

## ABS/EBS TESTER 12/24V

### User Guide



TRAIL-LINK's ABS/EBS Tester 12/24V is an innovative functional diagnostic device that is designed for basic testing of the ISO 7638 prime mover and trailer outlets and the trailer EBS lead. It checks for open or short circuits and confirms that the required operational voltages are present across the 12 or 24V prime mover and all compliant trailers.

Through a fast and comprehensive test run sequence, the ABS/EBS Tester helps to identify sources of error in their exact position (prime mover, EBS coil or trailer unit), even those that are usually rather difficult to localise.

The test output (for all pins) shows on the integrated LED indicator display (green, red, and blue lights) mounted on the side of the tester.

**\*\*ATTENTION\*\*** This is a basic system health check tool and NOT a full diagnostics tester.

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At a high level, the tester performs the following tests on the 7-pin EBS system:

- **Pins 1 & 4:** Determines if the battery/permanent power and earth are present (12V or 24V) and within voltage tolerances.
- **Pins 2 & 3:** Determines if the ignition power and earth are present (12V or 24V) and within voltage tolerances.
- **Pin 5:** Determines if a fault is detected within the trailer combination. A faulty trailer corresponds with the yellow in-cab warning light being ON. A compliant trailer(s) must be connected when interpreting Pin 5 results.
- **Pin 6 & 7:** Determines the state of the EBS CAN Bus link to the trailer
- **Switch:** This allows the user to isolate & test the functionality of the yellow warning lamp (without a trailer connected)

## Features:

- Application of trailer connector socket in accordance with both *ISO 7638-1 (7pin 24V)* and *ISO 7638-2 (7pin 12V)* specifications
- In-line testing the lead in accordance with ISO 7638 specification
- Verify the ABS electrical presence / functions at the vehicle and each trailer
- Exceptionally useful in multi-trailer combinations
- Indicates errors and faulty connections within the ABS/EBS circuit
- Perform CAN Bus continuity tests (high & low) for 12 or 24V systems
- Simple to operate
- Easy to interpret LED indicator display
- Generate test results in under **5 seconds!**

## Specifications:

- Measurements: 100mm x 100mm x 225mm long (approx.)
- Weight: 515g
- Power supply: Provided by the tractor/towing vehicle socket
- Connectors: ISO 7638 multi-volt plug and unkeyed socket.

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**\*\*ATTENTION\*\*** The ABS/EBS Tester must be inserted in the latch aligned / cover rest position **ONLY** – This applies to BOTH 12V and 24V trucks as the Tester will determine if it's a 12V or 24V vehicle when the device is powered.



