



PRECISION PERFORMANCE
SINCE 2008

TOTAL ENGINE SOLUTION FOR 1997-2008 PORSCHE®
MODELS WITH THE M96 AND M97 ENGINE

LN Engineering

Nickies + IMS Program

**Total Engine Solution for 1997-2008 Boxster,
Cayman, 911 models with the M96 and M97 Engine**



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Mission

LN Engineering seeks to provide innovative “no-compromise” solutions to the automotive aftermarket to exceed OEM requirements. We strive to deliver the highest level of precision performance for our products using improved material, manufacturing, and finishing technologies, all backed up by industry leading educational resources and support.

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Facility

We do all our machining and manufacturing in the USA in our 17,000 sq/ft facility, located one hour south of Chicago, IL.

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Quality

Every part made by LN Engineering undergoes stringent quality control inspections at multiple points during the manufacturing or reconditioning process to ensure the best possible outcome for our customer.





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Our Partners

LN Engineering offers premium performance parts designed to meet or exceed OEM requirements from industry leaders JE Pistons, CP Carrillo, Mahle Motorsport, and Total Seal.



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Shipping

Easy and secure shipping with trusted UPS and other freight partners minimizes time in transit which means less time waiting for your shipment with discounted rates that save you money.





Pre-Paid Shipping (US Only)

We make shipping easy. Pay one flat rate and we ship you a custom box to safely ship your block to us with our pre-paid shipping label.

Price includes return shipping for your entire order!





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Why rebuild rather than replace?

- **New complete engines are not available from the factory.**
- **OEM short block program is cost prohibitive and do not address cylinder and IMS problems.**
- **Used engines are expensive and may already have unknown cylinder or IMS issues.**
- **When upgraded with Nickies, performance and reliability is improved.**



Why LN Engineering?

- **Proven M96 Nickies sleeves and IMS kits since 2008.**
- **Increase displacement for improved performance without sacrificing reliability.**
- **No ECU tuning is required. Will not affect emissions.**
- **Assemble with factory tools and parts.**
- **Other fixes are temporary. Nickies are permanent.**
- **IMS Solution is designed to last a lifetime.**



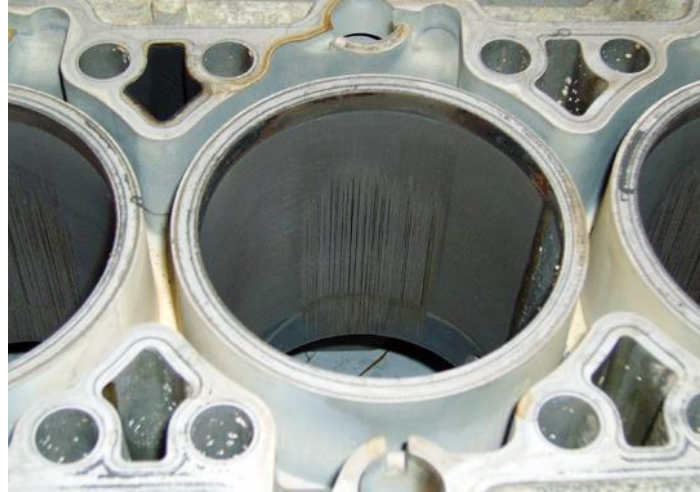
Cylinder Failures We Fix

- **Slipped Sleeve:** Blocks sleeved from the factory have sleeve move and separate from engine case.
- **D-Chuck:** Cylinder forms crack which spreads to bottom of water jacket before returning to the top of the deck, resulting in a D-shaped crack.
- **Scoring:** Failure of piston skirt coating or Lokasil bore resulting in galling of piston skirt and bores.
- **Ovality/Taper:** Bores with more than .002" taper or ovality cannot be successfully re-ringed.

