

Kliktronic EGA 48.3 Electronic Gear Actuator Installation Instructions

Thank you for purchasing the '*Kliktronic*' Electronic push-button gear-change system. The system first appeared in the marketplace in 1997, since then it has been steadily improved and refined to its present version, there are thousands of units in use throughout the world in many diverse applications and in extreme conditions from Norway to Nevada. This unit is designed to give years of trouble free operation, however to achieve optimum performance there are certain installation guidelines which must be followed.

Before attempting your installation - please read these instructions carefully

- **General Description**

The unit comprises of an electro-magnetic actuator which connects to the selector lever, this extends and retracts in order to effect the gear change. Also supplied is an electronic control box, handlebar switch assembly along with an actuator mounting clamp.

- **Choice of Actuator mounting position**

Each machine and rider will have specific individual requirements, so that the following will serve as a guide when determining the best position in which to attach the unit to the machine. Apart from a few exceptions the normal manual gear selection method is by means of a foot lever on the left hand side of the bike. The Kliktronic unit when attached to this lever becomes in effect an 'electronic foot' which will force the pedal up or down as required.

The Kliktronic actuator has an effective stroke of 25mm (1") in either direction, since the effort produced is progressive over the length of this travel it is very important to utilise the full stroke. This will dictate the point along the length of the pedal at which the actuator has to be connected. In most instances this will be at or towards the end of the lever. In order to find the best position proceed as follows:-

Using your hand, push the selector pedal down so that the gearbox engages 1st gear (you may have to turn the rear wheel in order to get the gear to engage). Using a 6" rule against the pedal arm, release the pedal allowing it to re-centre slowly noting the travel at the point at which your ruler is positioned. Move the ruler along the lever until you find the point that the distance is 25mm (1"). This is the point at which you need to attach the connecting rod of the actuator.

Important Note:

If there is excessive play in the gear linkage then you must tighten or replace any worn bushes, ball joints or other unions as necessary. Any free play represents a loss of effective stroke and will impair the performance of the Kliktronic unit.

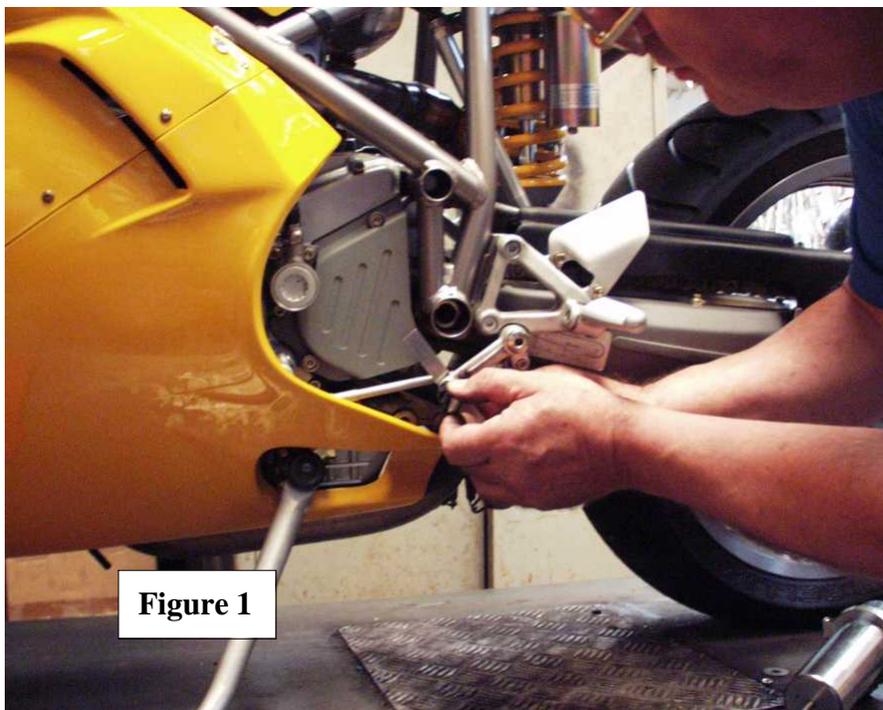


Figure 1

Next you will have to offer up the actuator to the bike taking account of the position on the lever where the connecting rod is to be attached (if the lever does not have the necessary travel you will have to extend it to suit).

- If you find that your unit shifts in one direction but not the other it may still be possible to make a suitable adjustment. The overall stroke of the Kliktronic is slightly more than 1" in either direction – this means the unit can be biased towards up or down shifts. If you are having problems changing down then push your gear lever down by hand until you engage 1st gear and hold the lever in that position. Then slacken the bolts securing the actuator in its clamp and slide the unit up or down as appropriate until it bottoms out. Tighten the clamps with the actuator in that position, if you then find you cannot change up - slacken the bolts again and gradually slide the actuator back about 1/16" at a time until you can change up as well as down. If the problem lies with the up-shift then hold the actuator in 2nd gear and follow the same procedure.

