side)
			P0015	8AH	9DH	VTC function failure diagnosis (Exhaust RET side)
			P0014	8BH	9DH	VTC function failure diagnosis (Exhaust ADV side)
			Advanced: P054A Retarded: P054B	8CH	9DH	Exhaust intermediate lock VTC function check diagnosis

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
36H	VVT Monitor (Bank2)		P100B	84H	10H	VEL slow response diagnosis
			P1093	85H	10H	VEL servo system diagnosis
			Advanced: P052C Retarded: P052D	87H	9DH	VTC intake intermediate lock system diagnosis (VTC intermediate lock position check diagnosis)
			P0021	88H	9DH	VTC function failure diagnosis (Intake ADV side)
			P0022	89H	9DH	VTC function failure diagnosis (Intake RET side)
			P0025	8AH	9DH	VTC function failure diagnosis (Exhaust RET side)
			P0024	8BH	9DH	VTC function failure diagnosis (Exhaust ADV side)
			Advanced: P054C Retarded: P054D	8CH	9DH	Exhaust intermediate lock VTC function check diagnosis

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
EVAP SYSTEM	39H	EVAP control system leak (Cap Off)	P0455	80H	0CH	Difference in pressure sensor output voltage before and after pull down
	3BH	EVAP control system leak (Small leak)	P0442	80H	05H	Leak area index (for more than 0.04 inch)
	3CH	EVAP control system leak (Very small leak)	P0456	80H	05H	Leak area index (for more than 0.02 inch)
			P0456	81H	FDH	Maximum internal pressure of EVAP system during monitoring
			P0456	82H	FDH	Internal pressure of EVAP system at the end of monitoring
	3DH	Purge flow system	P0441	83H	0CH	Difference in pressure sensor output voltage before and after vent control valve close
		Fuel Tank Vent Line	P00FE	84H	04H	Evap system air volume ratio of estimated to measured

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
O2 SENSOR HEATER	41H	A/F sensor 1 heater (Bank 1)	P0030	83H	0BH	A/F sensor heater circuit malfunction
			P0053	84H	14H	A/F sensor heater circuit malfunction (RACmonitor)
	42H	Heated oxygen sensor 2 heater (Bank 1)	P0141	81H	14H	Rear O2 sensor internal impedance
			P00D2	82H	0CH	Rear O2 sensor heater performance
	43H	Heated oxygen sensor 3 heater (Bank 1)	P0043	80H	0CH	Converted value of heater electric current to voltage
	45H	A/F sensor 1 heater (Bank 2)	P0036	83H	0BH	A/F sensor heater circuit malfunction
			P0059	84H	14H	A/F sensor heater Malfunction (RACmonitor)
	46H	Heated oxygen sensor 2 heater (Bank 2)	P0161	81H	14H	Rear O2 sensor internal impedance
			P00D4	82H	0CH	Rear O2 sensor heater performance
	47H	Heated oxygen sensor 3 heater (Bank 2)	P0063	80H	0CH	Converted value of heater electric current to voltage

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
SECONDARY AIR	71H	Secondary air system	P0411	80H	01H	Secondary air injection system incorrect flow detected
			Bank1: P0491 Bank2: P0492	81H	01H	Secondary air injection system insufficient flow
			P2445	82H	01H	Secondary air injection system pump stuck off
			P2448	83H	01H	Secondary air injection system high airflow
			Bank1: P2440 Bank2: P2442	84H	01H	Secondary air injection system switching valve stuck open
			P2440	85H	01H	Secondary air injection system switching valve stuck open
			P2444	86H	01H	Secondary air injection system pump stuck on

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
Fuel System	81H	Fuel injection system function (Bank 1)	P219A	82H	03H	Air-fuel ratio cylinder imbalance diagnosis parameter backup

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Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	

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Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	

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Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
			P219C	83H	83H	Air-fuel ratio cylinder imbalance diagnosis CPS method #1 cylinder parameter
			P219D	84H	83H	Air-fuel ratio cylinder imbalance diagnosis CPS method #2 cylinder parameter
			P219E	85H	83H	Air-fuel ratio cylinder imbalance diagnosis CPS method #3 cylinder parameter
			P219F	86H	83H	Air-fuel ratio cylinder imbalance diagnosis CPS method #4 cylinder parameter
			P21A0	87H	83H	Air-fuel ratio cylinder imbalance diagnosis CPS method #5 cylinder parameter
			P21A2	89H	83H	Air-fuel ratio cylinder imbalance diagnosis CPS method #7 cylinder parameter
			P23FE	8AH	03H	Air-fuel ratio cylinder imbalance diagnosis for DIG+MPI area parameter backup
			P23F2	8BH	83H	Air-fuel ratio cylinder imbalance diagnosis CPS

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
						method for DIG+MPI area #1 cylinder parameter
			P23F3	8CH	83H	Air-fuel ratio cylinder imbalance diagnosis CPS method for DIG+MPI area #2 cylinder parameter
			P23F4	8DH	83H	Air-fuel ratio cylinder imbalance diagnosis CPS method for DIG+MPI area #3 cylinder parameter
			P23F5	8EH	83H	Air-fuel ratio cylinder imbalance diagnosis CPS method for DIG+MPI area #4 cylinder parameter
			P23F6	8FH	83H	Air-fuel ratio cylinder imbalance diagnosis CPS method for DIG+MPI area #5 cylinder parameter
			P23F8	91H	83H	Air-fuel ratio cylinder imbalance diagnosis CPS method for DIG+MPI area #7 cylinder parameter

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
	82H	Fuel injection system function (Bank 2)	P219B	82H	03H	Air-fuel ratio cylinder imbalance diagnosis parameter backup

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Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
			P219D	83H	83H	Air-fuel ratio cylinder imbalance diagnosis CPS method #2 cylinder parameter
			P219F	85H	83H	Air-fuel ratio cylinder imbalance diagnosis CPS method #4 cylinder parameter
			P21A1	87H	83H	Air-fuel ratio cylinder imbalance diagnosis CPS method #6 cylinder parameter
			P21A3	89H	83H	Air-fuel ratio cylinder imbalance diagnosis CPS method #8 cylinder parameter
			P23FF	8AH	03H	Air-fuel ratio cylinder imbalance diagnosis for DIG+MPI area parameter backup
			P23F3	8BH	83H	Air-fuel ratio cylinder imbalance diagnosis CPS method for DIG+MPI area #2 cylinder parameter
			P23F5	8DH	83H	Air-fuel ratio cylinder imbalance diagnosis CPS method for DIG+MPI area #4 cylinder parameter
			P23F7	8FH	83H	Air-fuel ratio cylinder imbalance diagnosis CPS

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
						method for DIG+MPI area #6 cylinder parameter
			P23F9	91H	83H	Air-fuel ratio cylinder imbalance diagnosis CPS method for DIG+MPI area #8 cylinder parameter

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
MISFIRE	A1H	Multiple cylinder misfires	P0301	80H	24H	Misfiring counter at 1000 revolution of the first cylinder

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	

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Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	

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Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
			P0302	81H	24H	Misfiring counter at 1000 revolution of the second cylinder
			P0303	82H	24H	Misfiring counter at 1000 revolution of the third cylinder
			P0304	83H	24H	Misfiring counter at 1000 revolution of the fourth cylinder
			P0305	84H	24H	Misfiring counter at 1000 revolution of the fifth cylinder
			P0306	85H	24H	Misfiring counter at 1000 revolution of the sixth cylinder
			P0307	86H	24H	Misfiring counter at 1000 revolution of the seventh cylinder
			P0308	87H	24H	Misfiring counter at 1000 revolution of the eighth cylinder
			P0300	88H	24H	Misfiring counter at 1000 revolution of the multiple cylinders
			P0301	89H	24H	Misfiring counter at 200 revolution of the first cylinder
			P0302	8AH	24H	Misfiring counter at 200 revolution of the second

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
						cylinder
			P0303	8BH	24H	Misfiring counter at 200 revolution of the third cylinder
			P0304	8CH	24H	Misfiring counter at 200 revolution of the fourth cylinder
			P0305	8DH	24H	Misfiring counter at 200 revolution of the fifth cylinder
			P0306	8EH	24H	Misfiring counter at 200 revolution of the sixth cylinder
			P0307	8FH	24H	Misfiring counter at 200 revolution of the seventh cylinder
			P0308	90H	24H	Misfiring counter at 200 revolution of the eighth cylinder
			P0300	91H	24H	Misfiring counter at 1000 revolution of the single cylinder
			P0300	92H	24H	Misfiring counter at 200 revolution of the single cylinder
			P0300	93H	24H	Misfiring counter at 200 revolution of the multiple cylinders

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
	A2H	No. 1 cylinder misfire	P0301	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles
			P0301	0CH	24H	Misfire counts for last/current driving cycles
	A3H	No. 2 cylinder misfire	P0302	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles
			P0302	0CH	24H	Misfire counts for last/current driving cycles
	A4H	No. 3 cylinder misfire	P0303	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles
			P0303	0CH	24H	Misfire counts for last/current driving cycles
	A5H	No. 4 cylinder misfire	P0304	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles
			P0304	0CH	24H	Misfire counts for last/current driving cycles

Item	OBDMID	Self-diagnostic test item	DTC	Test value and Test limit (GST display)		Description
				TID	Unit and Scaling ID	
PM FILTER	A6H	No. 5 cylinder misfire	P0305	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles
			P0305	0CH	24H	Misfire counts for last/current driving cycles
	A7H	No. 6 cylinder misfire	P0306	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles
			P0306	0CH	24H	Misfire counts for last/current driving cycles
	A8H	No. 7 cylinder misfire	P0307	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles
			P0307	0CH	24H	Misfire counts for last/current driving cycles
	A9H	No. 8 cylinder misfire	P0308	0BH	24H	EWMA (Exponential Weighted Moving Average) misfire counts for last 10 driving cycles
			P0308	0CH	24H	Misfire counts for last/current driving cycles
	B2H	PM Filter Monitor (Bank 1)	P226D	80H	84H	GPF Removal diagnosis parameter by Tdiff
			P226D	81H	84H	GPF Removal diagnosis parameter by Pdiff

[\[Previous\]](#) [\[Next\]](#)

Values on the Diagnosis Tool

VALUES ON THE DIAGNOSIS TOOL

note	- The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to M.U.T.-III SE display items. - Numerical values in the following table are reference values. - These values are input/output values that ECM receives/transmits and may differ from actual operations. Example: The ignition timing shown by the timing light may differ from the ignition timing displayed on the data monitor. This occurs because the timing light shows a value calculated by ECM according to signals received from the camshaft position sensor and other sensors related to ignition timing. - For outlines of following items, refer to M.U.T.-III SE Function CONSULT Function .
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Monitor Item	Condition	Values/Status
COOLANT TEMP/S	Engine: After warming up	More than 70°C (158°F)
BATTERY VOLT	Ignition switch: ON (Engine stopped)	11 – 14 V
INT/A TEMP SE	Engine: After warming up	Indicates intake air temperature

Monitor Item	Condition		Values/Status
Ignition timing 1	- Engine: After warming up - Selector lever: P or N position - Air conditioner switch: OFF - No load	Idle	0 – 10 BTDC
		2,000 rpm	30 – 50 BTDC
PURG VOL C/V	- Engine: After warming up - Selector lever: P or N position - Air conditioner switch: OFF - No load	Idle (Accelerator pedal: Not depressed even slightly, after engine starting)	0 %
		2,000 rpm	1 – 90 %
FUEL T/TMP SE	Ignition switch: ON		Indicates fuel tank temperature
FUEL LEVEL SE	Ignition switch: ON		Depending on fuel level of fuel tank
EVAP SYS PRES	Ignition switch: ON		Approx. 1.8 – 4.8 V
CAL/LD VALUE	- Engine: After warming up - Selector lever: P or N position - Air conditioner switch: OFF - No load	Idle	5 – 35 %
		2,500 rpm	5 – 35 %

Monitor Item	Condition		Values/Status
HO2S2 (B1)	- Engine: After warming up - After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Revving engine from idle up to 3,000 rpm quickly	0 – 0.3 V ↔ 0.6 – 1.0 V
			LEAN ↔ RICH
ENG OIL TEMP	Engine: After warming up		More than 70°C (158°F)
A/F ALPHA-B1	See Diagnosis Procedure DTC Diagnosis Procedure  .		
MAP SENSOR	- Engine: After warming up - Selector lever: P or N - Air conditioner switch: OFF - No load	Idle	Approx. 1.16 V
		2,000 rpm	Approx. 0.9 V
A/F S1 HTR (B1)	Engine: After warming up, idle the engine (More than 140 seconds after starting engine)		4 – 100%
ATOM PRES SEN 2	Ignition switch: ON		0 V
EXH/V TIM B1	- Engine: After warming up - Selector lever: P or N position - Air conditioner switch: OFF - No load	Idle	–5 – 5 °CA
		Around 2,500 rpm while the engine speed is rising	12 - 60 °CA

Monitor Item	Condition		Values/Status
EGR VALVE POSITION	Ignition switch: ON		0.0 deg
	Engine: Idle		0.0 deg
FUN DUTY	Engine: Running		0 – 100 %
A/GRLL SHTR POSITION	- Engine RPM: idle speed. - Vehicle speed: 0 km/h (0 MPH).		F/OPEN
	Vehicle speed: 30 km/h (19 MPH) or faster. (Comply the condition of active grille shutter operation.)		F/OPEN →MOVING→F/ CLOSE
ENG SPEED	- Connect the tachometer. - Run engine and compare M.U.T.-III SE value with the tachometer indication.		Almost the same speed as the tachometer indication.
TRVL AFTER MIL	Ignition switch: ON		0 – 65.535 km
B/FUEL SCHDL	See Diagnosis Procedure DTC Diagnosis Procedure  .		
MASS AIRFLOW	These items are displayed but not used.		
FUEL PRES SEN	- Engine: After warming up - Selector lever: P or N position - Air conditioner switch: OFF - No load	Idle	Approx. 3.69 MPa
		2,000 rpm	Approx. 3.96 MPa
ACCEL SEN 1	Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.5 – 1.0 V
		Accelerator pedal: Fully depressed	4.2 – 4.8 V

Monitor Item	Condition		Values/Status
ACCEL SEN 2*	Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.25 – 0.5 V
		Accelerator pedal: Fully depressed	2.0 – 2.5 V
TP SEN 1-B1	- Ignition switch: ON (Engine stopped) - Selector lever: D position	Accelerator pedal: Fully released	More than 0.74 V
		Accelerator pedal: Fully depressed	Less than 4.75 V
TP SEN 2-B1*	- Ignition switch: ON (Engine stopped) - Selector lever: D position	Accelerator pedal: Fully released	More than 0.765 V
		Accelerator pedal: Fully depressed	Less than 4.75 V
I/P PULLY SPD	- Connect the tachometer. - Start the engine and compare M.U.T.-III SE value with the tachometer indication.	Vehicle speed: More than 20 km/h (12 MPH)	Almost the same speed as the tachometer indication
VEHICLE SPEED	Turn drive wheels and compare M.U.T.-III SE value with the speedometer indication.		Almost the same speed as the speedometer indication
TUMBLE POS SEN	Ignition switch: ON		Approx. 0.8 V
	Engine: After warming up	Idle	Approx. 4.3 V
AC PRESS SEN	- Engine: Idle - Both air conditioner switch and blower fan switch: ON (Compressor operates)		0.3 – 4.5 V

Monitor Item	Condition		Values/Status
A/F SEN1 (B1)	Engine: After warming up	Maintaining engine speed at 2,000 rpm	Fluctuates around 2.15 V
VHCL SPEED SE	Turn drive wheels and compare M.U.T.-III SE value with the speedometer indication.		Almost the same speed as speedometer indication
SET VHCL SPD	Engine: Running	ASCD: Operating	The preset vehicle speed is displayed
A/F ADJ-B1	Engine: Idle		-0.450 – 0.330
A/F ALPHA-B1	Diagnosis Procedure DTC Diagnosis Procedure 		
H/P FUEL PUMP DEG	• Engine: After warming up • Selector lever: P or N position • Air conditioner switch: OFF • No load	Idle	244.6 deg
		2,000 rpm	244.4 deg
FUEL PRES SEN V	• Engine: After warming up • Selector lever: P or N position • Air conditioner switch: OFF • No load	Idle	0.820 – 1.160 V
		When revving engine up to 4,000 rpm quickly	0.820 – 2.900 V

Monitor Item	Condition		Values/Status	
EOP SENSOR	• Engine oil temperature: 80°C • Selector lever: P or N position • Air conditioner switch: OFF • No load	Idle	1000 – 2000 mV	
		2,000 rpm	1500 – 3500 mV	
MASS AIR FLOW SENSOR (g/s) B1	Diagnosis Procedure DTC Diagnosis Procedure 			
EGR VALVE POSITION SEN	Ignition switch: ON		Approx. 0.5 V	
TOTAL DISTNC-OCS RST 1	Ignition switch: ON		0 - 655,350 km (0 - 407,234 miles)	
			note	Varies depending on vehicle environment.
TOTAL DISTNC-OCS RST 2			note	Varies depending on vehicle environment.
TOTAL DISTNC-OCS RST 3				
DETERIORNTN VL-OCS RST 1	Ignition switch: ON		0 - 655.35	
			note	Varies depending

Monitor Item	Condition	Values/Status
		on vehicle environment.
DETERIORTN VL-OCS RST 2	Ignition switch: ON	0 - 655.35 note Varies depending on vehicle environment.
DETERIORTN VL-OCS RST 3	Ignition switch: ON	0 - 655.35 note Varies depending on vehicle environment.
TOTAL DISTNC-OCS WRN 1	Ignition switch: ON	0 - 655,350 km (0 - 407,234 miles) note Varies depending on vehicle environment.
TOTAL DISTNC-OCS WRN 2	Ignition switch: ON	0 - 655,350 km (0 - 407,234 miles) note Varies depending on vehicle environment.
TOTAL DISTNC-OCS WRN 3	Ignition switch: ON	0 - 655,350 km (0 - 407,234 miles) note Varies depending on vehicle environment.
DETERIORTN VL-OCS WRN 1	Ignition switch: ON	0 - 655.35

Monitor Item	Condition		Values/Status
			note Varies depending on vehicle environment.
DETERIORATION VL-OCS WRN 2	Ignition switch: ON		0 - 655.35 note Varies depending on vehicle environment.
DETERIORATION VL-OCS WRN 3	Ignition switch: ON		0 - 655.35 note Varies depending on vehicle environment.
CURRENT DETERIORATION VAL	Ignition switch: ON		0 - 655.35 note Varies depending on vehicle environment.
LOAD SIGNAL	Ignition switch: ON	Rear window defogger switch: ON and/or Lighting switch: 2nd position	On
		Rear window defogger switch and lighting switch: OFF	Off
AIR COND SIG	Engine: After warming up, idle the engine	Air conditioner switch: OFF	Off
		Air conditioner switch: ON (Compressor operates)	On

Monitor Item	Condition		Values/Status
PW/ST SIGNAL	Engine: After warming up, idle the engine	Steering wheel: Not being turned	Off
		Steering wheel: Being turned	On
P/N POSI SW	Ignition switch: ON	Selector lever: P or N position	On
		Selector lever: Except above position	Off
START SIGNAL	Ignition switch: ON → START → ON		Off → On → Off
CLSD THL POS	Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	On
		Accelerator pedal: Slightly depressed	Off
HO2S2 MNTR(B1)	Engine: After warming up	Revving engine from idle up to 3,000 rpm quickly	LEAN ↔ RICH
	After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.		
IGNITION SW	Ignition switch: ON → OFF → ON		On → Off → On
HEATER FAN SW	Engine: After warming up, idle the engine	Blower fan switch: ON	On
		Blower fan switch: OFF	Off
IDL AV LEARN	- Engine: After warming up - Air conditioner switch: OFF - No load - Throttle valve closed position learning: Completed	Idle air volume learning has already been performed successfully.	CMPLT
		Idle air volume learning has not been performed yet.	YET

Monitor Item	Condition		Values/Status
BRAKE SW	Ignition switch: ON	Brake pedal: Fully released	Off
		Brake pedal: depressed	On
COMBUSTION	note This item is displayed but are not applicable to this model.		
VIAS S/V-1	- Engine: After warming up - Selector lever: P or N position - Air conditioner switch: OFF - No load	When revving engine up to 5,000 rpm quickly	Off → On → Off
AIR COND RLY	Engine: After warming up, idle the engine	A/C switch: OFF	Off
		A/C switch: ON (Compressor operates)	On
FUEL PUMP RLY	- For 1 seconds after turning ignition switch ON - Engine is running or cranking		On
	Except above		Off
VENT CONT/V	Ignition switch: ON		Off
HO2S2 HTR(B1)	Ignition switch: ON		Off
DIST SW	Ignition switch: ON	DISTANCE switch: Pressed	On
		DISTANCE switch: Released	Off
BRAKE SW2	Ignition switch: ON	Brake pedal: Fully released	On
		Brake pedal: Depressed	Off

Monitor Item	Condition		Values/Status
BRAKE SW1	Ignition switch: ON	Brake pedal: Fully released	Off
		Brake pedal: Depressed	On
SET SW	Ignition switch: ON	SET – switch: Pressed	On
		SET – switch: Released	Off
RESUME/ACC SW	Ignition switch: ON	RES + switch: Pressed	On
		RES + switch: Released	Off
CANCEL SW	Ignition switch: ON	CANCEL switch: Pressed	On
		CANCEL switch: Released	Off
MAIN SW	Ignition switch: ON	ASCD/ACC MAIN switch: Pressed	On
		ASCD/ACC MAIN switch: Released	Off
CRUISE LIGHT	Ignition switch: ON	ASCD switch: Pressed at the 1st time → at the 2nd time	On → Off
A/GRLL SHTR CALIBRATION	• Turn ignition switch OFF → ON • Drive the vehicle at a speed more than 30 km/h (19 MPH) for the first time.		CMPLT
	• Turn ignition switch OFF → ON. • When the vehicle speed does not reach 30 km/h (19 MPH).		INCMP
A/GRLL SHTR CIRCUIT DIAG	Malfunction of active grill shutter power supply is detected.		NG
	Malfunction of active grill shutter power supply is not detected.		OK

Monitor Item	Condition	Values/Status
A/GRLL SHTRR TEMP DIAG	Abnormal temperature of active grill shutter actuator is detected.	NG
	Abnormal temperature of active grill shutter actuator is not detected.	OK
A/GRLL SHTRR OVER RUN	Active grill shutter does not stop within normal moving limit.	NG
	Active grill shutter stops within normal moving limit.	OK
A/GRLL SHTRR STUCK	Detecting the active grille shutter stuck or the operation range less than normal.	NG
	Not detecting the active grille shutter stuck or the operation range less than normal.	OK
A/GRLL SHTRR CALIB DIAG	Malfunction of active grill shutter initial position learning is detected.	NG
	Malfunction of active grill shutter initial position learning is not detected.	OK
HO2 S2 DIAG1 (B1)	DTC P0139 self-diagnosis (delayed response) is incomplete.	INCMP
	DTC P0139 self-diagnosis (delayed response) is complete.	CMPLT
HO2 S2 DIAG2 (B1)	DTC P0139 self-diagnosis (slow response) is incomplete.	INCMP
	DTC P0139 self-diagnosis (slow response) is complete.	CMPLT
EVAP LEAK DIAG	Ignition switch: ON	Depending on condition of EVAP leak diagnosis
EVAP DIAG READY	Ignition switch: ON	Depending on ready condition of EVAP leak diagnosis
SYSTEM 1 DIAGNOSIS A B1	DTC P219A self-diagnosis is incomplete.	INCMP
	DTC P219A self-diagnosis is complete.	CMPLT

Monitor Item	Condition		Values/Status
A/F SEN1 DIAG1 (B1)	DTC P015A and P015B self-diagnosis incomplete.		INCMP
	DTC P015A and P015B self-diagnosis is complete.		CMPLT
A/F SEN1 DIAG2 (B1)	DTC P014C and P014D self-diagnosis incomplete.		INCMP
	DTC P014C and P014D self-diagnosis is complete.		CMPLT
SYSTEM 1 DIAGNOSIS B B1	DTC P219A self-diagnosis is on standby.		ABSENT
	DTC P219A self-diagnosis is under diagnosis.		PRSENT
A/F IMBALNC DIAG- CPS STAT	The vehicle condition is not within the diagnosis range of DTC P219C – P219F.		ABSNT
	The vehicle condition is within the diagnosis range of DTC P219C – P219F.		PRSNT
A/F SEN1 DIAG3(B1)	The vehicle condition is not within the diagnosis range of DTC P014C, P014D, P015A or P015B.		ABSNT
	The vehicle condition is within the diagnosis range of DTC P014C, P014D, P015A or P015B.		PRSNT
A/F IMBLNC DIAG- CPS CMPLT	Self-diagnosis of DTC P219C – P219F and P21A0 – P21A3 is incomplete.		INCMP
	Self-diagnosis of DTC P219C – P219F and P21A0 – P21A3 is complete.		CMPLT
Di inj pulse B1	- Engine: After warming up - Selector lever: P position - A/C switch: OFF - No load	Idle	About 1.47 – 1.75 ms
		2,000 rpm	About 1.5 – 1.77 ms

Monitor Item	Condition		Values/Status
DI timing SOI multi inj step1	- Engine: After warming up - Selector lever: P or N position - A/C switch: OFF - No load	Idle	28 BTDC
		2,000 rpm	48 BTDC
THRTL STK CNT B1	note This item is displayed but are not applicable to this model.		
VTC DTY EX B1	- Engine: After warming up - Selector lever: P or N position - Air conditioner switch: OFF - No load	Idle	0 %
		When revving engine up to 2,000 rpm quickly	Approx. 0 – 90 %

*: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

[\[Previous\]](#) [\[Next\]](#)

Work Procedure

Before Replacing ECM

1.SAVE ECM DATA

① With M.U.T.-III SE

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Turn ignition switch ON.
4. Select "SAVING DATA FOR REPLC CPU" in "WORK SUPPORT" mode of "ENGINE" using M.U.T.-III SE.
5. Follow the instruction of M.U.T.-III SE display.

note

- Necessary data in ECM is copied and saved to M.U.T.-III SE.
- Go to Step 2 regardless of with or without success in saving data.



:

- Replace ECM.
- After replacing ECM, perform necessary work.

2.REMOVE ECM

Remove ECM. Refer to [ECM : Removal & Installation](#) .

caution

After removing ECM, do not install new ECM, but change BCM at first.



3. REPLACE BCM

Replace BCM. Refer to [Removal and Installation](#) .



4. INSTALL ECM

Install ECM. Refer to [ECM : Removal & Installation](#) .
: After replacing ECM, perform necessary work.

After Replacing ECM

1.PERFORM ECM PROGRAMMING

 With M.U.T.-III SE

Perform ECM programming according to the procedure of “Programming” in M.U.T.-III SE Operation Manual. Refer to M.U.T.-III SE Operation Manual.

caution	During programming, maintain the following conditions: • Ignition switch: ON • Electric load: OFF • Brake pedal: Not depressed • Battery voltage: 12 – 13.5 V (Check the value displayed on the M.U.T.-III SE screen.)
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2.PERFORM IGNITION SWITCH OPERATION

1. Turn ignition switch OFF.
2. Turn ignition switch ON.



3.PERFORM INITIALIZATION OF NATS SYSTEM AND REGISTRATION OF ALL NATS IGNITION KEY IDS

Refer to [Description](#) .



