BFGoodrich
Engineered Systems Division

MANUAL G1076

MAINTENANCE AND OVERHAUL OF SPRING/AIR CALIPER BRAKES FOR OFF-HIGHWAY VEHICLES

ISSUED: 1 February 1977
REVISED: 9 November 1978 (JN16478)

THIS MANUAL IS TO BE USED IN CONJUNCTION WITH THE APPLICABLE PARTS CATALOG FOR THE SPECIFIC BRAKE BEING MAINTAINED.

NOTE: THIS MANUAL HAS BEEN COMPLETELY REVISED.

The BFGoodrich Company
Engineered Systems Division
Troy, Ohio 45373

TABLE OF CONTENTS

NOTE: Refer to applicable parts catalog for exploded view indexed in disassembly sequence to identify indexed parts discussed in this manual.

1. DESCRIPTION.

1.1 The spring/air caliper brake consists of a caliper (7), a manual or automatic slack adjuster (16) and a spring/air actuator (13).

1.2 The caliper (7) houses two carrier and lining assemblies (1), a piston assembly (6) threaded to a power screw shaft (19), and a piston seal (5) installed in an ID groove in the caliper. The seal helps to align the piston assembly in the caliper and prevents contamination of the piston bore area.

1.3 A cap assembly (23), fastened to the caliper (7) with four each bolts (2) and washers (3), supports the power screw shaft (19) seated on a thrust bearing (20) and a press-fitted journal bearing (22). A welded bracket on the cap assembly supports the actuator (13) secured with two each nuts (11) and lock washers (12).

1.4 The slack adjuster (16) is attached to the splined end of the power screw shaft (19) which protudes from the cap assembly (23). A packing (18) is seated against the journal bearing (22) in the cap assembly. Two wave spring washers (17) are installed on the power screw shaft between the cap assembly and slack adjuster. A washer (15) and retaining ring (14) secure the slack adjuster on the splined end of the power screw shaft.

1.5 A yoke (10) attaches the slack adjuster (16) to the actuator (13) with a yoke pin (9) secured with a cotter pin (8).

2. OPERATION.

2.1 The spring/air caliper brake is actuated by dumping (releasing) the air from the spring/air actuator (13) exhaust/inlet port, releasing the compressed spring in the actuator. The spring pushes the yoke (10) and slack adjuster (16) arm down, turning the attached power screw shaft (19) that is threaded into the piston assembly (6) housed in the caliper (7). This transmitted force moves the piston assembly forward against the carrier and lining assembly (1) until it presses against the disk.

2.2 Releasing the brake allows air pressure to re-enter the actuator (13) compressing the actuator spring and retracting the attached components discussed in paragraph 2.1.

3. MAINTENANCE.

3.1 Inspect brake for loose or missing attaching hardware (bolts, nuts cotter pins, retaining rings, etc.). Tighten and replace when necessary.

3.2 Inspect carrier and lining assemblies (1) for worn lining. Replace if lining thickness is 1/8-inch or less. See replacement procedure below.

3.3 Replace carrier and lining assemblies (1) as follows:

3.3.1 Support or block vehicle to prevent vehicle movement.

3.3.2 Apply brake pressure and mechanically cage actuator (13) to release slack adjuster (16) tension. Dump air pressure from actuator after caging.

WARNING: DO NOT PROCEED WITH REMOVAL PROCEDURE UNTIL ACTUATOR (13) IS SECURELY CAGED AS PERSONAL INJURY COULD RESULT FROM ACCIDENTAL APPLICATION OF BRAKE.

3.3.3 Back-off slack adjuster (16) by rotating the "C" worm adjustment nut counter-clockwise with a 12mm metric wrench until it stops turning.

3.3.4 Remove the caliper (7) from the vehicle support bracket.

3.3.5 Remove worn carrier and lining assemblies (1) and replace with new ones.

NOTE: Make sure the linings face each other when installed.

3.3.6 Position caliper (7) over disk with a carrier and lining assembly (1) on each side of the disk.

3.3.7 Perform slack adjustment by rotating "C" worm adjustment nut clockwise with a 12mm metric wrench until a total clearance of 0.040 to 0.060 inch is obtained between outboard lining and disk. Measurement is taken at center of lining I.D. after the caliper (7) is slid outboard as far as it will come.

CAUTION: DO NOT OVER-ADJUST OR LINING DRAG MAY RESULT.

