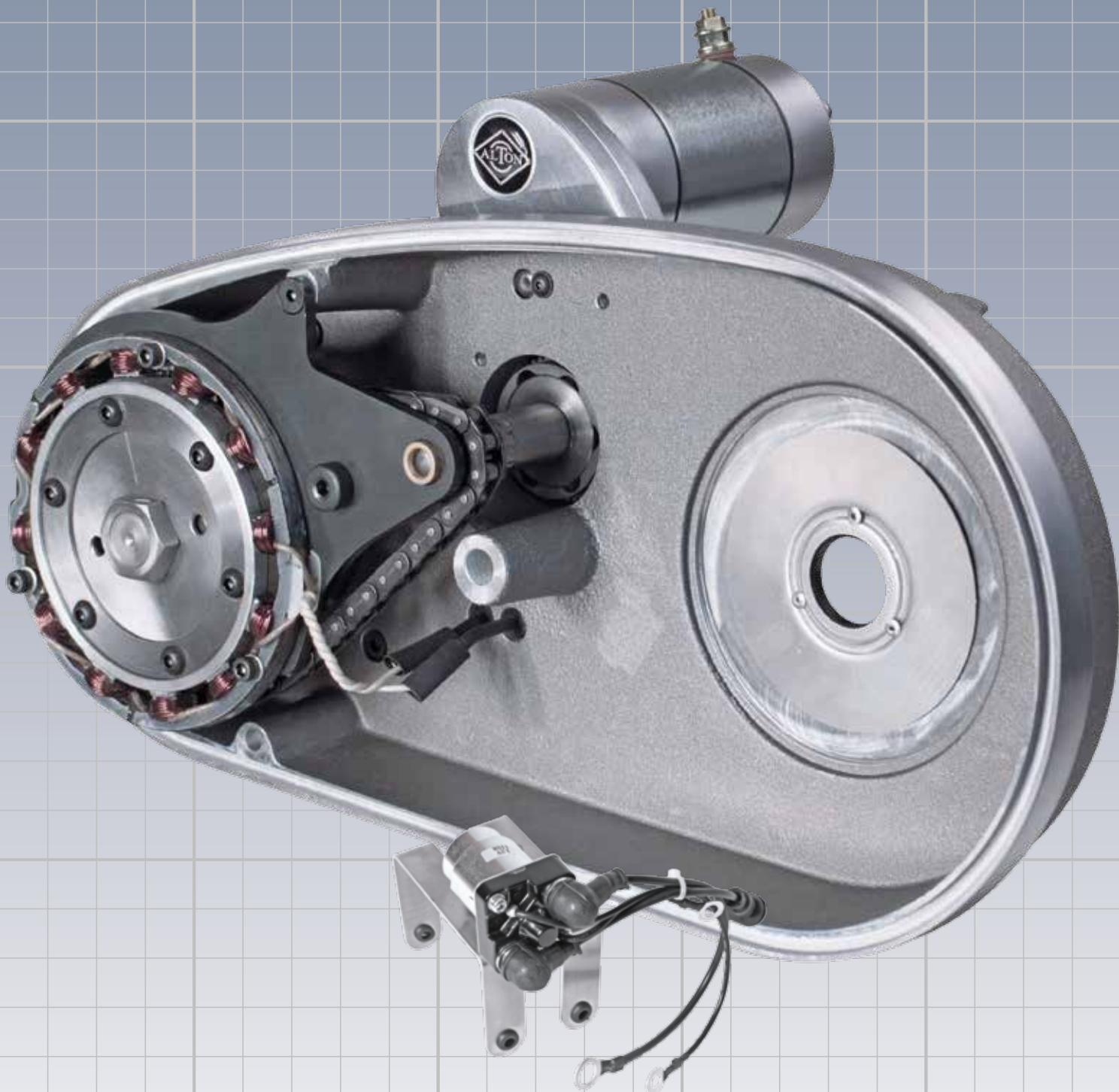


# ★ Electric Starter Kit ★

Norton Commando 750 & 850 MK II

*Fitting instructions*



EKit for Norton Commando 750 and 850 negative or positive earth models.

**Note.** This kit is not designed for the early 750 Fastbacks fitted with a distributor nor for the MK3 which was fitted with an electric starter.

## Kit parts

Open your parcel and check the contents against this list.

The steady plate is packed inside the casing and lightly bolted in place. Remove it and the fixing bolts from the casing and put them to one side until ready to install it correctly.

You should familiarise yourself with the contents and the rest of these instructions before going any further.

- 1 Inner casing
- 2 Steady plate
- 3 Sprag clutch rotor assembly
- 4 Starter chain
- 5 Alternator stator
- 6 Chaincase sealing band
- 7 Double-gear
- 8 Spacer
- 9 Crankshaft nut
- 10 Stud
- 11 Relay fitting
- 12 Relay
- 13 Rubber cap (x3)
- 14 Heavy duty cables
- 15 Shoulder bolt
- 16 3 x 1/4 BSW screws and washers
- 17 Counter-sunk Allen screws and washers
- 18 Allen screws for Alternator stator and washers
- 19 Fibre shims
- 20 Plastic block for crank-shaft blocking



### HEALTH WARNING

The rotor contained in this kit contains strong permanent magnets and should not be handled by people fitted with Pacemakers or similar electronic medical appliances without taking medical advice first.

Note that once fitted to the bike, the rotor poses no danger to health - it is handling the rotor in close proximity to Pacemakers and similar which could be dangerous.

## Contents

★ A	Before going any further	3
★ B	Organise your workspace	4
★ C	Step by step instructions	5
★ D	A brief history of why your switch may be either on the left or right of the handlebars	13
★ E	Appendix on belt drive modification	14
★ F	Alternative wiring diagram for negative earth kits	15





## Before going any further.

Thank you for your purchase of the Alton eKit electric starter for pre-mark 3 Norton Commandos. We hope you will be very happy with your kit and enjoy using it on a regular basis. Before fitting it, there are a few points to take into account.

