

04-03 SYMPTOM TROUBLESHOOTING

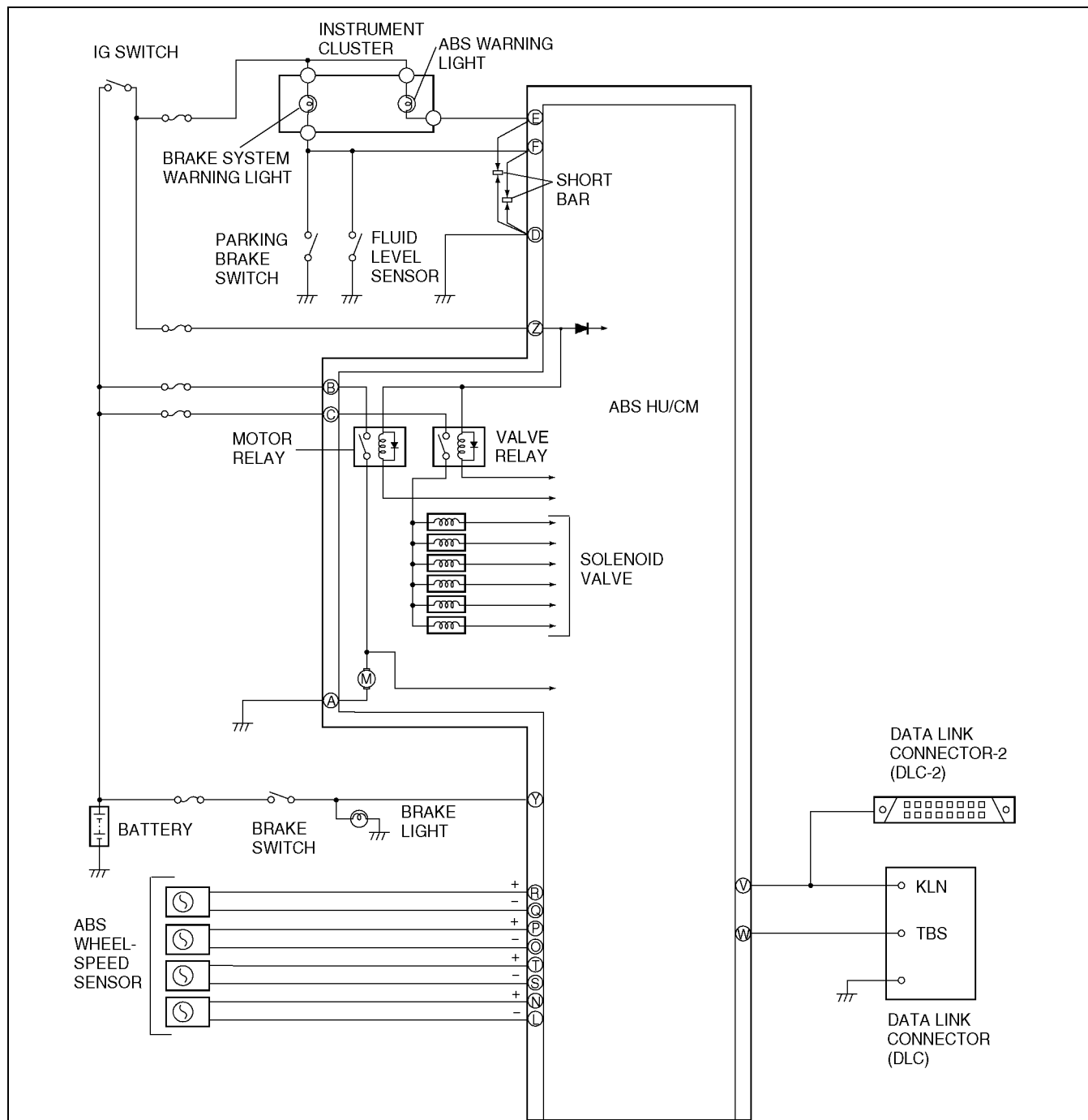
ABS SYSTEM DIAGRAM	04-03-1
FOREWORD	04-03-2
PRECAUTION	04-03-2
SYMPTOM TROUBLESHOOTING	04-03-3
Quick Diagnosis Chart	04-03-3
NO.1 ABS WARNING LIGHT OR BRAKE SYSTEM WARNING LIGHT DOES NOT ILLUMINATE WITH IGNITION SWITCH ON	04-03-3

