SAE The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

SURFACE VEHICLE RECOMMENDED PRACTICE

SAE J1953

REV. SEP2001

Issued 1993-10
Revised 2001-09

Superseding J1953 FEB1998

Brake-Stroke Indicator Design Guideline for Cam or Disc Air-Brake Actuators

1. ***Scope***—This SAE Recommended Practice shall cover mechanical- and electrical-readjust stroke indicators for air-brake actuators.

   This device shall indicate the foundation brake(s) may require adjustment or service when inspected per vehicle manufacturer's procedures. A measurement shall be made to determine actual stroke measurement for any system not factory calibrated.

   Stroke indication accuracy of an air-brake actuator can be assured only when all of its components are supplied by the original brake actuator manufacturer.

1.1 **Purpose**—This document establishes design guidelines for air-brake actuator stroke indicators.

2. ***References***

2.1 **Applicable Publication**—The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated, the latest revision of SAE publications shall apply.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J1292—Automobile, Truck, Truck-Tractor, Trailer, and Motor-Coach Wiring
SAE J1455—Joint SAE/TMC Recommended Environmental Practices for Electronic Equipment Design (Heavy-Duty Trucks)
SAE J1469—Air-Brake Actuator Test Procedure, Truck-Tractor, Bus, and Trailers
SAE J1817—Long-Stroke Air-Brake Actuator Marking

3. ***Requirements***

3.1 **Stroke Indicator—Mechanical Design Guidelines**

3.1.1 The stroke indication shall occur at +0 to 3.8 mm (+0.00 to 0.15 in) of the recommended readjustment stroke in Table 1 of SAE J1817.

TO PLACE A DOCUMENT ORDER: +1 (724) 776-4970 FAX: +1 (724) 776-0790
SAE WEB ADDRESS http://www.sae.org

Printed in U.S.A.

