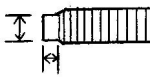
DART BIG M *ALUMINUM* Big Block - Technical *Notes*

Deck Height	.....	**9.800" & 10.200"**
Bore	.....	**4.250" or 4.500" unfinished**
Main Bearing Size	.....	**Standard BBC**
Main Caps	.....	**All 4 bolt - Steel or Ductile Iron**
Weight	.....	**9.800" x 4.250" bore = 160lbs / 9.800" x 4.500" = 136lbs**
		10.200" x 4.250" bore = 168lbs / 10.200" x 4.500" bore = 144lbs
Largest Recommended Bore	.....	**4.600"**
Camshaft Bearing Diameter	.....	**Standard BBC**
Camshaft Position	.....	**Standard BBC**
Cylinder Wall Thickness, min.	.....	**.140" @ 4.600" bore**
Deck Thickness, min	.....	**Adequate for all applications**

Torque Specs - Main Caps	**1 - 5 1/2" bolts**	**100**	**ft lbs w/CMD #3**
	2 - 4 1/2" splayed	**100**	**ft lbs w/CMD #3**
Dart's inner head studs	**3/8" – 7/16" stepped**	**50**	**ft lbs w/CMD #3**

Standard BBC oil filter is used.
Standard BBC timing chain, timing cover, gear or belt drive can be used.
Actual deck height will be .005"- .010" taller for additional machining requirements.
Standard BBC oil pan can be used. Extra bolt holes are provided for stroker crank pan.
Cam bearing OD should be deburred before installation.
When removing main caps initially, the caps & block should be deburred before reinstalling. This will insure that correct main size is maintained.
Standard BBC head studs or bolts may be used.
Head stud holes are blind. They do not go into the water jacket.
A sealant/antiseize *must* be used on the head studs. Loctite # 620 is recommended.
Studs should *never* be torqued into block. They should only be lightly snugged.
It is preferred that a bullet be machined on the end of the head stud where it bottoms in the block to center the stud before tightening.



.350" OD x .150" Deep

Press-in freeze plugs are provided.
Press-in cam plug dia = stock 2 7/32" 2.218".
Standard BBC distributor is used.
Note: Be sure to check distributor to oil pump shaft clearance with distributor, intake manifold and oil pump installed on the block.
When a mechanical fuel pump is used, a standard length BBC push rod is used.
Oil galley from filter to main galley is 5/8". The main oil galley is stepped 9/16" - 1/2" - 7/16" to insure an adequate oil supply to the main bearings.
Lifter bores are lengthened .350" for greater lifter support.
Roller Lifters should be Gen VI type which are .300" longer than Mark IV.
Solid & hydraulic lifters should be Mark IV type.
Timing cover and Oil pump dowel pins are .246" O.D. in dart blocks
We recommend using Fel-Pro# 1037, 1047 or 1067 head gaskets with the Big M block.

DRY SUMP SYSTEM

If a dry sump oiling system is used you must plug the oil inlet hole in the rear main cap or in the block, underneath the rear main cap.
Block has threaded inlet for dry sump oil feed in rear of block.
Stock oil filter can be used with a dry sump system.

PRIORITY MAIN OIL SYSTEM

Oil is directed to the main bearings first, then to the cam bearings.
The lifter galley is fed only from the front.
The lifter galley is threaded for 1/4" NPT restrictors.

INSIDE HEAD STUDS

When installing Dart's Inside Head Stud & Shoe Kit be sure the shoe and the 7/16" end of the inner head stud slide into the machined pocket in the block. Thread the stud into the cylinder head before the head is installed. Sometimes you may have to bottom tap the stud hole in the head to get full engagement of the threads on the stud. Install the shoes and nuts before tightening any head bolts or studs because you may have to tilt the head up at the top to slide the shoe and washer on and start the nut. Torque the 3/8-24 nuts to 50 ft lb with oil after torqueing all other head studs or bolts.

