GIRLING
THE BEST BRAKES IN THE WORLD
Service BULLETIN

KINGS ROAD · TYSELEY · BIRMINGHAM 11. TELEPHONE ACO 3371

GIRLING BRAKE AND CLUTCH EQUIPMENT
on the
TRIUMPH TR3
(From Chassis TS 13101 1956 on)

FEBRUARY 1957

BULLETIN No. 444 T 93

INSTALLATION

The brakes on the front wheels are Girling Disc type and on the rear Girling HL3 Drum type. All four wheels are braked hydraulically by foot pedal directly coupled to a Master Cylinder in which the hydraulic pressure is originated.

The handbrake is of the lever type and operates on the rear wheels by cables attached to the compensator and levers on the wheel cylinders.

The clutch is hydraulically operated by the Master Cylinder coupled by pipe and flexible hose to the slave cylinder attached to the clutch housing.

The supply tank situated on the bulkhead provides a reservoir of fluid which replenishes both the brake and the clutch master cylinders.

GENERAL MAINTENANCE

No adjustment or maintenance is needed for the front brakes except for occasional inspection of the pads. They should be replaced when the lining is worn to within 1/8" to 1/16" of the pad backing plate.

Rear brakes should be adjusted regularly and the need for it will be indicated by an increase of pedal travel or excessive free motion of the handbrake.

To adjust first block the front wheels, push off the handbrake to its limit and jack up the rear wheels. Turn in a clockwise direction the squared adjuster stem projecting through the backplate in front of the axle until the shoes are locked in the drum. Slack back two or three clicks when the wheel should rotate freely. Jack down and test.

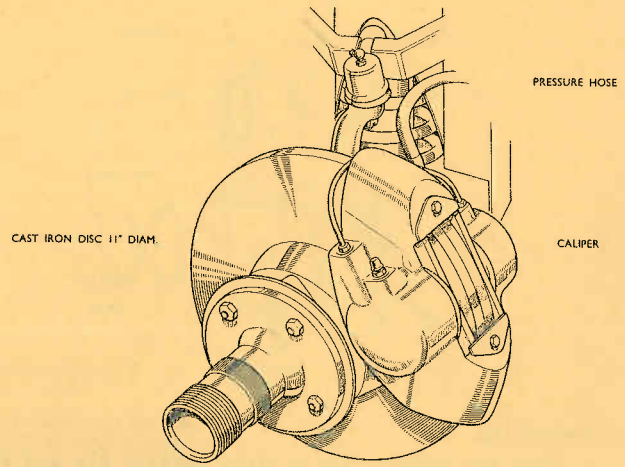
After several adjustments remove the drums to examine the condition of the lining. If worn replace with factory relined shoes as described on page 3.

Examine occasionally the level of fluid in the supply tank and if needed top up with Wakefield/ Girling Brake & Clutch Fluid, Crimson. Take great care that no grit or dirt of any kind is allowed to enter the tank during this process. The Girling filter which fits inside the supply tank assists in this matter and its use is recommended.

The handbrake cable should be greased regularly but the linkage should not require any adjustment. If after adjusting the rear brakes there is excessive free movement of handbrake the shoes should be locked up in the drums by turning the adjuster stems, the handbrake pulled on one click and the transverse cables adjusted until the slack is just taken up. Turn back the brake adjusters two clicks.

FRONT BRAKES

The front brakes are the Girling Disc Brakes consisting of the disc and caliper assembly. The disc is fixed to the hub by four spigot nuts and the caliper assembly is mounted on to a bracket on the stub axle. The segmental pads are bonded on to steel plates and are forced onto the disc by two opposed cylinders providing a powerful and fade-free brake.



Manual adjustment is eliminated as the pads are always in light contact with the disc. There are no pull off springs attached to the pads and no residual line pressure in the hydraulic system and when the pressure on the pedal is released the pads remain just touching the disc.

The only servicing needed will be the replacement of worn pads, seals and boots of the hydraulic caliper.

Lining Pad Replacement

Jack up the front of car and remove road wheels. On the caliper body are two set screws which secure the pad retaining plates. Unscrew sufficiently to enable the retaining plates with anti-rattle springs when fitted to be lifted and swung clear. The pads can then be lifted out of the caliper.

Under no circumstances should attempts be made to reline the pads, but only genuine factory replacements used.

