

ENGINE CONTROL SPECIFICATIONS

SERVICE SPECIFICATIONS

N14CB-C

Items	Specifications
Standard value Accelerator cable play <MPI models> mm (in.)	1-2 (.04-.08)

TORQUE SPECIFICATIONS

N14CC-C

Items	Nm	ft.lbs.
Accelerator cable to air intake plenum	4-6	3-4

TROUBLESHOOTING

ACCELERATOR CABLE AND ACCELERATOR PEDAL

N14EGBa

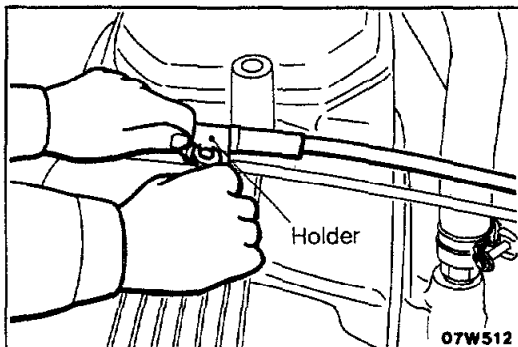
Symptom	Probable cause	Remedy
Throttle valve will not fully open or close	Misadjusted accelerator cable	Adjust
	Misadjusted automatic speed-control cable	Adjust
	Broken return spring	Replace
	Throttle lever malfunction	Replace
Accelerator pedal operation not smooth (over acceleration)	Accelerator pedal wrongly tightened	Repair
	Misinstalled accelerator cable	Repair
	Accelerator cable requires lubrication	Lubricate or replace

SERVICE ADJUSTMENT PROCEDURES

N14FBAEs

ACCELERATOR CABLE FREE PLAY ADJUSTMENT <FBC models>

1. Run the engine until it reaches the specified idle speed level.
2. Loosen the locking bolt or adjusting nut at the cable adjusting portion so that the throttle lever is free.
3. Move the holder to the position just before the throttle lever begins to operate, and then return it far enough so that there is an appropriate amount of slack in the inner cable and secure it at this position.
4. Operate the accelerator arm and confirm that the throttle valve changes from fully closed to fully open.



<MPI models>

N14FBCH

For models equipped with the auto-cruise control system, refer to P.14-106.

- (1) Turn air conditioner and lights OFF.
Inspect and adjust at no load.
- (2) Warm engine until stabilized at idle.
- (3) Confirm idle speed is at prescribed rpm.
- (4) Stop engine (ignition switch OFF).
- (5) Confirm there are no sharp bends in accelerator cable.
- (6) Check inner cable for correct slack.
- (7) If there is too much slack or no slack, adjust play by the following procedures.

- ① Turn the ignition switch to the ON position (without starting the engine) and leave in that condition for approximately 15 seconds.
- ② Loosen the adjusting bolts on the air intake plenum, and then secure the outer cable so that the free play of the inner cable will be the standard value.

Standard value:

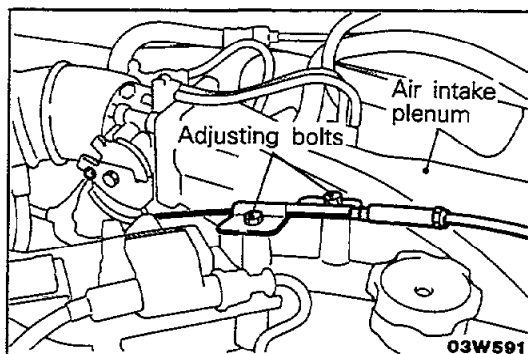
1-2 mm (.04-.08 in.)

NOTE

If there is excessive play of the accelerator cable, the vehicle speed drop ("undershoot") when climbing a slope will be large.

If there is no play (excessive tension) of the accelerator cable, the idling speed will increase.

- (8) After adjusting, confirm that throttle valve fully opens and closes by operating pedal.

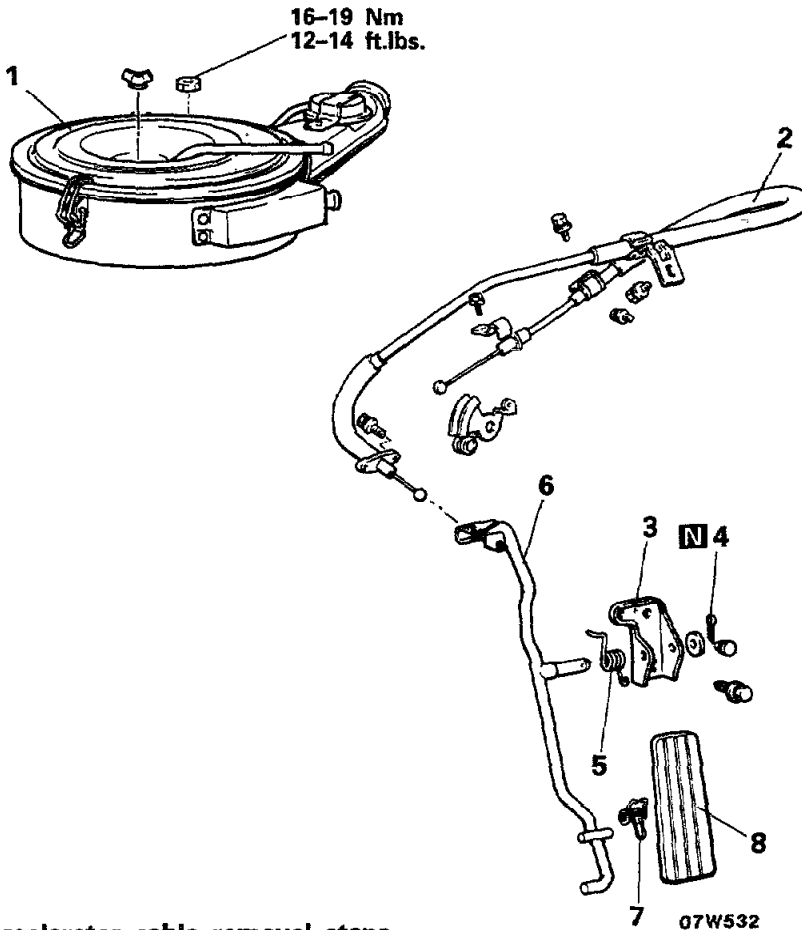


ACCELERATOR CABLE AND PEDAL

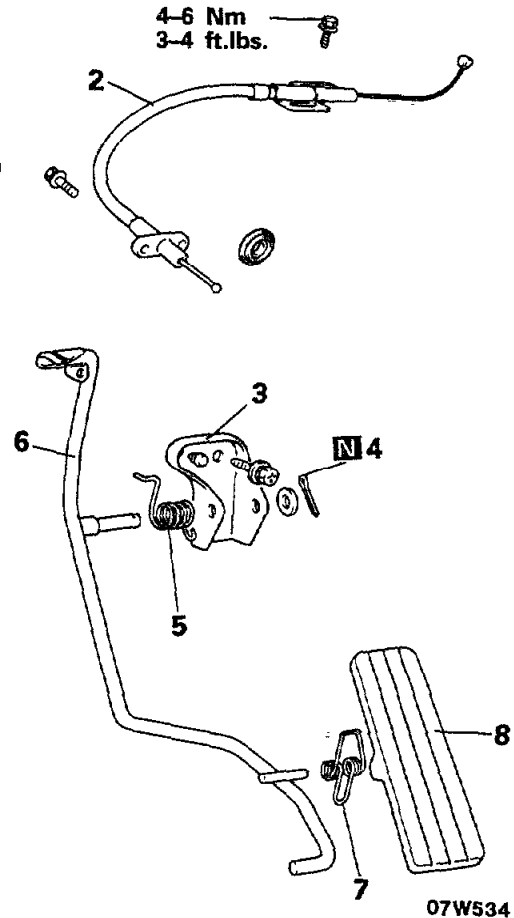
REMOVAL AND INSTALLATION

N140A-

<FBC models>



<MPI models>



Accelerator cable removal steps

- 1. Air cleaner
- ◄◄ Adjustment of accelerator cable free play
- ◄◄ 2. Accelerator cable

Accelerator pedal removal steps

- ◄◄ 3. Accelerator arm bracket
- ◄◄ 4. Cotter pin
- ◄◄ 5. Return spring
- ◄◄ 6. Accelerator arm
- ◄◄ 7. Spring
- ◄◄ 8. Pedal

NOTE

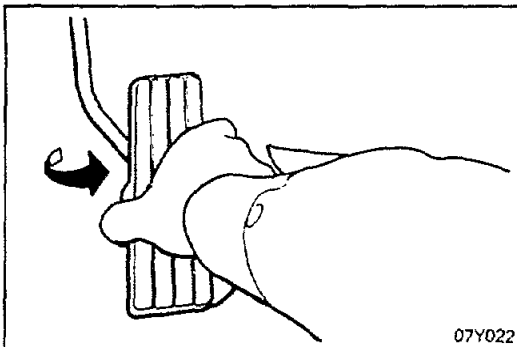
- (1) Reverse the removal procedures to reinstall.
- (2) ◄◄ : Refer to "Service Points of Removal".
- (3) ◄◄ : Refer to "Service Points of Installation".
- (4) N : Non-reusable parts

SERVICE POINTS OF REMOVAL

N140BAC

8. REMOVAL OF ACCELERATOR PEDAL

Pull the left side of the accelerator pedal toward you, and then remove the accelerator pedal from the accelerator arm.

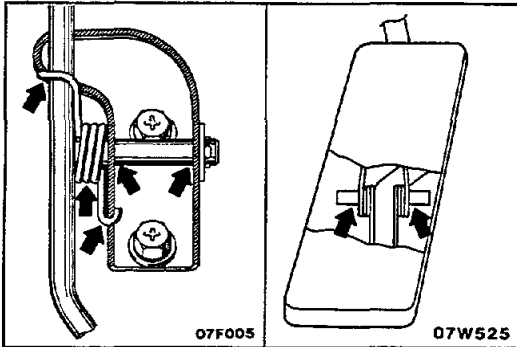


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INSPECTION

N140CAG

- Check the inner and outer cable for damage.
- Check the cable for smooth movement.
- Check the accelerator arm for bending.
- Check the return spring for deterioration.
- Check the connection of cable to end metal fitting.

**SERVICE POINTS OF INSTALLATION**

N140DAV

8. APPLICATION OF GREASE TO PEDAL/7. SPRING/6. ACCELERATOR ARM/5. RETURN SPRING/3. ACCELERATOR ARM BRACKET

Apply the multipurpose grease around the each moving point of the pedal.

2. INSTALLATION OF ACCELERATOR CABLE

Make sure that the accelerator cable is laid without sharp bends.

● ADJUSTMENT OF ACCELERATOR CABLE FREE PLAY

Refer to P.14-102.

AUTO-CRUISE CONTROL SYSTEM

SPECIFICATIONS

GENERAL SPECIFICATIONS

N14CA-C

Items	Specifications
Auto-cruise control switch Rated load A MAIN SET RESUME Voltage drop V	1.0 0.2±0.1 0.2±0.1 0.1 or less
Stop light switch Rated load A Voltage drop (at rated load) V	0.1-1.5 0.15 or less
Clutch switch Rated load A Voltage drop (at rated load)	0.1-1.5 0.15 or less
Auto-cruise control unit Set error km/h (mph) Range of speed control km/h (mph)	±5 (±3) 40-145 (25-90)
Actuator Drive system Stroke mm (in.)	Electrical (DC motor) 38-42 (1.5-1.7)

SERVICE SPECIFICATIONS

N14CB-D

Items	Specifications
Accelerator cable B (throttle valve side) play mm (in.) Actuator clutch coil resistance Ω	1-2 (.04-.08) Approx. 20

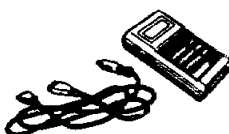

TORQUE SPECIFICATIONS

N14CC-D

Items	Nm	ft.lbs.
Auto-cruise control actuator protector	4-6	3-4
Actuator bracket	9-14	7-10
Accelerator cable plate	4-6	3-4

SPECIAL TOOLS

N14DA-C

Tool	Number	Name	Use
	MB991269	Multi-use tester assembly	• Checking of the self-diagnosis output
	MB991307	ROM pack	

TROUBLESHOOTING

N14EBDL

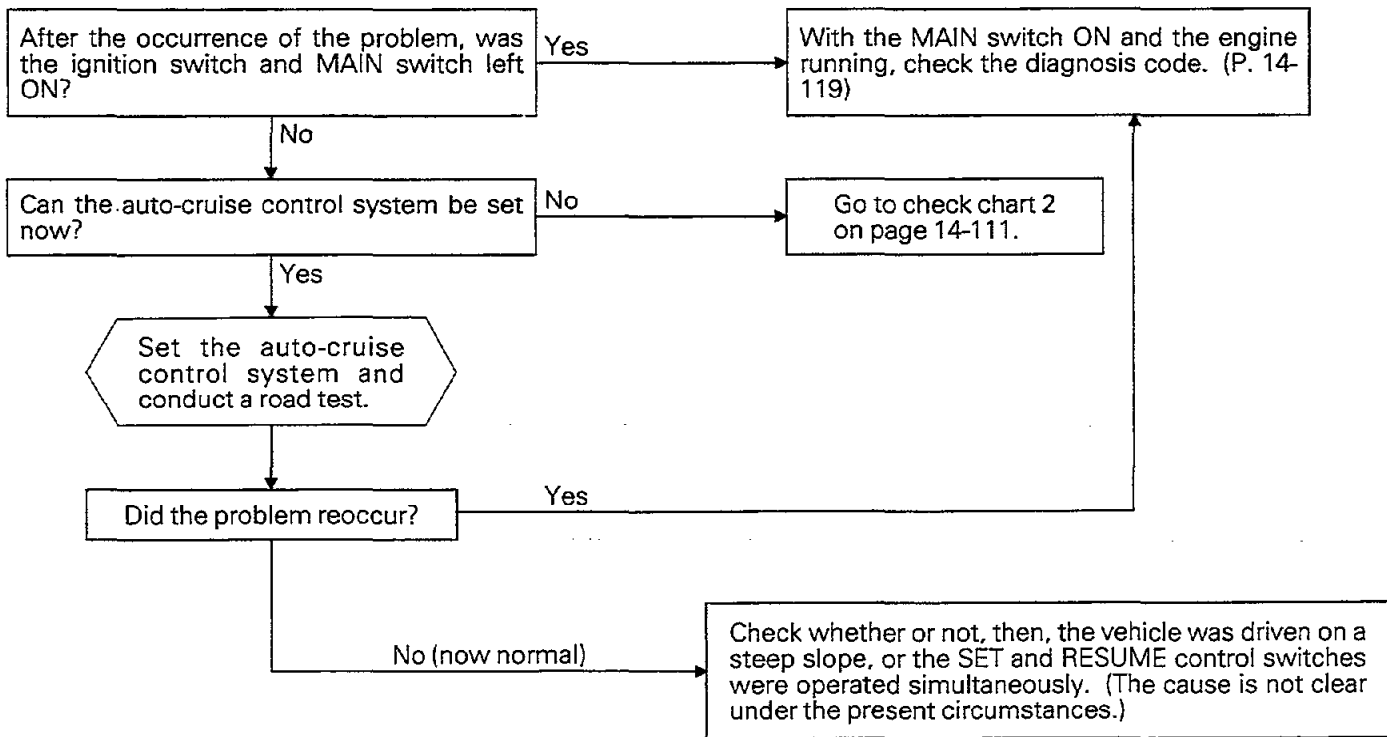
The auto-cruise control system performs control functions for the setting or cancellation of the fixed-speed driving speed based upon the data provided by input signals. As a result, when the auto-cruise control system is canceled, the cause of the cancellation is memorized in a separate circuit by the auto-cruise control unit, regardless of whether or not the auto-cruise control system condition is normal or abnormal, thus providing the auto-cruise control unit with the self-diagnosis function by certain fixed patterns, as well as the function of being able to check whether or not the auto-cruise control unit's input switches or sensor are normal. Thus, by effectively using these function, the time required checking and repair can be shortened.

