

**R.G.M MOTORS A.T. 10 SYNCHROFLEX BELT DRIVE KIT**

( Not required reading. Required reading starts page 3)

Thank you for choosing our AT10 Aluminium hard anodised belt drive system featuring the superior 32 mm wide polyurethane AT10 belt. Fitted carefully, a long and trouble free life can be expected. Here follows a list of the salient features.

1. 54 Tooth Clutch drum (smallest possible size, reduces weight and maximises applications) and engine pulley are machined from aircraft grade alloy, lightweight, improves acceleration and reduces stress on the gearbox mainshaft.
2. Hard anodising of all alloy parts ensures a very long life expectancy (tooth wear is virtually nil) failure to hard anodise can render components useless within months.
3. Use of a sealed clutch bearing enables the system to run completely dry, this will totally eliminate the irritating clutch slip problem often encountered on Commando's caused by oil contamination, (it should be remembered that the clutch bearing only actually operates when the machine is in gear and the clutch lever withdrawn).
4. Primary ratio increased 11% from 2.192 to 1.964, the faster shaft rotation then reducing stress on gears and gearbox components.
5. Super strong A.T. 10 polyurethane belt is steel backed and is unaffected by oil. Should the more commonly used (and much cheaper) fibre backed HTD belt become oil contaminated the teeth can swell and soften. Comparing equal widths of belts the A.T. 10 belt also has a much greater tensile strength, but perhaps more important it will operate successfully at the higher temperatures sometimes encountered when primary chain cases are fitted.
6. Use of a diaphragm spring gives a feather light operation and ensures easy assembly and clean disengagement.
7. Sturdy chamfered steel outer keeper plate of maximum O.D. firmly locates the drive belt, an inner keeper plate provides additional security.

**Contents: 850 COMMANDO PRE MK3 AND 750 COMMANDO.**

1. Clutch drum fully machined with bearing and bearing circlip fitted, 55 teeth.
2. Engine pulley 28 teeth (this is the maximum size that can be accommodated within the standard Commando primary chaincase), complete with fitted inner keeper plate. (FOR NON STANDARD FITMENTS WE CAN OFFER A RANGE OF PULLEY'S 26 TO 32 TEETH).
3. 890 x 32 mm A.T. 10 drive belt.
4. Chamfered steel outer keeper plate. Please note, on commandoes the outer keeper plate is not fitted to the pulley. It is sandwiched between the rotor and pulley with the spacer placed inside the pulley. The tapped holes are there for alternative applications.
5. Rotor lock washer.
6. Clutch lock washer.
7. Crank spacer (fits inside pulley)
8. Contents list and instructions.

**Contents: 850 MK3 COMMANDO. AS ABOVE PLUS**

Spacer to suit MK3 crankshaft. (NOT applicable if retaining starter motor.)

Special stainless steel gearbox top bolt and nut incorporating our own design of face cam adjuster enabling gearbox tensioning on a MK3 without slotting the cradle simply by rotating the bolt via its fitted lever supplied. The gearbox is automatically adjusted squarely.

1. 980 27 mm belt in place of 890.
  2. Three stator spacers and combined studs.
  3. Three 5/16“ unf nyloc nuts.
  4. Three 5/16” flat washers.
  5. Special narrow pulley to fit behind stator.
  6. Special extended rotor nut.
  7. Modified clutch centre.
  8. Diaphragm spring clutch compressor.
  9. Full set of clutch internals. All clutch plates, diaphragms, adjusters, etc.
- Please note, we can supply an alternative front pulley to suit single cylinder crankshafts at no extra cost.

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**Why fit a belt drive?**

**Drive belt technology has progressed enormously over the last twenty years it is certainly a fact that any designer working today whose chief aims were performance and noise reduction would specify a belt drive rather than a chain. Whilst the many different designs of primary transmissions used on British motorcycles, and the many different types of belt drive kits on the market make direct comparisons difficult, typically you should find that a belt drive kit offers greater efficiency (upto 98%). A very noticeable reduction in noise and vibration. Reduced weight. Complete elimination of clutch slip and of course complete absence of oil leaks (due to the elimination of oil). Improved gear tooth life (due to the elimination of high frequency shock loads which a traditional drive chain transmits, and the increased rotation speed of the gearbox effectively dividing the loads through a greater number of teeth). Our belt drives have been fitted to machines as diverse as Vincent twins, Puma racing outfits, vintage racing sunbeams, Pre 65 trials bikes and of course Nortons in all shapes and sizes. From plodding trials bikes to supercharged drag machines, all using essentially the same basic components. On many occasions special builders have returned again and again and specified our belt drives.**

Currently we can supply kits for all the Norton heavy twins with or without alternator, all the Norton road going singles with or without alternator and various pulleys and clutch centres suitable for BSA and Triumph but we have not as yet had time to develop these into a complete off the shelf kit.

