

ANTI-LOCK BRAKE SYSTEM

1988 Toyota Celica

1987-91 BRAKE SYSTEMS
Toyota Anti-Lock Brakes

Camry, Celica, Cressida, Supra

DESCRIPTION

The anti-lock brake system consists of hydraulic unit, brake actuator, three 3-position solenoids, pump motor, deceleration sensor (Camry All-Trac & Celica All-Trac), anti-lock brake (ABS) computer and 3 speed sensors (Cressida & Supra), 4 speed sensors (all other models). On Cressida and Supra, speed sensor for rear wheels is located on the transmission.

An indicator light "ANTILOCK" is located on the instrument panel in the combination meter. The indicator light comes on for 3 seconds as a bulb test when ignition is turned on. A primary check is performed after each engine start and initial vehicle speed exceeds 4 MPH. An actuator noise is heard as vehicle speed exceeds 4 MPH, this is normal. If brake pedal is depressed before vehicle exceeds 4 MPH, the primary check will not occur until brake pedal is released.

OPERATION

Under normal driving conditions, the anti-lock brake system functions as a standard brake system. With detection of wheel lock-up, short pedal pulsations occurring in rapid succession will be felt in brake pedal. Pedal pulsation will continue until there is no longer a need for anti-lock function or until vehicle is stopped. Maintaining a constant force on the pedal provides shortest stopping distance.

DESCRIPTION OF DIAGNOSTIC SYSTEM

If a malfunction occurs, the diagnostic system will identify the problem and the computer will store trouble codes. When a malfunction is detected the "ANTILOCK" warning light will illuminate in the combination meter. If 2 codes are detected by the computer, the code having the smallest number will be identified first.

Camry, Camry All-Trac, Celica and Celica All-Trac models have a separate diagnostic system for speed sensors and sensor rotors. Camry All-Trac and Celica All-Trac models also have a separate diagnostic system for deceleration sensor. These systems diagnose only faults with a particular sensor from other ABS failures. During diagnosis start with "ANTILOCK" LIGHT SEQUENCE DIAGNOSTIC PROCEDURE.

PRE-DIAGNOSIS INSPECTION

Perform a comprehensive visual inspection on system components which could create an apparent anti-lock system malfunction. Performing this inspection of system prior to diagnosing specific symptoms may result in isolation of a simple failure which may cause an inoperative system.

"ANTILOCK" LIGHT SEQUENCE DIAGNOSTIC PROCEDURE

1) Ensure battery voltage is 12 volts. Turn ignition switch to "ON" position. "ANTILOCK" warning light should illuminate, then go

out after 3 seconds. If warning light does not illuminate, check fuse, bulb, and wiring harness.

2) Turn ignition switch to "ON" position. On Celica models (except All-Trac), remove control relay bolt and control relay. On Camry, Camry All-Trac, Celica All-Trac, Cressida and Supra, disconnect actuator check connector. Actuator check connector is located near brake actuator in rear of vehicle on Celica All-Trac models. On Celica models (except All-Trac), disconnect check connector from control relay. See Fig. 1.

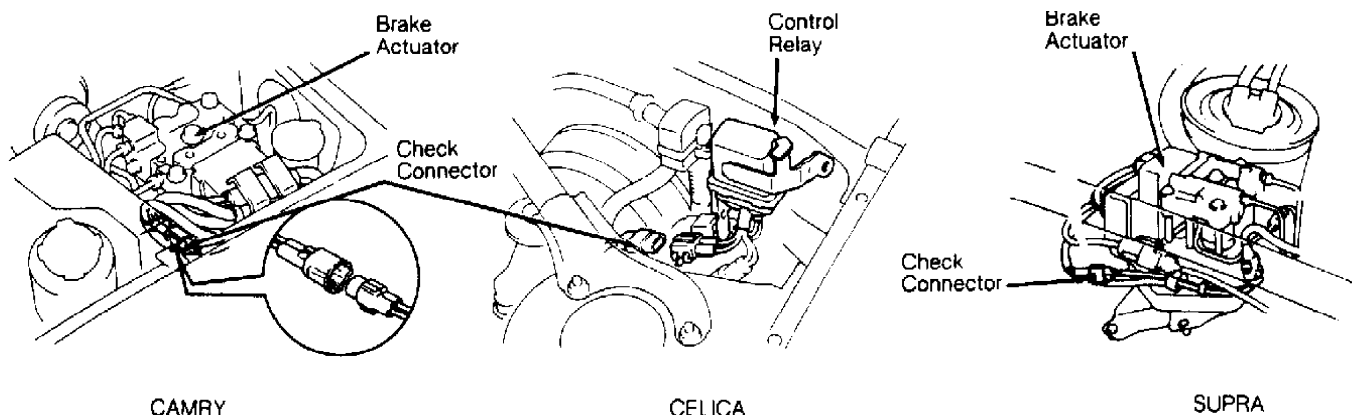


Fig. 1: Actuator Check Connector Location on Brake Actuator
Courtesy of Toyota Motor Sales, U.S.A., Inc.

3) To enter diagnostics on Cressida, leave ignition switch "ON". If switch is turned "OFF" computer memory will be erased. Connect terminals No. E1 and Tc of the diagnostic communication link. See Fig. 2.

4) If a malfunction is detected 4 seconds after the check connector is disconnected, the "ANTILOCK" light will begin to flash a 2 digit code. The first number of blinks will equal the first digit in a code. After a 1.5 second pause, the second number of blinks will equal the second digit in a code.

5) If 2 or more codes are stored, there will be a 4.5 second pause between each code. If the ABS system is functioning properly, the "ANTILOCK" light will blink once every .5 second.

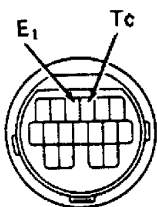
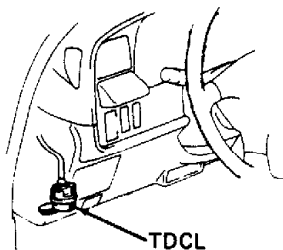


Fig. 2: Toyota Diagnostic Communication Link (TDCL)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

6) After repairing malfunctioning components, clear diagnostic codes. If a battery cable was disconnected during repairs, all codes will be erased. If battery cable was not disconnected during repairs, turn ignition on.

7) With actuator check connector disconnected and vehicle stopped, depress brake pedal 8 or more times within 3 seconds. Check that "ANTILOCK" light shows normal code (light blinking every .5 second). Connect check connector. Ensure warning light is out. On Celica models (except Celica All-Trac), install control relay and relay bolt.

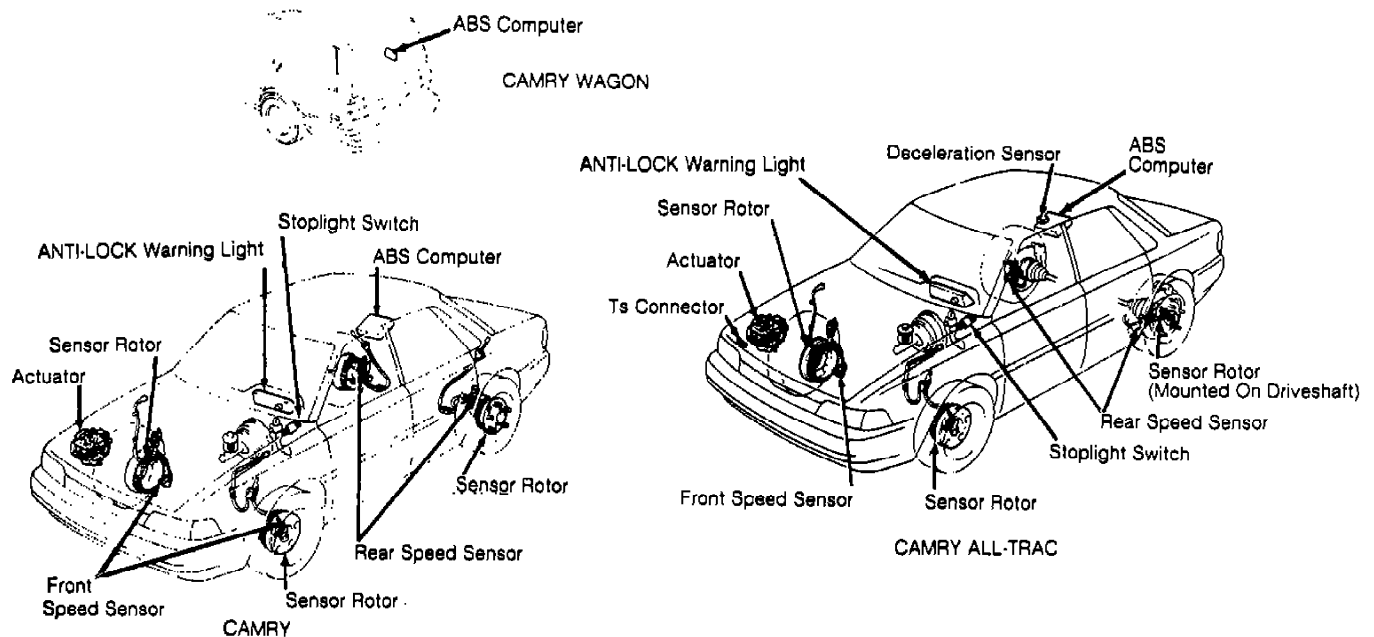


Fig. 3: Camry ABS Component Location
Courtesy of Toyota Motor Sales, U.S.A., Inc.

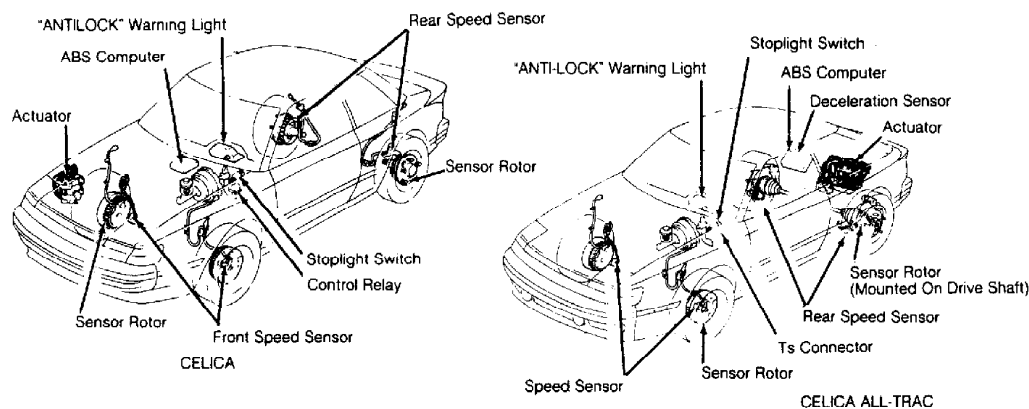


Fig. 4: Celica ABS Component Location
Courtesy of Toyota Motor Sales, U.S.A., Inc.

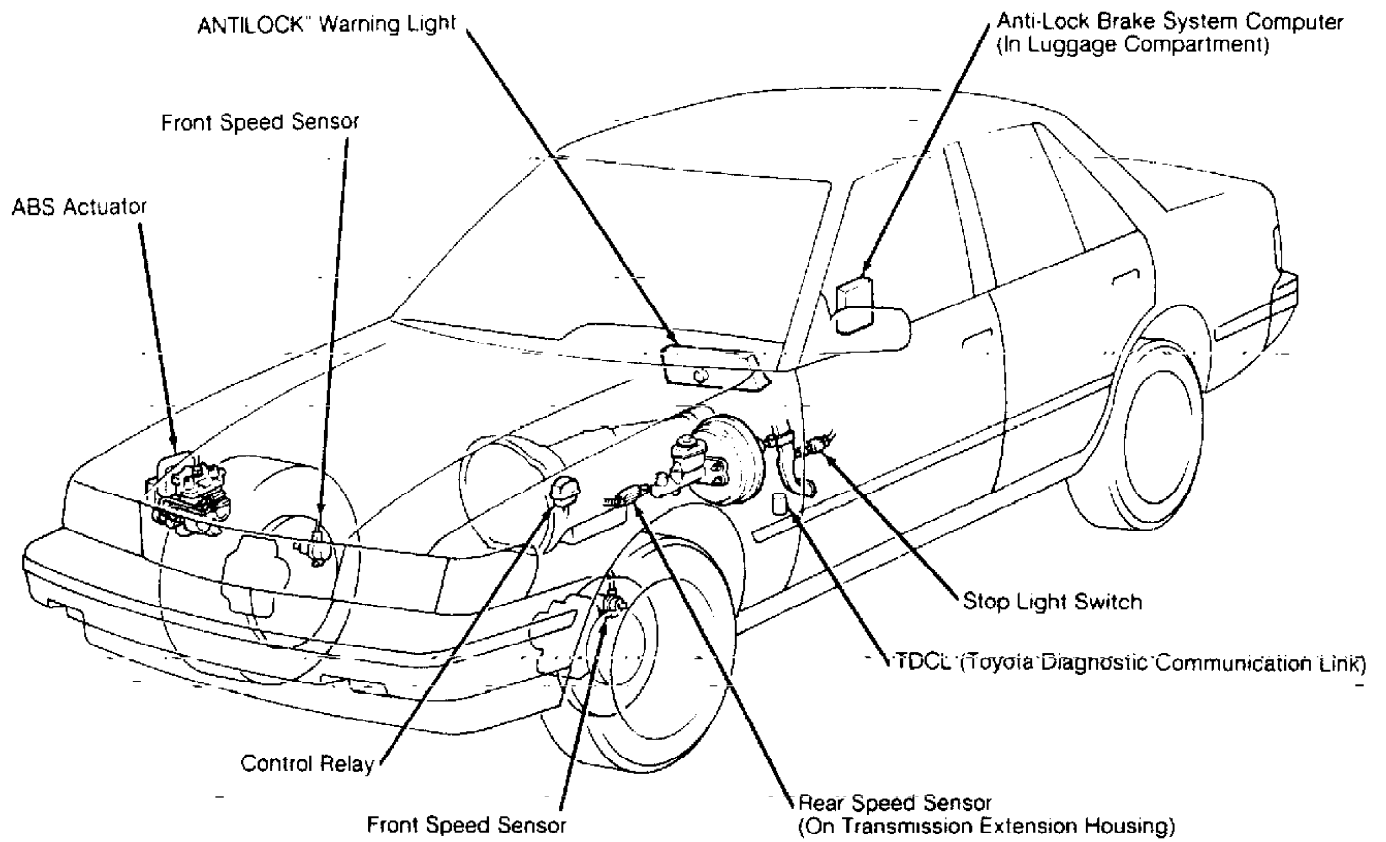


Fig. 5: Cressida ABS Component Location
Courtesy of Toyota Motor Sales, U.S.A., Inc.