NOTE

When the computer (auto-cruise control unit) power supply (ignition switch and main switch) is switched OFF, the memorized diagnosis codes are erased, and so for this reason the power supply must be left ON until the checking is completed.

TROUBLESHOOTING QUICK-REFERENCE CHART

Auto-cruise control system is canceled when cancellation not wanted.
Or, the auto-cruise control system cannot be set after an automatic cancellation.



Auto-cruise control system cannot be set.

Prepare to conduct input check.
(Refer to P.14-121.)

Were codes No. 21, 22 and 25 displayed when, with the vehicle stationary, the input check codes were recalled?

No

- Damaged or disconnected wiring of the auto-cruise control unit power-supply circuit (Go to check chart 1 on page 14-111.)
- Damaged or disconnected wiring of the SET or RESUME switch (Go to check chart 2 and 3 on page 14-111, 112.)

Yes

Are the results of all input checks normal?

Yes

No

Check results	Probable cause	Remedy	Check chart No.
Code 21 remains even though SET switch is set to OFF.	SET switch ON malfunction	Replace the control switch	No. 2
	SET switch input line short-circuit	Repair the harness.	
Code 22 remains even though RESUME switch is set to OFF.	RESUME switch ON malfunction	Replace the control switch.	No.3
	RESUME switch input line short-circuit	Repair the harness.	
Code 23 remains even though CANCEL switch is set to OFF.	Malfunction of the CANCEL circuit (ON malfunction)	Check or repair each CANCEL circuit.	No. 6-1, 6-2, 6-3
Code 25 does not disappear, and code 24 does not appear, even though vehicle speed reaches approximately 40 km/h (25 mph) or higher.	Malfunction of the vehicle-speed sensor circuit (damaged or disconnected wiring, or short-circuit)	Check or repair the vehicle speed sensor circuit.	No. 4

Check the actuator circuit.
(Go to check chart No.5 on page 14-114.)

NOTE

If the results of the check of the actuator circuit (check chart No.5) and of the actuator itself (P.14-114, 129) reveal no abnormal condition, replace the auto-cruise control unit (ECU).

NOTE

If, after the occurrence of the problem, the ignition switch and the MAIN switch have not been switched OFF, it is possible to determine (by checking the diagnosis output code) which circuit canceled the system's operation.

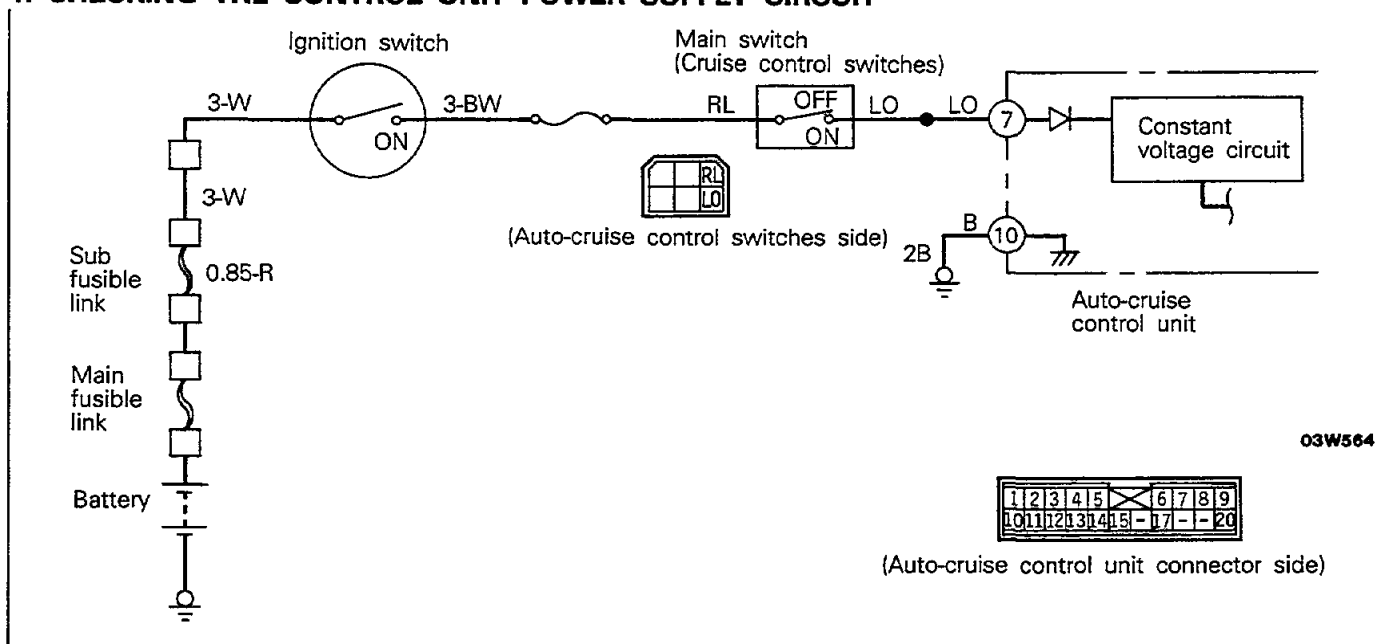
This chart is to be used, then, for troubleshooting if it is not possible to use the self-diagnosis for checking.

Trouble symptom	Probable cause	Check chart No.	Remedy
<ul style="list-style-type: none"> • The set vehicle speed varies greatly upward or downward. • "Hunching" (repeated alternating acceleration and deceleration) occurs after setting is made. 	Malfunction of the vehicle speed sensor circuit	No. 4	Repair the vehicle speed sensor system, or replace the part.
	Malfunction of the speedometer cable or speedometer drive gear		
	Actuator circuit poor contact	No. 5	Repair the actuator system, or replace the part.
	Malfunction of the actuator		
	Malfunction of the auto-cruise control unit	–	Replace the auto-cruise control unit
The auto-cruise control system is not canceled when the brake pedal is depressed.	Damaged or disconnected wiring of the stop light switch input circuit; brake switch (for the auto-cruise control) malfunction (short-circuit)	If the input check code No. 23 indicates a malfunction. No. 6-1	Repair the harness or replace the stop light switch.
	Actuator drive circuit short-circuit	No. 5	Repair the harness or replace the actuator.
	Malfunction of the auto-cruise control unit	–	Replace the auto-cruise control unit
The auto-cruise control system is not canceled when the clutch pedal is depressed. (vehicles with a manual transmission) (It is canceled, however, when the brake pedal is depressed.)	Damaged or disconnected wiring of clutch switch input circuit	If the input check code No. 23 indicates a malfunction. No.6-3	Repair the harness, or repair or replace the clutch switch.
	Clutch switch improper installation (won't switch ON)		
	Malfunction of the auto-cruise control unit	–	Replace the auto-cruise control unit
The auto-cruise control system is not canceled when the selector handle is moved to the "N" position. (Vehicles with an automatic transmission) (It is canceled, however, when the brake pedal is depressed.)	Damaged or disconnected wiring of inhibitor switch input circuit	If the input check code No. 23 indicates a malfunction. No.6-2	Repair the harness, or repair or replace the inhibitor switch.
	Improper adjustment of inhibitor switch		
	Malfunction of the auto-cruise control unit	–	Replace the auto-cruise control unit

Trouble symptom	Probable cause	Check chart No.	Remedy
Cannot decelerate by using the SET switch	Temporary damaged or disconnected wiring of SET switch input circuit	No. 2	Repair the harness or replace the SET switch.
	Actuator circuit poor contact	No. 5	Repair the harness or replace the actuator.
	Malfunction of the actuator		
	Malfunction of the auto-cruise control unit	–	Replace the auto-cruise control unit
Cannot accelerate or resume speed by using the RESUME switch.	Damaged or disconnected wiring, or short-circuit, of RESUME switch input circuit	No. 3	Repair the harness or replace the RESUME switch.
	Actuator circuit poor contact	No. 5	Repair the harness or replace the actuator.
	Malfunction of the actuator		
	Malfunction of the auto-cruise control unit	–	Replace the auto-cruise control unit
Auto-cruise control system can be set while traveling at a vehicle speed of less than 40 km/h (25 mph), or there is no automatic cancellation at that speed.	Malfunction of the vehicle speed sensor circuit	No. 4	Repair the vehicle speed sensor system, or replace the part.
	Malfunction of the speedometer cable or the speedometer drive gear		
	Malfunction of the auto-cruise control unit	–	Replace the auto-cruise control unit
The MAIN switch indicator light does not illuminate. (But auto-cruise control system is normal.)	Damaged or disconnected bulb of MAIN switch indicator	–	Repair the harness or replace the control switch.
	Harness damaged or disconnected		
Overdrive is not canceled during fixed speed driving. <AT>	Malfunction of circuit related to overdrive cancelation, or malfunction of the auto-cruise control unit	No. 7	Repair the harness or replace the part.
No shift to overdrive during manual driving <AT>			

CHECK CHART

1. CHECKING THE CONTROL UNIT POWER SUPPLY CIRCUIT



Description of operation

When the "Main" switch (of the cruise control's switches) is switched ON while the ignition switch is ON, current flows to the ignition switch, to the

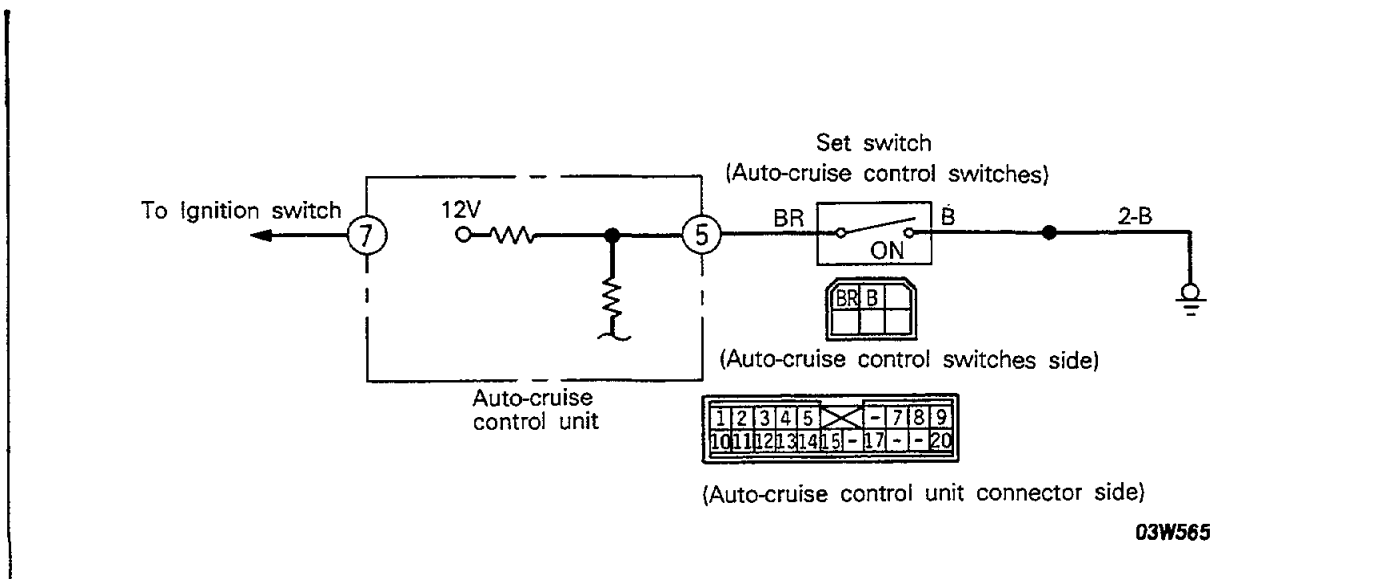
cruise control switch, to the control unit, and to earth.

Troubleshooting hint

Auto-cruise control unit terminal voltage

Terminal No.	Signal	Conditions	Terminal voltage
7	Control unit power supply	When the cruise-control switch ("MAIN") is switched ON, with the ignition switch "ON".	12V
10	Control unit ground	At all times	0V

2. CHECKING THE SET SWITCH CIRCUIT



Description of operation

When the SET switch is switched ON (at the vehicle speed desired to be maintained, and with the "MAIN" switch of the cruise control switches ON) that vehicle speed is maintained as a constant speed. Furthermore, the constant speed is gradually reduced (the "coasting" feature) when the SET switch is pressed speed, and, when the SET switch is released, the vehicle then maintains that

newly set constant speed (the speed at which the SET switch was released). Current flows to the control unit, the cruise control switch ("SET"), and to earth.

