Mechanical Park Brake

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Mechanical Park Brake

Safety

The purpose of this safety summary is twofold. First, it is to help ensure the safety and health of individuals performing service on, or operation of, the Blue Bird All American Series bus. Second, it is to help protect equipment. Before performing any service or operating procedure on the All American bus, individuals should read and adhere to the applicable warnings, cautions and notes located throughout this Blue Bird Service Manual.

Warnings

Warnings apply to a procedure or practice that, if not correctly adhered to, could result in injury or death. Particular attention should be paid to sections of this manual where warnings appear.

Cautions

Cautions apply to a procedure or practice that, if not correctly adhered to, could result in damage to or destruction of equipment.

Notes

Notes are used to explain, clarify or otherwise give additional insight for a given subject, product or procedure. Please note that on occasion, notes, too, may advise of potential safety issues.

Introduction

These procedures were documented using a Blue Bird All American Series bus with a Cummins ISB engine and an Allison AT 545 transmission. Buses with other engine or transmission options will differ slightly in detail, but the process will remain the same. Refer to the appropriate engine manual for specifics on electrical and fluid line connections and locations.

The appearance of, or the absence of, any specific component or part is determined by the options selected at the time of manufacture. Depending on the engine/transmission options installed, details of the mechanical park brake will vary.

Note

Instructions for adjusting the park brake control linkage and the driver's hand operated lever assembly are located at the end of this section.

Tools Required

General mechanic tools, consisting of common hand tools, will be needed to perform most of these functions.

Warning

The mechanical park brake is a critical part of the continued safe operation of the vehicle. Only personnel with the necessary skills, experience and judgment should attempt to perform repair or maintenance of the park brake system.

Removal of Mechanical Park Brake

1. Park the bus on a flat, level surface of sufficient strength or hardness to support the lifting equipment.
2. Chock the rear wheels.
3. When using jacks and jack stands, place them under the frame rails.
4. Never work under a bus supported only by jacks. Always use jack stands of sufficient strength.

AT 545 Transmission

Note

*There is no need to disassemble the mechanical park brake to remove the Allison 545 transmission. Simply remove cotter pin (1) and clevis pin (2) to remove the cable clevis, and then remove capscrews (3) to release the cable assembly. See **Figure 1**. After disassembly of the yoke/driveline connection, the transmission can be removed without further disassembly of the mechanical park brake. See Section 160—Transmission.*

Mechanical Park Brake Control Assembly Removal

To remove the mechanical park brake control assembly for repair, refer to the instructions below.

1. Remove capscrew (3) from two places, as necessary. **Figure 1**.
2. Remove cable clamp (12).
3. Remove cotter pin (1).
4. Remove clevis pin (2).
5. Remove cotter pin (16) in two places.
6. Remove clevis pin (15) in two places.
7. Remove nut (17).
8. Remove capscrew (18).
9. Remove Bellcrank assembly.

