

**DART**  **MARK IV Iron Big Block - Technical Notes**

Deck Height	.....	9.800" & 10.200"
Bore	.....	4.250", 4.500", 4.560" and 4.600" unfinished
Main Bearing Size	.....	Standard BBC
Main Caps	.....	All 4 bolt - Steel or Ductile Iron
Weight	.....	4.250" bore = 280lb / 4.600" = 260lb
Largest Recommended Bore	.....	4.625"
Camshaft Bearing Diameter	.....	Standard BBC
Camshaft Position	.....	Standard BBC or +.400" Raised

Cylinder Wall Thickness, min.	.....	.300" @ 4.625" 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

- **Note: Be sure to check distributor to oil pump shaft clearance with distributor, intake manifold and oil pump installed on the block before any assembly is attempted.**
- **Note: The tapered portion of the stud body should never contact the deck or bolt hole counter bore. If the stud body does thread to deep and makes contact with the deck surface then you should use a small ball bearing in the bottom of the bolt hole to space up the stud accordingly.**
- Standard BBC oil filter is used.
- Standard BBC timing chain, timing cover, gear or belt drive can be used on standard cam height Big M Blocks.
- +.400" Raised cam (Big M<sup>2</sup>) blocks require raised cam timing cover P/N: 67240002 (includes gasket).
- 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. Studs should never be torqued into block.
- 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.
- Block parts kits are provided with the Big "M" billet cap blocks only. These kits include: cam bearings, freeze plugs, timing cover dowel pins, oil pump dowel pins, head dowels, transmission dowels, oil galley plugs and a rear cam plug. These kits are sold separately when using the Sportsman series PN# 32000022.
- Press-in cam plug dia = stock 2 7/32" 2.218".
- Standard BBC distributor is used.
- 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 is .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.

**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 ¼" (1.250") O.A. length. This will allow ½" (.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. The hole will have a rough appearance and is located on the inside of the block about a ½" below the pan rail and directly under the fuel pump boss. The hole is only there for drain back and 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.

### **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 ¼" NPT restrictors.

### **INSIDE HEAD STUDS**

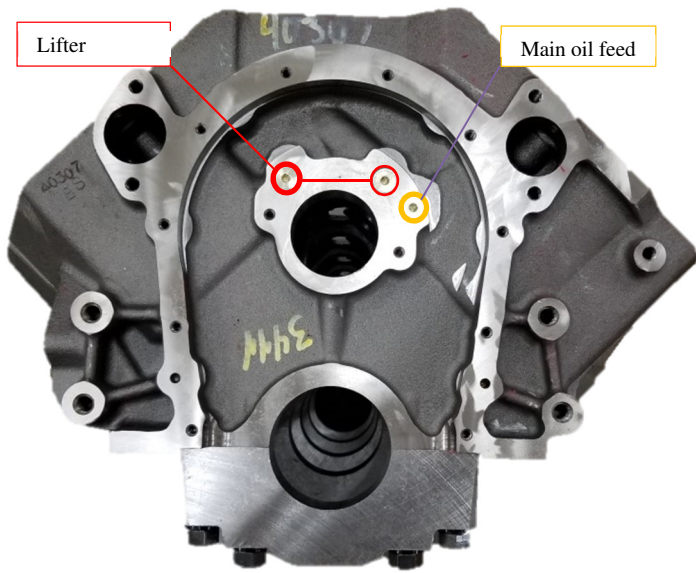
When installing Dart's Inside Head Stud & Shoe Kit be sure the shoe and the 7/16" end of the inner head stud slide into the machined pocket in the block. Thread the stud into the cylinder head before the head is installed. Sometimes you may have to bottom tap the stud hole in the head to get full engagement 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 CMD#3 after torquing all other head studs or bolts.

