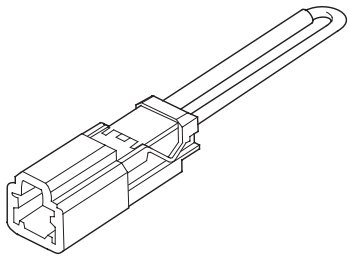
22B

Navigation System

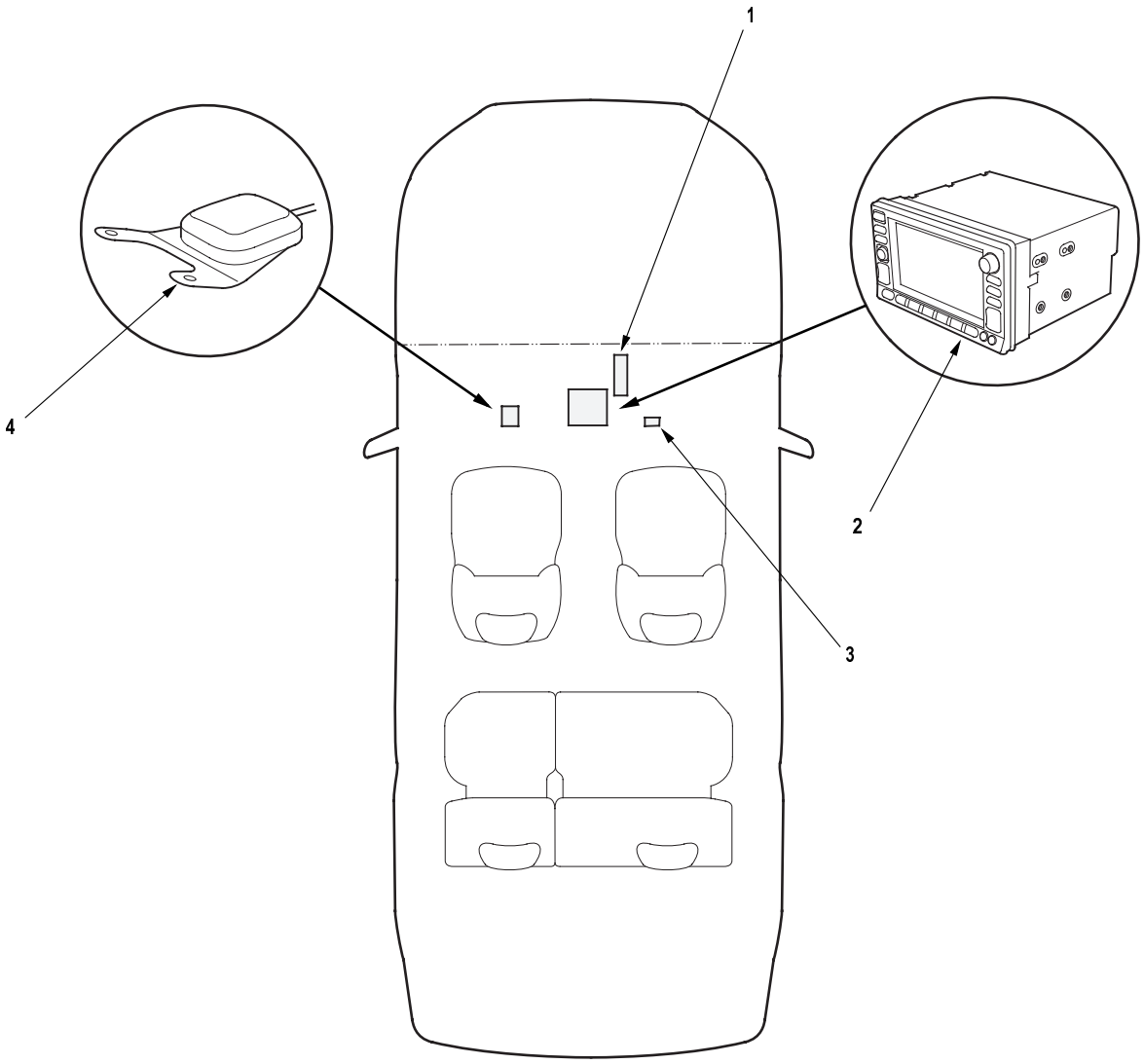
Special Tools

Ref. No.	Tool Number	Description	Qty
1	07PAZ-0010100	SCS Short Connector	1



1

Component Location Index



1	PCM (For Vehicle Speed Pulse (VSP))	
2	AVN UNIT	Removal/Installation, page 22B-26
3	NAVIGATION SERVICE CHECK CONNECTOR	Forced starting of display, page 22B-25
4	GPS ANTENNA	Removal/Installation, page 22B-26

General Troubleshooting Information

General Operation

Refer to the Honda Navigation System Owner's manual for the navigation system operating procedures.

Anti-theft Feature

The navigation system has a coded theft protection circuit. Be sure to get the customer's five-digit security code number before;

- disconnecting the battery
- disconnecting navigation unit connector A (12P)
- removing the No. 9 (10A) fuse from the under-hood fuse/relay box

After service, reconnect power to the navigation unit, and turn the ignition switch ON (II). Enter the five-digit security code.

When replacing the navigation unit, be sure to give the customer the new anti-theft security code.

Symptom Diagnosis

Certain circumstances and system limitations will result in occasional vehicle positioning errors. Some customers may think this indicates a problem with the navigation system when, in fact, the system is normal. Keep the following items in mind when interviewing customers about navigation system symptoms.

Self-Inertial Navigation Limitations

The limitations of the self-inertial portion of the navigation system (the yaw rate sensor and the vehicle speed signal) can cause some discripancies between the vehicle's actual position and the indicated vehicle position (GPS vehicle position). However, if GPS signals cannot be received, you must tune the vehicle position manually.

The following circumstances may cause vehicle positioning errors:

- Moving the vehicle with the engine stopped, such as by ferry or tow truck, or if the vehicle is spun on a turn table
- Tire slippage, changes in tire rolling diameters, and some driving situations may cause discrepancies in travel distances. Examples of this include:
  - Continuous tire slippage on a slippery surface
  - Driving with snow chains mounted
  - Abnormal tire pressure
  - Incorrect tire size
  - Frequent lane changes across a wide highway
  - Continuous driving on a straight or gently curving highway
- Tolerances in the system and map inaccuracies sometimes limit how precisely the vehicle position is indicated. Examples of this include:
  - Driving on roads not shown on the map (map matching is not possible)
  - Driving on a road that winds in one derection, such as a loop bridge, an interchange, or a spiral parking garage
  - Driving on a road with a series of sharp hair-pin turns
  - Driving on one of two close parallel roads
  - After making many 90 degree turns

Global Positioning System (GPS) Limitations

The GPS cannot detect the vehicle's position during the following instances:

- For the first 5 to 10 minutes after reconnecting the battery
- When the satellite signals are blocked by tall building, mountains, tunnels, large trees, or large trucks
- When the GPS antenna is blocked by something on the dashboard
- When there is no satellite signal output (Signal output is sometimes stopped for satellite servicing)
- When the satellite signals are blocked by the operation of some electronic after market accessories.

