Pilgrim

Sumo Construction Manual

Sierra/Granada Mk.3 Version

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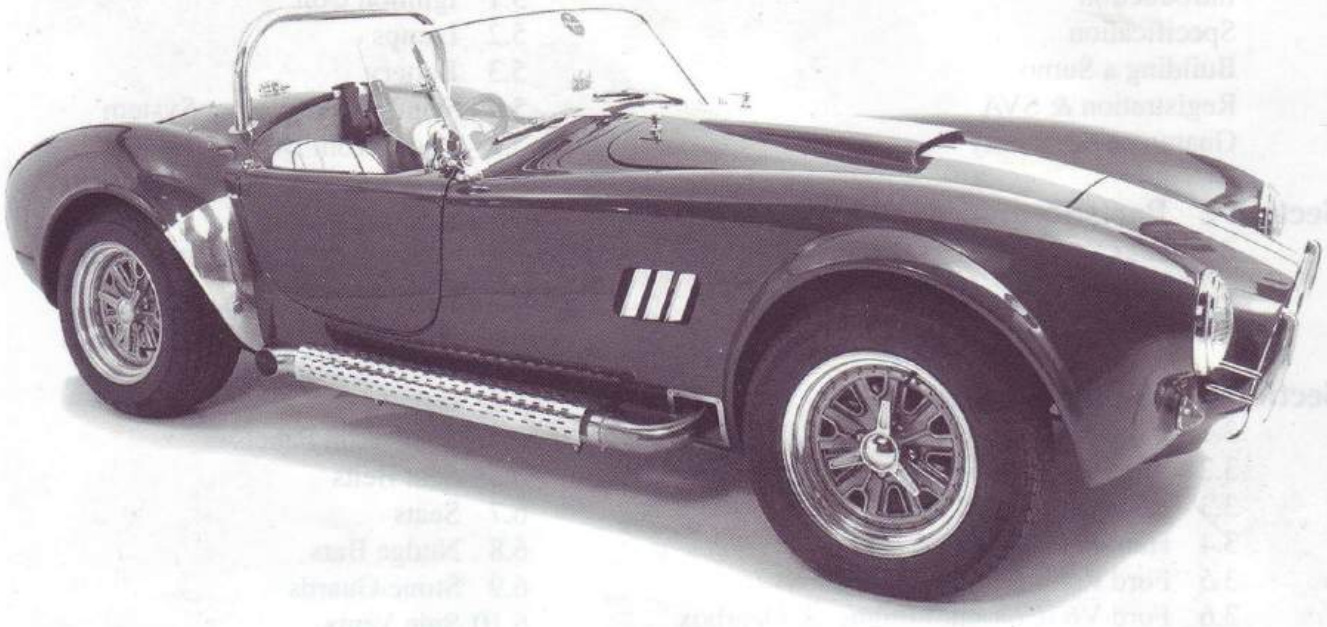
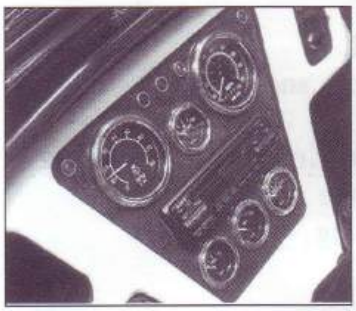
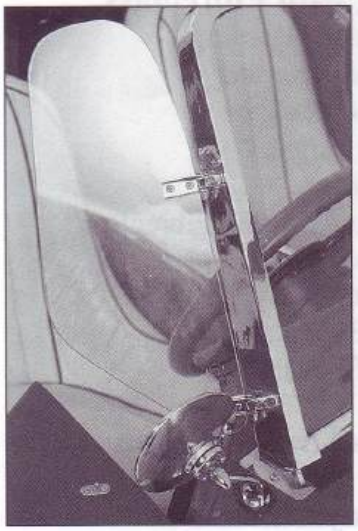
SUMO
Sierra & Mk. 3 Granada Version Issue 3







Dear Customer

We believe that these instructions set new industry standards for clarity, content and presentation. We hope that after reading them, you will feel confident enough to purchase a kit.

We at PILGRIM care about quality and believe it is not just skin deep. True quality extends from the high gloss exterior finish right through to every last detail of the mechanical assembly.

A large number of people have built cars from PILGRIM kits and would testify that they are as much fun to build as they are to drive when finished.

We hope that you will find these instructions clear, concise and informative, but some customers do get "stuck" at some stage. This is why we have a "help line", manned by friendly, knowledgeable staff who can guide you through any unforeseen problems. It is good to know they are there to help even if the majority of customers don't need them.

Yours sincerely

Tony Holmes

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Introduction

Safety

Our kits are amongst the safest within the specialist car industry. We spend a great deal of time and money having our kits examined, tested and approved by various British and European road traffic authorities. The Sumo has been tested by Dutch road traffic authorities and has been granted full Dutch type approval. Seat belt anchorage test were conducted to the rigorous requirements of ECE regulation 14.02 and passed with a comfortable margin. Various other tests have been conducted by the very strict German TUV authorities, including the Hydropulse test, before they grant their type approval.

We actually 'build in' many basic safety features such as positioning the fuel tank in a well protected area and providing a metal bulkhead 'fire wall' separating the occupants from the engine compartment in the event of an engine fire.

The Sumo also meets all SVA requirements. Seat belt positioning, as well as strength, is an important factor as are potentially dangerous cockpit protrusions and sharp edges around the body and chrome fittings. These items have all been designed to meet the SVA requirements without detracting from the classic design and presence of car, or the sheer exhilaration of driving it

We are extremely confident that no other specialist kit car producer can boast a better list of safety specifications than are present in our SUMO.

Pilgrim is a member of STATUS, an organisation that sets industry standards and is very conscious of the latest safety requirements in the automotive industry, both at home and abroad.

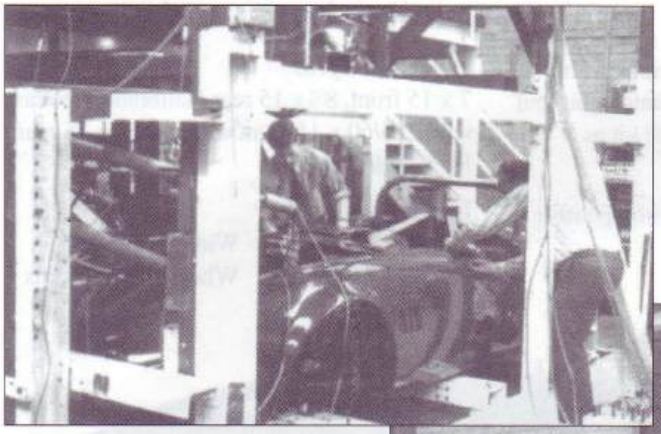
Chassis Design

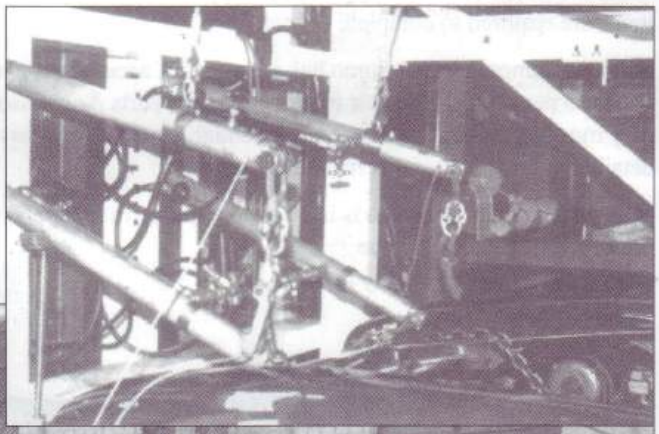
The chassis design incorporates a ladder frame at ground level, a very strong backbone with sheet steel bulkheads and floors. Bracing tubes are then used to transfer loads directly into the bulkheads and tunnel. Effectively, the chassis is a composite of ladder frame, space frame and monocoque construction techniques that provides very strong and cost-effective structure.

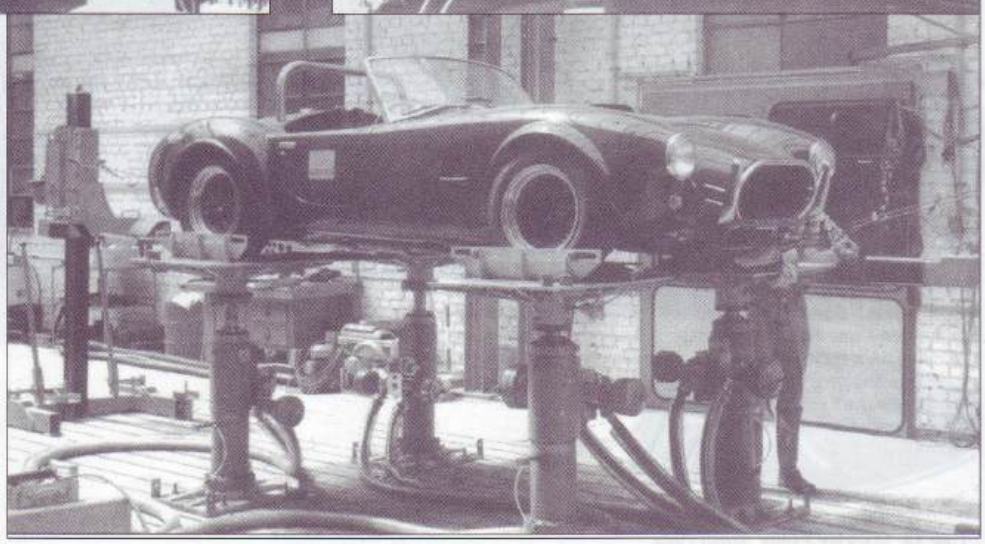
Because of the high sheet steel content, we offer the option of chassis galvanising for a small additional cost. Highly recommend!

Hydropulse Test

There is only one way to be sure that a chassis design is up to the job and that is to test it on a dynamic test rig. The Sumo







These illustrations show some of the test equipment used on our SUMO. From seat belt anchorage loads to the punishing Hydropulse (right) that compresses 100,000km of hard motoring into a few days. Only the toughest of suspension systems survive this one!

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Introduction & Specification

Mk.3 chassis was tested in Germany on a Hydropulse rig. The car was supported under the wheels by massive, fast moving hydraulic rams. They move in a way that simulates a bumpy road surface over which the car is moving at 120kph. To shorten the time of testing, the vibration program is edited so as to remove smooth sections of road. The idea is to concentrate about 100,000km of rough road driving into about an 80 hour test. This test program is extremely severe and can not only destroy several sets of shock absorbers, but actually melt plastic parts in the suspension due to heat build-up.

The Sumo passed this gruelling examination and is not only further testament to the Sumo's strength but also proof that the often quoted figures for static chassis stiffness in some kits are not proof of road worthiness. They are meaningless when applied to a dynamically stressed vehicle.

Buildability

For ease of build, the SUMO has been designed to use virtually all the required mechanical components from a single Sierra or Mk.3 Granada donor vehicle.

The chassis itself is very straightforward to assemble with pre-drilled mountings for nearly every component. The chassis forms the main strength of the car and it is possible to fit all the mechanical components including seats, steering column, battery and wiring loom and then drive the chassis without the body fitted. The fact that this is possible, illustrates how strong and complete the Sumo chassis is. The body, although immensely tough, is merely an unstressed cosmetic covering.

If you are comparing our kit with that of another manufacturer, please ensure that you compare like-for-like. Make sure that you not only read the instruction manual but also check exactly what is supplied in the basic kit plus what extra items are required to complete the car.

Even the comprehensive Sumo has a number of accessories and options with which to personalise your car (see our separate parts & accessories catalogue) but they must not be confused with the essential items that are part of the kit as detailed in Section 2 of this manual.

You will find that the Sumo is is a very comprehensive kit at a very competitive price, offering the best value along with unrivaled quality and buildability.

Sumo Specification

Sierra & Mk.3 Granada Based

Chassis
Rectangular box section steel tube ladder chassis with tubular tunnel frame and sheet steel tunnel, floors and bulkhead.
Bolt-on roll over bar.

Body
Hand laid GRP with additional reinforcement in high stress areas.

Engine
Virtually any European Ford 4 or 6 cylinder, Rover V8, American Ford 302 Ci (5 litre) or Chevrolet 350 Ci (5.7 litre).

Transmission
To match your chosen engine.

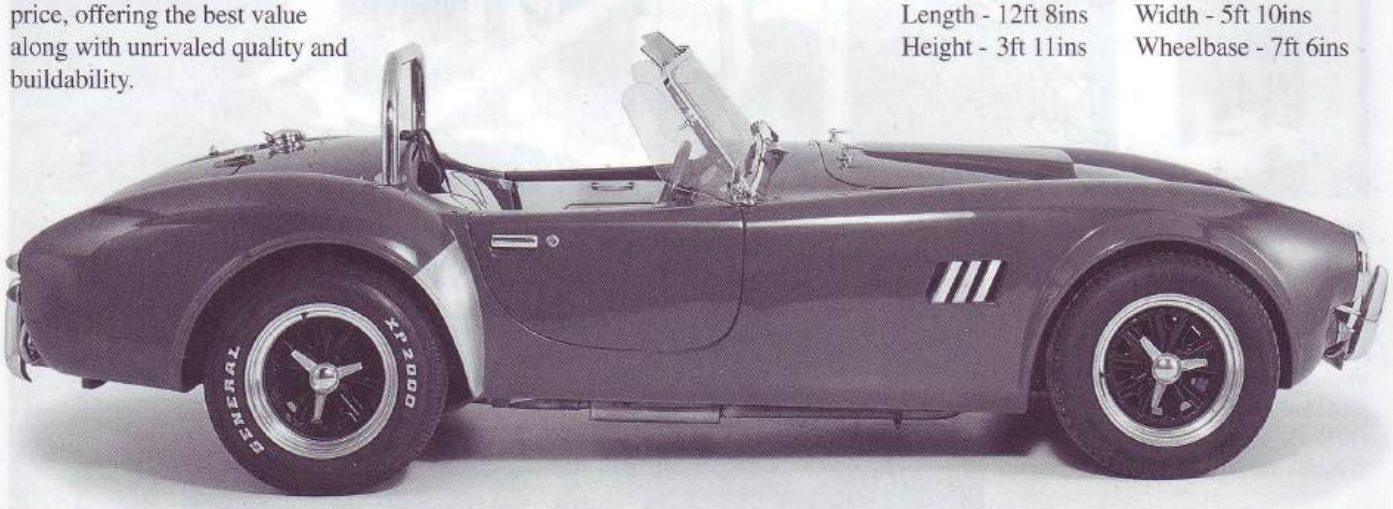
Suspension
Front - Double wishbone with coilover shocks
Rear - Independent lower semi trailing arm, coilover shocks.

Brakes
Servo assisted dual circuit
Front - Vented or solid discs
Rear - Discs or drum.

Wheels & Tyres
7 x 15 front, 8½ x 15 rear Halibrand replicas with 215/60 x 15 front and 235/60 x 15 rear BF Goodrich tyres.

Dimensions

Length - 12ft 8ins	Width - 5ft 10ins
Height - 3ft 11ins	Wheelbase - 7ft 6ins



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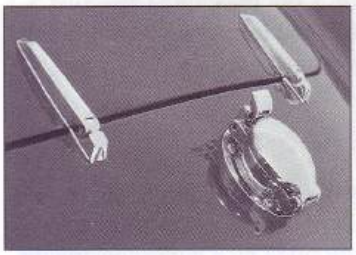
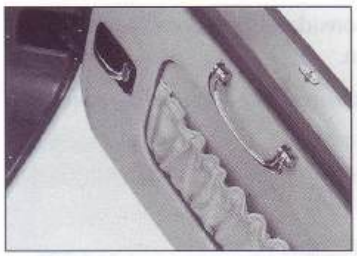
Building a Sumo





Kit Car History

The building of 'specials' has been a British pastime since the war. As it was almost impossible to purchase a sportscar, you had to make your own.

Kits and parts have been available since the 1950's to enable less adventurous home mechanics to achieve their ambitions to own a sportscar. Early kits required a great deal of practical and engineering skill to assemble. These kits often only comprised a basic body shell to fit on top of a chassis from an Austin or Ford 'donor' car. Although the 'donor' mechanics were far more basic, it was up the builder to make the body fit it somehow.

However, in 1959 the Lotus Seven was introduced as a kit which not only had a true sportscar pedigree but was supplied with a new chassis, a complete set of bodywork and a reasonable set of instructions. Since then, a large number of other manufacturers have produced similar kits to bring simple but fun sportscars within the reach of any home builder.

Modern Kit Cars

Most Kit Cars available today are very well designed and constructed, and require less work and skill to assemble than was the case a few years ago. This is particularly true of the Sumo

The Sumo has been designed in such a way as to be easily built by people without mechanical experience. We have sold about 3,500 examples to people from all walks of life, from factory workers to bank managers, from teenagers to octogenarians, male or female. What they all have in common is that they successfully built their cars. This is backed up by the fact that advertisements for partly finished Sumo projects are virtually non-existent.

Skills Required

The main qualities required by those considering building a Sumo are the ability to follow these instructions combined with a measure of patience and a certain amount of DIY ability. Only very basic mechanical knowledge is required as the Sumo is really only a large 'construction kit' and provided you follow the instructions carefully, the assembly is very straightforward. However, some builders may recognise areas where they are not entirely confident such as deciding what in the way of 'donor' parts need to be reconditioning and how to go about it. The donor's workshop manual is the obvious starting point but alternatively, you can obtain the components from us in a 'ready to fit' state. Other aspects such as choosing the mechanical parts, doing the wiring or working on the engine etc., can also be overcome. Within your build budget, you can allocate funds to pay a professional just to work on any part you are not confident about.

Even the most demanding part of building the car, the alignment of the body panels (particularly the doors), is no more complicated than assembling and fitting a set of kitchen cupboards. We are confident that anybody who regularly does DIY jobs can easily build a Sumo. The components required, the basic tools required, the step-by-step assembly procedures and the legalities are all fully covered in this manual.

Express Yourself

One of the best aspects of actually building your own personal car is that it can be done exactly as you want it, and exactly to your specification. It is impossible to describe the sense of accomplishment when your gleaming creation is finally on the road. You will soon realise that your particular car is unique to you and although there may be thousands of others out there, they are all different and bear the individual characteristics of their creators.

So now build the sports car you've always wanted!

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Having a Sumo Built For You

Built Vehicles

Not everyone would derive enjoyment from building their own vehicle and even if they would, they might not have the necessary time, skill or facilities.

This why we offer a full build and partial build service. We can do anything from sourcing and preparing the mechanical components, to assembling the chassis, to fitting the bodywork right through to completely finishing a vehicle to the standard of demonstrators, but to your specification.

Specifications

The Sumo can be built to various specifications with a number of engine options, finishes and accessories.

Clearly, a Sumo with a 2.0 litre. Ford engine is going to cost a great deal less than one built with a fire breathing Chevrolet 5.7 litre V8 engine. Similarly, a Sumo with a metallic paint finish and leather interior is going to cost more than one built with vinyl interior and a gel-coat finish.

Professional Assembly

These are quality hand built sports cars and a great many skilled man-hours go into their production in premises that have the usual factory overheads. Also, when we build a car, we use a higher proportion of new parts than would normally fitted by a home constructor.

Taking the above into account, a car built for you will be considerably more expensive than one you would build yourself to a similar specification.

However, by having your Sumo built for you, you can be assured of a top quality example that only the factory can provide.

Prices

We can build a new Sumo with a small engine and cheaper options from around £14,000 whilst a top specification example with a new Chevrolet 5.7 litre V8 and all the best options will be around £22,000.

In order that you can understand our pricing, we have produced a document entitled 'Costing Your Own Built Sumo' which is available by sending an S.A.E. It goes through the entire vehicle giving you the opportunity to see exactly how the price of a completed car is calculated.

We sell about 30 such cars a year with a typical price around £18,000.

Waiting List

The time it takes us to assemble a car depends upon how many are on order at the time. Demand is high during the spring and summer but less so during the winter months.

Used Sumos

We regularly part exchange used Sumos and usually have a number in stock. Prices vary according to age, general condition and build quality. If you would like a current stock list, please send an S.A.E.

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Registration & SVA

Registration

The Sumo has been in production since 1987 with examples being registered in almost every country. The British registration system has hitherto been one of the easiest in the world which has been one of the reasons why the British kit car industry has flourished.

Since the inception of the SVA (Single Vehicle Approval) in1998, initial teething problems have long since been resolved and this new test has had a very significant and beneficial impact on the kit car industry. With safety, roadworthiness and mechanical integrity being the prime objectives of the test, it will be reassuring to know that the car you are about to drive has qualified in all these aspects.

A Better Future

The SVA testing procedure has improved the standards of quality and safety of kit cars in general. This is good for the industry as it helps kit cars gain a deservedly greater respect and acceptance by the car buying public. It is also good for those who build them, drive them or may come 'into contact' with them on the roads. Well designed and well built kit cars have always been inherently safe by the very nature of their strong chassis and good handling, but now there is a level playing field and the prospective builder or purchaser can be sure that any manufacturer, whose demonstration cars are SVA compliant, has done what is required to produce kits that can be built to the same standard. Re-sale values also benefit from cars that have been granted a MAC (Ministers Approval Certificate).

Build Your Kit Carefully

The SVA test covers a very wide range of factors that all kit cars presented for testing will have to comply with. Most of the tests are designed to check that the car has been assembled safely and due regard to the law. Checks will be made to ensure that the car's electrical system is safely installed with correct fuses and that grommets have been used where the loom passes through holes in bulkheads etc. The lamps and other lighting equipment will be checked to ensure they are of the correct type and they are all present and working. You will have to ensure that items such as a hazard warning switch is fitted, with not only a 'tell-tale' bulb in the cockpit, but also side repeaters. A rear fog lamp must be fitted along with switch and 'tell-tale' bulb. If your reversing light is operated from a dashboard switch and not the reverse gear selector, this must also have a 'tell-tale'. These are all very minor points but there are many of them so build carefully.

The SVA test imposes a standard that is uniformly applied throughout all the test centres. It is advisable to obtain a copy of Department of Transport Handbook on the SVA test requirements to ensure that you are building a kit that can be registered.

Choose Your Kit Wisely

Whilst the SVA test will be looking at how you have built your car, it will also be looking at the overall design integrity of the kit itself. For this reason it is important to purchase a kit without any pitfalls in its basic design. There are two very important areas to check thoroughly. If the kit does not comply, it will be almost impossible to adapt it to do so. The regulations state that the position of the upper seat belt fixing point must be at least 500mm above the padding of the seats. Because of the strength required to be built into anchorage points this would not be easy to adapt. The second area to check is the height of lights. Headlights must be at least 500mm above the road (measured to the bottom of the glass) and indicators must be at least 350mm above the road (again measured to the bottom of the glass). This can be a problem, especially if the vehicle is a replica of an older classic car that does not have to comply with modern legislation. Having to drastically alter the lamp positions would have a devastating effect on the look of the car.

The Sumo is fully compliant with the current SVA regulations and no tweaks or slight mods are required to 'squeeze' through the test. Other manufactures cars may not be so competently designed and it may be left to builder to 'adapt' the car to get it through.

It is advisable to check out our competitor's SVA credentials before spending money on a car that may prove impossible to use on the road.

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Guarantee of Quality

Policy
pilgrim policy is to constantly develop and improve its products to keep them ahead of our competitors. The Sumo was refined during the first few months of manufacture and the resulting current kit, we believe, fits together perfectly. The quality of our bodywork mouldings and our chassis jigs are second to none.

Only the Best
These instructions detail the best way to assemble our kit. There are alternative techniques and cheaper parts available. However, if you decide to use or employ them, you may make problems for yourself elsewhere in the build-up. Our help-line staff may not be able to help you if you deviate from either these instructions or the parts we sell or recommend. Conversely, if you follow these instructions to the letter, we are certain of your success and of our ability to help you in times of need.

Honesty
Unlike many other companies, we produce very detailed and comprehensive instructions and in them, point out the real costs and any potential problems or difficulties we think you may encounter. Building one of our kits, or for that matter, a kit from any manufacturer, is a substantial undertaking and it would be wrong to assume that a less detailed (thinner) manual means an easier build. It could simply mean that you are left more to your own devices with a consequently longer and more frustrating build time.

Confidence
We are so confident that our kits are straight-forward to build that we guarantee to finish building your kit for you if you get stuck for any reason (including lack of time, illness, change in circumstances or anything else). Naturally we charge for such a service at our normal garage rate (currently £25 per hour, but subject to change). Materials and parts used are charged in addition at our normal retail prices. This guarantee means that you do not risk being left with a pile of unfinished parts in your garage.

Quick-Assembly
If a Sumo kit returned to us for finishing we guarantee not to charge for more than 160 hours of labour to bring the car to a fully finished state. This applies even if we have to strip the car and re-build from scratch, but excludes transportation, polishing and painting.
In other words we guarantee that a Sumo can be built by our factory staff in 160 hours.

Satisfaction
If, in your dealings with us, you are not happy with any of the parts we supply, you can return them for exchange or refund (in the case of refunds, a small handling charge is made). Please keep receipts for proof of purchase.

Mutual protection
In order to protect both you the customer, and us the manufacturer, we would like to clarify the following points:
These instructions are not intended to be an authoritative reference on car mechanics. They are, we hope, a sensible and logical sequence of instructions, which should enable an unskilled, but otherwise practical person to assemble a car using our kit and new or used mechanical components and accessories, as listed within this manual.

Responsibility
It is the responsibility of the builder to ensure that all the parts are suitable for use and are used correctly, with all return springs, locking washers, split pins and other safety devices in their relevant places.Pilgrim can take no responsibility for any accident, loss or injury resulting from any product which has been modified, assembled incorrectly or assembled with parts not recommended in these instructions.

Safety
When working on any motor vehicle you should keep the working area clean and tidy. Gloves should be worn when handling sharp and rough parts. Protective shoes should be worn when handling heavy parts. Before working under any vehicle it should be supported securely on blocks or stands (jacks should not be relied on). When cutting, drilling or grinding you should wear suitable breathing apparatus and eye protection.

Specification changes.
Pilgrim kits are amongst the best available on the market. They are continually revised, improved and altered in order to make them better, easier to build or cheaper to produce. We reserve the right to alter our specifications without giving prior notice. It should be understood that Pilgrim are under no obligation to modify a kit to a later specification after it has been sold to the customer.

Check before you buy
The standard of fit and finish of Pilgrim kits is very good. The cars available at our works for demonstration, or displayed in our brochures, are typical of the general standard of our products and also representative of what a customer can achieve given that a reasonable amount of time and care is spent on building the kit. The customer should examine our demonstration vehicle to satisfy him/herself that what is being sold is what is required.

Order parts well in advance
Pilgrim carry many thousands of pounds worth of stock to satisfy customers requirements. However, like most companies, we may not always be able to supply everything 'off the shelf'. To help both you and us, please order in writing, any parts that you may require after you have purchased the kit, at least 4 weeks before you need them. This particularly applies to fabric items such as hoods, seats and carpets which are available in too many types and colours to hold all variations in stock.

Read our terms of sale
Please note that all items are sold by Pilgrim in accordance with our terms and conditions of sale (also referred to as terms of business).

With that serious business out of the way, we wish you every success in assembling your Pilgrim kit. Remember that if you experience any problems we can be contacted by phone during normal working hours.

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Section 2 Parts Required

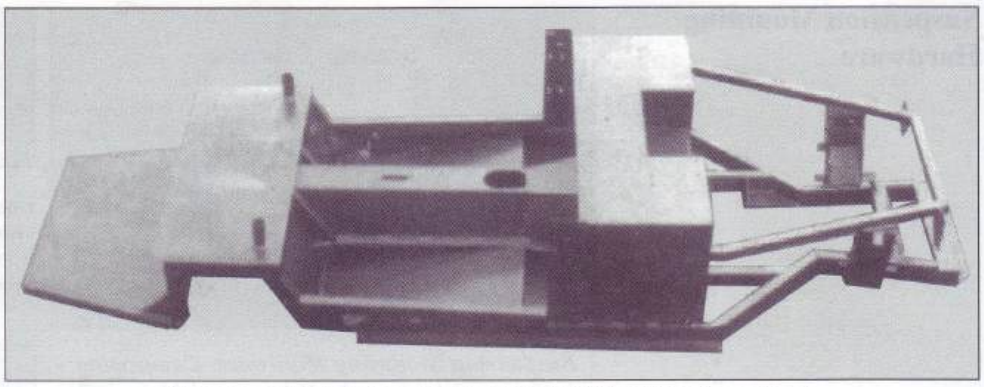
2.1 Kit Components

Basic Kit Contents (from 1.2.95) Sierra and Mk.3 Granada Versions.

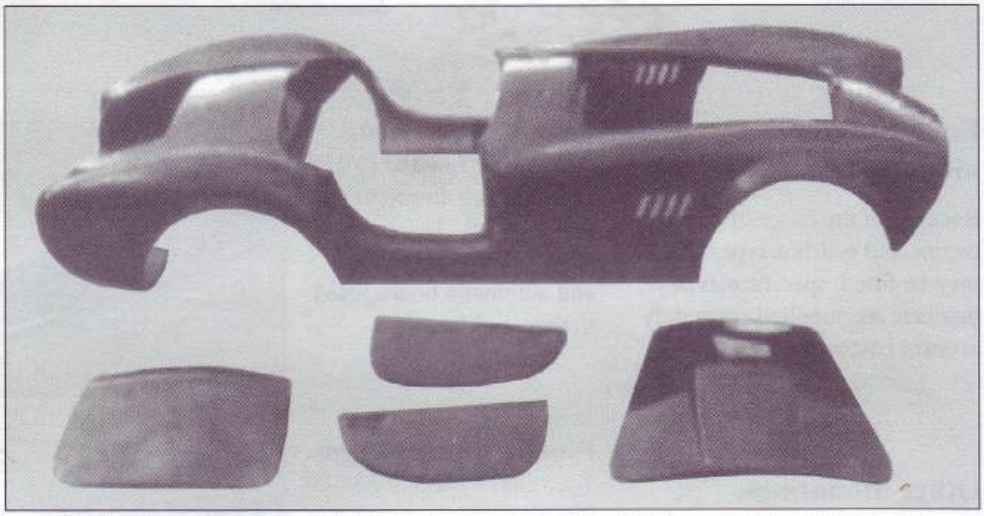
The parts shown here are supplied as part of the basic kit. Those items which specifically relate to chassis assembly are supplied when the chassis is purchased. The remaining parts are supplied with the body.

Extras and Accessories

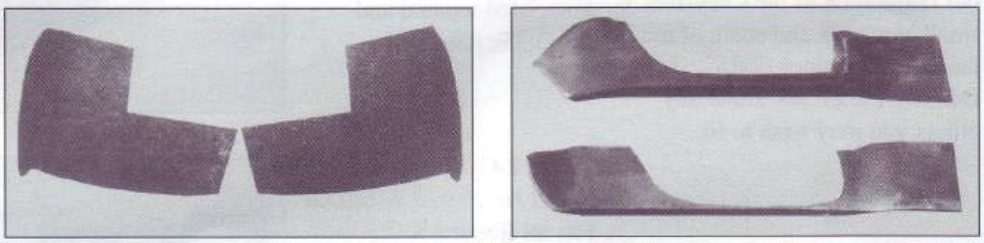
There are many other components required to build your Sumo and these are referred to in the main body of the instructions. All the items required are available from us and are shown in our illustrated 'Parts and Accessories Catalogue' available by sending an A4 s.a.e. to the address below. However many are standard motor accessories and are also available from other sources.



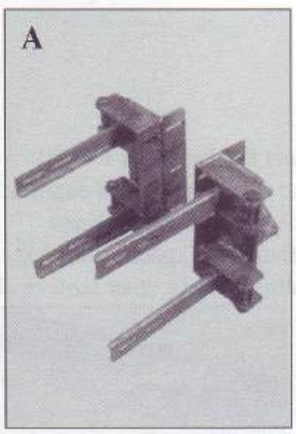
Chassis. *Fully bracketed and drilled. Galvanising is optional.*



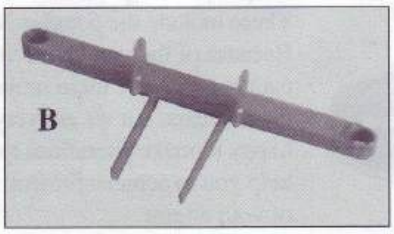
Body Mouldings. *Set of 5. Neutral gelcoat standard, Coloured gelcoat optional.*

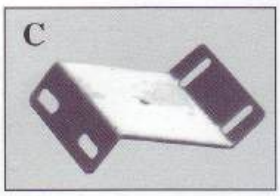


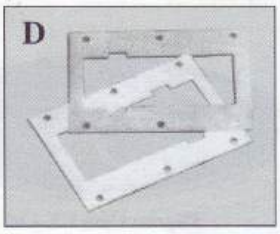
Inner Mouldings. *Set of 4, comprising rear inner arches and inner sills. Front inner arches are optional (see price list).*



Metal Brackets. *Comprising: A-Door hinges (2), B-Upper steering column bracket (1), C-Differential mounting bracket, D-Internal door handle fixing plates (2).*







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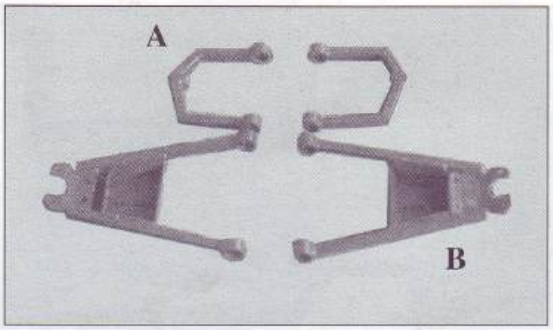
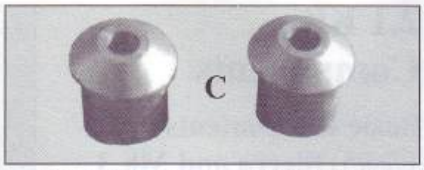
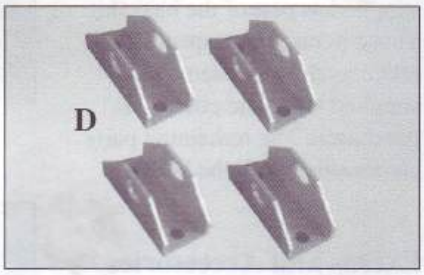
Section 2 Parts Required

Suspension Mounting Hardware





The 'mushrooms' are available to fit the Granada Mk3 and Scorpio uprights. This type is considerably larger and, if require in place of the Sierra items, attract a £10 surcharge



Suspension Mounting Hardware. *Comprising: A-Upper wishbones (2), B-Lower wishbones (2), C-Upper wishbone attachments (2, known by us mushrooms), D-Shock absorber lower fixing brackets (4).*

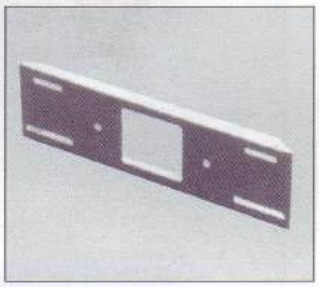
Engine / Gearbox mountings

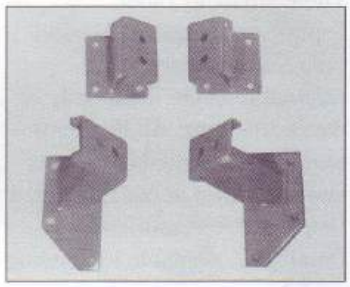
Because of the range of possible engine and gearbox types that may be fitted, specific sets of brackets are supplied separately at extra cost as listed here.

Other Mountings.

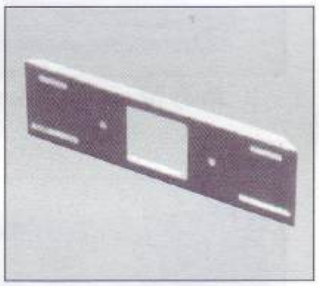
We are continually adding engine mounting hardware to our range such as the Chevrolet small-block V8 and some of the latest Ford engines (Zeta and DOHC). Please ask about any others you may wish to fit.

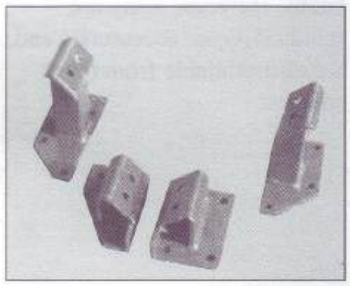
Ford 4 Cylinder Pinto.
5 part kit. Priced at £30.00
Fits all Pinto and Kent engine types. The gearbox mounting fits all manual and automatic boxes fitted to these engines



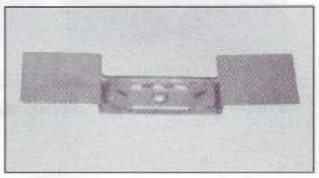


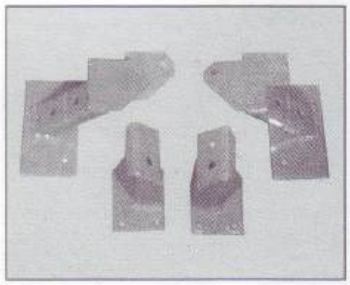
Ford 6 Cylinder Cologne.
5 part kit. Priced at £34.00
Fits all Cologne type V6 engines (2300cc and 2800cc) and their associated manual and automatic gearboxes.



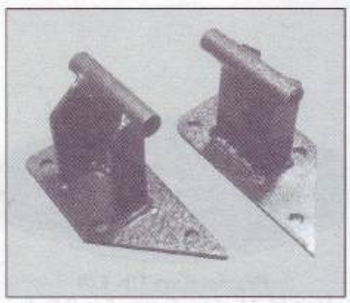


Rover 8 Cylinder.
5 part kit. Priced at £40.00
Fits all Rover 3500cc engines with Rover gearbox, as fitted in the Rover P6, SD1 and Range Rover models





Ford V8 Small Block. *3 part kit. Priced at £34.00*
Fits a wide range of American 'small block' V8 engines. These include the popular 289, 302 and 351 engines. Because of the number of variations in specification we cannot guarantee these mountings will fit other sizes or all model years, but we are very happy to make alterations to help you to achieve fitment of your engine.



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Section 2 Parts Required

2.2 Mechanical Parts Required

The donor car required for the assembly is the Ford Sierra or Mk.3 Granada. This model is available in a number of forms ie. 2 door (Sierra), 4 door 5 door and estate.The engines range from 1300cc to 2900cc. It is possible to use most of them as a basis for out kit. If using the Mk.3 Granada and Granada Scorpio variants, you will then need the 'mushrooms' as mentioned earlier.

You cannot use the 4 wheel drive versions because there are too many fundamental mechanical design differences. In particular, the front suspension components have different bottom fixings and the engine sump has a built-in differential and drive shafts.

If you start with an estate car, a small bracket has to be welded to each of the trailing arms. This can be done by Pilgrim at a price of £25. In all other respects the estate version is the same as the saloon car.

Our kit does not accept power steering so if you purchase a Sierra with this feature, you will require a manual steering rack and you should remove the power steering pump from the engine assembly.

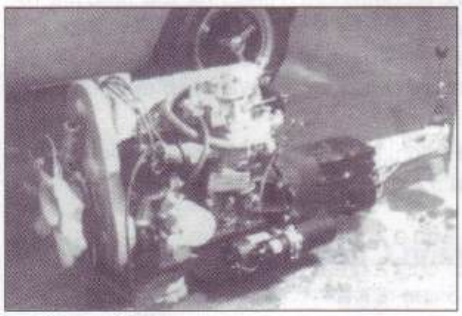
If you are using the Chevrolet engine, you will need the Sierra P100 Pick Up steering rack which is thinner.

Engine / Gearbox

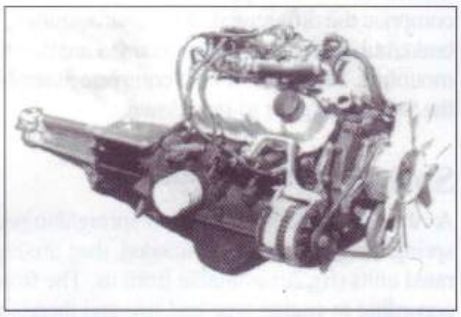
As a general rule, when you obtain an engine separately, you should ensure that it comes complete with all its ancillaries. Quite apart from obvious items such as starter, carburettor, distributor etc., make sure that you have all the remote items required for its operation. In particular, you may need an ignition module, engine wiring loom, computer, high pressure fuel pump etc. These items can be very expensive if purchased separately. More of this type of equipment has been added over the years to enable engines to comply with the latest exhaust emission regulations and also to increase power output. Fortunately, current emission regulations are related to the date the engine was manufactured so that the older the engine, the more lenient are the emission tests and therefore the less complicated the ancillary equipment needs to be. That simply means that you can use whatever form of carburettor / injection / ignition system you want provided that the engine is at least as 'clean' as it would have been when it was manufactured.

It is always advisable to purchase the engine and gearbox as a pair. If you fit a Rover engine, then fit a Rover gearbox and you will never have any problems with 'matching'. Certainly, different gearboxes can be mated to different engines but this usually requires adaptors along with specialised knowledge and equipment to modify mounts etc.

The most commonly chosen engines (depending upon performance requirements) are as follows:-

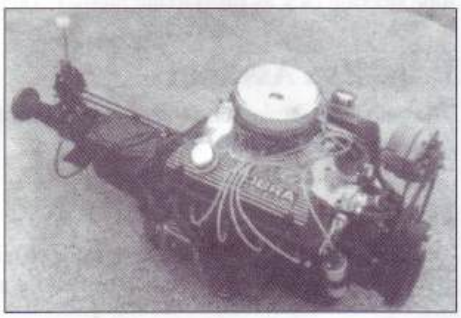


Ford 4 Cylinder Pinto. (1600cc, 1800cc, 2000cc)



Ford Cologne 6 Cylinder. (2300cc, 2800cc)

Rover V8. (3500)



Ford V8 Windsor type (4700cc to 5800cc)

Chevrolet V8 (5700cc)

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Section 2 Parts Required

Front Suspension Components

The Sierra is fitted with MacPhearson strut type front suspension which is too tall to be accommodated under the low nose line of our car. For this reason, the strut itself is discarded. The parts that are retained for re-use are the uprights fitted with bearings, spindles, brake discs and calipers along with their mounting bolts as shown in fig.2a.

Please note that these uprights require slight modification which is covered in section 3.2

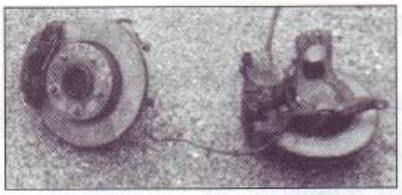


Fig.2a. Front suspension components

Rear Suspension Components

Virtually the entire Sierra rear suspension system is used in the Sumo with the exception of the springs, dampers and carrier frame. The items required are fully detailed in section 3.3 and comprise the differential, drive shafts, trailing arms and rear brake/hub assemblies. Also retained are the differential rubber mounting. Fig.2b shows the complete assembly as removed from the Sierra and prior to strip down.

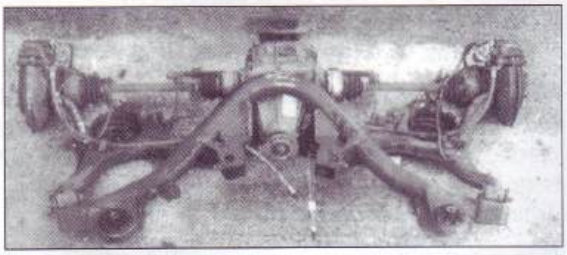


Fig.2b (above). Rear suspension components

Springs

As the front MacPhearson strut spring/damper unit and the rear spring/damper units are discarded, they are replaced by specially rated units (fig.2c) available from us. The front springs are rated according to engine type and size and therefore your chosen engine must be established prior to ordering these items. They are fully adjustable for ride height and damping rate.

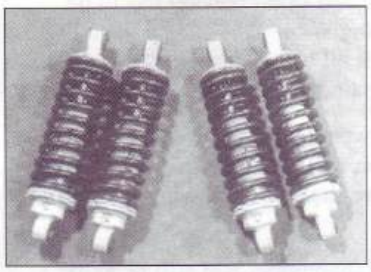


Fig.2c Special springs

Fig.2d (below). Standard type steering rack

Steering

The steering rack (fig 2d), upper steering column and column mounted switches with their plastic covers (fig.2e) are also taken from the Sierra. The lower steering column is a new 3 part unit (shown in fig.2f) available from Pilgrim at extra cost. However, you can have the Sierra lower column extended to suit, by a qualified welder.

Note. If fitting a large capacity engine such as the V8 Ford Windsor type or 5.7 Chevrolet, you will require the slimmer steel tube steering rack as fitted to the Sierra P100 Pick up.

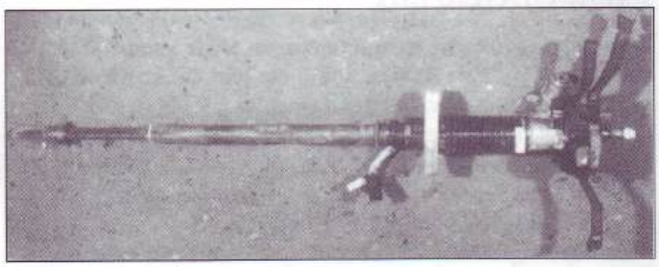


Fig.2e (above). Upper steering column with fig.2f (left). new lower steering column

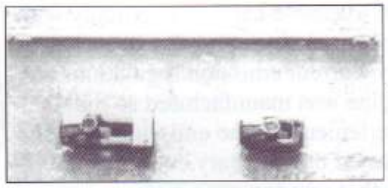
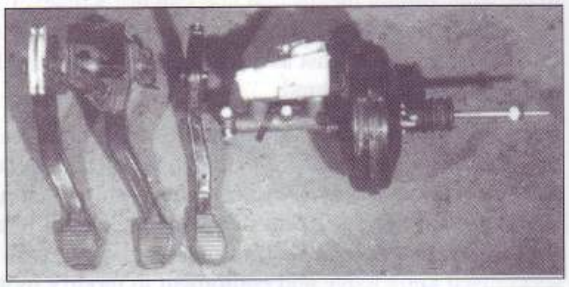


Fig.2g (below) Pedal box assembly

Pedal Box Assembly

The pedal box, brake master cylinder and servo assembly (fig.2g) are taken from the donor Sierra.



