YAMAHA

VMX12 '93

2EN-AE2

SUPPLEMENTARY SERVICE MANUAL

FOREWORD

This Supplementary Service Manual has been prepared to introduce new service and data for the VMX12 '93. For complete service information procedures it is necessary to use this Supplementary Service Manual together with the following manual.

VMX12 '86 SERVICE MANUAL: 2EN-ME1
VMX12 '91 SUPPLEMENTARY SERVICE MANUAL: 2EN-AE1

VMX12 '93
SUPPLEMENTARY
SERVICE MANUAL
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NOTICE

This manual was written by Yamaha Motor Company Ltd. primarily for use by Yamaha dealers and qualified mechanics. It is not possible to put an entire mechanic's education into one manual, so persons using this book to perform maintenance and repairs on Yamaha motorcycles should have a basic understanding of the mechanical concepts and procedures inherent in motorcycle repair technology. Without such knowledge, attempted repairs or service to the motorcycle may render it unfit to use and/or unsafe.
Yamaha Motor Company Ltd. is continually striving to improve all models manufactured by Yamaha. Modifications and significant changes in specifications or procedures will be forwarded to all Authorized Yamaha dealers and will, where applicable, appear in future editions of this manual.

PARTICULARLY IMPORTANT INFORMATION

This material is distinguished by the following notation.

⚠ — 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

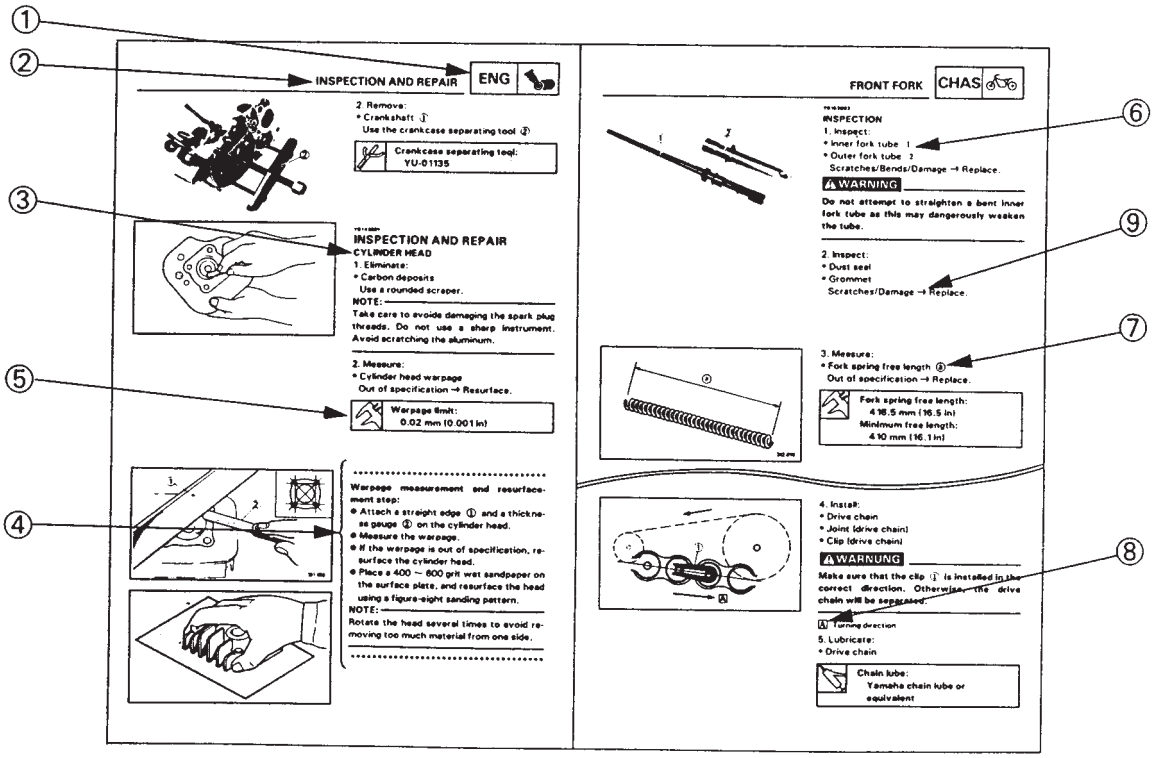
All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to povide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspections.
A set of particularly important procedure ④ is placed between a line of asterisks “* ” with each procedure preceded by “●”.