3.1.2 The stroke indication shall be orange. See Figure 1.

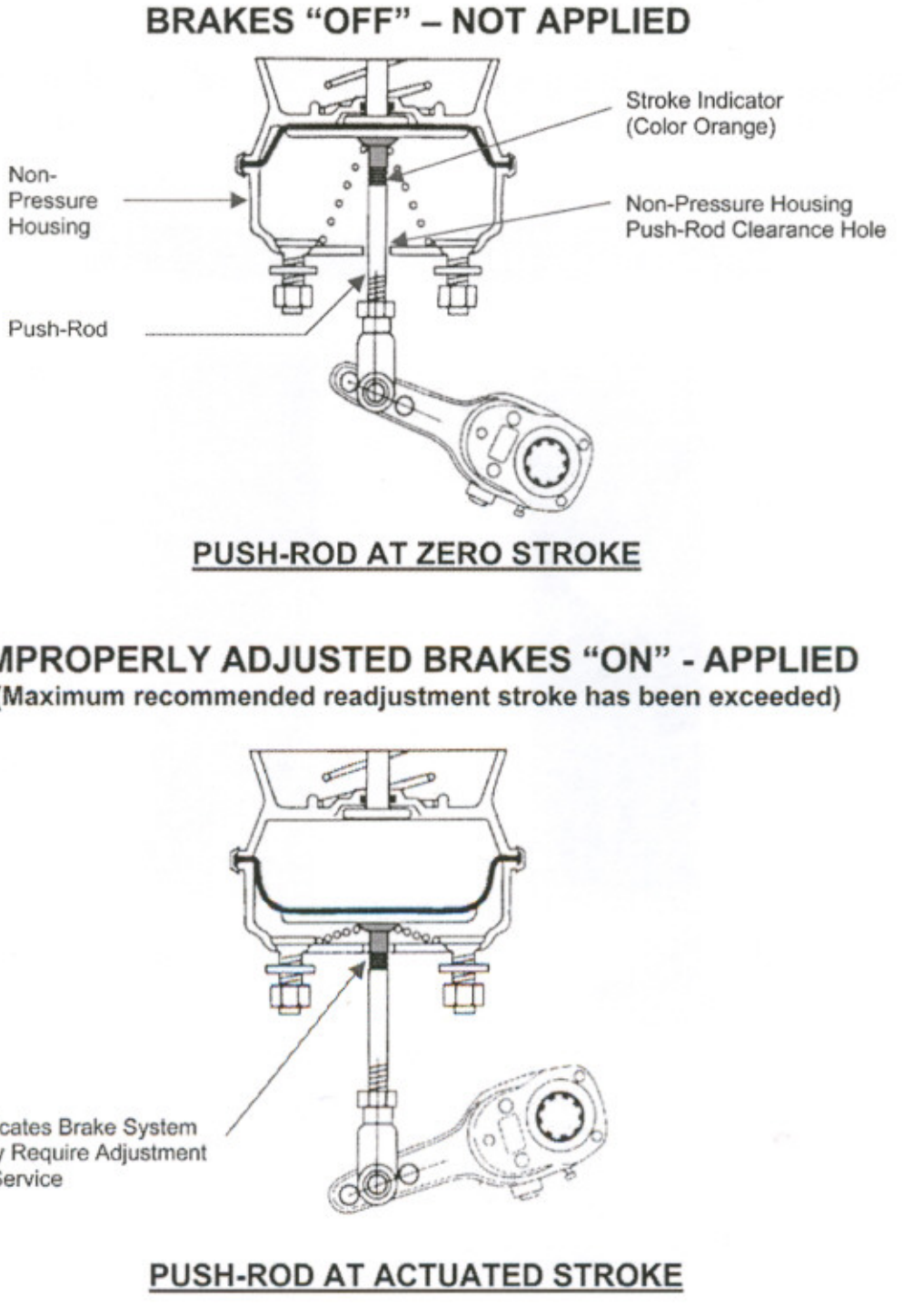

FIGURE 1—PUSHROD AT ZERO AND ACTUATED STROKE

3.2 Stroke Indicator—Electrical Design Guidelines

3.2.1 The readjust stroke indication shall occur at +0 to 3.8 mm (+0.00 to 0.15 in) of the recommended readjustment stroke in Table 1 of SAE J1817.

3.2.2 Electrical system installation shall conform to SAE J1292, if applicable.

3.2.3 Electrical systems shall have a system function test capacity.

3.2.4 Any system that provides a driver-warning device in a distracting manner shall be provided with manual override which shall automatically reset each time the vehicle is shutdown or restarted.

3.3 Test Procedure

3.3.1 MECHANICAL DESIGN—Test per SAE J1469.

3.3.2 ELECTRICAL DESIGN—Test per SAE J1455.

4. Notes

4.1 Marginal Indicia—The change bar (l) located in the left margin is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. An (R) symbol to the left of the document title indicates a complete revision of the report.

PREPARED BY THE SAE TRUCK AND BUS BRAKE ACTUATOR SUBCOMMITTEE
OF THE SAE TRUCK AND BUS BRAKE COMMITTEE

SAE J1953 Revised SEP2001

Rationale—The SAE Truck and Bus Actuator Subcommittee agreed that the requirement for a positive identifier groove near the non-pressure housing to indicate the unit has stroke indication is no longer required since stroke indication has been mandatory for several years. All new vehicles will have stroke indication and it is no longer necessary to distinguish a truck with stroke indication to one without stroke indication.

Relationship of SAE Standard to ISO Standard—Not applicable.

Application—This SAE Recommended Practice shall cover mechanical- and electrical-stroke indicators for air-brake actuators.

This device shall indicate the foundation brake(s) may require adjustment or service when inspected per vehicle manufacturer's procedures. A measurement shall be made to determine actual stroke measurement.

Stroke indication accuracy of an air-brake actuator can be assured only when all of its components are supplied by the original brake actuator manufacturer.

Reference Section

SAE J1292—Automobile, Truck, Truck-Tractor, Trailer, and Motor-Coach Wiring

SAE J1455—Joint SAE/TMC Recommended Environmental Practices for Electronic Equipment Design (Heavy-Duty Trucks)

SAE J1469—Air-Brake Actuator Test Procedure, Truck-Tractor, Bus, and Trailers

SAE J1817—Long-Stroke Air-Brake Actuator Marking

Developed by the SAE Truck and Bus Brake Actuator Subcommittee

Sponsored by the SAE Truck and Bus Brake Committee

DAVID ANGELES

(R) LONG-STROKE AIR-BRAKE ACTUATOR MARKING—SAE J1817 FEB98

SAE Recommended Practice

Report of the SAE Truck & Bus Actuator Subcommittee of the SAE Truck & Bus Brake Committee approved June 1991 and revised February 1998.

