# A Series Ignition System - Specifications

****All information refers to 602 cc M28 & M28/1 engines unless otherwise specified.**

## Contents:



## Specifications:

| | | |
|---|---|---|
| System Type | | Contact breaker and coil, no distributor, contacts driven directly by camshaft. Centrifugal advance only via springs and weights. |
| Spark Plugs | ..... | NGK B6HS or equivalent |
| | ..... | NGK B7HS or equivalent (high rev use) |
| Electrode gap | ..... | 0.6 mm (0.024 in) |
| Ignition Leads | ..... | Bougicord 3166 |
| Resistance | ..... | 2.99 KOhms (new) |
| Ignition Coil | ..... | Ducellier 2768 – 6 volt |
| | ..... | Ducellier 2769 – 12 volt |
| | ..... | Valeo 245030 – 12 volt |
| Primary Resistance | ..... | 3.7 Ohms (new) |
| Contact breakers | ..... | Valeo D301 or equivalent |
| Gap | ..... | 0.35 mm to 0.45 mm (0.014-0.018) |
| Dwell <Feb 70' (%) | ..... | 142° to 146° (78% - 81%) |
| Dwell >Feb 70' (%) | ..... | 106° to 112° (58% - 62%) |
| Condenser | ..... | Valeo D702 or equivalent |
| Timing | | |
| Static (M28 & M28/1) | ..... | 8.0° BTDC |
| Static (All others) | ..... | 12.0° BTDC |
| Dynamic (1000 RPM) | ..... | 8.0° to 12.5° BTDC |
| (2000 RPM) | ..... | 15.0° to 21.0° BTDC |
| (3000 RPM) | ..... | 26.5° to 35.0° BTDC |

# A Series Ignition System – Overview and Inspection

## Operation :

The standard system is very efficient and if maintained correctly will give many miles trouble free operation between services. The spark in the ignition system is produced by ignition coil which is basically two circuits of wire wound round iron cores in very close proximately to each other: one circuit has many times more wire than the other and the coil acts like an amplifier which uses the low voltage in the primary circuit to trigger a much larger voltage in the secondary circuit. It is this large secondary voltage that produces the power to cause a spark at the plugs and fire the combustion process.

There is no distributor in the system, the points cam is driven directly off the end of the camshaft and has two lobes that act directly on the heel of the moving part of the contact breakers. When the contacts are closed, voltage in the primary circuit of the coil builds up. As the points begin to open the current flows to the condenser and this causes a rapid collapse in the primary circuit. This collapse induces a high voltage in the secondary circuit that earths out via the spark plugs and creates the spark to ignite the mixture. The system is a so-called "wasted spark" system because the spark plugs fire on both the compression and exhaust strokes of the engine. The condenser also prevents the arcing that would otherwise cause the faces of the fixed and moving contacts to become welded together.

The main problem with the system is that the moving components are relatively difficult to get at and this makes any maintenance time consuming. Keeping the system in first class order is easy with a little practice and all the information you will ever need is included in these instructions.

## Inspection of the External Components:

**Coil**. Visually inspect it for signs of cracking (particularly around the plug leads) and also for signs of leakage. If it is dirty take it out and polish it with household polish until it is gleaming. You may find the coil hard to remove as it is held in place at each end with plastic clips. I wouldn't even bother trying to remove the small nuts on the bottom side of the light bar that hold these clips in – take a pair of snips and cut one of the plastic clips (make sure it hasn't already been done!). I generally cut the left one at the back just as it loops up over the coil. To remove the coil twist the split side out and up and remove the coil from that side, you should then get enough room to pull the coil clear of the clip on the other side.

**Ignition Leads**. The ignition leads themselves can also become damaged and/or inefficient over time. When it is dark, open your bonnet, start the car and rev it up. If it looks like Blackpool Illuminations round the leads it is time for a new set. If you have a multimeter that has a resistance setting then you can test them with this. The resistance of the leads is very important (particularly if you are using a standard coil) and modern leads typically have too high a resistance. Modern leads are usually brightly coloured and will have something like super duper silicon / carbon fibre / high energy written on them. The standard "Bougicord" leads are generally black and have a big rubber cover at the spark plug end that fits in the hole in the cylinder shrouding. New Bougicords have a resistance of just under 3 KOhms and used ones with a significantly higher resistance than this (say 7 KOhms) they should be replaced (modern leads typically measure 15KOhms+).

