SUZUKI

English Service Manual

K6A Engine Overhaul Manual

Cappuccino
Wagon R
Alto
Jimny
Carry

James L. Danko

Suzuki K6A Factory Engine Manual

Engine Overhaul & Specifications

Vehicle Series

Jimny
Alto
Wagon R
Carry
Others

James L. Danko

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Disclaimer: All translations from one language to another can involve technical errors.

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Introduction

Due to the high request for English version manuals on Japanese mini trucks & Vans, we are publishing wide variety information to provide the mini truck community with the ability to maintain their vehicles.

Japanese mini tucks & vans are produced only for the Japanese market. Therefore, all original manuals are only available in Japanese.

Service manuals are not sold to the public in Japan, as in many countries. You must be a new car dealer to receive them. We have a few hundred in stock. We do not sell manuals from our own library. We will start publishing them in English (Translated) and our own original versions.

This book or manual is for the professional mechanic. It is written in Factory Service Manual style. It is full of diagrams and schematics that are easily understood by a professional mechanic.

We have manuals for all Japanese manufactures. It's a time consuming process, please check our web page frequently as we post more information. www.yokohamamotors.com

K6A Important Information

The K6A Engine has been used in numerous applications since its debut from Suzuki. There will be differences in external parts such as oil pans and Intake & Exhaust manifolds. This overhaul manual supports the main components such as cylinder head, camshafts, pistons and block units. For specific vehicle external parts configuration please check vehicle specific parts manuals.

Tune-up specifications for vehicle specific information please check the information sticker located in or around the engine compartment. Your vehicle specific setting information will be included on the sticker of your vehicle.

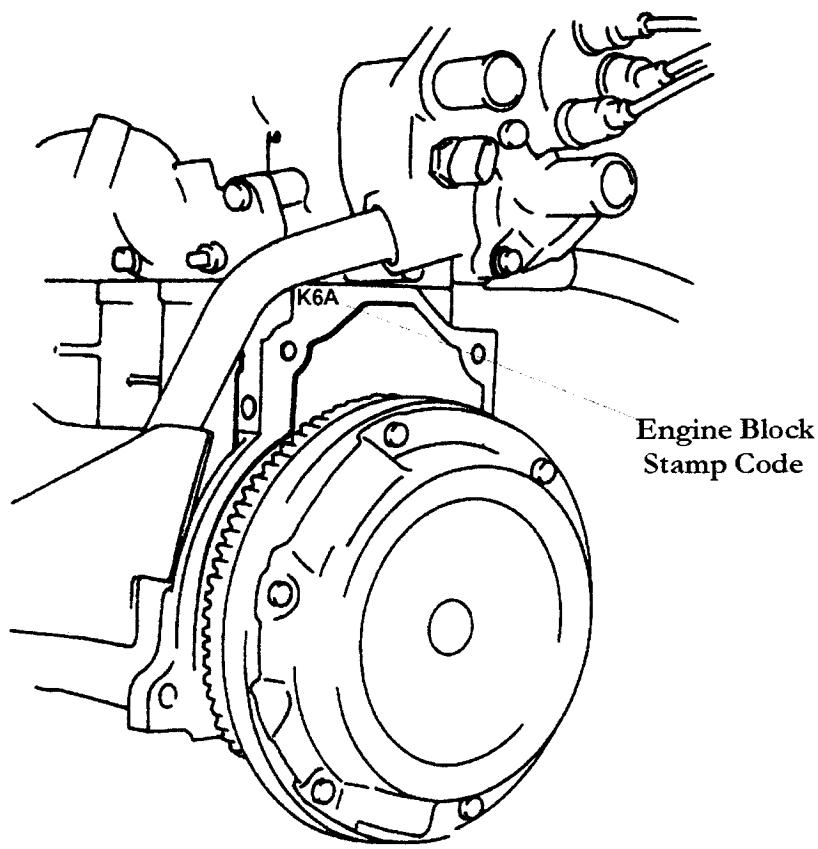
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4. Oil Pump system & Overhaul
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6. Piston, Connecting Rod, Crankshaft, Cylinder Block Section
7. Detailed Service Specifications
8. Conversion Charts

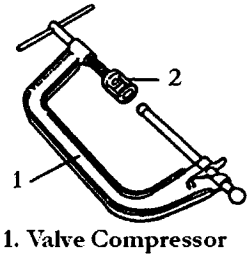
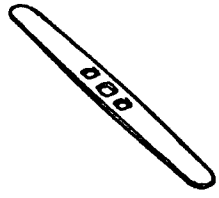
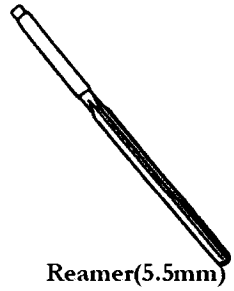
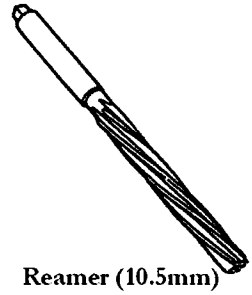
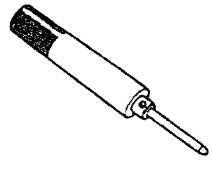
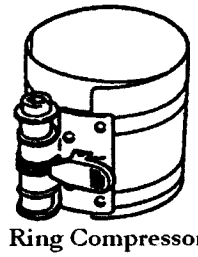
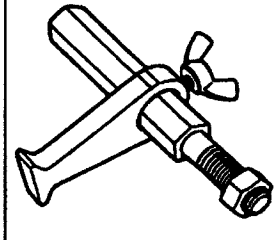
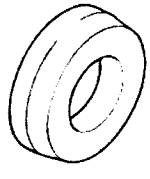
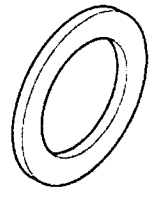
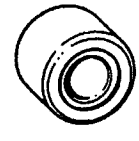
Engine Series Decoding

K6A – 100001

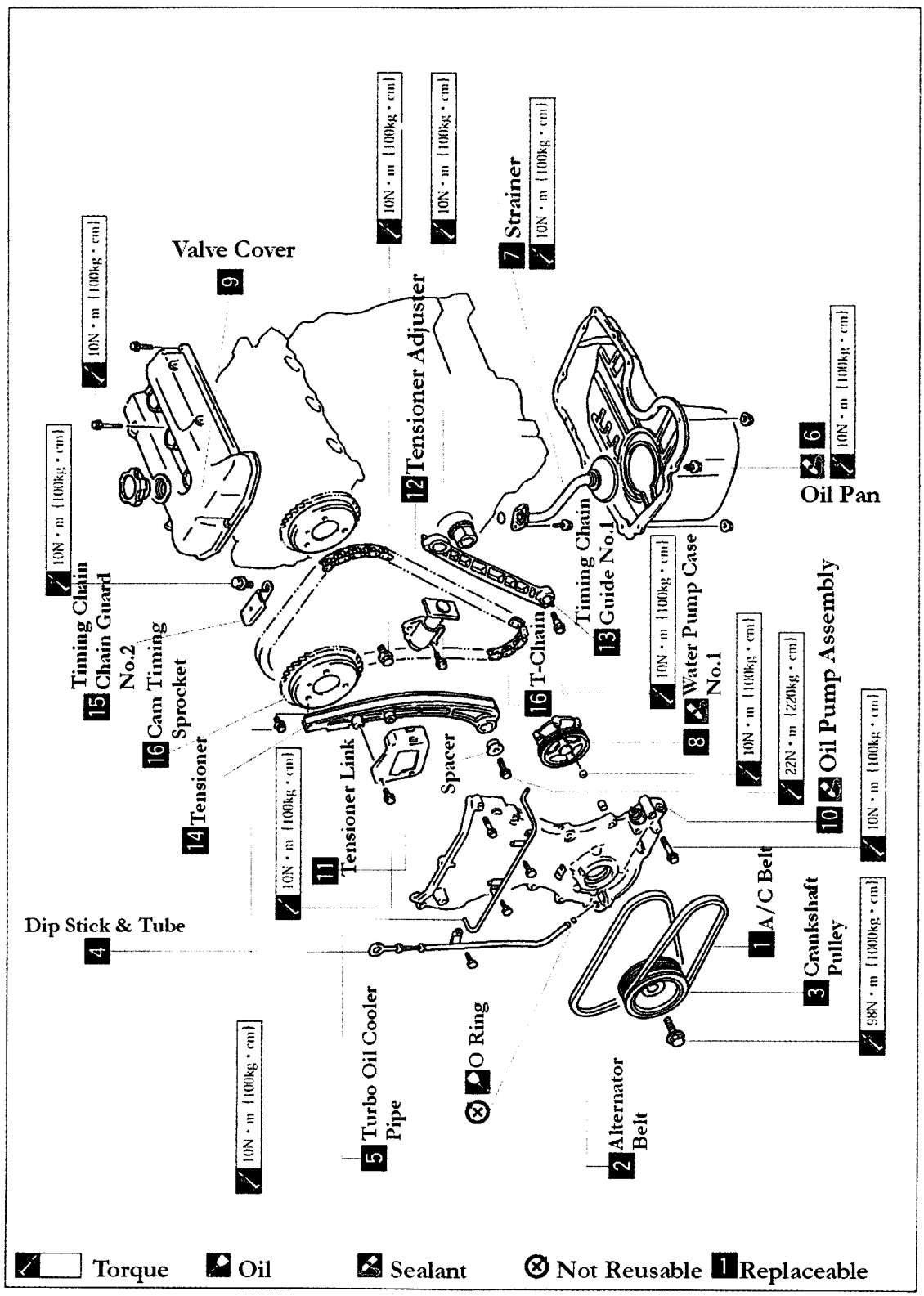
- 100001 — Production Series
- K6A — Engine Series



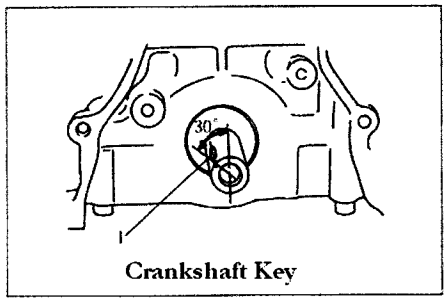
Specialty Tools

 1. Valve Compressor 2. Adapter 09916-14910	 Reamer Handle 09916-34542	 Reamer(5.5mm) 09916-34550	 Reamer (10.5mm) 09916-37320
 Valve Guide Remover 09916-44910	 Guide Installer Handle 09916-58210	 Installer Attachement 09917-87010	 Ring Compressor 09916-77310
 Flywheel Holder 09924-17810	 Oil Seal Guide 09911-97020	 Oil Seal Installer 09911-97030	 Valve Stem Installer 09917-98221

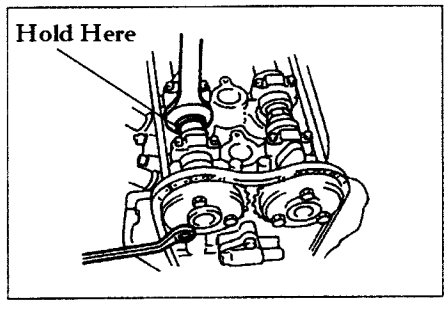
Timing Chain & Tensioner

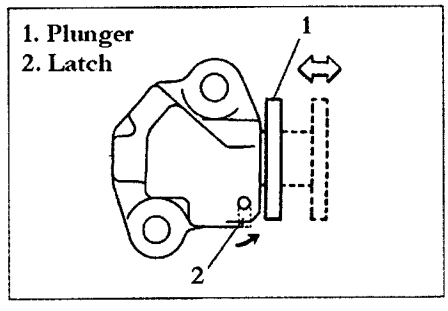


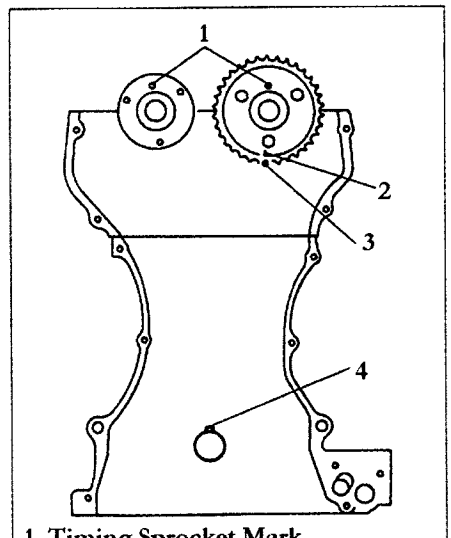
Timing Chain & Tensioner



Crankshaft Key







1. Timing Sprocket Mark
2. Slit
3. Alignment Mark 4. Crank Key

1. Rotate Crankshaft to TDC (Top Dead Center)

Note: Verify Rotor Pinted to #1 Cylinder

Note:

Engine No. KA6~1028584

Remove Timing Chain From Intake Side Camshaft Timing Sprocket

Engine No. KA6-1028585~
Remove Timing Chain From Cranshaft Timing Sprocket

Caution: When Timing Chain is Removed, DO NOT Turn Crankshaft. If Camshaft Must be Moved, The Crank Key Should Turn Max 30 Degrees. To Adjust Camshaft Hold With Wrench as in Diagram

Inspection
Timing Chain: If Damaged, Replace.
Note: Timing Chain Must be Replaced on Engines With 80,000 Kilometers

Tensioner: Push Latch and Check for Free Travel. If Unit Does Not Move Freely Replace.