1. Scope—This SAE Recommended Practice describes a marking system to distinguish long-stroke from standard stroke for service, parking, and combination air-brake actuators, roto-chambers, and components. Said actuators are used for applying cam and disc-type foundation brakes by slack adjuster means.

1.1 Purpose—This document establishes a uniform marking system to identify long-stroke actuators and components used in air-brake systems.

2. References

2.1 Applicable Publication—The following publication forms a part of the specification to the extent specified herein. Unless otherwise indicated, the latest revision of SAE publications shall apply.

2.1.1 SAE PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J1469—Air-Brake Actuator Test Procedure, Truck, Tractor, Bus, and Trailer

2.2 Related Publication—The following publication is provided for information purposes only and is not a required part of this document.

2.2.1 SAE PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J1953—Brake-Stroke Indicator Design Guideline for Cam or Disc Air-Brake Actuators

3. Definitions

3.1 Rated Stroke—The minimum design stroke of a unit as listed in Table 1.

3.2 Standard Stroke Actuators—Brake actuators having a rated stroke as listed in Table 1A, Column 1.

3.3 Long-Stroke Actuators

a. Class I—An actuator having a stroke 6.4 to 12.4 mm (0.25 to 0.49 in) greater than standard rated stroke. Refer to Table 1B, Column 2.
b. Class II—An actuator having a stroke 12.7 to 18.8 mm (0.50 to 0.74 in) greater than standard rated stroke. Refer to Table 1B, Column 2.
c. Class III—an actuator having a stroke 19 mm (0.75 in) greater than standard rated stroke. Refer to Table 1B, Column 2.

4. General—Long-stroke air-brake actuators have pushrod stroke capabilities in excess of standard stroke actuator designs. As some of these chambers are nearly identical in exterior appearance to the standard chambers, a unique marking system is needed for the purpose of identification by mechanics, inspectors, and others in the field. This marking will help assure both types of actuators are serviced correctly and that brakes are adjusted properly. Unique long-stroke actuator components are not interchangeable between actuator manufacturers nor standard actuator components.

5. Requirements

5.1 Identification—Long-Stroke Actuators—There are three methods described as follows, for differentiating long-stroke from standard stroke actuators. Long-stroke actuators should incorporate at least two of the three methods and 76.2 mm (3.00 in) long-stroke actuators must use square inlet ports per 5.1.3.

5.1.1 SERVICING INSTRUCTIONS—Service instructions embossed or stamped on spring brake center sections, service chamber pressure caps or in the case of the tie rod style chambers (see Figure 1), the markings will be located on the end cap. These instructions will instruct that long-stroke diaphragms are required for replacement. Numerical values shall be in mm and inches. (See Figures 1, 2, and 3).

5.1.2 TAGS—A trapezoidal tag, as shown in Figure 4 shall be secured to the service chamber clamp band bolts or attached/affixed to the service chamber by a suitable means. The actuators rated stroke shall be embossed or otherwise readable within the trapezoidal area with numerical values in millimeters and inches.

5.1.3 SQUARE AIR PORT AND/OR PRESSURE CAP EMBOSSMENT—All 76.2 mm (3.00 in) long-stroke actuators shall have square inlet ports. The top port of the service chambers shall have a square embossment raised a full 12.7 mm (0.50 in) from the top of the pressure cap. (See Figures 2 and 3).

5.2 Components unique to the long-stroke actuator shall have suitable text permanently marked on the components in order to identify them as long-stroke. Typical components might include (refer to Figure 5):

a. Diaphragm (service and parking chamber)
b. Center section
c. Pressure cap service chamber
d. End cap combination (service and parking)
e. Non-pressure housing
f. Service pushrod

5.3 Long-Stroke Air-Brake Actuator identifiers referred to in 5.1, must meet test requirements per SAE J1469 as assembled on or as part of test units.

