

1963-73 TRIUMPH-GIRLING

1200 (1963-65)
TR-4 (1963-65)
TR-4A (1965-68)
TR250 (1968-69)
Spitfire (1963-73)
GT6 (1968-73)
TR6 (1969-73)

DESCRIPTION

All Models (Girling Brakes) – Model 1200 is equipped with drum brakes on all wheels. All other models use front disc and rear drum brakes. Late models use a tandem piston master cylinder which consists of two independent and complete hydraulic circuits within master cylinder. Tandem units use a pressure differential warning actuator valve to detect low pressure in either front or rear systems. A vacuum servo unit for power braking is used on later models as optional equipment.

TR-4 & TR-4A Models – A brake restrictor valve is located in hydraulic line below master cylinder to maintain low pressure in brake lines and to prevent disc brake pads from moving away from rotor. This prevents excessive pedal travel during next brake application. As optional equipment, some models use a power booster (Mot-A-Vac) system for braking assists.

ADJUSTMENT

DISC BRAKES

Disc Brakes are self adjusting, therefore no in service adjustment is required.

REAR DRUM BRAKES (ALL MODELS)

While rotating wheel, turn adjusting screw clockwise to lock brakes. Loosen adjuster one notch at a time until wheel rotates freely. *NOTE* – Do not confuse binding with normal drag caused by differential.

FRONT DRUM BRAKES (1200 ONLY)

Adjust each shoe independently with top and bottom adjusting screw. While rotating wheel, turn one adjuster clockwise until wheel locks. Loosen adjuster one notch at a time until wheel rotates freely. Repeat this procedure on each adjuster.

PARKING BRAKE

NOTE – Adjustment of rear brakes will normally provide satisfactory parking brake adjustment.

If cables are stretched, further adjustment is performed as follows: Hoist vehicle in rear, release parking brake and lock both rear wheels with adjusters. Disconnect return springs from backing plate and remove clevis pin from lever. Adjust clevis on each brake (equal amounts). Cables are too tight if clevis pins cannot be easily inserted into clevis and relay lever. Secure clevis pins, reconnect return springs and adjust cable brackets to provide slight spring tension. Adjust rear brake shoes.

BLEEDING HYDRAULIC BRAKES

Single Circuit System – Keep reservoir fluid level full while bleeding brakes and ensure level does not drop below half full. Turn rear adjusters to lock brakes. Start bleeding from rear wheel farthest from master cylinder. Wipe bleed valve

clean, connect a rubber hose to valve and place hose end in a partially filled jar with brake fluid. Unscrew valve about 1/4 turn. Have a second operator apply brake pedal with fast, full, strokes pausing between each stroke. Pump pedal until air is expelled from fluid. *NOTE* – Ensure that master cylinder piston returns to end of its travel for each stroke. Finish with a few slightly faster applications of pedal using only bottom half of pedal stroke. Close bleed valve with pedal fully depressed. Complete bleeding with cylinder nearest master cylinder. *NOTE* – If bleeding continues without success on any one cylinder, air may be leaking through bleeder screw. In this case, tighten bleeder valve when pedal is at end of each stroke. Adjust brake shoes, check for leaks and top-off reservoir fluid to complete operation.

Tandem Circuit System – If air enters brake system, bleed system effected. Keep fluid level in reservoir above dividing partition while bleeding system. *NOTE* – Do not apply brakes hard until all air is expelled from system. This will prevent the brake pressure differential valve from actuating brake warning switch. Clean bleed valves, start bleeding with rear brakes first if both systems are being bled. When bleeding rear brakes, release handbrake and turn shoe adjusters to lock brakes. Connect a hose to bleed valve farthest from master cylinder with end submerged in jar containing clean brake fluid. Unscrew bleed valve about 1/2 turn, depress brake pedal, but not to end of stroke, and allow to return slowly. Pause between each pedal stroke and note when bubbles cease from fluid being pumped into jar. Tighten bleed valve when pedal is depressed and repeat procedure with other brake(s).

