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## GROUP 17

# ENGINE AND EMISSION CONTROL

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## ACCELERATOR SYSTEM

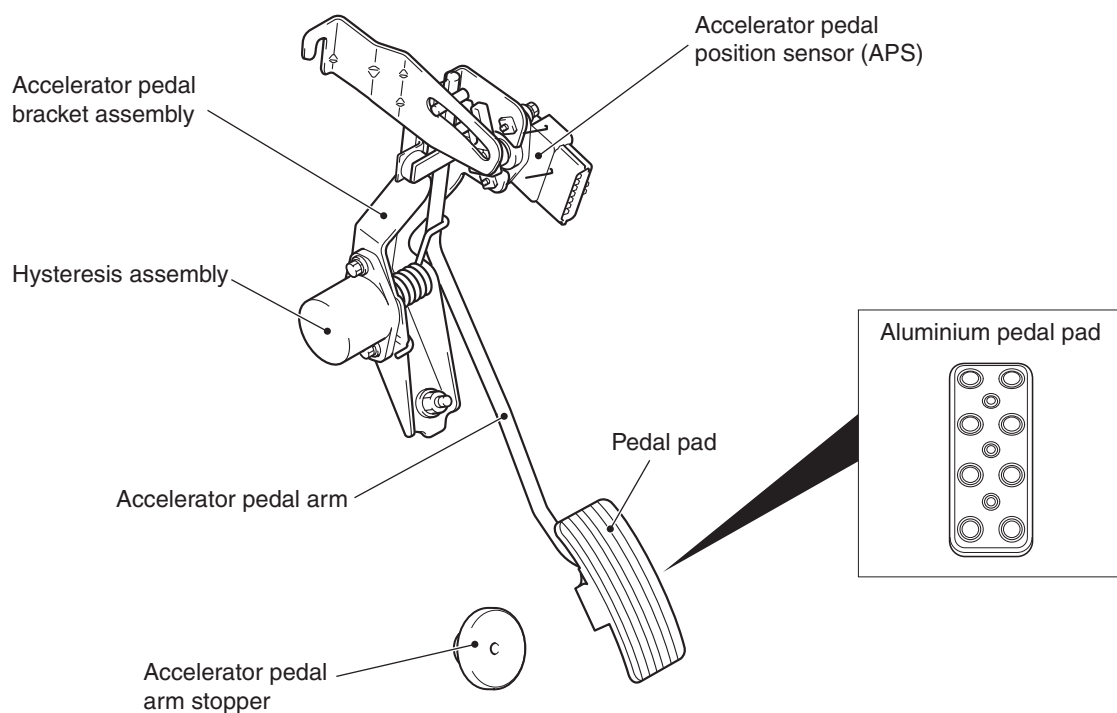
### GENERAL INFORMATION

M2170001000422

For the accelerator system, an electronic throttle valve control system has been adopted, eliminating of an accelerator cable. This system detects the amount of the accelerator pedal movement by using an accelerator pedal-position sensor (APS) in the accelerator pedal assembly for electronic control of the throttle valve angle.

For the accelerator pedal of some models, the aluminium pedal pad has been adopted as standard or as an option in order to improve the drivability and to enhance the sporty image.

