

Barnis 4006

*on Loan to Bristol Gnomes Club 1974 May
by Guy Marshall*

THE BRISTOL 2 LITRE CAR

TYPES 404 AND 405

*2 offlets 12 than 1st.
Loan 16 than
Plus 20-22.*

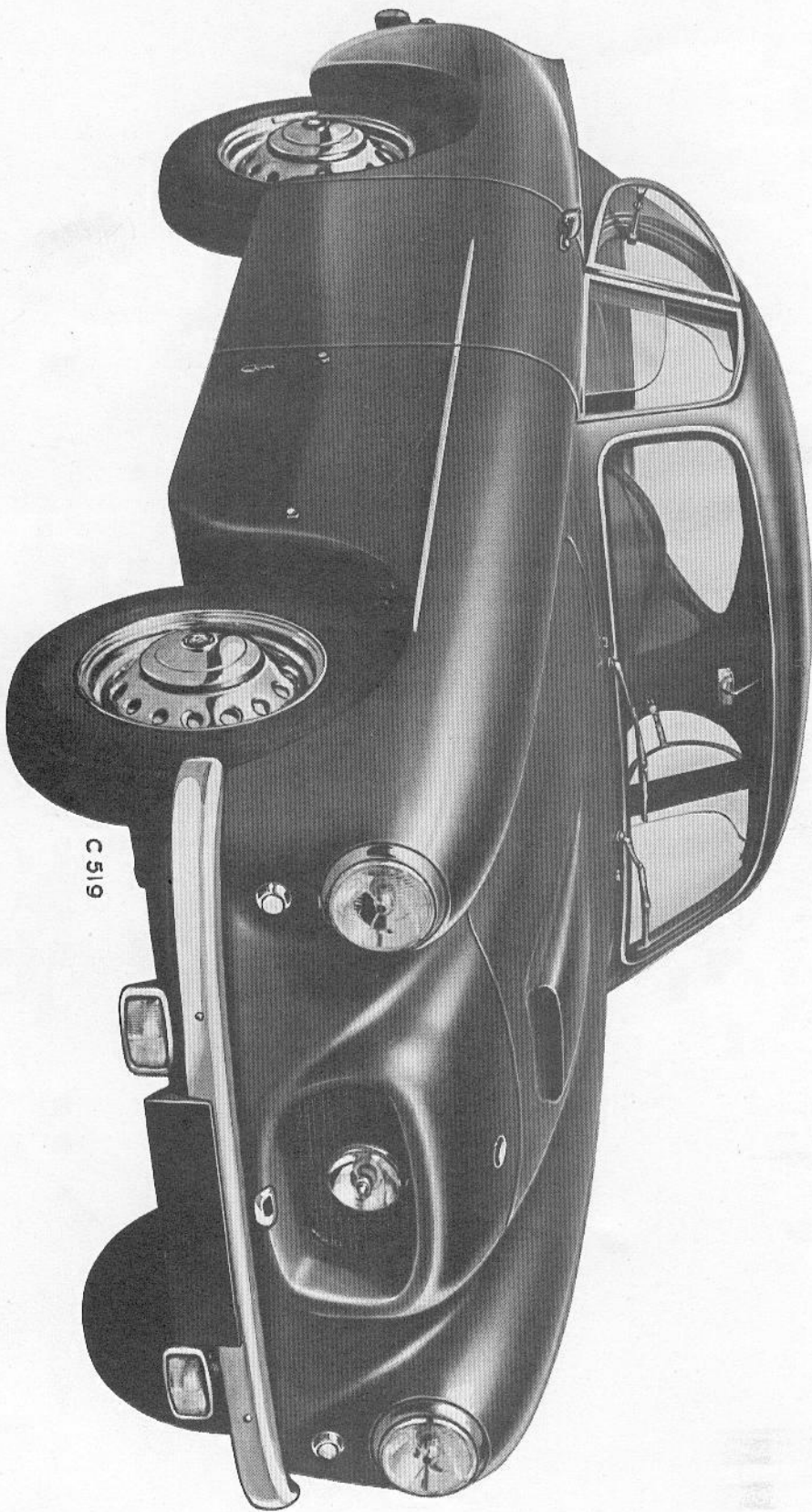
Workshop Manual

PHONE FULTON 3831

BRISTOL CARS LIMITED, FILTON HOUSE, BRISTOL, ENGLAND

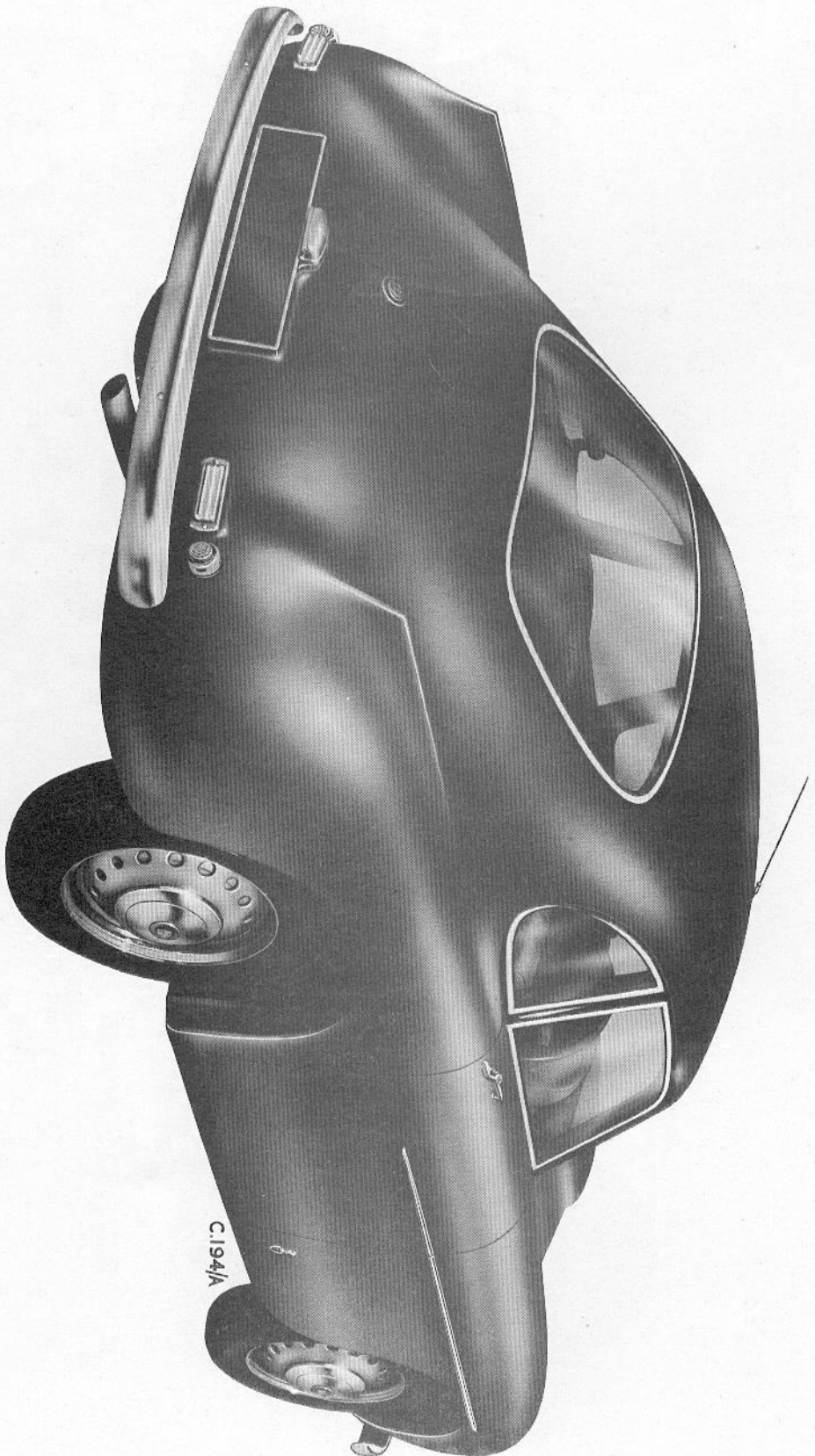
