PERFORMANCE & COMPETITION

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"FORWARD"

MINI SPARES (London) have, for the past two decades, been continually developing new products, redeveloping and improving old designs, or upgrading previously poor quality, mass produced components. Much of this development work has been concentrated on the "ST" range of equipment, especially since the demise of Special Tuning in Abingdon.

Components in this catalogue apply to not only the Mini, but other 'A' series engines where common components are shared. It must be born in mind that whilst obtaining more power from the venerable 'A' series can be relatively easy and very worthwhile, the further the modifications are taken, the less tractable the engine will become at low speed.

Modifications of the engine to increase performance will obviously extend greater stresses on all associated components, with the possibility of reduced reliability dependent on state of tune. Proper and frequent servicing is highly recommended to help increase reliability, especially regular changes of a good quality oil.

It is also imperative that all suspension and braking systems are in proper working order, or upgraded where necessary to match this increased power output. Drum brakes and 120hp do not go together!

All particulars presented in this catalogue are for general guidance only. The Company can not accept any responsibility for changes in design, modification or method of application instigated by the product manufacturers or following continued development and research.

Reference to small bore and large bore engines in this catalogue are SMALL BORE: - 850, 997, 998 and 1098 engines, LARGE BORE: - 970, 1071, 1275 and derivatives thereof (ie. 1380, 1400, 1430, etc.).

PRODUCTION WARRANTY AND DEFECTIVE ITEMS

MINI MANIA & MINI SPARES CENTER LIMITED make no warranties whatsoever expressed or implied, oral or written, to the purchaser on performance related parts.

Due to the nature of their application, and actual fitment being beyond their control, the manufacturers offer a limited warranty on a majority of the products contained herein. These products require manufacturers authorization before credit or replacement can be effected. Items found to be defective prior to use will automatically be replaced provided the customer has not used or blemished the product in any way. Failed products will be replaced at the customers cost prior to authorization from the manufacturer to effect a credit. Mini Spares & Mini Mania will make every effort on behalf of the customer to establish this authorization. The manufacturers reserve the right to repair any product that can be made good and pass the cost of repair to the customer if it is deemed to have been misused, incorrectly fitted, over stressed, etc. This warranty applies to products used in normal service for the application intended, and covers only the replacement of products. Mini Spares nor Mini Mania bear no responsibility for labor charges incurred relating to the removal and refinement of the original or replacement parts.

Parts sold for any form of racing are warranted only to be free from manufacturing defects at the point to sale. All parts should be carefully inspected prior to fitment. There are no other implied or expressed warranties.

Supercharger kit

Mini Mania has developed and produced the ultimate in bolt-on performance for the A-Series motor. Modern technology in compressors and modern manufacturing has resulted in serious performance improvements, indeed performance unheard of in A-Series history. The supercharger's biggest benefit, torque, is the ideal upgrade to the A-Series motor. While horsepower is typically achieved by increasing RPM, torque has been the sole property of increased displacement. A V-8 has loads more torque then a 4 cylinder, but the application of modern superchargers has greatly diminished this distinction. Since all A-Series motors have 3 main bearing cranks, they are best suited to lower RPM (less horsepower) and can take advantage of the major benefit of superchargers- torque!

Twin Screw Compressor Design:

The twin screw supercharger is actually a positive displacement "compressor", not just a blower. This unique design allows the Mini Mania Supercharger to force a greater volume of air, at lower temperatures, into the manifold than "Rootes" design blowers.

Volumetric Efficiency (VE) measures how well a supercharger breathes and how much leakage occurs. For example, if a supercharger has a displacement of 10 liters and only 8.8 liters exit, the unit is 88% VE. Naturally a less efficient supercharger with a lower VE will have to work that much harder to produce sufficient air. The Mini Mania supercharger ;has an 88% VE, while most "Rootes" type blowers will produce 60% VE. Adiabatic Efficiency (AE), measures how well a supercharger uses the energy delivered to the drive shaft and how well it controls temperature from intake to exit. The low exit temperature of the Mini Mania Supercharger, as referenced to intake temperature, precludes the need for internal engine modifications or compression changes.

The Mini Mania Supercharger requires less power to turn its rotors, and condenses the air to produce more cool air than normal blowers. The horsepower numbers are tremendous but the "feel" of power, the torque, the grunt is even more spectacular.

Complete kit

The package includes supercharger with manifold, HIF6 S.U. carb, special aluminum water pump, alternator, and crank and idler pulleys, poly-v belt. All parts are new and tailored to fit the Mini!

SPC100

113 Horsepower! 1380cc Power Unit

Because so many Mini Mania customers ask for built-up high performance engines, we have decided to develop our own "ultimate street engine". Our 1380cc "Big Bore" power units have been on the road since 1994. In 2000, Steve Weber sucessfully completed the "One Lap of America" endurance run driving a Mini equipped with a 1380 with the optional five-speed!

All assembly and testing is done by Bill Gilcrease's Mincomp Racing shop in southern California. Because driveability and reliability are of utmost importance, only components from well established suppliers are utilized. The cylinder head is a genuine Longman GT6, which is not only fully ported, but has hardened valve seats for use with unleaded fuels. We use Hepolite Powermax 73.5mm pistons which are specifically designed for this application. Elgin Cams supplied the custom ground camshaft. The distributor is an Aldon yellow. We sell these engines ready to bolt in and run. This means, of course that they are already mated with transmissions. The tranny is also fully rebuilt, with your choice of rod-change or remote shift. Flywheel and clutch are all in place. Carburation provided is a single HIF6 carb with K&N air filter on an aluminum manifold and also included is a Long Center Branch (LCB) exhaust manifold. You provide only your own cooling system, tailpipe, and Mini!

Specifications:

- 113 Horsepower
- 73.5mm Powermax pistons
- A-Plus engine block
- 10:1 Compression
- 10/10 Crank w/ Vandervell bearings
- Elgin Cam003 timed in at 108° for best horsepower
- .014/.016 Valve lash (Hot)
- HIF6 SU Carberator with BDK needle
- 113 horsepower at the flywheel at 6500 R.P.M.
- 102 ft/lbs of torque at 4700 R.P.M.
- Longman GT6 cylinder head
- LCB Exhaust Header
- Dyno tested and run-in
- Complete with transmission (Rod change or remote type)
- Aldon Yellow Distributor
- Optional Weber Carb
- Optional high lift rockers for added top-end horsepower
- Optional Aluminum Cylinder Head
- Optional five-speed transmission

1380_Powerunit

1293cc Engine

Both the engine and transmission have been rebuilt with our vast experience to insure the right combination of economy and performance; you get good performance at an economical price! Built for unleaded gas, the engine produces between 65 and 75 HP. The transmission is rod change type with inboard CV joints (Special order units with the older remote shift and yoke outputs are also available!) Clutch, flywheel and all covers are in place; it's ready to install! Sold outright-no core charge! Built right here at Mini Mania!

1275eng/trans

Street Performance 1275 Powerunit

With an estimated 100 Horsepower on tap this great package is ready to install and will absolutely thrill you. The *rebored* 1275cc motor includes *high compression (9.75:1) 21253 performance pistons*, an **Aluminum cylinder head** with stainless steel high lift roller rockers (1.5 ratio), *a fast road camshaft* (276 degrees duration) driven by an all steel set of timing gears. This set up will provide the ultimate in performance with great reliability. Includes water pump and spin-on filter assembly. The transmission is rod change type with provisions for inboard CV joints (Special order units with the older remote shift and yoke outputs are also available!) Clutch, flywheel and all covers are in place; it's ready to install! Sold outright-no core charge! Built right here at Mini Mania!

1275HP/eng/trans

1380cc Short Block

Big bore block, crank, rods and pistons.

A 1380cc assembled shortblock consists of A-Plus block and crank machined to 73.5mm and assembled with AE pistons, ARP rod bolts, Vandervell rod, main and cam bearings. We've done the hard work, you can do the final assembly with your favorite head, cam, and ancillaries. Built right here at Mini Mania! You can finish the project to you liking from Mild to Wild build!

1380/Shortblock

Aluminum Cylinder Head

RPM	HP #1	HP #2
3000	47.80	47.60
3500	56.12	56.97
4000	64.22	67.23
4500	70.31	73.30
5000	73.5	76.30
5500	72.93	79.25
6000		80.27

Head with Seats and Guides

There are several advantages inherent to an aluminum cylinder head including a great deal of weight savings (Heads fully assembled weigh just over 13lbs.) and considerably improved cooling. This improvement in cooling means we can now run higher compression ratios without detonation caused by localized hot spots. Other improvements to this head are less obvious: Flow has been considerably improved by reshaping the combustion chamber. This was made possible by relocating the spark plug and upgrading to 12mm plugs. As standard the head is ready to fit 1.15 exh and 1.31 int valves and has 23cc chambers with a thick deck to allow for plenty of skimming.

C-AHT345

Stage One Aluminum Head

How about 124 HP with S.U. carbs? We achieved that figure on Mincomp's engine dyno when bolting this slightly modified aluminum cylinder head to a 1275cc +.040 race engine. We've increased the intake valves to 1.4" and done some very slight polishing to the casting seams. While you won't generate these numbers on a street motor, you can see that the potential is there to get maximum possible performance from any engine! Available by special order, please allow two weeks. Sold "fully assembled" only.

C-AHT345/

Assembled Head

We also offer the aluminum head fully assembled and ready to bolt on! This includes "ST" dual springs, new valves, retainers, keepers, seals, studs and spark plugs!

Exclusively from Mini Mania!

"C-AHT345/Assembly"

LONGMAN CYLINDER HEADS

Mini Mania is the exclusive direct importer of genuine Longman Cylinder Heads. As such we are also able to have heads modified to our specification, and we are directly involved in the ongoing development of the SCCA GT5 spec. head. All Longman Heads are fully ported and polished, and come completely assembled with Longman's exclusive valves, guides, springs, and retainers. All 1275 heads are based on the 12G940 casting.

GT4L

SPEC: 1.31 intake, 1.15 exhaust.
combustion chamber volume 24cc
Based on the 12G295 casting, this is the ultimate "small bore" head.

GT7

SPEC: 1.4 intake, 1.21 exhaust.
Combustion chamber volume 21cc
Late Cooper S spec. head with larger ports and make this suitable for highly modified road engines and especially the big bore 1380/1400 type.

GT6

SPEC: 1.4 intake, 1.15 exhaust.
Combustion chamber volume 21cc
Same as GT7, but fitted with hardened seats for use with unleaded fuel.

GT14

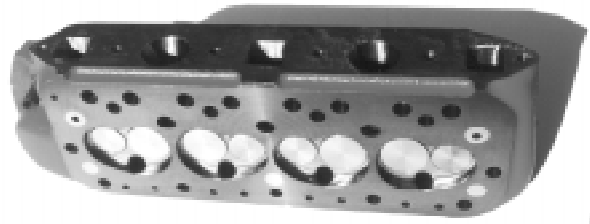
SPEC: 1.48 intake, 1.15 exhaust.
Combustion chamber 21cc
Very modified head, suitable for race applications and extensively modified big bore and long stroke engines.

GT15

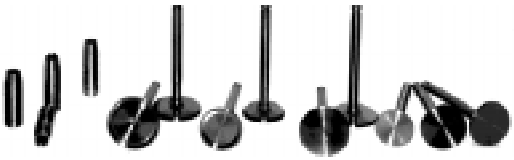
SPEC: 1.48 in, 1.21 ex.
Combustion chamber 21cc.
Very modified head, suitable for race applications and extensively modified big bore motors. The exhaust valve is offset to minimize cracking between the seats.

GT17

SPEC: 1.48 intake, 1.15 exhaust.
Combustion chamber to suit application.
Same as the GT14 but has been fully flow tested and balanced. It has longer valves (.140" longer) & special springs (with rotators) to work better with high lift cams.



Note: All heads may be ordered with your choice of combustion chamber volume!



Longman valves are specially shaped for maximum flow. 3.53" is the standard length for all 1275 12G940 castings. For special high lift applications, use 3.67 length with appropriate springs and roller platforms.

RLIN1.3STD
1.312" By 3.57", standard length inlet valve, standard size for 12G940 casting

RLIN1.3L
1.312" by 3.67, long inlet valve, as used in GT13 heads

RLIN1.4STD
1.405" by 3.57" inlet valve, standard length, as used in GT6 & GT7 heads

RLIN1.4L
1.405" by 3.67", long inlet valve

RLIN1.48STD
1.475" by 3.57", standard length inlet valve, as used in GT14 & GT15

RLIN1.48L
1.475" by 3.67", long inlet valve, as used in GT17 heads

RLEX1.15STD
1.15" by 3.57, standard length exhaust valve, standard size fot 12G940 heads

RLEX1.15L
1.15" by 3.67", long exhaust valve, as used in GT17 heads

RLEX1.21STD
1.215" by 3.57", standard length exhaust valve as used in GT15 & GT17 heads

RLEX1.21L
1.21" by 3.67", long exhaust valve.

C-AEA526L
Longman valve springs

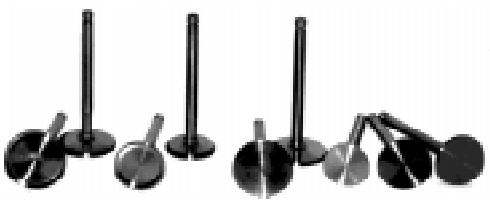
C-AJJ4037/L
Longman valve guides

88G459/L
Steel collets for spring retainers

ROTATERS
Special rotaters are used under the valve springs to reduce coil bind and friction.

VR1/Longman
Valve Spring Retainers for Longman heads.

RACE VALVES



All our race valves are produced in EN214N steel, stellite tipped and use the later narrow collett groove and current valve head shapes.

C-AHT111
1.525" Inlet valve x 3.57

C-AHT110
1.480" Inlet valve x 3.57

C-AHT55
1.464" Inlet valve x 3.57

C-AEG544
1.401" Inlet valve x 3.57

AEG593
1.401" Inlet valve x 3.57

C-AEG569
1.311" Inlet valve x 3.57

C-AEG590
1.311" Inlet valve x 3.44, small bore

C-AEG588
1.250" Inlet valve X 3.44, small bore

C-AEG107
1.215" Exhaust valve, x 3.57

C-AEG589
1.15" Exhaust valve, x 3.57

C-AEG106
1.15" exhaust valve, x 3.44, small bore

C-AEG587
1.04" Exhaust valve x 3.44, small bore

RIMFLOW VALVES

We also stock the range of Paul Ivey developed Rimflo valves for the A-Series. They are made of EN214N steel with chrome plated stems which enable them to be used with standard iron guides.

Rimflow1.46L
1.46" x 3.57 Inlet valve, 12G940 casting

Rimflow1.44L
1.44" x 3.57 Inlet valve, 12G940 casting

Rimflow1.4L
1.401" x 3.57 Inlet valve, 12G940 casting

Rimflow3.1L
1.311" x 3.57 Inlet valve, 12G940 casting.

Rimflow1.25
1.25" x 3.44 Inlet valve, 12G295 casting

Rimflow1.25L
1.25" 3.57 Exhaust valve, 12G940 casting

Rimflow1.21L
1.215" x 3.57 Exhaust valve,12G940 casting

Rimflow1.15L
1.15" x 3.57 Exhaust valve, 12G940 casting.

Rimflow1.0
1.06" x 3.44 Exhaust valve, 12G295 casting

Modern high lift, short duration camshafts have posed quite a few problems for the general public in recent years. Widely available performance valve springs were overnight out dated, as it became necessary to reduce spring crush. This, in turn, caused low valve seat pressures creating valve float at high rpm. Mini Spares has massively simplified these problems by introducing al range of springs that covers all eventualities. Manufactured from super-quality silicone wire imported from Switzerland, their resistance against fading and breaking is extremely high. They are also designed to take standard type top caps. They can be fitted directly to the head with no fear of spring crush.

C-AEA526
Anti coil bind dual springs for use up to 8000 rpm. 165 lb load at .380 lift, 185lb at .495 lift.

C-AEA527
Anti coil-bind dual springs for race use will take .570 lift without modifications, 240lb.

The standard fitted length of all springs above is 1.4" - 1.42".
Spacer shims are available to increase valve seat poundage and overall spring rate. If the spring or valve seats in the head have already been machined, it will be necessary to reshim to the correct fitted length.

SS4
Spring seat shims (set of 4), .080 thick (2mm).

It is essential to use bottom inner spring locating collars with all dual springs to prevent breakage caused by the inner spring wandering at high rpm.

C-AEA654
Competition inner spring locator

AEA403
Standard inner spring locator - lower - for use with cams up to .300" lift at the lobe.

903-0000
Crane competition steel retainers.

C-AJJ4037
Bronze Valve guides are required when using EN214N steel valves unless the valve stems are chrome plated.

VWE-005 SP6
260lb ISKY Valve springs (Require ISKY retainers).

VWE005/116
320LB ISKY Valve springs. (Require ISKY retainers)

SPOO7
ISKY lightweight aluminum valve spring retainers.

GASKETS

C-STR1057

Turbo head gasket. This gasket has an extra reinforced fire ring to eliminate inter-chamber blowing. Necessitates modification of the block - details available from us. Not suitable for bores over +.040". Beware TAM1521 is stamped on this gasket.

AF460

Competition copper/steel head gasket. Manufactured by Payen to their latest specifications. Essentially used on 1275cc engines, but also for small bore engines when using 12G940 head casting 3.6cc compressed volume.

GEG300

Copper/steel head gasket. Suitable for all large bore modified engines 3.4cc compressed volume.

TAM1521

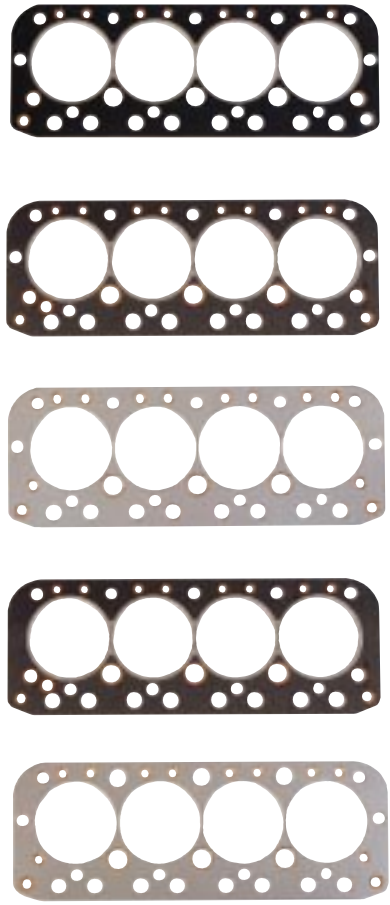
Standard composite steel reinforced gasket used on all large bore engines as standard, but is an exceptionally good gasket. 2.8cc compressed volume.

TAM2121

Competition Copper/steel small bore head gasket. Very good quality gasket. Can be used for all applications since the demise of the C-AEA647 ex 'ST' head gasket. It is possible to reinforce the fire ring to increase its sealing capability on high compression race engines. 2.4cc compressed volume.

C-AHT381

Large port competition manifold gasket, all 5 port heads.



Main Bearing Caps, Straps & Bolts

C-AGA619
4-bolt steel center main cap for large bore engines. Ultimate center main location. Essential for all stroked or race engines. Requires line boring, and two extra holes drilled in the block and tapped 7/16 UNF. The thrust faces are part machined for final finishing whilst the line boring is being done. Comes with correct length HT bolts. Fits 1300/ A-Plus blocks.

C-AGA621
3-piece Steel Main Cap set with 4-bolt center main.

CMS13
Steel center main strap for large bore engines. Comes with longer high tensile bolts. Main cap top needs machining flat. No other modifications required.

CMS10
Steel center main strap for small bore engines. Comes with longer high tensile bolts. Main cap top needs machining flat. No other modifications required.

206-5401
Main cap stud kit

AEG323L
Special 'S' main cap stud set. The center studs are longer for use with center main strap.

C-AJJ4013
Special 'S' main cap nut set.. Includes nuts and washers.

Studs, Nuts and Washers

C-AHT288
Competition head washer set of 10.

AMS-1


Stainless steel manifold kit. The benefit of stainless in addition to the strength and looks is that it won't rust and have the nut seize on the stud. The nuts used in this kit fit a standard stud but are a 12 point design with a shoulder, thus they have a wide surface for spreading the load but need only a 3/8' wrench in tight quarters!