Re-Centralizing Pressure Differential Valve – If brake warning light stays on after bleeding brakes (with ignition switch on), re-centralize valve shuttle as follows: Connect a rubber hose to bleeder valve on brake circuit (front or rear) opposite to circuit bled last. With hose in partially filled jar, open bleed valve, turn on ignition switch, but do not start engine. Brake warning light will glow, but oil warning light will not. Exert a steady pressure on pedal until brake light dims and oil light glows. A click should be felt on pedal as shuttle returns to its mid-position. Tighten bleed screw. *NOTE* – If pedal is applied too hard, shuttle will move to other side of valve and procedure must be repeated.

Mot-A-Vac (Bleeding Unit) – Release vacuum from booster. Maintain fluid level in reservoir during bleeding. Loosen fitting nut on line to four-way connector and withdraw pipe from seating slightly. Operate brake pedal until fluid, free of air bubbles, flows from loosened connection and retighten fitting immediately. Apply pressure to pedal and loosen bleed valve at top of master cylinder to expel air from valve chamber. Tighten valve while fluid is being released. Bleed wheel cylinder lines starting from shortest line and finish with longest bleeding all lines. Lastly, bleed master cylinder valve. *NOTE* – When bleeding, apply pedal sharply and allow to return slowly with a five second pause between each stroke.

REMOVAL & INSTALLATION

LINING REPLACEMENT (DISC BRAKES)

Removal – Hoist vehicle and remove wheels. Release spring retainers, pad retainer pins and remove pads.

Installation – Push pistons back in cylinders before installing pads. Install pads, pins and spring retainer clips.

1963-73 TRIUMPH-GIRLING (Cont.)

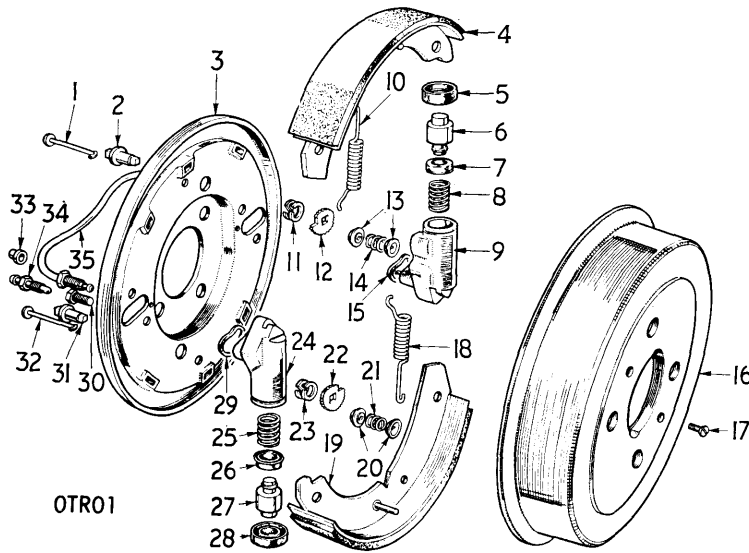
LINING REPLACEMENT (DRUM BRAKES)

Removal Front (1200 Models Only) – Hoist vehicle, remove wheel and loosen shoe adjusters. Remove drum, release anchor pins, cups and springs. Disconnect return springs by lifting shoes from stops. Lift shoes and springs from backplate and ensure that lower piston does not fall from cylinder.

Removal Rear (All Models) – Hoist vehicle, remove wheel and loosen shoe adjusters. Remove drum, cotter pin (for hand-

