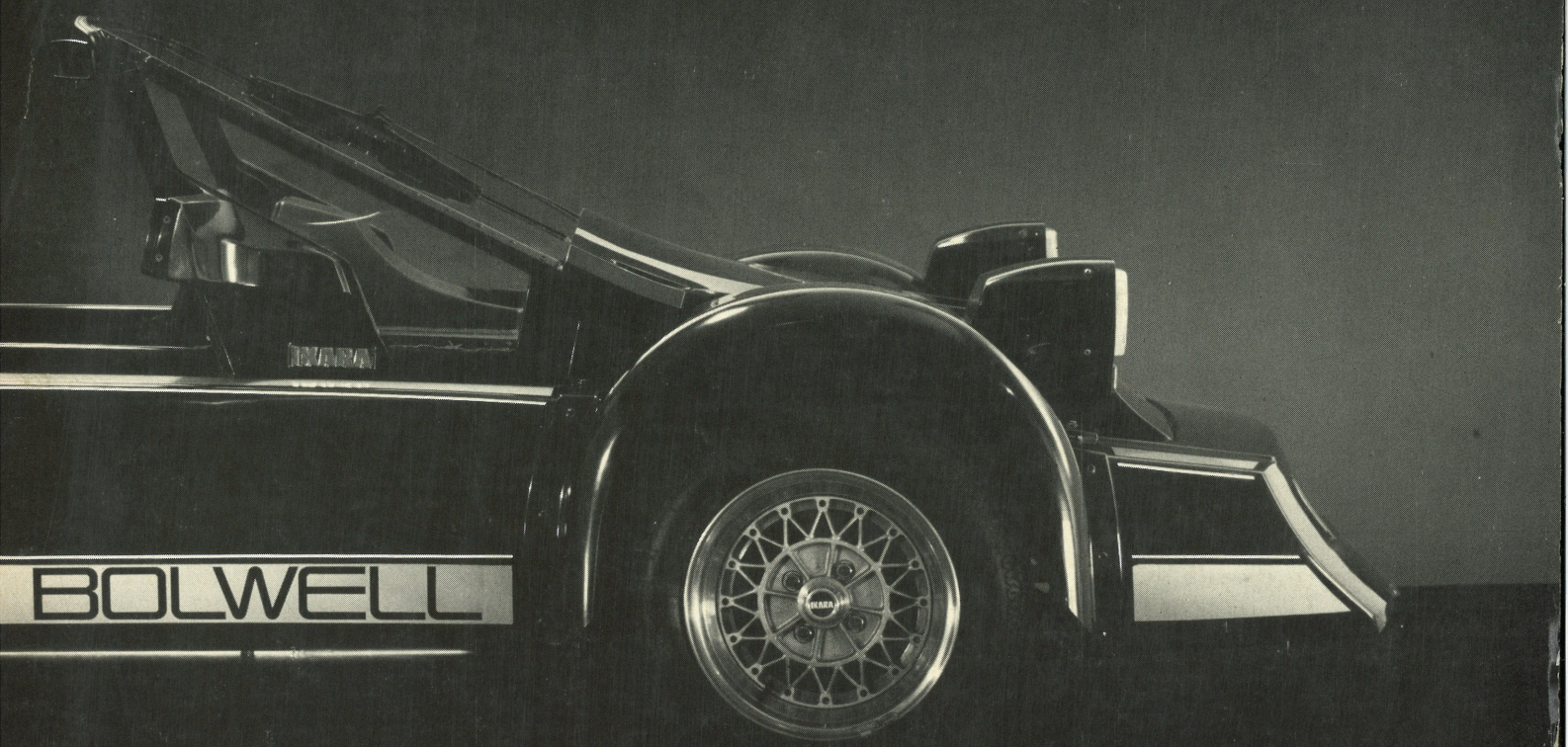
THE DRIVING FORCE



BOLWELL IKARA

UAL • CONSTRUCTION MANUAL • CON

CONSTRUCTION MANUAL

BOLWELL IKARA

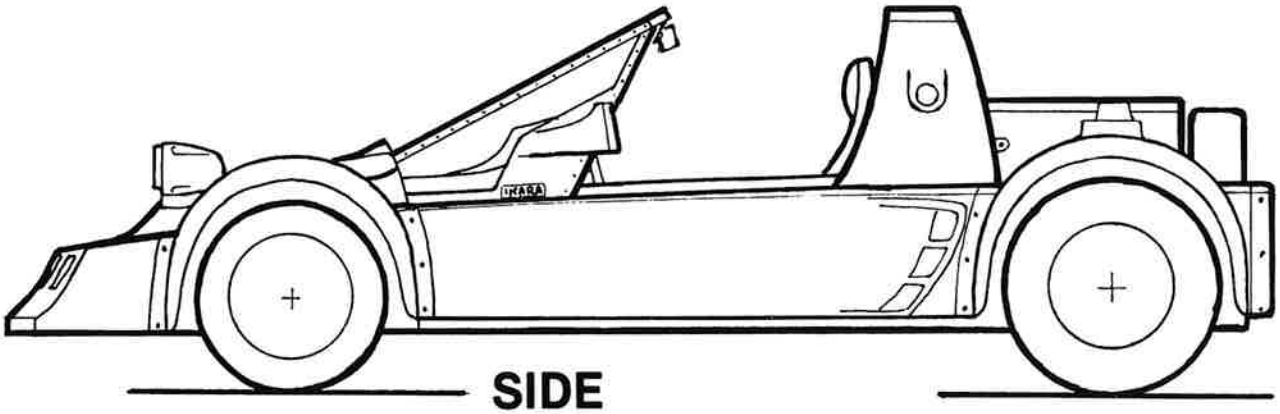
MODEL No. B9

BOLWELL DEVELOPMENTS — AUTOMOTIVE PTY. LTD.
Cnr. Wells & Boundary Rds., Mordialloc 3195
Australia
Phone (03) 90 7084 — 90 8396


COLWELL

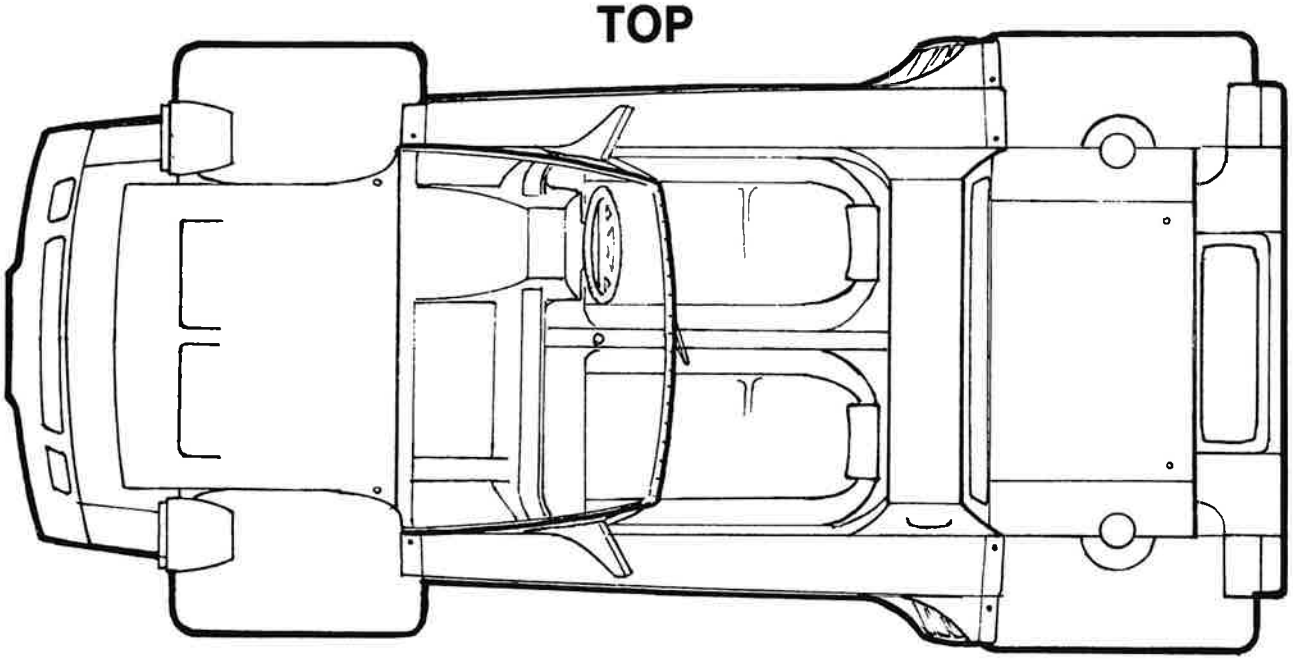
CONTENTS

IKARA — BOLWELL MODEL No. B9



SIDE

TOP



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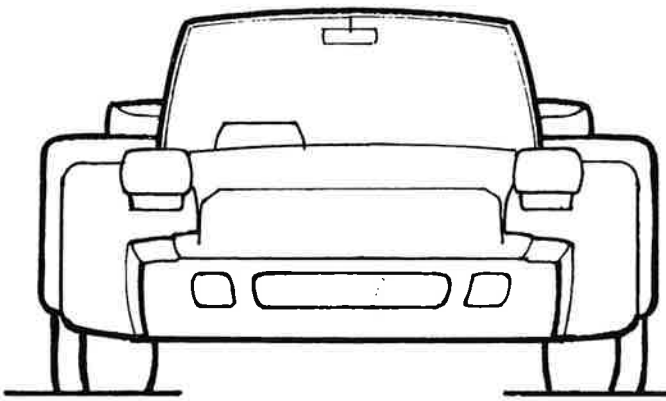

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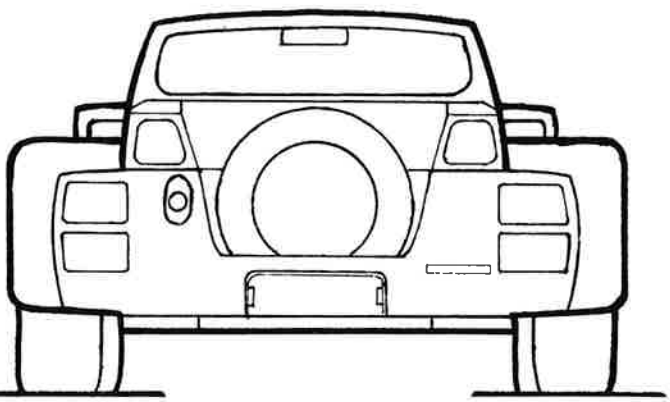


CONCEPT AND PHILOSOPHY

SECTION A

Let me introduce you to my latest development — the BOLWELL 'IKARA'.

The concept of the IKARA grew out of many hours of discussion with my design team and with keen motor sportsmen as to what constitutes the ultimate fun car for the road.

CONCEPT & PHILOSOPHY

These discussions were stimulated by my own growing disillusionment with the currently available marques which pretend to satisfy this "sporting" requirement.

My own interest in fine cars was born in the halcyon days of the MG TC when a sports car — a true sports car — was less compromising in its design. Such a car offered no pretence at ultimate luxury or sophistication.

It didn't bend this way and that to meet the "suburban" market forces of consumerism. But it **did** always inspire one in its austerity, and excite one with its blood-tingling performance. I was never in any doubt that the machine was a part of me — an extension of my ego and my ambitions.

That feeling has to me, almost disappeared these days and except for the high-powered motorcyle or the out-and-out racing car there has been little opportunity to experience this "T.C." type of driving since.

THE COMMITTEE CAR

Since that time, the motor industry entered a phase of prosperity and relative complacency. It was an era of the "committee car", where design was by appeasement rather than by inspiration, and many of the major manufacturers were conspicuous by the mediocrity of their products. There were some marques of course that survived this period with their individuality very much intact; drivers' cars such as Porsche, Jaguar and Morgan.

It is largely the fault of the major motor producers that they were so vulnerable to the attacks made on their products by such consumerists as Ralph Nader. As a result of years of neglect of sensible design and safety the motor industry became the favourite whipping boy for the short-comings of its products. This set the trend towards severe legislation and controls which, in turn, had the result of consolidating and rationalising the various models into large market "slots".

There was the further result that it killed the innovation and inventiveness of the smaller producers. The motor industry became further immured as it designed to satisfy legislation rather than explore the more realistic concepts of primary safety and accident avoidence.

The result of all this is that producers had to manufacture vehicles that tried to be **all** things to **all** people; this was done through "optioning up" the standard models. The current producers of so-called 'sports cars' became so involved in the market numbers game that they also compromised. Progressively the traditional sports car became more luxurious, roomier (and with it, heavier) and more expensive.

The true sports car evolved into just another grand tourer with handling and performance that was little different from some of the better-optioned domestic sedans. As a result of these production requirements, further

Bolwell Nagari, 1969-1974, Model No. B8

Neil Stephens (left) with Campbell Bolwell.

compromises had to be made in the styling areas, which led to a clone-like 'sameness' between the marques.

IKARA'S CREATION

It is against this background that I conceived the IKARA and gave vent to my urge to create the ultimate drivers car.

Timing the start of this project was also important. We had been building and designing Bolwell vehicles from 1963 until the Nagari ceased production in 1974. Over these years we had developed considerable expertise in fibreglass design and production and, as a consequence, the major part of our present-day operation is based on the design, production and repair of fibreglass for industrial applications.

This in turn led us to adopt new and advanced developments in fibreglass, (such as 'resin transfer moulding') and also enabled us to become one the largest industrial fibreglass moulders in Australia.

The team of dedicated experts we have gathered around us over these years of service to industry are all deeply involved with the IKARA project.

For their guidance, I set very precise design requirements to ensure that the IKARA achieved my original concept.

IKARA HANDLING

So, what did IKARA need to have?

It had to have basic good handling. This meant that all aspects relating to handling had to be fundamentally correct.

For the design of the suspension geometry we enlisted the help of a long-term associate and well known suspension design expert, Neil Stephens, of Sydney. It is Neil's attention to details like roll-centres and anti-dive characteristics, as well as the practical serviceability of the suspension components that have made the IKARA a top class handler.

For ultimate handling, IKARA needed to be of mid-engined design. With this configuration we achieved excellent weight distribution for traction "off the mark" and out of corners. It also gave us a saving in weight, especially where transmission components are concerned. We achieved this quite simply by utilising one of the popular front wheel drive transaxle units (Volkswagen Golf) which we then transplanted into the rear of our IKARA.

By using a mid-engined configuration, we also fulfilled two more of my design requirements. We gained an effective independent rear suspension (making the car fully-independent) and we could mount disc brakes on all four wheels.

The front suspension requirements were more than adequately filled by adapting Holden Gemini components. Independent front suspension with unequal length wishbones, disc brakes and very precise rack and pinion steering were coupled with an energy absorbing steering column system.

BALANCING THE BRAKES

One of the most important aspects of good handling is balance. By using an adjustable balance bar on the pedal unit (much the same system as found on today's racing cars) we were able to achieve surefooted braking right up to the limits of adhesion. By using larger 60 series tyres and 7" rims on the rear and the smaller 6" rims on the front (with anti-sway bar) we could offset the rear weight bias substantially. The result is a delicate near-neutrality of handling with a level of "controlability" absent from most production machinery.

AGILITY AND RESPONSE

These design parameters were achieved quite easily, but there is another factor in good handling that is not so easy to achieve; I think it is best described as "agility" — that elusive feel and responsiveness, which makes the car appear to be an almost supernatural extension of the driver's nerve endings. There is an almost telepathic sensitivity of the car to your needs even when you expect more of it than you should.

It is this innate responsiveness that gives the IKARA its high degree of 'primary safety' — accident avoidance.

We achieved this by building a lightweight. We used an efficient spaceframe chassis with 'step over the side' sills, clubman style. High strength to weight fibreglass body panels clothed the chassis module.

To achieve the low kerb weight of around 600 kg. we trimmed off all surface fat and the suprise is that we managed it without sacrificing the aspects of comfort and functional body styling we were so determined to retain.

SUPER LIGHT WHEELS

One of the critical aspects of handling on a light-weight is the unsprung-to-sprung weight ratio. By commissioning a special wheel to be built by Simmons we were able to cut the wheel weight from 9 kg. to 4.5 kg. While these wheels are comparatively expensive the advantage they give in handling as well as in appearance is unquestionable.

Another of my requirements was that the styling of the vehicle should reflect the functional business-like aspects of the car, yet offer a pleasing and highly individualised appearance. IKARA is basically a low slung tapering wedge shape dominated by the semi circular wheel arches. A highly raked windscreen and targa-enclosed roll bar enhance the simple geometric styling.

The "functionalism" can be seen in the external rear mounted spare wheel (excellent access to it!) and the freemounted headlight pods.

COMFORT WITH "FEEL"

I required the design to offer maximum comfort without losing the "feel" of the car. The seats were orthapaedically designed to give excellent support to the lower lumbar and under-thigh regions. The buckets are high sided at hip level to give maximum lateral location under the considerable "G" loadings when cornering, yet tapering off to allow freedom of movement for the upper part of the body.

Using an injected fibreglass shell and moulded high density foam this was achieved with the minimum possible weight.

Our dedication to the fundamental driving aspects of the car did not stop us from paying close attention to the details of the design. The fully moulded (soft) four-spoke steering wheel, specialised instruments with matt black rims, semi-concealed handbrake that falls easily to hand, sealed cockpit design to reduce engine noise, map light, two-speed self-parking wiper system with intermittent wiping action available, heater demist and fresh air footwell vent are all available. All these features and more reflect the thoroughness with which my design team approached the IKARA project.

A WORLD CAR

I specified one other major design criteria. The vehicle had to cater to world markets — our own version of the 'world car' concept. This meant that the design had to be acceptable to a wide range of componentry and stages of "build".

The transaxle engine configuration was chosen not only for reasons of handling mentioned previously, but also because these are the engines of the 80's. Nearly every major manufacturer will have (or already has) this configuration available. There are several reasons for this. **Firstly,** it is the most inexpensive way to achieve a motor transmission system when utilising it as a front wheel drive layout. Then, it is power-efficient — that is, a greater percentage of the power developed at the engine actually gets through to the wheels. Finally, it is lightweight, and every kilogram saved helps in the efforts towards fuel economy and economy of operation.

Because of this world trend, engine development is centered around 4-cylinder engines used in front wheel drive configuration. Many of the advances in combustion efficiency, pollution-reduction, turbocharging, and fuel economy indicate that substantial technological breakthroughs will occur in this area. The IKARA will always be well placed to take advantage of this process.

My first self-built car — Model No. B1.

WHY THE VW GOLF?

The motor I chose for the Australian market is the VW Golf. It is a small and light high performance engine with possibilities in diesel or gas-powered form. It lends itself to turbocharging and has earned itself a reputation for responding well to performance tuning. Some Golf engines are currently produced in excess of 180 bhp in Australia and many performance options are becoming available.

PERFORMANCE IN A KIT

I decided that for many reasons the Australian version of the IKARA would only be marketed in kit form.

The over-riding reason was that we could provide such exceptional value for money, thus making the IKARA driving experience something most people could enjoy.

Savings are made because the customer provides his own

labour and aside from enjoying the experience of creating his own car there are other benefits. Our constructor usually achieves a better quality-control without "production line" type problems, and he ends up with a much better understanding of the machinery he drives. **This is what this book is all about.**

APPROVED ASSEMBLERS

For those who don't think they can do the job themselves, or simply don't have the time, we have approved assemblers throughout Australia.

This book is designed to assist the IKARA builder. It is designed to not only explain in words and photographs how to build, but also to help you with some of the aspects of competition tuning, driving techniques, maintenance and service. It has a full list of components, tools required and many suggestions that will help you achieve the best results. A full flow-chart and electrical wiring loom diagram will help you plan your "build" from start to finish.

I believe we have achieved all my objectives and in some aspects we have exceeded them. We have not compromised our original aim to produce the ultimate driving machine for the road. The IKARA will put new meaning into the word 'sports car' and will set new standards for handling safety and performance. It is **not** designed to be everybody's car, it **doesn't** pretend to do more than it was designed for. But I promise you this, IKARA will endear itself to you like no other car does.

If you have "performance and safety driving", in your blood, your driver's days are here!

Enjoy them now with your own BOLWELL IKARA.

Campbell R. Bolwell
CHAIRMAN & MANAGING DIRECTOR.
BOLWELL DEVELOPMENTS — AUTOMOTIVE PTY. LTD.

PROJECT GUIDE

SECTION B — PANEL IDENTIFICATION
SECTION C — PANEL PREPARATION
SECTION D — SUB-ASSEMBLY
SECTION E — ASSEMBLY
SECTION F — TESTING AND DEVELOPMENT

Fibreglass has been around for more than 30 years, and a lot has been said for and against it. As the years passed since its initial development, the "chemistry" of fibreglass has improved to the point where it is now regarded as one of the most useful, lasting, structurally-sound and flexible materials in industry.

The engineers will vouch for its tensile strength, its impact resistance, and its versatility of application.

PANEL IDENTIFICATION

Those who own boats, aircraft or other equipment where fibreglass is used fully or in part, are more than happy to attest to its ease of maintenance and repair, its attractive appearance, and its capacity for achieving quite involved shapes and curves not possible with conventional steel or other metal materials.

The obvious advantages of strength-to-weight ratios, appearance and versatility make it mandatory for use in the new Bolwell Ikara — and to a degree in excess of most, if not all, previous automotive applications.

To put down any "fairytales" that might still persist about fibreglass, it is probably useful to take a look at what it is and does. As acknowledged industry leaders in the production of fibreglass reinforced plastic (FRP) products, the Bolwell Fibreglass Group is best placed to explain the ins-and-outs of this material-of-tomorrow.

The principle of using a fibrous material to reinforce another more "plastic" substance, has been around for centuries.

The crude mud bricks found in the Mediterranean and South and Central America are typical examples — the "plastic" material (the mud clay) is mixed with dry straw and allowed to set in the sun. These mud bricks last for centuries and are very strong.

Australia's early settlers used a similar technique — wattle and daub — to build their pioneer huts. The "daub" was simply clay reinforced with the bark from the ubiquitous stringybark eucalypt, and stuffed into the cracks to weatherproof the hut.

The development of plaster-board incorporated a related technique — a fibrous mat material mixed with plaster to become fibrous-plaster.

FRP or fibreglass reinforced plastic is simply these techniques given space-age materials — glass fibres and thermo-setting synthetic resins.

Modern, tough, hard-wearing synthetic resins or "plastic", teamed with a mesh of fine, indestructible glass fibre makes one of the most "unbreakable" panelling or structural materials available today.

The additional advantages of excellent heat and sound-proofing qualities plus versatility in manufacture, makes it a truly desirable product in the making of a motor-car.

Now let's take a more detailed look at this wonder-product.

Fibreglass reinforced plastics as we know them are thought to have been first used in Germany in the production of the infamous V Rockets. They became a commercially viable material in the mid 1940s with the introduction of polyester resins, the non-interference with radio

MATERIAL	GLASS CONTENT %	SPECIFIC GRAVITY	TENSILE STRENGTH LBS/SQ	MODULUS OF ELASTICITY	SPECIFIC STRENGTH OR STRENGTH/WEIGHT RATIO
Polyester/Glass Rovings	70	1.9	120,000	4×10^6	63
Polyester/Glass Cloth	55	1.7	45,000	2×10^6	26
Polyester/Glass Matt	30	1.4	15,000	1×10^6	11
Mild Steel	—	7.8	60,000	30×10^6	8

waves leading to their extensive use for radar housings on combat aircraft in the latter stages of the Second World War. Since then, the use of FRP in the aerospace industry has escalated with the introduction of new and more sophisticated resins and fibres such as epoxies, boron-coated tungsten filaments and carbon fibres, all aimed at improving the strength-to-weight ratio of reinforced plastic components.

Some of the more common FRP applications today are:—

- Marine — boat hulls and superstructure.
- Industrial — roof sheeting and facade panels, machinery housing and safety shrouds.
- Recreational — playgrounds, swimming pools, fishing rods.
- Automotive — shrouds, panels, scoops, air-dams and other bolt-on options.

The table above gives a comparison between different laminates and mild steel, including their respective strength to weight ratios.

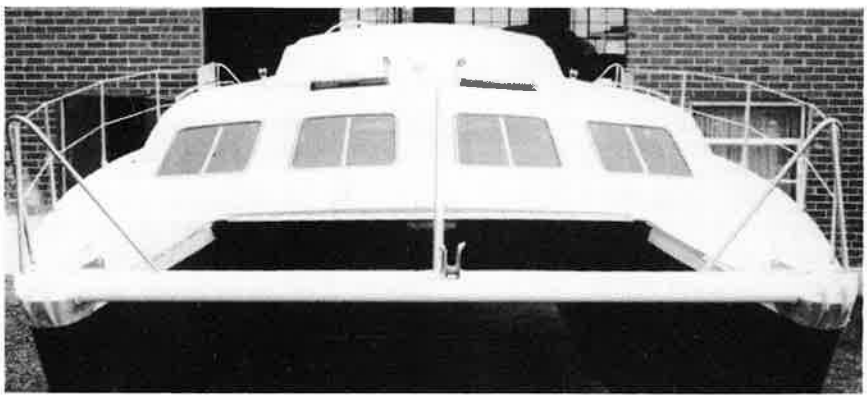
"GLASS" MINESWEEPER

As shown in the table, FRP components can be considerably stronger and at the same time lighter than steel components. However, the cost factor in producing components from FRP currently confines its use to specific areas such as low volume production, complex shapes, or applications where the inherent properties of FRP render it superior in performance to metallic components.

Some of the more exotic applications include the recently launched 61 metre all-FRP minehunter for the Royal Navy (in 1978), with more such vessels currently under construction. The advantages are two-fold in that the FRP hull does not attract magnetic mines but does offer increased impact strength, rendering the ship less susceptible to explosion damage.

Experimental military aircraft are now under development which are structurally built wholly from reinforced plastics. They are lighter, more manoeuvrable at high speeds and better able to elude radar detection.

In production motor vehicles, plastics are performing an ever-increasing role in the industry's search for weight savings and production efficiencies. A classic example is the case where one FRP nose section moulding on a modern car replaced sixty seven individual metal components. Current energy conservation trends demand that the cars of the future be increasingly lightened, yet conform to ever more stringent safety requirements. As a result tomorrow's motor vehicles will utilise even greater quantities of plastics, reaching the point where they will constitute the major input material used (if not 100%) in automotive body construction.



. . . and how is it used in the IKARA?

All the IKARA body components are moulded in FRP, the most suitable medium for the production of low volume specialised motor vehicles. In terms of tensile strength, bending strength and stiffness FRP is cost competitive with steel, yet allows for greater flexibility in form (shape) for a fraction of the tooling cost.

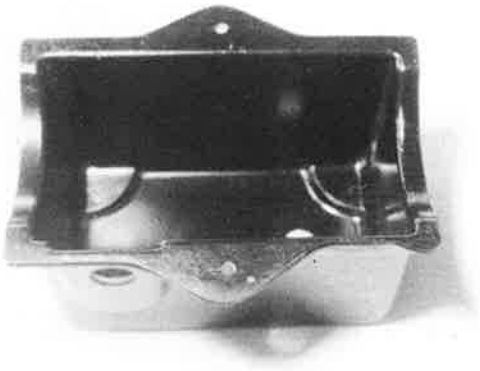
Two moulding methods are used in the production of the IKARA:—

1. Contact moulding where the laminate is formed in an open mould.
2. Injection moulding which uses closed moulds to give controlled tolerances and a smooth reverse surface. The choice of system used for each panel is based on the panel's complexity, application and projected volume.
   The injection moulding of FRP is a state-of-the-art fibreglass production technique in which Bolwell is one of Australia's leading specialists.

Regardless of which moulding system is used however, the materials incorporated have been chosen specifically for the product. The outer layer, the gelcoat, which is a coloured and modified resin, provides the gloss surface and a weathering barrier for the underlying laminate. The specially developed isophthalic resin used in the laminate offers greatly improved mechanical and physical properties throughout the range of temperature extremes in which the motor vehicle will operate.

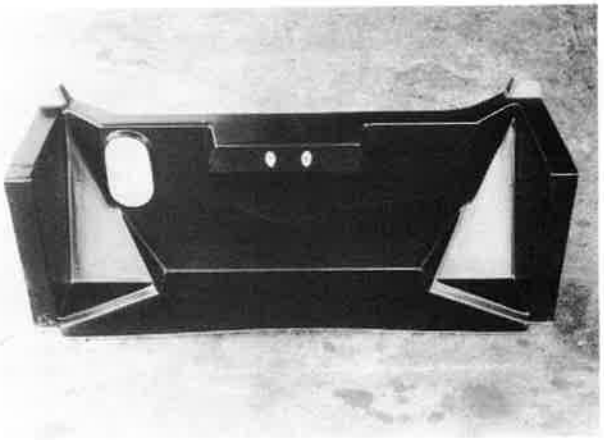
The core materials used selectively in the construction are incorporated to locally stress certain areas without adding unduly to the weight. The nett result is a vehicle which uses to best advantage the desirable properties of its raw materials, which compromises least in attaining the design objectives.

This section is to enable ready identification of each body component received with your kit. The panels as depicted have been trimmed ready for assembly.

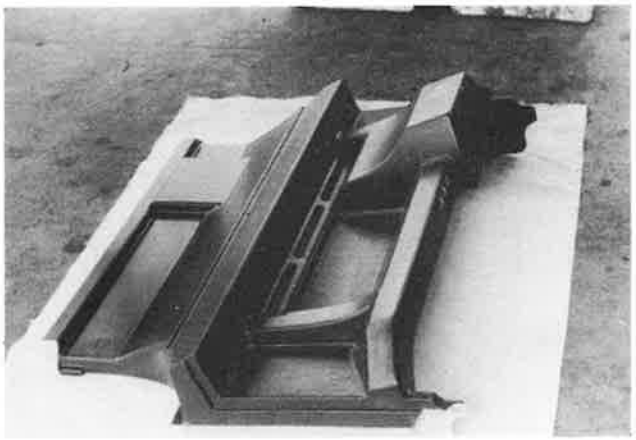


B4 BATTERY BOX

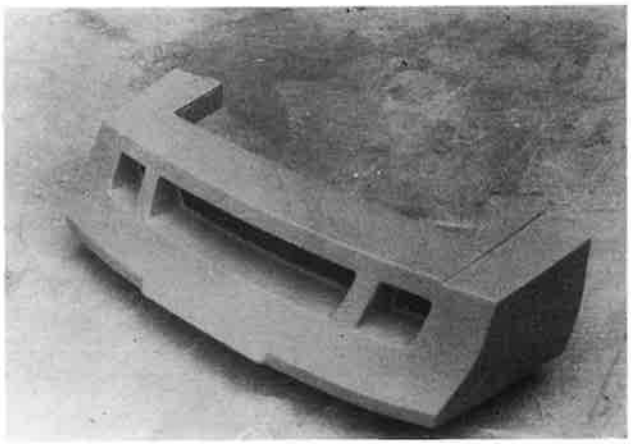
B1 FLOORPAN



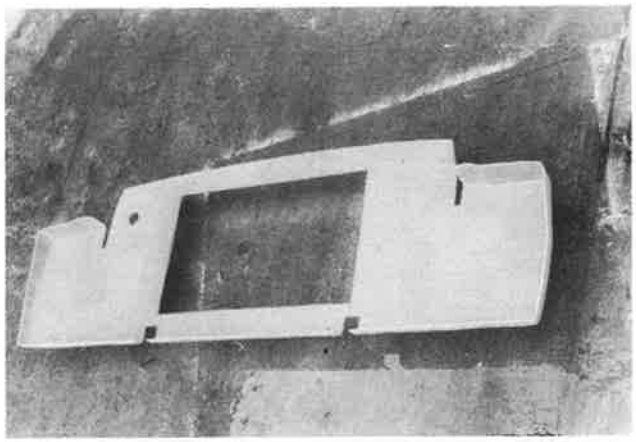
B5 SPARE WHEEL MOUNT



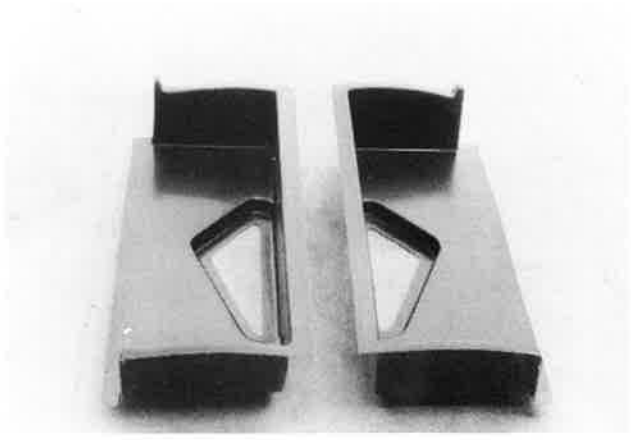
B2 FOOTWELL COVER/DASHBOARD



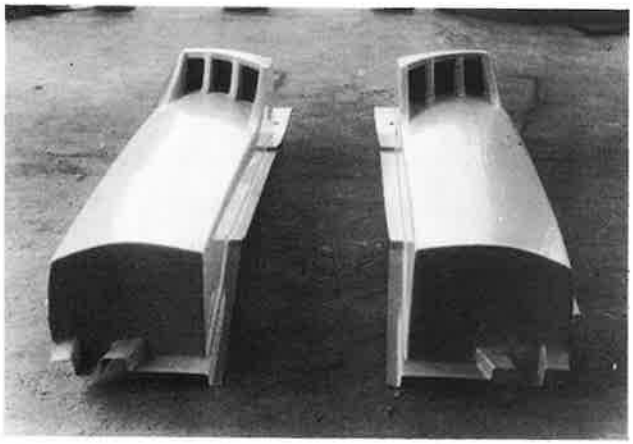
B6 NOSE CONE



B3 RADIATOR BAFFLE

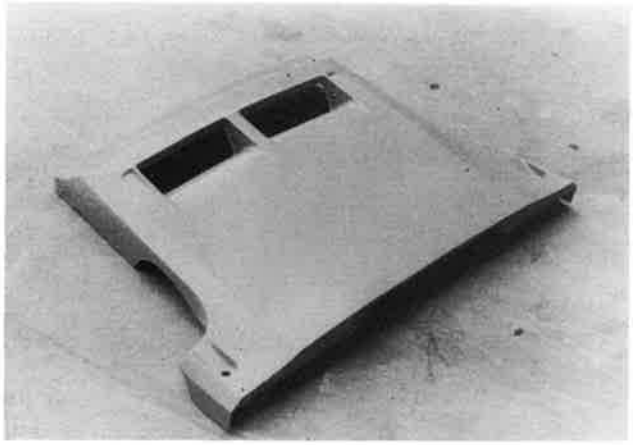


B7 SIDE POCKETS (PAIR)

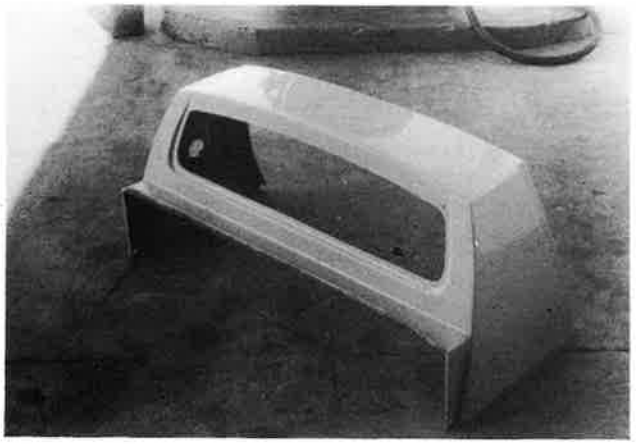


B8 SIDE PONTOONS (PAIR)

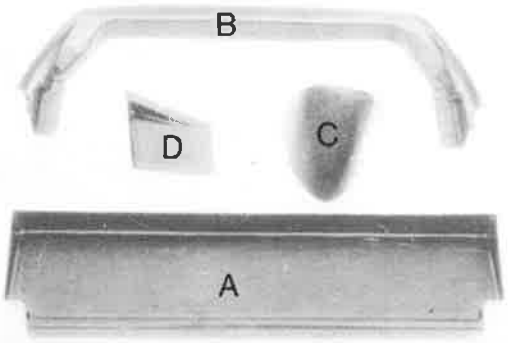
B9 FRONT MUDGUARD (LHS SHOWN)



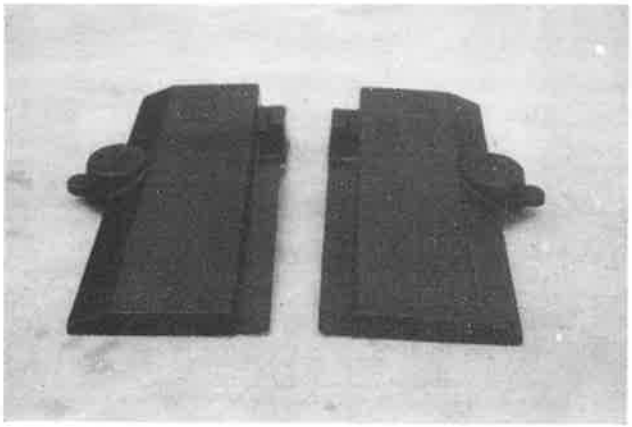
B10 FRONT BONNET



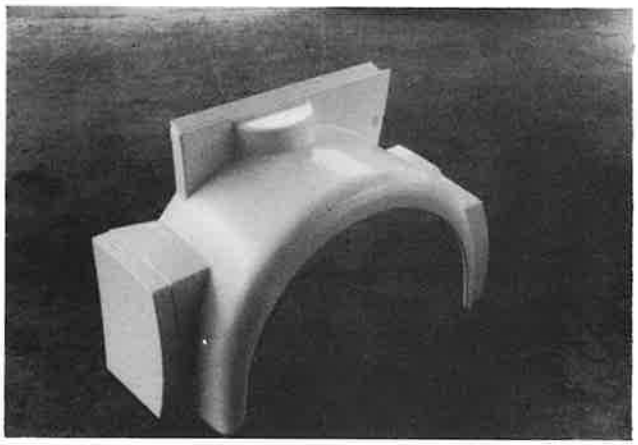
B11 TARGA PANEL



B12 PARCEL TRAY (A), ROLL BAR COVER (B). FUEL FILLER NECK COVER (C), THROTTLE PEDAL INSERT (D).

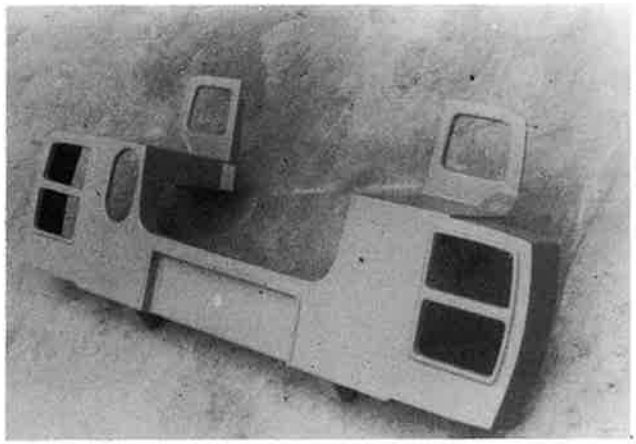


B13 ENGINE COVER SIDE PANELS (PAIR)

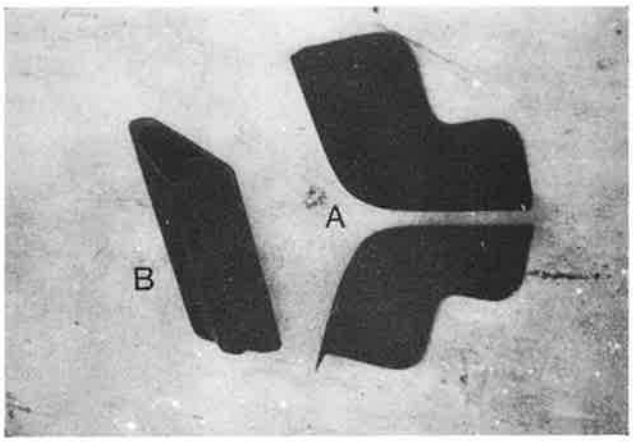


B14 REAR MUDGUARD (RHS SHOWN)

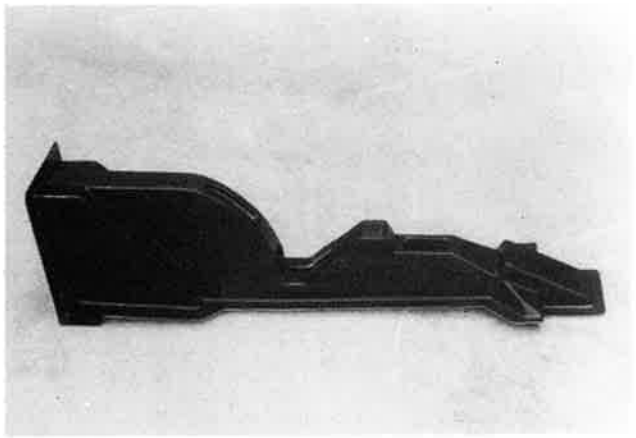
B15 ENGINE HOOD



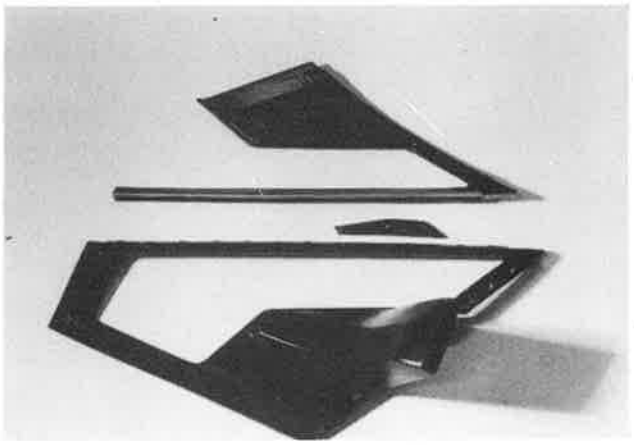
B16 REAR PANEL



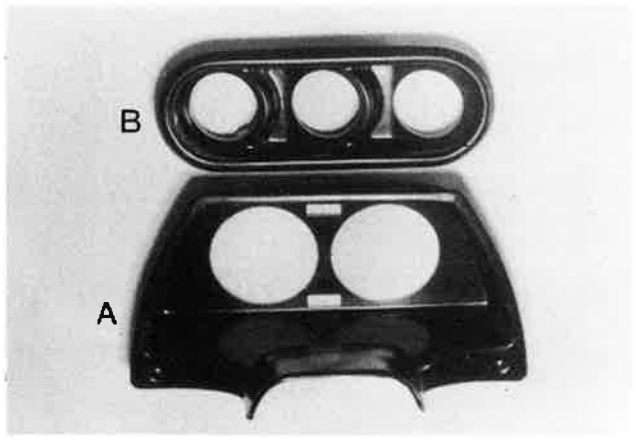
B20 SPLASH GUARDS, FRONT (A), FOOTREST (B).



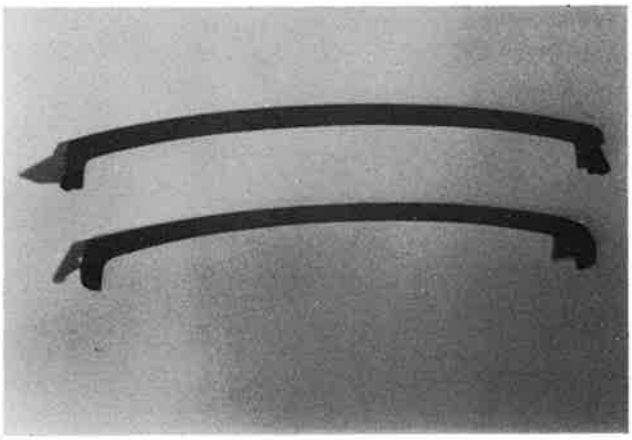
B17 CONSOLE



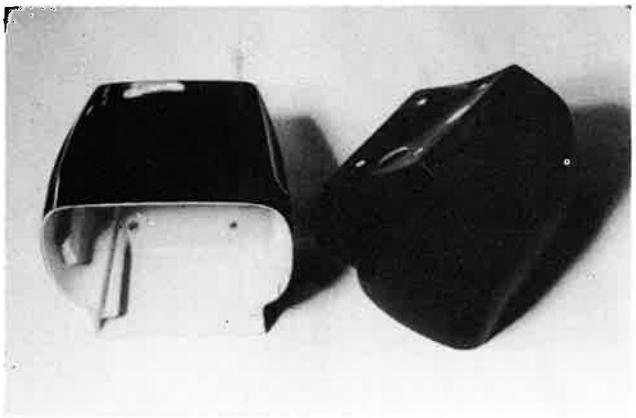
B21 WINDSCREEN FRAME — SIDE



B18 INSTRUMENT PANELS:
PRIMARY (A) & SECONDARY (B).



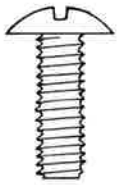
B22 WINDSCREEN FRAME — UPPER



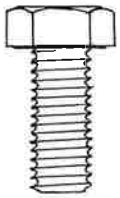
B19 HEADLIGHT PODS (PAIR)

GUIDE TO FASTENERS

As a further aid to identification, the following guide to fasteners is provided.



1. Mushroom headed bolt.



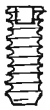
2. Engine bolt.

3. Socket head Unbrako.

4. Countersunk socket head Unbrako.

5. Body bolt.

6. Countersunk metal thread.

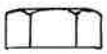


7. Socket set screw.

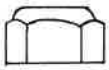
8. Pan-head self-tapping screw.

9. Countersunk self-tapping screw.

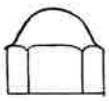
10. Raised-head self-tapping screw.



11. Plain nut.



12. Conelock nut.



13. Dome nut.

14. Serrated pop rivet, for fastening into plastic or fibreglass.

15. Plain pop rivet, for fastening into steel.

16. Plastic cover plug (used inside windscreen frame).

ADDITIONAL COMPONENTS

In addition to the Bolwell supplied components the following additional parts must be obtained.