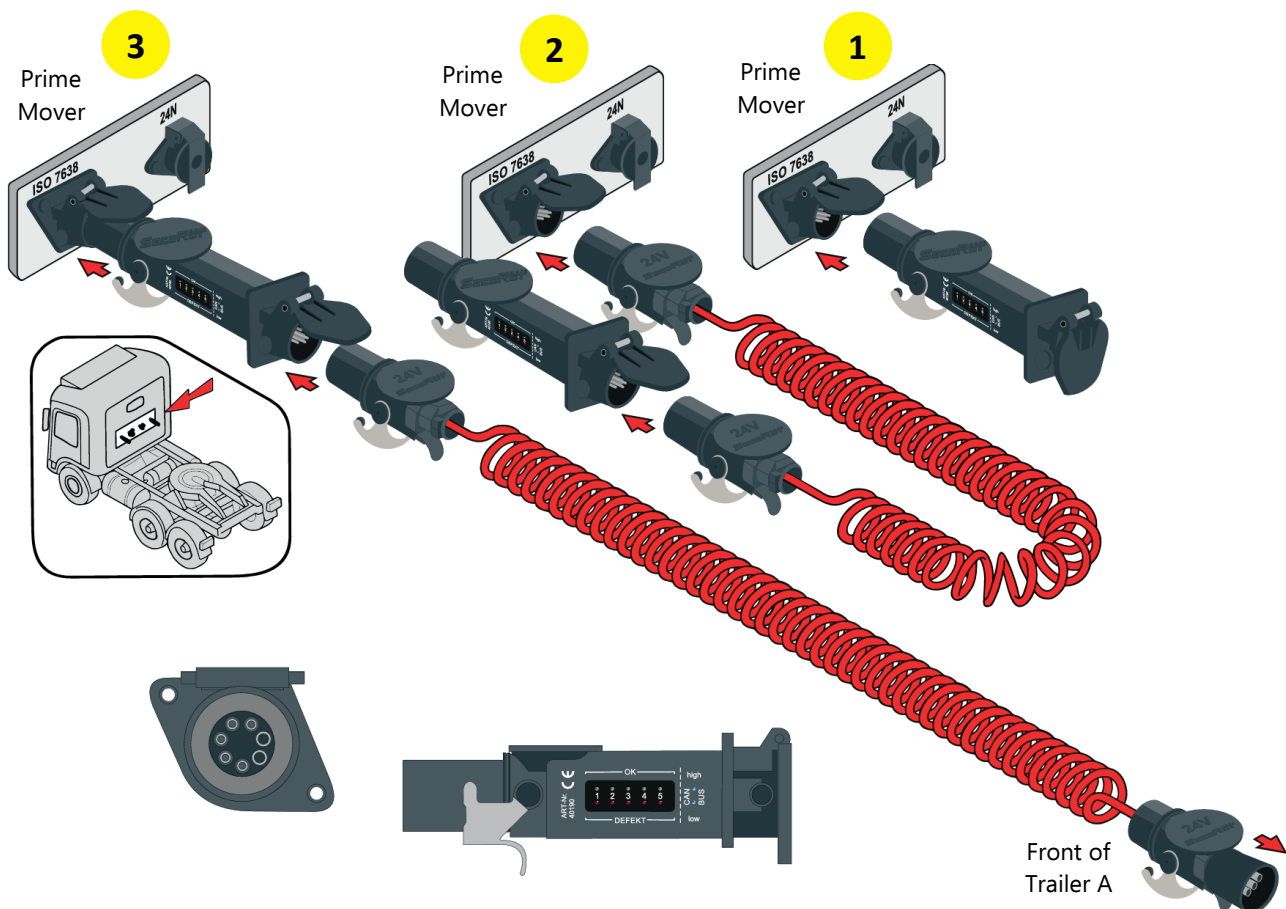
*EBS Tester inserted in the latch aligned and cover rest position ONLY!*

## **ISO7638-1/2 – Contact Allocations**

Contact No.	Colour	Function
1	Red	Positive (+) electrovalve / permanent / solenoid control valve
2	Black	Positive (+) electronics / ignition
3	Yellow	Negative (-) electronics / ignition
4	Brown	Negative (-) electrovalve / permanent / solenoid control valve
5	White	Warning device / trailer
6	White/Green	CAN High / Hi
7	White/Brown	CAN Low / Lo

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## Testing Procedure



Functional diagram showing possible testing configurations of Sequence A between Prime Mover and Trailer A

**\*\*ATTENTION\*\*** The ABS/EBS Tester must be inserted in the latch aligned / cover rest position **ONLY**  
– This applies to BOTH 12V and 24V trucks!!

To ensure complete testing of the truck / trailer combination, the following 3 test procedures can be performed. The overall idea is to isolate and test the 7-pin EBS outputs at the prime mover, end of the EBS coil(s), and end of compliant trailer A in Sequence A. Then, the same tests are repeated between the rear of Trailer A and front of compliant Trailer B for Sequence B, and so on.

### Important:

- In **all** testing, the vehicle must be stationary with park brake on and not obstructing any traffic.
- To fully isolate an individual trailer during testing, ensure that the 7-pin EBS cable is disconnected between that trailer (leader) and the next downstream trailer (follower).
- Be sure to record the test results as you move down the combination.