D-Chunk



Slipped Sleeve



Scored Bores



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Nickies

- **Even if bores have no visible damage, they are not round.**
- **If bores are not scored or cracked now, that doesn't mean they won't fail in the future, so sleeving single cylinders is not an option.**
- **Failure of factory iron-clad piston skirt coating leads to bore scoring when aluminum pistons contact the Lokasil aluminum bore.**
- **Reusing original components and re-ringing is risky.**



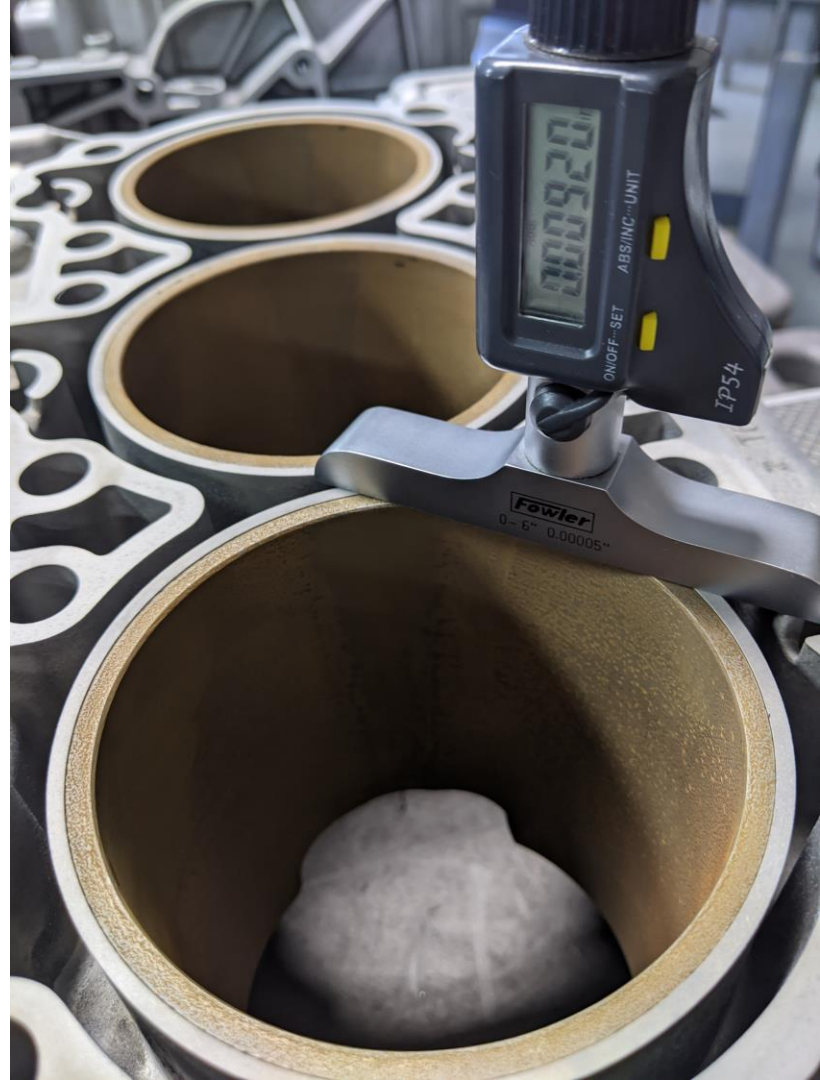
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Nickies

Nickies all-aluminum sleeve prevent dissimilar metal corrosion that occurs when steel sleeves are fitted to aluminum blocks.

Dissimilar expansion rates require significant interference fit that can crack the block. If not, steel sleeves can and do drop or rotate causing intermix and blown head gaskets.





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Nickies

Steel sleeves aren't a permanent solution and often lead to reoccurrence of engine failure.