The Alton eKit for Norton was specifically designed to be a 100% reversible installation. No original parts are modified during the fitting and use of the motorcycle. Owners should store all their unused original parts safely and not use or adapt them in any way for use with this kit. If your bike is not fitted with Lucas-type switches, you may need to buy a push-button.

Our eKit was originally created for use with a chain-driven primary. Under certain circumstances it can be used in conjunction with belt-drive primary systems but owners should be aware that Alton take no responsibility for problems arising from modifications to our parts for use in a belt drive system nor for parts made by third parties to enable fitting with belt-drive.

You must follow the instructions completely. Our kit is modern technology and you are about to fit it onto a motorcycle that is probably at least 40 years old. In an ideal world, our kit can be fitted and operational in approximately 3 hours. However you should be prepared for eventual surprises. Fitting an electric starter is in no way a fix for a motorcycle that is difficult to start because of ignition or timing issues. A motorcycle that is difficult to fire up will remain so unless they are addressed.

You must check that your isolastic mountings are in good condition. Excessive movement caused by inadequately adjusted isolastics can result in damage to our kit and to your motorcycle.

You should also check the condition of the woodruff keys used in mounting the rotor onto the crankshaft. If these are worn, we advise fitting new ones during the installation of our kit.

We recommend replacing the drive side crankcase main seal before installing the eKit. These seals are inexpensive, easy to replace and worth doing while you have the primary off.

We also advise that you think carefully about your level of mechanical competence. If you have never taken off the clutch, you can probably take it as read you don't have sufficient knowledge to safely fit our kit. If in any doubt, get a professional to install it. Kit breakdowns can be caused by poor installation - if you think it looks complicated, it's probably a good idea to get help.



Upon receiving your kit you should note the serial number and send, either by post or email, a duly completed copy of your warranty activation document. Each kit is a unique craftsman-made product and there may be slight differences in the parts so in the case of a service request or spares order, the serial number will be necessary.

Before fitting the kit, owners should ensure they have a suitable battery in as-new condition. Failure to use a suitable battery can result in damage to your kit. Batteries should be at least equivalent to reference YTX 20L-BS 12V 18Ah. If in any doubt consult a reputable battery specialist to be sure of acquiring a suitable model.

If you have any doubt or questions on fitting your kit, your first point of contact is the distributor from whom you purchased your kit - they should be able to help. In addition you may contact us via our after-sales service on the Alton internet site. We aim to reply to all service requests within 24 hours but at weekends or holiday times this may take slightly longer. In any case, don't improvise - ask for advice.

None of the above points affect the purchaser's statutory rights and warranty in any way. This is defined as two years parts, product repair or replacement as seen fit by Alton. Any litigation is subject to French law only.





# Organise your workspace

Never install your kit in a rush. Ensure you have a clean, well lit and quiet space in which to work. Lay out your tools in advance ensuring you have everything you need for the job. This may sound obvious but parts have been damaged or even gone missing when these suggestions are overlooked. Remember you should never start up your bike in an enclosed, badly ventilated space.

## ★ Tools required



- |                             |  |
|-----------------------------|--|
| 1 Hex spanner 13/16" AF     | 9 Plastic block for crank-shaft blocking           |
| 2 Hex spanner 3/4" AF       | 10 Clutch spring compressor Norton part n° 06-0999 |
| 3 Allen key 5 mm            | 11 Rotor extractor                                 |
| 4 Allen key 4 mm            | 12 Spacer  |
| 5 Allen key 3 mm            | Loctite or similar                                 |
| 6 13 mm metric spanner      | WD40 or similar                                    |
| 7 Allen key 5/32"           |  |
| 8 Socket for crankshaft nut |  |

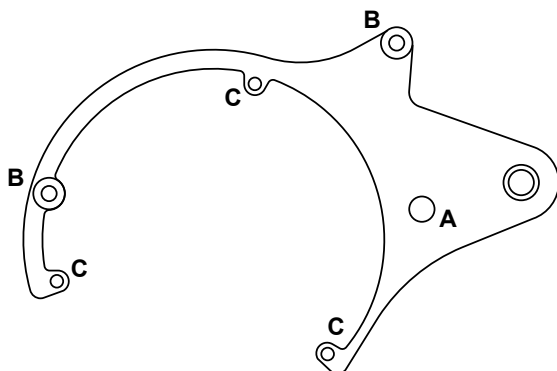
You will find that the steady plate ( N° 3 ) is packed inside the casing and is lightly bolted in place. When you are ready to start fitting the kit, remove it and its fixing screws and put them to one side until you are ready to fit them.

Note that the steady plate fasteners must not be replaced by any other than those listed here. If they are ever broken or mislaid these are the references and you may order them direct from Alton.

Point A shoulder bolt ( stripper bolt ) M8/10/20 (ISO7379)

Points B Countersunk allen screws M6 x 10 (DIN7991 ISO10642)

Points C Allen screws M5 x 16 (DIN912 ISO4762)



Disconnect your battery - ensure its connections are clean and free of corrosion.

Verify which switch you will be using and give it a good clean ensuring the contacts are not oxidised as this can affect the reliability of your system. Normally you will be connecting your kit to the spare button situated on the same side as the three position flip-switch ( this can vary - see electrical section for more information )

Dismantle your original primary drive completely - use a Norton workshop manual or the Haynes manual if needed. Put your original outer casing, the locating pin that holds it in place and the two Woodruff keys to one side as you will be using these. Put all your other original parts safely away in case you ever decide to remove the eKit.

Check the following points to ensure your bike is ready to receive the electric starter kit. Verify the condition of the Woodruff keys. They should be in good condition and not worn or damaged.