## 1 Testing the 7-pin EBS prime mover outlet *(diagram 1 above)*

1. Start with ignition OFF
2. Plug the EBS Tester into the 7-pin socket (prime mover)  
**Note:** ABS and EBS system connections are both permanent battery and ignition powered.
3. Turn the ignition ON and **observe** the LED light sequence on the tester.
4. Interpret the lighting sequence by referring to the testing output table.
5. Use the **switch** on the EBS Tester to test and isolate the prime mover in-cab warning lamp functionality. Refer to the testing output table.

## 2 Testing the 7-pin EBS coil from a prime mover *(diagram 2 above)*

1. Start with ignition OFF
2. Plug the existing EBS 7-pin cable into the prime mover
3. Plug the EBS Tester into the back of the existing 7-pin EBS cable  
**Note:** ABS and EBS system connections are both permanent battery and ignition powered.
4. Turn the ignition ON and **observe** the LED light sequence on the tester.
5. Interpret the lighting sequence by referring to the lighting sequence table below

If the EBS Tester reported GREEN lights for Pins 1 to 4 during Test 1 but now reports a fault (RED lights on any of the Pins 1 to 4) while plugged into the existing cable, this could indicate a faulty cable. Refer to the testing output table. Repeat this test with a **TRAIL-LINK EBS 7-pin fully moulded cable** (or a known fully functional cable) to allow continued testing down the combination.

## 3 Testing the front 7-pin EBS trailer socket *(diagram 3 above)*

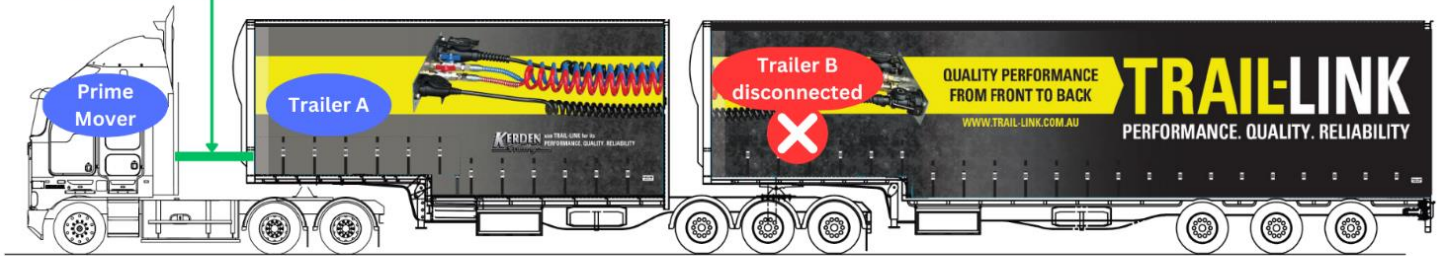
1. Start with ignition OFF
2. Plug the EBS Tester at the prime mover
3. Plug the existing EBS 7-pin cable at the back of the tester and connect it to Trailer A  
**Note:** ABS and EBS system connections are both permanent battery and ignition powered.
4. Turn the ignition ON and **observe** the LED light sequence on the tester.
5. Interpret the lighting sequence by referring to the testing output table.

**Once these 3 tests are complete for Sequence A (between the prime mover and trailer A), repeat the same tests for Sequence B (between rear of Trailer A and front of Trailer B), and so on.**