THS-1
Stainless steel thermostat studs
Stock studs are very prone to rusting and seizing to the thermostat housing.

You don't really have to be building the ultimate race motor to appreciate the need for quality hardware! Even a good street motor can benefit from the reliability of the best quality hardware! The ARP family of nuts and bolts are just that - quality!

206-4201
Head Stud kit
Nine stud kit for all A-Series. Includes all head studs, plus rocker studs, with 12-point nuts and machined washers.

HSA11
Head Stud kit
Stud kit for engines modified for 11 studs. Includes all head studs, plus rocker studs, with 12-point muts and machined washers.

AJW625M
Machined head washer.

AJN12-1
12 Point Nuts
Ideal for use as cylinder head rocker assembly nuts! The 12 point design (uses a 3/8" socket) makes for a sure grip that is small enough to not interfere with anything!
(These nuts are included in the stud kit # 206-4201)

206-5401
Main cap Stud kit. Includes nuts and washers.

C-AJJ4013
Special 'S' main cap nut set (6).

HARDWARE

Rod Nuts & Bolts

If you are inside the motor to do any serious rebuilding, then you have the crank and rods in you hands! The rule of thumb is that stock rod bolts and nuts should be replaced even in street motors at least after every other rebuild! If you are not certain, don't chance it! And with the cost of stock ones as high as they are, the better quality ARP kit is a real bargain!

BE6001
Fits 1275 Cooper S. (1.625 rod)

206-6002
Fits 1275 A-Plus, Austin America. (1.75 rod)

BEB-08
Fits all Small-Bore engines (only uses bolts!)

L903
Thread Lube
Maintain the quality and life of the numerous ARP components with this Moly based lube. 1.69fl oz.

200-8602
5/16 nut. 6-point

200-8604
3/8 nut, 6-point

200-8505
Hardened Washer
3/8" ID and 5/8" OD, these won't distort.

FITTINGS & ADAPTERS

RIC925

Oil adapter plate
This handy sandwich plate goes between the oil filter head and the engine block. It is drilled and tapped 1/8 NPT, ready to take an oil temp sender or pressure feed line.

C-2A715

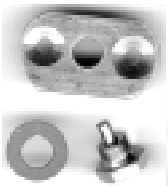
oIL Outlet adapter
Most serious racers prefer to plumb their oil systems with Aeroquip stainless steel hoses. At the same time, most fittings are converted to the common "AN" flare from the BSP fittings on the stock oil coolers. Our special adapter has the 5/8-18 British Straight Thread to screw into the block outlet, and accepts any -10 AN female fitting.

C-2A715k $14.95

RIC920MS

Inlet adapterThis special casting replaces the oil filter head. With it you can Aeroquip hose to a remote filter. An AN -10 fitting is included.

C-2a3637



Magnetic oil trap. Replaces the external plate on the oil pick-up pipe.

Dist.adapter

A-Plus distributor adapter. Our special adapter allows for direct bolt-in of any early "Pre A-Plus" distributor into any "A-Plus" block. Kit includes machined aluminum base clamp plus modified distributor drive spindle.

C-2A265

Crankcase breather. Designed to bolt onto the backside of any block that has a blanking plate where the mechanical fuel pump is sometimes located. The block provides baffled venting and has a pipe thread output to allow you to create your own catch/vent system. Machined from billet aluminum and very trick looking! Kit includes the breather, gaskets, hardware and instructions.

11K2846

Water gauge adapter. You'll need this adapter if you want to use a mechanical water temp gauge on an A-Series cylinder head.

OIL PUMPS

ing the heart of the engine, it is obviously essential that the pump is in prime condition when fitted. Due to robotised manufacture of the commercially produced pumps, tolerances have been opened up to facilitate rapid production and assembly. This has brought about a decline in the effectiveness of the pumps, especially in arduous environments such as racing and fast road work. Oil pressure in some cases has all but disappeared! Of course long term results are disastrous, not to mention expensive. Basically some pumps are effectively worn out when new.
The precision range of oil pumps from Mini Spares are all hand selected, component matched to exacting tolerances, then hand assembled. This ensures minimum end float and rotor clearance, maximizing pump efficiency. The rotor type is a 4 into 5 configuration as per the standard steel backed pump. This supplies more than enough oil for the Mini engine - some 40% of which is dumped straight back into the sump via the pressure relief valve. A greater oil supply would only create a loss in power.

C-AEG410
3 bolt, long pin-drive pump, big bore

C-AEG411
Spider-drive pump.

C-AEG412
Slot-drive pump, big bore

C-AEG413
998cc slot-drive pump.

C-AEG414
Pin-drive small bore pump.

CAM6614
Turbo Metro oil pump. Highest flow available.

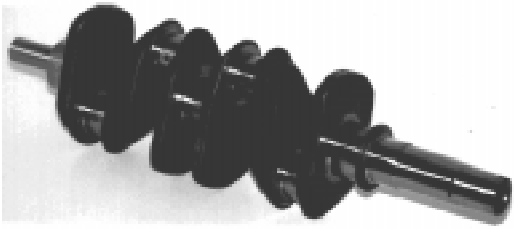
If necessary, the star drive pump can be used on the small bore engine without the necessity for drilling and tapping the block. The pumps all have the standard 3 bolt facility. However, an oil pump spacer (12G1127) would still be required.

GPS
Low pressure oil warning light switch is available to help protect the engine. The standard one comes on at 7lb - much too late a warning to avoid any damage. The high pressure one comes on at 22lb, and is a direct replacement for the standard one.

C-GPS101
Low pressure oil warning light switch. Adjustable from 22 to 50psi

GFE101
Super oil filter It is recommended that a more efficient oil filter is used. The Unipart replacement has a special micro fine filter with a magnetic trap in the bottom. On performance engines it is recommended to change the filter every 3,000 miles.

CRANKSHAFTS



Forged EN40B steel nitrided cranks are considered the ultimate in specification, even over the 'billet' type. This is mainly because the grain pattern of a forging follows the shape of the webs and bearings where as the billet type is machined across the grain. We hold stocks of all the forged type cranks, as well as re-stroked standard material cranks and new cranks. All are cross drilled, except AEG602, and heat treated for maximum strength and durability. All are machined to fit 1300 non-'S' center main except C-AEG479 which is 'S'.

C-AEG479 **(81.33mm) EN40B**
1275cc Cooper S.

C-AEG170
1071cc 'S'. Available from billet only

C-AEG329
970cc 'S'. Available from billet only

C-STR931 **(81.33mm) EN40B**
Nitrided, 1300 Big end journal for 1300/ A-Plus block

C-AEG476 **(76mm) EN40B**
Short Stroke Nitrided, 1.625" 'S' Big end journal. For 1300/A-Plus Block

C-AEG497 **(84mm) EN40B**
Long stroke Nitrided, 1.625" 'S' Big journal. For 1300/a-Plus block

C-AEG478 **(86 mm) EN40B**
Long Stroke Nitrided, 1.625" 'S' B/end journal
For 1300/A-Plus block

.

'S' big end journal diameter =1.625"
1300 big end journal diameter = 1.75"

BORE/STROKE CAPACITY COMBINATIONS IN CC

	.020	.040	73.5mm	74mm
76mm	1209	1226	1290	1308
79mm	1256	1274	1341	1359
81.33mm	1293	1330	1379	1399
84mm	1336	1355	1425	1445
86mm	1368	1387	1459	1480

When fitting 'S' main bearing width cranks in to non 'S' blocks, or vice-versa special thrust washers are needed.

TTW4
Thin thrust washers necessary to fit 'S' type cranks into non 'S' blocks.

TTW5
Thick thrust washers necessary to fit non 'S' cranks into 'S' blocks.

VPW41/30
+030 thrust washers (set)

CONNECTING RODS

As the Cooper 'S' con rod has not been produced by BL for many years, we have had them reproduced, faithful to the ORIGINAL specifications - including material type, EN24V. These are the strongest production 'A-Series con rods produced.

AEG624
1071cc and 1275 'S' rod 5.75" centers.

AEG309
970cc 'S' rod 5.875" centers.

CARILLO
Carrillo rods are undoubtedly the finest in the world, and come equipped with bolts that NEVER need to be replaced. Standard 5.75 inch length

CARRILLO6
Also available in 6" length.
Requires special build procedures.

PISTONS

AE Hepolite Powermax cast pistons are the highest quality cast piston available for the A-Series engine. Very robust, even in competition use, light weight, and very reasonably priced. They are available for the 1275 in oversizes in both 6.5cc dish and flat top, as well as for 73.5mm "Big-Bore size with a 9cc dish.

20659
73.5mm "Big Bore"

C-AJJ3378
1275 6cc dished oversize piston set, +.020", +.040", +.060".

C-AJJ3382
1275 flat top piston set, +.020", +.040", +.060".

AE's current standard production pistons are of such high quality they have been used in many successful race applications. What makes them especially attractive is their price and spares availability. Replacement ring sets are readily available, as are individual pistons if required. The different CR's are achieved by different pin to crown heights. The 21253 type are best suited to high performance use as they have a much smaller oil drain slot behind the oil control ring - thereby reducing the possibility of breakage.

P21250
9.41CR, 1275 low drag slipper piston. Available in +.020, .040", .060", 8.4cc dish.

P21251
8.8-1CR, 1275 low drag slipper piston. Available in +.020", .040", .060", 8.4cc dish.

P21253
9.75-1CR,1275 low drag slipper piston. Available in +.020", .040", .060", 8.4cc dish.

P20950
998cc Powermax piston, flat top, std to +.060".

P20773
8.5 CR, 998cc piston, dished top,+.020", .040", .060"

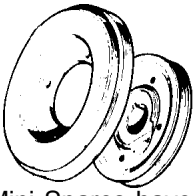
P20754
10.3 CR, 998cc piston, flat top, +.020", .040", .060".

The above are a good hardy piston, the flat top type being all right for up to 10.8-1 CR. However, they should not be used in engines being used continually over 6,500 rpm.

C-AEG701
Set of 8 PTFE wrist pin buttons to replace circlips for high RPM use. State whether for standard type or A+ slipper piston. For 998cc only.

Mini Mania can also produce almost any size or crown configuration required. These would be produced by Venolia pistons in California. These are forged, supreme quality pistons.. This service usually takes 4-6 weeks, but costs little more than buying a set of "off the shelf" forged pistons.
Forged pistons can also be supplied for 948cc and 1098cc in limited oversizes.

CRANK DAMPERS



For high performance engines an efficient crank damper is a necessity to reduce failure. The standard damper commonly used is barely adequate for the standard engine. Mini Spares have reproduced the original 'S' damper and pulley - far superior to the standard item. The damper ring can be bolted directly to the toothed belt crank pulley, or used with the original 'V' belt crank pulley.

12A367
"S" Damper ring.

C-AEG454
"S" Crank pulley.

C-AHT146
Lock tab for 12A367 to C-AEG454.

C-AEA750
Friction Damper kit

You've read all the books on engine harmonic vibration and how bad it is for the bottom end of your engine. Take a survey of race engine builders and they'll agree that the friction damper manufactured by Fisher is far superior to the rubber isolated dampner. Mini Mania is proud to offer a Fisher friction damper kit for the A-Series engine. Every effort has been made to make this kit as compact and lightweight as possible. To do so we have utilized a ribbed Poly-V belt drive system. The Poly-V belt drives lightweight aluminum water pump and alternator (or idler) pulleys.

C-AHT147
Uprated front pulley bolt

High tensile socket head bolt that is used with a thick EN16 washer. It is of sufficient length to ensure twice the recommended engineering thread engagement.

Engine Steady Kits

One of the biggest problems with the Mini is engine location and stability. We are all familiar with the engine rock experienced in a standard Mini on acceleration/deceleration and gear changes. A situation that rapidly deteriorates once the engine steady bushes start to “give in” - which takes an alarmingly short time. In the advent of the rod change type gearbox fitment, this situation became even worse as there is next to no stability offered by the rod linkage, unlike the old remote mounting. The engine movement suffered is the main reason for breakages in exhausts and manifolds, not to mention damage to carb jets.

Mini Spares have developed several kits to help control this situation. Use of one of the kits will improve things dramatically - using all of them will stop the engine dead! They are all to be used in conjunction with the standard engine steady bar and not to be used as replacements.

We also supply several kits for those who have broken bolts/stripped threads in the engine block preventing use of the standard bar.

MSSK1300

Competition engine steady kit. Fits from thermostat end of cylinder head to bulk head. 1275 engines.

MSSK1300L

As above but for left hand drive cars.

MSSK1000/RHD

Competition engine steady kit as above. Fits all small bore engines.

MSSK1000/LHD

As above but for Left hand drive cars.

MSSK

Lower engine steady kit. Fits from below flywheel housing to rear lower leg of subframe on the right hand side.

MSSK1

Lower engine steady kit. Fits from speedo drive housing to rear lower leg of subframe on the left hand side.

WB3

Poly bushes for engine steady bar.. Will also fit MSSK and MSSK1 kits. These are near solid bushes to replace the standard rubber ones. They will transmit some noise to the car body.

MSSK2

Engine steady repair kit. Replaces both broken stabilizer bolts.

MSSK3

Engine steady repair kit, replace only the rear bolt. For engines with breather on top of clutch case.

MSSK4

2 bolt engine steady repair kit for engines with no breather on flywheel side.

MSSK5

2 bolt engine steady repair kit for large bore engines.

Continuous research and development has often brought to light some intriguing and unexpected bonuses. Some time ago Min Spares started producing their own ultralight steel flywheels as we were suffering all manner of problems from the then only available supplier. However, recent testing on harmonic balancers brought to light an odd frequency at high rpm - which was being developed by the flywheel. We isolated the problem, and now have redesigned our flywheel to be near perfect! It is now more symmetrical, and evenly balanced. The flywheel comes with the required distance pieces for mounting the straps. It is highly recommended to use 3 clutch straps per location to minimize stretch on high performance engines. Part number 2A3658.

For the road we have developed a lightened steel flywheel. This has been produced as the ultra light version is far too light for most fast road applications, producing an uneven and lumpy tickover when high lift cams are used. Much lightened standard cast ones are dangerous. The steel flywheel also provides a much hardier clutch surface.

For those stuck with the verto flywheel assembly we have developed a replacement outer flywheel section in steel that is nearly 4lb lighter than the standard item.

C-AEG619
Ultra light steel flywheel. Weight 8.38lbs.

C-AEG421
Light steel street flywheel. Weight 10.5lbs.

C-AEG422
Light steel verto type assembly. Weight 8.84.

FLYWHEEL WEIGHT COMPARISONS

	KG	LBS
Standard iron flywheel unmodified	7.58	16.71
Safely lightened std. iron flywheel	6.06	13.36
Steel Light weight fast road spec.	4.8	10.5
Ultralight Steel race flywheel	3.80	8.38

Note: all above weights are with ring gears.

C-AHT230
Competition light clutch back plate. Weight as sold 3.56lbs. Standard back plate for comparison 5.74.

C-AEG481
Orange clutch diaphragm.

C-AEG482
Gray clutch diaphragm.

C-AHT596
Rally/race clutch disc.

Clutch02
Button clutch disc. Recommended for race use only.

It is recommended that only the gray diaphragm is used with the sintered button disc.

KENT CAMSHAFTS

There are three different cam/oil pump drive types - star drive, pin drive, and slot drive. All pre A-Plus small bore engines used pin drive cams as did the 'S', except the MK3. Star drive cams were fitted to all solid wall block large bore engines prior to A-Plus type. All A-plus type engines use the slot drive type.
We stock the latest generation of cams from Kent Cams, as well as their range of re profiled original BL specification cams.

KENT(MEGADYNE RANGE)

MD256
Excellent urban cam, pulls from very low down, increases low, mid and top end in nearly all engines. Smooth idle, and good economy. Rev band up to 6,000 rpm.

MD266
Brilliant all round performance road cam. Smooth idle, pulls from around 1,200 rpm. Small gain in low end, big increase in mid and top end. Unbeatable for genuine fast road use. Rev band 1,200 to 6,500/7,000 rpm.

MD276
Slightly lumpy at idle, especially in small bore units. Strong mid and top end power. Rev band 1,500 - 7,000 rpm.

MD286
Hottest road usable cam. Not a good traffic cam. Lumpy idle. Not very suitable for small bore units unless fully prepared with big valve head. Very strong mid and top end power. Rev range 2,000 - 7,500 rpm.

MD296
Needs free flowing exhaust manifold and system, high CR, best with medium to long inlet manifolds. Mid and top end power only. Gives very good results when twin SU's have to be used. Rev range 3,250-8,000/8,500 dependent on build.

MD310
Out and out race cam. Needs fully prepared engine to give best results. Rev range 4,000 to 8,500/9,000 dependent on build. High CR also required, 13:1 plus.

MD530
Rover Group 'modern' 649. Good general use race cam in almost anything. 1.5 ratio rockers a must with well ported head.

Kent Scatter Pattern Cams

This selection of cams are the very latest supercams available for the 'A' series engine. Their design gives more torque, more power and more usable rpm than their equivalent single pattern cams. Current state of the art.

MD286S
Ultimate street cam. Excellent for Autocross. Pulls very well from 2000 RPM.

MD296S
Gives very strong mid range and top end power. Needs CR and non restrictive exhaust manifold and system.

MD290S
Race cam. Needs CR not as fussy as to exhaust system. Effectively a 90's engineered 649. Gives wide power band, very good results in standard stroke race 1275cc 'S'.

MD310S
Kent's ultimate race cam. Needs fully prepared engine for good results - high CR, high flow head, exhaust manifold and system.

KENT CAMS (MEGADYNE RANGE)

	Duration IN / EX	Lobe Center	Lift at 1.25 Ratio	Lift at 1.5 Ratio
MD256 Mild Road	254/254	106	.320/.320	.380/.380
MD266 Fast Road	260/268	106	.320/.330	.380/.390
MD276 Road Rally	270/280	106	.360/.380	.430/.455
MD286 Rally	280/290	106	.388/.400	.460/.468
MD296 Race	290/300	106	.400/.420	.470/.495
MD310 Full Race	310/310	106	.420/.420	.495/.495

KENT MEGADYNE SCATTER PATTERN CAMS

	Timing No. 1 & 4	Timing No. No. 2 & 3	Lift at 1.25 Ratio	Lift at 1.5 Ratio
MD286S	34-66 71-39	34-66 71-39	.388/.400	.460/.488
MD296S	39-71 76-44	39-71 76-44	.400/.420	.470/.495
MD290S	41-69 73-37	47-63 67-43	.395/.395	.472/.472
MD310S	49-81 81-49	49-81 81-49	.420/.420	.495/.495

KENT CAMS STANDARD CAMS

	Duration IN / EX	Lift at 1.25 Ratio	Lift at 1.5 Ratio
450/500 Mild Road	252/262	.320/.320	.380/.380
*948/567 Mild Road	252/252	.320/.320	.380/.380
550/600 Fast Road	288/288	.360/.360	.430/.430
*731/800 Fast Road	268/268	.320/.320	.380/.380
*544/643 Road Rally	288/288	.387/.387	.464/.464
*649/530 Race	300/300	.394/.394	.472/.472
*Sprint 597 Race	320/320	.394/.394	.472/.472
*Super Sprint 598 Race	320/320	.394/.394	.472/.472
895 Race/Rally	300/320	.395/.395	.475/.475
475 Full Race	320/315	.396/.395	.475/.475

* Denotes BL's ST specification cams.

CAMSHAFTS BY ELGIN

Much information has been recorded about the four stroke internal combustion engine and yet only a small percentage of people really understand how it works and fewer people know how to modify an engine to suit their needs.

I will try to simplify this very complex subject by discussing some basic principles that may be overlooked by the average person.

It is very important to understand which way the piston is traveling and where the valves are during the four strokes.

We have four strokes to consider. The valve timing events, relative to piston placement, are the only thing easy to adjust/change. The camshaft that opens and closes the valves makes one complete 360deg revolution while the crankshaft which moves the piston up and down the cylinder rotates twice (720deg). Camshaft timing is usually talked about in crankshaft degrees relative to piston placement in the cylinder. We know that the piston is at the top (Top Dead Center) of the cylinder twice and at the bottom (Bottom Dead Center) twice.