### **"STROKER" OIL PAN GASKET**

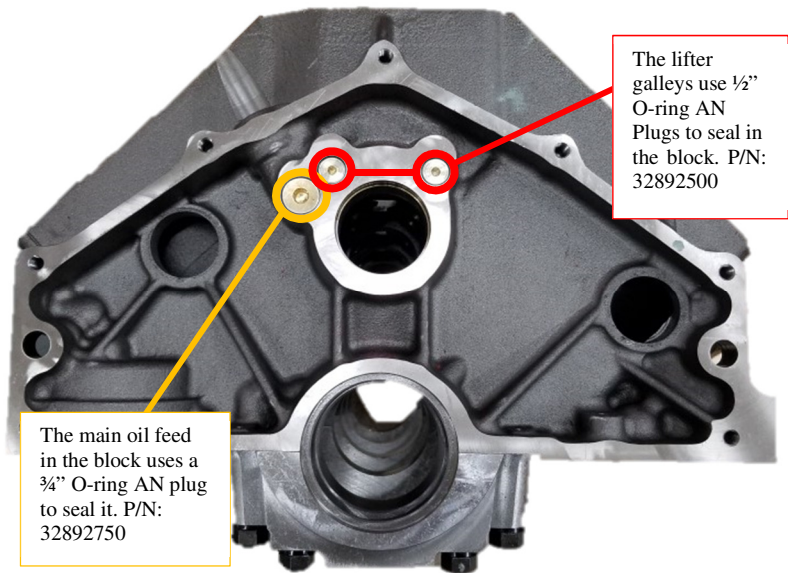
We install the extra bolt holes at the main cap for blocks that have been ground for extra rod clearance. The recommended oil pan gasket set for stroker cranks is Fel-Pro# 1863. This has the side rails trimmed for rod clearance and has bolt holes on the main cap center lines.

