# Ford Flathead V8 Assembly Instructions



#### **Recommended Tools**

Assortment of drill bits. Small metric or numbered assortment.

Pin vise for drill bits

M3 Tap

Hacksaw and dremel with cut off wheel

Super Glue - Thin and Medium Gap Filling

Thread Locker

Small file set

Sand Paper

Allen keys. 1.5, 2, and 2.5mm. Best to have ball end

Lubricant for cam lobes. Recommend SuperLube grease

Soldering Iron for electronics

Print 4mm drill stop.

Time....

#### **Flathead Non Printed Parts List**

Part	Quantity Needed
M2 x 5mm SHCS	18
M3 x 5mm SHCS	8
M3 x 8mm SHCS	31
M3 x 12mm SHCS	24
M3 x 20mm SHCS	8
M3 x 25mm SHCS	3
M3 x 30mm SHCS	2
M3 x 35mm SHCS	4
M3 x40mm SHCS	1
M3 x45mm SHCS (cut down to 38mm)	16
M3 x 50mm SHCS	2
M3 x 6mm Hex Screw	25
M2 x 4mm Set Screw	14
M3 x 4mm Set Screw	18
M3 x 8mm Set Screw	92
M2 Hex Nut	14
M3 Hex Nut	49
M3 Lock Nut	14
M3 Acorn Nut	48
M3 x 3mm Threaded Insert	54
3mm Washer	7
2mm x 200mm Round Rod	2
M3 x 200mm Threaded Rod	1
623ZZ Bearing	8
6700ZZ Bearing	16

6701ZZ Bearing	12
.36" OD 0.31" ID .825" L Spring	16
4mm x 2mm Disc Magnet	110
7 Feet 12 AWG Solid Core Wire	1
Black Rubber Band #33	1
Black Rubber Band #117B	1
Variable Speed controller	1
500 RPM Geared DC Motor	1
12V 1A Power Supply	1
DC Male dongle	1
DC Female Panel Mount Jack	2

#### **Non Printed Parts Locations**

Part	Quantity	Location	Notes
Crankshaft Assembly			
M3 x 50mm SHCS	1	Front Main Journal/Pulley Bolt	
M3 x 35mm SHCS	4	Connecting rod journal	May need to cut down to 34mm
M3 x 25mm SHCS	1	Center main journal	Cut down to 23mm
M3 x 40mm SHCS	1	Rear main journal	
M3 x 6mm Hex Screw	4	Flywheel to Rear main	
M3 Hex Nut	7		
M3 x 3mm Threaded Insert	10	Rear main and Flywheel	
19mm Long 2mm Rod	1	Front Main Indexing Pin	Cut from remainder of 200mm rod used on camshaft
24mm Long 2mm Rod	1	Center Main Indexing Pin	Cut from 200mm rod
30mm Long 2mm Rod	4	Connecting Rod Journal Indexing Pin	Cut from 200mm rod
37mm Long 2mm Rod	1	Rear Main Indexing Pin	Cut from 200mm rod
6700ZZ Bearing	16	Connecting Rod Bearings	
6701ZZ Bearing	6	Main Crankshaft Bearings	
Piston Assembly			
M3 x 20mm SHCS	8	Wrist Pin	
M3 Lock Nut	8	Wrist Pin	
M3 x 3mm Threaded Insert	16		
M3 x 12mm SHCS	16	Bearing cap	

Camshaft Assembly			
187mm M3 Threaded Rod	1		Cut to length from 200mm rod
177mm Long 2mm Rod	1		Cut from 200mm rod
M3 Lock Nut	2		
6701ZZ Bearing	6		
Water Pump Assemblies			
M3 x 8mm SHCS	8		
M3 x 25mm SHCS	2	Pulley Shaft	
M3 Hex Nut	4		
M3 Lock Nut	2		
623ZZ Bearing	4	Pulley Bearings	
Valve Spring Assembly			
M3 x 45mm SHCS	16	Valve Stem	Cut down to 38mm
.28" ID .85" L Spring	16	Valve Spring	Custom made spring
M3 x 6mm Hex Screw	16	Valve lifter	
M3 x 8mm Set Screw	16	Valve guide retainer	
Cylinder Head Assemblies			
M3 x 6mm Hex Screw	4	Coolant outlet	
M3 x 8mm Set Screw	56	Head studs and Spark plug threads	
M3 Acorn Nut	48	Head nuts	
4mm x 2mm Disc Magnet	12		

Exhaust Header Assemblies			
M3 x 4mm Set Screw	12		
M3 Hex Nut	12		
4mm x 2mm Disc Magnet	12		
Lower Intake Manifold Assembly			
M3 x 8mm Set Screw	20		
M3 Hex Nut	20		
M3 x 3mm Threaded insert	2		
4mm x 2mm Disc Magnet	8		
Upper intake and Carb assembly			
M3 x 5mm SHCS	6	Carb to throttle body spacer	
M3 x 8mm SHCS	14	Upper intake manifold to lower intake manifold and throttle body spacer to upper intake manifold	
M2 x 5mm SHCS	10	Join two pieces of carb together	
Fuel Pump Assembly			
M3 x 8mm SHCS	2		
M3 x 12mm SHCS	2		
M3 x 6mm Hex Screw	1		

Fan Assembly			
M3 x 50mm SHCS	1	Fan pulley shaft	
M3 x 8mm SHCS	2	Mounting bolts to intake manifold	
M2 x 5mm SHCS	8	Cosmetic screws on fan	
3mm Washer	6	Use extras to space out pulley if needed	
623ZZ Bearing	2	Pulley bearings	
M3 Lock Nut	1		
Generator and mount assembly			
M3 x 30mm SHCS	1	Pulley shaft	
M3 x 8mm SHCS	2		
M3 x 3mm Threaded Insert	2		
3mm Washer	4	Use extras to space out pulley if needed	
M3 Lock Nut	1		
623ZZ Bearing	2	Pulley bearings	
Timing Cover Assembly			
M3 x 8mm SHCS	2		
M3 x 6mm Hex Screw	1		
M3 x 4mm Set Screw	5		
M3 Hex Nut	5		
4mm x 2mm Disc Magnet	21		
Spark Plug Assemblies			
4mm x 2mm Disc Magnet	8		
7" Long 12 AWG Solid Core Wire	2	Cylinders 1 and 5 Spark Plug Wire	Cut from 7 foot long section of wire
9" Long 12 AWG Solid Core Wire	2	Cylinders 2 and 6 Spark Plug Wire	Cut from 7 foot long section of wire
11" Long 12 AWG Solid Core Wire	2	Cylinders 3 and 7 Spark Plug Wire	Cut from 7 foot long section of wire