3.3.8 Un-cage spring actuator (13) after completing brake clearance adjustment.

WARNING: UNCAGE ACTUATOR SLOWLY TO AVOID INJURY.

4. CALIPER OVERHAUL AND SEAL REPLACEMENT

4.1 Remove caliper (7) from vehicle in accordance with instructions in paragraphs 3.3.1 through 3.3.4 of Section 3. MAINTENANCE.

4.2 Separate yoke (10) from slack adjuster (16) by removing cotter pin (8) and yoke pin (9).

4.3 Dismount actuator (13) from cap assembly (23) bracket by removing nuts (11) and washers (12) from actuator studs.

4.4 Remove retainer ring (14) from power screw shaft (19).

4.5 Slide manual slack adjuster (16), and spline washer (15) from power screw shaft (19).

4.6 Remove and discard packing (18) and wave spring washers (17) from power screw shaft (19).

4.7 Remove bolts (2) and washers (3) from cap assembly (23).

4.8 Remove as a unit, the power screw shaft (19), piston assembly (6), and cap assembly (23) with welded-on bracket from caliper (7).

4.9 Slide power screw shaft (19) and piston assembly (6) from cap assembly (23).

4.10 Unscrew piston assembly (6) from power shaft (19).

4.11 Remove and discard thrust bearing (20) from power screw shaft (19).

4.12 Remove and discard piston seal (5) from caliper (7).

4.13 Remove and discard plastic journal bearing (22) by collapsing, splitting, or driving from cap assembly (23).

CAUTION: USE CARE NOT TO DAMAGE BORE OR CAP ASSEMBLY (23) WHILE REMOVING JOURNAL BEARING (22).

4.14 Inspect all brake parts for gross damage, cracks and excessive wear or scoring. Replace parts as required.

4.15 Install new journal bearing (22) in cap assembly (23) using BFGoodrich Tool No. 114-163 or equivalent (See Figure 1). Tool will install journal bearing in cap to a depth of 0.220 inch.

CAUTION: CORRECT JOURNAL BEARING LOCATION WILL INSURE PROPER SEALING OF PACKING (18).

4.16 Install new piston seal (5) into caliper (7).

4.17 Apply grease (Lubriplate Aero) to flat face of new thrust bearing (20).

4.18 Install and seat new thrust bearing (20) over splined end of power screw shaft (19) with greased side of thrust bearing against thrust collar of power screw shaft.

CAUTION: INSURE CORRECT INSTALLATION OF THRUST BEARING (20) BY VERIFYING THAT INSTALLATION WAS MADE OVER THE LARGER END-DIAMETER OF POWER SCREW SHAFT (19) AND THAT THRUST BEARING PART NUMBER IS VISIBLE AFTER INSTALLATION.

4.19 Screw power screw shaft (19) into piston assembly (6) after lubricating threads with coat of Lubriplate Aero grease.