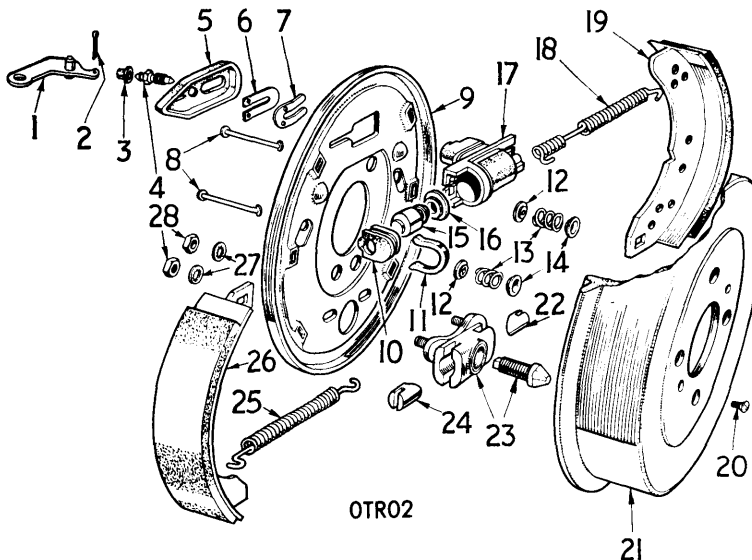
brake lever), shoe anchor pins, cups and springs. Disconnect return springs and lift shoes from abutments. Disconnect front shoe from handbrake lever and remove shoes.

Installation (All Models) – Reverse removal procedure, lightly apply white grease (zinc base) to ends of shoes and cam faces. **CAUTION** – Do not allow grease to contact lining material. Readjust brakes when lining replacement is complete.



- | | |
|--------------------|---------------------|
| 1 – Pin | 19 – Brake Shoe |
| 2 – Adjuster Shank | 20 – Pin Cups |
| 3 – Backplate | 21 – Spring |
| 4 – Brake Shoe | 22 – Adjuster Cam |
| 5 – Dust Boot | 23 – Spring |
| 6 – Piston | 24 – Wheel Cylinder |
| 7 – Seal | 25 – Spring |
| 8 – Spring | 26 – Seal |
| 9 – Wheel Cylinder | 27 – Piston |
| 10 – Return Spring | 28 – Dust Boot |
| 11 – Spring | 29 – Seal |
| 12 – Adjuster Cam | 30 – Screw |
| 13 – Pin Cups | 31 – Adjuster Shank |
| 14 – Spring | 32 – Pin |
| 15 – Seal | 33 – Dust Cap |
| 16 – Brake Drum | 34 – Bleed Valve |
| 17 – Screw | 35 – Bridge Pipe |
| 18 – Return Spring | |

**FRONT BRAKE ASSEMBLY
(L.H. SIDE)**



- | | |
|----------------------|----------------------------|
| 1 – Hand Brake Lever | 16 – Seal |
| 2 – Cotter Pin | 17 – Wheel Cylinder |
| 3 – Dust Cap | 18 – Return Spring |
| 4 – Bleed Valve | 19 – Brake Shoe |
| 5 – Dust Boot | 20 – Screw |
| 6 – Retaining Clip | 21 – Brake Drum |
| 7 – Retaining Clip | 22 – Adjuster Tappet |
| 8 – Pins | 23 – Adjuster Wedge & Body |
| 9 – Back Plate | 24 – Adjuster Tappet |
| 10 – Dust Boot | 25 – Return Spring |
| 11 – Clip | 26 – Brake Shoe |
| 12 – Pin Cups | 27 – Washers |
| 13 – Springs | 28 – Nuts |
| 14 – Pin Cups | |
| 15 – Piston | |

**REAR BRAKE ASSEMBLY
(L.H. SIDE)**

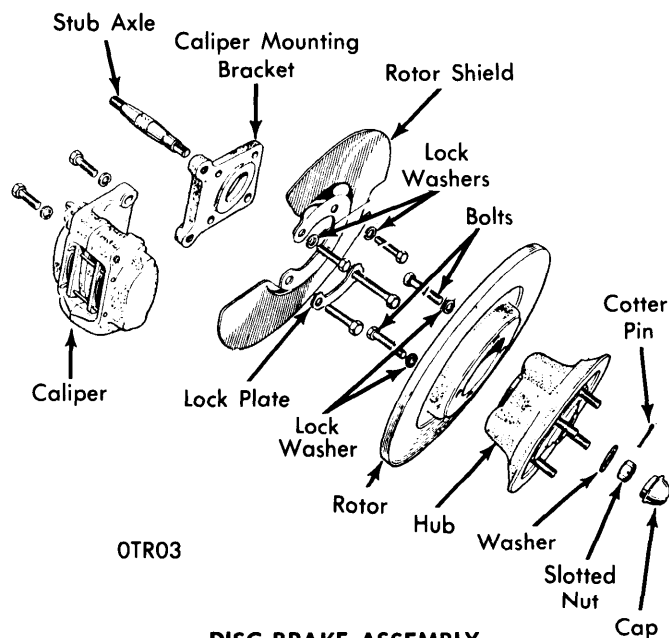
1963-73 TRIUMPH-GIRLING (Cont.)