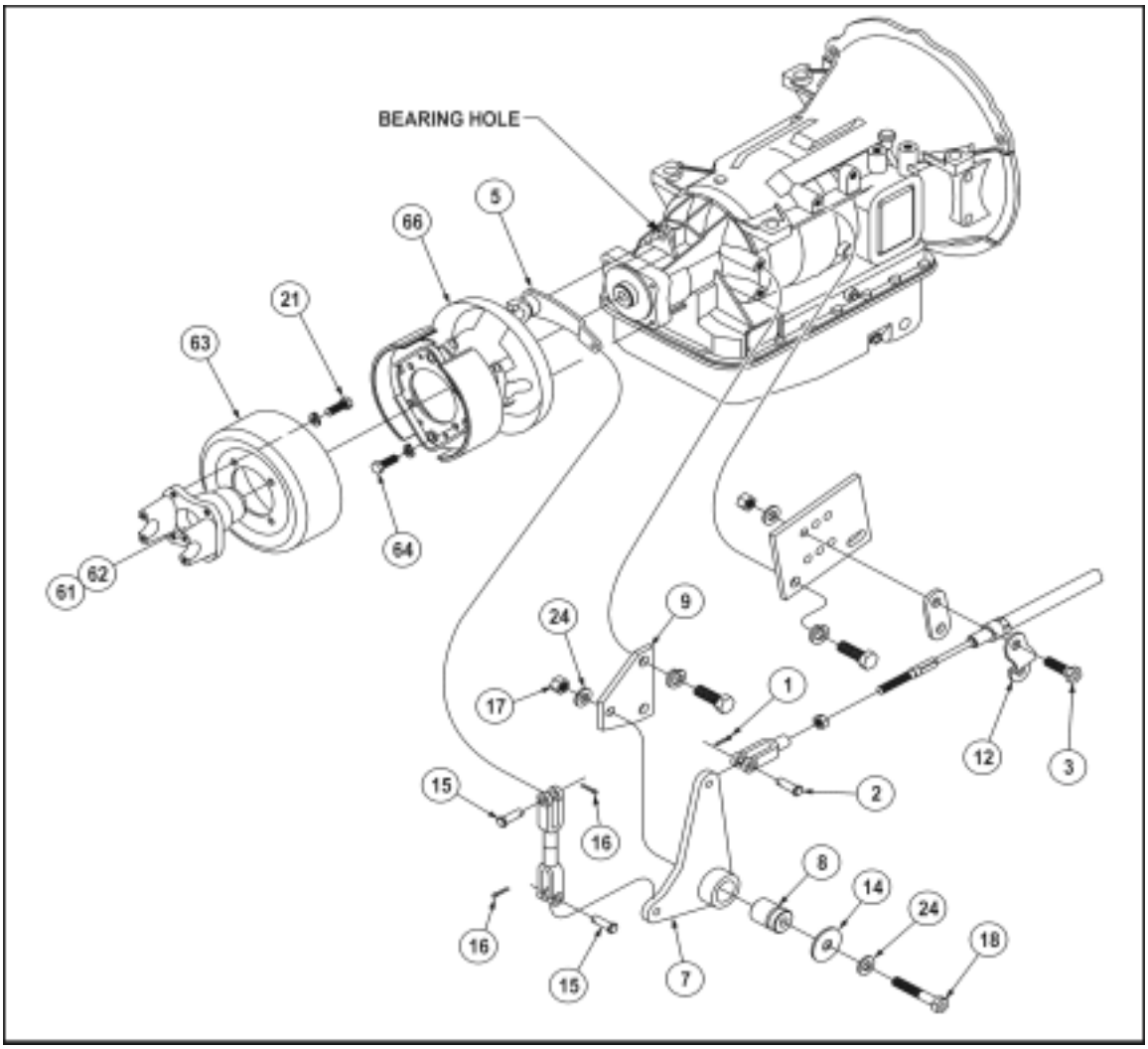

Figure 1—AT 545 Transmission

Assemble Bellcrank

1. Install flat washer (24) onto capscrew (18). **Figure 1**.
2. Install flat washer (14).
3. Install Mechanical Park Brake Linkage Spacer (8).
4. Install Bellcrank (7).
5. Install Bellcrank assembly capscrew (18) into mounting bracket (9).
6. Install flat washer (24).
7. Install lock nut (17). Torque to non-designated fasteners torque specifications listed in Section 005—Introduction.
8. Lubricate with NLGI Number 2 Grease (chassis grease).

Park Brake Shoe and Drum Replacement

Remove the transmission yoke/driveline connection in accordance with the instructions in Section 160—Transmission.

1. Remove capscrew (61) and flat washer (62). **Figure 1**.
2. Pull transmission yoke/park brake drum assembly straight back to remove.

Replace Park Brake Drum

To replace the park brake drum (63):

1. Remove capscrew (21) and lock washer at four places to disassemble transmission yoke/park brake drum assembly.
2. Install new park brake drum to transmission yoke by installing capscrew (21) and lockwasher at four places. Snug up the capscrews, and then in small increments, torque to 81-97 ft-lbs (9.15-10.95 Nm). Bring to full torque in a 180° (cross) pattern to avoid distorting brake drum.
3. Remove capscrew (64) and lockwasher from four places.
4. Remove brake shoe/support plate assembly.