**Spark Plugs**. No messing, replace them before you set anything unless they are virtually brand new.

## A Series Ignition System – Points, Condenser & Dwell

If you have a dwell meter then you can check the dwell angle (points gap) without taking anything apart at all. It doesn't matter if you don't have one that measures two cylinder vehicles, you can use one designed for four cylinders – just halve the values you read (all readings following assume you will be reading from a meter set to four cylinder).

### Points and Condenser Replacement:

The points box is located at the bottom of the fan housing behind the fan and its guard so I would advise that you fit a new set of points and a condenser every time. The easiest way is to remove the entire points box from the car. Prior to removing it mark the points box and the housing it sits in with a felt pen or a scriber – this will help a bit when you put it back in.

Fit your new contacts and condenser into the points box (see Page 3 & 8) and then fit the points box loosely in the car lining up with your previously made marks and install the two holding screws and their square washers. Don't do them up tight yet.

Put the fan screw back into the end of the crankshaft (without the fan) and rotate the engine using a 14 mm socket until the heel on the points rubbing block is positioned on the highest point on one of the cam lobes. Tighten the screw holding the fixed contact up till it is just enough to stop it moving. The idea is that it should be slack enough to be able to rotate the fixed contact, but tight enough to ensure that the spring pressure of the moving contact can't move it. Up in the top right hand corner of the points box you will see a little tag sticking out of the fixed contact and a couple of raised bits on the points box. You can insert a flat bladed screwdriver between these and lever the moving contact in both directions to adjust the gap. If the screw is done up to the required level you will be able to move the fixed contact, but it won't spring back.

The correct gap is 0.35 mm – 0.45 mm so select a feeler from your gauge close to 0.45 mm. Insert the feeler into the gap between the two contact points (one of the fixed contact and one on the moving one) and adjust the gap up or down until the feeler is a nice sliding fit. Once you are satisfied that it is right do up the screw on the fixed contact tight and measure the gap again. You will probably find that tightening up the screw decreases the gap – reset and test again. You can try and hold the tab on the fixed contact with a screwdriver when you are doing up the points screw, or you can set the gap a little large so that it closes down to 0.40 mm – 0.45 mm when you do the screw up. Persevere – it needs to be right.

### Dwell – Explanation and setting:

The dwell angle represents the time where the two contacts are touching and is usually expressed in degrees. It is exactly proportional to the points gap that you set with your feeler gauges, but these are not particularly accurate. Also, the two contact faces are not exactly flat and parallel and this can lead to a variance between what you are measuring and the actual value. If you have a dwell meter then you can check the actual dwell easily – connect the positive probe of your meter to the negative side of the coil and the negative probe to earth (not the battery or alternator). Start the engine and you should get a reading of between 53 and 56 (4 cylinder setting on the meter). If you don't then the gap is wrong – if the dwell angle is too high the points gap is too small and vice-versa. Adjust the contacts until the dwell is between 53 & 54 - if you set it to this value then you will allow for as much wear on the heel of the contacts as possible before you need to reset it. The wear on the heel of the points cam is greatest just after a new set has been fitted so you could actually make the dwell even lower than 106 degrees (53 on the meter, bigger gap) because these engines seem happier running a wide gap than a tight one. Setting them up in this way maximizes the time required before you need to adjust the gap again. If you don't have a dwell meter then all is not lost simply refer to Page 7.

# A Series Ignition System – Timing

## Overview:

The concept of timing is pretty simple and it is effectively the lead-time that is required so that the time difference between the "signal" for the coil to fire being sent (points opening) and the spark plug actually firing is catered for. As you can imagine the signal needs to be sent earlier as the speed of the engine increases so the ignition has to be advanced (more lead time) as engine speed increases.

There are two settings for timing, static and dynamic. Static timing is set without the engine running and the correct setting is 8° BTDC. Let me explain the term 8° BTDC – the 8° means eight degrees and refers to the angle of crankshaft rotation in relation to BTDC, which stands for Before Top Dead Centre. Top dead center is the point at which the piston reaches the top of the barrels and is theoretical point at which ignition of the mixture should take place so 8° BTDC means that the points should be opening eight degrees of crankshaft revolution prior to top dead center being reached in the engine. See Page 5 for a description of how to check/set static timing.

