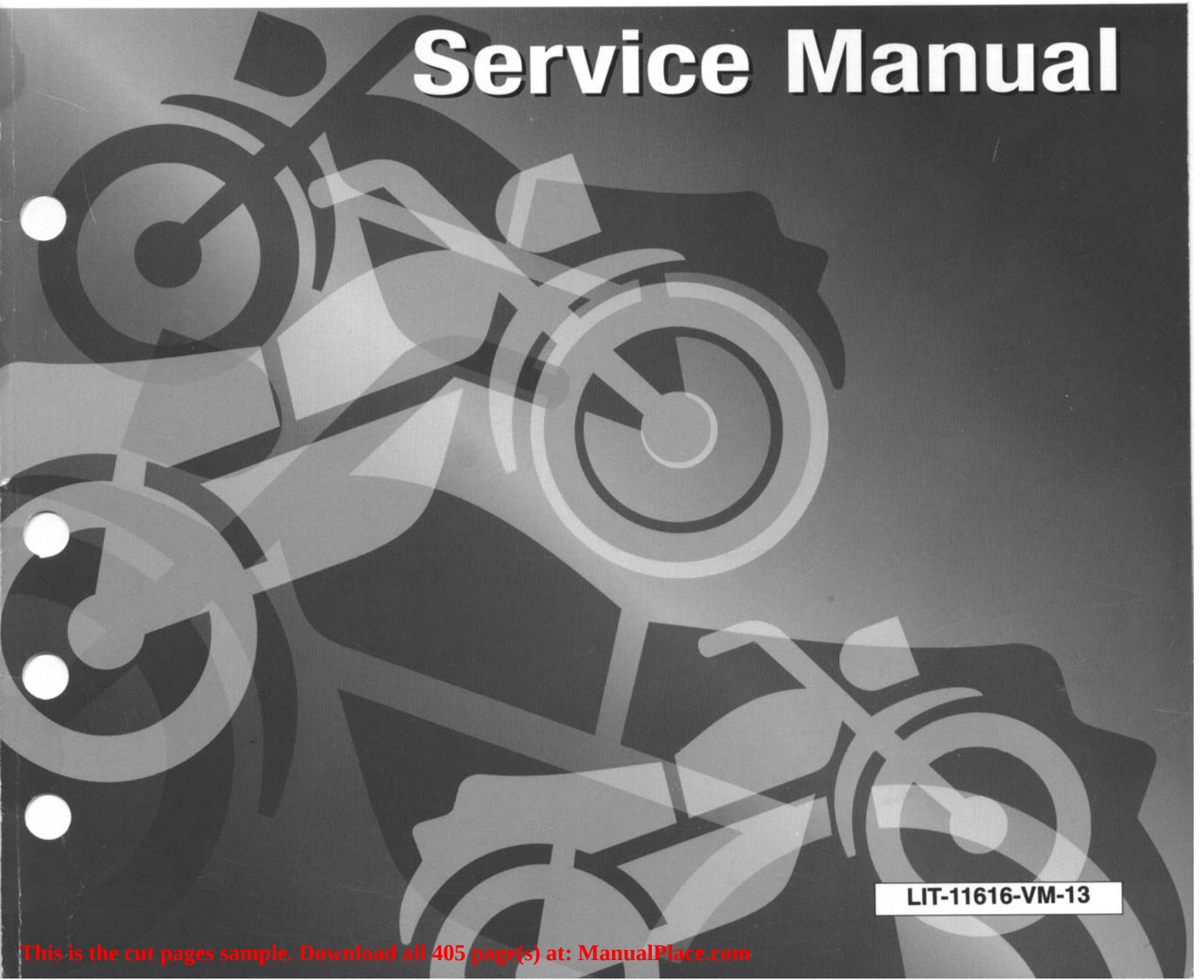
YAMAHA

VMX12N, NC~K, KC

Service Manual



LIT-11616-VM-13

YAMAHA

VMX12H
VMX12HC

SUPPLEMENTARY SERVICE MANUAL

LIT-11616-10-12

FOREWORD

This Supplementary Service Manual has been prepared to introduce new service and data for the VMX12H/VMX12HC. For complete service information procedures it is necessary to use this Supplementary Service Manual together with the following manual.

VMX12N SERVICE MANUAL: 2WE-28197-10
VMXI2F SUPPLEMENTARY SERVICE MANUAL: 2WE-28197-11

VMX 12H/VMX12HC
SUPPLEMENTARY
SERVICE MANUAL

NOTICE

This model has been designed and manufactured to perform within certain specifications in regard to performance and emissions. Proper service with the correct tools in necessary to ensure that the motorcycle will operate as designed. If there is any question about a service procedure, it is imperative that you contact a Yamaha dealer for any service information changes that apply to this model. This policy is intended to provide the customer with the most satisfaction from his motorcycle and to conform with federal environmental quality objectives.

NOTE:
For USA, California:
This Service Manual contains information regarding periodic maintenance to the emission control system. Please read this material carefully.

