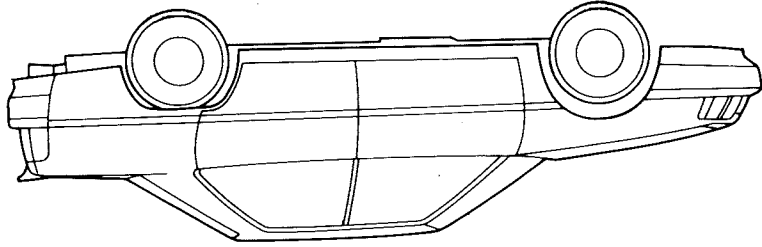




# ABS TESTER INSTRUCTIONS



OTC Tool & Equipment Division  
Sealed Power Corporation  
655 Eisenhower Drive  
Owatonna, Minnesota 55060  
Telephone 507-455-7000  
Order Entry 507-455-1480  
Technical Services 507-451-5860  
Telex RCA 201674

## WARRANTY

THIS WARRANTY IS EXPRESSLY LIMITED TO PERSONS WHO PURCHASE OTC PRODUCTS FOR PURPOSES OF RESALE OR USE IN THE ORDINARY COURSE OF THE BUYERS BUSINESS.

OTC electronic products are warranted against defects in materials and workmanship for 1 year (12 months) from date of delivery to the user. This warranty does not cover any part that has been abused, altered, used for a purpose other than that for which it was intended, or used in a manner inconsistent with instructions regarding use. The exclusive remedy for any electronic tester found to be defective is repair or replacement, and OTC shall not be liable for any consequential or incidental damages. Final determination of defects shall be made by OTC in accordance with procedures established by OTC. No agent, employee or representative of OTC has any authority to bind OTC to any affirmation, representation or warranty concerning OTC electronic testers, except as stated herein.

## DISCLAIMER

THE ABOVE WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, EXPRESSED OR IMPLIED INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

## ORDER INFORMATION

Replaceable and optional parts may be ordered directly from OTC, SPX Corporation, 655 Eisenhower Drive, Owatonna, Minnesota 55060 (507) 455-7010. Attn. Order Entry Dept.

Your order should include the following information:

1. Quantity
2. Item number
3. Item description
4. Instrument Model number
5. Instrument serial number

## REPAIR SERVICE AVAILABLE

Should your unit require repair service, return it to the manufacturer with date of purchase information.

If the unit is determined to be in warranty, it will be repaired or replaced with no charge and returned freight prepaid. If the unit is determined to be out of warranty, it will be repaired for a nominal service charge plus return freight.

Return the unit prepaid to:

OTC, SPX Corporation, 655 Eisenhower Dr., Owatonna, MN 55060, (507) 451-5860, Attn: Service Repair Dept.

There must be adequate ventilation in the service area. Carbon monoxide is odorless, causes slower reaction time, and may lead to serious injury.



**DANGER**

- Do not drive vehicle or engage the transmission during any part of the testing procedure.

- While testing the Mitsubishi ABS System, each wheel must be spun by a technician. A hoist, rack or floor jack must be used to raise the vehicle off the floor. All cautions pertaining to the equipment used to lift the vehicle MUST be observed by the technicians performing the test.

### IMPORTANT:

- Vehicle battery must have an adequate charge (tester will display LOW BATTERY at 10.5 volts) to insure accurate test results.

### NOTE:

This manual is written for service personnel who are knowledgeable and well trained in the technical aspects of the Mitsubishi ABS Systems. The ABS Analyzer will read data directly from the vehicle ABS components and will initiate special test conditions if the user applies it correctly. Full knowledge of the ABS system is essential to take advantage of the full range of information presented by this manual and the ABS Analyzer.

