

LITE-CHECK

"DIAGNOSTIC TOOLS FOR VEHICLE SAFETY"

***OPERATIONS MANUAL
SUPPLEMENT PAGES 16-22***

FOR

**MODEL 910B
Software REV 7.30
ABS/PLC Testing
Procedures**

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ABS/PLC TESTING (For 910B Software Rev 7.30)

DESCRIPTION: Operate and test trailer ABS/PLC for Active and/or Stored Faults

Manufacturers and Types of ABS Supported by LITE-CHECK 910B Tester:

MFG	BLINK CODE				PLC				PLC HELP
	ACTIVE FAULT		STORED FAULT		ACTIVE FAULTS		STORED FAULTS		
	Read	Clear	Read	Clear	Read	Clear	Read	Clear	
Bendix EC30-T									
Haldex									
Meritor Wabco									
Wabash									

All information and directions were obtained from each of the above ABS OEMs. The LITE-CHECK process conforms to each OEMs procedure.

NOTE: If the 910B tester does not support a particular ECU, the tester display will read "NOT SUPPORTED AT THIS TIME" or "UNABLE TO DETERMINE ECU TYPE".

SET-UP:

1. Connect tester to trailer with 7-way cable and (2) ¼" airlines with gladhands
2. Press "**AUX**" key to test power circuit to ECU.
 - a. Normal amperage with ABS warning light on is +/- 0.42 amp
 - b. Normal amperage with ABS warning light off is +/- 0.12 amp (ABS is working without fault)
3. Press "**ABS**" or "**A**" key to begin automatic ABS test.

BLINK CODE OPERATION:

1. Use the "D" or "SELECT" key to select either WABCO or WABASH ECU to access the fault codes
2. Screen will show ACTIVE fault if applicable
3. Press "ABS" or "A" key to remove power to ECU and make repairs
4. Press "ABS" or "A" key (repeat step one above) to verify repair and to view any additional active faults.
5. Press "CLEAR" or "C" key to clear fault codes and reconfigure the system
6. Rotate wheels to activate the ECU
7. Press "AUX" key to observe warning light turn on and off.

PLC OPERATION:

Display screen will show:

BEGIN ABS TEST
PLEASE WAIT

PLC TYPE ECU
SIGNAL DETECTED

(MFG NAME) ECU
DETECTED

AT THIS POINT, PROCEDURES VARY SLIGHTLY FOR EACH MANUFACTURER. PLEASE CONSULT PROCEDURES FOR EACH MANUFACTURER ON THE FOLLOWING PAGES.

910B PLC TESTING PROCEDURE BY MANUFACTURER

BENDIX

NO ACTIVE FAULT

BENDIX EC30-T	CAB OFF
NO FAULTS, ABS GOOD	

1. Press "CLEAR" or "C" key to clear Stored Faults
2. Press "ABS" or "A" key to exit ABS Test

ACTIVE FAULT

ACTIVE FAULT	CAB ON
GETTING DATA – WAIT	

ACTIVE FAULT	CAB ON
(Description of Fault)	

1. Press "SELECT" or "D" key to activate the **Help Screen** which will identify the SID & FMI and automatically scroll through Bendix' recommended repair.
2. When scroll is complete and "end>" appears, you can press "SELECT" or "D" again to repeat the **Help Screen**.
3. Press ABS key (and AUX key if still on) to remove power to ECU
4. Repair Fault
5. Press "ABS" or "A" key to verify no more active faults. If another Active Fault is displayed, repeat above procedures until you get the NO ACTIVE FAULT screen.
6. Press "CLEAR" or "C" key to clear Stored Faults
7. Press "ABS" or "A" key to exit ABS Test

HALDEX

NO ACTIVE FAULT

HALDEX ECU	CAB OFF
NO FAULTS, ABS GOOD	

1. Press "STORED" or "B" key to retrieve and read Stored Faults
2. Press "CLEAR" or "C" key to clear Stored Faults
3. Press "ABS" or "A" key to exit ABS test

ACTIVE FAULT

ACTIVE FAULT	CAB ON
GETTING DATA – WAIT	

ACTIVE FAULT	CAB ON
(Description of Fault)	