PARTICULARY IMPORTANT INFORMATION

This material is distinguished by the following notation.

a	The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!
⚠ WARNING	Failure to follow WARNING instructions could result in severe injury **or** death to the motorcycle operator, a bystander, or a person inspecting or repairing the motorcycle.
CAUTION:	A CAUTION indicates special precautions that must be taken to avoid damage to the motorcycle.
NOTE:	**A** NOTE provides key information to make procedures easier or clearer.

HOW TO USE THIS MANUAL

CONSTRUCTION OF THIS MANUAL

This manual consists of chapters for the main categories of subjects. (See "Illustrated **symbols**")

1st title ①: This is a chapter with its symbol on the upper right of each page.

2nd title ②: This title appears on the upper of each page on the left of the chapter symbol. (For the chapter "Periodic inspection and adjustment" the 3rd title appears.)

3rd title ③: This is a final title.

MANUAL FORMAT

All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspections.

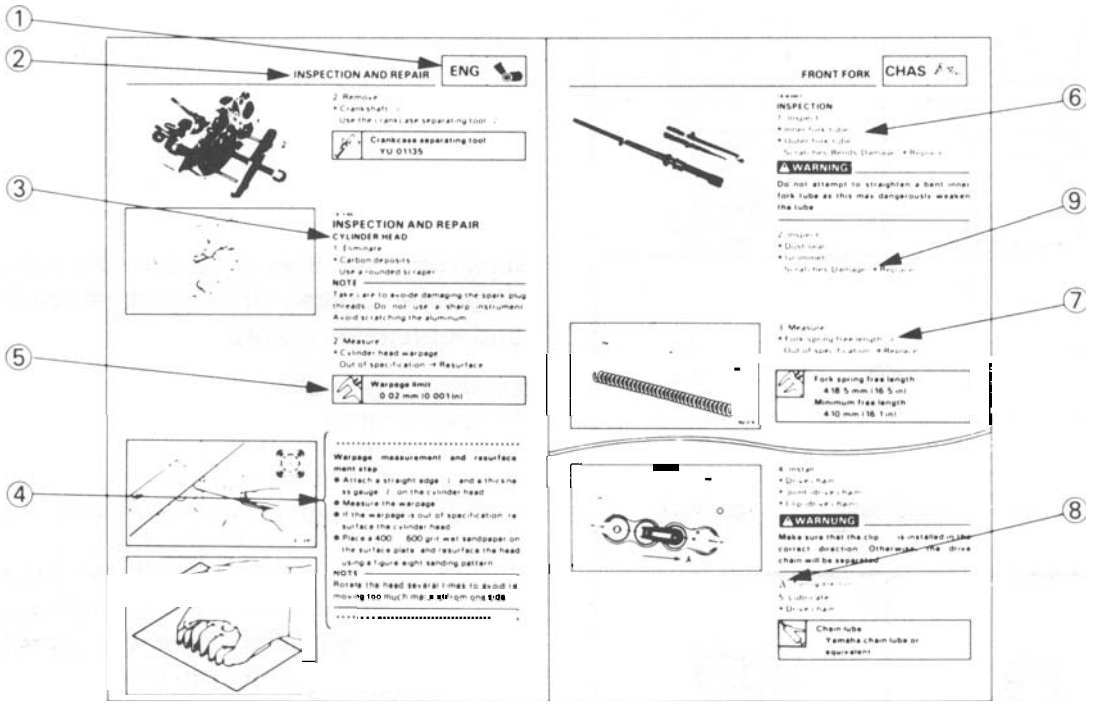
A set of particularly important procedure ④ is placed between a line of asterisks "✻" with each procedure preceded by "●".