All information, illustrations and specifications contained in this technical manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

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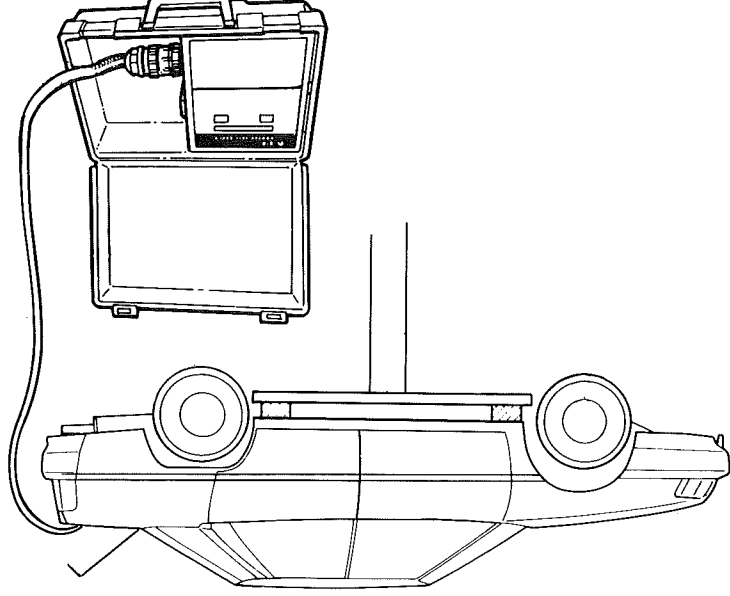
2	Description .....
3	Tester Components .....
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# REPLACEABLE PARTS

ITEM	PART NUMBER
ABS Tester .....	MB991131-02
ABS Vehicle Cable .....	52985
Instruction Manual .....	103189

## DESCRIPTION

The MB991131-02 ABS tester is a microprocessor-based diagnostic tool used to troubleshoot the anti-lock braking system. Connection to the vehicle is made by removing the 35-pin connector from the ABS controller and connecting the ABS tester to the vehicle harness. Power is supplied through the vehicle harness. After initial power up, the tester goes into a status test of input lines and a continuity check on the wheel speed sensors. Faults are displayed on a 16-character vacuum fluorescent display. Two membrane switches are provided to allow the user to select test modes and the wheel he wishes to test. Dynamic testing of the wheel speed sensors and actuation of the three stage valves are both capabilities of the MB991131-02 ABS tester.



## NOTES



## TROUBLESHOOTING

Vehicles equipped with the anti-lock braking system (ABS) may normally exhibit one or more of the following symptoms.

**NOTE:** These are not an indication of a problem.

(1) A vibration of the vehicle body or steering wheel, or a pulsation in the brake pedal when the anti-lock braking system is activated by braking suddenly or on a slippery surface.

(2) When the vehicle is started, the motor may whine the first time it reaches 6 km/h (4 mph). This noise is from a self-check of the anti-lock braking system.

## CHECKING THE ELECTRICAL SYSTEM

The electrical system of the ABS is divided into five parts: the electronic control unit, the body harnesses, the hydraulic unit, the speed sensor, and the failure light.

**IMPORTANT:** Make all tests in the order as instructed. The electronic control unit cannot be checked as a single component and must be replaced if all other components reveal no abnormal condition.

## NOTES



# TESTING PROCEDURE



**WARNING:** Do not drive vehicle or engage the transmission during any part of the testing procedure.

## 1. CONNECTION/POWER-UP

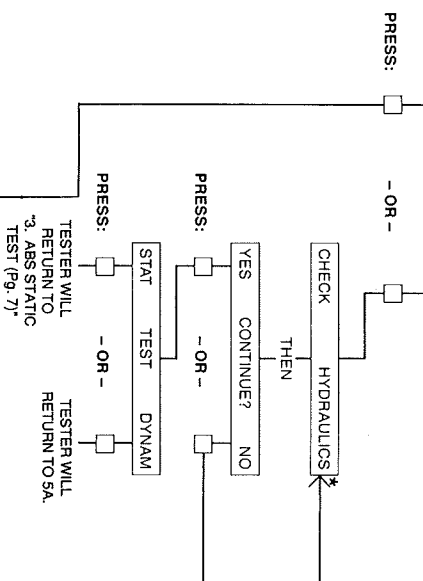
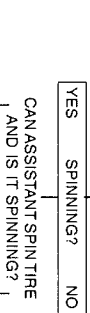
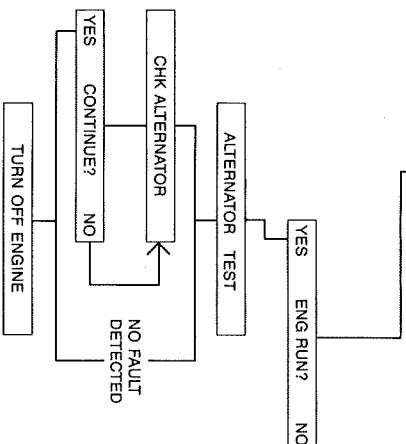
1. LOCATE ABS CONTROL UNIT.
2. DISCONNECT CONTROL UNIT HARNESS CONNECTOR FROM CONTROL UNIT.
3. CONNECT TESTER HARNESS TO CONTROL UNIT HARNESS CONNECTOR.