HOLDEN GEMINI — all models

1. Handbrake assembly complete with pull rod, grommet and balance bar.
2. Front suspension assembly including wishbones, vertical links, brake discs, calipers, hubs, bolts and nuts.
3. Steering rack complete with tie rod ends, nuts and bolts.
4. Steering column assembly complete with shroud trims, control stalks, steering wheel nut.

FIAT 124 Coupe or Sports, or **FIAT 125**

1. Rear brake calipers with bolts.
2. Handbrake cables.

VOLKSWAGEN GOLF — all models

1. Engine, gearbox, transaxle assembly.
2. Halfshafts.
3. Strut assemblies including springs, bearings, discs, caliper bolts, wheel nuts.
4. Lower control arms with bushes.
5. Tie rod ends.
6. Speedo cable.
7. Fuel tank cap, lockable.

TOOLS REQUIRED

Power:
Drill
Angle Grinder

Hand:
Assorted files
Assorted screwdrivers
Assorted spanners
Assorted allen keys
Assorted G-clamps
Assorted spring clamps
Pop rivet pliers
Hack saw
Pad saw
Pliers
Nutsert tool
Silicone gun
Tin snips
Stanley knife
Scissors

Attachments:
Set of H.S. drills
Set of holesaws
Set of taps
25mm (1") barrel sander
50mm (2") barrel sander
Diamond saw blade
Rubber backing pad, grinder
Rubber backing pad, drill
6mm (¼") rotary file
12mm (½") rotary file
90° rose bit (countersinking)

Expendables:
40 grit grinding discs
Buffing bonnets
Assorted production paper
Assorted wet & dry paper.

BOLWELL FIBREGLASS.

Moulding Australia's future.

The Bolwell Group of Companies has become an acknowledged leader nationally in F.R.P. technology. The Group has achieved this standing by pioneering new and highly innovative methods of construction in an industry which is new and exciting — a participant in an era of rapid technical advancement.

Group Managing Director, Campbell Bolwell, says:-
"We design our way around problems. We are able to offer clients fundamental changes in design to make their product more efficient and functional. It's all part of the job — service, skill and experience.

The Group builds large and small componentry, from automotive fan shrouds to ocean-going yachts.

Clients include many of Australia's leading manufacturers.

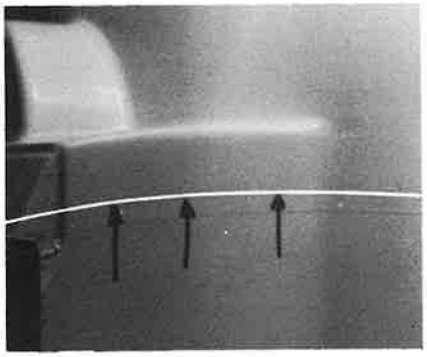
The new IKARA is only one example of Bolwell technology.

EFFICIENCY THROUGH DESIGN

BOLWELL FIBREGLASS PTY. LTD.
Cnr. Wells and Boundary Rds.
MORDIALLOC 3195 AUSTRALIA
Phone (03) 90 7084, 90 8396
A Member of the Bolwell Group of Companies

Fibreglass is probably one of the easiest materials around to work with — but it is still necessary to follow some basic rules to achieve the very best results.

It is the attention to detail at this point in building your car which determines whether it is another "backyard special" or a top quality automobile.



C1

PANEL PREPARATION

Certain basic operations are common in the preparation of any fibreglass panel and we list below some general pointers:—

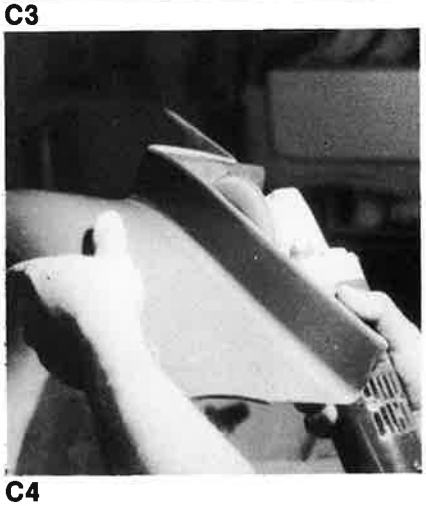
1. Read the instructions for each panel carefully, noting the relevant points and precautions to take. Remember that undue haste at any time during the build can eventually slow the project and lessen the result. Instead, complete each step carefully and in sequence.
2. Always ensure that the rotation of your sanding disc or drum is **AWAY** from the gelcoat and towards the laminate or "rough" side of the panel. In other words, always sand from the "good" side towards the "rough" side — this will prevent any scarring or chipping of that all-important body-colour finish.
3. Always wear a paper mask or respirator when cutting or sanding any fibreglass.
4. Trim the panels to the **inside of the moulded line** (see Figure C1). Certain panels may require "fine-fitting" during final assembly — patience makes perfect!
5. When sanding the edges it is easier to "eye-gauge" a true line while looking **along** the edge (see Figure C2). Just like putting a straight-edge on a timber plank.
6. Sand the **reverse** side to remove any glass fibre spines which may be present. This also prepares the surface for painting. Some body panels must be painted on the reverse (as indicated in the text). However, you may wish to paint the reverse sides of all the panels. We recommend spraying with an aerosol pack (see Figure C3), though they may be painted with a brush. In either case it will save time and heartache if the face surface is masked before painting.
7. All bonding flanges **must** be sanded before joining to ensure adhesion.

C2

8. Some panels utilise a moulded radius which terminates at the panel edge as marked. This is designed to eradicate raw-cut panel edges and thus maintain a high level of detail finish. However, they must be handled carefully during preparation to prevent damage — whether by cutting incorrectly or by chipping the gelcoat. (see Figure C4). They should also be sanded to an even thickness.
9. During the fabrication of fibreglass panels the heat generated by the curing process may imprint a glass pattern onto the surface gelcoat. This can be removed by rubbing the panel back with 1200 wet and dry paper on a block, then cut and polish. **NOTE:** Some cutting compounds tend to discolour the gelcoat; use white only.

These are the general "rules" about preparing and handling your IKARA panels — remember, care and attention to detail, patience and "doing it right" will give you a connoisseur's result.

C3



C4

Now let's get down to the real business of building . . .

COCKPIT/FLOORPAN: FIGURE B1

C5

Trim, sand edges smooth and true. Sand reverse side.

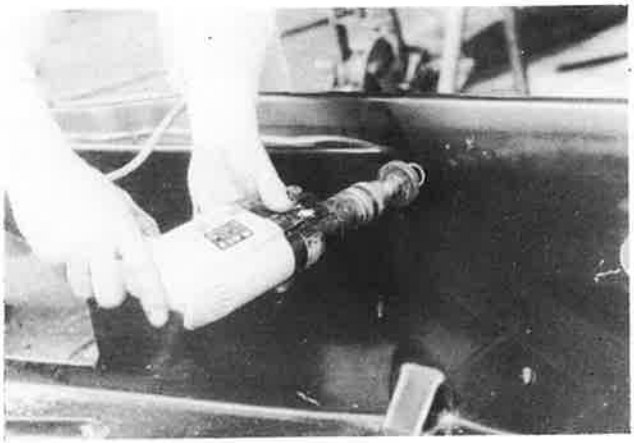
C6, C7

Cut out side pocket and throttle pedal recesses as marked; sand all edges with drum (corners) and disc sanders.

C8

Using a 38mm (1½") holesaw, drill three (3) master-cylinder mounting holes where dimples indicate. Drill two 16mm (5/8") front mounting holes for pedal unit above master-cylinder holes, where dimpled.

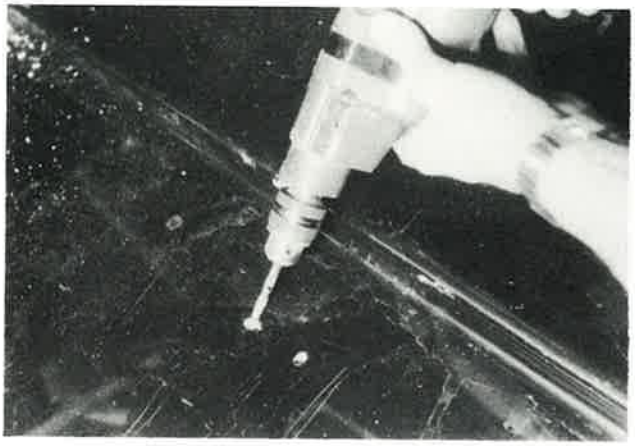
C9
Drill two 12mm (½") front mounting holes for the upper chassis frame, where dimpled.



C10
Using a 25mm (1") holesaw drill two bulkhead mounting holes for the upper chassis frame where dimpled.

C11
Using a 25mm (1") holesaw drill two holes through rear bulkhead where dimpled.

C12
Drill and cut holes for ashtrays where marked.



Cut a 25mm x 12mm (1'' x ½'') oval hole forward of L.H.S. of bulkhead, as marked, for speedo cable.

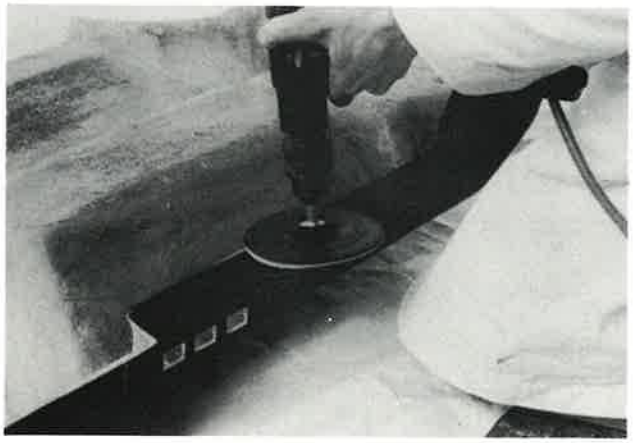
C13
Drill two 6mm (¼'') holes forward of centre ridge in floorpan where dimpled. Elongate on an angle for air control cables.
Drill a 25mm (1'') hole on top R.H.S. front platform where dimpled for wiring loom.

C14
Trial fit unit into chassis and relieve any tight spots. Specifically check:—

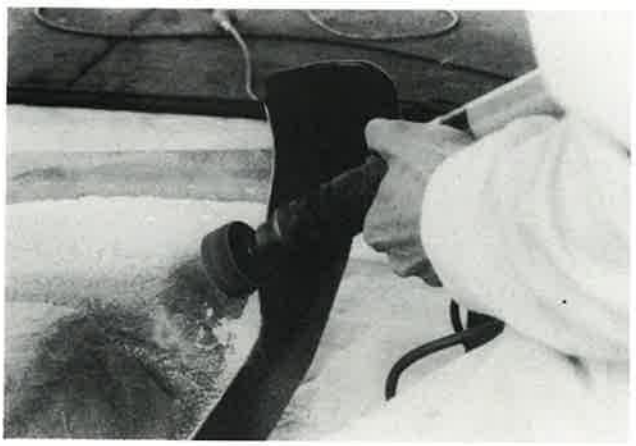
- Clearance under top front flange.
- That all holes line up with chassis equivalent.
  Relieve with small round file if necessary.
- Clearance around seat-belt reel mounts (see Figure 15 in Section E)

FOOTWELL COVER/DASHBOARD

FIGURE B2



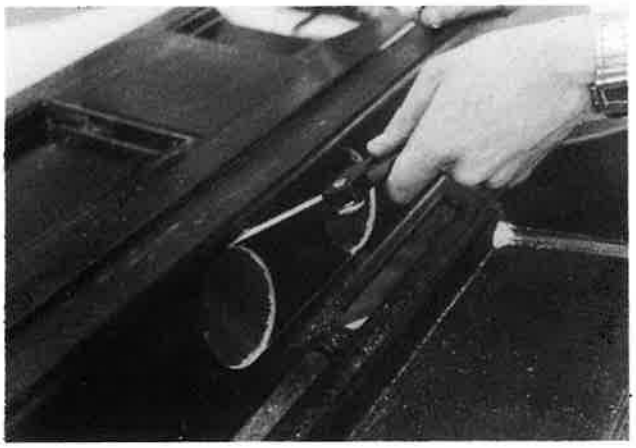
C15, 16
Trim, sand edges smooth and true. Sand reverse side.



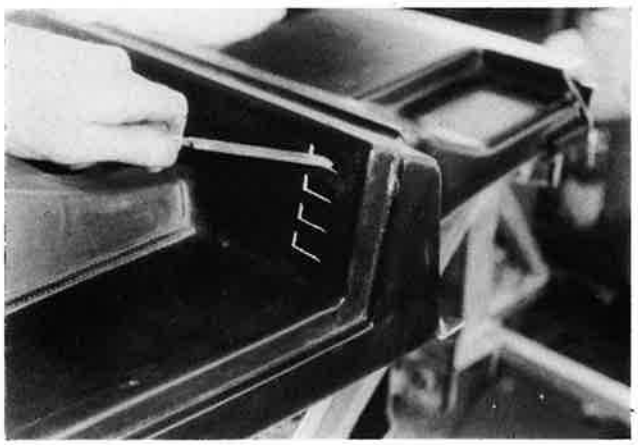
C17
Sand off bases of demist vents from underneath to reveal neat opening.

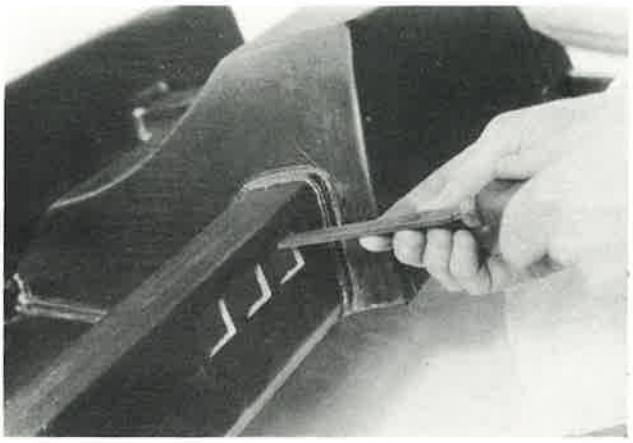
C18
Using a 76mm (3") holesaw drill two holes on vertical face forward of demist vents where dimpled. (There are three dimples: use only the two right hand ones unless specified in optional instrument kit).

C19
Using a pad saw, cut between holes as shown, to cut opening for secondary instrument panel.

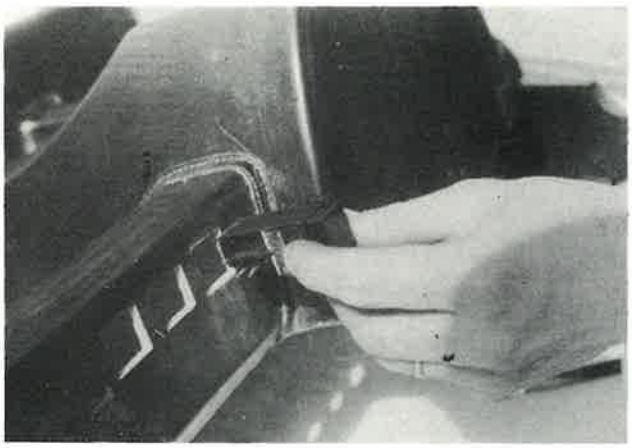


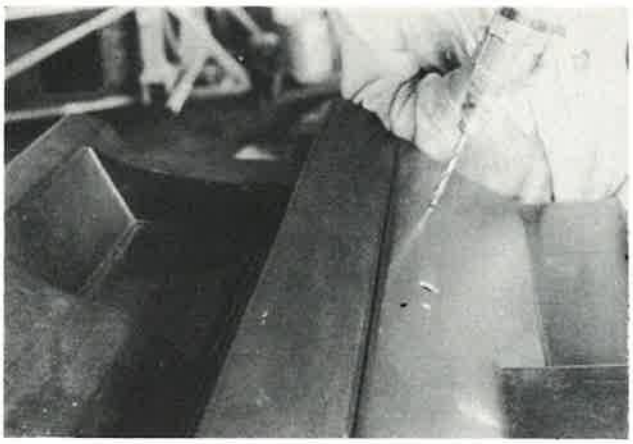
C20
Cut four rectangular holes for warning lights 27mm x 11mm (1/16" x 7/16") on far right hand side of same vertical face as marked and file to **minimum** clearance fit. **NOTE: do not fit lights.**





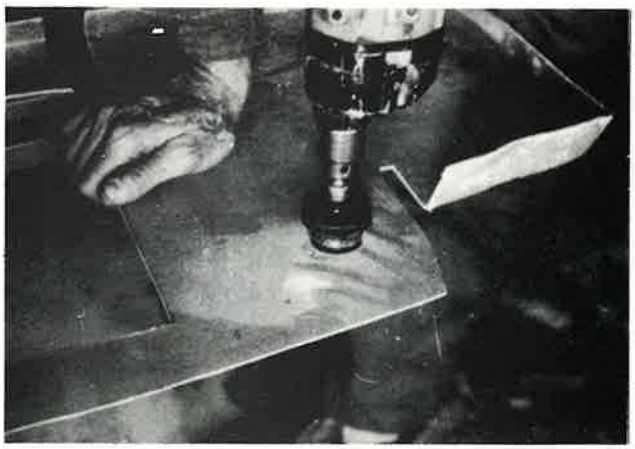
C21, 22
Cut three rectangular holes for switches 27mm x 23mm (1-1/32" x 29/32") on rear vertical face as marked and file to **minimum** clearance fit. **NOTE: do not fit switches.**





Drill four 5mm (3/16") holes for grab handle where dimpled to left of switch holes.
Drill a 14mm (9/16") hole for instrument light dimmer switch where dimpled to the R.H.S. of main instrument pod.

C23
Drill one 8mm (5/16") hole on R.H.S. for washer nozzle where dimpled. Drill one 16mm (5/8") hole for main wiper pivot post where dimpled.
Drill one 9mm (3/8") hole for pantograph support arm pivot assembly where dimpled.



RADIATOR BAFFLE FIGURE B3

Trim, sand smooth and cut out radiator aperture. Sand edges and de-burr.

C24
Using a 35 mm (1-3/8") holesaw, drill one hole on upper left hand side where dimpled.
Sand panel and paint matt black (except for bonding flange).

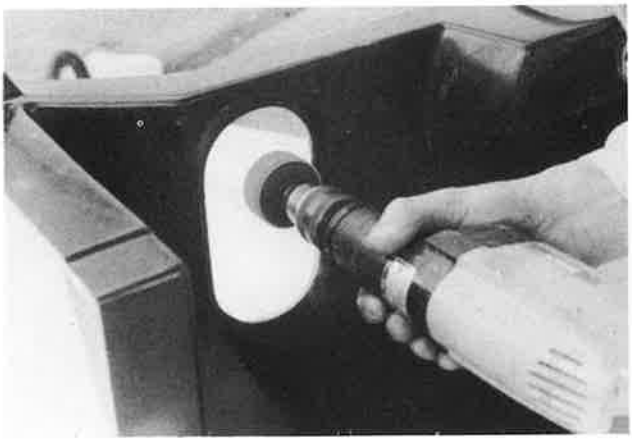
BATTERY BOX FIGURE B4

Trim, sand edges true and smooth.

C25
Using retaining bracket as a template, drill two 6mm (¼") holes on top flange.

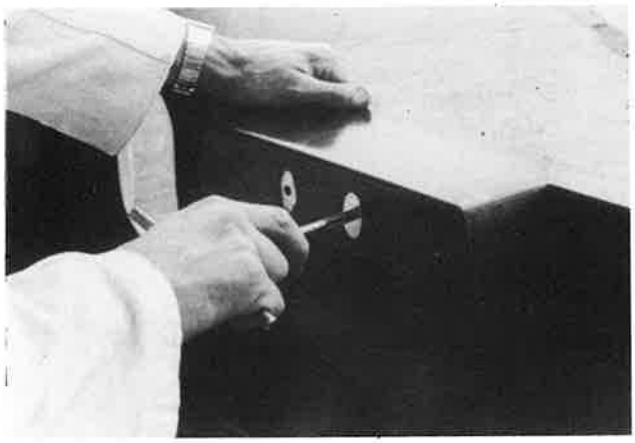
C26
Using a 32mm (1¼") holesaw, drill through the recessed portion of the box, as high up as possible.
Drill one 10mm (3/8") hole in centre of base (drain hole).

SPARE WHEEL MOUNT FIGURE B5

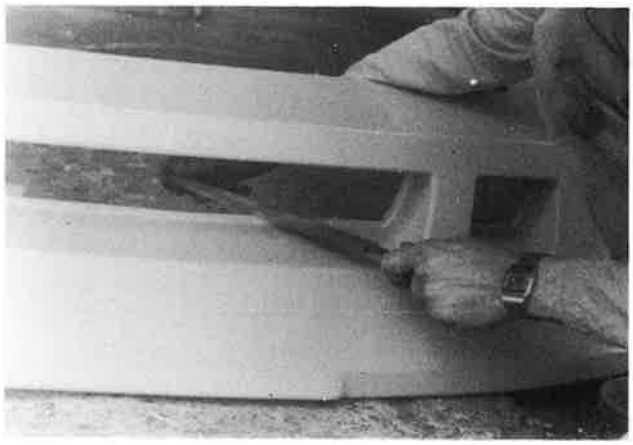


Trim, sand edges true and smooth.

C27
Sand reverse side, cut out exhaust pipe clearance hole and sand back neatly using drum sander.



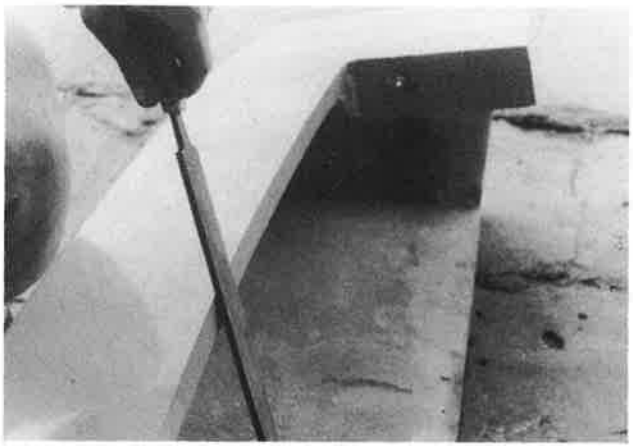
C28
Tap a 3/8" Whitworth thread into each bobbin casting to accept spare wheel retaining bolts. Paint reverse side of panel matt black. Mask to avoid overspray.



NOSE CONE FIGURE B6

Trim, sand edges true and smooth.

C29
Sand reverse side and clean around inside of bobbin castings. Cut out front openings as marked and sand from inside to reveal neat edge.

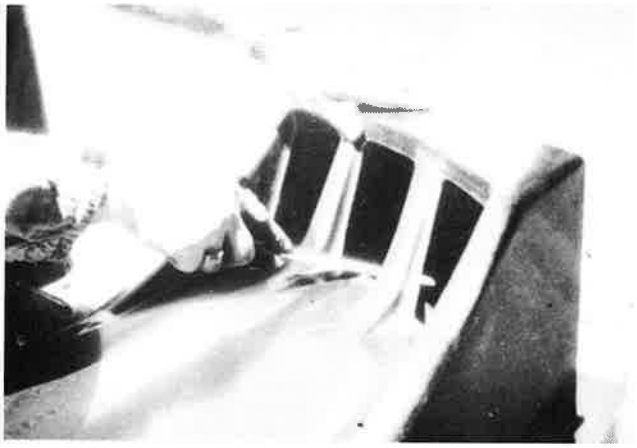


C30
Carefully file the flashing around the bonnet edge opening. **NOTE:** FILE ONLY DOWNWARDS AGAINST THE PANEL, NEVER AWAY FROM THE EDGE OR THE GELCOAT MAY CHIP. **USE A FINE FILE.** When all the flashing is removed, rub the join with 360 grit followed by 1200 grit wet and dry. Cut and polish the edge which will now have a small, even radius.
Paint reverse side matt black. Mask to avoid overspray.

SIDE POCKETS (PAIR) FIGURE B7

Trim panels to shape, leaving approximately 25mm (1") around the edge for jointing. Sand reverse side.

C31
Cut a hole in the access opening, but keep it smaller than the corresponding opening in the cockpit/floorpan moulding. This is to allow the final aperture to be accurately finished after installation. Heavily sand the bonding edge.



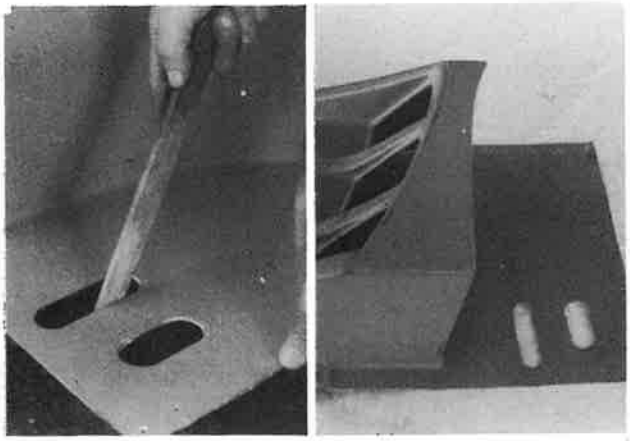
SIDE PONTOONS (PAIR) FIGURE B8

Sand edges smooth and true. Sand reverse side.

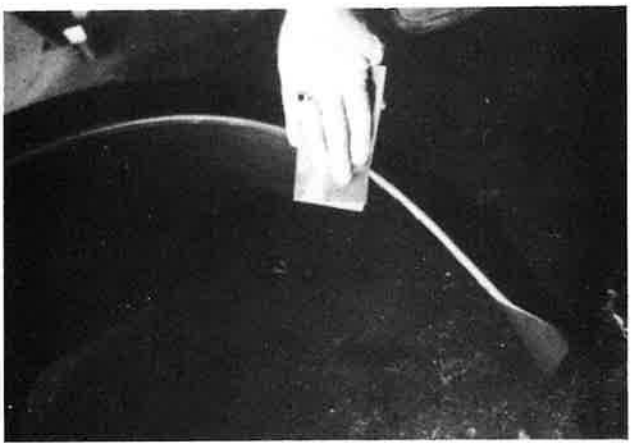
C32
Cut out air intake holes as marked and file carefully to a neat edge.

C33, 34

Using a 25mm (1") holesaw and a pad saw drill holes and cut into slots for handbrake cables as marked. Using a 38mm (1½") holesaw and a file, drill holes and file into slots for water pipes as marked.



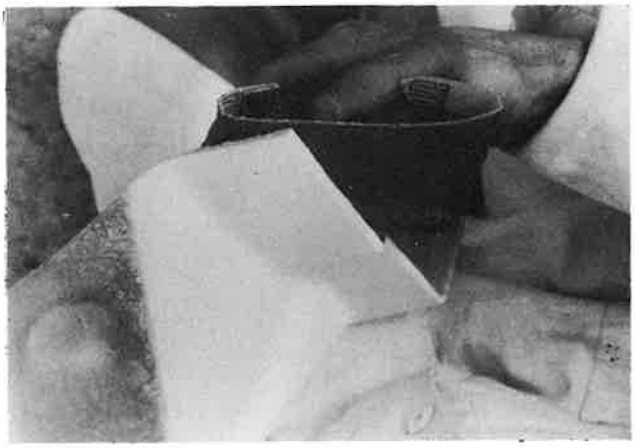
FRONT MUDGUARDS (PAIR) FIGURE B9



Trim, sand edges smooth and true. Sand reverse side.

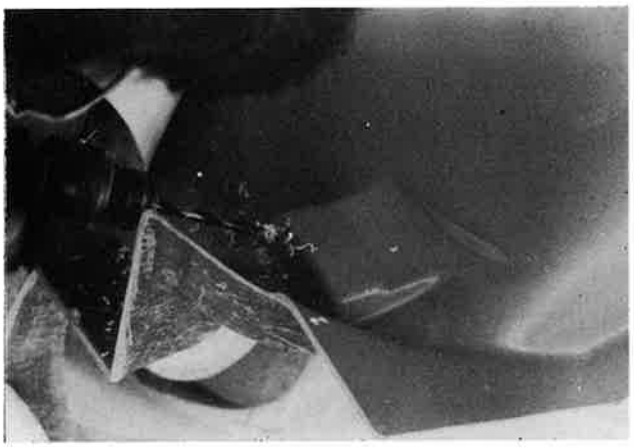
C35

Using 1200 grit wet and dry, rub the outside radius, cut and polish.



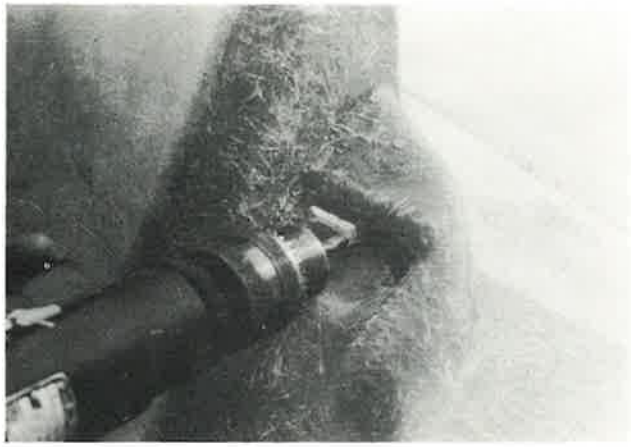
C36

Prepare the mudguard fixing flanges which are designed to retain, when finished, the moulded radius edge. Trim the guards as close as possible to the radius edge, then fine-finish from the INSIDE to avoid damage. Smooth the flanges down to an even thickness to enable a close fit when assembling.

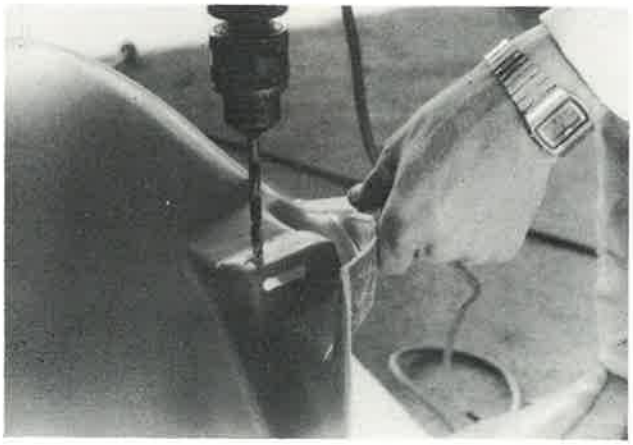


C37, 38

Drill a 6mm (¼") hole in the bonnet lock mound as marked. Using a rotary file from the inside, slot this hole as marked. File smooth and even.



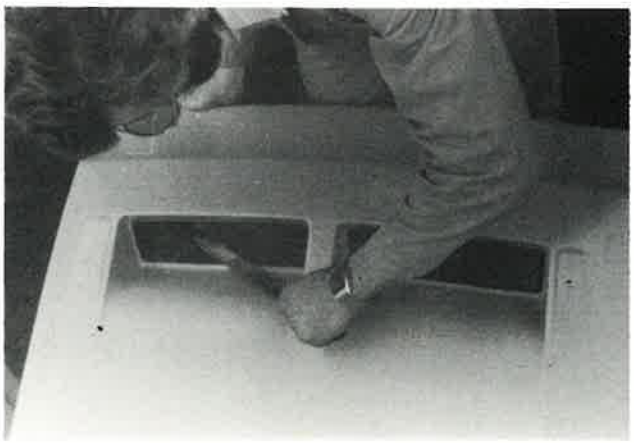
C38



C39
Drill a 6mm (¼'') hole through the top of the mound where dimpled for the adjustable bump stop.

C40
Drill four 6mm (¼'') holes where dimpled in the guard face for headlight pod mounting and elongate as marked.
Using a 25mm (1'') holesaw drill wiring access hole where dimpled.

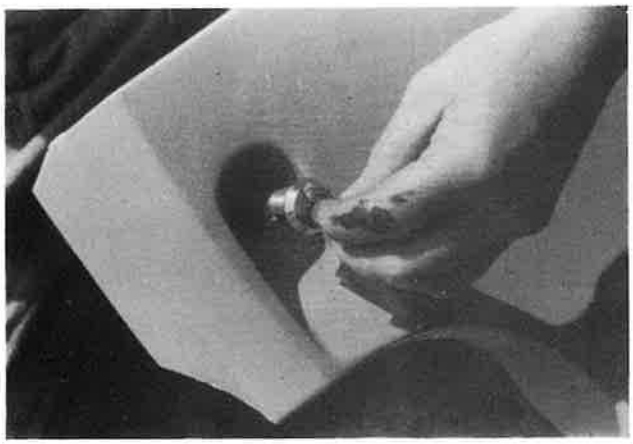
FRONT BONNET FIGURE B10



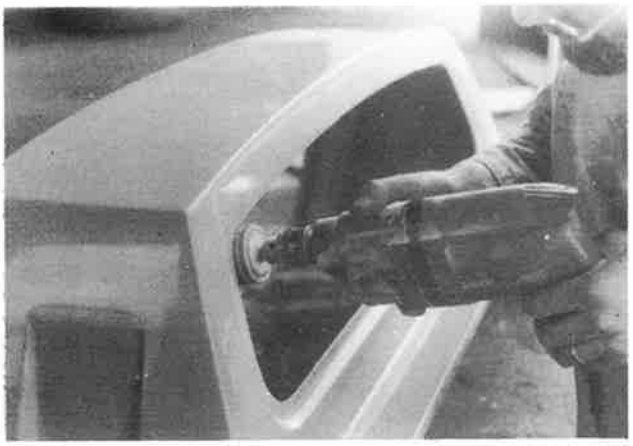
Trim, sand edges, smooth and true. Sand reverse side and clean around inside of bobbin castings.

C41
Cut out air outlet vents as marked and sand smooth and even.

C42
Using a 3mm (1/8") drill, cut holes for bonnet locks as marked, filing to achieve final shape. It is most important that these holes be **minimum** tolerance, particularly on the flat side.
Paint reverse side of the panel matt black. Mask to avoid overspray.

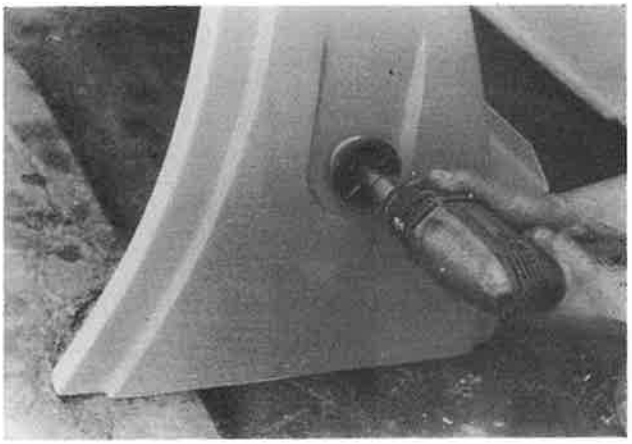


TARGA PANEL FIGURE B11



Trim, sand smooth and true. Sand reverse side.

C43
Cut rear window opening as marked and sand true.



C44
Using a 51mm (2") holesaw, drill fuel filler neck hole where marked. **NOTE: Maximum laminate thickness at this point should be 3mm (1/8"). If the panel exceeds this, sand back from the inside to achieve correct thickness.**

C45
Carefully shape front flange edge as this edge will be visible on the finished vehicle. Use a sanding block to achieve final line. Paint reverse side and edge matt black. Mask to avoid overspray.

PARCEL TRAY FIGURE B12

Trim, sand edges smooth and true. Sand reverse side.

ROLL BAR COVER FIGURE B12

Trim, sand edges smooth and true. Sand reverse side.

FUEL FILLER NECK COVER FIGURE B12

Trim, sand edges smooth and true. Sand reverse side.

THROTTLE PEDAL INSERT FIGURE B12

Trim, sand edges smooth and true. Sand reverse side.

C46

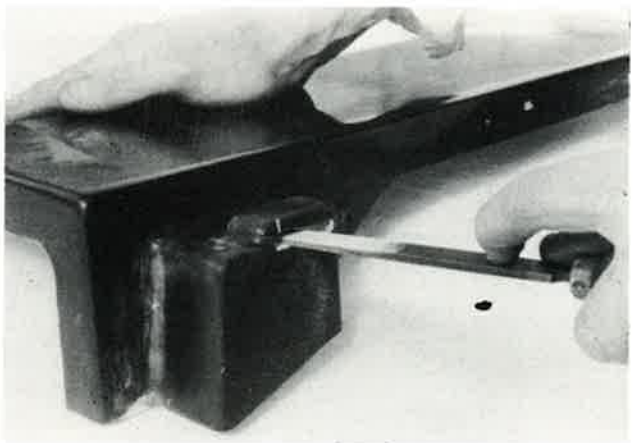
Trial fit to cockpit/floorpan cutout and ensure that flange sits flush all round. Relieve if necessary.

ENGINE COVER SIDE PANELS (PAIR) FIGURE B13

Trim, sand edges smooth and true. Sand reverse side.

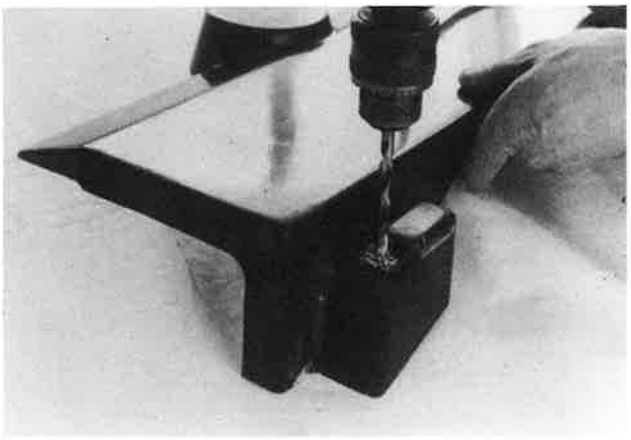
C47

To avoid damage to radius edge, hand sand from underneath panel.



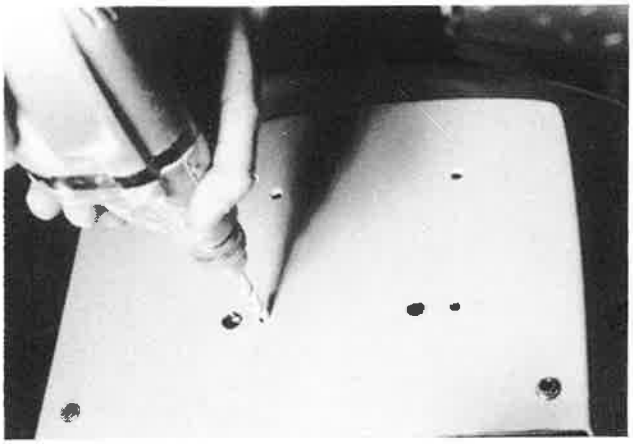
C48

Drill a 6mm (¼") hole in the hood lock mound where marked. Using a rotary file slot the hole as marked and file smooth.



C49
Drill a 6mm (¼") hole through the mound where dimpled.

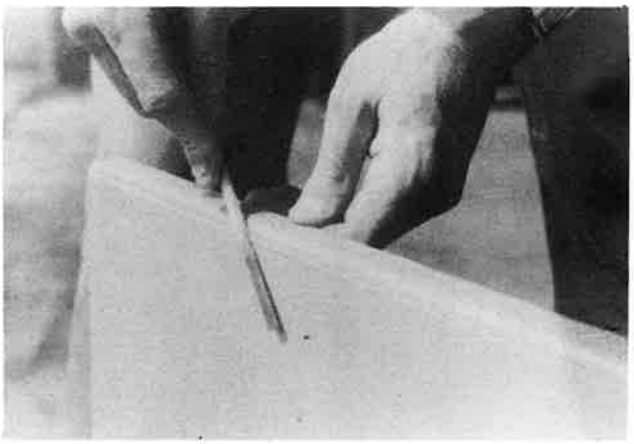
REAR MUDGUARDS (PAIR) FIGURE B14



Trim, sand edges smooth and true.

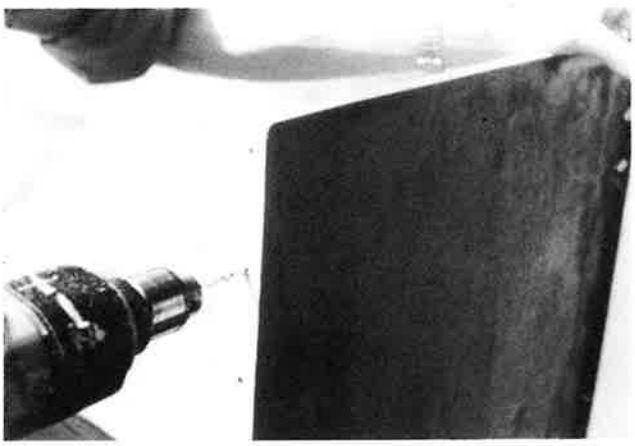
C50
Prepare the mudguard fixing flanges as for the front guards. Drill four 6mm (¼") holes on rear face where dimpled for mounting lights. Using a 25mm (1") holesaw drill two holes where dimpled for wiring.

ENGINE HOOD FIGURE B15

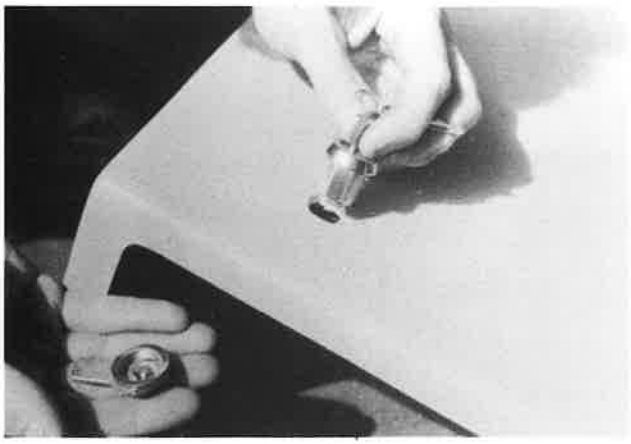


Trim, sand edges smooth and true. Sand reverse side.

C51
File mould flashing as shown, **with the same caution as used when preparing the nose cone.** Refinish with 360 then 1200 wet and dry. Cut and polish.



C52
Drill six 4mm (3/16") hinge mounting holes and slot as marked.



C53

Using a 3mm (1/8") drill, cut holes for hood locks as marked (as per bonnet locks). Paint reverse side of the panel matt black. Mask to avoid overspray.

REAR PANEL FIGURE B16

Trim, sand edges smooth and true. Sand reverse side.

C54

As with mudguard mounting flanges, take great care with those edges which incorporate a moulded radius.

C55

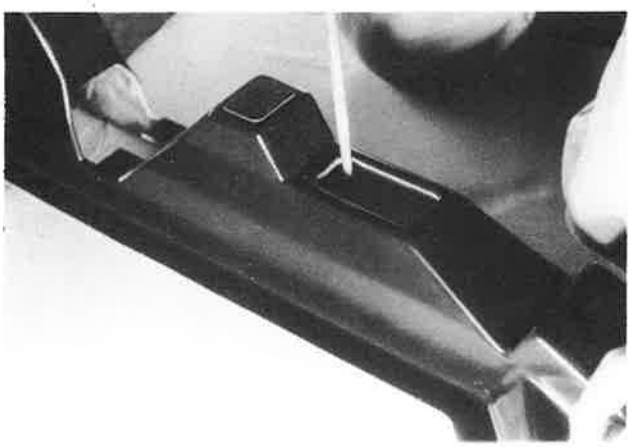
Cut openings for lights and exhaust pipe as marked and finish by fine sanding to a straight edge from the inside. Drill four 6mm (¼") holes for number plate lights where dimpled. Drill two 10mm (3/8") holes for number plate light wiring where dimpled. Drill three 4mm (5/32") holes for rear **BOLWELL** badge where dimpled.

CONSOLE FIGURE B17

Trim, sand edges smooth and true. Sand reverse side. Cut out moulded retaining strips from side flange flashing.

C56

Cut handbrake opening and seatbelt wand clearance hole using 16mm (5/8") drill and 25mm (1") holesaw respectively. Cut out with pad saw and rotary file as marked. File and sand edges.



C57
Cut gearstick aperture as marked, avoid damaging radius edge.

C58
If fitting air controls, drill two 10mm (3/8") holes for control cable knobs where dimpled.
If fitting cigarette lighter, drill one central 22mm (7/8") hole 25mm (1") down rear face of moulded non-skid mound.

INSTRUMENT PANEL — PRIMARY
FIGURE B18

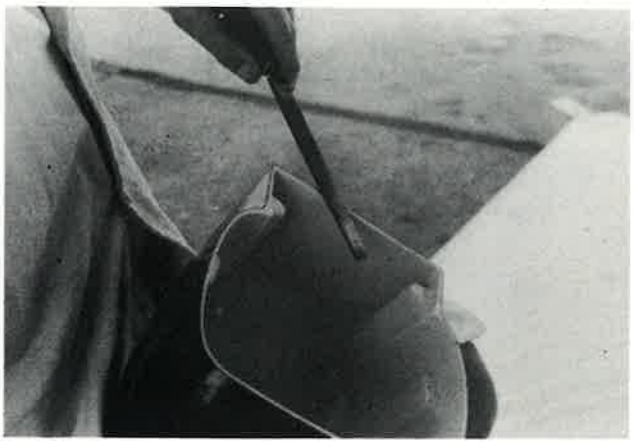
C59
Trim, sand edges smooth and true. Remove flashing around edge taking care not to damage gelcoat.
Using an 85mm (3 3/8") holesaw, drill holes for two main instruments, where dimpled.

C60
Cut 27mm x 23mm (11/32" x 29/32") rectangular holes for turn indicator lights as marked and file carefully to achieve minimum clearance.
Drill two 4.5mm (3/16") panel mounting holes where dimpled.