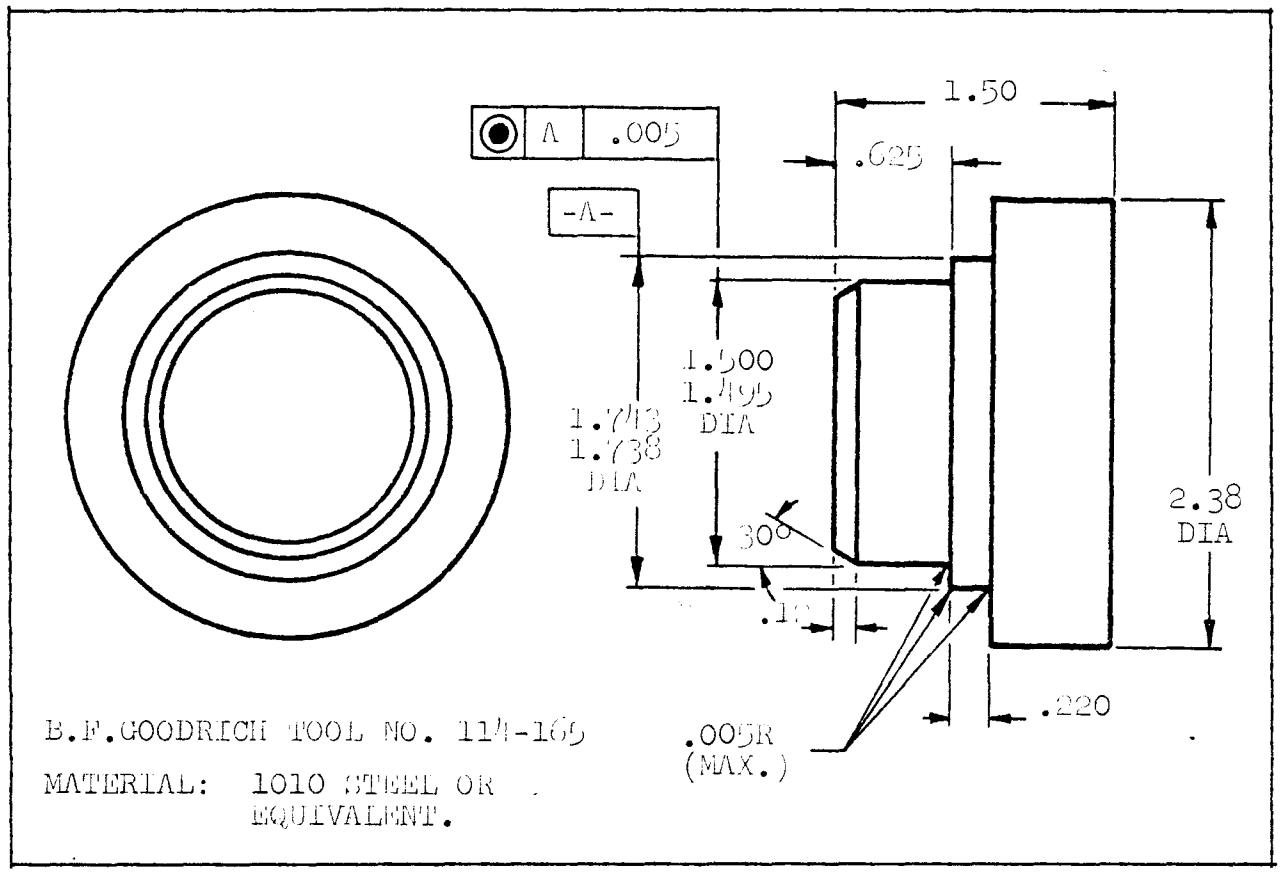


Figure 1. Journal Bearing Insertion Tool

4.20 Coat outside of piston assembly (6) with Lubriplate Aero grease then slide assembled power screw shaft (19) and piston assembly into cap assembly (23), shaft end first.

4.21 Bolt cap assembly (23) with assembled power screw shaft (19) and piston assembly (6) to caliper (7) using bolts (2) and washers (3). Torque bolts 125 to 135 ft-lbs.

4.22 Install two new wave spring washers (17) and a packing (18) over power screw shaft (19), with packing in front of washers.

4.23 Mount brake actuator (13) on cap assembly (23) bracket with nuts (11) and washers (12).

NOTE: Do not torque nuts (11) at this time. See paragraph 4.28 for final torquing.

4.24 Apply coat of Lubriplate Aero grease to mounting spline of slack adjuster (16).

4.25 Slide manual slack adjuster (16) on power screw schaft (19), aligning slack adjuster arm with yoke (10).

CAUTION: VERIFY "C" ADJUSTMENT NUT FACES AWAY FROM ACTUATOR (13). IF NOT, REMOVE SLACK ADJUSTER (16) FROM POWER SCREW SHAFT (19) AND REASSEMBLE TO SCREW SHAFT WITH OPPOSITE FACE FIRST.

4.26 Install spline washer (15) and then retainer ring (14) on power screw shaft (19).

4.27 Secure yoke (10) to slack adjuster (16) with yoke pin (9) and cotter pin (8).

4.28 Attach chamber stud with washers (12) and nut (11) while maintaining adjuster control arm against its internal stop. Torque both actuator nuts (11) 110 to 150 ft-lbs.

4.29 Complete assembly and brake clearance adjustment in accordance with the instructions in paragraphs 3.3.1 through 3.3.9 of Section 3. MAINTENANCE.

5. AUTOMATIC SLACK ADJUSTMENT

5.1 Automatic slack adjusters (refer to applicable parts catalog) have a control arm strap fastened to the bracket that supports the actuator with a flat washer, and the lock washer and nut used to secure the actuator to the bracket. The other end of the control arm strap is fastened to the ratchet arm of the slack adjuster with a flange nut.

