GROUP 17

ENGINE AND EMISSION CONTROL

CONTENTS

ACCELERATOR SYSTEM 17-2
GENERAL INFORMATION. 17-2

AUTO-CRUISE CONTROL SYSTEM 17-3
GENERAL INFORMATION. 17-3
CONSTRUCTION AND OPERATION 17-4

EMISSION CONTROL 17-8
GENERAL INFORMATION 17-8

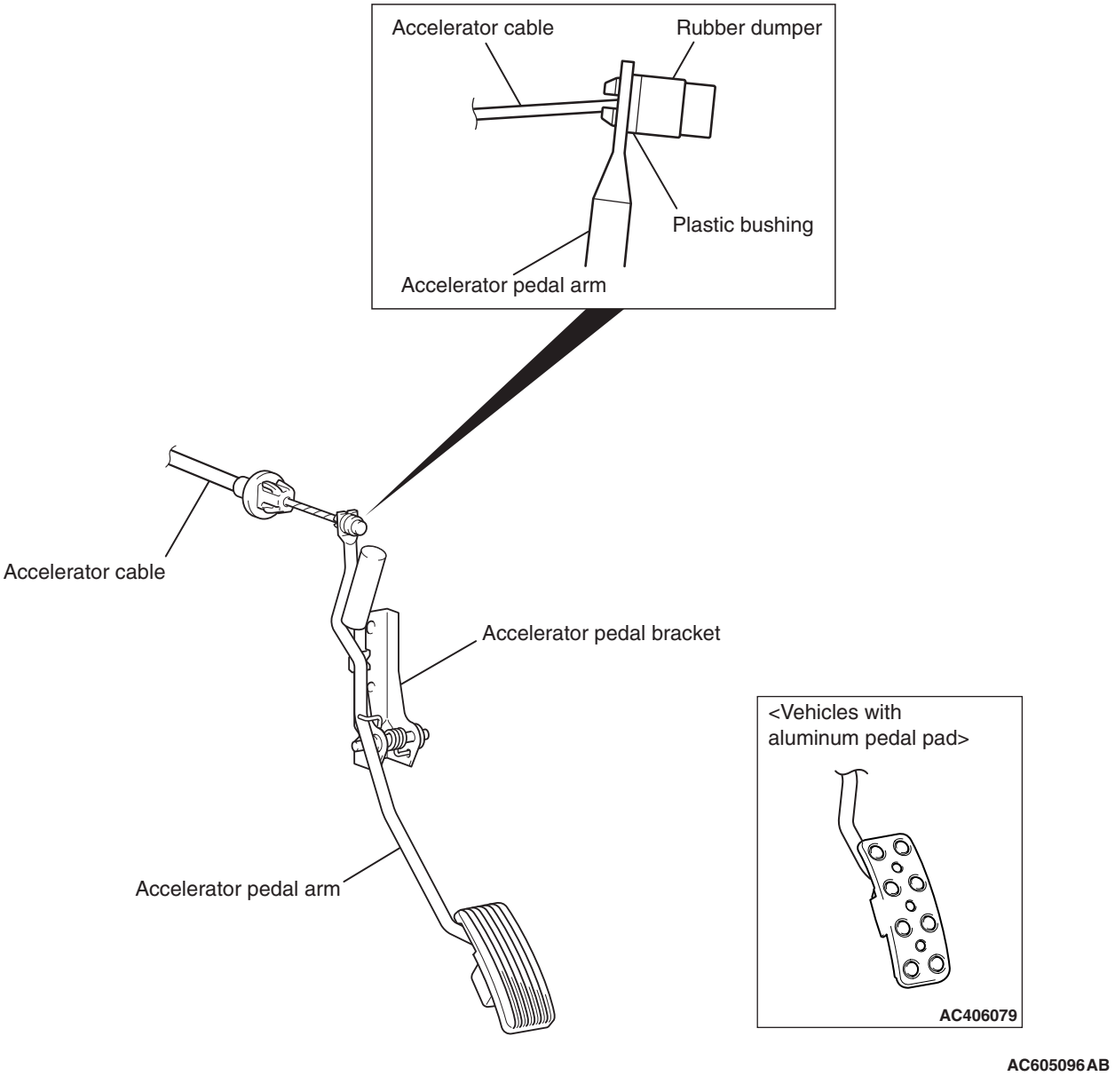
ACCELERATOR SYSTEM

GENERAL INFORMATION

M2170001000541

The accelerator system is a cable and suspended pedal combination. Plastic bushing and rubber damper have been attached to the end of the accelerator cable, to prevent noise and vibration when the cable and accelerator pedal arm contact.

