WOMBAT
Assembly Manual

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WOMBAT Assembly Manual

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WOMBAT Assembly Manual

Donors and Parts

A donor vehicle is the original car on which the WOMBAT is built.

Choose a Donor Vehicle

The **Wombat** Kit Car is designed to fit on a stock, standard Volkswagen Classic Bug chassis. (Also fits Thing and Kharmann Ghia chassis.) The chassis does not require any modification for the kit to fit other than removal of the floor pan tins. It is possible to merely swap the bodies, but we highly recommend that you carefully examine the mechanicals and replace or recondition them as necessary. At this point in time most people start with a non-running unit and restore it, which gives them the option to install the engine / transmission combination to match their desired performance and price range

The kit will not fit a Super Beetle unless the front end of the chassis is modified. (Not recommended–this would involve cutting off the Super Beetle front end and welding on a standard front end.) We hope to have a Super Beetle Compatible Kit at some point.

We recommend you locate a VW shop or enthusiast in your area to use as a resource for advice on how to set up the chassis to best suit your needs.

The book ***Baja Bugs & Buggies, How to prepare VW-based cars for off-road fun and racing***, by Jeff Hibbard, is an excellent information source to use when making decisions about your donor chassis. It is published by HPBooks, ISBN 0-89586-186-0.

Points to consider when selecting a donor vehicle are:

- Emission Requirements in your area.

  In most locales, cars manufactured before a certain year have less stringent emission requirements than later model cars. Check your local requirements. You may wish to purchase an earlier year car to avoid hassles with the DEQ.
- Licensing Requirements

  It may be easier to start with a licensed running bug with a valid title than a junkyard pan.
- Be sure the donor Bug has a valid title.

  If you discover you've built your kit on a stolen chassis the original owner of the donor bug will be the legal owner of your kit car.
- Your preference of a Swing Axle or CV rear end suspension.
- What you consider will be the primary use of your Wombat
- Professional Mechanic's Inspection.

  You want to avoid (or at least be aware of and correct) bent front and rear suspensions; worn ball joints, bearings, and brakes; non-functioning transmissions, etc.

  If you've determined that a part is going to used in the finished Wombat, be sure it is in good working order.

Donor Chassis Checklist

The following abbreviated checklist may help you decide if you want to use a particular chassis for your Wombat.

1. Verify the following on the chassis
   A. The transmission yolk mounting bolts are there (this is a difficult bolt to find)
   B. The rear transmission forks are an even height.
   C. The rear control arms do not appear to be bent and look proportionate from one side to the other
2. Check for damage of the framehorn
   A. Are the triangle plates flat or have they been bowed from a collision?
   B. Are the threads in all holes intact?
   C. Verify that the mounting area for the master cylinder has not been crushed due to lack of spacers.

Donor Parts to Save or Locate

It is possible that all of the following parts can be salvaged from your donor car, some will probably need reconditioning. If a part is missing or in poor shape, you may wish to buy new or reconditioned parts.

VW Bug Pan
All Running Gear
Engine
Transmission*
Front Beam Suspension
Lug Nuts
Body To Pan Bolts & Washers
Steering Column
w/ Nuts & Bolts & Wiring Plug
Steering Wheel
Horn
Gauge
Flasher
Dimmer Switch Relay
Emergency Flasher
Voltage Regulators**
Battery & cables
Dashboard Grab Handle and Bolts
(On later models may be found on ceiling.)
Brake Reservoir, Mounting Screws & Aluminum Tubes
Fuel Cap
Early Style Tank & Hardware
and gas tank sending unit
Clip From Speedometer Cable
Tool Kit.

* Depending on your choice of engine, tire size, and year of donor transmission, you may need to exchange the transmission for one with a different ring and pinion for proper performance. Please consult a competent VW mechanic to assist in this decision. Discuss with him the primary use of your Wombat (Off-Road, Freeway, Around Town, etc.) and he will be able to help you choose the best set up for you. See Appendix K.

**Most engines now come with alternators that have the voltage regulator built in.

Parts to Buy

These parts you will not be able to salvage from your donor.

Battery Tray and Hold Downs–*small vinyl coated steel battery tray, 10" J-Bolts, and hold down frame available from your local auto supply store.*

Carpet/Interior/Bed Lining

Gas Cap

Headlight Bulbs *–5-3/4" Round 3-Prong High/Low Beam #H5006*

Mirrors–*Vanagon Mirrors work well. We like German brand Hagus Part #251.857.514 and Part #251.857.513. Available at your local VW shop or through an on-line store such as www.van-cafe.com.*

Paint Job

Seats–*Most aftermarket bucket seats will work well.*

Seatbelts

Super Beetle Speedometer Cable (Long)

Tires

Wheels

Windshield Glass *(Use windshield frame itself as template.)*

Wiper Motors and Wipers–*A 12 Volt Jeep Wiper Motor Kit available at your local jeep shop or on-line at stores such as www.thejeep.com or www.discountjeepparts.com. You may prefer a more durable marine system. Check local marine shops or sites such as www.boatfix.com, www.westmarine.com and www.shipstore.com.*

Wombat Options

These are items available from Wombat Car Company.

Baja Header *(Thunderbird #4224)*

Custom Exhaust System *(Designed for use with Baja Header-not included.) See Appendix F.*

Rear Deck Luggage Rack *See Appendix G.*

Right Hand Drive Modification

Soft Half-Doors *See Appendix H*

Soft Top *See Appendix I.*

Soft Windows for Soft Half-Doors *See Appendix J.*

Limited Availability

Wheels

Wheel Spacers

Wombat Car Co. Experience

Donor Cars: Our preference is 1969 or later IRS chassis.

Tires & Wheels: We have used Mickey Thompson 11.5 x 29.5 x 15 on 15 x 10 rims front and back. This size tire hampers the steering radius in front. Dropping the front tires down to 9.5 x 29.5 x 15 on 15 x 8 rims improves steering but does not allow rotation of tires front to rear.

Mickey Thompson tires look extremely cool and are awesome off road but they are bias ply tires which can go out of round, are sometimes difficult to balance, and noisy.

Currently, our choice in tires are P235 75 R15 Radial Traction Tires, (Les Schwab Brand) all around, mounted on 15 x 8 rims. This allows tire rotation, and gives a ride smoother and quieter than the bias ply Mickey Thompsons.

We use wheels with an offset of 3-1/4" backspacing. Try your local yellow pages under “Wheels”.

Remember that the recommended tire pressure on these large tires assumes a much heavier car than the Wombat. Tailor the tire pressure to the weight of the Wombat and you will get a much better ride.

Shocks: If the standard shocks on your donor bug are in good shape go ahead and use them. Coil over shocks provide a stiffer ride and some lift.

Trannys & Engines: Our prototype used a 1973 chassis with its original 3.88 RP IRS transmission, a 1776 cc, dual carbureted performance engine, and 29" tall Mickey Thompson tires. The higher horse power engine compensated for the 3.88 RP and tall tires providing adequate power and acceleration. When using a stock 1600 cc engine with anything taller than a stock tire we prefer a 4.37 RP transmission.

Our current shop demo is a 1973 chassis, using the original stock single carburetor 1600 cc dual port engine and P235 75 R15 traction tires. The original 3.88 RP ’73 transmission with this engine and tire combination performed terribly. We swapped it for a rebuilt 4.37RP transmission which solved most of the problem. It could still use a little more power in fourth gear. We could do this by either installing a custom close ratio fourth gear or upgrading the engine.

Hot Weather Performance: If you live in a hot climate, your Wombat’s performance may benefit from the addition of a Fan Shroud Remote Air Intake System. This addition improves airflow through the Wombat engine shroud. See Appendix L.

WOMBAT Assembly Manual

Assembly Outline

This outline gives a good overview of the procedures necessary to build your Wombat. For details refer to the Assembly Instructions section. These instructions are in a logical order, but it is not necessarily the only order in which to do things. Some builders prefer to install the wiring harness before bonding to the body whereas we have it as an after-paint procedure. Read through the instructions and choose the order that is most convenient for you.

Assembly Step **Page in Detailed Instructions**

1. Prepare the Pan. 1

   A. Remove VW Bug body from pan. *Refer to one of the numerous manuals available to guide you in body removal.*

   B. Cut away the old floor pan tins leaving a flange along the center tube.

   C. Do all prep work you determine is necessary to make the pan serviceable. *You should plan to replace the shift coupler and shift rod bushing at this time as they will be worn in most donors and it is much simpler to replace them while the body is off.*

   D. Be careful to save any donor parts you plan to use in your finished Wombat

   E. Mount chassis on stock (small) tires--allows more room to work.

2. Bond the Body to the Chassis. 2

   A. Prepare the chassis. *Clean flange and chase threads in rear chassis mount points.*

   B. Prepare the body. *Cut a 4"x2-1/2" oval relief hole in the firewall for the brake master cylinder plunger. Clean bonding surfaces of the chassis with acetone.*

   C. Test Fit the Body. *Grind fiberglass as needed. Do a dry run with clamps.*

   D. Bond the Body. *Use epoxy and mounting clamps to bond body in place. Install body mount bolts.*

   E. Secure the sub-frame yoke to the firewall using the supplied bolts. *Drill holes in firewall for the 1/4" bolts.*

   F. Return Materials. *Return the clamping fixtures and epoxy gun in order to get a refund of your deposit.*

3. Top Support Frame and Spreader Bar **5**

   A. Position the Top Frame *18" between the bottom of top frame and top of rear passenger rail.*

   B. Drill "C" Pillar and "B" Pillar Holes*18" 3/8" holes and secure with provided bolts.*

   C. Drill out "A" Pillar Holes and Install Spreader Bar

D. Drill and Tap to 3/8" windshield mount bracket holes on the A-Pillars of the Top Support Frame.

4. Install Steering Column. 6

A. Drill steering column hole in firewall.

B. Fabricate bracket and position on spreader bar.

B. Mount column to bracket and steering box.

C. Seal hole in the firewall with silicone or choice of duraglass, bondo, etc.

5. Pre-Mounts, Drill Holes to Prepare for Paint 8

Drilling holes before *painting is recommended to avoid scratching paint and to allow painter to correct any errors.*

A. Windshield Frame & Wiper Motors 9

B. Side Mirrors 10

C. Defrost Diffusers 10

D. Dash 10

E. Gauge, Headlight Switch, Flasher Switch/Indicator Light, Grab Handle, Cigarette Lighter 11

F. Brake Reservoir 11

G Hood Support Rod 12

H Gas Tank 12

I. Tire Rack 12

J. Rear Bumper 12

K. License Bracket 13

L. Front Bumper & Brushguard 13

M. Luggage Rack Option 13

N. Soft Top/Windows/Half-Doors Option 14

6. Paint the Car 14

Take Mounted Body Along with Dash, Hood and Windshield Frame to Paint Shop. Windshield hinge to body spacer plates may be sanded and painted to match the car or you can paint to match trim. Many builders like the effect of painting the wheels to match the body. Be sure to keep track of your nuts & bolts when your remove pre-mounted pieces. Using paint tires will protect your finish tires.

7. Paint or Powder Coat Steel Pieces 14

Bumpers, brackets, brushguard, tire rack, top frame, hood support rod, rear and center bows. The most durable treatment is powdercoat, If you choose to paint we recommend that you use a primer.

WOMBAT Assembly Manual

Assembly Instructions

These instructions are in a logical order, but it is not necessarily the only order in which to do things. Some builders prefer to install the wiring harness before bonding to the body whereas we have it as an after-paint procedure. Read through the instructions and choose the order that is most convenient for you.

Tools: You will need a basic mechanics tool set: Metric and US Fractional complete socket and wrench sets, screwdrivers, pliers, measuring tape, rulers, Allen wrenches, etc. Also vise grips, a grinder and a drill. Compressor and air tools will make the job easier, but you can build a Wombat without them.

Personal Protection Equipment: Safety goggles, ear plugs, gloves, dust masks, etc. Use them.

1. Prepare the Chassis:

A. Remove the VW Bug Body from the Pan/Chassis.

Refer to one of the numerous manuals available to guide you in body removal. The factory manual is best ($45). The Haynes manual is also good.

B. Cut Away The Old Floor Pan Tins.

There is a natural lip of thicker material where the pan tins meet the chassis tunnel. You want to leave this flange as you cut away the old floor pan tins. We typically use a Sawzall to trim out floor pan tins, and an air chisel on spot welds.

See Figure 1.

C. Do All Prep Work You Determine is Necessary to Make the Chassis Serviceable.

Some tips from the WCC mechanics:

- **Shift Coupler And Shift Rod Bushing** You should plan to replace the shift coupler and shift rod bushing at this time unless you can guarantee that the current ones are in good shape. These wear out and will need replacing in most donor cars. It is much easier to do now while the body is off than to wait and do it later.
- **Clean Out the Center Tunnel.** *This is usually necessary only on junkyard chassis, but you should probably at least look at the center tunnel of any chassis*. Remove front inspection plate on center tunnel and 2 transmission mount bolts on rear frame horns. Flush any debris out the rear with a water hose directed into the front of the tunnel. This eliminates many mysterious noises that may have been in your future. It is surprising what can find its way into the center tunnel
- **Double Check the Clutch Tube**. The clutch tube is secured in the tunnel with several weld points. Broken welds are a common failure. Inspect and repair as required.
- **Torsion Adjustment**. Due to the wide variation in the number and type of mileage on donor chassis, it may be required to adjust the rear torsion tubes.

D. Be Careful To Save Any Donor Parts You Plan To Use In Your Finished Wombat.

E. Use Paint Tires

Mount the chassis on old stock VW Bug tires and wheels. Using old small tires gives you more room to work and you don't have to worry about protecting them from paint overspray, etc.

2. Bonding the Body to the Chassis

Tools Needed

grinder w/wire wheel & disc
rags
4 or more strong friends
saw horses
Tapered Line Up Bar
Rubber Gloves
Mask
Ventilation Fan
length of 2x4
Drill & 1/4" bit

From the Kit

Front Clamping Fixture
Rear Clamping Fixture
Epoxy Gun
Plexus 2 part Epoxy & Mixing Tips
Body Nuts & Bolt Assembly Pkg.

From the Donor

Restored Chassis, floor pan tins removed
Gear Shift Bolts (2)
Seat Belt Bolts (2)

To Buy

Acetone or equivalent
Tube of silicone sealer (optional)

The body will be bonded to the chassis along the center tunnel flange and the front cross-brace flange using a 2-part epoxy (Plexus), and bolted at standard mount points using bolts supplied in the kit.

With all chemicals, it is important that you read and follow the safety precautions, and warnings before using them. On the adhesive that you will be using for the bonding process (Plexus), there is an MSDS safety information and precautions that should be followed. See Appendix C.

A. Prepare the Chassis

1) Clean Flange: Clean the flange of all grease and debris. Application of the wire wheel followed by an acetone rubdown works well. If you have repainted the chassis you will need to grind the flange to bare metal to maximize bonding strength. A scuffed, rough surface is optimum.

2) Chase threads in rear chassis mount points.

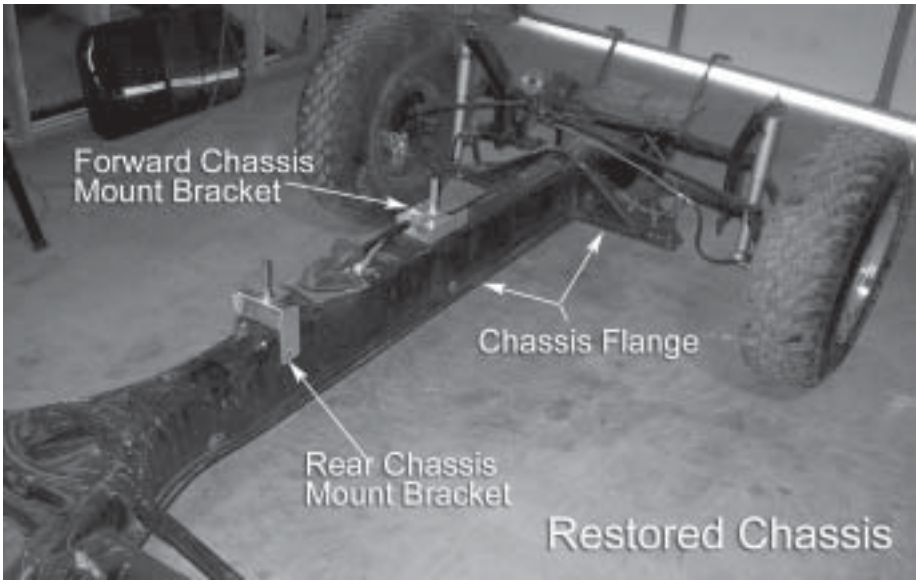


Figure 1. *Refurbished chassis with floor pan tins removed, note flange edge remaining.*

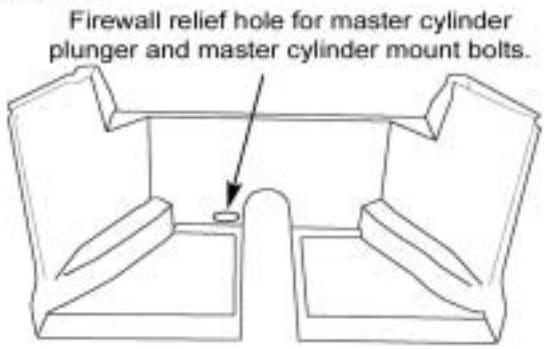
Bonding fixtures are in place. Rear clamping fixture fixes to the seatbelt mount holes. Front clamping fixture fixes to the shifter mounting holes.

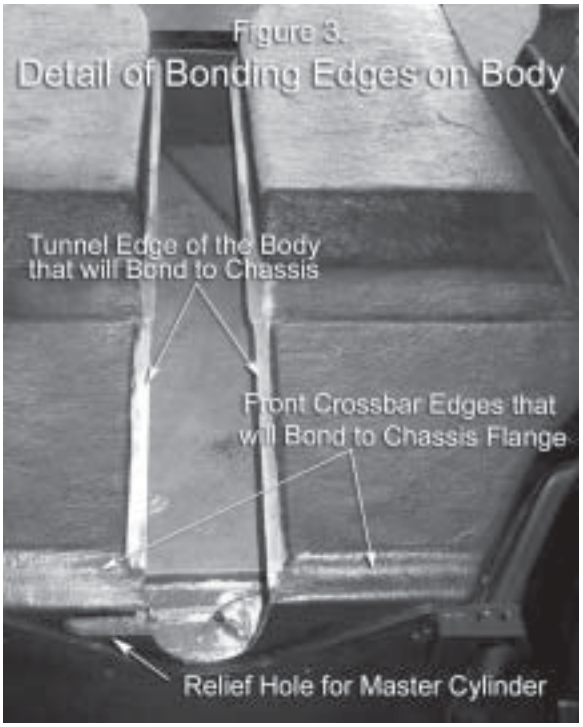
Picture is inaccurate as we recommend using stock size used tire/wheel during the complete build up process. The smaller tires allow easier access to the chassis.

B. Prepare the Body

1) Cut a 4" x 2-1/2" oval relief hole for the brake master cylinder plunger and master cylinder mount bolts. See figures 2 & 3.

Figure 2





2) Use acetone to wipe down the tunnel and front cross bar edges of the body where it will bond to the chassis flange. The bonding surface needs to be clean. See figure 3: *The body is inverted to show the detail of the body tunnel edge that will be bonded to the chassis flange. This may need to be sanded for the best fit.*

C. Test Fit the Body

1) Set the body down onto the chassis to check its fit. (This is where all those strong friends come in.) The center tunnel edge of the floor unit of the Wombat body should be able to contact the chassis center tunnel flange (this may require some downward pressure). Make sure all 6 body mount bolts line up. A tapered line up bar or Phillips screwdriver can be helpful with this. Some grinding of the fiberglass may be needed for fit.

2) Bolt the lower sections of the clamping fixtures to the center tunnel using existing shifting lever holes and seat belt holes and shifting lever and seat belt bolts saved from donor.

3) Do a "dry run" of the final bonding, tightening the clamping fixtures and the bolts in place. If the tunnel edge of the body is not contacting the chassis flange at the forward most point under the dash/trunk area, use a piece of 2x4 to wedge from trunk down to force it into position.

4) Remove upper parts of clamps and the mount bolts. Remove the body from the chassis.

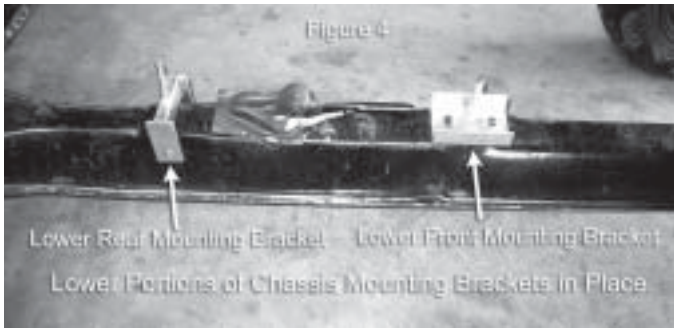


Figure 4.
Lower sections of the clamping fixtures bolted to the center tunnel using existing shifting lever holes and seat belt holes and shifting lever and seat belt bolts saved from donor.