NO.2 ABS WARNING LIGHT OR BRAKE SYSTEM WARNING LIGHT STAYS ON MORE THAN 4 SECONDS WITH IGNITION SWITCH ON.....	04-03-4
NO.3 THERE IS A MALFUNCTION IN THE SYSTEM EVEN THOUGH ABS WARNING LIGHT AND BRAKE SYSTEM WARNING LIGHT INDICATES THAT THE SYSTEM IS NORMAL	04-03-7

ABS SYSTEM DIAGRAM

A5U040343000W01

04-03



A5U0402W002

SYMPTOM TROUBLESHOOTING

FOREWORD

A5U040343000W02

- Before performing the steps in Symptom Troubleshooting, perform the On-board Diagnostic Inspection. To check the DTC, follow the DTC Inspection steps.

PRECAUTION

A5U040343000W03

When inspecting or servicing the ABS, note the following points:

- The ABS warning light illuminates even when the system is normal.

Cases	Remedy	ABS control when warning light illuminates
Under the following conditions: When the rear wheels are jacked up, stuck, or placed on a chassis roller, and only the rear wheels' ABS wheel speed sensors are spun for more than 20 seconds at more than 12 km/h {7.4 mph} .	After turning ignition switch (engine switch) off, vehicle is driven at speed greater than 12 km/h {7.4 mph} and normal operation is confirmed.	If ABS is operating, stop control after operation. If ABS is not operating, stop control immediately.
Parking brake is not fully released while driving.		
Brake drag.		
Sudden acceleration/deceleration.		
Left/right or front/rear tires are different. (Size, radius, tire pressure, or wear is other than that listed on tire label.)		
Battery voltage at ABS HU/CM ignition terminal Z drops below about 10 V. (*1)	Battery voltage rises above about 10 V.	Stop control.
Battery voltage at ABS HU/CM ignition terminal Z rises above about 17 V. (*2)	Battery voltage drops below about 17 V.	

*1 : If battery voltage drops **below about 10 V** while vehicle speed is **greater than 6 km/h {3.7 mph}**, ABS HU/CM records **DTC B1318 (DTC 63)**.

*2 : If battery voltage rises **above about 17 V** while vehicle speed is **greater than 6 km/h {3.7 mph}**, ABS HU/CM records **DTC B1318 (DTC 63)**.

2. Precautions during servicing of ABS

The ABS is composed of electrical and mechanical parts. It is necessary to categorize malfunctions as being either electrical or hydraulic when performing troubleshooting.

