HONDA RACING

OWNER'S MANUAL
PARTS LIST

2000-VTR1000 SP-1



Notice for those purchasing VTR1000SP-1 kit parts

Thank you for your purchase of these HRC products.
Regarding the kit parts listed in the parts list, we can confirm the performance of a machine which is fully equipped with all the kit parts. However, there are some kit parts that will not improve performance, or cannot be fitted on a machine if individual parts or an incomplete kit are purchased. This should be taken into consideration when purchasing parts.

Important

This machine is designed and manufactured for competition use only and is sold "as-is with no warranty". It does not conform to federal motor vehicle safety standards and operation on public streets, roads, or highways is illegal.

State laws prohibit operation of this vehicle except in an organized racing or competitive event upon a closed course which is conducted under the auspices of a recognized sanctioning body or permit issued by the local governmental authority having jurisdiction.

First determine that operation is legal.

Operator only, no passengers.

Read this manual carefully.

This manual should be considered as a permanent part of the motorcycle and should remain with the motorcycle when resold.

Safety Messages

Your safety and the safety of others is very important. We have provided important safety messages in this manual and on the HRC VTR1000 SP-1. Please read these messages carefully.

A safety message alerts you to potential hazards that could hurt you or others. Each safety message is preceded by a safety alert symbol ⚠ and one of three words, **DANGER, WARNING,** or **CAUTION.**

These mean:

⚠ DANGER — **You WILL be KILLED or SERIOUSLY HURT if you don't follow instructions.**

⚠ WARNING — **You CAN be KILLED or SERIOUSLY HURT if you don't follow instructions.**

⚠ CAUTION — **You CAN be HURT if you don't follow instructions.**

Each message tells you what the hazard is, what can happen and what you can do to avoid or reduce injury.

Damage Prevention Messages

You will also see other important messages that are preceded by the word **NOTICE.**

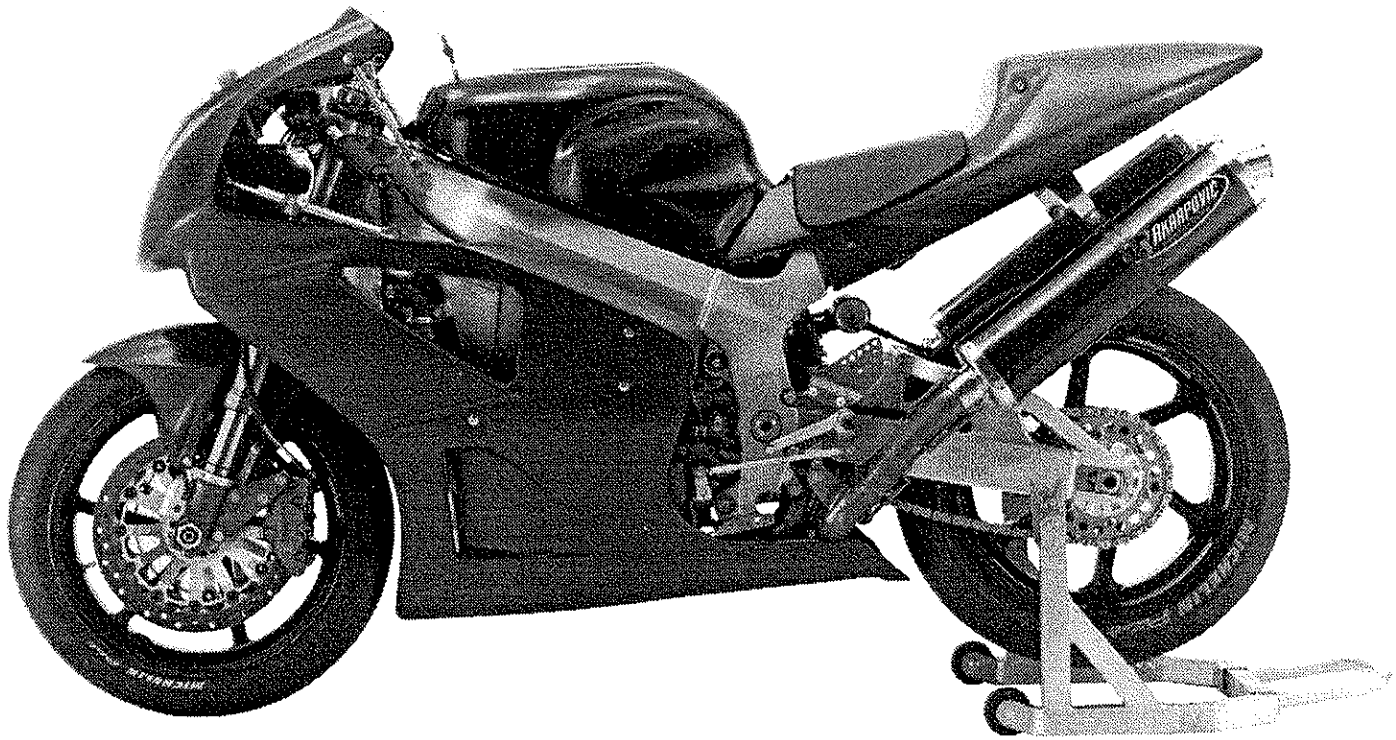
This word means:

NOTICE — Your HRC VTR1000 SP-1 or other property can be damaged if you don't follow instructions.

The purpose of these messages is to help prevent damage to your HRC VTR1000 SP-1, other property, or the environment.

HRC VTR1000 SP-1

Owner's Manual



All information in this publication is based on the latest product information available at the time of approval for printing.
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To The New Owner

By selecting a HRC roadracer VTR1000 SP-1 as your new machine, you have placed yourself in a distinguished family of owners and riders.

The VTR is a high performance racing machine utilizing the latest racing technology. This machine is intended for competition use by experienced riders only.

This new racer was designed to be as competitive as possible. But motorcycle racing is a physically demanding sport that requires more than just a fine racing machine. To do well, you must be in excellent physical condition and be a skillful rider. For the best possible results, work diligently on your physical conditioning and practice frequently.

The purpose of this Manual is to help ensure that you obtain the greatest possible satisfaction from your new VTR roadracer.

Importance Of Proper Preparation

Proper pre-competition preparation and regular service is essential to rider safety and the reliability of the motorcycle. Any error or oversight made by the technician during preparation or servicing can easily result in faulty operation, damage to the machine, or injury to the rider.

Parts Availability

Orders for the parts tend to be concentrated during the season, so you need to plan your parts orders carefully. To prevent delays in shipment, place orders on regularly replaced and fast-wearing parts well ahead of the season (see page 3-3).

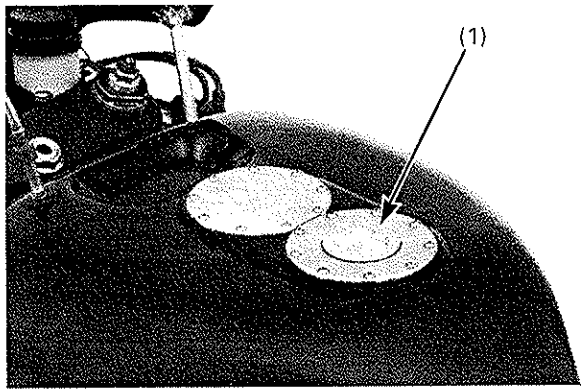
How To Use This Manual

The purpose of this Owner's Manual is to help ensure that you obtain the greatest possible satisfaction from your new VTR roadracer; satisfaction with the performance of the motorcycle, and through success in competition.

If you plan to do any service on your VTR, section 3 describes standard maintenance and sections 4 through 16 contain in information on repair, disassembly, assembly and special tools.

Follow the Maintenance Schedule recommendation (page 3-2) to ensure that your VTR is always in peak operating condition.

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(1) FUEL TANK CAP

Fuel

Gasoline: Premium unleaded gasoline (commercially available unleaded; research octane number 100 or higher)
Fuel tank capacity: 24 liter (6.3 US gal, 5.3 Imp gal)

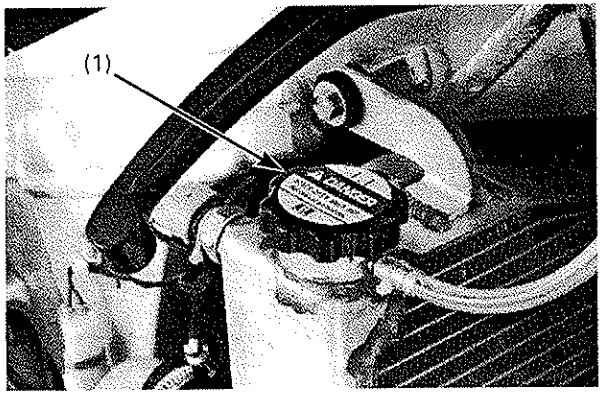
Turn the tank cap counterclockwise, then remove the fuel tank cap.

⚠ WARNING

Gasoline is highly flammable and is explosive. You can be burned or seriously injured when refueling.

- **Stop engine and keep heat, sparks, and flame away.**
- **Refuel only outdoors.**
- **Wipe up spills immediately.**

Install the fuel tank cap by turning it clockwise.



(1) RADIATOR CAP

Coolant

The engine of VTR is a water-cooled type. In order to provide adequate cooling, it is essential that the radiator be filled with coolant up the proper level.

Coolant: Distilled water or drain water

⚠ WARNING

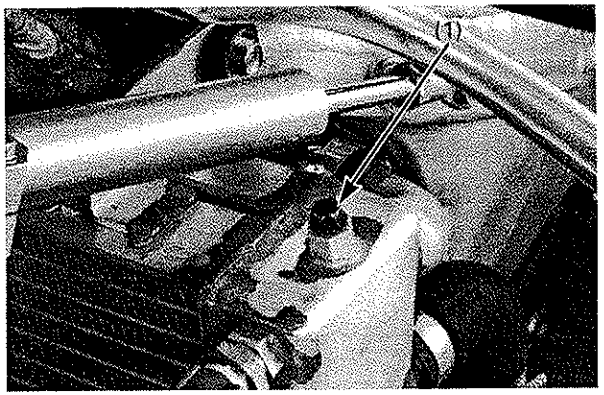
Removing the radiator cap while the engine is hot will allow the coolant to spray out, seriously scalding you.

Always let the engine and radiator cool down before removing the radiator cap.

Remove the radiator cap.

NOTICE

Failure to bleed the air completely may cause overheating and damage the engine.



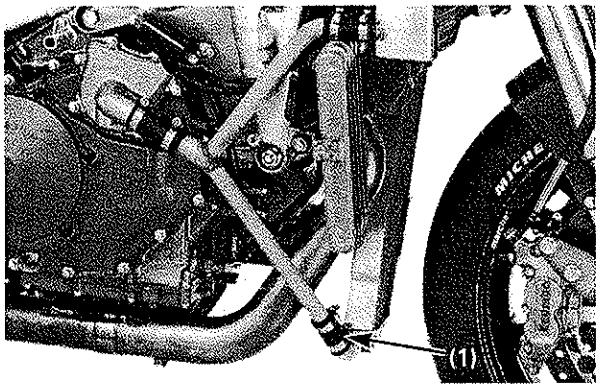
(1) AIR BLEED BOLT

When filling the coolant system, be sure to bleed air completely by loosing the air bleed bolt. If not, the system cannot be sufficiently filled.

Support the machine with the maintenance stand.
Fill the system with water up to the filler neck.
Remove the air bleed bolt and bleed the air from cooling system.

Shift the transmission into neutral.
Start the engine and snap the throttle 3 ~ 4 times to bleed the air from the system.

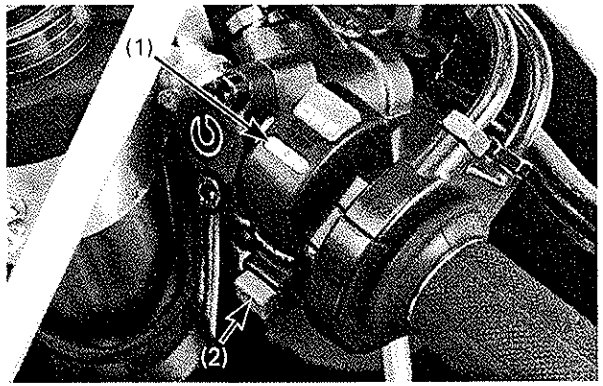
Check the coolant level.
The coolant level is correct when it is at the bottom of the radiator filler neck.
Add coolant up to the filler neck if the level is low.



(1) LOWER RADIATOR-TO-WATER JOINT HOSE

After running, check the radiator and coolant passages for rusting or clogging.
Since the cooling system uses water only, it should be drained completely at the end of each race day to prevent corrosion damage.

Remove the lower radiator-to-water joint pipe hose, drain the water.

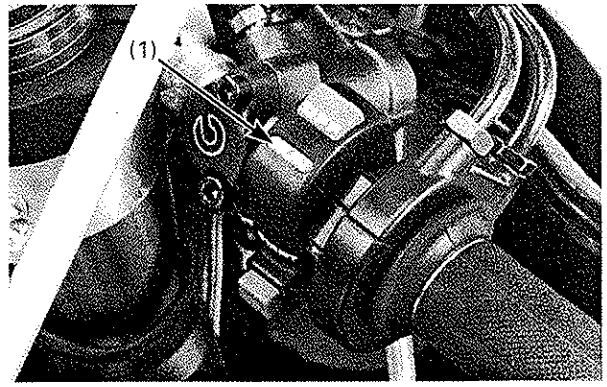


(1) ENGINE STOP SWITCH (2) STARTER BUTTON

Basic Operation

Starting The Engine
Your VTR exhaust contains poisonous carbon monoxide gas. High levels of carbon monoxide can collect rapidly in enclosed areas such as a garage. Do not run the engine with the garage door closed. Even with the door open, run the engine only long enough to move your VTR out of the garage.

1. Turn the engine stop switch to RUN.
2. Shift the transmission into neutral.
3. Disengage the clutch and start the engine with the starter motor by pushing the starter button.

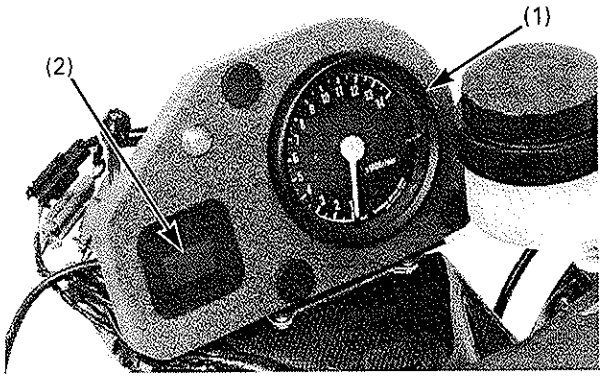


(1) ENGINE STOP SWITCH

Stopping The Engine
1. Shift the transmission into neutral.
2. Lightly open the throttle 2 – 3 times, and then close it.
3. Disengage the clutch and push the engine stop button and stop the engine.

NOTICE

When the engine stop switch turns OFF, the tachometer needle stays at this position, because this machine uses stepping motor type tachometer. It is not trouble of the tachometer.



(1) TACHOMETER
(2) WATER TEMPERATURE METER

Warming-up The Engine

NOTICE

- Do not rev the engine more than necessary or engine damage may result.
- Do not race the engine for an extended period of time during the warm-up the machine is stationary.

1. Disengage the clutch. Start the engine and let it idle at 1,800 min^{-1} (rpm) about 1 minute. Remove the radiator cap and check for coolant level.
2. Vary the engine rev to a maximum of 4,000 min^{-1} (rpm) about 5 minutes. Make sure that the water temperature within 80°C (176°F).
3. Vary the engine rev to a maximum of 6,000 min^{-1} (rpm) about 5 minutes. Make sure that the water temperature within 80°C (176°F).

Break-In Procedure

New Machine

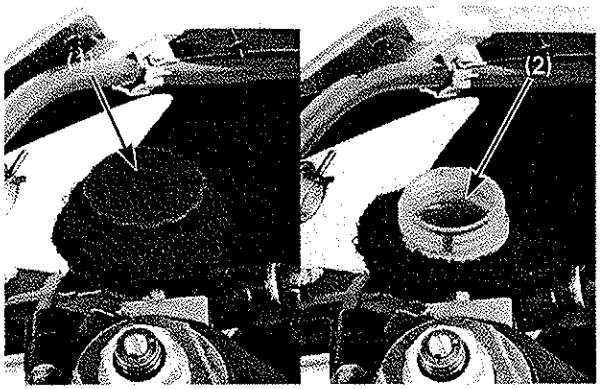
Following proper break-in procedure helps ensure that the most important and expensive components on your new machine will provide maximum performance and service life. (Also follow proper break-in procedure for a newly rebuilt engine.)

When riding a new machine, operate the machine as follow:

First 10 minutes:
Engine rev maximum of 6,000 min^{-1} (rpm)
Throttle opening: 20%
Next 20 minutes:
Engine rev maximum of 8,000 min^{-1} (rpm)
Throttle opening: 30%
Next 20 minutes:
Engine rev maximum of 8,000 min^{-1} (rpm)
Throttle opening: 50%
Next 10 minutes:
Engine rev maximum of 10,000 min^{-1} (rpm)
Throttle opening: 50%

Reconditioned Machine

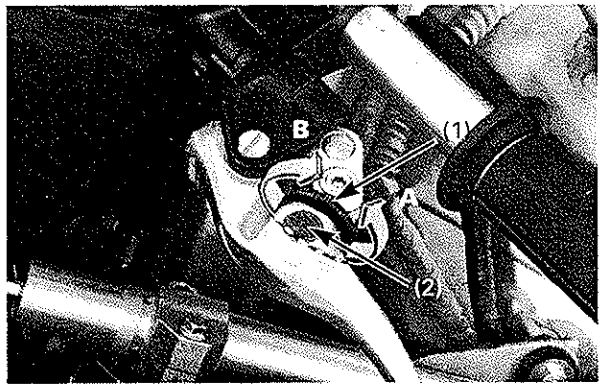
- After replacing the crankshaft and/or connecting rod, operate the machine observing the same cautions as for a new machine.
- After the break-in, check the valve clearance and engine oil level.



(1) RESERVOIR CAP
(2) UPPER LEVEL LINE

Controls

Clutch
Your VTR SP-1 has a hydraulically actuated clutch. There are no adjustments to perform but the clutch system must be inspected periodically for fluid level and leakage.
If the control lever free play becomes excessive and the motorcycle creeps or stalls when shifted into gear, causing acceleration to lag behind engine speed, there is probably air in the clutch hydraulic system and it must be bled out.

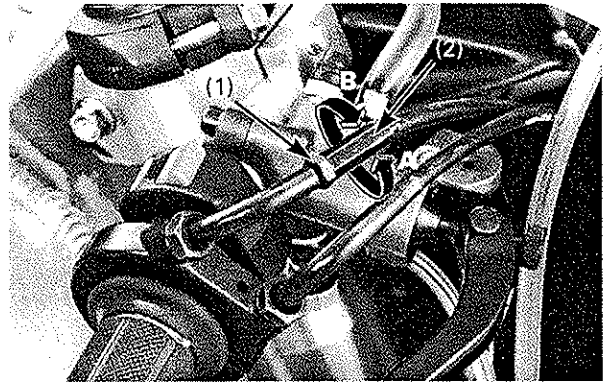


(1) INDEX MARK (2) ARROW MARK

Clutch Lever
The distance between the top of the clutch lever and the grip cam be adjusted by turning the adjuster.

Direction A: Clutch lever further away from the grip
Direction B: Clutch lever closer to the grip

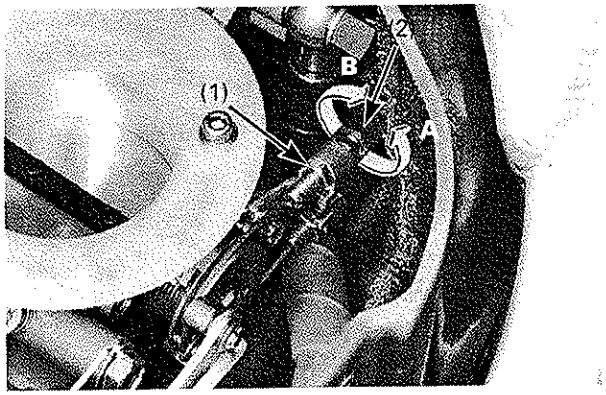
Align the arrow on the clutch lever with the index mark on the adjuster.



(1) LOCK NUT (2) ADJUSTER
(A) DECREASE (B) INCREASE

Throttle Grip
Throttle Grip Free Play
Remove the fuel tank.
Standard throttle grip free play is approximately 3 mm (0.12 in) of grip rotation.

Minor adjustment is made with the upper adjuster.
Loosen the throttle cable adjuster lock nut.
Turning the adjuster in direction "A" will increase free play and turning it in direction "B" will decrease free play. Tighten the lock nut after adjustment.

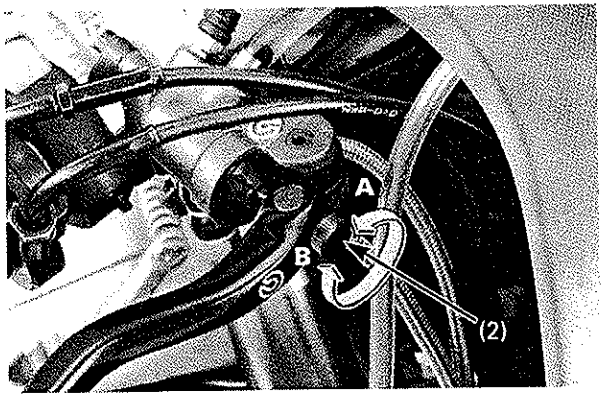


(1) LOCK NUT (2) ADJUSTER
(A) DECREASE (B) INCREASE

Major adjustment is made with the lower adjuster. Open the fuel tank and remove the air box cover.

Loosen the throttle cable adjuster lock nut.
Turning the adjuster in direction "A" will increase free play and turning it in direction "B" will decrease free play. Tighten the lock nut after adjustment.

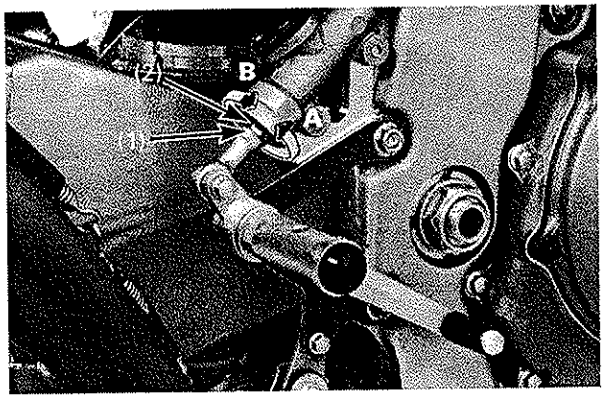
Operate the throttle grip to ensure that it functions smoothly and returns completely in all steering position.



(1) ADJUSTER

Front Brake Lever
The distance between the top of the brake lever and the grip can be adjusted by turning the adjuster.

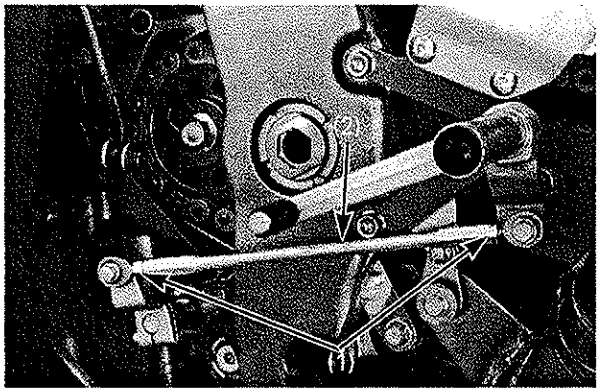
Direction A: Brake lever further away from the grip
Direction B: Brake lever closer to the grip



(1) LOCK NUT (2) ADJUSTING BOLT
(A) RAISE THE PEDAL HEIGHT
(B) LOWER THE PEDAL HEIGHT

Brake Pedal Height
The brake pedal height can be adjusted to the rider's preference.

To adjust the rear brake pedal height:
1. Loosen the lock nut and turn the adjusting bolt in direction "A" to lower the pedal, or in direction "B" to raise it.
2. Tighten the lock nut at the desired pedal height.



(1) LOCK NUTS (2) CHANGE ROD

Gearshift Pedal Height

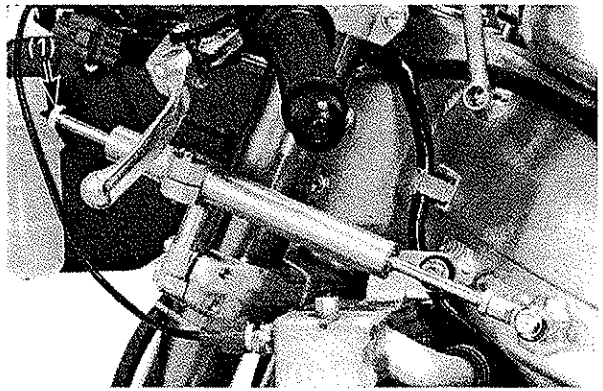
The gearshift pedal height can be adjusted to the rider's preference.

The gearshift pedal can be adjusted by changing the length of the change rod on its threaded ends.

To adjust the gearshift pedal height:

1. Loosen the lock nuts (one lock nut has reverse threads) on both ends of the change rod, and turn the rod as required.
2. Tighten the lock nuts at the desired pedal height. The gearshift arm should be installed so that it has at a right angle to the gearshift pedal lever.

Shifting pattern: 1-UP and 5-DOWN



(1) ADJUSTER

Steering Damper

Turn the adjuster clockwise to increase damping, counterclockwise to decrease damping. There are 12 – 17 notches between minimum and maximum. Do not force the adjuster to past its limit.

Standard setting: 6th notch bach from maximum

NOTICE

Improper handling or failure to install the damper properly may damage the steering damper.

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Specifications

Item	Specification
Dimensions	
Overall length	2,021 mm (79.6 in)
Overall width	695 mm (27.4 in)
Overall height	1,160 mm (45.7 in)
Wheelbase	1,414 mm (55.7 in)
Ground clearance	126 mm (5.0 in)
Dry weight	174.3 kg (384.3 lbs)
Frame	
Type	Aluminum twin tube
Front suspension	Inverted telescopic fork
Rear suspension	Swingarm
Front tire size	12/60 – 17
Rear tire size	18/67 –17
Front brake, diameter	Double disc, 320 mm (12.6 in)
Rear brake, diameter	Single disc, 196 mm (7.7 in)
Fuel capacity	24 liter (6.3 US gal, 5.3 Imp. gal)
Caster angle	23° 48′
Trail length	101 mm (4.0 in)
Engine	
Type	Liquid cooled 4-stroke engine
Cylinder arrangement	2 cylinders 90°V transverse
Bore and stroke	100.0 X 63.6 mm (3.90 X 2.50 in)
Displacement	999 cm^3 (60.9 cu-in)
Compression ratio	12.7: 1
Valve train	Gear driven, DOHC
Valve timing	
Intake opens	35° BTDC (at 1.2 mm lift)
Intake closes	60° ABDC (at 1.2 mm lift)
Exhaust opens	70° BBDC (at 1.3 mm lift)
Exhaust closes	25° ATDC (at 1.3 mm lift)
Lubrication system	Forced pressure and wet sump
Engine dry weight	73.7 kg (162.5 lbs)
Firing order	Front – 270° – Rear – 450° – Front

Item		Specification
Carburation		
Type		Programmed fuel injection
Throttle bore		62 mm (2.4 in)
Drive Train		
Clutch operating system		Hydraulic operated
Clutch type		Wet, multi-plate with back torque limiter
Transmission		6 speed constant mesh
Primary reduction		1.700 (68/40T)
Gear ratio (STD)	1st	2.063 (33/16T)
	2nd	1.632 (31/19T)
	3rd	1.368 (26/19T)
	4th	1.273 (28/22T)
	5th	1.154 (30/26T)
	6th	1.074 (29/27T)
Final reduction		2.412 (41/17T)
Gearshift pattern		1 – N – 2 – 3 – 4 – 5 – 6
Electrical		
Ignition system		Computer-controlled digital transitorized
Starting system		Electric starter motor
Charging system		Triple phase output alternator
Regulator/rectifier		SCR shorted, triple phase full wave rectification

Service Data

Unit: mm (in)

Item	Standard	Service Limit
Lubrication System		
Specified engine oil	HONDA Ultra GP 4-stroke oil API Service Classification: SF or SG Viscosity: SAE 10W – 40	
Engine oil capacity		
after draining	3.7 liter (3.9 US qt, 3.3 Imp qt)	
after disassembly	4.2 liter (4.4 US qt, 3.7 Imp qt)	
Oil pressure at oil filter	490 kPa (5.0 kgf/cm^2, 71 psi) at 5,000 min^{-1} (rpm)/(80°C/68°F)	
Oil pump		
Tip clearance	0.15 (0.006)	—
Side clearance	0.02 – 0.09 (0.001 – 0.004)	—

Item	Specification
Fuel System	
Throttle body identification No.	GQ73A
Throttle grip free play	2 – 6 mm (1/16 – 1/4 in)
IAT sensor resistance	1 - 4 kΩ (20°C/68°F)
ECT sensor resistance	2.3 - 2.6 kΩ (20°C/68°F)
INJ resistance	11.1 - 12.3 Ω (20°C/68°F)
Cam pulse generator peak voltage	0.7 V minimum
Ignition pulse generator peak voltage	0.7 V minimum
Manifold absolute pressure	200 – 250 mm Hg (7.9 – 9.8 in Hg) at idle
Fuel pressure at idle	392 kPa (4.0 kgf/cm^2, 57 psi) at idle
Fuel pump flow	190 cm^3 (6.4 US oz, 6.7 Imp oz) minimum/ 10 seconds at 12 V
Cooling System	
Recommended coolant	Distilled water or drink water
Radiator cap relief pressure	93 – 123 kPa (0.95 – 1.25 kgf/cm^2, 14 – 18 psi)

Unit: mm (in)

Item		Standard	Service Limit
Cylinder Head/Valve			
Valve clearance	IN	0.22 ± 0.02 (0.009 ± 0.0008)	—
	EX	0.32 ± 0.02 (0.013 ± 0.0008)	—
Cam lobe height	IN	39.82 – 39.98 (1.546 – 1.574)	—
	EX	39.43 – 39.59 (1.552 – 1.559)	—
Camshaft oil clearance		0.020 – 0.062 (0.0008 – 0.0024)	
Valve lifter O.D.		33.978 – 33.993 (1.3377 – 1.3383)	—
Valve lifter bore I.D.		34.010 – 34.026 (1.3390 – 1.3396)	—
Valve stem O.D.	IN	5.975 – 5.990 (0.2352 – 0.2358)	—
	EX	5.965 – 5.980 (0.2348 – 0.2354)	—
Valve guide I.D.	IN/EX	6.000 – 6.012 (0.2362 – 0.2367)	—
Stem-to-guide clearance			
	IN	0.010 – 0.037 (0.0004 – 0.0015)	—
	EX	0.020 – 0.047 (0.0008 – 0.0019)	—
Valve guide projection		14.2 (0.56)	—
Valve seat width	IN	1.1 – 1.3 (0.04 – 0.05)	—
	EX	1.3 – 1.5 (0.05 – 0.06)	—
Valve spring free length	Inner	41.50 (1.633)	—
	Outer	46.46 (1.829)	—
Clutch/Gearshift Linkage			
Specified clutch fluid		AP600 or DOT 4 Brake Fluid	—
Clutch master cylinder I.D.		12.700 – 12.743 (0.5000 – 0.5017)	12.755 (0.5022)
Clutch master piston O.D.		12.657 – 12.684 (0.4983 – 0.4994)	12.645 (0.4978)
Clutch disc thickness		2.65 – 2.75 (0.104 – 0.108)	—
Clutch center B I.D.		48.415 – 48.430 (1.9061 – 1.9067)	—
Clutch center guide O.D.		48.37 – 48.39 (1.904 – 1.905)	—
Clutch outer guide	I.D.	28.000 – 28.021 (1.1024 – 1.1032)	—
	O.D.	34.947 – 35.013 (1.3778 – 1.3785)	—
Mainshaft O.D. at outer guide		27.980 – 27.993 (1.1016 – 1.1021)	—

Unit: mm (in)

Item		Standard	Service Limit
Alternator/Starter Clutch			
Starter driven gear boss O.D.		57.749 – 57.768 (2.2736 – 2.2743)	—
Torque limiter slip torque		53 – 84 N•m (5.4 – 8.6 kgf•m, 39 – 62 lbf•ft)	—
Crankcase/Transmission			
Shift fork I.D.	L/R	12.000 – 12.021 (0.4724 – 0.4733)	—
	C	12.000 – 12.018 (0.4724 – 0.4731)	—
Shift fork claw thickness		5.93 – 6.00 (0.233 – 0.236)	—
Shift fork shaft O.D.		11.957 – 11.968 (0.4707 – 0.4712)	—
Transmission gear I.D.			
M5		31.000 – 31.025 (1.2205 – 1.2215)	—
M6		31.000 – 31.016 (1.2205 – 1.2211)	—
C2, C3, C4		33.000 – 33.025 (1.2992 – 1.3002)	—
Gear-to-bushing clearance			
M5		0.020 – 0.070 (0.0008 – 0.0028)	—
M6		0.020 – 0.061 (0.0008 – 0.0024)	—
C2		0.020 – 0.070 (0.0008 – 0.0028)	—
C3, C4		0.025 – 0.075 (0.0010 – 0.0030)	—
Gear bushing I.D.			
M5		27.985 – 28.006 (1.1018 – 1.1026)	—
C2		29.985 – 30.006 (1.1805 – 1.1813)	—
Mainshaft O.D. at M5		27.967 – 27.980 (1.1011 – 1.1016)	—
Countershaft O.D. at C2		29.950 – 29.975 (1.1791 – 1.1801)	—
Bushing-to-shaft clearance			
M5		0.005 – 0.039 (0.0002 – 0.0015)	—
C2		0.010 – 0.056 (0.0004 – 0.0022)	—

Item	Standard	Service Limit
Crankshaft/Piston/Cylinder		
Connecting rod		
side clearance	0.10 – 0.30 (0.004 – 0.012)	—
Crankpin bearing		
oil clearance	0.045 – 0.055 (0.0018 – 0.0022)	—
Main journal bearing		
oil clearance	0.035 – 0.045 (0.0014 – 0.0018)	—
Piston		
Pin bore I.D.	23.002 – 23.008 (0.9056 – 0.9058)	—
Pin O.D.	22.994 – 23.000 (0.9053 – 0.9055)	—
Piston-to-pin clearance	0.002 – 0.014 (0.0001 – 0.0006)	—
Ring end gap		
Top	0.14 – 0.18 (0.006 – 0.007)	—
Second	0.52 – 0.58 (0.020 – 0.023)	—
Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	—
Cylinder		
I.D.	100.005 – 100.025 (3.9372 – 3.9380)	—
Connecting rod small end I.D.	23.020 – 23.041 (0.9063 – 0.9071)	—
Connecting rod-to-piston pin clearance	0.020 – 0.047 (0.0008 – 0.0019)	—

Item		Standard	Service Limit
Wheels/Tires			
Axle runout		—	0.20 (0.008)
Wheel rim runout	Radial	—	0.5 (0.02)
	Axial	—	0.5 (0.02)
Drive chain slack		25 – 35 (1.0 – 1.4)	—
Front Suspension			
Fork tube runout		—	0.20 (0.008)
Recommended fork fluid		Showa D8 fork oil	—
Fork oil level		190 mm (7.5 in)	—
Pre-load adjuster setting		8 mm/Spring rate 0.95	
Rebound adjuster setting		7 clicks from full hard	
Compression adjuster setting		7 clicks from full hard	—
Rear Suspension			
Shock absorber spring pre-load		13 mm (0.5 in)	—
Nitrogen gas pressure		98 MPa (10 kgf/cm^2)	—
Rebound adjuster setting		9 clicks from full hard	
Compression adjuster setting		8 clicks from full hard	—

Item	Standard	Service Limit
Hydraulic brakes		
Specified brake fluid	AP600	—
Front Brake disc thickness	5.4 – 5.6 (0.21 – 0.22)	5.0 (0.20)
Brake disc runout	—	0.15 (0.006)
Rear Brake disc thickness	4.9 – 5.1 (0.19 – 0.20)	4.5 (0.18)
Brake disc runout	—	0.15 (0.006)
Battery/Charging System		
Battery		
Capacity	12 V – 6 A	—
Current leakage	0.1 mA max.	—
Voltage		
(fully charged)	13.0 – 13.2 V (20°C/68°F)	—
(need charging)	Below 12.3 V (20°C/68°F)	—
Charging current		
(normal)	0.6 A X 5 – 10 h	—
(quick)	3 A X 1 h	—
Alternator		
Charging coil resistance	0.2 – 0.5 Ω (20°C/68°F)	—
Ignition System		
Spark plug		
Specified plug (NGK)	R7279-10 (Iridium)	—
Plug gap	0.6 – 0.7 (0.02 – 0.03)	—
Ignition coil		
Primary peak voltage	100 V minimum	—
Electric Starter		
Starter motor brush length	12.0 – 13.0 (0.47 – 0.51)	6.5 (0.26)

Item	Specification
Lights/Meters/Switches	
PGM-FI warning indicator	LED
Main fuse	30 A
Coolant temperature meter sensor resistance	47.02 – 53.02 kΩ (25°C/77°F)

Torque Values

Standard

Item	Torque N·m (kgf·m, lbf·ft)
5 mm bolt and nut	5 (0.52, 3.5)
6 mm bolt and nut	10 (1.0, 7)
8 mm bolt and nut	22 (2.2, 16)
10 mm bolt and nut	33 (3.4, 25)
12 mm bolt and nut	54 (5.5, 40)
5 mm screw	4 (0.42, 3)
6 mm screw and flange bolt (SH type)	9 (0.9, 7)
6 mm flange bolt and nut	12 (1.2, 9)
8 mm flange bolt and nut	26 (2.7, 20)
10 mm flange bolt and nut	38 (3.9, 29)

Notes:
1. Apply clean engine oil to the threads and seating surface.
2. Using Plastic Region Tightening Method, see referring page.
3. Apply a locking agent to the threads.
4. Secure it using a locking wire after tightening.
5. Apply grease to the threads.
6. CT bolt.
7. Stake.
8. Apply sealant to the threads.
9. U-nut.
10. Left hand threads.
11. Apply molybdenum disulfide grease to the threads.
12. Hand tighten until it seats.
13. ALOC bolt.
14. Tighten the bolt to the specified torque 5 times, then retighten it to the specified torque.
15. If using new plug, tighten it to the specified torque, then retighten it to the specified torque.

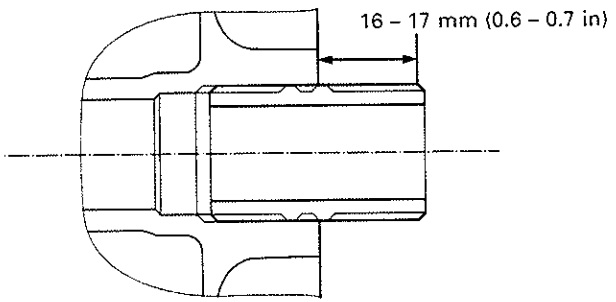
Engine

Item	Q'ty	Threads Dia. (mm)	Torque N·m (kgf·m, lbf·ft)	Remarks
Crankcase bolt/washer (black)	4	10	52 (5.3, 38)	Note 1
Crankcase flange bolt (gray)	4	10	See page 11-6	Note 2
Crankcase flange bolt	4	10	39 (4.0, 29)	Note 1
Cylinder block oil jet	2	5	2 (0.2, 1.4)	Note 3
Lower crankcase sealing bolt	1	14	18 (1.8, 13)	Note 3
Lower crankcase sealing plug	1	R1/4	12 (1.2, 9)	Note 3
Oil drain plug	1	12	29 (3.0, 22)	Note 4
Right crankcase cover sealing bolt	1	8	23 (2.3. 17)	Note 3
Crankshaft hole cap	1	30	15 (1.5, 11)	Note 5
Timing hole cap	1	14	10 (1.0, 7)	Note 5
Cylinder head flange bolt	8	11	64 (6.5, 47)	Note 1
Cylinder head sealing bolt	2	14	18 (1.8, 13)	Note 3
Camshaft holder flange bolt	16	7	23 (2.3, 17)	Note 1
Cylinder head cover bolt	6	6	10 (1.0, 7)	
Breather plate flange bolt	3	6	12 (1.2, 9)	Note 3
Breather joint	1	20	18 (1.8, 13)	Note 3
Connecting rod bolt (new bolt)	4	9	See page 12-2	Note 2
(reusing bolt)	4	9	See page 12-2	Note 2
Cam gear train holder bolt	2	8	26 (2.7, 20)	
Cam gear train mounting bolt	8	6	12 (1.2, 9)	
Oil pump mounting bolt	3	6	12 (1.2, 9)	
Oil pump assembly bolt	1	6	8 (0.8, 5.8)	Note 6
Oil pump driven sprocket bolt	1	6	15 (1.5, 11)	Note 2
Oil filter cartridge	1	20	26 (2.7, 20)	Note 4
Insulator band	4	5	1 (0.1, 0.7)	
Air funnel mounting socket bolt	4	5	5 (0.5, 3.6)	
Clutch center lock nut	1	25	127 (13.0, 94)	Note 1, 7
Primary drive gear bolt	1	12	88 (9.0, 65)	Note 1, 10
Drive sprocket bolt	1	10	54 (5.5, 40)	
Shift drum center socket bolt	1	8	23 (2.3, 17)	Note 3
Shift drum bearing set plate bolt	2	6	12 (1.2, 9)	Note 3
Gearshift return spring pin	1	8	23 (2.3, 17)	

Engine (cont'd)

Item	Q'ty	Threads Dia. (mm)	Torque N·m (kgf·m, lbf·ft)	Remarks
Mainshaft bearing set plate bolt	3	6	14 (1.4, 10)	Note 3
Shift drum stopper arm pivot bolt	1	6	12 (1.2, 9)	
Starter clutch socket bolt	6	8	23 (2.3, 17)	Note 3
Ignition pulse generator mounting bolt	2	6	12 (1.2, 9)	Note 3
Flywheel mounting bolt	1	12	157 (16.0, 116)	Note 1, Note 14
Stator mounting bolt	3	6	12 (1.2, 9)	
Starter motor terminal nut	1	6	10 (1.0, 7)	
Taper plug for crankcase hole	1	PT1/8	12 (1.2, 9)	Note 8
Neutral switch	1	10	12 (1.2, 9)	
Spark plug	2	14	18 (1.8, 13)	Note 15

Oil filter boss:



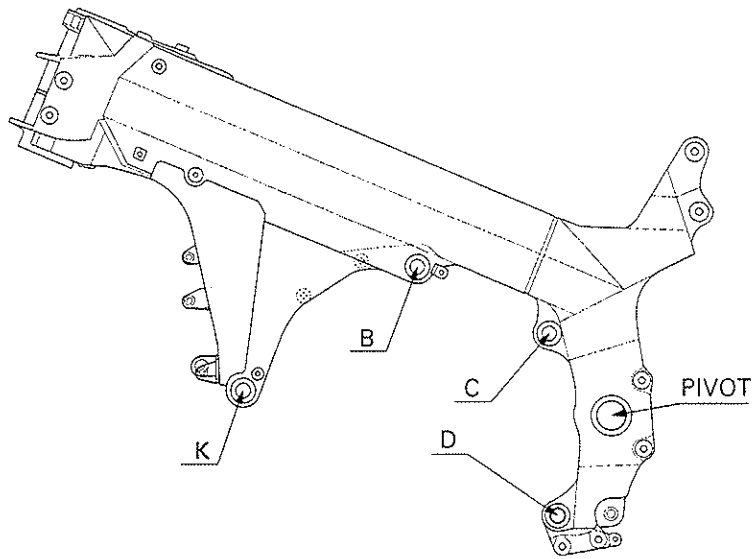
Frame

Item	Q'ty	Threads Dia. (mm)	Torque N·m (kgf·m, lbf·ft)	Remarks
Handlebar:				
Handlebar weight screw	2	6	10 (1.0, 7)	Note 13
Handlebar holder pinch bolt	2	8	22 (2.2, 16)	Note 11
Handlebar pipe pinch bolt	2	6	10 (1.0, 7)	Note 11
Steering stem:				
Stem nut	1	24	127 (13.0, 94)	Note 11
Top thread	1	26	16 (1.6, 12)	Note 11
Top bridge pinch bolt	2	8	22 (2.2, 16)	Note 11
Bottom bridge pinch bolt	4	8	22 (2.2, 16)	Note 11
Front wheel:				
Front axle bolt	1	18	59 (6.0, 43)	Note 11
Fork axle side nut	1	28	78 (8.0, 58)	Note 11
Front wheel bearing retainer	1	45	39 (4.0, 29)	Note 7, 11
Front brake disc bolt	6	6	15 (1.5, 11)	
Rear wheel:				
Rear axle nut	1	22	88 (9.0, 65)	Note 9, 11
Final driven sprocket nut		8	34 (3.5, 25)	Note 1, 9
Rear wheel bearing retainer	1	56	98 (10.0, 72)	Note 3, 10
Rear brake disc bolt	4	6	15 (1.5, 11)	
Brakes:				
Front master cylinder oil bolt	1	10	24 (2.4, 17)	
Front caliper mounting bolt	4	10	39 (4.0, 29)	Note 11
Front caliper oil bolt	2	10	24 (2.4, 17)	
Rear master cylinder oil bolt	1	10	24 (2.4, 17)	
Rear caliper mounting bolt	2	7	17 (1.7, 12)	Note 11
Rear caliper oil bolt	1	10	24 (2.4, 17)	
Bleeder screw	3	8	8 (0.8, 5.8)	
Rear shock absorber:				
Upper mounting bolt	1	10	44 (4.5, 33)	Note 9
Upper bracket nut	1	16	49 (5.0, 36)	
Shock arm bolt	2	10	44 (4.5, 33)	Note 9
Shock link bolt	2	10	44 (4.5, 33)	Note 9

Frame (cont'd)

Item	Q'ty	Threads Dia. (mm)	Torque N·m (kgf·m, lbf·ft)	Remarks
Swingarm:				
Pivot adjusting bolt	2	36	15 (1.5, 11)	Note 11
Pivot lock nut	1	36	69 (7.0, 51)	Note 11
Pivot nut	1	22	127 (13.0, 94)	Note 11
Drive chain slider bolt	2	6	9 (0.9, 6.5)	Note 3
Clutch master cylinder:				
Lever pivot bolt	1	6	1 (0.1, 0.7)	
Lever pivot nut	1	6	6 (0.6, 4.3)	
Oil bolt	1	10	34 (3.5, 25)	
Oil cup mounting screw	1	4	1.5 (0.15, 1.1)	Note 3
Engine hanger:				
Hanger special bolt (K, B)	2	20	——	Note 11,12
Hanger adjusting bolt (C, D)	2	20	10 (1.0, 7)	Note 11
Hanger lock nut (K, B, C, D)	4	10	59 (6.0, 43)	Note 11
Hanger nut (K, C)	2	12	59 (6.0, 43)	Note 11
Hanger bolt (B)	1	12	59 (6.0, 43)	Note 11
Hanger nut (D)	1	12	44 (4.5, 33)	Note 11
Fuel pump:				
Fuel feed pipe banjo bolt	1	12	22 (2.2, 16)	
Fuel feed pipe sealing nut	1	12	22 (2.2, 16)	
Fuel pump mounting screw	12	6	12 (1.2, 9)	

Engine hanger tightening points:



See page 7-2 for detail of the engine hanger tightening procedure.

Tools

Special

* Newly designed tool

Description	Tool number	Applicability
Snap ring pliers	07914-SA50001	Master cylinder snap ring
Steering stem socket	07916-3710101	Stem nut
Bearing remover handle	07936-3710100	Shock link bearing
Bearing remover, 17 mm	07936-3710300	Shock link bearing
Bearing remover shaft	07936-GE00100	Starter motor bearing
Bearing remover head, 10 mm	07936-GE00200	Starter motor bearing
Valve guide remover	07942-6570100	Valve guide
Driver attachment A	07946-KM90100	Steering stem race
Driver shaft assembly	07946-KM90300	Steering stem race
Race remover A	07946-KM90401	Steering stem race
Assembly base	07946-KM90600	Steering stem race
Driver attachment handle	07949-3710001	Swingarm pivot bearing
Support base	07965-SD90100	Water pump
Oil filter wrench	07HAA-PJ70100	Oil filter
Peak voltage adaptor	07HGJ-0020100	Electrical
Drive chain tool set	07HMH-MR10103	Drive chain
Oil seal driver attachment	07JAD-PH80101	Water pump
Pilot, 32 X 50 mm	07MAD-PR90200	Swingarm pivot bearing
Race remover B	07NMF-MT70110	Steering stem race
Driver attachment B	07NMF-MT70120	Steering stem race
Pilot collar, 22	07PAF-0010680	Water pump
Lock nut wrench, 20 mm	07VMA-MBB0100	Engine hanger
Cutter holder, 6 mm	07VMH-MBB0100	Valve seat
Valve guide reamer, 6.012 mm	07VMH-MBB0200	Valve guide
Lock nut wrench, 5.8 X 46 mm	07YMA-MCF0100	Engine hanger
Torque limiter inspection tool A	07YMJ-MCF0100	Torque limiter
Torque limiter inspection tool B	07YMJ-MCF0200	Torque limiter
ECM test harness	07YMZ-0010100	PGM-FI
*Valve spring compressor attachment	07956-NL6-003	Intake and exhaust valve

Common

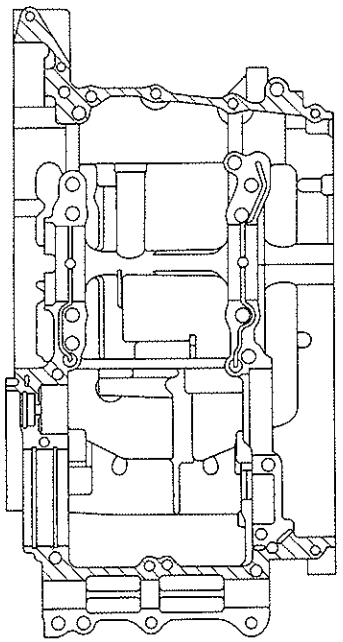
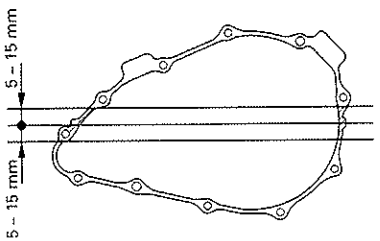
Description	Tool number	Applicability
Fuel pressure gauge	07406-0040002	Fuel pump check
Retainer wrench B	07710-0010200	Front wheel bearing
Retainer wrench body	07710-0010401	Front wheel bearing
Gear holder	07724-0010100	Clutch center lock nut
Flywheel holder	07725-0040000	Flywheel bolt
Flywheel puller	07733-0020001	Flywheel bolt
Bearing remover weight	07741-0010201	Case/cover bearing
Valve guide driver	07743-0020000	Valve guide
Attachment, 32 X 35 mm	07746-0010100	Bearing installation
Attachment, 37 X 40 mm	07746-0010200	Bearing installation
Attachment, 42 X 47 mm	07746-0010300	Bearing installation
Attachment, 52 X 55 mm	07746-0010400	Bearing installation
Attachment, 62 X 68 mm	07746-0010500	Bearing installation
Attachment, 24 X 26 mm	07746-0010700	Bearing installation
Attachment, 22 X 24 mm	07746-0010800	Bearing installation
Attachment, 40 X 42 mm	07746-0010900	Bearing installation
Inner driver C	07746-0030100	Mainshaft bearing
Attachment, 30 mm I.D.	07746-0030300	Mainshaft bearing
Attachment, 35 mm I.D.	07746-0030400	Steering stem
Pilot, 10 mm	07746-0040100	Bearing installation
Pilot, 17 mm	07746-0040400	Bearing installation
Pilot, 25 mm	07746-0040600	Bearing installation
Pilot, 35 mm	07746-0040800	Bearing installation
Pilot, 22 mm	07746-0041000	Bearing installation
Driver	07749-0010000	Bearing installation
Valve spring compressor	07757-0010000	Valve spring
Valve seat cutter		Valve seat refacing
– Seat cutter, 40 mm (IN 45°)	07780-0010500	
– Seat cutter, 35 mm (EX 45°)	07780-0010400	
– Flat cutter, 38.5 mm (IN 32°)	07780-0012400	
– Flat cutter, 36 mm (EX 32°)	07780-0013500	
– Interior cutter, 42 mm (IN 60°)	07780-0014400	
– Interior cutter, 37.5 mm (EX 60°)	07780-0014100	

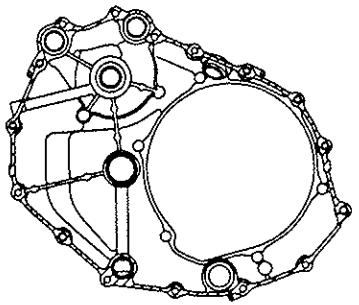
Lubrication & Seal Points

Engine

Item	Material	Remarks
Main journal bolt (M10 X 1.25) threads and seating surfaces Cylinder head bolt threads and seating surface Camshaft holder bolt threads and seating surfaces Piston outer surfaces Piston ring surfaces Connecting rod bolt threads and seating surfaces Primary drive gear bolt threads and seating surface Intake and exhaust valve sliding surfaces of valve guide Valve lifter sliding surfaces Camshaft lobes and journals Oil filter cartridge threads and mating surfaces Clutch friction disc lining surfaces Clutch center lock nut threads and seating surfaces Flywheel bolt threads and seating surfaces Each bearing, gear and O-ring	Engine oil	
Piston pin surface Connecting rod small end I.D.	LUB H45	
Oil jet (pre-coated)	Three-Bond 2363	Coating width: 2.5 ± 1 mm
Cylinder head cover packing (mating surface of cover)	Cemedine #521	Remove excessive adhesive
Cylinder head semi-circular area	Three-Bond 5211C or KE45C	Remove excessive adhesive
Lower crankcase sealing plug threads Oil filter boss threads Right crankcase cover sealing bolt threads Cylinder head sealing bolt threads Oil pump driven sprocket bolt threads Mainshaft bearing set plate bolt threads Shift drum bearing bolt threads Shift drum center bolt threads Starter clutch outer mounting bolt threads Ignition pulse generator mounting bolt threads Alternator wire clamp mounting bolt threads Breather plate bolt threads	Locking agent	Coating width: 6.5 ± 1 mm
Crankshaft main journal bearings Connecting rod bearings Clutch outer sliding area M3/4, C5, C6 gear shift fork groove Other rotating/sliding area	Molybdenum disulfide oil (A 50/50 mixture of molybdenum disulfide grease and Honda 4-stroke engine oil	
Timing hole cap threads Crankshaft hole cap threads Each oil seal lips	Multi-purpose grease	

Engine (cont'd)

Item	Material	Remarks
Crankcase mating surface  	Three-Bond 1207B or equivalent	

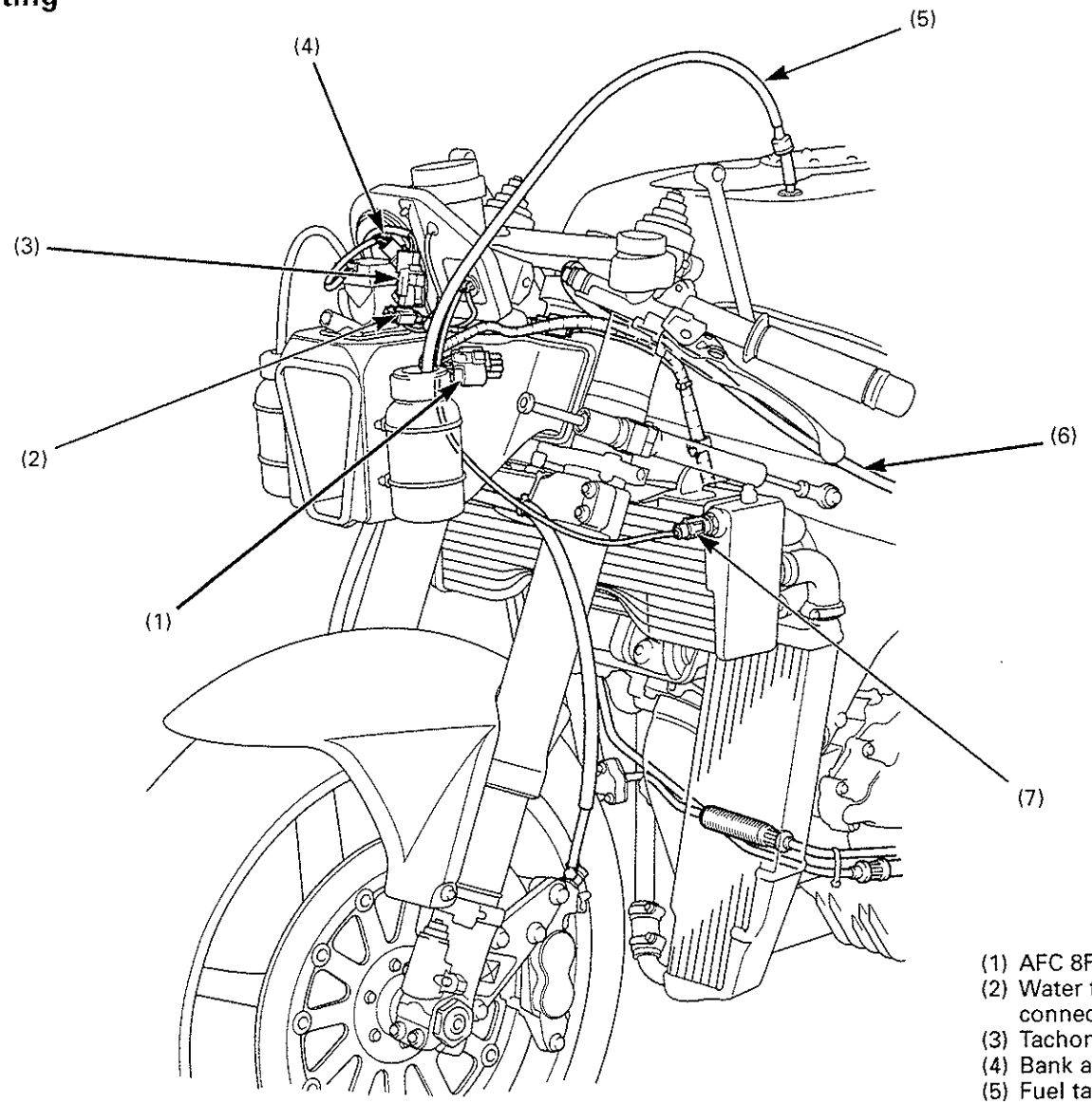
Item	Material	Remarks
Right crankcase cover mating surface  Alternator wire grommet Taper plug	Three-Bond 1207B or equivalent	