NOTES

Fault Finding

Mechanical

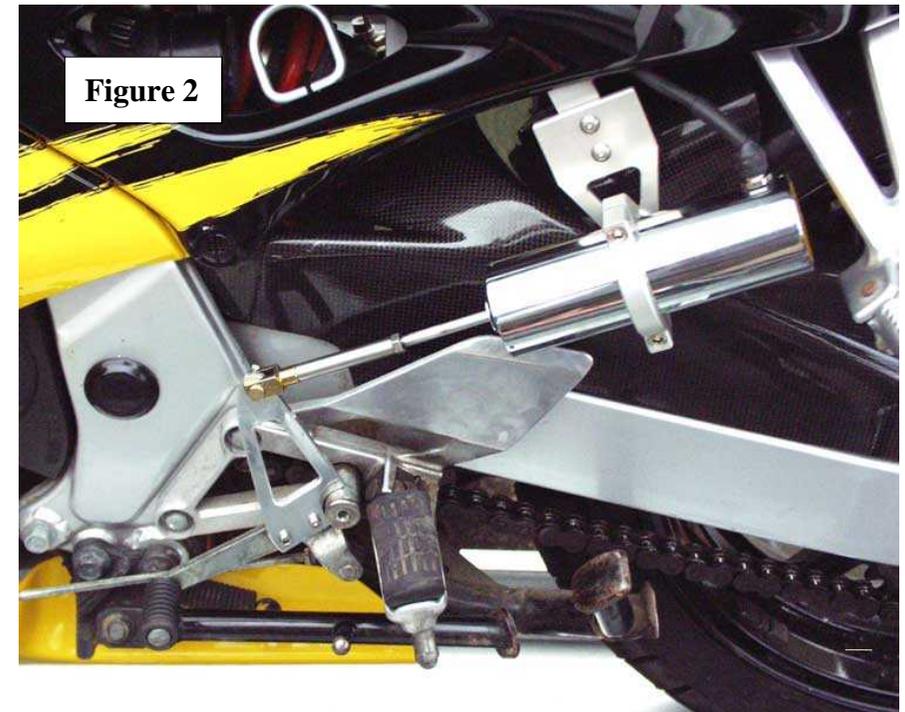
If this is a new installation then there are checks that should be made to ensure that the unit can operate correctly.

- Check the gear linkage for free play; this represents an effective loss of stroke. Tighten or replace any ball joints or other linkages as necessary
- Check that you have oil in your gearbox, if the level is low the gears will run hot after a short period and become tight.
- Check that the clutch is clearing properly, any clutch drag will cause the gears to mesh and prevent you changing gear cleanly.

If your installation has been working satisfactorily, but has begun to change erratically check the following:

- Ensure that the bearing in the clamp is tight and that there is no wear in it, if there is excessive play then replace the bearing.
- If you are using a ball joint to connect to the shift lever check this for wear, replace if necessary.
- Check all alignments, in particular if you have clamped onto a tubular frame it is possible that this has moved slightly over time
- Check the gear linkage for free play; this represents an effective loss of stroke. Tighten or replace any ball joints or other linkages as necessary – if your linkages are all tight you may still have some play in the gearbox itself.

When offering up the actuator it must also be borne in mind that the angle between the actuators connecting rod, and the pivot point of the lever should be as near as possible to 90 degrees. This ensures that the effort is equal in both directions. When looking for a suitable mounting location you may be able to pick up on existing bolts, the back-plate on the clamp can be drilled to pick up on these. If there is no convenient mounting point then you will have to make up a transition bracket to get the unit into the correct position. The following photographs show some of the common options. See our web site for a full index of mounting arrangements.



Above: CBR 600F – here the seat sub frame has been utilised as a mounting point, a ‘U’ shaped clamp was made to secure the mounting clamp. The pedal arm has an additional lever attached to achieve the correct angle and stroke. Also the connecting rod is extended to ensure the actuator is balanced in the clamp.

Below: CBR 600RR – In this instance the seat sub frame is not accessible, instead the two bolts which secure the foot-peg assembly are utilised to support a bracket which throws the unit forward of the lever. Please note that you may have to use spacers to get the bracket clear of the rest of the frame – longer bolts will almost certainly be needed.