13" Long 12 AWG Solid Core Wire	2	Cylinders 4 and 8 Spark Plug Wire	Cut from 7 foot long section of wire
Oil Pan			
M2 x 4mm Set Screw	14		
M2 x Hex Nut	14		
4mm x 2mm Disc Magnet	10		
Starter assembly			
M3 x 30mm SHCS	1		
M3 x 8mm SHCS	1		
M3 x 5mm SHCS	2		
M3 Hex Nut	1		
M3 x 4mm Set Screw	1		
M3 x 3mm Threaded Insert	1		
Engine Block Assembly			
M3 x 12mm SHCS	6	Main Bearing Caps	
M3 x 3mm Threaded Insert	23	Water Pump holes, main bearings cap holes, bell housing	
4mm x 2mm Disc Magnet	47		
3mm fender washer	4	Bellhousing to engine stand (if using)	
Black Rubber Band #33	1	Fan belt	
Black Rubber Band #117B	1	Generator and water pump belt	
Variable Speed controller	1		
500 RPM Geared DC Motor	1		
12V 1A Power Supply	1		
DC Male dongle	1		
DC Female Panel Mount Jack	2		

#### **Printed Parts List**

Part Name	Quantity	Printing Notes	Final Print Height
Flathead V8 Engine Block	1	Print with support touching build plate @ 80 Degrees	
Main Bearing Cap	2		
Main Bearing Cap - Rear	1		
Cam Lobe 1	1	Higher print resolution for cam parts will make achieving proper cam length easier.	0.305" / 7.73mm
Cam Lobe 2	1		0.298" / 7.55mm
Cam Lobe 3	1		0.305" / 7.73mm
Cam Lobe 4	1		0.502 / 12.74mm
Cam Lobe 5	1		0.305" / 7.73mm
Cam Lobe 6	1		0.298" / 7.55mm
Cam Lobe 7	1		0.305" / 7.73mm
Cam Lobe 8	1		0.365" / 9.26mm
Cam Lobe 9	1		0.305" / 7.73mm
Cam Lobe 10	1		0.298" / 7.55mm
Cam Lobe 11	1		0.305" / 7.73mm
Cam Lobe 12	1		0.502" / 12.74mm
Cam Lobe 13	1		0.305" / 7.73mm
Cam Lobe 14	1		0.298" / 7.55mm
Cam Lobe 15	1		0.305" / 7.73mm
Cam Lobe 16	1		0.365" / 9.26mm
Cam bearing seat 1	1		0.508" / 12.9mm
Cam bearing seat 2	1		0.505" / 12.81mm
Cam bearing seat 3	1		.478" / 12.15mm

Bearing Retainer 1	1		0.163" / 4.13mm
Cam Gear	1		0.262" / 6.65mm
Crank Gear	1		.738" / 18.75mm
Crank Pulley	1	Best at high infill 80% Support Everywhere	
Crankshaft 1	1	Best at high infill 80% Support touching build plate	0.359" / 9.10mm
Crankshaft 2	1	Best at high infill 80% Support touching build plate	0.70" / 17.77mm
Crankshaft 3	1	Best at high infill 80% Support touching build plate	0.302" / 7.66mm
Crankshaft 4	1	Best at high infill 80% Support touching build plate	0.302" / 7.66mm
Crankshaft 5	1	Best at high infill 80% Support touching build plate	0.359" / 9.10mm
Crankshaft 6	1	Best at high infill 80% Support touching build plate	0.359" / 9.10mm
Crankshaft Connecting rod bearing surface	8	Best at high infill 80%	0.354" / 9mm
Crankshaft Rear Bearing Surface	1	Best at high infill 80% Support touching build plate	1.39" / 35.33mm
Crankshaft Center Bearing Surface	2	Best at high infill 80%	0.253" / 6.42mm
Flywheel	1		
Water Pump - Mirrored	1		
Water pump pulley	2		
Waterpump	1		
Valve Lifter	16		
Spring Retainer	16	Support touching build plate if needed	
Valve Guide	16		
Valve	16		
Piston	8	Best to print at higher quality	
Connecting Rod Bearing Cap	8		
Connecting Rod	8		
Cylinder Head	2	Support touching build plate. Make sure you support settings are set right for easy support break away.	
Spark Plug	8		

Timing Cover	1		
Distributor	1		
Distributor Cap - For Wires	1	Support touching build plate	
Intake Manifold	1		
Upper intake manifold	1		
Oil Breather Tube	1		
Mechanical Fuel Pump	1		
Carburetor - Lower	2		
Carburetor - Upper	2		
Throttle body spacer	2		
Air Filter Bottom	2		
Air Filter Media	2		
Air Filter Top	2	Support touching build plate	
Generator Cooling Fan	1		
Generator Pulley	1		
Generator	1		
Generator Bracket	1		
Cooling Fan	1	Print with wide brim	
Fan Bracket	1		
Fan pulley	1		
Exhaust Header - 1	1	Support touching build plate	
Exhaust Header - 2	1	Support touching build plate	
Oil Pan		Support not needed if your printer can bridge the gap. Break off small square support after printing.	
Oil Pan Starter Flange	1		
Starter Drive Gear	1		
Oil Pan - Front	1		

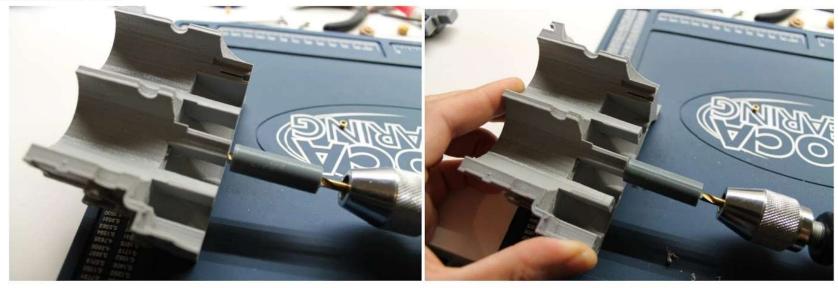
Spark Plug Boot - Hollow	8	Support touching build plate	
Spark Plug Boot	8	Support touching build plate	
Spark Plug Wire Holder -2	2		
Spark Plug Wire Holder - 3	2		
Spark Plug Wire Holder - 4	2		
Spark Plug Wire Holder - 4 - Square	2		

## How to install threaded inserts

Using a #20 drill bit or similar, set depth stop to slightly deeper than insert.



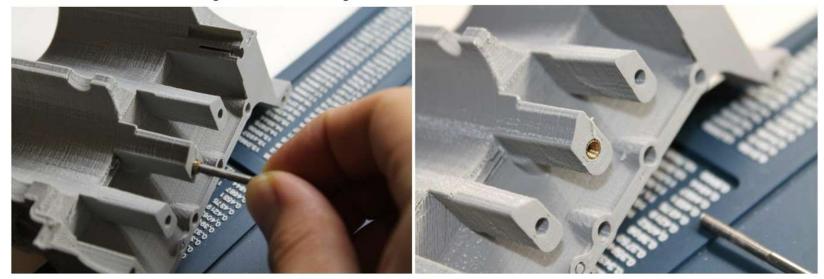
#### Drill out hole for insert



Using an M3 screw as a holder, apply super glue to the outside of the threaded insert. Medium build super glue works best. Tip: Grease can be applied to the threads of the screw to prevent super gluing the insert to the screw.