Hand Brake

The lever is from the Sierra but the cable requires shortening or you can purchase a new short cable from Pilgrim.

Fuel Tank

The fuel tank and filler cap are specially made for the Sumo as shown in figs 2h and 2i.

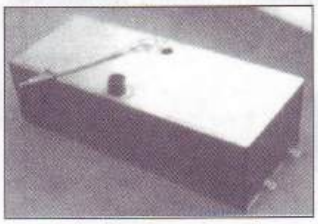


Fig.2h. Petrol tank

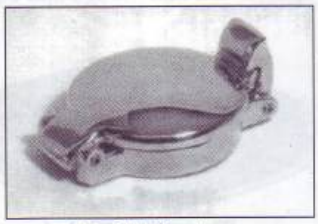


Fig.2i. Fuel cap

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Section 2 Parts Required

Exhaust System

The Sierra system will not fit the Sumo and any cutting and welding on old pipes will certainly be false economy. We supply new custom made systems for the Sumo of the type shown in fig.2j. They are available for most of the recommended engines and include manifolds where required. It is usually necessary to replace the old cast iron manifolds on most V6 and V8 engines.

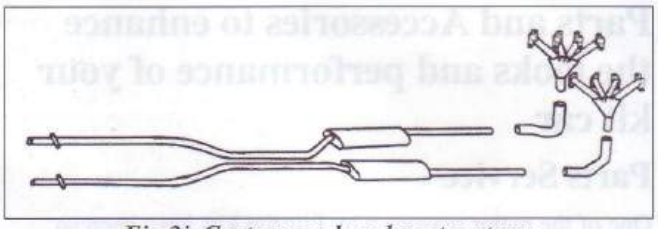

Fig.2j. Custom made exhaust systems

Propeller Shaft

You can either get your Sierra shortened and balanced or you can purchase a new shaft of the correct dimensions from Pilgrim. The one shown in fig.2k is for a Rover gearbox. See section 3.13 for more details.

Fig.2k. Special prop shafts

Radiator

You can use the Sierra radiator if fitting any of the donor car engines in standard tune but if fitting a V8, you will need one of our new high capacity radiators (fig.2l). Hoses will need extending as described in section 3.10.

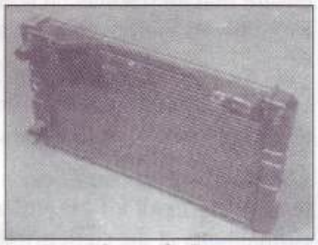

Fig.2l. High Capacity Radiators

Wiring Loom

Here you have two alternatives. You can use the complete existing Sierra loom and make a few modifications to shorten and lengthen wires as required or we can supply a new purpose made loom (fig.2m). Full details in section 5.

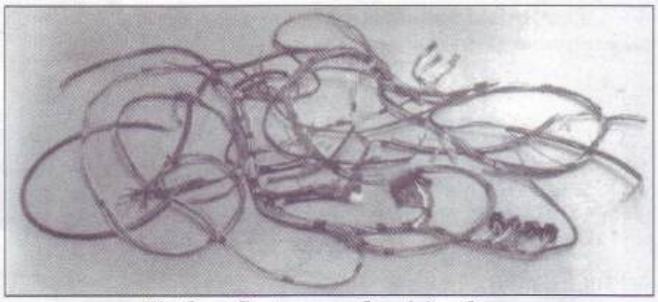

Fig.2m. Custom made wiring loom

Instruments

We offer a comprehensive range of the correct styled electronic instruments (fig.2n). You can fit other types but you will need to obtain calibration instructions from the supplier.

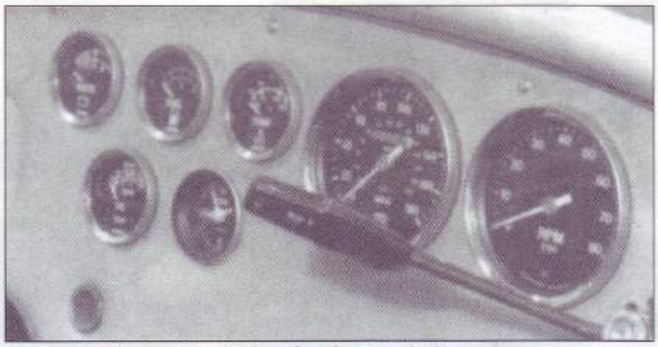

Fig.2n. Period style electronic instruments

Windscreen Wiper Motor

The complete assembly (fig.2o) is taken from a Mini. Use the later type with a two speed motor.

Windscreen Washer System

Pilgrim can supply the complete system as shown in fig.2p, or it may be possible to fit other types.

Fig.2o. Mini windscreen wiper assembly

Fig.2p. Windscreen washer and pump

Heater

This is also from a Mini (fig.2q) plus water pipes and pipe fitting adaptors.

Battery

You will need a battery to suit the carrier and a clamp assembly as shown in fig2.r. See also section 5.3

Fig.2q. Mini heater

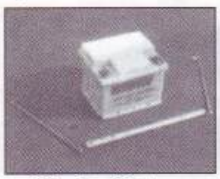

Fig.2r. Battery

Fig.2s. Fuel pump

Electric Fuel Pump

Only required for engines without a mechanical fuel pump.

Body Fittings

The above list does not cover any of the body fittings, trim and brightwork. These items are listed in our parts catalogue and also shown in the main body of these instructions.

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Pilgrim Sumo Construction Manual

Section 2 Parts Required

Parts and Accessories to enhance the looks and performance of your kit car

Parts Service

One of the major reasons why Pilgrim kits have been so popular is because Pilgrim have gone to great lengths to ensure that all the special components required in the assembly of their cars are available through Pilgrim.

This means that builders can assemble their Pilgrim kit with confidence and in the knowledge that they do not need to go hunting for difficult to obtain parts.

The Pilgrim parts service is not exclusive to Pilgrim builders but is open to all kit car enthusiasts who want good quality components at the right prices.

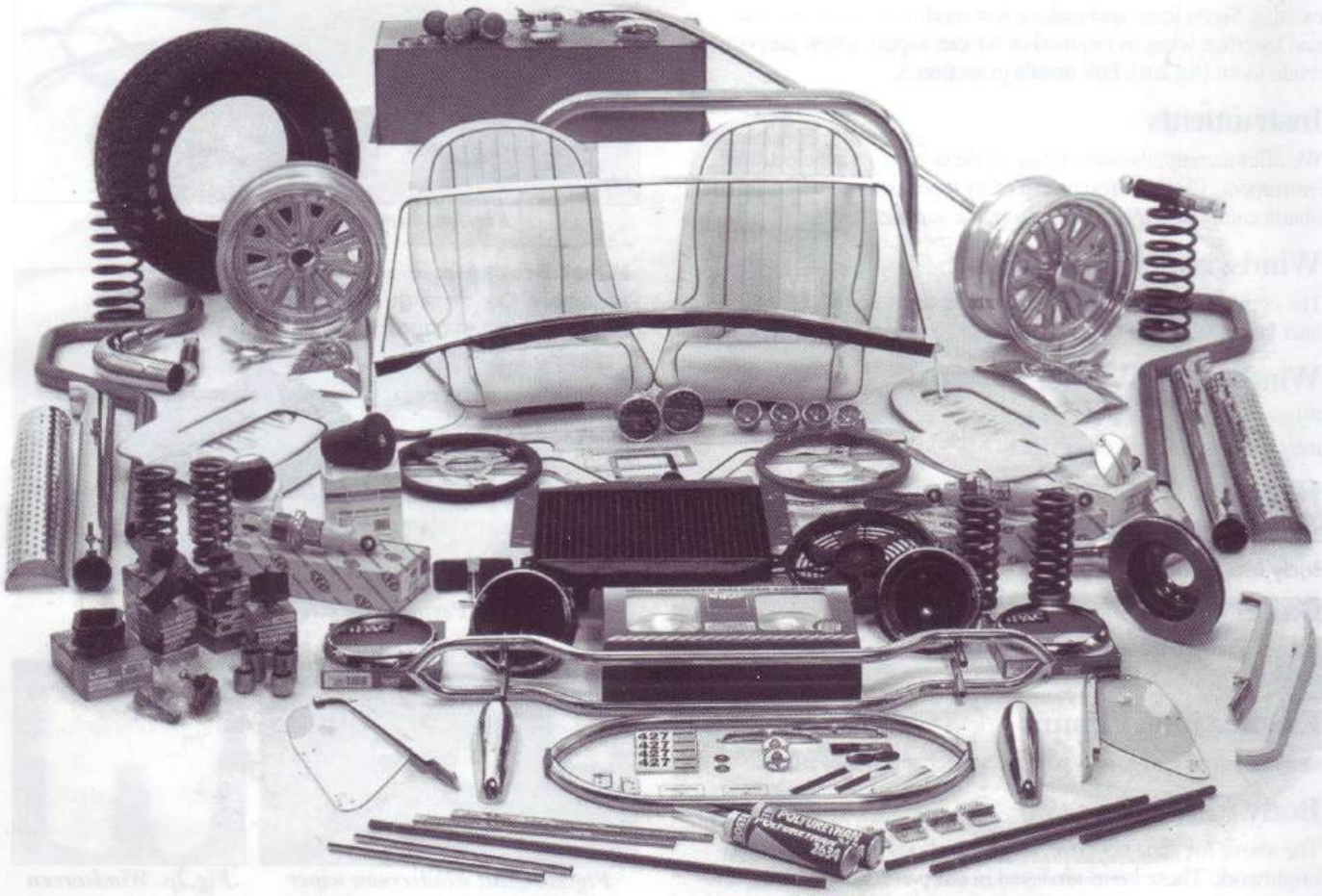
Catalogue

We have a parts catalogue that details all the parts required and their prices. It is available by sending a S.A.E. to the address below.

Whilst we do try to keep all parts in stock, many of the components are produced in low volume or made to order by small highly specialised suppliers. For this reason, please allow 21 days for delivery of most items and longer for items such as seats and carpets which have to be made as and when ordered because of the large range of colours and material choice available.

Value for money

We are convinced that nobody in the kit car industry offers such a range of items at the keen prices for which Pilgrim has gained an enviable reputation.



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Section 2 Parts Required

2.3 Tools Required

Mechanics Tools

Some of the tools listed will only be required for a short time and may be hired as and when required.

We have only listed tools required in the build up procedure.

Spanners

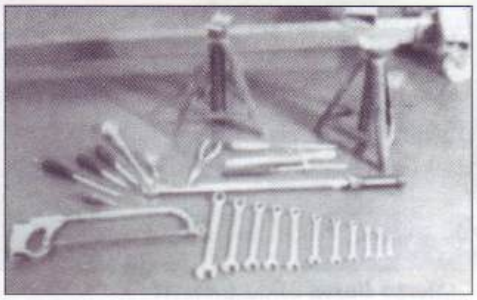
Screwdrivers

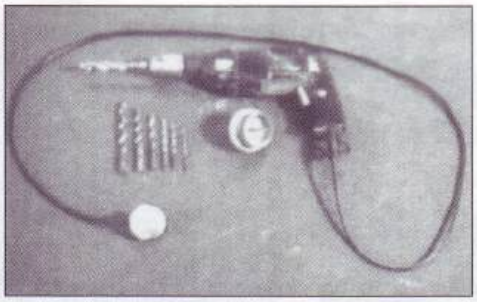
Axle Stands

Hacksaw & Padsaw

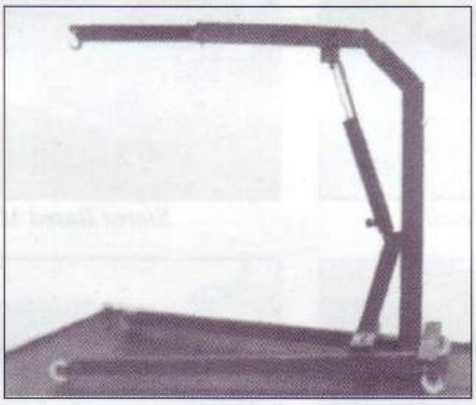
Round File

Torque Wrench

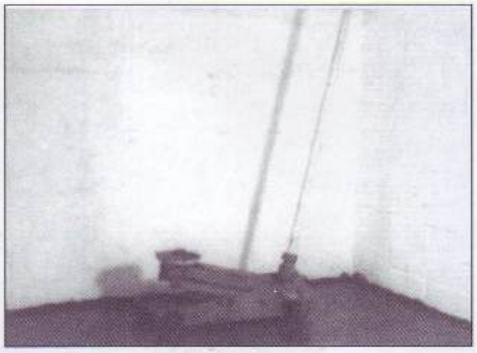




Drill with normal bits and a Hole Cutter Set.



Engine Hoist or Block and Tackle if you have a suitable beam in your garage.



Jack

Workshop Manuals for Donor Car - These are essential for working on the parts from the Sierra donor car. It is also useful to have a manual that covers the engine and gearbox if not from the donor car as would be the case if fitting a Rover V8 and five speed gearbox.

You may need special tools if you strip down the engine or other mechanical sub-assemblies. Please consult the relevant workshop manual for details

---

Safety Equipment

Goggles

Gloves

Steel Toe-capped Shoes or Boots

Dust Filtering Face Mask

Fire Extinguisher

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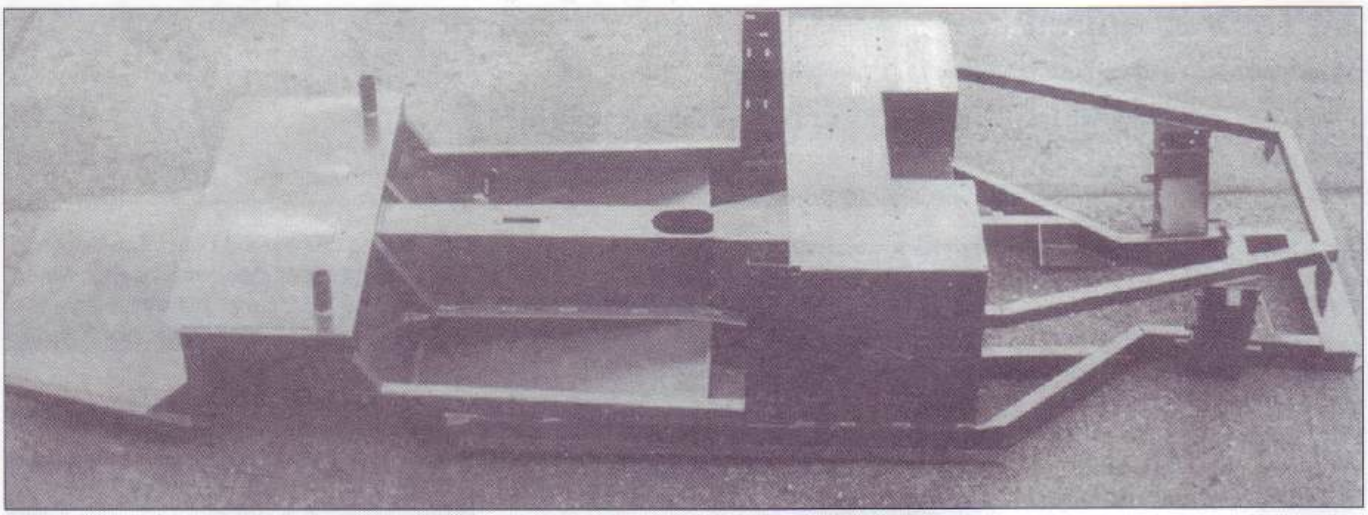
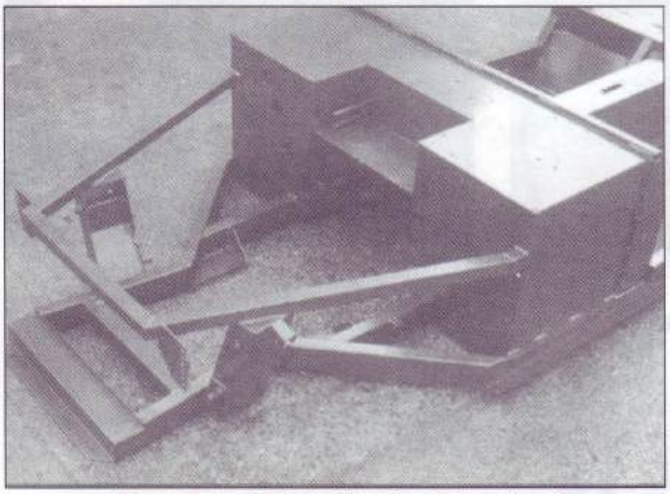
Pilgrim Sumo Construction Manual

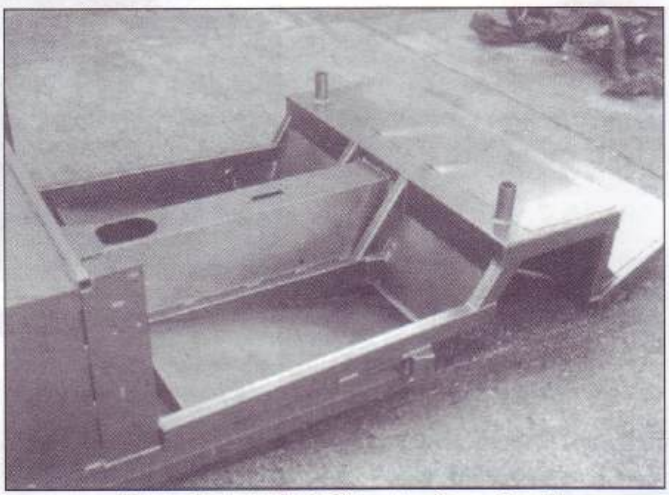
Section 3. Rolling Chassis



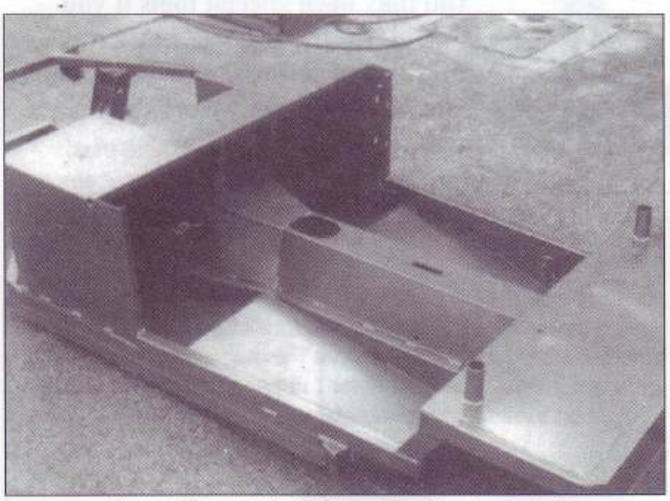
Sierra Based Mk.3 Chassis



Sierra Based Mk.3 Chassis - Front detail



Sierra Based Mk.3 Chassis - Rear detail



Sierra Based Mk.3 Chassis - Centre detail

Sierra Based Mk.3 Chassis - Underside View

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Section 3. Rolling Chassis

3.1 Preparation of Parts

If you are using used parts you must inspect, test, clean and paint them. Wire brushing will remove most of the rust etc., and a solvent such as paraffin or Gunk will get rid of the old grease and dirt.

For safety's sake (and for the sake of SVA and MOT) make a thorough check of all the donor components and replace as necessary. Refer to the donor car workshop manual for specific details.

SAFETY WARNING
Pay special attention to all braking and steering parts, ball joints & bushes, brake cylinders, discs & calipers.

Chassis Preparation and Buildup.

When tackling the assembly of your chassis you will have to decide to what extent you renovate the parts being used. In theory, you should be able to remove complete assemblies from the donor car and transfer them directly to the chassis without dismantling them. The engine for example could be transferred without disturbing the ignition or carb settings. Assembly in this way does enable the car to built quickly, more cheaply and less mechanical skills are required.

Alternatively, you can strip the assemblies down and thoroughly rebuild every component. The finished car may be all the better for it, but the building time, expense and the amount of skill and tools required will be increased.

If you adopt the first option, you will have to ensure that the mechanics are in good order.

The following pages show the overall chassis layout and close-up views of the main assembly location points.

You should refer to the relevant Haynes manual for details of exactly how to work on your donor car parts and for torque wrench settings.

Chassis Preparation

The chassis has been designed to be galvanised. This is a process which involves submerging the chassis in a vat of molten zinc. The resulting coating is chemically bonded to the steel and has a very long life expectancy. Because the zinc has to flow inside the tubes to also protect the structure from within, it is necessary to leave tube ends open where possible and vent holes are drilled in the structure elsewhere. We can arrange to have your chassis galvanised at extra cost, or you can if you prefer, paint your chassis. It will be necessary to degrease it with paraffin, then apply 2 coats of red-oxide primer followed by 2 coats of chassis black or similar paint. To protect the inside of your chassis you can use 'Waxoil' or similar.

The chassis made from a combination of sheet steel and box sections. When welding sheet steel, we use spot welds because continuous welds would distort the metal. You should therefore seal the sheet metal joints with 'Sikaflex' or similar as shown in figs.1a and 1b.

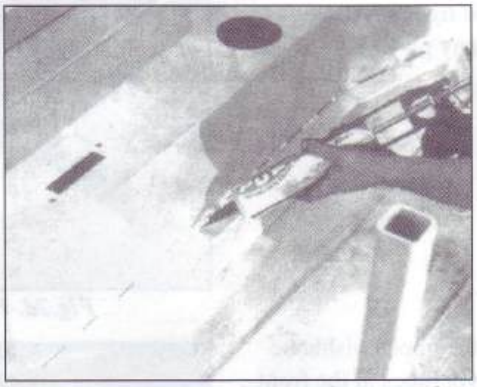

Fig.1a. Applying sealant to sheet metal to tube edges

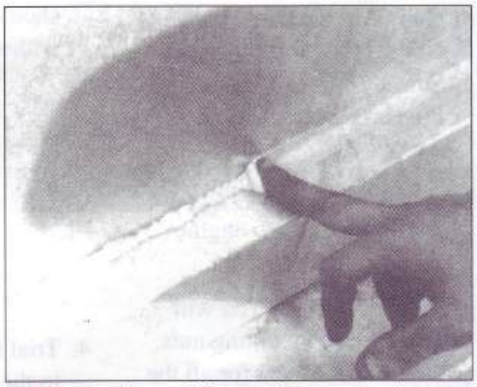

Fig.1b. Smoothing sealant to to give a neat finish.

If you have your chassis galvanised, please note that deposits of zinc may be left in mounting holes. These can be cleared by simply running an appropriate sized drill through the holes.

Galvanising causes distortion of sheet metal panels and also, the difficulty in handling a heavy chassis in and out of the galvanising vat by our sub-contractors, occasionally results in some slightly bent brackets. These can easily be straightened. Although these problems are inevitable and beyond our control, we consider that the benefits of galvanising far outweigh these minor deficiencies.

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3.2 Front Suspension (Sierra version)

Additional Parts Required.

Because it is not possible to use the Sierra front struts, it is necessary to obtain a few extra pieces.

The parts required are:-

a) Rubber Suspension Bushes.
Ford Cortina (Taunus) front upper wishbone.
Pilgrim part no. MRM 225.
8 required.

b) Upper Wishbone Pivot Bolts.
Ford Cortina (Taunus).
2 required.

c) Lower Ball Joints.
Ford Cortina (Taunus).
Pilgrim part no. MBJ663.
2 required.

d) Upper Ball Joints.
Ford Transit Van steering.
Right hand thread.
Pilgrim part no. MD 1117R.
2 required.

e) Coil Over Shock Absorber Units. Made for Pilgrim Sumo.
Pilgrim part no. G841.
2 required.

f) Springs for above. They are rated according to engine size.

g) Mounting Bolts. You will also require mounting nuts, bolts and washers for all the above components.

1. Start by fitting the bushes and ball joints to the upper and lower wishbones as shown in figs.2a and 2b.

IMPORTANT NOTE.

You must use either Nyloc nuts or castellated nuts with split pins on all suspension components.

Do not fully tighten any suspension nuts at this stage. This must be done when the chassis is fully weighted i.e. when the engine, gearbox and rear axle assembly are fitted.

2. Fit packing washers between the the rubber pivot bushes and the bracket to take up any space and ensure a snug fit as shown fig.2c.

3. Fig.2d shows the lower wishbone fully fitted. There should be free movement without any play.

4. Trial fit the upper wishbone to the pivot tubes in the front suspension upright and note any gaps. Fit pivot bolt and wishbone plus any packing washers on the inside of the wishbone as required. Secure with large washers and nuts as shown in fig.2e.

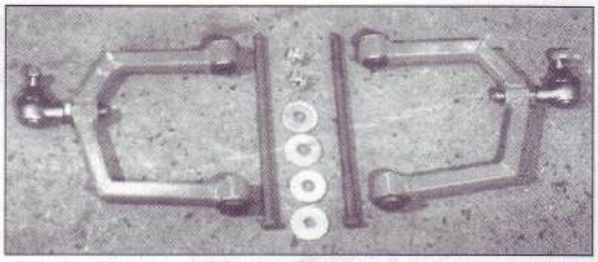

Fig.2a. Upper wishbones fitted with joints & bushes.

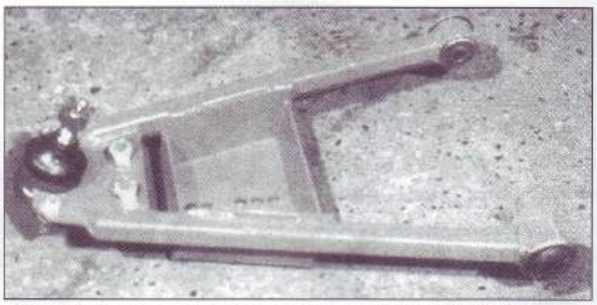

Fig.2b. Lower wishbones fitted with joints & bushes.

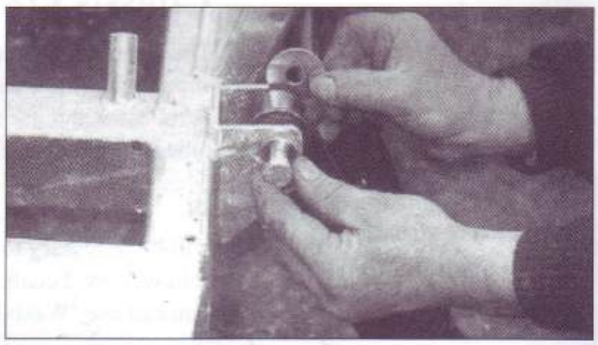

Fig.2c. Fitting packing washers.

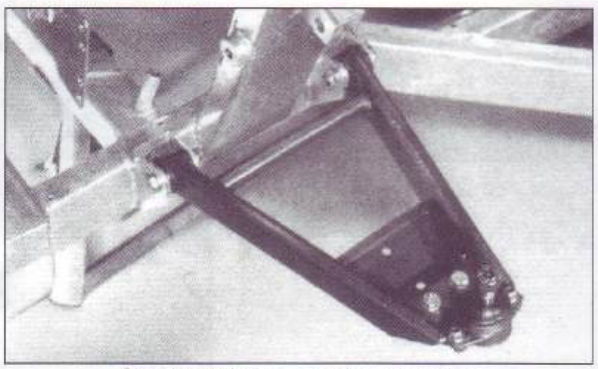

Fig.2d. Fitting packing washers.

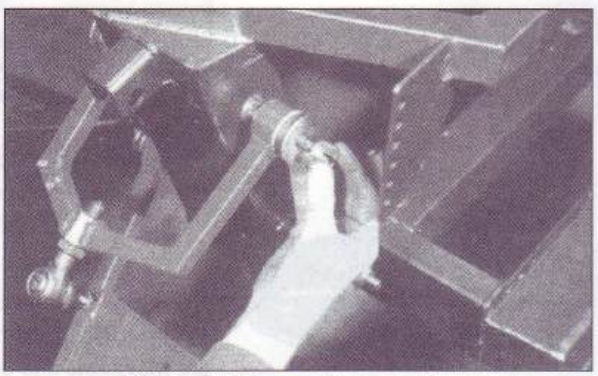

Fig.2e. Fitting packing washers.

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5. Attach the bottom bracket to the lower eye of the shock absorber as shown in fig.2f.

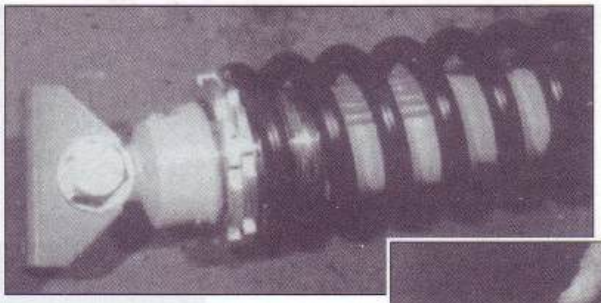

Fig.2f. Bottom bracket fitted.

6. Bolt the bottom bracket and shock absorber to the lower wishbone with 2 nuts, bolts and washers as shown in fig.2g.

Fig.2g. Bracket & shock absorber fitted to lower wishbone

7. Lift the whole assembly up and fit the top eye of the shock absorber into the top bracket as shown in fig.2h.

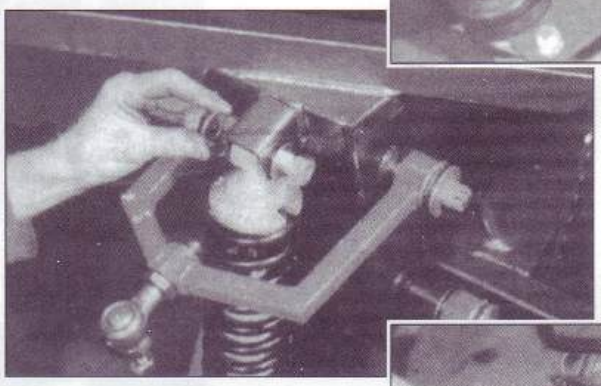

Fig.2h. Shock absorber fitted to top bracket.

8. Now take the Sierra uprights and fit the 'mushrooms' where the original struts were fitted as shown in fig.2i.

   Secure with pinch bolt.

Fig.2i. Inserting 'mushroom'

9. In order to fit the Sierra uprights, the pivot pin hole must be enlarged from 12mm to 14mm. This should be done carefully with a 14mm drill (fig.2j.) or undersize drill and a reamer.

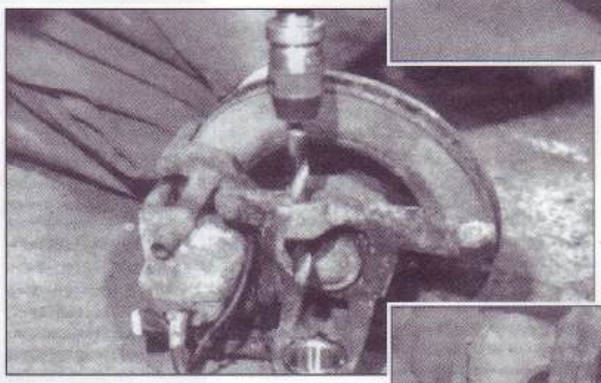

Fig.2j. Enlarging hole to 14mm.

10. Fit upright onto lower wishbone joint as shown in fig.2k.

Fig.2k. Fitting upright on to lower wishbone joint.

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11. Secure upright with nut (fig.2l.).

12. Fit upper ball joint into 'mushroom' (fig.2m).

13. The front camber angle is adjusted by means of the screw thread on the upper ball joint. Set the camber angle to zero when the suspension is at full droop as shown in fig.2n. The camber automatically increases as the suspension is loaded.

NOTE. The steering rack is finally fitted after the engine has been installed but it should be temporarily fitted in order to carry out modifications to the track rod end fittings on the Sierra uprights. On the Sierra, the track rod ends are fitted from the underside, however, in order to give adequate clearance for the lower wishbone pivot bolt, the Sumo has the rack mounted higher and the track rod ends are fitted from above.

The taper needs to be 'reversed' by using either a 7 degree taper drill or a 7 degree tapered shaft (fig.2o.) and a small supply of grinding paste (an old track rod end in a drill is ideal).

14. Drill out reversed taper as shown in fig.2o.

15. Fit track rod ends to rack as shown fig.p.

16. Temporarily fit steering rack to chassis (fig.2q.) with two M12x200mm bolts and push the track rod ends into the taper (fig.2q.inset) and check for snug fit. Do not fully tighten.

17. Remove rack and store until after engine is fitted.

Fig.2l. Upright secured with castellated nut & split pin.

VERY IMPORTANT. *If you use a castellated nut, you must use a split pin and re-drill the split pin hole.*

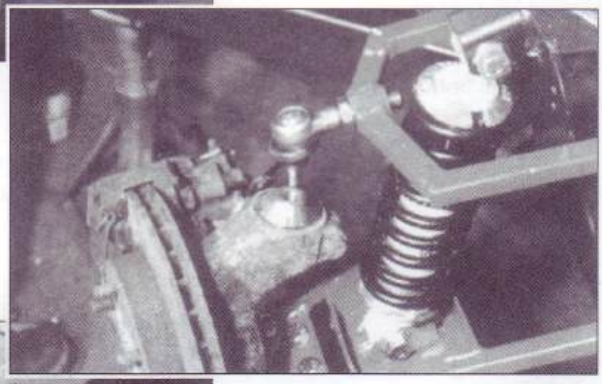

Fig.2m. Fitting upper ball joint into 'mushroom'.

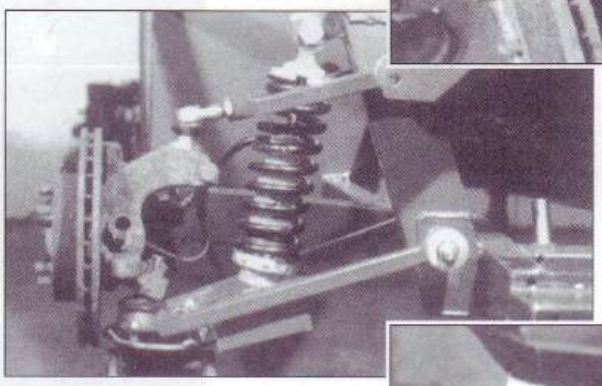

Fig.2n. Camber angle at zero on full droop.

Fig.2o. Drilling the upright with a taper covered in grinding paste.

Pilgrim can taper these out for you for free but you will need to cover carriage costs.

Fig.2p. Fitting track rod end

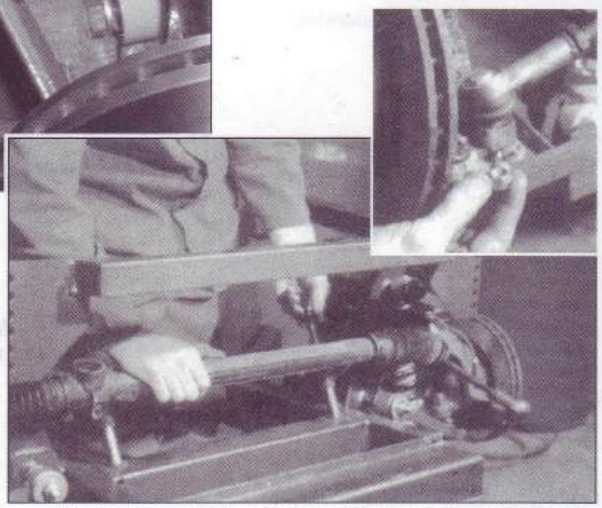

Fig.2q. Temporarily fitting rack and checking track rod taper fit (inset)

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3.3 Rear Suspension (Sierra version)

1. The Sierra rear sub-frame is discarded. The parts retained are shown in fig.3a.
2. The differential is held into the chassis with our fabricated carrier bracket (fig.3b). The bracket requires two Ford Cortina rear suspension bushes. Pilgrim part no. MRM201
3. Fit the carrier bracket and rear fixing bracket to the diff. (fig.3c.). There are three sizes of Sierra differential. The carrier bracket supplied will accommodate the largest type. Smaller differential types require spacers between the diff. itself and the carrier bracket. The spacers should be fitted with an equal number each side.

Note. It is easier to fit the handbrake cable before the differential is mounted

4. Offer up the differential and bracket assembly and secure to the chassis. The tube spacer must be between the bush and chassis front fixing.
5. Remove the old damper fixing bracket from Sierra wishbone as shown in fig.3e.
6. Drill two holes in each wishbone to take the new damper fixing brackets, positioned as shown in fig.3f. They **must** be fitted parallel to the wheel. (Also shown in fig.3i).

Fig.3a. Rear components retained.

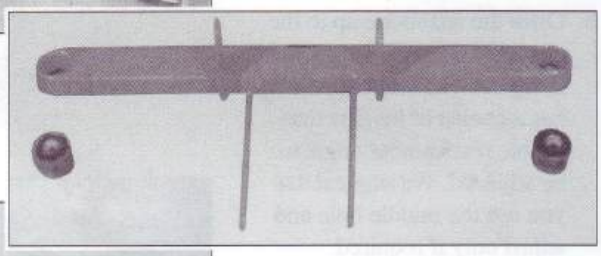

Fig.3b. Carrier bracket and Ford Cortina rear suspension bushes.

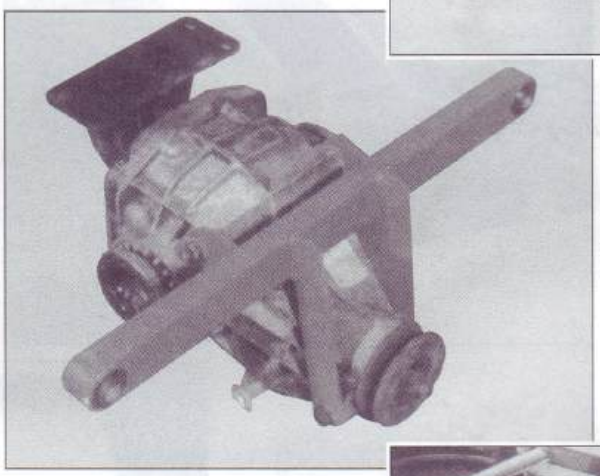

Fig.3c. Differential with rear fixing bracket carrier bracket fitted.

Please Note. Many of the following photographs were taken with the chassis upside-down. This was for ease of photography and not for any technical benefit.

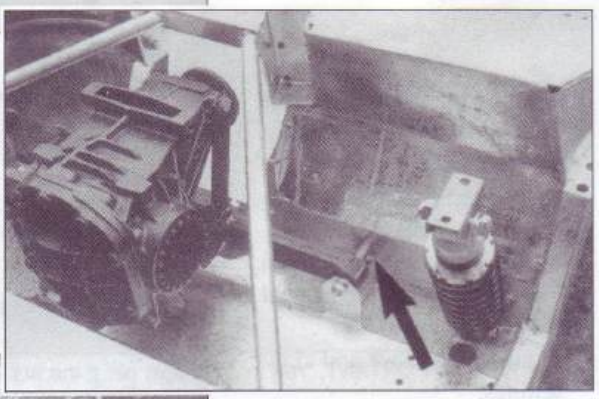

Fig.3d. Differential bolted to chassis. Note the tube spacer placed between the bush and the chassis front fixing.

Fig.3e. Removing old damper fixing bracket from wishbone.

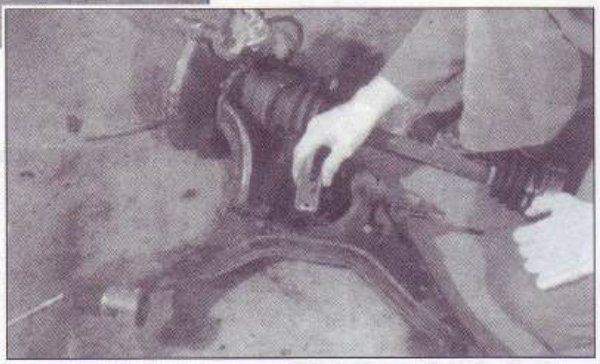

Fig.3f. The new damper fixing brackets fit here.

Note. The rear wishbones from a Sierra estate car have a large hole in this area. A piece of metal has to be welded into this hole to provide a base onto which the new damper fixing brackets can be attached

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7. Fix shock absorber into chassis bracket as shown in fig.3g.

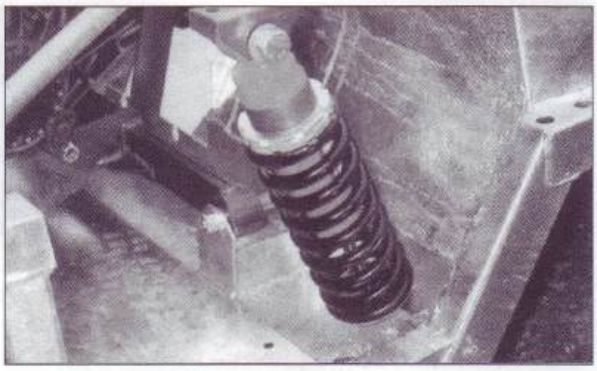

Fig.3g. Shock absorber fitted to chassis bracket.

8. Offer the wishbone up to the chassis fixing points as shown in fig.3h. The outboard fixing has a choice of heights that enable rear camber angle to be adjusted. We suggest that you use the middle hole and adjust only if required.

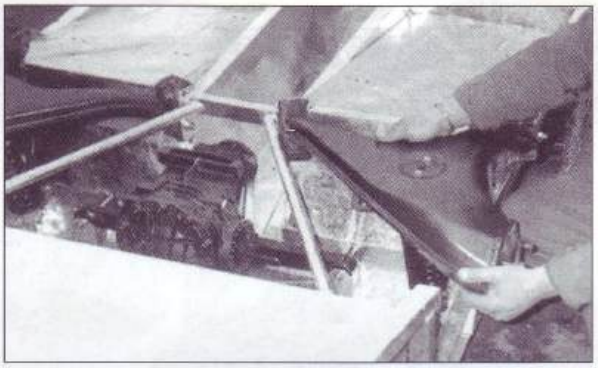

Fig.3h. Wishbones being fitted.

Important Note. When the body is fitted, it is not possible to remove the wishbone attachment bolts from the outside. It is therefore **essential** that the bolts are inserted from the **inside** of the chassis.

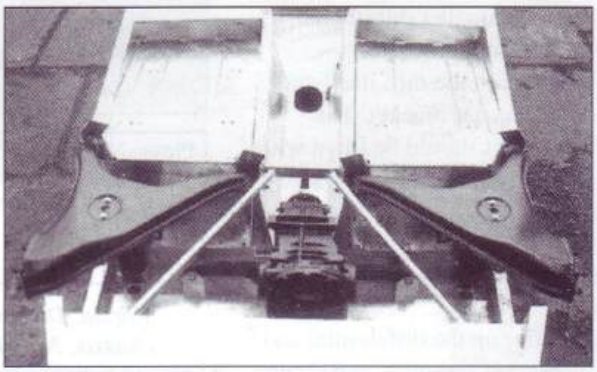

Fig.3i. Wishbones in position.

9. Offer up the wishbone and fit bottom of damper unit into the new bracket as in fig.3k. Re-connect the rear axle couplings, shafts, hubs and brakes etc. as shown in fig.3j. The Sierra workshop manual may be of use here for sequence guidance and torque settings.

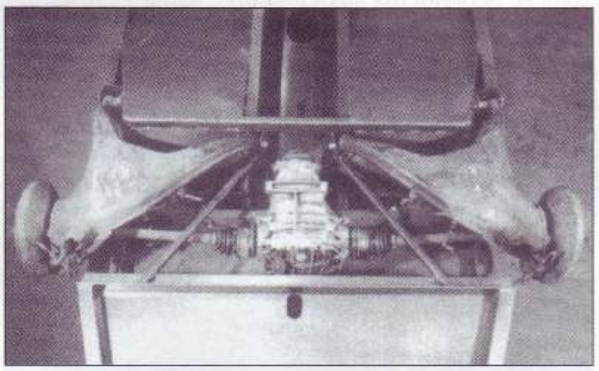

Fig.3j. Rear suspension fitted.

Please Note. The rear axle assembly used in this photographic sequence is from a Granada. It has 5 stud wheel fixings and disc brakes which are optional on Sierras.

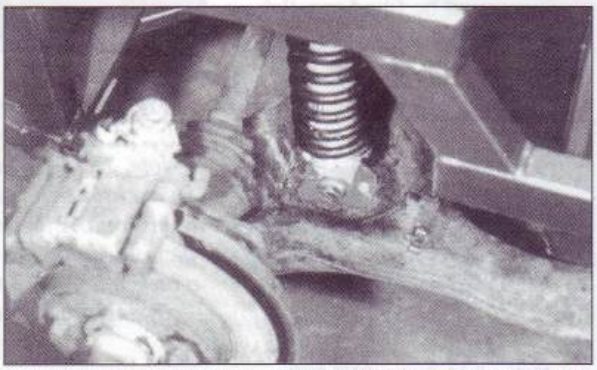

Fig.3k. Spring damper unit fitted to wishbone.

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3.4 Handbrake Cable (Ford)

You will require a special shortened Sierra handbrake cable which is available from us.

It is fitted in exactly the same way as in the Sierra.

Note: We also sell cables for Sierra / Granada rear disc brakes (see item 4 below).