BRAKE CALIPER

Removal & Installation – Remove pad lining as previously outlined. Loosen brake hose from line at support bracket and unscrew hose from caliper. Remove two bolts securing caliper and remove caliper. To reinstall, reverse removal procedure and bleed brakes.

BRAKE ROTOR (DISC)

Removal & Installation – Remove caliper as previously outlined. Remove grease cap from hub by screwing through it, a No. 10 U.N.F. setscrew (supplied in tool kit) or equivalent. Remove cotter pin, slotted nut and washer from axle. Remove hub with outer bearing race and outer part of inner race. Detach rotor from hub. To install, reverse removal procedure, install new cotter pin, bearings and seal as necessary. Tighten slotted nut so hub has specified end play and ensure that rotor is within specified maximum runout.



DISC BRAKE ASSEMBLY

DRUM BRAKE (WHEEL CYLINDER)

Removal & Installation (All Models) – Remove brake shoes as previously outlined. Drain fluid, disconnect flex hose from steel line and unscrew hose from cylinder. With front cylinders, disconnect crossover line and remove cylinders. With rear cylinders, disconnect handbrake cable clevis, remove dust cover, retaining plate, spring clips and withdraw cylinder. To install, reverse removal procedure and bleed brakes.

MASTER CYLINDER

Removal & Installation (All Models) – **NOTE** – With TR-4 models, clutch and brake master cylinders cannot be removed separately, but only as an assembly. Remove master cylinders and bleed both units after reinstallation.

Empty fluid reservoir(s), pull back rubber dust cover and remove clevis pins (models without servo unit) securing push rod-to-pedal. Disconnect fluid lines and bolts securing master cylinder and remove. To install, reverse removal procedure and bleed system.

VACUUM SERVO (BOOSTER) UNIT

Removal & Installation – Remove master cylinder as previously outlined. Disconnect vacuum hose from check valve. Remove clevis pin from servo operating rod and brake pedal lever. Remove four nuts holding servo unit-to-pedal box and remove servo with spacer. To reinstall, reverse removal procedure.

PRESSURE DIFFERENTIAL VALVE

Removal & Installation – Disconnect electrical connection. Disconnect inlet and outlet lines and plug all ports to prevent loss of fluid and entry of dirt. Remove bolt securing valve and remove unit. To reinstall, reverse removal procedure, bleed brakes and if necessary, re-centralize valve shuttle.

OVERHAUL

BRAKE CALIPER

Disassembly – Remove caliper as previously outlined. Remove pistons from body and rubber sealing rings.

Cleaning & Inspection – Clean components in brake fluid or alcohol and examine for serviceability. Replace parts as necessary.

Reassembly – Install new piston seals in cylinders and place rubber dust cover projecting lip in recess. Insert piston being careful not to scratch cylinder. Pull outer lip of dust cover to recess in piston and replace pad linings. To install caliper, reverse removal procedure.

DRUM BRAKE (WHEEL CYLINDER)

Disassembly (All Models) – Remove wheel cylinder as previously outlined. Remove dust cover and withdraw piston. Remove seal from piston using fingers only.

Cleaning & Inspection – Clean parts in hydraulic parts cleaning fluid or alcohol and examine cylinder bore for score marks, ridges or corrosion.

