

MGM Brakes

A Division of Indian Head Industries, Inc.

TECHNICAL BULLETIN

SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

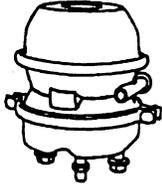
The e-Stroke GEN 3 Disc System is designed to continuously monitor Disc (or a combination of drum and disc) vehicle air brake systems both while in operation and during stationary brake inspections. The e-Stroke GEN 3 system also includes various diagnostic capabilities as described in this guide.

The MGM e-Stroke system utilizes piston rod travel measurements from the brake chambers, as well as brake application pressure and vehicle speed, to determine the overall status of the brake system. In addition the e-Stroke GEN 3 system is also capable of monitor lining wear if installed with the appropriate lining wear sensors. The MGM e-Stroke disc brake chambers are similar to MGM Brakes standard chambers, with the addition of a sensor pack which mounts in between the actuator and caliper, and a specially designed spring loaded pushrod that detects caliper lever arm movement. MGM e-Stroke disc brake actuators use an infrared sensor and reflective target material, located on the pushrod, to measure brake stroke. At the center of the e-Stroke system is the Chassis Communication Module or CCM, which accepts all of the systems inputs and outputs and utilizes proprietary MGM software to monitor the vehicles braking system.

- *Reference MGM Drawing (P/N 9230100) for a complete e-Stroke GEN 3 system schematic and wiring diagram.*

This Service Bulletin is intended to provide instruction on installing an e-Stroke GEN 3 system. The steps listed below outline the installation of each system component. In addition, the e-Stroke Technical Manual includes Technical Documents which provide supporting information for each installation step.

- *The e-Stroke Technical Manual is available for download at www.MGMBrakes.com.*



MGM Brakes

A Division of Indian Head Industries, Inc.

TECHNICAL BULLETIN

SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

WARNING:

THIS MANUAL IS INTENDED TO PROVIDE A GENERAL OVERVIEW OF POTENTIAL BRAKE ISSUES, NOT A SPECIFIC ANALYSIS. IT IS THE CUSTOMER'S RESPONSIBILITY TO FOLLOW AND PERFORM ALL PREVENTATIVE AND / OR SCHEDULED BRAKE MAINTENANCE AS SPECIFIED BY THE VEHICLE OEM.

E-STROKE IS INTENDED TO PROVIDE A MONITORING FUNCTION WHICH WILL ALERT THE OPERATOR OR TECHNICIAN OF A POTENTIAL BRAKING ISSUE. VISUAL INSPECTIONS OF THE BRAKING SYSTEM ARE PERIODICALLY REQUIRED TO VERIFY E-STROKE FAULT INDICATIONS OR CONFIRM THAT THE BRAKING SYSTEM IS PROPERLY FUNCTIONING.

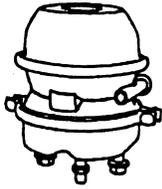
CUSTOMER (NOT MGM BRAKES) IS SOLELY LIABLE FOR CUSTOMER'S FAILURE TO PROPERLY MAINTAIN / INSPECT VEHICLE BRAKES.

How to Use this Installation Guide:

- This Service Bulletin is divided into steps covering an overview of the installation for each system component.
- Review all referenced Technical Documents for additional information pertaining to each step.

MGM Brakes e-STROKE[®] Technical Support:

1-877-4-e-STROKE
www.mgmbrakes.com



MGM Brakes

A Division of Indian Head Industries, Inc.

TECHNICAL BULLETIN

SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

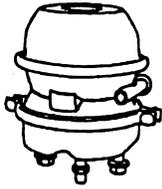
e-STROKE[®] Disc System Components & Installation Steps:

- STEP 1: e-Stroke Brake Chamber & Sensor Assemblies
- STEP 2: Chassis Communications Module (CCM)
- STEP 3: Pressure Transducer & Harness
- STEP 4: Power Harness
- STEP 5: Vehicle Diagnostic Connection
- STEP 6: Warning Light(s)
- STEP 7: Sensor Harnesses (Routing & Installation)
- STEP 8: e-Stroke GEN 3 Post System Installation Functionality Test
- STEP 9: e-Stroke GEN 3 System Diagnostics

Note: *Contact MGM Brakes for lining wear component installation technical information.*

Notes & Precautions:

- If drilling a hole through the vehicle's body is necessary to route any harnesses, make sure to use a weather-proof rubber grommet or approved sealant to properly seal the hole.
- Always use care when drilling any surface as vehicle critical components may be behind the drilled surface.
- Use ONLY Black UV (ultraviolet) Resistant Cable Ties (or equivalent) for harness installation.
- All e-Stroke harnesses are to be secured to existing wire harnesses, frame components, and/or air lines every 12-18". Make sure all connections are NOT unduly stressed and each connector is secured with a cable tie through the connector clip.



MGM Brakes

A Division of Indian Head Industries, Inc.

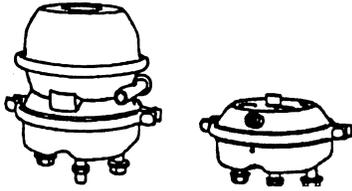
TECHNICAL BULLETIN

SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

WARNING: Installation, maintenance and replacement of MGM Brakes e-Stroke chambers and related system components require a high degree of skill and experience. Improper installation, maintenance or replacement can result in brake failure and resulting loss of control of the vehicle and possible injury or death. MGM Brakes, a division of Indian Head Industries, Inc. (IHI), does not authorize anyone other than highly skilled and experienced persons to attempt to utilize the instructions contained in this Installation Manual. MGM Brakes and IHI shall have no liability of any kind for damages arising out of any other use of the information contained within this Installation Manual.

IMPORTANT: Be aware that proper installation and warranty coverage of e-Stroke equipped brake chambers require that several important, unique steps be taken in addition to those found in the standard *MGM Brakes Service Manuals*. See *STEP 1 for Special e-Stroke Installation Instructions*.

IMPORTANT: If you need a *Technical Document* or *Service Manual*, it can be downloaded or a 'hard copy' can be requested by visiting the MGM Brakes website (www.mgmbrakes.com), or contact your MGM Brakes representative for assistance.