1. Press "SELECT" or "D" key to activate the **Help Screen** which will identify the fault code and automatically scroll through Haldex' recommended repair.
2. When scroll is complete and "end>" appears, you can press "SELECT" or "D" again to repeat the **Help Screen**.
3. Press ABS key (and AUX key if still on) to remove power to ECU
4. Repair Fault
5. Press "ABS" or "A" key to verify no more active faults. If another Active Fault is displayed, repeat above procedures until you get the NO ACTIVE FAULT screen.
6. Press "STORED" or "B" key to retrieve and read Stored Faults
6. Press "CLEAR" or "C" key to clear Stored Faults
7. Press "ABS" or "A" key to exit ABS Test

910B PLC TESTING PROCEDURE BY MANUFACTURER

(continued)

MERITOR WABCO

NO ACTIVE FAULT

WABCO ECU	CAB OFF
NO FAULTS, ABS GOOD	

1. Press "STORED" or "B" key to retrieve and read Stored Faults
2. Press "CLEAR" or "C" key to clear Stored Faults
3. Press "ABS" or "A" key to exit ABS test

ACTIVE FAULT

ACTIVE FAULT	CAB ON
GETTING DATA – WAIT	

ACTIVE FAULT	CAB ON
(Description of Fault)	

1. Press "SELECT" or "D" key to activate the **Help Screen** which will identify the fault code and automatically scroll through Wabco's recommended repair.
2. When scroll is complete and "end>" appears, you can press "SELECT" or "D" again to repeat the **Help Screen**.
3. Press ABS key (and AUX key if still on) to remove power to ECU
4. Repair Fault
5. Press "ABS" or "A" key to verify no more active faults. If another Active Fault is displayed, repeat above procedures until you get the NO ACTIVE FAULT screen.
6. Press "STORED" or "B" key to retrieve and read Stored Faults
7. Press "CLEAR" or "C" key to clear Stored Faults
8. Press "ABS" or "A" key to exit ABS Test

NOTE: For any fault reading "SENSOR RATE UPD", you must rotate the wheels to clear the fault

WABASH NATIONAL

NO ACTIVE FAULT

WABASH ECU	CAB OFF
NO FAULTS, ABS GOOD	

1. Press "ABS" or "A" key to exit ABS test

ACTIVE FAULT

ACTIVE FAULT	CAB ON
GETTING DATA – WAIT	

ACTIVE FAULT	CAB ON
(Description of Fault)	

1. Press ABS key (and AUX key if still on) to remove power to ECU
2. Repair Fault
3. Press "ABS" or "A" key to verify no more active faults. If another Active Fault is displayed, repeat above procedures until you get the NO ACTIVE FAULT screen.
4. Press "STORED" or "B" key to retrieve and read Stored Faults
5. Press "CLEAR" or "C" key to clear Stored Faults
6. Press "ABS" or "A" key to exit ABS Test

IMPORTANT: IF YOU HAVE ANY QUESTIONS REGARDING THE ECU, PLEASE DIRECT THOSE QUESTIONS TO THE MANUFACTURERS TECHNICAL HELP DEPARTMENT.