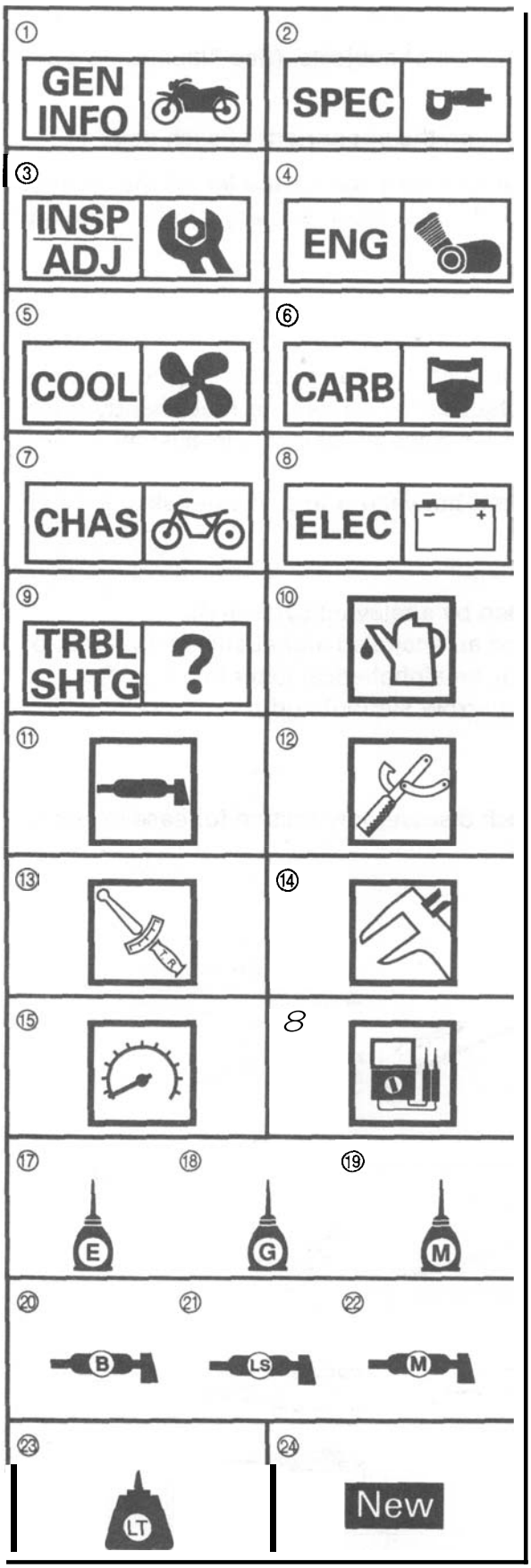
IMPORTANT FEATURES

- Data and a special tool are framed in a box preceded by a relevant symbol ⑤.
- An encircled numeral ⑥ indicates a part name, and an encircled alphabetical letter data or an alignment mark ⑦, the others being indicated by an alphabetical letter in a box ⑧.
- A condition of a faulty component will precede an arrow symbol and the course of action required ⑨.

EXPLODED DIAGRAM

Each chapter provides exploded diagrams before each disassembly section for ease in identifying correct disassembly and assembly procedures.





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ILLUSTRATED SYMBOLS

Illustrated symbols ① to ⑨ are printed on top right of each page and indicate the subject of each chapter.

① General information
② Specifications
③ Periodic inspections and adjustments
④ Engine
⑤ Cooling system
⑥ Carburetion
⑦ Chassis
⑧ Electrical
⑨ Troubleshooting

Illustrated symbols ⑩ to ⑯ are used to identify the specifications appearing in the text.

⑩ Filling fluid
⑪ Lubricant
⑫ Special tool
⑬ Torque
⑭ Wear limit, clearance
⑮ Engine speed
⑯ Ω, V, A

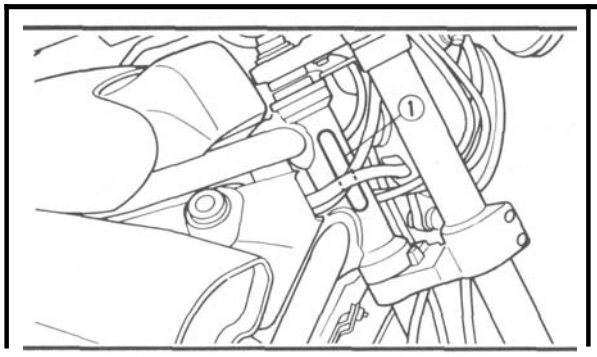
Illustrated symbols ⑰ to ㉒ in the exploded diagrams indicate the types of lubricants and lubrication points.

⑰ Apply engine oil
⑱ Apply gear oil
⑲ Apply molybdenum disulfide oil
⑳ Apply wheel bearing grease
㉑ Apply lightweight lithium-soap base grease
㉒ Apply molybdenum disulfide grease

Illustrated symbols ㉓ to ㉔ in the exploded diagrams indicate the where to apply locking agent ㉓ and when to install new parts ㉔.

㉓ Apply locking agent (LOCTITE®)
㉔ Replace

CONTENTS



GENERAL INFORMATION

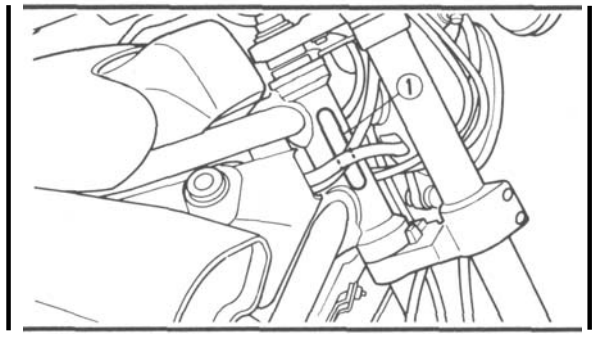
MOTORCYCLE IDENTIFICATION

VEHICLE IDENTIFICATION NUMBER

The vehicle identification number ① is stamped into the right side of the steering pipe.

Starting serial number:
JYA2WEE0 ✳TA050101 (USA)
JYA2WFC0 ✳TA012101 (California)

NOTE:
The vehicle identification number is used to identify your motorcycle and may be used to register your motorcycle with the licensing authority in your state.

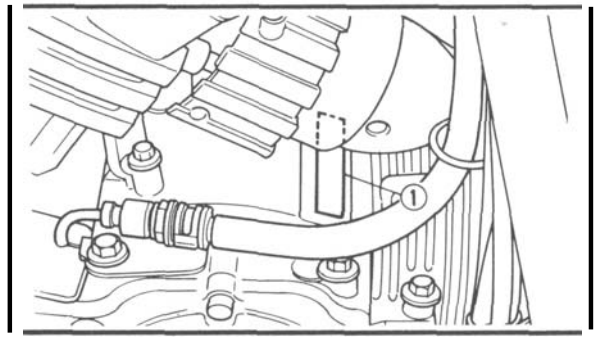


FRAME SERIAL NUMBER

The frame serial number ① is stamped into the right side of the steering pipe.