4.CHECK ECM DATA STATUS

Check if the data is successfully copied from the ECM at Step 1 (before replacement) and saved in M.U.T.-III SE.

Q.Is the data saved successfully?





5.WRITE ECM DATA

With M.U.T.-III SE

1. Select “WRITING DATA FOR REPLC CPU” in “WORK SUPPORT” mode of “ENGINE” using M.U.T.-III SE.
2. Follow the instruction of M.U.T.-III SE display.

note	The data saved by “SAVING DATA FOR REPLC CPU” is written to ECM.
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6.PERFORM VIN REGISTRATION

Refer to Description [Description](#)



7.WRITING MAC KEY FOR ECM

Refer to [Description](#)



8.PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

Refer to Description [Description](#)



9.PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Refer to Description [Description](#)



10.PERFORM IDLE AIR VOLUME LEARNING

Refer to [Description](#)



11.PERFORM EGR VOLUME CONTROL VALVE CLOSED POSITION LEARNING

Refer to [Description](#)



12.CHECK DTC

1. Turn ignition switch OFF and wait for 10 seconds or more.
2. Turn ignition switch ON.

3. If DTC is displayed, perform diagnosis of detected DTC. Refer to [DTC Index](#) .



: END

13.WRITING MAC KEY FOR BCM

Refer to [Description](#) .

: END

[\[Previous\]](#) [\[Next\]](#)

DTC Index

note

The details of time display are as follows.

- CRNT: A malfunction is detected now.
- PASS: A malfunction was detected in the past.

Self Diagnostic Result

×: Applicable

DTC No.	M.U.T.-III SE display		Fail-safe	Reference
B120E-42	IPDM E/R	[MEMORY ERROR]	—	DTC Description 
B120E-55	IPDM E/R	[NOT CONFIGURED]	—	DTC Description 
B121A-11	FR FOG LIGHT LH PWR SPLY CIRC	[CIRCUIT SHORT TO GROUND]	×	DTC Description 
B1256-11	FR FOG LIGHT RH PWR SPLY CIRC	[CIRCUIT SHORT TO GROUND]	×	DTC Description 
B12A3-72	Fuel pump Off circuit	[ACTUATOR STUCK OPEN]	—	DTC Description 
B12A4-81	Battery current sensor	[INVALID SERIAL DATA RECEIVED]	×	DTC Description 
B12A4-92	Battery current sensor	[PFM/INCORRECT OPERATN]	×	DTC Description 
B12A4-94	Battery current sensor	[UNEXPECTED OPERATION]	—	DTC Description 
B20A1-16	IPDM E/R	[CIRC VOLT BELOW THRESHOLD]	—	DTC Description 
B20A1-72	IPDM E/R	[ACTUATOR STUCK OPEN]	—	DTC Description 
B20A2-87	Headlight (RH) LIN communication	[MISSING MESSAGE]	×	DTC Description 
B20A4-87	Headlight (LH) LIN communication	[MISSING MESSAGE]	×	DTC Description 
B20C7-11	A/C clutch	[CIRCUIT SHORT TO GROUND]	×	DTC Description 
B20C7-15	A/C clutch	[CIRC SHORT TO BATT OR OPEN]	×	DTC Description 
B20C8-14	Compressor (ECV)	[CIRC SHORT TO GRND OR OPEN]	×	DTC Description 
B20D4-11	TAIL LIGHT LH PWR SPLY CIRC	[CIRCUIT SHORT TO GROUND]	×	DTC Description 
B20DD-73	IGN RELAY ON CIRC	[ACTUATOR STUCK CLOSED]	—	DTC Description 
B20DE-72	IGN RELAY OFF CIRC	[ACTUATOR STUCK OPEN]	—	DTC Description 

DTC No.	M.U.T.-III SE display		Fail-safe	Reference
B20E2-96	LED HEADLIGHT RH	[CMPNENT INTERNAL MLFNCTN]	×	DTC Description 
B20E3-96	LED HEADLIGHT LH	[CMPNENT INTERNAL MLFNCTN]	×	DTC Description 

Network-DTC

×: Applicable

DTC No.	M.U.T.-III SE display		Fail-safe	Reference
U0073-00	Control module comm Bus A Off	[NO SUBTYPE INFO]	×	DTC Description 
U2140-87	CAN comm err (ECM)	[MISSING MESSAGE]	×	DTC Description 
U2141-87	CAN comm err (TCM)	[MISSING MESSAGE]	—	DTC Description 
U2148-87	CAN comm err (brake control unit)	[MISSING MESSAGE]	—	DTC Description 
U214E-87	CAN comm err (combination meter)	[MISSING MESSAGE]	—	DTC Description 
U214F-87	CAN comm err (BCM)	[MISSING MESSAGE]	×	DTC Description 
U2153-87	CAN comm err (HVAC)	[MISSING MESSAGE]	—	DTC Description 
U2159-87	CAN comm err (steering control unit)	[MISSING MESSAGE]	—	DTC Description 
U2176-87	CAN comm err (CCM/ST angle sensor)	[MISSING MESSAGE]	—	DTC Description 

[\[Previous\]](#) [\[Next\]](#)

DTC Inspection Priority Chart

Priority	DTC No.	M.U.T.-III SE display	
1	U0073-00	Control module comm Bus A Off	[NO SUBTYPE INFO]
	U2140-87	CAN comm err (ECM)	[MISSING MESSAGE]
	U2141-87	CAN comm err (TCM)	[MISSING MESSAGE]
	U2148-87	CAN comm err (brake control unit)	[MISSING MESSAGE]
	U214E-87	CAN comm err (combination meter)	[MISSING MESSAGE]
	U214F-87	CAN comm err (BCM)	[MISSING MESSAGE]
	U2153-87	CAN comm err (HVAC)	[MISSING MESSAGE]
	U2159-87	CAN comm err (steering control unit)	[MISSING MESSAGE]
	U2176-87	CAN comm err (CCM/ST angle sensor)	[MISSING MESSAGE]
2	B120E-42	IPDM E/R	[MEMORY ERROR]
	B120E-55	IPDM E/R	[NOT CONFIGURED]
3	B12A3-72	Fuel pump Off circuit	[ACTUATOR STUCK OPEN]
	B12A4-81	Battery current sensor	[INVALID SERIAL DATA RECEIVED]
	B12A4-92	Battery current sensor	[PFM/INCORRECT OPERATN]
	B12A4-94	Battery current sensor	[UNEXPECTED OPERATION]
	B20A1-16	IPDM E/R	[CIRC VOLT BELOW THRESHOLD]
	B20A1-72	IPDM E/R	[ACTUATOR STUCK OPEN]
	B20DD-73	IGN RELAY ON CIRC	[ACTUATOR STUCK CLOSED]
	B20DE-72	IGN RELAY OFF CIRC	[ACTUATOR STUCK OPEN]

Priority	DTC No.	M.U.T.-III SE display	
4	B121A-11	FR FOG LIGHT LH PWR SPLY CIRC	[CIRCUIT SHORT TO GROUND]
	B1256-11	FR FOG LIGHT RH PWR SPLY CIRC	[CIRCUIT SHORT TO GROUND]
	B20A2-87	Headlight (RH) LIN communication	[MISSING MESSAGE]
	B20A4-87	Headlight (LH) LIN communication	[MISSING MESSAGE]
	B20C7-11	A/C clutch	[CIRCUIT SHORT TO GROUND]
	B20C7-15	A/C clutch	[CIRC SHORT TO BATT OR OPEN]
	B20C8-14	Compressor (ECV)	[CIRC SHORT TO GRND OR OPEN]
	B20D4-11	TAIL LIGHT LH PWR SPLY CIRC	[CIRCUIT SHORT TO GROUND]
	B20E2-96	LED HEADLIGHT RH	[CMPNENT INTERNAL MLFNCTN]
	B20E3-96	LED HEADLIGHT LH	[CMPNENT INTERNAL MLFNCTN]

Reference Value

VALUES ON THE DIAGNOSIS TOOL

note

The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to M.U.T.-III SE display items.

Monitor	Condition		Value/Status
Compressor request 1	Engine running	A/C switch ON (A/C compressor is operating)	On
		A/C switch OFF	Off
Easy fill tire alert horn req	Easy fill tire alert ON		On
	Easy fill tire alert OFF		Off
Cranking enable- TCM	Ignition switch ON	Cranking stop required	Stop
		Cranking allowed	Permit
		Cranking not allowed	Prohibit
	Receives invalid CAN signal		Unavailable value
Cranking enable- ECM	No request		No request
	Cranking stop required		Stop
	Cranking allowed		Permit
	Cranking not allowed		Prohibit
DTRL REQ	Engine running and parking brake is released	- Lighting switch OFF (Except for Canada) - Lighting switch AUTO (Only when the illumination judgement by auto light system is OFF) (For Canada)	On
		Lighting switch 2ND	Off
COOLING FAN REQ	Engine running		0 – 100%
FR WIPER REQ	Receives invalid CAN signal		NG
	Ignition switch ON	Front wiper HI operation	HIGH
		Front wiper LO operation	LOW
		Front wiper forced termination	STOP
		Front wiper stopped	RETURN
HIGH BEAM REQ	Lighting switch 2ND	Lighting switch HI	On
		Lighting switch LO	Off

Monitor	Condition		Value/Status
Horn request	Receives invalid CAN signal		NG
	C mode (Horn chirp mode) return horn request		Return
	Theft warning alarm request		Thft warn
	Horn chirp request		Hrn chirp
	Panic alarm request		Panic
	Horn OFF request		Off
	No request		No request
Low beam request	Lighting switch 2ND		On
	- Lighting switch OFF (Except for Canada) - Lighting switch AUTO (For Canada)		Off
POSITION LIGHT REQ	Lighting switch 1ST		On
	- Lighting switch OFF (Except for Canada) - Lighting switch AUTO (For Canada)		Off
IGNITION SW	Ignition switch START		Start
	Ignition switch ON		On
	No request		No request
	Ignition switch OFF		Off
FRONT FOG LIGHT REQ	Lighting switch 2ND	Front fog light switch ON	On
		Front fog light switch OFF	Off
Shift position	Receives invalid CAN signal		NG
	Engine running	Manual mode	M
		D range	D
		N range	N
		R range	R
		P range	P
COMP ECV STATUS	ECV control output	Malfunction	NG
		Normal	OK
BATTERY VOLTAGE	Ignition switch ON		11 V – 14 V
FR WIPER STOP POSITION	Ignition switch ON	Front wiper stop position	Stop P
		Except front wiper stop position	Active
IGNITION POWER SUPPLY	Ignition switch ON		On
	Ignition switch OFF		Off
HOOD SW (CAN)	Close the hood		Close
	Open the hood		Open
	Transmits invalid CAN signal		NG
A/C RELAY	Engine running	A/C switch ON (A/C compressor is operating)	Compressor clutch on
		A/C switch OFF	Off
REVERSE SIGNAL (CAN)	Transmits invalid CAN signal		NG
	Ignition switch ON	R range	On
		Except R range	Off

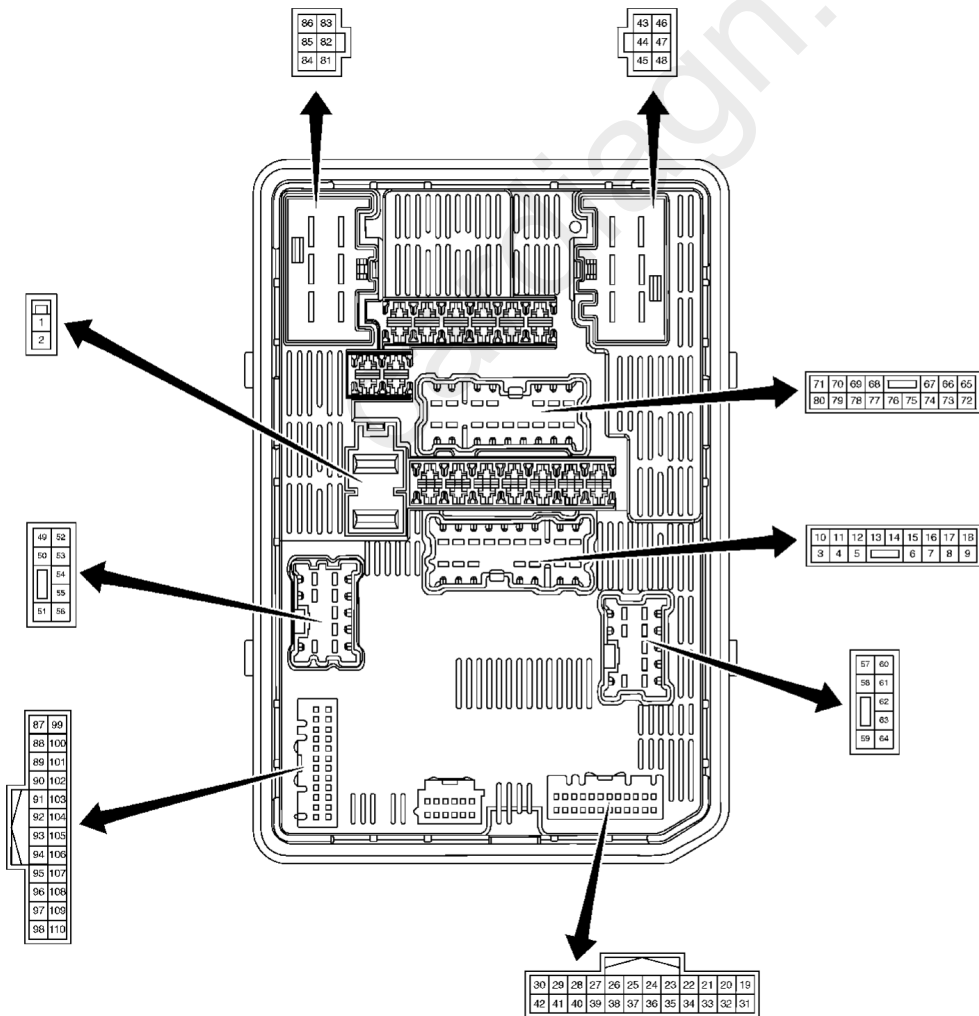
Monitor	Condition		Value/Status
COMP ECV CURRENT	Engine running	A/C switch ON (A/C compressor is operating)	0.00 A – 1.00 A
		A/C switch OFF	0.00 A
Starter&starter cont relay stat	Starter relay and starter cut relay are ON		On, On
	Transmits invalid CAN signal		invalid
	Starter relay is ON		On, Off
	Starter relay and starter cut relay are OFF		Off, Off
Hood switch	Close the hood		Close
	Open the hood		Open
IGN RELAY	Ignition switch ON		Close
	Ignition switch OFF		Open
Cooling fan relay-2	Engine running	Cooling fan operated	ON
		Cooling fan stop	OFF
Compressor	Engine running	A/C switch ON (A/C compressor is operating)	ON
		A/C switch OFF	OFF
Front wiper HI/LO relay	Ignition switch ON	Front wiper HI operated	ON
		Except front wiper HI operated	OFF
Horn relay	Horn ON		ON
	Horn OFF		OFF
Front wiper relay	Ignition switch ON	Front wiper is operating	ON
		Front wiper stop	OFF
Battery current sen value (LIN)	Engine running - Battery: Full charge - Engine Idling		(–200.00) – (+300.00) A
Headlight warning (LH) (LIN)	Ignition switch OFF (auto ACC status) or ON	Headlight LO (LH): Normal	Close
		Headlight LO (LH): Malfunction	Open
Headlight warning (RH) (LIN)	Ignition switch OFF (auto ACC status) or ON	Headlight LO (RH): Normal	Close
		Headlight LO (RH): Malfunction	Open
Compressor ECV duty	Engine running	A/C switch ON (A/C compressor is operating)	0 – 100%
		A/C switch OFF	0%
Cooling fan relay-3	Engine running		0 – 100%
Front fog light (LH)	Lighting switch 2ND	Front fog light switch ON	100.0%
		Front fog light switch OFF	0.0%
Front fog light (RH)	Lighting switch 2ND	Front fog light switch ON	100.0%
		Front fog light switch OFF	0.0%
Tail light (LH)	Lighting switch 1ST		100.0%
	- Lighting switch OFF (Except for Canada) - Lighting switch AUTO (For Canada)		0.0%

Monitor	Condition		Value/Status
Tail light (RH)	Lighting switch 1ST		100.0%
	- Lighting switch OFF (Except for Canada) - Lighting switch AUTO (For Canada)		0.0%
Headlight LO (RH)	Ignition switch OFF (auto ACC status) or ON		100.0%
	Ignition switch OFF (not auto ACC status)		0.0%
Headlight LO (LH)	Ignition switch OFF (auto ACC status) or ON		100.0%
	Ignition switch OFF (not auto ACC status)		0.0%
Parking light (LH) req (LIN)	- Lighting switch OFF (Except for Canada) - Lighting switch AUTO (For Canada)		Close
	Lighting switch 1ST		Open
DTRL (LH) req (LIN)	Engine running and parking brake is released	Lighting switch 2ND	Close
		- Lighting switch OFF (Except for Canada) - Lighting switch AUTO (Only when the illumination judgement by auto light system is OFF) (For Canada)	Open
Headlight LO (LH) req (LIN)	- Lighting switch OFF (Except for Canada) - Lighting switch AUTO (For Canada)		Close
	Lighting switch 2ND		Open
Headlight HI (LH) req (LIN)	Lighting switch 2ND	Lighting switch LO	Close
		Lighting switch HI	Open
Parking light (RH) req (LIN)	- Lighting switch OFF (Except for Canada) - Lighting switch AUTO (For Canada)		Close
	Lighting switch 1ST		Open
DTRL (RH) req (LIN)	Engine running and parking brake is released	Lighting switch 2ND	Close
		- Lighting switch OFF (Except for Canada) - Lighting switch AUTO (Only when the illumination judgement by auto light system is OFF) (For Canada)	Open

Monitor	Condition		Value/Status
Parking/DTRL (LH) output (LIN)	Engine running and parking brake is released	- Lighting switch OFF (Except for Canada) - Lighting switch AUTO (Only when the illumination judgement by auto light system is OFF) (For Canada)	100.0%
		Lighting switch 2ND	6.0%
	Engine stop	- Lighting switch OFF (Except for Canada) - Lighting switch AUTO (Only when the illumination judgement by auto light system is OFF) (For Canada)	0.0%
Parking/DTRL (RH) output (LIN)	Engine running and parking brake is released	- Lighting switch OFF (Except for Canada) - Lighting switch AUTO (Only when the illumination judgement by auto light system is OFF) (For Canada)	100.0%
		Lighting switch 2ND	6.0%
	Engine stop	- Lighting switch OFF (Except for Canada) - Lighting switch AUTO (Only when the illumination judgement by auto light system is OFF) (For Canada)	0.0%
Headlight HI (RH) req (LIN)	Lighting switch 2ND	Lighting switch LO	Close
		Lighting switch HI	Open
Headlight LO (RH) req (LIN)	- Lighting switch OFF (Except for Canada) - Lighting switch AUTO (For Canada)		Close
	Lighting switch 2ND		Open
T LIGHT LH CIRC MALFUNCTN	Tail light LH power supply circuit reaches the retry upper limit.		0 – 1
NMB T LIGHT LH CIRC RETRY	Retry of tail light LH power supply circuit is permitted.		0 – 20
Fr fog light (LH) circ malfunctn	Front fog light LH power supply circuit reaches the retry upper limit.		0 – 1
T LIGHT RH CIRC MALFUNCTN	Tail light RH power supply circuit reaches the retry upper limit.		0 – 1

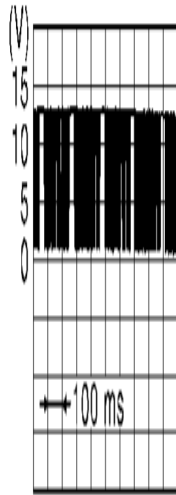
Monitor	Condition	Value/Status
NMB T LIGHT RH CIRC RETRY	Retry of tail light RH power supply circuit is permitted.	0 – 20
NMB T LIGHT RH CIRC SHORT	Tail light RH power supply circuit detects over current.	0 – 5
NMB F FOG LH CIRC RETRY	Retry of front fog light LH power supply circuit is permitted.	0 – 20
NMB F FOG LH CIRC SHORT	Front fog light LH power supply circuit detects over current.	0 – 5
F FOG RH CIRC MALFUNCTN	Front fog light RH power supply circuit reaches the retry upper limit.	0 – 1
NMB F FOG RH CIRC RETRY	Retry of front fog light RH power supply circuit is permitted.	0 – 20
NMB F FOG RH CIRC SHORT	Front fog light RH power supply circuit detects over current.	0 – 5
NMB T LIGHT LH CIRC SHORT	Tail light LH power supply circuit detects over current.	0 – 5

TERMINAL LAYOUT



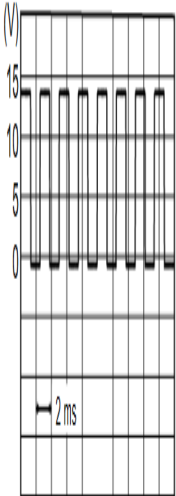
PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/Output			
1 (W)	Ground	Battery power supply	Input	Ignition switch OFF		6 – 16 V
2 (L)	Ground	Battery power supply	Input	Ignition switch OFF		6 – 16 V
4 (R)	Ground	Tail light LH power supply	Output	- Lighting switch OFF (Except for Canada) - Lighting switch AUTO (For Canada)		0 – 1 V
				Lighting switch 1ST		6 – 16 V
5 (Y)	Ground	Front window washer relay control	Output	Ignition switch ON	Front washer switch OFF	6 – 16 V
					Front washer switch ON	0 – 1 V
6 (SB)	Ground	Rear window washer relay control	Output	Ignition switch ON	Rear washer switch OFF	6 – 16 V
					Rear washer switch ON	0 – 1 V
8 (LG)	Ground	ECM relay power supply	Output	Ignition switch OFF (More than a few seconds after turning ignition switch OFF)		0 – 1 V
				For a few seconds after turning ignition switch OFF or ignition switch ON		6 – 16 V
9 (L)	Ground	Horn relay control	Output	Horn OFF		6 – 16 V
				Horn ON		0 – 1 V
11 (BR)	Ground	Ignition power supply	Output	Ignition switch OFF		0 – 1 V
				Ignition switch ON		6 – 16 V
12 (B)	Ground	Ground	—	Ignition switch ON		0 – 1 V
17 (W)	Ground	Tail light RH power supply	Output	- Lighting switch OFF (Except for Canada) - Lighting switch AUTO (For Canada)		0 – 1 V
				Lighting switch 1ST		6 – 16 V
19 (LG)	Ground	Ignition power supply	Output	Ignition switch OFF		0 – 1 V
				Ignition switch ON		6 – 16 V
22 (P)	Ground	CAN-L	Input/Output	—		—
24 (L)	Ground	CAN-H	Input/Output	—		—

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/Output			
31 (B)	Ground	Ground	—	Ignition switch ON		0 – 1 V
33 (BR)	Ground	Front wiper stop position	Input	Ignition switch ON	Front wiper stop position	0 – 1 V
					Other than above	6 – 16 V
37 (G)	Ground	LIN (Battery current sensor)	Input/Output	Ignition switch ON		
38 (R)	Ground	LIN (Front combination light)	Input/Output	Ignition switch ON		
43 (LG)	Ground	Ignition power supply	Output	Ignition switch OFF		0 – 1 V
				Ignition switch ON		6 – 16 V
45 (V)	Ground	Front wiper motor HI power supply	Output	Ignition switch ON	Front wiper switch OFF	0 – 1 V
					Front wiper switch HI	6 – 16 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/Output			
46 (W)	Ground	Fuel pump power supply	Output	More than a few seconds after turning ignition switch ON		0 – 1 V
				For a few seconds after turning ignition switch ON or engine running		6 – 16 V
47 (B)	Ground	Ground	—	Ignition switch ON		0 – 1 V
48 (Y)	Ground	Front wiper motor LO power supply	Output	Ignition switch ON	Front wiper switch OFF	0 – 1 V
					Front wiper switch LO	6 – 16 V
50 (L)	Ground	LED headlight control module LH control	Output	Ignition switch OFF (not auto ACC status)		0 – 1 V
				Ignition switch OFF (auto ACC status) or ON		6 – 16 V
51 (P)	Ground	Front fog light LH power supply	Output	Lighting switch 2ND	Front fog light switch OFF	0 – 1 V
					Front fog light switch ON	6 – 16 V
52 (SB)	Ground	Hood switch	Input	Close the hood		0 – 1 V
				Open the hood		6 – 16 V
55 (G)	Ground	Ignition power supply	Output	Ignition switch OFF		0 – 1 V
				Ignition switch ON		6 – 16 V
57 (G)	Ground	Front fog light RH power supply	Output	Lighting switch 2ND	Front fog light switch OFF	0 – 1 V
					Front fog light switch ON	6 – 16 V
62 (P)	Ground	LED headlight control module RH control	Output	Ignition switch OFF (not auto ACC status)		0 – 1 V
				Ignition switch OFF (auto ACC status) or ON		6 – 16 V
65 (P)	Ground	Compressor power supply	Output	Engine running	A/C switch OFF	0 – 1 V
					A/C switch ON (A/C compressor is operating)	6 – 16 V
66 (R)	Ground	ECM relay power supply	Output	Ignition switch OFF (More than a few seconds after turning ignition switch OFF)		0 – 1 V
				For a few seconds after turning ignition switch OFF or ignition switch ON		6 – 16 V
70 (LG)	Ground	Ignition power supply	Output	Ignition switch OFF		0 – 1 V
				Ignition switch ON		6 – 16 V
71 (SB)	Ground	Ignition power supply	Output	Ignition switch OFF		0 – 1 V
				Ignition switch ON		6 – 16 V

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/Output		
73 (G)	Ground	ECM relay power supply	Output	Ignition switch OFF (More than a few seconds after turning ignition switch OFF)	0 – 1 V
				For a few seconds after turning ignition switch OFF or ignition switch ON	6 – 16 V
75 (V)	Ground	ECM relay power supply	Output	Ignition switch OFF (More than a few seconds after turning ignition switch OFF)	0 – 1 V
				For a few seconds after turning ignition switch OFF or ignition switch ON	6 – 16 V
76 (BR)	Ground	Fuel pump relay control	Input	More than a few seconds after turning ignition switch ON	6 – 16 V
				For a few seconds after turning ignition switch ON or engine running	0 – 1 V
78 (L)	Ground	ECM relay power supply	Output	Ignition switch OFF (More than a few seconds after turning ignition switch OFF)	0 – 1 V
				For a few seconds after turning ignition switch OFF or ignition switch ON	6 – 16 V
81 (L)	Ground	Battery power supply	Input	Ignition switch OFF	6 – 16 V
83 (G)	Ground	Starter motor power supply	Output	Other than at engine cranking	0 – 1 V
				At engine cranking	6 – 16 V
86 (GR)	Ground	Starter relay power supply	Input	Other than at engine cranking	Less than 4 V (IPDM E/R always outputs the voltage to detect the ON/OFF state of starter cut relay)
				At engine cranking	6 – 16 V
93 (LG)	Ground	ECM relay control	Input	Ignition switch OFF (More than a few seconds after turning ignition switch OFF)	6 – 16 V
				For a few seconds after turning ignition switch OFF or ignition switch ON	0 – 1 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/Output			
98 (Y)	Ground	ECV control	Output	Electrical control valve note Select "HVAC TEST" in "Actuator Test" mode of "HVAC".	Duty ratio: 0% (MODE5 or MODE6)	0 – 1 V
					Duty ratio: 40% (MODE3 or MODE4)	
					Duty ratio: 80 – 90% (MODE1, MODE2 or MODE7)	6 – 16 V
106 (V)	Ground	Cooling fan control module control	Output	Engine running		0 – 16 V
107 (G)	Ground	Cooling fan relay control	Output	Engine running	Cooling fan stop	6 – 16 V
					Cooling fan operated	0 – 1 V

Fail-safe

FAIL-SAFE CONTROL BY DTC

IPDM E/R performs fail-safe control when any DTC are detected.