5.2 The automatic slack adjuster provides brake clearance automatically after each brake application through the control arm strap attached to ratchet arm of the slack adjuster. Brake clearance for brakes with manual slack adjusters is adjusted by an adjusting hex head screw installed on the bottom of the slack adjuster.

5.3 Perform slack adjustment by rotating "C" worm adjustment nut clockwise with a 12mm metric wrench until a total clearance of 0.040 to 0.060 inch is obtained between outboard lining and disk. Measurement is taken at center of lining I.D. after the caliper is slid outboard as far as it will come.

CAUTION: DO NOT OVER-ADJUST OR LINING DRAG MAY RESULT.

5.4 Perform final automatic slack adjustment by applying full braking pressure in several successive applications. The "C" worm adjustment nut will rotate on each return stroke. When no further rotation takes place, the brake is in proper adjustment.

NOTE: Place wrench on adjustment nut for easier observation of nut roation.

THE B F GOODRICH COMPANY
Engineered Systems Division
Troy, Ohio 45373

ILLUSTRATED PARTS CATALOG
FOR

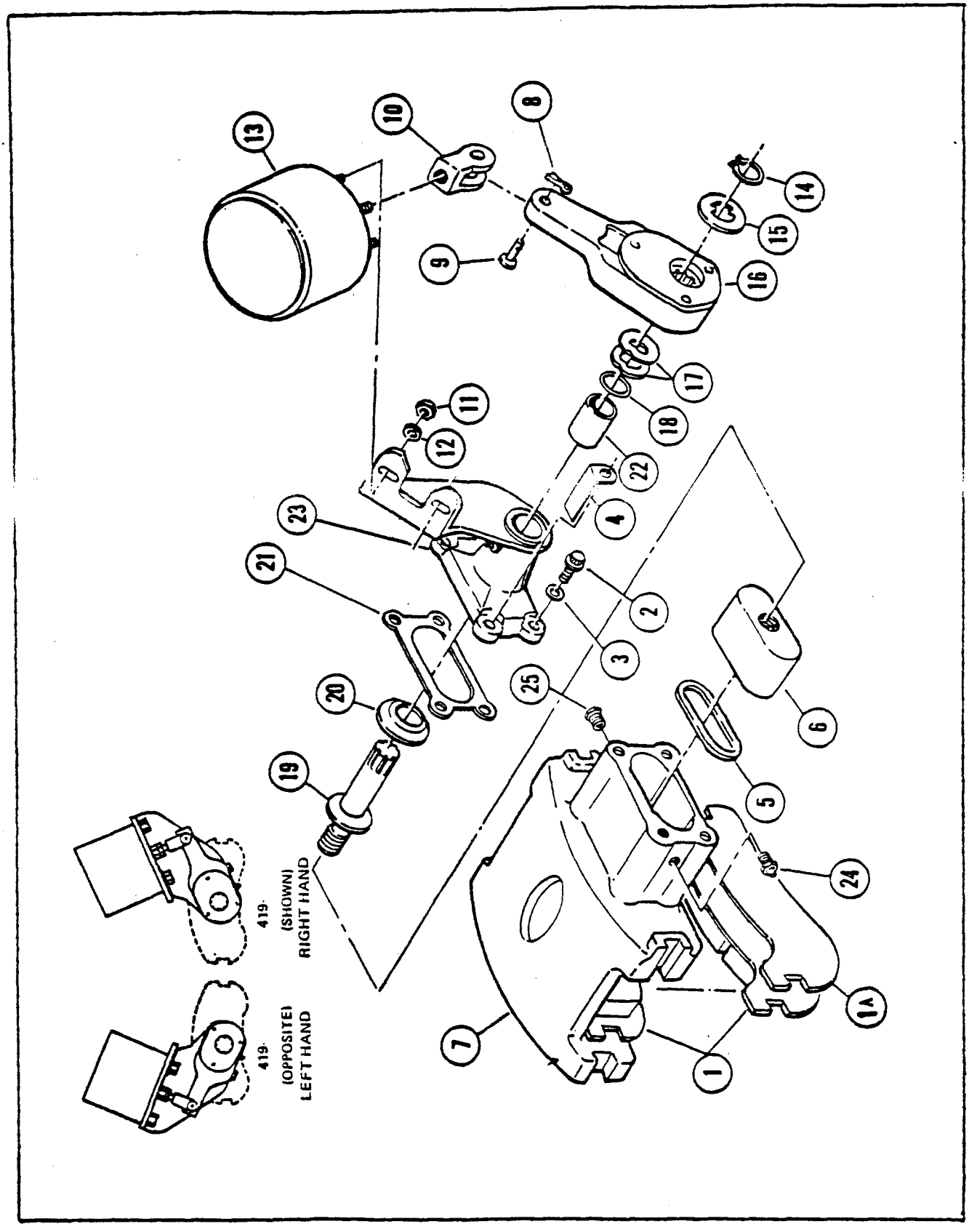
419-345	419-354	419-385
419-352	419-355	419-479
419-353	419-356	