The First Stroke starting at the TDC position the piston starts moving down the cylinder (intake stroke), picks up speed, and must slow down when it reaches the bottom. As the piston is moving down the cylinder the intake valve is opening. Some air and gas mixture is beginning to flow into the cylinder but the greatest gulp comes when the pressure differential is the greatest. That occurs when the piston reaches maximum velocity. The things that govern piston velocity (Velocity=Rate of change of position, in relation to time) are the stroke, rod length and piston pin off-set. You must be wondering why I'm talking about piston velocity during the first (intake) stroke. FACT ONE: Volumetric efficiency is directly related to piston velocity! We have at least 200 miles of air above the engine waiting to fill the cylinder with 14.7psi @ sea level.

As the piston reaches BDC the intake valve is almost closed. The intake valve finally closes after BDC when the piston is on the way back up the cylinder. You might guess correctly now that the piston does not move very fast at TDC or BDC. As the piston starts the second (compression) stroke it must compress the air and fuel to a high enough pressure and temperature that the spark plug ignites the mixture. We hope to have a CONTROLLED BURN (an "explosion" = detonation) to move the piston back down for the third (power) stroke. In most instances the expanding gasses are at a low pressure by the time the crankshaft is at 90deg after TDC (ATDC) so we can safely open the exhaust valve before BDC (BBDC). When we begin the fourth (exhaust) stroke the exhaust valve is opening at a fairly rapid rate, the piston is going up and if the exhaust valve is not open a lot by the time the piston reaches maximum velocity there will be resistance in the cylinder caused by exhaust gas pressure. This is known as pumping losses. As the piston is reaching the top of the cylinder, the end of the fourth stroke, you will see the exhaust valve is almost closed but, low and behold, the intake valve is just beginning to rise off its seat! At TDC at the end of the exhaust stroke both the intake and exhaust valve are open just a little. This end of the exhaust stroke is also called the OVERLAP PERIOD.

Commonly during the overlap period you will find that at TDC exhaust stroke both valves will be open an equal amount and that is called SPLIT OVERLAP. On standard engines the valves are only open together for 15-30deg of crankshaft rotation. In a race engine that uses higher engine speeds, 5000-7000RPM, you will find the overlap period to be in the neighborhood of 60-100deg (will also mean more duration)! With this much overlap the low speed running is very poor and a lot of the intake charge goes right out the ex-

haust pipe.

Let us review the four strokes again and add some timing events to calculate total valve duration. Let us use a good street cam timing of 268deg duration with 108deg camshaft lobe centers. Lobe centers=the center line of the exhaust lobe to the center line of the intake lobe in camshaft degrees. As we have discussed, at the end of the fourth stroke both valves were open and the next stroke is the intake stroke. With the 268deg cam the intake valve began to open at 26deg before TDC. We now have the piston going down the cylinder with the valve reaching full lift at 108deg (lobe center) ATDC and the intake valve is still open when the piston reaches BDC. The crankshaft has rotated 180deg from TDC to BDC. The intake valve opened 26 deg. BTDC. Now we have 26 deg.+180 deg.=206deg. of crank rotation. We started with a 268 deg. camshaft so that tells us when the intake valve will close. 268 deg. less the 206 deg. that we have already counted = 62 deg. The intake valve will close 62 deg. after bottom dead center (ABDC). The second stroke is the compression stroke but the intake valve is still closing! FACT TWO: The engine does not have any compression until the intake valve is fully closed! Now we compress the air fuel mixture and ignite it at the proper time in order to maximize the push down on stroke number three. Remember I said that most of the cylinder pressure is gone by 90 deg. ATDC? Now with our 268 deg. cam the exhaust valve will begin to open 62 deg. BBDC and we'll have 180 deg. of crankshaft rotation on the exhaust stroke. 62 deg.-180 deg. = 242 deg. of crank rotation. At TDC at the end of the exhaust stroke the intake valve just begins to open again and the exhaust valve is almost closed. When does it close? We already had 242 deg. of rotation and the cam has 268 deg. 268-242=26 deg. The exhaust valve closes 26 deg. ATDC. With the intake opening at 26 deg. BTDC and the exhaust closing 26 deg. ATDC we have a total of 52 deg. overlap.

Now we can start discussing duration, lift, lobe centers, compression and cylinder head flow.

Let us now take the four timing events and put them in order of importance. The least important is the exhaust valve opening. It could open anywhere from 50 to 90 degrees before bottom dead center (bbdc). If it opens late, close to the bottom, you'll take advantage of the expansion, *power,* stroke and it would be easier to pass a smog test but you'll pay for it with pumping loss by not having enough time to let the cylinder blow-down. You must let the residual gas start out the exhaust valve early enough so that the piston will not have to work so hard to push the gas out. Opening the valve earlier will give the engine a longer blow-down period and that will reduce pumping losses. For a low speed engine, say up to 4000 rpm, the cam can open the valve later.

The next least important timing point is the exhaust closing. If it closes early, say around 15 degrees after top dead center (ATDC), you will have a short valve overlap period. Less overlap is required to pass the smog test but it does not help power at higher engine speeds. Closing the exhaust valve later, in the vicinity of 40 degrees ATDC, there will be a longer valve overlap period and a lot more intake charge dilution that will make low speed operation poor. Some compromise must be made as to how much overlap one needs to use. Many factors need to be considered like idle quality, low speed throttle response, fuel economy, port sizes, and combustion chamber design just to name a few.

The next least important timing event is the intake valve opening. Early opening allows for a greater valve overlap period and adds to the poor low speed use. For the high performance enthusiast, low engine speed could mean 3000 RPM! I would not consider that as a typical street engine. If you're not concerned about

passing the smog test then early intake valve opening will help the power output of the engine. Earlier valve opening will have the valve open further when the piston reaches maximum velocity and that increases the volumetric efficiency (V.E.).

I must stop now and ask you a question about your engine. If the stock 1275cc BMC head does not flow much air above .350" valve lift and it is possible to have the intake valve open that much by the time that the piston reaches maximum velocity WHY IS IT THAT MOST PEOPLE WANT AT LEAST .500" VALVE LIFT??

Now the last timing event is the most important and the most critical THE CLOSING OF THE INTAKE VALVE. The closing of the intake valve is the governor of the RPM range and the governor of the effective compression ratio! If the intake valve closes early, about 50 degrees after bottom dead center (ABDC) then it will limit how much air/fuel mixture could enter the cylinder. Early closing makes the low speed very nice but it does limit power output as well as RPM. Another problem with early intake valve closing that most people do not consider is that if you have a high compression engine, say 10:1 or higher, you will have more pumping loss trying to compress the mixture. You might even have head gasket and or piston failure! Now if you close the intake valve later the cylinder will have more time to take in more air/fuel and the RPM will move up. That seems simple enough doesn't it? The later that the intake valve closes the higher the RPM and therefore the more power, maybe! If the valve closes past 75 degrees (ABDC) you could lose most of the low speed torque and if your STATIC compression is only 8:1 the engine will not be able to reach its horsepower potential. Now you might have a better understanding why the intake valve closing is the most important timing event.

Now to get onto another topic. It is very important to know the following in order to make a proper camshaft selection. What will be the RPM range that the engine must perform in? 1000- 4000, 2000-5000, 3000-6000, 4000-7000, 5000-8000 RPM?? What size is the engine? What is the bore and stroke? How long is the center to center distance on the connection rod? How much piston pin offset is there? What is the static compression ratio? In the cylinder head what is the maximum cubic feet per minute (CFM) air flow in the intake track with the manifold and carb installed? At what valve lift does the air flow level out on both the intake and exhaust valve? What is the percentage of the air flow of the exhaust vs. the intake? What are the valve sizes? What are the lengths and sizes of the intake and exhaust systems?

Once you have this data then a logical cam choice can be made. Sometimes the engine combinations are wrong for the expected RPM range that is desired.

How can a layperson look in a catalog and make a correct choice? The parts supplier must have the proper information in order to help the customer choose the proper camshaft.

Let us now look at the cam listings that are provided in this catalog. You will notice that of the six cams that are listed each one has the exhaust duration greater than the intake duration. The reason for this is when the standard 1275cc cylinder head and two other modified heads were flow tested the results showed that the exhaust flow was not up to par. In order to have the correct intake to exhaust balance a dual pattern cam must be used. If the engine is to be used for serious competition then it is necessary to install larger intake and exhaust valves and do the grinding and polishing with the aid of a steady state flow bench. When the cylinder head is prepared in this manner it is then advisable to use a single pattern camshaft.

If we look at part #CAM006 you will see that it was designed for a special

application. Usually the cylinder head was slightly modified and the compression ratio is on the high side for regular street driving. If a stock or near stock style camshaft is used the power would fall off early in the RPM range and the engine would have a pinging or detonation problem. In order to solve this problem the intake valve must close later and the other timing points need to be increased. This will compromise the idle and the torque under 2500 RPM but watch out after 3000 RPM!

We have covered a variety of topics related to the workings of the four stroke internal combustion engine. We discussed a little about volumetric efficiency (VE) and how it is related to piston velocity, cylinder pressures that determine normal or abnormal combustion, pumping losses that occur on the compression stroke as well as the exhaust stroke, overlap period, lobe centers and how to figure out the duration of the camshaft in crankshaft degrees. We went deeper into the four strokes by listing the order of importance of each stroke and how it affected engine performance. We talked about compression ratio versus intake valve closing, what RPM range one might choose for their application, some information about cylinder head flow, and finally some ideas about camshaft decisions when the engine data is known.

Let us now go over some more cylinder head information. We will compare a few BMC “A” series heads in different states of tune. A slightly reworked 1098cc head with std valves [A]; a stock 1275cc head with std valves, I=1.400", X=1.155" [B]; a modified 1275cc with larger valves, I=1.444", X=1.215" [C]; and a highly reworked “Longman” head with larger intake valves, I=1.477", but std exhaust valves, X=1.155" [D].

If you look at the ratio of the exhaust valve versus the intake valve you will find that the stock 1275 head has a ratio of 82% (X/I=1.155/1.400 =0.825); the modified 1275 head has a ratio of 84% and the “Longman” head has a ratio of only 78%. I prefer to be in the 80-85% range and the port the head to achieve about 80% exhaust CFM flow compared to intake CFM flow. the [B] head just got into the 70% range at low lift but dropped to 60% above .250" lift. The modified [C] head averaged 72.5% throughout the lift range. The [C] head could use a single pattern cam but all the other heads require a dual pattern cam because of their lower exhaust CFM flow. Some cylinder head shops tell me that they get good results using X/I ratios of 90-95%. That high a ratio will only work when you are stuck with using a standard cam with about 250deg duration or in the full throttle drag race application. For hot street, autocross or road-racing applications 90% will overscavange the cylinder which will waste fuel an lower the torque curve.

When we compare the [A] head to the [B] head we find that they are similar in flow even though the [B] head has larger valves. All of the BMC heads will increase in flow very nicely up to 0.350" lift and the the increase in flow will start to level out. The larger the valve the more CFM is the norm. The BMC head requires a lot of extra time on the flow bench grinding, polishing and blending valves and ports in order to get more air flow above 0.450"lift. The bottom line is that with a good cylinder head the engine will produce more power. Cylinder head [C] has close to 15% more air flow than a stock head and the [D] “Longman” head has about 20% greater flow than stock. If you can get more air into and out of the engine, you get more horsepower at the same time.

When making any engine modification a person has to be realistic about where they want the power range. Longer duration equals more top end power but it will reduce the torque in the lower RPM range. Just about any engine would benefit from a prepared cylinder head, a good exhaust system with a relatively small diameter for street use, and maybe a little larger carb and manifold. As you increase the RPM band you’ll need to increase the

compression and add some duration to the cam. The more duration that you add the more compression you need and that combination will increase the upper mid range and top end power. It is very important to keep your combinations balanced; for example, you cannot use a 270deg cam with 8:1 compression, 9.5:1 would be a lot better and conversely you cannot have 10:1 compression and use a cam with 250 or 264deg duration! As soon as the duration is above 264deg the standard exhaust system will restrict the breathing ability of the engine. Sometimes it's difficult to make the idle mechanism work properly in the carb due to the reduced vacuum and extra exhaust back pressure.

You probably have figured out by now that I am not an advocate of extra high lift, unnecessarily long duration or very high compression for any street driven car. I prefer to use maximum velocity on the camshaft design and that enables me to have more duration at 0.050", .100" and .200" lift as compared to "brand X". When you have longer duration at .200" lift and not as high cam lift you will them have a cam lobe with a rounder nose radius which will support higher loading's and therefore last longer than a pointed high lift cam. I learned a long time ago that DWELL on the nose-top portion of the cam lobe is the equal to lift provided that you have the valve open far enough when the piston reaches maximum velocity. On a normally aspirated engine I have NEVER seen power increase by adding more lift than the port can flow.

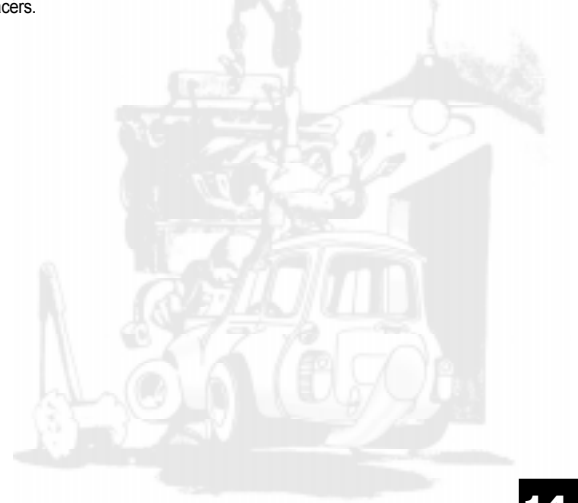
Head Flow Comparison

	1098cc "A" Head		"B" Head		Stock "S" "C" Head		Modified "S"		Longman "D" Head	
Valve Lift	1.3" Int.	1.14" Ext.	1.4" Int.	1.155" Ext.	1.44" Int.	1.215" Ext.	1.47" Int.	1.155" Ext.		
	CFM		CFM		CFM		CFM			
.020	7.5	6.9	7.8	6.3	7.8	6.6	8.2	6.4		
.050	18.3	15.1	19.5	14.3	21.2	16.2	21.6	15.2		
.100	39.3	32.4	43.0	32.8	43.0	32.8	45.4	32.4		
.150	57.6	45.3	53.1	40.4	62.7	43.9	65.8	46.1		
.200	74.6	55.9	69.1	49.4	82.0	54.3	88.1	57.7		
.250	85.5	60.4	85.5	58.1	94.4	65.2	102.8	65.8		
.300	88.8	65.5	93.4	62.4	107.4	73.5	116.7	73.2		
.350	96.3	68.0	102.1	66.0	114.2	79.9	128.2	79.1		
.400	99.0	72.1	106.8	68.0	116.7	88.6	135.8	88.5		
.430	99.5	73.6	109.0	68.0	117.9	92.2	136.5	84.8		
.450	99.9	74.5	109.0	67.0	117.5	92.0	136.6	84.0		
.500	101.1	75.6	108.0	67.0	116.8	91.5	135.9	83.5		

ELGIN CAM SHAFTS

Camshaft No.	Seat to Seat Duration In / Ex	Duration @ .50 cam lift	Cam Lift In / Ex	Valve Lift In / Ex 1 . 25 rockers	Valve Lift In / Ex 1 . 5 rockers	Application
CAM001	244/264	198/215	.264/.264	327/327	393/393	Mild Road. Smooth Idle.
CAM002	250/264	208/215	.250/.264	312/327	375/393	One up from Cooper 'S' Spec.
CAM6608	264/264	217/217	.262/.262	327/327	393/393	Max. for smog emmissions
CAM003	264/268	215/222	.264/.289	327/358	393/430	Fast Road Cam.
CAM004	262/268	225/230	.293/.318	366/397	439/477	Fast Road Cam. 9.1:1 compression recommended.
CAM6708	268/268	222/222	.289/.289	361/361	433/433	Mini & 1275. Will work with stock engine.
CAM6707	268/268	230/230	.318/.318	397/397	477/477	Heavy duty springs reqd. Cylinder head porting recommended.
CAM005	268/278	230/240	.318/.321	397/401	477/481	Hot Street. Header recommended. 9.5:1 compression.
CAM7008	280/280	228/228	.263/.263	329/329	395/395	Hot Street. Must have header to idle. 9.5:1 compression, heavy duty valve springs & good cyl.head are required. Adv. cam +2 deg.
CAM7007	280/280	228/228	.278/.278	348/348	417/417	Hot street grind. Same reqs as above.
CAM7107	284/284	235/235	.290/.290	363/393	435/435	Autocross. 9.5:1 compression required.
CAM71506	286/286	242/242	.302/.302	378/378	453/453	Autocross. 10:1 compression required.
CAM7207	288/288	235/235	.290/.290	363/363	435/435	Autocross. 10:1 compression required.
CAM006	288/292	235.254	.293/.321	366/401	439/481	Autocross. 11:1 compression. Pump gas okay.
CAM7505	300/300	250/250	.297/.297	371/371	446/446	Race grind. 11:1 compression reqd.
CAM007	300/300	250/250	.323/.323	404/404	485/485	Race grind. 11:1 compression reqd.
CAM76506	306/306	261/261	.341/.341	426/426	512/512	Full race. 13:1 compression reqd.
CAM7706-32	308/308	255/255	.322/.322	403/403	483/483	Full race.13:1 compres.Power ramge from 4500-7500
CAM7706-34	308/308	263/263	.348/.348	435/435	522/522	Full race. 13:1 compression reqd. Max. for a fully prepared 948cc. Dyno tune
CAM73503	310/310	268/268	.380/.380	475/475	570/570	Race. Works best for 1275 - 1380cc engines.

Elgin Cams is a company that is a direct descendent of such famous California specialists as Isky, Delong, Winfield, etc. etc. Elgin has taken the art of cams into the science of the '90's. Computer designed and handcrafted workmanship guarantee a First Class camshaft. Custom designed cams are a specialty.
Elgin has made cams or sold his design to General Motors, Ford Motor Co., Nissan Corp., Zakespeed International, Porsche Motor Sports, Winston Cup Engine Builders. Elgin has the largest percentage of cams used at SCCA's Runoffs from GT-1 to Formula-V. He also has provided original or new technology for antique and vintage racers.



CAM FOLLOWERS

It is of great importance to use high quality cam followers to get the best performance and reliability from your cam. Use of poor quality followers will lead to definite failure of the cam. The cam followers supplied by Mini Spares are of the highest quality, manufactured by an OE supplier to Rover. It is also extremely important to use new cam followers any time a cam is changed. Never reuse lifters with a new or different camshaft!

2A13

Standard weight cam follower. Weighs 46.1 grams.

AEG584

Standard weight cam follower with oil drain hole. Weighs 46.5 grams.

C-AEG579

Lightened cam follower with oil hole. Weighs 40 grams.

C-AEG580

"Isky style", chilled-iron hardened cam follower, has oil drain hole. Weighs 55.0 grams.

CAM-DRIVE SYSTEMS

Fitment of an uprated cam drive system is essential when building a performance oriented engine. Timing scatter induced by the standard set up can reach up to 15° once the single row chain has stretched, which it does after only a few miles. This scatter not only affects the cam timing, but also the ignition, the distributor being driven by the camshaft. Power loss suffered by this phenomenon is substantial. Replacing the standard single row (simplex) system with a dual row (duplex) system greatly reduces the problem, use of a tooth belt system all but eliminates it. The belt-drive system vastly reduces valve train noise and also helps damp out some of the odd harmonics generated by the 3 main bearing 'A' series engine. It is also extremely important to time any cam in to its required setting to obtain maximum performance, especially performance cams. The 'dot to dot' method can, because of manufacturing tolerances, be out by as much as 15° or more. Anything over 2° out, and power suffers - more noticeably in small bore engines. In race engines you probably lose 1 hp for every degree the cam timing is out, more if over 6°.

C-AJJ3325
Ultralight non adjustable steel duplex gear and chain set.

C-AJJ3327
Ultra light steel duplex timing chain set, dowel adjustable

C-AJJ3323
Budget standard cast duplex gear and chain set. Road use only.