The accuracy of GPS is reduced during these instances:

- When only two satellite signals can be received (Three satellite signals are required for accurate positioning)
- When the satellite control centers are experiencing problems

LCD Display Unit Limitations

- In cold temperatures, the display may stay dark for the first 2 or 3 minutes until it warms up.
- When the display is too hot because of direct summer sunlight, it will remain dark until the temperature drops.
- When the humidity is high and the interior temperature is low, the display may appear cloudy. The display will clear up after some use.

Symptom Duplication

- When the symptom can be duplicated, follow the self-diagnostic procedures (picture diagnosis mode) and the appropriate troubleshooting procedures.
- When the symptom does not reappear or only reappears intermittently, ask the customer about the conditions when the symptom occured.
  - Try to establish if outside interference may have been the cause.
  - Try to duplicate the symptom under the same conditions the customer was experiencing.
  - Vibration, temperature extremes, and moisture (dew, humidity) are factors that are difficult to duplicate.

Service Precautions

- Before disconnecting the battery, make sure you have the anti-theft codes for the radio and the navigation system, and write down the frequencies for the radio's preset buttons.
- After servicing, park the vehicle in an area where the GPS satellite signals will be unobstructed, and check the satellite mark on the display.
- When the battery is disconnected, the clock is reset to "0:00''. The clock will reset to the correct time after the system receives the GPS satellite signals.
- After reconnecting the battery, you have to wait to get the initial signal from the satellite. It will take about ten minutes.

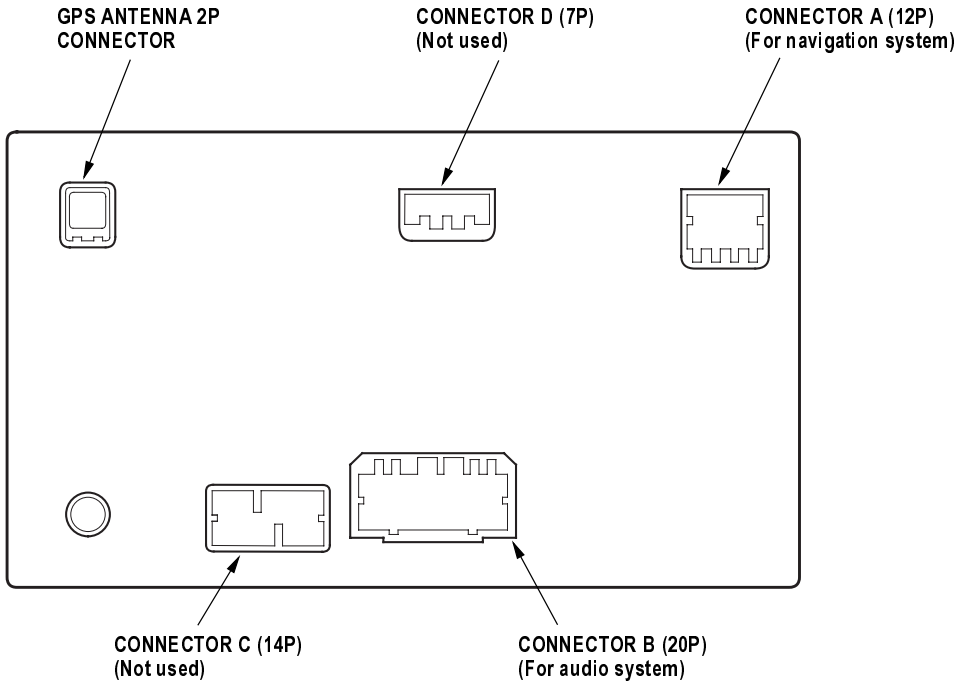
Symptom Troubleshooting Index

Symptom	Diagnostic procedure	Also check for
No picture is shown on the display	Troubleshooting (see page 22B-16)	
The picture is missing a color or tone	Troubleshooting (see page 22B-17)	
AVN unit buttons do not work	Replace the AVN unit.	
Satellite mark in the GPS mark is not indicated	Troubleshooting (see page 22B-18)	Electronic after market accessories
Audio driving instructions cannot be heard	Troubleshooting (see page 22B-18)	Vehicle position does not move on the map
Vehicle position does not move on the map	Troubleshooting (see page 22B-19)	

System Description

Connector Locations

AVN unit



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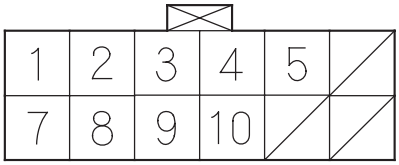
System Description (cont'd)

AVN Unit Inputs and Outputs for Connector A (12P)

AVN UNIT CONNECTOR A (12P)

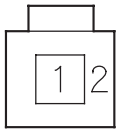


Wire side of female terminals

Terminal number	Wire color	Terminal	Terminal name	Description
1	WHT/RED	+B	+B power source	Continuous power source
2	YEL/RED	ACC	Accessory	Power source for accessory
3	WHT/BLU	CHG	Charge	Engine ON signal
4	BLK	GND	Ground	Ground for AVN unit
5	RED/BLK	ILL (+)	Illumination positive	Power source for illumination
7	GRN/BLK	BACK LT	Back light	Reverse signal of select lever
8	BLU/WHT	VSP	Vehicle speed pulse	Vehicle speed pulse signal
9	GRN/RED	DIAG (+)	Diagnosis positive	Signal for forced starting of display
10	GRN/YEL	DIAG (-)	Diagnosis negative	Signal for forced starting of display

AVN Inputs and Outputs for GPS antenna 2P Connector

GPS ANTENNA 2P CONNECTOR



Wire side of female terminals

Terminal number	Wire color	Terminal	Terminal name	Description
1	——	GPS	GPS	GPS signal
2	——	GPS GND	GPS ground	Ground for GPS antenna

(cont'd)

System Description (cont'd)

Overview

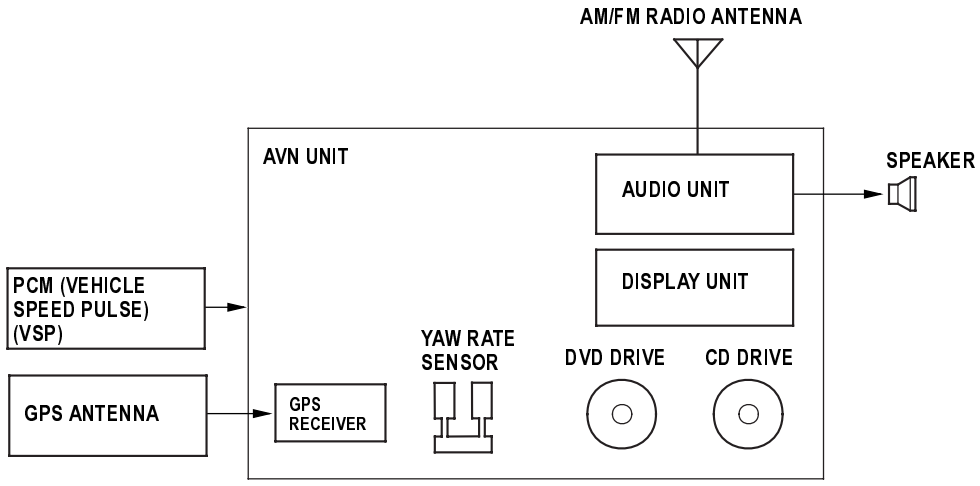
The Honda Navigation System is a highly-sophisticated, hybrid locating system that uses satellites and a map database to show you where you are and to help guide you to a desired destination.