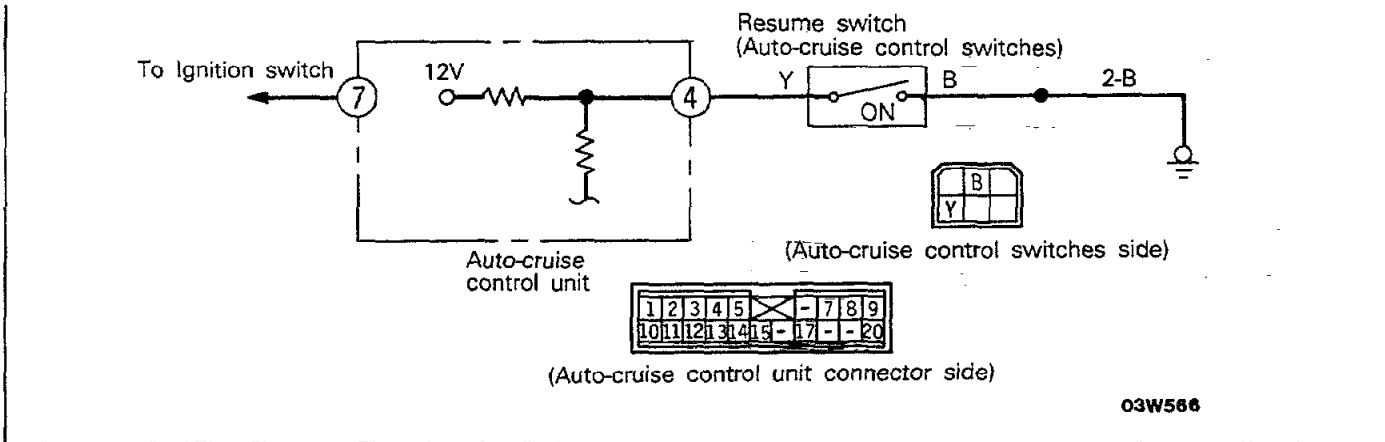
Troubleshooting hint

Diagnosis–No. 15 (automatically cancelled)

Auto-cruise control unit terminal voltage

Terminal No.	Signal	Conditions	Terminal voltage
5	SET switch	When the SET switch is switched ON	0V
		When the SET switch is switched OFF	12V

3. CHECKING THE RESUME SWITCH CIRCUIT



Description of operation

The RESUME switch is switched ON and held while the vehicle is traveling at a constant speed, the vehicle speed will increase (The vehicle speed cannot increase to 145 km/h (90 mph) or more.); the speed at which the switch is subsequently released will become the newly set constant speed. In addition, the set speed (before cancellation) resumes when the RESUME switch is switched ON, even if the constant-speed control

has been cancelled. That speed will not resume, however, even if the "RESUME" switch is switched ON, if the MAIN switch is switched OFF and if the vehicle speed decreases to 40 km/h (25 mph) or lower.

Current flows to the control unit, the cruise control switch (RESUME), and to earth.

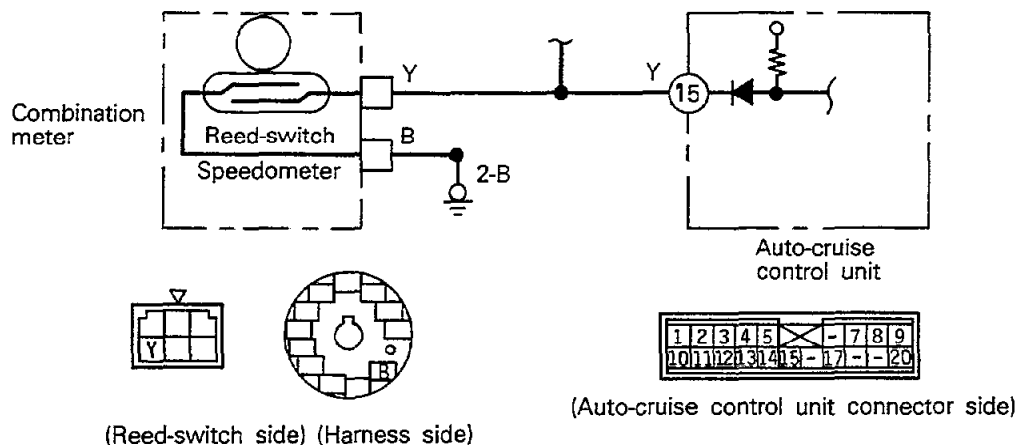
Troubleshooting hint

Diagnosis–No. 15 (automatically cancelled)

Auto-cruise control unit terminal voltage

Terminal No.	Signal	Conditions	Terminal voltage
4	RESUME switch	When the RESUME switch is switched ON	0V
		When the RESUME switch is switched OFF	12V

4. CHECKING THE VEHICLE-SPEED SENSOR CIRCUIT



03W567

Description of operation

The vehicle-speed sensor is installed within the speedometer; it sends to the control unit pulse signals that are proportional to the rotation speed (i.e., the vehicle speed) of transmission's output

gear. This vehicle-speed sensor is the reed switch type of sensor; it generates four pulse signals for each rotation of the speedometer's driven gear.

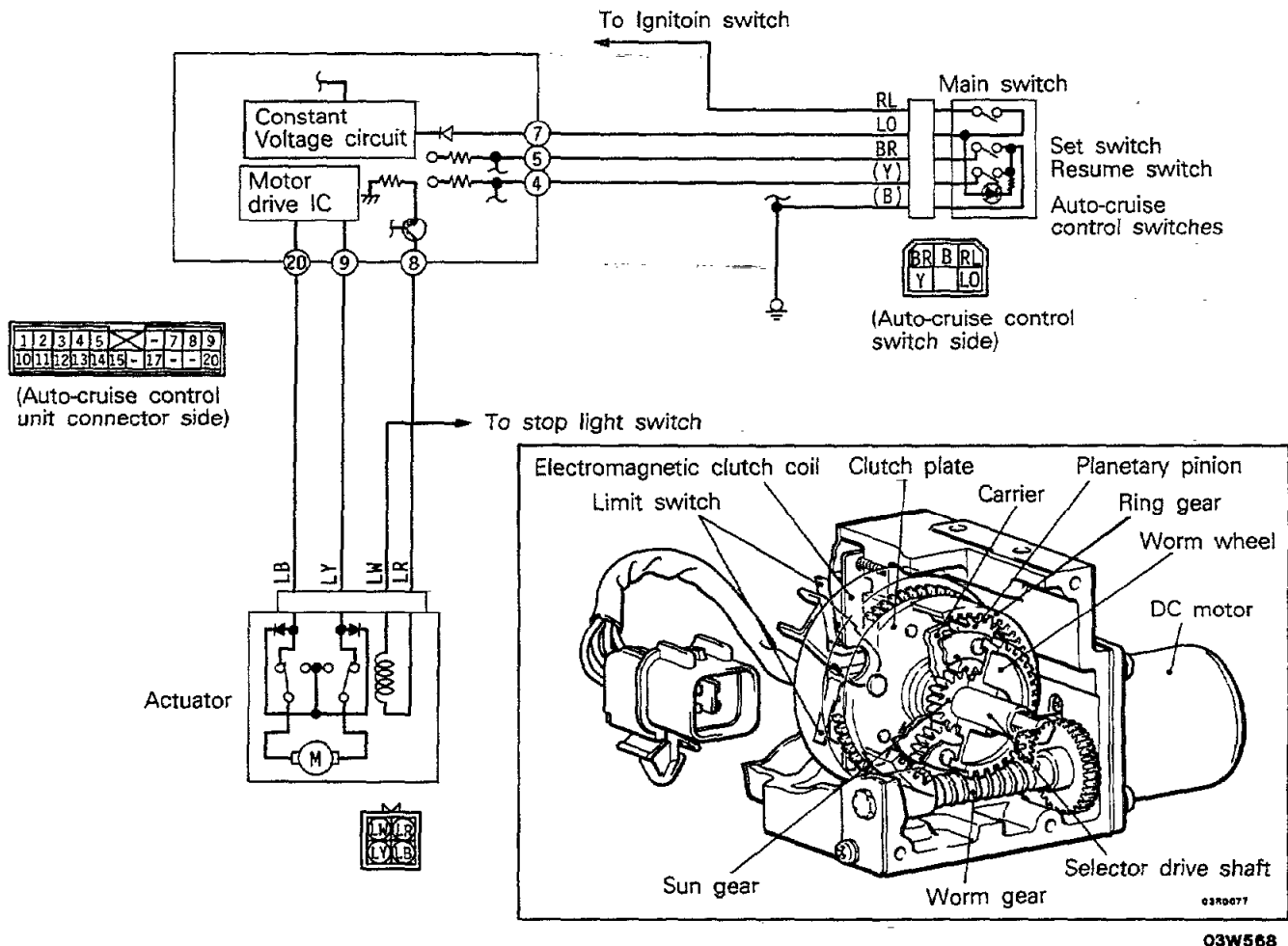
Troubleshooting hint

Diagnosis-No. 12 (automatically cancelled)

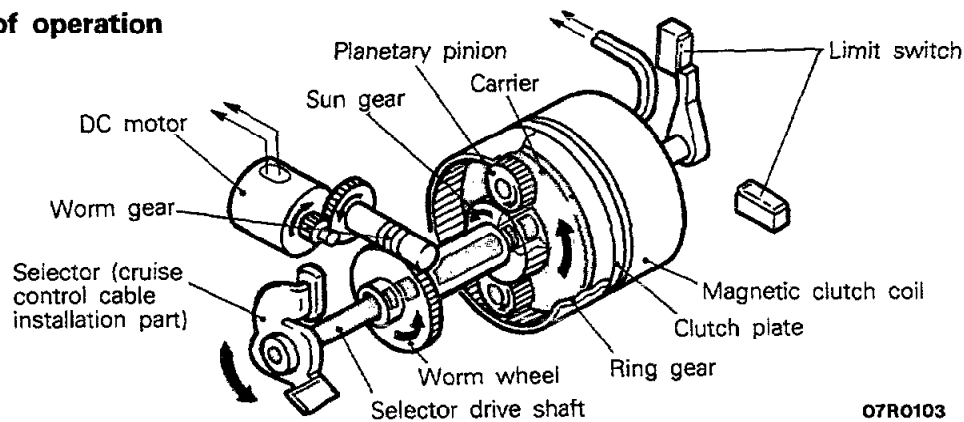
Auto-cruise control unit terminal voltage

Terminal No.	Signal	Conditions	Terminal voltage
15	Vehicle-speed sensor	Set the select lever to the "D" range or "1" range, and move the vehicle forward slowly.	0V – 0.6V ← Flashing → 2V or higher

5. CHECKING THE ACTUATOR CIRCUIT



Description of operation



1. When (with the "MAIN" switch ON) the driver switches ON the SET switch when the prescribed vehicle speed is reached, the control unit sends current to the electromagnetic clutch coil of the actuator, thus attracting the clutch plate, and also illuminating the auto-cruise indicator light. Then, when the ring gear of the planetary pinion is secured, the control motor at the same time causes the DC motor to be switched ON, and the DC motor operates at high speed.

2. The rotation of the DC motor is, as described in the illustration above, transmitted to the worm gear, and thereafter to the worm wheel, the sun gear, and the planetary pinion in that sequence. Because the ring gear is secured at this time, the planetary pinion rotates while revolving around the sun gear. Because the planetary pinion is installed to the carrier, both the carrier and the selector drive shaft unified with it, as well as the selector, are caused to rotate.

3. The switching of the direction (PULL or REL.) of rotation of the selector is accomplished by reversing the direction of current flow to the motor, and this is automatically regulated by the control unit.
4. The current flow to the electromagnetic clutch is interrupted if the driver switches OFF the MAIN switch, or if the operation of the auto cruise control system is cancelled as a result of the input of a cancel signal to the control unit because the stop light switch, clutch switch (for a manual transmission) or the inhibitor switch (for an automatic transmission) is activated.
5. As a result of the interruption current to the electromagnetic clutch, the clutch plate is caused to return from the electromagnetic clutch side to the ring gear side by the force of the spring, and therefore the ring gear becomes free.
6. When the ring gear becomes free, the planetary pinion becomes free relative to the sun gear, and thus the selector is caused, by the return spring installed to the selector part, to return to its original position.

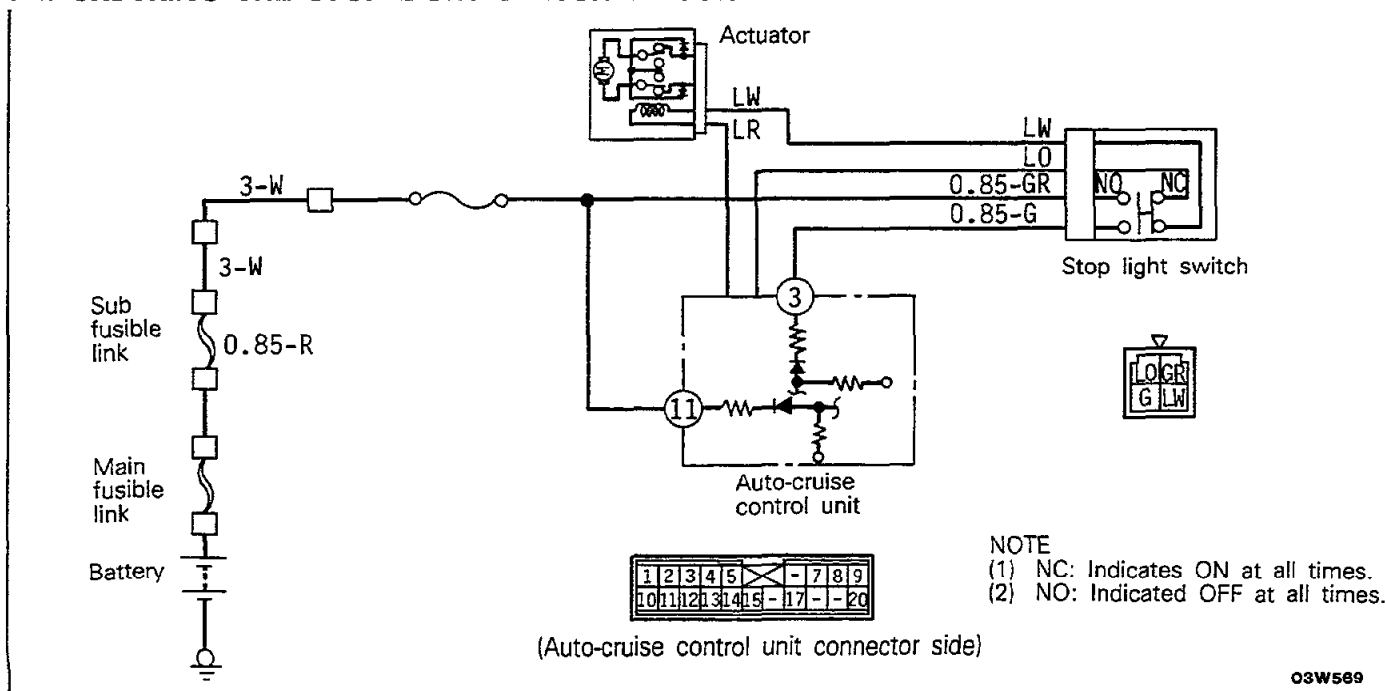
Troubleshooting hint

Diagnosis–No. 11 (automatically cancelled)

Auto-cruise control unit terminal voltage

Terminal No.	Signal	Conditions	Terminal voltage
8	Transistor for electromagnetic clutch coil	When the cruise-control switch (MAIN) is switched ON	0V
9	DC motor drive ("PULL" side)	During acceleration by RESUME switch	0V
	DC motor drive ("REL." side)	During speed reduction (coasting) by SET switch	12V
20	DC motor drive ("PULL" side)	During acceleration by RESUME switch	12V
	DC motor drive ("REL." side)	During speed reduction (coasting) by SET switch	0V

6-1. CHECKING THE STOP LIGHT SWITCH CIRCUIT



Description of operation

When the brake pedal is depressed during constant-speed travel, the stop light switch's (NC) contacts for the cruise-control system open, with the result that the current to the electromagnetic clutch of the actuator is interrupted, thus cancelling the constant-speed travel.

