

1968-74 TRIUMPH INTEGRAL CARRIER (I.R.S.)

TR250 (1968)
 TR4A (1968)
 Stag (1971-73)
 TR6 (1969-74)

DESCRIPTION

Rear axle is an independent rear suspension type with hypoid gears and an integral differential carrier. Inner axles are carried by ball bearings. Outer axles, pinion shaft and differential carrier are carried by taper roller bearings. Preload and backlash adjustment to these bearings is made by the use of selective shims or collapsible spacers. On Stag models, a short auxiliary shaft (Quill shaft) is coupled between rear axle pinion shaft and propeller shaft. It is carried by a ball bearing mounted in a separate pinion extension housing which is attached to chassis members and front axle housing.

AXLE RATIO & IDENTIFICATION

Triumph uses various axle ratios depending on model and year. To determine ratio, divide ring gear teeth by pinion gear teeth.

Model	Axle Ratio
TR250 & TR4A	
Low Ratio	①4.11:1
High Ratio	②3.70:1
TR6 & Stag	②3.70:1

- ① - Pinion 9 teeth, Ring Gear 37 teeth.
- ② - Pinion 10 teeth, Ring Gear 37 teeth.

REMOVAL & INSTALLATION

AXLE SHAFTS & BEARINGS

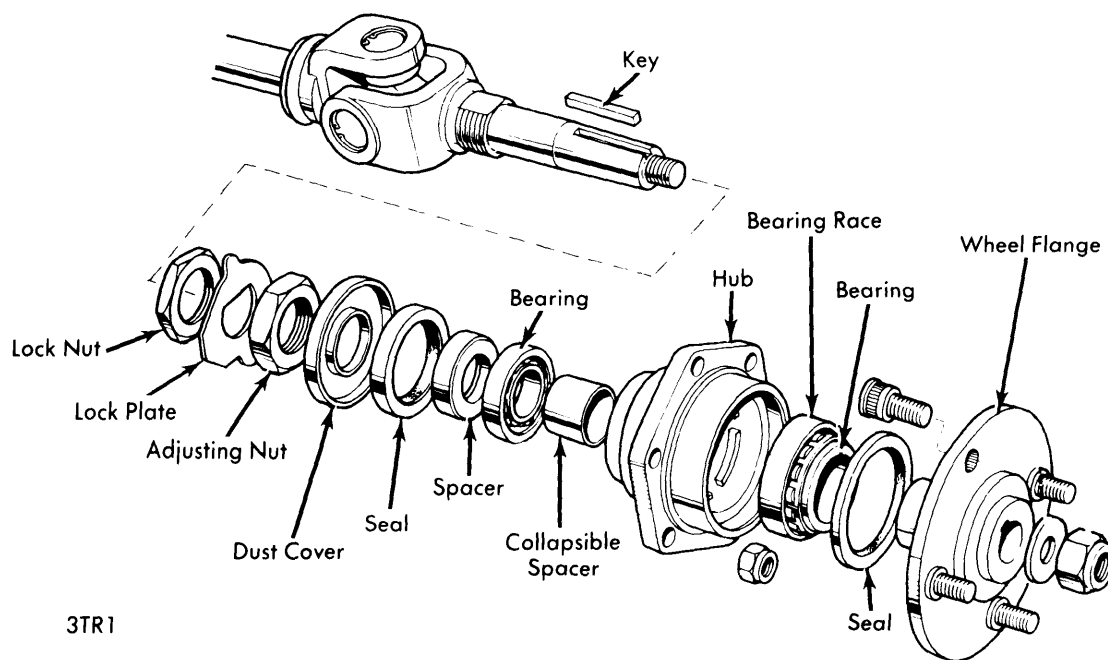
Removal Outer Axle - 1) Jack up rear of vehicle and remove wheel. Release parking brake. At inner axle, remove attaching bolts and separate inner and outer axle flanges. Remove brake drum and bolts attaching bearing hub to trailing arm. Withdraw hub assembly and outer axle shaft as a complete assembly.