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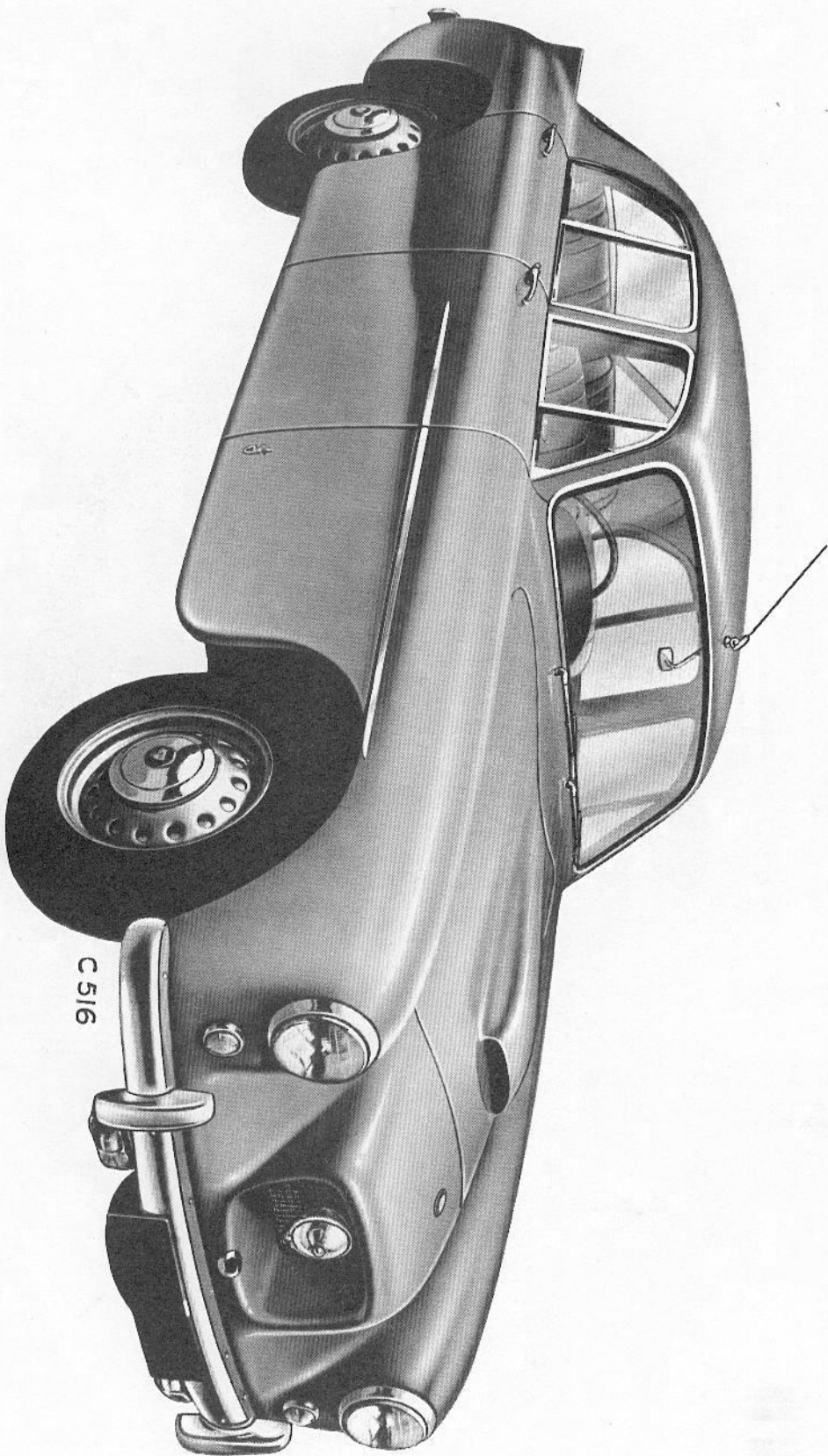
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Type 404 Car Front View