MGM Brakes

A Division of Indian Head Industries, Inc.

TECHNICAL BULLETIN

SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

STEP 1: Installation of e-STROKE[®] Brake Chamber & Sensor Assemblies

IMPORTANT: Prior to installation, it is very important to verify that all caliper adjustment mechanisms are working properly. Measure the lining clearance for each caliper before installation to determine if adjustment meets the caliper requirements. Reference the Caliper Service Manual for specific instruction. If the lining clearance is within specification for the caliper then the automatic adjusters should be functioning properly.

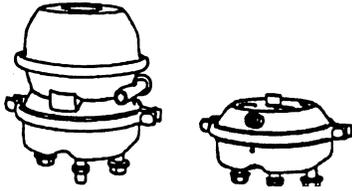
Follow MGM Brakes recommended installation procedures to replace all brake chambers with new MGM Brakes e-Stroke chambers. Refer to the following MGM Brakes Technical Documents for installation procedures:

Reference the following Technical Document(s) for STEP 1:

- *Form #5096 - Service and Spring Brake Actuators on Air Disc Braking Systems*
- *EB 13-001 – e-Stroke Disc Actuator & Harness Install Guide*
- *e-Stroke Disc Brake Actuator Drawing – Contact MGM Brakes for Drawings*

1.1: SPECIAL e-Stroke Brake Chamber Installation Instructions:

- 1.1.1: Install the e-Stroke brake chambers following standard *Service Manual* procedures, and reference the following procedures.
- 1.1.2: Ensure that the caliper sealing and mounting surfaces are clean and free from dirt and corrosion. Inspect caliper lever arm to insure dirt has not contaminated the existing grease during actuator removal. Apply new grease to caliper lever arm as specified by Caliper Service Manual.
- 1.1.3: The e-Stroke disc actuators denoted with “ESK” in the P/N include the ESP sensor pack as part of the actuator assembly. The ESP sensor pack is installed in between the actuator and caliper. See Figure 1 for e-Stroke Disc Brake Chamber Components.
- 1.1.4: Remove the actuator shipping dust cover prior to installation. Ensure that the caliper lever arm port shipping cover is completely removed prior to actuator installation.



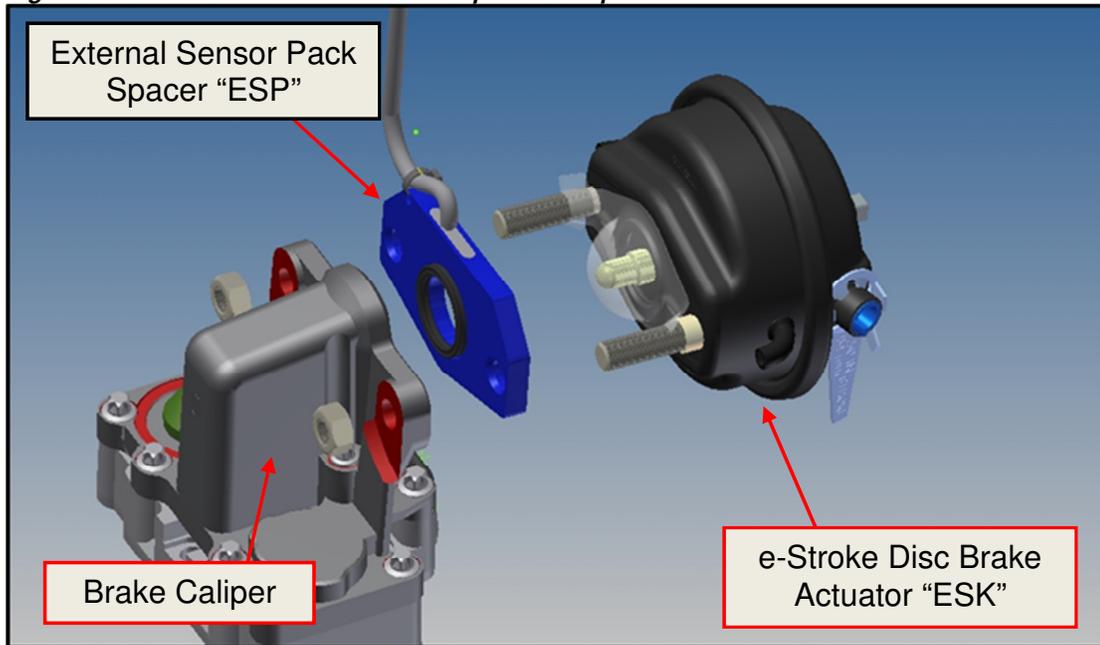
MGM Brakes

A Division of Indian Head Industries, Inc.

TECHNICAL BULLETIN

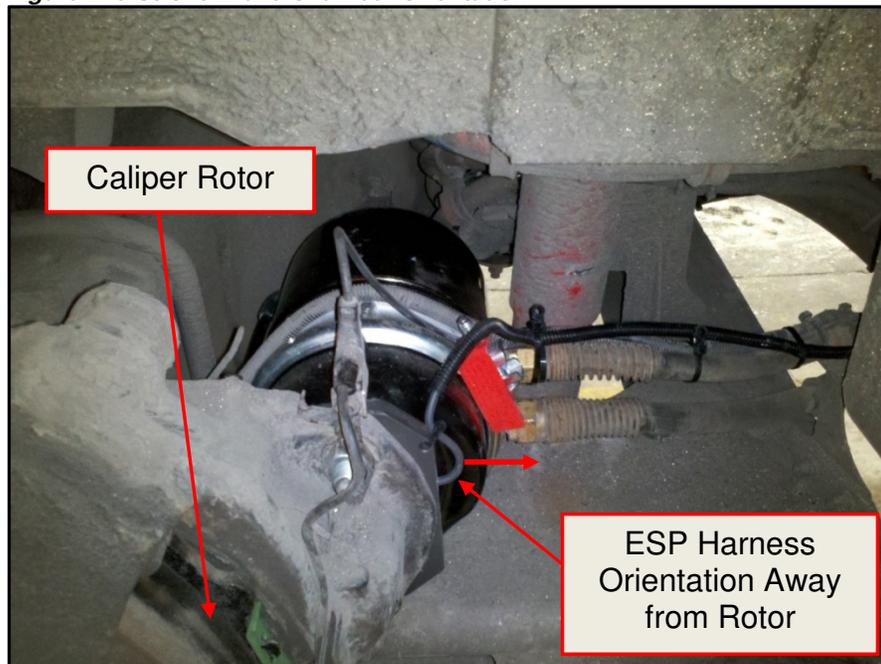
SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

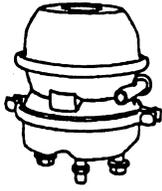
Figure 1: e-Stroke Disc Brake Chamber Special Components



- 1.1.5: It is important to properly orientate the e-Stroke disc brake actuators. **Mount the brake chamber so the sensor harness is orientated away from the brake rotor. Be aware that there are right and left hand actuators.** See Figure 2.