2) Support axle assembly in a vice using suitable jig (S318). Mount a dial indicator so that the end play between axle flange and bearing hub flange can be measured. End play should be .002-.005" (.05-.13 mm).

3) If end play is excessive, loosen lock nut and gradually tighten adjusting nut until proper end play is achieved. **NOTE** - If by over-tightening adjusting nut, end play is reduced to less than .002" (.05 mm). Hub assembly must be disassembled and a new collapsible spacer installed.

4) If further disassembly is required, remove axle nut and withdraw wheel flange complete with bearing from axle stub shaft. Remove key and slide bearing hub off of axle shaft. Remove collapsible spacer, inner bearing, rear spacer and dust cover. Pry out inner and outer oil seals. Remove outer bearing race only if replacement is necessary. Using suitable tool (S4221A & -16), remove outer bearing.

Installation - 1) Press bearing races into hub, followed by oil seals with seal lip facing bearing races. Screw lock nut, locking plate and adjusting nut down to bottom of threads on axle shaft. Slide dust cover, spacer, inner bearing and a new collapsible spacer onto axle shaft. Fit key to axle shaft and half fill hub with grease.



3TR1

OUTER AXLE HUB ASSEMBLY

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2) Slide hub and outer bearing onto axle shaft. Install wheel flange and tighten axle nut. Tighten adjusting nut carefully until end play of .002" (.05 mm) is reached. Holding adjusting nut in position, tighten lock nut and bend over lock tabs.

3) Place axle assembly in vehicle and install bearing hub to trailing arm. Install inner-to-outer axle flange bolts. Install brake drum and wheel and lower vehicle to floor.

Removal Inner Axle — 1) Remove attaching bolts and separate inner and outer axle flanges. Remove four bolts and withdraw inner axle assembly from axle housing. Unscrew axle shaft nut and press flange from axle shaft.

2) Press axle shaft from bearing. Pry oil seal from bearing housing. If both axles are to be removed, mark for assembly to their original locations.

Installation Inner Axle — 1) Press bearing onto axle shaft until edge of bearing is even with end of taper. Press oil seal into bearing housing so that lip will face rear axle housing when assembled. Slide seal over edge of axle flange.

2) Install key in axle shaft. Insert axle shaft into flange and tighten flange nut. Install axle shaft assembly into rear axle housing engaging splines in differential side gear. Install and tighten four bearing housing bolts. Connect inner and outer axles.

AXLE ASSEMBLY

1) Raise vehicle and support on floor stands. Place a jack under rear axle housing. Remove exhaust pipes and disconnect outer axle flanges from inner axle flanges. On TR6 models, disconnect parking brake bracket from axle housing.