Installation is Reverse or Removal

Engine Series ~K6A-1028584

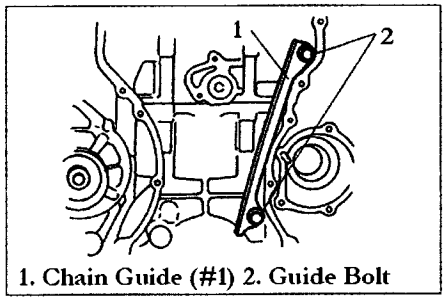
1. Put Cam Timing Sprocket point "g" or "UP" Posistion
2. Make Sure Crankshaft "Key" is Facing Upwards
3. Install Timing Sprocket

Engine Series K6A-1028585~

1. Put Cam Timing Sprocket in "g" Posistion
2. Put Intake & Exhaust Cam Spocket in Alignment With "Slit" & Mark on Cylinder Head
3. Make Sure Crankshaft "Key" Is Facing Upwards

Note: Use Diagram on Left

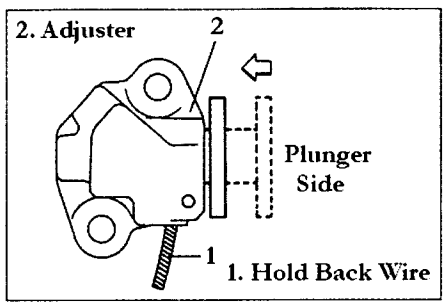
Timing Chain, Tensioner



1. Chain Guide (#1) 2. Guide Bolt

4. Apply Oil to Guide #1. Tighten Timing Chain Bolt To Specified Torque

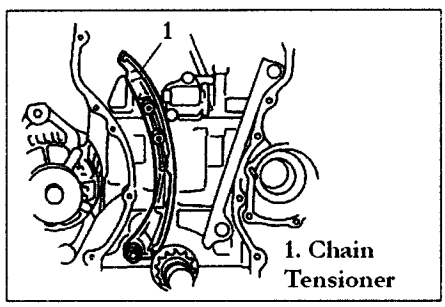
Torque: 100 kg.cm



1. Hold Back Wire

5. Pull Back Tension Adjuster and Retain With a Piece of Wire. Torque to Specification.

Toque: 100 kg.cm

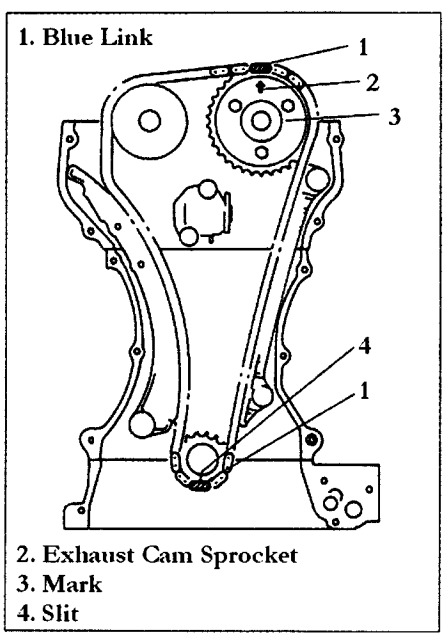


1. Chain Tensioner

Engine Series: ~K6A-1028584

6. Install Spacer onto Chain Tensioner
7. Tighten Chain Tensioner Mounting Bolt

Torque: 220 kg.cm

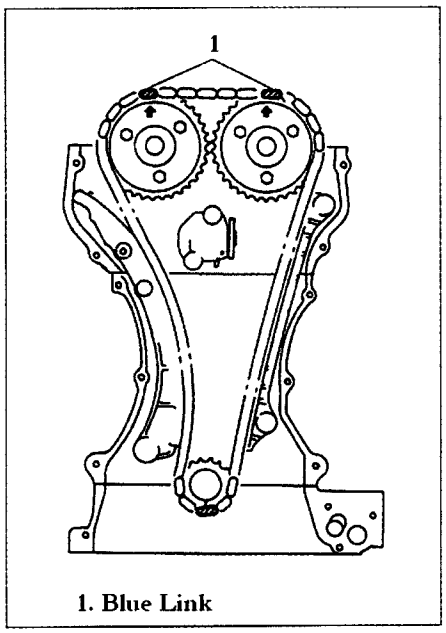


2. Exhaust Cam Sprocket
3. Mark
4. Slit

Engine Series: ~K6A-1028584

8. Align "Blue" Link onto Exhaust Side Cam Timing SprocketArrow. Next, Align "Blue" Link to Match The Slit On The Bottom of The Crankshaft Sprocket

Timing Chain, Tensioner



1. Blue Link

Engine Series: ~K6A1028584

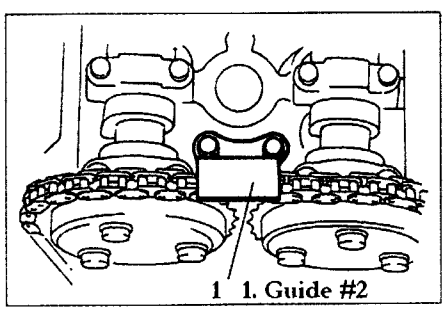
9. Line Up All Blue Links With Appropriate Sockets. Tighten Cam Sprocket Bolts to Specified Torque

Torque: 100 kg.cm

Engine Series: K6A-1028585~

9. Line Up All Blue Links as Shown. Torque to Specification

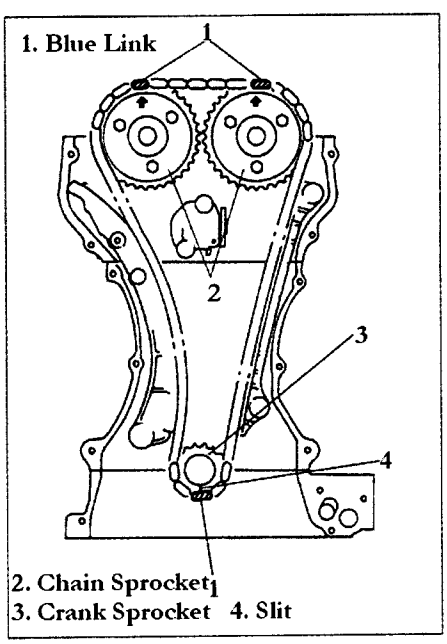
Torque: 220 kg.cm



1. Guide #2

10. Install Chain Guide No.2

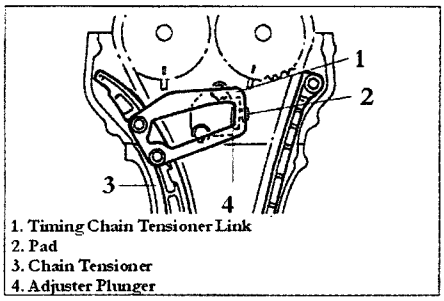
Torque: 100 kg.cm



2. Chain Sprocket
3. Crank Sprocket 4. Slit

11. After Setting Torque Confirm All Blue Links Are in Appropriate Locations.

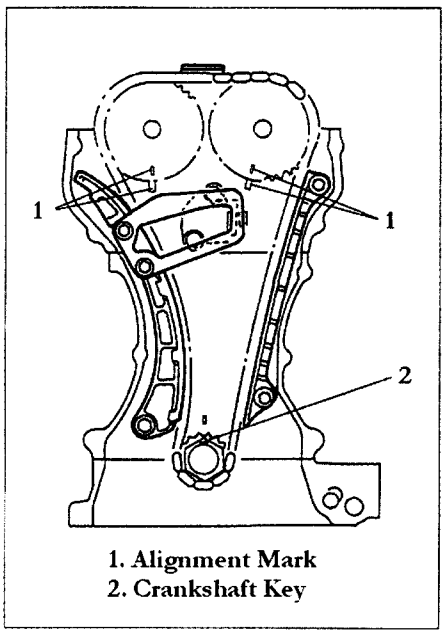
Timing Chain, Tensioner



1. Timing Chain Tensioner Link
2. Pad
3. Chain Tensioner
4. Adjuster Plunger

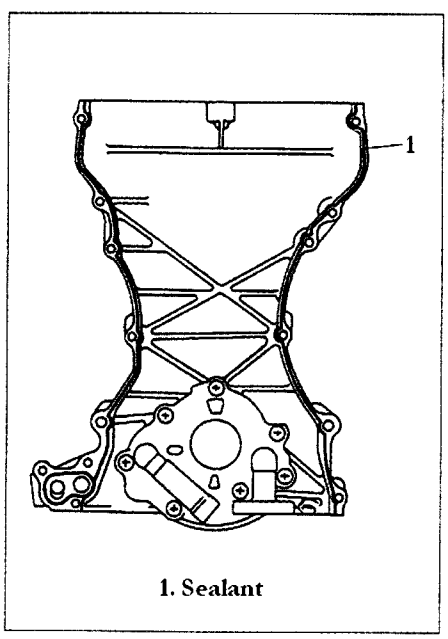
12. Confirm Pad is Attached to Timing Chain Tensioner
13. When Attaching Timing Chain Tensioner Link to Chain Tensioner, Align Tensioner Adjuster Plunger With Pad.

Torque: 100 kg.cm



1. Alignment Mark
2. Crankshaft Key

14. Remove Adjuster Stopper & Lubricate Chain
15. Confirm Settings: Turn Over Crank Twice, Verifying Mark Alignment

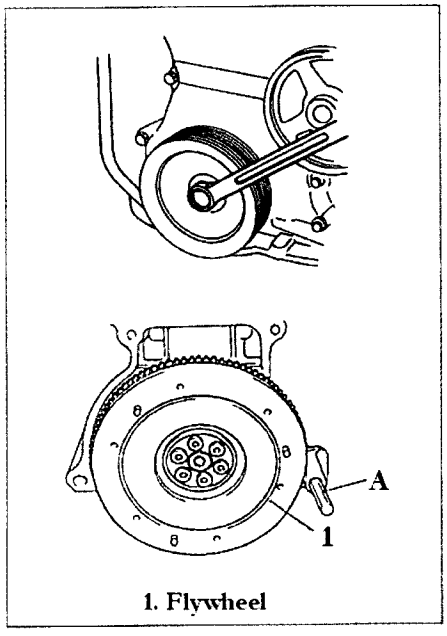


1. Sealant

16. Clean Matching Surface of Timing Chain Cover, Apply Sealant and Install
17. Tighten Timing Chain Cover to Specifications

Torque: 100 kg.cm

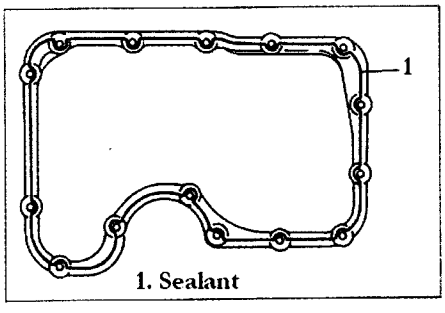
Timing Chain, Tensioner



1. Flywheel

18. Use Tool A: **09924-17810** Flywheel Adapter to Hold Crankshaft from Turning. Install Crankshaft Pulley and Torque to Specifications