Reassembly (All Models) – Install new seal with lip towards bottom of cylinder. Lubricate seal with clean brake fluid, insert piston into cylinder and install dust cover. To reinstall cylinder, reverse removal procedure and bleed brakes.

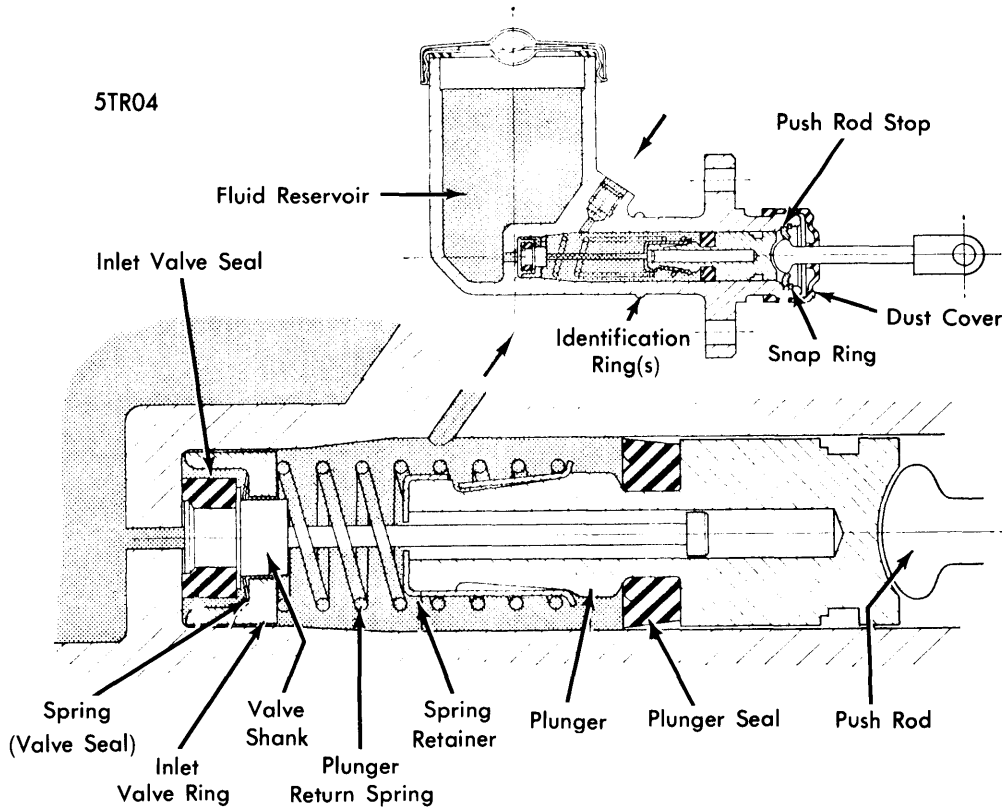
MASTER CYLINDER

Disassembly (Single Piston Unit) – Remove master cylinder as previously outlined. Depress push rod, remove snap ring and withdraw push rod and return stop plate (see illustration). Shake out plunger and fluid inlet valve. Use compressed air if necessary. Lift locating clip on spring retainer and remove from plunger. Separate valve shank from spring retainer. Remove plunger return spring, inlet valve ring and spring (valve seal). Remove inlet valve seal and plunger seal.

Cleaning & Inspection – Clean parts in suitable hydraulic parts cleaning fluid or alcohol and inspect for wear on all components.

Reassembly – Install new seals on inlet valve and plunger. Use brake fluid to lubricate parts. To reassemble, reverse disassembly procedure.

1963-73 TRIUMPH-GIRLING (Cont.)