Remove Park Brake Shoes

1. Remove shoe return springs from upper anchor pin. **Figure 2.**
2. Remove, shoe to shoe, return spring at lower anchor pin.
3. Remove brake shoe assembly from each side of the support plate.

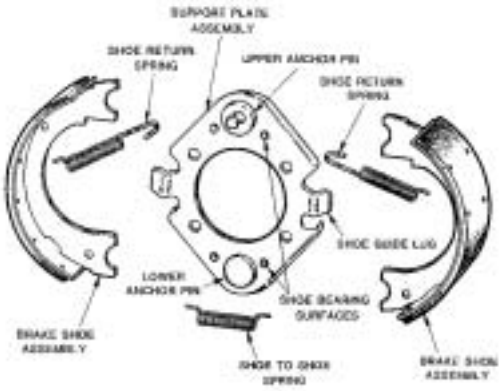

Figure 2—Park Brake Shoes

Replace Park Brake Shoes

The park brake shoe assembly goes together in the reverse order of the removal instructions above. Always use new springs when servicing brake shoes.

1. Lay the new brake shoes into the support plate. **Figure 2**.
2. Install the lower shoe (shoe-to-shoe) return spring. Make sure the lower end of each brake shoe assembly goes under the flange of the lower anchor pin.
3. Using a brake spring tool, or a large screwdriver, install the right hand top return spring over the upper anchor pin.
4. Install the left hand top shoe return spring over upper anchor pin, outboard of the right hand return spring.
5. Install the brake shoe/support plate assembly onto the Parking Brake Shield (66). **Figure 1**.
6. Fill the parking brake lever bearing hole (located on the transmission case) with grease. Use NLGI Grade Number 2 Grease.

7. Install parking brake actuating lever (5) into the bearing hole. Carefully align the cam end of the lever to fit over the upper anchor pin of the brake shoes/support plate assembly. **Figure 1**.
8. Align mounting holes with the threaded holes in the mounting flange on the transmission.
9. To avoid distortion of the support plate, install capscrews (64) and lock washers. Snug up all four capscrews, and then in small increments (using a 180°/90° or "cross" pattern), torque the capscrews to 81-97 ft-lbs (9.15-10.95 Nm).
10. Install transmission yoke/park brake drum assembly.
11. Install capscrew (61) and lockwasher (62). Torque to 110 ft-lbs (12.42 Nm).
12. Install driveline in accordance with specific instructions in Section 050—Drivelines.

MD 3060 Transmission

Note

There is no need to remove the mechanical park brake to remove the transmission. Simply remove cotter pin (22) and clevis pin (21) from Bellcrank (16); then, remove capscrews (19) and cable clamp (1) to release cable assembly. ***Figure 3.*** *Disconnect the driveline in accordance with instructions in section 050—Drivelines. The transmission can be removed without further disassembly of the mechanical park brake control linkage.*

Mechanical Park Brake Control Assembly Removal

To remove the mechanical park brake control assembly for repair, refer to the instructions below.

1. Remove cotter pin (24) in two places. **Figure 3**.
2. Remove clevis pin (23) in two places. The lower clevis pin has a flat washer (25) on each side of the Bellcrank.
3. Remove clevis assembly (8).
4. Remove cotter pin (22) and clevis pin (21) to remove control cable clevis (9) from the Bellcrank assembly.
5. Remove lock nut (20) and flat washer from capscrew (14) to remove Bellcrank assembly from bracket.

Assemble Bellcrank

1. Install flat washer (15) onto capscrew (14). **Figure 3**.
2. Install flat washer (13) onto capscrew (14).
3. Install Mechanical Park Brake Linkage Spacer (12) onto capscrew (14), and into the hole in the Bellcrank (16).
4. Install capscrew and Bellcrank assembly into bracket assembly.
5. Install flat washer and lock nut (20). Torque to non-designated fasteners torque values, located in Section 005—Introduction.
6. Lubricate with NLGI Number 2 Grease.