Check your crankshaft - ensure that the thread is in good condition to avoid damaging the rotor nut supplied with the kit.

Look at the crankshaft movement - it should rotate in a perfect, circular movement, i.e. not elliptical, - a sure sign of engine wear which could cause poor functioning of the kit.

Examine the three threads in the crankcase particularly if your motor is in original condition and has never been restored - this is a weak point on the Norton and these threads are often badly worn. If this should be the case, get them repaired before proceeding.

Check the isolastic mountings for undue wear - they must be correctly shimmed up or adjusted (depending on which system you are using) to the setting specified by Norton (see your manual). Excessive play can damage your kit and your bike.

Some clients have found our standard screws for mounting the inner primary chaincase to the crankcase are too long. Others have been obliged to remove a little material from the crankcase. This is probably linked to differences between individual casings and how they were machined from the raw foundry pieces. In the 1970s machine shops were far less automated than today and there are many variations, small but which could in rare cases require that little modifications are carried out to ensure a good interface between our kit and the donor motorcycle. Ideally, ensure the three bolts are locked in place by using Loctite or similar, and that the bolts do not protrude inboard and foul the flywheel. Note that there is end play in the crankshaft BY DESIGN. Therefore make sure the crankshaft is pulled to the drive side as far as possible when checking this.



# Step by step instructions

## ★ Step 1

### Position the central stud and provisionally tighten it

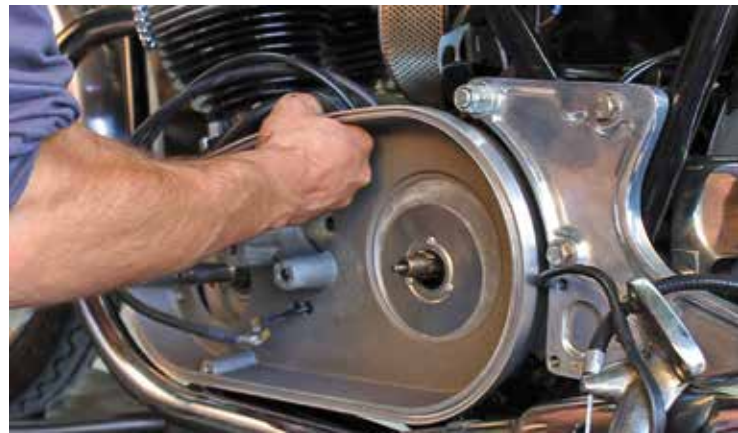
Remove the black stator support plate from the Alton casing. Put it carefully to one side with its screws. Position the central stud and finger tighten it in place.



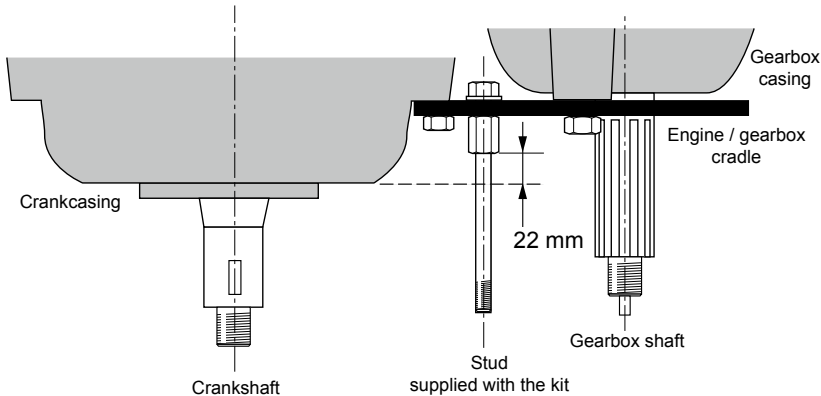
## ★ Step 2

### Provisionally position the Alton casing

Provisionally position the Alton casing and using the three screws and washers provided, secure it temporarily in place. Check it seats correctly. Check the measurements in the diagram. If you can't pass the casing over the central stud, you may adjust the hole in the engine plate slightly until the stud lines up nicely with the casing.



YOU MUST CHECK THE DISTANCE "22 mm"  
FROM ABOVE (bird's eye view)



Use shims if necessary to achieve the right fit as Norton did originally.



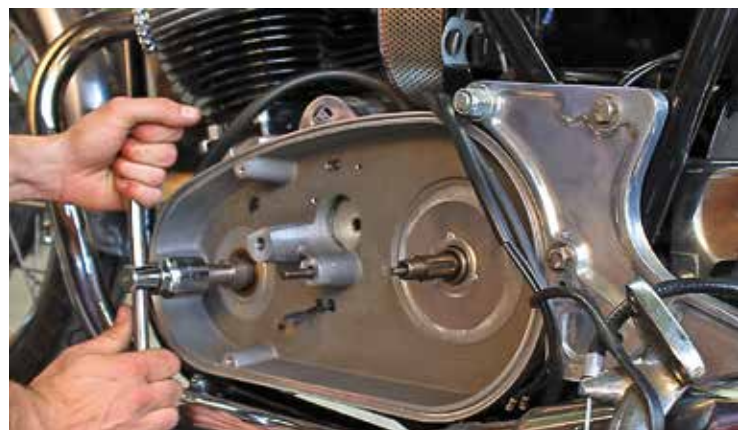
**NB** this is not shown in the video because the Norton used did not require it. This does not mean that yours will not. Check anyway.



## ★ Step 3

### Check for fouling

Fit the rotor nut and turn the crankshaft over to verify that nothing is blocking its rotation. If it turns smoothly move to the next step. If it blocks, check the screw lengths and shorten them if necessary.