Dynamic timing can only be measured with the car running and is a measure of the additional ignition advance given by the operation of the advance mechanism. The advance mechanism is located behind the points cam and consists of two springs with weights on them which sit between the ends of the camshaft which drives the points cam and the points cam itself which operates the contact breakers.

When you see this mechanism it will become apparent how it works, but I will try to describe it for you: the camshaft has two pegs on the end of it as does the rear of the points cam. The springs each have two holes that slip over these pegs. If you imagine that when you are installing a points cam you would start by turning the engine so that the two pegs on the end of the camshaft were vertical. The next step would be to position one of the springs so that the weight in the center was towards the outside and slip the hole at the top over the top peg and leave the spring hanging down one side (doesn't matter which). The you take the other spring and position it on the other side (weight out again) and slip the lower hole over the bottom camshaft peg and hold the top of this spring up. You would then take the points cam and slip the two pegs into the other two holes in the springs and secure it with the washer and circlip. In operation the camshaft spins and drives the points cam and as the engine spins faster the weights on the springs force the springs outwards. As they move outwards the angle of the points cam in relation to the camshaft changes and opens the points earlier in the cycle. There are two metal stops that define the limit of travel and therefore total advance in the engine.

This is extremely important as too much advance can cause pre-ignition in the combustion chamber (pinking) - this creates a lot of additional heat and pressure and can lead to engine damage. Pre-ignition occurs when the signal is sent too far in advance and the spark plug therefore fires before the piston reaches top dead center. Imagine the forces involved when the engine is revving at 6,000 RPM and the rotational forces of the engine are pushing the piston back up to top dead center to compress the mixture and the spark plug ignites the mixture! Bad news. Having the timing too far retarded is also not that great because the piston will be on its way back down the bore again before the mixture is ignited and the maximum energy will not be reaped from the explosion.

Opinions vary about how much ignition advance is "correct" and many have strong views on this subject but one thing is agreed on: and that is that there should be no pre-ignition. An oft-touted "ideal" figure is 33.6° total advance - and you should probably stay within 1.5 – 2.0 degrees of this either way. See Page 6 for a description of how to check/set the dynamic timing.

# A Series Ignition System – Static Timing

## Static Timing:

This is easy thing to do and the timing mark will come in useful later on, so lets start with that. First find a rod 6 mm in diameter. There is a diagram in Haynes that shows how to manufacture the correct tool, but a 6 mm drill bit will be almost as good. Prior to making the static timing mark ***remove*** the spark plug leads from the coil to stop the car from starting. Standing over the nearside wing locate the nearside 'horn' at the top of the engine (this is one of the four points where the engine is bolted to the gearbox). It is located under the air filter and one of the mounting points for the air filter will be bolted to this. Keeping in mind where this is located move to the front of the engine. At the bottom right of this 'horn' there is a hole, it is pretty hard to find but perseverance will pay off. Insert your 6 mm object into this hole. Again, it can be difficult as the oil breather tube mount can interfere with your rod. Once you have something suitable in the hole take a 14 mm socket mounted on a long extension bar and insert it into the tube in the centre of the engine fan and locate it on the bolt head that hold s the fan on. You are going to use this to rotate the engine so you will need at least a 3/8 ratchet. Rotate the engine clockwise while pushing the 6 mm rod against the flywheel; what you are feeling for is the hole in the flywheel that corresponds to the static timing mark. Go slowly as you can break the rod when it drops in the hole if the flywheel is spinning fast. As you rotate you will be able to feel when one of the pistons comes up to compression – you will feel this as a resistance, go really slow as you are almost there. Once the rod is inserted in the hole the engine is at the static timing point (8° BTDC). Leave the rod in the hole and go and get some Tippex or brightly coloured paint. Paint a mark on engine bellhousing and another on the flywheel (they must line up) - I usually make mine on the offside to the left of the starter nose. Once the marks are made, TAKE THE ROD OUT OF THE HOLE.