The Navigation System receives signals from the Global Positioning System (GPS), a network of 24 satellites in orbit around the earth. By receiving signals from serveral of these satellites, the Navigation System can determine the latitude and longitude of the vehicle. In addition, signals from the system's yaw rate sensor and the vehicle speed pulse (VSP) sensor enable the system to keep track of the vehicle's direction and speed of travel.

This hybrid system has advantages over a system that is either entirely self-contained or one that relies totally on the GPS. For example, the self-contained portion of the system can keep track of vehicle position even when satellite signals cannot be received, and the GPS can keep track of the vehicle position even when the vehicle is transported by ferry.

The Navigation System applies all this location, direction, and speed information to the maps and calculates a route to the destination entered. As you drive to that destination, the system provides both visual and audio guidance.

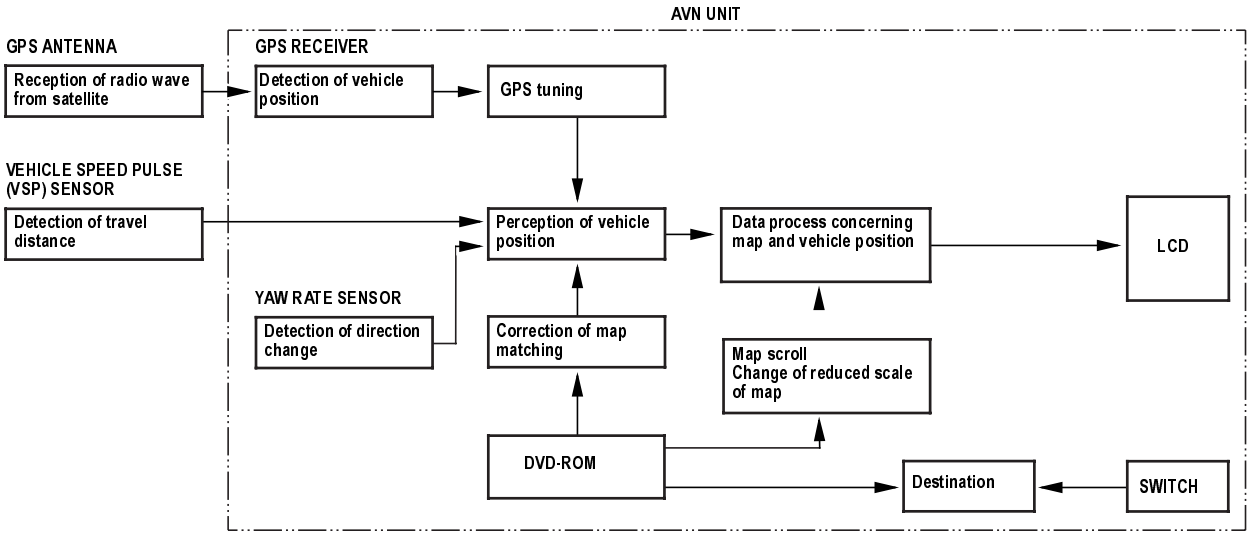
System Diagram



Navigation Function

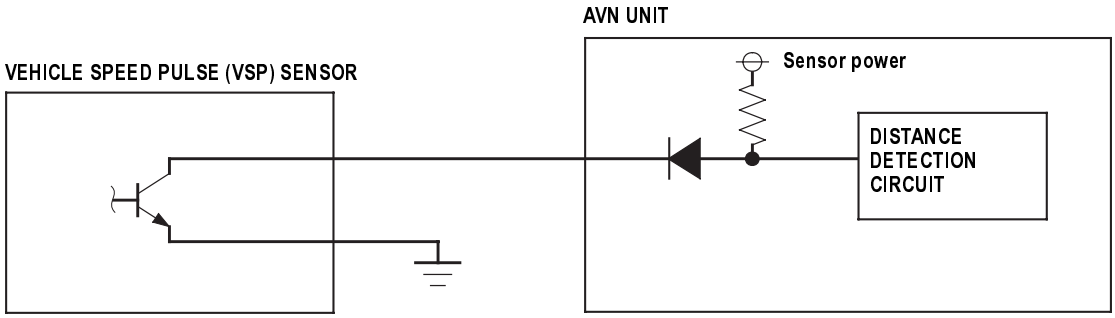
The navigation system is composed of the AVN unit, the PCM vehicle speed pulse (VSP) signal, the GPS antenna.

Function Diagram



Vehicle Speed Pulse (VSP)

The vehicle speed pulse (VSP) is outputted by the PCM. The PCM recieves the signal from the countershaft speed sensor, then the PCM prosesses the signal and transmits it to the speedometer and other systems.



Yaw Rate Sensor

The yaw rate sensor detects the direction change (angular speed) of the vehicle. The sensor is oscillation gyro built into the AVN unit.

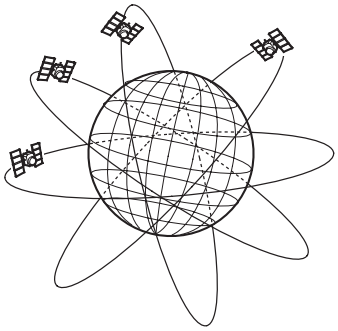
(cont'd)

System Description (cont'd)

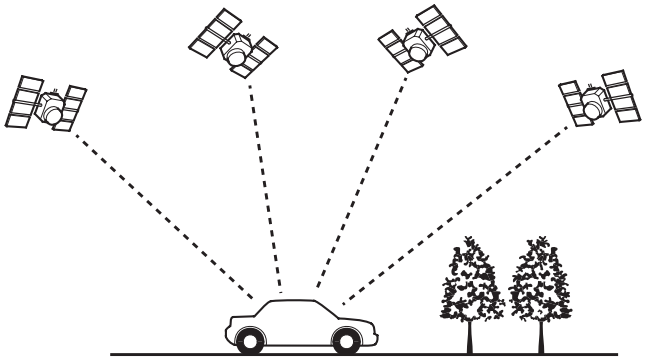
Global Positioning System (GPS)

The Global Positioning System (GPS) enables the navigation system to determine the current position of the vehicle by using the electronic waves transmitted from the satellites in orbit around the earth. The satellites transmit the satellite identification signal, orbit information, transmission time signal, and other information. When the GPS receiver receives the electronic waves from three or more satellites simultaneously, it calculates the current position of the vehicle based on the distance to each satellite and the satellite positions on their respective orbits.

Position detection Image with GPS satellite



NOTE: Four satellites on each of six orbits



Precision of GPS

The precision of the GPS varies according to the number of satellites from which electronic waves are received and the control condition. The precision is indicated by the GPS mark shown on the upper left of the display.

