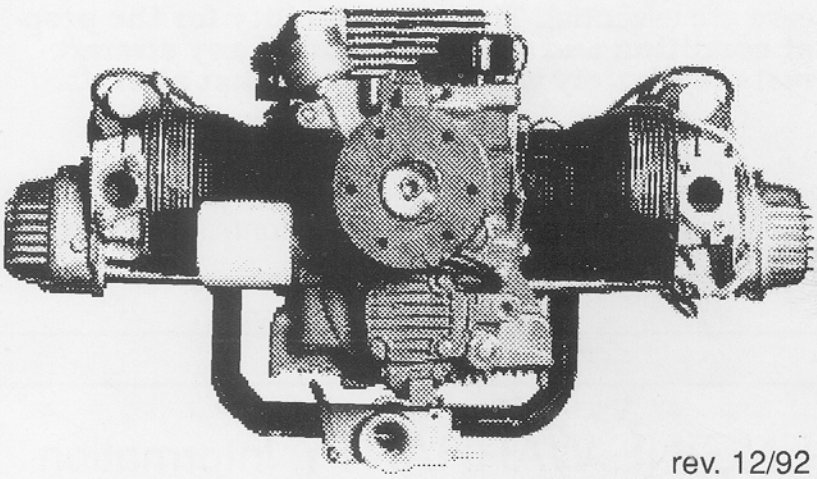
Installation, Operation, and Tuning of Two-Cylinder and Four-Cylinder Four-Stroke Air-Cooled Engines



rev. 12/92

Mosler Motors Inc.

140 Ashwood Road
Hendersonville NC 28739
USA
Telephone (704) 692-7713
FAX (704) 692-2008

Serial Number: 40-152

Issue Date: Sept. 15, 1993

General Information Sheet - 2 cyl.

Horizontally-opposed, four-stroke, air-cooled, direct drive, clockwise (viewing end of output shaft) rotation, overhead valve engine

Recommended Overhaul:	1000 hours
Oil Recommendation (after break-in):	SF or SG-rated, SAE 20W-50
Oil Pressure Range (hot):	30-80 psi
Oil Temperature	Continuous - 160°-220°F 5 minutes - 220°-260°F Never Exceed - 260°F
Oil Capacity, sump:	1.25 US quarts (refill; - 1.5 absolute)
Oil Capacity, cooler:	~.25 US quarts
Oil Capacity, filter:	~.25 US quarts
Oil Capacity, lines:	measure for your installation
Oil Filter life:	25 hrs / 6 months
Oil Filter Type:	NAPA 1374 or equivalent
Spark Plug Gap:	.016"
Timing	Static - 4° BTDC Max. advance - 28° BTDC
Tappet setting - solid lifters:	Intake - .004" cold Exhaust - .006" cold
Tappet setting - hydraulic lifters:	Interference + ½~1 turn
Magneto:	Point gap: .016" (SLICK=.008~.010")
Cylinder Head Temperature:	Normal - ≤300° F Never Exceed - 450° F
Fuel recommended:	100LL
Fuel filter required	70 micron
Power takeoff:	3⅛" bolt circle, 6 x 5/16" clearance holes, 2" pilot
Mounting:	Mosler rubber mounts, spindles, washers, 8mm hardened bolts

Do not operate Mosler engines in negative or zero-G conditions.

Break-in: See "Break-In," Page 5.

INSTALL A GASCOLATOR AT THE LOWEST POINT IN THE FUEL SYSTEM.

MOSLER ENGINES REQUIRE A CARBURETOR HEAT SYSTEM.

ENGINES EQUIPPED WITH MIXTURE CONTROL REQUIRE AN EGT GAUGE FOR PROPER OPERATION.

Tightening Torques

(all values in ft-lbs)

Cylinder head to crankcase:	8mm studs	18
	10mm studs	23
Connecting rod nuts		22~25
Crankshaft gland nut	4 cyl	215~225
Oil drain plug	4 cyl	25
	2 cyl	8~10
Sump cover to crankcase	4 cyl	6
Crankcase halves	12mm	25
	10mm	14
Prop hub to crankshaft		100
Intake manifold to head		10
Exhaust manifold to head		14
MMCB engine mounting bolts		16
Conical rubber bushing thru-bolt		7*
Spark plug (dry)	10mm	10
	14mm	14
Propeller thru-bolts	most wood props	14**

Recommended: Spark plug threads should be coated lightly with an anti-seize compound (molybdenum disulfide/grease solution). As an alternative to using above torque values: When spark plug is new, hand-tighten plug until washer makes contact with head, and then turn the plug an additional ¼ turn. When the spark plug's washer has already been compressed, as when re-installing a used plug, the same procedure applies, but turn the plug only 30° or so.

* 7 lb beyond any inherent torque necessary to overcome friction of stop nut, if used. If using the recommended castle nut and cotter key, apply 7 ft-lbs and then continue turning until the first available set of holes lines up. Note: Do not use lubricants on rubber bushings.

** *Always* follow prop manufacturer's instructions and *always* use a front plate.

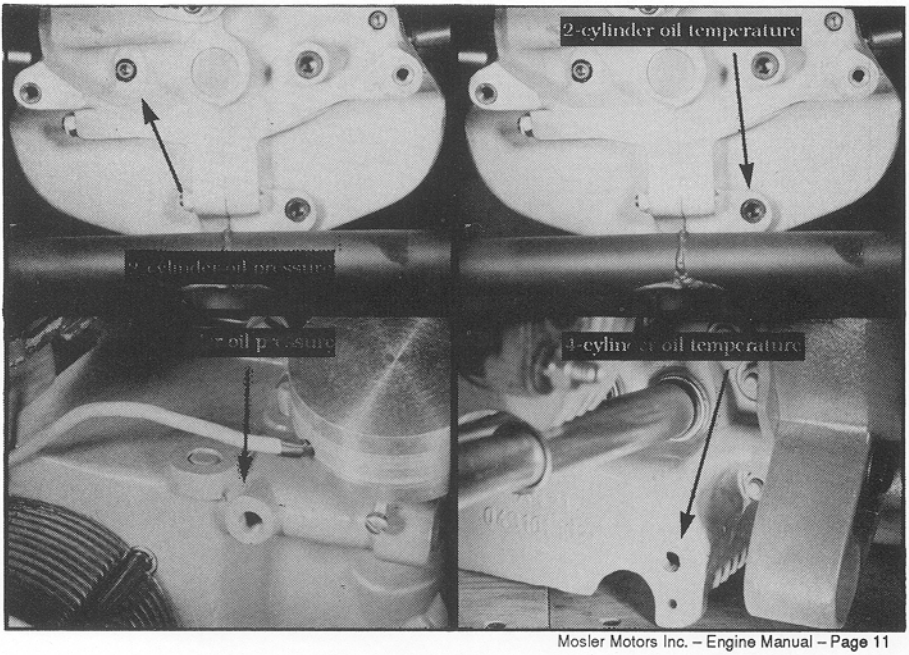
Instrument Hookups

Required engine instrumentation consists of a tachometer, oil pressure, and oil temperature gauges. If you have a mixture-control carburetor, an exhaust gas temperature gauge (EGT) is necessary. Cylinder head temperature (CHT) is recommended. (If you use just one EGT and/or CHT, typically cylinder #3 is hottest, and should be the one monitored. for CHT. Monotor either cylinder on -CB.) In addition, if you have an electronic ignition system, you need a voltmeter. For multiple-ignition systems (X and DX engines), you need separate ignition switches for each system. Make sure your ignition switches are easily reachable in event of a problem, and that their terminals are protected against touching other metal parts of the airframe. Good-quality switches are a wise investment.