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## Sequence A

Prime mover connected to Trailer A through EBS Tester

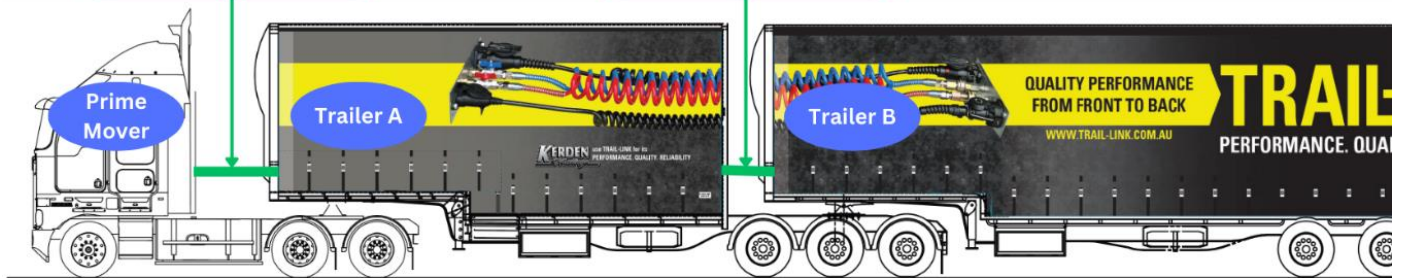


Prime mover & Trailer A isolated

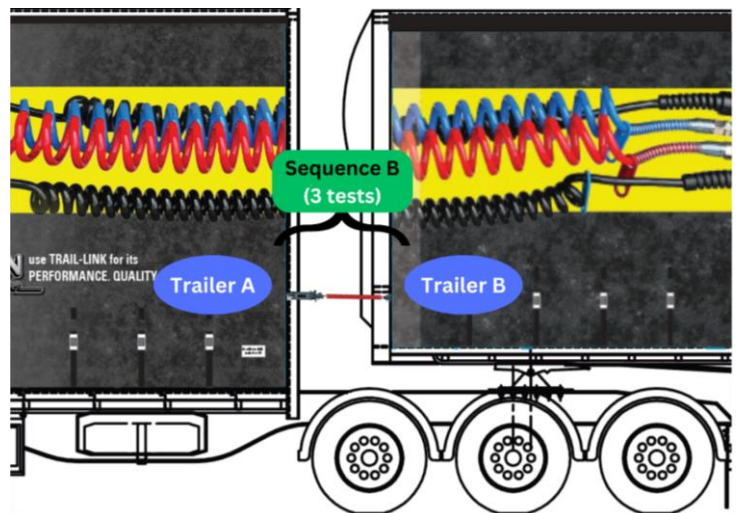
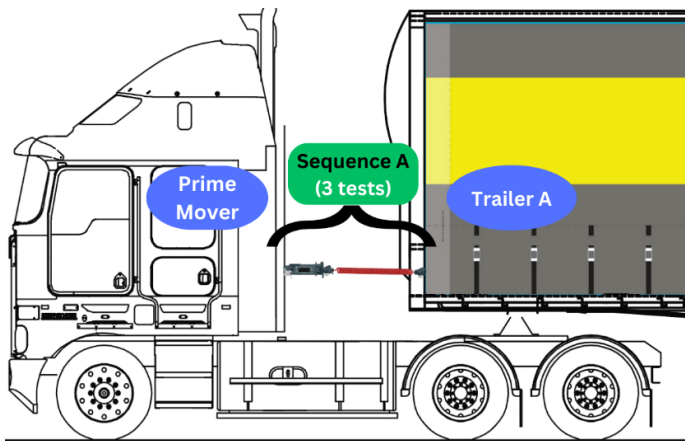
## Sequence B

Prime mover connected to Trailer A

Trailer A connected to Trailer B through EBS Tester



Prime mover, Trailer A & Trailer B isolated



## Testing Output table (Lighting Sequence Interpretation):

Once the ABS/EBS Tester is powered up, it immediately performs a set of procedures resulting in several quick lighting sequences. These lighting sequences outline the ABS/EBS test outputs and are described in the table below which the operator must take note of when interpreting the test output.

The full set of procedures include:

1. **Initialise** (duration: ~0.5 sec). The tester begins the Start-up procedure – see No. 1.
2. **Start-up** (duration: ~1 sec). The tester indicates if the system is 12V or 24V and then enters the stable state – see No. 2.
3. **Stable / idle** (duration: indefinite if powered). The tester is in stable state and will show results - see No. 3.