INSTRUMENT PANEL — SECONDARY
FIGURE B18

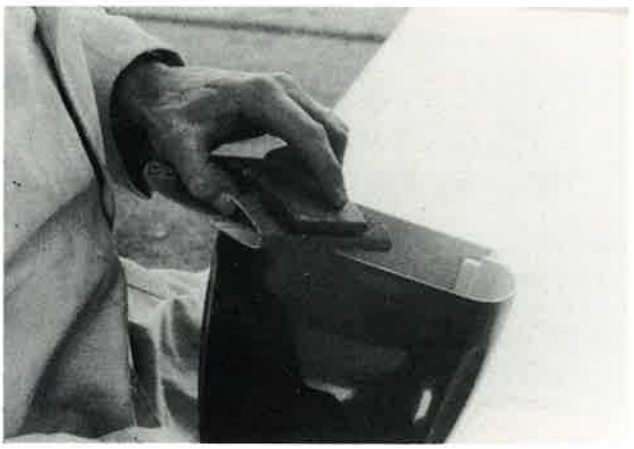
Trim, sand edges smooth and true. Remove flashing around edge taking care not to damage gelcoat.

C61
Using a 52mm (2-1/16'') holesaw drill three holes where dimpled.

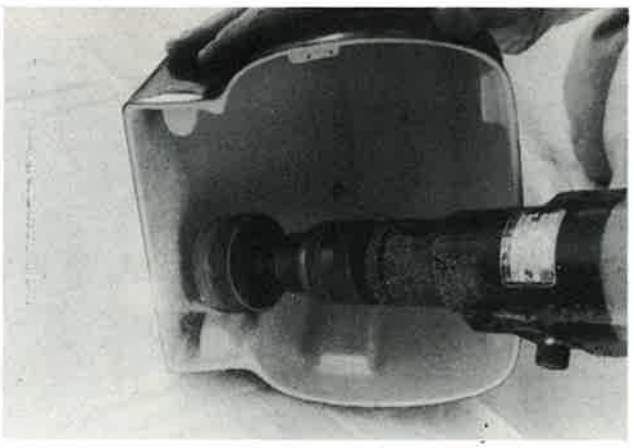


HEADLIGHT POD (PAIR) FIGURE B19

C62
Trim moulding edge close to mould line and smooth with a file. Again, use extreme caution to avoid chipping the gelcoat.



C63
Fine-sand the edges clean and straight, cut and polish.



C64
Using the drum sander, sand a notch approximately 6mm (¼'') deep into the outside moulded post, 12mm (½'') in from the post face to allow tolerance for the wiring outlet of the trafficator assembly.

C65
Drill four 10mm (3/8'') holes in base of moulding, where dimpled.

C66
Fit four nutserts into the holes using special nutsert tool.

C67
Using a 25mm (1'') holesaw drill one wiring exit hole where dimpled to the inside and therefore on opposite sides for each pod. When assembling, the wiring exit hole will be toward the centre of the vehicle for each headlight pod.

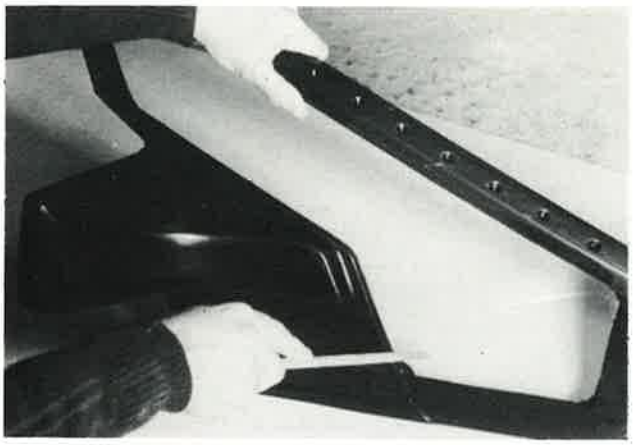
FOOTREST FIGURE B20

Trim, sand edges smooth and true. Sand reverse side.

SPLASH GUARDS FIGURE B20

Trim, sand edges smooth and true. Sand reverse side and paint matt black.

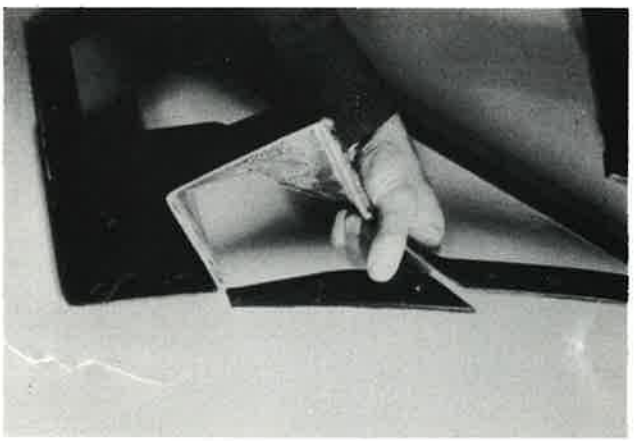
WINDSCREEN FRAME FIGURE B21, B22



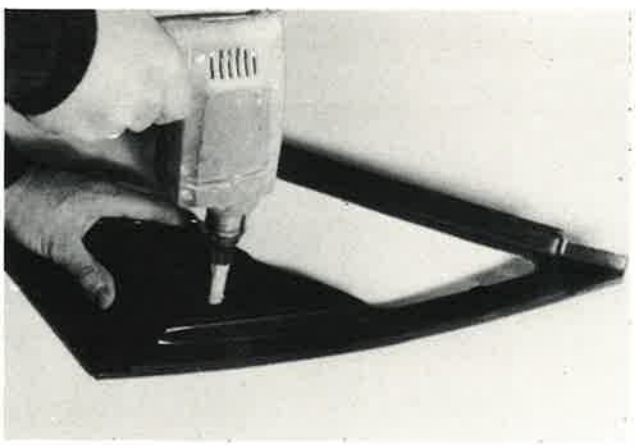
Outer side frame

C68
Carefully cut out frame and file edges and flashing. Grind flat on reverse surface to reveal a neat edge. File edges straight and fine-sand.

C69
Drill two 4.5mm (3/16") holes where dimpled in outer edge of the rear view mirror housing. Countersink. Refinish all edges where sanded with 320, 600 and 1200 wet and dry.



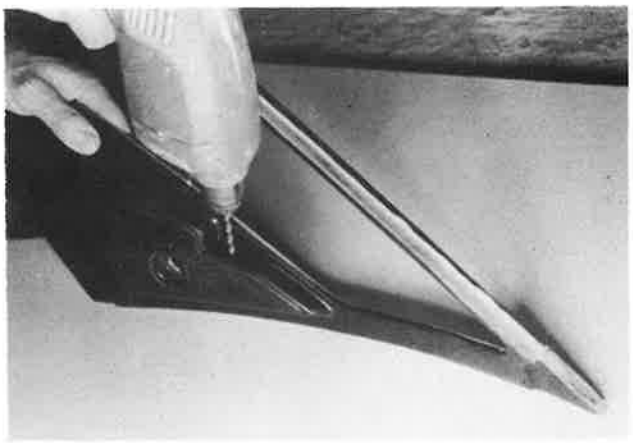
C70
Cut out inset moulding and file edges to fit into main moulding and allow neat continuation along the inner edge of the mirror housing.



Inner side frame

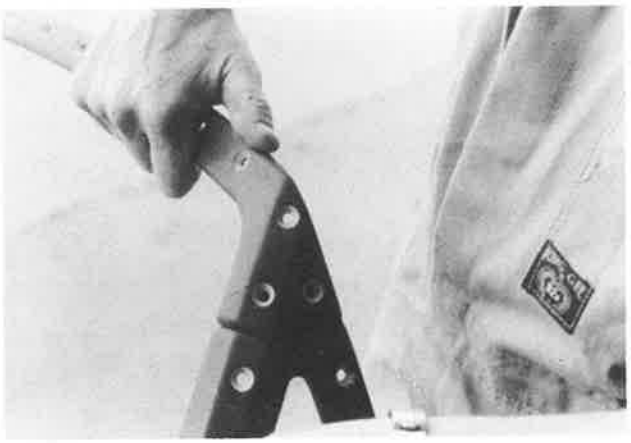
Cut out frame and file edges and flashing. Grind flat on reverse surface.

C71
Drill a 15mm (5/8") hole where dimpled for mirror adjustment wand.



C72
Drill a 4.5mm (3/16") hole where dimpled in recess for the attachment of mirror base.

Upper frame
Cut out outer and inner frames, file edges and flashing.



C73
Ensure that ends of outer moulding match neatly to the side window frames.

NOTE:
To lift the appearance of these mouldings we recommend that the entire external surface be rubbed progressively by 360,600 and 1,200 grit wet and dry. The surfaces will now have an excellent matt black finish. Should you require a gloss finish, this can be achieved with buffing.

KEMREZ

Cellobond* Polyester Resins used exclusively in the Bolwell Ikara.

Selecting the correct resin system for the Ikara was a complex process; Bolwell was able to call on over 20 years experience in the development of highly sophisticated resins for specific applications such as:

- the recently commissioned R. N. Minehunter HMS Brecon.
- refrigerated shipping containers for perishable foodstuffs.
- chemical resistant tanks and pipelines for highly corrosive environments.
- fire retardant facade panels for high-rise buildings.

Cellobond* Polyester Resins are made in Australia by Kemrez Chemicals under licence from BP Chemicals Limited, UK.

KEMREZ

Kemrez Chemicals:
(03) 550 1255.
328 Reserve Road,
Cheltenham, Vic. 3192.
Australia.

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SUB-ASSEMBLY

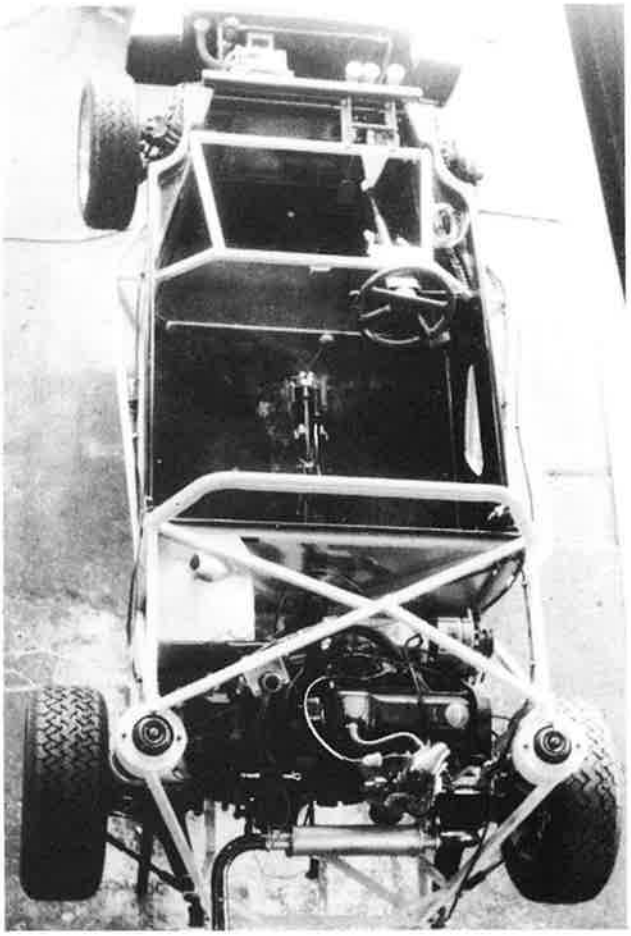
This section explains how to modify bought-in parts and how to combine them with Bolwell-supplied parts to form major sub-assemblies. These sub-assemblies will then be used during the final assembly stage to produce the finished product. Thus the project can be progressed at a rate to suit each individual builder. Should any builder wish to fabricate some of his own modification components instead of purchasing the complete kit, details are available on request on most items.

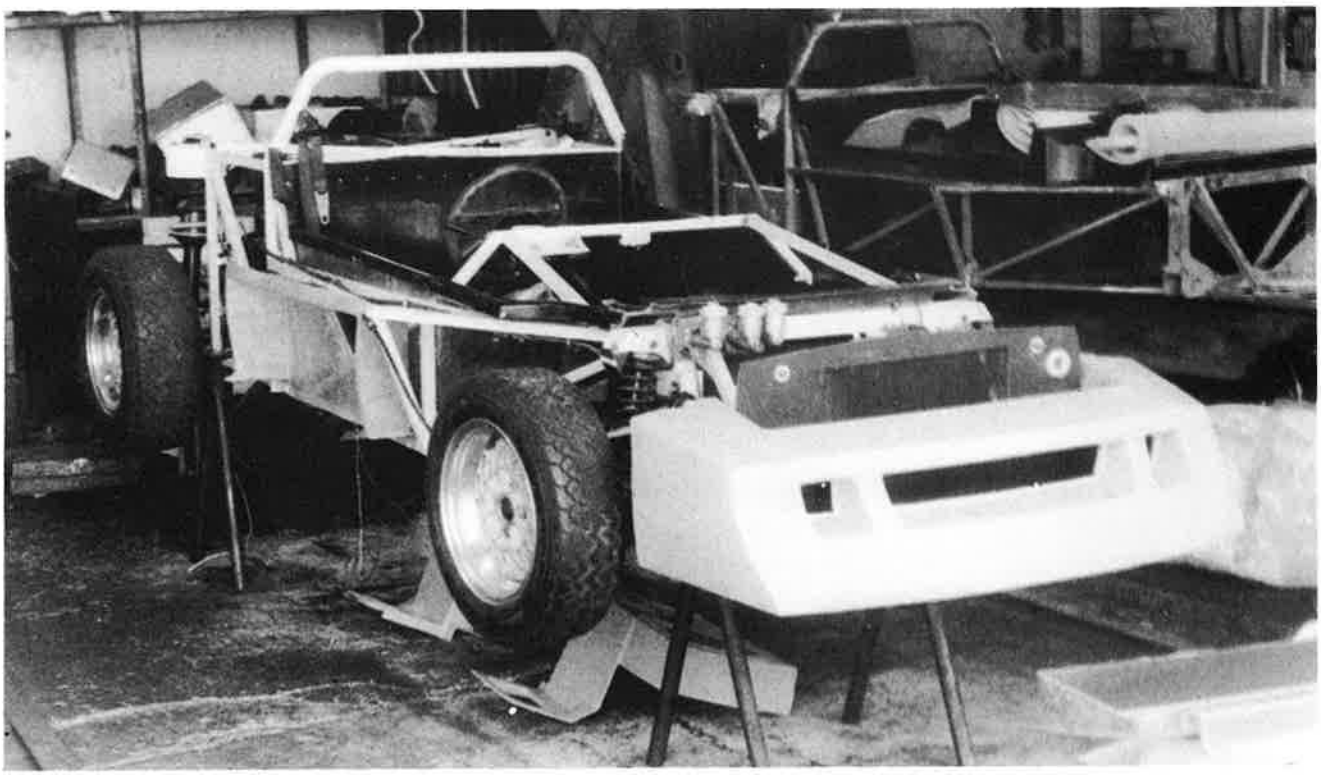
When purchasing second-hand parts for use in the **IKARA,** remember the axiom that 'you get what you pay for'. Check each intended purchase thoroughly for wear and tear, **noting the items which will require replacement (e.g. bushes, bearings).**

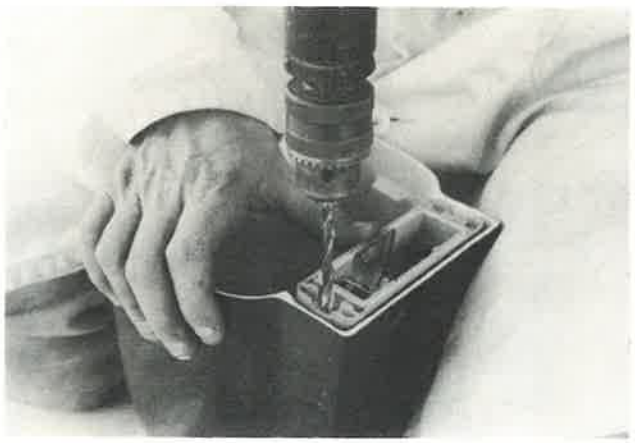
Once the purchase is made, clean and strip the unit and check again, this time more thoroughly. Replace any worn items, then paint the units. This will add to the quality of finish of the vehicle.

With the engine/transmission unit, it is our recommendation that a total overhaul be done prior to installation.

Builders who have purchased a late-model unit and are convinced that this would be unnecessary, are still advised to carry out a major service, replacing filters and lubricants and rechecking all adjustments.





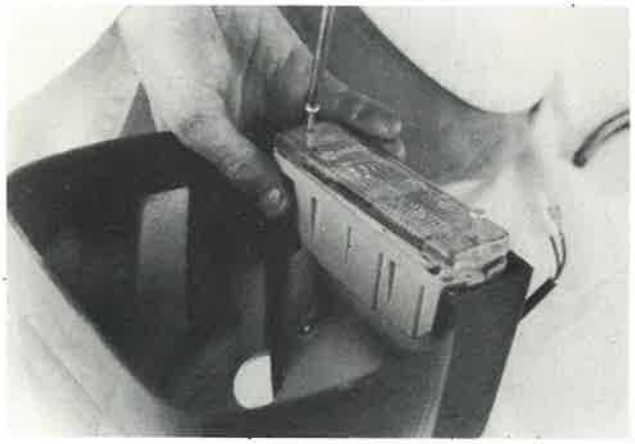


HEADLIGHTS (PAIR)

Kit comprises: 2 headlights, 2 QH bulbs, 2 retaining rings, 2 trafficator assemblies, 8 self-tapping screws.

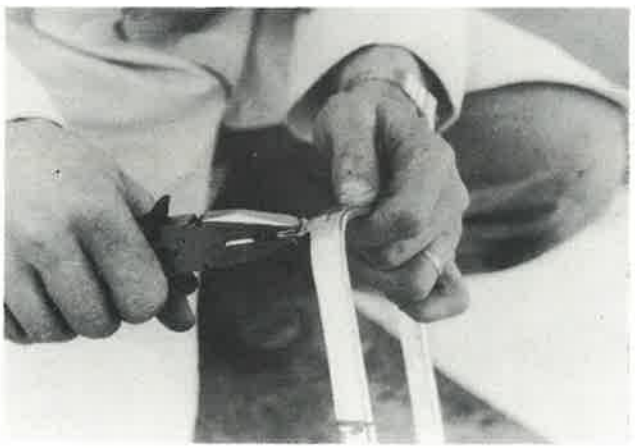
D1

Dis-assemble trafficator unit. Centralise the base as shown and, using it as a guide, drill two 6mm (¼") mounting holes 15mm (5/8") deep.



D2

Fit globe to base. Screw the lens and base together and into the pod using the plastic retainers and screws provided.



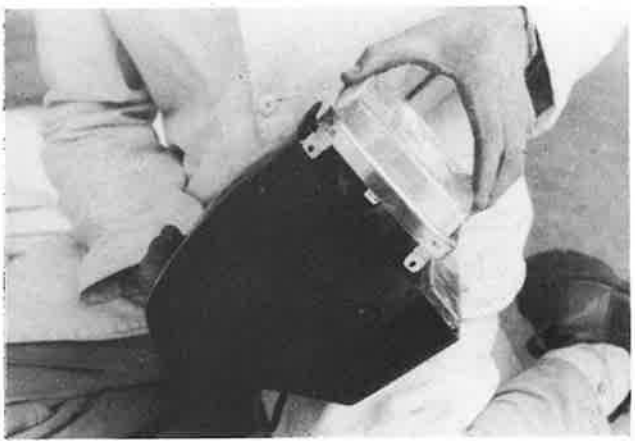
D3

Using pliers, straighten the 4 lugs on the headlight retaining ring.

D4

Apply silicone to the top of the four moulded posts inside the pod and allow to cure, forming a moulded vibration gasket.

D5
Push the retaining ring fully into the pod and, using the lug holes as a guide, drill four 4.5mm (3/16") holes through the pod.



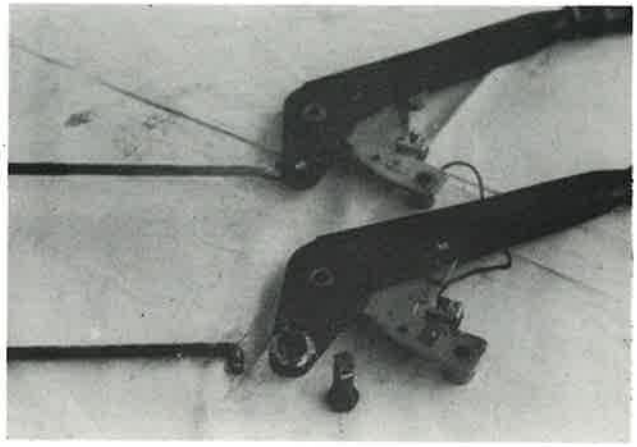
D6
Fit up QH bulbs, attach wiring (from wiring loom kit) and insert assembly into pod.

D7
Using the self-tapping screws supplied, secure headlight assembly.

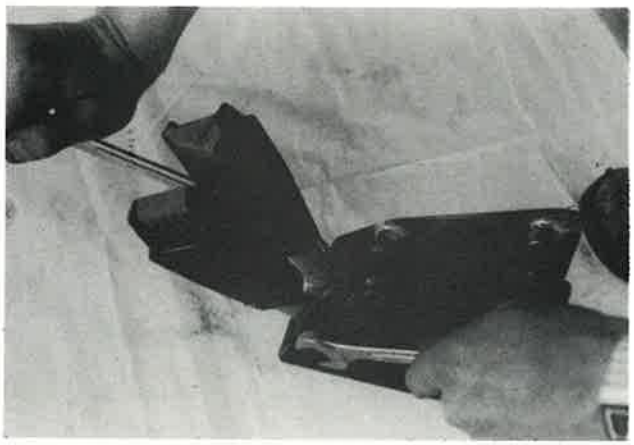
HANDBRAKE/SEAT BELT UNIT

Kit comprises: 1 mounting bracket with two bolts 45mm x 9mm (1 3/4" x 3/8") and conelock nuts, 1 bush, 1 flat-ended bolt 32mm x 9mm (1½" x 3/8"), 1 extended pullrod and retaining clip, 1 cable tensioner, 1 bolt 64mm x 12mm (2½" x 7/16") with nut and spring washer, 2 shouldered spacers 8mm (5/16") long, 1 spacer 23mm (7/8") long.

Additional Components Required: Gemini handbrake, pullrod grommett and balance bar bracket, **Fiat** 124 handbrake cables.



D8
Remove rivet from pulleye and drill out hole to 15mm (5/8''). Insert bush supplied to protrude through L.H.S. of handbrake no more than 3mm (1/8''). Bronze-weld into position.



D9
Bolt seat belt wands into bracket using 64mm (2½'') bolt supplied. Use one 8mm (5/16'') spacer each side together with the large 23mm (7/8'') spacer in the centre.

D10
Bolt handbrake into bracket using the two 45mm x 9mm (1 3/4'' x 3/8'') and conelock nuts.

FUEL TANK

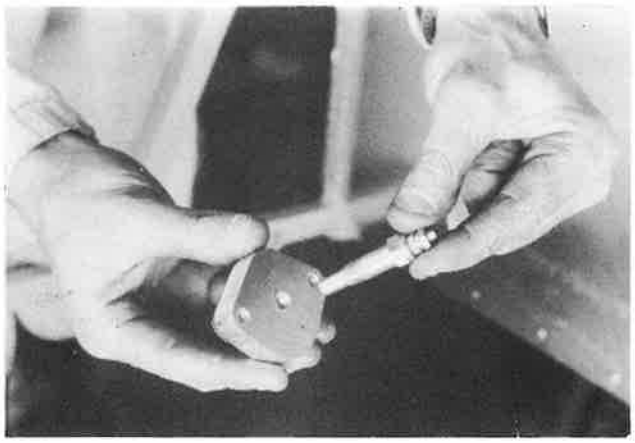
Kit comprises: 1 sender unit, 1 piece of gasket cork, 1 length rubber padding strip, 1 strap assembly with bolts and nuts, 1 gas tank fitting, 1 length of fuel line, fuel filter, 4 line clips, 1 fuel filler neck, 1 charcoal canister, 3 large clamps, 1 filler neck hose, 2 lengths breather tube, 1 small clamp.

D11
Adjust sender unit arm to give maximum movement without fouling. The pivot of the arm should be as close to the vertical centre of the tank as possible. Using supplied cork, cut gasket to suit sender flange. Fit sender unit to tank using five 3/4'' x 3/16'' Whitworth bolts.

ENGINE

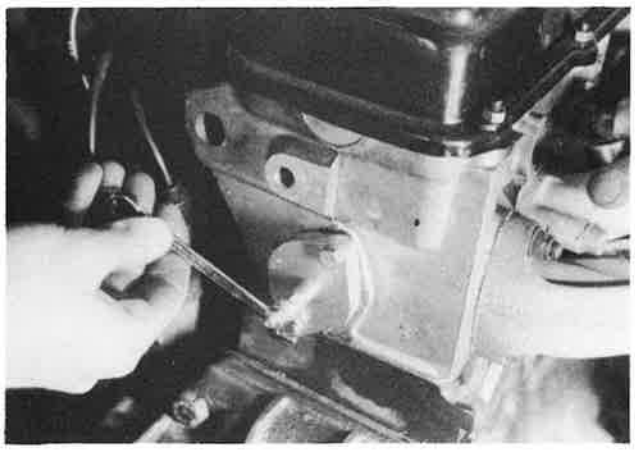
Kit comprises: 1 alloy coverplate (water temperature sender holder) 1 alloy L.H.S. engine mounting plate, 1 front mounting bracket, 2 rubber engine mounts, 1 rubber block, 2 bolts 19mm x 8mm (3/4" x 5/16") with conelock nuts, 2 bolts 25mm x 8mm (1" x 5/16") with conelock nuts, 1 clutch slave cylinder/circlip/pushrod/mounting bracket with washer and nut, 2 bolts 76mm x 11mm (3" x 7/16") with conelock nuts, 1 clutch lever, 1 clevis and split pin.

Additional Components Required: VW Golf motor, gearbox, differential assembly.



D12

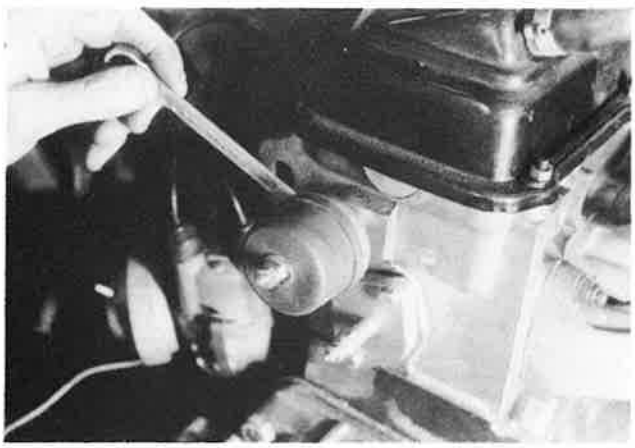
Senders: Remove water manifold plate from rear of head casting. Fit water temperature sender as supplied in the instrument kit to plate supplied.



D13

Bolt plate to head casting using gasket cement.

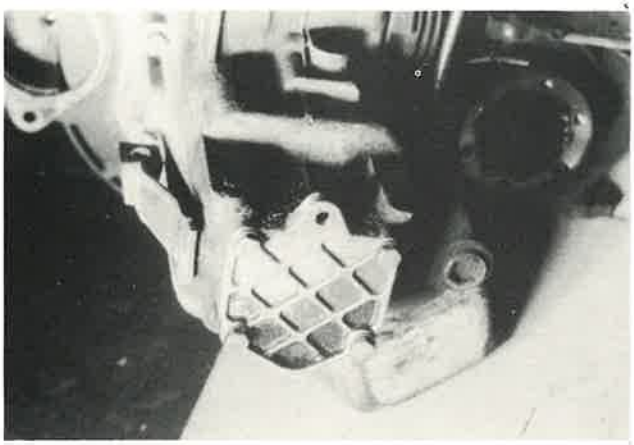
NOTE: Certain National and/or State registration authorities may insist on water-heated manifolds, requiring adaption of the sender unit to the existing manifold.



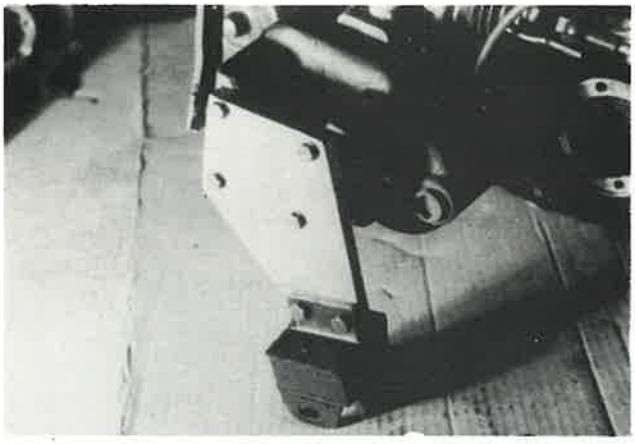
D14

Remove oil light sender from rear of head casting. Fit oil temperature gauge sender as supplied in the instrument kit.

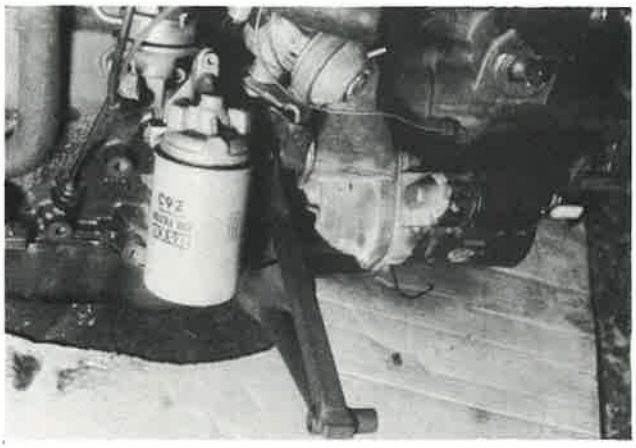
Engine Mounts



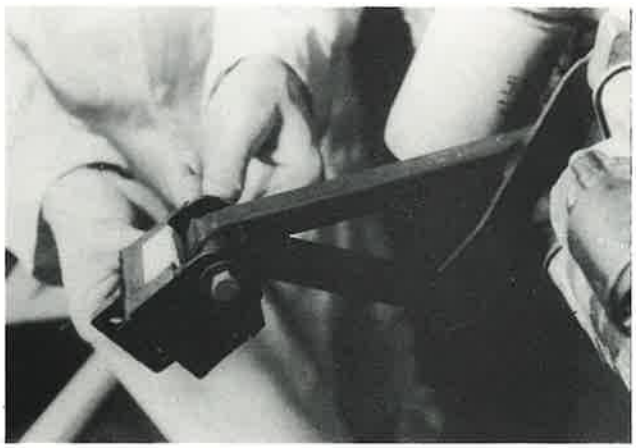
D15
Remove rear coverplate from engine.



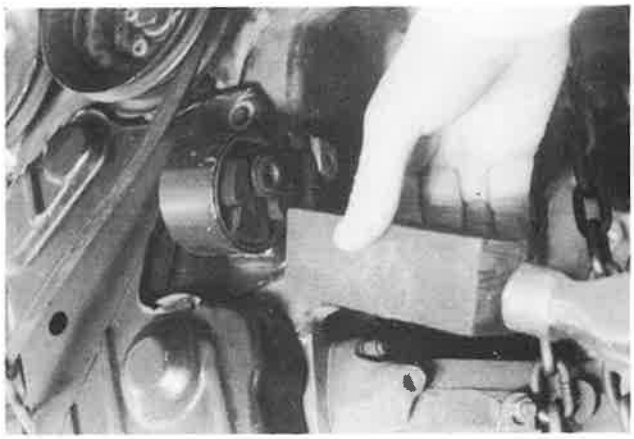
D16
Fit new aluminium plate and engine mounting. This figure shows the plate with mount attached, but mount should only be finally secured when engine is fitted to chassis.



D17
Remove original engine mount. Using the original bolts fit the supplied replacement bracket.



D18
Fit new engine mount. Do not finally secure.

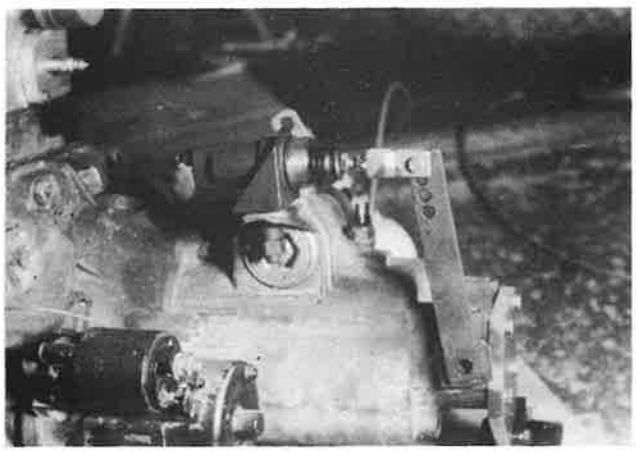


D19
This is the R.H.S. engine mount. The original is retained but has its resistance increased with the addition of an extra rubber block as supplied.

Clutch

D20
Cut existing clutch lever where indicated.

D21
File a flat onto the alloy casting to accommodate slave cylinder bracket.



D22
Fit slave cylinder into bracket and retain with circlip supplied. Mount bracket as shown and secure. Arc weld replacement clutch lever supplied at 90 degrees to original, with the hole at the centre of the fulcrum.

Attach slave cylinder pushrod to lever with clevis pin and secure with split pin.

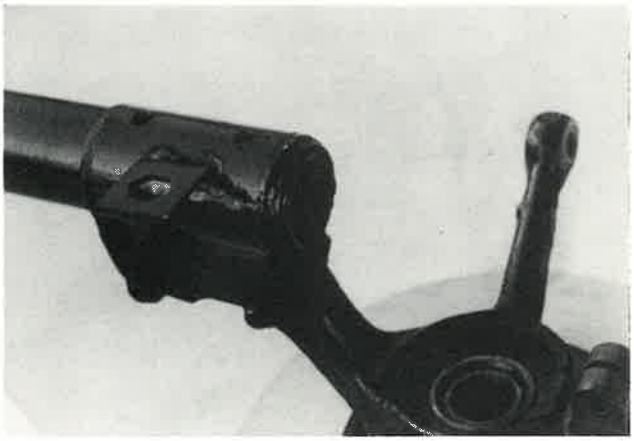
Thermostat

D23
Remove thermostat and drill two 3mm (1/8") air bleed holes to avoid air entrapment in the lower intake pipe.

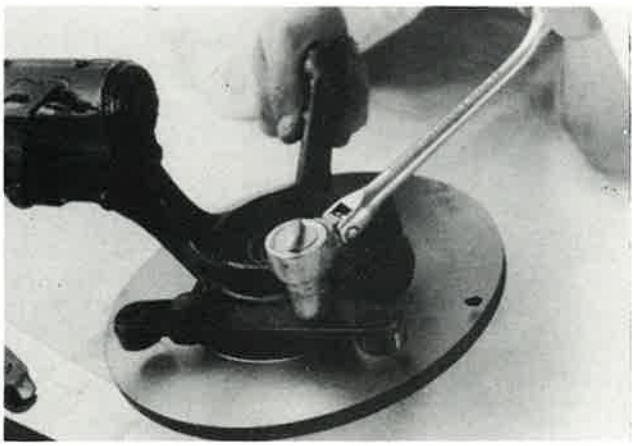
REAR SUSPENSION, BRAKES

Kit comprises: 2 brake hose mountings, bolts, nuts, 2 caliper adaptor brackets, 2 brake hoses, 2 copper washers, 2 horseshoe retaining clips, 2 adjustable tie rods, bolts, nuts, locknut.

Additional Components Required: 1 pair **Golf** McPherson strut assemblies complete with hubs, bearings, discs, caliper bolts and mounting nuts, 1 pair **Fiat 124** calipers and bolts with handbrake actuation lever, 1 pair **Golf** tie rod ends and castellated nuts, 1 pair of driveshafts with attachment bolts. 1 pair **Golf** lower control arms, 1 pair **Golf** driveshafts and retaining bolts.



D24
Attach brake hose mounting brackets to bases of McPherson Struts.



D25
Attach caliper adaptor brackets to caliper mounting legs using original bolts.
NOTE: use 'Locktite' or a locking wire to prevent loosening.

D26
Mount **Fiat 124** calipers on bracket using original **Fiat** bolts.
NOTE: Use 'Locktite' or a locking wire.

D27
Fit brake hoses using copper washer and retaining clip.

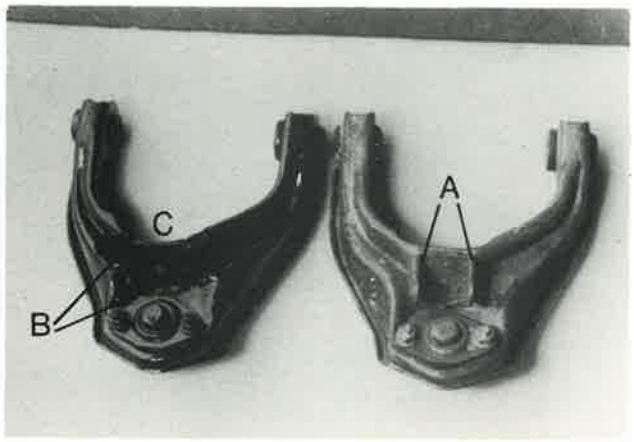
D28
Remove original **Golf** springs. (Alternatively, this can be done by your local garage) and have them re-set 25mm (1'') shorter (any spring manufacturer is able to do this). Refit springs.

FRONT SUSPENSION

NOTE: The modification described in text can be carried out, if necessary, by the Bolwell factory or its agents.

Kit comprises: 2 top wishbone plates, 2 lower spring shocker mounting brackets, 2 anti-sway bar mounting brackets, 2 shock absorbers, 2 special rate springs, 2 high tensile bolts 75mm x 9mm (3'' x 3/8'') and conelock nuts, 2 high tensile bolts 50mm x 9mm (2'' x 3/8'') and conelock nuts, 1 anti-sway bar, 2 rubber bushes, 2 saddle brackets, 2 anti-sway bar tie rods, bushes, nuts, 2 upper bumb stops, 2 brake hoses and clips.

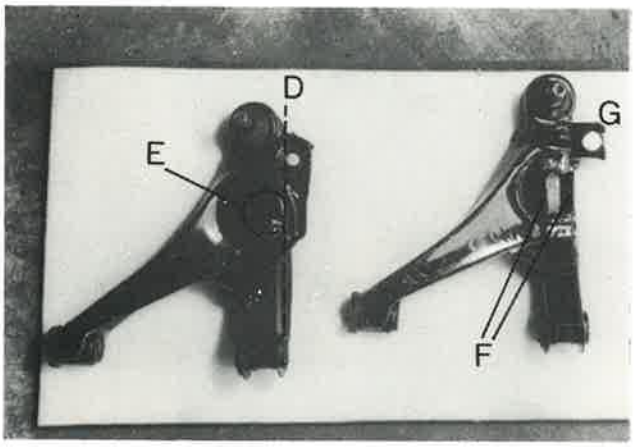
Additional Components Required: complete **Gemini** front suspension including wishbones, vertical links, disc brakes, hubs, calipers, and all bolts and nuts.



Upper Wishbones

D29

Flatten U bracket lugs (A) as shown and weld edges (B). Cut away metal on inner edge of wishbone approximately 50mm x 12mm (2'' x ½'') to allow clearance for spring shocker unit (C). Paint all components.



Lower Wishbones

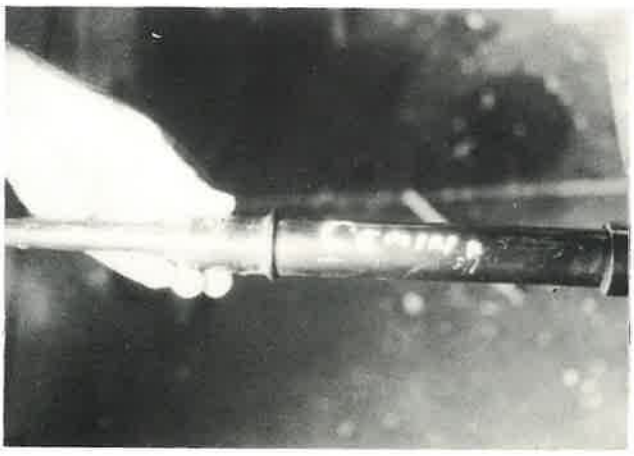
D30

Remove overhanging part of bracket as indicated (D). Cut around the circular pressing where indicated and grind flat (E). Weld-on spring shocker mounting bracket with the eye centre 165mm (6-7/16'') from the centre of the inner bush (F).

Weld on anti-sway bar bracket with the hole centre 270mm (10½'') from the centre of the inner bush and flush with the base of the pressing (G). Paint all components.

Spring Shocker Units

Using a spring compressor fit springs to shockers (or have local garage assemble).



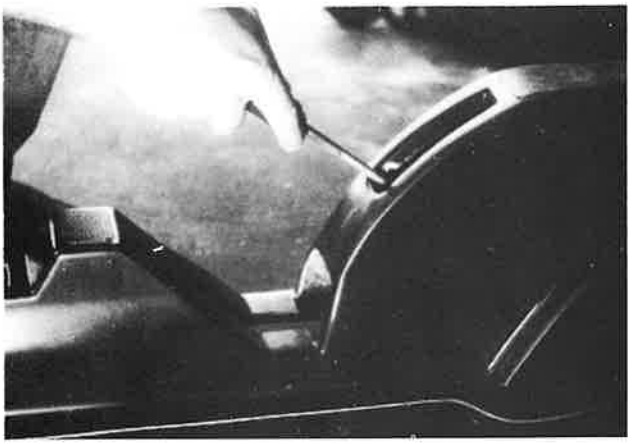
STEERING COLUMN

Components Required: Gemini steering column, complete with shroud trims, steering rack.

D31

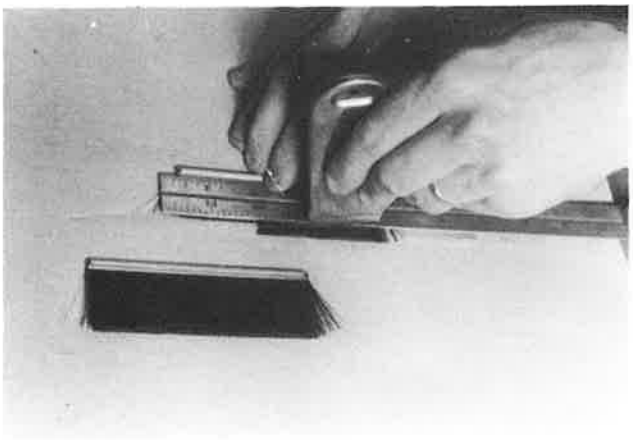
Remove flange from lower end of outer column. Replace flexible universal with a new part. Attach horn decal to end of wiper stalk, covering the **Gemini** washer symbol.

CONSOLE

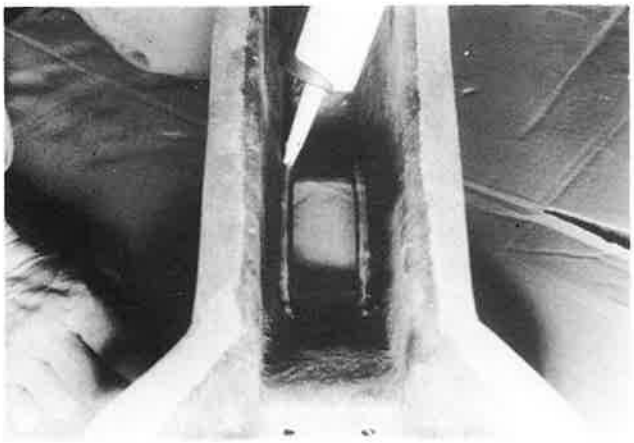


D 32
Trial fit panel and open out apertures to allow a minimum clearance fit at:
1. handbrake slot — enlarge at bottom to allow handle to pass through.
2. seatbelt wand slot — enlarge at bottom to allow wands to pass through.

Polish or paint touch-up all cut edges.

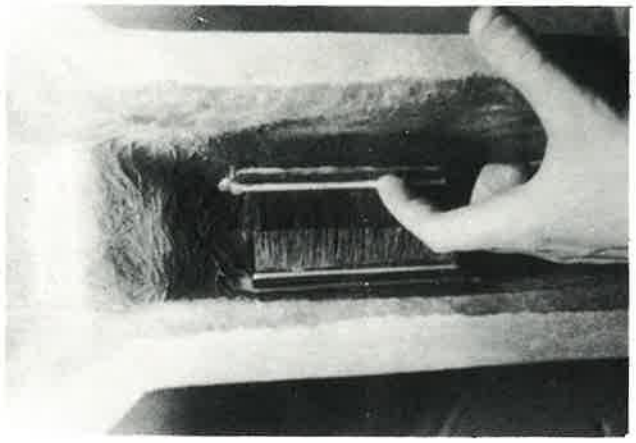


D 33
Cut the supplied brush into two lengths 120mm (4¾") long and trim bristles to 22mm (7/8").

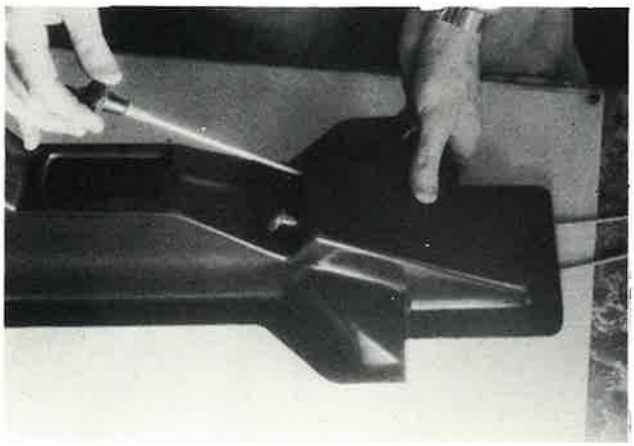


D 34
From the inside, apply a bead of silastic along each edge of the gearshift hole.