Figure 2: e-Stroke Brake Chamber Orientation





MGM Brakes

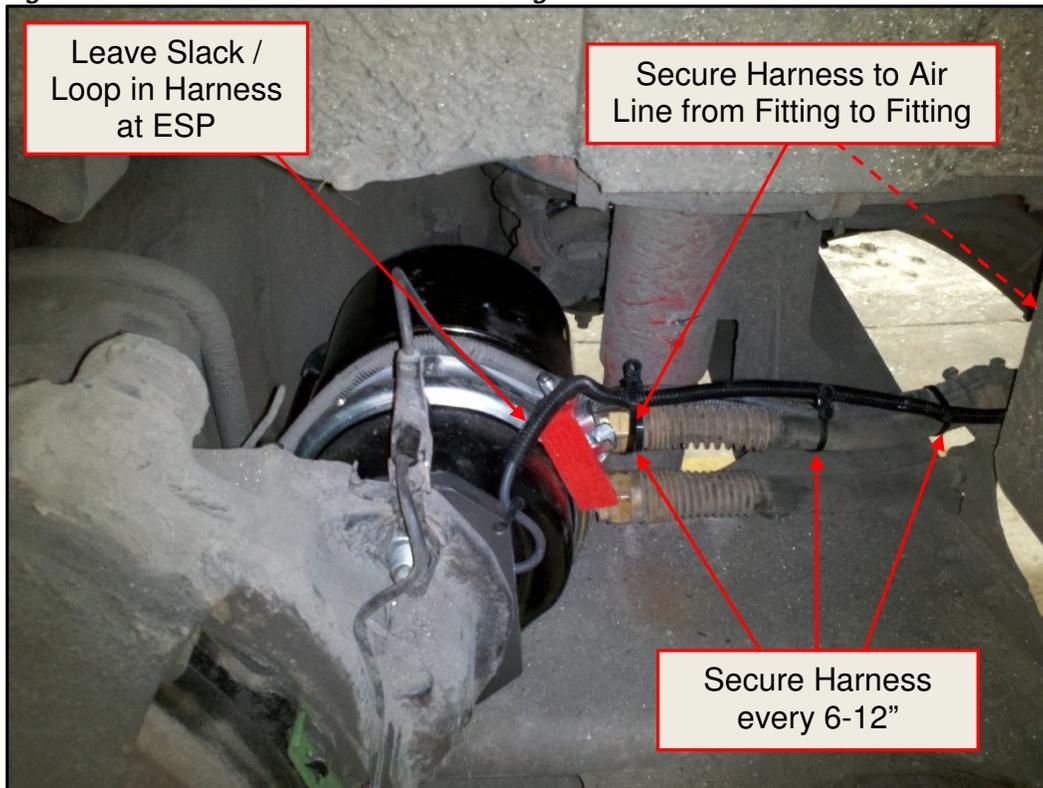
A Division of Indian Head Industries, Inc.

TECHNICAL BULLETIN

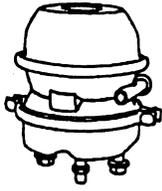
SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

- 1.1.6: Complete Brake Chamber installation and connect air lines.
- 1.1.7: Secure the Sensor Harness to airline fitting using UV resistant (Black) cable ties leaving some slack in between the Sensor and fitting. See Figure 3.
- 1.1.8: Route the Sensor Harness along the air line securing every 12-18" with UV resistant (Black) cable ties. See Figure 3.

Figure 3: e-Stroke ESP Sensor Harness Routing



- 1.1.9: Reference EB 13-001 for additional Actuator, Sensor & Harness installation information.



MGM Brakes

A Division of Indian Head Industries, Inc.

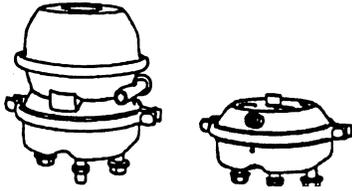
TECHNICAL BULLETIN

SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

STEP 2: Installation of Chassis Communications Module (CCM)

2.1: Choosing the CCM Mounting Location

- 2.1.1: The CCM must be mounted within 1 meter of the J1939 access. SAE specifies that J1939 drop leg extensions are limited to 1 meter in length from the J1939 backbone. The location of the available J1939 connections will determine the CCM mounting location for most retrofit applications. The communications closet behind the driver's seat (for bus applications where equipped) is the recommended CCM mounting location, as J1939 and ignition switched power are typically available. In addition, the e-Stroke GEN 3 CCM is not environmentally sealed requiring interior installation. *Reference Step 4, 5.*
- 2.1.2: Choose a CCM mounting location which provides accessibility for Technicians. Access to the CCM is required for diagnostic troubleshooting. *See Figure 4.*
- The CCM includes a Red Push Button on the face for initiating warning light blink codes. *Reference Step 9.3.*
 - The CCM "P2" connector needs to be accessible to connect the RS-232 Diagnostic Harness. *Reference Step 9.1.*
- 2.1.3: It is recommended that at least 2" of space is left around the CCM on all sides. Care should be taken to avoid exposure to anything that could damage the connectors or the module itself. *See Figure 4.*
- 2.1.4: Mount the CCM in an orientation which allows the Technicians and Operators to clearly read the text on the front of the CCM (Not upside down or sideways from the Technicians perspective). *See Figure 4.*