EGT probes should be located about two inches from the exhaust port, inserted at the inside of tubing bends, if possible.

If you are experimenting with a new design, or are using non-standard baffling, or you just like the reassurance, you need a cylinder head temperature gauge (CHT).

CHT senders which attach under the spark plug are a bit delicate but produce good readings. Use a CHT probe which mounts under a spark plug, as do the CHT probes available from Mosler.



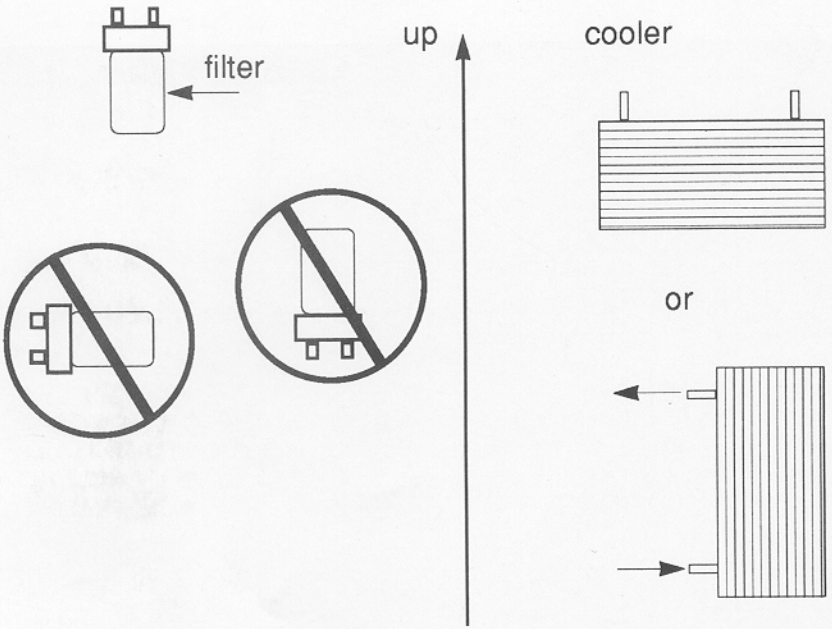
Oil System Hookup -CB

The two-cylinder Mosler engines use a remote oil filter and cooler. Their proper hookup and priming is essential to the long life of your engine.

The oil comes our from the front oil pump cover, is routed through the filter (note "IN" and "OUT" marks), and then through the cooler, before returning to the engine, just in front of the right-hand cylinder.

Note - Oil Filter: Position the oil filter so that it hangs from the bracket. Other positions tend to empty when the engine is off, overfilling the sump. Other positions can also trap air in the system, reducing your lubrication.

Note - Oil Cooler: Position the cooler so that its outlet and inlet are both on top, or so that the inlet is on the bottom, and the outlet on top. This will allow any air to escape.



Carburetors

Zenith, 21mm and 24mm

- Before readjusting carburetor, please note that your engine was run with this carburetor at the settings shown in this book. While these settings may not be optimal for your altitude/temperature/humidity, please remember that what you have *does work*. Note any changes you make so you can return to original settings if necessary.
- Carburetor intake must always face **forward**, in the direction of flight.
- Use any one of the three inlets, and plug the other two.
- *Caution! Check, and double-check, all fuel line connections to assure that there is no leakage. Check fuel lines often for chafing.*
- To reposition the choke lever, loosen the nut (A) and rotate the lever. Position, then re-tighten.
- Attach throttle cable swivel (B) to the 3/16" hole in the throttle lever with the flat washer (C) and clip pin (D).

IF YOU'RE IRRETRIEVABLY LOST:

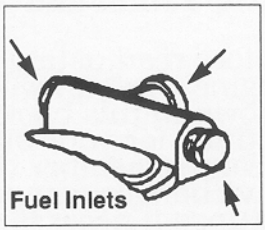
- Hold the throttle closed and set the throttle stop screw at 1½ turns from completely closed.
- Set the idle adjusting screw 1 turn open.
- Set the main jet adjusting needle (mixture control) 1½ ~2 turns open.

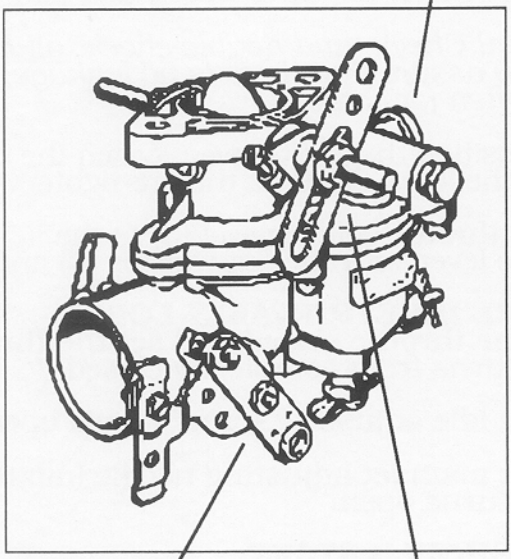
NOW IT SHOULD START.

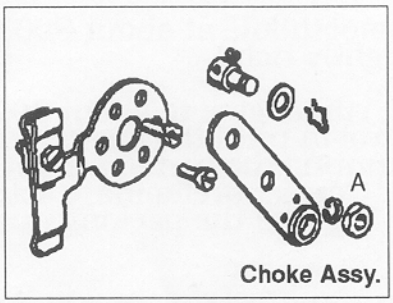
- Run the engine to warm it up. Do not use high power settings!
- Set the throttle stop screw for the desired idle speed.
- Set the idle needle for smooth idle at about 800 rpm. (In is rich. Best to be slightly rich.)
- With the prop mounted, run engine to about 2000 rpm. Turn mixture control in until the engine runs roughly. Back it out, counting the turns, until it runs rough (on the rich side). Correct preliminary setting is about ⅔ of the way rich. Tighten the packing nut to avoid fuel leakage.
- Do not fiddle with mixture control unless you are making a 3000' change in altitude. Don't forget to re-richen your mixture on the way back down.