To fit new pads the pistons in the caliper should be pushed to the bottom of the bores and the new pads placed in position. Swing back the retaining plates and tighten down set screws.

The replacement of pads is then complete and bleeding is unnecessary but the foot pedal should be pumped until a solid resistance is felt.

Jack down the front of the car and road test.

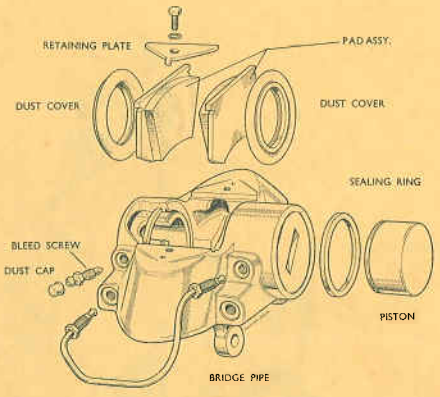
Caliper Cylinder Maintenance

To renew the square section sealing rings and dust covers it is necessary to remove the caliper from the vehicle. Release the pipe connection and remove the bulkhead nut from the hose, remove the caliper retaining studs and the caliper can be lifted off the disc with the hose attached. Remove the brake pads in the manner described above and carefully withdraw the pistons. The sealing rings may then be removed by inserting a blunt tool under the seals and prising out, taking care not to damage the locating grooves. Examine the bores and pistons carefully for any signs of abrasion or scuffing.

No attempt should be made to remove the end plug retainer as this is screwed in tightly with considerable torque effort.

It is important in cleaning that the components should not be degreased and no petrol, paraffin, trichlorethylene or mineral fluid of any kind should be used. Clean with methylated spirit and allow to vaporise, leaving the component clean and dry.

After cleaning and examining, lubricate the working surfaces of the bores and piston with clean genuine Girling Crimson Brake and Clutch Fluid.



Assembling

Take the appropriate Girling Service Kit and fit new rubber seals into the grooves of caliper cylinder bore. Locate the new rubber dust cover with the projecting lip into the groove provided which is the outer one in the cylinder bore. Insert the piston, closed end first, into the bore, taking great care not to damage the polished surface. Push the piston right home and then engage the outer lip of the rubber boot into the groove of piston.

The replacement of the lining pads as described under the heading "Pad Replacement" will retain the pistons in position.

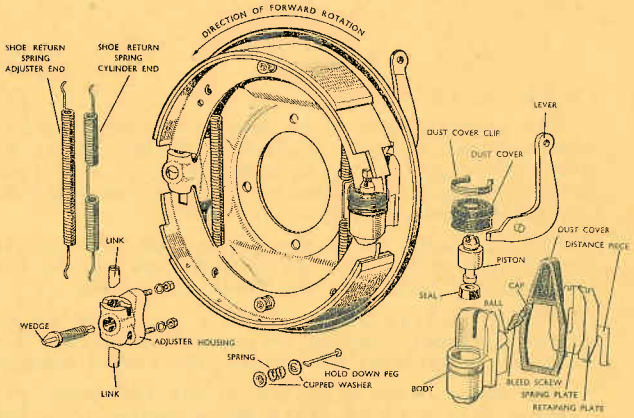
Replace the caliper over the disc, secure by tightening the fixing bolts, refit hose and bleed system as described on page 4.

Discs

To maintain the pads in close proximity to the disc a restrictor valve is fitted between each front hose and the pipe line, but the brake will not function at maximum efficiency unless the disc runs perfectly true between the pads. The maximum run-out permissible is .004"

REAR BRAKES

From the illustration it will be seen that they are of the drum type with a wheel cylinder and adjuster affixed to a backplate supporting the two shoes which are held in position by two return springs. The shoes are not fixed but are allowed to slide and centralize, and are hydraulically operated by the Girling Single Acting wheel cylinder incorporating lever handbrake mechanism. Lining wear is adjusted by a Girling Wedge type mechanical adjuster common to both shoes. At the cylinder end the leading shoe is located in a slot in the piston while the trailing shoe rests in a slot formed in the cylinder body. At the adjuster end they rest in slots in the adjuster links. The shoes are supported by platforms formed in the backplate and are held in position by two hold-down springs fitted on each shoe with a peg passing through a hole in the backplate.



The ADJUSTER consists of an alloy housing with studs which is spigoted and secured firmly to the inside of the backplate by nuts and spring washers.