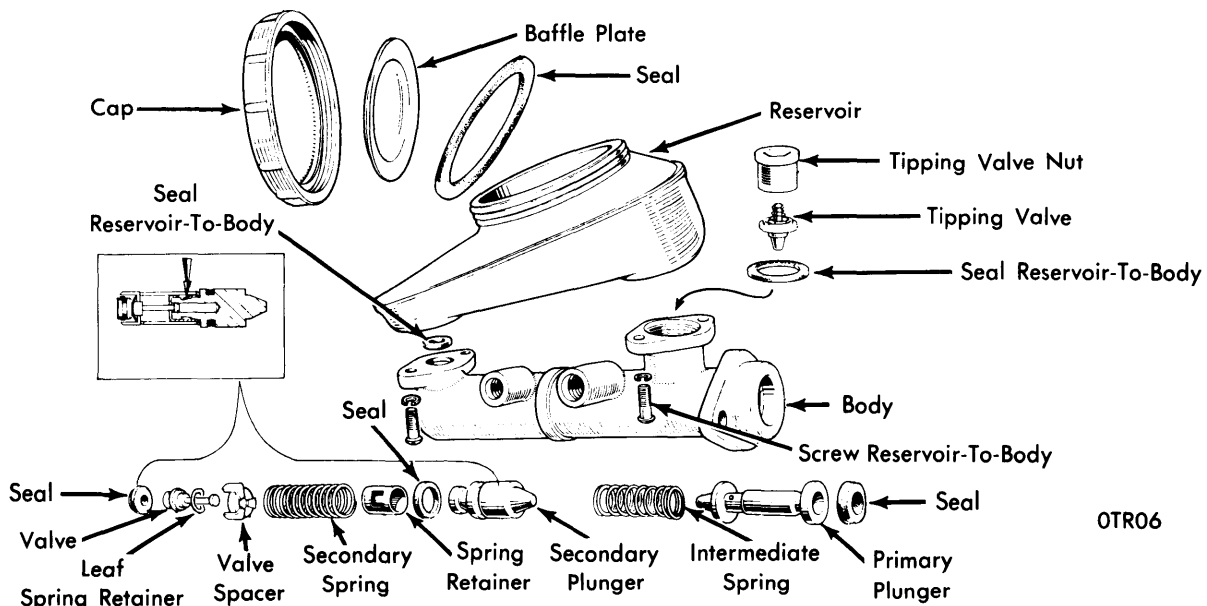


SINGLE PISTON MASTER CYLINDER

Disassembly (Tandem Piston Unit) — Remove master cylinder as previously outlined. Drain and discard fluid. Remove screws attaching reservoir-to-cylinder. Depress push rod, remove snap ring and withdraw push rod with abutment plate. Use an Allen wrench to unscrew tipping valve securing nut and remove seal. Depress primary plunger and remove tipping valve. Remove internal parts either with compressed air to end inlet or by shaking cylinder body. Separate plunger and intermediate spring. Lift leaf of spring retainer, remove spring

and center valve sub-assembly from secondary plunger. From valve stem, remove spring, valve spacer, spring washer and valve seal. Remove seals from primary and secondary plungers.

Cleaning & Inspection — Clean all servicable parts in suitable cleaning fluid or alcohol. Examine cylinder bore for score marks, ridges or corrosion. *NOTE* — Discard cylinder body even if only slight imperfections are found.



TANDEM PISTON MASTER CYLINDER

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1963-73 TRIUMPH-GIRLING (Cont.)

Reassembly — *NOTE* — Replace all seals with those contained in service repair kit. Prior to assembly, lubricate all parts in clean brake fluid.

