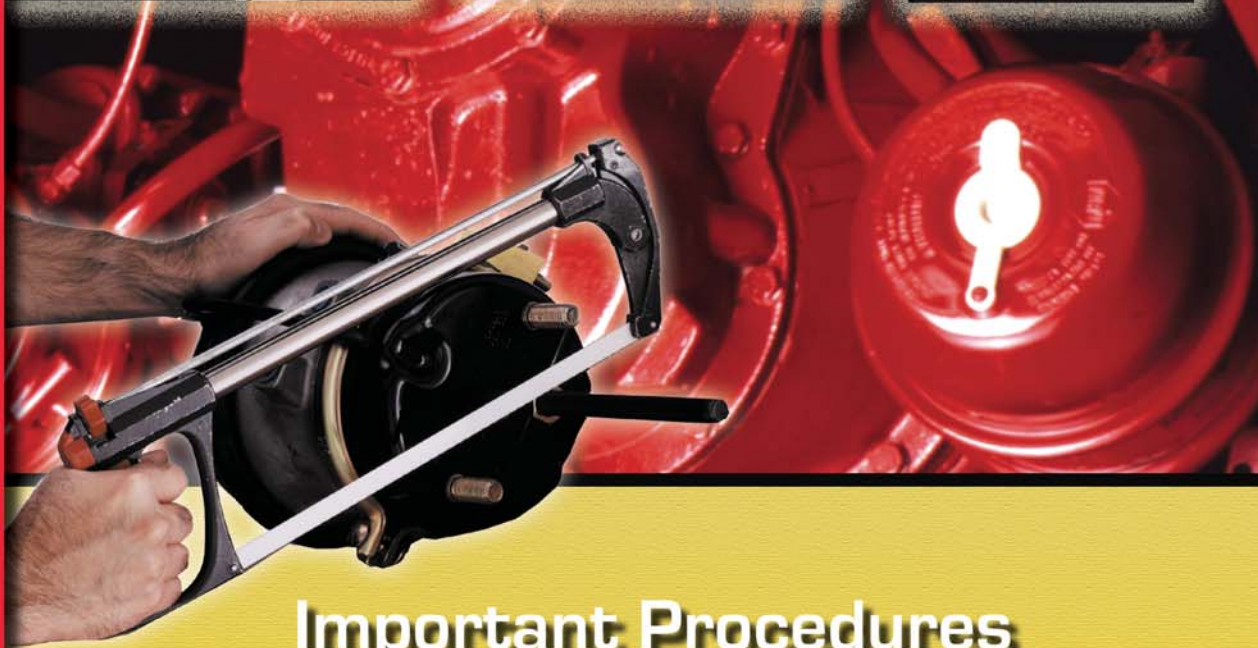
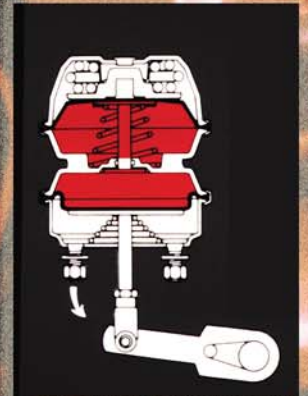
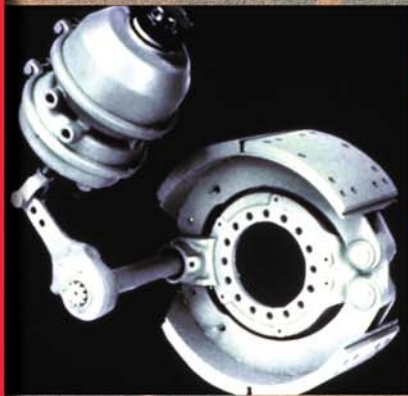


# TECHNICAL INFORMATION



Important Procedures  
& Detailed Tech Information

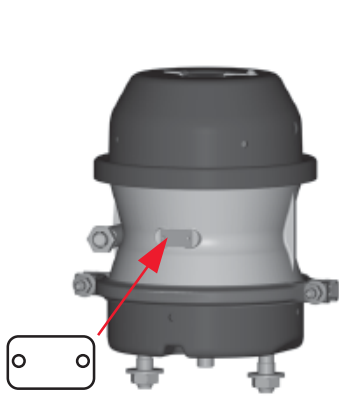
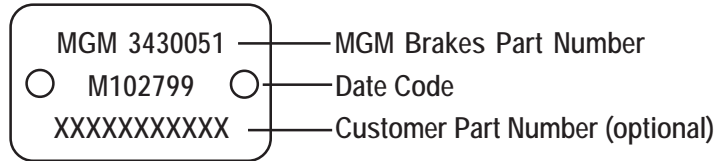
# SECTION 10

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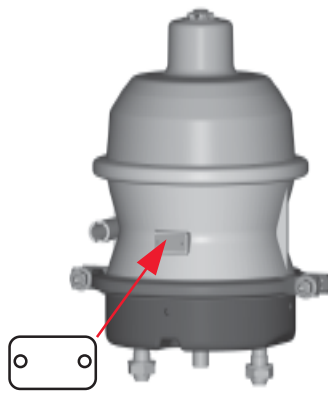
# PRODUCT IDENTIFICATION PLATE

All MGM brake actuators made after October - 1987 have an aluminum identification plate attached to the actuator which contains the MGM Brakes part number, date code, and often a customer part number.

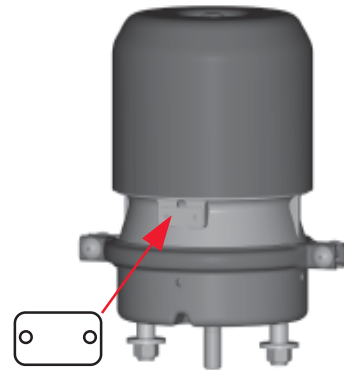
On all TR , LTR and MJ (Magnum Performance Plus) models the I.D. plate is attached to the center section aluminum casting. On all MG, WM models and remote cylinders the I.D. plate is attached to the aluminum head casting. On all C and CW models the I.D. plate is attached to the pressure cap or to the clamp band. See the illustrations below for I.D. plate locations.



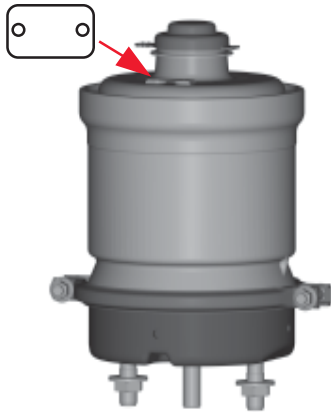
Double Diaphragm  
TR-LP3 Model



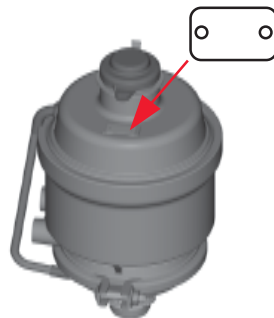
Long Life  
Double Diaphragm  
LTR-L3 Model