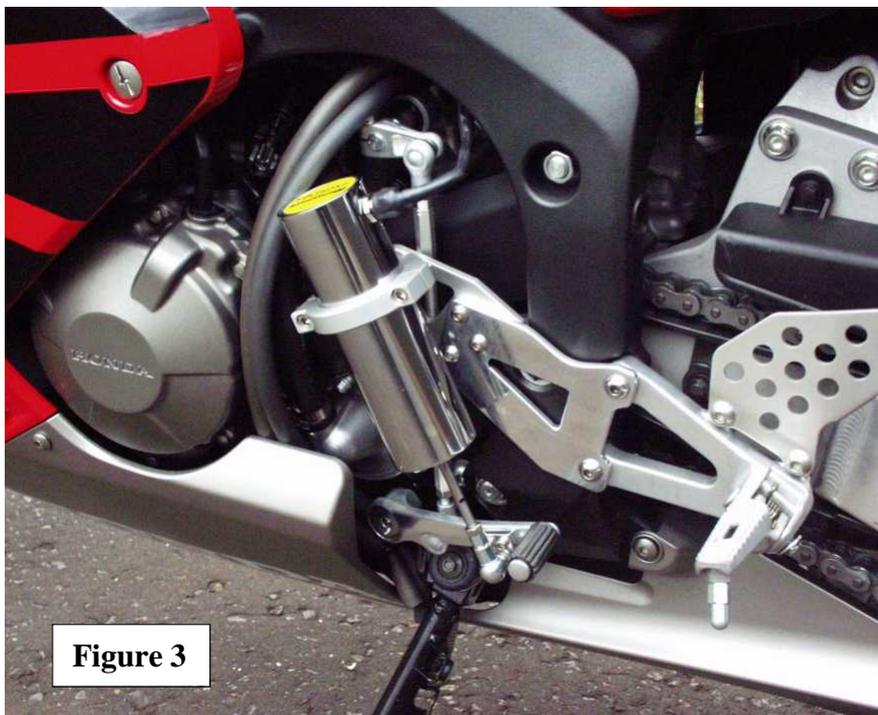


Figure 3

This is the most popular method for the majority of Japanese sports-bikes, since the majority of them have a similar frame and lever layout to that shown above. This method also ensures that the rider's foot is not impeded and that the conventional manual shift can still be used if required. We have available a number of templates which we can send upon request or alternatively we can make finished brackets for certain popular machines which are available on request. If you are uncertain about how to proceed simply email us a picture of the lever and surrounding frame and we will endeavour to suggest the best mounting solution.

actuator socket and check the integrity of the soldered joints – the procedure for dismantling this is described on page 19 along with the correct wiring arrangement on page 13.

- If this is correct and the unit still only works in one direction remove the actuator socket from the control box again, set your multimeter to a voltage range which covers up to 20 Volts DC. Place the negative probe on the control box pin which corresponds to number 2, place the other on pin number 1. Press the green button – you should have full battery voltage across these two pins (**take care not to short these pins with your probe – this will blow the main supply fuse**).
- Also check across pins 2 and 3, pressing the red button should again give battery voltage. If not then you have a control box fault – return to Kliktronic for repair/replacement.
- If both the above tests show the control box is OK then the fault lies with the actuator if there is no visible problem with the wire the fault is internal – return the actuator to Kliktronic for repair/replacement.
- If the actuator responds but appears sluggish then feel the body of the actuator, if it feels hot then let it cool down – a build up of heat weakens the unit and can cause permanent damage.
- Check that the stem runs smoothly in and out of the unit, a build up of grime can sometimes slow the unit down, clean and lubricate with a light oil such as WD40 as necessary.
- If you are happy that the rod runs freely and still appears sluggish then check the state of your battery – it should give a voltage of between **12.6 and 13.2 volts if fully charged**. A battery which reads **12.2 volts or less is flat** and needs either charging or replacing
- The charging system should also be checked and should deliver **between 13.5 and 14.5 volts**.

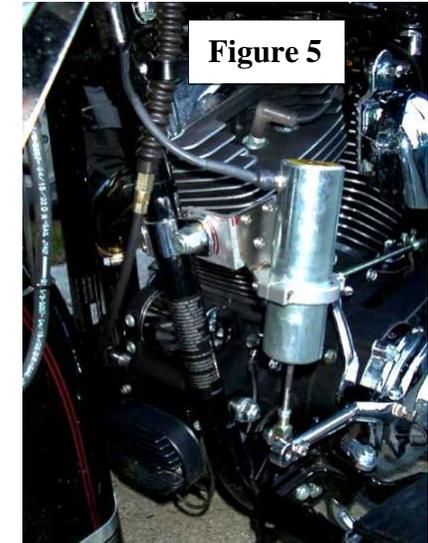
Fault Finding

Electrical

- If your unit does not seem to respond when you press either button check all fuses and connections and replace/tighten if necessary if this does not solve the problem then you should remove both the switch socket and actuator socket from the control box and check the system in turn as described below:
- Firstly check the switch assembly, using a multi-meter set for continuity testing place one probe in the switch socket pin hole marked 3, then place the other probe in the hole marked 1. Press the green button, you should have continuity. Remove the probe from pin 1 and place it in the pin hole marked 4 then press the red button, you should again have continuity.
- If the switch assembly checks out OK then replug it into the control box, if the in line 2 amp glass fuse is intact you should hear the control box click when either button is pressed. You may need to use your continuity tester to check the fuse since the filament is very fine and cannot always be reliably tested by visual examination alone. If you have to replace the fuse then check the cable run carefully to eliminate a short in the cable as a possible cause. If you are satisfied that the cable is OK but the fuse still blows when a button is pressed then the fault lies in the control box – this is a non user serviceable item and needs to be returned to us for testing and repair or replacement.
- If the switch is OK and the control box clicks when either button is pressed then firstly disconnect the actuator connecting rod from your pedal assembly and re-insert the actuator socket into the control box, observe the actuator closely – the unit should retract when the green button is pressed and extend when the red button is pressed. If the unit works only in one direction then you should disassemble the

Harley Davidson Mounting Options

The approach to mounting the *Kliktronic* system to A Harley Davidson is somewhat different to the Japanese sports-bikes already shown. Many machines have forward controls which make the forward frame down-tube the most convenient mounting point.



If you are in the USA then the brackets shown above are available from Adaptive Motorcycling LLC

This arrangement leaves the existing linkage largely intact; it is applicable to most machines from Shovelheads through to Twin-Cam. Horizontal adjustment is a simple matter of sliding the clamp up and down the frame tube to achieve the correct angular alignment with the pedal arm - the right-angled bracket can also be angled to get the correct vertical alignment.

If the machine has rubber engine mounts it is important to observe that you should use the clevis connection mounted to the side of the pedal arm, use a bolt of sufficient length to allow plastic washers to be positioned between the side of the clevis and the pedal arm. A locknut will enable you to make the connection without pulling the clevis tight against the pedal arm, this slack allows for the movement between engine and frame resulting from the use of rubber mounts.