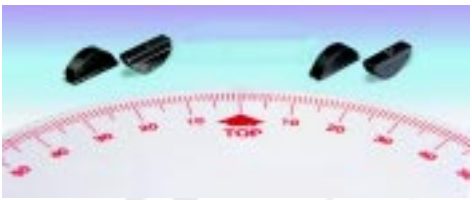
C-AJJ3328Race
Belt-Drive adjustable timing gear set. Dowel type, where interrelated holes are located by a dowel to give exact timing. Fixed increments of 1 degree. Plastic case.

C-AJJ3328
Belt-Drive adjustable timing gear set. As above but withAluminum case.

Engine04
Replacement belt for above.

ENGINE05
Replacement small oil seal for above.

ENGINE06
Replacement large oil seal for above.



To aid accurate timing when using non adjustable timing gear systems, there is a range of proper CNC machined offset cam keys available. These come in 1° increments up to 9°. One tooth round on the gear represents 13° of cam timing, so if you are more than 9° out move the cam gear one tooth in the required direction and use the keys the other way round as they are dual directional. They are available individually.

WKN / (DEGREE)
Offset cam key. Change the number to order the required key, (i.e.. for 3°, WKN3 SET).

ISKY 01
Degree wheel for timing camshaft

ROCKER GEAR

The new generation of short period, high lift cams have been developed to give the best results in large bore engines when used in conjunction with 1.5 ratio, hi-lift rockers. For the small bore range, the 'S' 1.3 ratio is optimum. In certain instances ratios of 1.7 to 1 are of benefit - but is really only applicable to fully developed race engines.

12G1221
1.3:1 ratio 'S' rocker.

C-AHT436
1.5:1 ratio "High Lift" rocker assembly. Forged steel. Includes rockers, pedestals, and thick-wall shaft. Known affectionately as "Keith Dodd " rockers.

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C-AHT437
1.3:1 Roller rocker set. The ultimate valve gear, maximum efficiency, absolute minimal valve stem side loading, vastly reduced friction and extra rigidity. They have a needle roller tip and dual needle roller bearings on a thick wall shaft. Manufactured in hard anodized aircraft alloy for maximum strength and lightness.

C-AHT438
1.5:1 hi-lift roller rockers. Specifications as per above.

C-AHT439
1.3:1 roller rocker set for small bore engines. Roller tips are centered in the arm to line up with valve stems, otherwise all other specifications as per above.

C-AHT440
1.5:1 hi-lift roller rocker set for small bore engines. Specifications as per above.

C-AHT441
1.7:1 big bore roller rocker set.

C-AHT442
Adjust screw - roller rockers.

C-AHT443
Lock nut for adjuster screw - roller rockers.

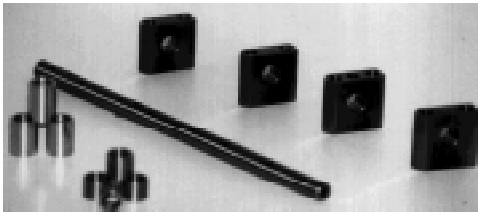
C-AHT446


To compliment our range of mechanical and full roller rocker sets, we offer a roller tipped alloy rocker set. They use the same billet alloy arm and hard chrome roller tip as the full roller set up, but do not use the needle rollers on the shaft. This allows a thick wall shaft to be used. Standard adjuster screws and nuts are also employed. All this culminates in a high quality yet infinitely more economical roller rocker set, as the roller tip is the most important factor to reduce valve and guide wear when using modern performance cams. The set comes with 8 rockers, adjuster screws and nuts, competition thick wall shaft and steel posts. To use on small bore heads it is necessary to rearrange the rockers to line up the tips with valve stems.

C-AHT447
Stainless steel high lift roller rockers allow for a much more compact design. Hence, there is less weight over the valve and push rod, and because they're narrower they can be centered over the valve. An additional bonus is that they're made to clear the large diameter valve springs that many racers are using today. In stock now, fully assembled as shown.

C-AHT447/ALLOY
As above, but spaced specifically for aluminum cylinder head.

Rocker Gear & Push Rods



C-AEA692
Set of 8 extra long adjuster screws.

AEG167
Adjuster screw - fits 12G1221 & C-AHT436/446

NT605061
Lock nut for above.

Extra lift of around .030" can be obtained with the bushed rockers by using offset bushes, supplied as a set of 8. If these bushes are used, before and after alignment of the rocker pad to valve and stem must be checked and corrected. Invariably in the 1.3 rockers a special set of steel posts are required. It is possible to to enhance valve gear rigidity and reliability, especially in high-revving engines, by using a thick wall rocker shaft. Heat treating rocker shafts is now no longer done as it greatly accelerates wear of the rocker bushes. It is cheaper and easier to replace a worn shaft than a set of worn bushes; the bushes require reaming to size once fitted.

C-AEG644
Set of 8 offset rocker bushes.

C-AEG645
Set of 4 steel posts when using offset bushes in standard ratio rockers.

C-AEG399
Super thick wall rocker shaft - bushed rockers only (not roller type).
To help rocker pad to valve stem tip alignment and reduce friction the standard springs can be replaced by spacers and shims. The spacer set is sold as a set of 3, the shims are so individually.

C-AEG392
Rocker spacer set. Replaces the springs to reduce friction.

AEG168
Rocker shaft shim.

C-2A515

To maintain proper rocker assembly geometry it is imperative that the distance from the camshaft to the top surface of the cylinder head be kept as near as possible to original. You'll note that if the block or cylinder head have been surfaced the pushrods now effectively rise further even in the "down" position. This does not give you more lift, but in severe cases will reduce lift, and in any case will increase wear and noise. The easy and only solution to this dilemma is to raise the rocker assembly by shimming the rocker pedestals. These shims are .028" thick and can be stacked to the height necessary.

Push Rods

SPO13
Isky tubular push rods for 1275 engines.

905-005
Isky tubular push rods for 998cc engines

GEARBOX

3 SYNCHRO TYPE

There are 3 different gear ratio sets for the 3 synchro gear box, 2 helical and one straight cut (although in the 1960's BL produced the straight cut ratio's in helical form as alternative). The earliest gearbox was fitted to all the Mini's, including the 997cc and 998cc Cooper. The closer ratio set was used in the S's and was also fitted as an option to the 998cc Cooper.

GEAR RATIO COMPARISON

	850/997 & 998	S' & 998 Cooper	Straight Cut
1st gear	3.627	3.2	2.573
2nd gear	2.172	1.916	1.722
3rd gear	1.412	1.357	1.255
4th gear	1.0	1.0	1.0

C-AJJ3371
3 synchro straight cut gear set, includes 2nd, 3rd, 1st motion shaft and laygear. Requires 1st/2nd hub assembly 22A1021 and standard reverse gear. Can only be fitted to 'B' type boxes.

C-22G1047
Laygear cluster - number of teeth 13, 17, 20, 23.

C-22G1048
1st motion shaft - 22 teeth.

C-22G1049
2nd gear - 28 teeth.

C-22G1050
3rd gear - 24 teeth.

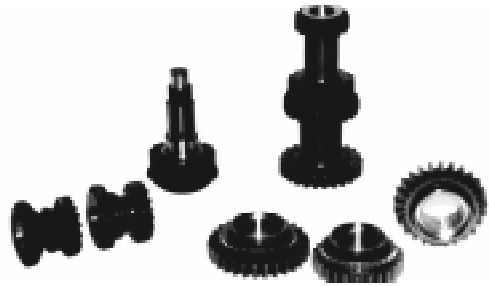
22A1021
3 Syncro 1st gear outer track.

The aforementioned gears also fit the Sprite and Midget, the only different gear is the 1st motion shaft which is much longer than the Mini. Also requires 22G1118/9 1st gear outer track.

C-AJJ3319
Sprite/Midget straight cut gear kit.

C-AEG3138
Sprite/Midget 1st motion shaft.

4 SYNCHRO TYPE



Six variations of all synchro gear sets are available, 3 helical and 3 straight cut. The early standard helical ratio set was fitted to all small bore Mini's, recognizable by their square top teeth. The first motion shaft uses 17 teeth, and the laygear is usually numbered 22G927.

The close ratio helical set fitted to the 'S' and 1275GT utilized the same first, second and third gears, but a different first motion shaft and laygear. The first motion shaft had 18 teeth, and the laygear was generally numbered 22G1040, although in later gearboxes some were marked 'ME'. Using these two components you can convert the early standard ratio gearbox to close ratio (sold as a set).

The third helical ratio set is fitted to all the A+ engined cars, irrespective of engine size. This can be identified by the sharp edge on the teeth tops and - barring a couple of initial gears -they also have a groove around the center of the tooth profile. The first motion shaft also has a .983" diameter hole for the larger mainshaft pilot bearing. Some early A+ units were fitted with the close ratio kit, the first motion shaft having the larger mainshaft pilot bearing.

GEAR RATIO COMPARISON

	EARLY 850/998 1098	'S' & 1275GT	A+
1st gear	3.52	3.32	3.64
2nd gear	2.21	2.09	2.18
3rd gear	1.43	1.35	1.42
4th gear	1.0	1.0	1.0

C-AJJ4032
4 synchro close ratio conversion set, laygear and 1st motion shaft for helical gears.

By using the very latest gear cutting techniques, equipment and top line manufacture it has been possible for Mini Spares to produce a close ratio, straight cut gearset with greatly reduced noise output usually associated with running a straight cut gearbox. This is ideal for powerful road engines where a close ratio, low power absorbing gear set is required to enhance engine performance. The ratio's have been reproduced as near as possible to the older 3 synchro straight cut close ratio set, as these have proven to be near perfect for road use. The racing 4 synchro straight cut gears being too close. It is also cheaper as the set utilizes the standard first and reverse gears, these being straight cut as standard. This is called the 'Clubman' set. There are 2 sets available, pre A-plus and A-plus, both use the single step layshaft, but only uses one bearing front and rear. The front bearing is supplied as it is peculiar to the set.

The 'special tuning' gear ratio set is available in 3 versions remote type, pre A-plus rod type, and A-plus rod type. There is a different reverse gear for the rod and remote types, all 3 use the single step layshaft.

The ultra close ratio set is available in 4 synchro. It will only fit the A-plus gearbox with large mainshaft pilot bearing and dual step layshaft without any gear case modifications. This is called the Metro Challenge set. The very low first gear is really designed for rolling starts.

GEAR RATIO COMPARISON

	Clubman Set	'ST' Set	Metro Challenge Set
1st gear	2.583	2.544	2.313
2nd gear	1.711	1.731	1.567
3rd gear	1.250	1.258	1.187
4th gear	1.0	1.0	1.0

C-STN38
Clubman gear set, all pre A-Plus.

C-STN39
Clubman gear set, all A-Plus.

C-STR291
Clubman 2nd gear, 26 teeth.

C-STR292
Clubman 3rd gear, 23 teeth.

C-STR293
Clubman 1st motion shaft, 20 teeth.

C-STR294
Clubman laygear, 15-19-23-25 teeth.

C-AJJ4014
Remote type ST ratio gear set.

C-STN76
Rod change ST ratio gear set, pre A-Plus.

C-STN77
Rod change ST ratio gear set, A-Plu

4-Synchro Cont...

C-22A1732
ST 1st motion shaft, pre A+, 19 teeth.

C-22A1732A
ST 1st motion shaft, A+, 19 teeth.

C-22A1733
ST 3rd gear, 22 teeth.

C-22A1734
ST 2nd gear, 25 teeth.

C-22A1735
ST 1st gear, 29 teeth.

C-22A1736
ST reverse gear; remote type, 7 teeth.

C-22A1737
ST laygear, 15-19-23-25 teeth.

C-STR303
ST reverse gear, rod type, 17 teeth.

C-STN160
Metro challenge gear set.

Five Speed Gearbox

Mini 5-speed gearboxes are available in Rod change configuration only. Standard Differential Ratio is 3.44, with a resulting overdrive of 3.1 call with your applications needs for more specifics.

ROD CHANGE GEAR SELECTORS AND SPEEDO DRIVE

NO.	PART NO.	DESCRIPTION	QTY	REMARKS
MSG4		5-Speed, std. ratio, helical cut, A-Plus rod-change		Tran-X
MSG5		5-Speed, std. ratio, helical cut, cross-pin diff, rod change		Tran-X
MSG6		5-Speed, close-ratio, helical cut, rod change		Tran-X
MSG7		5-Speed, close-ratio, helical cut, cross-pin diff, rod change		Tran-X
MINI5004		Straight-cut close-ratio 5-Speed, rod change		Jack Knight
MIN5001		Close-ratio Dog-Engagement 5-speed, LSD, rod change		Jack Knight

PRE A-PLUS FINAL DRIVE GEARS, CASTING NUMBER AS PER PART NUMBER

Crownwheel	TEETH	RATIO	PINION	TEETH
22A411	62	3.444	22A413	18
22G940	62	3.647	22A399	17
22A401	64	3.765	22A399	17
22G340	63	3.938	22G338	16
22G101	62	4.133	22G99	15
22G370	64	4.267	22G99	15
22G443	65	4.33	22G99	15

FINAL DRIVE GEARS WITH A-PLUS TEETH ANGLES

Crownwheel	TEETH	CASTING #	RATIO	PINION	TEETH	
DAM3645	65	DAM3546	4.333	DAM3647	15	
DAM3216	63	DAM3217	3.938	DAM3218	16	NLA
DAM4162	62	DAM4163	3.647	DAM4137	17	
DAM4779	64	DAM4780	3.765	DAM4131	17	
DAM2677	62	DAM2678	3.444	DAM2679	18	
DAM6327	59	DAM6243	3.105	DAM2808	19	12" Whls
DAM2806	61	DAM2807	3.211	DAM2808	19	TURBO
DAM5925	59	DAM5926	2.95	DAM5927	20	998cc Econ.
TCB10004	58	TCB10005	2.76	TCC10001	21	

A-PLUS TYPE PINIONS HAVE BOTH SIDES MACHINED FLAT

DROP GEARS

There are a unique seven ratios of straight cut drop gears to replace the standard helical set up, all based around a common idler gear. This superlative new system has been designed and developed by one of the leading high-grade gear manufacturers in England. Produced to accurate specifications and a high quality of finish, back lash is reduced to a minimum. This vastly reduces the 'clatter' experienced when using straight cut drop gears from other manufacturers, also making the gears inherently stronger and more tolerable when used in road cars. The interchangability greatly reduces the cost for racers of having alternative ratios for different circuits - allowing the optimum gear ratios to be used for each circuit without the need for crown wheel and pinion changes.
NOTE: When fitting to 3 synchro boxes, spacer no. C-STR239 is required for the input gear.

Number Of Teeth Ratio	Primary Gear	Idler Gear	Input Gear
1-1	24	30	24
1-1	23	30	23*
1.0416-1	24	30	25
1.0434-1	23	30	24
1.045-1	22	30	23*
1.0869-1	23	30	25
1.09-1	22	30	24
0.958-1	24	30	23*

*The 23 tooth input gear is extra strong for engines developing high torque/power figures.

C-STR124
24 tooth 1300 type primary gear.

C-STR224
24 tooth 998 type primary gear.

C-STR123
23 tooth 1300 type primary gear.

C-STR223
23 tooth 998 type primary gear.

C-STR122
22 tooth 1300cc type primary gear.

C-STR222
22 tooth 998cc type primary gear.

C-STR30
30 tooth idler gear - pre A-Plus 3/4" shaft.

C-STR30A
30 tooth idler gear - A+ 7/8" shaft.

C-STR30Timpken
30 tooth idler gear assembly for taper roller bearing conversion.

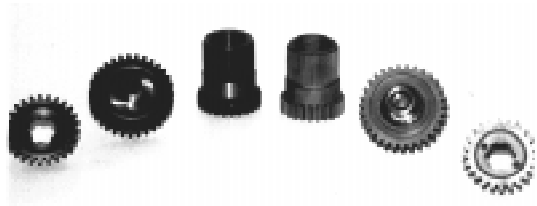
C-JKT1000
Taper roller bearing conversion, pre 'A' plus

C-JKT1000A
Taper roller bearing conversion, A-Plus

C-STR230
23 tooth extra strong input gear.

C-STR240
24 tooth input gear.

C-STR250
25 tooth input gear.



We can also supply replacement gears for the original ST profiled tooth type, in three ratios, adopted by other manufacturers. The interchangability of the ratios available are restrictive, only one alternative ratio being easily swapped, by changing the primary gear (1.043). The third being a completely different set of gears. A taper roller bearing conversion is available, but only for pre A-Plus, small bearing casings.

Number Of Teeth

Ratio Input	Primary Gear	Idler Gear	Gear
1-1	24	31	24
1.043-1	23	31	24
1.087-1	23	30	25

JACK KNIGHT

JK-1.1
1.1 straight cut drop gear set.

JK-1.04
1.043 straight cut drop gear set.

JK-1.08
1.087 straight cut drop gear set.

JK-1.1P
24 tooth primary gear.

JK-1.04P
23 tooth primary gear.

JK-TT
Taper roller idler gear conversion.

C-JKT1001
24 tooth 1275 primary gear 1.1 ratio

C-JKT1002
23 tooth 1275 primary gear 1.043/4 ratio

C-JKT1003
23 tooth 1275 primary gear 1.087 ratio

C-JKT1004
31 tooth idler gear pre 'A' plus

C-JKT1004A
31 tooth idler gear pre 'A' plus

C-JKT1005
31 tooth idler gear for taper roller bearing kit

C-JKT1006
30 tooth idler gear pre 'A' plus.

C-JKT1006A
30 tooth idler gear 'A' plus.

C-JKT1007
30 tooth idler for taper roller bearing kit, 1.087 only.

C-JKT1008
24 tooth input gear

C-JKT1009
25 tooth input gear 1.087 only.

C-JKT1000
Taper roller bearing conversion pre A-Plus

C-JKT1000A
Tapper roller bearing conversion A-Plus

Note: for pin type idler gears, state whether for A-Plus or pre A-Plus when ordering. A-Plus has 7/8" diameter pin, pre A-Plus has 3/4" pin.

TRANSMISSION TRANSISION

Research, development and production of new and alternative products for the A-Series goes on unabated at Mini Spares. Not only in the never ending quest for more power from the evergreen engine, but also in the components around it to usefully and reliably transmit that power to “terra-firma”.
The past 12 months has seen Mini Spares involved in much research and development in the gearbox department, trying to solve reliability, quality, and power transmission problems.

Current standard baulk rings produced in sintered metal are not man enough to deal with the demands of performance usage, in many instances only lasting one race before failure. The main reason is the incompatibility of the material specification with the usage to which it is being put. Basically it is too brittle. Mini Spares’ competition baulk ring is cast in a very high quality, high tensile manganese bronze alloy, then finish machined by hand to give an exact fit on the baulk ring cone. This provides an exceptionally strong, wear resistant ring.

The next component that came under scrutiny was the diff pin - an item that causes frequent distress amongst those with powerful road cars, auto testers, and all manner of racing where a standard diff has to be used. BL changed the pin a few times over the years, but made apparently little difference, especially to the modified market.
In-depth analysis over a couple of months accumulated the contributing factors to the horrendous wear rates and failures, enabling Mini Spares to produce a new generation pin that would all but eradicate the aforementioned problems. Production tolerances are tied down to exacting specifications, and material type upgraded, as was the heat-treatment. Planet wheel contact area is increased as is the core strength of the pin, combining with the finer finish ground surface to give a very tough and hard wearing component.

Layshafts have been giving more than their fair share of aggravation over the past couple of years. Basically it is just a case of cheap engineering - shafts produced down to a price rather than reasonable quality. The use of cheap materials, rapidly machined, then poorly heat treated results in a shaft that wears rapidly due not only to poor surface finish but also because of shaft flexing. The Mini Spares layshafts are produced as a precision component from high grade materials and meticulous attention to the heat treatment and finish grinding, thus providing a stronger, straighter, more resilient shaft. These are available for 3 and 4 syncro boxes, both single and dual step types.

C-22A1740
Competition baulk ring.

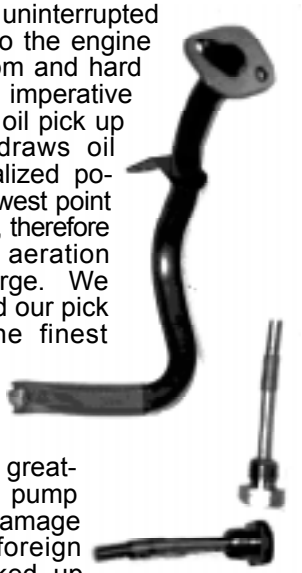
C-BTA166
Super strength diff pin.