D. Bond the Body

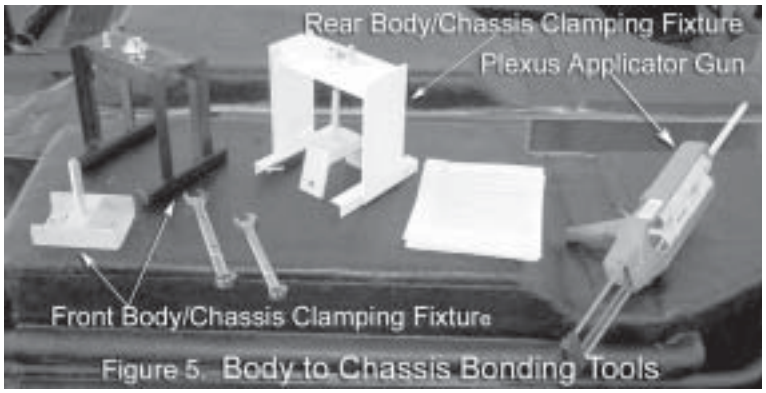
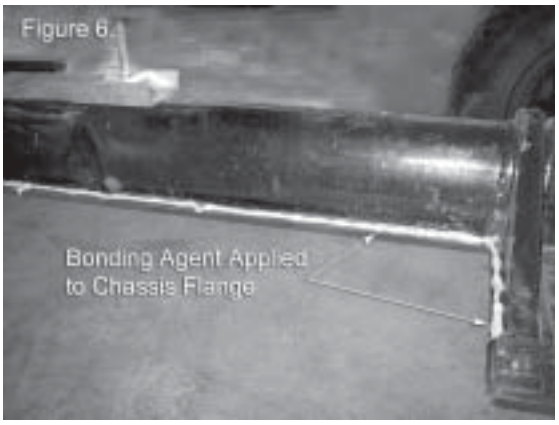


Figure 5. Body to Chassis Bonding Tools

1. Prepare to apply the glue. Read over the instructions in Appendix C for using Plexus and the Epoxy gun. Be sure to set up in a well-ventilated area and wear your personal protective gear. Set time of the glue is temperature sensitive; you will have less time at high temps.

   Glue time is limited so be sure to have at hand before you start:

   - the upper sections of the clamping fixtures
   - rear bolts from the kit (2 10mm x 35mm long x 1.5 pitch hex bolts with flat and lock washers)
   - the front bolts from the kit (4 3/8"-16 x 2-1/2" Hex Cap Bolts with flat washers and nylock nuts)
   - Friends to lift the body

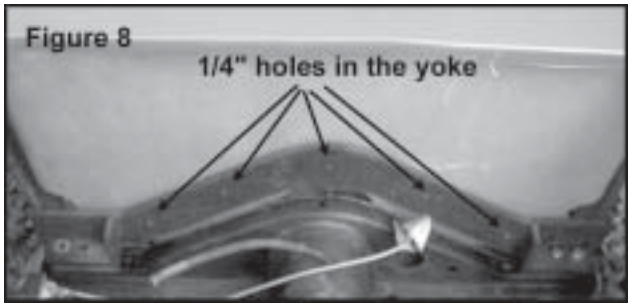


2) Apply a 1/4" bead of glue along the tunnel flange and the front cross brace flange. *See figure 6.*
3) Lower the body back onto the chassis, lining up all four corner mounting points and install bolts finger tight, this will square up the body to the chassis.
4) Place the upper sections of the clamping fixtures onto the lower sections that are already installed on the chassis.
5) Tighten clamps.
6) Finish installing and tightening body mount bolts.
7) Scrape off any excess adhesive from the tunnel and fill in the remaining gaps if desired.
8) Once the adhesive is fully cured, remove the clamping fixtures. We recommend letting the glue dry over night just to be assured of a secure bond.

9) If desired, apply silicone sealer to the area where the tunnel and firewall intersect and around the pedal assembly mounting area.
10) If the firewall front edge doesn't meet the front crossbar use Plexus and/or Duraglass to fill the gap.

E. Secure the yoke to the firewall.

Using the supplied 1/4"-20 x 1" hex head bolts, washers and nuts secure the sub-frame yoke to the firewall. You will need to drill the fiberglass. The yoke may have been predrilled. If not, drill 5 evenly spaced holes through the yoke.



F Return Materials

Return the clamping fixtures and epoxy gun to Wombat Car in order to get a refund of your deposit.

Return to:

Wombat Car Company
10013 NE Hazel Dell Ave., #147
Vancouver, WA 98685-5203

Items:

- Clamping Fixtures
  - Front Fixture, Upper & Lower Sections
  - Rear Fixture, Upper & Lower Sections
  - 5/8" Hex Nut & Washer
  - 1/2" Hex Nut & Washer
- Epoxy Gun
  - (Used Nozzles/Tips are disposable and need not be returned)

3. Top Support Frame and Spreader Bar

Tools Needed

Drill & Bits
Tapping Tool

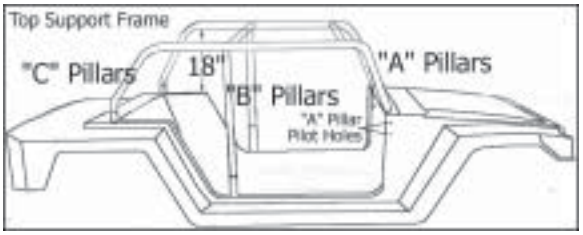
From the Kit

Top Support Frame Nuts & Bolt Assembly Pkg
Spreader Bar.

Your Top Support Frame will come welded and set into position in the body subframe sleeves. Pilot holes (1/4") have been drilled at the "A" pillars (front pillars). You will need to drill the "B" Pillars (center pillars) and "C" Pillars (rear pillars.).

A. Position the Top Frame

Adjust the top frame position such that there is 18" between the bottom of the top frame and the top of the passenger rail



B. Drill "C" Pillar and "B" Pillar Holes

Drill 1/4" holes in the "B" and "C" pillar body sleeves and top frame tubes. Drill out to 3/8". You may wish to enlarge the holes incrementally when going from 1/4" to 3/8"

Before drilling you may wish to consider whether you wish to install the bolts parallel or perpendicular (or at an angle) to the top frame side bars. You may wish to use the "B" pillar bolts for seat belt mounting.

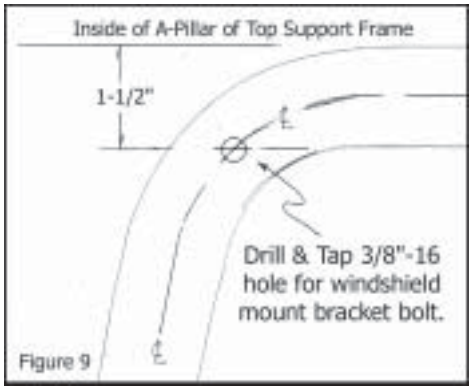
Secure the top frame using the provided 3/8" x 2-1/2" Hex Head Bolts and nuts provided for the "B" and "C" pillar mount.

C. Drill out "A" Pillar Holes and Install Spreader Bar

Enlarge the "A" Pillar holes to 3/8". Install spreader bar using the provided 3/8" x 4" button head socket cap screws and nuts.

D. Drill and Tap A Pillar for Windshield Bracket mount.

The windshield is fastened to the top support frame via L-brackets. It is necessary to drill and tap for a 3/8"-16 bolt to fasten the bracket to the Top Frame. Position the hole along the centerline of the A-Pillar, on the inside, 1-1/2" below the top edge. See figures 9 and 10.



4. Mount the Steering Column

Tools Needed

Ratchet & Socket to fit donor bolts
Drill
¼" and 5/16" Bits
2" Holesaw
Straight Dowel or stiff ruler
Caulking Gun
Grinder
Welder (optional)

From the Kit

Steering Column Bracket Flat Iron
2 2" U Clamp sets

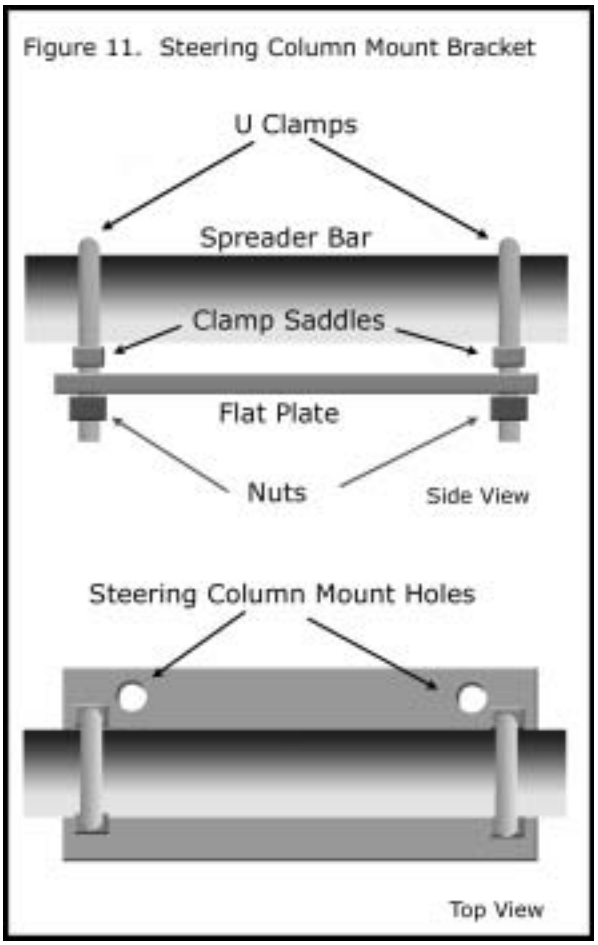
Your column should be inspected and reconditioned if needed. It is also advisable to paint it before installation.

To Buy

1 Can Black Satin Interior/Exterior Spray Paint
Silicone
1-1/2 x 2 x 1/2" x 6" angle iron (option)

From the Donor

Donor Nuts & Bolts
Steering Column



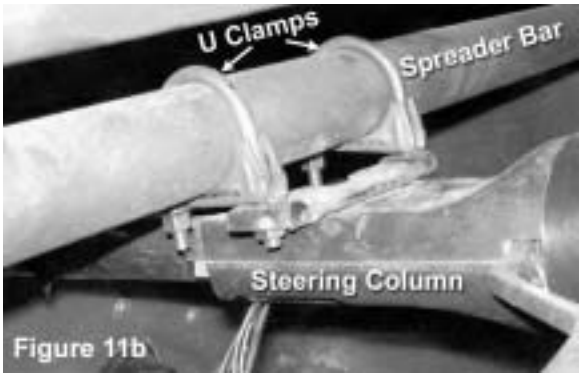
A. Drill Steering Column Hole in Firewall

It is helpful to use a stiff ruler or narrow dowel to line up the hole with the steering box. Start with a small hole you can sight through, so that if you are off line you can make adjustment with your next hole. Work your way up in size until the hole is just large enough to allow the column through.

B. Fabricate Bracket and Position on Spreader Bar.

The bracket flat iron is 8 inches long and 3 inches wide. Bracket is shown in Figure 11.

Depending on your column, you may prefer to eliminate the flat plate and attach the column direclty with the U-Clamps as shown in fugure 11b.



1) Grind edges of flat iron smooth
2) With the steering column in position, hold the flat plate between the column and the spreader bar and mark for steering column mount bolts. Be sure the bracket is positioned to allow for the U-clamp holes.
3) Drill holes for steering column mount bolts and U-clamps
4) Attach bracket to spreader bar using U clamps. You can adjust the height by adding spacer washers between the U Clamp saddles and the flat plate.

C. Mount the Column

Loosely mount the column to the bracket (reuse donor bolts & nuts) and to the steering box. The U Clamps allow adjustment of bracket placement if necessary. Inspect to insure everything is correct, then tighten.

D. Seal the Column Hole

The column hole in the firewall needs to be sealed. This can be done with a variety of materials. If your cutout is well done, a bead of silicone is adequate. If the hole is a little rough, then it can either be glassed, duraglassed, bondoed, etc.

Alternate Bracket

Option: fabricate bracket from angle iron (1-1/2" x 2"x 6") and weld in place. See figures 12 and 13. If you opt for a welded bracket you may wish to weld to the front of the spreader bar rather than that shown which is welded to the back of the spreader bar. Welding to the front will allow better access after the dash is in place.

5. Pre-Mounts, Drill Holes to Prepare for Paint

Tools Needed

Drill & bits	Measuring Tape	Screwdrivers	Masking Tape
Tapping Tools	Level	Marker	Wrench & Socket Set

It is good practice to drill any holes required in the fiberglass before paint. Any mistakes you make while drilling holes at this point can be easily remedied by the painter. If you do decide to drill after paint, start with a small bit and gradually work up to the size hole you need. This method is least likely to damage your paint or fiberglass. Items which overlap the holes are less critical but you may wish to pre-mount them anyway. You may also wish to pre-mount bumpers.

Most of the nuts provided with the kit are nylon lock nuts. When you need to use nuts during a pre-mount you may wish to substitute non-locking nuts to make it easier to disassemble to paint.

Holes for the lights and hood mount have been predrilled. The following are items you may wish to pre-mount before paint.

A. Windshield Frame & Wiper Motors
B. Side Mirrors
C. Defrost Diffusers
D. Dash
E. Gauge, Headlight Switch, Flasher Switch/Indicator Light, Cigarette Lighter, Grab Handle
F. Brake Reservoir
G. Hood Support Rod
H. Gas Tank
I. Tire Rack
J. Rear Bumper
K. License Bracket
L. Front Bumper
M. Luggage Rack Option
N. Soft Top/Windows/Half-Doors Option

A. Windshield Frame & Wiper Motors Pre-Mount

From the Kit

Windshield Frame	Hinge Spacers	Windshield Nut & Bolt Pack
Windshield Hinges	Hinge Gaskets	
Windshield Frame Gasket	Miscellaneous Nut & Bolt Pack	

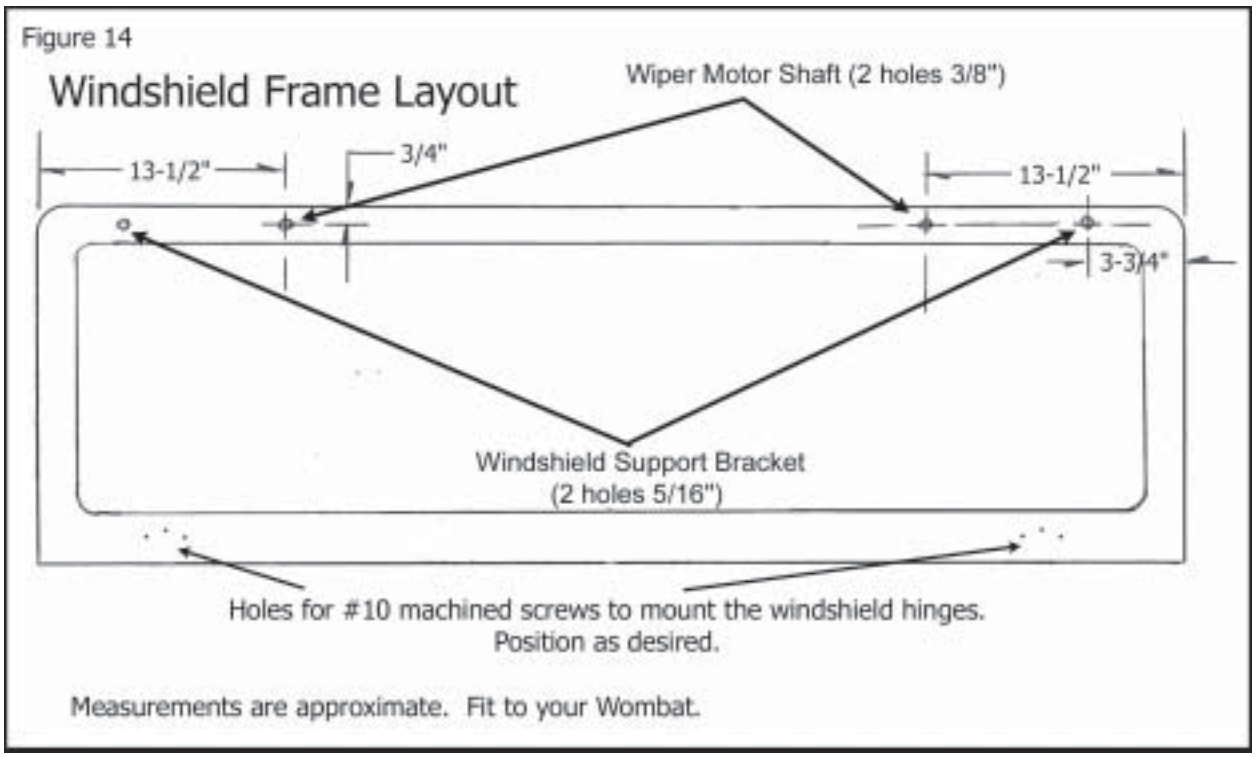
To Buy

Non locking #10 nuts	2 Wiper and Wiper Motor Kits

Jeep 12 Volt Wiper Motor Kits are available at your local jeep shop or on-line at stores such as www.thejeep.com or www.discountjeepparts.com. You may prefer a more durable marine system. Check local marine shops or sites such as www.boatfix.com, www.westmarine.com and www.shipstore.com.

1) Mount the windshield brackets to the A-Pillars using the spacer bushing and provided bolts.
2) Secure the self-adhesive windshield gasket to the cowl temporarily with masking tape. Center the windshield frame on the cowl.
3) Position the windshield frame hinges and spacers on the cowl. Once everything is positioned as you like, mark windshield frame and cowl for drilling. You will drill 5/16" holes at the bracket position and #10 holes for the hinges.
4) Drill 3/8" holes for wiper motor shafts. The wiper motors may be mounted on either the top or the bottom of the frame. If you choose lower mount be aware of steering wheel clearance with the motor housing. With top mount the wiring will run along the top support frame. With bottom mount the wires will be carried under the dash--drill 1/4" holes for wire access to motors.
5) Mount Windshield frame using non locking nuts to check for fit.
6) Mount wiper motors. Secure with supplied #10 self- drilling screws--drill pilot holes with 1/8" bit.

Figure 14



B. Side Mirrors

From the Kit
Miscellaneous Nut & Bolt Package

To Buy
Mirrors

Vanagon Mirrors work well. We like German brand Hagus Part #251.857.514 and Part #251.857.513. Available at your local VW shop or through an on-line store such as www.van-cafe.com.

Mirrors may be mounted to the sides of the windshield frame or to the body forward of the A pillar. (If you opt for the soft half-door, mirrors will instead be mounted to the half-door frame using machine screws in the half-door nut & bolt package.)

1) Position mirrors along the lower side edges of the windshield frame or forward of the A Pillars. Mark for drilling.
2) Drill holes for the 1/4-20 x 3/4" Phillips oval head machine screws provided in the kit. If you chose windshield mount, tap holes.
3) Secure mirrors in place.

C. Defrost Diffuser

Figure 15

From the Kit
Defrost Diffusers
Dash & Defrost Nut & Bolt Pack

To Buy
Non locking #10 nuts

Refer to Section 14 on page 17 for complete description of the defrost set up.

1) Trim diffusers to fit under the upper dash edge of the cowl. See Figure 15. Drill mounting holes in the diffuser for #10 machine screws.
2) Position diffuser under dash edge of cowl and mark holes.
3) Drill holes for mounting diffusers.
4) Drill holes or slot between mount holes for venting air. See Figure 16.

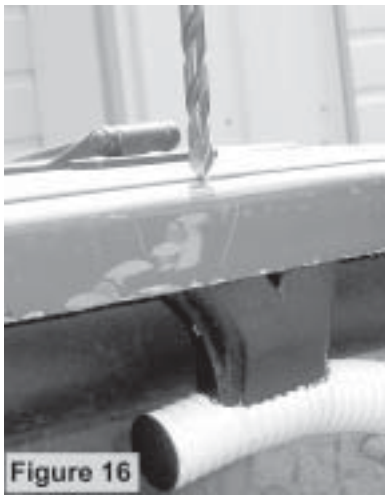


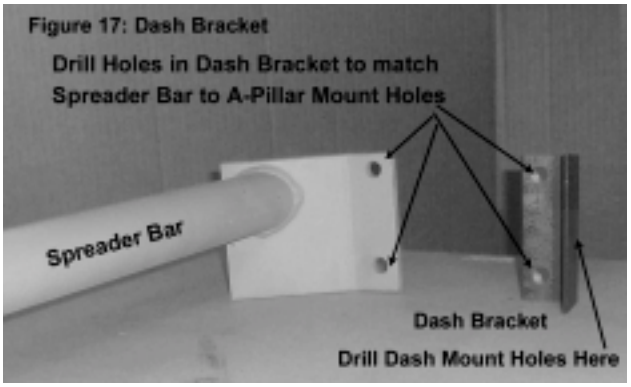
Figure 16

D. Dash Pre-Mount

From the Kit
Dash
Dash Bracket Angle Iron
Dash & Defrost Nut & Bolt Pack

To Buy
Non locking 1/4" nuts

The Dash can easily be replaced with a custom unit. Customers have used wood and aluminum to fabricate custom dashes.



1) Fabricate Brackets
Bracket is made of a 4" length of 1-1/2 x 1-1/2 1/4" angle iron.
   a) Grind edges of angle iron smooth

b) Mark and drill holes in brackets to mount to spreader bar via 3/8" spreader bar A-Pillar bolts.

c) Mark and drill 1/4" holes in brackets for dash mount.

2) Fasten Brackets to A-Pillars via Spreader Bar Bolts.

3) Position dash and mark for drilling. You will connect the dash to the bracket via two screws along the sides. Four evenly spaced screws across the top of the dash attach the dash to the cowl edge.

4) Drill 1/4" holes as marked.

5) Secure dash to brackets using 1/4" Phillips Pan Head Machine Screws and temporary non-locking nuts.