- Malfunctions in electrical system
 - The ABS control module (ABS HU/CM) has an on-board diagnostic function. With this function, the ABS warning light will come on when there is a problem in the electrical system. Also, past and present malfunctions are recorded in the ABS HU/CM. This function can find malfunctions that do not occur during periodic inspections. Turn the ignition switch (engine switch) to ON position, shorting the TBS terminal and the GND terminal of the data link connector, or connecting the WDS or equivalent, and **approximately 5 seconds** later the stored malfunctions will be displayed in the order of occurrence. To find out the causes of ABS malfunctions, use these on-board diagnostic results.
 - If a malfunction occurred in the past but is now normal, the cause is likely a temporary poor connection of the harness. The ABS HU/CM usually operates normally. Be careful when searching for the cause of malfunction.
 - After repair, it is necessary to erase the DTC from the ABS HU/CM memory. Also, if the ABS related parts have been replaced, verify that the no DTC has been displayed after repairs.
 - After repairing the ABS wheel-speed sensor or ABS sensor rotor, or after replacing the ABS HU/CM (ABS motor or ABS motor relay or solenoid valve), the ABS warning light may not go off even when the ignition switch (engine switch) is turned to ON position. In this case, drive the vehicle at a speed of **more than 12 km/h {7.4 mph}**, make sure the ABS warning light goes off, and then erase the DTC.
 - When repairing, if the ABS related connectors are disconnected and the ignition switch (engine switch) is turned to ON position, the ABS HU/CM will mistakenly detect a fault and record it as a malfunction.
 - To protect the ABS HU/CM, make sure the ignition is off before connecting or disconnecting the ABS HU/CM connector.
- Malfunctions in hydraulic system
 - Symptoms in a hydraulic system malfunction are similar to those in a conventional brake malfunction. However, it is necessary to determine if the malfunction is in an ABS component or the conventional brake system.
 - The ABS hydraulic unit contains delicate mechanical parts. If foreign materials get into the component, the ABS may fail to operate. Also, it will likely become extremely difficult to find the location of the malfunction in the event that the brakes operate but the ABS does not. Make sure foreign materials do not get inside when servicing the ABS (e.g. brake fluid replacement, pipe removal).

SYMPTOM TROUBLESHOOTING

SYMPTOM TROUBLESHOOTING

A5U040343000W04

Verify the symptom, and perform troubleshooting according to the appropriate number.

No.	Symptom
1	ABS warning light or BRAKE system warning light does not illuminate with ignition switch on.
2	ABS warning light or BRAKE system warning light stays on more than 4 seconds with ignition switch on.
3	There is a malfunction in the system even though ABS warning light and BRAKE system warning light indicates that the system is normal.

Quick Diagnosis Chart

x : Applicable

Possible factor		Troubleshooting Item													
		ABS CM	Instrument cluster	ABS warning light circuit	BRAKE system warning light circuit	Battery	Charging system	Instrument cluster power supply (1C Terminal)	ABS CM Power supply (Terminal Z)	ABS CM GND 1 (Terminal D)	Brake fluid	Brake fluid level sensor	Parking brake switch	Conventional brakes	Brake pipe routing
1	ABS warning light or BRAKE system warning light does not illuminate with ignition switch on.	×	×	×	×			×							
2	ABS warning light or BRAKE system warning light stays on more than 4 seconds with ignition switch on.	×	×	×	×	×	×	×	×	×	×	×	×		
3	There is a malfunction in the system even though ABS warning light and BRAKE system warning light indicate that the system is normal.	×												×	×

Z5U0403W101

NO.1 ABS WARNING LIGHT OR BRAKE SYSTEM WARNING LIGHT DOES NOT ILLUMINATE WITH IGNITION SWITCH ON

A5U040343000W05

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

1	ABS warning light or BRAKE system warning light does not illuminate with ignition key on.
[TROUBLESHOOTING HINTS]	
<ul style="list-style-type: none"> ABS warning light circuit open or shorted to ground. BRAKE system warning light circuit open or shorted to ground. 	

Diagnostic procedure

STEP	INSPECTION	ACTION
1	CHECK TO SEE WHETHER MALFUNCTION IS IN COMMON POWER SUPPLY FOR ABS WARNING LIGHT OR OTHER WARNING LIGHTS Do either of the following warning lights illuminate when ignition key is turned to ON position? <ul style="list-style-type: none"> Air bag system warning light Generator warning light 	Yes Go to step 4.
		No Go to next step.