Pre MK3 Commando belt drive kit	£240.00
MK3 Commando belt drive kit	£260.00
MK3 Commando retaining starter motor	£285.00
Complete Belt Drive with all clutch internals	£418.00 to £440.00 depending on model

**IN ADDITION TO THE ABOVE BASIC KITS WE OFFER SPARES AND ACCESSORIES AS FOLLOWS:**

Engine pulley blanks, steel blanks for converting other machines to belt drive standard tooth profile on the outer diameter but with a plain 1 and 3/8 bore, the original sprocket can thus be turned or ground down and then fitted into above, simply by welding. We can also supply clutch centres modified to fit our belt drive onto a Triumph or BSA mainshafts.

Complete double sided primary chain tensioner, tensions on both left and right of gearbox, in stainless steel, includes gearbox top bolt. PTL as above but not including the right hand components (which are standard Norton)

Hard anodised Commando clutch drums (i.e. our standard clutch drum) aircraft grade alloy with 54 or 55 teeth

In order to accommodate the widest possible number of applications we stock belts in the following lengths, 780, 800, 840, 890, 920, 960, 980, 1000, 1010, 1050, (all mm long).

Aluminium hard anodised clutch pressure plate, 0.050" thicker than std, designed to work with fibre clutch plates and recommended for belt drives, this converts the clutch to one finger operation. They do wear on the drive face and require the clutch internals to be cleaned two or three times over the first hundred miles to remove the wear debris until they have bedded in.

Clutch centre to fit onto a pre Commando gearbox mainshaft. This is a Commando clutch centre but modified to fit directly onto an earlier mainshaft that has no circlip groove

Another newly introduced part is our Commando clutch centre with a plain 1/2" bore (with the bore left soft) this enables the customer to machine to fit virtually any gearbox mainshaft. We also have clutch centres to fit certain BSA and Triumph bikes to allow the Norton diaphragm clutch.

For those people building Triumph engine specials we can also offer engine pulleys broached for the Triumph crankshaft, these are steel, 28 or 30 teeth with two keeper plates.

#### INSTRUCTIONS (GENERAL) (required reading here on in)

##### 1. BELT TENSION

Belt tension is not as critical as people sometimes think. If you aim for freeplay of 1/2 inch up and down movement when hot. (This is actual FREE PLAY, not total up and down movement which will be greater). When static there should be no pull on the bearings. Total up and down movement will depend on gearbox wear, how hard you pull, etc., but expect at least an inch. Remember check when hot and if possible examine belt when under load to make sure it is not trying to climb over the outer keeper plate. (A rolling road is ideal.) Alternatively check belt tension by rotating belt firmly between finger thumb, 70 to 80 degrees of rotation each way being correct. Essentially the aim is to have the belt when the bike has reached operating temperature still maintaining freeplay on the bearings. In certain conditions, very hot climates or excessive stop-starting, a small additional amount of freeplay may be necessary to allow for expansion. To test for this, check for freeplay when hot.

##### 2. BEARING FITMENT AND REMOVAL

If you purchase a complete belt drive kit from us then the clutch bearing will be fitted, if you should ever have need to change the bearing. First you

must remove the clutch centre, the should be carefully pressed out having first removed its retaining circlip, great care must be taken if the centre is tight, leave it to soak in releasing fluid and ease out gently. Then the bearing should be removed by placing the drum in an oven at about 200 degrees, leave until the bearing drops out otherwise unaided. A new bearing should drop in unaided at again 200 degrees and this drum left to cool.

