

# REAR VIEW MONITOR SYSTEM

## PRECAUTION

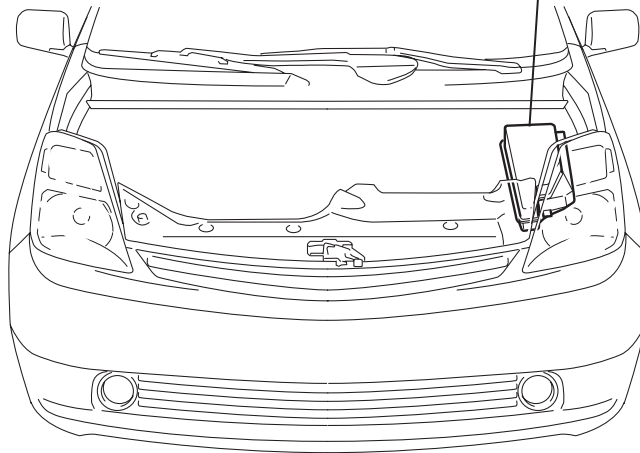
### NOTICE:

When disconnecting the cable from the negative (-) battery terminal, initialize the following systems after the cable is reconnected.

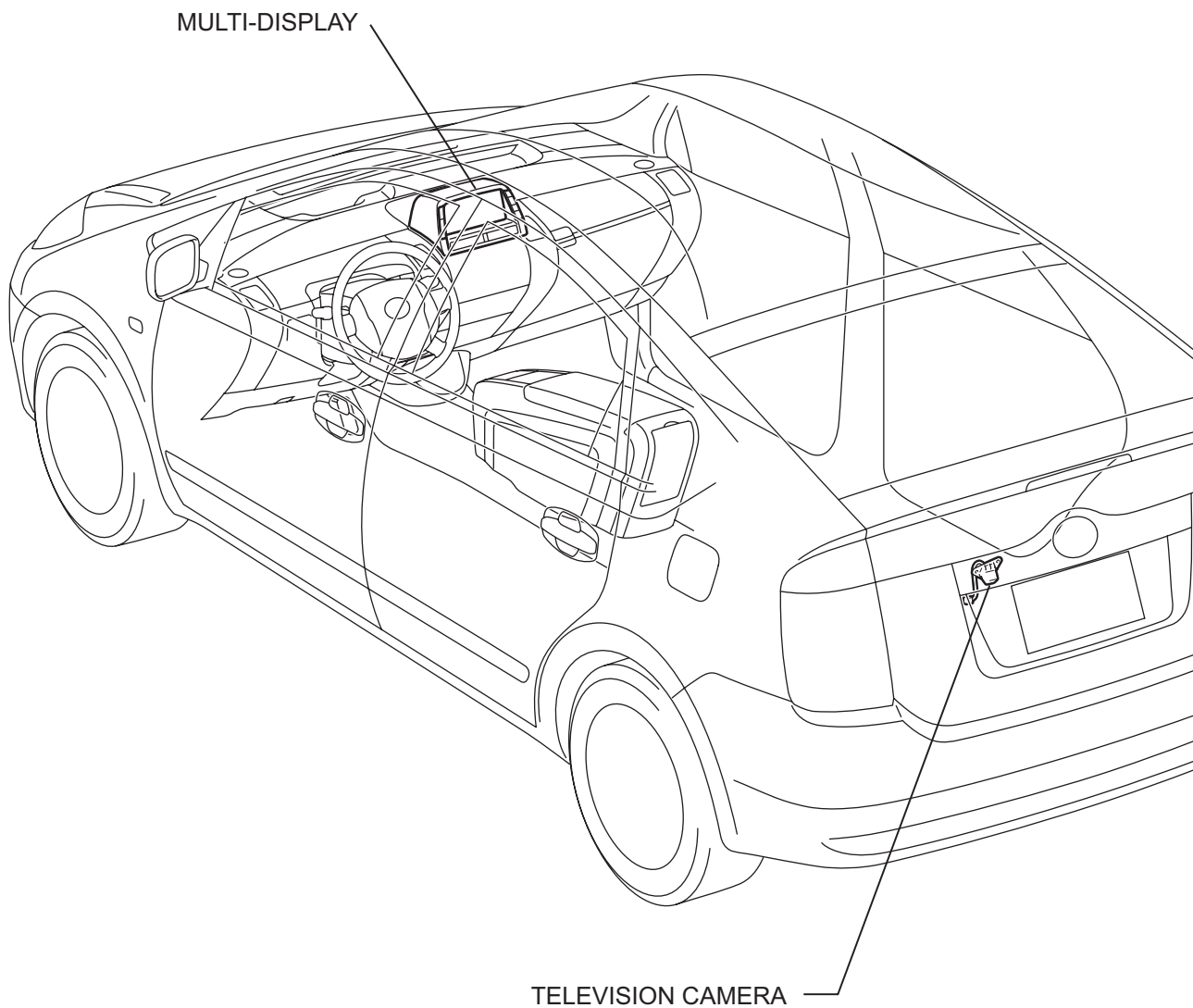
System Name	See procedure
Power Window Control System	<a href="#">IN-32</a>