CONSTRUCTION DIAGRAM



AUTO-CRUISE CONTROL SYSTEM

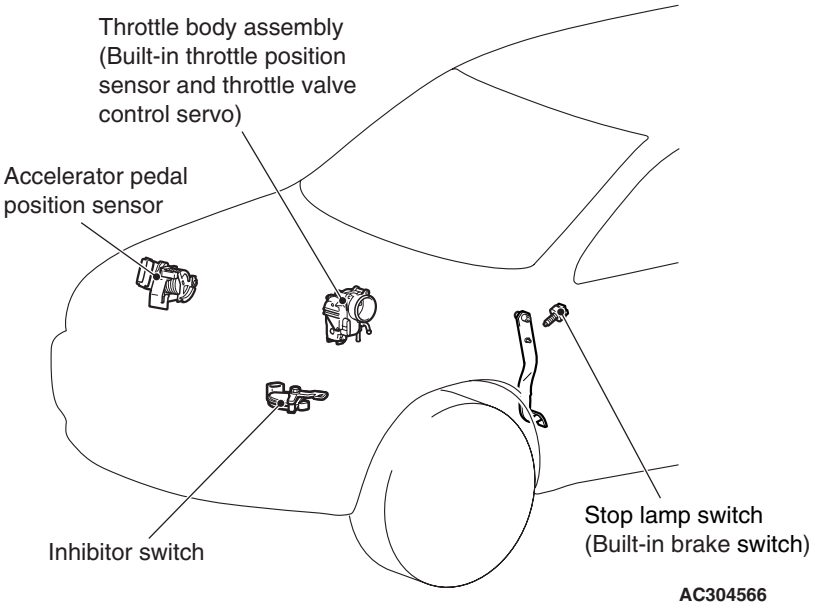
GENERAL INFORMATION

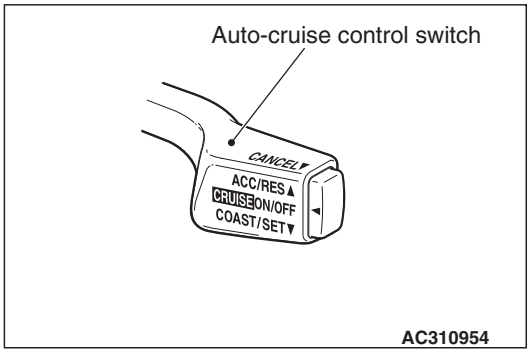
M2170001000552

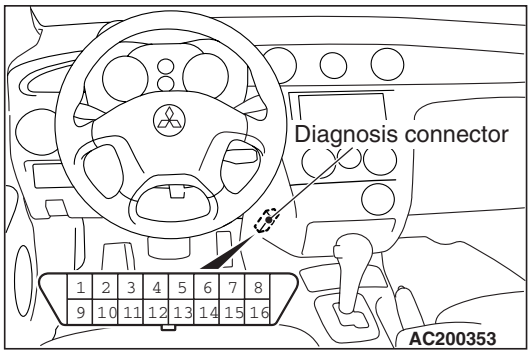
By using the auto-cruise control, the driver can drive at preferred speeds in a range of approximately 40 to 200 km/h without depressing the accelerator pedal.

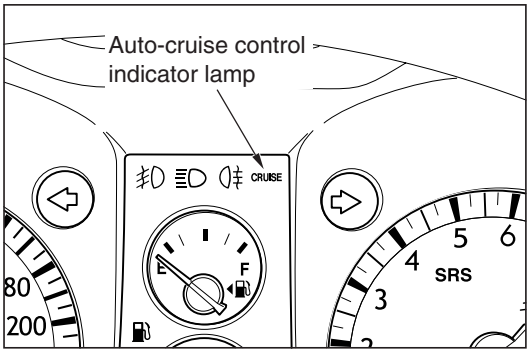
For this auto-cruise control system, in conjunction with the electronic throttle valve control system, the engine-A/T-ECU electronically controls the throttle valve.