C-22A1731
3 synchro hi-grade layshaft.

C-22A1738
4 synchro hi-grade layshaft single step pre A-Plus.

C-22A1739
4 synchro hi-grade layshaft dual step A-Plus.

CENTER OIL PICK-UP



To ensure an uninterrupted supply of oil to the engine during high rpm and hard cornering it is imperative to fit a center oil pick up pipe. This draws oil from a centralized position at the lowest point of the gearbox, therefore avoiding aeration caused by surge. We have designed our pick up to use the finest screen possible without reducing maximum oil flow. This greatly reduces oil pump and engine damage caused by foreign particles sucked up by the pick up pipe. The original type of screen was too open, allowing an alarming amount of debris to be circulated. An extended magnetic drain plug is also available.

DP1
Extended magnetic drain plug.

C-AHT54
Center oil pick up pipe. Fits all boxes although slight alteration may be needed due to inconsistent casting of the casings.

QUICK SHIFT KITS

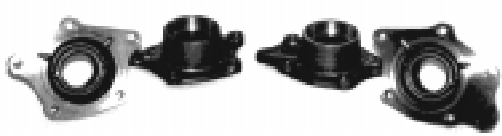
A recent development is the quick shift gear lever kit. It has been designed to reduce the overall gear lever ratio from 8 to 1 to 4 to 1, thereby reducing the distance the lever has to be moved for gear selection.

C-22A1750
Quick shift gear change kit for remote type gear lever.

C-22A1751
Quick shift gear change kit for rod type gear lever.

LIMITED SLIP

Reproduction parts include the 'S' type diff side plate, essential when using the Hardy Spicier type coupling, and the studs that fit the output shaft flange. A bonus is that Mini Spares also produce the 'S' side plate with the extra "ear" for use in rod-change type gear boxes, making use of LSD's in rod-change boxes a great deal easier.



22G419
'S' Diff side plate - state whether for remote or rod type gear box.

22A1139
Output flange stud.

Mini Spares are the main stockist of the excellent Tran-X Limited Slip differential. Basically a clutch type diff it is a 1950's idea incorporating 1990's technology and is much more refined than previous plate type diffs. Fine engineering and design allows variations in static pre-load, percentage torque transfer, and acceleration/deceleration action to be made. This facilitates tuning of the diff to suit individual requirements and applications - be it road, rally or race. Unlike most other diff units, the Tran-X diff can be fitted with the minimum of casing modifications. All components necessary to fit an LSD unit are stocked, as is a wide range of crown wheels and pinions giving final drive ratios from 3.44 to 4.67.

It is highly recommended to use a full track, steel cage bearing when using the LSD unit. These provide better location of the diff in the housing. An information sheet on how a limited slip differential works and specific settings data is available on request.

C-AJJ3387
Tarmac/race setting Limited slip.

C-AJJ3387A
Rally/autocross setting Limited Slip.

C-AJJ3387B
Road setting Limited Slip.

C-BTA1262
Hardy Spicer coupling type output shaft.

C-BTA1263
Inboard CV joint type output shaft.

C-BTA1243
Spacer washer for C-BTA1262.

CCN122
Retaining circlip for C-BTA1262.

DIFF RATIOS AVAILABLE FOR L.S.D.

SEMI-HELICAL

C-BTA1250 3.44 Crown wheel & pinion
C-BTA1248 3.76 Crown wheel & pinion
C-BTA1252 3.9 Crown wheel & pinion
C-BTA1246 4.1 Crown wheel & pinion
C-BTA1251 4.23 Crown wheel & pinion
C-BTA1249 4.3 Crown wheel & pinion
C-BTA1253 4.67 Crown wheel & pinion

DIFF RATIOS AVAILABLE FOR STANDARD DIFF ASSEMBLY

HELICAL TYPE

PRE ' A' PLUS GEARS

Ratio	Crown Whl	Teeth	Pinon	Teeth
3.647	22G940	62	22A399	17
3.444	22A411	62	22A413	18
3.765	22A401	64	22A399	17
3.938	22G340	63	22G338	16
4.133	22G101	62	22G99	15
4.267	22G370	64	22G99	15
4.350	22G443	65	22G99	15

'A' PLUS GEARS

Ratio	Crown Whl	Teeth	Pinon	Teeth
3.647	DAM4162	62	DAM4137	17
3.765	DAM4779	64	DAM4131	17
3.444	DAM3216	62	DAM2679	18
3.938	DAM3216	63	DAM3218	16
3.105	DAM6327	59	DAM2808	19
3.210	DAM2806	61	DAM2808	19
2.950	DAM5925	59	DAM5927	20
4.133	DAM3645	65	DAM3647	15

The crown wheels are usually stamped with the part number and often the number of teeth for that crown and pinon, (ie 22A411 will be marked with that number and 18/62). The pinons are not marked in anyway, but note some crown wheels and pinons have the same number of teeth, but the tooth pitch and overall diameters vary. It is absolutely imperative that the correct pair of gears are used to avoid considerable damage.

DIFF RATIOS AVAILABLE FOR STANDARD DIFF ASSEMBLY SEMI HELICAL

JK-4.3CWP
4.3 Crown wheel and pinion.

JK-4.5CWP
4.5 Crown wheel and pinion - straight cut only.

JK-4.6CWP
4.67 Crown wheel and pinion.

CROSS-PIN DIFF.

The ultimate in reliablity for street and race use. Twice the strength of a stock differential. Contains four spider gears and two cross pins. The greater number of gears means greater reliability since each gear only takes on 1/4 of the load instead of 1/2. The outer cage is also made from billet steel instead of cast. The cross-pin differentials also use stock crown wheels and outputs shafts (not included).

C-AJJ3385
Road-Duty Cross-Pin Bullet differential assembly

DRIVE SHAFTS

Mini Spares actually reproduce the 'S' drive shaft but in a slightly higher specification material. Even these are not strong enough to cope with power outputs being achieved - a problem magnified when used in autocross, rally cross, and rallying. To combat this, Mini Spares stocks two other specifications of drive shafts. Firstly, a competition steel shaft is available to suit both coupling or pot joint type applications utilizing standard Mini or S CV joints. Then a pair of super-competition extra thick shafts that are only made for coupling type applications and using a bigger CV joint negates the requirement of any spacers, it all fits straight into a Mini hub. This set up is literally unbreakable. Both types of shaft are guaranteed for 6 months of competition use.

27H4775
'S' drive shaft right hand (long).

27H4776
'S' driveshaft left hand (short).

MS1248
Pot joint drive shaft, right hand in EN24W (right hand).

MS1249
Pot joint drive shaft, left hand in EN24W (left hand).

C-BTA1265
Coupling type super steel driveshafts

C-BTA1264
Inboard CV type super steel driveshafts (pair).

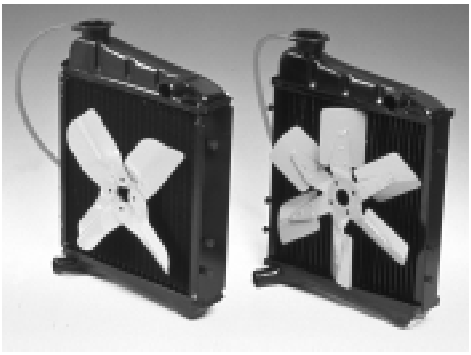
C-BTA1266
Super competition steel driveshafts

37H7869
Large CV joint.

GSV1186
Large CV joint boot.

QL5000
This is an uprated needle roller and nylon driveshaft coupling to replace the standard rubber 'cross'. This is a relatively strong coupling, and has proved very reliable in racing with out-puts up to 110 bhp, where a standard type diff assembly has to be used.

COOLING SYSTEM



One side effect of uprating an engine to increase power output, or even economy, is that extra heat is generated. Unfortunately the standard radiator is only just sufficient to cool the unmodified engine. Early Minis had a 3 core radiator with 13 gills per inch. When the Cooper S was introduced, the number of gills were increased to 16 gills per inch in an effort to increase the cooling capability. This only just contained the extra heat generated by the higher power output, and soon overheated in traffic jams. This S specification radiator was fitted to all Minis as standard when the A-Plus engine was introduced in 1980 as they used high compression ratios - once again the by-product being extra heat.

The situation obviously becomes a great deal worse with highly modified road, rally and race engines.

The basic problem is the lack of water capacity. To this end we have specially produced a radiator that has 4 cores in it, with larger header tanks. This increases the water capacity by just over 27%, and actually increases cooling efficiency by some 35%. The overall dimensions are made to fit the standard cowling, the extra depth being towards the inner wing.
If this is still insufficient on very highly tuned engines, especially large capacity engines, then it will be necessary to fit an auxiliary radiator - a heater matrix being the common choice. This should be plumbed in from the heater outlet and returned to either the interior heater if used, or the bottom hose. Ensure that it is correctly plumbed in, the water out of the head needs to pass down the BACK of the auxiliary radiator and out of the FRONT. If this is not done, then all you are doing is passing hot air across the water returning to the engine - therefore defeating the object of the exercise.

Removal of the thermostat also helps to reduce engine temperature, however a thermostat blanking sleeve needs to be fitted to retain correct water circulation around the entire head. Failure to do so will cause overheating around 3 and 4 combustion chambers - with obviously disastrous results. If the blanking sleeve is used, it is necessary to blank off the by pass hose between head and water pump. The ideal temperature commensurate with optimum power output is 65-70°C.

ARP2000
'S' Specification radiator.

C-ARA4444
4 core high capacity radiator.

C-ARA4442
"Super 2-Core" radiator, fits all applications with no modification to inner fender panel.

C-AJJ4011
Auxiliary radiator (heater matrix).

11G176
Thermostat blanking sleeve.

GTS102
74°C thermostat (165°F).

GTS104
82°C thermostat (180°F).

GTS106
88°C thermostat (192°F).

COOLING SYSTEM

12G617
'S' radiator top bracket. Required when fitting 1300 based engines in the Mini, (not Clubman).

GRH247
Top hose required when fitting 1300 type engine in a Mini, (not Clubman).

To further assist cooling, there are a variety of fan types. The 11 blade plastic fan is pretty efficient, especially where a lot of low speed urban driving is done, as it passes a fairly high volume of air through the radiator. This can become more obstructive at higher road speeds, therefore less efficient. A more efficient type is the metal 6 bladed 'tropical' or export fan. This is exceptionally good all around as it's impedance of air flow through the radiator at high road speeds is greatly reduced. Unfortunately it is a little noisier than the 11 blade plastic fan. For fast road use, the 4 blade fan appears best, but is somewhat noisy. This is made up of two 2 blade fans. For race use a 2 blade fan helps cool the engine until on the move, and does not impede air flow at high speed to any noticeable degree.

Use of a high capacity alloy water pump helps to reduce the occurrence of cavitation in the water jacket, particularly at high rpm as well as circulating a greater volume of water. Further reduction in cavitation is achieved by using a large diameter water pump pulley as originally fitted to the 'S', and reintroduced on the A-Plus engines. It is necessary to check clearance between it and the cylinder head as if a lot of material has been machined from the head face it may foul the pulley. It is not possible to use this on small bore engines when a 12G940 head casting is used. If the 12G940 head is fitted to a small bore engine, it is necessary to modify the top edge of the water pump otherwise the head will sit on this and not seal properly. Look to get at least a 1/16" gap.

12G2129
11 blade plastic fan.

2A998
6 blade metal tropical fan.

2A997
2 blade metal fan - two of these make a four blade fan.

GWP134
High capacity alloy water pump - with by pass hose take off.

GWP154
High capacity alloy water pump - no by pass hose take off.

CAM6408
Large diameter water pump pulley.

12A667
Cooper S large diameter cast water pump pulley

GCB10838
Fan belt alternator and large water pump pulley.

GCB10725
Fan belt when no charging system used and large pulley.

C-AEA539
Fan belt when no charging system used, standard water pump pulley.

Alternative ancillary drive systems are available. For race use where the alternator is not used there is a toothed belt drive system with large diameter or standard diameter pump pulley that eliminates problems caused by conventional belts being turned or thrown through misalignment. The crank pulley is made to take the separate damper ring from the 'S'. A tooth belt drive kit for the alternator is also available with an oversized alternator pulley for the standard size tooth belt water pump drive. Running a secondary belt from the water pump pulley to the alternator ensures that if the charging system belt goes, the car can still be driven. For improved drive for fast road applications where an alternator is used, a 'poly V' system is available. This is the latest design of ancillary drive fitted to most modern production cars.

C-AEA534
Comprises large diameter toothed belt water pump drive system. Water pump pulley, crank pulley and belt.

C-AEA533
Spare belt for C-AEA534.

C-AEA536
Comprises toothed belt water pump only drive system. Water pump gear, crank gear, and drive belt.

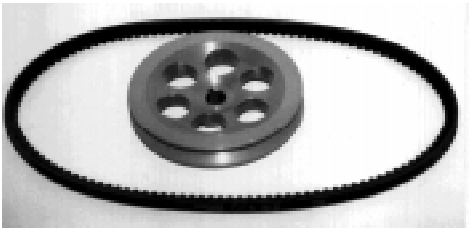
C-AEA537
Spare toothed belt for C-AEA536.

C-AEA536A
Comprises toothed belt alternator drive for use with C-AEA536, large diameter alternator pulley and belt.

C-AEA537A
Spare toothed belt for C-AEA536A.

C-AEA532
Spare toothed belt for C-AEA536A when used with C-AEA534.

C-AEA538
Poly V drive system. Water pump pulley, alternator pulley, new crank damper pulley and drive belt.



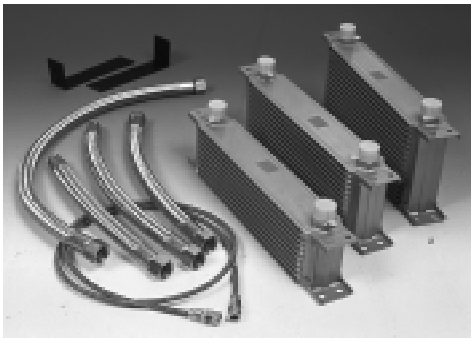
C-AEA540
Spare V belt for C-AEA538.

A large diameter alloy dynamo/alternator 'V' pulley is available for reducing the speed of the charging system to prevent over charging.

C-AEA535
Large dynamo/alternator 'V' pulley.

An electric, thermostatically controlled fan kit is available to supplement the standard fan for highly modified cars being used mainly in urban or heavy traffic situations.

430-380
Mini Mania electric fan kit.



OIL COOLERS

In the past, fitting an oil cooler was mandatory once an engine had been even slightly uprated. The Cooper 'S' had a 13 row oil cooler fitted as standard. The main cause for this was the quality of Motor Oils available at that time. If the oil temperatures exceeded a specific point, then engine failure was almost guaranteed.

Modern motors oils are generally of a much higher quality, especially the recognized 'names' and have far superior high temperature tolerances than those of 10 or 15 years ago. Fully synthetic oils have an extremely high temperature tolerance. Use of any of these oils makes an oil cooler less of a necessity where engine outputs do not exceed around 90 horse power. It is as bad to run the oil temperature too cool as it is to let it get too hot. The ideal operating range is 200°F to 230°F (sump temperature). At these temperatures the oil is working efficiently to produce best power, economy and release of combustion by-products. If the oil is too cool, these by-products are absorbed into the oil requiring frequent changes to avoid bearing and bore damage. It is worth noting that keeping the oil at the correct temperature helps cool the engine generally. High oil temperatures will create higher water temperatures. Various sizes of oil coolers and fitting kits including pipes are available.

To help control oil temperature there is a thermostat available that fits into the engine cooler pipes, it operates at 74°C (165°F). This can not be used with the steel braided pipe set. An oil temperature gauge adapter is also available that fits into one of the cooler pipes, not compatible with the steel braided pipes.

21A1780
½" BSP screw-on adapter for engine block.

AHA6423
½" BSP screw-on adapter for filter head.

MOC3
Push on adapter set.

C-ARH221
13 Row oil cooler 1/2" BSP fittings.

C-ARO9809
16 Row oil cooler 1/2" BSP fittings.

C-ARH223
19 Row oil cooler 1/2" BSP fittings.

MOC1013
Mini rubber oil cooler pipe and fitting kit.

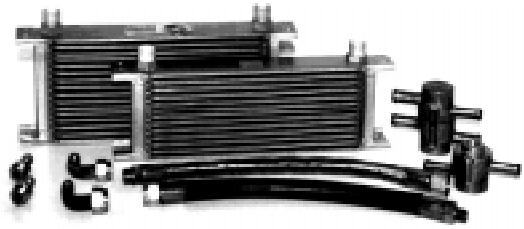
MOC100102
Clubman steel braided pipe kit.

C-AHT4
Mini steel braided pipe kit.

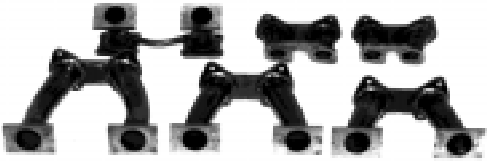
C-AHT9
Braided Oil Pressure gauge line, long enough to fit remote gauge locations.

MOCOT1
Thermostat, fits into cooler lines

MOC0T2
Oil temp sender housing, fits into cooler line.



INLET-MANIFOLDS



Following the enormous success of our SU inlet manifolds, further development has recently encompassed a detailed look at the manifolds available for side draught carbs.
The steel inlet manifolds available have long been acclaimed the very best, outperforming all the alloy types by far. Unfortunately this includes the price!
After flow-testing a number of randomly picked steel manifolds, the results showed that as a rule they did not meet their expectations and varied - considerably in some cases - from one port to the other on the same manifolds. Despite this they were still superior to the other manifolds available.
Having set a base-line of data we have designed an alloy manifold that out-flows the steel ones, is extremely consistent port to port, and greatly reduces port-biasing of the mixture. The results were as follows:-

	Steel	Mini Spares
3.75"	116.2	116.8
6.00"	116.6	117.4

Tested by Mike Parry at Race Techniques at 25" pressure drop. Bare head used flowed 124CFM.

The manifolds tested were all unsettled, in fact the alloy ones were straight out of the casting box. Mike tidied up very slightly the short manifold to see what happened, and the flow went up to 117.2CFM. That is another benefit of the alloy manifold, there is scope for modifications to increase flow even further. We expect the flow figures to be higher on the finish machined manifolds.

The manifolds come complete with rose jointed linkage mounted directly to the manifold to eliminate flexing.

CAST MANIFOLDS:

C-AHT772
3.75" Long 40/45/48 DCOE/DHLA.

C-AHT773
5.00" Long 40/45/48 DCOE/DHLA.

C-AHT774
6.00" Long 40/45/48 DCOE/DHLA.

I
Maniflow Tubular Steel manifolds:

C-AHT775
Split Weber manifolds, 3 3/4" long, upswept.

C-AHT776
45 DCOE/DHLA, 5" long.

C-AHT776A
45 DCOE/DHLA, 7" long.

C-AHT777
45 DCOE/DHLA, 3-1/2” long.

C-AHT778
48 DCOE/DHLA, 3-1/2” long.

C-AHT779
48 DCOE/DHLA, 5" long.

C-AHT780
48 DCOE/DHLA, 7" long.

C-AEG490
HS4/6 twin SU manifold. Narrow balance pipe.

Inlet-Manifolds Cont.

Mini Spares has produced a range of cast alloy manifolds for the many SU applications covering the A-Series. The single SU manifolds are developed to give maximum airflow and gas speed yet fit all engines even if the standard air cleaner set up is used -without requiring massive bulkhead alterations and speedo cable re-routing. The as-cast finish provides maximum fuel atomization.

C-AHT770
Takes 1 1/2" and 1 3/4" carbs, HS or HIF type. Medium sized port runners suit all small bore engines irrespective of state of tune, and large bore engines up to fast road spec (dependent on head inlet port size).

C-AHT771
Takes 1 1/2" and 1 3/4" carbs, HS or HIF type. Really designed for 1 3/4". It has large port runners for use on extensively modified heads on big bore engines (1380cc and over).