SPRING/AIR CALIPER BRAKES

This parts catalog illustrates and lists the components of the above brakes, and is to be used in conjunction with BFGoodrich Manual G1076 Maintenance and Overhaul of Spring/Air Caliper Brakes.

The "Usable On Code" column indicates non-interchangeable parts used on similar coded brakes only. Parts not coded are interchangeable between all brakes listed, unless otherwise noted.

Revised: 13 July 1979
JN20779



Exploded View of Spring/Air Caliper Brakes

Revised: 13 July 1979

Index Number	Part Number	Description 1 2 3 4 5 6 7	Qty Per Assy	Usable On Code
	419-345	BRAKE HEAD ASSEMBLY (Right Hand). . .	1	A
	419-352	BRAKE HEAD ASSEMBLY (Right Hand). . .	1	B
	419-353	BRAKE HEAD ASSEMBLY (Right Hand). . .	1	C
	419-354	BRAKE HEAD ASSEMBLY (Left Hand) . . .	1	D
	419-355	BRAKE HEAD ASSEMBLY (Left Hand) . . .	1	E
	419-356	BRAKE HEAD ASSEMBLY (Left Hand) . . .	1	F
	419-385	BRAKE HEAD ASSEMBLY (Left Hand) . . .	1	G
	419-479	BRAKE HEAD ASSEMBLY (Right Hand). . .	1	H
1	244-532	. CARRIER AND LINING ASSEMBLY OF. . .	2	
1A	261-472	. CARRIER AND LINING.	1	B,H
2	43-1168	. BOLT HEX HD	4	
3	80-670	. WASHER, FLAT.	4	
4	50-481	. INSTRUCTION PLATE	1	
5	68-982	. SEAL PISTON	1	
6	116-166L	. PISTON ASSEMBLY	1	A,B,C,H
6	116-166R	. PISTON ASSEMBLY	1	D,E,F,G
7	493-15	. CALIPER	1	
- - -	92-32	. YOKE ASSEMBLY	1	
8	- - -	. . PIN, COTTER	1	
9	- - -	. . PIN, YOKE	1	
10	- - -	. . YOKE.	1	
11	63-464-13	. NUT	2	
12	80-610	. WASHER, LOCK.	2	
13	520-5-1	. ACTUATOR, SPRING BRAKE.	1	A,E
13	520-4-1	. ACTUATOR, SPRING BRAKE.	1	B,D
13	520-6-1	. ACTUATOR, SPRING BRAKE.	1	C,F,H
13	520-6-3	. ACTUATOR, SPRING BRAKE.	1	G
14	85-553	. RING, RETAINER.	1	
15	80-674	. WASHER, SPLINE.	1	
16	107-314	. ADJUSTER ASSEMBLY, SLACK.	1	
17	80-671	. WASHER WAVE SPRING.	2	
18	68-1018	. PACKING, PREFORMED.	1	
19	138-134-1L	. SHAFT, POWER SCREW.	1	A,B,C,H
19	138-134-1R	. SHAFT, POWER SCREW.	1	D,E,F,G
20	111-82	. BEARING, THRUST	1	
21	379-9	. GASKET ASSEMBLY	1	
22	111-81	. BEARING JOURNAL	1	
23	118-99-15	. CAP ASSEMBLY.	1	H
23	118-99-2	. CAP ASSEMBLY.	1	A,B,C
23	118-99-1	. CAP ASSEMBLY.	1	D,E,F,G
24	274-197	. FITTING, ZERK	1	
25	274-196	. FITTING, PRESSURE RELIEF.	1	
	304-203	PARTS KIT - OVERHAUL.	A/R	
	305-170	PARTS KIT - FIELD	A/R	