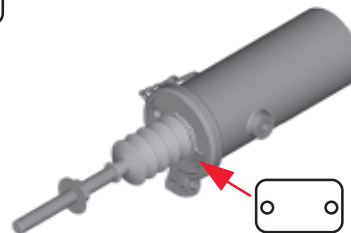
Piston  
Magnum Performance Plus Model



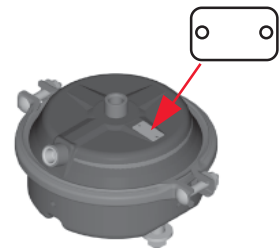
Piston  
MG-T Model



Wedge  
WM Model



Remote Cylinder

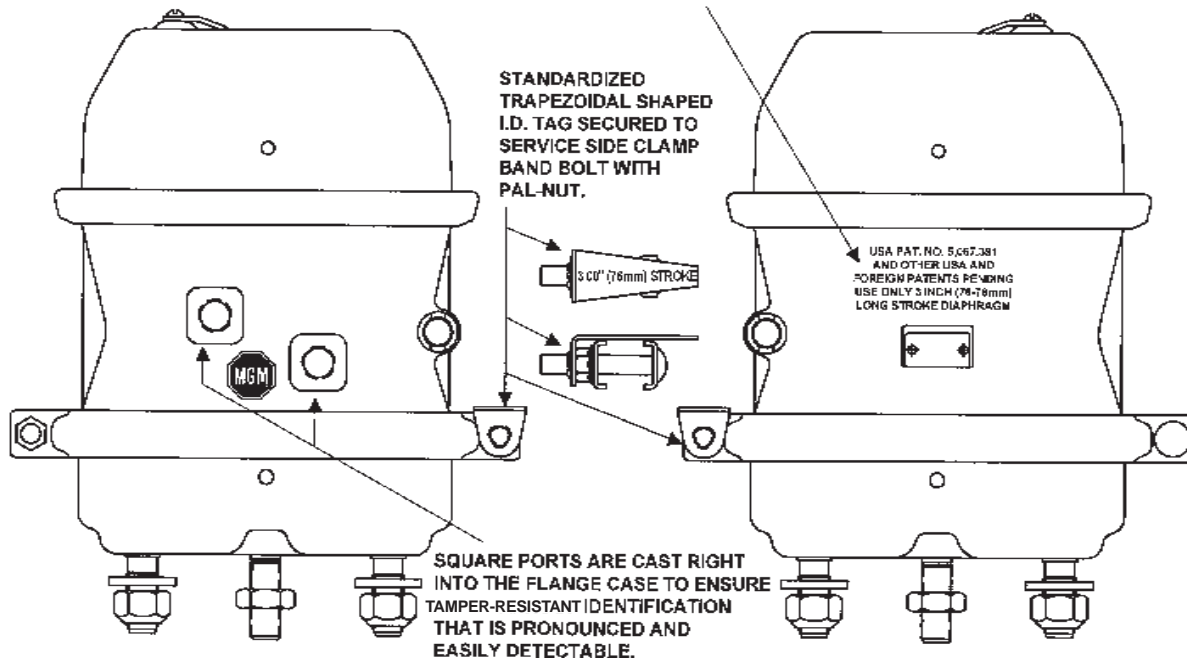


S-Cam Service

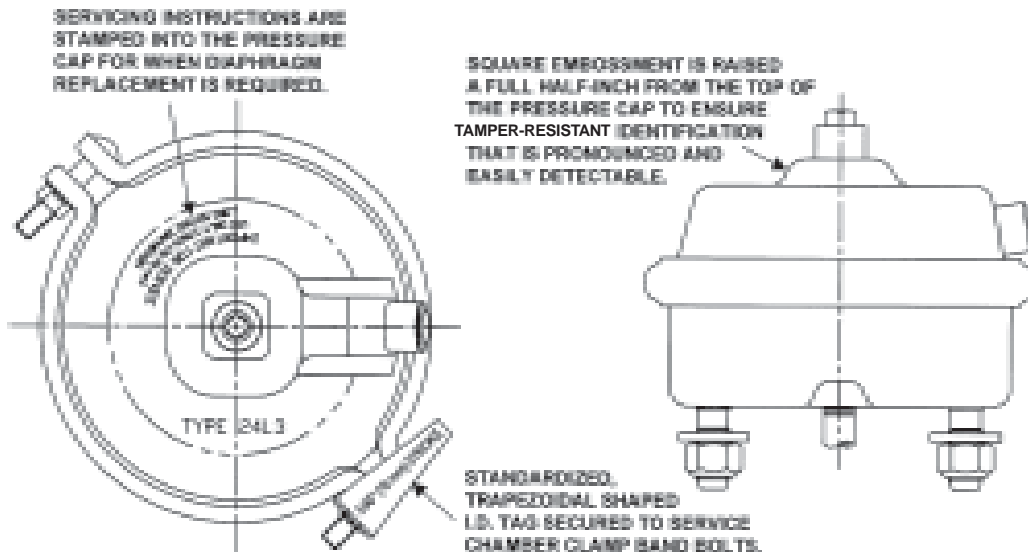
# LONG STROKE IDENTIFICATION

## “LONG STROKE” SPRING BRAKE IDENTIFICATION

SERVICING INSTRUCTIONS ARE  
EMBOSSSED INTO THE FLANGE  
CASE FOR WHEN DIAPHRAGM  
REPLACEMENT IS REQUIRED.



## “LONG STROKE” SERVICE CHAMBER IDENTIFICATION



# DOUBLE-DIAPHRAGM TO PISTON CONVERSION CHART

1.0 **PURPOSE:** The purpose of this technical bulletin is to recommend a MJ-ET piston type air brake actuator replacement for various MG-T's and double diaphragm models.

**CAUTION:** The recommended MJ-ET replacement may have more parking force than the model it is replacing. An anti compounding valve may be required to prevent excess braking torque. Note: The J-Series (Magnum Performance Plus) models listed on the chart below are 3.00 inch stroke actuators. Ensure that installations have proper clearance for 3.00 inches of stroke.

MGM Brakes recommends replacing both brakes on an axle if force and/or stroke is different than unit being replaced.

2.0 **CROSS REFERENCE CHART:** The following chart provides an easy cross reference for selecting a MJ-ET piston type air brake actuator to replace a MG-T or double diaphragm air brake actuator.

3.0 **MODEL NUMBER DEFINITIONS:** Model numbers for double diaphragm air brake actuators describe the diaphragm size. A model TR2430 describes a type 24 service chamber diaphragm and a type 30 spring chamber diaphragm. Model numbers for piston type air brake actuators describe the service chamber diaphragm size and a level of parking chamber force. A model M2420LG-T describes a type 24 service chamber diaphragm and a parking chamber having 1410 lbs. ± 10% force output at 1.25 inch stroke (see chart below).

(A) Hold-Off Pressure (psig) is measured as decreasing air pressure at .200 inch of full "OFF" stroke position (zero stroke).

(B) Parking Force (lbs. ± 8%) is measured at 1.25 inches of stroke.

Model Size	Stroke (Inches)	Parking Force (B)	→ Hold-Off Pressure (A)	MJS1724	MJS2024	MJS2424	MJS3024	MJS2028	MJS2428	MJS3028	MJS3628	MJS2030	MJS2430	MJS3030	MJS3630
				1922 lbs.			2320 lbs.			2600lbs.					
				71 psig			73 psig			75 psig					
TR2430HD	2.50	1580 lbs.	68 psig												
TR3030HD	2.50	1580 lbs.	68 psig												
TR2430	3.00	1435 lbs.	63 psig												
TR2430HD	3.00	1580 lbs.	68 psig												
TR3030	3.00	1435 lbs.	63 psig												
TR3030HD	3.00	1580 lbs.	68 psig												
TR3036	2.50	1960 lbs.	66 psig												
TR3636	3.00	1960 lbs.	68 psig												
LTR2430	3.00	1525 lbs.	71 psig												
LTR3030	3.00	1525 lbs.	71 psig												
M1620LG-T	2.50	1410 lbs.	50 psig												
M1624LG-T	2.50	1625 lbs.	56.8 psig												
M2020LG-T	2.50	1410 lbs.	50 psig												
M2024LG-T	2.50	1625 lbs.	59.6 psig												
M2030LG-T	2.50	2360 lbs.	58.2 psig												
M2420LG-T	2.50	1410 lbs.	50 psig												
M2424LG-T	2.50	1625 lbs.	59.3 psig												
M2430LG-T	2.50	2360 lbs.	68.2 psig												
M3024GT	2.50	1625 lbs.	60 psig												
M3027GT	2.50	2040 lbs.	67 psig												
M3031GT	2.50	2325 lbs.	69 psig												

**Note:** Contact MGM Brakes Sales for model's not specified above.

# PROCEDURE TO CUT A PUSH-ROD

## PROCEDURE: TO CUT THE SERVICE PUSH-ROD TO PROPER LENGTH

**Warning:** Do not attempt to service or disassemble the spring chamber or any spring brake actuator. A large spring in the spring chamber having extreme force could cause serious bodily injury if it were suddenly released due to inadvertent removal of this clamp or tamper-resistant head.

**IMPORTANT:** Place blocks under wheels to prevent vehicle runaway before removing air brake actuators.

- REMOVE WORN OR NON-FUNCTIONAL UNIT FROM VEHICLE. Determine manufacturer and model of unit to be replaced. Refer to that manufacturer's service manual for caging and removal instructions.
- Make sure the spring chamber of the removed actuator is fully released (power spring caged) and the service brake push-rod is fully retracted to zero stroke position (i.e. brake fully released).
- Measure and record the "X" and "Y" dimensions (Figure 1).