DTC No.	M.U.T.-III SE display		Fail-safe
B121A-11	FR FOG LIGHT LH PWR SPLY CIRC	[CIRCUIT SHORT TO GROUND]	Shuts off the power supply to the front fog light LH power supply circuit until the front fog light ON conditions are no longer satisfied.
B1256-11	FR FOG LIGHT RH PWR SPLY CIRC	[CIRCUIT SHORT TO GROUND]	Shuts off the power supply to the front fog light RH power supply circuit until the front fog light ON conditions are no longer satisfied.
B12A4-81	Battery current sensor	[INVALID SERIAL DATA RECEIVED]	Fix the power generation command value to 14.3 V.
B12A4-92	Battery current sensor	[PFM/INCORRECT OPERATN]	
B20A2-87	Headlight (RH) LIN communication	[MISSING MESSAGE]	- Transmits the headlight warning signal (CAN communication) to the combination meter. (When the ignition switch turns ON, the headlight warning is displayed on the information display of the combination meter.) - Transmits the request signal (via LIN communication) to the both side LED headlight control module, and turns ON the headlight (LO) and parking light.
B20A4-87	Headlight (LH) LIN communication	[MISSING MESSAGE]	
B20C7-11	A/C clutch	[CIRCUIT SHORT TO GROUND]	Inhibit A/C compressor (magnetic clutch) operation.
B20C7-15	A/C clutch	[CIRC SHORT TO BATT OR OPEN]	
B20C8-14	Compressor (ECV)	[CIRC SHORT TO GRND OR OPEN]	Inhibit A/C compressor (electrical control valve) operation.
B20D4-11	TAIL LIGHT LH PWR SPLY CIRC	[CIRCUIT SHORT TO GROUND]	Shuts off the power supply to the following power supply circuits until the license plate light, side marker light and tail light ON conditions are no longer satisfied. - Tail light - License plate light

DTC No.	M.U.T.-III SE display		Fail-safe
			Side marker light
B20E2-96	LED HEADLIGHT RH	[CMPNENT INTERNAL MLFNCTN]	- Transmits the headlight warning signal (CAN communication) to the combination meter. (When the ignition switch turns ON, the headlight warning is displayed on the information display of the combination meter.) - Transmits the request signal (via LIN communication) to the both side LED headlight control module, and turns ON the headlight (LO) and parking light.
B20E3-96	LED HEADLIGHT LH	[CMPNENT INTERNAL MLFNCTN]	
U0073-00	Control module comm Bus A Off	[NO SUBTYPE INFO]	Refer to CAN COMMUNICATION CONTROL of following.
U2140-87	CAN comm err (ECM)	[MISSING MESSAGE]	
U214F-87	CAN comm err (BCM)	[MISSING MESSAGE]	

CAN COMMUNICATION CONTROL

When CAN communication with ECM and BCM is impossible, IPDM E/R performs fail-safe control. After CAN communication recovers normally, it also returns to normal control.

If No CAN Communication Is Available With ECM

Control part	Fail-safe operation
Cooling fan	- The cooling fan is operated at HI operation when the ignition switch is turned ON. - Turn OFF the cooling fan operation when the ignition switch is turned OFF.
A/C compressor	A/C compressor OFF

If No CAN Communication Is Available With BCM

Control part	Fail-safe operation
Headlight	Turns ON the headlight (LO) when the ignition switch is turned ON.

Control part	Fail-safe operation
	- Turns OFF the headlight (LO) when the ignition switch is turned OFF. - Headlight (HI): OFF
- Parking light - License plate light - Tail light - Side marker light - Illumination	- Turns ON the tail light, parking light, license plate light, side marker light and each illumination when the ignition switch is turned ON. - Turns OFF the tail light, parking light, license plate light, side marker light and each illumination when the ignition switch is turned OFF.
Front wiper	- The status just before activation of fail-safe control is maintained until the ignition switch is turned OFF while the front wiper is operating at LO or HI speed. - The wiper is operated at LO speed until the ignition switch is turned OFF if the fail-safe control is activated while the front wiper is set in the INT mode and the front wiper motor is operating.
Daytime running light	Daytime running light: OFF
Front fog light	Front fog light: OFF
Ignition relay	The status just before activation of fail-safe is maintained.
Starter motor	Starter relay: OFF

IGNITION RELAY CONTROL

- IPDM E/R monitors the voltage at the contact circuit of the ignition relay inside it.
- IPDM E/R judges the ignition relay error if the voltage differs between the contact circuit.

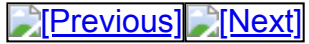
Voltage judgement		IPDM E/R judgement	Operation
Ignition relay contact side	Ignition relay control condition		
ON	ON	Ignition relay ON normal	—
OFF	OFF	Ignition relay OFF normal	—
ON	OFF	Ignition relay ON stuck	Detects DTC [B20DD-73: IGN RELAY ON CIRC]
OFF	ON	Ignition relay OFF stuck	Detects DTC [B20DE-72: IGN RELAY OFF CIRC]

FRONT WIPER CONTROL

IPDM E/R detects front wiper stop position by front wiper stop position signal.

When front wiper stop position signal is in the condition listed below while the front wiper is operating, IPDM E/R activates the fail-safe.

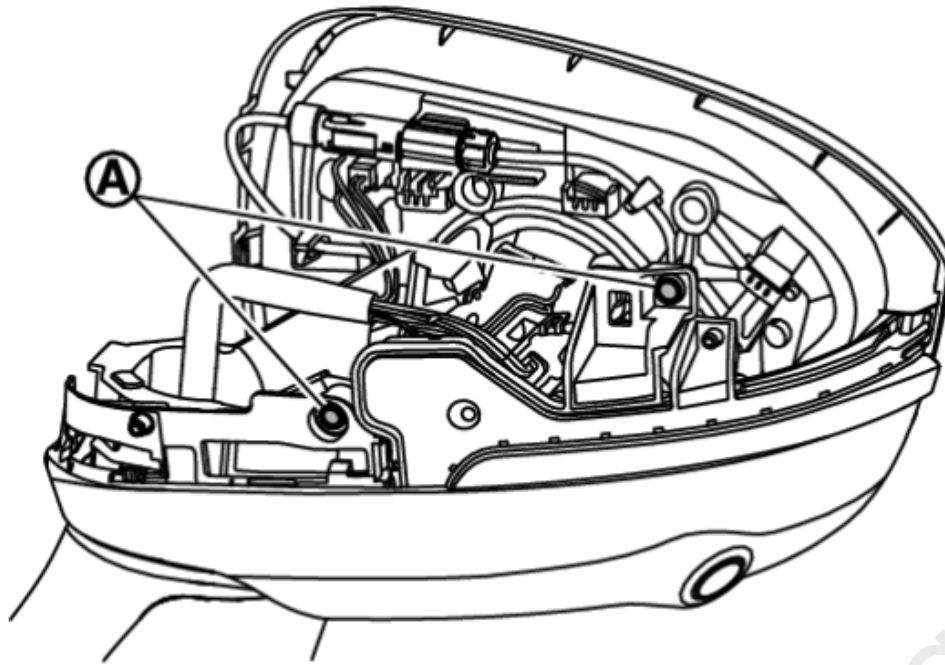
Ignition switch	Front wiper switch	Front wiper stop position signal	Fail-safe
ON	OFF	The signal does not change from the battery voltage for 10 seconds.	Stops front wiper power supply for 20 seconds
	Except OFF	The signal does not change for 10 seconds.	



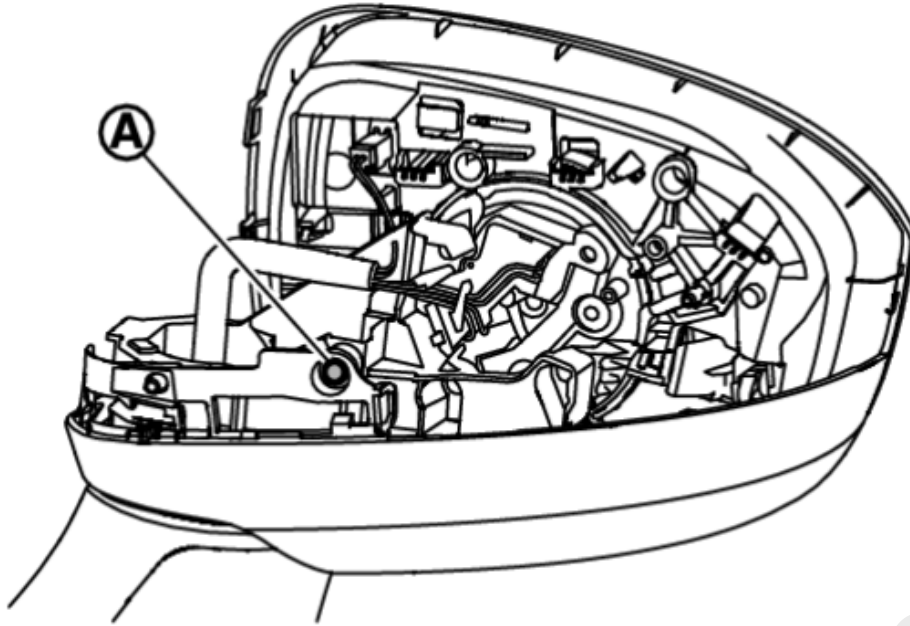
Disassembly and Assembly

DISASSEMBLY

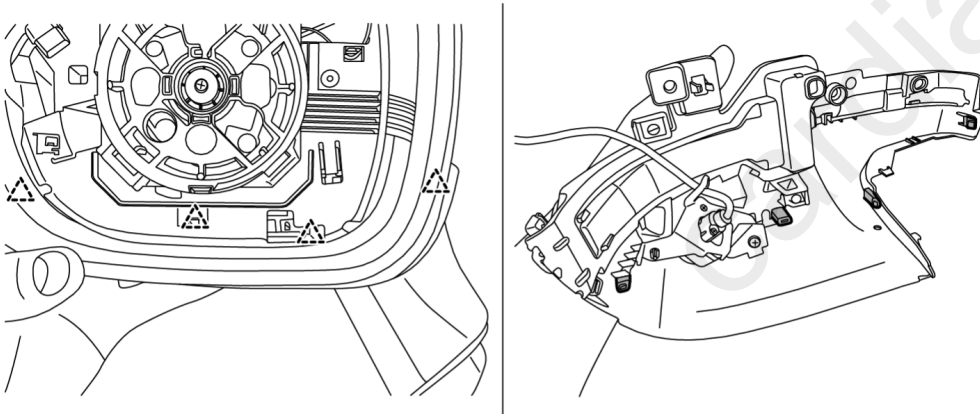
1. Remove door mirror assembly. Refer to [Removal and Installation](#) .
2. Remove glass mirror. Refer to [Removal and Installation](#) .
3. Remove door mirror cover. Refer to [Removal and Installation](#) .
4. Remove door mirror finisher fixing screws 
 - With side turn signal light



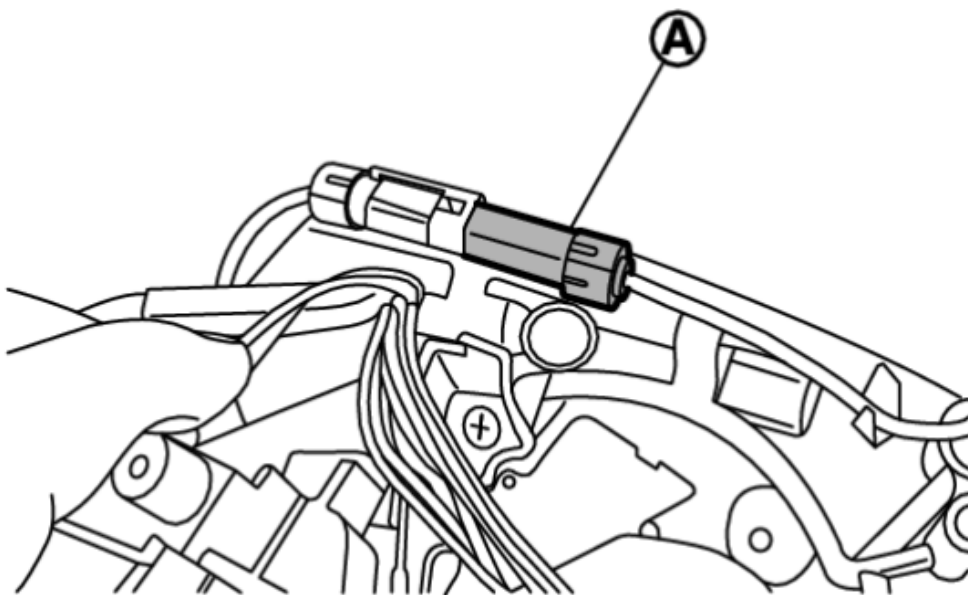
- Without side turn signal light



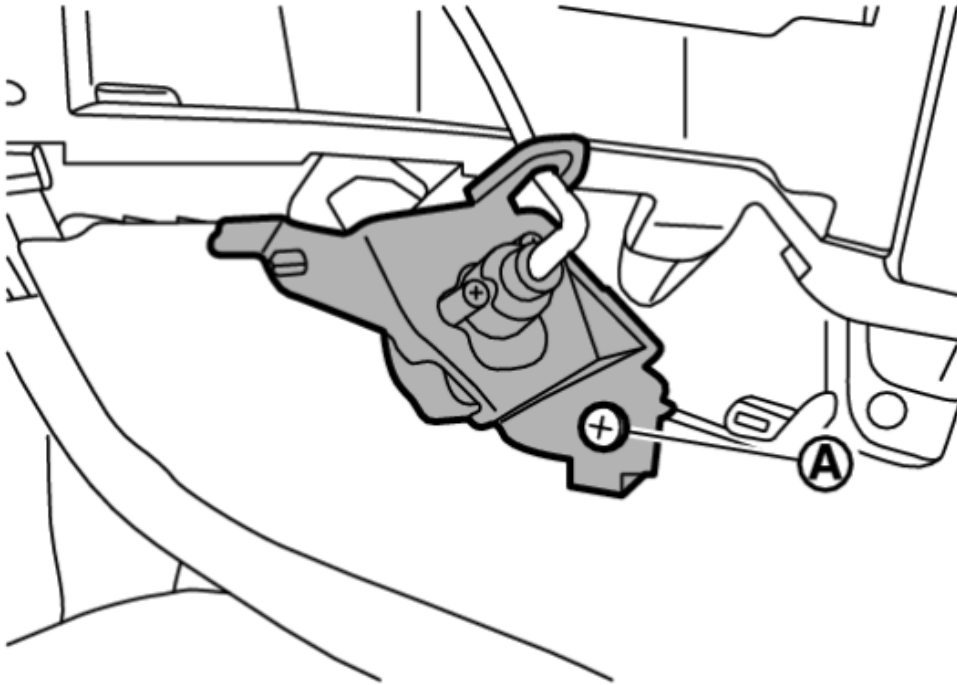
5. Disengage door mirror finisher fixing pawls, and then remove door mirror finisher.



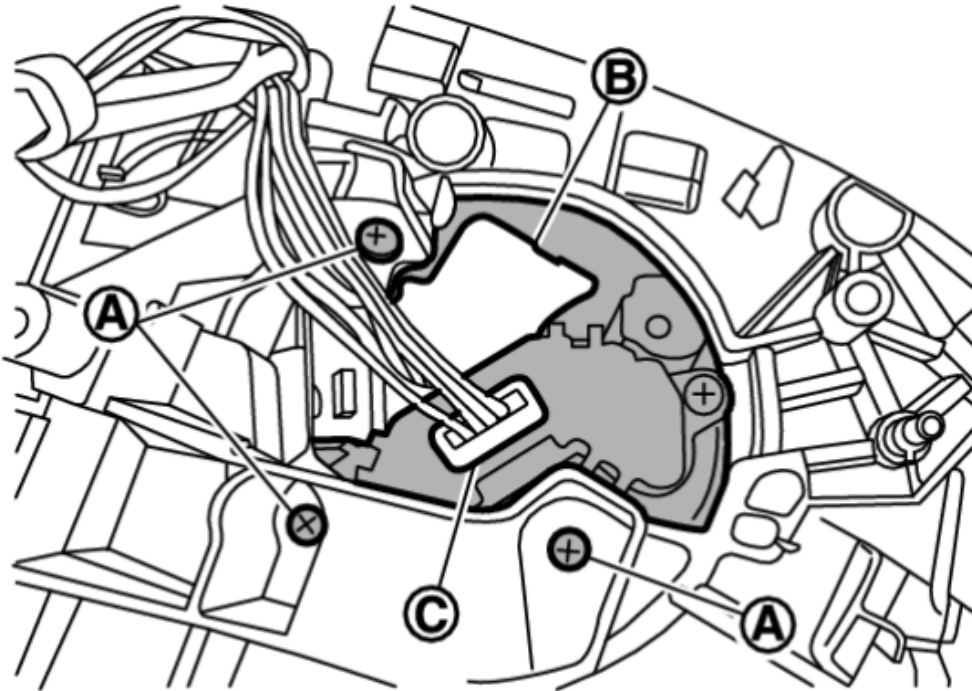
6. Disconnect side camera harness connector ① (with side camera).



7. Remove side camera fixing screw ①, and then remove side camera (with side camera).



8. Remove side turn signal light (with side turn signal light). Refer to [Removal and Installation](#) .
9. Remove door mirror actuator fixing screws (A).



10. Disconnect harness connectors ② and ③, and then remove door mirror actuator.

ASSEMBLY

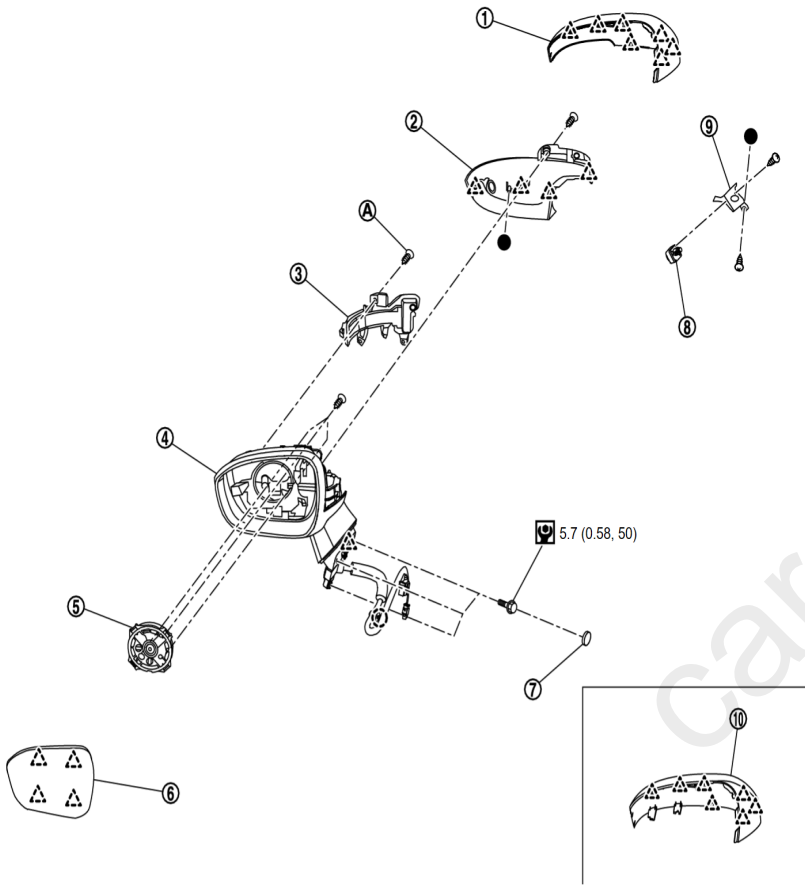
Note the following item, and then assemble in the reverse order of disassembly.

caution

Perform side camera image calibration (with side camera). Refer to [Work Procedure](#) ➡.

Exploded View

SEC. 963

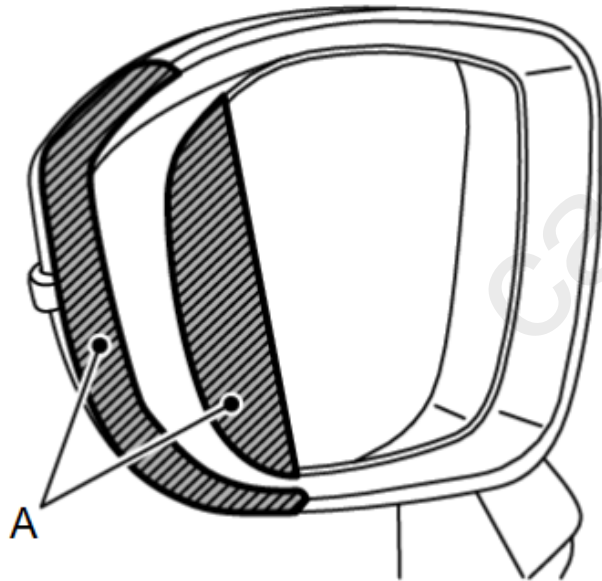


①	Door mirror cover (with side turn signal light)	②	Door mirror finisher	③	Side turn signal light (with side turn signal light)
④	Door mirror base	⑤	Door mirror actuator	⑥	Glass mirror
⑦	Blind cap	⑧	Side camera (with side camera)	⑨	Side camera bracket (with side camera)
⑩	Door mirror cover (without side turn signal light)				
A	Screw (with side turn signal light)				
○ : Clip					
△ : Pawl					
Ⓜ : N·m (kg·m, in-lb)					
● : Indicated that the part is connected at points with same symbol in actual vehicle.					

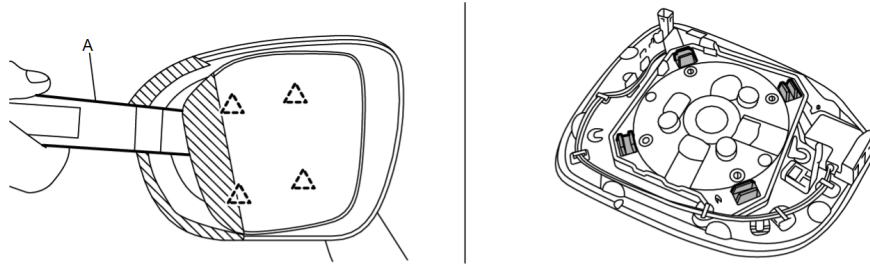
Removal and Installation

REMOVAL

1. Place glass mirror inward.
2. Apply protective tapes (A) on the part to protect it from damage.



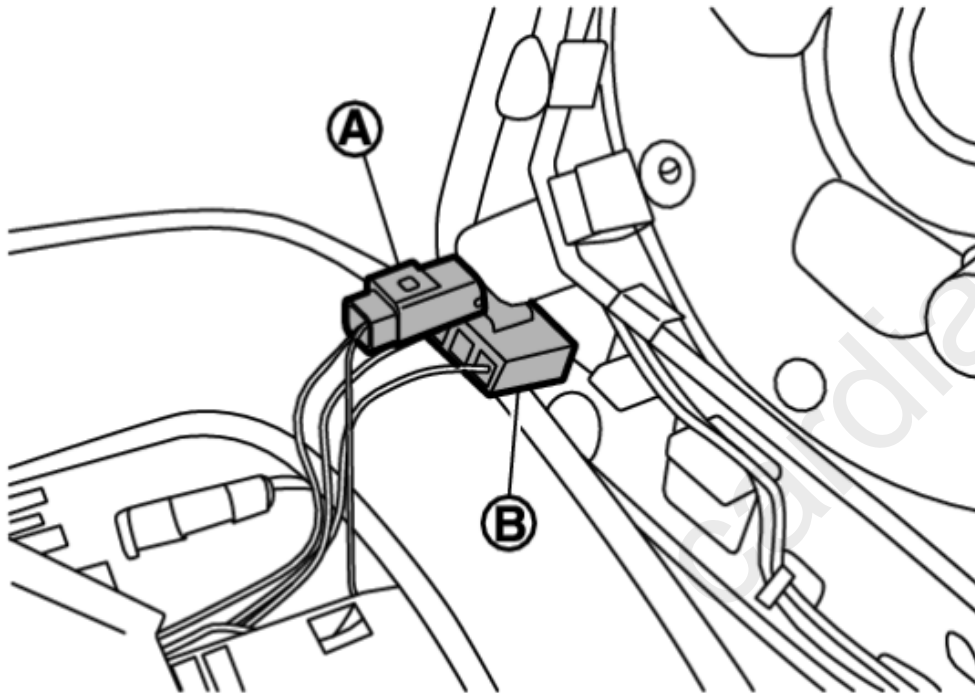
3. Insert remover tool (A) into the recess at outside between glass mirror and door mirror actuator, and then disengage glass mirror fixing pawls.



caution Remove the fixing pawls slowly so they are not damaged.

 : Pawl

4. Disconnect harness connector ① and ②.



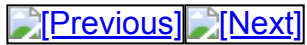
5. Remove glass mirror.