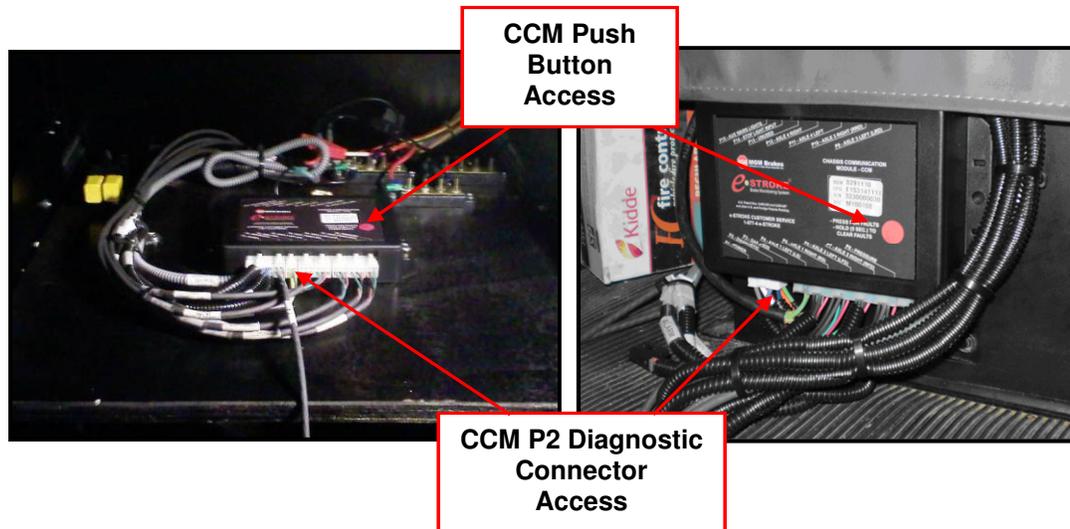
MGM Brakes

A Division of Indian Head Industries, Inc.

TECHNICAL BULLETIN

SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

Figure 4: Examples of CCM Mounting Locations

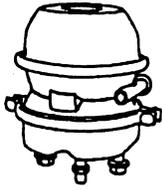


2.2: CCM Mounting Methods

The e-Stroke GEN 3 CCM may be mounted using either the provided adhesive tape on the back of the CCM or (2) fasteners with the mounting tabs.

2.2.1: Adhesive Tape Mounting

- The included adhesive tape on the back of the CCM requires a clean flat surface for proper adhesion. Either a painted or gloss plastic surface is recommended.
- Clean the CCM mounting surface to remove dirt and grease.
- Remove the red film from the adhesive tape and press CCM into place.
- Verify that the CCM is adhered to the mounting surface after installation.



MGM Brakes

A Division of Indian Head Industries, Inc.

TECHNICAL BULLETIN

SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

2.2.2: Fastener Mounting

- Use the CCM as a template for locating the mounting holes.
- Drill appropriately sized holes for the mounting fasteners to be used. Two 1/4" fasteners are recommended. Locking nuts are recommended for machine screw type fasteners.
- Always use care when drilling any surface as critical components may be behind the drilled surface.
- Install CCM using mounting tabs and selected fasteners.

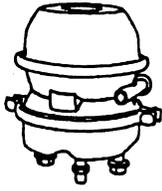
STEP 3: Installation of Pressure Transducer & Harness

3.1: Choosing the Pressure Transducer Mounting Location

- The e-Stroke pressure transducer is intended to measure brake application pressure.
- The recommended mounting location for the pressure transducer is at the **Brake Treadle Valve Secondary Delivery Output**.
- Bus applications typically have a treadle valve output manifold with multiple ports containing other pressure switches and transducers.
- Tractors & Trucks may have a spare port on the treadle valve body.

3.2: Pressure Transducer Mounting

- 3.2.1: The e-Stroke pressure transducer includes a 1/4" NPT male fitting. Either locate a spare 1/4" NPT port in the brake treadle valve secondary delivery output or add one using standard 1/4" NPT brass fittings. *See Figure 5.*
- 3.2.2: Install the pressure transducer into the air-port using approved thread sealer. Verify the connection to be leak free after installation.



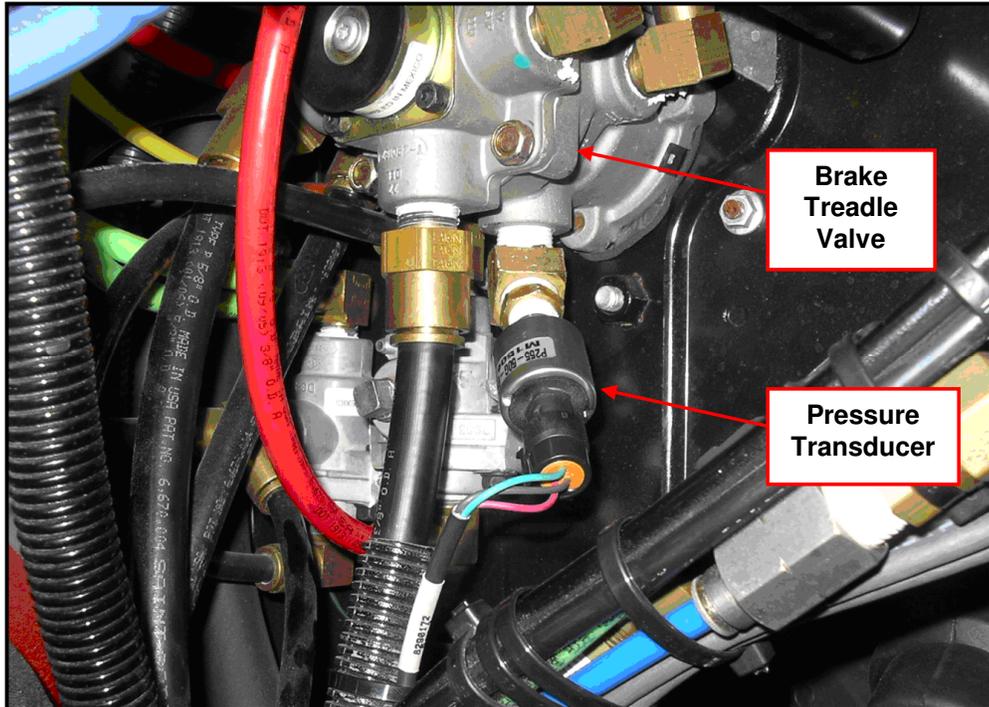
MGM Brakes

A Division of Indian Head Industries, Inc.