Starting serial number:
2EN-042101 (EUR)

NOTE:
The first three digits of these numbers are for model identifications; the remaining digits are the unit production number.



ENGINE SERIAL NUMBER

The engine serial number ① is stamped into the crankcase.

Starting serial number:
2WE-050101 (USA)
2WF-012101 (California)
2EN-042101 (EUR)

NOTE:
- The first three digits of these numbers are for model identification; the remaining digits are the unit production number.
- Designs and specifications are subject to change without notice.

SPECIAL TOOLS

The proper special tools are necessary for complete and accurate tune-up and assembly. Using the correct special tool will help prevent damage caused by the use of improper tools or improvised techniques. The shape and part number used for the special tool differ by country, so two types are provided.

Refer to the list provided to avoid errors when placing an order.

P/N. YM- □□□□□, YU-□□□□□
YS- □□□□□, YK-□□□□□
ACC-□□□□□ } For US, CDN

P/N. 90890- □□□□□ } Except for US, CDN

FOR ENGINE SERVICE

Oil filter wrench
YU-38411
P/N. 90890-01426

This tool is used to remove and install the oil filter.

SPECIFICATIONS

GENERAL SPECIFICATIONS

Model	VMX12
Model code:	3JPM (USA) 3JPN (California) 3LRA (EUR)
Engine starting number:	2WE-050101 (USA) 2WF-012101 (California) 2EN-042101 (EUR)
Vehicle identification number:	JYA2WEE0*TA050101 (USA) JYA2WFC0 * TA012101 (California)
Frame starting number:	2EN-042101 (EUR)
Basic weight: With oil and full fuel tank	283 kg (624 lb) (USA) 284 kg (626 lb) (California) 281 kg (620 lb) (EUR)

MAINTENANCE SPECIFICATIONS

ENGINE

Model		VMX12
Carburetor:		
I. D. Mark		1FK02 (USA), 2WF02 (California), 3LR01 (EUR)
Main jet	(M.J)	#152.5 (USA, California), #150 (EUR)
Main air jet	(M.A.J)	82.0
Jet needle	(J.N)	5EZ43-1 (USA), 5EZ50-1 (California), 5EZ19-3 (EUR)
Needle jet	(N.J)	Y-0
Pilot jet	(P.J)	#37.5 (USA, California), #42.5 (EUR)
Pilot air jet	(P.A.J. 1)	#90 (USA), #100 (California), #95 (EUR)
Pilot screw	(PS)	2-1/4 (USA), 3 (California), 2-1/2 (EUR)
Pilot outlet	(P.O)	0.9
Bypass 1	(B.P.I)	0.8
Bypass 2	(B.P.2)	0.8
Bypass 3	(B.P.3)	0.9
Valve seat size	(V.S)	1.5
Starter jet	(G.S.1)	#45
Starter jet	(G.S.2)	#0.8
Throttle valve size	(Th.V)	#125 (USA, EUR), #130 (California)
Fuel level	(F.L)	15 ~ 17 mm (0.59 ~ 0.66 in)
Engine idling speed		950 ~ 1,050 r/min (USA, EUR), 1,050 ~ 1,150 r/min (California)
Vacuum pressure at idling speed		26.7 kPa (200 mmHg, 7.87 in Hg) (USA, EUR) 33.3 kPa (250 mmHg, 9.84 in Hg) (California)

ELECTRICAL

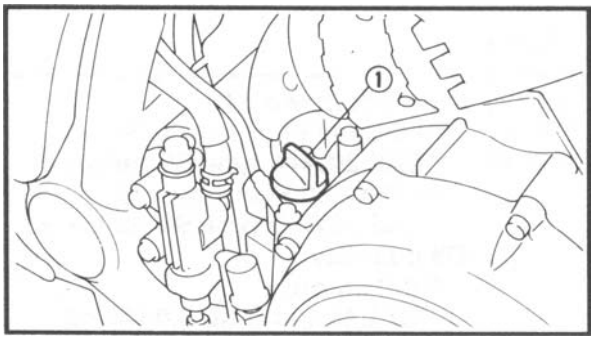
Model	VMX12
Rectifier:	
Model / manufacturer	SH662-12/ SHINDENGEN
Capacity	25 A
Withstand Voltage	200 V
Electric starter system:	
TYPe	Constant mesh type
Starter motor:	
Model / manufacturer	SM-13 / MITSUBA
output	0.65 kW
Brush overall length	12.5 mm (0.49 in)
<Limit>	<5.0 mm (0.20 in)
Commutator diameter	28 mm (1.10 in)
<Wear limit>	<27 mm (1.06 in)>
Mica undercut	0.7 mm (0.03 in)
Starter switch:	
Model / manufacturer	MS5D-191/ HITACHI
Amperage rating	100 A
Coil winding resistance	3.9 ~ 4.7 Ω at 20°C (68°F)
Thermostatic switch:	
Model / manufacturer	2EL (USA), 47X (California, EUR)/ NIHON THERMOSTAT