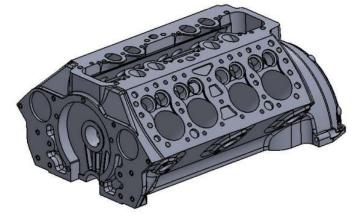
Install insert and remove screw. Making sure that insert is aligned with hole.

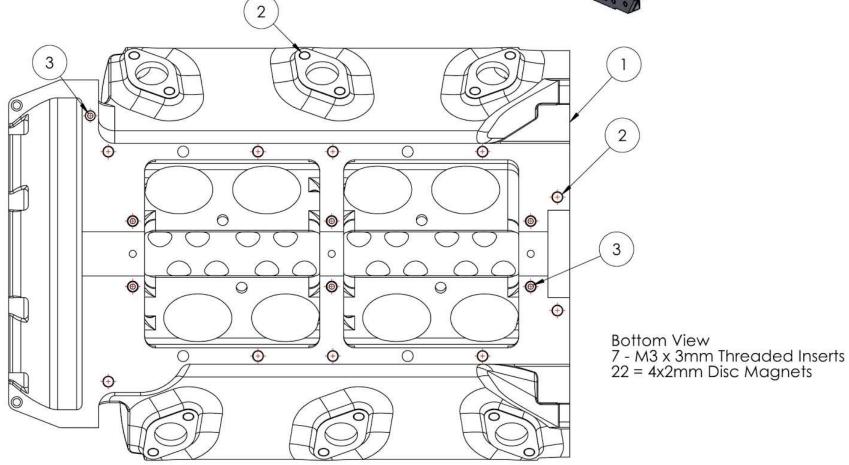


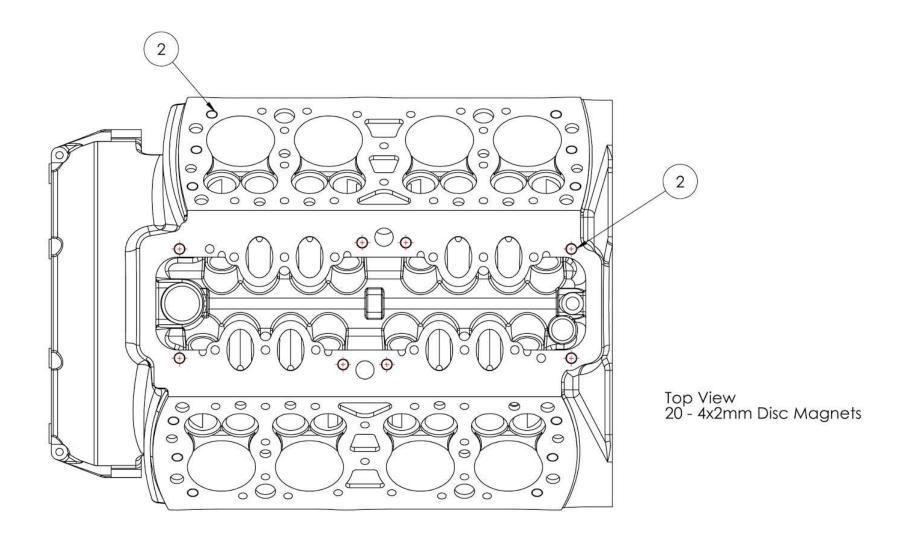
## **Block Assembly**

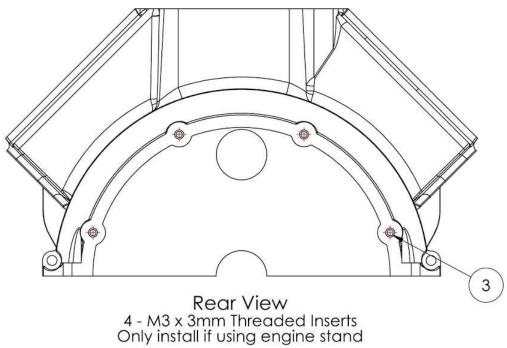
Inserts and Magnets

ITEM NO.	PART NUMBER	QTY.
1	Flathead V8 Engine Block	1
2	4mm x 2mm disc magnet	47
3	M3 x 3mm Threaded Insert	23

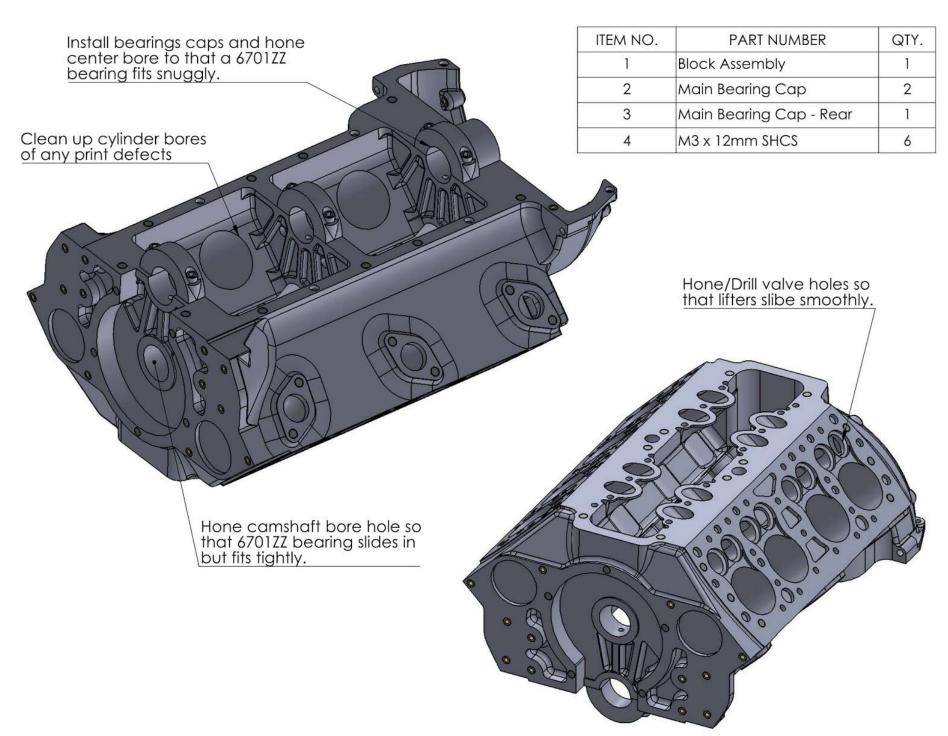








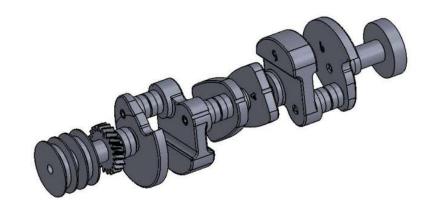
Front View 12 - M3 x 3mm Threaded Inserts 5 - 4x3mm Disc Magnets