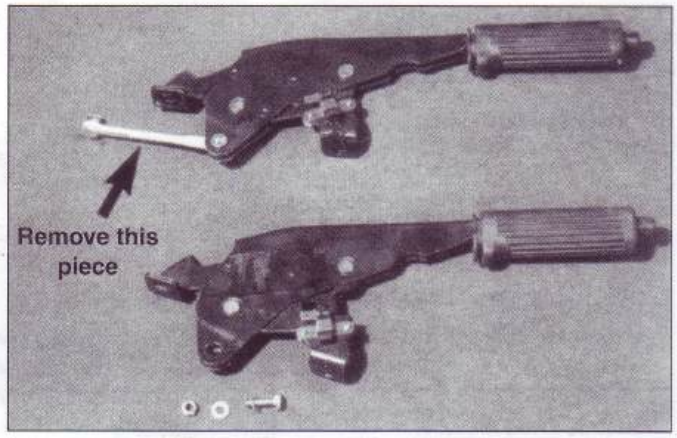

Fig.4a. Extension bar to be removed.

1. Remove the extension bar (arrowed in fig.4a) from the Sierra handbrake by drilling through its fixing rivet. (The cable will be attached at the same point using an M6 bolt, nut & washers).

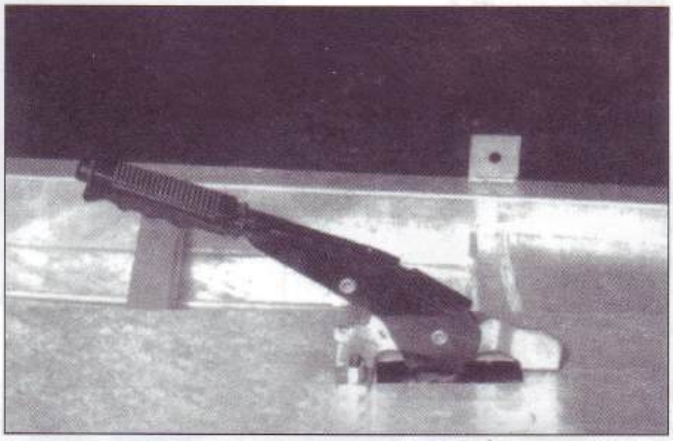

Fig.4b. Handbrake bracket bolted to transmission tunnel.

2. Bolt the handbrake lever bracket to the transmission tunnel as shown in fig.4b. The rear bolt **must** be fitted upside-down (nut on top) in order to clear the cable saddle.

3. Fit the cable to the handbrake lever as shown in fig.4c. Secure with M6 bolt, nut & washers.

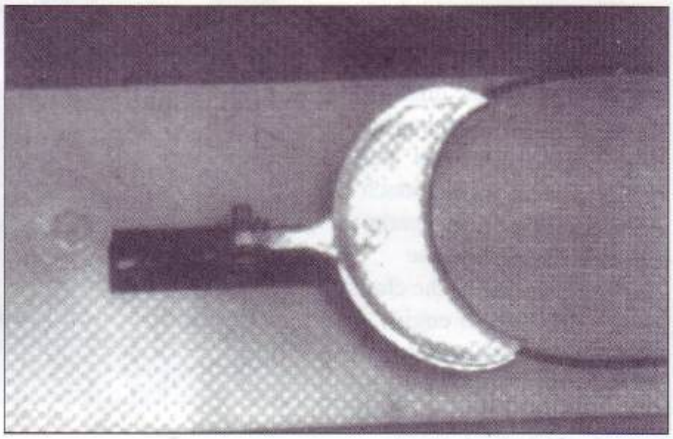

Fig.4c. Underside view of handbrake cable attached.

4. Fit rear ends of the cable to the hub (fig.4d). **Note:** There are different types of rear hub unit, some have the cable entry at the top and others at the bottom. There is also a disc brake version which requires a cable with suitable fittings which is available from us.

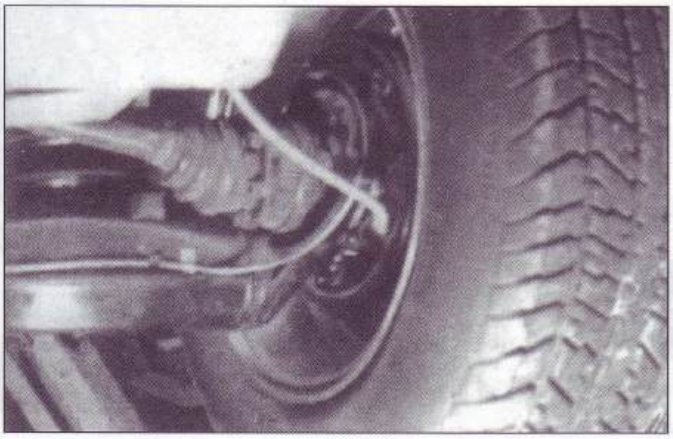

Fig.4d. Handbrake cable fitted to hub.

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3.5 Fitting Pinto 4 Cylinder Engine & Gearbox

1. Fit new engine mountings (fig.5a).
2. The engine should be slung from a suitable hoist (fig.5a) to enable it to be lifted sufficiently to clear the chassis cross member between the two front suspension pillars.
3. If the hoist is 'mobile', gently ease the engine towards the rear of the chassis over the cross member, tipping the rear of the gearbox downward and under the transmission tunnel as shown in fig.5b. If the hoist is fixed to an overhead beam or girder, the road wheels should be temporarily fitted and the chassis rolled under the raised engine ti achieve the same result as above.
4. Lower the engine until the engine mounts can be fitted to the chassis the 'lift' the rear of the gearbox, attach the special Pilgrim gearbox mountings and fit the mounting plate to the chassis. Note. The rubber engine mounting is often distorted once fitted. This caused by production tolerances and is perfectly natural even in a Ford car.

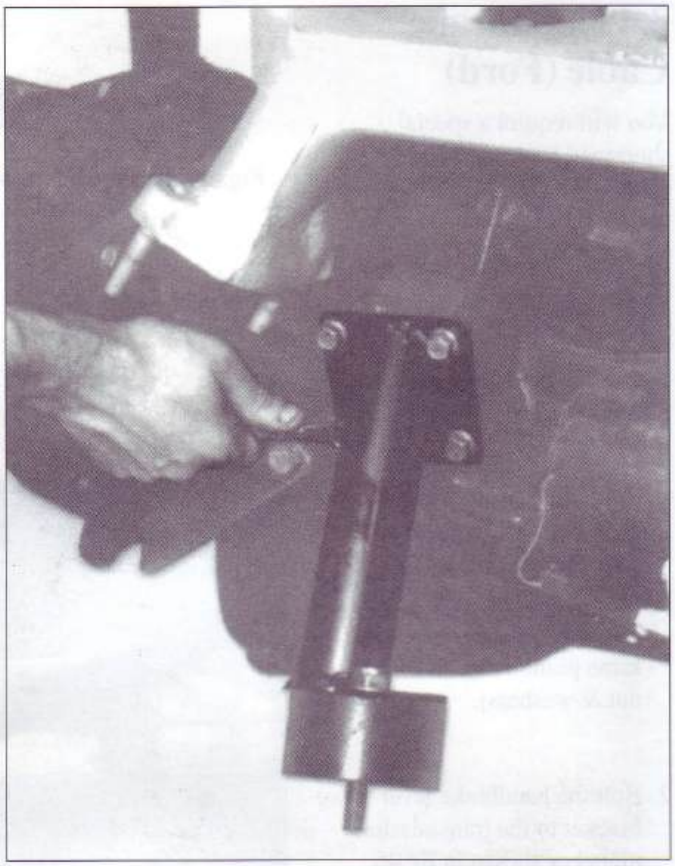

Fig.5a. Pinto engine having its new engine mountings fitted. These are mountings for a Sumo Mk 2. Mk 3 mountings are similar but are in two halves like V6 mounts shown on next page.

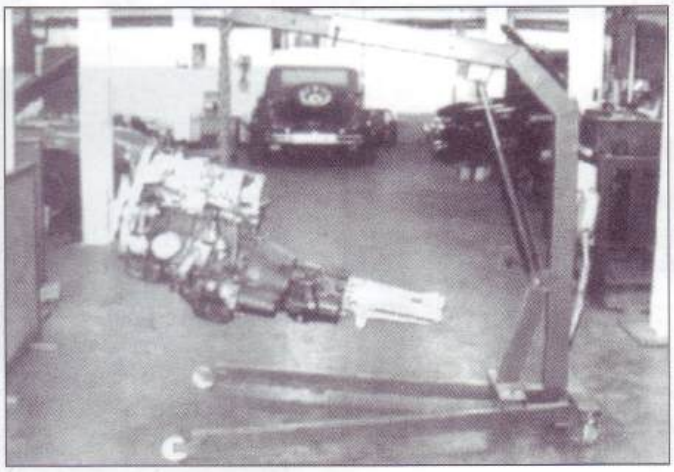

Fig.5b. Engine and gearbox slung from 'mobile' hoist.

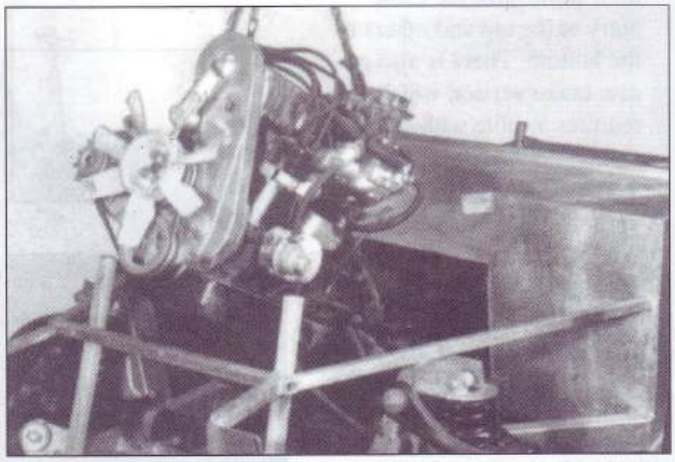

Fig.5c. Pinto being fitted into Mk 2 chassis. Mk 3 has much more clearance.

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3.6 Fitting Ford V6 Cologne type Engine & Gearbox

This type of Ford engine is available in 2300cc / 2800cc and 2900cc capacities. It is also available on the Continent as a 2000cc unit.

This type of engine requires our special 4 piece engine mounting kit, our gearbox crossmember, a pair of Ford round rubber engine mountings (Pilgrim part no. MRM 161) and our special replacement alternator bracket.

1. Make sure the alternator has been removed from the engine and the original bracket discarded.
2. Lift the engine and gearbox assembly into the chassis as shown in fig.5a.
3. Fit the upper engine mountings to the block (fig.5b).
4. With the engine still suspended, fit the rubber and lower mountings (fig.5c).
5. Lower the engine until the lower mounts can be bolted to the chassis as shown in fig.5d. The engine should have adequate clearance all round.
6. Drill the gearbox mounting to match the the pre-drilled holes in the chassis.
7. Re-fit alternator using our special bracket and a new shorter 1150mm fan belt (figs.5e & 5f).

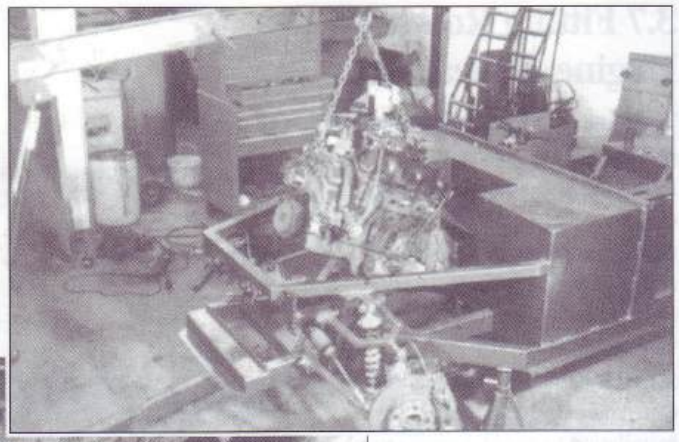

Fig.6a. Engine and gearbox being lowered into chassis.

Fig.6b. Upper mounting being fitted to the block.

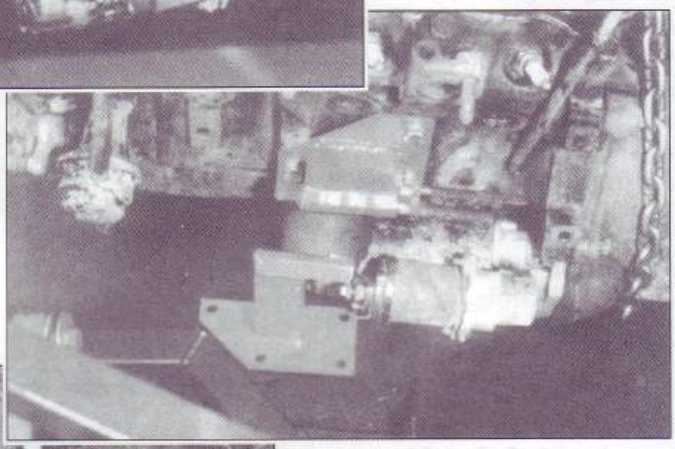

Fig.6c. Fitting rubber and lower engine mounts.

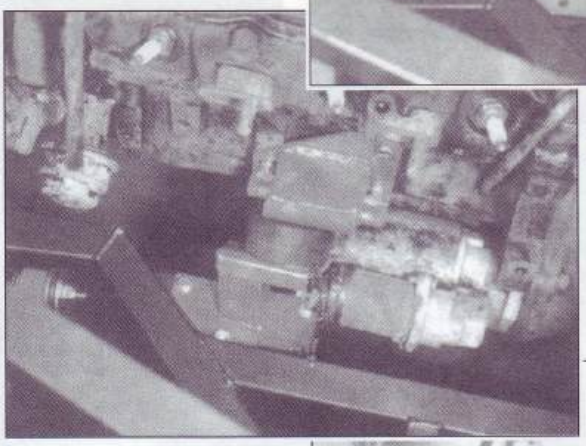

Fig.6d. Bolt lower engine mounts to chassis.

Fig.6e. Alternator refitted to the engine using new bracket (shown inset).

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3.7 Fitting Rover V8 Engine & Gearbox

The Rover V8 installation requires our special 4 piece engine mounting kit, our special gearbox crossmember, and a pair of Ford round rubber engine mountings (Pilgrim part no. MRM 161). The fit of this engine in the chassis is very tight, especially in the forward & backward direction. Care must be taken during the installation to avoid damage to either the chassis or engine. Make sure existing alternator and bracket are removed prior to engine fitting.

The Rover manual gearbox is equipped with an hydraulically operated clutch mechanism. If you are using this gearbox, we recommend that you convert to cable operation by purchasing a cable, part no. BB11152C, and a new 50mmØ pedal quadrant (plastic ratchet), Ford part no. 6183029 or Pearl part no. PCQ07.

1. Assemble the two parts of the mounting and rubber and fit to engine block (fig.7a).
2. Fit gearbox cross member (fig.7b).
3. Lift assembly into the chassis as shown in fig.7c & 7d.
4. Attach the gearbox cross member to the chassis by drilling 4 holes in the member to align with the pre-drilled holes in the chassis. Bolt in position.

There are two types of Sierra steering rack, the one shown fig.7e is of cast aluminium construction, the other is fabricated from steel tube (from a P100 Sierra pick up). Being far less bulky, it will give better clearance for the Rover installation.

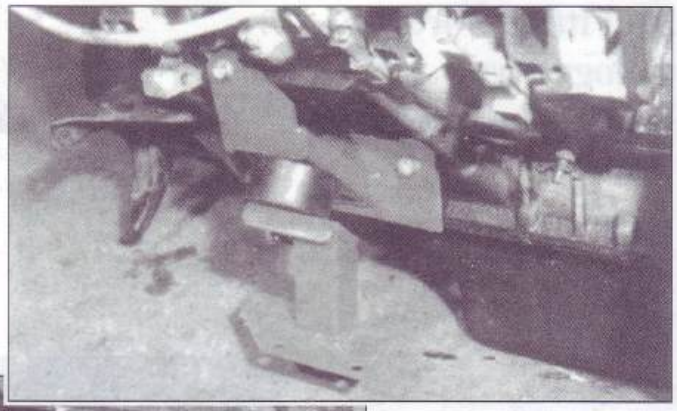

Fig.7a. Engine mount s fitted.

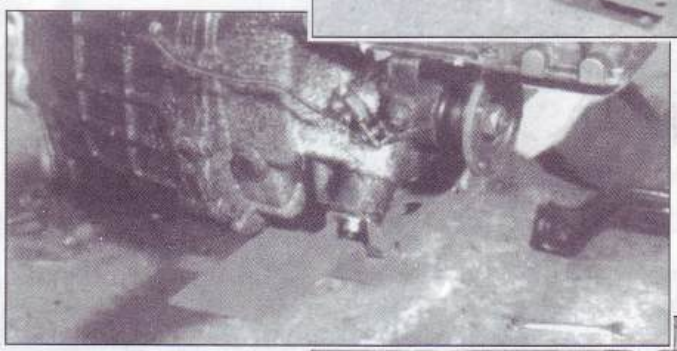

Fig.7b. Gearbox crossmember fitted.

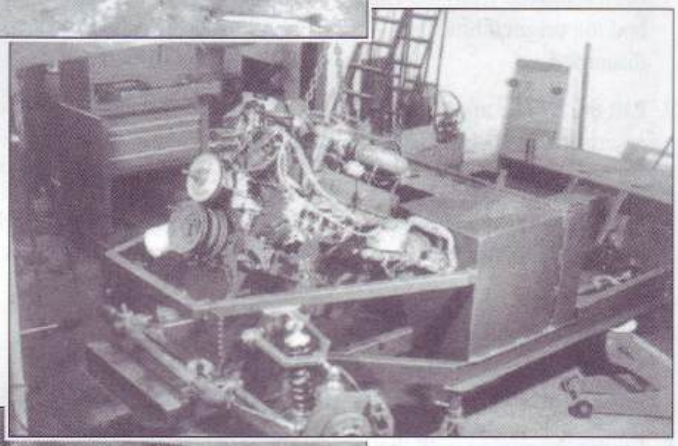

Fig.7c. Engine being lowered into chassis.

Fig.7d. Engine in position in chassis.

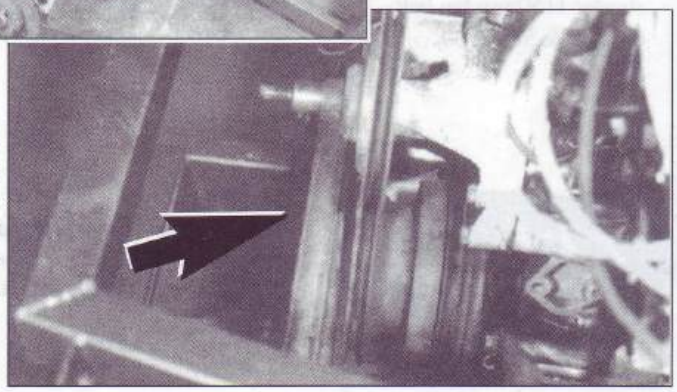

Fig.7e. Shows tight fit at front using normal cast aluminium rack. It is referable to use steel tube version as per 5.7 Chevy installation (sect 3.8).

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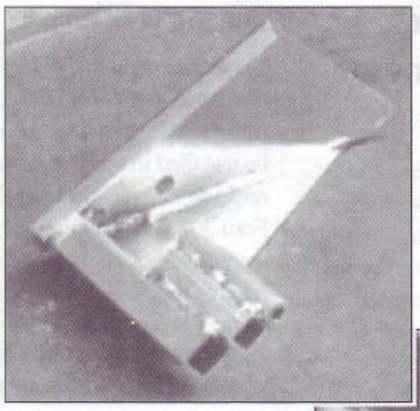
The alternator requires repositioning to clear the chassis and steering column. You can either devise your own bracketry or purchase our purpose made units shown in fig.7f.

Note. These brackets are designed to accept Ford Cortina or Sierra alternators, not the normal Rover unit.

1. Fit the new bracket and adjuster to the engine in place of the old units as shown in fig.7g.
2. Fit the Ford Cortina / Sierra alternator to the brackets as shown in fig.7h.

Note. You will require a shorter fan belt measuring 1100mm.



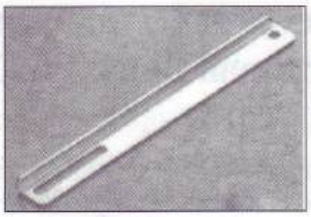


Fig.7f. Our purpose made alternator bracket and adjuster.

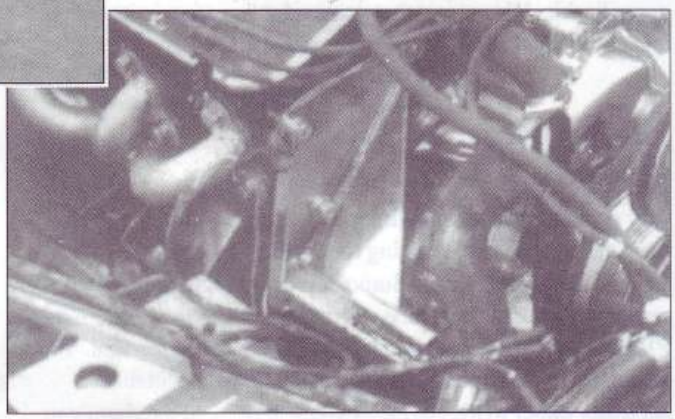


Fig.7g. New alternator bracket fitted to engine. *(Granada based Mk2 Sumo shown).*

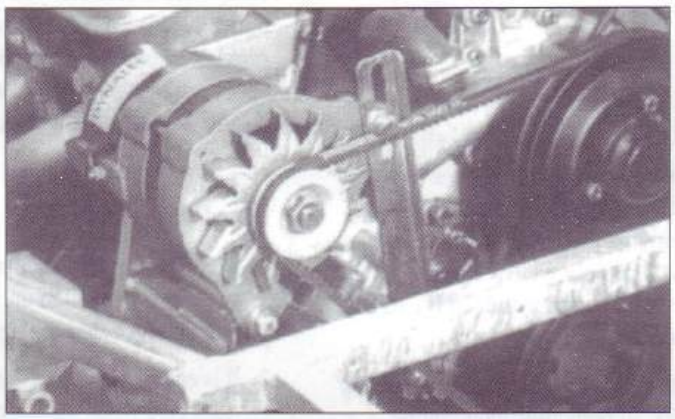


Fig.7h. Alternator fitted to bracket. *(Granada based Mk2 Sumo shown).*

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3.8 Fitting Chevrolet 5.7 (350) and Ford Windsor Small Block V8 Engine & Gearbox

The following installation procedures cover both the Chevy and Ford units. There are a few fundamental differences between the two engine types but these are covered individually when important. In order to save duplication, the photo sequence shows the Small Block Ford installation with notes to cover Chevrolet as applicable. We suggest that you read this section in its entirety, regardless of which of the engine types you have chosen.

Chevrolet:

The Chevrolet 350 V8 mated to a Tremec gearbox is becoming a very popular installation. We can supply these units brand new from the 'States, so please ring for details. Although the Chevy is an ideal power unit for the Sumo, it is a very tight fit. You will require a 'slimline' steel tube steering rack from the Ford Sierra P100 pick up in place of the old cast aluminium Sierra unit. You will also need our special alternator bracket to mount the alternator closer to the engine as you will need all the room you can get!

Ford:

The Ford small block V8 (Windsor) is popular in all of its various sizes. It has been in production a very long time and comes in 221, 255, 260, 289, 302 and 351 cubic inch capacity. Only the 351 differs slightly, being a little wider and taller, but otherwise they all look identical. The only way to be sure which engine you have is to check the engine number which is cast into the side of each block for identification purposes.

All the above listed engines in the 'Windsor Small Block' family share the same kind of ancillaries. In particular, their engine mountings, exhaust manifolds, rocker box covers, water pump, timing chain covers and alternator fixing requirements are all identical and are consequently interchangeable. Furthermore, most of them have the same gearbox fixing centres. The 221, 260 and pre 1965 289s being the only exceptions in having 5, as opposed to the more common, 6 bolt fixing centres. Because of their age and relative rarity, we think it unlikely that many customers will choose any of the engines with 5 bolt gearbox fixings.

With the exception of those marked 'Chevrolet', the photo sequences shown in this section are of a Ford 302ci. unit being fitted. They apply to all of the Windsor type engines.

Suggested Engines:

We recommend that our customers choose the more popular make and sizes of small block engines. This is not because of any fitting difficulties with the rarer or older versions, as they can all be installed in the same straightforward manor, but to ensure an ongoing and plentiful supply of spare parts. The Chevrolet 350 or Ford 302 and 351 Windsor engines are the best to go for in this respect, although the post 1965 Ford 289 is also a very good and reliable unit with good parts availability. The Ford 289 will always be a popular choice as it was one of the engines fitted to early AC 289 Cobra cars. However, as stated earlier, we do not recommend early 289s with 5 bolt gearbox fixings.

Safety First:

These engines are extremely heavy and, if fitted without the correct tools and equipment, could cause very serious injuries to those involved. We cannot stress enough the importance of ensuring your lifting equipment is up to the job in hand. Check its rating and its general serviceability prior to using it. If you are relying on an overhead beam, do ensure it too is capable of supporting the load. Even if you are confident that all your equipment is suitable, you should still work with care. Do not get under the engine unless it is securely supported on blocks or stands. Ensure that you wear suitable protective clothing and above all, don't take any chances. Rather spend a little more time and effort and do the job safely.

The Procedure:

1. Remove as many ancillaries from the engine as possible. This will not only lighten the load but also make sure that they are not damaged during engine fitting.
2. It is easier to fit the engine and gearbox as one unit but it does need care when manoeuvring the gearbox down the tunnel at the same time as lifting the sump over the front crossmember.

   To make this exercise a little easier, the chassis should be tilted so that the front is as low to the ground as possible and the rear is as high off the ground as possible. Fig.8a illustrates the general principle.

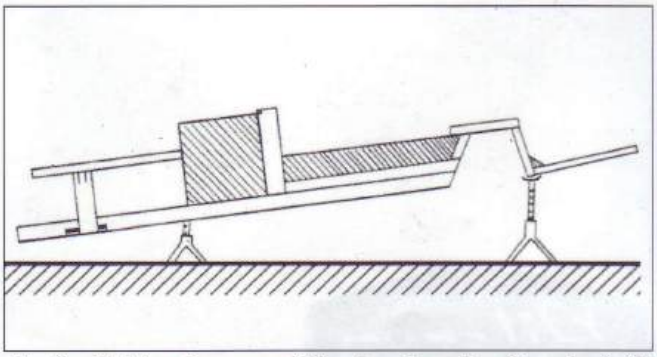

Fig.8a. Raising the rear of the chassis makes it easier to fit engine and gearbox

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3. **Ford:** Fit the engine mounting adaptor plates (fig.8b) to the chassis as shown in fig.8c.

   Chevy: Assemble the two halves of the engine mounting brackets and the Ford rubber as shown in fig.8c.

4. **Ford:** The holes in both the chassis and adaptor plates are 11mmØ. Use 8mm bolts so that the difference in sizes will give a degree of adjustment to compensate for production tolerances in both the chassis and engine. Initially fit the adaptor plate bolts hand tight. They should be fully tightened when the engine is in position.

   Chevy: Bolt engine mount assembly to block (fig.8d).

5. **All Engines:** Sling the engine from a hoist (fig.8e), ideally with the gearbox sloping downwards.

6. Lift the engine up and over the front crossmember and deflect the the gearbox downwards into the transmission tunnel as shown in fig.8f.

7. With the engine in this position, push the assembly rearward and downward, in small stages (fig.8g) until it is possible to fit the engine mountings.

   Ford: It is occasionally necessary to lever the rubber mounting to get the bolt through the tube (fig.8h) or in some cases it may be necessary to to unbolt the mounting plate from the chassis so that it is easier to fit to the engine mounting. If this proves necessary, bolt the adaptor plate back to the chassis afterwards and, in either case, all four bolts should now be fully tightened.

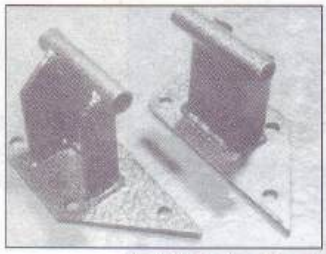

Fig.8b & 8c. Ford engine mount fitting

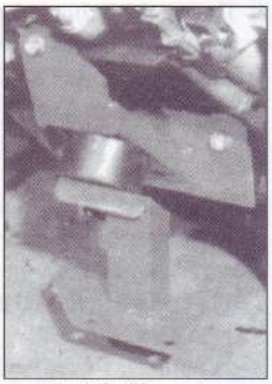

Fig.8d. Chevy type engine mount fitting
(Rover engine shown)

Fig.8e. Engine in sling
(Ford engine illustrated)

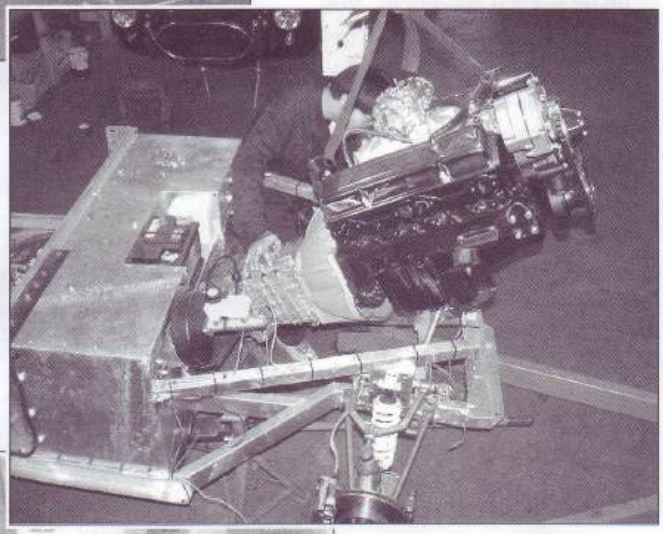

Fig.8f. Engine and 'box being lowered into position.
(Chevy engine illustrated)

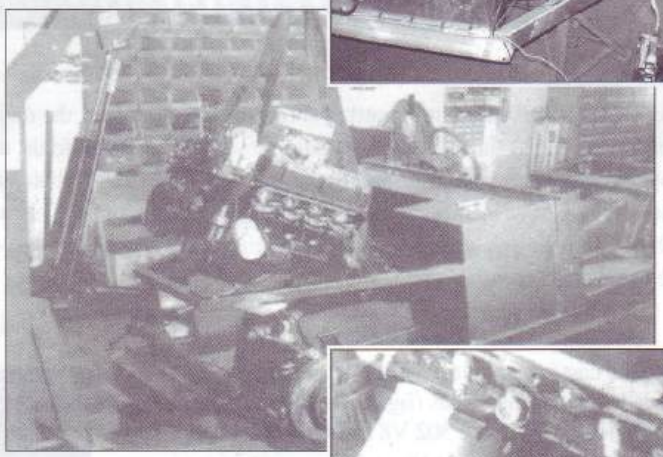

Fig.8g. Engine and 'box being gently eased down transmission tunnel.
(Ford engine illustrated)

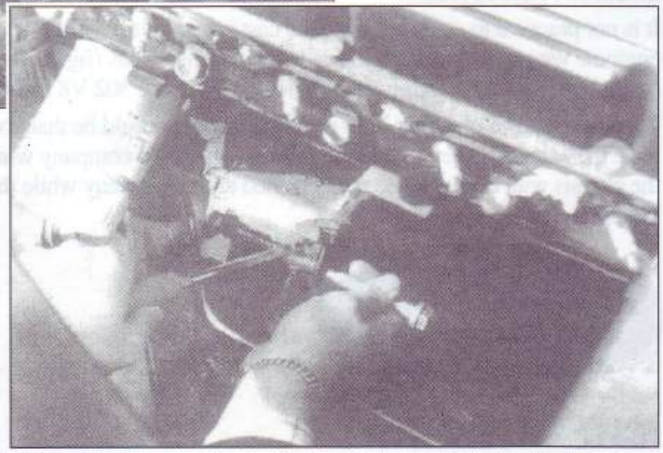

Fig.8h. Fitting the Ford engine mounting

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8. The gearbox should be secured to the chassis via the crossmember relevant to your installation.

9. When satisfied that whole assembly sits accurately in the engine bay and transmission tunnel (fig.8i), fully tighten all engine and gearbox mountings. You will notice that the engine slopes backwards slightly but the carburettor is level as shown in fig.8j. This is perfectly normal as the carburettor is designed to operate in a position level with the road under normal conditions. You should aim to get as close to this optimum position as possible as the spirit level in fig.8k shows, but the angle will depend to some extent on the height of the gearbox crossmember, which in turn depends upon the type of gearbox used.

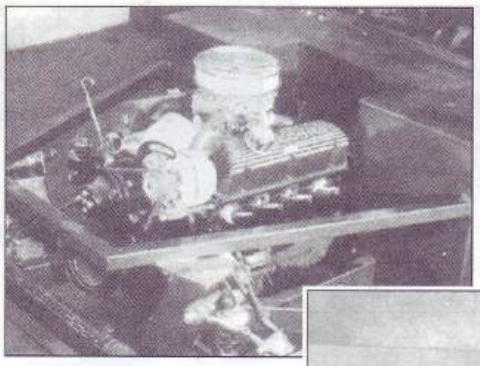

Fig.8i. Engine fitted snugly into chassis.
(Ford engine illustrated)

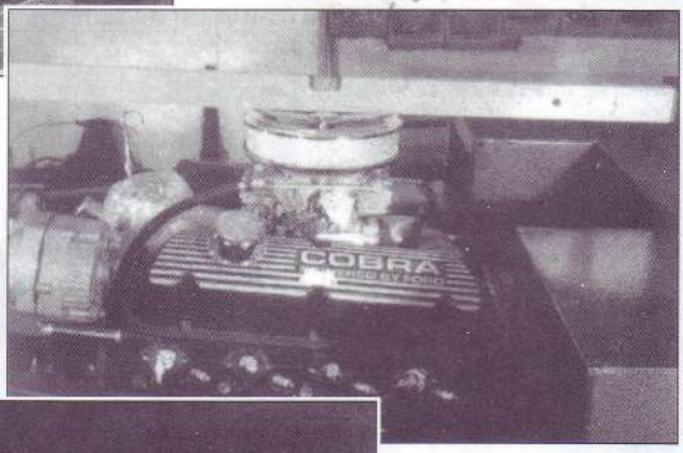

Fig.8j. Engine sloping back slightly but carburettor is level.

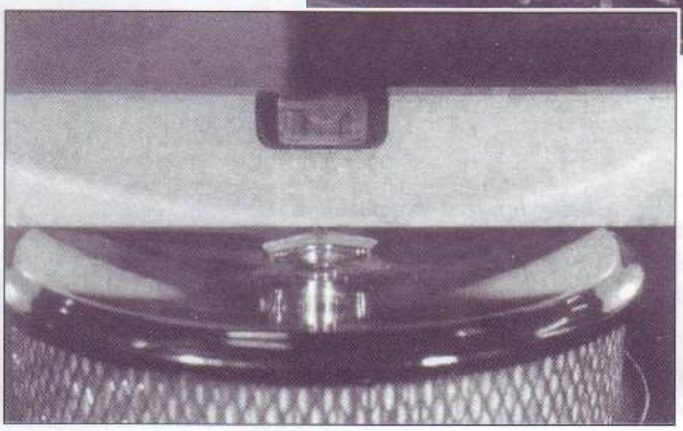

Fig.8k. Spirit level showing carburettor at its optimum angle.

Solving Problem Areas:

The basic procedure of fitting the engine is very straightforward as shown above. However, the majority of snags arise when fitting and connecting ancillary components. Items such as throttle cables, radiator hoses, exhaust manifolds, air filters etc. can cause a disproportionate amount of problems. In the course of assembling our fully built cars, our technicians have obviously found solutions to any problems that may have arisen and we have incorporated this experience in this manual. This why it is better for you to follow our recommendations and not branch out on your own and fit 'unknown' engines unless you are sure you can overcome any subsequent problems. Some typical examples are listed below.

Exhaust manifolds

It is not practical to consider using the cast iron manifolds fitted as standard to most engines. We can supply custom made tubular manifolds (fig.8l) for most engines such as the Ford Pinto, Ford Cologne V6, Rover V8, Ford 302 V8 and Chevrolet 350 V8.

The consequence of fitting 'non-standard' engines could be that you would need to have the exhaust system made for you by a specialist company which would require the chassis with engine fitted being loaned to the company while they make the system to fit.

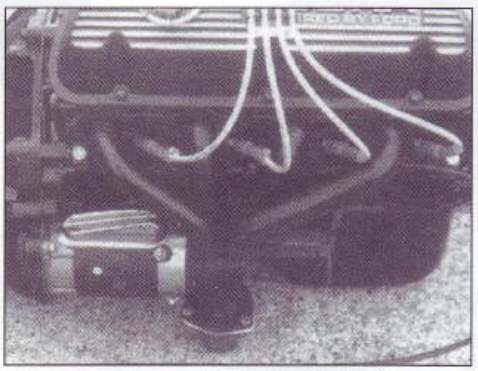

Fig.8l. 4 into 1 tubular manifold similar to the type we supply for V8 engines.

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Alternator Fixing

The alternator and its fixing to the engine vary even on the same engine type. Very occasionally, the alternator already fitted to an engine can be used unaltered, but as already stated, they normally need to be fitted closer to the engine to clear the chassis etc.

We recommend the standard alternator as fitted to the Pinto engined Ford Sierra (fig.8p). Do not use the one from the V6 as it doesn't fit. We supply the bracketry for this alternator to suit Rover V8 and Small Block Windsor type Fords (fig.8m).

Note: Most Chevrolet 350 engines are supplied new and come with alternator fitted.

1. The main mounting bracket is fitted to the engine block as shown in fig.8n.
2. Fit the alternator to the mounting bracket (fig.8o) then fit the adjuster bracket to engine and alternator.
3. Fit fan belt. You will need a shorter belt. This is usually 1100mm in length but check first. Tension alternator and fully tighten all bolts.

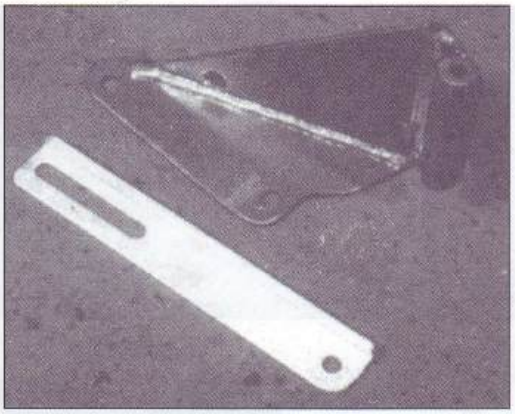

Fig.8m. Alternator mounting brackets. *(Ford Small Block Windsor version illustrated)*

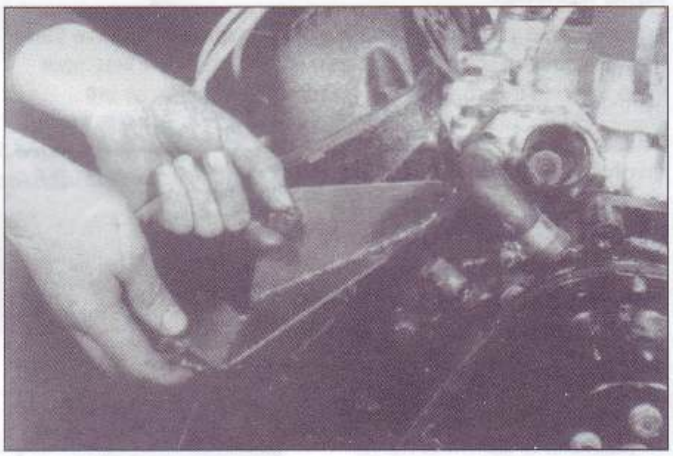

Fig.8n. Alternator mounting bracket being fitted to engine block. *(Ford Small Block Windsor version illustrated)*

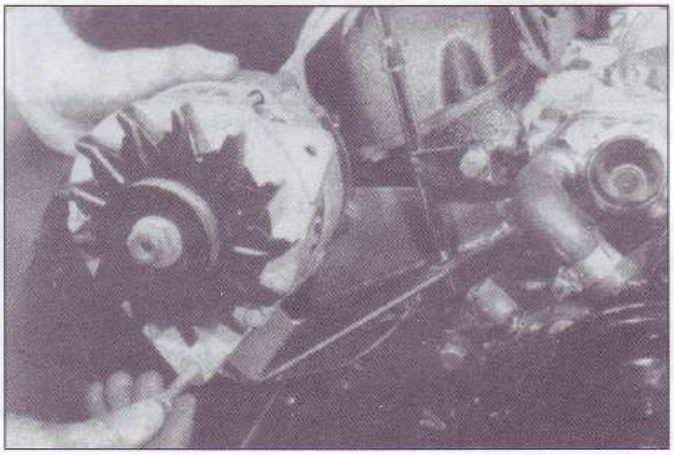

Fig.8o. Alternator being fitted to bracket. *(Ford Small Block Windsor version illustrated)*

Cooling Pipes

Each type of engine has differing positions for top and bottom hose outlets. Some have water cooled manifolds or automatic chokes that require a hot water supply.

It is not possible to give specific hose details for every type of installation but most follow a similar layout and section 9.10 deals with a typical installation on a Rover V8.

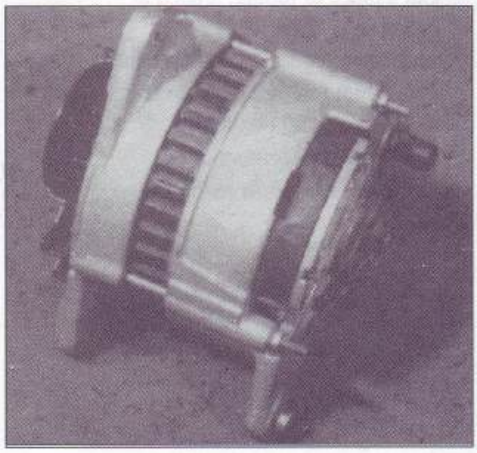

Fig.8p. Typical alternator from Pinto engined Sierra.

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3.9 Pedal Assembly- Sierra Version

The pedals, brake master cylinder and servo (fig.9a) are taken from the Sierra donor car. The assembly is neat and compact and works perfectly with all European Ford engine / gearbox combinations that have a cable operated clutch.

It is suitable for use in all Sumo versions from the Cortina to Jaguar based cars.

Note. If you are particularly tall, you may wish to maximise the available legroom by re-setting the pedals. This is a simple operation involving cutting a 'V' in the rear of the two sides of each pedal, then bending the pedal back to close the 'V' and welding the joint. The overall effect is to set the pedals closer to the bulkhead.

1. Mount the master cylinder / servo to the engine side of the bulkhead as shown in fig.9b.
2. Mount the pedal box on the inside of the bulkhead as shown in fig.9c.

As the assembly is mounted onto the relatively thin sheet metal bulkhead, which may deflect under very hard brake pressure, you must brace the pedal box as follows:-

3. Drill a hole in the top surface of the bulkhead vertically above the hole in the pedal box (which can be seen in fig.9c). Cut a piece of tubing, angled at one end, to fit between the pedal box and the top bulkhead. Pass a bolt through the tube and secure the pedal box to the bulkhead to increase the rigidity of the whole assembly.

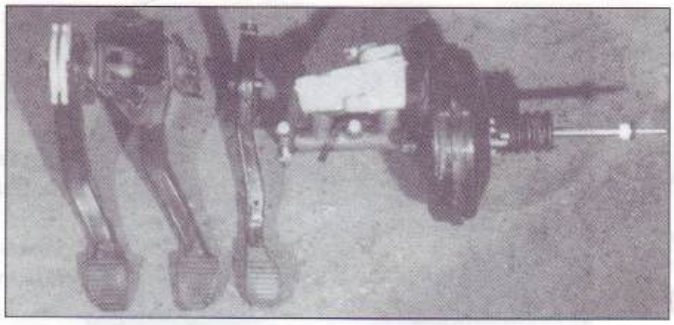

Fig.9a. Sierra pedals prior to fitting

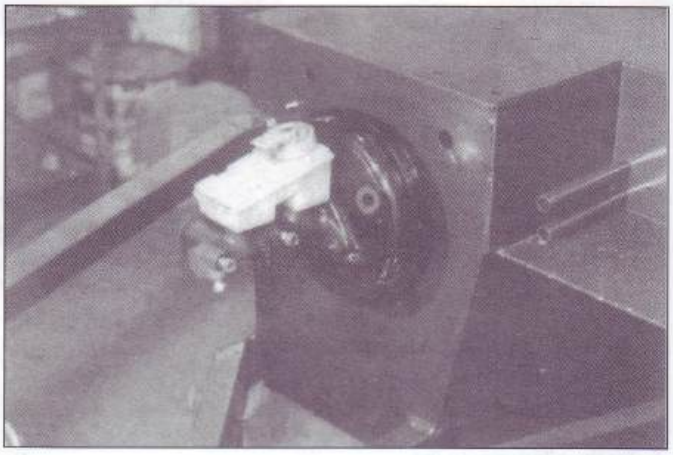

Fig.9b. Master cylinder / servo mounted to bulkhead.

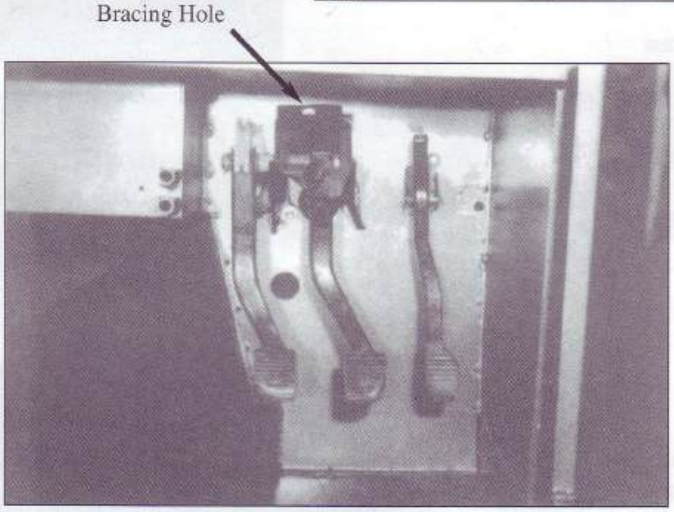

Fig.9c. Pedal box mounted to inside of bulkhead. Also showing hole for bracing the assembly.