(NO) contacts for the stop light switch results in the sending of the cancel signal to the control unit, so that the actuator's electromagnetic clutch current is discontinued within the control unit, thereby canceling the constant-speed travel.

At the same time, moreover, the closing of the

The flow of current is from the battery to the stop light switch, and the control unit.

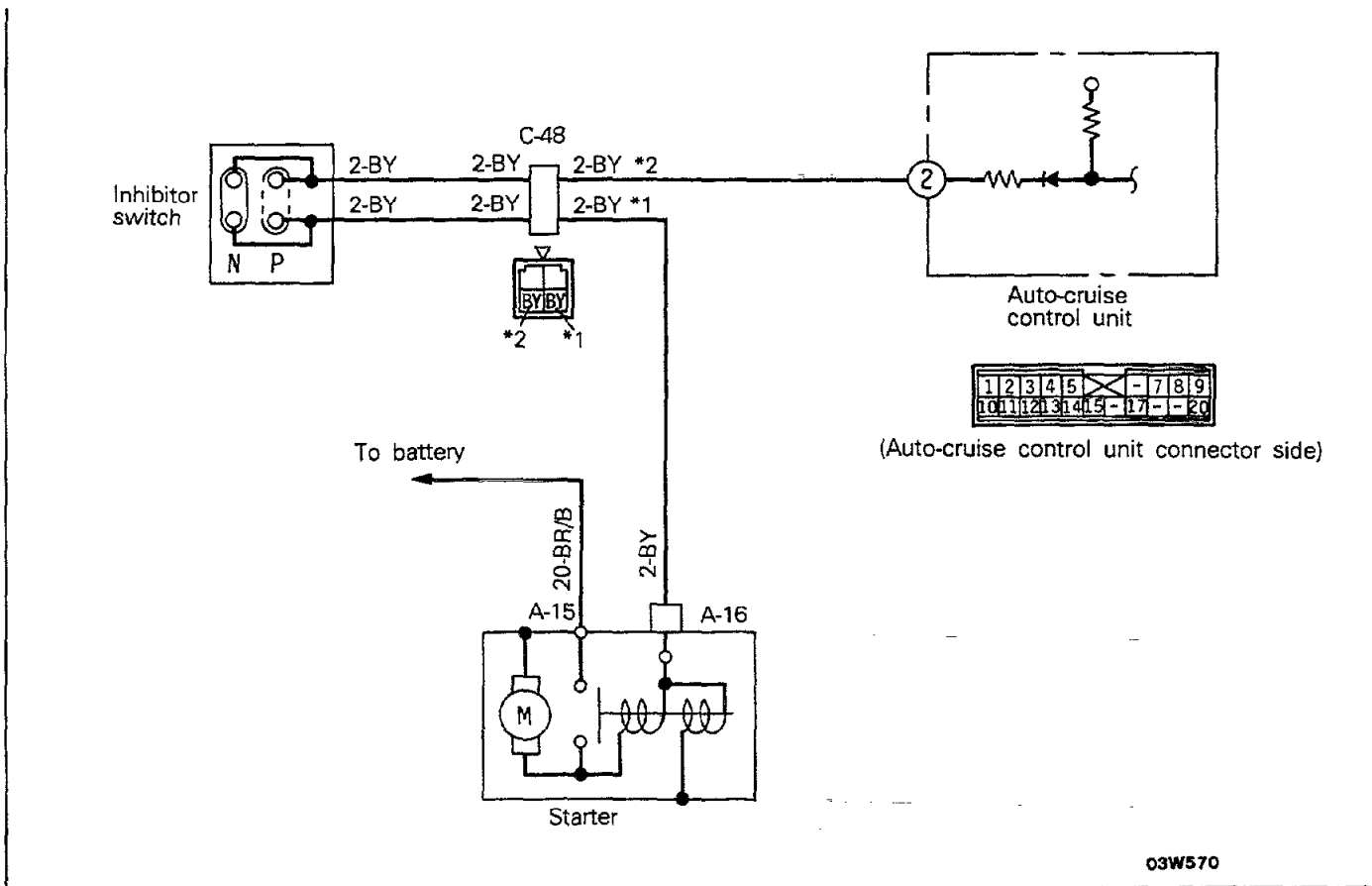
Troubleshooting hint

Diagnosis—No. 16 (automatically cancelled)

Auto-cruise control unit terminal voltage

Terminal No.	Signal	Conditions	Terminal voltage
3	Stop light switch (load side)	When the brake pedal is depressed	12V
		When the brake pedal is not depressed	0V
11	Stop light switch (power supply side)	At all times	12V

6-2 CHECKING THE INHIBITOR SWITCH CIRCUIT <A/T>



Description of operation

When , during driving at a constant speed, the selector handle is moved to the "N" position, the

inhibitor switch is switched ON (continuity), and the cancel signal is input to the control unit.

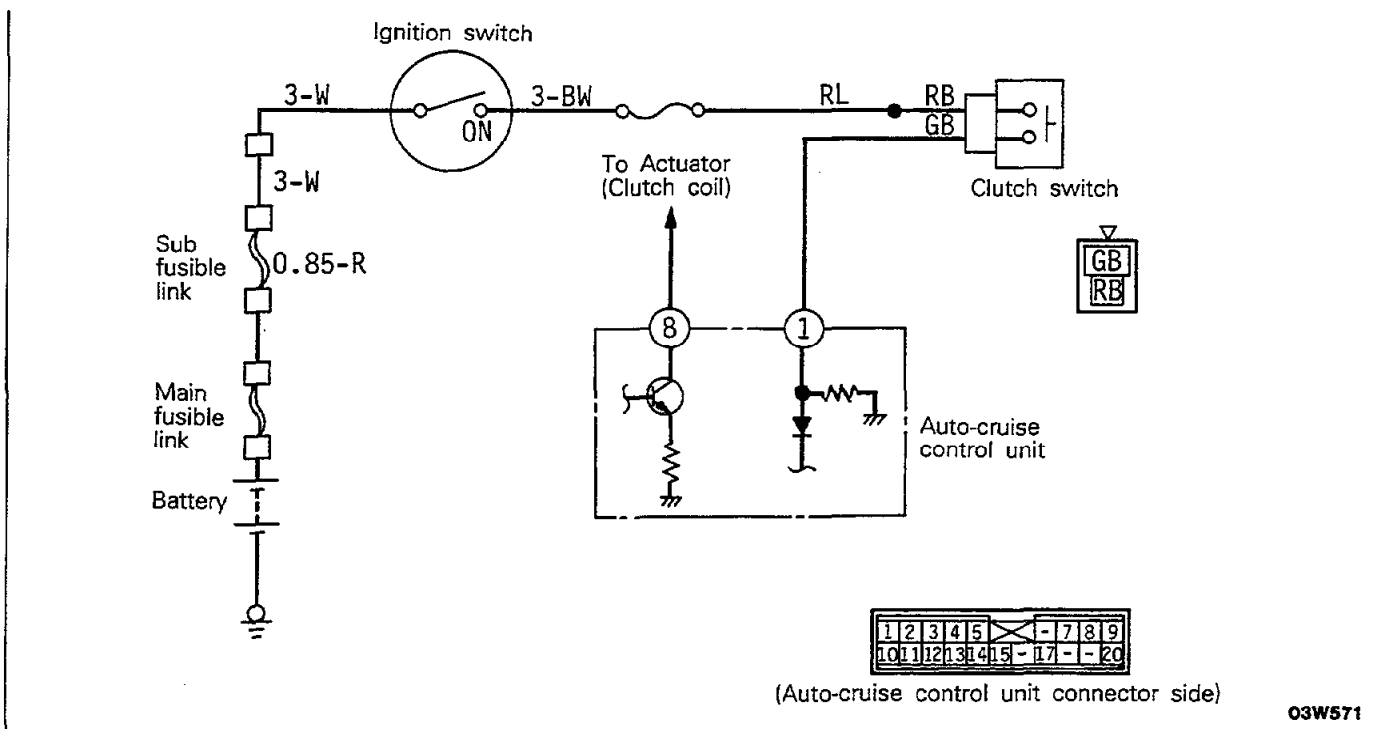
Troubleshooting hint

Diagnosis–No. 16 (automatically cancelled)

Auto-cruise control unit terminal voltage

Terminal No.	Signal	Conditions	Terminal voltage
2	Inhibitor switch	Selector handle set to "N" or "P"	0V
		Selector handle set to other than "N" or "P"	12V

6-3. CHECKING THE CLUTCH SWITCH CIRCUIT <M/T>



Description of operation

If the clutch pedal is depressed during constant-speed travel, the contacts of the clutch switch close, with the result that the cancel signal is sent to the control unit, so that the current to the electromagnetic clutch of the actuator is discontin-

ued within the control unit, thereby canceling the constant-speed travel.

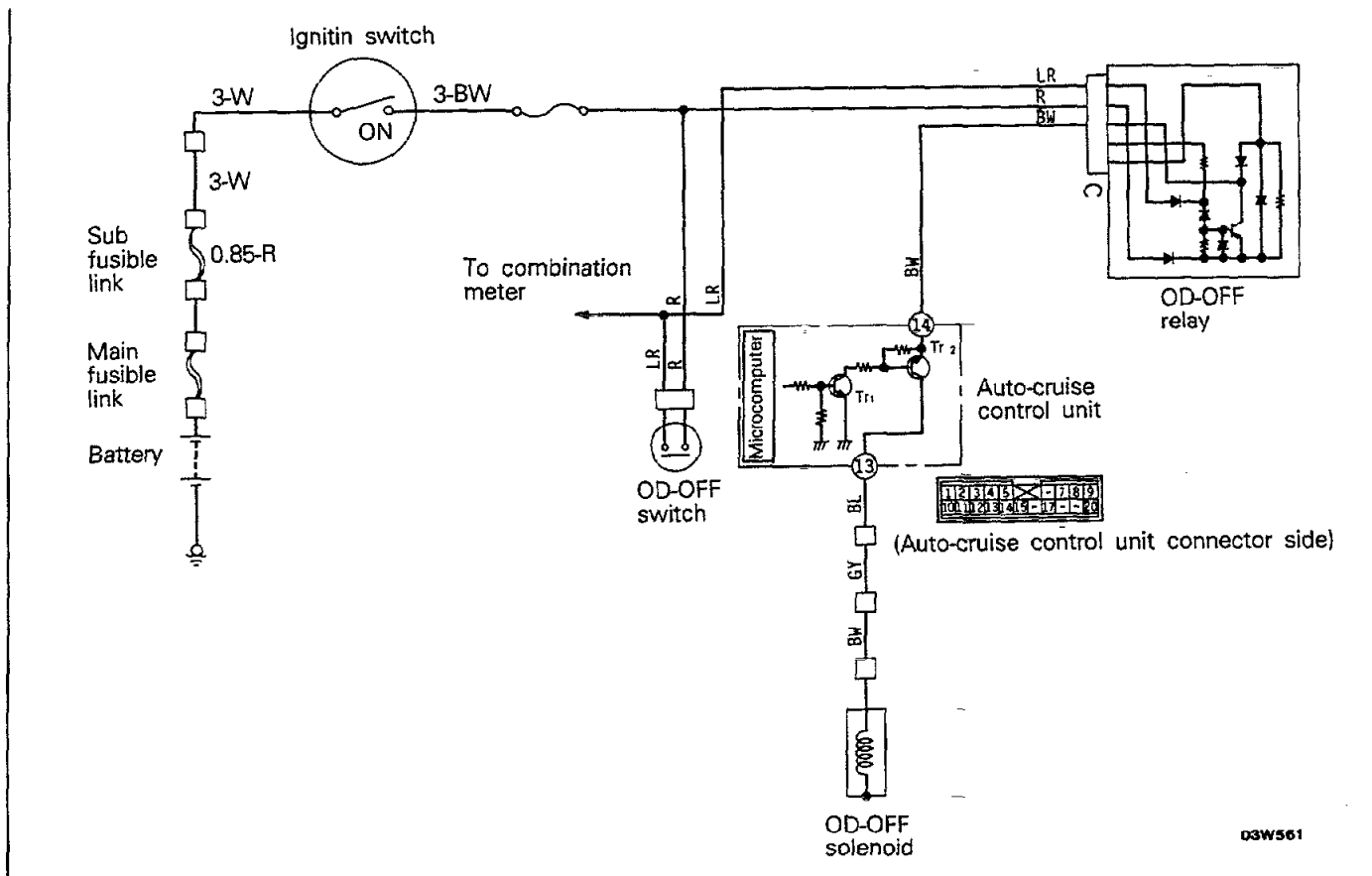
Troubleshooting hint

Diagnosis–No. 16 (automatically cancelled)

Auto-cruise control unit terminal voltage

Terminal No.	Signal	Conditions	Terminal voltage
1	Clutch switch	When the clutch pedal is depressed	12V
		When the clutch pedal is not depressed	0V

7. CHECKING THE CIRCUITS RELATED TO THE OVERDRIVE-CANCELLATION FUNCTION <A/T>

**Description of operation**

This is a function that cancels the overdrive function for a certain fixed period of time, if during constant-speed travel in overdrive, the actual vehicle speed decreases to less than the vehicle speed retained in the memory, and then after a short time causes the vehicle speed to return to the vehicle speed retained in the memory.

Overdrive is canceled under the following conditions.

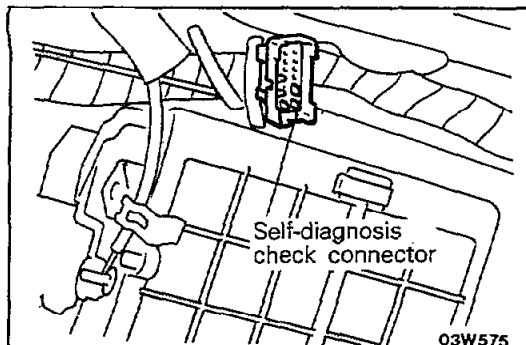
1. If the "RESUME" switch is used.
2. If, during constant-speed travel, the actual vehicle speed decreases to 1.25 km/h (.78 mph) or more below the set vehicle speed.

