

# DART Iron Small Block - *Technical Notes*

Deck Height	.....	9.025"
Bore	.....	4.00" or 4.125" unfinished
Main Bearing Size	.....	350 (2.45") 400 (2.65")
Weight	.....	205 lbs
Largest Recommended Bore	.....	4.185"
Camshaft Bearing Diameter	.....	SBC - 2.00"
Camshaft Position	.....	Standard SBC
Cylinder Wall Thickness, min.	.....	.275" @ 4.185" bore
Deck Thickness, min	.....	.675"

Torque Specs - Main Caps w/thread lube	1 - 5	7/16" bolts	65 ft lbs
	1 & 5	3/8" bolts	35 ft lbs

Blocks with cam shaft diameters above 50mm require the use of Dart lifter bushings.

Early stock SBC 2 hole oil filter adaptor is needed.

Standard SBC timing chain, timing cover, gear or belt drive can be used.

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

Standard SBC oil pan can be used.

Cam bearing OD should be deburred before installation.

When initially removing main caps, the caps & block should be deburred before reinstalling. This will insure that correct main size is maintained.

Standard SBC head studs or bolts may be used.

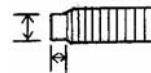
Head stud holes are blind. They do not go into the water jacket.

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 = 2 3/8".

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

The block is machined for a left hand dipstick. The boss is provided for a right hand dipstick but it must be drilled if needed.

**Dipstick Tube installation:** If an oil dipstick tube is used, after installation, fill the engine with oil and remark the dipstick indicator Full mark if necessary. In certain applications you may need to modify or bend tube to properly install it. The tube is a press fit.

Recommended part# - Indicator (dipstick) - GM# 14094756 Tube - GM# 14075615

**Honing:** Hone block to finished size with 220 grit @ 40 amps of load on sunnen hone.

Make 3 strokes on each cylinder with 280 grit @ 20 amps.

Make 3 strokes on each cylinder with 400 grit @ 20 amps.

When rehonon start with 220 grit, get cylinder straight and round or just deglaze. Then do same procedure as above.

## OIL PUMP DRIVESHAFT

On blocks with 400 main size you **MUST** use a 400 oil pump shaft which has a diameter of .425". If you are using an after market HD shaft or a 350 shaft, which are .481" diameter, you **MUST** machine the center of the shaft to .425" to clear the hole in the block. If this is not done, you may experience oil pump and/or distributor gear problems. The 400 main blocks have a hole .062" smaller than a 350 so the shaft hole will not break through to the rear main bore.

**Note:** Be sure to check distributor to oil pump shaft clearance with distributor, intake manifold and oil pump installed on block.

### **DRY SUMP SYSTEM**

If a dry sump oiling system is used you must plug the inlet hole in the rear main cap or the hole in the block underneath the rear main cap.

Block has threaded inlets for dry sump oil feed in front or rear of block.

Block has boss provided for dry sump scavenge in the valley area. Hole must be drilled & tapped for valley scavenging.

### **PRIORITY MAIN OIL SYSTEM**

Oil feed can be directed through the front or the rear oil inlet.

Oil is directed to the main bearings first, then to the cam bearings.

If lifter oiling is restricted, restrictors must be installed in the front and rear lifter galleys to prevent oil from bypassing and feeding from opposite end.

**NOTE:** If a high volume oil pump is used it is highly recommended to restrict the oil feed to the top of the engine.

**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.

### **FOR ADDITIONAL INFORMATION SEE DIAGRAM**

**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.

**OIL PANS:** Most GM & aftermarket oil pans should fit on this block. Due to the massive size of our front & rear main caps we have machined the corners of the caps for oil pan clearance but with some oil pans you may still experience clearance problems. This will require additional machining or grinding on the corner of the cap. Oil pan clearance should be checked before assembly.

**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.

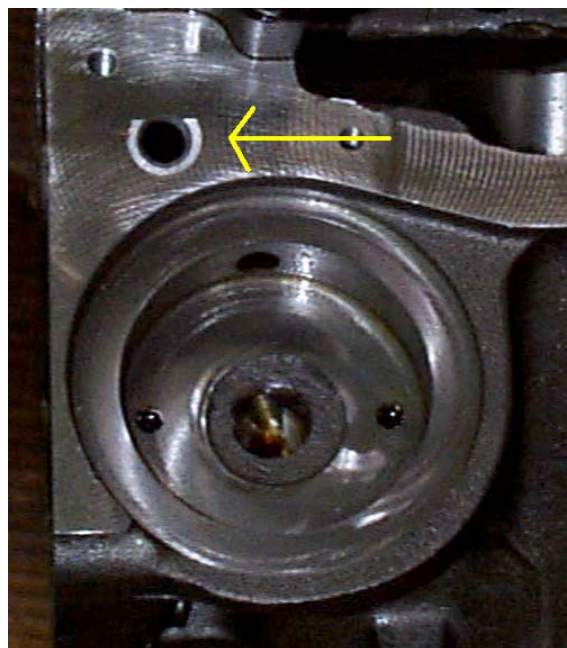
### **We Also Stock Parts for this Block.**

Belt Drive assembly

67120001

Head Stud Sets (specify cyl head type)