**Note:** Due to impedance differences and other factors across each vehicle, **all voltages** stated below are **approximations**.

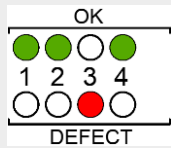
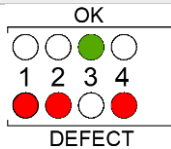

**Note:** When the ABS/EBS Tester switch is in the OFF (OPEN) position, you may see a faint glow on the in-cab warning lamp. This is not a problem and does not influence test results.


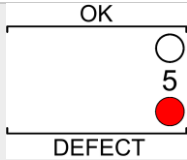
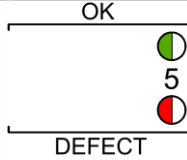
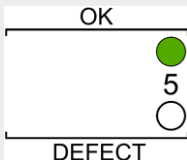
No.	Procedure	PIN Position	LED colour & sequence	Approximate duration	Visual representation	Interpretation	Comments	
1	Initialise	1 - 5, CAN High & Low	Green and Red lights alternating, Blue lights blinking	~0.5 second		System initialisation	Go to No. 2	
2	<p><b>12V or 24V</b></p> <p>During the initial seconds of the device starting up, the tester will briefly indicate if the <b>initial</b> power source voltage range of the prime mover is <b>12V</b> (6.5V – 17V) OR <b>24V</b> (17V – 30V). Initial power could be from either permanent or ignition power (or both) – whichever is provided first - and so test results are based on (or display in reference to) this initial power source when displaying its results.</p>							
	Start-up	1	Green and Red lights blinking	~1 second		<b>12V</b> system detected	Go to No. 3	
		<b>OR</b>						

No.	Procedure	PIN Position	LED colour & sequence	Approximate duration	Visual representation	Interpretation	Comments
		1, 2	Green and Red lights blinking	~1 second		<b>24V</b> system detected	Go to No. 3
<p><b>Test Results</b></p> <p>Once the tester has started up, it provides a set of stable outputs reflecting the status of the ABS/EBS functionality detected on the prime mover / trailer combination. These outputs are described in 3 sections:</p> <ul style="list-style-type: none"> <li>• <b>Pin 1 – 4:</b> Permanent and Ignition power</li> <li>• <b>Pin 5:</b> Warning lamp</li> <li>• <b>Pin 6 – 7:</b> CAN Bus</li> </ul> <p><b>Note:</b> Test results for Pin 1 - 4 must be interpreted based on (or display in reference to) the initial power source detected (12 or 24V) during start-up.</p>							
3	<b>PIN 1 - 4</b>						
	Stable	1 - 4	Green solid	-		<ul style="list-style-type: none"> <li>• Permanent power (Pin 1 &amp; 4) is <b>GOOD</b></li> <li>• Ignition voltage (Pin 2 &amp; 3) is <b>GOOD</b></li> <li>• Both voltages are <b>GOOD</b> and within acceptable range: &gt;9V for 12V system <u>OR</u> &gt;19V for 24V system.</li> <li>• Both Earth connections are <b>GOOD</b></li> </ul>	For 12V and 24V systems
		2, 3, 4 1	Green solid Red solid	-		<ul style="list-style-type: none"> <li>• Permanent power voltage is <b>below</b> acceptable threshold: &lt;9V for 12V system <u>OR</u> &lt;19V for 24V system.</li> <li>• Permanent power earth is <b>GOOD</b></li> <li>• Ignition voltage (and earth) is <b>GOOD</b> and within acceptable range</li> </ul>	For 12V and 24V systems