"X" Dimension - The dimension from bottom of actuator to end of push-rod.

"Y" Dimension - The dimension from bottom of actuator to centerline of yoke pin.

Figure 1

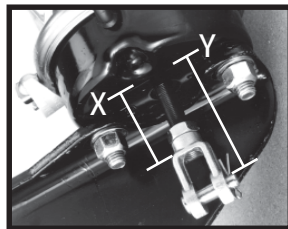
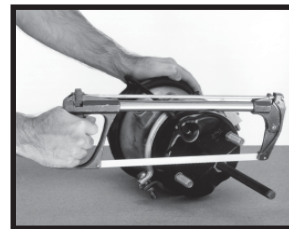


Figure 2



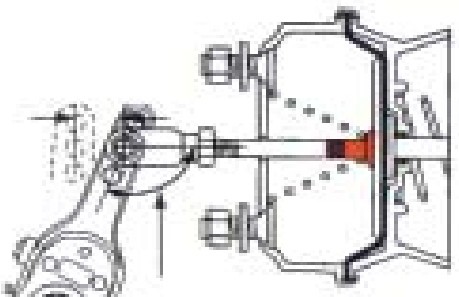
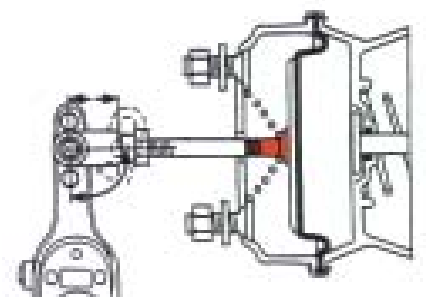
**NOTE:** If for some reason the spring chamber power spring cannot be caged and fully released, then the "X" and "Y" dimensions will need to be measured from another actuator of the exact type from the same vehicle provided it is retracted to its zero stroke position (brake fully released) and was operating correctly.

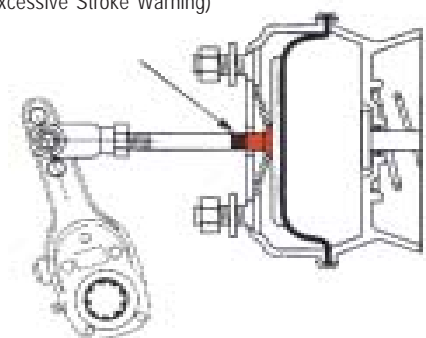
- Before marking push-rod to be cut on a new unit, be sure the spring chamber and push-rod are fully retracted to the zero position. (This may be done with the manual caging bolt or by applying 90-100 psi air pressure to the spring chamber air inlet port.)
- Take measured "X" dimension from the removed unit and mark push-rod of new unit from the bottom of the actuator.
- Thread yoke jam nut past mark on push-rod. Align bottom edge of nut with mark.
- Use a sharp hack-saw and cut push-rod on the mark (Figure 2).
- After cutting rod, thread jam nut off to clean up the thread.
- Thread yoke onto the push-rod. Yoke from removed unit may be reused provided yoke pin hole is not worn. Adjust yoke to the same "Y" dimension as measured from the removed unit.
- Hold yoke to prevent it from turning and tighten jam nut against yoke 25-35 Lbs.-Ft. torque.

TO INSTALL NEW UNIT ON VEHICLE: Refer to MGM Brakes Service Manual for the model that is being installed.

# PROPER BRAKE ADJUSTMENT

**NOTE:** The last half of an air chamber stroke is less efficient than the first half. Therefore, the following adjustments are recommended for maximum efficiency when using manually adjusted slack adjusters.

<p style="text-align: center;"><b>BRAKES "OFF" - NOT APPLIED</b></p>  <p>Angle must always be greater than 90° due to various slack adjuster lengths and installation setups. (Refer to axle or OEM manufacturer's manual for recommended angle).</p> <p>Stroke should be as short as possible with no lining to drum contact.</p>	<p style="text-align: center;"><b>PROPERLY - ADJUSTED BRAKES "ON" - APPLIED</b></p>  <p>To check brake adjustment, apply 90 to 100 psi air pressure to the service chamber. Consult the vehicle manufacturer for the correct angle between the slack adjuster arm and push-rod and/or the push-rod length. This is necessary since different dimensions are required for automatic or manual slacks, various slack lengths and different slack adjuster manufacturers.</p>
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<p style="text-align: center;"><b>IMPROPERLY ADJUSTED BRAKES "ON" - APPLIED</b> Maximum recommended readjustment stroke has been exceeded)</p> <p>MGM Brake "Stroke Alert" (Excessive Stroke Warning)</p>  <p style="text-align: center;">See chart for recommended readjustment stroke</p>	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Type</th> <th rowspan="2">Effective Area (SQ. IN.)</th> <th colspan="2">Approx. Diaphragm O.D.</th> <th colspan="2">Rated Stroke of Chamber</th> <th rowspan="2">Maximum Stroke with Brakes Adjusted</th> <th colspan="2">"B" MV/MA Recommended Readjustment Stroke</th> </tr> <tr> <th>Inches</th> <th>MM</th> <th>Inches</th> <th>MM</th> <th>Inches</th> <th>MM</th> </tr> </thead> <tbody> <tr> <td>9</td> <td>9</td> <td>5.00</td> <td>125</td> <td>1.75</td> <td>45</td> <td rowspan="12">SHOULD BE AS SHORT AS POSSIBLE WITHOUT LINING TO DRUM CONTACT</td> <td>1.35</td> <td>35</td> </tr> <tr> <td>12</td> <td>12</td> <td>5.50</td> <td>140</td> <td>1.75</td> <td>45</td> <td>1.35</td> <td>35</td> </tr> <tr> <td>16</td> <td>16</td> <td>6.00</td> <td>150</td> <td>2.25</td> <td>57</td> <td>1.75</td> <td>45</td> </tr> <tr> <td>16L</td> <td>16</td> <td>6.00</td> <td>150</td> <td>2.50</td> <td>64</td> <td>2.00</td> <td>51</td> </tr> <tr> <td>20</td> <td>20</td> <td>6.50</td> <td>165</td> <td>2.25</td> <td>57</td> <td>1.75</td> <td>45</td> </tr> <tr> <td>20L</td> <td>20</td> <td>6.50</td> <td>165</td> <td>2.50</td> <td>64</td> <td>2.00</td> <td>51</td> </tr> <tr> <td>24</td> <td>24</td> <td>7.00</td> <td>175</td> <td>2.25</td> <td>57</td> <td>1.75</td> <td>45</td> </tr> <tr> <td>24L</td> <td>24</td> <td>7.00</td> <td>175</td> <td>2.50</td> <td>64</td> <td>2.00</td> <td>51</td> </tr> <tr> <td>24L3</td> <td>24</td> <td>7.00</td> <td>175</td> <td>3.00</td> <td>76</td> <td>2.50</td> <td>64</td> </tr> <tr> <td>30</td> <td>30</td> <td>8.00</td> <td>200</td> <td>2.50</td> <td>64</td> <td>2.00</td> <td>51</td> </tr> <tr> <td>30L3</td> <td>30</td> <td>8.00</td> <td>200</td> <td>3.00</td> <td>76</td> <td>2.50</td> <td>64</td> </tr> <tr> <td>36</td> <td>36</td> <td>9.00</td> <td>230</td> <td>3.00</td> <td>76</td> <td>2.25</td> <td>57</td> </tr> </tbody> </table> <p style="text-align: center;">SOURCE: MVMA (Motor Vehicle Manufacturers Association)</p> <p><b>Note:</b> The push-rod must remain perpendicular to the bottom surface of the non-pressure chamber (NPC) within ±3° zero to full stroke.</p>	Type	Effective Area (SQ. IN.)	Approx. Diaphragm O.D.		Rated Stroke of Chamber		Maximum Stroke with Brakes Adjusted	"B" MV/MA Recommended Readjustment Stroke		Inches	MM	Inches	MM	Inches	MM	9	9	5.00	125	1.75	45	SHOULD BE AS SHORT AS POSSIBLE WITHOUT LINING TO DRUM CONTACT	1.35	35	12	12	5.50	140	1.75	45	1.35	35	16	16	6.00	150	2.25	57	1.75	45	16L	16	6.00	150	2.50	64	2.00	51	20	20	6.50	165	2.25	57	1.75	45	20L	20	6.50	165	2.50	64	2.00	51	24	24	7.00	175	2.25	57	1.75	45	24L	24	7.00	175	2.50	64	2.00	51	24L3	24	7.00	175	3.00	76	2.50	64	30	30	8.00	200	2.50	64	2.00	51	30L3	30	8.00	200	3.00	76	2.50	64	36	36	9.00	230	3.00	76	2.25	57
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• **IMPORTANT** •

