BRUTANZA

SNOWMOBILE
SERVICE MANUAL

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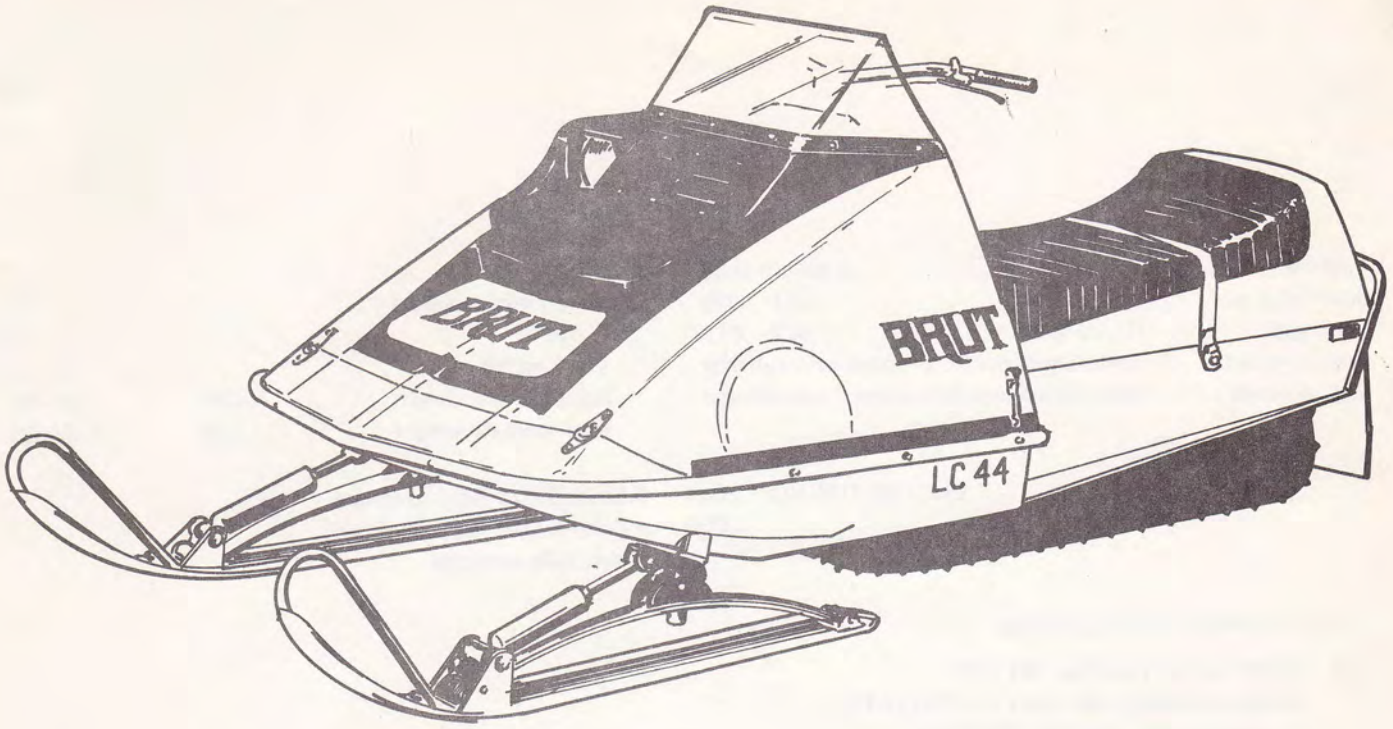
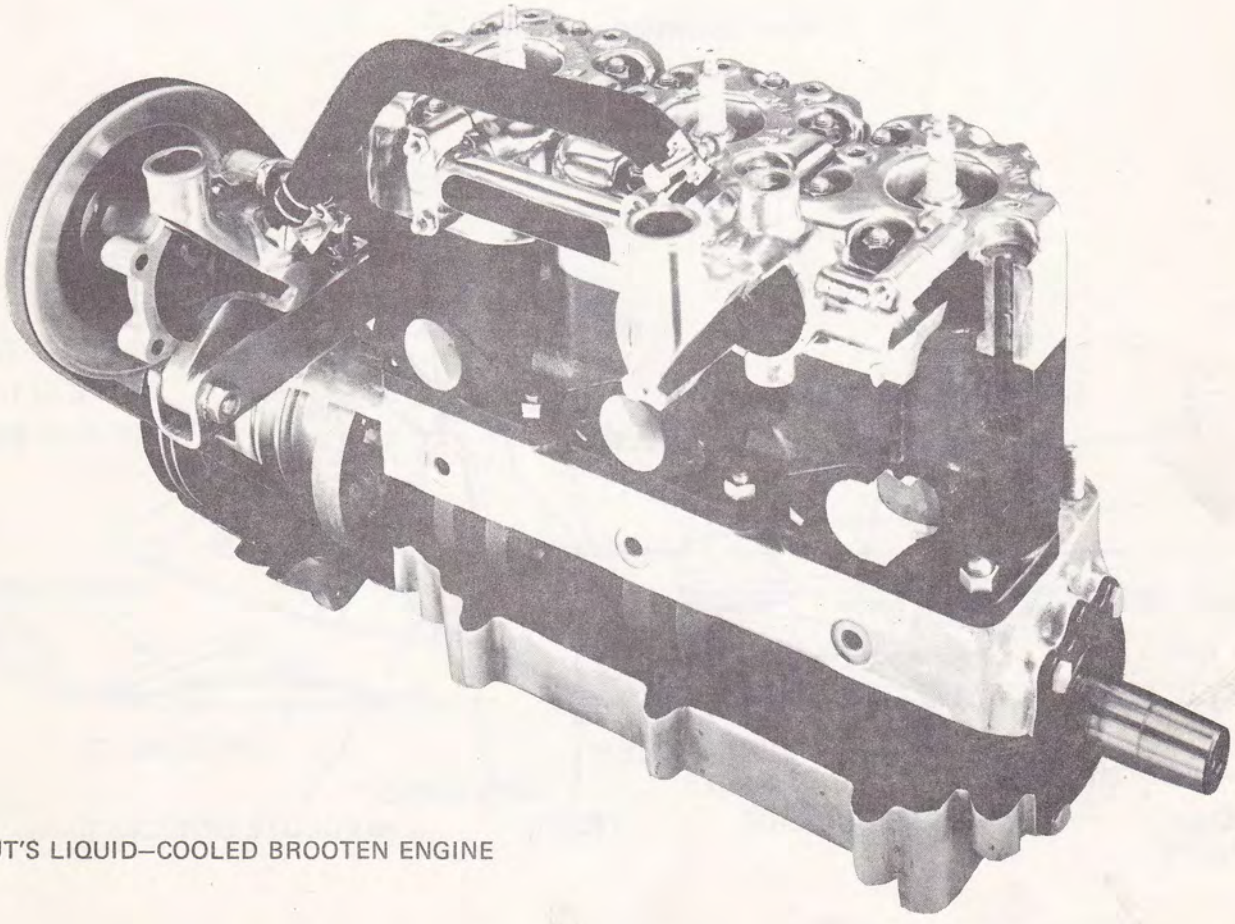