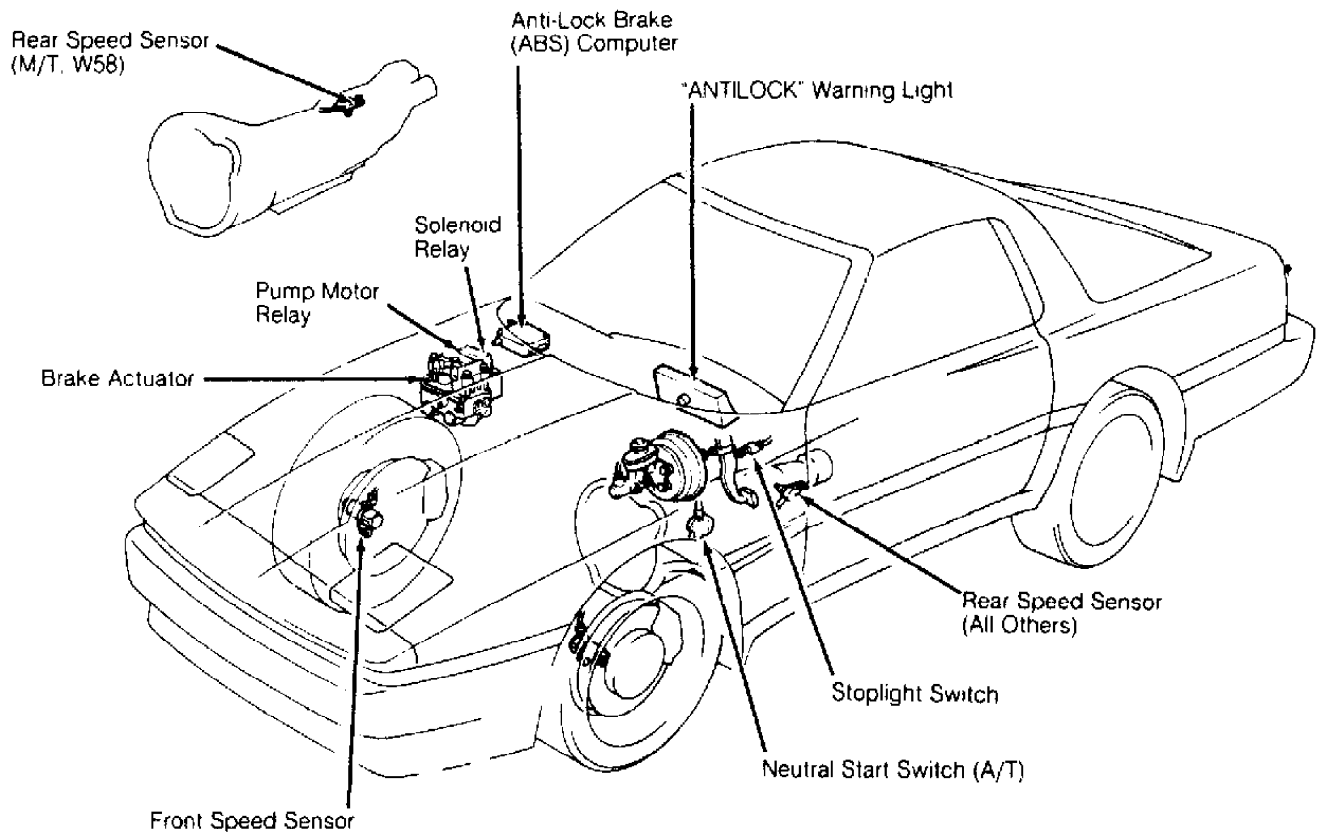


Fig. 6: Supra ABS Component Location
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

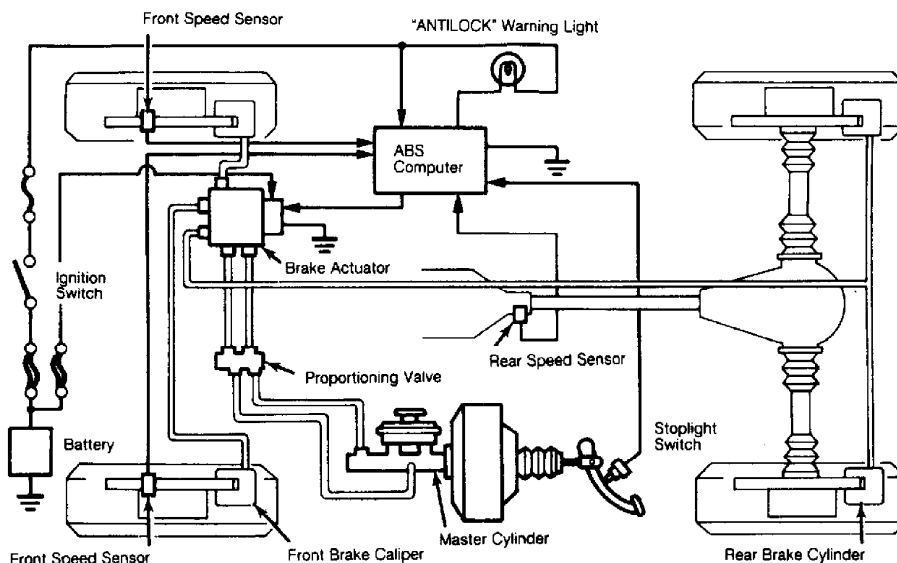


Fig. 7: Typical Anti-Lock Brake System Circuit Diagram
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

DIAGNOSTIC CODES

NOTE: On Camry, Camry All-Trac, Celica and Celica All-Trac, if a speed sensor code is detected, follow diagnostic routine under code. If problem is not resolved, refer to CAMRY & CELICA SPEED SENSOR DIAGNOSTIC SYSTEM. On Camry All-Trac and Celica All-Trac, if a deceleration sensor code is detected, follow diagnostic routine under code. If problem is not resolved, refer to CAMRY ALL-TRAC & CELICA ALL-TRAC DECELERATION SENSOR DIAGNOSTIC SYSTEM.

Code 11

Open circuit in solenoid relay. Check wire harness, connector of solenoid relay circuit, and solenoid relay. On Celica models, also check control relay operation.

Code 12

Short circuit in solenoid relay. Check wire harness, connector of solenoid relay circuit, and solenoid relay. On Celica models, also check control relay operation.

Code 13

Open circuit in pump motor relay. Check wire harness, connector of pump motor relay circuit, and pump motor relay. On Celica models, also check control relay operation.

Code 14

Short circuit in pump motor relay. Check wire harness, connector of pump motor relay circuit, and pump motor relay. On Celica models, also check control relay operation.

Code 21

Open or short circuit in 3 position solenoid of right front wheel. Check wire harness, connector of actuator solenoid circuit, and actuator solenoid.

Code 22

Open or short circuit in 3 position solenoid of left front wheel. Check wire harness, connector of actuator solenoid circuit, and actuator solenoid.

Code 23 (Camry, Camry All-Trac, Celica & Celica All-Trac)

Open or short circuit in 3 position solenoid of right rear wheel. Check wire harness, connector of actuator solenoid circuit, and actuator solenoid.

Code 23 (Cressida & Supra)

Open or short circuit in 3 position solenoid of rear wheel. Check wire harness, connector of actuator solenoid circuit, and actuator solenoid.

Code 24 (Camry, Camry All-Trac, Celica & Celica All-Trac)

Open or short circuit in 3 position solenoid of left rear wheel. Check wire harness, connector of actuator solenoid circuit, and actuator solenoid.

Code 31

Malfunction of right front wheel speed sensor signal. Check speed sensor, sensor rotor, and wire harness and connector of speed sensor.

Code 32

Malfunction of left front wheel speed sensor signal. Check speed sensor, sensor rotor, and wire harness and connector of speed sensor.

Code 33 (Camry, Camry All-Trac, Celica & Celica All-Trac)

Malfunction of right rear wheel speed sensor signal. Check speed sensor, sensor rotor, and wire harness and connector of speed sensor.

Code 33 (Cressida & Supra)

Malfunction of rear wheel speed sensor signal. Check speed sensor, sensor rotor, and wire harness and connector of speed sensor.

Code 34 (Camry, Camry All-Trac, Celica & Celica All-Trac)

Malfunction of left rear wheel speed sensor signal. Check speed sensor, sensor rotor, and wire harness and connector of speed sensor.

Code 34 (Supra)

Open circuit in front speed sensor. Check speed sensor, sensor rotor, and wire harness and connector of speed sensor.

Code 35 (Camry, Camry All-Trac, Celica & Celica All-Trac)

Open circuit in left front or right rear wheel speed sensor circuit. Check speed sensor, sensor rotor, and wire harness and connector of speed sensor.

Code 35 (Cressida)

Open circuit in front speed sensor. Check speed sensor, sensor rotor, and wire harness and connector of speed sensor.

Code 36 (Camry, Camry All-Trac, Celica & Celica All-Trac)

Open circuit in right front or left rear wheel speed sensor circuit. Check speed sensor, sensor rotor, and wire harness and connector of speed sensor.

Code 37 (Camry & Celica, except Celica All-Trac)

Wrong application of rear axle hubs. Check rear axle hubs and sensor rotors for correct application.

Code 37 (Cressida)

Wrong application of front axle hubs. Check front hubs and sensor rotors for correct application.

Code 41

Low battery voltage of 9.5 volts or lower. Check battery and voltage regulator.

Code 42

High battery voltage of 16.2 volts (Camry and Celica), 17.2 (Cressida and Supra) or higher. Check battery and voltage regulator.

Code 43 (Camry All-Trac & Celica All-Trac)

Malfunction of deceleration sensor. Check deceleration sensor for obvious damage. Ensure sensor is installed correctly. Check wiring harness and sensor connector.

Code 44 (Camry All-Trac & Celica All-Trac)

Open or short circuit in deceleration sensor. Check deceleration sensor for obvious damage. Ensure sensor is installed correctly. Check wiring harness and sensor connector.

Code 51

Pump motor of actuator locked or open circuit in pump motor circuit of actuator. Check battery, relay, pump motor, wire harness, connector, and ground bolt of actuator pump motor circuit.

"ANTILOCK" Light Always On

Malfunction in computer. Trouble area is computer.

CAMRY & CELICA SPEED SENSOR DIAGNOSTIC SYSTEM

NOTE: When system is displaying diagnostic codes, DO NOT turn ignition off, pull on parking brake lever or depress brake pedal more than 16 times after diagnostic system begins to function or diagnostic codes will be cleared.

1) Ensure battery voltage is 12 volts. Turn ignition switch to "ON" position. "ANTILOCK" warning light should illuminate, then go out after 3 seconds. If warning light does not illuminate, check fuse, bulb, and wiring harness.

2) If warning light illuminated, turn ignition off. On Camry All-Trac and Celica All-Trac, remove rubber cap from "Ts" connector. See Fig. 8. "Ts" connector is located behind left front shock tower on Celica All-Trac models. Connect a jumper wire between terminals of "Ts" connector.

3) On Camry, disconnect actuator check connector. On Celica, remove control relay bolt. Remove control relay. Disconnect check connector from control relay. See Fig. 1. On Cressida, connect a jumper wire between terminals No. E1 and Tc of the diagnostic communication link. See Fig. 2.

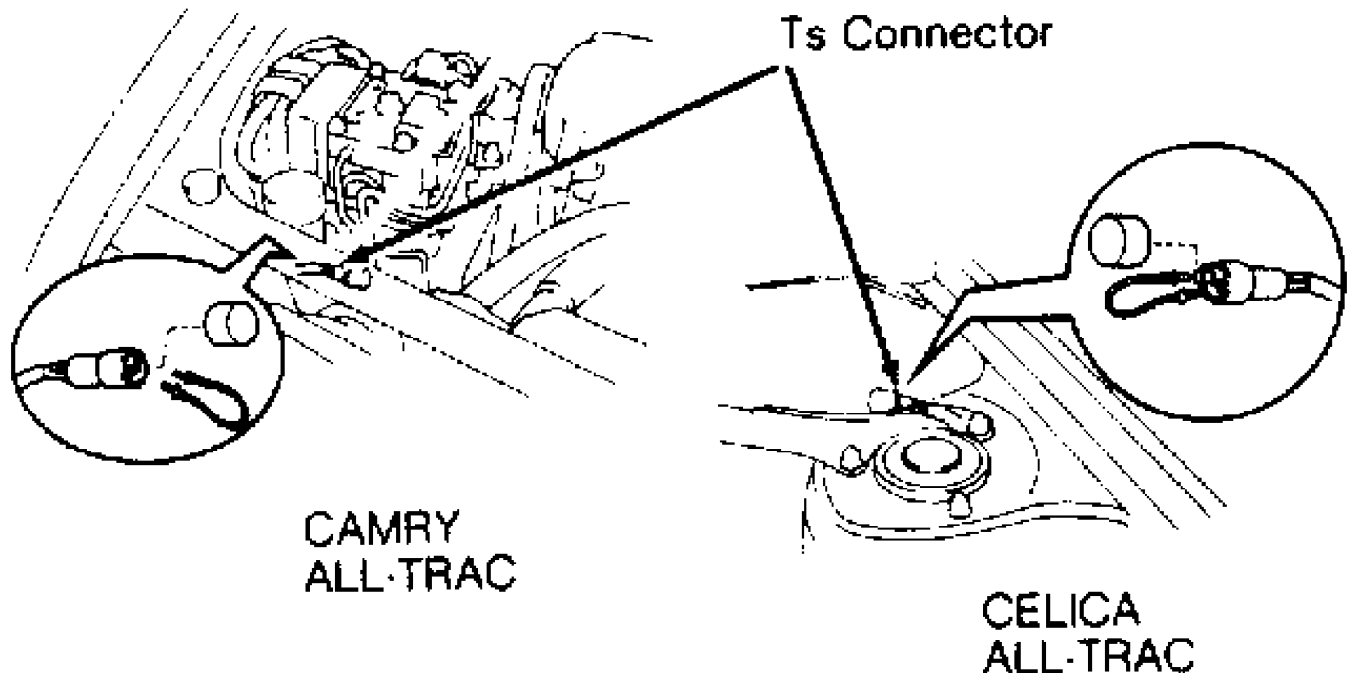


Fig. 8: All-Trac Ts Connector Location
Courtesy of Toyota Motor Sales, U.S.A., Inc.

4) On all models, engage parking brake. Start engine. On Camry All-Trac and Celica All-Trac models, DO NOT depress brake pedal. On Camry, Celica, and Cressida, depress brake pedal 4-6 times within 2 seconds. On all models, ensure "ANTILOCK" light is blinking about 4

times every second.

5) To inspect sensor signal level, drive vehicle straight 2.5-3.7 MPH. "ANTILOCK" light should turn off after a one second pause. If "ANTILOCK" light turns on without blinking when vehicle speed is NOT within specified range, stop vehicle and read diagnostic code. Diagnostic codes are read in 2 digits. Repair malfunctioning components.

NOTE: While "ANTILOCK" light is off, DO NOT accelerate, decelerate, brake, change gears, steering wheel position, or subject vehicle to rough roads.

6) If "ANTILOCK" light turns on while vehicle is within specified speed range, check is completed. When vehicle speed exceeds 3.7 MPH, "ANTILOCK" light should blink again. If "ANTILOCK" light responds correctly, speed sensors are okay. Go to next step.

7) To inspect sensor signal change, drive vehicle straight about 28-34.2 MPH. Check that "ANTILOCK" light turns on after a one second pause. If "ANTILOCK" light turns on without blinking when vehicle speed is NOT within specified speed range, stop vehicle and read diagnostic codes. Refer to SPEED SENSOR DIAGNOSTIC CODES in this article. Diagnostic codes are read in 2 digits. Repair malfunctioning components.

NOTE: While "ANTILOCK" light is off, DO NOT accelerate, decelerate, brake, change gears, steering wheel position, or subject vehicle to rough roads.

8) If "ANTILOCK" light turns on while vehicle speed is within specified speed range, check is complete. When vehicle speed is NOT within specified speed range, "ANTILOCK" light will blink again. If "ANTILOCK" light responds correctly, sensor rotors are okay.

9) When system check is complete, on Camry and Celica All-Trac models, connect check connector if disconnected in step 2). Remove jumper wire from "Ts" connector and install rubber cap. Turn ignition off. On Celica models (except Celica All-Trac), turn ignition off. Connect check connector if disconnected in step 6). Install control relay and relay bolt. On Cressida, turn ignition off and remove jumper wire.

SPEED SENSOR DIAGNOSTIC CODES

Code 71

Low voltage on right front speed sensor signal. Check speed sensor and sensor installation.

Code 72

Low voltage on left front speed sensor signal. Check speed sensor and sensor installation.

Code 73

Low voltage on right rear speed sensor signal. Check speed sensor and sensor installation.

Code 73 (Cressida)

Low voltage on rear speed sensor signal. Check speed sensor and sensor installation.

Code 74

Low voltage on left rear speed sensor signal. Check speed sensor and sensor installation.

Code 75

Abnormal change of right front speed sensor signal. Check speed sensor rotor.

Code 76

Abnormal change of left front speed sensor signal. Check speed sensor rotor.

Code 77

Abnormal change of right rear speed sensor signal. Check speed sensor rotor.

Code 77 (Cressida)

Abnormal change of rear speed sensor signal. Check speed sensor rotor.

Code 78

Abnormal change of left rear speed sensor signal. Check speed sensor rotor.

CAMRY & CELICA ALL-TRAC DECELERATION SENSOR DIAGNOSTIC SYSTEM

NOTE: While diagnosing deceleration sensor, brake system functions as a conventional system.

1) Ensure battery voltage is 12 volts. Turn ignition switch to "ON" position. "ANTILOCK" warning light should illuminate, then go out after 3 seconds. If warning light does not illuminate, check fuse, bulb, and wiring harness.

2) Remove rubber cap from "Ts" connector. Connect a jumper wire between Ts connector terminals. See Fig. 8. "Ts" connector is located behind left front shock tower on Celica All-Trac models. Engage parking brake, depress brake pedal and start engine. Check that "ANTILOCK" light blinks about once every second.

3) If "ANTILOCK" light does not blink, inspect parking brake switch, stoplight switch, "Ts" connector, deceleration sensor installation and computer. To inspect sensor detection point, raise rear of vehicle 33" (Camry All-Trac), 27" (Celica All-Trac). On Camry All-Trac, measure distance between bottom of rear bumper and ground. On Celica All-Trac, measure distance between bottom of lower body and ground.

4) Check that "ANTILOCK" light is off. As vehicle is lowered, "ANTILOCK" light will start blinking. Completely lower rear of vehicle. Raise front of vehicle 26" (Camry All-Trac), 23" (Celica All-Trac). Measure distance between lower body or spoiler edge of vehicle.

5) Check that "ANTILOCK" light is off. As vehicle is lowered, "ANTILOCK" light will start blinking. If "ANTILOCK" light turns on, inspect deceleration sensor installation. If sensor installation is okay, replace deceleration sensor.

6) To inspect sensor operation, drive vehicle straight about 6.2 MPH or more. Lightly depress brake pedal. "ANTILOCK" light should be blinking once every second with no change in pattern.

7) Drive vehicle straight about 12.4 MPH or more. Using a little force, depress brake pedal. "ANTILOCK" light should stay on while braking. Drive vehicle about 12.4 MPH or more. Strongly depress brake pedal. "ANTILOCK" light should blink approximately 7 times per second.