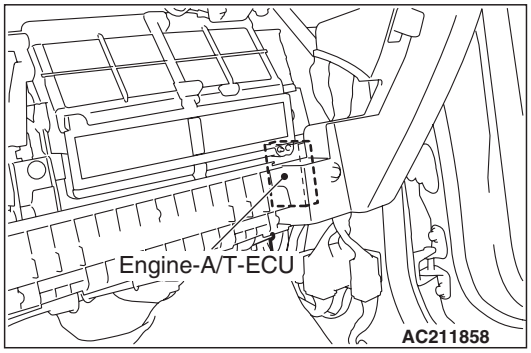
CONSTRUCTION DIAGRAM











COMPONENTS AND FUNCTIONS

Components		Function
Accelerator pedal position sensor		Informs the engine-A/T-ECU of the accelerator pedal depression.
Auto-cruise control indicator lamp		It is included in the combination meter and illuminates when the auto-cruise control "MAIN" switch is "ON" position.
Auto-cruise control switch	"MAIN" switch	Switch for cruise control power.
	"SET/COAST" switch	Vehicle speed is set with the "SET/COAST" switch and "RESUME/ACCELERATING" switch.
	"RESUME/ ACCELERATING" switch	
	"CANCEL" switch	Cancels the cruise speed setting.
Cancel system	Stop lamp switch	Outputs a signal to cancel cruise control
	Inhibitor switch	
Diagnosis connector		If the M.U.T.-II/III is connected, the diagnosis code and input check code from the engine-A/T-ECU can be read.
Engine-A/T-ECU		• Judges how the cruise control is operating by using input signals from the auto-cruise control system and the cancel system, and sends the throttle valve opening angle signal to the throttle actuator control motor by using the accelerator pedal position sensor signal. • The diagnosis code and input check code are sent to the diagnosis connector. • When the "MAIN" switch "ON" signal is entered, a signal is sent to illuminate the auto-cruise control indicator lamp.
Throttle valve control servo		The throttle valve opens and closes in response to the throttle angle control signal from the engine-A/T-ECU.
Throttle position sensor		Informs the engine-A/T-ECU of the throttle valve opening angle.