GPS MARK	No. of SATELLITES	CONDITION	DESCRIPTION
No satellite mark → 	Two or less	Impossible to detect vehicle position	The GPS function is normal. The satellite electronic waves that are received by the GPS receiver are to few to determine the vehicle position.
Yellow satellite mark → 	Three	Vehicle position detectable in two dimensions	The longitude and latitude of the vehicle position can be determined. (Less precise than detection in three dimensions)
Green satellite mark → 	Four or more	Vehicle position detectable in three dimensions	The longitude, latitude and the altitude of the vehicle position can be determined. (More precise than detection in two dimensions)
Not indicate	——	Faulty	The GPS can't be used due to a faulty GPS receiver, open in the antenna wire, or other fault.

GPS Antenna

Receiving the electronic waves from the satellites, the GPS antenna amplifies and transmits them to the GPS receiver.

GPS Receiver

The GPS receiver is built in to AVN unit. It calculates the vehicle position by receiving the signal from the GPS antenna. The vehicle position and signal reception condition is transmitted from the GPS receiver to the AVN unit to adjust the vehicle position.

AVN Unit

The AVN unit calculates the vehicle position and guides you to the destination. The unit performs map matching correction, GPS correction, and distance tuning. It also controls the menu functions and the DVD-ROM drive. With control of all these items, the AVN unit makes the navigation picture signal, then it transmits the signal to the display unit and audio driving instructions to the audio unit.

Calculation of Vehicle Position

The AVN unit calculates the vehicle position (the driving direction and the current position) by receiving the directional change signals from the yaw rate sensor and the travel distance signals from the vehicle speed pulse (VSP) sensor.

Map Matching Tuning

The map matching tuning is accomplished by indicating the vehicle position on the roads on the map. The map data transmitted from the DVD-ROM is checked against the vehicle position data, and the vehicle position is indicated on the nearest road. Map matching tuning does not occur when the vehicle travels on a road not shown on the map, or when the vehicle position is far away from a road on the map.

GPS Tuning

The GPS tuning is accomplished by indicating the vehicle position as the GPS's vehicle position. The AVN unit compares its calculated vehicle position data with the GPS vehicle position data. If there is large difference between the two, the indicated vehicle position is adjusted to the GPS vehicle position.

Distance Tuning

The distance tuning reduces the difference between the travel distance signal from the VSP and the distance data on the map. The AVN unit compares its calculated vehicle position data with the GPS vehicle position data. The AVN unit then decreases the tuning value when the vehicle position is always ahead of the GPS vehicle position, and it increases the tuning value when the vehicle position is always behind the GPS vehicle position.

Route Guidance

The AVN unit can calculate different routes to a selected destination. You have four options:

- Direct Route - Calculate a route that is the most direct and will take the least time.
- Easy Route - Calcute a route that minimizes the number of turns needed.
- Minimize Motorways - Calculate a route that avoids motorway travel. If that is not possible, keep the amount of motorway travel to a minimum.
- Minimize Toll Roads - Calculate a route that avoids, or minimizes travel on toll roads.

Audio Guidance

The AVN unit transmits audio driving instructions before entering an intersection or passing a junction.
The audio instructions come through audio unit and the front speakers.

DVD-ROM

The map data (including all scale rates) is stored in the DVD-ROM. The map data includes:

- Road distances, road widths, speed limits, traffic regulations, passing time at junction, distances to junctions, and the driving instructions for audio guidance.
- Latitude and longitude GPS.

(cont'd)

System Description (cont'd)

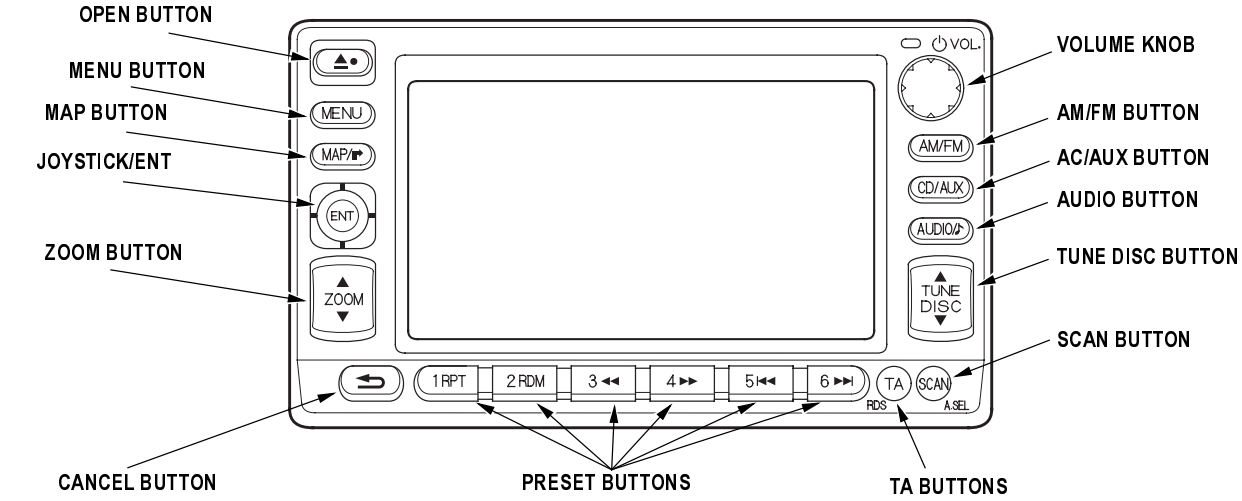
Audio Unit

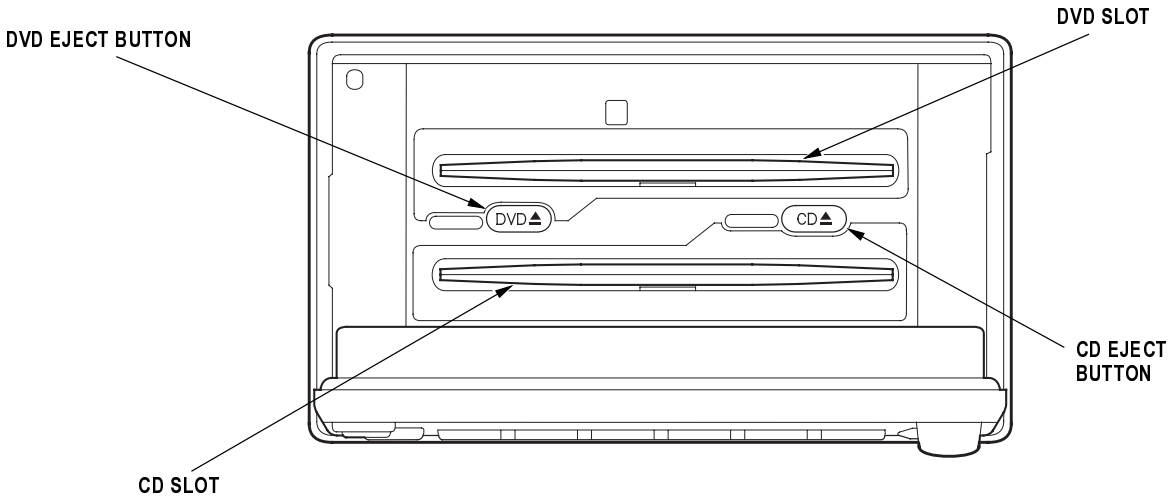
The audio unit built in the AVN unit. It receives the audio driving instructions from the navigation unit and transmits the instructions through the front speakers even when the audio system is in use.