PERIODIC INSPECTION AND ADJUSTMENT

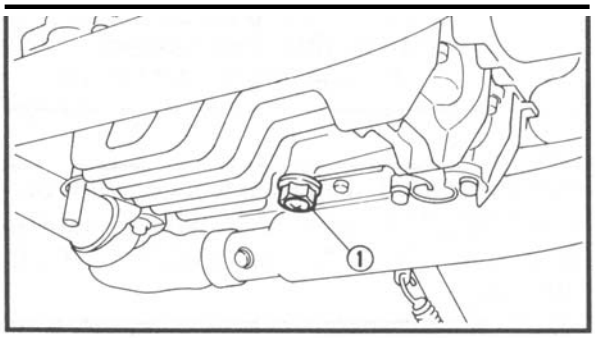
ENGINE

ENGINE OIL REPLACEMENT

1. Start the engine and let it warm up for several minutes.
2. Stop the engine and place an oil pan under the drain bolt.



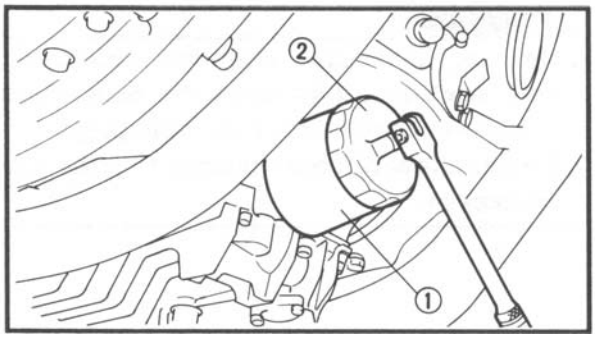
3. Remove:
- Oil filler cap ①



4. Remove:
- Drain bolt ① (with gasket)

Drain the crankcase of its oil.

5. If the oil filter is to be replaced during this oil change, remove the following parts and reinstall them.



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Replacement steps:

- Remove the oil filter ① using the oil filter wrench ②.

Oil filter wrench:
YU-38411,90890-01426

- Apply engine oil to the O-ring ③ of the new oil filter.

NOTE:

Make sure the O-ring ③ is positioned correctly.

- Tighten the oil filter using the oil filter wrench.

Oil filter:
18 Nm (1.8 m • kg, 13 ft • lb)

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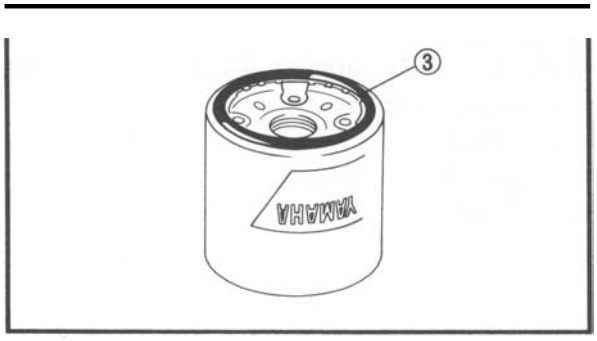
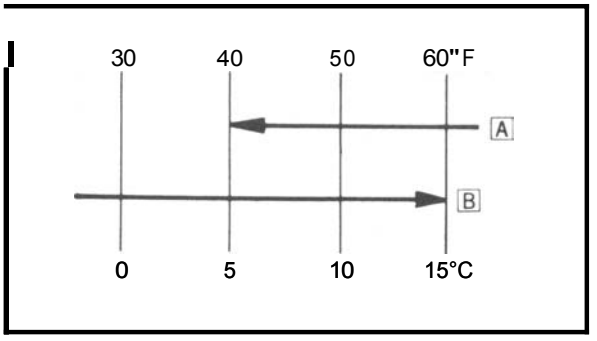


Drain bolt:
43Nm(4.3m-kg,31ft• lb)

NOTE:
Always use a new gasket.



7.Fill:
- Crankcase

Recommended oil:
At 5°C (40°F)or higher [A]:
SAE 20W40 type SE motor oil
At 15°C (60°F)or lower [B]:
SAE 10W30 type SE motor oil
Oil quantity:
Total amount:
4.7 L (4.1 Imp qt, 5.0 US qt)
Periodic oil change:
3.5 L (3.1 Imp qt, 3.7 US qt)
With oil filter replacement:
3.8 L (3.3 Imp qt, 4.0 US qt)

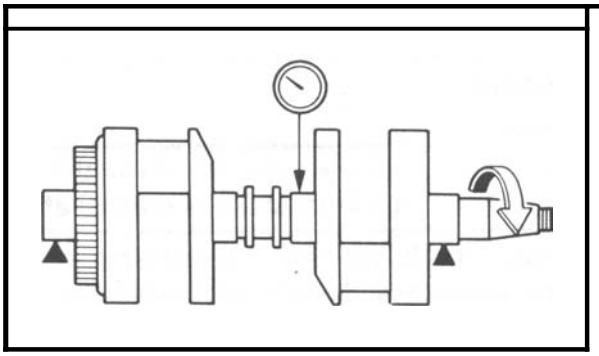
NOTE:
Recommended oil classification: API Service "SE", "SF" and "SG" type or equivalent (e.g. "SF-SE", "SF-SE-CC", "SF-SE-SD" etc.).

