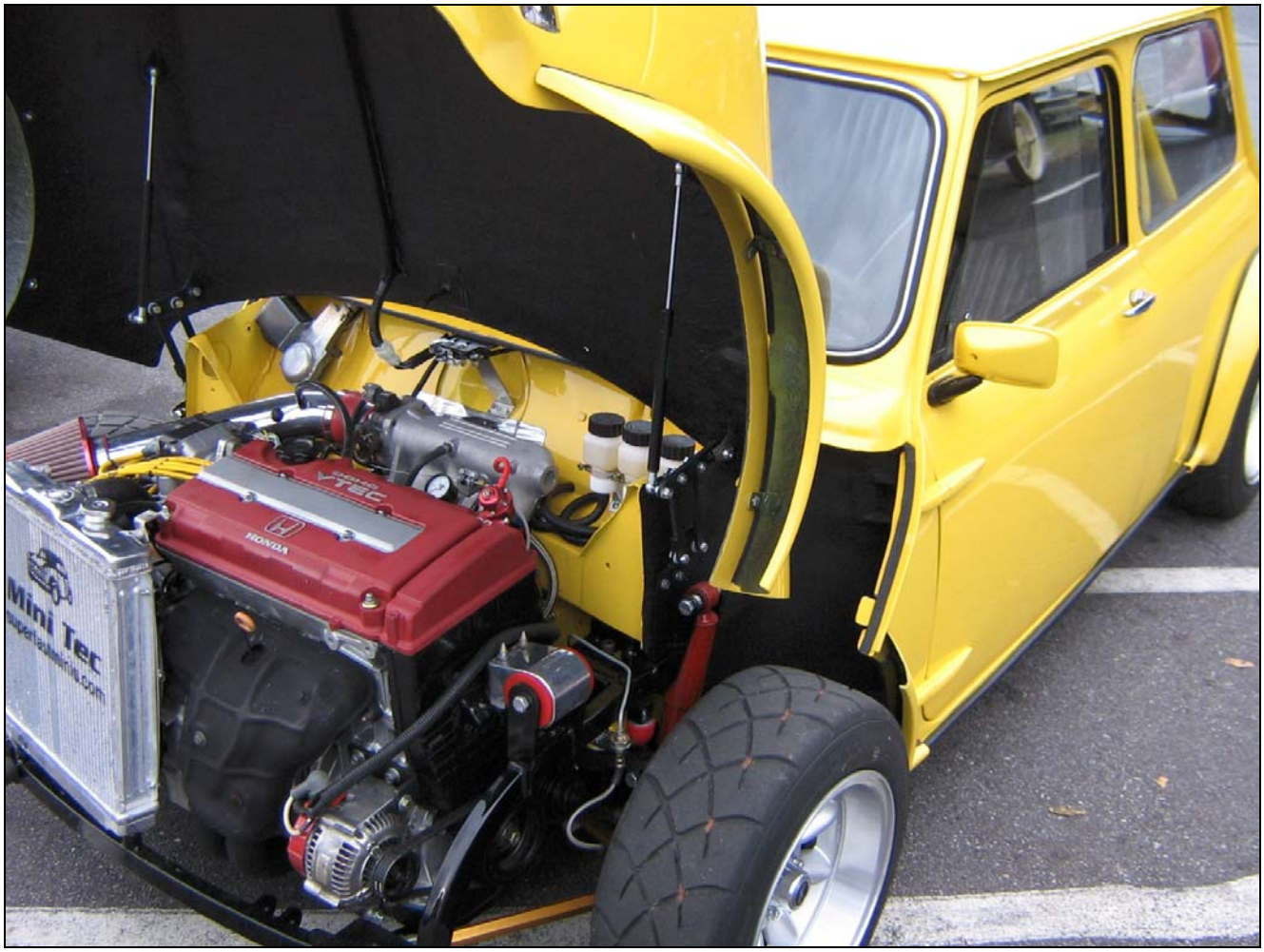
MT-B KIT:
HONDA ENGINE CONVERSIONS TO CLASSIC MINIS

MT-B INSTALLATION MANUAL

FOR CLASSIC MINIS 1959 – 2001



Dear Customer,

We welcome you to the Honda Powered Mini World. Thank you and Congratulations for your purchase. You can be certain that you have made a wise choice with this upgrade. This kit was designed to help put you on the right track when building your ultimate Mini. With the help of this MT-B Kit, you will be driving your Super Fast Mini soon.

Mini has been made in many variations with many subtle "tweaks" and varying build quality over its lifetime. It is impossible to account for all these, and some will even be unique to your car. Additionally, your car is likely 15-20 years old, with all that has happened to it in that time.

With all that said, your MT-B kit and these instructions are designed to try to allow for some of these differences. For others, you will have to "field fit" or adjust as you go. We'll do all we can to help keep your project moving along. Please keep in mind that pictures will be of great help, so if you don't have a digital camera, (or always wanted one) now is a good time to get one. In fact, you should take LOTS of pictures to document your project. Your project may seem overwhelming at times, but if you take it one step at a time, in a logical sequence and take an occasional break from it, you'll do OK.

The purpose of this kit is to make your Honda VTEC installation easy and hassle free. We have taken the research and development headaches out of the install so that you do not have to deal with all of that. The sub-frame mounts to the car. The engine mounts to the sub-frame. And before you know it, you are ready to crank and drive your car.

We have broken the whole VTEC Mini build up into sections, from start to finish. We hope that this will be a pleasurable experience for you and we will do everything that we can to make it that. Just remember, we are available to help you 5 days a week. Just give us a call or an email.

Thanks and have fun,

Mini Tec, L.L.C.

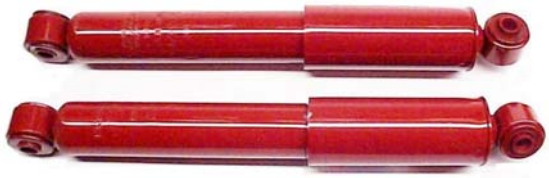
CONTENTS

PARTS

This Section contains a list and description of the parts included in the MT-B Kit, and a list of parts that you will need in addition to the MT-B Kit.

MT-B Kit Contents:

- MT-B Sub-frame
- 2 Outer Suspension Springs (Red)
- 2 Inner Suspension Springs (Blue)
- Front Transmission Stabilizer Bracket
- Front Transmission Stabilizer Bracket Mount
- Rear Transmission Stabilizer Bracket
- 2 HD Shocks
- Alternator Bracket
- Mounting Hardware
- 2 Mini/Honda Axle Shafts
- Rear Transmission Stabilizer Bracket Bushing
- Front Height Suspension Adjustment Bolts
- RH and LH Extended Steering Control Arms



Additional Parts Needed:

- Complete Mini Upper Arm Suspension (Upper Arm, Axle, Hardware, Knuckle Joint)
- Outer CV Joint Assembly (8.4” Disc Brake Type Only)
- RH and LH Swivel Hub Assemblies (8.4” Disc Brake Type Only)
- Front Disc Brake System: Mini Tec’s Superbrake, 8.4” Disc Brakes, Other…
- Wheels with a –7” Offset to the outside (needed for turning radius clearance)
- Cooling System
- Engine Swap – B Series or D Series (Engine, Transmission, Shifter, Wiring, ECU)
- Digital gauges: Speedometer, Coolant Temperature, Oil Pressure, etc…

PREPARATION

Step 1: Remove stock Mini engine and sub-frame. Then remove everything else in the engine compartment. See Figure 1-1 below.