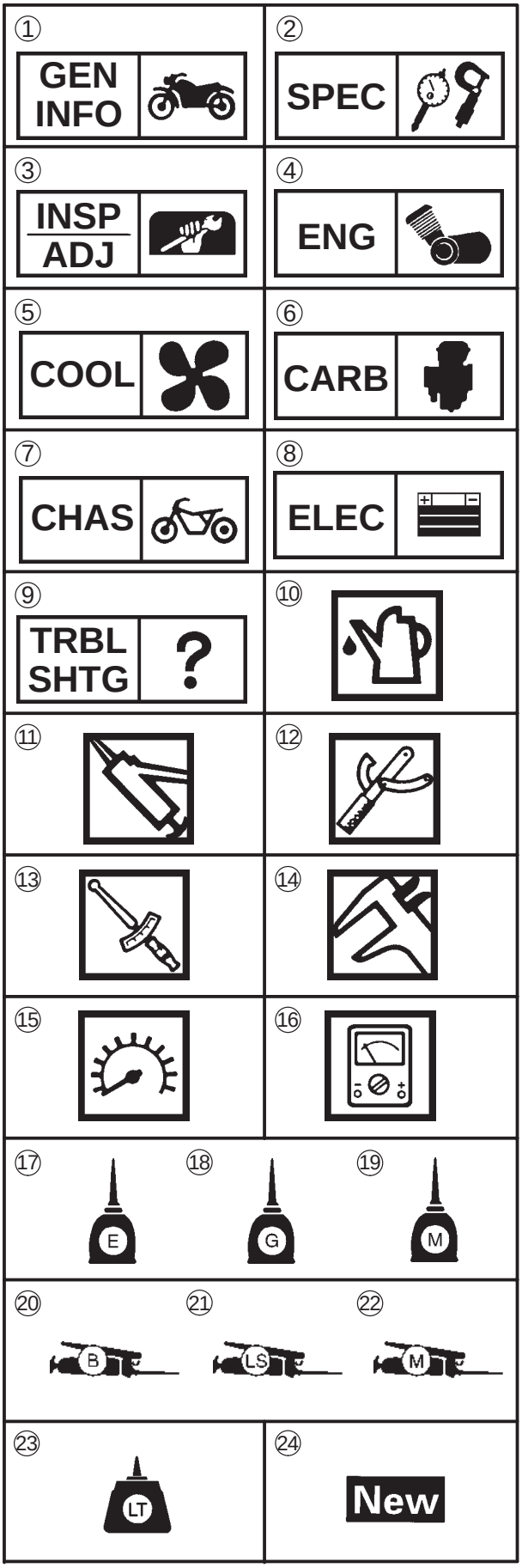
IMPORTANT FEATURES

- 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 the symbol ⑨.

EXPLODED DIAGRAM

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





ILLUSTRATED SYMBOLS (Refer to the illustration)

Illustrated symbols ① to ⑨ are designed as thumb tabs to indicate the chapter's number and content.

① General information
② Specifications
③ Periodic inspection and adjustment
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 Tightening
⑭ Wear limit, clearance
⑮ Engine speed
⑯ Ω, V, A

Illustrated symbols ⑰ to ㉔ in the exploded diagram indicate grade of lubricant and location of lubrication point.

⑰ Apply engine oil
⑱ Apply gear oil
⑲ Apply molybdenum disufide oil
⑳ Apply wheel bearing grease
㉑ Apply lightweight lithium-soap base grease
㉒ Apply molybdenum disulfide grease
㉓ Apply locking agent (LOCTITE®)
㉔ Use new one

CONTENTS

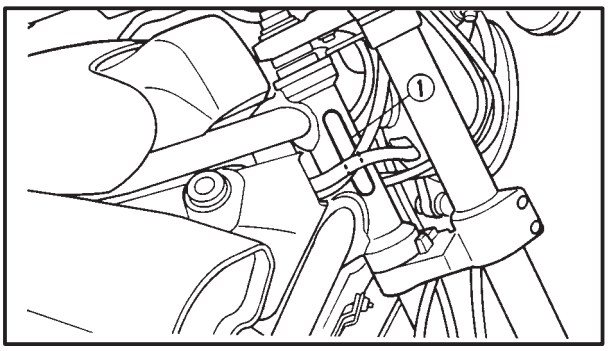
GENERAL INFORMATION 1
MOTORCYCLE IDENTIFICATION 1
VEHICLE IDENTIFICATION NUMBER (For E) 1
FRAME SERIAL NUMBER (Except for E) 1
ENGINE SERIAL NUMBER 1
SPECIAL TOOL 2
FOR CHASSIS SERVICE 2

SPECIFICATIONS 3
GENERAL SPECIFICATIONS 3
MAINTENANCE SPECIFICATIONS 4
ENGINE 4
CHASSIS 4
ELECTRICAL 5

CHASSIS 6
FRONT AND REAR BRAKE 6
FRONT FORK 7
REMOVAL 8
DISASSEMBLY 9
INSPECTION 10
ASSEMBLY 11
INSTALLATION 14

GENERAL INFORMATION

MOTORCYCLE IDENTIFICATION



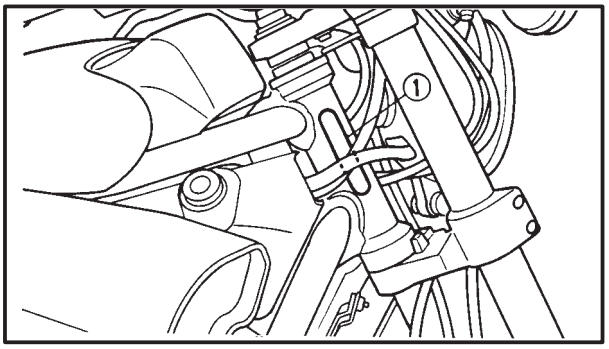
VEHICLE IDENTIFICATION NUMBER (For E)

The vehicle identification number ① is stamped into the steering head pipe.

