



# Masten Brake Systems

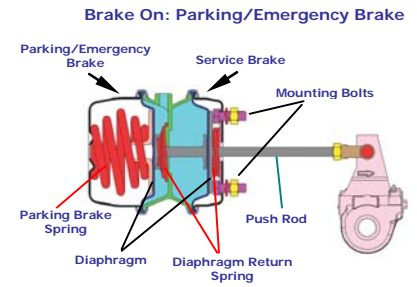
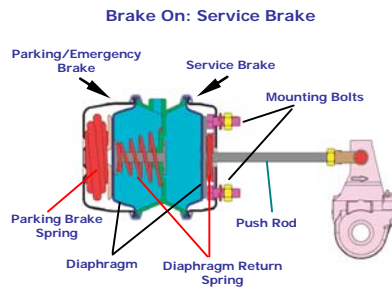
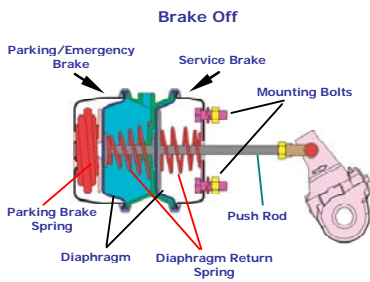
## SPRING BRAKE CHAMBERS SERVICE, INSTALLATION AND MAINTENANCE INSTRUCTIONS

### SERVICE

#### Description

In case of parking and emergency braking, a spring brake chamber can be used in conjunction with the standard air brake chamber. The spring brake contains an additional air diaphragm and a strong loaded/compressed spring. The spring is held in the off position by the air diaphragm when air is applied to spring brake side. The spring provides the braking force to the air chamber pushrod, thus actuating the brakes, when the air is exhausted.

#### Functions/Operations



#### Normal Running Condition:

With an application of air pressure greater than Maximum Required Release Pressure ( $> 5.5$  bar) acting upon parking/emergency diaphragm in the spring hold-off cavity, the spring is fully compressed and push plate is held in release position. This isolates the spring brake from service brake which turns out to Normal Running Condition.

#### Service Brake Condition:

In case of a service brake application, air pressure acts upon the service diaphragm that forces the push plate and rod forward against the slack adjuster.

#### Park/Emergency Brake Condition:

In case of a parking/emergency brake operation, air exhausted from spring hold-off cavity. The spring forces push plate forward on service diaphragm and piston against the slack adjuster. The brake will remain under brake condition until the spring is compressed as described in Normal Running Condition.

#### Technical Data

Maximum Operating Pressure:	10 bar
Operating Temperature Range:	-40 °C to +80 °C
Maximum Required Release Pressure:	5.5 bar
Maximum Release Torque:	55 Nm

#### Quality Requirements for Manufacturing

Release Pressure Check,  
Dimensional Check,  
Vibration Test (16 g -  $10^7$  cycles/32 g  $10^6$  cycles)  
FMEA (Failure Mode and Effects Analysis)  
Dirt Test  
Salt Spray Mist Test  
Hot & Cold Temperature Tests (-40 °C to +80 °C)  
Endurance Strength Test



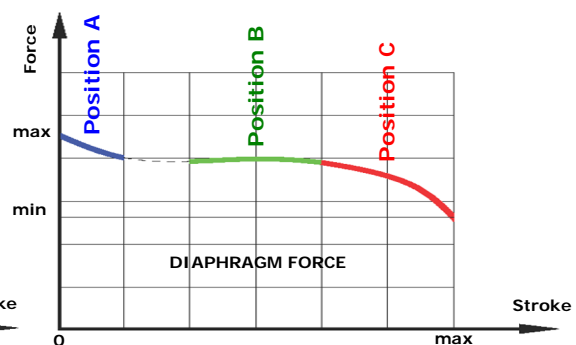
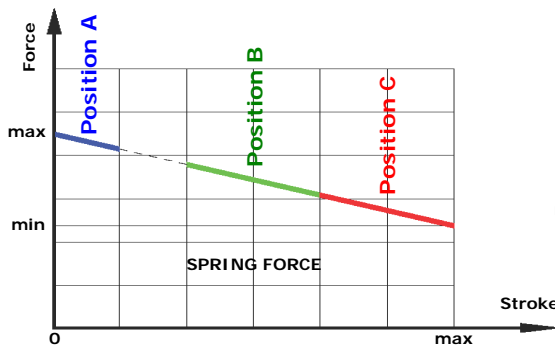
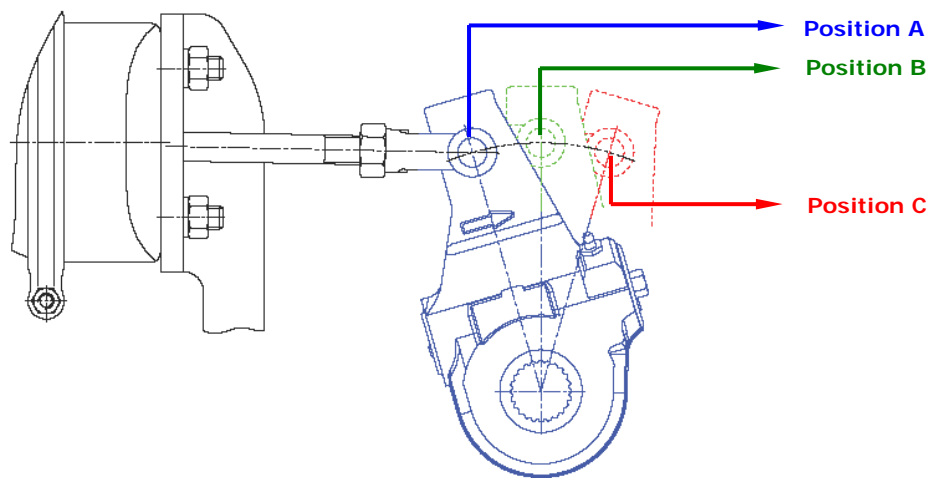
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## INSTALLATION