Display Unit

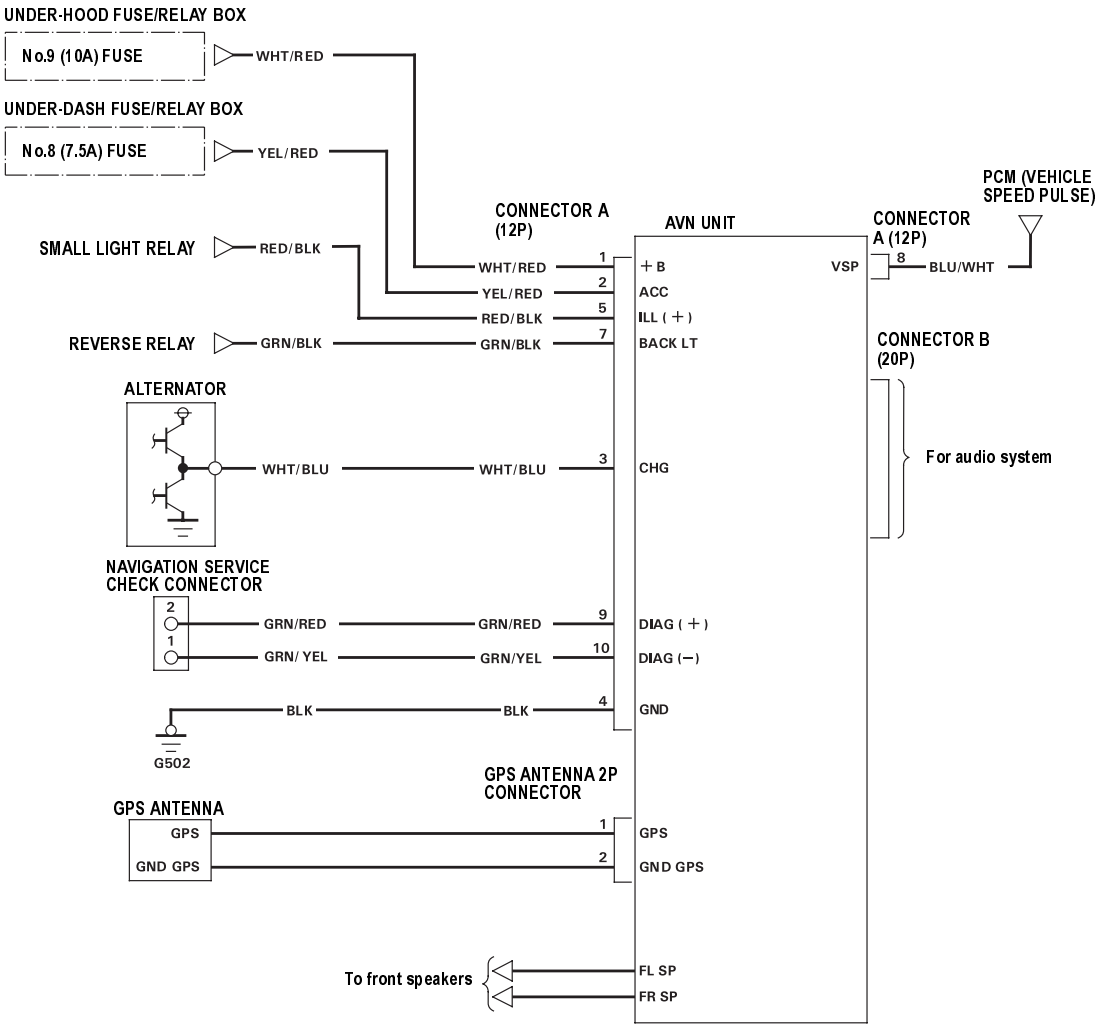
The display unit built in the AVN unit. It uses Liquid Crystal Display (LCD). The LCD is a 6-inch-wide, Thin Film Transistor (TFT), stripe type with about 280,000 picture elements. The color film and fluorecent light are laid out on the back of the liquid crystal film.

Operation keys

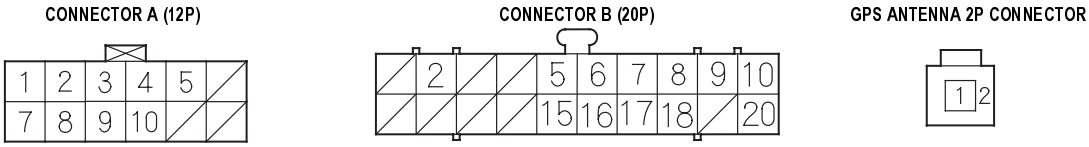




Circuit Diagram



AVN UNIT CONNECTORS



Wire side of female terminals

Symptom Troubleshooting

No picture is shown on the display

1. Check the No. 9 (10A) fuse in the under-hood fuse/relay box.

Is the fuse OK?

Yes Reinstall the fuse, and go to step 2.

No Replace the fuse, and recheck.■

2. Check the No. 8 (7.5A) fuse in the under-dash fuse/relay box.

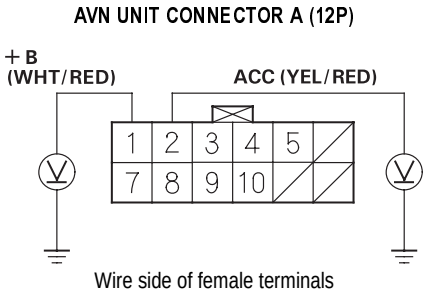
Is the fuse OK?

Yes Reinstall the fuse, and go to step 3.

No Replace the fuse, and recheck.■

3. Turn the ignition switch ON (II).

4. Measure the voltage between body ground and AVN unit connector A (12P) terminals No. 1 and No. 2 individually.

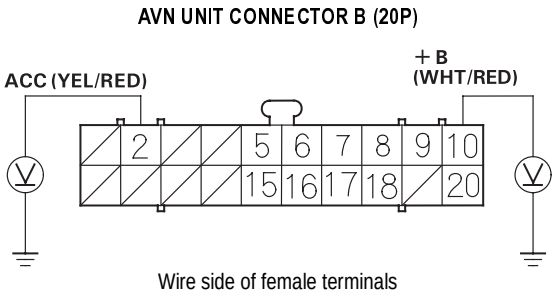


Is there battery voltage?

Yes Go to step 5.

No Repair open in the wire between the fuse/relay box and the AVN unit.■

5. Measure the voltage between body ground and AVN unit connector B (20P) terminals No. 2 and No. 10.



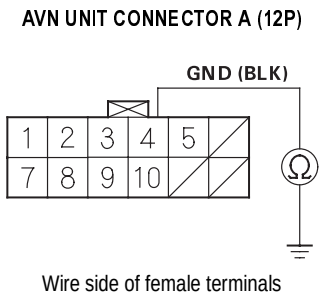
Is there battery voltage?

Yes Go to step 6.