INSTALLATION

Note the following item, and then install in the reverse order of removal.

caution	After installation, visually check that fixing pawls are securely engaged.
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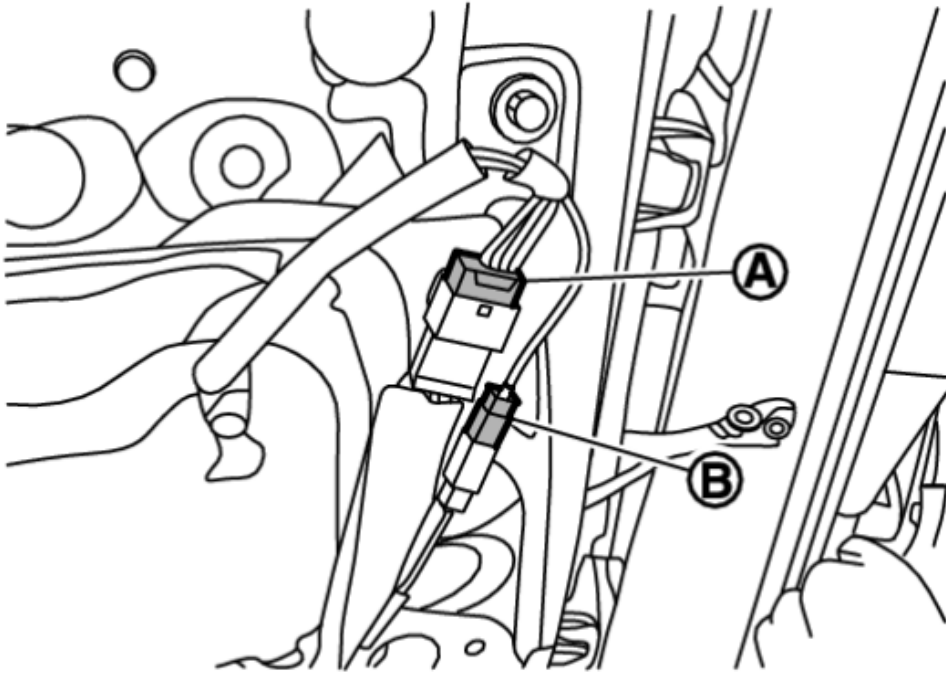


Removal and Installation

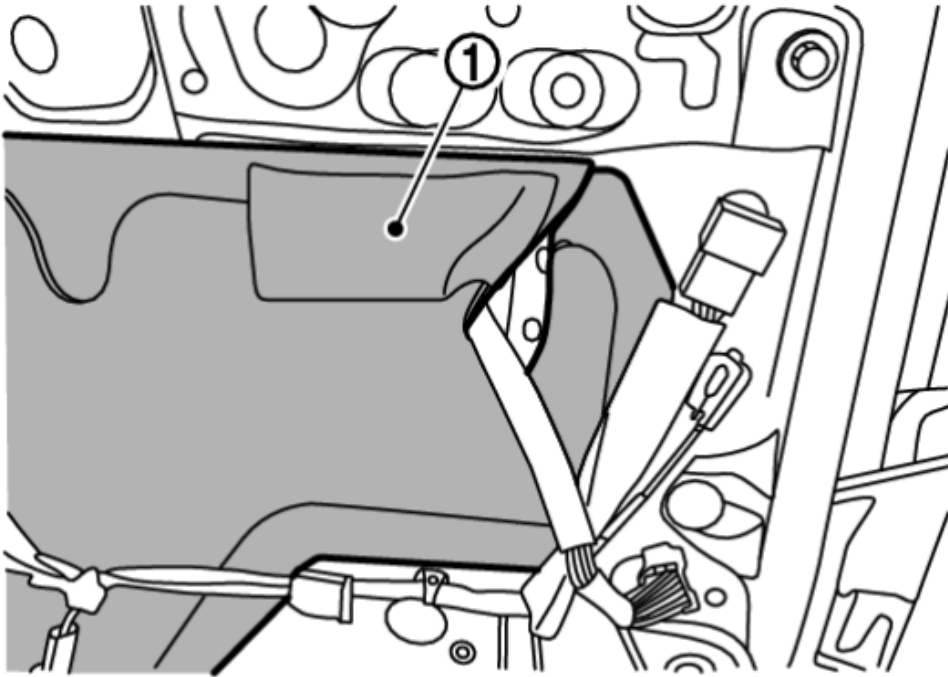
REMOVAL

caution	Never damage the front door panel.
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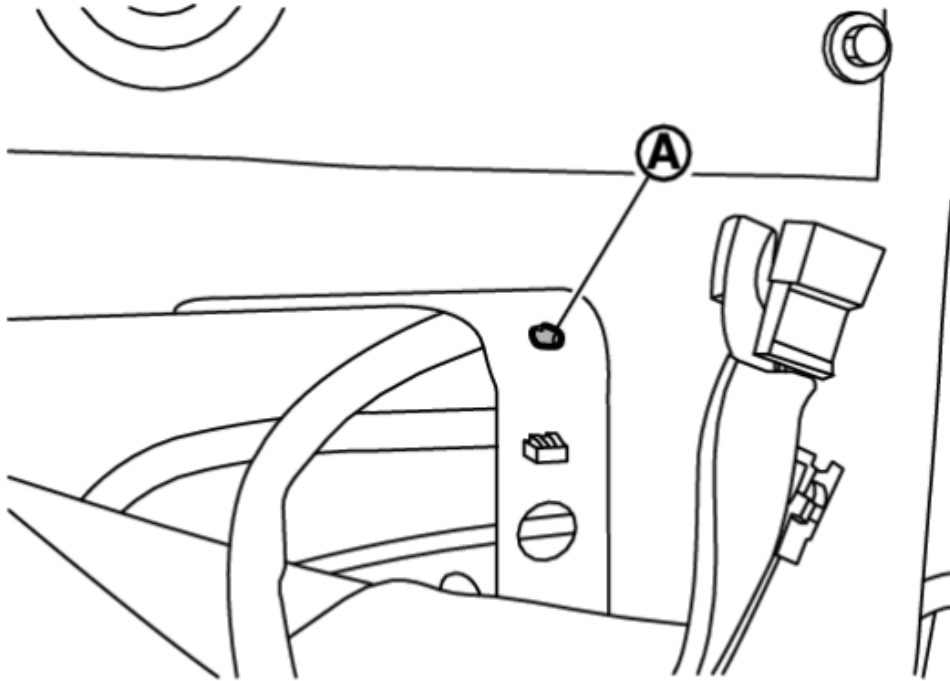
1. Remove front door finisher. Refer to [Removal and Installation](#) .
2. Disconnect door mirror assembly harness connector ①.



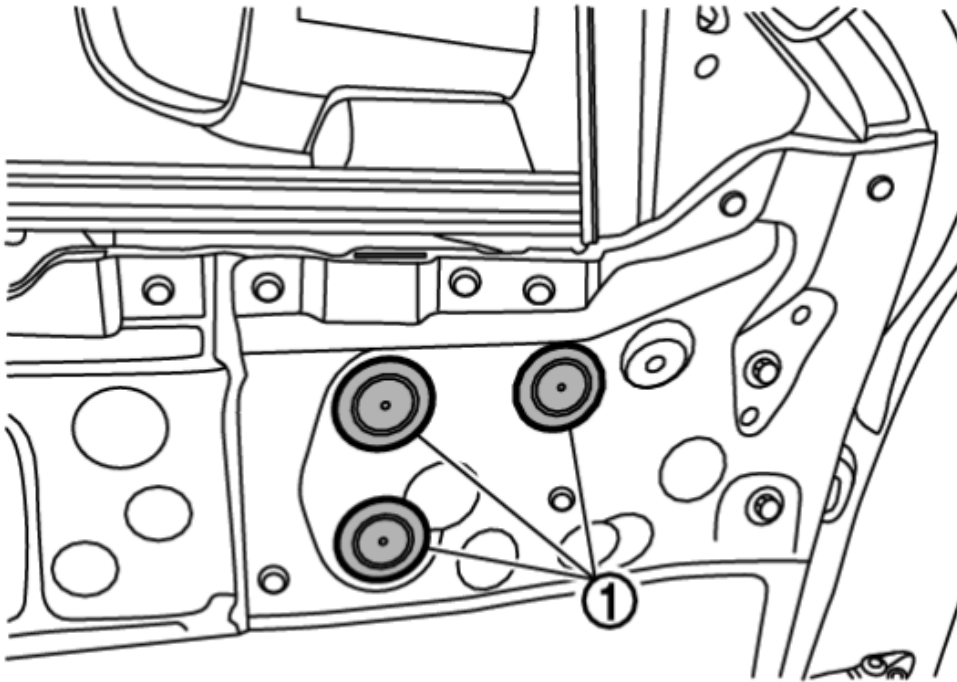
3. Disconnect side camera harness connector ② (with side camera).
4. Remove front door sealing screen ①. Refer to [Removal and Installation](#) ➡.



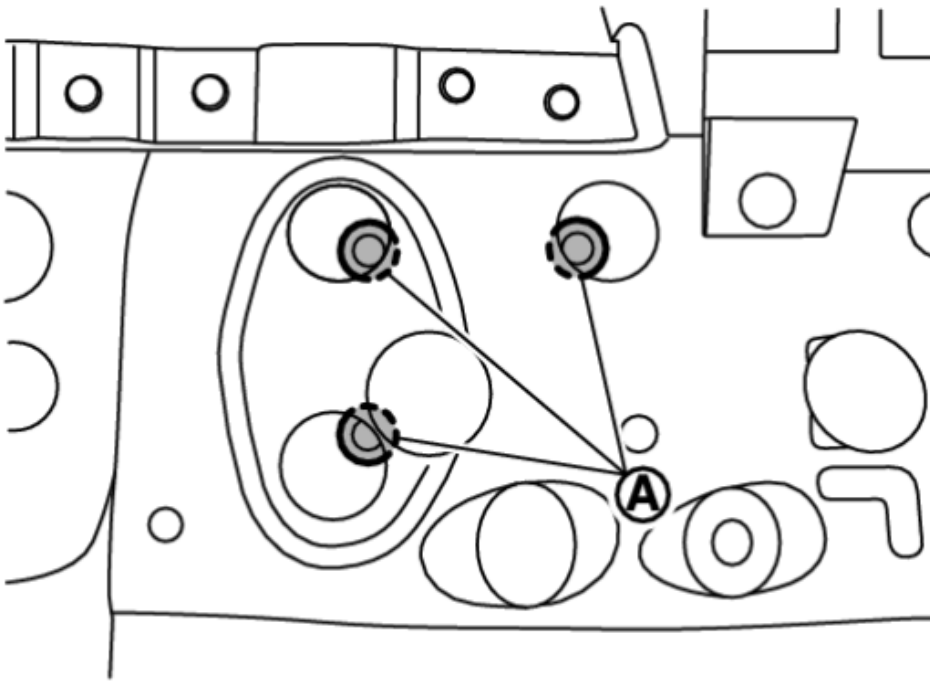
5. Remove harness clip ①.



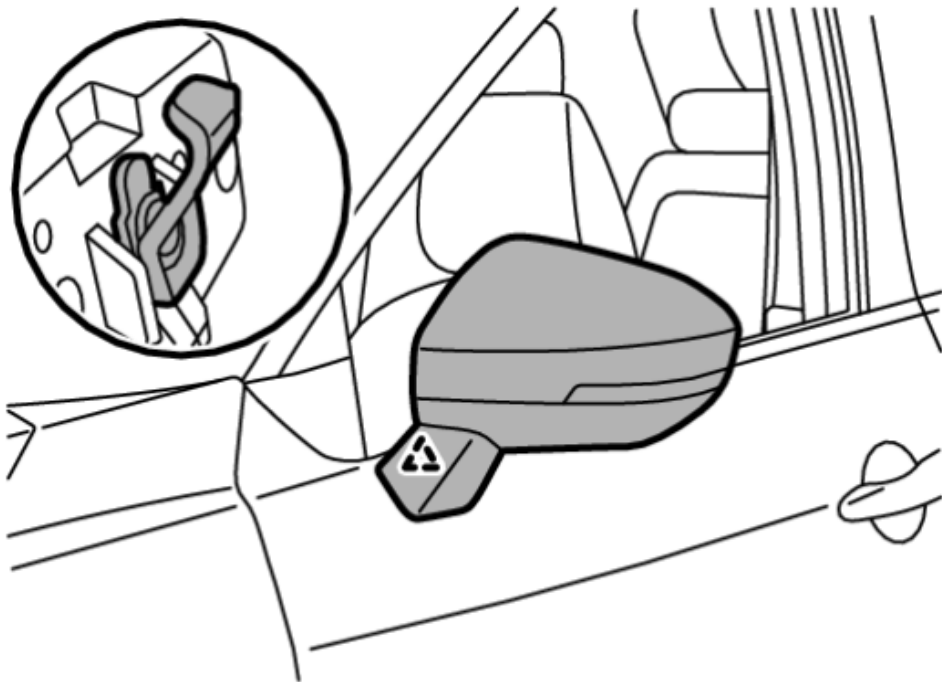
6. Remove blind cap ①.



7. Remove door mirror assembly mounting bolts ①.



8. Disengage door mirror assembly fixing pawl, and then remove door mirror assembly.



INSTALLATION

Note the following item, and then install in the reverse order of removal.

caution

Perform side camera image calibration (with side camera). Refer to [Work Procedure](#) .

Technical Service Bulletin

SUBJECT: NEW MODEL FEATURES & SERVICE INFORMATION - 2022 OUTLANDER			No: TSB-21-00-009
			DATE: March 2021
			MODEL: 2022 Outlander
CIRCULATE TO:	☐ GENERAL MANAGER	☒ PARTS MANAGER	☒ TECHNICIAN
☒ SERVICE ADVISOR	☒ SERVICE MANAGER	☒ WARRANTY PROCESSOR	☒ SALES MANAGER

PURPOSE



This bulletin contains important new model service information and features for the **2022 Outlander** (U.S. models only). Review the details that follow to familiarize yourself regarding new features and options. Refer to the 2022 Outlander Service Manual on MEDIC, MDL, or CD (p/n MSCD-007B-2022), and the Owner's Manual for details on these and other features.

AFFECTED VEHICLES

2022 Outlander

U.S. MODEL LINEUP

MODEL	ENGINE	TRANSMISSION
ES (2WD, S-AWC)	2.5L DOHC 4-cylinder Direct Injection	CVT with 8-speed Electronic Automatic
SE (2WD, S-AWC)		
SEL (2WD, S-AWC)		

SERVICE INFORMATION

See TSB-21-00-008 for 2022 Outlander Technical Specifications.

NEW FEATURE HIGHLIGHTS

<u>EXTERIOR</u>	<u>COMMENTS</u>
- High performance LED Low and High Beam Headlights - Prominent 255/45 R20 All-Season Tires 20-inch Two Tone Alloy Wheels	Available on ES, SE, and SEL Available on ES PKG, SE, and SEL Available on ES PKG, SE, and SEL

<u>INTERIOR</u>	<u>COMMENTS</u>
- Genuine Leather - Semi-Aniline Leather	Available on SEL Available on SEL Touring

<u>TRANSMISSION/DRIVE SYSTEM</u>	<u>COMMENTS</u>
Drive Mode with two additional options (TARMAC and MUD)	TARMAC Standard on all Outlander MUD Standard on Outlander S-AWC
New Direct Coupling	Standard on all Outlander S-AWC Models
Shift by Wire	Standard on all Outlander Models

<u>SAFETY & SECURITY</u>	<u>COMMENTS</u>
- Trailer Stability Assist (TSA) - Active Blind Spot Assist - Tire Pressure Monitoring System with Tire Fill Notification - Driver Attention Alert - Mitsubishi Connect - MI-PILOT Assist w/Navi Link (Adaptive Cruise Control (ACC) with Stop & Go and Lane Keep Assist (LKA)) - Rear Autonomous Emergency Braking (Rear AEB) - Traffic Sign Recognition (TSR) - Front Parking Sensors - Rear Parking Sensors - Rear Outer Board Seat-Mounted SRS side Airbags - Rear Seat Alert - Headlight Washer	Standard on all Outlander Models Standard on all Outlander Models Standard on all Outlander Models Standard on all Outlander Models Available on ES PKG, SE & SEL Available on SE and SEL except Launch Editions Available on SE & SEL except Launch Editions Available on SE & SEL except Launch Editions Available on SE & SEL Models Standard on all Outlander Models Standard on all Outlander Models Standard on all Outlander Models Standard on all S-AWC Models

<u>CONVENIENCE</u>	<u>COMMENTS</u>
- Rear Seat Heater - Power Panoramic Sunroof - Smartphone Wireless Charger - Capless Fuel Filler 9.0" Smartphone-Link Display - Audio (SDA) Navigation System 10.8" Head Up Display 12.3" Full Digital Driver Display	Available on SEL and SEL Launch Models Available on SE Tech and SEL Touring Available on SE and SEL Models Available on SE and SEL Models Available on all Models Available on SEL Launch Edition & SEL Touring Available on SEL Launch Edition & SEL Touring Available on SEL Launch Edition & SEL Touring

EXTERIOR

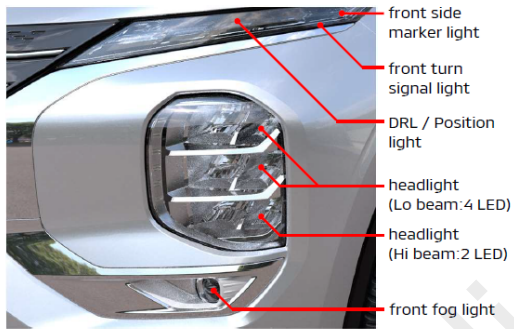


Alloy Wheels

Quality and robust presence for our brand-representing Outlander. ES Models are equipped with 18-inch alloy wheels.



20-inch two tone alloy wheels are equipped on ES, SE and SEL Models.



New Full LED Headlights (US only)

Full LED headlights, front turning indicator lights equipped with LED light source, also provide impressive styling by emitting thin and wide lights.



Paint Colors

Five Quality Rich Colors and three Diamond Color Series: Red Diamond, White Diamond and Black Diamond.



INTERIOR

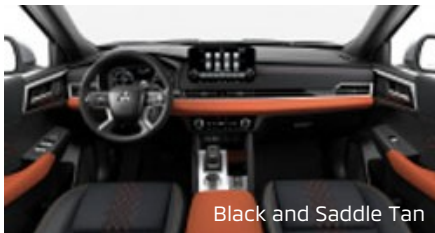


Interior Seating Materials/Shifter Trims

Black Genuine Leather Seat Material available on SEL with Aluminum Shifter Trim.



Light Gray Genuine Leather Seat Material available on SEL with Aluminum Shifter Trim.



Black and Saddle Tan Semi-Aniline Leather with Coordinated Stitching Interior available on SEL Launch Edition and SEL Touring with Aluminum Shifter Trim.



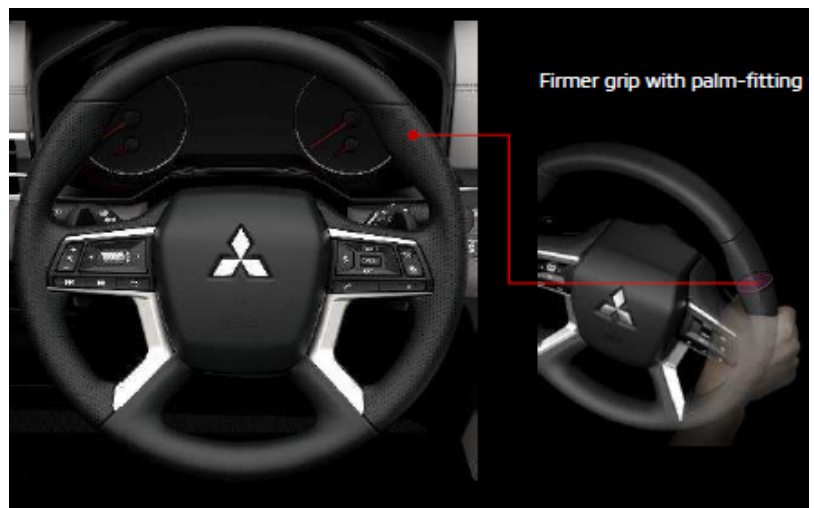
Black Interior with Cloth/Fabric seating available on ES.

Black Suede/Combination Seating Interior is available on SE.

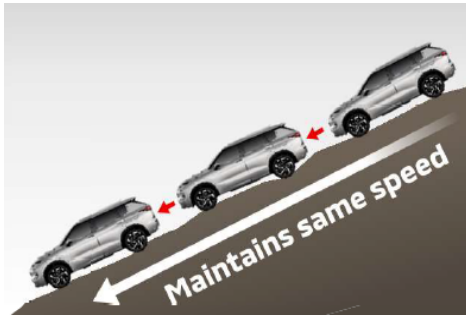
Both interiors are complimented with a Black Shift Trim.

Steering Wheel

Firm Grip area with Palm-Fitting section added to the steering wheel.



SAFETY



Hill Descent Control (HDC)

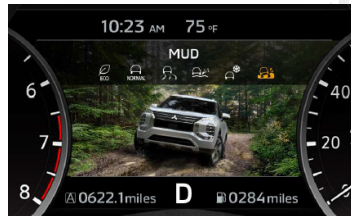
Helps maintain a set speed while traveling downhill by automatically applying the brakes.



	Mode	Concept	Typical situation
Select based on road condition	TARMAC	Provide agile and fun driving on dry paved road	Winding Dry Paved Road
	GRAVEL	Provide powerful and stable driving on unpaved roads	Unpaved Road (ex. AUSTRALIA Outback)
	SNOW	Provide sense of security on slippery icy roads	Snow and/or Icy Road
	MUD (S-AWC Only)	Provide powerful driving on muddy and deep snow	Mud, Deep-snow
Select based on driving style	NORMAL	Provide SUV-like sense of security on various roads	Dry and Wet Paved Road
	ECO	Provide ecological and economical driving	Dry Paved Road

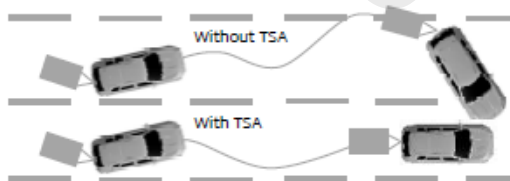
Drive Mode Selector

Drive mode has been improved and now provides two additional modes: "MUD" mode for mud/deep snow and "TARMAC" for winding dry pavement.



Rear Autonomous Emergency Braking (AEB)

Sonar installed near the rear bumper detects objects behind the vehicle which provides a warning and allows the brakes to be applied.



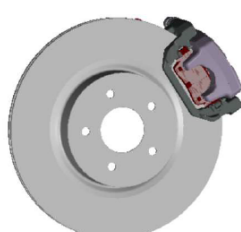
Trailer Stability Assist (TSA)

Trailer Stability Assist works by continuously monitoring the sway of the trailer. One or more of the car's wheel brakes are applied as necessary. If this is not enough to correct the sway, all four wheel brakes are engaged and engine power is reduced, until control is regained.

Front Brake



Rear Brake



Brakes

The front and rear brake caliper size has increased to accommodate increased vehicle weight and enlarged tire diameter. The improvements also enhance brake effort and feeling to create a more premium SUV braking feel.



Operation image: Current OUTLANDER



For vehicles with MI-PILOT Assist



For vehicles with ACC only (launch edition)

Adaptive Cruise Control (ACC) with Stop & Go

Improvements have been made to the Adaptive Cruise Control operation.

For Models with MI-PILOT Assist New Features have been added:

- Connecting with the navigation info and Traffic Sign Recognition, the speed limit information detected will be used to set the ACC speed.
- Connecting with the navigation info, curves and exits on the highway are detected to assist speed reduction.
- Stop & Go added to ACC. When the vehicle stops in a traffic jam, the ACC can be resumed automatically (or manually)

Head-Up Display (HUD)

The new large full-color windshield-type Head-Up Display provides premium convenience and allows instinctive understanding of vehicle status.

Improvements from previous models include an increase in focal length and wide angle in a 10.8 inch virtual display through the windshield.



Full Digital Display

The 12.3" full display provides quick at a glance functionality with high visibility graphics.

CONVENIENCE



Capless Fuel Filler

Another first for Mitsubishi is a new Capless Filler makes it easy-to-refuel.

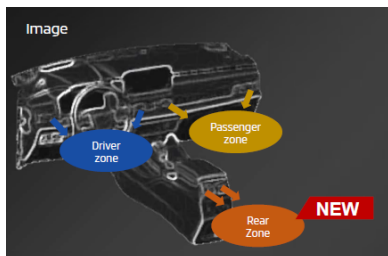
A spring action Fuel Filler Door opens with a light push and unlocks automatically when the vehicle doors are unlocked.



Smartphone Wireless Charger Pad/USB

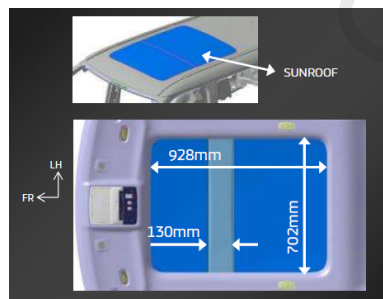
Wireless Charger Pad allows quick charging time of smartphones/other devices (max output 15W). Simply place the phone on the pad to charge.

Mitsubishi's first application of USB Type-C ports and USB port illumination is located just above the convenient Wireless Charger Pad. (max output 3.0A/2.4A - Type C/A).



3-zone Climate Control

Now available for overall comfort while driving, temperatures for driver, passenger, and rear can separately be set.



Power Panoramic Sunroof

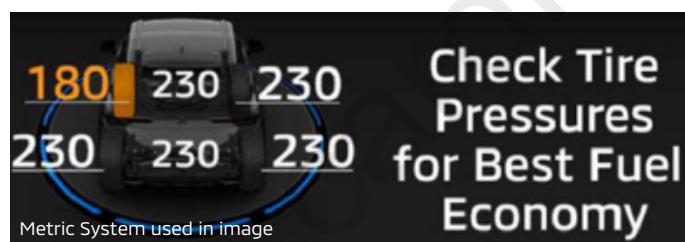
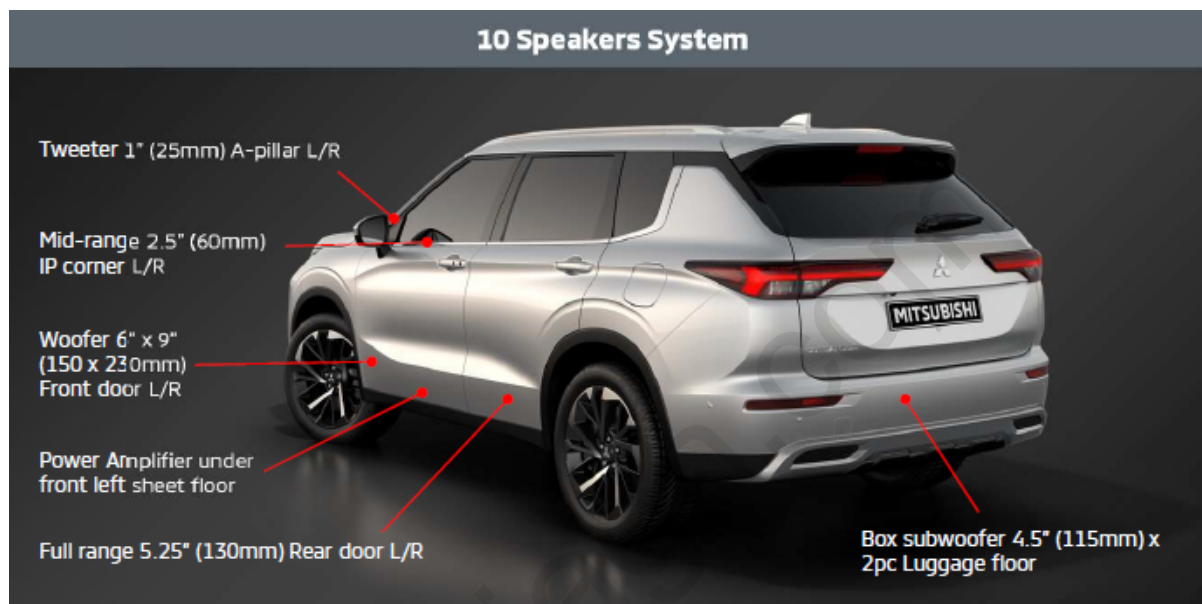
With a large opening and narrow drip rail, the Power Panoramic Sunroof provides a wider view of the sky and more comfort while driving.