## 2. ALTERNATOR TEST START ENGINE

TESTER WILL RAPIDLY DISPLAY SEVERAL MESSAGES DURING AN INITIAL SEGMENT CHECK.

ALTERNATOR TESTED BY RUNNING ENGINE.

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\* INDICATES A FAULT MESSAGE. REFER TO APPLICABLE SHOP MANUAL FOR ADDITIONAL DIAGNOSTIC INFORMATION.

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PUSH TEST 2

PUSH EITHER SWITCH TO START THIS TEST  
(CONTINUE APPLYING FIRM PRESSURE TO BRAKE PEDAL.)

IF NO FAULTS ARE DETECTED, TESTER WILL ADVANCE TO NEXT STEP.

IF A FAULT IS DETECTED, TESTER WILL DISPLAY EITHER:

CHK VALVE RELAY  
(Check Valve Relay)

CHK HYDRA WIRING  
(Check Hydraulic Wiring)

YES CONTINUE? NO

YES CONTINUE? NO

PRESS:

PRESS:

- OR -

SPIN -- TIRE  
HAVE YOUR ASSISTANT SPIN THE TIRE AS DIRECTED.

STAT TEST DYNAM

PRESS:

- OR -

PRESS:

TESTER WILL RETURN TO "3. ABS STATIC TEST (Pg. 7)"\*

TESTER WILL RETURN TO 5A.

\* INDICATES A FAULT MESSAGE. REFER TO APPLICABLE SHOP MANUAL FOR ADDITIONAL DIAGNOSTIC INFORMATION.

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### 3. ABS SYSTEM TEST

## TURN IGNITION KEY ON

(DO NOT RUN ENGINE)

TESTER WILL RAPIDLY DISPLAY SEVERAL MESSAGES DURING AN INITIAL SEGMENT CHECK.

YES ENG RUN? NO

YES MITSUBISHI ABS

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VEHICLE SELECTION

YES SIGMA? NO

PRESS:

- OR -

YES ALL WD NO

PRESS:

- OR -

READING VOLTAGES

**3. ABS SYSTEM TEST - CONT'D**

\* INDICATES A FAULT MESSAGE. REFER TO APPLICABLE SHOP MANUAL FOR ADDITIONAL DIAGNOSTIC INFORMATION.

READING VOLTAGES  
TESTER AUTOMATICALLY PERFORMS MULTIPLE SYSTEM VOLTAGE TESTS.

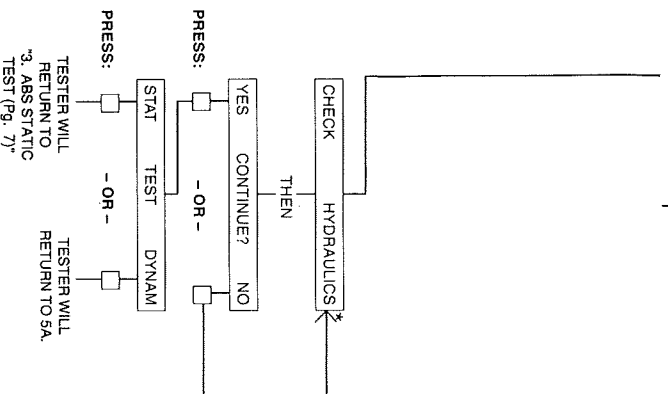
IF NO FAULTS ARE DETECTED, TESTER WILL ADVANCE TO NEXT TEST.

