

MGM Brakes

A Division of Indian Head Industries, Inc.

TECHNICAL BULLETIN

SUBJECT: EB 08-008 e-Stroke GEN 3 Post Install Functionality Test

Introduction:

The following procedure is intended to test the e-Stroke GEN 3 System functionality after installation. Following these steps will verify that the system is installed correctly, and the vehicle's foundation brakes are operating within the recommended limits. The e-Stroke GEN 3 System will monitor the brake status and display faults through warning light(s) or vehicle displays where applicable.

This test procedure applies to e-Stroke GEN 3 systems with either drum or disc brakes including ECU / CCMs with P/N 8291XXX prefix.

Overview of e-Stroke GEN 3 Systems:

The e-Stroke GEN 3 system has the capability to monitor brake status as well as record fault codes for conditions that occur during operation of the vehicle. In addition, the GEN 3 system had the optional capability to monitor brake lining wear if this functionality was active on select systems produced prior to 2022.

Typical ECU alarm outputs:

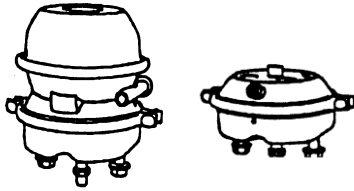
- **Alarm Output 1:** Brake Monitor Warning (All Systems)
- **Alarm Output 2:** Lining Wear Warning (Optional prior to 2022)

Upon startup of e-Stroke system Alarm Outputs 1 and 2 will simultaneously bulb check indicating that the system and the lamps are operational. With an active fault condition, the e-Stroke system will illuminate the appropriate warning light. For example, Alarm Output 1 will turn on with an active dragging brake fault condition.

Stored fault codes can be accessed by initiating a blink code sequence with the warning light(s). Alarm Outputs 1 and 2 will blink simultaneously during the blink code sequence. The blink code sequence can be initiated by pressing the red button on the front of the ECU for 1 second. The stored fault history can be cleared by pressing the red button on the front of the ECU for 5 seconds. Active brake faults can only be cleared by repairing the fault condition.

The e-Stroke system will output active brake fault codes first. If no active brake faults are present the system will then output the stored brake fault codes and any lining wear fault codes.

Note: The blink code operation described in this document will only work with lamps directly wired to the ECU alarm output. OEM driver warning lamps which are activated via SAE J1939 data will illuminate with select active faults but not display the blink codes as described in this document. Consult the vehicle OEM for specific brake monitor warning operation.



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Required Vehicle Status:

In order to complete this test, the following systems must be completely installed and operational on the vehicle:

- Air Brake System
- Foundation Brake System
- Engine Controller
- Electrical Ignition System which powers the e-Stroke System
- SAE J1708 / 1939 circuits (where applicable)
- Vehicle Warning Light or Dash Display I/O System (where applicable)

Functionality Test Preparation:

It is important to clear the e-Stroke ECU memory upon completion of the vehicle build and e-Stroke system installation and prior to the functionality test. Clearing the ECU memory will ensure that any inconsequential faults which may have been recorded during the installation process are not misunderstood as actual faults during the test.

Step 1: With the power turned *OFF*. Press the red button on the face of the ECU while switching the ignition power *ON*. Allow a few seconds for the e-Stroke ECU to turn *ON*. Release the red button after 3-5 seconds.

Pressing the red button on the face of the ECU during start-up will clear the ECU communications memory.

Upon completion of the e-Stroke start up the following should be observed:

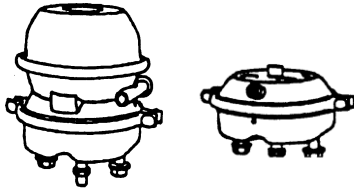
- e-Stroke warning light(s) should briefly bulb check *ON* (1-3 sec) after ignition power is turned on. This is only applicable if the vehicle has e-Stroke warning light(s) which are powered directly by the e-Stroke ECU.

Note: Consult the vehicle I/O system designer for I/O controlled warning light operation. In some cases, the I/O system module may have an input indicator lamp displaying the actual / unfiltered e-Stroke ECU alarm output. This indicator display may be used in the same manner as a warning lamp connected directly to the e-Stroke ECU.

Note: Consult the vehicle OEM if a dash display is used in place of a traditional warning lamp. Dash displays may indicate the brake fault condition in text. The vehicle OEM may elect to filter brake fault condition displays.

Step 2: With the ECU power *ON*. Clear the e-Stroke stored fault codes by pressing the red button on the front of the ECU for 5 seconds (In some cases, it may take 12 seconds).

- Shortly after the button is pressed the warning light(s) will blink 10 times indicating that the ECU fault history has been cleared.



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Functionality Test Procedure:

Step 3: Chock vehicle wheels.

Step 4: Switch the ignition power ON. Allow a few seconds for the e-Stroke ECU to turn ON.

Upon completion of the e-Stroke start up the following should be observed:

- e-Stroke warning light(s) should briefly bulb check *ON* (1-3 sec) after ignition power is turned on. This is only applicable if there is an e-Stroke warning light(s) which is powered directly by the e-Stroke ECU.

Step 5: Build the air system pressure to 100-110psi using either the engine compressor or external compressed air supply.

Step 6: Release parking brake, and any brake interlock functions (i.e.: Door, Transmission, Driver's Seat Interlocks). Allow a few seconds for the brakes to fully release.

- All warning lights should remain *OFF* and/or dash display should *NOT* indicate a brake fault condition.

Step 7: Apply service brake foot pedal to 90-100psi (for at least 4 seconds), then release the foot pedal (for at least 4 seconds). Repeat this pressure application **at least 5** times to cycle the vehicles braking system. During this pressure application watch the warning light(s) and/or dash display for a fault indication.