### CONSTRUCTION DIAGRAM



AC504968AB

# AUTO-CRUISE CONTROL SYSTEM

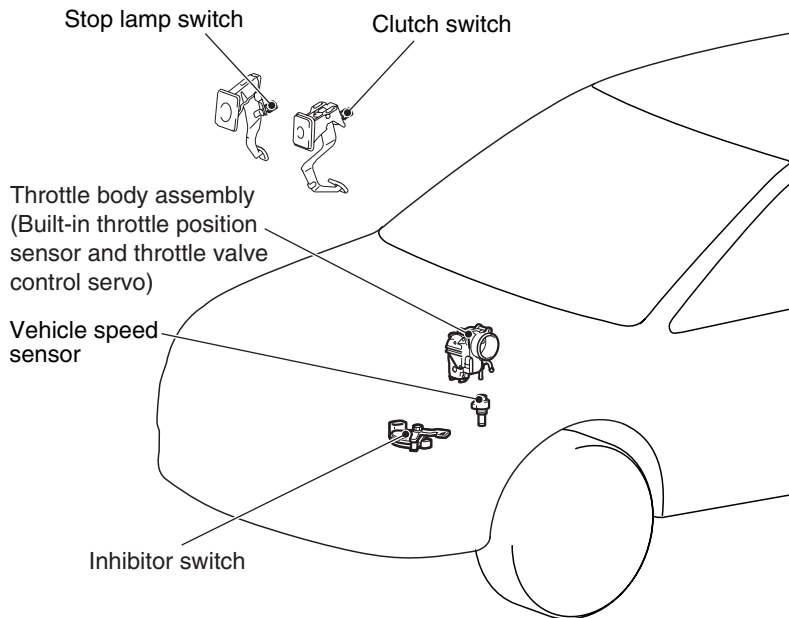
## GENERAL INFORMATION

M2170001000433

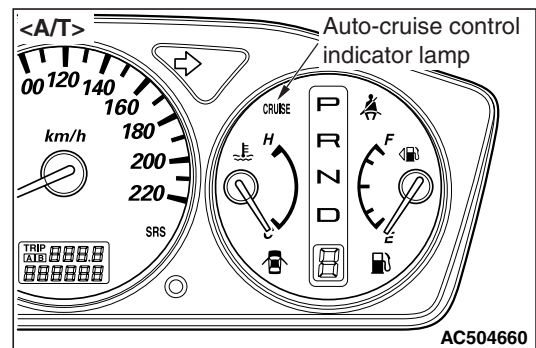
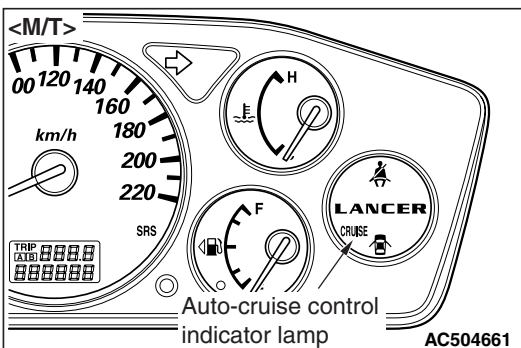
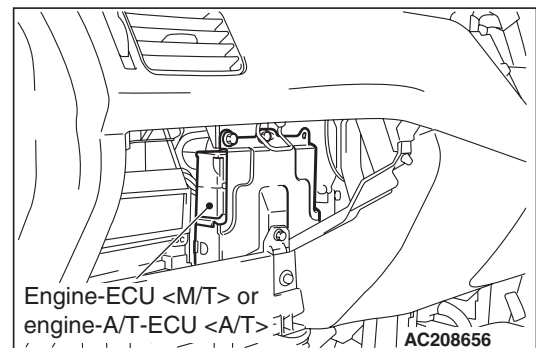
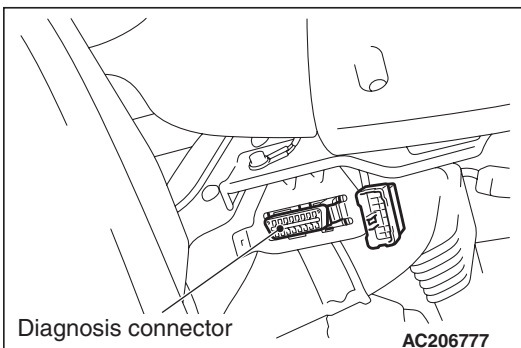
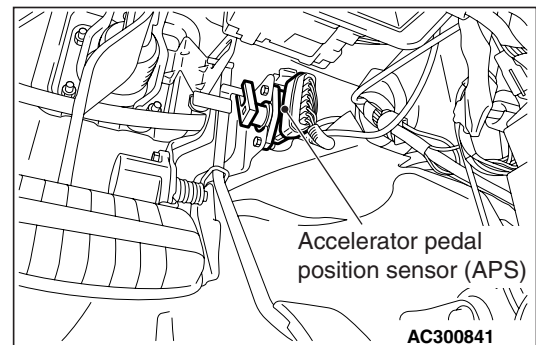
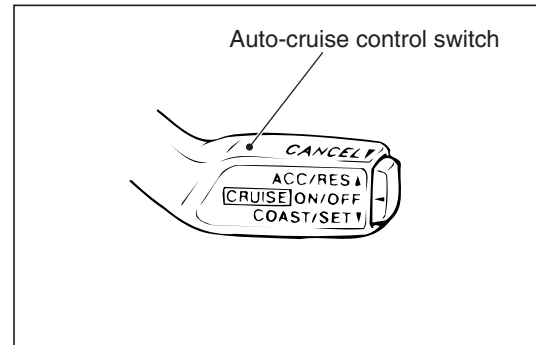
By using the auto-cruise control, the driver can drive at preferred speeds in a range of approximately 40 to 200 km/h without depressing the accelerator pedal.