CONVENIENCE (continued)

BOSE Premium Sound System

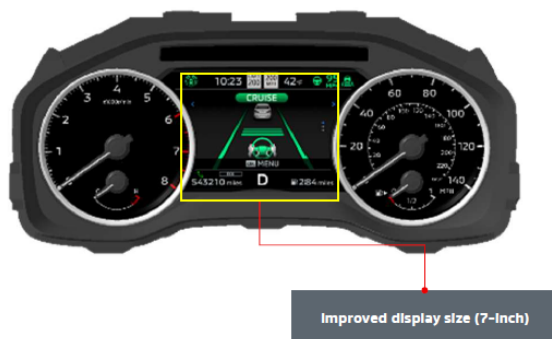
One of the most popular audio brands in the world, the new BOSE Sound System provides a premium driving experience.

Dynamic sound due to deep bass of the subwoofer and large front door speaker, creates a premium sound. 10 Speakers (in 9 locations) including mid-range speakers and a dual subwoofer. Front speakers are composed of 3-way speakers (woofer, mid-range and tweeter).



Tire Pressure Monitoring System

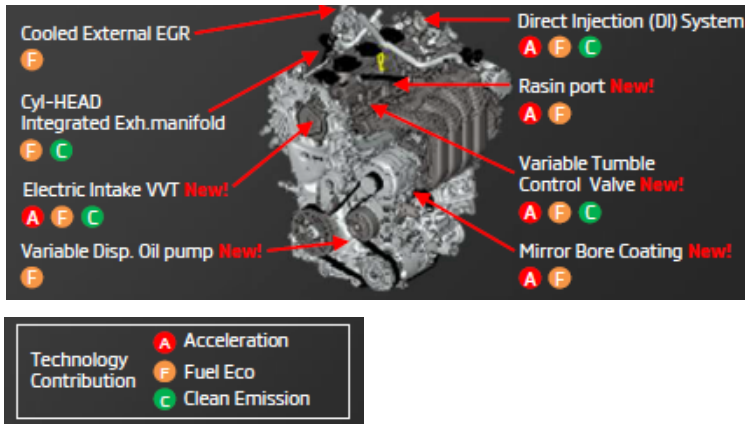
The Tire Pressure Monitoring System (TPMS) can now be monitored on the information display. The information provides the current pressure of each tire and the recommended pressures of front/rear tires. (Metric example image used)



Meter Cluster (7-inch LCD)

New 7 inch LCD display with 4 dial meter is New for Mitsubishi. Better visibility with LED, enriched display contents, allows easy and intuitive understanding of the vehicle status. Usability of the meter display control is convenient with steering wheel switches.

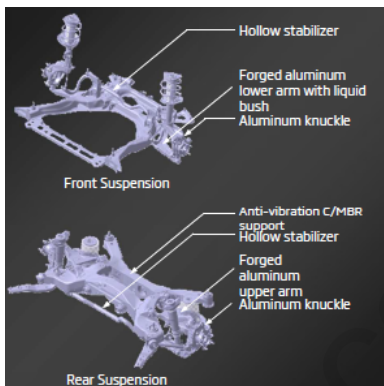
ENGINE



Engine Specifications

The concept defined for this new 4-cylinder engine is to achieve engine output, torque, fuel economy, and clean emissions at the highest possible levels, by incorporating the latest technologies, including a "Mitsubishi" first application. Improvements have been made by balancing fuel economy and acceleration performance.

The PR25DD engine continues as Mitsubishi's new engine concept of recent years with regard to the basic engine systems, including the use of direct injection, an electrically operated Valve Timing Control (VVT) system, cooled Exhaust Gas Recirculation (EGR), and mirror bore coating, etc.



Suspension

New suspension with lightweight and high-rigidity aluminum help provide a safe and secure feeling, driving comfort, and vibration reduction.

Shift by Wire

New advanced shift operation is light and provides practical operation when parking, etc. compared with conventional systems.



FACTORY OPTION PACKAGES - 2022 Outlander

ES CONVENIENCE PACKAGE (2WD/S-AWC)

- 20-inch Two Tone Alloy Wheels
- 255/45 R20 All-Season Tires
- Mitsubishi Connect with Safeguard and Remote Services/24 month Free Trial (Mobile App Enrollment Required)

SE TECH PACKAGE (2WD/S-AWC)

- 12.3" Full Digital Driver Display
- BOSE Premium Sound System (10 speakers)
- Power Panoramic Sunroof, Auto-Dimming Rearview Mirror

SEL TOURING PACKAGE (2WD/S-AWC)

- Heated Steering Wheel
- Synthetic Leather Door Insert with Quilting (Black/Saddle Tan)
- Semi-Aniline Leather Appointed Seating Surfaces
- 10.8" Head-Up Display (HUD)
- BOSE Premium Sound System (10 speakers)
- Power Panoramic Sunroof,
- Rear Door Pull-Up Sunshade

PREMIUM PAINT (All Trim Levels)

- White Diamond, Red Diamond and Black Diamond

PORT OPTIONS

Package Name	Package Code	Contents	ES	ES CONV	SE	SE TECH	SE LAUNCH	SEL	SEL TOUR	SEL LAUNCH
All Weather Package	H4	Cargo Liner, Floor Mats - All-Weather	O	O	O	O	N	O	O	N
Black Chrome Wheel Lugs & Locks	HS	Wheel Locks & Lug Nuts (Black Chrome)	N	N	O	O	N	O	O	N
Black Out Appearance Package	Q7	Hood Emblem (Black), Side Mirror Cover (Black), Door Handle Trim (Black), Wheel Locks & Lug Nuts (Black Chrome)	O	O	O	O	N	O	O	N
Carbon Appearance Package	Q8	Side Mirror Cover (Carbon), Center Console Trim (Carbon), Door Switch Panel Trim (Carbon)	O	O	O	O	N	O	O	N
Cargo Package	G7	Seat Back Net, Cargo Management System, Cargo Scuff Plates	O	O	O	O	N	O	O	N
Chrome Effects	FD	Front Lower Trim (Chrome), Rear Lower Trim (Chrome), Side Door Trim (Chrome)	O	O	O	O	N	O	O	N
Chrome Value Package	Q3	Door Handle Trim (Chrome), Side Mirror Cover (Chrome), Hood Emblem (Chrome), Tailgate Trim (Chrome)	O	O	O	O	N	O	O	N
Console Lighting Package	HP	Center Console Tray Illumination, Center Console Illumination (Cup Holders, Sides, Rear Seat Well)	O	O	O	O	N	O	O	N
Deflectors	DF	Hood Protector, Window Deflectors	O	O	O	O	N	O	O	N
Door Ground Illumination	DH	Ground Illumination with Logo	O	O	O	O	N	O	O	N
Dynamic Grille Illumination	DG	Dynamic Shield Illumination	O	O	O	O	N	O	O	N
Exterior Package	FB	Front Effects (Body Color), Rear Effects (Body Color), Side Effects (Body Color)	O	O	O	O	N	O	O	N

PORT OPTION PACKAGES (continued)

Package Name	Package Code	Contents	ES	ES CONV	SE	SE TECH	SE LAUNCH	SEL	SEL TOUR	SEL LAUNCH
Grille & Ground Illumination	DI	Ground Illumination with Logo, Dynamic Shield Illumination	O	O	O	O	N	O	O	N
Hood Emblem (Black)	GH	Hood Emblem (Black)	O	O	O	O	N	O	O	N
Hood Emblem (Chrome)	GF	Hood Emblem (Chrome)	O	O	O	O	N	O	O	N
LED Fog Lights	HI	LED Fog Lights	O	O	S	S	S	S	S	S
Mud Guards	GE	Front & Rear Mud Guards	O	O	O	O	N	O	O	N
Popular Value Package	Q1	Floor Mats - All-Weather, Roadside Emergency Kit, Cargo Liner, Rear Bumper Protector	O	O	O	O	N	O	O	N
Protection Value Package	Q2	Front & Rear Mudguards, Rear Bumper Protector, Scuff Plates, Roadside Emergency Kit	O	O	O	O	N	O	O	N
Roll Up Shades	RS	Roll Up Shades	O	O	O	O	N	O	S	S
Roof Rack Crossbars	H7	Crossbars	N	N	N	N	N	O	O	N
Roof Rails & Crossbars	H8	Roof Rails, Crossbars	O	O	O	O	N	N	N	N
Satin Appearance Package	Q9	Hood Emblem (Satin), Fuel Door (Satin), Gauge Bezel Trim (Silver)	O	O	O	O	N	O	O	N
SE Launch Edition	A1	Logo Ground Light, Dynamic Grille Illumination, Hood Emblem (Chrome), SE Launch Edition Badge,	N	N	N	N	P	N	N	N
SE/SEL Trim	HC	Trim Badge, Mitsubishi Connect Tag	N	N	P	P	N	P	P	N

PORT OPTION PACKAGES (continued)

Package Name	Package Code	Contents	ES	ES CONV	SE	SE TECH	SE LAUNCH	SEL	SEL TOUR	SEL LAUNCH
SEL Launch Edition	A2	Logo Ground Light, Dynamic Grille Illumination, Hood Emblem (Chrome), SEL Launch Edition Badge, Mitsubishi Connect Tag	N	N	N	N	N	N	N	P
Spoiler	FK	Spoiler	O	O	O	O	N	O	O	N
Style Lighting Package	G6	Scuff Plates with LED, Floor Illumination	O	O	O	O	N	O	O	N
Tonneau Cover	G8	Tonneau Cover	O	P	P	P	P	P	P	P
Towing Package	FW	Tow Hitch, Towing Wire Harness	O	O	O	O	N	O	O	N
Welcome Package	GM	Vehicle Manuals Binder, Floor Mats - Carpet, Center Console Tray Mat, Touch-Up Paint Pen (Body Color)	R	R	R	R	R	R	R	R
Welcome Package (Fleet)	FM	Vehicle Manuals Binder, Floor Mats - Carpet, Center Console Tray Mat	F	F	F	F	F	F	F	F
Wheel Locks	GD	Wheel Locks (Chrome)	O	O	O	O	N	O	O	N

O	Port Option
P	Port Option (Mandatory)
R	Port Option (Retail Mandatory)
F	Port Option (Fleet Mandatory)
S	Factory Standard
N	Not Available



Technical Service Bulletin

SUBJECT:				No: TSB-21-00-008
TECHNICAL SPECIFICATIONS- 2022 OUTLANDER				DATE: March 2021
				MODEL: 2022 Outlander
CIRCULATE TO:	☐ GENERAL MANAGER	☒ PARTS MANAGER	☒ TECHNICIAN	
☒ SERVICE ADVISOR	☒ SERVICE MANAGER	☐ WARRANTY PROCESSOR	☒ SALES MANAGER	

2022 OUTLANDER		TECHNICAL AND MECHANICAL FEATURES				
Feature Description	ES 2WD	ES S-AWC	SE 2WD	SE S-AWC	SEL 2WD	SEL S-AWC
Engine						
Type	2.5L MIVEC DOHC 4-cylinder Direct-Injection PR25DD	2.5L MIVEC DOHC 4-cylinder Direct-Injection PR25DD	2.5L MIVEC DOHC 4-cylinder Direct-Injection PR25DD	2.5L MIVEC DOHC 4-cylinder Direct-Injection PR25DD	2.5L MIVEC DOHC 4-cylinder Direct-Injection PR25DD	2.5L MIVEC DOHC 4-cylinder Direct-Injection PR25DD
Engine Code						
Materials	Aluminum block/aluminum cylinder heads	Aluminum block/aluminum cylinder heads	Aluminum block/aluminum cylinder heads	Aluminum block/aluminum cylinder heads	Aluminum block/aluminum cylinder heads	Aluminum block/aluminum cylinder heads
Bore x Stroke	89.0 mm x 100.0 mm	89.0 mm x 100.0 mm	89.0 mm x 100.0 mm	89.0 mm x 100.0 mm	89.0 mm x 100.0 mm	89.0 mm x 100.0 mm
Compression Ratio	12.0:1	12.0:1	12.0:1	12.0:1	12.0:1	12.0:1
Displacement	2.5L / 2,488 cc	2.5L / 2,488 cc	2.5L / 2,488 cc	2.5L / 2,488 cc	2.5L / 2,488 cc	2.5L / 2,488 cc
Horsepower	181 @ 6,000 rpm	181 @ 6,000 rpm	181 @ 6,000 rpm	181 @ 6,000 rpm	181 @ 6,000 rpm	181 @ 6,000 rpm
Torque	181 lb-ft @ 3,600 rpm	181 lb-ft @ 3,600 rpm	181 lb-ft @ 3,600 rpm	181 lb-ft @ 3,600 rpm	181 lb-ft @ 3,600 rpm	181 lb-ft @ 3,600 rpm
Redline RPM	6000	6000	6000	6000	6000	6000
Emissions	LEV III SULEV30 / Tier 3 bin 30	LEV III ULEV50 / Tier 3 bin 50	LEV III SULEV30 / Tier 3 bin 30	LEV III ULEV50 / Tier 3 bin 50	LEV III SULEV30 / Tier 3 bin 30	LEV III ULEV50 / Tier 3 bin 50
Engine Oil type	0W-20	0W-20	0W-20	0W-20	0W-20	0W-20
Recommended Fuel Type	Regular Unleaded	Regular Unleaded	Regular Unleaded	Regular Unleaded	Regular Unleaded	Regular Unleaded
Transmission						
Continuously Variable Transmission (CVT)	STD	STD	STD	STD	STD	STD
CVT Automatic Ratios	2.631 - 0.378	2.631 - 0.378	2.631 - 0.378	2.631 - 0.378	2.631 - 0.378	2.631 - 0.378
Reverse	1.960	1.960	1.960	1.960	1.960	1.960
Final Drive	5.694	5.694	5.694	5.694	5.694	5.694
Suspension						
Front	MacPherson strut with stabilizer bar	MacPherson strut with stabilizer bar	MacPherson strut with stabilizer bar	MacPherson strut with stabilizer bar	MacPherson strut with stabilizer bar	MacPherson strut with stabilizer bar
Rear	Multi-link with stabilizer bar	Multi-link with stabilizer bar	Multi-link with stabilizer bar	Multi-link with stabilizer bar	Multi-link with stabilizer bar	Multi-link with stabilizer bar
Steering						
Type	Electric Power Steering	Electric Power Steering	Electric Power Steering	Electric Power Steering	Electric Power Steering	Electric Power Steering
Overall Ratio	14.2 : 1	14.2 : 1	14.2 : 1	14.2 : 1	14.2 : 1	14.2 : 1
Turns, lock to lock	2.6	2.6	2.6	2.6	2.6	2.6
Turning circle	36.1 ft	36.1 ft	36.1 ft	36.1 ft	36.1 ft	36.1 ft
Brakes / Tires / Wheels						
Front	Ventilated disc, 13.8 in	Ventilated disc, 13.8 in	Ventilated disc, 13.8 in	Ventilated disc, 13.8 in	Ventilated disc, 13.8 in	Ventilated disc, 13.8 in
Rear	Ventilated disc, 13.0 in	Ventilated disc, 13.0 in	Ventilated disc, 13.0 in	Ventilated disc, 13.0 in	Ventilated disc, 13.0 in	Ventilated disc, 13.0 in
ABS	4-wheel, 4-channel, 4-sensors with Electronic Brake-force Distribution (EBD) and Brake Assist	4-wheel, 4-channel, 4-sensors with Electronic Brake-force Distribution (EBD) and Brake Assist	4-wheel, 4-channel, 4-sensors with Electronic Brake-force Distribution (EBD) and Brake Assist	4-wheel, 4-channel, 4-sensors with Electronic Brake-force Distribution (EBD) and Brake Assist	4-wheel, 4-channel, 4-sensors with Electronic Brake-force Distribution (EBD) and Brake Assist	4-wheel, 4-channel, 4-sensors with Electronic Brake-force Distribution (EBD) and Brake Assist
Wheels	18 x 7 1/2J aluminum alloy	18 x 7 1/2J aluminum alloy	20 x 8J aluminum alloy	20 x 8J aluminum alloy	20 x 8J aluminum alloy	20 x 8J aluminum alloy
Tires	P235/60 R18	P235/60 R18	P255/45 R20	P255/45 R20	P255/45 R20	P255/45 R20
Exterior Dimensions						
Wheelbase (inches)	106.5	106.5	106.5	106.5	106.5	106.5
Overall length (inches)	185.4	185.4	185.4	185.4	185.4	185.4
Overall width (inches) w/ mirror folded	74.7	74.7	74.7	74.7	74.7	74.7
Overall width (inches) w/ mirror unfolded	84.4	84.4	84.4	84.4	84.4	84.4
Overall height (inches)	68.7	68.7	68.8	68.8	68.8	68.8
Track, front (inches)	62.7	62.7	62.7	62.7	62.7	62.7
Track, rear (inches)	63.1	63.1	63.1	63.1	63.1	63.1
Ground clearance (inches)	8.3	8.3	8.4	8.4	8.4	8.4
Interior Dimensions						
Head Room (with sunroof)						
Front (inches)	40.6	40.6	40.6 (38.8)	40.6 (38.8)	40.6 (38.8)	40.6 (38.8)
2nd row (inches)	39.1	39.1	39.1(37.4)	39.1(37.4)	39.1(37.4)	39.1(37.4)
3rd row (inches)	34.5	34.5	34.5(34.5)	34.5(34.5)	34.5(34.5)	34.5(34.5)
Leg room						
Front (inches)	41.7	41.7	41.7	41.7	41.7	41.7
2nd row (inches)	39.9	39.9	39.9	39.9	39.9	39.9
3rd row (inches)	18.7	18.7	18.7	18.7	18.7	18.7
Shoulder room						
Front (inches)	57.9	57.9	57.9	57.9	57.9	57.9
2nd row (inches)	55.9	55.9	55.9	55.9	55.9	55.9
3rd row (inches)	51.2	51.2	51.2	51.2	51.2	51.2
Hip room						
Front (inches)	54	54	54	54	54	54
2nd row (inches)	53.3	53.3	53.3	53.3	53.3	53.3
3rd row (inches)	42.1	42.1	42.1	42.1	42.1	42.1

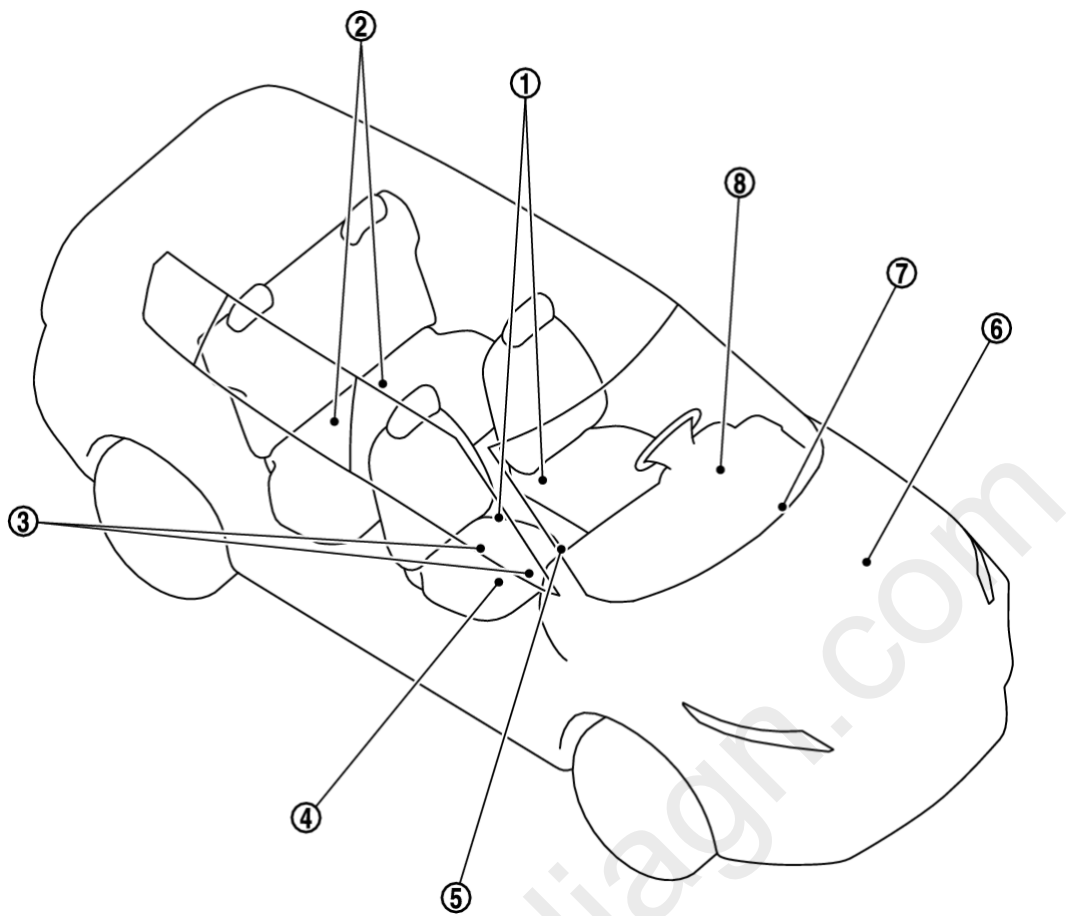
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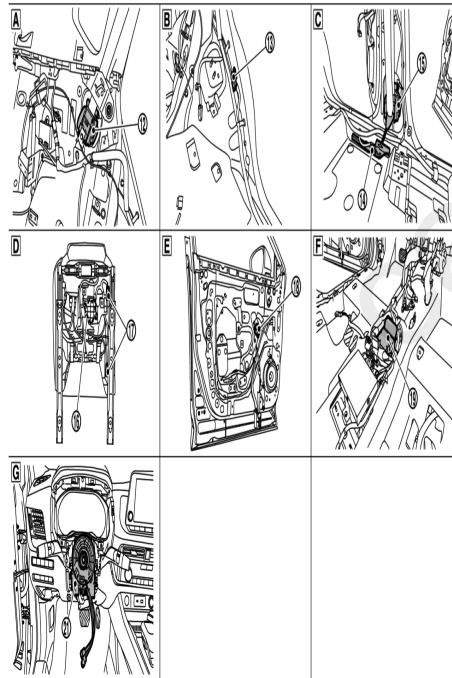
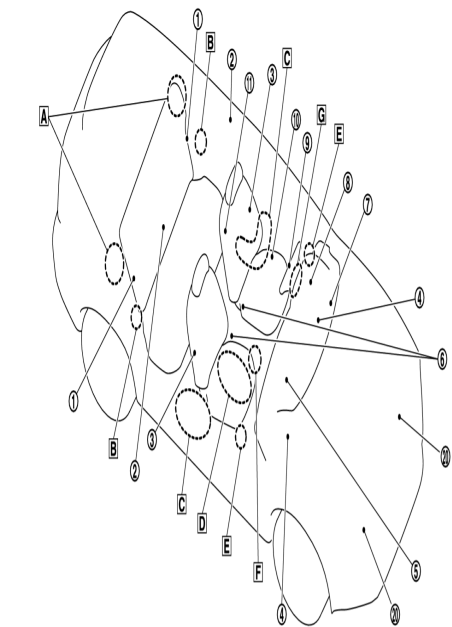
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD
5-year / 60,000 miles	5-year / 60,000 miles	5-year / 60,000 miles	5-year / 60,000 miles
10-year / 100,000 miles	10-year / 100,000 miles	10-year / 100,000 miles	10-year / 100,000 miles
7-year / 100,000 miles	7-year / 100,000 miles	7-year / 100,000 miles	7-year / 100,000 miles
5-year / Unlimited miles	5-year / Unlimited miles	5-year / Unlimited miles	5-year / Unlimited miles

Component Parts Location



①	Front seat belt buckle switch	②	Rear seat belt buckle switch	③	Occupant detection system sensor
④	Occupant detection system control unit	⑤	Air bag diagnosis sensor unit Refer to Component Parts Location ➡	⑥	ECM Refer to Component Parts Location ➡
⑦	BCM Refer to Component Parts Location ➡	⑧	Combination meter		

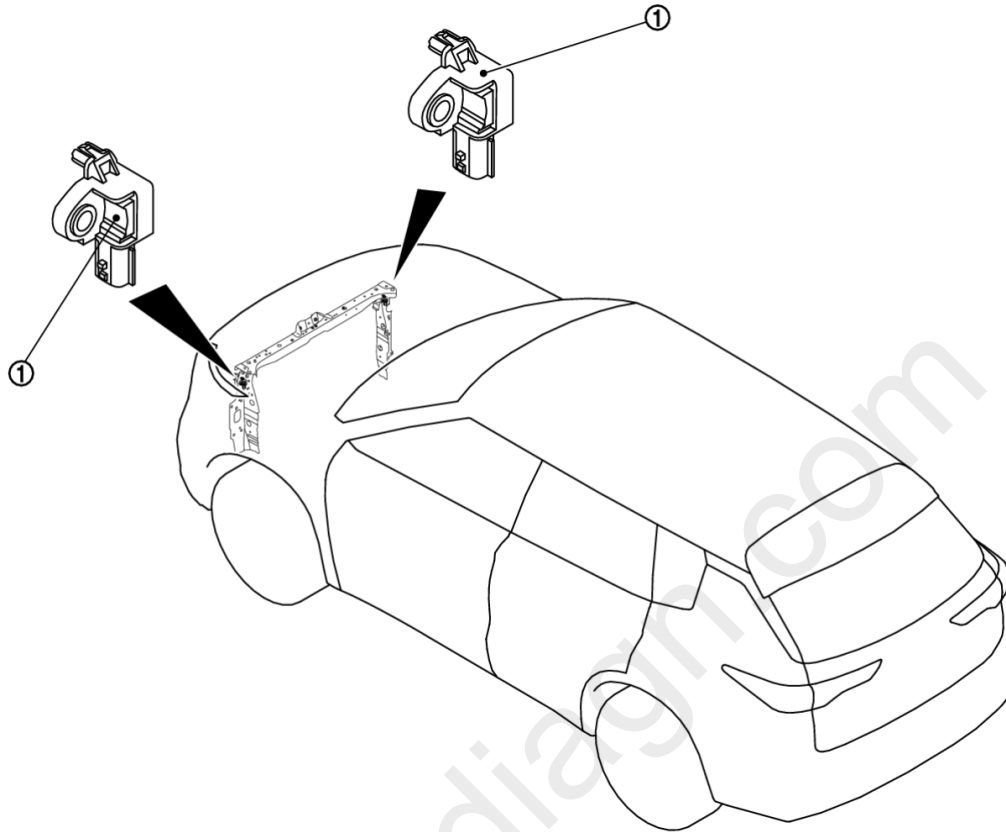
Component Parts Location



① Rear side air bag module	② Curtain air bag module	③ Front side air bag module
④ Knee air bag module	⑤ Passenger air bag module	⑥ Front seat belt buckle switch
⑦ BCM Component Parts Location →	⑧ Combination meter (SRS air bag warning light)	⑨ Driver air bag module
⑩ Front passenger air bag OFF indicator	⑪ Front center air bag module	⑫ Rear seat belt pre-tensioner
⑬ C-pillar satellite sensor	⑭ Lap pre-tensioner	⑮ Front seat belt pre-tensioner
⑯ Occupant detection system control unit	⑰ Occupant detection system sensor	⑱ Front door satellite sensor
⑲ Air bag diagnosis sensor unit	⑳ Crash zone sensor	㉑ Spiral cable
A View with luggage side lower finisher removed	B View with luggage side lower finisher removed	C View with floor carpet removed
D Backside of passenger seat cushion	E View with front door finisher removed	F View with center console assembly removed
G Radiator core support upper	H View with steering wheel removed	

Crash Zone Sensor

- Crash zone sensor ① is installed to crash zone sensor bracket. Crash zone sensor integrates frontal collision “G” sensor which detects frontal collision impact that exceeds the specified limit of the vehicle.