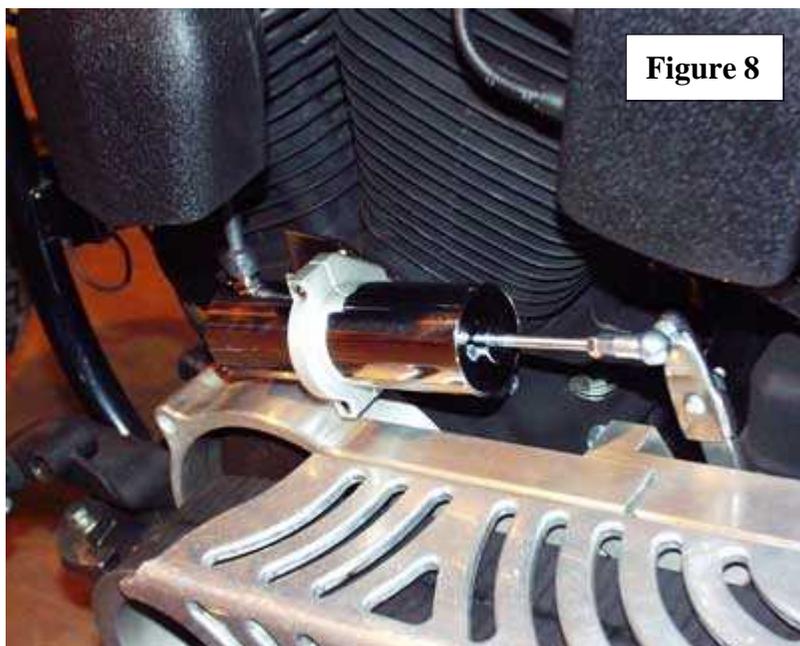
As an alternative to using the frame down-tube as your mounting point there are a couple of other methods worth looking at depending on your own preference.



If you do not need to retain the existing linkage then it is possible to pick up on the centre bolt which runs through the centre of the 'V' between the cylinders.



This then requires an extension piece in order to get the correct alignment and stroke from the arm which comes directly off the gearbox selector spline.



Night-Train 1340 Evo engine using the engine mounting arrangement.

the foot lever in place of your foot and will trigger the system mechanically as before.

Connecting the two systems together could not be easier. The Kliktronic control box now comes with the standard feature of an additional yellow wire, which simply connects, to the yellow wire on the optional interrupt system

If you have purchased one of these units then there is one point to observe when marrying the two units together. The standard switching configuration for the Kliktronic is Green switch button for up changes (actuator rod *retracts*). The trigger signal to the interrupt unit is pulsed from the green button; this configuration suits the majority of machines.

However if your gear linkage is such that the actuator rod *extends* in order to change up then it will be necessary to swap the green and white wires round in the actuator plug.

To do this you will firstly have to strip away the black protective heat shrink sleeving which shrouds the plug. Then using a small cross-head screwdriver firstly slacken off the two retaining screws where the wire enters the plug (2-3 turns should suffice). Next remove the single screw which secures the plastic plug insert to the metal jacket take care to put the screw in a safe place since it is very small and easily lost. Twisting the metal jacket anticlockwise a few degrees whilst holding the plastic plug firmly will disengage the key. It should then be possible to slide back the metal jacket exposing the connections.

Using a suitably sized soldering iron carefully de-solder the green and white wires noting their positions. Re-solder swapping these two wires, take care not to overheat the wires as this can cause the insulation to melt and risk a short circuit. Having checked that the soldered joints are sound re-assemble the plug assembly taking care not to over-tighten the retaining screw. We would advise using an insulating tape to rewrap the plug once remade. Your unit should then extend when the green button is pressed.

- **Riding Technique**

Once you have your system installed and adjusted correctly there are techniques which you can employ to make the Kliktronic gear-changing experience more efficient and pleasurable.

If you have the on-bar switch please note that the rubber hoods may feel a little vague, hitting them squarely will make the change feel more positive. A hard plastic cover for this switch is available as an option if preferred

When changing up the box, the majority of machines will allow for clutch-less shifts. The technique here is to ease back the throttle very slightly just as you hit the 'up' button. This has the effect of unloading the gears and will allow the shift to take place. The speed of the shift will depend on your particular machine and your own co-ordination. Some gearboxes will also allow clutch-less downshifts too, here when under engine braking the gears are also meshed under load. In order to unload the gears the method is to blip the throttle very slightly as you press the down button – very satisfying once you have mastered the technique.

So far as up-shifts are concerned then these can be achieved without the clutch at full throttle by means of an additional electronic module which kills the ignition spark for a measured duration (normally around 70 milliseconds which is long enough for the Kliktronic to change gear)

- **Optional Ignition Interrupt**

The Kliktronic system now interfaces with an optional ignition interrupt, this system is tried and proven and is used in many race and fast road applications.

This combination enables full throttle clutch-less up-shifts at the push of a button. The advantage of the Kliktronic/Interrupt marriage is that the system is triggered electronically with no need for special linkages or switches on the gear selector linkage.

Obviously if you already have an ignition interrupt then you can still use this in the normal way, the Kliktronic system will operate

There is a third method which is particularly suited to the Sportster where the short shift lever is fitted, this utilises the primary cover bolts.