## RECOMMENDED SPRING BRAKE ACTUATOR DISARMING PROCEDURE

**Warning:** This procedure must be strictly adhered to. Never attempt to remove the spring chamber clamp ring from a double diaphragm actuator or the spring chamber retaining ring from a piston actuator. Both actuators employ a high energy power spring that could cause serious bodily injury if the spring were suddenly released due to improper

All retired spring brake actuators must be safely disarmed before they are disposed of to prevent serious personal injury from accidental sudden release of the high energy spring (as much as 2700 Lbs. of force) in the parking chamber. To disarm the unit, remove it from the vehicle following the instructions in the MGM Brakes Service Manual. Be sure to release the brake per Section (2) of the MGM Brakes Service Manual. Never attempt to remove the head which contains the power spring. Observe all safety precautions. Place the unit in a steel \*container and use an acetylene torch to cut a hole through the head housing the power spring. Cut completely through at least two spring coils. The steel container must have openings to expose the head where it is to be cut with the acetylene torch and it must be strong enough to prevent parts from hurtling out should the unit suddenly separate before it is safely disarmed. It is the users responsibility to ensure the steel container is safe.

\*Information concerning a suitable container is available through your MGM Brakes Representative.

# FASTENER TORQUE VALUE CHART

BOLT TORQUES			
Component	Bolt Size	Foot/Pounds of Torque	Newtons/Meters of Torque
<b>Release Bolts</b>			
<b><u>Caging</u></b>			
TR Models	1/2 - 13 UNC	40-50	54-68
TR Models	5/8 - 11 UNC	40-50	54-68
L Models	5/8 - 11 UNC	40-50	54-68
J Models	5/8 18 UNF / 1/2 - 13 UNC	74 Max.	100 Max.
M Models	3/8 - 24 UNF	15-32	20-44
M Models	1/2 - 20 UNF	15-32	20-44
<b><u>Storage</u></b>			
TR Models	1/2 - 13 UNC	10	14
TR Models	5/8 - 11 UNC	10	14
L Models		45-50	61-68
J Models		50-60	68-81
M Models (MG-T)		34-45	46-61
<b>Clamp Band Nuts &amp; Bolts</b>			
	5/16 - 24 UNF	18-23	24-31
	3/8 - 16 UNC	30-35	41-47
<b>Yoke Nuts</b>			
	1/2 - 20 UNF	20 - 30	27 - 41
	5/8 - UNF	25 - 50	34 - 68
	3/4 - 16 UNF	75 - 100	102 - 136
	M16 X 1.5 - 6G	25 - 50	34 - 68
<b>Mounting Nuts &amp; Bolts</b>			
	7/16 - 14 UNC	35-40	47-54
	5/8 - 11 UNC	133-155	180-210
	5/8 18 UNF	133-155	180-210
	M16 X 1.5 - 6G	133-155	180-210
<b>Air Inlet Fittings</b>			
	3/8 NPTF	25 - 30	34 - 40
	3/8 - 24 UNF	17 - 19	23 - 26
	M16 X 1.5 - 6H	13 - 15	18 - 20

 **Warning: Do not use impact wrench.**



# PROCEDURE TO LENGTHEN AN EXTERNAL BREATHING TUBE

- 1.0 **Purpose:** To provide a procedure to add a tube section to lengthen a breathing tube in the field when the single/piggyback is rotated to reposition the ports relative to the non-pressure chamber housing.
- 2.0 **Scope:** All MGM Brakes models with an external breathing tube.
- 3.0 **Material required:**

8081128	Rubber extension tube
8400025	Adhesive (Loctite #414 Superbond) or equivalent
- 4.0 **Procedure:**
  - 4.1 Cut breathing tube approximately half way between the rubber elbows.
  - 4.2 Using the recommended procedure in the MGM Brakes Service Manual, loosen the service chamber clamp and rotate the piggyback to the desired position. Tighten service chamber clamp.
  - 4.3 If necessary, cut 8081128 rubber extension to a length that will insure a minimum of ½ inch engagement over both ends of the cut breathing tube.
  - 4.4 Apply an adhesive to both ends of the cut breathing tube.
  - 4.5 Slip the rubber extension over both ends of the cut breathing tube a minimum of ½ inch.
- 5.0 Using the recommended procedure in the MGM Brakes Service Manual, check the service chamber clamp for leaks.



**WARNING:** Do not remove the spring chamber clamp ring (clamp closest to the release bolt) as serious injury may result from sudden release of the power spring.

# MIXING STANDARD AND LONG STROKE CHAMBERS

## 1.0 Scope

Installing and replacing brake chambers with different rated strokes – specifically long stroke versus standard stroke.

## 2.0 Recommendation

MGM Brakes recommends replacing chambers with the same stroke rating across an axle. When servicing a truck/trailer equipped with either standard stroke or long stroke chambers, it is crucial that replacement of the chambers be like for like. For example: if a 3-inch stroke chamber is to replace a 2.5-inch stroke chamber, both chambers on that axle must be upgraded to 3-inch chambers.

**CAUTION:** When upgrading from standard stroke to long stroke chambers, be sure there is 1) adequate clearance for the increased stroke of the pushrod, yoke, and slack adjuster at full stroke and 2) adequate clearance of the longer chamber at the worst case suspension and steering articulation. Approval from the original vehicle manufacturer for proper clearance is recommended.

## 3.0 Background

The heat generated by the contact of the lining against the drum, especially during hard or continuous braking situations, causes the drum to “grow”, or expand. The ability of a 2.5-inch “standard” stroke chamber to provide adequate pressure of the lining against the ever-expanding drum is limited by the stroke and performance characteristics of the brake. As the 2.5-inch stroke chamber exceeds 2-inches of travel, the operator will begin to sense the “brake fade” phenomenon, which will become more prevalent as the chamber moves closer to its maximum travel position, at which point the brake will cease to provide any braking capability.

However, the performance and operational characteristics of the MGM 3-inch “long stroke” chamber provides braking force beyond the point where the 2.5-inch “standard” stroke chamber ceases to provide braking. The 3-inch “long stroke” chamber provides the same force-output at 2.5-inches of stroke as provided by the “standard” chamber at 2-inches of stroke.

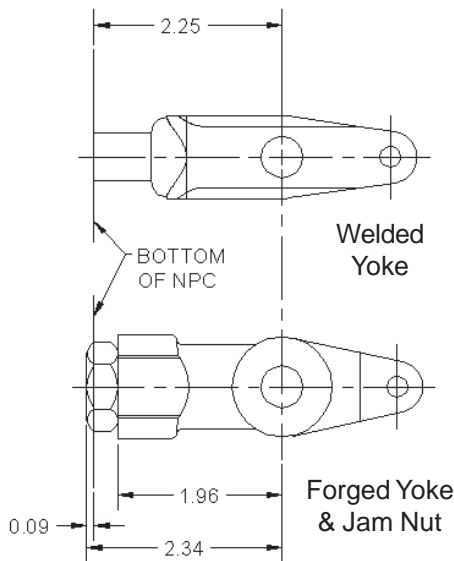
Therefore, due the difference in operational characteristics of the chambers, an imbalance may exist in the stopping capability of the vehicle when the “standard stroke” chamber exceeds its recommended (2-inch) readjustment limit. This may result in the vehicle being “pulled” toward the side of the “long stroke” chamber, which is doing the majority of the braking. This may go unnoticed by the driver during “normal” brake applications, but could cause vehicle instability during “emergency” braking.

