ASSEMBLY INSTRUCTIONS FOR FORMULA "S" KIT

NOTE: THIS INFORMATION WAS OBTAINED FROM BILL RUTAN BY TOM COX & WAS EDITED BY GEORGE VAPAA FROM A PHOTOCOPY OF THE ORIGINAL.

BEGIN:

Remove front and rear body pieces and place chassis on saw horses no less than 10" from lowest part of chassis to floor. Remove lower body pieces. Install circular retaining rings on body fasteners on nose piece. Note that three body hanger brackets on each side use a longer fastener #360; the balance use a #220. Do not install retaining clips on the forward fasteners on the tail piece. The tail cannot be spread at this point and then must be removed from holes when the tail piece is removed.

SUSPENSION:

All lower arms are installed with shock mounting pins up and facing rear. Inner pivots are installed on chassis with pivot point down at front and up at rear using one 1/8" spacer behind each pivot. The inside ends of all lower arms may have to have metal removed to keep from fouling chassis members. Swing lower arm a minimum of 4" up and down from horizontal to check this clearance. Remove top stud from rear pivot on front lower arms.
This stud is then mounted with nut facing out to provide clearance for stud head internally.

The upper arms and pivots are installed with one aluminum shim behind the pivot opposite the spring hanger. Two types of SAAB pivots and bushings are used. 1/2" I.D. steel washers are supplied to space rubber pivot bushing and pivots out if interference is found when installing the A arms on chassis. THE REAR UPPER ARM MUST BE MODIFIED TO PROVIDE ANOTHER 10 DEGREES OF BOUND TRAVEL THROUGH THE UPPER BALL JOINT. THIS IS BEST DONE WITH A RAT TAIL FILE BY FILING THE INSIDE BALL JOINT MOUNTING HOLE UP ONE HALF THE HOLE DIAMETER (3/16"). THIS WILL ALLOW THE BALL JOINT TO TILT DOWN PIVOTING ON THE OUTER MOUNTING BOLT.

The SAAB rear hub assemblies can now be installed on the rear with the brake hose fitting at the rear. The steering arms are installed at this time pointing to the rear and downward (upside down). SAAB tie rod ends are used to connect rear track rod (supplied with lock washers) to steering arms. The track rod is connected to the chassis through the 3/8" diameter top hole at the rear chassis column. Use one 3/8" lock washer at spacer when mounting inner ball joint. Attach "L" shaped brake hose bracket to lower

holes of rear column facing forward. Backing plates are marked LH & RH. Install LH on right and RH on left.

The front suspension can now be completed. The hub casting and axle supplied is made to accept the SAAB pattern I and II backing plates. The upper and lower ball joint pins are held and keyed by the pinch bolt. A special U shaped shim is supplied to restrict the closing of the slot when tightening the pinch bolt. Torque pinch bolts to 25 foot-pounds. Check to see if pin is held securely. Backing plates are mounted with wheel cylinders towards the rear of the car. Brake hoses are attached by clips through the holes in the aluminum chassis insert and to the wheel cylinder and copper sealing gaskets.

STEERING:

The standard SAAB steering rack is installed on chassis with four spacer washers equal to 1/4" of each mounting bolt. Aluminum steering rod extensions are supplied with the lock washer to adapt to SAAB tie rod end. A spline steering connection is supplied to join steering rack spine shaft to steering shaft.

SPRINGS AND SHOCKS:

Shocks are identified as to location on shock body ("F" front, "R" rear). All shocks must have rubber limit bumpers forced over collar onto piston side of shock rod. They are doughnut shaped and supplied as bumpers for all shocks and top mounting bushings for rear shocks only. Front top mounting bushings are tubular in shape and are supplied. Three cup washers are supplied for front shocks. One cup washer is supplied for rear bumper and two heavy flat washers capture the rubber mounting bushings.

Wrap tape on base of shock bodies above spring mounting pads to center springs with slight interference.