Frame

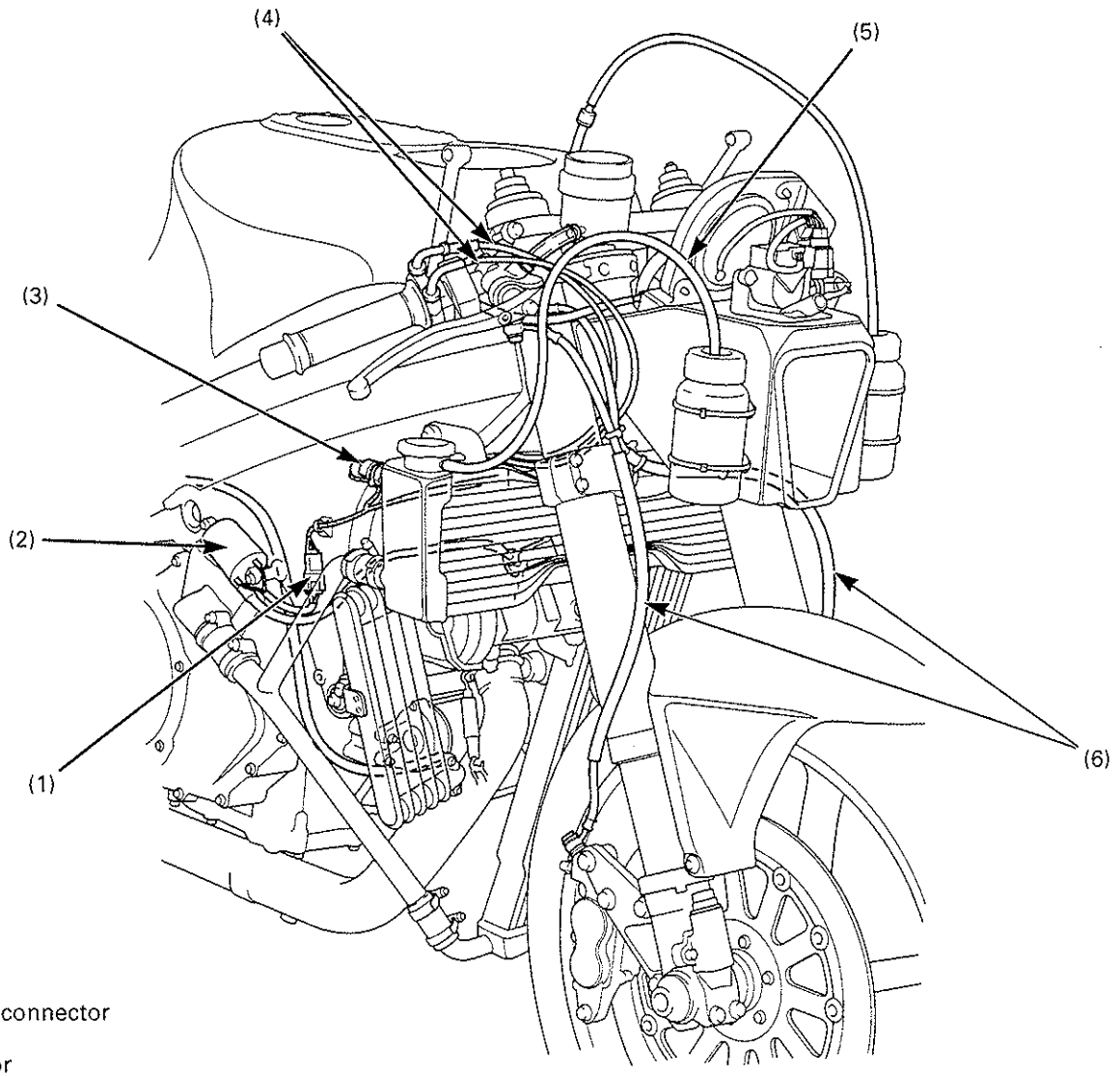
Item	Material	Remarks
Handle lever pivot Throttle wire adjusting bolt threads Front axle shaft surface Rear axle shaft surface Brake pedal pivot thrust surface Gearshift pedal pivot thrust surface ECT sensor threads	Multi-purpose grease	
Steering head bearings Steering head dust seal lips Right swingarm pivot bearing (Radial ball bearing) Left swingarm pivot bearing (Needle bearing) Swingarm pivot dust seal lips Shock absorber needle bearing Shock absorber dust seal lips	Multi-purpose grease (Shell alvania EP2 or equivalent)	3 g minimum (each bearing) 3 g minimum
Master cylinder lever pivot and piston contact area Rear brake caliper piston seal piston contact area Clutch lever pivot and piston contact area Rear brake push rod piston contact area	Silicone grease	
Stem bearing races and each bearing press fit area Final driven sprocket nut threads and seating surface	Engine oil	
Brake hydraulic system inside	AP600	
Clutch hydraulic system inside	AP600 or DOT 4 brake fluid	

Item	Material	Remarks
Front axle bolt threads Front axle side nut threads Front wheel bearing retainer threads Rear axle nut threads Front brake caliper mounting bolt threads Rear brake caliper mounting bolt threads Engine hanger bolt threads Engine hanger adjusting bolt threads Engine hanger lock nut threads and seating surface Engine hanger washer seating surface Fork top and bottom bridge pinch bolt threads Handlebar holder and pipe pinch bolt threads Steering top threads Steering stem nut threads Swingarm pivot bolt threads Swingarm pivot adjusting bolt threads Swingarm pivot lock nut threads and seating surface Swingarm pivot washer seating surface	Molybdenum disulfide grease	
Handlebar grip inside Step arm press fit surface Seat rail mounting rubber	Honda bond A or Equivalent	Do not overflow more than 3 mm Do not overflow more than 3 mm

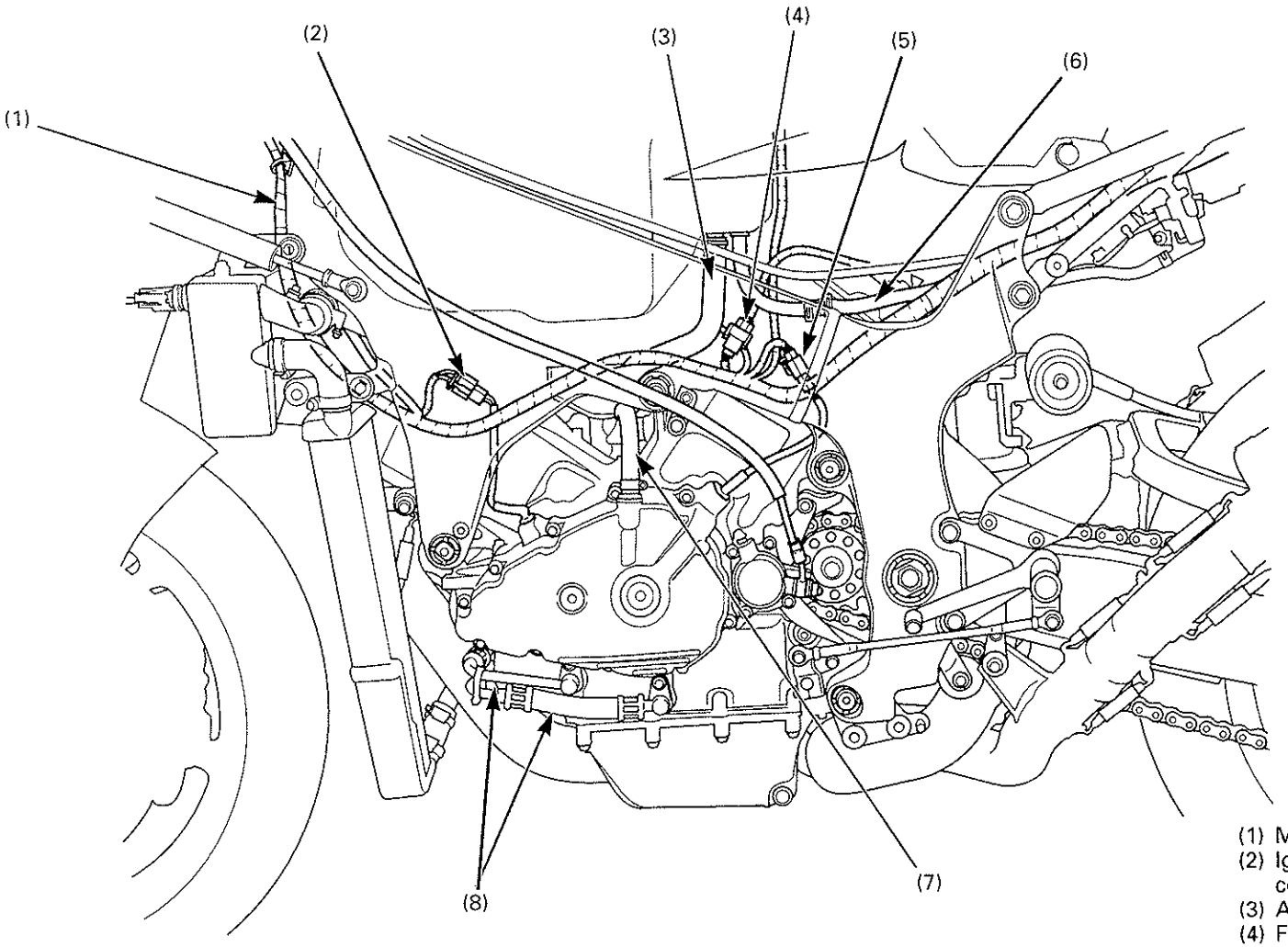
Cable & Harness Routing



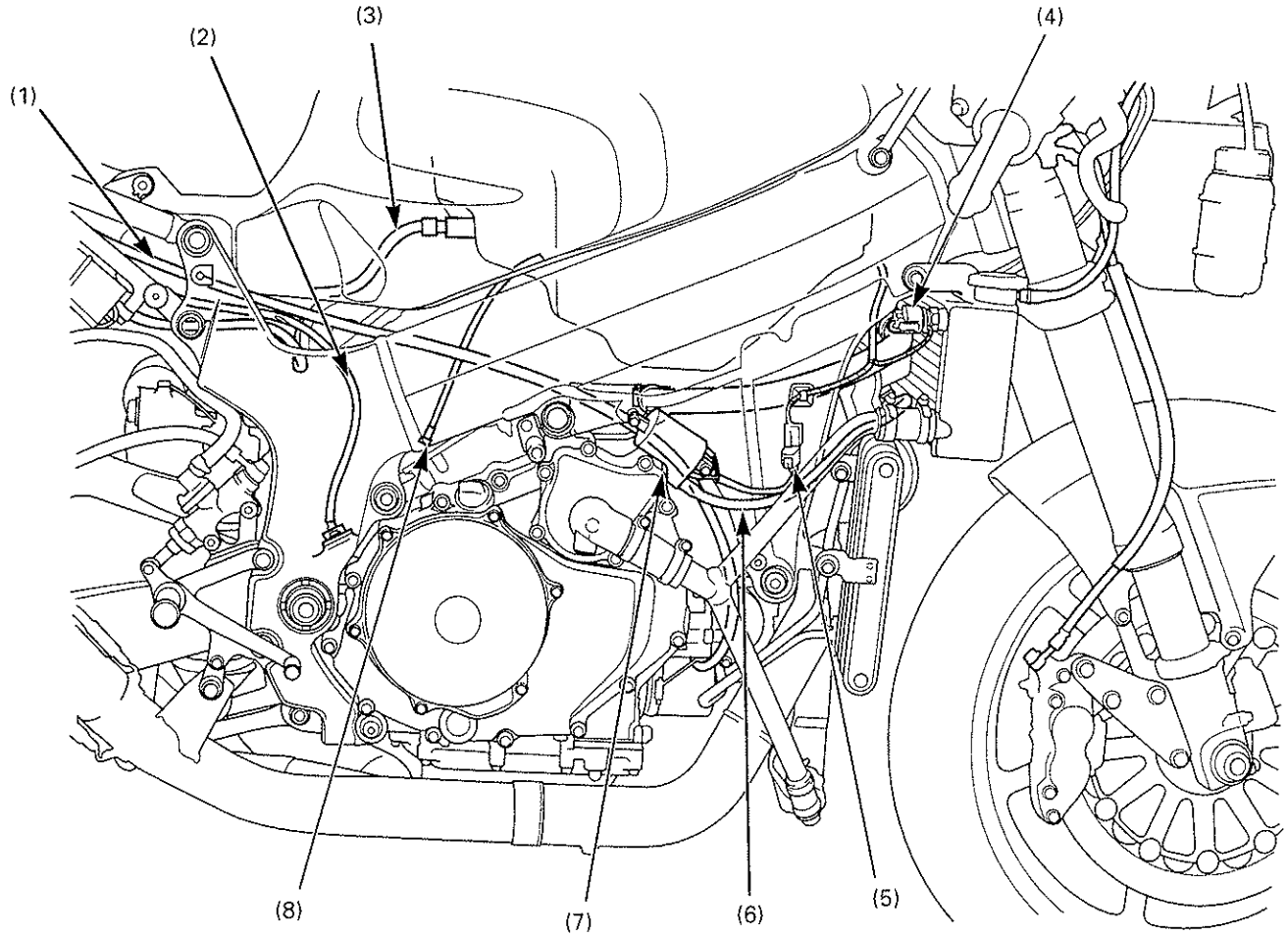
(1) AFC 8P (Gray) connector
(2) Water temperature meter 2P (Black) connector
(3) Tachometer 3P (Gray) connector
(4) Bank angle sensor 3P (Green) connector
(5) Fuel tank overflow tube
(6) Clutch hose
(7) Thermo sensor 2P (Gray) connector



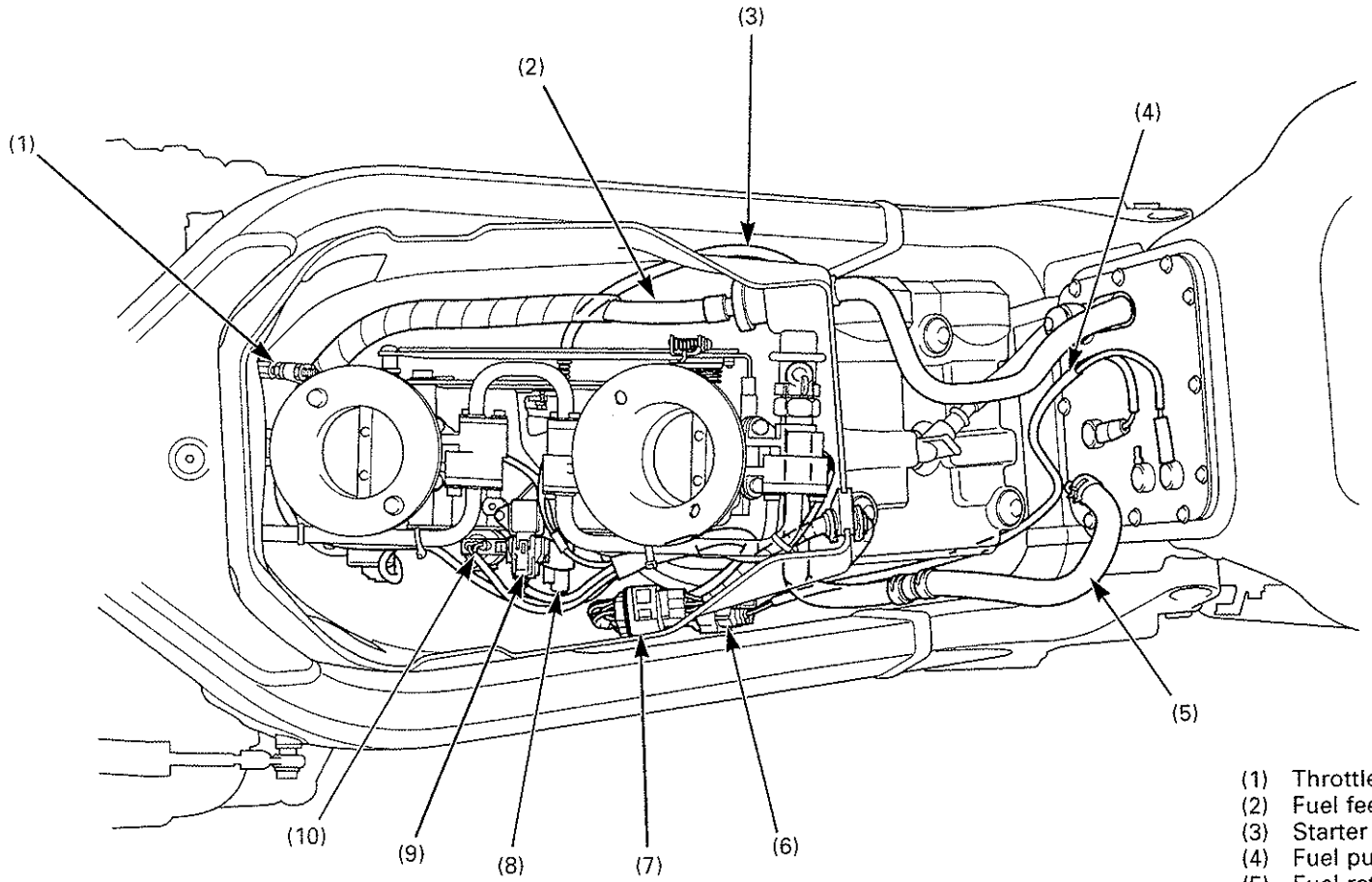
(1) Front ignition coil 2P (Natural) connector
(2) Front ignition coil
(3) ECT sensor 2P (Gray) connector
(4) Throttle cables
(5) Radiator overflow tube
(6) Front brake hoses



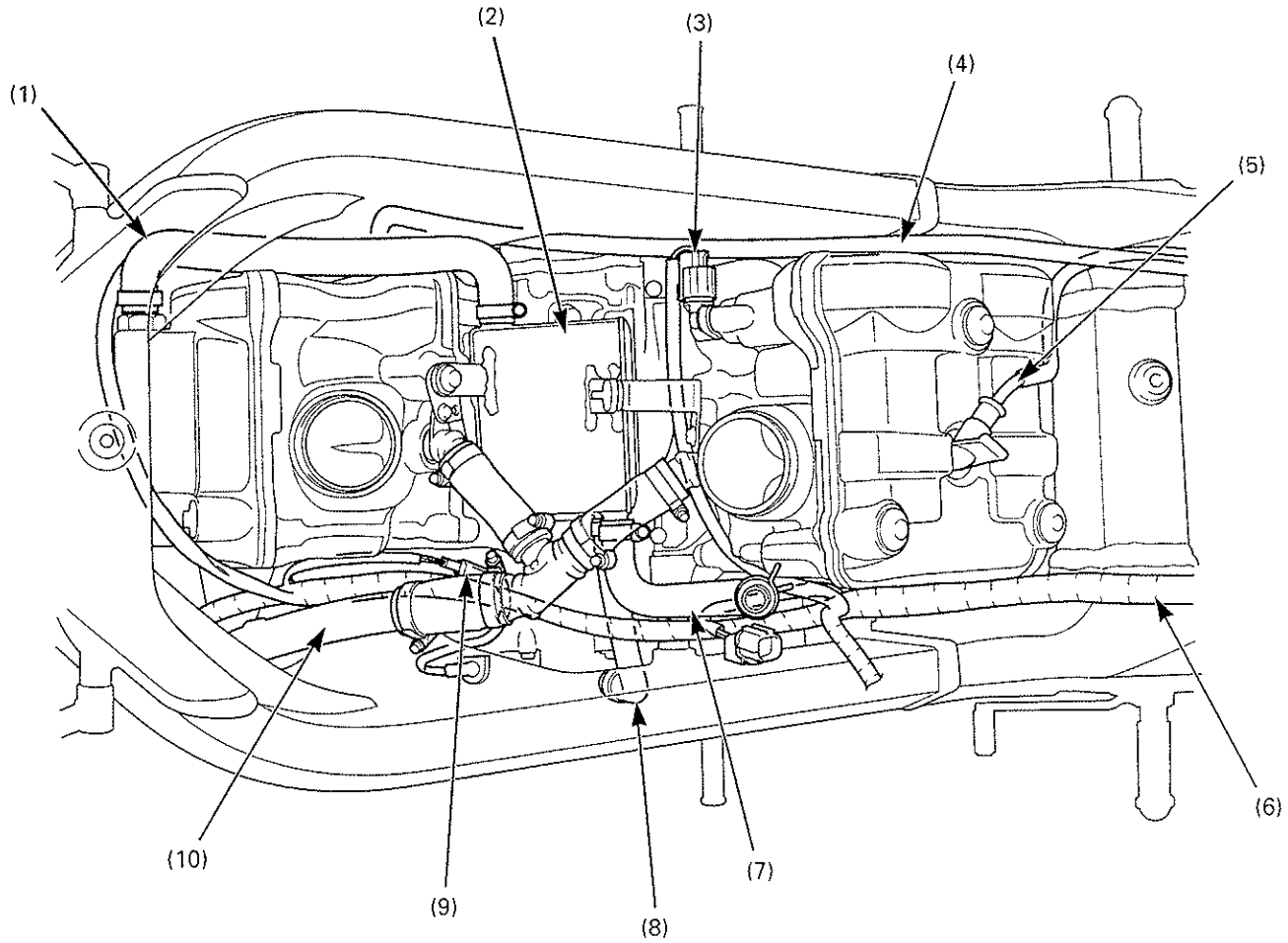
(1) Main wire harness
(2) Ignition pulse generator 2P (Red) connector
(3) Air box-to-oil catch tank hose
(4) Fuel pump 2P (Gray) connector
(5) Alternator 3P (Natural) connector
(6) Fuel return tube
(7) Oil catch tank-to-left crankcase cover tube
(8) Oil cooler pipes



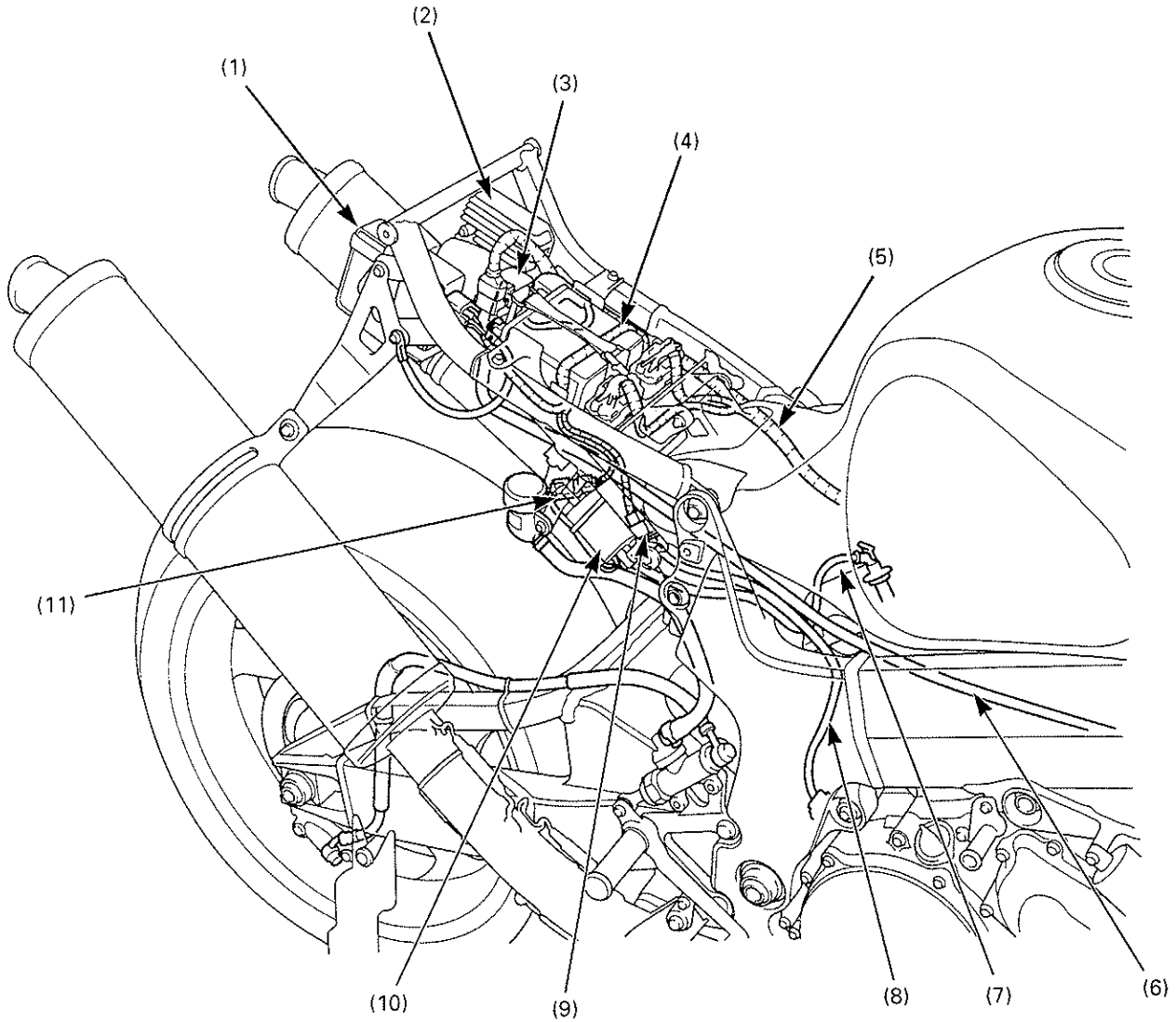
(1) Starter motor cable
(2) Vehicle speed sensor wire
(3) Fuel feed tube
(4) ECT sensor 2P (Gray) connector
(5) Front ignition coil 2P (Natural) connector
(6) Front spark plug wire
(7) Front ignition coil
(8) Starter valve control cable



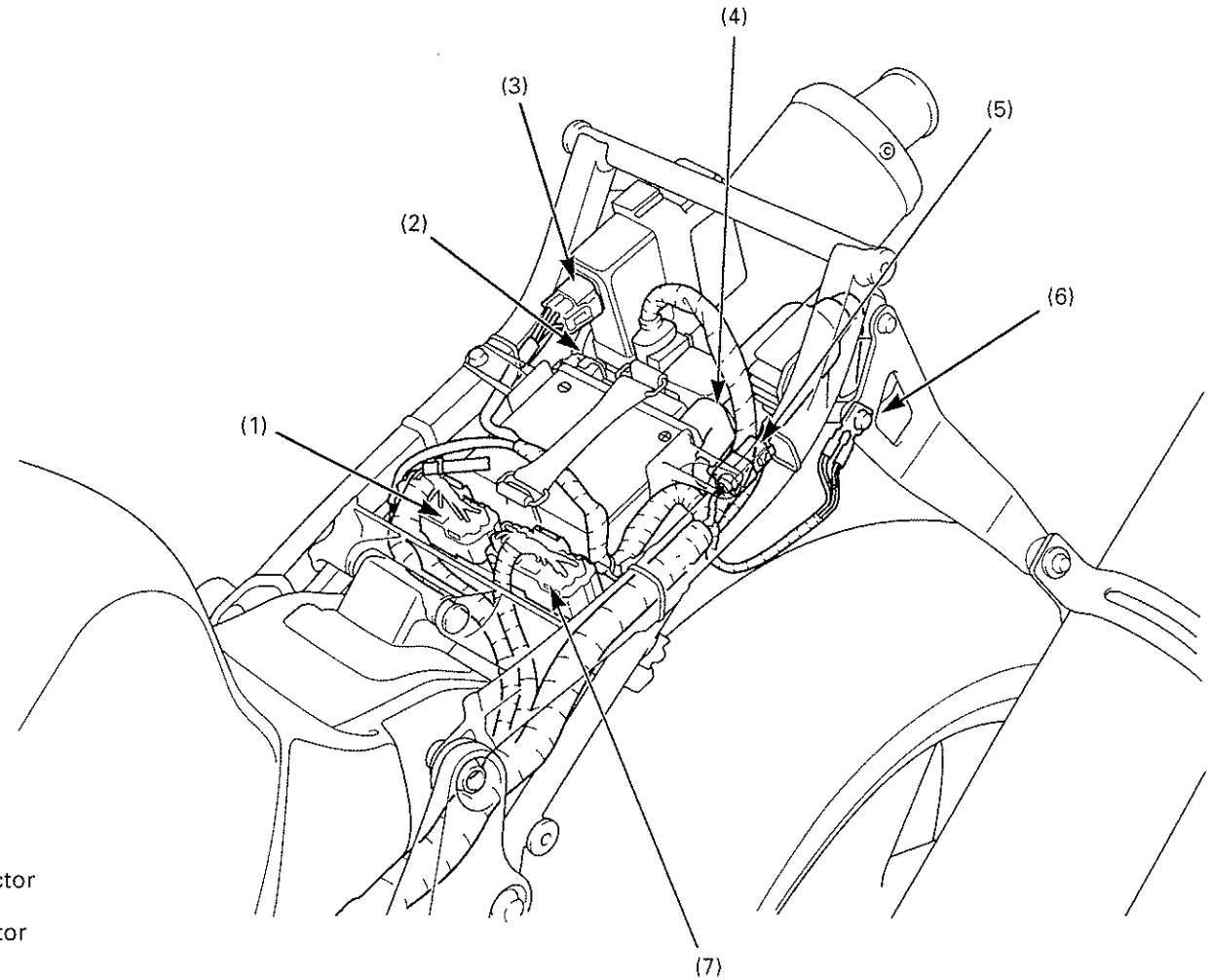
(1) Throttle cables
(2) Fuel feed tube
(3) Starter valve control cable
(4) Fuel pump sub-harness
(5) Fuel return tube
(6) Fuel pump 2P (Gray) connector
(7) Throttle body sub-harness 14P (Gray) connector
(8) IAT sensor 2P (White) connector
(9) BARO sensor 3P (Gray) connector
(10) MAP sensor 3P (Gray) connector



(1) Crankcase breather tube
(2) Oil catch tank
(3) Cam pulse generator
(4) Starter motor cable
(5) Rear cylinder spark plug wire
(6) Main wire harness
(7) Air box-to-oil catch tank hose
(8) Oil catch tank-to- left crankcase hose
(9) Ignition pulse generator 2P (Red) connector
(10) Upper radiator hose

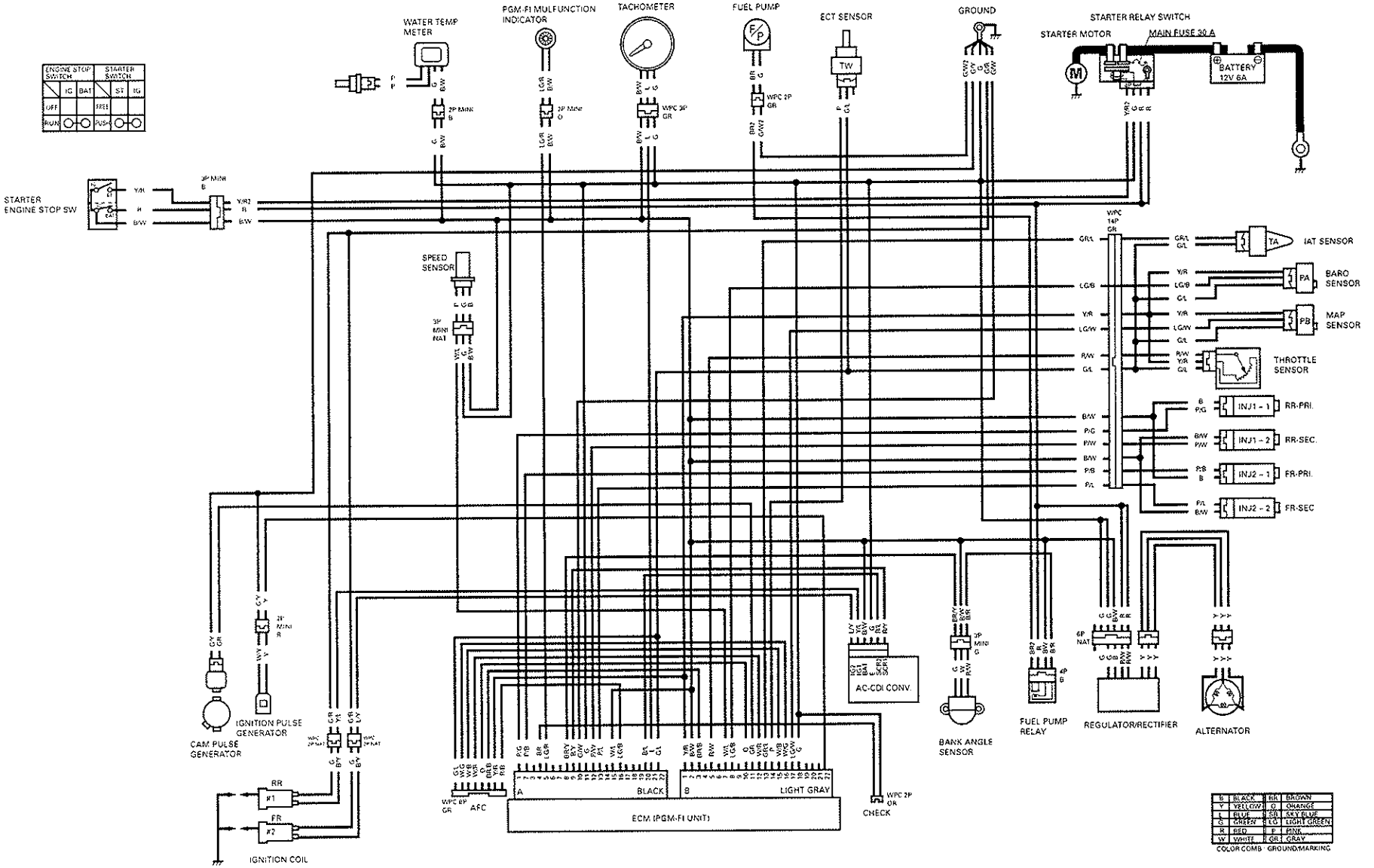


(1) AC-CDI converter
(2) Regulator/rectifier
(3) Starter relay switch
(4) Battery
(5) Main wire harness
(6) Starter motor cable
(7) Rear spark plug wire
(8) Vehicle speed sensor wire
(9) Vehicle speed sensor 3P (Natural) connector
(10) Rear ignition coil
(11) Rear ignition coil 2P (Natural) connector



(1) ECM 22P (Light gray) connector
(2) Battery negative (–) terminal
(3) AC-CDI converter 6P connector
(4) Battery positive (+) terminal
(5) Fuel pump relay
(6) Ground point
(7) ECM 22P (Black) connector

Wiring Diagram



Maintenance Schedule	3-2	Brake Fluid	3-13
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Drive Chain Roller	3-12	Storage	3-21
Drive/Driven Sprocket	3-12		

Maintenance Schedule

Perform pre-ride Inspection at each scheduled maintenance period.
I: Inspect and clean, Adjust, Lubricate or Replacement if necessary. C: Clean, R: Replace, L: Lubricate.

Item \ Frequency	Each race or about 2.5 hours	Remarks
Fuel Line	I	
Throttle Operation	I	
Spark Plug	I	
Valve Clearance	I	
Engine Oil	R	
Engine Oil Filter	R	
Intake and Exhaust Valves	I	
Valve Springs	I	R: every 5,000 km (3,100 mi)
Pistons/Piston rings	I	R: every 5,000 km (3,100 mi)
Crankpin Bearings	I	
Main journal bearings	I	
Cylinder Head	I	
Camshaft	I	
Cylinder Sleeve	I	
Radiator Coolant	I	
Cooling System	I	
Drive Chain	I, L	
Drive Chain Slider/Guide Roller	I	
Drive/Driven Sprocket	I	
Brake Fluid	I	R: every 3 races Replace after riding in rain
Brake Pad Wear	I	
Brake System	I	
Clutch System	I	R: every race (clutch discs and plates)
Clutch Fluid	I	R: every 3 races Replace after riding in rain
Exhaust Pipe/Muffler	I	
Suspension	I	
Nuts, Bolts, Fasteners	I	
Wheels And Tires	I	
Steering Head Bearings	I	

Pre-ride Inspection

For your safety, it is very important to take a few moments before each ride to walk around your VTR1000 SP-1 and check its condition.

⚠ WARNING

Improperly maintaining this VTR1000 SP-1 or failing to correct a problem before riding can cause a crash in which you can be seriously hurt or killed.

Always perform a Pre-ride and Pre-race inspection before every ride and correct any problems.

Check the following items before you get on the VTR1000 SP-1:

- Fuel, oil and water leaks
- Coolant for proper level
- Spark plug for proper heat range, carbon fouling and spark plug cap terminals for looseness
- Clutch operation
- Steering head bearings and related parts for condition
- Damaged or distorted frame
- Throttle grip and throttle valve operation
- Tires for damaged or improper inflation pressure
- Front and rear suspension for proper operation
- Front and rear brakes, for proper operation
- Drive chain for correct slack and adequate lubrication
- Drive chain slider for damage or wear
- Loose bolts, screws and other fasteners

Warming-up Inspection

When warming-up the engine, check for the following:
- Do not rev the engine more than necessary or engine damage may result.
- Check for fuel, oil and water leaks
- Warm up the engine for a few minutes until it is heated to the operating temperature until the engine responds to the throttle smoothly.

Ride Inspection

When running the VTR, check for the following:
- Fuel injection setting
- Control system
- Brake stopping power

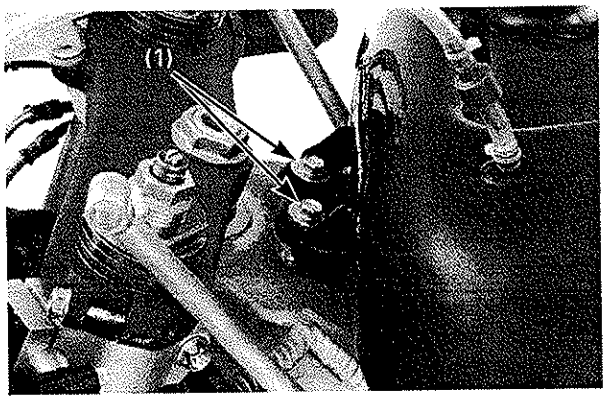
After Ride Inspection

After riding the VTR, check for the following:
- Color condition of spark plug
- Signs of detonation
- Fuel, oil and water leaks
- Loose or missing bolts and nuts

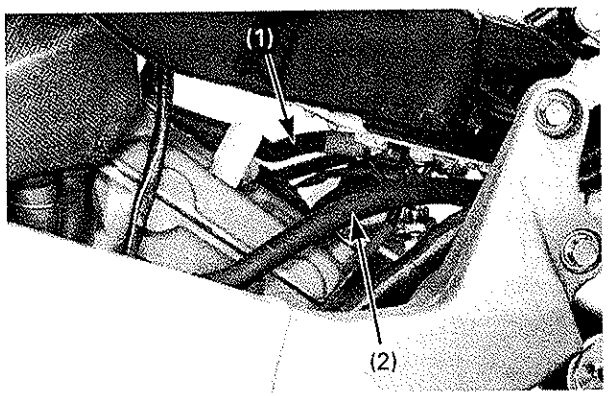
Replacement Parts

Parts Requiring Periodic Replacement

Item	Replacement Interval	Cause
Engine		
Piston	Every 5,000 km (3,100 mi)	Damage or wear
Piston pin	Every 5,000 km (3,100 mi)	Damage, wear or burning
Piston ring	Every 5,000 km (3,100 mi)	Damage or wear
Connecting rod	Every 5,000 km (3,100 mi)	Damage, wear or burning
Intake valve	Every 1,500 km (900 mi)	Damage, wear or burning
Exhaust valve	Every 5,000 km (3,100 mi)	Damage, wear or burning
Valve spring	Every 5,000 km (3,100 mi)	Weak or fatigue
Valve spring retainer	Every 5,000 km (3,100 mi)	Wear
Piston pin	Every 5,000 km (3,100 mi)	Damage, wear or burning
Transmission gear	Every 5,000 km (3,100 mi)	Wear
Clutch outer	Every 4,000 km (2,500 mi)	Loose bearing
Clutch disc	Every race	Wear or burning
Clutch plate	Every race	Burning
Frame		
Fuel pump	Every 4,000 km (2,500 mi)	
Fuel strainer	Every 2,000 km (1,200 mi)	



(1) BOLT/WASHERS

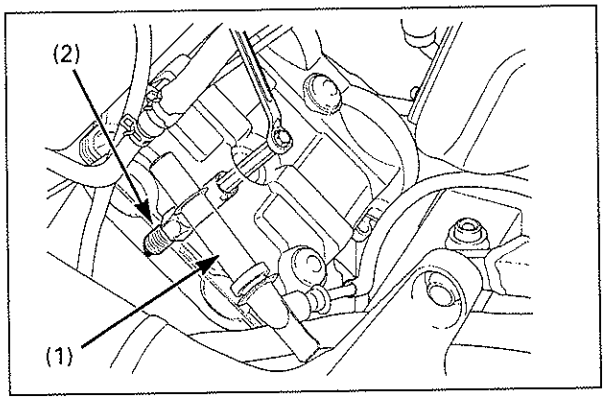


(1) FUEL FEED TUBE
(2) FUEL RETURN TUBE

Fuel Line

Disconnect the fuel tank overflow tube from the catch tank.
Remove the fuel tank front mounting bolt/washers, then open the front end of fuel tank.

Check the fuel feed tube and return tube for cracks, deterioration or leakage.



(1) SPARK PLUG CAP (2) SPARK PLUG

Spark Plug

NOTICE

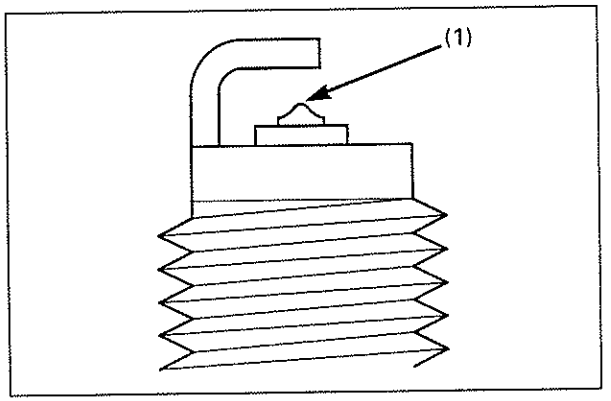
This machine's spark plug is equipped with iridium type center electrode. Do not clean the electrodes.

Using a spark plug with the wrong heat range can damage the engine or cause the plugs to foul. Always use specified spark plug for this machine.

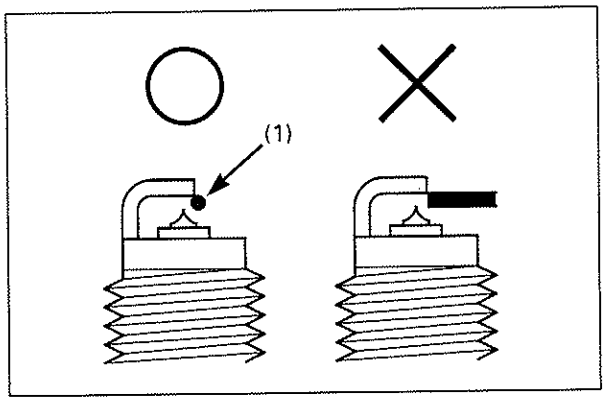
Specified plug:
NGK: R7279-10 (Iridium)
Plug gap:
0.6 – 0.7 mm (0.02 – 0.03 in)

Before removing the spark plug, clean around the spark plug bases with compressed air, and be sure that no debris is allowed to enter the combustion chamber.

Remove the spark plug cap and remove the spark plug.



(1) ROUNDED ELECTRODE

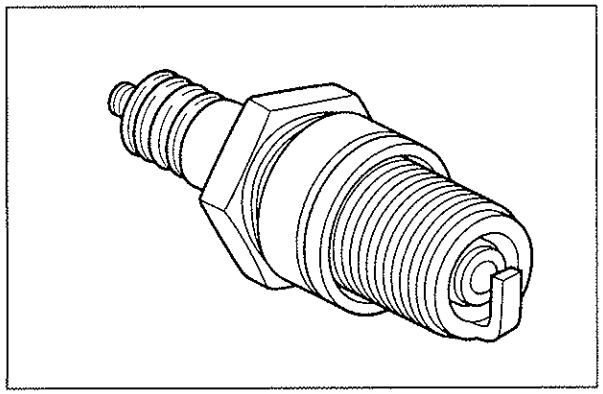


(1) WIRE TYPE FEELER GAUGE

Replace the plug of the center electrode is rounded as shown.
Measure the spark plug gap using a wire type feeler gauge.

Standard: 0.6 – 0.7 mm (0.02 – 0.03 in)

Replace the spark plug if the spark plug gap is out of specification.



Flash Over

If engine misfire occurs due to arcing, replace both the spark plug and the cap.

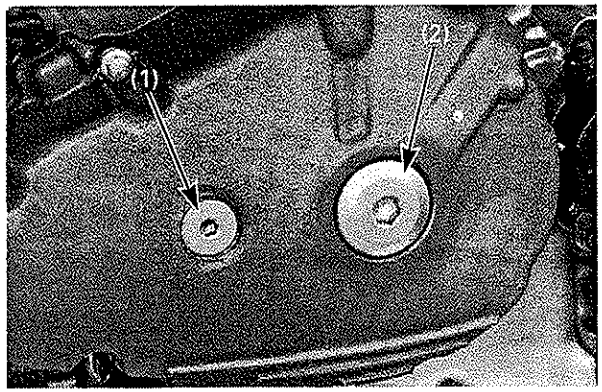
Spark Plug Cap

Remove the spark plug cap from the spark plug.
Clean the inside of the plug cap with electrical contact cleaner to prevent misfire.

Screw the spark plug into the cylinder head by hand to prevent cross-threading.
Using a new spark plug, once tighten the new spark plug to the specified torque, retighten it to the specified torque.

Torque: 18 N•m, 1.8 kgf•m, 13 lbf•ft)

Install the spark plug cap.



(1) TIMING HOLE CAP
(2) CRANKSHAFT HOLE CAP

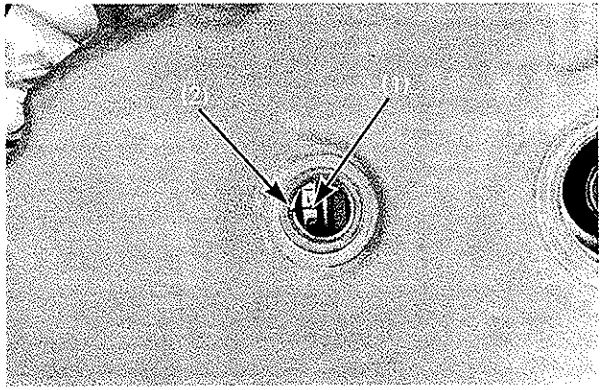
Valve Clearance

Inspection

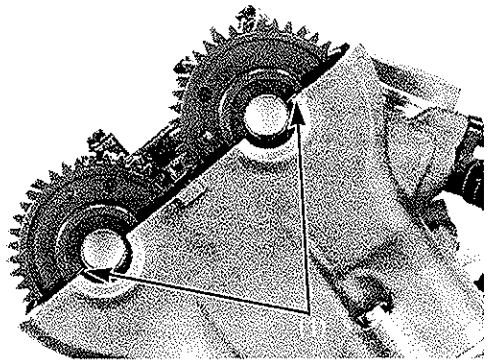
Inspect and adjust the valve clearance while the engine is cold (below 35°C/95°F).

Remove the front and rear cylinder head cover.

Remove the timing hole cap and crankshaft hole cap.

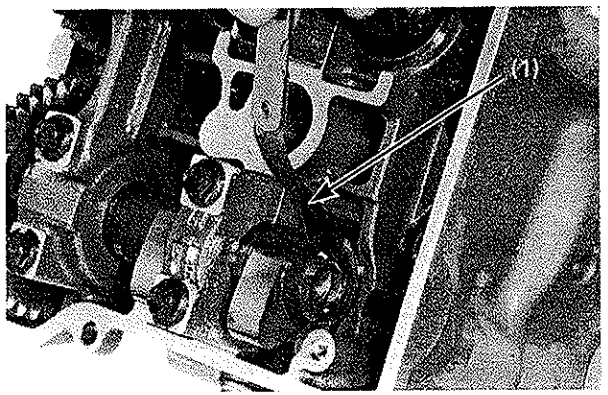


(1) "RT" MARK
(2) INDEX MARK



(1) INDEX LINES

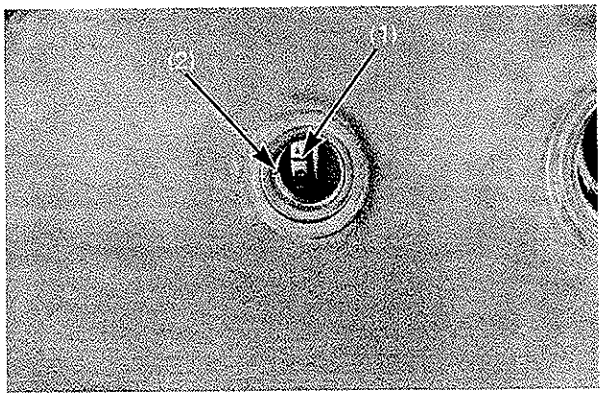
Rotate the crankshaft counterclockwise and align the "RT" mark on the flywheel with the index mark on the left crankcase cover.
The index lines on the rear cylinder camshafts must be flush with the cylinder head surface and facing outward as shown.
If the index lines are facing inward, rotate the crankshaft counterclockwise one full turn (360°) and realign the index lines.



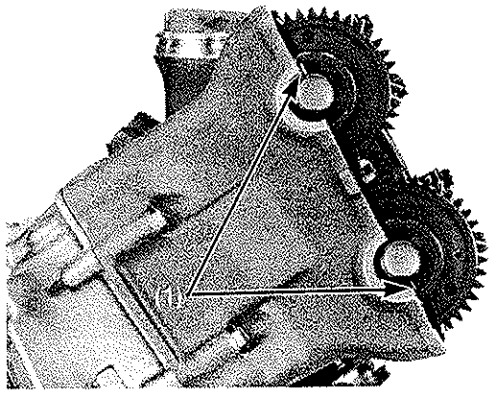
(1) FEELER GAUGE

Measure the rear cylinder valve clearance by inserting a feeler gauge between the valve lifter and cam lobe.

Valve clearance:
IN: 0.22 ± 0.02 mm (0.009 ± 0.008 in)
EX: 0.32 ± 0.02 mm (0.013 ± 0.008 in)



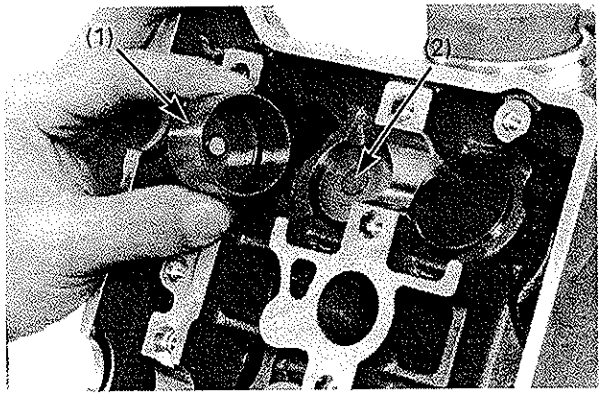
(1) "FT" MARK
(2) INDEX MARK



(1) INDEX LINES

Rotate the crankshaft counterclockwise 450° and align the "FT" mark on the flywheel with the index mark on the left crankcase cover.

The index lines on the front cylinder camshafts must be flush with the cylinder head surface and facing outward as shown.



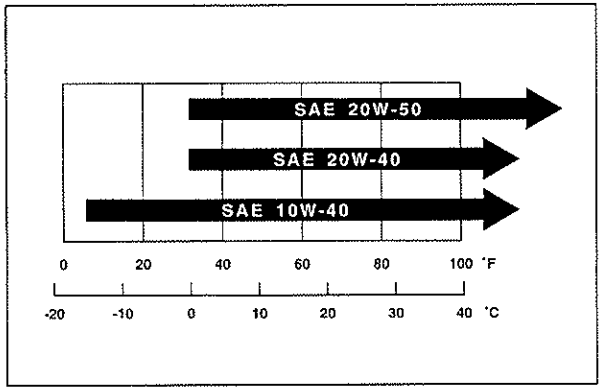
(1) VALVE LIFTER
(2) SHIM

Measure the rear cylinder valve clearance by inserting a feeler gauge between the valve lifter and cam lobe.

Valve clearance:
IN: 0.22 ± 0.02 mm (0.009 ± 0.008 in)
EX: 0.32 ± 0.02 mm (0.013 ± 0.008 in)

If necessary, remove the camshaft and valve lifter, adjust the valve clearance.
See VTR Shop Manual for shim adjustment.

Install the removed parts in the reverse order of removal.



Engine Oil/Oil Filter

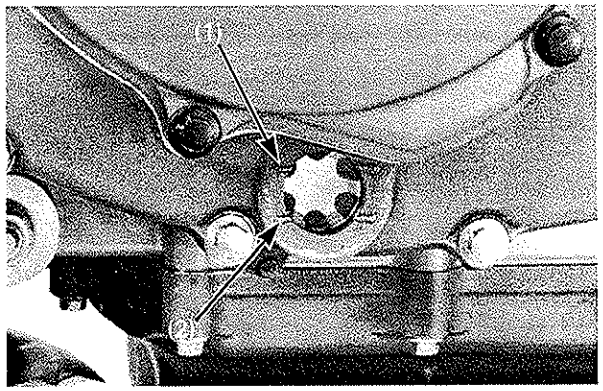
Specified engine oil:
Honda Ultra GP 4-Stroke Oil (10W-40)

Motor oil intended for Service SF or SG will show this designation on the container. The use of special oil additives is unnecessary and will only increase operating expenses.

Oil is a major factor effecting the performance and service life of the engine. Non-detergent, vegetable, or castor based racing oils are not recommended.

Recommended oil viscosity: SAE 10W-40

Other viscosities shown in the chart above may be used when the average temperature in your riding area is within the indicated range.

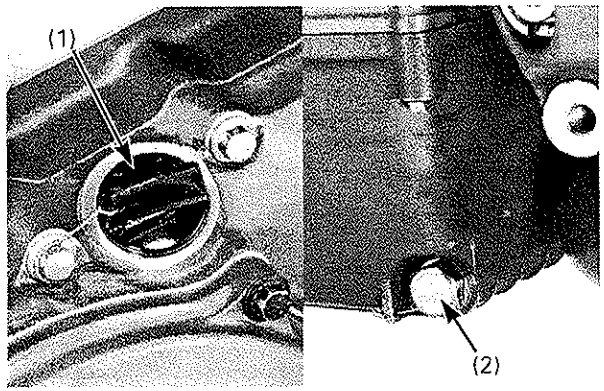


(1) UPPER LEVEL MARK
(2) LOWER LEVEL MARK

Oil Level Inspection

Start the engine and let it idle for a few minutes.

Stop the engine, support the machine using a maintenance stand.
Wait for a few minutes and check that the oil level is between the upper and lower level marks in the inspection window.



(1) FILLER CAP
(2) DRAIN BOLT

Oil Change

Change the engine oil with the engine warm.
Support the machine using a maintenance stand to assure complete and rapid draining.

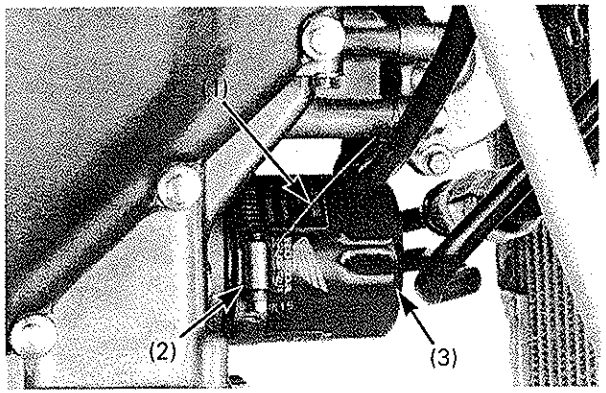
1. Cut the locking wires from the oil filler cap and oil drain plug.
2. Remove the oil filler cap.
3. Place an oil drain pan under the engine and remove the drain bolt.
4. After the oil has completely drained, make sure that the sealing washer is in good condition and reinstall the drain bolts. Tighten the drain bolt to the specified torque.

Torque: 29 N·m (3.0 kgf·m, 22 lbf·ft)

5. Pour the recommended engine oil slowly through the oil filler hole.

Capacity:
3.7 liter (3.9 US qt, 3.3 Imp qt) at draining
4.2 liter (4.4 US qt, 3.7 Imp qt) at disassembly

Install the oil filler cap.
Secure the filler can and drain bolt using a locking wire.



(1) LOCKING WIRE (2) BAND
(3) OIL FILTER CARTRIDGE

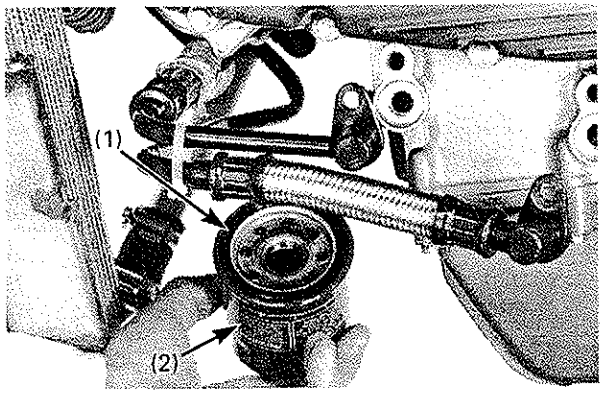
Oil Filter Change

Remove the following:
- Exhaust pipe
- Oil cooler pipes (page 4-4)

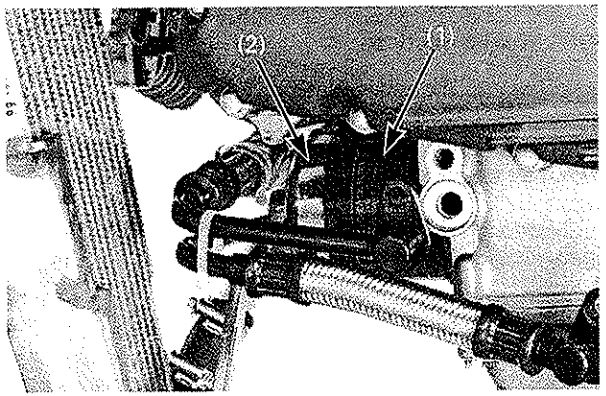
Cut a locking wire from the oil filter band.
Loosen and remove the filter band.

Remove and discard the oil filter using the special tool.

Tool:
Oil filter wrench **07HAA-PJ70100**



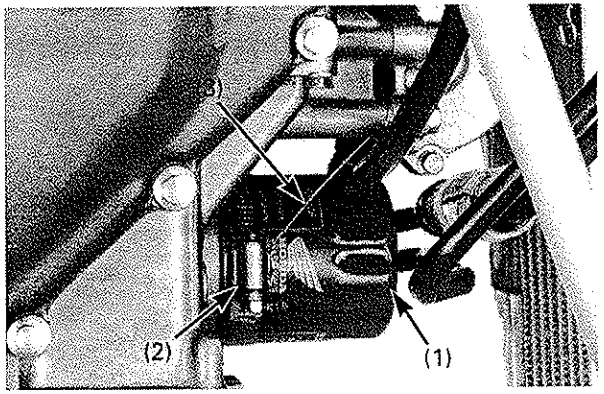
(1) O-RING (2) OIL FILTER CARTRIDGE



(1) OIL FILTER CARTRIDGE
(2) OIL FILTER WRENCH

Pour recommended engine oil into the new oil filter.
Apply oil to the O-ring.
Install and hand tighten the oil filter, then tighten it to the specified torque.

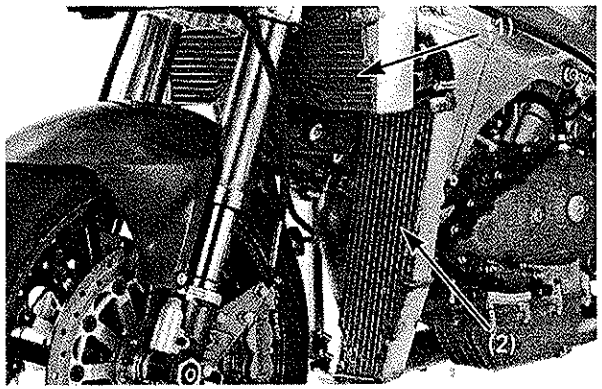
Torque: 26 N·m (2.7 kgf·m, 20 lbf·ft)



(1) OIL FILTER CARTRIDGE (2) BAND
(3) LOCKING WIRE

Install the oil filter band and secure it.
Secure the band using a locking wire.

Install the removed parts in the reverse order of removal.
Fill the crankcase with the recommended oil (see previous page).

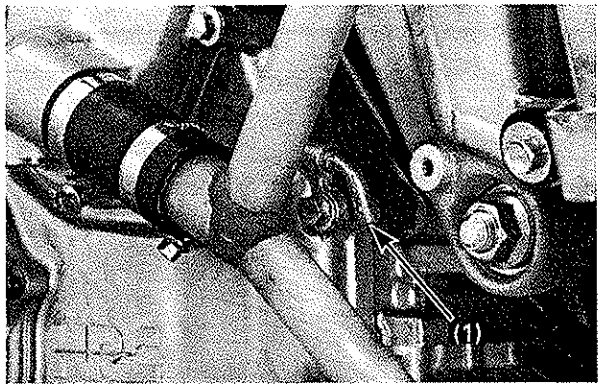


(1) UPPER RADIATOR
(2) LOWER RADIATOR

Cooling System

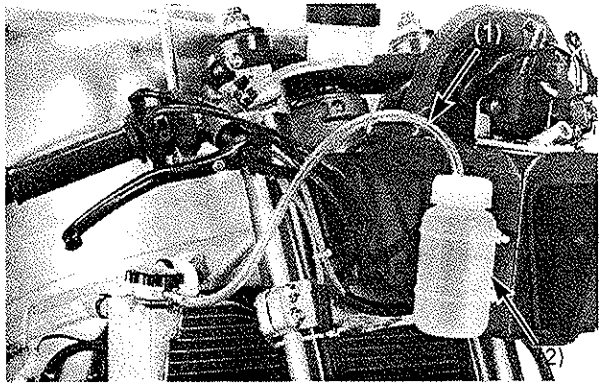
Cooling System Inspection

1. Check the cooling system for leaks.
2. Check water hoses for cracks, deterioration, and clamp bands for looseness.
3. Check the radiator mount for looseness.
4. Make sure the overflow tube is connected and not clogged.
5. Check radiator fins for obstructions or damage.



(1) INSPECTION HOLE

6. Check the water pump inspection hole front side of the right crankcase cover for leakage. Make sure the hole remains open.
   If water leaks through the check hole, the water seal is damaged.
   If oil leaks through the check hole, the oil seal is damaged.
   Replace the water seal or the oil seal (see VTR service manual).