Both have water heating facility (1/2" tube).

12G1405 Servo adapter.

The twin SU manifolds have been carefully produced to minimize cross-port-flow interference caused by the balance tube, and have good radiuses in all the right places. Further blending can be carried out if required, but leave a ground finish to promote, fuel atomization. DO NOT POLISH!

C-AEG488
Twin H2/HS2/ H4 Manifold.

C-AEG489
Twin HS4/ HS6 Manifold.

Downpipes 1990-on

These downpipes fit original cast iron exhaust manifolds 1990-on allowing you fit an RC-40 exhaust system.

C-AEG367
Fits New Cooper fitted with HIF6 carburetor, twin outlet cast exhaust. Use when eliminating catalyst.

C-AEG370
Same as above, but has necessary fitting for retaining catalyst.

C-AEG372
Downpipe for fuel injected cars to fit RC-40. Flange fitting.

C-AEG375
Intermediate pipe to be used in conjunction with C-AEG375 to retain catalyst.

EXHAUST HEADERS

Ease of fitting, high production quality combined with maximum flow for power make the MANIFLOW exhaust manifolds unbeatable value.

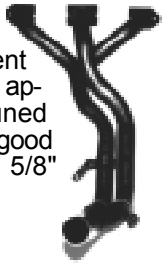
C-STR816

Cooper freeflow. Extremely good all round road manifold. Tends to be quieter than LCB, and is easier to seal.

C-STR817

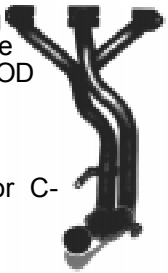
Small bore LCB, ideal for 850/998/1098, 1 3/8" ID / 1 1/2" OD tail pipe.

C-AEG365



Medium bore LCB, excellent all round for almost all road application including well tuned fast road 998's etc. Gives good results on 998 racers. 1 5/8" ID / 1 3/4" OD tail pipe.

C-AHT289



Large bore LCB. For big engines and race big bore applications. 1 7/8" ID / 2" OD tail pipe.

C-AHT197

Replacement Y piece for C-AEG365.

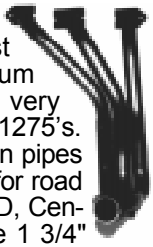
C-AHT198

Replacement Y piece for C-AHT289.

BudgetLCB

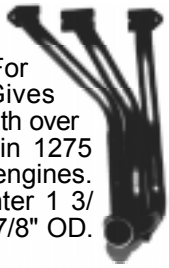
Less expensive reproduction of the LCB, NOT made by Maniflow.

C-STR340



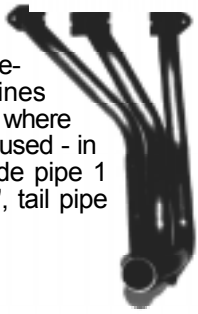
Small bore 3 into 1. Best manifold to use if maximum economy is sought. Gives very good mid range torque on 1275's. Has flat clamps to seal down pipes into collector so is suitable for road use. Outside pipes 1 1/8" ID, Center pipe 1 1/4" ID, Tail pipe 1 3/4" ID / 1 7/8" OD.

C-STR332



Medium bore 3 into 1. For race application only. Gives best results when cams with over 300° duration are used in 1275 and standard oversized engines. Outside pipe 1 1/4", center 1 3/8", tail pipe 1 3/4" ID / 1 7/8" OD.

C-STR336



Large bore 3 into 1. Really only gives positive results on big bore engines (1380cc plus) especially where long duration cams are used - in excess of 305°. Outside pipe 1 3/8", center pipe 1 1/2", tail pipe 1 7/8" ID / 2" OD.

NOTE:
All road exhaust manifolds come with manifold to gearbox steady bracket. This MUST be fitted, otherwise premature breakage will occur due to engine rock.

PECO EXHAUST SYSTEMS

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PECO-BB2

Single outlet exhaust system with joining pipe for using with catalyst.

PECO-TTB4

Large-bore twin outlet muffler only with upswept pipes. 1-7/8" inlet pipe.

RC-40 EXHAUST SYSTEMS

There are a very limited number of exhaust systems that actually produce more power, yet remain at a civilized noise level. Beware of poor imitations.

RC40

The original and genuine RC-40, designed by Competition Silencers, and acclaimed by David Vizard as THE Mini system. Twin box, uses standard hanging points, and is unobtrusive. No power loss on engines up to 125 bhp. Mild steel with chrome tip.

RC40FK

Fitting kit including new rubber mounts.

C-STR809

Straight through single rear box of RC40 system. Produces a good throaty sound, yet still performs well. Fit with AN180V down pipe.

AN180V

Down pipe from manifold to silencer box, 1 3/4" ID.

RC40-057

Intermediate pipe for fitting C-STR809 single box to catalyst fitted as standard on post 1990 cars.

RC-40 Millennium Exhaust Systems

The Millenium Range of RC-40 exhaust system maintains the optimum 1.75" pipe diameter for maximum performance and efficienct. But they're now available in a variety of tailpipe sizes and styles. also available in stainless steel or mild steel with stainless internal pipe. Order connector pipe seperately, with intermediate muffler for quieter twin-box system.

RC40-051
Standard exit, standard bore tailpipe, stainless steel

RC40-052
Standard exit, DTM style, 2" tailpipe, stainless steel

RC40-053
Standard exit, single 2-1/4" tailpipe, stainless steel

RC40-010
Standard exit, single 2-1/4" tailpipe, mild steel

RC-40-054
Center exit, standard bore tailpipe, stainless steel.

RC40-011
Center exit, standard bore,mild steel

RC40-056
Center exit, large bore, stainless steel

RC40-012
Center exit, large bore, mild steel

RC40-055
Center exit, DTM style, stainless steel

RC40-059
Pipe from C-AEG365 LCB to rear Muffler, stainless steel

RC40-061
Pipe with muffler, from C-AEG365 LCB to rear muffler, stainless steel

RC40-014
Pipe with muffler, from C-AEG365 LCB to rear muffler, mild steel.

RC40-058
Pipe from C-STR816 Freeflow header to rear muffler, stainless steel

RC40-060
Pipe with muffler, from C-STR816 freeflow header to rear muffler, stainless steel

RC40-013
Pipe with muffler, from C-STR816 Freeflow header to rear muffler, mild steel

RC40-057
Pipe from catalyst to rear muffler. stainless steel

RC40-062
Pipe with muffler from catalyst to rear muffler, stainless steel

Maniflow Exhaust Systems

C-ARA334
2" bore twin box exhaust system. Rear side exit in the standard position. If the 1.75" bore of the RC-40 isn't enough and you want to make it better, and louder, this 2" Maniflow system is for you. Very high quality, with skid platse on the bottom of the mufflers and gusseted pipes. Requires use of large bore LCB or 3-1 header. Recommended for 1380s or screaming 1275s.

C-ARA333
2" bore single box exhaust sytem, rear side exit exhaust system.

C-ARA335
2" bore twin box system. Center exit This Maniflow exhaust system has the qualities you want: warm mellow sound, great looking center exit, bolts directly to the large bore LCB or 3-1 header.

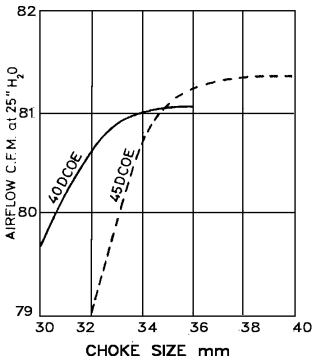
C-ARA332
1.75" bore twin box, center exit exhaust system. Fits directly to Maniflow standard bore LCB.

C-ARA336
1.75" bore twin box, rear side exit exhaust system.

C-ARA339
1-3/4" twin box system for Van, Pick-Up, Wagon

C-ARA336
1.75" win-box exhaust system "cat back" system fot catalyst equipped cars. Side exit.

WEBER CARBURETTORS



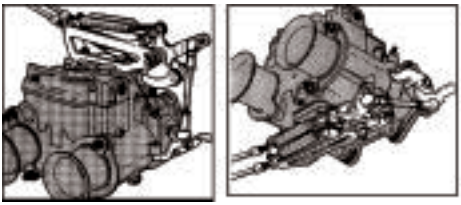
One of the common problems where sidedraft carbs are involved is the choice of carb size in the first place and choke size in the second. The trick with carb sizing and choke selection is basically one of choosing a size which provides the engine with the airflow it needs without going over the top. Although carb selection should really be done only after you know the flow characteristics of your cylinder head, we can provide the following guidelines: If the choke size required for your engine is less than 35mm you should be using a 40DCOE, for all choke sizes of 36mm or larger a 45DCOE should be used. NOTE: a 40DCOE with 32mm chokes will flow more air than a 45DCOE with the same chokes! A 948cc with modified cylinder head, semi-race camshaft and LCB exhaust typically uses a choke size of 33mm, a 1098cc with the same set-up uses 34mm chokes and even a stock 1275cc still only needs a 35mm choke; all of these engines should use a 40DCOE. A full race/street 1098cc can use between a 32 & 36mm choke. A highly modified street/race 1275cc could use as much as a 38mm choke.

40DCOE
Side draft Weber Carb only

45DCOE
Side draft Weber Carb only

P5-001
40DCOE side draft Weber carb kit with manifold, carb, air filter & linkage.

P5-002
45DCOE side draft Weber carb kit with manifold, carb, air filter & linkage.



PM3714
Top mounting, dual spring, dual cable, cam action throttle linkage kit.

PM3715
Bottom mounting, dual spring, dual cable, cam action throttle linkage kit.

92.3246-05
Tune-up Kit for 45 DCOE Weber Carb.

92.0015-05
Tune-up Kit for DCOE Weber Carb.

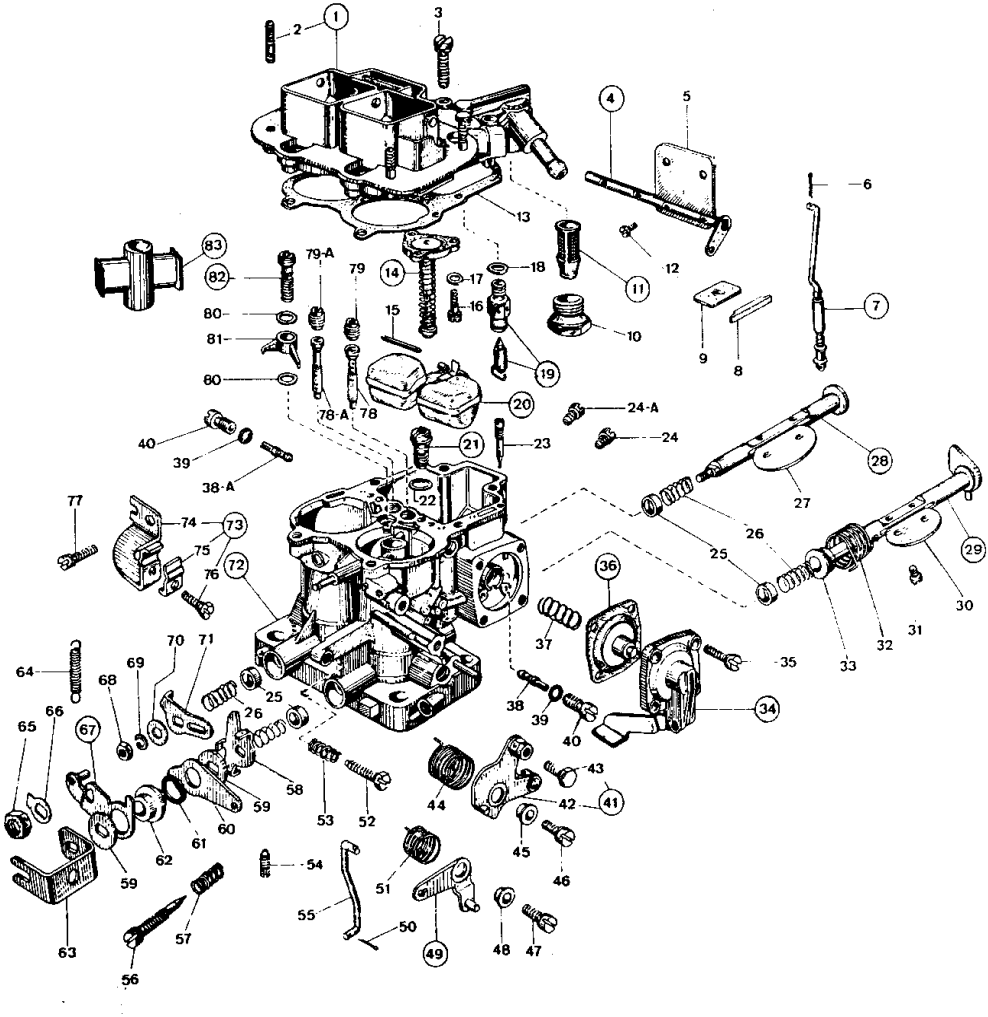
The DGV Carb is a two barrel progressive linkage downdraft carb that is perfect for any street application. The progressive linkage assures both performance and economy. A big improvement over any stock carb and it is available with either a manual or electric choke.

P4-004
32/36 DGV carb with 32mm choke on primary and 36mm on secondary. Complete kit includes manifold, carb, linkage and air filter.

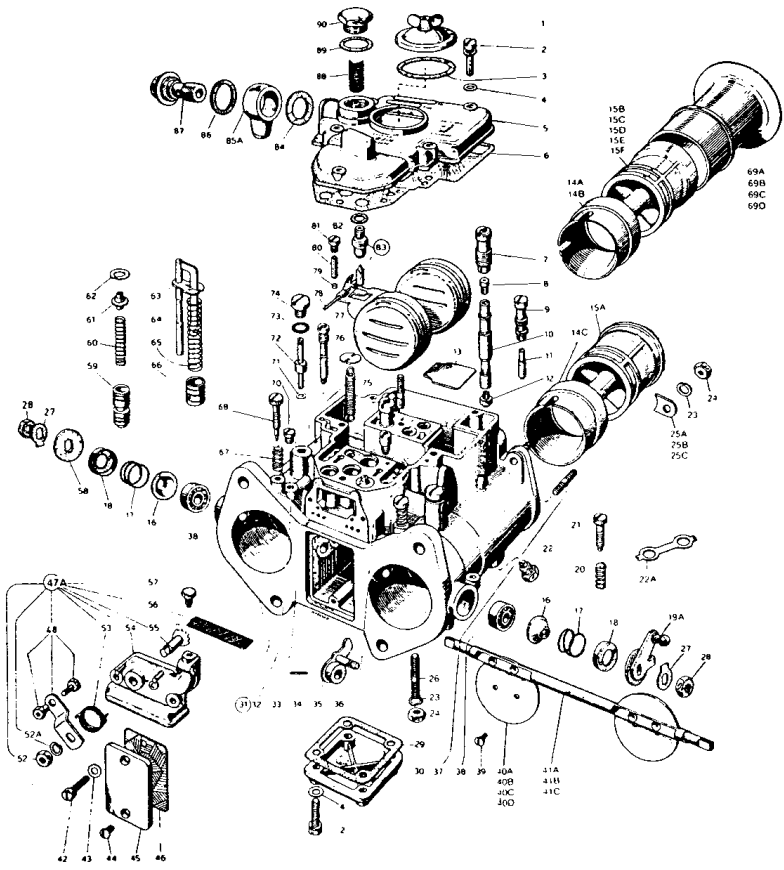
72303
Basic part number for chokes in 40 DCOE carb, sizes from 26mm to 36mm

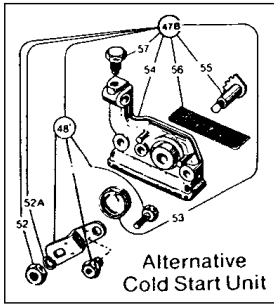
72110
Basic part number for chokes in 45 DCOE carb, sizes from 30mm to 40mm

WEBER DGV PARTS

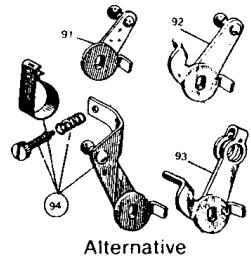


Die. No.	Qty. Req'd	Description	Part Number	Die. No.	Qty. Req'd	Description	Part Number
1	1	Carburetor Cover Assy. Incliuding	31716.132	44	1	Spring For Choke Lever	47610.058
2	4	-Stud Bolt	64955.002	45	1	Bushing For Choke Lever	12775.010
3	6	Carb. Cover Fixing Screw	64700.001	46	1	Choke Lever Fixing Screw	64700.012
4	1	Choke Shaft & Lever Assy.	10020.222	47	1	Square Lever Fixing Screw	64700.012
5	2	Choke Valve	64010.007	48	1	Bushing For Square Lever	12775.010
6	1	Split Pin	32610.005	49	1	Fast Idle Control Square	
7	1	Choke Rod	61267.008			Lever Assy.	45096.025
8	1	Dust Seal Plug	61070.002	50	1	Split Pin	32610.005
9	1	Dust Seal Plate	52135.010	51	1	Spring For Square Lever	47610.033
10	1	Strainer Inspection Plug	61002.018	52	1	Primary Throttle Adjusting Screw	64625.017
11	1	Strainer Assy.	37022.010	53	1	Spring for Throttle Adjusting	
12	4	Choke Plates Fixing Screw	64525.003			Screw	47600.007
13	1	Carb. Cover Gasket	41705.035	54	1	Secondary Throttle Adjusting	
14	1	Carb. Power Valve Assy.	57604.052			Screw	84595.005
15	1	Float Fixing Pin	52000.015	55	1	Fast Idling Control Rod	61280.086
16	3	Control Valve Retaining screw	64700.007	56	1	Idle Adjusting Screw	64750.025
17	3	Washer For Control Valve Screw	55510.038	57	1	Spring For Idle Adjusting Screw	47600.007
18	1	Needle Valve Gasket	41535.015	58	1	Primary Throttle Control Lever	45046.020
19	1	Needle Valve Assy.	79519*	59	2	Washer For Loose Lever	55510.061
20	1	Float Assy.	41030.019	60	1	Fast Idling Loose Lever	45067.024
21	1	Full Power Needle Valve Assy.	64235.016	61	1	Washer Wave	55530.002
22	1	Power Valve Gasket	41530.013	62	1	Bushing For Loose Lever	12775.006
23	1	Pump Discharge Blanking Needle	64900.001	63	1	Throttle Valve Control Lever	45136.029
24	1	Primary Main Jet	73801*	84	1	Spring For Loose Lever	47605.010
24A	1	Secondary Main Jet	73801*	65	1	Throttle Shaft Fixing Nut	34715.014
25	4	Shaft Retaining Bush	12750.085	66	1	Lock Washer	55520.002
26	4	Bush Retaining Spring	47600.027	67	1	Loose Lever Assy.	45069.011
27	1	Secondary Throttle Valve	64005.034	68	1	Secondary Schaft Fixing Nut	34705.001
26	1	Secondary Shaft	10015.492	69	1	Spring Washer	55525.001
28	1	Secondary Shaft Assy. Oversize	10016.477	70	1	Washer For Loose Lever	55510.046
29	1	Primary Shaft	10015.493	71	1	Secondary Throttle Control Lever	45032.124
29	1	Primary Shaft Assy. Oversize	10016.476	72	1	Carburetor Body	Not Serviced
30	1	Primary Throttle Valve	84005.090	73	1	Sheath Support Assy. InAuding	58702.024
31	4	Throttle Plates Fixing Screw	84520.023	74	1	— Sheath Support	58700.028
32	1	Shaft Return Spring	47610.079	75	1	— Sheath Securing Plate	52145.001
33	1	Spacer	12765.047	76	1	— Sheath Plate Fixing Screw	64615.007
34	1	Accel. Pump Cover Assy.	32486037	77	1	Sheath Support Fixing Screw	64700.012
35	4	Pump Cover Fixing Screw	64700.006	78	1	Primary Emulsioning Tube	61440.216
36	1	Accel. Pump Diaphragm Assy	47407.355	78A	1	Secondary Emulsioning Tube	61440.211
37	1	Pump Loading Spring	47600.092	79	1	Primary Air Corrector Jeft	77201*
38	1	Primary Idle Jet	74403*	79A	1	Secondary Air Corrector Jet	77201*
38A	2	Secondary Idle Jet	74403*	80	2	Pump Jet Gasket	41540.014
39	2	Gasket For Idling Jet Holder	41565.002	81	1	Accel. Pump Jet	76226*
40	2	Idling Jet Holder	52570.006	82	1	Pump Delivery Valve Assy.	64290.017
41	1	Choke Control Lever Assy.		83	1	Auxiliary Venturi	71111*
		Including	45202.064				
42	1	— Lever	45202.056				
43	1	— Screw Securing Wire	64615.004				

