

e-Stroke GEN 3 Post System Installation Functionality Test Procedure

Introduction: The following procedure is intended to test the e-Stroke system functionality after installation. Following these steps will verify that the system is installed correctly and the vehicles foundation brakes are operating within the recommended limits. The e-Stroke GEN 3 System will monitor the brake status and display faults through dash mounted warning light(s).

This test procedure applies to e-Stroke GEN 3 systems installed on up to 4 Axle Tractor / Truck / Bus applications. 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 has the capability to monitor brake lining wear if this functionality is active.

The GEN 3 system has (4) Alarm (Warning Light) Outputs which function as follows:

- Alarm Output 1 – Tractor / Truck / Bus e-Stroke Warning
- Alarm Output 2 – Tractor / Truck / Bus Lining Wear Warning
- Alarm Output 3 – Trailer e-Stroke Warning
- Alarm Output 4 – Trailer Lining Wear Warning

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 2 will turn on with an active Tractor / Truck / Bus lining wear 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 CCM for 1 second. The stored fault history can be cleared by pressing the red button on the front of the CCM 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.

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 I/O System (where applicable)

Functionality Test Preparation:

It is important to clear the e-Stroke CCM memory upon completion of the vehicle build and e-Stroke system installation and prior to the functionality test. Clearing the CCM memory will insure that any inconsequential faults which may have been recorded during the install 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 CCM while switching the ignition power *ON*. Allow a few seconds for the e-Stroke CCM to turn *ON*. Release the red button after 3-5 seconds.

Pressing the red button on the face of the CCM during start up will clear the CCM 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 e-Stroke warning light(s) are powered directly by the e-Stroke CCM.

Note: The vehicle I/O system controls the CCM warning light(s); consult the vehicle I/O system designer for I/O controlled warning light operation. In some cases the vehicle I/O system may have another indicator lamp displaying the actual / unfiltered e-Stroke alarm output. This indicator display may be used in the same manner as a warning lamp connected directly to the e-Stroke CCM.

Step 2: With the CCM power up. Clear the e-Stroke stored fault codes by pressing the red button on the front of the CCM 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 CCM fault history has been cleared.

Functionality Test Procedure:

Step 3: Chock vehicle wheels.

Step 4: Switch the ignition power *ON*. Allow a few seconds for the e-Stroke CCM 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 the e-Stroke warning light(s) are powered directly by the e-Stroke CCM.

Step 5: Build 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*

Step 7: Apply service brake foot pedal to 90-100psi (for at least 2 seconds), then release the foot pedal. Repeat this pressure application a few times to cycle the vehicles braking system. During this pressure application watch the warning light(s) for a fault indication.

- Warning Light(s) should remain *OFF* both during and after the brake applications.
- If the Warning Light(s) turn *ON* during or after the brake applications proceed to Step 9 to acquire fault codes.

Step 8: Apply parking brakes.

- Warning Light(s) should remain *OFF*

Step 9: Check CCM memory for any stored e-Stroke faults. The CCM fault memory can be accessed in one of 3 methods outlined in the following section. If the CCM 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. Repeat Steps 1-9 upon completion of foundation brake or e-Stroke system repair to verify proper functionality.

e-Stroke CCM Memory Retrieval Methods:

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

Press the red button on the front of the CCM 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 CCM.
- 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 CCM.
- 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 08-016) for additional instruction on blink code retrieval.

| e-Stroke Warning Light Blink Codes | | | |
|---|------------------------------|---------------------|--------------------------------------|
| CCM Push Button Operation: | | | |
| Press CCM Button for 1 second to begin e-Stroke fault blink code sequence | | | |
| Press CCM 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 | | |

Method 2: e-Stroke GEN 3 RS-232 Diagnostic Program:

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 08-017) for additional instruction.
- The RS-232 Diagnostic tool uses a set of harnesses and a computer program to communicate with the e-Stroke CCM. The diagnostic harness connects directly to the P2 – Diagnostic connector on the CCM.
- **e-Stroke GEN 3 RS-232 Diagnostic Kit (MGM P/N 9090109)**

Method 3: e-DT Diagnostic Tool:

The e-DT is a handheld e-Stroke diagnostic tool that communicates through the SAE J1587/1708 or 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 08-018) for additional instruction.
- The e-DT requires a connection to the same SAE J1939 circuit that the e-Stroke CCM is connected to. The e-DT may not function properly with vehicles that have split J1708 / J1939 circuits.
- **e-DT Diagnostic Tool Kit (MGM P/N 9090110)**