Torque: **1000** kg-cm

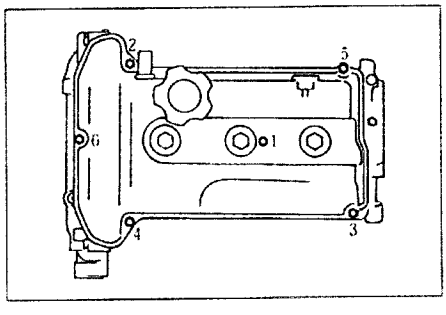


1. Sealant

19. Install Oil Pan

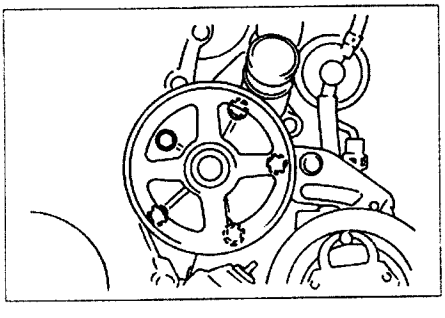
Note: Use Sealant (Suzuki) Part #**99000-31080-07F**

Torque: **100** kg.cm



20. Attach Valve Cover

Torque: **100** kg.cm



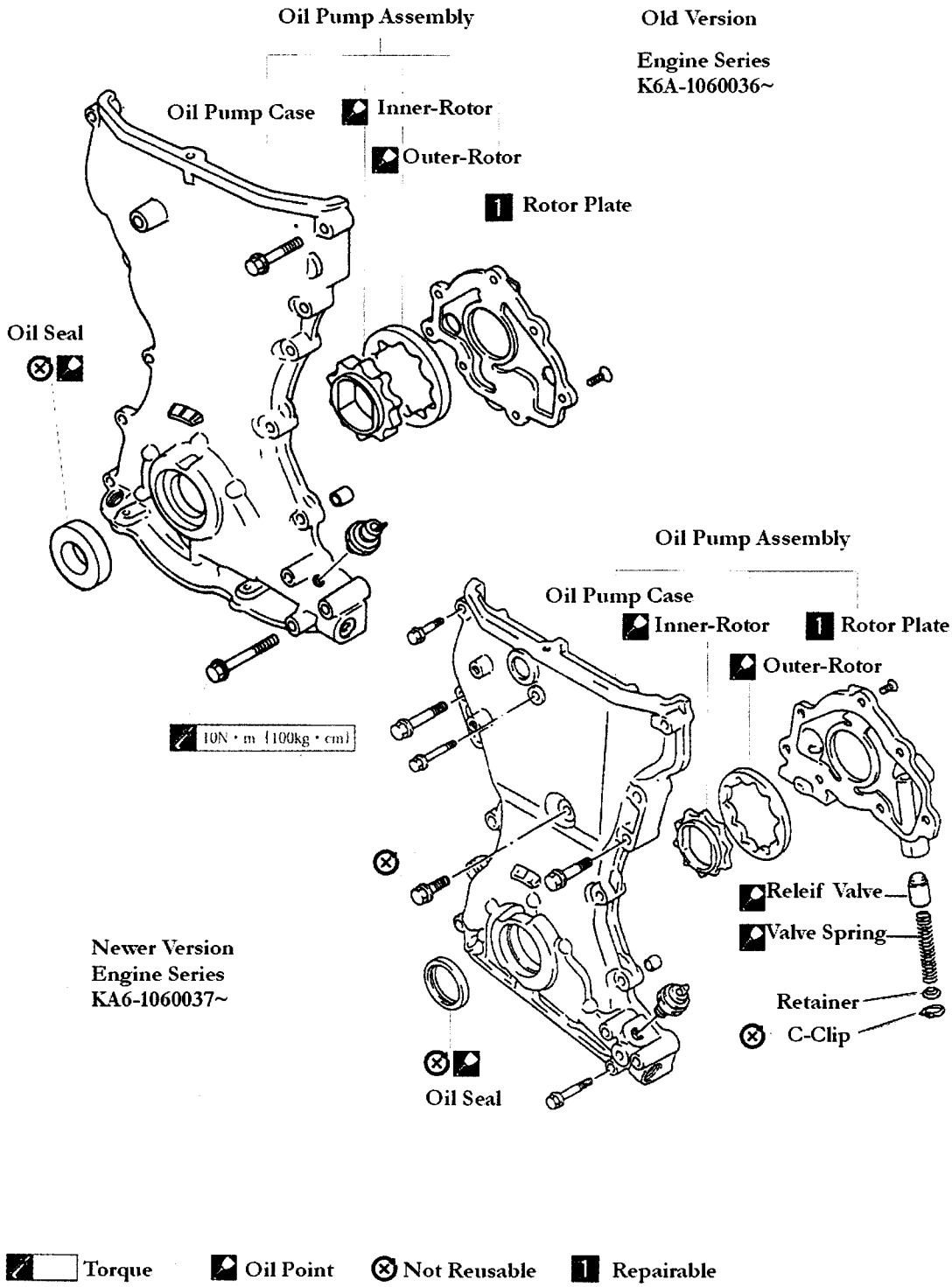
21. Install Water Pump

Torque: **110** kg.cm

Sealant: (Suzuki) Part # **99000-31080-07F**

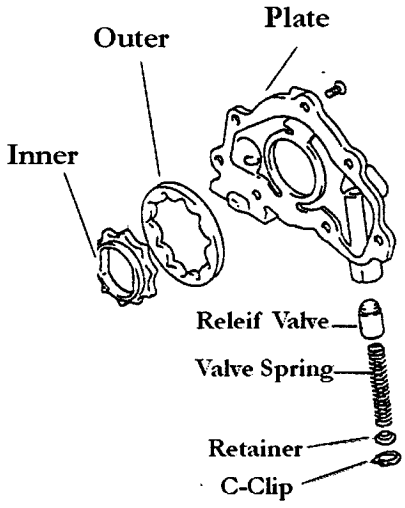
22. Install Remaining Components Per Vehicle Requirments

Oil Pump Assembly
Old & New Version



Torque Oil Point Not Reusable 1 Repairable

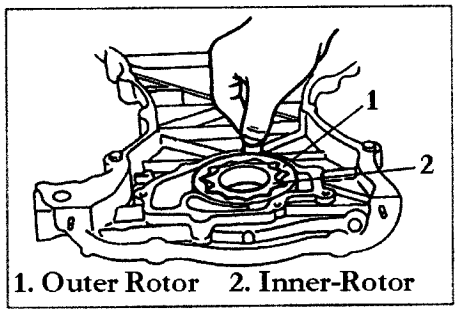
Oil Pump



Removal & Replacement

1. Remove Timing Chain Cover and Assembly as in Listed in this Book

2. Remove Oil Pump Assembly
3. Verify Part Numbers
4. Clean Unit for Inspection



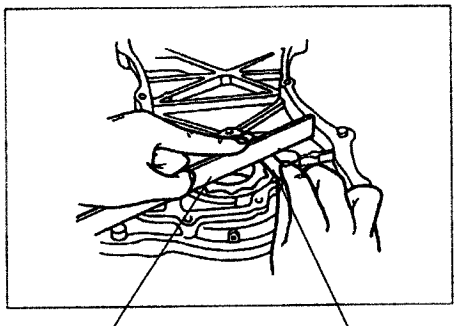
1. Outer Rotor 2. Inner-Rotor

Oil Pump Inspection

Lateral Clearance

1. Use a Thickness Gage and First Check Outer Rotor to Case Clearance. If The Thickness is Out of Range Replace Case

Lateral Clearance Limit: 0.31mm



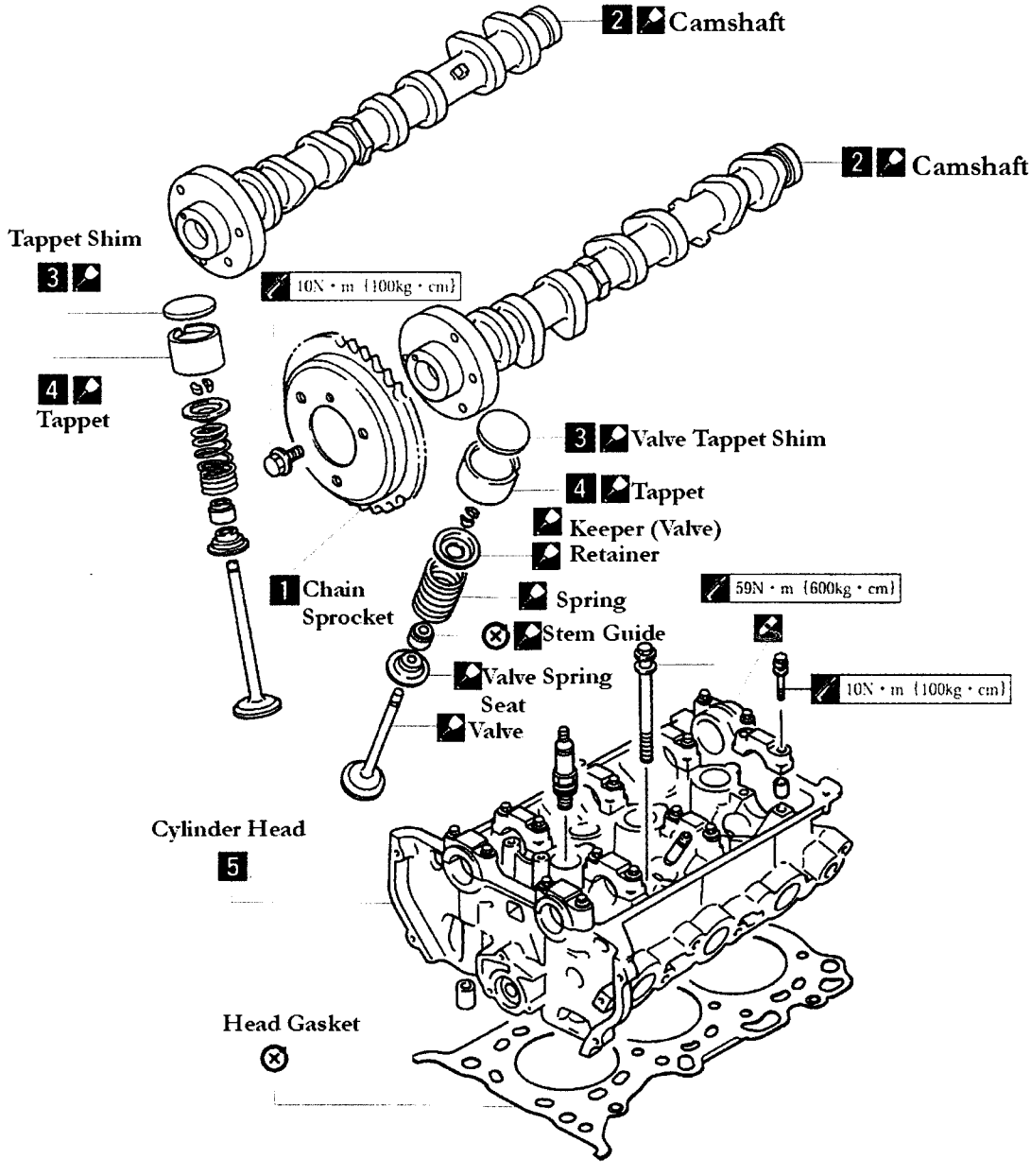
Side Clearance

1. Using a Thickness Gage and a Straight Edge Bar, Measure Side Clearance. Measure Both Outer & Inner Rotor Units. If Either are Out of Limits Replace Both Inner & Outer as a Set.