TABLE 1A—RECOMMENDED AIR-BRAKE ACTUATOR SERVICE STROKE—CLAMP BAND/SEALED DESIGNS—COLUMN 1—STANDARD STROKE

Type (Size)	Standard Rated Stroke mm	Standard Rated Stroke In	Maximum Readjust For Standard Rated Stroke mm	Maximum Readjust For Standard Rated Stroke In
9	44.5	1.75	35.1	1.38
12	44.5	1.75	35.1	1.38
14	57.2	2.25	44.5	1.75
16	57.2	2.25	44.5	1.75
20	57.2	2.25	44.5	1.75
24	57.2	2.25	44.5	1.75
30	63.5	2.50	50.8	2.00
36	76.2	3.00	57.2	2.25

TABLE 1C—RECOMMENDED AIR-BRAKE ACTUATOR SERVICE STROKE (CONTINUED) ROTO-CHAMBER DESIGNS

Type (Size)	Rated Stroke mm	Rated Stroke In	Maximum Readjust Stroke mm	Maximum Readjust Stroke In
9	50.8	2.00	38.1	1.50
12	50.8	2.00	38.1	1.50
16	63.5	2.50	47.8	1.88
20	63.5	2.50	47.8	1.88
24	63.5	2.50	47.8	1.88
30	76.2	3.00	57.2	2.25
36	88.9	3.50	66.5	2.62
50	101.6	4.00	76.2	3.00

TABLE 1B—RECOMMENDED AIR-BRAKE ACTUATOR SERVICE STROKE (CONTINUED) CLAMP BAND/SEALED DESIGNS—COLUMN 2—LONG-STROKE BRAKE ACTUATORS

Type (Size)	Class I Std. + 6.4 mm (0.25 in) Minimum Rated Stroke mm	Class I Std. + 6.4 mm (0.25 in) Minimum Rated Stroke In	Class I Std. + 6.4 mm (0.25 in) Maximum Readjust Stroke mm	Class I Std. + 6.4 mm (0.25 in) Maximum Readjust Stroke In	Class II Std. + 12.7 mm (0.50 in) Minimum Rated Stroke mm	Class II Std. + 12.7 mm (0.50 in) Minimum Rated Stroke In	Class II Std. + 12.7 mm (0.50 in) Maximum Readjust Stroke mm	Class II Std. + 12.7 mm (0.50 in) Maximum Readjust Stroke In	Class III Std. + 19.0 mm (0.75 in) Minimum Rated Stroke mm	Class III Std. + 19.0 mm (0.75 in) Minimum Rated Stroke In	Class III Std. + 19.0 mm (0.75 in) Maximum Readjust Stroke mm	Class III Std. + 19.0 mm (0.75 in) Maximum Readjust Stroke In
9	50.8	2.00	38.1	1.5	—	—	—	—	—	—	—	—
12	50.8	2.00	38.1	1.5	—	—	—	—	—	—	—	—
14	63.5	2.50	50.8	2.0	69.9	2.75	57.2	2.25	—	—	—	—
16	63.5	2.50	50.8	2.0	69.9	2.75	57.2	2.25	—	—	—	—
20	63.5	2.50	50.8	2.0	69.9	2.75	57.2	2.25	76.2	3.00	63.5	2.50
24	63.5	2.50	50.8	2.0	69.9	2.75	57.2	2.25	76.2	3.00	63.5	2.50
30	69.9	2.75	57.2	2.25	76.2	3.00	63.5	2.50	—	—	—	—
36	82.6	3.25	66.5	2.62	88.9	3.50	69.9	2.75	—	—	—	—