◀ : Vehicle front

- In a frontal collision that exceeds the specified limit of the vehicle, crash zone sensor detects impact. If frontal collision safing sensor in air bag diagnosis sensor unit judges that impact is due to a collision, driver air bag, passenger air bag, driver knee air bag, passenger knee air bag and seat belt pre-tensioner (front and rear) operate.

Description

Vehicle specification needs to be written with M.U.T.-III SE because it is not written after replacing the air bag diagnosis sensor unit.

The configuration requires network connection. M.U.T.-III SE connects to network and then it downloads the configuration data from the server. Then M.U.T.-III SE writes the vehicle specification to the air bag diagnosis sensor unit.

Refer to [Work Procedure](#) .

note	For details the network connection and operation, refer to “M.U.T.-III SE Operation Manual”. The configuration no need to “save” configuration data from the air bag diagnosis sensor unit. The configuration data is always generated freshly at the server and then downloaded to the M.U.T.-III SE.
caution	• Complete the procedure of “Configuration” in order. • If incorrect “Configuration”, incidents might occur.

[\[Previous\]](#) [\[Next\]](#)

DTC Index

Self Diagnostic Result

DTC	Diagnostic item	SRS air bag warning light	Reference
B0001-09	DRIVER AIRBAG MODULE	ON	DTC Description 
B0001-11	DRIVER AIRBAG MODULE	ON	DTC Description 
B0001-12	DRIVER AIRBAG MODULE	ON	DTC Description 
B0001-13	DRIVER AIRBAG MODULE	ON	DTC Description 
B0001-1A	DRIVER AIRBAG MODULE	ON	DTC Description 
B0001-1B	DRIVER AIRBAG MODULE	ON	DTC Description 
B0001-1E	DRIVER AIRBAG MODULE	ON	DTC Description 
B0001-55	DRIVER AIRBAG MODULE	ON	DTC Description 
B0002-09	DRIVER AIRBAG MODULE 2	ON	DTC Description 
B0002-11	DRIVER AIRBAG MODULE 2	ON	DTC Description 
B0002-12	DRIVER AIRBAG MODULE 2	ON	DTC Description 
B0002-13	DRIVER AIRBAG MODULE 2	ON	DTC Description 
B0002-1A	DRIVER AIRBAG MODULE 2	ON	DTC Description 
B0002-1B	DRIVER AIRBAG MODULE 2	ON	DTC Description 
B0002-1E	DRIVER AIRBAG MODULE 2	ON	DTC Description 
B0002-55	DRIVER AIRBAG MODULE 2	ON	DTC Description 
B0010-09	ASSIST A/B MODULE	ON	DTC Description 
B0010-11	ASSIST A/B MODULE	ON	DTC Description 
B0010-12	ASSIST A/B MODULE	ON	DTC Description 
B0010-13	ASSIST A/B MODULE	ON	DTC Description 
B0010-1A	ASSIST A/B MODULE	ON	DTC Description 
B0010-1B	ASSIST A/B MODULE	ON	DTC Description 
B0010-55	ASSIST A/B MODULE	ON	DTC Description 
B0011-09	ASSIST A/B MODULE 2	ON	DTC Description 

DTC	Diagnostic item	SRS air bag warning light	Reference
B0011-11	ASSIST A/B MODULE 2	ON	DTC Description 
B0011-12	ASSIST A/B MODULE 2	ON	DTC Description 
B0011-13	ASSIST A/B MODULE 2	ON	DTC Description 
B0011-1A	ASSIST A/B MODULE 2	ON	DTC Description 
B0011-1B	ASSIST A/B MODULE 2	ON	DTC Description 
B0011-55	ASSIST A/B MODULE 2	ON	DTC Description 
B0012-55	Passenger air bag module 3	ON	DTC Description 
B0020-09	SIDE A/B MODULE LH	ON	DTC Description 
B0020-11	SIDE A/B MODULE LH	ON	DTC Description 
B0020-12	SIDE A/B MODULE LH	ON	DTC Description 
B0020-13	SIDE A/B MODULE LH	ON	DTC Description 
B0020-1A	SIDE A/B MODULE LH	ON	DTC Description 
B0020-1B	SIDE A/B MODULE LH	ON	DTC Description 
B0020-55	SIDE A/B MODULE LH	ON	DTC Description 
B0021-09	CURTAIN A/B MODULE LH	ON	DTC Description 
B0021-11	CURTAIN A/B MODULE LH	ON	DTC Description 
B0021-12	CURTAIN A/B MODULE LH	ON	DTC Description 
B0021-13	CURTAIN A/B MODULE LH	ON	DTC Description 
B0021-1A	CURTAIN A/B MODULE LH	ON	DTC Description 
B0021-1B	CURTAIN A/B MODULE LH	ON	DTC Description 
B0021-55	CURTAIN A/B MODULE LH	ON	DTC Description 
B0028-09	SIDE A/B MODULE RH	ON	DTC Description 
B0028-11	SIDE A/B MODULE RH	ON	DTC Description 
B0028-12	SIDE A/B MODULE RH	ON	DTC Description 
B0028-13	SIDE A/B MODULE RH	ON	DTC Description 
B0028-1A	SIDE A/B MODULE RH	ON	DTC Description 
B0028-1B	SIDE A/B MODULE RH	ON	DTC Description 
B0028-55	SIDE A/B MODULE RH	ON	DTC Description 
B0029-09	CURTAIN A/B MODULE RH	ON	DTC Description 

DTC	Diagnostic item	SRS air bag warning light	Reference
B0029-11	CURTAIN A/B MODULE RH	ON	DTC Description 
B0029-12	CURTAIN A/B MODULE RH	ON	DTC Description 
B0029-13	CURTAIN A/B MODULE RH	ON	DTC Description 
B0029-1A	CURTAIN A/B MODULE RH	ON	DTC Description 
B0029-1B	CURTAIN A/B MODULE RH	ON	DTC Description 
B0029-55	CURTAIN A/B MODULE RH	ON	DTC Description 
B0030-09	REAR SIDE A/B MODULE LH	ON	DTC Description 
B0030-11	REAR SIDE A/B MODULE LH	ON	DTC Description 
B0030-12	REAR SIDE A/B MODULE LH	ON	DTC Description 
B0030-13	REAR SIDE A/B MODULE LH	ON	DTC Description 
B0030-1A	REAR SIDE A/B MODULE LH	ON	DTC Description 
B0030-1B	REAR SIDE A/B MODULE LH	ON	DTC Description 
B0030-55	REAR SIDE A/B MODULE LH	ON	DTC Description 
B0038-09	REAR SIDE A/B MODULE RH	ON	DTC Description 
B0038-11	REAR SIDE A/B MODULE RH	ON	DTC Description 
B0038-12	REAR SIDE A/B MODULE RH	ON	DTC Description 
B0038-13	REAR SIDE A/B MODULE RH	ON	DTC Description 
B0038-1A	REAR SIDE A/B MODULE RH	ON	DTC Description 
B0038-1B	REAR SIDE A/B MODULE RH	ON	DTC Description 
B0038-55	REAR SIDE A/B MODULE RH	ON	DTC Description 
B0052-11	Front seat belt buckle switch RH	ON	DTC Description 
B0052-12	Front seat belt buckle switch RH	ON	DTC Description 
B0052-13	Front seat belt buckle switch RH	ON	DTC Description 
B0052-29	Front seat belt buckle switch RH	ON	DTC Description 
B0052-2B	Front seat belt buckle switch RH	ON	DTC Description 
B0073-09	PRE-TEN REAR LH	ON	DTC Description 

DTC	Diagnostic item	SRS air bag warning light	Reference
B0073-11	PRE-TEN REAR LH	ON	DTC Description 
B0073-12	PRE-TEN REAR LH	ON	DTC Description 
B0073-13	PRE-TEN REAR LH	ON	DTC Description 
B0073-1A	PRE-TEN REAR LH	ON	DTC Description 
B0073-1B	PRE-TEN REAR LH	ON	DTC Description 
B0073-55	PRE-TEN REAR LH	ON	DTC Description 
B0075-09	PRE-TEN REAR RH	ON	DTC Description 
B0075-11	PRE-TEN REAR RH	ON	DTC Description 
B0075-12	PRE-TEN REAR RH	ON	DTC Description 
B0075-13	PRE-TEN REAR RH	ON	DTC Description 
B0075-1A	PRE-TEN REAR RH	ON	DTC Description 
B0075-1B	PRE-TEN REAR RH	ON	DTC Description 
B0075-55	PRE-TEN REAR RH	ON	DTC Description 
B0091-11	DOOR SATEL SENS LH	ON	DTC Description 
B0091-12	DOOR SATEL SENS LH	ON	DTC Description 
B0091-25	DOOR SATEL SENS LH	ON	DTC Description 
B0091-28	DOOR SATEL SENS LH	ON	DTC Description 
B0091-55	DOOR SATEL SENS LH	ON	DTC Description 
B0091-81	DOOR SATEL SENS LH	ON	DTC Description 
B0091-86	DOOR SATEL SENS LH	ON	DTC Description 
B0091-88	DOOR SATEL SENS LH	ON	DTC Description 
B0091-93	DOOR SATEL SENS LH	ON	DTC Description 
B0092-55	B-PILLAR SAT SEN LH	ON	DTC Description 
B0093-11	C-PILLAR SAT SEN LH	ON	DTC Description 
B0093-12	C-PILLAR SAT SEN LH	ON	DTC Description 
B0093-25	C-PILLAR SAT SEN LH	ON	DTC Description 
B0093-28	C-PILLAR SAT SEN LH	ON	DTC Description 
B0093-55	C-PILLAR SAT SEN LH	ON	DTC Description 
B0093-81	C-PILLAR SAT SEN LH	ON	DTC Description 

DTC	Diagnostic item	SRS air bag warning light	Reference
B0093-86	C-PILLAR SAT SEN LH	ON	DTC Description 
B0093-88	C-PILLAR SAT SEN LH	ON	DTC Description 
B0093-93	C-PILLAR SAT SEN LH	ON	DTC Description 
B0094-11	CRASH ZONE SENS	ON	DTC Description 
B0094-12	CRASH ZONE SENS	ON	DTC Description 
B0094-25	CRASH ZONE SENS	ON	DTC Description 
B0094-28	CRASH ZONE SENS	ON	DTC Description 
B0094-55	CRASH ZONE SENS	ON	DTC Description 
B0094-81	CRASH ZONE SENS	ON	DTC Description 
B0094-86	CRASH ZONE SENS	ON	DTC Description 
B0094-88	CRASH ZONE SENS	ON	DTC Description 
B0094-93	CRASH ZONE SENS	ON	DTC Description 
B0096-11	DOOR SATEL SENS RH	ON	DTC Description 
B0096-12	DOOR SATEL SENS RH	ON	DTC Description 
B0096-25	DOOR SATEL SENS RH	ON	DTC Description 
B0096-28	DOOR SATEL SENS RH	ON	DTC Description 
B0096-55	DOOR SATEL SENS RH	ON	DTC Description 
B0096-81	DOOR SATEL SENS RH	ON	DTC Description 
B0096-86	DOOR SATEL SENS RH	ON	DTC Description 
B0096-88	DOOR SATEL SENS RH	ON	DTC Description 
B0096-93	DOOR SATEL SENS RH	ON	DTC Description 
B0097-55	B-PILLAR SAT SEN RH	ON	DTC Description 
B0098-11	C-PILLAR SAT SEN RH	ON	DTC Description 
B0098-12	C-PILLAR SAT SEN RH	ON	DTC Description 
B0098-25	C-PILLAR SAT SEN RH	ON	DTC Description 
B0098-28	C-PILLAR SAT SEN RH	ON	DTC Description 
B0098-55	C-PILLAR SAT SEN RH	ON	DTC Description 
B0098-81	C-PILLAR SAT SEN RH	ON	DTC Description 
B0098-86	C-PILLAR SAT SEN RH	ON	DTC Description 

DTC	Diagnostic item	SRS air bag warning light	Reference
B0098-88	C-PILLAR SAT SEN RH	ON	DTC Description ➡
B0098-93	C-PILLAR SAT SEN RH	ON	DTC Description ➡
B00A0-02	OCCUPANT SENS UNIT	ON	DTC Description ➡
B00A0-04	OCCUPANT SENS UNIT	ON	DTC Description ➡
B00A0-09	OCCUPANT SENS UNIT	ON	DTC Description ➡
B00A0-22	OCCUPANT SENS UNIT	ON	DTC Description ➡
B00A0-83	OCCUPANT SENS UNIT	ON	DTC Description ➡
B00A0-86	OCCUPANT SENS UNIT	ON	DTC Description ➡
B00A0-87	OCCUPANT SENS UNIT	ON	DTC Description ➡
B00A0-88	OCCUPANT SENS UNIT	ON	DTC Description ➡
B00A0-8F	OCCUPANT SENS UNIT	ON	DTC Description ➡
B00A0-93	OCCUPANT SENS UNIT	ON	DTC Description ➡
B00D5-11	PASS A/B INDICATOR	ON	DTC Description ➡
B00D5-12	PASS A/B INDICATOR	ON	DTC Description ➡
B00D5-13	PASS A/B INDICATOR	ON	DTC Description ➡
B1000-49	Air bag diagnosis sensor unit	ON	DTC Description ➡
B1000-55	Air bag diagnosis sensor unit	ON	DTC Description ➡
B1001-09	Lap pre-tensioner LH	ON	DTC Description ➡
B1001-11	Lap pre-tensioner LH	ON	DTC Description ➡
B1001-12	Lap pre-tensioner LH	ON	DTC Description ➡
B1001-13	Lap pre-tensioner LH	ON	DTC Description ➡
B1001-1A	Lap pre-tensioner LH	ON	DTC Description ➡
B1001-1B	Lap pre-tensioner LH	ON	DTC Description ➡
B1001-55	Lap pre-tensioner LH	ON	DTC Description ➡
B1002-09	Lap pre-tensioner RH	ON	DTC Description ➡
B1002-11	Lap pre-tensioner RH	ON	DTC Description ➡
B1002-12	Lap pre-tensioner RH	ON	DTC Description ➡
B1002-13	Lap pre-tensioner RH	ON	DTC Description ➡
B1002-1A	Lap pre-tensioner RH	ON	DTC Description ➡

DTC	Diagnostic item	SRS air bag warning light	Reference
B1002-1B	Lap pre-tensioner RH	ON	DTC Description ➡
B1002-55	Lap pre-tensioner RH	ON	DTC Description ➡
B1004-09	Passenger air bag module active vent	ON	DTC Description ➡
B1004-11	Passenger air bag module active vent	ON	DTC Description ➡
B1004-12	Passenger air bag module active vent	ON	DTC Description ➡
B1004-13	Passenger air bag module active vent	ON	DTC Description ➡
B1004-1A	Passenger air bag module active vent	ON	DTC Description ➡
B1004-1B	Passenger air bag module active vent	ON	DTC Description ➡
B1004-55	Passenger air bag module active vent	ON	DTC Description ➡
B100D-09	Knee air bag module LH	ON	DTC Description ➡
B100D-11	Knee air bag module LH	ON	DTC Description ➡
B100D-12	Knee air bag module LH	ON	DTC Description ➡
B100D-13	Knee air bag module LH	ON	DTC Description ➡
B100D-1A	Knee air bag module LH	ON	DTC Description ➡
B100D-1B	Knee air bag module LH	ON	DTC Description ➡
B100D-55	Knee air bag module LH	ON	DTC Description ➡
B100E-09	Knee air bag module RH	ON	DTC Description ➡
B100E-11	Knee air bag module RH	ON	DTC Description ➡
B100E-12	Knee air bag module RH	ON	DTC Description ➡
B100E-13	Knee air bag module RH	ON	DTC Description ➡
B100E-1A	Knee air bag module RH	ON	DTC Description ➡
B100E-1B	Knee air bag module RH	ON	DTC Description ➡
B100E-55	Knee air bag module RH	ON	DTC Description ➡
B101B-09	Front center air bag module LH	ON	DTC Description ➡
B101B-11	Front center air bag module LH	ON	DTC Description ➡
B101B-12	Front center air bag module LH	ON	DTC Description ➡

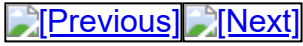
DTC	Diagnostic item	SRS air bag warning light	Reference
B101B-13	Front center air bag module LH	ON	DTC Description ➡
B101B-1A	Front center air bag module LH	ON	DTC Description ➡
B101B-1B	Front center air bag module LH	ON	DTC Description ➡
B101B-55	Front center air bag module LH	ON	DTC Description ➡
B101C-55	Front center air bag module RH	ON	DTC Description ➡
B1029-09	Front seat belt pre-tensioner LH	ON	DTC Description ➡
B1029-11	Front seat belt pre-tensioner LH	ON	DTC Description ➡
B1029-12	Front seat belt pre-tensioner LH	ON	DTC Description ➡
B1029-13	Front seat belt pre-tensioner LH	ON	DTC Description ➡
B1029-1A	Front seat belt pre-tensioner LH	ON	DTC Description ➡
B1029-1B	Front seat belt pre-tensioner LH	ON	DTC Description ➡
B1029-55	Front seat belt pre-tensioner LH	ON	DTC Description ➡
B102A-09	Front seat belt pre-tensioner RH	ON	DTC Description ➡
B102A-11	Front seat belt pre-tensioner RH	ON	DTC Description ➡
B102A-12	Front seat belt pre-tensioner RH	ON	DTC Description ➡
B102A-13	Front seat belt pre-tensioner RH	ON	DTC Description ➡
B102A-1A	Front seat belt pre-tensioner RH	ON	DTC Description ➡
B102A-1B	Front seat belt pre-tensioner RH	ON	DTC Description ➡
B102A-55	Front seat belt pre-tensioner RH	ON	DTC Description ➡
B1036-16	Ignition voltage	ON	DTC Description ➡
B1036-17	Ignition voltage	ON	DTC Description ➡
B1040-22	Vehicle speed	OFF	DTC Description ➡
B1041-82	Vehicle speed signal	OFF	DTC Description ➡
B107B-55	ECU setting	ON	DTC Description ➡
B12B5-97	Frontal collision	ON	DTC Description ➡

DTC	Diagnostic item	SRS air bag warning light	Reference
B12B6-97	Side collision	ON	DTC Description 
B12B7-97	Rollover detection	ON	DTC Description 
B12B9-97	Rear collision	ON	DTC Description 
B12BA-97	Air bag disposal completion	ON	DTC Description 
B1500-92	DOOR SATELLITE SENSOR	ON	DTC Description 
U2140-81	CAN comm err (ECM)	OFF	DTC Description 
U2141-81	CAN comm err (TCM)	OFF	DTC Description 
U2148-81	CAN comm err (brake control unit)	OFF	DTC Description 
U2148-83	CAN comm err (brake control unit)	OFF	DTC Description 
U214E-81	CAN comm err (combination meter)	OFF	DTC Description 
U214F-81	CAN comm err (BCM)	OFF	DTC Description 
U2152-81	CAN comm err (ADAS control unit)	OFF	DTC Description 
U215B-81	CAN comm err (IPDM E/R)	OFF	DTC Description 
U215F-81	CAN comm err (laser/radar)	OFF	DTC Description 
U2176-81	CAN comm err (CCM/ST angle sensor)	OFF	DTC Description 

Network-DTC

DTC	Diagnostic item	SRS air bag warning light	Reference
U0073-00	Control module comm Bus A Off	OFF	DTC Description DTC Logic 
U2140-87	CAN comm err (ECM)	OFF	DTC Description DTC Logic 
U2141-87	CAN comm err (TCM)	OFF	DTC Description 
U2148-87	CAN comm err (brake control unit)	OFF	DTC Description DTC Logic 
U214E-87	CAN comm err	OFF	DTC Description 

DTC	Diagnostic item	SRS air bag warning light	Reference
	(combination meter)		
U214F-87	CAN comm err (BCM)	OFF	DTC Description 
U2152-87	CAN comm err (ADAS control unit)	OFF	DTC Description DTC Logic 
U215B-87	CAN comm err (IPDM E/R)	OFF	DTC Description 
U215F-87	CAN comm err (laser/radar)	OFF	DTC Description DTC Logic 
U2176-87	CAN comm err (CCM/ST angle sensor)	OFF	DTC Description DTC Logic 



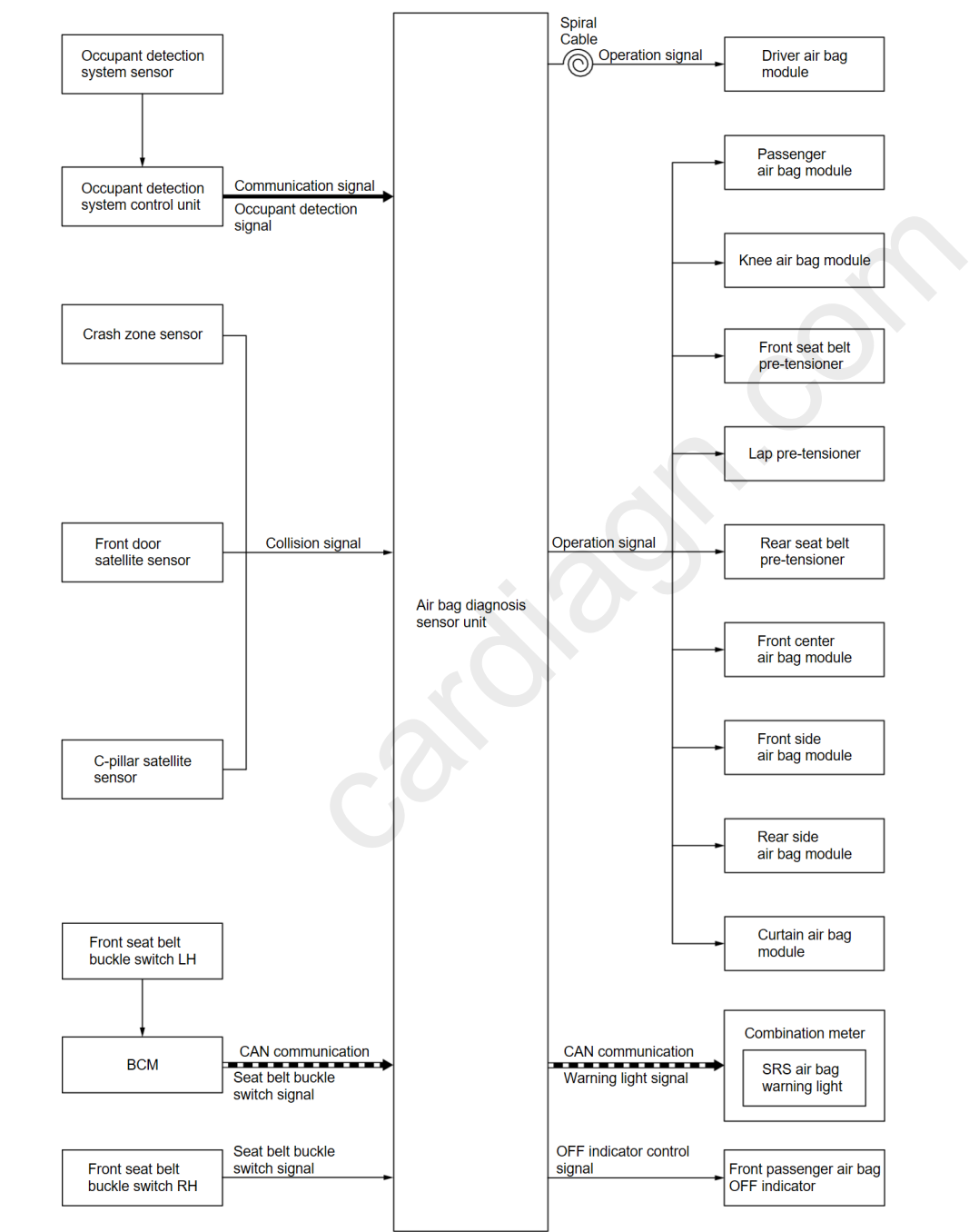
Occupant detection system control unit

- Occupant detection system control unit installed in the passenger seat cushion frame.
- Occupant detection system control unit transmits the passenger seat status (occupied or empty) to air bag diagnosis sensor unit.

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System Description

SYSTEM DIAGRAM



Component	Function
Occupant detection system sensor	Refer to Occupant Detection System Sensor  .
Occupant detection system control unit	Refer to Occupant Detection System Control Unit Occupant detection system control unit

Component	Function
	
Crash zone sensor	Refer to Crash Zone Sensor 
Front door satellite sensor	Refer to Satellite Sensor Satellite Sensor 
C-pillar satellite sensor	Refer to Satellite Sensor Satellite Sensor 
Front seat belt buckle switch	Fastening or not fastening of seat belt judged. This judge is used for control of front air bag system.
BCM	BCM transmits the front seat belt buckle switch LH signal to air bag diagnosis sensor unit via CAN communication.
Air bag diagnosis sensor unit	Refer to Air Bag Diagnosis Sensor Unit 
Spiral cable	Refer to Spiral Cable 
Driver air bag module	Refer to Driver Air Bag Module 
Passenger air bag module	Refer to Passenger Air Bag Module 
Knee air bag module	Refer to Driver Knee Air Bag Module  and Passenger Knee Air Bag Module 
Front seat belt pre-tensioner	Refer to Seat Belt Pre-tensioner with Load Limiter 
Lap pre-tensioner	Refer to Double Pre-tensioner Seat Belt 
Rear seat belt pre-tensioner	Refer to Seat Belt Pre-tensioner with Load Limiter 
Front center air bag module	Refer to Front Center Air Bag Module 
Front side air bag module	Refer to Front Side Air Bag Module 
Rear side air bag module	Refer to Rear Side Air Bag Module 
Curtain air bag module	Refer to Curtain Air Bag Module 
Combination meter (SRS air bag warning light)	Refer to Air Bag Warning Light Air Bag Warning Lamp 
Front passenger air bag OFF indicator	Refer to Front Passenger Air Bag OFF Indicator 

SYSTEM DESCRIPTION

Supplemental Restraint System (SRS) activates air bag module and seat belt pre-tensioner when it detects a collision that is more than the specified limit. Together with other safety devices, it reduces the impact that occupant receives when vehicle collision occurs. Air bag diagnosis sensor unit supplies power supply to air bag module and pre-tensioner seat belt when deceleration that is

more than the specified limit is detected by G sensor in air bag diagnosis sensor unit, crash zone sensor and each satellite sensor. Air bag module is composed of electric igniter (squib), filter, pyrotechnic material, and gas generating material. When air bag module receives a signal from air bag diagnosis sensor unit, air bag module ignites pyrotechnic material using electric igniter (squib) so that gas generating material generates high temperature nitrogen gas. The gas through filter activates air bag. At the same time, pre-tensioner seat belt receives power supply from air bag diagnosis sensor unit, gas generator is activated, and then gas is generated. The pressure of the generated gas causes the balls inside of pipe to move and the shaft to rotate and retract the shoulder belt. Similarly, the piston inside of pipe moves, and retracts the lap belt connected to the wire.