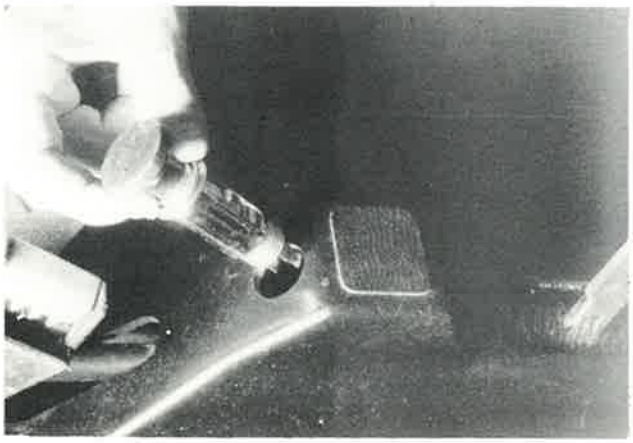
D 35
Fit the cut brushes onto the silicone as shown.



D 36
Apply a bead of silastic along edge of brushes and fit retaining strips down into corners.



D 37
Fit air control cables (if required) and tighten.



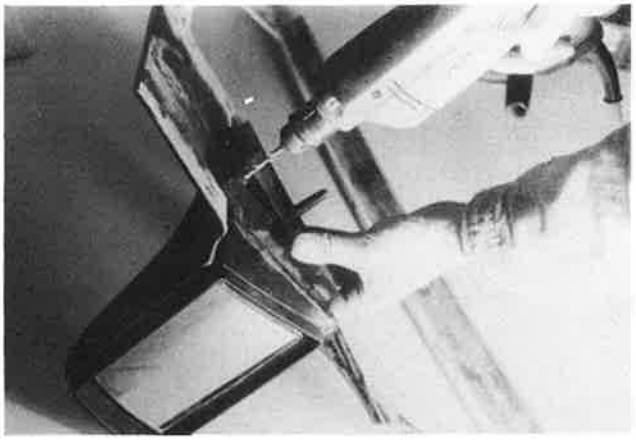
D 38
Fit cigarette lighter (if required).

WINDSCREEN FRAMES, SIDE

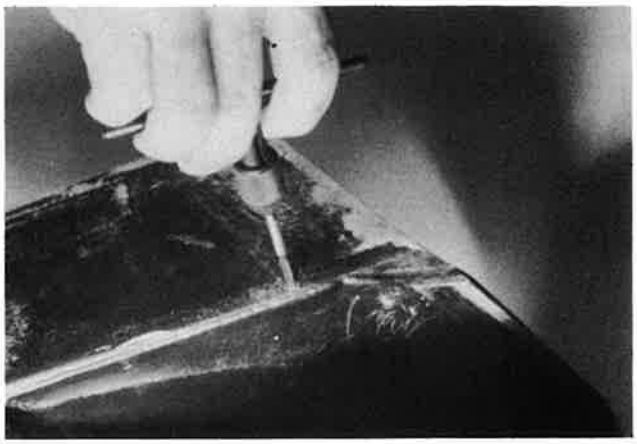
Rear view mirror kit comprises:
1 R.H.S. exterior mirror assembly, 1 L.H.S. exterior mirror assembly, 1 day/night interior mirror assembly, 1 mounting block, 1 retaining screw, 2 countersunk 31mm x 4.5mm (1¼" x 3/16") metal threads, four 3mm (1/8") pop rivets, four black countersunk self-tapping screws.

D 39
Trial fit mirror to outer frame moulding as shown.

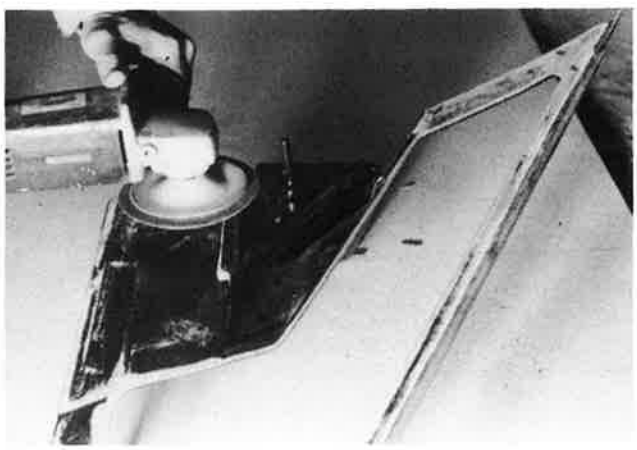
D 40
Grind off excess plastic from mirror assembly to allow neat fit into moulding.



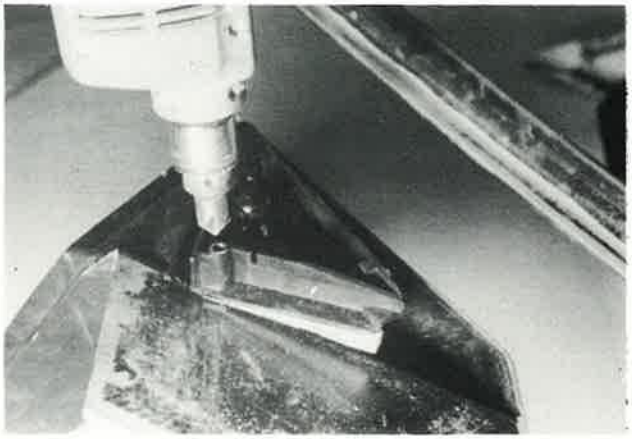
D 41
Fit mirror into place and, using a 6mm. (¼'') drill, mark the centre. Do not drill through.



D 42
Drill through using a 3.5mm. (9/64'') drill. Tap a 3/16'' Whitworth thread.



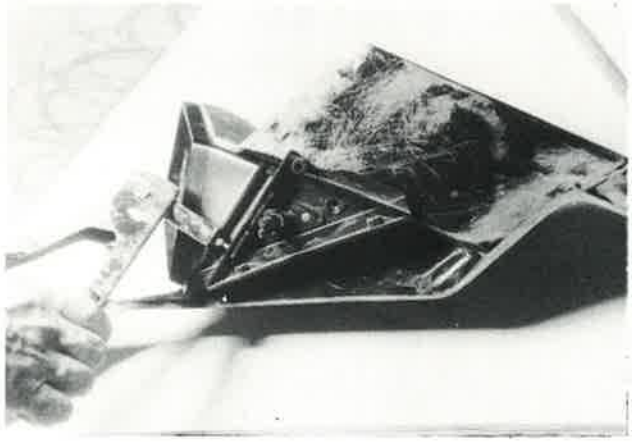
D 43
Grind plastic mirror assembly back to allow clearance when joining inner and outer frame mouldings.



D 44
Countersink existing hole in mirror assembly.

D 45

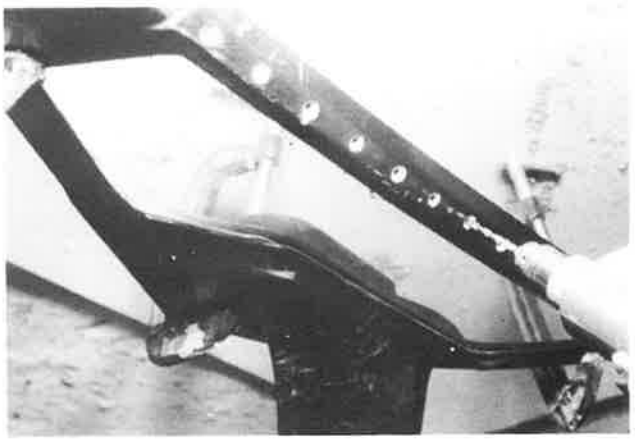
Secure mirror assembly in outer frame using a 3/16'' Whitworth countersunk metal thread. 31mm. (1¼'') long. Screw two self-tapping screws through the countersunk holes in the outer edge of the mirror housing and into the mirror assembly.



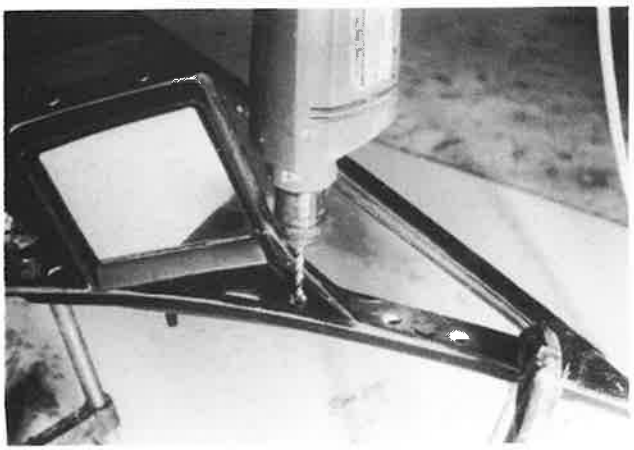
D 46
Pop rivet the two plastic mouldings of the mirror assembly to make firm using 3mm. (1/8'') rivets.

D 47
Position the inner and outer side frames together and clamp with the side glass in place.

D 48
Using the countersunk holes in the outer frame as a guide, drill right through both frames with a 5mm. (3/16") drill.

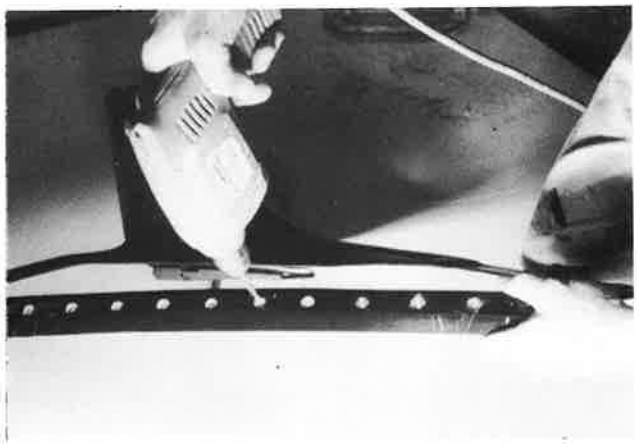


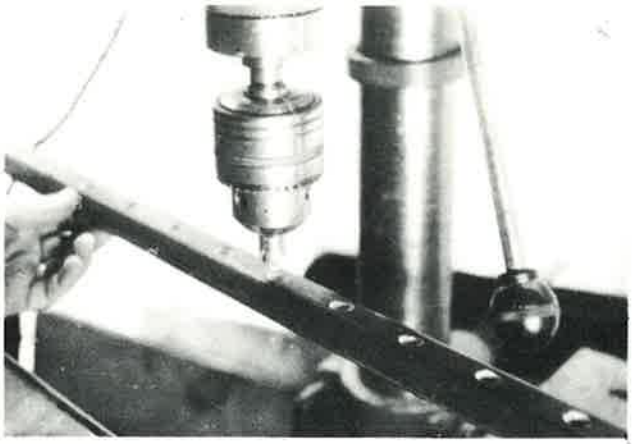
D 49
Position insert moulding into place and drill top hole through as above.



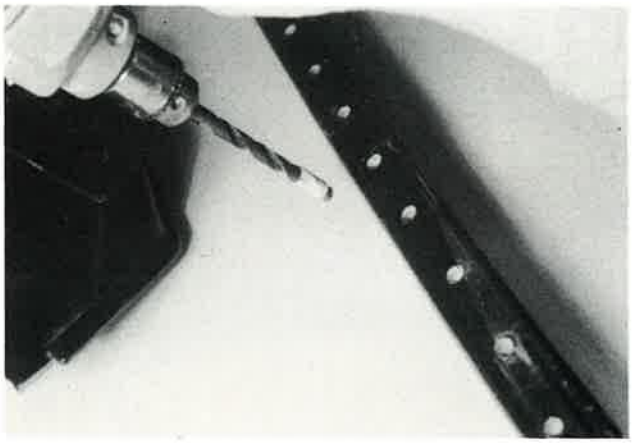
D 50
Remove the inner frame and place the insert moulding on it. Using the hole just drilled as a guide, drill the second hole.

D 51
Drill out holes in outer frame to 6mm. (¼").

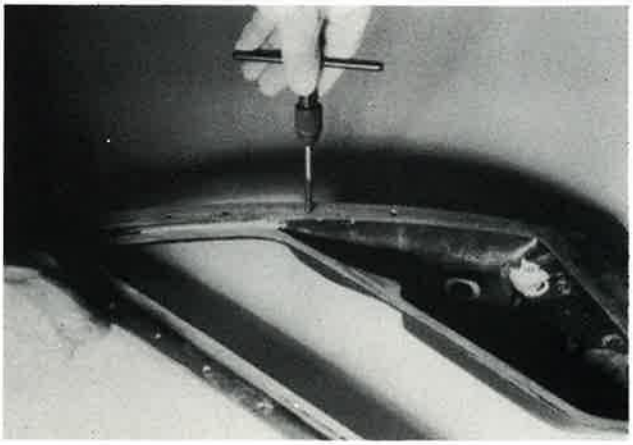




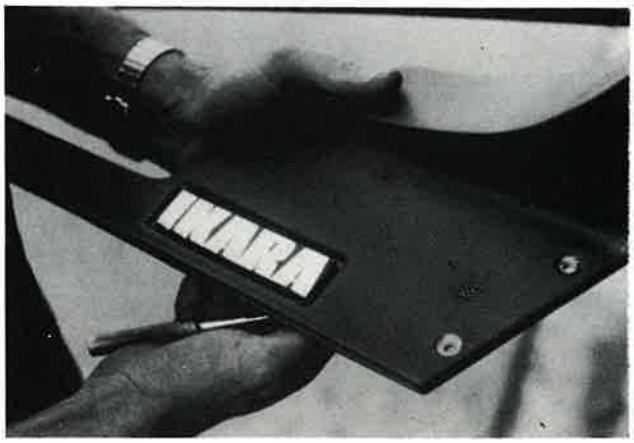
D 52
Using a 90° countersunk bit clean out all moulded countersinkings to flush-fit the Unbrako bolts supplied.



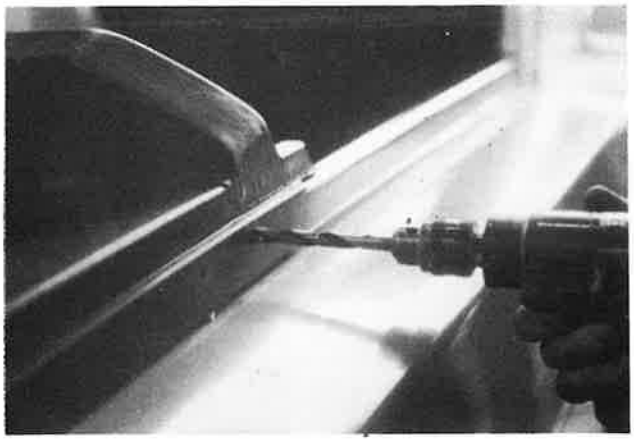
D 53
Set a depth gauge at 6mm. (¼") on an 8mm. (11/32") drill. On the **INSIDE** of the inner frame, back drill to the established depth. (This is to accept the plastic plugs supplied).



D 54
Tap a 6mm. metric thread into inner frame holes.

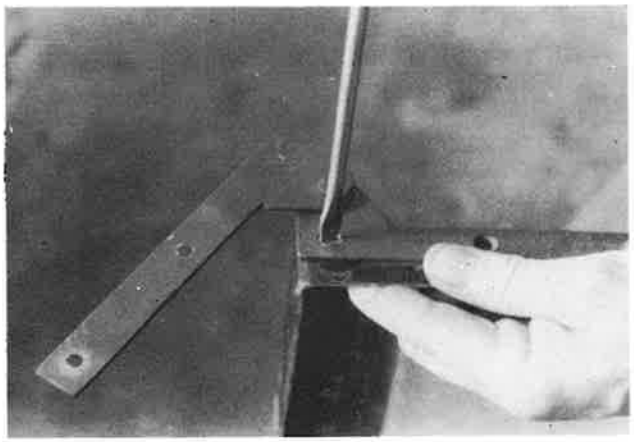


D 55
Drill 3mm. (1/8") holes in **IKARA** badge recesses where dimpled beneath exterior view mirrors. Fit badges.

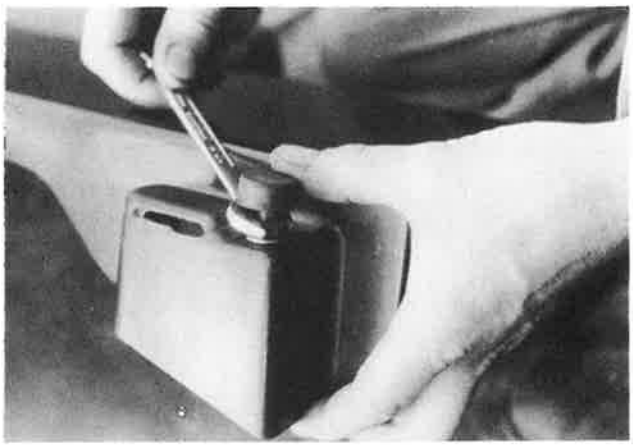


D 56
Trial fit side moulding against footwell cover moulding to locate position of badge studs. Drill two 13mm. (½") holes through footwell cover to allow clearance and therefore a flush fit.

SIDE ENGINE COVERS



D 57
Fit engine cover hinges to front inner flanges where drilled using 18mm. x 4.5mm. (3/4" x 3/16") countersunk metal threads and nuts.



D 58
Fit bump stops.

INSTRUMENT PANEL — PRIMARY

D 59
Fit instruments as follows:
R.H.S. — Speedometer
L.H.S. — Tachometer
R.H.S. — High beam indicator
L.H.S. — Trafficator

INSTRUMENT PANEL — SECONDARY

D 60
Fit instruments as follows:
R.H.S. — Oil pressure
Centre — Temperature
L.H.S. — Fuel

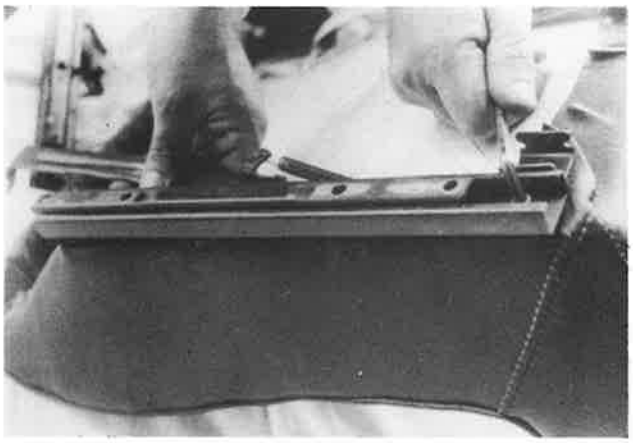
SEATS (Pair)

Kit Comprises:

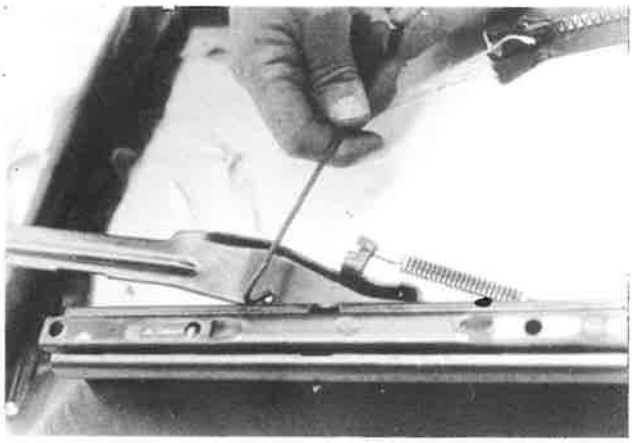
Eight panhead bolts, 38mm x 4.5mm (1½" x 5/16"), two pull wires, four seat runners (two with lever) two adjuster knobs, eight 5/16" Whitworth conelock nuts and mudguard washers.

Turn seat moulding upside down, drill four holes 6.5mm (17/64") in underside of seat. Note that the seats are double dimpled, allowing a choice of two different runner positions. Tap to 5/16" Whitworth.

D61
Remove superfluous runner brackets as shown by drilling through spot welds.



D62
Mount seat runners using 25mm (1") x 5/16" Whitworth Unbrakos.



D63
Fit pull wire between two runners and check locking action.

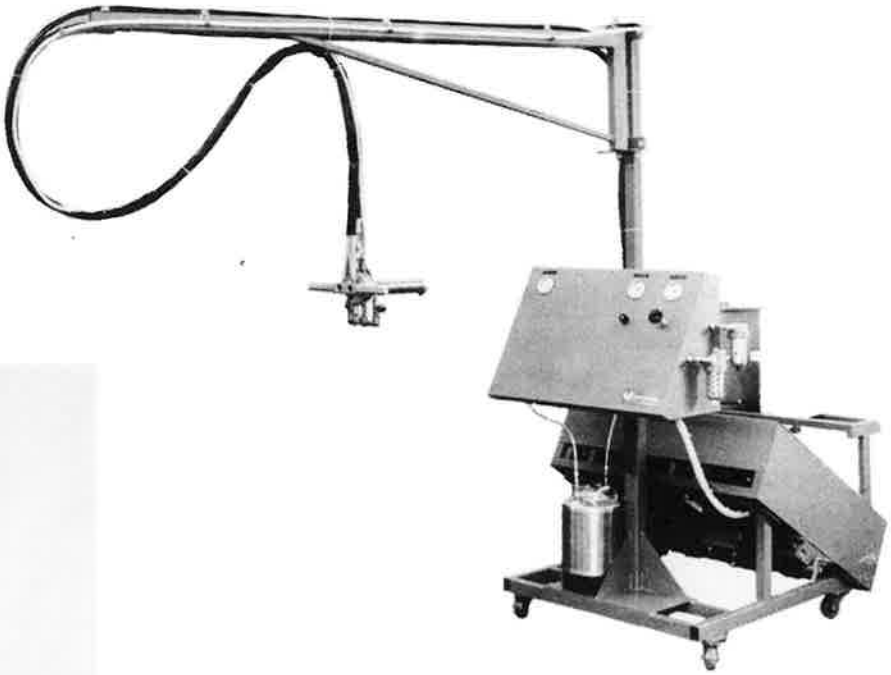
D64
Fit knob to lever-side seat runner.

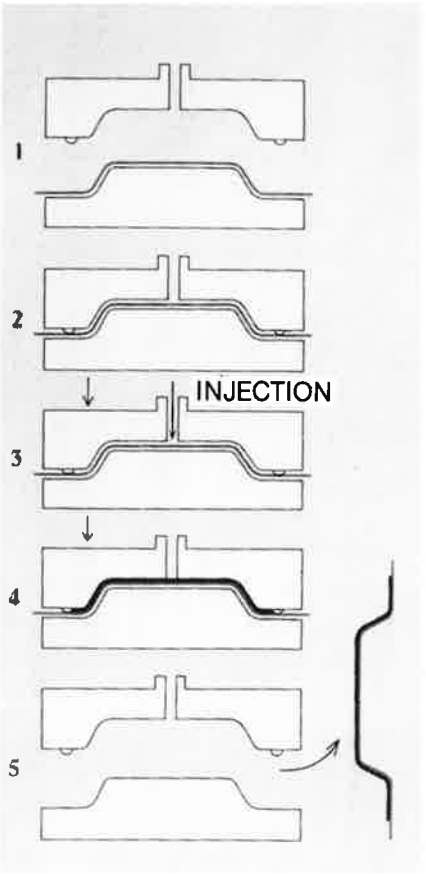
D65
Fit the four square-headed bolts as supplied with runners.

Twinflo®

Catalyst Injection Equipment for the F.R.P. Industry

Twinflo machines are designed to automatically pump, meter, mix and dispense pre-accelerated polyester and catalyst high ratio systems and provide the necessary accurate control of volume and pressure for injection moulding purposes.





Machine Principle

Self-priming, positive displacement, patent "Posiload" type reciprocating piston pumps are slide mounted with lever operation via a reciprocating air cylinder drive assembly. Relative pump piston diameters and adjustable positioning of the pumps along the lever/side assembly provide the required relative material ratio. The total volume dispensed is proportionate to the lever movement and is adjustable for shots, or continuous flow when recycled. The ratio of pneumatic drive piston to pump piston area provides the basic air pressure input to material pressure output intensification and is adjustable to pump and meter the separate liquids up to and through a Remote I.S.G. mixing head. Mixing head volume is kept to a minimum and the design incorporates an efficient purging system. The pumping, metering and mixing assembly, forms a completely sealed system.

Colour

Due to the unique pumping and metering performance of the "Posiload" pump, additional pumps may be added to "Twinflo" machines for the automatic metering of pigments into the final stage mixing head.

Established 1952

HERMEX CORPORATION PTY. LTD.

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TELEPHONES (02)

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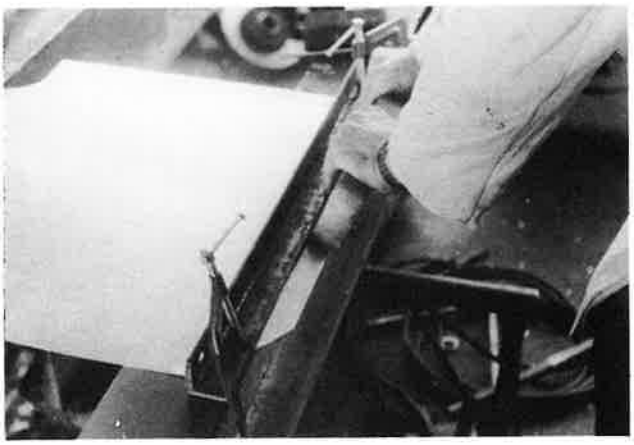
Here is where we begin in earnest to build a car. Once again remember to take your time in the interests of doing a first-class job.

ASSEMBLY

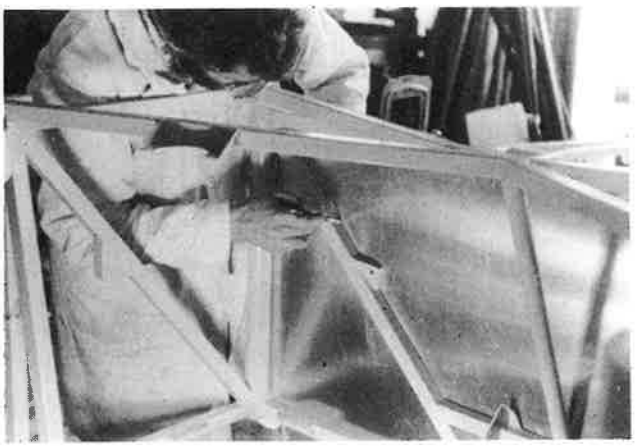
CHASSIS PREPARATION

Firewall & Fuel Tank

E1
Cut aluminium sheet to scribe mark.



E2
Fold ends to lie flat against roll bar (approximately 30°) clamping the panel as shown. Clean the panel with solvent (petrol or dry cleaning fluid), to remove any trace of grease or wax.

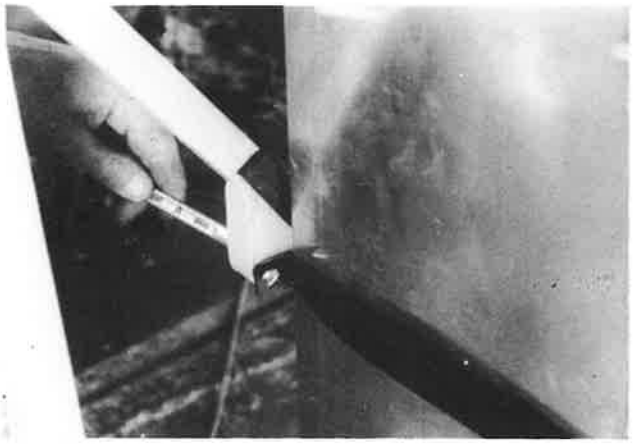


E3
Fit panel into frame and clamp into position. Mark with a pencil line the position of the chassis tubes on the back face.
Remove panel and pre-tension it by bending into a gentle curve (this avoids vibration when panel is finally rivetted into place). Cut insulation to suit, allowing 6mm (¼") around chassis tubes as marked.

E4
Attach insulation using 5 minute epoxy glue (Araldite). Refit panel to chassis as shown and clamp.

E5
Using contact cement attach rubber padding strips (supplied in fuel tank kit) on chassis bars to insulate fuel tank.

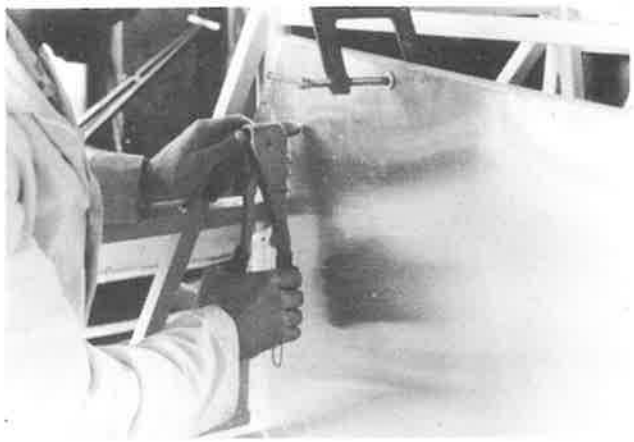
E6
Position tank by sliding it in from underneath and support it on the removable retaining bracket beneath.
NOTE: Ensure this also has a rubber strip attached.

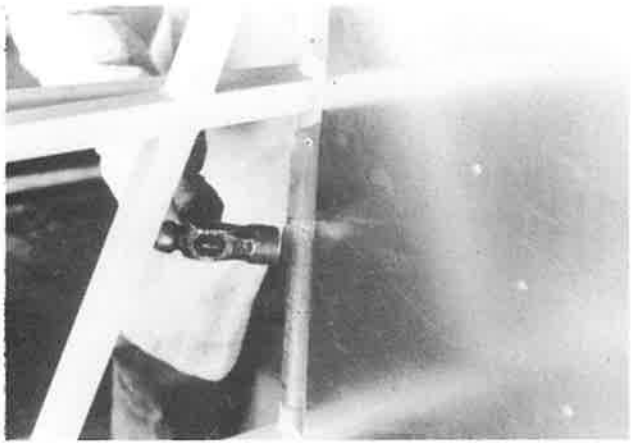


E7
Secure tank with the waistband retaining strip and bolt tight. Again, ensure that this also has a rubber strip attached.
CAUTION: It is vitally important that the tank does not contact the chassis directly. Double check this and glue rubber padding strip insulation wherever the possibility of rubbing may occur.

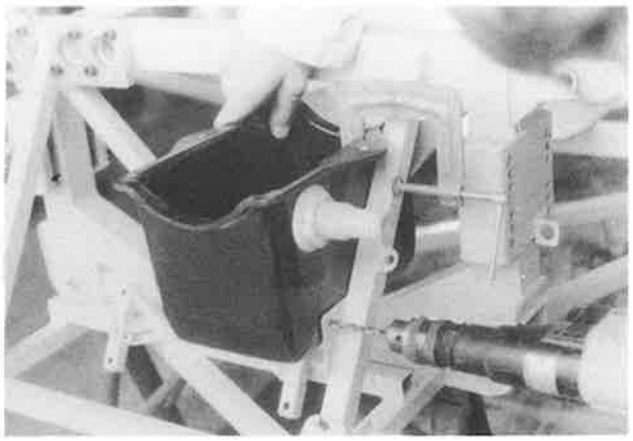
E8
Drill and rivet firewall every 75mm (3") where practical, using 1/8" rivets. Do not rivet to top horizontal chassis tube at this stage.

NOTE: When drilling the rivet holes mark them first using a centreline for each chassis tube. If the hole is drilled too close to the tube edge it will weaken it.



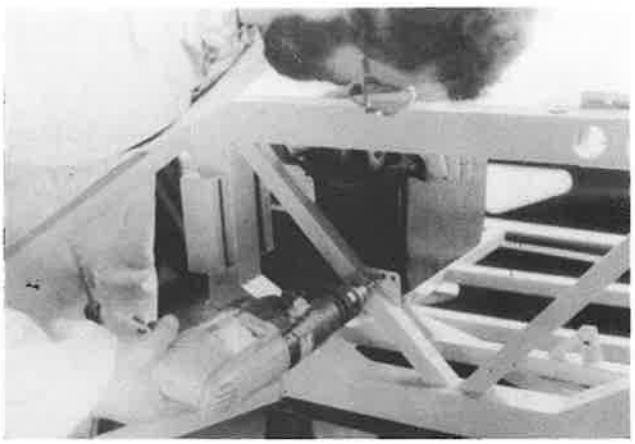


E9
Peen the edges of the panel around the roll bar tube.



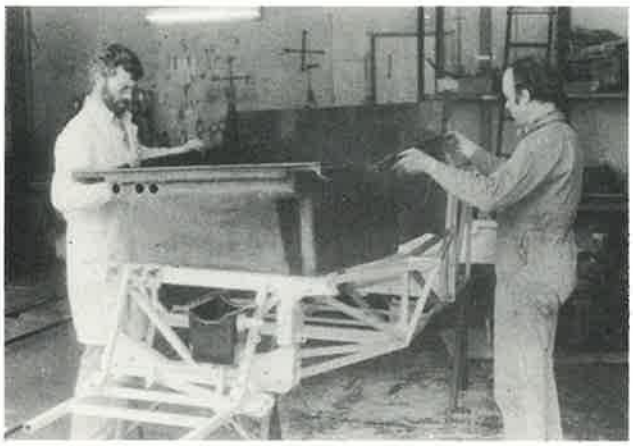
Battery Box

E10
Attach skin fitting supplied and tighten. Position battery box as shown (checking that it is horizontal to chassis), and clamp into position.

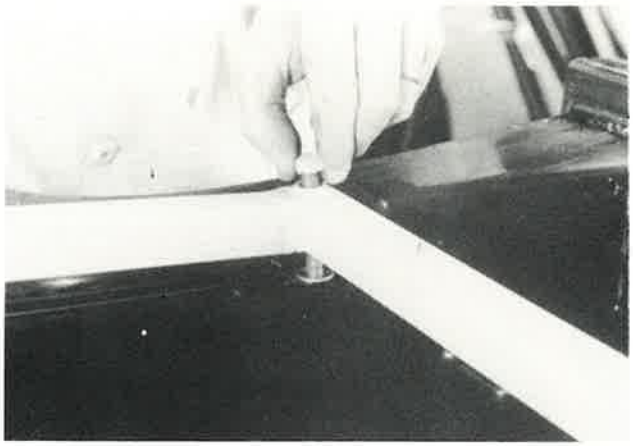


E11
Drill 6mm (¼") holes through the chassis mounting brackets and the battery box moulding. Bolt box from the inside using 25mm x 6mm (1" x ¼") mushroom-headed bolts and conelock nuts. Use washers to space where necessary.

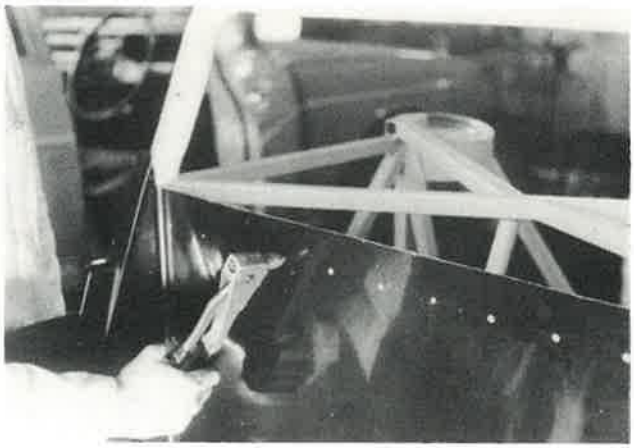
FLOORPAN



E12
Trial fit floorpan moulding and ensure that it sits firmly; relieve where necessary.

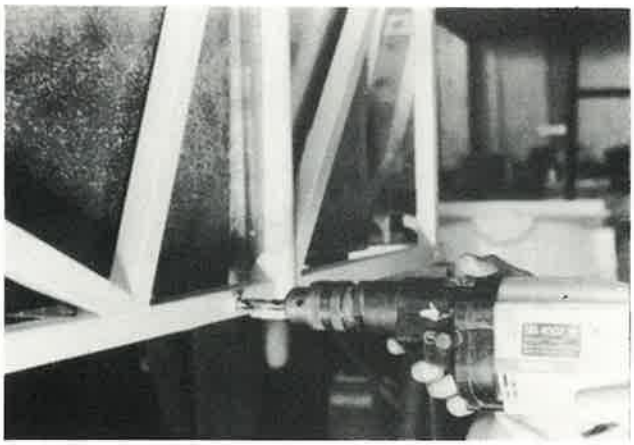


E13
Fit removable upper chassis stress frame with 9mm (3/8") washers between frame and fibreglass of two front holes. Before tightening any bolts locate all four (supplied).

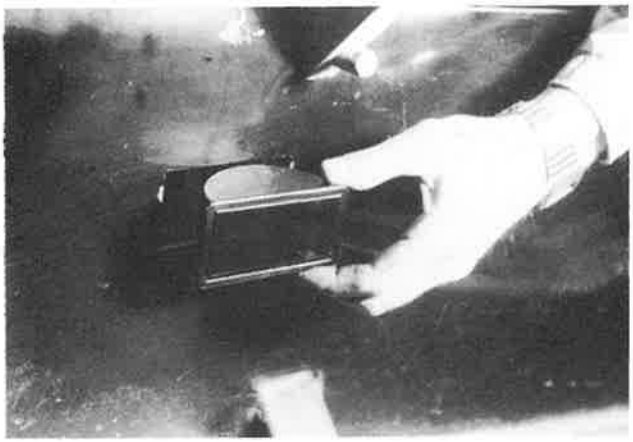


E14
Press rear of floorpan down hard against chassis. Then mark the tube centreline and hole positions, and drill and rivet along top horizontal chassis tube; this also secures the firewall.

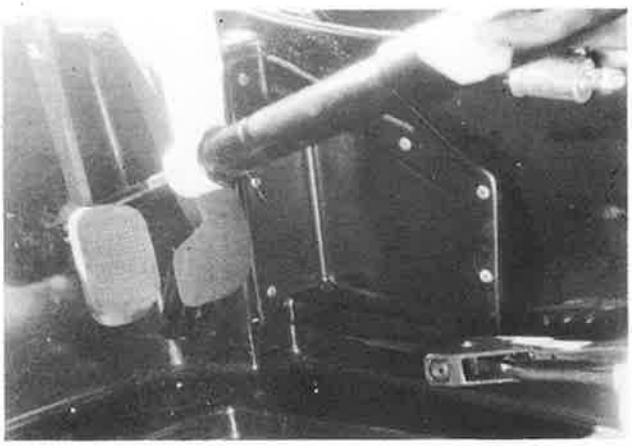
Using the chassis lugs as a guide, drill four 6mm (¼") holes for gearchange, two 9mm (3/8") holes for handbrake and eight 8mm (5/16") holes for seat runners.



E15
Drill 9mm (3/8") holes through seat belt reel bushes, being careful not to damage the threads. Open these holes out to 11mm (7/16") from inside the mouldings.

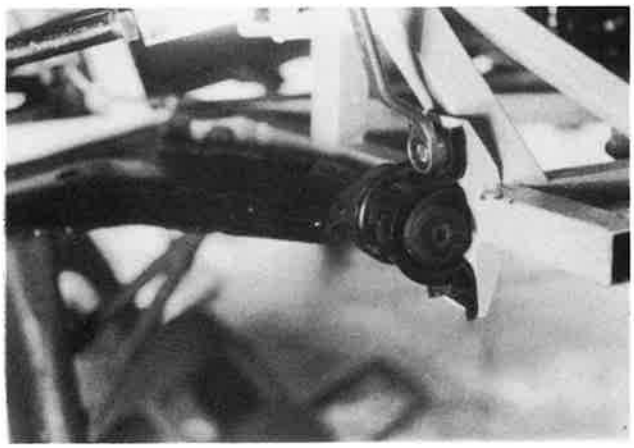


E16
Fit ashtrays.

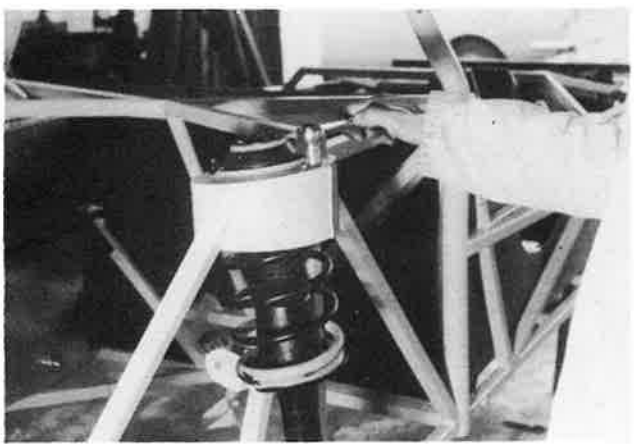


E17
Pop rivet throttle pedal recess into position as high as possible and against the chassis tube. Seal both sides with silastic.

REAR SUSPENSION

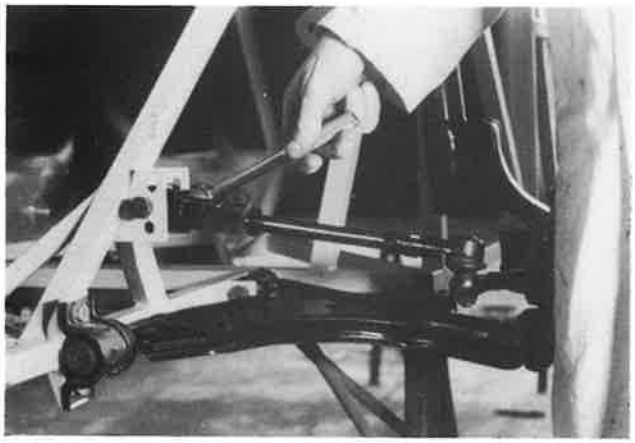


E18
Fit lower wishbones to chassis. Rear bush uses one 16mm x 9mm (5/8'' x 3/8'') high tensile bolt on top of saddle and one 19mm x 9mm (¾'' x 3/8'') high tensile bolt and conelock nut below. Front bush uses the original **Golf** lower wishbone bolt.



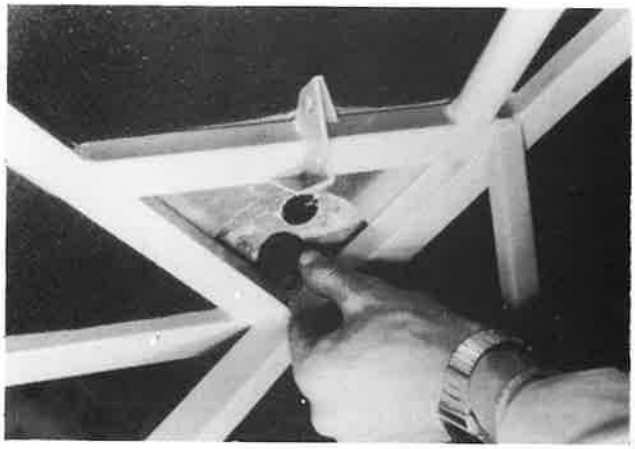
E19
Fit McPherson strut to top mounting using original **Golf** bolts and nuts.

E20
Fit McPherson strut to lower wishbone using original **Golf** bolts and nuts.

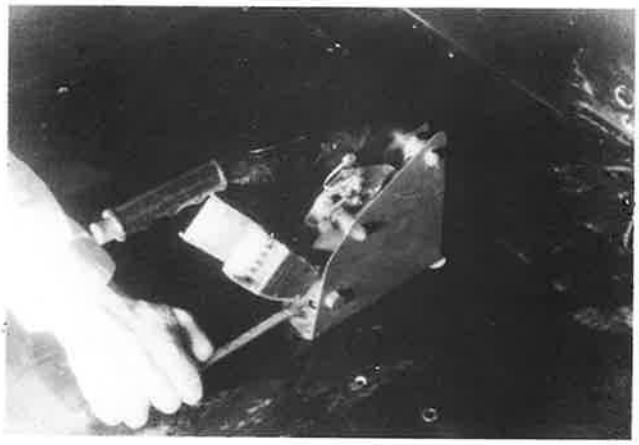


E21
Attach lower adjustable link (supplied in rear suspension kit).

HANDBRAKE

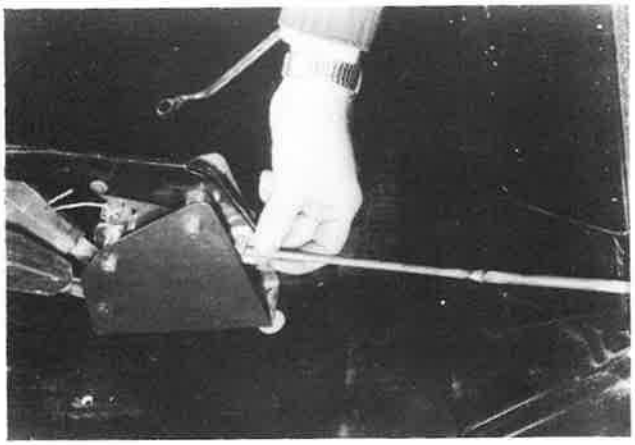


E22
Fit **Gemini** dust cover cone from behind through lower 25mm (1") hole in rear of floorpan moulding. Pass handbrake pullrod through firewall.