## ★ Step 4

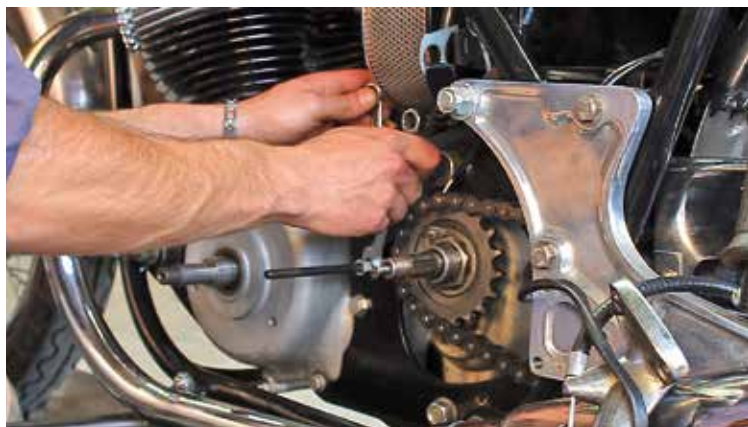
Remove the screws, washers and casing



## ★ Step 5

Complete the central stud installation

Fully tighten the central stud in place with the coupling nut on the outer side of the plate and the screw and washer on the inner side of the plate.



## ★ Step 6

Apply joint compound or similar to the crank casing instead of a gasket



## ★ Step 7

Replacing the casing

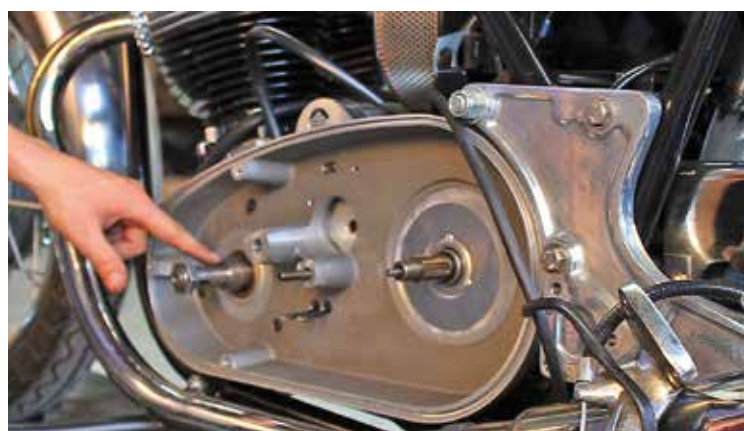
Replace the casing. Replace the screws and their washers using Loctite or similar. You should be able to tighten them most of the way by hand if the casing has been correctly seated. Fully tighten them.



## ★ Step 8

Begin the primary chain and clutch assembly

Use the rotor nut to turn the crankshaft until the inner keyway is at «top dead centre» (12 o'clock).





## ★ Step 9

### Continue the primary chain and clutch assembly

Replace the clutch, the triplex chain and the crankshaft sprocket (refer to the Norton workshop manual). Be sure to refit the clutch alignment washers. Check that the engine sprocket fits correctly on the shaft taper. Remember to verify the alignment - just because the shims are there does not mean it was done correctly by the last fellow.



## ★ Step 11

### Positioning the rotor keyway

Using the rotor nut again, turn the crankshaft so that the rotor keyway is at «top dead centre» (12 o'clock).



## ★ Step 10

### Complete primary chain and clutch assembly

Finish the clutch assembly using the correct Norton service tool. Many Nortons are fitted with an extra steel plate which allows for better ease of clutch pull - you might like to consider this while you have the clutch dismantled. Also remember that correct cable lubrication is essential for a light clutch. And a final point on good clutch etiquette is to be sure the cable is routed correctly. All of this will help to ensure a really efficient functioning of your electric starter.



## ★ Step 12

### Immobilise the crankshaft

Using the small, plastic chock provided, jam the crankshaft so that the rotor nut can be removed without displacing the keyway.



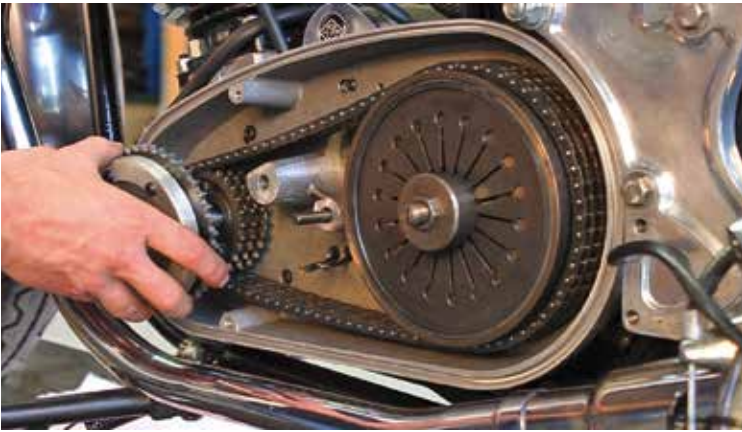
## ★ Step 13

### Dry fit

Proceed to a dry fit of the sprag clutch assembly on the crankshaft. It should slide easily on the crankshaft. If it is hard to position, then polish the crankshaft with emery paper until you obtain a free-sliding action. Check the height of the Woodruff key - if it catches on the keyway in the sprag clutch assembly, adjust its profile until the assembly passes neatly and smoothly over it without using force. Then clean the area thoroughly with solvent to be sure no grit or debris remain.

If necessary, sand and polish the crankshaft to allow a smooth assembly of the sprag clutch assembly.

Once the dry fit is satisfactorily accomplished you can remove the sprag clutch assembly and proceed to the full installation.



## ★ Step 14

### Spacer and Woodruff key

Fit the spacer with the larger side facing outwards. Insert the Woodruff key being sure that the key does not move out of its horizontal axis. If you are fitting the kit to a belt drive model, pay special attention to this section and see the additional instructions supplied in the appendix document for belt drives.