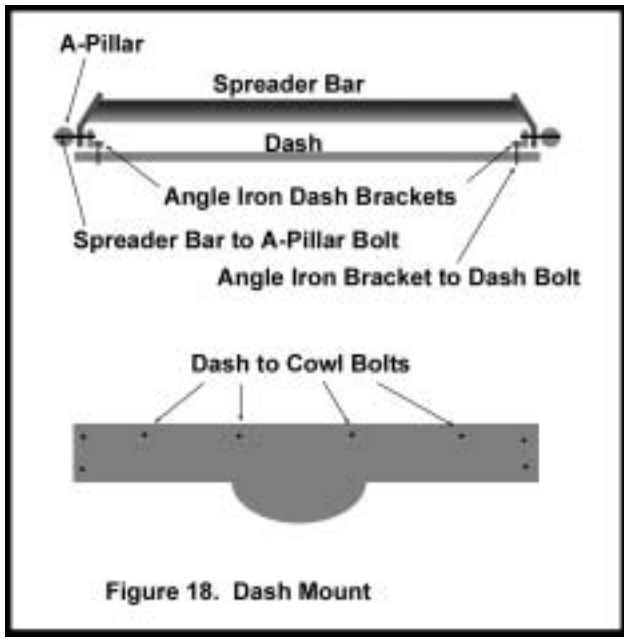


Figure 18. Dash Mount

E. Gauge, Headlight Switch, Flasher Switch/Indicator Light, Cigarette Lighter

From the Kit *(Switches and Lighter packed in Wire Harness Bag)*

Dash	Dash & Defrost Nut & Bolt Package	
Headlight Switch	Flasher Switch/Indicator Light	Cigarette Lighter

To Buy or Salvage from Donor

Speedometer	Grab Handle w/Nuts & bolts	non locking #10 nuts

1) **Speedometer** There is a pre-cut hole in your dash for the **gauge** that you salvaged from your donor car or bought aftermarket. The gauge mounts from the back. Drill two holes in the dash on each side of the gauge hole to match the mount tabs on your gauge. Install using the supplied #10 phillips pan head machine screws and temporary non-locking nuts.

   You may also request at the time you order your Wombat that we not pre-cut the gauge hole if you prefer to use custom gauges.

2) Drill holes in the dash to fit your **headlight switch, emergency flasher switch/ indicator light and cigarette lighter**. Positions are your choice, they should be convenient to the driver. These items are packaged with the wiring harness.

3) **Grab Handle** If you salvaged a grab handle from the dash or ceiling of your donor car use it as a template to mark hole positions on the dash. Drill. You will install using nuts & bolts from your donor car.

F. Pre-Mount Brake Reservoir.

From the Donor

Brake Reservoir with mounting screws	Aluminum fluid tubes

The brake reservoir mounts in the front trunk area, towards the firewall on the drivers side. Two holes must be drilled through the body for the fluid lines to run down to the master cylinder. Two holes for mounting must be drilled, also. The reservoir will be mounted using the original nuts & bolts salvaged from the donor car. Hold the reservoir in place to set these

holes- it is easiest if the holes allow the fluid lines to run down along the firewall. During final installation you will want to bond the hoses to the firewall.


Figure 19. Gas Tank, Hood Support Rod, & Brake Reservoir in Place

G. Pre-Mount Hood Support Rod

From the Kit
Hood Support Rod
Hood Nut & Bolt Assembly Package

The hood support rod is an "L" shaped rod threaded on the short end. The threaded end is secured through the side of the trunk area with the provided two 1/4" nuts and washers to allow it to pivot. Position as desired and drill 1/4" hole. See Figure 14.

H. Pre-Mount Gas Tank

From the Kit
Gas Tank Nut & Bolt Assembly Package

To Buy or Salvage
Early Style Gas Tank & mounting hardware

Place the tank in the opening. Position salvaged mounting hardware. Mark and drill holes for the supplied 5/16" bolts to secure gas tank to trunk. (Fabricate simple retaining straps if necessary.)

I. Tire Carrier

From the Kit

Tire Rack	Hinge Bracket	Tire Carrier Nuts & Bolts *(Lock Pin)*
Pivot Pin	Pin Bracket	

To Buy
Non-Locking 3/8"-16 Nuts

1) Assemble the unit off the car: Install bushings in the tubes of the tire carrier. Install the pivot pin in the hinge bracket securing the tire carrier to the bracket. Place lock pin in pin bracket to close carrier
2) Position unit so that the bracket holes are centered in the rear vertical base bars of the body sub frame, and so that the length of the tire rack is level. Mark holes.
3) Drill Holes.
4) Mount Tire Carrier.
5) Pre-Mount Rear Bumper before removing and disassembling Tire Carrier. Be sure to remove bushings from tubes before sending to paint or powder coat.

J. Rear Bumper

From the Kit

Rear Bumper	Rear Bumper Nut & Bolt Package
Rear Bumper Brackets (2)	

1) Insert brackets into tubes on body subframe.
2) Center bumper on brackets. Mark and drill bumper to match bracket holes.
3) Bolt Bumper into place using provided bolts.
4) Adjust Bumper to Body distance so that it lines up with the tire carrier, then drill frame and bracket. Secure using supplied bolts.

K. License Bracket

Figure 20. Tire Rack, Rear Bumper, & License Bracket

From the Kit

License Bracket
Lights Nuts & Bolts

This is mounted on the passenger side of the rear bumper, after the bumper and tire rack are mounted. Holes are not predrilled. Position, mark and drill holes in the bumper for mounting with the provided #10 pan head machine screws

L. Front Bumper and Brushguard

From the Kit

Front Bumper
Front Bumper Brackets, Left & Right
Brushguard
Front Bumper & Brushguard Nut & Bolt Package

1). Mount Front Bumper Brackets

Mount the Left and Right Front Bumper Brackets to the Angle Beam one side at a time using provided bolts. **DO NOT REMOVE BOTH SIDES AT ONCE OR THE AXLE BEAM WILL DETACH ITSELF**

2) Position Bumper and Mark for Drilling

Center bumper on bracket. Mark locations on bumper to match predrilled holes on bracket.

3) Position Brushguard and Mark Bumper for Drilling

Center Brushguard on bumper. Mark locations on bumper to match predrilled holes on brushguard tabs.

4) Drill holes in bumper.

5) Attach bumper to bracket using bolts supplied with your kit.

6) Attach brushguard to bumper using bolts supplied with the kit.

M. Pre-Mount Optional Luggage Rack

From the Kit

Luggage Rack Luggage Rack Nuts & Bolts

The Wombat rear deck luggage rack mounts by way of threaded inserts in the four legs that rest on the deck.

1) Place the rack on the deck, visually centering it on the deck lid. Use a straight edge held against the fender to measure from the side to the rack. When you are satisfied with the placement, trace around the leg.

2) Look underneath the deck lid, and confirm your leg placement mount hole will intersect with the body subframe rails that run below the deck lid. The holes do not have to center perfectly on frame rails.

3) Adjust if necessary. If needed you can fabricate bracket to mount. See Appendix G.

4) Starting with a small bit, drill a hole in the center of your marked circles, then gradually work your way up to a 3/8" diameter hole. Warning–if you increase the diameter too quickly, you risk chipping the fiberglass.

5) Use the supplied bolts, washers to mount. Loosely start all the bolts, and then slowly and equally tighten.

N. Pre-Mount Soft Top/Windows/Half-Doors Option

You may choose to pre-mount the Soft Top/Windows/Half-Doors option. This is not critical as these pieces have parts that overlap the holes.

The Soft Top requires holes drilled in the windshield frame for snaps and the awning rail and holes drilled along the rear passenger rail for snaps. The Half-Doors require holes in the body for door hinges. The half-door windows come with a wind deflector that mounts on the windshield frame.

See page Appendices H, I and J for mounting instructions.

6. Paint the Car

After each piece has been test-mounted, it is removed. (Be careful not to lose any nuts & bolts.) The mounted body, dash, hood, and windshield frame should now be taken to the paint shop, or painted yourself. We recommend that you use paint tires to avoid getting paint on your finish tires.

The windshield hinge to body spacer plates may be sanded and painted to match the car . Many builders like the effect of painting the wheels to match the body.

Note: If you plan to cover your top frame bars with bar padding so the color won't matter, don't tape off your cage as the paint adds protection.

7. Paint, Chrome, or Powdercoat Steel Pieces.

While the body is being painted, it is a good time to paint, chrome, or powdercoat the steel pieces: Bumpers, mounting brackets, brushguard, tire carrier, luggage rack (option) and hood support rod. Krylon Satin Black Interior/Exterior Spray Paint works well.

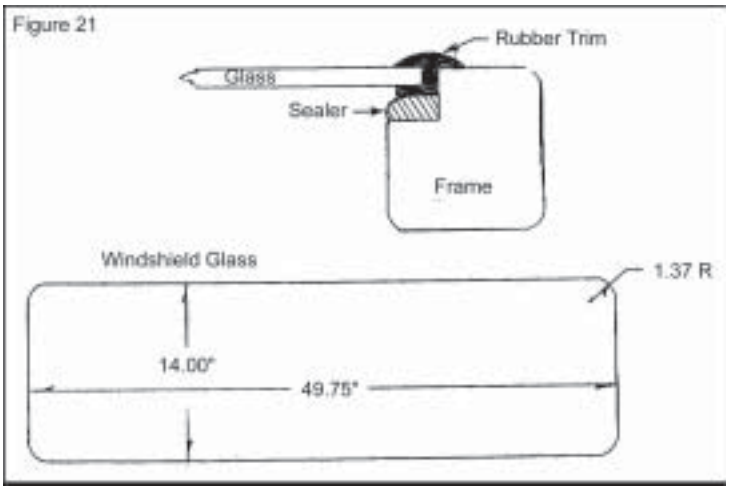
Powder coat is recommended as the most durable finish. If you decide to use paint, it is definitely worth the trouble to use a coat of primer. Be sure to rub the steel down with solvent to remove any grease before painting.

The windshield hinge to body spacer plates may be sanded and painted black if you did not send them to the paint shop. You may wish to consider painting the gas tank black. You may also wish to consider lightly sanding and painting your muffler and exhaust pipes using a paint designed for barbecues. This looks good and helps prevent corrosion.

If you opted for the soft top you may wish to paint or powdercoat the aluminum awning rail to match your trim.

8. Install Windshield Glass

After the windshield frame has been painted, take it to a glass shop and have the windshield glass installed now. The windshield frame itself acts as a template. Use flat plate safety glass. The process is a standard bond-in system.



9. Apply Bedliner Coating to Floor.

Option Coating the floor with a bedliner product is an alternative to carpet. There are a variety of bedliner options available at various prices in both do-it-yourself and professional installation. Be sure to mask off the heater vent tubes before bedlining.

If you plan to do a lot of wet and dirty off-roading you may wish to get plugs and drill drain holes in your floor boards.

10. Install the Wiring Harness

Tools Needed

Drill
5/8" hole saw
1-3/4" hole saw
4 or more strong friends
blower or vacuum
extension cord
saw horses

From the Kit

Wiring Harness Nut & Bolt Assembly Package
Wiring Schematic
Wiring Harness

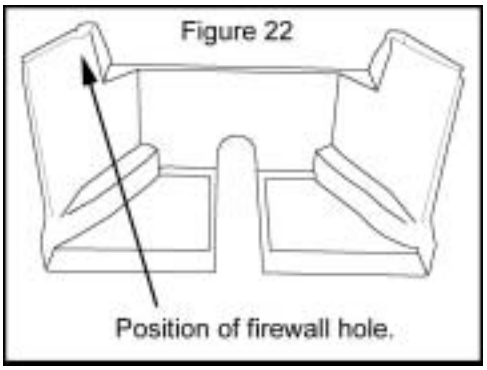
From the Donor

Dimmer Switch Relay
Flasher & Emergency Flasher
Fuel Tank Sender

Some builders think the optimum time to install the harness is before bonding the body. They find it easier to get to the body before the chassis is bonded. Others prefer to wait until after bonding to body to the chassis. Your car, you choose.

Although our Wiring harness has been greatly simplified, you may still wish to get experienced help for this. Use the schematic diagram included with your harness (also in Appendix E) to install the included harness. Test the wiring before final bolt in of the gas tank for easy access.

The harness is in sections that plug together. The front section is detailed on page 1 of the schematic. The rear section is detailed on pages 2 & 3. Page 4 is a detail of the turn signal converter box.



You will need to drill a hole in the firewall on the driver's side for the front trunkline to the front lights, fuel tank and brake master cylinder. The main wiring trunk runs from the firewall hole, along the driver side lower sill inside the car along the frame rail near the floor, then through a hole

drilled at the base of the rear seat (**Alternatively**, some builders have chosen to run the main wiring trunk through a pvc pipe bonded beneath the body. If you choose to carpet the interior, the harness running along the floor of the car is neatly hidden. If you choose bedliner, having the wires under the body works better. The choice is yours.) The rear harness runs along the frame rails, to each taillight assembly, engine connections, and to the transmission for backup lights

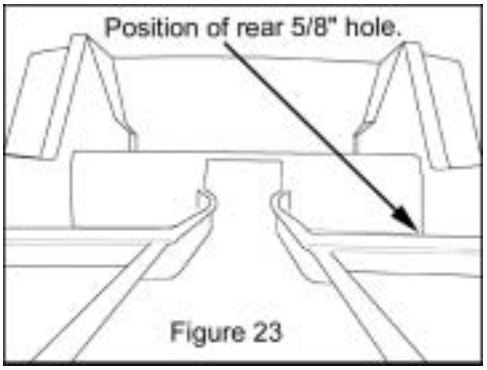


Figure 23

The first step in the installation is to drill the bulkhead holes. Drill a 1-3/4" hole in the firewall and a 5/8" hole at the base of the rear seat. (Not necessary if you opt to run the harness through pvc pipe on the underside of the car.) See Figures 22 and 23 for positioning.

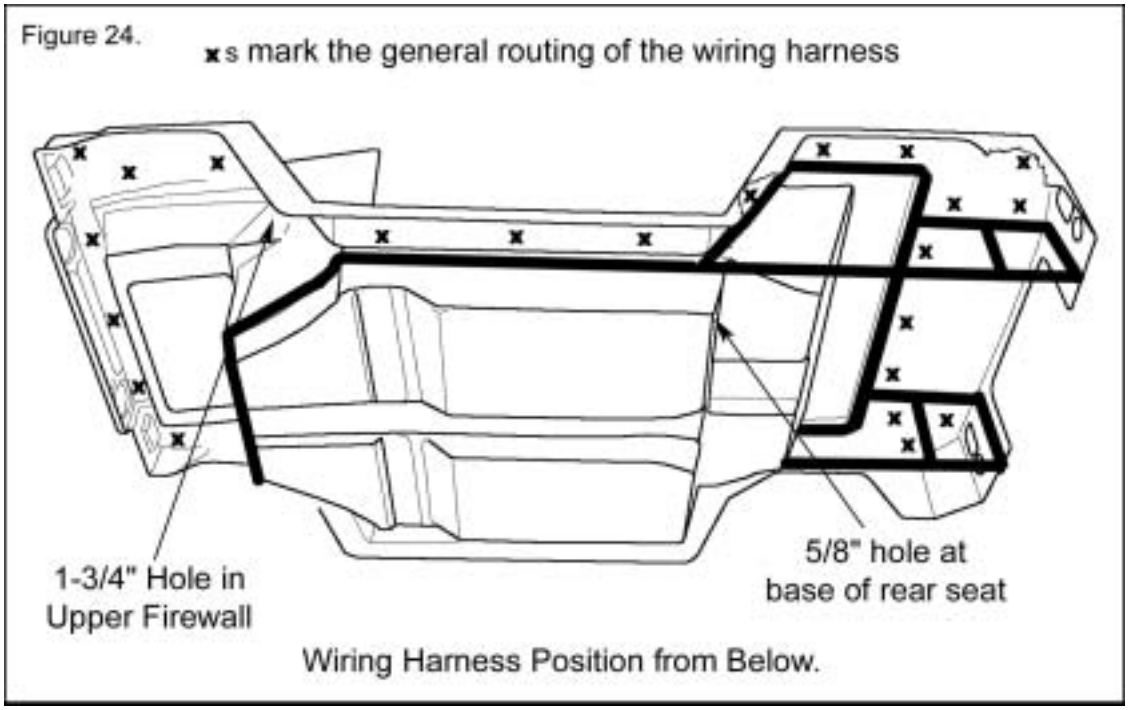
You will want to prop the body up on sawhorses if you choose to install the wiring harness before bonding to the chassis. We recommend that you have at least 4 people, to move the body onto the supports.

Clean the underside of the body. Blowing or vacuuming work well, as does hosing it off with water.

The drawing below shows the general routing of the harness on the underside of the body. The harness is affixed via zip ties, self-adhesive cable clamps, and screw in cable clamps. An assortment is provided with your kit. We found the adhesive in the self-adhesive clamps to fail in the extreme heat of desert summers, but they may be sufficient for milder climates.

Along the sub frame you may wish to simply zip tie the harness in place, or use the provided self-drilling screws to affix cable clamps to the sub-frame. In the front trunk area, away from the sub-frame, you may use either the self-adhesive clamps to bond to the fiberglass, or drill holes through to the trunk and fasten cable clamps with the stainless machine screws and nuts provided. As an alternative, you may wish to bond various lengths of pvc pipe under the body to hold the harness.

Figure 24.



Before you begin, you may want to relax and take your time to familiarize yourself with the harness. Lay the harness out on the floor. With the diagram and a cup of coffee or pop, figure out where each of the wires go. This will help tremendously.

The fuse panel mounts to the driver side, upper firewall with the screws, washers, and nuts.

Depending on which year steering column you have, you will either wire though it, or bypass it. You can wire in custom gauges, or reuse your donor Bug gauge.

Headlight Switch, Emergency Panel Light, & Switch are will be mounted in the dash to the left of the steering column.

Note that the schematic calls for the harness wires to be fed through the rubber grommet in the base of the front turn signal so that the connections between the light wires and harness wires are protected by the lens.

If you encounter problems when testing your vehicle, it is a good idea to keep in mind that most electrical problems are ground related and/or in the steering column.

11. Apply Undercoating or Paint to the Underside of Body and Hood.

Option. Spray paint or 3M rubberized undercoating to the underside of the fiberglass body and subframe. You may choose to undercoat the hood also. The black color gives the car a clean finished look. Undercoating helps add another layer of soundproofing to the entire structure.

It is your choice as to the best time to undercoat the body. Some people prefer to do it before mounting the body, some after mounting but before painting, others after painting but before wiring.

If you choose to undercoat early in the assembly of the car you may wish to apply a touch-up coat later in some areas.

12. Brake Reservoir

Tools Needed
- Drill
- Drive Bit

From the Donor
- Reservoir with mounting screws
- Aluminum fluid tubes

To Buy
- Zip ties or cable clamps
- Brake Hose, 7mm. Blue Braided, aprox. 3 feet , part N203501

Holes should have been drilled during the pre mount before paint.

Attach a length of brake hose to each end of the metal tubes from the donor to give the correct length to reach from the reservoir to the master cylinder. Run hoses through holes down towards master cylinder along the firewall. Don't add too much length. You want the fluid to flow smoothly without any bends or folds to catch air bubbles.

Attach reservoir in place using screws from your kit. Tubes should be attached to the firewall in some fashion, such as zip ties or cable clamps. (Silicone is not recommended for fastening).

13. Mount Windshield Frame.

Tools Needed
- Drill
- #10 Phillips Bit
- Utility Knife

From the Kit
- Windshield Frame
- Hinges & Hinge Gaskets
- Windshield Nut & Bolt Package
- Hinge Spacers
- Windshield Gasket

Holes were drilled during pre-mount.

A Trim the self-adhesive windshield gasket as necessary and adhere to cowl.

B Secure the windshield frame bracket to the A-Pillar using supplied 3/8" button head screws and bushings.

C Secure the windshield hinges, gaskets, and spacers to the cowl.

D Place windshield in position and secure to bracket and hinges using supplied bolts.

14. Heat and Defrost

Tools Needed
- Drill
- Utility Knife

To Buy
- Bonding Agent
- Silicone Sealer
- OPTIONAL
- 1" OD PVC pipe
- 90 elbows

From the Kit
- Length Defrost Hose
- 2 Hose End Caps
- 2 Louvered Ball Vents
- 2 Hose Adaptors
- 2 Defrost Diffuser Ducts
- Dash & Defrost Nut & Bolt Assembly Pack

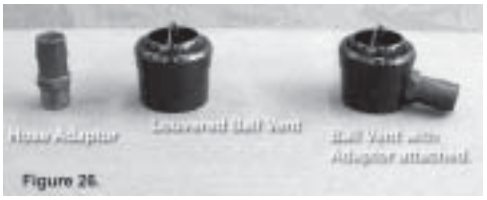
Hot air is brought forward from the engine through pvc pipes installed behind the running boards. There are inlets in the passenger and driver side footwells. Defrost air may be routed to the windshield either on the inside or outside of the firewall. Defrost duct hose is provided with the kit. If you choose to route the air to the outside of the cab you will need to purchase pvc pipe and 90º elbows.

A. Ball Vents

1) Drill ball vent and attach hose adaptor.

The louvered ball vents will be bonded to the hot air inlets in the footwell. The vent is directional, so determine if you prefer up/down; front back; or something in between and position accordingly. Mark the top of the vent for drilling. The hose adaptor will attach to the sleeve of this vent to attach the defrost hose If you choose to route the defrost air outside the firewall, no modification needs to be done to the vent. Simply bond in place.

Figure 26 shows the adaptor and ball vent. A 1" hole has been drilled in the sleeve of the ball vent and the threaded adaptor has been screwed in. Seal with silicon if desired. You may need to shorten the threaded end of the adaptor for clearance on the louver.



2) Bond ball vent to hot air inlet and attach hose to hose adaptor.

Figure 27 shows the ball vent and hose in place. Soak the hose in warm water for a few minutes to make it more flexible and easier to push onto the hose adaptor. The hose runs along the firewall up to the dash to deliver air to the defrost diffuser ducts.

Figure 28 shows the possible alternative of using pvc pipe to run up the inside of the fire wall. Seal with silicone if desired. Attach the hose at the top of the pipe to deliver air to the defrost diffuser ducts.

Figure 27

Figure 28

B Exterior Defrost Air Routing

Figure 29 illustrates how you can use pvc pipe and elbows to tap into the main air pipe outside the firewall and bring the defrost air up to the dash area.

Figure 30 shows how a hole is drilled high up in the firewall for the pipe. Attach the defrost hose to this pipe.