Side Clearance Limit: 0.15mm

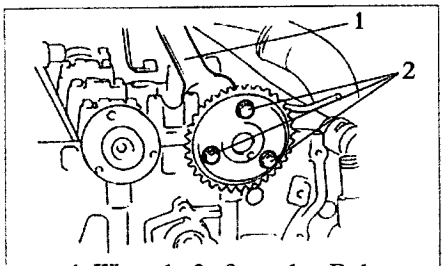
Installation
Install in Reverse Order
Note: Never Reuse Gaskets

Cylinder Head, Valve Train

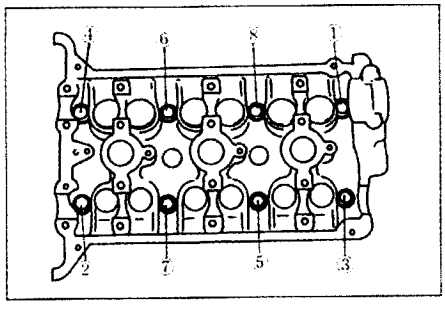


Torque Oil Point Sealant Not Reusable 1 Repairable

Cylinder Head, Valve Train



1. Wrench 2. Sprocket Bolts

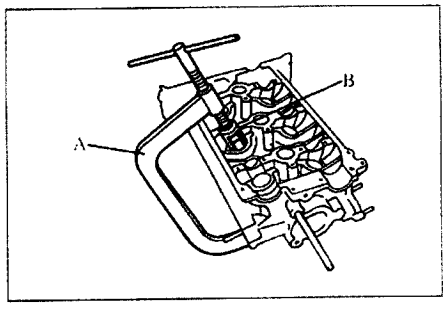


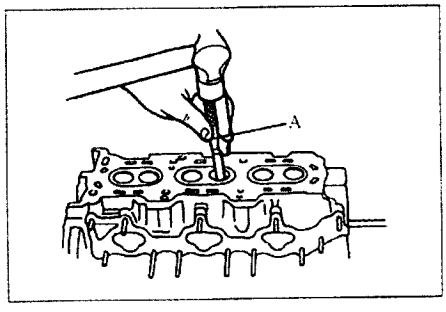
Removal

1. Remove Valve Cover & Timing Chain Front Assembly.
2. Use a Wrench and Hold Camshaft at the 6 Point Camshaft Retainer Part of Shaft.
3. Remove Sprockets From Camshafts
4. Remove Camshaft Caps & Remove Camshafts

Note: Put Caps Back in Original Location

5. Use 10mm 12 Point Socket and Remove Head Bolts in Order Listed in Left Diagram.
6. Remove Cylinder Head and Discard Old Head Gasket.
7. Clean Head & Prepare for Disassembly





Disassembly & Inspection

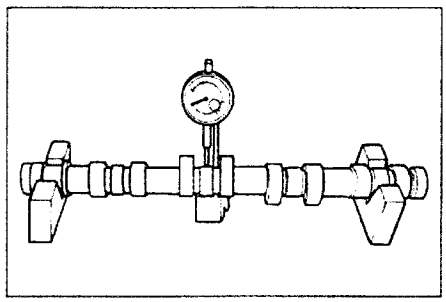
1. Remove Old Intake & Exhaust Manifold Gaskets and Discard
2. Remove Shim & Tappet and Position Valve Spring Compressor with Atachment

Tool # A: **09916-14510**
B: **09916-14910** (See Tool Page)

3. Remove Valves Retainers and Valves. Lable Position
4. Remove Spring Seat & Oil Seal
5. Use Valve Guide Remover and Remove Valve Guides.

Tool # A: **09916-44910**

Cylinder Head, Valve Train

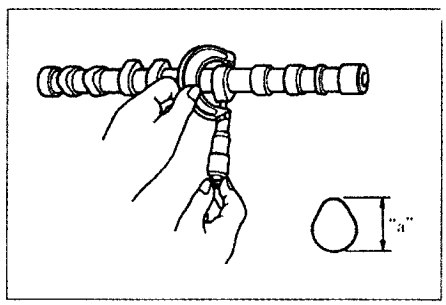


Camshaft Inspection

1. Place Camshaft in V-Block. Use a Dail Gage and Check Shaft Round-Out.

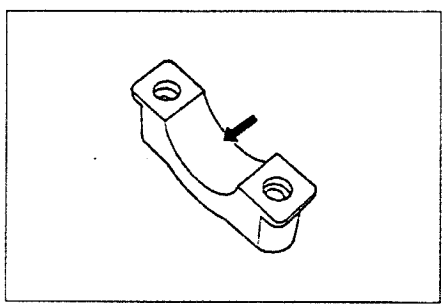
Limit: 0.10mm

2. Cam "a" Height or "Max Lobe Lift" Use the Chart Below for Limitations.



Type	Cam Height "a" Limit	
Normal	IN	37.54~37.70
	EX	37.05~37.21
Turbo	IN	37.66~37.82
	EX	37.75~37.91
Wagon "R"	IN	38.24~38.40
	EX	38.24~38.40

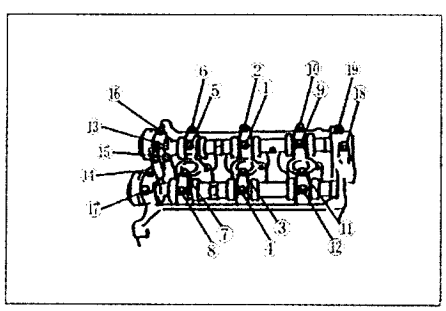
Note: If Camshaft is out of Limits Replace Unit



Camshaft Housing Track & Caps

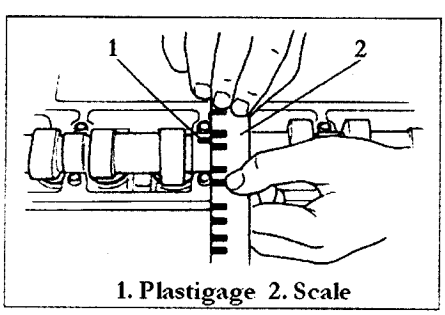
1. Use a Straight Edge & Check Camshaft Track for Straightness. If Head is Warped Replace Head. Inspect Retainer Caps for Damage or Scratches. Replace if Damaged or Scratches are Detected

2. Inspect Head Oil & Water Passages



3. Place Camshafts in Cradle and Torque Caps to Specifications. Oil shaft well before Setting Torque Value. Check for Free Spin.

Torque: 10N*M (100kg.cm)



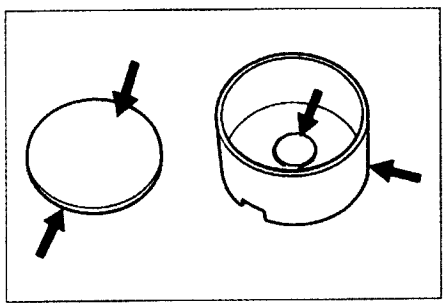
1. Plastigage 2. Scale

4. Use Platigage and Check Limitations Use Diagram on Left

Oil Orifice: Limit 0.045~0.087mm
Replace: 0.12mm

Cylinder Head, Valve Train

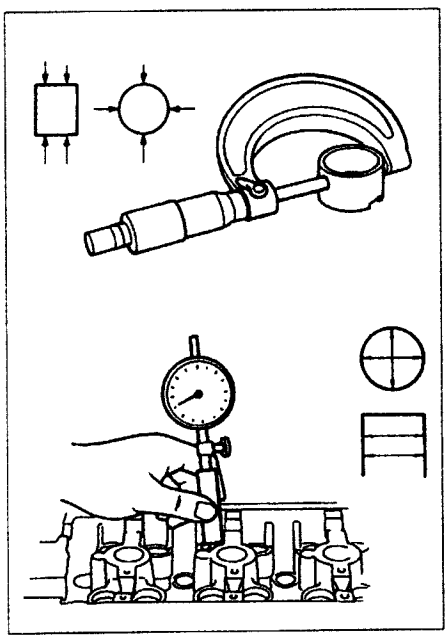
Note: Measurments Shall be Taken at an Ambient Temperature of 20C (Celsius)



Tappet & Shim Inspection

Inspect Shim for Damage. Replace With Exact Shim Size for Initial Replacement Testing.

Note: Never Mix Shims With Other Tappets

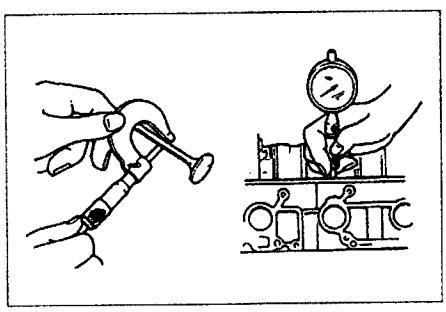


Tappet Inspection

Tappet Outside Diameter	26.959~26.975mm
Cylinder Head Bore	27.000~27.021

Use a Micrometer to Inspect Outside Diameter of Tappet

Use Dial Gage to Inspect Cylinder Head Tappet Bore



Valve Stem & Valve Guide Inspection

Valve Stem Thickness	IN	5.465~5.480	–
	EX	5.440~5.455	–
Valve Guide Diameter	IN	5.500~5.512	5.54
	EX		5.54
Valve Stem to Valve Guide Clearance	IN	0.020~0.047	0.07
	EX	0.045~0.072	0.09

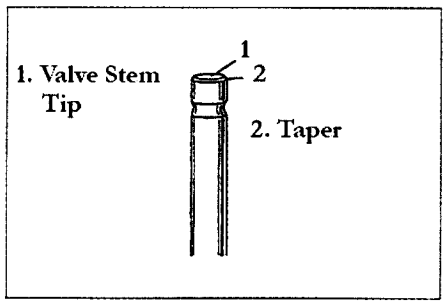
Use a Micrometer and Dial Gage to Inpect Valve Stem and Valve Guide Clearances

Any Part Outside of Specifications Must Be Replaced With New Parts

Cylinder Head, Valve Train

Note: Make Sure Valves Are Marked and Not Mixed From Original Position

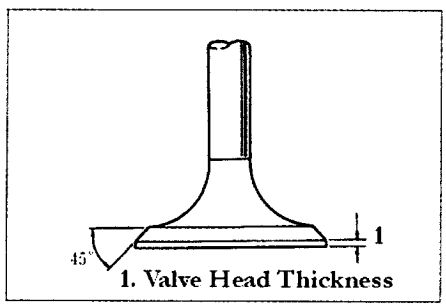
Valve Stem



Valve Inspection

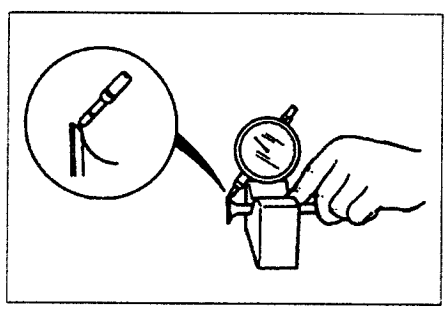
1. Remove Any & All Carbon Deposits
2. Replace Bent or Scratched Valves
3. Replace Valve if Tip Surface is Worn More Than Specifications

Limit: 0.5mm



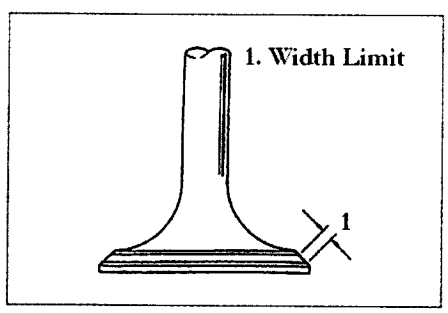
Valve Head Thickness

		Normal	Replace
Valve Head Thickness (mm)	IN	1.0	0.7
	EX	1.15	0.5



Place Valve in V-Block. Use a Dial Gage and Check For Round-Out. Replace if Out of Specification

Round-Out Limit: 0.08mm

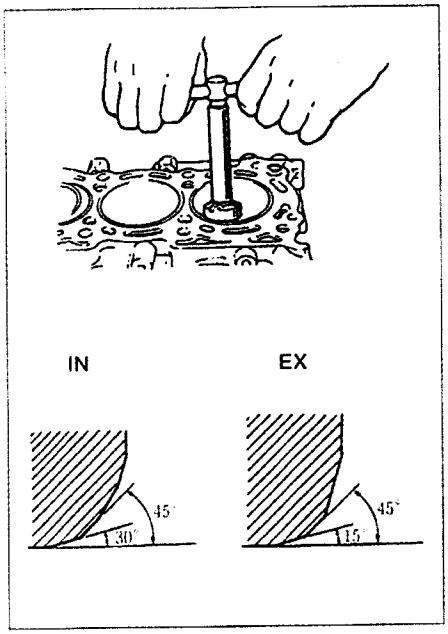


Valve Seat Angle

Width Measurment

Limit
IN: 1.1~1.5mm
EX:1.2~1.6mm

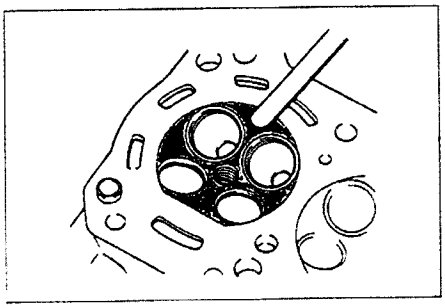
Cylinder Head, Valve Train



Valve Seat

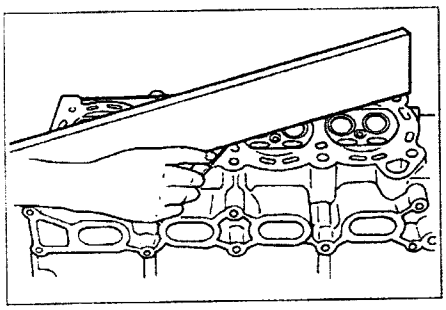
Use the Diagram on the Left for Proper Valve Seat Angle Cuts.