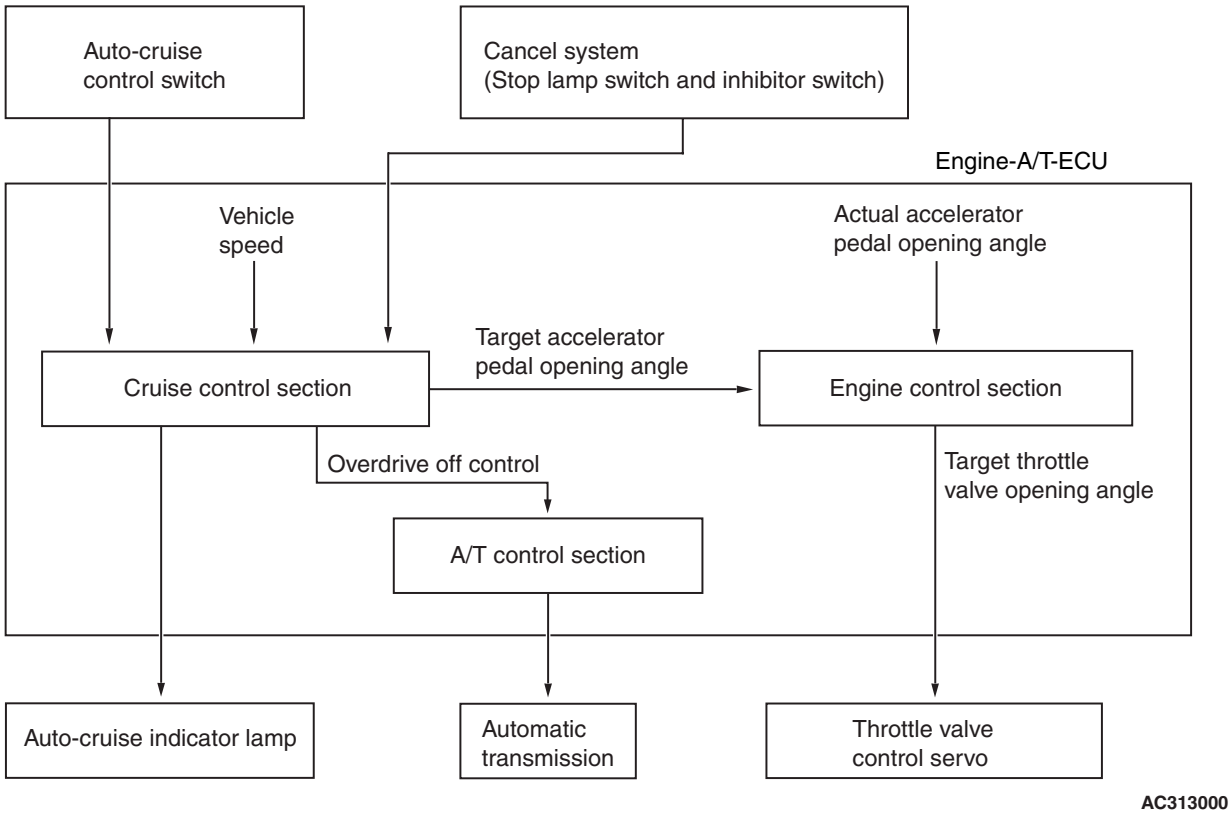
CONSTRUCTION AND OPERATION

M2170002000061

SYSTEM OUTLINE

The engine-A/T-ECU calculates the cruise control operation status when the control section of the cruise control inside the engine-A/T-ECU receives the input signals of the auto-cruise control switch, vehicle speed, and cancel system (stop lamp switch and inhibitor switch). To the engine control section it sends the target accelerator angle value for cruise control, to the A/T control section it issues a command to cancel OD, and to the gauge it issues an ON/OFF command for the auto-cruise control indicator lamp. In the engine control section, the target throttle angle value is calculated from the target acceleration value for cruise control and the actual accelerator angle value, and the vehicle speed is controlled by applying the throttle valve control servo.

BLOCK DIAGRAM



"SET/COAST" SWITCH FUNCTION

SET

The vehicle speed at the moment the "SET" switch was switched from ON to OFF while driving within the limit vehicle speed range is memorized as the "set vehicle speed" and thereafter the throttle actuator control motor is controlled so that fixed-speed driving at that speed is possible. However, if the vehicle speed is set at 200 km/h or higher, the speed of 200 km/h is saved as the vehicle speed, but if the vehicle speed is set above 205 km/h , the vehicle will not reach the specified speed.

COAST

While the "COAST" switch is held ON during auto-cruise driving, the vehicle keeps decelerating. If the "COAST" switch is turned OFF before the vehicle speed decreases to 40 km/h, the vehicle runs at the fixed speed at the moment the switch is turned OFF. If the "COAST" switch is turned OFF after the vehicle speed decreases to less than 35 km/h, the auto-cruise control is cancelled. However if the "COAST" switch has been ON for 0.5 second or less, a tap-down operation is performed (decelerating from the current speed by 1.6 km/h). At over 0.5 second, continuous deceleration is performed.

"ACC/RES" SWITCH FUNCTION

RESUME

When fixed speed driving is cancelled by the conditions given in "CANCEL FUNCTION," switching the "RESUME" switch from OFF to ON while driving at a speed higher than the set speed causes the vehicle to be driven at a fixed speed which is the speed memorized just before cancelling.

ACCELERATING

While the "ACCELERATING" switch is ON during fixed speed driving, the vehicle accelerates to the target speed. The vehicle speed at the moment the switch is turned OFF is then memorized and the vehicle remains at this for fixed speed. When the "ACCELERATING" switch is ON, the vehicle may accelerate to speeds above the high-speed limit but after the "ACCELERATING" switch is turned OFF, the vehicle will remain at this high-speed limit. However, if the "ACCELERATING" switch has been ON for 0.5 second or less, a tap-down operation is performed (accelerating from the current speed by 1.6 km/h). At over 0.5 second, acceleration is performed continuously.