No Repair open in the wire between the fuse/relay box and the AVN unit.■

6. Turn the ignition switch OFF.

7. Check for continuity between AVN unit connector A (12P) terminal No. 4 and body ground.

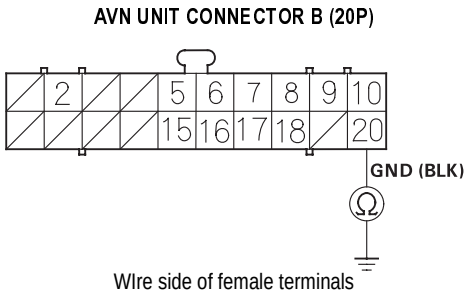


Is there continuity?

Yes Go to step 8.

No Repair open in the wire between the AVN unit and body ground (G502).■

8. Check for continuity between AVN unit connector B (20P) terminal No. 20 and body ground.



Is there continuity?

Yes Go to step 9.

No Repair open in the wire between the AVN unit and body ground (G502).■

9. Perform the forced starting of display (see page 22B-25).

Is the diagnosis menu of the picture diagnosis displayed?

Yes Perform the System Links Test in the Picture Diagnosis Test menu (see page 22B-20).■

No Replace the AVN unit.■

The picture is missing a Red, Green or Blue color or tone

1. Perform the start-up procedure (see page 22B-20). Select the Monitor Check then select the RGB Color (see page 22B-21).

Are the Red, Green, and Blue colored circles shown?

Yes Select the Return. Select the Color Change, and then Select the Default to restore the standard color settings.■

No Replace the AVN unit.■

Symptom Troubleshooting (cont'd)

Satellite mark in the GPS mark is not indicated

1. Perform the System Link check under the picture diagnosis (see page 22B-20).

   Is "NG" indicated?

   Yes Repair as indicated by the system link check.■

   No Check that nothing is blocking the GPS antenna located under the dash board, and recheck where nothing can block the GPS satellite signal.■

Audio driving instructions cannot be heard

1. Check the audio driving instructions volume setting.

   Is it set to OFF?

   Yes Set the volume to an audible level.■

   No Go to step 2.

2. Perform the System Link check under the picture diagnosis (see page 22B-20).

   Can the sound be heard?

   Yes The system is OK at this time.■

   No Go to step 3.

3. Check for open and short to body ground in the speaker circuits.

   Are the circuits OK?

   Yes Go to step 4.

   No Repair open or short to body ground in the wire speaker circuits.■

4. Check the speaker.

   Is the speaker OK?

   Yes Replace the AVN unit.■

   No Replace the speaker.■

Vehicle position does not move on the map

1. Start the engine.
2. Perform the Car Status Test under the Picture Diagnosis Test menu (see page 22B-20).

   Is there vehicle speed pulse signal?

   Yes Replace the AVN unit.■

   No Check the VSP circuit. If the circuit is OK, replace the AVN unit.■

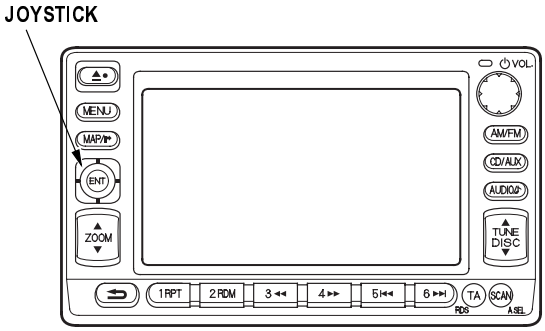
Picture Diagnosis Test

Start-up procedure

1. Turn the ignition switch ON (II), then press and hold the keys in this order: (1) Key 1, (2) Key 2, (3) Key 6, and keep them pressed simultaneously for 5 seconds.

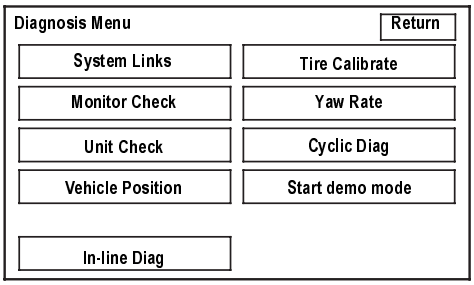
Operation keys

Joystick: Use for select the item



2. After the display changes to the diagnosis menu screen, select the item you want to check, and the check will start. To return to previous screen, select ”Return” on the diagnosis screen.

   When you quit picture diagnosis test, return to standard nevigation screen and then turn the ignition switch OFF. If you turn the ignition switch OFF when the diagnosis screen displayed, the system will not work.



Diagnosis items:

- System Links
- Tire Calibrate
- Monitor Check
- Yaw Rate
- Unit Check
- Cyclic Diag
- Vehicle Position
- Start demo mode
- In-line Diag

Cyclic Diag

This test is for manufacturer’s use only. In this test, the system checks the following items repeatedly:

- AVN unit check
- Monitor check

To exit this test, press the cancel key.

Vehicle Position

When moving the vehicle with the engine stopped such as ferry or tow truck and vehicle positioning error occured, you can adjust the vehicle position using the joystick.

Start demo mode

This test is for manufacturer’s use only. If the indication of this item is changed to ”Stop demo mode”, select this item once and make sure the indication changes to ”Start demo mode”.

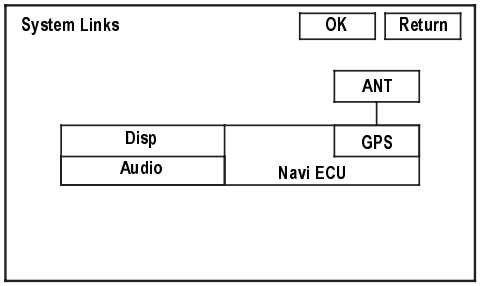
In-line Diag

This test is for manufacturer’s use only. In this test, the system checks the following items:

- System Links
- Car status
- Yaw Rate

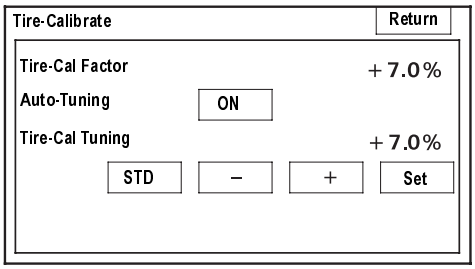
System Links

- If the system is OK, all of the communication lines connecting the components color will not change, the screen will indicate ”OK”, and a tone will sound.
- If there is a problem in the system, the faulty components will change to red, the screen will indicate ”NG”, and tone will sound.
- If the ”GPS” is in red and the screen indicates ”NG”, check the GPS communication line. If the line is OK, replace the GPS antenna.
- If the component exept ”GPS” is in red and the screen indicates ”NG”, replace the AVN unit.



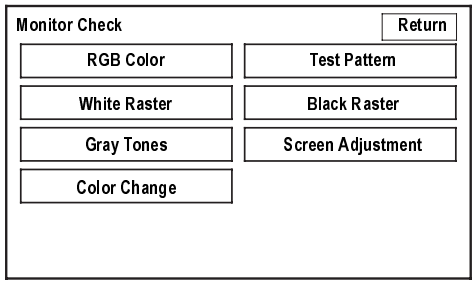
Tire Calibrate

- The ”Auto-Tuning” is factory-set to ”ON”, and it should remain ON. If you find it has been turned OFF, turn it back ON.
- The ”Tire-Cal Tuning” can be used, but it is not recommended. The ”AUTO TUNING” fanction keeps the system in better tune.