1973 BRUT SNOWMOBILE



BRUT'S LIQUID–COOLED BROOTEN ENGINE

BRUT SPECIFICATIONS

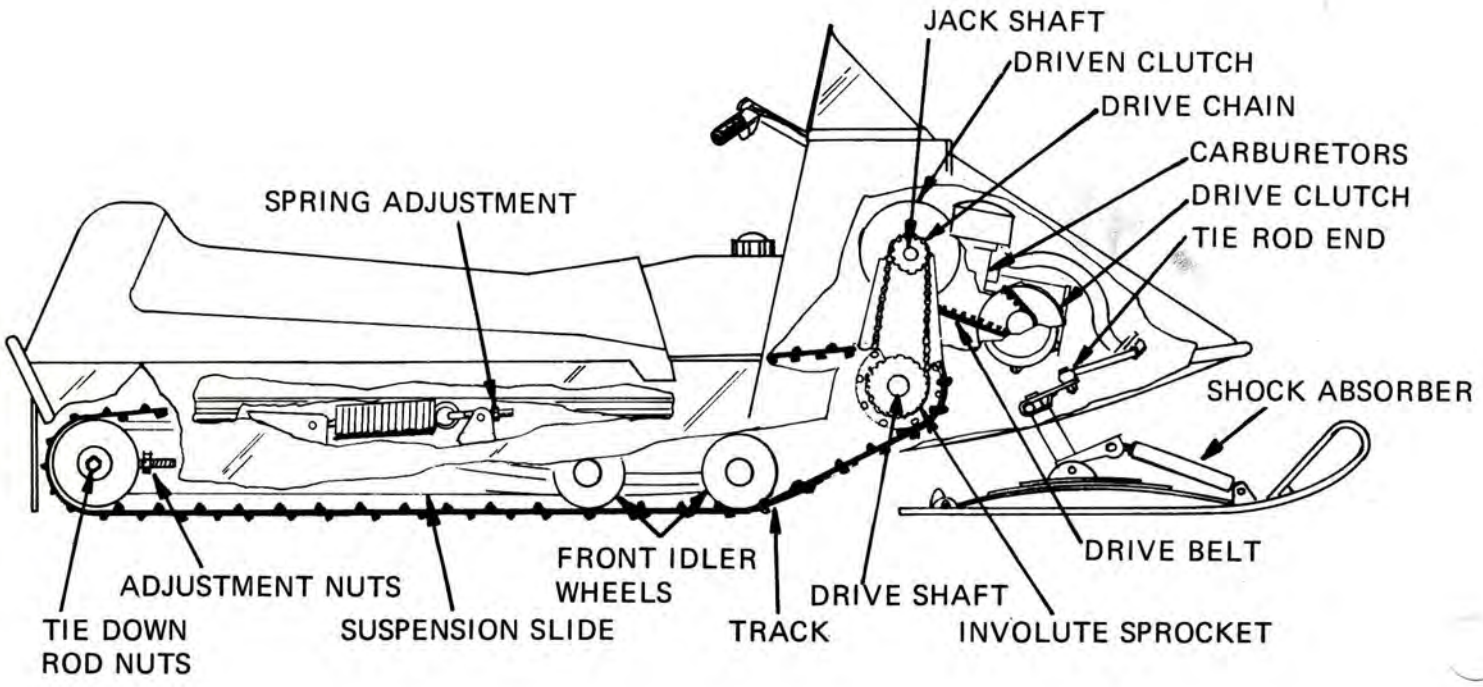
Fuel capacity	.5 gallons (US)	Length	102"
Spark plug gap	.017 - .020	Height w/windshield	.35-1/2"
Point gap (LC29 only)	.012 - .017	Width	.33-3/4"
Engine models	294cc liquid-cooled Brooten twin-cylinder	Track width	.15-1/2"
Engine models	439cc liquid-cooled Brooten three-cylinder	Approximate weight LC44	.395 lbs. (dry)
		Approximate weight LC29	.355 lbs. (dry)

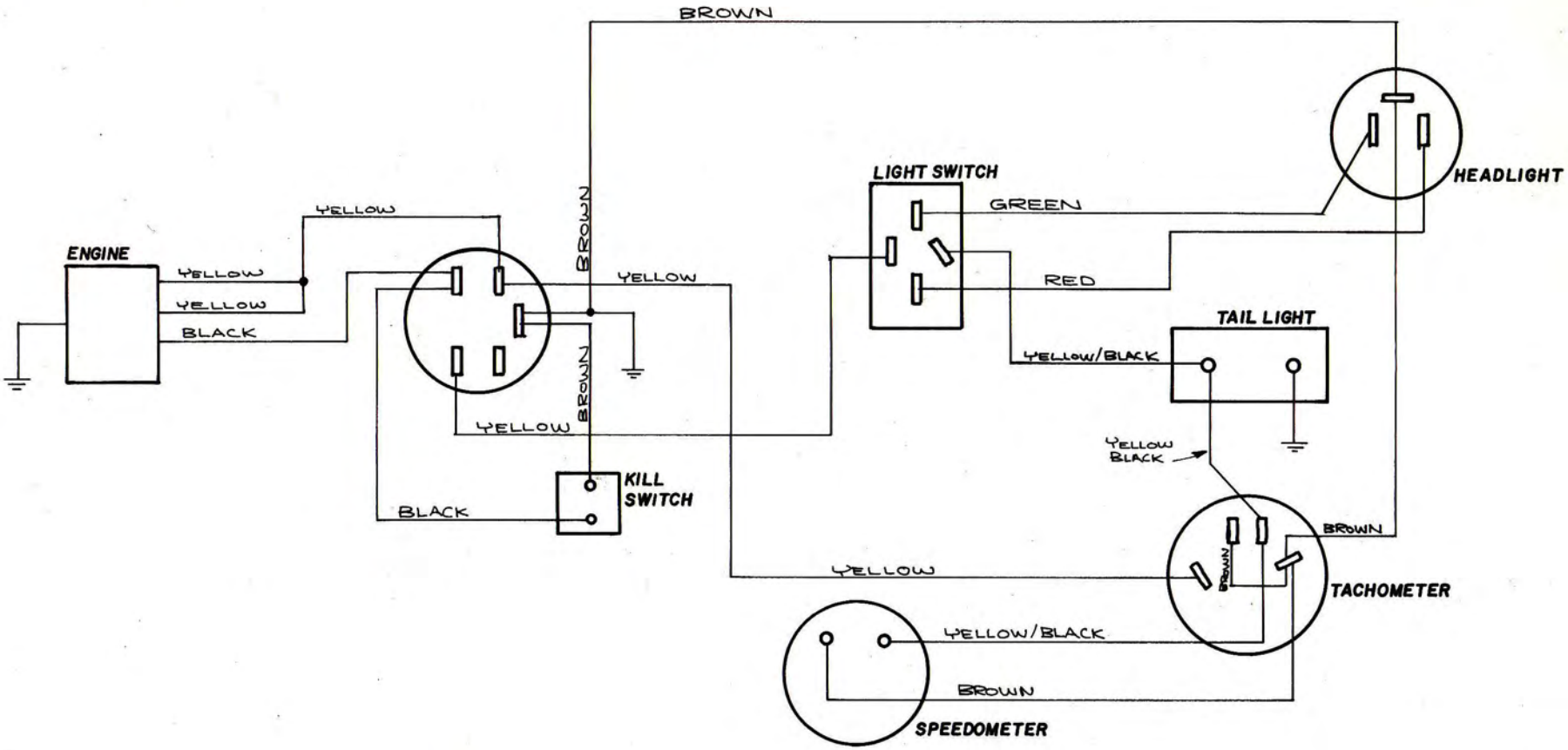
ENGINE TIMING: LC44 – 3.5mm BTDC fully-advanced
LC29 – 3.5mm BTDC fully-advanced
.6mm fully-retarded

BRUT SERVICE TOOL LISTING:

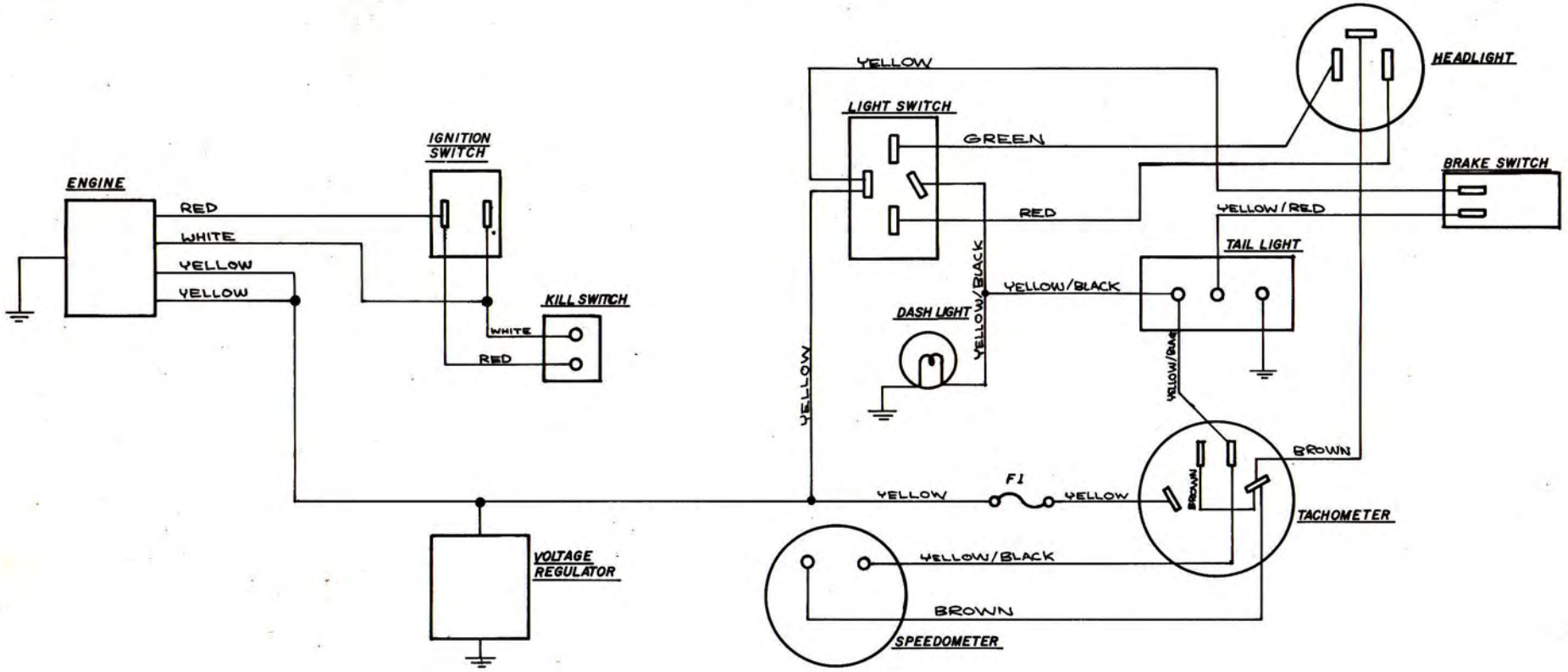
Clutch puller, Part No. 23112-11
Clutch alignment tool, Part No. 23122-10
Flywheel puller, Part No. 23123-10