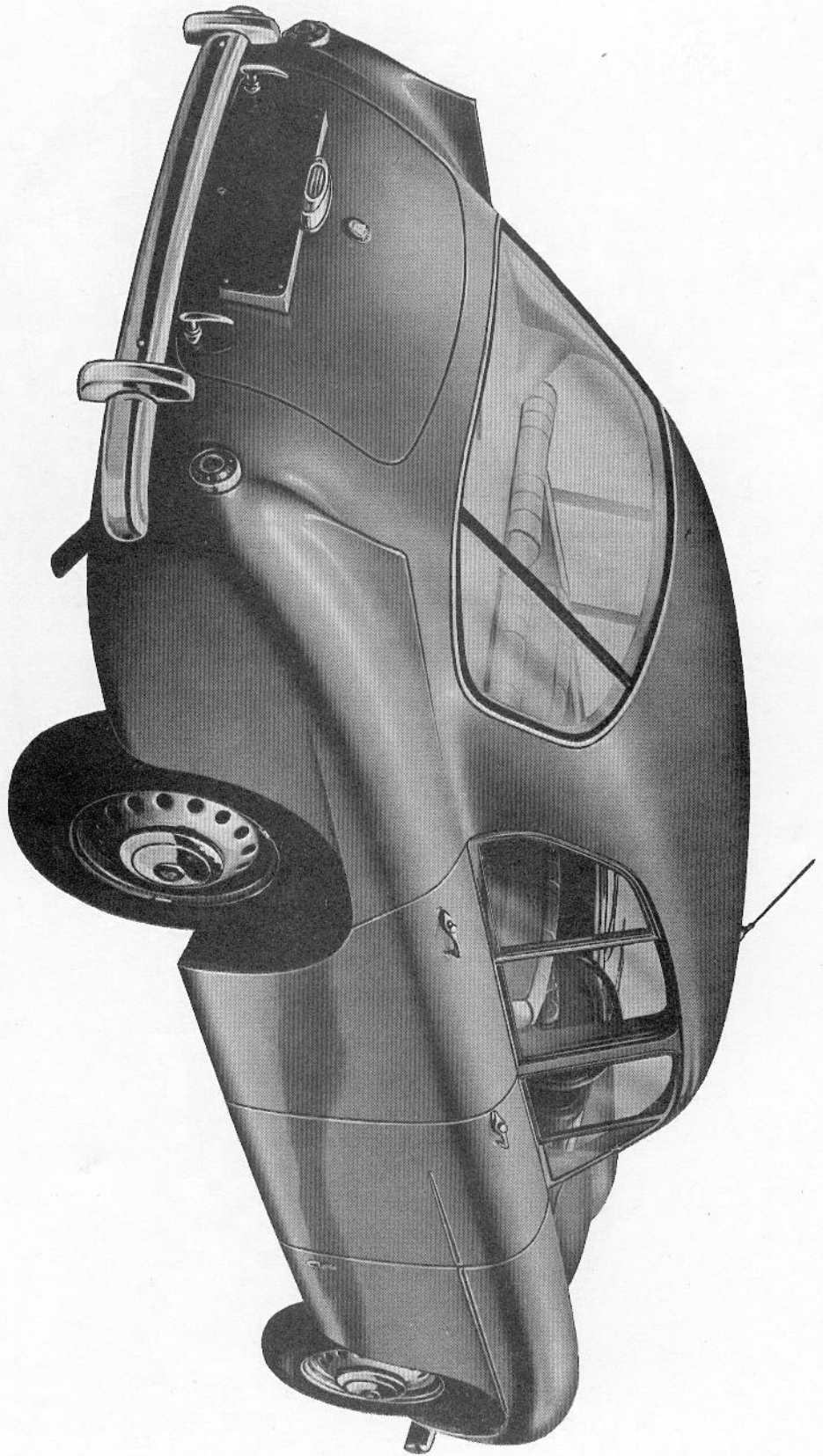


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Type 404 Car Rear View



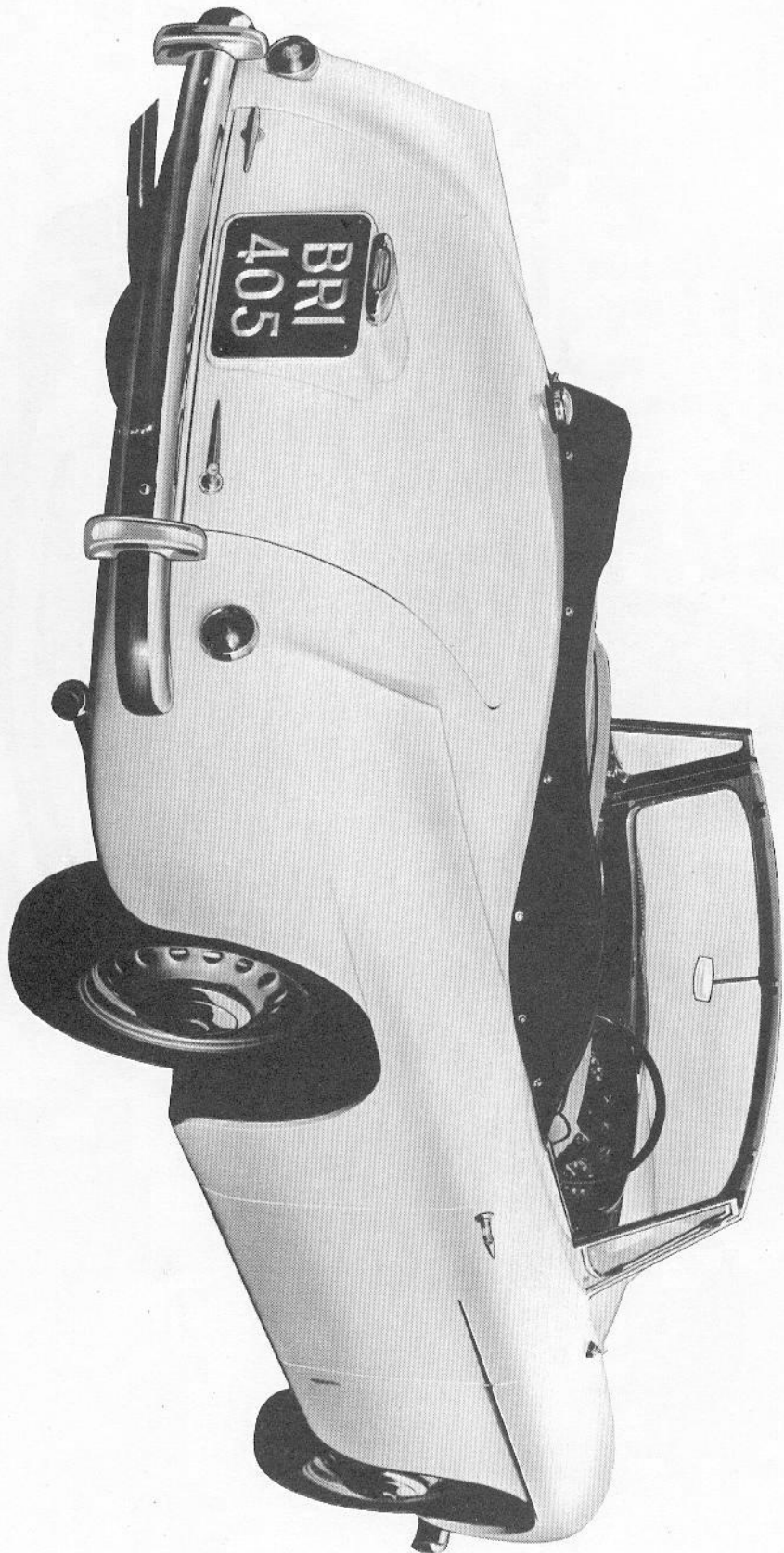
Type 405 Car Front View



Type 405 Car Rear View



Type 405 Drophed Front View



Type 405 Drophead Rear View

Introduction

This manual has been compiled to provide information on the maintenance and repair of the 'Bristol' Type 404 and Type 405 Cars.

For general day to day maintenance the owners Instruction Manual should be used as this may have information not dealt with in this workshop manual.

Each section describes practical dismantling repair or replacement and re-assembly of the various components and every effort should be made to conform to the standards and limits given.