# PARTS LOCATION

ENGINE ROOM RELAY BLOCK  
- INTEGRATION RELAY (UNIT C: BK/UP LP RELAY)

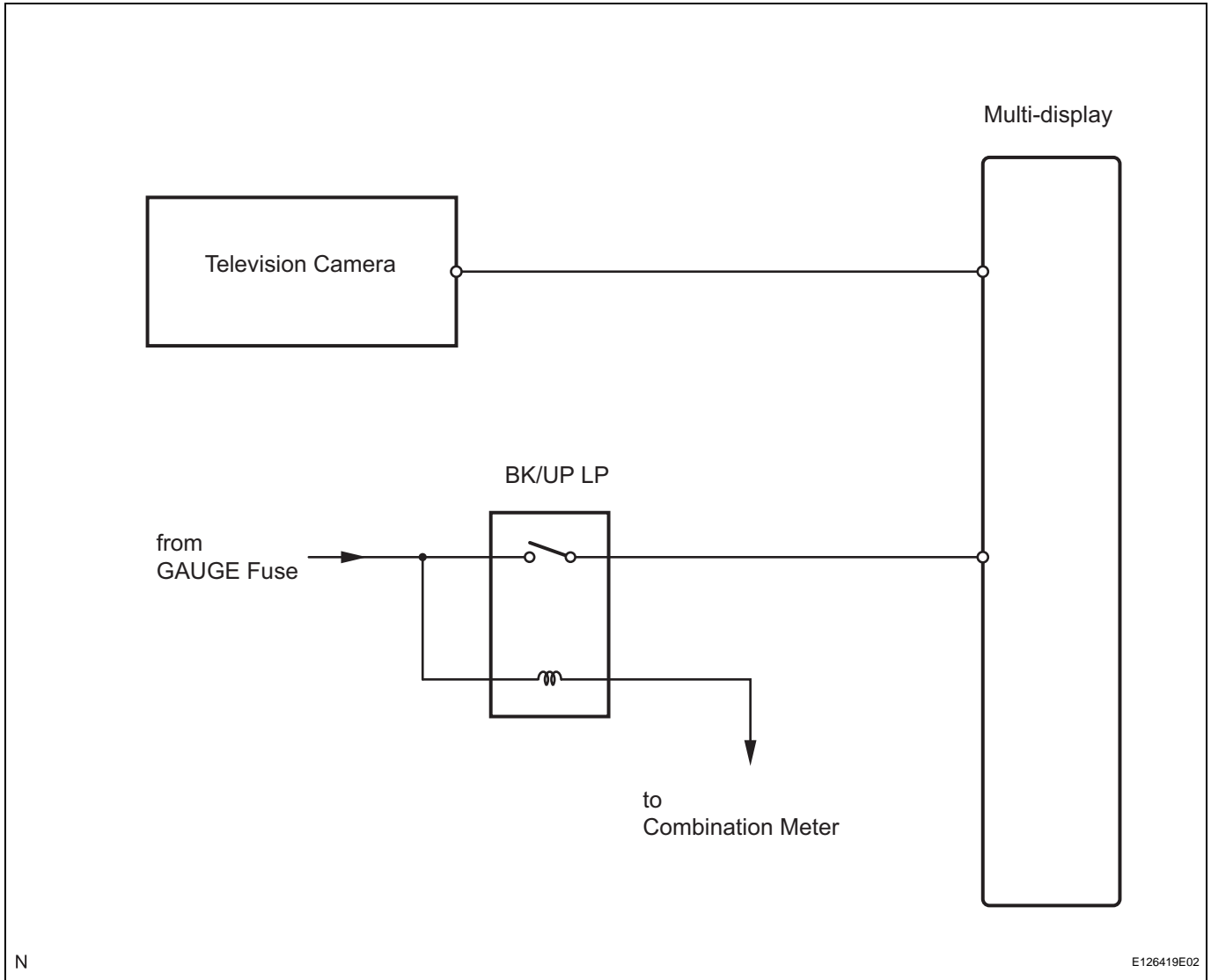


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# SYSTEM DIAGRAM



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## SYSTEM DESCRIPTION

### 1. GENERAL

- (a) To assist the driver with parking the vehicle by displaying an image of the area behind the vehicle, this system has a television camera mounted on the luggage compartment door. The system displays the image on the multi-display.
- (b) This system consists of the following components:
  - (1) Multi-display
  - (2) Television camera
- (c) This system is equipped with a self-diagnosis system, which is operated on a designated window that appears on the display panel, just as in the navigation system.

### 2. FUNCTION OF COMPONENTS

- (a) The multi-display controls the system by using information from the following components:

Item	Function
Television Camera Assembly	<ul style="list-style-type: none"> <li>• Mounted on luggage compartment door to transmit an image of area behind vehicle to multi-display.</li> <li>• Color video camera that uses CCD (Charge Coupled Device) and wide-angle lens.</li> </ul>
Multi-display	<ul style="list-style-type: none"> <li>• Receives video signals, which contain an image of area behind vehicle taken with television camera assembly.</li> <li>• Multi-display effects control of system by receiving shift position signal from BK/UP LP relay.</li> <li>• Displays rear view monitor image on display panel.</li> </ul>
BK/UP LP Relay	Transmits a reverse shift position signal to multi-display.

### 3. OPERATION EXPLANATION

- (a) The BK/UP LP relay sends an R position signal to the multi-display when the shift lever is moved to the R position. After receiving the R position signal, the multi-display switches from the navigation system to the rear view monitor system.