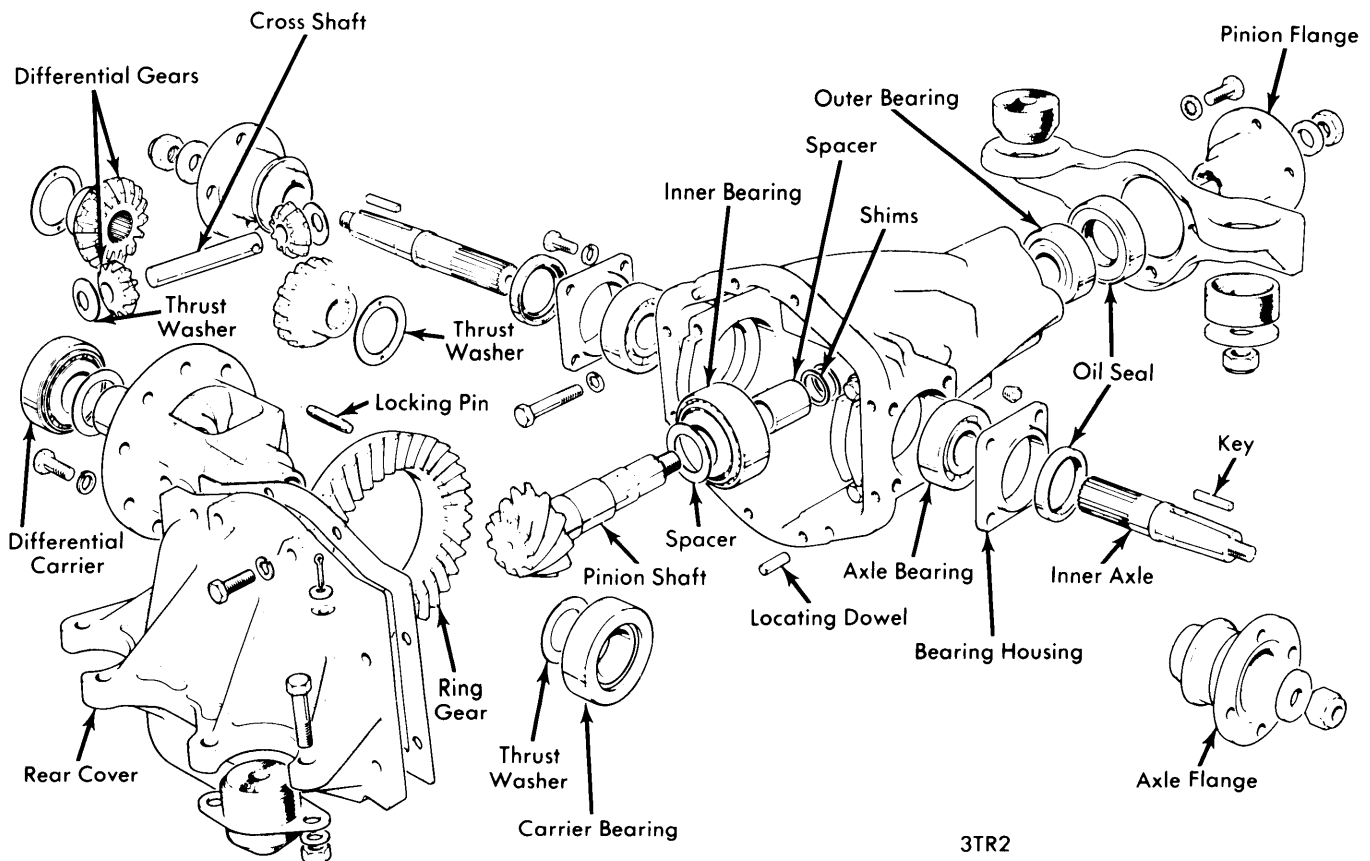
2) With axle housing supported by floor jack, remove nuts, washers and rubber mounting pads. On Stag models, remove bolts attaching pinion shaft extension housing to front of axle housing. Carefully lower axle housing and withdraw to rear of vehicle. To install, reverse removal procedures.

OVERHAUL

NOTE — This procedure assumes inner and outer axles removed from differential assembly and assembly removed from vehicle. For axle removal, See Axle Shafts & Bearings.

DISASSEMBLY

1) Remove bolts and lock washers attaching rear cover and allow oil to drain from housing. Mark differential bearing caps for reassembly. Remove bearing caps.

**INNER AXLES & DIFFERENTIAL ASSEMBLY**

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2) Install suitable differential spreader (S101) to housing. Spread housing and pry out differential carrier. **CAUTION** — Do not spread housing more than necessary to remove differential carrier or damage may occur. Using suitable tool (S4221A-10), press carrier bearings from carrier assembly.

3) Mark ring gear and carrier for proper reassembly. Remove ring gear and drive out cross shaft locking pin. Push out pinion cross shaft and rotate pinion gears 90° to carrier opening. Remove pinion gears and side gears with their thrust washers.

4) Remove cotter pin from pinion shaft. Using suitable flange holder (RG421 or S316), remove pinion shaft nut and flange (TR6) or coupling gear (Stag). Press out pinion shaft and remove shims and spacer. Using suitable tools, press inner bearing from pinion shaft. With a drift, drive out bearing races and oil seal from pinion housing.

NOTE — Ring and pinion gears are replaced as a matched set only. Numbers etched on each gear must be the same.

REASSEMBLY & ADJUSTMENT

Drive Pinion Depth — 1) Press inner and outer bearing races into pinion housing. Place inner pinion bearing on dummy pinion shaft (M84B-1). Oil bearings and install dummy pinion, outer bearing, washer and nut into pinion housing.