Step 2: Whether you use Mini Tec's MT-B Flip Front End Kit or you do an extension yourself, you will need to cut existing Mini front end after the a-panel seem to remove existing Mini front. See Figure 1-2. Note: For extended metal front ends, it is best to attach the MT-B sub-frame first before performing any body extensions.

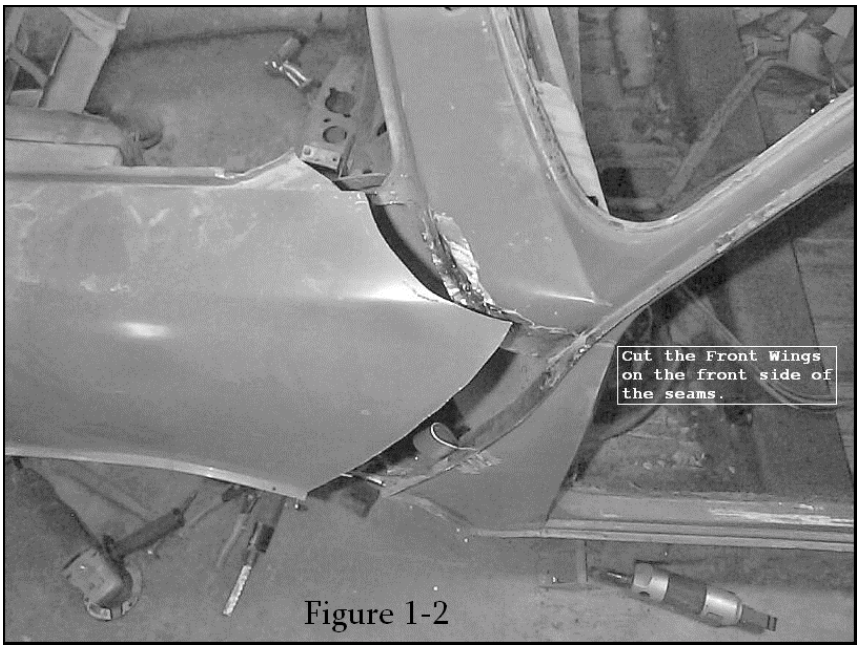


Figure 1-2

Step 3: Clean, Prepare, and Prime the cars firewall and all ruff surfaces (See Figure 1-3). Relieve the firewall approximately ½" at the center of the car just above the bulkhead, for extra intake clearance. Use a hammer and a hard rounded object for this task. Note: Add additional metal for extra stiffness to the front side of the a-panel as shown in the photo below. A guide tab on the inside of the a-panel will help align the MT-B Flip Front End.

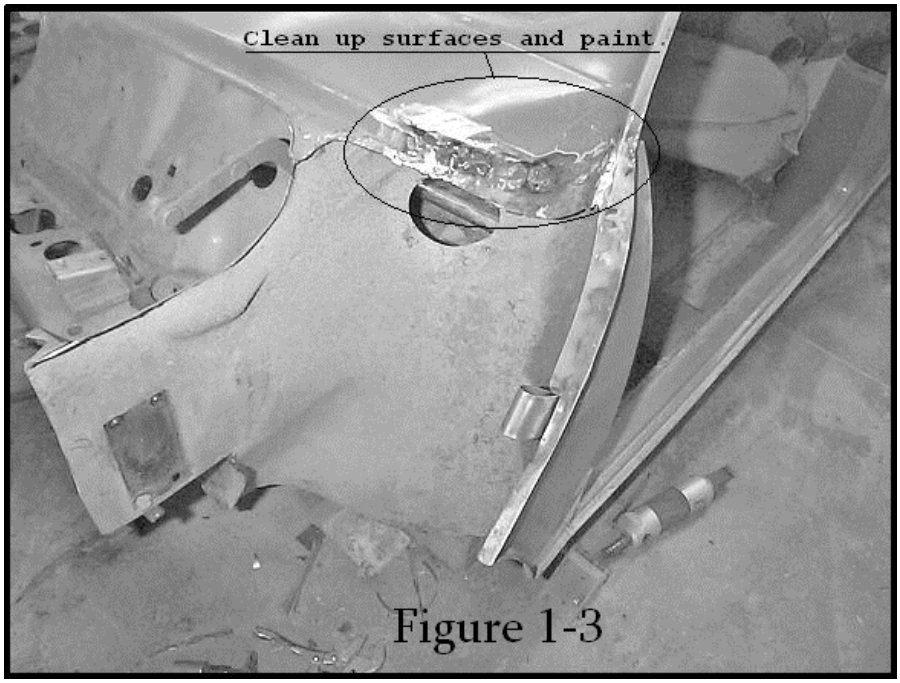
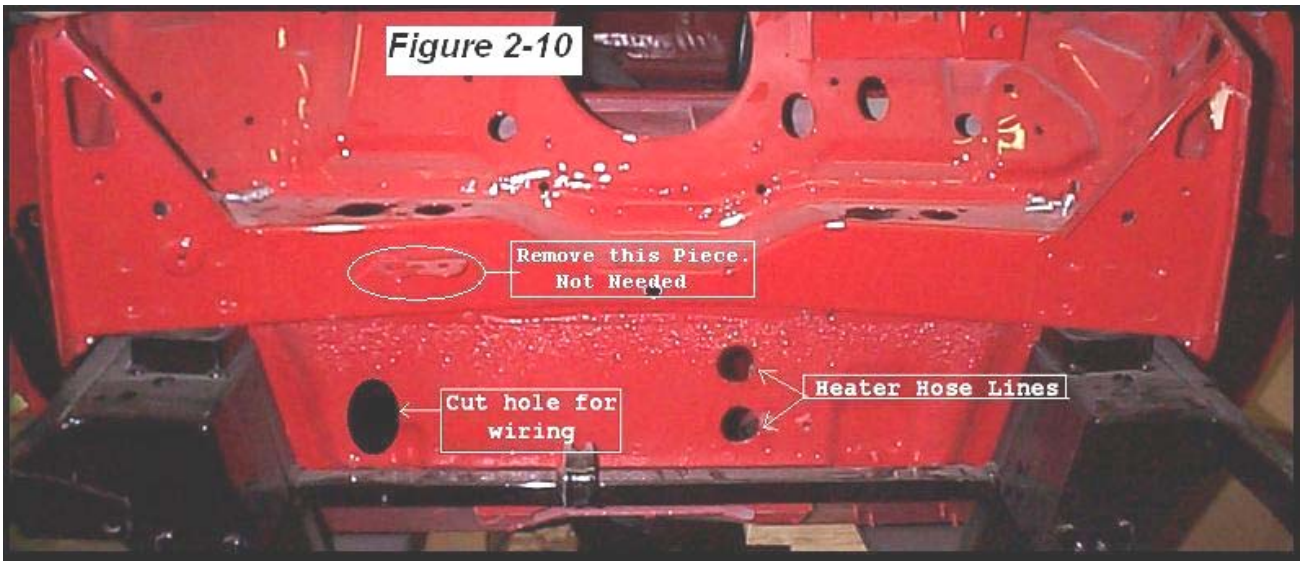
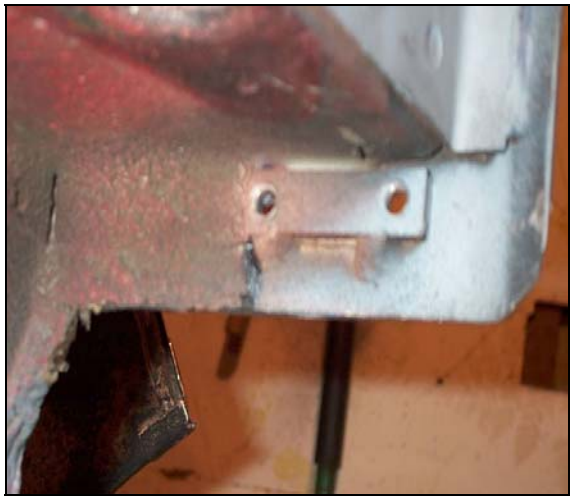


Figure 1-3

Step 9: Cut holes for wiring harness and heater hoses. Remove the bulkhead bracket shown in the photo below. See Figure 2-10.