Figure 9



Figure 10

The lever is spun round on the splined shaft and the mounting is finished off with a small aluminium plate on the lever end in order to attach the connecting rod

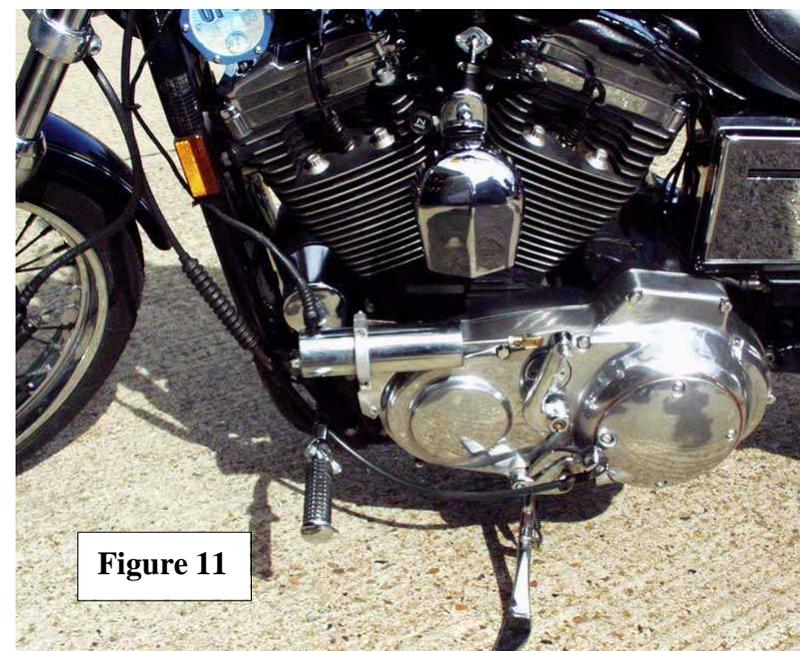


Figure 11

Horizontal Sportster Installation

Optional rubber gaiter keeps out grime and water important if you are fitting horizontally or on an off road machine.

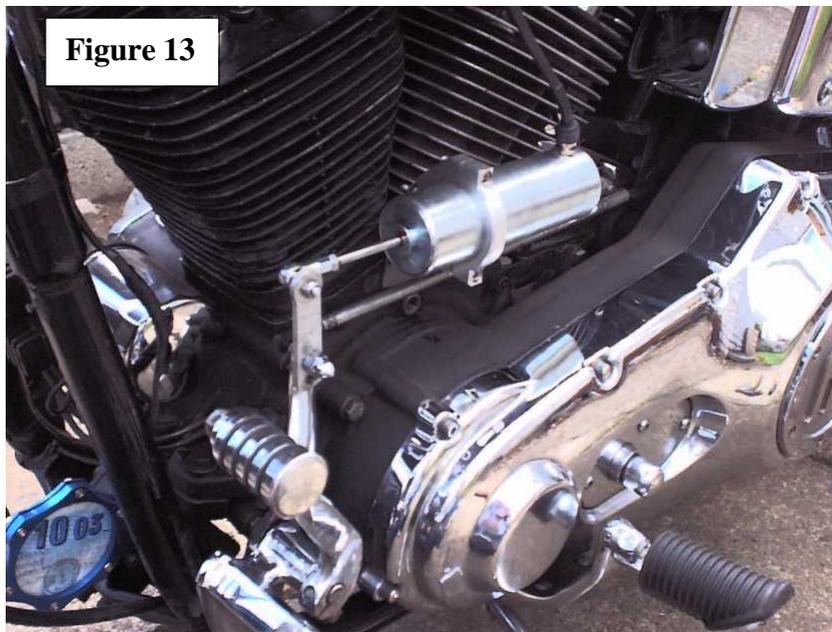
Figure 12

The 88 Twin-cam installation is much the same as the Evo, except that the lever extension has to extend outwards as well as vertically in order to get the correct alignment between connecting rod and mounting point.

Gaiter available from Harley Davidson dealers. Part No. 38630-88
Cut down to eight convolutions – push one end over the actuator flange and cable tie the other end.

One further method we have seen is to mount the unit horizontally, but still retain the foot lever arrangement. This has the advantage of retaining the manual shift option, at the same time most of the potential free play is eliminated by having a more or less direct connection to the selector arm

Figure 13



• Testing the unit and final set-up

Once you have completed your installation and are happy that all connections and alignments are correct you can then carry out your final testing and fine adjustments.

If possible you should test the system with the engine running, since you cannot reliably change gear with the machine stationary, the gears need to be turning for them to mesh properly.

If your machine has a centre stand then you can use this, if not then a paddock stand can be used. If you have a trike, quad bike, outfit or other specialist machine then you should jack the axle up so that the drive wheels can turn freely – if the machine has a differential fitted to the axle you should be able to test with just one wheel clear of the ground. It is always advisable to test the machine strapped down or nosed onto a wall in case of any accidents.

Start the machine in neutral, clear the clutch as normal and with your thumb press the red button – this should cause the actuator rod to extend and select first gear, release the clutch and allow the revs to build slightly. Clear the clutch again and as it clears press the green button positively and firmly the actuator rod will retract and lift the lever into second gear – release the clutch and go through all the gears until you are in top. Then come down the box on the red button as normal to first gear – to find neutral simply clear the clutch and jab the green button very lightly and quickly. This should nudge the lever into neutral, if it goes through into second gear then come back down to first and try again until you have developed the feel necessary to find neutral. Each gearbox behaves slightly differently in terms of how quickly you need to press the button.