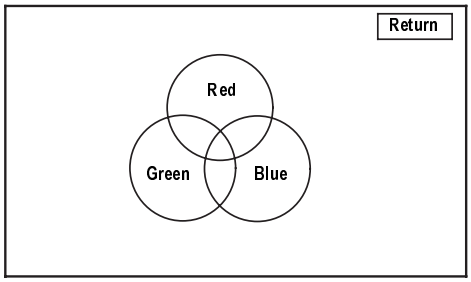
Monitor Check

Select the item you want to check, and the check starts.



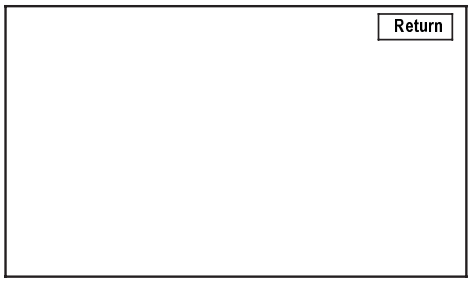
RGB Color

The three primary colors of red, green and blue must be shown.



White Raster

The entire display must be in white.

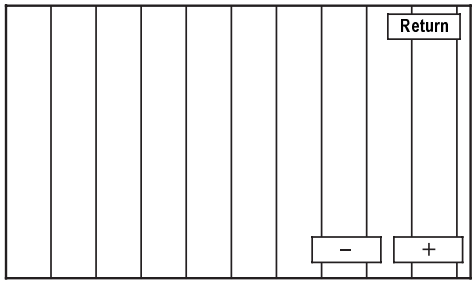


(cont’d)

Picture Diagnosis Test (cont'd)

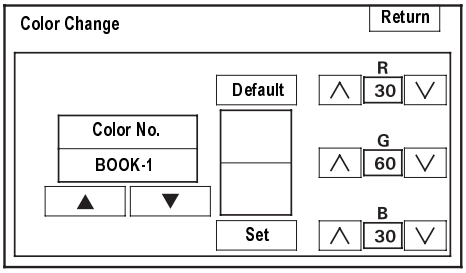
Gray Tones

The gray tone level must be changed smoothly in holyzontal direction. If you want to change the contrast of the screen, select "+" or "-".



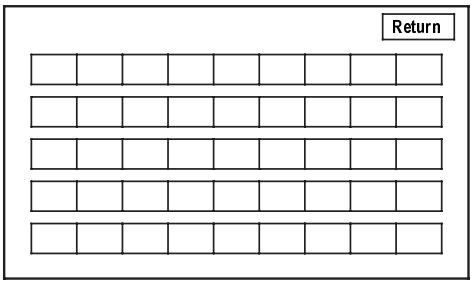
Color Change

This screen is for manufacturer's only.



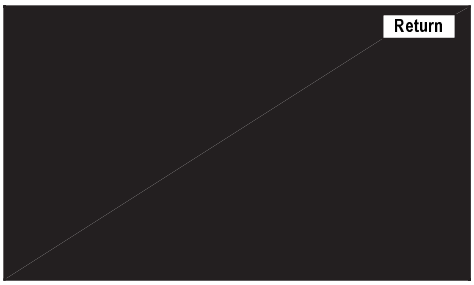
Test Pattern

The system color palette must be indicated.



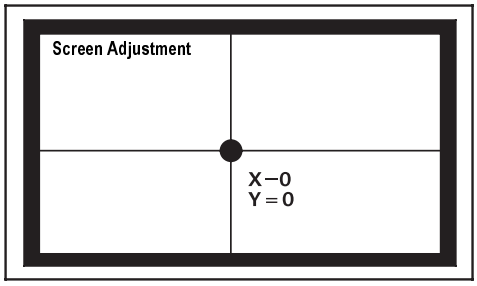
Black Raster

The entire display must be shown in black.



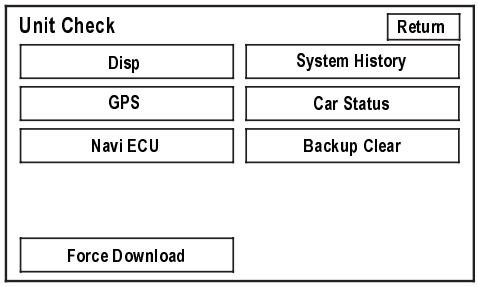
Screen Adjustment

In this screen, you can adjust the screen position in the display. Use the joystick to adjust the screen position.



Unit Check

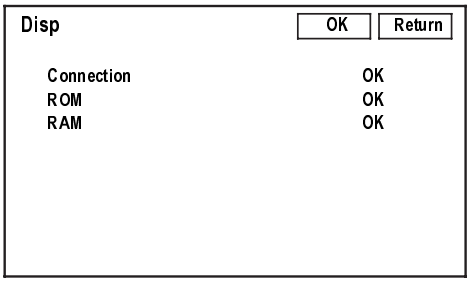
Select the item you want to check, and the check starts.



NOTE: Do not use ”Backup Clear” and ”Force Download”. These commands are for the manufacturer’s use only.

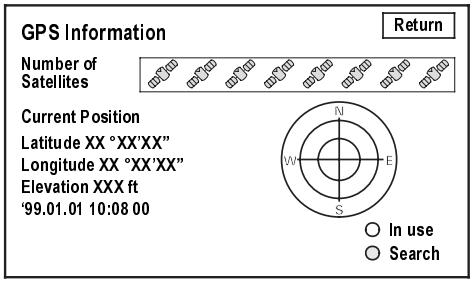
Disp

When any item is ”NG”, replace the AVN unit.



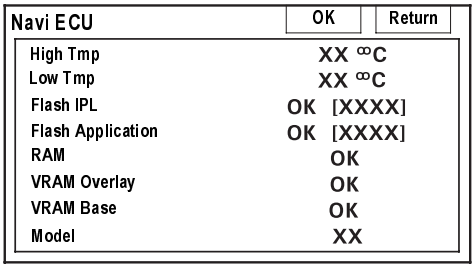
GPS

This screen shows the condition of the GPS reception and the vehicle position.



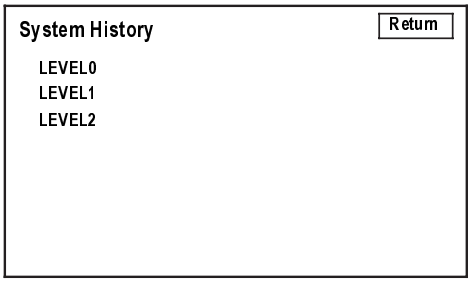
Navi ECU

When any item is ”NG”, replace the AVN unit.



System History

This screen is for manufacturer’s use only.



(cont’d)

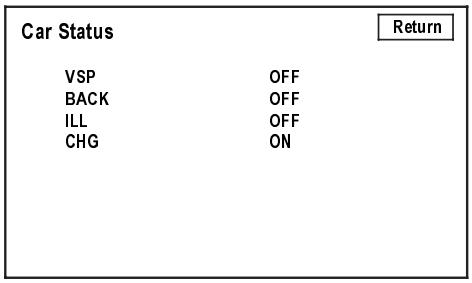
Picture Diagnosis Test (cont'd)

Car Status

Use the car status screen to check each signal.