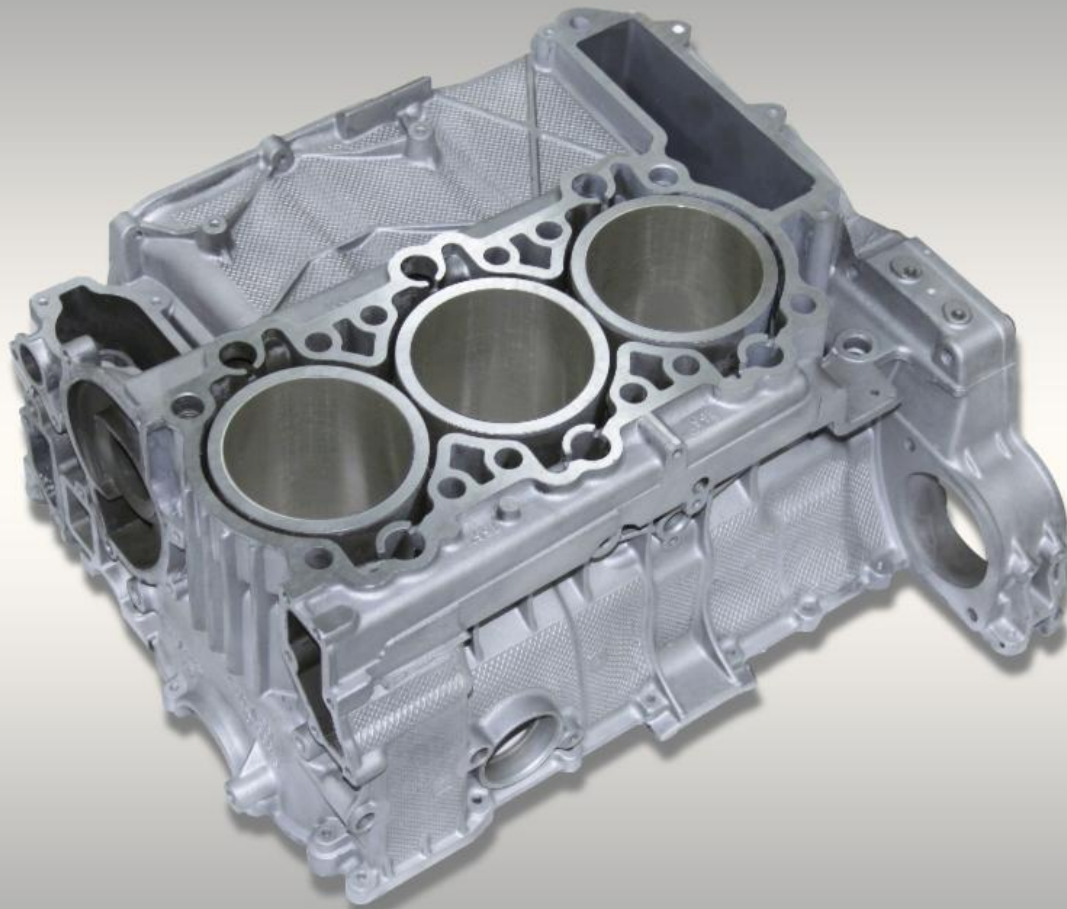
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Nickies

The Solution: Billet Aluminum NSC-Plated Cylinders

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NICKIES
PERFORMANCE CYLINDERS™