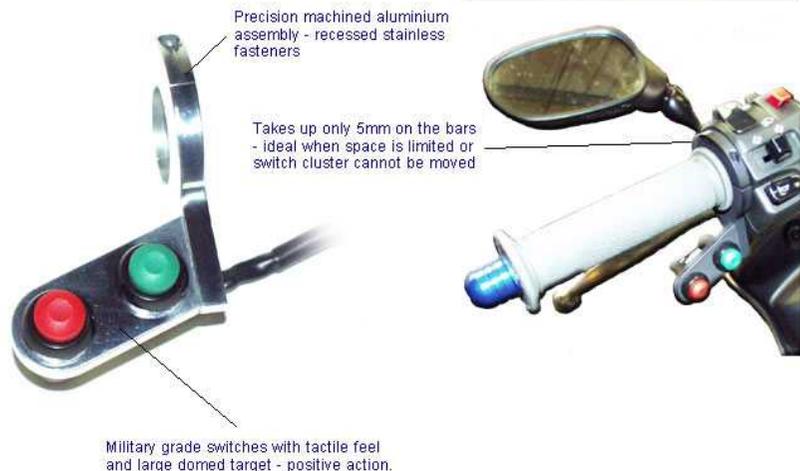
Important Safety note:

If you are having difficulty changing gear then run through all the fitting parameters again – **DO NOT CONTINUOUSLY PRESS THE BUTTONS** – this will cause the unit to overheat and lose power, permanent damage may also occur. **If it does not work straight away then you need to make adjustments accordingly.**

Fig. 21 New Under-bar switch assembly

New! slimline switch assembly

Available in a choice of polished aluminium or black anodised finish for 7/8" or 1" bars



The under-bar switch assembly can usually be installed without having to make any alterations to the grip, since it occupies a much narrower space on the bars – particularly useful for machines with heated grips such as BMW. However you should note that the assembly is not suitable for some sports bikes where the under-hang of the switch can foul the tank.

When tightening the clamp onto the handlebars take care not to over-tighten, the screws are quite small and will easily strip the thread from the aluminium assembly.

Important Safety Note:
If you are not used to push-button gear operation take particular care if working on or mounting/dismounting your machine with the engine running not to accidentally touch the switches. Most trikes, outfits and modified machines have had the side-stand gear selection safety cut-out device removed or disabled.

Schematic diagram to show correct alignment parameters – please study carefully as these are important to the correct operation of the unit.

Fig. 14 - Horizontal Alignment Angle

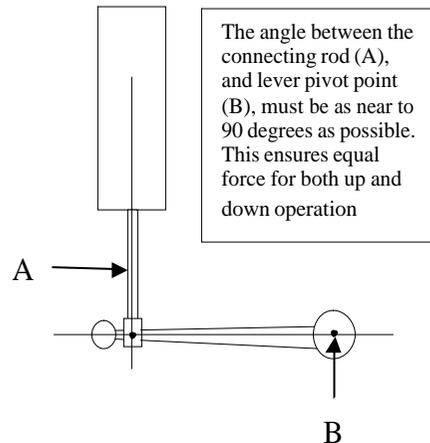


Fig. 15 - Lever connection position

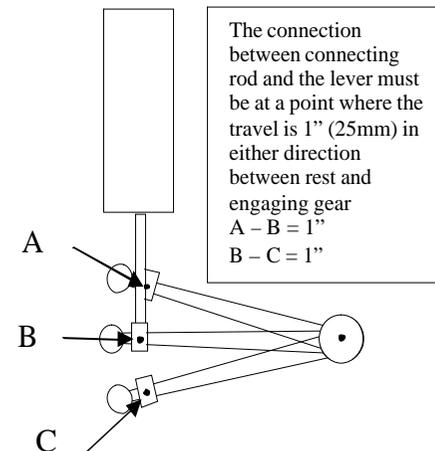
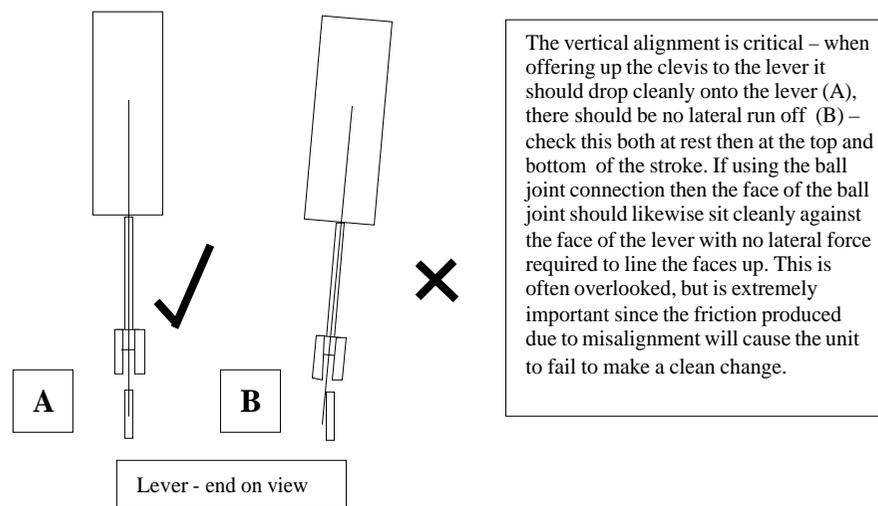