### 4. NOTES FOR REAR VIEW MONITOR

- (a) Notes for the rear view monitor.
  - (1) The rear view monitor may not function properly if subjected to a severe impact by any hard object.
  - (2) Do not "scrub" the lens of the camera because it is made of resin. Scrubbing it may scratch the cover and affect the image. Prevent organic solvents, waxes, bond removing solvents, or glass coating from adhering to the cover. If anything adheres to the cover, clean it off immediately and wash the lens with water.
  - (3) Exposing the camera to a sudden temperature change may affect proper functioning of the camera.
  - (4) A clear image may not appear if the camera is dirty with snow, mud, etc. In that case, wash it with water and wipe off the lens. Use a detergent to remove dirt if necessary.

- (b) Images are difficult to discern even in normal conditions if:
- (1) The camera lens is frosted over (the image immediately after turning the power switch ON (IG) may be blurred or darker than normal).
  - (2) A strong beam of light, such as a sunbeam or headlight, hits the camera.
  - (3) It is too dark around the camera (at night, etc.).
  - (4) The ambient temperature around the camera is either too high or too low.

HINT:

When a strong light, such as a sunbeam reflected off the vehicle's body, hits the camera, the image may be blurred. This is called the "SMEAR" phenomenon, peculiar to the CCD camera.

# HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

Use these procedures to troubleshoot the rear view monitor system.

**1** VEHICLE BROUGHT WORKSHOP

NEXT

**2** INSPECT BATTERY VOLTAGE

**Standard voltage:**

**11 to 14 V**

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT

**3** CHECK CAMERA LENS

- (a) Check that the camera lens is not dirty with mud, foreign matter, etc.

NEXT

**4** BASIC INSPECTION

- (a) Turn the power switch ON (ACC).
- (b) Check whether or not the display appears on the multi-display.