BRUT SNOWMOBILE CUTAWAY

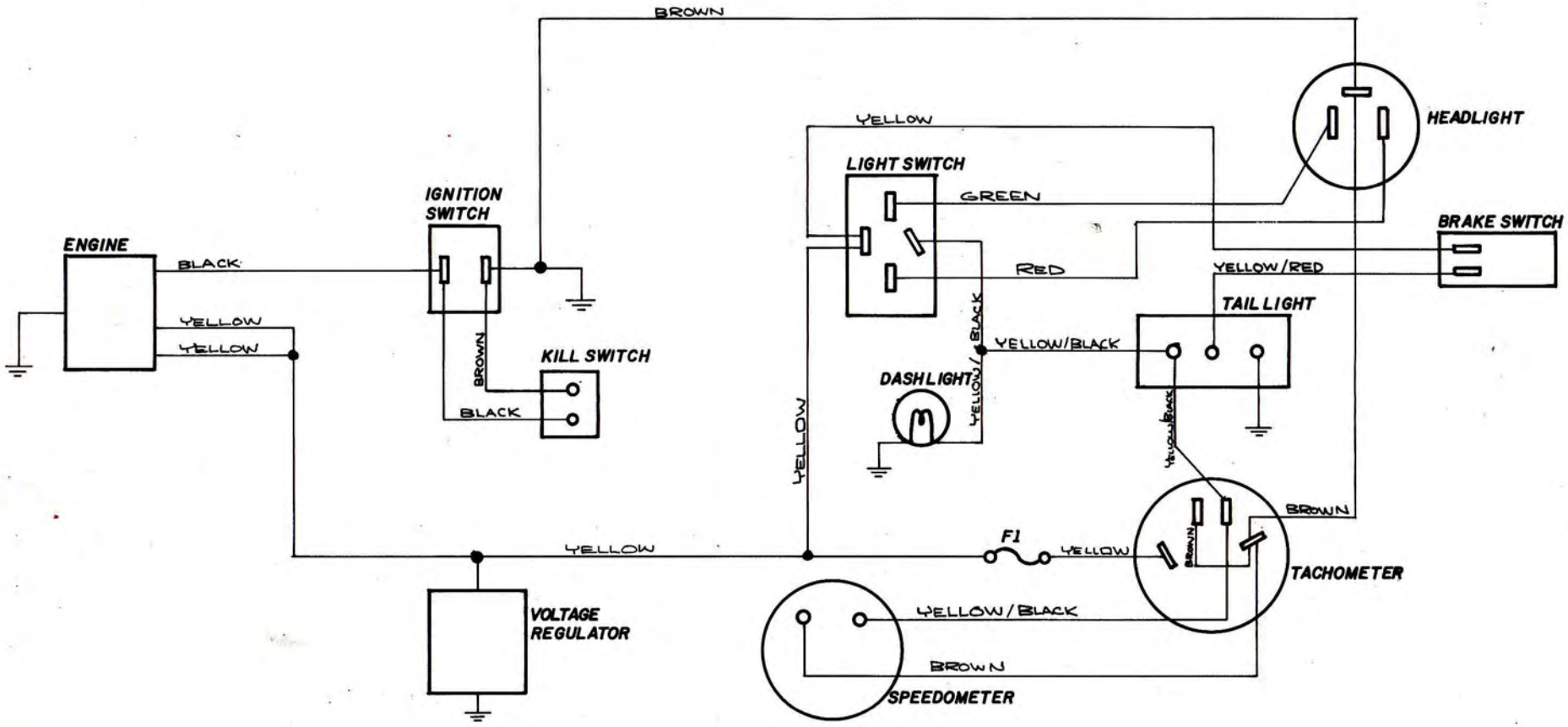




ELECTRICAL SCHEMATIC
1972 BRUT (440)



ELECTRICAL SCHEMATIC
1973 BRUT (294)



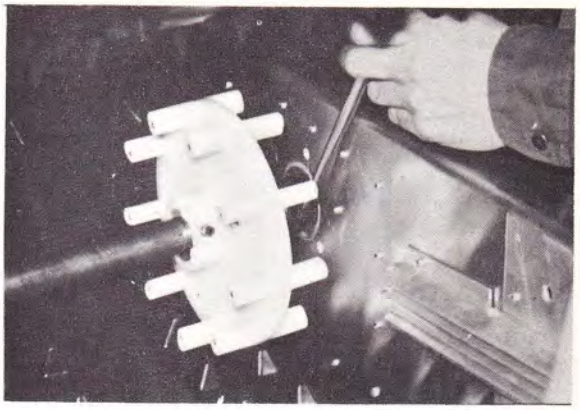
ELECTRICAL SCHEMATIC
1973 BRUT (440)

SUSPENSION

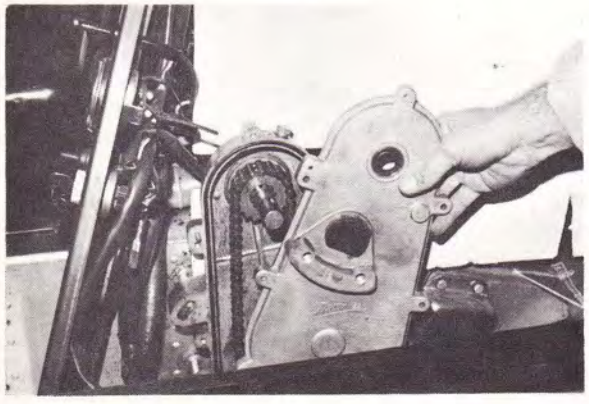
Remove suspension. To remove suspension remove the four (4) 3/8" locking bolts mounting suspension to chassis. Plug air bleed hole in gas cap, turn machine on to one side. Then pull out suspension.

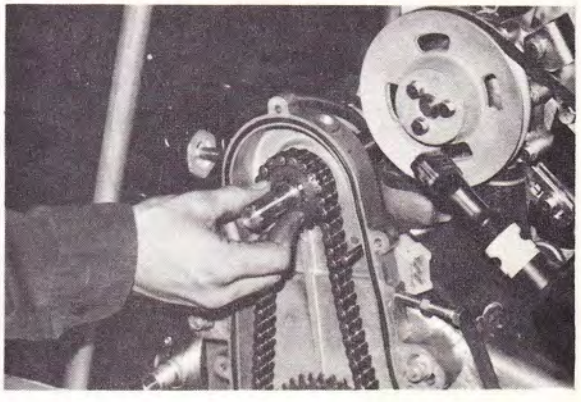
DRIVE SHAFT REMOVAL

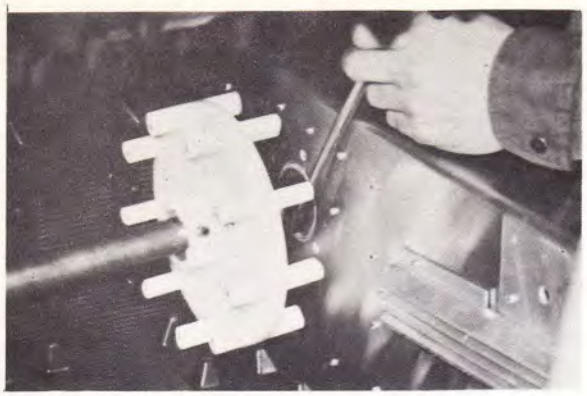
To remove drive shaft, the chain case must be removed and the suspension must be removed. On the left side of the machine is a locking collar positioned on the spherical bearing in the flangette. (Photo at right) Loosen allen screw, turn collar opposite way it was installed. Note punch mark in locking hole. Slide collar over shaft, then push shaft into chain case hole and pull out bottom.



Chaincase assembly must be removed before drive shaft can be removed. (Two photos below) Remove chain case drive elements. Remove chain by removing snap ring on upper sprocket and bolt on lower sprocket. Remove chain tensioner by backing out tightener bolt.







INVOLUTE DRIVE SPROCKET REMOVAL

With drive shaft removed, remove the involute sprocket. With long 1/4" punch, pound out 5/16" roll pin from shaft. Drive sprocket should slide off.

CLUTCH REMOVAL

Remove three (3) Phillips head screws holding bumper and hood extrusion onto nosepan on left side of machine only. Remove 5/8" head clutch bolt, then special large nut on clutch. Thread clutch puller into threads of special end nut. Bearing on end of puller will press against end of crankshaft and pull clutch, by tightening puller against crankshaft.