8) If "ANTILOCK" light does not respond correctly, check deceleration sensor installation. If sensor installation is okay, replace deceleration sensor. Turn engine off. Remove jumper wire from "Ts" connector. Install rubber cap on "Ts" connector.

ERASING ABS CODES

1) Turn ignition on. On Celica (except All-Trac), remove bolt and remove control relay. Disconnect check connector from control relay. On all models (except Cressida), disconnect actuator check connector. On Cressida, connect a jumper wire between terminals No. E1 and Tc of the diagnostic communication link. See Fig. 2.

2) Ensure vehicle does not move during procedure. To clear diagnostic codes, depress brake pedal 8 or more times within 3 seconds. "ANTI-LOCK" warning light should show a normal code. Warning light should blink once every .5 second.

3) On Celica (except All-Trac), connect control relay check connector. Ensure "ANTI-LOCK" light goes out. Install control relay and relay bolt. On all other models (except Cressida), connect actuator check connector. On Cressida, disconnect jumper wire between terminals No. E1 and Tc of the diagnostic communication link. Ensure "ANTI-LOCK" light goes out.

TROUBLE SHOOTING FLOW CHARTS

NOTE: The following trouble shooting charts are courtesy of Toyota Motor Sales, U.S.A., Inc.

CAMRY & CELICA FLOW CHARTS

Problem		No.
"ANTI-LOCK" warning light	Always comes on after ignition switch is turned on.	1
	Does not come on for 3 seconds after ignition switch on.	2
	Comes on and off.	3
	Comes on while running.	1
Brake working	Brakes pull.	4
	Braking inefficient.	4
	A.B.S. operates at ordinary braking.	4
	A.B.S. operates just before stopping at ordinary braking.	4
	Brake pedal pulsates abnormally while A.B.S. is operating.	4
	Skidding noise occurs while A.B.S. working. (A.B.S. works inefficiently)	5

1	"ANTI-LOCK" warning light comes on.
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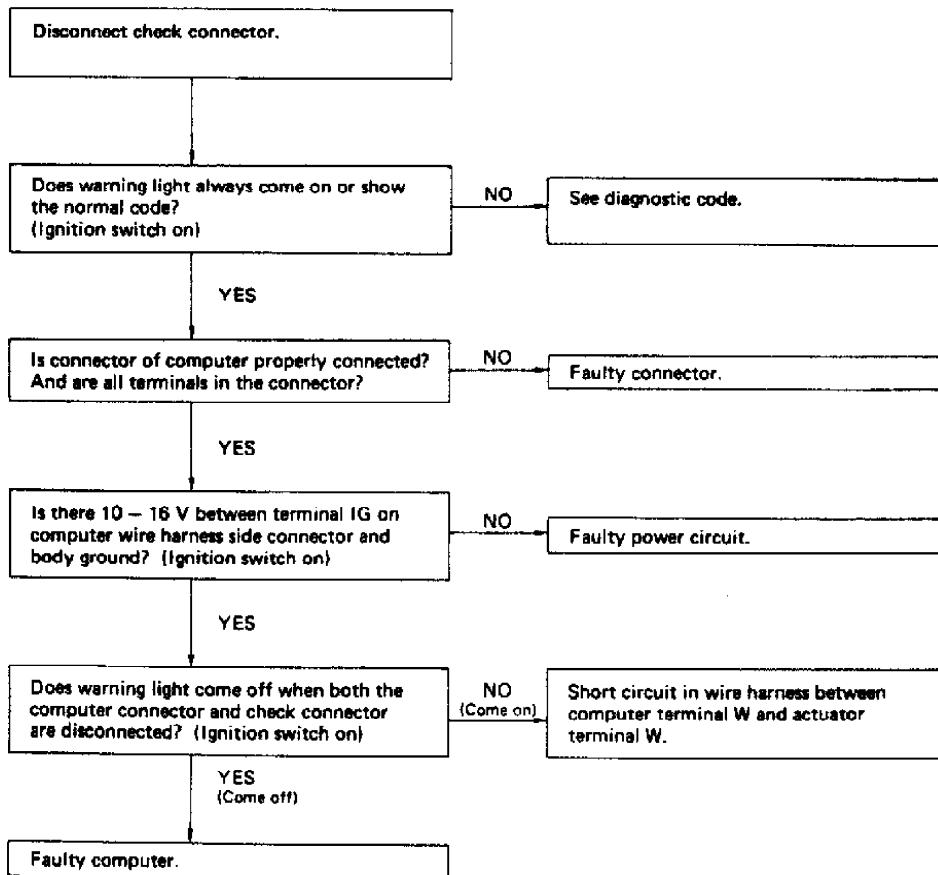


Fig. 9: Chart 1, "ANTI-LOCK" Light Comes On

**CAMRY, CAMRY ALL-TRAC, CELICA
& CELICA ALL-TRAC CHART 2
"ANTILOCK" LIGHT DOES NOT COME ON FOR
3 SECONDS AFTER IGNITION IS TURNED ON**

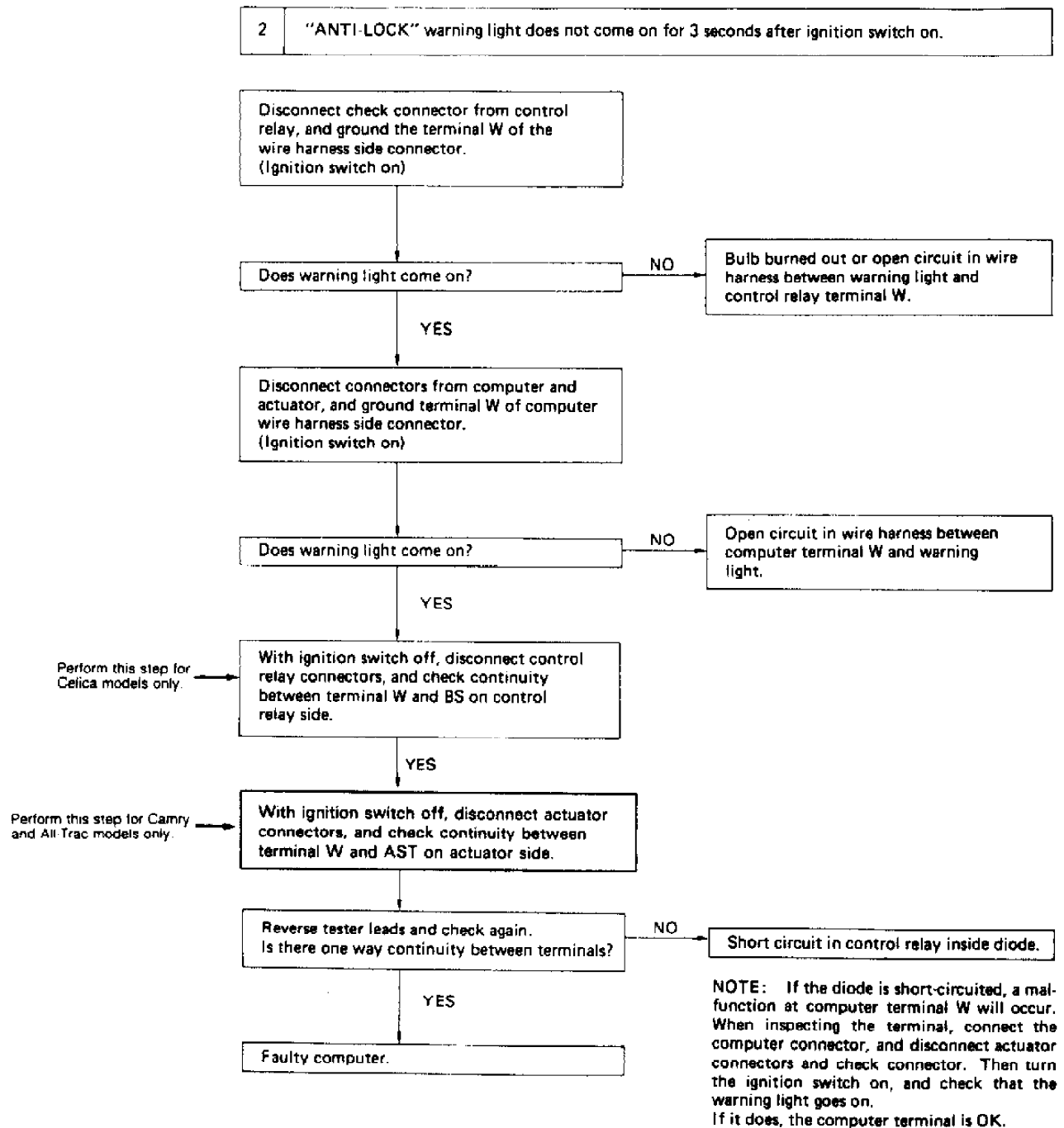


Fig. 10: Chart 2, "ANTI-LOCK" Light Does Not Come On For 3 Seconds After Ignition is Turned On

CAMRY, CAMRY ALL-TRAC, CELICA & CELICA ALL-TRAC CHART 3 "ANTILOCK" WARNING LIGHT COMES ON & OFF

3	"ANTILOCK" warning light comes on and off.
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- Check connector is disconnected.
- Open circuit in wire harness between computer terminal T and actuator terminal T.
- Actuator terminal GND is improperly connected or open circuit in wire harness between actuator terminal GND and body ground.
- Short circuit in wire harness between computer terminal Ts and Ts connector. (All-Trac models only).

Fig. 11: Chart 3, "ANTI-LOCK" Light Comes On & Off

CAMRY & CELICA CHART 4
BRAKES PULL, BRAKING INEFFICIENT, ABS OPERATES AT ORDINARY
BRAKING, ABS OPERATES JUST BEFORE STOPPING AT ORDINARY BRAKING
BRAKE PEDAL PULSATES ABNORMALLY WHILE ABS IS WORKING

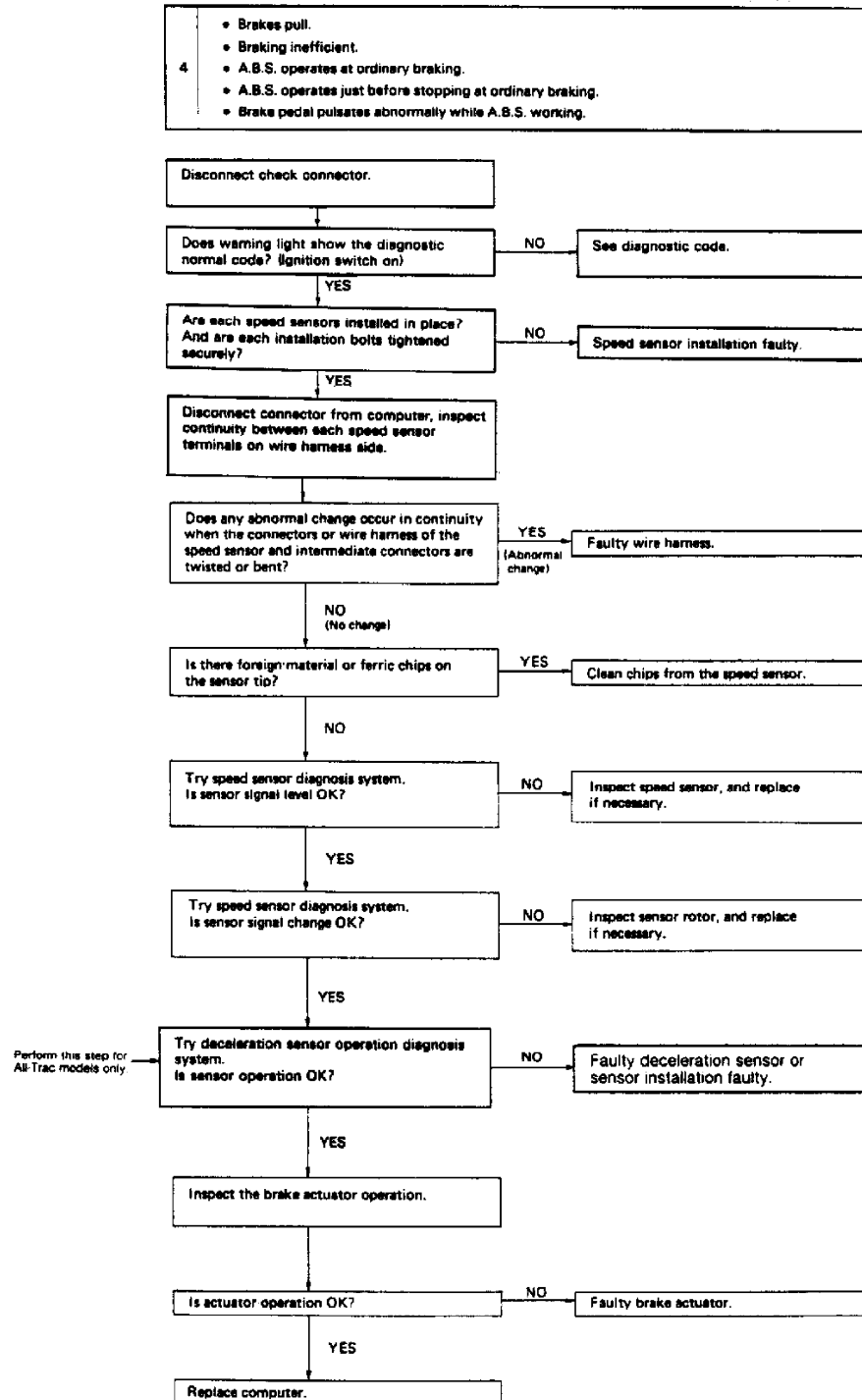


Fig. 12: Chart 4, Brakes Pull, Inefficient Braking, ABS Operates at Ordinary Braking or Just Before Stopping At Ordinary Braking, Brake Pedal Pulsates Abnormally While ABS is Working