**Result**

Result	Proceed to
Display appears	A
Display does not appear	B

**B** Go to NAVIGATION SYSTEM

A

**5** PROBLEM SYMPTOMS TABLE

**Result**

Result	Proceed to
Fault is not listed in problem symptoms table	A
Fault is listed in problem symptoms table	B

PM

**B**  **Go to step 7**

**A**

**6** **OVERALL ANALYSIS AND TROUBLESHOOTING**

(a) Terminals of ECU (see page [PM-8](#))

**NEXT**

**7** **ADJUST, REPAIR OR REPLACE**

**NEXT**

**END**



## PROBLEM SYMPTOMS TABLE

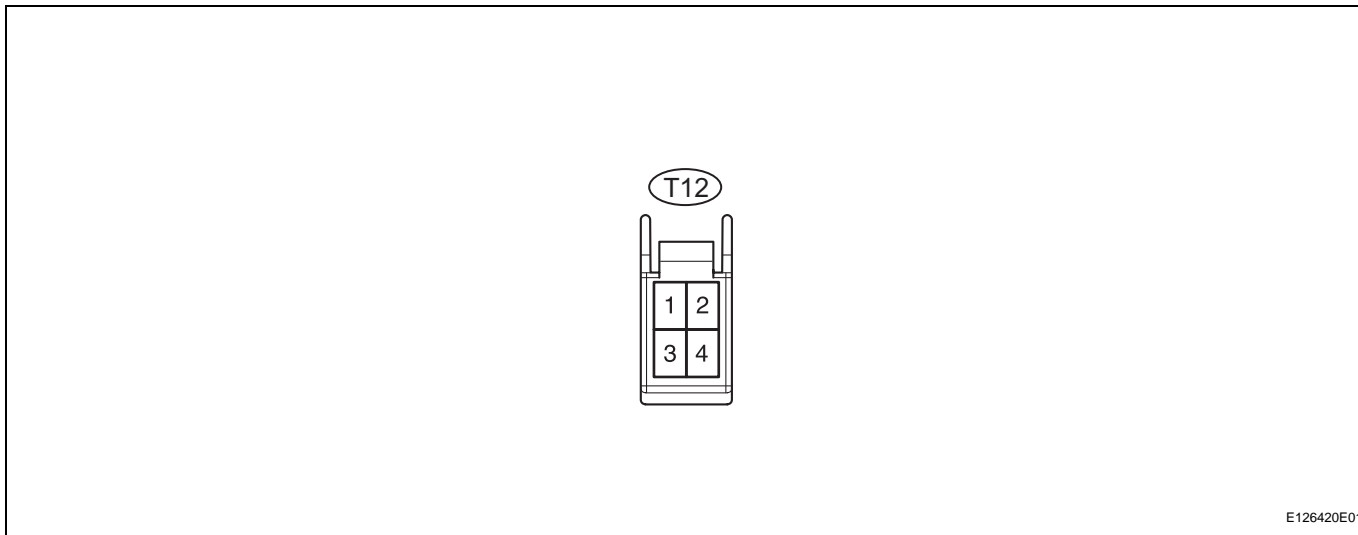
### HINT:

Use the table below to help determine the cause of the problem symptom. The potential causes of the symptoms are listed in order of probability in the "Suspected area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

Symptom	Suspected area	See page
When shift lever is in R position, rear view monitor image is not displayed (Screen is not black).	1. Reverse signal circuit	PM-9
	2. Proceed to "Display Signal Circuit between Multi-display and Television Camera Assembly"	PM-12
	3. Multi-display	-
When shift lever is in R position, rear view monitor image is not displayed (Screen is black).	1. Multi-display power source circuit	AV-175
	2. Proceed to "Display Signal Circuit between Multi-display and Television Camera Assembly"	PM-12
	3. Multi-display	-
	4. Television camera assembly	-
When shift lever is not in R position, rear view monitor image is displayed.	1. Reverse signal circuit	PM-9
	2. Multi-display	-
Problem with the rear view monitor image (color, disorder of picture).	1. Proceed to "Display Signal Circuit between Multi-display and Television Camera Assembly"	PM-12
	2. Multi-display	-
	3. Television camera assembly	-