From time to time amendments will be issued in order to keep the book up-to-date and these should be inserted into the appropriate section.

At the back of the book are the fully dimensioned drawings of the special tools which are mentioned in the descriptive matter. These tools are not available for purchase and the object of providing drawings is to (a) enable them to be made (b) to adapt similar mass-produced tools to do the work.

SERIAL NUMBERS.

When ordering replacement parts, always:

(a) Quote the Engine Number in full i.e. 100B2/4000.

- (b) Quote the Chassis Number in full i.e. 405/4000.
- (c) Where possible give the Part Number, the number of parts required and the full description of the parts.
- (d) If in any doubt, send the old part with the request for the spare.
- (e) Order from the nearest authorised 'Bristol' Distributor or Agent. Where this is impracticable, order direct from the Company.

Note. Left and right-hand side of the car is always understood as from the driving position. This should be carefully noted when ordering left or right-hand parts.

Orders given by telephone or telegraph should be confirmed immediately, in writing.

The Car Number Plate is attached to the bulkhead under the bonnet.

The Engine Number Plate is attached to the rocker box cover on the right-hand side.

The Chassis Number Plate is attached to the chassis frame on the left-hand side under the bonnet in the vicinity of the petrol pump.

Specifications

Dimensions

Type 404

Wheel Base.	8ft.0.25 ins. (244.5 CM).
Front Track.	4ft.4.36 ins. (133 CM).
Rear Track.	4ft. 6 ins. (137.16)
Turning Circle	32ft. 10 ins. (10M).
Ground Clearance	6.1/2 ins. (16.5 CM).
Overall Height	4ft. 7.3/4 ins. (142 CM).
Overall Width	5ft. 8.3/4 ins. (174 CM).
Overall Length	14ft. 3.1/4 ins. (435 CM).
Weight (approx.)	20 cwt. 50 lb. (1038 KG) (2290 lb.)

Type 405

Wheel Base.	9ft. 6 ins. (289.56 CM).
Front Track.	4ft. 4.36 ins. (133CM).
Rear Track.	4ft. 6 ins. (137.16 CM).
Turning Circle	37ft. 6 ins. (11.43 M).
Ground Clearance	6.1/4 ins. (15.9 CM).
Overall Height	4ft. 9.1/2 ins. (146.05 CM).
Overall Width	5ft. 8.3/4 ins. (174.6 CM).
Overall Length	15ft. 11.1/2 ins. (486.4 CM).
Weight (approx.)	24 cwt. 24 lb. (1233 KG). (2712 lb.)

Chassis Frame

Sheet steel construction. Rigid box section side members of 6.1/2 inch depth with three cross members.

Integral rear floor construction. Chassis frame internally soundproofed and finished with anti-rust paint.

Front Suspension

Independent. Transverse leaf spring with hydraulic telescopic shock absorbers. Anti-Roll Bar.

All joints lubricated by one-shot chassis lubricating system, spring and joints shrouded by gaiters.

Rear Suspension

Longitudinal torsion bars with hydraulic telescopic shock absorbers. Rear Axle located by suspension arms and triangulated stabilizing bracket. All friction surfaces lubricated direct from rear axle.

Steering

Rack and Pinion. Steering box lubricated from one-shot system.

Special two-spoke steering wheel with provision for three different positions on the steering column.

Brakes

Lockheed hydraulic brakes on all four wheels operated by master cylinder.

FRONT.

12 inch x 2.1/4 inch two leading shoe fitted with automatic adjusters. 'Alfin' type aluminium alloy brake drums with bonded cast iron liners.

REAR.

11inch x 1.3/4 inch single leading shoe brakes operating in chromidium brake drums.

Handbrake

Cable and rod operating to each rear wheel. Handbrake lever situated centrally between front seats.

Wheels and Tyres

Easy clean type road wheels pierced to permit ventilation of the brake drums.

~~For Tyres and pressures see Section 10.~~

Clutch

8" Borg & Beck. Single Dry Plate. Carbon Release Bearing.

Engine

Type 404.

Type 405 Drophead. 100B. (Single six branch Exhaust Manifold.)

Type 405.

100B2. (Two three branch Exhaust Manifolds).