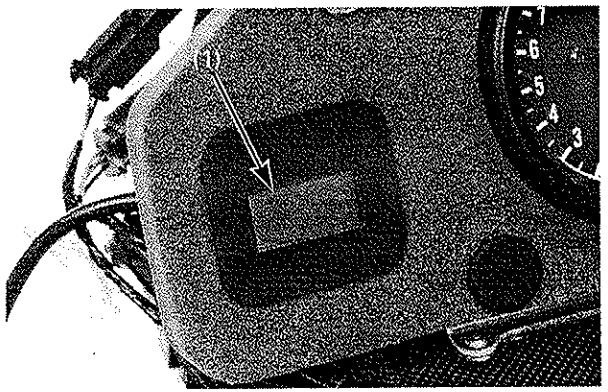


(1) OVERFLOW TUBE
(2) CATCH TANK

Coolant Overflow Catch Tank

The coolant overflow catch tank trap coolant vapor from the radiator through the overflow tube.
Make sure that the end of the overflow tube is inserted into the hole in the catch tank as shown.

Before starting, drain coolant from the catch tank.



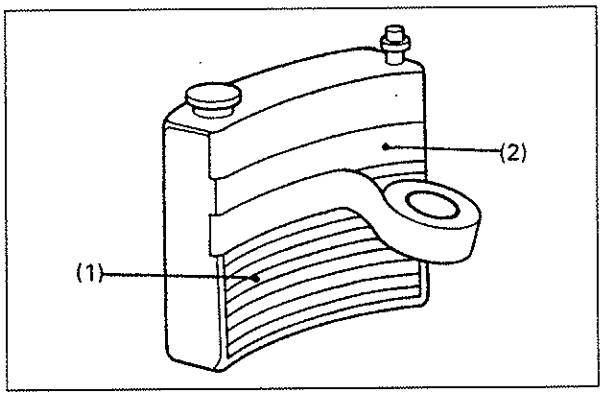
(1) COOLANT TEMPERATURE METER

Coolant Temperature Meter

Block the air flow through the radiators, and adjust to ensure that the water temperature can be kept in a proper condition.

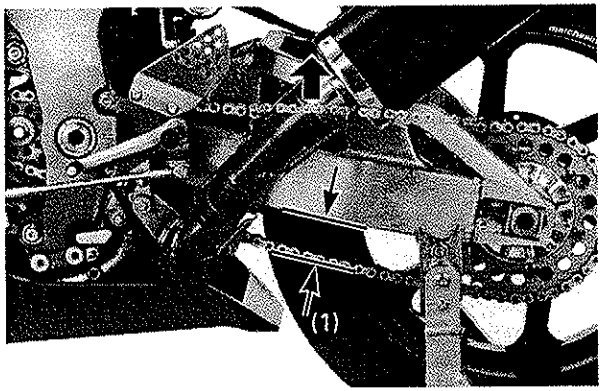
Water temperature: 65 – 75°C (149 – 167°F) (in running)

The water temperature will only display in a range from 25°C to 99°C (77°F to 210°F).
The figure disappears within 30 minutes after the engine stop button is turned off.



(1) RADIATOR (2) COVERING

If the indication never changes from (–°C), check the radiator coolant level and temperature (25 – 99°C/77 – 210°F), and then inspect the water temperature sensor and harness.



(1) DRIVE CHAIN SLACK

Drive Chain

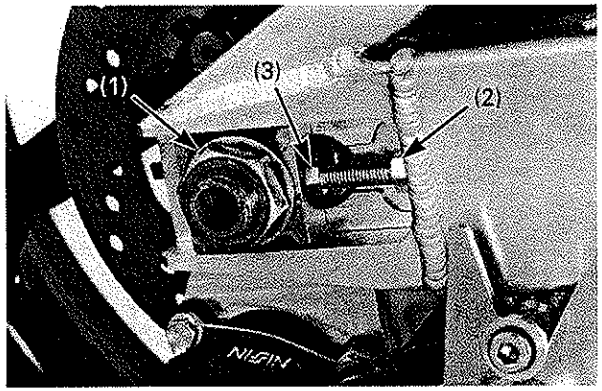
Drive Chain Slack Inspection

During the break-in period, drive chain slack should be checked and adjusted often. Also check the drive chain slack after the drive chain replacement.
Regular cleaning, lubrication, and proper adjustment will help to extend the service life of the drive chain.

Shift the transmission into neutral, turn the engine off and support the motorcycle with maintenance stand.
Pull the upper section midway of the drive chain with your hand, then measure the distance between the swingarm and drive chain at the lower section midway between the sprockets.

Drive chain slack: 25 – 35 mm (1.0 – 1.4 in)

Rotate the wheel and check distance in several sections. If slack in one section increases beyond the standard measurement, this indicates the chain has stretched and needs to be replaced.
Take care to prevent catching your fingers between the chain and sprocket.



(1) AXLE NUT (2) LOCK NUT
(3) ADJUSTING BOLT

Drive Chain Slack Adjustment

Loosen the rear axle nut just enough to move the rear wheel in fore-act direction.
Loosen the adjusting bolt lock nuts and turn the adjusting bolts equally on both sides until the correct drive chain tension is obtained.
Turn the adjusting bolt counterclockwise will decrease slack and turning it clockwise will increase slack.

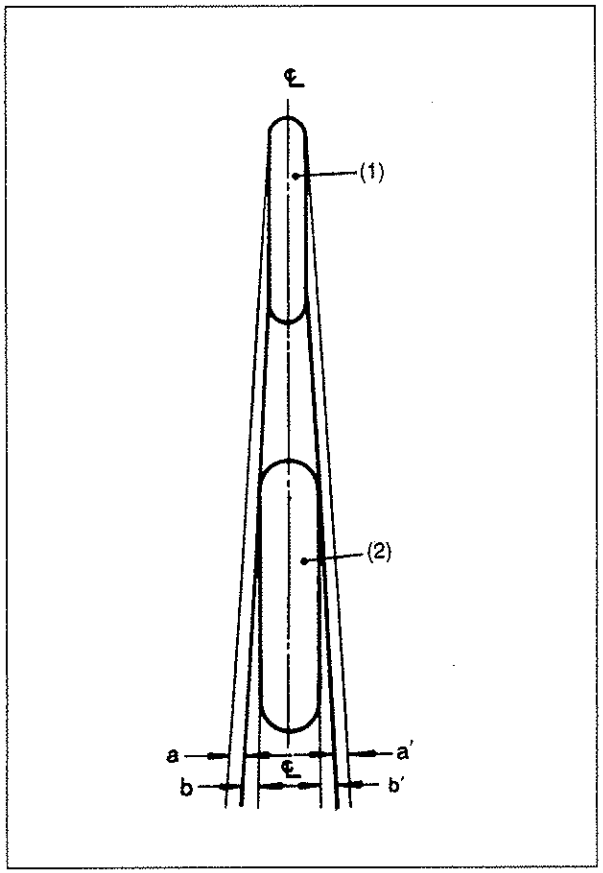
- Adjust the chain with the chain adjusters so that it is parallel with the center line of the frame.
- Check that the stopper is between the teeth of the adjuster.

Recheck the drive chain slack and free wheel rotation.
After adjustment, tighten the axle nut to the specified torque.

Torque: 88 N•m (9.0 kgf•m, 65 lbf•ft)

Tighten the adjusting bolt lock nut.

Lubricate the drive chain.

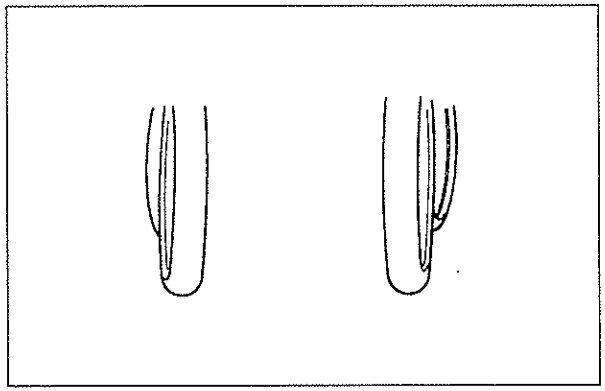


(1) FRONT TIRE (2) REAR TIRE

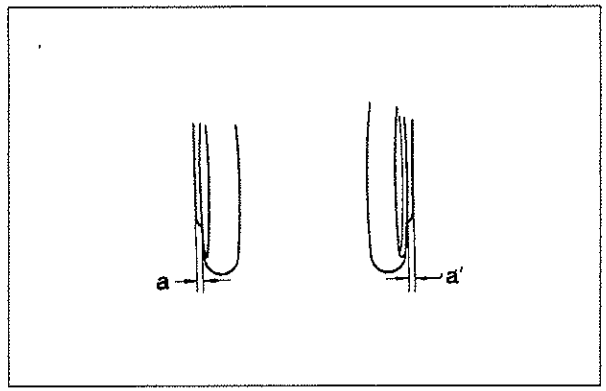
Wheel Alignment

After adjusting the drive chain slack, check the front and rear wheels for alignment.

1. Place the machine upright on firm, level ground.
2. Stand at a position 1 – 2 m from the rear end of the machine on either side; squat down.



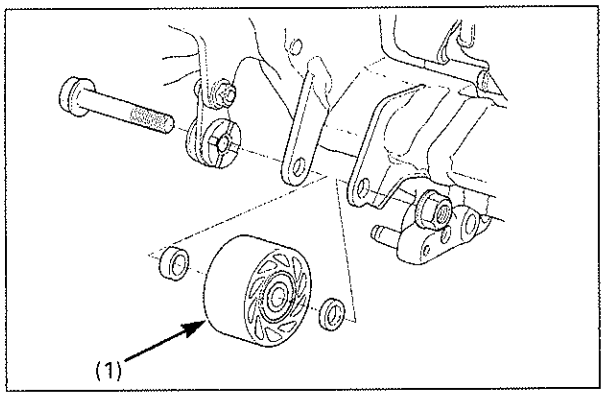
In the illustration above, the handlebar is turned too far toward the right.



In the illustration above, rear wheel is no yet aligned.

3. Position the front wheel straight-ahead by turning the handlebars and noting the distance between the outer edges of the front and rear wheel on that side.

Repeat steps 2 and 3 on the opposite side, being sure that the difference is equal on both sides.
Adjust by loosening the rear axle and turning the drive chain adjusting bolt.



(1) DRIVE CHAIN ROLLER

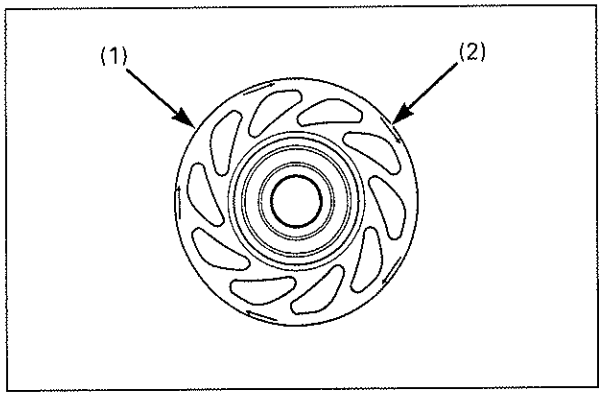
Drive Chain Roller

Inspection

Check the drive chain roller for wear or damage, replace if necessary.

Replacement

Remove the bolt, nut, drive chain roller and collars.

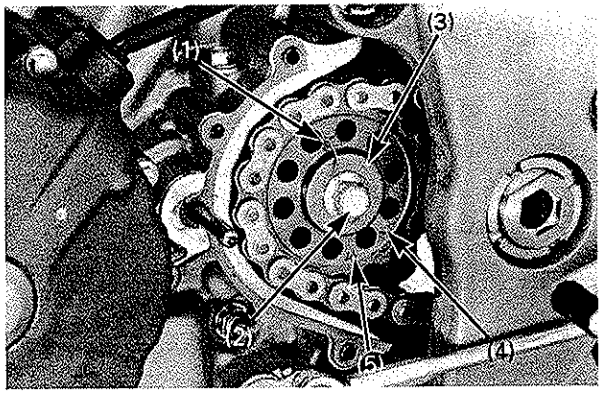


(1) DRIVE CHAIN ROLLER
(2) ROTATING DIRECTION MARK

Install the new drive chain roller and collars into the frame bracket while aligning its rotating direction mark.

Install the bolt and nut, then tighten the nut securely.

The drive chain roller mounting bolt/nut must be retightened after break-in.



(1) LOCKING WIRE (2) BOLT
(3) WASHER (4) DRIVE SPROCKET
(5) NUMBER OF TEETH

Drive/Driven Sprockets

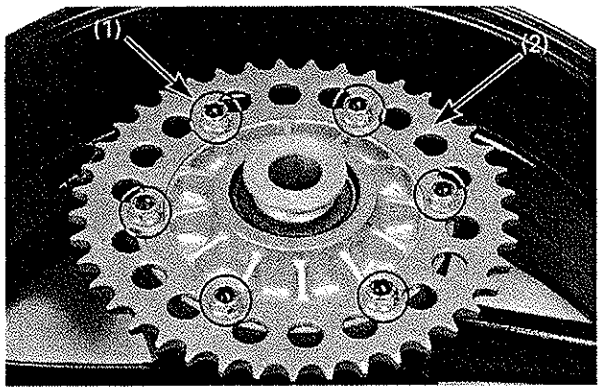
Drive Sprocket Replacement

Remove the drive sprocket cover.
Loosen the drive chain fully (page 3-11).

Cut and discard the locking wire.
Shift the transmission into low gear, apply rear brake.

Remove the following:
- Drive sprocket bolt
- Washer
- Drive sprocket

Install the drive sprocket with its etched number (number of teeth) facing out.



(1) BOLTS/NUT (2) DRIVEN SPROCKET

Driven Sprocket Replacement

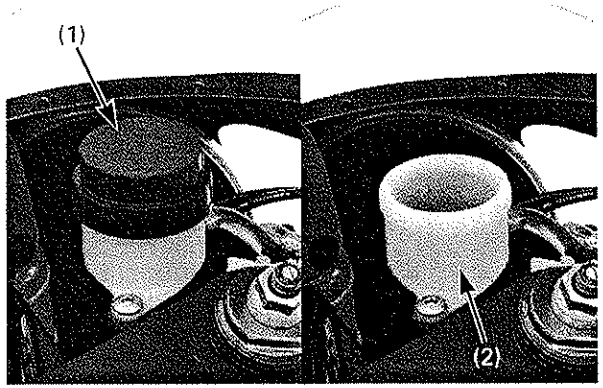
Remove the rear wheel (page 14-2).

Remove the bolts/nuts and driven sprocket.

Installation is in the reverse order of removal.
Apply oil to the drive sprocket nut threads and seating surfaces.
Tighten the nuts to the specified torque.

Torque: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Adjust the drive chain slack (page 3-10).



(1) MASTER CYLINDER CAP
(2) "MIN" LEVEL

Brake Fluid

Front Brake Master Cylinder

Always inspect the brake fluid level.

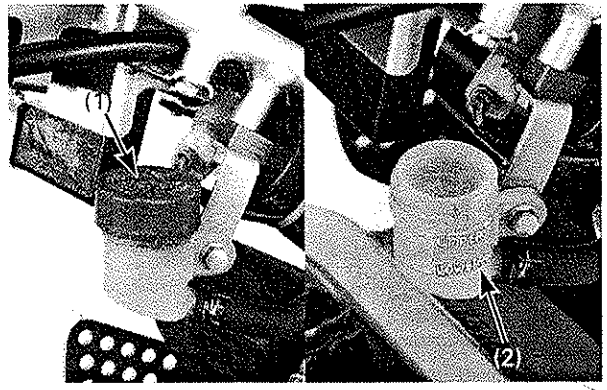
Remove the master cylinder cap and diaphragm.

If the fluid level is lower than the "MIN" line, check for the brake pad wear.
Replace the brake pad if necessary.
Refer to page 15-2 for brake pad replacement.

Also check the brake system for leaks.

Do not service the brake system in high humidity.
Replace the brake fluid after riding in rain.

Specified brake fluid: AP600



(1) MASTER CYLINDER CAP
(2) "MIN" LEVEL

Rear Master Cylinder

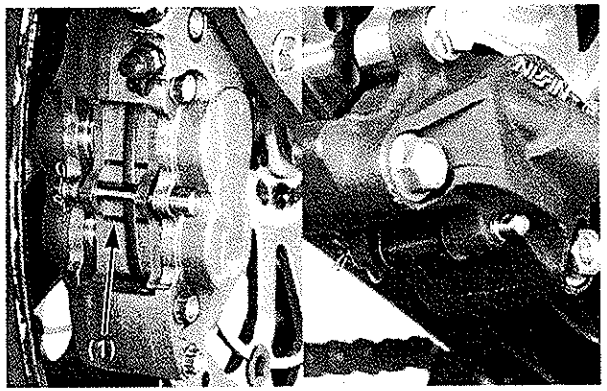
Always inspect the brake fluid level.

Remove the rear cowl.
Remove the master cylinder cap, set plate and diaphragm.
If the fluid level is lower than the "MIN" level, check for brake pad wear.
Replace the brake pad if necessary.
Refer to page 15-3 for brake pad replacement.

Also check the brake system for leaks.

Do not service the brake system in high humidity.
Replace the brake fluid after riding in rain.

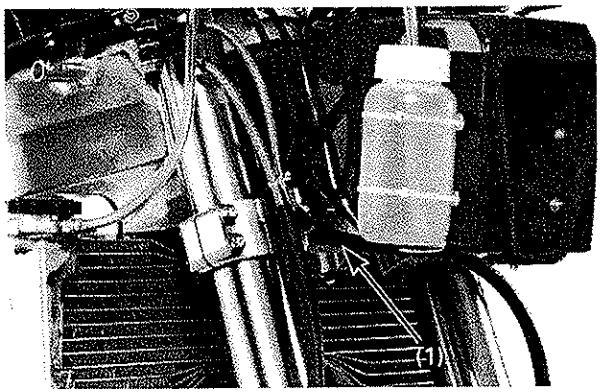
Specified brake fluid: AP600



(1) WEAR INDICATOR

Brake Pad Wear

Inspect the brake pads visually to determine the pad wear.
If either pad is wear to the indicator, both pads must be replaced.



(1) BRAKE HOSE

Brake System

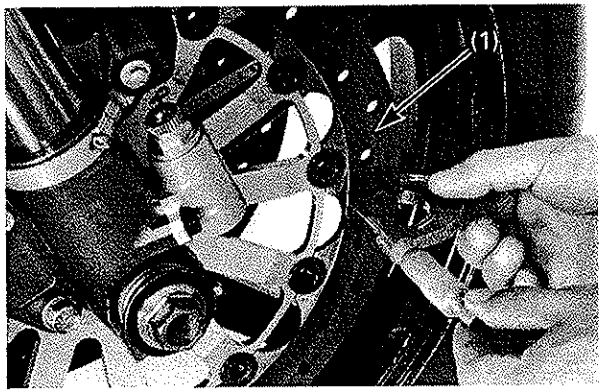
Refer to page 1–4 for Brake Lever Adjustment.
Refer to page 1–4 for brake pedal height adjustment.

Inspection

Check that the brake hose do not bind or kink in all steering position, and is not pulled when the suspension is extended.

Do not service the brake system in high humidity.

Specified brake fluid: AP600 only



(1) BRAKE DISC

Brake Discs

Measure the rear brake disc runout with a dial gauge.

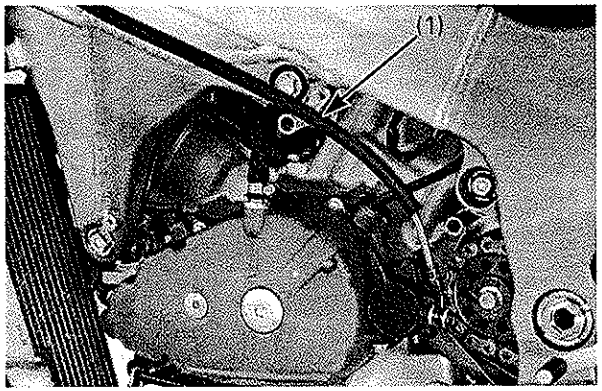
Service limit: 0.15 mm (0.006 in)

Replace the brake disc if the runout exceeds the service limit.

Measure the brake disc thickness.

Service limit:
Front: 5.0 mm (0.20 in)
Rear: 4.5 mm (0.18 in)

Replace the brake disc if necessary.
Refer to pages 13–3 and 14-3 for removal.



(1) CLUTCH HOSE

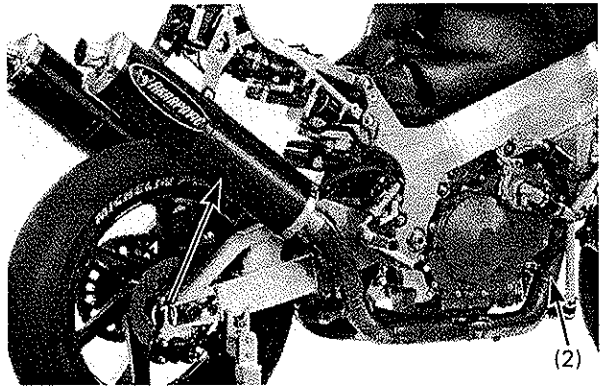
Clutch System/Clutch Fluid

System Inspection

Operate the clutch lever and check that no air has entered in the clutch hydraulic system.
If the clutch is not disengaged properly, or the lever feels soft or spongy, bleed the air from the system.

See VTR Service Manual for clutch air bleeding procedure.

Inspect the clutch hose and fittings for damage, deterioration, cracks or signs of leakage.
Tighten any loose fittings.
Replace the hose and fitting as required.

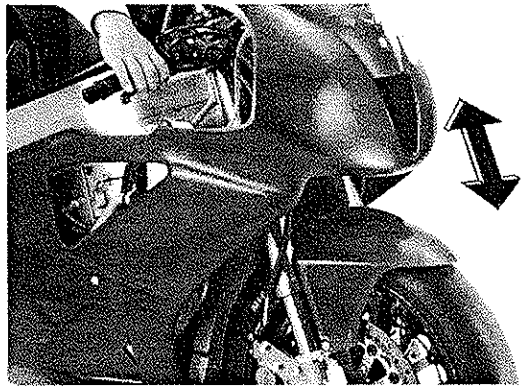


(1) MUFFLERS (2) EXHAUST PIPE

Exhaust Pipe/Muffler

Check the mufflers for clogging.
Check for loose or missing bolts and nuts.
Check the exhaust pipe and muffler for cracks or deformation.

Loss of power will result if the exhaust pipe is broken.

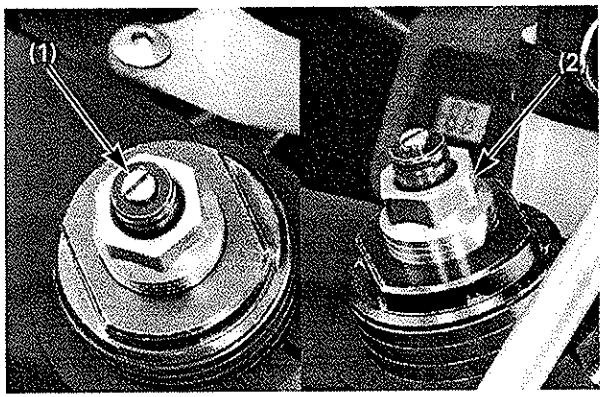


Front Suspension

Inspection

1. Make sure that the fork surfaces and dust seals are clean.
2. Check for signs of oil leakage. Damaged or leaking fork seals should be replaced before you ride the machine.
3. Make a quick check of fork operation by locking the front brake and pushing down on the handlebars several times.

- When your VTR is new, break in your VTR to ensure that the suspension has worked in.
- After break-in, test ride your VTR with the front suspension at the standard setting before attempting any adjustments.



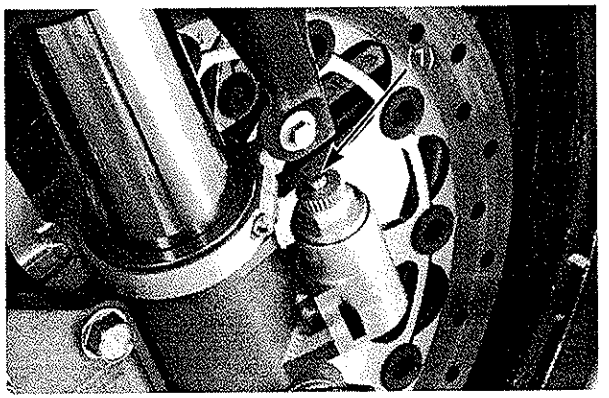
(1) REBOUND ADJUSTER
(2) PRE-LOAD ADJUSTER

Fork

The machine is shipped with a light coating of grease on the forks. This is not an indication of a leak.

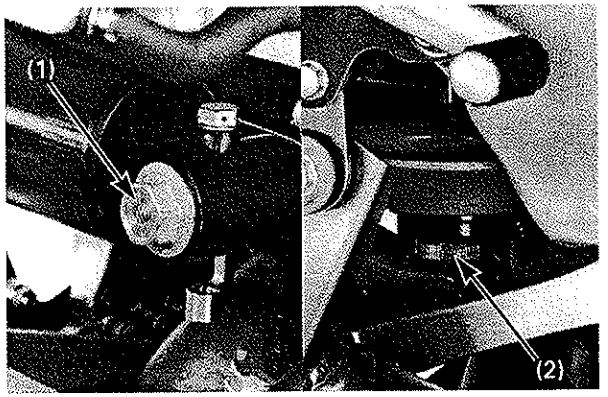
The fork should always be adjusted for the rider's weight and race track conditions by using one or more of the following methods.
Basically, there are five adjustments you can make to the front suspension:

- Rebound damping
  Turning the rebound damping adjuster adjusts how quickly the fork extends.
- Compression damping
  Turning the compression damping adjuster adjusts how quickly the fork compresses.
- Spring pre-load
  Turning the spring pre-load adjuster adjusts the spring initial pre-load length.
- Fork fluid volume
  The effects of higher or lower fork fluid level are only felt during final fork travel.
- Fork spring
  Optional stiffer and softer springs than the standard spring are available.



(1) COMPRESSION ADJUSTER

- For optimum fork performance, we recommended that you disassemble and clean the fork after riding your VTR for three hours.
- Replace the fork fluid every three races. Check and adjust the fork oil level after the fork fluid is changed.
- Use Honda Ultra Cushion Oil Special or equivalent with additives to assure maximum performance of your VTR's front suspension.
- Periodically check and clean all front suspension parts to assure top performance. Check the dust seals for dust, dirt and foreign materials. Check the fluid for any contamination.
- Make all compression and rebound damping adjustments in one-click increments. Adjusting two or more clicks at a time may cause you to pass over the best adjustment. Test ride after each adjustment.
- If you become confused about adjustment settings, return to the standard position and start over.
- For the fork maintenance and service, see your Showa service shop.

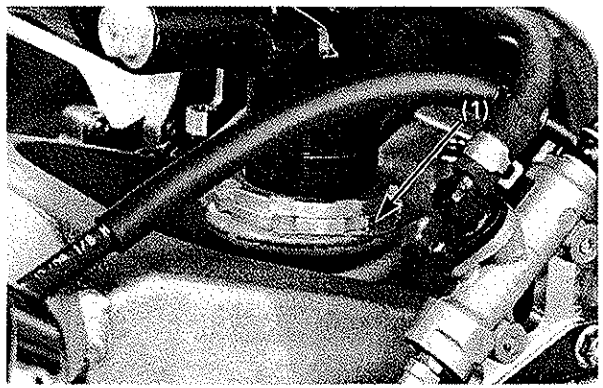


(1) COMPRESSION ADJUSTER
(2) REBOUND ADJUSTER

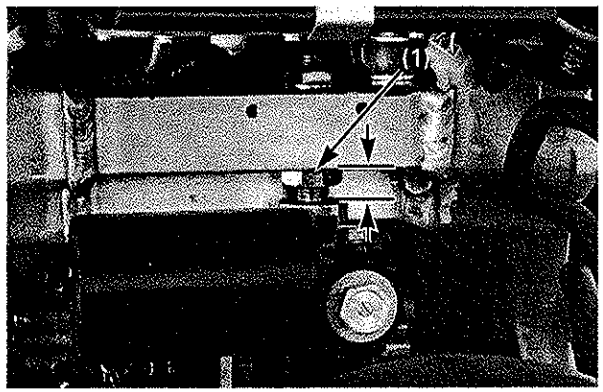
Rear Suspension

The swingarm is controlled by a shock absorber. The rear shock absorber should always be adjusted for the rider's weight and race track conditions by using one or more of the following methods.

- Rebound damping
  Turning the rebound damping screw adjusts how quickly the shock absorber extends.
- Compression damping
  Turning the compression damping screw adjusts how quickly the shock absorber compresses.
- Spring pre-load
  Turning the spring pre-load adjuster adjusts the spring initial pre-load length.
- Shock absorber spring
  Optional stiffer and softer springs than the standard spring are available.
- Ride height
  Ride height can be adjusted to the rider's preference.
- When your VTR is new, your suspension will break-in as you ride.
- After break-in is completed, test ride your VTR with the rear suspension at the standard setting before attempting any adjustments.

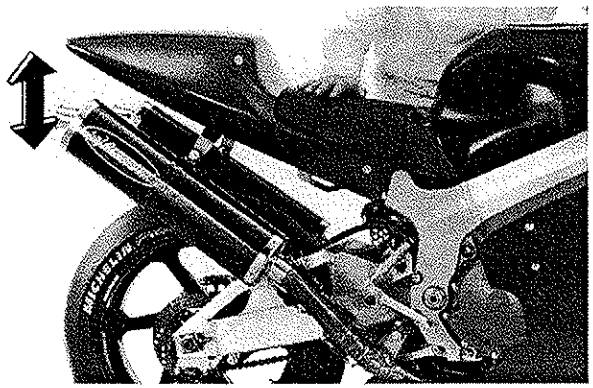


(1) PRE-LOAD ADJUSTER



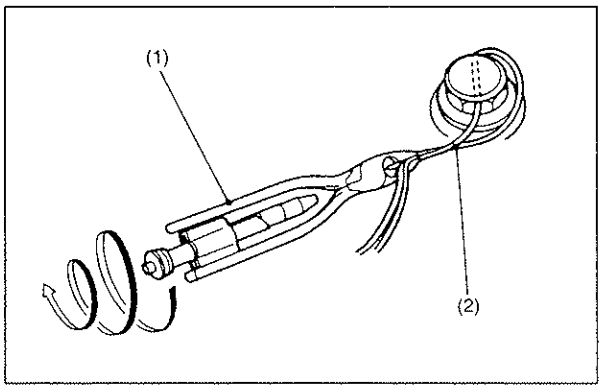
(1) RIDE HEIGHT ADJUSTER (STANDARD 15.5 mm)

- Make all compression and rebound damping adjustments in one-click increments. Adjusting two or more clicks at a time may cause you to pass over the best adjustment. Test ride after each adjustment.
- If you become confused about adjustment settings, return to the standard position and start over.
- For the shock absorber maintenance and service, see your Showa service shop.



Inspection

1. Check for a broken or collapsed spring.
2. Bounce the rear of the machine up and down and check for smooth suspension action.
3. Check the rear shock absorber for a bent shaft or oil leaks.
4. Push the rear wheel sideways to check for worn or loose swingarm bearings. There should be no movement. If movement is felt, replace the pivot bearings (see VTR Service Manual).

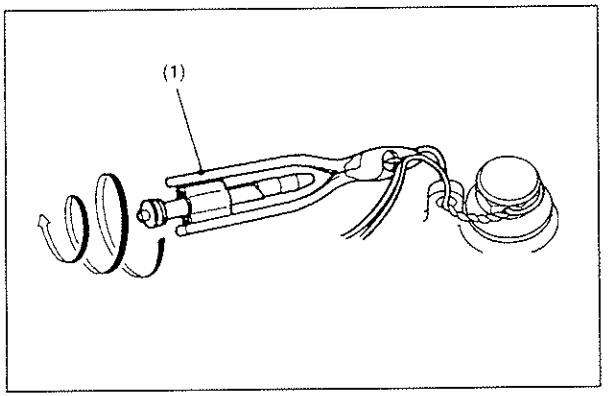


(1) WIRE TWISTING TOOL
(2) LOCKING WIRE

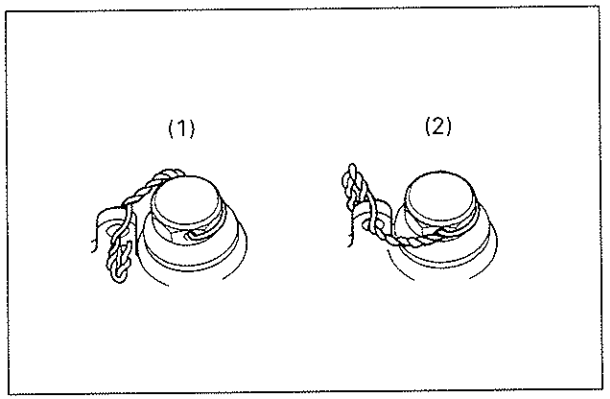
Nuts, Bolts, Fasteners

Wire Locking

Before starting the engine, secure the following bolts and nuts.
- Engine oil drain plug/oil filler cap
- Oil filter cartridge band
- Oil cooler pipe mounting bolts (engine and cooler side)
- Air funnel mounting bolts
- Drive sprocket bolt
- Rear brake caliper mounting bolts
- Caliper pad pin clips

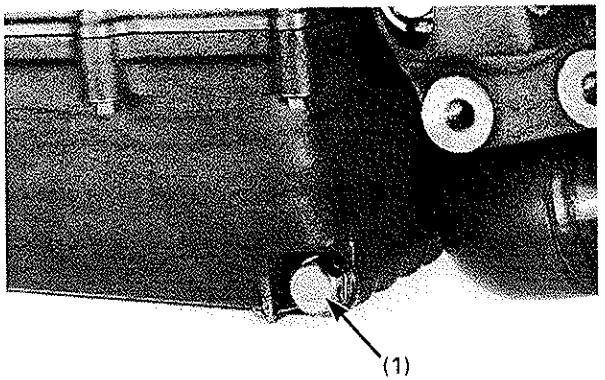


(1) WIRE TWISTING TOOL

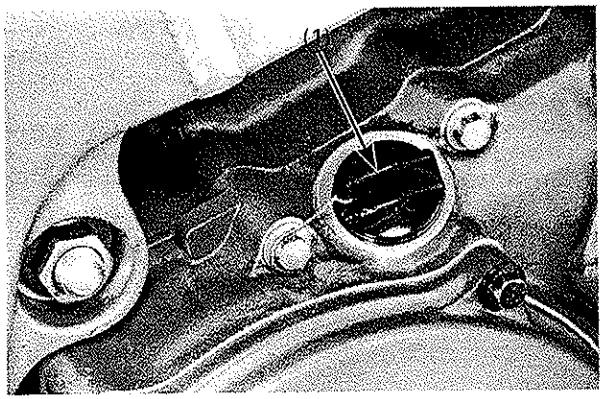


(1) INCORRECT (2) CORRECT

Example (in case the oil drain plug):
Insert the proper length locking wire to the bolt.
Twist the wire using a commercially available wire twisting tool.
Insert the wire in the oil pan hole.
Twist the wire and cut off any excess.



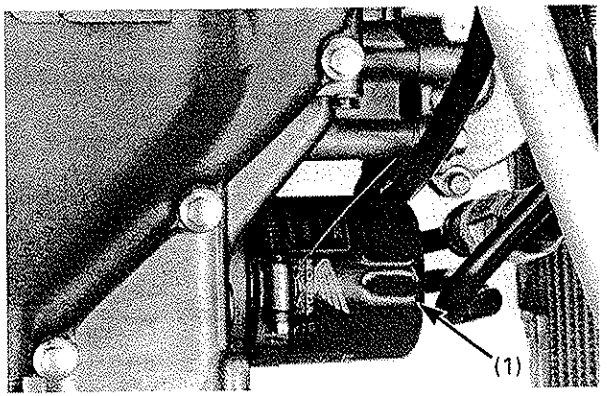
(1) OIL DRAIN BOLT



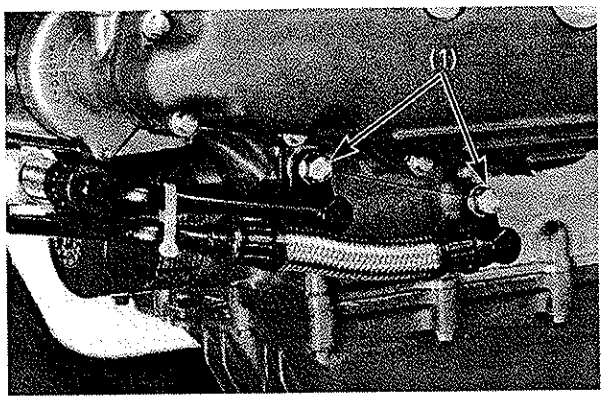
(1) OIL FILLER CAP

- Use new 0.8 mm (0.03 in) stainless wire.
- Secure the bolt as shown so that it cannot come loose.
- Twisting the wire too tightly will break a locking wire.

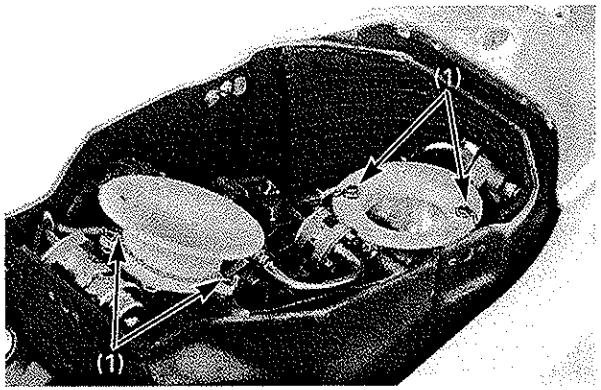
Make a hole to the right crankcase cover bolt with a drill for securing the oil filler cap.



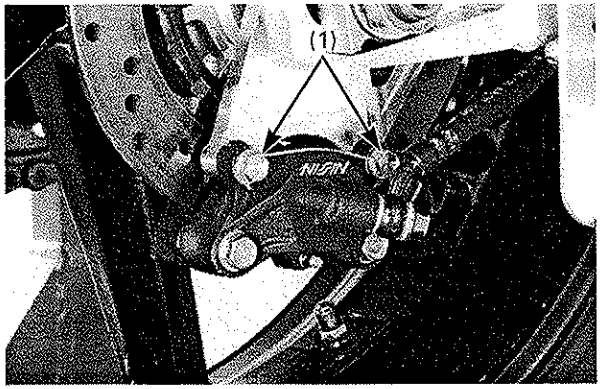
(1) OIL FILTER CARTRIDGE



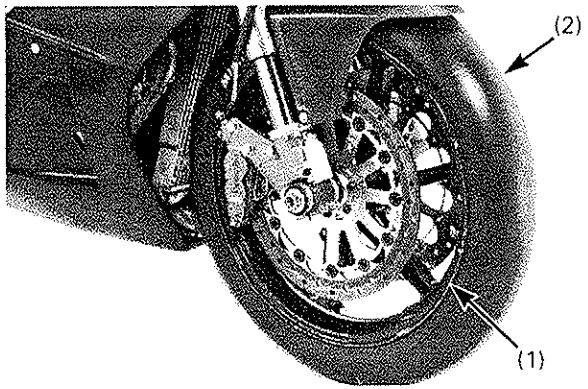
(1) OIL COOLER PIPE BOLTS



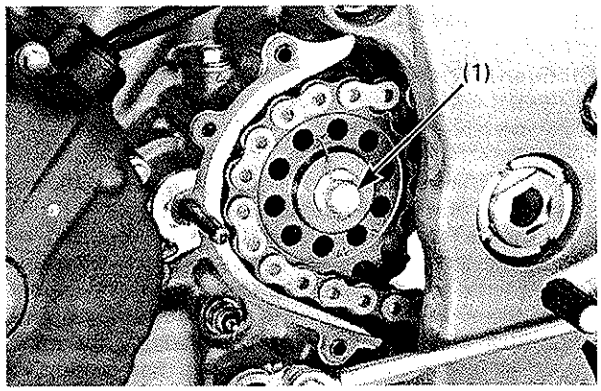
(1) AIR FUNNEL BOLTS



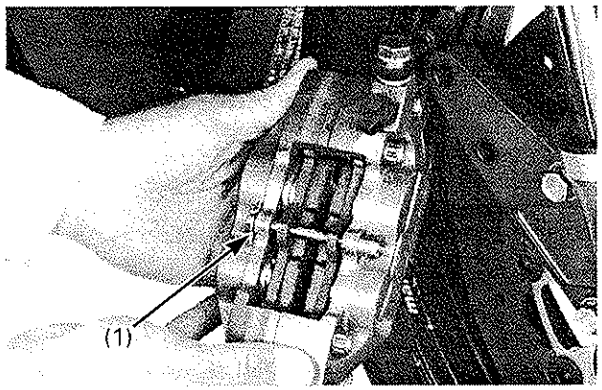
(1) REAR CALIPER MOUNTING BOLTS



(1) WHEEL (2) TIRE



(1) DRIVE SPROCKET BOLT



(1) CALIPER PAD PIN CLIP

Wheels And Tires

Proper air pressure will provided maximum stability and tire life.
Check tire pressure frequently and adjust if necessary.
Tire air pressure should be checked when the tires are COLD.
See your tire maker for specified air pressure.

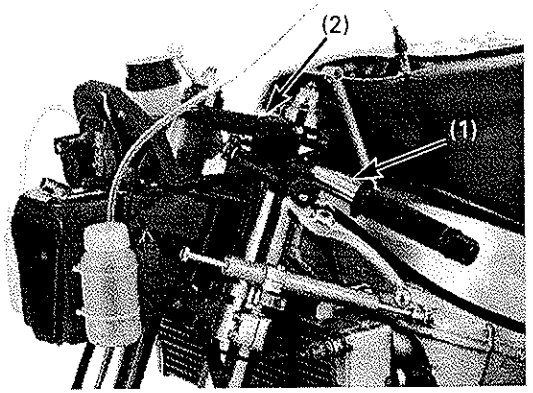
The wheels are made of magnesium alloy and have a protective coating to prevent oxidation.
If moisture contacts the bare metal, oxidation can rapidly occur.
Repair any damage to the painted surfaces.
Check the rims frequently and carefully for signs of cracking or other damage, especially after a crash.

Inspect the wheel for damage.
Check the wheel runout. If runout is noticeable, replace the wheel with a new one.

Check the axle for runout.
Check the condition of the front and rear wheel bearings.

NOTICE

Oxidation will eventually damage the alloy rims.



(1) HANDLEBAR
(2) TOP BRIDGE

Handlebars And Steering Head Bearings

Handlebar

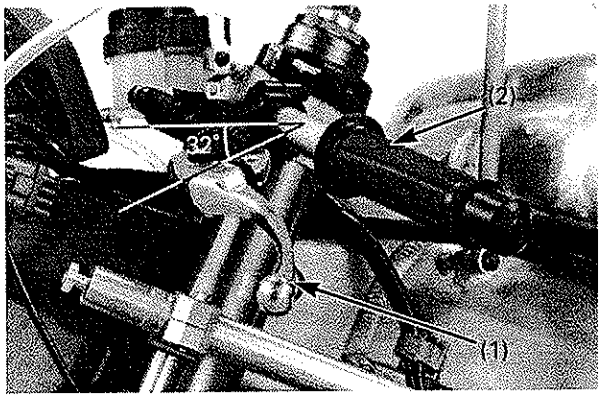
Check the handlebars for bends or cracks.

Check that the handlebars has not moved from its proper position.

Standard position: Handlebar holder contact to the lower surface of the top bridge

Check that the handlebar holder bolts are tight.
If necessary, tighten the holder pinch bolts to the specified torque.

Torque:
Handlebar holder pinch bolt:
22 N·m (2.2 kgf·m, 16 lbf·ft)
Handlebar pinch bolt:
11 N·m (1.1 kgf·m, 8 lbf·ft)



(1) HANDLE LEVER
(2) HANDLEBAR

Check the control lever angle.

Standard: 32 degree from horizontal

Steering Head Bearings

Support the motorcycle using the maintenance stand with its front wheel off the ground.
Turn the handlebar to the right and left to check for roughness in the steering head bearings. Stand in front of the motorcycle and grab the fork (at the axle), then push the fork in and out (toward the engine) to check for play in the steering head bearings. If any roughness or play is felt, adjust or replace the steering head bearings.

Cleaning

Clean your VTR regularly to protect the surface finishes and inspect damage, wear, and oil seepage. When washing your VTR, always use water and a mild detergent (such as diswashing liquid) to avoid discoloring decals.

High pressure water (or air) can damage certain parts of the motorcycle.
Throttle body
Wheel hubs
Engine stop switch
Muffler outlet
Electrical components
Drive chain
Brake and clutch master cylinder

1. After cleaning, rinse your VTR thoroughly with plenty of clean water. Strong detergent residue can corrode alloy parts.
2. Dry your VTR, start the engine, and let it run for several minutes.
3. Lubricate the drive chain immediately after washing and drying your VTR.
4. Test the brakes before riding your VTR. Several applications may be necessary to restore normal braking performance. Braking performance may be impaired immediately after washing your VTR.

Storage

Extended storage, such as for winter, requires that you take certain steps to reduce the effects of non-use. In addition, necessary repairs should be made BEFORE storing your VTR: otherwise, these repairs may be forgotten by the time your VTR is removed from storage.

Preparing The Motorcycle For Storage

1. Completely clean all parts of your VTR. Wash with fresh water and wipe dry.
2. Drain the fuel from the system into an approved gasoline container.

⚠ WARNING

Gasoline is highly flammable and explosive. You can be burned or seriously injured when draining or refueling.

- **Stop engine and keep heat, sparks, and flame away.**
- **Drain or refuel only outdoors.**
- **Wipe up spills immediately.**

3. Remove the lower radiator-to-water joint pipe hose to drain coolant. Drain coolant into a proper container. After the coolant has been completely drained, reinstall the hose and tighten the clamp screw securely.
4. Lubricate the drive chain.
5. Remove the spark plug and pour a table spoon (15 – 20 cm^3) of clean engine oil into the cylinder. With the spark plug grounded, crank the engine several times to distribute the oil.
6. Disconnect the battery terminals, and remove the battery and keep it in cool place.
7. Seal the throttle body intake ports using piece of tape or equivalent.
8. Inflate the tires to their recommended pressure.
9. Place your VTR on the maintenance stand or equivalent to raise both tires off the ground.
10. Stuff rags into the mufflers outlet. Then tie a plastic bag over the end of the mufflers to prevent moisture from entering.
11. Cover your VTR and store in a place which is free of humidity and dust.

Removal From Storage

1. Uncover and clean your VTR.
   Change the engine oil if more than 4 months have passed since the start of storage.
2. Uncover the end of the mufflers and remove the rags from the muffler outlets.
3. Fill the fuel tank with fuel (page 1-1).
4. Pour the recommended coolant slowly into the radiator filler neck.
   Bleed the air in the cooling system and install the radiator cap securely (page 1-1).
5. Charge the battery and install it.
6. Perform the maintenance check (page 3-2).

Memo

Service Information	**4-1**	**Oil Pump**	**4-3**
Troubleshooting	**4-1**	**Oil Cooler**	**4-4**
Oil Strainer/Pressure Relief Valve	**4-2**	**Oil Tank**	**4-5**

Service Information

- The oil pump can be serviced with the engine installed in the frame.
- The service procedures in this section must be performed with the engine oil drained.
- When removing and installing the oil pump, use care not to allow dust or dirt to enter the engine.
- If any portion of the oil pump is worn beyond the specified service limits, replace the oil pump as an assembly.
- After the oil pump has been installed, check that there are no oil leaks.
- See section 3 for engine oil and oil filter service.

Troubleshooting

Engine oil level too low
- Oil consumption
- External oil leak
- Worn piston rings
- Improperly installed piston ring
- Worn cylinders
- Worn valve guide or seal

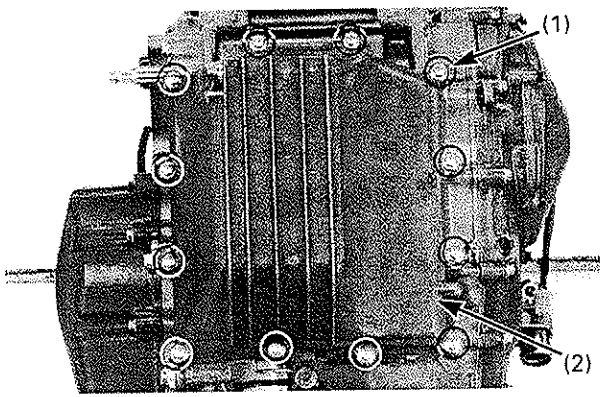
Low or no oil pressure
- Oil level low
- Clogged oil strainer
- Faulty oil pump
- Internal oil leak
- Clogged oil orifice
- Incorrect oil being used

No oil pressure
- Oil level too low
- Oil pressure relief valve stuck open
- Broken oil pump drive chain
- Broken oil pump drive and driven sprocket
- Oil pump damaged (pump shaft)
- Internal oil leak

High oil pressure
- Oil pressure relief valve stuck closed
- Clogged oil gallery or metering orifice
- Incorrect oil being used

Oil contamination
- Oil or filter not changed often enough
- Worn piston rings
- Faulty water pump mechanical seal

Oil emulsification
- Blown cylinder head gasket
- Leaky coolant passage
- Entry of water



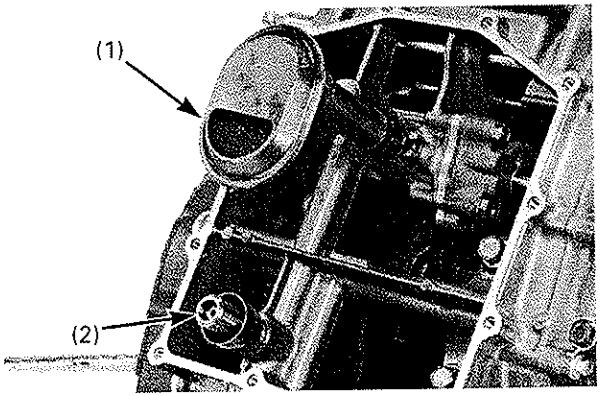
(1) BOLTS (2) OIL PAN

Oil Strainer/Pressure Relief Valve

Oil Pan Removal

Drain the engine oil (page 3-7).
Remove the exhaust pipe.

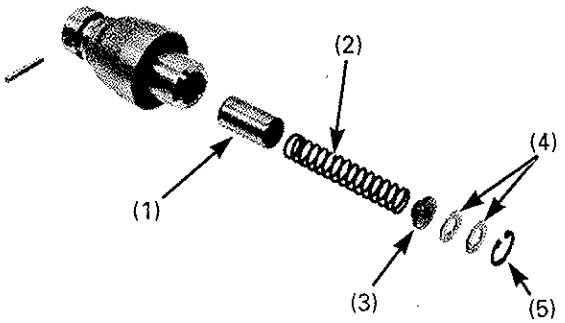
Remove the twelve oil pan mounting bolts, oil pan and gasket.



(1) OIL STRAINER (2) PRESSURE RELIEF VALVE

Remove the oil strainer and pressure relief valve.

Clean the oil strainer screen thoroughly.
Check the operation of the pressure relief valve by pushing the piston.

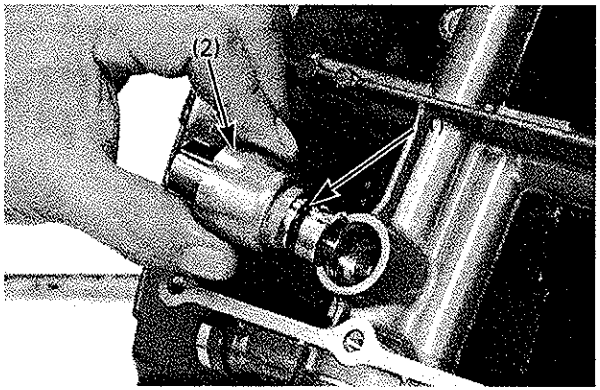


(1) PISTON (2) SPRING
(3) SPRING SEAT
(4) PLAIN WASHERS (5) SNAP RING

If you convert your standard VTR pressure relief valve to the racing use, replace the relief valve spring and spring seat, add the plain washers included in the racing kit.

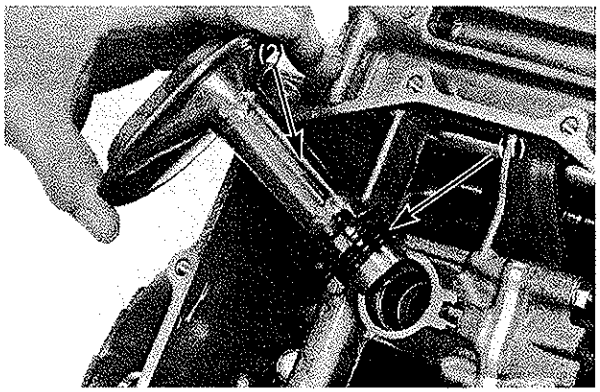
NOTICE

Do not install standard spring seat washer.



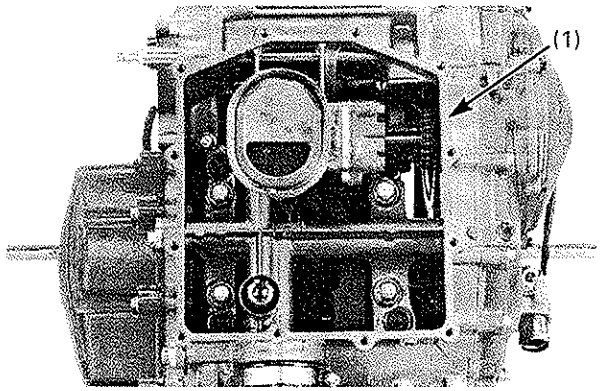
(1) O-RING (2) PRESSURE RELIEF VALVE

Coat a O-ring with oil and install it into the relief valve body groove.
Install the pressure relief valve into the lower crankcase.



(1) SEAL RUBBER (2) OIL STRAINER

Coat a seal rubber with oil and install it onto the strainer.
Install the strainer, aligning its tab with the groove in the lower crankcase.

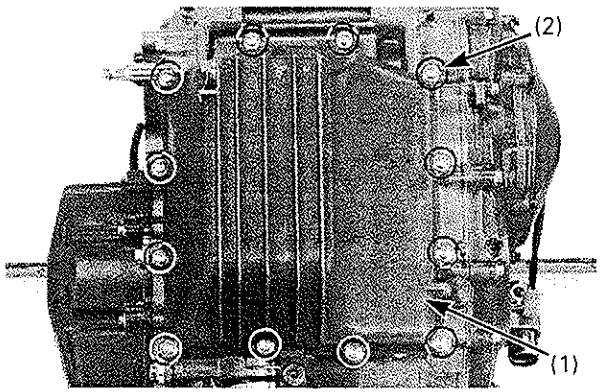


(1) NEW GASKET

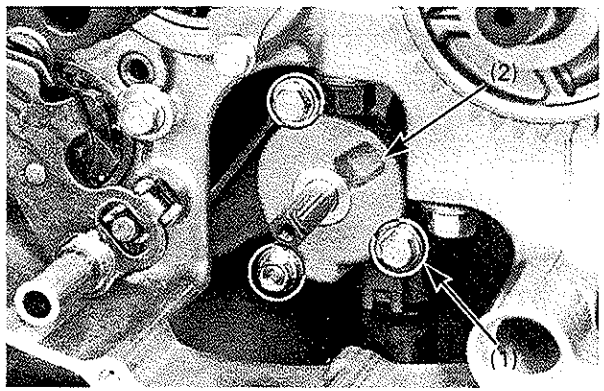
Install the new gasket onto the oil pan mating surface.
Install the oil pan and twelve mounting bolts.

Tighten the bolts in a crisscross pattern in 2 or 3 steps.

Install the removed parts in the reverse order of removal and check for oil leaks.



(1) OIL PAN (2) BOLTS



(1) BOLTS (2) OIL PUMP

Oil Pump

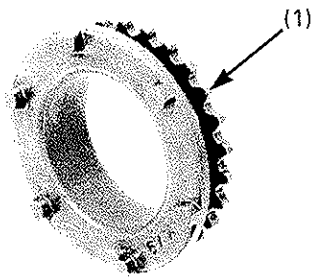
Removal

Remove the clutch assembly (page 9-3).

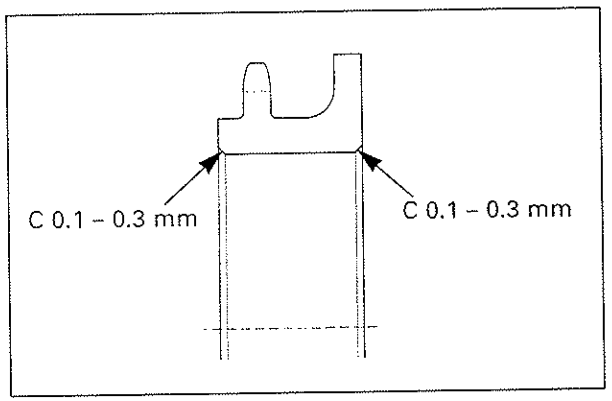
Remove the three bolts and oil pump assembly.

Refer to VTR Service Manual for the oil pump disassembly/assembly and inspection.

If you convert your standard VTR oil pump to the racing use, replace the oil pump rotor, oil pump shaft and oil pump plate included in the racing kit. In this case, the rotor is installed in reverse direction.

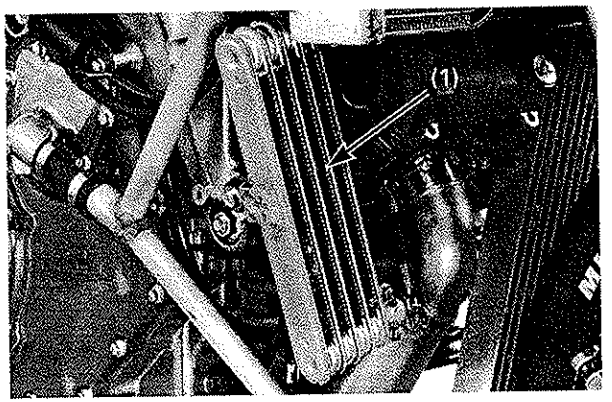


(1) OIL PUMP DRIVE SPROCKET



If you using standard VTR oil pump drive sprocket, chamfer the edge of the drive sprocket I.D. as shown in the illustration.

Install the oil pump in the reverse order of removal.

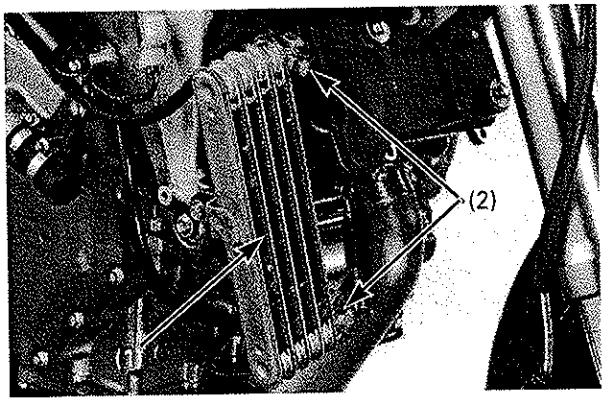


(1) OIL COOLER

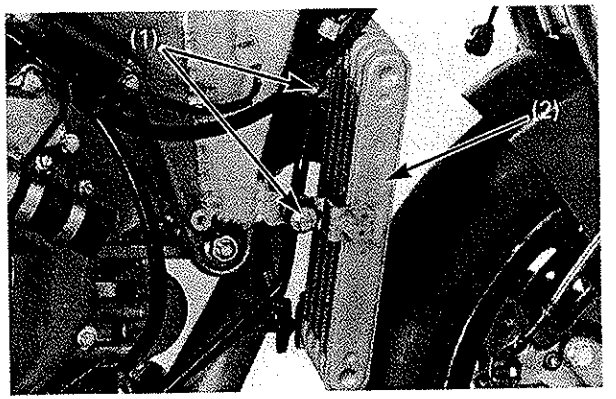
Oil Cooler

Inspection

Check the oil cooler pipe joints and seams for leaks.
Check the oil cooler air passage for clogging or damage.
Straighten bent fins with a small, flat blade screwdriver and remove insects, mud or other obstructions with compressed air or low pressure water.



(1) OIL COOLER
(2) JOINTS



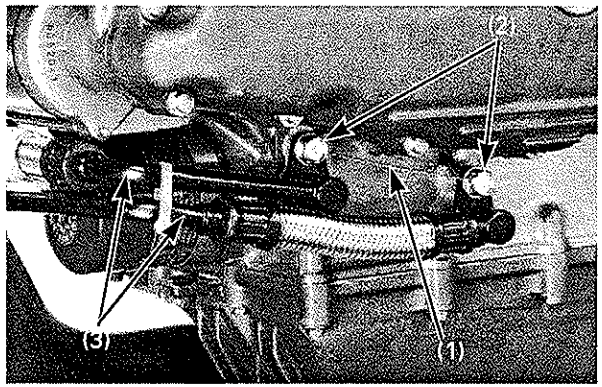
(1) BOLTS (2) OIL COOLER

Removal

Remove the radiator assembly (page 6-3).