"STROKER" OIL PAN GASKET

We install the extra bolt holes at the main cap for blocks that have been ground for extra rod clearance. The recommended oil pan gasket set for stroker cranks is Fel-Pro# 1863. This has the side rails trimmed for rod clearance and has bolt holes on the main cap center lines.

NOTE: Due to the extended cylinder walls and variations in distributor and gear dimensions from numerous manufacturers make sure to check clearance between bottom of distributor gear and block. If it is not adequate, machine .040" off the OD of the bottom section (w/o gear teeth) of the gear and chamfer the bottom end also.

NOTE: Due to variations in lifter sizes and clearance preferences, most of our Engine Builder customers prefer the lifter bores sized on the small end of the specification. Sometimes these bores will need to be lightly honed.

NOTE: Several aftermarket head bolt kits have four ¼" longer bolts for the end holes that are countersunk for the dowel pins. You need to verify that the bolts do not go into the block more than .850" from the deck surface or they will bottom out before they tighten on the head. If they are too long you should be able to grind off a thread or two.

NOTE: The two oil filter adaptor attaching bolts should be 1 1/4" (1.250") O.A. length. This will allow 1/2" (.500") of thread into the block. This is *shorter* than the stock Chevrolet bolts. *This MUST be adhered to.*

NOTE: There is a drain back hole for the fuel pump cavity that is drilled through to the crankcase. Sometimes it is not drilled completely through and leaves a rough cast hole on the inside of the block about a 1/2" below the pan rail and directly under the fuel pump boss. This is a normal condition and since the hole is only there for drain back, it only needs to be open a minimum of .090".

NOTE: The fuel pump pushrod bore is machined for a .500" rod. Be sure to check the clearance because of the inconsistencies in the diameters of push rods.

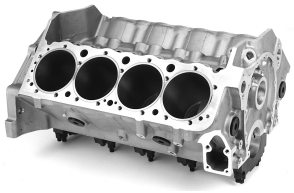
SPECIAL NOTE: With a multitude of different crank, rod and piston combinations available it is important to check clearance of all moving parts, especially crankshaft counterweight and connecting rod to block. All parts must be checked before any type of machining or assembly is attempted. It is good engine building procedure to ALWAYS check the fit of the distributor before any machining or cleaning is done.

NOTE: If you are using aftermarket cam profiles you must use the correct components for the application.

BBC Aluminum Big "M" Block

Part #	**31264344 - 31264695**
Material:	**RMR Cast Aluminum Alloy**
Bore:	**4.250", 4.500" & 4.600"**
Bore & stroke:	**4.600" x 4.750" (max recommended)**
Cam bearing bore ID:	**BBC - 2.1195"- 2.1205"**
Cam bearings:	**Special coated, grooved, w/3 oil holes**
Cam bearing O.S.	**+.010", +.020", +.030"**
Cam bearing press:	**.002"**
Camshaft position:	**Std. Location**
Camshaft to Crank:	**5.152" Std. / 5.552" +.400**
Camshaft snout:	**BBC**
Cam Drive:	**Timing chain, Gear drive & Belt drive**
Cam Plug:	**2.375" Dia. Cup Plug w/ Snap ring**
Cam Plug snap ring:	**.030" thick**
Cubic inch:	**638" (max recommended)**
Cylinder Wall Thickness:	**Min @ 4.770 (+.030) is .070 - .080 thick**
Deck Height:	**9.800" & 10.200" +/- .002**
Deck Thickness:	**.625" min.**
Fuel Pump:	**Mechanical pump provision**
Fuel Pump Pushrod:	**Std. BBC pushrod**
Freeze Plugs:	**Threaded 1 5/16" OD (1.312")**
Lifter Bores:	**SBC .8427" - .8437"**
Main bearing size:	**Std. BBC**
Main bearing bore:	**2.937" – 2.938"**
Main caps:	**Steel - 4 bolt splayed .005" press**
Oil system:	**Wet or Dry Sump - Main Priority Oiling**
Oil Pump shaft:	**BBC shaft 6.500" oal / +.400" blocks use 6.900" oal**
Oil Filter:	**Std. BBC Location**
Oil Pan:	**Standard pan bolt pattern, extra bolt holes provided for stroke**
Rear Main Seal	**STD 2 pc seal / Fel-Pro# 2918**
Serial No.	**Left front & main caps**
Sleeve OD:	**4.740"**
Sleeve O.S.	**+ .010", +.020" & +.030" available**
Sleeve thickness:	**4.245 Bore (.250) 4.500 Bore (.120) 4.600 Bore (.070)**
Sleeve Length:	**9.800 Deck (6.370) 10.200 Deck (6.770) 10.400 Deck (7.00)**
Starter:	**Mounts on either side**
Studs, Mains:	**1-5 Inner ½ x 4.850 2-4 Splayed ½ x 3.800 1 & 5 Outer ½ x 4.325**
Studs, heads:	**Must use our head studs**
Studs holes, Head:	**Blind holes**
Stud length in block:	**1.750"**
Timing chain/gears	**STD BBC or BBC +.400**
Timing Cover:	**Std. BBC Timing Cover**
Torque Specs:	**1-5 100 ft lbs with CMD #3 high pressure lube**
Weight:	**9.800 x 4.250 bore (160lbs) - 9.800 x 4.500 bore (136lbs)**
	10.200 x 4.250 bore (168lbs) - 10.200 x 4.500 bore (144lbs)