To check the static timing take up test lamp and connect the positive lead to the negative terminal of the coil and the negative lead to a good earth. Rotate the engine clockwise and check that the light comes on 'just' as the two marks on the flywheel line up. If they don't, memorise how many teeth pass before or after the light comes on (you will often find it's about one half tooth out) and carry on spinning to check the timing on the other cylinder. It may be that the timing on the two cylinders has been 'balanced out' by someone previously to take account of wear in the points cam. For example if on one cylinder the light comes on one half tooth prior to the marks lining up, and on the other cylinder the light comes on one half tooth after the two marks line up, the timing is fine. If the light comes on before the timing marks on both cylinders, or after the timing marks on both cylinders the timing needs adjustment. If there is a total of more than one tooth difference between the two cylinders then you should consider purchasing a new points cam or investing in an electronic ignition system that does not retain the standard points mechanism. See the section on Buying Electronic Ignition and our Ignition Stuff Products section for more information. Apart from finding out any imbalance the actual position of static timing is not that relevant to the good running of the engine but you need to establish a base point to work from.

# A Series Ignition System – Dynamic Timing

## Dynamic Timing:

In order to check or adjust the dynamic timing of the engine you will need to purchase a timing light. This tool uses a special light source and an inductive clamp, which senses the current passing through one of the ignition leads. When a current is sensed in the lead (spark at the plug) the light (usually Xenon or Neon) comes on and the operation of this means that the light flashes. The idea is that you will have painted a line on the face of your flywheel at your ignition point and the flashing light will pick up this line. If the engine is too far advanced the mark on the flywheel will be to the right of the flashing light and vice-versa. Basic timing lights are not particularly expensive starting at around £20 and go up to about £100 for the bells and whistles versions – get one.

In order to check the dynamic timing you will need to make a couple new marks on your flywheel corresponding to top dead center (TDC) and your maximum advance mark. See Page 7 for more detail on marking the flywheel.

First mark your TDC point on the flywheel, this will be 2.377 teeth anti clockwise round from your static mark (all directions given as if you are standing at the front of the car looking at the engine). From this point simply count round exactly 10 flywheel teeth clockwise and make another mark on the flywheel. I like to put a symbol either side of the mark as well to aid with setting the timing – something like <|> or A|R might work well where the "|" is the maximum advance mark. Ten flywheel teeth equates to 33.6 degrees - be really careful with the marking though as one half tooth equates to nearly 1.7°.

With the marks established, connect your timing light according to the instructions and have someone start the car. Rev the engine to something over 3,000 RPM and point the light at your bellhousing mark. If all is well then the line you made to show maximum advance should be exactly opposite the bellhousing mark and steady. If the flywheel mark is to the right of the bellhousing mark the ignition is too far advanced and the timing will need to be retarded. Retarding the ignition is achieved by slackening the points box bolts and rotating the box in an anti-clockwise direction. If the ignition is too far retarded then the mark will be to the left and can be adjusted by rotating the points box clockwise. Make very small adjustments and check again until it lines up exactly. It may well be that the line appears to flutter from one side to the other – this is caused by uneven wear on the points cam. If the wear is more than (say) one tooth in total then you should replace the points cam, otherwise simply adjust the timing to distribute the difference between the cylinders (light shines in the middle of the fluttering line).

Once you have adjusted the timing you should check for pre-ignition by listening very carefully for pinking. This is a funny tinkling or jangling noise that is most apparent under a high load such as climbing a hill in a high gear. There are many factors apart from ignition advance that can cause pre-ignition including, low octane fuel or a lean mixture, high ambient temperatures, wrong spark plug heat range or high engine temperatures due to inappropriate use of the muff, dirty oil cooler fins, broken fan blades, missing dump tubes or a faulty exhaust. If you are getting pinking at 33.6° total advance then you should find out what the reason is and/or retard the ignition until it stops.

# A Series Ignition System – Tooth Counting

**NB: All directions are given as if you are standing in front of the car looking at the engine.**

## Sad beyond belief, or a something useful?:

A special subset of 2CV'ers exist in the dark netherworld of A Series motoring – the tooth counters. These people spend all their time working out multiples of the number 3.364 and interesting new ways to foist their views on the rest of us.

First up you will need an appreciation of the fact that there are 107 teeth on the flywheel of a post 1970 2CV. Given that there are 360 degrees in a circle each tooth therefore represents 3.364°. With this in mind the next thing is to establish a fixed point on the rotation of the flywheel and the static timing point is ideal for this. It is worth persevering with marking the static point correctly as everything else will stem from this point.