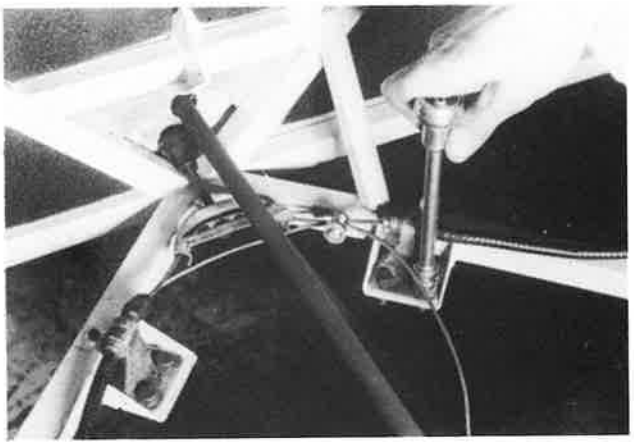


E23

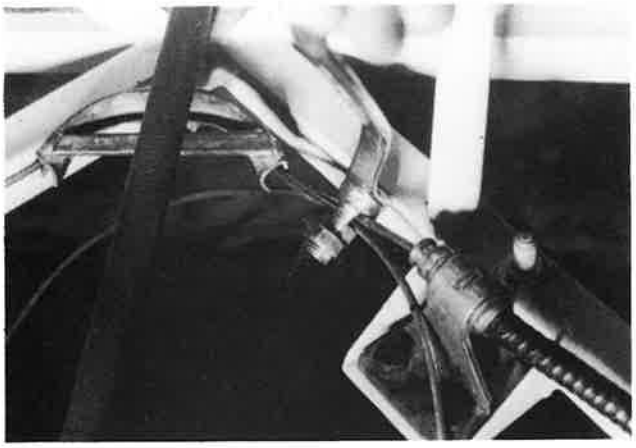
Bolt in handbrake sub-assembly using 45mm x 9mm (1¾" x 3/8") high tensile bolts and conelock nuts.



E24
Fit pullrod to flat-ended bolt and secure with the split pin.

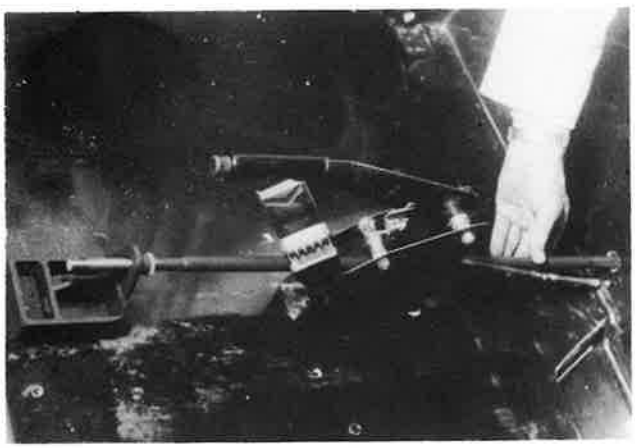


E25
Fit cable yoke to pullrod with cable passing over the top of the pullrod.
Secure the outer cables to the chassis brackets (three bolts per side).



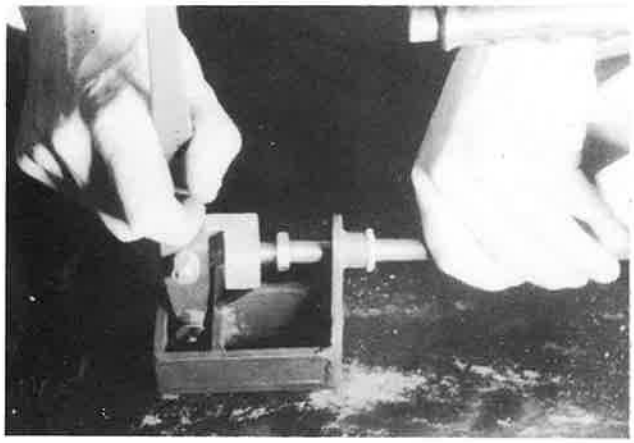
E26
Clamp the cables together on one side of the yoke and cut-off excess cable.

GEAR LINKAGE SHAFT AND STICK



E27
Pass mainshaft through firewall from the rear. Slip the firewall support bush over the mainshaft then pass the shaft through the handbrake bracket, taking it further than required. Then work it back through the bush behind the engine (see Figure E38).

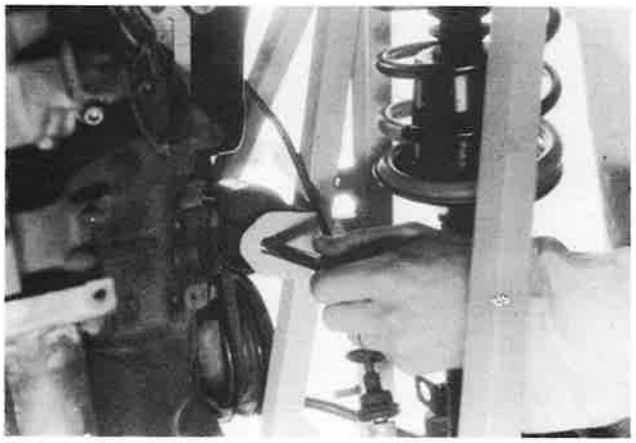
E28
Locate gearstick bracket and secure using four 44mm x 6mm (1-¾'' x ¼'') Unbrako bolts. Use washers to shim between floorpan and brackets to ensure that mainshaft does not bind in bush.
Tighten bolts, checking that the angle of the bracket is correct and does not impede smooth movement of the mainshaft. Fit supplied ½'' UNF locknut to shaft.



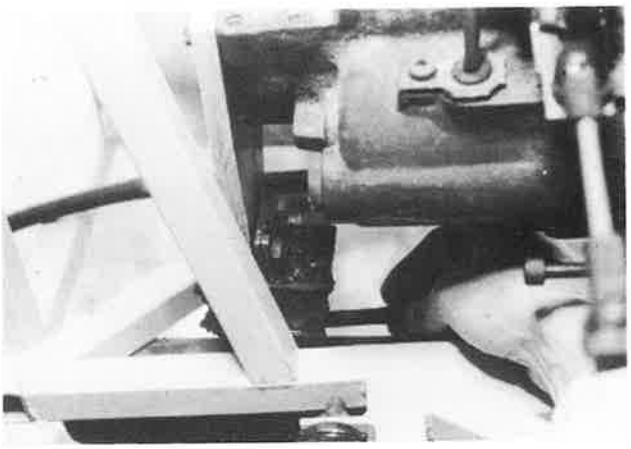
E29
Fit gearstick to bracket using clevis pin supplied and secure with split pin. Screw mainshaft into threaded aluminium base block. Do not secure with locknut at this stage.

ENGINE INSTALLATION

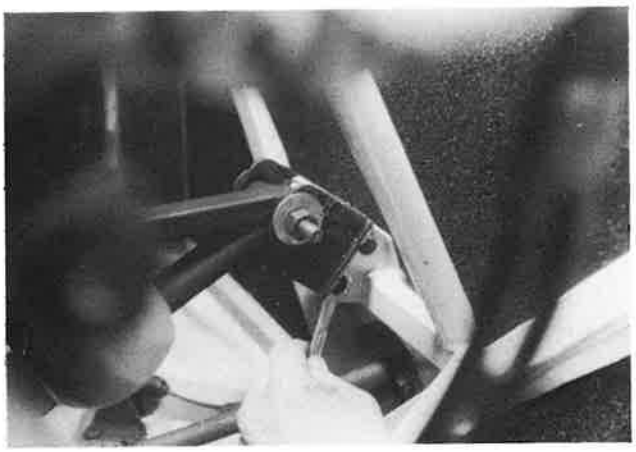
E30
Lower engine into chassis. Check clearances.



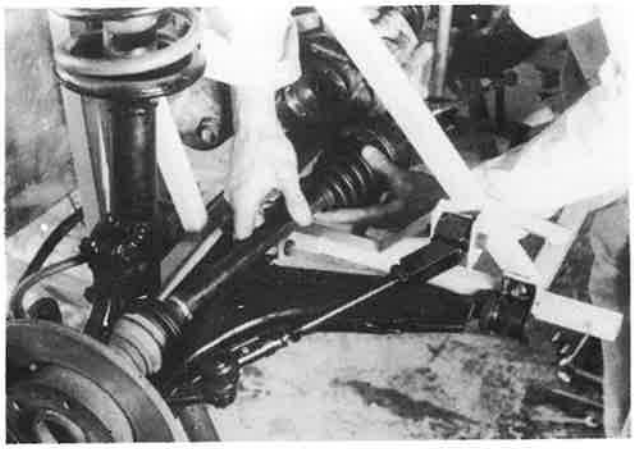
E31
Insert original **Golf** bolt in R.H.S. engine mount to locate.



E32
Insert bolt in L.H.S. engine mount to locate.

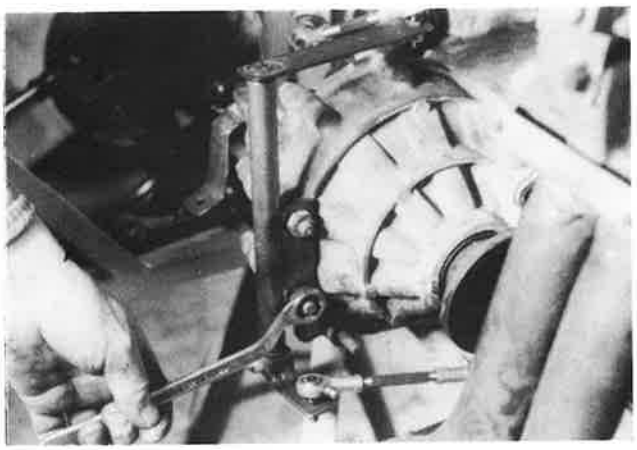


E33
Insert bolt in front engine mount to locate.
Tighten all engine mount bolts.

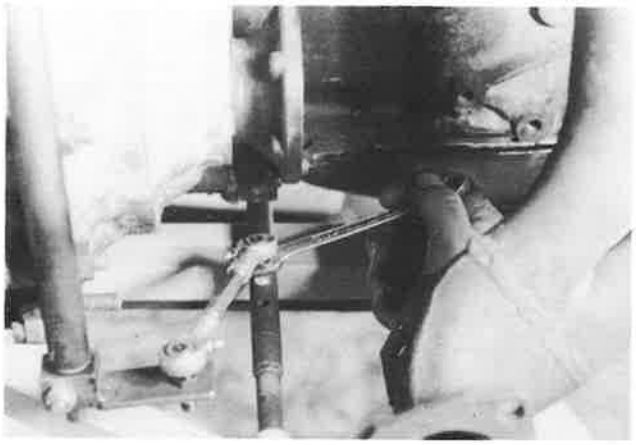


E34
Insert drive shafts and bolt into position.

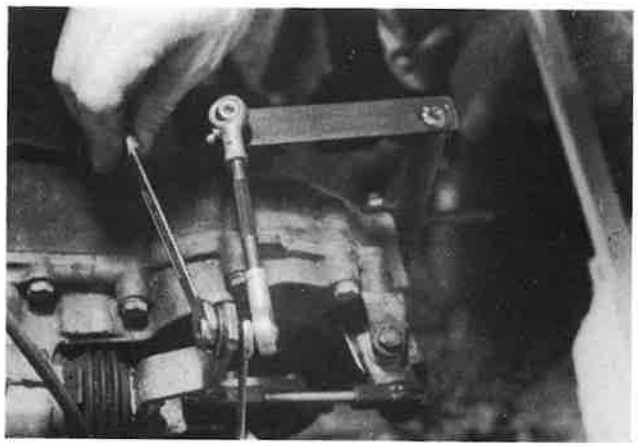
GEAR SHIFT MECHANISM



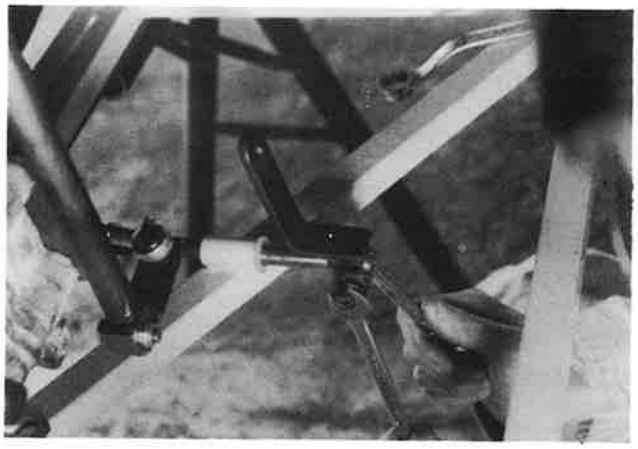
E35
Using conelock nuts fit vertical crank mechanism to rear of differential housing as shown.



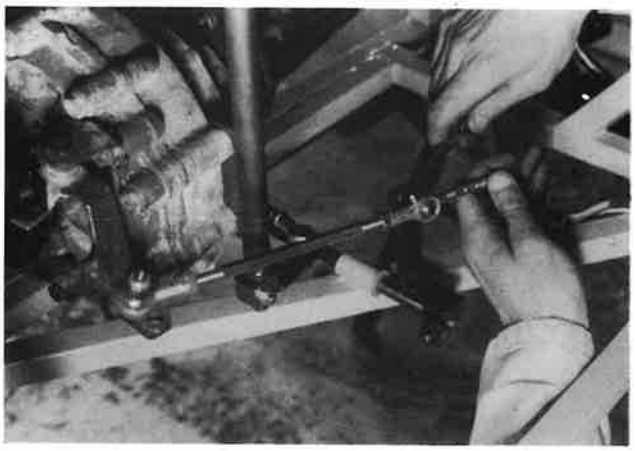
E36
Connect lower ball joint linkage to gearshift mainshaft and tighten.



E37
Connect upper balljoint linkage to gearbox actuating lever and tighten.

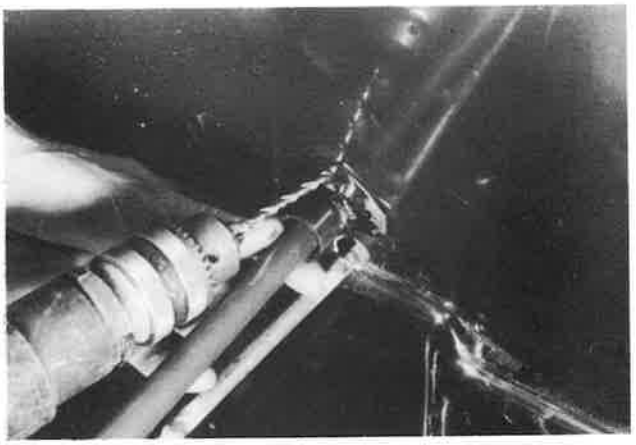


E38
Fit mainshaft end lever and tighten. **Note that this will only fit in one position.**



E39
Fit connecting balljoint linkage and tighten. Coat all nylon bushes with teflon grease to ensure smooth action.

E40
Make final adjustments to give correct function in all gears. Then tighten adjustment linkages and secure locknut at gear stick.

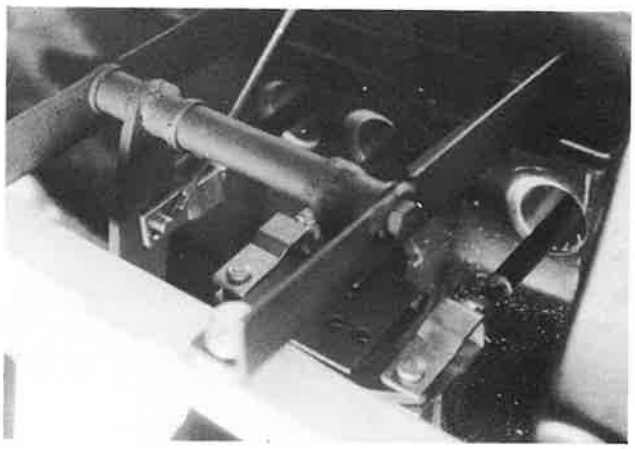


E41
Fit firewall support bush hard against floorpan face. Drill holes and secure with the nuts and bolts supplied.

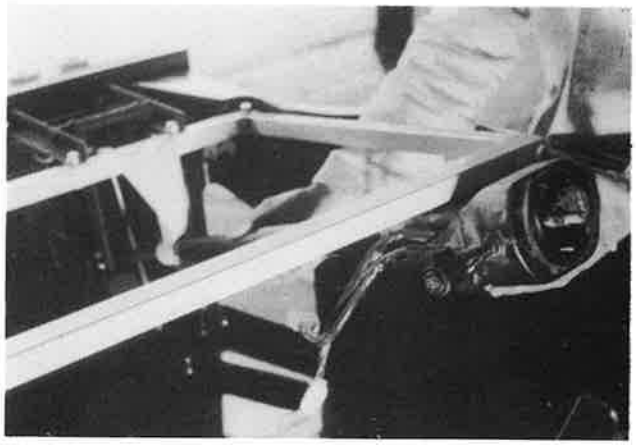
PEDAL UNIT

E42
Fit pedal rubbers and position pedal unit into chassis. Bolt it into place using four 32mm x 9mm (1¼'' x 3/8'') bolts, nuts and shakeproof washers.

E43
Fit the three master cylinders over the studs and tighten. Note that the largest of the three is fitted to the R.H.S.

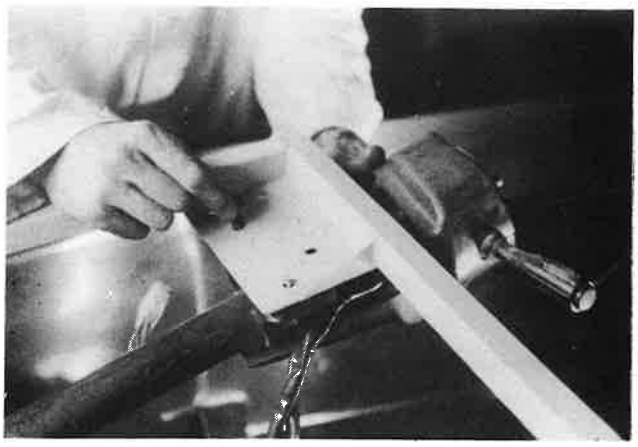


E44
Fit pushrods to pedals using clevis pins and secure with split pins.

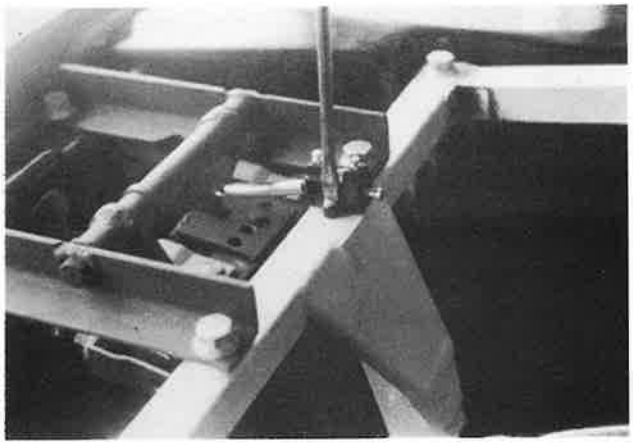


E45
Place steering column into position and mark centre position on front panel.

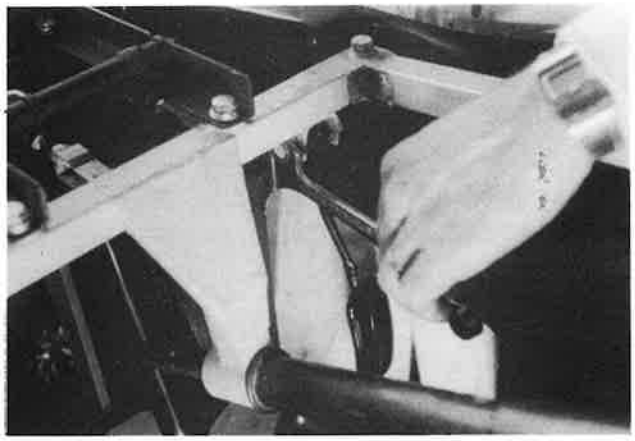
E46
Drill 25mm (1'') hole for inner column.



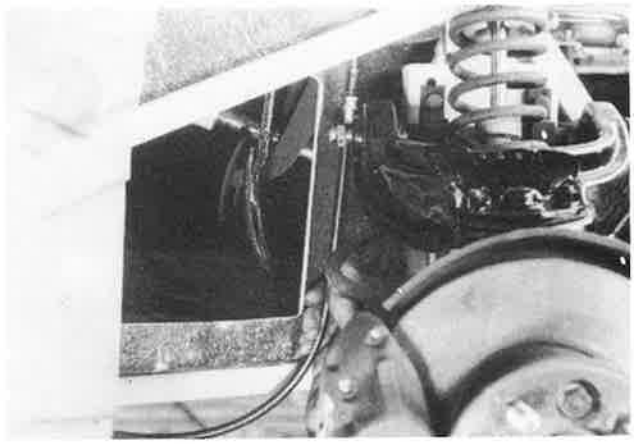
E47
Refit column, bolting it onto upper bracket using 25mm x 9mm (1'' x 3/8'') high tensile bolts and conelock nuts.



E48
Drill two 3mm (1/8") holes and fit brake failure switch in line with brake pedal using self tapping screws. Clip spring into 3mm (1/8") hole in brake pedal.

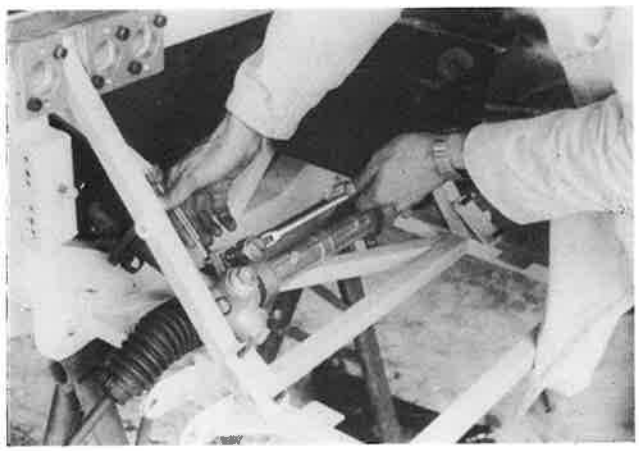


E49
Fit throttle pedal into chassis bracket. Grease pivot bush and secure using bolt supplied.
Drill a 12mm (½") outer cable retaining hole using position of hole in throttle pedal lever as a guide to centre.



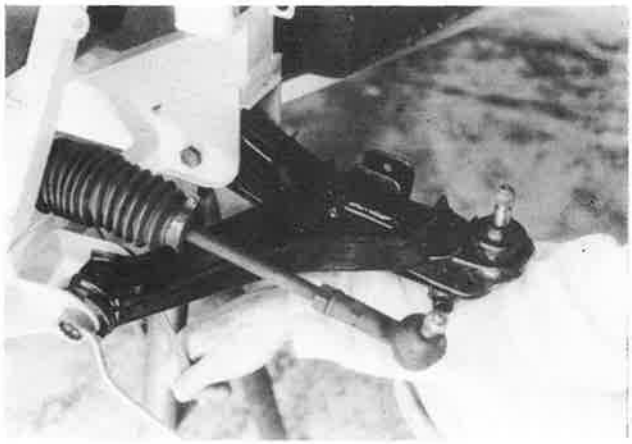
E50
Fit throttle cable up from R.H.S. of floorpan. Fit circlip.

FRONT SUSPENSION

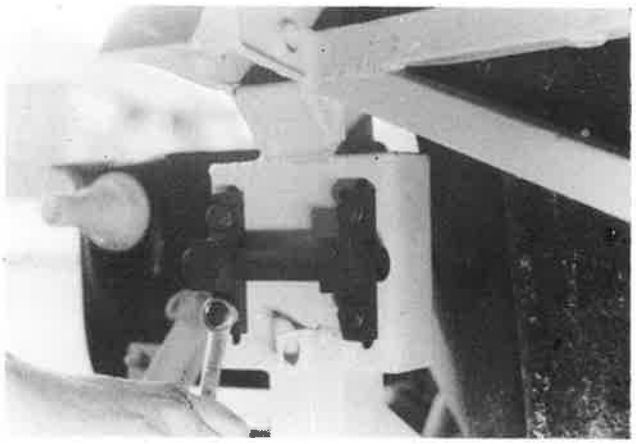


E51
Position steering rack and secure using four 37mm x 8mm (1½" x 5/16") high tensile bolts and conelock nuts over flat washers.

E52
Bolt universal joint to steering column. Glue felt section to floorpan to seal column.



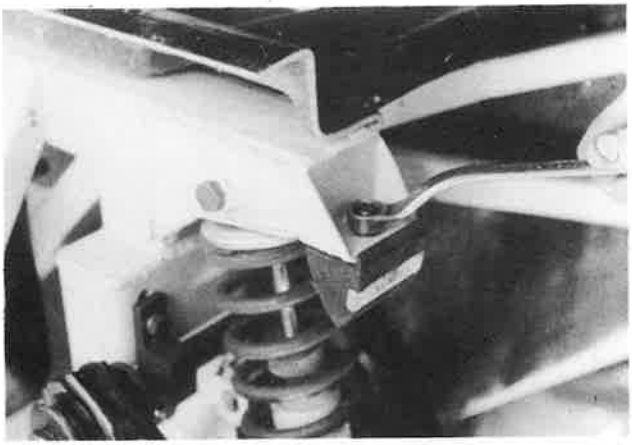
E53
Offer lower wishbones up to mounting brackets and bolt into place using two 101mm x 12mm (4'' x ½'') bolts on rear bushes and two 88mm x 12mm (3¼ x ½'') bolts on front bushes. Use conelock nuts, do not tighten.



E54
Fit upper wishbone mounting bracket and tighten. Note that it is by shimming this bracket from the chassis that camber adjustment is made. Castor adjustment is through shimming the wishbone on its main bolt.

E55
Fit upper wishbone using **Gemini** main bolt, spacer (for castor adjustment) and conelock nuts.

E56
Fit spring shocker units using a 76mm x 9mm (3'' x 3/8'') high tensile bolt for the top mounting and a 50mm x 9mm (2'' x 3/8'') high tensile bolt for the bottom. Use conelock nuts, do not tighten.

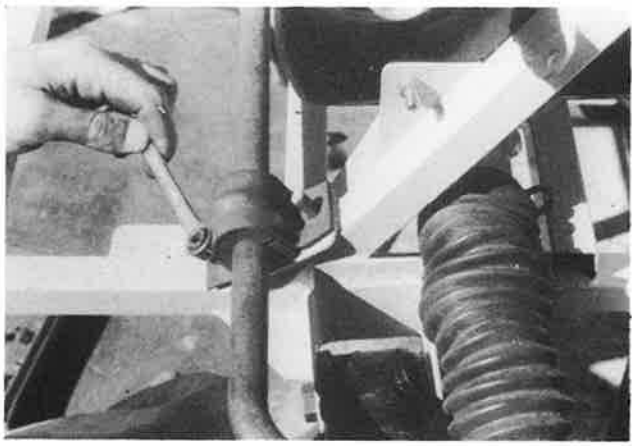


E57
Fit upper bump stops as supplied.

E58
Fit vertical links/hubs and brake units to wishbones.
Secure with conelock nuts and tighten.

E59
Fit tie rod ends, securing with castellated nuts and split pins.

E60
Install **new** brake hoses and fit retaining clip at chassis mount.



E61
Fit anti-sway bar onto chassis mountings, using conelock nuts.

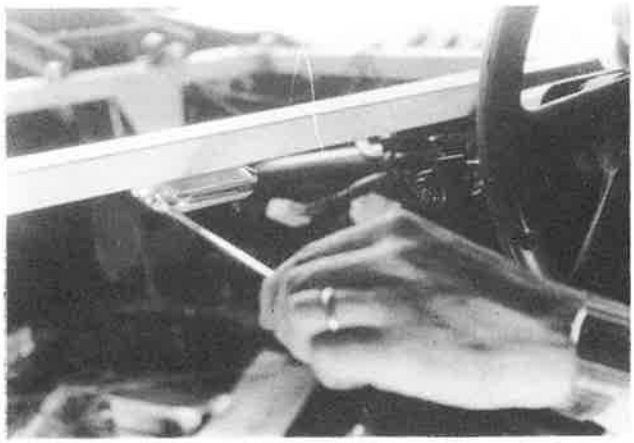
E62
Connect sway bar links to lower wishbones.

FOOTWELL COVER/DASHBOARD

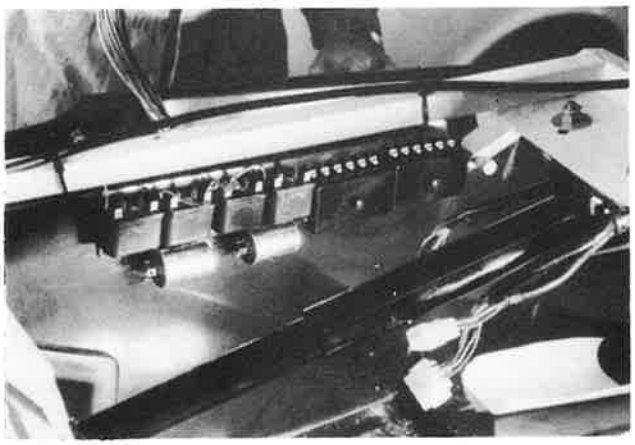
E63
Trial fit the panel, specifically checking clearance on the dash bulkhead tube, the longitudinal bulkhead support tubes and the fit where it contacts the floorpan, particularly the leading edge. **NOTE: this fit is very important as it determines the final position of the windscreen in relation to the other panels.**

E64
Drill through grab handle mounting holes with a 3mm (1/8") drill and into bracket behind. Mount the grab handle using four 19mm x 3mm (¾" x 1/8") panhead self-tapping screws.

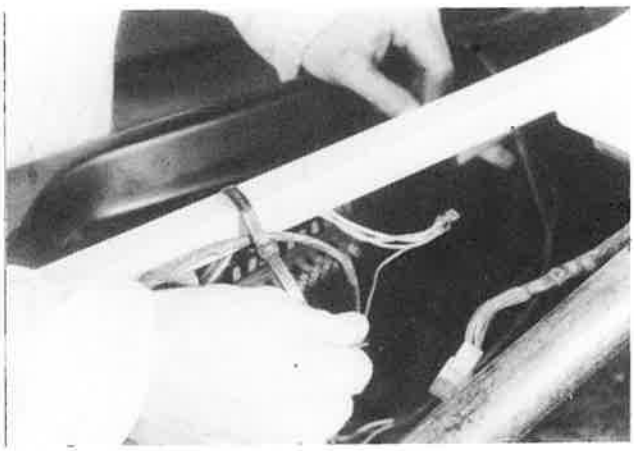
E65
Attach interior light to bracket supplied, switch pointing downwards.

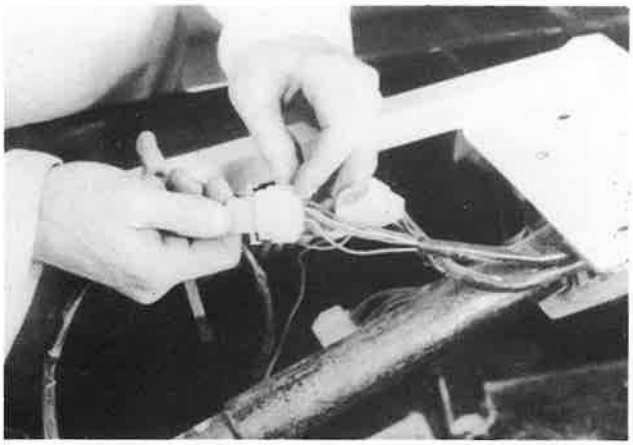


E66
Mount two fuse boxes, four relays and two flasher cans on upper right side of footwell as shown.

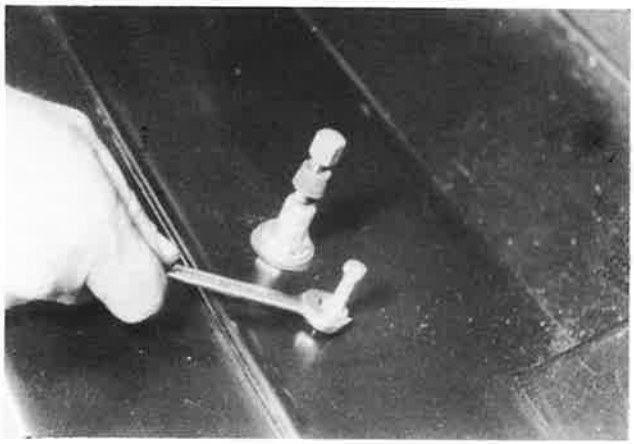


E67
Attach wiring loom assembly to chassis tubes (see fold out diagram) and tape or strap into position. Ensure that it does not foul footwell cover.

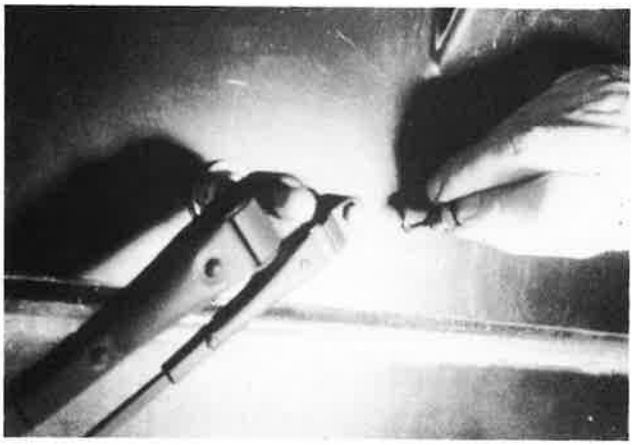




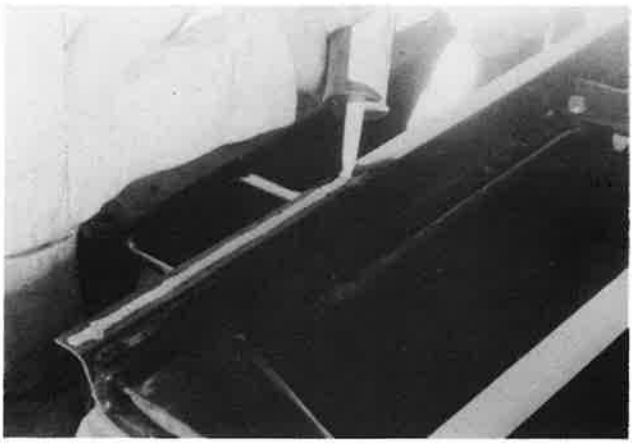
E68
Attach wiring loom to steering column connectors and fuse boxes where applicable. (see fold out diagram).



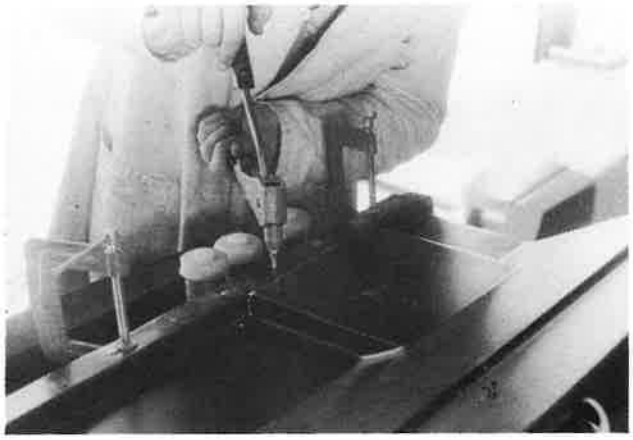
E69
Fit large and small wiper pivot assemblies.



E70
Fit windscreen washer nozzle.

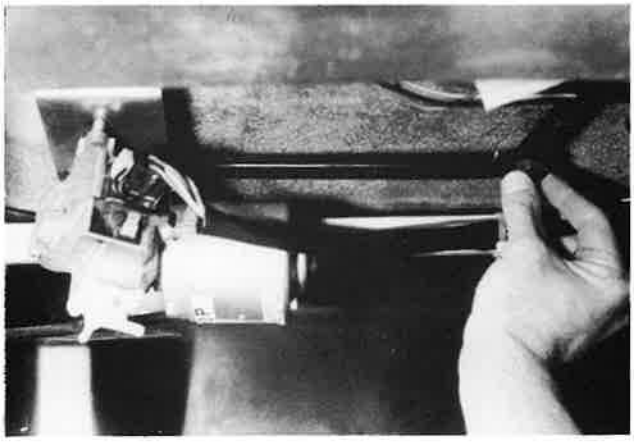


E71
Apply silastic to jointing edge of mouldings.

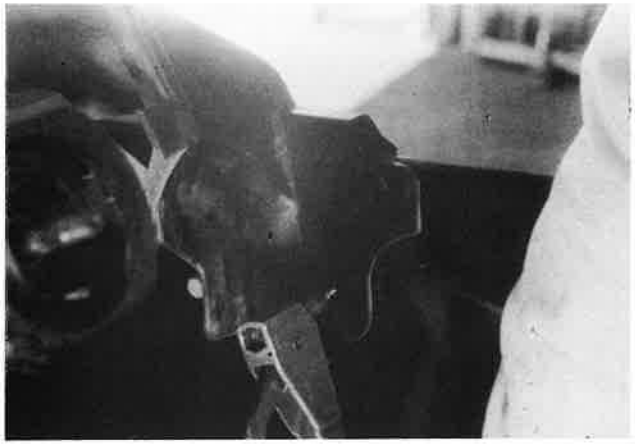


E72
Fit moulding into place and clamp into position. Drill and rivet every 76mm (3") along leading edge.

E73
Fit wiper motor to bracket inside footwell cover and secure with bolts supplied.
NOTE: slotted holes in bracket allow for adjustment of wiper park position.

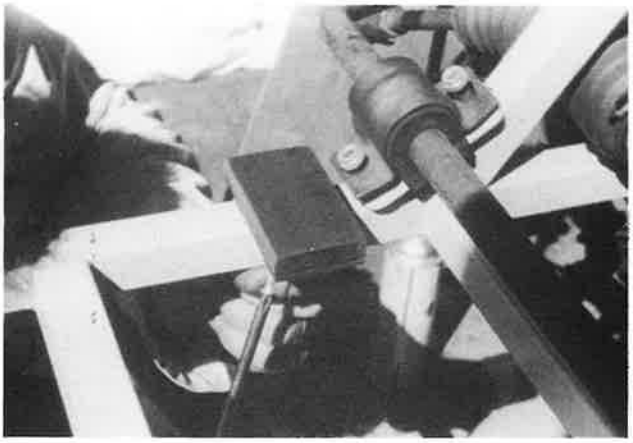


E74
Join connecting link and clips.

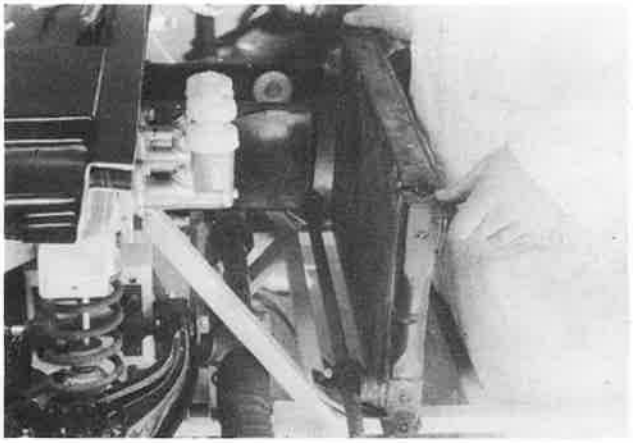


E75
Drill and rivet (one only) each dash side cover into the chassis tube. **NOTE: do not rivet along the sides of moulding.** Feed all relevant wiring through each applicable opening for warning lights, instruments, switches (see fold out diagram).

RADIATOR



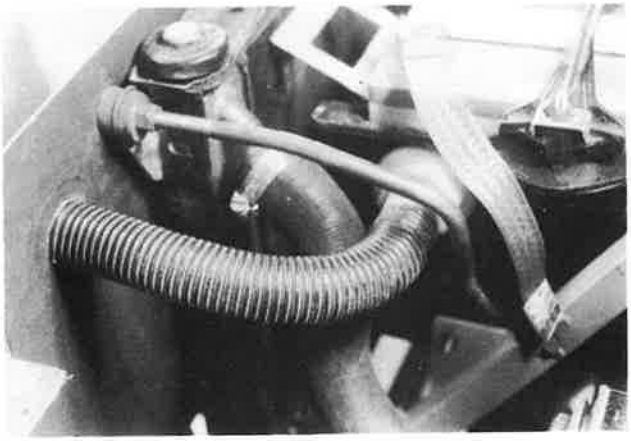
E76
Fit rubber pads (supplied in radiator kit) to chassis mounting plates using contact cement and 12mm (½") self-tapping screws from underneath.



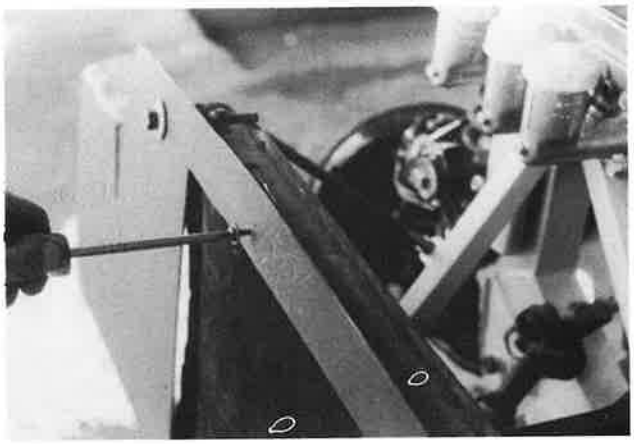
E77
Position radiator over rubber pads and centralise in chassis.

E78
Fit radiator baffle, the **returned edges facing rearwards.**

E79
Attach upper radiator mounting rods using large mudguard washers to sandwich the radiator mounting flange bush and the baffle. Note that final adjustment will not be until the nose panel is fitted.



E80
Fit 25mm (1") convoluted hose between battery box and radiator baffle, sliding it over the skin fitting on the battery box and pushing it through the hole drilled in the baffle. Secure the hose with silastic.

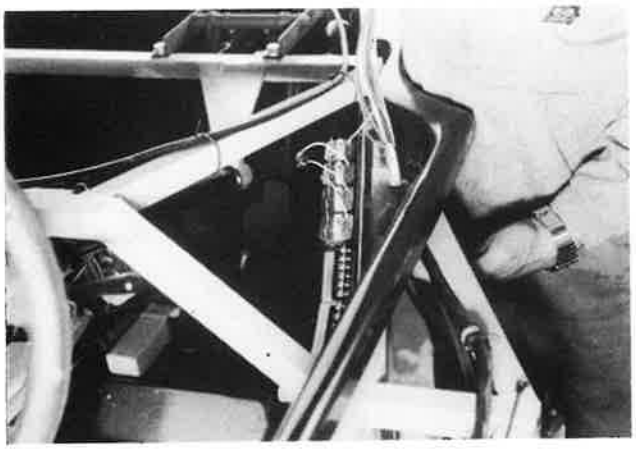


E81
Drill two 3mm (1/8") holes through baffle and into top radiator flange, 102mm (4") in from each corner of the airflow opening. Secure with self-tapping screws.

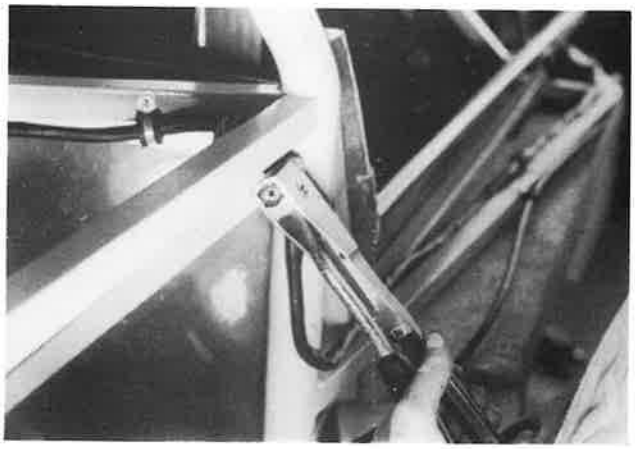
SIDE POCKETS

E82
Fit side pocket mouldings against chassis and rivet onto tubes. **NOTE: do not rivet along bottom tube as this is fastened when attaching side pontoons.**

LINES & WIRING

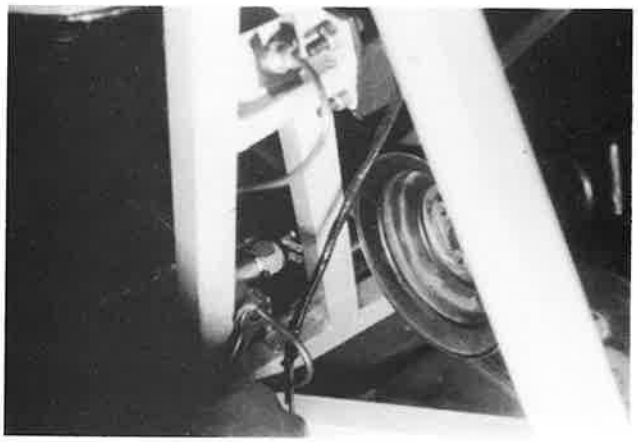


E83
Pass wiring loom up through platform high on R.H.S. of footwell for cabin wiring and connection to fuse boxes, relays and flasher cans.

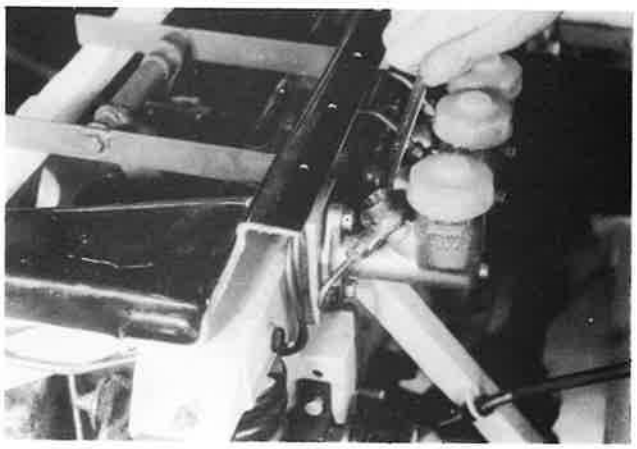


E84
Run main loom back along R.H.S. chassis outrigger tubes and up rear face of rollbar; the loom splits at this point, one part connecting to engine and fuel tank, the other part running along under the top R.H.S. lateral bar and down to the rear lights. Locate with clamps supplied.