IMPORTANT



This Block should be assembled only by experienced, professional engine builders.

INSPECTION

Upon receiving this block it should be thoroughly inspected for shipping damage.

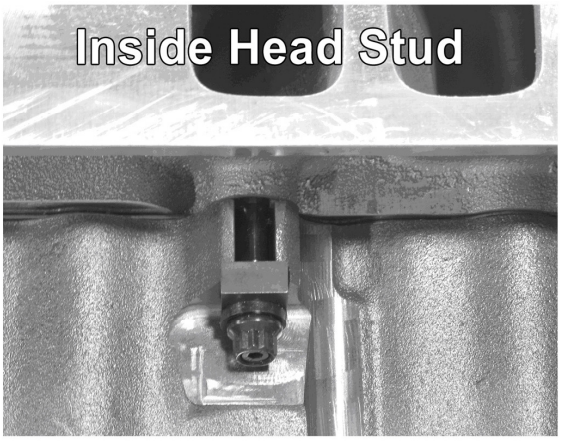
Prior to machining and assembly please inspect the following items:
Cylinder bores - Oil passages - Deck surfaces - All threads

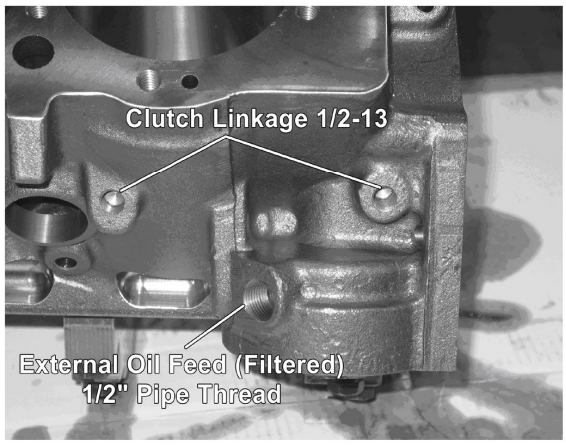
MEASURING & MACHINING

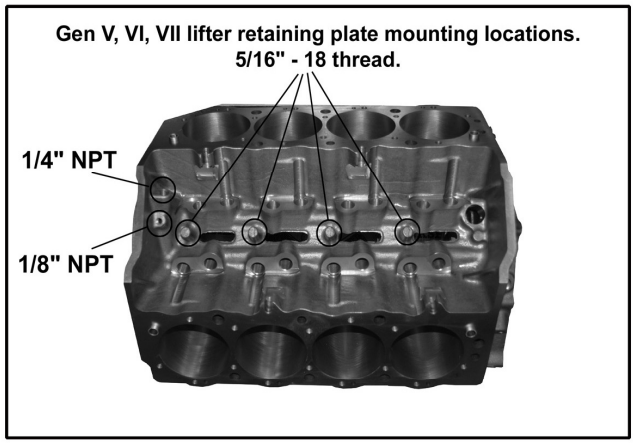
- All initial measuring should be done before any machining has begun.
- Decks are CNC machined to standard deck heights. If you need a particular deck height always measure before machining.
- Main journals are finish line honed to the low to middle of the specification. They should be measured for your preference. If you have need for a different diameter you must realign hone this yourself.
- Crankshaft & rod clearance should always be checked before any machining is started. You need .060" clearance for rotating counterweights and rods.
- Due to variations in OD dimensions of the numerous lifter manufacturers, lifter bores are finish honed on the tight side of the tolerance to leave room for lifters that are larger than the standard.

WASHING

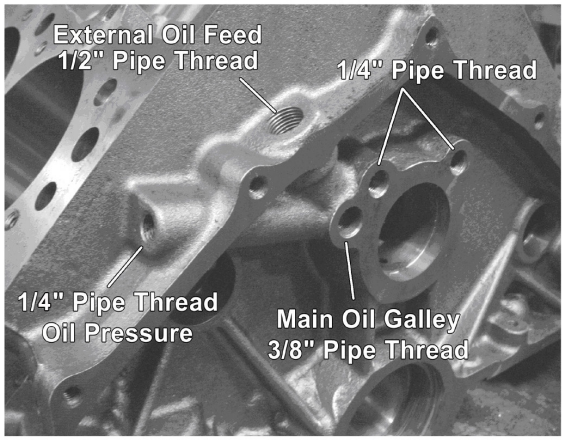
- Final washing should be very thorough, paying particular attention to all oil galleys. Use hot soapy water and rinse with hot water first, followed by cold water which helps reduces rust.