Find the static point using the rod in hole method outlined earlier and make a mark on the flywheel and on the bellhousing. Mark the flywheel side first and make your mark in the dip between the tips of two teeth, remembering that you will need a bit of bellhousing opposite this for the other mark. It might sound daft but you want to make the flywheel mark slightly over 1/3 of the way into the valley between two teeth (.377 would be perfect) i.e. .377 in from the left tooth. Once established, make a mark exactly opposite this on the bellhousing.

It might all have sounded insane so far but bear with me as next up we need to mark the TDC point on the flywheel. Count anti clockwise 2.377 teeth (8°) to the right of your static mark and mark the point of that tooth – this represents Top Dead Centre.

Next up we will mark the theoretical maximum advance point of 33.6° - simply count round 10 teeth clockwise from the TDC tooth and mark that one.

Finally we can also mark on the flywheel the tooth that represents the correct dwell (contact gap). The middle dwell value is given as 109° for an M28 or M28/1 engine so we divide this by 3.364 to come up with 32.4 teeth in total. The dwell is the measure of when the contacts are closed (test lamp off) but we can only see when the test lamp is on so if we take 32.4 teeth (the dwell, light off) from the total number of teeth (107) that leaves 74.6 teeth where the light should be on, so starting at the static timing point either (a) count round 74.6 teeth anti-clockwise, or (b) count clockwise 32.4 teeth which is probably easier. The range of value for dwell means that you can safely round these numbers to 75 and 32 teeth in establishing the dwell mark. Whichever means you arrive at this point make a mark on the flywheel and indicate that it is the dwell mark in some way. To check the dwell all you need to do is to connect your test lamp to the negative terminal of the coil and spin the engine over manually. The test lamp should light up as the static timing mark goes past the bellhousing mark and go out when the dwell mark goes past. If it does not then the dwell (contact gap) is wrong although one tooth out either way is acceptable.

The dwell increases as the contact gap decreases so if the lamp goes out before the dwell mark goes past the bellhousing mark the dwell is too small – the gap is therefore too big and should be reduced. I personally would set this so that the lamp went out one tooth prior to the dwell mark as this represents around 106° which is the minimum dwell (maximum points gap). As the points gap shrinks with wear on the heel of the points I think it is worthwhile setting them as wide as possible. These engines seem much happier running too big a gap than too small.

As a final word on the subject remember to change this mark if you change the static mark to represent the best setting for your engine.

## A Series Ignition System – Bring It All Together

### In Practice:

To adjust or replace the points, condenser or timing you need to strip the front end to get to the points box. Remove the fan cover (4 x 11 mm bolts), undo the fan bolt (14 mm socket on long bar) and remove the fan. Removing the fan can be difficult as it sits on a tapered shaft. Put a long bar (a piece of pipe or a jack handle) down the centre hole (where the 14 mm bolt came from) and give it a sharp levering up and down/side to side to free it from its taper. Remove fan and push the fan belt to one side. In many ways getting the fan off is the hardest bit.

Next up is remove the two horizontal metal bars that hold the rubber shield in place (4 x 8 mm bolts). Remove these, the top one comes away easy, the bottom one goes through the oil feed pipes to the oil cooler – slide it along to one side, tilt it up and pull it out. There should also be small bolts at the bottom of the rubber cover (3 x 8 mm) remove these too and pull the rubber cover out to expose the points box. The points box is located towards the bottom of the engine and the cover is held on with 3 plain screws and has a rubber seal to keep out dirt and water.

I recommend that if the points need adjusting then you should just replace them – not exactly necessary but why take a chance. I also recommend that you replace the condenser and contacts as a set.

Lets assume that you are going to replace both, the easiest way is to remove the entire points box from the car. Prior to removing it mark the points box and the housing it sits in with a felt pen or a scriber – this will help a bit when you put it back in. At each side of the points box there are bolts holding it in (2 x 11 mm) with two flat square washers. Undo these and pull the points box out slowly, it might need a tap with a rubber mallet to free it. As it come out you will find that there is a wire attached to the bottom right corner – this is the cable from the negative side of the coil, detach it from the points box. Take the points box, your plain screwdriver, new contacts and condenser and that half drunk coffee into the house (warm). Insert coffee in microwave and heat up. Don't just immediately rip everything inside to bits, remove each part carefully and remember how it all fits together.