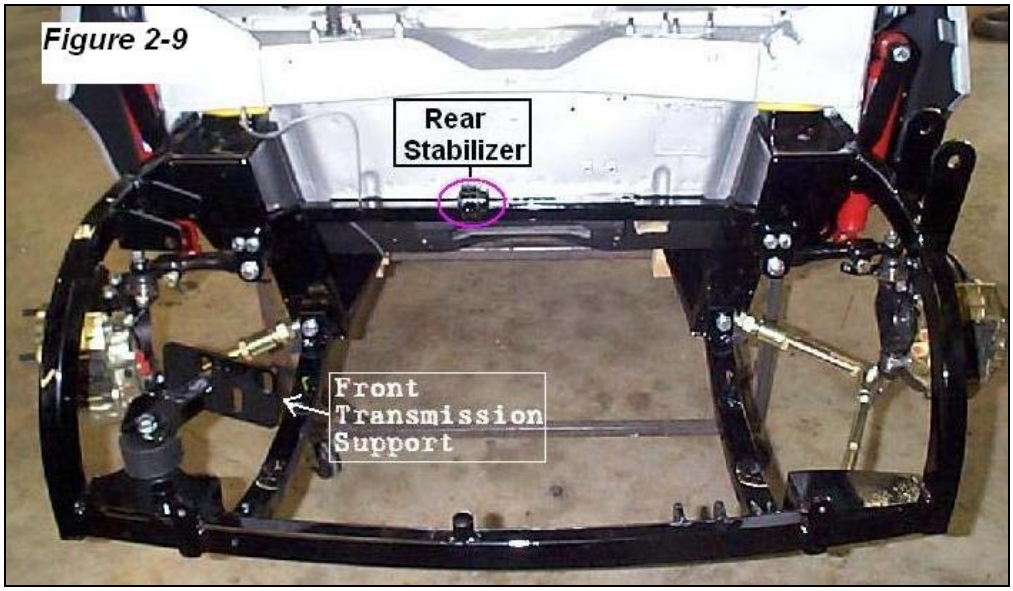
Step 10: Cut out metal just below stock shock mount. (See following two photos)



Your Mini should now be prepared for the installation process.

Sub-frame:

Step1: Bolt *MT-B Sub-frame to the Mini using the two stock bulkhead bolts as done on the original Mini sub-frame. For MK1/MK2 Minis, use Mini Tec's Part # 10110 to bolt the sub-frame to the car. (See Figure 2-9)



Step 2: Drill six holes to support the lower sub-frame using a 5/16" drill bit. Use *Six 5/16 x 1" bolts, Six 5/16 locking nuts, and Six 5/16 flat washers to fasten the sub-frame to the car on the lower side. (See Figure 2-2)

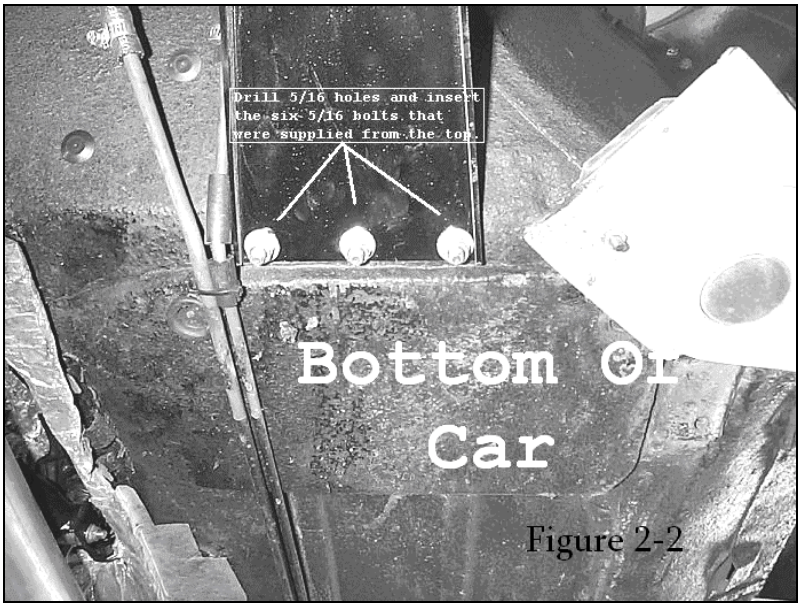
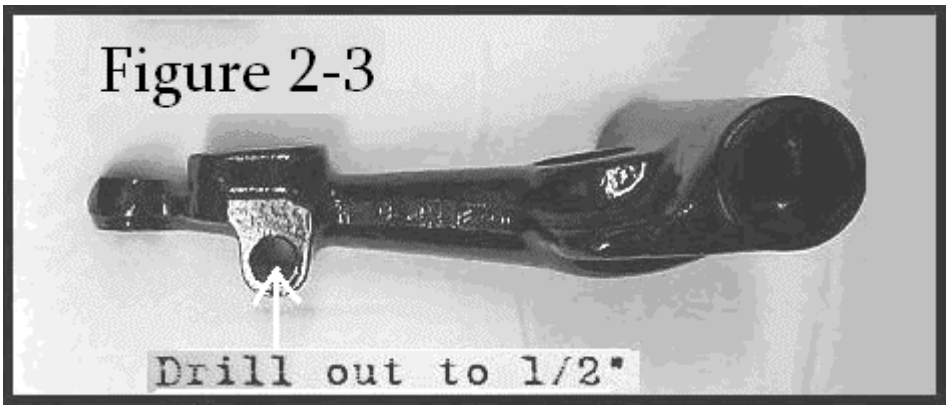


Figure 2-2

Upper Suspension:

Step 3: Drill upper suspension arm's shock bolt-hole to ½" using a ½" drill bit. Insert *½ x 4 1/2" bolt from the front side of upper arm all the way through. Slide one * ¾" Aluminum bushing onto the bolt as a shock spacer. (See Figure 2-3 and Figure 2-7)



Step 4: Install Mini upper suspension arms. You will need; RH and LH Stock Mini upper suspension arm assemblies with axles and thrust washers, *four 3/8 x 1" bolts, *four 3/8 lock washers, *two ½" locking nuts, * two ½" thin locking nuts, and *four ½" flat washers. See Figure 2-4 and Figure 2-5