## ★ Step 15

### Fitting the sprag clutch assembly

Assemble the sprag clutch, the 3/8" chain and the double gear/shock absorber in one go. See the photo for how to fit the three elements together. The double gear is going to sit in the bushing in the inner cover. Be aware that the rotor section contains strong magnets that will try to grab onto anything metal they can reach - the chain is especially close so some patience is needed here so keep it taut while carrying out this manoeuvre.

Pay attention to the Woodruff key, line up carefully so you don't catch the key on the inner race when mounting the rotor assembly. Having a second pair of hands available can be useful at this point.

Note that after assembly the chain should not be taut - it is designed to be intentionally slack.

Once the sprag clutch assembly is in place, replace the rotor nut and tighten it up a little but only hand tight for the moment.





## ★ Step 16

### Steady plate

You are now ready to replace the steady plate. Place it in position and tighten the central bolt (stripper / shoulder bolt). Replace the other screws. Make sure it has seated as far as it possibly can go towards the interior of the inner casing.

These screws are specific and therefore not replaceable by other 'standard' screws. - if ever they are mislaid you may re-order them using the part numbers shown earlier in the instructions.



## ★ Step 18

### Check proper movement

Remove the plastic chock. Turn the crankshaft clockwise to check it rotates freely in both directions.



## ★ Step 17

### Secure the rotor nut

Loctite the rotor nut in place. Lock the crankshaft in place with the plastic chock and tighten the rotor nut using a torque wrench to a minimum of 65 to 70 lbs-ft (95N.m 9.5 kgm). This is really important. Failure to use Loctite and the proper torque settings will likely result in the nut backing off and creating a major failure.



## ★ Step 19

### Position the stator

Position the stator checking that it is the correct way around with the wires facing the outside.

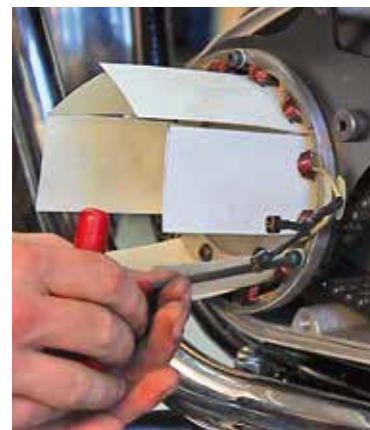
A - Fit 2 of the 3 stator screws with their washers.  
B - Insert the shims making sure there is one between each winding and the rotor.

C - Adjust the air gap by moving the stator sideways.

D - Tighten the 2 screws.

E - Fit and tighten the 3rd screw with its washer.

Then fully tighten the retaining screws and remove the shims. Turn the crankshaft. Double check the clearance ensuring the rotor stays clear of the stator at all points of its rotation. Do not move on until you are sure that this is the case.



## ★ Step 20

### Connecting the stator

Connect the stator wires to the two wires situated inside the primary chaincase and insulate the connections. Any order will do - there is no «right or wrong» way round.



## ★ Step 21

### Sealing band

Position the rubber sealing band using a jointing compound if wished. Keep the join at the top and cut to length with a cutter or sharp knife. Check the primary chain tension using the original Norton specifications.



## ★ Step 22

### Closing the casing

#### Fitting the outer primary chaincase cover

Place the pin in the lower edge of the casing, Position the outer casing. Replace the retaining screw and washer and fully tighten.



## ★ Step 23

### Oil

Add oil as appropriate (primary chain models only) according to Norton instructions.





## ★ Step 24

### Connect the alternator cables

Pass the cables that come from inside the casing under the back of the starter motor and connect them to the two original Lucas alternator cables. One is green/white and the other is green/yellow. Again the order is not important.



## ★ Step 26

### Position the battery

Position the battery and fit the relay using the supporting bracket which sits on top of the battery in most cases. Tighten the screws. You may want to use additional means such as «j» hooks to secure the bigger battery.

If you prefer to fit the relay elsewhere, this is ok provided you keep it away from the carburetors and any place where it could ignite fuel in case of a spark.

You must always use the correct quality cables for connecting the kit. We supply cables that conform to our quality and safety standards - should you need longer cables than those supplied for a standard installation contact us and we will supply you with the length you require.



## ★ Step 25

### Connect the starter motor

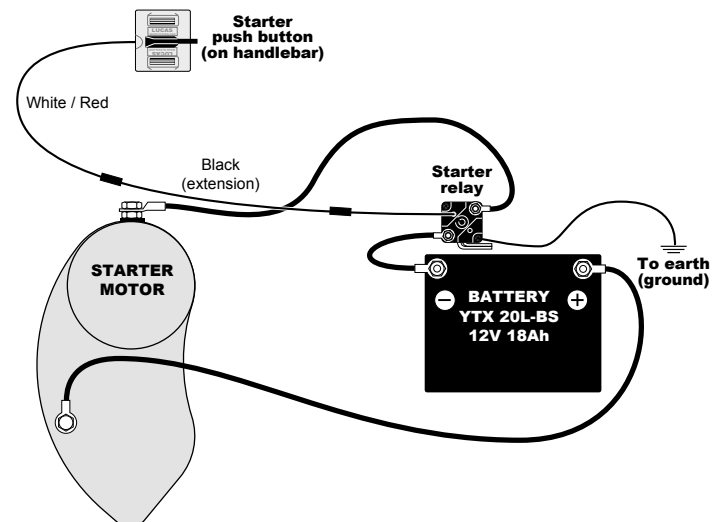
Fit the black protective dust cap onto the HD cable (wide diameter, longest provided in kit). Screw in place on the starter motor connector.