Before installing shocks, loosen all suspension pivot nuts to release binding in bushings on suspension arms. Install shocks on lower end only.

With brake drums in place, attach road wheels with tires. Springs are identified by length. The longer springs with more coils are front springs.

TO INSTALL SPRINGS:

Lift chassis to engage top of spring in retainer. Lower chassis and add weight to compress springs and engage lock nut on shock rod.

COOLING SYSTEM:

The front of the SAAB radiator is the side with the small diameter tube soldered to the lower tank. The radiator must be modified as follows:
Remove filler neck and top inlet tube. Bend lower mounting brackets 90 degrees to the rear. Mount radiator on top hangers with brackets supplied. Attach to chassis with "V" shaped lower brace to lower brackets. Enlarge filler neck hole and shape to suit the 3" long brass tube supplied. This tube must point toward the hole centeres in the top body support mounted on the chassis. Cut the lower outlet tube at the rear flush with the bottom tank. Remove radiator from chassis and solder plate supplied over lower rear outlet hole and upper inlet hole. Solder off end of small bypass tube, solder top tube in place at proper angle.

It is recommended that soldering be done where facilities permit pressure testing after modifications. Reinstall radiator on chassis with radiator shroud. The radiator shroud is held at the bottom by the V shaped brace. It is held down at the top by two L shaped bolts. They pass through the loop in the radiator outer frame with a washer on either side of the frame. The lower hose is attached to the radiator through the hole in the shroud and is routed along the left side of the car held by wire clips attached to the fasteners through hole in the rear body section. Then it is rested on tp of rear chassis member to the rear hose connection on the water pump.

The top hose is routed to the right side of the car clamped to steering hoop, through the rear body section to the lower tube on the header tank.

FUEL SYSTEM:

Block off reserve tube at front of left fuel tank with 1/4" I.D. tube supplied with safety wire and plug.

Install fuel pump on forward right side of fire wall with 1/4" bolts supplied.

Install two short 1-1/2" I.D. hoses with hose clamps on fuel tank outlets. Join with hose clamps the 1-1/2" I.D. tee with fitting and shut off valve. Join valve to inlet side of fuel pump with 3/16" I.D. fuel line through center of fire wall to fuel pump outlet.

BRAKE SYSTEM:

Brakehoses are attached to chassis by spring clips at front and lock nuts at rear bracket.

Two 60" long 3/16" brake lines supplied are joined together with connector supplied and are installed along the right side of the chassis, outside of the lower chassis tube. Join to the rear fitting on the tee connection by passing the line through the last triangular chassis opening bending alongside and at the base of the column. Bend line to pass through the large hole in the rear diagonal member.

File one side of master cylinder for clearance, and install master cylinder on pedal assembly and bolt to chassis. The front end of the 3/16" line is passed through the large hole in the front diagonal member under the steering universal and master cylinder, up to the rear outlet on the cylinder and connected to the cylinder with the single outlet brass banjo fitting supplied.

This fitting must be sealed on both sides with a copper washer.

The left wheel brake line is 1/4" diameter, 40" long and passes from the left front hose through the large hole in the left diagonal member, bend down to floor and pass under the pedal assembly, then forward through the large hole in the right diagonal member under the master cylinder straight up and connected to the double outlet banjo fitting supplied. The right brake line is attached to top outlet on double banjo and bent down to pass under the steering universal and up to the right brake line.

SUSPENSION SETTINGS:

This car should be set up with 590 X 15 tires rear, 450 X 15 tires front. Goodyear 2 ply racing tires or other racing tires with an equivalent rolling diameter are recommended.

With front tires at 20 pounds cold and rear tires at 24 pounds cold, and car ready to race (fuel, water, driver on board) jump front and rear of chassis to maximum travel. All nuts on inner suspension pivots should be loose at this time. Check height of chassis to floor at base of chassis column. Front should be 3-5/8", rear should be 3-3/4". Shims are supplied to raise chassis. They are installed under coil springs. Caster settings are fixed. Camber settings at this time should be 1/2 degree to 1 degree negative front and rear. Shim lower A arm out to increase.