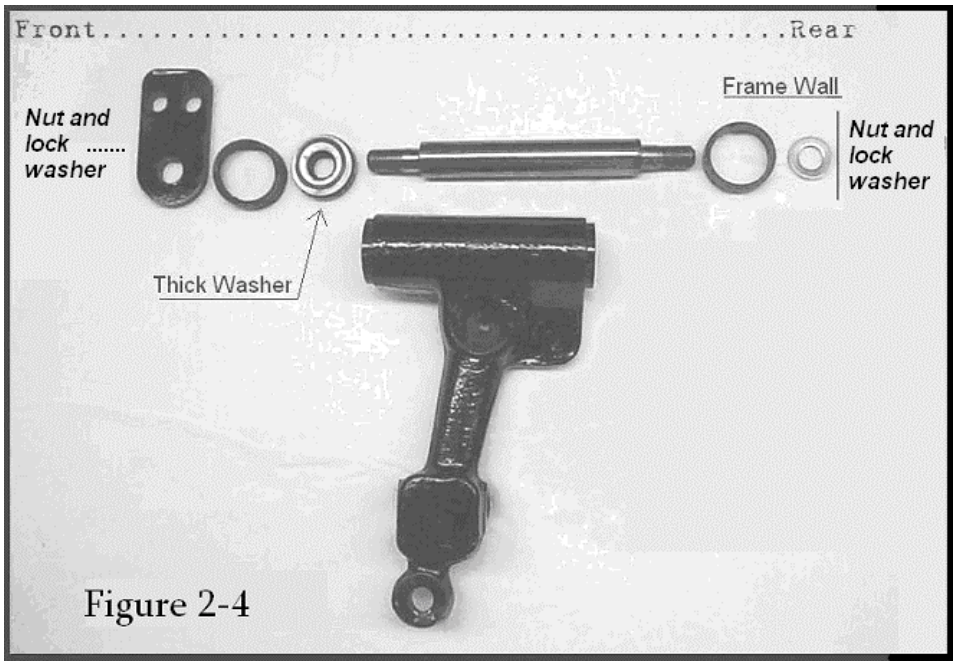
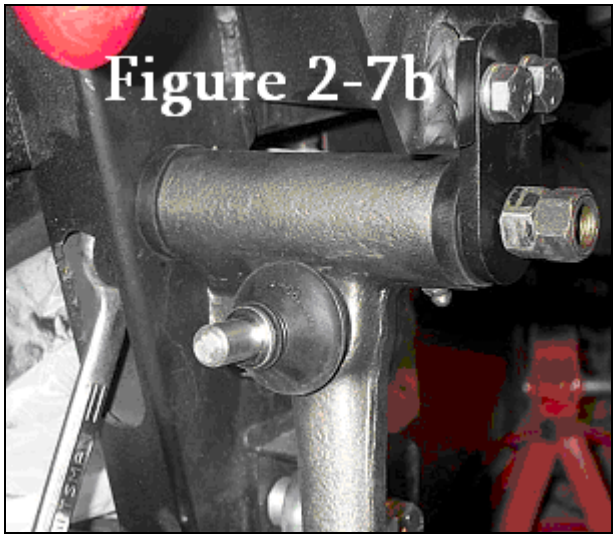
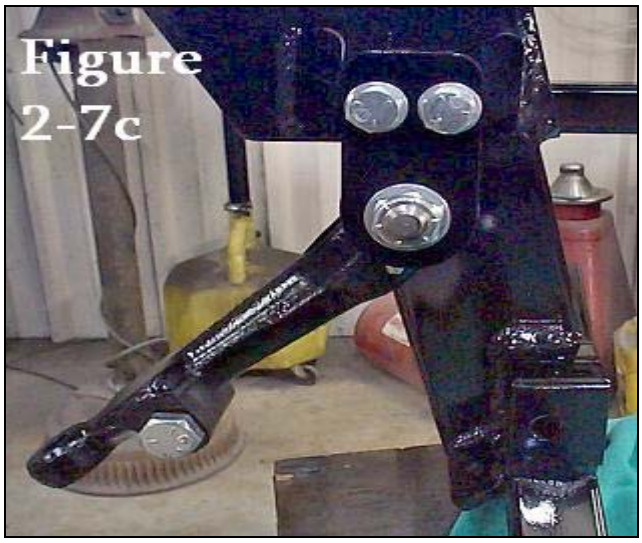


Figure 2-4





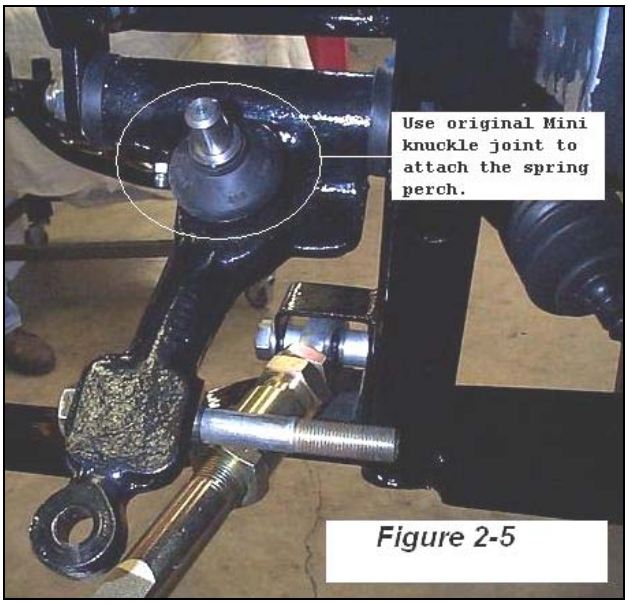
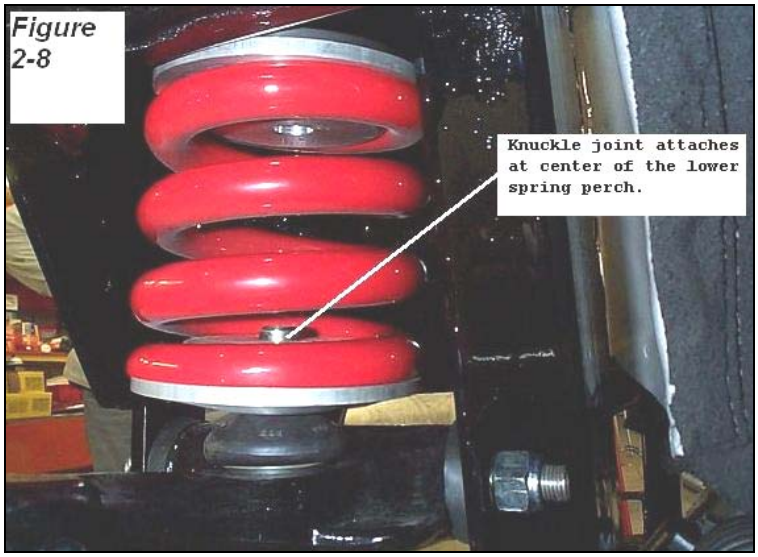