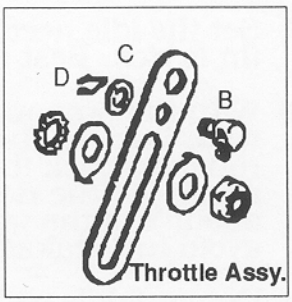
Carburetors

Zenith









Illustrations Courtesy Facet

Filling the Engine With Oil

Two-cylinder: Due to the many applications in which the Mosler engine is used, and to the many configurations in which it is mounted, the dipstick does not carry high/low marks. The first time you intend to run the engine, drain any residual oil from the crankcase. Make sure all oil lines and fittings are tight, except the return fitting from the cooler, and that your oil cooler and filter are installed. Put 1.75 quarts (US qts - amount varies with installation - see page 4) into the top filler hole of the engine, and crank the engine over by hand (with the spark plugs removed and ignition OFF) until oil comes out of the line. Connect the last fitting, and turn the engine over by hand until oil pressure registers on the gauge. Replace the filler plug, secure the dipstick, install the spark plugs (check for anti-seize on the threads, and proper gap) and run the engine for two to three minutes. Shut the engine down, and inspect for leaks in the engine or lines. If any appreciable amount of oil has left the engine, drain everything (engine, filter, and cooler with lines), fix the problem, and refill with 1.6 quarts (US) of 30W non-detergent oil. Run the engine for two minutes. Shut it off, and let it sit for five minutes. Remove the dipstick, and wipe it with a clean cloth. Reinsert the dipstick, but do not screw it into position. Remove the stick and mark the position of the oil. This is your "fill to" mark. Always check engine oil level before using the engine. Due to pumping action, the engine may blow a small amount of oil at startup. This condition will lessen as your engine accumulates hours and the rings seat better. If your engine consistently pumps out a set amount of oil, you are probably filling it too full. Make small adjustments until your optimum level is achieved.

Four-Cylinder Engines: Because these engines carry more oil in the sump, and generally have integral filters and coolers, it is permissible to use the existing marks on the dipstick as a guide. Start by draining any residual oil from the engine, and then refill with 2.5 quarts (US) of 30W non-detergent oil. Turn the engine over by hand (with spark plugs removed and switches OFF) until oil pressure registers on the gauge in the cockpit.

ALL ENGINES: After the first two hours, drain the oil, clean the screen (in four-cylinder models), change the oil filter, and refill with 20W-50 SG rated motor oil. Let the engine cool, and re-torque the heads and check/set valve clearances.

Timing the Engine

Magneto Ignition
(2-cylinder, -EH, -M, & -DX Engines):

- Remove **all** the spark plugs from the engine.
- Re-attach the plugs to the high tension wires, and turn the ignition ON.
- Rotate the engine slowly, and note when the spark happens. If it coincides with the mark just before the Top Dead Center (TDC) mark on the hub, on compression, the static engine timing is correct, and the magneto should be locked in position. To adjust, loosen the lock nuts on the magneto and rotate it slightly, until spark/timing mark coincidence is assured.
- Turn the ignition OFF.

> *An alternate method of timing the SLICK magneto is detailed in their* ***SLICK Master Service Manual,*** *publication F-1100, packed with SLICK-equipped engines.*

Electronic Ignition (-X Engines):

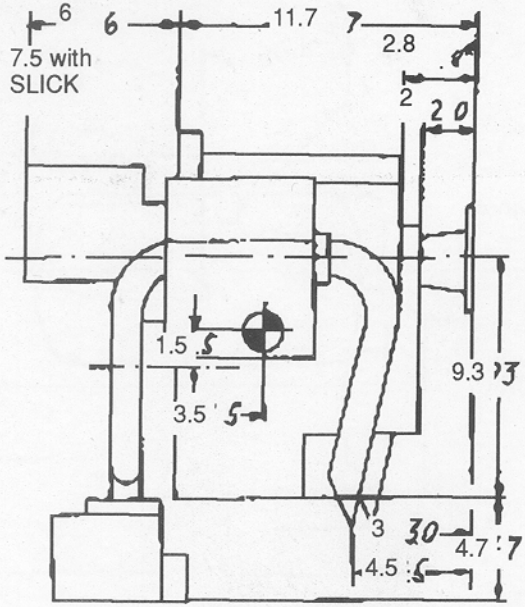
- Follow the exact same procedure as for the magneto, except substitute "timing unit" for "magneto." Be sure that any one coil fires two different cylinders (1&3 or 2&4). There is an extra spark on the exhaust stroke.

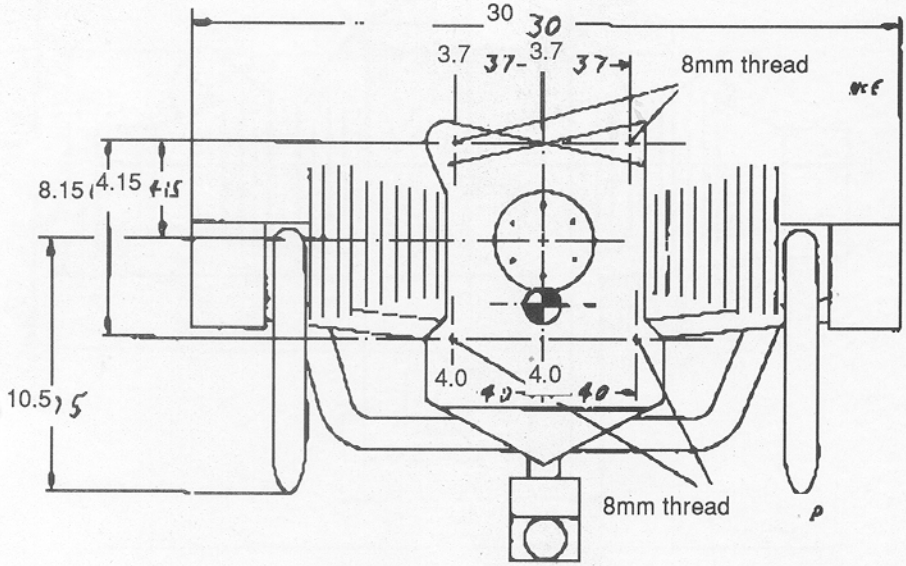
Electronic Ignition (backup on "True Dual" engines):

- With the engine running at about 2500 rpm on the primary system, loosen the set screws holding the timer in place, and turn on the secondary system.
- Rotate the timing unit the engine runs most smoothly. It should also be running at a peak in rpm.
- Tighten the set screws securing the ignition unit.

Note: Keep away from the propeller, and be sure the airplane is securely tied, with a trained and qualified assistant at the switches and controls, before you attempt to time any running engine!