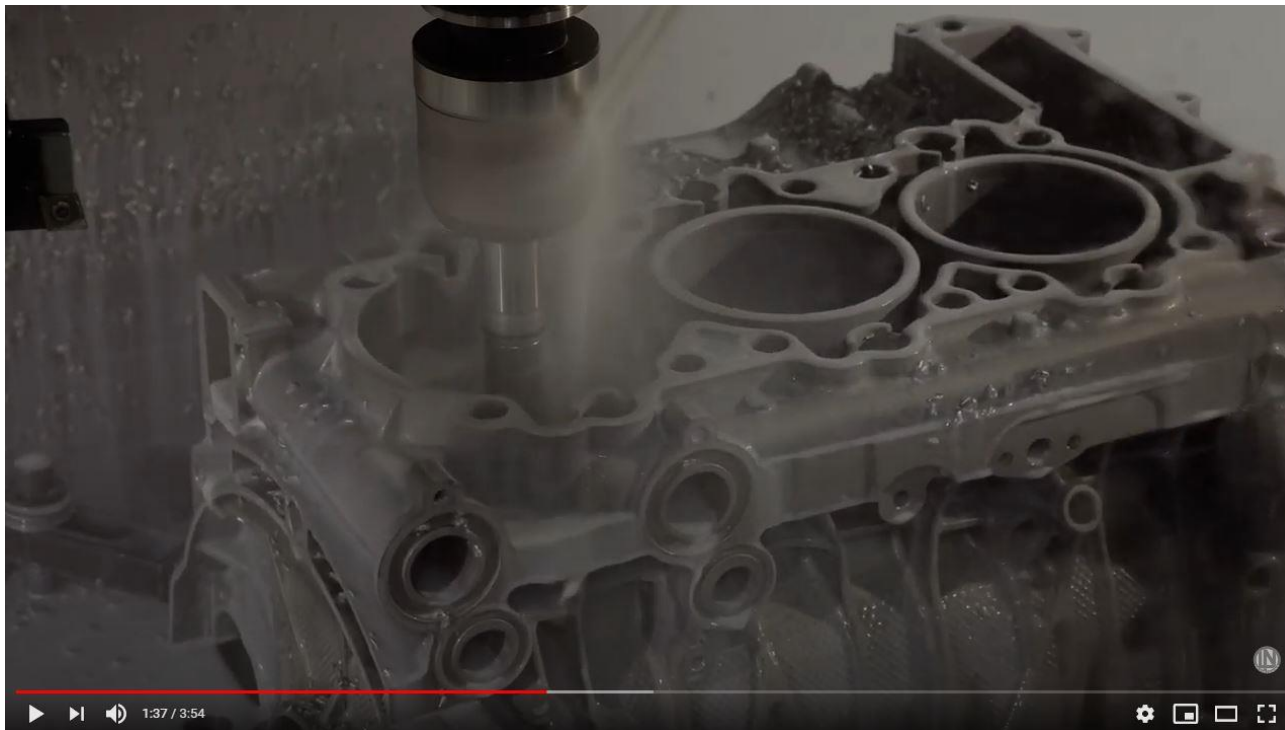




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Nickies Sleeving Process



Please note this video content requires connection to the Internet and access to YouTube.



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Nickies

- **Original cylinder is completely machined out of the block and remaining parent metal is used only to locate the new, stronger billet aluminum sleeves.**
- **Block is o-ringed and the new Nickies NSC-plated wet liners are permanently fitted to the engine case.**
- **Nickies prevent future d-chunk, slipped sleeve, and scored bores failures with wear resistant NSC bores.**
- **Nickies are more durable than Lokasil, direct plating of bores, or steel sleeves.**



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Repair Sleeves

Blocks with damage to one or more cylinders below the water jacket from a connecting rod failure can be machined for a repair sleeve for significantly less than a used crankcase, if one can be found.





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Closed Deck

Although not needed for normally aspirated engines, when adding forced induction to an M96 or M97 engine and going larger than 99mm, LN Engineering does offer closed deck conversions.



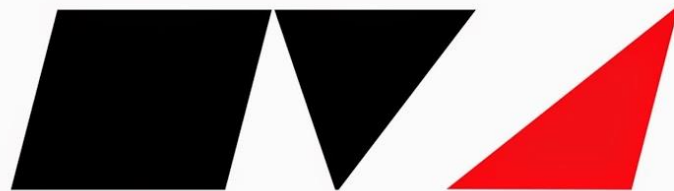


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NSC-Plating

LN Engineering has utilized Millennium Technologies NSC-plating since 2002.

Similar to Nikasil, the NSC plating is made up of nickel, silicon, and carbide. Cylinders are precision honed to our specifications.



**MILLENNIUM
TECHNOLOGIES**

Advanced Engine Solutions



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Displacement Increases

- **2.5 Boxster to 2.7 liters (89mm)**
- **2.7 Boxster/Cayman to 2.9 liters (89mm)**
- **3.2 Boxster to 3.6 liters (99mm) or 3.8 (101mm)**
- **3.4 Boxster, Cayman, or 911 to 3.6 (99mm) or 3.8 (101mm)**
- **3.6 911 to 3.8 (99mm) or 4.0 (101mm)**
- **3.8 to 4.0 (101mm) or 4.1 (102mm)**