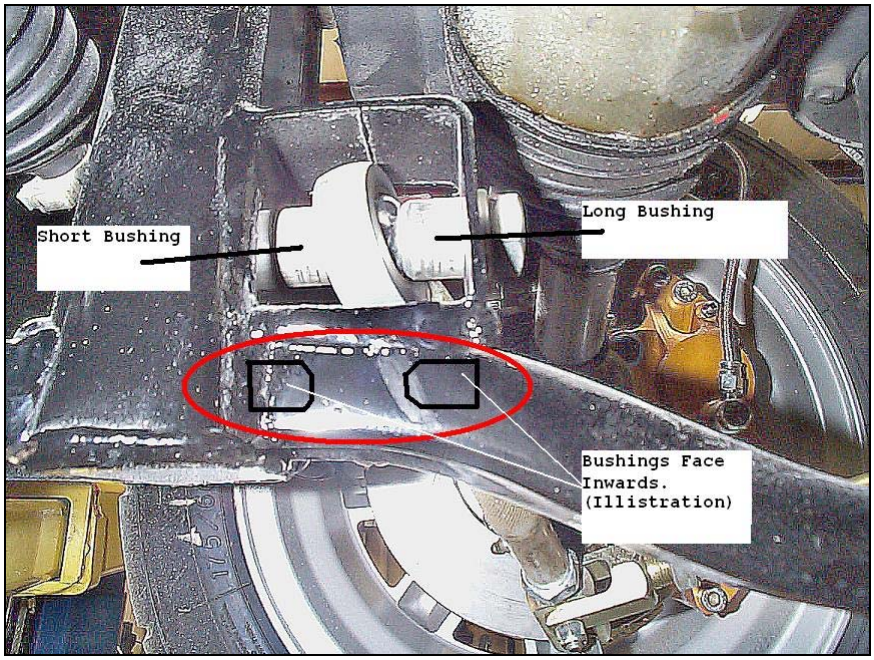
Figure 2-5

Step 6: Install inner and outer suspension springs. (See Figure 2-6, Figure 2-7, and Figure 2-8) The *Inner Suspension Spring (Blue) is to be inserted into the center of the *Red Outer Suspension Spring. Figure 2-6 illustrates how the height adjustor bolt attaches to the upper spring perch. This bolt, in the sub-frame, will allow you to set your Minis' ride height by simply screwing the bolt down to raise the car, or up to lower the car.



Lower Suspension:

Step 5, Option 1: Install Front end alignment kit. You will need Mini Tec's front-end alignment kit (40200), *two ½" bolts 2 ½" long, and *two ½" lock washers. (See next 2 photos)



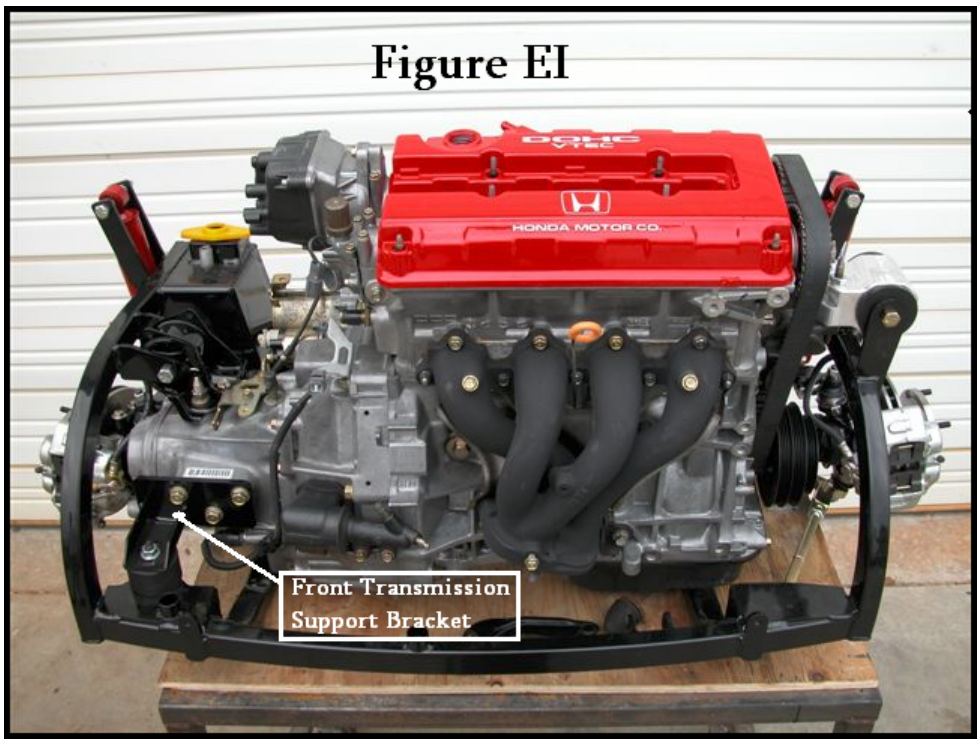
Step 5, Option 2: Install Mini lower arms and tie bars as done on a stock Mini.

Engine Installation:

Step 10: Drill stock Honda engine and transmission mount to ½".

Step 11: Attach engine to sub-frame using stock engine mount (use *1/2 x 4 ½ bolt) and stock transmission mount (use ½ x 4" bolt). (See Figure EI)

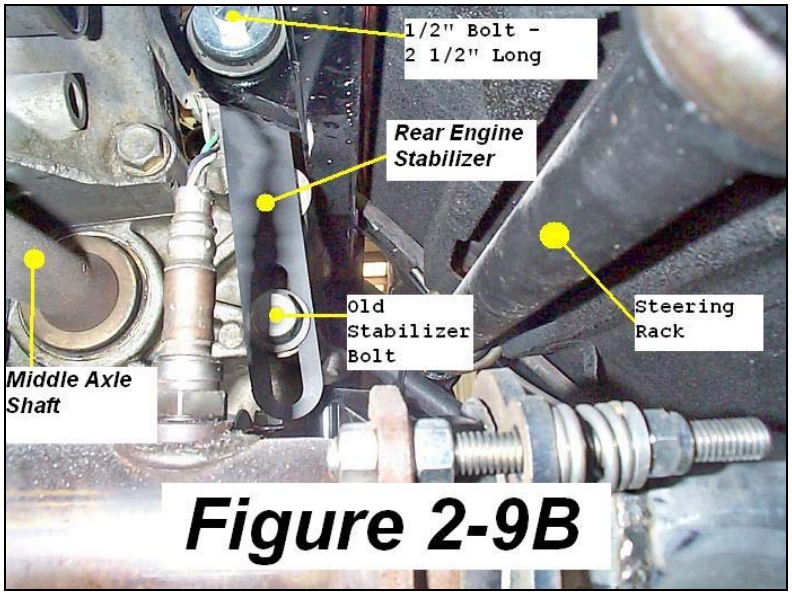
Figure EI



Your engine should now be mounted.

Step 7: Install *front transmission support bracket and bushing. (See Figure EI2)

Step 8: Tighten *rear engine stabilizer so that the Honda transmission is 3/8” away from rear cross bar of the sub-frame. This will give you correct engine alignment. (See Figure 2-9B)



Axles: Assembly and Installation

Parts needed for Assembly: *Axle Shafts (30 or 32 Spline), Complete Inner Honda CV Joint Assemblies, and Complete Outer Mini CV Joint Assemblies. (See Photo Below)

Step 1: Assemble Small end of axle shaft with the Mini cv joint assembly as done on a stock Mini. (See following four Photos)

Honda Axle End Assembly: Assemble large splinned side of axle with the Honda cv joint assembly. (See following four Photos)




Axle Installation: Simply slide one of the axles into the transmission and the other into the engine mid-shaft until the axles lock into place.

