

# MASTER CYLINDER (Air Actuated)



## Service Instructions

**TABLE 1**

Complete Unit Model Number	Residual Check Valve	Replacement Actuator Number	Actuator Repair Kit Number	Air Chamber Replacement Kit Number
12-020-029	Yes	(Complete unit Replaced by 12-460-017)		
12-021-029	No	(Complete unit Replaced by 12-460-025)		
12-460-017	Yes	30-025-003	12-400-005	02-001-308
12-460-023	Yes	30-025-003	12-400-005	none
12-460-025	No	30-025-005	02-400-231	02-001-308
12-460-027	No	30-025-005	02-400-231	none

**NOTE:** If your product number is not listed, contact ZF Off-Highway Solutions Minnesota Inc. for information.

**NOTE**  
Item 6 may be a spring retainer (Figure 1) or a check valve (Figure 2). Compare item 6 removed from your cylinder to the one in the repair kit. These components must be the same.

### MASTER CYLINDER DISASSEMBLY

(Refer to Figures 1 and 2)

1. Remove Air/Hydraulic Actuator from machine by disconnecting necessary air and fluid lines and removing mounting bolts. Drain fluid from assembly.
2. Separate air chamber section and mounting bracket from master cylinder section by removing two nuts and two lock washers.
3. Remove boot (1) from housing.
4. Remove retaining ring (2) from housing.

**CAUTION**  
Piston assembly (3) is under tension of spring assembly (5).

5. Remove piston assembly (3), cup (4) and spring assembly (5) from housing.
6. **Models 12-460-025 & 12-460-027:** Remove spring retainer (6) and seat (7) from housing.  
**Models 12-460-017 & 12-460-023:** Remove check valve (6) and seat (7) from housing.

### MASTER CYLINDER ASSEMBLY

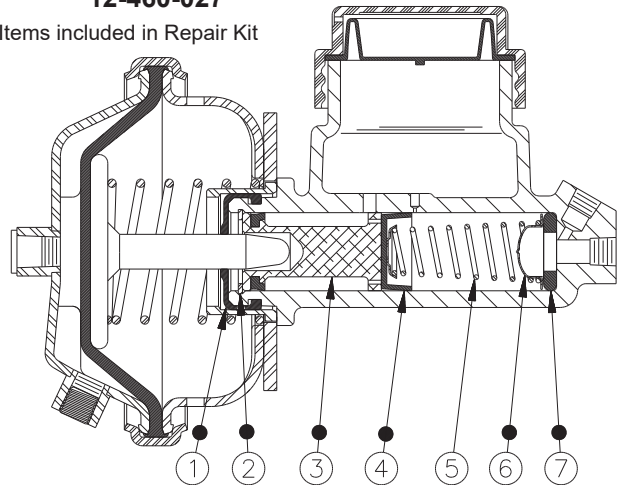
(Refer to Figures 1 and 2)

LUBRICATE ALL RUBBER COMPONENTS FROM REPAIR KIT WITH CLEAN TYPE FLUID USED IN THE SYSTEM.

1. Thoroughly clean spring assembly (5) and housing bore before assembling.
2. **Models 12-460-025 & 12-460-027:** Install new seat (7) and new spring retainer (6) into housing.  
**Models 12-460-017 & 12-460-023:** Install new seat (7) and new check valve (6) into housing.
3. Install spring assembly (5), new cup (4), new piston assembly (3) and new retaining ring (2) in housing.
4. Install new boot (1) on housing.
5. See DIAPHRAGM REPLACEMENT Procedures on back page.
6. Lubricate end of push rod with moly impregnated grease and attach air chamber section, bracket and master cylinder section using two lock washers and two nuts. Torque nuts 33.9-47.5 N·m (25-35 lb·ft).
7. Install the unit on the machine. Connect the air and fluid lines. Bleed the fluid system of air. Tighten fittings if leaks occur. Make several applications to be sure the actuator is working properly. **NOTE: All fittings must be inspected for leaks and tightened if leaks occur.**

### MODELS: 12-460-025 12-460-027

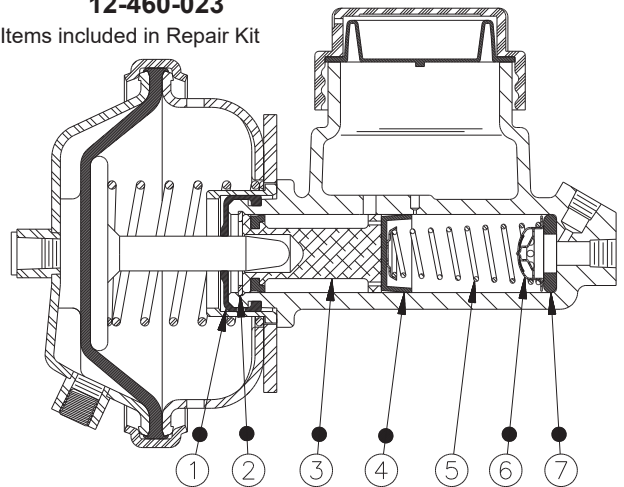
● Items included in Repair Kit



**FIGURE 1**

### MODELS: 12-460-017 12-460-023

● Items included in Repair Kit



**FIGURE 2**

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