# TERMINALS OF ECU

## 1. CHECK TELEVISION CAMERA ASSEMBLY



- (a) Disconnect the T12 camera connector.
- (b) Measure the voltage and resistance between each terminal of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
CGND (T12-3) - Body ground	W - Body ground	Ground	Always	Below 1 Ω
CB+ (T12-4) - CGND (T12-3)	B - W	Power source	Power switch ON (IG), shift lever R position	Approx. 6 V

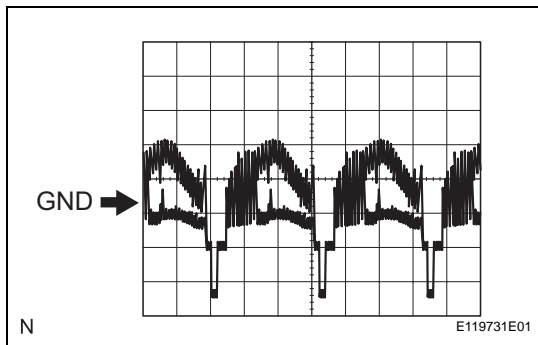
If the result is not as specified, there may be a malfunction on the wire harness side.

- (c) Reconnect the T12 camera connector.
- (d) Measure the voltage and frequency between each terminal of the connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
CV+ (T12-2) - CV- (T12-1)	R - Shielded	Display signal	Power switch ON (IG), shift lever R position	See waveform 1

If the result is not as specified, the camera may have a malfunction.

- (e) Using an oscilloscope, check the waveform **Waveform 1**



Item	Content
Symbols (Terminal No.)	CV+ (T12-2) - CV- (T12-1)
Tool Setting	0.2 V/DIV., 0.2 μsec./DIV.
Condition	Power switch ON (IG), shift lever R position

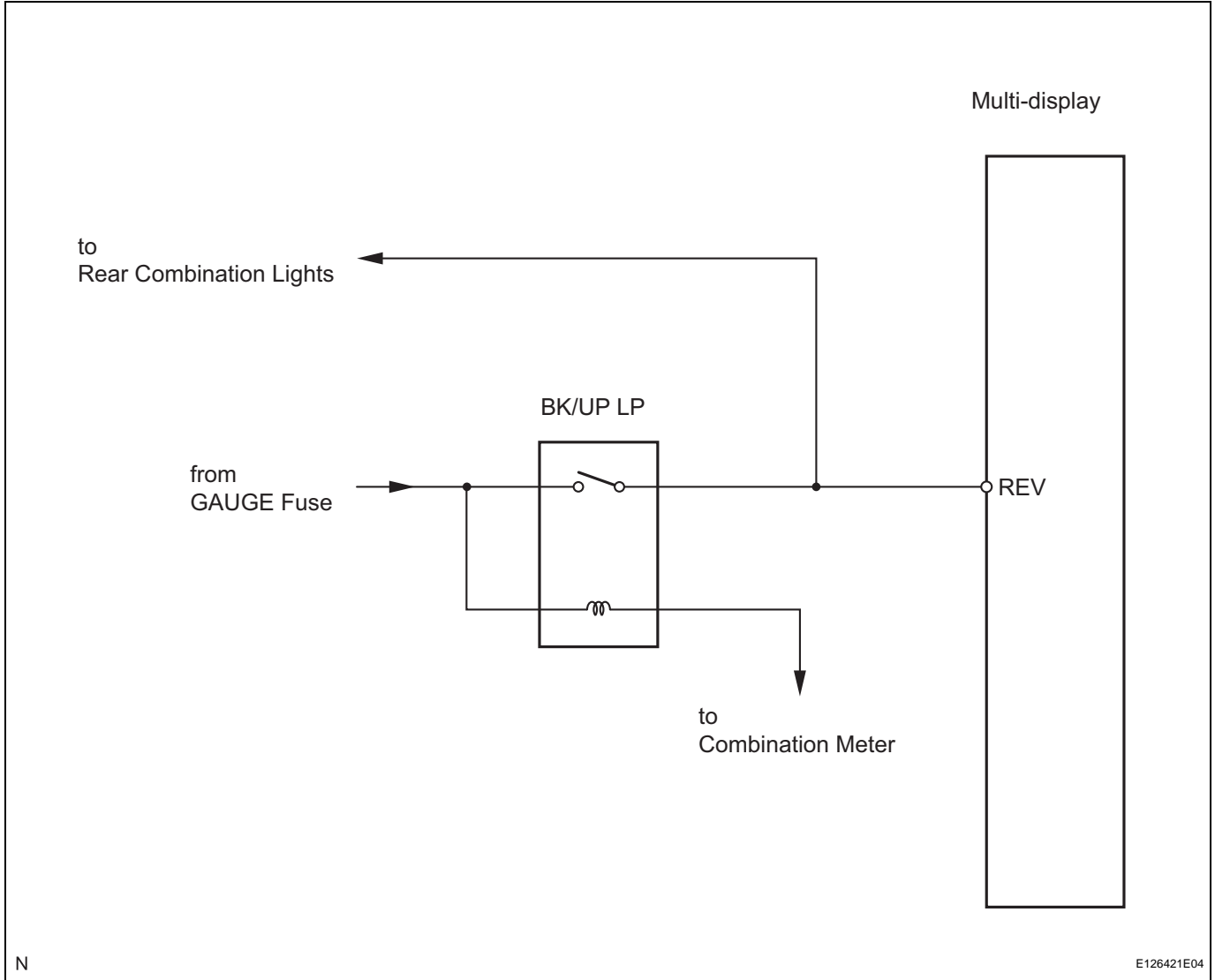
## 2. CHECK MULTI-DISPLAY (See page AV-31)