If the indication does not match the actual vehicle status, check the applicable signal line.

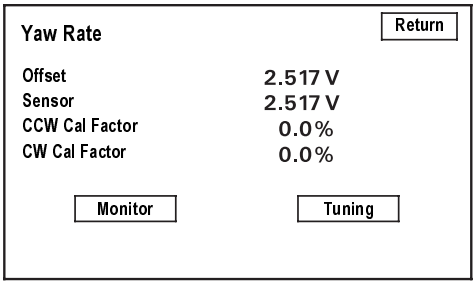
- "VSP" (vehicle speed pulse indication)
  - "OFF" when vehicle is not moving
  - "ON" when vehicle is moving
- "BACK" (reverse indication)
  - "OFF" when shift lever is in any position other than reverse
  - "ON" when shift lever is in reverse
- "ILL" (illumination indication)
  - "OFF" when parking lights or headlights are off
  - "ON" when parking lights or headlights are on
- "CHG" (charging indication)
  - "ON" when engine is running and alternator is charging
  - "OFF" when engine is off or alternator is not charging



Yaw Rate

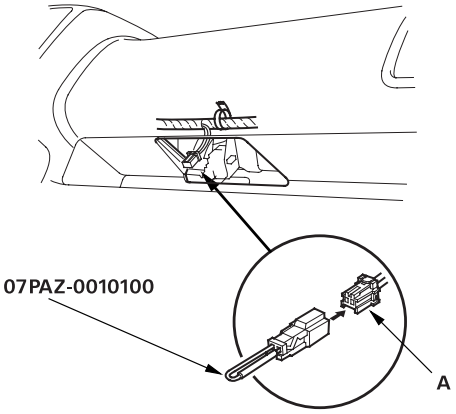
"SENSOR" indicator the voltage output from the yaw rate sensor. It should indicate 1,500 to 3,500 V with the vehicle stopped.

NOTE: Do not try to tune the yaw rate sensor unless instructed by Honda Motor Europe.

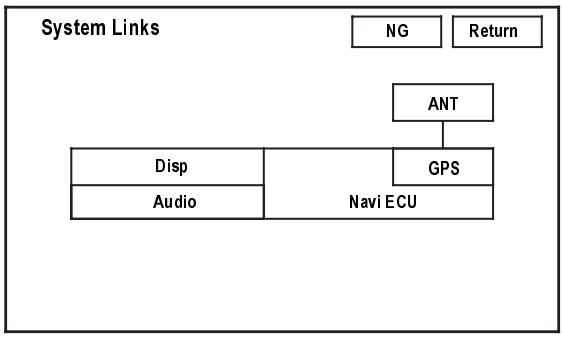


Forced Starting of Display

1. Locate the navigation service check connector (A) upper of the data link connector.



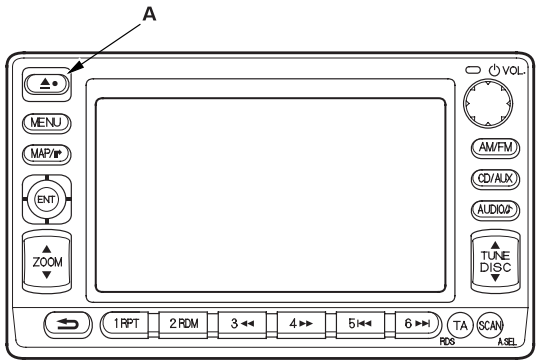
2. Connect the SCS short connector to the navigation service check connector (A).
3. Turn the ignition switch ON (II).



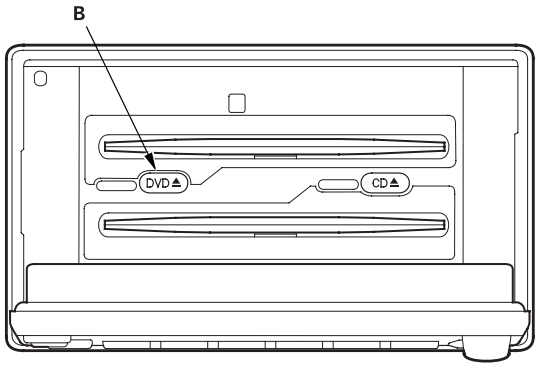
4. Check that the diagnosis menu for the picture diagnosis start up and then changes to the system link screen.

DVD-ROM Replacement

1. Turn the ignition switch ON (II).
2. Push the open key (A) of the AVN unit, then open the front panel.



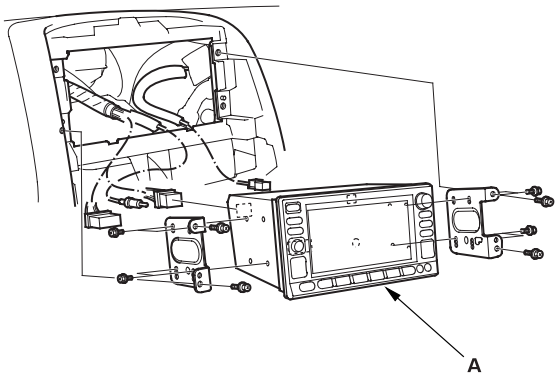
3. Push the DVD EJECT switch (B), then remove the DVD-ROM.



4. Insert the new DVD-ROM.
5. Close the front panel.

AVN Unit Removal/Installation

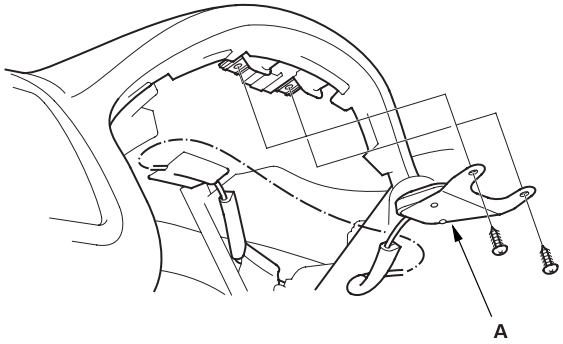
1. Remove the center panel (see page 20-89).
2. Remove the AVN unit (A).



3. Install the parts in the reverse order of removal.

GPS Antenna Removal/Installation

1. Remove the gauge assembly (see page 22A-74).
2. Remove the GPS antenna (A).



3. Install the parts in the reverse order of removal.

Clock Display Size and Location Adjustment

1. Turn the ignition switch ON (II).
2. When the disclaimer is shown on the navigation display unit, select ”OK.”
3. When the ”Enter destination by:” screen is shown, select ”Setup.”
4. When the ”Setup Screen” is shown, select Display ”Off.”
5. Select the numbers of the clock to change the clock size and location.
   - If the clock is small and in the lower right hand corner of the screen, it will increase in size and move to the center of the screen.
   - If the clock is large and in the center of the screen, it will decrease in size and move to the lower right hand corner of the screen.
6. Push the MENU button to return to the ”Enter destination by:” screen. The clock display settings will be saved.