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

## CONSTRUCTION DIAGRAM



AC307227



AC504972 AB

## COMPONENTS AND FUNCTIONS

Component		Function
Accelerator pedal position sensor		Informs the engine-ECU <M/T> or engine-A/T-ECU <A/T> 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	<ul style="list-style-type: none"> <li>Because the constant speed driving is cancelled by the brake operation, the brake pedal status is detected.</li> <li>For the stop lamp switch, 2 switches, a stop lamp switch for the stop lamp illumination and a brake switch exclusively for the cruise control system, are incorporated to improve the reliability.</li> </ul>
	Clutch switch <M/T>	Because the constant speed driving is cancelled by the clutch operation, the clutch pedal status is detected.
	Inhibitor switch <A/T>	Because the constant speed driving is cancelled by the selector operation, the "N" position is detected.
Diagnosis connector		If the M.U.T.-II/III is connected, the diagnosis code and input check code from the engine-ECU <M/T> or engine-A/T-ECU <A/T> can be read.
Engine-ECU <M/T> or engine-A/T-ECU <A/T>		<ul style="list-style-type: none"> <li>Based on the input signal from sensors and switches, the throttle opening angle indication signal is sent.</li> <li>Based on the signal from the vehicle speed sensor, the vehicle speed is calculated. &lt;M/T&gt;</li> <li>Based on the signal from the output shaft speed sensor of the automatic transmission, the vehicle speed is calculated. &lt;A/T&gt;</li> <li>Based on the input signal from sensors and switches, the overdrive cancellation control signal is sent to the A/T control section. &lt;A/T&gt;</li> <li>To the cruise control indicator lamp, the cruise control system ON/OFF signal is sent.</li> <li>The diagnosis code and service data of the cruise control system are sent to the diagnosis connector.</li> </ul>
Throttle valve control servo		The throttle valve opens and closes in response to the throttle angle control signal from the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
Throttle position sensor		Informs the engine-ECU <M/T> or engine-A/T-ECU <A/T> of the throttle valve opening angle.

## CONSTRUCTION AND OPERATION

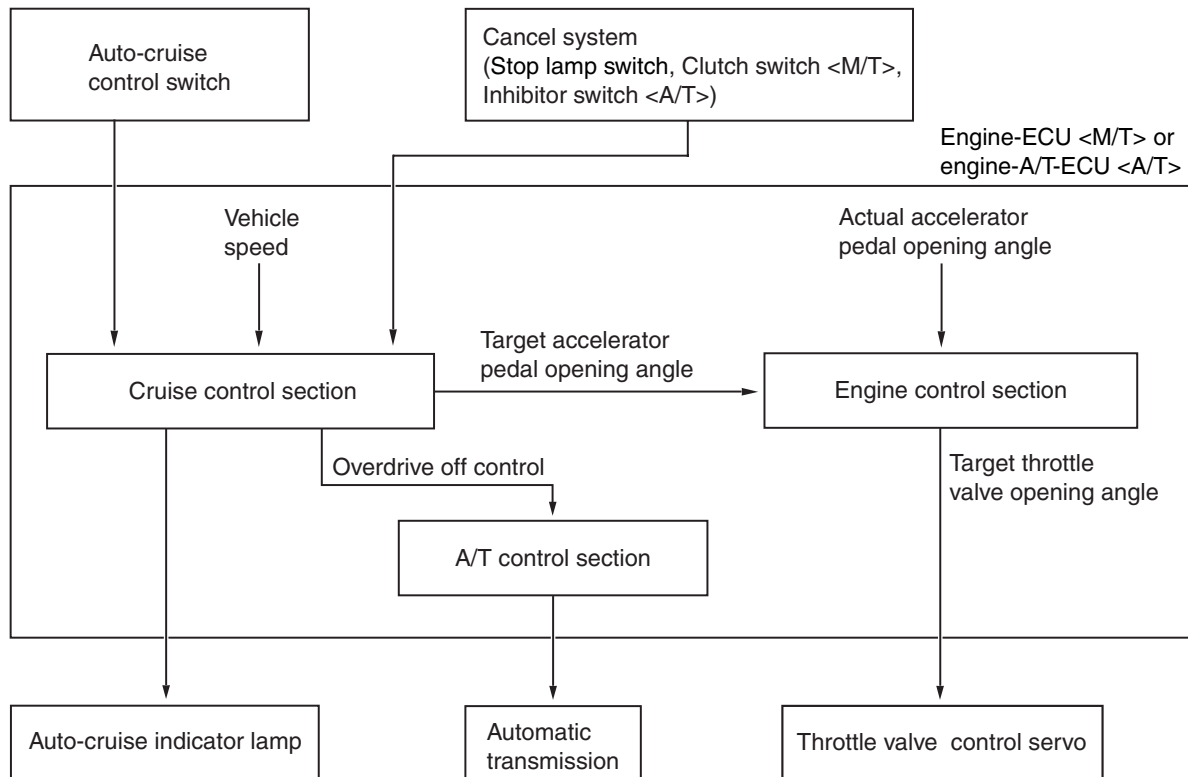
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### SYSTEM OUTLINE