OVERDRIVE-CANCEL FUNCTION

When during fixed speed driving, the actual vehicle speed decreases to (or below) the memorized speed, the overdrive is cancelled temporarily, the memorized speed is restored when driving conditions allow. Overdrive is cancelled in the following case:

- When the set speed can not be maintained with the current gear ratio due to insufficient drive power under constant speed control mode.
- When a proper acceleration can not be obtained with the current gear ratio due to insufficient drive power during the driver's acceleration switch operation (under acceleration mode).
- When a proper acceleration can not be obtained with the current gear ratio due to insufficient drive power after the driver's resume switch operation until being the set speed.

CANCEL FUNCTION

When any of the following conditions occur, the auto-cruise control is cancelled.

- "MAIN" switch OFF
- "CANCEL" switch ON
- Stop lamp switch ON (brake is applied)
- Brake switch ON (brake is applied)
- Inhibitor switch in "P" "N" or "R" position
- The vehicle speed is about 35 km/h or lower
- Vehicle speed is lower than memorized speed by 15 km/h or more
- Vehicle speed once increasing to memorized speed less than 10 km/h and then decreasing more than 15 km/h with "RESUME" switch ON
- Vehicle speed changing sharply
- Stop lamp switch input (malfunction or open circuit)
- Defective auto-cruise control switch input voltage
- When the cancel latch signal is ON (The cancel latch signal is ON when the signal of the engine control section and the signal of the cruise control section in engine-A/T-ECU do not accord each other).

FAIL-SAFE FUNCTION

When any of the following conditions are met and do not activate auto-cruise control, and if the requirements are met during auto-cruise control, auto-cruise control is cancelled instantly. At this time, after the regular state is restored, auto-cruise control is possible again.

- "SET" or "RESUME" switch held ON for 60 seconds or more.
- Fault in cancel state holding circuit
- The vehicle speed signal fails to be input for 0.1 second or longer during the vehicle speed is 40 km/h or more.
- During fixed-speed driving, if the vehicle exceeds the set speed by 10 km/h, the fixed-speed control is cancelled momentarily, then resumed after the vehicle speed exceeds the set speed by 7 km/h or less.

When any of the following conditions are met, until the ignition is switched OFF once, do not activate auto-cruise control. If the requirements are met during auto-cruise control, auto-cruise control is cancelled instantly.

- Defective engine-A/T-ECU
- Defective throttle position sensor
- Defective accelerator pedal position sensor

SELF-DIAGNOSIS AND SERVICE DATA OUTPUT FUNCTIONS

SELF-DIAGNOSIS

When the auto-cruise control system operation cancels without driver input determine the cause simply by reading the diagnosis code.

DIAGNOSIS CODE CHART

Code No.	Major contents of diagnosis
15	Defective auto-cruise control switch
21	Defective cancel latch
22	Defective stop lamp switch/brake switch
23	Defective in engine-A/T-ECU

HOW TO ERASE DISPLAY DIAGNOSIS CODE

Use the M.U.T.-II/III to erase the diagnosis code.

SERVICE DATA OUTPUT

The service data output is shown in the following.

Items No.	Service data item		Unit
01	Auto-cruise control switch	"MAIN"	ON/OFF
02		"SET/COAST"	ON/OFF
03		"RESUME/ACCELERATING"	ON/OFF
04		"CANCEL"	ON/OFF
05	Stop lamp switch		ON/OFF
06	Brake switch		ON/OFF
07	Inhibitor switch		ON/OFF
08	Closed throttle position switch		ON/OFF
09	Auto-cruise control operation		ON/OFF
10	Vehicle speed signal		km/h
11	Throttle position sensor		mV
12	Accelerator pedal position sensor		mV
13	Cancel code		Displays a cancel code number.

NOTE: If two or more actions are taken at the same time, codes are set in ascending order of code number.

EMISSION CONTROL

GENERAL INFORMATION

M2171000100441

The emission control system is basically the same as that of the 4G63-DOHC-INTERCOOLER TURBO engine used in the LANCER EVOLUTION.

System	Remarks
Crankcase ventilation system	Closed type
Evaporative emission control system	Electronic control type with duty signal
Exhaust gas recirculation (EGR) system	Electronic control type with duty signal
Air/fuel ratio closed loop control	Oxygen sensor signal used
Catalytic converter	Three-way catalytic converter

EMISSION CONTROL SYSTEM DIAGRAM