

# TROUBLESHOOTING



## ABS Diagnostic Codes



Fault Code	Explanation	PLC Select		Possible Causes
		1M	2M	
	<b>OCCURS ONLY WHEN VEHICLE IS STATIONARY</b>			
00	System OK (with vehicle traveling > 6 mph)	X	X	ABS is fully operational. Displays "00" when vehicle is traveling > 6mph.
	<b>OPEN OR SHORT CIRCUIT</b>			
01	01 Red channel wheel speed sensor wiring S1A	X		Indicates a wheel speed sensor or its wiring has a short or open circuit. Disconnect the relevant sensor and measure the resistance between the two pins in the sensor connector housing.  Verify extension continuity and connections. Replace sensor and/or extension cable, if necessary.  If the Ohm meter reading for the sensor and extension cable is not between 980 - 2350 Ohm (.98K - 2.35K Ohm). replace sensor and/or extension cable.
02	Red channel wheel speed sensor wiring S1B	X		
03	Blue channel wheel speed sensor wiring S2A		X	
04	Yellow channel wheel speed sensor wiring S2B		X	
05	Blue channel wheel speed sensor wiring S3A		X	
06	Yellow channel wheel speed sensor wiring S3B		X	
07	System OK (No Active Fault)	X	X	ABS ECU is fully operational. Displays "07" when vehicle is stationary.
	<b>OCCURS ONLY WHEN VEHICLE IS MOVING</b>			
	<b>LOW SENSOR OUTPUT</b>			
11	Red channel wheel speed sensor S1A	X		Sensor or spring clip is worn or not properly adjusted, wiring open or short circuit, wheel bearing not properly adjusted (these faults will only occur when vehicle is traveling >6 mph).  Measure the AC voltage at the sensor in question while rotating the wheel at a rate of about one revolution every two seconds. If the output is not at least 200 millivolts (0.2 VAC), push in the sensor until it touches the exciter and rotate the wheel again. If this doesn't correct the problem, the sensor and sensor block clip should be replaced.  Verify extension continuity and connections. Replace sensor and/or extension cable, if necessary.  Inspect exciter teeth for minor damage or teeth filled with debris. Verify all exciters have the same number of teeth.  Verify sensor and valve wiring/plumbing is correct.
12	Red channel wheel speed sensor S1B	X		
13	Blue channel wheel speed sensor S2A		X	
14	Yellow channel wheel speed sensor S2B		X	
15	Blue channel wheel speed sensor S3A		X	
	<b>GAP TOO LARGE (gap should be kept to a minimum)</b>			
16	Yellow channel wheel speed sensor S3B		X	

Fault Code	Explanation	PLC Select		Possible Causes
		1M	2M	
	<b>OCCURS ONLY WHEN VEHICLE IS MOVING</b>			
	<b>ERRATIC OUTPUT VOLTAGE</b>			
21	Red channel wheel speed sensor S1A	X		<p>Loose sensor, connection, bracket or exciter, damaged exciter, sensor is not properly adjusted or has worn cable insulation, or worn sensor block clip, wheel bearing failure, wheel bearing is not properly adjusted (these faults will only occur when vehicle is traveling &gt;6 mph).</p> <p>Measure the AC voltage at the sensor in question while rotating the wheel at a rate of about one revolution every two seconds. If the output is not at least 200 millivolts (0.2 VAC) push in the sensor until it touches the exciter and rotate the wheel again. If this doesn't correct the problem, the sensor and sensor block clip should be replaced.</p> <p>Inspect exciter teeth for minor damage or teeth filled with debris. Verify all exciters have the same number of teeth.</p> <p>Verify tire and wheel size is large enough for 100 tooth exciter ring. If these faults re-occur at the same speed, inspect exciter ring for damage. Smaller wheels and tires require 80 tooth exciter rings.</p> <p>Verify sensor and valve wiring/plumbing is correct.</p>
22	Red channel wheel speed sensor S1B	X		
23	Blue channel wheel speed sensor S2A		X	
24	Yellow channel wheel speed sensor S2B		X	
25	Blue channel wheel speed sensor S3A		X	
26	Yellow channel wheel speed sensor S3B		X	
	<b>OCCURS ONLY WHEN VEHICLE IS STATIONARY</b>			
	<b>PLC SELECT PLUS 2M AUXILIARY CODES</b>			
31	Auxiliary Channel 1 fault (Digital Channel 1) output only			<p><b>NOTE: These codes are only used with PLC Select Plus 2M ABS that supports trailer Auxiliaries.</b></p> <p>Auxiliary Channel has an open circuit or the ECU (Electronic Control Unit) has auxiliary device connected and is not programmed to be.</p> <p>These codes do not affect ABS performance and do not illuminate the tractor or trailer ABS warning lamps.</p>
32	Auxiliary Channel 2 fault (Digital Channel 2) output only			
33	Auxiliary Channel 3 fault (Digital Channel 3) input only			
34	Auxiliary Channel 4 fault (Digital Channel 4) input only			
35	Auxiliary Channel 5 fault (Digital Channel 5) input only			
	<b>SLOW WHEEL RECOVERY</b>			
41	Red valve channel	X		<p>For a 2M System, verify sensor and valve wiring/plumbing is correct. Slow brake release, foundation brake mechanical faults, dry bushings, broken ABS valve, restricted piping. Check for kinks and blockage etc. Incorrect airlines, wiring.</p>
42	Blue valve channel		X	
43	Yellow valve channel		X	