Engine Mounting Points and Center of Gravity (CG): -CB





Specific Instructions

Hooking Up Spark Plug Wires - Magneto Ignition

Two-cylinder:
Attach each spark plug wire to its corresponding side on the magneto.

-EH Engines and *True Dual*-equipped Engines:
Remember, firing order is 4-3-2-1, and that the magneto output is opposite the engine's rotation.

Make sure all the spark plugs are out of the engine, to avoid a kickback or start! With the plugs out, this is a good time to re-coat the threads with anti-seize. Check the gap (.016"). Leave the magneto switch ON.

- Find the plug which is firing. Set the spark plugs, while attached to the magneto harness, on the engine itself to complete a ground. Turn the engine over slowly by hand until you hear the magneto click. This should coincide with a spark at one of the plugs.
- Determine which piston is at top dead center. You can do this by looking down the spark plug hole, or by CAREFULLY inserting a small wooden or plastic dowel into the spark plug hole. DO NOT turn the engine over when the dowel is in the spark plug hole; you might break it off in there, or damage the spark plug threads.
- Determine whether the piston is on the compression stroke.Use a rubber hose about the size of the spark plug opening, place one end over the spark plug hole, and blow. If the piston is on the compression stroke, you will not be able to blow through the hose. (If you have a dual ignition system, you must cover the other spark plug hole in that cylinder.)
- Turn the ignition OFF. Hook up that spark plug and wire. Using the firing order diagram, hook up the others in turn.

Hooking up Spark Plug Wires - Electronic Ignition

Use the same method as above, but note that you will have to determine which coil is firing at which time, so you will need to establish the ignition firing order yourself. The cylinder firing order, of course, will not change! Be sure that any one coil fires two different cylinders (1&3 or 2&4). There is an extra spark on the exhaust stroke.

Cooling and Baffling

All air-cooled engines require a plentiful supply of *moving* air to provide cooling. There are many factors to consider, and some general guidelines are offered here:

The **-CBs**, when mounted in free air (not cowled or shrouded), will almost always stay cool enough, even in pusher configurations. If you are using a new design, or a very slow aircraft (blimp), or if you are at all unsure of your cooling, however, install and monitor a CHT gauge. If you need baffling, follow the guidelines below.

All Mosler four-cylinder engines are provided with lower cylinder shrouds. These simplify baffle design.

CONSIDERATIONS & SUGGESTIONS:

- Air should be forced to move as close to the heads and cylinder fins as possible.
- Air should be forced to pass *between* the cylinders and heads, as well as over them.
- *Any* leaks - intake or exit - reduce cooling.
- Be sure there is a place for air to escape after it has done its cooling job. *Locate exits in a low-pressure area.*
- On pusher aircraft, it is helpful to bring the exit baffling right up to the propeller so that the prop's action can help *draw* air through the engine. (Leave enough clearance so the prop, when it is under full bending loads, cannot hit the baffling.)
- Baffle the oil cooler and *force* air through it.
- Use a flexible seal between the baffling and cowl to keep any leaks from forming and thus allowing precious cooling air to escape.
- The size of the openings varies with your top airspeed; a slow pusher may require 48 square inches of ram opening, while a tractor-configured air racer may require only 20 square inches. Too much is better than too little, but remember the penalty = too much drag.
- Isolate the exhaust system by design or by using heat tape. Tape is particularly effective on the first 12~16" of each pipe.
- Efficient air *exit* design is just as important as a clean intake!

Care and Feeding of the Mosler 4-Stroke Engine

In view of a popular series of articles on the care of the leading 2-stroke powerplant, many have asked why there has not been a similar series on the leading *4-stroke* powerplants, the Mosler two-cylinder -CB and its four-cylinder brothers. Hey! Four-stroke engines don't *need* dozens of articles to keep them in the air.

But wait a minute! Obviously, there's a bunch of people who really want to know what's good for their four-strokes and what can make them sick. While many of the tips in here are specific to Mosler engines, most of them can also be applied to other four-stroke powerplants...and even to the ubiquitous "ring-dings."

Fuel. Compression. Ignition. Timing. When you put them together correctly in the right amounts and at the right times, you get a smooth-running engine. They're equally essential, equally important.

Fuel. Gasoline is wonderful stuff. It's light weight, cheap, plentiful, and powerful. Six pounds of the stuff will move a 2000-pound car nearly *forty miles*. That's power! And always remember that all it takes to unleash this power is, say, one idiot smoking around the fuel pumps at your local field!

Cleanliness is essential in most things mechanical, and gasoline is no exception. Once it's contaminated, the best gas in the world is useless. Even the lowest octane fuel around, if it's clean, can get you out of a tight situation. We recommend 100 low lead for our engines, not so much because of the octane or lead content it has, but because of what it *doesn't* have.

Many automotive gasolines contain anti-knock, anti-corrosive, and anti-vapor-lock additives, along with various performance-enhancing chemicals. These generally present no problem. However, over the last few years our legislators have appointed (anointed?) themselves gasoline experts and have made mandatory the addition of certain oxygen-bearing additives, the most common ones being alcohol (ethanol) and MTBE*. Notices announcing the presence of these additives must be placed on the pumps, (but only if their concentration is greater than 10%)

* Methyl-Tertiary-Butyl-Ether

and they're more common in the winter than in the summer, so keep your eyes open for them. *Alcohol* attacks many metals, attracts moisture, and thus enhances bimetallic corrosion. Some fuel systems contain various rubber compounds which are damaged by exposure to alcohol. *MTBE* does not have an affinity for water and does not eat metal or most rubbers. It eats fiberglass instead -- not good if that's what your tanks are made of. BEWARE! (Note: Gas station fiberglas tanks are heavy construction, and are coated to resist the effects of MTBE and its cousin, TAME. Ethanol, which is also unfriendly to fiberglas, is blocked by the commercial gas tank lining materials, as well.)

If you're confident that your source of MOGAS (automotive gasoline) is pure, look for an octane sufficient for your compression ratio. Even though airplane (and conversion) engines have nominally low compression ratios (Mosler's largest engines run at 9.0:1 or below even that, excepting contest engines) and even though they fly in rarefied atmospheres which render their compression ratios even lower, keep in mind the nasty life they lead: They are kept cooped up in a tight cowling, receiving uneven cooling. They are asked to perform their task only infrequently, and then under life-threatening circumstances. Look for octane of 91 or better. Keep it *fresh*. Keep the tanks full (to avoid moisture buildup), and make sure your system is up to the job.