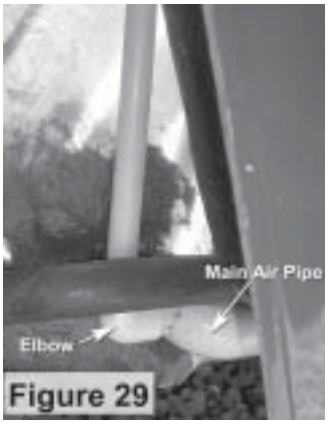


Figure 29

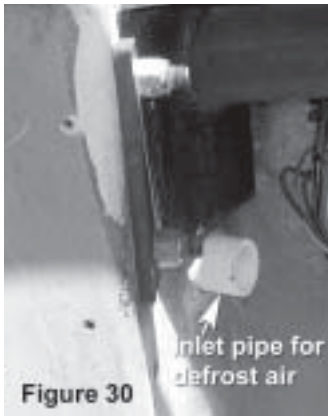


Figure 30

C Diffuser Ducts

(You may have trimmed diffusers and drilled cowl for mounting/venting during the pre-mount.)

1) Trim diffuser ducts.

The two diffuser included in the kit need to be trimmed to fit under the upper dash edge of the cowl. Figure 31 shows a trimmed and an untrimmed diffuser.

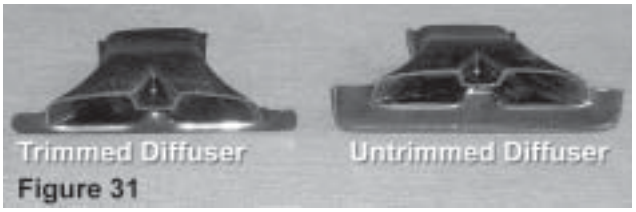


Figure 31

2) Attach duct to hose

About 1 inch from the end of the hose, user a marker to trace the base of the diffuser as seen in figure 32. Cut along the outline with a utility knife (Figure 33).


Figure 32

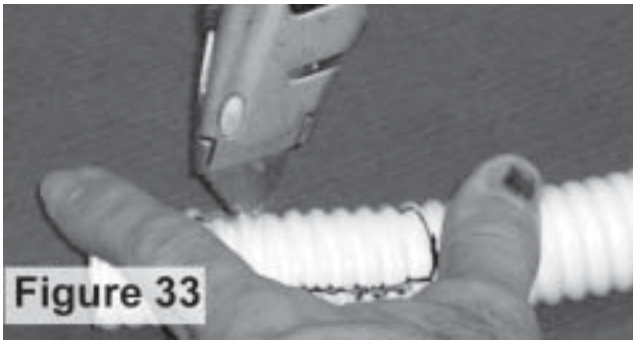


Figure 33

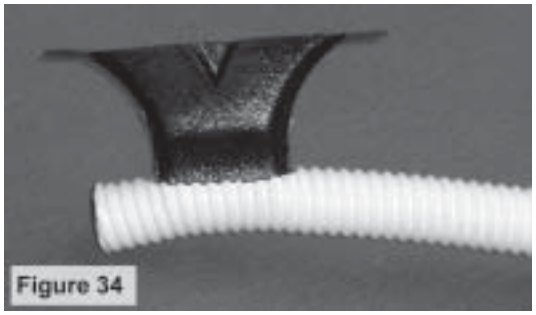


Figure 34

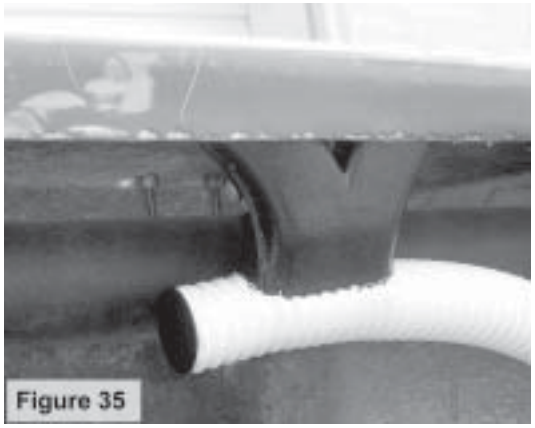


Figure 35

Insert the diffuser into the hose and cap the end of the hose with the included cap. Seal with silicone, if desired. See Figure 34

3) Drill holes for mounting screws

   Drill screw holes in the diffuser for #10 machine screws. Position diffuser under the dash edge of the cowl and mark holes. Drill holes in dash edge for diffuser mounting.

4) Drill vent holes/slot.

   Between mount holes drill holes or slot for venting air. See Figures 35 & 36.

4) Trim defrost hose

   Once Diffusers are properly positioned, trim hose to proper length to fit with your choice of defrost air routing.

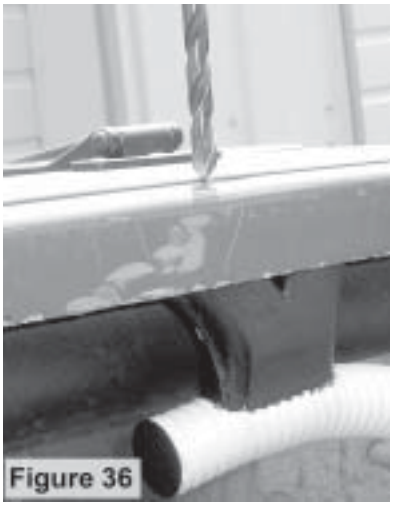


Figure 36

Consider your interior finish as you choose your defrost method. You may wish to paint your pvc pipe or defrost hose. If you choose to hide it behind carpet, consider fastening the carpet with Velcro strips rather than glue to allow future access.

15 Install Dash

From the Kit

Dash
Dash Brackets
Dash & Defrost Nut & Bolt Pack

Drilling was done on the dash, dash brackets, and body cowl during pre-mount. Use supplied screws to secure dash to brackets attached to spreader bar/A-pillars. Use supplied screws to secure the top of the dash to the cowl.

16 Install Dash Switches

From the Kit *(Switches and Lighter packed in Wire Harness Bag)*

Cigarette Lighter
Headlight Switch
Dash & Defrost Nut & Bolt Package
Flasher Switch/Indicator Light

To Buy or Salvage from Donor

Grab Handle w/Nuts & bolts

Holes were drilled during pre-mount. Mount headlight switch, emergency flasher light/switch, and cigarette lighter. Mount Grab Handle if you saved one from your donor.

17 Install Gauge and Speedometer Cable

From the Kit
Dash & Defrost Nut & Bolt Package

To Buy or Salvage from Donor
Speedometer
Super Beetle Speedometer Cable
Super Beetle Speedometer Cable Clip

From the Kit
Battery Tray
Battery Hold Down Frame
10" J-Bolts
Nut & Bolt Assembly Pkg

During pre-mount you drilled two holes in the dash on each side of the gauge hole to match the mount tabs on your gauge. Install gauge from the back using the supplied #10 phillips pan head machine screws and nylon lock nuts.

The speedometer cable requires a small clip that is not included in most new cable packages. Salvage one from your donor car or remember to get one when you buy your new super beetle speedometer cable.

18. Mount the Lights.

Tools Needed
Screwdrivers
Wrenches

To Buy
2 5-3/4" Round 3-Prong #H5006
High/Low Beam Headlight Bulbs

From the Kit
Lights (In cardboard Light Box in kit)
Lights Nuts & Bolts Assembly Pkg.
Headlight Support Frames
Headlight Rings

A Front Turn Signals

Mounting holes are predrilled. A gasket is included that fits between the body and the base. Amber lens attaches with 2 screws. Feed wiring harness wires through the rubber grommet in the base so that the connections between the light wires and harness wires are protected by the lens.

B. Front Marker Lights

Amber lights are sealed units that snap into mounting brackets. Brackets screw into predrilled holes.

C. Rear Marker Lights

Red lights are sealed units that snap into mounting brackets. Brackets screw into predrilled holes.

D. Back Up Lights

Cut outs are done for you. Fit rubber mounting grommets into cut outs then work in the round sealed lights. Lubrication eases this task.

E. Stop/Turn/Tail Light:

Cut outs are done for you. Fit rubber mounting grommets into cut outs then work in the rectangular red sealed lights. Lubrication eases this task.

F. Headlights

Refer to diagram in Figure 37

1.) Pre-assemble the headlamp Support Frame, Headlamp, and Retaining Ring. Line up the 3 notches on the Headlamp and Support Frame. Slip retaining ring over headlamp and line up the three small screw holes. Use the 8-32 x 3/8" screws provided to secure the three pieces together.

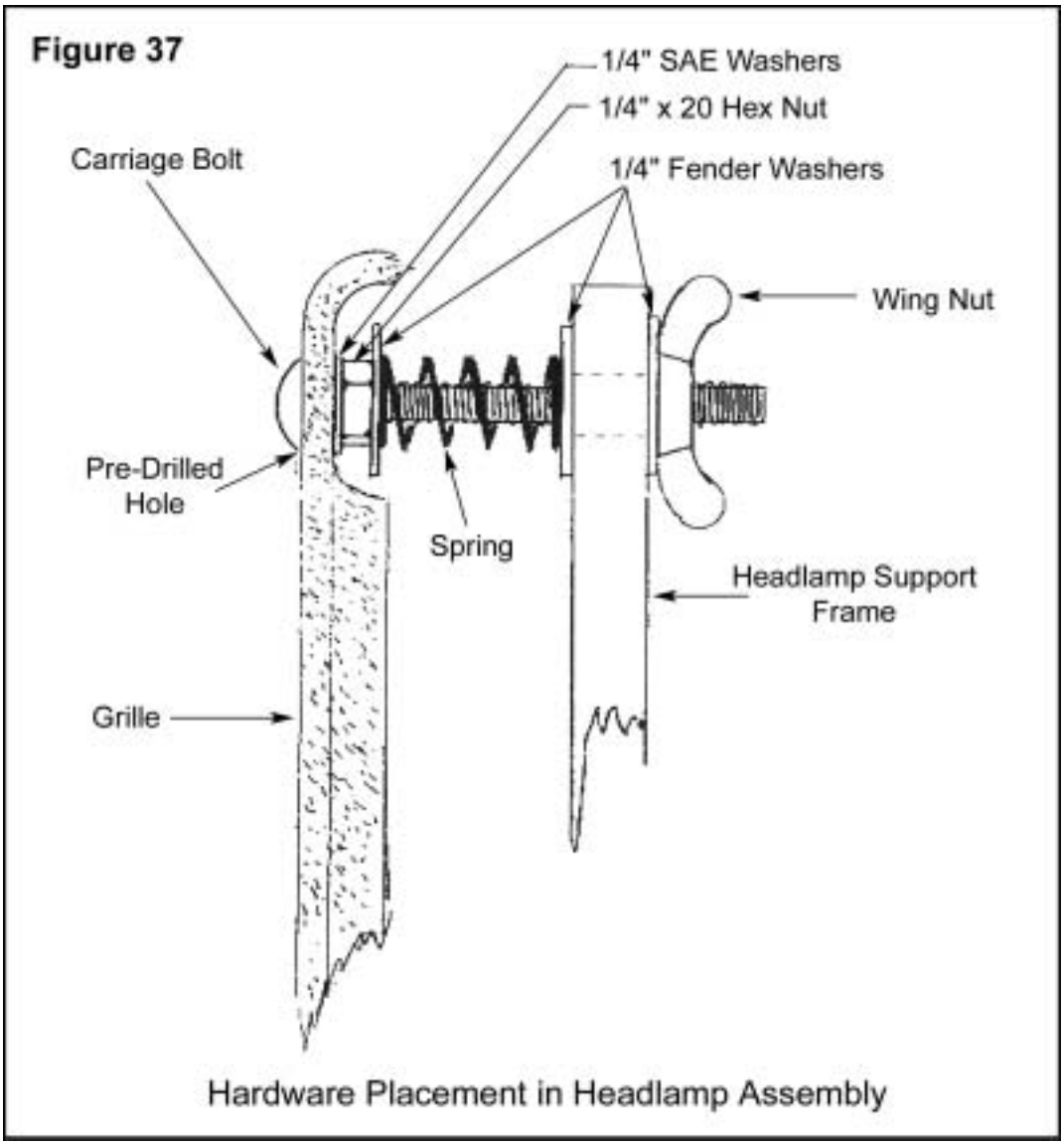
2.) Place carriage bolts through the 4 holes in the body by each headlamp opening. Use one 1/4" SAE washer and one 1/4"-20 hex nut to secure carriage bolts to body creating 8 fixed studs.

3.) On each stud place a fender washer, spring, and fender washer in that order. Refer to diagram.

4.) Place Headlamp Assembly over studs making sure that the top of the headlamp is actually on top.

5.) Put one fender washer and nylon wing nut on each stud and secure the assembly in place. Tighten wing nuts to adjust the headlamp to desired depth and angle.

Figure 37



Hardware Placement in Headlamp Assembly

19. Install Battery Tray & Battery

Tools Needed
Drill & Bits

To Buy (or salvage from donor)
Battery
Battery Cables

From the Kit
Gas Tank Nut & Bolt Package
Pkg Gasket material

The tray mounts on the rear frame rail of the body subframe behind the rear seat on the passenger side. Position the tray on the rear frame to bumper strut. Drill Holes and secure tray in place using the provided 5/16"-18 x 2" Hex Cap Screws, lock nuts, and washers.

Secure battery to tray using the hold down frame and J-bolts provided, following the instructions on the packages.

Battery is installed after the wiring harness to leave more room to access the rear lights during wiring installation.

20. Mount Horn

The horn can be attached directly to any of the available mounting points on the VW front beam suspension. The horn can be salvaged from your donor or purchased new.

21. Steering wheel

After the column is wired, if the steering wheel has been removed, or a custom one is going on the car, it should be installed at this time..

22. Gas Tank

Tools Needed
Drill
Screwdriver
Utility Knife

To Buy or salvage from Donor
Early Style Gas Tank
Gas Tank Sending Unit
Gas Cap
Neoprene Gas Hose and Clamp

From the Kit
Gas Tank Nut & Bolt Package
Pkg gasket Material

The Wombat requires an early style gas tank. Before the tank is installed, replace or clean the in-tank fuel screen. A nice touch is to paint the exterior of the tank with satin black. You may have drilled mount holes during the pre-mount.

A Outline the bottom edge of the tank, under the flanges, where it will contact the body with the gasket material.

B Attach a length of neoprene gas hose to bottom of tank and secure with a hose clamp. Attach length of fuel tube to vent fitting.

C Place the tank in the opening. Secure using the metal restraining clamps salvaged from donor or fabricated and 5/16" bolts supplied with the kit.

D Hook up the sending unit.

23. Hood & Hood Support Rod

Tools Needed
- Drill
- #10 Phillips Bit
- Utility Knife

To Buy
- 3M Spray Undercoating

From the Kit
- Hood Support Rod
- Hood
- 2 Hood Hinges, 4 Hinge Butt Gaskets, 2 Hinge Strap Gaskets
- 2 Rubber Hood Latches
- Hood Nut & Bolt Package

If desired, undercoat or paint the bottom of the hood before installation. Hole for the hood support rod may have been drilled during pre-mount.

Install the hood support rod on the drivers side of the trunk area using the 2 ¼" nuts and 2 washers supplied. Fit the plastic end cap on the hood support rod.

The holes for the hinges have been predrilled in both the body and hood. Mount the hinge (short side) to the body first, using the long oval head phillips machine screws (1-1/2") and 2 butt gaskets. Then mount the hood to the hinges using the short (¾") #10 oval head screws and strap gaskets.

The rubber hold down latches mount in the predrilled holes with #10 x ¾"pan head machine screws.

24. Install Wiper Motors in Windshield Frame

Holes were drilled in the windshield frame during pre-mount.

A The shafts of the wiper motors may be shortened for a cleaner look:

1) Place a rubber washer on the shaft then position wiper motor in place with the shaft through the hole in the window frame. Place second rubber washer, metal trim piece, and nut on the shaft. Tighten the nut down..
2) Count 4 threads out from the nut and mark this as the cutting location. Remove wiper motor from windshield frame.
3) Run the nut only back onto the shaft. Now cut off only the outer threaded housing of the shaft at the mark. This can be cut with either a saw or a small tubing cutter. Be careful not to cut the smooth inner shaft.
4) Now cut off an equal amount of the inner shaft so that it again protrudes 3/4" from the threaded outer housing..
5) Clean up the threaded shaft by backing off the nut.

B. Mount the wiper motors to the windshield frame with the shafts through the hole predrilled before paint using the washers, trim piece and nut provided in the wiper kit.

C. Mount the wiper arms onto the shaft.

D. Secure the wiper motors to the Windshield Frame with #10 phillips pan head self-tapping screws. Drill pilot holes with 1/8" bit.

E. Run wires along the top support frame, securing with zip ties, to connect to the wiper motors.

25. Front Bumper & Brushguard

Tools Needed
- Wrench & Socket Set
- One helper

From the Kit
- Front Bumper
- Front Bumper Brackets, Left & Right
- Brushguard
- Front Bumper & Brushguard Nut & Bolt Package

Holes were drilled during pre-mount.

A. Mount Front Bumper Brackets

Mount the Left and Right Front Bumper Brackets to the Angle Beam one side at a time using provided bolts. DO NOT REMOVE BOTH SIDES AT ONCE OR THE AXLE BEAM WILL DETACH ITSELF

B. Attach bumper to bracket using bolts supplied with your kit.

C. Attach brushguard to bumper using bolts supplied with the kit.

26. Exhaust System

We recommend our optional custom exhaust system (muffler, exhaust pipes and hangers) designed to be used with a Baja header. See Appendix F.

We used an exhaust header: Thunderbird #4224 from Autosport: 1-800-344-2847

We suggest that you may want to sand lightly and paint black the muffler and exhaust pipes using a paint designed for barbecues. This looks good and prevents corrosion.

When installing the muffler adjust/rotate it in position to give maximum clearance from the body subframe on one side and the engine valve cover on the other. Leave enough clearance to service the valves.

27. Mount Tire Carrier

Tools Needed
- Wrench & Socket Set
- Scissors
- Utility Knife
- Marker

From the Kit
- Tire Carrier
- Hinge Bracket
- Pin Bracket
- Lock Pin
- Tire Carrier Protective Vinyl
- Tire Rack Nut & Bolt Package

Holes were drilled during the test-fit before paint.

Trace the bases of the pin and hinge brackets on the paper side of the self-adhesive protective vinyl. Cut out and apply to the brackets. This will help protect the paint surface of your Wombat. Alternatively, apply the vinyl to the body rather than the bracket.

Mount the tire rack hinge and pin brackets in the predrilled holes using the provided bolts. Mount the tire rack to the hinge bracket using the 1/2" x 2-3/4" Hex Cap Screws, nuts, and washers provided. Close the tire rack and secure with the lock pin.

28. Rear Bumper

Tools Needed
- Wrench & Socket Set
- Marker

From the Kit
- Rear Bumper
- Rear Bumper Brackets (2)
- Rear Bumper Nut & Bolt Package

Holes were drilled during pre-mount before paint. Insert brackets into tubes on body subframe. Bolt Bumper into place using provided bolts.

Adjust Bumper to Body distance so that it lines up with the tire carrier, then secure brackets to frame using supplied bolts.

29. Mount & Hook Up License Bracket with Light

Holes may have been drilled during pre-mount. Mount the license bracket with light on the passenger side of the rear bumper. Use the pan head machine screws & nuts included in the kit. The bracket comes with a small bag of fasteners to fasten the license plate to the bracket

30. Install Seat Mounts

Place your seats in the car, and determine where the mounting hardware will mount. Different seat companies use different systems, so follow their directions for proper installation. Any drilling that is to be done should be done before carpet is installed–***drilling through carpet is a very bad idea*.**

31. Carpet/Floor Covering

You will have to decide on what type of interior you want. Possibilities include spray on bedliner, custom rubber mats, or a custom carpet. If you choose to use carpet or mats glued in place, consider securing with velcro in areas where you may wish later access.

32. Rear Bench Area

This area may be used for a rear seat, storage box, audio system, etc.

You can have a local upholstery shop make up a seat for you—vinyl and foam over plywood backing. It may be secured permanently with screws or be removable with velcro. If you carpet over the rear bench area you can apply the stiff side of velcro to the back of your seats and it will adhere to the carpet. Or use self-adhesive velcro on the rear bench area.

33. Mount Seat Belts

34. Running Boards

Trim and attach self-adhesive anti-slip tape to running boards.

35. Grille Decals

Your kit contains two 2" x 2' strips of self-adhesive black vinyl textured tape. Trim to fit in your grille. Remove backing and apply to your clean, painted grille. Be careful, the adhesive is strong and will stay stuck in the first place it touches.

36. Wombat Decals

Your decals consist of three layers.

- Top layer: transfer tape
- Middle layer: the decal
- Bottom layer: wax backing paper.

You will need:

Wombat Decals Cleaning Materials
Scissors
Masking Tape

A. Clean application areas.

Clean the surface of your Wombat where you have determined to locate the decal. (Note: We recommend a surface temperature of 55 degrees or more for decal applications)

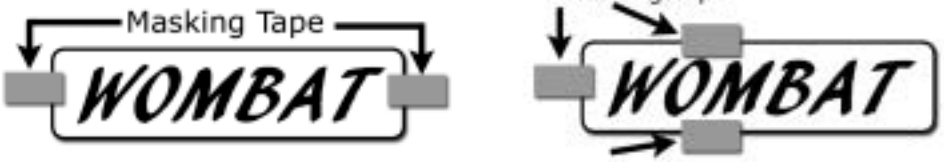
Suggested Locations:

- Centered on nose section,
- Each front quarter panel in front of door openings
- Rear panel, on either side of engine.

B. Carefully cut apart your decals.

C. Position and Tape in place.

Use masking tape to secure decal (as it came with paper back still on) to surface. Position carefully, measuring as necessary.



D. Secure one side of decal

Once in position, tape half of decal securely to the surface. Remove positioning tape from other half.

E. Separate backing paper from free half

Peel transfer tape and decal from the backing paper on the unsecured side. Be sure to watch out so that the decal doesn't come off with the under layer. If it does, work backwards and try peeling it at a sharper angle. Cut away wax paper backing only and discard. This exposes the sticky back of the decal.