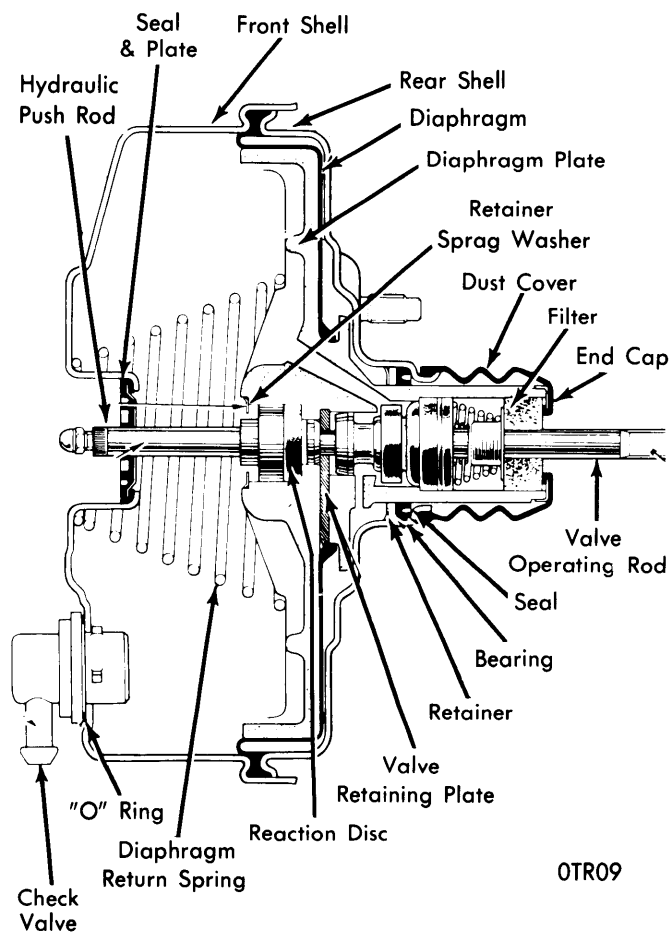
1) Install seals on primary and secondary plungers. Install seal, smaller diameter leading, to valve head. Place spring washer on valve stem ensuring that convex side of washer is to valve. Place spring retainer to valve stem with keyhole leading. Slide secondary spring over spring retainer and up to secondary plunger.

2) Place secondary plunger and valve assembly between protected jaws of a vise and compress spring. Use a small screwdriver to press leaf spring retainer against secondary plunger and then compress leaf spring retainer with needle nose pliers against plunger. Remove plunger and valve assembly from vise and check retainer spring.

3) Install intermediate spring between primary and secondary plungers and insert in cylinder. Replace push rod, snap ring and rubber boot. Depress push rod and insert tipping valve. Fit seal, secure nut, and torque to specification. Install reservoir and seal.

VACUUM SERVO (BOOSTER) UNIT

NOTE — Overhauling unit consists of changing check valve, filter, dust cover, seal and plate assembly. Any other component failure requires complete unit replacement. Replacing filter is the only normal service required. A service repair kit is available for limited service.



VACUUM SERVO UNIT

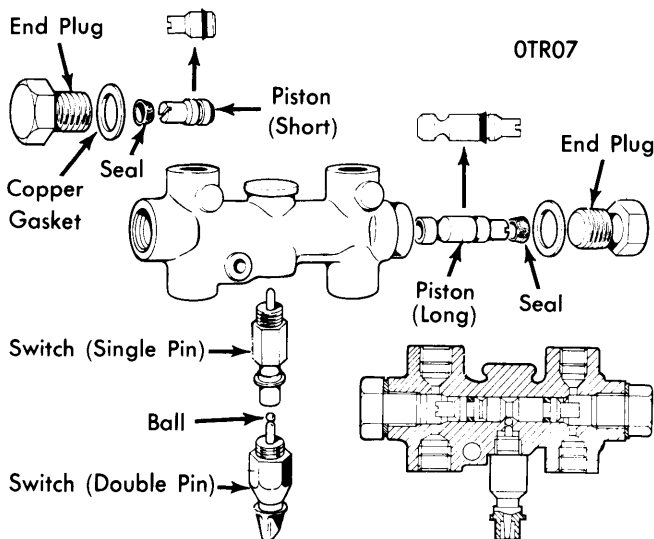
Disassembly (Servo Unit Components) — 1) Remove servo unit as previously outlined. To remove check valve, note angle of valve in relation to servo housing. Use a suitable wrench, press down on valve and turn counterclockwise 1/3 turn.

2) Remove filter by pulling back dust cover and pulling out filter. For ease of filter installation, cut new filter diagonally.

3) Remove seal and plate assembly from front shell recess by gripping center rib with needle nose pliers. Use grease supplied in service kit to lubricate new seal and plate assembly when installing.