Sensors

FMI	Initial Active Fault Screen	Bendix SID 1-4	Wabco SID 3-6
Desc.		(Location) Sensor Start	(color/#) Air gap too large
1	(location) SENSOR TOO LOW	Sensor output low during low-speed vehicle operation. Adjust speed sensor to contact tone ring. Verify condition of tone ring mounting and teeth. Rotate wheel and verify minimum 0.8 volts AC sensor output @ 1 RPS. Verify condition and retention force of sensor clip. Verify proper sensor lead routing and clamping.	The ABS ECU has detected that the sensor is not producing a large enough signal. Push the sensor in until it touches the tooth wheel
Desc.		(Location) Sensor Intermittent	(color/#) Wheel Speed Difference
2	(locattion) SENSOR ERRATIC	Intermittent sensor output. Adjust speed sensor to contact tone ring. Verify condition of tone ring mounting and teeth. Rotate wheel and verify minimum 0.8 volts AC sensor output @ 1 RPS. Verify condition and retention force of sensor clip. Verify proper sensor lead routing and clamping.	The ABS ECU has detected a wheel speed difference. Check for loose sensor connectors on the ECU and on the extension cables. Check for damaged teeth on the tooth wheel. Push sensor all the way in until it touches the tooth wheel. Check wheel bearing adjustment
Desc.		(Location) Sensor Shorted to VBAT	(color/#) Shorted to 12 Volts
3	(location) SENSOR SHORT HI	Check for corroded or damaged sensor and ECU wiring and connectors. Verify +12V is not measured at either sensor lead.	The ABS ECU has detected that the sensor wiring has 12 volts on it. Check the sensor wiring and connectors for damage. The resistance of the sensor should be between 500 and 2000 ohms. Replace sensor if the resistance reading is out of range
Desc.		(Location) Sensor Shorted to Gnd	(color/#) Shorted to Ground
4	(location) SENSOR SHORT LO	Check for corroded or damaged sensor and ECU wiring and connectors. Verify no continuity from sensor leads to ground.	The ABS ECU has detected that the sensor wire is shorted to ground. Check the sensor wiring and connectors for damage. The resistance of the sensor should be between 500 and 2000 ohms. Replace sensor if resistance reading is out of range
Desc.		(Location) Sensor Open	(color/#) Open Circuit
5	(location) SENSOR OPEN CKT	Check for corroded or damaged sensor and ECU wiring and connectors. Verify 1500 to 2500 ohms across sensor leads.	The ABS ECU has detected that the sensor wires or the sensor itself has an open in it. Check the sensor wiring and connectors for damage....
Desc.		() Sensor Shorted Across Sensor	(color/#) Open or short circuit
6	(location) SENSOR GRND CKT	Check for corroded or damaged sensor and ECU wiring and connectors. Verify 1500 to 2500 ohms across sensor leads.	The ABS ECU has detected that the sensor wire is open or shorted. Check the sensor wiring and connectors for damage...
Desc.		(Location) Sensor Lock Time Out	(color/#) Tone Wheel Defect
7	(location) SENSOR BAD RESP	Sensor output low during vehicle operation above 10 mph. Verify condition of tone ring mounting. Adjust speed sensors to contact tone ring. Rotate wheel and verify minimum 0.8 volts AC sensor output @ 1 RPS. Verify condition and retention force of sensor clips. Verify proper sensor lead routing and clamping	The ABS ECU has detected an erratic sensor signal that may be caused by a defective tone wheel. Examine the tone wheel for damaged/missing teeth, or wheel-end bearing adjustment causing runout
Desc.		(Loc.) Sensor Frequency Doubling	(color/#) Wheel Slip Failure
8	(location) SENSOR FREQ ODD	Verify condition and retention force of sensor clips. Check for corroded or damaged sensor and ECU wiring and connectors. Verify no continuity from sensor leads to ground. Verify sensor leads are twisted pair.	The ABS ECU has detected that the sensor is producing an erratic signal. Check for loose sensor connectors on the ECU and on the extension cables. Check for damaged teeth on the tooth wheel. Push sensor all the way in until it touches the tooth wheel.
Desc.		() Sensor High Frequency Noise	(color/#) No Speed Detected
9	(location) SENSOR RATE UPD	Verify condition and retention force of sensor clips. Check for corroded or damaged sensor and ECU wiring and connectors. Verify no continuity from sensor leads to ground. Verify sensor leads are twisted pair.	The ABS ECU has detected that the sensor is producing no signal. Check for loose sensor connectors on the ECU and on the extension cables. Check for damaged teeth on the tooth wheel. Push sensor all the way in until it touches the tooth wheel.