Under either of the conditions described above, the overdrive-ON signals output from the microcomputer (within the control unit) are no longer output, and transistor Tr1 is switched OFF.

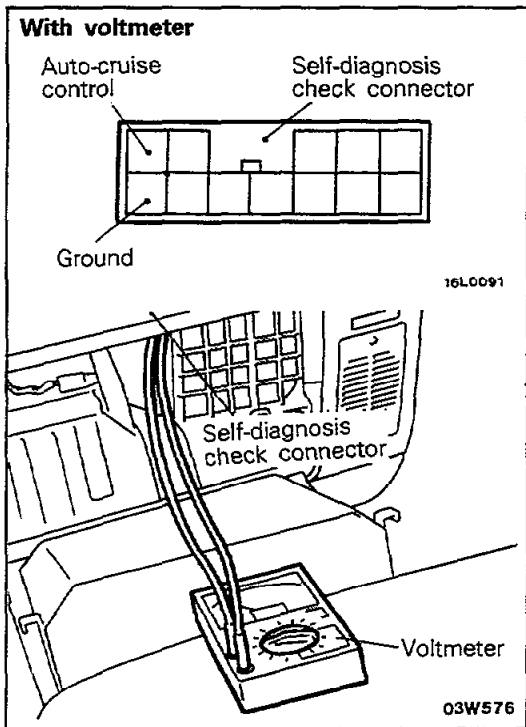
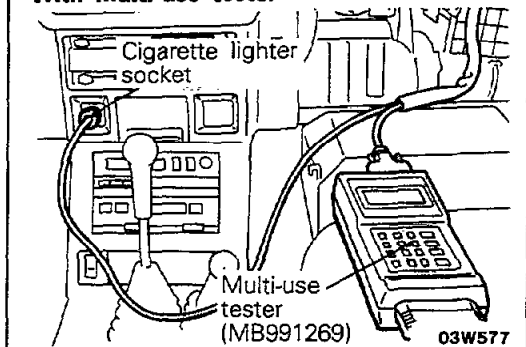
As a result, transistor Tr2 is also switched OFF, causing the current passing through the overdrive switch of the selector handle to be interrupted at transistor Tr2, with the result that the drive is controlled at 3rd gear.

Troubleshooting hint**Auto-cruise control unit terminal voltage**

Terminal No.	signal	Conditions	Terminal voltage
13	Overdrive switch	When the overdrive switch is switched ON	12V
14	Overdrive switch	When the overdrive switch is switched ON	12V



With multi-use tester



SELF-DIAGNOSIS CHECK

Self-diagnosis checking is performed when there has been an automatic cancellation, without cancel switch operation.

(1) The following method can be used for checking the diagnosis. When the glove compartment is removed (as shown in the illustration), the diagnosis check connector can be found at the upper part.

① If a multi-use tester is used.

Connect the multi-use tester's socket and connector to the cigarette lighter socket and the self-diagnosis check connector, and set the tester.

Use the tester according to its operation instructions; display the diagnosis code number and then check.

② If a voltmeter is used.

Connect a voltmeter between the ground terminal and the terminal for auto-cruise control of the diagnosis check connector.



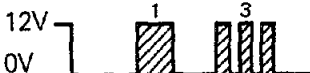
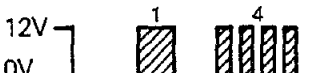
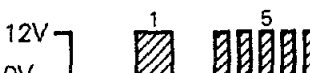
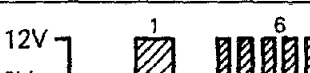
It is possible to discover which circuit is the cause of the cancellation by verifying the indication shown by the voltmeter with the display patterns shown on the next page.

(2) When diagnosis code No. 11, 12, 15 or 16 is displayed, check by referring to the check chart applicable to that number.

NOTE

There are six diagnosis items, including the one for the normal condition. As examples of the normal condition, code No. 16 is entered in the memory as cancel switch ON signal input if the system is canceled by depressing the brake pedal, and code No. 13 or No. 14 is entered when there is an automatic cancellation because the vehicle speed drops when the vehicle is driven up a steep slope with the preset speed setting left set, etc.. When, however, there is a cancellation not intentionally made by the driver, the cause might be damaged or disconnected stop light switch input wiring, a malfunction of the stop light switch ON, etc., even though the same code No. 16 is displayed.

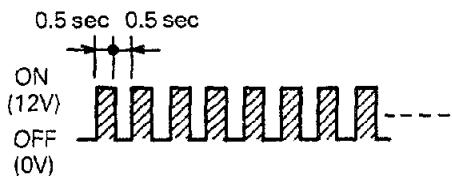
DIAGNOSIS DISPLAY PATTERNS AND CODES

Code No.	Display patterns (output codes)	Probable cause	Check chart No.
11		Abnormal condition of actuator drive system	No. 5
12		Abnormal condition of vehicle-speed signal system	No. 4
13*		Low-speed limiter activation (The system is normal if it can be reset.)	-
14*		Automatic cancellation activated by vehicle speed reduction. (The system is normal if it can be reset.)	-
15*		Control switch malfunction (when SET and RESUME switches switched on simultaneously)	No. 2,3
16*		Cancel switch ON signal input (including stop light switch input wiring damage or disconnection)	No. 6-1, 6-2, 6-3

NOTE

- Codes indicated by the * symbol are displayed, if the conditions are satisfied, even if the system is normal. In either case, the system is normal if it can be reset. If there is an automatic cancellation not intentionally made by the driver, however, excluding cancellations explicitly made by the cancel procedure, there may be a temporary malfunction such as poor contact of a harness connector even though the system can be reset, and for that reason it is necessary to check according to each individual check chart that is applicable.

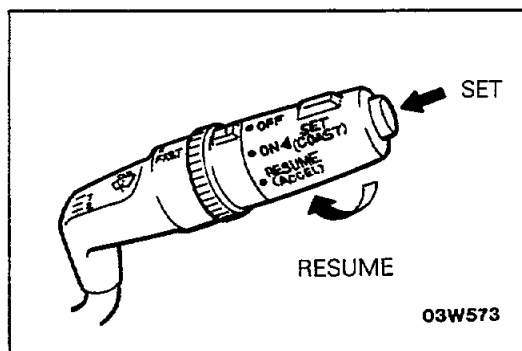
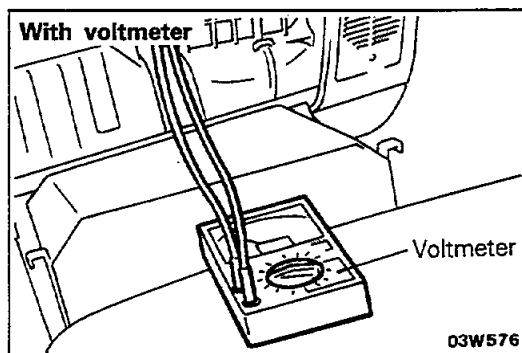
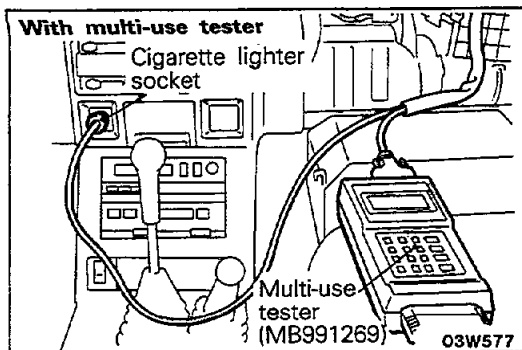
Display when vehicle speed is approximately 20 km/h (12 mph) or higher, or before the auto-cruise control system is set



- Diagnosis codes are displayed when, after cancellation of the auto-cruise control system, the vehicle speed decreases to less than approximately 20 km/h (12 mph), and are erased by switching OFF the ignition switch or the MAIN switch.

After the diagnosis codes in the memory are erased, if (when the power supply of the auto-cruise control unit is switched ON once again) the power supply of the electronic control unit is normal, the diagnosis output code display will be as below, regardless of whether the system condition is normal or not.

- If a multi-use tester is used: "NORMAL!!" will be displayed.
- If a voltmeter is used: Continuous ON/OFF signals will be displayed at 0.5-second intervals. (Refer to the figure at the left.)



INPUT CHECK

Input checks should be made when the auto-cruise control system cannot be set and when it is necessary to check (when a malfunction related to the auto-cruise control system occurs) whether or not the input signals are normal.

NOTE

1. If inspection of self-diagnosis is necessary, confirm diagnosis code first and conduct input check.
2. Input check can be conducted by set operations. Self-diagnosis terminal outputs codes number or display patterns.
3. Display codes are displayed only if the circuit is normal according to the conditions shown in the table the next page.






- (1) If a multi-use tester is used, the setting of the tester is the same as for the self-diagnosis check, and call-out the auto-cruise control system.
- (2) The voltmeter is set in the same way as for the self-diagnosis check.
- (3) Turn the ignition key to ON. (Check No. 1 to No. 3 of the input check table.)
- (4) Start the engine. (Check No. 4 and No. 5 of the input check table.)
- (5) Code call-out
 - ① Switch ON the SET switch while holding the RESUME switch ON.
 - ② This procedure makes it possible to display the results of the input check.
- (6) Code read-out
 - ① Perform each input operation according to the input check table (on the next page) and read the codes.

NOTE

- Each code will be displayed in an order of priority beginning from No. 1. When each input operation is performed and the signals for the conditions are received by the computer, each output code will be repeatedly displayed in the sequence of priority for as long as that signal continues. If there is no display, it is possible that there is a malfunction of the auto-cruise control unit power-supply circuit or the SET and/or RESUME switch, so check according to check charts 1, 2 and 3 (P.14-112, 113).
- If, during the display of output codes, the input operation is canceled (if, for example, the SET switch is set from ON to OFF), the code will be displayed for one cycle of the display, but will not be displayed during the next cycle. This makes it possible, therefore, to check the OFF condition (existence of not of a shortcircuit of the input line or the switch).

- ② Switch the MAIN switch OFF.

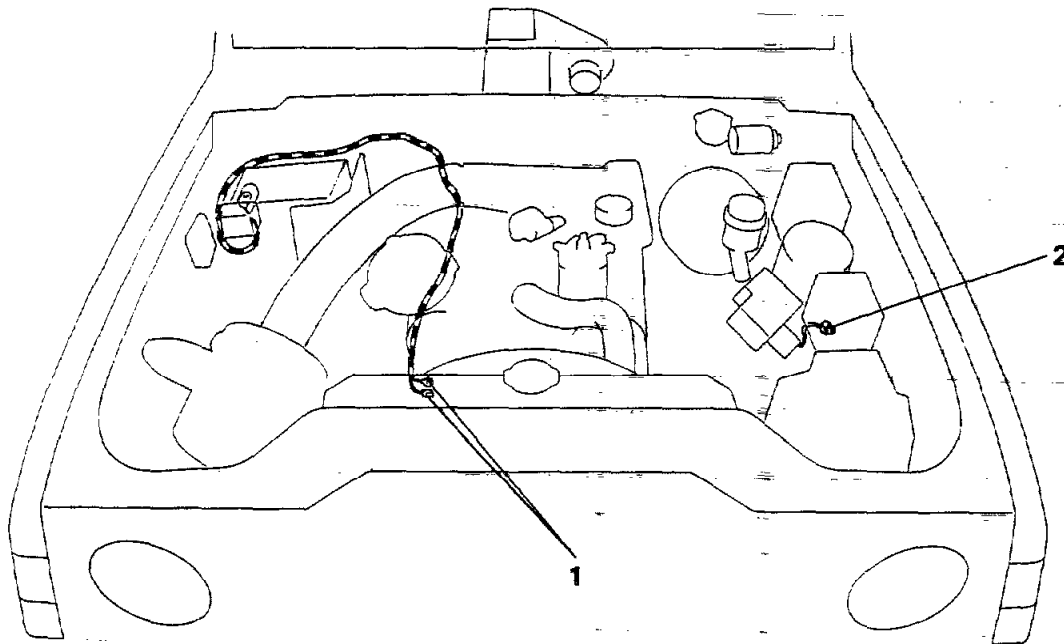
INPUT CHECK TABLE

Check No.	Input operation	Code No.	Display patterns (output codes)	Check results
1	SET switch ON	21	12V 0V 	SET switch circuit normal
2	RESUME switch ON	22	12V 0V 	RESUME switch circuit normal
3	Each CANCEL switch ON 1 Stop light switch (brake pedal depressed) 2 Clutch switch *(clutch pedal depressed) 3 Inhibitor switch *(selector handle to "N" range)	23	12V 0V 	Each CANCEL circuit normal
4	Driving at approximately to 40 km/h (25 mph) or higher	24	12V 0V 	When both No. 4 and No. 5 can be confirmed, vehicle-speed sensor circuit normal.
5	Driving at less than approximately 40 km/h (25 mph) or stopped	25	12V 0V 	

*1 <M/T>
*2 <A/T>

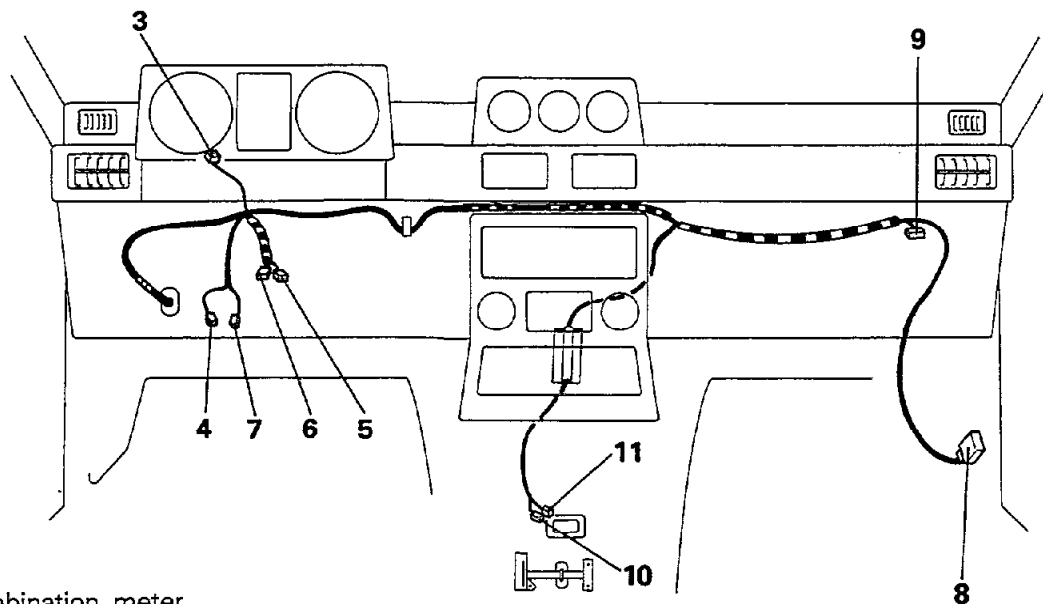
AUTO-CRUISE CONTROL RELATED HARNESSSES

<ENGINE COMPARTMENT>



1 - Starter motor
2 - Inhibitor switch

<INSIDE THE CABIN>



- 3. Combination meter
- 4. Clutch switch
- 5. Column switch
- 6. Ignition switch
- 7. Stop light switch
- 8. Auto-cruise control unit
- 9. Diagnosis check terminal
- 10. Overdrive switch
- 11. Inhibitor switch