CAMRY, CAMRY ALL-TRAC, CELICA & CELICA ALL-TRAC CHART 5 ABS WORKS INEFFICIENTLY

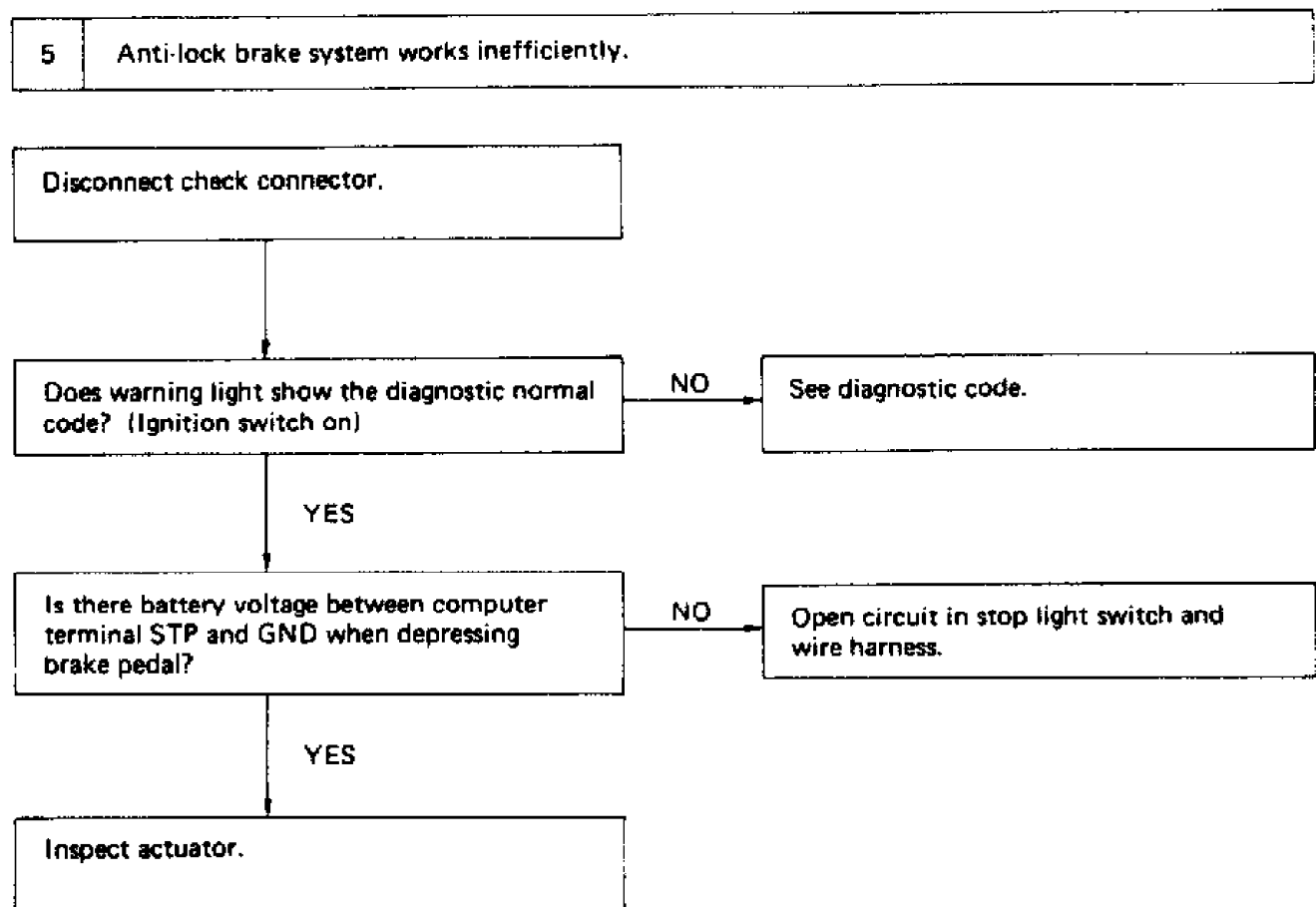


Fig. 13: Chart 5, ABS Works Inefficiently

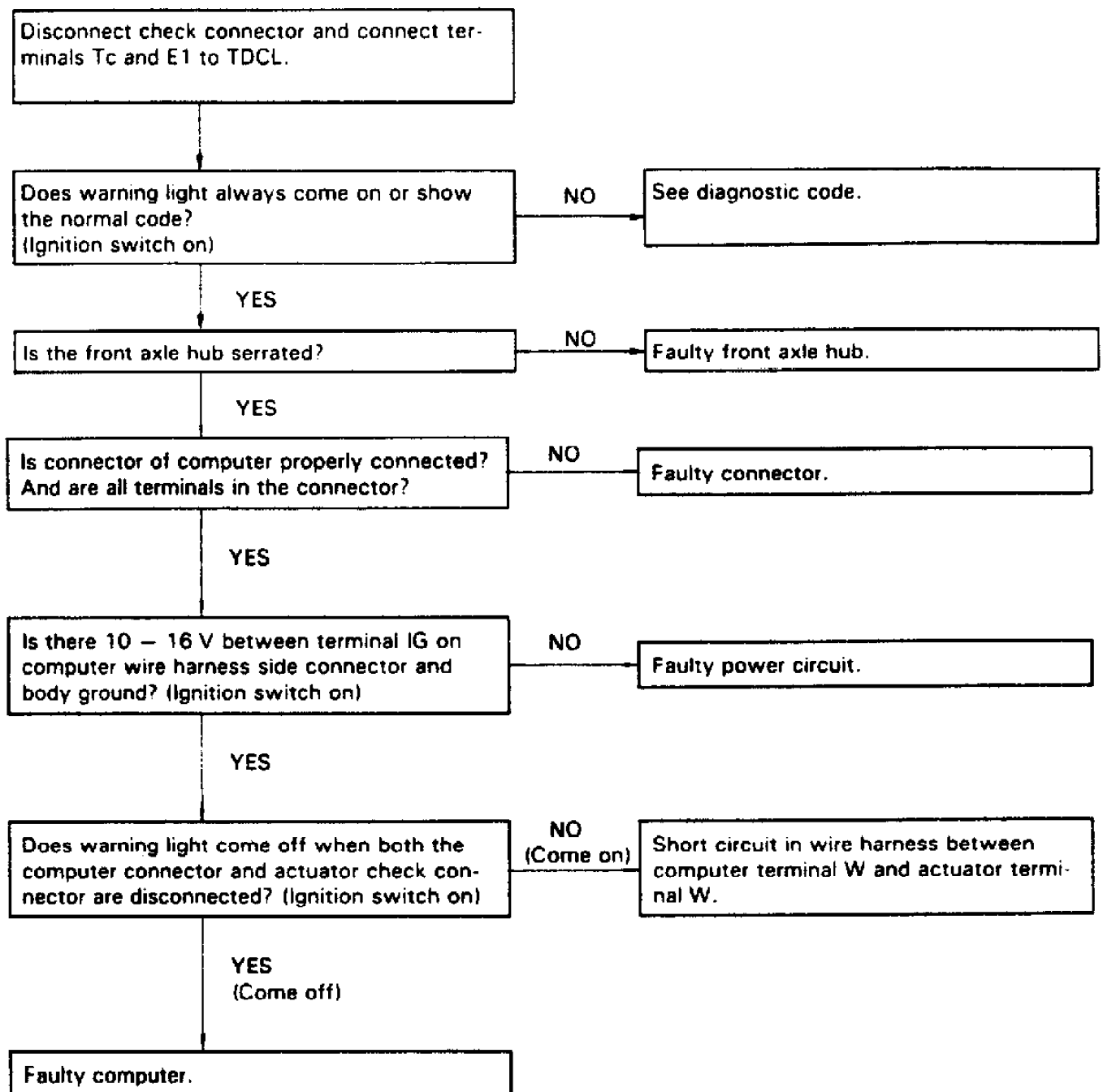


Fig. 14: Chart 1, "ANTI-LOCK" Light Comes On

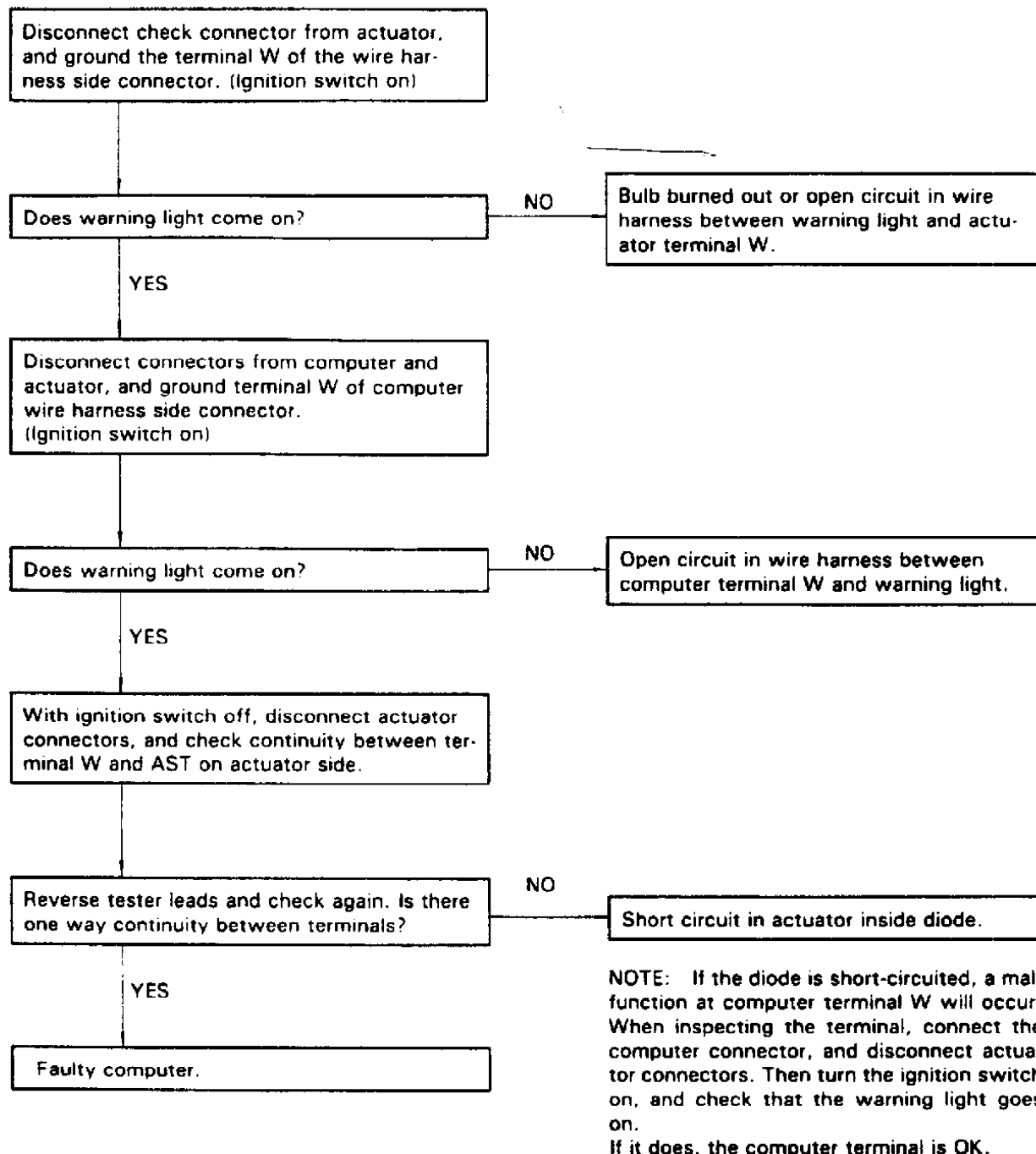


Fig. 15: Chart 2, "ANTI-LOCK" Light Does Not Come On For 3 Seconds After Ignition is Turned On

Chart 3 "ANTI-LOCK LIGHT COMES ON & OFF"
Check for short circuit in wire harness between terminal "Tc"

and "E1" of the TDCL.

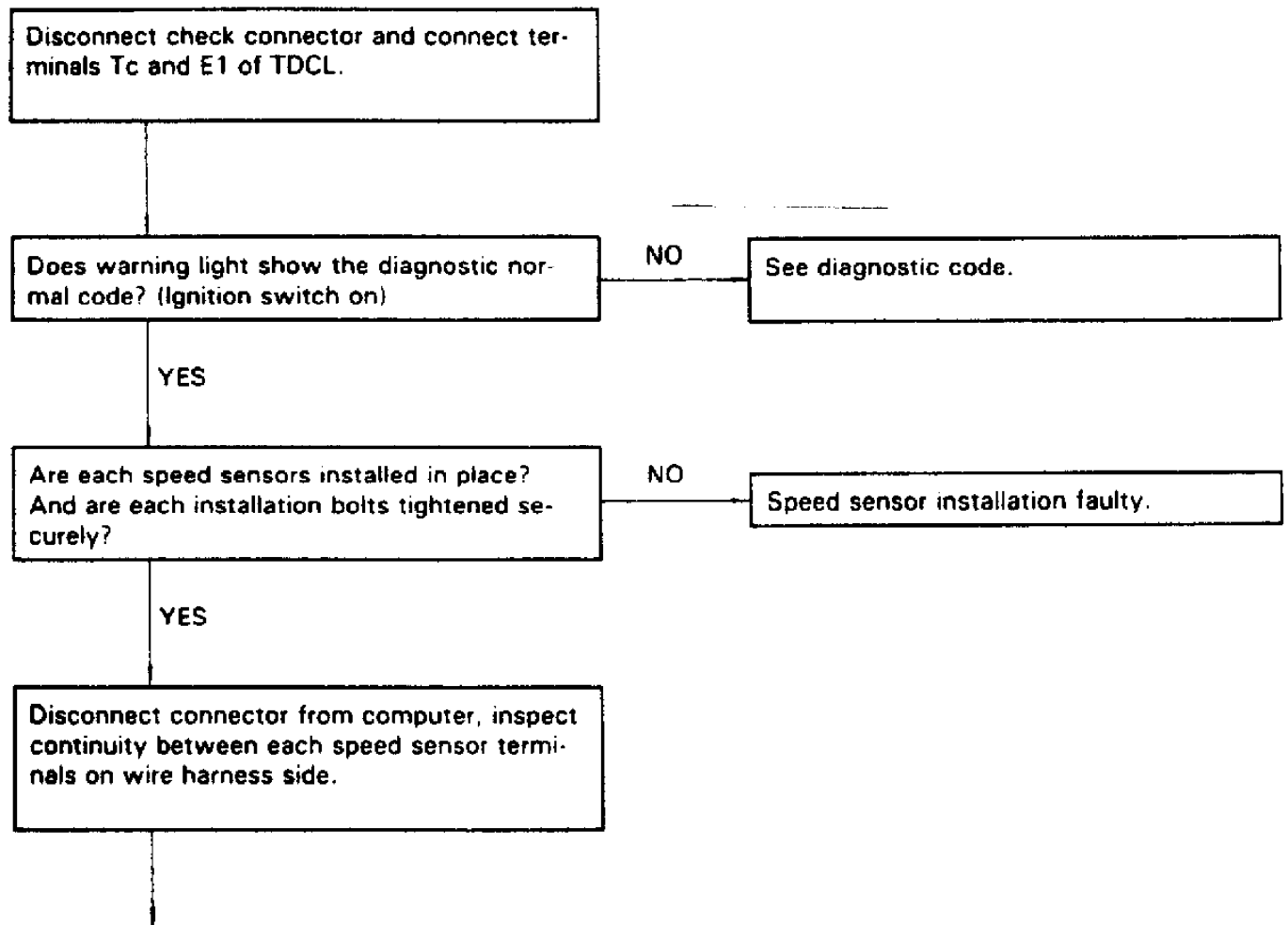


Fig. 16: Chart 4, (1 of 2), Brakes Pull, Inefficient Braking, ABS Operates at Ordinary Braking or Just Before Stopping At Ordinary Braking, Brake Pedal Pulsates Abnormally While ABS is Working

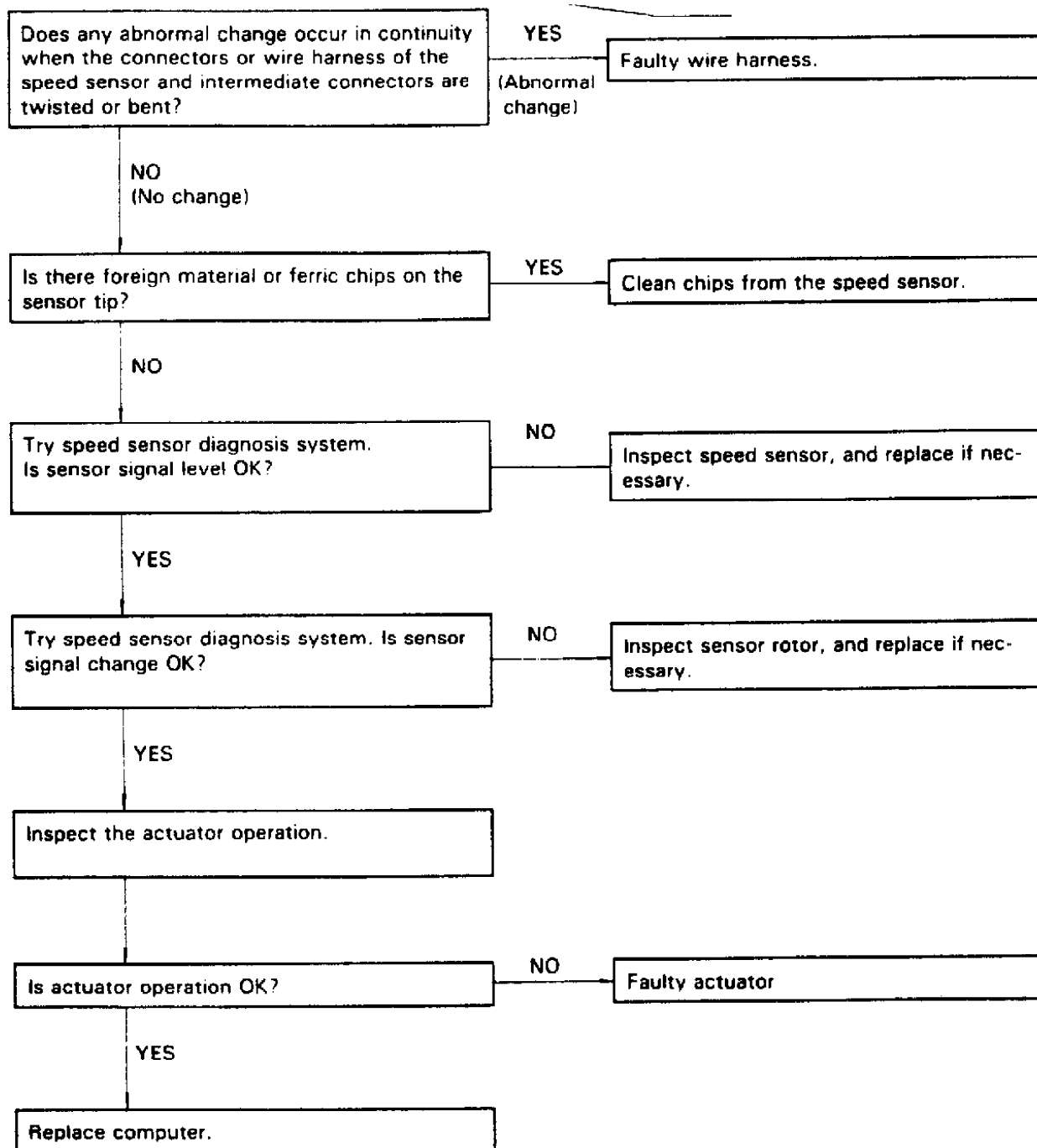


Fig. 17: Chart 4, (2 of 2), Brakes Pull, Inefficient Braking, ABS Operates at Ordinary Braking or Just Before Stopping At Ordinary Braking, Brake Pedal Pulsates Abnormally While ABS is Working