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Porsche 911

106-996.3	3.4 to 3.6 911 99mm JE Piston set, inc. rings, pins, & clips; 12:1 CR
106-996.20	3.4 to 3.8 911 101mm JE Piston set, inc. rings, pins, & clips; 12:1 CR
106-996.3T	3.4 to 3.6 911 99mm JE Piston set inc. rings, pins, & clips; 10:1 CR Turbo Conversion
106-996.5	3.6 911 96mm JE Piston set, inc. rings, pins, & clips; 12:1 CR
106-996.7	3.6 to 3.8 911 99mm JE Piston set, inc. rings, pins, & clips; 12:1 CR
106-997.1	3.8 911 99mm JE Piston set, inc. rings, pins, & clips; 12:1 CR
106-997.2	3.8 to 4.0 911 101mm JE Piston set, inc. rings, pins, & clips; 12:1 CR
106-997.20	3.6 to 4.0 911 101mm JE Piston set, inc. rings, pins, & clips; 12:1 CR
106-997.4	3.8 to 4.1 911 102mm JE Piston set, inc. rings, pins, & clips; 12:1 CR
106-996.96	Porsche 996/987/997 3.4 or 3.6 96mm Nickies
106-996.99	Porsche 986/987 3.2 to 3.6, 3.4 to 3.6, 3.6 to 3.8 99mm Nickies
106-996.101	Porsche 986/987 3.2 to 3.8, 3.4 to 3.8, 3.6 to 4.0 101mm Nickies
106-997.99	Porsche 997 3.8 99mm Nickies
106-997.101	Porsche 997 3.8 to 4.0 101mm Nickies
106-997.102	Porsche 997 3.8 to 4.1 102mm Nickies

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Porsche Boxster & Cayman

106-986.1.SPB	Spec Boxster 2.5 85.5mm CP Piston set, inc. rings, pins, & clips TS rings; STD CR
106-986.3	2.5 to 2.7 Boxster 89mm JE Piston set, inc. rings, pins, & clips; 12:1 CR
106-986.4	2.7 Boxster 85.5mm JE Piston set, inc. rings, pins, & clips; 12:1 CR
106-986.5	2.7 to 2.9 Boxster 89mm JE Piston set, inc. rings, pins, & clips; 12:1 CR
106-986.9	3.2 to 3.6 Boxster 99mm JE Piston set, inc. rings, pins, & clips; 12:1 CR
106-986.9T	3.2 to 3.6 Boxster 99mm JE Piston set inc. rings, pins & clips; 10:1 Turbo Conversion
106-986.20	3.2 to 3.8 Boxster 101mm JE Piston set, inc. rings, pins, & clips; 12:1 CR
106-987.3	3.4 to 3.6 987 Boxster/Cayman 99mm JE Piston Set inc. rings, pins, and clips; 12:1 CR
106-987.3T	3.4 to 3.6 987 Boxster/Cayman 99mm JE Piston Set inc. rings, pins, & clips; 10:1 CR Turbo Conversion
106-987.20	3.4 to 3.8 987 Boxster/Cayman 101mm JE Piston Set inc. rings, pins, and clips; 12:1 CR
106-996.2.SPC	Spec Cayman 3.4 96mm CP Piston set, inc. rings, pins, & clips. TS rings; Stock CR
106-986.85.5	Porsche 986/987 2.5 or 2.7 85.5mm Nickies
106-986.89	Porsche 986/987 2.5 to 2.7 or 2.7 to 2.9 89mm Nickies
106-986.93	Porsche 986/987 3.2 93mm Nickies
106-996.96	Porsche 996/987/997 3.4 or 3.6 96mm Nickies
106-996.99	Porsche 986/987 3.2 to 3.6, 3.4 to 3.6, 3.6 to 3.8 99mm Nickies
106-996.101	Porsche 986/987 3.2 to 3.8, 3.4 to 3.8, 3.6 to 4.0 101mm Nickies