2) Gradually tighten nut until a bearing preload of 15-18 INCH lbs. (.17-.21 mkg) of rotating torque is obtained. Zero dial indicator (84B) and place indicator and dummy bearings in differential housing. Rock dial indicator foot across dummy pinion and determine minimum reading. This figure will be the thickness of pinion head spacer needed for assembly.

3) Remove dummy pinion from differential housing. Press inner bearing from dummy pinion.

Pinion Bearing Preload — 1) Place pinion head spacer, See *Drive Pinion Depth*, onto pinion shaft and press on inner bearing. Install bearing spacer with chamfered end towards outer bearing. Install shims, bearing, centralizing collar (Stag), coupling gear (Stag) or pinion flange (TR6), washer and nut. Do not install oil seal at this time.

2) Gradually tighten nut while checking rotating torque. If rotating torque of 15-18 INCH lbs. (.17-.21 mkg) is obtained before reaching 90 ft. lbs (12.4 mkg) of pinion nut tightening torque, more shims are required. If less rotating torque is obtained, fewer shims are required. Adjust shims to achieve correct preload torque and pinion tightening torque.

3) Remove pinion nut and flange. Install oil seal (lip facing pinion), flange and pinion nut. **NOTE** — On Stag models, it is not necessary to remove pinion nut or coupling gear. Tighten pinion nut to 90 ft. lbs. (12.4 mkg) using suitable tool (RG421 or S316). Install a new cotter pin.

Case Assembly — 1) Using suitable tool, press differential bearings onto carrier housing. Install thrust washers and side gears into carrier. Select pinion gear thrust washers so that there will be zero backlash when pinion gears are installed.

2) Using an axle shaft, rotate side gears until cross shaft can be inserted through carrier and pinion gears. Install cross shaft locking pin and peen over edge of pin hole.

Backlash & Side Bearing Preload — 1) Before installing ring gear, measure "Total End Play" of carrier assembly as follows: Mount a dial indicator so foot will touch ring gear side of carrier. With bearing caps removed, push carrier fully to one side of case and zero dial indicator. Move carrier fully in the opposite direction and note total end play measurement for further use.

2) Install ring gear on carrier and place differential assembly back in housing. Fully move ring gear into mesh with pinion gear and zero dial indicator. Move carrier assembly fully in opposite direction until ring gear side bearing is butted in its housing. Note "In-Out" mesh clearance for following example calculations.

Ring Gear Backlash Calculations

"In-Out" Mesh Clearance025" (.63 mm)
MINUS Backlash005" (.13 mm)
Ring Gear Side Shim Pack	①.020" (.50 mm)
"Total End Play"060" (1.52 mm)
MINUS Ring Gear Side Shim Pack020" (.50 mm)
Caged Side Shim Pack	①.040" (1.02 mm)

① — For preload, add .0015" (.038 mm) to each shim pack.

3) Install suitable case stretcher (S101 & -1) and spread just enough to install carrier assembly and shims. Remove case stretcher. Install bearing caps to their original positions and tighten bolts. With a dial indicator, measure ring backlash at several points. If backlash is not to specifications, remove shims from one side and add to the other side until correct backlash is achieved.

Final Inspection & Assembly — Make a tooth contact pattern check to assure proper running mesh. Using suitable gasket compound, install gasket and rear cover to axle housing and tighten attaching bolts.

AXLE ASSEMBLY SPECIFICATIONS

Outer Axle End Play002-.005" (.05-.13 mm)
Pinion Bearing Preload	15-18 INCH lbs. (.17-.21 mkg)
Differential Gear Backlash	Zero
Ring Gear Runout003" (.08 mm)
Ring Gear Backlash004-.006" (.10-.15 mm)

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (mkg)
Outer Axle Flange Nut	90-100 (12.4-15.2)
Pinion Shaft Nut	90-120 (12.4-16.6)
Ring Gear Bolts	38-46 (5.2-6.4)
Differential Bearing Cap Bolts	30-38 (4.1-5.2)