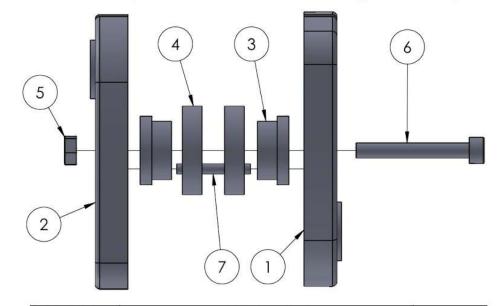
Crankshaft Assembly

PART NUMBER	QTY.
Crank Gear	1
Crank Pulley	1
Crankshaft 1	1
Crankshaft 2	1
Crankshaft 3	1
Crankshaft 4	1
Crankshaft 5	1
Crankshaft 6	1
Crankshaft Connecting rod bearing surface	8
Crankshaft Rear Bearing Surface	1
Crankshaft Center Bearing Surface	2
6700zz Bearing	16
6701zz Bearing	6
M3 Nut	7
M3 x 50mm SHCS	1
M3 x 35mm SHCS	4
M3 x 40mm SHCS	1
M3 x 23mm SHCS - Cut Down From 25mm	1
2mm x 30mm Rod	4
2mm x 35mm Rod	1
2mm x 15mm Rod	1
2mm x 24mm Rod	1

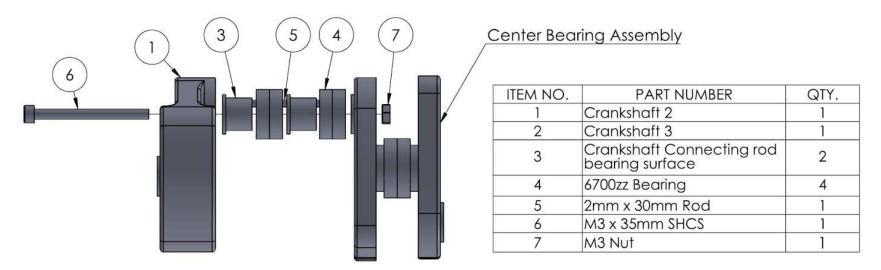
Note: Crankshaft can be glued together on final assembly for strength if desired.



Step 1: Center Main Bearing Assembly

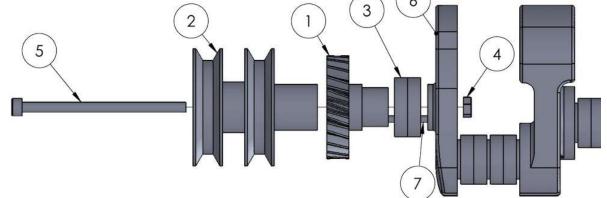


ITEM NO.	PART NUMBER	QTY.
1	Crankshaft 3	1
2	Crankshaft 4	1
3	Crankshaft Center Bearing Surface	2
4	6701zz Bearing	2
5	M3 Nut	1
6	M3 x 23mm SHCS - Cut Down From 25mm	1
7	2mm x 15mm Rod	1



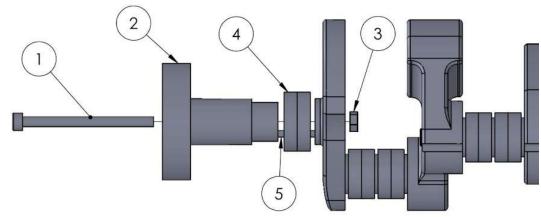
Step 2: Connecting rod bearing assembly. Repeat for other connecting rod bearings.

ITEM NO.	PART NUMBER	QTY.
1	Crank Gear	1
2	Crank Pulley	1
3	6701zz Bearing	2
4	M3 Nut	1
5	M3 x 50mm SHCS	1
6	Crankshaft 1	1
7	2mm x 24mm Rod	1

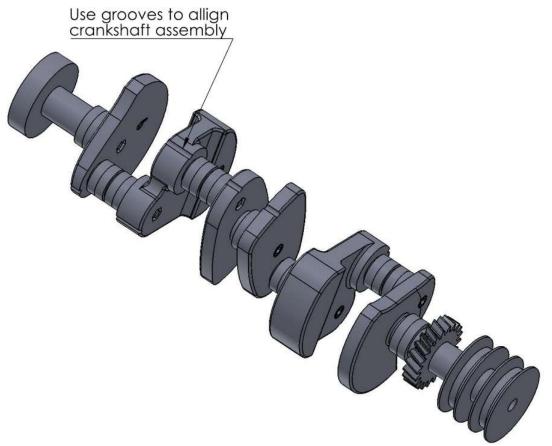


Step 3: Front Crank Gear Assembly

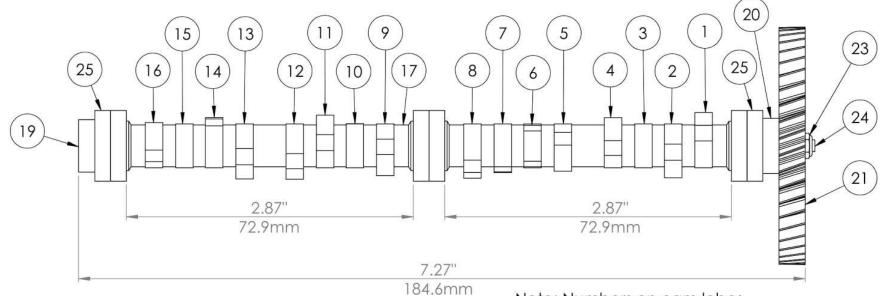
ITEM NO.	PART NUMBER	QTY.
1	M3 x 40mm SHCS	1
2	Crankshaft Rear Bearing Surface	1
3	M3 Nut	1
4	6701zz Bearing	2
5	2mm x 35mm Rod	1



Step 4: Rear Main Assembly



## **Camshaft Assembly**

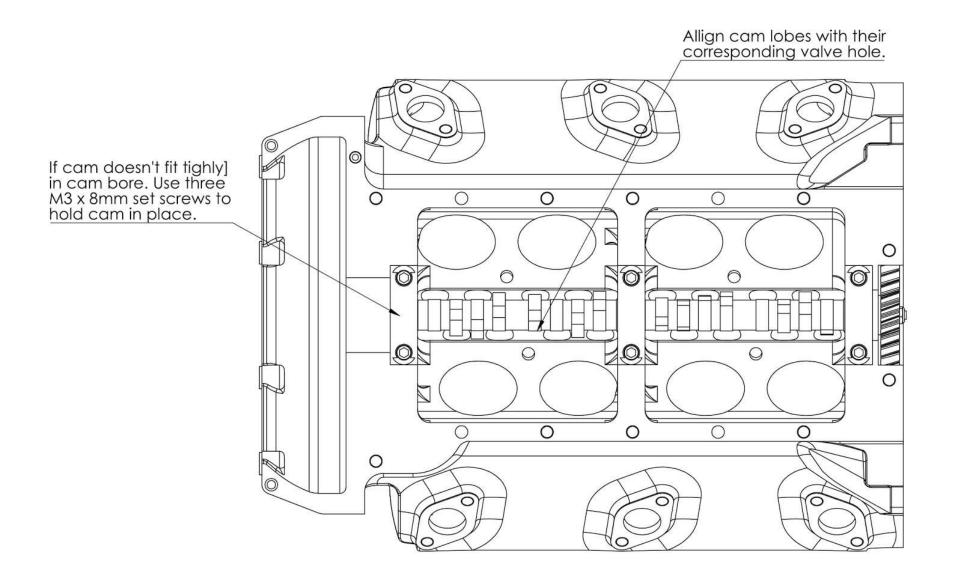


Note: Numbers on cam lobes should face towards front of cam. Glue together on final assembly. 2mm rod runs through camshaft to allign lobes.