F. Smooth free half of decal into place.

Using your thumb, rub transfer tape and decal to surface. Smooth from the center out to the edges.

G. Remove remaining masking tape.

Remove the masking tape and wax paper backing form the other side. Rub transfer tape and decal to surface smoothing from center out to edges..

H. Remove transfer tape.

Slowly peel up the transfer tape. Make sure none of the decal peels up with it. If it does, work backwards and try peeling the tape off at a sharper angle. The decal will stay on the surface.

37. Side Mirrors

Holes were drilled during pre-mount. The mirrors may mount to the sides of the windshield frame, on the body forward of the A-Pillar, or on the optional half-door frame. Secure mirrors to location of choice using supplied bolts.

38. Options

A. Luggage Rack *See Appendix G.*

B. Soft Half-Doors *See Appendix H.*

C. Soft Top *See Appendix I.*

D. Soft Windows for Half-Doors *See Appendix J.*

39. Mount Finish Tires & Wheels

40. Apply Patent Protection Sticker in the Trunk/Gas Tank Area.

41. Test Drive

Appendix A: Kit Contents

Fiberglass

- Body, *with installed Steel Subframe, Steering Bracket, and Front Splash/Kick Panel. Necessary cutouts performed, miscellaneous mount points predrilled, all post-mold preparation performed, & sanded.*
- Dash
- Hood
- Windshield Frame *with Steel Subframe*

Steel

- Brushguard
- Front Bumper
- Hood Support Rod
- Mounting Hardware:
  - Dash Bracket Angle Iron (2)
  - Front Bumper Left Side Bracket
  - Front Bumper Right Side Bracket
  - Rear Bumper Mount Brackets (2)
  - Steering Column Bracket Flat Iron
  - Tire Carrier Hinge Bracket
  - Tire Carrier Pin Bracket
  - Windshield Brackets (2)
- Rear Bumper
- Spreader Bar
- Tire Carrier
- Top Support Frame:
  - Left Side
  - Right Side
  - Center Bars (2)

Body Mount Tools & Supplies

- Front Clamping Fixture *(return for deposit)*
- Rear Clamping Fixture *(return for deposit)*
- Epoxy Gun *(return for deposit)*
- Plexus Epoxy (1 tube)
- Mixing Tips (2)

Plastic

- Defrost Ball Vents (2)
- Defrost Ball Vent nozzles (2)
- Defrost Diffusers (2)
- Defrost Duct Hose
- Windshield Hinge Spacer Plates (2)

Lights& Electrical

Amber Front Turn Signals w/gasket & screws (2)
Sealed Small Amber Front Marker Lights (2)
Sealed Small Red Rear Marker Lights (2)
Black Marker Light Mounting Brackets (4)
Sealed 2-1/2" Round Clear Back Up Lights (2)
Black Recessed Mount 2-1/2" Grommets for Back Up Lights (2)
Large Red Stop/Turn/Tail Lights w/Black Recessed Mount Grommets (2)
Red Reflectors, 2-3/8" Round, w/Self Adhesive Backing (2)
Amber Reflectors, 2-3/8" Round, w/Self Adhesive Backing (2)
License Bracket w/ Light (includes License Plate Fastener Pkg.)
Headlamp Frames (2)
Headlamp Rings (2)
Wiring Harness *includes headlight switch, emergency flasher light/switch, cigarette lighter.*

Other Hardware & Parts

Black Powdercoat Flush Hood Hinge (Pair: 1 Left Side Pin & 1 Right Side Pin)
Black Powdercoat Flush Windshield Hinge (Pair: 1 Left Side Pin & 1 Right Side Pin)
Black Textured Vinyl Self-Adhesive Anti-Slip Tape for Running Boards (2 4' x 6" Strips)
Gas Tank Gasket
Grille Decal Kit (Self-Adhesive Black Textured Vinyl)
Hood Support Rod
Rubber Hood Latches (2)
Steering Column Bracket U-Clamps (2)
Tire Carrier Pivot Pin
Tire Carrier Lock Pin
Tire Carrier Mount Protective Vinyl (1 10" x 6" Self-Adhesive Black Textured Vinyl)
Windshield Gasket

Nuts & Bolts Assembly Packages

Battery Tray
Body
Dash & Defrost
Front Bumper & Brushguard
Gas Tank
Headlamp
Lights
Miscellaneous
Rear Bumper
Tire Rack
Hood
Top Support Frame
Windshield
Wiring Harness

Custom Exhaust System Option *For Use With Baja Header, Not Supplied*

- Muffler
- Straight Tail Pipe
- 2-Bend Primary Exhaust Pipe
- 1-Bend Secondary Exhaust Pipe
- Clamps, 2" (3)
- Clamps, 1-3/4" (1)
- L-Bracket
- Rubber Strap Hanger
- Flange
- Flange Gasket
- Exhaust Nuts & Bolts Assembly Pkg.

Rear Deck Luggage Rack Option

- Luggage Rack
- Luggage Rack Nuts & Bolts Assembly Pkg.

Soft Half-Doors Option

- Half-Door Frames (Left & Right)
- Half-Door Skins (Left & Right)
- Half-Door Top Bar
- Striker Plates and Strikers (2)
- Black Powdercoat Flush Door Hinges w/Removable Pins (4)
- Stainless Steel Paddle Handle Door Latches (2)
- Soft B-Pillar Filler Panels (Left & Right)
- Snap Kit
- Velcro Strip
- Half-Door Nut & Bolt Assembly Pkg.

Soft Top Option

- Awning Rail
- Black Nylon Rear Bow Eye End (2)
- Black Nylon Rear Bow Deck Mounts (2)
- Center Top Support Bow
- Rear Top Support Bow
- Snap Kit
- Soft Top
- Soft Top Nut & Bolt Assembly Pkg.

Soft Windows for Half-Doors Option

- Skinned Soft Window Frames (Left & Right)
- Wind Deflector Kit
- Soft Window Nut & Bolt Assembly Pkg.

Appendix B: Nut & Bolt Assembly Pack Contents

Battery Tray

Position	Item	Qty
Battery Tray to Body Subframe	5/16"-18 Nylon Insert Lock Nut, Zinc	2
Battery Tray to Body Subframe	5/16"-18 x 1-1/2" Carriage Screws, Zinc	2
Battery Tray to Body Subframe	5/16" SAE Flat Washers, Zinc	4

Body Mount

Position	Item	Qty
Frame to Chassis	3/8"-16 Nylon Insert Lock Nut, Zinc	4
Frame to Chassis	3/8"-16 x 2" Hex Head Bolt, Zinc Grade 5	4
Frame to Chassis	3/8" SAE Flat Washer, Zinc	8
Frame to Rear Chassis	10mm Lock Washer, Zinc	2
Frame to Rear Chassis	10mm SAE Flat Washer, Zinc	2
Frame to Rear Chassis	10mm x 35mm x 1.50 pitch Hex Head Bolt, Zinc	2
Sub Frame Yoke to Body	1/4"-20 Nylon Insert Lock Nut, Zinc	5
Sub Frame Yoke to Body	1/4"-20 x 1" Hex Head Bolt, Zinc Grade 5	5
Sub Frame Yoke to Body	1/4" Fender Washer, Zinc	5
Sub Frame Yoke to Body	1/4" SAE Flat Washer, Zinc	5

Dash & Defrost

Position	Item	Qty
Dash to Bracket	1/4"-20 Nylon Insert Lock Nut, SS	4
Dash to Bracket	1/4"-20 x 2" Phillips Pan Head Machine Screw, SS	4
Dash to Bracket	1/4" Flat Washer, SS	4
Dash to Cowl	1/4"-20 Nylon Insert Lock Nut, SS	4
Dash to Cowl	1/4"-20 x 2" Phillips Pan Head Machine Screw, SS	4
Dash to Cowl	1/4" Flat Washer, SS	4
Defrost Hose End	Nylon Locking Finishing Plug Unvented, Fits 1" ID, 1-13/64" Head Dia, Black	2
Diffusers to Body	#10-24 Nylon Insert Lock Nut, SS	4
Diffusers to Body	#10-24 x 1" Phillips Pan Head Machine Screw, SS	4
Diffusers to Body	#10 Flat Washer, SS	4
Speedometer to Dash	#10-24 Nylon Insert Lock Nut, SS	2
Speedometer to Dash	#10-24 x 3/4" Phillips Pan Head Machine Screw, SS	2
Speedometer to Dash	#10 x 5/8" Fender Washer, SS	2

Front Bumper & Brushguard

Position	Item	Qty
Brushguard to Bumper	5/16"-18 Nylon Insert Lock Nut, Zinc	2
Brushguard to Bumper	5/16"-18 x 1" Hex Head Bolt, Zinc	2
Brushguard to Bumper	5/16" SAE Flat Washer, Zinc	4
Bumper Bracket to Axle Beam	12mm Lock Washer, Zinc	4
Bumper Bracket to Axle Beam	12mm SAE Flat Washer, Zinc	4
Bumper Bracket to Axle Beam	12mm x 100mm 1.50 pitch Metric Hex Head Bolt, Zinc Grade 8.8	4
Bumper to Bracket	3/8"-16 Nylon Insert Lock Nut, Zinc	4
Bumper to Bracket	3/8"-16 x 1" Hex Head Bolt, Zinc Grade 5	4
Bumper to Bracket	3/8" SAE Flat Washer, Zinc	8

Gas Tank

Position	Item	Qty
Gas Tank to Trunk	5/16"-18 Nylon Insert Lock Nut, Zinc	4
Gas Tank to Trunk	5/16"-18 x 1-1/2" Hex Head Bolt, Zinc Grade 5	4
Gas Tank to Trunk	5/16" SAE Flat Washer, Zinc	4

Headlamp

Position	Item	Qty
Headlamp Assembly to Stud	1/4"-20 Nylon Wing Nut	8
Headlamp Assembly to Stud	1-1/2", 3/8" OD, .O28 Wire Dia. Closed End Compression Spring	8
Headlamp Assembly to Stud	1/4" x 1" Fender Washer, Zinc	24
Headlamp Ring to Support Frame	#8-32 x 3/8" Phillips Pan Head Thread Cutting Screw	6
Headlamp Stud to Body	1/4"-20 Hex Nut, Zinc	8
Headlamp Stud to Body	1/4"-20 x 2-1/2" Carriage Screw, SS	8
Headlamp Stud to Body	1/4" SAE Flat Washer, Zinc	8

Hood

Position	Item	Qty
Hood Hinge & Gasket to Body	#10-24 Nylon Insert Lock Nut, SS	6
Hood Hinge & Gasket to Body	#10-24 x 1" Phillips Oval Head Machine Screw, SS	6
Hood Hinge & Gasket to Body	#10 Flat Washer, SS	6
Hood Hinge & Gasket to Hood	#10-24 Nylon Insert Lock Nut, SS	6
Hood Hinge & Gasket to Hood	#10-24 x 7/8" Phillips Oval Head Machine Screw, SS	6
Hood Hinge & Gasket to Hood	#10 Flat Washer, SS	6
Hood Support Rod	1/4" Rubber Rod End Caps	1
Hood Support Rod to Body	1/4"-20 Nylon Insert Lock Nut, Zinc	2
Hood Support Rod to Body	1/4" SAE Flat Washer, Zinc	2
Rubber Hood Latch to Body	#10-24 x 3/4" Phillips Pan Head Machine Screw, SS	2
Rubber Hood Latch to Body	#10 Flat Washer, SS	2
Rubber Hood Latch to Hood	#10-24 x 3/4" Phillips Pan Head Machine Screw, SS	4
Rubber Hood Latch to Hood	#10 Flat Washer, SS	4

Lights

Position	Item	Qty
Front Turn Signal Lights to Body	#10-24 Nylon Insert Lock Nut, SS	8
Front Turn Signal Lights to Body	#10-24 x 3/4" Phillips Pan Head Machine Screw, SS	8
Front Turn Signal Lights to Body	#10 Fender Washer, SS	8
License Bracket to Rear Bumper	#10-24 Nylon Insert Lock Nut, SS	2
License Bracket to Rear Bumper	#10-24 x 3/4" Phillips Pan Head Machine Screw, SS	2
Marker Light Brackets to Body	#10-24 Nylon Insert Lock Nut, SS	8
Marker Light Brackets to Body	#10-24 x 3/4" Phillips Pan Head Machine Screw, SS	8
Marker Light Brackets to Body	#10 Fender Washer, SS	8

Miscellaneous

Position	Item	Qty
Side Mirrors to Body/Windshield Frame	1/4"-20 x 3/4" Phillips Oval Head Machine Screw, SS	4
Side Mirrors to Body	1/4" Flat Washers, SS	4
Side Mirrors to Body	1/4" Nylon Insert Lock Nuts, SS	4
Wiper Motors to Windshield Frame	#10-16 x 3/4" Phillips Pan Head Self-Tapping Screw	2
Wiring Harness to Steering Column	12 Contact Connector Body Plug Housing	1
Wiring Harness to Steering Column	Terminal Socket Amp Female 201-14 GA	9

Rear Bumper

Position	Item	Qty
Bracket to Frame	3/8"-16 Nylon Insert Lock Nut, Zinc	2
Bracket to Frame	3/8"-16 x 2-1/2" Hex Head Bolt, Zinc Grade 5	2
Bracket to Frame	3/8" SAE Flat Washer, Zinc	2
Bumper to Bracket	3/8"-16 Nylon Insert Lock Nut, Zinc	4
Bumper to Bracket	3/8"-16 x 1" Hex Head Bolt, Zinc Grade 5	4
Bumper to Bracket	3/8" SAE Flat Washer, Zinc	4

Tire Carrier

Position	Item	Qty
Bracket to Body	3/8"-16 Nylon Insert Lock Nut, SS	5
Bracket to Body	3/8"-16 x 2" Hex Head Bolt, SS	5
Bracket to Body	3/8" Flat Washer, SS	5
Pivot Pin	1/2"-13 Cap Nut, SS	1
Pivot Pin	1/2"-13 Nylon Insert Lock Nut, SS	1
Pivot Pin	1/2" Flat Washer, SS	2
Tire Carrier Bushing	Tire Carrier Bushing: 1-1/4 x .120 urethane bushing	4
Tire Carrier to Pin Bracket	1/2" x 2-3/4" Clevis Pin, Zinc or SS	1

Top Support Frame

Position	Item	Qty
Spreader Bar to Body/A Pillar	3/8"-16 Nylon Insert Lock Nut, SS	4
Spreader Bar to Body/A Pillar	3/8"-16 x 4" Button Head Socket Cap Screw	4
Spreader Bar to Body/A Pillar	3/8" Flat Washer, SS	4
Top Frame to Body SubFrame B Pillar	3/8"-16 Nylon Insert Lock Nut, Zinc	2
Top Frame to Body SubFrame B Pillar	3/8"-16 x 2-1/2" Hex Head Bolt, Zinc Grade 5	2
Top Frame to Body SubFrame C Pillar	3/8"-16 Nylon Insert Lock Nut, Zinc	2
Top Frame to Body SubFrame C Pillar	3/8"-16 x 2-1/2" Hex Head Bolt, Zinc Grade 5	2

Windshield

Position	Item	Qty
Bracket to Top Frame	Windshield Spacer: 1" x .095 urethane bushing	2
Bracket to Top Frame	3/8"-16 x 1-1/4" Button Head Screw, SS	2
Bracket to Top Frame	3/8" Flat Washer, SS	2
Windshield Frame to Bracket	5/16"-18 Cap Nut, SS	2
Windshield Frame to Bracket	5/16"-18 x 2" Button Head Screw, SS	2
Windshield Frame to Bracket	5/16" Flat Washer, SS	2
Windshield Hinge to Body	#10-24 Nylon Insert Lock Nut, SS	6
Windshield Hinge to Body	#10-24 x 1-1/2" Phillips Oval Head Machine Screw, SS	6
Windshield Hinge to Body	#10 Flat Washer, SS	6
Windshield Hinge to Windshield Frame	#10-24 Nylon Insert Lock Nut, SS	6
Windshield Hinge to Windshield Frame	#10-24 x 2" Phillips Oval Head Machine Screw, SS	6
Windshield Hinge to Windshield Frame	#10 Flat Washer, SS	6

Wiring Harness

Position	Item	Qty
Harness to Body/SubFrame	1/2" Adhesive Backed Clamp	5
Harness to Body/SubFrame	3/8" Adhesive Backed Clamp	5
Harness to Body/SubFrame	1/2" Nylon Cable Clamp	7
Harness to Body/SubFrame	1/4" Nylon Cable Clamp	2
Harness to Body/SubFrame	3/4" Nylon Cable Clamp	2
Harness to Body/SubFrame	3/8" Nylon Cable Clamp	4
Harness to Body/SubFrame	5/16" Nylon Cable Clamp	7
Harness to Body/SubFrame	5/8" Nylon Cable Clamp	5
Harness to Body/SubFrame	7/16" Nylon Cable Clamp	5
Harness to Body/SubFrame	5-3/4" Nylon Cable Tie	4
Cable Clamps to SubFrame	#10 Hex Head Self Drilling Screws	20
Cable Clamps to Firewall	#10-24 x 3/4" Phillips Pan Head Machine Screw, SS	8
Cable Clamps to Firewall	#10 Flat Washer, SS	8
Cable Clamps to Firewall	#10-24 Nylon Insert Lock Nut, SS	8

Custom Exhaust System Option

Position	Item	Qty
Flange & Gasket to Header	3/8"-16 Hex Nut, Zinc	3
Flange & Gasket to Header	3/8"-16 x 1" Hex Head Bolt, Zinc Grade 5	3
Rubber Strap Hanger to Subframe	5/16"-18 Hex Nut, Zinc	1
Rubber Strap Hanger to Subframe	5/16"-18 x 2-1/2" Hex Head Bolt, Zinc Grade 5	1
Rubber Strap Hanger to Subframe	5/16" x 1-1/4" Fender Washer, Zinc	2
L-Bracket to Rubber Strap Hanger	5/16"-18 Hex Nut, Zinc	1
L-Bracket to Rubber Strap Hanger	5/16"-18 x 1-1/2" Hex Head Bolt, Zinc Grade 5	1
L-Bracket to Rubber Strap Hanger	5/16" x 1-1/4" Fender Washer, Zinc	2
Muffler to L-Bracket	5/16"-18 Hex Nut, Zinc	1
Muffler to L-Bracket	5/16"-18 x 1" Hex Head Bolt, Zinc	1
Muffler to L-Bracket	5/16" x 1-1/4" Fender Washer, Zinc	2

Rear Deck Luggage Rack Option

Position	Item	Qty
Luggage Rack to Body	3/8"-16 x 2" Hex Head Bolt, Zinc Grade 5	4
Luggage Rack to Body	3/8" SAE Flat Washer, Zinc	4
Luggage Rack to Body	3/8" Rubber Washer	4
Luggage Rack to Body	3/8" Split Lock Washer, Zinc	4

Soft Half-Doors Option

Position	Item	Qty
Door Hinge to Body	#10-16 x 1-1/4" Phillips Oval Head Self Drilling Screw	12
Door Hinge to Door	#10-24 Nylon Insert Lock Nut SS	12
Door Hinge to Door	#10-24 x 5/8" Phillips Oval Head Machine Screw SS	12
Door Hinge to Door	#10 Flat Washer, SS	12
Mirrors to Soft Half-Door Frame	1/4"-20 Nylon Insert Lock Nut, SS	4
Mirrors to Soft Half-Door Frame	1/4"-20 x 3/4" Phillips Oval Head Machine Screw, SS	4
Mirrors to Soft Half-Door Frame	1/4" Flat Washer, SS	4
Paddle Latch to Door	#10-24 Nylon Insert Lock Nut SS	8
Paddle Latch to Door	#10-24 x 1/2" Phillips Pan Head Machine Screw SS	8
Paddle Latch to Door	#10 Flat Washer, SS	8
Top Bar to Half-Door Frame	3/8"-16 x 3/4" Hex Head Bolt, Zinc	4
Striker Plate to B-Pillar	1/4"-20 x 1" Phillips Oval Head Machine Screw, SS	4

Soft Top Option

Position	Item	Qty
Awning Rail to Windshield Frame	#6 x 1/2" Phillips Pan Head Self-Tapping Screw, Zinc	7
Center Bow to Top Support Bars	#6 x 1/2" Phillips Pan Head Self-Tapping Screw, Zinc	4
Deck Mount to C-Pillars	#10-16 x 3/4" Phillips Oval Head Self Drilling Screw	4

Soft Windows for Half-Doors Option

Position	Item	Qty
Soft Window Frame to Half Door	1/4"-20 x 3/4" Phillips Pan Head Machine Screw, Zinc	4
Soft Window Frame to Half-Door	1/4"-20 Hex Nut, Zinc	4
Soft Window Frame to Half-Door	1/4" SAE Flat Washer, Zinc	4
Wind Deflectors to Windshield Frame	#10-16 x 3/4" Phillips Oval Head Self Drilling Screw	6

ITW Plexus | Material Safety Data Sheet
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MA 300 ADHESIVE

Last revised: 11/16/99
Printed: 02/18/01

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Chemical family Acrylate

General information: Adhesive

MANUFACTURER

ITW Plexus
30 Endicott St.
Danvers, Massachusetts 01923

EMERGENCY INFORMATION

Emergency telephone number
(CHEMTREC) (800) 424-9300
Other calls: (978) 777-1100

2. COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS CONSTITUENTS

Constituent	Abbr.	CAS No.	Weight percent	Exposure limits ACGIH TLV	Exposure limits OSHA PEL	Exposure limits Other Limits
Methacrylic acid	MAA	79414	5-15	20 ppm	20 ppm	4 ppm (Manufact) (urer)
Methyl Methacrylate Monomer	MMA	80626	50-60	100 ppm	100 ppm	100 (Canada)

"TLV" means the Threshold Limit Value exposure (eight-hour, time-weighted average, unless otherwise noted) as established by the American Conference of Governmental Industrial Hygienists. "STEL" indicates a short-term exposure limit. "PEL" indicates the OSHA Permissible Exposure Limit. "n/e" indicates that no exposure limit has been established. An asterisk (*) indicates a substance whose identity is a trade secret of our supplier and unknown to us.