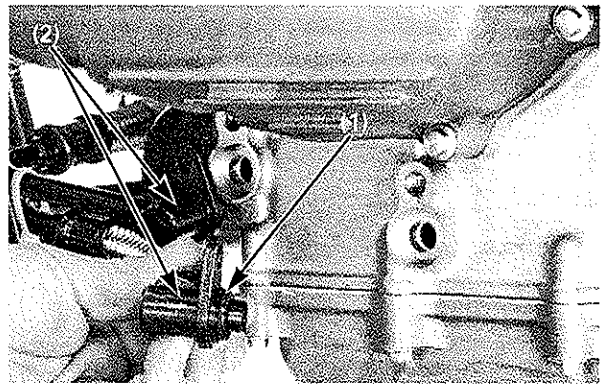
Cut and discard the oil cooler pipe joint bolt locking wires.
Remove the oil cooler pipe joint bolts and joints from the oil cooler.

Remove the mounting bolts and oil cooler.

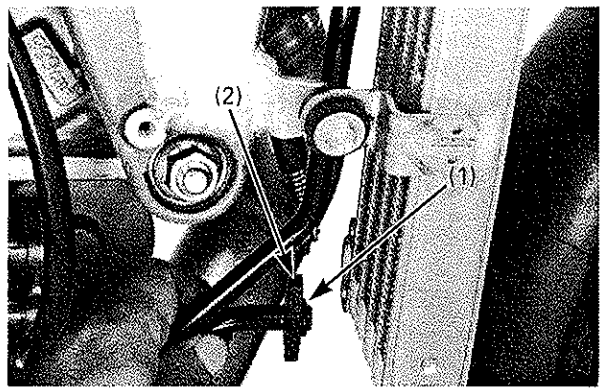


(1) LOCKING WIRE (2) BOLTS
(2) OIL COOLER PIPE

Cut and discard the locking wire.
Remove the oil cooler pipe joint bolts and joints from the lower crankcase.



(1) NEW O-RING
(2) OIL COOLER PIPE JOINT



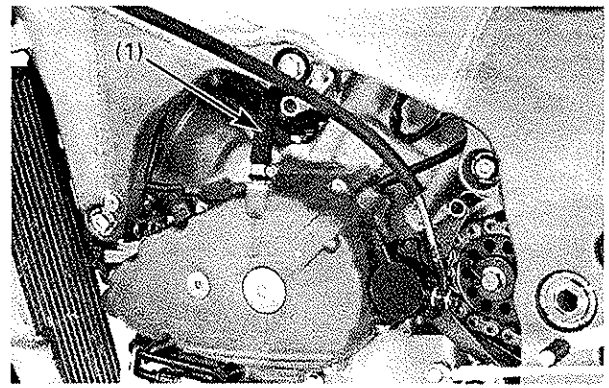
(1) NEW O-RING
(2) OIL COOLER PIPE JOINT

Installation

Install the oil cooler in the reverse order of removal.

Always replace the o-rings with new ones.

Pour recommended engine oil to the proper level.



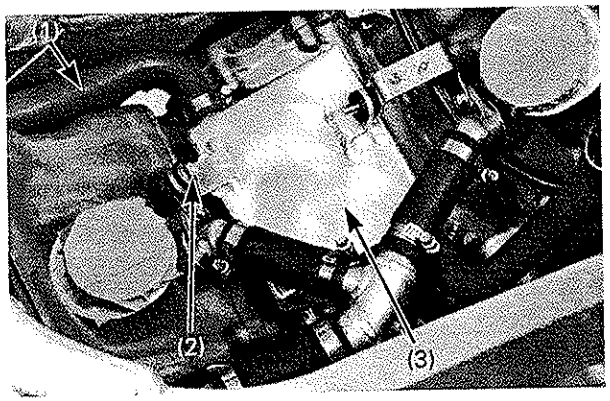
(1) COVER-TO-OIL CATCH TANK HOSE

Oil Tank

Removal/Installation

Remove the throttle body (page 5-16).

Loosen the hose clamp and disconnect the alternator cover-to-oil catch tank hose from the alternator cover.



(1) CRANKCASE BREATHER TUBE
(2) BOLT
(3) OIL CATCH TANK

Loosen the tube clamp and disconnect the crankcase breather tube from the catch tank.
Remove the mounting bolts and oil catch tank

Installation is in the reverse order of removal.

Service Information	5-2	Bank Angle Sensor	5-11
Fuel System Troubleshooting	5-2	BARO/MAP Sensor	5-12
System Location	5-3	IAT Sensor	5-13
PGM-FI Troubleshooting	5-4	Cam Pulse Generator	5-13
PGM-FI Self-diagnosis Malfunction Indicator Lamp Failure Codes	5-5	ECT Sensor	5-13
Fuel Line Inspection	5-6	TP Sensor	5-14
Fuel Flow Inspection	5-7	ECM (Engine Control Module)	5-15
Fuel Tank/Fuel pump	5-8	Throttle Body/Air Box	5-16
Fuel Pump Relay	5-10		

Service Information

- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- Do not apply commercially available carburetor cleaners to the inside of the throttle bore, which is coated with molybdenum.
- Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.
- Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed.
- Do not apply excessive force to the fuel pipe on the throttle body while removing or installing the throttle body.
- Do not damage the throttle body. It may cause incorrect throttle and idle valve synchronization.
- Prevent dirt and debris from entering the throttle bore, fuel feed tube and return tube, clean them using compressed air.
- The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.
- Do not loosen or tighten the white painted bolts and screws of the throttle body. Loosening or tightening them can cause throttle and idle valve synchronization failure.
- Do not push the fuel pump base under the fuel tank when the fuel tank is stored.
- Always replace the O-ring when the fuel pump is removed.
- The programmed fuel injection system is equipped with the Self-Diagnostic System described on page 5-4. If the malfunction indicator lights, follow the Self-Diagnostic Procedures to remedy the problem.
- When checking the PGM-FI, always follow the steps in the troubleshooting flow chart (see VTR Service Manual).
- The PGM-FI system is provided with fail-safe function to secure a minimum running capability even when there is any trouble in the system. When any abnormality is detected by the self-diagnosis function, running capability is secured by making use of the numerical values of a situation preset in advance in the simulated program map. It must be remembered, however, that when any abnormality is detected in four injectors and/or the ignition and cam pulse generator, the fail safe function stops the engine from the standpoint of protecting it.
- For PGM-FI system location, see page 5-3.
- A faulty PGM-FI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- When disassembling the programmed fuel injection parts, note the location of the O-rings. Replace them with new ones upon reassembly.
- Before disconnecting the fuel tube, release the fuel pressure by loosening the fuel tube banjo bolt at the fuel tank.
- Always replace the sealing washers when the fuel tube banjo bolt is removed or loosened.
- Use a digital tester for PGM-FI system inspection.

Fuel System Troubleshooting

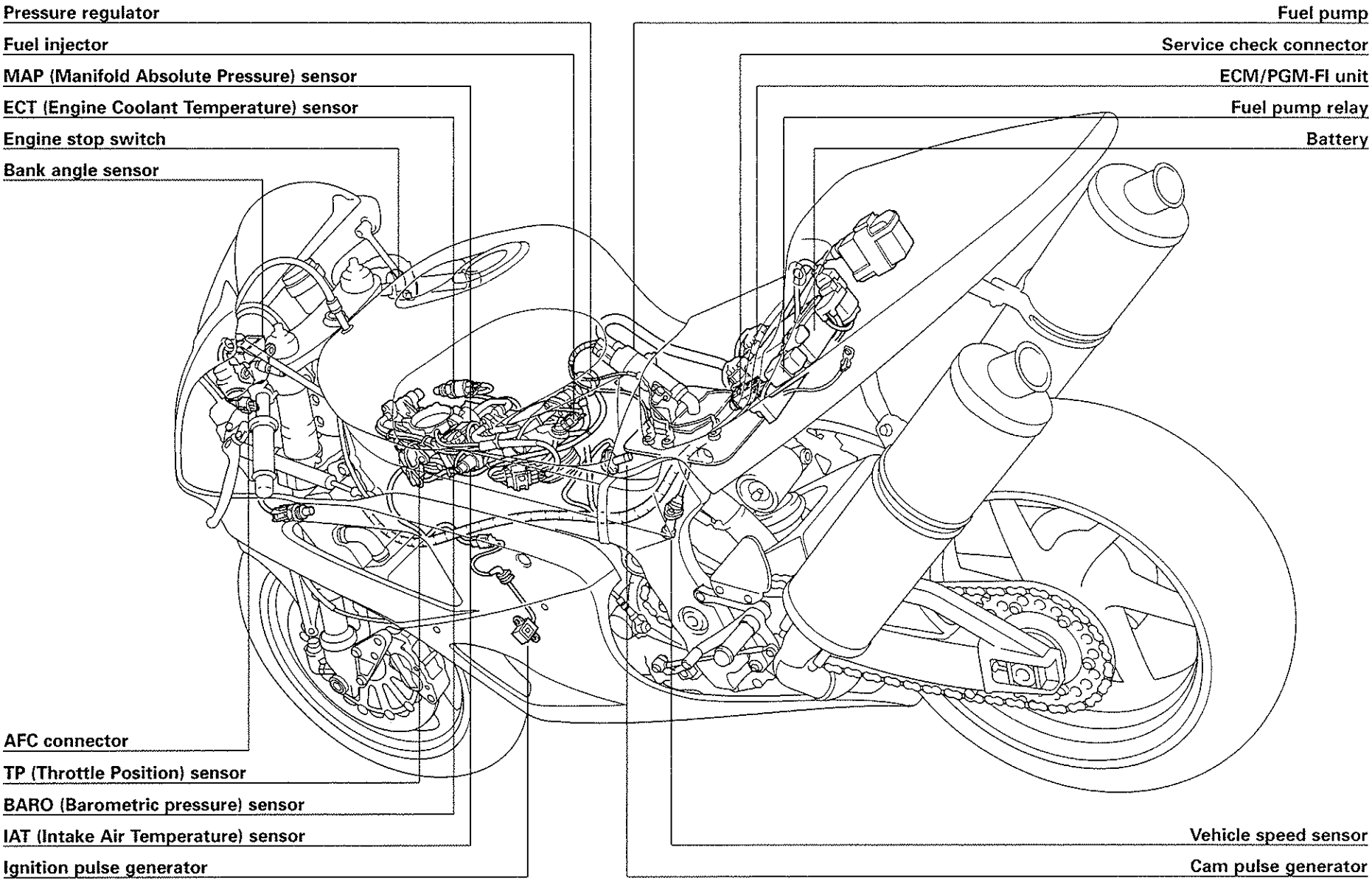
Engine cranks but won't start
- No fuel in tank
- No fuel to injector
  - Clogged fuel filter
  - Clogged fuel injector filter
  - Pinched or clogged fuel feed hose
  - Clogged fuel tank breather
  - Faulty fuel pump
  - Faulty fuel pump operating system
  - Sticking fuel injector needle
- Intake air leak
- Fuel contaminated/deteriorated
- Faulty fuel injector
- No spark at plug (see section 16)

Engine stall, hard to start, rough idling
- Restricted fuel feed hose
- Fuel contaminated/deteriorated
- Intake air leak
- Restricted fuel tank breather
- Misadjusted starter valve synchronization
- Faulty ignition system (see section 16)

Backfiring or misfiring during acceleration
- Faulty ignition system (see section 16)

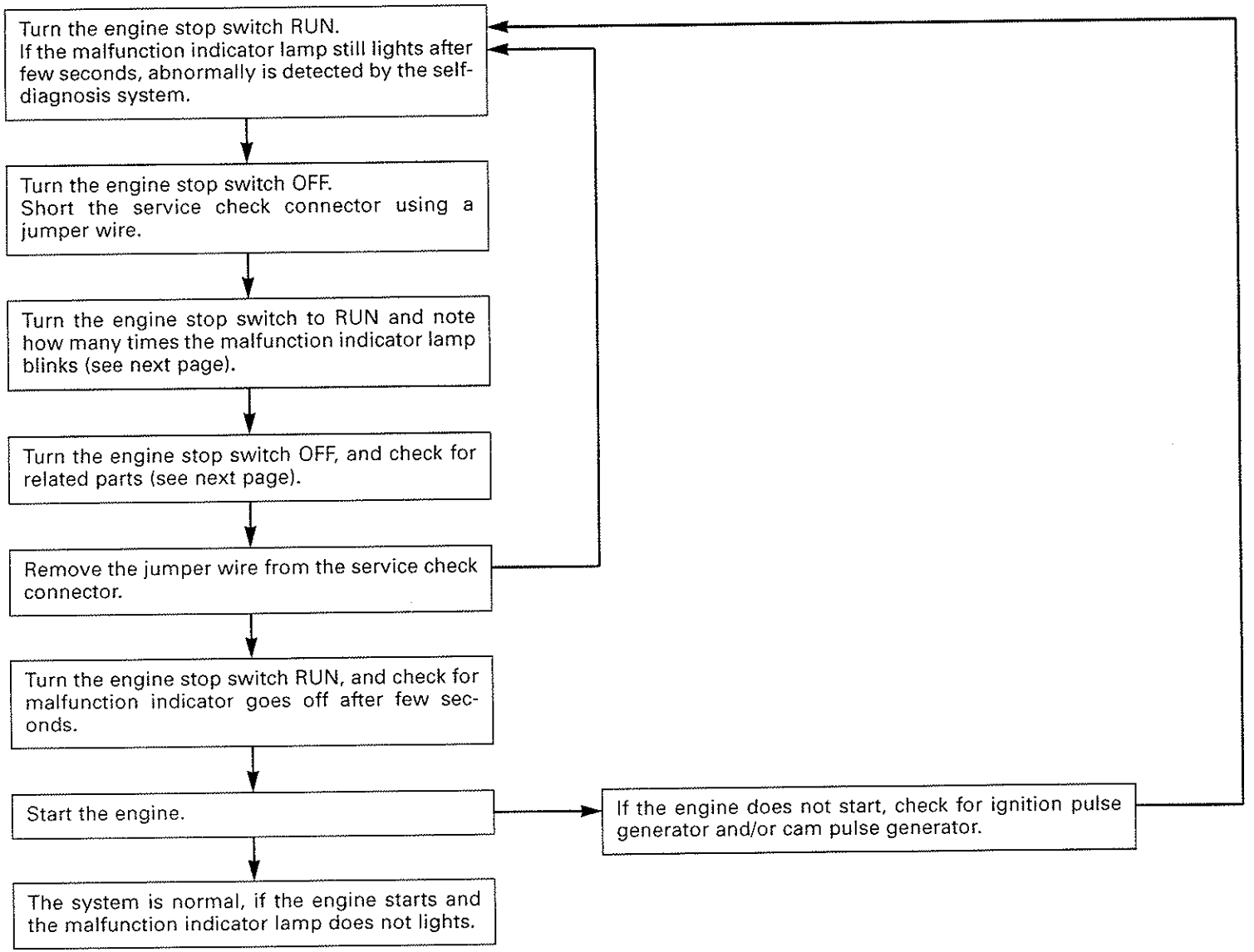
Poor performance (driveability) and poor fuel economy
- Pinched or clogged fuel feed hose
- Faulty pressure regulator
- Faulty ignition system (see section 16)

System Location



PGM-FI Troubleshooting

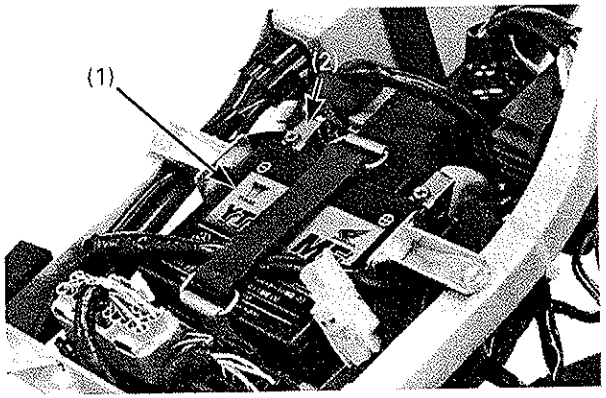
If the PGM-FI malfunction indicator lamp lights



PGM-FI Self-diagnosis Malfunction Indicator lamp Failure Codes

- See VTR Service Manual for malfunction indicator lamp blinking function.

Number of blinks	Causes	Symptoms (Fail-safe contents)
1 blink	• Loose or poor contacts on MAP sensor connector • Open or short circuit in MAP sensor wire • Faulty MAP sensor	• Engine operates normally (Simulate using TP map)
7 blinks	• Loose or poor contact on ECT sensor • Open or short circuit in ECT sensor wire • Faulty ECT sensor	• Hard start at a low temperature (Simulate using numerical values)
8 blinks	• Loose or poor contact on TP sensor connector • Open or short circuit in TP sensor wire • Faulty TP sensor	• Poor engine response when operating the throttle quickly (Simulate using numerical values)
9 blinks	• Loose or poor contact on IAT sensor • Open or short circuit in IAT sensor wire • Faulty IAT sensor	• Engine operates normally (Simulate using numerical values)
10 blinks	• Loose or poor contact on BARO sensor • Open or short circuit in BARO sensor wire • Faulty BARO sensor	• Engine operates normally (Simulate using numerical values)
11 blinks	• Loose or poor contact on vehicle speed sensor connector • Open or short circuit in vehicle speed sensor connector • Faulty vehicle speed sensor	• Engine operates normally
12 blinks	• Loose or poor contact on No.1-1 injector connector • Open or short circuit in No.1-1 injector wire • Faulty No.1-1 injector	• Engine does not start (Cut off ignition circuit and fuel pump circuit)
13 blinks	• Loose or poor contact on No.1-2 injector connector • Open or short circuit in No.1-2 injector wire • Faulty No.1-2 injector	• Engine does not start (Cut off ignition circuit and fuel pump circuit)
14 blinks	• Loose or poor contact on No.2-1 injector connector • Open or short circuit in No.2-1 injector wire • Faulty No.2-1 injector	• Engine does not start (Cut off ignition circuit and fuel pump circuit)
15 blinks	• Loose or poor contact on No.2-2 injector connector • Open or short circuit in No.2-2 injector wire • Faulty No.2-2 injector	• Engine does not start (Cut off ignition circuit and fuel pump circuit)
18 blinks	• Loose or poor contact on cam pulse generator • Open or short circuit in cam pulse generator • Faulty cam pulse generator	• Engine does not start (Cut off ignition circuit)
19 blinks	• Loose or poor contact on ignition pulse generator connector • Open or short circuit in ignition pulse generator • Faulty ignition pulse generator	• Engine does not start (Cut off ignition circuit)
33 blinks	• Faulty E^2-PROM in ECM	• Engine operates normally



(1) BATTERY
(2) NEGATIVE (–) TERMINAL

Fuel Line Inspection

Fuel Pressure Inspection

⚠ WARNING

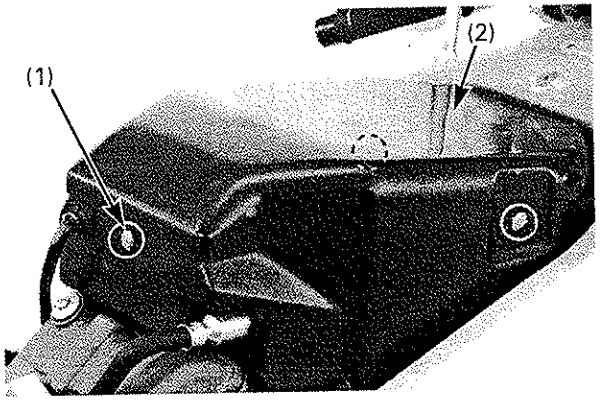
Gasoline is highly flammable and is explosive. You can be burned or seriously injured when refueling.

- **Be sure to release fuel pressure with the ignition switch OFF.**

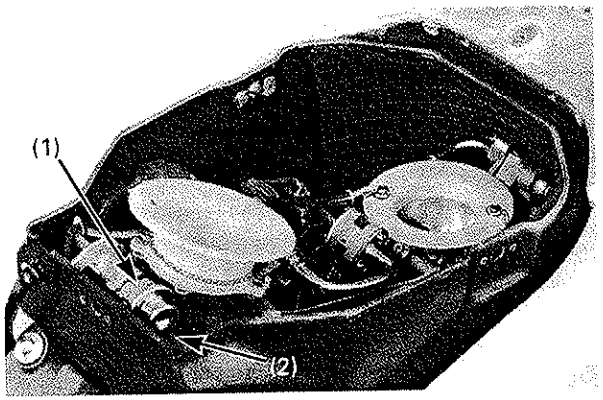
NOTICE

- Before disconnecting fuel feed hose, release the fuel pressure by loosening the fuel feed hose banjo bolt at the fuel tank.
- Always replace the sealing washers when the fuel feed hose banjo bolt is removed or loosened.

Disconnect the battery negative cable from the battery terminal.



(1) QUICK SCREWS
(2) AIR BOX COVER

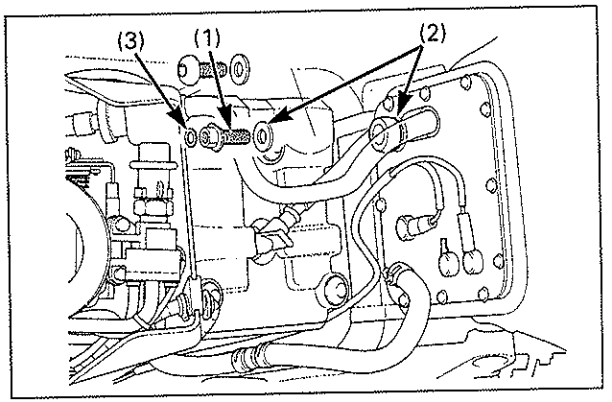


(1) PRESSURE REGULATOR
(2) VACUUM TUBE

Remove the fuel tank front mounting bolts and raise the front of the fuel tank and support it.

Turn the quick screws counterclockwise and remove the screws.
Remove the air box cover.

Disconnect the pressure regulator vacuum tube and plug the vacuum tube end.



(1) BANJO BOLT, 12 mm
(2) SEALING WASHER, 12 mm
(3) SEALING WASHER, 6 mm

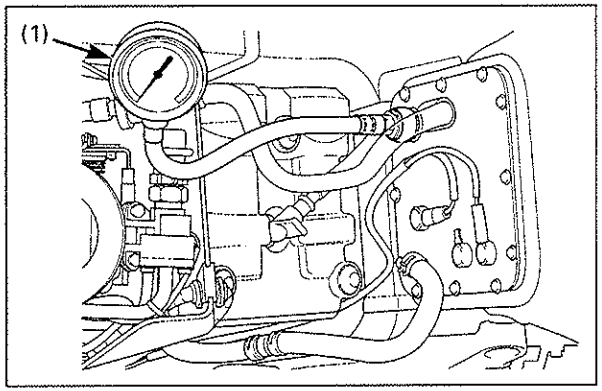
Cover the fuel feed hose banjo bolt with a rag or shop towel.

Slowly loosen the fuel tube banjo bolt and catch the remaining fuel using a approved gasoline container.

Remove the fuel feed banjo bolt and attach the fuel pressure gauge with the following Honda Genuine parts.

Banjo bolt, 12 mm: Part No. 90008-PP4-E02
Sealing washer, 12 mm: Part No. 90428-PD6-003
Sealing washer, 6 mm: Part No. 90430-PD6-003

Torque:
12 mm banjo bolt: 22 N·m (2.2 kgf·m, 16 lbf·ft)



(1) FUEL PRESSURE GAUGE

Connect the fuel pressure gauge.

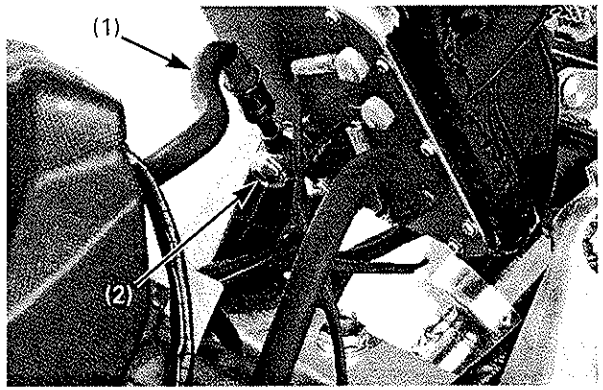
Tool:
Fuel pressure gauge 07406-0040002

Connect the battery negative cable.
Start the engine, let it idle and read the fuel pressure at idle speed.

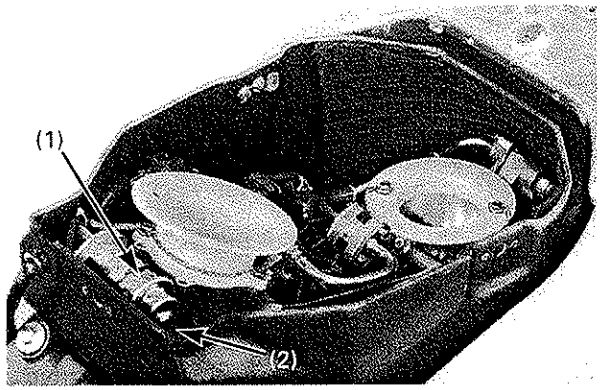
Standard: 392 kPa (4.0 kgf/cm², 57 psi)

If the fuel pressure is higher than specified, inspect the following:
- Pinched or clogged fuel return tube
- Pressure regulator
- Fuel pump

If the fuel pressure is lower than specified, inspect the following:
- Clogged fuel filter
- Pressure regulator
- Fuel pump



(1) FUEL FEED HOSE
(2) BANJO BOLT/NEW SEALING WASHERS



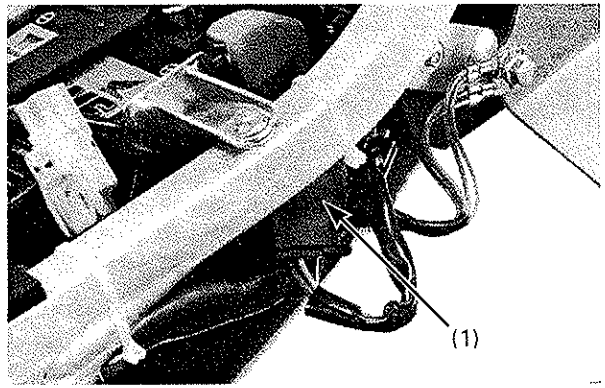
(1) PRESSURE REGULATOR
(2) VACUUM TUBE

After inspection, remove the fuel tube banjo bolt and reinstall and tighten the original fuel tube banjo bolt using the new sealing washers.

TORQUE: 22 N•m (2.2 kgf•m, 16 lbf•ft)

Connect the pressure regulator vacuum tube.

Install the removed parts in the reverse order of removal.

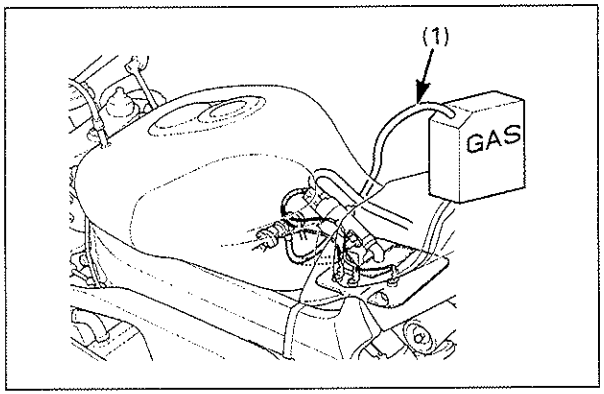


(1) FUEL PUMP RELAY

Fuel Pump Flow Inspection

Turn the engine stop switch OFF and disconnect the fuel pump relay connector.

Jump the Brown and Black/White wire terminals of the wire harness side using a jumper wire.



(1) FUEL RETURN TUBE

Disconnect the fuel return tube from the fuel tank and plug the fuel pipe of the fuel tank immediately.

NOTICE

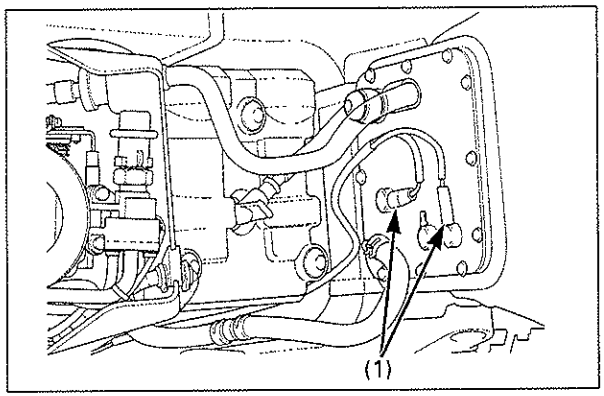
- When the fuel return tube is disconnected, gasoline spill out from the tube. Place a approved gasoline container and drain the gasoline.
- Wipe off spilled out gasoline.

Turn the ignition switch ON for 10 seconds.
Measure the amount of fuel flow.

Amount of fuel flow:
190 cm³ (6.4 US oz, 6.7 Imp oz) minimum/ 10 seconds

If the fuel flow is less than specified, inspect the following:
- Clogged fuel feed hose and/or fuel return tube
- Clogged fuel filter
- Pressure regulator
- Fuel pump

After inspection, connect the fuel return tube.
Start the engine and check for leak.



(1) FUEL PUMP CONNECTORS

Fuel Tank/Fuel Pump

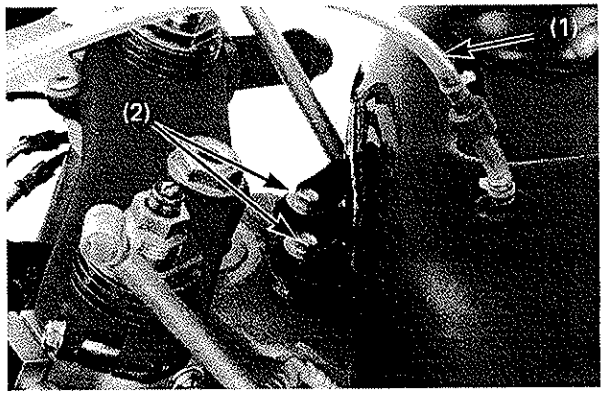
Inspection

Turn the engine stop switch RUN and confirm that the fuel pump operates for a few seconds.
If the fuel pump does not operate, check for the following:
- Loose or poor contact fuel pump 2P (Gray) connector
- Open or short circuit in fuel pump related wires
- Open or short circuit in bank angle sensor and fuel pump relay related wire
- Loose or poor contact fuel pump relay 4P connector

If there is OK, check the fuel pump input voltage as follow:
Disconnect the fuel pump connectors from the fuel pump base.
Connect the voltmeter to the each wire terminals.

Connection: Brown (+) – Green/White (–)

Turn the engine stop switch RUN, check for voltage.
If there is battery voltage, replace the fuel pump.
If there is no voltage, check the fuel pump relay and bank angle sensor related circuits.



(1) BREATHER TUBE
(2) BOLTS/WASHERS

Removal

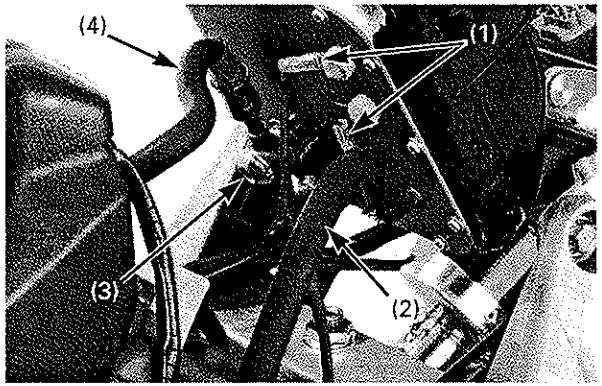
NOTICE

- Before disconnecting the fuel tube, release the fuel pressure by loosening the fuel tube banjo bolt at the fuel tank.
- Always replace the sealing washers when the fuel feed hose banjo bolt is removed or loosened.

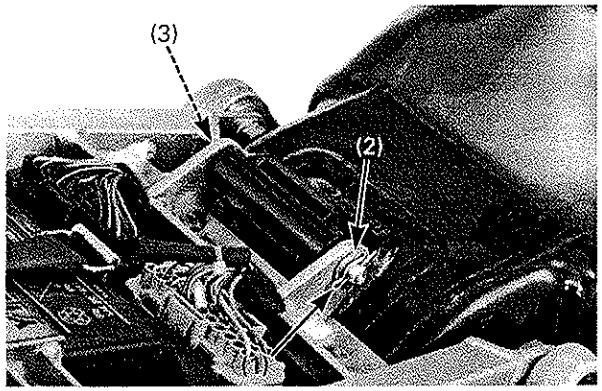
Disconnect the fuel tank breather tube from the catch tank.

Remove the fuel tank front mounting bolts and washers.

Open the front end of fuel tank and support it.



(1) PUMP CONNECTORS (2) FUEL RETURN HOSE
(3) BANJO BOLT/SEALING WASHERS
(4) FUEL FEED HOSE

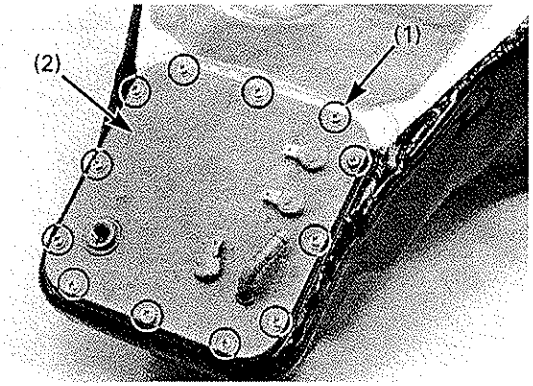


(1) B-CLIPS (2) WASHER
(3) PIVOT SHAFT

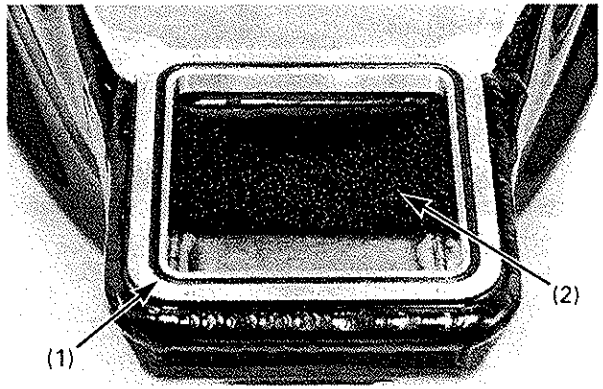
Release the fuel pressure (page 5-6).

Disconnect the fuel pump connectors.
Disconnect the fuel return hose.
Remove the fuel feed hose banjo bolt, sealing washers and fuel feed hose.

Remove the B-clip, washer and fuel tank rear pivot shaft, then remove the fuel tank.



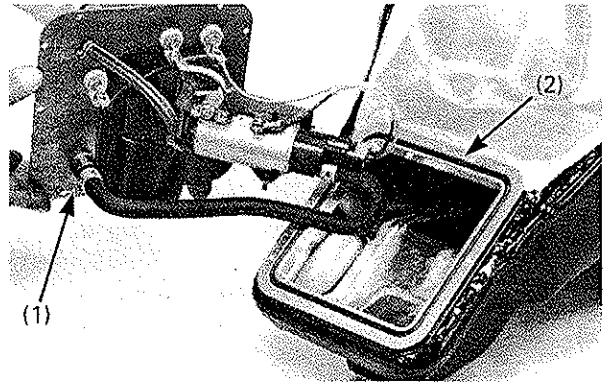
(1) SCREWS
(2) FUEL PUMP BASE



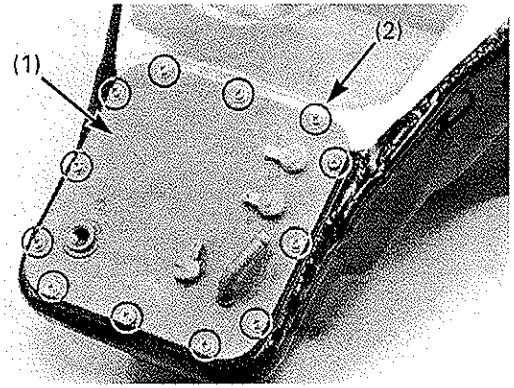
(1) O-RING
(2) BAFFLE SPONGE

Remove the fuel pump base mounting screws.
Remove the fuel pump assembly and O-ring.

If necessary, remove the baffle sponge.



(1) NEW O-RING
(2) FUEL PUMP/BASE ASSEMBLY



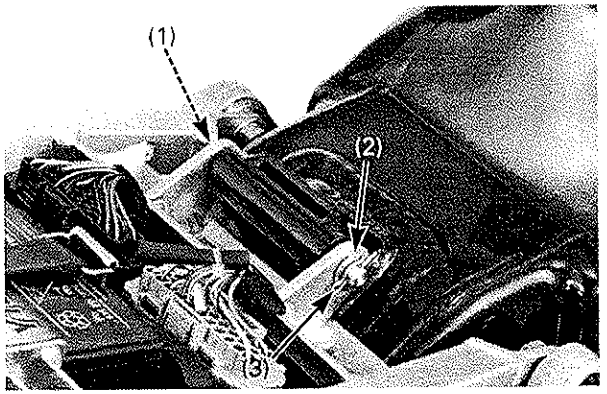
(1) FUEL PUMP BASE
(2) SCREWS

Installation

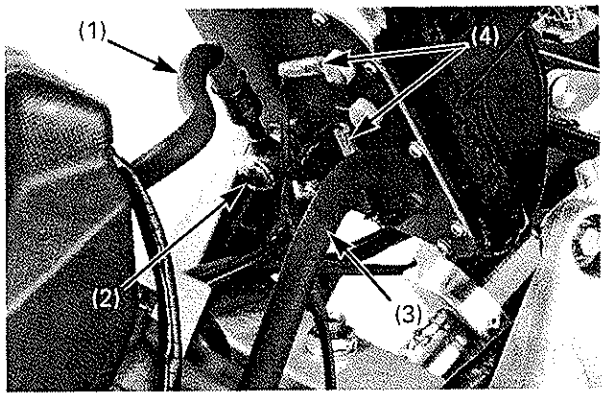
Place a new O-ring into the groove of the fuel tank.
Install the fuel pump being careful not to damage the fuel pump wire.

Install and tighten the fuel pump base mounting screws in a criss-cross pattern in 2 or 3 steps.

Torque: 12 N•m (1.2 kgf•m, 9 lbf•ft)



(1) PIVOT SHAFT (2) WASHER
(3) B-CLIPS

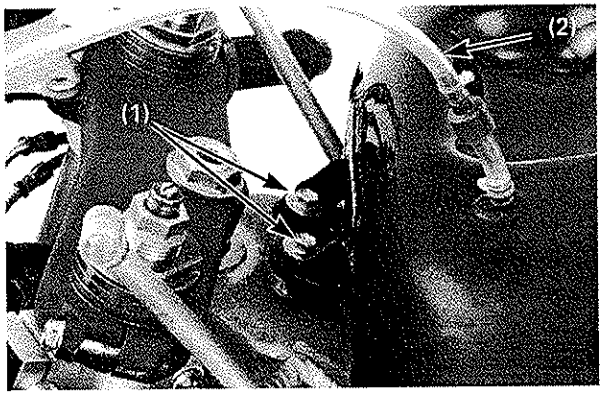


(1) FUEL FEED HOSE
(2) BANJO BOLT/SEALING WASHERS
(3) FUEL RETURN HOSE (4) PUMP CONNECTORS

Install the fuel tank onto the frame, then install the pivot shaft and washer.
Secure the pivot shaft using a B-clip.
Connect the fuel feed hose with new sealing washers, then tighten the banjo bolt to the specified torque.

Torque: 22 N·m (2.2 kgf·m, 16 lbf·ft)

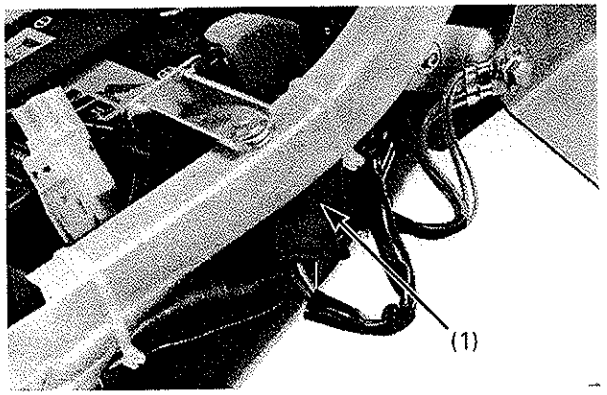
Connect the fuel return tube.
Connect the fuel pump wire connectors.



(1) BOLTS/WASHERS
(2) BREATHER TUBE

Close the fuel tank.
Install the washers and mounting bolt, then tighten the bolts.

Install the fuel tank breather tube to the catch tank.



(1) FUEL PUMP RELAY

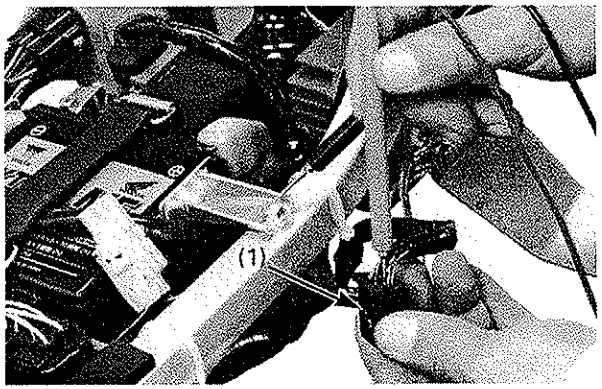
Fuel Pump Relay

Inspection

Turn the engine stop switch RUN.
The coil is normal if the fuel pump relay clicks.

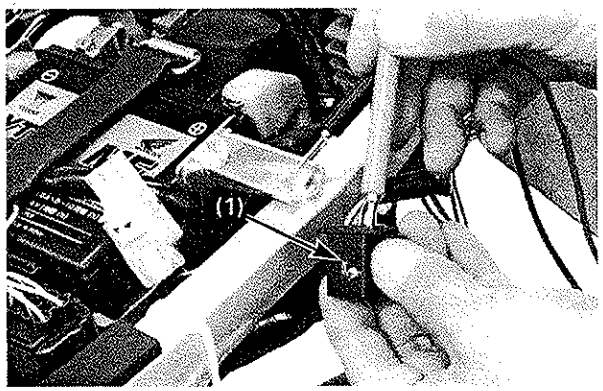
If you don't hear the relay "CLICK", inspect the relay using the procedure below.

Turn the engine stop switch OFF.
Disconnect the fuel pump relay 4P (Black) connector.



(1) FUEL PUMP RELAY CONNECTOR

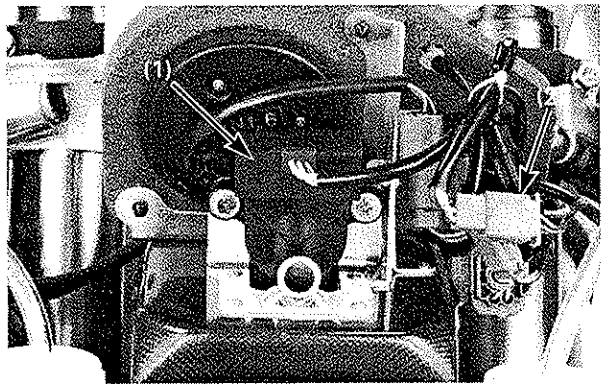
Signal line
Check for continuity between the Black/Red wire terminal of the wire harness side connector and ground.
- There should be continuity, check for short circuit in Black/Red wire between the fuel pump relay and bank angle sensor.
- Turn the engine stop switch RUN.
  There should be continuity for a few seconds.
  If there is no continuity, check for open circuit in Black/Red wire between the relay, bank angle sensor and ECM.



(1) FUEL PUMP RELAY CONNECTOR

Power input line
Measure the voltage between the Black/White wire terminal (+) of the wire harness side connector and ground (–).
Turn the engine stop switch to RUN.
There should be battery voltage.
If there is no voltage, check for open circuit in Black/White wire between the fuel pump relay and ECM.

See VTR Service Manual for fuel pump relay operation check.



(1) BANK ANGLE SENSOR
(2) 3P (GREEN) CONNECTOR

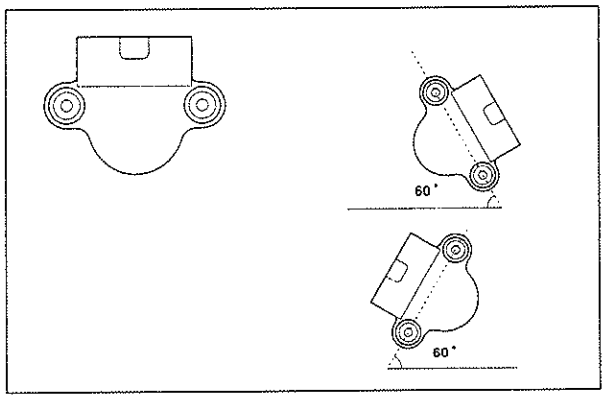
Bank Angle Sensor

Inspection

Support the motorcycle level surface.
Turn the engine stop switch RUN and measure the voltage between the bank angle sensor 3P (Green) connector terminals with the connector connected.

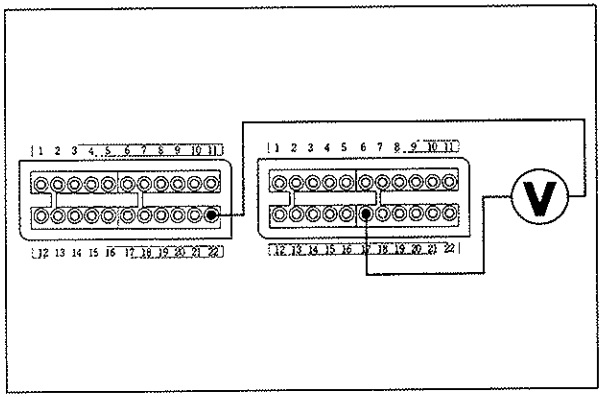
Standard:
White (+) – Green (–): Battery voltage
Red/White (+) – Green (–): 0 – 1 V

Turn the engine stop switch OFF.
Remove the screws and bank angle sensor from the bracket.



Incline the bank angle sensor approximately 60 degrees to the left or right with the engine stop switch RUN.

There shoud be battery voltage between the Red/White (+) and Green (–) wire.



BARO/MAP Sensor

Output voltage inspection

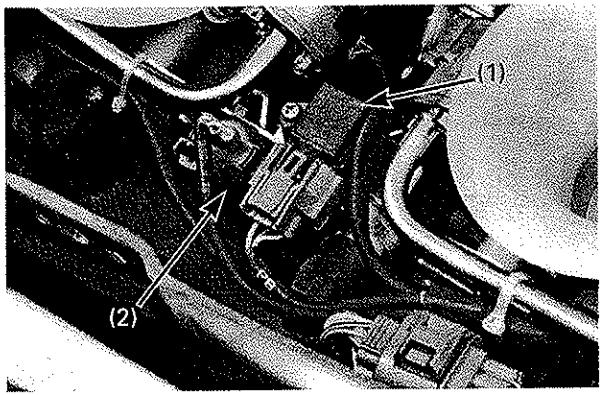
Remove the air box cover (page 5-6).

Connect the test harness to the ECM (see VTR Service Manual).

Measure the voltage at the test harness terminals (page 5-9).

Connection:
BARO: B8 (+) – A22 (–)
MAP: B17 (+) – A22 (–)
Standard: 2.7 – 3.1 V

The MAP sensor output voltage (above) is measured under the standard atmosphere (1 atm = 1,030 hPa).
The MAP sensor output voltage is affected by the distance above sea level, because the output voltage is changed by atmosphere.
Check the sea level measurement and be sure that the measured voltage falls within the specified value. (see VTR Service Manual)



(1) MAP SENSOR
(2) BARO SENSOR

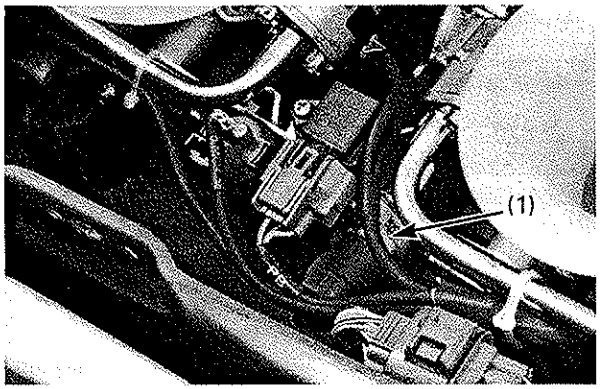
BARO/MAP Sensor Removal/Installation

Remove the air box cover (page 5-6).

Disconnect the BARO/MAP sensor connectors.

Disconnect the vacuum tube from MAP sensor.
Remove the screw and BARO/MAP sensor from the throttle body bracket.

Installation is in the reverse order of removal.



(1) IAT SENSOR

IAT Sensor

See VTR Service Manual for IAT sensor inspection.

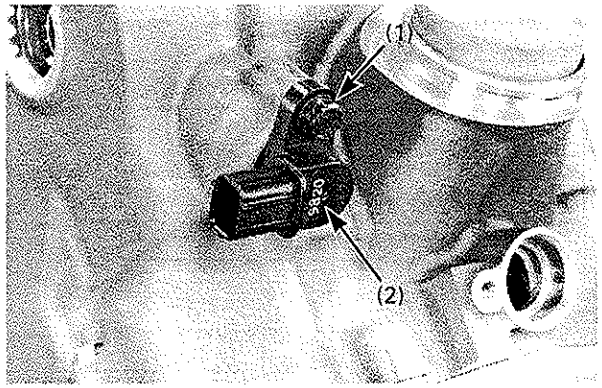
Removal/Installation

Remove the air box cover (page 5-6).

Disconnect the IAT sensor connector.

Remove the screws and IAT sensor from the throttle body bracket.

Installation is in the reverse order of removal.



(1) BOLT
(2) CAM PULSE GENERATOR

Cam Pulse Generator

See VTR Service Manual for cam pulse generator inspection.

Removal/Installation

Remove the throttle body (page 5-16).

Disconnect the cam pulse generator 2P (Black) connector.

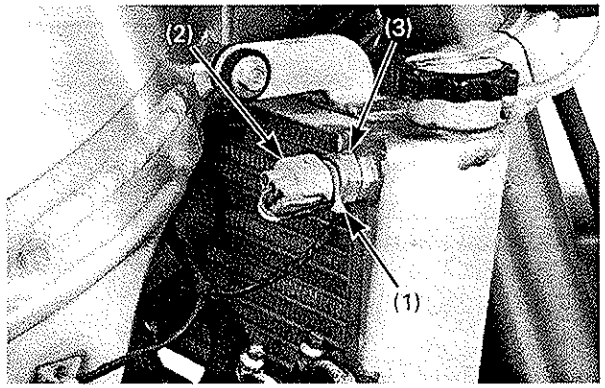
Remove the bolt and cam pulse generator from the rear cylinder head.

Coat a new O-ring with engine oil and install it onto the cam pulse generator.
Install the cam pulse generator into the rear cylinder head.

Install and tighten the mounting bolt securely.

Route the cam pulse generator wire properly, connect the 2P (Black) connector.

Install the removed parts in the reverse order of removal.



(1) TIE-WRAP
(2) 3P (GRAY) CONNECTOR
(3) ECT SENSOR

ECT Sensor

See VTR Service Manual for ECT sensor inspection.

Removal/Installation

Drain the coolant from the system (page 1-2).

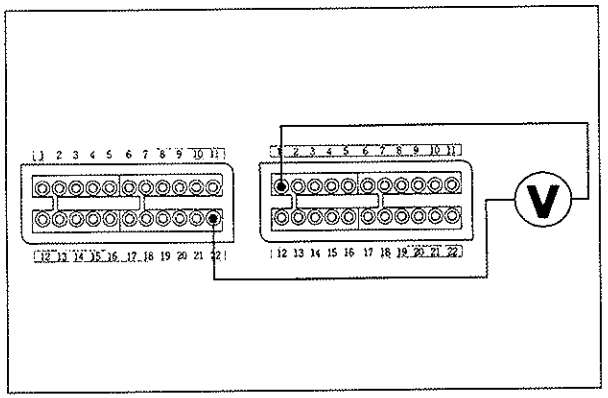
Cut and remove the tie-wrap.
Disconnect the ECT sensor 3P (Gray) connector from the sensor.
Remove the ECT sensor and sealing washer.

Install the new sealing washer and ECT sensor.
Tighten the ECT sensor to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Connect the ECT sensor 3P (Gray) connector.
Secure the wire with a tie-wrap.

Fill the cooling system with recommended coolant.



TP Sensor

Inspection

Disconnect the ECM 22P (Black) and 22P (Light gray) connectors.
Check the connector for loose or corroded terminals.
Connect the ECU test harness between the ECM and main wire harness.

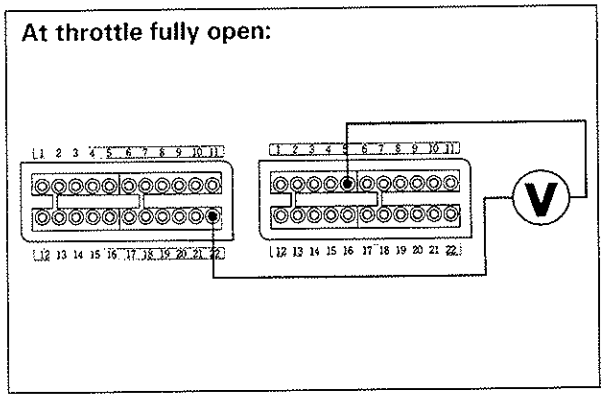
Tool:
ECU test harness **07YMZ–0010100 (two required)**

1. Input voltage inspection
Turn the engine stop switch RUN and measure and record the input voltage at the test harness terminals using a digital multimeter.

Connection:
B1 (+) – A22 (–)
Standard: 4.5 – 5.5 V

If the measurement is out of specification, check the following:
– Loose connection of the ECM multi-connector
– Open circuit in wire harness

At throttle fully open:



2. Output voltage inspection with throttle fully open
Turn the engine stop switch RUN and measure and record the output voltage at the test harness terminals.

Connection:
B5 (+) – A22 (–)
Measuring condition:
At throttle fully open

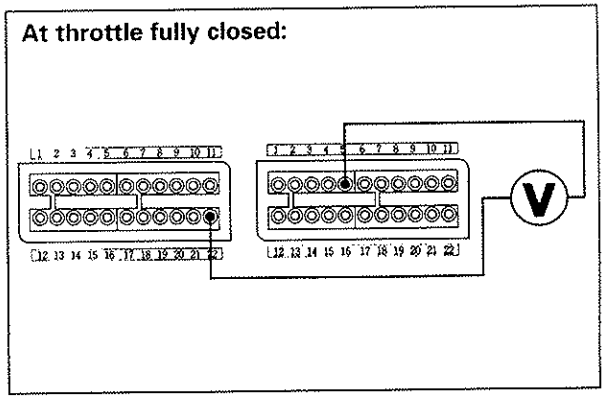
3. Output voltage inspection with throttle fully closed
Turn the engine stop switch RUN and measure and record the output voltage with the throttle fully closed.

Connection:
B5 (+) – A22 (–)
Measuring condition:
At throttle fully closed

4. Calculate result comparison
Compare the measurement to the result of the following calculation.

With the throttle fully open:
Measured input voltage X 0.824= Vo

At throttle fully closed:



The sensor is normal if the measurement output voltage measured in step 2 is within 10% of Vo.

With the throttle fully closed:
Measured input voltage X 0.1 = Vc

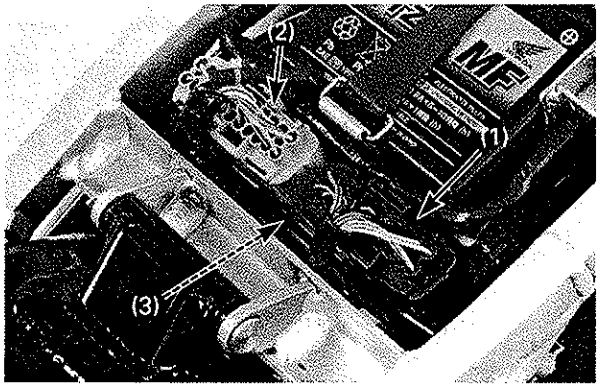
The sensor is normal if the throttle closed output voltage measured in step 3 is within 10%of Vc.
Using an analog meter, check that the needle of the voltmeter swings slowly when the throttle is opened gradually.

Continuity inspection

Open and support the front end of fuel tank (page 3-4).

Disconnect the ECM 22P (Light gray) connector and the TP sensor 3P connector.
Check for continuity between the ECM and TP sensor.

If there is no continuity, check the open or short circuit in wire harness.



(1) 22P (BLACK) CONNECTOR
(2) 22P (GRAY) CONNECTOR
(3) ECM

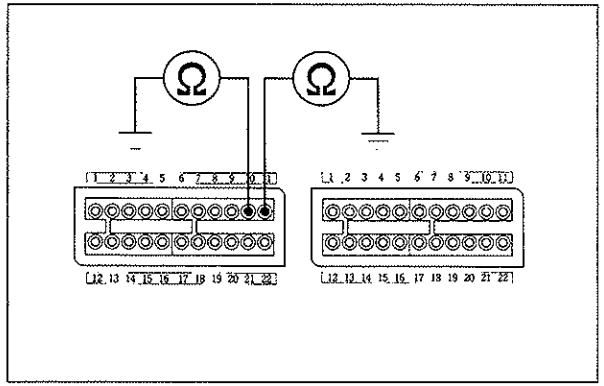
ECM (Engine Control Module)

Disconnect the ECM 22P (Black) and 22P (Light gray) connectors.

Power/ground line inspection

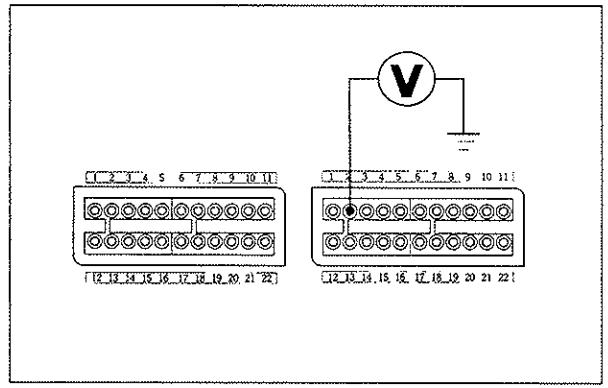
Connect the test harness between the main wire harness and ECM (see VTR Service Manual).

Tool:
ECU test harness **07YMZ-0010100 (two required)**



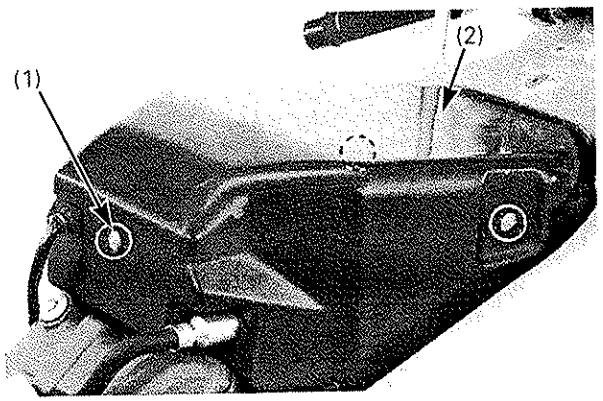
Ground line

Check for continuity between the ECM test harness connector A10 terminal and ground, between the A11 terminal and ground, between the A22 terminal and ground.
There should be continuity at all times.
If there is no continuity, check for open circuit in Green/White wire, Green and Green/Blue wire.



Power input line

Turn the engine stop switch in RUN position.
Measure the voltage between the ECM test harness connector B2 terminal (+) and ground.
There should be battery voltage.
If there is no voltage, check for open circuit in Black/White wire between the ECM and bank angle sensor/fuel pump relay.
If the wire is OK, check for the bank angle sensor/fuel pump relay (page 5-10, 11).



(1) QUICK SCREWS
(2) AIR BOX COVER

Throttle Body/Air Box

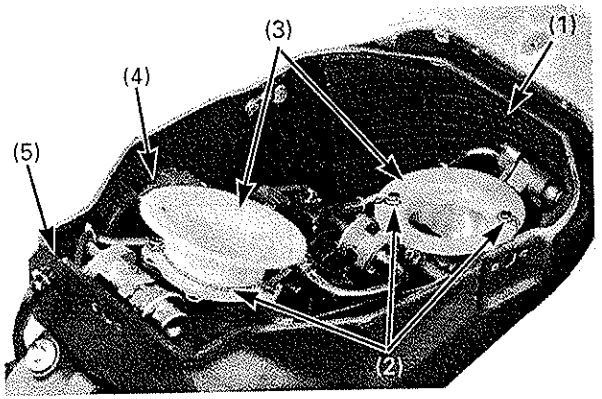
Removal

NOTICE

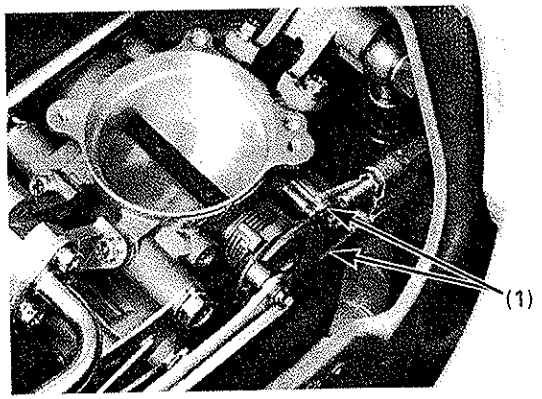
- Before disconnecting the fuel feed hose, release the fuel pressure by loosening the fuel feed hose banjo bolt.
- Always replace the sealing washers when the fuel feed hose banjo bolt is removed or loosened.