Install a gascolator (water separator) in the lowest part of the line, and drain it before every flight. Use fuel filters: one in each tank (a finger strainer at least five times the area of the outlet tube is recommended), one in front of the fuel pump, and one (70 micron or so) just after the gascolator. Check the latter on your preflight. Filters finer than recommended by the engine manufacturer are unnecessary, and can cause problems when they clog prematurely. Every once in a while, drain your carburetor's float bowl. (Note: the clear-bodied fuel filters which contain white elements, such as Mosler provides, can look clean and still be clogged with white dust from freshly-made fuel tanks. Don't just look - also CHECK FUEL FLOW frequently. See page 21.)

Fuel *pressure* cannot be overlooked. While this is primarily a function of airframe design, make sure your engine gets adequate fuel at recommended pressure. By the way, don't forget to learn exactly how much fuel you have available under *all* flying conditions, and mark your gauge for the worst case.

Ignition. Once the fuel is safely in the combustion chamber and is compressed, ignition really gets things going. Just before the piston reaches the top of its stroke, the spark plug fires, igniting the volatile mixture inside. This literally causes an explosion, the shock of which is transmitted to the crankshaft. If the spark fails to materialize or is feeble, the explosion is ineffective and the engine does not produce the expected power. Poor gas does not ignite properly. Water in the gas won't ignite at all. Dirty spark plugs (or oil-fouled plugs) won't provide a bright, healthy spark. Sometimes a feeble spark won't even light the compressed mixture. Mosler's inherently clean-running four-stroke engines use two basic types of ignition: magneto and electronic. The magneto systems (found on the world champion MMCB, the EH line, the 65M, and as part of the True Dual systems) fire a spark across a gap of .016". This spark is generated by the magneto (a whirling magnet inside or alongside a coil), and requires no outside electricity (no battery or charging system). This simplicity makes magneto-fired ignition systems ideal for ultralights and simple (or high-performance) experimental aircraft. The electronic ignition systems found on the X and True Dual models fire a spark of .030". This spark is generated by a battery-fed coil, and timed by an independent timing device which lives in the hole formerly occupied by the distributor. Unlike the archaic and unwieldy distributor, however, the timer contains no points, and neither receives nor distributes a high-voltage spark. It merely tells the coils when to fire their pent-up energy. Obviously, the spark is important, and the timing of the spark is also critical.

Timing. Timing is everything, or nearly so. Not only is the timing of the spark important, the timing of the opening of the valves, their closing, and the timing of the availability of fuel and air are all critical. Checking ignition timing is a matter of finding a piston at the top of its compression stroke, and noting the firing of the appropriate spark plug. Cam timing (to open and close the valves) is a design consideration, and cannot be altered except by disassembling the engine.

Valve timing can be affected by the adjustment of the valve clearances. That is why Mosler recommends 25-hour checking intervals, and why Mosler's four-cylinder engines incorporate hydraulic valve openers, which hardly ever require adjustment. Generally, if ignition timing is too far advanced (the spark occurs too far before the piston reaches the top of its stroke on compression), the resultant explosion in the engine will work against the production of power, and temperatures will rise dramatically. In severe cases, temperatures will be so high as to

melt a hole in the top of the piston. If ignition timing is too late, the engine will not produce the expected power, will run rough, and in severe cases, develop high temperatures. Sometimes flames can be seen coming from exhaust pipes. Often, retarded timing is a contributing factor in this display. Valve timing is best left to the engine designer. Any significant change in timing through valve adjustment would so severely misalign the valve operating mechanism as to cause severe wear or even component failure. Check valve adjustments with an eye to staying "stock."

So, how does one get maximum reliability and power out of a Mosler engine? Keep the oil clean, feed it clean, fresh gasoline, make sure the spark happens at the right time, and check the valve clearances now and again. Notice that I did not mention fiddling with the carburetor. That is to be found elsewhere in this manual, and besides, *it won't help unless all the above is done first.*

Propeller Installation

When the Mosler engines are used on aircraft, it is imperative that the propeller be installed properly.

Be sure you have the correct hardware before you start:

- AN bolts (6)
- AN nuts (castellated nuts (6) with cotter pins (6))
- AN washers (6)
- Appropriate prop plate

Use only *new* AN bolts to mount a prop, and start by bringing all bolts up to snug by hand.

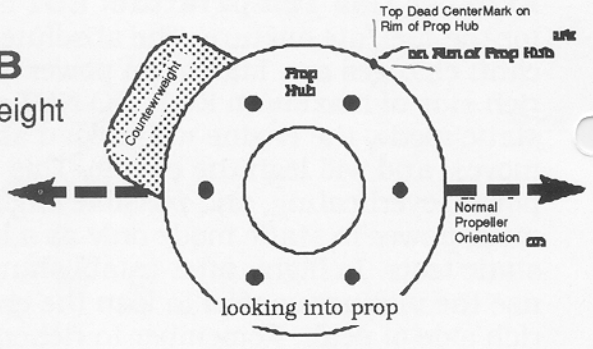
Bring nuts up to torque one turn at a time, alternating at 120°~180° intervals around hub.

In the absence of recommendations from the prop manufacturer, use 14 ft-lbs (170 in-lbs) of torque.

Check the prop tracking. Improvise some sort of reference point securely to the engine, cowling, anything that will put the point close behind one tip of the propeller. Measure the distance between your reference and the prop tip. Now rotate the other blades to the same position and make sure the measured distance remains the same. Minor differences can be addressed by sanding the hub face of the propeller, or by tightening the castle nuts to the next cotter-pin opening (remember to check all the nuts again for torque). Maximum tip runout ± 1/16".

Check the nuts for torque and the prop for tracking after two hours, and then at least twice a year; more often in humid climates.

Important: -CB
Position of Counterweight



Engine General Specifications:

	MMCB	CB-40 ***	60EH	65EH	65M	65X	65DX	82X	82DX
# Cylinders	2	4							
Horsepower	35	40	60	65				82	
@ rpm	3200								
Displacement	1039	1083	1834	1915				2165	
BoreXStroke	92X78	94X78	92X69	94X69				94X78	
Ignition	single				dual				
	magneto				electronic		TD*	elec.	TD*
Valve Lifters	solid***		hydraulic						
Carburetor size	21	24	29	32				34	
Weight (lbs.)*	85		138	144	173	173	175	181	182	188
Alternator**	no				yes				
Starter**	no				yes				
Windage Tray	no								yes
RED Features	no		yes						
Lower Baffle	no		yes						
Oil Cooler	yes•		no		integral				
Oil Filter	yes•		attached, spin-on						

*** Early CB-40s used hydraulic valves.

**Engines with either starter or alternator have a flywheel and accessory case.

* TD ("True Dual") ignition has one magneto and one electronic ignition, each system driven from a mechanically separate location.

• Two-cylinder engines are shipped with remote oil filter, oil filter bracket, oil cooler and lines.

*Weights include all attached accessories and complete induction and ignition systems, but do not include exhaust systems or lubricants.