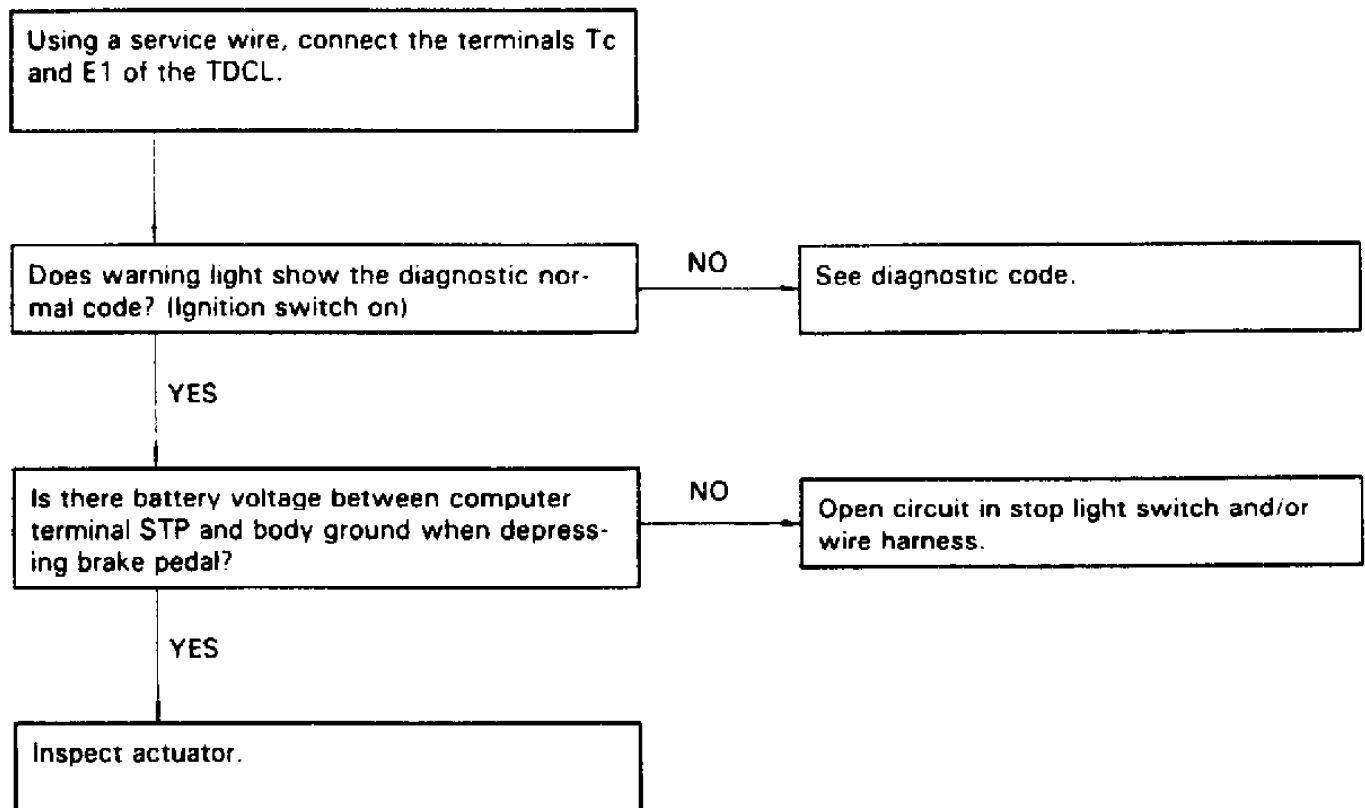


Fig. 18: Chart 5, ABS Works Inefficiently

SUPRA FLOW CHARTS

SUPRA CHART 1 "ANTILOCK" LIGHT COMES ON

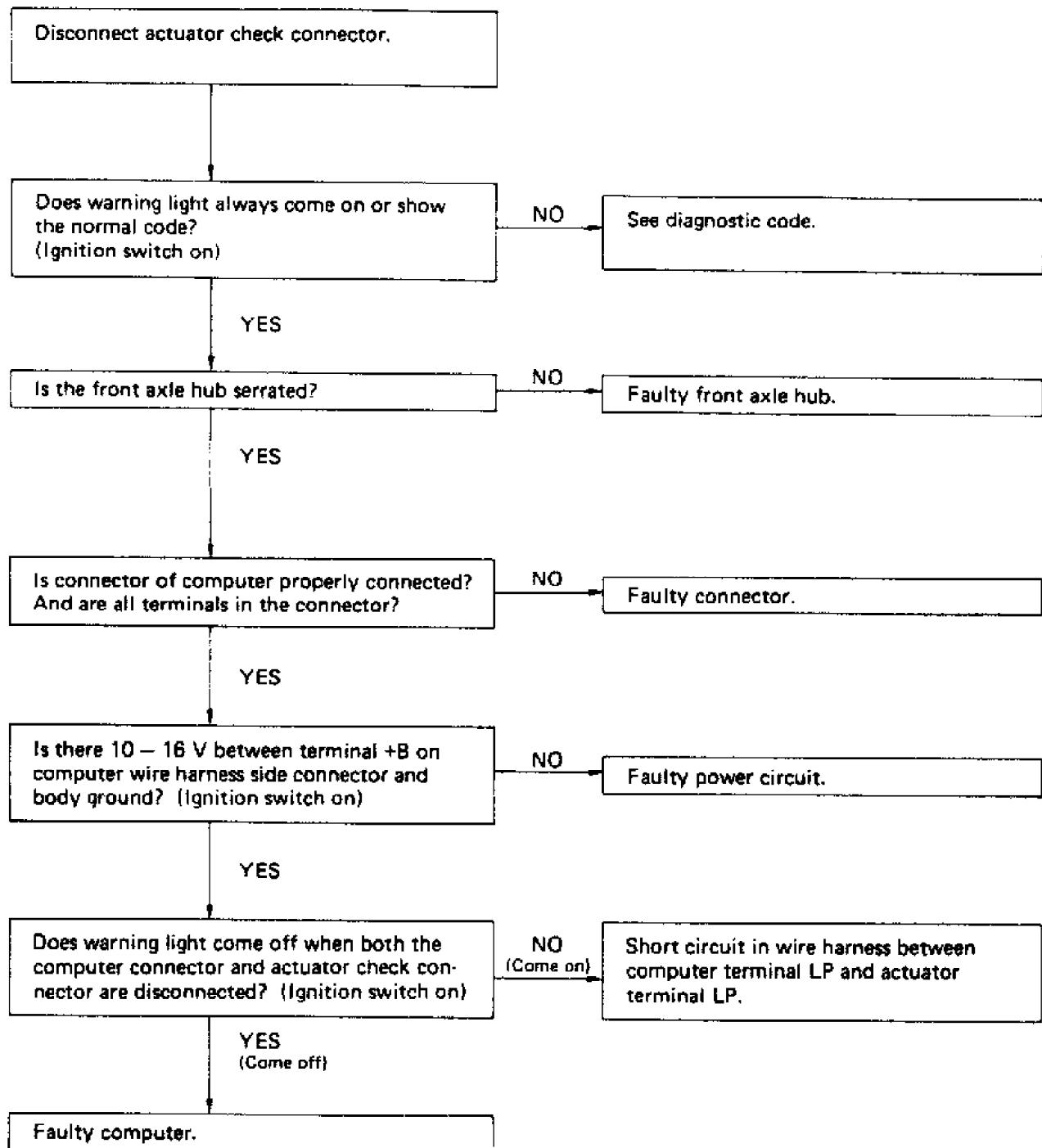


Fig. 19: Chart 1, "ANTI-LOCK" Light Comes On

SUPRA CHART 2 "ANTILOCK" LIGHT DOES NOT COME ON FOR 3 SECONDS AFTER IGNITION IS TURNED ON

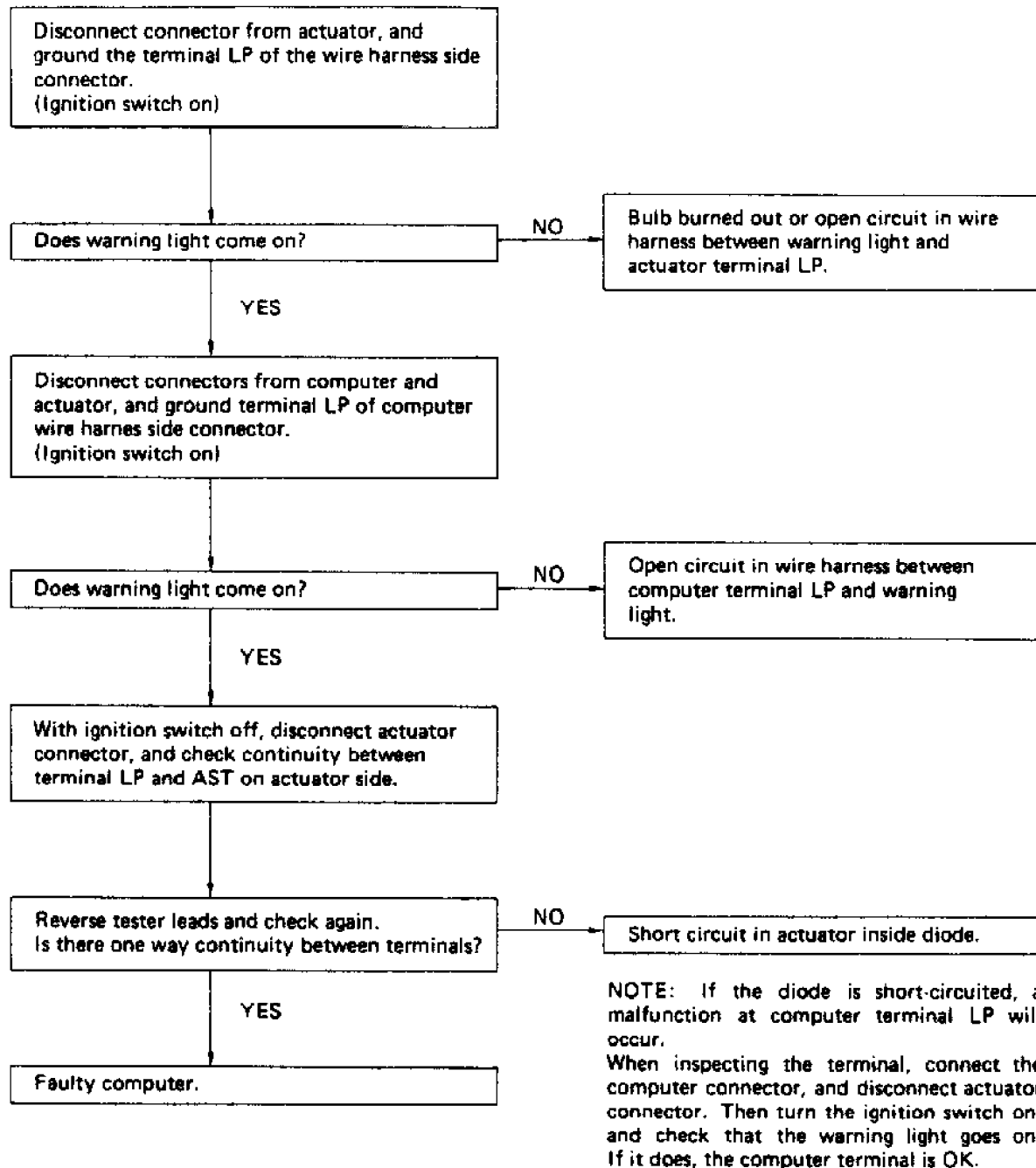


Fig. 20: Chart 2, "ANTI-LOCK" Light Does Not Come On For 3 Seconds After Ignition is Turned On

Chart 3 "ANTI-LOCK" LIGHT COMES ON & OFF"
Actuator check connector is disconnected. Open circuit in

wire harness between computer terminal "T" and actuator terminal "T".
Actuator terminal GND is improperly connected or open circuit in wire harness between actuator terminal GND and body ground.

SUPRA CHART 4
BRAKES PULL, BRAKING INEFFICIENT, ABS OPERATES AT ORDINARY
BRAKING, ABS OPERATES JUST BEFORE STOPPING AT ORDINARY BRAKING
BRAKE PEDAL PULSATES ABNORMALLY WHILE ABS IS WORKING

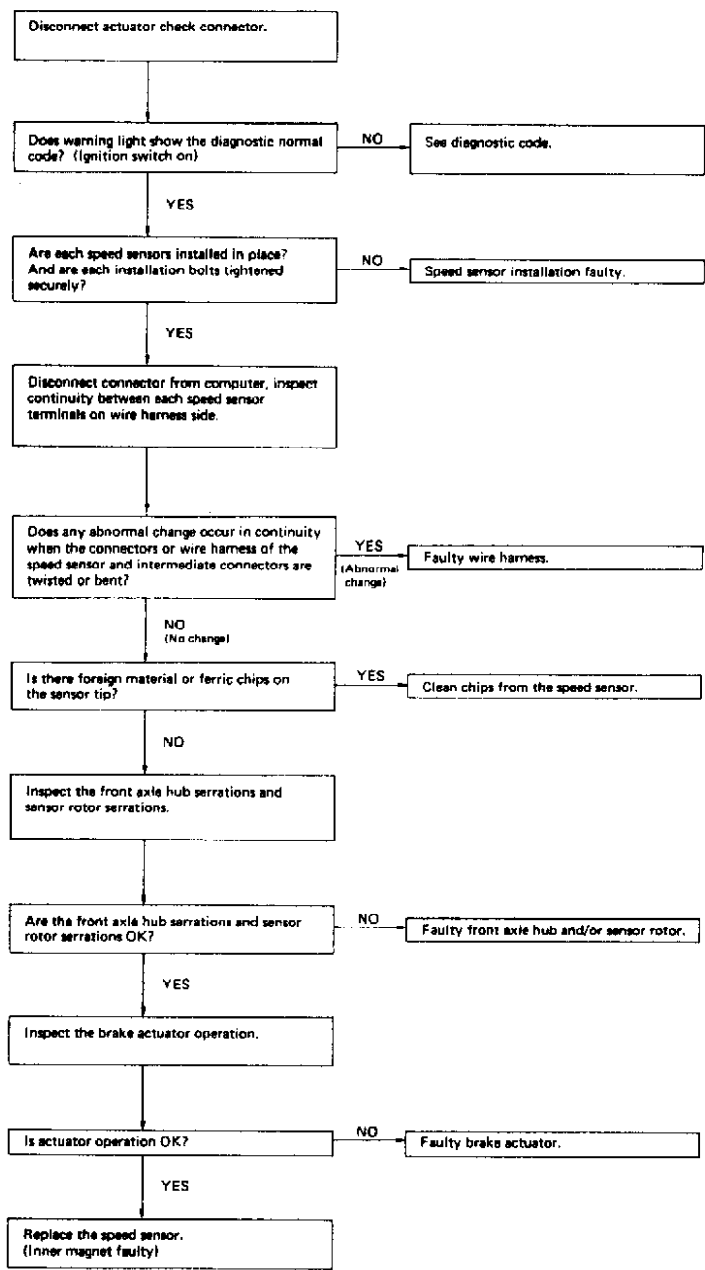


Fig. 21: Chart 4, Brakes Pull, Inefficient Braking, ABS Operates at Ordinary Braking or Just Before Stopping At Ordinary Braking, Brake Pedal Pulsates Abnormally While ABS is Working

SUPRA CHART 5 ABS WORKS INEFFICIENTLY

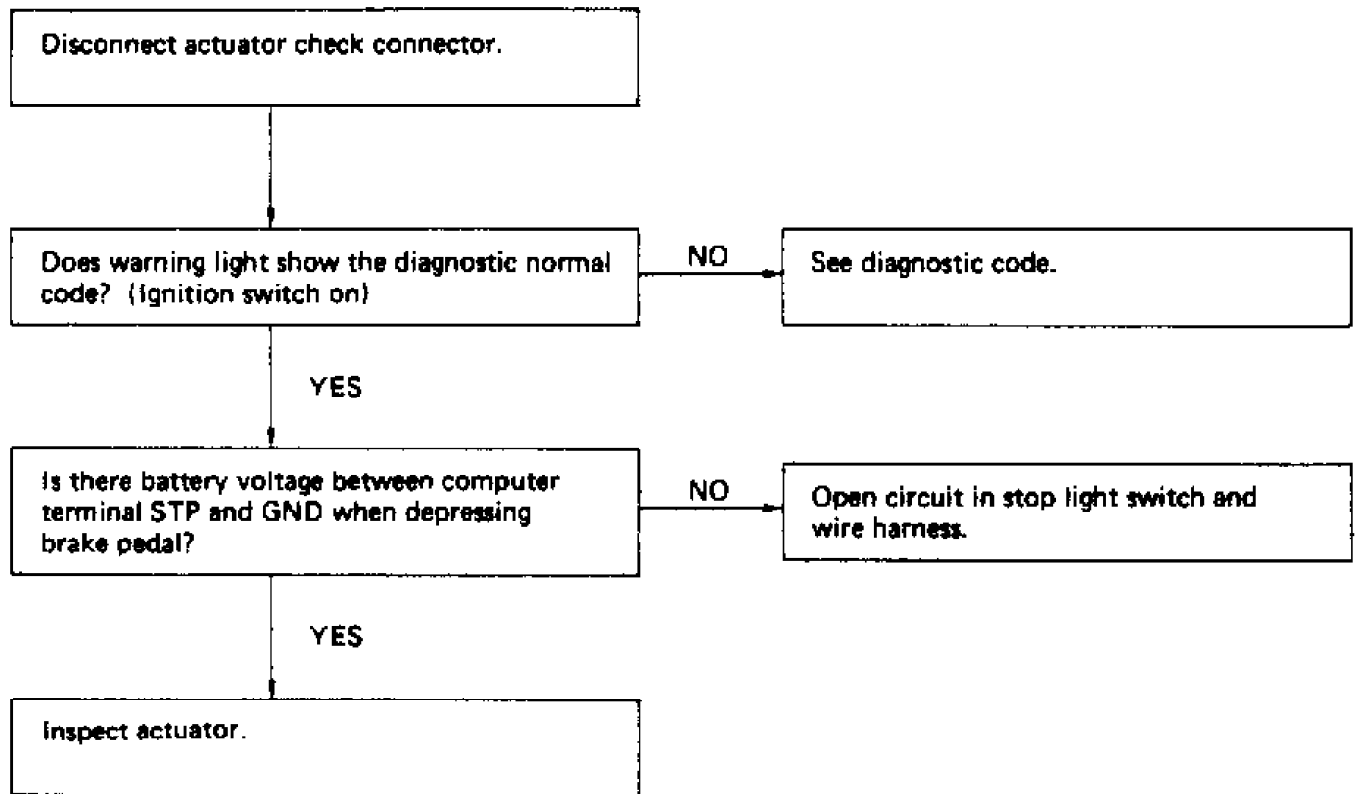


Fig. 22: Chart 5, ABS Works Inefficiently

TESTING

NOTE: If brake actuator is suspected of failure, actuator testing can be performed with Actuator Checker (SST 09990-00150).