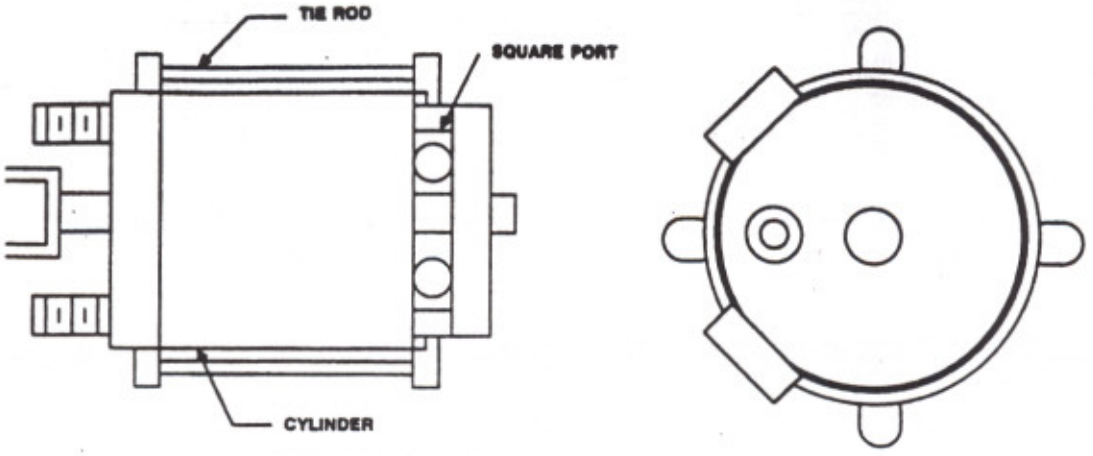

FIGURE 1—TIE ROD STYLE PISTON BRAKE CHAMBER

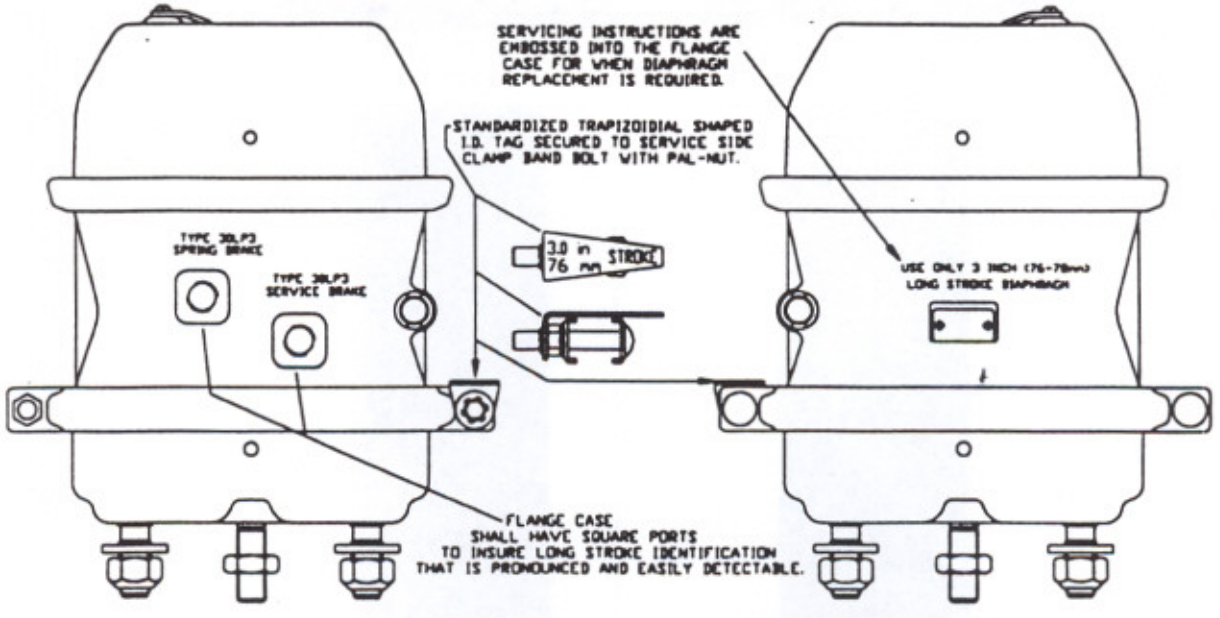

FIGURE 2—3.00 in LONG-STROKE