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION	ACTION
2	INSPECT INSTRUMENT CLUSTER POWER SUPPLY FUSE Is instrument cluster ignition power supply fuse okay?	Yes Go to next step.
		No Check for a short to ground on blown fuse's circuit. Repair or replace as necessary. Install appropriate amperage fuse.
*3	INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER POWER SUPPLY AND INSTRUMENT CLUSTER FOR VOLTAGE Turn ignition key to ON position. Measure voltage at instrument cluster connector terminal 1C. Is voltage approximately 12 V ?	Yes Inspect ABS warning light circuits in instrument cluster (open circuit in instrument cluster).
		No Repair wiring harness between fuse block and instrument cluster (Terminal 1C).
4	CHECK FOR OPEN CIRCUIT IN ABS HU/CM Do ABS warning light and BRAKE system warning light illuminate when the ignition key is at ON position and the ABS HU/CM is disconnected?	Yes Go to next step.
		No Go to Step 6.
5	CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER ABS HU/CM IS CONNECTED Reconnect ABS HU/CM. Do ABS warning light and BRAKE system warning light illuminate when the ignition key is at ON position?	Yes Temporary poor connection at ABS HU/CM connector Terminals E and F. Inspect ABS HU/CM connector and Terminals E and F.
		No Replace ABS HU/CM (open circuit in ABS HU/CM).
6	INSPECT EACH WARNING LIGHT BULB Remove instrument cluster. Inspect each warning light bulb. Are they okay?	Yes Go to next step.
		No Replace malfunction warning light bulb.
*7	CHECK TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN WIRING HARNESS (BETWEEN INSTRUMENT CLUSTER AND ABS HU/CM) OR INSTRUMENT CLUSTER Caution <ul style="list-style-type: none"> • Attach a wire to the tester lead to avoid damaging the ABS HU/CM terminal. Disconnect ABS HU/CM connector and instrument cluster connectors. Is there continuity between instrument cluster connector terminals 1D and 3C and ABS HU/CM connector terminals E and F?	Yes Replace instrument cluster (open circuit in instrument cluster).
		No Repair wiring harness between instrument cluster and ABS HU/CM (Terminal E or terminal F).

NO.2 ABS WARNING LIGHT OR BRAKE SYSTEM WARNING LIGHT STAYS ON MORE THAN 4 SECONDS WITH IGNITION SWITCH ON

A5U040343000W06

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

2	ABS warning light or BRAKE system warning light stays on more than 4 seconds with ignition switch on.
[TROUBLESHOOTING HINTS] <ul style="list-style-type: none"> • ABS HU/CM detects ABS system malfunction • ABS HU/CM detects low voltage in power supply (ABS HU/CM ignition terminal Z voltage is below about 9.4 V or above about 17.4 V) • ABS HU/CM does not operate • ABS warning light circuit shorted to ground • BRAKE system warning light circuit shorted to ground 	

Diagnostic procedure

STEP	INSPECTION	ACTION
1	INSPECT BRAKE FLUID LEVEL Is brake fluid level okay?	Yes Go to next step.
		No Add brake fluid.