Remove the fuel tank (page 5-8).

Turn the quick screws counterclockwise and release the screw, then remove the air box cover.

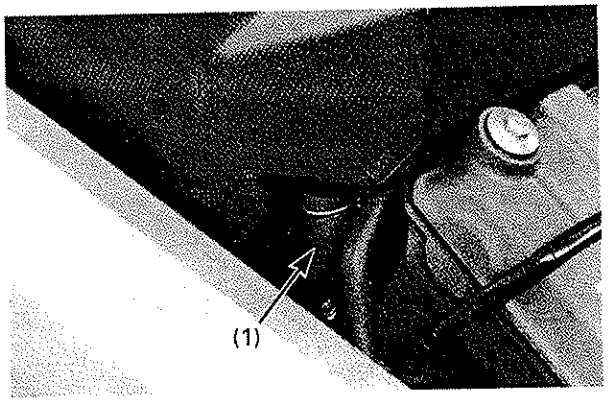


(1) MESH FILTER (2) LOCKING WIRES
(3) AIR FUNNELS
(4) 14P (GRAY) CONNECTOR (5) GROMMET

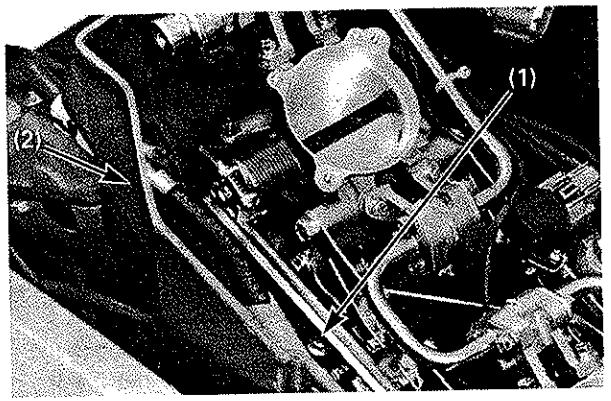


(1) THROTTLE CABLES

Remove the mesh filter from the air box.
Remove and discard locking wires.
Avoid damaging the air funnels, remove the screws and air funnels from the throttle body.
Disconnect the throttle body sub-harness14P (Gray) connector.
Remove the wire harness grommet from the air box groove.
Loosen the throttle cable lock nuts, disconnect the throttle cable ends from the throttle drum.



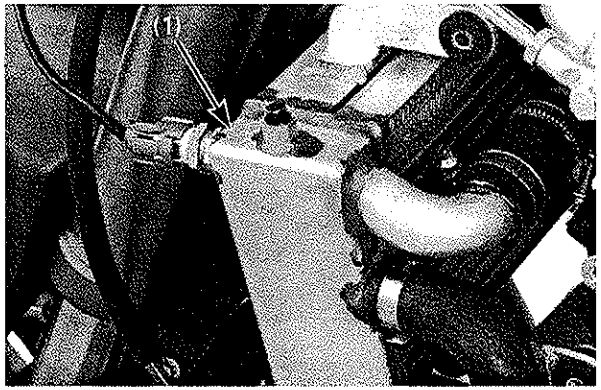
(1) AIR BOX-TO-OIL CATCH TANK HOSE



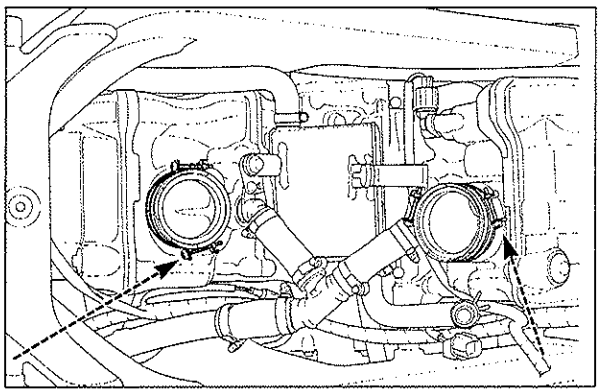
(1) BOLT
(2) AIR BOX

Disconnect the air box-to-oil catch tank hose from the chamber.

Remove the air box mounting bolt.



(1) UPPER RADIATOR



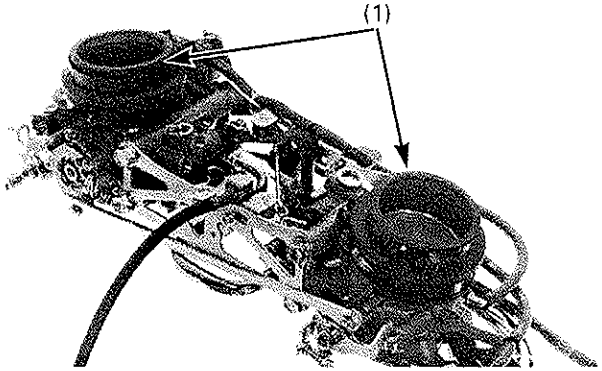
SCREW ACCESS DIRECTION

Remove the upper and lower radiator mounting bolts and move the radiator forward.

Loosen the engine side insulator band screws.

Remove the throttle body from the cylinder head.

Do not hold the fuel pipe on the throttle body while removing the throttle body.



(1) INSULATORS

Disassembly

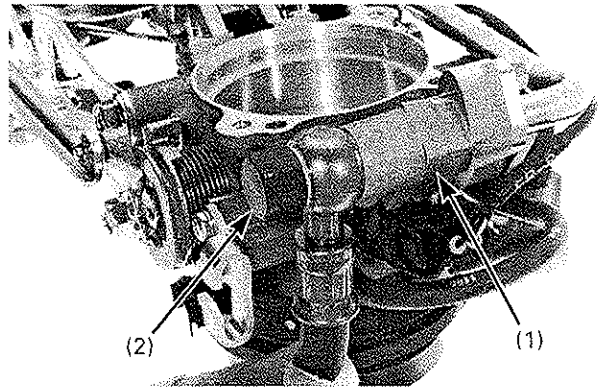
Remove the throttle body from the air box.

Remove the insulators from the throttle body.

Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed.

NOTICE

- Do not damage the throttle body. It may cause incorrect throttle and idle valve synchronization.
- The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.
- Do not loosen or tighten the white painted bolts and screws of the throttle body. Loosening or tightening them can cause throttle and idle valve synchronization failure.

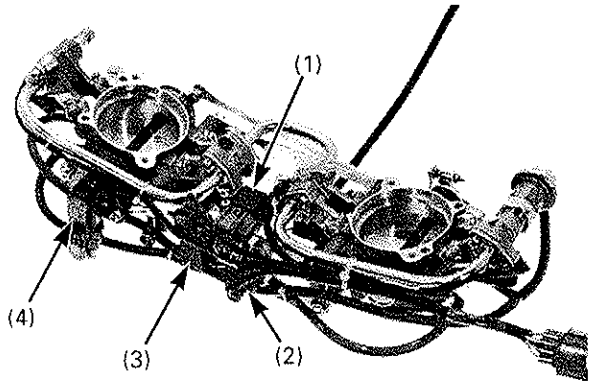


(1) PIPE STAY
(2) FUEL FEED HOSE NUT

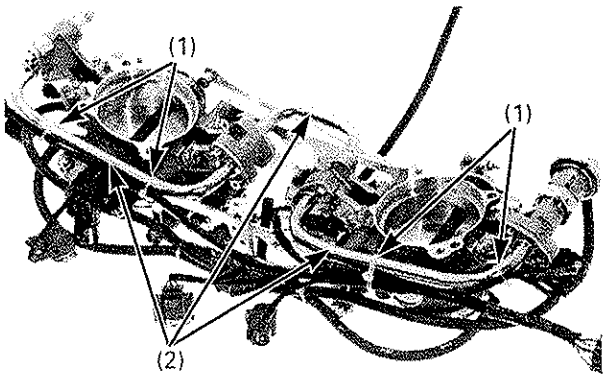
Hold the pipe stay with a 17 mm open end wrench and loosen the fuel feed hose nut.
Remove the nut, fuel feed hose and sealing washers.

NOTICE

- Do not apply excessive force to the fuel pipe.
- Always hold the fuel pipe nut while removing the fuel tube sealing nut.



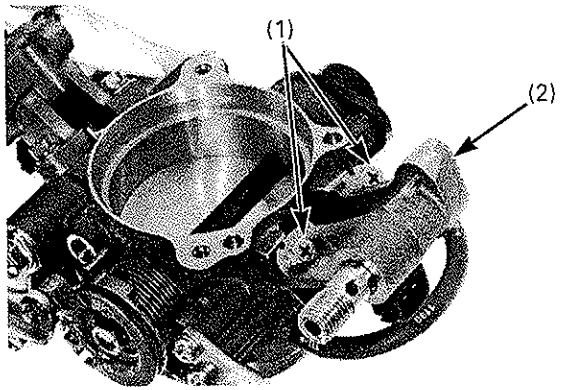
(1) MAP SENSOR (2) IAT SENSOR
(3) BARO SENSOR (4) TP SENSOR



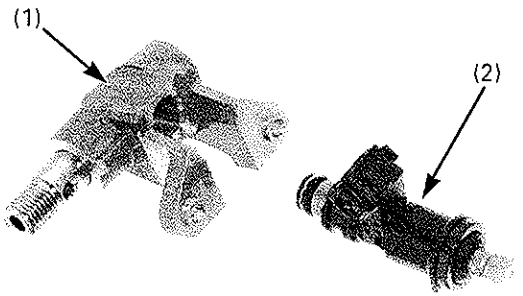
(1) TIE-WRAPS
(2) FUEL FEED PIPES

Disconnect the following connectors:
- MAP sensor connector
- IAT sensor connector
- BARO sensor connector
- TP sensor connector
- Fuel injector connectors

Cut and remove the tie-wraps and remove the sub-harness from the throttle body.
Remove the bolts and fuel feed pipes.



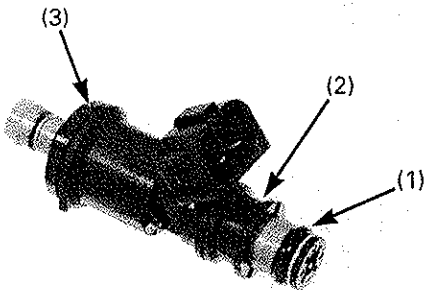
(1) BOLTS (2) PIPE STAY



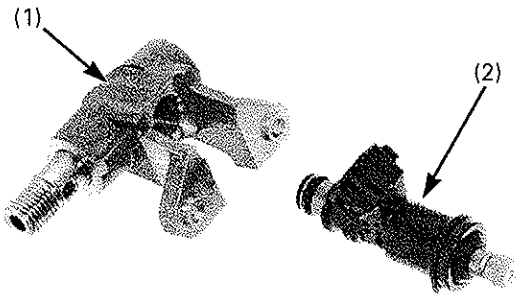
(1) PIPE STAY
(2) FUEL INJECTOR

Remove the two bolts and pipe stay with the injector from the throttle body.
Remove the seal ring.

Remove the injector from the pipe stay.



(1) O-RING
(2) CUSHION RING
(3) SEAL RING

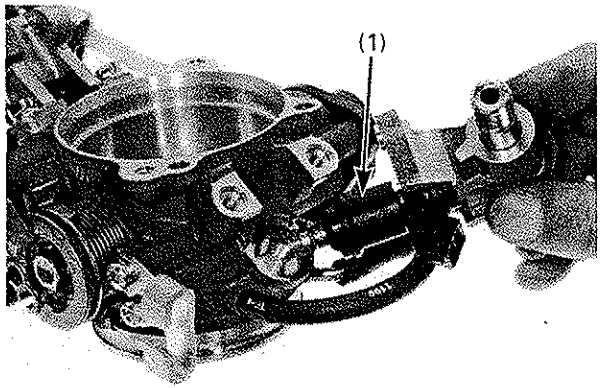


(1) PIPE STAY
(2) FUEL INJECTOR

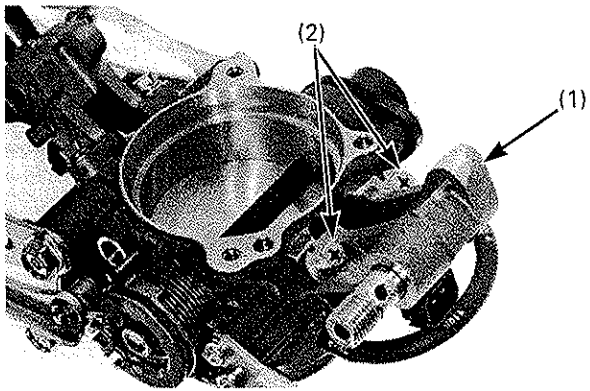
Remove the O-ring, cushion ring and sealing ring from the injector.

Assembly

Install the cushion ring onto the injector.
Coat a new O-ring with oil and install it into the injector groove.
Coat the new seal ring with oil and install it into the injector.
Install the injector into the pipe stay.



(1) FUEL INJECTOR/FUEL PIPE STAY

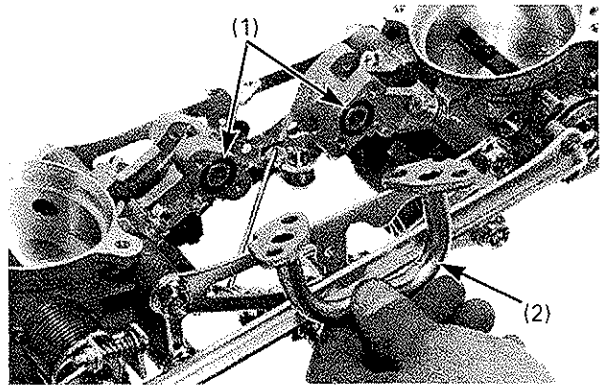


(1) FUEL PIPE STAY (2) BOLTS

Install the the injector/pipe stay onto the throttle body.

Install and tighten the two bolts to the specified torque.

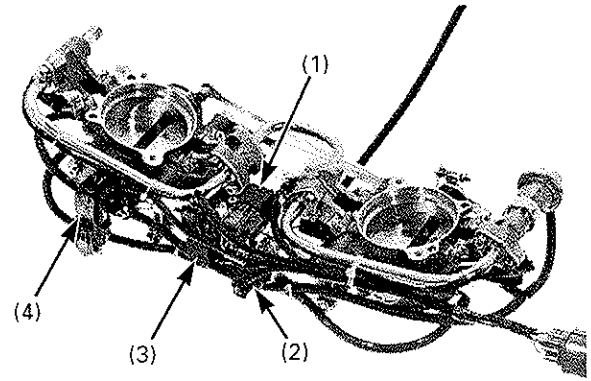
Torque: 5 N•m (0.5 kgf•m, 3.6 lbf•ft)



(1) NEW O-RING
(2) FUEL PIPE

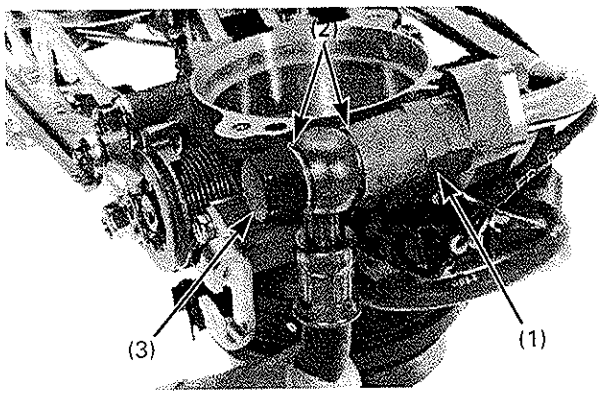
Coat new O-rings with oil and install them into the fuel pipe stay grooves.
Install the fuel pipe and tighten the mounting bolts to the specified torque.

Torque: 5 N•m (0.5 kgf•m, 3.6 lbf•ft)



(1) MAP SENSOR (2) IAT SENSOR
(3) BARO SENSOR (4) TP SENSOR

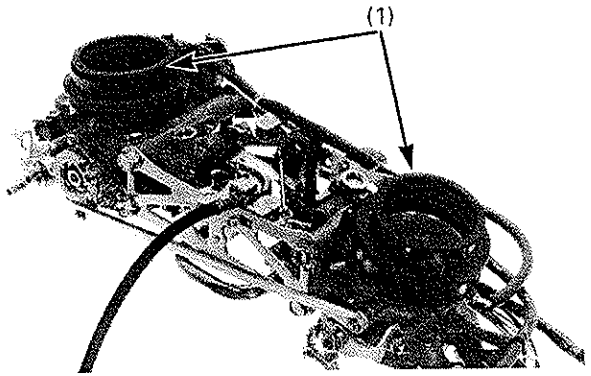
Install the throttle body sub-harness, and connect the injector, MAP sensor, TP sensor, BARO sensor, IAT sensor connectors.
Clamp the sub-harness to the fuel pipe using tie-wraps as shown.



(1) PIPE STAY
(2) NEW SEALING WASHERS
(3) FUEL FEED HOSE NUT

Install the fuel feed hose with new sealing washers and nut.
Adjust the hose angle and tighten the hose nut to the specified torque.

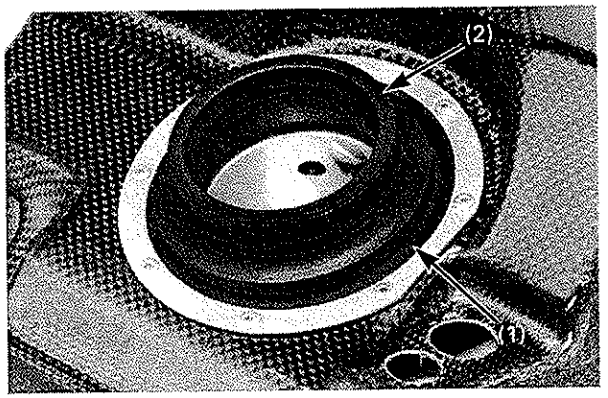
Torque: 22 N•m (2.2 kgf•m, 16 lbf•ft)



(1) INSULATORS

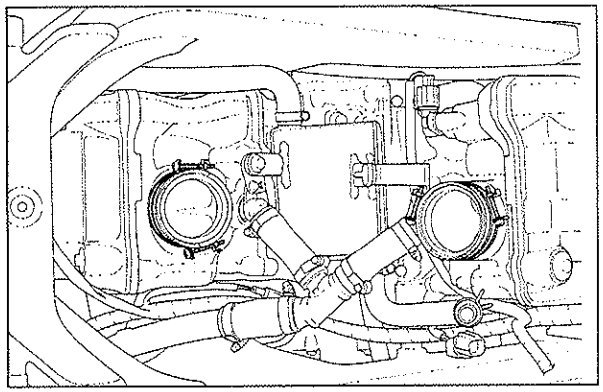
Install the insulators onto the throttle body, aligning the grooves with the tabs on the throttle body.
Tighten the throttle body side insulator band screws to the specified torque.

Torque: 1 N•m (0.1 kgf•m, 0.7 lbf•ft)



(1) SEAL RUBBER
(2) INSULATOR

Install the throttle body assembly into the air box.
Seal the insulators with the air box seal rubbers properly.
Route the throttle stop screw cable into the hole of the air box.
Apply oil to the insulator inside surfaces for ease of throttle body installation.



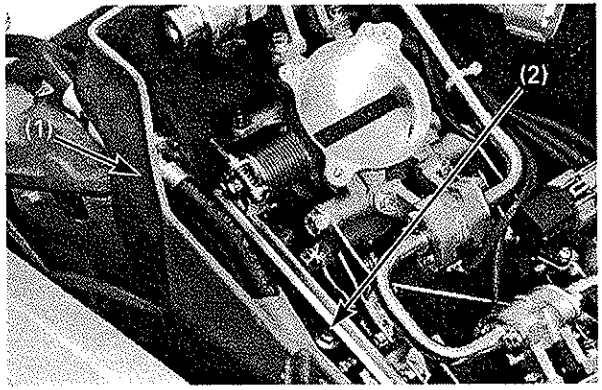
Adjust the engine side insulator band angles as shown.
Install the air box/throttle body assembly onto the cylinder head intake ports.
Push the throttle body and make sure that the insulators are properly installed onto the intake ports.

NOTICE

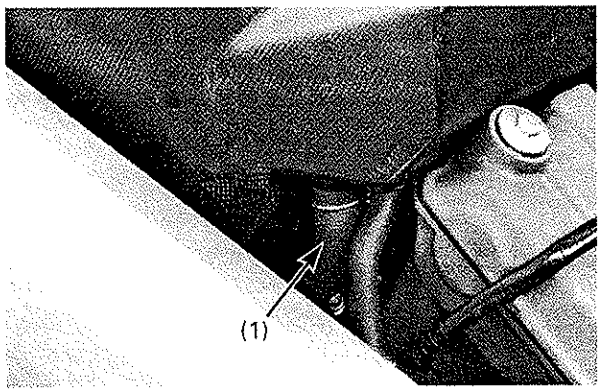
Do not push the fuel pipes and fuel pipe stays while installing the throttle body.

Tighten the insulator band screws to the specified torque.

Torque: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)



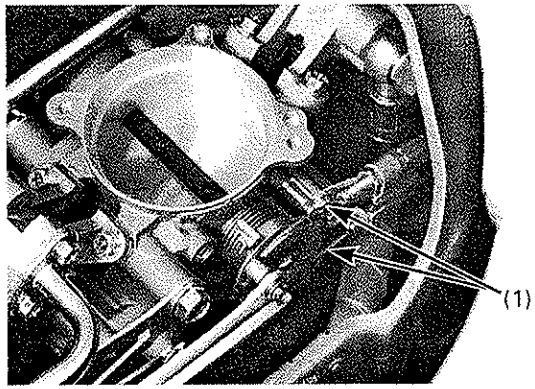
(1) AIR BOX
(2) BOLT



(1) AIR BOX-TO-OIL CATCH TANK HOSE

Install and tighten the air box mounting bolt securely.

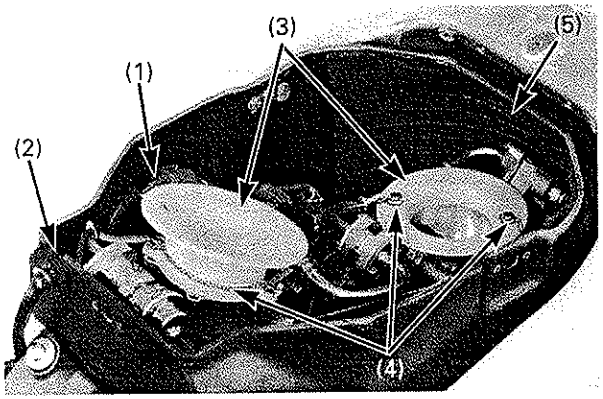
Connect the air box-to-oil catch tank tube.



(1) THROTTLE CABLES

Connect the throttle cables to the throttle drum.

Adjust the free play (page 1-5).



(1) 14P (GRAY) CONNECTOR (2) GROMMET
(3) AIR FUNNELS (4) LOCKING WIRE
(5) MESH FILTER

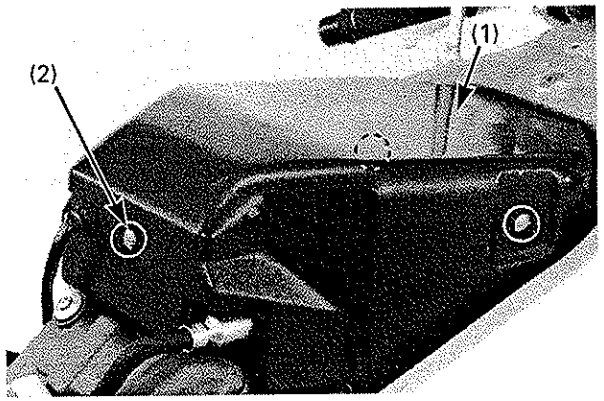
Route the wire harness referring the wiring diagram (page 2-14), and connect the sub-harness 9P (Gray) connector.
Install the grommet into the air box groove.

Apply a locking agent to the air funnel mounting bolts.
Install the air funnels and tighten the screw to the specified torque.

Torque: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)

Secure the air funnel bolts with a locking wire.

Install the mesh filter.



(1) AIR BOX COVER
(2) QUICK SCREWS

Install the air box cover and secure it with the quick screws.

Install the removed parts in the reverse order of removal.

Service Information	6-1	Cooling System Inspection	6-3
Troubleshooting	6-1	Radiator	6-3
System Illustration	6-2	Water Pump	6-5

Service Information

- All cooling system service can be done with the engine in the frame.
- After servicing the system, check for leaks with a cooling system tester.

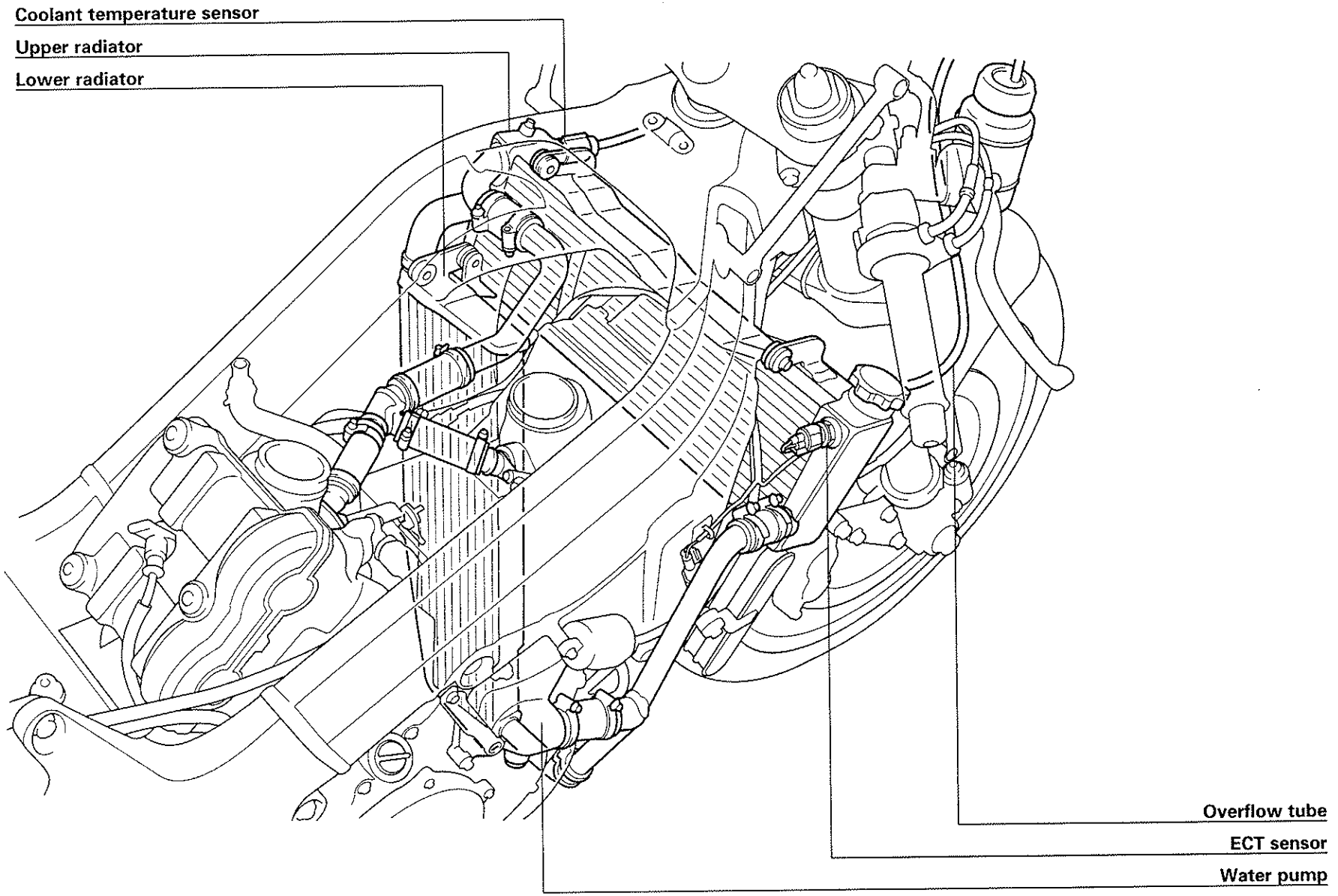
Troubleshooting

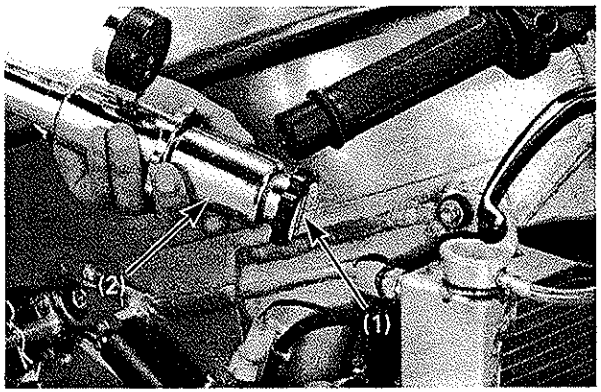
Engine temperature too high
- Faulty temperature gauge or thermosensor
- Faulty radiator cap
- Insufficient coolant
- Passages blocked in radiator, hoses or water jacket
- Air in system
- Faulty water pump

Engine temperature too low
- Faulty temperature gauge or thermosensor

Coolant leaks
- Faulty water pump mechanical seal
- Deteriorated O-rings
- Faulty radiator cap
- Damaged or deteriorated cylinder head gasket
- Loosen hose connection or clamp
- Damaged or deteriorated hoses

System Illustration





(1) RADIATOR CAP
(2) CAP TESTER

Cooling System Inspection

⚠ WARNING

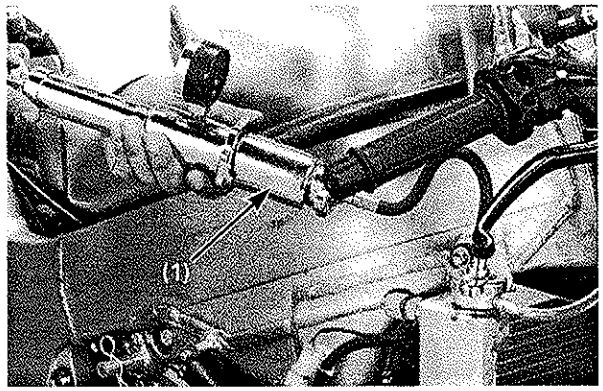
Removing the radiator cap while the engine is hot will allow the coolant to spray out, seriously scalding you.

Always let the engine and radiator cool down before removing the radiator cap.

Radiator Cap

Pressure test radiator cap.
Replace the radiator cap if it does not hold pressure, or if relief pressure is too high or too low.
Before installing the radiator cap on the tester, apply water to sealing surfaces.
It must hold specified pressure for at least six seconds.

Radiator cap relief pressure:
93 – 123 kPa (0.95 – 1.25 kgf/cm², 14 – 18 psi)



(1) CAP TESTER

Radiator

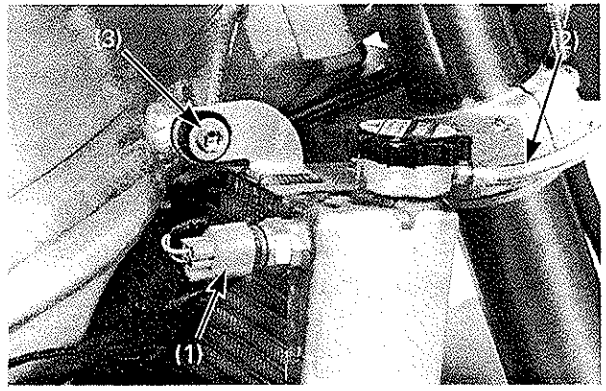
Pressurize the radiator, engine and hoses, and check for leaks.

Specified pressure:
118 kPa (1.2 kgf/cm², 17 psi)

NOTICE

Excessive pressure can damage the radiator. Do not exceed 118 kPa (1.2 kgf/cm², 17 psi).

Repair or replace components if the system will not hold specified pressure for at least six seconds.



(1) ECT SENSOR CONNECTOR
(2) OVERFLOW TUBE
(3) UPPER RADIATOR MOUNTING BOLT

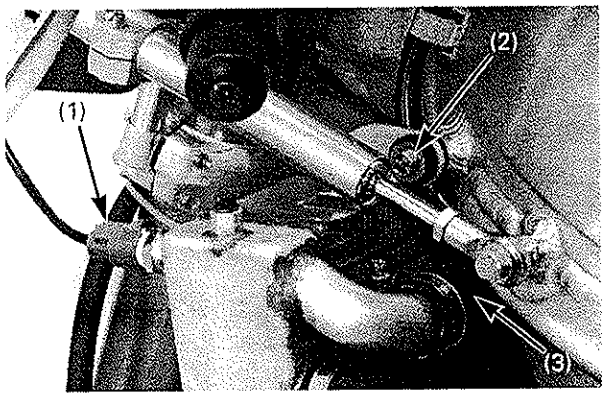
Radiator

Removal

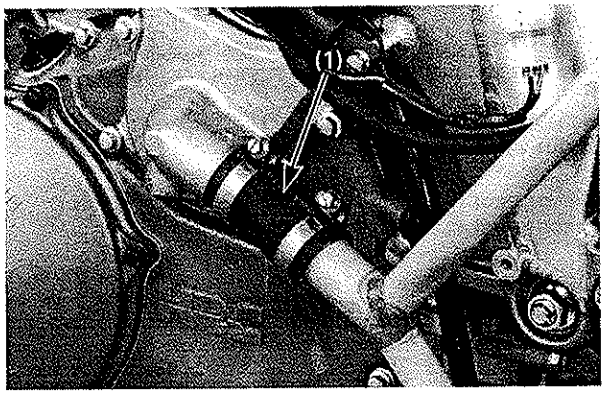
Drain the cooling system.

Disconnect the ECT sensor 3P (Gray) connector.
Disconnect the overflow tube.

Remove the upper radiator right mounting bolt.



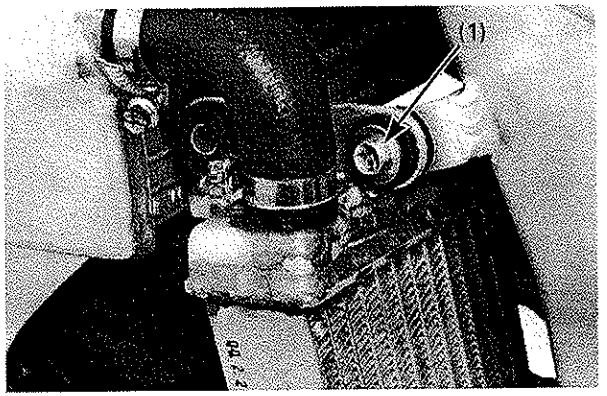
(1) THERMOSENSOR CONNECTOR
(2) UPPER RADIATOR MOUNTING BOLT
(3) UPPER RADIATOR HOSE



(1) WATER JOINT HOSE

Disconnect the thermosensor 2P (Gray) connector.
Remove the upper radiator right mounting bolt.

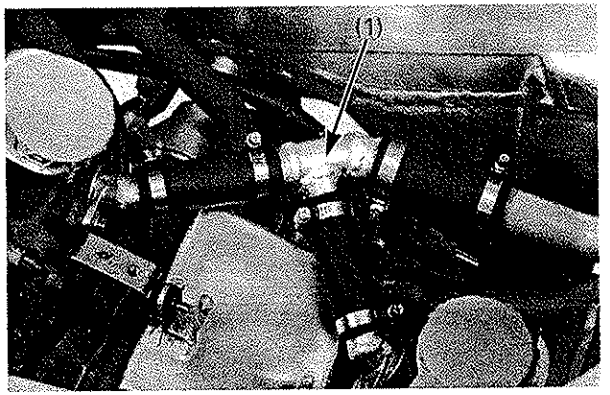
More the upper radiator forward and disconnect the upper radiator hose.
Loosen the water joint water hose clamp.



(1) LOWER RADIATOR MOUNTING BOLTS

Remove the lower radiator mounting bolt, then remove the upper and lower radiator as an assembly.

Separate the upper and lower radiator.

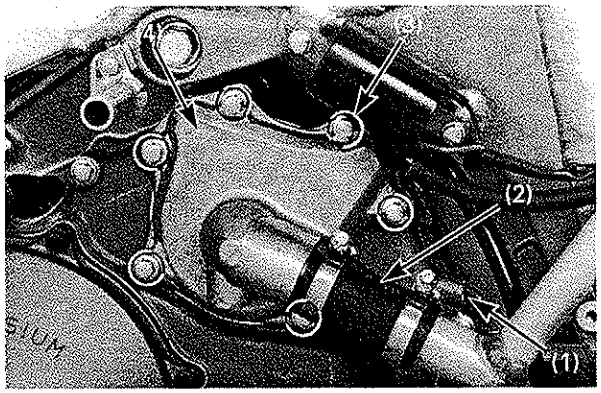


(1) WATER JOINT HOSE/PIPE

Remove the water joint mounting bolts, then disconnect the water joints from the cylinder block.

Installation

Install the radiator in the reverse order of removal.
Always replace the water joint seals with new ones.



(1) INSPECTION HOLE
(2) JOINT HOSE (3) BOLTS
(4) WATER PUMP COVER

Water Pump

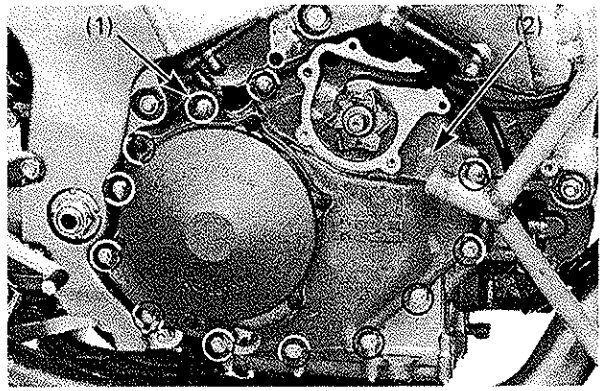
Mechanical Seal Inspection

Check the inspection hole for sign of leakage.
If there is coolant leakage, the water pump mechanical seal is defective, replace the mechanical seal.
If there is oil leakage, the oil seal is defective, replace the water pump oil seal.

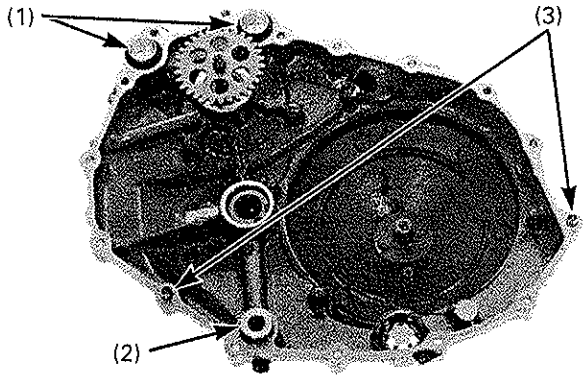
Disassembly

Drain the engine oil (page 3-7).
Drain the coolant (page 1-2).

Loosen the water joint hose clamps.
Remove the water pump cover mounting bolt, then disconnect the water joint hose from the water joint pipe.
Remove the dowel pins and O-ring.



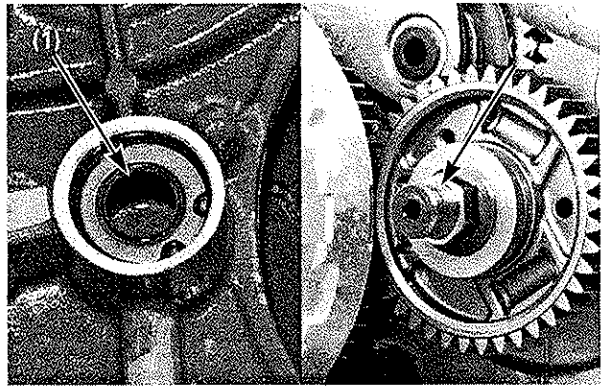
(1) BOLTS
(2) RIGHT CRANKCASE COVER



(1) WATER JOINT COLLARS/O-RINGS
(2) OIL JOINT COLLAR/O-RING
(3) DOWEL PINS

Remove the bolts and right crankcase cover.
Remove the water joint collars and O-rings.
Remove the oil joint collar and O-ring.
Remove the dowel pins.

See VTR Service Manual for water pump seal replacement.

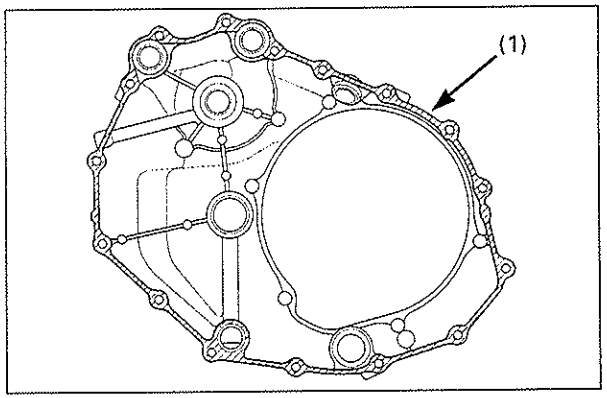


(1) OIL SEAL
(2) PRIMARY DRIVE GEAR BOLT

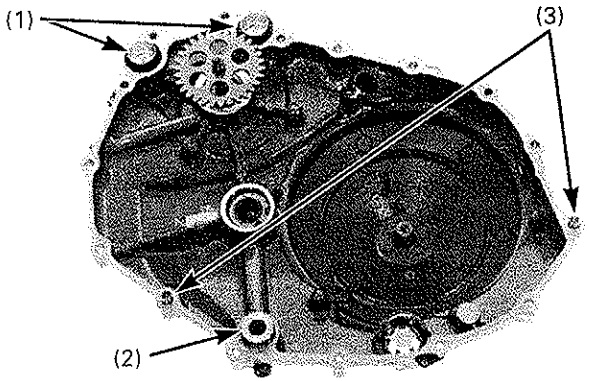
Inspection

Check the oil seal for wear or damage, replace if necessary.

Check the sealing surface of the primary drive gear bolt is not scratched or scored.



(1) APPLY SEALANT

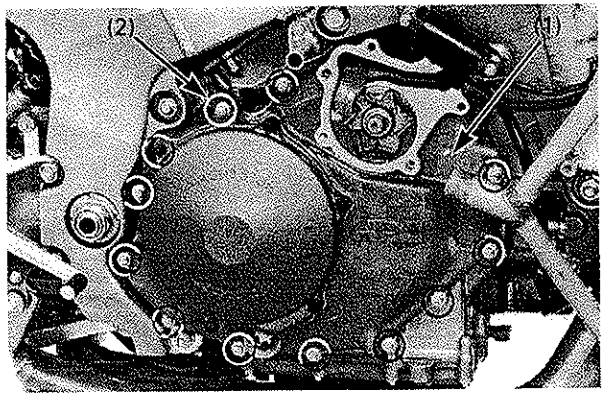


(1) WATER JOINT COLLARS/O-RINGS
(2) OIL JOINT COLLAR/O-RING
(3) DOWEL PINS

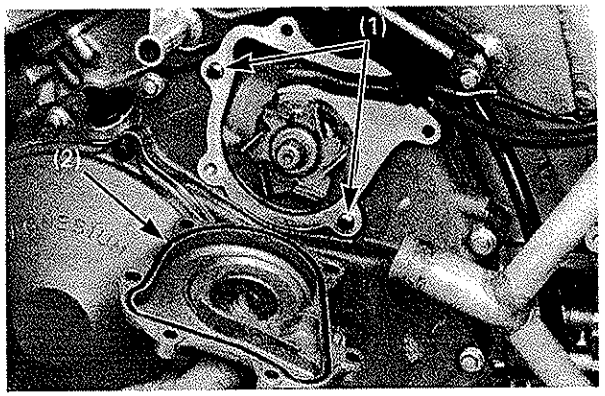
Assembly

Apply sealant to the crankcase cover mating surface.
Apply oil to the new O-rings.

Install the following:
- Water joint collars and new O-rings
- Oil joint collar and new O-ring
- Dowel pins



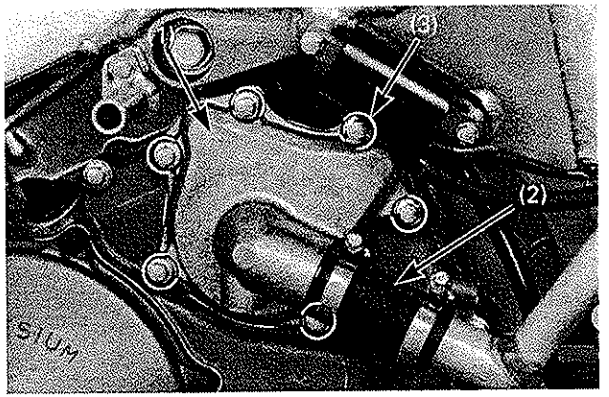
(1) RIGHT CRANKCASE COVER
(2) BOLTS



(1) DOWEL PINS
(2) NEW O-RING

Install the right crankcase cover while turning the water pump impeller being careful not to damage the oil seal.
Install and tighten the bolts in a criss-cross pattern in 2 or 3 steps.

Install the dowel pins.
Apply grease to the new O-ring and install it into the water pump cover groove.



(1) WATER PUMP COVER (2) JOINT HOSE
(3) BOLTS

Connect the water hose and install the water pump cover.
Install and tighten the cover bolts in a criss-cross pattern in 2 or 3 steps.
Tighten the water hose clamp screw securely.

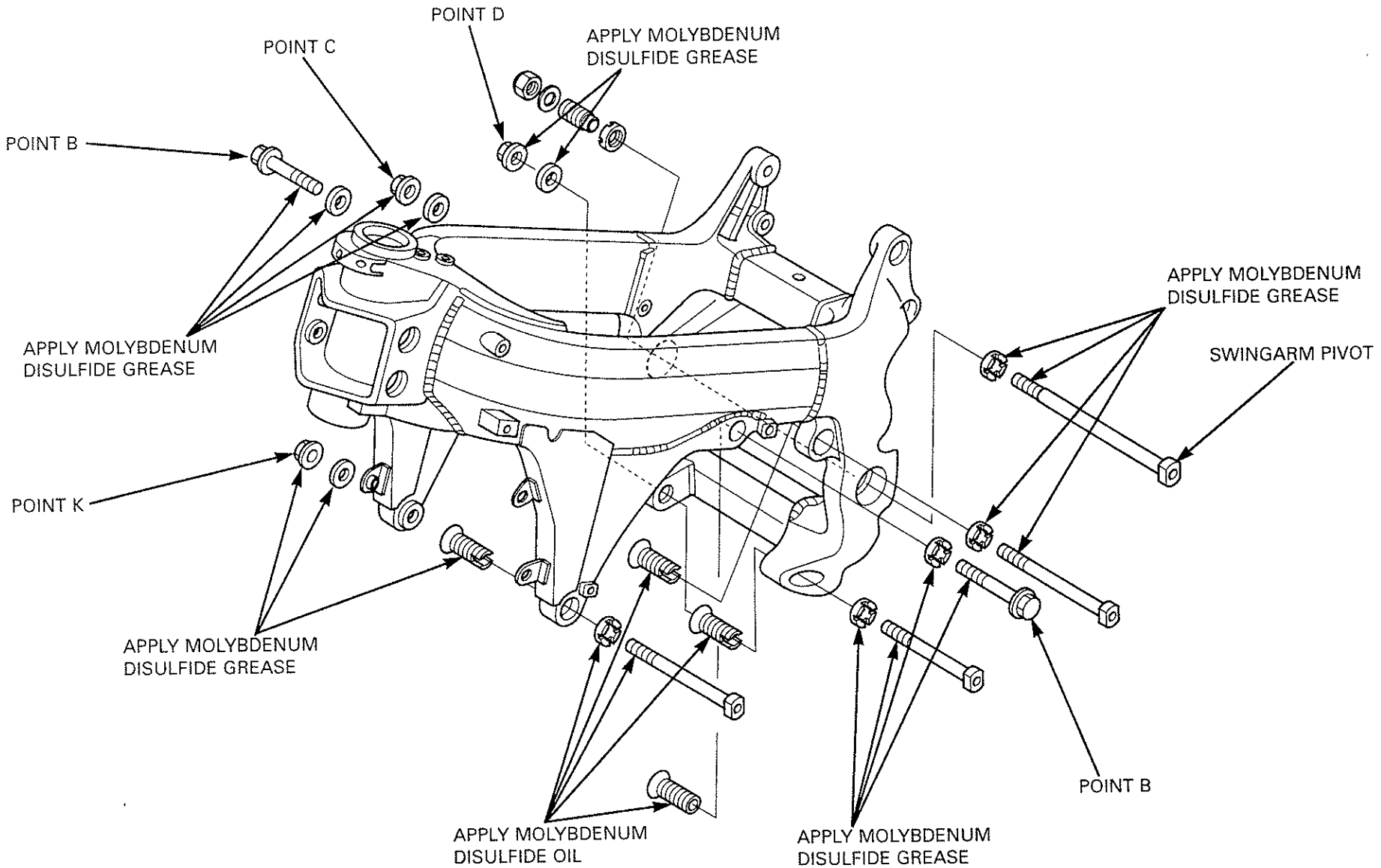
Pour recommended engine oil to the proper level.
Fill the cooling system and bleed the air.

Service Information	**7-1**
Engine Removal/Installation	**7-2**

Service Information

- Support the machine with a maintenance stand securely when removing or installing the engine.
- A floor jack or other adjustable support is required to support and maneuver the engine.
- Do not use the oil filter as a jacking point.
- When using the lock nut wrench for the adjusting bolt lock nut, use a deflecting beam type torque wrench 20 inches long. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given is the actual torque applied to the lock nut, not the reading on the torque wrench. Do not overtighten the lock nut. The specification later in the text gives both actual and indicated.
- The following parts must be removal for servicing:
  - Mufflers/exhaust pipes
  - Radiator (page 6-3)
  - Throttle body (page 5-16)
  - Starter motor cable
  - Spark plug caps (3-4)
  - Alternator connector and ignition pulse generator connector (page 10-2)
  - Speed sensor connector
  - Clutch slave cylinder (page 9-3)
  - Drive sprocket (page 14-10)
  - Swingarm pivot bolt (page 14-11)
  - Shock link bolt (page 14-8)
  - Gearshift pedal link (page 9-16)
- The following components require engine removal for service:
  - Transmission (section 11)
  - Crankshaft/piston/cylinder (section 12)
- When installing the engine, be sure to tighten the engine mounting fasteners to the specified torque in the specified sequence. If you mistake the tightening torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the correct sequence.

Engine Hanger Tightening Sequence



NOTICE

When using the lock nut wrench for the adjusting bolt lock nut, use a deflecting beam type torque wrench 20 inches long. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given is the actual torque applied to the lock nut, not the reading on the torque wrench. Do not over-tighten the lock nut.

Apply molybdenum disulfide grease to the all mounting bolt threads and seating surface of the nuts and washers.

Install and tighten the engine hanger bolts as follow:

1. Install the right and left swingarm pivot adjusting bolt, so that the tip of the adjusting bolts does not protrude inward.
2. Install all the engine hanger adjusting bolts into the left side mounting points from the inside.
3. Install the engine into the frame, then install all the engine hanger bolts.
4. Set the swingarm between the frame and engine, install the swingarm pivot bolt from the left side.
5. Tighten the point C adjusting bolt to the specified torque, then tighten the point D adjusting bolt to the specified torque.

   Torque: 10 N·m (1.0 kgf·m, 7 lbf·ft)

6. Install the lock nuts onto the point C and D adjusting bolts.
   Tighten the point C adjusting bolt lock nut to the specified torque, then tighten the point D adjusting bolt lock nut to the specified torque.

   Tool:
   Lock nut wrench 07VMA-MBB0100

   Torque:
   Actual: 59 N·m (6.0 kgf·m, 43 lbf·ft)
   Scale reading: 53 N·m (5.4 kgf·m, 39 lbf·ft)

7. Tighten the point C hanger nut to the specified torque.

   Torque: 59 N·m (6.0 kgf·m, 43 lbf·ft)

8. Tighten the point D hanger nut to the specified torque.

   Torque: 44 N·m (4.5 kgf·m, 33 lbf·ft)

9. Retighten the point C adjusting bolt lock nut to the specified torque, then tighten the point D adjusting bolt lock nut to the specified torque.

   Tool:
   Lock nut wrench 07VMA-MBB0100

   Torque:
   Actual: 59 N·m (6.0 kgf·m, 43 lbf·ft)
   Scale reading: 53 N·m (5.4 kgf·m, 39 lbf·ft)

10. Retighten the point C hanger nut to the specified torque.

    Torque: 59 N·m (6.0 kgf·m, 43 lbf·ft)

11. Retighten the point D hanger nut to the specified torque.

    Torque: 44 N·m (4.5 kgf·m, 33 lbf·ft)

12. Tighten the right side of the point B hanger bolt to the specified torque.

    Torque: 59 N·m (6.0 kgf·m, 43 lbf·ft)

13. Hand tighten the left side of the point B adjusting bolt fully.
14. Tighten the left side of the point B adjusting bolt lock nut to the specified torque.

    Tool:
    Lock nut wrench 07VMA-MBB0100

    Torque:
    Actual: 59 N·m (6.0 kgf·m, 43 lbf·ft)
    Scale reading: 53 N·m (5.4 kgf·m, 39 lbf·ft)

15. Tighten the left side of the point B hanger bolt to the specified torque.

    Torque: 59 N·m (6.0 kgf·m, 43 lbf·ft)

16. Hand tighten the left side of the point K adjusting bolt fully.
17. Tighten the left side of the point K adjusting bolt lock nut to the specified torque.

    Tool:
    Lock nut wrench 07VMA-MBB0100

    Torque:
    Actual: 59 N·m (6.0 kgf·m, 43 lbf·ft)
    Scale reading: 53 N·m (5.4 kgf·m, 39 lbf·ft)

18. Tighten the right side of the point K hanger nut to the specified torque.

    Torque: 59 N·m (6.0 kgf·m, 43 lbf·ft)

19. Tighten the right side of the swingarm pivot adjusting bolt to the specified torque.

    Torque: 15 N·m (1.5 kgf·m, 11 lbf·ft)

20. Tighten the right side of the swingarm pivot adjusting bolt lock nut to the specified torque, while holding the adjusting bolt.

    Tool:
    Lock nut wrench, 5.8 X 46 mm 07VMA-MBB0100

    Torque:
    Actual: 69 N·m (7.0 kgf·m, 51 lbf·ft)
    Scale reading: 62 N·m (6.3 kgf·m, 46 lbf·ft)

21. Tighten the left side of the swingarm pivot adjusting bolt to the specified torque.

    Torque: 15 N·m (1.5 kgf·m, 11 lbf·ft)

22. Tighten the left side of the swingarm pivot adjusting bolt lock nut to the specified torque, while holding the adjusting bolt.

    Tool:
    Lock nut wrench, 5.8 X 46 mm
    07VMA-MBB0100

    Torque:
    Actual: 69 N·m (7.0 kgf·m, 51 lbf·ft)
    Scale reading: 62 N·m (6.3 kgf·m, 46 lbf·ft)

23. Install the washer and swingarm pivot nut, then tighten the pivot nut to the specified torque.

    Torque: 127 N·m (13.0 kgf·m, 94 lbf·ft)

Install the removed parts in the reverse order of removal.

Service Information	8-1	Valve Seat Inspection/Refacing	8-5
Troubleshooting	8-1	Cylinder Head Assembly	8-7
Camshaft Removal	8-2	Cylinder Head Installation	8-8
Cylinder Head Removal	8-4	Camshaft Installation	8-8
Cylinder Head Disassembly	8-4	Cam Gear Train	8-11

Service Information

- This section covers service of the camshafts, cylinder head and valves. These services can be done with the engine installed in the frame.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft lubricating oil is fed through oil passages in the cylinder head. Clean the oil passages before assembling cylinder head.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head.

Troubleshooting

- Engine top-end problems usually affect engine performance. These problem can be diagnosed by a compression test or by tracing engine noises to the top-end with a sounding rod stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather tube. If the tube is smoky, check for a seized piston ring (Section 12).

Compression too low, hard starting or poor performance at low speed

- Valves
  - Incorrect valve adjustment
  - Burned or bent valve
  - Incorrect valve timing
  - Broken valve spring
  - Uneven valve seating
- Cylinder head
  - Leaking or damaged cylinder head gasket
  - Warped or cracked cylinder head
  - Loose spark plug
- Worn cylinder, piston or piston rings (section 12)

Compression too high, overheating or knocking

- Excessive carbon build-up on piston crown or on combustion chamber

Excessive smoke

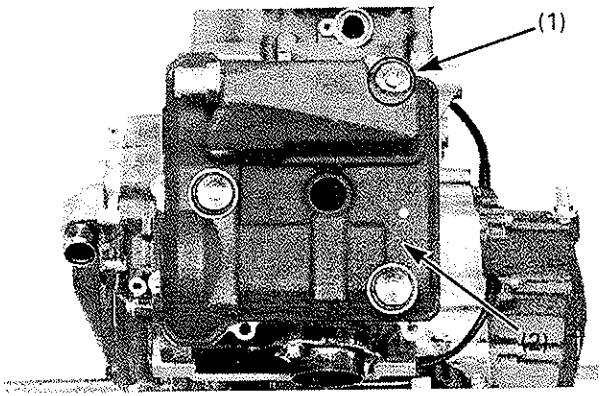
- Cylinder head
  - Worn valve stem or valve guide
  - Damaged stem seal
- Worn cylinder, piston or piston rings (section 12)

Excessive noise

- Cylinder head
  - Incorrect valve adjustment
  - Sticking valve or broken valve spring
  - Damaged or worn camshaft
  - Worn or damaged cam gear train
  - Worn camshaft gear
- Worn cylinder, piston or piston rings (section 12)

Rough idle

- Low cylinder compression

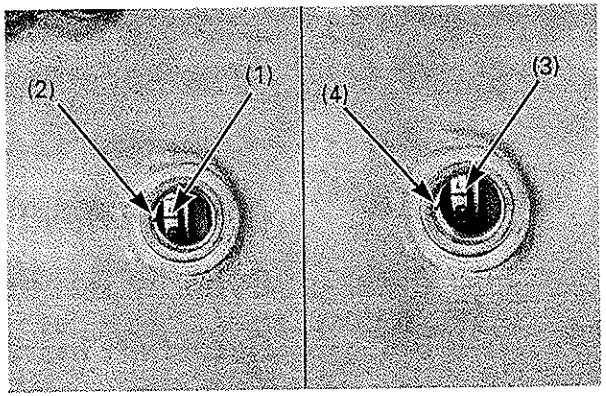


(1) BOLTS/MOUNTING RUBBER
(2) CYLINDER HEAD COVER

Camshaft Removal

Remove the timing hole cap and crankshaft hole cap (page 3-5).

Remove the cylinder head mounting bolts, mounting rubbers and cover.
Remove the cylinder head packing from the cover.



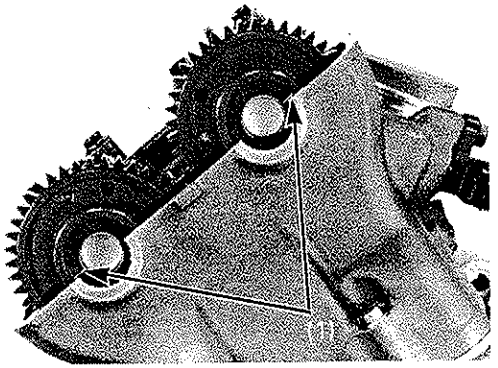
(1) "RT" MARK (2) INDEX MARK
(3) "FT" MARK (4) INDEX MARK

Rear cylinder camshaft:

Rotate the crankshaft counterclockwise and align the "RT" mark on the flywheel with the index mark on the left crankcase cover.

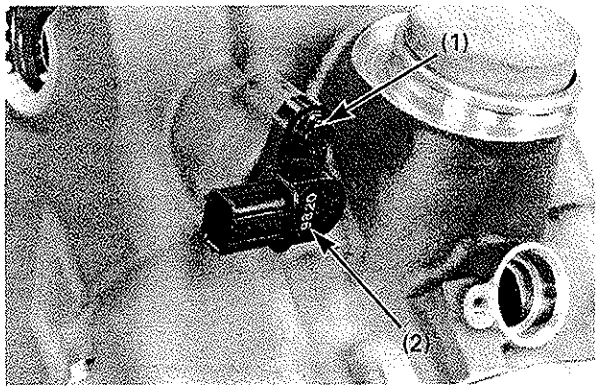
Front cylinder camshaft:

Rotate the crankshaft counterclockwise and align the "FT" mark on the flywheel with the index mark on the left crankcase cover.