## ★ Step 27A

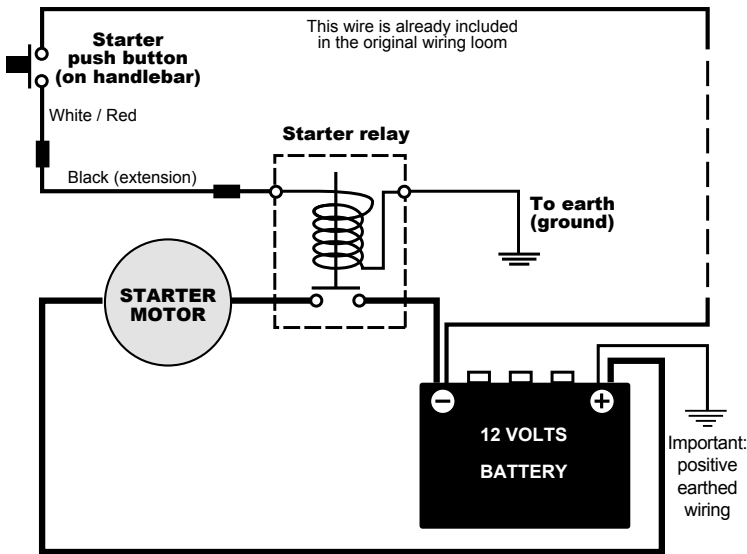
### Battery and relay connection

Connect the battery and the relay as shown in the wiring diagrams. Refer to the diagrams in appendix E if fitting a negative earth kit. Otherwise use these.



## ★ Step 27B

### Battery and relay connection



## ★ Step 28

### Connect the relay to earth

## ★ Step 29

### Connecting the switch

Locate the white/red wire that comes from the handlebar switch (this can be either on the left or right depending on the model and year of manufacture/modification).



Not sure which is the right wire? There are two red and white wires? Not got the original wiring loom?

You need to identify which one is the correct wire.

If using a test light, connect the battery and set the ignition switch to on. Connect the earth lead of the test light to the positive battery terminal. Placing the probe end alternatively into the two wires, identify which one

lights the test light when the starter button is depressed. This is the correct wire to use for starting the motorcycle.

If using a multi-meter, set to Ohms (on a low scale, such as 20). Connect one probe to the end of one of the wires, and the other to the battery negative terminal. The ignition switch must be in the on position. Then press on the starter button while holding the meter in place. If it is the starter button wire, the gauge will show continuity. If there is no response, then try the other wire - it should make the gauge indicate continuity.



Before going any further, it is a good idea to clean the handlebar switch, checking for any corrosion that could result in a poor connection. Pay particular attention to the starter button - remember it's probably been there for around 30 years doing nothing apart from getting wet. Apply some WD40 or similar product to ensure a good dry connection.

Connect this cable (white and red), using the supplied extension, to the relay. No cable or no switches?

If your bike is not fitted with Lucas type switches, you may fit a push-button switch of your choice, connect it to the relay using the extension cable as indicated above. It would be best to use a white/red cable just to be coherent and helpful in the future if you sell the bike.

If this is starting to feel complicated or you suspect your wiring is far from the original, we strongly suggest getting help from someone competent in bike electrics or your favourite bike shop's electrical person.

## ★ Step 30

### Starting your bike.

While we accept you are now raring to go and see the results of your work, we would like to remind you that certain safety precautions should be taken after any major alterations to a motor vehicle whether it be in a private garage or a mechanical workshop.

Don't be in too much of a rush - you are nearly there!

**SAFETY NOTE!**  
**ROLL YOUR BIKE OUTSIDE BEFORE ACTUALLY STARTING IT UP.**



With the plugs removed, crank the engine with the electric starter.

If the engine turns smoothly, refit the plugs BUT not their caps and crank the engine again with the electric starter.

**NB** - If you have electronic ignition fitted, check with the manufacturer's information that it is safe to carry out the tests above.



## Performance notes!

Low battery voltage can increase the risk of starter kick-back, so avoid excessively draining the battery. It is advisable to have the lights off during this procedure.

If your kit was fitted as part of a major rebuild that included the engine, you should use the kick-starter until the engine is correctly tuned.

Whilst the starter mechanism is mechanically resilient to occasional backfires, the stress caused is considerable. Any persistent backfire problem should be investigated and fixed immediately - a bike that kicks back like a mule is going to break your kit!

ONCE YOU ARE SATISFIED THAT YOUR ENGINE IS TURNING OVER SMOOTHLY, AND THAT TIMING SETTINGS ARE CORRECT, YOU CAN USE YOUR ELECTRIC STARTER.

**WE RECOMMEND OWNERS PULL THE CLUTCH LEVER IN AS A SAFETY AND PERFORMANCE FEATURE. SAFETY - SINCE THEN THERE IS NO ISSUE IF THE BIKE IS LEFT IN GEAR. PERFORMANCE - AS THE STARTER IS NOT TURNING THE GEARBOX OVER WHILST IN STARTING SEQUENCE, JUST THE CLUTCH BASKET THUS SAVING A LITTLE WEAR AND TEAR.**

Happy riding! 

## A brief history of why your switch may be either on the left or right of the handlebars

According to Matthew Vale, all Mk2 Commando models were supplied with a button destined for use by a possible future starter already fitted.