ITEM NO.	PART NUMBER	QTY.
1	Cam Lobe 1	1
2	Cam Lobe 2	1
3	Cam Lobe 3	1
4	Cam Lobe 4	1
5	Cam Lobe 5	1
6	Cam Lobe 6	1
7	Cam Lobe 7	1
8	Cam Lobe 8	1
9	Cam Lobe 9	1
10	Cam Lobe 10	1
11	Cam Lobe 11	1
12	Cam Lobe 12	1
13	Cam Lobe 13	1

ITEM NO.	PART NUMBER	QTY.
14	Cam Lobe 14	1
15	Cam Lobe 15	1
16	Cam Lobe 16	1
17	Cam bearing seat 1	1
18	Cam bearing seat 2	1
19	Cam bearing seat 3	1
20	Bearing Retainer 1	1
21	Cam Gear	1
22	2mm x 177mm Rod	1
23	M3 Lock Nut	2
24	M3 x 187mm Threaded Rod	1
25	6701zz Bearing	6

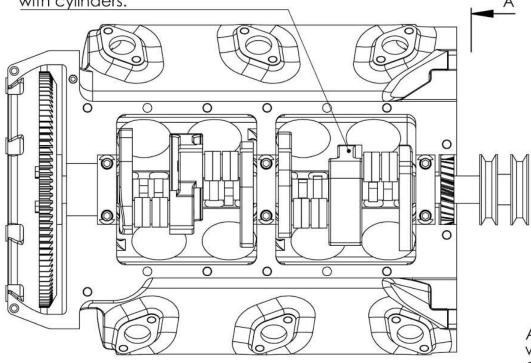
### **Cam Installation**

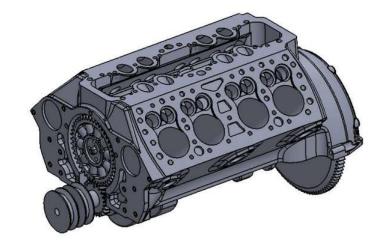


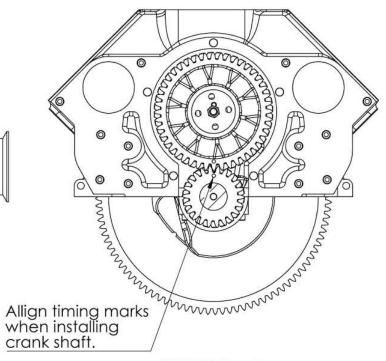
#### **Crankshaft Installation**

ITEM NO.	PART NUMBER	Default/QTY.
1	Block Assembly With Cams - 2	1
2	Crank Assembly With Flywheel	1

Allign crankshaft so it rotates freely with bearing caps installed.
Connecting rod journals do not have to be completely alligned with cylinders.





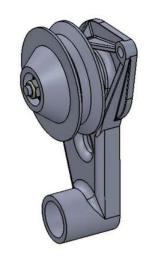


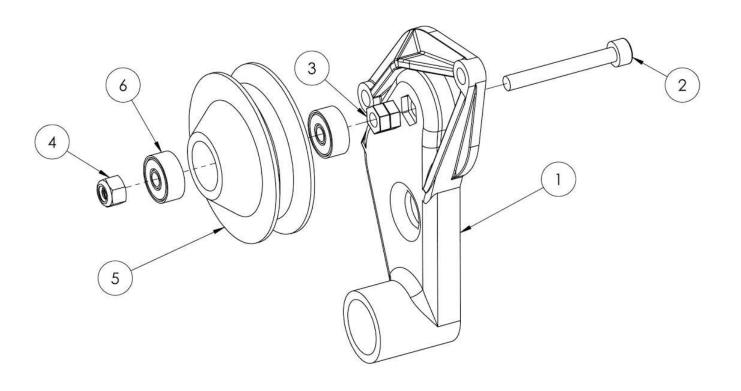




## **Waterpump Assembly**

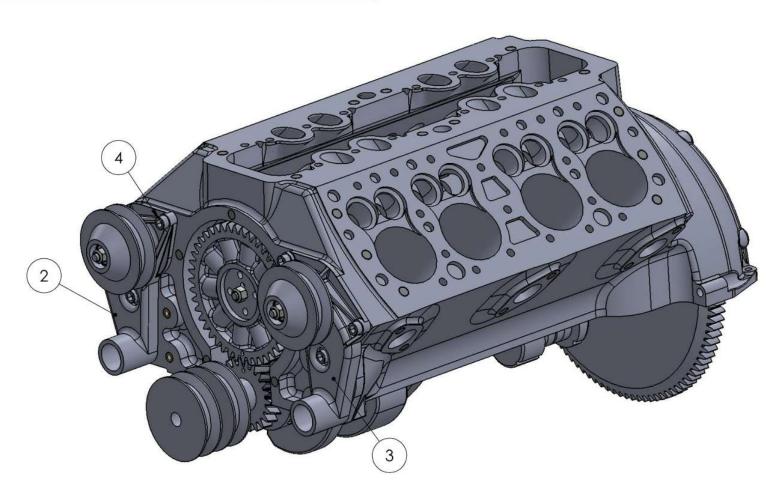
ITEM NO.	PART NUMBER	QTY.
1	Waterpump - Mirrored	1
2	M3 x 25mm SHCS	1
3	M3 Nut	2
4	M3 Lock Nut	1
5	Water pump pulley	1
6	623zz bearing	2





## **Water Pump Installation**

ITEM NO.	PART NUMBER	QTY.
1	Block Assembly With Crank	1
2	Passenger Side Water Pump Assembly	1
3	Driver Side Water Pump Assembly	1
4	M3 x 8mm SHCS	8

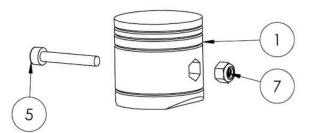


#### Piston Assembly

ITEM NO.	PART NUMBER	QTY.
1	Piston	1
2	Connecting Rod Bearing Cap	1
3	Connecting Rod	1
4	M3 x 3mm Threaded Insert	2
5	M3 x 20mm SHCS	1
6	M3 x 12mm SHCS	2
7	M3 Lock Nut	1

#### Valve Assembly

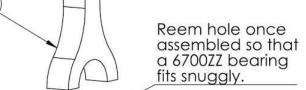
ITEM NO.	PART NUMBER	QTY.
1	Spring Retainer	1
2	Valve Guide	1
3	Valve Spring	1
4	Valve	1
5	M3 x 45mm SHCS Cut Down	1