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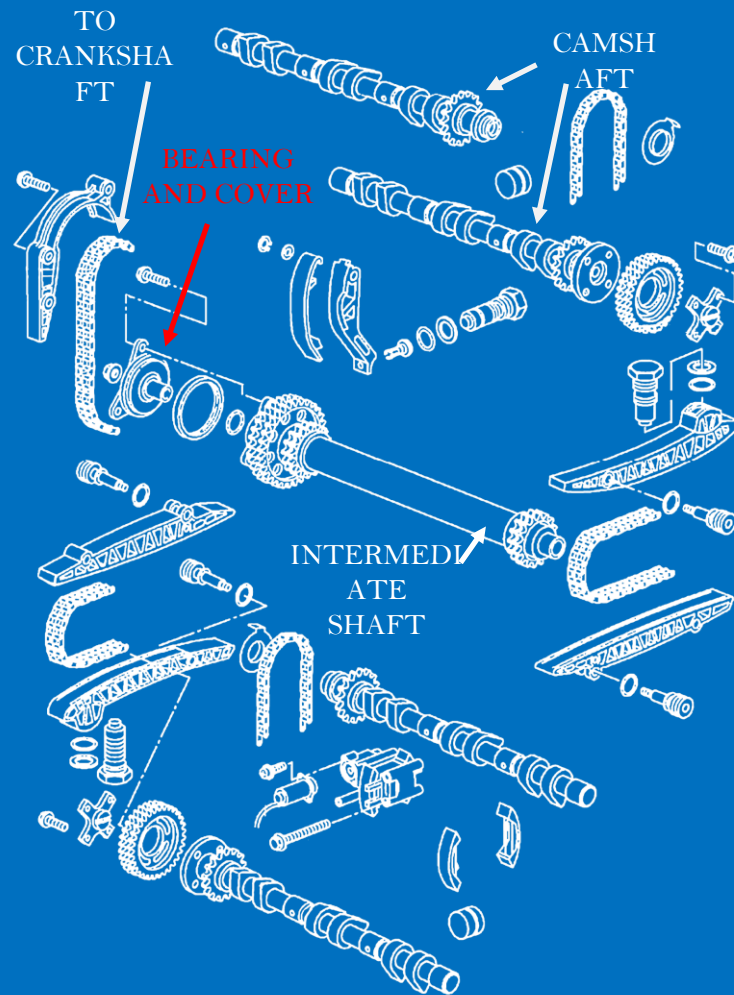


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New to the IMS?

There are several versions of the IMS used from 1997 through 2008.

- **1997-1999: Dual Row**
- **2000-2001: Dual or Single Row**
- **2002-2005: Single Row**
- **2006-2008: Non-Serviceable (engine disassembly required)**





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IMS Failures by the Numbers

According to Eisen class action lawsuit, 1% of original dual row bearings failed under warranty compared to 8% for the single row bearing.

Source: <http://eisenimssettlement.com/>

The factory dual row bearing had twice the load capacity of the original single row. *This is why the failure rate is so high on MY2000-2005 cars with the smaller bearing.*

The IMS bearing should always be replaced when rebuilding the engine.



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IMS Bearing Failures

- **Insufficient load capacity**
- **Lack of lubrication (sealed bearing was used even though bearing is submerged in oil)**
- **No service interval, replacement bearing, or tools and procedure for changing the original bearing offered by Porsche.**





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LN IMS Service

All intermediate shafts should be inspected for runout exceeding .005" and have the main timing gear pinned to prevent slippage that can lead to engine damage while the engine is apart.





IMS Retrofit & IMS Solution

106-08.2.2	Single Row Pro IMS Retrofit Kit for MY00-05 with factory single row bearing
106-08.2R	Single Row RND RS Roller IMS Kit for MY00-05 with factory single row bearing
106-08.4	Dual Row IMS Retrofit Kit for MY97-01 with factory dual row bearing
106-08.4R	Dual Row RND RS Roller IMS Kit for MY97-01 with factory dual row bearing
106-08.30	IMS Upgrade Kit for MY06-08 with non-serviceable bearing; engine disassembly required.
106-08.20	IMS Solution for Single Row IMS MY00-05 with factory single row bearing
106-08.40	IMS Solution for Dual Row IMS MY97-01 with factory dual row bearing
106-08.60	IMS Solution for Dual Row IMS MY06-08 with non-serviceable bearing; engine disassembly required.
106-08.13	IMS Pro Tool Kit
106-08.21	M96 MY06-08 Upgrade + IMS Solution Supplemental Tool Kit
106-08.22	M96 Faultless Tools IMS Removal & Installation Tool Kit
106-08.1.L	Inspect IMS for runout, recondition, pin sprocket, and install bearing



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Upgrades

Increased sump capacity coupled with anti-slosh tray and X51 baffle reduces engine failures from loss of lubrication.



2 QUART DEEP SUMP KIT



A must when rebuilding any 1997 - 2008 M96 or M97 engine to prevent rod bolt failures.

ARP ROD BOLT KIT



Power increase due to lower friction. Engine protection during start-ups and oil starvation.

COATED MAIN & ROD BEARINGS



High performance 4340 chromoly Steel and ARP rod bolts prevent rod failures.