## ***DART* Dart BBC Big "M" Mark IV Block**

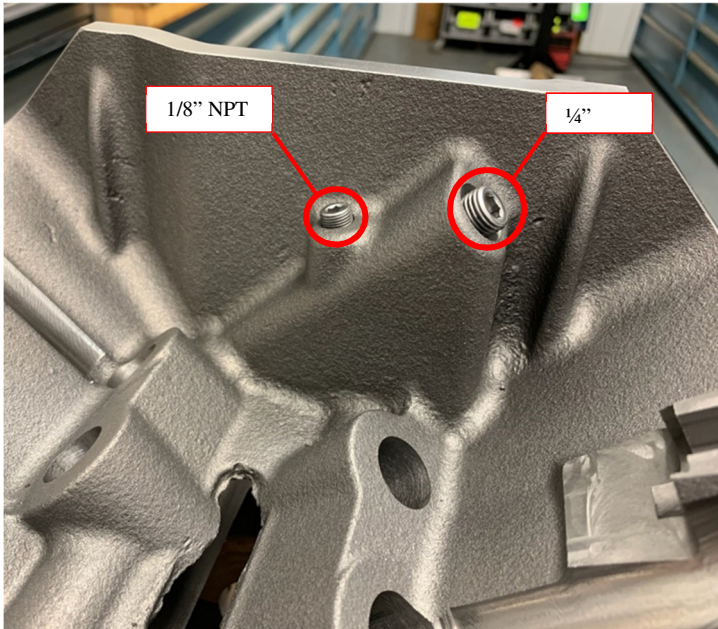
<b>Part #</b>	<b>31213344 – 31223655</b>
<b>Material:</b>	<b>Superior Iron Alloy</b>
<b>Bore:</b>	<b>4.250", 4.500", 4.560", and 4.600"</b>
<b>Bore &amp; stroke:</b>	<b>4.625" x 4.750" (max recommended)</b>
<b>Cam bearing bore ID:</b>	<b>2.120" Std.</b>
<b>Cam bearings:</b>	<b>Coated, grooved, w/3 oil holes PN# 32210030</b>
<b>Cam bearing O.S.</b>	<b>+.010", +.020", +.030" available *Call for Part numbers</b>
<b>Cam bearing press:</b>	<b>.002"</b>
<b>Camshaft position:</b>	<b>Standard or +.400" (Option / Big M<sup>2</sup>)</b>
<b>Cam Drive:</b>	<b>Timing chain, Gear drive &amp; Belt drive</b>
<b>Cam Plug:</b>	<b>Standard BBC 2.215" P/N: 32520000</b>
<b>Cubic Inch:</b>	<b>632" (Max Recommended)</b>
<b>Cylinder Wall Thickness:</b>	<b>.300" min @ 4.625" bore</b>
<b>Deck Height:</b>	<b>9.800", 10.200" &amp; 10.400" on Big M<sup>2</sup></b>
<b>Deck Thickness:</b>	<b>Adequate for all applications</b>
<b>Dist. Tap Hole Valley:</b>	<b>None</b>
<b>Fuel Pump Boss:</b>	<b>Mechanical pump provision</b>
<b>Fuel Pump Pushrod:</b>	<b>Std. BBC or +.200" for Raised cam/Big M<sup>2</sup> - P/N: PR200FP</b>
<b>Freeze Plugs:</b>	<b>Std. Press in cup plugs 1 5/8 "dia.</b>
<b>Head Bolt Pattern:</b>	<b>Std. BBC Big M Bolt Pattern</b>
<b>Inside Head Studs:</b>	<b>P/N: 64210240 (Not included)</b>
<b>Lifter Bores:</b>	<b>BBC .8427" - .8437" + .300 Taller Gen V, VI style</b>
<b>Main bearing size:</b>	<b>Std. BBC</b>
<b>Main bearing bore:</b>	<b>2.937" – 2.938"</b>
<b>Main caps:</b>	<b>Steel Billet or Ductile Iron (Sportsman) 4 bolt</b>
<b>Oil system:</b>	<b>Wet or Dry Sump - Main Priority Oiling</b>
<b>Oil Galley, main:</b>	<b>Stepped, 9/16" – 1/2" – 7/16"</b>
<b>Oil Cooler Holes:</b>	<b>None (Can use aftermarket inline)</b>
<b>Oil Galley, filter main:</b>	<b>5/8"</b>
<b>Oil Filter:</b>	<b>Stock oil filter location</b>
<b>Oil Pan:</b>	<b>Std. BBC bolt pattern &amp; Stroker pattern at mains</b>
<b>Rear Main Seal:</b>	<b>STD 2 pc seal / Felpro# 2918</b>
<b>Hyd. Roller Provisions:</b>	<b>None</b>
<b>Serial No.</b>	<b>On main caps / Front passenger side below deck</b>
<b>Starter:</b>	<b>Mounts in standard location</b>
<b>Stud &amp; bolt holes:</b>	<b>Blind tapped</b>
<b>Tapped Holes:</b>	<b>Std. English Thread &amp; Pitch</b>
<b>Timing chain / gears:</b>	<b>Std. BBC or +.400" Raised cam/Big M<sup>2</sup> (Cloyes 9-3647TX3, 9-3647TX9 or 9-3147A)</b>
<b>Timing Cover:</b>	<b>Gen IV / V stock 10 bolt cover or Dart +.400" Aluminum- cover P/N: 67240002 (Includes Gasket)</b>
<b>Torque Specs:</b>	<b>All ½" bolts – 100 ft lbs w/CMD #3 high pressure lube</b>
<b>Weight:</b>	<b>4.250" bore (280lbs) – 4.500" bore (260lbs) 4.600" bore (250lbs)</b>
<b>Block Prep Option:</b>	<b>Available for additional fee (Call)</b>