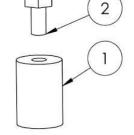


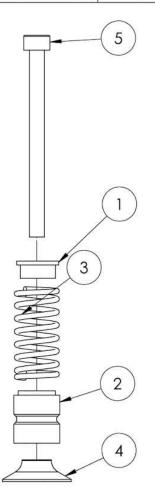
3

#### Lifter Assembly

ITEM NO.	PART NUMBER	QTY.
1	Valve Lifter	1
2	M3 x 6mm Hex Head Screw	1

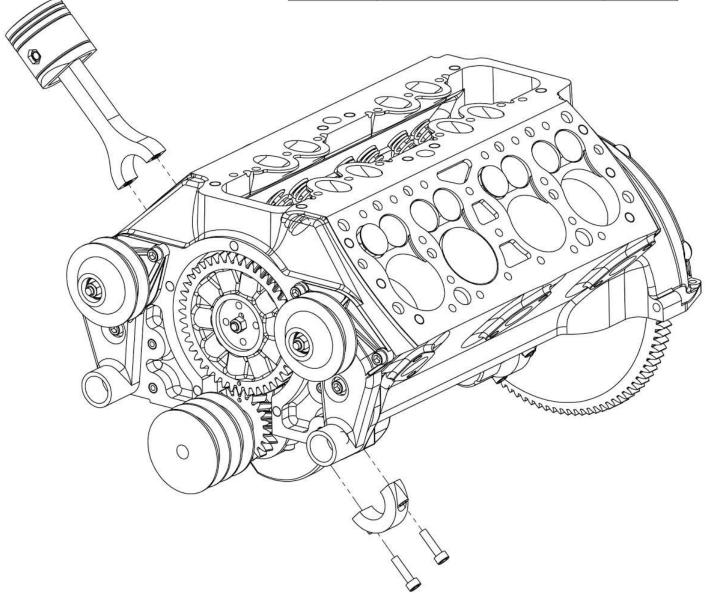






## **Piston Installation**

ITEM NO.	PART NUMBER	QTY.
1	Block Assembly With Valves - 6	1
2	Piston Assembly	8



## **Valve Installation**

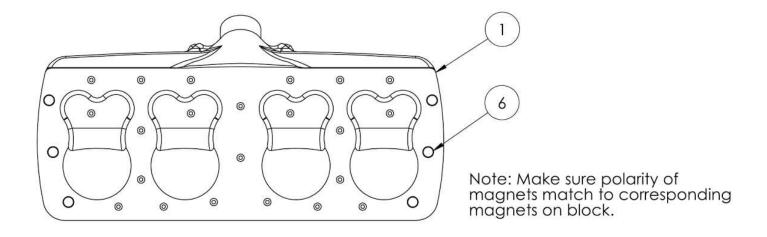
ITEM NO.	PART NUMBER	QTY.	
1	Block Assembly With Lifters - 4	1	
2	Valve Assembly	16	
3	M3 8mm Set Screw	16	Note: Install lifter with hex scre
4	Lifter Assembly	16	facing up before installing valve assembly.
Set	screw should allign with ove in valve guide.		

## **Head Assembly**

ITEM NO.	PART NUMBER	QTY.
1	Cylinder Head	1
2	M3 8mm Set Screw	28
3	M3 Acorn Nut	24
4	M3 x 6mm Hex Head Screw	2
5	Spark Plug	4
6	4mm x 2mm disc magnet	6

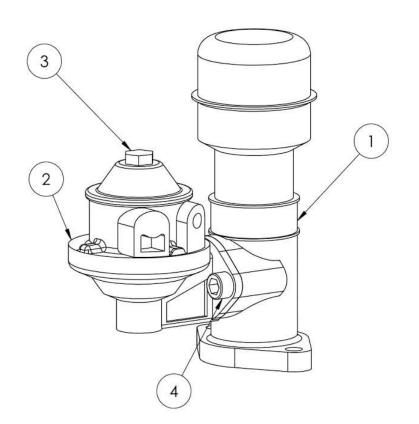
Note: Insert set screws into acorn nuts and spark plugs. Parts can be glued into head.





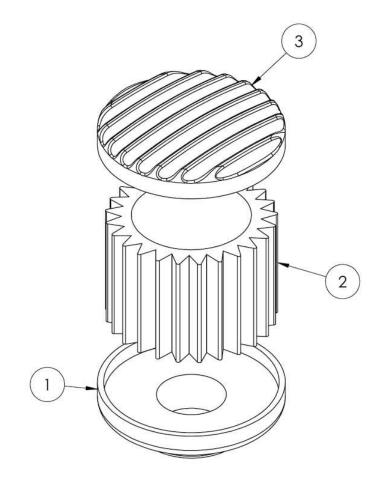
## **Fuel Pump Assembly**

ITEM NO.	PART NUMBER	QTY.
1	Oil Breather Tube	1
2	Mechanical Fuel Pump	1
3	M3 x 6mm Hex Head Screw	1
4	M3 x 8mm SHCS	2



## **Air Filter Assembly**

ITEM NO.	PART NUMBER	QTY.
1	Air Filter Bottom	1
2	Air Filter Media	1
3	Air Filter Top	1



## **Intake Manifold Assembly**

ITEM NO.	PART NUMBER	QTY.
1	Intake Manifold	1
2	4mm x 2mm disc magnet	8
3	M3 x 3mm Threaded Insert	2
4	M3 Nut	20
5	M3 8mm Set Screw	20
6	Upper intake manifold	1
7	M3 x 8mm SHCS	14
8	Carburetor - Lower	2
9	Carburetor - Upper	2
10	Throttle body spacer	2
11	M3 x 5mm SHCS	6
12	M2 x 5mm SHCS	10
13	M3 x 12mm SHCS	2
14	Air Filter Assembly	2
15	Fuel Pump Assembly	1
	(3)	
		-0
8 1v2mm	disc magnets on	0
underside	disc magnets on e of inatke manifold.	
Make sure	e polarity matches anding magnet on block.	
correspor	ding magner on block.	(5)

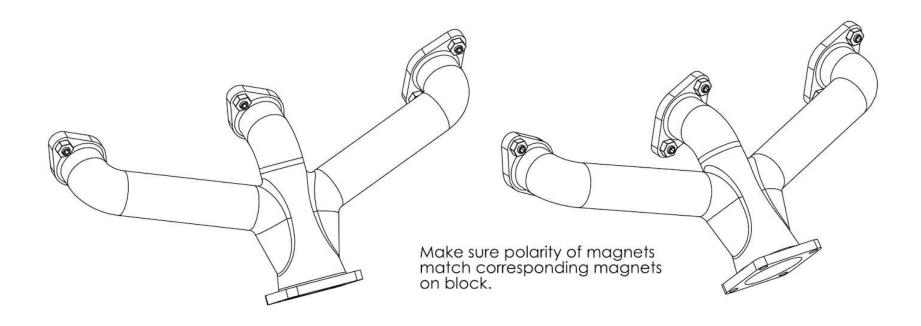
## **Header Assembly**

#### Passenger Side Assembly

ITEM NO.	PART NUMBER	QTY.
1	Exhuast Header - 2	1
2	4mm x 2mm disc magnet	6
3	M3 Nut	6
4	M3 4mm Set Screw	6