Swivel Hubs and Brakes:

Install the Swivel Hubs and Brakes as done on stock Mini. Replace Mini steering arm with the *Extended Steering Arm. Route all brake lines along the contour of the MT-B Sub-frame.

Shocks:

Mount the *HD Shocks as shown in following photo. For the upper shock mount, use the *4 x ½" bolt, 2 x .500" Aluminum bushings, one ½" flat washer, and one ½" nylon lock nut to fasten. For the lower shock mount, remove the nut and flat washer

that are on the upper suspension arm (Refer to Figure 2-7 from Upper Suspension Section). Slide shock onto the bolt. Replace the flat washer and nut, and tighten.

Master Cylinder:

Depending on your setup, you may have to relocate one of your master cylinders. If you have both master cylinders on the right side of the car, then they are clear. If you have both master cylinders on the left side, then the brake master cylinder will have to be relocated. We recommend getting a left hand drive conversion pedal box. This will allow you to mount the master cylinder on the right side of the car, clear of any objects. Note: For best clearance, check out Mini Tec's Racing pedal system.

Shifter Linkage:

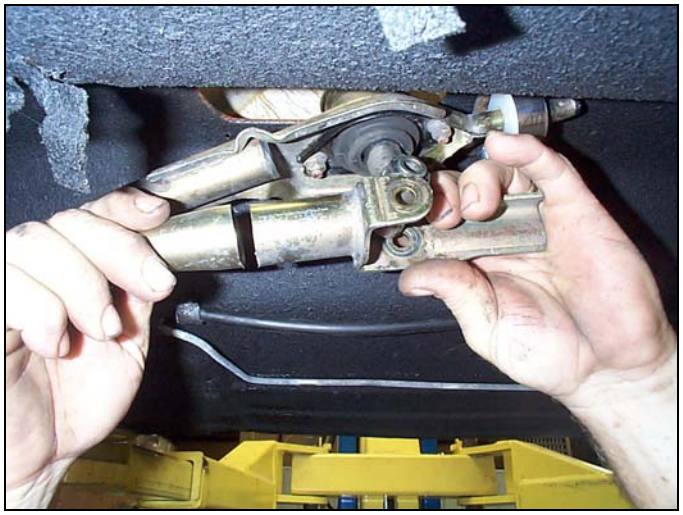
Use Honda Shifter linkage for the conversion.

Step 1: Cut all four ends off of the shifter linkage.

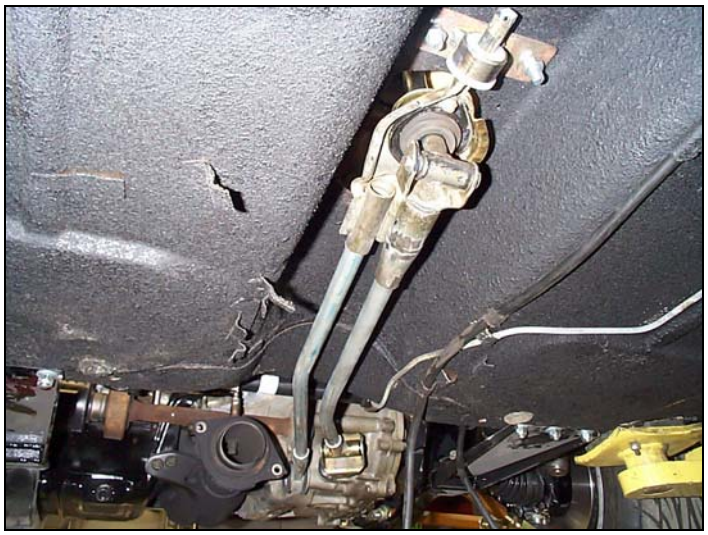
Step 2: Hang shifter in stock Mini location. New holes will need to be drilled. (See following Photo)

Step 3: Hang shifter ends on the transmission. (See following Photo)

Step 4: Reattach lower shifter end (as shown in following photo). The shifter rod reducers will be needed to rebuild the shifter linkage (shifter rod reducers are shown being held in previous and following photos).

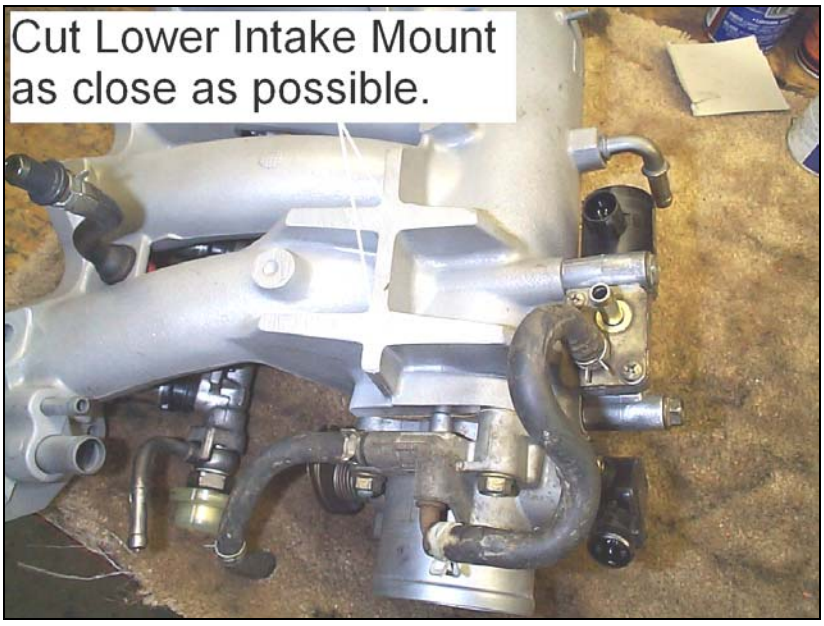


Step 5: Rebuild the shifter linkage using ¾" metal pipe. Bend and weld pipes so that all gears can be easily shifted to and from without hitting the body or anything else. (See following photo)



Fuel System: Change your fuel pump to one that ranges from 32 to 48 PSI. A return line will be needed on certain models that do not have them.

Intake: Cut lower intake mount as close to the intake as possible. This procedure is needed for maximum bulkhead clearance. (See following photo)



Alternator – Non A/C Models:

Step 1: Mount the *upper alternator bracket in the holes indicated in Figure A1 with the *two aluminum bushings behind it for proper spacing.

Step 2: Mount the *lower alternator bracket in the holes indicated in Figure A1.