## Reverse Signal Circuit

### DESCRIPTION

The multi-display receives a reverse signal from the BK/UP LP relay (engine room relay block).

### WIRING DIAGRAM



### INSPECTION PROCEDURE

#### 1 CHECK BACK-UP LIGHT

- (a) Move the shift lever to the R position and check if the back-up light comes on.

**OK:**

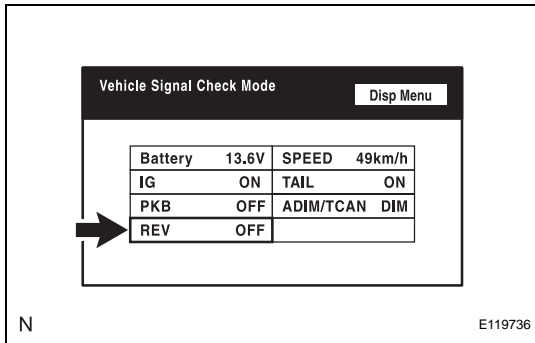
The back-up light comes on.

**NG**

**GO TO LIGHTING SYSTEM**

**OK**

**2 CHECK VEHICLE SIGNAL (DISPLAY CHECK MODE)**



- (a) Enter the "Display Check" mode (Vehicle Signal Check Mode) (see page [PM-12](#)).
- (b) Check that the display changes between ON and OFF according to the shift lever operation (P and R).

**OK**

Shift Lever Position	Display
R	ON
Except R	OFF

**HINT:**

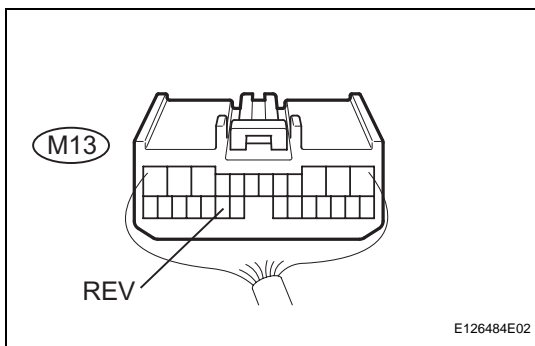
This display is updated once per second. As a result, it is normal for the display to lag behind the actual change in the switch.

**OK** → **PROCEED TO NEXT INSPECTION PROCEDURE SHOWN IN PROBLEM SYMPTOMS TABLE**

**NG**

**3 CHECK MULTI-DISPLAY**

**PM**



- (a) Disconnect the M13 display connector.
- (b) Measure the voltage of the display.