TECHNICAL BULLETIN

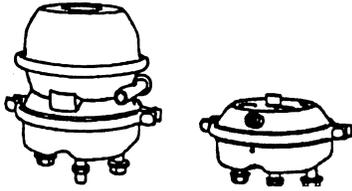
SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

Figure 5: Pressure Transducer Mounted to Brake Treadle Valve



3.3: Pressure Transducer Harness Installation

- 3.3.1: Apply a label marked "P" on both ends of the pressure transducer harness if harness is not already labeled.
- 3.3.2: Connect the pressure transducer harness to the pressure transducer. Note the harness orientation as the CCM and Pressure Transducer use different connectors.
- 3.3.3: Route the pressure transducer harness to the CCM and connect to the "P8" connector. Secure the harness to the transducer body and every 12-18" along the harness using UV resistant (Black) cable ties.



MGM Brakes

A Division of Indian Head Industries, Inc.

TECHNICAL BULLETIN

SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

STEP 4: Power Harness Installation

Reference the following e-Stroke Technical Manual Document(s) for STEP 4:

- EB 13-001– e-Stroke Disc Actuator & Harness Install Guide
- MGM Drawing P/N 9230100 – e-Stroke GEN 3 System Schematic

- The e-Stroke GEN 3 system requires that ignition switched power, ground and J1708 or J1939 circuits are connected to the CCM.
- Use only MGM Brakes e-Stroke GEN 3 Power Cables for power connection.
- Reference Figure 6 (Below) for CCM Power, Diagnostic & Alarm Connections.

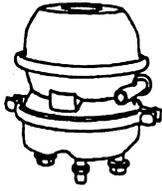
**Figure 6: GEN 3 CCM Power, Diagnostic, Alarm Connections
(MGM P/Ns 8291xxx)**

CCM Connector	Terminal	Function	Aftermarket Harness P/N	Harness Wire Color
P1	1	SAE J1708 / 1587+	8290189	Blue
P1	2	SAE J1708 / 1587 -	8290189	White
P1	4	System Power + 12 / 24V DC Ignition Switched	8290233	Red
P1	5	System Ground -	8290233	Black
P1	6	Alarm 1 +	8290233	Dark Blue
P1	7	Alarm 2 +	8290233	Light Blue
P1	9	Alarm 1 -	8290233	White
P1	10	Alarm 2 -	8290233	Gray
P3	1	SAE J1939 CAN HI	8290218, 8290257	Yellow
P3	2	SAE J1939 Shield	8290218, 8290257	NA
P3	3	SAE J1939 CAN LO	8290218, 8290257	Light Green
P15	2	Alarm 3, 4 -	8290235	White
P15	3	Alarm 3 +	8290235	Tan
P15	4	Alarm 4 +	8290235	Pink

4.1: Power Connections

4.1.1: Connect the supplied Power Cable (P/N 8290233) to the CCM “P1” connector and route to power / ground connection location.

- The typical source for electrical power is the vehicle's 12 VDC or 24 VDC (ignition-switch) Auxiliary Circuit with 5 Amp capacity.



MGM Brakes

A Division of Indian Head Industries, Inc.

TECHNICAL BULLETIN

SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

- This connection can typically be made at the vehicle's 'Power Distribution Panel' (PDP) or fuse box.
 - Consult the vehicle OEM wiring diagram to determine the appropriate connection locations.
- 4.1.2: MGM P/N 8290233: e-Stroke Aftermarket Power Cable Special Instructions
- The Red and Black Power Wires & Loom may be trimmed to appropriate length. Leave enough slack in the harness to allow for minor adjustment.
 - Connect the supplied fuse holder with 5 amp fuse to the Power Harness Red Wire using included solder & seal connector.
- 4.1.3: Make electrical connection to vehicle power source. Ensure all connections are sound.
- 4.1.4: Secure the harness every 12-18" with UV resistant (Black) cable ties.

STEP 5: Vehicle Diagnostic Connection

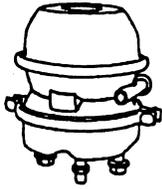
Reference the following e-Stroke Technical Manual Document(s) for STEP 5:

- *EB 08-007 – SAE J1708 & J1939 Wiring Reference*
- *MGM Drawing P/N 9230100 – e-Stroke GEN 3 System Schematic*

- The e-Stroke GEN 3 system must be connected to the vehicles J1939 circuit in order to operate with all features. If J1939 is not available on the vehicle then J1708 should be used. Connecting both J1939 and J1708 is not necessary if J1939 is available.
- Reference Figures 6, 7 and the vehicles OEM Wiring schematic for SAE J1939 / J1708 connection locations.

5.1: SAE J1939 Connection

- 5.1.1: Locate or install an SAE J1939 Drop Leg connection in the circuit backbone. This connection needs to be within 1 meter of the CCM mounting location. *Reference Step 2.1.*



MGM Brakes

A Division of Indian Head Industries, Inc.

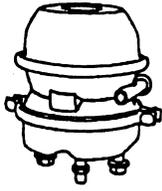
TECHNICAL BULLETIN

SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

- 5.1.2: e-Stroke SAE J1939 harnesses (P/N 8290218, 8290257) include a Deutsch 3-Pin DT Series industry standard connector. If the vehicle J1939 circuit will not accept this connector then the supplied J1939 harness can either be modified with the appropriate connector (customer supplied) or a new harness may be built. *Reference MGM Drawing P/N 9230100 – e-Stroke GEN 3 System Schematic for Connector Information.*
- 5.1.3: Connect the SAE J1939 Harness to the CCM “P3” Connector and the Vehicle Drop Leg connection securing the harness every 12-18” with UV resistant (Black) cable ties.