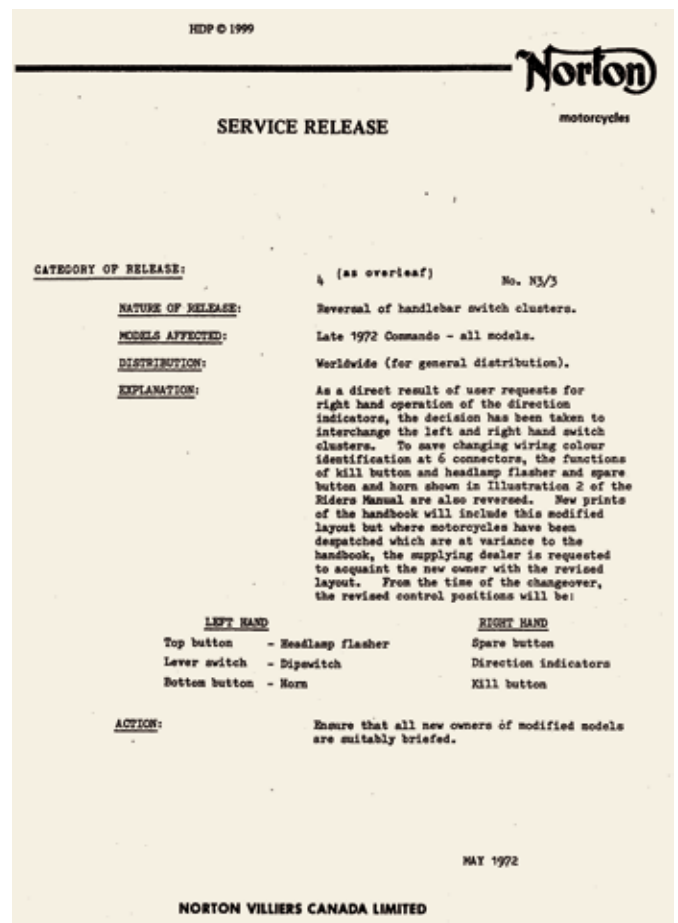
(Norton Commando -The complete Story, Matthew Vale, Chapter 3, page 95).

If we take this as a starting point, Mk 2 Commandos have this spare button situated on the right hand side of the hand bars. But earlier models don't have this button OR it is fitted on the left hand side. Why is this the case?

Because the very first Commandos don't have the same switch equipment at all and don't have a two or three position flip switch.

Then we have the introduction of the most common set-up - the Lucas switches that are very familiar with on the left side, the indicators on the flip switch with the kill button on the top and the spare button underneath. On the right side, there is the headlamp, dipped beam on the flip switch with the top button being the headlamp flasher and the underneath button being the horn.

Then in May 1972, this was altered.



The switch unit with the indicators was moved to the right hand side and from here on all models made had the kill button underneath and the spare button on the top.

# Appendix on belt drive modification

Our kits have been designed to be fitted on Norton Commandos with their original primary drives and their typical triplex chains.

In some cases and provided you follow the instructions carefully and you have some basic knowledge in machining, it is possible to fit the Alton starter kit on a Commando with a toothed belt primary drive.

Originally there was no sprag clutch / rotor assembly on a pre-75 Norton Commando. It is an unknown component to most Norton owners. So be modest : even a Norton expert may make a mistake when fitting the starter kit.

The risk of error is even higher with a toothed belt primary drive because it is necessary to locate the sprag clutch / rotor assembly very carefully with a dedicated spacer (not supplied with our kit).

The main concern is about the side location of the sprag clutch/ rotor assembly on the crankshaft. The objective is to ensure both the proper alignment of the starter chain and the correct movement of the sprag clutch assembly on the crankshaft. Considering that

these objectives are critical, this location should be obtained very carefully.

The problem comes from the more or less slight variations of dimensions of the front toothed pulleys depending on the makers (there are at least 6 different makers of toothed belt primary drives for Nortons), the models, sometimes the year of production. Not taking into account the modifications the user (or the previous owners of the bike) may have carried out on pulleys to make them lighter, narrower etc... Some fit side plates (various widths available), others don't. Some modify side plates etc.

Also bear in mind the front pulley is tapered, it could be slightly differently located inwards or outwards when tightened by the crankshaft nut.

Not much but enough to miss the targets mentioned above. Pay special attention to this especially if the pulley is aluminium.

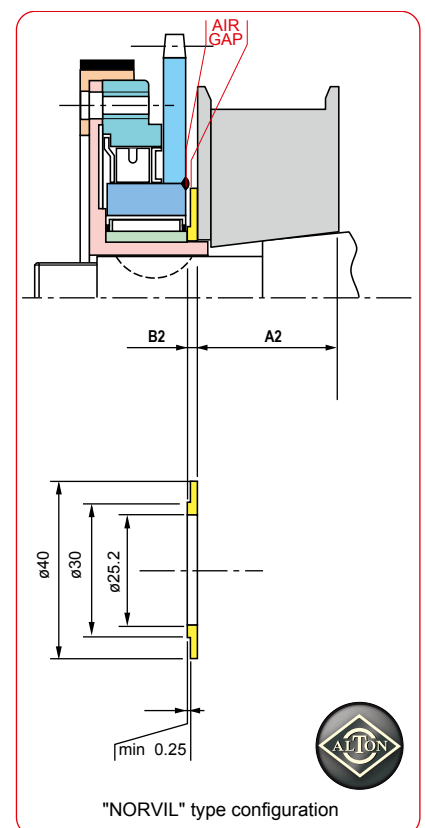
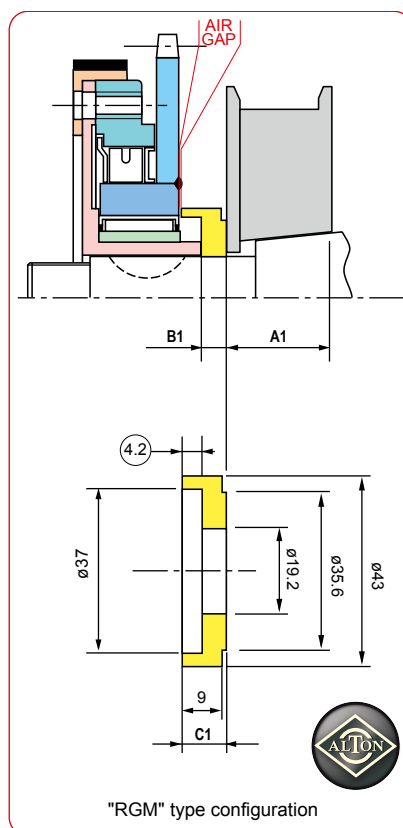
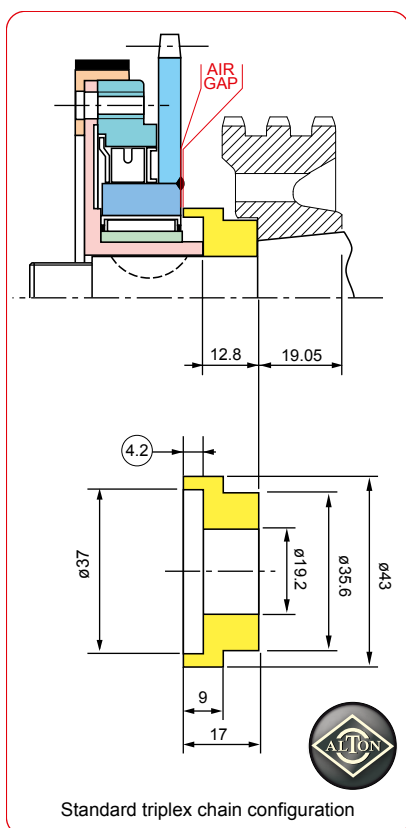
In all cases you must measure carefully the full width of the front pulley with its side plate if you intend to fit one.