Starting serial number:
JYA2ENS0-PA041101

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.



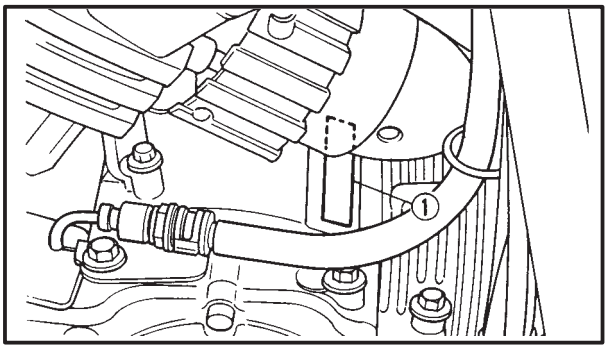
FRAME SERIAL NUMBER (Except for E)

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

Starting serial number:
2EN-031101 (F) (I) (B) (PRT) (GB)

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 left side of the engine.

Starting serial number:
2EN-031101 (F) (I) (B) (PRT) (GB)
2EN-041101 (E)

NOTE:

- The first three digits of these numbers are for model identifications; 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.

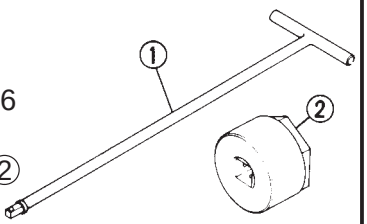
Refer to the list provided to avoid errors when placing an order.

P/N. YM-□□□□□, YU-□□□□□ For USA, YS-□□□□□, YK-□□□□□ California, ACC-□□□□□ CDN

P/N. 90890-□□□□□ For EUR, AUS

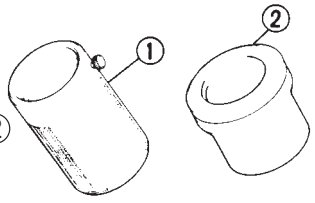
FOR CHASSIS SERVICE

1
T-Handle ①
P/N. YM-01326
P/N. 90890-01326
For damper rod holder (29 mm) ②
P/N. YM-33962
P/N. 90890-01375



These tools are used to loosen and tighten the front fork damper rod holding bolt.

2
Front fork seal driver (weight) ①
P/N. YM-33963
P/N. 90890-01367
Adapter (43 mm) ②
P/N. YM-8020
P/N. 90890-01374



These tools are used when installing the fork seal:

SPECIFICATIONS

GENERAL SPECIFICATIONS

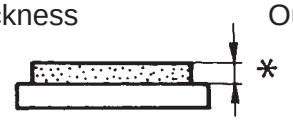
Model	VMX12
Model code number:	3LR8 (F) (I) (B) (PRT) (GB) 3LR9 (E)
Engine starting number:	2EN-031101 (F) (I) (B) (PRT) (GB) 2EN-041101 (E)
Frame starting number:	2EN-031101 (F) (I) (B) (PRT) (GB)
Vehicle identification number:	JYA2ENS0* PA041101 (E)
Minimum turning radius:	2,900 mm (114 in)
Tire:	
Type	Tubeless
Size (F)	110/90V 18 METZELER/ME33
Size (R)	150/90VB 15 M/C METZELER/ML2
Wear limit	1.0 mm (0.04 in)

MAINTENANCE SPECIFICATIONS

ENGINE

Model		VMX12
Carburetor:		
I.D. Mark		3LR-01
Main jet	(M.J.)	#150
Main air jet	(M.A.J.)	ø2.0
Jet needle	(J.N.)	5DZ19-3
Needle jet	(N.J.)	Y-0
Pilot jet	(P.J.)	#42.5
Pilot air jet	(P.A.J.1)	#95
Pilot screw	(P.S.)	2 and 1/2 turn out
Pilot outlet	(P.O.)	0.9
Bypass 1	(B.P.1)	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
Fuel level	(F.L.)	15 ~ 17 mm (0.59 ~ 0.66 in)
Engine idling speed		950 ~ 1,050 r/min
Vacuum pressure at idling speed		200 mm Hg (7.87 in Hg)

CHASSIS

Model		VMX12
Front suspension:		
Front fork travel		140 mm (5.51 in)
Fork spring free length		386.5 mm (15.2 in)
<Limit>		<381.5 mm (15.0 in)>
Collar length		245 mm (9.65 in)
Spring rate:	K1	3.75 N/mm (0.375 kg/mm, 21.0 lb/in)
	K2	4.90 N/mm (0.5 kg/mm, 28.0 lb/in)
Stroke	K1	0 ~ 78 mm (0 ~ 3.07 in)
	K2	78 ~ 140 mm (3.07 ~ 5.51 in)
Optional spring		No.
Oil capacity		619 cm^3 (21.8 lmp oz, 20.9 US oz)
Oil level		123 mm (4.8 in)
Oil grade		Yamaha fork oil 10wt or equivalent
Enclosed air pressure (standard)		39.2 kPa (0.4 kg/cm^2, 5.7 psi)
<Min. ~ Max.>		<39.2 ~ 98.1 kPa (0.4 ~ 1.0 kg/cm^2, 5.7 ~ 14.2 psi)>
Front disc brake:		
Type		Dual
Disc outside diameter × thickness		298 × 5.0 mm (11.7 × 0.20 in)
Pad thickness	Inner	5.0 mm (0.20 in)
<Limit>*		<0.5 mm (0.02 in)>
Pad thickness	Outer	5.0 mm (0.20 in)
<Limit>* 		<0.5 mm (0.02 in)>
Master cylinder inside diameter		15.87 mm (0.63 in)
Caliper cylinder inside diameter		33.96 + 30.23 mm (1.33 + 1.19 in)
Brake fluid type		DOT #4 or DOT #3