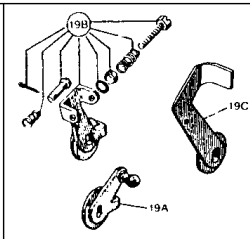




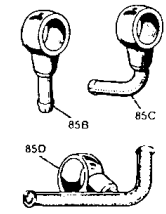
Alternative
Cold Start Unit



Alternative
Right Hand Levers



Alternative
Left Hand Levers



Alternative
Fuel Fittings

Dia. No.	Qty. Rec'd	Description	Part Number	Dia. No.	Qty. Rec'd.	Part Description	Number
1	1	Jet Cover	32376.003	41B	1	Throttle Shaft 42 DC0E	10005.423
2	5	Cover Screw	64700.001	41C	1	Throttle Shaft 45 DCOE	10005.426
3	1	Gasket	1550.002	42	2	Cold Start Fixing Screw	64700.004
4	5	Washer	55510.034	43	2	Flat Washer	55510.038
5	1	Carb Top Cover	31734.025	44	2	Flat Fixing Screw	64570.009
6	1	Carb Cover Gasket	41715.011	45		Plate	52135.002
7	2	Emulsion Tube Holder	52580.001	46	1	Gasket	41640.021
8	2	Air Corrector Jet	77401*	47A	1	Cold Start Unit L/H	32556.002
9	2	Idle Jet Holder	52385.006	47B	1	Alt. Cold Start Unit R/H	32556.004
10	2	Emulsion Tube	61450*	48	1	Lever Assy. L/H Unit	45027.030
it	2	Idle Jet	74800 Series	48	1	Lever Assy. R/H Unit	45027.037
12	2	Main Jet	73401*	52	1	Nut	34715.010
13	1	Plate	52130.003	52A	1	Washer	55525.010
14A	2	Choke Tube 40 DCOE	72303*	53	1	Return Spring UN Unit	47610.006
14B	2	Choke Tube 42 DCOE	72304*	53	1	Return Spring R(H Unit	47610.042
14C	2	Choke Tube 45 DCOE	72110*	54	1	Cold Start Unit Body	Not Service
				55	1	Shaft	Not Service
15A	2	Auxiliary Venturi 45 DCOE With Air Horns	69602*	56	1	Filter Screen	3/000.016
15B	2	Auxiliary Venturi 45 DCOE Without Air Horns	69904*	57	1	Fixing Bolt	64605.017
				58	1	Shaft Washer	55555.010
15C	2	Auxiliary Venturi 42 DCOE With Air Horns	70002	59	2	Start Valve	64330.003
				60	2	Starter Valve Spring	47600.005
15D	2	Auxiliary Venturi 40 DCOE With Air Horns	70003*	61	2	Spring Retainer	12775.004
				62	2	Spring Washer	10140.010
15E	2	Auxiliory Venturi 40 DCOE Without Air Horns	70001*	63	1	Pump Spring Retainer	52140.004
				64	1	Pump Rod	10410 Series
1SF	2	Auxiliary Venturi Extended Type 40 DCOE With Air Horns	70005*	65	1	Pump Spring	47600 Series
				6	1	Pump Plunger	58602.003
16	2	Dust Cover	41570.001	67	2	Idle Screwspring	4/600.007
17	2	Spring	47600.063	68	2	Idle Mixture Screw	64750.001
18	2	Retaining Cover	58000.007	69A	2	Air Horn 45 DCOE 9	52840.001
19A	1	Throttle Lever	45034.044	69B	2	Air Horn 45 DCOE 13/15/16	52840.030
19B	1	Throttle Lever For Use With 92 & 93	45048.005	69C	2	Air Horn 40 DCOE 2	52840.004
				69D	2	Air Horn 40 DCOE 18	52840.024
190	1	Throttle Lever For Use With 94	45034.084	70	2	Progression Hole Plug	61015.002
20	1	Spring	47600.007	71	2	Pump Gasket	41535.021
21	1	Throttle Screw	64590.002	72	2	Pump Jet	76601*
22	4	Locking Screw	64840.003	73	2	Pump Cover Seal	41565.009
22A	2	Locking Plate	52155.003	74	2	Pump Cover	61015.008
23	1	Spring Washer	55525.002	75	1	Inlet Valve With Exhaust	79701*
24	1	Nut	34705.004	76	2	Starter Jet	75605*
25A	4	Locking Plate 45 DCOE	52150.004	77	1	Float	41030.005
25B	4	Locking Plate 42 DCOE	52150.005	78	1	Float Fulcrum Pin	52000.001
25C	4	Locking Plate 40 DCOE	52150.012	79	2	Pump Valve Ball	58300.001
26	1	Stud	64955.104	80	2	Stuffing Ball	52730.001
27	2	Lock Washer	55520.004	81	2	Retaining Screw	61015.006
28	2	Shaft Nut	34710.003	82	1	Needle Valve Gasket	83102.100
29	1	Gasket	41640.001	83	1	NeeeleValve	79503*
30	1	Bottom Bowl Cover	32374.008	84	1	Fuel Union Gasket	41530.031
31	1	Carburetor Body	Not Serviced	85A	1	Fuel Union (Blank)	10354.001
32	1	Spring Anchor Plate	52210.006	85B	1	Fuel Union Straight '4" Dia.	10356.004
33	1	Throttle Return Spr~ng	47605*	85C	1	Fuel Union Straight 5/16" Dia.	10356.003
34	1	Pin	58445.001	85D	1	Fuel Union 90 5/16	10536.035
35	1	Pump Control Lever	45082.005	50	1	Fuel Union (Dual) 5/16	10536.034
.36	1	Stud	64955.007	86	1	Outer Fuel Union Gasket	41530.024
37	1	Stud	64955.101	87	1	Fuel Union Bolt	12715.008
38	2	Throttle Shaft Bearing	32650.001	88	1	Fuel Filter	37022.OIC
39	4	Throttle Plate Screw	64570.006	89	1	Gasket	41530.024
40A	2	Throttle Plate 40 DCOE	64005.059	90	1	Plug	61002.010
40B	2	Throttle Plate 42 DCOE	64005.067	91	1	R/H Lever	45034.042
40C	2	Throttle Plate 45 DCOE Except 15/16	64005.069	92	1	R/H Lever Use With 45048.005	45041.009
				93	1	R/H Lever Use Wtth 45048.005	45048.007
40D	2	Throttle Plate 45 DCOE 15/16	64005.084	94	1	R/H Lever Use With 45034.084	45041.025
41A	1	Throttle Shaft 40 DCOE	10005.401				

AIR FILTERS

K&N developed and manufactures the only air filration system of its kind ... a high-flow, washable filter that's been proven, again and again, to be the finest in the world. Professinal racers and mechanics worldwide rely on K&N air filters to protect their expesive engines .. and so should you!

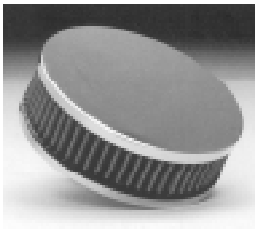
1. Pleated multi-layered oil impregnated surgical cotton grid fabric.
2. Suspended dirt on outside of filter does not cause any significant airflow restriction up to 50,000 mi (street conditions).
3. Dirt absorbs oil from filter and becomes an additional filter medium.
4. Integral oil lock-barrier attracts and holds dirt in suspension without clogging filter medium or restricting airflow.
5. Grid woven cotton and bonded wire mesh grids straightens airflow to reduce turbulence and direct high velocity airflow into carburetor — in some cases, **increasing** C.F.M. and H.P.
6. Bonded wire mesh.
7. Straight filtered air.

SU Filters

SD21-318
1¼" SU • Round 5 7/8" o.d. x 1¾" h.

SD3-318
1½" SU • Round 5 7/8"o.d. x 1¾" h

SD23-318
1½" SU • Round 5 7/8" o.d. x 1¾" h. with offset hole



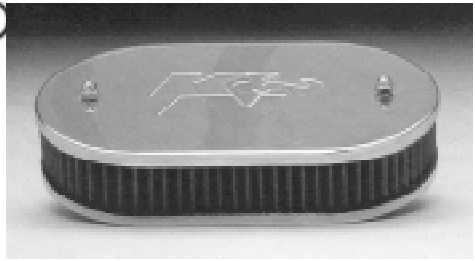
SD25-318
1¾" SU (HIF6) • Round 5 7/8" o.d. x 1¾" h.

SD27-332
1¾" SU (HIF6) • Oval 4½ x 7" o.d. x 1¾" h.

SD40
1¾" SU (HIF6) • Conical 5 7/8" o.d. x 1¾" h.

SDX318/SSX
1 ¼" dual SUs • Special offset filters for Cooper 'S' to clear master cylinders.

WEBER Filters



56-1340
DCOE 40,42 • Oval 5½ x 9" o.d. x 3¼ h works with airhorns

56-1310
DCOE 45,48 • Oval 4½ x 7" o.d. x 1¾ h does not work with airhorns

56-1350
DCOE 45,48 • Oval 4½ x 7" o.d. x 3¼ h works with airhorns

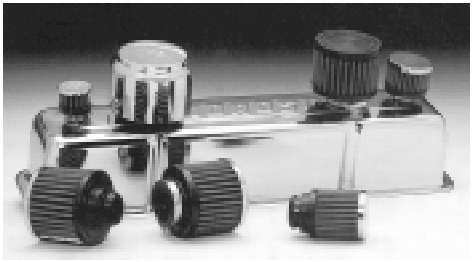
56-1360
DCOE 45,48 • Oval 5½ x 9" o.d. x 3¼ h works with airhorns

56-1220
IDA 48 • Oval 5½ x 9" o.d. x 4½ h.

WEBER Filters (Cont.)

56-1030
DGV 32/36 • Oval 4½ x 7" o.d. x 1¾" h.

56-1040
DGV 32/36 • Oval 4½ x 7" o.d. x 3¼" h.



Crankcase Vent Filters

62-2470
5/16" I.D. flange, 1 3/8" filter diamter, 1 1/8" filter height, Chrome top

62-2480
9/16" I.D. flange, 1 3/8" filter diamter, 1 1/8" filter height, Chrome top

62-1320
3/8" I.D. flange, 2" filter diamter, 1 ½" filter height, Chrome top

62-1330
1/2" I.D. flange, 2" filter diamter, 1 ½" filter height, Chrome top

62-1340
5/8" I.D. flange, 2" filter diamter, 1 ½" filter height, Chrome top

K&N Filter Elements

E-3211
Round 5.87" o.d. x 1.75" h.

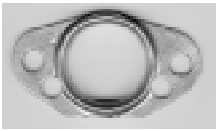
E-3340
Oval 6.12" o.d. x 3.25" h.

E-3440
Oval 7.75" o.d. x 1.75" h.

E-2601
Stock replacement for Mini 1000 & A/A

E-9001
Stock replacement for Cooper S

K&N SU Stub Stacks



SS3
Stub stack, center mount, 1½" SU

SS50
Stub stack, offset mount, 1¼" SU (HS2)

SS51
Stub stack, offset mount, 1½" SU

SS52
Stub stack, offset mount, 1¾" SU (HS6)

SS53
Stub stack, offset mount, 1¾" SU (HIF6)

K&N Maintenance

99-5000
Recharger filter care service kit. A six-step maintenance system designed to recharge your K&N Filtercharger® Air Filter. Completely restores air flow efficiency so your Filtercharger® performs like new!

BG Air Filters

CHROME PANCAKE FILTERS

BG1101A
1.25" wire mesh internals with offset holes for all engines.

BG1102A
1.5" wire mesh internals with offset holes for all engines.

SU Carburettors

AUD365L&R
Pair of 1.25" HS2 SU's. Direct replacement for Cooper S. .

C-AUD640
Pair of 1.5" SU's. These are the later HS4 type, replacing the original but no longer available H4 type. Fixing holes are diagonal instead of top and bottom.

FZX1280
HIF6 1.75" SU. Recognized as the ultimate in performance SU carburetor. When correctly set up can produce power outputs comparable with most twin choke carbs, yet be more economical and vastly simpler to fit.

MSSK8
Heatshield set for 1.25" HS2 twin carbs.

MSSK1006
Heatshield kit for 1.5" HS4 twin carbs

MSSK9
Twin carb linkage kit, contains link rods, butterfly links, throttle cable lever arm and cable clamps.

C-AHT85
Long anti-friction lined accerator cable.

A200015
Alloy large throttle pedal, up to 1975

A200016
Large alloy throttle pedal 1976-on

Velocity Stacks

Velocity stacks are necessary on SU carburetors for a variety of reasons. Running an SU void of anything to regulate air flow around the carburetor mouth creates a constriction. This is caused by air being forced around 90º angled edge immediately prior to the carburetor mouth, this constriction reduces the carburetor mouth size. The effect is reduced flow throughout the induction system.

To maximize air flow potential from any SU a radiused entry is essential, especially on single carburetor applications. While dyno testing engines, different styles of radiused entries were tried. Although many different lengths and shapes were tried, a few details were soon to emerge that influenced flow potential more than anything else, the radius size, total shape, and bore taper being the highest. Using this data, we can now supply a range of velocity stacks for 1.25"and 1.5" SU carburetors. Overly long stacks would severely restrict air filter fitment.

The short velocity stacks are for engines putting out power at higher rpm levels (ie over 7,000 rpm), or where space for deep filters is a problem. The long ones produce better mid-range performance and generally better for engines up to 7,000 rpm - but a deep filter is needed, around 3.5" deep. However, there are no hard and fast rules - so the either is only a guide line. One thing is certain - either is a vast improvement over nothing at all or a badly shaped item.

C-AHT245
1¼" short for 1¼" SU

C-AHT246
1½" long for 1¼ SU

C-AHT247
1½" short for 1½" SU

C-AHT248
2½" long for 1½ SU

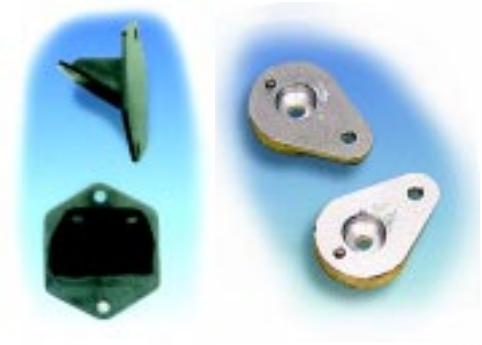
Front Subframe Mounts

On post 1976 cars the rubber mounted subframes flex when driven hard. Using alloy blocks to replace the rubber mounts on the front subframe will eliminate the movement making the car handle better.

C-STR640
Set of four aluminum top mounts to replace the standard rubbers fitted on vehicles from 1976 to present.

C-STR641
Solid blocks to replace the lower front mounts.

C-STR642
Fabricated solid mounts to replace the lower rear mounts.



Polyeurethane pads are also available to replace the soft rubber pads on the front subframe tower bolts.

21A2597/POLY
Polyeurethane upper pad for front subframe tower bolt

21A2598/POLY
Polyeurethane lower pad for front subframe tower bolt.

Rubber Cone

Two methods of suspension have been used on the Mini. The most common is the rubber cone system referred to as the “dry” type, the other is the hydrolastic displacer unit system referred to as the “wet” type.

C-STR687
Progressive uprated cone, pictured at left

Coil Spring Conversion

This direct-replacement kit includes everything to replace the harsh riding rubber cones with proper springs. Special hard anodized aluminum perches allow the springs to be fitted to either the stock trumpets or Hi-Los. The highest quality progressive winding is used to insure that the springs will not sag after many years of use, unlike the rubber cones. Available in three spring rates.

C-SRP100
Soft (Blue) springs,

C-SRP200
Firm (Red) springs

C-SRP250
Competition spec. (Green) springs

Coil-Over Conversion

Coil springs in place of rubber provides more consistent performance. Springs are easy to change for various spring rates, ride height is easily adjusted (no need for HI-LO kits) and thus corner weights can be set very precisely. The shocks are the highest quality gas filled adjustables from Spax. The best part about this kit is that it is a "bolt-on" process, easily done in an afternoon. No cutting or welding and normal 10" wheels and tires can still be used. Also converts "wet" to dry.

CK17

SPAX Coil-over shock kit. Standard ride height.

CK18

SPAX Coil-over shock kit. Lowered suspension.

Hi-Lo Suspension

Lowering or raising the ride height of the Mini with dry suspension is a relatively simple task. With suspension ratios of 3-1 at the front and 5-1 at the rear, removal or insertion of a specific amount will change the ride height multiplied by the relevant ratio. So removal of 1/8" off of the front alloy trumpet will lower the suspension by 3/8", or at the rear 5/8". Lowering the car improves the handling as it lowers the roll center, lowers the center of gravity and reduces positive camber on the front wheels. However, excessive lowering can cause suspension binding. If the car is lowered onto its bump stops, the ride will be very harsh, and tend to make the car skip and jump in corners. Effectively making the suspension solid like a go-kart, so this is NOT recommended.

For easy adjustment of the ride height of the car, special adjustable alloy trumpets are available - more commonly known as “Hi-lo’s”. This system allows ride height adjustment at the turn of a wrench. Very easy to install.

HI/LO

Adjustable Ride Height suspension trumpet, one pair. Includes knuckle joint nylon cups.

SHOCKS

Uprated shock absorbers help improve the “bouncy” ride created by the standard ones. There are several types available, Spax, Koni, and KYB.
Spax adjustables are probably the most widely used, as they are very easily adjusted with a screw driver without the need to remove them from the car. They are an oil filled unit, incorporating an extra gas filled cell that replaces the air content of a normal oil filled unit. This eliminates the aeration that creates fade in normal units under arduous conditions. Two lengths are available, standard and lowered. If the car has been lowered by 3/4" or more, then it is important to fit the lowered variety to avoid damaging the internal valving caused by the shock bottoming out.

158/M1 GAS
Front Spax (M1) standard length

158/M2 GAS
Rear Spax (M2) standard length

158/M11 GAS
Front Spax (M11) short length

158/M12 GAS
Rear Spax (M12) short length

Konis are a well respected manufacturer of performance shock absorbers. These are conventional oil filled units, and can only be adjusted by removal from the car.

C-STR1675
Front Koni standard length

C-STR1794
Rear Koni standard length

C-STR1717
Front Koni short length

C-STR1795
Rear Koni short length shock.

KYB's "Gas Adjust" is a gas filled shock that works harder the harder you work the car. Ride quality is excellent.

552018
Front KYB Gas-Adjust Shock

552019
Rear KYB Gas-Adjust Shock

C-AJJ3361
Uprated shock absorber bottom pin. Produced in hi-grade steel to reduce failure when shock absorbers are set very hard.

C-AJJ3359
Special shock absorber top bracket for cars that have been lowered. Pin is moved in so shock is in a more upright position. (Pair)

SUSPENSION GEOMETRY

Front suspension geometry can be altered to improve the cars road holding, further enhancing its cornering ability. Standard settings from the factory are 1-3° of positive camber, approximately 3° of Castor, and 1/16" toe out tracking. The easiest alteration to make is to fit negative camber bottom arms. These add 1½° of negative camber to whatever the car already has, ie. if you have 1° positive camber, you will get ½° negative camber. Always check the camber first as lowering the car naturally reduces camber. For road applications 1½° negative camber is as much as is required.

Exact camber can be achieved by the used of rose jointed bottom arms. These are really only suitable for race applications as the rose joints are not designed to do volumous miles without requiring replacement.

Castor can be altered by using either the heavy duty tie rod set (designed for road use) or the rose jointed set really only suitable for racing. The heavy duty tie rods are increased in diameter form ½" to 5/8" to reduce flexing, therefore controlling suspension variations when on the move.

To further enhance this control, poly-nylon bushes are available to replace the standard rubber items. These help reduce wandering under braking, making the car more stable. These bushes can, of course, be fitted to the standard tie rods. Poly-nylon bushes are also availf able for the bottom arms.