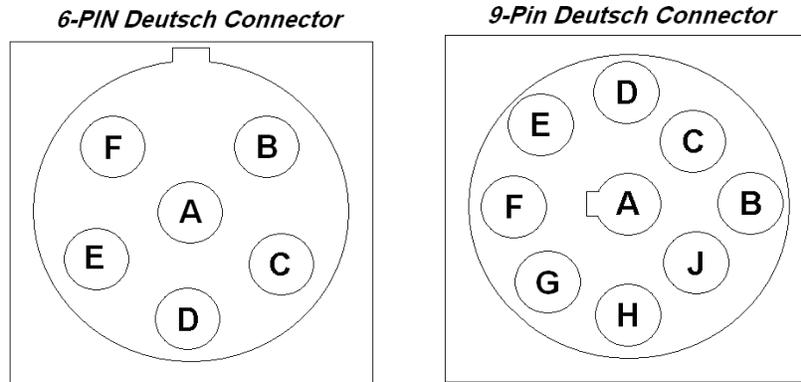
5.2: SAE J1708 / J1587 Connection

- 5.2.1: Connect the e-Stroke J1708 / J1587 harness (P/N 8290189) to the Power Harness connector marked “J1708”.
- 5.2.2: The SAE J1708 / J1587 connection can typically be made near the 6 or 9 pin OBD connector. Determine the location for the J1708 / J1587 connection and route the harness accordingly securing the harness every 12-18” with UV resistant (Black) cable ties. See Figures 7, 8.
- 5.2.3: The e-Stroke SAE J1708 / J1587 harness is blunt cut at the end allowing for the addition of the appropriate connector (customer supplied) or spliced into the vehicle circuit.



SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

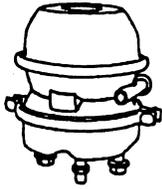
Figure 7: e-Stroke SAE J1708 / J1939 Wiring Reference



SAE OBD Diagnostic Connector Designations			
6-Pin Connector		9-Pin Connector	
A	J1708 / J1587(+)	A	Power (-)
B	J1708 / J1587(-)	B	Power (+)
C	Power (+)	C	CAN J1939 HI (+)
D	N/A	D	CAN J1939 LO (-)
E	Power (-)	E	CAN J1939 Shield
F	N/A	F	J1708 / J1587 (+)
		G	J1708 / J1587 (-)
		H	CAN J1939 HI (+) CHASSIS NEW FLYER ONLY
		J	CAN J1939 LO (-)CHASSIS NEW FLYER ONLY

SAE J1939 / J1708 Notes:

1. Always reference Vehicle OEM Wiring Schematics for additional wiring information: wire color, locations.
2. Consult vehicle manufacturer for recommended connection methods.
3. 2009 and newer New Flyer Buses have a split J1939 circuit, Powertrain & Chassis. Always consult New Flyer OEM wiring schematic for vehicle specific connections. The table above indicates the 9-Pin OBD connector Powertrain & Chassis connections for most New Flyer Buses.



MGM Brakes

A Division of Indian Head Industries, Inc.

TECHNICAL BULLETIN

SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

STEP 6: Warning Light(s) Installation

Reference the following e-Stroke Technical Manual Document(s) for STEP 6:

- *EB 13-001– e-Stroke Disc Actuator & Harness Install Guide*
- *MGM Drawing P/N 9230100 – e-Stroke GEN 3 System Schematic*

The e-Stroke GEN 3 System will monitor the brake status and display faults through dash mounted warning light(s). The e-Stroke GEN 3 system has (4) warning light or alarm outputs as listed below. All applicable warning lights will need to be accounted for when determining the mounting location.

- **Alarm 1:** Tractor / Truck / Bus Brake Monitor Warning
- **Alarm 2:** Tractor / Truck / Bus Lining Warning (*Lining Wear Applications Only*)
- **Alarm 3:** Trailer Brake Monitor Warning (*Tractor Applications Only*)
- **Alarm 4:** Trailer Lining Warning (*Tractor Applications Only*)

The e-Stroke Warning Light Kit(s) (P/Ns 9090105, 9090106) include an amber ½ inch diameter panel mount lamp. Each kit includes appropriate labels for all warning light functions.

6.1: Choose the Warning Light(s) Mounting Location

- It is recommended that the warning light(s) be mounted near the park brake release valve. This will help associate the lamp warning with the vehicle brakes.
- The warning light(s) harnesses must be long enough to reach the CCM from the mounting location.
- Ensure that the mounting location allows for enough room to apply the warning light label(s) next to the warning light(s).

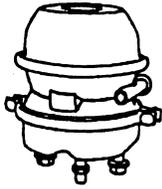
6.2: Warning Light Installation

6.2.1: Drill a ½ inch diameter hole in the designated panel for each warning light to be installed.

Note: Always use care when drilling any surface as critical components may be behind the drilled surface.

6.2.2: Pull the warning light cable through the hole and push the lamp to lock into place.

6.2.3: Clean the warning light mounting surface removing dirt and grease. Apply the appropriate warning light label next to the lamp.



MGM Brakes

A Division of Indian Head Industries, Inc.

TECHNICAL BULLETIN

SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

6.2.4: Route the warning light harnesses to the CCM securing harness every 12-18" with UV resistant (Black) cable ties.

6.2.5: Connect the warning light harnesses to the CCM as follows:

- **Alarms 1 & 2:** Connect the Warning Light Harness to the appropriately labeled leads on the CCM power harness (P/N 8290233) which is connected to the CCM "P1" Connector.
- **Alarms 3 & 4:** Connect the Warning Light Harness to the appropriate labeled Warning Light Adapter Harness (P/N 8290235) lead which is connected to CCM P15 Connector. (*Tractor Applications Only*)

STEP 7: Sensor Harnesses (Routing & Installation)

Reference the following e-Stroke Technical Manual Document(s) for STEP 7:

- EB 13-001– e-Stroke Disc Actuator & Harness Install Guide
- MGM Drawing P/N 9230100 – e-Stroke GEN 3 System Schematic

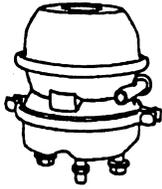
IMPORTANT: *Using proper harness installation practices is the most important action which can be taken to ensure the long term durability of the e-Stroke system.*

Reference Service Bulletin EB 13-001 for additional harness installation instruction.