MAINTENANCE SPECIFICATIONS

SPEC 

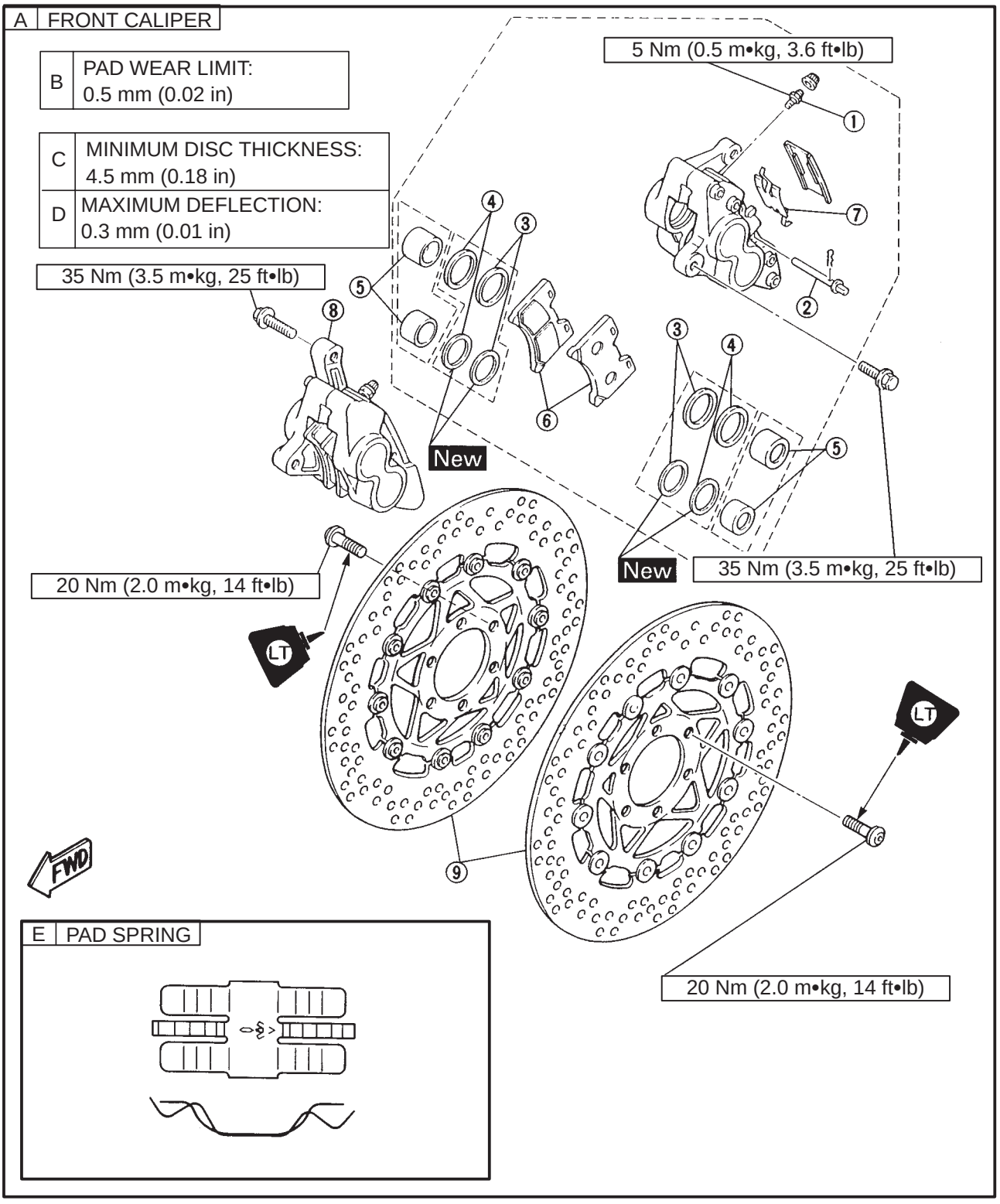
ELECTRICAL

Model	VMX12
T.C.I.:	
Pickup coil resistance (color)	81 ～ 121 Ω at 20°C (68°F) (Black – Orange)
T.C.I. Unit-model/Manufacturer	BB7224/HITACHI