C-AJJ3364
Negative camber bottom arm set. -1.5º

C-AJJ3364A
Negative camber bottom arm set. -2º

C-AJJ3364B
Negative camber bottom arm set. -2.5º

WB1
Polyeurethane bottom arm bush set, early arms with straight hole.

WB2
Polyeurethane bottom arm bush set, late arms with tapered hole.

C-AJJ3363
Hiem jointed bottom arm set.

21A1091
Heavy duty adjustable tie rod set.

C-STR628
Harder rubber tie bar bush for road use.

WB3
Polyeurethane tie bar bush set.

Rose jointed tie rods allow infinite adjustment of castor angles, combining them with the rose jointed bottom arms facilitates exact settings of both sides of the suspension - critical for racing. There are rubber boots available to protect the rose joints from dirt.

C-AJJ3365
Hien jointed tie rods.

C-AJJ3367
Hiem joint boot.

When aligning a car that has been lowered substantially or major alterations to suspension angles have been carried out, it is often found that the track rod end is not held onto the track rod by sufficient threads. To counter this problem we can supply an extended tie rod end.

GSJ158
Longer tie rod end.

SUSPENSION GEOMETRY

For alteration of the rear camber there are three types of radius arm bracket. First is a fixed set that adds 1½° of negative camber to whatever the car has with standard ones. The second is adjustable to allow preferential settings to be reached. The third is adjustable for both camber and toe.

MS69
Fixed rear camber brackets.

MS70
Adjustable rear camber brackets.

MS73
Adjustable camber & toe rear trailing arm brackets

MSRJF
1/2" UNF X 1/2" female hiem joint.

C-AJJ3363/RE
1/2" UNF X 1/2" Male hiem joint.

The Mini's rear subframe is rubber mounted. Polyurethane (stiffer, much longer lasting) bushes are now available for the rear subframe trunions. Cars manufactured before 1976 use the same bush (2A5818/POLY) at the front and rear of the subframe, 8 per car. Starting in 1976 (MKIV) the front trunion bush was enlarged. That bush (21A2560/POLY) is also available in Poly. These later cars use 4 of each 2A5818/POLY and 21A2560/POLY.
Made in the USA, the Poly bushes are less expensive than the imported rubber originals!

2A5818/Poly
Rear subframe trunnion bush, fits front and rear trunnion up to 1975, front only 1975-on.

2A2560/POLY
Rear subframe trunnion bush, fits rear trunnion 1976-on.

Cars with hydrolastic may be fitted with oversize "Progressive Bump Stops" to reduce body roll and dive.

C-AJJ4007
Front progressive bump stop kit.

C-AJJ3313
Rear progressive bump stop kit.

AHH7074
Replacement Rubbers for progressive bump stops.

ANTI-ROLL BARS

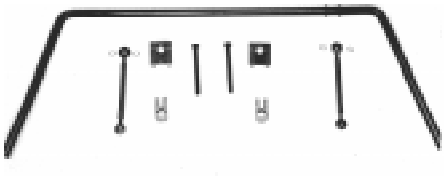
Use of a rear anti-roll bar increases roll stiffness (resistance), therefore helping reduce understeer. Two kits are available, one fixed, one adjustable. The fixed bar is in 1/2" diameter steel bar and comes complete with all components required for fitment. It is not rubber mounted except for the metalastic bushes in the drop links, and is therefore very efficient - unlike those utlilisng rubber mountings for the bar itself. The adjustable kit is also complete, using hiem joints to ensure ultimate stiffness and efficiency. Adjustment is made using two sliding blocks on the bar, which is 3/4" steel.

The front kit contains a 3/4" steel bar, mounted in alloy mounting blocks. Two collars welded to the bar restrict sideways movement of the bar. Fully hiem jointed with sliding alloy blocks to allow ratio adjustment.

C-AJJ4006
Adjustable front anti-roll bar kit.

C-AJJ4008
Adjustable rear anti-roll bar kit.

C-AJJ4009
Fixed rear anti-roll bar kit.



C-SRP003
Front sway bar. Clamps onto suspension tie rods. Easy installation.

BRAKES

A fairly broad variety of brake kits are now available. The use of four piston calipers, then ventilated discs on the Metro considerably improved braking options for the Mini - although these would only fit inside most 12" and all 13" rims. Further development by Mini Spares evolved into production of an all alloy, four piston caliper that, in two kits, will fit very nearly all wheel/disc combinations. It is super light, very easy to service and convert from solid to ventilated disc application. The alloy construction greatly increases heat dissipation, reducing fluid-boiling. Therefore improving efficiency even under the most arduous of conditions. Intelligent design makes these calipers very effective in expelling pad dust and heat from the pad/disc contact area. Pad type is the same as the Metro. A bonus of the design is that they are not handed, and only require the standard single line feed.

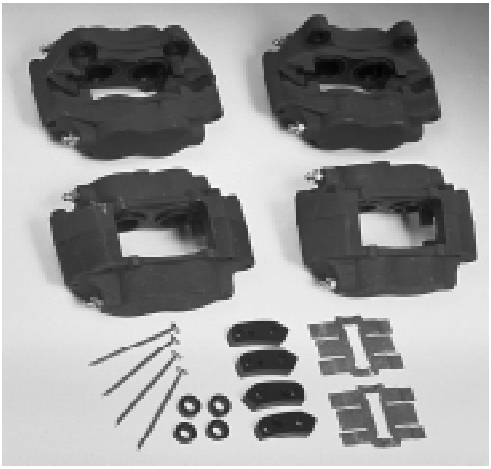
Weight Comparisons

4 Piston alloy caliper	1.15kg
S/1275GT Caliper	2.66kg
Late Mini caliper (post 1985)	3.46kg
4 Piston iron caliper	3.48kg

Other kits available are the standard S/1275GT type and the ventilated, four piston Metro type. The first kit comprises all components required to change from drum brakes to disc brakes. The second kit is to convert from solid disc to ventilated disc. This, however, will only be suitable for Mini's using 12" or 13" wheels.

C-AJJ4022

All alloy four piston brake caliper kit to fit 12 or 13" wheels either as a replacement for the iron Metro caliper or the late Mini (1985 on) two piston iron caliper. When used with the ventilated disc, an adapter kit is required.



C-AJJ4023

All alloy four piston brake caliper kit to fit most 10" wheels, and is a direct replacement for the standard S/1275GT 7.5" disc. It will also fit the later 8.4" disc - solid or ventilated - when machined down to 7.5". An adapter kit is required when used with ventilated discs.

C-AJJ4021

Adapter kit required to convert the alloy calipers when used with ventilated discs.

C-AJJ4028

Conversion kit for changing from drum brakes to discs. The kit uses the standard Cooper S 7.5" disc assembly so is compatible with 10" wheels.

BRAKES

C-AJJ4029
Conversion kit to change from solid disc to ventilated disc with four piston, iron calipers. The calipers have been converted to single line feed to greatly ease installation, and comes with a pair of steel braided flexible brake lines. This kit is not suitable for 10" wheels.

C-21A1265
Cooper 'S' brake rotor with cooling groves

13H7939
Servo unit. As used on the Mk3 Cooper 'S' and early 1275GT. Boosts braking input, so less effort is required by the driver, but loses feel.

13H7940
As above with line kit

MSSK7
Servo fitting kit for use with above servo. Will not fit MK1 'S' servo.

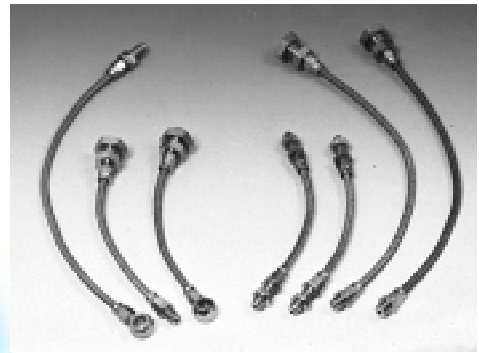
GMC227
Tandem split brake master cylinder. Required by nearly all race regulations. Tandem is front to rear split. Stepped bore for use without servo.

To compliment the upgraded braking system is a range of steel-braided flexible brake lines. Their construction ensures the pressure applied when the pedal is depressed is concentrated at the caliper/cylinder instead of dissipating along the way by expanding the standard rubber hose. This makes for more efficient braking and better pedal feel.

C-AJJ4024
Pair braided lines for use with four piston Metro calipers that have been converted for single line use.

C-AJJ4025
One braided line for the clutch slave cylinder. Only for use with pre 1983 type clutch hydraulics.

C-AJJ4026
Four braided lines to replace all brake flexibles.



C-AJJ4027
Five braided lines to replace all flexible brake lines and clutch line. Only suitable for pre 1983 type clutch hydraulics.

MS72
Brake bias valve. Allows adjustment of front to rear brake biasing, especially useful in competition cars. Can be cockpit mounted to facilitate easy driver adjustment.

C-8G8996
Cooper S brake pad set in Ferodo 2459 compound.

C-8G8993
Cooper S 7.5" pad in carbon metallic compound. Exceptional co-efficient of friction combined with a low wear rate make these a must for all racers.

C-AHT16
8.4" solid disc pad for post 1984 Minis in Mintex M171 compound.

C-8G8994
Metro type 8.4" disc pad for four piston caliper, either iron or alloy, in Mintex M171 compound. Fits 'A' type Metro brakes including ventilated types.

C-STR987
Metro type 8.4" disc pad for four piston caliper, either iron or alloy, in carbon metallic compound. Fits 'A' type Metro brakes including ventilated types.

HAWK BRAKE

Hawk's "Ferro-Carbon" pads exhibit fade-free performance with low wear rates and high torque values. We now stock Hawk pads for High Performance Street/Autocross application plus two race compounds for the Cooper S as well as '84-on cars with 12" wheels. The high performance street, HPS material is quiet running, rotor friendly, and creates very little dust. Good for temperatures between 100 to 900 degrees. The "Black" competition pad works best at temperatures of 400-1100 degrees; the "Blue" pad is for more severe use for temps from 600-1400 degrees.

HB108/HPS
HB108/Black
HB108/Blue
Cooper S

HB123/HPS
HB123/Black
HB123/Blue
'84-on W/ 12" wheels

Superfins
Aluminum brake drums with built-in 1" spacer. Sold by the pair

C-AHT315
1-1/2" front brake shoes with Mintex lining

C-8G8997
1-1/4" rear brake shoes with Mintex lining.

IGNITION

The two best features of the new Pertronix Ignitor electronic ignition conversion kit are the low price and the fact that it fits entirely inside your stock distributor cap! All previous ignition kits utilized an extermal black box, not the sort of thing you want under the hood of yoir stock-looking engine compartment! And, like the more expensive electronic ignition kits, once you install the magnetic trigger and sensor, you will never have to change points again! Available all Lucas distributors.

LU142
Pertronix Ignitor for Lucas 23/25D distributors, negative ground

LU142/P
Pertronix Ignitor for Lucas 23/25D distributors, ositive ground

LU143
Pertronix Ignitor for Lucas 43/5 D distributor, "Red" fixed points

LU144
Pertronix Ignitor for Lucas 43/5 D distributor, "Blue" sliding points

40501
40,000 volt "Flamethrower" coil for use with Pertronix Ignitor

40611
40,000 volt "Flamethrower" coil for use with Pertronix Ignition, epoxy filled for severe-vibration application

IGNITION

Once the engine has been modified, it will invariably require a different ignition curve - especially when compression ratios have been raised and camshafts changed. We stock the Aldon Automotive range of distributors for the A series engine. For road use, it is advisable to retain the vacuum advance for economy. Many believe this over advances ignition causing detonation on performance engines. This is incorrect as the vacuum advance only works at part throttle openings, not under load with the throttle open when no manifold vacuum exists. Add a 'V' for distributors with vacuum advance.

ALDON Y
Aldon yellow - all performance road engines.

ALDON Y+
As above but for A+ series.

ALDON R
Aldon red - for race engines.

ALDON R+
As above but for A+ engines.

DLB105
Lucas 'gold' sports coil. 12 volt.

00-012
Bosch Blue coil

CRANE Cams
PERFORMANCE ENGINE COMPONENTS

Crane Cams (formerly Allison iginition) optically triggered electronic ignition points conversion kits. The XR700 and XR3000 electronic ignition modules use an optical trigger assembly to replace conventional breaker points. The XR700 requires ballast resistance to limit coil current. The XR3000 is a high performance version with a computer chip that controls coil current and dwell. The XR3000 includes an accessory plug for an optional rev limiter. When installing an XR3000, all O.E. (original equipment) ballast resistance must be bypassed.

XR700-231
Crane electronic ignition system, negative ground

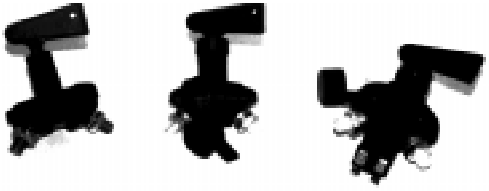
XR720-0001
Crane electronic ignition system, positive ground.

XR3000-0231
Crane/Allison heavy duty electronic ignition system. Requires a coil with no ballast resistance. Crane suggests using a Crane/Allison PS20, PS40, or PS91 coil. (All Bosch blue and Lucas coils have internal resistance.)

730-0020
Coil, for XR700/XR3000, black

730-0040
Coil, for XR700/XR3000, chrome

KILL SWITCHES



KILL SWITCHES

Fitment of a general circuit breaker which isolates the battery from all electrical equipment has become mandatory in nearly all forms of Motorsport. The switch has to be accessible from inside and outside the car, the external trigger should be located on the windscreen scuttle panel - preferably on the drivers side. It should be clearly marked by a red flash in a white edged blue triangle with a base of at least 12cm2.

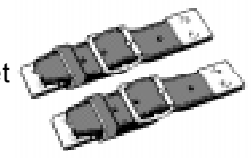
C-AHT623
Basic budget circuit breaker - battery line only.

MW003
Quality circuit breaker - battery line only.

MW002
FIA appendix requirement cut out with special diode protection device to allow switch off whilst the engine is running without damaging the electrical equipment (ie. alternator, electronic ignitions, etc.)

BONNET PINS & STRAPS

MS121
Leather bonnet straps, pair



BSP001
Heavy duty bonnet pins, stainless steel.

BSP002
Heavy duty ponnet pins, blue anodize

BSP003
Heavy duty bonnet pins, red anodize

MS118
Large rubber bonnet hooks approximately 4" long.

MS119
Small rubber bonnet hooks approximately 2" long.

Mincomp
RACING PROUCTS

Bill Gillcrease's Mincomp Racing has been building and racing championship winning racing Minis since the 1970's. Bill develops and manufactures all of his own components. Our long running association with Mincomp allows us to be the exclusive retailer of Mincomp racing equipment.

MIN200
Front mounted racing radiator. Designed for racing in California desert climate. Simple bracketry will be required. Relocation of oil cooler and filter may be required. Can not be used with a charging system.

MIN300
Distributorless ignition system. Complete kit includes electromotive HPV1 ignition unit with trigger wheel and pick-up, modified front pulley, pick-up bracket, plug wires.

MIN500
Windage tray. Helps keep excess oil from being thrown up from the spinning gears into the crank and rod assembly and robbing horsepower. Also helps keep unwanted objects from falling into the transmission in the case of a catastrophic engine failure.

MIN445
Split Weber kit. We can build you a set suited to your needs and pricing. Available with 45, 48, or 50DCOE, to fit right or left hand drive.

MIN700
Quick-release steering wheel hub. Allows easy removal of steering wheel for easy entry and exit of driver's compartment. Also makes an effective anti theft device for street cars. SFI approved.

MIN100
One piece, Mincomp Racing, carbon fiber reinforced "S Glass" front end. Includes front-end with built-in Fortech Style flares and air dam with integral bumper. 61" width covers 8" tires Approximate weight 10 pounds.

MIN110
64" width front end to cover 9½" wide tires.

MIN120
Replacement air-dam. Useful if the lower edge of the air dam gets damaged. May be DZUS fastened on.

MIN130
"S Glass"/carbon fiber reinforced door shell. (no window frames) Mount with Mk1 external hinges.

FLARE05
Rear Fortech flares to match front ends. Fiberglass construction.

FLARE03
Complete set of front and rear Fortech fender flares Fiberglass construction.

Useful Formulas

Here are some useful formulae that may be of assistance.

ENGINE CAPACITY

$r_2 \times h \times 4$
$= 3.142$

r = radius of bore (half bore diameter)
h = stroke

Example: Bore = 70.64 Stroke =81.33

3.142 x (35.32 x 35.32) x 81.33 x 4
=1275cc

COMPRESSION RATIO

CR = swept vol. + unswept volume
unswept volume

Swept volume =
Volume of bore ($r_2 \times h$) or engine capacity divided by 4.

Unswept Volume =
Total of combustion chamber volume, piston dish volume, gasket volume, distance piston is down the bore, valve cut outs in block if any, ring and (although this is not usually used to leave a small safety margin).

Example:1275cc engine (bore capacity)

Head capacity	21.00cc
Piston dish	6.6cc
Volume of bore	4.0cc
Gasket volume	3.4cc
Unswept volume	35

Compression Ratio = 318.75 +35
35
Compression Ratio= 353.75
35
Compression Ratio = 10.1:1

FORMULA FOR DETERMINING EFFECT OF LIGHTENING ROTATING ENGINE COMPONENT

$$\frac{0.5 \times n_2 \times r_2 + R_2}{R_2}$$

n = Total gear ratio (gear ratio x diff ratio)
r = Radius of gyration
R = Radius of wheel/tyre used

This formula's result gives what accelerative weight the engine sees of the car per lb.

Radius of gyration of a transverse engine's flywheel is approximately 3.75". So to determine "weight loss" for a flywheel from a standard weight of say 18lb to 10lb, the engine would see an overall weight loss of the car to accelerate in first gear of 3.33 = 1st gear of 4 syn 'S' box, 3.44 = diff ratio

0.5 x (3.33x3.44) x (3.75) + (9.5)
9.5

=0.5 x 131.1 x 14.06 + 90.25
90.25

= 1011.88 = 11.21 lbs
90.25

So for every 1lb removed from the flywheel, the engine sees 11.21lb less to accelerate off of the total car. Therefore by lightening the flywheel by 8 lb, the engine sees a total reduction of the cars accelerative weight of 89.68lb.

Useful Formulas

Here are some useful formulae that may be of assistance.

GEARBOX RATIOS AND TRANSMITTED ENGINE RPM

The basic rule to remember when computing gear ratios is the driven gear is always divided by the driver, and that to determine gearbox ratios it is necessary to work out what the constant input ratio is. This is worked out by dividing the number of teeth on the first motion shaft into the number of teeth on its corresponding end of the laygear. This is NOT the fourth gear ratio, as in essence fourth gear does not really exist; once in top gear the first motion shaft drives the mainshaft directly, hence it is always a 1 to 1 ratio.

Example:
On the four syncro 'S' gearbox the 1st motion shaft has 18 teeth, the corresponding gear on laygear has 29 teeth. Therefore the "constant" ratio for the box is: 29 / 18 = 1.61

First gear has 31 teeth and is the driven gear. The driver is its corresponding gear on the laygear. This has 15 teeth. So to work out the first gear ratio • 31/15 = 2.066 x 1.61 (constant ratio)= 3.3

Input gear speed in RPM =
Engine RPM
Drop gear ratio

Pinion speed in RPM =
Input speed (RPM)
Actual gear ratio

Output shaft speed in RPM =
Pinion speed
Crown wheel & pinion ratio

COMPUTING VEHICLE SPEED FOR DIFFERENT FINAL DRIVE RATIOS

It is necessary to work out how many revolutions per mile your particular wheel and tyre combination does. For this you will need to know its rolling radius when inflated to the correct pressure.

This table shows some typical tyre sizes and their corresponding wheel revs per mile.

The formula for vehicle speed in MPH per 1,000 RPM for a particular diff ratio can then be worked out:-

60,000
Diff ratio x wheel revs per mile/30mph

So for 3.44 with 165/70/10 tyre -

60,000 = 60,000 = 16.47 mph
3.44 x 1059 3642.96

To estimate KPH/1,000 rpm =
96.56
Diff ratio x wheel revs per mile/30mph