# FIELD REPLACEMENT OF CHAMBERS EQUIPPED WITH “WELDED” YOKES

Every day, more and more vehicles are being manufactured with 3-Inch “long stroke” spring brakes and service chambers with the yoke “welded” to the service push rod.

Because the “welded” yoke is permanently attached to the push-rod, it is virtually impossible to remove and re-use it. Therefore, unless the non-pressure housing (mounting base), push-rod, and/or yoke have been damaged, or are severely worn, MGM Brakes recommends replacement of the single/piggyback unit only.

However, if replacement of the combination/tandem unit is required, it is recommended that a unit equipped with a “welded” yoke be used.



Units manufactured with a “welded” yoke have a preset “Y” dimension, measured from the bottom of the NPC to the center-line of the yoke pin, of 2.25-inches. Because the “Y” dimension is relatively short, the corresponding “X” dimension, measured from the bottom of the NPC to the end of the rod, will also be short, at approximately  $\frac{3}{4}$  of an inch.

Consequently, if a replacement unit with a “universal” all-threaded cut-to-fit push rod is used, the “stack-up” of the yoke and jam nut will exceed the “X” dimension by approximately  $\frac{1}{8}$ th of an inch.

In some cases, this will prevent the unit from achieving zero-stroke, or, if the push rod opening in the NPC is large enough, the jam nut will protrude into the NPC and may damage the protective stone shield.

Spring brakes and service chambers must fully retract to zero-stroke in order to completely release the foundation brakes so the lining no longer contacts the drum, and to allow the automatic slack adjusters to properly operate and adjust the stroke.

Therefore, do not use a replacement unit with a universal all-threaded cut-to-fit push rod to replace a unit with a “welded” yoke.

**NOTE:** Be sure to always replace like for like. Do not mix 2.5-inch “standard stroke” chambers with 3-inch “long stroke” chambers across an axle. Reference MGM Technical Bulletin on page 95.

# ACTUATORS MANUFACTURED WITH NEOPRENE DIAPHRAGMS

MGM Brakes manufactures a limited line of service chambers and spring brakes with “Neoprene” diaphragms for severe service applications where petroleum saturated contaminants may enter the air system and come into contact with the diaphragms.

While “Natural Rubber” diaphragms may resist the negative effects of oil and oil saturated contaminants for a period of time, “Neoprene” diaphragms have proven to be more durable. Manufactured from a combination of materials that insure superior strength, flexibility and resistance to degradation due to contact with oil and other chemicals, “Neoprene” diaphragms are a great option when the air system is prone to contamination from oil.

The following is a list of MGM “Neoprene” diaphragm equipped service chambers and spring brakes:

<b><u>PART #</u></b>	<b><u>MODEL</u></b>	<b><u>DESCRIPTION</u></b>
1420801	C20	Service Chamber
1427801	C24L	Service Chamber
1436801	C36	Service Chamber
3230851	TR3030LP3	Combination
3430808	TR3030	Piggyback Plus Kit
3430808X	TR3030	Piggyback Plus Kit – Bulk Pack 20 Pcs/Box
3430851	TR3030	Combination
3430851X	TR3030	Combination – Bulk Pack 20 Pcs/Box
3431808	TR3030T	Piggyback Plus Kit
3431851	TR3030T	Combination
3436851	TR3636T	Combination
3530851	TR3030S	Combination
3531801	TR3030TS	Piggyback
3531851	TR3030TS	Combination
3533851	TR3030TSHD	Combination
3535851	TR3030LP3TS	Combination
MJS3024ET851	MJS3024ET	Combination
MJS3628ET851	MJS3628ET	Combination

# PERFORMANCE CHART - SPRING BRAKE CHAMBERS

Model	Service Chamber Size	Spring Chamber Size	Rated Service Stroke (in)	Stroke & Air Volume		Hold-Off Pressure Required (psi) (b)	Spring Brake Force-Output (Pounds-Force) at Inches of Stroke (c) (d)								In Pounds of Torque Applied at 1.25" Stroke by S-Cam Camshaft w/Slack Adjuster Length of (in) (**)					
				Max. Service Stroke (in)	Vol. Displ. @100 psi Max. Service Stroke (in) (a)		1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	5.00	5.50	6.00	6.50	
					Spring															Service
TR2024	20 S-Cam	24	2.25	2.33	76.2	53.4	78.0	1280	1210	1150	1080	1000	840	-	-	-	6050	6655	7260	7865
TR2030LP3	"	30	3.00	3.08	115.4	83.2	63.0	1519	1435	1352	1270	1187	1098	1009	919	837	7175	7893	8610	9328
TR2424L	24 S-Cam	24	2.50	2.53	76.2	69.8	78.0	1280	1210	1150	1080	1000	840	620	-	-	6050	6655	7260	7865
TR2430L	"	30	2.50	2.53	104.8	69.8	70.0	1510	1420	1350	1280	1190	1060	895	-	-	7100	7810	8520	9230
TR2430LHD	24 S-Cam		2.50	2.53	103.2	69.8	68	1681	1580	1488	1396	1303	1211	1119	-	-	7900	8690	9480	10270
TR2430LP3	"	30	3.00	3.08	115.4	83.2	63	1519	1435	1352	1270	1187	1098	1009	919	837	7175	7893	8610	9328
TR2430LP3HD	"		3.00	3.08	115.4	83.2	68	1681	1580	1488	1396	1303	1211	1119	1026	934	7900	8690	9480	10270
TR3024	30 S-Cam	24	2.50	2.58	76.2	88.3	78.0	1280	1210	1150	1080	1000	840	620	-	-	6050	6655	7260	7865
TR3030	"	30	2.50	2.58	104.8	88.3	70.0	1510	1420	1350	1280	1190	1060	895	-	-	7100	7810	8520	9230
TR3030HD	"		2.50	2.58	103.2	88.3	68	1681	1580	1488	1396	1303	1211	1119	-	-	7900	8690	9480	10270
TR3030LP3	"	30	3.00	3.08	114.7	108.1	63	1519	1435	1352	1270	1187	1098	1009	919	837	7175	7893	8610	9328
TR3030LP3HD	"		3.00	3.08	114.7	108.1	68	1681	1580	1488	1396	1303	1211	1119	1026	934	7900	8690	9480	10270
TR3036	"	36	2.50	2.58	121.9	88.3	66.0	2050	1960	1867	1774	1679	1584	1487	-	-	9800	10780	11760	12740
TR3636	36 S-Cam	36	3.00	3.02	138.7	122.4	68.0	2050	1960	1867	1774	1679	1584	1487	1390	1280	9800	10780	11760	12740
LTR2430T	24 S-Cam	30	2.50	2.54	104.8	70	70	1560	1420	1350	1280	1210	1145	1070	-	-	7100	7810	8520	9230
LTR2430L3	"	30	3.00	3.10	108	83.3	71	1615	1525	1435	1350	1260	1160	1050	935	-	7625	8388	9150	9913
LTR3030T	30 S-Cam	30	2.50	2.54	104.8	87	70	1560	1420	1350	1280	1210	1145	1070	-	-	7100	7810	8520	9230
LTR3030L3	"	30	3.00	3.10	108	107.5	71	1615	1525	1435	1350	1260	1160	1050	935	-	7625	8388	9150	9913

**Note:** (\*) Indicates "piston-type" design in the spring chamber.

(\*\*) Brake chambers with 2.00" or less rated stroke calculated at 1.00" stroke.

(a) Spring chamber measured at full "OFF" (zero) stroke and service chamber measured at maximum "ON" stroke. Reference SAE J1469.

(b) Measured as decreasing air pressure required to activate spring chamber to within 0.20 inch (5 mm) of full "OFF" (deactivated) stroke.

(c) Measured at end of service chamber push-rod using power springs which have been held compressed to assembly shut height for 24 hours to remove initial false load. Forces shown are nominal performance (+/- 10%) for all spring chamber model sizes.

(d) Refer to the following pages for performance characteristics of all MGM service brake chamber sizes (pgs. 100-104)

Performance levels shown hold true for all design versions of the same model size. For example...read the same performance for Models TR3030T and TR 3030TS as shown above for Model TR 3030.

Product information and specifications subject to change without notice.