Mosler 2-Cylinder
Powers International Winners

Our tough and reliable little two-cylinder four-stroke **MMCB** engine just seems to win international competition after international competition. A world record setter since 1989, the **MMCB** has some impressive distinctions in its trophy case:

- **World Champion**
- **World Cup Champion**
- **European Champion**
- **British Champion**
- **Spanish Champion**

The **CB-40** incorporates the most-requested improvements from MMCB users: it's larger inside, produces more torque, and is now equipped with the SLICK magneto.

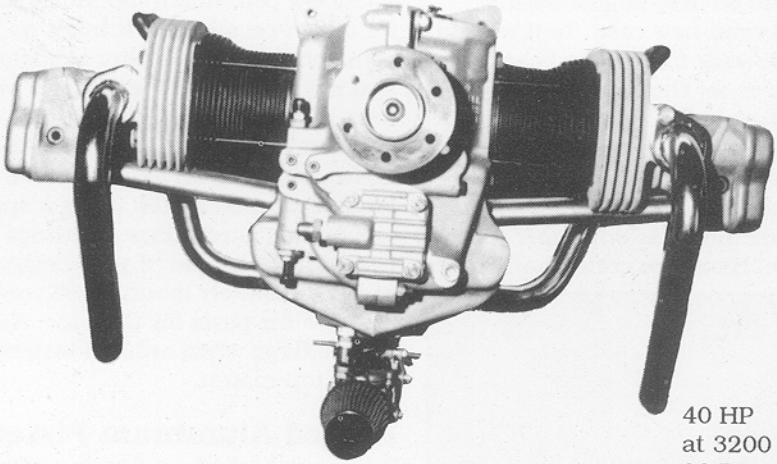
Mosler's new and improved version of the two-cylinder is fast becoming a popular OEM engine in the microlight world, and is the most popular replacement for troublesome two-stroke engines still supplied with many popular airframes.

Mosler Engines Have the NASAD Stamp of Approval!

The National Association of Sport Aircraft Designers awards its coveted **Certificate of Compliance** *only* to powerplants measuring up to its stringent standards. They examine raw materials, manufacturing methods, assembly procedures, engine testing, quality control practices, and record-keeping capabilities. Rigorous testing programs are required, and exacting data must be submitted for evaluation.

All Mosler four-cylinder engines have met or exceeded **NASAD**'s tough standards for excellence, and proudly wear the **NASAD Seal of Compliance**. **You don't have to take OUR word for how good Mosler engines are!**

The Mosler CB-40



40 HP
at 3200 RPM
90 Pounds

Our Two-Cylinder Champ!

- ✔ **1083 cc**
- ✔ **Bore - 94 mm**
- ✔ **Stroke - 78 mm**
- ✔ **40 Horsepower**
- ✔ **Mosler Counterbalanced Crankshaft**
- ✔ **Special Cylinder Heads**
- ✔ **Hydraulic Valve Lifters**
- ✔ **Full-Flow Oil Filter**
- ✔ **Oil Cooler**
- ✔ **Matched Forged Pistons**
- ✔ **SLICK Magneto Ignition**
- ✔ **Updraft Carb w/mixture**
- ✔ **Redesigned Intake Manifold**
- ✔ **High-Volume Oil Pump**
- ✔ **Completely Balanced**
- ✔ ***1000 hours TBO!***
- ✔ **Sips Just 1.2 to 1.8 GPH!**
- ✔ **Includes stubby exhaust**

The Little Engine that DID!
Our amazing little **CB-40** is the ultimate in its class, holding a long list of world records. It's proven to be the most reliable **two-cylinder four-stroke** aircraft engine in the world, the *only* one manufactured in the USA.

Engineered for reliability and long life, it's 90 lbs. of velvet dynamite, designed and built from the crankshaft out. We cast our own cases. We use our own special crankshaft to tame the inherent "opposed-twin" vibration to almost nothing. The direct-drive **CB-40** has a float-bowl carburetor with mixture, oil cooler and filter, and Slick magneto.

SPECIFICATIONS

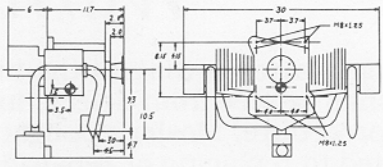
	Horsepower	Displ.	Ignition	Lifters	Alternator	Starter	Carburetor	Lbs.
82DX	82 @ 3200	2165	*True Dual*	Hyd.	Yes	Yes	UltraCarb™	188
82X	82 @ 3200	2165	Dual Elect.	Hyd.	Yes	Yes	UltraCarb™	182
82LB		2165	No	Hyd.	No	No	No	143
65DX	65 @ 3200	1915	*True Dual*	Hyd.	Yes	Yes	SuperCarb	182
65X	65 @ 3200	1915	Dual Elect.	Hyd.	Yes	Yes	SuperCarb	175
65M	65 @ 3200	1915	SLICK Mag	Hyd.	Yes	Yes	SuperCarb	177
65EH	65 @ 3200	1915	SLICK Mag	Hyd.	No	No	SuperCarb	146
60TD	60 @ 3200	1835	*True Dual*	Hyd.	No	No	POSA	144
60EH	60 @ 3200	1835	SLICK Mag	Hyd.	No	No	POSA	138
CB-40	40 @ 3200	1083	SLICK Mag	Hyd.	No	No	Mix. Control	90

- Weights are approximate and include complete intake and ignition systems. Weights do not include exhaust systems or propellers.
- Engines not equipped with starters or alternators also have no flywheels or accessory cases.
- Alternators, starters, flywheels, belts, and accessory cases may be deleted from engines normally equipped with them. The weight saving is 26 pounds per engine.
- Due to ongoing product improvement, all prices and specifications are subject to change without notice.

The Mosler Engines

These will help you plan your installation.

Mosler CB-40

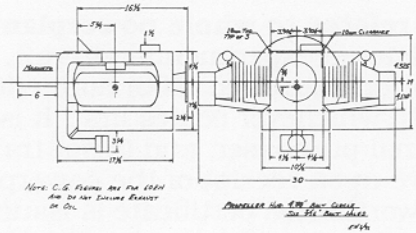


"1" IS AT LEFT EXHAUST PIPE

NOTE: C.G. NUMBERS DO NOT INCLUDE OIL FILTER, OIL COOLER, OIL LINES, EXHAUST PIPES, PROPELLER, SPINNER, ETC.