Fig.9d. The Sierra system fitted showing clearance under the Sumo bodywork.

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3.10 Radiator Installation

The chassis has been designed to accept a specially adapted double core radiator as shown in fig.10a. It is suitable for all the engines described in this manual although a Sierra or Rover Radiator may be fitted in exactly the same way but do ensure that the radiator has enough cooling capacity for the chosen engine.

For all engine types:

1. Fit the fan control switch in the threaded boss of the radiator as shown in fig.10b.
2. The radiator has an air bleed pipe at its uppermost point and a filler pipe connection at its lower most point. These should be connected to our the expansion / filler bottle.
3. Fit the cooling fan (fig.10c)to the radiator (figs.10d & 10e).

   Note. You will need two cooling fans for the larger engines.

For engines up to and including Ford 2.9 V6

1. Fit the radiator directly to the chassis at the bottom as shown in fig.10e and via two adaptor brackets fitted between the top radiator flanges and the chassis cross member as shown in fig.10f.

For Rover, Small Block Ford and Chevy V8s

1. Fit the radiator **upside down**. with the fan switch on the drivers side (RHS). This will give far shorter hose runs.

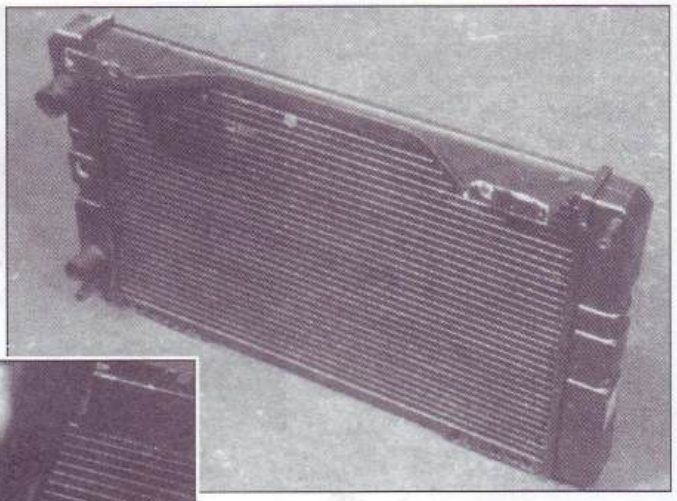

Fig.10a. Double core radiator specially adapted for the Sumo.

Fig.10b. Fitting the fan control switch.

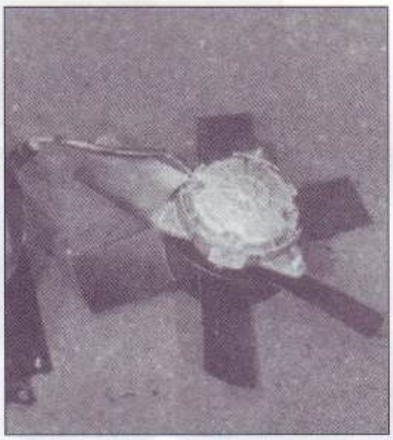

Fig.10c. Fan unit

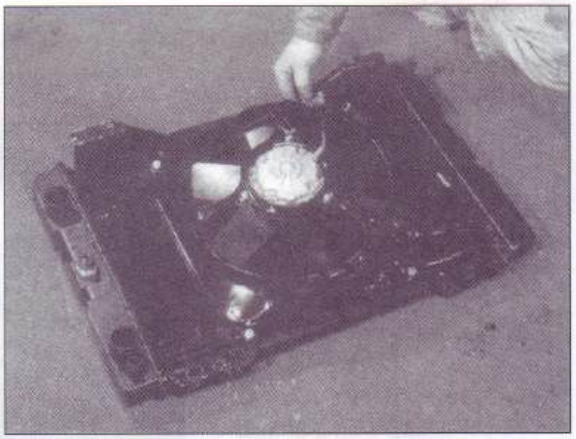

Fig.10d. Fan unit fitted to radiator

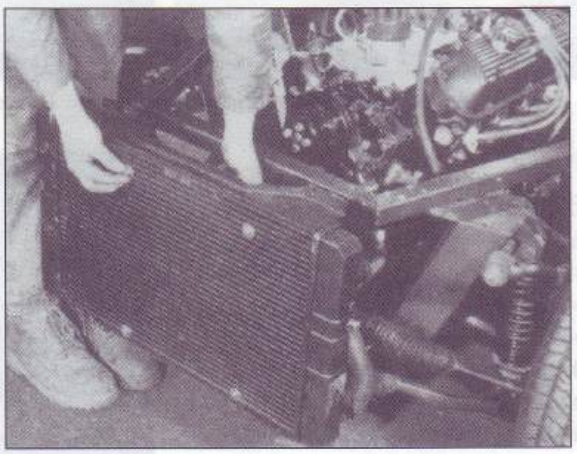

Fig.10e. Radiator fitted to chassis at the bottom and also showing fan fixing through matrix.

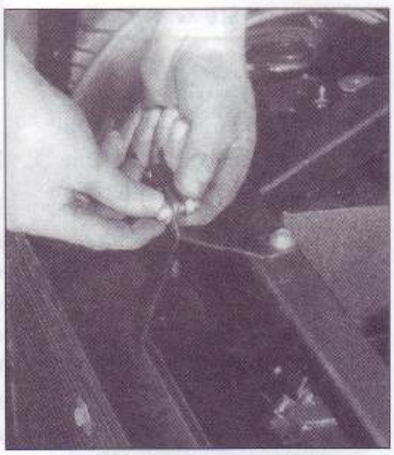

Fig.10f. Radiator top fixing brackets

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2, Cut off the small tag on the radiator as shown in fig.10g and use the two bolt holes which coincide with the holes in the chassis. Space the rad away from the chassis using one M8 plain nut.

3. You will need to make two L-shaped brackets as shown in fig.10h. Use two rubber bobbins as spacers between the bracket and radiator.

All engine types.

Radiator Top Hose.

1. Fit the top hose from the engine to the top tube on the radiator (fig.10i). The exact positioning will vary depending upon the engine fitted but the hose should be routed via the shortest distance without kinking or running to close to rotating engine components.

Radiator Bottom Hose.

1. Fit the bottom hose from the engine to the lower tube on the radiator. Again, the exact positioning will vary depending upon the engine fitted. The arrangements shown in fig.10j and 10k show a Ford Small Block V8 installation. It comprises part of a Rover top hose, a piece of steel tubing with a double bend and a short piece of straight 44mm ID hose. All these parts are available from Pilgrim.

Note. If you are using one of the smaller engines along with the radiator that came from the same car, the hoses should fit neatly but you may need extensions using a piece of metal tube.

Fig.10g. Remove this tag.

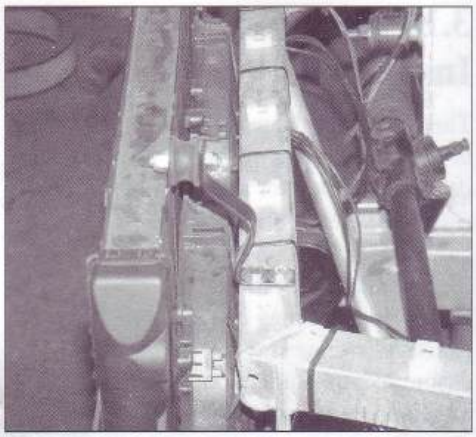


Fig.10h. Fan unit fitted to radiator

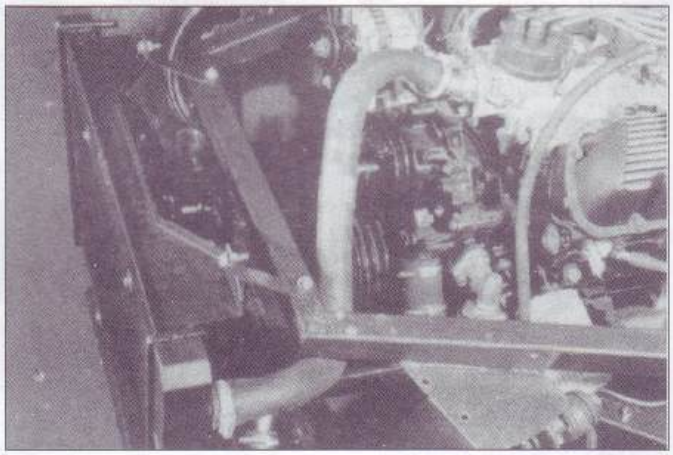


Fig.10i. The top hose fitted - Radiator is mounted the correct way up in this illustration. *(Ford engine illustrated)*

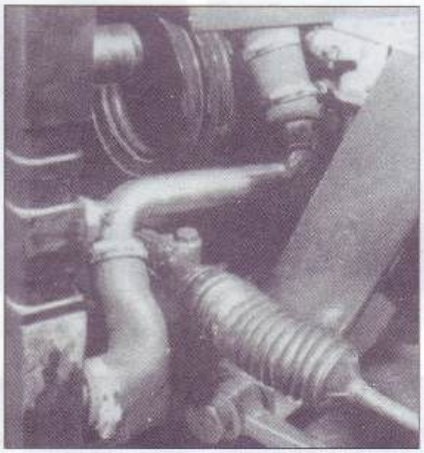


Fig.10j. Bottom hose connection.

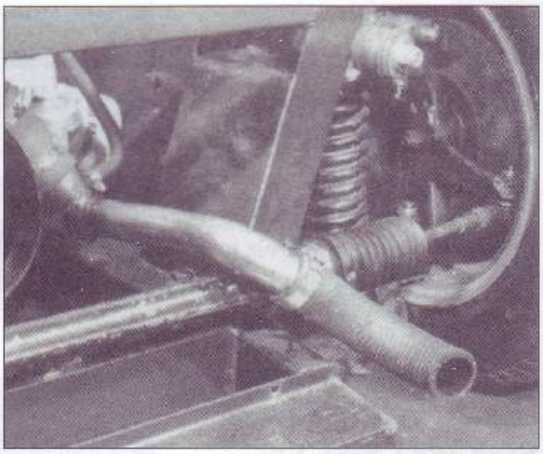
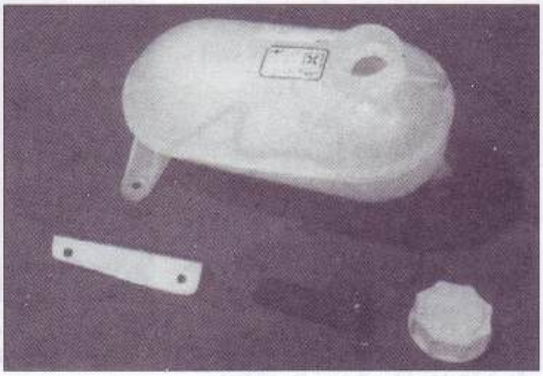


Fig.10k. Bottom hose *(Radiator removed for clarity)*

Expansion Tank.

Effective cooling requires a system that allows water to fill the system without leaving air locks. To this end we supply an expansion tank (fig.9l) which has two outlets. One is an air bleed, which is connected to the small tube on the highest point of the radiator. The other is the water filler which is connected to the lowest point on the radiator.



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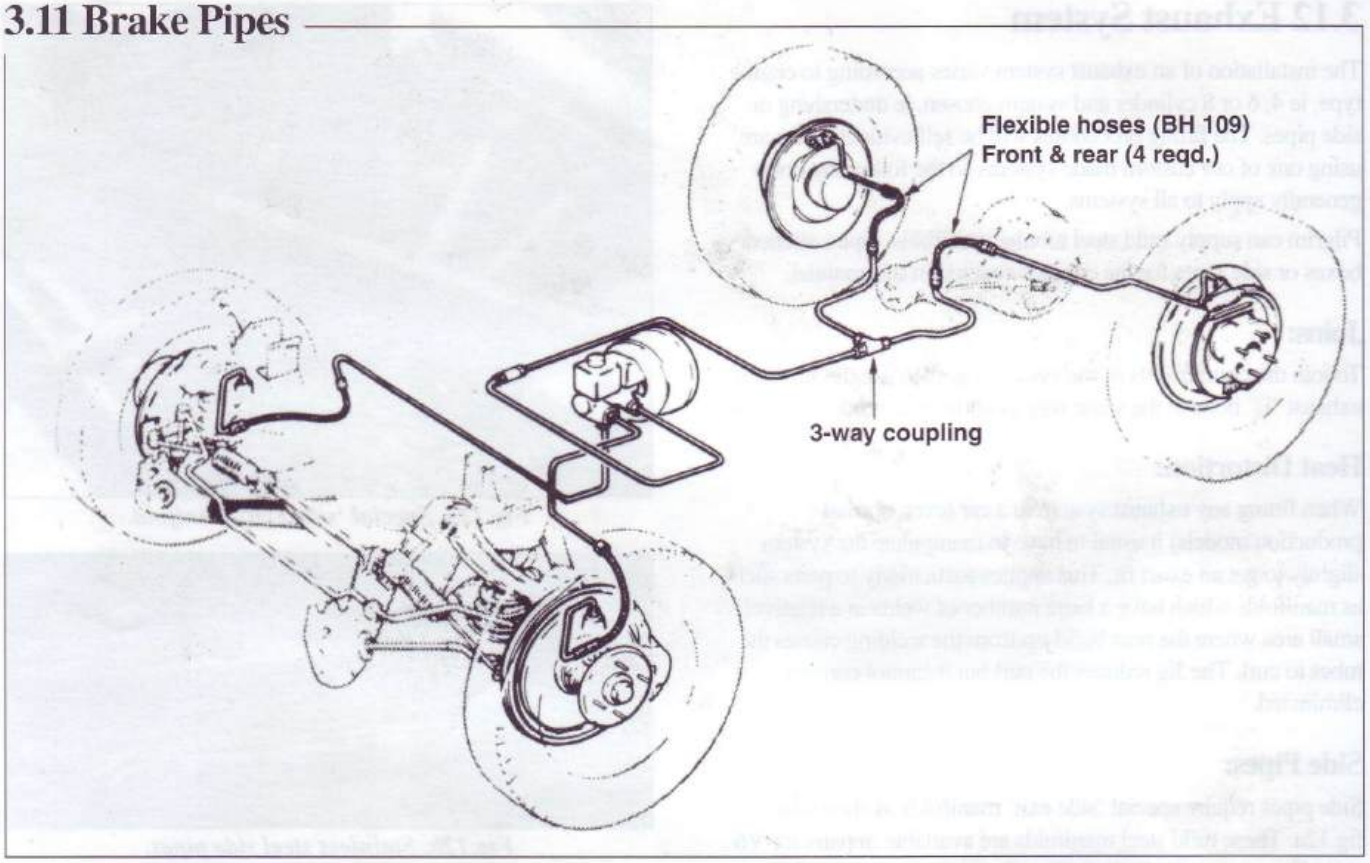
Section 3. Rolling Chassis

3.11 Brake Pipes



SAFETY WARNING

YOU MUST USE NEW BRAKE PIPES AND HOSES.

YOU MUST ENSURE THAT THEY CANNOT COME INTO CONTACT WITH ANY MOVING PART.

CHECK THIS UNDER FULL SUSPENSION TRAVEL AND WHEN FRONT WHEELS ARE TURNED LOCK TO LOCK

IMPORTANT NOTE

WHEN INSTALLING BRAKES, YOU MUST USE THE DONOR CAR MANUAL AS A PRIMARY SOURCE OF REFERENCE. THE NOTES IN THIS MANUAL ARE FOR GENERAL GUIDANCE ONLY. IF YOU HAVE ANY DOUBTS, THEN REFER TO A BRAKE SPECIALIST.

Run the brake lines as shown in the schematic diagram, fig.11a. Route the pipes to suit your individual installation and secure at least every 9 inches. Make sure the pipes cannot be damaged and the flexible hoses are free to move throughout the full suspension travel and with the steering turned lock to lock. In the factory built cars, we run the brake pipe from the master cylinder along the 'off side' of the chassis to the rear. Alternatively, you can run the brake pipes through the transmission tunnel. We fit the petrol pipe along the 'near side' of the chassis and the wiring loom is run from the front to the rear along the 'off side' as described in section 5.

Please note the following:-

Compensator Valve. Because the Sumo is a very light and well balanced vehicle, it is not necessary to fit any kind of brake balance or compensator valve.

Silicon Brake Fluid. We have been asked by a leading brake component manufacturer to advise our customers NOT TO USE Silicon brake fluid. It is not better than the latest formulations of ordinary fluid and is also inferior in some respects. It has a lower boiling point which could cause brake failure and it has poor lubricating properties which could seizure of brake pistons. The consequences could be fatal so only use Silicon in systems specifically designed for Silicon.

Copper Tube. Pure copper tubing is unsuitable for use in an automotive brake system because copper becomes brittle when subjected to vibration. When copper is extruded, microfine cracks appear in the sides of the tube which can break open under hydraulic pressure. This could cause a fatal brake failure so DON'T USE PURE COPPER tube for brake lines.

Secure Your Brake Pipes. These must be secured to the chassis at no more than 9" (228mm) intervals. This is an SVA requirement and it will be checked during the test.

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3.12 Exhaust System

The installation of an exhaust system varies according to engine type, ie 4, 6 or 8 cylinder and system chosen, ie underslung or side pipes. The fitting procedures will be self evident if you are using one of our custom made systems so the following notes generally apply to all systems.

Pilgrim can supply mild steel tubular manifolds, pipes, silencer boxes or side pipes for the engines covered in this manual.

Joins:

To join the components of the system together, use the standard exhaust 'U' bolts in the same way as on normal production cars.

Heat Distortion:

When fitting any exhaust system to a car (even normal production models) it usual to have to manipulate the system slightly to get an exact fit. This applies particularly to parts such as manifolds which have a large number of welds in a relatively small area where the heat build-up from the welding causes the tubes to curl. The Jig reduces the curl but it cannot entirely eliminated.

Side Pipes:

Side pipes require special 'side exit' manifolds as shown in fig.12a. These mild steel manifolds are available in pairs for V6 and V8 engines and singly for 4 cylinder engines where the side pipe is on one side only.

The side pipes themselves are made from high quality stainless steel as shown in figs.12b & 12c. They are supplied empty, ie no silencing ability, but we can also supply the baffles to knock in which will enable the car to pass the SVA noise test. See parts list for details.

The side pipes are made from stainless steel because they get very hot. Chrome plated pipes look very attractive but heat, road salt, rain and chromium plate do not mix very well, so think twice before spending money on chrome plated exhaust pipes. You can always polish the stainless steel ones, but remember that on the genuine race cars of 60s, the side pipes were always painted!

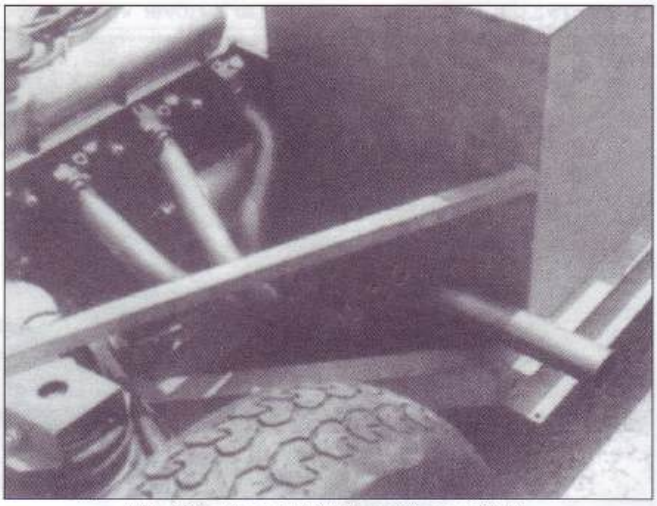

Fig.12a. Special 'side exit' manifold.

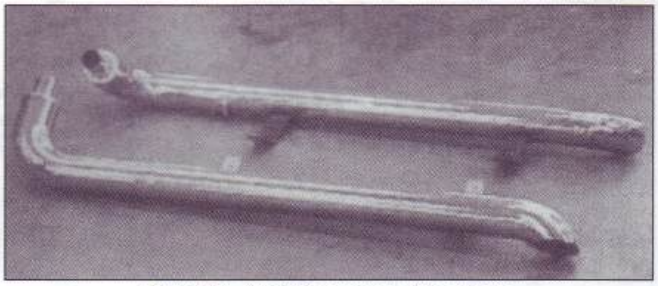

Fig.12b. Stainless steel side pipes.

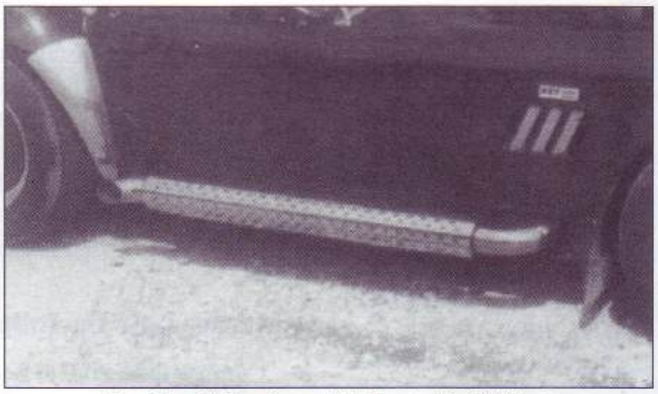

Fig.12c. Side pipes with heat shield fitted.

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Section 3. Rolling Chassis

3.13 Propeller Shaft

The gearbox end of the prop shaft will either have a sliding splined drive shaft (most Ford gearboxes and those from the USA) or a drive flange (Rover and Ford MT75 types). See figs. 13d & 13e.

1. **Rover type boxes.** Fit the special shortened shaft between the gearbox and differential drive flanges as shown in fig.13a. Secure both with special threaded bolts and spring washers as shown in fig.13b.
2. **Ford type boxes.** Slide the splined shaft into the rear of the gearbox then connect the differential flange to the prop shaft flange using special threaded bolts and spring washers.
3. The front universal joint must have a clearance of between 9mm and 40mm from the back of the gearbox (fig. 13c) otherwise the gearbox end bearing could be damaged.

Note. The prop shaft rotates at speeds in excess of 5,000 rpm so it is vital that the fixing bolts cannot come loose. Make sure that all bolts, nyloc nuts and spring washers are in good condition and fully tightened.

New shafts for American gearboxes can be expensive. We can offer new shafts for a limited number of American gearbox but we can also manufacture shortened shafts using the existing end pieces from the donor car shaft.

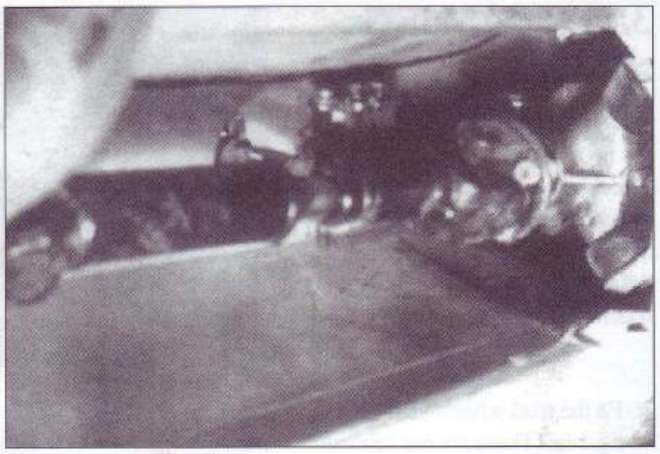

Fig.13a. Propeller shaft fitted. *(Rover type illustrated)*

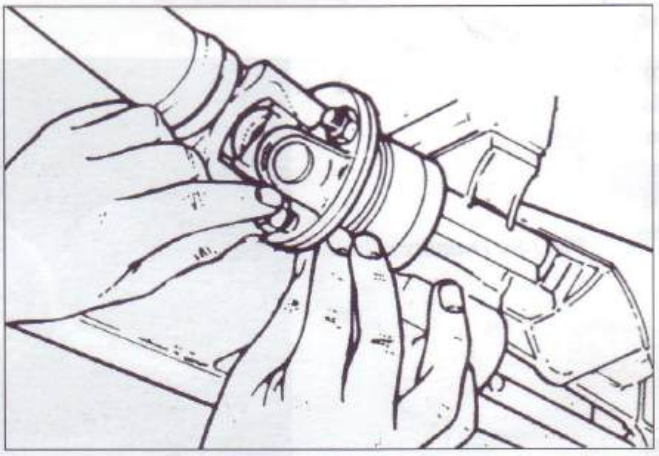

Fig.13b. Secure flanges with special threaded bolts and spring washers. *(Rover V8 type illustrated)*

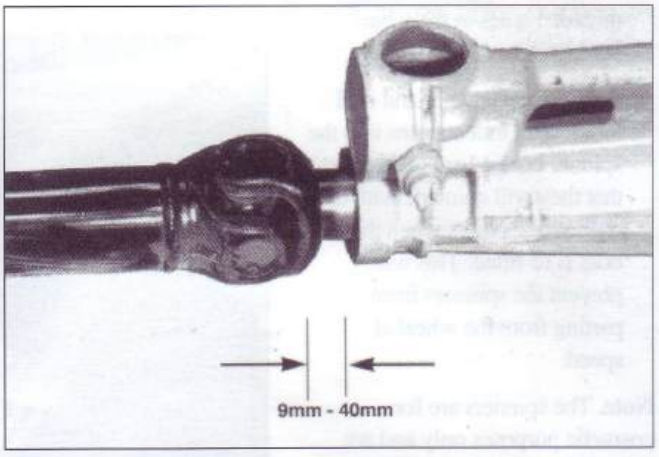

Fig.13c. Propeller shaft to gearbox clearance. *(Ford type illustrated)*

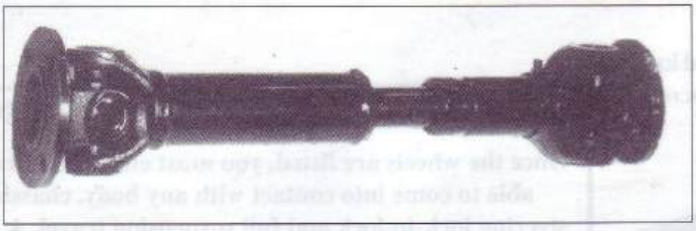

Fig.13d. For Rover V8 and Ford MT75 gearboxes

Fig.13e. For most Ford gearboxes and those from the USA.

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Section 3. Rolling Chassis

3.14 Road Wheels and Tyres

Wheel / Tyre Specifications.
All necessary dimensions for wheel and tyre sizes and ratings are given in Section 9 of this manual. We do not recommend fitting sizes outside these specifications.

1. Fit the road wheels as shown in fig.14a. (These are our replica Halibrand type with the optional dummy spinners).
2. The dummy spinners (fig.14b) are attached to the road wheels with grub screws. The boss on the spinner fits *inside* the boss on the wheel and is held by the three grub screws threaded into the wheel boss.
3. Initially, push fit the spinner into position. Ideally the threaded holes in the wheel boss should be equi-distance between each spinner ear. Mark the spinner boss through the threaded holes in the wheel boss.

   Remove the spinner and drill three small indentations into the spinner boss where marked so that they will coincide with the grub screw points when the boss is re-fitted. This will prevent the spinners from parting from the wheel at speed.

Note. The spinners are for cosmetic purposes only and are **not** used for wheel attachment in any way.

4. Finally fit the spinners and lock in position with the grub screws as shown in fig.14c.

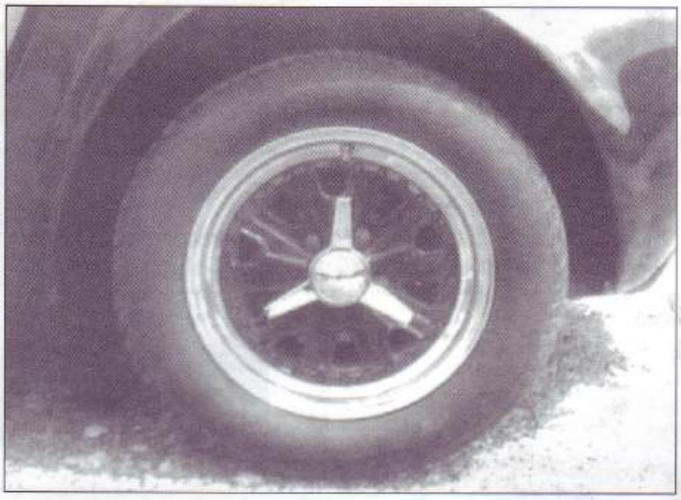

Fig.14a. Road wheel fitted. *(Replica Halibrand type with dummy spinner illustrated)*

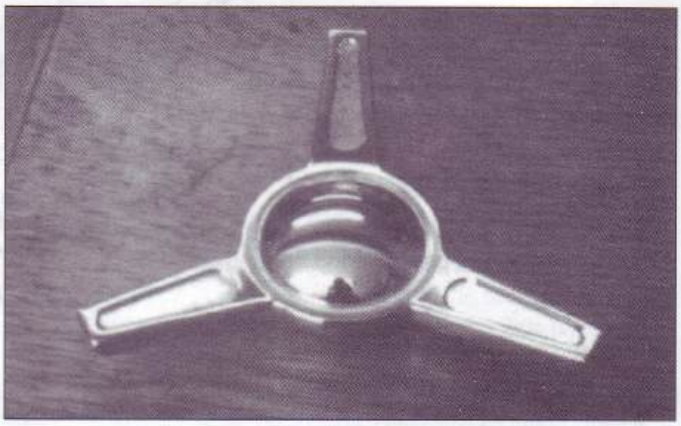

Fig.14b. Dummy spinner

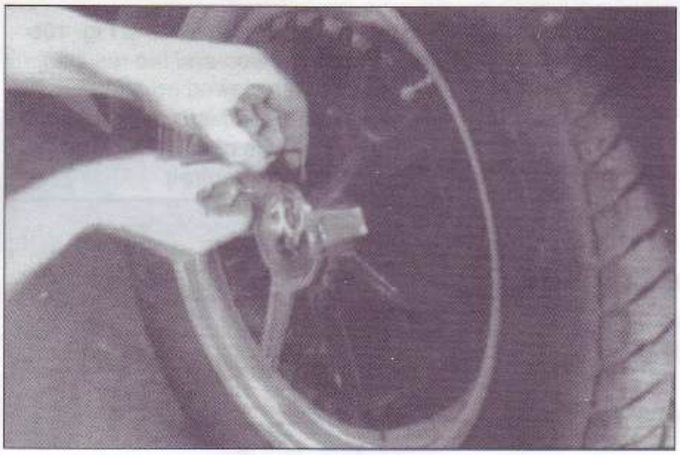

Fig.14c. Dummy spinner being fitted to replica Halibrand road wheel.

SAFETY WARNING

Once the wheels are fitted, you must ensure that both the wheels and tyres are not able to come into contact with any body, chassis or mechanical part on both steering lock-to-lock and full suspension travel. A minimum side to side clearance of 8mm is required in all places.

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Section 3. Rolling Chassis

3.15 Steering Column

The Sumo Mk3 kit is designed to accept the upper steering column and switch gear from the Ford Sierra. The Granada upper column can also be used but the column mounted switches are wired very differently and the wiring looms we supply are for Sierra switches / columns only.

If you decide to use the Granada column and switch gear you must be competent enough in vehicle wiring to modify the loom to suit.

The following instructions are for Sierra components only.

The lower column is made from new components.

1. The Sierra upper column is slightly too short in its standard form and requires extending by 50mm. As the inner and outer parts are an interference fit, it can be extended by simply clamping the lower (inner) part in a vice and then, using a pair of pry-bars, lever the upper (outer) part out far enough to achieve the required 50mm extension (fig.15a).
2. Fit the plastic bushes into the bulkhead as shown in fig.15b.
3. Insert the lower end of the upper column into the bush and clamp the upper end to the chassis as shown in fig.15c.
4. Fit UJs to each end of the new lower column then clamp each UJ to the rack and upper column (fig.15d & 15e).

Note. The rack will only accept the UJ in one position. Look for the 'key' on the rack before attempting to fit the joint.

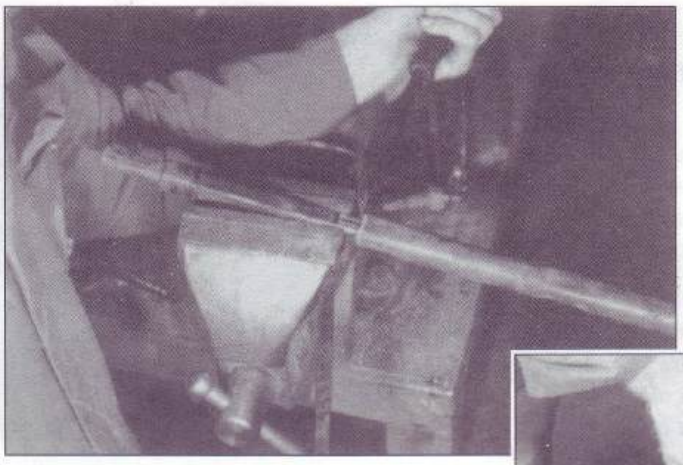

Fig.15a. Extending the column by an extra 50mm.

Fig.15b. Plastic bushes being fitted to bulkhead (Sierra column only) to accept lower end of upper steering column.

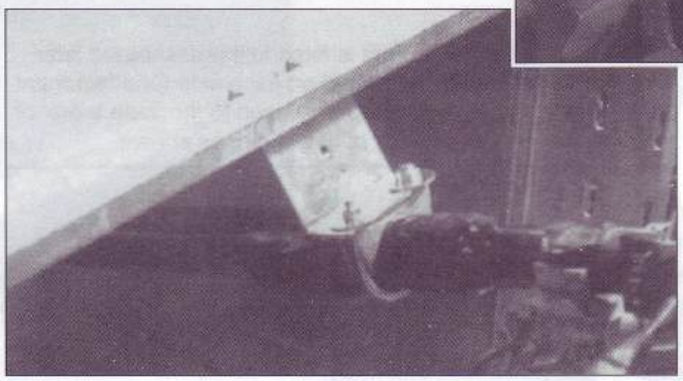

Fig.15c. Upper steering column clamped to the chassis.

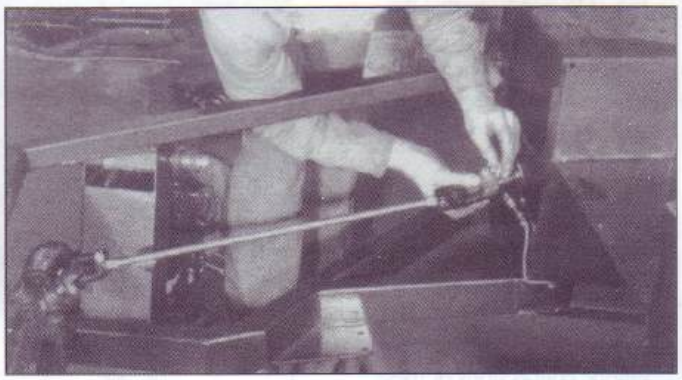

Fig.15d. (Right) Attaching the lower column and universal joints to the rack and upper column.

Fig.15e. (Below right) Clamping the universal joint to the lower shaft and rack. Each joint must be secured with an M8 pinch bolt and NEW nyloc nut.

SAFETY WARNING
Do ensure that all components in the steering system are in good condition. Use new components such as Locking Tabs, Split Pins and Nyloc Nuts where applicable.

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Section 3. Rolling Chassis

3.16 Heater

The heater we recommend is from a Mini.

The fitting of the main heater unit is described below but the front of the unit is fitted to the dashboard and is covered later in Section 6.

1. The rear of the heater has a stud on each side for attachment purposes as shown in fig.16a. You need to fabricate a pair of metal straps to hold the rear of heater as shown.
2. The engine heater hoses and the Mini heater hoses are of a different size therefore 'step down' adaptors are required to join the two. These are positioned on the engine side of the bulkhead. We can supply suitable adaptors as shown in fig.16b.
3. Run 13mm bore Mini heater hoses from the inlet and outlet tubes on the heater and through the steel tubes in the bulkhead as shown in fig.16c. They should protrude into the engine bay sufficiently so that the smaller diameter of the adaptors can be pushed into the hoses up as far as the step (fig.16b). Secure with a Jubilee clips.
4. Flow and return hot water supply is taken from the engine to the adaptors and again secured to the adaptors with Jubilee clips. The routing and engine connections of these hoses will depend upon the engine fitted.

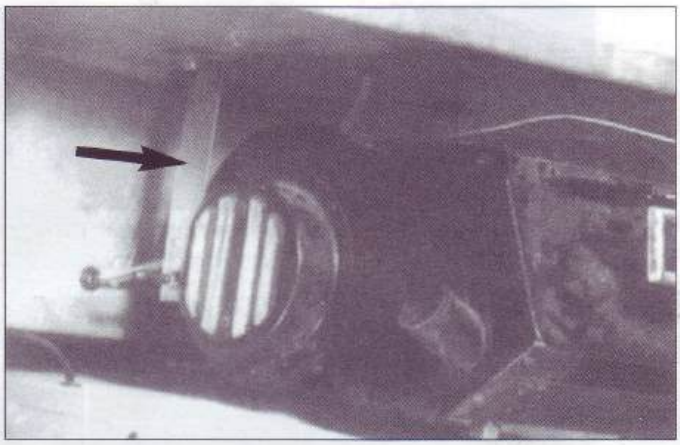

Fig.16a. Mini heater fitted showing securing strap attached to heater and underside of bulkhead.

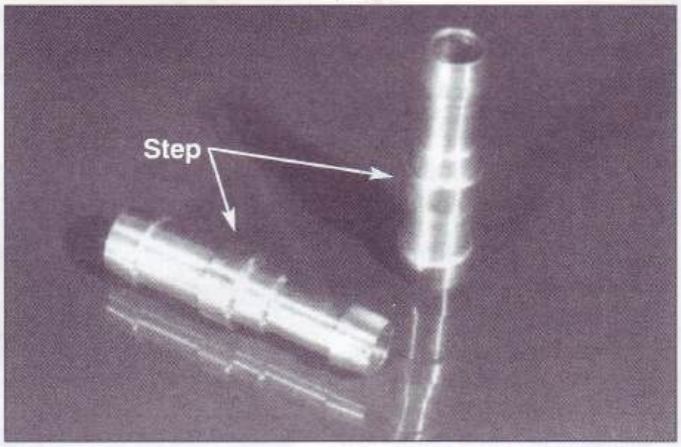

Fig.16b. Heater hose adaptors as supplied by Pilgrim

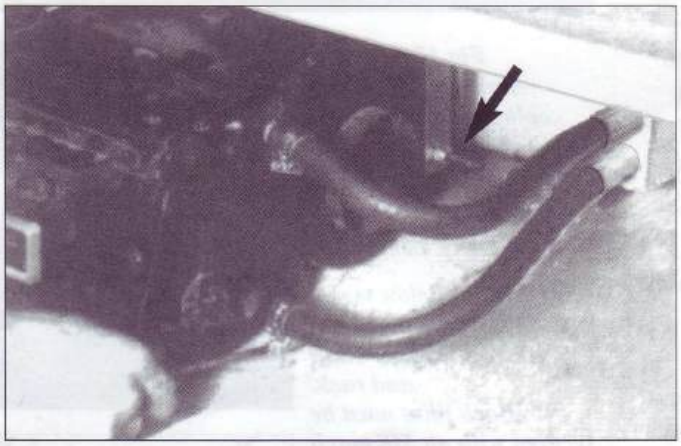

Fig.16c. Heater hoses routed through the bulkhead. Also showing fixing stud for heater securing bracket.

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Section 3. Rolling Chassis

3.17 Fuel Tank.

Our fuel tank (fig.17a) is specially made to fit the Sumo. It holds about 70 litres although alternative tanks can be fitted.

1. Fit the fuel gauge sender unit to the tank and secure the tank in position with the 4 bolts. Fig.17b shows the fuel tank fitted.

Electric Fuel Pump.

This is required when fitting an SD1 Rover V8 and certain other engines without a mechanical pump or where there is no room to fit a mechanical pump. It is installed in the boot next to the tank on the passenger side.

Note. Ford engines with a carb have a mechanical pump fitted to the engine.

Fuel Feed Lines.

The major runs are 8mm OD copper tube terminated each end with flexible fuel hoses. You can run the pipe inside the tunnel but in the workshop we run it on the outside of the chassis on the 'nearside'. At the front, bend it around the corner to just pass the expansion tank. At the rear, through the holes by the fuel pump.

1. Attach the pipe to the chassis at no more than 300mm intervals. Fig.17c shows fixing clips rivetted to the chassis. Please note that twin pipes are only required on systems requiring a return to the tank. Where pipes pass through metal panels you must protect the pipe with grommets.
2. From the tank connect the hose, or hoses to the pump or fuel pipes (fig.17d) according to the type of system applicable to your engine. Refer to the following options on high and low pressure systems and filters.

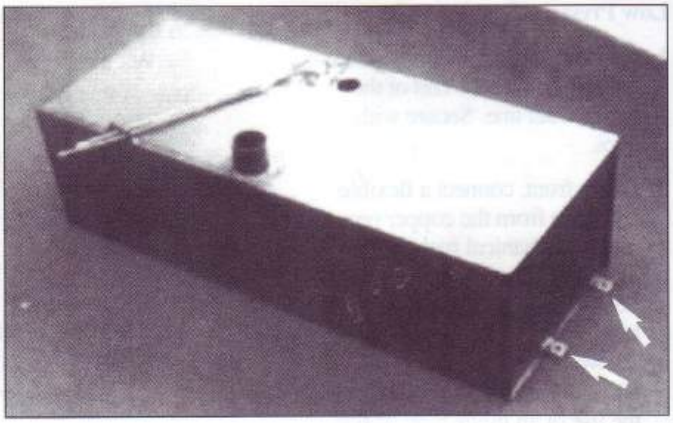

Fig.17a. Our specially made fuel tank showing mounting lugs.

Left: Fig.17b. Fuel tank fitted. Shown here after the body has been fitted.

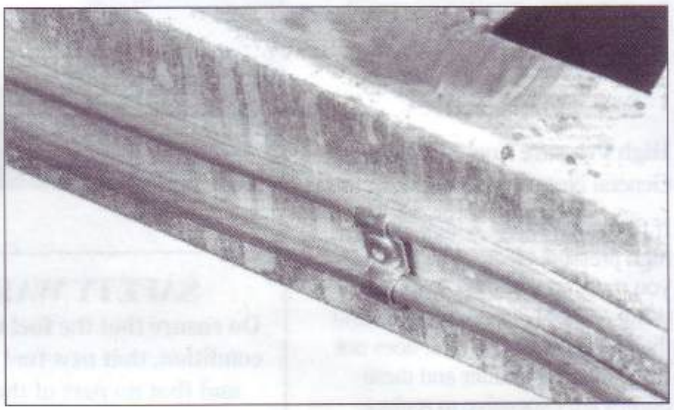

Fig.17c. Twin copper fuel lines shown clipped to chassis.

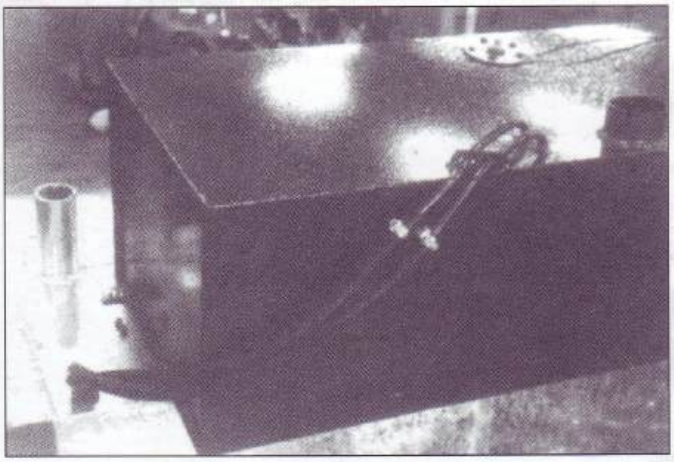

Fig.17d. Connection of the flow and return fuel lines on a system with a mechanical fuel pump.

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Low Pressure System

1. Connect flexible fuel hose from the fuel tank to the end of the copper fuel line. Secure with clips.
2. At the front, connect a flexible fuel hose from the copper pipe to the mechanical fuel pump. From the pump, connect flexible fuel hose to the carb via an inline low pressure filter as shown in fig17e. Secure with clips. We strongly recommend the use of an inline filter as this will protect the carburettor and engine from contaminates.

DO NOT USE LOW PRESSURE FUEL FILTERS IN A HIGH PRESSURE SYSTEM.

High Pressure System (See note below on High Pressure Fuel Filters)

1. Connect flexible fuel pipe first from the fuel tank, via an inline filter, to the electric pump and then from the pump to the end of the copper fuel line. Secure with clips.
2. At the front, connect a flexible fuel pipe from the copper pipe, via a high pressure micro-fine filter, to the injection system. Secure with clips.

High Pressure Fuel Filters - General Notes.

If fitting an engine which uses a high pressure electric fuel pump, you must protect the pump by using a filter between the tank and the pump itself. Our tank does not have an internal filter and these pumps are expensive to replace.

These pumps are used in conjunction with fuel injected engines which are very easily contaminated. You must also use a Ford high pressure micro-fine filter (fig.17f) between the pump and the injection equipment.