# PERFORMANCE CHART - SPRING BRAKE CHAMBERS

Model	Service Chamber Size	Spring Chamber Size	Rated Service Stroke (in)	Max. Stroke & Air Volume			Hold-Off Pressure Required (psi) (b)	Spring Brake Force-Output (Pounds-Force) at Inches of Stroke (c) (d)									In Pounds of Torque Applied at 1.25" Stroke by S-Cam Camshaft w/Slack Adjuster Length of (in) (**)			
				Max. Service Stroke (in)	Vol. Displ. @100 psi Max. Service Stroke (in)			1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	5.00	5.50	6.00	6.50
					Spring	Service														
M1620LG-T*	16 S-Cam	-	2.50	2.76	107.4	59.0	50.0	1510	1410	1310	1210	1110	1010	910	-	-	7050	7755	8460	9165
M1624LG-T*	"	-	2.50	2.76	107.4	59.0	56.8	1725	1625	1525	1425	1325	1225	1125	-	-	8125	8938	9750	10563
M2020LG-T*	20 S-Cam	-	2.50	2.55	107.2	58.2	50.3	1510	1410	1310	1210	1110	1010	910	-	-	7050	7755	8460	9165
M2024LG-T*	"	-	2.50	2.55	107.6	58.2	59.6	1725	1625	1525	1425	1325	1225	1125	-	-	8125	8938	9750	10563
M2030LG-T*	"	-	2.50	2.55	107.3	58.2	68.2	2420	2360	2290	2225	2165	2080	2010	-	-	11800	12980	14160	15340
M2420LG-T*	24 S-Cam	-	2.50	2.58	106.2	69.3	50.5	1510	1410	1310	1210	1110	1010	910	-	-	7050	7755	8460	9165
M2424LG-T*	"	24	2.50	2.58	103.7	69.3	59.3	1725	1625	1525	1425	1325	1225	1125	-	-	8125	8938	9750	10563
M2430LG-T*	"	-	2.50	2.58	106.3	69.3	68.2	2420	2360	2290	2225	2165	2080	2010	-	-	11800	12980	14160	15340
M3024G-T*	30 S-Cam	-	2.50	2.58	115.5	92.2	55.9	1725	1625	1525	1425	1325	1225	1125	-	-	8125	8938	9750	10563
M3027G-T*	"	-	2.50	2.58	115.2	92.2	67.2	2140	2040	1960	1860	1790	1690	1620	-	-	10200	11220	12240	13260
M3031G-T*	"	-	2.50	2.58	115.6	92.2	70.3	2420	2360	2290	2225	2165	2080	2010	-	-	11800	12980	14160	15340
MJS1216AT*	S-Cam	16	1.75	1.84	44.4	26.6	82	1404	1310	1211	1098	-	-	-	-	-	7020	7722	8424	9126
MJS2424ET*	24 S-Cam	24	3.00	3.02	98.5	82	71	2000	1922	1842	1771	1696	1607	1528	1449	1370	9610	10571	11532	12493
MJS3024ET*	"	24	3.00	3.02	98.5	106.4	71	2000	1922	1842	1771	1696	1607	1528	1449	1370	9610	10571	11532	12493
MJS3028ET*	"	28	3.00	3.02	128.4	106.4	73	2423	2320	2207	2070	1982	1870	1756	1670	1521	11600	12760	13920	15080
MJS3030ET*	"	30	3.00	3.02	128.4	106.4	75	2556	2450	2350	2256	2183	2086	1987	1858	1657	12250	13475	14700	15925
MJS3628ET*	36 S-Cam	28	3.00	3.02	128.4	129.6	73	2423	2320	2207	2070	1982	1870	1756	1670	1521	11600	12760	13920	15080
MJS3630ET*	"	30	3.00	3.02	128.4	129.6	75	2556	2450	2350	2256	2183	2086	1987	1858	1657	12250	13475	14700	15925
WM1624LG-T	Wedge	16	2.00	2.06	104.7	42.5	60.0	1850	1750	1650	1550	1450	-	-	-	-	-	-	-	-
MJW1216AT	"	16	1.75	1.84	44.4	26.6	78	1404	1310	1211	1098	-	-	-	-	-	7020	7722	8424	9126

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## REMOTE MOUNT CYLINDERS

Model	-	-	Rated Stroke (in)	-	-	-	Hold-Off Pressure	Spring Brake Force-Output (Lbs.-Force) at Inches of Stroke												
								1.00	1.50	2.00	2.50	3.00	3.50	4.00						
R4A	-	-	4.50	-	-	-	80	800	745	690	640	585	535	480	-	-	-	-	-	-
R5A	-	-	4.40	-	-	-	56	1150	1065	980	895	810	725	640	-	-	-	-	-	-
R5AHD	-	-	4.37	-	-	-	80	1720	1580	1440	1300	1160	1020	875	-	-	-	-	-	-

# PERFORMANCE CHART - SERVICE BRAKE CHAMBERS

Model	Type	Rated Stroke & Air Volume		Application Pressure Of (PSI)	Service Brake Force-Output (Pounds-Force) at Inches of Stroke									In Pounds of Torque Applied At Mid-Stroke by S-Cam Camshaft w/Slack Adjuster Length of (in)			
		Rated Service Stroke (in)	Vol. Displ. @100 psi Rated Service Stroke (cubic in)		1.00	1.25	1.50	1.75	2.00	2.25	2.50	275	3.00	5.00	5.50	6.00	6.50
					20	40	60	80	100	20	40	60	80	100	20	40	60
TR2024	S-Cam	2.25	53.40	20	325	325	320	310	250	160	-	-	-	1625	1788	1950	2113
				40	710	710	690	630	540	390	-	-	-	3550	3905	4260	4615
				60	1080	1085	1080	1040	900	620	-	-	-	5400	5940	6480	7020
				80	1410	1480	1470	1375	1200	840	-	-	-	7050	7755	8460	9165
				100	1800	1855	1845	1790	1500	1125	-	-	-	9000	9900	10800	11700
TR24xxL	S-Cam	2.50	69.80	20	362	372	379	377	365	336	278	-	-	1860	2046	2232	2418
				40	808	824	840	842	820	773	676	-	-	4120	4532	4944	5356
				60	1245	1270	1296	1302	1279	1223	1106	-	-	6350	6985	7620	8255
				80	1682	1717	1757	1764	1739	1674	1534	-	-	8585	9444	10302	11161
				100	2115	2158	2211	2224	2201	2133	1980	-	-	10790	11869	12948	14027
TR24xxLP3	S-Cam	3.00	83.20	20	355	358	368	376	378	369	351	326	246	1840	2024	2208	2392
				40	783	790	814	835	839	827	795	750	616	4070	4477	4884	5291
				60	1204	1218	1255	1288	1296	1282	1247	1184	1008	6275	6903	7530	8158
				80	1623	1642	1694	1738	1752	1734	1696	1620	1399	8470	9317	10164	11011
				100	2034	2061	2129	2185	2204	2188	2147	2067	1800	10645	11710	12774	13839
TR30xx	S-Cam	2.50	87.00	20	526	528	528	515	489	427	290	-	-	2640	2904	3168	3432
				40	1120	1130	1135	1115	1064	950	718	-	-	5650	6215	6780	7345
				60	1717	1737	1748	1724	1658	1510	1208	-	-	8685	9554	10422	11291
				80	2307	2337	2358	2331	2254	2083	1731	-	-	11685	12854	14022	15191
				100	2894	2937	2967	2940	2856	2667	2277	-	-	14685	16154	17622	19091
TR30xxLP3	S-Cam	3.00	107.50	20	493	508	524	524	512	498	479	446	363	2620	2882	3144	3406
				40	1062	1091	1109	1113	1103	1090	1063	1009	892	5545	6100	6654	7209
				60	1628	1658	1695	1698	1694	1683	1649	1576	1442	8475	9323	10170	11018
				80	2183	2229	2277	2283	2283	2274	2241	2149	1997	11385	12524	13662	14801
				100	2735	2788	2855	2867	2870	2868	2835	2745	2581	14275	15703	17130	18558
TR36xx	S-Cam	3.00	122.12	20	624	624	626	619	607	584	539	446	284	3130	3443	3756	4069
				40	1338	1334	1328	1324	1311	1298	1218	1087	846	6640	7304	7968	8632
				60	2042	2030	2029	2028	2014	1976	1898	1731	1436	10145	11160	12174	13189
				80	2733	2720	2727	2733	2718	2681	2591	2405	2071	13635	14999	16362	17726
				100	3412	3402	3423	3444	3439	3411	3336	3169	2858	17115	18827	20538	22250
LTR24xxT	S-Cam	2.50	69.80	20	362	372	379	377	365	336	278	-	-	1860	2046	2232	2418
				40	808	824	840	842	820	773	676	-	-	4120	4532	4944	5356
				60	1245	1270	1296	1302	1279	1223	1106	-	-	6350	6985	7620	8255
				80	1682	1717	1757	1764	1739	1674	1534	-	-	8585	9444	10302	11161
				100	2115	2158	2211	2224	2201	2133	1980	-	-	10790	11869	12948	14027
LTR24xxL3	S-Cam	3.00	83.20	20	355	358	368	376	378	369	351	326	246	1840	2024	2208	2392
				40	783	790	814	835	839	827	795	750	616	4070	4477	4884	5291
				60	1204	1218	1255	1288	1296	1282	1247	1184	1008	6275	6903	7530	8158
				80	1623	1642	1694	1738	1752	1734	1696	1620	1399	8470	9317	10164	11011
				100	2034	2061	2129	2185	2204	2188	2147	2067	1800	10645	11710	12774	13839