CHASSIS

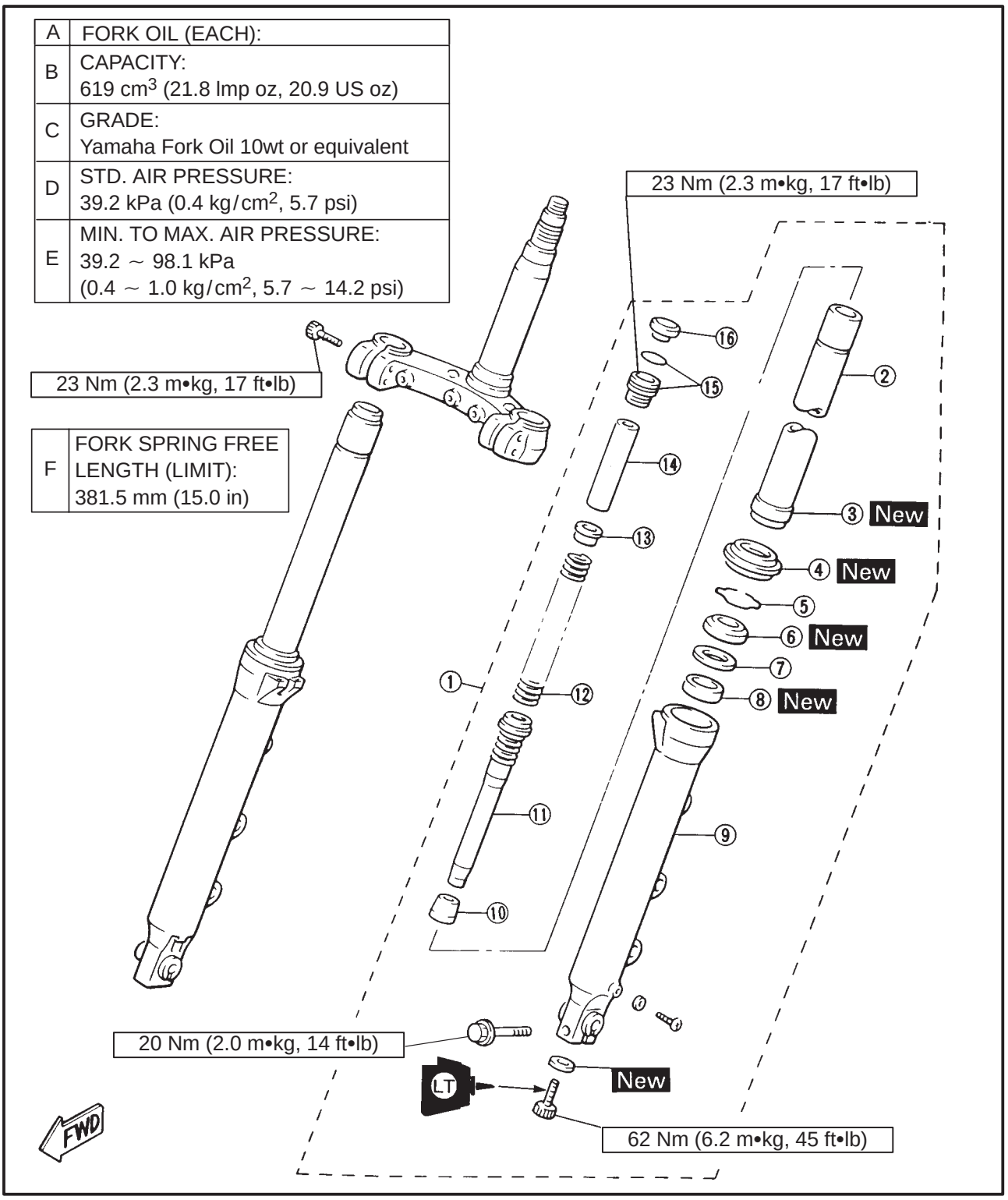
FRONT AND REAR BRAKE

① Air bleed screw
② Retaining pin
③ Dust seal
④ Piston seal
⑤ Piston
⑥ Brake pad
⑦ Pad spring
⑧ Caliper assembly
⑨ Brake disc
E The arrow mark on the pad spring must point in the disc rotating direction.



FRONT FORK

① Front fork assembly
② Inner fork tube
③ Piston metal
④ Dust cover
⑤ Retaining clip
⑥ Oil seal
⑦ Seal spacer
⑧ Slide metal
⑨ Outer fork tube
⑩ Oil lock piece
⑪ Damper rod
⑫ Fork spring
⑬ Spring seat
⑭ Collar
⑮ Cap bolt
⑯ Fork cap



REMOVAL

⚠ WARNING

Securely support the motorcycle so there is no danger of it falling over.

1. Place the motorcycle on a level place.
2. Elevate the front wheel by placing suitable stand under the engine.



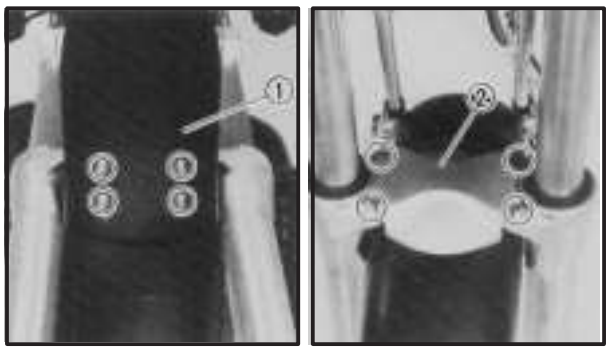
3. Remove:
   - Caliper assembly ①
   - Brake hose holder ②
4. Disconnect:
   - Speedometer cable ③

NOTE:

Do not depress the brake lever when the wheel is off the motorcycle otherwise the brake pads will be forced shut.