3. HAZARDS IDENTIFICATION

Emergency Overview

Appearance, physical form, odor: Off-white paste with varied fragrant odor.

WARNING! Flammable. Overexposure to liquid, mist or vapor may have the following effects: EYE AND SKIN EXPOSURE: Irritant and potential skin sensitizer. May cause redness, itching, burning, rash. RESPIRATORY EXPOSURE: Irritant. May cause headache, nausea, dizziness, fatigue, drowsiness. Avoid breathing vapor. Use with adequate ventilation or use proper respiratory equipment. Wash thoroughly after handling. Do not take internally. Keep away from heat, sparks, open flames.

Potential health effects:

Primary routes of exposure:

■ Skin contact ■ Skin absorption ■ Eye contact ■ Inhalation □ Ingestion

Symptoms of acute overexposure:

Skin:
May cause irritation and sensitization. May be absorbed through the skin.

Eyes:
Liquid and vapors causes moderate irritation. May cause corneal damage.

Inhalation:

High concentration is irritant to respiratory tract and may cause dizziness, headache, and anaesthetic effects.

Ingestion:

Causes irritation, a burning sensation of the mouth, throat and gastrointestinal tract and abdominal pain.

Effects of chronic overexposure:

Prolonged exposure may lead to kidney, lung, heart and liver damage.

Medical conditions which may be aggravated by exposure:
Preexisting eye, lung and skin disorders.

Carcinogenicity -- OSHA regulated: No ACGIH: No National Toxicology Program: No
International Agency for Research on Cancer: No
Cancer-suspect constituent(s):

Other effects:

Developmental toxicity observed in animal tests with MMA at levels toxic to the mother.

4. FIRST AID MEASURES

First aid for eyes:

Flush eye with clean water for at least 15 minutes while gently holding eyelids open. Get immediate medical attention.

First aid for skin:

Immediately remove contaminated clothing and excess contaminant. Flush skin with water. Wash thoroughly with warm soap and water. Consult a physician if irritation develops.

First aid for inhalation:

Remove patient to fresh air. Administer oxygen if breathing is difficult. Get medical attention if symptoms persist.

First aid for ingestion:

Do NOT induce vomiting. Give two glasses of water to dilute if patient is conscious. Get medical attention.

5. FIRE FIGHTING MEASURES

Extinguishing media:
☐ Water ■ Carbon dioxide ■ Dry chemical ■ Foam ☐ Alcohol foam

Flash Point (°F): 50 Method: TCC

Explosive limits in air -- Lower: 2.1 Upper: 12.5

Special firefighting procedures:

Keep personnel removed and upwind from fire. Wear self contained breathing apparatus and full protective equipment. Cool tank with water spray. Fight fire from a distance as the heat may rupture the tanks.

Unusual fire and explosion hazards:

Sealed containers at elevated temperatures may rupture due to polymerization. Vapors are heavier than air and may travel to ignition sources and flash back.

Hazardous products of combustion:
Carbon monoxide, carbon dioxide and smoke.

6. ACCIDENTAL RELEASE MEASURES

Spill control:

Avoid personal contact. Eliminate ignition sources. Ventilate area.

Containment:

Dike, contain and absorb with clay, sand or other suitable non-combustible material.

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Cleanup:

For large spills, pump to storage/salvage vessels. Soak up residue with an absorbent such as clay, sand, or other suitable material and dispose of properly (RCRA hazardous waste). Add inhibitor to prevent polymerization.

Special procedures:

Prevent spill from entering drainage/sewer systems, waterways, and surface waters. Use non-sparking tools

7. HANDLING AND STORAGE

Handling precautions:

Do not breathe vapor or mist. Do not get in eyes, on skin or clothing. Wash thoroughly after handling. Close container after each use. Ground container when pouring. Keep away from heat, flame or sparks. Use non-sparking tools.

Storage precautions:

Keep in a cool place, without direct exposure to sunlight. Keep container tightly closed and otherwise in accordance with NFPA regulations. Maintain air space in storage containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls

Ventilation:

Use ventilation that is adequate to keep employee exposure to airborne concentrations below exposure limits.

Other engineering controls:

Keep container tightly closed. Observe label precautions. Have emergency eyewash and safety shower present.

Personal protective equipment

Eye and face protection:

Wear safety glasses. Wear coverall chemical splash goggles and face shield when eye and face contact is possible.

Skin Protection:

Wear impervious butyl rubber clothing as appropriate to prevent contact.

Respiratory protection:

A NIOSH/MSHA air purifying respirator with an organic vapor cartridge may be permissible, however use a positive pressure air supplied respirator if there is any potential for uncontrolled release, or unknown exposure levels.

9. PHYSICAL AND CHEMICAL PROPERTIES

Specific gravity:	1.03		Boiling point (°F):	213
Melting point (°F):	n/d		Vapor density (air = 1):	> 1
Vapor pressure (mmHg):	28 mm Hg	at 68 °F	Evaporation rate (butyl acetate = 1):	3
VOC (grams/liter):	< 50 mixed		Solubility in water:	n/d
Percent volatile by volume:	n/d		pH (5% solution or slurry in water):	3.0-3.5
Percent solids by weight:	n/d			0

10. STABILITY AND REACTIVITY

This product is chemically stable. Hazardous polymerization may occur.

Conditions to avoid:

Unstable with heat, direct sunlight, inert gas blanketing, ultraviolet radiation.

Incompatible materials:

Incompatible with strong oxidizing agents and reducing agents, acids and bases. Material is a strong solvent and can soften paint and rubber.

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Hazardous decomposition products:

Carbon monoxide, carbon dioxide and smoke.

Conditions of hazardous polymerization:

Excessive heat, storage in the absence of inhibitor and inadvertant addition of catalyst.

11. TOXICOLOGICAL INFORMATION

Acute oral effects:

LD50 (rat): > 2000 mg/kg estimate

Toxicity of MMA exposed near LD50 include blood in the urine and liver changes.

Acute dermal effects

LD50 (rabbit): > 1700 mg/kg estimate

Dermatitis.

Acute inhalation effects:

LC50 (rat): No data available. in 4 hours

Toxicity of MMA at 8-100 times TLV from respiratory and gastrointestional irritation, lung damage, nervous system effects and blood in urine.

Eye irritation:

Not available.

Subchronic effects

Inhalation: Repeated exposure of MMA at 5-100 times the TLV include lung damage, pulmonary irritation, liver changes, eye irritation, nasal tissue changes, incoordination and upper respiratory irritation. Ingestion: Liver and kidney affects with altered function in both organs. Skin permeation may occur.

Chronic effects

Inhalation: long term exposure of MMA caused inflammation of the nasal cavity, changes in nasal sensory cells and decreased body weight.
Ingestion: Can cause decreased body weight, and increased kidney weight

Carcinogenicity, teratogenicity, and mutagenicity:

Possible reproductive hazard based on animal data.

Toxicological information on hazardous chemical constituents of this product:

Constituent	Oral LD50 (rat)	Dermal LD50 (rabbit)	Inhalation LC50 (rat, 4 hours)
Methacrylic acid	1060 mg/kg	500 mg/kg	>1300 ppm
Methyl Methacrylate Monomer	7872 mg/kg	> 5000 mg/kg	7093 ppm

12. ECOLOGICAL INFORMATION

Ecotoxicity:

MMA has: estimate of 96 hour median threshold limit: 100-1,000 ppm; 96 hour LC50, fathead minnow: 150 ppm; 96 hour LC50, bluegill sunfish: 232 ppm. MAA has: LC50 = 85mg/l, 96 hr, Rainbow trout (slightly toxic); EC50 > 130 mg/l, 48 hr, Daphnia magna (practically non-toxic); EC50 = 0.6 mg/l, 96 hr, Algae (highly toxic).

Mobility and persistence:

MMA is partially biodegradable in water. BOD-5 day: 0.14 g/g - 0.90 g/g; THOD : 1.92 g/g. MAA readily biodegraded (86% within 28 days) under aerobic conditions.

Environmental fate:

MMA produces high tonnage material in wholly contained systems. Liquid with moderate mobility. Sparingly soluble in water. High potential for bioaccumulation. Low mobility in soil.

13. DISPOSAL CONSIDERATIONS

Waste management recommendations:
Do not dispose of in a landfill. Incineration is the preferred method of disposal.

14. TRANSPORT INFORMATION

Proper shipping name: Adhesives

Technical name: N/A

Hazard class: 3

UN number: 1133 Packing group: II IMDG Page no.: 3174

Emergency Response Guide no.: 128

Other: Containers < 30 liters are PG III

Depending on the size and type of container, this material may be reclassified as "Consumer Commodity, ORM-D" for shipments within the United States, or as "Limited Quantity" elsewhere. Refer to the appropriate regulation.

15. REGULATORY INFORMATION

U.S. Federal Regulations

TSCA:

All ingredients of this product are listed, or are exempt from listing, on the TSCA Inventory.

The following RCRA code(s) applies to this material if it becomes waste: D001, D019

Regulatory status of hazardous chemical constituents of this product:

Constituent	Extremely Hazardous*	Toxic Chemical**	CERCLA RQ (lbs)	TSCA 12B Expor t Notification
Methacrylic acid	No	No	No	Not required
Methyl Methacrylate Monomer	No	Yes	No	Required

*Consult the appropriate regulations for emergency planning and release reporting requirements for substances on the SARA Section 301 Extremely Hazardous Substances list.
**Substances for which the "Toxic Chemical" column is marked "Yes" are on the SARA Section 313 list of Toxic Chemicals, for which release reporting may be required. Consult the appropriate regulations for specific requirements.

Classification of this material for SARA Section 312 hazardous materials inventory reporting:
Immediate health hazard Delayed health hazard Fire hazard Reactivity hazard

Regulatory notes:
In normal use, the methyl methacrylate in this product is polymerized during cure. For purposes of air quality regulations, the maximum amount of VOC (i.e. MMA) emitted is negligible (less than 5%). Actual emissions are a function of substrate and process and should be considered on an individual basis.

Canadian regulations

WHMIS hazard class(es): B2; D2B

16. OTHER INFORMATION

Hazardous Materials Information System (HMIS) ratings:

Health	Flammability	Reactivity
2*	3	2

The information and recommendations in this document are based on the best information available to us at the time of preparation, but we make no other warrenty, express or implied, as to its correctness or completeness, or as to the results of reliance on this document.

Appendix D: Epoxy Gun Instructions

Simpson Brand Epoxy Tie Tool Model # EDT22A

Manual Dispensing Tool for 22 oz. Cartridges –The EDT22A features a molded nylon reinforced body for ultimate strength and light weight. The handle is positioned under the cartridge for balance and ease of use. The drive mechanism is released by pushing forward on the drive handle. Cartridges "snap-lock" into position.

http://www.simpsonanchors.com/catalog/adhesives/accs/adhesive_tools.html

INSTRUCTION SHEET

EDT22A
Dispensing Tool

RECALIBRATION and TROUBLESHOOTING

1. General Instructions for use

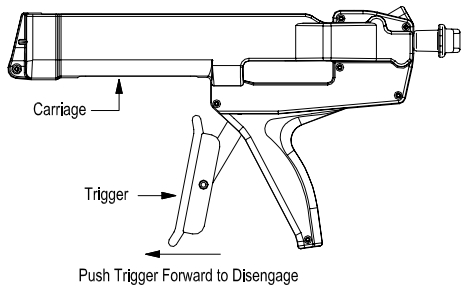
1. Retract pistons – push trigger forward and pull on retracting handle at the rear of the tool.

2. After preparing cartridge, insert cartridge into carriage. Make sure cartridge is aligned with pistons and sets level in carriage.

3. Dispense adhesive by squeezing trigger. Operation: Squeeze trigger. Hold for 2-3 seconds, release and repeat. Tool can be damaged by applying too much pressure! This can also cause cartridge to deform resulting in adhesive blowing past wipers.

4. To release pressure, push trigger forward. This will stop the flow of adhesive.

5. Should it be necessary due to wear, the drive mechanism can be recalibrated by turning the adjusting screw at the rear of the tool body (see *troubleshooting guidelines* below).



2. Non-drip
Trigger-Release Brake
Push the trigger forward to release the piston rod and to remove the piston pressure – the rod can be moved back and forth without manual release of brake.

3. Cleaning and maintenance
It is *very* important to keep the center piston rod clean and to oil it frequently to ensure a better function.

Clean dispensing tool after use. Wipe drive and plunger rods with oil to prevent rust. Clean adhesive paste from tool using a cloth and appropriate solvent. Do not submerge or soak the tool in any solvent! Scrape or chip off hardened adhesive.

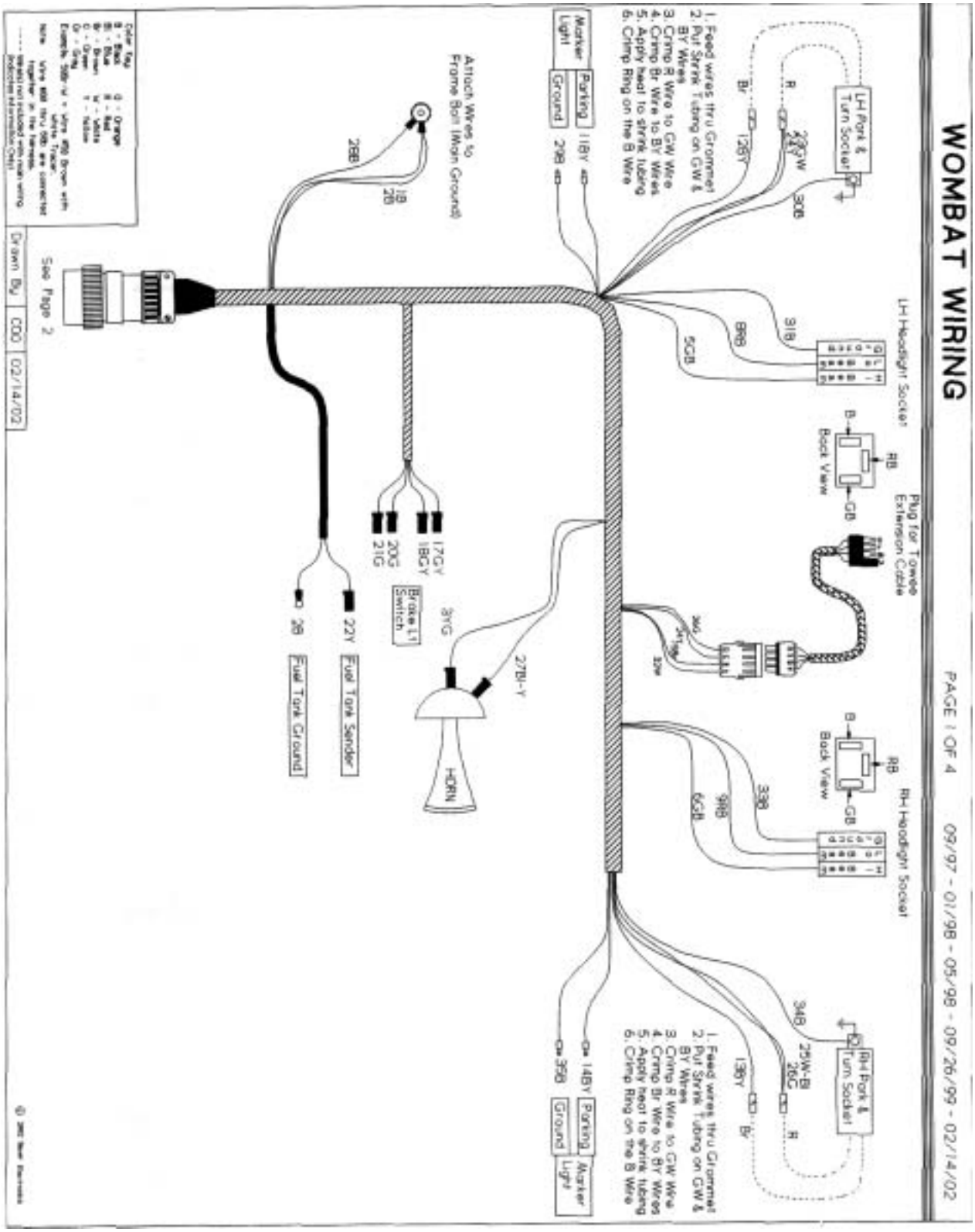
4. Recalibration (regain the movement of the piston)
If your gun does not advance in a proper way, it needs recalibration.

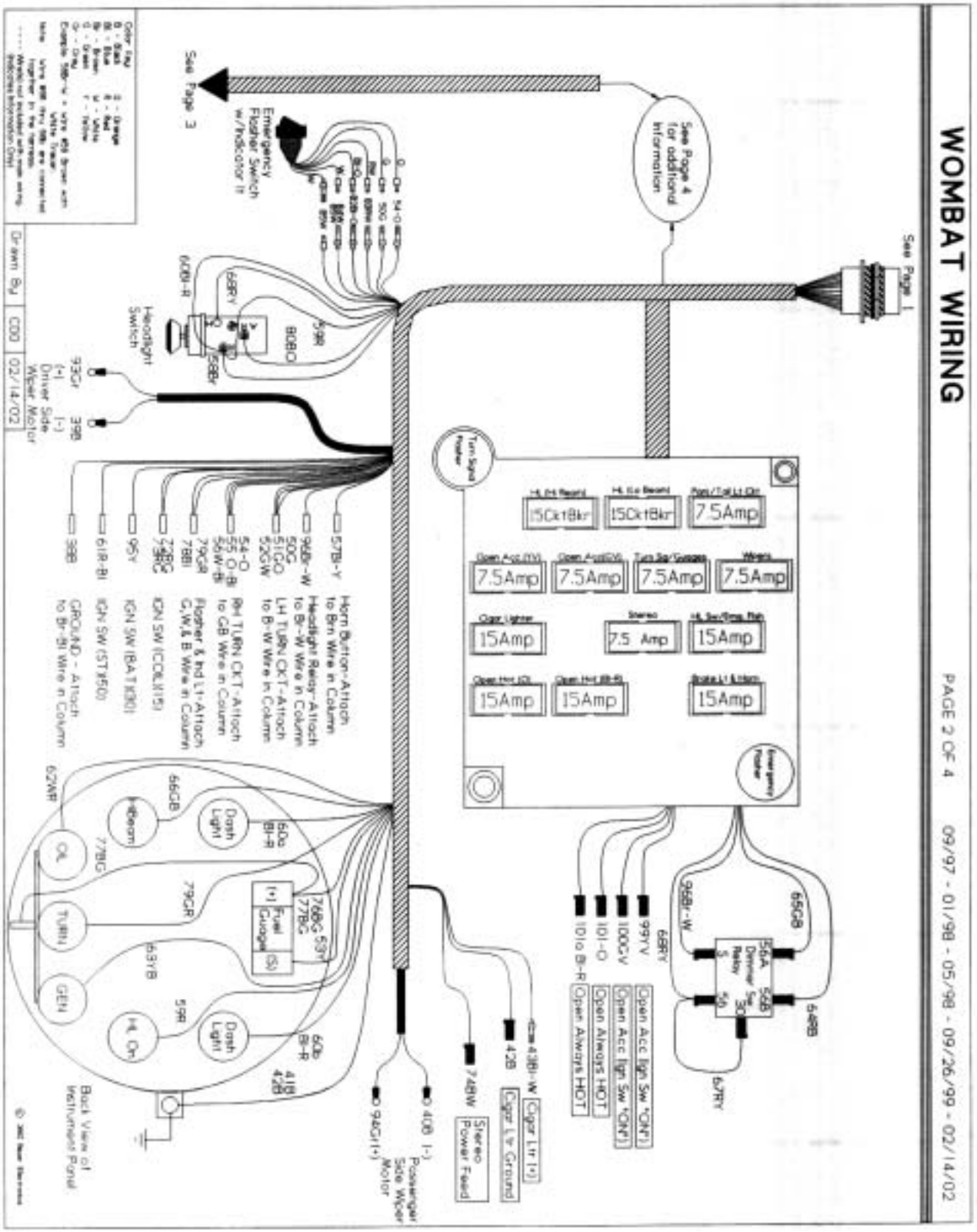
Symptom:
Back-lash of the trigger, or locked piston rod.

Troubleshooting Guidelines:
To eliminate the back-lash, that may occur as a result of wear, do as follows:
1) turn the adjusting screw clockwise the whole way down, the piston rod can now be moved back and forth.
2) turn the adjusting screw counter-clockwise until the the piston rod can be moved by squeezing the trigger.