Note: Valve Seats are Not Replaceable



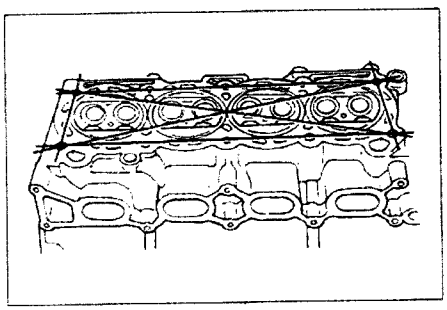
Cylinder Head Inspection

Remove All Corbon Deposits and Inpspect for Cracks, if Cracks are Detected Head Must be Replaced



Use the Two Diagrams on the Left to Check Straightness

Use a Straight Edge and Thickness Gage to Measure Head

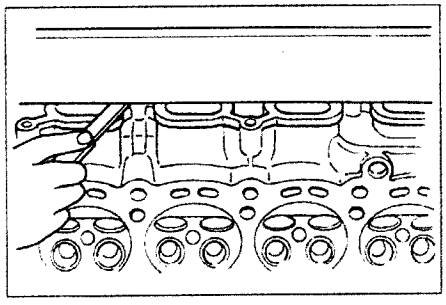


Check Straightness (4) Ways as Shown in Diagram

Surface Limitation: 0.005mm

Resurfacing Limitations: 0.01mm

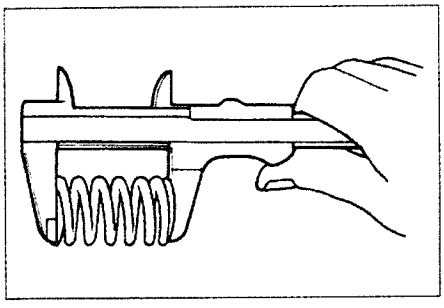
Cylinder Head, Valve Train



Cylinder Head Intake & Exhaust Manifold Surface

Use a Thickness Gage & Straight Edge to Inspect Cylinder Head Intake & Exhaust Manifold Surface Straightness.

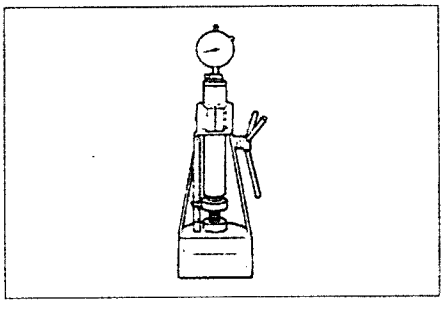
Limit: 0.10mm
Resurface Limit 0.9mm~1.0mm



Valve Spring Inspection

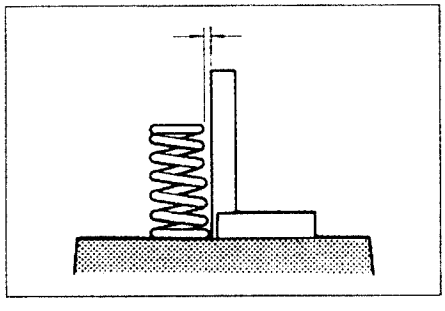
Check Valve Spring Free Length

Use the Chart Below for Specifications



	Normal	Replace
Free Length (mm)	36.30	-----
Spring Height@28.55 Press	132~152	125
(N {kgf})	13.5~15.5	12.8

Note: Free Length Must be 36.30. Any Veriation Can Cause Valve Train Damage. Any Engine With Over 80,000 Kilometers Spring Must be Replaced

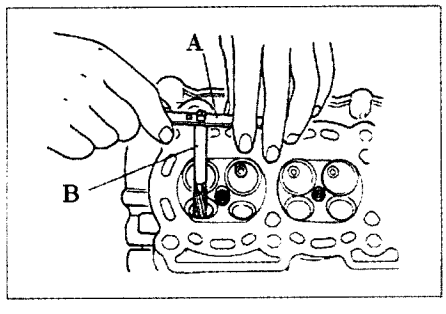


Spring Straightness

Place Spring on Flat Surface and Place Straight Edge Next to Measure Straightness

Measure from Top of Spring With Thickness Gage

Limit: 0.0~1.3mm
Springs over 80,000 Kilometers Must be Replaced

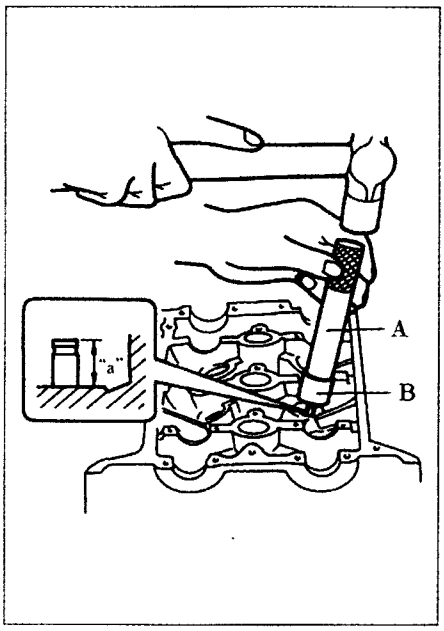


Assembly

Before Installing New Valve Guides Use a Reamer (10.5mm) to Clean Bores Before Installation

Tools: A: 09916-37320 Reamer (10.5mm)
B: 09916-34542 Handle (Reamer)

Clyinder Head, Valve Train



Valve Guide Installation

Note: Warm Head to 80~100 Celsius Before Installation

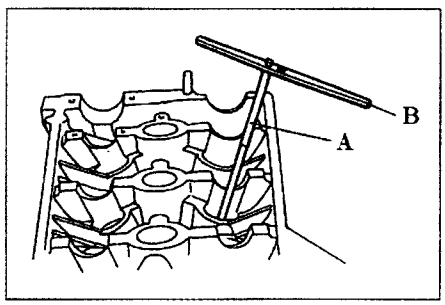
Note: If Guide Fails Installation and Removed it Must be Discarded & Replaced

Note: Valve Guide Oversize Outside Diameter Limit
Limit: 10.583~10.598mm

Use Diagram on Left "a"= IN: 11mm
EX: 11mm

Use Tools A: 09916-58210 Valve Guide Installer Handle
B: 09917-87010 Valve Guide Installer Attachment

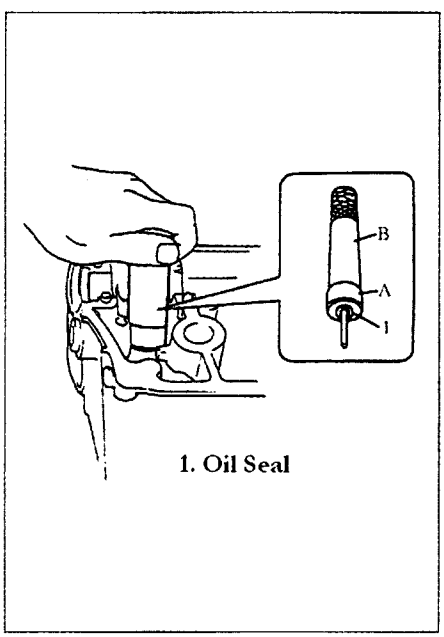
Install Guides: Use Tools Listed Above and Install All Valve Guides



Valve Guide Reaming

Use Tool A: 09916-34550 Reamer (5.5mm)
B: 09916-34542 Handle

Ream All Guides With Above Listed Tools



Valve Stem Seals

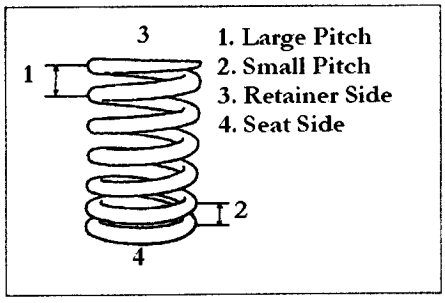
Install Valve Stem Oil Seals With Following Tools

Tools A: 09917-98221 Valve Stem Instaler
B: 09916-58210 Installer Handle

Note: Coat Seals With 30W Engine Oil Before Installation

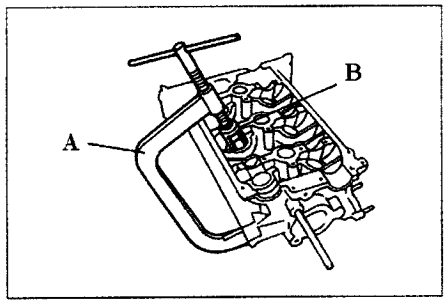
Note: Valve Stem Seals Can Not be Reused

Cylinder head, Valve Train



Valve Spring Installation

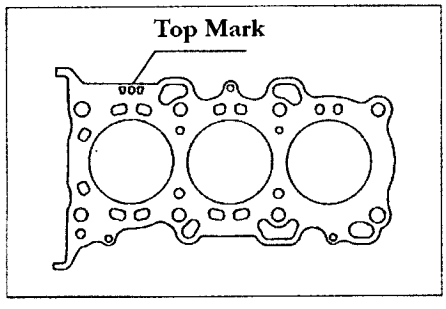
Use the Diagram on Left for Valve Spring Intallation Guide



Use the Following Tools for Valve Spring Installation

Tools A: **09916-14510** Spring Compressor
B: **09916-14910** Attachment

Install Valves and Keepers



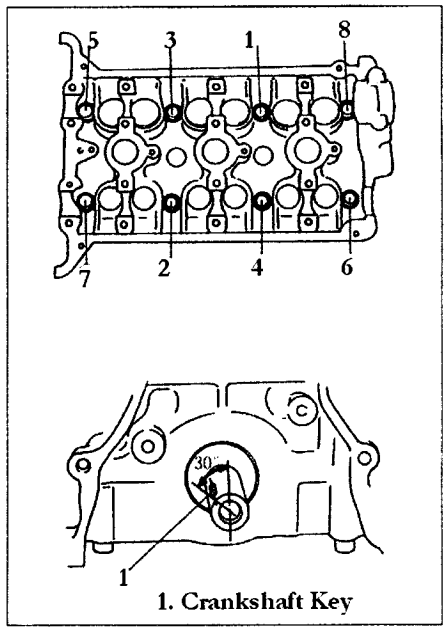
Installation of Cylinder Head

Note: Make Sure All Surfaces are Clean & Oil Free

Note: Check New Gasket for Proper Location Mark

Note: Do Not Coat Head Bolts With Oil

Note: Do Not Install Head With Spark Plugs Installed

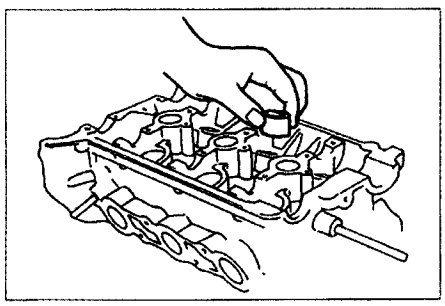


1. Place Head Gasket on Cylinder block
2. Place Cylinder Head on Block Over New Gasket
3. Install All Head Bolts Finger Tight
4. Use 10mm Socket and Torque Wrench and Initially Torque to 150 kg.cm. Wait 10 Minutes and Torque to 350 kg.cm. Wait 15 Minutes and Final Torque to 600 kg.cm

Note: Use Torque Sequence from Left Diagram

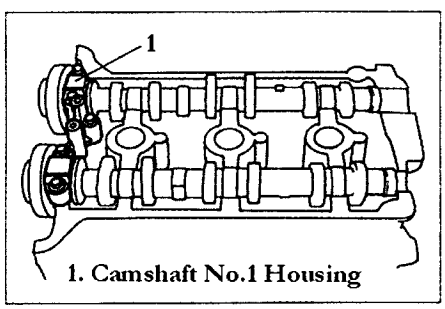
Note: With Timing Chain Removed, Do Not Turn Crankshaft More Than 30 Degrees to the Left