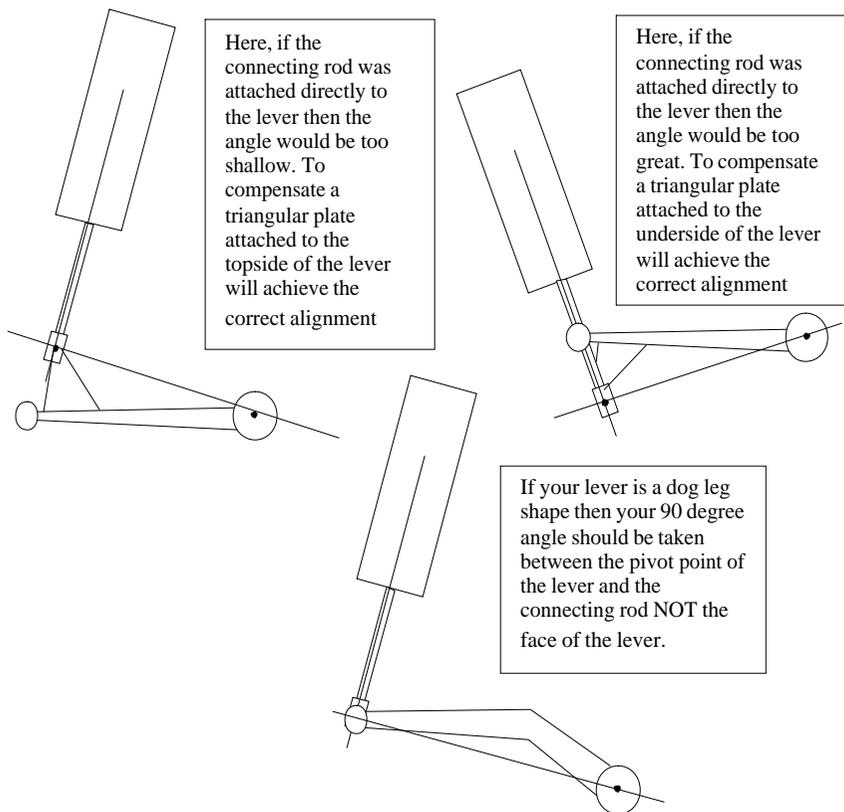
Fig. 16 Vertical alignment between connecting - rod and lever



Methods of overcoming common installation problems

The preceding diagrams illustrate a straightforward installation directly onto an existing lever; however this is not always possible. There are various ways to get round problems such as inaccessibility of the lever in its usual position.

Fig. 17 - Correcting the angle between lever and connecting rod



The basic principles of stroke and both horizontal and vertical alignment will apply irrespective of whether your unit is mounted vertically or horizontally. For a full range of mounting options and ideas please visit our web site <http://www.kliktronic.co.uk> there you will find a huge selection of photographs showing all makes and styles of machines.

Basic Adjustments

There are two different switch designs available for bike handlebar applications, either 'under-bar' or 'on-bar'. These are both available to suit either 7/8" or 1" diameter bars.

Fig. 20 Standard On-bar switch assembly



The standard on-bar switch illustrated above is normally fitted to the left-hand bar so that the buttons fall conveniently under the thumb of the clutch hand. Sometimes it is possible to move the switch cluster along the bar to accommodate the switch assembly. If not then use a sharp knife to remove a small section of the rubber grip to suit - (not possible if you have heated grips use the under-bar switch instead).

Tip: If cutting the grip use a cable tie round the grip to guide your blade for a neat finish.

Control Box Location

When positioning the control box then a covered location is preferred, there is often room under the seat – this also normally ensures that the wiring is long enough to reach the battery. If it is not possible to site the unit under the seat then it can be tucked inside a fairing, the unit is supplied with a Velcro fastening pad which is very effective providing the mounting surface is clean before the pad is applied. There is also a flange on the ends of the box which have holes for additional fastening such as bolts, rivets or cable ties. **On no account should you drill holes into the main body of the box.**

Also observe that the box should not be sited near an exhaust or other location where there is likely to be a build up of excessive heat. When pushing home the DIN connectors make sure that these go fully home and that the locking collar is tightened, the plug/socket is keyed to ensure the correct alignment of the pins. If these connections are exposed to the elements, then a smear of petroleum jelly is advisable to prevent electrical corrosion.

If the cables need extending then this should be done using wire of a similar gauge with **soldered joints** - **we do not advocate the use of scotch locks or crimp connections**, since these are simply not reliable or substantial enough for high current applications.

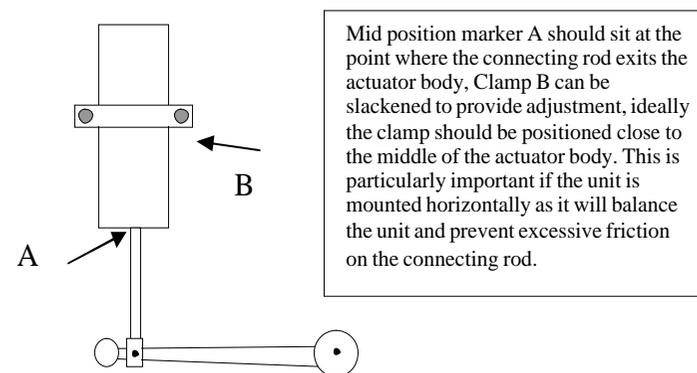
When routing the cables take care to ensure that these are not directed through areas where they can be nipped or chafed, use cable ties to neatly secure the runs of cable to the frame - it is best to follow the course of the bikes wiring loom where possible. Also avoid areas close to exhaust pipes or cylinder heads where heat may melt through the insulation.