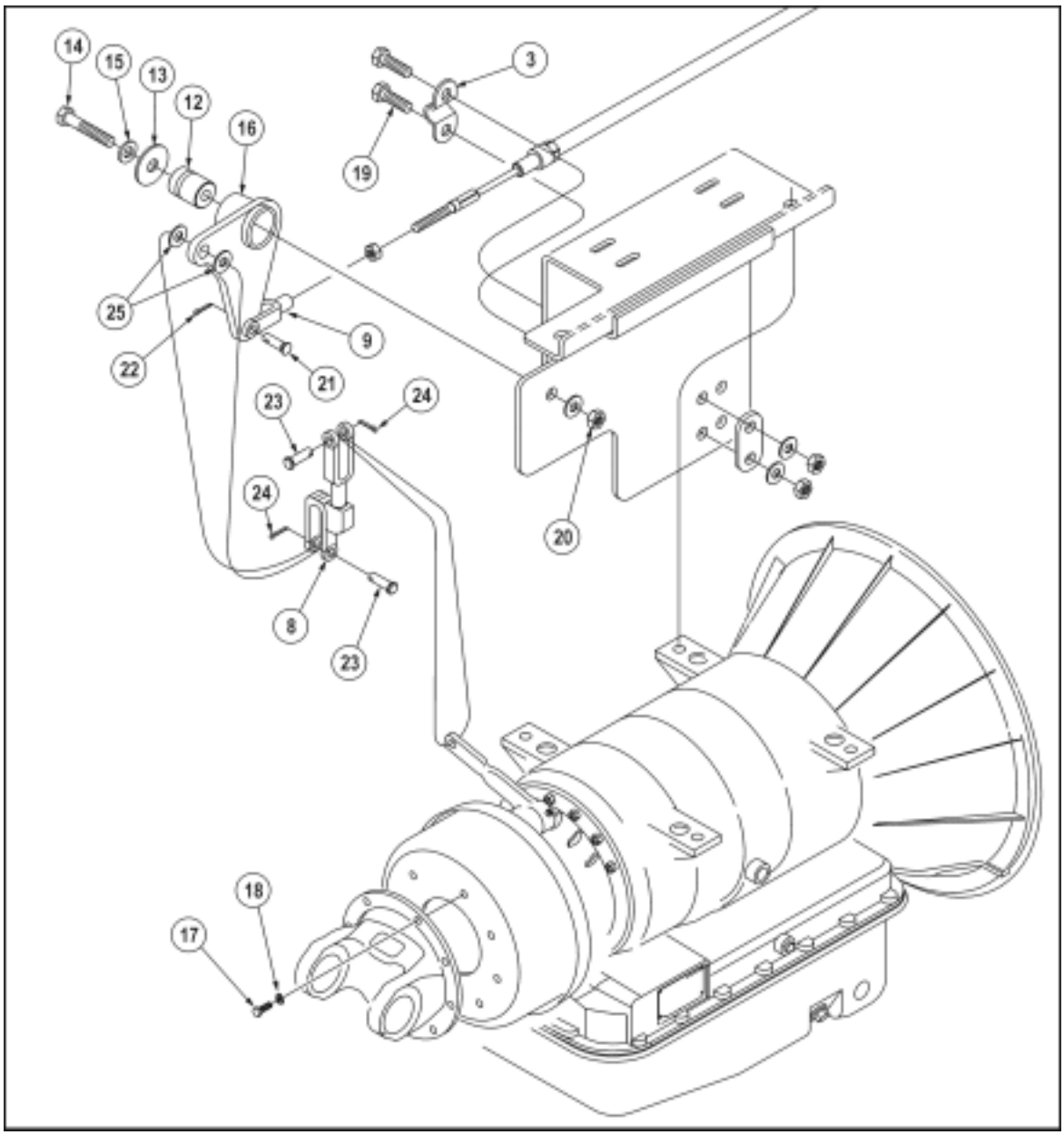

Figure 3—MD 3060 Transmission

Park Brake Shoe and Drum Replacement

Remove the transmission yoke assembly in accordance with specific instruction in Section 050—Driveline. To remove the park brake drum, grasp the outside of the drum and pull straight back. To replace the park brake drum, align and install capscrew (17) and lock washers in eight places. See Section 050—Driveline for torque values and specific instructions for replacing the driveline.

Remove Park Brake Shoes

See Remove Park Brake Shoes in AT 545 Transmission instructions, above.

