

# MASTER CYLINDER (Air Actuated)



## Service Instructions

**TABLE 1**

Model Number	Repair Kit Number	Air Chamber Replacement Kit Number	Model Number	Repair Kit Number	Air Chamber Replacement Kit Number
02-460-155 (BF)	02-400-222	none	12-460-055 (BF)	02-400-006	none
12-460-012 (HO)	02-400-085	none	** 12-460-057 (BF)	02-400-006	none
12-460-013 (BF)	02-400-006	none	12-460-061 (BF)	02-400-207	none
12-460-015 (BF)	02-400-006	none	* 12-460-063 (BF)	02-400-007	none
12-460-024 (HO)	02-400-085	none	12-460-070 (HO)	02-400-050	none
* 12-460-029 (BF)	02-400-207	none	12-460-071 (BF)	02-400-007	none
* 12-460-031 (BF)	02-400-207	02-001-311	12-460-073 (BF)	02-400-007	none
12-460-032 (HO)	02-400-102	02-001-311	12-460-074 (HO)	02-400-050	none
12-460-034 (HO)	02-400-208	none	12-460-197 (BF)	02-400-006	02-001-320

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

BF = Brake Fluid HO = Mineral Base Hydraulic Oil

\* Contains residual valve

\*\* Uses an adapter

### REMOVING AIR ACTUATED MASTER CYLINDER FROM MACHINE AND SEPARATING SECTIONS

(Refer to Figure 1)

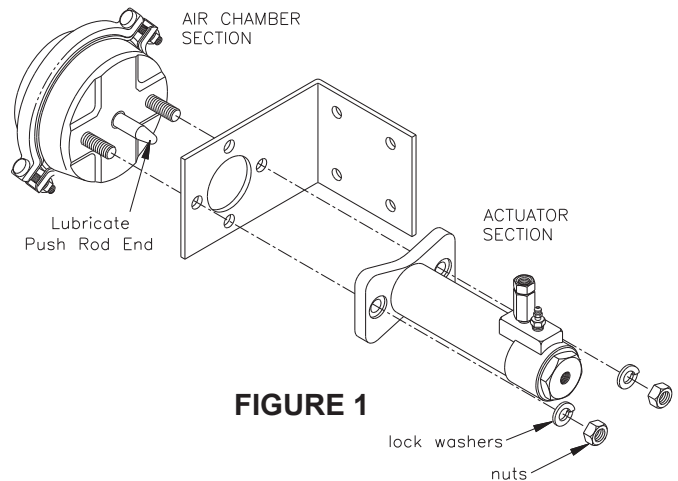
1. Remove air actuated master cylinder from the machine by disconnecting necessary air and fluid lines and removing mounting bolts. Drain fluid from the assembly.
2. Separate air chamber section and mounting bracket from master cylinder section by removing two nuts and two lock washers. Note, tube mounted models use four bolts, four lock washers, and four nuts to connect air chamber section to master cylinder section.

### CONNECTING SECTIONS AND MOUNTING AIR ACTUATED MASTER CYLINDER ON MACHINE

(Refer to Figure 1)

1. 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. Note, tube mounted models use four bolts, four lock washers, and four nuts. Tighten nuts and bolts according to torque specifications chart.
2. Install unit on machine. Connect air and fluid lines. Bleed fluid system of air. Make several applications to be sure master cylinder is working properly.