DRIVE INSTALLATION

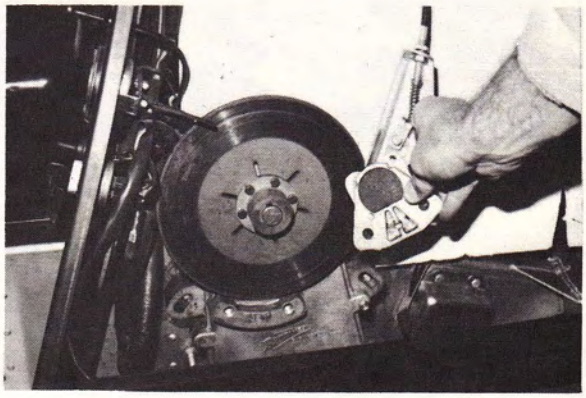
Lock collar must be on flangette side of shaft with eccentric portion facing tunnel before installation. Before installing chaincase, be sure snap ring is on shaft. With machine laying on left side, fit track into tunnel. Then push driveshaft into chaincase hole and back through spherical bearing mounted on the flangette. Holding drive sprockets as close to center of tunnel as possible slide chaincase onto drive shaft. Snug chaincase tightly up against tunnel. Slide top sprocket spacer over spline and install sprockets and chain. Screw bolt in driveshaft to hold chain sprocket on and center involute drive sprockets.

Slip snap ring on top drive sprocket in chaincase to hold it in position. Install chain tightener assembly and tighten chain so there is 1/2" deflection in chain. Jam locking nut on tightener bolt. Check "O" ring seal on chaincase cover and install if O.K. Be careful not to damage jackshaft seal when installing chaincase cover.

Go back to driveshaft inside tunnel and slide lock collar into position next to flangette bearing. Turn collar lock with punch and tighten with allen wrench.

BRAKE INSTALLATION

Place inner brake puck in chaincase cover. Install brake disc, then brake assembly. Make sure actuating pin points toward actuating lever.



SUSPENSION INSTALLATION

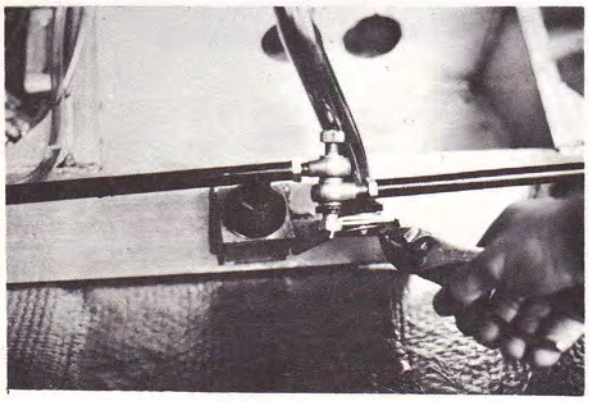
With track and driveshaft installed, you can now install suspension. Raise machine rear approximately 30" off ground on secure stand. Slide suspension into track. Line up front two (2) mounting bolts, insert and tighten. Slide a 2"x2" or 2"x4" block under track, positioned just behind second set of front idler wheels. Drop rear of machine down. Push down or up on machine rear while holding rear suspension mounting shaft until shaft is in line to insert mounting bolts. Tighten bolts and align suspension. See p. 23

ENGINE REMOVAL

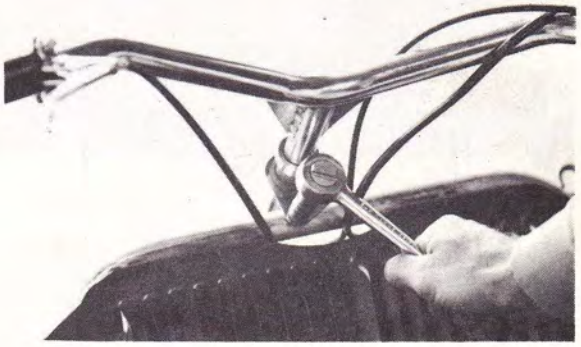
Loosen linkage rod tie down screws on choke and throttle on carb next to water pump. Loosen cable tie down screw on choke cable housing. Remove throttle cable at throttle lever next to handle grip.

Disconnect fuel supply and return line at carburetor. Disconnect impulse line on carb next to water pump.

Remove 3/8" nut holding tie rod ends to steering post frog.



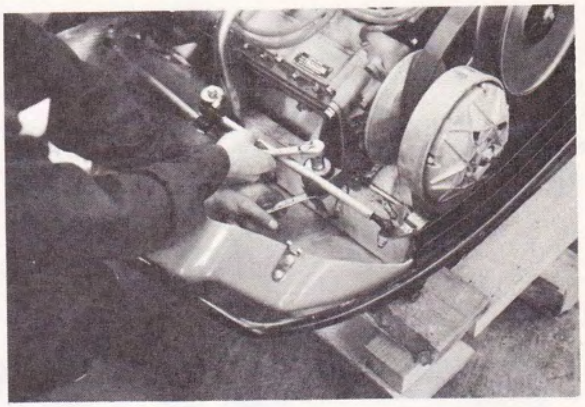
Remove cotter key at base of steering post.



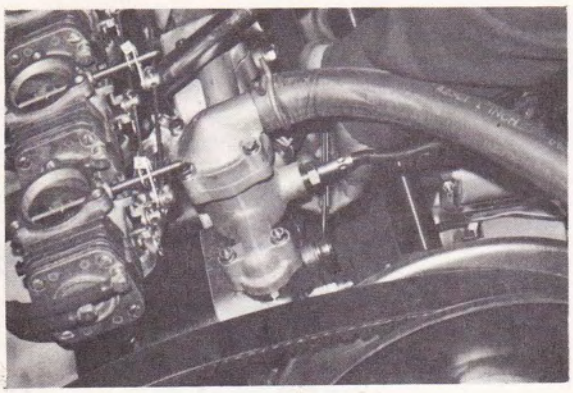
Remove two (2) 1/4" nuts at upper steering yoke. Lift steering post away from engine compartment.

Disconnect CDI unit lead to engine. Disconnect the two (2) yellow lighting wires and black ground wire leading from stator unit. Disconnect spark plug leads.

Disconnect temperature gauge line from engine and plug hole with small cork. Remove coolant hoses and plug holes with corks so coolant does not spill.



Remove 7/16" lock nuts holding front motor mounts to chassis.

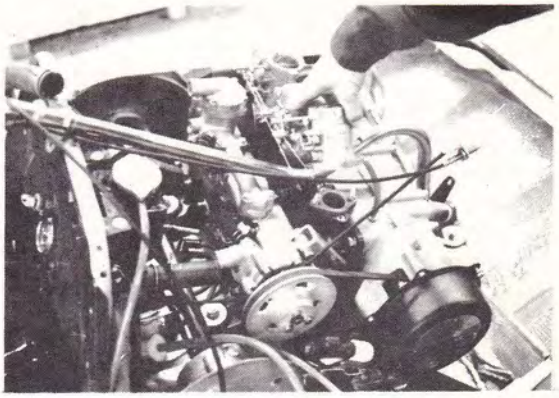


Remove the six (6) 12mm head bolts on rear pair of motor mounts. Lift engine and drain coolant. Be careful not to let engine drop and break the plugs during removal.

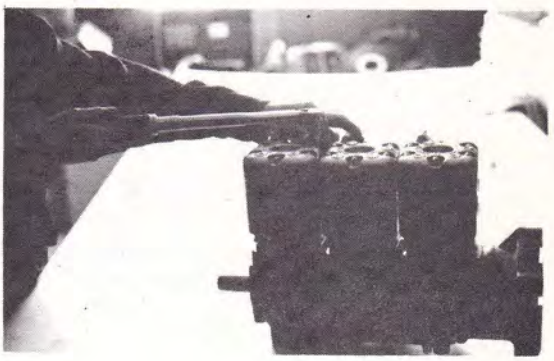
ENGINE DISASSEMBLY

Remove the 1/2" nuts holding down carbs.

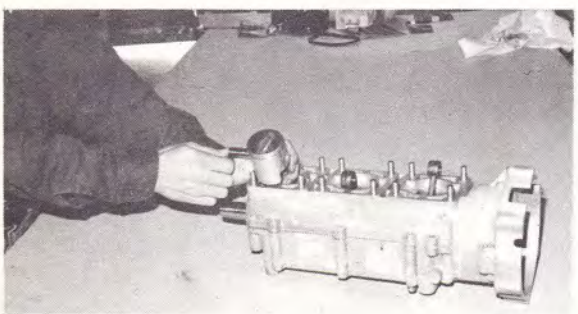
Next remove the 12mm head nuts and one bolt in crankcase holding on muffler. Remove 10mm head nuts holding both water manifolds in place, then remove manifold after disconnecting coolant bypass hose.