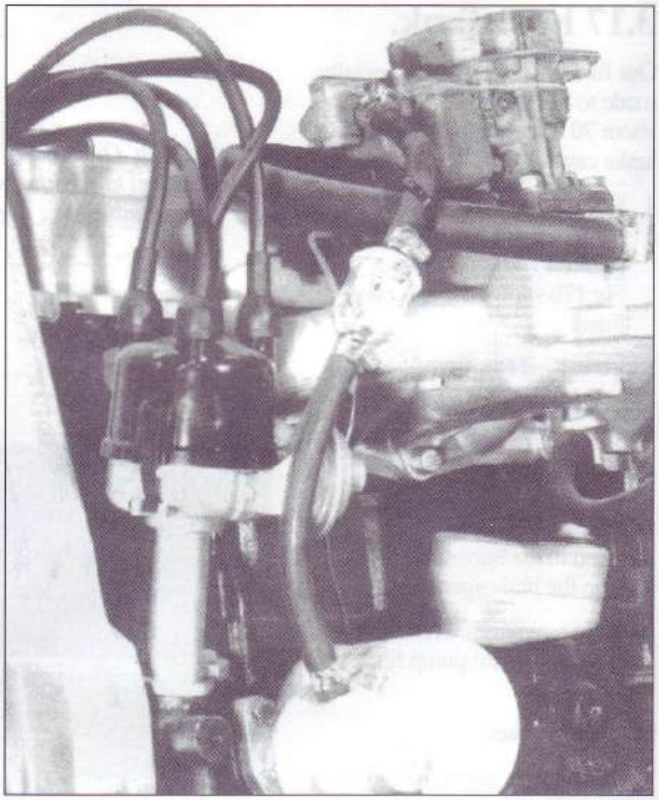

Fig.17e. Pinto engine showing inline fuel filter fitted.

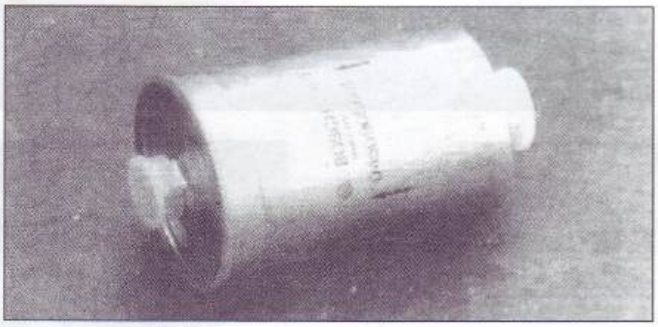

Fig.17f. Ford micro-fine inline fuel filter.

SAFETY WARNING
Do ensure that the fuel tank is in good condition, that new fuel pipes are used and that no part of the fuel system touches the exhaust or any moving part.

SAFETY WARNING
Petrol is highly inflammable. When working on any part of the fuel system you should not use naked lights and you should refrane from smoking.

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Pilgrim Sumo Construction Manual

Section 4 Fitting the bodyshell

Jobs you can do before the body fit.

You can cut holes for all the lights, door hinges etc. Trim the body around the boot and door sills. You can also pre-fit the bonnet, adjust it for accurate fit, then remove it from the body mounting bracket. **Note.** To keep it adjusted, only remove the two bolts that secure the hinges to the 'bonded in' body bracket. Do not disturb the brackets fixed to bonnet. All this work is easier without the engine in the way.

The wiring loom should also be installed before the body is fitted as this makes certain aspects of the wiring easier. Also, make sure that the fuel sender unit is fitted to the tank and wired before fitting the body.

Refer to the relevant sections for details of these operations.

Before getting started with this section, it will be helpful to read Section 8.0 (Dealing with fibreglass). This gives general guidance on handling, cutting, drilling and finishing fibreglass. In particular, you should read the section on flashline removal. The careful removal of flashlines to preserve a gel-coat finish takes a long time. Consequently it is less tedious if done in stages.

If you tackle the area around the door when fitting the door and the area around the headlamps when fitting the headlamps etc., you will not go far wrong.

Fig.1b. Fitting the body tub

However, if you intend to have the car painted, removing the flashlines is a quick and easy job.

It is a general rule that the greater the amount of care that is taken in the preparation of either gel-coat or painted finishes, the better the final result will look.

Before finally fitting or securing the body, make sure you use a pilot drill through the ⅜" UNF welded nut on the top seat belt mount. Also, where the reels fit, we use a ⅜" UNF nut and bolt through the body and lock it up very tight. You should now have a thread protruding into the car (as shown in fig.1a), ready to accept the reels after carpeting.

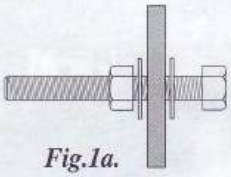

Fig.1a.

4.1 The Main Body Tub.

The process of fitting the body is not difficult, but it is most important to strictly adhere to the following sequence otherwise certain jobs will become difficult and door fitting may become impossible.

1. Fit the main body tub (fig.1b). If you are using old 'slave' wheels during the build up, it is better to temporarily fit the correct size wheels when aligning the body. The 'slave' wheels can then be refitted after. Once the body is lifted on you will need to cut around the rear suspension radius arms.

Note. Figs 1c, and 1d show drilling and rivetting the body to the chassis. Only do this in each area as and when specified in the following instructions because the body needs to remain 'flexible' for operations such as door fitting. Exact inward/outward position of sills will ensure excellent door fit.

2. The body should be fitted nearly touching the roll bar sockets on the chassis. Just leave enough room for the roll bar to slide past when fitted.
3. Now work on the rear sideways alignment. You can do this with a spirit level set vertically against the centre of the rear wheel arch and a tape measure. Measure from the hub to the spirit level. Do this both sides and adjust body to

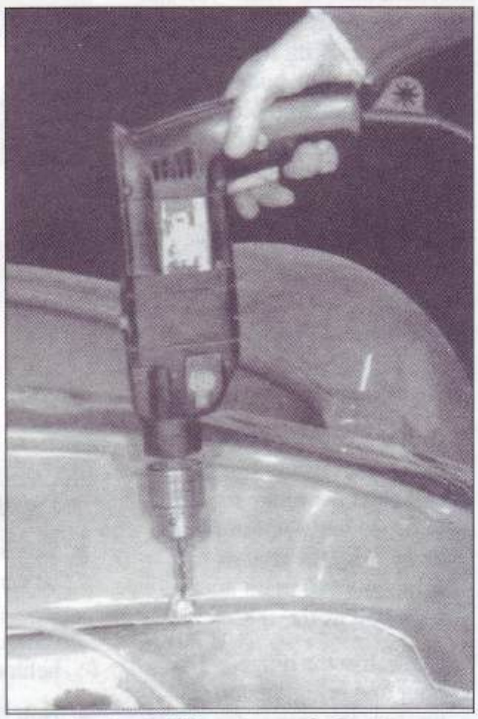

Fig.1c. Drilling through the front bulkhead into the chassis

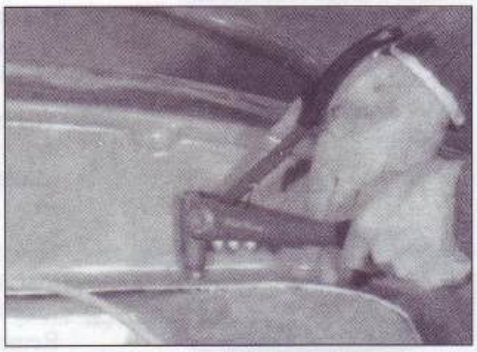

Fig.1d. Rivetting the front bulkhead to the chassis

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give equal measurements. Once this has been achieved, fix the body around the boot floor and behind where the seats will be (fig.1e). Drill through the body and chassis with a clearance drill to suit the rivet diameter then rivet the body to the chassis. Now centralise the nose cone and bolt through using M8 nuts and bolts. Do not fix the scuttle area (around the battery tray) yet.

4. Rivet the boot area as shown in fig.1f.

4.2 Doors.

Door Fit.

Our demonstration cars have an excellent door fit which you can also easily achieve providing you take care with fitting the body. As both the body and doors are made in moulds, accurate door fit is assured. Badly fitting doors are a direct result of a poorly fitted body.

The doors are fitted using the special door hinges (fig.2a) supplied in the kit. The locking mechanisms are taken from the Ford Fiesta, Escort, Orion, Sierra or Granada.

1. Bolt the two door hinges to the chassis using four M8 nuts and bolts per hinge as shown in fig.2b but space the hinge away from the chassis by using an M10 plain nut on each bolt as the spacer.
2. Centralise the hinge in the door and bring the hinge towards the rear as far as you can. Put masking tape on the door's hinge recesses and mark through the hinge holes. These are slotted so drill through in the centre of the slot to give room for adjustment.

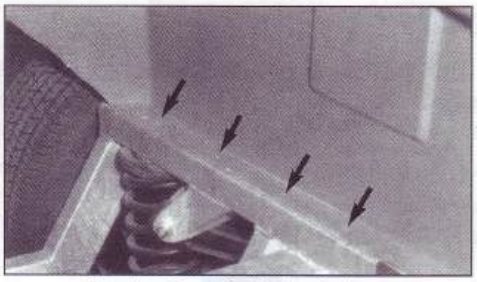


Fig.1e. Rear bulkhead rivets

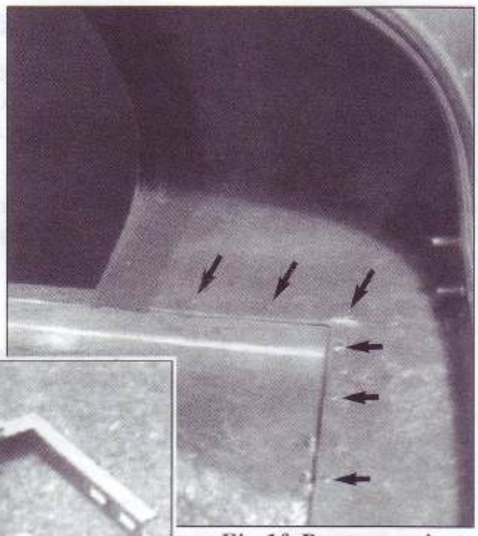
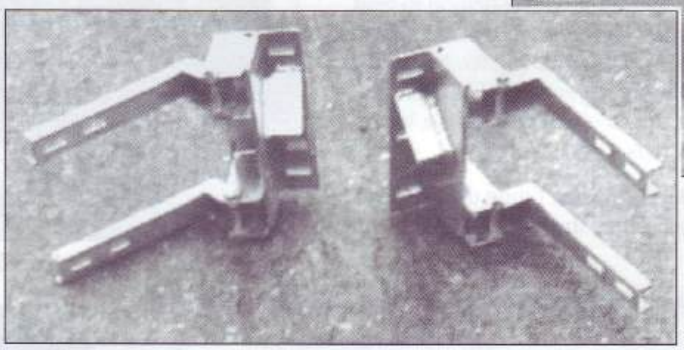


Fig.1f. Boot area rivets



Left: Fig.2a. Door hinges as supplied in the kit.

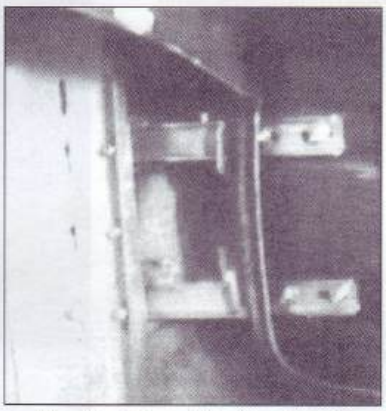


Fig.2b. Hinge fitted to chassis

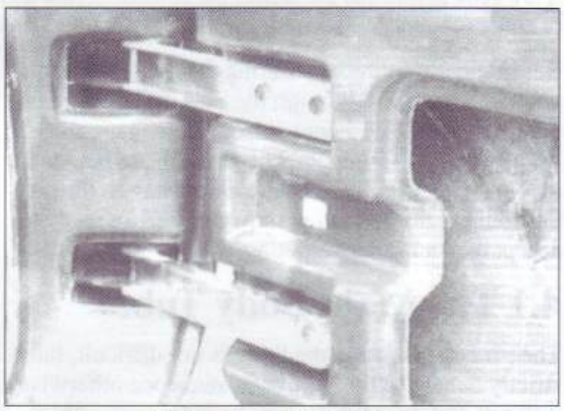


Fig.2c. Door fitted to hinge

3. The doors have steel plates bonded in so be careful when drilling not to go straight through the outer skin. As a protection measure, you could slide a piece of wood behind the plate.
4. Bolt the doors to the hinges (fig.2c), and see how they look. We find it best to start with the driver's door. You can now move the scuttle / body around so that it flows nicely where the body meets the door at the top. The idea is not to have a step.
5. You can now shim the door if necessary to give a perfect fit. Make the shims as required. Fix the body around the battery tray.
6. Now fit the nearside door. You may need to trim the sills in order to move the body in or out to achieve the required door fit. Remember, the chassis, the door hinges and the bonded in door hinge plates are all extremely strong and rigid with virtually no 'give' apart from shimming. However, the body is quite flexible until it is fixed everywhere and the inner panels bonded in. So work on the principle of 'Make the body fit the door, not the door fit the body'.
7. Apply sealant to all joints as shown in fig.2d.

Fig.2d. Applying the sealant

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9. Smooth the sealant where joints will be visible to achieve a neat edge as shown in fig.2e.
10. Bolt sills to chassis as shown in fig.2f.

Fig.2e. Smoothing the sealant

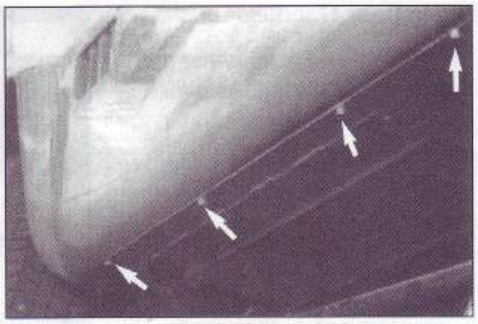

Fig.2f. Sill fixing bolts

4.3 Door Locking Mechanisms

The type used are shown in fig.3a. These would normally be sourced from the donor vehicle.

1. To fit each mechanism, you need to remove a portion of the door and drill out the fixing screw holes as shown in fig.3b.
2. The striker plate is fitted into the body recess as shown in fig.3c.
3. When drilling fibreglass, it is advisable to place masking tape over the area being drilled as shown in fig.3d to avoid gel coat cracking.
4. Shims may be required to fitted between the body and the striker to allow the door lock to operate smoothly.
5. Make sure the striker goes fully home into the lock which is two clicks. first one safety and the next one locked.

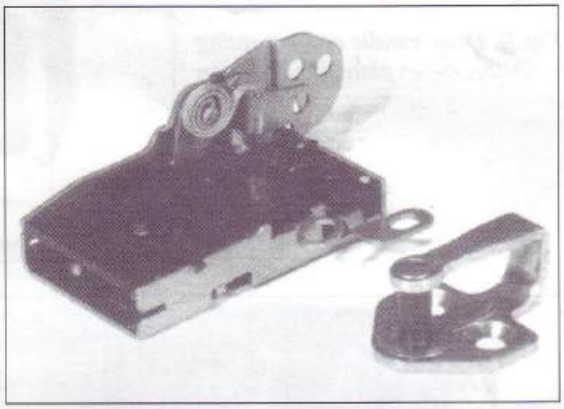

Fig.3a. Door locking mechanisms

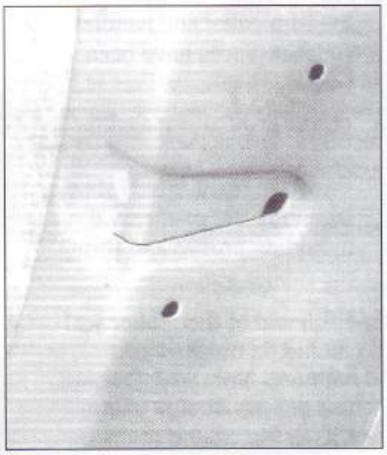

Fig.3b. Remove portion as shown

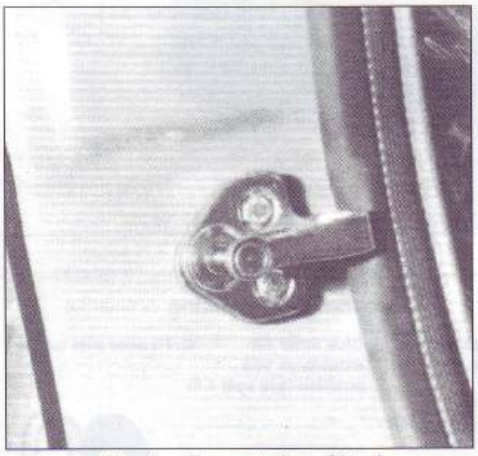

Fig.3c. Door striker fitted

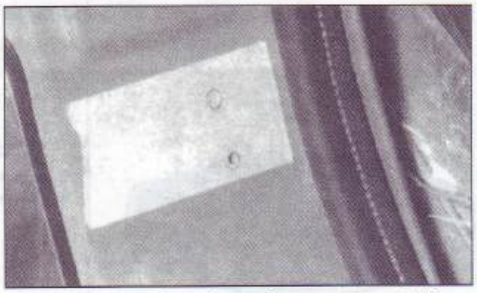

Fig.3d. Protecting the gelcoat when drilling

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Inner Door Handles.

These are taken from either the Ford Cortina, early Capri, Escort or Granada.

The handle is held to the door with the aluminium mounting plates supplied in the kit as shown in fig.3e.

1. Fit the handle to the mounting plate then screw the plate to the door as shown in fig.3f. Use the door panel as a guide .
2. Connect the rod from the door handle (fig.3g) to the locking mechanism.

The following information, although relevant to the doors, can be left until the final trimming and finishing is done as described in Section 6.

3. Fig.3h shows the handle after the trim panel and handle finisher pieces have been fitted.
4. Fit the door reveal sealing rubber. Follow information shown in fig.3i which shows trimming the door reveal moulding profile and fitting the rubber seal.
5. Each end of the rubber seal should be finished as follows:- For the dashboard end,cut the sponge section longer and tuck it under the dashboard as shown in fig.3j. For the other end, cover the cut end with our chrome end finishers as shown in fig.3k. Leave a longer tag of the soft rubber and put the screws through it.

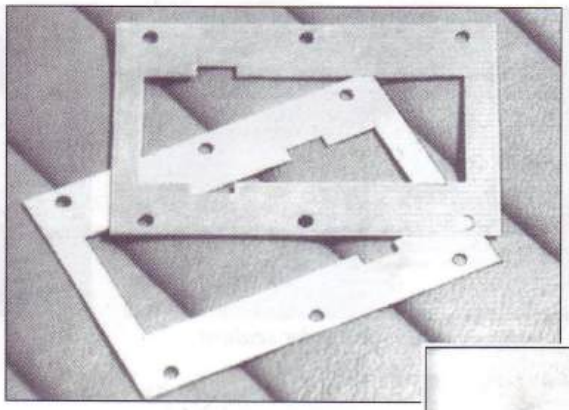

Fig.3e. Aluminium door handle mounting plates as supplied in the kit.

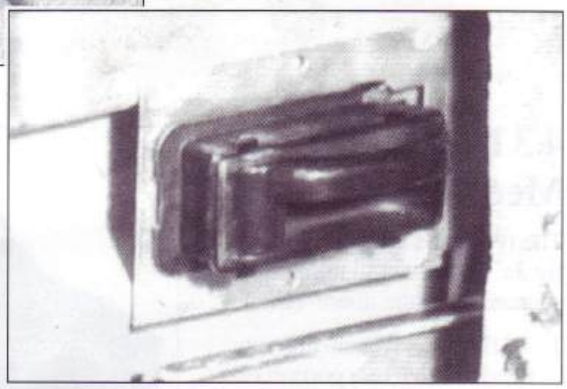

Fig.3f. Door handle and mounting plate fitted to door.

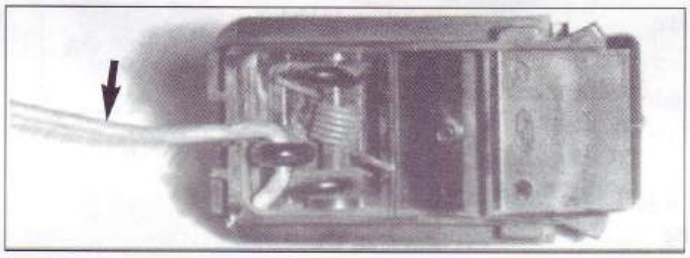

Fig.3g. Connecting rod from handle to lock mechanism.

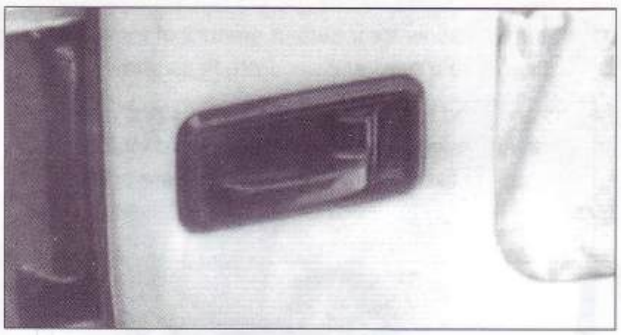

Fig.3h. Handle with trim and finishers fitted.

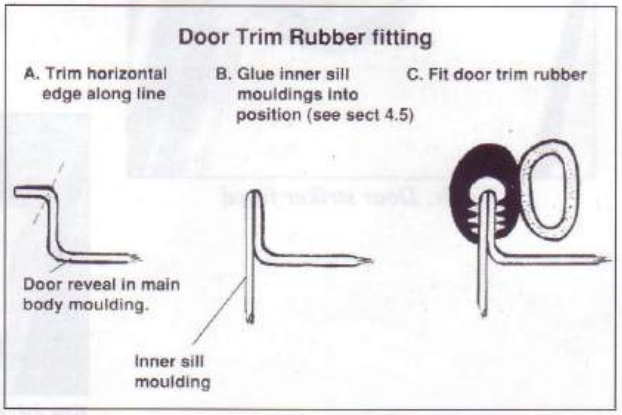

Fig.3i. Door reveal profile.

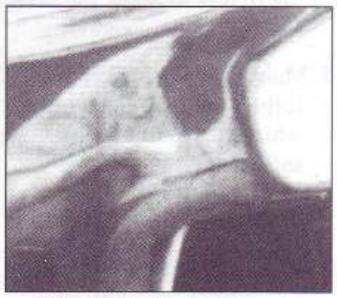

Fig.3j. Seal at dash end.

Fig.3k. Seal at back end.

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4.4 Demisters.

The best time to fit these items is before the windscreen and whilst there is plenty of access within the cockpit.

1. Cut slots in the scuttle (fig.4a.) to suit the vent aperture. The ideal position for the slot is 270mm inward from the centre of the windscreen leg mark and 65mm forward of the scuttle edge as shown in fig.4b.
2. Attach the hot air duct moulding to the underside of the scuttle using Polyurethane adhesive as shown in fig.4c.
3. The Mini heater pipes can be fitted as shown in fig.4d.
4. Fit the chrome vents over the slot as shown in fig.4e. Fig.4f shows a pair of vents currently available from Pilgrim Cars.

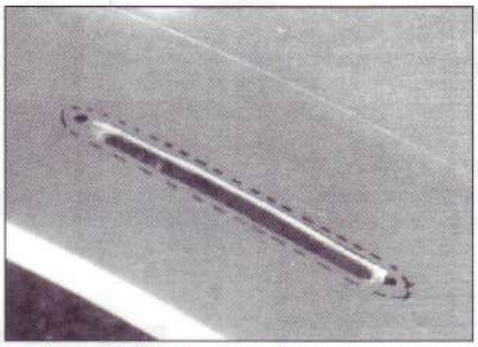

Fig.4a. Mark and cut slot for vent

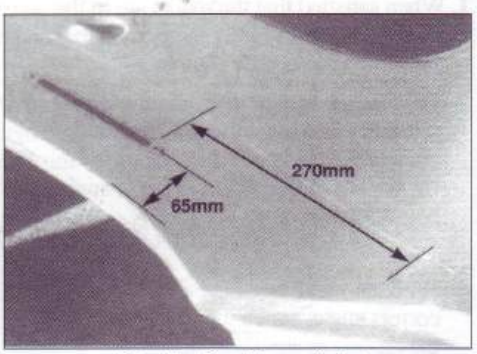

Fig.4b. Position of slot

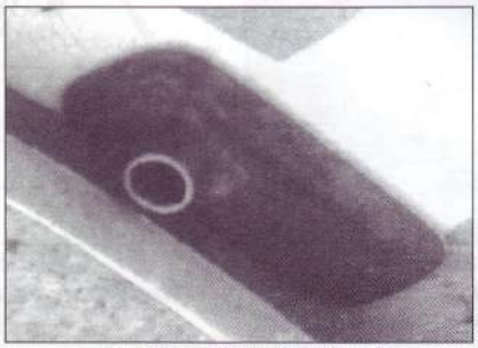

Fig.4c. Hot air duct fitted

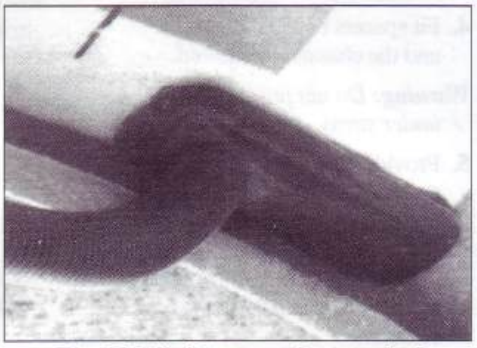

Fig.4d. Mini heater tube attached

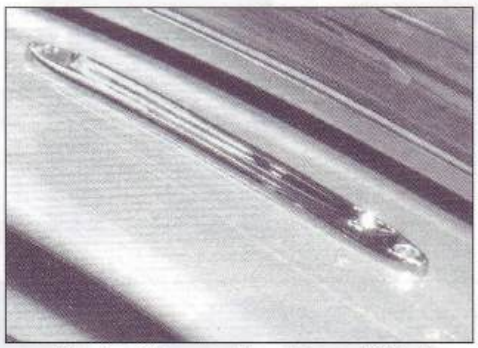

Fig.4e. Chrome de-mist vent fitted

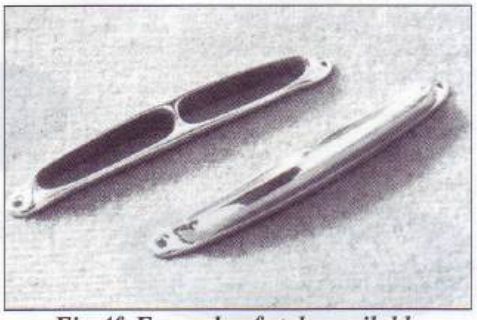

Fig.4f. Example of style available

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4.5 Windscreen Frame mounting.

The windscreen and frame assembly we supply for the Sumo is shown in fig.5a.

The bodywork has a pair of indented marks on the scuttle top to show where to make the slot for the windscreen legs as shown in fig.5b. These marks are for general guidance only and their position should be checked prior to cutting holes by offering the screen legs up to the markings.

1. When satisfied that the marks are in the correct place, drill out the slot with a drill slightly larger than the thickness of the screen legs to give adequate clearance.
2. Position the screen in the slots and ascertain the rake of the screen by making a prop of 870mm in length to go between the back of the cockpit and the centre of the screen as shown in fig.5c. The angle of the screen is important to ensure that the hood fits correctly.
3. With the windscreen at the correct angle, attach the legs to the chassis as shown in fig.5d. (This shows the mounting without the body fitted for clarity). It is possible that the slots in the chassis and the pre-drilled holes in the screen legs may not align. Simply re-drill the holes in the chassis mounting plate.
4. Fit spacers between the legs and the chassis as required.

Warning: *Do not put the glass under stress.*

5. Providing everything is fitted correctly with no stress to the body around the slots or screen frame, remove the screen, fit the escutcheon plates (Fig.5e) over the legs and re-fit the screen.
5. Attach the escutcheon plates as shown in fig.5f.

Note: The escutcheon plates will have to be sealed from the inside of the body with Polyurethane to prevent leaks. However, if you intend to have a painted finish to your car, do not seal until after it has been sprayed as the windscreen will have to be removed prior to painting.

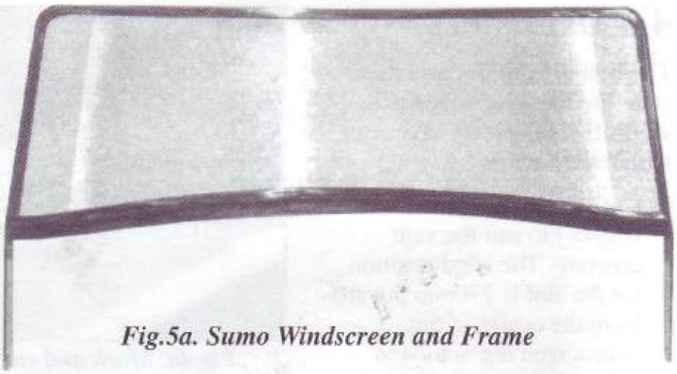

Fig.5a. Sumo Windscreen and Frame

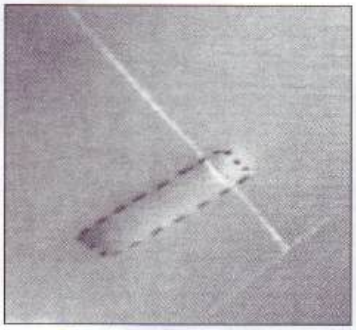

Fig.5b. Indented marks showing windscreen leg position on scuttle top

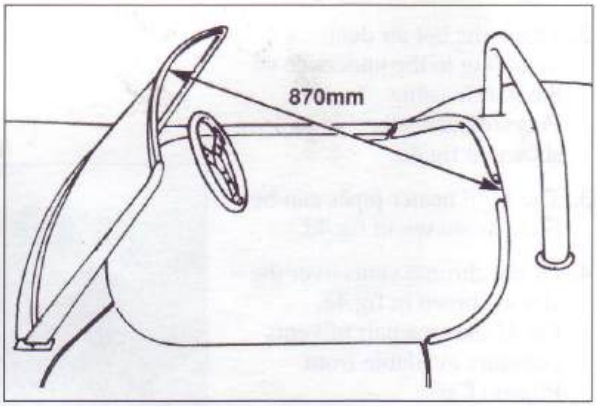

Fig.5c. Sumo Windscreen angle.
(This dimension needs to be 845mm on kits made prior to mid 1992)

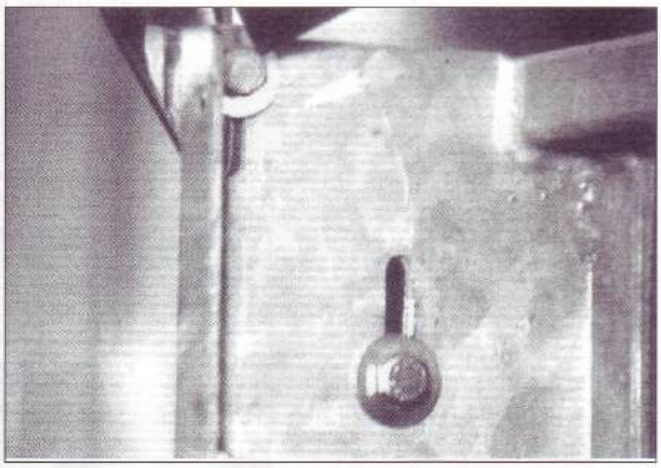

Fig.5d. Windscreen legs attached to the chassis mounting brackets

Fig.5e. Windscreen escutcheon plate

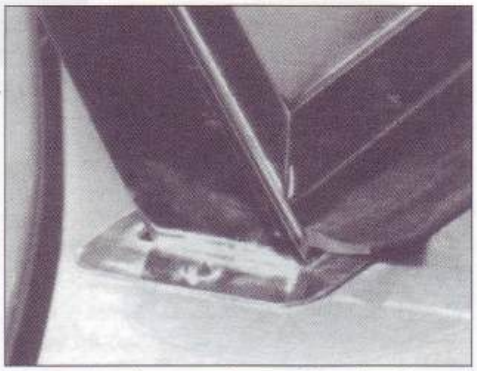

Fig.5f. Escutcheon plate fitted

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Important Notes:

Windscreen Fittings.

The bottom bracket, wind wings and sun visors are screwed into the delicate frame, behind which lies the glass. It goes without saying that if you use screws that are too long you will break the glass. To ensure that you don't break your glass in this way, you MUST double check the amount of screw thread protruding through the fitting BEFORE using them. In the case of the centre bracket and sun visors only 2mm of thread is allowable. In the case of wind wings it may be up to 8mm (the sides of the screen frames are thicker). The above measurements are applicable to Pilgrim made screens, different dimensions may apply to screens made by other companies.

Regardless of who supplied the screen or the fittings, we would like to make it clear that the builder, not Pilgrim, is responsible for checking that the screws are suitable. We will not accept responsibility for any broken glass, howsoever caused.

Spare Glass and Reglazing.

Pilgrim can supply spare glass and its rubber seal or can reglaze all popular makes of Sumo type chromium plated screen assemblies.

Handling glass.

Clearly glass is a fragile material and has to be handled with care and respect. We feel obliged to point out that once it is accepted by the customer, responsibility for breakage, howsoever caused, falls upon the customer. Pilgrim will not accept any claims for breakages after the screen has been handed over to the customer's care (accept where delivered on Pilgrim's account by courier - see below). To ensure there is never any occasion for ill feeling, we respectfully request our customers to check the glass prior to accepting it. This applies in all cases, whether it is collected or delivered by us.

Windscreen Delivery.

We have a special crate, made from fibreglass, for the transportation of our windscreens by courier. When we agree to transport a windscreen by this method, we accept full responsibility for it. If it arrives damaged we meet all the additional delivery and reglazing costs. We charge £30 for the crate and 3 times our normal delivery charge (currently £6.50) for the delivery service. The £30 for the crate is refunded upon its return. So if you order a screen to be delivered in this way, send the required amount and we arrange everything from there. When it arrives you should open the crate as soon as you can (certainly within a week) and remove the screen. If it's Ok (and about 80% are) just 'phone Pilgrim and we will arrange for the crate to be collected and returned to us. If you are one of the unlucky 20%, let us know and again we will arrange for it to be collected, then we will try again at no extra cost to yourself.

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4.6 Forward Hinging Bonnet.

The forward hinging bonnet kit comprises five brackets/hinges and all necessary fixing screws and hinge bolts as shown in fig.6a.

1. Refer to fig.6a for identification. The long bracket (item 1) is fibre-glassed centrally into the nose.
2. The two curved hinges (item 2) are the bolted to item 1 as shown in fig.6b.
3. The two brackets (item 3) are fixed to the inner moulding of the bonnet and bolted to the curved hinges as shown in fig.6c.

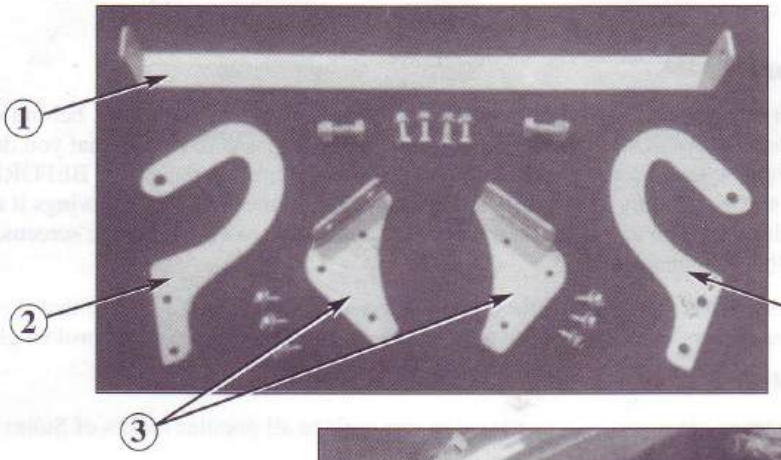

Fig.6a. Forward hinging bonnet kit.

Fig.6b. Hinges fitted to long bracket.

Bonnet Locks.

The authentic looking chrome bonnet handles, locks, striker plates and fixings are available from Pilgrim.

1. Drill holes to take the bonnet handle shaft equi-distance either side of the bonnet centre line and forward of the bonnet rear edge.
2. Fit the handle with the elliptical base parallel to the rear edge of the bonnet, mark the fixing hole positions and drill. Fit and secure the handle as shown in fig.6d.
3. Fit the cam to the handle shaft as shown in fig.6e.
4. Fit the striker plate to the scuttle as shown in fig.6f.
5. Adjust cam as necessary.

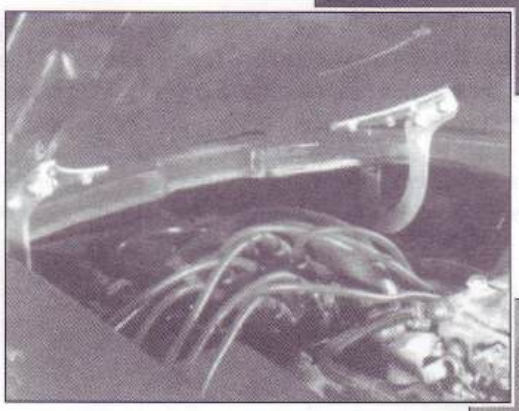

Fig.6c. Hinges and bonnet brackets fitted.

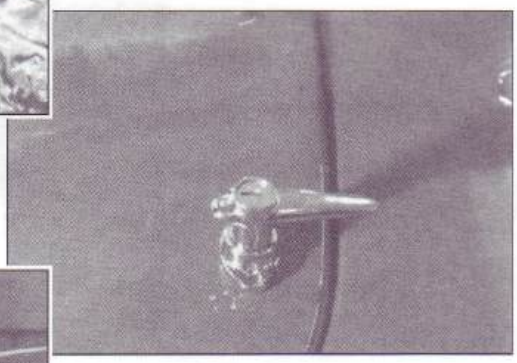

Fig.6d. Bonnet handle fitted.

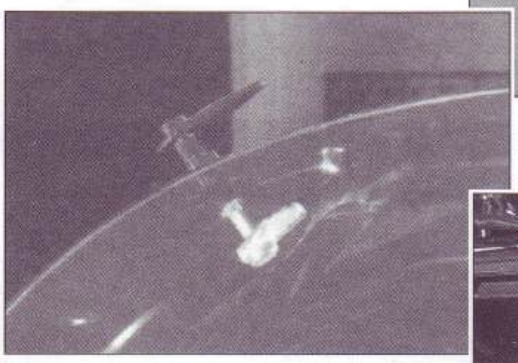

Fig.6e. Bonnet handle cam fitted.

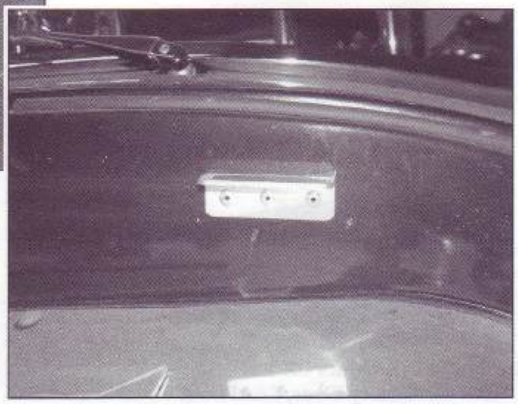

Fig.6f. Striker fitted to body.

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4.7 Inner Body Panels.

As the exact positioning of the body on the chassis is beyond the control of Pilgrim, the inner panels are moulded with excess material to allow for a certain amount of trimming. This is in order to ensure a neat and accurate fit as shown below.

The panels are fitted to the chassis with rivets and sealed with polyurethane adhesive. Where they come into contact with the body, they can be fixed with either polyurethane adhesive or fibreglass.

1. Fit the inner sill mouldings as shown in fig.7a.
2. Fit the inner rear wheel arches as shown in figs.7b and 7c. **Note**. These arches are now made 'squarer' to enable easier carpeting of the boot area.
3. Fit the optional front wheel arches as shown in fig.7d. The rivet positions have arrowed for clarity.

Check Bonnet Fit.
Prior to finally gluing the front inner wings, it is advisable to re-check the fit of the bonnet as once the inner wings have been glued, they hold the body rigidly in position.

4. When satisfied that everything has been aligned perfectly, glue the inner front wings as shown in fig.7e. Note that a prop has been used to hold the moulding against the main body tub whilst bonding.
5. Fit a sheet of plywood in the gap between the main body tub and steel bulkhead as shown in fig.7f. Seal all around the edges of the ply with polyurethane sealant.

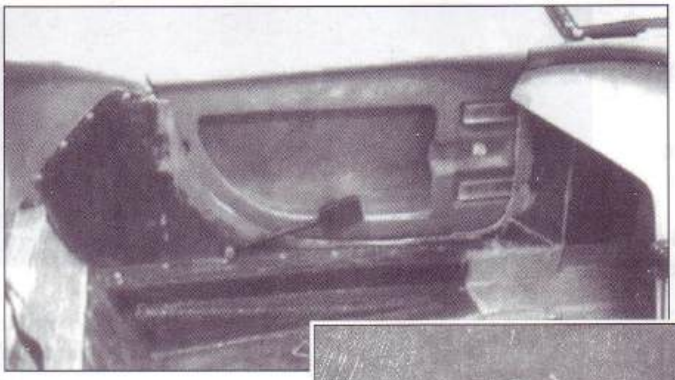

Fig.7a. One of the inner sill mouldings fitted.

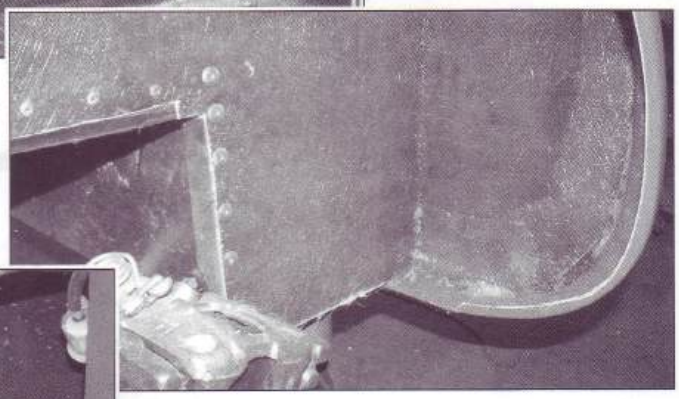

Fig.7b. Inner rear wheel arch viewed from the outside.

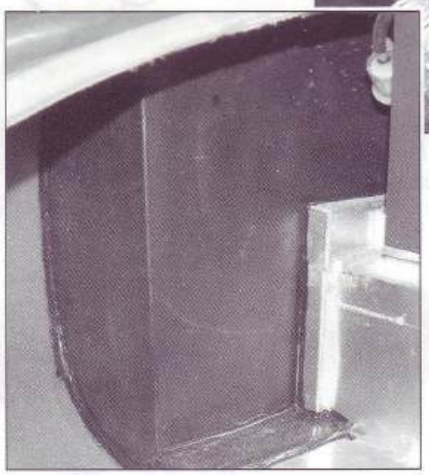

Fig.7c. Inner rear wheel arch viewed from inside the boot.

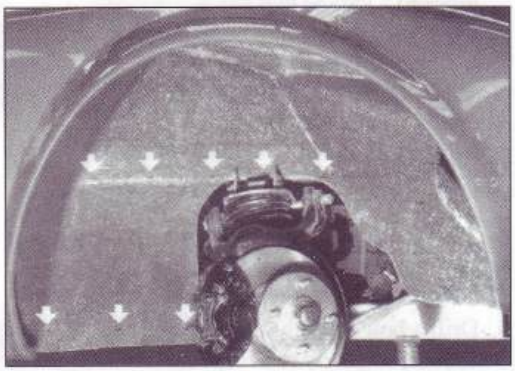

Fig.7d. Inner front wheel arch fitted showing rivet positions.

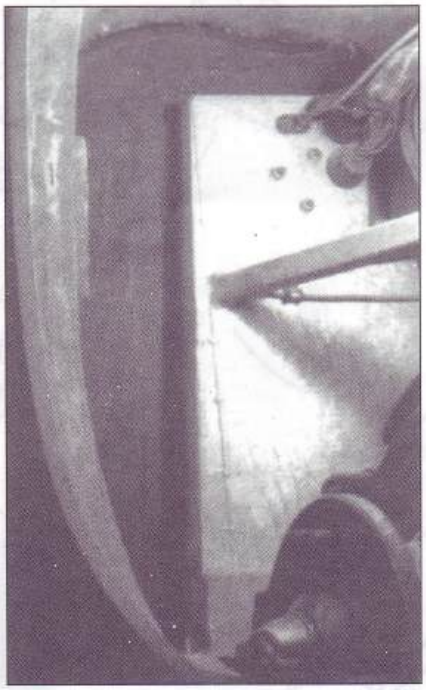

Fig.7f. Plywood sheet filling gap between main body tub and bulkhead.

Fig.7e. Inner front wheel arch being glued to the main body tub.

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4.8 Windscreen Wiper Mechanism

The wiper mechanism can either be purchased new from Pilgrim or taken from a Mini. The tube connecting the wheelboxes is shortened and re-flared to suit the Sumo wiper positions.

1. If you are starting with a used Mini mechanism (fig.8a), disassemble it as shown in figs.8b and 8c.
2. If using new components, modify as follows:-
   Cut the tube connecting the wheelboxes to 385mm as shown in fig.8d and re-flare the tube end.
3. Cut the tube from the motor to the first wheelbox to 230mm and re-flare as above.

Tip. If you do not possess a flaring tool, either take the tubes to a garage that has a large flaring tool or, alternatively, take a 6" nail, bend it, insert the point into the tube end, hold the tube firmly the rotate the nail to force a flare.