E85
Run the clutch line from the L.H.S. master cylinder, under the crossmember front spring mount (see Figure E87), along the top of R.H.S. chassis outrigger tubes and down behind the rollbar base. Fit joining block at this point using a 25mm x 6mm (1'' x ¼'') bolt and conelock nut and attach flexible line to slave cylinder.

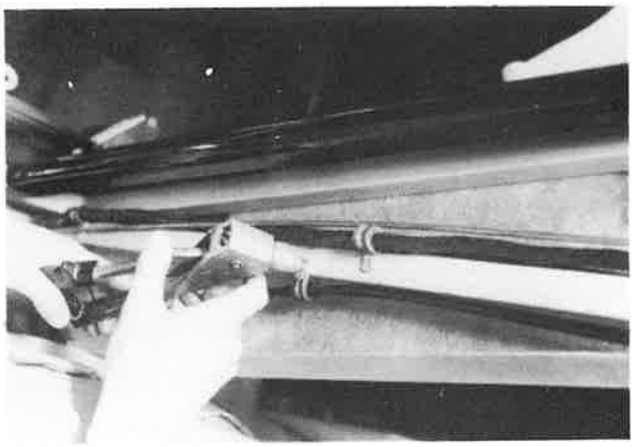


E86
Run the main rear brake line from the centre master cylinder beside the clutch line to the base of the rollbar, then along the lower R.H.S. longitudinal tube and up to the joining block and stop light switch. Mount these on the stud in the vertical tube in front of R.H.S. half shaft. The short line then runs from the block to the R.H.S. brake hose, the longer line passing along the lower horizontal tube and up to the L.H.S. brake hose. Clamp all lines securely to prevent vibration.



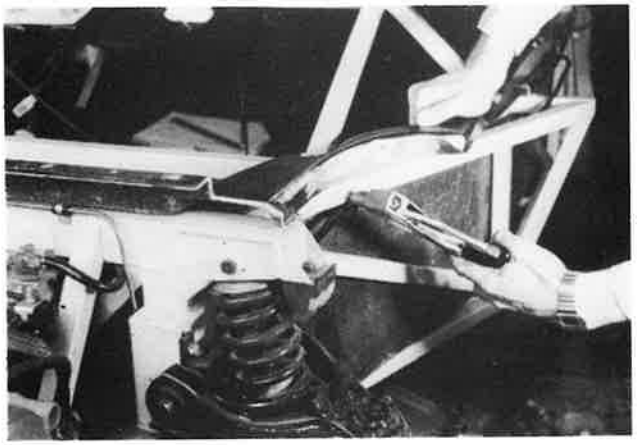
E87
The front brake lines attach to the R.H.S. master cylinder using a double outlet fitting, the short line running to the R.H.S. brake hose, and the longer one passing along the cross member to the L.H.S. brake hose.

E88
Run throttle cable along R.H.S. outrigger tubes and into engine bay. Fasten along its length to prevent vibration.

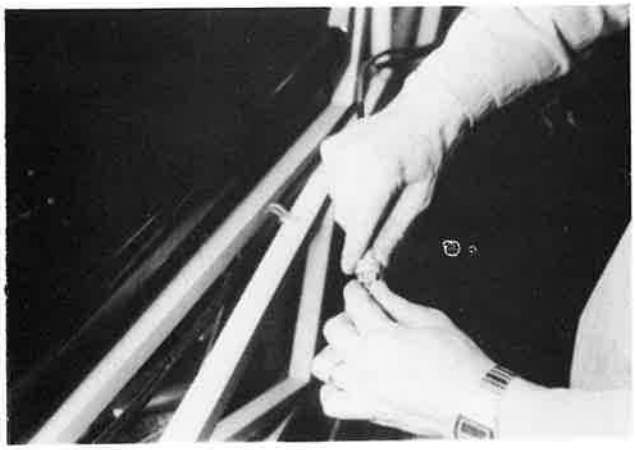


E89
Fit battery with negative terminal forward. Attach earth strap from negative terminal to L.H.S. radiator mounting rod.

E90
Run battery power cable from the positive battery terminal, passing it rearward under cross member tube, along the underside of the upper L.H.S. chassis tube, over L.H.S. pocket moulding and behind the fuel tank to the starter motor. Fasten cable along its length to prevent vibration. Do not attach cable to terminal.



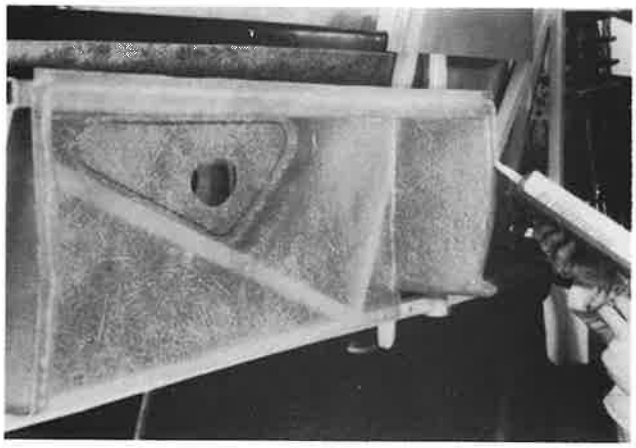
E 91
Fit standard **VW Golf** speedo cable from transmission along the top of L.H.S. pocket moulding. Fit speedo gearing adaptor as supplied in the instrument kit and join to cable extension, passing it through the oval hole cut high in the L.H.S. footwell. Tape cable to subframe and lead it up to primary instrument pod. **Caution: do not bend cable into tight bends.**



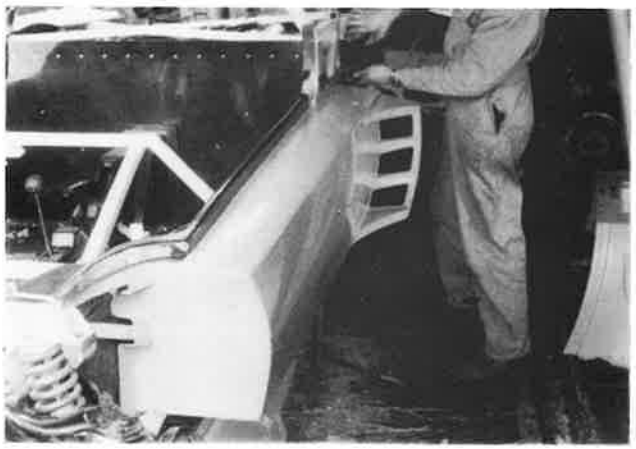
E92
Fit fuel line from tank via line filter to fuel pump.

SIDE PONTOONS

E93
Trial fit and relieve where necessary.

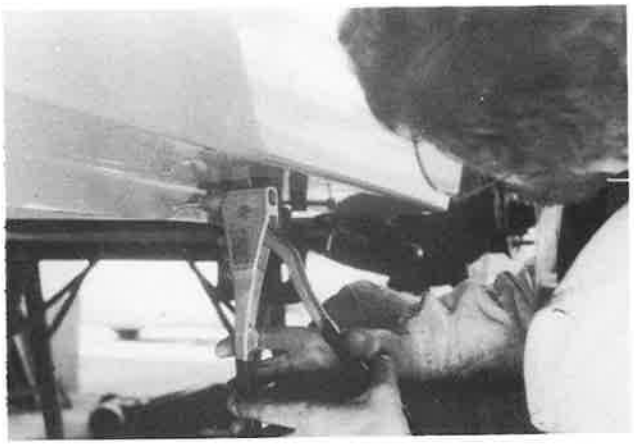


E94
Run a silastic bead onto flanges of side pockets.

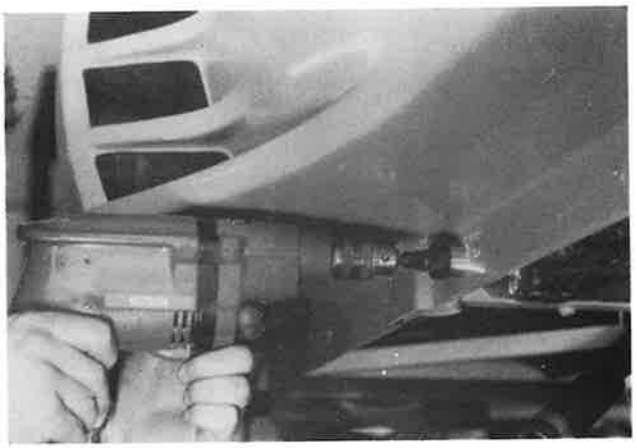


E95
Run a bead of silastic along top flange of side pontoon moulding and position it as high as possible under rolled edge of floorpan. Locate rear edge flush with rear edge of vertical chassis tube. Clamp into position.

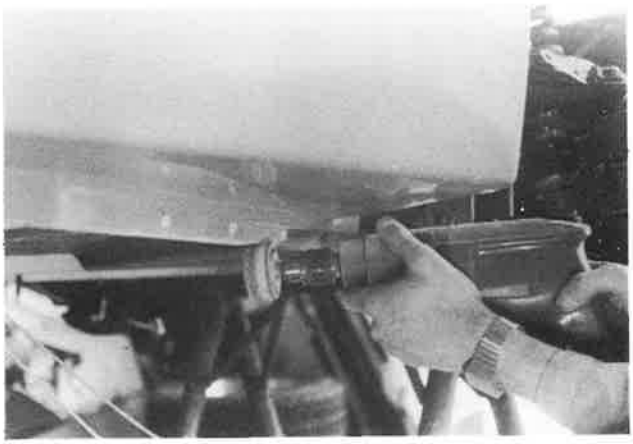
E96
Drill 4.5mm (3/16") holes and rivet every 4" where rear flat section joins chassis tubes and along lower flange. Secure top of front flange to top chassis tube with one rivet. The top edge and front are self-locating.



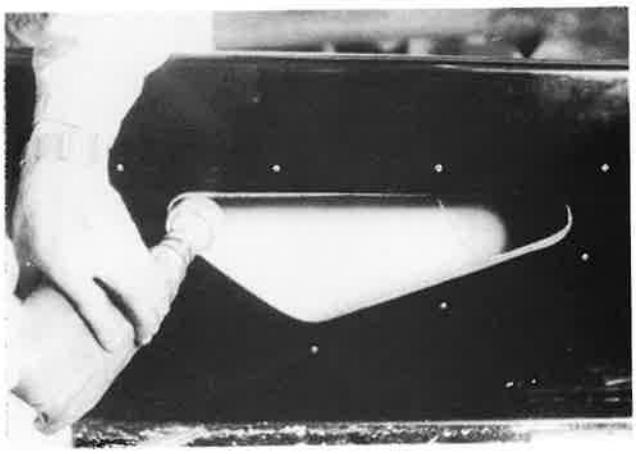
E97
Using a 25mm (1") holesaw drill hole for seatbelt bolt attachment.

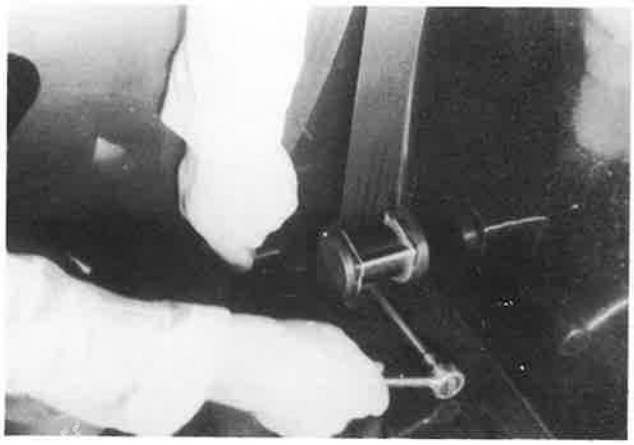


E98
Trim underside of panel flush with lower chassis tube.

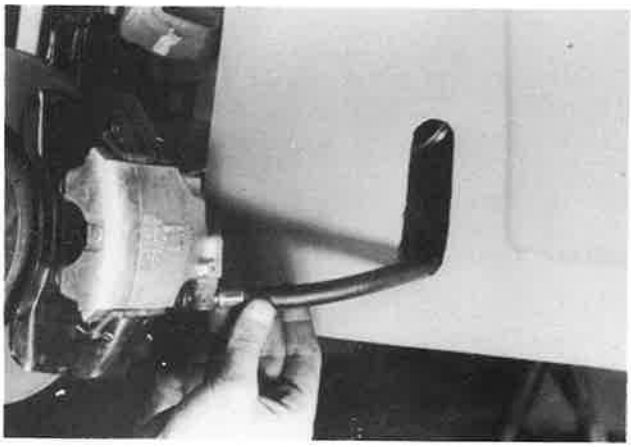


E99
Sand back side pocket cutouts to align with floorpan cutouts. Hand sand edges to fine radius ready for trim. Check seal of side pocket against pontoon moulding and add more silastic from the inside if necessary.



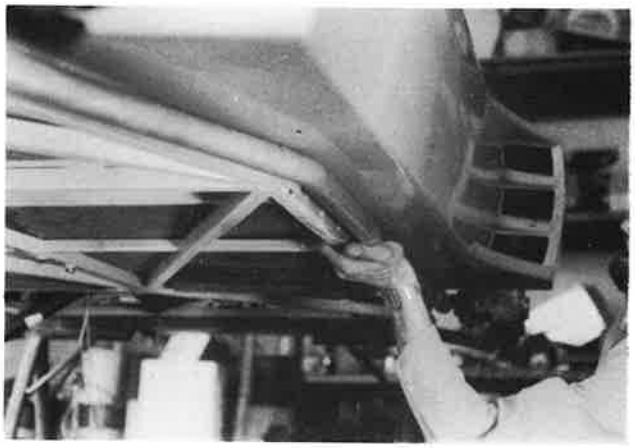


E100
Fit seatbelt reels to chassis using bolts, nuts, spacers and washers supplied in package.



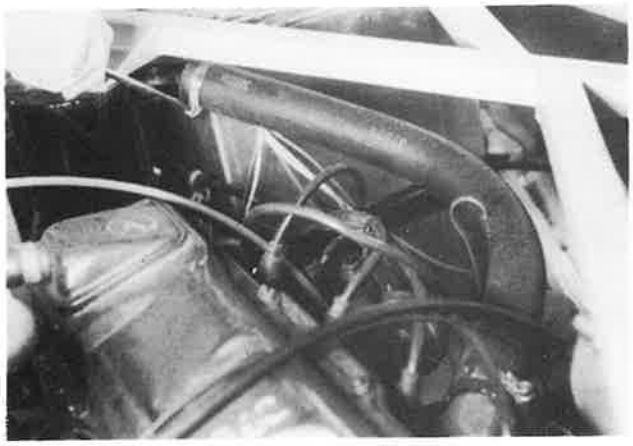
E101
Pass handbrake cables through vertical slots in pontoons and attach to rear caliper levers.

WATER SYSTEM



E102
Trial fit tubes under side pontoons and pass through holes beside handbrake cable slots.

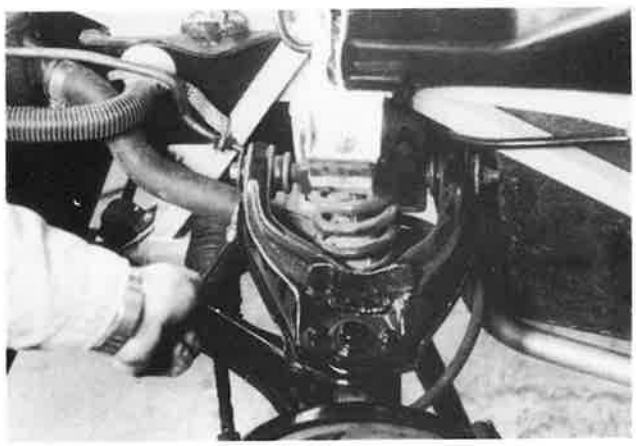
E103
Bolt swill pot to bracket in engine bay with upper pipe pointing towards engine.



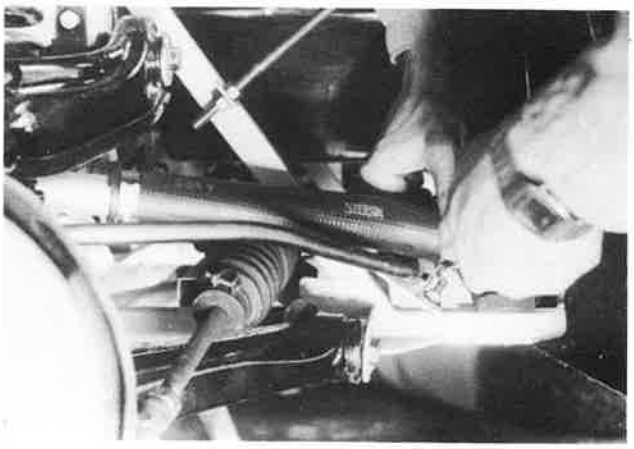
E104
Connect hose from engine to upper swill pot pipe. Clamp both ends.

E105
Connect hose from lower swill pot pipe to L.H.S. water tube. Clamp both ends.

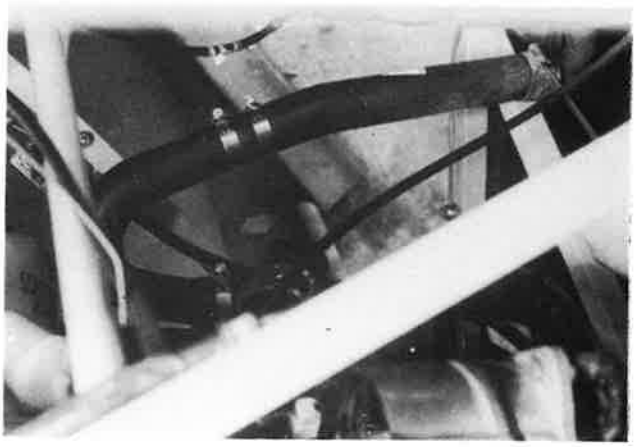
E106
Fit overflow hose from swill pot to just below chassis. Clamp to strut as shown.



E107
Fit radiator hose from L.H.S. water tube to radiator. Clamp both ends.



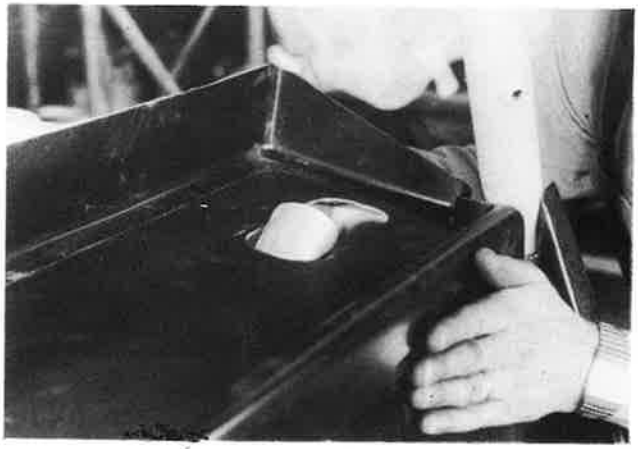
E108
Fit radiator hose from radiator to R.H.S. water tube. Clamp both ends.



E109
Connect hose from R.H.S. water tube to joiner and from joiner to engine. Clamp all four ends.

E110
Check all clearances on panels, chassis and suspension. Using three insulated clamps each side fasten water tubes to side pontoons with 4.5mm (3/16") pop rivets.

TARGA PANEL & PARCEL TRAY

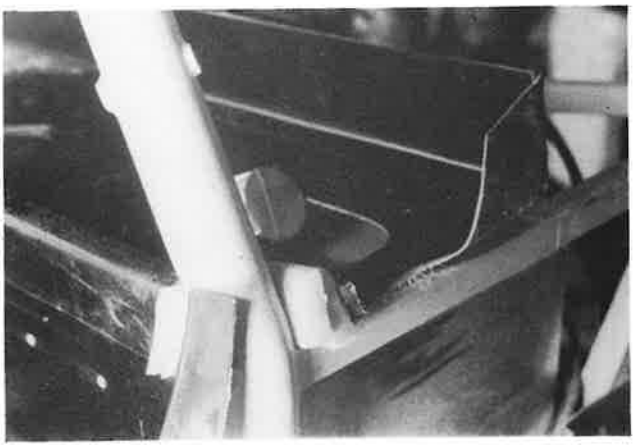


Trim parcel tray panel to fit between rollbar uprights. Locate petrol filler hole position.

E111
Cut oval hole to accept filler tube. Cut a 'V' into rear vertical corners of moulding to allow flex.

E112
Trial fit targa moulding over parcel tray. Trim sides of parcel tray where necessary to allow targa to seat properly. Check lower edges of targa to ensure that they sit neatly onto pontoons.

E113
Fit parcel tray onto chassis with forward edge lapping over floorpan. Fit foam rubber sealing pad around rollbar, silastic all panel joints and using 3mm (1/8") rivets secure tray every 6" along forward edge plus one rivet in the centre rear.

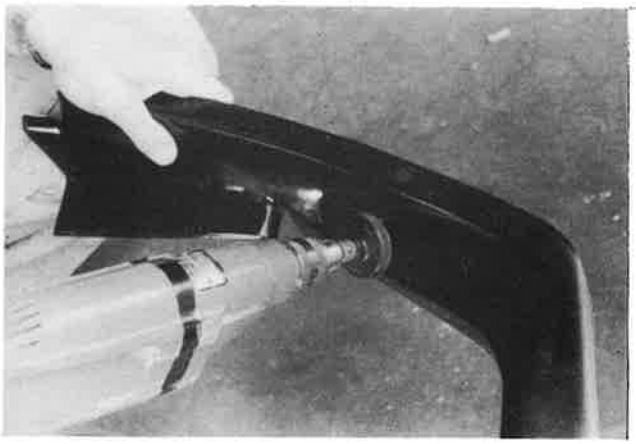


E114
Refit targa, check that parcel tray is not twisted and mark inside rear window cutout.

E115
Remove targa moulding. Trim parcel tray moulding 9mm (3/8") below the line marked (clearance for rear window rubber).

E116
Check thickness of targa moulding at fuel filler hole. Fit up filler neck with breather tube uppermost and secure using original bolts.

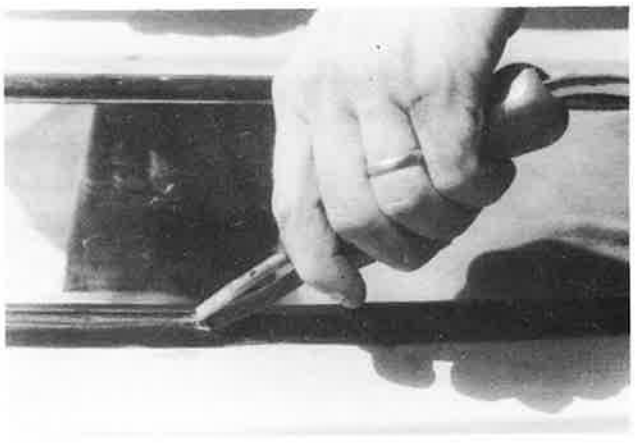
E117
With rollbar cover moulding in position refit targa panel; mark position of seatbelt mounting holes and check fit of lower corners.



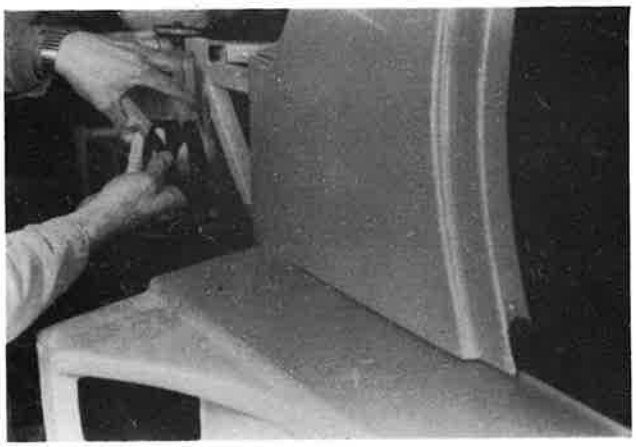
E118
Using a 25mm (1'') holesaw drill seatbelt mounting holes and relieve lower corners if necessary. Measure the circumference of the rear window. Cut the supplied rubber 25mm (1'') longer and compress fit to opening with the join at centre **bottom** and lock strip groove to the outside.

E119
Fit glass into rubber.

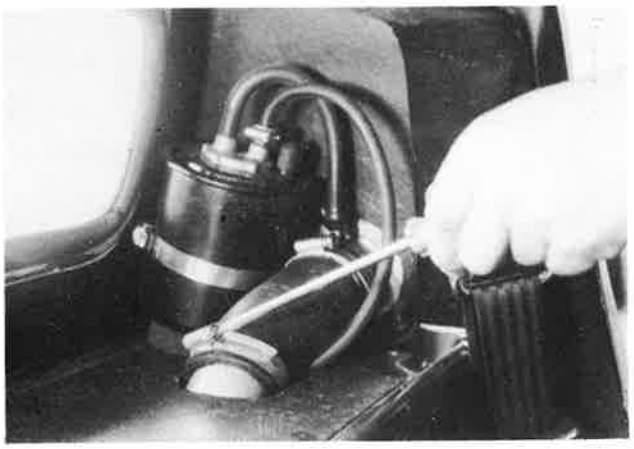
E120
Using rubber grease or vegetable oil as a lubricant and the special lockstrip tool, insert lockstrip starting at centre **top,** i.e., opposite the main rubber join. Wipe off excess lubricant.
Run a bead of silastic round all flange and panel joins, fit targa into place and clamp until dry. Secure rollbar cover to targa with three 3mm (1/8") pop rivets along front edge.



E121
Secure targa panel using four 4.5mm (3/16") rivets, two on front face corners and two on rear lower flange corners.

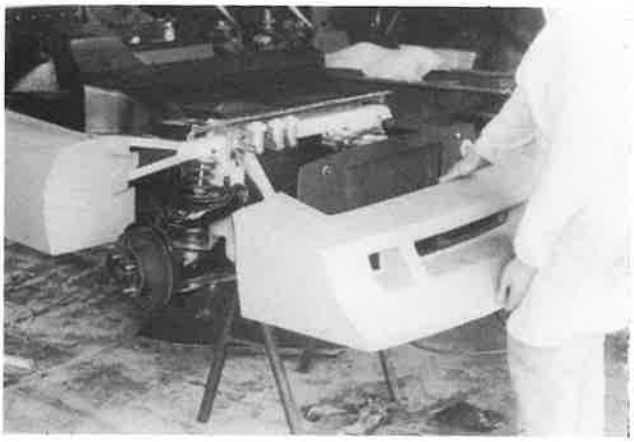


E122
Join fuel filler neck to tank using hose and clamp. Fit charcoal canister using worm-drive clamp located under top hose clamp. Connect breather and overflow pipes as shown.



E123
Run a bead of silastic around the edge of the fuel filler neck cover and fit into position.

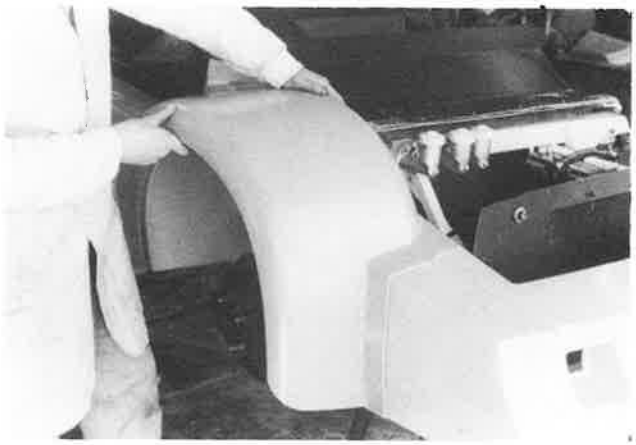
E124
Fit locking petrol cap.



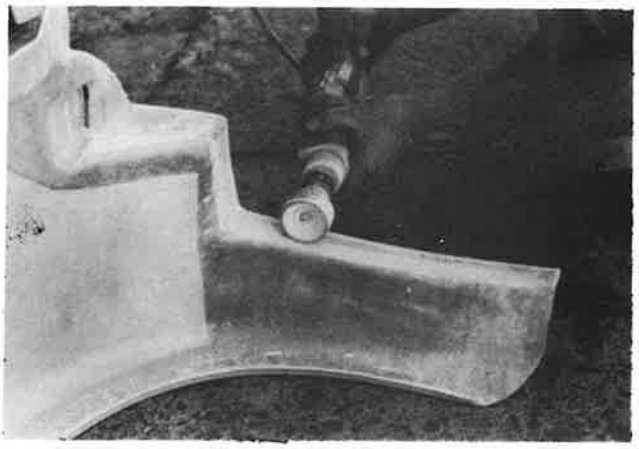
FRONT BODYWORK

This part of the assembly must be followed precisely to ensure a neat panel fit. Each stage must be done with extreme care and only after it is correct proceed to the next stage.

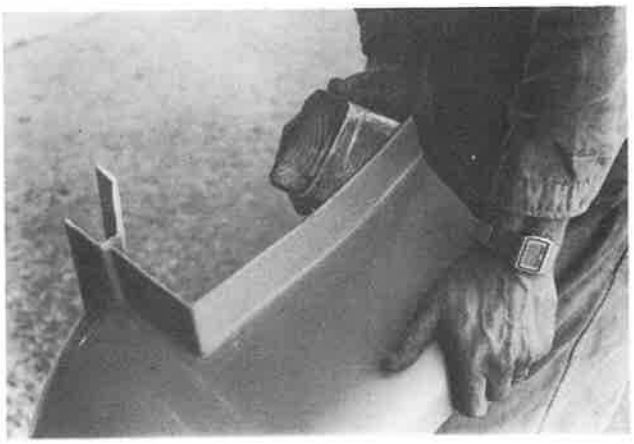
E125
Offer nose section into position and support it. **DO NOT FASTEN.**



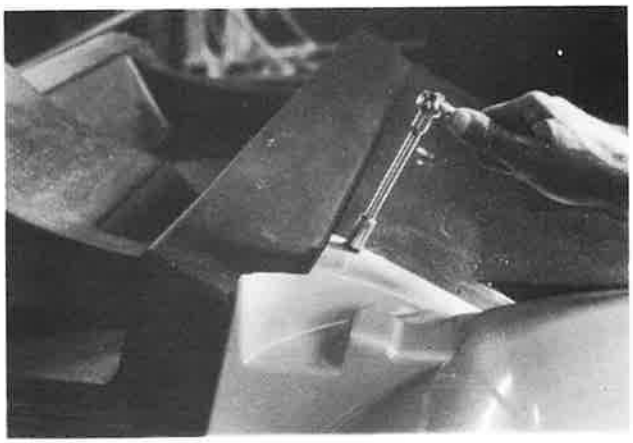
E126
Trial fit the front mudguard mouldings and relieve where necessary. The guard-to-nose panel joint, **inside** the bonnet opening, may retain a gap between the two panels. This is of no consequence.



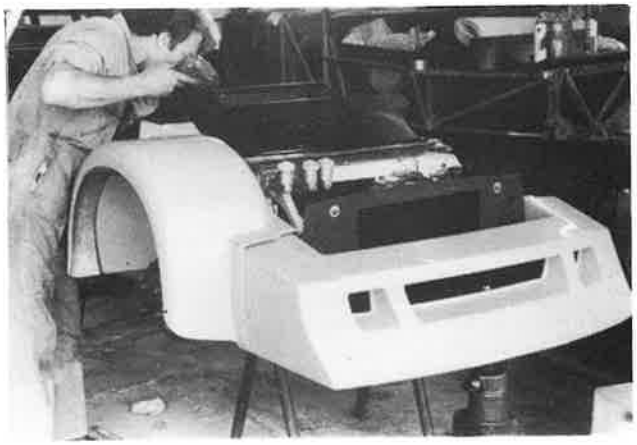
E127
Pay particular attention to flanges to avoid gaps or uneveness when bolted against the other panels.



E128
Remember to fine sand behind radius edge.

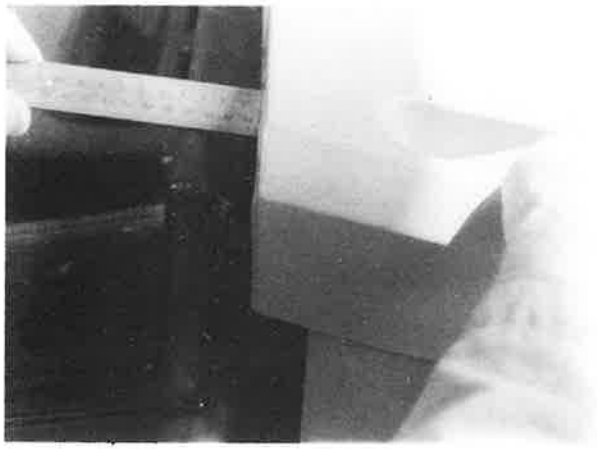


E129
Locate mudguards at top rear inner corner and align with recess in footwell cover as shown. Drill a 4.5mm (3/16") hole where dimpled and through panel below. Open out hole in top panel to 6mm (¼") and screw in bodybolt, which cuts its own thread. Drill and fit bodybolt through top rear flange and into top of pontoon.

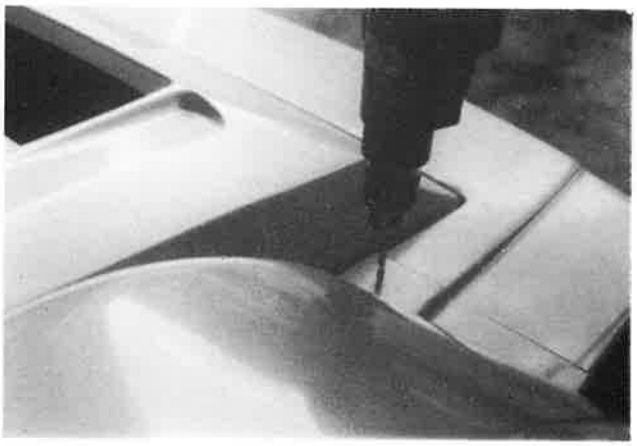


E130
Check clearances from inside to ensure that nothing restricts a perfect fit. If necessary remove mudguard and relieve.
Check that the lower face of the nose moulding is flush with the bottom of the chassis.
Drill and bolt inner bonnet bay flanges (five bodybolts where dimpled).

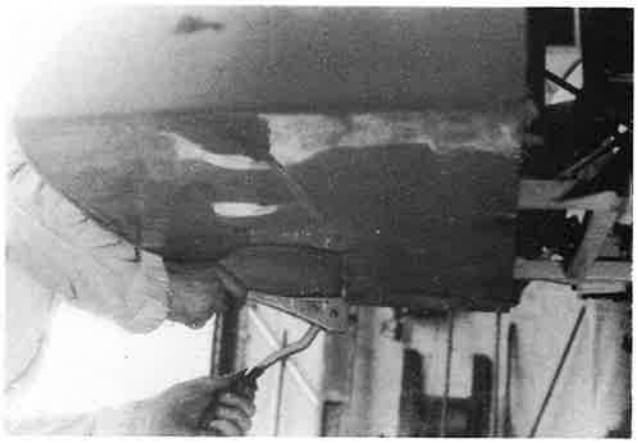
E131
Fit bonnet to nose cone using 63mm x 7.5mm (2½" x 5/16") bolts through the bobbins and conelock nuts. Use 7.5mm (5/16") washers to space the bonnet evenly and produce an equal gap on each side.



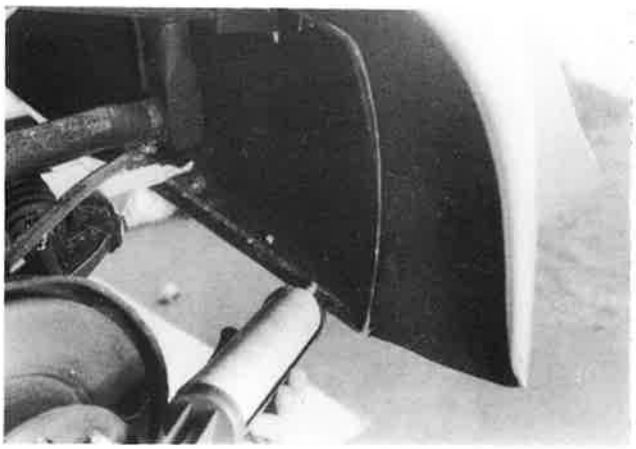
E132
Adjust nose cone into final position. This is done by setting up the rear face of the bonnet 40mm (1-9/16") forward of the footwell cover vertical surface as shown. Check that it is true and square.



E133
Drill a location hole in the top forward flange on both mudguards and bolt them to the nose moulding. Again check that the panels have not moved.

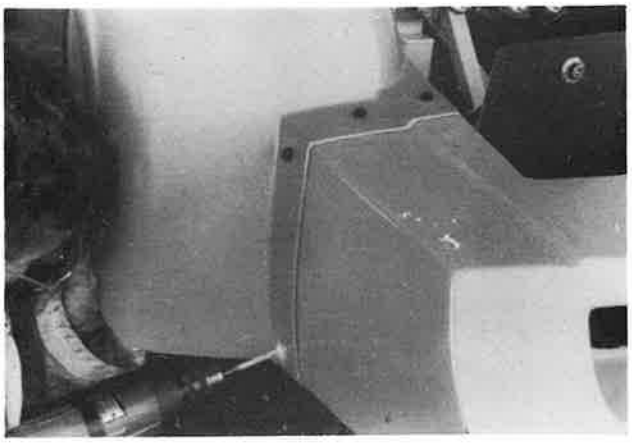


E134
Drill and rivet underside of nose cone to chassis rails every 75mm (3").
Squeeze silastic between nose panel and radiator baffle and rivet underside near edge to radiator baffle moulding every 75mm (3").

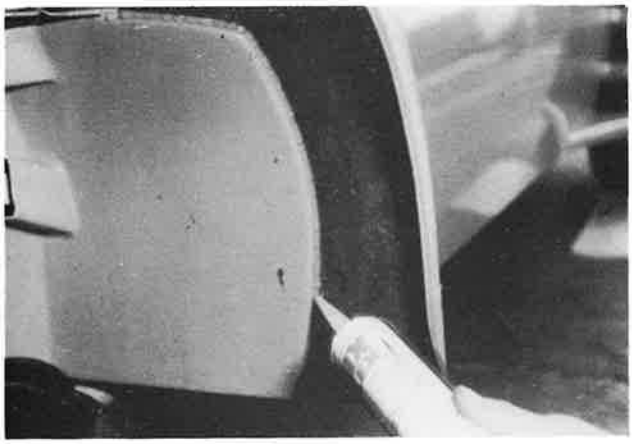


E135
Run more silastic around both sides of all nose panel to baffle joins.

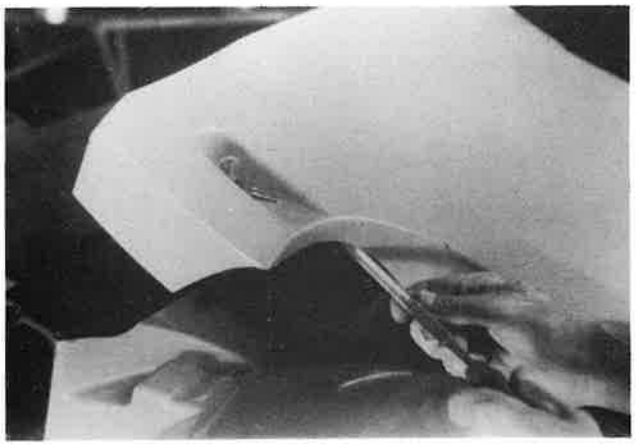
E136
Drill the remainder of the mudguard flange mounting holes.
Noting those bolts which do not allow easy rear access remove both guards. Drill out the noted holes to 9mm (3/8'') and fit nutserts using special tool. Refit both mudguards using mudguard washers and lock nuts on those bolts not secured by nutserts.



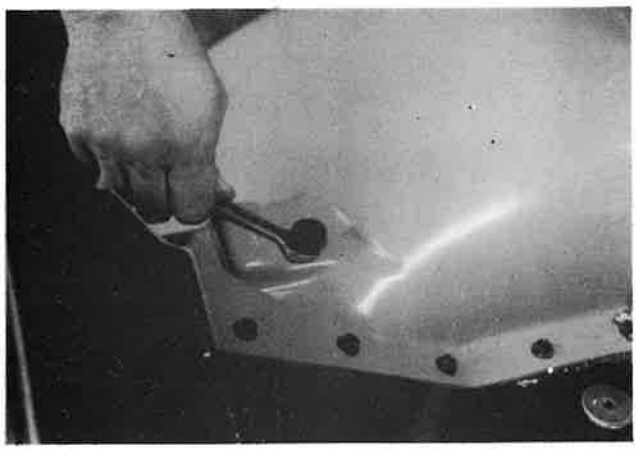
E137
Seal mudguard to body join with silastic. (An alternative would be to fit single-sided foam tape between guard and body during assembly).



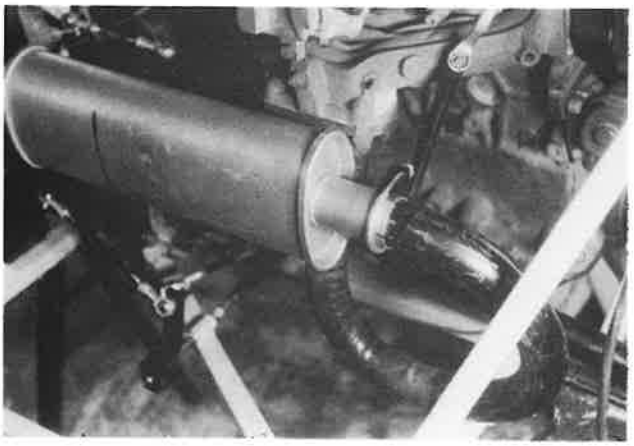
E138
Close bonnet and relieve any edges which may touch mudguards.



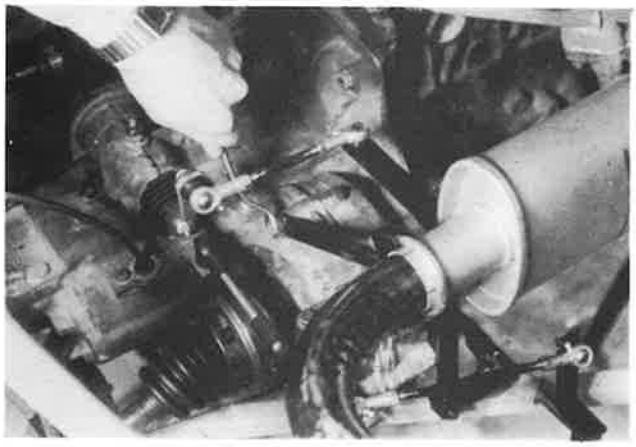
E139
Fit bonnet bump stops onto the lower part of the mounds and adjust so that bonnet is supported firmly when locked.



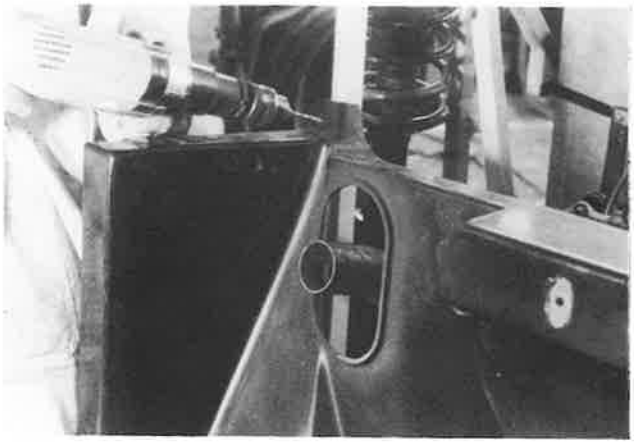
ENGINE ASSEMBLY



E140
Fit engine exhaust pipe and silencer to manifold. Attach bracket clamp as shown.



E141
Fit tailpipe and rear silencer bracket clamp. Tighten at engine end only.
Fit up spare wheel mount moulding true and level and relieve where necessary to give a neat fit onto chassis tubes.

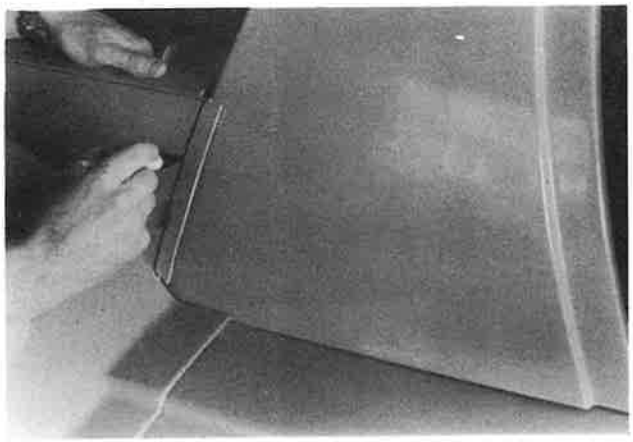


E142
Drill four 4.5mm (3/16'') holes where dimpled through panel and into upright on each side; attach using bodybolts. **NOTE: it is most important that this panel be fitted accurately as it determines the position of most of the rear bodywork.**
Centralise tailpipe in opening and tighten rear silencer clamp.

REAR BODYWORK

E143
Trial fit rear mudguards and follow the same checks as for the front ones i.e., flanges, clearances over the spare wheel moulding.
Cut clearance for top of McPherson strut and outboard strut mounting bolt (it will later be covered by the side engine covers).