No.	Procedure	PIN Position	LED colour & sequence	Approximate duration	Visual representation	Interpretation	Comments
		1, 3, 4 2	Green solid Red solid	-		<ul style="list-style-type: none"> <li>Permanent power voltage (and earth) is <b>GOOD</b> and within acceptable range: &gt;9V for 12V system <u>OR</u> &gt;19V for 24V system.</li> <li>Ignition voltage is <b>below</b> acceptable threshold: &lt;9V for a 12V system <u>OR</u> &lt;19V for a 24V system.</li> <li>Ignition earth is <b>GOOD</b></li> </ul>	For 12V and 24V systems
		1, 4 2, 4	Green solid Red solid			<ul style="list-style-type: none"> <li>Permanent power voltage (and earth) is <b>GOOD</b> and within acceptable range: &gt;9V for 12V system <u>OR</u> &gt;19V for 24V system.</li> <li>Ignition voltage <b>NOT</b> detected</li> </ul>	Check ignition fuse if ignition is ON
		2, 3 1, 4	Green solid Red solid			<ul style="list-style-type: none"> <li>Permanent power voltage <b>NOT</b> detected</li> <li>Ignition voltage (and earth) is <b>GOOD</b> and within acceptable range: &gt;9V for 12V system <u>OR</u> &gt;19V for 24V system.</li> </ul>	Check battery fuse if compliant battery is connected
		3, 4 1, 2	Green solid Red solid	-		<ul style="list-style-type: none"> <li>BOTH permanent power and ignition voltages are <b>below</b> 9V (for 12V system) <u>OR</u> 19V (for 24V system). Both earth connections are <b>GOOD</b></li> </ul>	Works best with trailer attached
		1, 2, 3 4	Green solid Red solid	-		<ul style="list-style-type: none"> <li>Permanent power voltage is <b>GOOD</b> and within acceptable range: &gt;9V for 12V system <u>OR</u> &gt;19V for 24V system.</li> <li>Permanent power grounding/earth <b>error</b> or poor connection</li> </ul>	Check ground connections

No.	Procedure	PIN Position	LED colour & sequence	Approximate duration	Visual representation	Interpretation	Comments
						<ul style="list-style-type: none"> <li>Ignition voltage (and earth) is <b>GOOD</b> and within acceptable range: &gt;9V for 12V system <u>OR</u> &gt;19V for 24V system.</li> </ul>	
		1, 2, 4 3	Green solid Red solid	-		<ul style="list-style-type: none"> <li>Permanent power voltage (and earth) is <b>GOOD</b> and within acceptable range: &gt;9V for 12V system <u>OR</u> &gt;19V for 24V system.</li> <li>Ignition voltage is <b>GOOD</b> and within acceptable range: &gt;9V for 12V system <u>OR</u> &gt;19V for 24V system.</li> <li>Ignition grounding/earth <b>error</b> or poor connection</li> </ul>	Check ground connections
		3 1, 2, 4	Green solid Red solid	-		<ul style="list-style-type: none"> <li>Possible corroded pins or loose wires under load</li> </ul>	
	<p><b>SWITCH</b></p> <p>The in-built switch is used exclusively to isolate and test the on-off functionality of the yellow in-cab warning light by simulating a faulty connected trailer. This test is a requirement for vehicle roadworthiness. To perform this test, it's best to ensure that <i>NO</i> trailers are connected to the prime mover with the tester connected to the back of the prime mover. The user toggles the switch on and off to turn the in-cab warning lamp on and off respectively. When this check is complete, ensure that the switch is in the <i>OFF (OPEN)</i> position before continuing with testing.</p>						
	Switch ON / CLOSED		RED solid (irrelevant)	-		<ul style="list-style-type: none"> <li>Yellow in cab warning lamp should be ON</li> </ul>	If the lamp does not toggle to ON, lamp may be faulty and requires investigation