SPRING BRAKE CHAMBER IDENTIFICATION

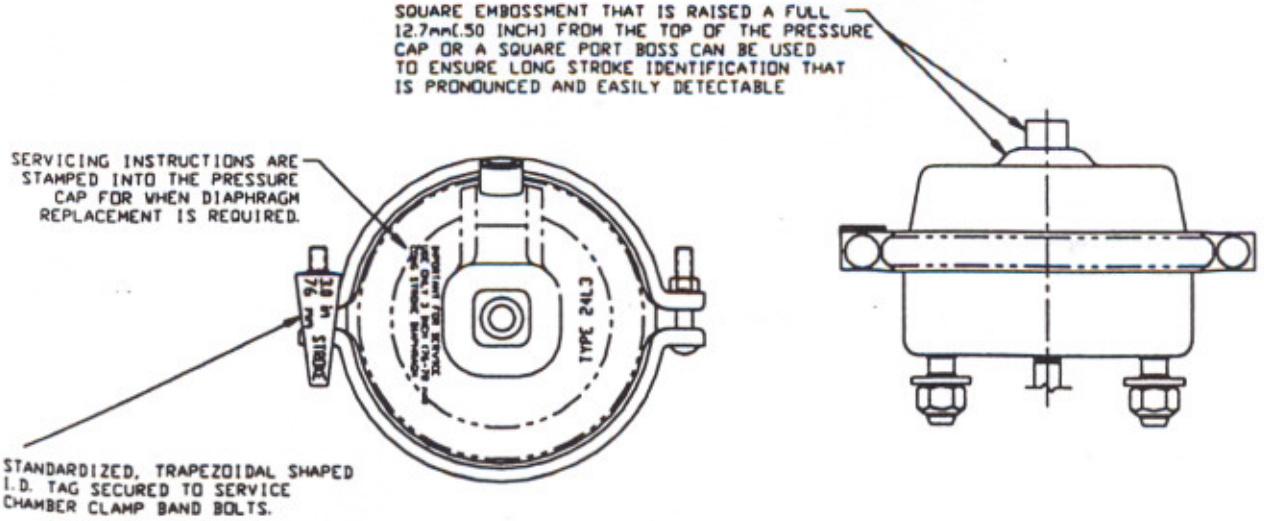

FIGURE 3—3.00 in LONG-STROKE SERVICE CHAMBER IDENTIFICATION

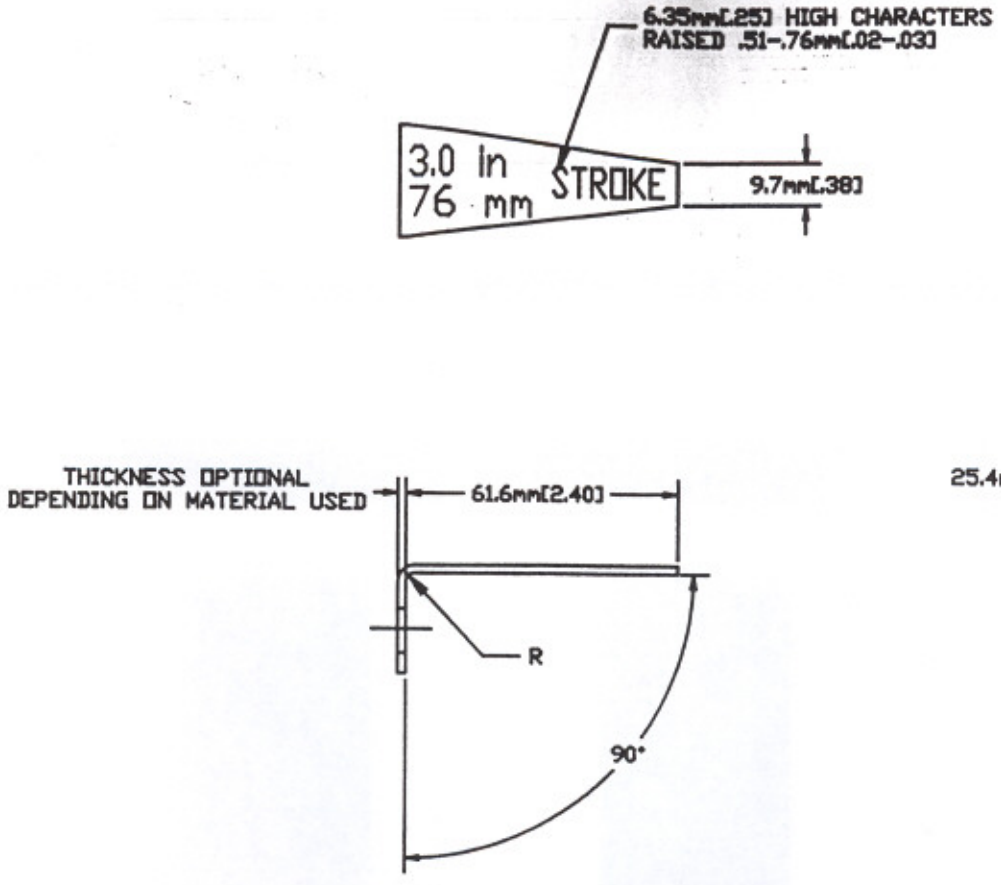