Remove the three (3) 12mm head bolts holding water pump mounting brackets to end cylinder, then remove water pump and brackets. Remove motor mounts on top and bottom of engine.

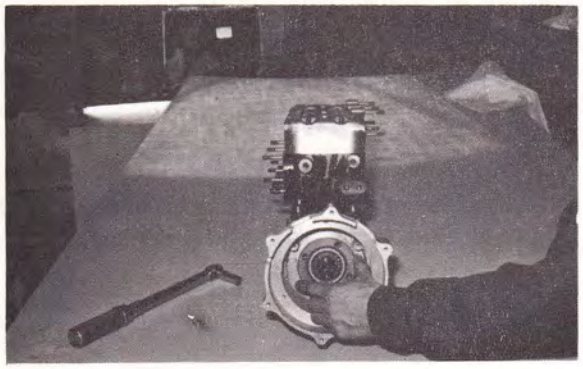


Remove 12mm head nuts holding heads on, then remove heads while prying up gaskets with flat edge.



Remove 14mm nuts holding down cylinders and slide cylinders off pistons. With snap ring pliers remove snap ring holding piston pin in position. Don't apply excessive side pressure on connecting rod while removing piston pin. Remove wrist pin bearing and spacers.

Remove 10mm head bolts holding on recoil and take off recoil. Remove 10mm head bolts holding on belt pulley. Remove 10mm head bolts holding on dust cover. Remove 30mm head nut on flywheel and install 10mm head bolts furnished with flywheel puller and a 27mm socket for the flywheel puller and remove rotor.

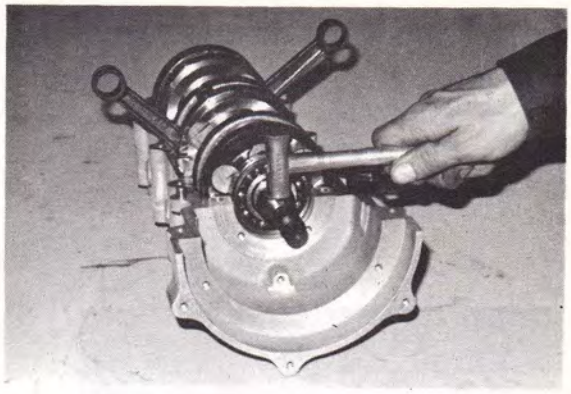


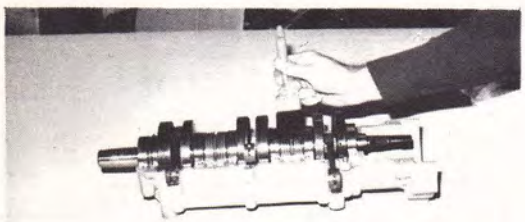
Remove Phillips head screws on special seal on flywheel side and remove seal. Bend lock tabs back on 12mm head bolts holding seal plate on end of crankshaft, remove bolts, then seal plate.

Now you can disassemble crank[redacted]. Remove eighteen (18) 12mm head bolts and two (2) 14 mm head bolts with plastic hammer, tap on one half of crankcase, holding the other half in one hand. When case separates, shaft can be removed.

ENGINE ASSEMBLY

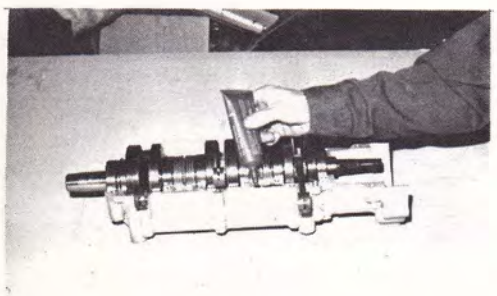
Lay crankcase lower half on workbench. Place crankshaft in crankcase. Install rotor key in crankcase.



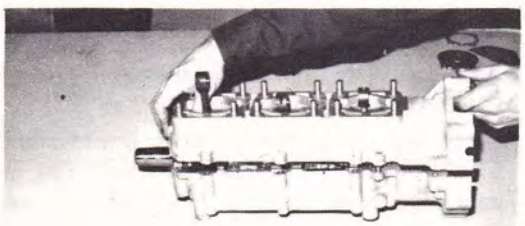


Grease labyrinth seal and oil bearings.

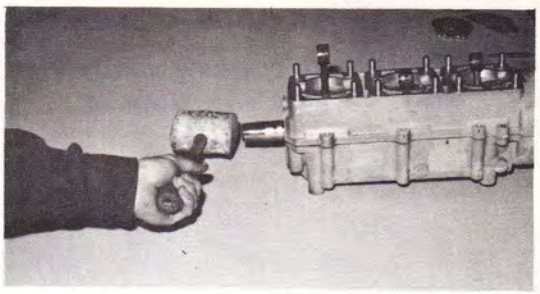
Install spacer ring next to ball bearings on flywheel side.

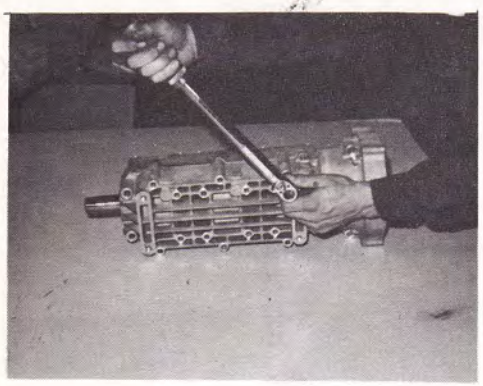


Smear gasket sealer on upper joining half of crankcase and fit onto lower half carefully.

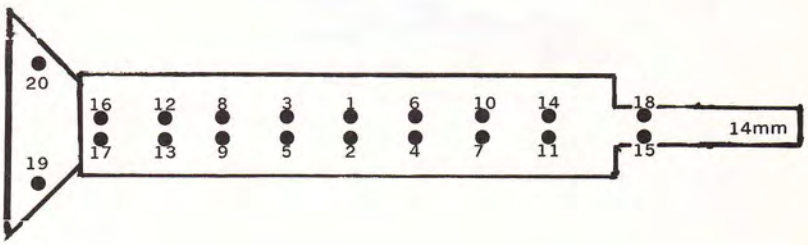


Tap clutch end of shaft with plastic hammer to position shaft correctly in case.



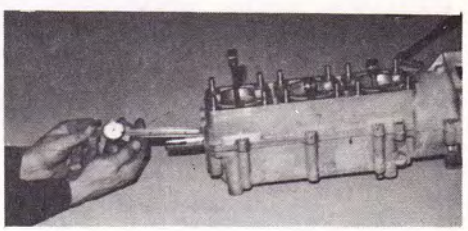


Install eighteen (18) 12mm head bolts and two (2) 14mm head bolts and torque-tighten according to pattern in illustration below.

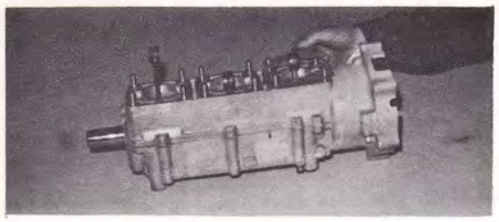


Torque 14mm heads to 25 ft. lbs.
Torque 12mm heads to 18 ft. lbs.

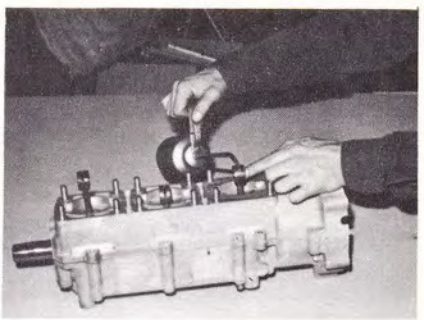
With depth micrometer, measure from seal plate mounting surface on case to outer race of shaft ball bearing.



Choose from three (3) thicknesses of gaskets to place under seal plate. If micrometer measures from .091 and up, use .2mm (.008"); if it measures from .081 to .091, use .3mm (.012); if it measures from .080 and down, use .5mm (.020"). Install correct gasket and seal plate, tend lock tabs over plate bolts.

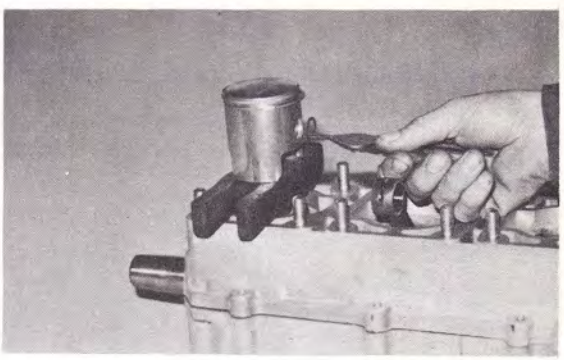


Install cylinder base gasket.



Place wrist pin bearing in connecting rod, then place piston pin spacers on ends of bearings, being careful not to drop them. Lubricate wrist pin bearings.