Remove the cover and seal first (3 plain screws) and then the condenser. The condenser is held on the left hand side of the points box by a plain screw and by another screw through the terminal on it's wire. Remove the screw from the left hand side and undo the screw that locates the wire. When you remove this screw you will notice that there is a brass terminal under it (the one that you removed the terminal from) and also that the moving part of the contacts will become loose. Remove the condenser and the plastic surround it sits in.

The moving contact of the points can now be pulled towards you off the locating peg and removed along with the flat plastic insulator that the plate at the bottom sits in: as you take it out be careful to note how the spring is located as you will need to put the new one back in the same way. To remove the fixed section of the points undo the small (plain) screw holding the points into the points box. Put the screw somewhere safe (it is a very specific size and you won't find a new one too easy to get). Take this opportunity to clean the points box up and remove all the oil and grime.

You are now ready to reassemble with your new components. Fit the fixed part of your new contacts first by dropping it into the box and doing up the locating screw lightly. Then fit the moving part of the points along with it's spring and the insulator that sits at the bottom of the box. This is a bit fiddly so persevere. The easiest way to do it is to locate the spring in the moving contact (there are two little checks for it to locate into) and bend it over the circular part of the moving contact – hold it there, slip the rectangular insulator over the rectangular metal part at the end of the spring and then push the whole lot into the points box. The hole in the moving contact goes over the peg in the points box and the spring/insulator should be slipped inside the bottom of the box. If this is your first time you might take a couple of go's to figure it out. Once the moving contact is in, install the plastic holding bracket, the condenser and the terminal that connects to the coil onto the bottom of the points box. The next bit is also fiddly, insert the holding screw and its washer through the ring terminal at the end of the condenser wire, the hole in the angled terminal and push it through the hole in the plastic holding bracket. The thread that this screws into is on the rectangular metal bit at the end of the spring of the moving contact. You need to slide this metal part along the bottom of the points box to line the holes up to allow you to install the screw. Lastly you should refit the condenser holding screw on the left hand side of the points box.

Back out to the car with the points box in hand (without cover). Install the box into the car, lining up with your previously made marks and install the two holding screws and their square washers. Don't do them up tight yet. Set the contact breaker gap to 0.45mm using the instructions outlined on Page 3. Persevere – it needs to be right.

Check your static timing as outlined on Page 5, remember to disconnect the ignition leads and to go round two complete turns to check for uneven wear of the points cam. If the light does not come on at all try tightening up the points box tightly as this could indicate a bad earth. If the light comes on before mark then the timing is too far advanced and you should turn the points box anti-clockwise and vice-versa. If the points cam exhibits too much wear (more than one tooth out side to side) then replace it, otherwise average out the value between the two cylinders.

Put the ignition leads back on the coil and start the car. Let it car run for a few minutes to bed it the rubbing block on the moving contact. Sparingly apply a small amount of suitable contact breaker grease to the cam lobes (not too much). The grease will minimize the wear on the rubbing block and give you the maximum service life from the points. Check the dwell angle and make sure that it is within prescribed limits – adjust as required. Check the dynamic advance and adjust as required using the instructions on Page 6.

Don't worry about running the engine without the fan for a few minutes it won't do any harm.

If either the gap or the advance needs to be adjusted then you must go back and check the other. In other words if you change the timing then you should check the dwell angle again even if it was perfect before. If you need to change the dwell at this point you should check the advance again just to be sure. You need perfection and then you can build it all up again and remember to apply a (very) light smear of grease or anti-sieze fluid to the fan taper on the end of the crankshaft – this will make future removal much easier.

## Preparing for the next time:

Once you have reached this happy stage your dwell angle and dynamic advance will be absolutely perfect. Take the time to change the static marks you made on the flywheel again to reflect what is best for your car. Turn on the ignition, connect your timing light and turn the engine over by hand until the light 'just' comes on (ignition leads OFF). Rub out your old mark and put a new one in line with the bellhousing mark. You will need to change the dwell mark but the TDC and MAM marks should be left. The static timing mark is irrelevant to normal driving and resetting it to reflect your car means that you will have a much better base setting should any work be required on the road.

From now on you can check your timing and dwell without removing anything just using your test lamp and the marks on the flywheel. Looking back at these instructions they look really complex but the truth is that it's all pretty quick and easy with a bit of practice by anyone with basic mechanical skills. If you don't have these, why not get some who does do it for you the first time – watch how they do it and you will be able to do any subsequent work yourself.