FIGURE 4—LONG-STROKE TRAPEZOIDAL IDENTIFIER TAG

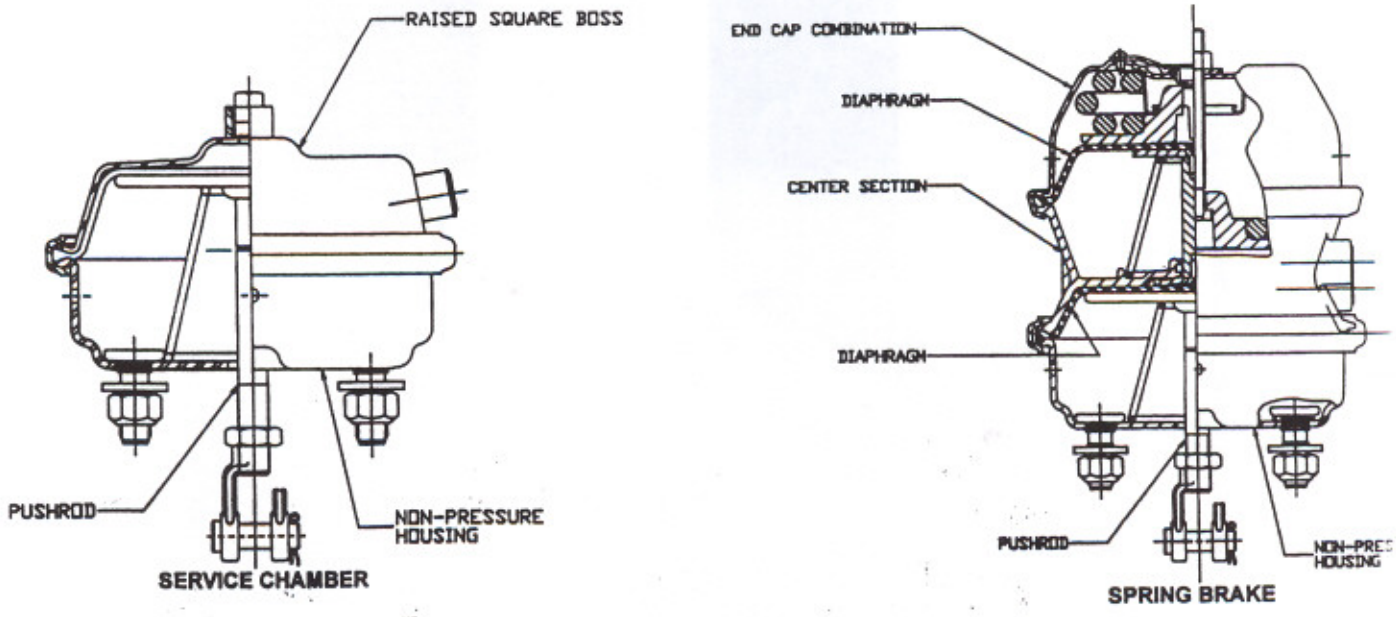

FIGURE 5—UNIQUE COMPONENTS—LONG-STROKE ACTUATORS