Sensors (cont.)			
FMI	Initial Active Fault Screen	Bendix SID 1-4	Wabco SID 3-6
Desc.		(Location) Sensor Wobble Run	(color/#) Erratic Speed Signal
10	(location) SENSOR RATE CHG	Sensor output intermittent or excessive wobble in exciter ring. Verify condition of tone ring mounting and teeth. Verify proper adjustment of wheel bearings. Adjust speed sensor to contact tone ring. Rotate wheel and verify minimum 0.8 volts AC sensor output @ 1 RPS. Verify condition and retention force of sensor clip. Verify proper sensor lead routing and clamping.	The ABS ECU has detected that the sensor is producing an erratic signal. Check for loose sensor connectors on the ECU and on the extension cables. Check for damaged teeth on the tooth wheel. Push sensor all the way in until it touches the tooth wheel or wheel-end bearing adjustment causing run out.
Desc.			(color/#) Chattering
11	(location) SENSOR NO IDENT		The ABS ECU has detected that the sensor is producing an erratic signal. Check for loose sensor connectors on the ECU and on the extension cables. Check for damaged teeth on the tooth wheel. Push sensor all the way in until it touches the tooth wheel.
Desc.		Sensor Abnormal Speed	(color/#) Bad Device or Component
12	(location) SENSOR SMARTDEV	Adjust speed sensor to contact tone ring. Verify proper number of tone ring teeth per sensed wheel. Rotate wheel and verify minimum 0.8 volts AC sensor output @ 1 RPS. Verify condition and retention force fo sensor clip. Verify proper sensor lead routing and clamping	The ABS ECU has detected an internal error. Check the sensor cable for pinching or cuts and check connectors. If ok, call WABCO for technical support and return authorization claim number.
Desc.		(Location) Sensor Gross Mismatch	
13	(location) SENSOR CALIB NG	Tire size mismatch. Verify correct tire size as desired. Verify proper tire inflation. Verify proper number of tone ring teeth per sensed wheel. Verify proper wheel rolling radius setting in ECU.	

Modulators

FMI	Initial Active Fault Screen	Bendix SID 7-10	Wabco SID 7-10
Desc.		Mod __ Shorted to VBAT	(Ext)Mod Valve (color) - short to 12v
3	MODULATOR () SHORT HI	Check for corroded or damaged modulator wiring and connections. Verify for M-21, M-22 or M-30 that resistance between pins: Hold to Common is 3.5 to 5.0 ohms, Exhaust to hold is 7.0 to 10 ohms. For M-32 and M-32QR, verify that resistance between pins: Hold to common is 4.9 to 5.5 ohms, Exhaust to Hold is 9.8 to 11 ohms. Verify no continuity from modular leads to ground.	The ABS ECU has detected a short to 12 volts on the (color) (external) modulator valve. Check the (external) valve cable and connectors. If cable is ok, call WABCO for technical support and return authorization claim number
Desc.			(Ext)Mod Valve(color) -short to grnd
4	MODULATOR () SHORT LO		The ABS ECU has detected a short to ground on the (color) (external) modulator valve. Check the (external) valve cable and connectors. If cable is ok, call WABCO for technical support and return authorization claim number
Desc.		Mod __ Open/Shorted to GND	(Ext) Mod Valve (color) - Open Ckt
5	MODULATOR () OPEN CKT	Check for corroded or damaged modulator wiring and connections. Verify for M-21, M-22 or M-30 that resistance between pins: Hold to Common is 3.5 to 5.0 ohms, Exhaust to hold is 7.0 to 10 ohms. For M-32 and M-32QR, verify that resistance between pins: Hold to common is 4.9 to 5.5 ohms, Exhaust to Common is 4.9 to 5.5 ohms, Exhaust to Hold is 9.8 to 11 ohms. Verify no continuity from modular leads to ground.	The ABS ECU has detected an open circuit on the (color) (external) modulator valve. Check the (external) valve cable and connectors. If cable is ok, call WABCO for technical support and return authorization claim number

Modulators (cont.)