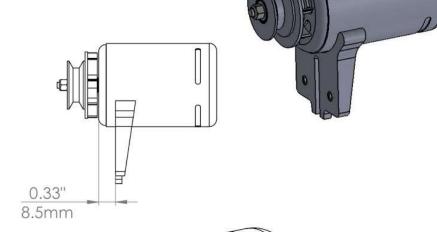
#### **Drivers Side Assembly**

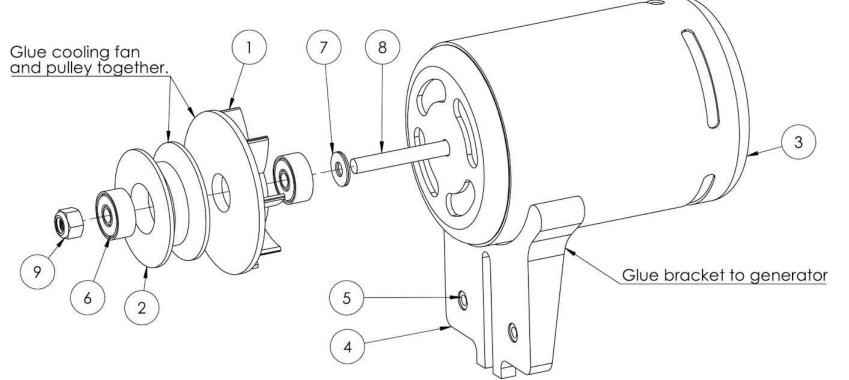
ITEM NO.	PART NUMBER	QTY.
1	Exhuast Header - 1	1
2	4mm x 2mm disc magnet	6
3	M3 4mm Set Screw	6
4	M3 Nut	6



## **Generator Assembly**

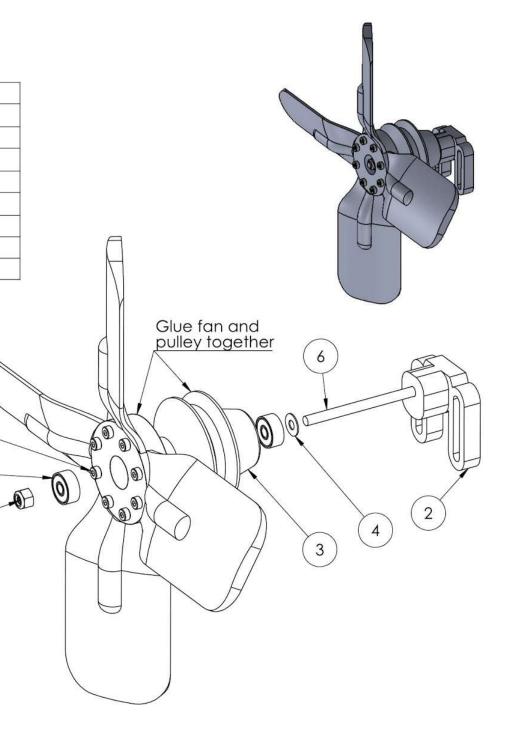
ITEM NO.	PART NUMBER	QTY.
1	Generator Cooling Fan	1
2	Generator Pulley	1
3	Generator	1
4	Generator Bracket	1
5	M3 x 3mm Threaded Insert	2
6	623zz bearing	2
7	3mm washer	2
8	M3 x 30mm SHCS	1
9	M3 Lock Nut	1





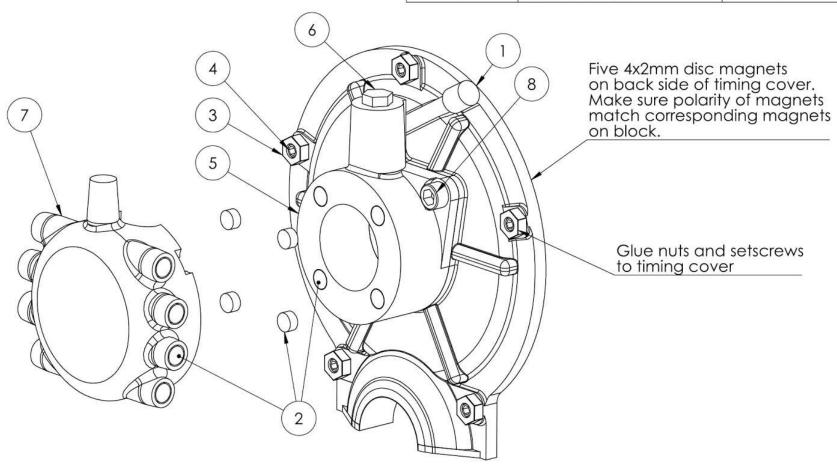
# Fan Assembly

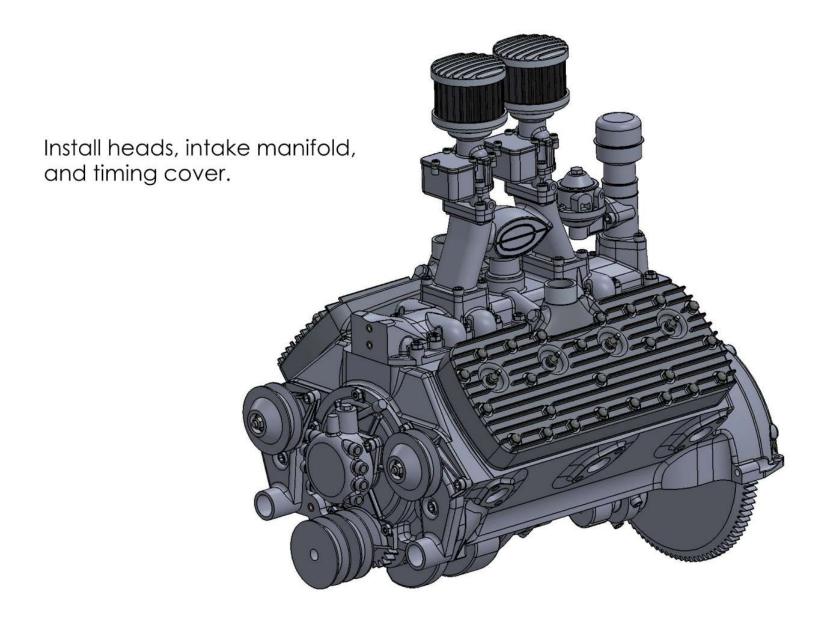
ITEM NO.	PART NUMBER	QTY.
1	1 Cooling Fan	
2	Fan Bracket	1
3	Fan pulley	1
4	3mm washer	1
5	623zz bearing	2
6	M3 x 50mm SHCS	1
7	M3 Lock Nut	1
8	M2 x 5mm SHCS	8



