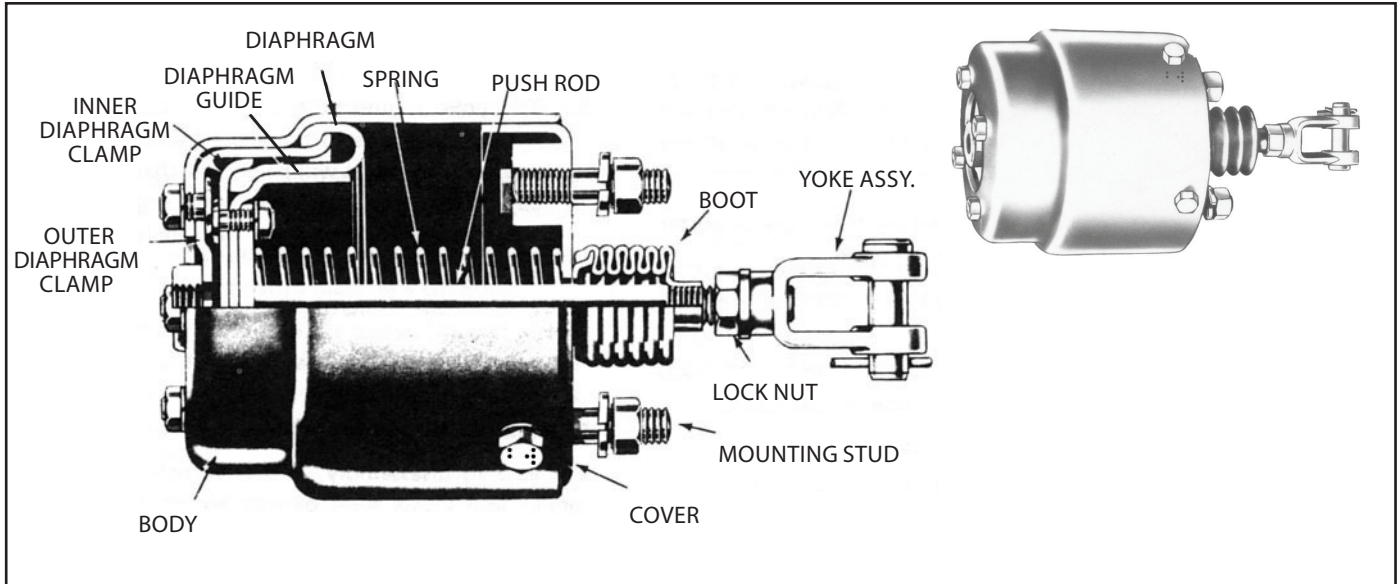


## Rotochambers



### DESCRIPTION

The rotochamber is an actuator which converts the energy of air pressure into mechanical force. The type number of the rotochamber indicates the actuator's diaphragm effective area (Type 30 - 30 sq. in. of diaphragm) and the various sizes available give a wide range of output force and length of stroke. The rolling type diaphragm provides long life and gives a constant output force throughout the entire stroke.

One end of the diaphragm is clamped to the inside wall of the body by the outer clamp. The other end of the diaphragm is clamped between the diaphragm guide and inner diaphragm clamp. The cover is fastened to the outer body by cap screws. Mounting studs are used to mount the chambers. A boot retained by a boot retainer is used to prevent entrance of moisture through the hole in the cover. A lock nut and yoke with pin are screwed on the threaded push rod. Most rotochambers now have 3/8 in. NPTF inlet ports. The long stroke Type 50 employ a 1/2 in. NPTF inlet port.

### OPERATION

Controlled air pressure enters the rotochamber through the inlet port and acts upon the diaphragm, moving the diaphragm guide and diaphragm forward. The diaphragm moves along the inside wall of the cylinder body with a smooth rolling motion. The forward motion of the diaphragm guide and diaphragm forces the push plate and push rod forward.

When the rotochamber is used to actuate cam type foundation brake assemblies, the yoke is connected to a slack adjuster which in turn is connected to the brake cam shaft. This forward motion of the push rod rotates the slack adjuster, cam shaft and cam applying the vehicle brakes.