CONTROL RELAYS (EXCEPT CELICA W/OUT ALL-TRAC)

NOTE: To check for continuity and operation of the pump motor relay and solenoid relay, relays must be removed from actuator.

PUMP MOTOR RELAY CONTINUITY

NOTE: For location of relay, see Figs. 23 - 27 in this article.

Using a DVOM, there should be continuity between terminals No. 1 and 2. See Fig. 23. Check that there is no continuity between terminals No. 3 and 4, and terminals No. 1 and 4. See Fig. 23. If readings are not as specified, replace relay.

SOLENOID RELAY CONTINUITY

For location of relay, see Fig. 25. Using a DVOM, there

should be continuity between terminals No. 1 and 3, and terminals No. 2 and 4. Check that there is no continuity between terminals No. 4 and 5. See Fig. 23. If readings are not as specified, replace relay.

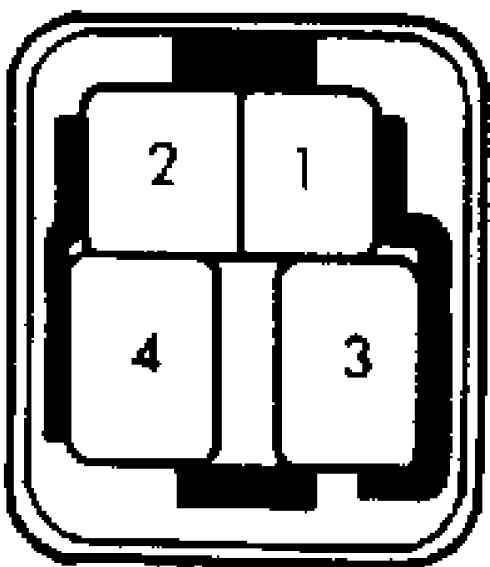
PUMP MOTOR RELAY OPERATION

Apply battery voltage to terminals No. 1 and 2. Using a DVOM, there should be continuity between terminals No. 3 and 4. Check that there is no continuity between terminals No. 1 and 4. See Fig. 23. If readings are not as specified, replace relay.

SOLENOID RELAY OPERATION

Apply battery voltage to terminals No. 1 and 3. Using a DVOM, there should be continuity between terminals No. 4 and 5. Check that there is no continuity between terminals No. 2 and 4. See Fig. 23. If readings are not as specified, replace relay.

PUMP MOTOR RELAY



SOLENOID RELAY

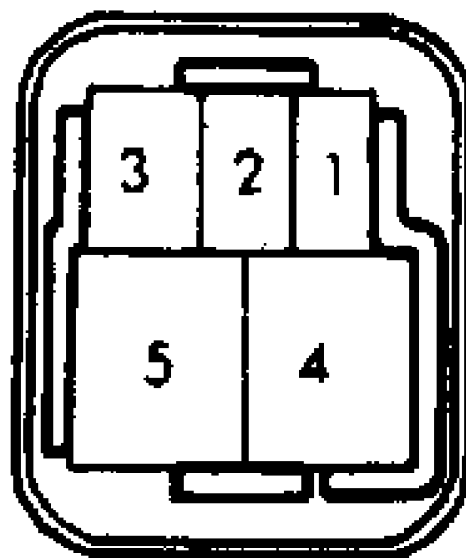


Fig. 23: Control Relays Terminal Identification (Camry, Celica, Cressida & Supra)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

CELICA CONTROL RELAY

NOTE: This test DOES NOT apply to Celica All-Trac models.

MOTOR RELAY CIRCUIT CONTINUITY

Disconnect 3 connectors from control relay. For location of relay, see Fig. 26. Using a DVOM, there should be continuity between terminals No. 5 and 7. See Fig. 25. Check that there is no continuity between terminals No. 1 and 3. If readings are not as specified, replace control relay.

MOTOR RELAY CIRCUIT OPERATION

Connect battery positive to terminal No. 5 and battery

negative to terminal No. 7. See Fig. 25. Using a DVOM, there should be continuity between terminals No. 1 and 3. If reading is not as specified, replace control relay.

SOLENOID RELAY CIRCUIT CONTINUITY

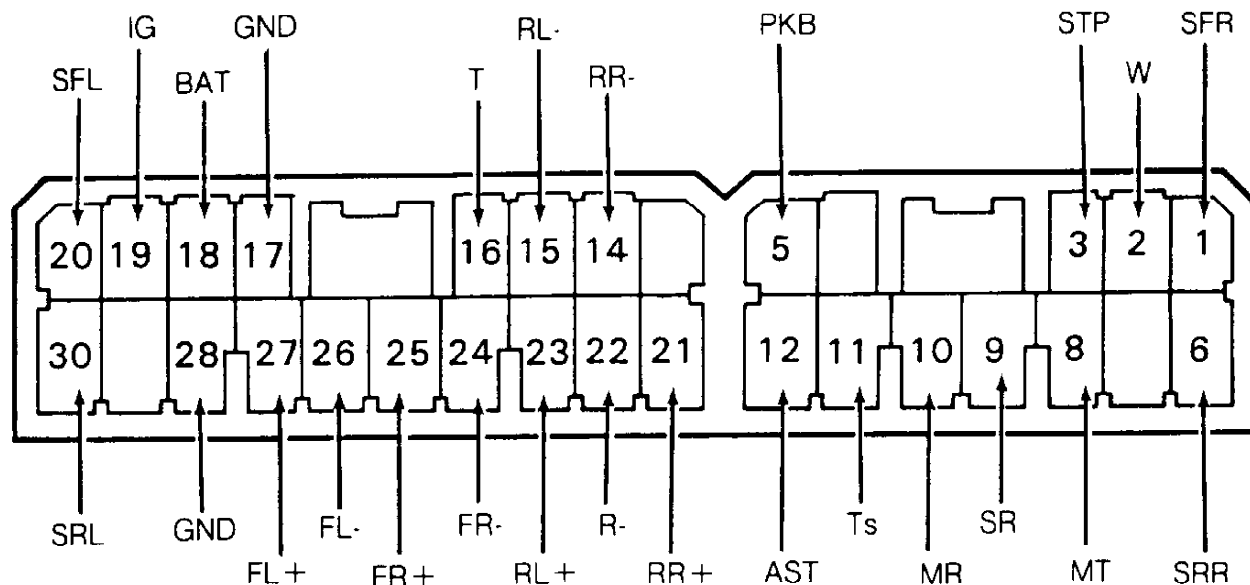
1) Using a DVOM, there should be continuity between terminals No. 6 and 7 and terminals No. 2 and 4. See Fig. 25. There should be continuity between terminals No. 2 and 8 or 10.

2) Connect positive lead of DVOM to terminal No. 2 and negative lead to terminal No. 9. DVOM should indicate continuity between terminals. Reverse DVOM leads. DVOM should now indicate no continuity. If readings are not as specified, replace control relay.

SOLENOID RELAY CIRCUIT OPERATION

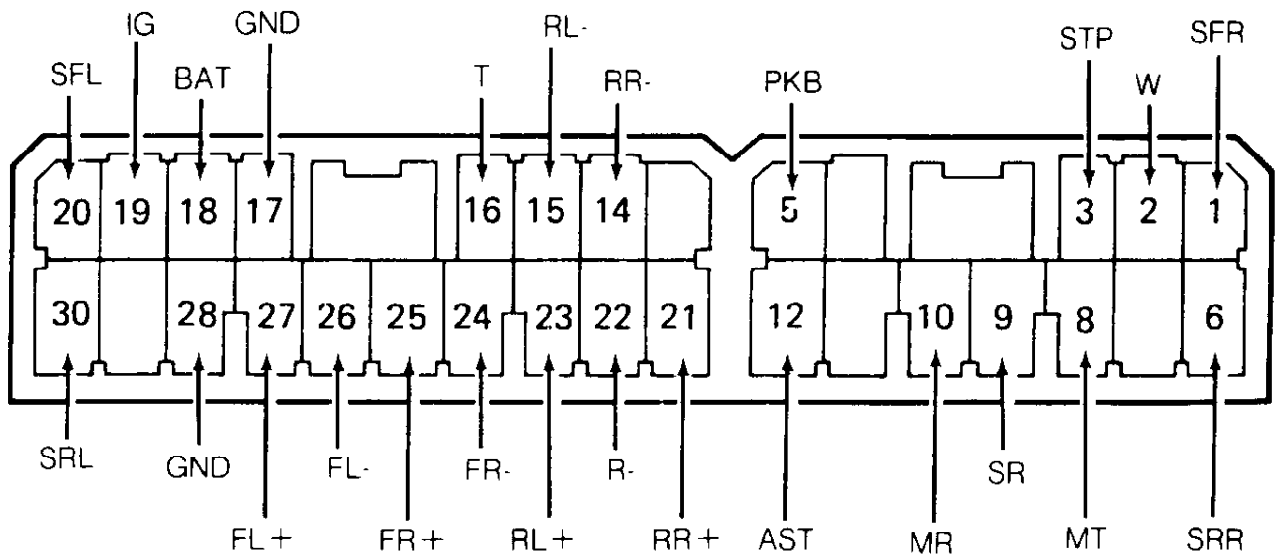
Connect battery positive to terminal No. 6 and battery negative to terminal No. 7. See Fig. 25. Using a DVOM, there should be continuity between terminals No. 2 and 4. If reading is not as specified, replace control relay.

ANTI-LOCK BRAKE SYSTEM COMPUTER



100573

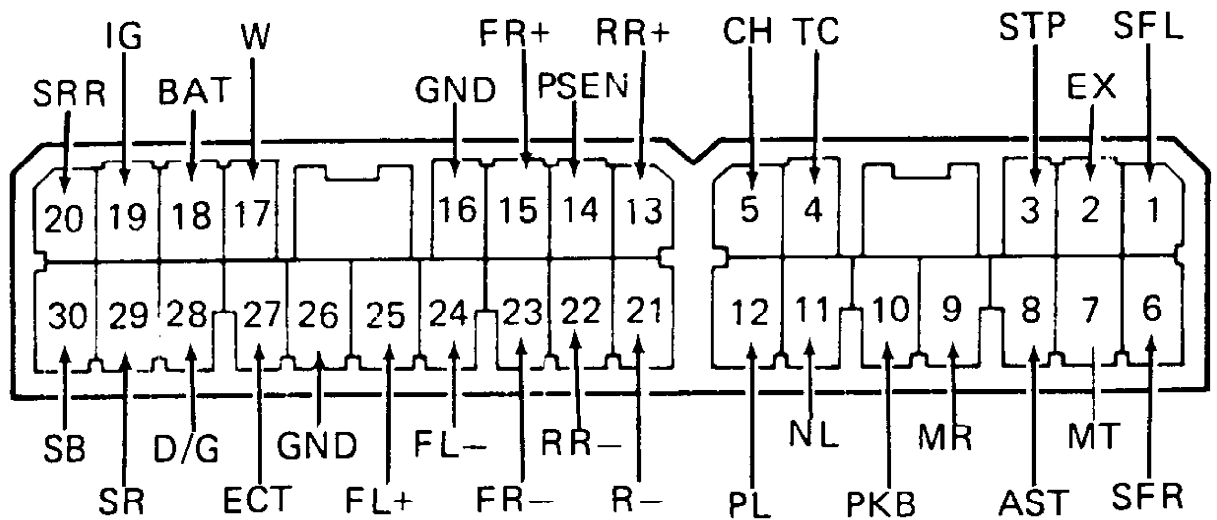
Fig. 24: Connector Terminal ID (Camry, Camry All-Trac & Celica All-Trac)
Courtesy of Toyota Motor Sales, U.S.A., Inc.



100574

Fig. 25: Connector Terminal ID (Celica, Except Celica All-Trac)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

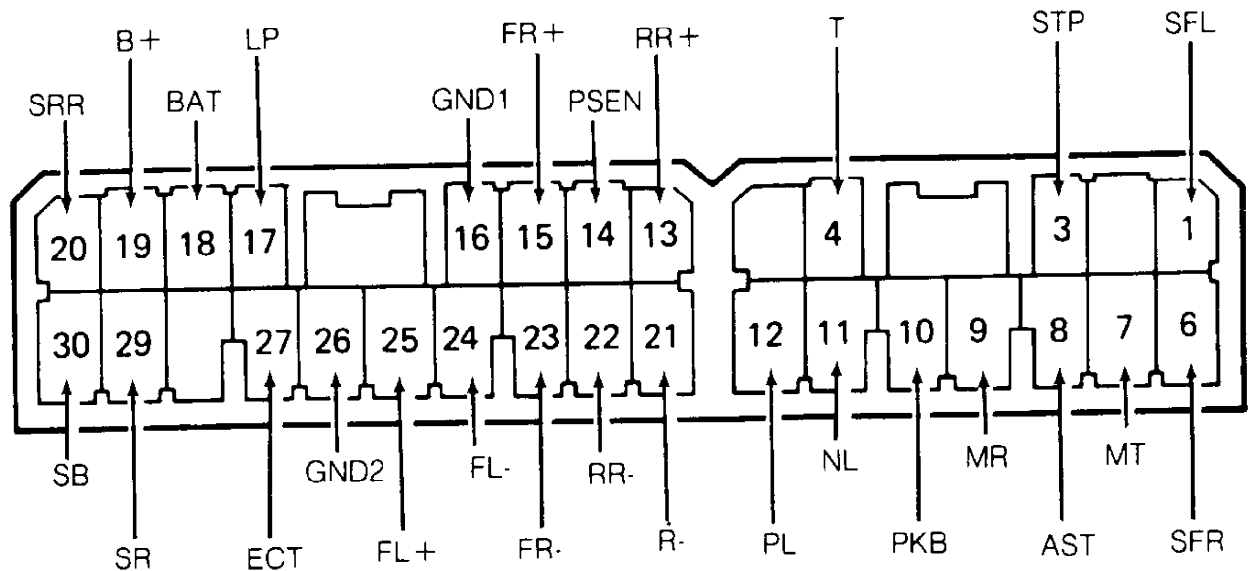
ANTI-LOCK BRAKE SYSTEM COMPOUTER



90G01007

Fig. 26: Connector Terminal ID (Cressida)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

ANTI-LOCK BRAKE SYSTEM COMPUTER



100575

Fig. 27: Connector Terminal ID (Supra)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

FRONT SPEED SENSOR

Disconnect speed sensor connector. Using a DVOM, measure resistance between terminals of sensor. See Fig. 24, 33, 34 or 35. Resistance reading should be 1200-1600 ohms on Cressida, 800-1300 ohms on Supra, and 850-1300 ohms on all other models. If reading is not as specified, replace sensor. Check that there is no continuity between either terminal of sensor and sensor body. If there is continuity, replace sensor.

FRONT ROTOR SERRATION RUNOUT

Measure rotor serrations at .08" (2 mm) from serration edge. Maximum fluctuation allowed measured at the top of 3 consecutive serrations is .004" (.1 mm). If runout is more than maximum allowed, on Cressida and Supra, replace front axle hub. On all other models, replace sensor rotor.

REAR SPEED SENSOR CAMRY & CELICA (ALL)

Disconnect speed sensor connector. Using a DVOM, measure resistance between terminals of sensor. See Fig. 24 or 26. Resistance reading should be 850-1300 ohms. If reading is not as specified, replace sensor. Check that there is no continuity between either terminal of sensor and sensor body. If there is continuity, replace sensor.