This is how the kit is designed to fit originally with chain-driven primary a chain-driven primary.

Basically the dimension A + B should be 32mm and the dimension C should be calculated so that the maximum depth of the recess in the 37 diameter is 4.2mm

Norvil type belt-drive. In the case of a large pulley, it is necessary to machine a thin spacer with a 25.2mm bore (instead of 19.2mm). In order to maintain the correct air-gap the spacer should be narrowed starting from 30mm diameter to the outer diameter. The side plate bore should be increased to 25.2mm.





## ★ Completing your installation

In all cases, when you fit the kit and before any attempt to start, it is absolutely necessary to do a dry fit of the sprag clutch / rotor assembly with your specific spacer installed to check if everything is working properly.

i.e. with the complete primary drive in place (front pulley, side plate if any, toothed belt fitted, clutch basket etc), fit the newly made spacer, the sprag clutch / rotor assembly on the crankshaft but without the starter chain.

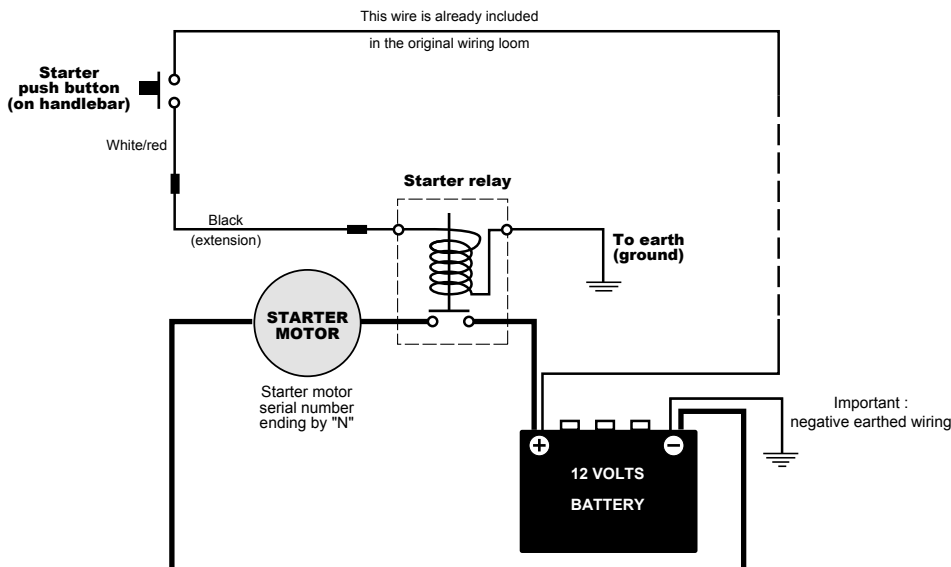
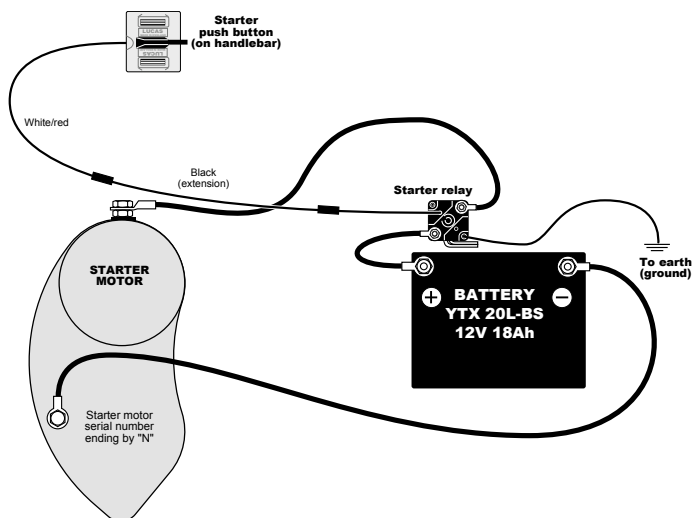
Tighten the crankshaft nut to Norton's original specifications. Then you should be able to move the 38 tooth chain sprocket clockwise. It should turn freely by hand with no effort and without rubbing.

If this is obtained and also the alignment of starter chain sprockets is obtained, you can fit the complete kit and follow the rest of the instruction in the booklet.

If one of the conditions fails, don't go further. You should go back to callipers, measures, drawing board and lathe. And try again until a correct alignment and a satisfactory sprag clutch function is obtained.



## F Alternative wiring diagram for negative earth kits





*Light up your bike !*

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