Replacement of Brake Shoes

See Replace Park Brake Shoes in AT 545 Transmission instructions, above.

Allison 2000/2400 Transmission

Note

There is no need to disassemble the mechanical park brake to remove the Allison 2000/2400 transmission from the vehicle. Simply remove the cotter pin (16) from clevis pin (15), remove the control cable clevis (10) from the Bellcrank, and remove two lock nuts (17) and capscrews (19) from the cable clamp (12). Remove the driveline in accordance with the instructions in Section 050—Driveline.

Mechanical Park Brake Control Assembly Removal

To remove the mechanical park brake control assembly, refer to the following instructions.

1. Remove lock nut (17) from capscrew (19).
2. Remove cable clamp (12). **Figure 4**.
3. Remove clevis pin (15) from clevis (10).
4. Remove cotter pin (16) from two places at clevis assembly (6).
5. Remove clevis pin (15) from two places at clevis assembly (6).
6. Remove clevis assembly (6) from Bellcrank (7) and park brake actuator lever (5).
7. Remove lock nut (17) and flat washer from Bellcrank pivot capscrew (18).
8. Remove Bellcrank assembly from Bellcrank assembly bracket (9).

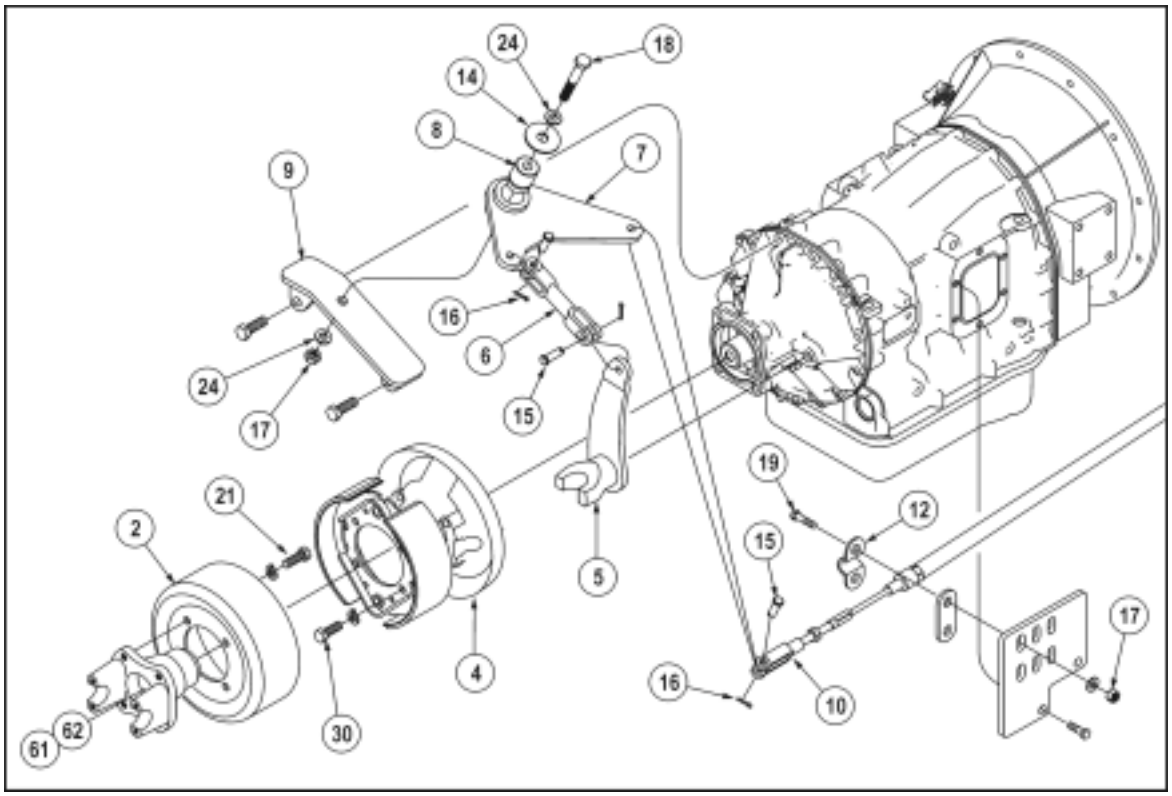

Figure 4—AT 2000

Assemble Bellcrank

1. Install flat washer (24) onto Bellcrank pivot capscrew (18). **Figure 4**.
2. Install flat washer (14).
3. Install mechanical park brake linkage spacer (8) onto Bellcrank pivot capscrew (18) and into Bellcrank assembly bushing.
4. Install Bellcrank assembly onto Bellcrank assembly bracket (9) with flat washer (24) and lock nut (17). Torque to non-designated fasteners torque specifications contained in Section 005—Introduction.

Park Brake Shoe and Drum Replacement

Note

There is no need to remove mechanical park brake control linkage to replace park brake shoes and/or drum.

Remove transmission yoke/driveline connection in accordance with specific instruction in Section 160—Transmission.

1. Remove capscrew (61) and lock washer.
2. Pull transmission yoke/park brake drum assembly straight back to remove.

To replace park brake drum (2):

- Remove capscrew (21) and lock washer from four places to disassemble transmission/park brake drum assembly.