CAUTION:
- Do not add any chemical additives. Engine oil also lubricates the clutch and additives could cause clutch slippage.
- Do not allow foreign material to enter the crankcase.

8.Install:
- Oil filler cap

9.Warm up the engine for a few minutes, then stop the engine.

10.Inspect:
- Engine (for oil leaks)
- Oil level



ENGINE OVERHAUL

INSPECTION AND REPAIR

CRANKSHAFT AND CONNECTING ROD

1.Measure:
- Runout (crankshaft)
  Out of specification → Replace.

Runout:
Less than 0.03 mm (0.0012 in)

21nspect:
- Main journal surfaces
- Crank pin surfaces
- Bearing surfaces
  Wear/Scratches → Replace.

3.Measure:
- Oil clearance (main journal)
  Out of specification → Replace bearing.

Oil clearance:
0.020 ~ 0.038 mm
(0.0008 ~ 0.0015 in)

****

Measurement steps:

CAUTION:

Do not interchange the bearings and connecting rod. They must be installed in their original positions, or the correct oil clearance may not be obtained causing engine damage.

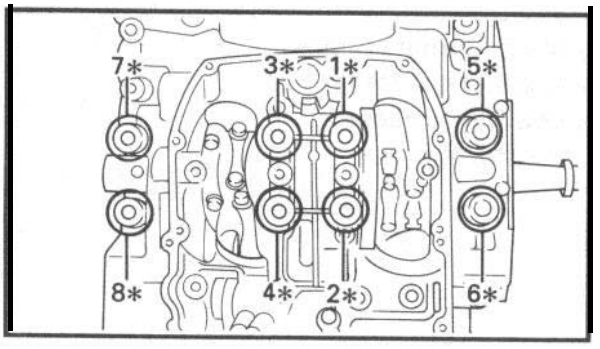
- Clean the bearings, main journals and bearing portions of the crankcase.
- Place the crankcase (upper) on a bench in an upside down position.
- Install the upper half of the bearings and the crankshaft into the crankcase (upper).

NOTE:
Align the projection of the bearing with the notch in the crankcase.

- Put a piece of Plastigauge® on each main journal.

NOTE:
Do not put the Plastigauge® over the oil hole in the main journal of the crankshaft.

- Install the lower half of the bearings into the crankcase (lower) and assemble the crankcase halves.



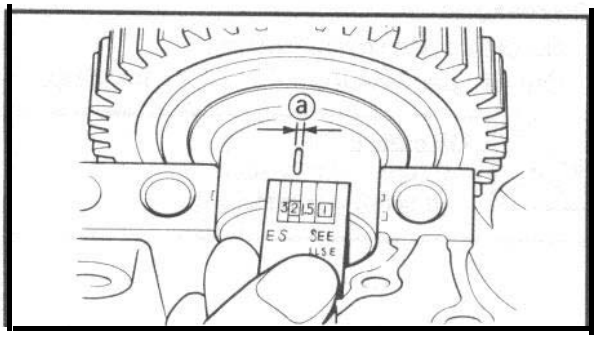
NOTE:
- Align the projection of the bearing with the notch in the crankcase.
- Do not move the crankshaft until the oil clearance has been completed.

- Tighten the bolts to specification in the tightening sequence cast on the crankcase.

	Bolt (Crankcase-M10): 40 Nm (4.0 m•kg, 29 ft•lb)

* With a washer

- Remove the crankcase (lower) and lower half of the bearing.
- Measure the compressed Plastigauge®' width ⓐ on each main journal.
  If oil clearance is out of specification, select a replacement bearing.



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4. Measure:
- Oil clearance (crank pin)
  Out of specification → Replace bearing.

	Oil clearance: **0.021 ~ 0.039 mm** (0.0008 ~ 0.0015 in)

****

Measurement steps:

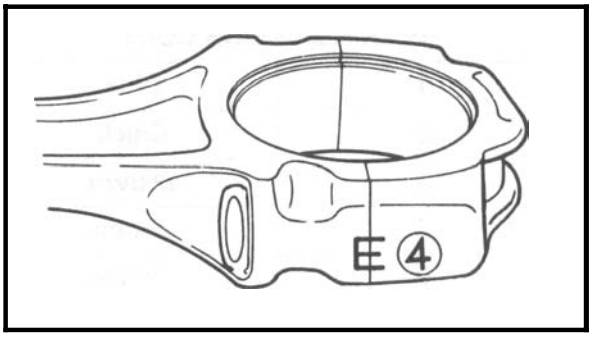
CAUTION:
Do not interchange the bearings and connecting rod. They must be installed in their original positions, or the correct oil clearance may not be obtained causing engine damage.

- Clean the bearings, crank pins and bearing portions of the connecting rods.
- Install the upper half of the bearing into the connecting rod and lower half of the bearing into the connecting rod cap.

NOTE:
Align the projection of the bearing with the notch of the cap and connecting rod.

- Put a piece of Plastigauge® on the crank pin.
- Assemble the connecting rod halves.