IF FAULTS ARE DETECTED, TESTER WILL DISPLAY THE CORRESPONDING FAULT MESSAGE(S) AS SHOWN BELOW:

LF VALVE OPEN *	CHK SYSTEM GND *
(Left Front Valve Open)	(Check System Ground)
RF VALVE OPEN *	CHK LF SPD SENS *
(Right Front Valve Open)	(Check Left Front Speed Sensor)
LR VALVE OPEN *	CHK RF SPD SENS *
(Left Rear Valve Open)	(Check Right Front Speed Sensor)
RR VALVE OPEN *	CHK LR SPD SENS *
(Right Rear Valve Open)	(Check Left Rear Speed Sensor)
CHK ABS DIODE *	CHK RR SPD SENS *
(Check ABS Diode)	(Check Right Rear Speed Sensor)
CHK CONT MOD GND *	L.F. + R.R. VALVE OPEN *
(Check Control Module Ground)	(Left Front - Right Rear)
CHK G-SENSOR 1+2 *	R.F. + L.R. VALVE OPEN *
(Check G-Sensor 1 and 2)	(Right Front - Left Rear)

TESTER DISPLAY WILL ALTERNATE ABOVE MESSAGES WITH

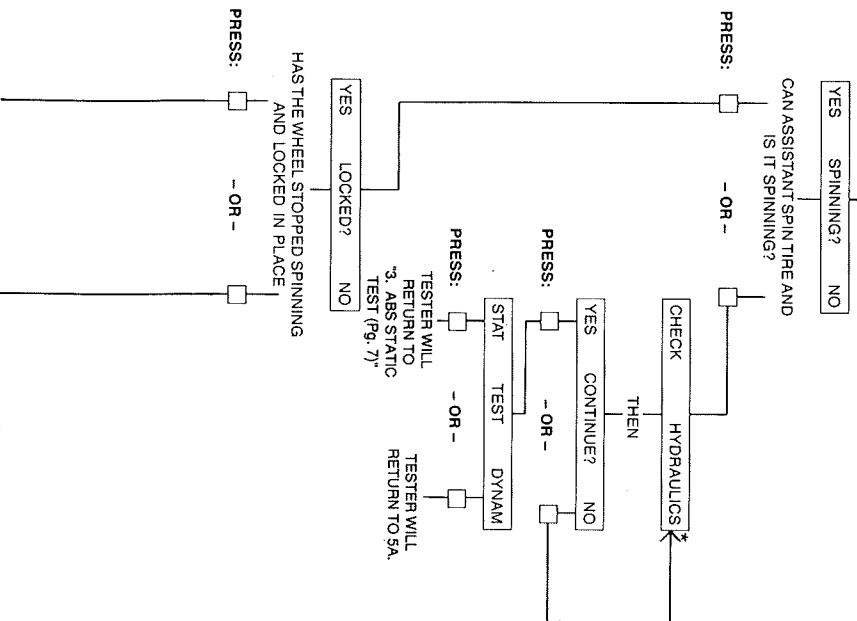
YES CONTINUE?  - OR -  TESTER WILL DISPLAY SAME FAULT MESSAGE.  
IF NO ADDITIONAL FAULTS ARE DETECTED, TESTER WILL ADVANCE TO NEXT TEST.  
IF ADDITIONAL FAULTS ARE DETECTED, TESTER WILL DISPLAY NEXT FAULT MESSAGE.



\* INDICATES A FAULT MESSAGE. REFER TO APPLICABLE SHOP MANUAL FOR ADDITIONAL DIAGNOSTIC INFORMATION.