# **Timing Cover Assembly**

ITEM NO.	PART NUMBER	QTY.
1	Timing Cover	1
2	4mm x 2mm disc magnet	21
3	M3 Nut	5
4	M3 4mm Set Screw	5
5 Distributor 6 M3 x 6mm Hex Head Screw 7 Distributor Cap - For Wires 8 M3 x 8mm SHCS		1
		1
		1
		2





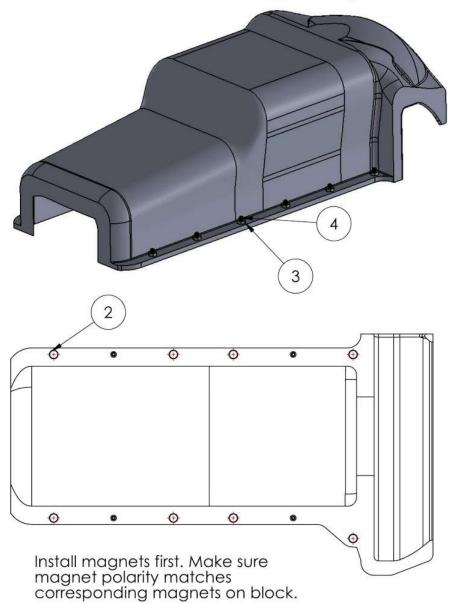
#### **Generator Installation**

ITEM NO.
1
2
3
4

#### Fan Installation

ITEM NO.	PART NUMBER	QTY.	
1	Block Assembly With Generator - 11	1	
2	Fan Assembly	1	
3	3mm washer	2	
4	M3 x 8mm SHCS	2	
	2		

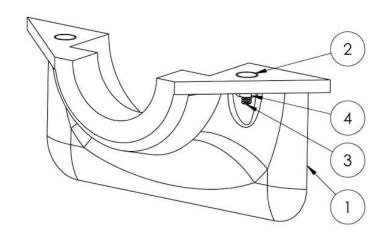
## Oil Pan Assembly



ITEM NO.	PART NUMBER	QTY.
1	Oil Pan	1
2	4mm x 2mm disc magnet	8
3	M2 Nut	12
4	M2 x 4mm Set Screw	12

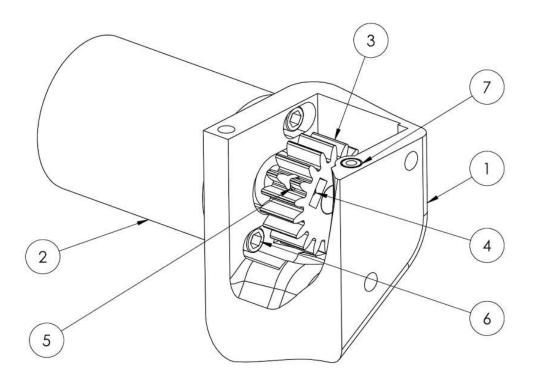
#### Front Oil Pan Assembly

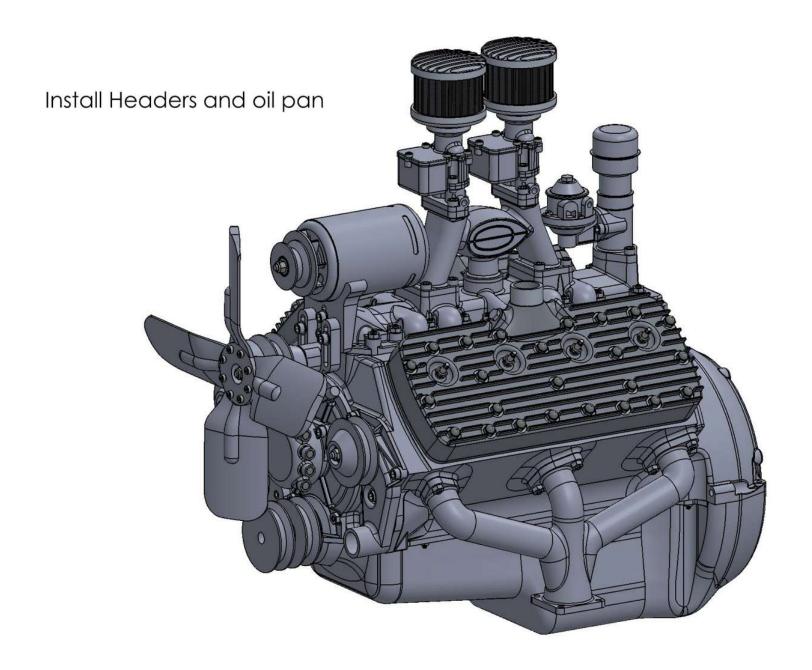
ITEM NO.	PART NUMBER	QTY.
1	Oil Pan - Front	1
2 4mm x 2mm disc magnet		2
3	3 M2 x 4mm Set Screw	
4	M2 Nut	2



# **Starter Motor Assembly**

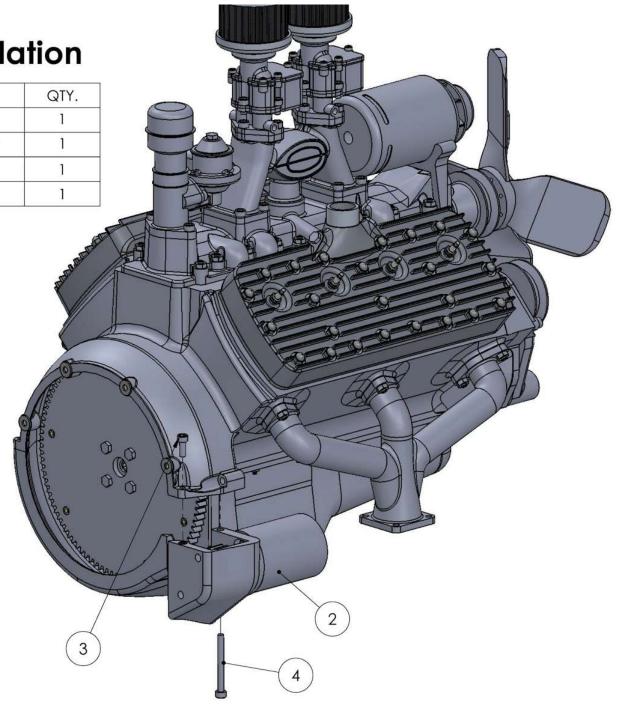
ITEM NO.	NO. PART NUMBER	
1	Oil Pan Starter Flange	1
2	500rpm geared motor	1
3	Starter Drive Gear	1
4	M3 Nut	1
5	M3 4mm Set Screw	1
6 M3 x 5mm SHCS		2
7	M3 x 3mm Threaded Insert	1





## **Starter Motor Installation**

ITEM NO.	PART NUMBER	QTY.
1	Block Assembly	ì
2	2 Start Drive Motor assembly	
3	3 M3 x 8mm SHCS	
4	M3 x 30mm SHCS	1



#### **Assembled Pictures**