The housing carries two opposed steel links, the outer end slotted to take the shoes, and the inclined inner faces bearing on inclined faces of the hardened steel wedge.

The Wedge has a finely threaded spindle with a square end which projects on the outside of the backplate. By rotating the Wedge in a clockwise direction the links are forced apart and the brake shoes expanded.

The WHEEL CYLINDER body is a light alloy die casting with highly finished bore in which moves a piston with seal. The other end of the body has a machined slot to carry the trailing shoe, and at right angles projecting through the backplate is pivoted the handbrake lever. The cylinder is attached to the backplate by spring plates allowing it to slide laterally. Rubber covers are fitted to exclude dust and water. A bleed screw is incorporated in the cylinder body with a rubber dust cap over the nipple end.

When the brake is applied, the piston by hydraulic pressure, moves the leading shoe and the body reacts by sliding on the backplate to operate the trailing shoe.

The handbrake lever is pivoted in the cylinder body and when operated the lever tip expands the leading shoe and the pivot moves the cylinder body and with it the trailing shoe.

Replace handbrake lever. Locate the retaining plate between the distance piece and spring plate (open end towards the handbrake lever) tap into position until the two cranked tips of the spring plate locate in the retaining plate.

Fit the rubber dust cover. Connect the pressure pipe union to the cylinder and connection to the handbrake lever. Replace the shoes, brake drum, and bleed the system. Finally re-fit wheels.

Fitting Replacement Shoes

1. Jack up the car and remove road wheels and brake drums.
2. Remove the hold-down springs by turning the washer under the peg head. Lift one of the shoes out of the slots in the Adjuster Link and Wheel Cylinder piston. Both shoes can then be removed complete with springs. Place a rubber band round the wheel cylinder to keep piston in place.
3. Clean down the backplate, check wheel cylinders for leaks and freedom of motion.
4. Check Adjusters for easy working and turn back (anti-clockwise) to full 'off' position. Lubricate where necessary with Girling White Brake Grease.
5. Smear the shoe platforms and the operating and abutment ends of the new shoes with Girling White Brake Grease.

Dismantling

To remove a wheel cylinder, jack up the vehicle, remove the wheels, disconnect the rod from handbrake lever. Remove the brake drum and shoes. Disconnect the pressure pipe union from the cylinder, and remove the rubber dust cover from rear of backplate. By using a screwdriver prise the retaining plate and spring plate apart, then tap the retaining plate from beneath the neck of the wheel cylinder. Withdraw the handbrake lever from between the backplate and wheel cylinder and remove the spring plate and distance piece, and finally the wheel cylinder from the backplate.

Re-fitting the Rear Wheel Cylinder

Mount the wheel cylinder onto the backplate with the neck through the large slot. Replace the distance piece between cylinder neck and backplate, with the open end away from handbrake lever location. The two cranked lips must also be away from the backplate.

Insert the spring plate between the distance piece and backplate also with open end away from handbrake lever location, and the two cranked lips away from the backplate.

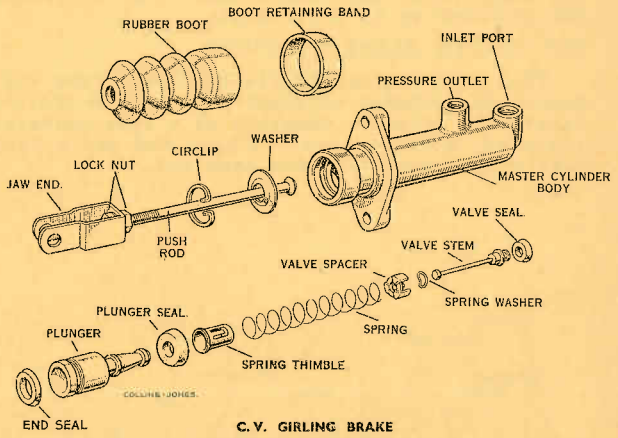
6. Fit the two new shoe return springs to the new shoes (with the shorter spring at the Adjuster end) from shoe to shoe and between shoe web and backplate. Locate one shoe in the Adjuster Link and Wheel Cylinder piston slots then prise over the opposite shoe into its relative position. Remove rubber band. Insert the hold-down peg through hole in backplate, and replace spring and cupped washers smeared with White Girling Brake Grease.
7. Make sure drums are clean and free from grease etc, then refit.
8. Adjust brakes as described.
9. Refit road wheels and jack down.