REAR SPEED SENSOR CRESSIDA & SUPRA

Disconnect speed sensor connector. Using a DVOM, connect

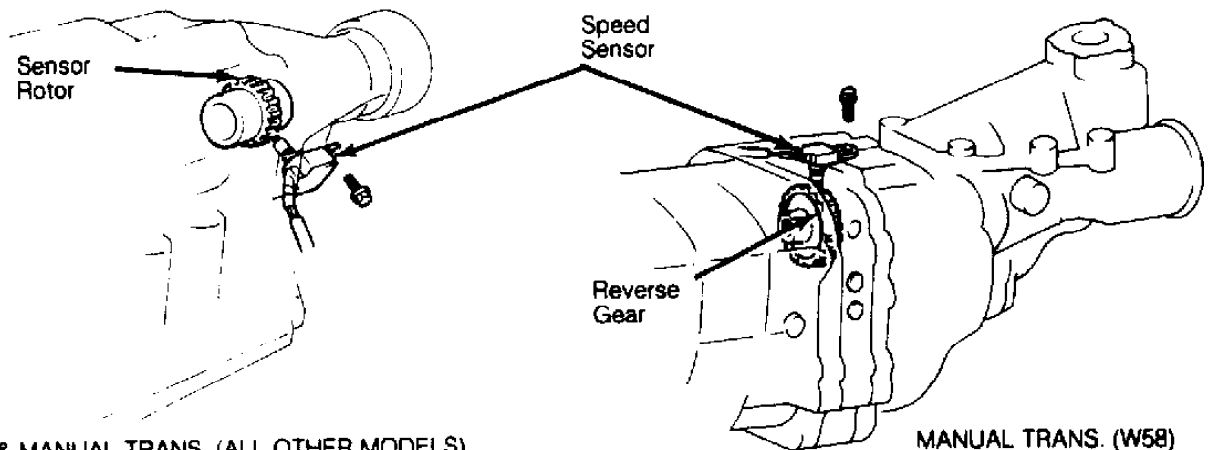
positive lead to terminal RR+. Connect negative lead to terminal RR-. See Fig. 26 or 27. DVOM should read 10,000 to 50,000 ohms. If reading is not as specified, replace sensor. Check that there is no continuity between each terminal and sensor body. If there is continuity, replace sensor.

REAR ROTOR SERRATIONS CAMRY & CELICA (ALL)

On Camry All-Trac and Celica All-Trac, remove left or right drive shaft as necessary. On Camry and Celica, remove brake caliper. Remove rotor assembly. On all models, perform a comprehensive visual inspection of sensor rotor. If any damage is found, replace sensor rotor.

REAR ROTOR SERRATIONS CRESSIDA & SUPRA

On all automatic and manual transmissions, inspect sensor rotor serrations. On manual transmission (W58) equipped vehicles, inspect reverse gear serrations. See Fig. 28. Inspect for scratches, cracks, missing teeth or abnormal play. If any abnormality is found replace sensor rotor or reverse gear.

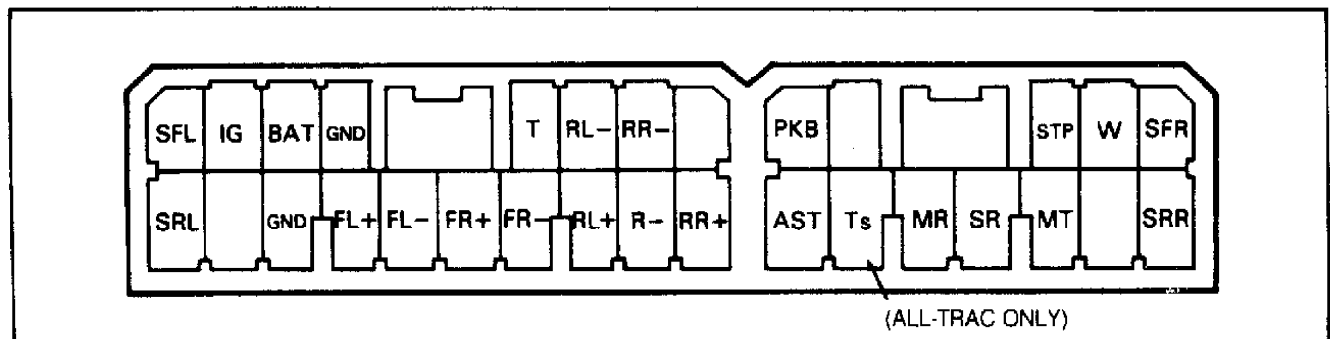


AUTOMATIC & MANUAL TRANS. (ALL OTHER MODELS)

Fig. 28: Rear Speed Sensor & Rotor Location (Cressida & Supra)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

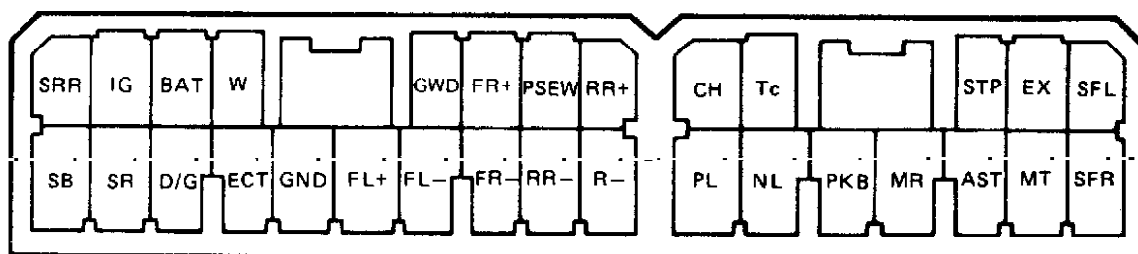
ABS SYSTEM CIRCUIT CHECK W/ABS COMPUTER CONNECTED

Check for voltage readings by back-probing connectors at ABS computer with computer connected. See Fig. 29, 30 or 31.



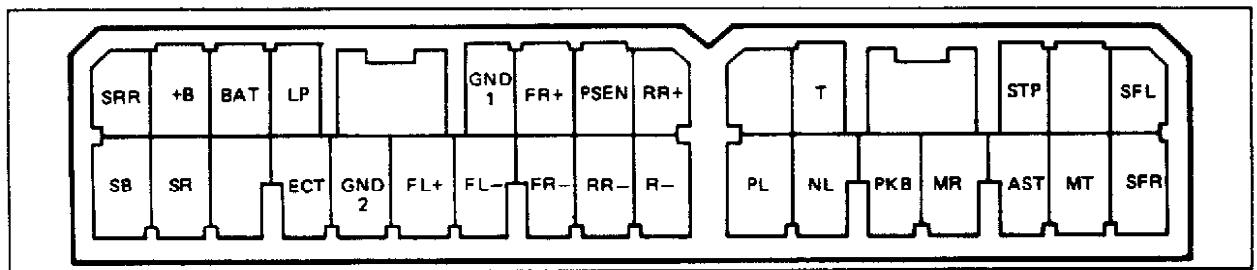
Tester Connection	Condition	Voltage	Trouble Part
SFL - Body ground	Ignition switch on	Battery voltage	Actuator, control relays
	Ignition switch on and "ANTI LOCK" warning light goes on	About 0 V	
SFR - Body ground	Ignition switch on	Battery voltage	
	Ignition switch on and "ANTI LOCK" warning light goes on	About 0 V	
SRL - Body ground	Ignition switch on	Battery voltage	
	Ignition switch on and "ANTI LOCK" warning light goes on	About 0 V	
SRR - Body ground	Ignition switch on	Battery voltage	
	Ignition switch on and "ANTI LOCK" warning light goes on	About 0 V	
AST - Body ground	Ignition switch on	Battery voltage	
	Ignition switch on and "ANTI LOCK" warning light goes on	About 0 V	
W - Body ground	Ignition switch on	Battery voltage	"ANTI LOCK" warning light bulb
	Ignition switch on and "ANTI LOCK" warning light goes on	About 0 V	
T - Body ground	Check connector disconnected	Battery voltage	Check connector, computer
	Check connector connected	About 0 V	

Fig. 29: ABS System Circuit With ABS Computer Connected (All Camry, & Celica)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.



Tester Connection	Condition	Voltage	Trouble Part
SFL — Body ground	Ignition switch on	Battery voltage	Actuator, control relays
	Ignition switch on and "ANTILOCK" warning light goes on	About 0 V	
SFR — Body ground	Ignition switch on	Battery voltage	
	Ignition switch on and "ANTILOCK" warning light goes on	About 0 V	
SRR — Body ground	Ignition switch on	Battery voltage	
	Ignition switch on and "ANTILOCK" warning light goes on	About 0 V	
AST — Body ground	Ignition switch on	Battery voltage	
	Ignition switch on and "ANTILOCK" warning light goes on	About 0 V	
W — Body ground	Ignition switch on	Battery voltage	"ANTILOCK" warning light bulb
	Ignition switch on and "ANTILOCK" warning light goes on	About 0 V	
SB — Body ground	Check connector disconnected	Battery voltage	Connector
	Check connector connected	About 0 V	

Fig. 30: ABS System Circuit With ABS Computer Connected (Cressida)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.



Tester Connection	Condition	Voltage
SFL – Body ground	Ignition switch on	Battery voltage
	Ignition switch on and "ANTILOCK" warning light goes on	About 0 V
SFR – Body ground	Ignition switch on	Battery voltage
	Ignition switch on and "ANTILOCK" warning light goes on	About 0 V
AST – Body ground	Ignition switch on	Battery voltage
	Ignition switch on and "ANTILOCK" warning light goes on	About 0 V
PSEN – Body ground	Ignition switch on	Battery voltage
LP – Body ground	Ignition switch on	Battery voltage
	Ignition switch on and "ANTILOCK" warning light goes on	About 0 V
SRR – Body ground	Ignition switch on	Battery voltage
	Ignition switch on and "ANTILOCK" warning light goes on	About 0 V
SB – Body ground	Ignition switch on	Battery voltage
	Ignition switch on and "ANTILOCK" warning light goes on	About 0 V

Fig. 31: ABS System Circuit With ABS Computer Connected (Supra)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

ABS SYSTEM CIRCUIT CHECK WITHOUT ABS COMPUTER CONNECTED

Check for readings by back-probing connectors at ABS computer with computer disconnected from system. See Fig. 32, 33 or 34.

Tester Connection	Check Item	Condition	Voltage or Resistance Value	Trouble Part
SFR - AST	Resistance	Ignition switch off	About 6 Ω	Actuator
STP - Body ground	Voltage	Ignition switch off and brake pedal depressed	Battery voltage	Stop light switch, stop light
	Continuity	Ignition switch off and brake pedal returned	Continuity	
PKB - Body ground	Voltage	Ignition switch on and PKB lever pulled	About 0 V	Parking brake switch, level warning switch
		Ignition switch on and PKB lever returned	Battery voltage	
SRR - AST	Resistance	Ignition switch off	About 6 Ω	Actuator
MT - Body ground	Continuity	Ignition switch off	Continuity	
SR - R $\ominus$	Resistance	Ignition switch off	85 - 100 Ω	
MR - R $\ominus$	Resistance	Ignition switch off	50 - 80 Ω	
¹ Ts - Body ground	Continuity	-	No continuity	Ts connector, wiring harness
		Ts connector shorted	Continuity	
AST - Body ground	Resistance	Ignition switch off	About 6 Ω	Wiring harness
RR $\ominus$ - Body ground	Continuity	Ignition switch off	No continuity	Rear RH speed sensor
RL $\ominus$ - Body ground	Continuity	Ignition switch off	No continuity	Rear LH speed sensor
T - Body ground	Continuity	Ignition switch off	Continuity	Check connector, wiring harness
GND - Body ground	Continuity	Ignition switch off	Continuity	Wiring harness
BAT - Body ground	Voltage	-	Battery voltage	FOG fuse
IG - Body ground	Voltage	Ignition switch on	Battery voltage	ECU-IG fuse
SFL - AST	Resistance	Ignition switch off	About 6 Ω	Actuator
RR $\oplus$ - RR $\ominus$	Resistance	-	0.85 - 1.30 k Ω	Rear RH speed sensor
R $\ominus$ - Body ground	Continuity	Ignition switch off	No continuity	Wiring harness
RL $\oplus$ - RL $\ominus$	Resistance	-	0.85 - 1.30 k Ω	Rear LH speed sensor
FR $\ominus$ - Body ground	Continuity	-	No continuity	Front RH speed sensor
FR $\oplus$ - FR $\ominus$	Resistance	-	0.85 - 1.30 k Ω	
FL $\ominus$ - Body ground	Continuity	-	No continuity	Front LH speed sensor
FL $\oplus$ - FL $\ominus$	Resistance	-	0.85 - 1.30 k Ω	
SRL - AST	Resistance	Ignition switch off	About 6 Ω	Actuator

¹ - All-Trac models only.

Fig. 32: ABS System Circuit With ABS Computer Disconnected
(Camry, & Celica)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

Tester Connection	Check Item	Condition	Voltage or Resistance Value	Trouble Part
SFR – AST	Resistance	Ignition switch off	About 6 Ω	Actuator
STP – Body ground	Voltage	Ignition switch off and brake pedal depressed	Battery voltage	Stop light switch, stop light
	Continuity	Ignition switch off and brake pedal returned	Continuity	
PKB – Body ground	Voltage	Ignition switch on and PKB lever pulled	About 0 V	Parking brake switch, level warning switch
		Ignition switch on and PKB lever returned	Battery voltage	
SRR – AST	Resistance	Ignition switch off	About 6 Ω	Actuator
MT – Body ground	Continuity	Ignition switch off	Continuity	
SR – R $\ominus$	Resistance	Ignition switch off	65 – 100 Ω	
MR – R $\ominus$	Resistance	Ignition switch off	50 – 80 Ω	
AST – Body ground	Resistance	Ignition switch off	About 5 Ω	Wiring harness
RR $\ominus$ – Body ground	Continuity	Ignition switch off	No continuity	Rear speed sensor
Tc – Body ground	Continuity	Ignition switch off	No continuity	Check TDCL connector wiring harness
GND – Body ground	Continuity	Ignition switch off	Continuity	Wiring harness
BAT – Body ground	Voltage		Battery voltage	FOG fuse
IG – Body ground	Voltage	Ignition switch on	Battery voltage	ECU-IG fuse
SFL – AST	Resistance	Ignition switch off	About 6 Ω	Actuator
R $\ominus$ – Body ground	Continuity	Ignition switch off	No continuity	Wiring harness
FR $\ominus$ – Body ground	Continuity		No continuity	Front RH speed sensor
FR $\oplus$ – FR $\ominus$	Resistance		1.2 – 1.6 k Ω	
FL $\ominus$ – Body ground	Continuity		No continuity	Front LH speed sensor
FL $\oplus$ – FL $\ominus$	Resistance	Ignition switch off	1.2 – 1.6 k Ω	

Fig. 33: ABS System Circuit With ABS Computer Disconnected (Cressida)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

Tester Connection	Check Item	Condition	Voltage or Resistance Value
SFL – AST	Resistance	Ignition switch off	About 1 Ω
STP – Body ground	Voltage	Ignition switch off and brake pedal depressed	Battery voltage
	Continuity	Ignition switch off and brake pedal returned	Continuity
T – Body ground	Continuity	Ignition switch off	Continuity
SFR – AST	Resistance	Ignition switch off	About 1 Ω
MT – Body ground	Continuity	Ignition switch off	Continuity
AST – Body ground	Continuity	Ignition switch off	Continuity
MR – R $\ominus$	Resistance	Ignition switch off	50 – 80 Ω
PKB – Body ground	Voltage	Ignition switch on and PKB lever pulled	About 0 V
		Ignition switch on and PKB lever returned	Battery voltage
NL – Body ground	Voltage	Ignition switch on and shift into “N” range	Battery voltage
PL – Body ground	Voltage	Ignition switch on and shift into “P” range	Battery voltage
RR $\oplus$ – RR $\ominus$	Resistance	Ignition switch off	10 Ω – 50 k Ω
FR $\oplus$ – FR $\ominus$	Resistance	Ignition switch off	0.8 – 1.3 k Ω
GND1 – Body ground	Continuity	Ignition switch off	Continuity
BAT – Body ground	Voltage	–	Battery voltage
$\oplus$ B – Body ground	Voltage	Ignition switch on	Battery voltage
SRR – AST	Resistance	Ignition switch off	About 1 Ω
R $\ominus$ – Body ground	Continuity	Ignition switch off	No continuity
RR $\ominus$ – Body ground	Continuity	Ignition switch off	No continuity
FR $\ominus$ – Body ground	Continuity	Ignition switch off	No continuity
FL $\ominus$ – Body ground	Continuity	Ignition switch off	No continuity
FL $\oplus$ – FL $\ominus$	Resistance	Ignition switch off	0.8 – 1.3 k Ω
GND2 – Body ground	Continuity	Ignition switch off	Continuity
ECT – Body ground	Voltage	Ignition switch on and shift into “N” or “P” range	About 5 V
SR – R $\ominus$	Resistance	Ignition switch off	65 – 100 Ω
SB – AST	Resistance	Ignition switch off	About 2 Ω

Fig. 34: ABS System Circuit With ABS Computer Disconnected (Supra)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

BLEEDING BRAKE SYSTEM

Brake bleeding procedure is the same procedure used to bleed non-ABS systems. If master cylinder was rebuilt or reservoir was ran empty, bleed master cylinder first. Bleed remaining wheels starting with wheel having longest hydraulic line working to shortest hydraulic line.