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# PERFORMANCE CHART - SERVICE BRAKE CHAMBERS

Model	Type	Rated Stroke & Air Volume		Application Pressure Of (PSI)	Service Brake Force-Output (Pounds-Force) at Inches of Stroke									In Pounds of Torque Applied At Mid-Stroke by S-Cam Camshaft			
		Rated Service Stroke	Vol. Displ. @100 psi Rated Service Stroke (cubic in.)		1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	5.00	5.50	6.00	6.50
LTR30xxT	S-Cam	2.50	87.00	20	526	528	528	515	489	427	290	-	-	2640	2904	3168	3432
				40	1120	1130	1135	1115	1064	950	718	-	-	5650	6215	6780	7345
				60	1717	1737	1748	1724	1658	1510	1208	-	-	8685	9554	10422	11291
				80	2307	2337	2358	2331	2254	2083	1731	-	-	11685	12854	14022	15191
				100	2894	2937	2967	2940	2856	2667	2277	-	-	14685	16154	17622	19091
LTR30xxL3	S-Cam	3.00	107.50	20	493	508	524	524	512	498	479	446	363	2620	2882	3144	3406
				40	1062	1091	1109	1113	1103	1090	1063	1009	892	5545	6100	6654	7209
				60	1628	1658	1695	1698	1694	1683	1649	1576	1442	8475	9323	10170	11018
				80	2183	2229	2277	2283	2283	2274	2241	2149	1997	11385	12524	13662	14801
				100	2735	2788	2855	2867	2870	2868	2835	2745	2581	14275	15703	17130	18558
M1216G-T	S-Cam	1.75	28.50	20	190	190	150	90	-	-	-	-	-	950	1045	1140	1235
				40	410	400	350	200	-	-	-	-	-	2000	2200	2400	2600
				60	650	620	545	360	-	-	-	-	-	3100	3410	3720	4030
				80	900	875	760	490	-	-	-	-	-	4375	4813	5250	5688
				100	1120	1080	930	650	-	-	-	-	-	5400	5940	6480	7020
M16xxLG-T	S-Cam	2.50	58.96	20	260	260	260	250	250	240	200	-	-	1300	1430	1560	1690
				40	605	605	605	600	595	550	475	-	-	3025	3328	3630	3933
				60	930	930	930	930	910	860	750	-	-	4650	5115	5580	6045
				80	1260	1260	1270	1280	1260	1200	1090	-	-	6300	6930	7560	8190
				100	1590	1595	1610	1640	1600	1550	1400	-	-	7975	8773	9570	10368
M20xxLG-T	S-Cam	2.50	58.19	20	295	298	300	300	300	280	245	-	-	1490	1639	1788	1937
				40	655	665	680	690	680	645	570	-	-	3325	3658	3990	4323
				60	1010	1030	1060	1075	1060	1015	900	-	-	5150	5665	6180	6695
				80	1380	1400	1450	1465	1450	1390	1250	-	-	7000	7700	8400	9100
				100	1750	1780	1840	1850	1840	1760	1610	-	-	8900	9790	10680	11570
M24xxLG-T	S-Cam	2.50	69.31	20	362	372	379	377	365	336	278	-	-	1860	2046	2232	2418
				40	808	824	840	842	820	773	676	-	-	4120	4532	4944	5356
				60	1245	1270	1296	1302	1279	1223	1106	-	-	6350	6985	7620	8255
				80	1682	1717	1757	1764	1739	1674	1534	-	-	8585	9444	10302	11161
				100	2115	2158	2211	2224	2201	2133	1980	-	-	10790	11869	12948	14027
M30xxG-T	S-Cam	2.50	92.20	20	526	528	528	515	489	427	290	-	-	2640	2904	3168	3432
				40	1120	1130	1135	1115	1064	950	718	-	-	5650	6215	6780	7345
				60	1717	1737	1748	1724	1658	1510	1208	-	-	8685	9554	10422	11291
				80	2307	2337	2358	2331	2254	2083	1731	-	-	11685	12854	14022	15191
				100	2894	2937	2967	2940	2856	2667	2277	-	-	14685	16154	17622	19091

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# PERFORMANCE CHART - SERVICE BRAKE CHAMBERS

TECHNICAL

Model	Type	Rated Stroke & Air Volume		Application Pressure Of (PSI)	Service Brake Force-Output (Pounds-Force) at Inches of Stroke									In Pounds of Torque Applied at Mid-Stroke by S-Cam Camshaft			
		Rated Service Stroke	Vol. Displ. @100 psi Rated Service Stroke (cubic in.)		1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	5.00	5.50	6.00	6.50
MJS12xxAT	S-Cam	1.75	28.00	20	190	190	150	90	-	-	-	-	-	950	1045	1140	1235
				40	410	400	350	200	-	-	-	-	-	2000	2200	2400	2600
				60	650	620	545	360	-	-	-	-	-	3100	3410	3720	4030
				80	900	875	760	490	-	-	-	-	-	4375	4813	5250	5688
				100	1120	1080	930	650	-	-	-	-	-	5400	5940	6480	7020
MJS24xxET	S-Cam	3.00	83.20	20	355	358	368	376	378	369	351	326	246	1840	2024	2208	2392
				40	783	790	814	835	839	827	795	750	616	4070	4477	4884	5291
				60	1204	1218	1255	1288	1296	1282	1247	1184	1008	6275	6903	7530	8158
				80	1623	1642	1694	1738	1752	1734	1696	1620	1399	8470	9317	10164	11011
				100	2034	2061	2129	2185	2204	2188	2147	2067	1800	10645	11710	12774	13839
MJS30xxET	S-Cam	3.00	107.50	20	493	508	524	524	512	498	479	446	363	2620	2882	3144	3406
				40	1062	1091	1109	1113	1103	1090	1063	1009	892	5545	6100	6654	7209
				60	1628	1658	1695	1698	1694	1683	1649	1576	1442	8475	9323	10170	11018
				80	2183	2229	2277	2283	2283	2274	2241	2149	1997	11385	12524	13662	14801
				100	2735	2788	2855	2867	2870	2868	2835	2745	2581	14275	15703	17130	18558
MJS36xxET	S-Cam	3.00	122.77	20	622	623	623	620	612	598	574	534	438	3115	3427	3738	4050
				40	1313	1310	1319	1322	1313	1295	1259	1188	1027	6595	7255	7914	8574
				60	1989	1989	2008	2017	2011	1992	1950	1860	1659	10040	11044	12048	13052
				80	2658	2667	2698	2714	2712	2694	2647	2543	2318	13490	14839	16188	17537
				100	3324	3342	3385	3410	3414	3398	3348	3235	2994	16925	18618	20310	22003
C12	S-Cam	1.75	26.00	20	190	190	150	90	-	-	-	-	-	950	1045	1140	1235
				40	410	400	350	200	-	-	-	-	-	2000	2200	2400	2600
				60	650	620	545	360	-	-	-	-	-	3100	3410	3720	4030
				80	900	875	760	490	-	-	-	-	-	4375	4813	5250	5688
				100	1120	1080	930	650	-	-	-	-	-	5400	5940	6480	7020
C16	S-Cam	2.25	45.10	20	250	250	250	250	215	135	-	-	-	1250	1375	1500	1625
				40	580	600	600	580	490	335	-	-	-	3000	3300	3600	3900
				60	900	915	920	890	780	510	-	-	-	4575	5033	5490	5948
				80	1220	1250	1250	1200	1050	755	-	-	-	6250	6875	7500	8125
				100	1525	1585	1585	1510	1360	1035	-	-	-	7925	8718	9510	10303
C20	S-Cam	2.25	50.80	20	325	325	320	310	250	160	-	-	-	1625	1788	1950	2113
				40	710	710	690	630	540	390	-	-	-	3550	3905	4260	4615
				60	1080	1085	1080	1040	900	620	-	-	-	5400	5940	6480	7020
				80	1410	1480	1470	1375	1200	840	-	-	-	7050	7755	8460	9165
				100	1800	1855	1845	1790	1500	1125	-	-	-	9000	9900	10800	11700
C30	S-Cam	2.50	90.10	20	526	528	528	515	489	427	290	-	-	2640	2904	3168	3432
				40	1120	1130	1135	1115	1064	950	718	-	-	5650	6215	6780	7345
				60	1717	1737	1748	1724	1658	1510	1208	-	-	8685	9554	10422	11291
				80	2307	2337	2358	2331	2254	2083	1731	-	-	11685	12854	14022	15191
				100	2894	2937	2967	2940	2856	2667	2277	-	-	14685	16154	17622	19091