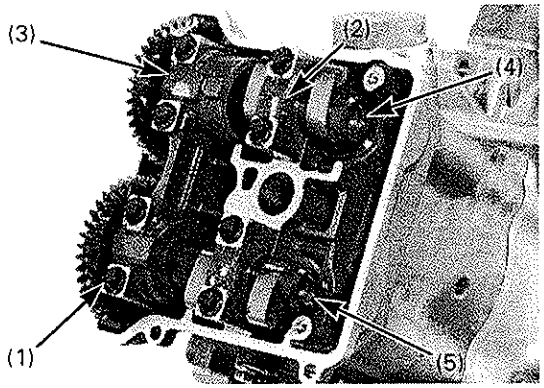
(1) INDEX LINES

The index lines on the camshafts must be flush with the cylinder head surface and facing outward as shown.
If the index lines are facing inward, rotate the crankshaft counterclockwise one full turn (360°) and realign the index lines.



(1) BOLT (2) CAM PULSE GENERATOR

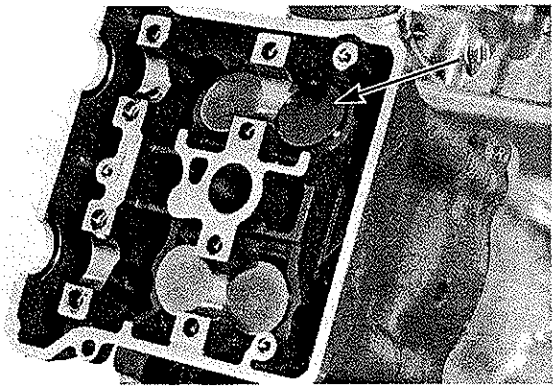
For the rear cylinder camshaft removal, remove the bolt and cam pulse generator prevent damaging it.



(1) BOLTS (2) CAMSHAFT HOLDER A
(3) CAMSHAFT HOLDER B
(4) INTAKE CAMSHAFT (5) EXHAUST CAMSHAFT

Remove the camshaft holder bolts, camshaft holder A and B.
Do not forcibly remove the dowel pins from the camshaft holders.

Remove the intake and exhaust camshaft.

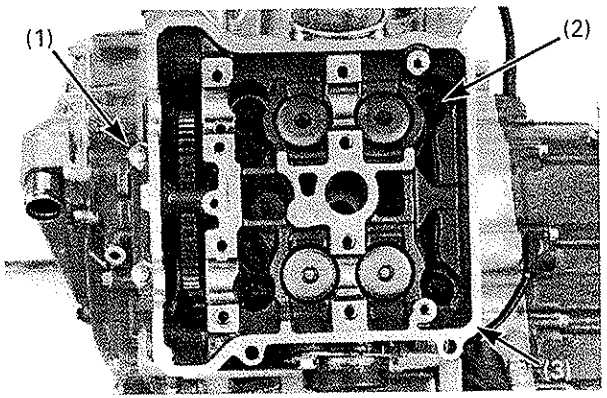


(1) VALVE LIFTERS

Remove the valve lifters and shims.

- Be careful not to damage the valve lifter bore.
- Shim may stick to the inside of the valve lifter. Do not allow the shims to fall into the crankcase.
- Mark all valve lifters and shims to ensure correct reassembly in their original locations.
- The valve lifter can be easily removed with a valve lapping tool or magnet.
- The shims can be easily removed with a tweezers or magnet.

See VTR Service Manual for camshaft inspection.



(1) 6 mm BOLTS
(2) 11 mm BOLTS
(3) CYLINDER HEAD

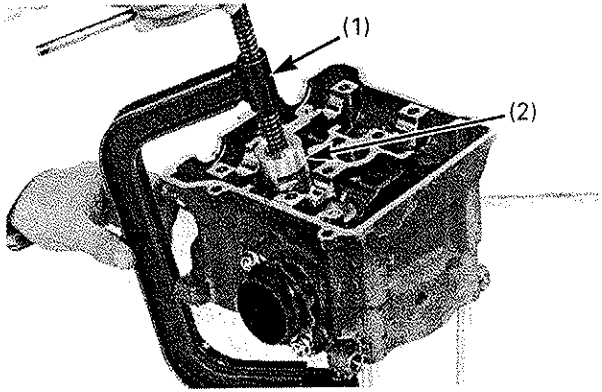
Cylinder Head Removal

Remove the following:
- Exhaust system
- Throttle body
- Camshafts (page 8-2)

Remove the bolts, water hose joints and O-rings from the front and rear cylinder head.

Remove the two 6 mm cylinder head mounting bolts.
Loosen the four 11 mm cylinder head bolts in a crisscross pattern in 2 or 3 steps, and remove them.

Remove the cylinder head.
Remove the gasket and dowel pins.



(1) VALVE SPRING COMPRESSOR
(2) ATTACHMENT

Cylinder Head Disassembly

Remove the spark plug from the cylinder head.

Remove the valve spring cotters using the valve spring compressor and attachment.

Tools:

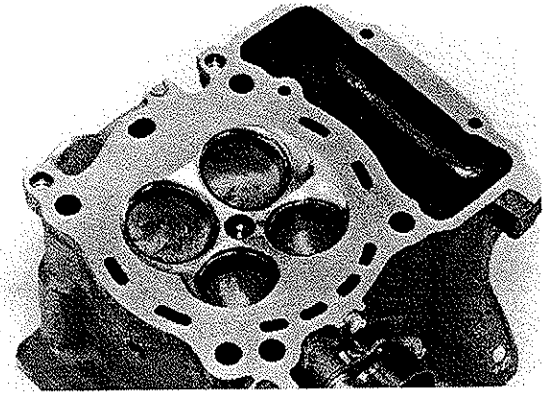
Valve spring compressor	**07757-0010000**
Attachment	**07956-NL6-003**

- To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.
- Do not damage the spring retainer.

NOTICE

Do not separate the inner and outer spring each other.

Remove the following:
- Spring retainer
- Outer and inner valve springs
- Valve
- Stem seal
- Valve spring seat

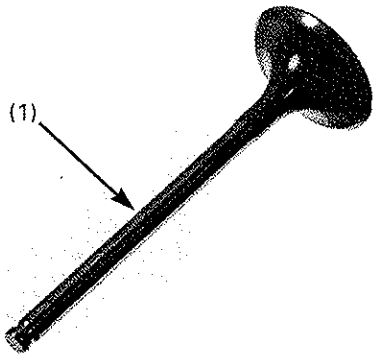


Inspection

See VTR Service Manual for cylinder head inspection.

Combustion chamber
Remove the carbon deposits from the combustion chamber, being careful not to damage the gasket surface and valve seats.

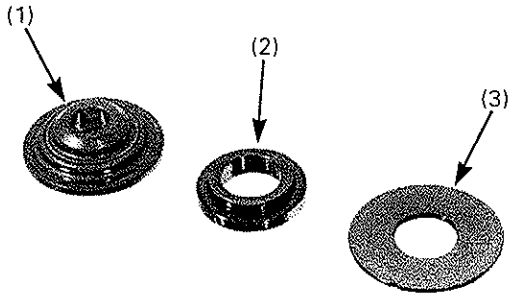
Check the spark plug hole and valve areas for cracks.



(1) VALVE

Valves
- The VTR1000 SP-1's intake and exhaust valves using the titanium valve.
- If the brown coating of the valve is removed, or the metal surface is appeared, replace the valve with a new one.
- The exhaust valve has special brown coating. When cleaning the exhaust valve, be careful not to damage the coating of valves. Use #1000 or more fine emery cloth to clean the valve.

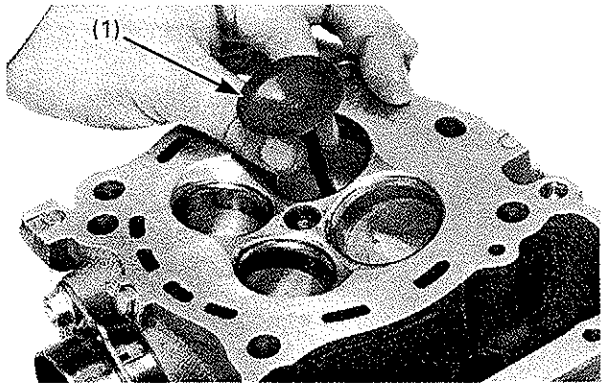
Check the valve for wear or damage.



(1) SPRING RETAINER
(2) INNER SPRING SEAT
(3) OUTER SPRING SEAT

Spring retainer/spring seat
Check that spring retainer and valve seat for wear or damage, replace if necessary.

The racing kit outer valve seat is identified by the groove.
Do not install the stand VTR valve seat.



(1) STANDARD VTR VALVE

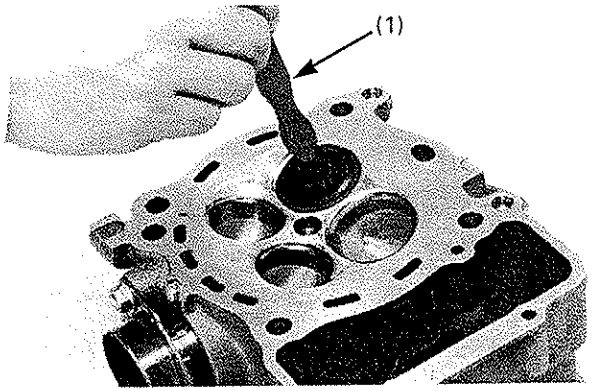
Valve Seat Inspection/Refacing

NOTICE

- The VTR1000 SP-1's intake and exhaust valves using the titanium valve.
  When cleaning the exhaust valve, be careful not to damage the coating of valves.
  Use #1000 or more fine emery cloth to clean the valve.
- Use standard VTR valve when you lapping the intake valve seat.

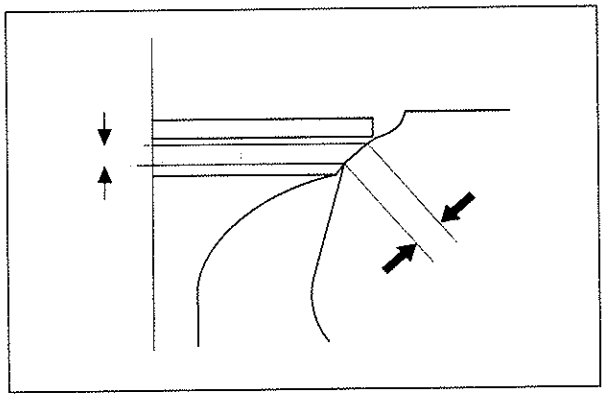
Inspection

Remove carbon deposits from the combustion chamber and valves.
Apply a light coating of Prussian Blue to the valve seats.



(1) HAND-LAPPING TOOL

Tap the valve against the valve seat several times without rotating the valve, to check for proper valve seat contact.
Remove the valve and inspect the valve seat face.



Inspect the width of each valve seat.

Valve seat width:
IN: 0.8 mm (0.03 in)
IN: 1.0 mm (0.04 in)

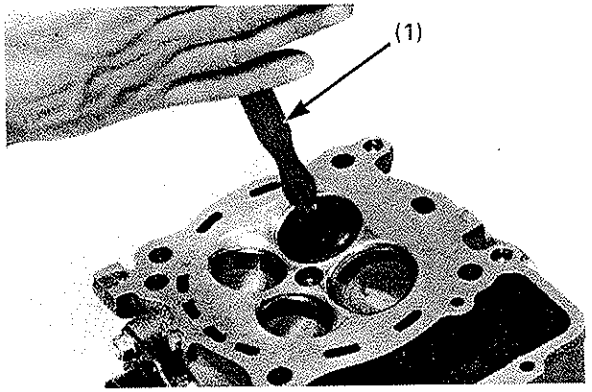
If the seat is too wide, too narrow or has low spots, the seat must be ground.

Refacing

For the inlet valve refacing, install the standard VTR standard valve into the valve guide.

If the contact area is too high on the valve, the seat must be lowered using a 32 degrees flat cutter.

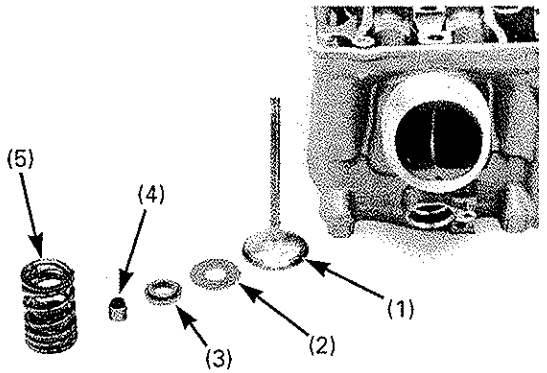
If the contact area is too low on the valve, the seat must be raised using a 60-degree inner cutter.



(1) VALVE LAPPING TOOL

Refinish the seat to specifications, using a 45-degree finish cutter.
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

After lapping, wash all residual compound off the cylinder head and valve.



(1) VALVE (2) OUTER SPRING SEAT
(3) INNER SPRING SEAT (4) STEM SEAL
(5) INNER/OUTER SPRING

Cylinder Head Assembly

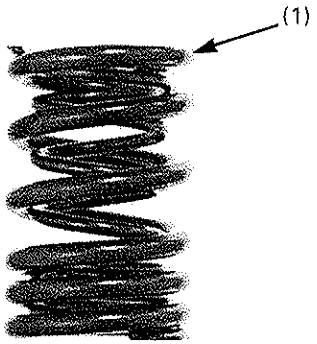
Clean the cylinder head assembly with solvent and blow through all oil passages with compressed air.

Install the valve spring seats.
Install the new stem seals.

- Use standard VTR exhaust valve stem seals for the intake and exhaust valve stems.

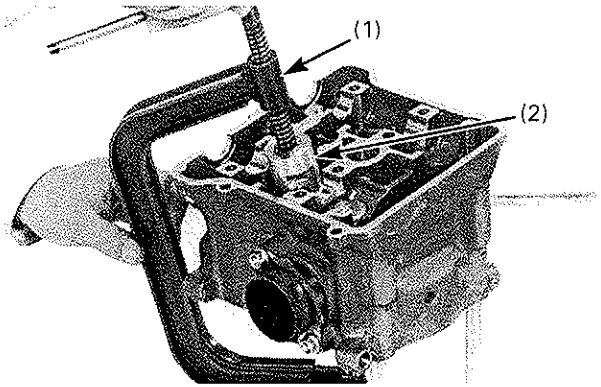
Lubricate the valve stems with engine oil or molybdenum disulfide oil and insert the valve into the valve guide.

To avoid damage to the stem seal, turn the valve slowly when inserting.



(1) VALVE SPRINGS

Install the inner and outer valve springs as a set with the tightly wound coils facing the combustion chamber.



(1) VALVE SPRING COMPRESSOR
(2) ATTACHMENT

Install the valve spring retainer.

Carefully install the valve cotters using the special tool as shown.

NOTICE

- Do not contact the valve cotters each other.

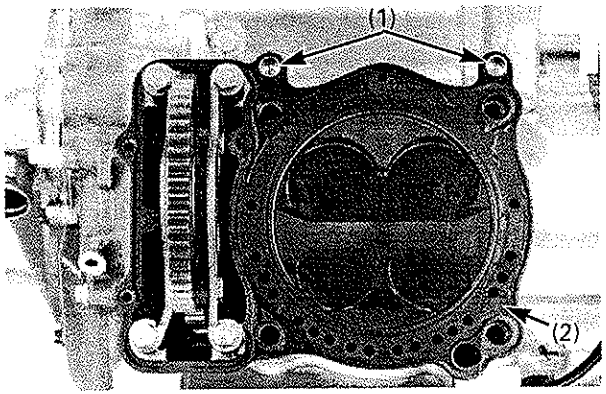
To prevent loss of tension, do not compress the valve spring more than necessary.

Tools:

Valve spring compressor	**07757-0010000**
Attachment	**07956-NL6-003**

Make sure the clearance between the valve cotter with the same clearance.
If the cotters are incorrectly installed, check the valve and cotter for damage, replace if necessary.

Tap the valve stem end gently to seat the cotters firmly.

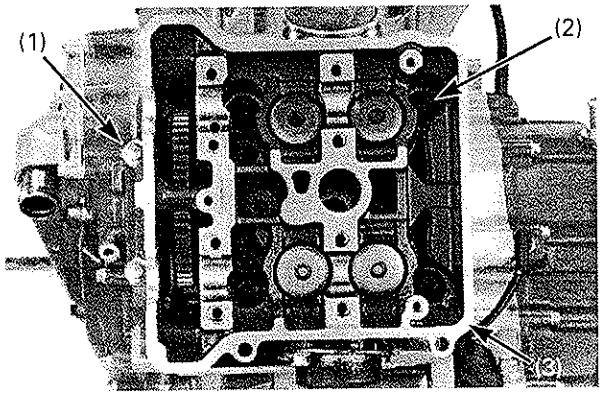


(1) DOWEL PINS
(2) NEW GASKET

Cylinder Head Installation

Remove the carbon deposits from top of cylinder bore being careful not to damage the cylinder bore.

Install the dowel pins and a new gasket.



(1) 6 mm BOLTS
(2) 11 mm BOLTS
(3) CYLINDER HEAD

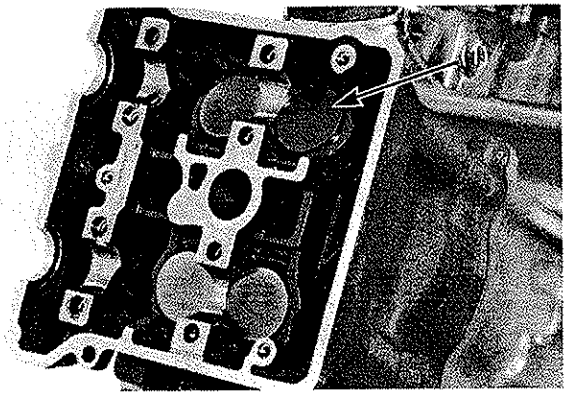
Install the cylinder head onto the cylinder.

Apply oil to the threads and seating surfaces of the 11 mm cylinder head bolts and install them. Tighten the 11 mm bolts in a crisscross pattern in 2 or 3 steps.

Torque: 64 N•m (6.5 kgf•m, 47 lbf•ft)

Install and tighten the two 6 mm bolts securely.

Install the water joints to the cylinder head using the new O-rings (page 6-4).

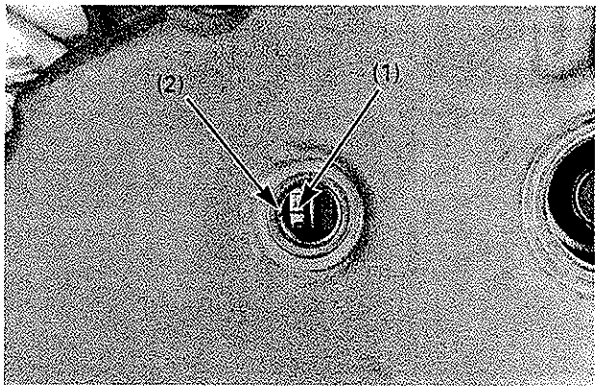


(1) VALVE LIFTERS

Camshaft Installation

Apply molybdenum disulfide oil to the outer surface of the each valve lifter.

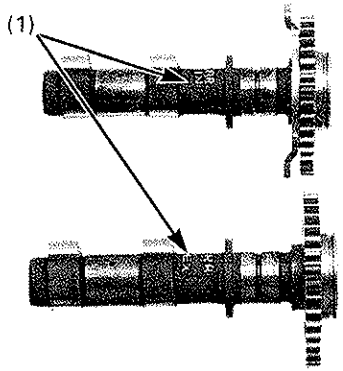
Install the shims and valve lifters into the valve lifter bores.



(1) "RT" MARK
(2) INDEX MARK

Rotate the crankshaft counterclockwise and align the "RT" mark on the flywheel with the index mark on the left crankcase cover.

Check that the rear cylinder at TDC using a dial gauge.

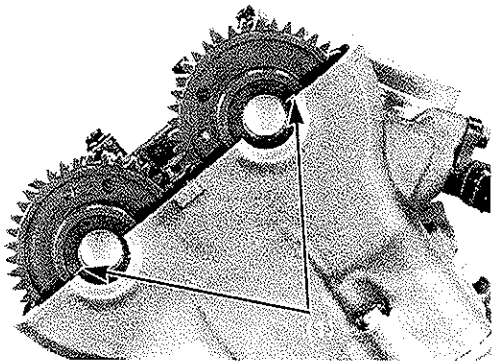


(1) IDENTIFICATION MARKS

The camshaft has the following identification mark:

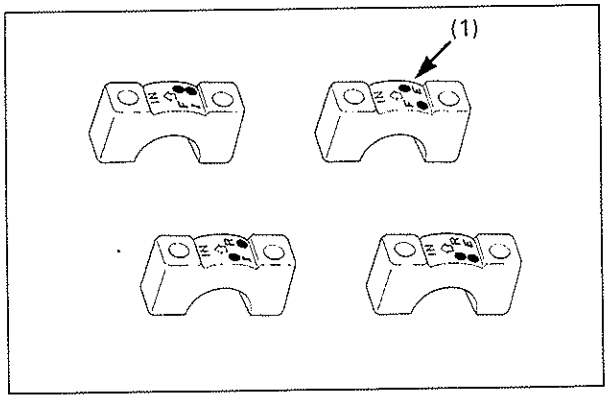
FR IN: Front cylinder intake camshaft
FR EX: Front cylinder exhaust camshaft
RR IN: Rear cylinder intake camshaft
RR EX: Rear cylinder exhaust camshaft

Apply molybdenum disulfide oil to the camshaft journals of the cylinder head and camshaft holder.



(1) INDEX LINES

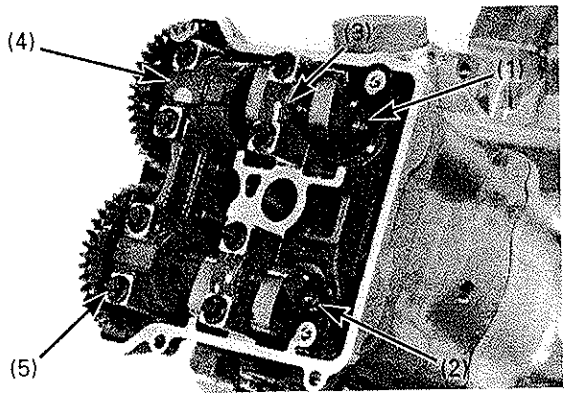
Set the rear cylinder intake and exhaust camshafts onto the cylinder head.
The index lines on the camshafts gear must be flush with the cylinder head surface and facing outward as shown.



(1) IDENTIFICATION MARKS

Camshaft holder A has the following identification mark:

F I: Front cylinder intake camshaft holder
F E: Front cylinder exhaust camshaft holder
R I: Rear cylinder intake camshaft holder
R E: Rear cylinder exhaust camshaft holder

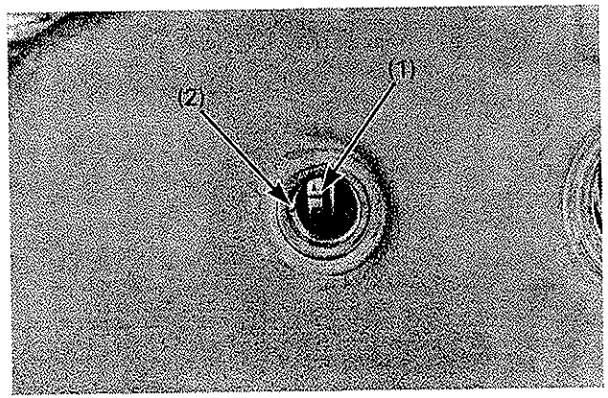


(1) INTAKE CAMSHAFT (2) EXHAUST CAMSHAFT
(3) CAMSHAFT HOLDER A
(4) CAMSHAFT HOLDER B (5) BOLTS

Install the camshaft holder B in its proper location.
Install the camshaft holder A in their proper locations with the "IN" (arrow) mark facing to the intake side.
Apply oil to the threads and seating surfaces of the camshaft holder bolts.
Install the bolts and tighten them in a crisscross pattern in 2 or 3 steps.

Torque: 23 N•m (2.3 kgf•m, 17 lbf•ft)

Make sure that the index lines on the camshaft gears are flush with the cylinder head surface.

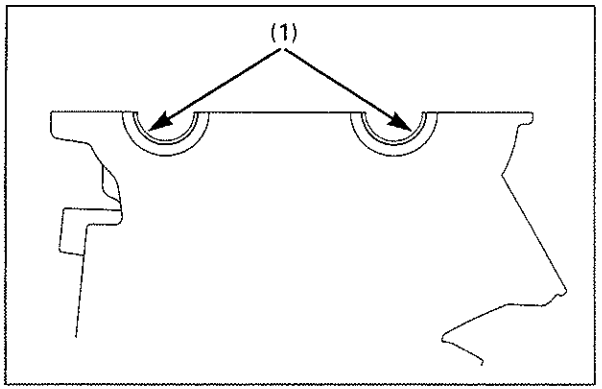


(1) "FT" MARK
(2) INDEX MARK

Rotate the crankshaft counterclockwise 1–1/4 turns (450°) and align the "FT" mark on the flywheel with the index mark on the left crankcase cover.

Check that the front cylinder at TDC using a dial gauge.

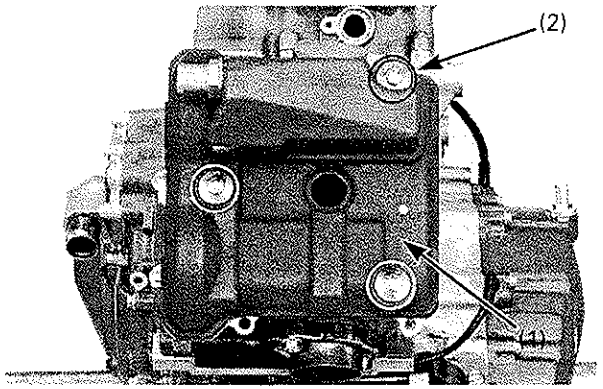
Install the front cylinder camshafts and camshaft holders in the same procedures as for the rear cylinder.



(1) APPLY 5211C OR KE45C

Install the cylinder head packing into the cylinder head cover groove.

Apply Three-Bond 5211C or KE45C to the cylinder head semi-circular portion.

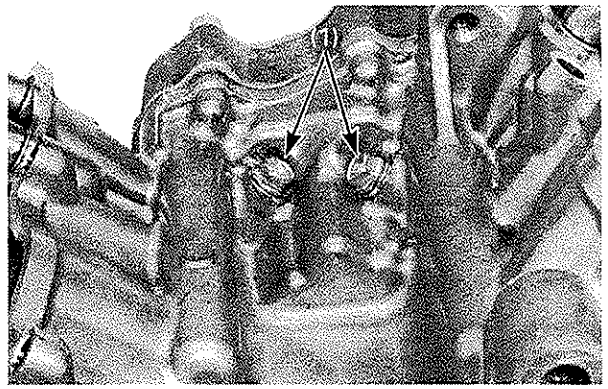


(1) CYLINDER HEAD COVER
(2) BOLTS/MOUNTING RUBBER

Install the cylinder head cover.
Install the mounting rubbers with their "UP" mark facing up.

Install the cylinder head mounting bolts.
Tighten the left side cylinder head cover bolts first, then the other bolt to the specified torque.

Torque: 10 N•m (1.0 kgf•m, 7 lbf•ft)



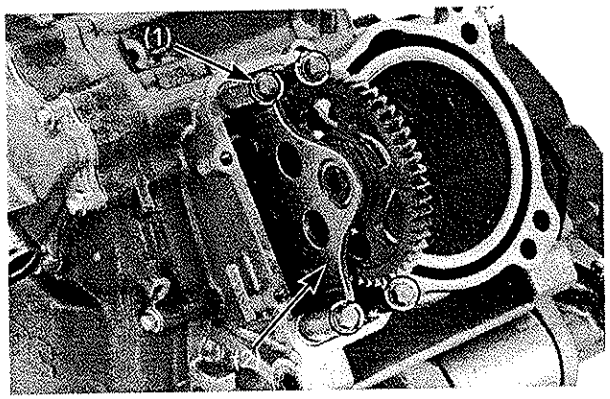
(1) SETTING BOLT/SEALING WASHER

Cam Gear Train

Removal

Remove the cylinder head (page 8-4).

Remove the cam gear train setting bolt and sealing washer.

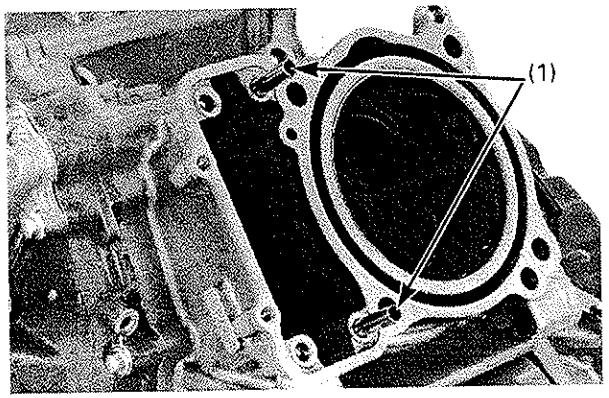


(1) BOLT/WASHERS
(2) CAM GEAR TRAIN

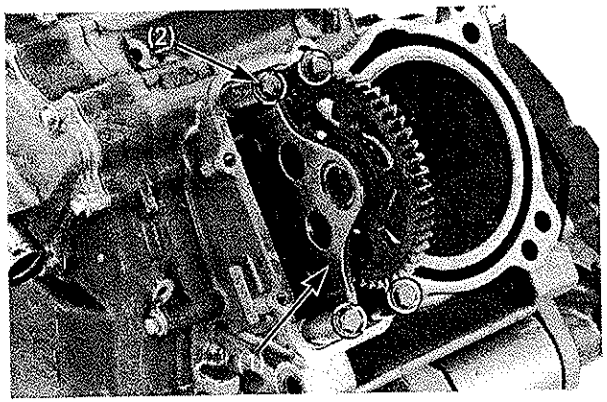
Remove the four cam gear train mounting bolt/washers and cam gear train assembly.

Remove the two dowel pins.

See VTR Service Manual for gear train inspection.



(1) DOWEL PINS



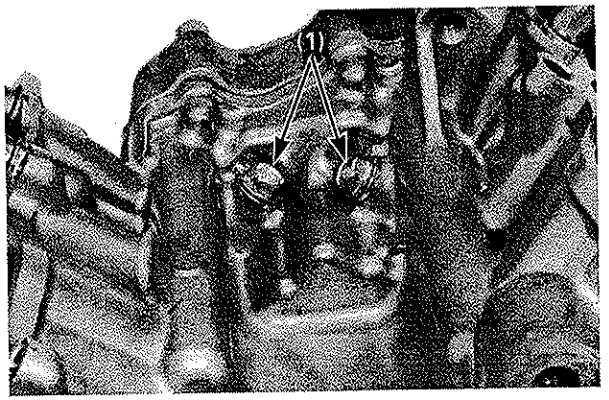
(1) CAM GEAR TRAIN
(2) BOLT/WASHERS

Installation

Install the two dowel pins onto the cylinder block.

Install the each cam gear train for proper location (FR mark: front, RR mark: rear).
Install the four gear train mounting bolt/washers, and tighten the bolts to the specified torque.

Torque: 12 N•m (1.2 kgf•m, 9 lbf•ft)



(1) NEW SEALING WASHER/SETTING BOLT

Install the setting bolt with a new sealing washer, and tighten it to the specified torque.

Torque: 26 N•m (2.7 kgf•m, 20 lbf•ft)

Install the cylinder head (page 8-8).

Service Information	**9-1**	**Clutch**	**9-3**
Troubleshooting	**9-1**	**Back Torque Limiter**	**9-13**
Clutch Master cylinder	**9-2**	**Gearshift Linkage**	**9-17**
Clutch Slave Cylinder	**9-3**	**Primary Drive Gear**	**9-17**

Service Information

- The clutch system can be done with the engine installed in the frame.
- AP600 or DOT 4 brake fluid is used for the hydraulic clutch and is referred to as clutch fluid in this section. Do not use other types of fluid as they are not compatible.
- Spilled clutch (brake) fluid will severely damage the plastic parts and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the reservoir is horizontal first.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, the system must be bled.
- Engine oil viscosity, level and the use of oil additives have an effect on clutch disengagement. Oil additives of any kind are specifically not recommended. When the clutch does not disengage or the machine creeps with clutch disengaged, inspect the transmission oil level before servicing the clutch system.
- This machine's clutch is equipped back torque limiter. Always adjust the back torque limiter whenever the clutch discs and plates are replaced.

Troubleshooting

Clutch lever too hard
- Sticking piston
- Clogged hydraulic system
- Damaged clutch lifter mechanism
- Faulty clutch lifter bearing
- Clutch lifter piece installed improperly

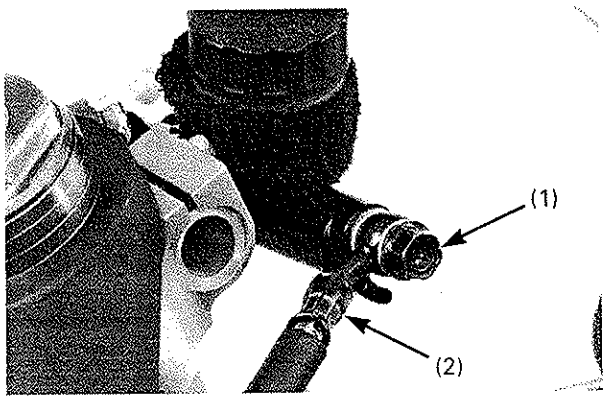
Clutch slips when accelerating
- Sticking piston
- Clogged hydraulic system
- Worn clutch disc
- Weak clutch spring
- Improperly adjusted back torque limiter
- Engine oil mixed with molybdenum or graphite additive

Clutch will not disengage or machine creeps with clutch disengaged
- Air in hydraulic system
- Sticking piston
- Clutch plate warped
- Loose clutch lock nut
- Oil level too high
- Improper oil viscosity
- Damaged clutch lifter mechanism
- Clutch lifter piece installed improperly

Hard to shift
- Improper clutch operation
- Improper oil viscosity
- Bent shift fork, shift fork shaft, or shift fork claw
- Damaged shift drum cam groove
- Loose stopper plate bolt
- Damaged stopper plate and pin
- Damaged gearshift spindle

Transmission jumps out of gear
- Worn shift drum stopper arm
- Weak or broken shift arm return spring
- Loose stopper plate bolt
- Bent shift fork shaft
- Damaged shift drum cam groove
- Damaged or bent shift forks
- Worn gear engagement dogs or slots

Gearshift pedal will not return
- Weak or broken gearshift spindle return spring
- Bent gearshift spindle



(1) OIL BOLT
(2) CLUTCH HOSE

Clutch Master Cylinder

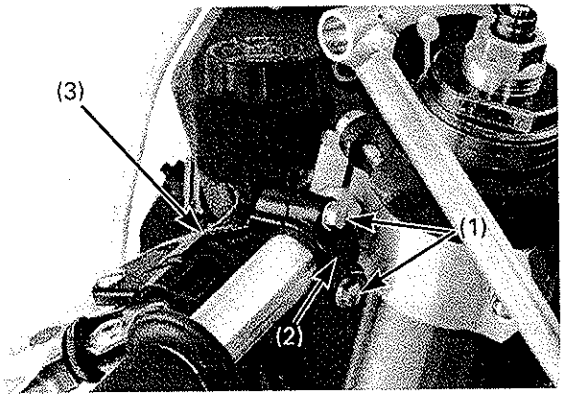
Removal

NOTICE

- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling fluid on painted, plastic or rubber parts. Place a tag over these parts whenever the system is serviced.
- When removing the oil bolt, cover the end of the hose to prevent contamination.

See VTR Service Manual for clutch fluid replacement/air bleeding.

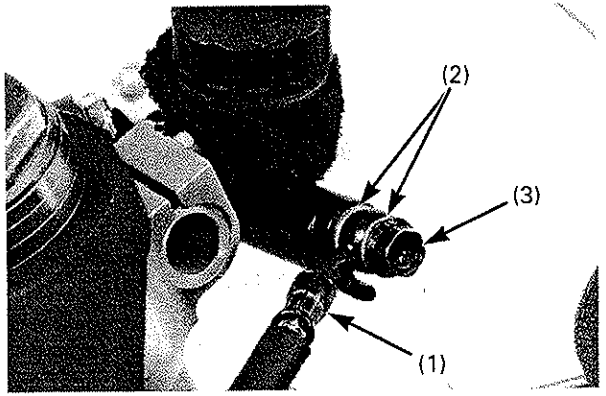
Disconnect the clutch hose from the master cylinder by removing the oil bolt and sealing washers.



(1) BOLTS (2) HOLDER
(3) MASTER CYLINDER

Remove the master cylinder holder bolts, holder and master cylinder.

See VTR Service Manual for clutch master cylinder disassembly/assembly and inspection.



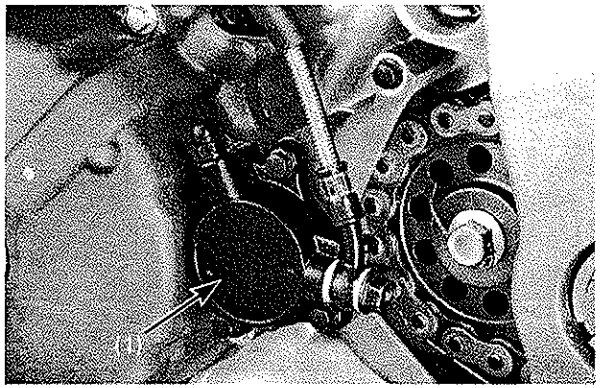
(1) CLUTCH HOSE
(2) NEW SEALING WASHERS
(3) OIL BOLT

Installation

Installation is reverse order of removal.

While tightening the oil bolt, rest the hose joint against the stopper and tighten the oil bolt to the specified torque.

Torque: 34 N·m (3.5 kgf·m, 25 lbf·ft)

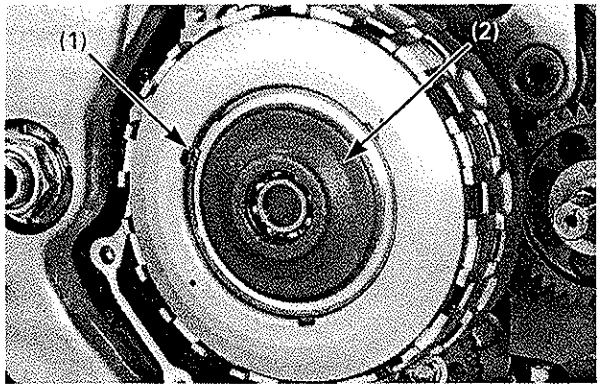


(1) SLAVE CYLINDER

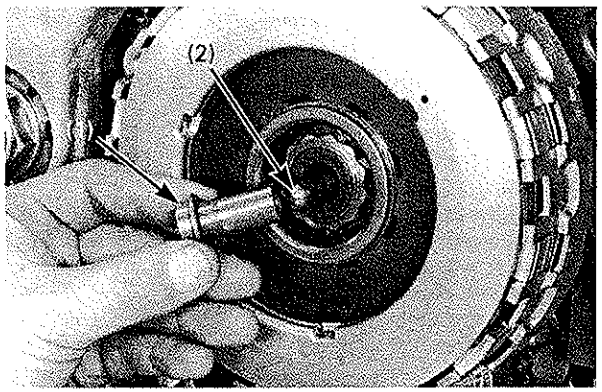
Clutch Slave Cylinder

The clutch slave cylinder is standard parts of the VTR.

See VTR Service Manual for clutch slave cylinder service.



(1) SET RING
(2) LIFTER PLATE



(1) LIFTER PIECE
(2) LIFTER ROD

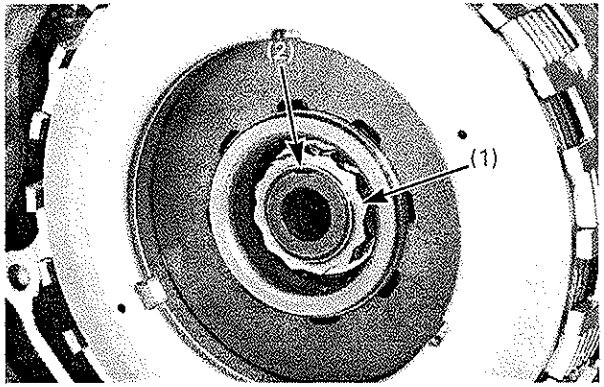
Clutch

Removal

Remove the right crankcase cover (page 6-5).

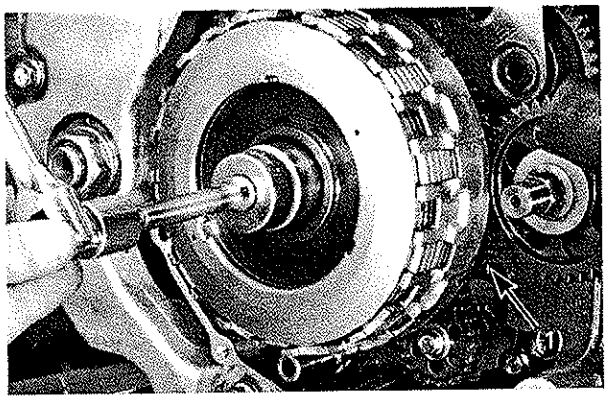
Remove the set ring and clutch lifter plate.

Remove the clutch lifter piece and lifter rod.



(1) CENTER LOCK NUT
(2) UNSTAKE

Unstake the clutch center lock nut, being careful not to damage the mainshaft threads.

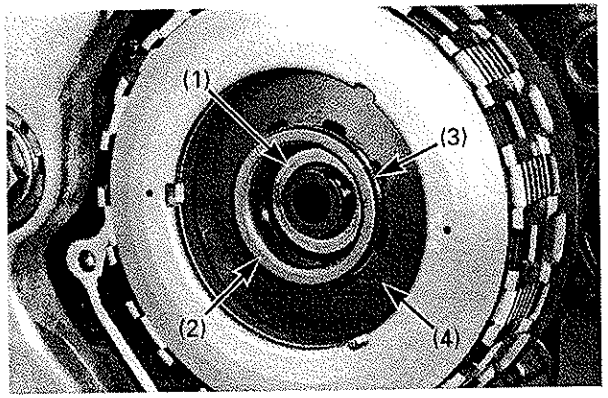


(1) GEAR HOLDER

Hold the primary drive and driven gear with a gear holder.

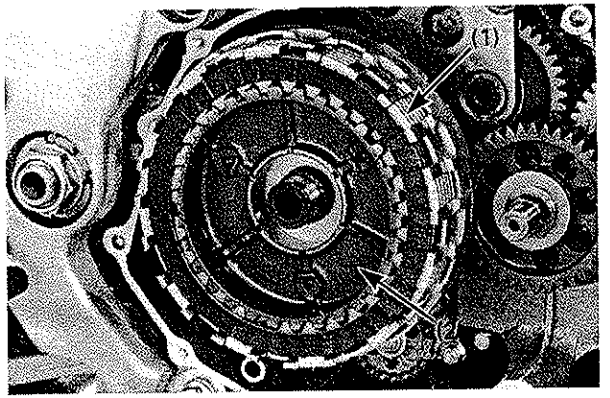
Tool:
Gear holder **07724-0010100**

Loosen the lock nut.

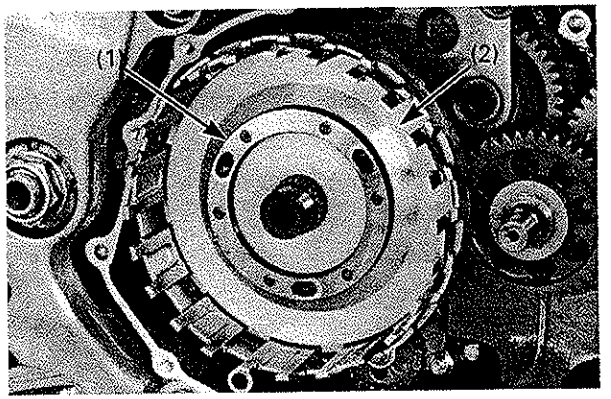


(1) LOCK WASHER (2) CENTER GUIDE
(3) SHIMS (4) CLUTCH SPRING

Remove the following:
- Lock washer
- Clutch center guide
- Shims
- Clutch spring
- Stroke shim
- Clutch VC spring
- Pressure plate



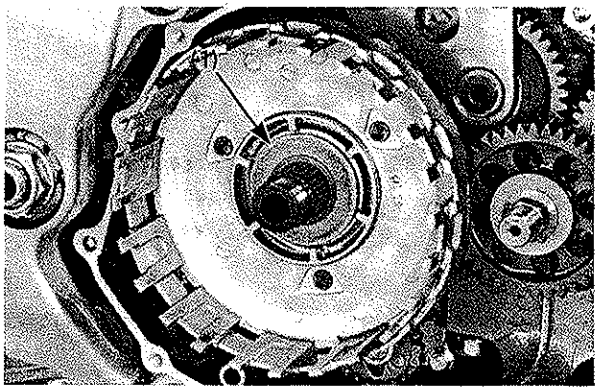
(1) DISCS/PLATES
(2) CLUTCH CENTER B



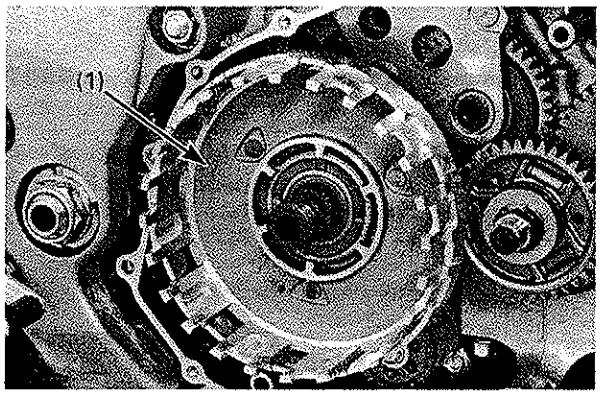
(1) LIFTER CAM PLATE
(2) CLUTCH CENTER

Remove the clutch discs and plates.
Remove the clutch center B.

Remove the clutch lifter cam plate and clutch center.



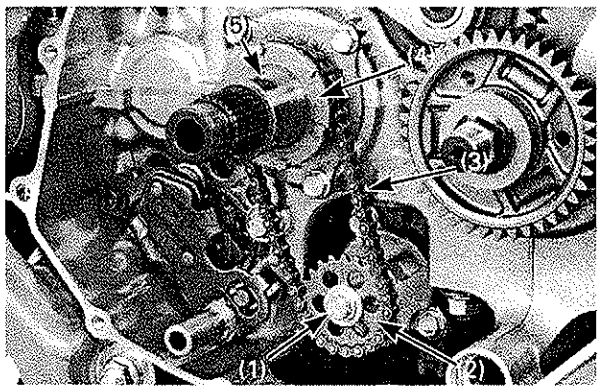
(1) THRUST WASHER



(1) CLUTCH OUTER

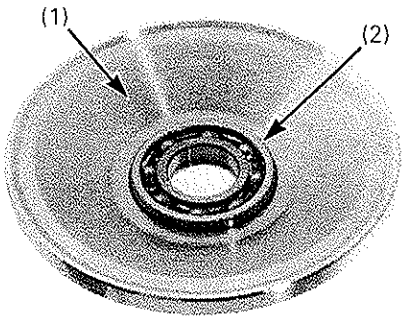
Remove the thrust washer.

Remove the clutch outer from the mainshaft.



(1) BOLT/WASHER (2) DRIVEN SPROCKET
(3) DRIVE CHAIN (4) DRIVE SPROCKET
(5) OUTER GUIDE

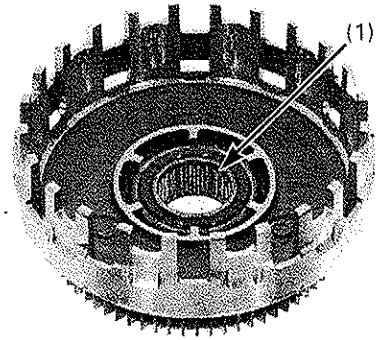
Remove the oil pump driven sprocket bolt and washer.
Remove the oil pump driven sprocket, drive chain and drive sprocket as a set.
Remove the clutch outer guide.



(1) LIFTER PLATE (2) BEARING

Inspection

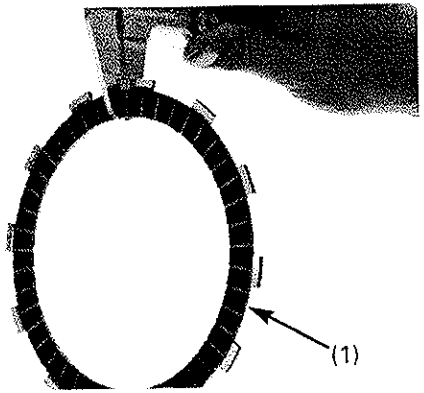
Clutch lifter plate/bearing
Turn the inner race of the lifter bearing with your finger.
The bearing should turn smoothly and quietly.
Also check that the outer race of the bearing fits tightly in the lifter plate.
Replace the bearing if the inner race does not turn smoothly, quietly, or if the outer race fits loosely in the lifter plate.



(1) NEEDLE BEARING

Clutch outer
Check the slots in the clutch outer for nicks, indentations or abnormal wear made by the clutch discs.

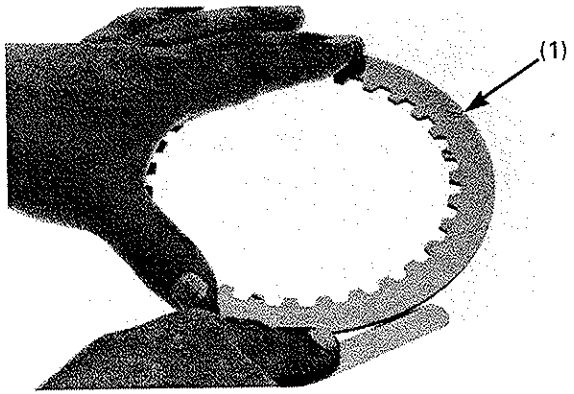
Check the needle bearing for wear or damage.
If the bearing loosely fit in the clutch outer, replace the clutch outer assembly.



(1) CLUTCH DISC

Clutch disc
Check the clutch discs for signs or spring or discoloration.

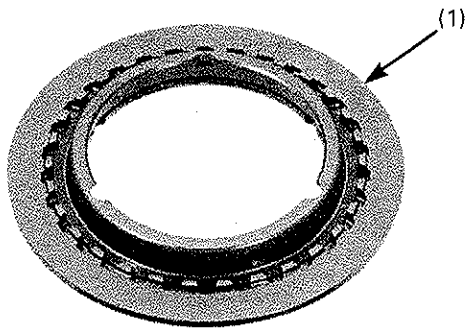
Replace the clutch discs and plates as a set.
Always adjust the back torque limiter whenever the clutch discs and plates are replaced (page 9-12).



(1) CLUTCH PLATE

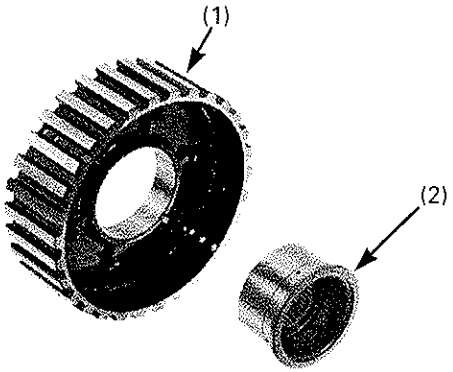
Clutch plate
Check the plates for discoloration.
Check the plate warpage on a surface plate using a feeler gauge.

Replace the clutch discs and plates as a set.
Always adjust the back torque limiter whenever the clutch discs and plates are replaced (page 9-12).



(1) PRESSURE PLATE

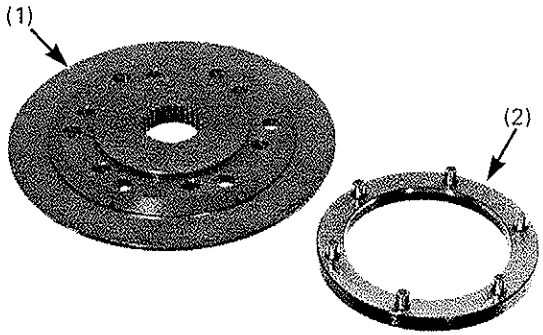
Pressure plate
Check the clutch pressure plate for nicks, indentations or abnormal wear made by the clutch disc.



(1) CLUTCH CENTER B
(2) CENTER GUIDE

Clutch center B
Check the clutch center B for nicks, indentations or abnormal wear made by the clutch plates.
Check the clutch center B bosses sliding area of clutch lifter cam plate grooves for wear or damage.

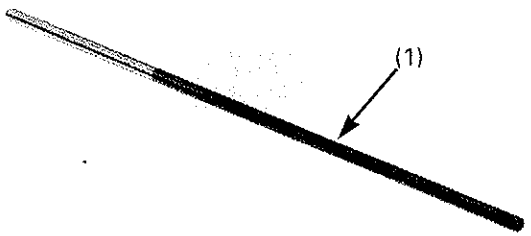
Clutch center guide
Check the clutch center guide for wear or damage.



(1) CLUTCH CENTER
(2) LIFTER CAM PLATE

Clutch center/clutch lifter cam plate

Check the clutch lifter cam plate grooves sliding area of clutch center B bosses for wear or damage.

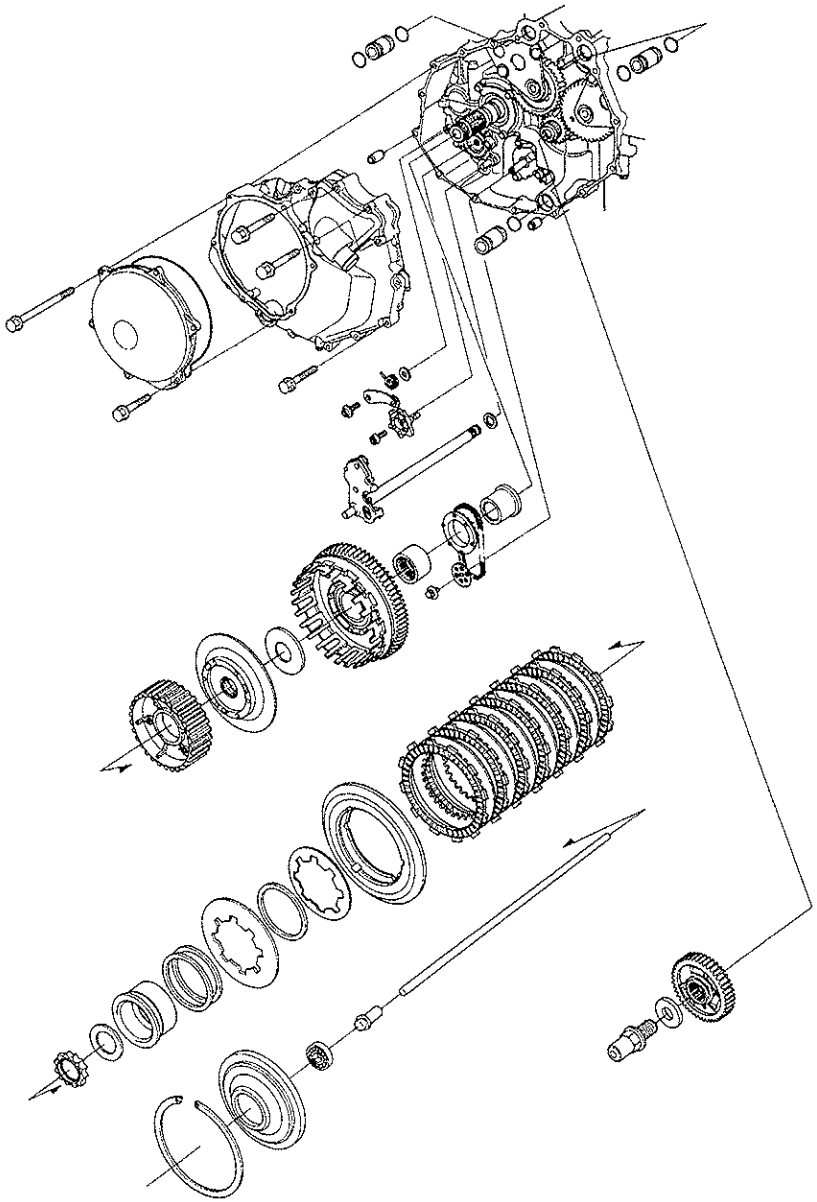


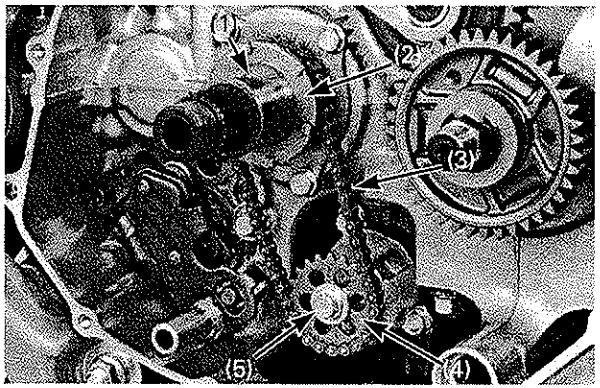
(1) LIFTER ROD

Clutch lifter rod
Check the clutch lifter rod for bending or damage.

See VTR Service Manual for clutch outer guide and mainshaft inspection.

Installation



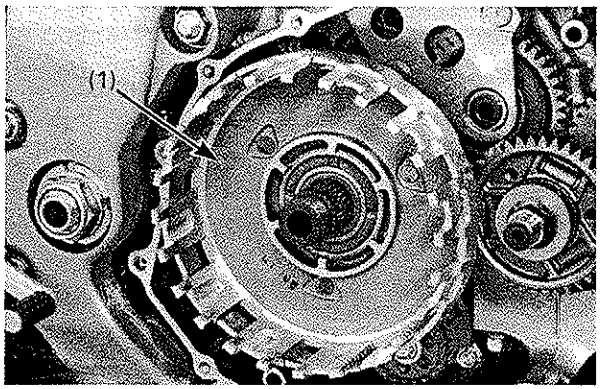


(1) OUTER GUIDE (2) DRIVE SPROCKET
(3) DRIVE CHAIN (4) DRIVEN SPROCKET
(5) BOLT/WASHER

Coat the clutch outer guide with molybdenum disulfide oil and install it onto the mainshaft with the flange side facing the crankcase.

Install the oil pump drive sprocket, drive chain and driven sprocket as a set with the index lines on the driven sprocket facing in.

Apply a locking agent to the oil pump driven sprocket bolt threads and install the washer and bolt.
Tighten the driven sprocket bolt to the specified torque after installing the clutch outer.

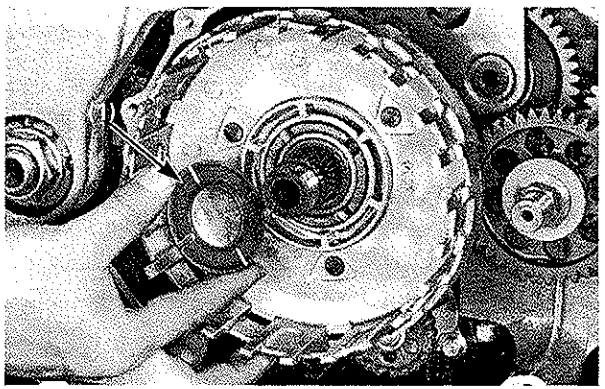


(1) CLUTCH OUTER

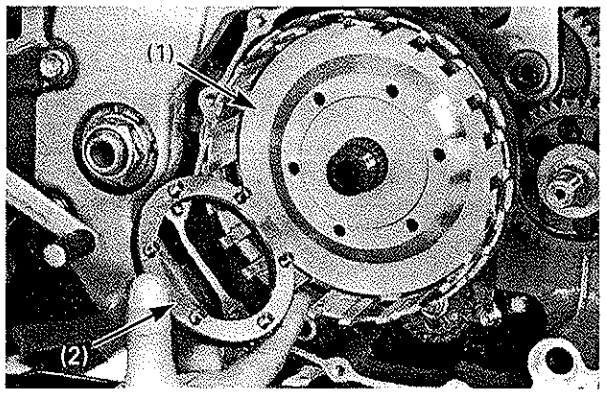
Apply molybdenum disulfide oil to the clutch outer needle bearing.
Install the clutch outer while aligning the primary driven gear with the primary drive gear.
Align the holes in the clutch outer with the pins on the oil pump drive sprocket by turning the oil pump driven sprocket while pushing in the clutch outer.

Tighten the oil pump driven sprocket bolt to the specified torque.

Torque: 15 N·m (1.5 kgf·m, 11 lbf·ft)



(1) THRUST WASHER

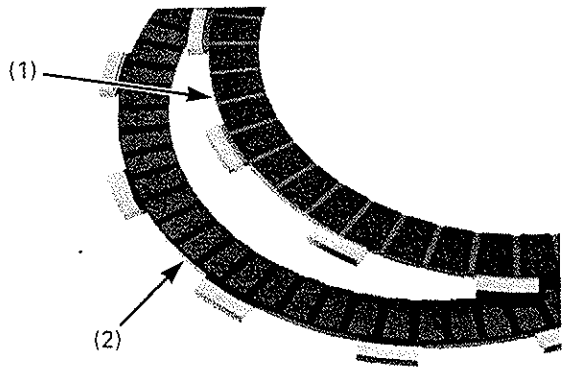


(1) CLUTCH CENTER
(2) LIFTER CAM PLATE

Install the thrust washer with its grooved side facing in.