The engine-ECU <M/T> or engine-A/T-ECU <A/T> calculates the cruise control operation status when the control section of the cruise control inside the engine-ECU <M/T> or engine-A/T-ECU <A/T> receives the input signals of the auto-cruise control switch, vehicle speed, and cancel system (stop lamp switch, clutch switch <M/T> and inhibitor switch

<A/T>). 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



AC504977

### "SET/COAST" SWITCH FUNCTION

#### SET

1. While driving in the vehicle speed range of approximately 40 to 200 km/h, press down the auto-cruise control switch, and then release the hand from the switch.
2. The cruise control stores the vehicle speed when the switch is released, and then performs a constant speed driving at the stored vehicle speed.
3. When the switch is operated within the vehicle speed range of approximately 200 to 205 km/h, the vehicle speed of approximately 200 km/h becomes the new stored speed, and then the constant speed driving is performed at that speed. When the switch is operated while driving at the vehicle speed of approximately 205 km/h or faster, the constant speed driving is not performed.

**COAST**

1. When the auto-cruise control switch is pressed down for 0.5 seconds or more during the constant speed driving, the vehicle is decelerated while the switch is pressed up.
2. After that, when the hand is released from the switch, the vehicle speed of that time is newly stored, and then the constant speed driving is performed at that speed.
3. In addition, when the auto-cruise control switch is pressed down for less than 0.5 seconds, the vehicle speed is decreased by 1.6 km/h from that of the constant speed driving. The decelerated speed is newly stored, and then the constant speed driving is performed at that speed.
4. When the auto-cruise control switch is pressed down and held, and the vehicle speed is decelerated to approximately 40 km/h or less, the set function and coast function are released, and the constant speed driving is cancelled.

**"ACC/RES" SWITCH FUNCTION****RESUME**

1. During the constant speed driving, pull the auto-cruise control switch toward you or depress the brake pedal to cancel the constant speed driving.
2. Afterward, when the auto-cruise control switch is pressed up while driving at a vehicle speed of approximately 40 km/h or more, a constant speed driving is performed at the vehicle speed stored when the constant speed driving was cancelled.

**ACCELERATING**

1. When the auto-cruise control switch is pressed up for 0.5 seconds or more during the constant speed driving, the vehicle is accelerated with the specified acceleration while the switch is pressed up.
2. After that, when the hand is released from the switch, the vehicle speed of that time is newly stored, and then the constant speed driving is performed at that speed.
3. In addition when the auto-cruise control switch is pressed up for less than 0.5 seconds, the vehicle speed is increased by 1.6 km/h from that of the constant speed driving. The accelerated vehicle speed is newly stored, and then the constant speed driving is performed at that speed.

4. It is possible to accelerate the vehicle speed to approximately 200 km/h or more by pressing up and holding the auto-cruise control switch. However, after the hand is released from the switch, the vehicle speed of approximately 200 km/h becomes a newly stored vehicle speed, and then the constant speed driving is performed at that speed.

**CANCEL FUNCTION**

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

- When the "MAIN" switch at the tip of auto-cruise control switch is pressed to stop the auto-cruise control system.
- When the auto-cruise control switch is pulled toward you.
- When the brake pedal is depressed.
- When the clutch pedal is depressed. <M/T>
- When the select lever is shifted to the "N" position. <A/T>
- When the vehicle speed becomes approximately 40 km/h or less.
- When the vehicle speed is decreased by 15 km/h or more from the starting speed of the constant speed driving.
- When an abnormality occurs in the vehicle speed signal.

**OVERDRIVE-CANCEL FUNCTION <A/T>**

While driving at a constant speed with the transmission gear in the overdrive status, if the vehicle speed decreases because of the uphill slope or others, the overdrive is automatically cancelled to accelerate the vehicle, and the vehicle speed returns to the stored vehicle speed before the deceleration.