Cylinder Head, Valve Train



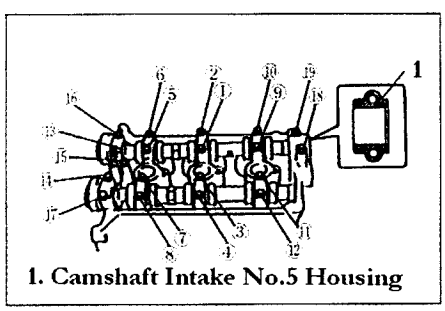
Tappet & Shim Installation

1. Coat Tappet and Shim With New 30W Engine Oil
2. Install Tappet and Shim



1. Camshaft No.1 Housing

3. Cover Camshafts in Engine Oil & Place in Housing
4. Install No.1 Housing First and Finger Tighten.



1. Camshaft Intake No.5 Housing

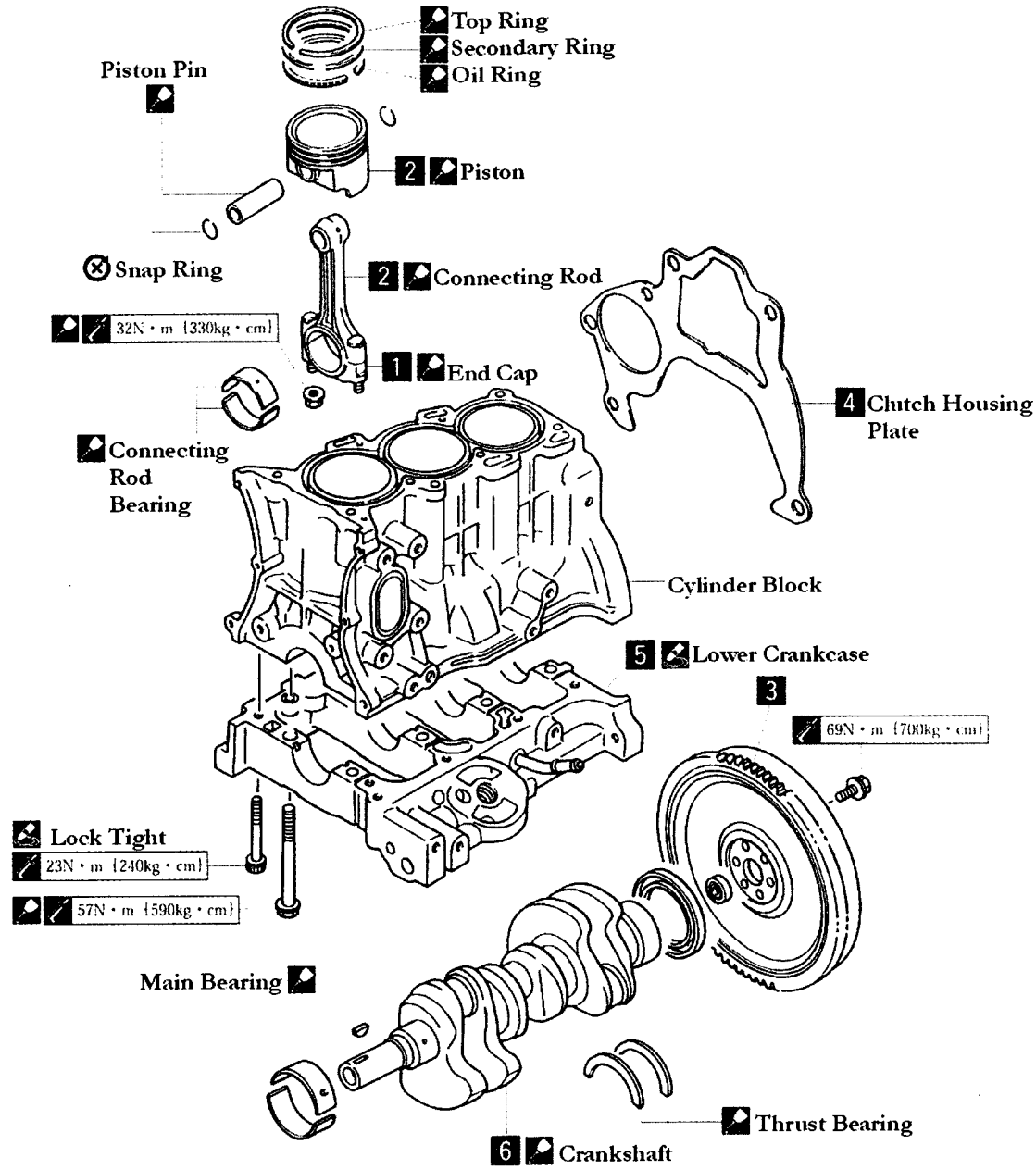
5. Install No.5 Housing
6. Install Reming Caps and Finger Tighten Bolts

Use Torque Sequence Diagram on Left

7. Torque All Bolts to 10N*m (100kg.cm)

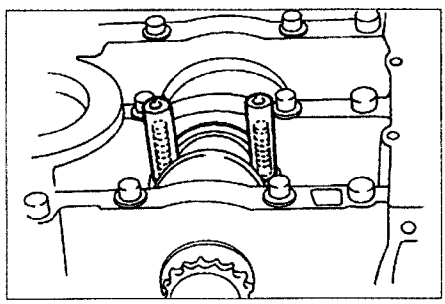
8. Attach Timing Chain and Other Components
9. Complete Intallation & Tune to Vehicle Specifications

Piston, Connecting Rod, Crankshaft, Cylinder Block



Torque Oil Point Sealant Not Reusable 1 Replaceable

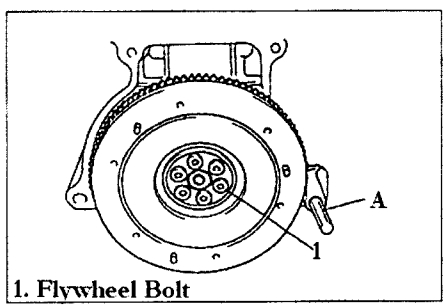
Piston, Connecting Rod, Crankshaft, Cylinder Block



Engine Disassembly

1. Remove Engine
2. Remove Timing Chain Assembly
3. Remove Cylinder Head
4. Rotate Engine & Remove Pistons

Note: Use Vacuum Hose to Cover Connecting Rod Bolts Before Piston Removal



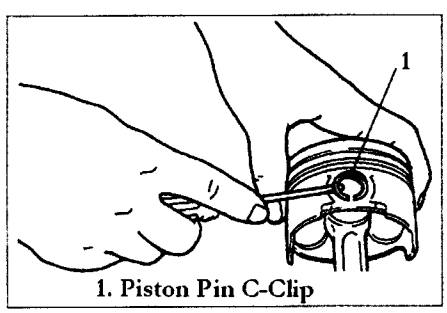
1. Flywheel Bolt

Use Tool A: **09924-17810** Flywheel Holder to Retain Flywheel While Removing Bolts

5. Remove Flywheel

6. Clean Engine Block

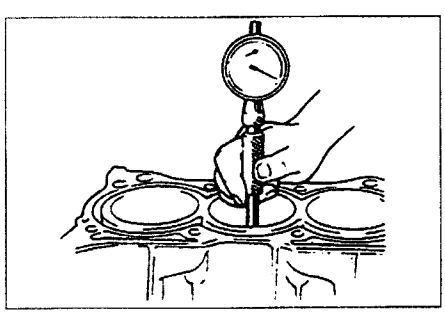
Note: Mark Pistons With Location Information



1. Piston Pin C-Clip

7. Remove Piston Pin C-Clips & Disassemble Pistons

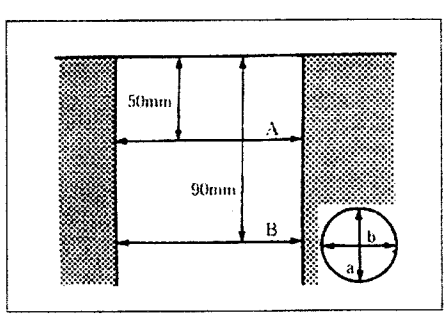
Note: C-Clips Can Not be Reused



Block Inspection

Use Dial Gage and Inspect Cylinder Bore Diameter

Use Two Diagrams on Left for Reference



Limitations

Cylinder Bore: Limit **65.070mm**

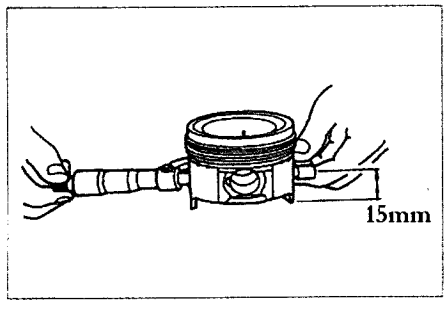
Taper Limit: **0.10mm**

Note: See Parts Manual for Oversize Pistons & Rings

Piston, Connecting Rod, Crankshaft, Cylinder Block

Note: Engines with Over 100,000 Kilometers Piston Must be Replaced
Note: Engines with Over 65,000 Kilometers Piston Rings Must be Replaced

Piston Measurment



Piston Measurment

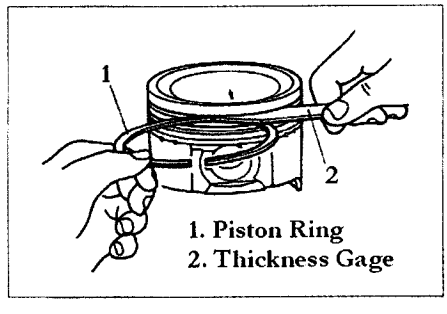
Measure Piston Size Using the Diagram on Left

Measurment Must be Taken 15mm Up From Bottom of Skirt

		Limits
Piston Size (mm)	Stock Size	67.97~67.99
	Over Size 0.25mm	68.22~68.24
	Over Size 0.50mm	68.47~68.49

Piston Gap Clearance: 0.025~0.045mm

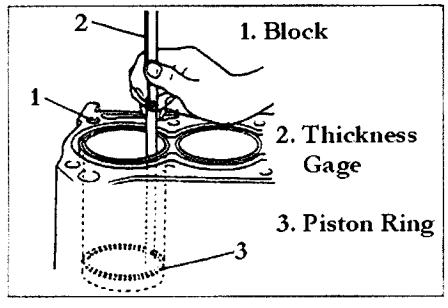
Piston Ring Side Clearance



Piston Ring Specifications

Use Thickness Gage and Inspect Side Clearance

	Piston Ring	Limit	Replace
Ring Gap (mm)	Top	0.03~0.07	0.12
	Secondary	0.02~0.06	0.10
	Oil	0.06~0.15	–

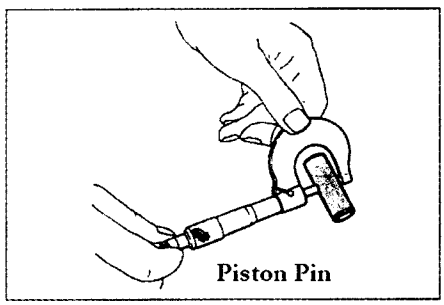


Piston Ring Gap (Bore)
Place Ring in Bore as in Diagram on Left
Measure from Lowest Stroke Point on Up

		Limits	Replace
Piston Ring Gap	Top Ring	0.12~0.27	0.7
	Secondary	0.35~0.50	1.0
	Oil Ring	0.10~0.40	1.5

Piston, Connecting Rod, Crankshaft, Cylinder Block

Piston Pin

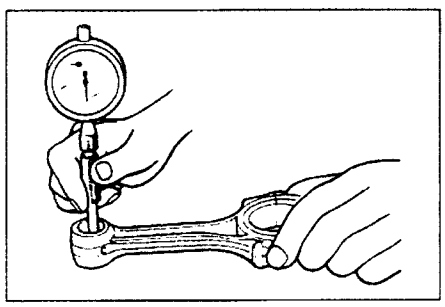


Piston Pin Inspection

Note: C-Clips Can Not be Reused

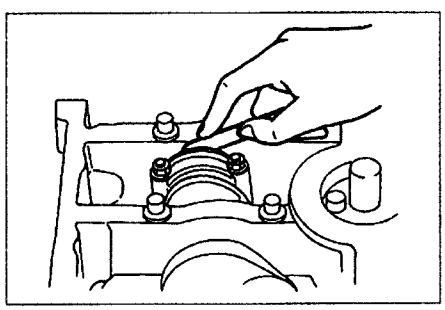
Use The Diagrams on Left & Charts Below to Inspect the Clearances Listed Below

Tools Required: Micrometer & Dial Gage



	Limit
Piston Pin Outside Diameter	17.995~18.000
Piston Boss Inside Diameter	18.006~18.014
Connecting Rod (Small) Inside Dia	18.003~18.011
Piston to Piston Pin Gap (mm)	0.006~0.019
Connecting Rod (Small End) to Piston Pin Gap	0.003~0.016

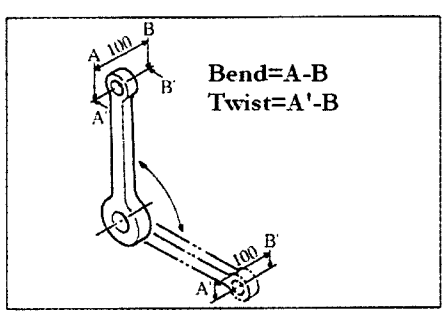
Connecting Rod Inspection



With Crankshaft in Place, Connect Rod and Torque to Specification. Use Thickness Gage & Check Thrust Gap.