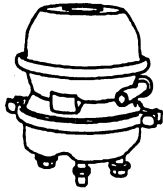
- Warning light(s) should remain *OFF* and/or dash display should not indicate a brake fault condition both during and after the brake applications.
- If the warning light(s) turn *ON* or the dash display indicates a brake fault during or after the brake applications proceed to Step 9 to acquire fault codes.

Step 8: Apply parking brakes and wait **60** seconds.

- Warning light(s) should remain *OFF* and/or dash displays should *NOT* indicate a brake fault condition.

Step 9: Check ECU memory for any stored e-Stroke faults. The ECU fault memory can be accessed in one of 3 methods outlined in the following section. If the ECU memory does not contain any active or inactive stored faults, then the e-Stroke system and foundation brake system is functioning properly.

Step 10: Road test the vehicle once road worthy. Brakes should be used in normal operation and the vehicle should reach speeds over 5mph for at least **60** seconds.



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Step 11: Again, Check ECU memory for any stored e-Stroke faults. The ECU fault memory can be accessed in one of 3 methods outlined in the following section. If the ECU memory does not contain any active or inactive stored faults, then the e-Stroke system and foundation brake system is functioning properly.

The Functionality Test is now complete:

If the above conditions are met during this test the e-Stroke system is properly installed and functioning.

Trouble Shooting:

If the e-Stroke system deviates from the above functionality proceed as follows:

1. Follow Step 9 to retrieve the e-Stroke fault codes.
2. Inspect and repair the e-Stroke system or vehicle braking system as appropriate for the recorded fault condition.
3. Consult the Vehicle OEM for proper warning light or dash display function.
4. Repeat Steps 1-11 upon completion of foundation brake or e-Stroke system repair to verify proper functionality.

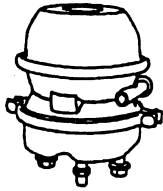
e-Stroke ECU Memory Retrieval Methods:

Method 1: e-Stroke GEN 3 Blink Code Retrieval:

Note: *Method 1 - Blink Codes require a Warning Light powered directly by the e-Stroke ECU to operate*

Press the red button on the front of the ECU for 1 second to initiate fault code warning light blink sequence.

- The warning light(s) will respond with a series of blink codes indicating whether any faults have been recorded by the ECU.
- A blink code of 1-1 (1 blink 1.5 second pause followed by 1 blink) indicates that no stored fault codes are present within the ECU.
- Reference the e-Stroke Blink Code Definition Table (Below) to determine the system condition.
- Reference the e-Stroke GEN 3 Blink Code Operation Guide (MGM Bulletin EB 08-011) for additional instruction on blink code retrieval.



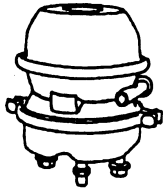
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e-Stroke Warning Light Blink Codes			
<i>Applies to ECUs with P/N 8291XXX Prefix.</i>			
ECU Push Button Operation:			
Press ECU Button for 1 second to begin e-Stroke fault blink code sequence			
Press ECU Button for 5 seconds to clear e-Stroke stored fault blink codes			
Blink Code Timing:			
0.5 seconds	Lamp On		
0.1 seconds	Lamp Off		
1.5 seconds	Pause In-Between Digits		
4 seconds	Pause In-Between Faults		
e-Stroke Blink Code Definitions			
First Digit	Type of Fault	Second Digit	Location of Fault
1	No Fault	1	No Fault (Only with First Digit = 1)
2	Non-Functioning Brake	1	Axle 1 - Left
3	Over-Stroke Brake	2	Axle 1 - Right
4	Dragging Brake	3	Axle 2 - Left
5	e-Stroke Sensor Fault	4	Axle 2 - Right
6	Lining Wear Warning	5	Axle 3 - Left
		6	Axle 3 - Right
		7	Axle 4 - Left
		8	Axle 4 - Right
7	e-Stroke System Fault	1	Pressure Transducer
		2	SAE J1708 / J1939 Communication
10	e-Stroke Fault Codes Cleared		



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Method 2: e-Stroke GEN 3 Laptop Diagnostic Program:

Note: *Method 2 – Laptop Diagnostic Program does not require Warning Light(s) or a Dash Display to operate.*

The status of the e-Stroke system as well as any stored faults can be accessed using the e-Stroke GEN 3 RS-232 diagnostic program and a lap top computer.

- Reference the e-Stroke GEN 3 RS-232 Program Users Guide (MGM Bulletin EB 11-001) for additional instruction.
- The RS-232 diagnostic tool uses a set of harnesses and a computer program to communicate with the e-Stroke ECU. Reference Bulletin EB 11-001 for connections.
- **e-Stroke GEN 3 RS-232 Diagnostic Kit (MGM P/N 9090109)**
- **e-Stroke GEN 3 SAE J1939 Diagnostic Kit (MGM P/N 9090111, SAE J1939 250 kbs. Only)**

Method 3: e-DT Diagnostic Tool:

Note: *Method 3 – e-DT Diagnostic Tool does not require Warning Light(s) or a Dash Display to operate.*

The e-DT is a handheld e-Stroke diagnostic tool that communicates through the SAE J1939 diagnostic circuits on the vehicle. This hand-held diagnostic tool can be used to access the e-Stroke system status as well as any stored fault codes.

- Reference the e-DT Diagnostic Tool Users Guide (MGM Bulletin EB 08-013) for additional instruction.
- The e-DT requires a connection to the same SAE J1939 circuit that the e-Stroke ECU is connected to. The e-DT may require an adapter for vehicles with split J1939 circuits. Contact MGM Brakes for adapter options.
- **e-DT Diagnostic Tool Kit (MGM P/N 9090110, SAE J1939 250 & 500 kbs.)**