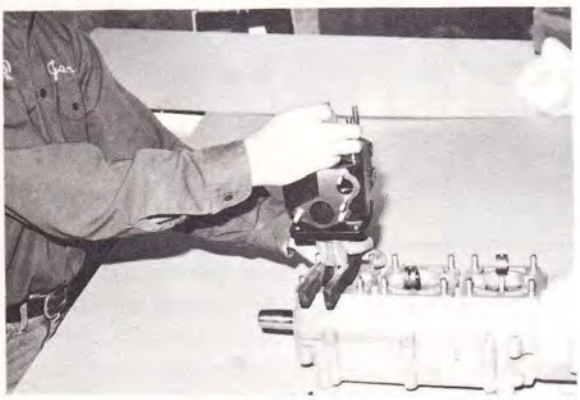
Slip piston over connecting rod with bearing and spacer. Slide piston pin through piston, bearing and spacer, then install snap rings at both ends of piston pin. On 1973 models with the "L" ring, locator pin must face intake port with second ring, locator pin between exhaust and transfer port. On 1972 models both locator pins are between the transfer ports and the exhaust port. This places locating pins for piston rings so rings do not catch in ports.



Put one snap ring on each piston before installing on rod so you don't have to squeeze on between two pistons.

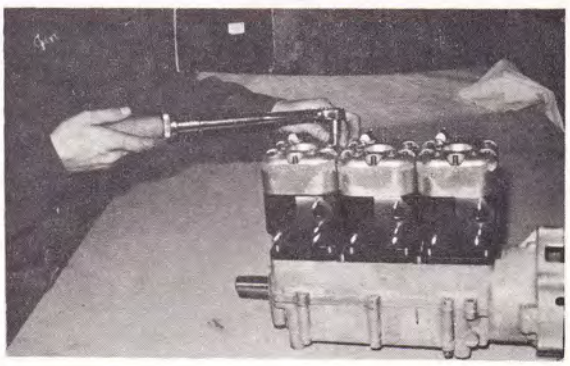
PISTON RING INSTALLATION

Use piston ring pliers to expand ring until it just slips over piston. Be sure ring is correctly positioned so ring notch slides into ring locating pin correctly. With rings in place, set pistons aside.



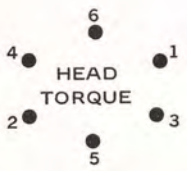
After pistons have been installed, bolt on cylinders in any order. Position cylinders so intake port, or carb side, is toward side of crankcase with impulse fittings. Place wooden block under piston so it sits solid on crankcase. With ring compressor over piston rings, slide cylinder onto piston.

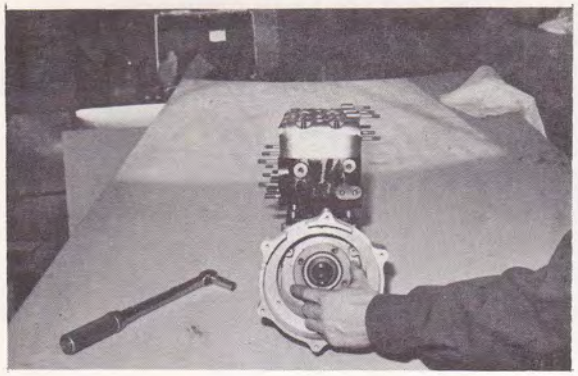
Caution: Ring ends will catch in transfer ports so you must press them in your fingers. Do not force cylinders on! When rings do not catch, cylinder will slide on with little effort. With cylinders in place, tighten four (4) 14mm head nuts on each cylinder securely.



Put water manifold on cylinders and torque 10mm head nuts to 60 inch lbs.

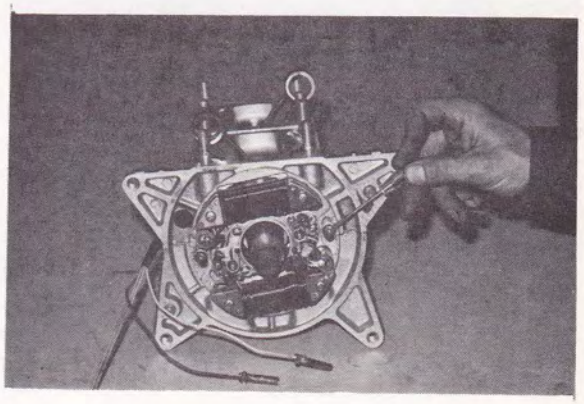
Install heads and torque nuts to 17 ft. lbs. according to the following torque pattern:

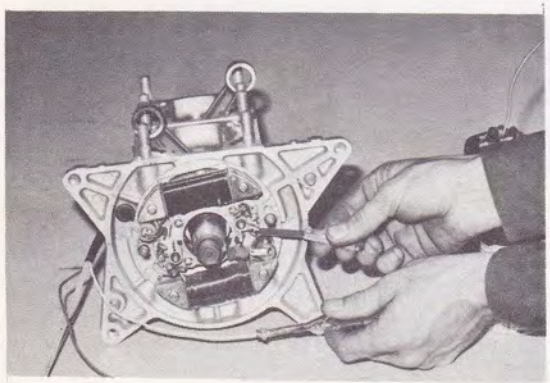




Grease and install Seal on recoil side. Install flywheel and torque to 60 ft. lbs.

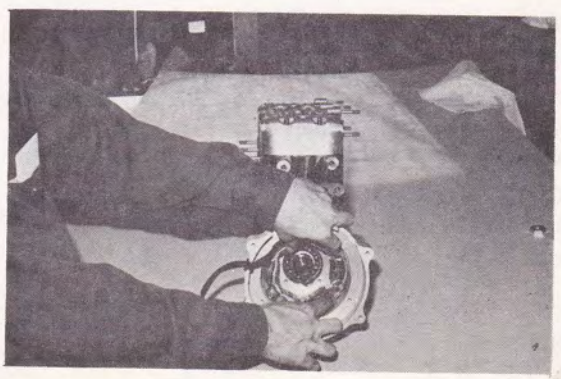
(LC29) Mount stator plate in center of slots.



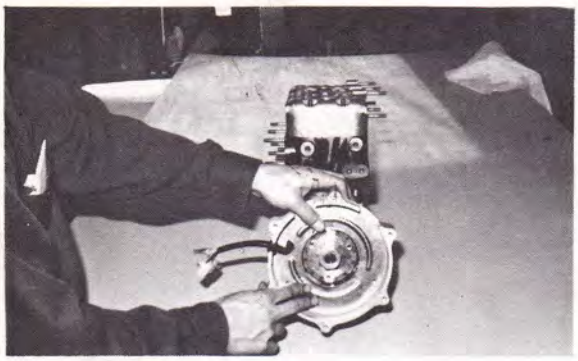


(LC29) Coat breaker cam with thin coat of grease. Connect timing equipment, light, buzzer or ohm meter to white primary lead, adjust point gap to get correct timing. Point gap should be between .011 and .017.

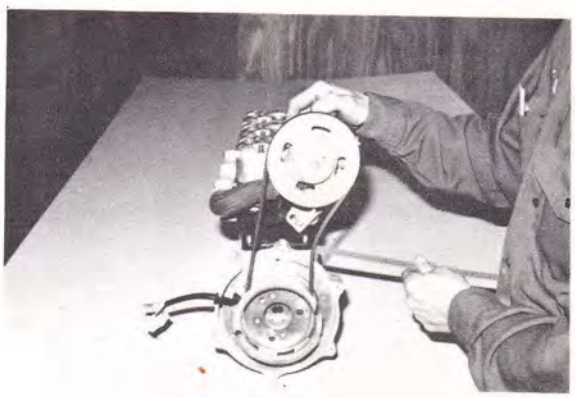
Install stator with three (3) Phillips head screws after aligning installing holes with machined holes in crankcase. (Do not force stator in, it should slide in by hand snugly. Do not rotate stator, holes must line up!)



Key rotor on crankshaft. Torque 30mm nut to 55 ft. lbs.



Install dust cover next to rotor stator assembly with 10mm head cap screws. On 1972 models, spacer ring must be in place before installing lower belt pulley. With ring in position, install pulley with 10mm head cap screws. Slide "v" belt over pulley and install recoil and spacer ring (1972 only) on crankcase.



Slide outlet water pipe on manifold and torque 10mm head nuts to 60 inch lbs.

With brackets mounted on water pump, slide belt over pump pulley and screw brackets onto cylinder with three (3) 12mm head bolts. Tighten belt with tightener bracket until you reach 1/2" deflection in belt.

Install water inlet hose and bypass hose, and tighten clamps. Fit exhaust gasket on manifold and install muffler with 12mm head nuts.

Install the two carbs closest to clutch. Throttle bracket fits under carb nearest clutch. The 1/4" spacer fits under two carbs nearest water pump.

Install two (2) lower engine mounts with four (4) 14mm head bolts.