**Standard voltage**

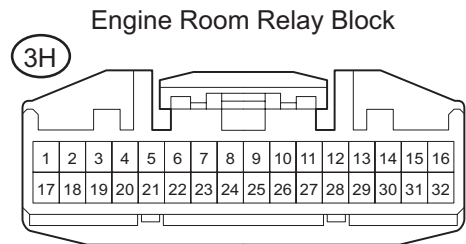
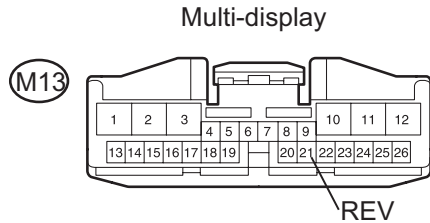
Tester Connection	Condition	Specified Condition
M13-21 (REV) - Body ground	Power switch is ON (IG). Shift lever is moved to R position.	10 to 14 V
M13-21 (REV) - Body ground	Power switch is ON (IG). Shift lever is moved to any position except R.	Below 1 V

**OK** → **REPLACE MULTI DISPLAY ASSEMBLY**

**NG**

**4 CHECK WIRE HARNESS (MULTI-DISPLAY - ENGINE ROOM RELAY BLOCK (BK/UP LP RELAY))**

Wire Harness Side



E126422E04

- (a) Disconnect the M13 display connector.
- (b) Disconnect the 3H relay block connector.
- (c) Measure the resistance of the wire harness side connectors.

**Standard resistance**

Tester Connection	Specified Condition
M13-21 (REV) - 3H-8	Below 1 Ω
M13-21 (REV) - Body ground	10 kΩ or higher

**NG** REPAIR OR REPLACE HARNESS AND CONNECTOR

**OK**

**PROCEED TO NEXT INSPECTION PROCEDURE SHOWN IN PROBLEM SYMPTOMS TABLE**

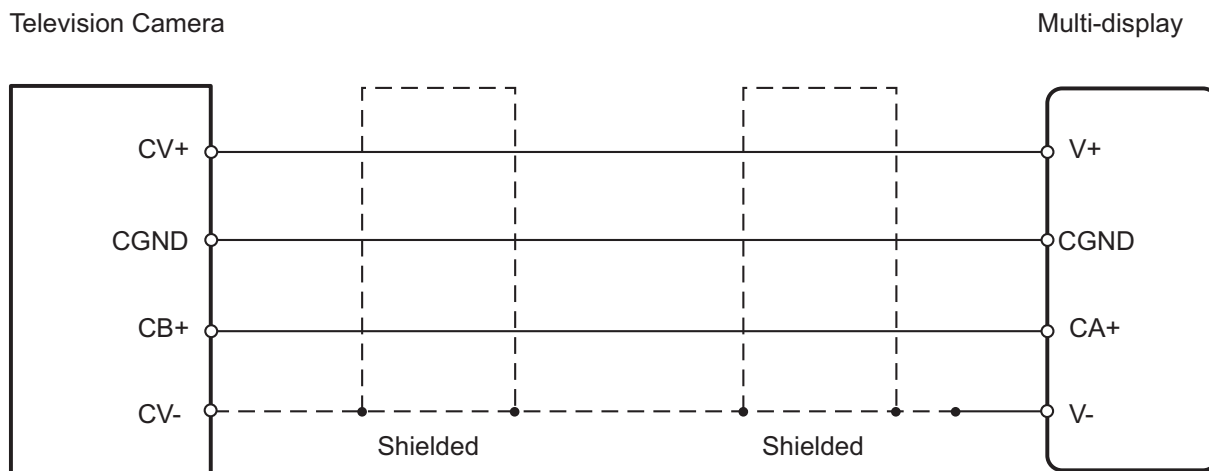
# Display Signal Circuit between Multi-display and Television Camera Assembly

## DESCRIPTION

This is the display signal circuit of the television camera.

