



# BIG "M" PRO IRON Big Block - Technical Notes

Deck Height	.....	9.600" & 9.800"
Bore	.....	4.500" unfinished
Main Bearing Size	.....	Standard BBC
Main Caps	.....	All 4 bolt – Billet Steel
Weight	.....	4.500" bore = 260lb
Largest Recommended Bore	.....	4.625"
Camshaft Bearing Diameter	.....	2.250" DRCE II
Camshaft Position	.....	Raised +.600"
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
Dart's inner head studs	3/8" – 7/16"	stepped	50	ft lbs

Standard BBC oil filter is used.

DRCE II Raised +.600" timing chain, timing cover, gear or belt drive can be used.

Actual deck height will be .005"- .010" taller for additional machining requirements.

Donovan spread pan rails (.750") spread oil pan must be used.

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.

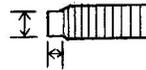
Head stud holes are blind. They do not go into the water jacket.

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 rear cam plug dia = 2.500"

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.

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 with .904" diameter.

Oil pump dowel pins should be .250" OD. Stock GM pins are only .246" OD.

We recommend using Fel-Pro# 1037, 1047 or 1067 head gaskets with the Big M block based on bore size.

## 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 torquing all other head studs or bolts.

**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 1/4" 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.


**Dart Big "M" Pro Block**

<b>Part#</b>	31283435 thru 31293445
<b>Material:</b>	Superior iron alloy
<b>Bore:</b>	4.500" - 4.600" with 4.840" bore space
<b>Bore Spacing:</b>	4.840"
<b>Bore &amp; stroke:</b>	4.625" x 4.500" max recommended
<b>Cam bearing bore ID:</b>	2.250"
<b>Cam Journal OD:</b>	2.125"
<b>Cam bearings:</b>	Special coated, grooved, w/3 oil holes
<b>Cam Bearing O.S.</b>	+ .010", +.020", +.030"
<b>Cam bearing press:</b>	.002"
<b>Camshaft position:</b>	Raised .600"
<b>Cam Drive:</b>	DRCE II Timing chain, Gear drive or Belt drive
<b>Cam Plug:</b>	2.500" dia. Pioneer# EPS-191-10
<b>Cubic inch:</b>	604 max recommended
<b>Cylinder Wall Thickness:</b>	.300" min @ 4.625" bore
<b>Deck Height:</b>	9.600" & 9.800"
<b>Deck Thickness:</b>	Adequate for all applications
<b>Fuel Pump:</b>	Mechanical pump provision
<b>Fuel Pump Pushrod:</b>	Must be measured
<b>Freeze Plugs:</b>	Press in cup plugs 1.500" O.D
<b>Inner Head stud:</b>	2 or 4 slotted bosses per side
<b>Lifter Bores:</b>	BBC .904" dia.
<b>Lifter Boss:</b>	Raised .350" for longer lifter bore
<b>Lifter type:</b>	Roller or Gen VI (+.300 longer), Solid – Mark IV
<b>Main bearing size:</b>	Standard BBC
<b>Main bearing bore:</b>	2.937" – 2.938"
<b>Main caps:</b>	Steel Billet - 4 bolts, all
<b>Main cap register:</b>	Deep stepped register on each side (No need for dowels)
<b>Main cap press:</b>	.004"-.005"
<b>Main cap Bolts:</b>	All are 4-bolt ½", #2, #3, #4 have splayed outer bolts
<b>Oil Galley, main:</b>	Stepped, 9/16" - ½" - 7/16"
<b>Oil Galley, filter-main:</b>	5/8"
<b>Oil Filter:</b>	Relocated Oil Filter location
<b>Oil Pan:</b>	Donovan pan bolt pattern (spread pan rails .750")
<b>Oil Pump Shaft:</b>	Moroso #22072 (Overall length 7.353")
<b>Oil System:</b>	Wet or Dry Sump - Main Priority Oiling
<b>Rear Main Seal:</b>	STD 2 pc seal / Fel-Pro# 2918
<b>Rear Main thrust width:</b>	1.622"- 1.624"
<b>Serial Number:</b>	On main caps
<b>Starter:</b>	Mounts in standard location
<b>Stud holes, Head:</b>	Blind holes
<b>Timing chain/gears:</b>	DRCE (+.600")
<b>Timing Cover:</b>	DRCE
<b>Torque Specs:</b>	All ½" bolts - 100 lbs
<b>Weight:</b>	9.600" @ 4.600 =                      9.800" @ 4.600 =