5. Loosen:
   - Pinch bolt ① (wheel axle)
6. Remove:
   - Wheel axle ②
   - Front wheel assembly



7. Remove:
   - Front fender ①
   - Fork brace ②



8. Remove:
   - Fork cap ①

   Depress the valve ② until all of the air has been released.

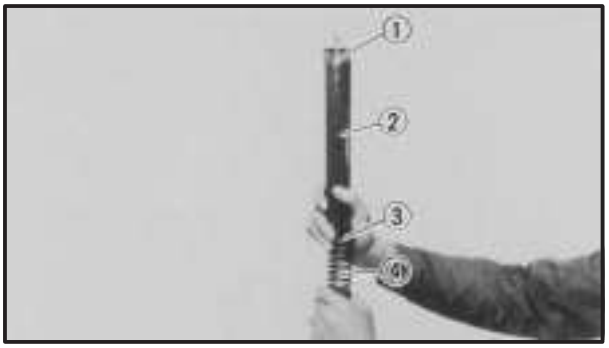




9. Loosen:
   - Pinch bolt ① (handle crown)
   - Cap bolt ②
   - Pinch bolts ③ (under bracket)

⚠ WARNING

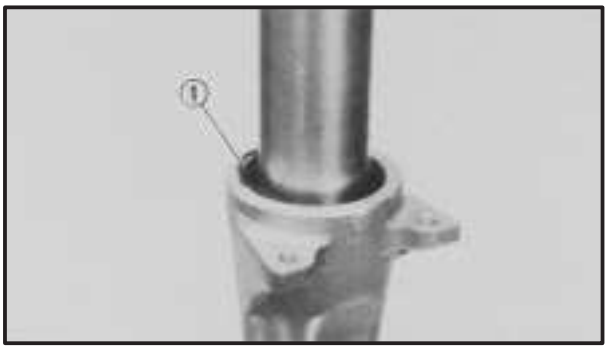
Support the fork before loosening the pinch bolts.



DISASSEMBLY

1. Remove:
   - Cap bolt ①
   - Spacer ②
   - Spring seat ③
   - Spring ④

2. Drain:
   - Fork oil

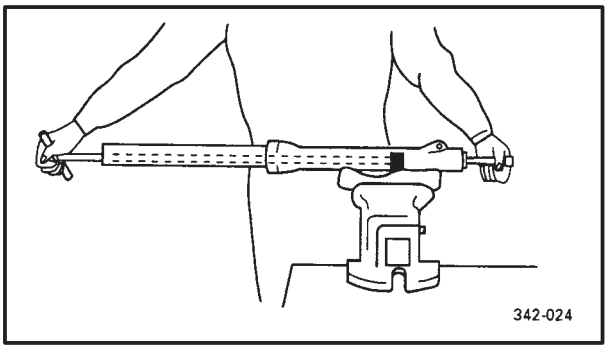


3. Remove:
   - Dust seal
   - Retaining clip ①

   Use a thin slotted head screw driver.

CAUTION:

Take care not to scratch the inner tube.



4. Remove:
   - Bolt (damper rod)
   - Copper washer

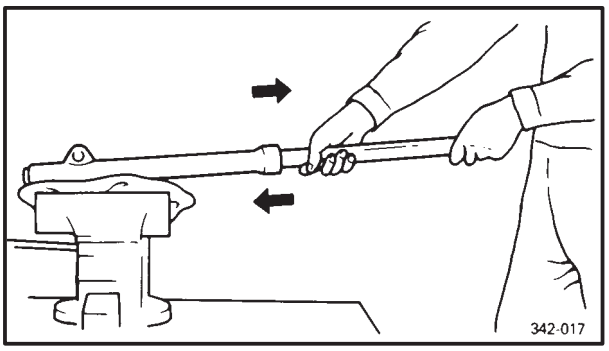
NOTE:

Loosen the bolt (damper rod) while holding the damper rod with the T-handle and holder.



T-handle:
YM-01326
90890-01326
Holder (29 mm):
YM-33962
90890-01375

5. Remove:
   - Inner fork tube

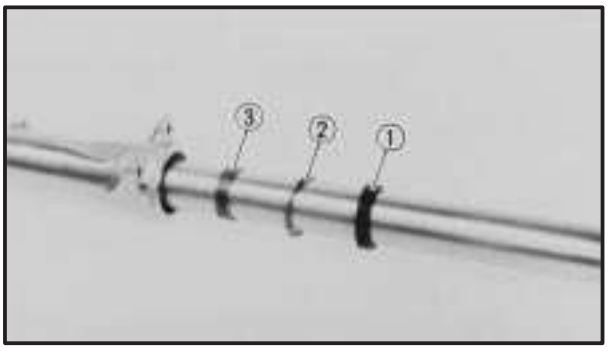


Removal steps:

- Hold the fork leg holizontally.
- Clamp the caliper mounting boss of the outer tube securely in a vise with soft jaws.
- Pull out the inner fork tube from the outer tube by forcefully, but carefully, with drawing the inner tube.