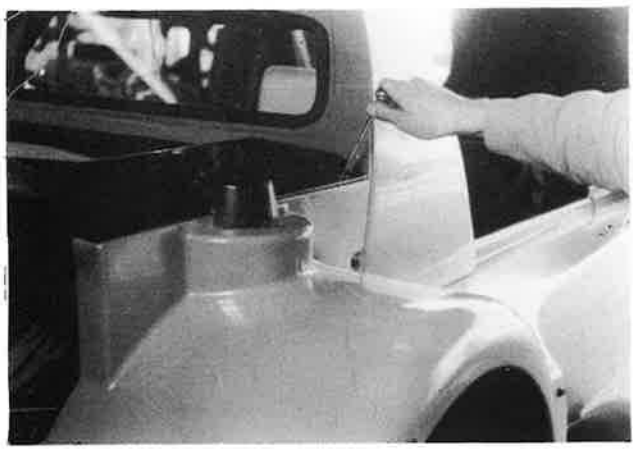
E144
Holding each mudguard firmly in position and using masking tape on the rear edge of the targa moulding as a guide to shape, mark a trim line onto the mudguard to allow a 3mm (1/8") gap. Trim off and sand smooth.

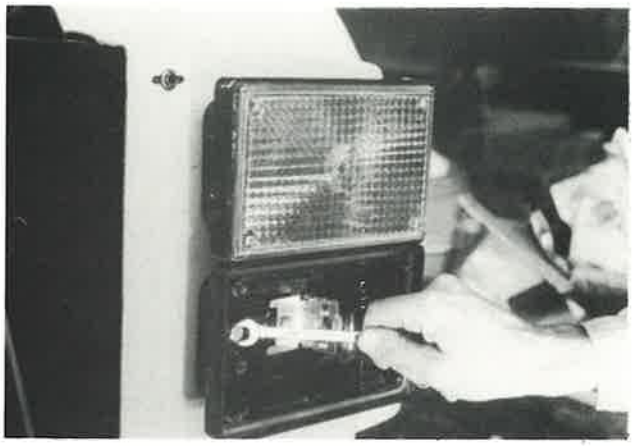


E145
Drill and secure in position with one body bolt where dimpled on inner top front flange (see arrow).

E146
Drill all 4.5mm (3/16") holes for bodybolts, in total six on the leading edge and two in the slotted holes for attachment to spare wheel mount. Remove mudguards, open out bolt holes in mudguards to 6mm (¼"), drill out inaccessible holes in lower panels to 9mm (3/8") and fit nutserts. Refit guards and bolt securely, using mudguard washers and conelock nuts on those bolts not secured by nutserts.

E147
Fine fit side engine covers with rear edges flush with top rear of mudguards. Secure each with two bodybolts on the chamfered edge, 38mm (1½") from each end. **Do not tighten.**

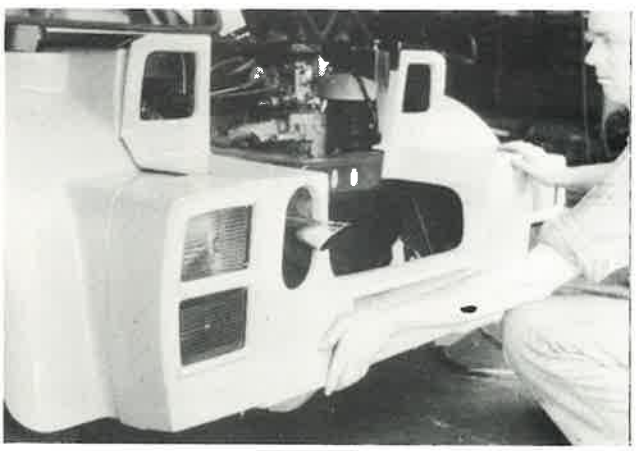




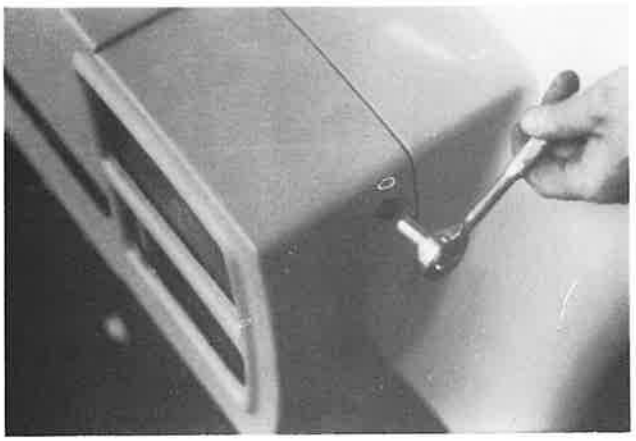
E148
Fit rear light assemblies with trafficator (amber) above and stop/tail lights below. Fit globes and connect wiring but do not tighten nuts from behind at this stage.

E149
Fit jack mounting bracket into R.H.S. of spare wheel mount by drilling two 6mm (¼") holes where dimpled and secure using bodybolts and nuts.

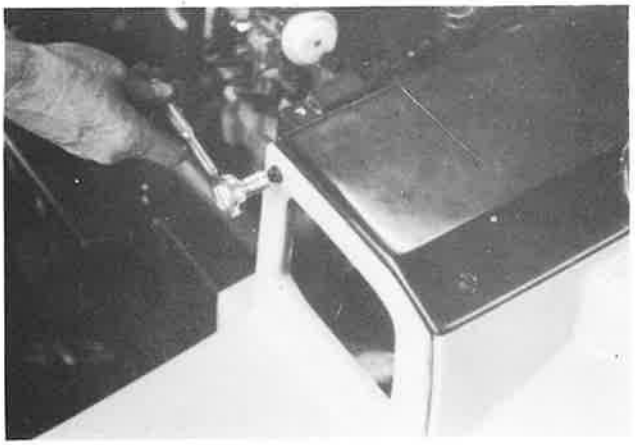
E150
Fit jack into place by screwing up until firm.



E151
Trial fit rear panel, adjusting the overall width of the rear guards via the slotted holes. Relieve where necessary, paint reverse side matt black.

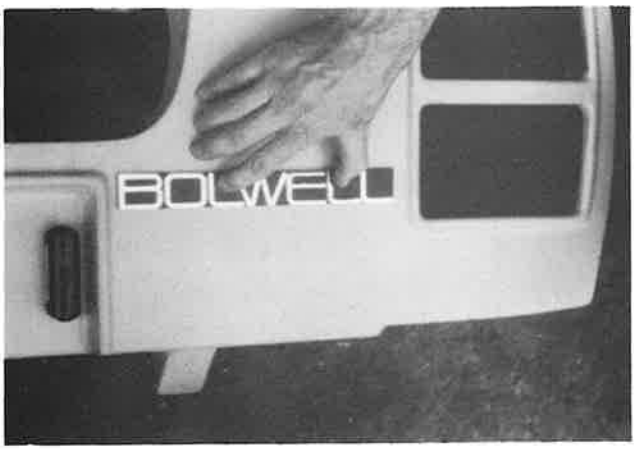


E152
Secure to car, locating first with 1 bodybolt each side as shown.



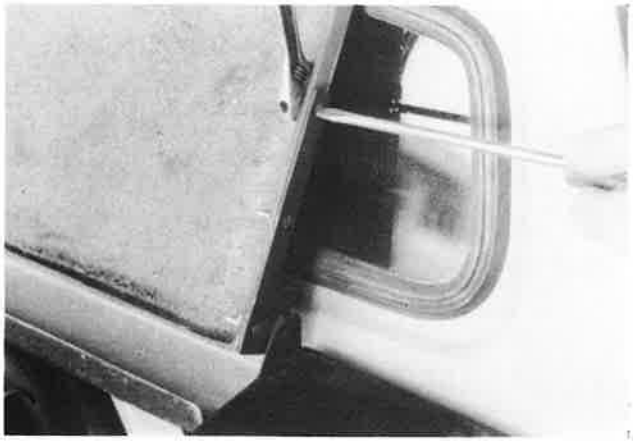
E153
Align top side engine covers and rear body panel and locate with one bodybolt each side as shown.

E154
Drill and attach sides of rear panel where dimpled. Tighten all body bolts (including side engine covers). Adjust rear lights to fit squarely behind cutouts and tighten mounting bolts.
NOTE: Do not use silastic on this panel as it must remain easily removable.

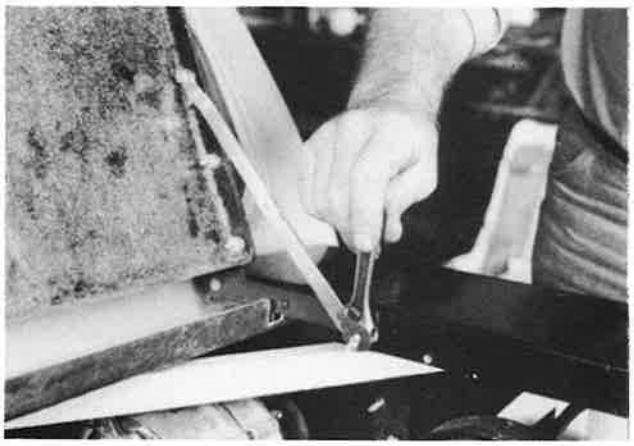


E155
Fit number-plate lights and globes and connect wiring. Fit rear **BOLWELL** badge using the three holes on R.H.S. of recess.

E156
Mount spare wheel using optional locknuts for security.



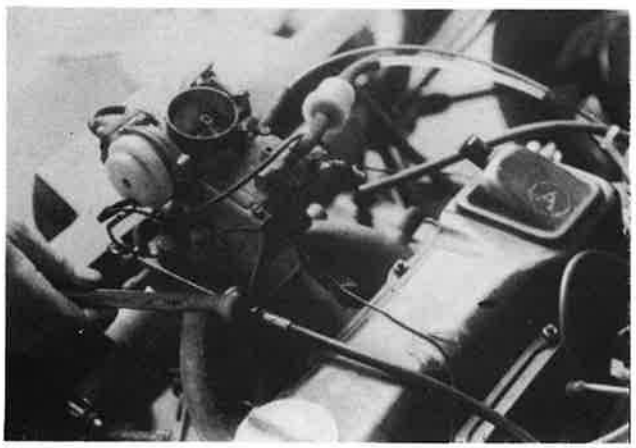
E157
Fit engine hood to hinges using 18mm x 4.5mm (¾" x 3/16") countersunk metal threads and test operation of locks. Relieve if necessary. Adjust bump stops to allow firm tension on engine cover in the closed position.



E158
Fit engine hood stay using the rearmost R.H.S. hinge bolt for the top mount. Mount the lower end of the stay on a 4.5mm (3/16") bolt, 13mm (½") below the rearmost hinge bolt on the R.H.S. engine side cover.
NOTE: The stay must be offset inboard to clear the engine hood when closed and secured with double locknuts.

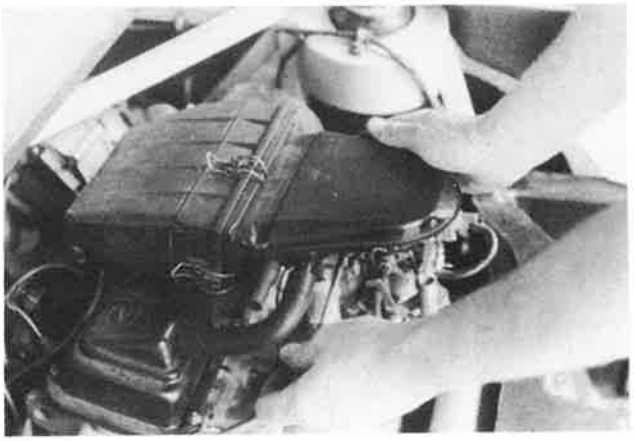
FINAL ENGINE ASSEMBLY

Connect all wiring as per wiring chart.

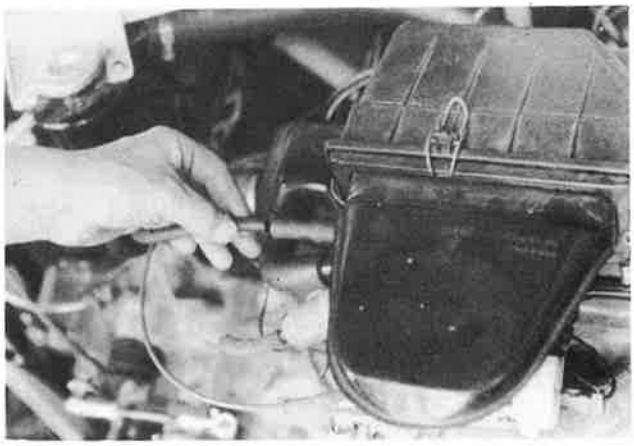


E159
Attach throttle cable to carburettor and adjust.

E160
Fit air cleaner and tighten. Connect breather hose to camshaft cover.

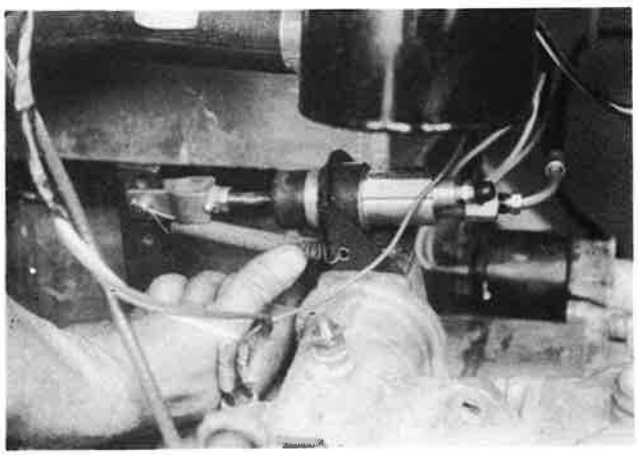


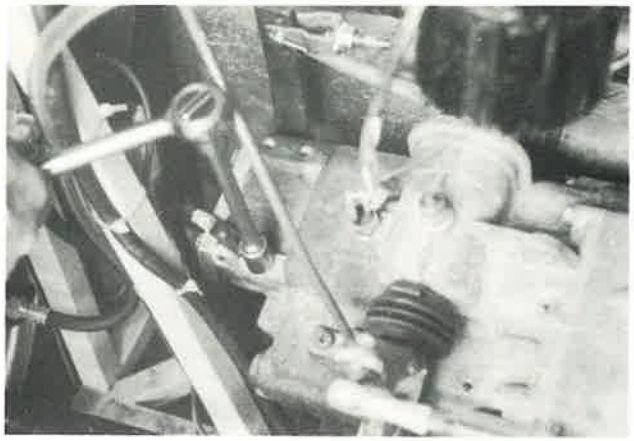
E161
Fit hose from canister (petrol tank) to air cleaner.



E162
Fit overflow hose from canister down rear chassis tube as shown and secure together with overflow hose from swillpot.

E163
Fit return spring to clutch slave cylinder. Check that flexible clutch line is securely coupled to slave cylinder.

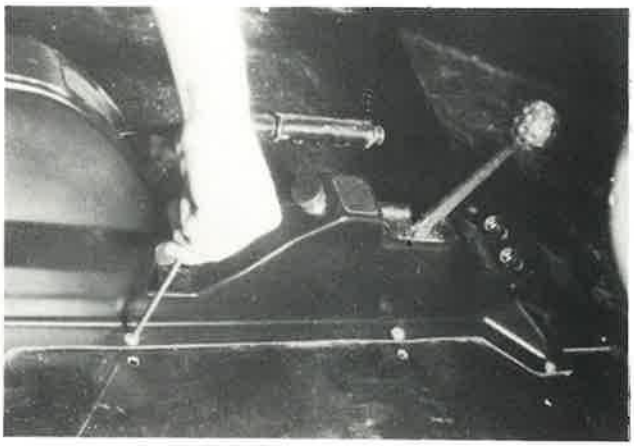




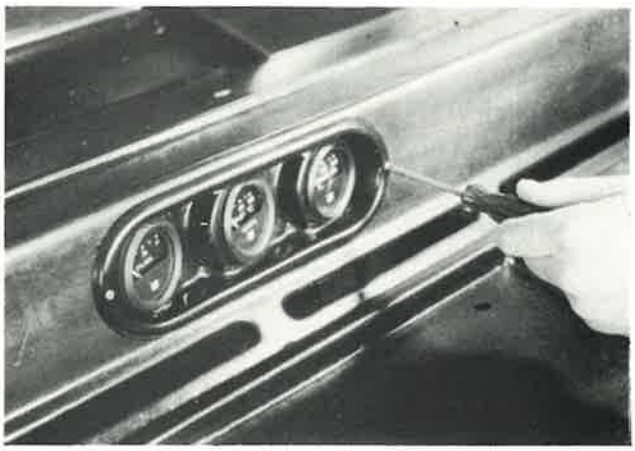
E164
Fit 350mm (14") high tension cable from motor to lower diagonal chassis tube as shown. Note that the cable must earth onto bare metal.

CONSOLE
Attach wiring to handbrake switch and cigarette lighter. **NOTE: Some lighter bases require an earth terminal soldered to the outside to accept earth wire.**

E165
Fit console over the mechanicals, passing the air control cables through the two angled holes in the floor and forward between the base diagonal chassis tube and the floorpan moulding. Silastic seal the angled holes. If necessary remove plastic covers from seat-belt wands and replace later.

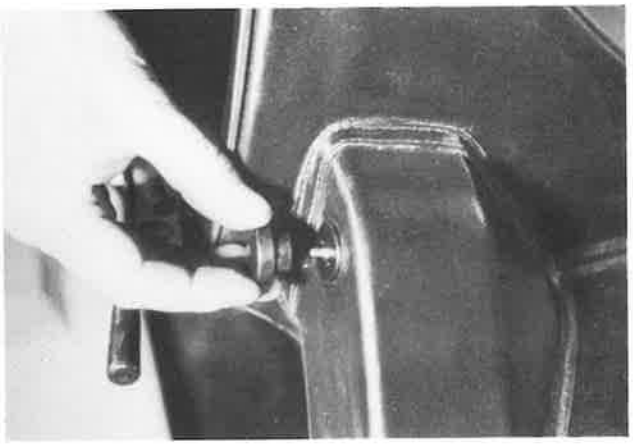


E166
Drill ten 3mm (1/8") holes — five each side — around the base of the console moulding and where possible through a chassis tube. Secure using 16mm (5/8") self tapping screws with washers.



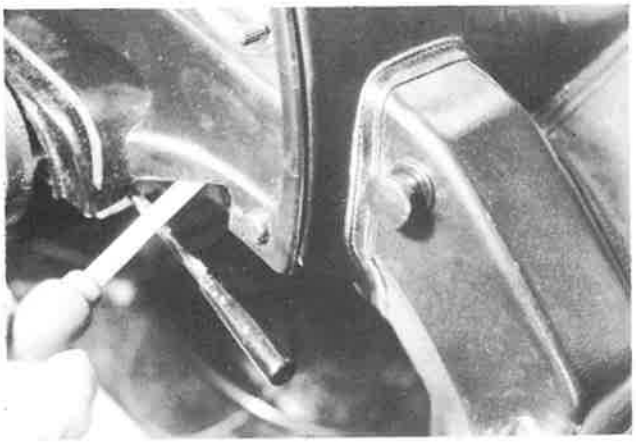
INSTRUMENTS & SWITCH WIRING
Connect wiring to secondary instrument panel as per wiring code.

E167
Fit panel to footwell cover by drilling two 2mm (3/32") holes as shown through both panels. Open out the holes in the instrument panel to 3mm (1/8") and countersink, then fasten with 20mm x 5 (¾" x 5) self-tapping screws. Touch up screw heads with black paint.

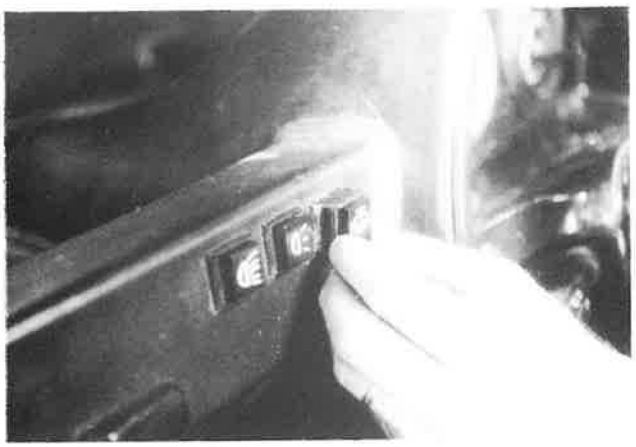


E168
Connect wiring to instrument light dimmer switch, pass switch through dash from behind then fit escutcheon and knob.

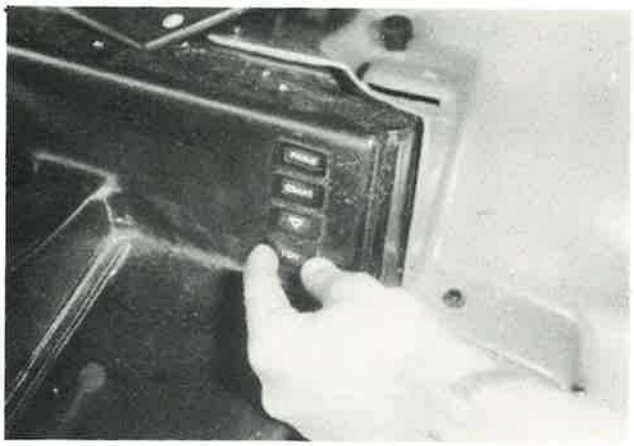
E169
Bend trafficator stalk. Using a clamp on the first 13mm (½") to take the strain, bend the stalk forward to give a clearance of 3mm (1/8") to the dash panel with the stalk in its most forward position.



E170
Connect wiring to primary instrument panel as per wiring code. Attach speedometer cable. Fit panel into place using two 20mm x No. 8 (¾" x 8) self tapping screws inside plastic covers on each side of the panel. Clip the covers closed to hide screw heads.
Relieve panel if necessary to allow full trafficator stalk movement.



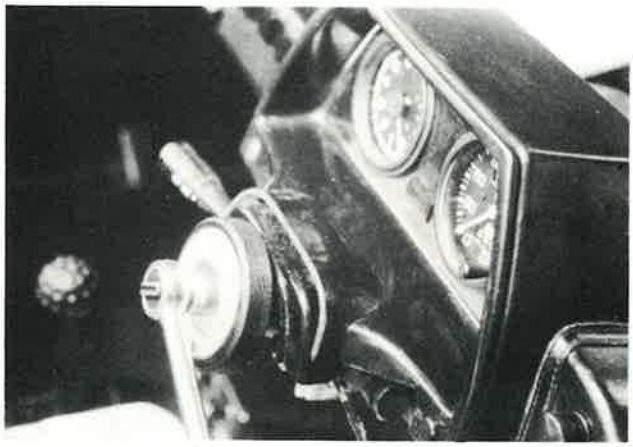
E171
Connect wiring to switches as per wiring code and press switches into sockets in the order shown. **NOTE: The parklight switch must be in the ON position (depressed) to operate the headlights.**



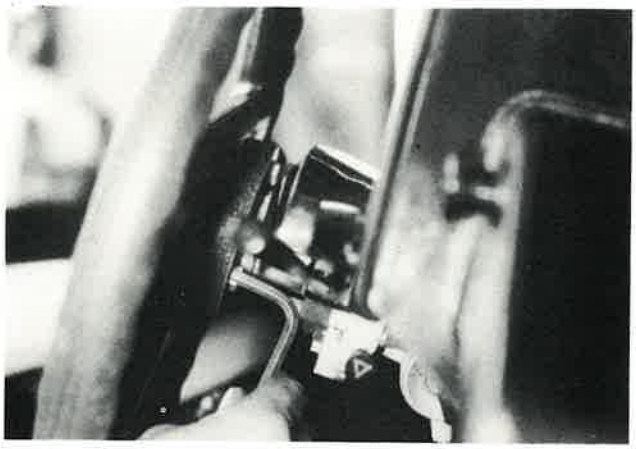
E172
Connect wiring to warning lights as per wiring code and press lights into sockets in the order shown.

Connect wiring to all under dash components as per wiring code: brake-fail switch, interior light, steering column switches, wiper motor.

STEERING WHEEL



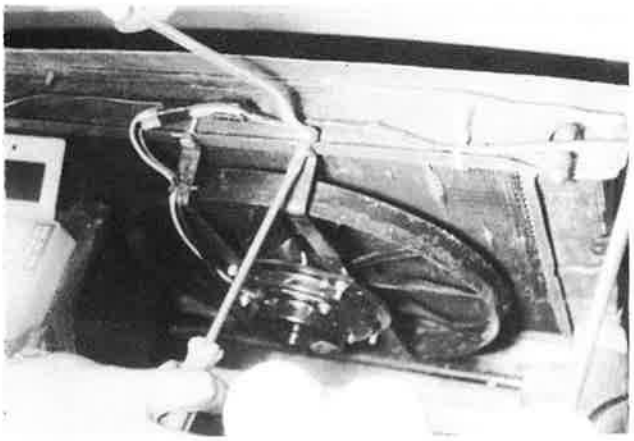
E173
With lower steering column shroud removed fit steering wheel hub to shaft and tighten column nut. (Trial fit with wheel attached first to achieve centralization.)



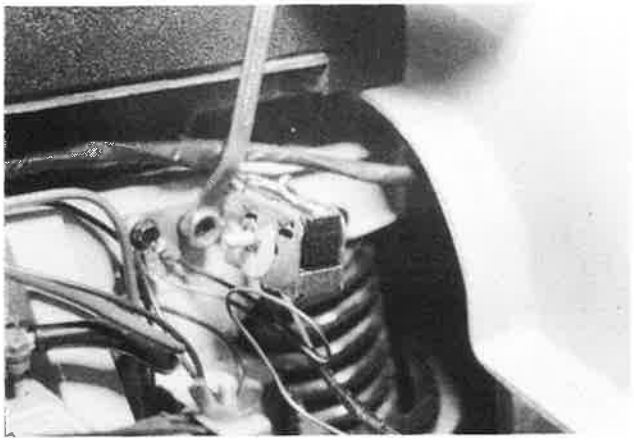
E174
Fit steering wheel to hub using the three supplied Unbrako screws.

E175
Refit lower shroud and hazard warning switch.

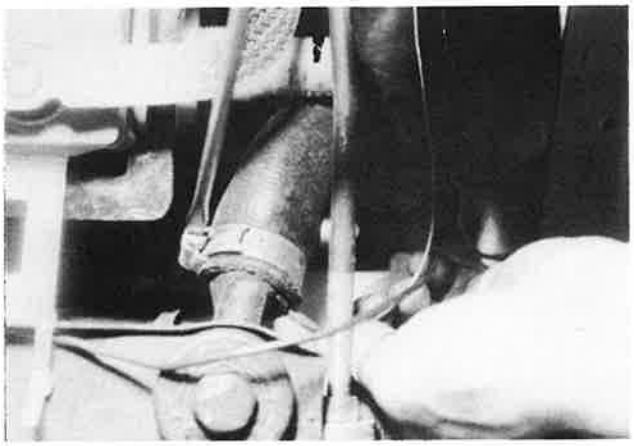
FRONT ELECTRICALS



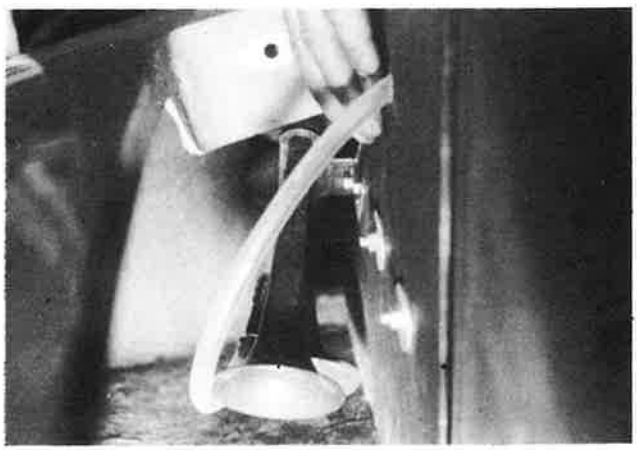
E176
Fit electric fan to radiator using four bolts supplied. Connect wiring.



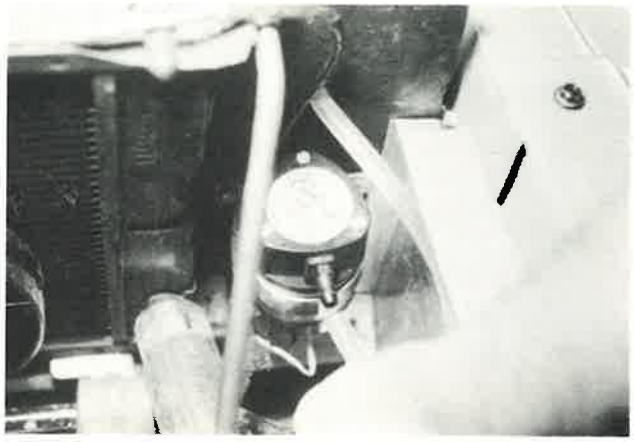
E177
Using two bodybolts, fasten supplied thermostat switch to chassis as shown. Set as per instructions in the kit. **NOTE: One mounting bolt can be used also to secure earth wires as shown.**



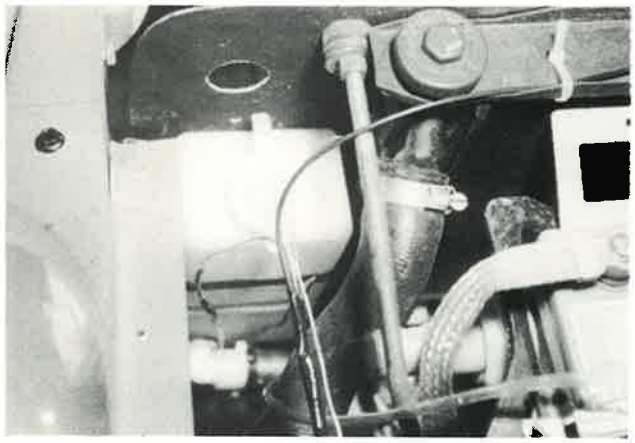
E178
Fit thermostat sensor into radiator hose using silastic, and tighten clamp.



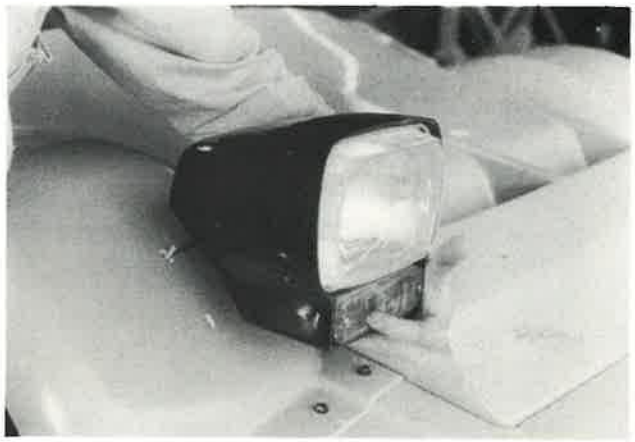
E179
Fit horn(s) to R.H.S. front face of radiator baffle using bolts supplied in kit. Connect wiring. If fitting air horns (as shown, optional) connect air tube, drill hole and pass tube through to other side of baffle.



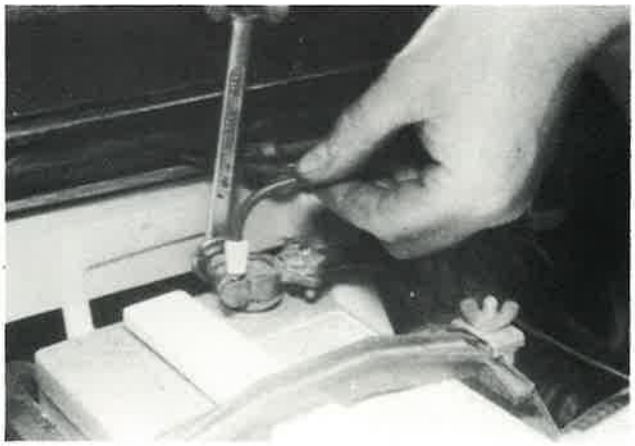
E180
Mount air horn compressor to R.H.S. rear face of radiator baffle using bolts supplied in kit. Connect wiring as per wiring code and air tube.



E181
Mount washer bottle on L.H.S. rear face of radiator baffle using two 20mm x 4mm (¾" x 3/16") mushroom headed bolts, nuts and shakeproof washers. Connect wiring as per wiring code and water tube to washer motor. Drill a 3mm (¼") hole through centre of floorpan moulding just below top cross member tube. Pass water tube through this hole and connect to nozzle tail. Seal hole with silastic.

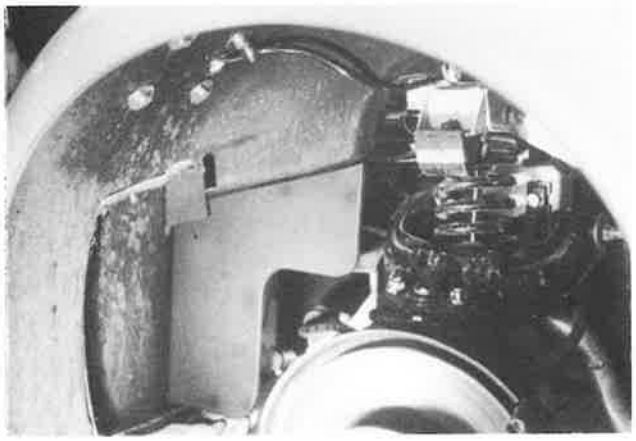


E182
Fit headlight to guard moulding using four 25mm (1") x ¼" Whitworth bolts and mudguard washers screwed up from underneath.

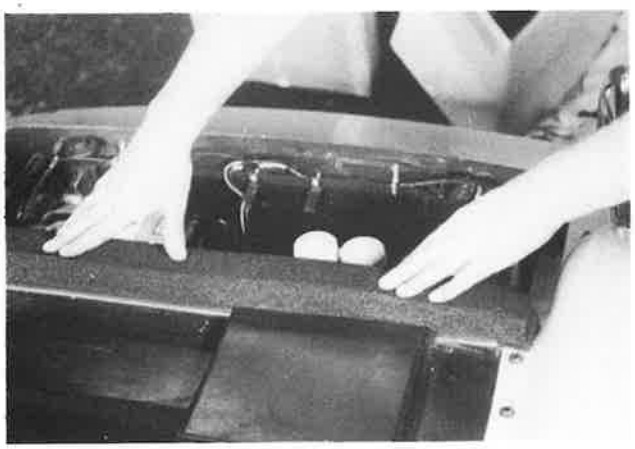


E183
Connect main power cable to positive battery terminal as shown.

E184
Connect headlight/trafficator wiring as per wiring code, ensuring that the wires run inside a protective cover to avoid stone damage. Use an insulated clip to secure wiring away from wheel. Fit front splash guards where shown using three 4.5mm (3/16'') pop rivets through the inner mudguard flange.



E185
Fit and glue a 50mm x 50mm (2'' x 2'') foam strip to top front flange of footwell moulding to create bonnet seal.

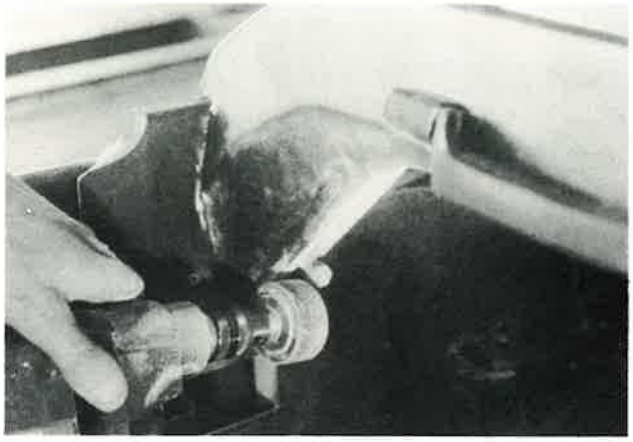


TRIM & SEATS

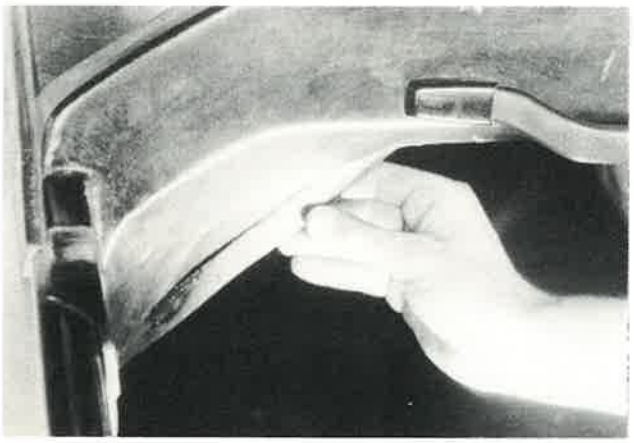
NOTE: Whenever using contact adhesives follow closely the manufacturer's instructions. Apply adhesive to both surfaces and allow to dry tack free. Then press firmly together.

E186
Trial fit rear bulkhead carpet so that top edge sits approximately 25mm (1'') below edge of parcel tray moulding. Apply contact adhesive to both bulkhead and carpet, along top and down centre to where the carpet tucks in behind the flange of the console. When joining, ensure that carpet sits square and parallel along top edge.

E187
Lift each side and the bottom corners and apply glue along bottom and sides. Also apply at random in the middle. Gently stretch carpet when joining to ensure a wrinkle-free lay.

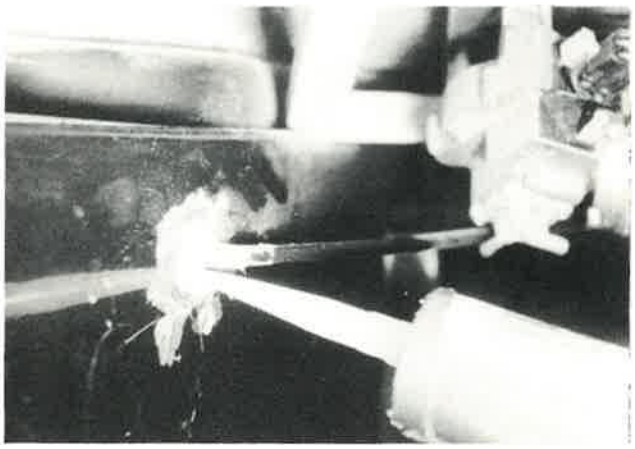


E188
Grind back inside dash corners to bring the moulding back flush with the bulkhead chassis tube. Sand corners neatly.

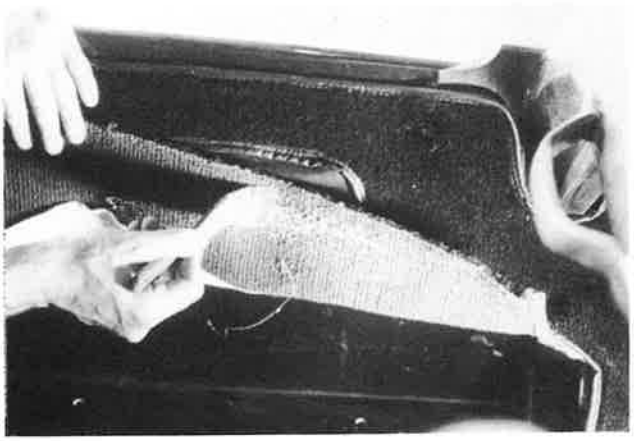


E189
Using 30mm x 25mm (1¼" x 1") section high-density foam rubber strip make up knee supports and glue to the bottom of these tubes as shown. Secure with self-tapping screws. Cut them out to allow a neat fit over the tube mounting bolts and paint with tyre black. NOTE: These knee supports are essential for lateral support under the g-forces the IKARA is capable of generating.

E190
Trial fit side carpets so that top edge sits approximately 25mm (1") below top of floorpan moulding. Cut slot to allow carpet to sit down around speedometer cable.



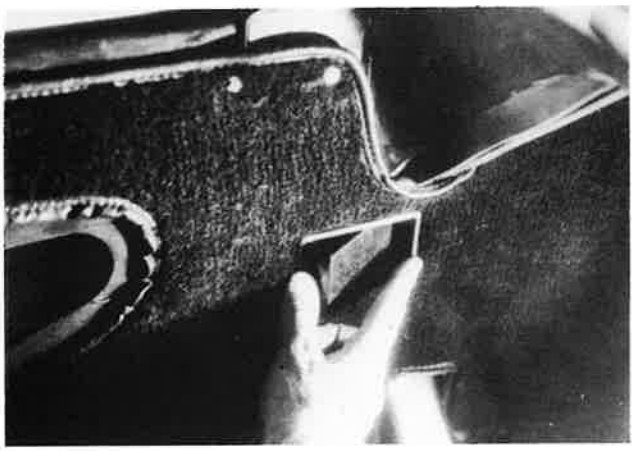
E191
Seal cable hole with silastic. Glue carpet and side of floorpan moulding along top and front edges, and join. Ensure that carpet is square and top edge runs parallel.



E192
Lift carpet from bottom and glue along lower edge and around side pocket openings. Attach carpet.

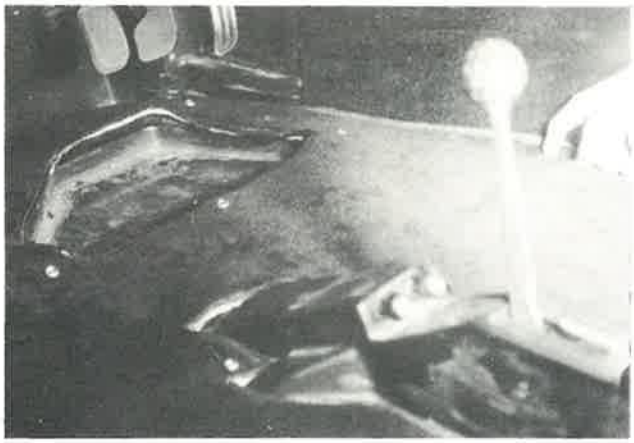
E193
Using scissors (or a blade) make a series of cuts into the vinyl excess around side pocket opening but keep at least 3mm (¼") inside. Stretch the vinyl around the back face and glue down.

E194
Trim off any excess vinyl with a blade. Paint inside of side pockets matt black.

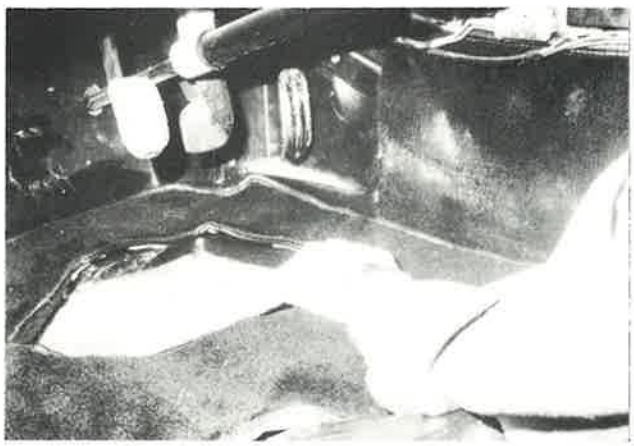


E195
Carefully cut out ash tray holes in carpets and fit ashtrays.

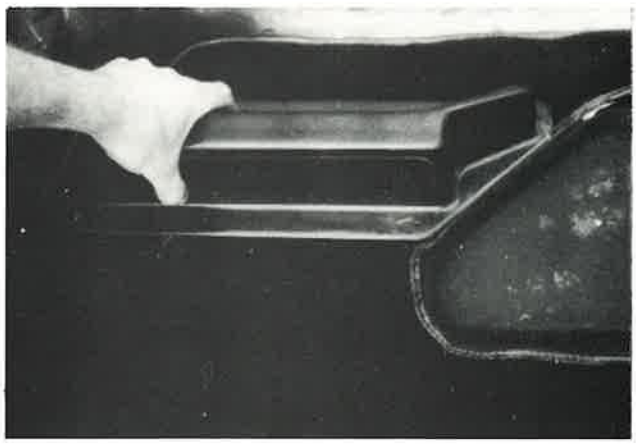
E196
Drill holes and fit four countersunk self tapping screws along top edge of each side of carpet to assist retention. Use the black plastic screw cover caps supplied.



E197
Trial fit front floor carpet then fit press studs as follows:
3 along front edge
1 in the centre of each side edge
2 around heel recess
4 along rear edge in front of seats (2 each side)



E198
Cut out ribbed rubber mat to suit shape of bottom heel recess. Glue into place.



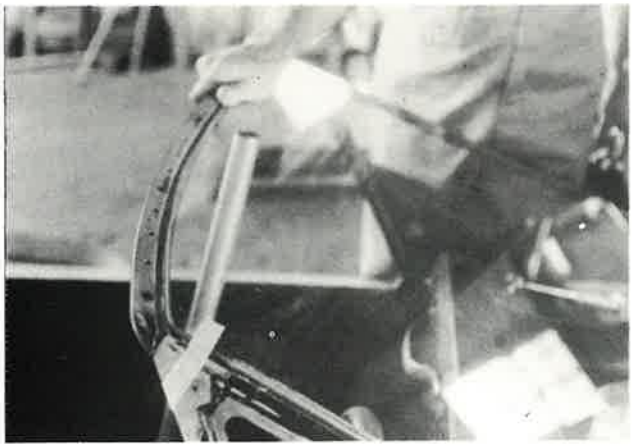
E199
Fit left foot brace moulding to floorpan as shown using four 20mm x 4.5mm (¾" x 3/16") mushroom-headed bolts.

E200
Fit seats and tighten retainer nuts under car. Cut off excess bolt length.