34W032

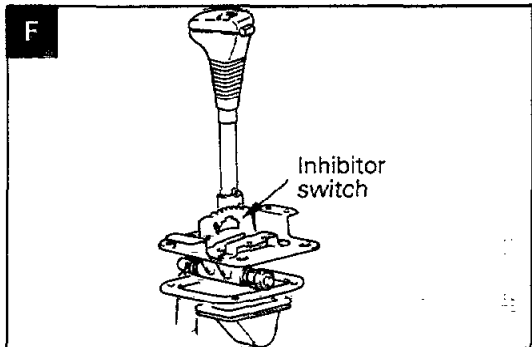
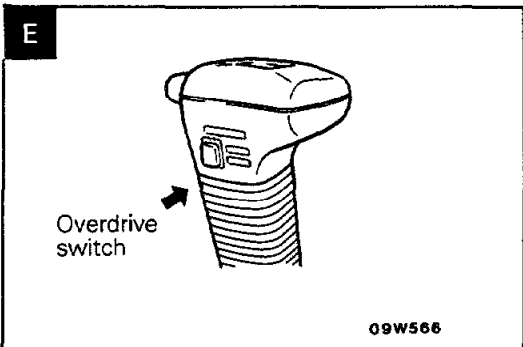
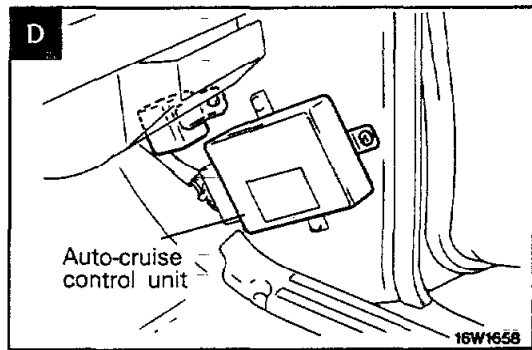
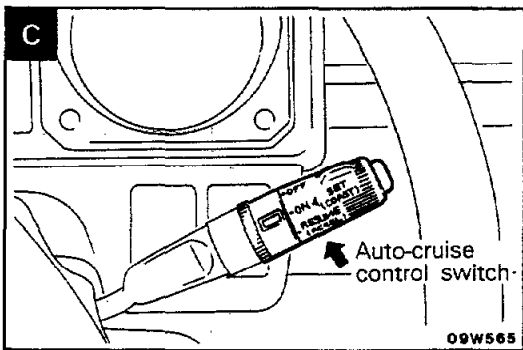
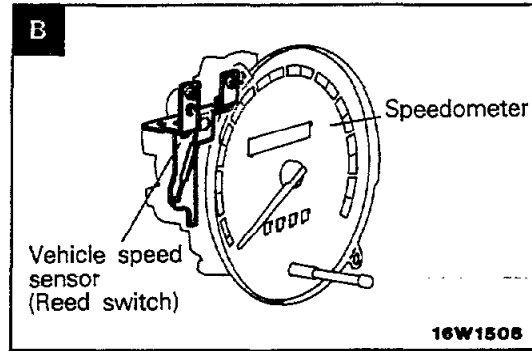
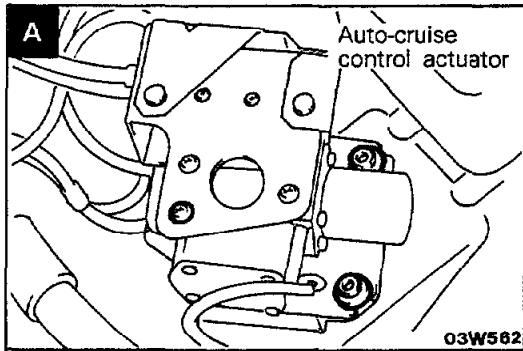
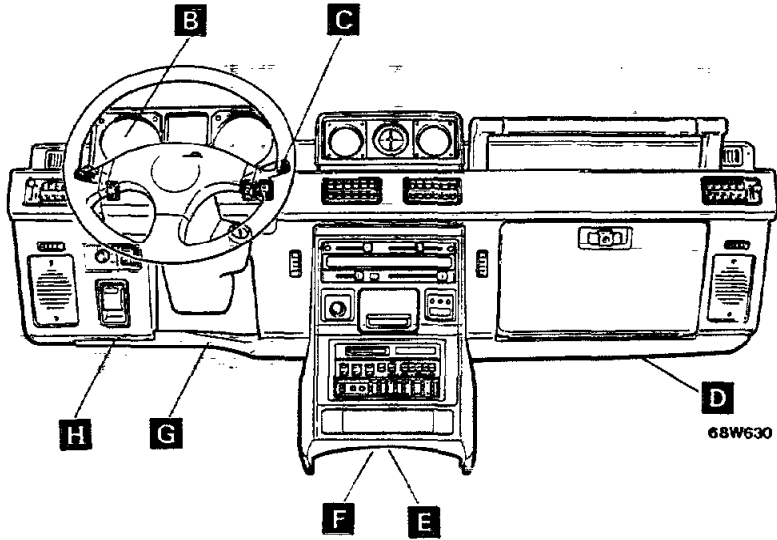
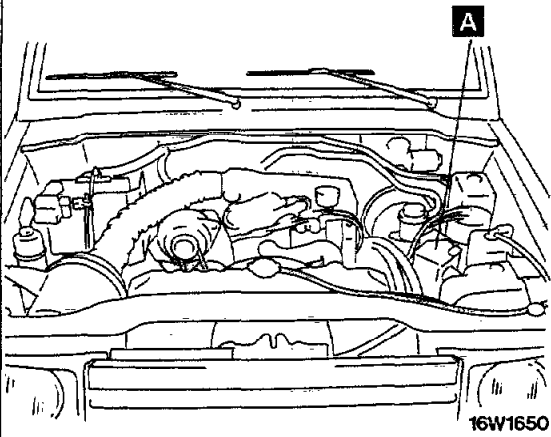
AUTO-CRUISE CONTROL COMPONENTS LOCATION

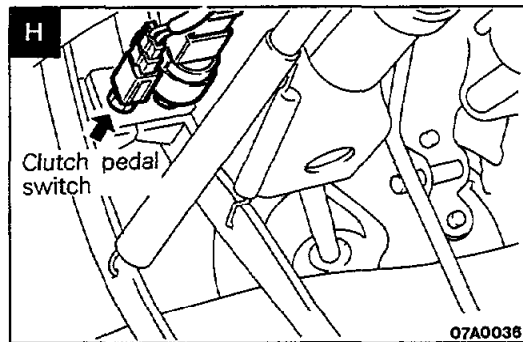
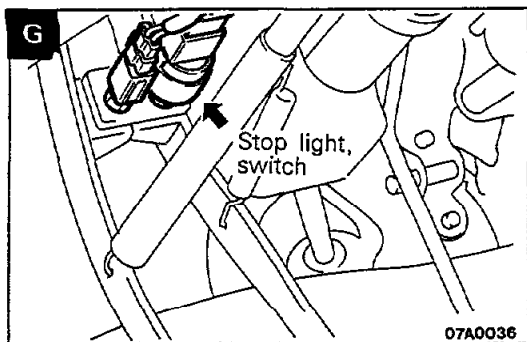
Name	Symbol	Name	Symbol
Auto-cruise control actuator	A	Inhibitor switch <A/T>	F
Auto-cruise control switch	C	Overdrive switch <A/T>	E
Auto-cruise control unit	D	Stop light switch	G
Clutch pedal switch <M/T>	H	Vehicle speed sensor (Reed switch)	B

NOTE
The "Name" column is arranged in alphabetical order.

<Engine compartment>

<Interior>





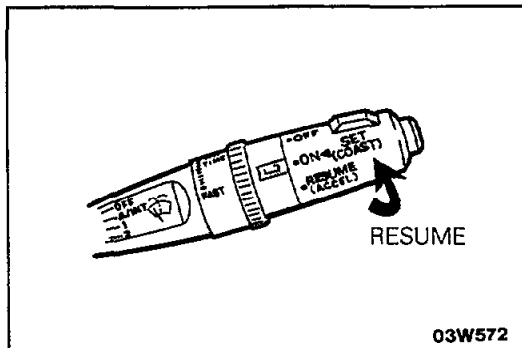
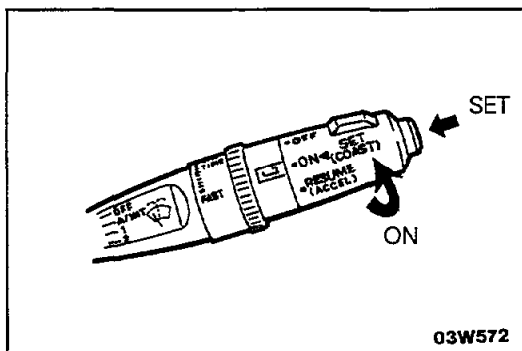
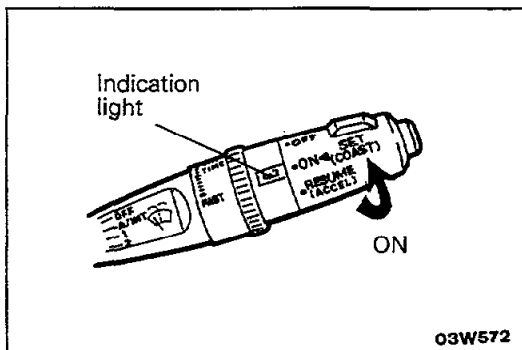
SERVICE ADJUSTMENT PROCEDURES

N14FTAN

AUTO-CRUISE CONTROL SYSTEM INSPECTION

AUTO-CRUISE CONTROL MAIN SWITCH CHECK

- (1) Turn the ignition switch to ON.
- (2) Check to be sure that the indicator light within the switch illuminates when the MAIN switch is switched ON.



AUTO-CRUISE CONTROL SETTING CHECK

- (1) Switch ON the MAIN switch.
- (2) Drive at the desired speed within the range of approximately 40–145 km/h (25–90 mph).
- (3) Press the SET button.
- (4) Check to be sure that the speed is the desired constant speed when the switch is released.

NOTE

If the vehicle speed decreases to approximately 20 km/h (12 mph) below the set speed, because of climbing a hill for example, the auto-cruise control will be cancelled.

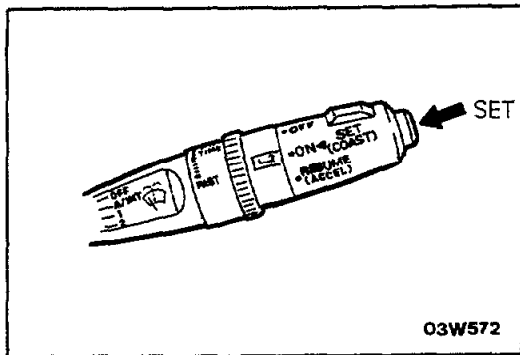
SPEED-INCREASE SETTING CHECK

- (1) Set to the desired speed.
- (2) Turn the control switch to RESUME position.
- (3) Check to be sure that acceleration continues while the switch is hold, and that when it is released the constant speed at the time when it was released becomes the driving speed.

NOTE

Even if, during acceleration, the vehicle speed reaches or exceeds the high limit [approximately 145 km/h (90 mph)], acceleration will continue, however, when the switch is released, the set speed ("memorized speed") will become the high limit of the vehicle speed.

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SPEED REDUCTION SETTING CHECK

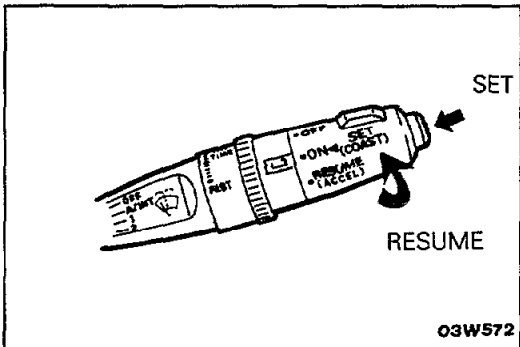
- (1) Set to the desired speed.
- (2) Press the SET button.
- (3) Check to be sure that deceleration continues while the switch is pressed, and that when it is released the constant speed at the time when it was released becomes the driving speed.

NOTE

When the vehicle speed reaches the low limit [approximately 40 km/h (25 mph)] during deceleration, the automatic speed control will be cancelled.