Gearbox

Type 404 Car

BWCR/7 Gearbox without overdrive.

Gear Ratios (overall).

1st 14.08 to 1.

2nd 7.12 to 1.

3rd 5.04 to 1.

Top 3.9 to 1 (Direct).

Reverse 11.27 to 1.

Type 405 Car

BWCR/11 Gearbox with Laycock de Normanville Overdrive operating in Top Gear only

Gear Ratios (overall).

1st.....	15.24 to 1.
2nd.....	7.71 to 1.
3rd.....	5.46 to 1.
4th.....	4.22 to 1 (Direct).
Reverse.....	12.20 to 1.
Overdrive.....	3.28 to 1.

Both gearboxes are of 'Bristol' manufacture with four forward speeds and reverse, Synchromesh on Top, third and second speeds and freewheel first gear.

Transmission

Fully balanced Propellor Shaft. Differential Gearbox with spiral bevel crown wheel and pinion. Banjo type rear axle casing with semi-floating half shafts.

Differential Gearbox Ratio.

Type 404.....	3.9 to 1.
Type 405.....	4.22 to 1.

Petrol Supply

Aluminium alloy petrol tank including inbuilt electrically operated reserve, the reserve warning light being mounted on the instrument panel. Supply transferred to Carburettors by engine driven mechanical petrol pump.

Capacities.**Type 404**

16 galls. with 2.1/2 galls. reserve.
(72.7 litres.) (10.2 litres).

Type 405

16 galls. with 2 galls. reserve.
(72.7 litres) (9.09 litres).

Radiator

System.	Sealed with steam pressure relief valve.
Capacity of Cooling.	16 pints (9.09 Litres).
Radiator.	9.1/2 pints (5.4 Litres).
Engine.	4 pints (2.27 Litres).
Heater.	1 pint (.568 Litres).

Electrical Equipment

Lucas 12 volt system is a single wire type circuit having the positive (+) pole of the battery earthed to the engine and body. Current is supplied by a ventilated two brush dynamo in conjunction with a compensated voltage regulator on automatic cut-out and a 12 volt 51 ampere hour battery.

Heating and Demister Unit

Built into each car and not an extra. Supplies heated fresh air to car interior and into dashboard peak for demisting and defrosting. Air distribution regulated by controls on dashboard which enable heating and screen demisting to be used together or independently. In warm weather the system may be used as a fresh air ventilator.

Jacking System

Smiths Bevelift Jack stowed in the engine bay. Jacking point in the centre of each side of the car.

Tools

See tool kit.

Recommended Lubricants

Engine	Summer.	Mobiloil A. Essolube 30 Energol SAE 30 Shell X-100 30 Castrol XL.	'One Shot' Lubrication	Mobilube C.90 Esso Gear Oil 90 Energol SAE 90 Shell Dentex 90 Castrol ST.
	Winter.	Mobiloil Artic. Essolube 20 Energol SAE 20W Shell X-100 20/20W Castrolite.	Front Hubs and Rear Suspension Units	Mobilgrease MP. Esso Grease. Energol C.3. Shell Retinax A Castrolite Heavy.
Gearbox & Overdrive		Mobiloil A Essolube 30 Energol SAE 30 Shell X-100 30 Castrol XL.	Water Pump	Pre-packed.
Rear Axle & Propellor Shaft			Distributor	Mobiloil Artic. Essolube 20 Energol SAE 20W Shell X-100 20/20W Castrolite.
		Mobilube GX 140 Esso Expee Compound 140 Energol E.P. SAE 140 Shell Spirax 140 EP. Castrol Hipress.		

Tools

At Chassis 4152 a plastic tool roll was introduced together with chrome plated Adjustable spanner and Pliers and a new screwdriver. Apart from this change all cars are supplied with the following tools.

All Type 404 Cars and Type 405 (to Chassis 4151).

N.705671 Tool Roll complete with tools comprising:

N.705458 Tool Roll.
 N.600241 Spanner 3/16" x 1/4"
 N.600251 Spanner 5/16" x 3/8"
 N.600261 Spanner 3/8" x 1/2"
 N.600211 Adjustable Spanner.
 N.600221 Screwdriver.
 N.600231 Pliers.
 N.600121 Box Spanner-Cylinder Head.
 N.600161 Ring Spanner-Cylinder Head.
 N.600130 Tommy Bar-Box & Plug Spanner.
 N.600321 Bleeder Wrench.
 N.705749 Feelers.