**NOTE:** Be sure to plug this oil feed hole in block.



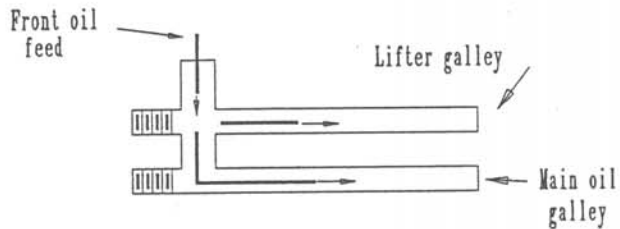
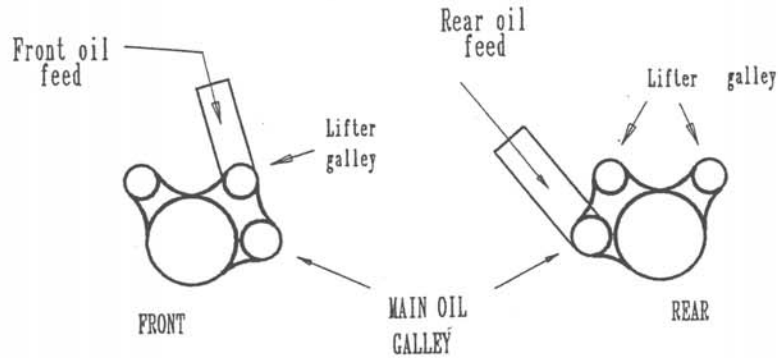
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**Dart**  **SBC Iron Block**

<b>Part#</b>	31131111 / 31131211 / 31132211
<b>Material:</b>	Superior iron alloy
<b>Bore:</b>	4.00" or 4.125" unfinished
<b>Bore &amp; stroke:</b>	4.185" x 3.875" max recommended
<b>Cam bearing bore ID:</b>	SBC - 2.00"
<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>Cam journal OD:</b>	Standard SBC - 1.869"
<b>Cam Plug:</b>	2.375" dia. cup plug
<b>Cylinder Wall Thickness:</b>	.275" min @ 4.185" bore
<b>Deck Height:</b>	9.025"
<b>Deck Thickness:</b>	.675" min.
<b>Fuel Pump:</b>	Mechanical pump provision
<b>Fuel Pump Pushrod:</b>	Standard Length
<b>Freeze Plugs:</b>	Press in cup plugs
<b>Lifter Bores:</b>	SBC .8427" - .8437"
<b>Main bearing size:</b>	2.450" (350) 2.650" (400)
<b>Main bearing bore:</b>	(350) 2.6405 – 2.6415 (400) 2.8405 – 2.8415
<b>Main Cap Bolts:</b>	#1 7/16" (2) 3/8" (2) #2, #3, #4 7/16" (2) 7/16" splayed (2) #5 7/16" (2) 3/8" (2)
<b>Main cap press:</b>	.005"
<b>Main caps:</b>	Steel - 4 bolt, all 5
<b>Main cap register:</b>	Deep stepped register on each side (no need for dowels)
<b>Oil system:</b>	Wet Sump - Main Priority Oiling (can use dry sump)
<b>Oil Pump shaft:</b>	350 main = Stock shaft (.481"OD) 400 main = Stock shaft (.425"OD) <i>MUST</i> machine aftermarket shaft
<b>Oil Filter:</b>	Standard SBC filter, uses 2 bolt filter adapter
<b>Oil Pan:</b>	Standard SBC oil pan
<b>Rear Main Seal</b>	350 main - std seal / 400 main - FelPro# 2909
<b>Serial No.</b>	Left front & main caps
<b>Starter:</b>	Standard SBC
<b>Stud holes, Head:</b>	Blind holes
<b>Timing chain/gears</b>	Standard SBC components
<b>Timing Cover:</b>	Can use stock cover / Magnesium w/ pump provision avail.
<b>Torque Specs:</b>	1-5 7/16" bolts - 65 ft lbs 1 & 5 3/8" bolts - 35 ft lbs
<b>Weight:</b>	205 lbs @ 4.00" bore

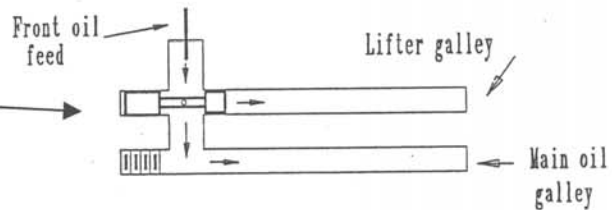


## ALUMINUM & CAST IRON BLOCKS



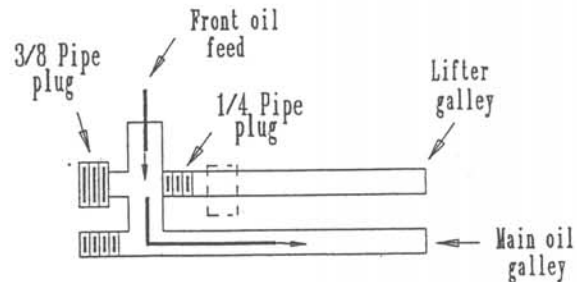
### NOTE

Conventional restrictor will block Main oil feed before it reaches the main oil galley. This could restrict oil supply to main oil galley.



### SOLUTION

1/4" pipe plug can be drilled for desired flow to lifters. Plugs should be installed flush so they don't restrict oil flow in the passage.



All threaded plug holes in blocks are National Pipe thread and use tapered pipe plugs. We recommend using female allen socket plugs. Various length plugs are available from Pioneer for adjusting the depth of the plug.

### Pioneer Automotive Parts - pipe plugs

1/4" NPT (restrictors)	PP584	.325" OA	3/8" NPT (outer)	PP554	.375" OA
	PP625	.333"		PP560	.410"
	PP567	.375"		PP637	.460"
	PP507	.460"			

# 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.

# 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 26 - 28

- **SHOE ASSEMBLY TECHNIQUE**

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

Delrin (engineering plastic) attached to brass shoe holder & trimmed to size on other side. (Delrin 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**