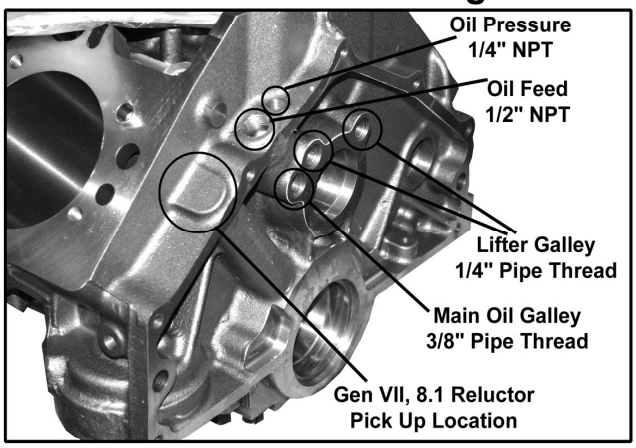




Pre-2011 Casting



Post 2011 Casting



Dart Aluminum Big “M" Sleeve Installation and Removal Procedure

1.) Check cylinder bore concentricity and deburr bottom of sleeve for removal.

2.) Install short length bolts with washers in 1 or 2 bolt hole locations around each sleeve that will not be removed. This will prevent the sleeves from falling out when the block is flipped over.

3.) Heat the block in an oven at 300°F for approximately 30 - 45 min. **(STOP! When removing block from oven use caution! The block will be extremely hot and could burn you!)**

4.) Push / Drive out damaged sleeve(s) with sleeve driver from bottom side up towards the deck surface. (Note: If the cylinder measured out of round in (Step 1) and will not drive out the sleeve will have to be bored out due to distortion.)

5.) When the block cools check sleeve bore concentricity and I.D measurement. The standard sleeve O.D should measure 4.740" O.D making the block sleeve bore 4.7385" I.D to maintain the required .0015" press fit for the entire sleeve surface area. If this interference fit is not possible due to damage or the bore being out of round you will need to overbore the block and install a + .010, +.020 or +.030 O/S sleeve depending on how far the block needs to go for clean up. When installing an oversized sleeve the press fit specification will stay the same as above at .0015" total interference.