PROPELLER HUB: 3 1/4" BOLT CIRCLE
SIX 5/16" BOLT HOLES

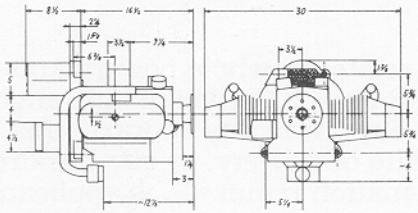
Mosler 60EH/TD



NOTE: C.G. FIGURES ARE FOR ENGINE AND DO NOT INCLUDE EXHAUST OR OIL

PROPELLER HUB: 4 7/8" BOLT CIRCLE
SIX 5/16" BOLT HOLES

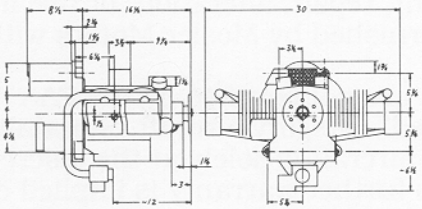
Mosler RED 65X



NOTE:
C.G. NUMBERS DO NOT INCLUDE OIL, EXHAUST, PLUG CABLES, COILS, PROPELLER, SPINNER, ETC.

PROPELLER HUB:
4" BOLT CIRCLE, SIX 5/16" BOLT HOLES

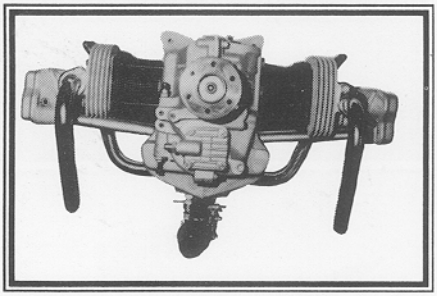
Mosler RED 82X



NOTE:
C.G. NUMBERS DO NOT INCLUDE OIL, EXHAUST, PLUG CABLES, COILS, PROPELLER, SPINNER, ETC.

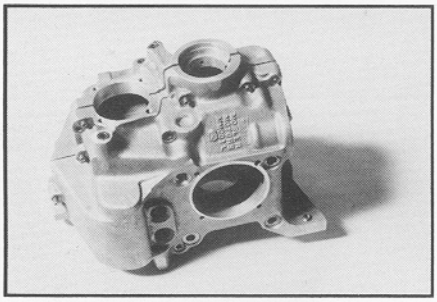
PROPELLER HUB: 4" BOLT CIRCLE
SIX 5/16" BOLT HOLES

CB-Series Parts



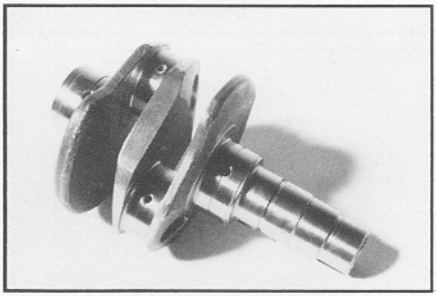
Just for the Champ!

Built for economical maintenance, the **CB-Series** uses many of the same parts as its four-cylinder brothers. Some parts, however, are just for the **CB-40** alone. We've put all of these *specific* parts together here in this section. **CB-40** engine, fuel system, and airframe parts are all here.



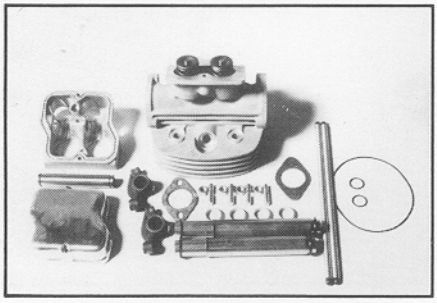
Engine Case

A specially designed aluminum case, custom cast and then individually machined by us to computer-tight specs, this is positively definitely *NOT* a "half-VW" case! These are available as "catastrophe" replacement to **registered MMCB/CB-40 owners ONLY.**
No. 101.020 (specify bore)



Crankshaft

Tough, **forged** crankshafts made for us by *the* leading US manufacturer. Designed especially for the **two-cylinders**. Available to **registered two-cylinder owners ONLY.**
No. 101.014

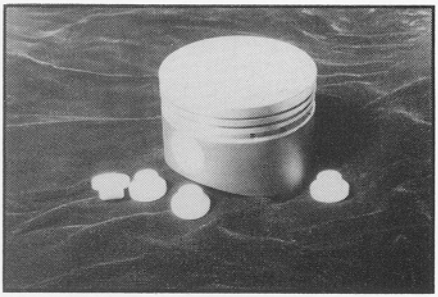


Cylinder Heads

Similar to those used on our **RED 82** engines. Remember, you need one *left* head and one *right* head. They are *not* the same. Each comes complete with rocker box, rocker arm assembly, push-rods, and pushrod tubes.
No. 10.502 - Right Head specify bore
No. 10.503 - Left Head specify bore

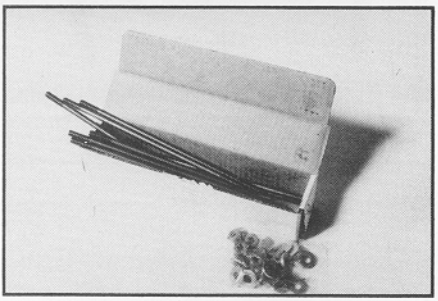
Teflon Wrist Pin Buttons

These things are much easier to use than the original wrist pin retaining clips. There's no chance of a scored cylinder wall if one pops loose in a running engine. Set of four.
No. 510.034 - 92mm
No. 510.032 - 94mm



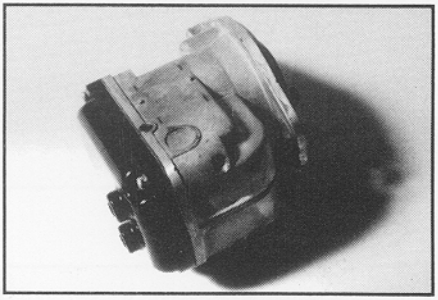
Cylinder Studs

These are special 8mm cylinder hold-down studs just for the **MMCB** and **CB-40**. We sell 'em in sets of eight.
No. 510.036



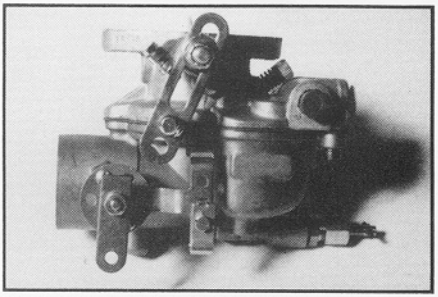
Optional Two-Cylinder Magneto

This excellent little magneto has an enviable history of reliability, and you can use regular unshielded plug wires with it. Some replacement parts also available. Call.
No. 401.001