When cable tying the actuator cable, please check that there is sufficient slack to allow the actuator to pivot in its mount. Similarly when securing the switch cable, move the handlebars from lock to lock to ensure that there is sufficient slack to allow for this movement.

Once you have installed the unit according to the diagrams on the preceding page you will then have to make adjustments to the installation to ensure optimum performance. As mentioned before the unit has 25mm of travel in either direction. It is important to ensure that when the actuator assembly is secured in the clamp that the position of the unit will allow the full travel in either direction

To find the central position on the connecting rod, extend the rod fully, mark the rod with a felt tipped pen where it comes out of the body. Do the same thing with the rod fully retracted – then mark the mid position between the two marks. When the actuator is secured in the clamp the mid position marker you have made should sit where the connecting rod exits the body of the actuator. Slackening the clamp slightly that holds the actuator will enable you to move the unit up or down as appropriate to get this correct.

Fig. 18 - Clamp/actuator adjustment



If you find that you are unable to get the clamp close to the centre of the actuator body and it sits at the top of the actuator then you can either extend the connecting rod, or as shown in **fig. 17** make a plate which sits on top of the pedal arm – providing the mounting angle is still close to 90 degrees. Conversely if the clamp is at the bottom of the actuator body then this can be remedied by making a fixing plate to hang underneath the pedal

Electrical Installation

There are just two components to install on the electrical side, the control box and the switch assembly. The control box has only 3 connections to make as shown in the diagram below:

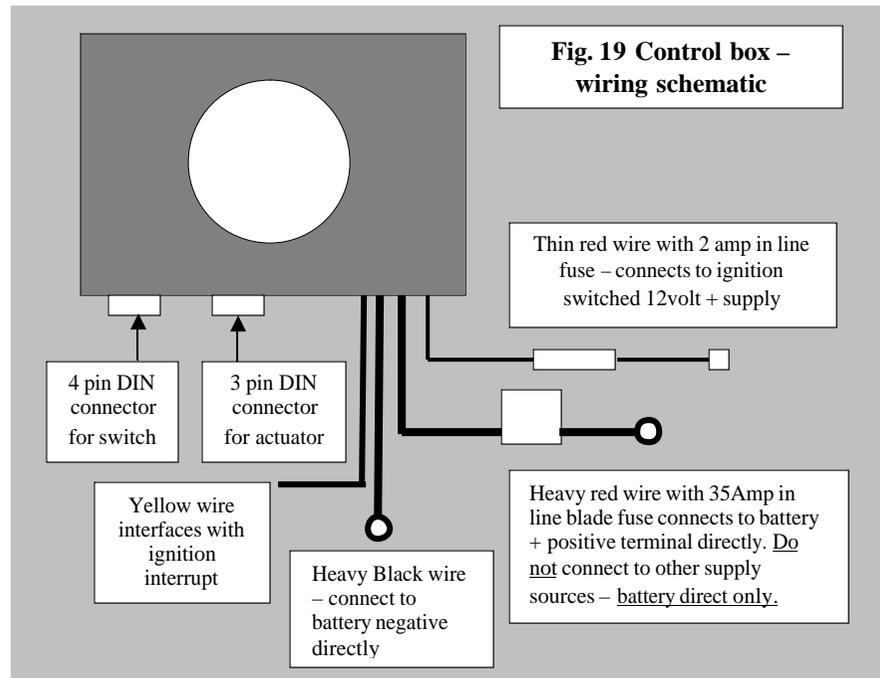


Figure 19 shows the control box and the external connections to be made.

The unit is protected against overload by two fuses, the main actuator supply is fused by the blade type fuse which is rated at **35 Amps** continuous. The switching circuit is also fused by an in-line glass type fuse rated at **2 Amps**.

It is unlikely that either of these fuses will ever need to be replaced, spares are supplied with your kit in case a problem arises, please keep these with your machine.

There are essentially only 3 connections to make:

Safety Note: When disconnecting the battery always remove the negative wires first, then the positive. When re-connecting, reverse the procedure – connect positive first then the negative.

- 1) Heavy red cable connects to the battery positive terminal
- 2) Black cable connects to the battery negative terminal
- 3) The thin red wire connects to a 12 volt positive ignition switched supply. This ensures that the unit is inoperative when the ignition is off. If you are unsure where to find a suitable connection then the positive supply to the ignition coils is usually a suitable supply.
- 4) The yellow wire is only used if you are connecting an optional ignition interrupt module, if not used then this can simply be tucked away – the end of the cable is already insulated with shrink sleeving.
- 5) There are two DIN type connections, the 3 pin connection is for the actuator, the 4 pin connection is for the switch.

Should you need to alter any of the wiring then the plugs/sockets are wired as follows:

3 Pin Actuator plug/socket

Pin 1 - Green wire up-shift positive supply (rod retracts)

Pin 2 - Black wire - common negative

Pin 3 - White wire down-shift positive supply (rod extends)

4 Pin Switch plug/socket

Pin 1 - Green/yellow wire trigger for up-shift circuit

Pin 2 - Unused.

Pin 3 - Brown wire, common supply for both switches

Pin 4 - Blue wire, trigger for down-shift circuit