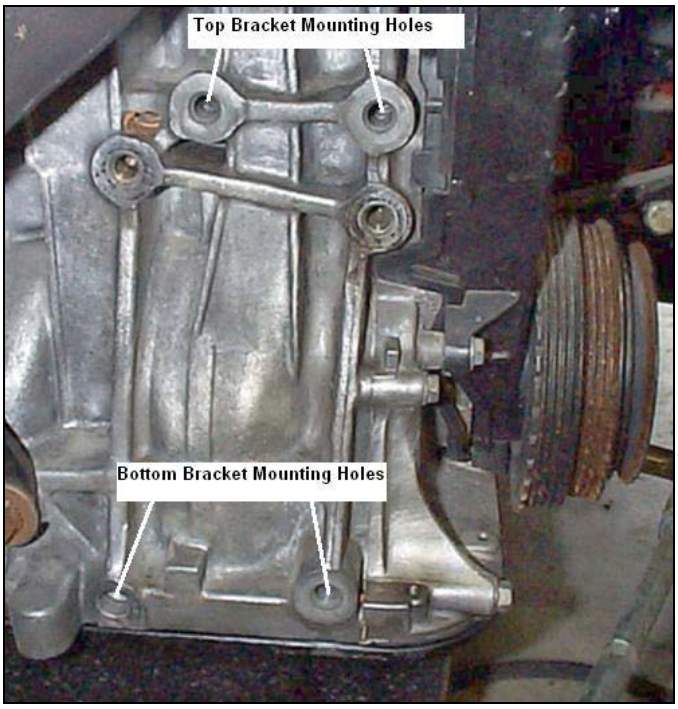
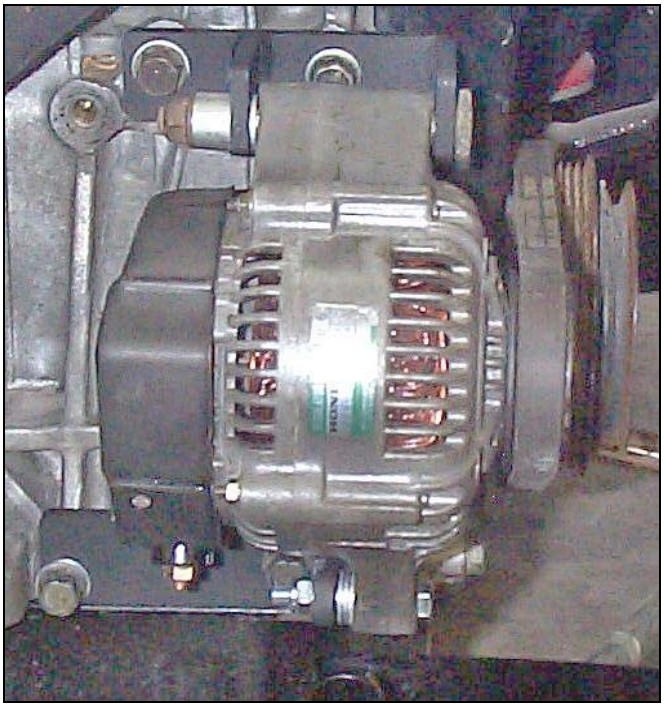


Figure 1A



Step 3: Use the stock Honda alternator bolt with the square head as the top alternator mounting bolt for attaching the alternator to the upper alternator bracket.

Step 4: Attach the lower alternator mount to the alternator.

Step 5: Adjust belt until tight.

Alternator Bracket A/C Models:

The alternator bracket A/C model will allow you to mount your alternator on the backside of the engine block, above the left height adjustor bolt. This will allow use of the stock Honda compressor bracket on the front side of the block.

In Figure 1AC; Hole 1 and 2 will be for the lower alternator mount. Use the stock Honda alternator bolt (the one with the square head), and the stock Honda round bushing to tighten it. Holes 3 and 4 will be your lower bracket mounting holes, to mount the alternator bracket to the stock Honda upper alternator bracket in Figure 2AC. Hole 5 is the upper bracket mount to the engine block. Hole 6 is the upper alternator mounting hole.

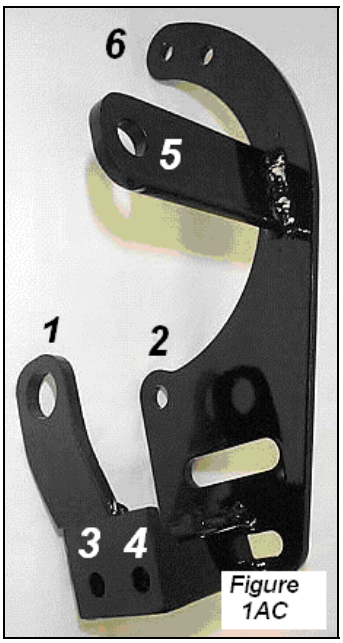


Figure 1AC

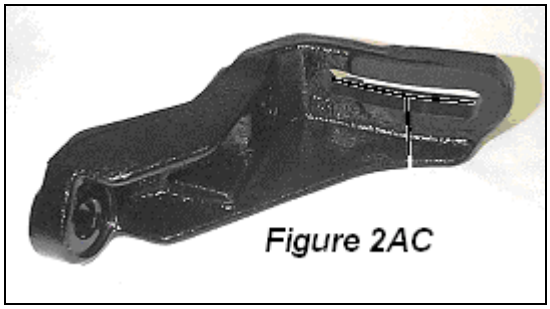
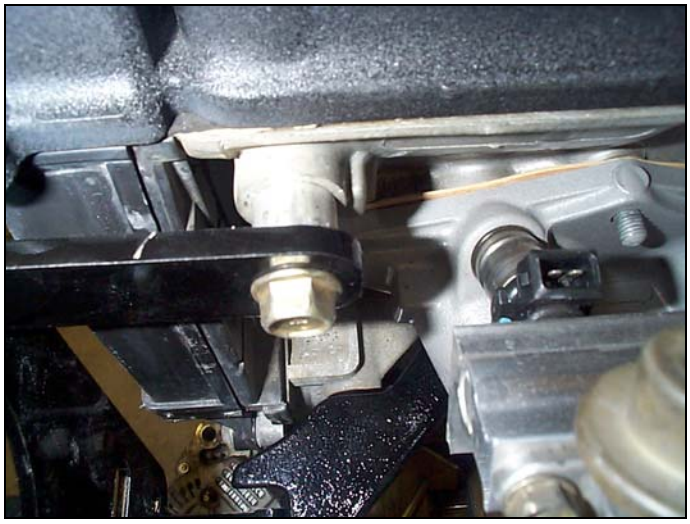
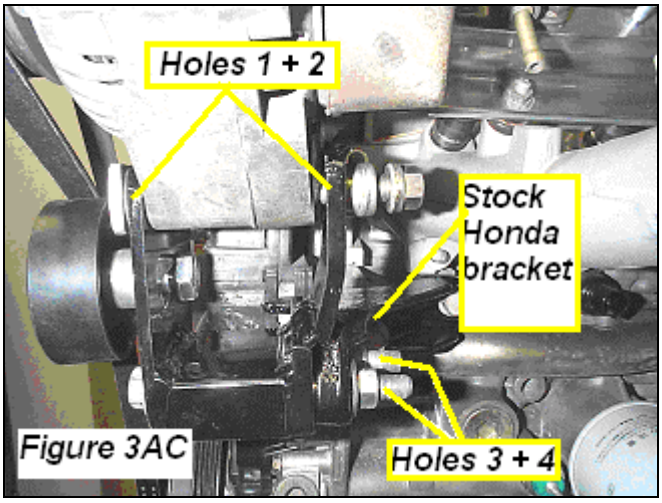


Figure 2AC

Step 1: Mount the Alternator bracket to the block as shown, using hole number 5: (See following Photo)