AUTO-CRUISE CONTROL CANCELLATION CHECK

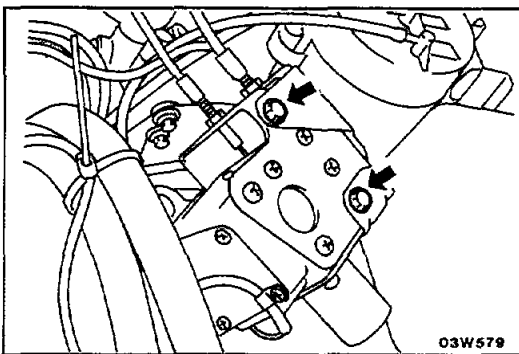
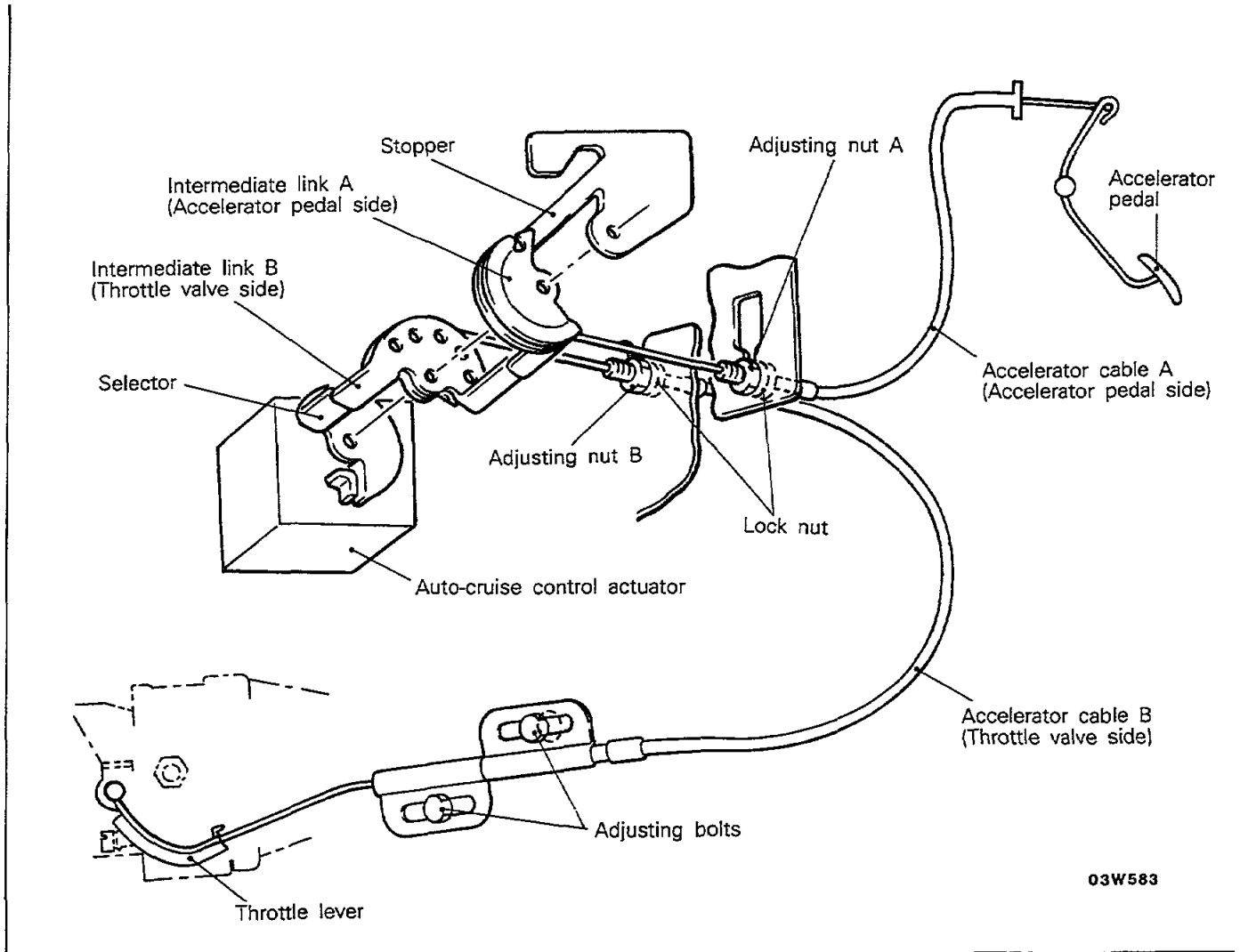
- (1) Set the auto-cruise control.
- (2) Check to be sure that there is a return to ordinary driving, and that the illumination of the auto-cruise indicator goes out, when either of the operations below is performed.
 - ① The brake pedal is depressed.
 - ② The clutch pedal is depressed. <M/T>
 - ③ The selector handle is moved to the "N" range. <A/T>
- (4) The auto-cruise control MAIN switch is switched OFF.



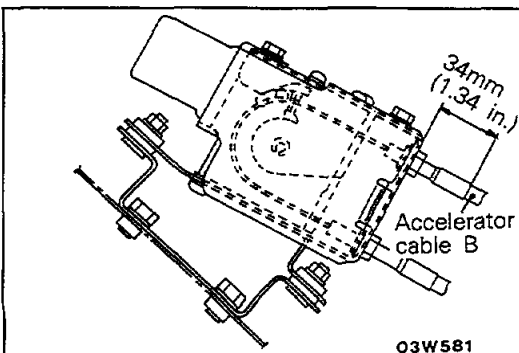
CHECK OF RETURN TO THE SET SPEED BEFORE CANCELLATION

- (1) Set the auto-cruise control.
- (2) Check to be sure that the auto-cruise control is cancelled when either of the operations below is performed.
 - ① The brake pedal is depressed.
 - ② The clutch pedal is depressed. <M/T>
 - ③ The selector handle is moved to the "N" range. <A/T>
- (3) Turn the control switch to RESUME position and release (RESUME switch ON → OFF) while driving at a vehicle speed of approximately 40 km/h (25 mph) or higher.
- (4) After switching RESUME switch to OFF there will be a return to the auto-cruise control speed before the auto-cruise control speed will be cancelled and the vehicle will travel at the constant speed.

ACCELERATOR CABLES INSPECTION AND ADJUSTMENT

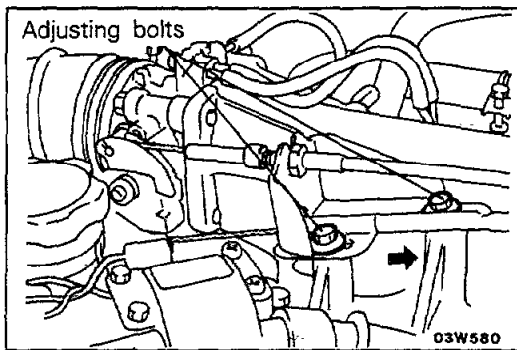


- (1) Confirm there are no sharp bends in accelerator cables.
- (2) Check inner cables for correct slack.
- (3) If there is too much slack or no slack, adjust play by the following procedures.
 - ① Remove the actuator's protector.

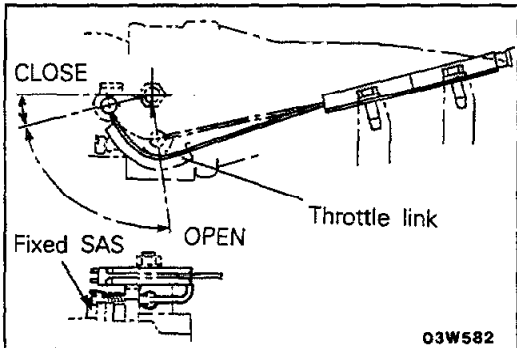


- ② Connect accelerator cable B to the actuator (at the dimensions shown in the figure).

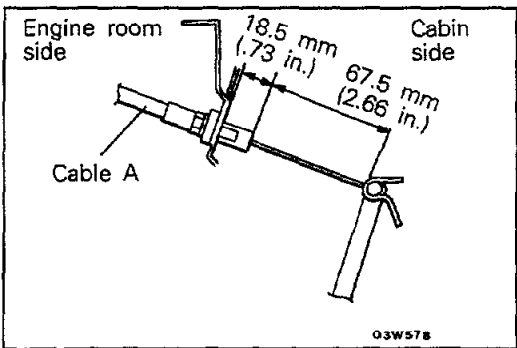
14-128 AUTO-CRUISE CONTROL SYSTEM – Service Adjustment Procedures



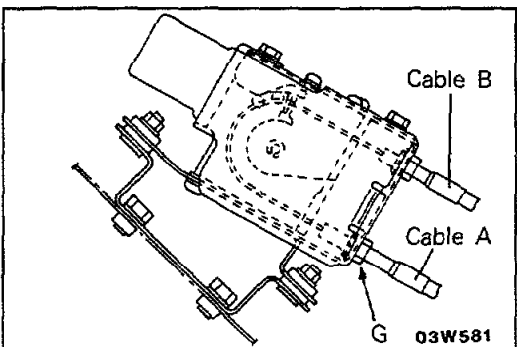
- ③ Slide (in the direction of the arrow) the cable (outer) so that the cable's play will be 1 – 2 mm (.04 – .08 in.), and secure by using the adjustment bolts. Check to be sure that the throttle link contacts the stopper (fixed SAS).



- ④ Connect cable A at the dimensions shown in the figure.



- ⑤ Adjust so that the play of cable A at the G part is 0 – 1 mm (0 – .04 in.).
 ⑥ Check to be sure that the throttle link moves when the actuator link is turned 1 – 2 mm (.04 – .08 in.).
 ⑦ Check to be sure that the actuator link and the throttle link function smoothly when the accelerator pedal is fully open and fully closed.
 ⑧ Install the protector to the actuator.

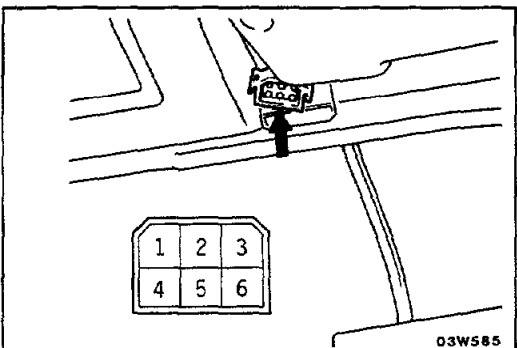


INDIVIDUAL PARTS INSPECTION AUTO-CRUISE CONTROL SWITCH INSPECTION

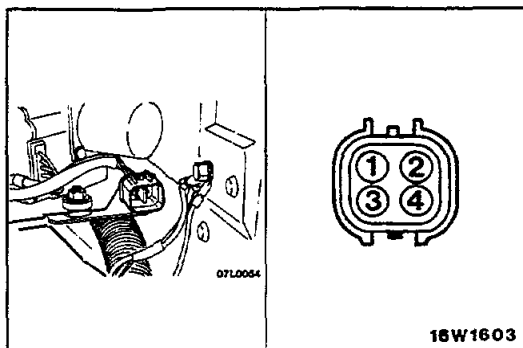
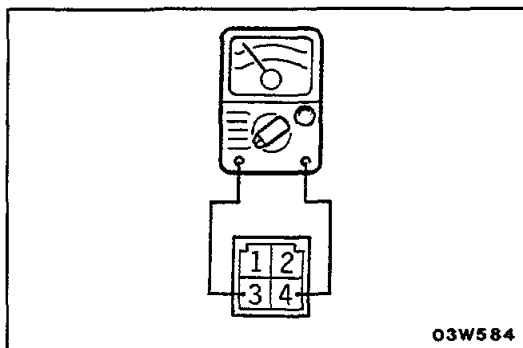
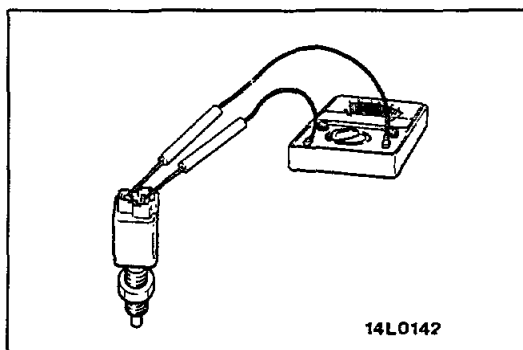
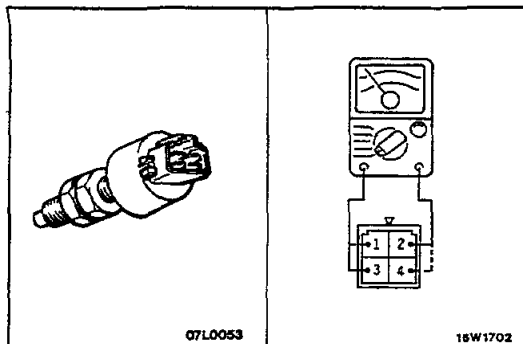
N14FTA0

Disconnect the column switch connector and check the continuity between the terminals.

○—○ Continuity



Switch position	Terminal	2	1	3	4	6
OFF						
MAIN switch ON				○—○		
SET switch ON		○—○				
RESUME switch ON		○—○			○—○	



STOP LIGHT SWITCH/BRAKE SWITCH INSPECTION

- (1) Disconnect the connector.
- (2) Check for continuity between the terminals of the switch.

○—○ : Continuity

Measurement conditions	Switch Terminal	Brake switch		Stop light switch	
		1	4	2	3
When brake pedal depressed.				○—○	○—○
When brake pedal not depressed.		○—○	○—○		

CLUTCH SWITCH INSPECTION

- (1) Disconnect the connector.
- (2) Check to be sure that there is continuity between connector terminals when the clutch pedal is depressed.

INHIBITOR SWITCH ("N" AND "P" POSITIONS) INSPECTION

- (1) Disconnect the connector.
- (2) Check to be sure that there is continuity between connector terminals 3 and 4 when the selector handle is moved to the "N" and "P" range.

ACTUATOR INSPECTION

- (1) Disconnect the connector.
- (2) Measure the resistance value of the clutch coil.

Resistance of clutch coil between connector terminals (1) – (2)

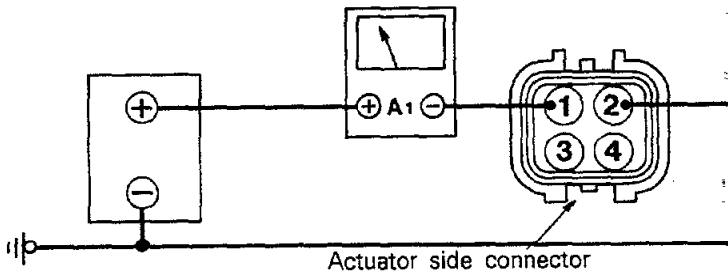
Standard value: Approx. 20Ω

ACTUATOR OPERATION CHECK

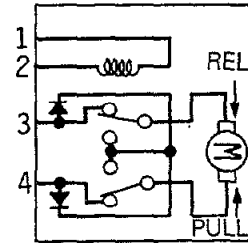
Disconnect the actuator's connector and, in the order described below, check the actuator's operation and the circuit tester's indication; replace the actuator assembly if any abnormal condition is discovered.

- (1) Checking the clutch coil solenoid operation
Connect terminal (1) of the actuator through the ammeter to the positive (+) terminal of the battery, and connect terminal (2) to the negative (–) terminal.