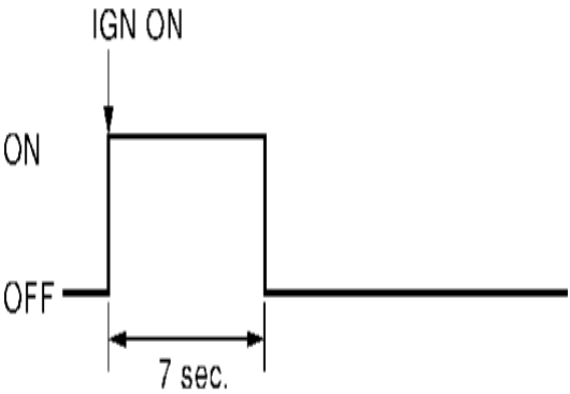
AIR BAG DIAGNOSIS SENSOR UNIT FUNCTIONS

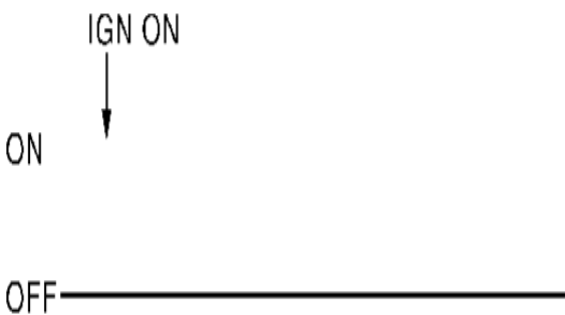
Air bag diagnosis sensor unit has the following functions.

- Detects a collision and supplies the energy for deploying air bag and seat belt pre-tensioner.
 - Detects and records electrical malfunction in air bag system and seat belt pre-tensioner system, and turns SRS air bag warning light ON.
 - Detects and records the deployment of air bag and seat belt pre-tensioner, and turns ON SRS air bag warning light.
 - Indicates the malfunction record via M.U.T.-III SE.
-

SRS AIR BAG WARNING LIGHT

- Detects electrical malfunction in air bag system and seat belt pre-tensioner system, and turns SRS air bag warning light ON.
- Detects deployment malfunction in air bag system and seat belt pre-tensioner system, and turns SRS air bag warning light ON.
- Air bag diagnosis sensor unit warns the driver by turning SRS air bag warning light ON when air bag diagnosis sensor unit detects battery low voltage. SRS air bag warning light turns ON when a voltage value at which air bag diagnosis sensor unit cannot operate normally (9 V or less) is detected. After starting to turn ON, SRS air bag warning light turns OFF when air bag diagnosis sensor unit detects the normal value of battery voltage.
- Air bag diagnosis sensor unit warns the driver by turning SRS air bag warning light ON when air bag diagnosis sensor unit detects battery high voltage. SRS air bag warning light turns ON when a voltage value at which air bag diagnosis sensor unit cannot operate normally (16 V or more) is detected. After starting to turn ON, SRS air bag warning light turns OFF when air bag diagnosis sensor unit detects the normal value of battery voltage.

SRS air bag warning light operation	SRS condition
	No malfunction is detected
	• Air bag is deployed • Seat belt pre-tensioner is deployed • Air bag diagnosis sensor unit is malfunctioning • Air bag power supply circuit is malfunctioning • SRS air bag warning light circuit is malfunctioning • Each sensor is malfunctioning • Each module is malfunctioning • Battery voltage is low (9 V or less) or high battery voltage (16 V or more) • Occupant detection system is malfunctioning • Zero point reset not yet performed

SRS air bag warning light operation	SRS condition
	• Air bag diagnosis sensor unit is malfunctioning • SRS air bag warning light circuit is malfunctioning • Combination meter is malfunctioning

COLLISION MODES

The operation of SRS is different depending on the collision modes applications.
SRS configurations that are activated for the following collision modes.

×: Apply —: Not apply

SRS configuration	Frontal collision	Left side collision	Right side collision	Rollover	Rear collision
Driver air bag module	×	—*1	—*1	—*1	—*1
Passenger air bag module	×	—*1	—*1	—*1	—*1
Knee air bag module LH	×	—*1	—*1	—*1	—*1
Knee air bag module RH	×	—*1	—*1	—*1	—*1
Front seat belt pre-tensioner LH	×	×	×	×	—*1*2*3
Front seat belt pre-tensioner RH	×	×	×	×	—*1*2*3
Lap pre-tensioner LH	×	×	×	×	—*1*2*3
Lap pre-tensioner RH	×	×	×	×	—*1*2*3
Rear seat belt pre-tensioner	×	×	×	×	—*1*2*3

SRS configuration	Frontal collision	Left side collision	Right side collision	Rollover	Rear collision
LH					
Rear seat belt pre-tensioner RH	x	x	x	x	__*1*2*3
Front center air bag module	__*2*3	x	x	x	__*2*3
Front side air bag module LH	__*2	x	__*2	__*2	__*2
Front side air bag module RH	__*3	__*3	x	__*3	__*3
Rear side air bag module LH	__*2	x	__*2	__*2	__*2
Rear side air bag module RH	__*3	__*3	x	__*3	__*3
Curtain air bag module LH	__*2	x	__*2	x	__*2
Curtain air bag module RH	__*3	__*3	x	x	__*3

*1: SRS may be activated when an excessive impact is applied toward the front of the vehicle.

*2: SRS may be activated when an excessive impact is applied toward the left of the vehicle.

*3: SRS may be activated when an excessive impact is applied toward the right of the vehicle.

OCCUPANT DETECTION SYSTEM

This Occupant Detection System has the following functions.

- Suppress the deployment of passenger air bag and knee air bag (passenger side) when front passenger seat is empty, or when occupied by child and child-seat. Turns ON front passenger air bag OFF indicator when front passenger seat is occupied by child-seat and child.
- Indicates the malfunctioning record by M.U.T.-III SE.
- When “zero point reset” for occupant detection system is incomplete, M.U.T.-III SE indicates that “zero point reset” is incomplete.

This function is applied to Mitsubishi Motors genuine parts only.

note

- The following table shows operation of air bag diagnosis sensor unit when air bag diagnosis sensor unit receives information from Occupant Detection System.
- Even if zero point reset is “complete”, always perform zero point reset after the removal and installation of seat or the removal of control unit harness connector.

Status (front passenger seat)	Passenger air bag and knee air bag (passenger side)	Front passenger air bag OFF indicator	SRS air bag warning light
Empty	Suppress	ON	OFF
An object	Suppress	ON	OFF
Child/ child-seat	Suppress	ON	OFF
Adult	Enable to deploy	OFF	OFF
Malfunction	Suppress	ON	ON
Zero point reset Not yet performed (Mitsubishi Motors genuine parts only)	Suppress	ON	ON

Active Vent Function

Air bag diagnosis sensor unit opens vent of passenger air bag module by passenger side occupant detecting condition if necessary. The pressure of the deployed air bag falls, and the passenger side occupant is take care of appropriately.

Warning Light/Indicator Light

Item	Design	Reference	
SRS air bag warning light		Full TFT meter	For layout, refer to Design 
			For function, refer to SRS Air Bag Warning Light SRS Air Bag Warning Lamp 
		7 inch information display	For layout, refer to Design 
			For function, refer to SRS Air Bag Warning Light SRS Air Bag Warning Lamp 



Technical Service Bulletin

SUBJECT: A/C INOPERATIVE WITH DTC B20C8-14			No: TSB-22-55-001	
			DATE: February 2022	
			MODEL: 2022 Outlander	
CIRCULATE TO:	[] GENERAL MANAGER	[X] PARTS MANAGER		[X] TECHNICIAN
[X] SERVICE ADVISOR	[X] SERVICE MANAGER	[X] WARRANTY PROCESSOR		[X] SALES MANAGER

PURPOSE

This reflash is to correct the IPDM (Intelligent Power Distribution Module) software. The air conditioner is not operative with the A/C switch on and illuminated (see image below). DTC B20C8-14 ECV (Electrical Control Valve) is stored in the IPDM E/R. Please perform this reflash first, then proceed to diagnosing other codes if they persist.



Please reprogram the ECU with countermeasure software to correct the issue upon customer complaint.

AFFECTED VEHICLES

ALL 2022 Outlander

REPAIR PROCEDURE

- Confirm your MUT-III SE is updated with the latest reprogramming database.
- Write down all the electrical device settings such as A/C and radio before reprogramming. The settings should be restored after reprogramming.
- Turn off all electrical devices to minimize the vehicle's electrical load. Also use an external power source to ensure that the vehicle battery maintains the specified voltage during reprogramming.
- Make sure the USB cable and MUT-III SE main harness are not damaged.
- Connect the MUT-III SE to an AC power source to prevent internal battery discharge.
- Stay away from the under hood area during reprogramming. If the connection between the Engine ECU and ETACS is lost, the cooling fan operates as fail-safe.

NOTE: If an affected vehicle has a Malfunction Indicator Lamp (MIL) illuminated before reprogramming, and DTCs are listed in the ECU memory, save the ALL-DTC results and then erase the codes prior to reprogramming. If hard codes are present that are applicable to the target ECU and won't clear, diagnose and repair these codes first and then proceed with reprogramming.

EQUIPMENT

- The following equipment is needed to reprogram the ECU:
- VCI (Vehicle Communication Interface) or VCI Lite - MB991824 or MB992744
- MEDIC Laptop/Tablet with A/C power adapter - 520924, or FZG1MK2
- MUT III Main Harness "A" (blue connector at the DLC end) - MB991910 or MB992745
- USB 2.0 Cable - MB991827 or MB992747
- MEDIC 3.5/4 update at **727** or higher
- For Standalone MUT III units, MUT3-SE Reprogramming Database **N220101** or higher

ECU REPROGRAMMING CHART

Model	Data Number	New Hardware #	Current Hardware #	Remarks
Outlander	SDB N220101	284B76RR0A	284B76RA0A	Target System is IPDM E/R

REPAIR PROCEDURE

SOFTWARE/MEDIC VERSION VERIFICATION

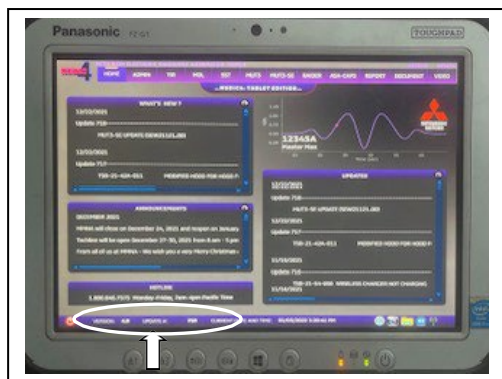
1. Verify that the ECU has not already been updated to the latest S/W number in the table above. If the IPDM ECU is at the latest level, reprogramming is not necessary.

NOTE: Reprogramming the target ECU with the latest database (e.g., **N220101**) includes all past and current reprogramming for TSBs of affected vehicles. It is not necessary to reprogram the ECU for each previous TSB.

For MEDIC 3.5/4 users only: (MUT-III SE users go to step 5)

2. Verify the MEDIC 3.5/4 is at version 3.5 and at update **727** or higher.

If your **MEDIC 3.5/4 update is at least 727**, continue with the Reprogramming Procedure. If your **MEDIC 3.5/4 update is below 727**, update your MEDIC as follows.



3. Select the MEDIC 3.5/4 Admin tab and click on "Updates".



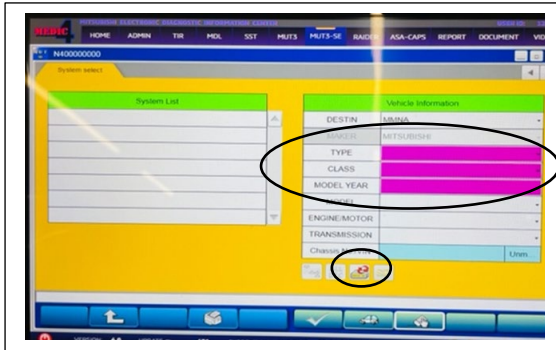
4. If the MEDIC update screen advises updates are available, click the "Begin" button. After all updates are complete, **GO TO THE REPROGRAMMING PROCEDURE.**



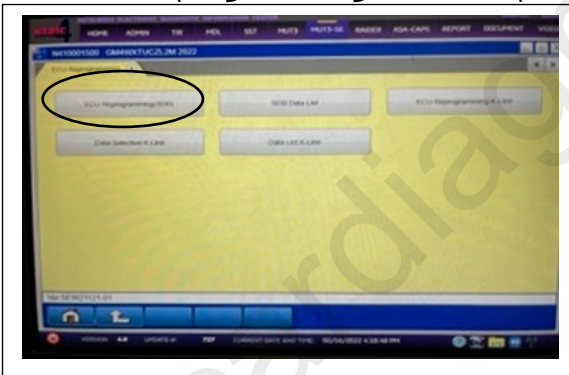
5. Click "STV".



a. Fill in the vehicle information and click the ECU reprogramming button.

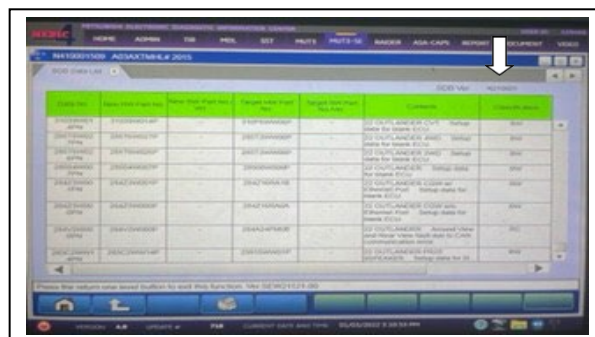


b. Click "ECU Reprogramming (SDB) and press the OK button".



c. Confirm that the database number displayed in the upper right above the chart is **N220101** or higher

- If the database number displayed on your MUT3-SE is **N220101** or greater, continue to the next section.
- If the reprogramming database number displayed on your MUT3-SE is lower than **N220101**, then the MUT3-SE database needs to be updated.



d. Once the database number is confirmed, hit the Home button to go back to the System Select screen.

REPROGRAMMING PROCEDURE

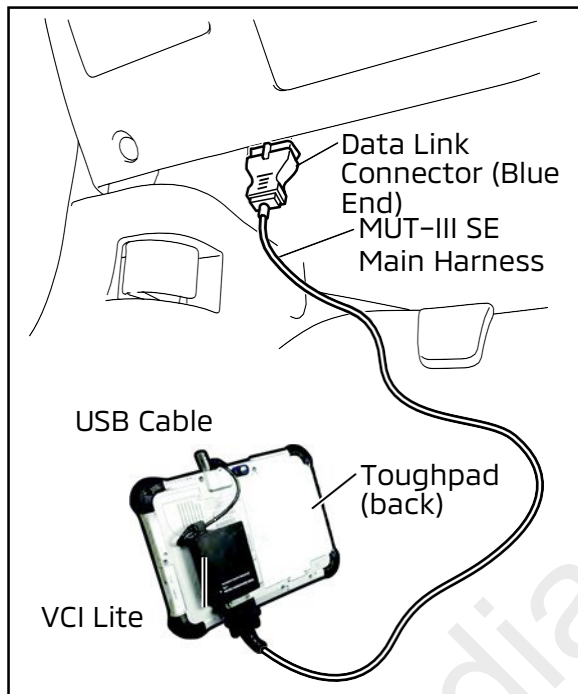


To ensure that the vehicle battery maintains 12V during the procedure, hook-up a battery charger to the vehicle during the procedure.

NOTE: VCI Stand-alone reprogramming is not available for this procedure. The laptop/tablet and the VCI must remain connected for the entire procedure.

1. Connect the equipment as follows:

NOTE: VCI Lite and MEDIC 4.0 Toughpad shown for illustration purposes only.

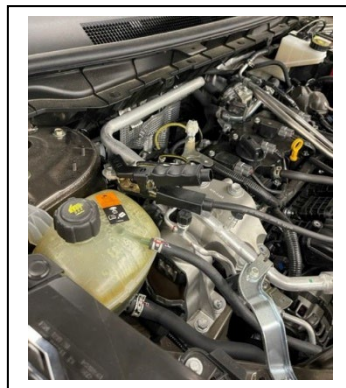
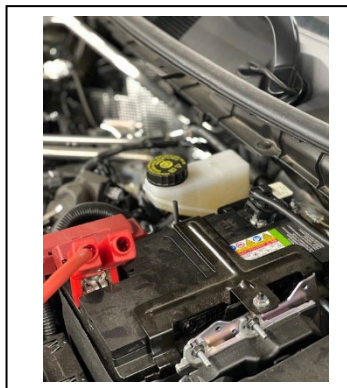


- Turn the MEDIC PC/tablet on. If the battery indicator in the lower right hand corner of the screen does not show a full charge, it is recommended that either the battery be charged prior to beginning or be used with the A/C power adaptor connected.
- Connect the USB cable to the VCI/VCI Lite. When the laptop/tablet displays the MUT-III SE main screen, connect the USB cable to the device.
- Connect the MUT-III SE main harness with the blue DLC connection to the VCI/VCI Lite. Connect the blue connection of the MUT-III SE main harness to the vehicle's data link connector.
- For VCI only (p/n MB991824): Turn the VCI power switch ON. Verify that the indicator lamp in the upper right corner of the screen is green.



DO NOT DISTURB THE HARNESS CABLES OR CONNECTIONS DURING THE REPROGRAMMING PROCESS AS IT COULD CAUSE THE CONTROL UNIT TO LOSE DATA. IF THE USB CABLE IS DISCONNECTED DURING THIS PROCEDURE, A WARNING MESSAGE WILL DISPLAY.

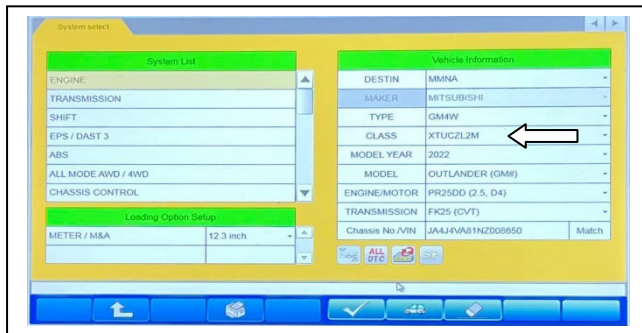
NOTE: Due to limited space it may be easiest to connect cable onto negative ground post and ground strap as shown below.



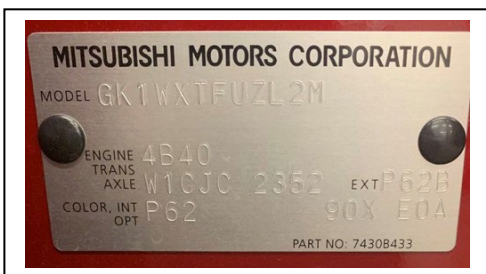
2. Turn the ignition switch to the "ON" position.



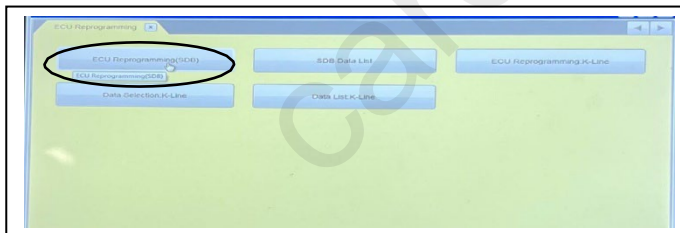
3. Using MEDIC, from the main page, click the "MUT3-SE" icon at the top center of the screen.



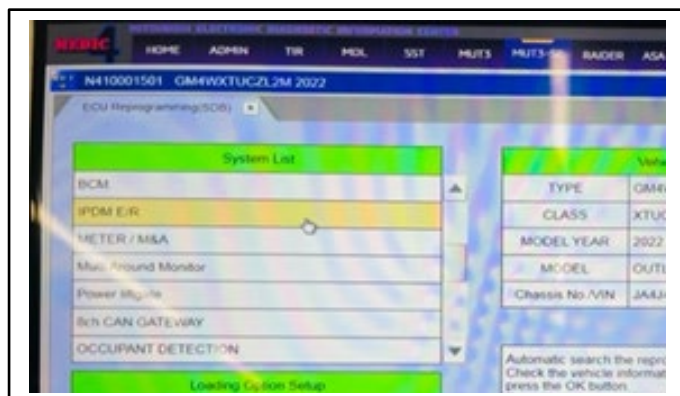
4. The System Select screen opens and populates with some basic information from the vehicle. Look at the label on the passenger side B pillar to identify the appropriate class. (See B pillar label below; class is labeled as "model"). If necessary, select the correct class from the drop-down list.



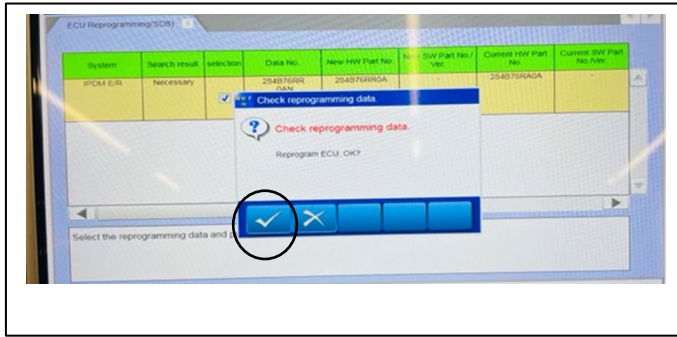
5. Verify that the ECU has not already been updated to the latest S/W number shown in the "ECU Reprogramming Chart" in this TSB. If the ECU is at the latest level, reprogramming **is not** necessary. If reprogramming **is** necessary, proceed with the following steps.



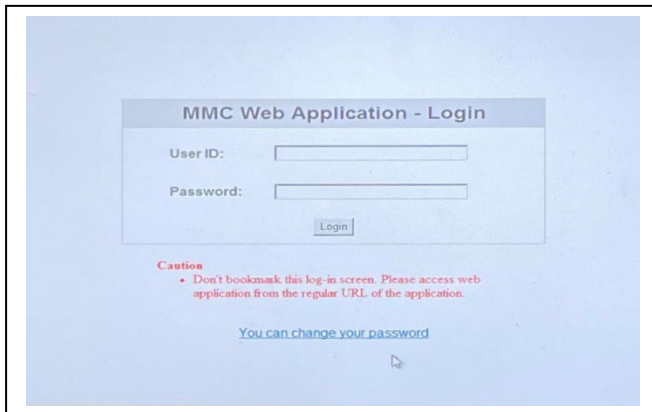
- a. Select ECU Reprogramming (SDB).



- b. Select "IPDM E/R" from Systems List and click the OK button.

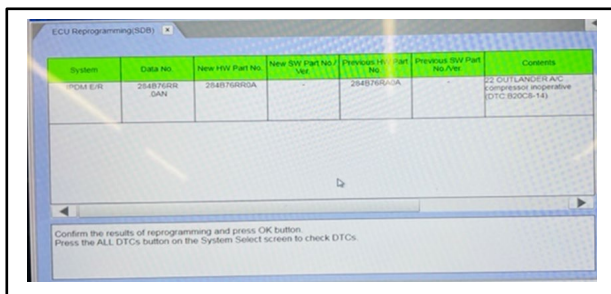
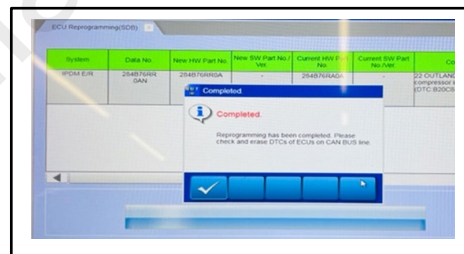


- c. After confirming the reprogramming data listed, click the OK button to begin reprogramming the ECU.

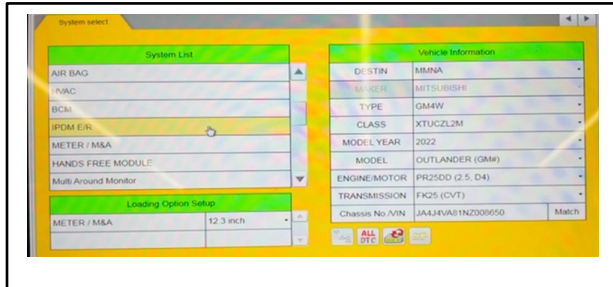


- d. Login to the MMC Web Application.

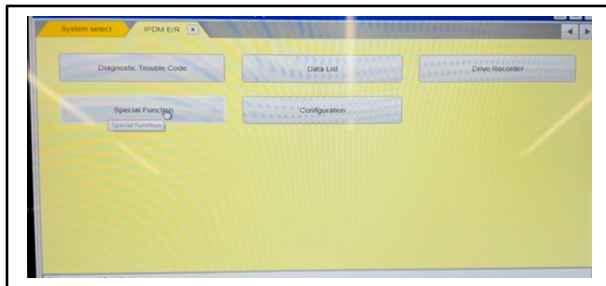
- e. Reprogramming will begin and a progress bar will appear followed by a notification upon successful completion.



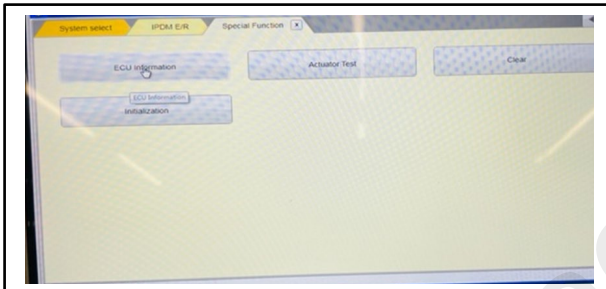
6. Confirm the reprogramming results and press the OK button.



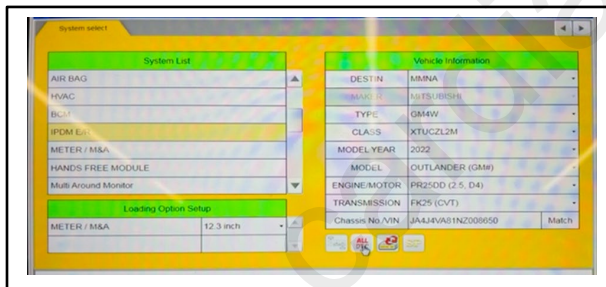
a. Select IPDM E/R in the System List.



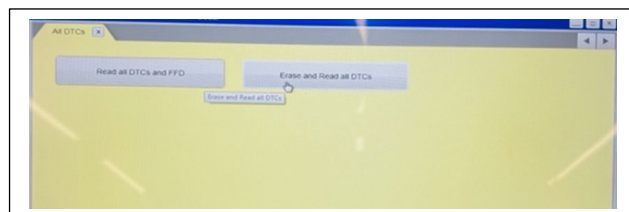
b. Select the Special Function button.



c. Select ECU Information.

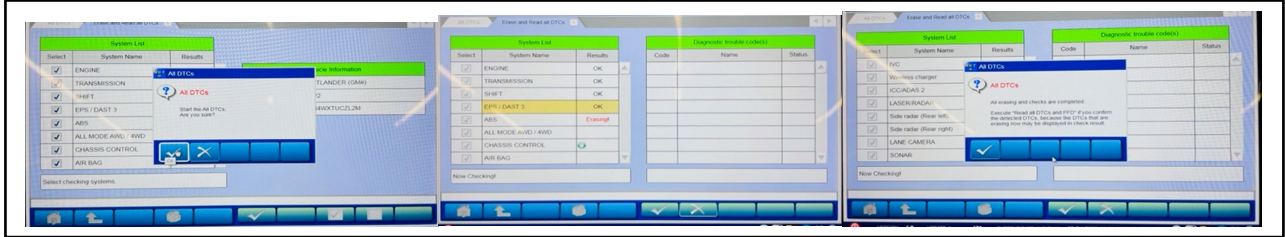


d. Select ALL DTCs.



e. Select Erase and Read all DTCs.