7.1: Label both ends of each Sensor Harness for ease of Identification at CCM and Sensor.

Note: Care should be taken to ensure that connections on the wheel ends will match designations on the CCM, otherwise the displayed fault may not match the reading because of switched cable ends.

7.2: Connect the required length Sensor Harness to each Sensor installed with the brake chambers. Note the harness orientation as that the Sensor and CCM use different connectors.



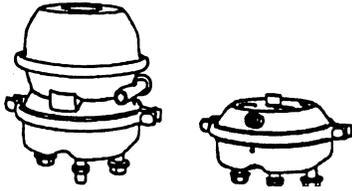
MGM Brakes

A Division of Indian Head Industries, Inc.

TECHNICAL BULLETIN

SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

- 7.3: Route each Harness from the Sensor to the CCM. See Figures 8, 9.
- It is recommended that the e-Stroke harnesses are routed along with the vehicles existing wire harness as much as possible.
 - Route harnesses along air lines from the actuator to the vehicle frame. The vehicle OEM designed and routed these air lines to account for suspension movement and steering articulation.
 - Secure connectors together by routing a UV resistant (Black) cable tie through the connector clip. This will ensure the connectors are completely locked together. See Figure 8.
 - Secure the connectors to an airline, cable harness bundles, or frame components using UV resistant (Black) cable ties around connector body. See Figure 9.
 - Connectors must not be stressed or bent when secured.
 - Connectors must be located in a serviceable location.
 - Secure a minimum of 8" of slack harness near the connectors for future service.
- 7.4: Secure the Sensor Harnesses every 12-18" using UV resistant (Black) cable ties.
- 7.5: Connect Sensor Harnesses to appropriate CCM connector for each wheel end.



MGM Brakes

A Division of Indian Head Industries, Inc.

TECHNICAL BULLETIN

SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

Figure 8: Secure e-Stroke Sensor Harness Connector with Cable Tie through Connector Clip

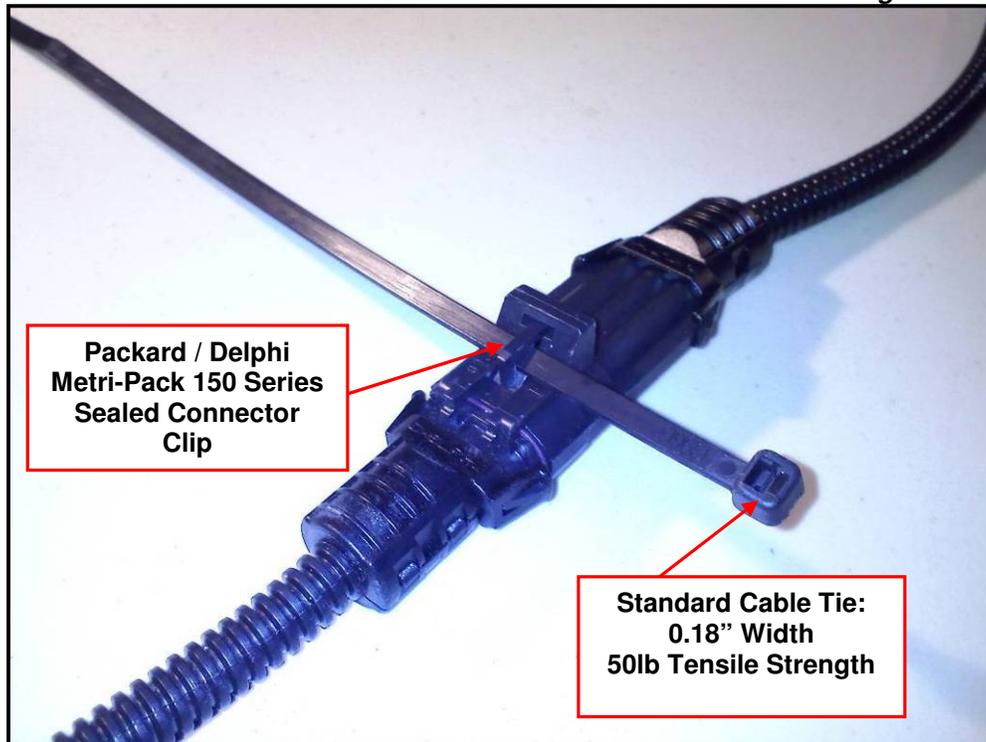
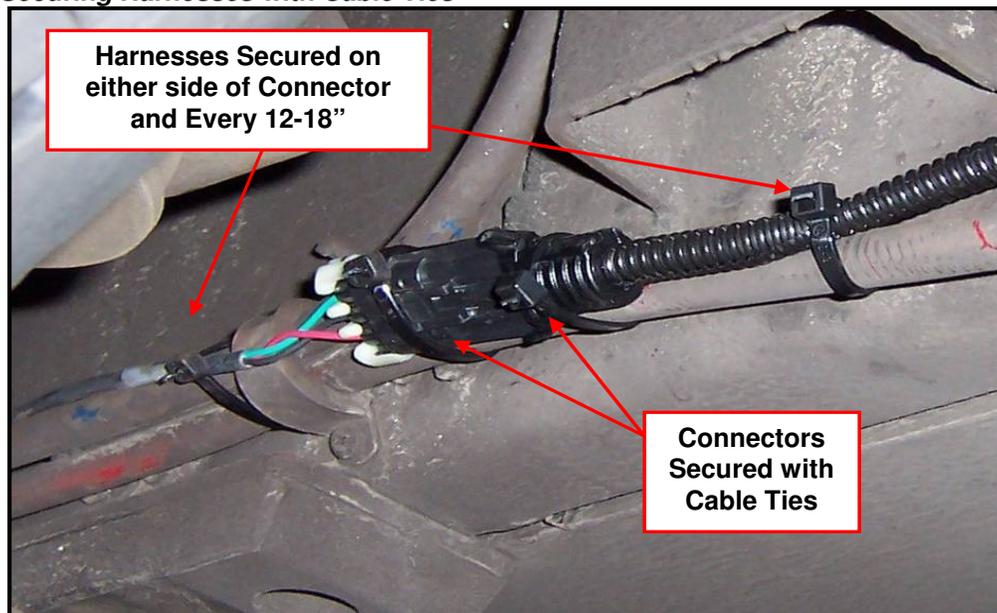
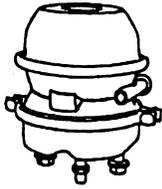


Figure 9: Securing Harnesses with Cable Ties





MGM Brakes

A Division of Indian Head Industries, Inc.