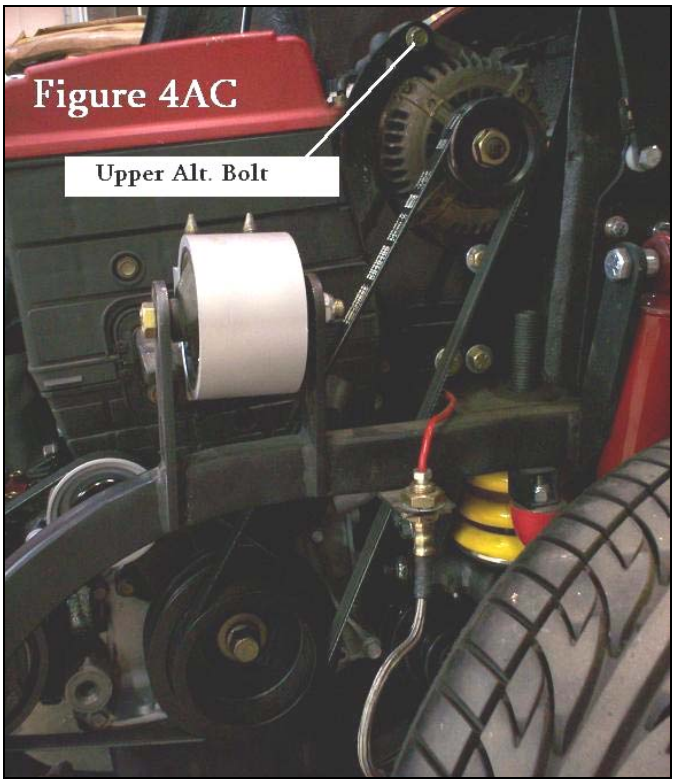


Step 2: Mount the Alternator bracket to the stock Honda alternator bracket using the *two 3/8" bolts. (See Figure 3AC)

Step 4: Mount the alternator to the bracket on the bottom as shown in Figure 3AC.

Step 5: Route belt around alternator pulley and corresponding crankshaft pulley.

Step 6: Pull alternator up, insert upper alternator bolt into hole 6 and tighten. (See Figure 4AC)



Cooling System:

The MT-B Sub-frame is designed to use the Honda Civic radiator 1992 – 1998 model. There are two tabs located on the front of the sub-frame for mounting this radiator.

Alternative: Mini Tec Radiator Kit – comes with everything you need to keep your Honda Mini running at the correct operating temperature. Items included are: Aluminum Radiator, Radiator fan, radiator hoses, and a catch can.

Wiring: Because the Mini is a stand alone system, only OBD1 computers can be used. Here are a few Pin-outs to help you wire your car. Contact your local Honda tuner for more information. We also offer plug-in wiring harnesses to relieve you of this step.

p72_obd1

A1	INJ1	INJ1
A2	INJ4	INJ4
A3	INJ2	INJ2
A4	VTS	VTEC solenoid
A5	INJ3	INJ3
A6	PO2SHTC	O2 sensor (heating element)
A7	FLR1	fuel pump
A8		(empty)
A9	IACV	IAC valve
A10		(empty)
A11		(empty)
A12	FANC	engine coolant temp switch
A13	MIL	MIL (check engine light)
A14		(empty)
A15	ACC	(a/c compressor clutch)
A16	ALT C	alternator
A17	IAB	IAB Solenoid
A18		(empty)
A19	(AUTO ONLY)	(a/t trans only)
A20	PCS	EVAP purge control solenoid
A21	ICM	ICM

A22		(empty)
A23	PG1	ground
A24	PG2	ground
A25	IGP2	to main relay and to ground for o
A26	LG1	ground
B1	IGP2	to pin A25
B2	LG2	ground to shields for CYP & TDC
B3		(a/t trans only)
B4		(a/t trans only)
B5	ACS	a/c switch
B6		(empty)
B7		(a/t trans only)
B8	PSPSW	PSP switch
B9	STARTER SIGNAL	starter signal
B10	VSS	vehicle speed sensor
B11	CYP P	CYP -P
B12	CYP M	CYP -M
B13	TDC P	TDC -P
B14	TDC M	TDC -M
B15	CKP P	CKP -P
B16	CKP M	CKP -M
D1	VBU	Back Up Power
D2	BKSW	brake switch
D3	KS	Knock Sensor
D4	SCS	service check connector
D5		(empty)
D6	VTM	VTEC pressure switch
D7	TXD/RXD	(data link connector)
D8		(empty)
D9	ALT F	alternator
D10	ELD	electric load detector
D11	TPS	TPS Signal
D12		
D13	ECT	ECT sensor
D14	PHO2S	O2 sensor
D15	IAT	IAT sensor
D16	VREF	VREF
D17	MAP	Map Signal
D18		(a/t trans only)
D19	VCC1	MAP 5V
D20	VCC2	TPS 5V
D21	SG1	MAP GND
D22	SG2	TPS GND

p30_obd1

A1	INJ1	INJ1
A2	INJ4	INJ4
A3	INJ2	INJ2
A4	VTS	VTEC solenoid
A5	INJ3	INJ3
A6	PO2SHTC	O2 sensor (heating element)
A7	FLR1	fuel pump
A8		(empty)
A9	IACV	IAC valve
A10		(empty)
A11		(empty)
A12	FANC	Fan Output
A13	MIL	MIL (check engine light)
A14		(empty)
A15	ACC	(a/c compressor clutch)
A16	ALT C	alternator
A17		
A18		(empty)
A19		(a/t trans only)
A20	PCS	EVAP purge control solenoid
A21	ICM	ICM
A22		(empty)
A23	PG1	ground
A24	PG2	ground
A25	IGP2	to main relay and to ground for o
A26	LG1	ground
B1	IGP2	to pin A25
B2	LG2	ground to shields for CYP & TDC
B3		(a/t trans only)
B4		(a/t trans only)
B5	ACS	a/c switch
B6		(empty)
B7		(a/t trans only)
B8	PSPSW	PSP switch
B9		clutch interlock switch
B10	VSS	vehicle speed sensor
B11	CYP P	CYP -P
B12	CYP M	CYP -M
B13	TDC P	TDC -P
B14	TDC M	TDC -M
B15	CKP P	CKP -P
B16	CKP M	CKP -M

D1	VBU	Back Up Power
D2	BKSW	brake switch
D3	KS	Knock Sensor
D4	SCS	service check connector
D5		(empty)
D6	VTM	VTEC pressure switch
D7	TXD/RXD	(data link connector)
D8		(empty)
D9	ALT F	alternator
D10	ELD	electric load detector
D11	TPS	TPS Signal
D12		
D13	ECT	ECT sensor
D14	PHO2S	O2 sensor
D15	IAT	IAT sensor
D16	VREF	VREF
D17	MAP	Map Signal
D18		(a/t trans only)
D19	VCC1	MAP 5V
D20	VCC2	TPS 5V
D21	SG1	MAP GND
D22	SG2	TPS GND

Suspension Setup:

These figures are for daily driving. You may want to set up the car differently if planning on racing your Mini.

- Front Caster Setting = 3.5 Degrees
- Front Camber Setting = -1 Degree
- Front Height = 1” gap from upper suspension arm to the rubber bump stop.

Check List: For your safety, please check…

- That every suspension component is fastened tightly.
- That the steering system is fastened properly.
- For a firm brake pedal.
- That the engine is stationary.
- All fluid levels are full.
- Tires are inflated properly
- All lug nuts are tight

Test Drive:

For your first test drive, go slow and easy to make sure that there are no problems. Listen to the car as you drive it for odd noises. Drive the car easy for a few miles and then go over the Check List again. After driving the car for 100 miles, check front suspension alignment.

After that, have fun!