The rotochamber is also used in industrial applications and in such cases may be used in clamping or holding operations.

The greater air pressure admitted to the rotochamber, the greater the force applied by the push rod and, conversely, the less air pressure applied to the rotochamber, the less force applied by the push rod. Push rod force is determined by multiplying the air pressure delivered by the effective diaphragm area. For example, if 60 psi is admitted to the Type 30 rotochamber the lineal force on the end of the push rod is approximately 1800 lbs.



## GENERAL SAFETY GUIDELINES



**WARNING! PLEASE READ AND FOLLOW THESE INSTRUCTIONS  
TO AVOID PERSONAL INJURY OR DEATH:**

When working on or around a vehicle, the following guidelines should be observed **AT ALL TIMES**:

- ▲ Park the vehicle on a level surface, apply the parking brakes and always block the wheels. Always wear personal protection equipment.
- ▲ Stop the engine and remove the ignition key when working under or around the vehicle. When working in the engine compartment, the engine should be shut off and the ignition key should be removed. Where circumstances require that the engine be in operation, **EXTREME CAUTION** should be used to prevent personal injury resulting from contact with moving, rotating, leaking, heated or electrically-charged components.
- ▲ Do not attempt to install, remove, disassemble or assemble a component until you have read, and thoroughly understand, the recommended procedures. Use only the proper tools and observe all precautions pertaining to use of those tools.
- ▲ If the work is being performed on the vehicle's air brake system, or any auxiliary pressurized air systems, make certain to drain the air pressure from all reservoirs before beginning **ANY** work on the vehicle. If the vehicle is equipped with a Bendix® AD-IS® air dryer system, a Bendix® DRM™ dryer reservoir module, or a Bendix® AD-9si™ air dryer, be sure to drain the purge reservoir.
- ▲ Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in a manner that safely removes all electrical power from the vehicle.
- ▲ You should consult the vehicle manufacturer's operating and service manuals, and any related literature, in conjunction with the Guidelines above.
- ▲ Never exceed manufacturer's recommended pressures.
- ▲ Never connect or disconnect a hose or line containing pressure; it may whip. Never remove a component or plug unless you are certain all system pressure has been depleted.
- ▲ Use only genuine Bendix® brand replacement parts, components and kits. Replacement hardware, tubing, hose, fittings, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems.
- ▲ Components with stripped threads or damaged parts should be replaced rather than repaired. Do not attempt repairs requiring machining or welding unless specifically stated and approved by the vehicle and component manufacturer.
- ▲ Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.
- ▲ For vehicles with Automatic Traction Control (ATC), the ATC function must be disabled (ATC indicator lamp should be ON) prior to performing any vehicle maintenance where one or more wheels on a drive axle are lifted off the ground and moving.
- ▲ The power **MUST** be temporarily disconnected from the radar sensor whenever any tests **USING A DYNAMOMETER** are conducted on a Bendix® Wingman® Advanced™-equipped vehicle.

When air pressure is released from the rotochamber the rotochamber spring returns the slack adjuster (if applicable), push rod, diaphragm guide and diaphragm to the released position.

## PREVENTIVE MAINTENANCE

A. Every month, 8,000 miles, or after 300 operating hours, depending on type of operation:

1. Check push rod travel and adjust travel at the slack adjuster if needed. Push rod travel should be as short as possible without brakes dragging. Excessive push rod travel reduces braking efficiency, shortens diaphragm life, gives slow braking response and wastes air.
2. Check push rod to slack adjuster alignment from release to full stroke position to be sure push rod moves out and returns properly without binding at the cover hole or with other structures. Also check the angle formed by the slack adjuster arm and push rod. It should be 90° or greater when the chamber is in the applied or released positions.
3. Check tightness of mounting nuts. Check cotter pins to make sure they are in place.
4. Check all hoses and lines. They should be secure and in good condition.