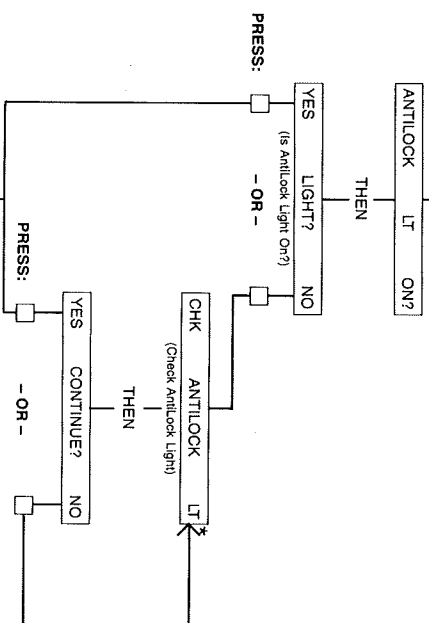
\* INDICATES A FAULT MESSAGE. REFER TO APPLICABLE SHOP MANUAL FOR ADDITIONAL DIAGNOSTIC INFORMATION.

\*NOTE: ON ALL WHEEL DRIVE VEHICLES, THE FRONT WHEELS WILL ROTATE WITH GREAT RESISTANCE DUE TO THE VISCOUS COUPLING. THIS DOES NOT INDICATE A PROBLEM. DURING THE LOCKED PHASE, THE WHEELS WILL NOT TURN.



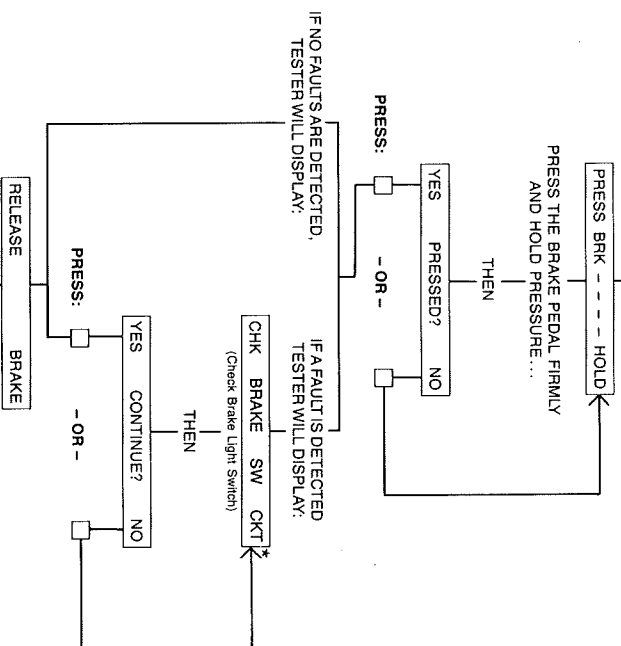
**4. STATIC TESTS**

**4A. ANTI-LOCK LIGHT TEST**



\* INDICATES A FAULT MESSAGE. REFER TO APPLICABLE SHOP MANUAL FOR ADDITIONAL DIAGNOSTIC INFORMATION.