Type 405 (Chassis 4152 on).

405-1-6009 Tool Roll complete comprising:

405-1-60011 Tool Wrap.
 405-1-60010 Screwdriver.
 405-1-60014 Adjustable Spanner.
 405-1-60015 Pliers.
 N.600161 Ring Spanner-Cylinder Head.
 N.600241 Spanner 3/16" x 1/4"
 N.600251 Spanner 5/16" x 3/8"
 N.600261 Spanner 7/16" x 1/2"
 N.600130 Tommy Bar-Plug & Box Spanner.
 N.600121 Box Spanner-Cylinder Head.
 N.705749 Feelers.
 N.600321 Bleeder Wrench.

N.600311 Bleeder Tube-in tin.
 N.600011 Plug Spanner.
 N.705674 Bevelift Jack.
 N.707126 Minalite Inspection Lamp.
 405-1-66017 Wheel Brace.
 404-1-60007 Starting Handle (Type 404 to Chassis 2051).
 404-II-60006 Starting Handle (Type 404 Chassis 2052 on and Type 405)

Modifications

Type 404

On Cars up to Chassis 2028 the brakes were operated by a tandem master cylinder, the front cylinder operating the rear wheel brakes and the rear cylinder operating the front wheel brakes. At Chassis 2029 and onwards a single master cylinder is used which operates all four wheel brakes.

Instruments and instrument layout was changed at Chassis 2029 and the Heating and Ventilating System was re-designed at Chassis 2020.

Hinged Side Valances were of three types, Cable Release from a Button on the door pillars, Locking by means of a square key and finally toggle fastening on the underside ledge.

Type 405

Engine

At Chassis 4052 a Viscous Damper was fitted to the front of the Crankshaft. This necessitated a new Front Cross Member with revised front transverse spring clamping. It is important to note from this that replacement engines with Viscous Dampers fitted may not be fitted to any Type 404 Cars or to Type 405 Cars up to Chassis 4051.

At Chassis 4037 a cylindrical Air Filter/Silencer was fitted.

At Chassis 4137 a large nose type crankshaft was fitted together with new type connecting rods and big end bearings. The drive sprocket, crankshaft thrust plate, crankshaft oil baffle, Damper carrier, Camshaft Drive cover and its felt washer and the starter dog are changed to suit the new crankshaft.

At Chassis 4059 revised carburettor settings were introduced making the 3 Solex Carburettors similar as against the previous two outer carburettors and a different centre carburettor.

At Chassis 4137 the Carburettor controls were revised. The aluminium fulcrum brackets and the control

shaft unit are altered and are not interchangeable with previous similar parts.

At Chassis 4067 an aperture covered by a swing cover was introduced into the top left hand side of the Clutch Casing. At the same time the Flywheel was clearly marked at Top Dead Centre and at 10° before Top Dead Centre. A central marking on the clutch casing aperture enables accurate sighting for engine and ignition timing.

Gearbox

At Chassis 4137 revised selector mechanism was introduced. Redesignated parts were the Gearbox Cover, 1st and 2nd. Selector Shaft, 3rd and 4th Selector Shaft, Selector Plate and Selector Ball Units. These parts are not interchangeable with previous gear-boxes.

At Chassis 4185 redesigned Metalastik Mountings were introduced at the Overdrive to Chassis Frame attachment points.

Chassis

Rear Half Shafts up to Chassis 4171 have a single row (Brass Cage) ball bearing.

At Chassis 4172 a double row ball bearing is fitted with corresponding redesigned Half Shafts, Bearing Housings and Retaining nuts.

Body

At Chassis 4137 the Boot Door Spring Unit attachment brackets were repositioned to give the correct balancing.

Previous cars can be corrected by the introduction of an additional spring which fits inside the existing spring.

Overriders were fitted to later Type 405 Cars and they can be fitted readily to the earlier cars if required.