5. Safety Regulations
Always wear adequate eye protection when using any tool.

Appendix E: Wiring Harness Schematic




WOMBAT WIRING
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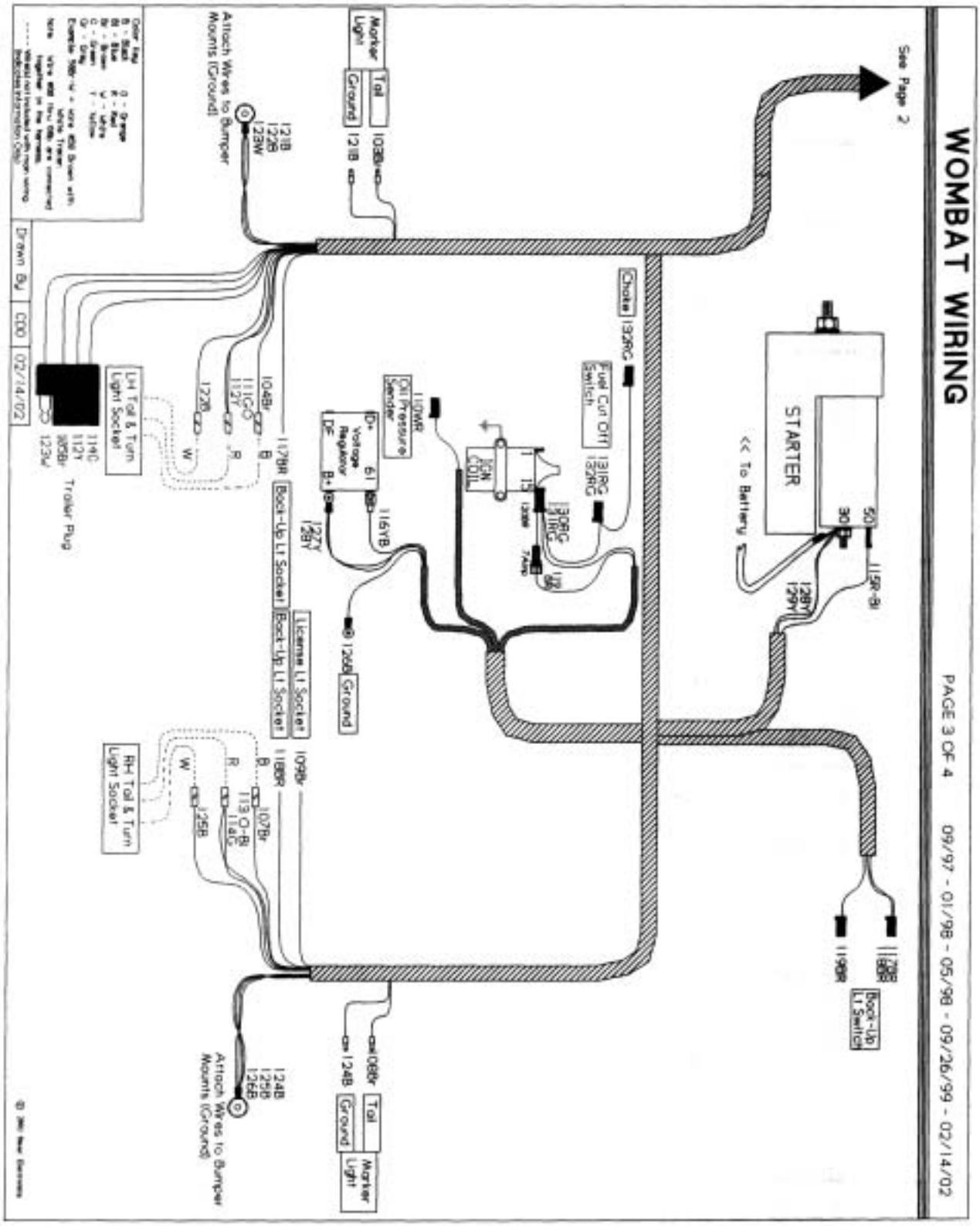
See Page 4 for additional Information
See Page 3
Emergency Flasher Switch w/Indicator lt
Headlight Switch
Driver Side Wiper Motor
Passenger Side Wiper Motor
Turn Signal Flasher
Emergency Flasher
15Ckt Bkr
15Ckt Bkr
7.5Amp
7.5Amp
7.5Amp
7.5Amp
7.5Amp
15Amp
7.5 Amp
15Amp
15Amp
15Amp
15Amp
56A Dimmer Sw Relay
Open Acc Ilgh Sw "ON"
Open Acc Ilgh Sw "ON"
Open Always HOT
Open Always HOT
Cigar Lt Ill (+)
Cigar Lt Ill Ground
Stereo Power Feed
Horn Button-Attach to Brn Wire in Column
Headlight Relay-Attach to Br-W Wire in Column
LH TURN CKT-Attach to B-W Wire in Column
RH TURN CKT-Attach to GB Wire in Column
Flasher & Ind Lt-Attach G,W,& B Wire in Column
IGN SW (ECCBUS)
IGN SW (BATTERY)
IGN SW (START)
GROUND - Attach to Br-Bl Wire in Column
Back View of Instrument Panel
Dash Light
Dash Light
Fuel Gauge
OIL
TURN
GEN
Hi Bm
Hi Ch
Drawn By
CDD
02/14/02


WOMBAT WIRING
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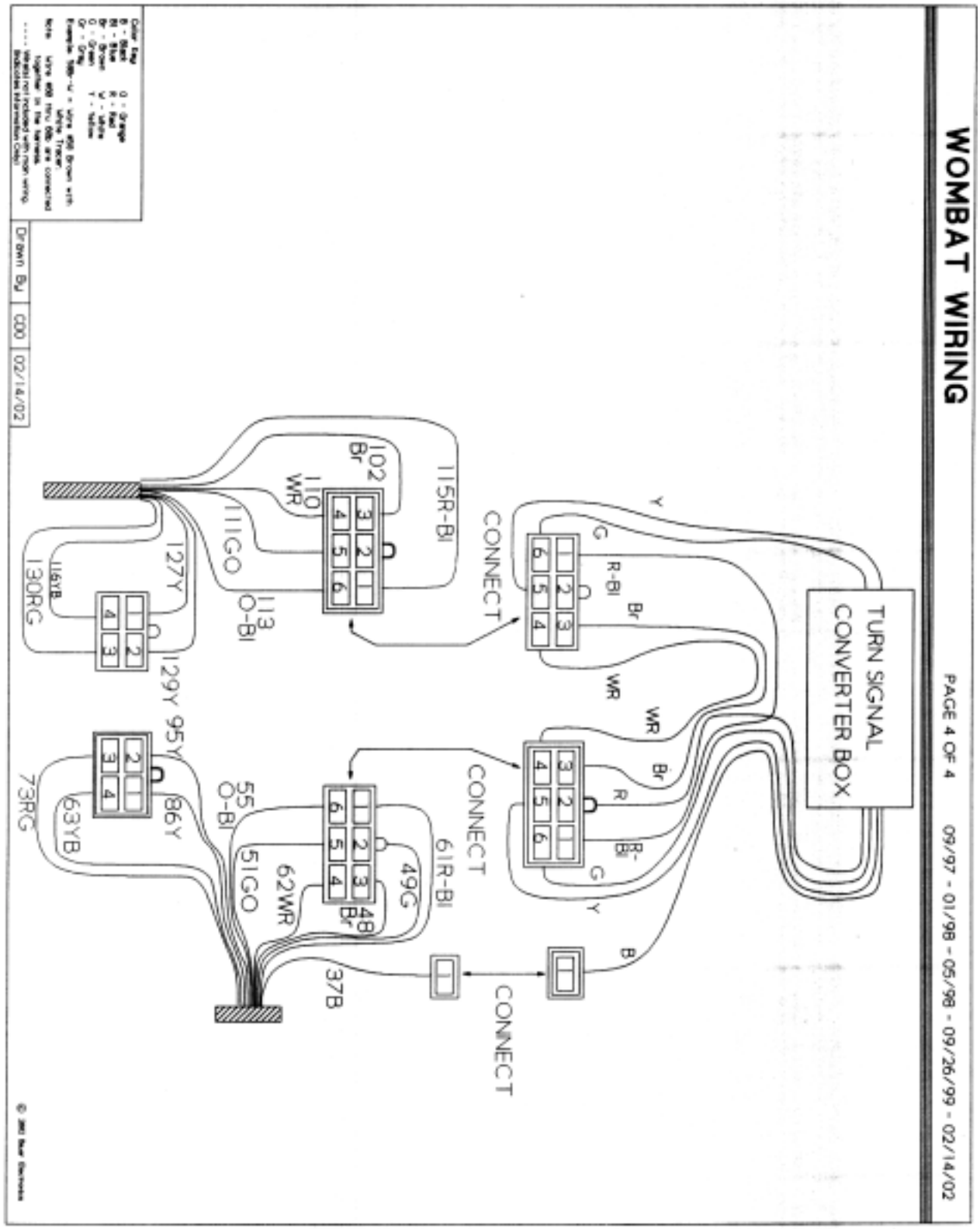
See Page 2
STARTER
<< To Battery
50
30
115R-Bl
128Y
129Y
Back-Up LT Switch
Choke
132RG
Fuel Cut Off Switch
131RG
132RG
IGN COIL
Oil Pressure Sender
Voltage Regulator
D+
61
DF
B+
116YB
127Y
128Y
Marker Light
Tail
Ground
103B
121B
Attach Wires to Bumper Mounts (Ground)
121B
122R
123W
104Br
111GO
112Y
122R
W
R
B
117BR
Back-Up LT Socket
License LT Socket
1268 Ground
LH Tail & Turn Light Socket
RH Tail & Turn Light Socket
Trailer Plug
114O
112Y
98Br
123W
109Br
118BR
107Br
113 O-Bl
114G
125B
088Br
124B
125B
126B
Drawn By
CDD
02/14/02


WOMBAT WIRING
PAGE 4 OF 4
09/97 - 01/98 - 05/98 - 09/26/99 - 02/14/02
TURN SIGNAL CONVERTER BOX
CONNECT
CONNECT
CONNECT
Y
G
R-Bl
Br
WR
WR
Br
R
Bl
G
Y
B
115R-Bl
102 Br
10 WR
111GO
113 O-Bl
127Y
116YB
130RG
129Y
95Y
86Y
63YB
73RG
55 O-Bl
61R-Bl
49G
48 Br
62WR
51GO
37B
Color Key
O - Orange
R - Red
Bl - Blue
Br - Brown
W - White
G - Green
Y - Yellow
Gr - Gray
Example: 102 - wire #58 Brown with White Tracer
Note: wires #58 thru #86 are connected together in the harness.
----- Wires not included with main wiring. Available Information Only!
Drawn By
CDO
02/14/02
© 2001 Rear Harness

Appendix F: Exhaust System Notes

Exhaust System Option Contents

1 muffler
1 straight tail pipe
1 2-bend primary exhaust pipe
1 1-bend secondary exhaust pipe
3 clamps
1 L-bracket
1 rubber strap hanger
1 flange
1 flange gasket
Exhaust Nuts & Bolts Assembly Pkg

Nuts & Bolt Package Contents

Position	Item	Qty
Flange & Gasket to Header	3/8"-16 Hex Nut, Zinc	3
Flange & Gasket to Header	3/8"-16 x 1" Hex Head Bolt, Zinc Grade 5	3
L-Bracket to Rubber Strap Hanger	5/16"-18 Hex Nut, Zinc	1
L-Bracket to Rubber Strap Hanger	5/16"-18 x 1-1/2" Hex Head Bolt, Zinc Grade 5	1
L-Bracket to Rubber Strap Hanger	5/16" x 1-1/4" Fender Washer, Zinc	1
Muffler to L-Bracket	5/16"-18 Hex Nut, Zinc	1
Muffler to L-Bracket	5/16"-18 x 1" Hex Head Bolt, Zinc	1
Muffler to L-Bracket	5/16" x 1-1/4" Fender Washer, Zinc	1

- Put the flange & gasket on the header. (We use Baja exhaust header: Thunderbird #4224. Available through us or from Autosport: 1-800-344-2847)
- Hang the muffler from the pre-drilled hole in the body sub-frame. The muffler sits on the driver side of the engine, vertically, with a hanger off the back.
- Cut the pipes to fit.
  - **The primary pipe** has a 120 degree bend, and a 20 degree bend. The end of the pipe with the 120 degree bend is expanded to slip over the collector.
  - **The secondary pipe** has a 90 degree bend that has a swedge fit end and a standard end. The swedge end slides over the primary pipe. The standard end goes to the inlet of the muffler and will need to be cut to length. This joint may need to be welded.
  - **The tail pipe** is the straight 12 inch piece, and attaches to the outlet of the muffler.
- Make sure the muffler bracket has clearance on the CV boot.
- Make sure there is sufficient clearance between the pipes and the fiberglass body.
- When installing the muffler adjust/rotate it in position to give maximum clearance from the body subframe on one side and the engine valve cover on the other. Leave enough clearance to service the valves.
- We provide clamps for the joints, but welding may be required for a complete seal.
- We recommend that you sand lightly and paint black the muffler and exhaust pipes using a paint designed for barbecues. This looks good and helps prevent corrosion.

Appendix G: Rear Deck Luggage Rack

Wombat Rear Deck Luggage Rack Mounting Instructions

Rear Deck Luggage Rack Option Contents

Luggage Rack
Luggage Rack Nuts & Bolts Assembly Pack

Tools

Drill & Bits
Protective Paper & Tape
Marker

Nuts & Bolts

Qty	Item	Position
4	3/8"-16 x 2" Hex Head Bolt, Zinc Grade 5	Luggage Rack to Body
4	3/8" SAE Flat Washer, Zinc	Luggage Rack to Body
4	3/8" Rubber Washer	Luggage Rack to Body
4	3/8" Split Lock Washer, Zinc	Luggage Rack to Body

The Wombat rear deck luggage rack mounts by way of threaded inserts in the four legs that rest on the deck.

1. Protect the Finish

Cover the rear deck with some type of paper or tape that will prevent scratching, and that you can write on to mark locations. (If you get your luggage rack at the same time as your kit, pre-mount it and avoid possible paint problems during drilling.)

2. Position the Luggage Rack

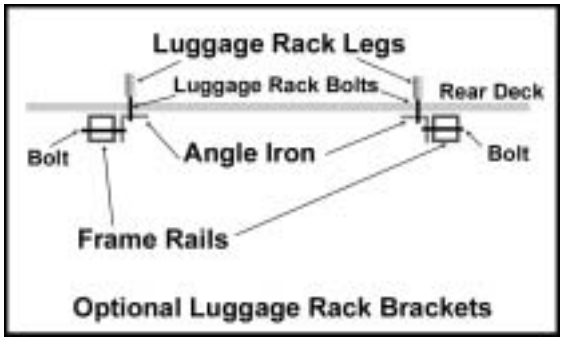
Place the rack on the deck, visually centering it on the deck lid. Use a straight edge held against the fender to measure from the side to the rack. When you are satisfied with the placement, trace around the leg.

3. Confirm Placement

Look underneath the deck lid, and confirm your leg placement mount hole will intersect with the body subframe rails that run below the deck lid. The holes do not have to center perfectly on frame rails. Adjust if necessary.

A. Fabricate Bracket

If feet do not align to frame rails while luggage rack is centered on body, you may fabricate brackets from angle iron or square tube. Bolt bracket to frame. Bolt luggage rack to bracket.



Optional Luggage Rack Brackets

5. Drill Holes

Starting with a small bit, drill a hole in the center of your marked circles, then gradually work your way up to a 3/8" diameter hole. Warning–if you increase the diameter too quickly, you risk chipping the fiberglass.

6. Mount Luggage Rack

Use the supplied bolts, washers to mount. Loosely start all the bolts, and then slowly and equally tighten.

Appendix H: Soft Half-Doors Option

Half-Door Option Contents
- Half-Door Frame, Left & Right
- Top Bars (2)
- Door Hinges, 2 Left Pin, 2 Right Pin
- Hinge Gaskets
- Paddle Latches
- Striker Plates (2)
- Striker Bars (2)
- Door Nut & Bolt Assembly Pkg

From the Kit
- Side Mirrors

To Buy
- Paint

Drop Ship from Top Company
- Soft Half-Door Skins, Left & Right
- Soft B-Pillar Filler Panels, Left & Right
- Snap Kit
- Velcro Strip

Tools
- Drill w/ bits and drivers
- Threading Tool
- Measuring Tape
- Marker
- Utility Knife
- Grinder
- Welding Tools
- Snap Tool (option)

Nuts & Bolts

Qty	Item	Position
4	3/8"-16 x 3/4" Hex Head Bolt, Zinc	Top Bar to Half-Door Frame
12	#10-24 Nylon Insert Lock Nut SS	Door Hinge to Door
12	#10-24 x 5/8" Phillips Oval Head Machine Screw SS	Door Hinge to Door
12	#10 Flat Washer, SS	Door Hinge to Door
12	#10-16 x 1-1/4" Phillips Oval Head Self Drilling Screw, Zinc	Door Hinge to Body
4	1/4"-20 Nylon Insert Lock Nut, SS	Mirrors to Soft Half-Door Frame
4	1/4"-20 x 3/4" Phillips Oval Head Machine Screw, SS	Mirrors to Soft Half-Door Frame
4	1/4" Flat Washer, SS	Mirrors to Soft Half-Door Frame
8	#10-24 Nylon Insert Lock Nut SS	Paddle Latch to Door
8	#10-24 x 1/2" Phillips Pan Head Machine Screw SS	Paddle Latch to Door
8	#10 Flat Washer, SS	Paddle Latch to Door
4	1/4"-20 x 1" Phillips Oval Head Machine Screw, SS	Striker Plate to B-Pillar

1. Attach Hinges to Door Frame

Drill mount holes on hinge mount plates for hinges. Install hinges using provided machine screws.

2. Position Door Frame

Place door frames in body openings. Position frame so the gap between door edge and body is equal. Mark body for drilling.

3. Drill Pilot Holes

Drill #6 or #8 pilot holes.

4. Mount Door Frame

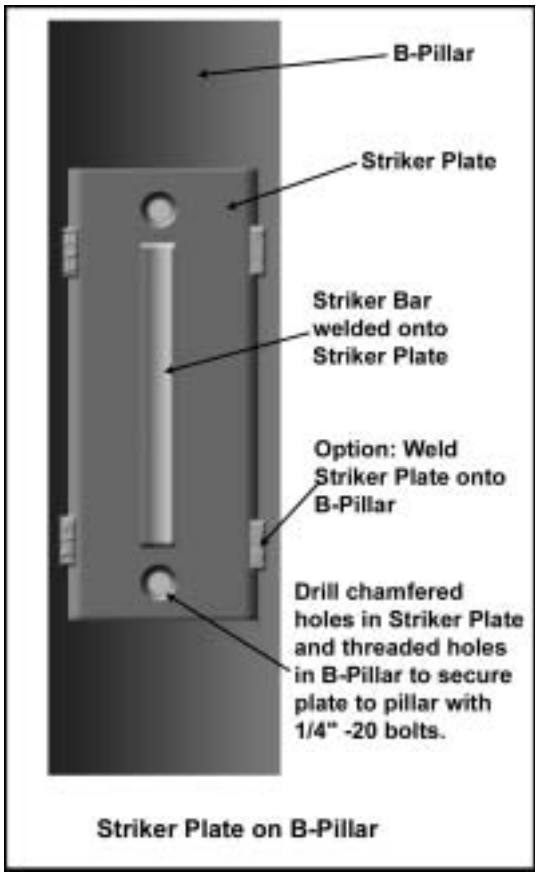
Install hinges with the provided #10 self-drilling screws.

5. Finish Striker Plate

A) Grind edges smooth.

B) Weld the striker bar to the center of the striker plate.

C) Drill chamfered holes in striker plate for mount screws. *(Holes unnecessary if welding plate in place.)*



Striker Plate on B-Pillar

6. Attach Striker Plate to B-Pillar

A) Position Striker Plate

The 3" striker plate needs to be attached to the B-Pillar about 11" up from the sill. Exact position determined by alignment with door frame.

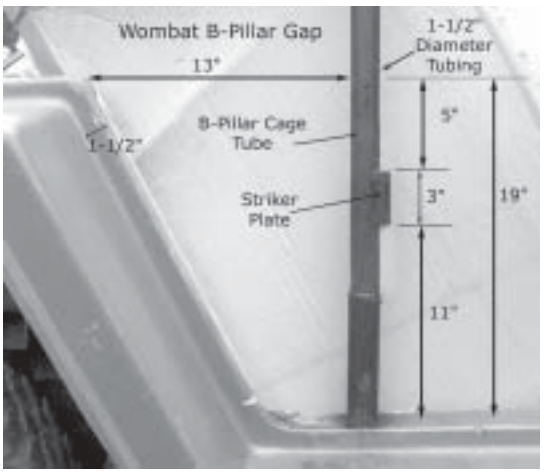
B) Drill Mount Holes in B-Pillar

Mark and drill mount holes. Thread holes for 1/4" -20 phillips oval head mount screws.

C) Secure Striker Plate to B-Pillar

Use included 1/4"-20 oval head machine screws.

Optionally, you may weld the striker plate in place rather than using screws.



7. Install Paddle Latches

With door mounted, install paddle latch in door frame so that the striker of the latch correctly engages the striker bar on the striker plate. Drill hinge mount plates on door frame and secure latch in place with provided #10 machine screws.

8. Finish Top Bar

A) Grind edges till smooth

B) Position Bar on Door Frame, Mark and Drill Mounting Holes for 3/8" Bolts.

C) Paint

9. Install Side Mirrors

Position mirrors on door frames and mark and drill mount holes on side mirror mount holes. Install using provided 1/4" machine screws.

10. Remove Latches, Hinges and Mirrors.

11. Apply Door Skin to Door Frame

12. Reinstall Hinges and Latches

Cut out the material so that the flange of the paddle latch overlaps the material. Be careful not to cut out too much!

13. Install Top Bar to Door Frame

Bolt top bar in place using provided 3/8" bolts.

14. Reinstall Side Mirrors

11. Install B-Pillar Filler Panel

A) Install Body Snaps Studs

Install snap button studs to the body along the ledge of the B-Pillar Gap. Snaps should be centered in the area. Drill 1/8" holes and install studs using a #2 Phillips driver.

B) Install Velcro

Adhere the self-adhesive Velcro strip to the back of the B-Pillar.

C) Position the Filler Panel in Place.

Position the panel and secure to the B-Pillar with Velcro flaps.

D) Install Panel to Body Snaps

Attach the button and socket pieces of the snaps the filler panel using the punch & die provided in your snap kit. You can rent or borrow a snap-fastening tool for easier installation. Working from the top down, install each snap of the panel. Fasten snaps, stretch and smooth as you go.

E) Install Panel to Soft Top Snaps

If you have installed a soft top, you will need to install a row of snaps along the top of the panel and a row along the bottom of the soft top.