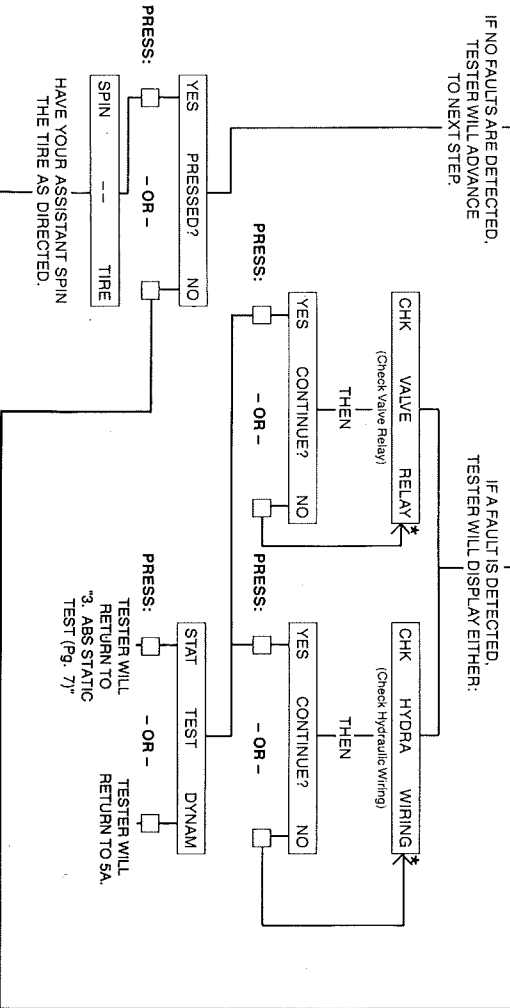
4B. BRAKE LIGHT SWITCH TEST



\* INDICATES A FAULT MESSAGE. REFER TO APPLICABLE SHOP MANUAL FOR ADDITIONAL DIAGNOSTIC INFORMATION.

PRESS BRK... HOLD

APPLY FIRM PRESSURE TO BRAKE PEDAL, AND HOLD FIRMLY THROUGH SOLENOID TEST 1 AND TEST 2.

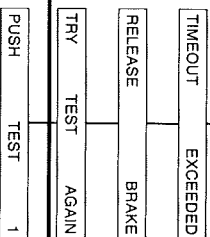


\* INDICATES A FAULT MESSAGE. REFER TO APPLICABLE SHOP MANUAL FOR ADDITIONAL DIAGNOSTIC INFORMATION.

HAVE YOUR ASSISTANT SPIN THE TIRE AS DIRECTED.

5C. SOLENOID TEST

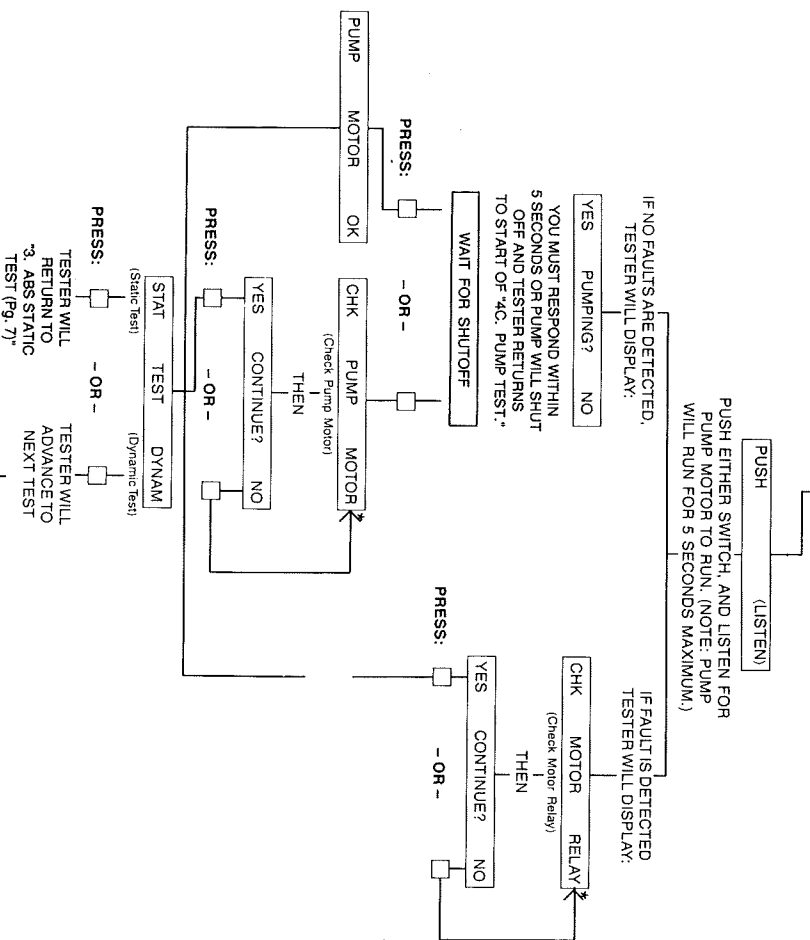
**NOTE:** EACH OF THE TWO SOLENOID TESTS FOR EACH WHEEL CAN BE CONDUCTED FOR A MAXIMUM OF 20-90 SECONDS. IF TIME LIMIT IS EXCEEDED, TESTER WILL DISPLAY:



PUSH EITHER SWITCH TO START THIS TEST. TESTER WILL DISPLAY:

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4C. PUMP TEST



\* INDICATES A FAULT MESSAGE. REFER TO APPLICABLE SHOP MANUAL FOR ADDITIONAL DIAGNOSTIC INFORMATION.