**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.
- If vehicle speed is 40 km/h or more, vehicle speed signal fails to be input for 0.1 second or longer.

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

## **SELF-DIAGNOSIS AND SERVICE DATA OUTPUT FUNCTIONS**

To simplify the system check, the following functions that can be diagnosed using M.U.T.-II/III are provided.

- Diagnosis code set
- Diagnosis code erase
- Service data output

## **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-ECU <M/T> or engine-A/T-ECU <A/T>

## **HOW TO ERASE DISPLAY DIAGNOSIS CODE**

Erase the diagnosis code using M.U.T.-II/III.

## **SERVICE DATA OUTPUT**

The service data output is shown in the following.

Items No.	Service data item	Unit
01	Auto-cruise control switch	"MAIN"
02		"SET/COAST"
03		"RESUME/ACCELERATING"
04		"CANCEL"
05	Stop lamp switch	ON/OFF
06	Brake switch	ON/OFF
07	Clutch pedal position switch <M/T>	ON/OFF
	Inhibitor switch <A/T>	ON/OFF
08	Engine idle status	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

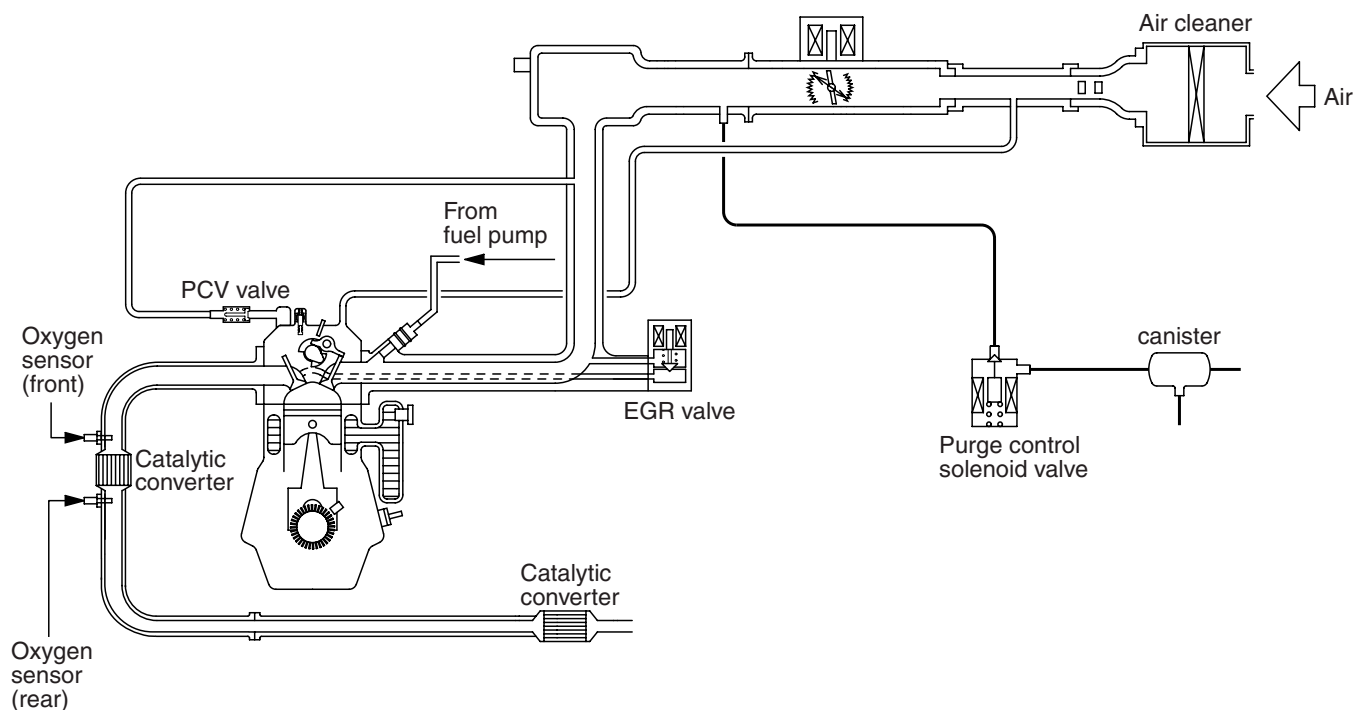
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4G69-MIVEC is newly added. The following changes are added to the conventional controls based on OUTLANDER 4G69-MIVEC engine.

- Dual oxygen sensors has been adopted.

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

## EMISSION CONTROL SYSTEM DIAGRAM



AK501854 AB