Install the clutch center onto the mainshaft.

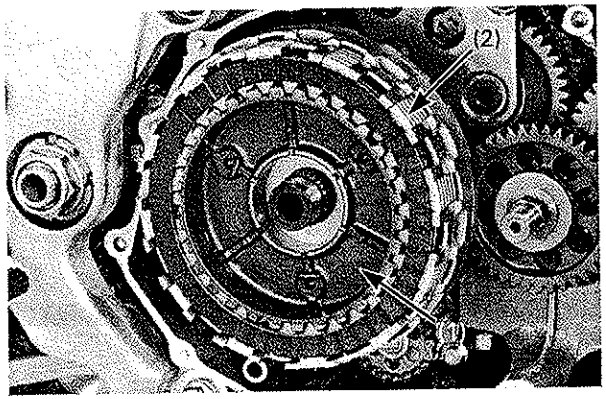
Install the clutch lifter cam plate aligning its pins with the hole in the clutch center.



(1) CLUTCH DISC 2500 (A)
(2) CLUTCH DISC 517D (A)

The clutch disc has a identification color paint.

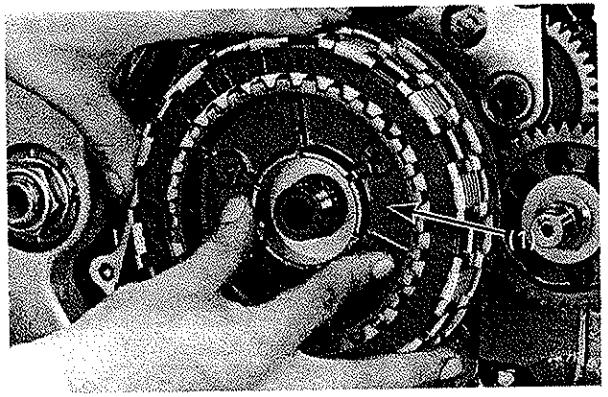
Clutch disc 2500 (A):
Green painted (wide segments)
Clutch disc 517D (A):
Blue painted (narrow segments)



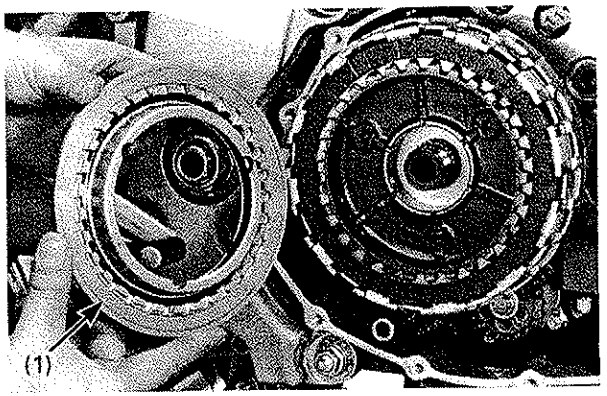
(1) CLUTCH CENTER B
(2) CLUTCH DISCS/PLATES

Install the clutch center B while aligning its bosses with the grooves in the clutch lifter cam plate.
While holding the clutch center B, install the clutch discs and plates alternately starting with clutch disc 2500 (A).

Install the clutch disc 2500 (A) on each ends.



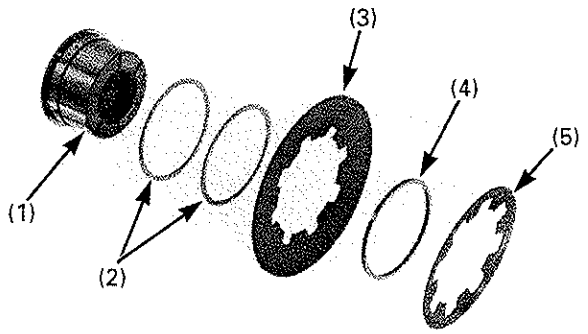
(1) CLUTCH CENTER B



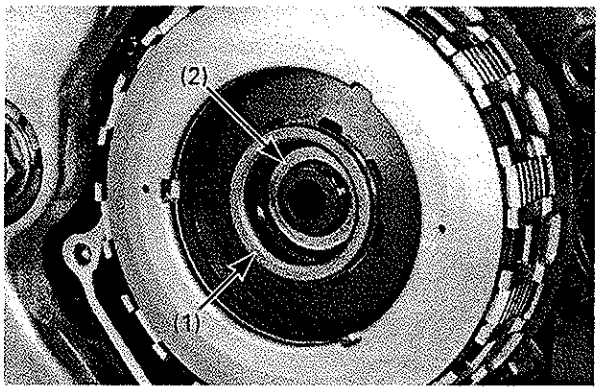
(1) PRESSURE PLATE

Check that the the clutch center B is installed securely onto the clutch lifter cam plate by pushing the clutch center B.

Install the clutch pressure plate onto the clutch center B.



(1) CLUTCH CENTER GUIDE (2) CLUTCH SHIMS
(3) CLUTCH SPRING (4) SPRING SEAT
(5) CLUTCH VC SPRING

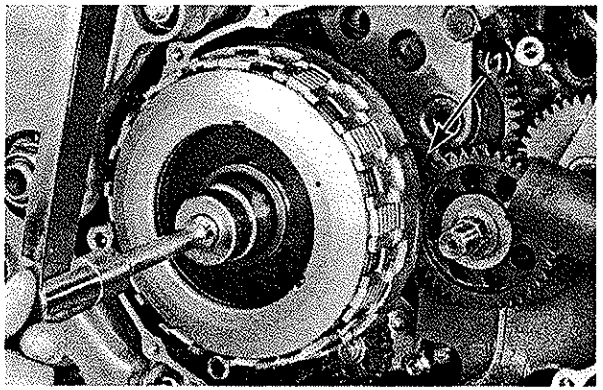


(1) CENTER GUIDE
(2) LOCK WASHER

Assemble the clutch center guide, shim(s), clutch spring, spring seat and clutch VC spring as shown.

Install the clutch center guide assembly onto the mainshaft.

Install the lock washer.



(1) GEAR HOLDER

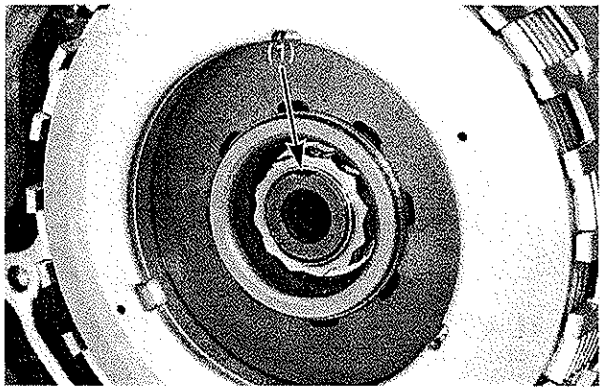
Apply oil to the new clutch center lock nut threads and seating surfaces.
Screw the center lock nut by hand fully.

Hold the primary drive and driven gear with a gear holder.

Tool:
Gear holder 07724-0010100

Tighten the clutch center lock nut to the specified torque.

Torque: 127 N·m (13.0 kgf·m, 94 lbf·ft)



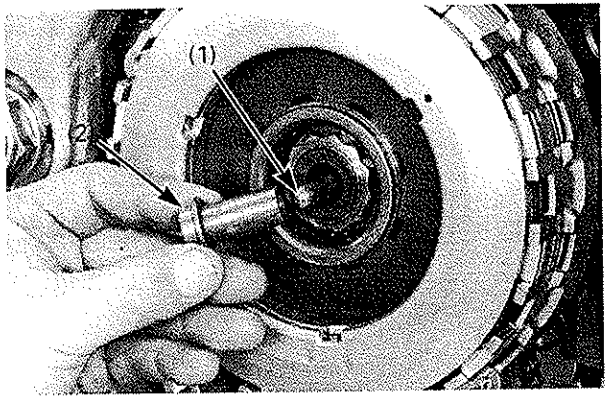
(1) STAKE



(1) CLUTCH SIDE
(2) SLAVE CYLINDER SIDE

Stake the clutch center lock nut into the mainshaft being careful not to damage the mainshaft.

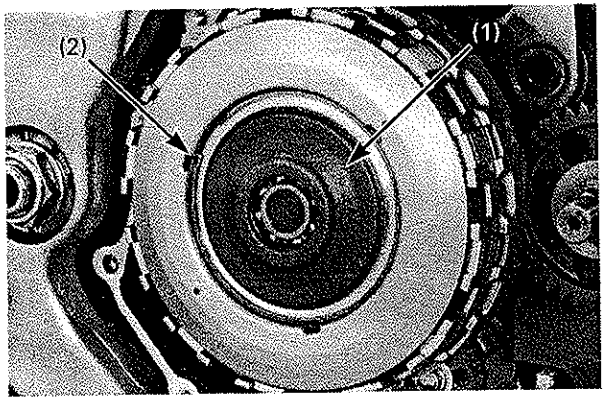
Note the installation direction of the clutch lifter rod.



(1) LIFTER ROD
(2) LIFTER PIECE

Install the clutch lifter rod into the mainshaft.

Apply molybdenum disulfide oil to the clutch lifter piece, then install it into the mainshaft.



(1) LIFTER PLATE
(2) SET RING

Install the clutch lifter plate with the lifter bearing and secure it with a set ring.

Install the right crankcase cover (page 6-6).

Back Torque Limiter

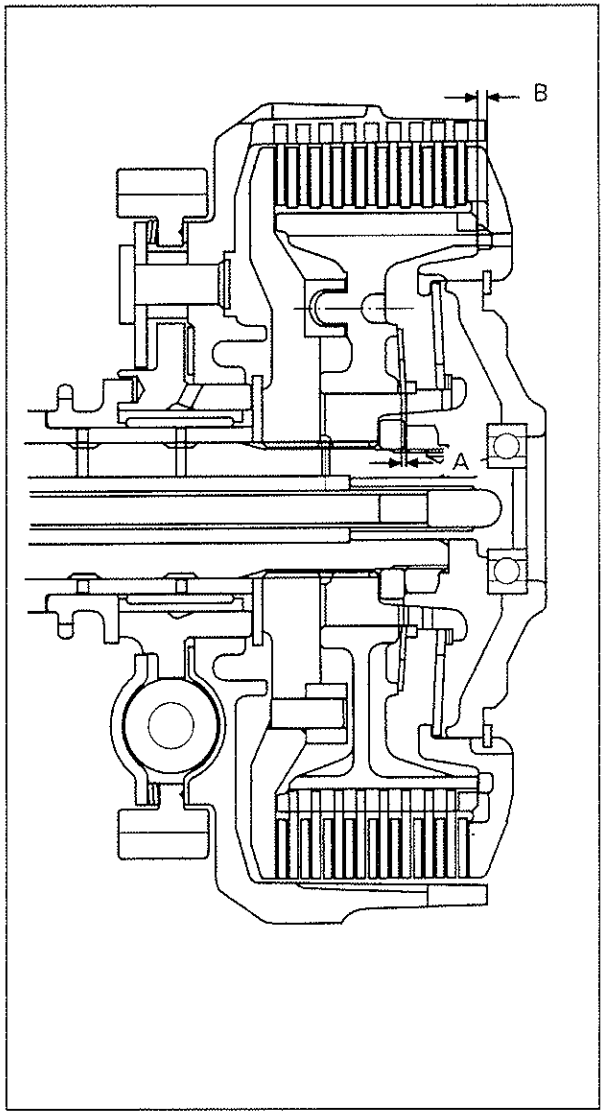
Troubleshooting

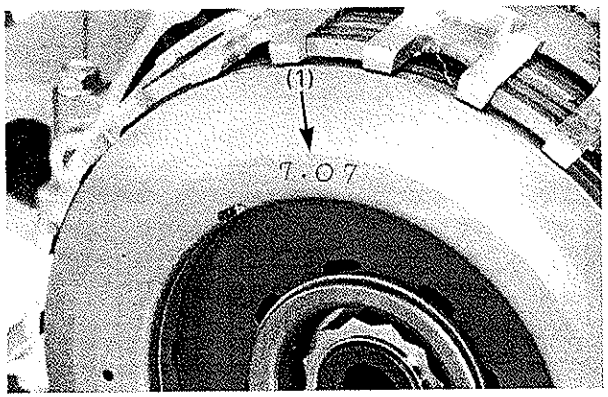
- **Back torque limiter effect is poor or does not effect**

Pressure plate does not lift	Clearance between the pressure plate and clutch center (B) is too large	Adjust clearance between the pressure plate and clutch center (B) to the specified value (page 9-13)
	Clearance between the clutch center and clutch center guide (A) is too small	Adjust clearance between the clutch center and clutch center guide (A) to the specified value (page 9-14)
Clutch center does not move	Sticking clutch center and clutch center guide or damaged sliding surface	Replace the clutch center and clutch center guide

- **Back torque limiter excessively effect (less engine brake)**

Pressure plate lift too large	Clearance between the pressure plate and clutch center (B) is too small	Adjust clearance between the pressure plate and clutch center (B) to the specified value (page 9-13)
	Clearance between the clutch center and clutch center guide (A) is too large	Adjust clearance between the clutch center and clutch center guide (A) to the specified value (page 9-14)
Weak clutch VC spring		Replace the clutch VC spring
Clutch disc wear		Replace the clutch discs and plates as a set and adjust the back torque limiter





(1) PRESSURE PLATE THICKNESS LETTER

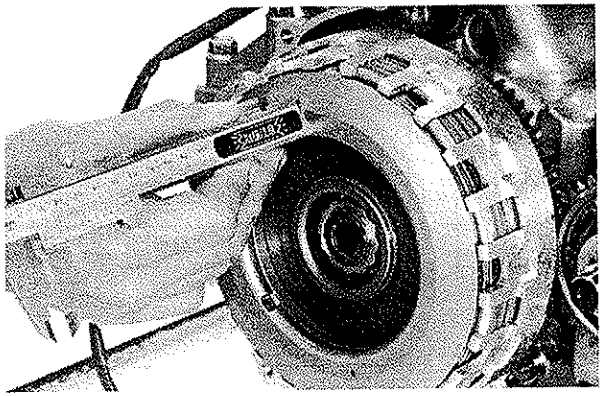
Adjustment

- **Pressure plate-to-clutch center B clearance adjustment**

- For the racing use, the clutch discs and plates must be finished the break-in.
- While the break-in, do not use racing start.
- Always adjust the clearance before you start the race.

Measure the clutch pressure plate-to-clutch center B clearance as follow:

1. Note the clutch pressure plate thickness lettered on the plate (A).



2. Measure the depth from the clutch pressure plate outer surface to clutch center B (B) by installing the depth gauge into the plate holes as shown.
3. Calculate the clearance (C) using the equation below.

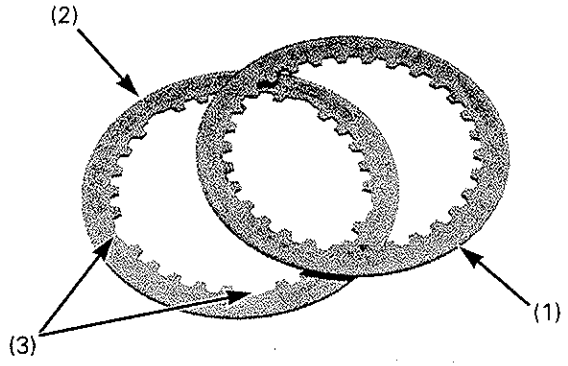
C = B – A

Example:

Pressure plate thickness (A)	=	7.00
Measured depth (B)	=	7.6
Clearance (C)	=	0.6

0.6 = 7.6 – 7.00

Specified clearance: 0.5 – 0.6 mm



(1) CLUTCH PLATE 1.97
(2) CLUTCH PLATE 1.85
(3) WIDE GROOVES

Adjust the clearance by selecting the clutch plate thickness.

Two different thickness clutch plates are available.

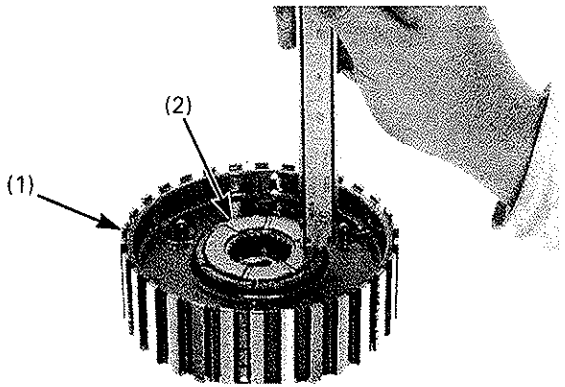
Clutch plate thickness:
1.85 mm
1.97 mm

The clutch plate 1.85 has wide grooves.

Select and combine the clutch plates so that the clearance is fall between the specified range.

Clearance is too small:
– Easy to slip clutch
Clearance is too large:
– Does not effect the back torque limiter

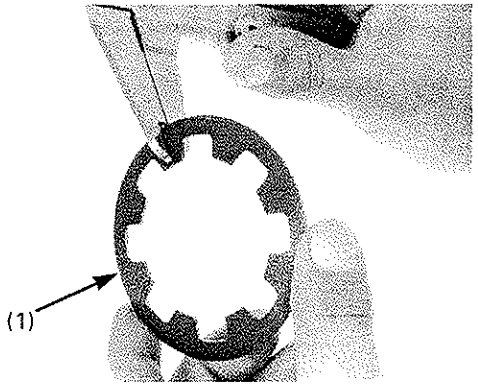
If the clutch discs are worn, the clearance is too small and can cause clutch slipping.



(1) CLUTCH CENTER B
(2) CLUTCH CENTER GUIDE

- **Clutch Center Stroke Adjustment**

Calculate the clutch center stroke as follow:
1. Install the clutch center guide into the clutch center B.
   Support the center guide so that its flange contacts to the clutch center B.
   Measure the clutch center guide height extended from the clutch center B surface (A) as shown.



(1) CLUTCH VC SPRING

2. Measure the clutch VC spring thickness (B).
3. Note the stroke shim thickness (C).

- The stroke shim has a thickness identification letter on its side surface.
  Example: mark 18 = 1.8 mm thickness

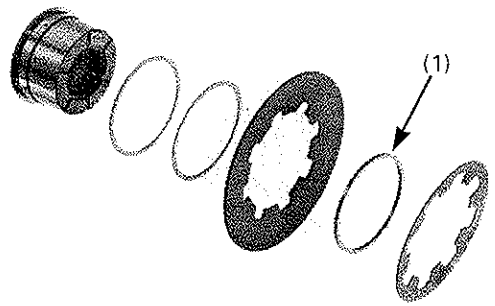
4. Calculate the clutch center stroke (D) using the equation below.

   D = A – (B + C)

Example:

Measured height (A)	= 3.5 mm
VC spring thickness (B)	= 0.8 mm
Stroke shim thickness (C)	= 1.8 mm
0.9 = 3.5 – (0.8 + 1.8)	
Clutch center stroke (D)	= 0.9 mm

Specified stroke: 0.8 – 1.0 mm



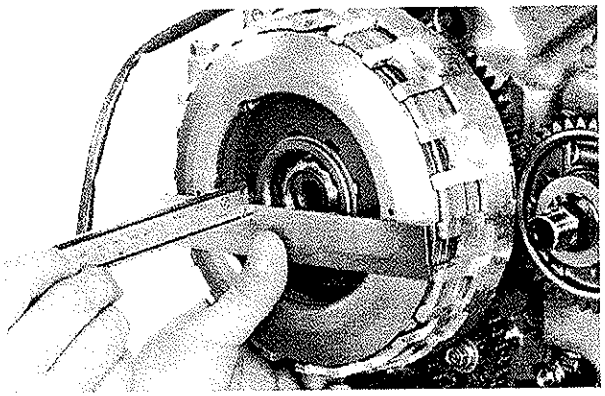
(1) STROKE SHIM

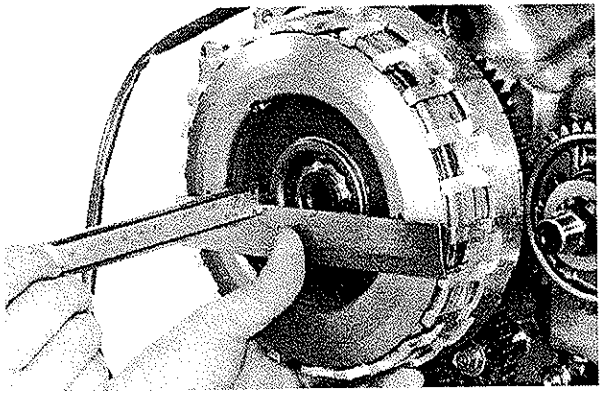
Adjust the stroke by selecting the stroke shim thickness.

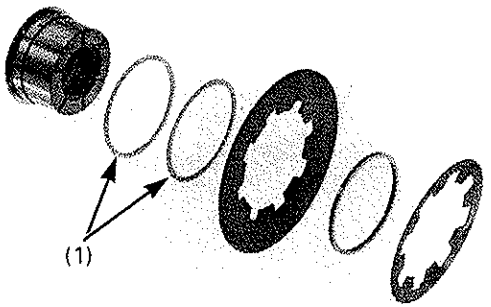
Six different thickness clutch stroke shims are available.

Stroke shim thickness:
Mark 18: 1.8 mm thickness
Mark 19: 1.9 mm thickness
Mark 20: 2.0 mm thickness
Mark 21: 2.1 mm thickness
Mark 22: 2.2 mm thickness
Mark 23: 2.3 mm thickness

Select the stroke shim so that the stroke is fall between the specified range.







(1) CLUTCH SHIMS

- **Clutch Spring Initial Tension Adjustment**

Remove the clutch center lock nut (page 9-3).

Measure the clutch spring initial stroke as follow:

1. Install and hand tighten the clutch center lock nut, and measure the height between the clutch pressure plate-to-clutch center guide (A).
3. Tighten the clutch center lock nut to the specified torque (page 9-11), and measure the height between the clutch pressure plate-to-clutch center guide (B).
4. Calculate the clutch spring initial stroke (C) using the equation below.

C = A – B

Specified stroke: 2.6 – 2.8 mm

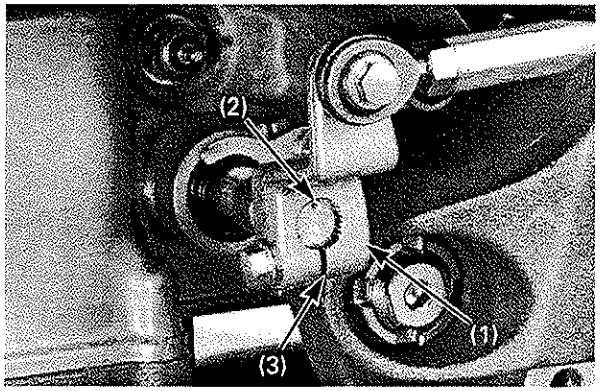
Adjust the stroke by selecting the clutch shim thickness.

Seven different thickness clutch shims are available. The clutch shim has a thickness identification letter on its surface.

Clutch shim thickness:
Mark 09: 0.9 mm thickness
Mark 10: 1.0 mm thickness
Mark 11: 1.1 mm thickness
Mark 12: 1.2 mm thickness
Mark 13: 1.3 mm thickness
Mark 14: 1.4 mm thickness
Mark 15: 1.5 mm thickness

Select the clutch shims so that the stroke is fall between the specified range.

If the initial tension is less than the specified range:
– Clutch slips easily
If the initial tension is more than the specified range:
– Clutch spring weak easily

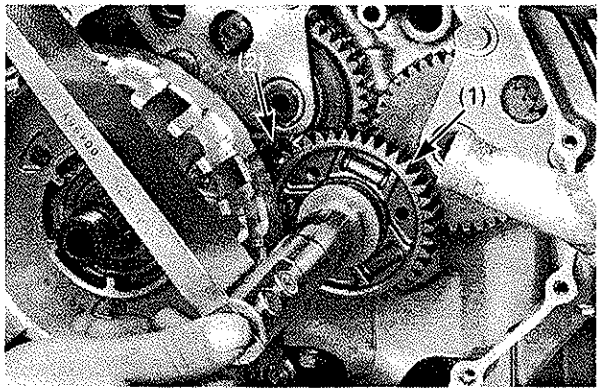


(1) GEARSHIFT PEDAL LINK
(2) PUNCH MARK (3) SLIT

Gearshift Linkage

See VTR Service Manual for gearshift linkage removal, inspection and installation.

When installing the gearshift pedal link, align the punch mark on the gearshift spindle with the opposite side of the slit of the gearshift pedal link as shown.



(1) PRIMARY DRIVE GEAR
(2) GEAR HOLDER

Primary Drive Gear

Removal

Remove the clutch assembly (page 9-3).

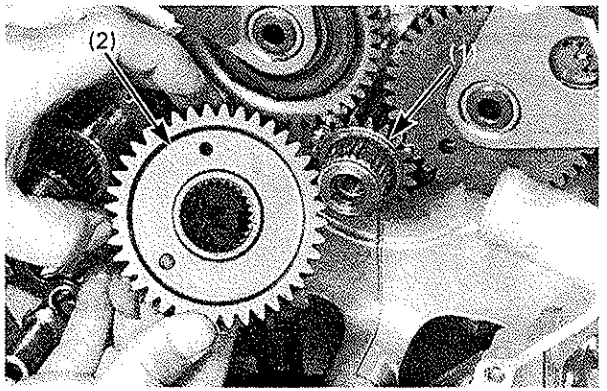
Temporarily install the clutch outer.

Hold the primary drive and driven gear with a special tool, then loosen the primary drive gear bolt. The primary drive gear bolt has left hand threads. Be careful not to damage the sealing surface of the primary drive gear bolt.

Tool:
Gear holder **07724-0010100**

Remove the clutch outer.
Remove the bolt, special washer and primary drive gear.

If you convert your standard VTR primary drive gear to the racing use, remove the sub-gear from the primary drive gear.

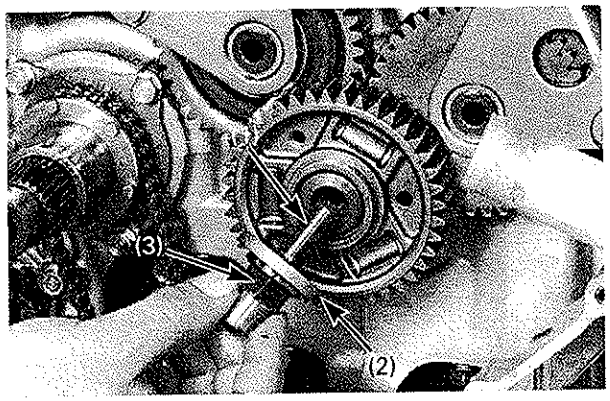


(1) TIMING GEAR
(2) PRIMARY DRIVE GEAR

Installation

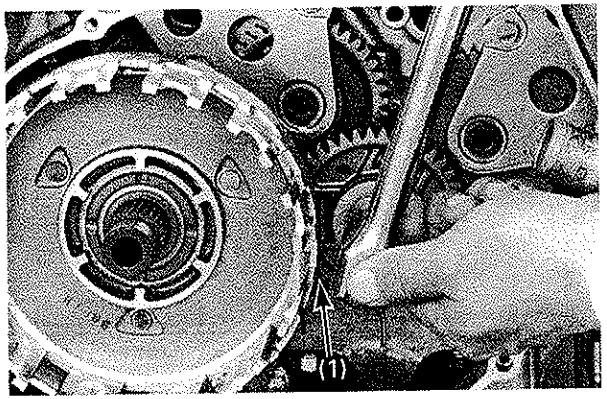
Install the timing gear if it has been removed.

Install the primary drive gear aligning its wide groove with the wide tooth of the crankshaft.



(1) APPLY OIL (2) SPECIAL WASHER
(3) PRIMARY DRIVE GEAR BOLT

Apply oil to the threads and seating surface of the primary drive gear bolt.
Install the special washer and primary drive gear bolt.
The primary drive gear bolt has left hand threads.
Be careful no to damage the sealing surface of the primary drive gear bolt.



(1) GEAR HOLDER

Install the clutch outer.

Hold the primary drive and driven gear with a special tool, then tighten the primary drive gear bolt to the specified torque.

Torque: 88 N•m (9.0 kgf•m, 65 lbf•ft)

Install the removed parts in the reverse order of removal.

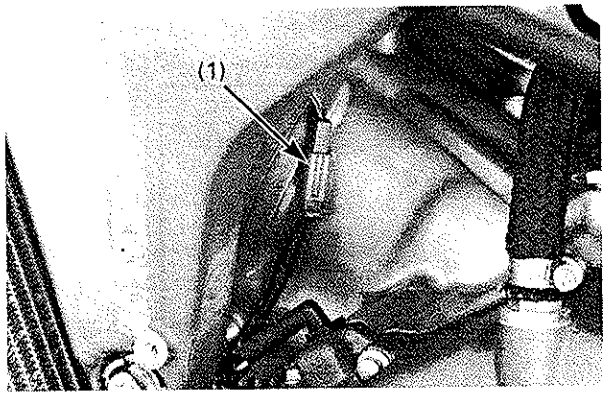
Service Information	10-1	Starter Clutch	10-4
Troubleshooting	10-1	Flywheel Installation	10-5
Alternator Stator	10-2	Torque Limiter/Starter Idle Gear	10-5
Flywheel Removal	10-4		

Service Information

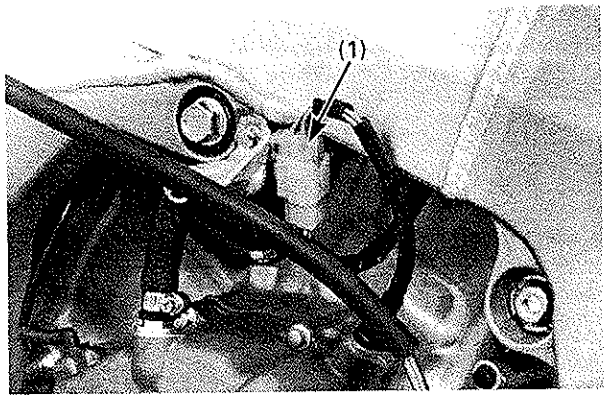
- This section covers service of the alternator stator, flywheel, starter clutch and starter gears. These can be done with the engine installed in the frame.
- Refer to section 16 for alternator starter inspection.
- Refer to VTR Service Manual for starter motor servicing.

Troubleshooting

Engine does not turn
- Faulty starter clutch
- Damaged torque limiter/starter reduction gear
- Damaged starter idle gear



(1) 2P (RED) CONNECTOR



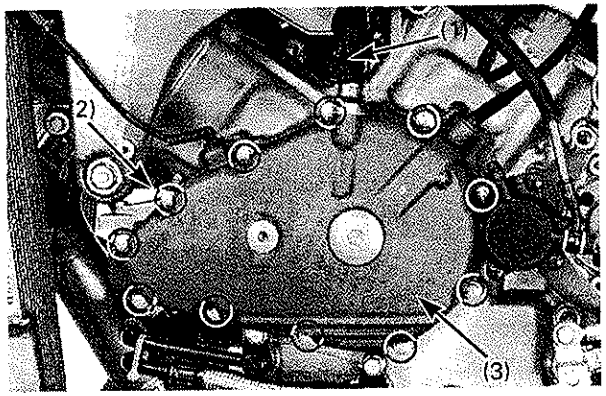
(1) 3P (WHITE) CONNECTOR

Alternator Stator

Alternator Cover Removal

Disconnect the ignition pulse generator 2P (Red) connector.

Disconnect the alternator 3P (White) connector.



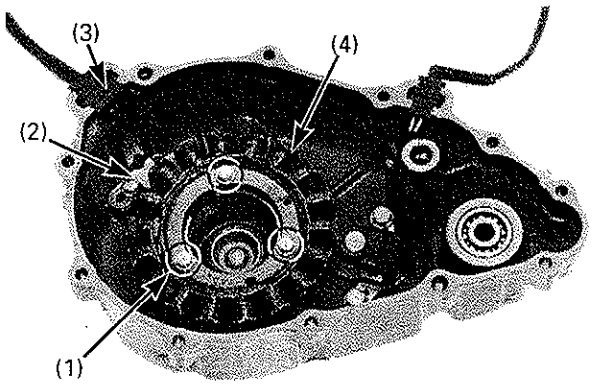
(1) OIL CATCH TANK HOSE
(2) BOLTS
(3) ALTERNATOR COVER

Loosen the hose clamp and disconnect the oil catch tank hose from the alternator cover.

Remove the SH bolts and alternator cover.

The alternator cover (stator) is magnetically attached to the flywheel, be careful during removal. The engine oil will run out when the alternator cover is removed. Set a clean oil pan under the engine and add the recommended oil to the specified level after installation.

Remove the gasket and dowel pin.



(1) BOLTS (2) WIRE CLAMP
(3) GROMMET (4) STATOR

Stator Replacement

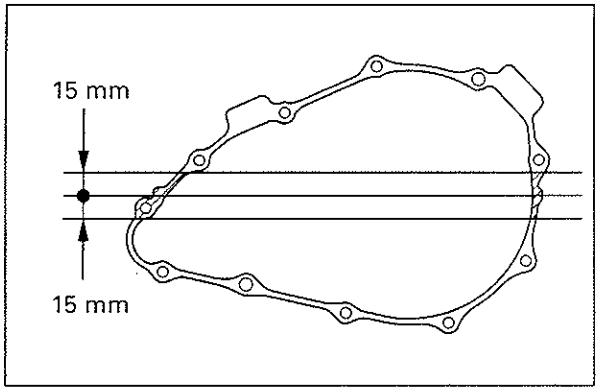
Remove the alternator wire grommet from the alternator cover.
Remove the socket bolt and stator wire clamp.
Remove the socket bolts and stator.

Install the stator into the alternator cover.

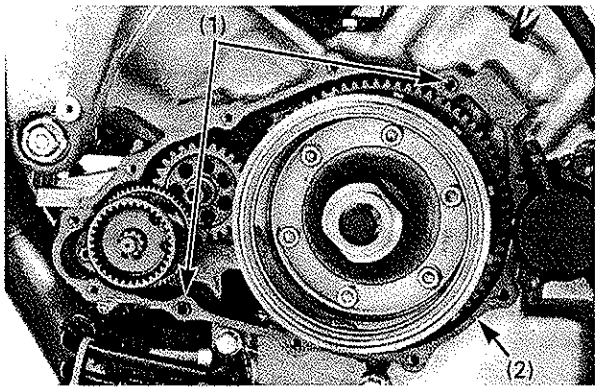
Apply sealant to the wire grommet, then install the wire grommet into the alternator groove securely.
Apply a locking agent to the stator mounting bolt threads.
Install and tighten the stator mounting socket bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the wire clamp and tighten the bolt securely.



(1) APPLY SEALANT

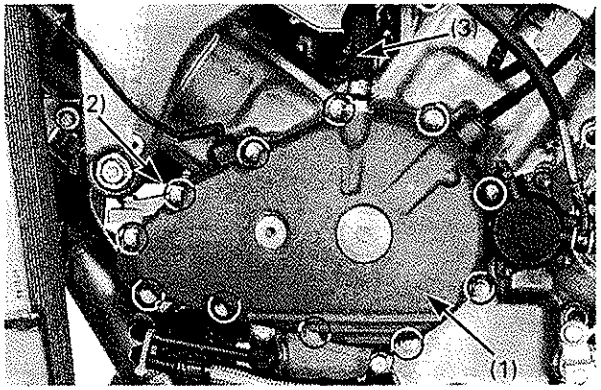


(1) DOWEL PINS
(2) NEW GASKET

Alternator Cover Installation

Apply sealant to the mating surface of the crankcase as shown.

Install the dowel pins and new gasket.

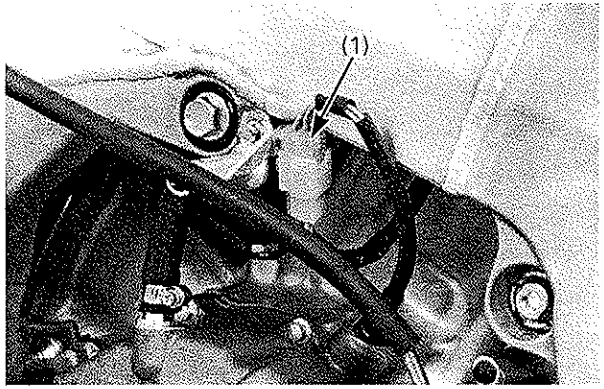


(1) LEFT CRANKCASE COVER
(2) BOLTS
(3) OIL CATCH TANK HOSE

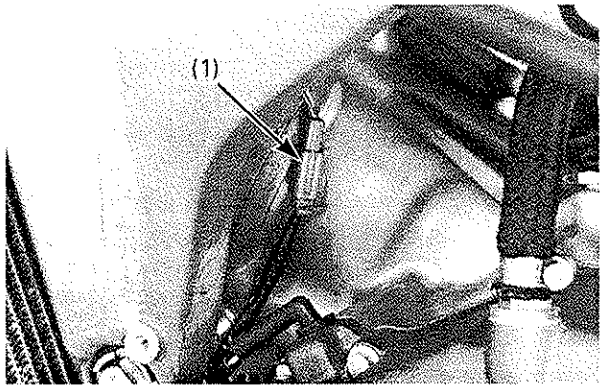
Install the alternator cover.

The alternator cover (stator) is magnetically attached to the flywheel, be careful during installation.
Install and tighten the SH bolts.

Connect the oil catch tank hose to the alternator cover, tighten the clamp screw securely.



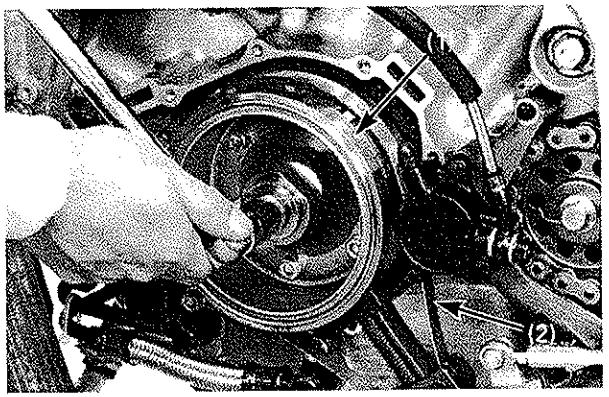
(1) 3P (WHITE) CONNECTOR



(1) 2P (RED) CONNECTOR

Connect the alternator 3P (White) connector.

Connect the ignition pulse generator 2P (Red) connector.



(1) FLYWHEEL HOLDER
(2) FLYWHEEL

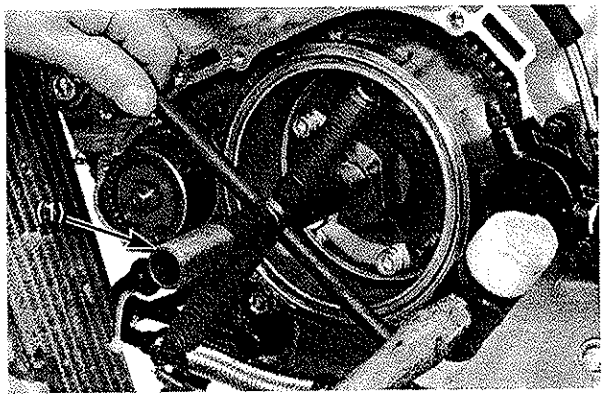
Flywheel Removal

Remove the left crankcase cover (page 10-2).

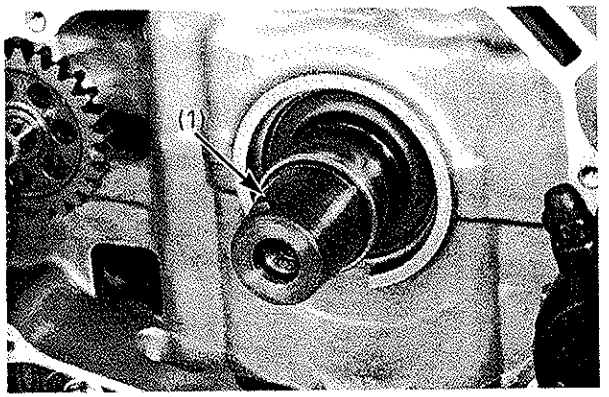
Hold the flywheel using the flywheel holder, then remove the flywheel bolt.

TOOL:
Flywheel holder — **07725-0040000 (Equivalent commercially available)**

Remove the washer.



(1) FLYWHEEL PULLER

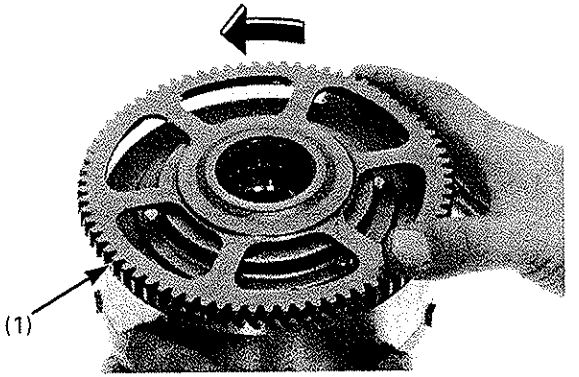


(1) WOODRUFF KEY

Remove the flywheel using the special tool.

Tool:
Rotor puller — **07733-0020001 or 07933-3950000**

Remove the woodruff key.

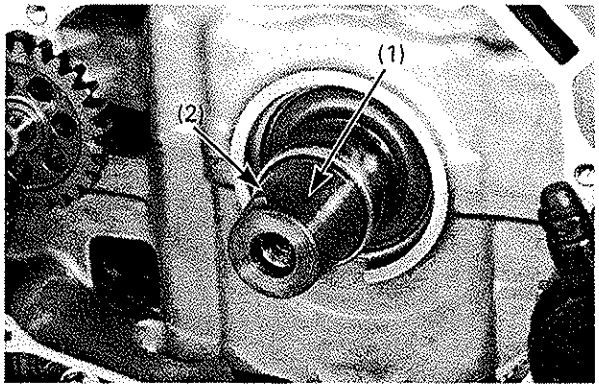


(1) STARTER DRIVEN GEAR

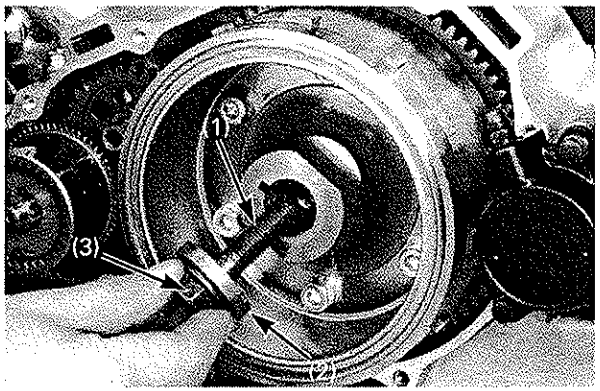
Starter Clutch

Check the operation of the one-way clutch by turning the driven gear.
You should be able to turn the driven gear counterclockwise smoothly, but the gear should not turn clockwise.

See VTR Service Manual for starter clutch inspection and replacement.



(1) DEGREASE
(2) WOODRUFF KEY

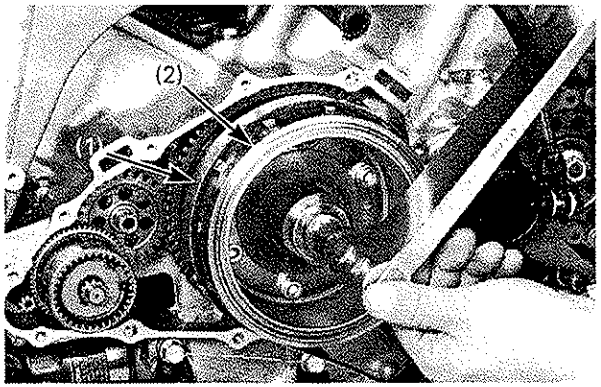


(1) APPLY OIL (2) WASHER
(3) BOLT

Flywheel Installation

Clean any oil from the crankshaft taper.
Install the woodruff key on the crankshaft.
Install the flywheel aligning the key way in the flywheel with the woodruff key on the crankshaft.

Apply oil to the flywheel bolt threads and seating surface.
Install the washer and flywheel bolt.



(1) FLYWHEEL HOLDER
(2) FLYWHEEL

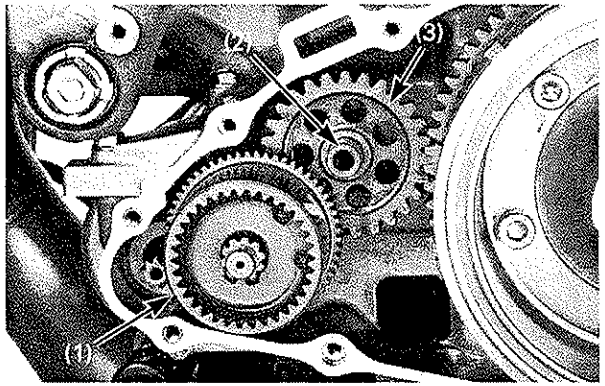
Hold the flywheel using the flywheel holder.
Tighten the bolt to the specified torque 5 times, and then tighten the bolt to the specified torque.

Tool:

Flywheel holder	**07725-0040000 (Equivalent commercially available)**

TORQUE: 157 N·m (16.0 kgf·m, 116 lbf·ft)

Install the alternator cover (page 10-3).



(1) TORQUE LIMITER
(2) IDLE GEAR SHAFT
(3) IDLE GEAR

Torque Limiter/Starter Idle Gear

See VTR Service Manual for torque limiter and starter idle gear servicing.

Memo

Service Information	11-1	Transmission	11-3
Troubleshooting	11-1	Crankcase Combination	11-4
Crankcase Separation	11-2		

Service Information

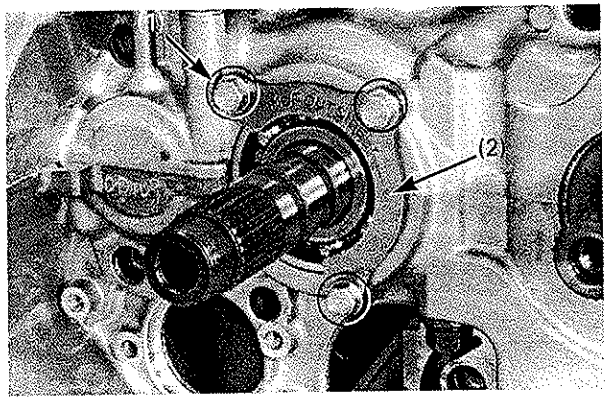
- The crankcase must be separated to service the following:
  - Transmission
  - Crankshaft (page 12-2)
  - Piston/connecting rod (page 12-5)
- Be careful not to damage the crankcase mating surfaces when servicing.
- Prior to assembling the crankcase halves, apply sealant to their mating surface. Wipe off excess sealant thoroughly.
- Tighten the main journal gray colored bolts using the Plastic Region Tightening Method.
- Refer to VTR Service Manual for shift fork, shift drum servicing.

Troubleshooting

Hard to shift
- Improper clutch operation (section 9)
- Improper engine oil viscosity
- Bent shift fork
- Bent shift fork shaft
- Bent shift fork claw
- Damaged shift drum cam groove
- Loose stopper plate bolt
- Damaged stopper plate and pin
- Bent gearshift spindle

Transmission jumps out of gear
- Worn gear engagement dogs or slots
- Worn gear shift groove
- Damaged shift drum cam groove
- Bent shift fork shaft
- Loose stopper plate bolt
- Bent shift fork shaft
- Broken shift drum stopper arm
- Worn or bent shift forks
- Weak or broken stopper arm return spring
- Broken gearshift spindle return spring

Excessive engine noise
- Worn or damaged transmission gears
- Worn or damaged transmission bearings

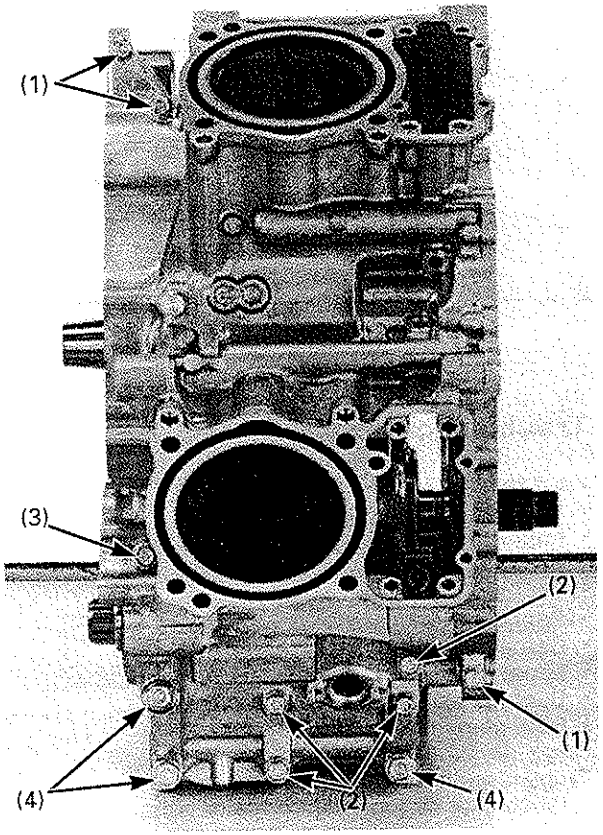


(1) BOLTS
(2) SET PLATE

Crankcase Separation

Remove the following:
- Engine (section 7)
- Cylinder head/cam gear train assembly (section 8)
- Clutch/gearshift linkage (section 9)
- Oil pump/oil strainer/pressure relief valve (section 4)
- Flywheel/starter reduction gear (section 10)
- Starter motor (section 16)

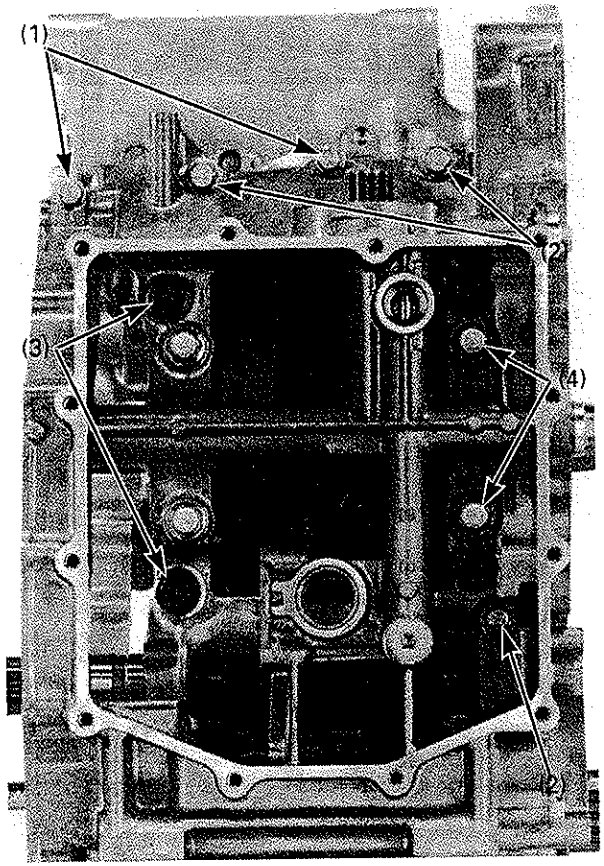
Remove the mainshaft bearing set plate bolts and plate.



(1) 6 mm BOLTS (2) 8 mm BOLTS
(3) 8 mm BOLT/COPPER WASHER
(4) 10 mm BOLTS

From outside to inside, loosen the three 6 mm bolts, six 8 mm bolts and three 10 mm bolts in a crisscross pattern in 2 or 3 steps and remove them from the upper crankcase.

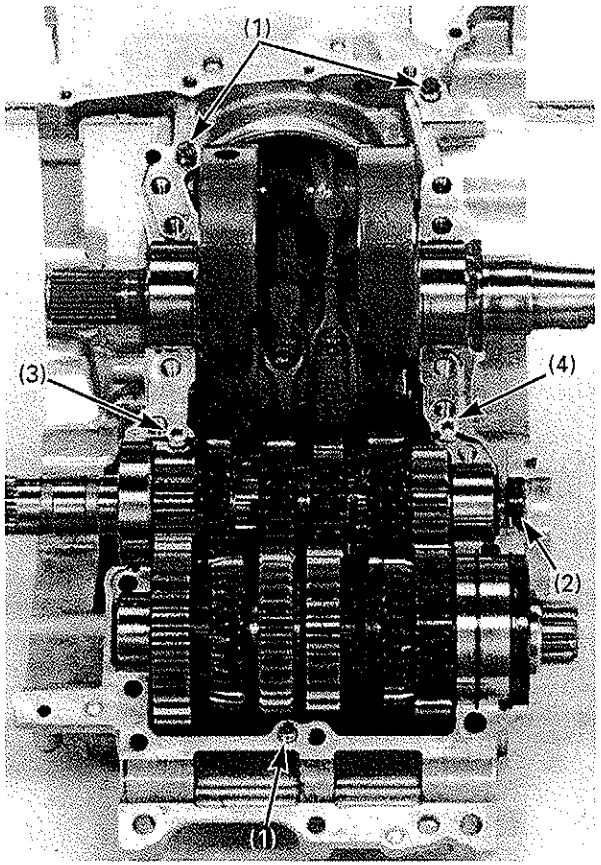
Note that the one 8 mm bolt has the copper washer.



(1) 6 mm BOLTS (2) 8 mm BOLTS
(3) 10 mm BOLTS (BLACK COLOR)
(4) 10 mm BOLTS (GRAY COLOR)

Place the engine with the upper side down.
Loosen the two 6 mm bolts, three 8 mm bolts in a crisscross pattern in 2 or 3 steps and remove them from the lower crankcase.

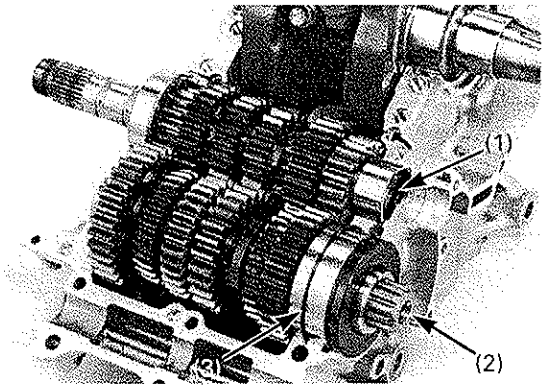
Loosen the main journal 10 mm bolts (Black and Gray color) in a crisscross pattern in 2 or 3 steps, and then remove them.
Discard the gray colored main journal 10 mm bolts.



(1) DOWEL PINS (2) OIL SEAL
(3) OIL ORIFICE (Ø1.8)
(4) OIL ORIFICE (Ø1.4)

Remove the three dowel pins, mainshaft oil seal and two oil orifices.

Clean any sealant from the crankcase mating surfaces.



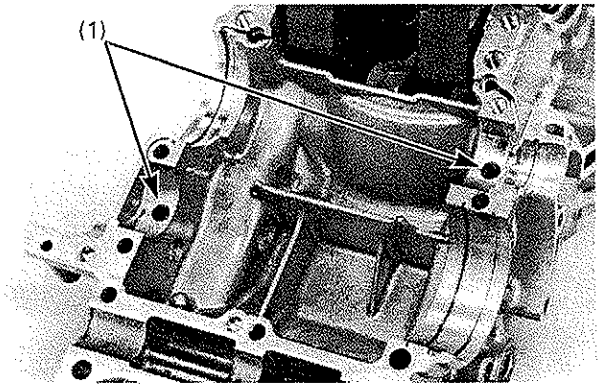
(1) MAINSHAFT
(2) COUNTERSHAFT
(3) SET RING

Transmission

Removal/Disassembly

Separate the crankcase halves (page 11-2).

Remove the mainshaft and countershaft assembly.
Remove the countershaft bearing set ring.

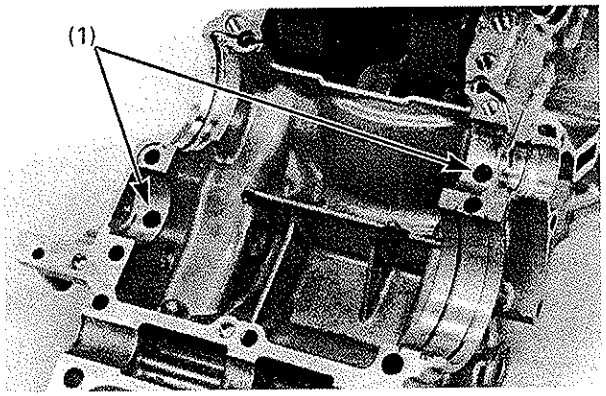


(1) DOWEL PINS

Remove the dowel pins.

Disassemble the mainshaft and countershaft.

See VTR Service Manual for transmission inspection and bearing replacement.
See section 17 Machine Setting of this manual for optional transmission gears information.



(1) DOWEL PINS

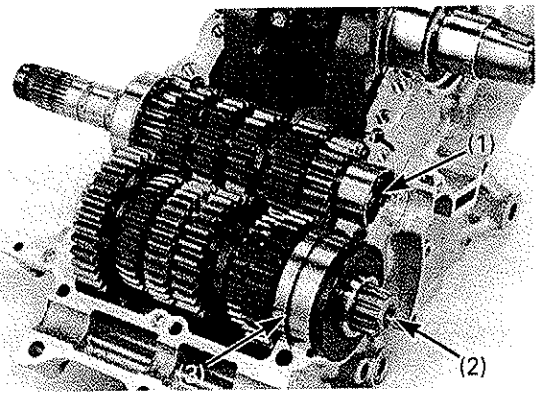
Assembly

Assemble the transmission gear and shafts.
Coat each gear with clean engine oil and check for smooth movement.

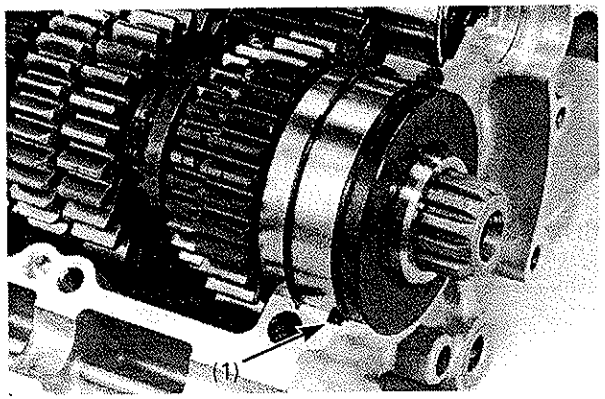
Apply molybdenum disulfide oil to the shift fork grooves in the M3/4, C5 and C6 gear.

Installation

Install the dowel pins in the upper crankcase holes.



(1) MAINSHAFT
(2) COUNTERSHAFT
(3) SET RING

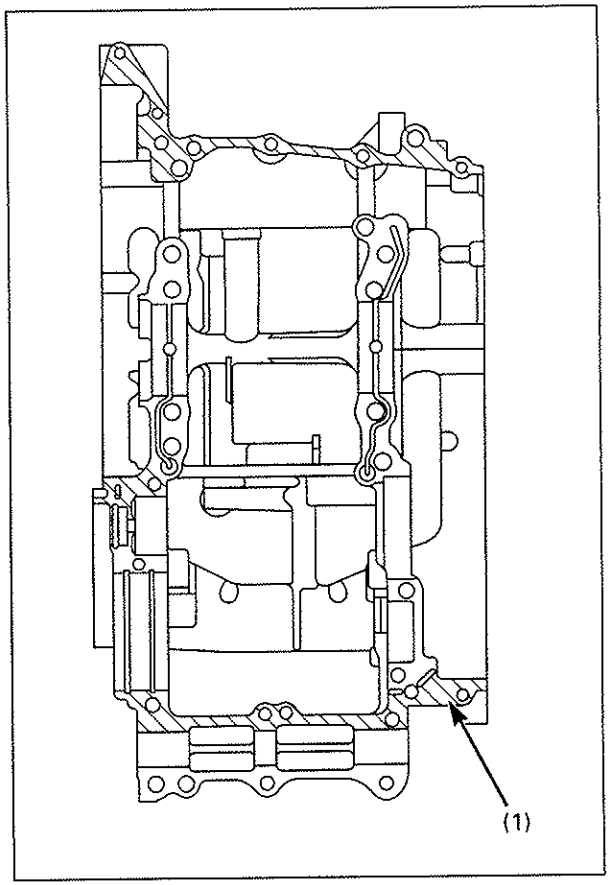


(1) STOPPER PIN

Install the countershaft bearing set ring into the bearing groove.
Install the mainshaft and countershaft by aligning the countershaft bearing groove with the set ring on the crankcase, and aligning the bearing cap holes with the dowel pins.

Also align the countershaft bearing stopper pin with the groove in the crankcase.