**NOTE: All fittings must be inspected for leaks and tightened if leaks occur.**

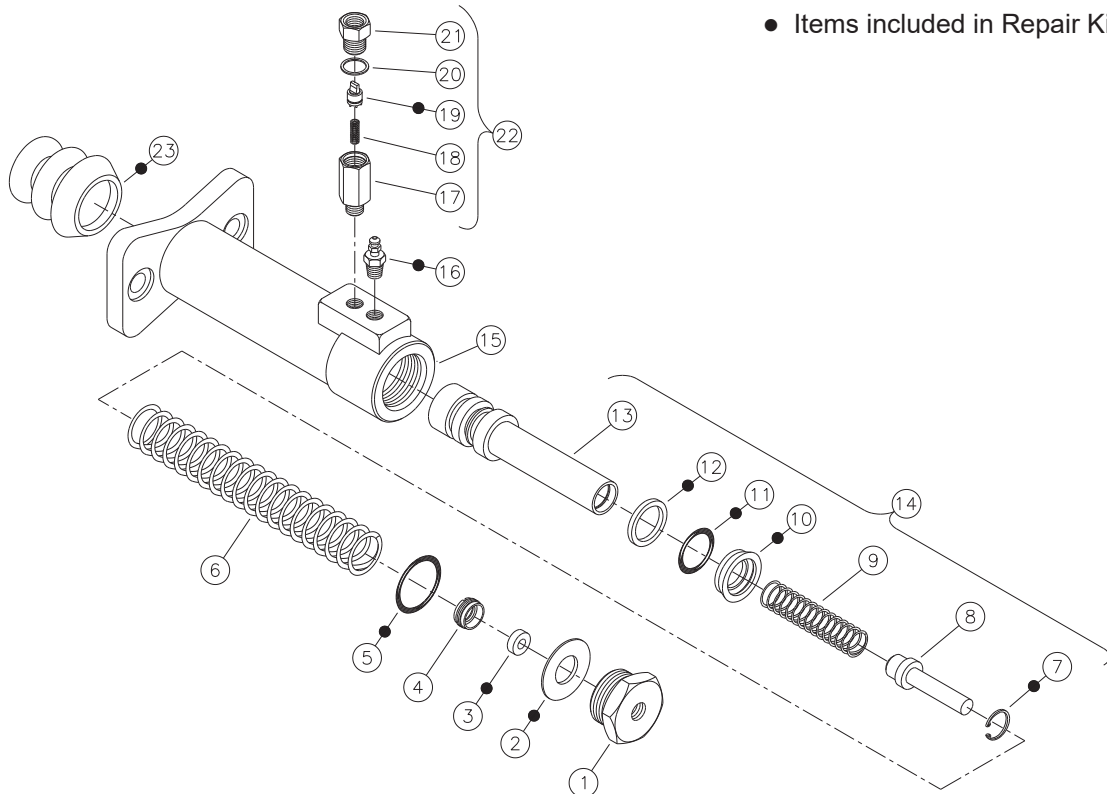


**FIGURE 1**

### Torque Specifications

Thread Size	Torque
7/16-14UNC	32.5 N·m (24 lb·ft)
7/16-20UNF	33.9 N·m (25 lb·ft)
1/2-13UNC	47.5 N·m (35 lb·ft)
1/2-20UNF	54.2 N·m (40 lb·ft)
5/8-11UNC	101.7 N·m (75 lb·ft)
5/8-13UNF	115.3 N·m (85 lb·ft)

- Items included in Repair Kit



**FIGURE 2**

**DISASSEMBLY**

(Refer to Figure 2)

1. Remove end plug (1) and retainer (2) from housing(15).  
**NOTE: Not all models use retainer (2).**

**⚠ CAUTION**

End plug (1) is under spring tension.

2. Remove retainer (4), seat (3), and o-ring (5) from end plug (1).
3. Remove spring (6) and piston assembly (14) from housing (15).
4. Remove retaining ring (7), stem (8), and spring (9) from piston (13).
5. Remove cup (10), o-ring (11), and back-up ring (12) from piston (13). **NOTE: Be careful not to damage grooves in piston. Not all models use back-up ring (12).**
6. Remove boot (23). **NOTE: Not all models use boot (23).**
7. Remove residual valve (22) from housing (15). Remove adapter (21), gasket (20), check valve (19), and spring (18) from valve body (17). **NOTE: Not all models use residual valve (22).**
8. Remove bleeder screw (16). **NOTE: Not all repair kits include new bleeder screw. Do not remove bleeder screw unless new bleeder screw is included in the repair kit.**

**ASSEMBLY**

(Refer to Figure 2)

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

1. Clean all parts thoroughly before assembling.
2. Install new cup (10), new o-ring (11), and new backup ring (12) on piston (13). Note direction of components.  
**NOTE: Not all models use back-up ring (12).**
3. Insert spring (9) and stem (8) into piston (13) and install new retaining ring (7).
4. Install piston assembly (14) and spring (6) in housing (15). Note direction of piston assembly (14).
5. Insert new seat (3) into retainer (4) and install in end plug (1). Torque retainer 16.3-19.0 N·m (12-14 lb-ft).
6. Install new o-ring (5) on end plug (1). Install retainer (2) and end plug (1) into housing. Torque end plug (1) 67.8-108.5 N·m (50-80 lb-ft). **NOTE: Not all models use retainer (2).**
7. Install new boot (23). **NOTE: Not all models use boot.**
8. Install spring (18), new check valve (19), gasket (20), and adapter (21) in valve body (17). Torque adapter (21) 27.1-33.9 N·m (20-25 lb-ft). Install residual valve (22) in housing (15) and torque 6.8-7.9 N·m (60-70 lb-in). **NOTE: Not all models use residual valve (22).**
9. Install new bleeder screw (16). Torque bleeder screw 6.8-7.9 N·m (60-70 lb-in). **NOTE: Not all repair kits include new bleeder screw.**

This publication is not subject to any update service. Information contained in this publication was in effect at the time the publication was approved for printing and is subject to change without notice or liability. ZF Off-Highway Solutions Minnesota Inc. reserves the right to revise the information presented or to discontinue the production of parts described at any time.



**ZF Off-Highway Solutions Minnesota Inc.**

1911 Lee Boulevard / North Mankato, MN U.S.A. 56003

**Tel:** +1 507 625 6426 **Fax:** +1 507 625 3212