- f. Select OK to start the All DTCs and ensure the erasing and checks are completed.



7. Using a ball-point pen, enter the appropriate ECU part number, Software Part Number (ROM ID#), this Technical Service Bulletin number, your dealer code, and the current date on the Engine Compartment/Control Module Label (p/n MSSF024G00). The Vendor Code is not applicable. The label is available from your facing PDC.

		AUTHORIZED MODIFICATIONS		These Modifications Have Been Approved as Appropriate by EPA and NHTSA	
THE FOLLOWING MODIFICATIONS HAVE BEEN MADE:					
PART NUMBER 1860DXXX		VENDOR CODE N/A		ROM ID # ENG 1860C2XXXX	
TSB ENG TSB-20-13-XXX		DATE 06/25/20		A/T 99332	
A/T 99332		DATE 06/25/20		A/T 99332	
Engine Compartment Label		Control Module Label		Control Module Label	

8. Test drive the vehicle to confirm proper operation.

WARRANTY

This bulletin is supplied as technical information only and is not an authorization to repair. If an affected vehicle is reported with the described condition, diagnose the condition, repair as described in this bulletin and submit a normal warranty claim using the information below.

Operation Code	Operation	Nature Code	Cause Code	Work Time
548503GM	ECU reprogramming	91D	990	0.3H



Technical Service Bulletin

SUBJECT: CHECK ENGINE LIGHT ILLUMINATES OR ENGINE MALFUNCTION POWER REDUCED SERVICE NOW WARNING MESSAGE APPEARS WHILE IDLING OR DRIVING		No: TSB-22-13-001	
		DATE: January 2022	
		MODEL: 2022 Outlander	
CIRCULATE TO:	☐ GENERAL MANAGER	☒ PARTS MANAGER	☒ TECHNICIAN
☒ SERVICE ADVISOR	☒ SERVICE MANAGER	☒ WARRANTY PROCESSOR	☒ SALES MANAGER

PURPOSE

This reflash is to correct the ECU software. The check engine light illuminates or an engine malfunction power reduced service now warning may appear while idling or driving. DTC P0401, P0404 or others may be set. Please perform this reflash first, then proceed to diagnosing other codes if they persist.

Please reprogram the Engine Control Module (ECU) with countermeasure software to correct the issue for any affected vehicles that come in for service (with customer approval) **and any in dealer inventory.**

AFFECTED VEHICLES

2022 Outlander - built prior to December 16, 2021

REPAIR PROCEDURE

- Confirm your MUT-III SE is updated with the latest reprogramming database.
- Write down all the electrical device settings such as A/C and radio before reprogramming. The settings should be restored after reprogramming.
- Turn off all electrical devices to minimize the vehicle's electrical load. Also use an external power source to ensure that the vehicle battery maintains the specified voltage during reprogramming.
- Make sure the USB cable and MUT-III SE main harness are not damaged.
- Connect the MUT-III SE to an AC power source to prevent internal battery discharge.
- Stay away from the under hood area during reprogramming. If the connection between the engine ECU and ETACS is lost, the cooling fan operates as fail-safe.

NOTE: If an affected vehicle has a Malfunction Indicator Lamp (MIL) illuminated before reprogramming, and DTCs are listed in the ECU memory, save the ALL-DTC results and then erase the codes prior to reprogramming. If hard codes are present that are applicable to the target ECU and won't clear, diagnose and repair these codes first and then proceed with reprogramming.

IMPORTANT

To maximize customer satisfaction with the quality of their vehicle, affected new or used inventory vehicles should be remedied before the vehicle is delivered.

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The information contained in this bulletin is subject to change. For the latest version of this document, go to the Mitsubishi Dealer Link, MEDIC, or the Mitsubishi Service Information website (www.mitsubishitechinfo.com).

EQUIPMENT

- The following equipment is needed to reprogram the ECU:
- VCI (Vehicle Communication Interface) or VCI Lite - MB991824 or MB992744
- MEDIC Laptop/Tablet with A/C power adapter - 520924, or FZG1MK2
- MUT III Main Harness "A" (blue connector at the DLC end) - MB991910 or MB992745
- USB 2.0 Cable - MB991827 or MB992747
- MEDIC 3.5/4 update at **720** or higher
- For Standalone MUT III units, MUT3-SE Reprogramming Database **N211201** or higher

ECU REPROGRAMMING CHART

Part Name	Target HW Part No.	Reprogramming SW file name	New SW No. / Ver.	Target SW No. / Ver.	Remarks
Engine Control Unit	237036RA3A	237614PN.4EN	237614PN4E	237614PN4C	2WD CRUISE CONTROL
				237614PN4D	
		237614PN.0EN	237614PN0E	237614PN0C	2WD ADAPTIVE CRUISE CONTROL
				237614PN0D	
		237614PN.1EN	237614PN1E	237614PN1C	2WD ADAPTIVE CRUISE CONTROL (W/MI-PILOT)
				237614PN1D	
	237034PM2A	237614PN.5EN	237614PN5E	237614PN5C	4WD CRUISE CONTROL
				237614PN5D	
		237614PN.2EN	237614PN2E	237614PN2C	4WD ADAPTIVE CRUISE CONTROL
				237614PN2D	
		237614PN.3EN	237614PN3E	237614PN3C	4WD ADAPTIVE CRUISE CONTROL (W/MI-PILOT)
				237614PN3D	

REPAIR PROCEDURE

SOFTWARE/MEDIC VERSION VERIFICATION

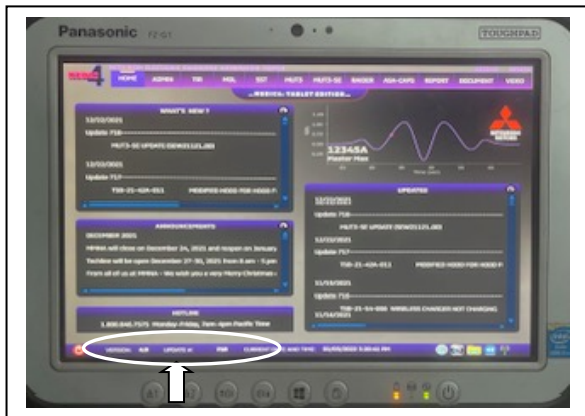
1. Verify that the ECU has not already been updated to the latest S/W number in the table above. If the Engine ECU is at the latest level, reprogramming is not necessary.

NOTE: Reprogramming the Engine ECU with the latest database (e.g., **N211201**) includes all past and current reprogramming for TSBs of affected vehicles. It is not necessary to reprogram the ECU for each previous TSB.

For MEDIC 3.5/4 users only: (MUT-III SEV users go to step 5)

2. Verify the MEDIC 3.5/4 is at version 3.5 and at update **720** or higher.

If your **MEDIC 3.5/4 update is at least 720**, continue with the Reprogramming Procedure. If your **MEDIC 3.5/4 update is below 720**, update your MEDIC as follows.



3. Select the MEDIC 3.5/4 Admin tab and click on "Updates".



4. If the MEDIC update screen advises updates are available, click the "Begin" button. After all updates are complete, **GO TO THE REPROGRAMMING PROCEDURE.**

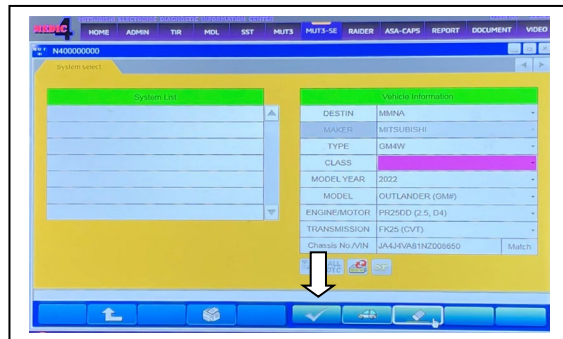


5. STANDALONE MUT-III SE SCAN TOOL VIEWER (STV) ONLY: (MEDIC 3.5 USERS – GO TO THE REPROGRAMMING PROCEDURE). Verify that your MUT3-SE has the most current version of the reprogramming database from the MUT3-SE Main Page.

- a. Click "STV".



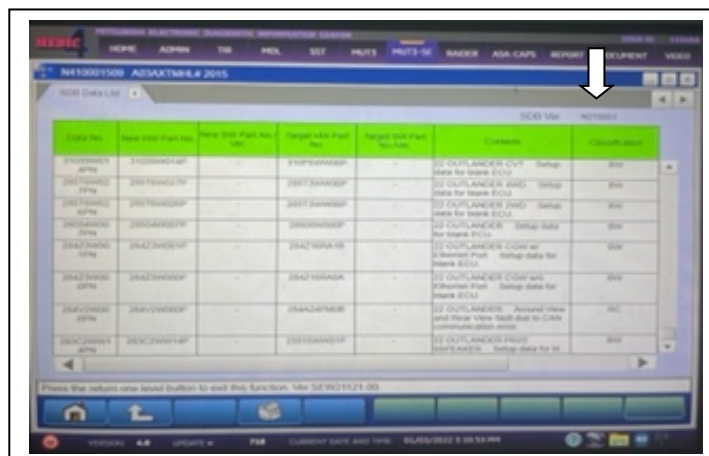
- b. Click the "ECU Reprogramming" button.



- c. Click "SDB Data List, select the reprogramming data system and press the OK button".



- d. Confirm that the database number displayed in the upper right above the chart is **N211201** or higher
- If the database number displayed on your MUT3-SE is **N211201** or greater, continue to the next section.
 - If the reprogramming database number displayed on your MUT3-SE is lower than **N211201**, then the MUT3-SE database needs to be updated.



- e. Once the database number is confirmed, hit the Home button to go back to the System Select screen.

REPROGRAMMING PROCEDURE



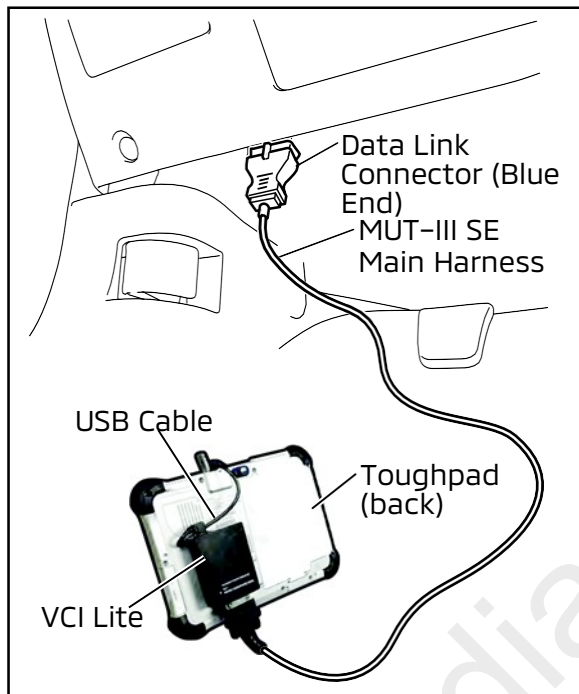
CAUTION

To ensure that the vehicle battery maintains 12V during the procedure, hook-up a battery charger to the vehicle during the procedure.

NOTE: VCI Stand-alone reprogramming is not available for this procedure. The laptop/tablet and the VCI must remain connected for the entire procedure.

1. Connect the equipment as follows:

NOTE: VCI Lite and MEDIC 4.0 Toughpad shown for illustration purposes only.



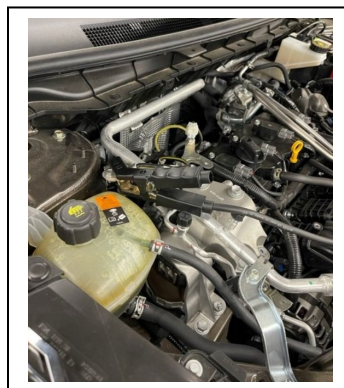
- Turn the MEDIC PC/tablet on. If the battery indicator in the lower right hand corner of the screen does not show a full charge, it is recommended that either the battery be charged prior to beginning or be used with the A/C power adaptor connected.
- Connect the USB cable to the VCI/VCI Lite. When the laptop/tablet displays the MUT-III SE main screen, connect the USB cable to the device.
- Connect the MUT-III SE main harness with the blue DLC connection to the VCI/VCI Lite. Connect the blue connection of the MUT-III SE main harness to the vehicle's data link connector.
- For VCI only (p/n MB991824): Turn the VCI power switch ON. Verify that the indicator lamp in the upper right corner of the screen is green.



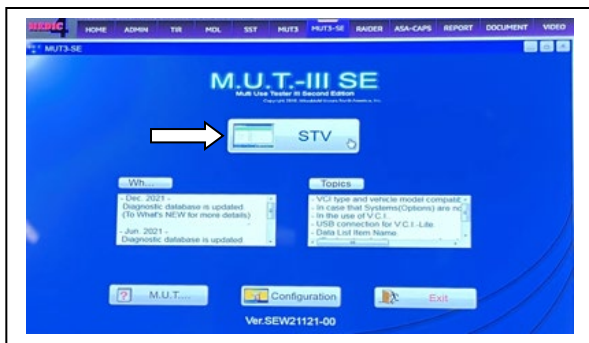
CAUTION

DO NOT DISTURB THE HARNESS CABLES OR CONNECTIONS DURING THE REPROGRAMMING PROCESS AS IT COULD CAUSE THE CONTROL UNIT TO LOSE DATA. IF THE USB CABLE IS DISCONNECTED DURING THIS PROCEDURE, A WARNING MESSAGE WILL DISPLAY.

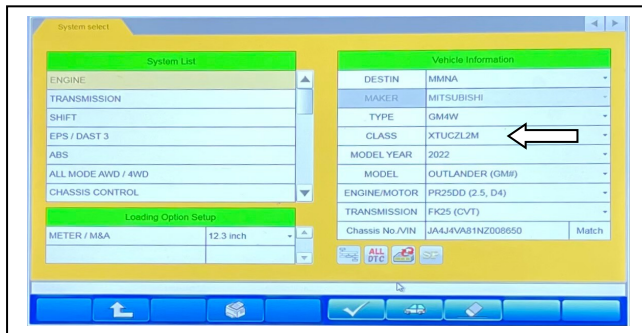
NOTE: Due to limited space it may be easiest to connect cable onto negative ground post and ground strap as shown below.



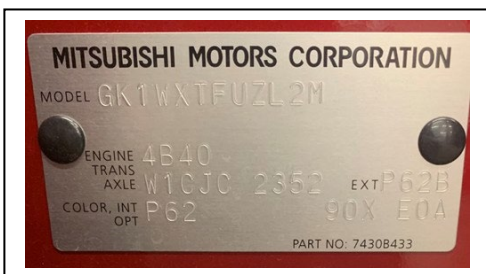
2. Turn the ignition switch to the "ON" position.



3. Using MEDIC, from the main page, click the "MUT3-SE" icon at the top center of the screen.



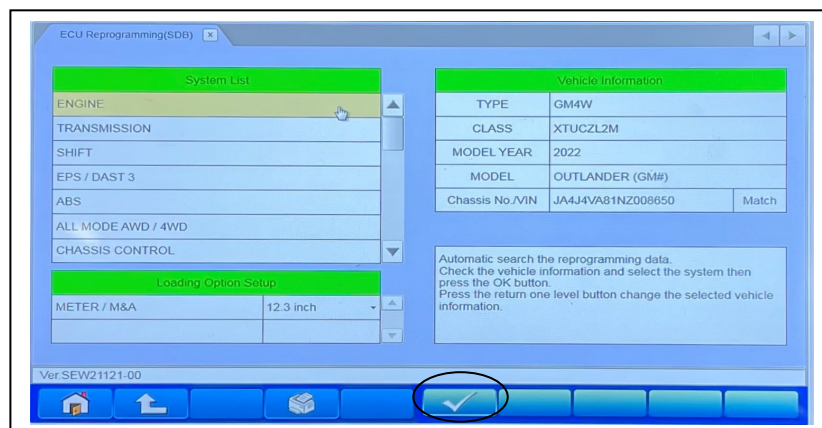
4. The System Select screen opens and populates with some basic information from the vehicle. Look at the label on the passenger side B pillar to identify the appropriate class. (See B pillar label below; class is labeled as "model"). If necessary, select the correct class from the drop-down list.



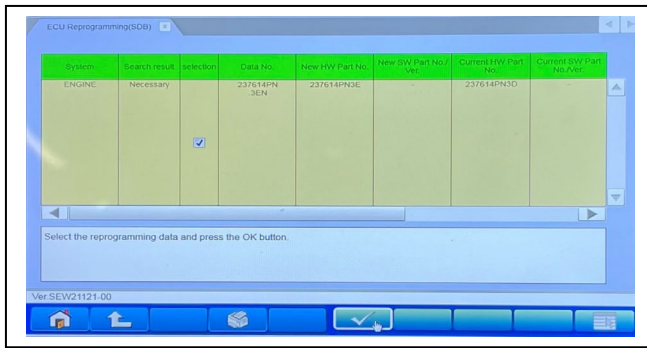
5. Verify that the ECU has not already been updated to the latest S/W number shown in the **"ECU Reprogramming Chart"** in this TSB. If the ECU is at the latest level, reprogramming **is not** necessary. If reprogramming **is** necessary, proceed with the following steps.



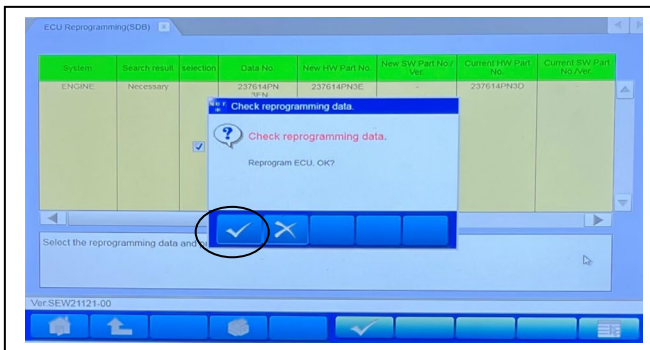
- a. Select ECU Reprogramming (SDB).



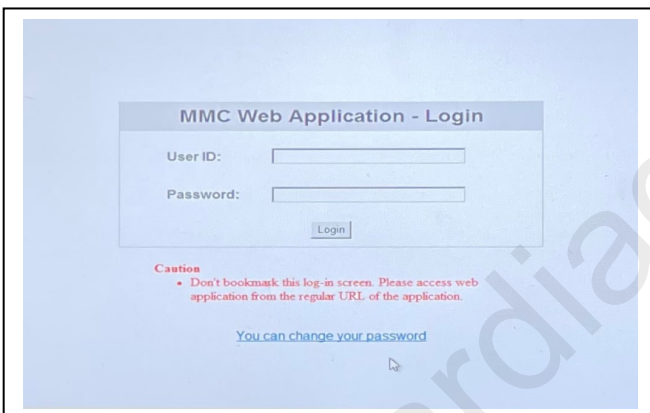
- b. Select "Engine" from Systems List and click the OK button.



c. Click the Selection box and the OK button.

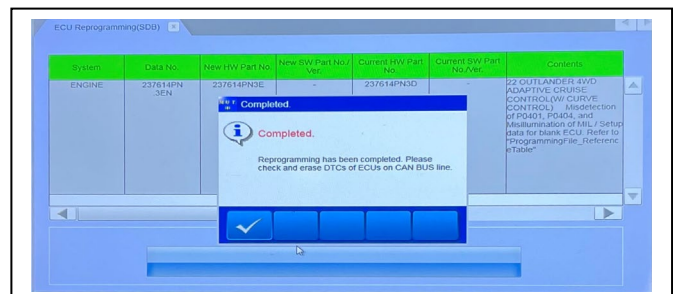
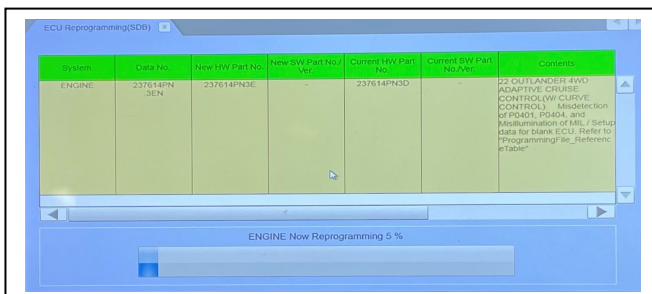


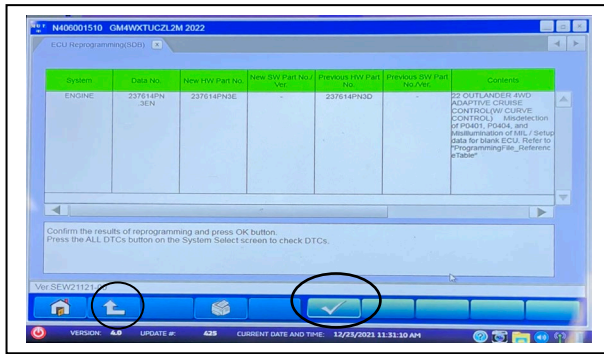
d. After confirming the reprogramming data listed, click the OK button to begin reprogramming the ECU.



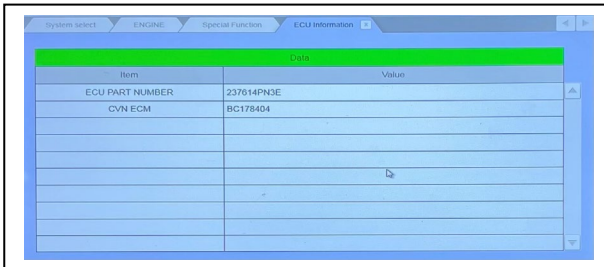
e. Login to the MMC Web Application.

f. Reprogramming will begin and a progress bar will appear followed by a notification upon successful completion.

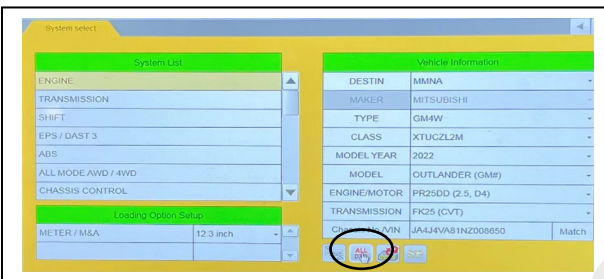




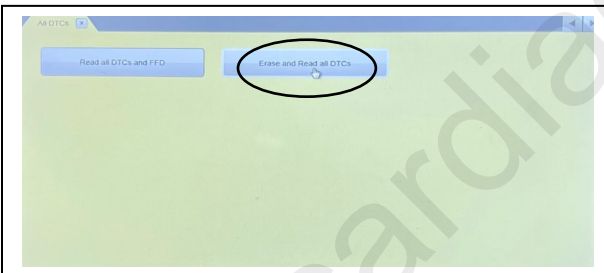
6. Confirm the reprogramming results and press the OK button. Return to the System Select screen by pressing the arrow button.



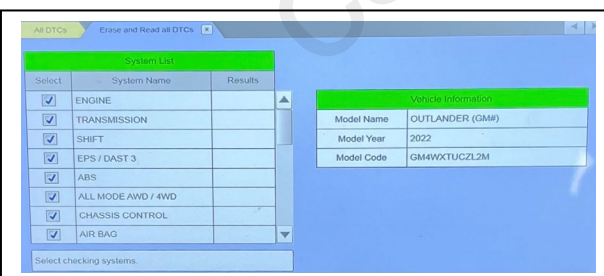
a. Select the ECU Information Tab to view the data.



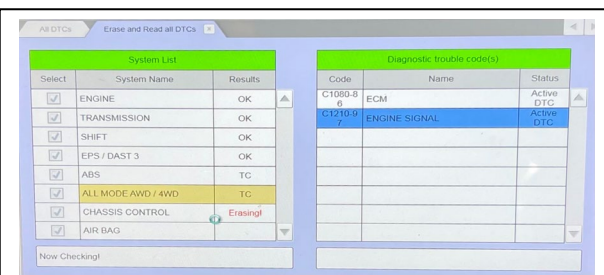
b. Press the ALL DTCs button on the System Select tab to check DTCs.



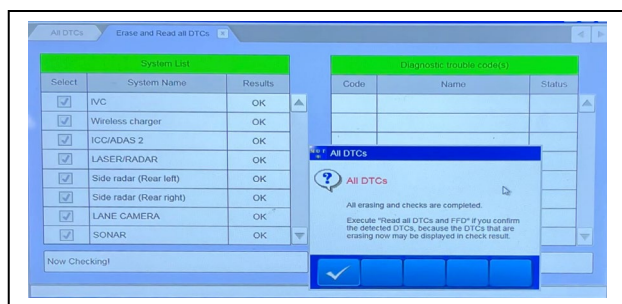
c. Press the Erase and Read all DTCs button.



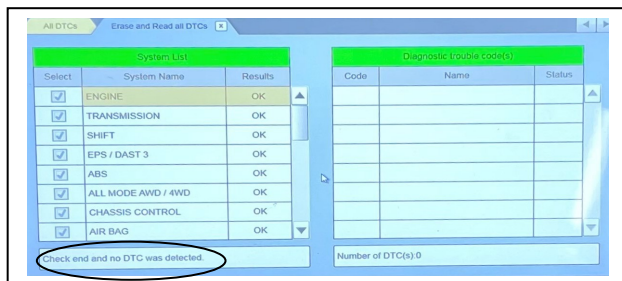
d. Select all systems.



e. The results are displayed during the erase and read process.



- f. Confirm that the erasing and checks have been completed and that no DTCs were detected.



7. Using a ball-point pen, enter the appropriate ECU part number, Software Part Number (ROM ID#), this Technical Service Bulletin number, your dealer code, and the current date on the Engine Compartment/Control Module Label (p/n MSSF024G00). The Vendor Code is not applicable. The label is available from your facing PDC.

MITSUBISHI MOTOR SALES OF AMERICA, Inc.		AUTHORIZED MODIFICATIONS These Modifications Have Been Approved as Appropriate by EPA and NHTSA		AUTHORIZED MODIFICATIONS MITSUBISHI MOTOR SALES OF AMERICA, Inc.	
THE FOLLOWING MODIFICATIONS HAVE BEEN MADE:					
PART NUMBER 1860DXXX		VENDOR CODE N/A		ROM ID # ENG 1860C2XXXX	
TSB ENG TSB-20-13-XXX		A/T 			
A/T 		DEALER CODE 99332		DATE 06/25/20	
Engine Compartment Label			Control Module Label		

8. Test drive the vehicle to confirm proper operation.

WARRANTY

This bulletin is supplied as technical information only and is not an authorization to repair. If an affected vehicle is reported with the described condition, diagnose the condition, repair as described in this bulletin and submit a normal warranty claim using the information below.

OPERATION	NATURE CODE	CAUSE CODE	LABOR OPERATION	TIME ALLOWANCE
Engine ECU Reprogramming	02A	605	138501FY	0.3 HRS