Set engine in chassis and install six (6) 12mm head bolts in two (2) rear engine mounts and two (2) 7/16" bolts on front mounts. Set steering post in position and fasten all bolts. Install third carb next to water pump. Install throttle cable on cable bracket mounted toward center of threads.

Slide linkage rods through choke tie downs on the two carbs closest to flywheel and loop cable around carb closest to clutch. Replace tie-down screw after looping over linkage swivel. Mount choke cable on choke cable bracket and tighten securely. Pull choke and throttle cables through linkage swivel and tighten tie down screw.

THROTTLE ROD ADJUSTMENT

Loosen linkage rod tie down screws on the two carburetors closest to clutch. Squeezing the throttle, the linkage rod should move freely inside tie downs without activating the throttle shafts on these two carbs.

Back out all carburetor idle speed screws away from carb throttle shaft stops. This will synchronize all butterflies in closed position. Grasp linkage rod and push it hard enough so first carb butterfly closes completely. The other two carbs should be closed also. When they are all closed, continue to hold down rod and tighten tie down screws securely. Move throttle lever to check synchronization of all throttle shafts. If synchronized, turn idle speed screws until they just touch shaft stops, then make an additional 3/4 turn on each screw. You must turn them more for proper idle but this should be done with engine running. To set correct idle speed of 1500 rpm, you must turn idle screws on all carburetors exactly the same amount.

CHOKE LINKAGE ADJUSTMENT

Make choke adjustments the same as throttle so choke butterflies are all closed when choke cable is pulled. Then, when choke is pushed in, butterflies will open all the way.

STEERING ADJUSTMENT AND SKI ALIGNMENT

Position handle bars so they face straight ahead. Adjust either ski so it is also facing straight ahead. Adjust ski by loosening jam nuts at both ends of tie rod either direction to align one ski. If you cannot align one ski exactly, you may have to index steering arm at spindle. When both handle bars and one ski are aligned, measure distance from one ski to other at points on front and rear ski spring saddles. There should be 1/4" toe out, that is, front of skis are spread 1/4" farther apart than rear. If you do not have correct toe out, loosen jam nuts on tie rod that has not been adjusted and turn whichever way necessary to get 1/4" toe out. When steering is adjusted, make sure all jam nuts and other nuts and bolts are tight.

ENGINE TIMING

LC44 – The LC440 engine is equipped with capacitor discharge ignition (CDI) and timing is set in the factory at 3.5MM BTDC. in fully advanced position. Timing cannot be adjusted on this system and should never change.

LC29 – The LC294 engine is equipped with flywheel magneto ignition system. Timing is factory set at 3.5mm BTDC in fully advanced position and .6mm fully retarded position.

To set timing, disconnect red wire leading from ignition points to ignition coil on cylinder next to flywheel. Connect one lead of an ohmmeter, timing light or timing buzzer on connector leading from points.

Connect other lead to grounding surface on engine. Insert a dial indicator in spark plug hole nearest flywheel.

Position pole shoe adjuster on stator plate in center of slots. (Note: It is best to set correct timing with stator in this position. But if timing will not come into specs without having the point gap out of tolerances, then pole shoe adjuster on stator must be changed.)

Adjust point gap on points open when dial indicator reads .6mm or .024" in the cam retarded or static position. If you have fully advanced cam under flywheel, then dial indicator should read 3.5mm or .138" at correct timing setting.

Check point gap with feeler gauge and make sure point gap is within specs of .012" and .017". If not, stator plate must be adjusted accordingly to set proper specs.

When timing is correct on flywheel cylinder, next set timing on cylinder next to clutch. Disconnect white lead to coil. Adjust timing by changing point gap only. If stator plate is moved, flywheel cylinder must be retimed.

SERVICING DRIVEN CLUTCH

Position removed clutch with fixed face down. Rotate moveable sheave approximately 35° clockwise and hold steady. Press stationary helix down to clear key and rotate so key holds helix down. Remove snap ring, then rotate helix into snap ring groove. Hold firmly to prevent sudden spring release.

Clean and examine all parts. Replace if worn. Slide moveable face onto hub, replace key. Engage spring with anchor point in torque bracket and anchor point in moveable face. Compress spring until 1/16" to 1/8" shows between ramps. Rotate moveable face 1/3 turn or 120° counter clockwise after clock spring tension is taken up. Push stationary helix down hub shaft and lock under key. Replace snap ring. Release stationary helix to seat against snap ring.

SERVICING DRIVE CLUTCH

Disassemble drive clutch by removing special large end nut and installing clutch puller in clutch. Grab moveable face with cover assembly firmly with one hand and turn puller until clutch comes off.

Holding moveable face of clutch in both hands and puller facing floor, tap puller against a firm object. It should separate from stationary hub. Remove puller and clutch will come apart.

Inspect clutch arms to make sure they are not sticking. Clean and examine all parts. Replace if worn. When assembling clutch, note balance lines on cover and moveable face. They must line up after assembly.

SKAG REPLACEMENT

The skag is a wear bar attached to each ski bottom to aid in turning and prevent wear on actual ski blade. Check condition of skag wear often and replace skags when worn down near ski. To replace, remove nut holding skag in place. With a solid bar, bend skag outward until bolt is free from its ski hole. Place a 1" piece of wood between skag and ski blade, just behind front ski bolt. With hammer, tap on wooden block, forcing skag forward until back pops out of slot. With new skag, push front sloped end into front ski slot, with 1" wooden block positioned in front of rear skag bolt. While guiding rear of skag toward rear skag hole by hand, tap on wooden block to drive skag backwards. When skag bolts line up directly with holes, use pry bar to remove wooden block and skag will snap into place. Then replace lock nuts and skag bolts.

HEADLIGHT REPLACEMENT

To replace headlight, start by removing wiring plug on back of lens. With fingers, remove wire spring holding lens down. Install new lens by first positioning it, then reinsert wire spring and plug in electrical plug. Replace with dual element, 12-volt GE4454 bulb or equivalent.

HEADLIGHT ADJUSTMENT

Four headlight adjustment screws enable you to adjust the beam, up, down and to either side. Adjustments should be made for your particular driving condition. Caution: It is easy to overdrive your headlight at night. Always use common sense and a safe speed at night. Drive especially carefully on unfamiliar land.

TAILLIGHT BRAKE LIGHT REPLACEMENT

To replace taillight, first remove lens screws. Take off lens and replace bulb with a 12-volt 1157 bulb.

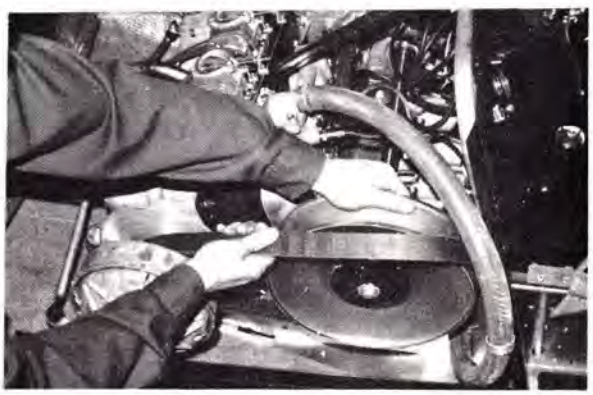
BRAKE ADJUSTMENT

Your Brut caliper-disc brakes were preset at the factory and checked by your dealer in his setup procedure. No adjustment should be necessary for the first 100 miles. After this break-in period, brakes should be checked each day of operation for approximately 3/4" free travel of the brake handle. There are two methods to adjust brakes in order to move disc brake puck closer to disc. In first, loosen both ½" hex head nuts on cable housing mount (F, p.23) to adjust. To tighten brake, raise cable housing; to loosen brake, lower cable housing.

In other method, remove cotter pin on castellated nut (G, p.23) and tighten nut until puck presses against disc and there is about ¾" brake handle play.

DRIVE BELT REPLACEMENT

Removal: Squeeze the brake so brake pressure will hold the stationary face of the large diameter driven clutch. Grab moveable face and rotate backwards, then pull belt down into driven clutch "V". Lift and slide belt off stationary sheave of driven clutch. When loose from driven unit, remove from drive, or small diameter, clutch. Reminder – driven clutch should be pulled open completely. Installation: Mount belt on drive clutch. Grab moveable face of driven clutch with both hands on opposite sides of rim diameter and turn moveable face backwards, then push to compress the clutch spring. With clutch completely open, push belt down between sheaves and slide belt over stationary sheave.