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		Rated Service Stroke	Vol. Displ. @100 psi Rated Service Stroke (cubic in.)		1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	5.00	5.50	6.00	6.50
C36	S-Cam	3.00	124.29	20	624	624	626	619	607	584	539	446	284	3130	3443	3756	4069
				40	1338	1334	1328	1324	1311	1298	1218	1087	846	6640	7304	7968	8632
				60	2042	2030	2029	2028	2014	1976	1898	1731	1436	10145	11160	12174	13189
				80	2733	2720	2727	2733	2718	2681	2591	2405	2071	13635	14999	16362	17726
				100	3412	3402	3423	3444	3439	3411	3336	3169	2858	17115	18227	20538	22250
C16L	S-Cam	2.50	53.71	20	260	260	260	250	250	240	-	-	-	1300	1430	1560	1690
				40	605	605	605	600	595	550	475	-	-	3025	3328	3630	3933
				60	930	930	930	930	910	860	750	-	-	4650	5115	5580	6045
				80	1260	1260	1270	1280	1260	1200	1090	-	-	6300	6930	7560	8190
				100	1590	1595	1610	1640	1600	1550	1400	-	-	7975	8773	9570	10368
C16LH	S-Cam	2.50	59.72	20	265	260	250	240	225	200	165	-	-	1300	1430	1560	1690
				40	598	575	565	550	530	500	435	-	-	2875	3163	3450	3738
				60	920	900	890	875	850	800	730	-	-	4500	4950	5400	5850
				80	1240	1220	1210	1200	1170	1110	1020	-	-	6100	6710	7320	7930
				100	1560	1550	1540	1525	1495	1440	1315	-	-	7750	8525	9300	10075
C20L	S-Cam	2.50	59.90	20	295	298	300	300	300	280	245	-	-	1490	1639	1788	1937
				40	655	665	680	690	680	645	570	-	-	3325	3658	3990	4323
				60	1010	1030	1060	1075	1060	1015	900	-	-	5150	5665	6180	6695
				80	1380	1400	1450	1465	1450	1390	1250	-	-	7000	7700	8400	9100
				100	1750	1780	1840	1850	1840	1760	1610	-	-	8900	9790	10680	11570
CS20L	S-Cam	2.50	58.71	20	295	298	300	300	300	280	245	-	-	1490	1639	1788	1937
				40	655	665	680	690	680	645	570	-	-	3325	3658	3990	4323
				60	1010	1030	1060	1075	1060	1015	900	-	-	5150	5665	6180	6695
				80	1380	1400	1450	1465	1450	1390	1250	-	-	7000	7700	8400	9100
				100	1750	1780	1840	1850	1840	1760	1610	-	-	8900	9790	10680	11570
CS20L3	S-Cam	3.00	68.29	20	293	298	308	312	312	305	295	277	230	1540	1694	1848	2002
				40	654	662	679	695	699	693	679	647	568	3395	3735	4074	4414
				60	1006	1018	1048	1074	1084	1081	1067	1026	925	5240	5764	6288	6812
				80	1353	1371	1415	1451	1468	1470	1457	1409	1294	7075	7783	8490	9198
				100	1693	1718	1777	1826	1850	1858	1848	1796	1675	8885	9774	10662	11551
C24L	S-Cam	2.50	69.60	20	362	372	379	377	365	336	278	-	-	1860	2046	2232	2418
				40	808	824	840	842	820	773	676	-	-	4120	4532	4944	5356
				60	1245	1270	1296	1302	1279	1223	1106	-	-	6350	6985	7620	8255
				80	1682	1717	1757	1764	1739	1674	1534	-	-	8585	9444	10302	11161
				100	2115	2158	2211	2224	2201	2133	1980	-	-	10790	11869	12948	1402
C24L3	S-Cam	3.00	83.20	20	355	358	368	376	378	369	351	326	246	1840	2024	2208	2392
				40	783	790	814	835	839	827	795	750	616	4070	4477	4884	5291
				60	1204	1218	1255	1288	1296	1282	1247	1184	1008	6275	6903	7530	8158
				80	1623	1642	1694	1738	1752	1734	1696	1620	1399	8470	9317	10164	11011
				100	2034	2061	2129	2185	2204	2188	2147	2067	1800	10645	11710	12774	13839

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		Rated Service Stroke	Vol. Displ. @100 psi Rated Service Stroke (cubic in.)		1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	5.00	5.50	6.00	6.50	
C30L3	S-Cam	3.00	111.76	20	493	508	524	524	512	498	479	446	363	2620	2882	3144	3406	
				40	1062	1091	1109	1113	1103	1090	1063	1009	892	5545	6100	6654	7209	
				60	1628	1658	1695	1698	1694	1683	1649	1576	1442	8475	9323	10170	11018	
				80	2183	2229	2277	2283	2283	2274	2241	2149	1997	11385	12524	13662	14801	
				100	2735	2788	2855	2867	2870	2868	2835	2745	2581	14275	15703	17130	18558	
CW9	Wedge	1.75	21.25	20	175	170	150	55	-	-	-	-	-	-	-	-	-	
				40	355	340	300	174	-	-	-	-	-	-	-	-	-	
				60	530	510	415	260	-	-	-	-	-	-	-	-	-	
				80	720	690	615	375	-	-	-	-	-	-	-	-	-	
				100	895	860	775	515	-	-	-	-	-	-	-	-	-	
CW12	Wedge	1.75	28.80	20	225	225	180	70	-	-	-	-	-	-	-	-	-	
				40	455	455	385	200	-	-	-	-	-	-	-	-		
				60	685	680	570	350	-	-	-	-	-	-	-	-		
				80	915	910	820	560	-	-	-	-	-	-	-	-		
				100	1145	1130	1080	800	-	-	-	-	-	-	-	-		
CW16	Wedge	1.75	38.90	20	312	310	300	145	-	-	-	-	-	-	-	-	-	
				40	630	660	610	385	-	-	-	-	-	-	-	-		
				60	960	950	920	630	-	-	-	-	-	-	-	-		
				80	1290	1275	1235	780	-	-	-	-	-	-	-	-		
				100	1605	1595	1590	980	-	-	-	-	-	-	-	-		
WM1624LG-T	Wedge	2.00	42.50	20	320	330	330	305	120	-	-	-	-	-	-	-	-	
				40	630	650	640	620	300	-	-	-	-	-	-	-		
				60	960	980	980	930	550	-	-	-	-	-	-	-		
				80	1280	1290	1290	1250	800	-	-	-	-	-	-	-		
				100	1590	1625	1625	1600	930	-	-	-	-	-	-	-		

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