FMI	Initial Active Fault Screen	Bendix SID 7-10	Wabco SID 7-10
Desc.		Mod _ Shorted to Ground	(Ext)Mod Valve (color)-short to grnd
6	MODULATOR () GRND CKT	Check for corroded or damaged modulator wiring and connections. Verify for M-21, M-22 or M-30 that resistance between pins: Hold to Common is 3.5 to 5.0 ohms, Exhaust to Common is 3.5 to 5.0 ohms, Exhaust to hold is 7.0 to 10 ohms. For M-32 and M-32QR, verify that resistance between pins: Hold to common is 4.9 to 5.5 ohms, Exhaust to Common is 4.9 to 5.5 ohms, Exhaust to Hold is 9.8 to 11 ohms. Verify no continuity from modular leads to ground.	The ABS ECU has detected a short to ground on the (color) (external) modulator valve. Check the (external) valve cable and connectors. If cable is ok, call WABCO for technical support and return authorization claim number
Desc.		Mod _ Lock Time Out	
7	MODULATOR () BAD RESP	No wheel response to ABS command. Verify proper modulator activation with brake pressure applied, at power-up (Chuff Test) and/or using diagnostic tool. Wiring to modulator may be reversed. Possible slow brake release. Check for dragging brakes, dry bearings, faulty return springs, parking brake system faults, restricted brake air lines, over adjusted slacks, out of round drums or damaged/loose tone rings.	
Desc.			
8	MODULATOR () FREQ ODD	Check for corroded or damaged modulator wiring and connections. Verify for M-21, M-22 or M-30 that resistance between pins: Hold to Common is 3.5 to 5.0 ohms, Exhaust to Common is 3.5 to 5.0 ohms, Exhaust to hold is 7.0 to 10 ohms. For M-32 and M-32QR, verify that resistance between pins: Hold to common is 4.9 to 5.5 ohms, Exhaust to Common is 4.9 to 5.5 ohms, Exhaust to Hold is 9.8 to 11 ohms. Verify no continuity from modular leads to ground.	
Desc.			(Ext) Mod Valve (color) - Failure
12	MODULATOR () SMARTDEV		The ABS ECU has detected a failure in the (color) valve circuit. Check the (external) valve cable and connectors. If cable is ok, call WABCO for technical support and return authorization claim number.
Desc.		Mod _ Shorted to Solenoid	(Ext) Mod Valve (color) - Not Found
14	MODULATOR () SPECIAL	Check for corroded or damaged modulator wiring and connections. Verify for M-21, M-22 or M-30 that resistance between pins: Hold to Common is 3.5 to 5.0 ohms, Exhaust to hold is 7.0 to 10 ohms. For M-32 and M-32QR, verify that resistance between pins: Hold to common is 4.9 to 5.5 ohms, Exhaust to Common is 4.9 to 5.5 ohms, Exhaust to Hold is 9.8 to 11 ohms. Verify no continuity from modular leads to ground.	The ABS ECU has not detected the external (color) valve circuit. Check the (external) valve cable and connectors. If cable is ok, call WABCO for technical support and return authorization claim number.