TECHNICAL BULLETIN

SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

STEP 8: e-STROKE® GEN 3 Post System Installation Functionality Test

Reference the following e-Stroke Technical Manual Document(s) for STEP 8:

- EB 09-004 - e-Stroke Inspection Checklist
- EB 08-008 – e-Stroke GEN 3 Post Install Functionality Test
- EB 13-003 – e-Stroke Disc Truck / Bus Troubleshooting Guide

The Installation is now complete.

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.

8.1: Required Vehicle Status:

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

- Air brake system
- Foundation Brake System
- Engine Controller
- Electrical Ignition System which powers the e-Stroke System
- SAE J1708 / J1939 circuits (where applicable)
- Vehicle Warning Light I/O System (where applicable)

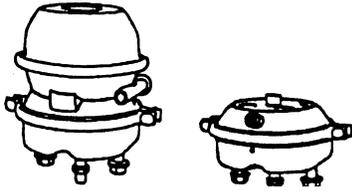
8.2: Test Preparation

- Chock vehicle wheels.
- Build air system pressure to 100-110psi using either the engine compressor or external compressed air supply.

8.3: Reference Technical Document EB 09-004 – e-Stroke Inspection Check List for Inspection Outline.

8.4: Reference Technical Document EB 08-008 – e-Stroke GEN 3 Post Install Functionality Test for complete functionality test Instructions.

8.5: Reference Technical Document EB 13-003 – e-Stroke Disc Truck / Bus Troubleshooting Guide for additional technical information.



MGM Brakes

A Division of Indian Head Industries, Inc.

TECHNICAL BULLETIN

SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

STEP 9: e-STROKE® GEN 3 System Diagnostics

**9.1: e-Stroke Computer Diagnostic Program:
MGM Kit P/N 9090109, 9090111**

Reference the following e-Stroke Technical Manual Document(s) for STEP 9.1:

- EB 11-001 – e-Stroke Diagnostic Program Users Guide

The e-Stroke Diagnostic Program Kit (P/N 9090109, 9090111) will operate with a Lap Top Computer (customer supplied) and appropriate diagnostic harness. This tool may be used to acquire the following information from the e-Stroke GEN 3 CCM:

- Current Wheel Specific Brake & Lining Status
- Stored Fault History
- System Status
- CCM Information: Software Version, Configuration, Serial Number.

P/N 9090109 Kit – Connects Lap Top directly to CCM. CCM access required.

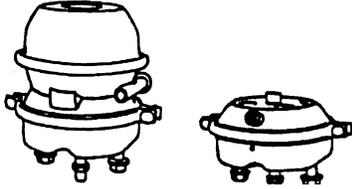
P/N 9090111 Kit – J1939 connection to CCM via vehicle 9-Pin Diagnostic Connector.

9.2: e-DT - e-Stroke Diagnostic Tool: MGM Kit P/N 9090110

Reference the following e-Stroke Technical Manual Document(s) for STEP 9.2:

- EB 08-013 – e-DT Diagnostic Tool Users Guide

- The e-stroke e-DT is a hand held diagnostic tool that is designed to work with MGM Brakes e-Stroke GEN 3 systems. The e-DT monitors the vehicles J-1939 network for the e-stroke system status and brake faults codes.
- The e-DT Diagnostic Kit (P/N 9090110) contains all harnesses and equipment required to use the diagnostic tool.
- The e-DT can be easily used by connecting the harness to the vehicle 9 pin diagnostic port. The e-DT will automatically turn on and link up with the e-Stroke system when connected.
- The e-DT displays real time e-Stroke system status and active brake faults. In addition the brake fault history can be acquired from e-Stroke GEN 3 systems. Vehicle speed and brake application pressure are also displayed on the e-DT for diagnostic purposes.



MGM Brakes

A Division of Indian Head Industries, Inc.

TECHNICAL BULLETIN

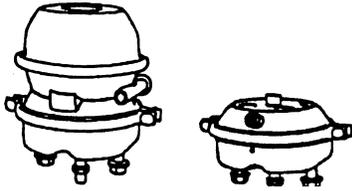
SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

9.3: Warning Light Blink Codes

Reference the following e-Stroke Technical Manual Document(s) for STEP 9.3:

- *EB 08-011 – e-Stroke GEN 3 Blink Code Operation Guide*

- The e-Stroke system warning lamp(s) will illuminate when the system is operating and an active fault is occurring. The nature of the fault will determine which lamp illuminates, such as a lining fault will illuminate Alarm 2. The e-Stroke GEN 3 System will also display diagnostic blink codes for active and inactive / stored faults through the warning lights.
- Press the Red Push Button on the CCM face for 1-2 seconds to initiate the blink code sequence. Pressing the push button for 5 seconds will clear the CCM fault history.
- See Figure 10 for Blink Code Definitions.



MGM Brakes

A Division of Indian Head Industries, Inc.

TECHNICAL BULLETIN

SUBJECT: EB 13-004 e-Stroke Disc System Installation Guide

Figure 10: e-Stroke GEN 3 Blink Code Definitions

e^{s3}™ Warning Light Blink Code Operation			
<i>Applies to CCMs with P/N 8291xxx Prefix.</i>		<i>Reference EB 08-011</i>	
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^{s3}™ Warning Light 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		
			

Cut Out and Fold Here for Reference Card

MGM Brakes e-STROKE® Technical Support:

1-877-4-e-STROKE
www.mgmbrakes.com