## WIRING DIAGRAM

## INSPECTION PROCEDURE



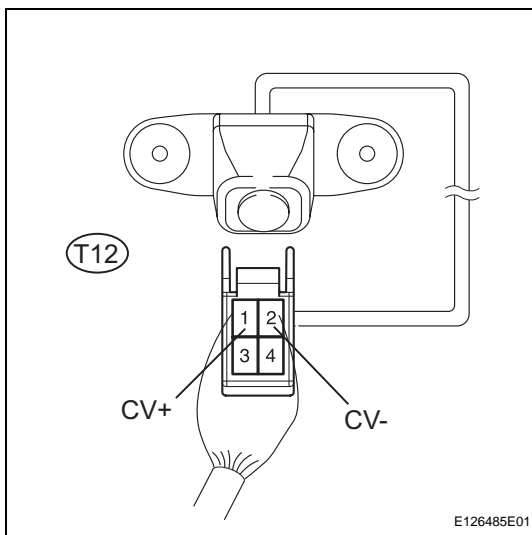
I102047E02

### 1 CHECK TELEVISION CAMERA ASSEMBLY

(a) Check the waveform of the camera using an oscilloscope.

**OK:**

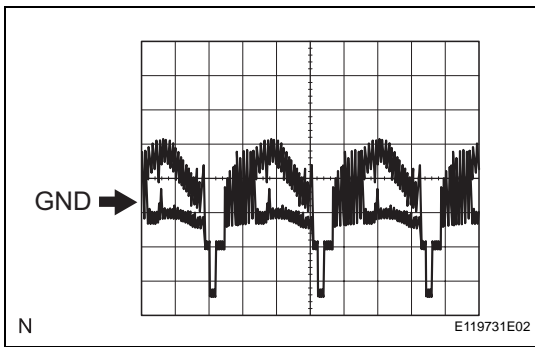
**Waveform is as shown in the illustration.**



E126485E01

Item	Content
Tester Connection	CV+ (T12-2) - CV- (T12-1)
Tool Setting	0.2 V/DIV., 0.2 μsec./DIV.
Condition	Power switch ON (IG), shift lever R position

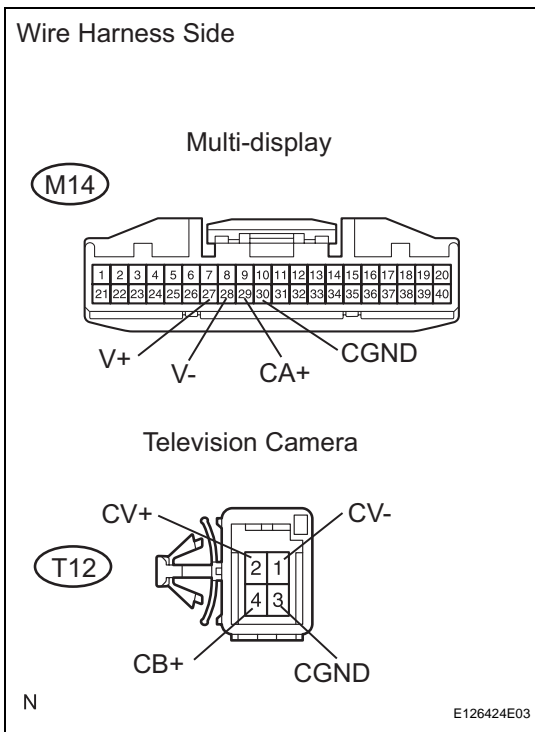
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**NG** REPAIR TELEVISION CAMERA ASSEMBLY

**OK**

**2 CHECK WIRE HARNESS (MULTI-DISPLAY - TELEVISION CAMERA)**



- (a) Disconnect the M14 display connector.
- (b) Disconnect the T12 camera connector.
- (c) Measure the resistance of the wire harness side connectors.

**Standard resistance**

Tester Connection	Specified Condition
M14-29 (CA+) - T12-4 (CB+)	Below 1 Ω
M14-30 (CGND) - T12-3 (CGND)	Below 1 Ω
M14-27 (V+) - T12-2 (CV+)	Below 1 Ω
M14-28 (V-) - T12-1 (CV-)	Below 1 Ω
M14-29 (CA+) - Body ground	10 kΩ or higher
M14-27 (V+) - Body ground	10 kΩ or higher
M14-28 (V-) - Body ground	10 kΩ or higher

**OK**

**NG** REPAIR OR REPLACE HARNESS AND CONNECTOR

**PROCEED TO NEXT INSPECTION PROCEDURE SHOWN IN PROBLEM SYMPTOMS TABLE**

PM