3. SHAFT ALIGNMENT Perhaps the most important aspect of fitting a belt drive is shaft alignment, whereas on a chain driven motorcycle any small discrepancies in shaft alignment will merely result in a small reduction in transmission efficiency, with a corresponding increase in heat generation and wear. If a belt drive is fitted onto shafts that do not run parallel then the belt is thrust firmly towards the lesser diameter. In practise this always equates to the belt trying to move outwards away from the engine hence the heavy outer keeper plate. As obviously the crankshaft is fixed we turn our attention to the gearbox mainshaft alignment, when tensioning this in the conventional manner the box is tensioned from the right hand side, the tendency here is to allow the box to pull back more on this side. This undesirable effect can be countered in one of two ways, either when tensioning the box use rear wheel adjusters to pull the box back squarely, (pressing the chain down with your foot also works) or use our double sided primary chain tensioner part no: PTC which with the drilling of one 3/8 inch hole will allow the gearbox to be tensioned from both sides. This is best done with the inner chaincase removed, once correct it will not need adjustment for many thousands of miles. The aim is to actually have the gearbox shaft pointing away from the crankshaft slightly so that under power the mainshaft flexure and the small amounts of play in the relevant bearing/bushes combine to achieve optimum position. As a guide the belt should feel slightly tighter on the outside edge, and when fired up and ticking over the belt should ideally not be running against the outer keeper plate.



Using a pair of ground centres to check shaft alignment. This accurate method of measurement reveals that the majority of shafts run far from parallel.

1. Dismantle the primary transmission as per the workshop manual do not remove the inner primary chaincase (Pre MK3) (unless fitting the double tensioner). At this stage those people with a MK3 Commando must remove the inner primary chaincase and replace the gearbox top bolt with the stainless item supplied. The nut should be on the right hand side with the face cams facing forwards. Please note this only applies to MK3 Commandos. The tensioner allows for any small amounts of bedding in that may occur and also accomodates the variation found on the shaft distance of the MK3 Commando. Now replace the primary chaincase (MK3) obviously without the primary chain tensioner or its mounting studs.
2. Assemble your clutch centre etc. into the belt drive clutch drum.
3. Debur any rags from the top edge of the woodruff key then fit the key to the crankshaft.
4. Place pulley over crankshaft engage woodruff key and tap home with a soft tubular drift.
5. Check that the spacer is over the clutch location circlip on the gearbox mainshaft, place the drive belt around the clutch and assemble the clutch onto the mainshaft engaging the belt with the engine pulley at the same time.
6. The clearance between the inner primary chaincase and the rear of the clutch drum should be checked. Some localised points are close. The necessary clearance can be achieved by localised re working of the chaincase or if the clutch is located by a circlip as non commandoes then the addition of an appropriate shim.
7. Now fit the spacer and then the keeper plate over cfankshaft. Note that the keeper plate is fitted with the chamfered edge inboard, ie against the belt and the spacer is fitted with the large counter bore against the pulley.
8. Next fit the rotor, lock washer etc. Assemble alternator as std (remember to check the rotor to stator air gap).
9. When the crankshaft nut is fully tightened, check the clearance between the back of the pulley and the crankcase. Crankcase shape and thickness varies quite a lot and the clearance is reduced as the motor warms up. Minimum cold clearance is 1 mm.
10. Clutch can now be assembled as std, i.e. first a fibre plate then a steel ending with the thick alloy end plate, we recommend four fibre and three steel plates, followed by our alloy plate. It may be necessary to carefully relieve the teeth on the fibre clutch plates, these should be a sliding fit on the clutch centre, careful use of a sharp knife may be required.
11. Check tension on all disturbed nuts and bolts check that the rotor nut is torqued up to 80 ft lb. Turn clutch adjuster in until it just begins to lift the operating arm back off 3/4 of a turn and then take up the slack with the cable adjuster.

**Additional notes for Pre Commando machines.**

Atlas and Dominator owners wishing to retain the alternator and standard chaincases will have to space the stator out with the three special studs provided, as this will disengage the stator from the housing these incorporate an increased diameter to locate the stator. Remember to check rotor to stator clearance with an .008" feeler gauge, if there is a tight spot slacken the three stator holding nuts, insert a feeler blade in the tight spot, as thick as possible, and retighten the nuts, now check clearance again. Should an alternator not be required then the standard Commando kit with the appropriate length belt can be fitted. Other fitting details are as per Commando/general notes above.

Your belt drive should now be ready to run, we recommend for maximum advantage to transmit maximum power the unit should run dry. However if you expect to be using your motorcycle in particularly hot climates, or you are using it in competition events and you retain the enclosed primary chaincase it would be worthwhile arranging the passage of some cool air through the chaincase, the specific details of which can safely be left to the preferences of the individual owner.

Now is the time to see if all your effort has been worthwhile, testing the unit you should experience absolutely no clutch slip under any conditions, finger light clutch operation, smoother running, quieter running, and the super light weight design should produce a small increase in acceleration and or top speed depending on final gearing used.

Should you encounter any technical difficulties contact: R.G.M. Motors.