4) To check push rod for wear, place a straight edge across front shell recess. Measure clearance, .011-.016" (.28-.41 mm), between end of push rod and straight edge. Replace servo unit if clearance is incorrect. *NOTE* — Servo push rod-to-master cylinder clearance is set by factory and secured with Loctite. No attempt should be made to alter setting.

Reassembly — To reassemble components to servo unit, reverse disassembly procedures.



PRESSURE DIFFERENTIAL VALVE

PRESSURE DIFFERENTIAL VALVE

Disassembly — Remove valve as previously outlined. Remove end plugs and discard copper washers. Remove nylon switch being careful not to lose ball (if equipped). Carefully push out valves and avoid scratching cylinder. Remove seals on pistons using fingers only.

Cleaning & Inspection — Clean parts in brake fluid. Inspect cylinder and pistons for scoring or imperfections. Replace unit if parts show signs of wear. To test nylon switch, reconnect to warning light circuit and actuate plunger on switch by pressing it to an electric ground.

Reassembly — Replace seals and copper washers with new ones provided in service repair kit. Lubricate parts with clean brake fluid during assembly. Install new seals on pistons with lips facing outwards. Insert long piston into bore (slotted end out) until radiused groove is opposite switch plunger hole. Insert ball (if equipped) and screw in switch assembly and torque to specification. *CAUTION* — Ensure that piston seals are never pushed across central hole in valve body as this will damage seals. Insert short piston into bore with slotted end out. Install plugs with new copper washers and torque to specification.

Brakes

1963-73 TRIUMPH – GIRLING (Cont.)

BRAKE SPECIFICATIONS

Application	Specification
Rotor	
Diameter	
TR-4 & TR-4A	11" (279 mm)
Spitfire Series	9" (229 mm)
GT Series	9.7" (246 mm)
Max. Permissible Runout	
Installed .....	.006" (.152 mm)
Removed .....	.002" (.0508 mm)
Min. Thickness	
TR-4 & TR-4A .....	.440" (11.18 mm)
GT Series .....	.460" (11.68 mm)
Hub End Play	
Disc Brake Models .....	.003-.005" (.076-.127 mm)
Drum Size	
1200 (Front)	8 x 1 1/4"
TR-4 & TR-4A (Rear)	9 x 1 3/4"
Spitfire Models (Rear)	7 x 1 1/4"
Master Cylinder (Non-Tandem Unit)	
Bore Diameter ^①	
Single Ring .....	.75" (19.05 mm)
Double Ring .....	.7" (.7-.78 mm)
Piston Stroke	
Max. Available	1.38" (35.05 mm)
Stroke At Cut-Off .....	.099" (2.5 mm)

① — Ring on cast cylinder body indicates bore size (see Single Piston Master Cylinder illustration). Smaller bore supersedes larger from vehicle serial number CT. 5783.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (mkg)
Disc Brake	
Rotor-to-Hub	
Spitfire IV	30 (4.1)
All Other Models	33 (4.5)
Caliper-to-Mounting Plate	
Spitfire IV	58 (8.0)
All Other Models	52 (7.1)
Pressure Differential Valve	
Plunger Switch	2.5 (.3)
End Plugs	18 (2.4)
Wheel Nuts	
TR-4	50 (6.9)
All Others	40 (5.5)

1963-73 TRIUMPH-GIRLING (Cont.)

DISC BRAKE ROTOR SPECIFICATIONS						
Application	Disc Diameter In. (mm)	Lateral Runout In. (mm)	Parallelism In. (mm)	Original Thickness In. (mm)	Minimum Refinish Thickness In. (mm)	Discard Thickness In. (mm)
TR-4 & TR-4A	11.0 (279.0)	.006 (.15)	....	....	.440 (11.17)	⓪ ...
Spitfire	9.0 (229.0)	.006 (.15)	....	....	....	....
GT6	9.7 (246.0)	.006 (.15)	....	....	.460 (11.68)	⓪ ...
TR6 (276.0)	10.85 (.15)	.006....	....	....	....	....