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION		ACTION
2	INSPECT ABS HU/CM IGNITION POWER SUPPLY FUSE Is ABS HU/CM power supply fuse okay?	Yes	Go to next step.
		No	Check for a short to ground on blown fuse's circuit. Repair or replace as necessary. Install appropriate amperage fuse.
3	INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC (DATA LINK CONNECTOR) FOR CONTINUITY OR SHORTS Perform DTC inspection. Is error message displayed regarding communication between ABS HU/CM and WDS or equivalent?	Yes	Go to next step.
		No	If a communication error message is displayed even after inspecting according to procedures displayed on the WDS or equivalent, go to Step 7.
4	CHECK FOR DTCS IN ABS HU/CM Have DTCs been recorded in memory?	Yes	Perform inspection using appropriate DTC.
		No	Go to next step.
5	INSPECT PID/DATA IN ABS HU/CM Inspect the following items using WDS or equivalent PID/DATA monitor function. <ul style="list-style-type: none">• ABS_LAMP (ABS warning light)• ABS_BOLT (power supply voltage) Is ABSLAMP ON after more than 4 seconds with ignition switch to ON position?	Yes	Go to next step.
		No	ABS system is normal.
6	INSPECT ABS HU/CM IGNITION POWER SUPPLY SYSTEM (TERMINAL Z) Check the voltage for PID/DATA monitor ABS_BOLT item. Specification: above 10 V Is voltage within specification?	Yes	Go to Step 17.
		No	Go to next step.
7	INSPECT BATTERY Is battery voltage normal?	Yes	If a communication error message is displayed on WDS or equivalent in Step 2 inspection, go to next step. If a communication error message is not displayed on WDS or equivalent in Step 2 inspection, go to Step 10.
		No	Perform inspection of battery and charging system.
8	VERIFY THAT ABS HU/CM IS CONNECTED Is ABS HU/CM securely connected?	Yes	Go to Step 10.
		No	Connect ABS HU/CM connector securely, then go to next step.
9	CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER ABS HU/CM IS CONNECTED Do ABS warning light and BRAKE system warning light go out after more than 4 seconds with ignition switch at ON position?	Yes	Temporary poor connection in ABS HU/CM connector. Inspect connector and terminal.
		No	Go to next step.
*10	VERIFY THAT ABS HU/CM CONNECTOR TERMINALS Z AND D ARE CONNECTED Does malfunction symptom reoccur when ABS HU/CM connector terminals Z and D are shaken while the ignition switch is at ON position?	Yes	Connect ABS HU/CM connector terminals Z and D securely, then go to next step.
		No	Go to Step 12.
11	CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER ABS HU/CM CONNECTOR TERMINALS Z AND D ARE CONNECTED Do ABS warning light and BRAKE system warning light go out after more than 4 seconds with ignition switch at ON position?	Yes	Temporary poor connection at terminal. Inspect ABS HU/CM connector and terminal.
		No	Go to next step.

04-03

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION	ACTION	
*12	INSPECT WIRING HARNESS BETWEEN FUSE BLOCK AND ABS HU/CM (TERMINAL Z) FOR VOLTAGE Caution <ul style="list-style-type: none"> • Attach a wire to the tester lead to avoid damaging the ABS HU/CM terminal. <p>Turn ignition switch to LOCK position. Disconnect ABS HU/CM connector. Is voltage approximately 12 V at ABS HU/CM terminal Z?</p>	Yes	Go to next step.
		No	Repair wiring harness between fuse block and ABS HU/CM (Terminal Z).
*13	INSPECT WIRING HARNESS BETWEEN ABS HU/CM (TERMINAL D) AND GROUND FOR CONTINUITY Caution <ul style="list-style-type: none"> • Attach a wire to the tester lead to avoid damaging the ABS HU/CM terminal. <p>Is there continuity between ABS HU/CM connector terminal D and ground?</p>	Yes	If a communication error message is displayed on WDS or equivalent tester in Step 2 inspection, go to next step. If a communication error message is not displayed on WDS or equivalent tester in Step 2 inspection, recheck malfunction symptoms.
		No	Repair wiring harness between ABS HU/CM (terminal D) and ground.
*14	INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC (DATA LINK CONNECTOR) FOR CONTINUITY Caution <ul style="list-style-type: none"> • Attach a wire to the tester lead to avoid damaging the ABS HU/CM terminal. <p>Is there continuity between ABS HU/CM connector terminal V and data link connector (DLC)?</p>	Yes	Go to next step.
		No	Repair wiring harness between ABS HU/CM (Terminal V) and data link connector (DLC).
*15	INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC (DATA LINK CONNECTOR) FOR SHORT TO B+ Caution <ul style="list-style-type: none"> • Attach a wire to the tester lead to avoid damaging the ABS HU/CM terminal. <p>Turn ignition switch to ON position. Is voltage approximately 12 V at ABS HU/CM connector terminal V?</p>	Yes	Repair wiring harness between ABS HU/CM (Terminal V) and data link connector (DLC).
		No	Go to next step.
*16	INSPECT WIRING HARNESS BETWEEN ABS HU/CM AND DLC (DATA LINK CONNECTOR) FOR SHORT TO GROUND Caution <ul style="list-style-type: none"> • Attach a wire to the tester lead to avoid damaging the ABS HU/CM terminal. <p>Is there continuity between ABS HU/CM connector terminal V and ground?</p>	Yes	Repair wiring harness between ABS HU/CM (Terminal V) and data link connector (DLC).
		No	Replace ABS HU/CM (communication circuit or ABS HU/CM power supply circuit malfunction in ABS HU/CM).
17	VERIFY THAT ABS HU/CM CONNECTOR TERMINALS E AND F ARE CONNECTED <p>Does malfunction symptom happen again when ABS HU/CM connector terminals E and F are shaken while the ignition switch is ON position?</p>	Yes	Connect ABS HU/CM connector terminals E and F securely, then go to next step.
		No	Go to Step 18.
18	CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT REOCCUR AFTER ABS HU/CM CONNECTOR TERMINALS E AND F ARE CONNECTED <p>Do ABS warning light and BRAKE system warning light go out after more than 4 seconds with ignition switch to ON position?</p>	Yes	Temporary poor connection at terminal. Inspect ABS HU/CM connector and terminal.
		No	Go to next step.