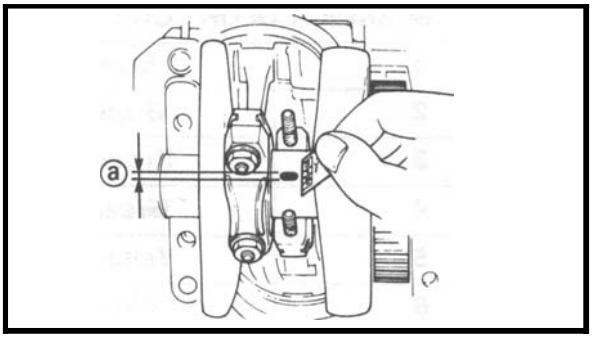
NOTE:
- Do not move the connecting rod or crankshaft until the oil clearance measurement has been completed.
- Apply molybdenum disulfide grease to the bolts, threads and nut seats.
- Make sure the "Y" marks on the connecting rods face the left side of the crankshaft.
- Make sure that the letters on both components align to from a perfect character.



- Tighten the nuts.

Nut:
36 Nm (3.6 m • kg, 25 ft • lb)

CAUTION:
Tighten to full torque specification without pausing. Apply continuous torque between 3.0 and 3.8 m•kg. Once you reach 3.0 m•kg, DO NOT STOP TIGHTENING until final torque is reached. If tightening is interrupted between 3.0 and 3.8 m•kg, loosen nut to less than 3.0 m•kg and start again.



- Remove the connecting rods and bearings.
- Measure the compressed Plastigauge® width ⓐ on each crank pin.
  If oil clearance is out of specification, select a replacement bearing.

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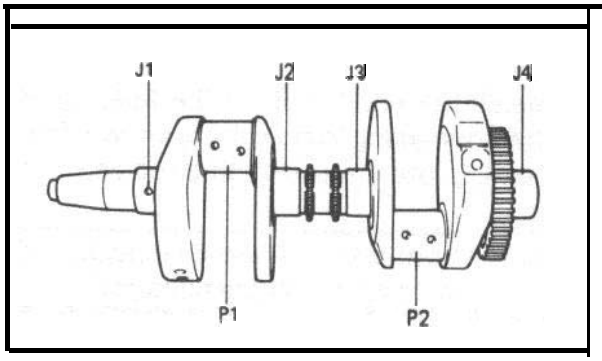
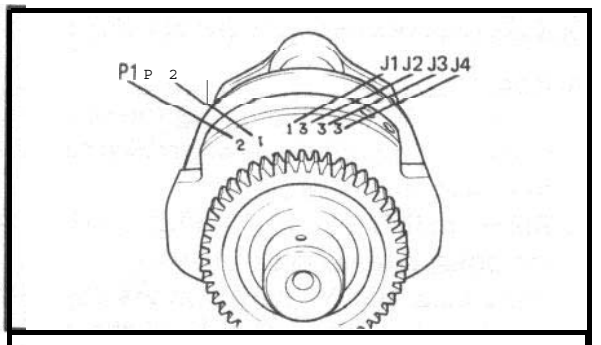
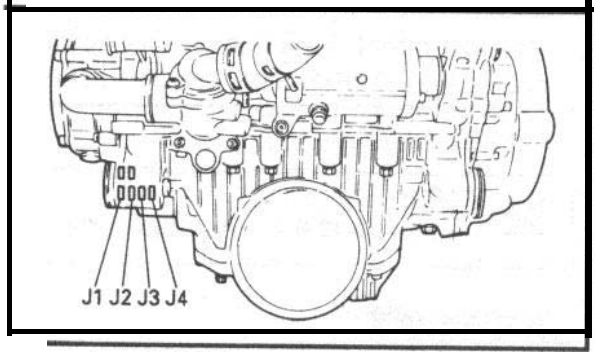
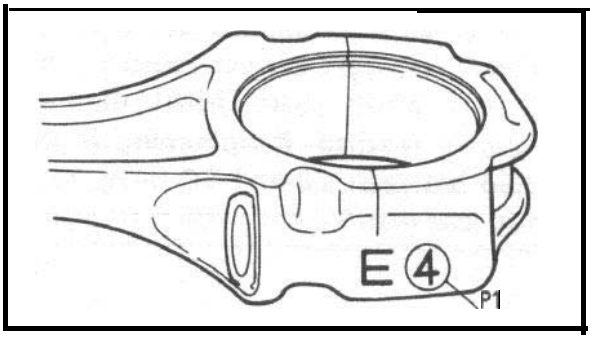








5. Select:
- Main journal bearing ($J_1 \sim J_4$)
- Crank pin bearing ($P_1 \sim P_4$)

****

Selection of bearings:

Example 1: Main journal bearing

- If "J" on the crankcase is "6" and "1" on the crankweb, then the bearing size for "J_1" is:

Bearing size of J_1:
Crankcase J_1 – Crankweb J_1 =
6 – 1 = 5 (Yellow)

BEARING COLOR CODE	
1	Blue
2	Black
3	Brown
4	Green
5	Yellow
6	Pink
7	Red

Example 2: Crank pin bearing

- If "P_1" on the connecting rod is "4" and "2" on the crankweb, then the bearing size for "P_1" is:

Bearing size of P_1:
Connecting rod P_1 – Crankweb P_1 =
4 – 2 = 2 (Black)

BEARING COLOR CODE	
1	Blue
2	Black
3	Brown
4	Green
5	Yellow
6	Pink

****

BALANCER SHAFT

1.Measure:

- Oil clearance (balancer shaft bearing)
  Out of specification → Replace bearing.