14-130 AUTO-CRUISE CONTROL SYSTEM - Service Adjustment Procedures



16W1604

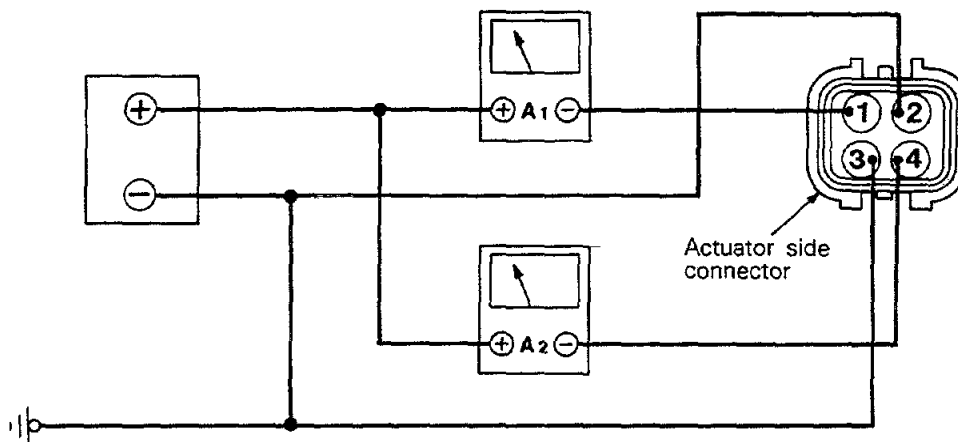


Actuator 03W587

NOTE
 (1) NC: Indicates ON at all times.
 (2) NO: Indicates OFF at all times.

Judgement		Probable cause
Normal	Abnormal	
Solenoid operation sound ("click") can be heard. A ₁ : 0.5-0.7A	No solenoid sound A ₁ = 0A	Damaged or disconnected wiring of clutch coil
	No solenoid sound A ₁ = ∞ A	Short-circuit of clutch coil

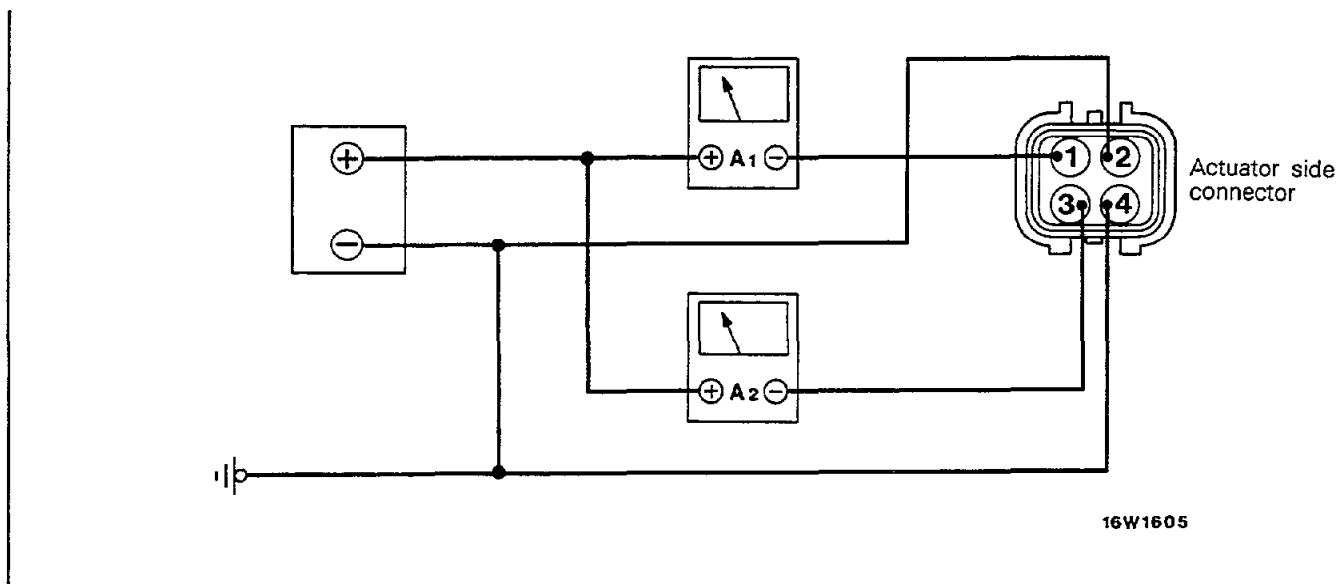
- (2) Checking the motor (PULL direction) and limit switch operation
 In the condition described in (1), connect terminal (4) of the actuator, through the ammeter, to the positive (+) side and terminal (3) to the negative (-) side.



16W1711

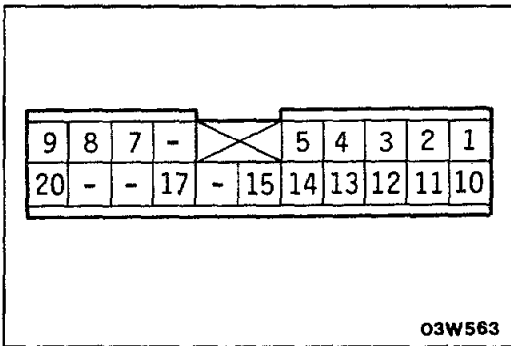
Judgement		Probable cause
Normal	Abnormal	
Current is cut off when selector is turned in PULL direction for full stroke (fully open). A ₁ : 0.5–0.7A A ₂ : less than 0.5A (when current ON)	Selector moves in PULL direction but A ₂ : equal or more than 1A A ₁ : 0.5–0.7A	<ul style="list-style-type: none"> ● Improper backlash between gears ● Imminent burning between shaft and metal ● Insufficient thrust clearance
	Selector doesn't move. A ₂ : equal or more than 1A A ₁ : 0.5–0.7A	<ul style="list-style-type: none"> ● Shaft burned ● Foreign material caught between gears ● Motor burned
	Selector doesn't move. A ₂ =0A A ₁ : 0.3–0.7A	<ul style="list-style-type: none"> ● Damaged or disconnected internal lead wire ● Damaged or disconnected motor wiring ● Poor contact of limit switch ● Open diode
With the selector stroke at the intermediate level, disconnect the connection to terminal (1) and cut the current flow to the clutch coil.	The selector doesn't return to the original position even if the current to the clutch coil is cut.	Malfunction of clutch operation (Clutch plate remains engaged with clutch)

(3) Checking the motor (REL. direction) and limit switch operation
 Reverse the connections to terminal (3) and terminal (4) from those described in (2).



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Judgement		Probable cause
Normal	Abnormal	
Current is cut off when selector is turned in REL. direction for full stroke (fully closed). A ₁ : 0.5–0.7A A ₂ : less than 0.5A (when current ON)	Selector moves in REL. direction but A ₂ : equal or more than 1A A ₁ : 0.5–0.7A	<ul style="list-style-type: none"> ● Improper backlash between gears ● Imminent burning between shaft and metal ● Insufficient thrust clearance
	Selector doesn't move. A ₂ : equal or more than 1A A ₁ : 0.5–0.7A	<ul style="list-style-type: none"> ● Shaft burned ● Foreign material caught between gears ● Motor burned
	Selector doesn't move. A ₂ = 0A A ₁ : 0.3–0.7A	<ul style="list-style-type: none"> ● Damaged or disconnected internal lead wire ● Damaged or disconnected motor wiring ● Poor contact of limit switch ● Open diode



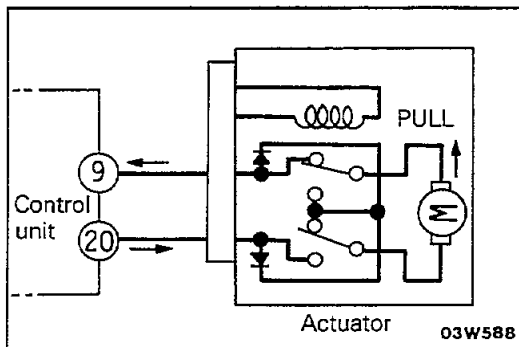
AUTO-CRUISE CONTROL SIGNAL CIRCUIT CHECK

Disconnect the connector of the auto-cruise control unit, and then check at the body side wiring harness according to the chart below.

IG S/W : Ignition switch
MAIN S/W : MAIN switch
OD S/W : Overdrive switch

Terminal	Connection or measured part	Measurement item	Tester connection	Check conditions	Standard
1	Clutch switch	Voltage	1–Ground	IG S/W ON Clutch switch ON	Approx. 12V
				Clutch switch OFF	0V
2	Inhibitor switch (P, N)	Continuity	2–Ground	"P" or "N" range	Continuity
				Other than "P" or "N" range	No continuity
3	Stop light switch load side	Voltage	3–Ground	Press the brake pedal.	Approx. 12V
4	RESUME switch	Continuity	4–Ground	RESUME switch ON (Turn)	Continuity
				RESUME switch OFF (Release)	No continuity
5	SET switch	Continuity	5–Ground	SET switch ON (Press)	Continuity
				SET switch OFF (Release)	No continuity
7	Power supply (MAIN)	Voltage	7–Ground	IG S/W ON, MAIN S/W ON	Approx. 12V

Terminal	Connection or measured part	Measurement item	Tester connection	Check conditions	Standard	
8	Stop light switch (for auto-cruise control cancellation) and actuator (clutch)	Voltage	8–Ground	IG S/W ON, MAIN S/W ON (Don't press brake pedal.)	Approx. 12V	
				Press brake pedal after checking above.	Approx. 12V → 0V	
9, 20	Actuator (motor)	Resistance	9–*120	Actuator selector (Fully closed position)	Approx. 12Ω	
10	Ground	Continuity	10–Ground	At all times	Continuity	
11	Stop light switch power supply side	Voltage	11–Ground	At all times	Approx. 12V	
12	Ground	Continuity	12–Ground	At all times	Continuity	
13	Overdrive solenoid	Continuity	13–Ground	At all times	Continuity	
14*2	OD switch	Voltage	14–Ground	IG S/W ON	OD S/W ON position	Approx. 12V
					OD S/W OFF position	0V
15	Vehicle speed sensor	Voltage	15–Ground	With the ignition key at the ON position, slowly turn the speedometer cable.	4 voltage changes/ cable rotation	
17*2	Self-diagnosis	–	–	–	–	



NOTE

- As shown by the *1 symbol, the limit switch within the actuator will become as shown in the figure at the left if the actuator selector is at the fully closed position when the resistance between terminals No. 9 and No. 20 is measured; for that reason, after checking the polarity of the tester, the tester's probe should be connected so that current flows from the No. 20 terminal to the No. 9 terminal.
- For terminals No. 17 and 14 indicated by the *2 symbol, it is necessary to check individual terminal voltages with the auto-cruise control unit's harness connector connected and with the ignition switch ON.
 - The No. 17 terminal is normal if the self-diagnosis code can be confirmed. (Refer to P. 14-119)
 - The No. 14 terminal is normal if there is approximately 12V with the auto-cruise control system not functioning and the overdrive switch switched ON. (Refer to P. 14-118.)

VEHICLE-SPEED SENSOR INSPECTION

Refer to GROUP 8–Meters and Gauges for checking of vehicle speed sensor.

AUTO-CRUISE CONTROL REMOVAL AND INSTALLATION

Post-installation Operation

- Accelerator Cable Adjustment (Refer to P. 14-127).

Removal steps of actuator

1. Protector
2. Accelerator cable B adjusting nut
3. Accelerator cable A adjusting nut
4. Actuator side inner cable
5. Actuator connector
6. Actuator

Removal of sensor and switches

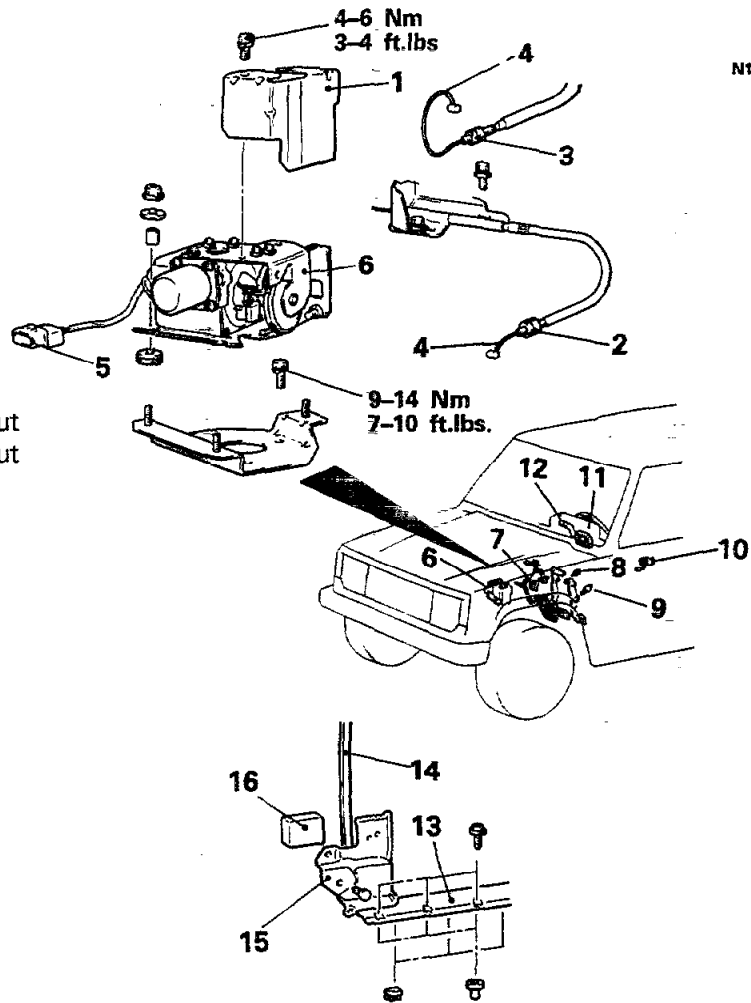
7. Accelerator switch <A/T>
8. Stop light switch
9. Clutch switch <M/T>
10. Inhibitor switch <A/T>
- ↔ ↔ 11. Vehicle speed sensor
- ↔ ↔ 12. Auto-cruise control switch

Removal steps of control unit

13. Front rail cover
14. Front door opening trim
15. Cowl side trim
16. Auto-cruise control unit

NOTE

- (1) Reverse the removal procedures to reinstall.
- (2) ↔ : Refer to "Service Points of Removal".
- (3) ↔ : Refer to "Service Points of Installation".



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SERVICE POINTS OF REMOVAL

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11. REMOVAL OF VEHICLE SPEED SENSOR

Refer to GROUP 8 - Meters and Gauges.

12. REMOVAL OF AUTO-CRUISE CONTROL SWITCH

Refer to GROUP 8 - Column Switch.

INSPECTION

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- Check the inner and outer cable for damage.
- Check the cable for smooth movement.
- Check the actuator cover for damage.

CHECKING THE ACTUATOR

Refer to P.14-129.

SERVICE POINTS OF INSTALLATION

N14TDDE

12. INSTALLATION OF AUTO-CRUISE CONTROL SWITCH

Refer to GROUP 8 - Column Switch.

11. INSTALLATION OF VEHICLE SPEED SENSOR

Refer to GROUP 8 - Meters and Gauges.