TORQUE SPECIFICATIONS

TIGHTENING SPECIFICATIONS TABLE

Application	Ft. Lbs. (N.m)
Camry & Celica	
Front & Rear Speed Sensor Bolt	9 (12)
Rear Axle Hub Bolts	59 (80)
Rear Brake Caliper Bolts	34 (46)
Camry All-Trac & Celica All-Trac	
Front Speed Sensor Bolt	9 (12)
Rear Brake Caliper Bolts	34 (46)
Rear Speed Sensor Bolt	14 (19)
Cressida	
Front Speed Sensor Bolt	9 (12)
Rear Brake Caliper Bolts	34 (46)
Rear Speed Sensor Bolt	12 (16)
Supra	
Front Speed Sensor Bolt	14 (19)
Rear Brake Caliper Bolts	14 (19)
Rear Speed Sensor Bolt	
A/T	12 (16)
M/T	21 (28)

WIRING DIAGRAMS

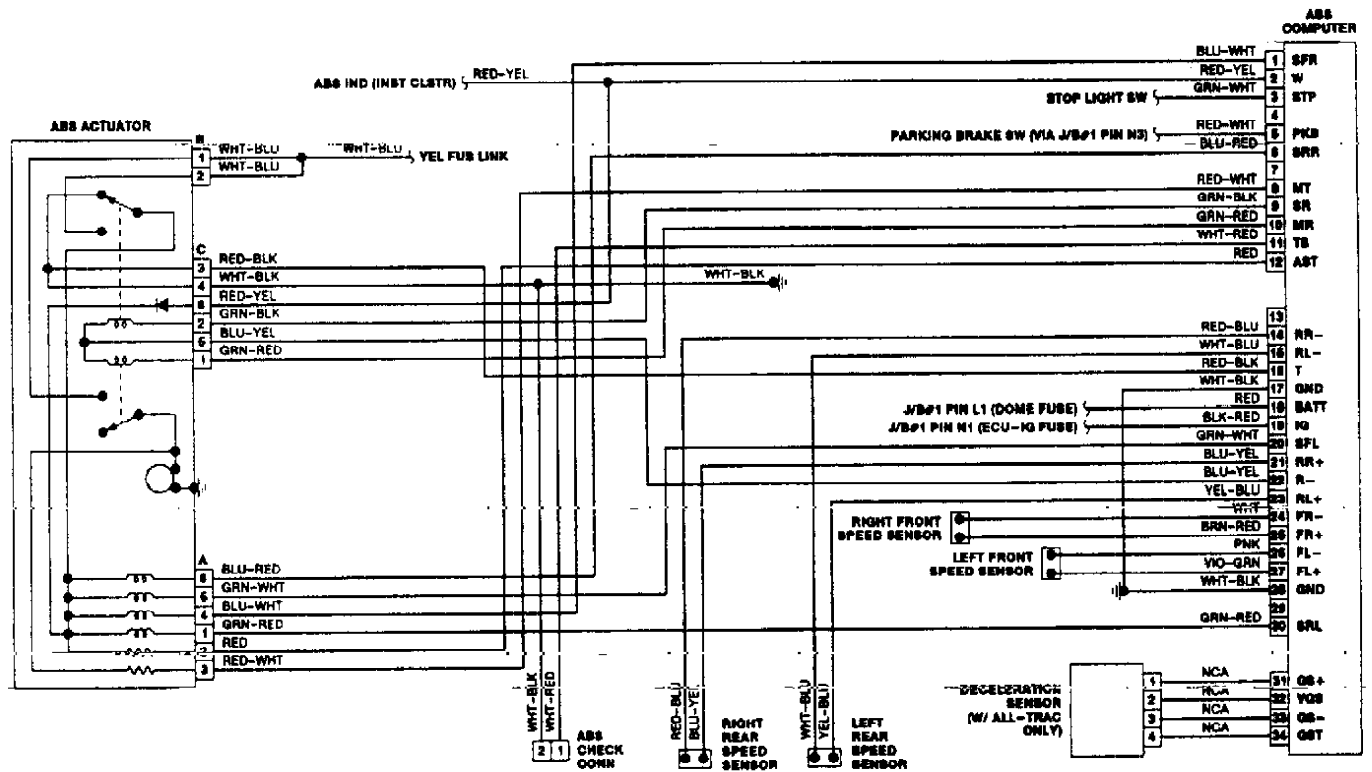


Fig. 35: Camry & Camry All-Trac Anti-Lock Brake System Wiring Diagram

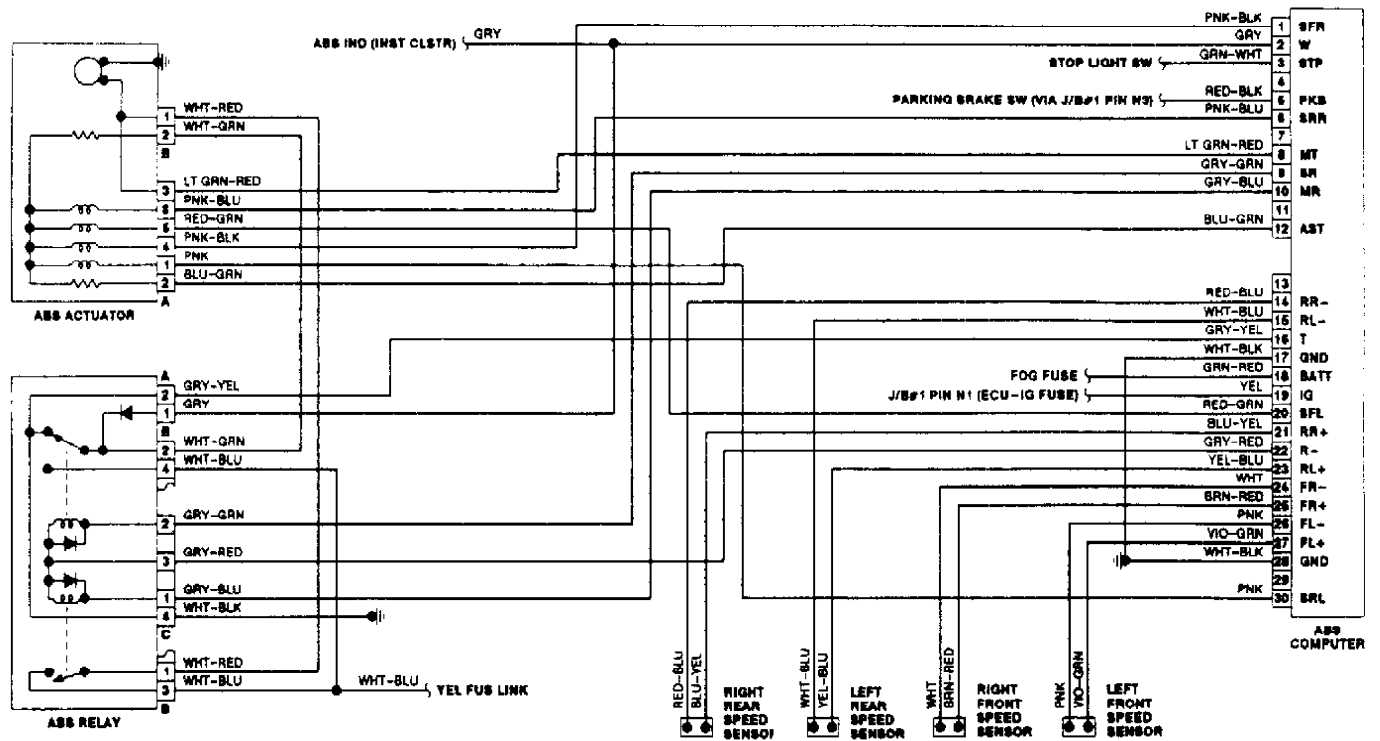


Fig. 36: Celica Non-Turbo Anti-Lock Brake System Wiring Diagram

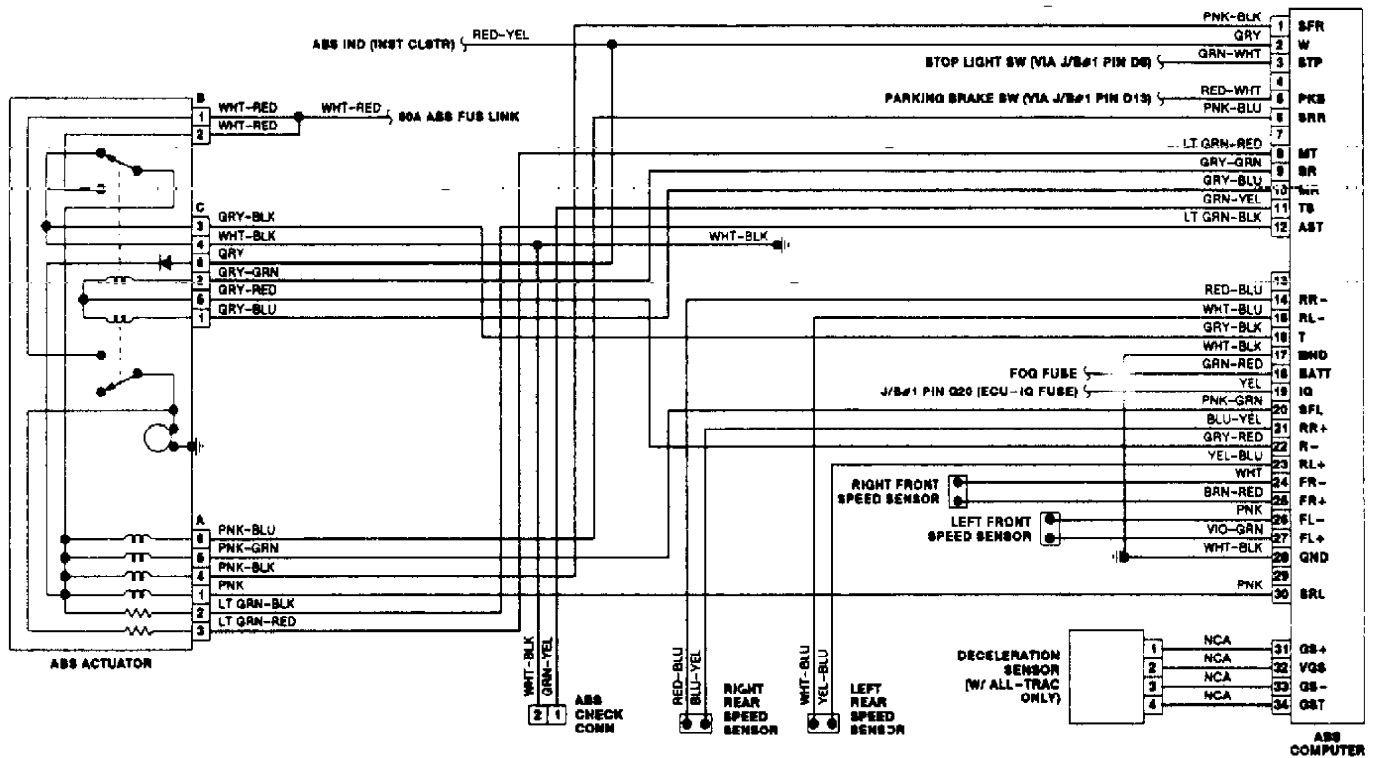


Fig. 37: Celica & Celica All-Trac Anti-Lock Brake System Wiring Diagram

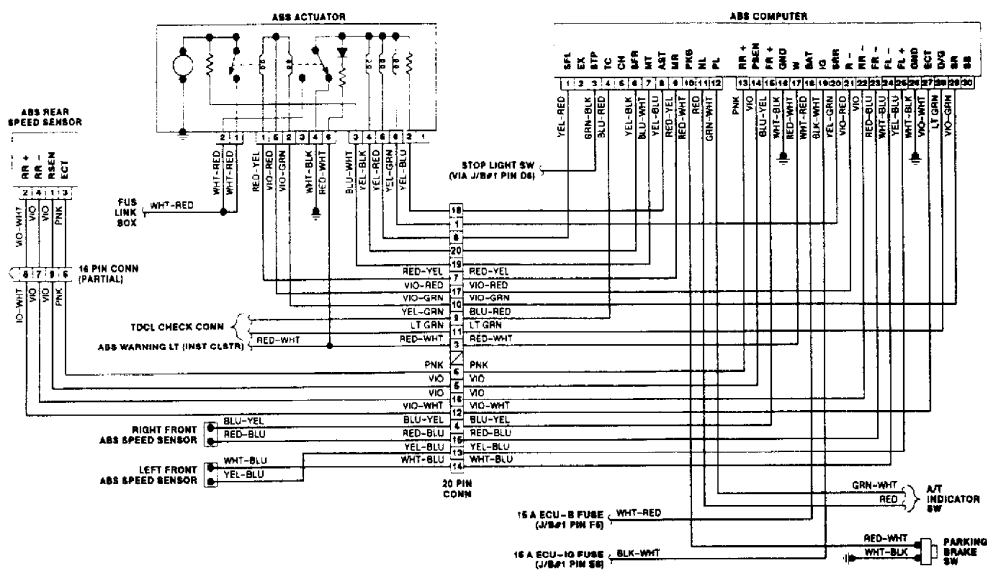


Fig. 38: Cressida Anti-Lock Brake System Wiring Diagram

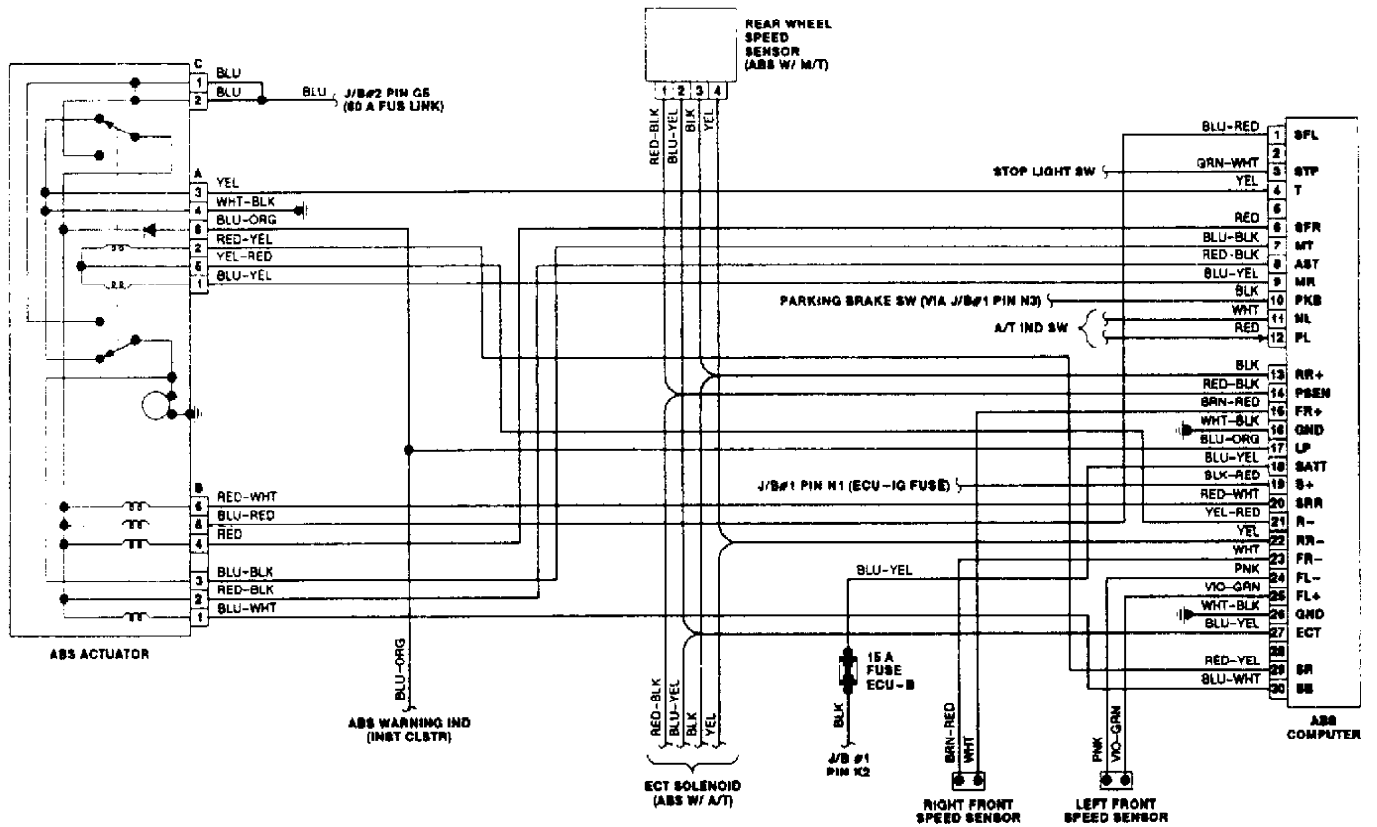


Fig. 39: Supra Anti-Lock Brake System Wiring Diagram