FORGED CONNECTING RODS



Stronger by design, LN Engineering's Billet Aluminum Paddle also utilizes an upgraded, steel pressure pin.

LN BILLET TENSIONER PADDLE



Custom Multi-Layered Steel head gaskets for larger than original bore sizes.

CUSTOM MLS HEAD GASKETS



Designed to be fully open 20-25 F earlier than OEM, this thermostat maximizes cooling system potential.

LOW TEMP THERMOSTAT



PRECISION PERFORMANCE
SINCE 1908

Upgrades



Stronger than factory ones, ARP bolts prevent shuffling and fretting of the main bearing saddles.

ARP CARRIER THROUGH BOLTS



Pro Series, Chromoly head stud kit. Provides 40% more tensile strength than OEM Torque-To-Yield studs.

ARP HEAD STUD KIT



Make sure engine oil stays around the main oil pickup at all times - during braking, acceleration and in fast turns

X51 OIL PAN BAFFLE KIT



Exclusive full-flow adapter allows for use of a conventional spin on oil filter for superior filtration.

SPIN-ON OIL FILTER ADAPTER



Protect your engine's oil pan from damage on street and track when using a deep sump.

OIL PAN GUARD PLATE



A heat treated, shot-peened, chromoly hex oil pump drive prevents loss of oil pressure.

CHROMOLY OIL PUMP DRIVE



Reduce a primary source of wear in your engine - iron levels in oil - with up to 14 lbs. of magnetic pull!

MAGNETIC DRAIN PLUG



**TAPERED SLEEVE
RING COMPRESSOR**



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Total Seal Rings

**Gapless rings
reduce oil
consumption in
horizontally
opposed engines.**

**Optional gas ported
or total conform top
rings ensure
maximum sealing.**





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Upgrades

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106-00	Bilt Racing .5QT Deep Sump Oil Pan Kit with X51-Style Baffle & Anti-Slosh Tray
106-00.1	Bilt Racing 2QT Deep Sump Oil Pan Kit
106-00.6	X51-Style Oil Pan Baffle Kit
106-00.7	X51-Style Oil Pan Baffle Kit for .5 Quart Deep Sump 106-00
106-00.8	Bilt Racing Boxster/Cayman 2 Quart Deep Sump Stainless Steel Guard Plate
106-00.9	Bilt Racing 911 2 Quart Deep Sump Stainless Steel Guard Plate
106-00.10	Bilt Racing Billet Aluminum Finned Sump Plate
106-01	Spin-on Oil Filter Adapter
106-06.1	160F Low Temperature Thermostat, insert only.
106-06.2	Thermostat Installation/Removal Tool
106-07	Billet Al Hard Anodized Magnetic Drain Plug
106-09.1	Custom 89mm head gasket set for 2.5/2.7 (5-Chain; Qty. 2 req)
106-09.2	Custom 89mm head gasket set for 2.5/2.7 (3-Chain; Qty. 2 req)
106-09.3/99	Custom 99mm Head Gasket Set for 3.2/3.4/3.6/3.8 (5- or 3- Chain; Qty. 2 req)
106-09.3/101	Custom 101mm Head Gasket Set for 3.2/3.4/3.6/3.8 (5- or 3- Chain; Qty. 2 req; .032", .040", .060")
106-09.4/102	Custom 101mm Head Gasket Set for 3.2/3.4/3.6/3.8 (5- or 3- Chain; Qty. 2 req; .032", .040", .060")
106-10	Billet IMS to Crankshaft Tensioner Paddle
106-11	Chromoly Oil Pump Hex Drive
106-22	Bilt Racing M96/M97 Oil Cooler Delete. For installing external oil cooler.