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Fault Code	Explanation	PLC Select		Possible Causes	
		1M	2M		
<b>HOLD SOLENOID OPEN CIRCUIT</b>					
61	Red valve channel	X		Modulator valve solenoid failure, solenoid connection or valve cable damage. The most likely causes include: a damaged solenoid or a loose solenoid connection. Disconnect the indicated solenoid and check the resistance at the solenoid pins (3.5 to 9 Ohms).	
62	Blue valve channel		X		
63	Yellow valve channel		X		
<b>DUMP SOLENOID OPEN CIRCUIT</b>					
67	Red valve channel	X		Check the female terminals on the connector for excessive pin spread or corrosion. Replace defective hardware as required and retest.	
68	Blue valve channel		X		
69	Yellow valve channel		X		
<b>HOLD SOLENOID SHORT CIRCUIT TO GROUND</b>					
71	Red valve channel	X		Modulator valve solenoid failure or valve cable damage. The most likely causes include: a damaged solenoid or a damaged cable. An example of this is a worn or chafed cable that has exposed wires contacting the trailer.	
72	Blue valve channel		X		
73	Yellow valve channel		X		
<b>DUMP SOLENOID SHORT CIRCUIT TO GROUND</b>					
77	Red valve channel	X		Disconnect the indicated solenoid and check the resistance at the solenoid pins.	
78	Blue valve channel		X		
79	Yellow valve channel		X		
80	Output leakage or poor insulation on any of the valve channels	X	X	<p>Modulator valve solenoid failure or valve cable damage. Indicates that the solenoid or its cable has a short circuit to positive power (12 volts DC). The most likely causes include: a damaged solenoid or damaged cable. Disconnect the indicated solenoid and check the resistance at the solenoid pins.</p> <p>If the solenoid checks out good and 80-89 codes are still appearing, check the ECU for proper operation.</p> <p>Verify 12 VDC power source. Do Not Use Battery Charger as Power Supply. ECU minimum operating voltage is 8.5 VDC.</p>	
<b>HOLD SOLENOID SHORT CIRCUIT TO PERMANENT POWER</b>					
81	Red valve channel	X			
82	Blue valve channel		X		
83	Yellow valve channel		X		
<b>DUMP SOLENOID OUT SHORTED TO PERMANENT POWER</b>					
87	Red valve channel	X			
88	Blue valve channel		X		
89	Yellow valve channel		X		
90	Low supply voltage fault. This code is not stored in memory.	X	X		

Fault Code	Explanation	PLC Select		Possible Causes
		1M	2M	
91	No internal ABS ECU solenoid voltage available.	X	X	Verify permanent power is present.
92	Power input over voltage fault.	X	X	Verify 12 VDC power source. Do Not Use Battery Charger as Power Supply. ECU maximum operating voltage is 16.0 VDC.
93	Short circuit on ABS ECU internal relay.	X	X	ABS ECU is defective; replace.
99	ABS corrupt memory.	X	X	
9A	ABS corrupt memory.	X	X	
A7	<p>Codes A(x) and C(x) are displayed when power is applied to the ABS ECU. They should not be displayed for more than two seconds; if code remains permanently displayed, replace the ECU.</p> <p>Trailer 2S/1M - SLH on red channel 2S/2M and 4S/2M - SLH on yellow channel</p>	X	X	<p>PLC Select 2M: A C(x) code is common with 4S/2M configurations that have been changed to a 2S/2M or 2S/1M. Clear codes three times without interrupting power. After the third clear - verify sensors are in the correct location and repower.</p> <p>Programmed for tandem or multi-axle trailer. Displays current configuration.</p>
A8	Trailer 2S/1M - MSLH on red channel (dollies, steerable or single axle only)	X	X	Programmed for dollies, single or steer axle trailer. Displays current configuration.
C0	<p>Only display when viewing stored fault codes.</p> <p>2S/1M Configuration</p>	X	X	S1A, S1B sensors. Red modulator. ECU is configured as a 2M and is powered up as a 1M. See "CC" cause below. Displays current configuration.
C1	2S/2M Configuration	X	X	S2A, S2B sensors. Blue, Yellow modulators. ECU is configured as a 4S/2M and is powered up as a 2S/2M. See "CC" cause below. Displays current configuration.
C2	4S/2M Configuration (not a fault code)	X	X	S3A, S2A, S2B, S3B sensors. Blue, Yellow modulators. Displays current configuration.
C3	4S/2M Configuration (not a fault code)	X	X	S3A, S2A, S2B, S3B sensors. Blue, Yellow modulators. (S3A and S3B sensed lift axle). Displays current configuration.

Fault Code	Explanation	PLC Select		Possible Causes
		1M	2M	
CA	Clear all fault codes	X	X	Occurs when clearing fault codes with the Info Center.
CC	Clear configuration  Only display when viewing stored fault codes.	X	X	Only required when configured ABS System from a 4S/2M to a 2S/2M or any 2M configured to a 1M. Clear fault codes three times with uninterrupted power to reconfigure.
CF	Configuration fault?	X	X	Unrecognized ABS configuration. Verify all sensors and valve connections are correct. Verify sufficient power.
E(x) Codes	E0 through EF are generated when internal problems exist within the ABS ECU.	X	X	ABS ECU is defective; replace.

For more information on complete ABS Systems, see the Haldex Service Manual (L30041) at [haldex.com](http://haldex.com) or contact your Haldex Sales Professional.

For additional ABS Service questions, contact the Haldex Technical Support Department at +1 800-643-2374, Option 2.