Toe in at front is 1/16", toe in at rear is 3/16" minimum.

ELECTRICAL SYSTEM:

Lead the wiring harness from the back of the instrument panel to the driver's right; then down the instrument panel hoop and back along the parting line between the nose section and the quarter panel securing the harness to the body panel clips as it is led to the rear. Pass the harness through the grommet in the outer firewall and into the engine bay. Lead fuel pump and regulator wires through the grommet in the center of the firewall. Connect the leads as follows:

WIRE COLOR CONNECTION

INSTRUMENT PANEL

Brown #12	Ignition switch - battery terminal
Red #16	Ignition switch - battery terminal
Blue #16	Ignition switch - ignition terminal
Yellow #16	Ignition switch - ignition terminal
White #16	Ignition switch - ignition terminal
Brown #16	Ignition switch - ignition terminal
Red #16 (2 wires)	Starter button
Green #16	Tachometer #1 Terminal
White #16	Tachometer & Terminal
Black #16	Mounting bracket to Tachometer Terminal
Brown #16 (2 wires)	Generator warning light

STARTER SOLENOID

Brown #12	Solenoid, large terminal
Blue #12	Solenoid, large terminal
Red #16	Solenoid, small screw terminal

GENERATOR

White #16	F Field terminal
Brown #12	D+ terminal
Brown #16	D+ terminal
Black #16	D- ground screw

COIL

Green #16	Coil - terminal
Blue #16	Coil + terminal

DISTRIBUTOR

Green #16 (2 wires)	Distributor terminal

RESISTOR

Blue #16 (2 wires)	Resistor terminal (2)

FUEL PUMP

Yellow #16	Pump

REGULATOR

Blue #12	B+
Black #16	D- ground
Brown #12	D+ armature
White #16	DF field

OPERATING INSTRUCTIONS FOR SAAB HM AND "S" ENGINES BY QUANTUM

IGNITION TIMING: With engine off and using a SAAB timing tool with indicator light or meter set distributor (VJ3BR7T points to open .01 mm (1/10 of one degree) before top dead center.

SPARK PLUGS: All HM and "S" engines are supplied with startup plugs (hot), do not operate vehicle without changing to cold plugs. Plugs can be obtained from your local Champion distributor. Champion K61T or Bosch 310 are two suitable cold plugs.

CARBURETOR: The main jets for a dual choke Solex are fitted with #150 front and #145 rear. If leaner jets are fitted (#145-140), careful checking of plugs and conditions should be considered. "S" engines are fitted with #160 main jets, #250 air correction and 32 mm venturi.

COOLING SYSTEM: Make every attempt to run this engine as cool as possible. The radiator should be equal to or greater than the 96 SAAB in efficiency. It is recommended that a header tank be fitted that is located above the cylinder head with a capacity of at least 2 quarts.

CYLINDER HEAD: Tighten the cylinder head frequently to 40 foot-pounds. Engine should be cold or cool (less than 100 degrees F).

VIBRATION DAMPER: Check rubber washer between front pulley and damper. This rubber should be cemented to both metal surfaces with rubber cement. Ply-O-Bond is recommended. Apply cement to both rubber and metal surfaces and assemble while cement is wet to ensure alignment.

IGNITION SYSTEM: A strong high output coil should be used to fire this engine properly. All plug leads should be well separated from each other and any engine part.

OPERATING RANGE: This engine should be geared to the vehicle to produce maximum speed at 6,000 RPM. Maximum power is developed at 6,000 RPM.

FUEL-OIL RATIO: One quart of oil to 5 gallons of fuel is recommended for racing. SAAB summer weight oil is recommended. This oil has an additive to improve its mixing with gasoline. All fuel should be pre-mixed in separate containers before filling fuel tank. If engine is stored for any length of time, particularly if subjected to any degree of temperature change, use a preservative oil to protect roller bearings.