	Limit	Over
Thrust Gap	0.11~0.31	0.35

Note: Any Connecting Rod That Fails, Replace.



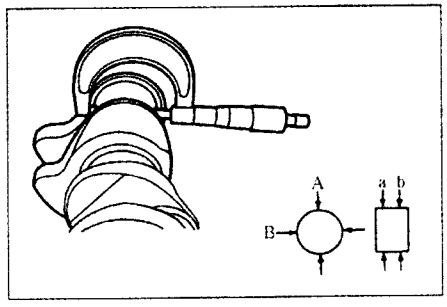
Connecting Rod Alignment Specifications

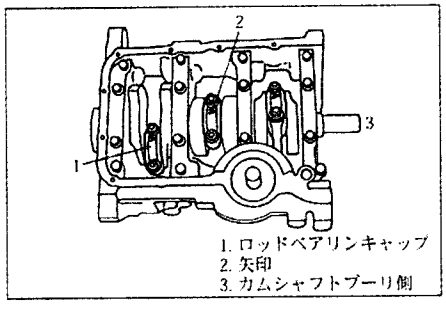
Use Diagram on Left for Reference

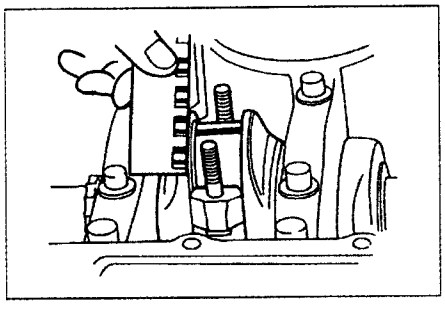
Bend Rate: 0.05mm
Twist Rate: 0.10mm

Piston, Connecting Rod, Crankshaft, Cylinder Block

Crankshaft Meaurment







Crankshaft Inspection

Crankshaft Diameter Round Out Measurment

Tools Required: Micrometer

Taper Limit: 0.01mm

Calculation: A-B
a-b

Note: Crankshaft Found Out of Round Should be Replaced and New Set of Standard Bearings Installed

Connecting Rod Bearing Inspection

1. Remove Bearing Cap
2. Inspect for Wear, Replace if Worn

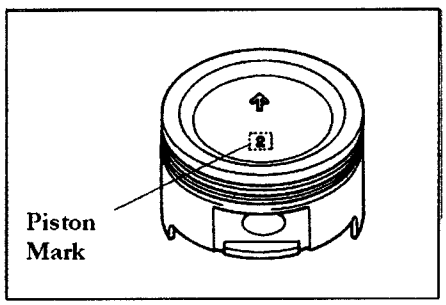
Note: Replace All Bearing if Engine Over 60,000 Kilometers

Crankshaft Cap Toqure: 32N*m (330kg.cm)

Diagram 1. Rod Bearing Cap
2. Identification Stamp
3. Camshaft Pulley Direction

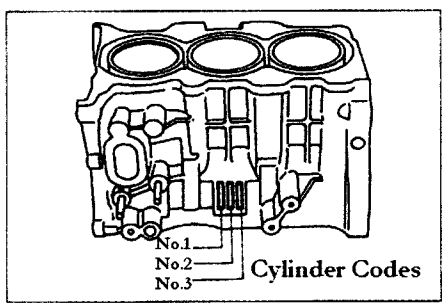
Oil Oriface : Limit 0.020~0.040

Piston, Connecting Rod, Crankshaft, Cylinder Block



Assembly

Note: If Pistons Have Been Replaced Make Sure Proper Markings are Stamped or Stamps Added

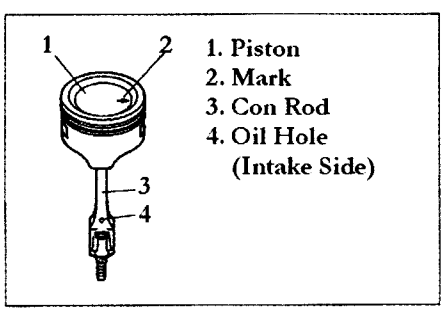


Factory Piston Replacements

Piston		Cylinder		Piston & Cyl Gap (mm)
No.	Out Dia	No.	In Dia	
1	67.9801~67.9900	R	68.001~68.020	0.021~0.0399
1	67.9700~67.9800	B	68.00~68.01	0.02~0.04

R=Red B=Blue

Check Block Tag as in Left Diagram to See if Pistons are Factory Installed Replacements or Oversize.

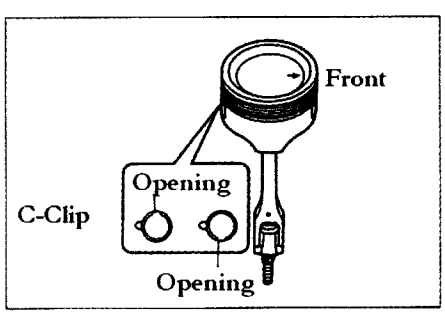


1. Piston
2. Mark
3. Con Rod
4. Oil Hole (Intake Side)

Use Diagram on Left for Proper Connecting Rod Configuration.

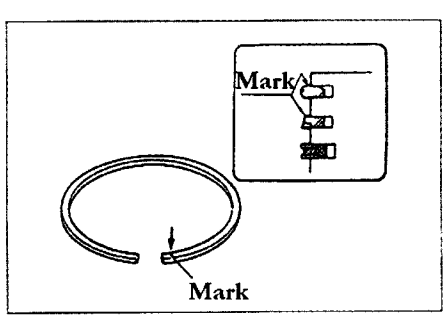
Forward Mark to Front of Engine & Oil Hole Must be Pointed to Intake Direction

Note: Make Sure All Moving Parts are Well Lubricated With 30W Engine Oil



Piston Pin C-Clips

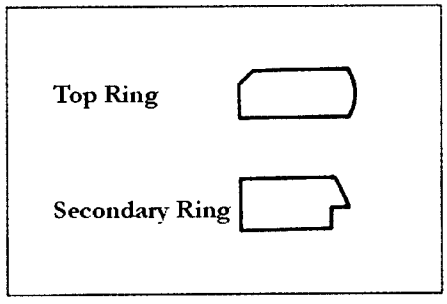
Use Diagram on Left for Installation Location C-Clip Mut Face Either 12 O'Clock or 6 O'Clock Position



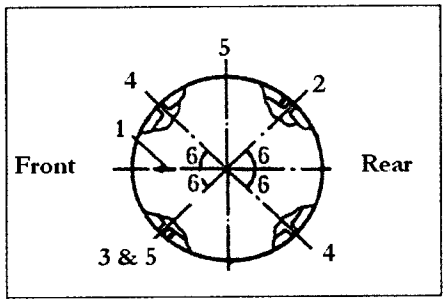
Piston Rings

Install Rings With Marks Facing Upwards

Piston, Connecting Rod, Crankshaft, Cylinder Block



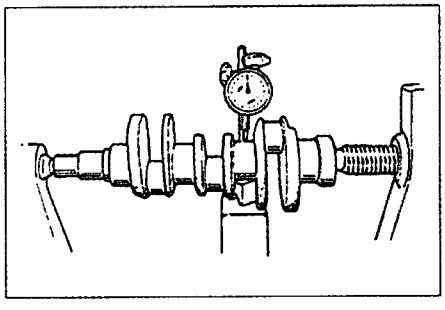
Use Diagram on Left to Verify Ring Type and Facing Direction



Ring Installation Guide

Use the Diagram on Left for Installation Information

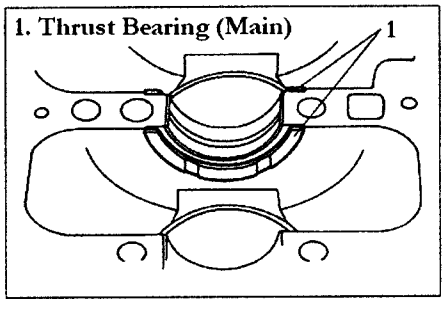
1. Mark (To Front of Engine)
2. Top Ring (Compression)
3. Secondary Ring (Compresion)
4. Oil Ring
5. Oil Ring Spacer
6. 45 Degrees



Crankshaft Center Journal

Measure Round Out

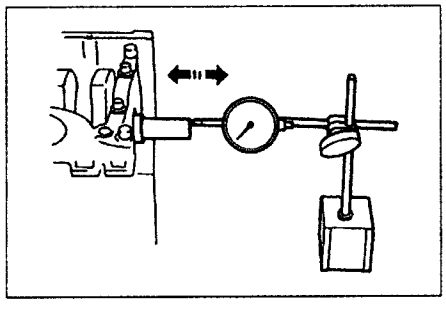
Limit: 0.04mm



Main Bearing

Use Diagram on Left for Proper Installation

Torque: 56N*m (580 kg.cm)



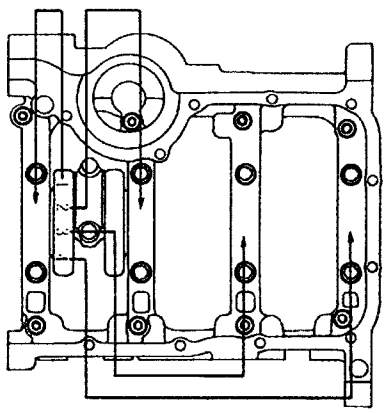
Thrust Bearing Limitations

Front~Rear Limitation: 0.11~0.31mm

Thrust Bearing Thickness Limitation
Limit: 2.500mm
Oversise: 2.563mm

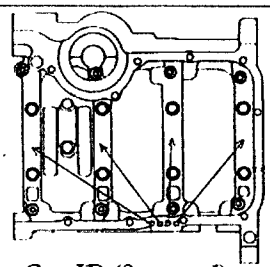
Piston, Connecting Rod, Crankshaft, Cylinder Block

Journal Cap Identification



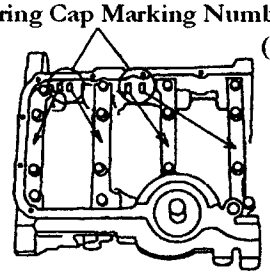
Specifications

	1	2	3
Crankshaft Journal Outside Diameter	44.994 ~45.000	44.988 ~44.994	44.982 ~44.988



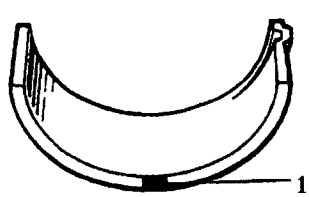
Bearing Cap ID (Stamped)

Bearing Cap Marking Numbers (Paint)



Bearing Cap Diameter

	1	2	3
Bearing Cap Inside Diameter	49.000 ~49.006	49.006 ~49.012	49.012 ~49.018



1. Paint Mark

Bearing Color Codes

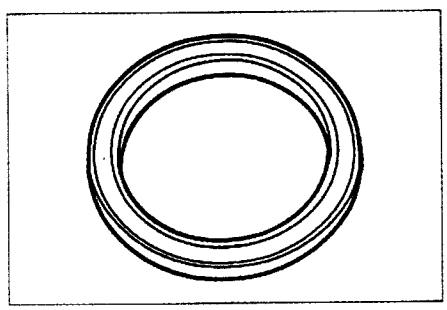
Color Code	Bearing Size Thickness
Green	1.996~2.000
Black	1.999~2.003
No-Color	2.002~2.006
Yellow	2.005~2.009
Blue	2.008~2.012

Piston, Connecting Rod, Crankshaft, Cylinder Block

Crankshaft Specification Continued

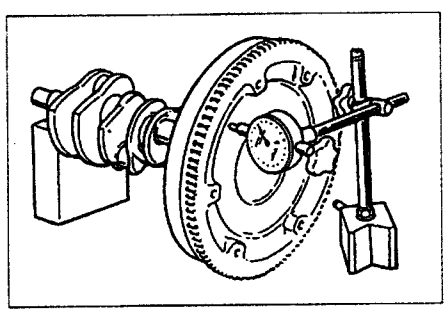
		Crankshaft Journal Stamped #		
		1	2	3
Bearing Cap ID	1	Green	Black	No-Color
	2	Black	No-Color	Yellow
	3	No-Color	Yellow	Blue