# Honing Procedures for



- **HONING OIL** Sunnen MAN 845-55
- **SPEED & FEED** CK-10 (C&E) Pulleys  
CV-616 185 rpm 50 strokes per minute
- **HONING**
  - 1) Rough .003" from size Sunnen C30A-25
  - 2) 220 to size Sunnen C30A-55
  - 3) 280 3 strokes Sunnen C30J-65
  - 4) 400 3 strokes Sunnen C30J-85
- **REHONE (deglaze)**
  - 1) 220 3 strokes Sunnen C30A-55
  - 2) 280 3 strokes Sunnen C30J-65
  - 3) 400 3 strokes Sunnen C30J-85

- RA should be 10 - 24

- **SHOE ASSEMBLY TECHNIQUE**

Titanium or hard shoe (part# CK-3570) from Sunnen on one side of honing head.

Delron (hard nylon) attached to brass shoe holder & trimmed to size on other side.  
(Delron bars can also be purchased from your local plastic supplier)

**\*\*\* DO NOT use bronze shoe \*\*\***

- **FRESH OIL IS CRITICAL**

These are only recommended procedures we have developed through our Pro Stock program. Some engine builders have their own procedures for honing our blocks.

**All supplies from Sunnen Products**

# 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.

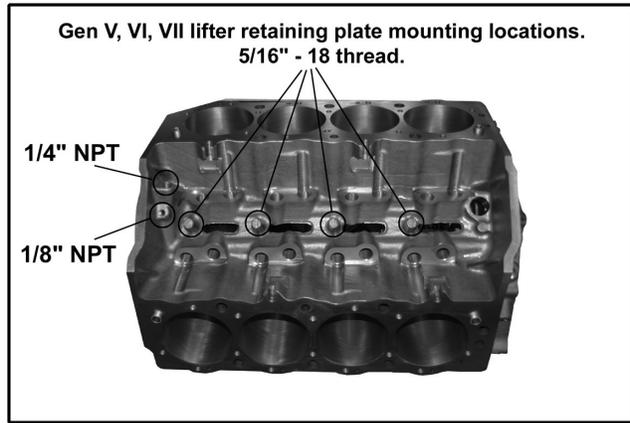
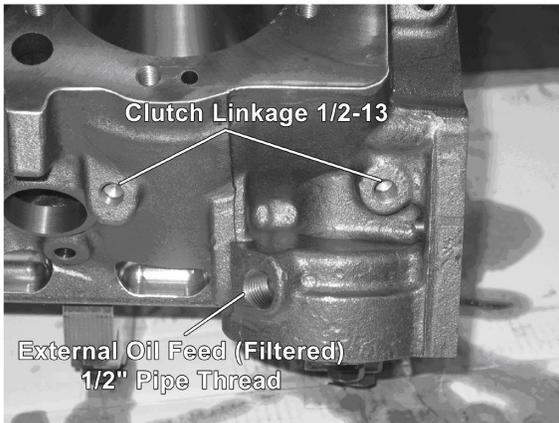
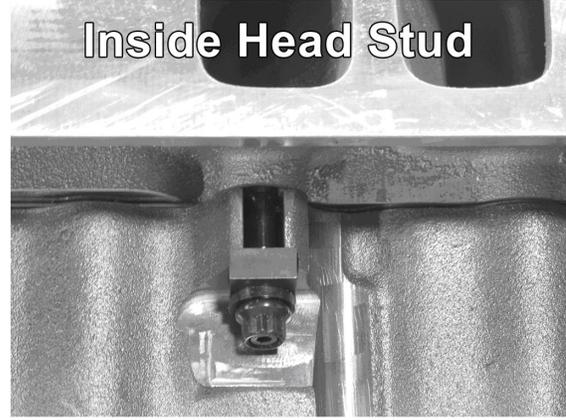
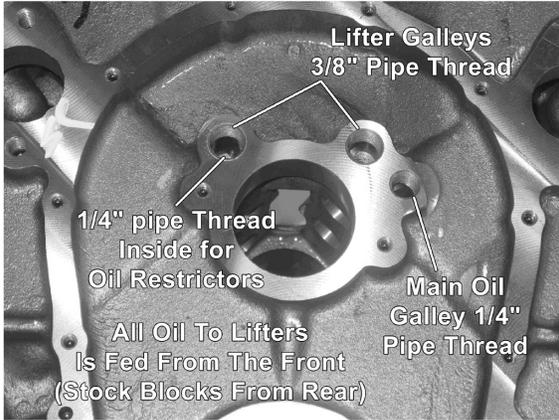
Prior to machining and assembly please inspect the following items:  
Cylinder bores - Oil passages - Deck surfaces - All threads