4. Re-assemble the whole mechanism as shown in fig.8e.
5. Drill a hole in each wiper arm boss on the body to accept the threaded shaft on the wheel-boxes. Insert the wheelboxes through these holes as shown in figs.8f and 8g.

   To space the wheelbox from the body, we use a slice of ⅜" heater hose cut straight at each end.

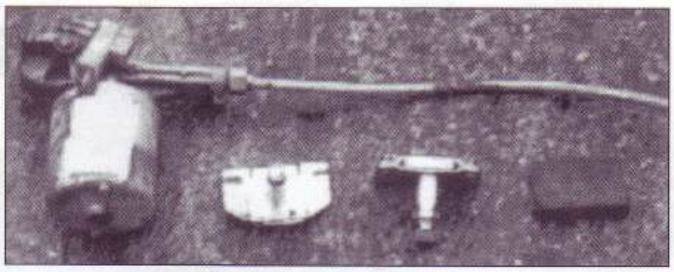

Fig.8a. Mini wiper mechanism

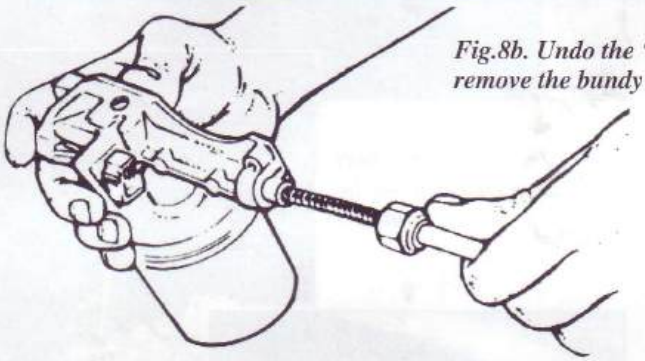

Fig.8b. Undo the 'Bundy' nut from the motor and remove the bundy tubing complete with wheelboxes

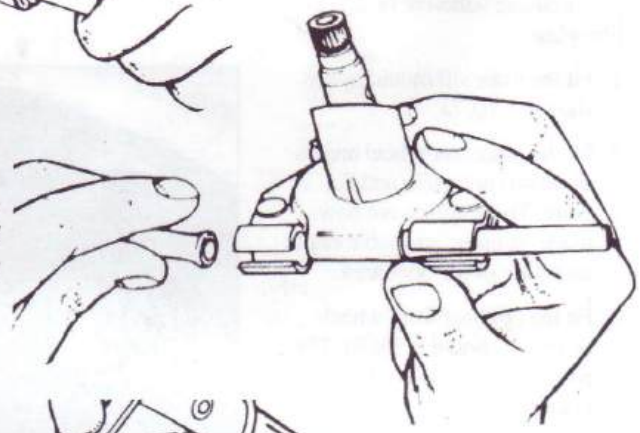

Fig.8c. Loosen wheelbox retaining nuts and remove tubing

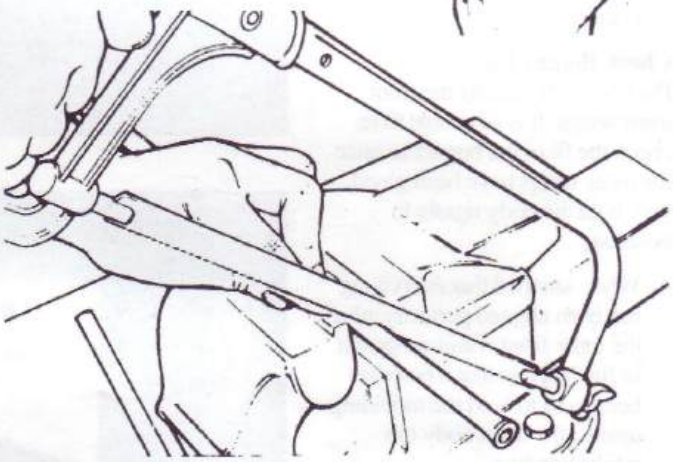

Fig.8d. Cut tubing to new lengths.

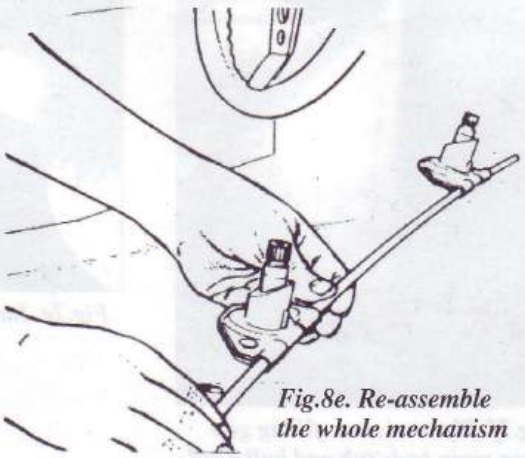

Fig.8e. Re-assemble the whole mechanism

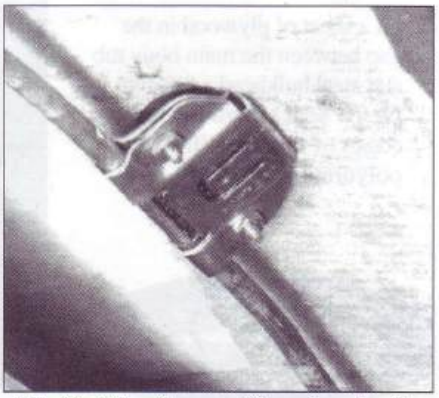

Fig.8f. Wheelbox positioned under the scuttle

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6. Secure to the body with the original nuts as shown in fig.8h.
7. Secure the motor to the upper metal bulkhead using its original metal support strap as shown in fig.8i.
8. Fit the wiper arms to the splined shaft and attach the wiper blades. Check that they rest just above the lower chrome windscreen frame when fully at rest as shown in fig.8j.
9. Fig.8k shows the expected wiper sweep with the complete system operational.

Note. We can supply short adjustable wiper arms and 10" blades. Both items are finished in bright stainless steel. They are simply 'snap' fitted. See fig.8l. We can also supply new wiper motors, wheelboxes and complete ready to fit wiper systems.

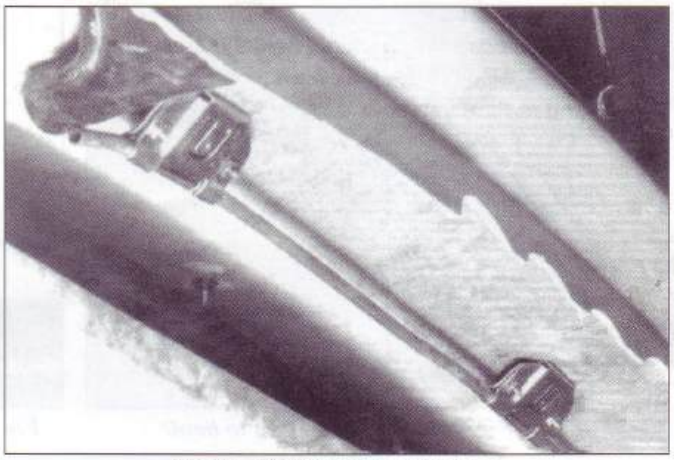


Fig.8g. Mini wiper mechanism.

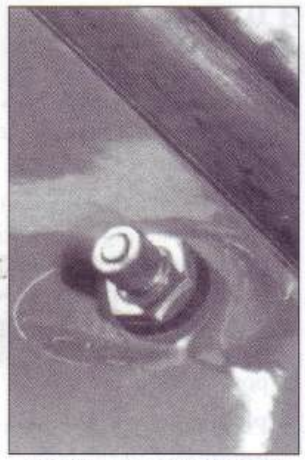


Fig.8h. Re-use original nuts to secure wheelboxes

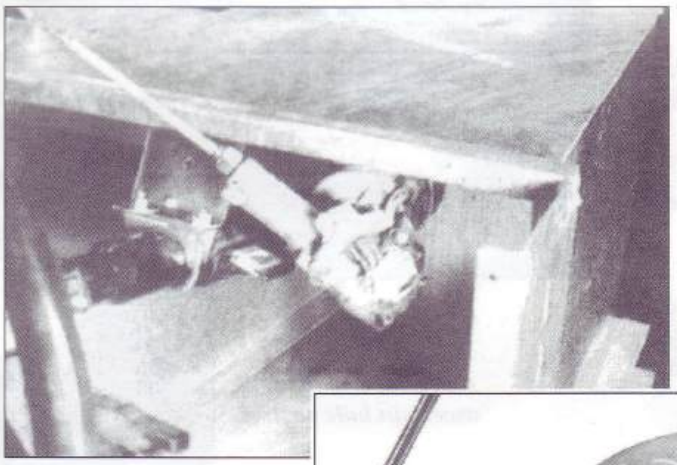
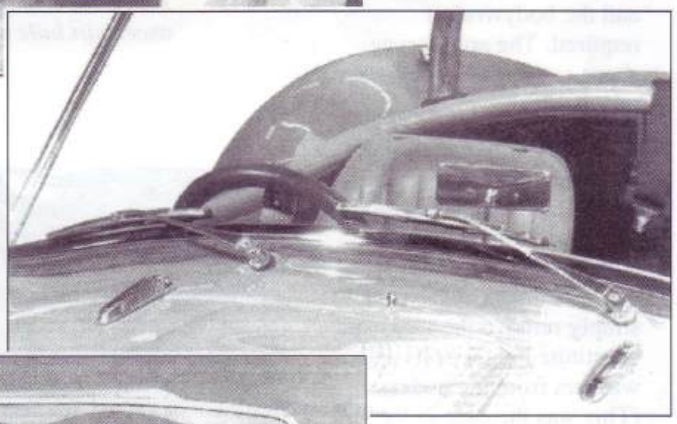


Fig.8i. Motor unit fitted.

Fig.8j. Wiper arms and blades fitted.



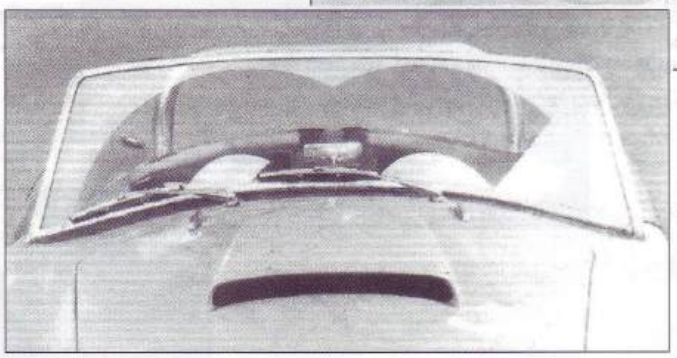


Fig.8k. Expected wiper sweep

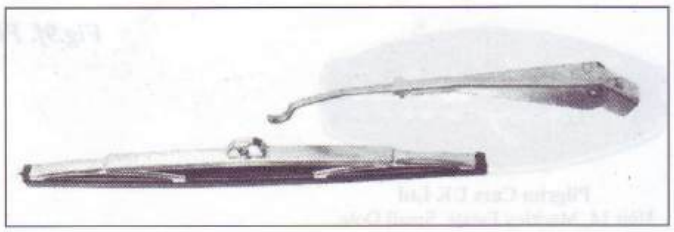


Fig.8l. Stainless steel wiper blade and arm of the type we supply.

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4.9 Boot Lid

This is hinged as shown in fig.9a using two Imp hinges and locked using a 'T' handle and budget lock.

1. Temporarily fit the boot lid in position, noting the position of the recessed detail on the inner moulding (as can be seen in fig.9b) as the hinges must be fitted at these positions.
2. Place masking tape on the top surface of the boot lid and body directly above the the recesses as shown in fig.9c.
3. Using the hinge as a guide, mark a cross on the masking tape where the stud holes need to be. (fig.9d)
4. Carefully drill out the stud holes as shown in fig.9e.
5. Fit the hinge (fig.9f) and secure with nyloc nuts and washers. A rubber gasket can be fitted between each hinge and the bodywork if required. The appropriate shape cut from an old inner tube is ideal.

Note. Because the moulding is quite thick and strong, it is possible that the studs on the hinge will not be long enough to fit nuts and washers. If this is the case, simply remove the studs and substitute longer bolts and washers from the underside (This was the case in fig.9b). The thread size is 5/16" UNF and 1/4" UNF.

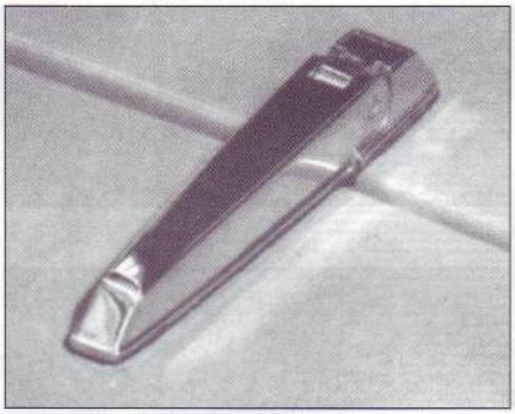

Fig.9a. Imp hinge fitted to boot.

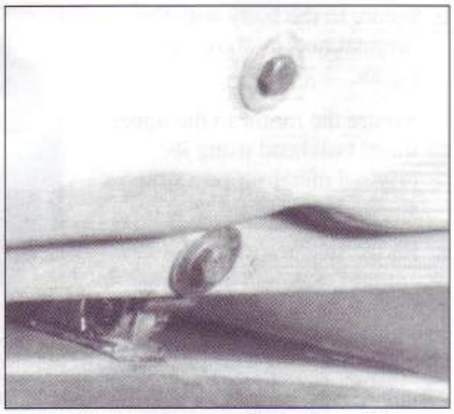

Fig.9b. Recesses on inner moulding.

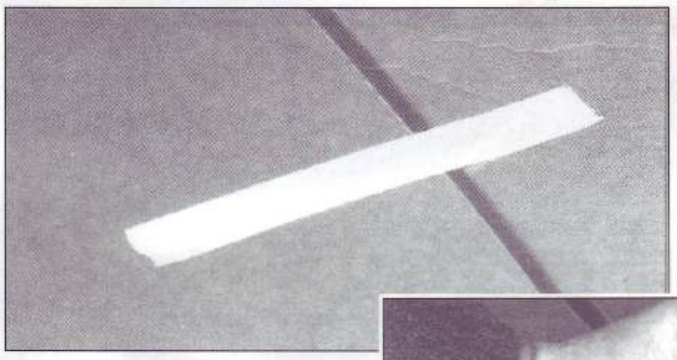

Fig.9c. Apply masking tape to mark hole positions and protect body when drilling.

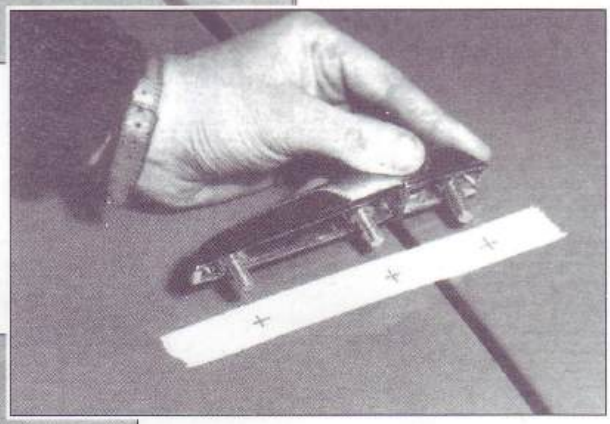

Fig.9d. Use hinge to ascertain hole centres.

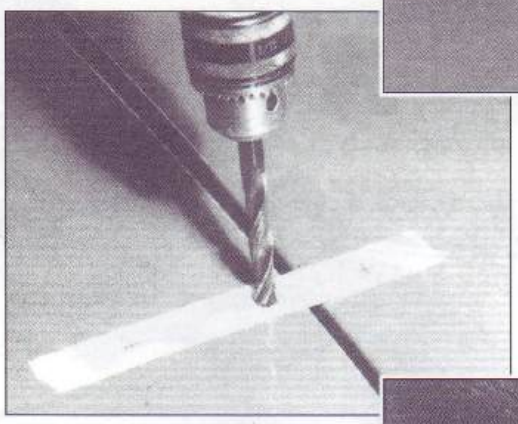

Fig.9e. Carefully drill out stud holes.

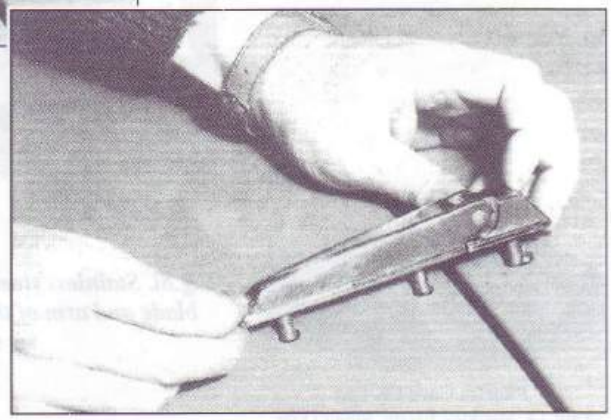

Fig.9f. Fit hinge

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6. Fit the budget lock inside the boot as shown in fig.9g.
7. Fit the 'T' handle to the outside of the boot as shown in fig.9h.

Latch Pin.

1. Fabricate a boot lock pin. A short metal bar welded to a backing plate is ideal. However, if you do not have welding facilities, an easy method is a bolt screwed into a metal backing plate as shown in fig.9i. The backing plate is bolted to elongated holes in the rear chassis cross-member.

Rubber Boot Seal.

1. In order to fit the seal around the boot edge, the downward return edge of the boot moulding (arrowed in fig.9j) must be removed.
2. Using an angle grinder (fig.9k) or a saw, carefully cut the return away and file rough edges to achieve a smooth lip.
3. Fit the seal (fig.9l). Start at a central position either at the top or the bottom of the boot reveal and work round the edge pushing the seal fully home especially into the corners. When you end up at the start position, cut the seal slightly over long and push in to form a tight but joint.

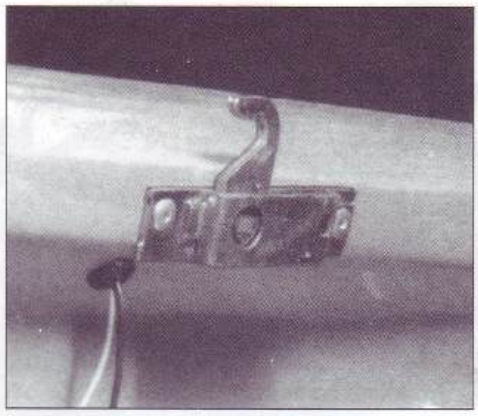

Fig.9g. Budget lock fitted.

Fig.9h. 'T' handle fitted.

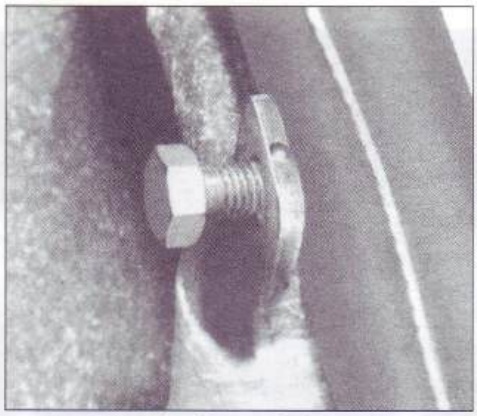

Fig.9i. Latch pin.

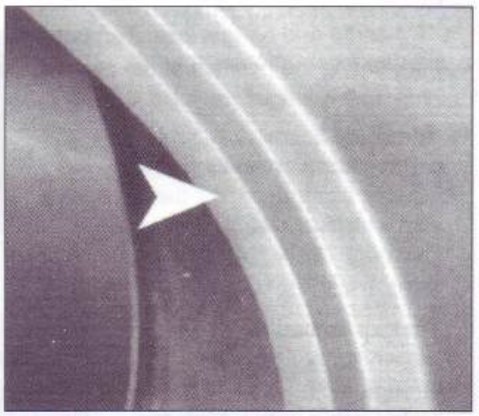

Fig.9j. Remove this return as arrowed.

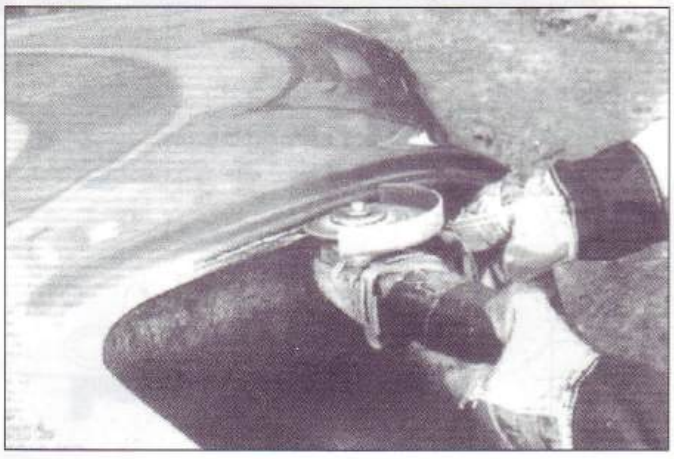

Fig.9k. Using an angle grinder to remove unwanted boot reveal return edge.

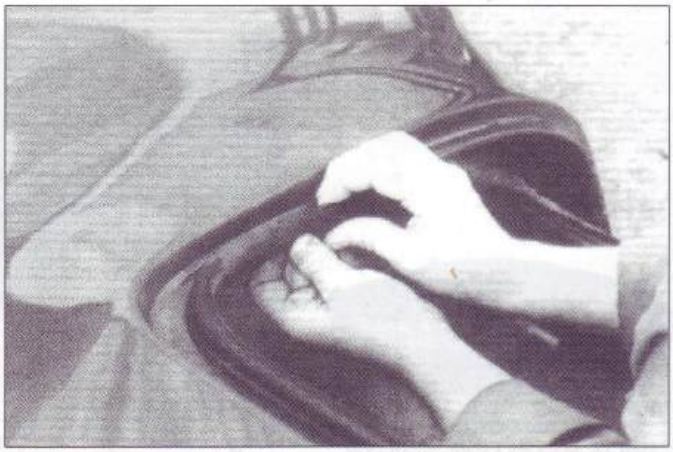

Fig.9l. Fitting the seal to the boot edge.

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4.10 Roll-over Bar.

The full width roll-over bar is shown in fig.10a.

1. To fit the bar you will need to carefully cut two holes in the body directly above the mounting spigots. Start with relatively small holes and gradually enlarge them ensuring they are centrally above the spigots. Do not worry if they are a little oversized as the escutcheon plates will cover any small errors (up to about 10mm).
2. Fit the 'legs' onto the spigots as shown in fig.10b and 10c.
3. Adjust the height of the roll bar to give a distance of 215mm from the top of the rear scuttle moulding to the underside of the roll-over bar as shown in fig.10d.
4. The gap around the roll-over bar where the legs go through the body can be sealed either with a Mini fuel tank grommets as shown in fig.10e or stainless steel escutcheon plates as shown in fig.10f.

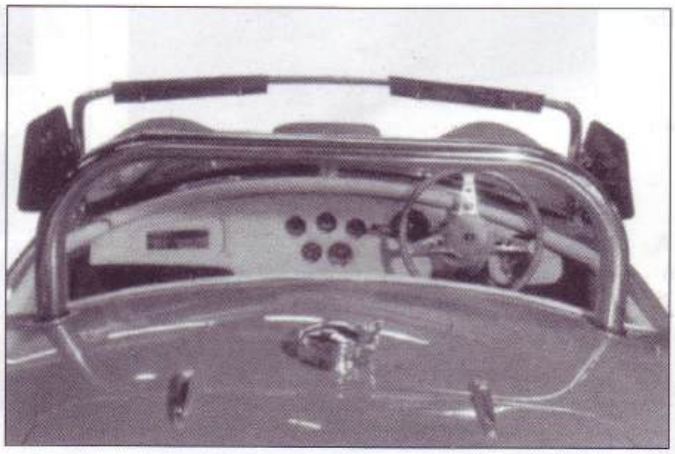
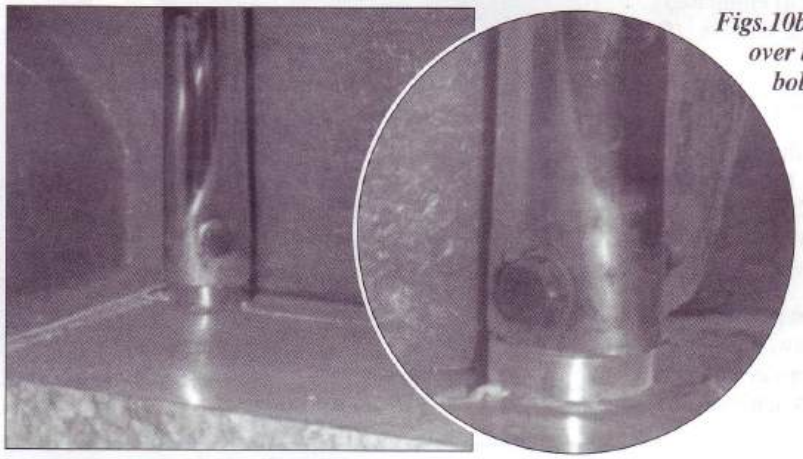


Fig.10a. Roll-over bar fitted.



Figs.10b and 10c. Roll-over bar securing bolts.

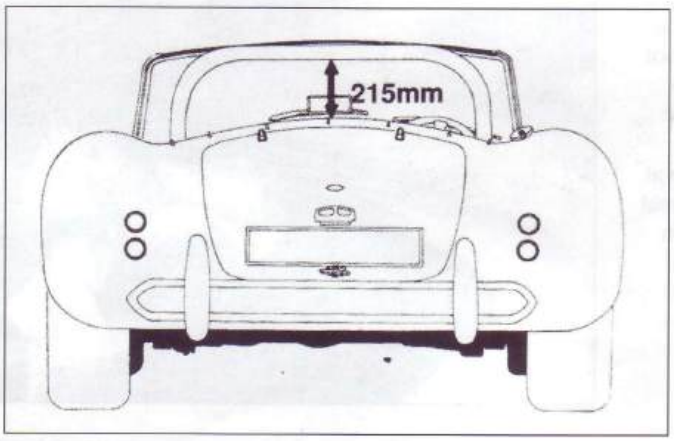


Fig.10d. Diagram showing roll-over bar height.

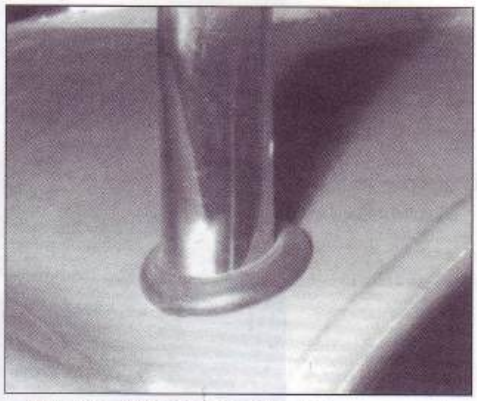


Fig.10e. Mini fuel tank rubber grommet

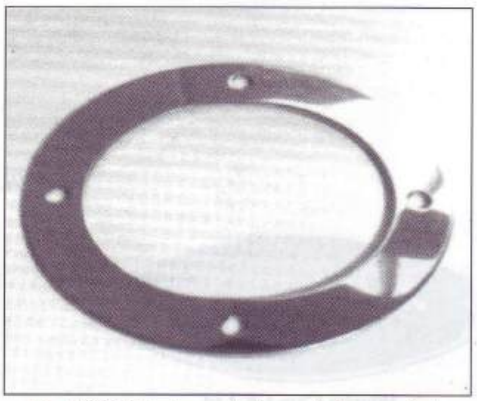


Fig.10f. Stainless steel escutcheon plate.

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4.11 Fuel Filler.

Our fuel filler caps and bases as shown in fig.11a,11b and 11c. They have been exclusively manufactured for Pilgrim with a spigot to fit a 54mm i.d. tube and are far superior to those without spigots.

Also available is a special filler base with a restrictor for lead free petrol. These are required on all cars fitted with a catalytic convertor

1. Cover the filler neck of the fuel tank with masking tape to prevent swarf entering.
2. The fuel filler cap is mounted on the rear bulkhead as shown in fig.11a. To ascertain its position, mark the exact centreline of the body on masking tape where the cap is to be fitted. Measure the distance from the forward edge of the boot reveal to the tank neck. Transfer this dimension to the rear scuttle top and add half the diameter of the tank neck. Mark this position on the centreline. This will be the centre of the hole directly above the tank neck.
3. Drill a small hole at this point to accept a thin rod or knitting needle. Push the rod **vertically** downwards until it rests on the masking tape covering the tank neck. Check that the rod is in the centre of the neck. Drill the large hole for the base spigot.
4. Remove any masking tape, fit the 54mm i/d hose and 'loose' Jubilee clips to the tank neck. Push the filler cap base spigot over the hose and fasten the Jubilee clips as shown in fig.11d. Fix the base to the body.
5. Screw on the cap to prevent dirt entering the tank.

Fig.11a. Cap and flanged base fitted.

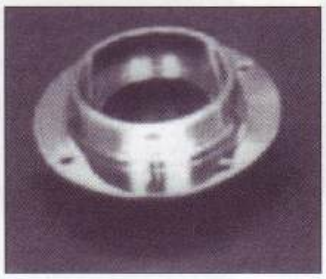


Fig.11b. Flange base - top view

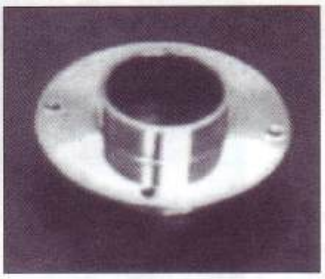
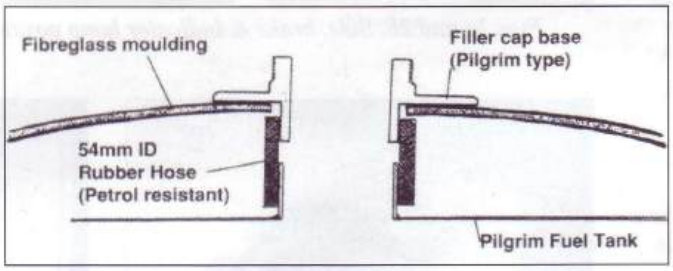


Fig.11c. Flange base - bottom view



Above: Fig.11d. Flange and tank connection

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5.1 Ignition Coil and Module.

Not all engines have an associated ignition module but if required, it should be fitted in the engine compartment as shown in figs.1a (Rover) and 1b (Ford).

Please note that older Ford engines and older American engines do not have an ignition module Later Ford engines have complex EFI computers which have to be fitted inside the bulkhead.

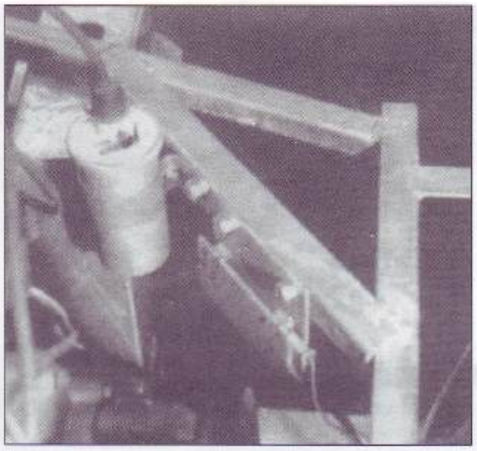


Fig.1a. Rover ignition module.

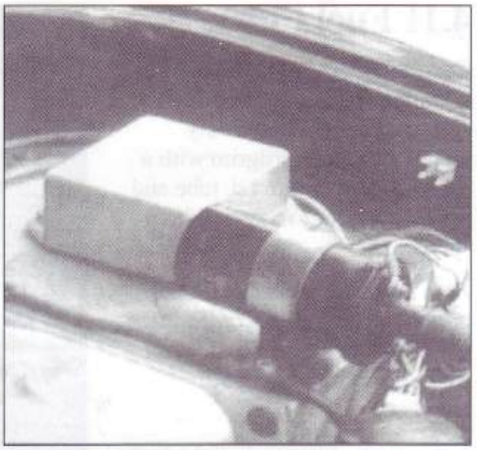


Fig.1b. Ford ignition module.

5.2 Lamp Units.

Side, Brake and Indicator Lamps.

1. These lamps should be positioned as shown in figs.2a and 2b. The hole centres are pre-marked on the body shell. Drill out the required 25mm diameter holes using a hole cutter/tank cutter. Fit the bulb holder as shown in fig.c.

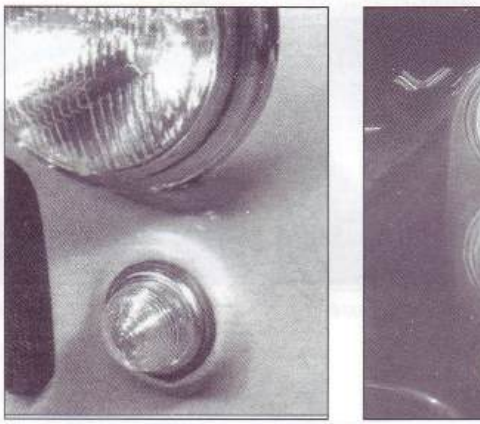
Number Plate Lamp.

2. Fit the number plate lamp to the raised mounting on the boot lid as shown in fig.2d.

Each of these small lamp units will require an earth wire running from the bulb holder to a convenient point on the chassis as shown in fig.2e.

Reflectors.

The reflectors have a stud on their rear. Drill a small hole in fibreglass and tap a thread or simply 'screw' the reflector into the hole and apply glue to prevent them working loose.



Figs.2a and 2b. Side, brake & indicator lamp positions.

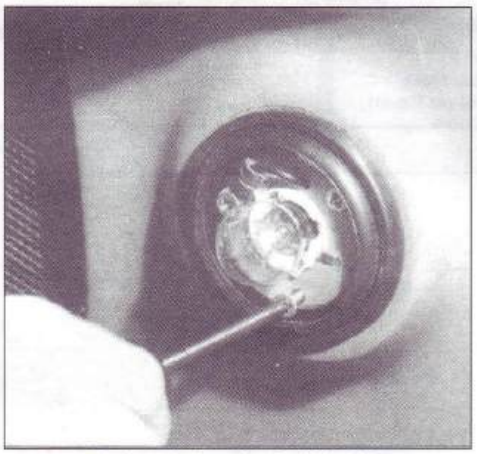


Fig.2c Fixing the bulb holder.

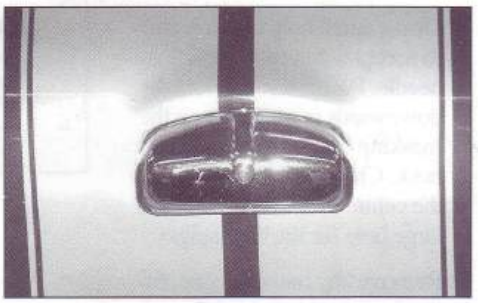


Fig.2d Number plate lamp position.

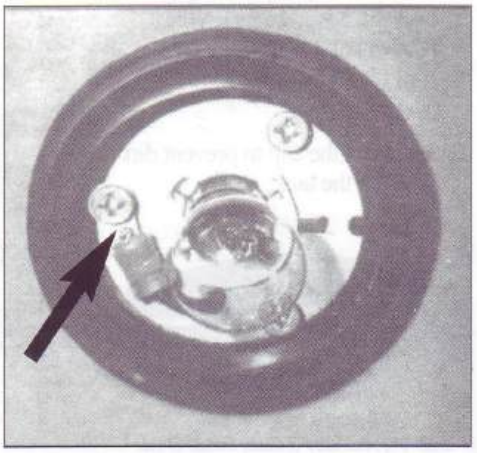


Fig.2e Earth return connection to chassis as required for all small lamps.

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Headlamp Units.

1. The best method of cutting out the headlamp holes is with a jigsaw. First, mark out a circle on the body moulding the diameter of the headlamp backing bowl. Drill a 'starting hole' slightly larger than the jigsaw blade well inside the circle. Using the jigsaw, cut from this hole outwards in a smooth curve (fig.2f) until you meet the marked circle. Continue to cut around the circle.
2. Cut out two notches for the adjusting screws in the 9 o'clock and 12 o'clock position as shown in fig.2g.
3. Fit the headlamp bowl with the rubber gasket next to the body and secure with self tapping screws or rivets.
4. Connect the harness into the headlamp bowl assembly. The sealed beam unit, side lamp and bezel are then fitted as shown in fig.2h.

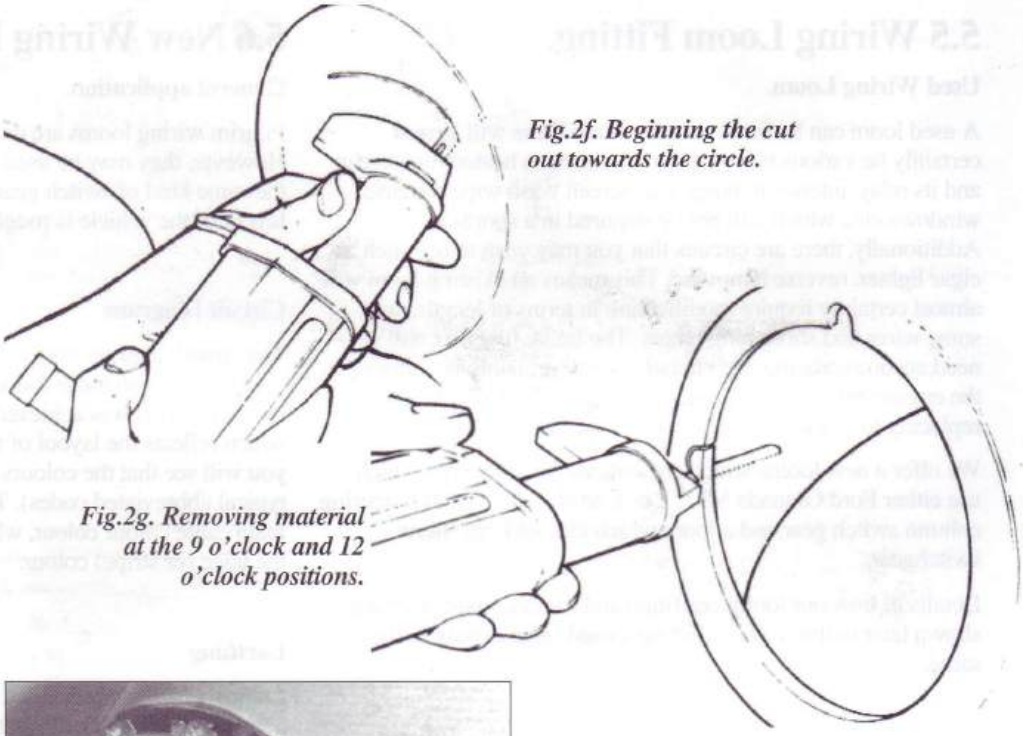


Fig.2f. Beginning the cut out towards the circle.

Fig.2g. Removing material at the 9 o'clock and 12 o'clock positions.

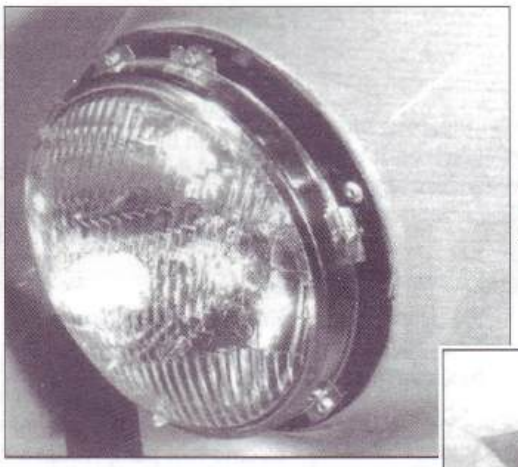


Fig.2h. Headlamp bowl and sealed beam unit fitted.

5.3 Battery.

1. Fit battery into recess and secure with a battery clamp as shown in fig.3a. Position battery offset towards the drivers side sufficiently to allow space for washer bottle.

5.4 Washer Bottle.

1. Fit washer bottle and motor in recess next to battery.
2. Fit a double washer jet to the centre of the scuttle top as shown in fig.4a. Attach tubing to its underside and connect to washer bottle motor via pre-drilled holes in the chassis. Where tubing passes through metal panels you must use grommets.

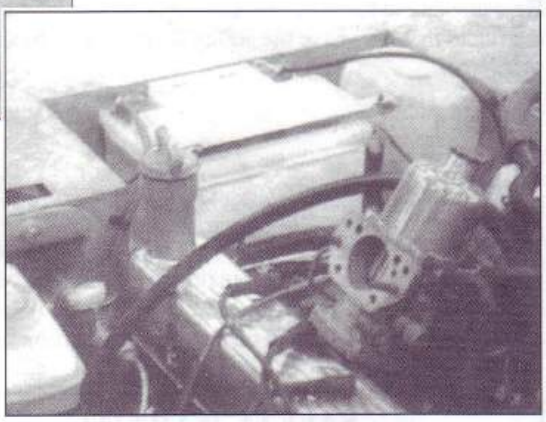


Fig.3a. Battery fitted offset to allow for washer bottle.

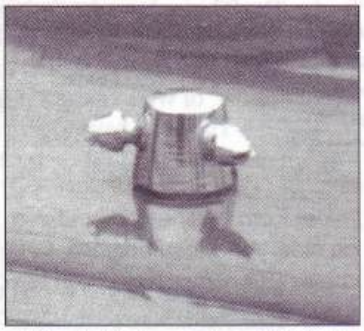
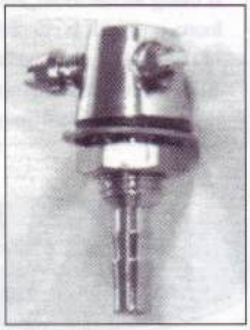


Fig.4a. Twin washer jet fitted



Figs.4b and 4c. New windscreen washer systems and jets of the type we can supply.

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5.5 Wiring Loom Fitting.

Used Wiring Loom.

A used loom can be fitted into the SumoThere will almost certainly be various electrical circuits such as heated rear screen and its relay, interior lighting, rear screen wash wipe, electric windows etc., which will not be required in a sportscar. Additionally, there are circuits that you may wish to use such as cigar lighter, reverse lamps etc. This means an existing loom will almost certainly require modification in terms of lengthening some wires and shortening others. The bulky fuse box will also need accommodating and alterations will probably be required to the engine wiring. Some plugs on the loom will also need replacing to fit the Mini heater and wiper motor etc.

We offer a new looms which are suitable for all Sumos which use either Ford Granada Mk1, 2 or Cortina Mk3, 4 and 5 steering column switch gear and a loom which utilises Ford Sierra switchgear.

Details of how our looms are fitted and the circuit diagram are shown later in this section. Fitting a used loom is basicly the same.

Wiring Problems

It is very difficult to offer technical support on wiring, even more difficult when the loom is not manufactured by ourselves. If you decide to re-use a donor car loom you will have to solve any technical problems yourself. Naturally we will help where we can, but such available help is very limited.

Customers who are in any doubt about their ability with electrical circuits and wiring are advised to purchase a new loom. Re-using an old loom is only advisable for those who are confident that they have the ability to overcome the inevitable problems.

Safety

Please read the warning printed below.

We cannot stress the importance of ensuring that the wiring is properly installed and working correctly. This is because the consequences of an electrical short circuit are far more severe in a fibreglass bodied car than on a normal production model.

SAFETY WARNING

If using an old loom, ensure it in good condition. When fitting any loom, ensure it is correctly tied at regular intervals so that no part of the loom is able to chafe against metal components. Check that all terminations are insulated and that no exposed wire is visible. Where wires pass through metal panels, ensure a grommet is used

5.6 New Wiring Loom.

General application.

Pilgrim wiring looms are designed for use in Pilgrim kit cars. However, they may be used in other similar vehicles providing the same kind of switch gear is used and that the dimensions and layout of the vehicle is roughly the same.

Circuit Diagram

The circuit diagram for the Pilgrim loom is very clear (by comparison with those found in production car workshop manuals). This was achieved by drawing the diagram in a way which reflects the layout of the car. When following the diagram, you will see that the colours are marked in full (rather than the typical abbreviated codes). The first mentioned colour is the main cable colour colour, whilst the second mentioned colour is the trace (or stripe) colour.

Earthing

Looms which are manufactured for metal bodied cars do not need an earth circuit within the loom (because the body of the vehicle is used instead). The Pilgrim loom has a separate earth circuit which has four connection points to the chassis. One of these is in the cockpit area near the steering column, one is in the boot and the others are in the engine bay on either side of the engine. This earth circuit makes the installation of the Pilgrim loom into a fibreglass body particularly easy.

Loom Specification.

Apart from all the essential circuits, the Pilgrim loom provides for side repeater indicators, rear fog lamps, reverse lamp, hazard warning, delayed windscreen wipers, electric cooling fan, electric fuel pump, radio and electronic oil pressure sensor. If you do not need or wish to use any of these additional functions, you simply ignore those terminals on the loom. However, we suggest that you leave them in situ in case you wish to use them in the future.

The loom does not have provision for automatic gearbox inhibitor switches or for electronic ignition. These functions can be added by the customer as required.

Switchgear.

The Pilgrim loom has been made to plug into Ford steering column mounted switches. The switches used are from the Ford Sierra 1987 onwards. You must cut off switch plugs, leaving at least 4" of wire, from your donor as we can no longer buy these new. They will have to be joined onto our loom with solder and tape. The wiring instructions are supplied with your loom.

Engine Connections.

Each kind of engine is slightly different in so far as its electrical connections are concerned. The starter motor can be on either side, whilst sensors for oil pressure and water temperature can be

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almost anywhere. It would not be practical for us to design, manufacture and stock a separate loom to suit each engine type. Instead we make all the wires for the above functions (5 in all) long enough to reach anywhere in the engine compartment. When the loom is installed the wires are trimmed back and terminated with the connectors which are supplied loose with the loom. The installation instructions detail exactly how this is done.