HALDEX FAULT CODES AND DESCRIPTIONS

01	Red channel wheel speed sensor. S1A has an open or short circuit. Check connections then replace cable or sensor as required. Resistance reading of sensor is between 980 and 2350 ohms. If sensor checks good, may be a defective ECU. Replace ECU as required.
02	Red channel wheel speed sensor. S1B has an open or short circuit. Check connections then replace cable or sensor as required. Resistance reading of sensor is between 980 and 2350 ohms. If sensor checks good, may be a defective ECU. Replace ECU as required.
03	Blue channel wheel speed sensor. S2A has an open or short circuit. Check connections then replace cable or sensor as required. Resistance reading of sensor is between 980 and 2350 ohms. If sensor checks good, may be a defective ECU. Replace ECU as required.
04	Yellow channel wheel speed sensor. S2B has an open or short circuit. Check connections then replace cable or sensor as required. Resistance reading of sensor is between 980 and 2350 ohms. If sensor checks good, may be a defective ECU. Replace ECU as required.
05	Blue channel wheel speed sensor. S3A has an open or short circuit. Check connections then replace cable or sensor as required. Resistance reading of sensor is between 980 and 2350 ohms. If sensor checks good, may be a defective ECU. Replace ECU as required.
06	Yellow channel wheel speed sensor. S3B has an open or short circuit. Check connections then replace cable or sensor as required. Resistance reading of sensor is between 980 and 2350 ohms. If sensor checks good, may be a defective ECU. Replace ECU as required.
11	Wheel speed sensor S1A (Red Channel) air gap too large. Push sensor head toward the exciter ring.
12	Wheel speed sensor S1B (Red Channel) air gap too large. Push sensor head toward the exciter ring.
13	Wheel speed sensor S2A (Blue Channel) air gap too large. Push sensor head toward the exciter ring.
14	Wheel speed sensor S1B (Yellow Channel) air gap too large. Push sensor head toward the exciter ring.
15	Wheel speed sensor S3A (Blue Channel) air gap too large. Push sensor head toward the exciter ring.
16	Wheel speed sensor S3B (Yellow Channel) air gap too large. Push sensor head toward the exciter ring.
21	Wheel speed sensor S1A (Red Channel) has an erratic voltage output. Check all connections. Sensor/exciter ring misalignment or defective sensor cable or sensor head.
22	Wheel speed sensor S1B (Red Channel) has an erratic voltage output. Check all connections. Sensor/exciter ring misalignment or defective sensor cable or sensor head.
23	Wheel speed sensor S2A (Blue Channel) has an erratic voltage output. Check all connections. Sensor/exciter ring misalignment or defective sensor cable or sensor head.
24	Wheel speed sensor S2B (Yellow Channel) has an erratic voltage output. Check all connections. Sensor/exciter ring misalignment or defective sensor cable or sensor head.
25	Wheel speed sensor S3A (Blue Channel) has an erratic voltage output. Check all connections. Sensor/exciter ring misalignment or defective sensor cable or sensor head.
26	Wheel speed sensor S3B (Yellow Channel) has an erratic voltage output. Check all connections. Sensor/exciter ring misalignment or defective sensor cable or sensor head.
41	Slow wheel recovery on red valve channel. Check for mech. faults such as dry bearings, broken springs, restricted piping, defective valve.
42	Slow wheel recovery on blue valve channel. Check for mech. faults such as dry bearings, broken springs, restricted piping, defective valve.
43	Slow wheel recovery on yellow valve channel. Check for mech faults such as dry bearings, broken springs, restricted piping, defective valve
61	Hold solenoid open circuit on red valve channel. Check cable and all connections. Solenoid may be defected, replace as required
62	Hold solenoid open circuit on blue valve channel. Check cable and all connections. Solenoid may be defected, replace as required
63	Hold solenoid open circuit on yellow valve channel. Check cable and all connections. Solenoid may be defected, replace as required
67	Dump solenoid open circuit on red valve channel. Check cable and all connections. Solenoid may be defected, replace as required
68	Dump solenoid open circuit on blue valve channel. Check cable and all connections. Solenoid may be defected, replace as required
69	Dump solenoid open circuit on yellow valve channel. Check cable and all connections. Solenoid may be defected, replace as required
71	Hold solenoid short circuit to ground on red valve channel. Check cable and all connections. Solenoid may be defective, replace as required.
72	Hold solenoid short circuit to ground on blue valve channel. Check cable and all connections. Solenoid may be defective, replace as required.
73	Hold solenoid short circuit to ground on yellow valve channel. Check cable and all connections. Solenoid may be defective, replace as required.
77	Dump solenoid short circuit to ground on red valve channel. Check cable and all connections. Solenoid may be defective, replace as required.
78	Dump solenoid short circuit to ground on blue valve channel. Check cable and all connections. Solenoid may be defective, replace as required.
79	Dump solenoid short circuit to ground on yellow valve channel. Check cable and all connections. Solenoid may be defective, replace as required.
81	Hold solenoid short circuit to B+ on red valve channel. Check cable and all connections. Solenoid may be defective, replace as required.
82	Hold solenoid short circuit to B+ on blue valve channel. Check cable and all connections. Solenoid may be defective, replace as required.
83	Hold solenoid short circuit to B+ on yellow valve channel. Check cable and all connections. Solenoid may be defective, replace as required.
87	Dump solenoid short circuit to B+ on red valve channel. Check cable and all connections. Solenoid may be defective, replace as required.
88	Dump solenoid short circuit to B+ on blue valve channel. Check cable and all connections. Solenoid may be defective, replace as required.
89	Dump solenoid short circuit to B+ on yellow valve channel. Check cable and all connections. Solenoid may be defective, replace as required.
90	Low supply voltage. Power supply (battery) voltage less than required for ECU. Reapply power to ECU to check if this fault is still occurring. Do not use a battery charger for a power supply to the ABS ECU.
91	No internal ABS ECU solenoid voltage. Faulty power supply or fuse blown. May be defective ECU. Replace as required.
92	Power input over voltage error. Power supply (battery) is greater than 16 volts DC. Check voltage regulator on engine.
93	Short circuit on ECU internal relay. Defective ABS ECU, valve cable or solenoid. Replace as required.
C0	ABS ECU is not configured for this sensor-valve combination. Check sensor and valve connections and reapply power.