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION	ACTION
*19	CHECK TO SEE WHETHER MALFUNCTION IS IN INSTRUMENT CLUSTER (SHORT TO GROUND) OR ELSEWHERE Disconnect all instrument cluster connectors. Is there continuity between instrument cluster connector terminals 1D or 3C and ground?	Yes If there is continuity between terminal 1D and ground: Go to next step. If there is continuity between terminal 3C and ground: Go to Step 21.
		No Replace instrument cluster (short to ground circuit in instrument cluster).
*20	INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND ABS HU/CM FOR SHORT TO GROUND Disconnect ABS HU/CM. Insert insulating material between terminals E and D of ABS HU/CM connector so short bar cannot function. Is there continuity between instrument cluster connector terminal 1D and ground?	Yes Repair wiring harness between ABS HU/CM (Terminal E) and instrument cluster.
		No Replace ABS HU/CM (short to ground or B+ circuit in ABS HU/CM).
21	INSPECT WIRING HARNESS BETWEEN INSTRUMENT CLUSTER AND ABS HU/CM FOR SHORT TO GROUND Disconnect ABS HU/CM. Insert insulating material between terminals F and D of ABS HU/CM connector so short bar cannot function. Is there continuity between instrument cluster connector terminal 3C and ground?	Yes Repair wiring harness between ABS HU/CM (Terminal F) and instrument cluster.
		No Replace ABS HU/CM (short to ground or B+ circuit in ABS HU/CM).

04-03

NO.3 THERE IS A MALFUNCTION IN THE SYSTEM EVEN THOUGH ABS WARNING LIGHT AND BRAKE SYSTEM WARNING LIGHT INDICATES THAT THE SYSTEM IS NORMAL

A5U040343000W07

3	There is a malfunction in the system even though ABS warning light and Brake system warning light indicate that the system is normal.
[TROUBLESHOOTING HINTS] There is a mechanical malfunction in system.	

Diagnostic procedure

STEP	INSPECTION	ACTION
1	CHECK FOR DTCS IN ABS HU/CM Have DTCs been recorded in memory?	Yes Perform inspection using appropriate DTC.
		No Go to next step.
2	INSPECT ABS HYDRAULIC UNIT Perform "ABS hydraulic unit system inspection".	Yes Inspect conventional brake system.
		No If wheels do not rotate: Replace ABS HU/CM. If wheels rotate but order in which wheels rotate is incorrect: Inspect brake pipe passage to ABS HU/CM.