The alternator is situated on the offside of all Pilgrim recommended engines. These are Ford 1600, 2000cc Pinto, Ford 2300, 2800cc Cologne V6, Ford 2500, Rover V8 and Chevrolet 5.7 V8. The loom is made to accept a Lucas type alternator as fitted to most Sierras and Granadas. If you use any other type of alternator you will need to change the plug on the loom to suit. If you use an engine with a nearside alternator, you will need to convert the loom to suit.

Installation Instructions

General notes.

Disconnect the battery until after the loom is installed. Ensure that the loom is protected from chaffing against any sharp or rough edges. When wires are passed through holes you must use a grommet to protect them, this also neatens the appearance of the installation.

Loom Positioning.

1. Drape the cockpit portion of the loom over the steering column, such that the two spurs holding the special black Ford multi-plugs straddle the steering column. These multi-plugs are plugged into the rear of the switches as shown in fig.6a.

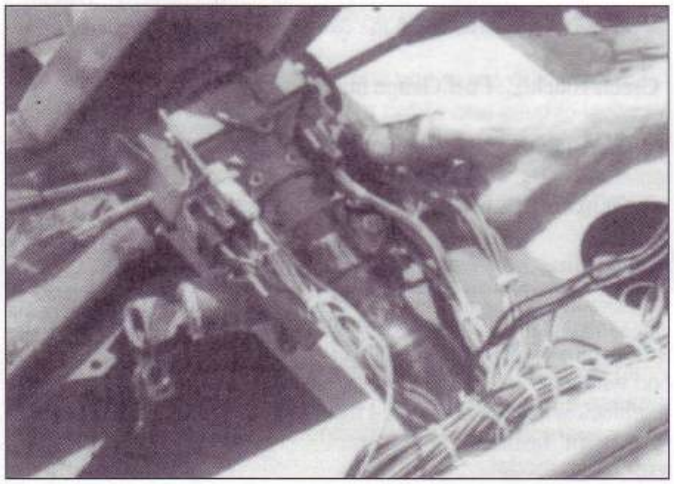

Fig.6a. Loom plugged into the column switches.

2. Affix the 4 relays to a convenient point on the offside bulkhead, then attach the fuse box next to it as shown in fig.6b.

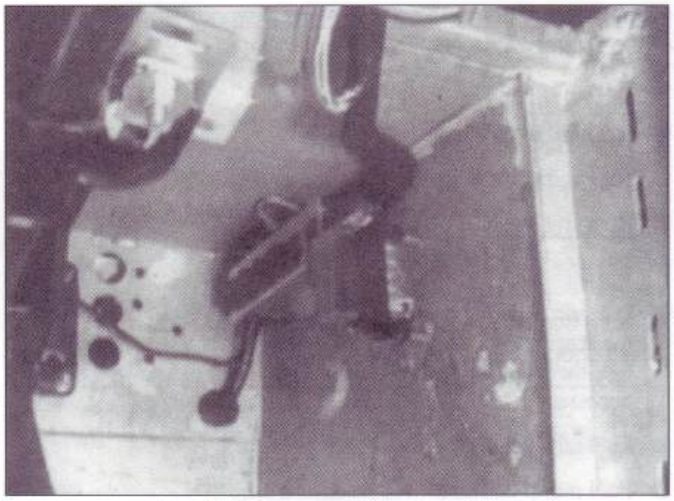

Fig.6b. Relays and fusr box fitted.

3. Drill a hole through the offside front bulkhead large enough to pass the front section of the loom into the engine compartment.
4. Route the loom down the offside chassis rail as shown in fig.6c, then across to the nearside in the vicinity of the front of the engine then back down the nearside chassis rail toward the nearside bulkhead.

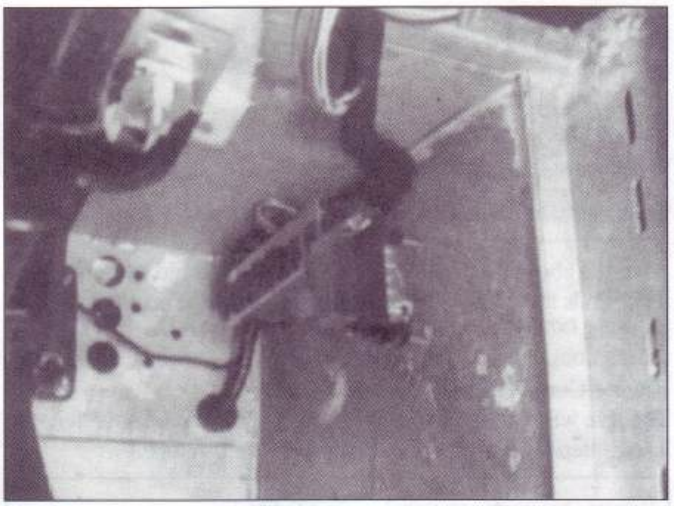

Fig.6c. Wiring routed down chassis rail.

5. The rear section of the loom is routed down the offside of the chassis into the boot area. The two 'bunches' of wires should end up in the two rear corners in the vicinity of the rear lamps.

Now that the loom is in position, it is possible to connect the majority of its fittings as follows.

Main Loom Connections.

The main loom connections can be made easily and with little chance of error or confusion. Simply look at the fitting you wish to connect and then seek its wire from nearby in the loom. To confirm you have the correct wire, you should check its colour against that marked on the circuit diagram.

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Pilgrim Sumo Construction Manual

Section 5 Electrical Installation

For the sake of convenience, we suggest working from the rear of the car, forwards as follows:-

- Rear stop lamps.
- Rear tail lamps.
- Rear indicator lamps.
- Rear fog lamp (if fitted).
- Reverse lamp (if fitted).
- License plate lamp - this can be connected from the point at the rear / centre of the boot or at the point offside of the boot. Use the most convenient place and an extension wire if necessary.
- Fuel tank sender (via an extension wire).
- Fuel pump (if fitted - via extension wire).
- Heater.
- Windscreen wiper motor (5 pin plug).
- Stop lamp switch.
- Side repeater indicators (if fitted).
- Coil.
- Windscreen washer motor.
- Headlamp sub-harness.
- Front indicators
- Horn
- Electric fan switch (if fitted).
- Electric fan (if fitted)..

After the above connections are made there should be very few loose ends to tie up, these being dealt with in the next few sections.

Engine Connections.
The five wires which connect to the engine are made overlength. Their intended destinations and colours are listed below:

Brown (heavy gauge wire)	Starter
White/Red	Starter Solenoid
Green/Blue	Water Temperature Sender
White/Brown	Oil Pressure Switch
Red/Green	Oil Pressure sender

The oil pressure sender will not normally be fitted to the engine. It is only required if you are using an electronic oil pressure gauge (like the ETB units Pilgrim offer for sale).

In addition to the above connections, a wire (white/black) needs to be connected from the ignition coil to the distributor. If a ballast resistor is employed, another wire (white/green) is connected from the ignition coil to the starter motor as shown on the circuit diagram. These lengths of wire are supplied loose with the loom.

If your engine is equipped with any type of electronic ignition module, you will have to connect the necessary additional wires to the loom.

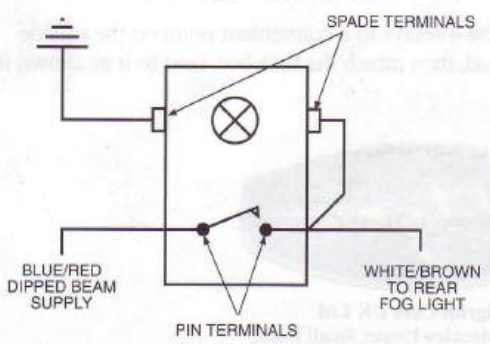
Once all the wires have been shortened (where necessary) and connected to the engine and any additional wiring which is required by your particular engine type has been added, you can cable tie them into the main loom and cover the exposed wires with loom tape.

Instrumentation.
The Pilgrim loom has an 8 way terminal block which is situated behind the centre of the dashboard. This terminal block contains all the wires for the instruments as follows:-

Red/Black	Instrument illumination lamps - Connect to every instrument.
Black	Earth - Connect to all illumination lamps and to the earth terminals of most instruments.
Green/Purple ...	Clock and Radio - This one is fused but permanently live so not switched by the ignition switch.
White	Live feed for instruments (Rev counter, Volt meter, Fuel and Temperature Gauges) - This is live when the ignition is switched to position 2.
Green/Black	Fuel Gauge input.
White/Black	Rev Counter (Pulse type) input.
Red/Green	Oil Pressure (Electronic type) input.
Green Blue	Water Temperature input.

To connect these functions you simply run a length of wire from the terminal block to the gauge in question and terminate each end with the appropriate kind of terminal. The white , black and red/black wires are connected from one instrument to the next in 'ring main' fashion.

Rear Fog Light Switch



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Section 6 Trimming and Finishing

6.1 Carpet Set.

The cockpit carpet comes in several pieces. all exposed edges are professionally bound. The carpet is held in position using contact adhesive. First stick the two long thin sections of carpet over the main inner chassis rails as shown in fig.1a. Then drape the two transmission tunnel pieces over the tunnel as shown in fig.1b. Fit the side pieces as shown in fig.1c. The floor pieces can then be fitted into the floor wells - fig.1d.

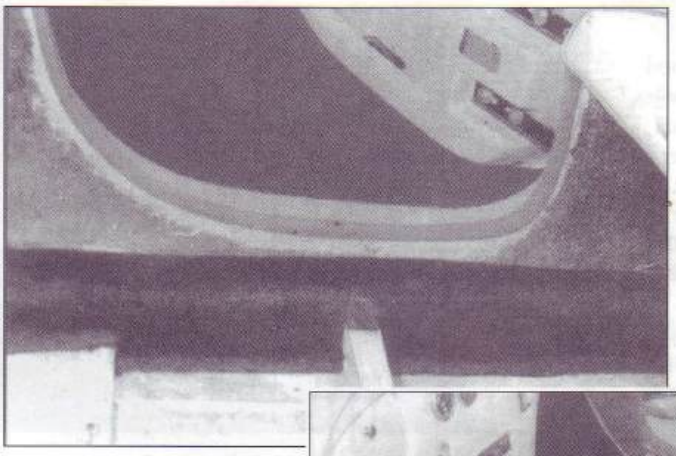

Fig.1a.

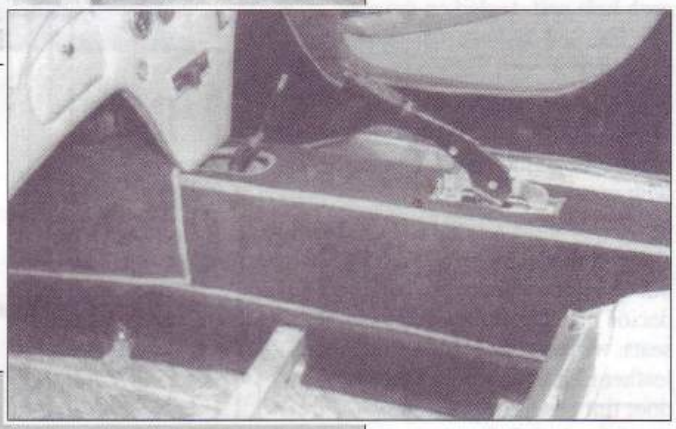

Fig.1b.

When the carpet pieces overlap, the visible edge is always a bound edge. The covered edge is not always bound.

The rear carpet section is per fig.1e and the remaining two rectangular pieces are stuck onto the front bulkheads on each side of the car (not illustrated).

Boot Carpet. We offer a boot carpet to those who wish to trim their boot. It comes in two pieces.

Please note. We have over the years made several subtle changes to the chassis of our Sumo. The carpet set we sell should exactly fit the current kit we supply. If you purchase a carpet set and find that it requires a slight alteration to fit an earlier chassis (or for any other reason), we shall be happy to re-bind the edges around such alterations and at the same time supply small pieces of carpet to 'fill' the gaps (if this proves necessary). We are happy to do this at no extra cost but we will expect the customer to pay for postage. We hope that you can see that it would be totally impractical to keep separate patterns for all carpets covering the many minor changes which have been made.

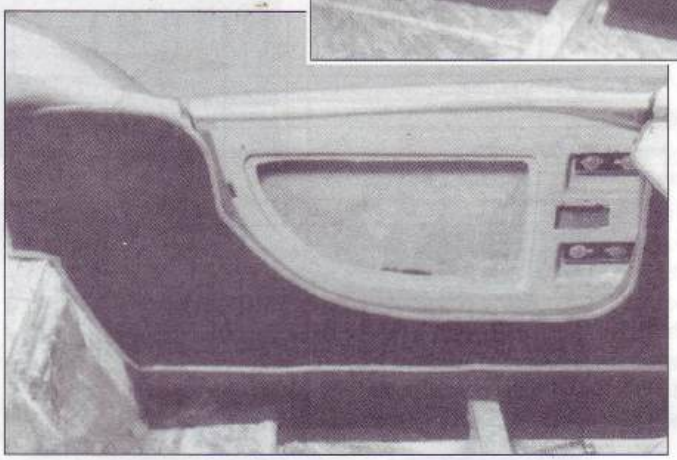

Fig.1c.

Please note that some of the above picture sequences show our Cortina based car. The Granada based version is similar.

Fig.1d.

Fig.1e.

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6.2 Dashboard.

We sell a dashboard blank wood panel. You will need to drill holes for the Mini heater, instruments and glove compartment. Cover the whole dashboard in fabric. We place sponge between the fabric and the wood because this adds a quality feel to the finished product. The fabric is pulled around the wood and stapled on the rear, it is also pulled through each hole and stapled on the rear. The finished dashboard is shown in fig. 2a.

Fig.2b shows our glove compartment moulding fitted behind the dashboard. It can fixed with screws, rivets, glue or Sikaflex.

We supply vinyl fabric to match our Cobra style seats. If you decide on using our original style seats, we can supply matching leather for the dashboard and door tim panels or you can purchase them fully trimmed.

The new GRP SVA dashboard can be also supplied.

Note. When we make a dashboard in the factory, we fit the fixing screws before we cover the dash and lock them up with nuts. We then drill holes in the body lip so that when the dash is covered, the screws can be passed through the holes and secured with nuts so that no fixings show.

Fig.2a. Dashboard fitted

Fig.2b. Glove box fitted

6.3 Steering Column Covers.

Both the steering column covers need to be slightly trimmed to fit. Fig.3a shows the covers fitted and indicates the lower cover trimmed area.

Fig. 3b shows before and after trimming of the top cover.

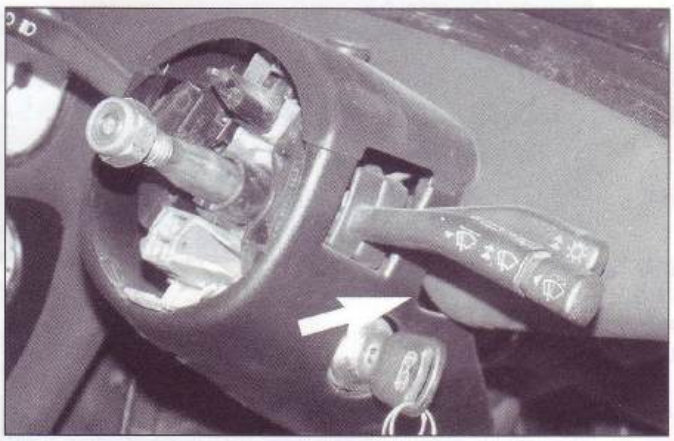

Fig.3a. Cowls trimmed and fitted

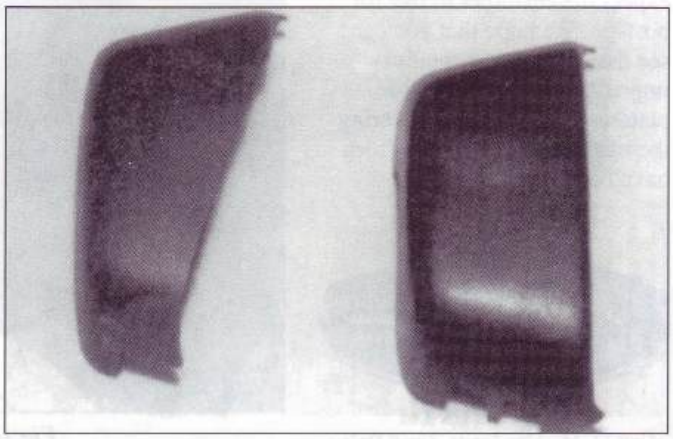

Fig.3b. Top cowl before and after trimming

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Section 6 Trimming and Finishing

The steering wheel can now be fitted as shown in fig.3c.

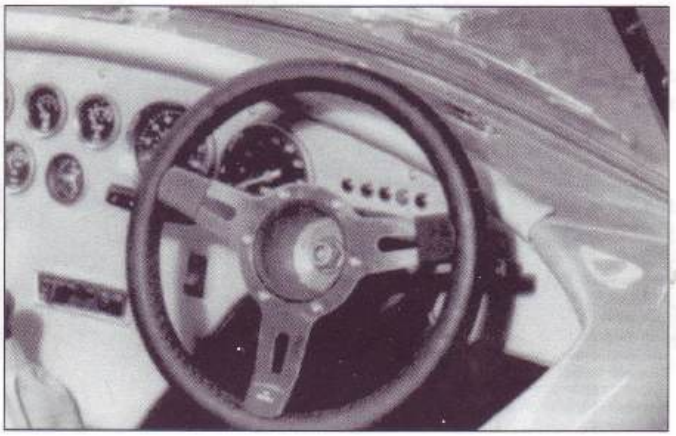

Fig.3c. Steering wheel fitted

6.4 Handbrake and Gearstick gaiters.

1. Fit the handbrake and gearstick gaiters as shown in fig. 4a and 4b.

Note. Do not use long self tapping screws at the rear of the handbrake gaiter because they could foul the handbrake cable and fail the SVA test.

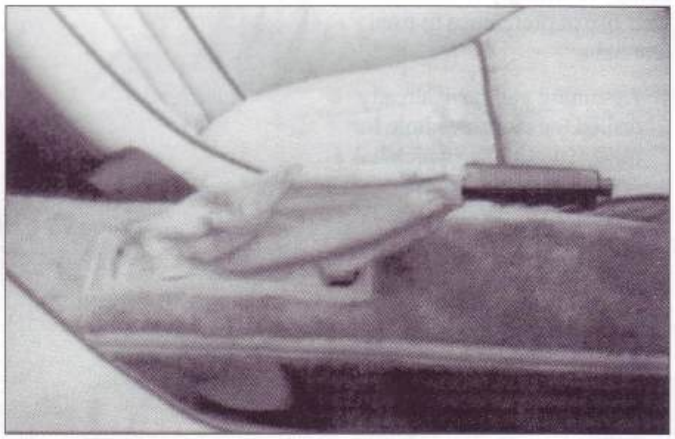

Fig.4.a. Handbrake gaiter fitted

6.5 Door trim panels.

1. Secure the panel to the inside of the panel as shown in fig.5a.

We can supply the wood panels for the door trims. The fabric is stretched over these panels and stapled on the rear. A layer of foam between the wood and the fabric adds a quality feel. The door pockets are easily made by stitching a 20mm hem along one edge of cloth an inserting a length of 12mm elastic. The cloth is gathered over the elastic and the stapled to the inside of the wooden trim panel.

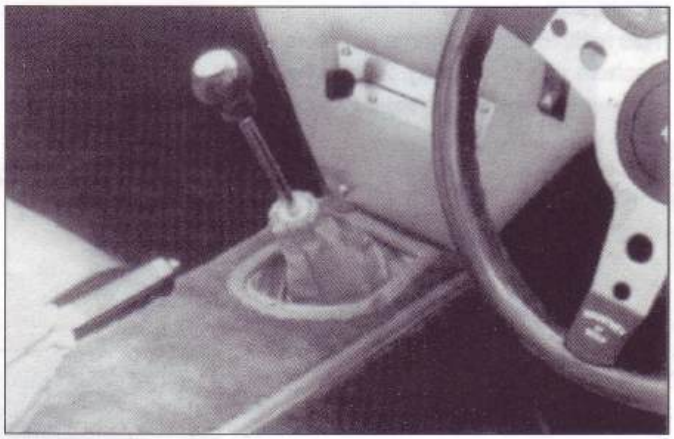

Fig.4.b. Gearstick gaiter fitted

Fig.5a. Door trim panel fitted.

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Section 6 Trimming and Finishing

6.6 Seat belts.

The mounting positions can be seen in the chassis photos in the beginning of Section 3.

Note. The upper seat belt mount position must be located BEFORE the body is fitted. See begining of Section 4.

Recommended belts. We use Kangol 250 inertia reel belts as shown in fig.6a (available from Pilgrim). They are supplied with all necessary fixing brackets and bolts. We strongly recommend their use in preference to used seat belts.

1. Assuming you have already drilled the clearance hole for the top mounting (which has a 7/16" UNF captivated nut welded to it), fit the inertia reel units as shown in fig.6b using 7/16" UNF bolts.

Note. Seat belt anchorage regulations state that you must use 7/16" UNF bolts.

2. The stalk assemblies are fitted to the chassis as shown in fig.6c and the other end is fitted to the centre as shown in fig.6d.

Tested. Our original Mk1 Sumo was presented for European type approval seat belt anchorage tests and passed with a comfortable margin. The Sumo Mk2 has an even stronger structure than the original Mk1 version.

Fig.6a. Inertia reel seat belts available from Pilgrim.

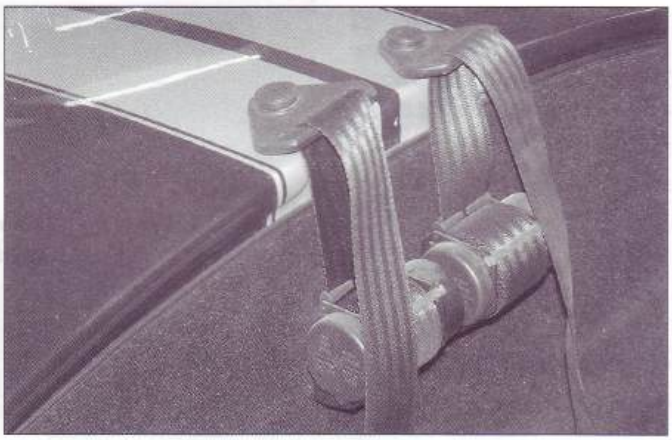

Fig.6b. Inertia reels and guides fitted.

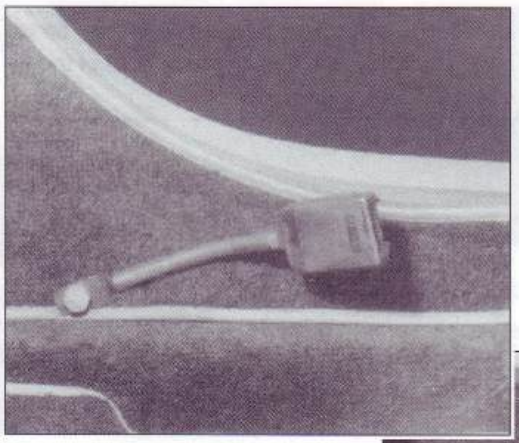

Fig.6c. Seat belt stalk fitted.

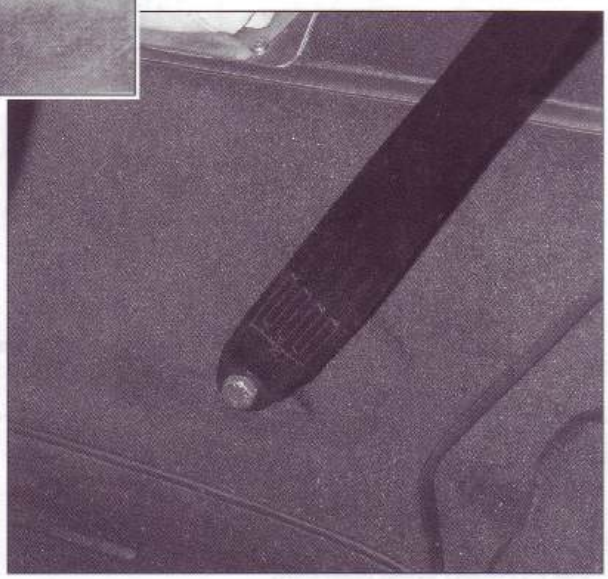

Fig.6d. Belt fitted to transmission tunnel side.

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6.7 Seats.

These are fitted to adjustable runners (fig.7a.) which are available from us.

1. Fit the runners to the bottom of the seats using very large self tapping screws as shown in fig.7b. Ensure that the runners are exactly parallel to each other. Careful measuring before fully tightening will ensure this.
2. Fit the runners to the floor as follows: Move the seat as far forward on its runners as possible to expose the rear fixing hole. Drill through the floor as shown in fig.7c. Move the seat fully back and drill the front fixing hole.
3. Fix the seat runners to the floor with bolts from the inside and nuts underneath. Fig.7d shows the seats fitted.

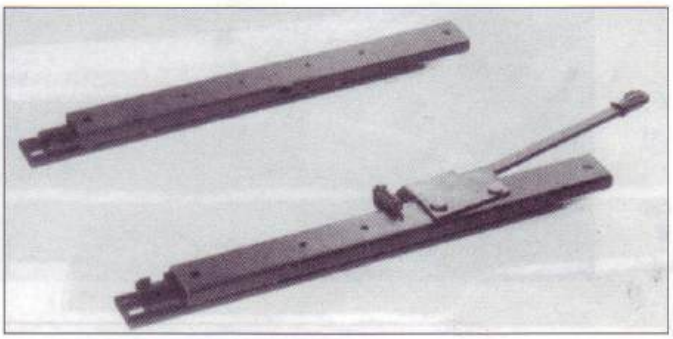

Fig.7a. Seat runners.

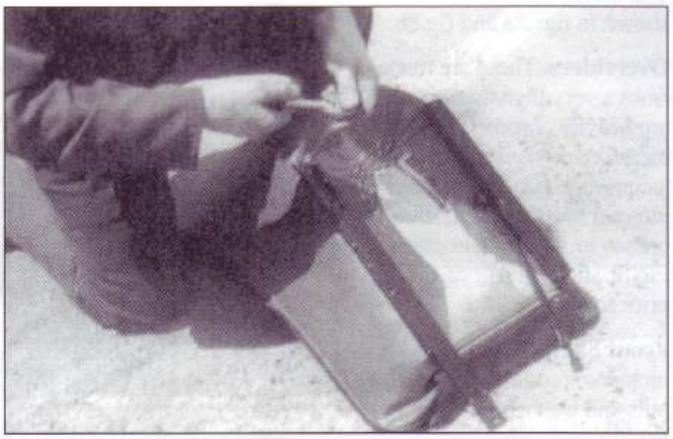

Fig.7.b. Fitting runners to seat.

Fig.7e shows one of our original style seats. They are available in either leather or vinyl and can be be supplied with contrasting piping if required as shown in fig.7d.

As the seat backs in a Sumo are not visible, we cover the rear parts of our leather seats in vinyl fabric.

Seat Shells. For those who have trimming facilities, we sell wooden bottomed fibreglass bucket seat shells of the type used to make the seat shown in fig.7e.

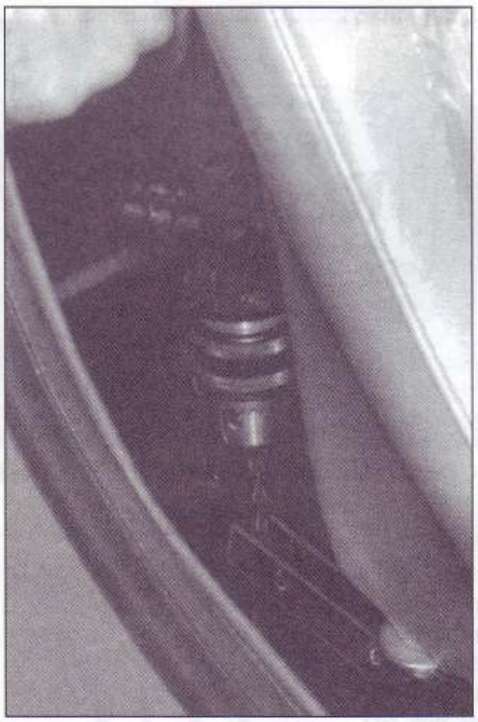

Fig.7c. Drilling seat fixing holes.

Fig.7d. Seats fitted.

Fig.7e. Original style seat.

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6.8 Nudge Bars.

It is possible to fit overriders without nudge bars, but it is not possible to fit budge bars without overriders.

Our stainless steel nudge bars can be fitted as supplied, however if you are fitting chrome plated steel nudge bars they must be protected by a thick coating of clear lacquer.

The nudge bars we supply are shown in figs.8a and fig.8b.

Overriders. These are made from a very high quality alloy and are heavily chrome plated and therefore do not require lacquering. Each overrider has 2 internal M10 threaded mounting bosses for attachment purposes. Fig.8c shows a pair of overriders prior to fitting.

Front Fixing. Our fixing kit includes studding, chrome tubes, nuts and washers (see fig.8f below).

1. Cut two pieces of M10 studding of approximately 500mm in length. These are screwed into each overrider and locked with a nut (fig.8d).

   Each piece of studding is covered with a piece of chrôme plated or stainless steel tubing (fig.8d) of approx. 120mm in length as shown in and held in position with a nut.

2. Drill holes in each side of the body to accept the fixing studs in the recesses shown in fig.8e.

3. The nudge bar is fitted to each front overrider by drilling two holes in the side of each overrider and securing them with M8 bolts as shown in fig.8f. Make sure you have the nudge bar the right way round. Overriders must be vertical and the same angle as the nudge bar.

Fig.8a. Front nudge bar

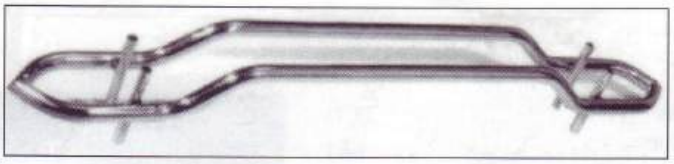

Fig.8b. Rear nudge bar

Fig.8c. Overriders.

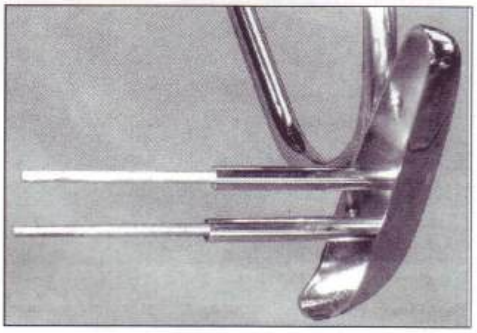

Fig.8d. Overrider with studs and tubes.

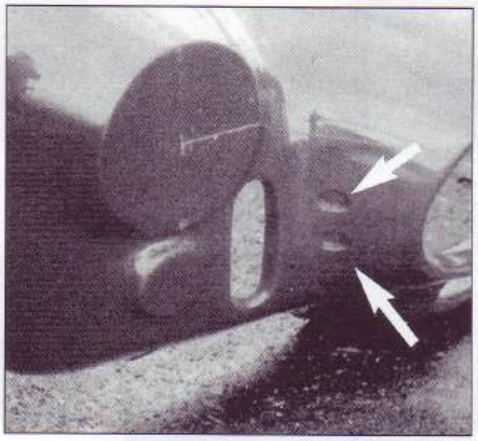

Fig.8e. Overrider stud hole positions.

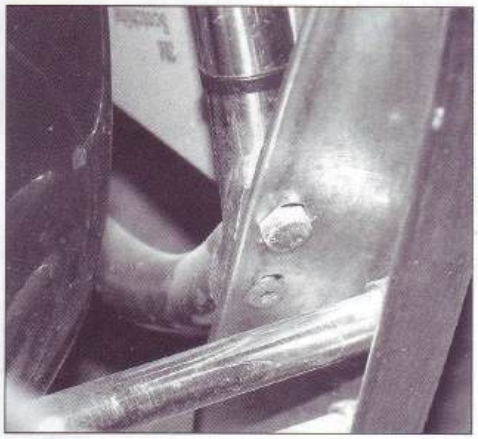

Fig.8e. Overrider bolted to nudge bar.

Fixing Kit. Our optional nudge bar / overrider fixing kit (shown right) comprises three lengths of studding, two for the front and one for the rear (cut up), four chrome tubes, nuts and washers.

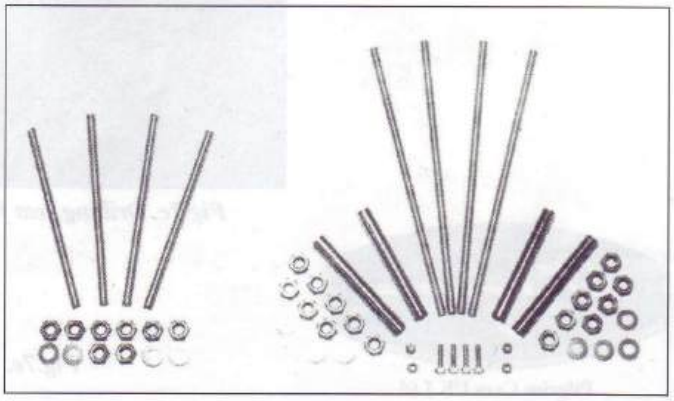

Fig.8f. Front and rear fixing kit

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4. Pass the studding through the top and third hole down on the chassis bracket and secure with washers and nuts. The final assembly is shown in fig.8g.

Fig.8g. Front nudge bar and overriders fitted.

Rear Fixing. The rear nudge bars have mounting tubes welded to them as shown in fig.8b.

1. Screw two pieces of M10 studding of approximately 160mm in length into each overrider and lock with a nut in a similar way to the front overriders.
2. Pass the studding through the tubes in the nudge bar (you may have to squeeze the nudge bar inwards to do this).
3. Drill holes through the body and into 'L' shaped brackets. You will need to make these brackets with suitable fixing holes (shown in fig.8h) and bolt them to the boot floor. You can also make a bracket from here for the boot prop.
4. Bolt the studding to the bracket. Fig.8i shows the fixing from the outside whilst fig.8j shows the complete assembly in position.

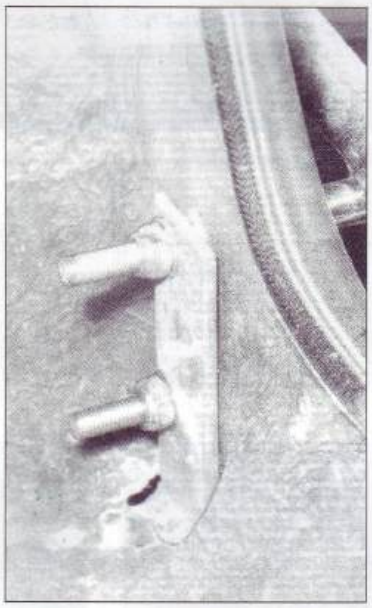

Fig.8h. Rear fixing bracket.

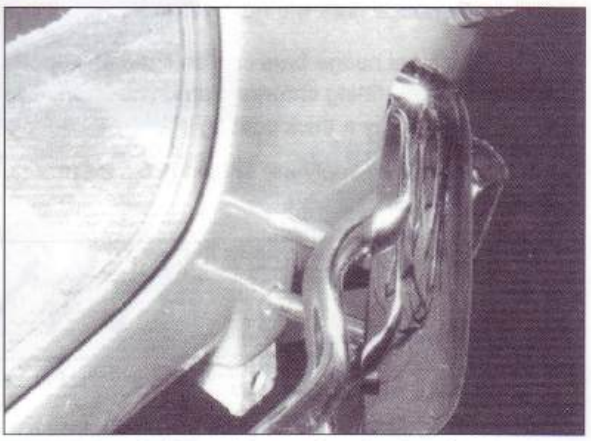

Fig.8i. Detail of overrider and nudge bar fitted to body.

Fig.8j. Overriders and nudge bar assembly fitted.

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6.9 Stone Guards.

The stone guards do not just look good, they are very functional in preventing damage to the rear wheel arches as shown in fig.9a. These stone guards are individually hand beaten from flat sheet by skilled panel beaters, then hand polished.

1. Fit with either polyurethane adhesive, rivets or screws (illustrated). To neaten the edges of stone guards, a rubber 'U' channel section can be fitted over their edges as is visible in fig.9a.

Fig.9a. Polished stone guard fitted.

6.10 Side Vents.

These are supplied as a set of six polished stainless steel side vent finisher louvers as shown in fig.10a.

1. Apply polyurethane adhesive to the body as shown in fig.10b and fix in position as shown in fig.10c.

Fig.10a. Polished stainless louvre set.

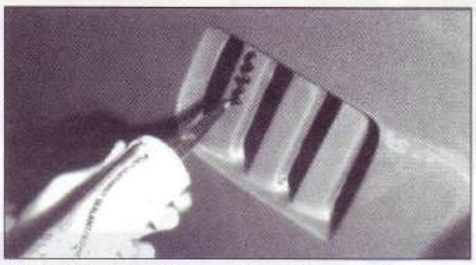

Fig.10b. Applying polyurethane adhesive.

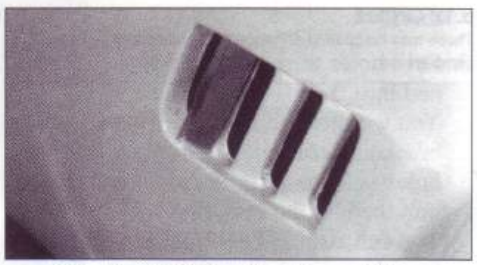

Fig.10c. Finisher fixed in position.

6.11 Mirrors.

Wing Mirrors. The type of mirrors we recommend are the Lucas type as shown in fig.11a as they are ideally suited to the styling of the Sumo.

Rear View Mirror. Fig.11b shows the chrome plated scuttle mounted rear view mirror. It is fixed to the scuttle with 2 screws as illustrated.

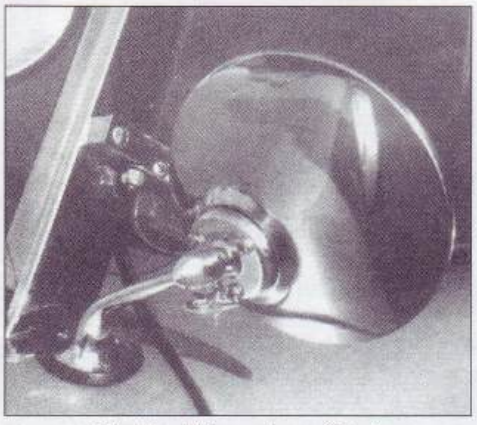

Fig.11a. Wing mirror fitted.

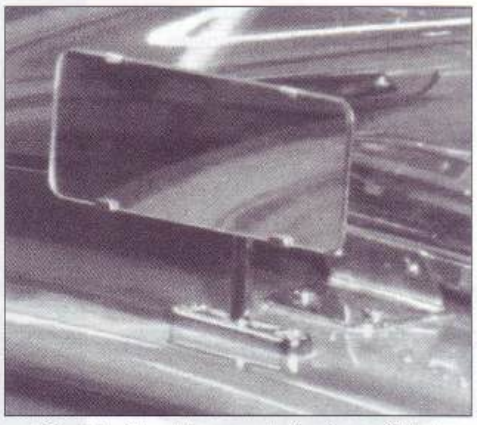

Fig.11b. Scuttle mounted mirror fitted.

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6.12 Grilles.

These may be fitted to enhance the look of the completed car. The set of four mesh grilles is shown in fig.12a.

1. Fit with either adhesive or screws. Fig.12b shows one of the two side grilles attached with adhesive from the rear.
2. Fig.12c shows the large centre nose grille attached with screws around the body return lip. The screw positions have been highlighted for clarity.

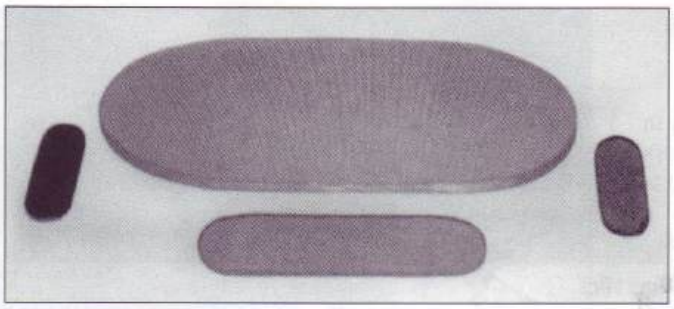

Fig.12a. Mesh grille set as supplied.

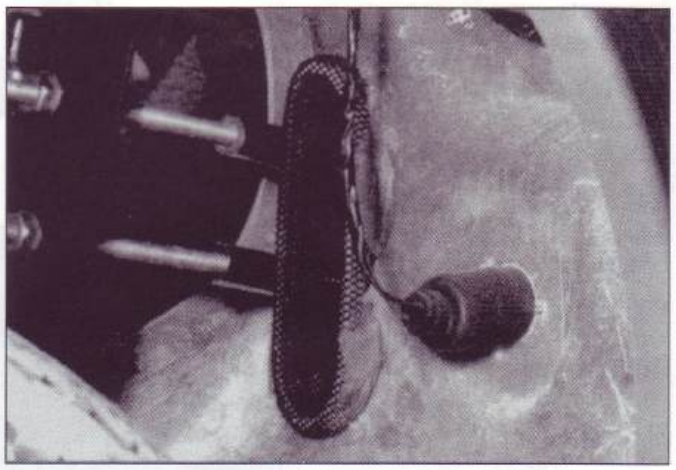

Fig.12b. Side grille attached with adhesive.

6.13 Tow Hitch.

We can supply a tow bar (fig.13a) for attachment to the rear of the chassis to which you can attach a tow ball.

Note. Our tow plate is rated for balanced trailers with a total laden weight not exceeding 500Kg.

1. Bolt the assembly through the metal floor panel from the underside. The load spreading plate is placed inside the boot to spread the load over a wide area. Fig.13b shows the tow hitch fitted.

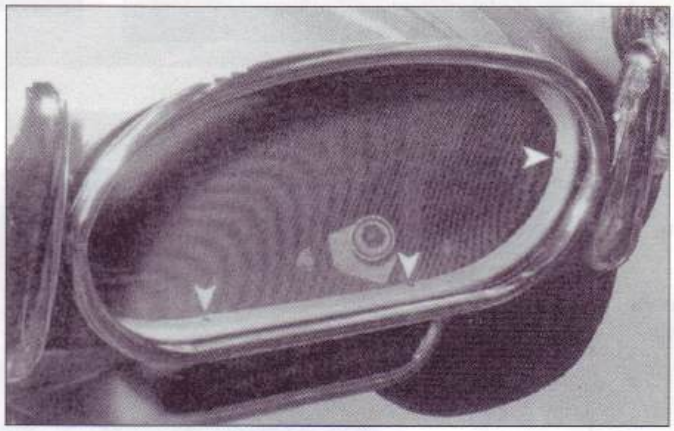

Fig.12c. Main nose grille attached with screws.

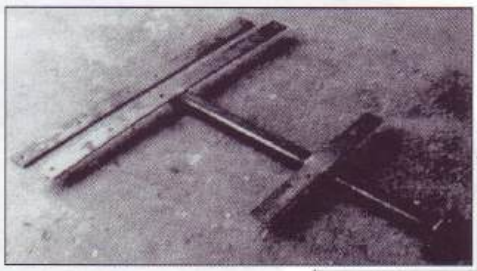

Fig.13a. Tow hitch brackets.

Fig.13b. Tow hitch fitted.

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6.14 Wind Wings and Sun Visors.

These can be fitted as shown in fig.14a. When fitting the visors, you must ensure that you use very short screws to avoid breaking the windscreen glass.

Please read the section dealing with the windscreen before proceeding (Section 4.5 - Windscreen Frame Fitting).

Figs.14b and 14c show the wind wing and sun visor respectively prior to fitting. Please note that our bracket assemblies have their edges rounded, unlike those supplied by other companies.

Figs.14d and 14e show our wind wings and sun visors fitted. When we supply these parts, we supply fitting screws to mount them to Pilgrim screens. The bracket assemblies are supplied as a bag of loose parts which have to be pieced together by the customer.

Our wind wings are made from high quality safety glass which does not scratch like the cheaper plastic type.

The sun visors are made from tinted perspex material.

Please note that the items shown on this page may not be suitable for the SVA test due to their edges exceeding the 2.5mm radius requirement.

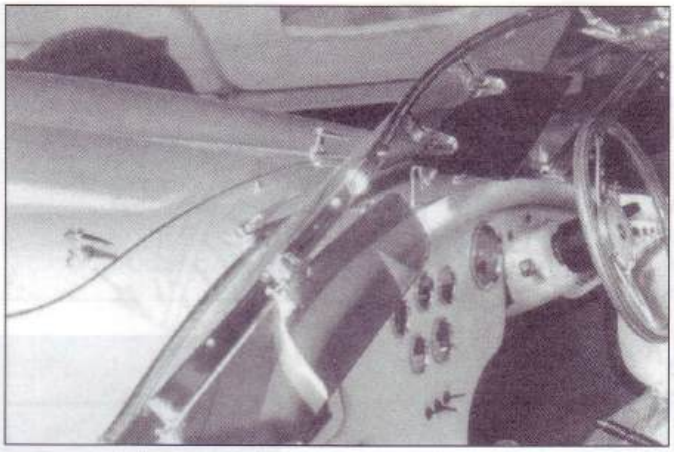

Fig.14a. Visors and wind wings fitted.