CAUTION:

- **Excessive force will damage the oil seal and/or the bushes. Damage oil seal and bushing must be replaced.**
- **Avoid bottoming the inner tube in the outer tube during the above procedure, as the oil lock piece will be damaged.**



6. Remove:
   - Oil seal ①
   - Seal spacer ②
   - Slide metal ③
   - Piston metal
   - Damper rod
   - Oil lock piece



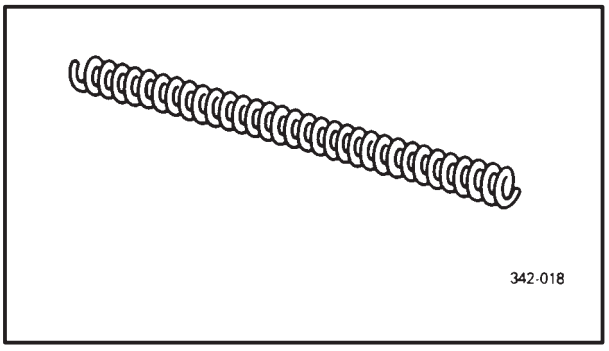
INSPECTION

1. Inspect:
   - Inner fork tube
   - Outer fork tube

   Scratches/Bends/Damage → Replace.

⚠ WARNING

Do not attempt to straighten a bent inner fork tube as this may dangerously weaken the tube.



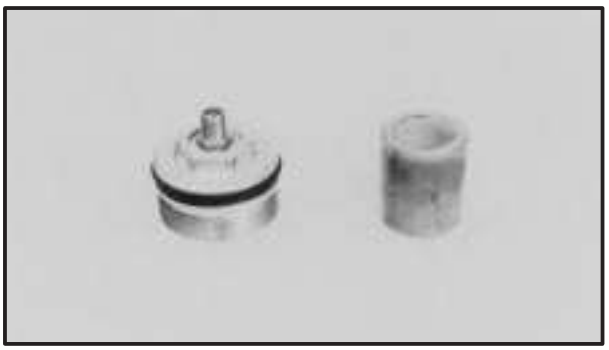
2. Measure:
   - Fork spring

   Over specified limit → Replace.

	Fork spring free length (limit): 381.5 mm (15.0 in)



3. Inspect:
   • Damper rod
   Wear / Damage → Replace.
   Contamination → Blow out all oil passages with compressed air.



4. Inspect:
   • Oil lock piece
   • O-ring (cap bolt)
   Wear / Damage → Replace.

ASSEMBLY

Reverse the "DISASSEMBLY" procedure.
Note the following points.

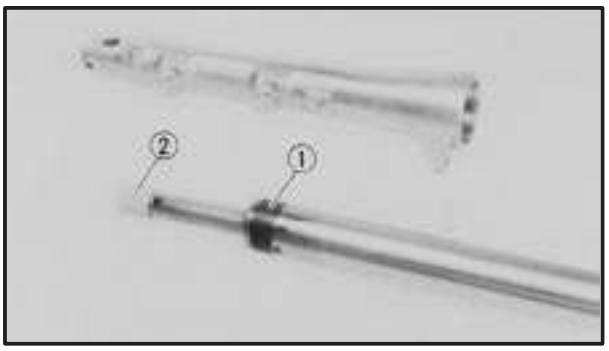
NOTE:

- In front fork reassembly, be sure to use following new parts.
  * Piston metal
  * Slide metal
  * Oil seal
  * Dust seal
- Make sure that al components are clean before reassembly.

1. Install:
   • Damper rod

CAUTION:

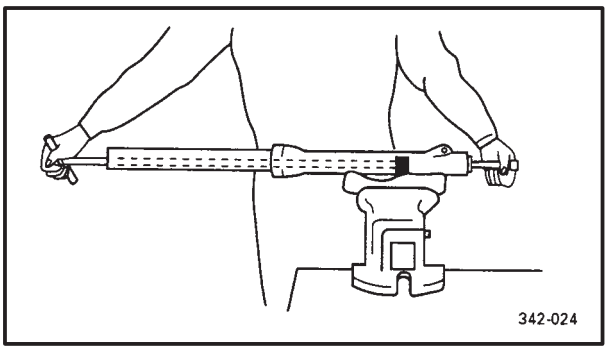
Allow the damper rod to slide slowly down the inner fork tube until it protrudes from the bottom, being careful not to damage the inner fork tube.



2. Lubricate:
   • Inner fork tube (outer surface)

Recommended lubricant:
Fork oil 10w or equivalent

3. Install:
   • Piston metal ①
   • Oil lock piece ②



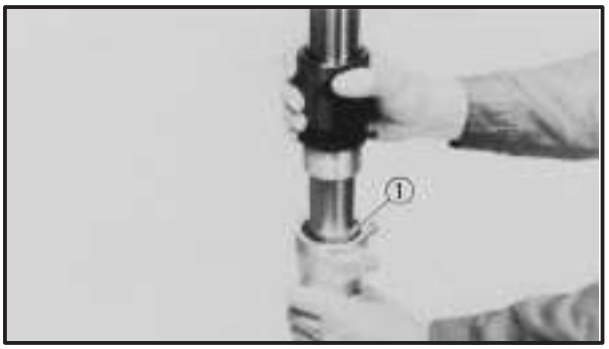
4. Tighten:
   • Bolt (damper rod)

Bolt (damper rod):
62 Nm (6.2 m•kg, 45 ft•lb)
LOCTITE®

NOTE:

Tighten the bolt (damper rod) while holding the damper rod with the T-handle and holder.