6.) When the block has been sized for the required sleeve re-heat block as specified in step # 3 and push the sleeve in from the deck side down. Make sure the sleeve is clocked correct so that the interlocking flats on the sleeve will line up with the adjacent sleeves on either side.

7.) Remove all small retaining bolts that were used to hold in the non removed sleeves and use a torque plate to seat all sleeve(s) in the sleeve bores.

8.) Measure sleeve to deck height and mill according to your engine building specs. Most engine builders run the sleeve height anywhere from .000" - .002 above the deck for proper gasket sealing.

If you have any questions please contact our technical department at 1-248-362-1188 and we can assist you with the R&R procedure if needed.

Dart Machinery, Ltd
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Troy, MI 48084
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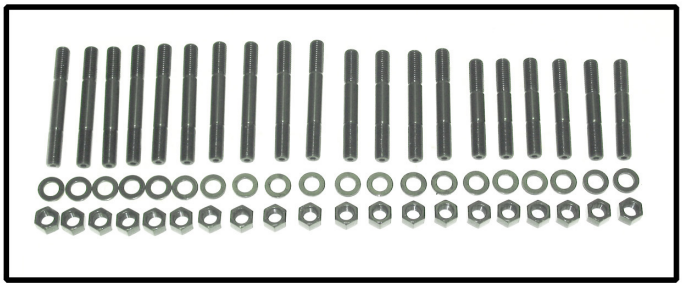
1-248-362-2027

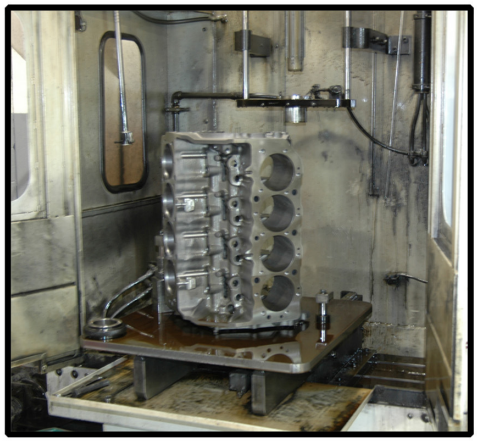
Make Sure You Have Everything You Need For Your New Block!

Inside Head Stud Kit
 # 64210240

Assembly Lubricant
 # 70000009



BBC Aluminum Main Stud Kit
 # 66120024



Block Prep
Final lifter and hone spec.
Finish machined to your specs.
Final prepped and washed.
Pipe plugs, cam bearings and freeze plugs installed.
 # BLOCK PRP

BBC Top End Kits
 # 0112005 - 01220010

Call Or Visit Our Website!

Dart Machinery 248-362-1188 www.DartHeads.com

CHAMPIONSHIP ENGINE COMPONENTS

Here at Dart we are constantly improving upon our products to ensure that you are receiving the latest and most technologically advanced products in the industry. Through our extensive R&D we have found that valvetrain oil is crucial in a high performance engine. The following modification will correct oil volume to the valvetrain that may occur when using solid roller lifters in any block.

Figure 1:
Stock un-modified solid roller lifters

Figure 2:
Dart oil galley modification from band to pushrod oil hole

We recommend a .020”deep x .080”radius wide groove from the pushrod feed hole to the oil band / machined feed hole in your solid lifters (**Front hole only** as shown in Figure 2 above) depending on your tooling & method. You can also do this with a cutoff wheel or a dremel. This allows you to use the restrictor provisions provided in your Dart block to tune oil volume to the lifter oil galley. This allows you to control the oil going to the pushrods, rocker arms and valve springs.

CAUTION!

The use of lifters that are heavily lightened should not be used in Dart Blocks. The lightening holes will cause lifter oil to leak into the valley instead of oiling the pushrod, rocker arm and valvespring.

Please call our technical staff with any questions Mon-Fri 9am-6pm E/T (248)-362-1188