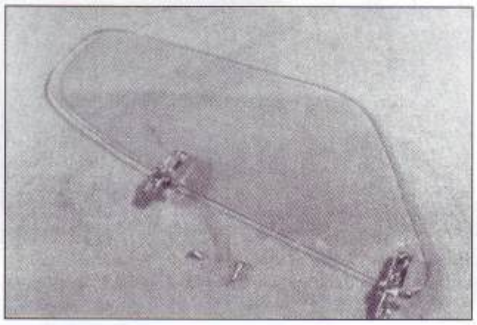

Fig.14b. Wind wing.

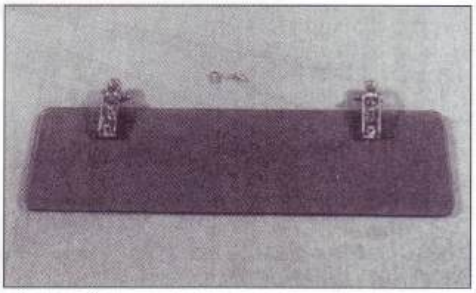

Fig.14c. Sun visor

Fig.14d.

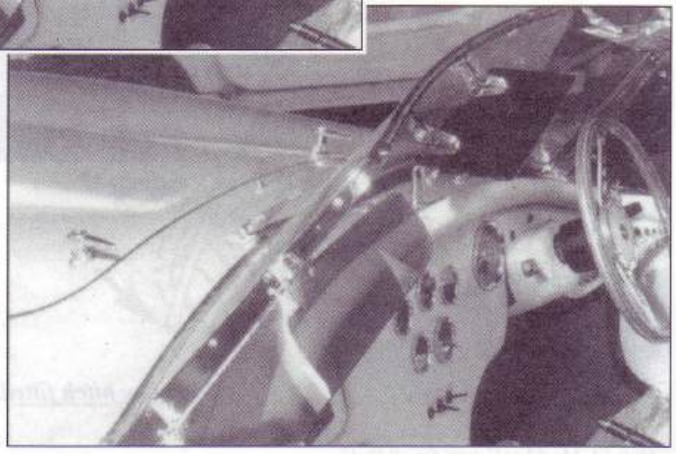

Fig.14e.

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Section 7 Weather Equipment Fitting

Weather Equipment. Fitting this is best done in warm conditions when the fabric is most supple. The set contains the hood itself, a pair of zip in side screens, a pair of hood frame tubes, a pair of hood bows, a set of 5 hood frame fittings, a pair of over-centre catches and a set of poppers.

Weather conditions. If the hood has to be fitted in cold conditions then a fan heater should be positioned inside the cockpit (being very careful not to damage either the heater or the trim). The heat built up under the hood will help make the fabric pliable during fitting. A fitted hood is shown in fig.2c.

7.1 Hood Frame.

This is assembled by forcing the aluminium parts shown in fig.1a into the tube ends as shown in fig.1b.

To prevent the aluminium parts moving in the tubes, they may be glued or riveted. Alternatively, the tube can be 'dented' with a centre punch.

Hood frame body fittings are attached to the body as shown in fig.1c.

1. Glue a piece of wood into the body in this region to give a strong fixing. contour the upper edges of the wood to match the underside of the body moulding.
2. When the adhesive is dry, drill the body (and wood) to take the fittings.

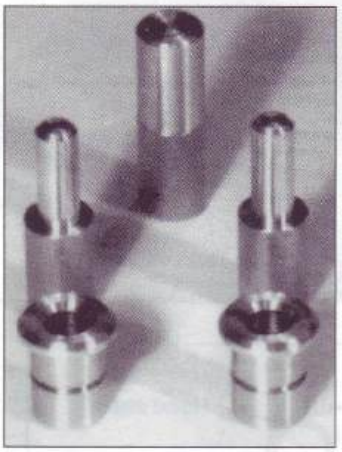

Fig.1a.

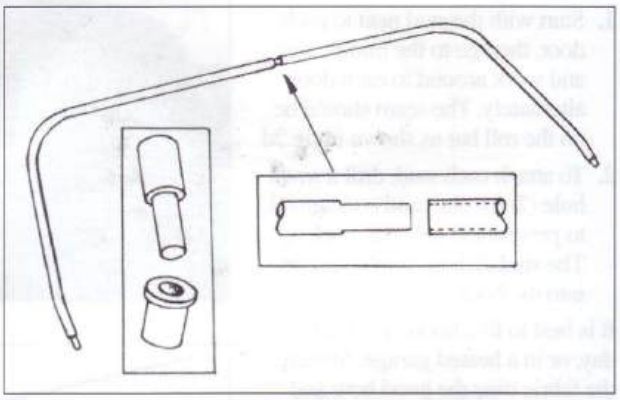

Fig.1b.

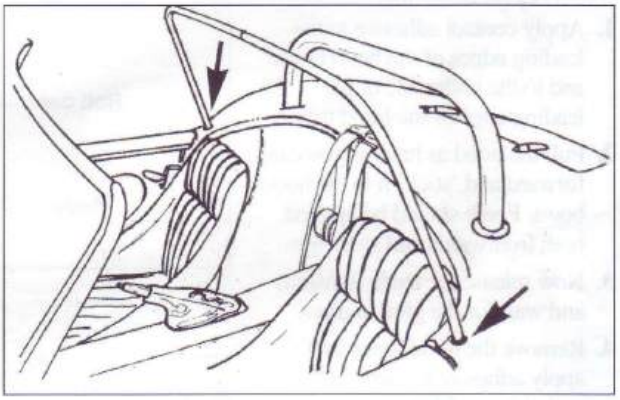

Fig.1c.

7.2 Hood Fitting.

Hood Bows.

1. Rest the hood 'bows' on the windscreen frame. Fig.2a shows the locating pin and slot in the centre of the windscreen frame.

Hood.

1. Drape the hood over the roll bar and hood frame. attach the hood to the frame using the velcro pouch in the hood as shown in fig.2b.

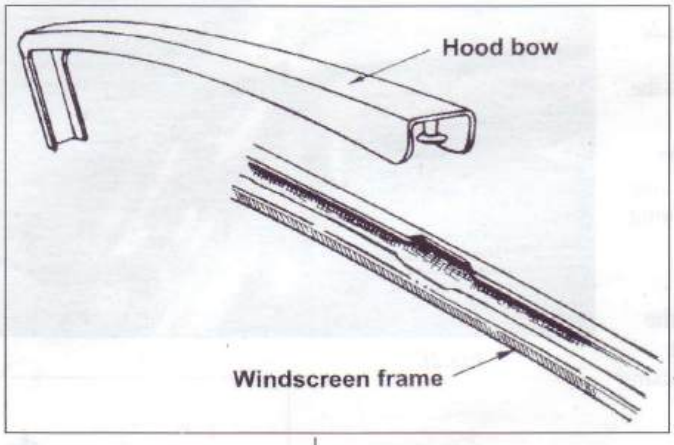

Fig.2a.

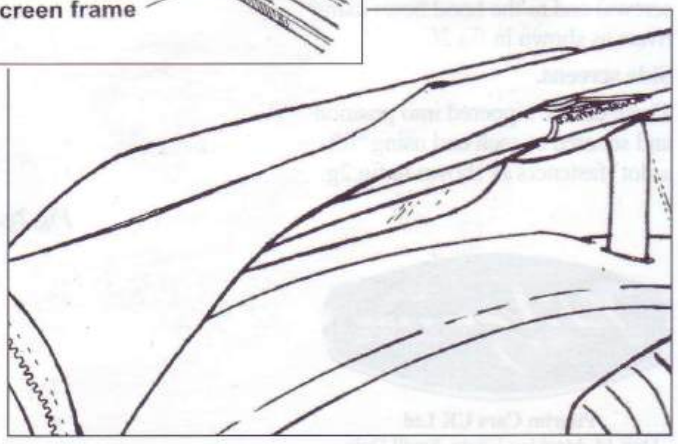

Fig.2b.

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Stud Fitting.

The rear part of the hood is secured with 14 'lift-a-dot' fasteners as shown in fig.2c.

1. Start with the stud next to each door, then go to the middle rear and work around to each door alternately. The seam should be on the roll bar as shown in fig.2d.
2. To attach each stud, drill a small hole (2mm dia.) and countersink to prevent the gel coat cracking. The stud is then simply screwed into the body.

It is best to fit a hood on a warm day, or in a heated garage. Stretch the fabric over the hood bow and mark a pencil line on the underside, which is your glue line.

1. Apply contact adhesive to the leading edges of the hood bows and to the underside of the leading edge of the hood fabric.
2. Pull the hood as hard as you can forward and 'stick' it to the hood bows. Force should be applied both frontwards and sideways.
3. Now release the studs (tension) and wait for the glue to dry.
4. Remove the hood bows and apply adhesive to their insides and tuck the fabric into them.
5. Trim any surplus fabric with scissors or a sharp knife. Fig.2e shows a cross section of the fabric wrapped over and into the hood bow.
6. Apply more adhesive into the hood bows and insert the sealing rubber to prevent leakage during use.

Overcentre catches.

These can now be attached to the windscreen frame (with metric screws) and to the hood bows using rivets as shown in fig.2f.

Side screens.

These can be zippered into position and secured at each end using 'lift-a-dot' fasteners as shown in fig.2g.

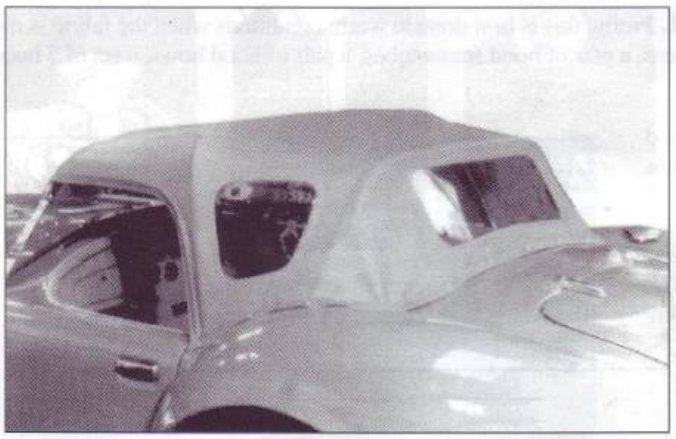

Fig.2c.

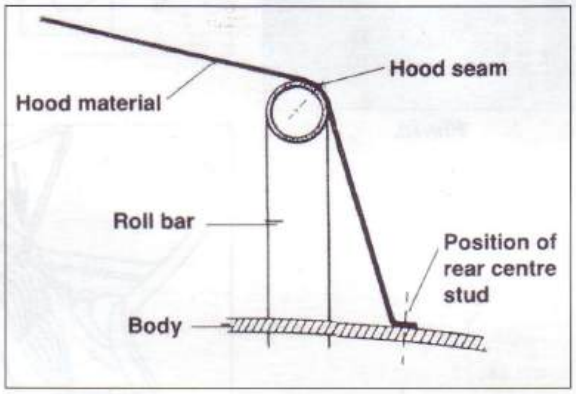

Fig.2d.

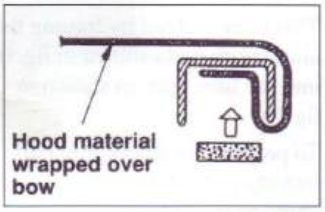

Fig.2e.

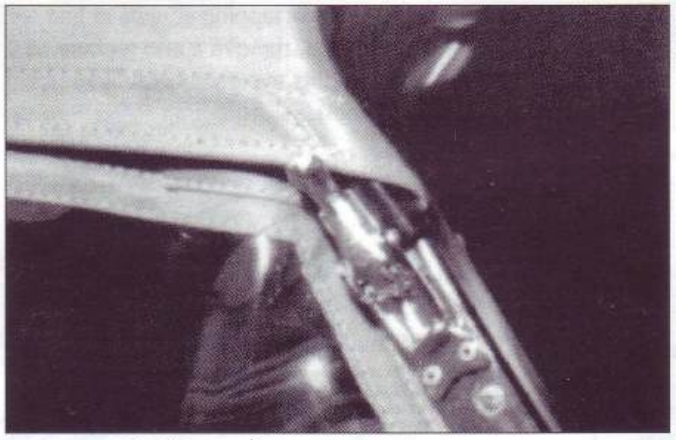

Fig.2f.

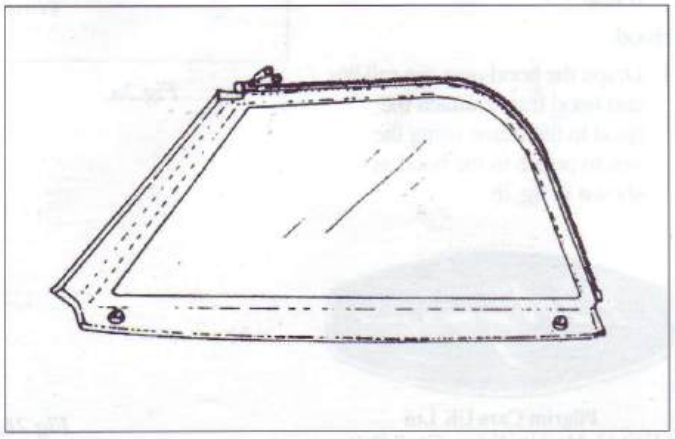

Fig.2g.

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Section 7 Weather Equipment Fitting

7.3 Tonneau Cover.

This is fitted with durable fasteners. The first are to be fitted in the centre front (near to the end of the zip) in the centre of the scuttle. Then tension the cover rearward and attach the centre rear. Working out from these points you can affix all the other fastenings.

We have found it is best to use self tapping screws at first. Then when the cover is fully fitted, remove it and replace all the screws with durable fasteners (this avoids constantly removing the cover to fit the next fastener).

All the attachment points are clearly marked on each Tonneau cover.

We sell a special tool for fitting durable fasteners.

Fig.3a shows the fitted result.

Durable Fastener - fitting technique. These fasteners come in 3 parts, button, stud and socket.

Socket - with the special 3 part tool, use the round punch to pierce a hole in the fabric (fig.3b). Use the concave receptacle to hold and protect the button and join the button to the socket with the special punch. (fig.3c).

Stud - this is attached to the body using countersunk screws or rivets as shown in fig.3d.

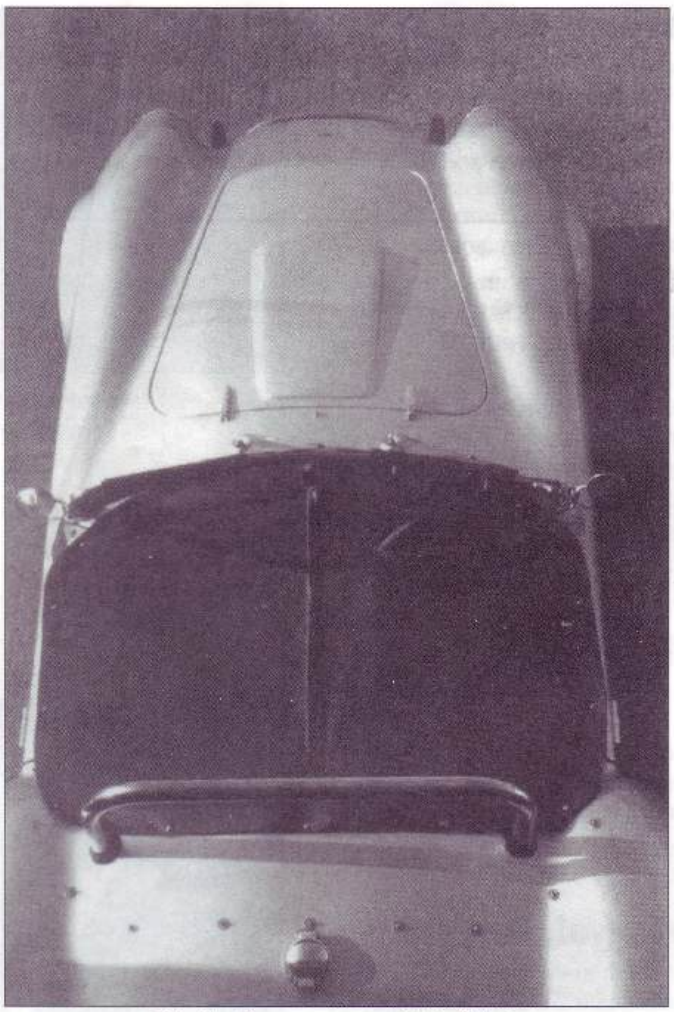


Fig.3a. Tonneau cover fully fitted.

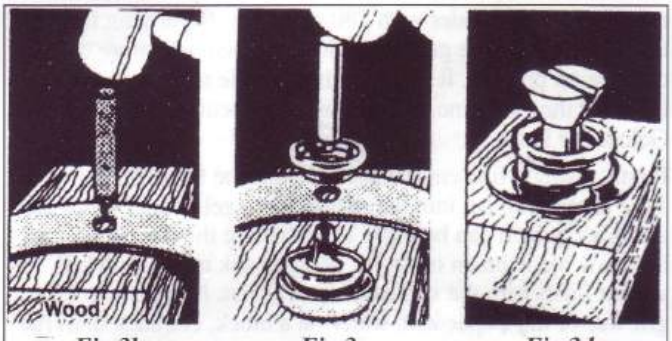
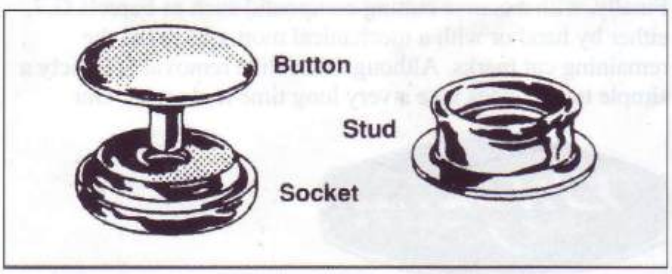


Fig.3b. *Fig.3c.* *Fig.3d.*



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Section 8 Dealing with Fibreglass

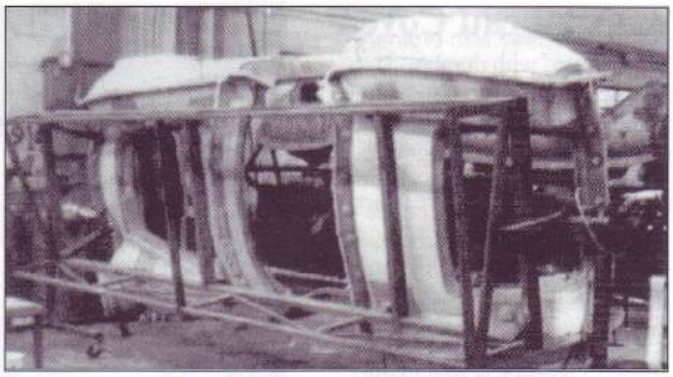
8.1 General Strength and Handling.

The body mouldings are manufactured by Pilgrim Cars to a very high standard in order to keep to a minimum the amount of work needed, on the part of the builder, to achieve a very attractive and well presented car. The overall lay-up is 1250 grams per square metre with additional material around the fixing points and potential stress areas. Steel frames and plates are bonded into the mouldings where required.

Whilst the gel-coat surface of the mouldings are a good deal more scratch resistant than standard paint, it is a wise precaution to protect it during the build up with old blankets, polythene etc.

We recommend that the underside of the wheel arches be painted with a standard undersealing solution. This will help to protect the underside from stones thrown up from the road.

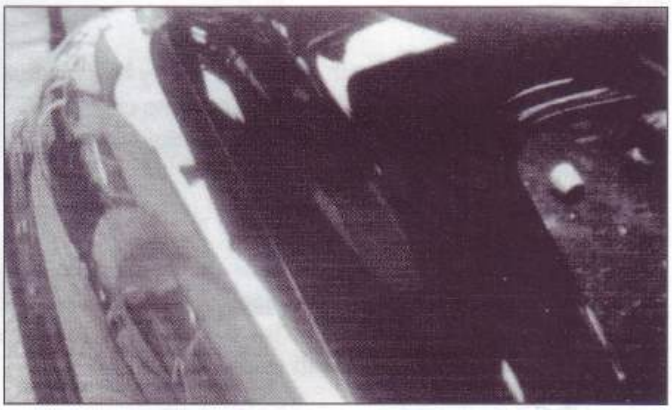
When handling mouldings (particularly from the underside) you are advised to wear protective gloves to avoid getting fibreglass splinters.



Sumo mould showing the way it is joined (joins cause flash lines).

8.2 Fixing to and Rivetting Fibreglass

Wherever fixing takes place through the GRP bodywork, either to the chassis or fixing of trim, we strongly recommend the use of load spreading washers, even where the body has been reinforced. When screwing through a fibreglass panel from the gel-coat side, you must countersink the hole to avoid cracks in the gel.



Flash line on a Sumo (new mould)

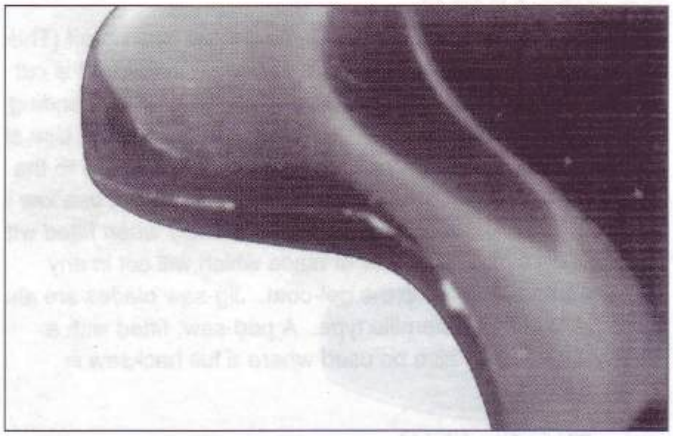
8.3 Flash Line Removal.

A significant portion of the strength in the bodywork is provided by the returned edges, which are achieved in the moulding process by the use of separate removable mould pieces.

These create a seam or flash line where they meet. On bodies which are to be painted, they are easily and quickly removed using an orbital sander with 280 grit discs. Removing flash lines to preserve the gel-coat coloured finish is a more time consuming process. It is almost impossible to remove all traces of the flash line. Please read our document entitled Gelcoat or Paint.

Firstly, using a fine cut flat file, take off the bulk of the flash. Take care not to cut into the surrounding gel-coat. Then with a scraper, which can be made by polishing the flat edge of a hacksaw blade on an oil stone, scrape back until the line is almost flush with the surrounding gel-coat. Next, using 1200 grit wet-or-dry paper with water on a block, cut back until the line disappears and blends with the surrounding body.

Finally, with a course cutting compound such as Farecla G.7, either by hand or with a mechanical mop, polish out the remaining cut marks. Although flash line removal is basicly a simple task, it does take a very long time to do well. Our



Flash line on a Bulldog (old mould)

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Section 8 Dealing with Fibreglass

experienced staff take two full days to de-flash a body even with the correct materials and equipment.

The flash line is a weak point on the mould. Pieces chip off it over an extended production run. Each time a moulding is made, these 'chips' are filled with plasticine which come off the mould and show as white marks on the body. They can be removed with a little soap and water.

To achieve an overall high gloss finish on the bodywork. simply polish with a compound such as Farecla G.7 followed by G.3 on a soft sheep skin or nylon foam mop. Compounds such as T-cut can be used but take much longer to bring to a shine to the body (because fibreglass is a good deal harder than paint). Take care not to overheat local areas of the GRP with the mop as this can cause discolouring of the gel-coat. We find that sponge head mops are much easier to use than sheep skin type and are much less likely to overheat. Always refer to the instructions given with whichever compound you have chosen. Do not leave large wet areas of the compound on the body for long periods as the ammonia in the compound can cause the moulding to change colour.

8.4 Accident damage.

Minor scratches in the gel-coat can be removed in the same way as flash lines. Deeper scratches or cracks require digging out and filling.

Larger repairs.

These may have to be done with an ordinary body filler on the surface, reinforced with glassfibre laminate on the underside. The repair then has to be spray painted, the colour can be matched by your local car paint specialist.

Serious damage repairs,

To repair larger damaged areas, sections can be moulded in our mould to replace the section damaged on the car. The new section can be fibreglassed into the existing bodywork and the join line filled. It is then sprayed as above.

8.5 Body Storage.

If you intend to store the body for a long period of time whilst you are working on the chassis, it is advisable to put it in a shaded area. If covers have to be employed they must be of canvas material, not polythene. Polythene covers can, and frequently do, cause the surface finish to be damaged.

8.6 Drilling and Cutting Fibreglass

It is best to use drill bits with the cutting edge backed off (This is because fibreglass is less prone to being chipped if it is cut with a scraping action). If you have difficulty in understanding how to back off a drill bit, then use a blunt drill instead. Use at low revs where possible and drill through the gel-coat side to the laminate side. Hole saws are very useful but again use low revs. A hacksaw is also very useful, especially when it is fitted with the tungsten carbide file type of blade which will cut in any direction and will not chip the gel-coat. Jig-saw blades are also available in the tungsten file type. A pad-saw, fitted with hacksaw blade can also be used where a full hacksaw is denied access.

When cutting, grinding or sanding fibreglass, it is very important that you do not inhale any airborne dust particles. You should always wear protective breathing apparatus.

8.7 Pin Holes.

Gel-coat is a porous material. Viewed under a microscope, it appears to be like a sponge. The size of each hole in the structure is usually very tiny but, depending on how the gel-coat has cured, it can have a few quite large (up to 2mm diameter) pin holes. When sandpapering or polishing the fibreglass to remove the flash lines or scratches, you may expose some of these pin holes. When polishing, they fill with compound and appear as white spots.

To eradicate these pin holes you have three alternatives:

a) Dig out each hole and fill with gel-coat (available from us) and the treat as in section 8.4, Please note that you stand the risk of exposing another whilst attempting to fix the first.

b) Dig out the polish, mask the problem area and spray normal car paint over the holes, such that they fill with paint. Then use course cutting compound to remove the paint from around the pin hole.

c) Wax the pin hole with a wax crayon or coloured shoe polish of the same colour as the car. The holes fill with wax and are then not easily visible.

Even the very best fibreglass mouldings will have pin holes in areas where the gel surface is polished. In practice it is impossible to fill every one. If you are not prepared to accept this problem then you should order an un-coloured body and have it painted.

8.8 Important Note.

The quality of the gel-coat finish cannot be better than the finish on the mould itself. When new, all Pilgrim exterior body moulds are top quality (arguably the best in the business). However, with constant use, the moulds suffer wear and damage which manifests itself as general dullness, chips and scratches in the mould surface (particularly in the area of flash lines). All these cause corresponding marks in each moulding which can be removed in the same way as flash lines. It does take a great deal, of time and effort to remove them properly. We strongly advise customers to visit our factory at the time of ordering to examine the quality of the products being made at the time.

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8.9 Painting Fibreglass.

In view of some of the above problems associated with a gel-coat body, and given that gel-coat is never quite as good as a painted finish, some customers will choose to paint their cars. It is beyond the scope of this manual to detail all the intricacies of painting a car. but some of the following information should be of assistance to those who have no experience.

Keying.

In order for paint to adhere to fibreglass, the mouldings must be fully abraded with 600 grade wet-or-dry paper. All traces of mould release wax are removed at the same time. We suggest that the keying is done wet with a little bit of soap in the water, (to help ensure the removal of the wax). At this stage it is possible to fill any minor irregularities in panel fit and flat out any wrinkles, moulding marks or ripples in the panels.

When to paint.

Do not be tempted to paint the mouldings too soon. Ideally you should complete the entire build including fitting the windscreen, hood, bumpers and brightwork, such that all holes are drilled. Then remove (or mask) these items prior to applying the paint.

Type of paint.

Almost any type of automotive paint and painting system can be employed. It is not essential that an etching primer is used but most conscientious paint shops would err on the side of caution and use such a primer. We favour the use of high build primer/filler which tends to fill pin holes in the gel surface. If these are not filled then the top coat can develop 'fish eyes' around the pin holes.

8.10 Choice of Finish.

Gel-coat finish. Gel-coat is a plastic material which is pigmented by Pilgrim Cars in a choice of colours. In common with all externally used plastics, it can suffer from fading, blistering warping and general dullness due to the effects of weather and chemical attack. If looked after, the finish will usually last for several years but on some occasions, the finish can deteriorate quickly (within a year in some cases). For these reasons we cannot offer any guarantee as to the expected service life of a gel-coat colour. It must therefore be accepted that sooner or later. the gel-coat will require painting.

When building with gel-coat. There are technical problems such as pin holes and flash lines as mentioned earlier. Also the general alignment of the body panels one to another varies slightly from car to car. It is therefore unlikely that the fibreglass bonnet, boot and door mouldings will exactly fit their reveals in the body. On mouldings with a gel-coat finish the best compromise of fit has to accepted. Our demonstration vehicles show how good the fit can be, but it should be noted that they are never perfect.

Painted finish. To have a fibreglass car properly painted is a fairly expensive job. Paint will not last forever, just like the gel-coat, it suffers from weathering and chemical attack (there are plenty of dull and faded ordinary cars to prove the point). If the car is to be painted, the fitting of the bonnet, boot and doors is much easier because the high spots can be sanded down and the low spots filled. Pin holes, flash lines and other blemishes can be dealt with in a fraction of the time. The only disadvantages are its cost and stone chip damage (which gel-coats do not suffer).

Horses for courses.

Whether you opt for a paint finish or a gel-coat finished car will depend to some extent on your expectations and finances.

If you intend to spend a lot of money elsewhere (on the trimming and mechanical side) then you will probably not be satisfied with a relatively cheap gel-coat finish. On the other hand, if you are building a 'basic' car from used parts then you will probably be happy with a low cost gel-coat coloured car. In any event, we want to make it crystal clear that we shall not accept claims arising from 'defects' in the gel-coat. It has to be accepted for what it is, a very low cost finish which is about one tenth of the price of a painted finish. We want our customers to be very happy and to that end would like them to consider all the implications in order to select the correct finish for the their car.

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Pilgrim Sumo Construction Manual

Section 9 Technical Specifications

9.0 Technical Specifications.

Chassis.

Type: A combination of ladder frame, space frame, backbone and monocoque construction techniques consisting of 4 structural rails (this greatly increases the safety of the chassis by reducing the stress on each rail), with considerable cross-bracing, back bone tunnel and upper frame work for pedal assembly, steering column and bulkhead firewall.

Assembly: MIG welded on a precision jig by skilled welders.

Fixing points: All mounting points for the mechanical components are accurately pre-drilled (about 70 mounting holes in all).

Power handling: The chassis will accept power units with an output of up to 300 BHP.

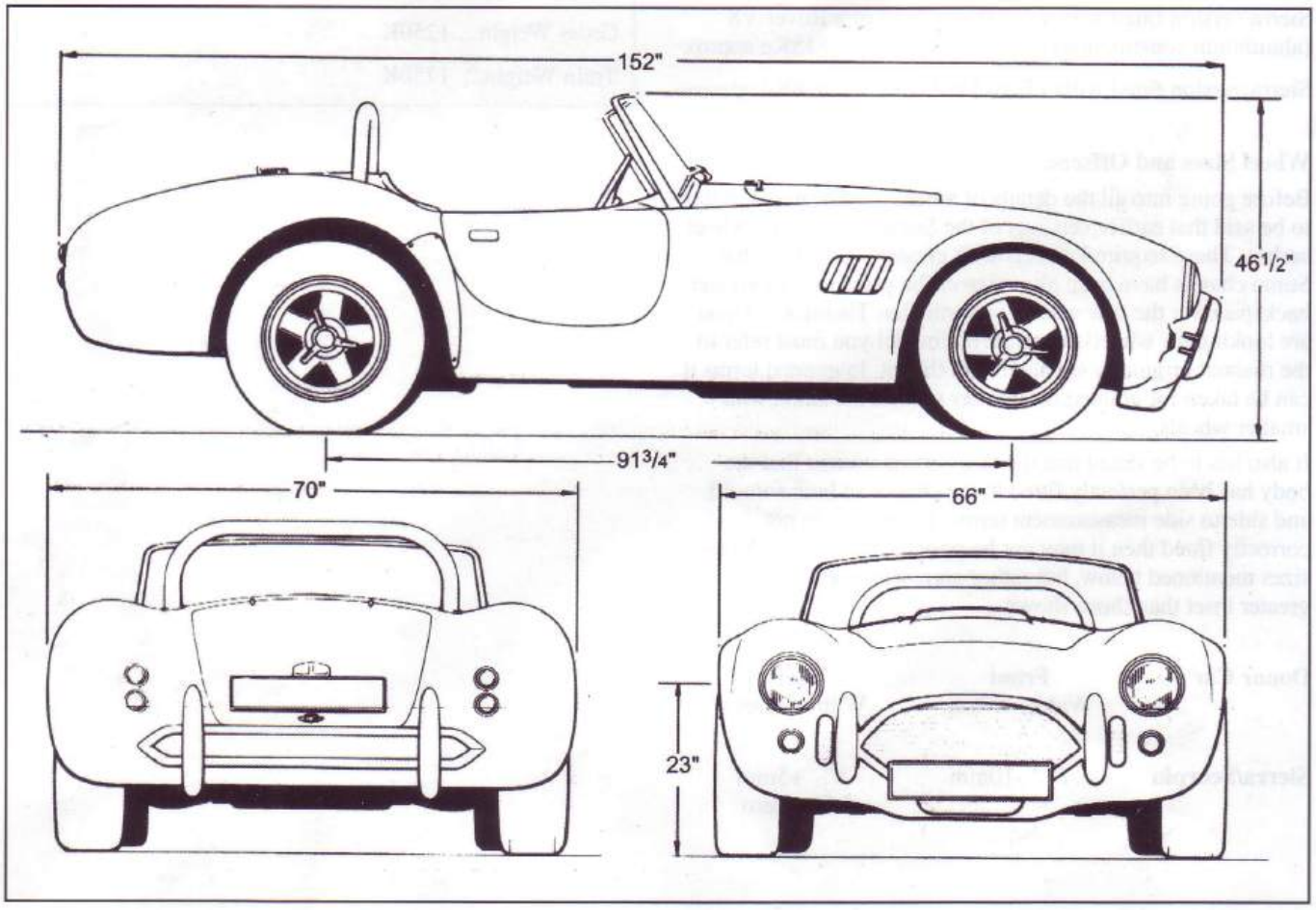
Body.

Type: Fibreglass, cold laminated with polyester resin, and chopped strand mating (CSM) reinforced with steel and 'coremat' as necessary.

Thickness: Varies over the structure, generally not less than 1.2Kg of CSM per square metre.

Finish: The surface finish is very high gloss, many of our kits are sold with a self coloured gel-coat finish impregnated into the first 2 coats of resin (gel-coats). Please refer to section 8 and our terms of business for general technical details of gel-coats. We recommend that the finished car be painted.

Materials: We only use top quality fibreglass materials with a proven record in the automotive industry. If this were not the case our products would suffer in the long term from star crazing, stress cracking or osmosis (ingress of water into the fibreglass).



Dimensions of the finished car

Overall length	152"	(386cm)
Wheelbase	91¾"	(233cm)
Width (across front wheel arches)	66"	(167.6cm)
Width (across rear wheel arches)	70"	(178cm)
Height to top of windscreen	46½"	(118cm)
Height to centre of headlights	23"	(58.5cm)

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Section 9 Technical Specifications

Mechanical Specifications.

Tyre Pressures.

To some extent the tyre pressure settings will depend on your engine and on your driving technique. The heavier the engine, the harder the required tyre pressure.

We recommend the following;

Rear .....22 psi.

Front .....20 to 24 psi.

Please experiment within the above range until you find the best front tyre pressure to suit yourself.

Fuel Tank Capacity ..... 65 Litres

All Sumo kits are approximately the same weight. Variations in finished vehicle weight will be due to which mechanical components are used and which extras are fitted. Galvanising of the chassis usually adds at least 35Kg to the example figures shown below. The figures otherwise assume that all brightwork and trim has been fitted as shown in this manual.

Sierra version fitted with a 4 cylinder Ford or a Rover V8 (aluminium construction) ..... 815Kg approx

Sierra version fitted with a Ford V6 engine ..... 870Kg approx

Wheel Sizes and Offsets.

Before going into all the details of wheel specifications. It has to be said that earlier versions of the Sumo had smaller wheel arches. These required wheels with greater inset. Also that Sumo chassis have been altered over the years to give greater backspace for the rear wheels in particular. Therefore, if you are looking for wheels for an earlier model you must refer to the manual originally supplied with the kit. In general terms it can be taken for granted that earlier models are fitted with smaller wheels.

It also has to be stated that the sizes given assume that the body has been perfectly fitted to the chassis in both fore-aft and side to side measurement terms. If the body is not correctly fitted then it may not be possible to fit the maximum sizes mentioned below, but rather narrower wheels with greater inset than those shown.

Donor Car	Front Width	Front Offset	Rear With	Rear Offset
Sierra/Scorpio	7"	-10mm	8"	+5mm
			8.5"	zero

Suspension Settings.

It is not possible to adjust some of the following on some donor car types. Where adjustment is not provided within the mechanical components themselves the chassis will have been so constructed as to 'fix' the setting as required. In other words, if there is no adjustment provided, do not worry. Where adjustment is possible you should aim for the following settings.

Toe in ..... 0° (front and rear)

Castor ..... 3° 15' (+/- 1° 50')

Camber ..... 1° 35' (+/- 1° 20')

Design Weights.

These will be required upon filling out your SVA form.

Weights are as follows:

Axle 1 ..... 600K

Axle 2 ..... 650K

Gross Weight... 1250K

Train Weight.... 1750K

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Section 10 Final Adjustments

It will be necessary to have a few items checked or adjusted before you use your car on the road.

10.1 Headlamps.

So as not to blind other road users, the headlamps have to be correctly adjusted. To do this you will need to park the car in front of a wall or other flat surface. Mark a cross on the wall directly in front of each headlamp. Move the car back from the wall so that there is 1m between the wall and the headlamps. Turn on the headlamps to dipped beam. The lamp pattern on the wall should be in the 3 quadrants illustrated. If not, use the 2 adjuster screws in the headlamp unit to place the beam as shown in fig.1a.

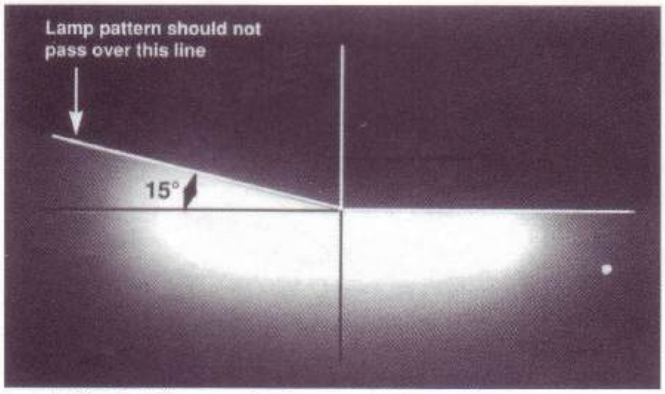

Fig.1a. Diagram showing typical dipped beam pattern

10.2 Engine Tuning.

It is possible to cause your engine internal damage if it is not correctly tuned. This is even more evident now that petrol companies have been forced to reduce the lead additives in fuel (to reduce pollution). The engine will run better and be more economical if it is properly tuned.

To tune your engine you should follow the donor car workshop manual or take the car to a specialist company to do it for you.

10.3 Tracking.

Your car will handle better and the tyres will last longer if you have the tracking accurately set with gauges.

10.4 Bolting.

To ensure that the car is safe to drive you should spend some time under the car checking that all the nuts and bolts are properly tightened up. You should check them again after you have done about 500 miles. Consult your workshop manual for torque settings. You should ensure that only new nylon locking nuts have been used and that all locking devices and return springs are fitted.

When a car is built on a chassis from a number of different panels, as opposed to the monocoque construction of a production car. It is inevitable that when the car is first built there may well be squeaks and rattles. Each noise will have a point of origin and can be dealt with by the use of rubber buffers, Sikaflex adhesive, cable ties or chassis sponge.

You should never accept that because it is a kit it will rattle. Over the first couple of weeks of driving you should identify each rattle and deal with it. We have found that a good starting point is to use a couple of tubes of polyurethane adhesive Sikaflex between the bodywork and the chassis. Next you should check that the bonnet and boot are cushioned, then it's down to your ears to isolate any further noise sources.

10.5 Carrying Spares.

Particularly during the first few journeys in your newly completed car, it is a very good idea to carry a few spares. Gremlins always seem to appear when you are miles from a service centre and just after your AA membership expired. So save yourself a long walk and take the items shown in fig.5a. A number of basic tools may also be helpful.

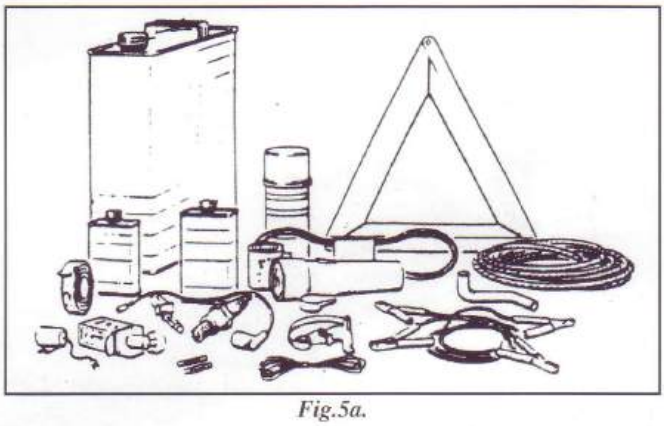

Fig.5a.

10.6 Registration.

You must mark the chassis with a serial number which should also be marked onto a VIN plate (available from Pilgrim). The VIN plate should be attached inside the engine compartment in a place where it can be easily seen and read.

Next you should book an SVA and MOT test.

When you have a certificate showing it has passed, you arrange with your Local Vehicle Licencing Office (LVLO) to inspect the car. They will issue you with a road fund licence (Tax Disc) when they have done so.

We advise you to contact your LVLO at least a month prior to your required registration date. They will provide you with the forms and with leaflets explaining the whole process.

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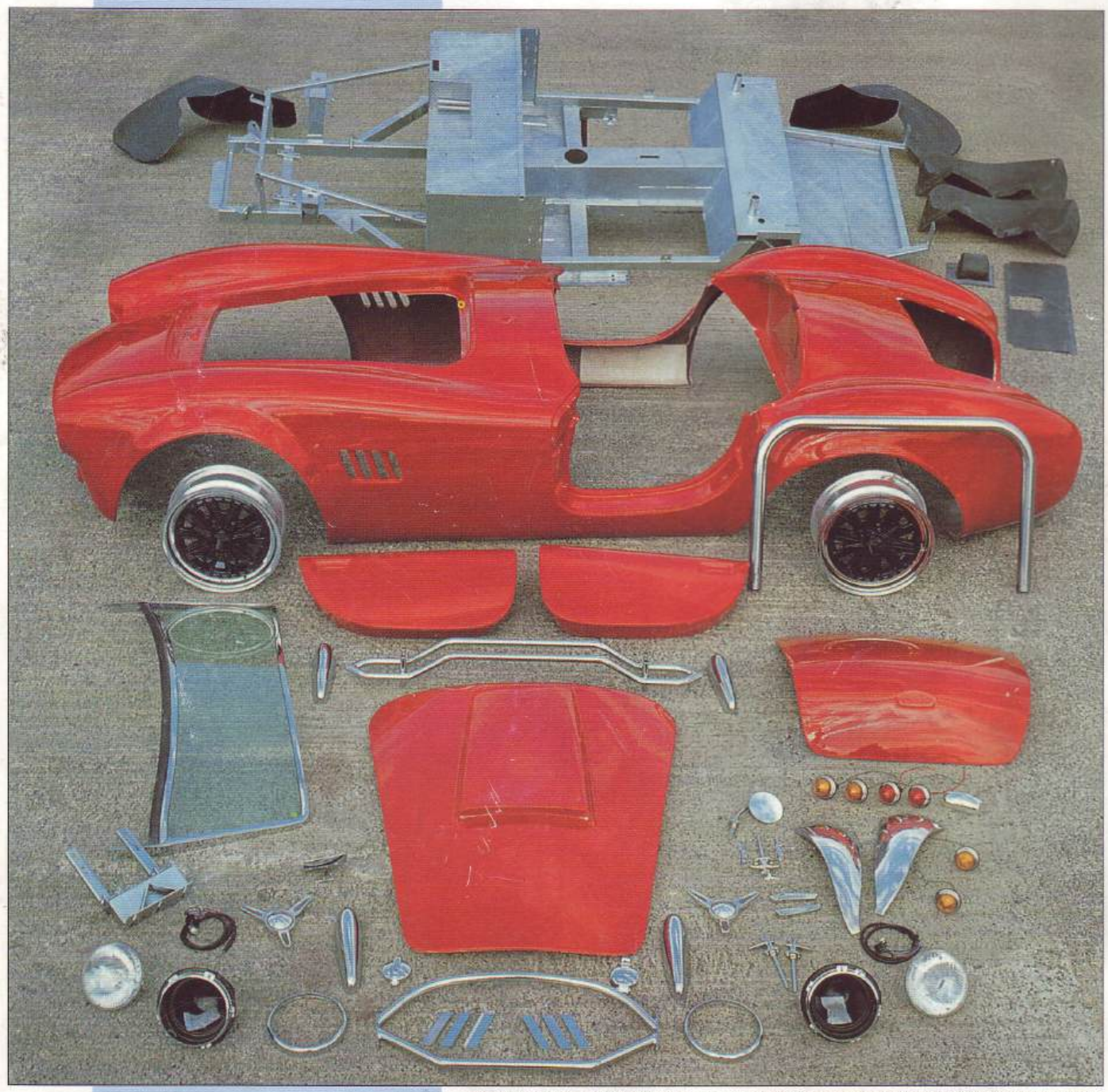
Sumo Construction Manual

Sierra/Granada Mk.3 Version



The illustration above show a selection of quality components supplied by Pilgrim Cars for the assembly of a Sumo

Pilgrim

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