B. Every year or after each 100,000 miles or 3,600 operating hours, depending on type of operation.

1. Disassemble and clean all parts.
2. Install new diaphragm or any other parts if they are worn or deteriorated.

When the diaphragm, spring, or both are replaced they should be replaced in the corresponding chamber on the same axle.

## OPERATING AND LEAKAGE TESTS

A. Operating Test

1. Apply brakes and observe that the push rods move out promptly and without binding.
2. Release brakes and observe that the push rods return to the released position promptly and without binding.
3. Check push rod travel. Push rod travel should be as short as possible without brakes dragging. Adjust travel of push rod at slack adjuster if necessary.

B. Leakage Test

1. Loosen rubber boot from around push rod hole in cover. Make and hold a full brake application.

Coat area with soap suds and check for leakage. No leakage is permissible. If leakage is detected, the diaphragm must be replaced.

## REMOVING

1. Block vehicle wheels.
2. Disconnect line to rotochamber.
3. Remove the yoke pin.
4. Remove the rotochamber.

## INSTALLING

1. Before installing chamber, check bracket for distortion, cracks or any condition which might cause chamber misalignment or malfunction.
2. Re-install the chamber on the bracket. Tighten the mounting nuts securely and evenly.
3. Connect the air lines to the rotochamber and check for leakage.
4. Insert the push rod yoke pin through the hole in the yoke and slack adjuster. Make sure the same hole location in the slack adjuster on each side of the axle is used.
5. The yoke should be adjusted on the push rod so that with brakes released the angle formed by the push rod and slack adjuster will be greater than 90° and all slack adjusters should be at the same angle. With properly adjusted brakes applied, the angle should still be greater than 90°.

## DISASSEMBLY

For ease in disassembly, if the rotochamber has been in service and shows signs of rust accumulation, it is recommended that the chamber be immersed and soaked in the cleaning or rust dissolving solvent for 24 hours.

1. Remove yoke and lock nut from push rod.
2. Remove rubber boot.
3. Remove cap screws from cover.
4. Remove cover, springs and spring guides (if so equipped).
5. Remove nuts from body. These nuts secure the outer clamp to the body and are located at the air inlet end of the rotochamber.
6. Grasp the push rod and by pulling and wiggling the entire assembly consisting of push rod and plate, diaphragm guide, diaphragm, inner and outer clamps should ease out of the body.
7. Straighten the rolled diaphragm.
8. Remove outer diaphragm clamp.
9. Remove nuts from inside of diaphragm guide.
10. Disassemble inner diaphragm clamp, diaphragm and push plate rod assembly from the diaphragm guide.

## **CLEANING AND INSPECTION**

1. Clean all metal parts in a good cleaning solvent.
2. Carefully inspect all metal parts for cracks, distortion or damage. Replace any parts not considered serviceable.
3. Replace diaphragm and rubber boot.

## **ASSEMBLY**

1. Position the diaphragm on end in the inner diaphragm clamp. The smaller diameter end of the diaphragm should be against the diaphragm clamp.
2. Place and install the diaphragm guide within the diaphragm and over the inner diaphragm clamp studs.
3. Install the push plate push rod assembly within the diaphragm guide and over the inner diaphragm clamp studs.
4. Install nuts on the inner diaphragm clamp studs and tighten securely.
5. Place the assembly consisting of the push rod, push plate, diaphragm guide, diaphragm and inner clamp inside of the outer clamp.

6. Roll the free end of the diaphragm back and over the end of the outer diaphragm clamp.
7. Lubricate the inside wall of the body and the rolled surface of the diaphragm with Murphy's oil soap.
8. Slide the above assembly into the body. The end of the diaphragm should fit snugly against the shoulder in the body. Position the outer diaphragm clamp studs through the holes at the end of the body, install nuts and tighten securely.
9. Install spring guide (if so equipped) and install spring over push rod, and install spring guide on spring (if so equipped).
10. Install cover over push rod and into body. Attach cover to body with cap screws, tightening securely.
11. Install boot over push rod attaching to cover.
12. Install lock nut and yoke on push rod.

## **TESTING OF REBUILT ROTOCHAMBER**

Perform "Operating and Leakage" checks.