The top shoe should have the square hole over the lever lip, and the square hole in the bottom shoe should be near the adjuster.

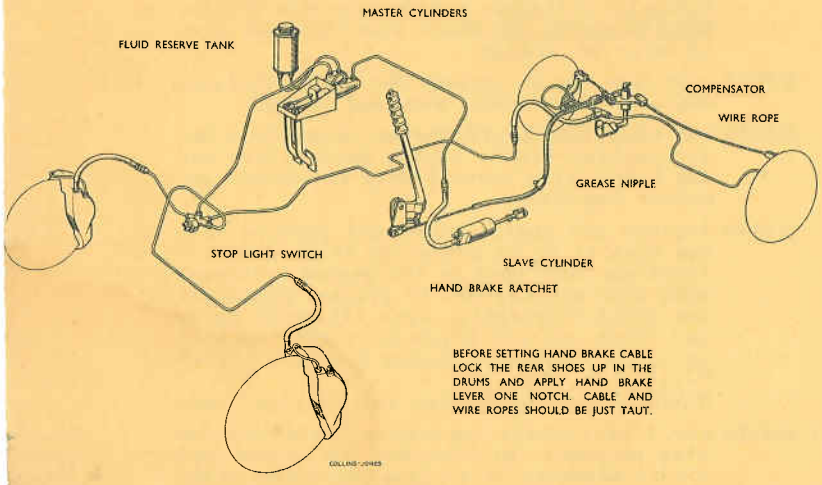
Several hard applications of the pedal should be made to ensure all the parts are working satisfactorily and the shoes bedding to the drums, then the brakes should be tested.

BRAKE & CLUTCH MASTER CYLINDER

The Girling Centre Valve (C.V.) type has an alloy body with polished finished bore. The inner assembly is made up of the push rod, dished washer, circlip, plunger with end seal and plunger seal, spring thimble plunger return spring, valve spacer, spring washer, valve stem and valve seal. The open end of the cylinder is protected by a rubber dust cover.



C.V. GIRLING BRAKE AND CLUTCH MASTER CYLINDER



When pressure is applied to the foot pedal the plunger moves up the bore of the cylinder and the valve seal closes the aperture to the supply tank. Line pressure is then built up and transmitted to the wheel cylinders.

When the foot pedal is returned to the off position the valve seal is lifted and retained off its seat as the plunger finally returns. This permits a free flow of fluid between the cylinders and supply tank when the brake is off, compensating for any temperature change.

DISMANTLING

Before removing the Master Cylinder for dismantling, it is advisable to drain off most of the fluid by disconnecting one of the flexible pipes, lowering the open end into a clean container and pumping the pedal until no further fluid enters the container. Disconnect the two pipe unions on the Master Cylinder and disconnect the Master Cylinder push rod from its connection to the pedal. The Master Cylinder can now be removed when the securing bolts to the chassis frame have been withdrawn.

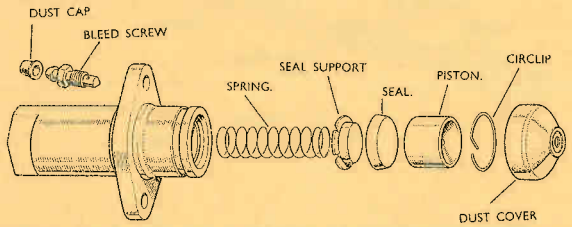
Pull back the rubber dust cover and remove the circlip with a pair of long-nosed pliers, which releases the push rod and dished washer. Remove the plunger assembly complete. The assembly can then be separated by lifting the thimble leaf over the shouldered end of the plunger. The seal should be eased off the plunger. Depress the plunger return spring allowing the valve stem to slide through the elongated hole of the thimble, thus releasing the tension of the spring. Remove the thimble spring and valve complete. Detach the valve spacer, taking care of the spacer spring washer which is located under the valve head. Remove the seal from the valve head.