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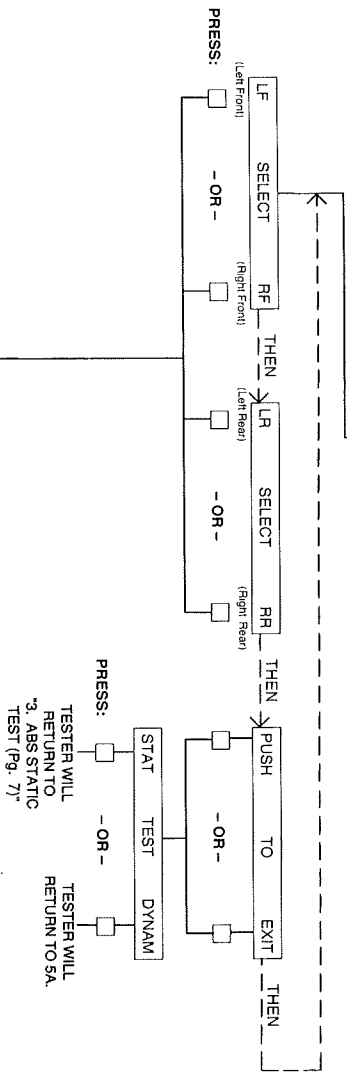
**5. DYNAMIC TESTS**

**5A. WHEEL SELECTION OR EXIT**

THESE THREE MESSAGES WILL ALTERNATE ON THE DISPLAY SCREEN AT 3 1/2 SECOND INTERVALS. NOW, SELECT ONE OF THE FOUR WHEELS TO BEGIN THE DYNAMIC TEST SEQUENCE.

OR

PRESS EITHER SWITCH UNDER "PUSH TO EXIT" DISPLAY TO RETURN TO "STAT TEST DYNAM" SELECTION.



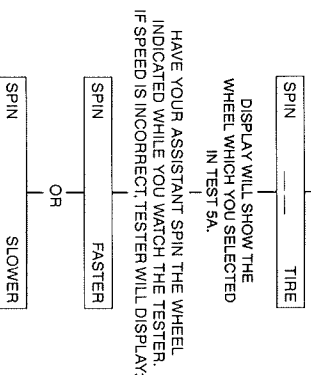
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**IMPORTANT:**  
WHEN ENTERING THE DYNAMIC TEST SEQUENCE, YOU WILL SELECT ONE OF FOUR WHEELS TO BEGIN. WHEN YOU HAVE FINISHED WITH THAT WHEEL TEST, YOU SHOULD RETURN TO "5A. WHEEL SELECTION." TO SELECT ANOTHER WHEEL, AND REPEAT THESE TEST PROCEDURES FOR ALL FOUR WHEELS.

**NOTE: FOR EACH OF THE WHEEL TESTS, IT IS NECESSARY TO RAISE THE WHEEL(S) BEING TESTED OFF THE FLOOR. (WHEN TESTING REAR WHEELS, BOTH WHEELS MUST BE RAISED OFF THE FLOOR.) AN ASSISTANT WILL BE REQUIRED TO SPIN THE WHEELS.**

**CAUTION!**  
ON ALL WHEEL DRIVE VEHICLES ALL WHEELS MUST BE OFF THE FLOOR TO PREVENT VEHICLE FROM DRIVING OFF THE HOIST.

**5B. WHEEL SENSOR TEST**



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\* INDICATES A FAULT MESSAGE. REFER TO APPLICABLE SHOP MANUAL FOR ADDITIONAL DIAGNOSTIC INFORMATION.

TESTER WILL RETURN TO "5A. WHEEL SELECTION"