T-handle:
YM-01326
90890-01326
Holder (29 mm):
YM-33962
90890-01375



5. Install:
   • Slide metal
   • Seal spacer
   • Oil seal ①
   Use the fork seal driver weight and adapter

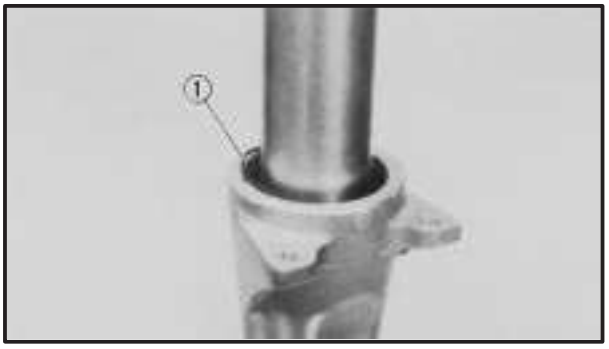
Fork seal driver weight:
YM-33963
90890-01367
Adapter (43 mm):
YM-8020
90890-01374

NOTE:

Before installing the oil seal, apply the lithium soap base grease onto the oil seal lips.

CAUTION:

Be sure that the oil seal numbered side face upward.



6. Install:
   • Retaining clip ①

NOTE:

Fit the retaining clip correctly in the groove in the outer tube.



7. Install:
   • Dust seal ①
   Use the fork seal driver weight.

Fork seal driver weight:
YM-33963
90890-01367

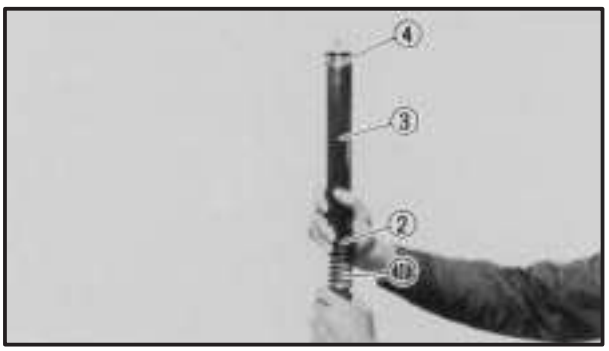
8. Fill:
   • Fork oil

Each fork
619 cm³
(21.8 Imp oz, 20.9 US oz)
Fork oil 10w or equivalent after filling, slowly pump the fork up and down to distribute oil.

Oil level:
123 mm (4.8 in)
from the top of inner fork tube fully compressed without spring.

NOTE:

Place the front fork on upright position.



9. Install:
   • Fork spring ①
   • Spring seat ②
   • Spacer collar ③
   • Cap bolt ④

NOTE:

- Fork spring must be installed with the smaller pitch upward.
- Before installing the cap bolt, apply the grease to the O-ring.
- Temporarily tighten the cap bolt.

INSTALLATION

Reverse the “REMOVAL” procedure.
Note the following points.

1. Install:
   - Front fork(s)
     Temporary tighten the pinch bolts.

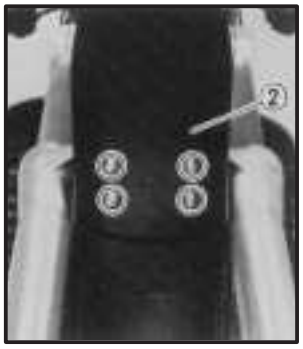
NOTE:

Be sure the inner fork tube end is flush with the top of the handle crown.




2. Tighten
   - Pinch bolts ① (under bracket)
   - Cap bolt ② (front fork)
   - Pinch bolt ③ (handle crown)

Pinch bolt (lower bracket):
23 Nm (2.3 m•kg, 17 ft•lb)
Cap bolt (front fork):
23 Nm (2.3 m•kg, 17 ft•lb)
Pinch bolt (handle crown):
23 Nm (2.3 m•kg, 17 ft•lb)

3. Adjust:
   - Front fork air pressure
     Refer to “FRONT FORK ADJUSTMENT” in the CHAPTER 2.

4. Install:
   - Fork brace ①
   - Front fender ②

5. Install:
   - Front wheel

Front wheel axle:
60 Nm (6.0 m•kg, 43 ft•lb)
Pinch bolt (wheel axle):
20 Nm (2.0 m•kg, 14 ft•lb)



6. Install:
   - Caliper assembly ①
   - Brake hose holder ②
   - Speedometer cable ③

	**Bolt (caliper bracket): 35 Nm (3.5 m•kg, 25 ft•lb)**

⚠ WARNING

Make sure that the brake hose are routed properly.