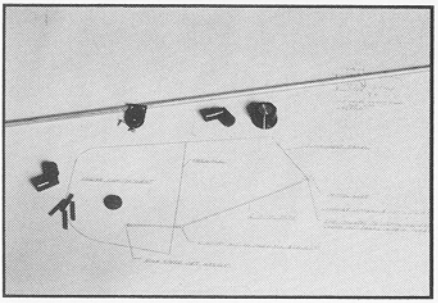
Updraft Carb

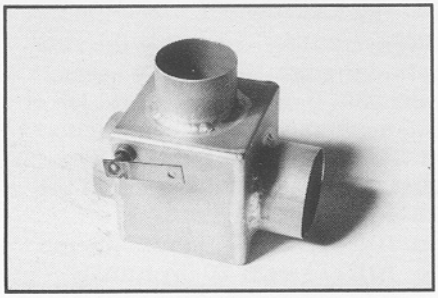
This little beauty has a choke and a special cockpit-adjustable main jet that allows mixture control in flight. Works with gravity or pump feed up to 4 psi. 2⅝" bolt spread.
No. 601.002



Mixture Control

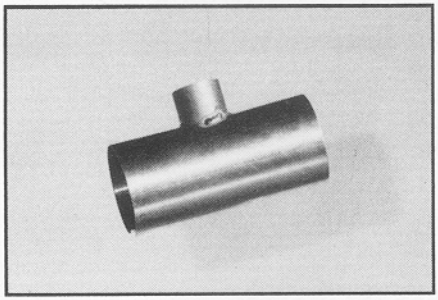
This special setup facilitates operating the above carburetor's needle valve from the cockpit. Includes control shafts, universal joint, adjusting knob, mounting plate, and grommet. Designed for the N3 Pup but adaptable to other aircraft.
No. 95.371





CB Carb Heat Box

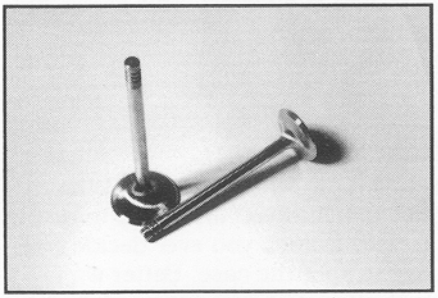
If it's an engine and it leaves the ground, ***it needs carburetor heat!*** The people who tell you otherwise are the lucky ones who've never had carburetor ice. It happens! Even on scorching summer days! You need carb heat! Can also be used as a cabin heat box.
No. 95.421



CB Heat Muff

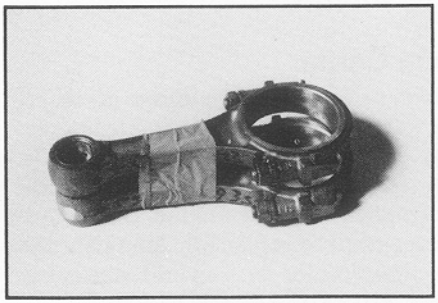
Similar to the version used with the four-cylinder engines, this is a scaled-down muff for the **CB-40**. Works perfectly with the box above.
No. 95.422 - Muff and Clamps
No. 540.031- Flexible Ducting, 2 ft.
No. 95.699 - Heat Exchanger Spring

No. **50.021** - **Complete setup** - contains 95.421, 95.422, 95.699, 540.031, and clamps



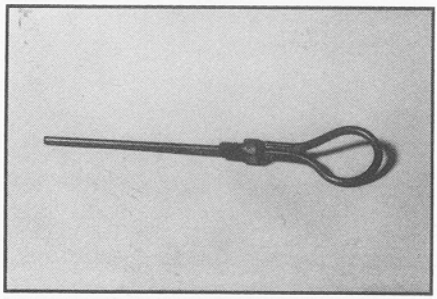
Intake & Exhaust Valves

If you ever have to do a "valve job" on your -**CB,** here are the exact replacement valves. Don't switch to some other diameter or type!
No. 201.019 - Exhaust Valve
No. 201.020 - Intake Valve



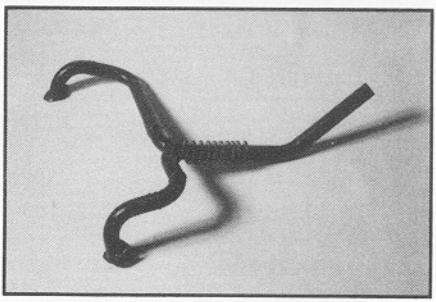
Connecting Rods

These are the same super-strong connecting rods we put into our four-cylinder engines, so you KNOW they're tough. Carefully balanced for smooth running, they're ready to install. Sold in pairs for the **CB**.
No. 510.011



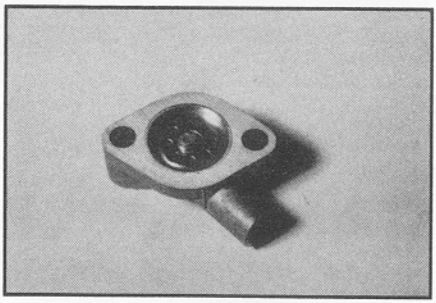
Dipstick

The **CBs** use special screw-in dipsticks, so you can't buy a replacement anywhere else but here. The screw-in design helps keep the oil inside the engine where it belongs.
No. 801.004 (MMCB)
No. 10.337 (early CB-40)



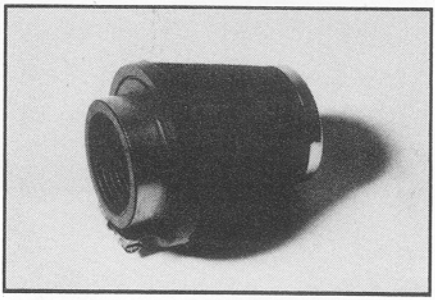
Crossover Exhaust System

Quieter and more efficient than the simple, straight stacks. This system also makes it easier to adapt carburetor heat to your engine.
Spring shown is not included.
No. 601.008
No. 95.699 - Heat Exchanger Spring



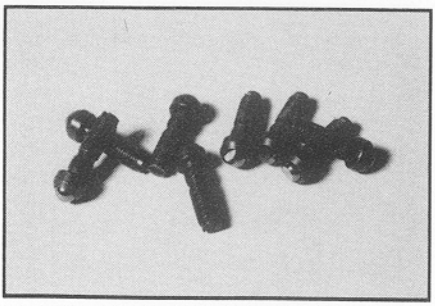
Engine Breather Valve

This is a clever little one-way valve that allows air pressure inside the engine to bleed off but prevents dirty outside air from entering the engine case. One of those beautifully simple gadgets.
No. 802.004



Air Filter

Here's an effective little filter that attaches directly to the front of our **CB** carb heat box. It's a combination of screen and foam, and comes with special filtration oil that helps trap abrasive particles.
No. 802.005



Swivel Valve Adjusters

The same tough, high-quality swivel-ball adjusters we put in our four-cylinder engines. They cut down on valve end wear and hold an adjustment longer than the stock adjusters.
Set of four adjusters.
No. 510.049