Upgrades

204-4707	ARP M96/M97 Head Stud Kit 97-08 Porsche Boxster, Cayman, 911
204-5001	ARP M96/M97 Carrier Through Bolt Kit Porsche Boxster, Cayman, 911
204-6301	ARP M96/M97 Rod Bolts for Stock Porsche Boxster, Cayman, 911 Connecting Rods
400-986	Porsche Boxster, 911 LN Spec K1 Forged (986, 996 & 987; 2.5-3.4), replaces pn# 99610397501
400-986.CP	Porsche Boxster, 911 LN Spec Carrillo (986, 996 & 987; 2.5-3.4), replaces pn# 99610397501
400-986-SPC	PCA Club Racing Spec Carrillo Connecting Rod Set 2.5-3.4, replaces pn# 99610397501
400-997	Porsche 911 LN Spec K1 Forged (996 & 997; 3.6 and 3.8), replaces pn# 99610398500, 01, 02
400-997.CP	Porsche 911 LN Spec Carrillo (996 & 997; 3.6 and 3.8), replaces pn# 99610398500, 01, 02



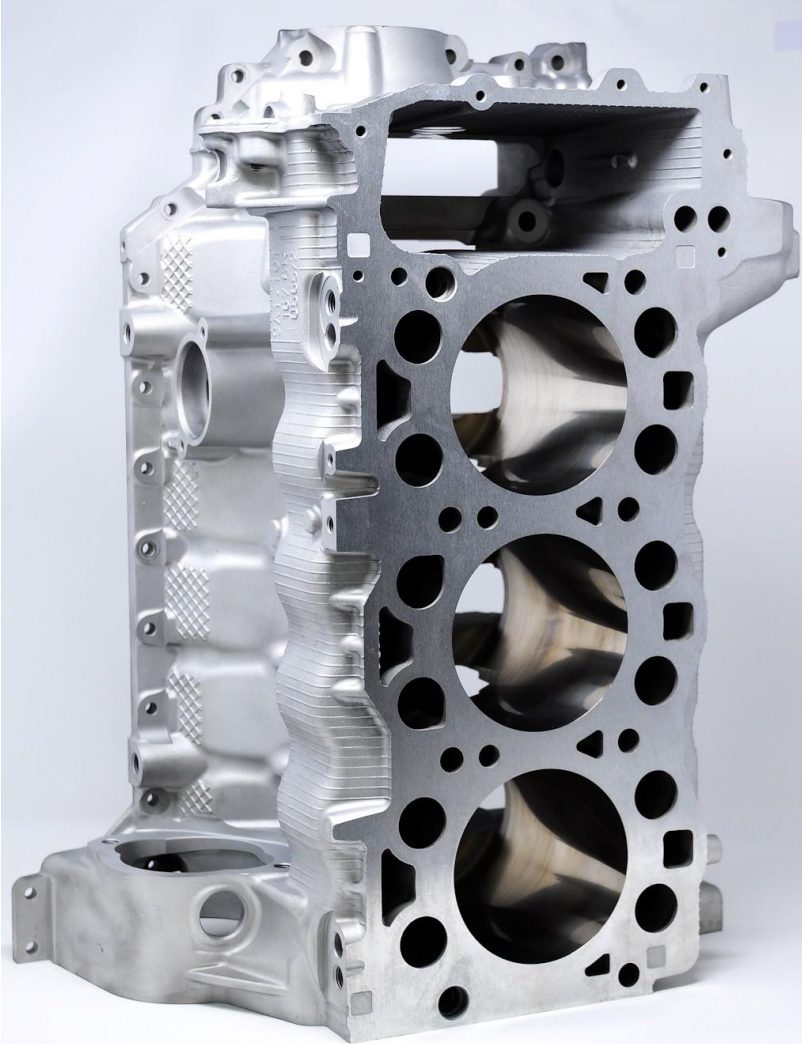
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2009+ MA1 Engines

Porsche introduced the MA1/9A1 engine featuring an Alusil engine block.

Bore scoring is still an issue with these engines, but rest assuring, we have repair options including Nickies aluminum sleeves and Nickies Lite direct NSC-plating.





PRECISION PERFORMANCE
SINCE 2002

Free Technical Resources

LN Engineering offers free technical information, available for download off their website by clicking on the Education link located at the top of the home page.



PRECISION PERFORMANCE
SINCE 2002

**TECHNICAL
LIBRARY**



**1997-2008 PORSCHE®
BOXSTER®, CAYMAN® AND 911®
CARS WITH M96/M97 ENGINES**

WARNINGS AND PRECAUTIONS

TOTAL ENGINE SOLUTION FOR 1997-2008 PORSCHE®
MODELS WITH THE M96 AND M97 ENGINE



Contact Details



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SINCE 2002

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