- Install new park brake drum to transmission yoke by installing capscrew (21) in four places. Snug up the capscrews, and then in small increments, torque to 81-97 ft-lbs (9.16-10.95 Nm). Bring to full torque in a 180° "cross" pattern to avoid distortion of the brake drum.

3. Remove capscrew (3) and lock washer from four places.
4. Remove brake shoe/support plate assembly.

Remove Park Brake Shoes

See Remove Park Brake Shoes in AT 545 Transmission instructions, above.

Replacement of Brake Shoes

See Replace Park Brake Shoes in AT 545 Transmission instructions above, Steps 1 through 4.

After replacement of the brake shoes, in accordance with instructions above:

1. Install the brake shoe/support plate assembly onto the parking brake shield (4). **Figure 4.**
2. Carefully align the assembly with the four mounting holes in the transmission flange. Make sure the cam lever fork (5) fits over the upper anchor pin and between the ends of the brake shoe assemblies.
3. Install capscrew (3) and lock washer in four places. Snug up all four capscrews, and then in small increments (using a 180° or "cross" pattern to avoid distortion of the support plate assembly), torque the capscrews to 81-97 ft-lbs (9.15-10.95 Nm).
4. Install transmission yoke/park brake drum assembly.
5. Install capscrew (61) and lock washer. Torque to 110 ft-lbs (12.42 Nm).
6. Install driveline in accordance with instructions in Section 050—Driveline.

Adjustment of Park Brake Control Linkage

Since the mechanical park brake does not include an automatic slack adjuster, it may become necessary to adjust the linkage from time to time.

The driver's hand-operated park brake lever should require a force of 120 to 125 lbs to operate, just prior to the lever breaking over the center of the cam action. **Figure 5**.

Adjustment of the park brake control linkage is accomplished by managing the length of the control cable.

For the purpose of the following procedure, either disconnect the driveline at the transmission yoke (in accordance with instruction in Section 050—Driveline) or raise the drive wheels off the floor.