## MEASURING & MACHINING

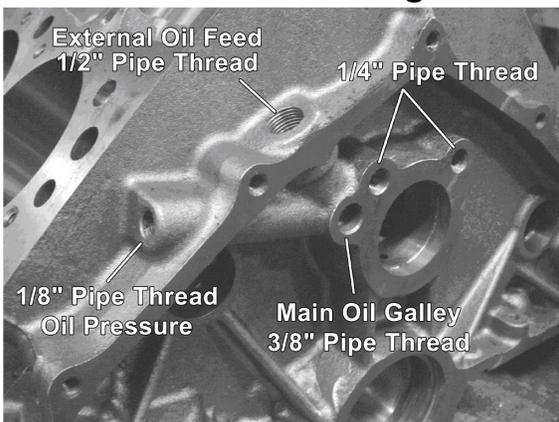
- ❑ All initial measuring should be done before any machining has begun.
- ❑ Decks are CNC machined to standard deck heights. If you need a particular deck height always measure before machining.
- ❑ Main journals are finish line honed to the low to middle of the specification. They should be measured 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

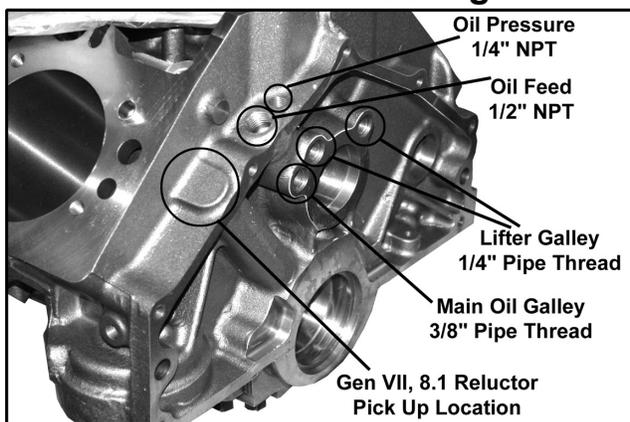
- ❑ Final washing should be very thorough, paying particular attention to all oil galleys. Use hot soapy water and rinse with hot water first, followed by cold water which helps reduce rust.



**Pre-2011 Casting**



**Post 2011 Casting**



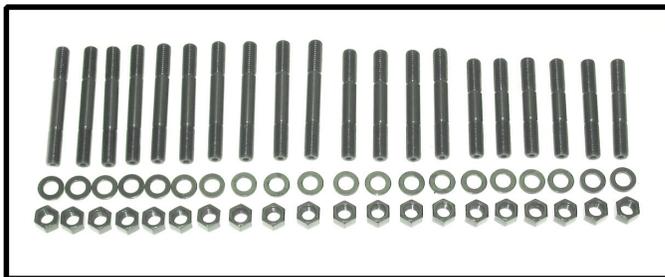
**Make Sure You Have Everything You Need For Your New Block!**



**Inside Head Stud Kit  
# 64210240**



**Assembly Lubricant  
# 7000009**



**BBC Aluminum 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**

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**Dart Machinery 248-362-1188**

**www.DartHeads.com**