Appendix I: Soft Top Option

Soft Top Option Contents
- Rear Bow
- Center Bow
- 2 Eye Ends
- 2 Deck Mounts
- Soft Top Nut & Bolt Assembly Pkg

Tools
- Drill w/ bits and drivers
- Measuring Tape
- Marker
- Utility Knife

Drop Ship from Top Company
- Awning Rail
- Snap Kit
- Soft Top

To Buy
- Foam Pipe Insulation. (1-3/8" inner diameter, 1/2" thick wall split self-sealing insulation.)
- Sports Wrap
- Silicone

Nuts & Bolts

Qty	Item	Position
4	10-16 x 1-1/4" Phillips Oval Head Self Drilling Screw, Zinc	Deck Mount to C-Pillar
4	1/4"-20 x 1" Hex Head Bolt, or Phillips Pan Head 1-1/4"	Soft Window Frame to Half Door
4	#6 x 1/2" Phillips Pan Head Self-Tapping Screw, Zinc	Center Bow to Top Support Bars
7	#6 x 1/2" Phillips Pan Head Self-Tapping Screw, Zinc	Awning Rail to Windshield Frame

The top uses the awning rail to attach to the windshield frame, Velcro to the side verticals of the top support frame, and snaps along the body rail. **Take your time, keep moving around the car and adjusting. A poorly installed top can spoil an otherwise well put together kit. If you are at all uncomfortable with this, get some professional help.**

1. Attach the Awning Rail

Attach the awning rail to the top of the windshield frame. This can be done with the 7 included #6 x 1/2" phillips pan head self tapping screws included or pop rivets. One screw in the center, with 3 equally spaced screws on either side. The “C” channel should face forward, toward the front of the car and extend over the edge of the windshield frame. The taller side of the rail should be up. Run a bead of silicone along flat side of the awning rail where it will contact the windshield frame before screwing it in place. Use 1/8" drill bit. (Depending on your color scheme you may wish to paint or powdercoat the awning rail to match the other trim on your Wombat.)

2. Install Body Snap Studs

Locate and mark the center of the rear passenger rail. Starting from the center mark snap positions, equally spaced about 4-5 inches apart, all along the vertical edge of the rear rail. Body snap studs should be centered vertically in the rise along the rear rail. Drill 1/8" holes and install studs using a #2 Phillips driver.

Later you will attach button/socket snaps on the soft top as it is stretched and pulled into place in positions to match the studs on the body.

3. Install Soft Top in Awning Rail

Slide the top into the awning rail. Center it on the windshield frame. Fold the top over the “C” channel and back over the top support frame. Position and install 2 snap studs on each of the upper corners of the windshield frame, one on the side and one on the front. Use 1/8" drill bit.

4. Install Center Bow

The center bow has a saddle on either end that rests on the side bars of the top support frame. Determine where to position your center bow by locating the velcro wrapper on the underside of the soft top. (Located near the rear center bars). Attach the center bow to top frame using the included #6 x 1/2" phillips pan head self tapping screws.

5. Rear Bow

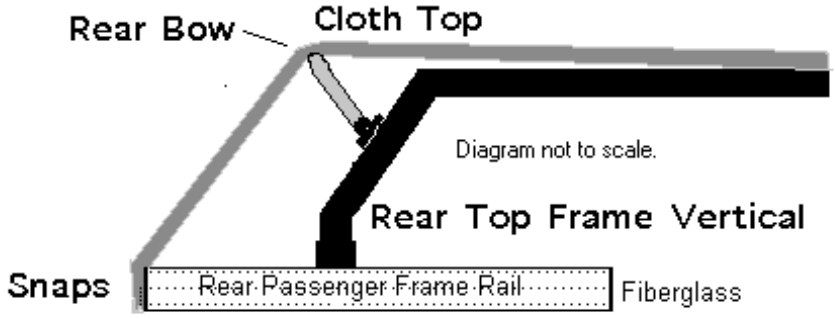
The rear bow attaches to the rear legs (C-pillars) of the top frame via deck mounts and eye ends. It will hold the top at the same height as the center bow.

A) Eye ends

The eye ends fit onto the ends of the rear bow and attach to the deck mounts.

B) Deck Mounts

Position the deck mounts on the rear legs of the top frame so that the top of the rear bow supports the top in the same plane as the center bow. The legs of the rear bow can be shortened if necessary. Attach deck mounts to C-Pillars using the 10-16 x 1-1/4" Phillips oval head self-drilling screws.



6. Bar Padding

The top is designed to accommodate foam pipe insulation as bar padding. We use 1-3/8" inner diameter, 1/2" thick wall. Our preference is split self-sealing insulation. Cut the insulation to fit and secure on front and rear center bars, side bars, and side and rear vertical bars. Some customers have used sports wrap tape to cover the pipe insulation.

7. Center Bow

Secure the top to the center bow with the Velcro wrap.

8. Velcro Restraining Straps

On the underside of the soft top are Velcro restraining flaps for both center bars, and the B-pillar side vertical bars. Attach these flaps now over the installed pipe insulation.

9. Install Snaps on Soft Top

You will attach the button & socket pieces of the snaps to the soft top using the punch & die provided in your snap kit. You can rent or borrow a snap fastening tool for easier installation. It will be easier to smooth and stretch the top into place if you have at least two people working on this. Working in warm weather also makes smoothing the wrinkles out of the top easier.

A. Windshield Frame Snaps

Double check that the top is centered in the awning rail, then install snaps at the front of the top to match tie studs in the windshield frame.

B. Rear Rail Snaps

Find and mark the rear center of the soft top and install snap. Snap the center snap of the soft top to the center snap on the rear rail of the body. Working from one side of the center to the other stretch and smooth the top and attach snaps to the soft top that correspond with the snaps on the body. Fasten snaps as you go. Alternating sides will help keep wrinkles out of the top. Work from the rear forward.

C. B-Pillar Filler Panel Snaps

If you chose to purchase the half-door option, you will install button & socket snaps on the soft top to match snap studs on the B-Pillar Filler Panel.

Appendix J: Soft Windows for Half-Doors Option

Soft Windows for Half-Doors Option Contents
- 2 Flat Panel Wind Deflector Pieces
- 2 Formed Wind Deflector Pieces
- Soft Windows Nut & Bolt Assembly Pkg

To Buy
- ABS Cement
- Cotton Swabs

Nuts & Bolts

QTY	ITEM	POSITION
4	1/4"-20 x 3/4" Phillips Pan Head Machine Screw, Zinc	Soft Window Frame to Half Door
4	1/4"-20 Hex Nut, Zinc	Soft Window Frame to Half-Door
4	1/4" SAE Flat Washer, Zinc	Soft Window Frame to Half-Door
6	#10-16 x 3/4" Phillips Oval Head Self Drilling Screw, Zinc	Wind Deflectors to Windshield Frame

Drop Ship from Top Company
- 2 Soft Windows, frame & skin

Tools
- Clamps
- Protective Gloves
- Protective Eyewear
- Utility Knife
- Strips of scrap lumber for clamping
- Drill

The window frame is bolted to the top bar of the half-door. The wind deflector must first be assembled. It is screwed into place along the windshield frame.

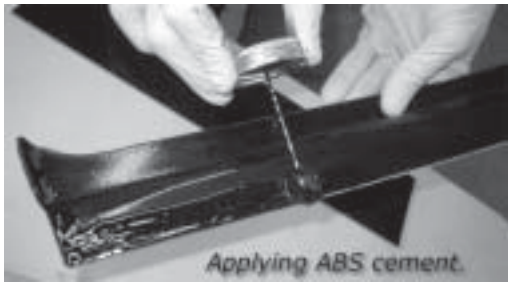

Tools and deflector pieces.

1. Assemble Wind Deflector

The wind deflectors fit along the sides of the windshield frame, protecting the soft windows from the wind. Each deflector comes in two pieces, a formed piece and a flat panel. You will glue them together, trim and drill holes for mounting on the windshield frame with self-tapping screws

A.) Pre-Assemble Parts

The formed deflector fits to the flat panel smooth side to smooth side with the leading edge flush. Check the flat panel pebble side for imperfections to determine positioning of the formed part. Pre-assemble prior to gluing to insure proper set up. Some trimming / truing to fit may be required.


Applying ABS cement.

B.) Apply Glue

Apply glue to the formed deflector pieces along the surfaces that will contact the flat piece. Place the pieces into the position you determined as best

C.) Clamp the Pieces Together

D.) Clean Up Seams

After clamping use the cotton swabs to add or remove cement to ensure a good bond on the inner and outer seams.

E.) Allow Cement to Cure

F.) Score Flat Piece

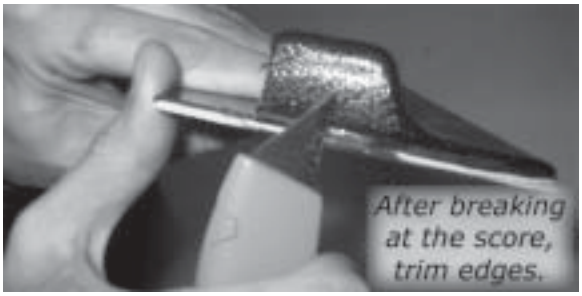
After the cement has cured, remove the clamps and use a razor knife to score the top and bottom edge of the flat piece using the formed piece as a guide.

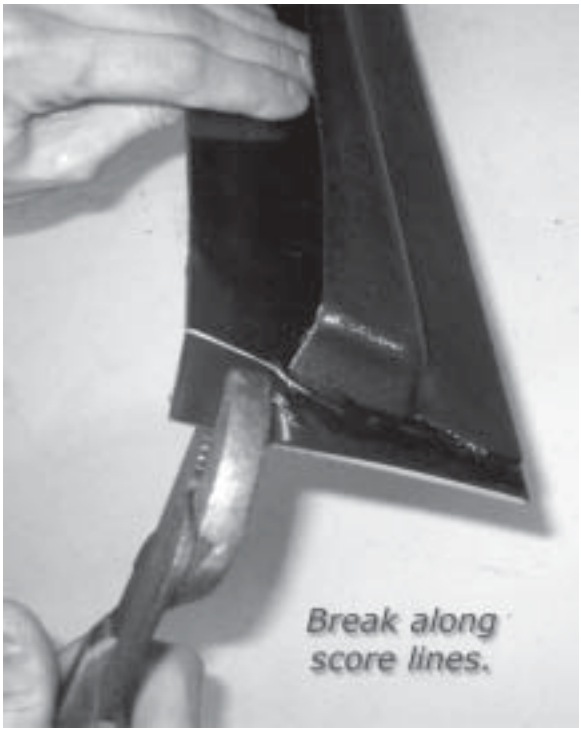
G.) Break at Scores

Use pliers or vise grips to break the part at the scores.

H.) Trim the Edges

Use a utility knife to clean up the edges along the breaks.





I.) Smooth Bonded Edges

Apply ABS to the bonded edges to make a uniform surface.

J.) Drill Mounting Holes

Drill 3 equally spaced holes along the leading edge for mounting to the windshield frame with the #10 self-drilling screws

2. Position Window Frame and Mark for Drilling

Position Frame in window opening. Mark holes in top bar.

3.) Drill Mount Holes

Drill 1/4" mount holes in top bar of half-door frame.

4.) Bolt Window Frame in Place

Bolt window frame to top edge of door using provided 1/4"-20 x 3/4" Phillips Pan Head Machine screws, washers and nuts.

5.) Secure Velcro of window to velcro of half-door.

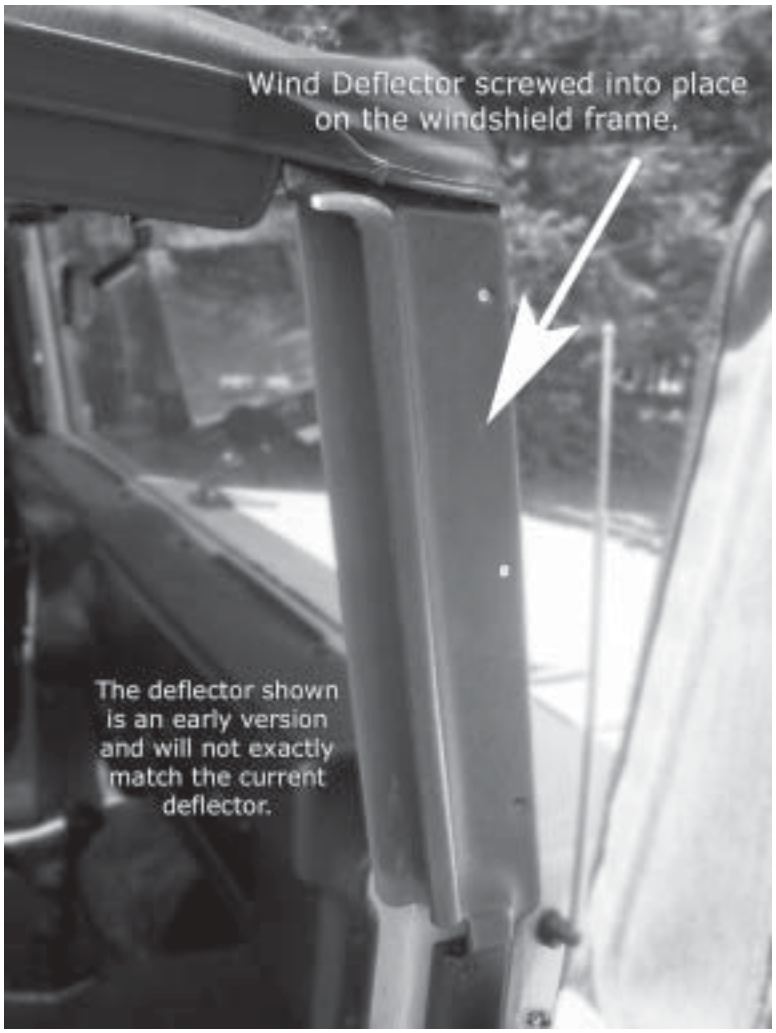
6.) Install Wind Deflectors

A.) Mark Windshield Frame for Mounting Screws

Position plastic deflector along the windshield frame so that the door window is protected when the door is closed. Mark position of screws.

B.) Drill and Install

Drill pilot holes in marked positions. Install deflectors using the #10 self-drilling screws provided.



Appendix K: Trannys, Tires, and Engines

Depending on your choice of engine, tire size, and year of donor transmission, you may need to exchange the transmission for one with a different ring and pinion for proper performance. Please consult a competent VW mechanic to assist in this decision.

Taller than stock tires change the effective gear ratio of the transmission. To maintain equivalent performance the gear ratio in the transmission must be lowered and/or the engine power output increased as tire height is increased.

Pre-1968 swing axle transmissions have a 4.37 ring & pinion. IRS transmissions 1968-'72 have a 4.12 RP, 1973 and later have a 3.88 RP. Re-built transmissions are readily available with your choice of ring and pinion for around $300.00.

Our prototype used a 1973 chassis with its original 3.88 RP IRS transmission, a 1776 cc, dual carbureted performance engine, and 29" tall Mickey Thompson tires. The higher horse power engine compensated for the 3.88 RP and tall tires providing adequate power and acceleration. When using a stock 1600 cc engine with anything taller than a stock tire we prefer a 4.37 RP transmission.

Our current shop demo is a 1973 chassis, using the original stock single carburetor 1600 cc dual port engine and P235 75 R15 traction tires. The original 3.88 RP '73 transmission with this engine and tire combination performed terribly. We swapped it for a rebuilt 4.37RP transmission which solved most of the problem. It could still use a little more power in fourth gear. We could do this by either installing a custom close ratio fourth gear or upgrading the engine.

The correct matching of engine, transmission and tires is a science. Please consult a professional.

Performance Formulae

Factors That Must Be Known

1. Engine RPM (Revolutions per Minute)
2. Tire Radius in Inches (Tire Diameter divided by 2)
3. Ring and Pinion Ratio
4. Transmission Gear Ratio
5. Final Ratio = (Ring & Pinion Ratio x Transmission Gear Ratio)
6. Constant = 168
7. M.P.H. (Miles per Hour)

Formulae courtesy of
Oregon Performance Products
PO Box 1715
Hillsboro, OR 97123
(503) 628-3409
http//www.spiretech.com/~opshroud

Formula to Determine MPH:

MPH = (RPM x Tire Radius) / (Final Ratio x 168)

Example: (4400 RPM x 16 inches) / {(4.59 x .88) x 168} = 70,400 / 675.36 = 104.2 MPH

Formula to Determine Cruising RPM

RPM = (MPH X Final Ratio x 168) / Tire Radius

Example: (65 MPH x (4/57 x .88) x 168) / 16 inches=43,898 / 16 = 2,743.6 RPM

Formula to Determine RPM Change when Shifting Up or Down:

(Present RPM / Present Transmission Gear Ratio) x Next Gear Ratio = New RPM

Example A, Shifting from 2nd (2.06) to 3rd (1.26) @ 4,400 RPM
(4400 / 2.06) x 1.26 = 2,135 x 1.26 = 2,691 RPM, a 1,709 RPM Drop.

Example B, Shifting from 4th (.88) to 3rd(1.26) @ 2,500 RPM
(2500 / .88) x 1.26 = 2,840 x 1.26 = 3,579 RPM, a 1,079 RPM Rise.

Some WOMBAT Customers have found this company to be quite helpful with their transmission decisions:

Transform Company 800-508-7267 Phone
2105 Cowles Street 562-435-2966 Fax
Long Beach, CA 90813

Mail $3.00 for a catalog. See their ad in Hot VWs.

Quote from TRANSFORM COMPANY catalog:

Ever wonder why your Baja Bug, Thing, Manx, or Street Rail never has the power it should? Gets poor mileage? Suffers early engine failure? The answer is simple. When you installed those tall (27" to 33") tires, the effective gear ratios in the transaxle were changed dramatically. The stock ratios, so carefully chosen by the factory to optimize the VW engine, are now working against you. Big Time. The combination of bad ratios and greater wheel/tire moment of inertia commonly results in a 25% loss of power when the same bad ratios that kill performance also hurt mileage and engine life.

Fortunately, excellent performance is available with a well-planned change of ratios. At TRANSFORM we specialize in Baja ratios and take pride in providing effective, affordable solutions. We will take the time to analyze your exact needs, as these vary greatly with type of vehicle, terrain, tire diameter, etc. (please measure from ground to top of tire before you call.) Prices start as just $299. Look at it this way: the transaxle will pay for itself with added mileage and engine life. The great performance is free! All have great freeway drivability. NOW ON SALE!

	Price	***Ring***	***3rd***	***4th***	***Comment***
Baja #1	$299	4.37	1.26	.93	Great for shorter (26"-28") tires and/or small budgets.
Baja #2	$379	4.37 or 4.12	1.32	1.00 or 1.04	Low cost choice if freeway rpm is the problem.
Baja #3	$469	4.37 or 4.12	1.48	1.04	If stock 1st & 2nd ratios are OK , you win big in 3rd & 4th.
Baja #4	$489	4.86	1.32	.89	When more rpm is needed in 1st & 2nd as well as 3rd & 4th.

Appendix L: Fan Shroud Remote Air Intake System

The Fan Shroud Remote Air Intake System is a method to possibly improve your Wombat engine's cooling air flow.

The stock VW engine fan cooling shroud normally mounts inside the sealed engine compartment and pulls air in through the vents above the rear deck lid. It is standard procedure on buggies and kits to merely leave a large clear area around the engine to facilitate air intake for cooling. This seems to be working well. There have been no problems.

Even so, it has come to our attention that there may be a potential for heat build up in the engine area.

The possible concerns could be

- A negative air space under the car when moving,
- Warm air recirculating from below the engine to the intake when the car is not moving
- Reduced efficiency of the fan because it does not have a defined space to pull against.

To test this possibility, I obtained a short length of 6 inch flexible furnace pipe from HomeBase, duct taped it to the shroud, and positioned the intake in the wheel well. I have not noticed any improvement in the running of the car, but the heater airflow was increased noticeably. I would recommend the system for that reason, and peace of mind.

Hummbug Owner Hal Underwood and I discussed idea, and as he had his engine out for other repairs, he went ahead and installed a more permanent version of the intake system. Photos and a description of Hal's system follow:

Hal mounted a 6-7" 90° Furnace Duct Elbow to the fan shroud. (See figures 1 and 2.) He then clamped on a short length of flexible duct to extend to the wheel well where he secured it to a flange attached to a flat steel plate mount he had fabricated and affixed to the Hummbug frame. A screen over the intake keeps out debris. (See figure 3.)

The elbow may be attached to the fan shroud using rivets or sheet metal screws. Use silicone to seal. Obviously the best time to mount the elbow to the shroud with least hindrance is before the body is in place.

Figure 1.

Detail view of Elbow installed on the Air Shroud.

Figure 2.

Side View, Engine is mounted, Body is in Place, Elbow is installed on the Air Shroud.

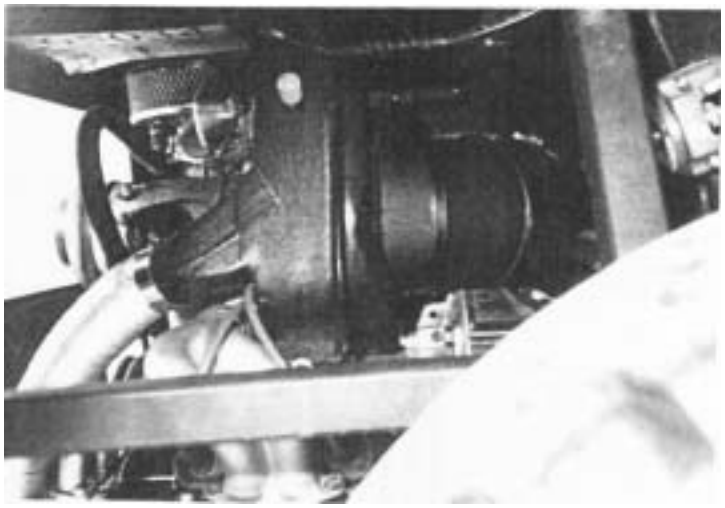


Figure 3.

The Remote Air Intake.