No.	Procedure	PIN Position	LED colour & sequence	Approximate duration	Visual representation	Interpretation	Comments
		Switch OFF / OPEN	GREEN solid (irrelevant)	-		<ul style="list-style-type: none"> <li>Yellow in cab warning lamp should be OFF</li> </ul>	
<p><b>PIN 5</b></p> <p>Use the Pin 5 output to determine the feedback received from the connected trailer(s): working OR faulty. For a working trailer combination, the tester will also feedback if the Pin 5 voltage is &lt;12V or &gt;12V. This high-level feedback reports back either that all attached trailers are connected without fault <u>OR</u> at least 1 trailer ECU is reporting at least 1 fault. See Pin 5 Interpretation below for additional info.</p> <p><b>Note:</b> The following Pin 5 outputs can <b>ONLY</b> be interpreted if:</p> <ul style="list-style-type: none"> <li>- a trailer(s) is connected to the prime mover AND</li> <li>- the ABS/EBS Tester switch is in the OFF (Open) position</li> </ul>							
		5	Red solid	-		<ul style="list-style-type: none"> <li><b>Fault</b> detected (e.g. sensor fault) on one of the connected trailers. Voltage measured from trailer(s) is &lt;1.5V</li> </ul>	Yellow dash warning lamp should be ON.
		5	Green and Red lights blinking			<ul style="list-style-type: none"> <li>All connected trailer(s) are detected and <b>GOOD</b>. Voltage measured from trailer(s) is &gt;1.5V but &lt;12V</li> </ul>	Yellow dash warning lamp should be OFF.
		5	Green solid	-		<ul style="list-style-type: none"> <li>All connected trailer(s) are detected and <b>GOOD</b>. Voltage measured from trailer(s) is &gt;12V</li> </ul>	<p>Yellow dash warning lamp should be OFF.</p> <p>During prime mover start-up, Pin</p>

No.	Procedure	PIN Position	LED colour & sequence	Approximate duration	Visual representation	Interpretation	Comments
							5 may be Red for a short period, then turn Green solid.
	<p><b>CAN Bus</b> Use the CAN Bus outputs (Pin 6 – 7) to determine if the CAN present in the prime mover / trailer combination. See CAN Bus Interpretation below for additional info.</p>						
	CAN High & CAN Low		Blue solid	-		Full CAN Bus detected	For 12V and 24V systems.
	CAN High or CAN Low		Blue lights blinking (<2 times each per second)	-		Full CAN Bus detected	For 12V and 24V systems.
	CAN High or CAN Low		Blue lights flashing / strobing (>5 times each per second)	-		Looking for CAN Bus	For 12V and 24V systems. Suggest waiting <i>30 seconds</i> for the tester to establish full CAN Bus.
	CAN High or CAN Low		No light	-		No CAN detected	For 12V and 24V systems.

## **Pin 5 Interpretation:**

The functionality of the Pin 5 results is to provide feedback from ALL Electronic Control Units (ECU) from trailers connected to the prime mover. This high-level feedback reports back either that all attached trailers are connected without fault OR at least 1 trailer ECU is reporting at least 1 fault. In the case of a fault reported from at least one trailer's ECU, the yellow in-cab warning lamp should be ON. Furthermore, please investigate and inspect the faulty trailer ECU.

The ABS/EBS Tester was designed to test Pin 5 with a **trailer connected** while being powered by the prime mover. If no trailer is connected to the prime mover, then the prime mover's in-cab warning lamp functionality can be tested by connecting the tester to the prime mover and toggling the ABS/EBS Tester switch. If the in-cab warning lamp turns off and on while the switch is turned off and on, this indicates a functional in-cab warning light. If the lamp does not toggle on and off, this indicates a potential fault which requires specific investigation. Please disregard any Pin 5 LED outputs when testing the in-cab warning lamp. Pin 5 LED outputs should only be interpreted when a trailer(s) is connected.

**Note:** The tester switch must be in the OFF (Open) position for all other tests. The switch is only used to test the functionality of the in-cab warning lamp in the prime mover when no trailer is attached.

## **CAN Bus Interpretation:**

The CAN communicates various messages to and from the prime mover, from electronic brake signals through to current weight. The CAN Bus is however, an optional feature during operation. The EBS valve will still operate with a stability function and ABS if only connected through Pins 1 - 5. Programmed functions will also work e.g. Axle lift, steer axle control, etc.

**Note:** It is possible to have only one working CAN signal with no trailer attached (bad connection, broken wire etc.).