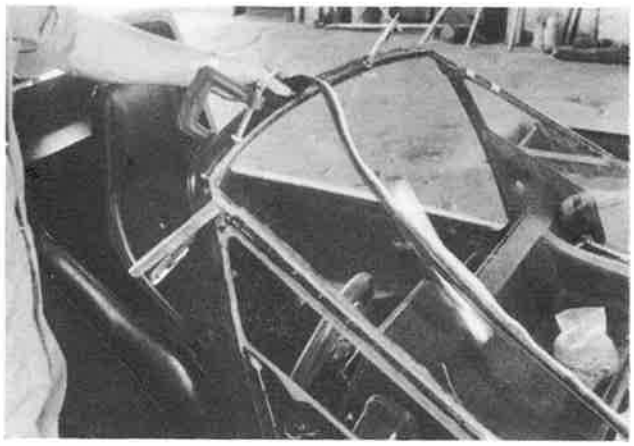
WINDSCREEN

E201
Fit inner side frames to footwell cover as shown. Position the frame fore and aft by butting the forward end of the top part against the forward vertical face of the footwell cover. Secure frame against the side rebate using two countersunk pop rivets.

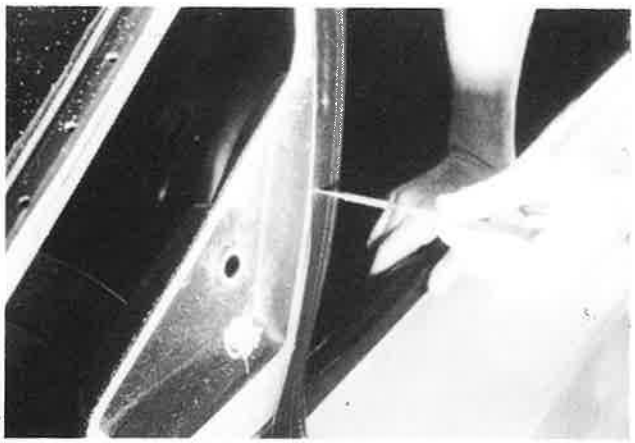
E202
Apply a silastic bead along the leading edge of the glass recess and up both inner side frames on the windscreen support plane. With the centre windscreen supported as shown, tape the screen into position. Ensure that the glass is centralized and square.



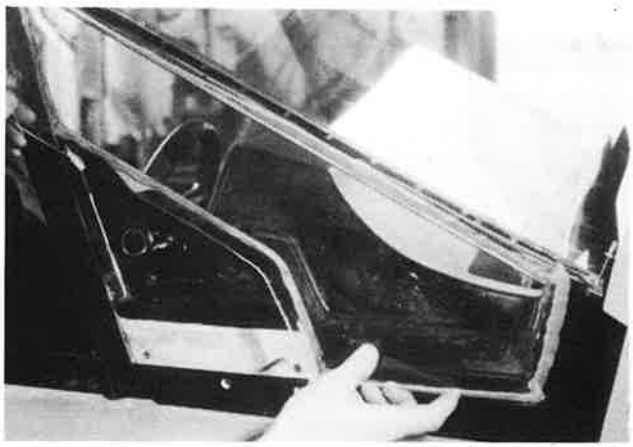
E203
Trial fit top inner frame to ensure that the side frames are correctly spaced. Raise screen slightly into the rebate if necessary. Apply a bead of silastic to the rebate of the top inner frame and clamp against the screen. Allow to harden (preferably overnight).



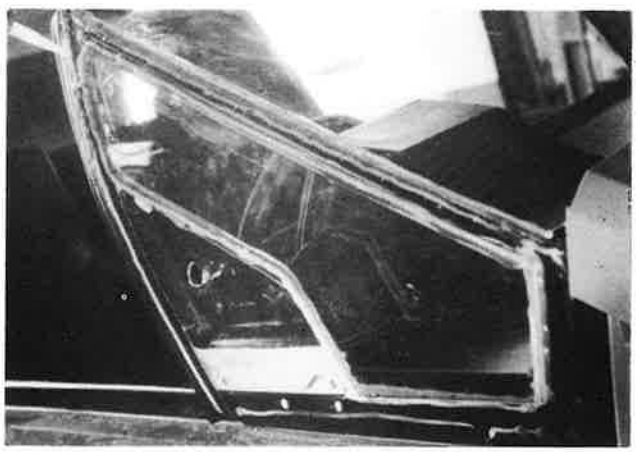
E204
Trial fit the zip panel with the start tag on the driver's side. Trim the material back to 25mm (1") from the zip teeth. Using contact adhesive glue the zip panel to the mouldings, allowing an even 6mm (¼") clearance between the moulding edge and the zip teeth.



E205
Pierce bolt holes.

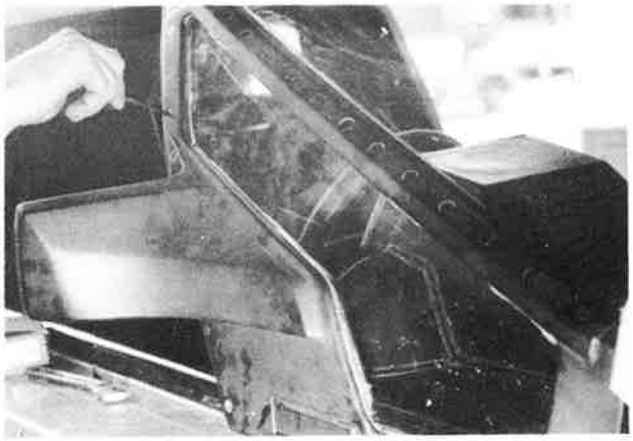


E206
Seat the side glasses onto a bead of silastic.



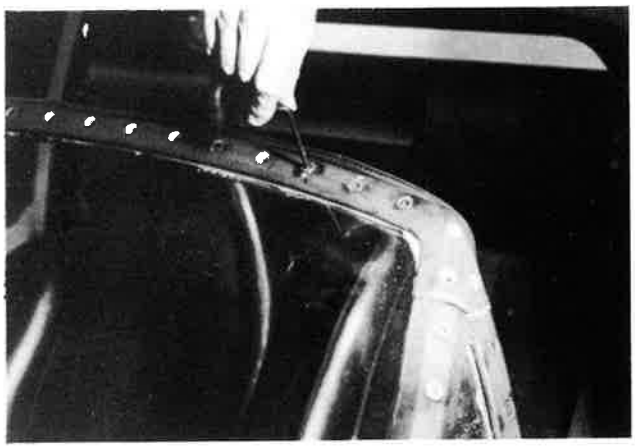
E207
Apply a further series of silastic beads to completely seal side glass and inner frame to outer side of frames.

E208
Fit outer side frames and secure using the 16 x 6 countersunk Unbrakos supplied.
Caution: Do not overtighten the bolts; they should be firm only.

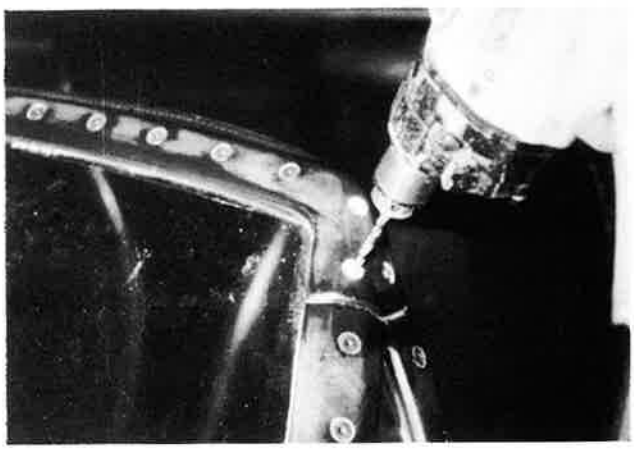


E209
The front and rear lower holes of this frame are used to secure the windscreen to the body. Therefore drill these 6mm (¼") holes right through and fit up using 45mm x 6mm (1¾" x ¼") Unbrakos with dome headed nuts on the inside.

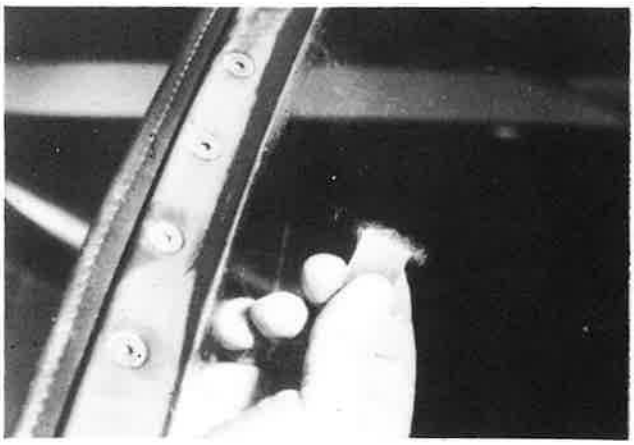
E210
Fit top outer frame onto bead of silastic and bolt as per side frames.



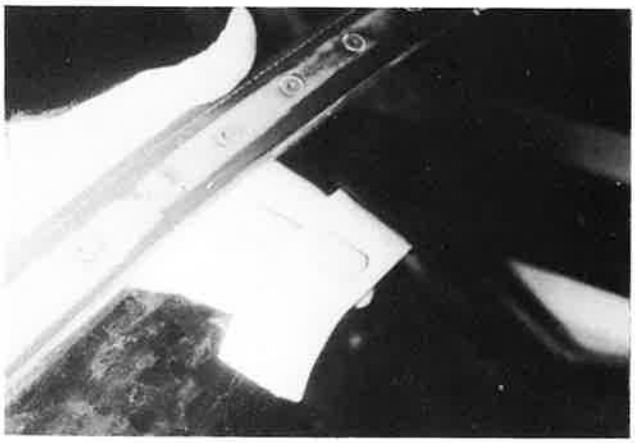
E211
Drill and fit the three top corner Unbrakos. The two holes on the upper face should utilize 25mm (1") Unbrakos, the third hole (on the side face) using a 30mm (1¼") Unbrako with a dome nut on the inside.



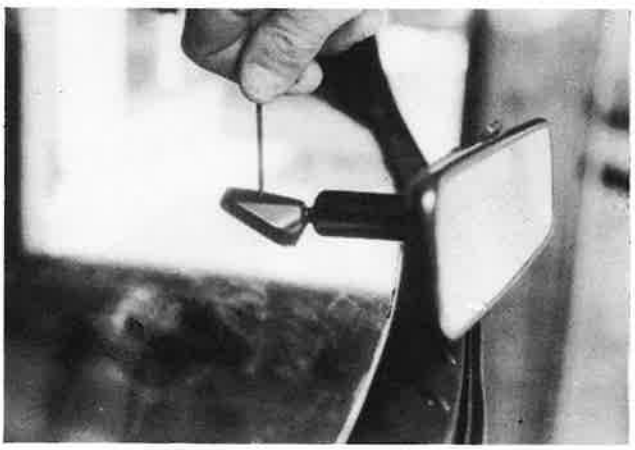
E212
Insert the plastic cover plugs into all inside holes as shown except for the three top corner holes each side.



E213
Mark the windscreen centreline 64mm (2½") down from lower edge of the top outer frame. Using that mark as a centre, roughen a patch on the INSIDE of the screen equal to the size of the mirror block.

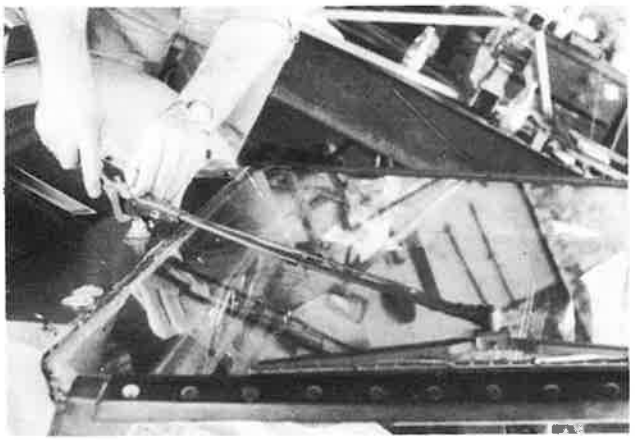


E214
Fit mirror block with lead flare up; apply 24-hour Araldite to secure, using tape to hold the block in position. Allow to cure a minimum of 24 hours before attaching mirror.



E215
Mount interior mirror and tighten grub screw. Adjust from driver's seat.

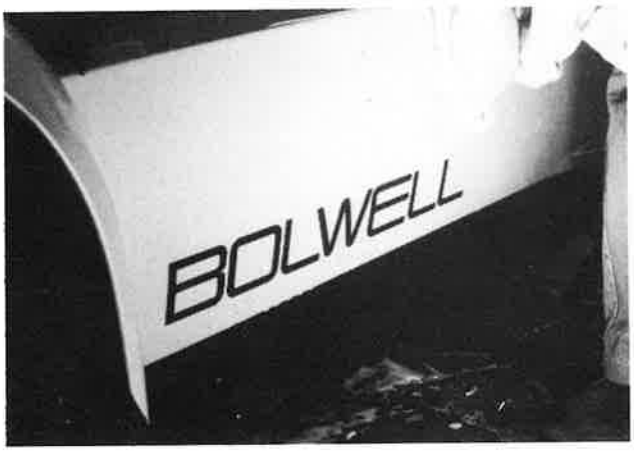
E216
Paint wiper arms and blade carrier matt black.



E217
Fit wiper arms to pivots with the motor in the park position. Set the blade 19mm (¾") in from the L.H.S. side frame moulding. This adjustment can only be verified by running the wipers on a wet screen. **NOTE: Remove the spring tension from the main arm when installing to avoid bending the main pivot shaft. Tighten the retaining nuts while the tension is still off.**

DECALS
Ensure that the fibreglass is clean and free from wax and dirt. Use plenty of water and detergent to position the decal carefully, then squeeze out all air and excess water.

E218
Position one decal as shown central on the front of the bonnet, 25mm (1") below the style line.



E219
Position the side decals 76mm (3") rearward of the front mudguard and 38mm (1½") above the lower edge of the pontoon.

WEATHER EQUIPMENT:

With the rear zip closed attach the leading edge to the windscreen frame assembly zip and stretch the rear edge firmly and centrally over the targa and onto the rear face. Mark and rivet the rear press studs. Secure the hood across the rear then holding it taut, mark and rivet the side studs.

WHEELS & TYRES

Have the tyres carefully fitted by a competent dealer. Have each wheel fully balanced. Fit the self-adhesive **IKARA** decals to the 5 wheel centres; press the wheel centres into the wheel and secure with circlips supplied.

Spray the underside of each mudguard with proofcote (a rubberized sound deadener which also protects the guard panels from stone damage.)

Fit wheels and lower your completed IKARA to the ground.

PAINTING:

Some builders (or should we say at this stage, Owners) may wish to paint their IKARA, either in part or wholly. This is quite acceptable but we recommend that to achieve a quality lasting job the following methods be used. The system as described is based on DULUX products and it should be noted that different paint manufacturers may recommend a different system.

First, a few basic principles:

1. Dis-assemble the hardware instead of masking around it.
2. When rubbing use a block.
3. Follow closely the recommended cure times between coats.

Step 1. Sand back the area to be sprayed using 180 free cut, then 320.

Step 2. Spray 2 coats Dulux Bildcote.

Step 3. Sand back using 320 free cut.

Step 4. Spray 3 coats Dulux 3D primer surfacer.

Step 5. Sand back using 320 free cut, then 400.

Step 6. Spray 6-8 coats of Dulon Acrylic Lacquer, colour of your choice.

Step 7. Cut and polish. (If necessary rub back first with 1200 wet and dry.)

CRASH PADDING, SUNVISORS:

Some Australian states require the addition of crash padding to the rear face of the dash moulding and/or sunvisors. Should these be necessary, kits are available to comply. The procedures for fitting are as follows.

Crash Pad:

Offer backing panel up to dash and mark the bolt positions.
Drill mounting holes in the dash.
Glue the foam strip to backing panel.
Fit vinyl covering over the foam, stretch evenly and glue it to the rear panel face.
Bolt up panel using the nuts supplied.

Sunvisor:

Mount sunvisors as close to the side windscreen frames as possible, replacing the relevant original windscreen frame Unbrako bolts with longer ones supplied in the sunvisor kit.

IDENTIFICATION PLAQUE:

Stamp engine number onto the identification plaque supplied. Mount plaque using four 3 mm (1/8") pop rivets in the forward R.H.S. corner of the pedal unit mound in the footwell cover.

Now that the major task of assembly is completed it is time to put the finishing touches to your IKARA. This is the same process as the dealer's pre-delivery check on a new car which should be carried out on all motor vehicles prior to their going into use.

TESTING & DEVELOPMENT

In addition to being a second check or final inspection, it is also the fine-tune stage which checks the function of the individual components and develops their interdependent characteristics toward the integral whole.

This produces the balance, feel and sensitive response to driver command for which the IKARA is designed.

On this point it is worthwhile noting that the IKARA is so responsive and its handling so precise that the majority of drivers will require a short period to acclimatise behind the wheel.

It is recommended, therefore, that extra caution be taken during this familiarisation period until the vehicle's responsiveness becomes a natural extension of the driver. From this point on other vehicles will appear very pedestrian indeed.

CHECK & ADJUST:

1. BRAKES: Check all hydraulic lines for leaks. In addition to visual inspection test by applying full pedal pressure for 30 seconds; the pedal should not sink. Check fluid levels in reservoirs.
Check that front and rear disc pads are uniform in both brand and pad composition. This is most important to avoid braking imbalance. We recommend Bendix or Ferodo standard grade pads; **do not fit metallic pads.**
When installing rear caliper pads check that the handbrake piston is reset, i.e. **fully wound in.**
Adjust handbrake cable to be fully on at the halfway point of lever travel.
Adjust handbrake warning light switch to ensure that light goes off when handbrake is fully released.

2. CLUTCH: Check Hydraulic lines for leaks.
Check fluid level in reservoir.
Adjust slave cylinder pushrod to allow 3-5mm (1/8''-3/16'') free travel at clutch lever.

3. THROTTLE: Check that the throttle is fully opened at the limit of pedal travel. Adjust if necessary as follows:

- Remove air cleaner. Gently tighten the cable clamp screw at the carburettor and fully depress the throttle pedal. Have an assistant make the adjustment and fully tighten the clamp.
- Check the throttle return spring to ensure that throttle is fully closed each time. Adjust or replace if necessary.
- Check carburettor earth wire for correct installation. Replace air cleaner.

NOTE: Use only the factory-supplied throttle cable which is specially coated to minimise cable friction.

4. GEARSHIFT: Check for smooth operation. Adjust if necessary as follows:

- Disconnect one end of each of the three screwed transfer rods.
- Place gearbox in neutral.
- Adjust length of lowest transfer rod until upper arm of vertical transfer shaft lies parallel with the rear face of engine block.
- Connect lower transfer rod to main shift rod.
- With gear lever in vertical position, adjust length of top transfer rod to suit position of transfer arm (3) and connect rod.
- Adjust rear transfer rod to a length of 225 mm. (8 7/8'') and connect to main shift rod vertical arm.
- Loosen locknut securing main shift rod to alloy pivot block.
- Have assistant pull gearbox output lever forward in neutral gate until the resistance of reverse gear indent spring is felt.
- While held in the above position hold the gearlever against the reverse lockout spring and tighten locknut.
- Try gearshift through all gears.

NOTE: Sometimes it may be necessary to alter adjustment of rear transfer rod to obtain a smooth shift pattern.

5. WHEELS & TYRES:

Set tyre pressures at 1.5 kp (22 psi). Note that these pressures are established for the factory recommended tyres. Variation of either tyre type or pressure will greatly affect the handling characteristics.

Have wheels dynamically balanced taking care that the placement of inner weights does not foul the calipers.

Check all wheel nuts for tightness.

6. SUSPENSION:

With vehicle at ride height tighten suspension bushes. Have wheel alignment done professionally to the following settlings.

Front: Camber 0°—½° negative.
Caster 2½°—3° positive
Toe in 3mm. (1/8")
Rear: Camber 0 + ¼°
Toe out 0 — 3 mm (1/8")

NOTE: Rear wheel toe out must be equal for each side to avoid crabbing.

7. ENGINE:

Check oil level in engine sump.
Check oil level in transmission.
Check fan belt tension.
Check clearances in engine bay of all wiring, tubes, hoses, lines. Secure to avoid rubbing or burning.
Start motor and check oil pressure.

Check clutch and gearchange.

8. COOLING SYSTEM:

When filling with coolant ensure that bleed point on top of radiator is loosened until all air is expelled and only clear coolant observed. Then tighten bleed point and fill the swill pot to two thirds.

With the motor running and the pressure cap removed check water circulation. If water is not swilling check that all the air is expelled from the system. Also check that the bleed holes drilled in the thermostat are correct.

Replace the pressure cap. When motor reaches normal operating temperature check all hoses and joints for leaks.

Check that thermatic fan and override switch operate as per manufacturer's specifications provided.

9. ELECTRICAL:

Check that power cables are secured. Check fluid level in battery.

With ignition off check horn, park and numberplate lights, headlights, high beam switch and indicator, interior light, instrument lights and dimmer, cigarette lighter.

With ignition on check ignition light, wipers, washers, turn signals and indicator, brake lights, reverse lights, hazard warning, headlight flasher.

With key in start position check that the brake failure indicator light is on.

Start engine and check that the ignition light goes off.

10. HEADLIGHTS:

Adjust according to the applicable regulations of the State or Nation, with vehicle at normal ride height. Loosen the four mounting bolts and slide the headlight up or down the mudguard. Side angle is adjusted by shimming.

11. WINDSCREEN WASHERS:

Check water level in reservoir. Use a pin to adjust nozzle to desired jet position.

12. OPTIONS:

Check the operation of any options fitted.

13. ON ROAD:

The IKARA is now ready to roadtest:

- Adjust the seat so all controls come easily to hand.
- Check that clutch pedal can be fully depressed.
- Adjust rear vision mirrors.
- Adjust seat belt.
- Run car up slowly through the gears.
- Test brakes; vehicle should pull up quickly and in a straight line.
- Check steering action and control.
- Check wheel balance.
- Observe any body rattles, pinpoint and rectify.

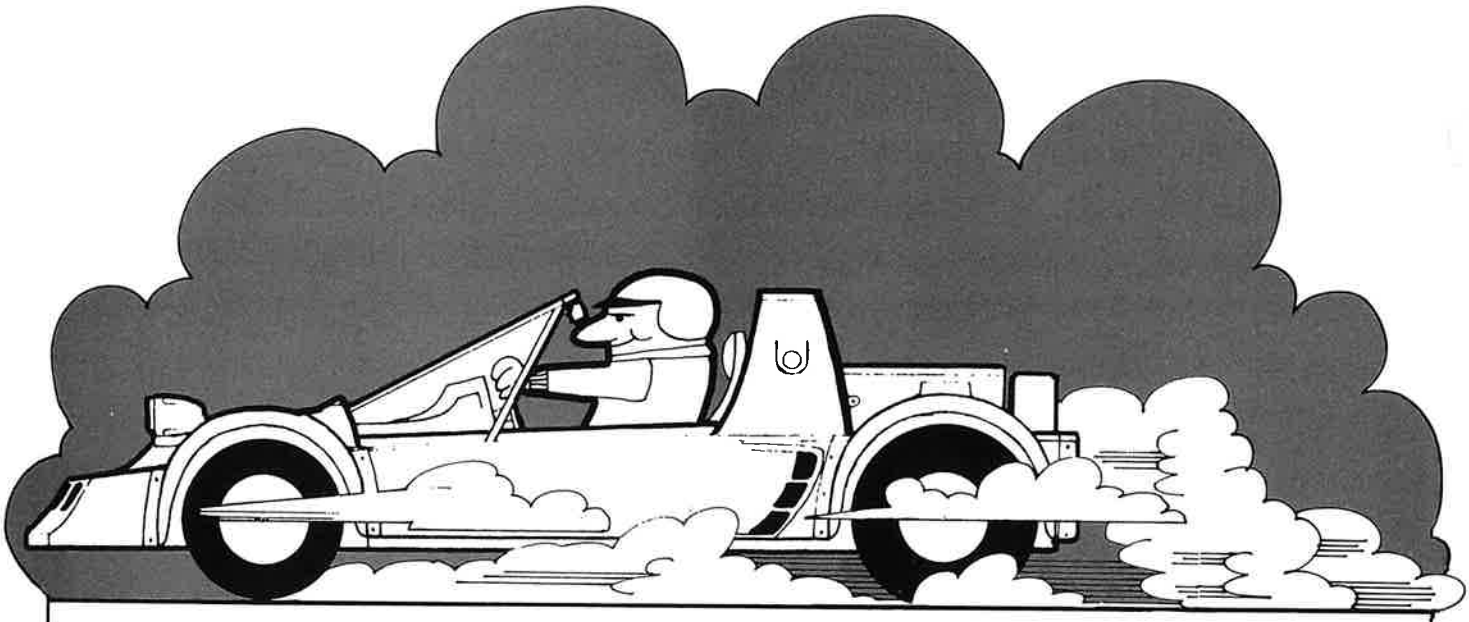
Any unusual behaviour or noises which are apparent at this stage should be located and rectified.

OWNERSHIP

SECTION G — DRIVING THE IKARA

SECTION H — SERVICE, MAINTENANCE & REPAIR

PROLOGUE



Bolwell Car Club of Australia

affiliated with C.A.M.S.

Since 1968;
open to all who are interested in the Bolwell Marque.

Membership provides:

- A forum for the discussion of automotive topics.
- Eligibility for participation in Marque Sports Car Association events, without necessity for competition licence.
- Eligibility for application for C.A.M.S. competition licence and participation in open competition.
- A wide range of social activities.
- Discounts from many trade houses on automotive and associated products.
- Monthly meetings and magazine.

For information contact the Secretary at your nearest branch:
B.C.C.A.
P.O. Box 965G,
Melbourne, Vic. 3001.

BOLWELL
BCCA
CAR CLUB

B.C.C.A.
46 Kathryn Drive,
Morphett Vale, S.A. 5162.

The IKARA, by virtue of its efficient engine, light weight, low aspect and overall simplicity, is essentially an economical car to run; it achieves good economy through thoughtful design.

However, in this fuel/energy conservation-conscious age, adherence to certain sound principles and practices in use can greatly increase fuel economy, as well as reducing overall vehicle wear and tear.

DRIVING THE IKARA

Basic to all of these principles is a good state of vehicle tune. A poorly-tuned vehicle (and this does not mean just the motor) increases the amount of energy required, and therefore the amount of fuel used to achieve a given result.

Attention to the following points is thus essential.

1. Maintain a high state of engine tune; defective electrical, fuel or lubrication systems all bring a marked drop in efficiency.
2. never run with tyre pressures uneven or set below the manufacturer's specifications.
3. Ensure that wheel bearing friction and brake drag are reduced to a minimum.
4. Maintain good wheel alignment.
5. Avoid lugging around superfluous weight.
6. Use only quality lubricants.

The best mechanical practices count for nothing without correct driving techniques and very significant fuel usage savings can be made by developing these driving skills. As in performance driving, they all centre around balance and feel, with the prime aim being to develop smoothness.

DRIVE "AHEAD"

Economy-run results, the statistics for which appear almost unbelievable, are essentially based on the techniques of the drivers. To increase economy, the driver must drive "further ahead" to avoid placing his vehicle in situations which require rapid acceleration and braking. Fuel usage rises in direct relationship to the fierceness of these, therefore the more gently and smoothly the driver can 'flow' his vehicle from point A to point B, the less fuel he will use. Any situation which requires an increase in engine load means a reduction in fuel economy.

Drive as though you are travelling on an eggshell, and your pocket will be the better and heavier for it.

PERFORMANCE MOTORING

It is not incongruous that this should follow a section on driving for economy. Driving is a skill, a developed technique, and both variations of this technique share many similarities and require both thought and practice. They each start from the same point — balance and feel. Both must be smooth flowing, must show a full awareness of the responsibility to other road users and recognise the social responsibilities that being in charge of a motor vehicle entails.

The IKARA has been produced for that thinking driver who wishes to enjoy his motoring and seeks a nimble, balanced vehicle in which to enjoy travelling from A to B, quickly but responsibly.

With the right vehicle in skilled hands it is possible to do exactly that, and well within the law; to do otherwise would not be responsible. For the driver who wishes to develop these skills the IKARA represents the ideal, responding as it does like a thoroughbred.

For the driver who wishes to compete, the **IKARA** is suitable for gymkhana, hill climbs or circuit, while still capable of use as a road car — a true "clubman" vehicle.

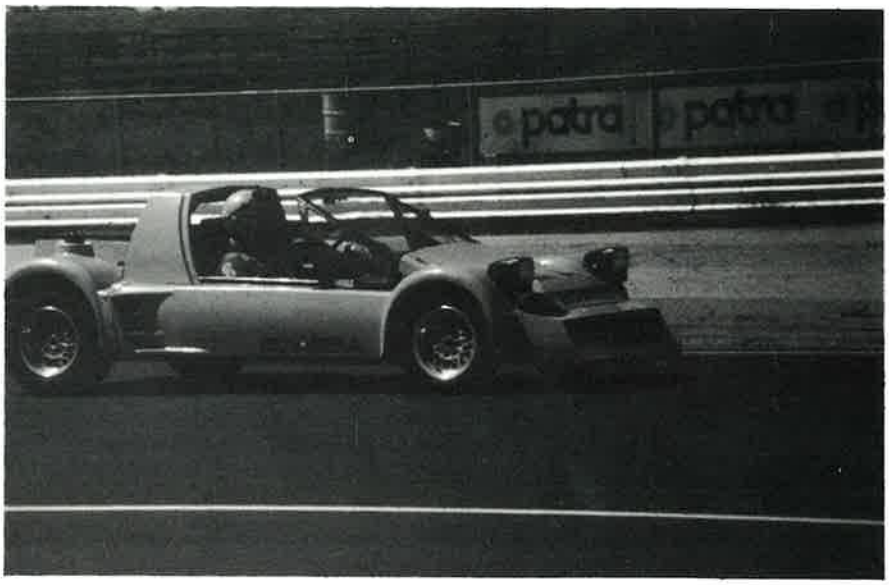
It should be noted that all the theory in the world is no substitute for practice. This is just as true for driving skill as for anything else. **The Bolwell organisation is a firm believer in the concept of advanced driving schools and strongly recommends attendance at one of the courses available for anybody who has a higher than average interest in motoring.**

We only regret that it is not practical for **all** drivers to be required to attend such a course.

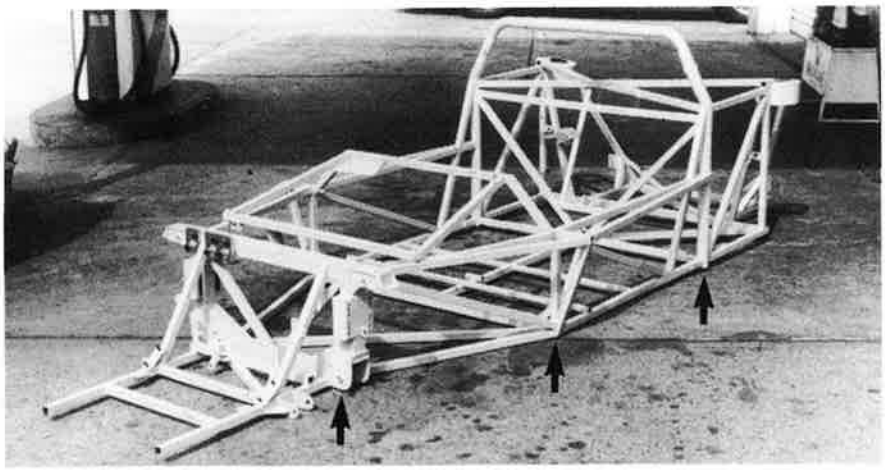
As a progression, interested drivers can then gain further experience through membership of one of the many car clubs in

existence who organise closed meetings (i.e. club meetings) where keen amateur drivers compete and develop their skills for their own enjoyment.

The Bolwell Car Club, an independent body, have an advertisement in this manual. They organise and participate in such events and have members from all over Australia and P.N.G. who share the trials, tribulations and joys of specialised motor vehicles and motoring.



Routine service, minor adjustments and regular mechanical and bodywork maintenance are well reflected in the overall life of any motor vehicle, reducing repair costs and maintaining resale values. This section covers these aspects and instructions are also given for those who wish to conduct their own minor bodywork repairs.



H1

SERVICE, MAINTAINENCE & REPAIR

NOTES:

1. As with most sports cars the IKARA is not designed to be towed. Instead, should the need arise it must be transported on a car trailer or special tilt-tray, flat-top truck as used by most major salvage firms.
2. When hoisting (or jacking) position the lifting pads under chassis tubes near a joint or strong point as indicated **(see figure H 1).** They must not be placed under the fibreglass panels nor in the centre of any tube span.
3. The front and rear wheel are different in offset, rim width and stud diameter. The fifth wheel is inter-changeable and is designed for use only as a spare.
4. If replacing a blown fuse do not 'make-do' with silver paper or similar as serious damage to the electrical system may result. Instead carry spare fuses, the recommended amperages being (from front to rear):

1. 20 amp — wipers
2. 5 amp — washers
3. 8 amp — instruments, brake fail
4. 8 amp — parking
5. 10 amp — horn, cigar
6. 10 amp — fan
7. 15 amp — lights
8. 10 amp — turn, hand brake warning
9. 20 amp — brake, reverse
10. Spare
11. 2 amp — radio
12. 10 amp — hazard

5. Whenever working on the motor or welding anywhere on the vehicle disconnect the battery cable.
6. Change brake fluid every 2 years; brake fluid is hygroscopic and the resultant build up in water content is detrimental to the entire braking system.

ROUTINE SERVICES AND MAINTENANCE

Each fuel stop:

1. Check engine oil level.
2. Check radiator water level.
3. Check tyre pressures (refer to tyre plaque).

First 1,000 km (600 miles):

1. Change engine oil and oil filter. Sump capacity 3.0 litres (5¼ pints or 3.5 litres (6 pints) with filter.

Each 8,000 km (5,000 miles):

1. Change engine oil and oil filter.
2. Check radiator water level.
3. Check all water hoses and fan belt for deterioration. Adjust fan belt.
4. Service air cleaner, adjust engine idle.
5. Check transmission oil level.
6. Check drive shaft boots for deterioration and/or damage; check minor joint to flange bolt for tightness.
7. Check steering box and linkages for security; check steering ball joints and idler arm for wear and damage.
8. Check front ball joint dust covers for deterioration and/or damage; check shock absorbers for leakage and mounting deterioration.
9. Check rear ball joint dust covers for deterioration and/or damage; check shock absorbers for leakage and mounting deterioration; check rear suspension mounting for deterioration.
10. Check and top up clutch and brake master cylinders; inspect all brake lines for damage and/or chafing, particularly the flexible hoses.
11. Check all lamps, horn, instruments and warning lights.
12. Check battery, remove excessive corrosive built up and smear terminals with petroleum jelly.
13. Remove distributor cap and sparingly lubricate the lobes of the cam with a high melting point grease. Clean and adjust contact points. Reset ignition timing.
14. Clean and reset spark plugs; inspect high tension lead for deterioration.
15. Check tyres for damage and/or abnormal wear, the latter indicating poor suspension setting or a malfunction. Replace missing valve caps and remove any foreign bodies. If tread depth is less than 1.5mm (1/16''), replace tyre IMMEDIATELY.
16. Check wheels for radial run-out and for damage to flanges and bead seats.
17. Adjust windscreen washer jets; top up water reservoir.
18. Lubricate hood zips with beeswax or paraffin wax.

Each 16,000 km (10,000 miles):

1. Replace air cleaner element.
2. Replace spark plugs.
3. Check rear ball joints for wear using a vernier gauge (maximum wear limit 2.5mm-1/10'').
4. Clean and inspect brake pads.
5. Remove, clean and repack front wheel bearings with a disc-brake type high melting

point Lithium-based grease.
6. Coat gearshaft nylon crushes with teflon grease.
7. Check suspension settings.
8. Check headlight alignment.

BODYWORK MAINTENANCE

As stated earlier, the fibreglass panels on the IKARA have been produced using modern developments in fibreglass technology. Some have been made using an injection system in closed moulds, and others by more conventional gun-layup methods. In both cases the materials selected for use (and they differ) have been carefully chosen and developed to achieve the design aims.

As a result an optimum balance is achieved between strength and weight for each individual panel according to its specific requirements and purpose.

Cleaning

The gelcoat exterior finish on your vehicle, whilst harder and more durable than automotive paint, still benefits from regular care and attention. Unless it is washed regularly to remove road grime and other foreign matter deposited during the course of time, the original lustre will deteriorate, dulling the "new look" and ageing the vehicle.

Use warm soapy water, a clean sponge or chamois and rinse clean. Do not wash the vehicle in strong direct sunlight as this will result in a streaky finish.

NOTE: Current petrols tend to stain the surface and should be flushed off with clean water immediately any spillage occurs. Greases, oils, fresh tar, insects can be removed with kerosene then the area washed and polished to prevent staining.

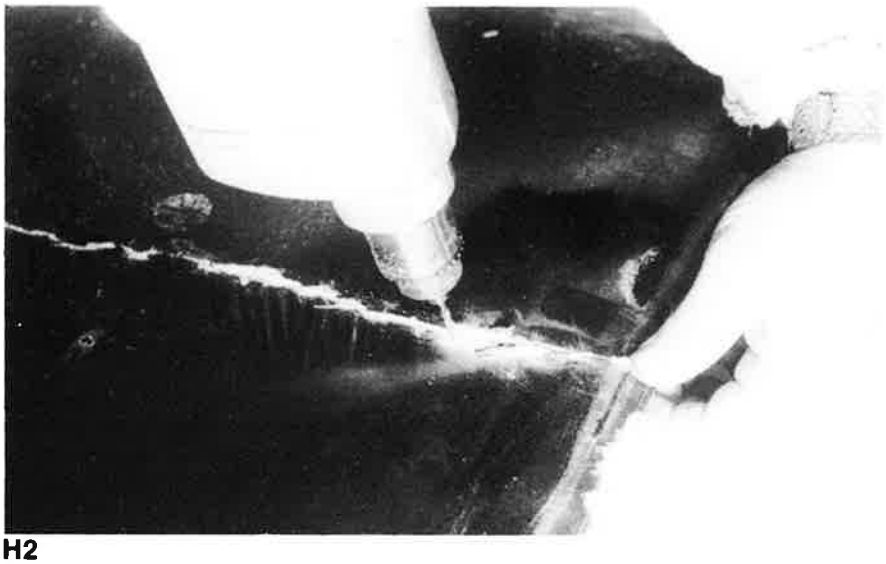
Polishing

Any of the currently available automotive or boat polishes are acceptable, although we advise not to use those containing a silicon base. As with other automotive finishes, regular polishing protects the surface.

Upholstery and hood can be maintained and freshened by using regular upholstery cleaners. Maintain the imprinted fibreglass mouldings in the same manner, though here normal body polishes can also be used effectively.

COSMETIC REPAIRS

Unlike steel bodied vehicles, minor surface scratches in the IKARA bodywork do not lead to further deterioration such as rust, corrosion etc. However, to maintain appearance they should be touched up.



H2

Included in your IKARA kit is a gelcoat repair pack. This section describes how to carry out gelcoat repairs and also how to cope effectively with slightly more ambitious repairs.

For major body repairs, we advise having the vehicle professionally repaired to guarantee maintenance of structural integrity.

Caution: The raw materials used in the making of a fibreglass laminate require sensible handling. Follow these simple rules and the problems will not arise.

1. Wear plastic or rubber gloves and protective clothing to avoid direct contact with the materials you are mixing. If resin or catalyst **do** touch the skin, wash immediately with warm soapy water.
2. Work in a well ventilated area to avoid inhalation of vapors. It is a better idea to wear a breathing mask if you have one. Wear goggles to protect the eyes. If you do suffer a 'splash', flush the affected eye **immediately** with flowing water for at least 15 minutes.
3. **Remember, the materials in their raw state are flammable.** Remove all potential sources of ignition and keep a fire extinguisher close by — foam, CO_2 or dry chemical.
4. The solvent for resin and gelcoat is acetone. Use this to clean brushes and to remove spillage from clothes. Note, however, that it is also very volatile and flammable!
5. Prolonged skin contact with this solvent may cause severe itchiness or even dermatitus with some skin types. Therefore wash with warm, soapy water.

Scratches

Your gelcoat repair pack contains two items — gelcoat and catalyst. When mixed, the curing process is commenced, so it is important to effect your repairs in the correct sequence.

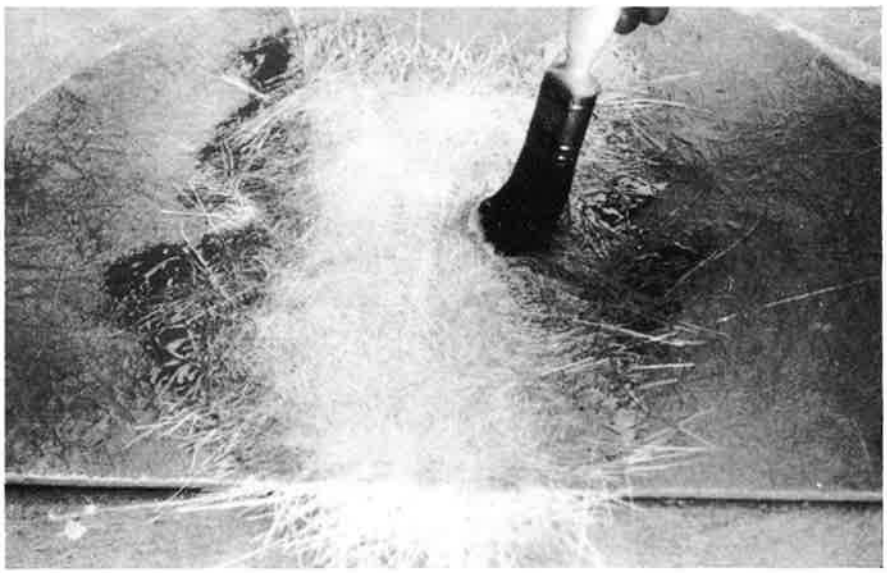
1. Lightly scuff out the scratch with coarse sandpaper to ensure adhesion. The surface must be clean and dry. Blow off any dust.
2. If the scratch to be filled is deep, mix gelcoat and talcum powder together in equal proportions using a putty knife.
3. Mix catalyst into the gelcoat. As a guide to ratios, sufficient gelcoat to cover a 20 cent piece requires 2 drops of catalyst (measured with an eyedropper). This allows a working time of 15-20 minutes before the material begins to gel.
4. Using a spatula fill the scratch with the mixture and allow to harden.
5. Sand it back to flush using 180 grit wet and dry. If the patched area has shrunk to below the surrounding surface, repeat the process, possibly without the addition of the talcum powder.
6. Wet and dry the repair using successively finer grades of paper, cut and polish.

FRACTURES

Should the laminate be broken, it is essential to regain structural integrity prior to commencement of the resurfacing operation. However, if such breakage is extensive, have the part repaired professionally.

1. Relieve any pressure at the fracture by running a drill through the crack. **(see figure H 2).**
2. Working on the INSIDE of the laminate, grind the area deeply in the middle, at the fracture, feathering towards the outside. **(see figure H 3).**
3. Using the cellotape or cellophane-wrapped cardboard, close off the exterior surface by taping into place. This creates both a surface seal and a former.
4. Bond the inside repair patch using random glass mat (not cloth). Allow to cure. **(see figure H 4).**
5. Remove the exterior surface former and grind out the exterior surface (as for the inner), again feathering towards the outside of the repair.
6. Bond the external repair patch.
7. Grind the surface flush and ready for filling.
8. Using a polyester putty, fair the surface ready for spraying.
9. Mix gelcoat and catalyst together with surface hardener and spray the repaired area.
10. Rub back, cut and polish as before.

H3



H4

The Bolwell Group has a long history in the manufacture of a wide range of industrial, commercial and consumer products, including the legendary Bolwell Nagari — predecessor of the Ikara.

Well, the hard part is over — you have built your IKARA and the fun can now begin!

That is, after you have taken care of the legalities and had your IKARA registered and insured.

PROLOGUE

The regulations governing registration vary from State to State and Nation to Nation. Our investigation of the various Australian regulations demonstrates that the safest course of action to ensure smooth passage through registration is to enlist the aid of an automotive engineer and registration consultant. The factory is able to recommend such people who will not only be invaluable for advice with the many details but also able to provide any necessary engineering certificates.

Insurance of your IKARA is another specialised area with changing trends. There are differing premiums and types of cover and again these vary from State to State. The factory is able to advise the current status for most of these, although in many instances it may be preferable to consult a Broker.

OPTIONAL EQUIPMENT:

To date we have concentrated on developing a piece of basic but exciting automotive engineering. As we develop our marketing history on the IKARA we will also be developing a series of options.

Many people will be more than content with the IKARA in its most basic form, but there are some who will require that little "extra something" to give their car an edge in comfort, function and individuality.

Radios, heaters, extra lights, and so on, are being developed right now and all IKARA builders will receive this instructional material as it becomes available.

Again, if you have any queries, contact the Factory and we'll be more than happy to assist you.

There are few pleasures in life to compare with the satisfaction of creating a "masterpiece" with your own hands. With this project you have not only had that rare pleasure of creation, but you can now continue to enjoy the finer points of your handiwork for a long time to come.

As you come to know the many features of the vehicle, and become familiar with its abilities and its special attributes, you will also become more aware of the enjoyment of driving and share my pride in creating a finely-honed vehicle of great individuality.

CAMPBELL BOLWELL.

VEHICLE RECORD

This manual forms part of the construction of BOLWELL IKARA No. B9 _____

PURCHASER: _____

ADDRESS: _____

_____

_____

DATE ORDERED: _____

DATE RECEIVED: _____

DATE REGISTERED: _____

ENGINE TYPE: _____

ENGINE NUMBER _____

BODY COLOUR: _____

TRANSFER OF OWNERSHIP: _____

No. 2 _____

No. 3 _____

No. 4 _____

No. 5 _____

CONSTRUCTED BY: _____
(if other than purchaser)

SIGNATURE: _____

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