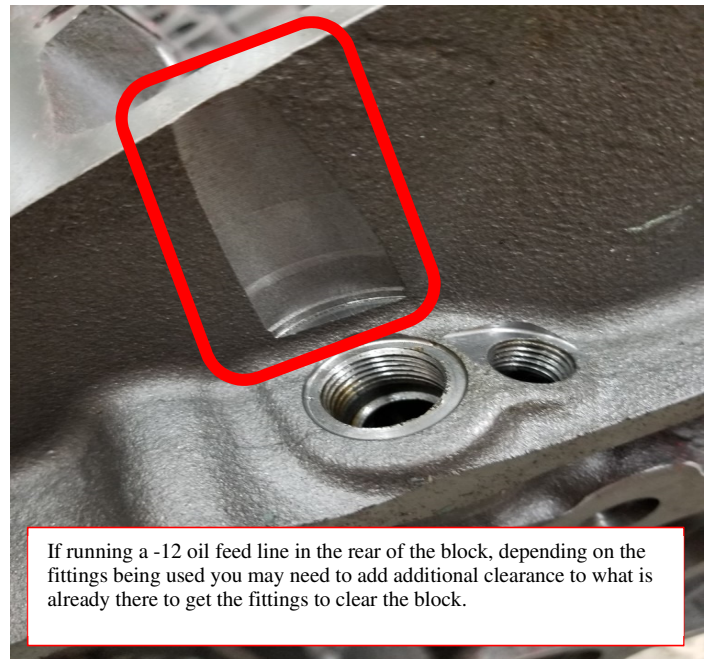
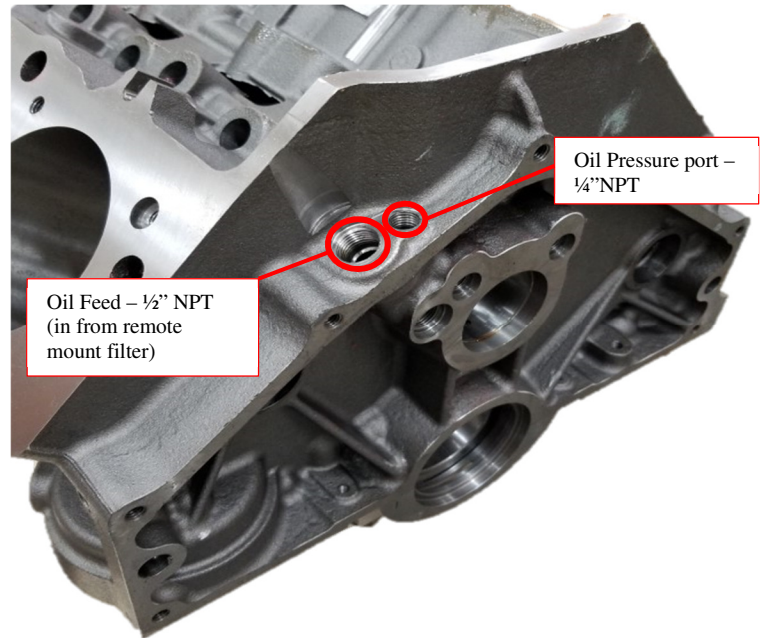
Big M Front



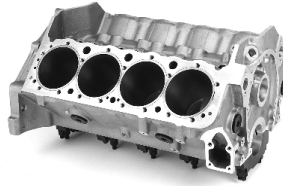
Big M Rear



Front Crossover



# 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 reduce rust.

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



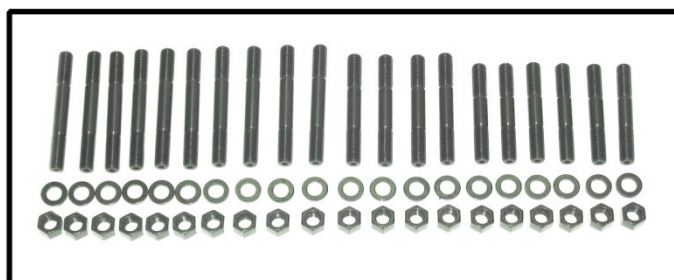
**Inside Head Stud Kit  
# 64210240**



**Assembly Lubricant  
# 7000009**



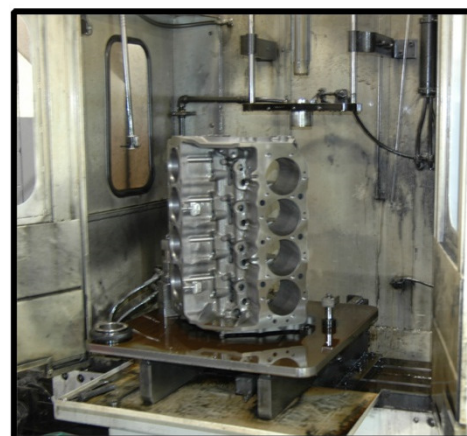
**Big M<sup>2</sup> block parts kit  
P/N: 3200022**



**Big M Main Stud Kit  
# 66311300**



**BBC Top End Kits  
# 0112005 - 01220010**



**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**

**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 is not always necessary but if you are getting minimal oil to the pushrods and rocker arms this will help to 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



Machining a small 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 fine tune the amount of oil going to the lifter oil galley, 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*