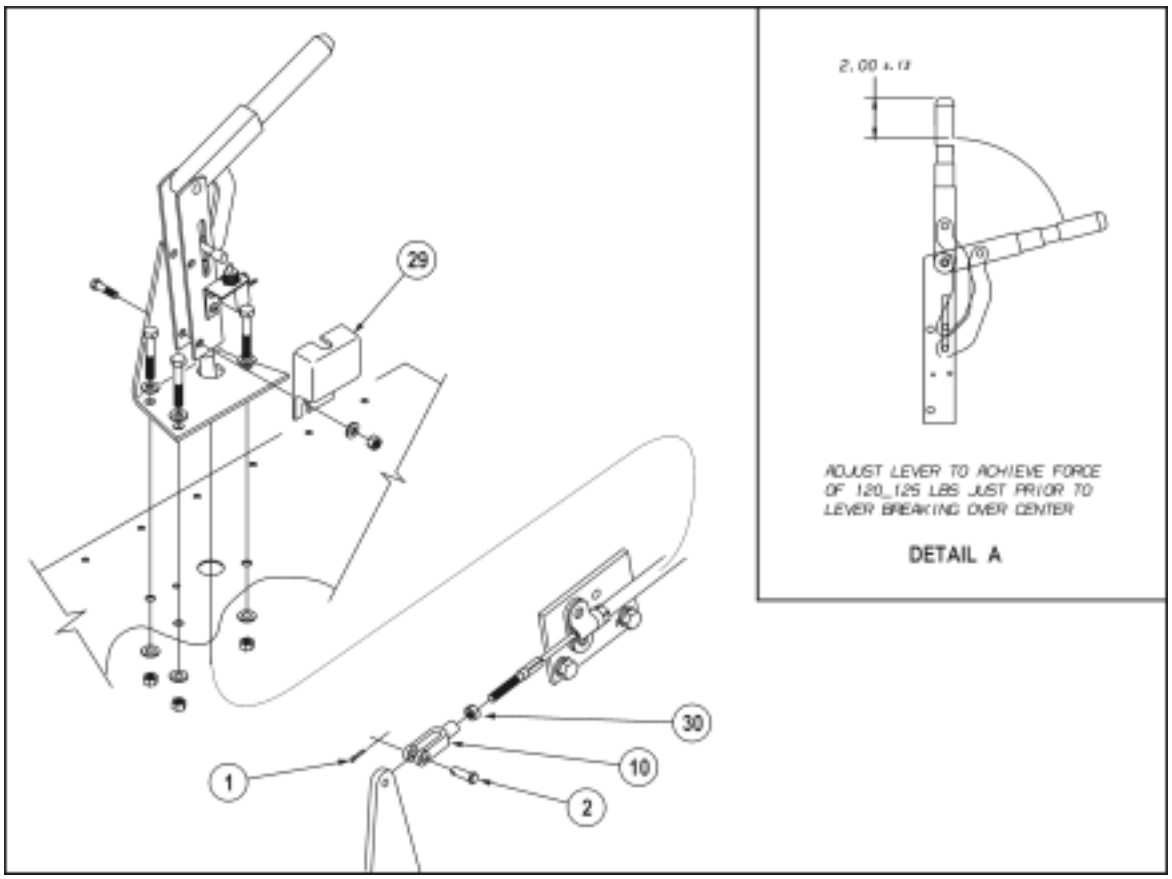

Figure 5—Lever

Warning

Chock the front wheels. Never go under a bus supported only by jacks. Place jack stands or sufficient strength under the frame rails to support the weight of the vehicle.

1. Remove cotter pin (1). **Figure 1**.
2. Remove clevis pin (2).
3. Loosen jam nut (30).
4. Adjust length of control cable.
   - Turn clevis (1) counter clockwise to lengthen.
   - Turn clevis (10) clockwise to shorten.

Note

Check to be sure that the brake control lever in the driver's compartment is in the fully released position before continuing.

5. Hold the actuating lever in the brake-applied position with sufficient force to

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take up any slack between the park brake shoes and the park brake drum.
6. Turn length-adjusting clevis (1) as necessary to line up the mounting holes in the Bellcrank.
7. Install clevis pin (2) and cotter pin (1).

Note
The clevis pin (2) must be installed to check the adjustment.

8. By trial and error, adjust the length of the control cable until the park brake drum just turns freely.
9. Tighten jam-nut (30) securely.
10. Install a new cotter pin (1). Wrap ends enough to prevent the cotter pin from slipping out.
11. Lubricate all moving joints on the Bellcrank.

Replace Park Brake "ON" Switch

1. Remove switch cover (29). **Figure 5**.
2. With park brake lever in the up or "applied" position, remove the ring nut from the switch.
3. Disconnect the electrical connectors.
4. Using a VOM or DVM, check the switch for open/close operation.

If the switch operates correctly:
- Adjust the switch position by loosening the ring nut at each side of the mounting bracket, moving up or down, as required.
- Tighten the ring nuts securely when the park brake lever action operates the switch properly.

5. Replace the switch. It is normally open.
6. Adjust the position of the switch for proper operation, in accordance with the above instructions.
7. Replace the switch cover (29).