ASSEMBLING

On the plunger fit the end seal into its groove with the larger diameter against the step and the plunger seal with the back against the plunger face. On the valve stem head fit the valve seal, flat side first. Pass the spring washer, domed side first, over the small end of the stem and locate on the valve head. Follow with the valve spacer legs first and the coil spring. Insert the thimble into the spring and compress until the stem passes through the keyhole and is engaged in the centre. Insert the reduced end of the plunger into the thimble and press home the thimble leaf so that it engages under the shoulder of the plunger. Smear the assembly well with Red Rubber Grease, confirm that the spring is central on the valve spacer and with this end leading, insert into the cylinder. Replace the push rod with the dished side of washer under the spherical head in the cylinder and retain by engaging the circlip in the groove machined in the body. Refit the rubber dust cover and remount the cylinder on to the chassis.

THE CLUTCH SLAVE CYLINDER

This cylinder is the flange fixing type and is mounted on a bracket adjacent to the clutch operating lever. The cylinder consists of a body containing a piston, a rubber seal, a push rod and a rubber dust cover protecting the open end.



DISMANTLING

Disconnect the hose from the pipeline. Remove the cylinder from its mounting, disconnect the push rod from the clutch shaft lever and remove dust cover followed by push rod circlip, piston, seal and spring in that order. Replace all parts necessary from the appropriate Girling Service Kit.

ASSEMBLING

Fit the seal over the reduced end of the piston with the back of the seal located against the shoulder. Smear the seal and the piston with clean Girling Crimson Fluid and, after the spring, carefully insert into the cylinder, seal first. Replace circlip and rubber dust cover, remount cylinder and reconnect the push rod to the clutch shaft lever. Top up the supply tank and bleed the clutch system.

ADJUSTMENT

Slight free movement should be discernible in the clutch operating lever, and the jaw end on the slave cylinder push rod should be adjusted until this can be obtained.

BLEEDING THE HYDRAULIC SYSTEM

Bleeding is necessary any time a portion of the hydraulic system has been disconnected, or if the level of the brake fluid has been allowed to fall so low that air has entered the master cylinder.

With all the hydraulic connections secure and the reservoir topped up with fluid, remove the rubber cap from the bleed nipple furthest away from the master cylinder and then fit the bleed tube over the bleed nipple, immersing the free end of the tube in a clean jar containing a little GIRLING Brake and Clutch Fluid.

Unscrew the bleed screw about three-quarters of a turn and then operate the brake pedal with slow full strokes until the fluid entering the jar is completely free of air bubbles.

Then during a down stroke of the brake pedal, tighten the bleed screw, remove bleed tube and replace the bleed nipple dust cap. UNDER NO CIRCUMSTANCES MUST EXCESSIVE FORCE BE USED WHEN TIGHTENING THE BLEED SCREW.

This process must now be repeated for each bleed screw, finishing at the wheel nearest the master cylinder. Always keep a careful check on the reservoir during bleeding, since it is most important that a full level is maintained. Should air reach the master cylinder from the reservoir, the whole operation of bleeding must be repeated.

After bleeding, top up the reservoir to its correct level.

ESSENTIAL PRECAUTIONS

ALWAYS exercise extreme cleanliness when dealing with any part of the hydraulic system. NEVER handle rubber seals or internal hydraulic parts with greasy hands or greasy rags. NEVER allow petrol, paraffin, trichlorethylene or Girling White Brake Grease to contact these parts.

ALWAYS use GIRLING Crimson Brake & Clutch Fluid from sealed quart tins. NEVER use fluid from a container that has been cleaned with petrol, paraffin or trichlorethylene. NEVER put dirty fluid into the reservoir nor any which has been bled from the system.

ALWAYS use clean GIRLING Crimson Brake & Clutch Fluid or alcohol for cleaning internal parts of the hydraulic system.

ALWAYS examine all seals carefully when overhauling hydraulic cylinders and replace with genuine GIRLING spares any which show the least sign of wear or damage.

ALWAYS take care not to scratch the highly finished surfaces of cylinder bores and piston.

ALWAYS use WAKEFIELD/GIRLING Rubber Grease No 3 Red for packing rubber boots, dust covers and for lubricating parts likely to contact any rubber components.

ALWAYS replace all seals, hoses and gaskets with new ones if it is suspected that incorrect fluid has been used or the system contaminated with mineral oil or grease. Drain off the fluid thoroughly, wash all metal parts and flush out all pipes etc. with alcohol or clean GIRLING Crimson Brake & Clutch Fluid.
NEVER use anything else for this purpose.

ALWAYS use a particular container (reserved for this purpose) for bleeding the system and always maintain in a clean condition. NEVER use a receptacle which has been cleaned with petrol, paraffin or trichlorethylene.