Oil Seal



Oil Seal Must be Replaced

Note: See Part Book for Proper Part Number

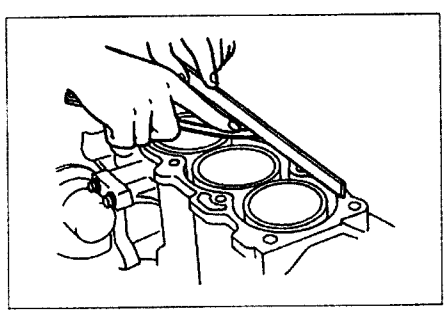


Flywheel Inspection

Tool Required: Dial Gage

Use Dial Gage to Inspect Flywheel Surface Round Out

Limitation: 0.20mm

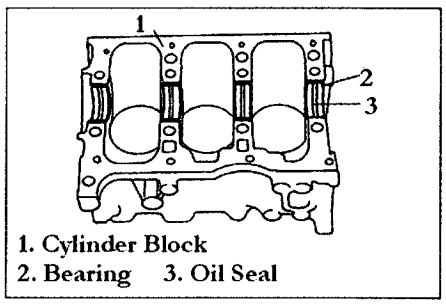


Cylinder Block Deck

Tools Required: Thickness Gage
Straight Edge

Limitation: 0.05mm
(See Previous Section for More Detail)

Piston, Connecting Rod, Crankshaft, Cylinder Block

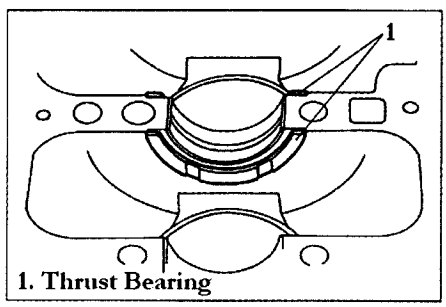


1. Cylinder Block
2. Bearing 3. Oil Seal

Assembly

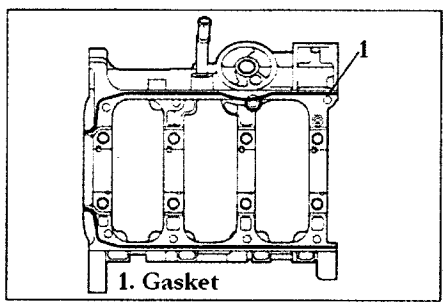
1. Install Bearings

Note: Coat With 30W Engine Oil



1. Thrust Bearing

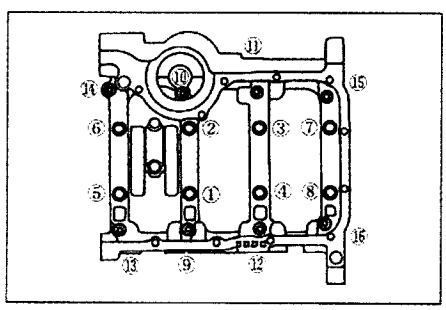
2. Cover New Oil Seal With 30W Engine Oil and Install.



1. Gasket

3. Clean Lower Deck Surface and Apply Sealant. Place New Gasket and Allow to Dry.

Note: Do Not Put Sealant on Top of Gasket



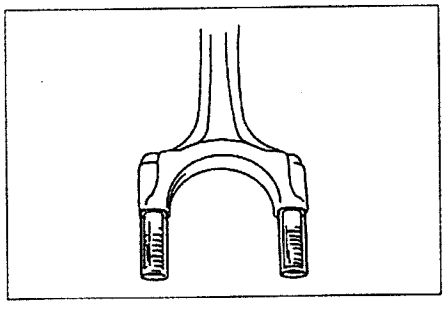
Torque Sequence

4. Coat All Bearing With Fresh Oil. Install Crankshaft. Torque Caps to Specification.

Note: Torque in Stages Until Maximum Torque Level Achieved
Torque: Bolts: 1~8: 580kg.cm
Bolts: 9~16 400 kg.cm

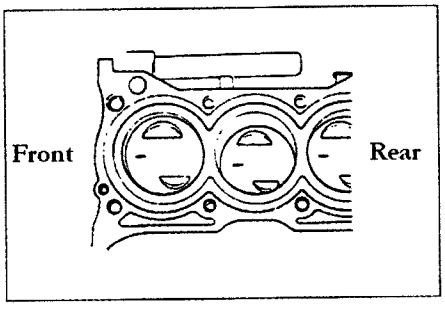
5. Sping Crankshaft to Verify Free Movement. If Binding Occurs Remove Caps and Troubleshoot Problem.

Piston, Connecting Rod, Crankshaft, Cylinder Block

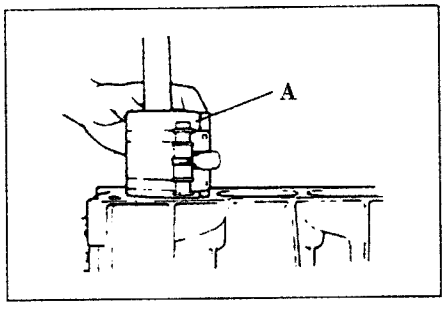


6. Place Used Rubber Vacuum Hose on Connecting Rod Bolts Before Installation

7. Coat With 30W Engine Oil & Intall Upper Connecting Rod Bearing



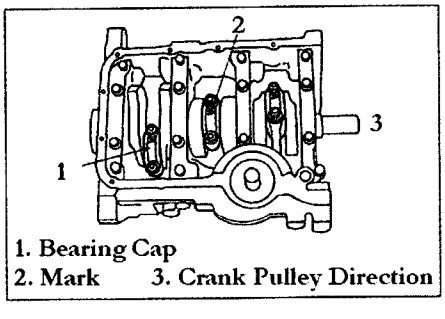
9. Verify Mark on Piston is Facing Forward to Front of Engine



10. Coat Piston, Rings, and All Componnents With 30W Engine Oil.

11. Use Tool A: **09916-77310** (Ring Compressor) and Install Piatons.

Note: Only Use Wood or Plactic Handle to Install Pistons.



1. Bearing Cap
2. Mark 3. Crank Pulley Direction

12. Install Lower Connecting Rod Bearing in Cap, Coat with 30W Engine Oil and Attach Caps.

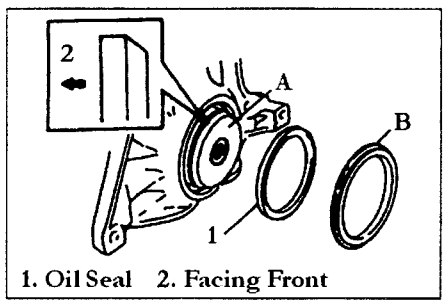
13. Torque to Specifications

Torque: 330 kg.cm

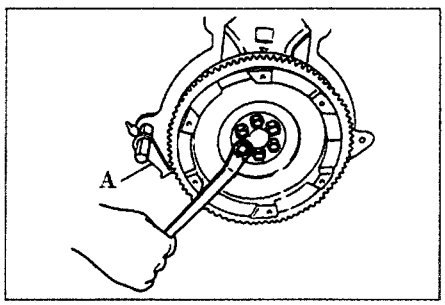
Note: Turn Over Engine With Crankshaft Adapter And Check For Smoothness. Use Abundant Oil Coating.

14. Install Cylinder Head & Timing Chain
15. Attach Oil Pan

Rear Oil Seal



1. Oil Seal 2. Facing Front



Engine Series: K6A-1060037~

Rear Oil Seal Installation

Tools: A: **09911-97020** Oil Seal Guide
B: **09911-97030** Oil Seal Installer

16. Coat New Oil Seal and Install

17. Use Tool A: **09924-17810** Flywheel Holder & Install Flywheel.

Torque: 700 kg.cm

Service Data

				Benchmark	Usage Limits	Memo
Valve Gap	IN	Cold		0.18-0.23	-	
		Hot		0.21-0.27	-	
	EX	Cold		0.18-0.23	-	
		Hot		0.20-0.26	-	
Cylinder Head	Cylinder Matching Surface(mm)			-	0.05	
	Manifold Attaching Surface(mm)			-	0.10	
	Valve Seat	Matching width(mm)	IN	1.1-1.5	-	
			EX	1.2-1.6	-	
		Angle(°)	Seat face	45	-	
			Flat surface	IN:30,EX:15	-	
	Valve	Valve Head Thickness(mm)	IN	1.0	0.7	
			EX	1.15	0.5	
		Valve Head (mm)		_-	0.08	
	Valve Guide Internal Diameter(mm)		IN	5.500-5.512	5.54	
			EX	5.500-5.512	5.54	
	Valve Guide External Diameter(mm)		IN	5.465-5.480	-	
			EX	5.440-5.455	-	
	Gap Between Valve Guide and Valve System(mm)		IN	0.020-0.047	0.07	
			EX	0.045-0.072	0.09	
	Height of the Valve Guide			11	-	
	Valve Spring	Free Length(mm)		36.30	-	
		Tensile @ Spring Height 28.5mm (N{kgf})		132-152 {13.5-15.5}	125(12.8)	
		Straightness Limit (mm)		0.0-1.3	-	
	(NA) Gap between Valve Rocker Arm Shaft(mm)			-	-	
	NA (mm)			-	-	
	Cam Shaft Round Out (mm)			-	0.10	
	Height Of CAM	Normal	IN	37.54-37.70	-	
			EX	37.05-37.21	-	
		Turbo (Except Works R)	IN	37.66-37.82	-	
			EX	37.75-37.91	-	
		Works R	IN	38.24-38.40	-	
			EX	38.24-38.40	-	
	Cylinder Head's Cam Shaft Bearings Internal Diameter (mm)		1	23.00-23.021	23.171	
			2			
			3			
			4			
	Cam Shaft Bearings External Diameter(mm)		①	22.934-22.955	22.784	
			②			
			③			
			④			
	Gap of Cam Shaft Oil Orifice (mm)			0.045-0.087	0.12	

Term				Benchmark	Usage Limit	Memo
Cylinder	Cylinder Matching Surface(mm)			-	0.05	
	Internal Diameter(mm)			68.00-68.020	68.070	
	Bore Limit in Internal Diameter(mm)			-	0.10	
	Taper of Internal Diameter(mm)			-	0.10	
	Main Journal Internal Diameter(mm)			49.00-49.018	-	
	Internal Expansion Limits(mm)			-	68.2	
Piston	Piston External Diameter			67.970-67.990	-	
	Gap between Piston and Cylinder			0.010-0.050	0.10	
	Piston Ring	Gap of Assembly Miter(mm)	0.7	0.12-0.27	0.7	
			0.10	0.35-0.50	0.10	
			1.5	0.1-0.4	1.5	
		Gap of Free Miter(mm)	-	6.9	-	
			-	8.7	-	
		Gap between Ring and Ring Chase(mm)	0.12	0.030-0.070	0.12	
			0.10	0.020-0.060	0.10	
			-	0.06-0.15	-	
Connecting Rod	Piston Pin Boss Internal Diameter			18.006-18.014	-	
	Piston Pin External Diameter			17.995-18.000	-	
	Bend(mm)			-	0.05	
	Twist(mm)			-	0.10	
	Large End Internal Diameter(mm)			41.000-41.018	-	
	Large End Thrust Gap(mm)			0.11-0.31	0.35	
	Connecting Rod Bearing Oil Gap(mm)			0.020-0.040	0.065	
Crankshaft	Straightness(mm)			-	0.04	
	Journal, Pin Straightness(mm)			-	0.01	
	Journal Pin Taper(mm)			-	0.01	
	Journal External Diameter(mm)			44.982-45.000	-	
	Pin External Diameter(mm)			37.982-38.000	-	
	Gap Crankshaft Bearing			0.020-0.040	0.065	
				0.11-0.31	0.35	

Conversion Charts

CONVERSION OF TORQUE					
Convert			Convert		
From	To	Multiply	From	To	Multiply
lb.in.	oz.in.	16	oz.in.	lb.in.	.0625
lb.in.	lb.ft.	.08333	lb.ft.	lb.in.	12
lb.in.	kg.cm.	1.1519	kg.cm.	lb.in.	.8681
lb.in.	kg.m.	.011519	kg.m.	lb.in.	86.81
lb.in.	Nm	.133	Nm	lb.in.	8.85
lb.in.	dNm	1.13	dNm	lb.in.	.885
lb.ft.	kg.m.	.1382	kg.m.	lb.ft.	7.236
lb.ft.	Nm	1.356	Nm	lb.ft.	.7376
Nm	dNm	10	dNm	Nm	.10
Nm	kg.cm.	10.2	kg.cm.	Nm	.09807
Nm	kg.m.	.102	kg.m.	Nm	9.807

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