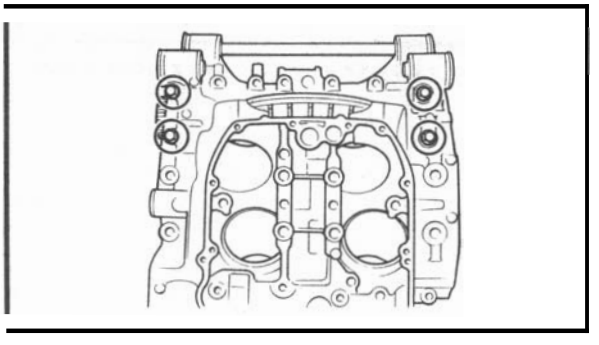
Oil clearance:
0.020 ~ 0.048 mm
(0.0008 ~ 0.002 in)

****

Measurement steps:

- Clean the bearings, balancer shaft and bearing portions of the crankcase.
- Place the crankcase (upper) on a bench in an upside down position.
- Install the upper half of the bearings and the balancer shaft into the crankcase (upper).
- Put a piece of Plastigauge® on each balancer shaft journal.
- Install the lower half of the bearings into the crankcase (lower) and assemble the crankcase halves.

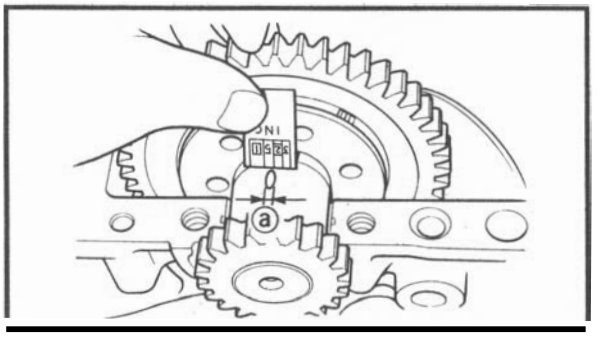
NOTE:
Do not move the balancer shaft until the oil clearance measurement has been completed.



- Tighten the bolts to specification in the tightening sequence cast on the crankcase.

Bolt (crankcase-M8):
24 Nm (2.4 m•kg, 17 ft•lb)

- Remove the crankcase (lower) and lower half of the bearings.



- Measure the compressed Plastigauge® width ⓐ on each balancer shaft journal. If oil clearance is out of specification, select a replacement bearing.

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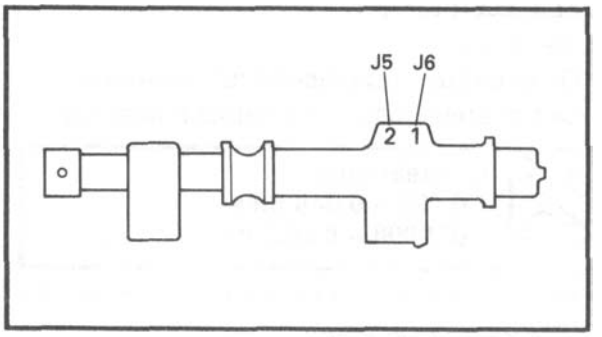

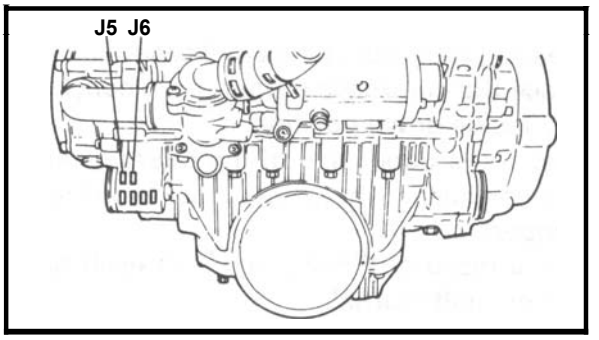

2.Select:
- Balancer shaft bearing

****

Selection of bearings:
Example:

- If "J_5" on the crankcase is "6" and "2" on the balancer shaft, then the bearing size for "J," is:

Bearing size of J_5:
Crankcase J_5 – Balancer shaft No. □
6 – 2 □ 4 (Green)

BEARING COLOR CODE	
1	Blue
2	Black
3	Brown
4	Green
5	Yellow
6	Pink
7	Red

****

MIDDLE GEAR SERVICE

① Universaljoint
② Dust seal
③ Housing
④ O-ring
⑤ Bearing
⑥ Collapsible collar
⑦ Bearing
⑧ Middle drive shaft
⑨ Middle driven pinion gear
⑩ Spring seat
⑪ Damper spring
⑫ Damper cam
⑬ Middle drive pinion gear
@Thrust washer
⑮ Retainer