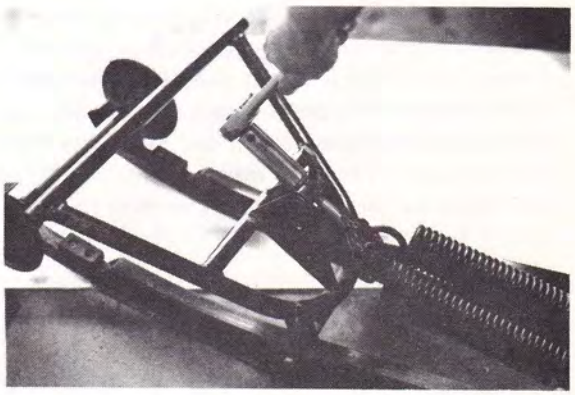
CLUTCH ALIGNMENT

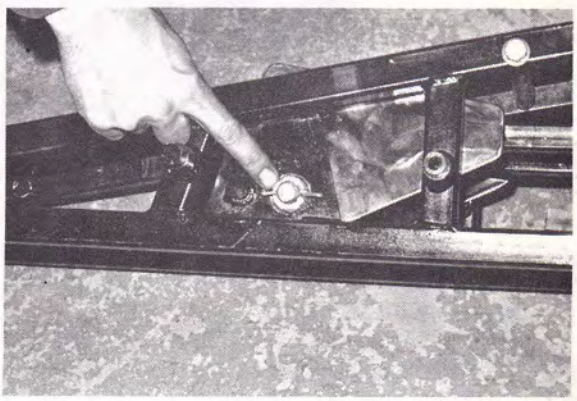
Clutch alignment was set at the factory and checked by your dealer during pre-delivery service. If you are having unnecessary belt trouble, such as a lot of wear on the edges, your dealer should check alignment. Offset from drive to driven clutch is 5/16 inch. Adjust by adding or subtracting washers on shaft under driven clutch.

RIDE ADJUSTMENT

SPRING TENSION

Increasing or decreasing the spring tension by adjusting the eye bolt at the front of the spring will alter the firmness of the suspension. When adjusting spring tension, always have tension on friction shocks completely released. Shock adjustment will overcome severe machine bottoming. Adjust the eye bolt so that 1-1/2 - 2 inches of thread shows past the nut for a normal 175 lb. rider. Increase the amount of thread showing for a heavier person.





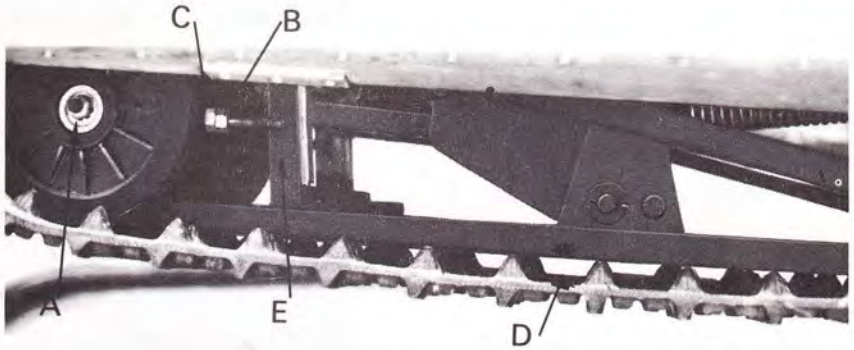
SHOCK TENSION

After adjusting spring tension to fit rider, adjust friction shocks by tightening castellated nut. This should give you the overall ride you want.

TRACK ADJUSTMENT AND ALIGNMENT

To work on track, lift rear of machine and set on secure stand, about 4" to 8" off the floor. To make track adjustments:

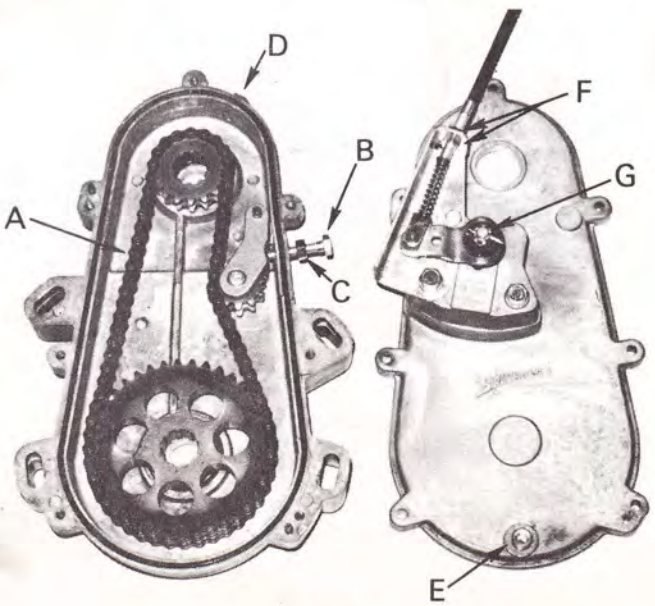
1. Loosen rear idler wheel tie down rod (A), allowing the idler wheels to turn freely as adjustments are being made.
2. Break lock nuts (B) away from adjustment nuts (C) on both sides of suspension, allowing you to move the idler shaft and wheels forward and back for adjustment.
3. Correct track drop is 1-1/2" away from the slide frame (D) to inside sliding part of track. Do not pull down on track to get this measurement and make sure that track is free of ice and snow or other weight. Correct tension and alignment should result in an even drop on both sides.
4. To check track alignment, start engine with machine on stand and turn track over slowly. (Caution – do not run track fast when checking alignment, and clear all tools away from track and suspension areas before starting engine.) After adjustments have been made, stop machine and shut off engine. Measure distance from rear of suspension upright (E) to rear of adjusting nut (C) on both sides. Measurements should be equal. If there is misalignment, side of track closest to tunnel must be tightened. If track is already very tight, then adjusting nut on track side farthest from tunnel must be loosened. Adjusting for drop and alignment, you should wind up with correct track tension and alignment. Track should be run after each adjustment to see if corrected. When track adjustment is correct, tighten rear idler tie-down rod, then tighten locking nut against adjusting nut on both sides of suspension, being careful not to move adjusting nut. After locking all nuts, start engine and check adjustment once more.



DRIVE CHAIN ADJUSTMENT

A well-adjusted chain has 1/2" deflection (A) in travel between the two chain case sprockets. Chain tension is adjusted by tightener bolt (B). To adjust chain tension, loosen and back out lock nut (C). With an inch/lb. torque wrench, torque tightener bolt to 10 inch/lb., then back tightener bolt out 1/2 turn. Turn lock nut in and jam against chain case, being careful not to further tighten bolt.

When refitting chain case cover, replace lubricating oil. Add oil through filler plug (D), with check plug (E) removed. When oil level reaches check plug level, replace plug.



COOLING SYSTEM

Your Brut snowmobile is equipped with an exclusive Brooten liquid-cooled, two-cycle engine. Your cooling system requires an Ethylene Glycol-based coolant mixed at least 50-50 with water. Use more coolant for colder weather. If you live in a climate where temperature drops to a -40°F, mix coolant to match the temperature. Check coolant with an anti-freeze hydrometer. To check coolant level, run machine enough to warm up engine. Coolant level should be approximately 1-1/2" below sealing surface of tank. Also check system periodically for loose clamps.

LUBRICATION

Your Brut has two lubrication points. One is the chain case which has an oil bath reservoir for the drive chain. Maintain oil level with No. 10 weight nondetergent oil. To check correct oil level, make sure machine is on level surface. Loosen or remove check plug at bottom of chain case. If oil does not appear when removed, open filler plug at top of chain case and add oil until oil appears at check hole.

There is a lube fitting on slide suspension frame near front idler wheel. Use only Brut Track Suspension Lubricant, which has a low melting point. This lubricant is <u>not a substitute</u> for no-snow conditions and does not permit your Brut to be run for distances without some moisture or snow for normal slide rail suspension lubrication. Brutanza has available an optional suspension wheel kit for marginal snow conditions.

FUEL MIXTURE

Your Brooten engine is a two-cycle, or two-stroke snowmobile engine which requires you to mix lubricating oil with the gasoline. The carburetor draws this gas/oil mixture into the crankcase for the engine to lubricate internal moving parts.

GASOLINE

Use a good grade of clean fresh gasoline. Don't use gasoline that has been stored in containers for a long time, since storage usually results in a gummy substance that can plug carburetor jets.

OIL

Use a good grade of two-cycle engine oil, which states on the label that it is blended for snowmobiles. If your spark plugs are fouling a lot, there is a good chance that you are not using a good oil for your Brooten engine.

FUEL MIXING RATIO

Mix 20 parts of gasoline to 1 part of oil (a 20:1 ratio), which is 5 gallons of gas to 1 quart of oil. Too much oil will cause plug fouling, smoking and excessive carbon formation. Too little oil can cause engine overheating with resulting piston seizure or engine bearing failure.

MIXING INSTRUCTIONS

Never mix gasoline with oil in your snowmobile's fuel tank! Use a clean container. Fill it about half full of gas. Add the right amount of oil to fill the container with mixed fuel. Shake the mix well, then add the remaining amount of gas to fill the container with mixed fuel. When refueling your snowmobile, use a funnel with a fine screen to prevent spilling and entry of dirt and water into the tank. Always reshake the fuel container if it's been sitting around for even a few hours to prevent oil from settling out.