The brakes must be adjusted as instructed below in initial or after maintenance installation.

### Installation Tests

- Check that if the all slack adjusters rotate freely without binding after brake application (Position B),
- Check that if the all slack adjusters return to their release position (Position A) without binding when the brakes released,
- Check that angle between slack adjuster arm and push rod is greater than 90 degrees and all angles maintained for all slack adjusters when brakes released (Position A).
- Check that angle between slack adjuster arm and push is about 90 degrees and all angles maintained for all slack adjuster when the brakes applied (Position B).



**Position A:** Normal Running Condition (Spring Compressed and Service unpressurized)

**Position B:** Service/Parking/Emergency Brake Condition (Service Pressurized/Spring Force Activated)

**Position C:** Over-Stroke Condition (Improper Use /Installation)

Note: Recommended actuator mounting nut torques: 100 ~ 155 lb-in / 136 ~ 210 N-m (M16x1.5)



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## PREVENTIVE MAINTENANCE

### Operational Maintenance

Once an every month/every 12000 km/300 operating hours;

- Check tightness of mounting nuts is sufficient and the cutter pins if they are in place.
- Check push rod – slack adjuster alignment and make sure no binding of rod at full stroke and smooth returns.
- Check conditions of hoses and lines
- Check push-rod travel distance if needed for optimum brake efficiency, long diaphragm life, brake response, and low air consumption. This is possible with shortest push-rod travel.

### Unistallation and Repair

#### Mechanical Release (Caging the Brake)

- Clean dust from release tool keyhole in center of spring housing.
- Remove release tool assembly from side pocket of adapter base.
- Insert release tool through keyhole in chamber into the pressure plate.
- Turn release tool turn clockwise
- Pull on release tool to seat it in the pressure plate properly
- Put on release washer and nut. Tighten nut until it is finger tight.

Note: In case of unpressurized chamber, to cage spring, tighten release nut with hand wrench and make sure the pushrod is retracting. Do not over torque release tool assembly (max. 55 Nm)

#### Service Diaphragm Replacement

- Mechanically release spring brake as explained above. Release all air pressure out of unit.
- Clamp/stop pushrod to move backward. Thus cages the service return spring.
- Remove service clamp assembly while being careful to spurt piggyback from falling. Remove the old diaphragm.
- Inspect all visible service brake parts. Replace damaged or worn parts.
- Wipe off any dirt or grease in the service side of the piggyback.
- Place the new diaphragm in between the piggyback and non pressure housing making sure they are all centered.
- Reassemble the clamp assembly making sure all parts are seated properly and they remained centered. (Rotate the clamp assembly and port holes as desired for a new chamber assembling position)
- Tighten the clamp nuts to 15 Nm. and remove the vice grips.
- Pressurize the service chamber (10 bar) and check for leaks around the clamps (no leaks allowed).
- Un cage release tool and put back into its pocket.
- Replace dust cup back in keyhole

## CAUTION!

Do not strike/drop a spring brake any time!

Do not use a spring brake chamber if it has structural damage or any kind replace complete unit of chamber!

## CAUTION!

Spring Brake Chambers contain a compressed/loaded spring.

Follow instructions! Otherwise it may cause personal injury/death or property damage.

The spring brake must be caged before servicing and should only be performed by experienced personal.