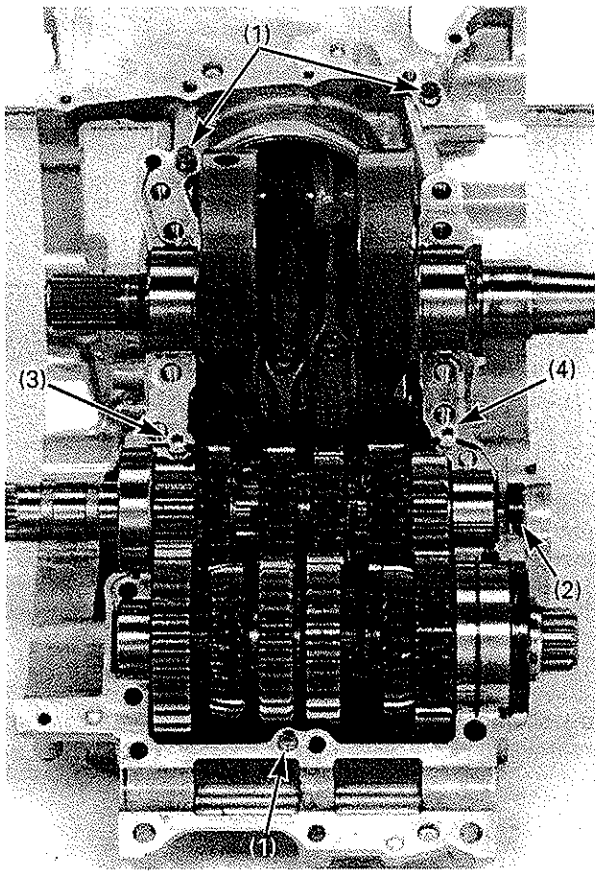
Assemble the crankcase (page 11-12).



(1) SEALANT APPLYING AREA

Crankcase Combination

Apply a light, but through, coating of liquid sealant to the crankcase mating surface except to the main bearing journal bolt (lower crankcase bolt, 10 mm) area and the oil passage area as shown.

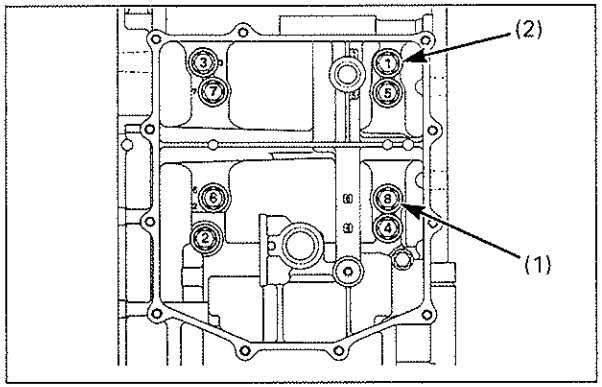


(1) DOWEL PINS (2) OIL SEAL
(3) OIL ORIFICE (Ø1.8)
(4) OIL ORIFICE (Ø1.4)

Install the three dowel pins.
Install oil orifices aligning their cut-out with the groove in the upper crankcase.

NOTICE

- Install the ø1.8 orifice (equipped + groove) to the right side (clutch side).
- Install the ø1.4 orifice (equipped – groove) to the left side (flywheel side).



(1) GRAY BOLTS (No.5, 6, 7, 8)
(2) BLACK BOLTS (No.1, 2, 3, 4)

Apply oil to the threads and seating surfaces of the four main journal special black bolts and new four special gray bolts, and install them.

NOTICE

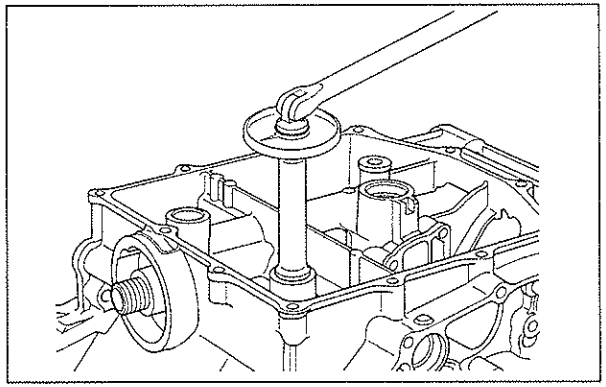
- Do not reuse the special gray colored bolts. Once the special gray colored bolts have been loosened, replace them with new ones.
- Tighten the main journal gray colored bolts using the Plastic Region Tightening Method.

Tighten the eight main journal special bolts to the specified torque in 2 or 3 step in the numerical order casted on the lower crankcase.

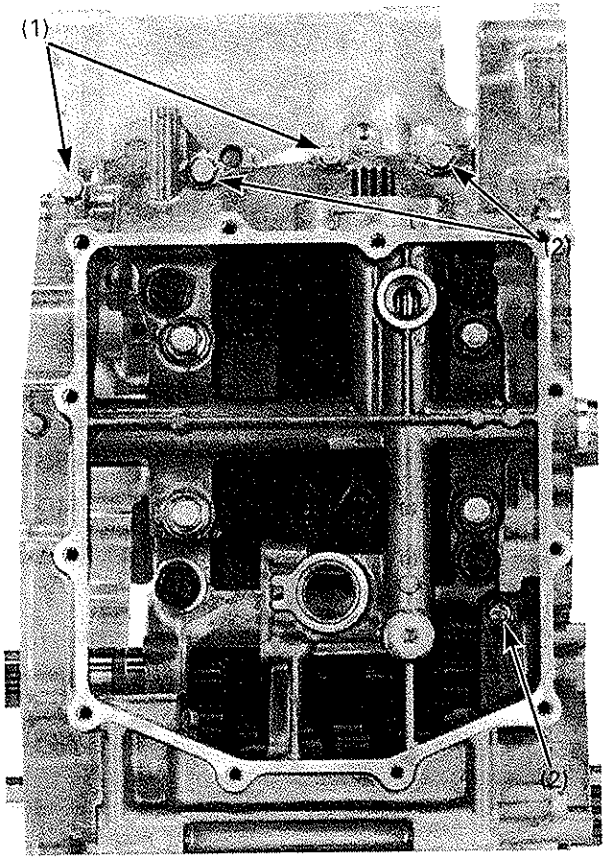
Torque: 20 N•m (2.0 kgf•m, 14 lbf•ft)

Tighten the four main journal special bolts (Black color) to the specified torque in 2 or 3 step in the numerical order casted on the lower crankcase.

Torque: 52 N•m (5.3 kgf•m, 38 lbf•ft)

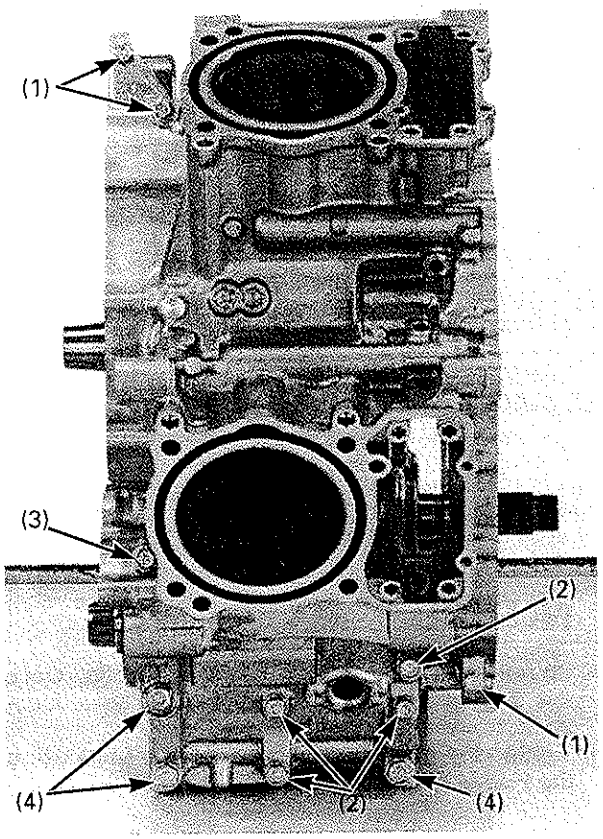


Further tighten the gray bolts 60 degrees in numerical order casted on the lower crankcase, then further tighten 60 degrees again (total 120 degrees).



(1) 6 mm BOLTS
(2) 8 mm BOLTS

Install the three 8 mm bolts and two 6 mm bolts, and tighten them in a crisscross pattern in 2 or 3 steps.

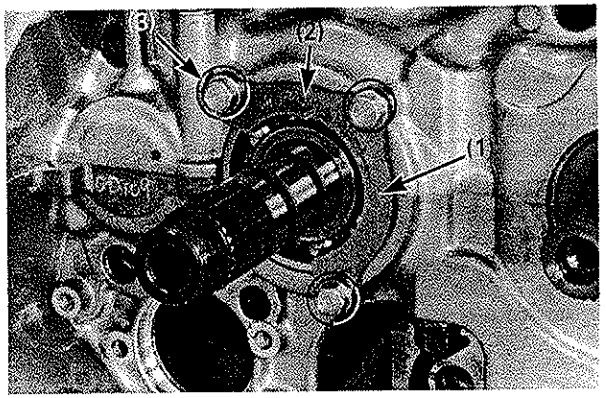


(1) 6 mm BOLTS (2) 8 mm BOLTS
(3) 8 mm BOLT/NEW COPPER WASHER
(4) 10 mm BOLTS

Apply oil to the three 10 mm bolt threads and seating surfaces.
Install the three 10 mm bolts, new copper washer, six 8 mm bolts and three 6 mm bolts.

From inside to outside, tighten the bolts in a crisscross pattern in 2 or 3 steps.

Torque:
10 mm bolt: 39 N·m (4.0 kgf·m, 29 lbf·ft)



(1) SET PLATE
(2) OUTSIDE MARK
(3) BOLT (APPLY LOCKING AGENT)

Apply a locking agent to the mainshaft bearing set plate bolt threads.
Install the mainshaft bearing set plate with its "OUTSIDE" mark facing out.
Tighten the mounting bolts to the specified torque.

Torque: 14 N·m (1.4 kgf·m, 10 lbf·ft)

Install the removed parts in the reverse order of removal.

Service Information	**12-1**	**Main Journal Bearing**	**12-3**
Troubleshooting	**12-1**	**Crankpin Bearing**	**12-4**
Crankshaft	**12-2**	**Piston/Cylinder**	**12-5**

Service Information

- The crankcase must be separated to service the crankshaft and piston/connecting rod. Refer to section 11 for crankcase separation and combination.
- Mark and store the connecting rods, bearing caps and bearing inserts to be sure of their correct locations for reassembly.
- The cankpin and main journal bearing inserts are select fit and are identified by color codes. Measure the case or connecting rod bearing I.D. and journal O.D. with a micro meter or cylinder gauge to determine the oil clearance. Incorrect oil clearance can cause major engine damage.
- Tighten the connecting rod bolts using the Plastic Region Tightening Method.
- Clean the oil jets in the upper crankcase with compressed air before installing the piston.

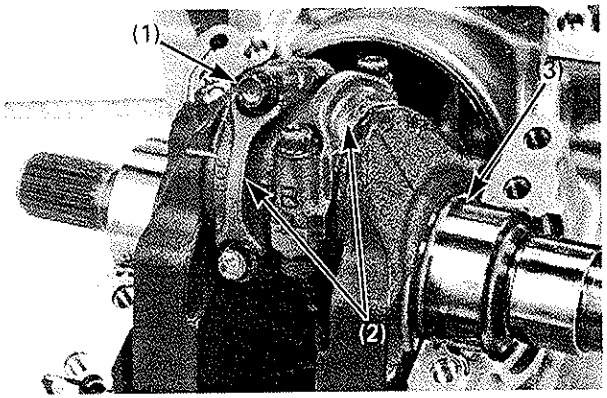
Troubleshooting

Compression too low, hard starting or poor performance
- Leaking cylinder head gasket (section 8)
- Worn.stuck or broken piston ring
- Worn or damaged cylinder and piston

Compression too high, overheating or knocking
- Excessive carbon built-up on piston head or combustion chamber

Excessive smoke
- Worn cylinder, piston or piston rings
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

Abnormal noise
- Worn piston pin or piston pin hole
- Worn connecting rod small end
- Worn cylinder, piston or piston rings
- Worn main journal bearings
- Worn crankpin bearings



(1) BOLTS
(2) BEARING CAPS
(3) CRANKSHAFT

Crankshaft

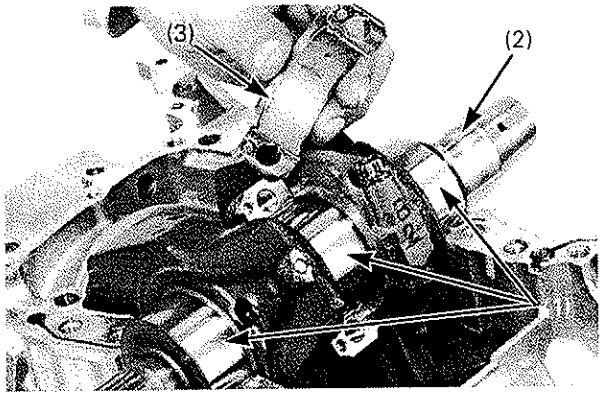
Removal

Separate the crankcase halves (page 11-2).

Remove the connecting rod bearing cap bolts and bearing caps.

Remove the crankshaft.

See VTR Service Manual for crankshaft inspection.

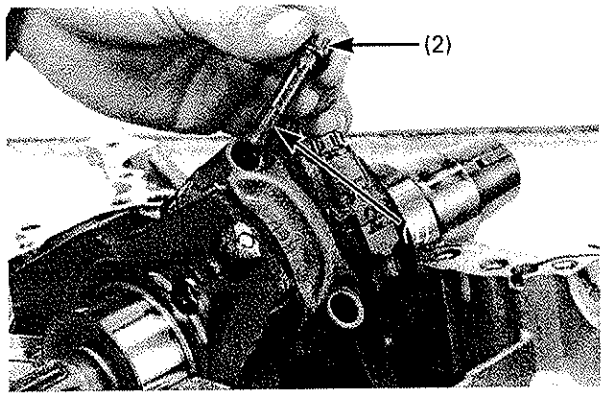


(1) APPLY MOLYBDENUM DISULFIDE OIL
(2) CRANKSHAFT
(3) BEARING CAP

Installation

Apply molybdenum disulfide oil to the main journal bearing sliding surfaces on the upper crankcase and crankpin bearing sliding surfaces on the connecting rods and bearing caps.

Install the crankshaft onto the upper crankcase.
Set the connecting rods onto the crankpin.
Install the bearing caps aligning the dowel pins with the holes in the connecting rods.



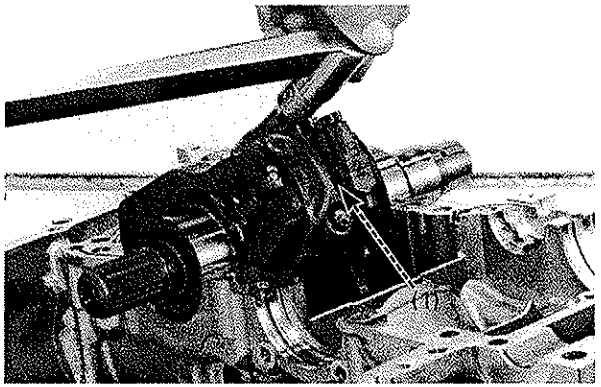
(1) APPLY OIL
(2) CONNECTING ROD BOLT

Apply oil to new connecting rod bolt threads and seating surfaces, and install them.

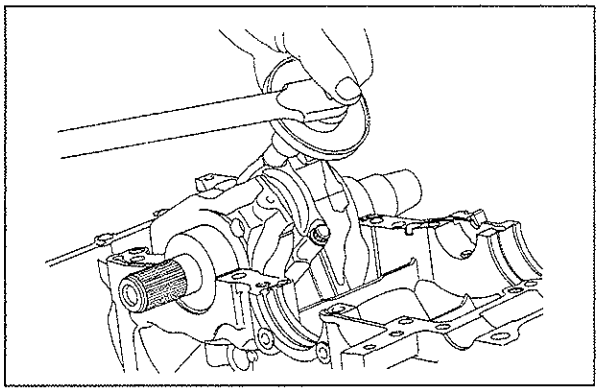
NOTICE

- Do not reuse the connecting rod bolts, except using for measuring the oil clearance.
- Tighten the connecting rod bolts using the Plastic Region Tightening Method.

To avoid damaging the connecting rods, temporarily install a feeler gauge between the connecting rods.



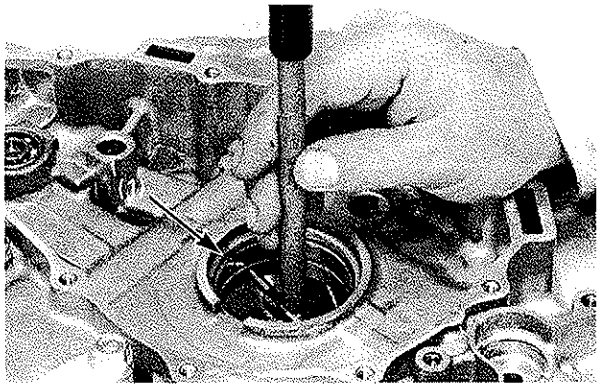
(1) FEELER GAUGE



Tighten the connecting rod bolts in 2 or 3 steps alternately to the specified torque.

Torque: 29 N•m (3.0 kgf•m, 22 lbf•ft)

If reusing the connecting rod bolts, tighten them to 20 N•m (2.0 kgf•m, 14 lbf•ft).
Further tighten the connecting rod bolts 60 degrees, then further tighten 60 degrees again (total 120 degree).



(1) MAIN JOURNAL BEARING

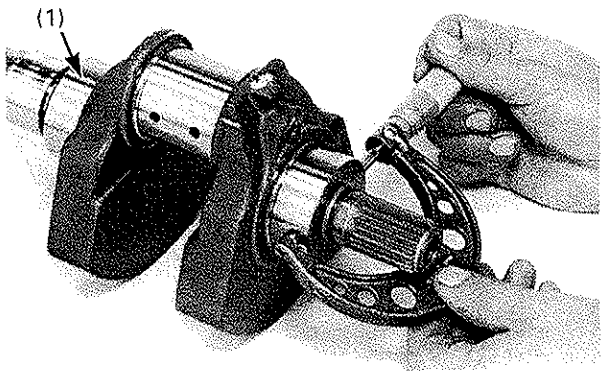
Main Journal Bearing

See VTR Service Manual for bearing inspection.

Main journal bearing selection

Clean off any oil from the main journals and bearings.
Install the mainshaft and countershaft onto the upper crankcase, assemble the crankcase halves and tighten the main journal bolts to the specified torque (page 11-5).

Measure the main journal bearing I.D.s using a dial gauge in an X, Y and Z axis.
Take the minimum reading to determine the bearing I.D.s.



(1) CRANKSHAFT

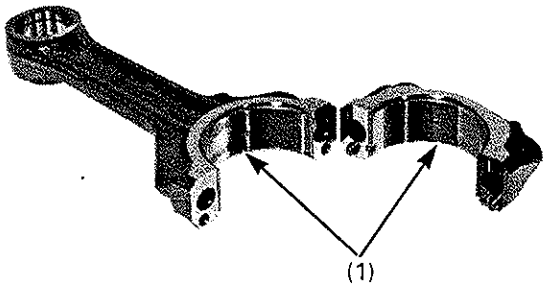
Measure the crankshaft main journal O.D.s using a micrometer in an X, Y and Z axis.
Take the maximum reading to determine the main journal O.D.s.

From the measured bearing I.D.s and main journal O.D.s, calculate the clearance.

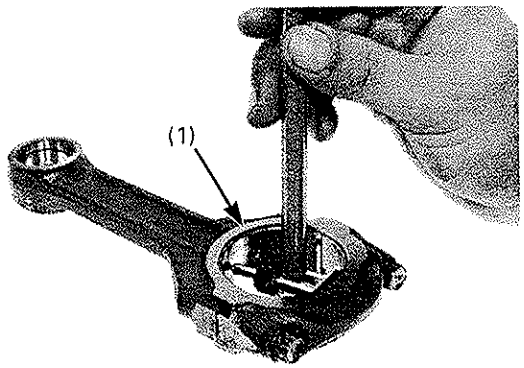
Specified oil clearance:
0.035 – 0.045 mm (0.0014 – 0.0018 in)

If the clearance does not fall in the specified oil clearance, select the bearing inserts so that the oil clearance fall in the specified oil clearance.

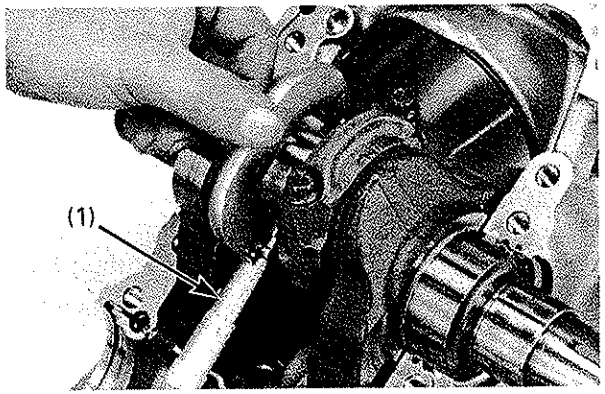
BEARING THICKNESS:
A (Blue): Thick
B (Black):
C (Brown):
D (Green):
E (Yellow): Thin



(1) CRANKPIN BEARINGS



(1) CRANKPIN BEARING



(1) MICRO METER

Crankpin Bearing

See VTR Service Manual for bearing inspection.

NOTICE

Do not remove the crankpin bearing from the connecting rod. If the bearing is damaged, replace the bearing and connecting rod as an assembly.

Crankpin bearing selection

Clean off any oil from the crankpins and crankpin bearings.
Carefully install the bearing caps, aligning the dowel pins with the holes in the connection rods.

Apply oil to the connecting rod bolt threads and seating surfaces and install the bolts.
Tighten the connecting rod bolts in 2 or 3 steps alternately to the specified torque.

Torque: 20 N•m (2.0 kgf•m, 14 lbf•ft)

If using the new connecting rod bolts, tighten them to 29 N•m (3.0 kgf•m, 22 lbf•ft).
Further tighten the connecting rod bolts 60 degree alternately, then further tighten 60 degree again (total 120 degree).

Measure the crankpin bearing I.D.s using a dial gauge in an X, Y and Z axis.
Take the minimum reading to determine the bearing I.D.s.

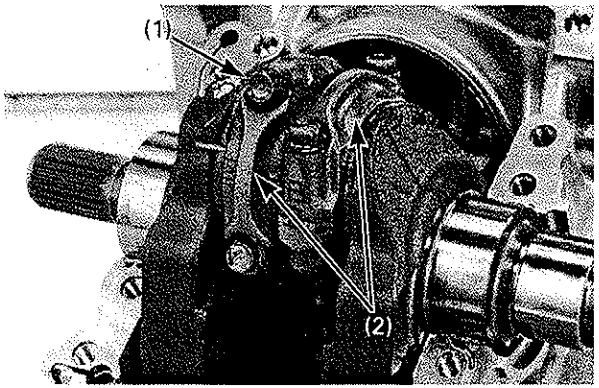
Measure the crankpin O.D.s using a micrometer in an X, Y and Z axis.
Take the maximum reading to determine the crankpin O.D.s.

From the measured bearing I.D.s and main journal O.D.s, calculate the clearance.

Specified oil clearance:
0.045 – 0.055 mm (0.0018 – 0.0022 in)

If the clearance does not fall in the specified oil clearance, select the bearing inserts so that the oil clearance fall in the specified oil clearance.

BEARING THICKNESS:
A (Blue): Thick
B (Black):
C (Brown):
D (Green):
E (Yellow): Thin

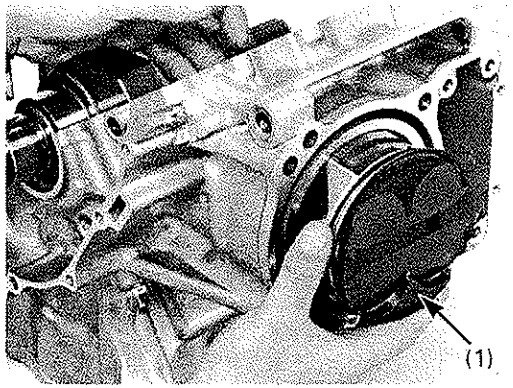


(1) BOLTS
(2) BEARING CAPS

Piston/Cylinder

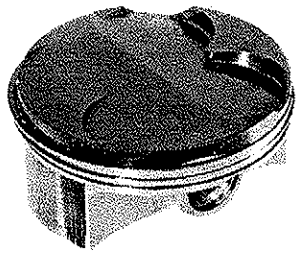
Piston Removal

Remove the bolts and connecting rod bearing cap.



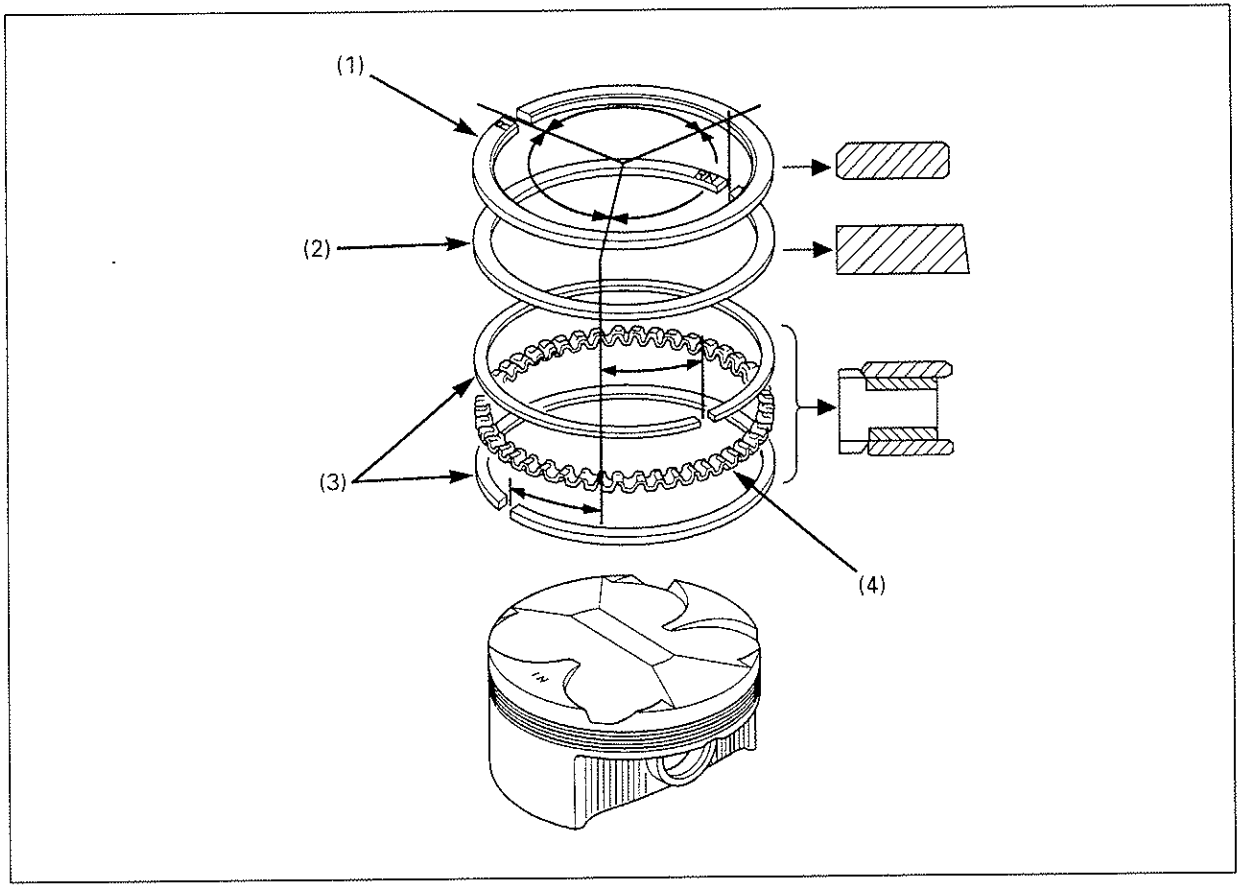
(1) PISTON/CONNECTING ROD ASSEMBLY

Remove the piston/connecting rod assembly from the top of the cylinder.



Piston Disassembly/Inspection

See VTR Service Manual for piston disassembly and piston, connecting rod and cylinder inspection.
See section 2 of this manual for service data.



(1) TOP RING (2) SECOND RING
(3) SIDE RAILS (4) SPACER

Piston Assembly

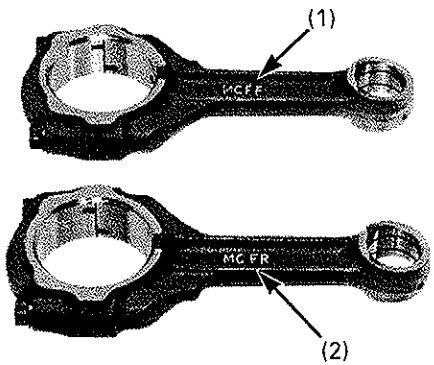
Clean the piston ring grooves thoroughly.
Carefully install the piston rings into the piston ring grooves with the marking facing up.

NOTICE

Be careful not to damage the piston and rings during installation.

To install the oil ring, install the spacer first, then install the side rails.

Stagger the piston ring end gaps 120 degree apart from each other.
Stagger the side rail end gap as shown.



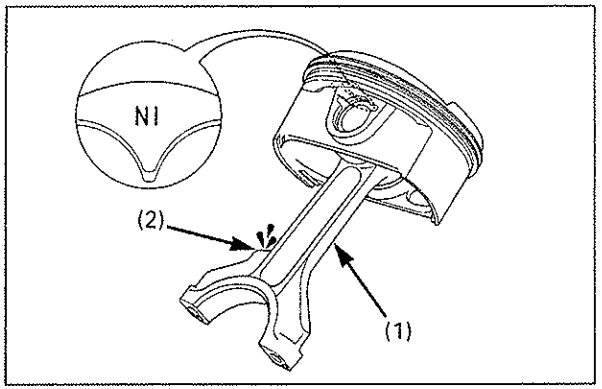
(1) MCFF MARK (FRONT CONNECTING ROD)
(2) MCFR MARK (REAR CONNECTING ROD)

Piston Installation

The connecting rod has the following identification mark:

MCFF: Front cylinder connecting rod
MCFR: Rear cylinder connecting rod

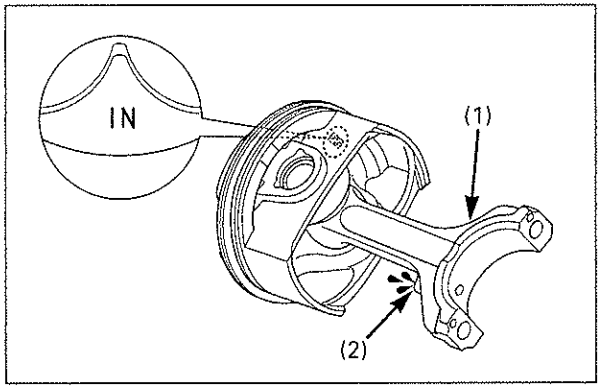
Install the each connecting rod into proper location.



(1) FRONT CONNECTING ROD
(2) OIL HOLE

Apply LUB45 to the connecting rod small end inner surface, piston pin bore and piston pin outer surface.

Front cylinder piston:
Note that the connecting rod has "MCFF" mark.
Install the piston on the connecting rod so that the "IN" mark on the piston top is facing the same direction as the oil hole in the rod.

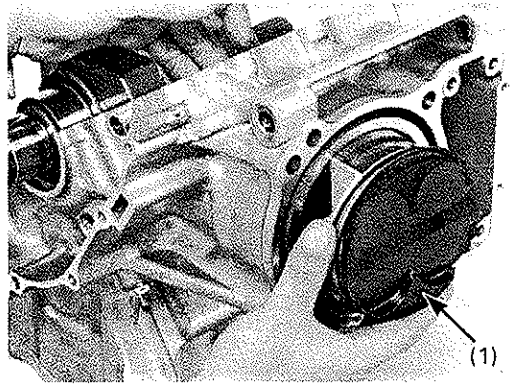


(1) REAR CONNECTING ROD
(2) OIL HOLE

Rear cylinder piston:
Note that the connecting rod has "MCFR" mark.
Install the piston on the connecting rod so that the "IN" mark on the piston top is facing the opposite direction as the oil hole in the rod.

Install the piston pin into the piston and connecting rod.
Install new piston pin clips into the groove of the piston pin hole.

- Make sure that the piston pin clips are seated securely.
- Do not align the piston pin clip end gap with the piston cutout.



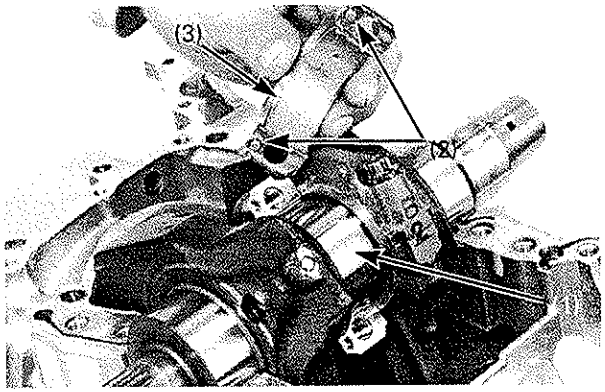
(1) "IN" MARK

Cleat the piston and piston rings with engine oil.
Install the piston/connecting rod in the cylinder with the "IN" mark toward the intake side.

Compress the piston rings using a commercially available piston ring compressor tool, the install the piston into the cylinder.

NOTICE

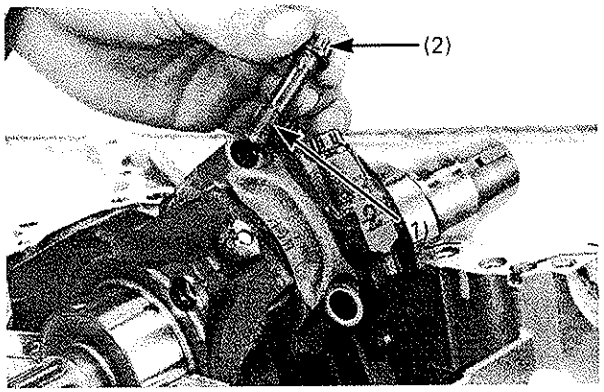
- While installing the piston, being careful not to damage the top surface of the cylinder, especially around the cylinder bore.
- Be careful not to damage the cylinder sleeve and crankpin with the connecting rod.



(1) APPLY MOLYBDENUM DISULFIDE OIL
(2) DOWEL PINS
(3) BEARING CAP

Apply molybdenum disulfide oil to the crankpin bearing sliding surfaces on the connecting rods and bearing caps.

Set the connecting rods onto the crankpin.
Install the bearing caps aligning the dowel pins with the holes in the connecting rods.



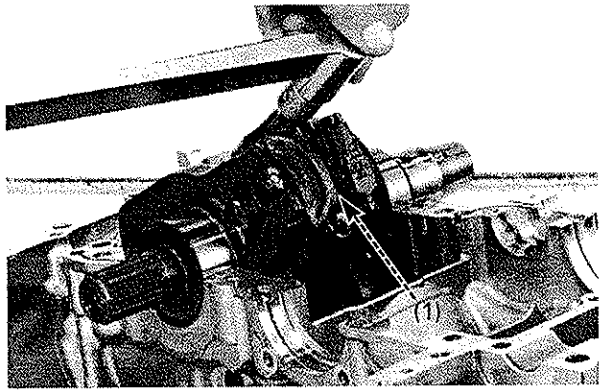
(1) APPLY OIL
(2) CONNECTING ROD BOLT

Apply oil to new connecting rod bolt threads and seating surfaces, and install them.

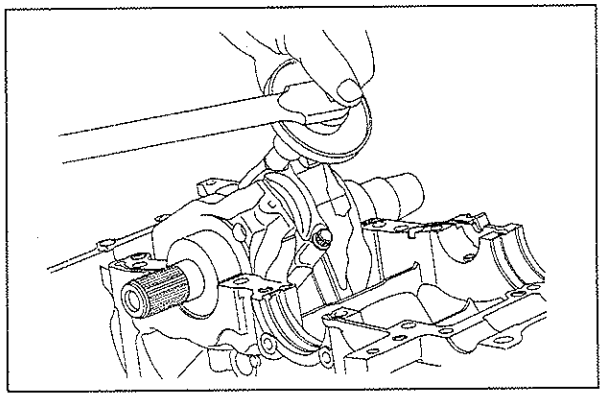
NOTICE

- Do not reuse the connecting rod bolts, except using for measuring the oil clearance.
- Tighten the connecting rod bolts using the Plastic Region Tightening Method.

To avoid damaging the connecting rods, temporarily install a feeler gauge between the connecting rods.



(1) FEELER GAUGE



Tighten the connecting rod bolts in 2 or 3 steps alternately to the specified torque.

Torque: 29 N•m (3.0 kgf•m, 22 lbf•ft)

Further tighten the connecting rod bolts 60 degrees, then further tighten 60 degrees again (total 120 degree).

Service Information	**13-1**	**Fork**	**13-9**
Troubleshooting	**13-1**	**Steering Stem**	**13-11**
Front Wheel	**13-2**		

Service Information

- This section covers maintenance of the front wheel, fork and steering stem.
- Optional lighter and heavier than standard springs are available. Refer to Parts List for detail.
- A workstand is required to support the machine.
- For optimum fork performance, the fork should be completely disassembled and cleaned after the first three hours of riding. Thereafter it should be disassembled and cleaned on the regular basis to ensure maximum performance and service life.
- Refer to section 15 for brake system information.

Troubleshooting

Hard steering
- Steering head to thread is too tight
- Faulty steering head bearing
- Insufficient tire pressure
- Worn steering damper

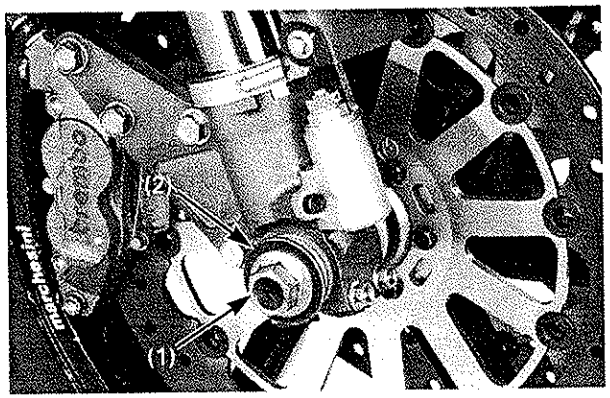
Steers to one side or does not track straight
- Bent fork tube
- Bent front axle
- Wheel installed incorrectly
- Unequal oil quantity in each fork tube
- Faulty steering head bearing
- Bent frame
- Worn wheel bearing
- Worn swingarm pivot components

Front wheel wobbling
- Faulty wheel
- Worn front wheel bearing
- Faulty tire
- Wheel installed incorrectly

Soft suspension
- Insufficient fluid in fork
- Fork oil viscosity too thin

Hard suspension
- Fork oil level too high (too much oil)
- Fork oil viscosity too thick
- Fork outer tube(s) bent and/or fork sliders are damaged

Front suspension noise
- Fork slider damaged
- insufficient fluid in fork
- Loose fork fasteners



(1) AXLE
(2) AXLE WASHER

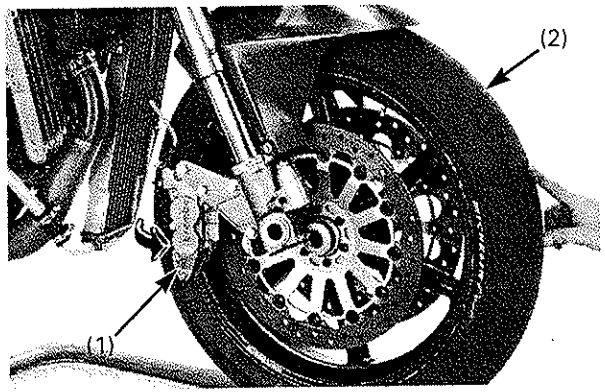
Front Wheel

Removal

The VTR SP-1's front wheel is equipped with a quick release system.
It is not necessary to remove the brake calipers from the caliper bracket.

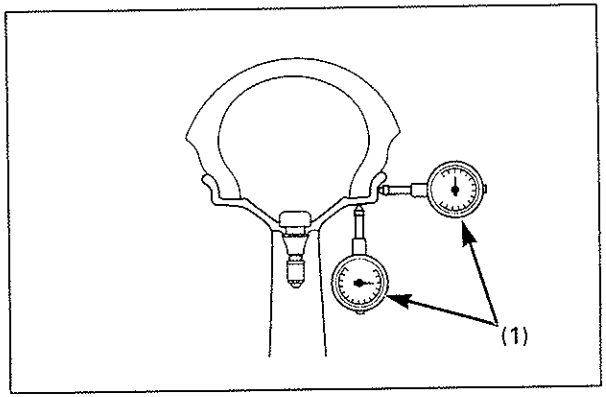
Support the machine securely and the front wheel off the ground.

Remove the axle and axle washer.



(1) CALIPER
(2) FRONT WHEEL ASSEMBLY

Pull the front wheel forward.
Move the front brake calipers outward, release the caliper from the brake discs, then remove the front wheel.



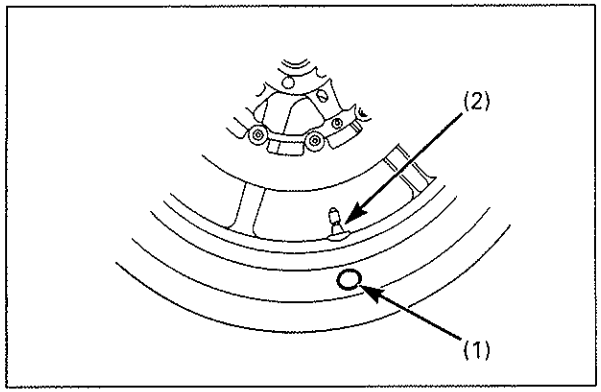
(1) DIAL INDICATOR

Wheel Rim Inspection

Spin the wheel slowly and measure the runout using a dial indicator.

The wheel cannot be repaired and must be replaced with a new one if the runout exceeds the service limit.

Service limit: 0.5 mm (0.02 in)

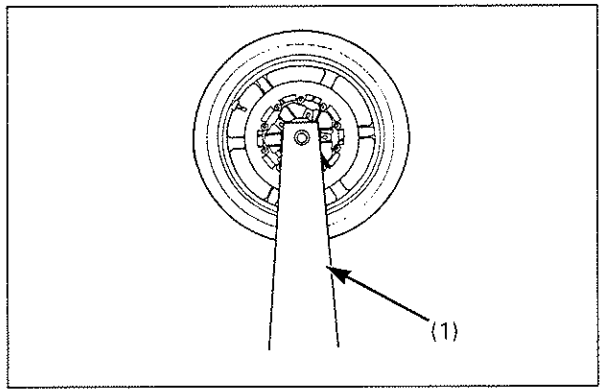


(1) BALANCE MARK
(2) VALVE STEM

Wheel/Tire balance

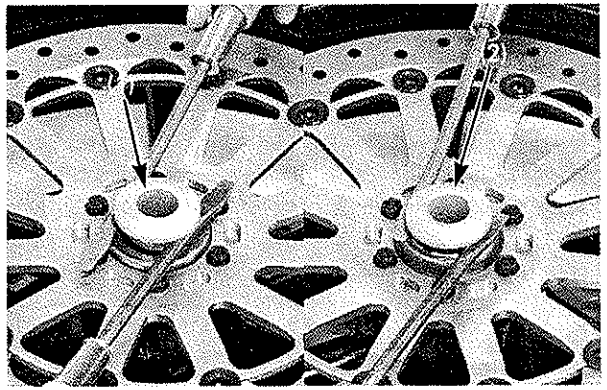
Wheel balance directly affects the stability, handlings and overall safety of the machine. Always check the balance when the tire has been removed from the rim.

For optimum balance, the tire balance mark (a paint dot or circle on the side wall) must be located next to the valve stem. Remount the tire if necessary.



(1) INSPECTION STAND

Mount the wheel, tire and brake disc assembly in an inspection stand.
Spin the wheel, allow it to stop, and mark the highest (lightest) part of the wheel with chalk.
Do this two or three times to verify the lightest area. If the wheel is balanced, it will not stop consistently in the same position.
To balance the wheel, install the wheel weights on the upper most point of the rim.
Add just enough weight so the wheel will no longer stop in the same position when it's spun.
Clean the wheel surface and attach the balance weight.
Do not add more than 60 grams per wheel.



(1) RIGHT SIDE COLLAR
(2) LEFT SIDE COLLAR

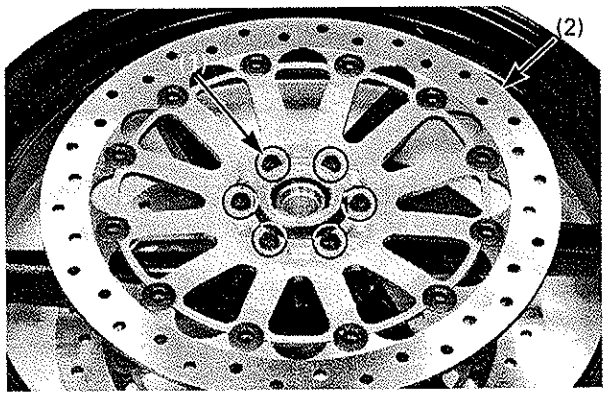
Disassembly/Wheel Bearing Replacement

⚠ WARNING

A contaminated brake disc or pad reduces stopping power, and can cause a serious injury or death.

Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

Remove the right and left side collars using two screw drivers as shown.



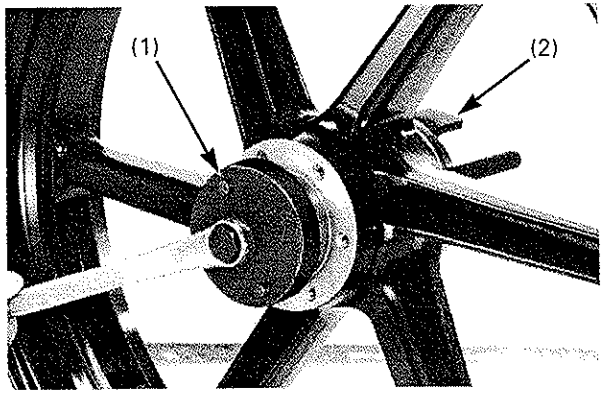
(1) BOLTS
(2) BRAKE DISC

Remove the bolts and brake discs.

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer races fit tightly in the hub.

Remove the discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub.

Replace the bearings in pairs.

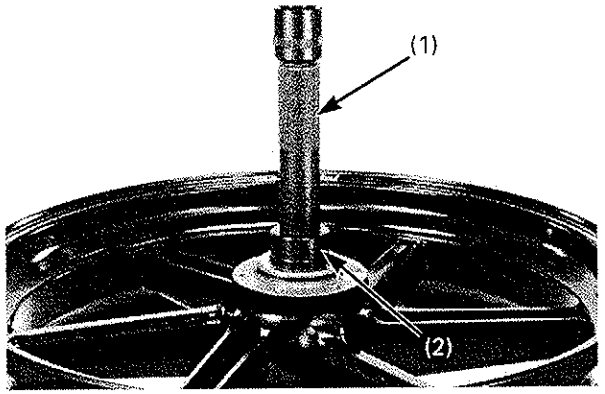


(1) RETAINER WRENCH B
(2) RETAINER WRENCH BODY

Unstake the bearing retainer.
Remove the bearing retainer using a special tool.

Tools:

Retainer wrench B	**07710-0010200**
Retainer wrench body	**07710-0010401**



(1) DRIVER
(2) ATTACHMENT/PILOT

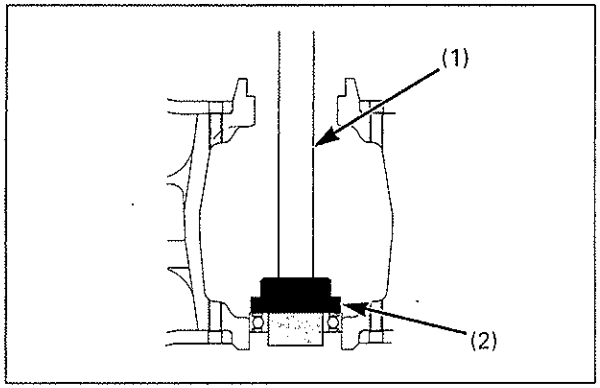
Press the right wheel bearing and distance collar using a special tools and a hydraulic press until the left wheel bearing is removed.

NOTICE

Press the right wheel bearing more than necessary, or the right bearing fall into the wheel hub.

Tools:

Driver	**07749-0010000**
Attachment, 42 X 47 mm	**07746-0010300**
Pilot, 25 mm	**07746-0040600**



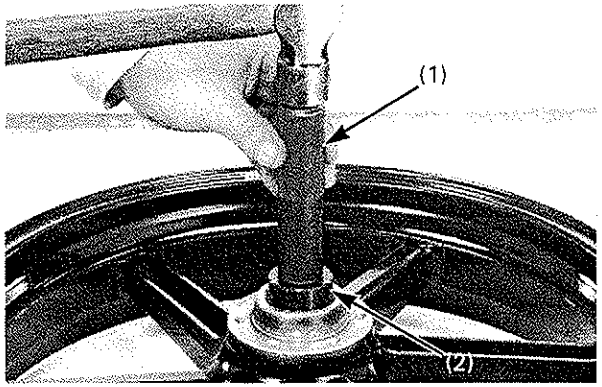
(1) DRIVER
(2) ATTACHMENT/PILOT

Remove the right side bearing using the special tools.

Tools:

Driver	**07749–0010000**
Attachment, 42 X 47 mm	**07746–0010300**
Pilot, 25 mm	**07746–0040600**

Never install oil bearings; once the bearing have been removed, they must be replaced with new ones.
Replace the wheel bearings in pairs.



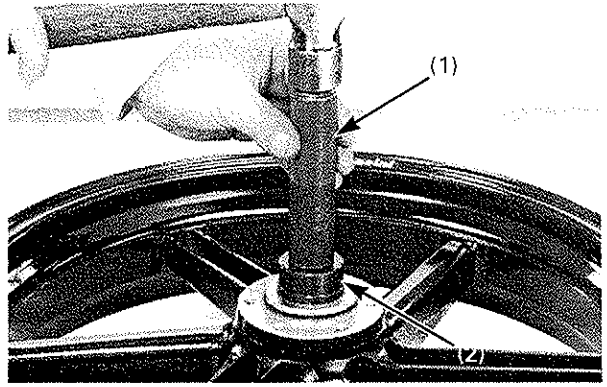
(1) DRIVER
(2) ATTACHMENT/PILOT

Assembly

Apply oil to the bearing outer surface.
Drive the new left wheel bearing into the hub until it seat.

Tools:

Driver	**07749–0010000**
Attachment, 42 X 47 mm	**07746–0010300**
Pilot, 25 mm	**07746–0040600**

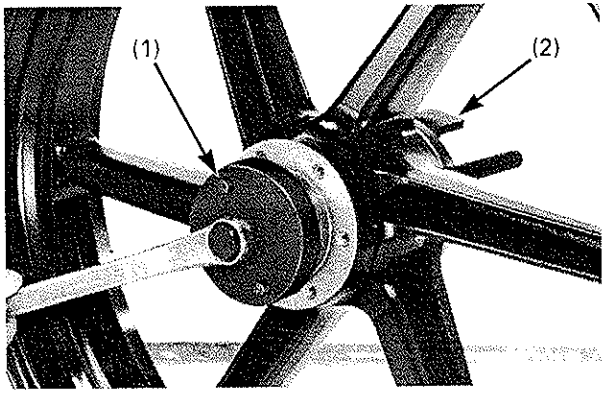


(1) DRIVER
(2) ATTACHMENT/PILOT

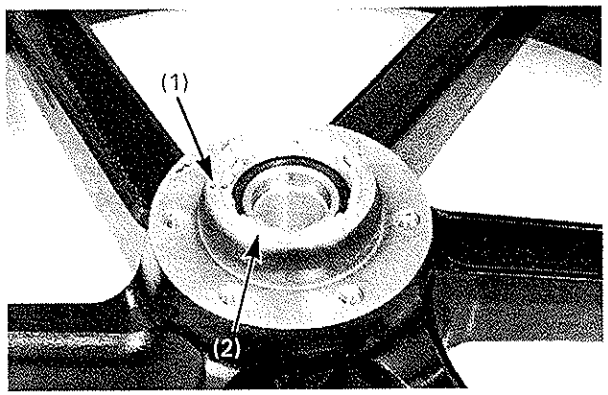
Install the distance collar, then drive the right side bearing into the hub using the same tools.

Tools:

Driver	**07749–0010000**
Attachment, 42 X 47 mm	**07746–0010300**
Pilot, 25 mm	**07746–0040600**



(1) RETAINER WRENCH B
(2) RETAINER WRENCH BODY



(1) BEARING RETAINER
(2) PUNCH

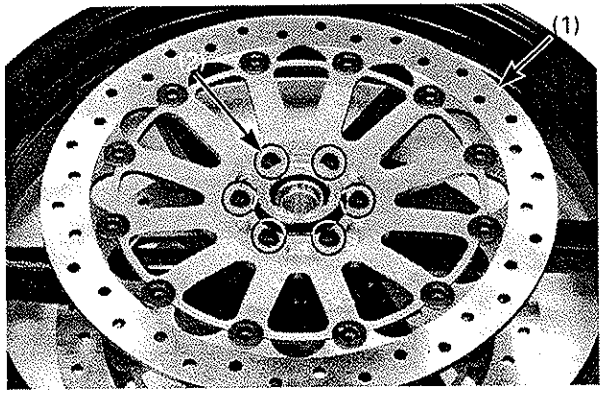
Apply molybdenum disulfide grease to the new bearing retainer threads and install it into the hub. Tighten the bearing retainer using the special tools.

Tools:

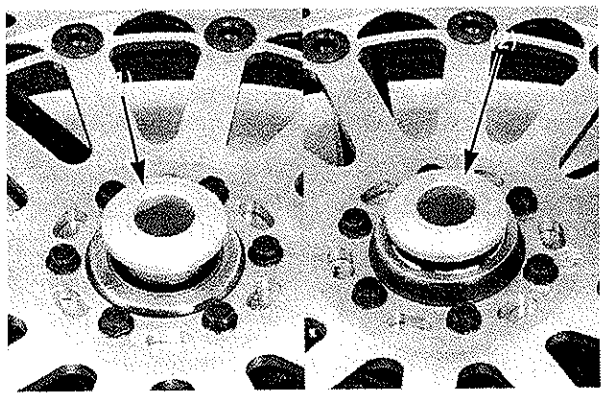
Retainer wrench B	**07710-0010200**
Retainer wrench body	**07710-0010401**

Torque: 39 N•m (4.0 kgf•m, 29 lbf•ft)

Secure the bearing retainer with a punch.



(1) BRAKE DISC
(2) BOLTS

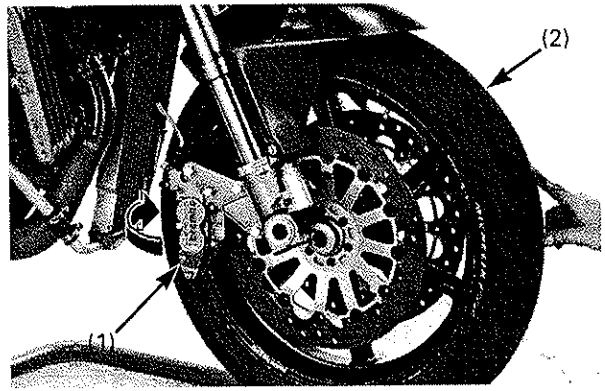


(1) RIGHT SIDE COLLAR
(2) LEFT SIDE COLLAR

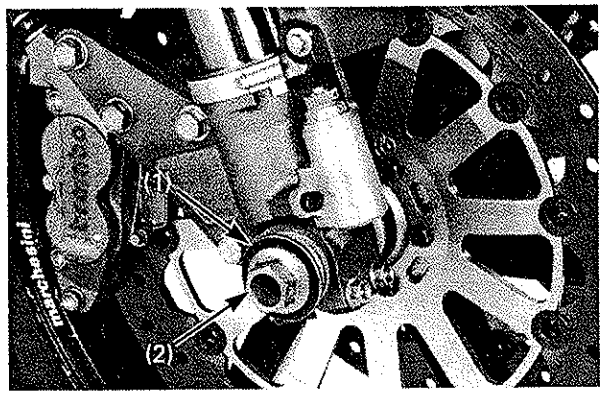
Install the brake discs and tighten the bolts to the specified torque.

Torque: 15 N•m (1.5 kgf•m, 11 lbf•ft)

Install the wheel side collars.



(1) CALIPER
(2) FRONT WHEEL ASSEMBLY

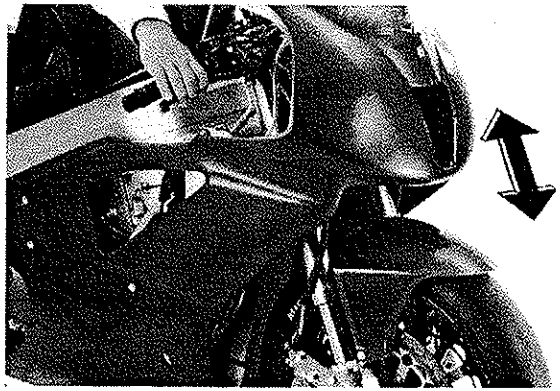


(1) AXLE WASHER
(2) AXLE

Installation/Axle Distance Adjustment

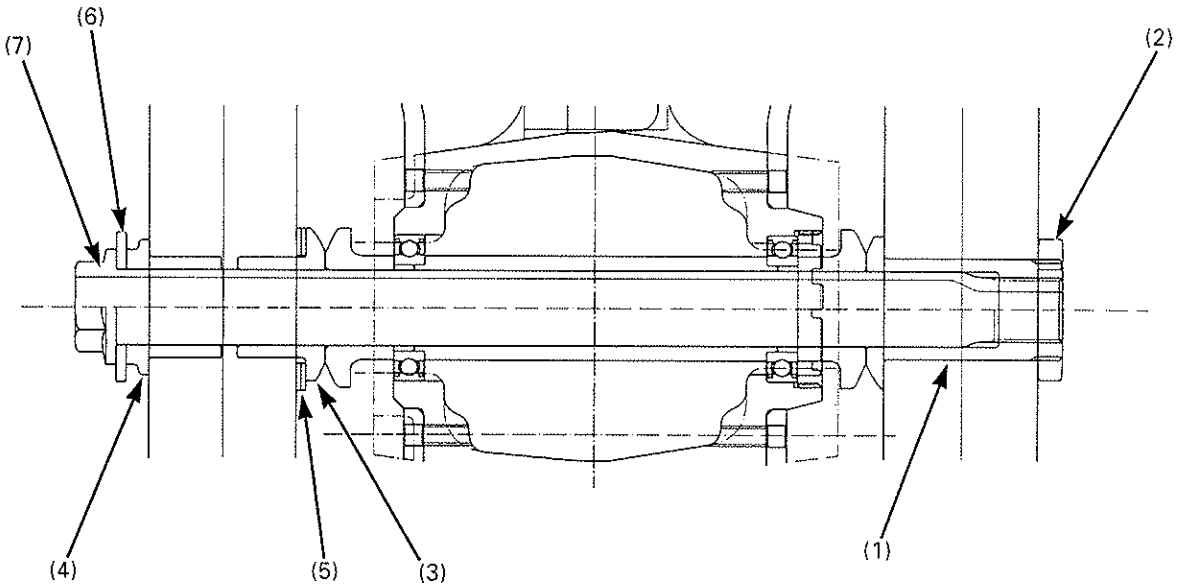
Place the front wheel between the folk legs and install the brake calipers onto the brake discs being careful not to damage the pad.

Apply thin coat of grease to the front axle surface.
Apply molybdenum disulfide grease to the axle threads.
Install the front axle washer and axle from the right side.

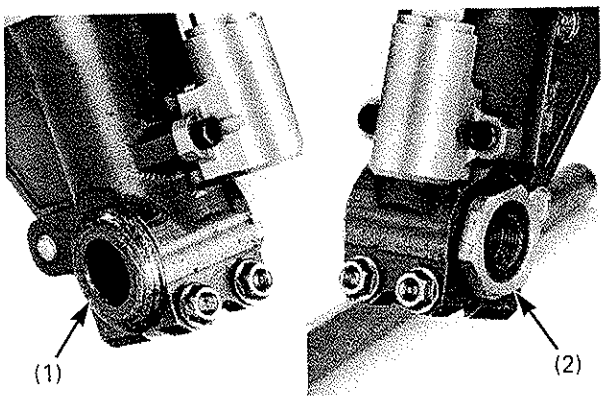


With the front brake applied, pump the fork up and down several times to parallel the fork.
Check the brake operation.

Front axle installed view from forward



(1) FRONT AXLE NUT
(2) AXLE SIDE NUT
(3) AXLE GUIDE A
(4) AXLE GUIDE B
(5) SHIMS
(6) AXLE WASHER
(7) AXLE BOLT

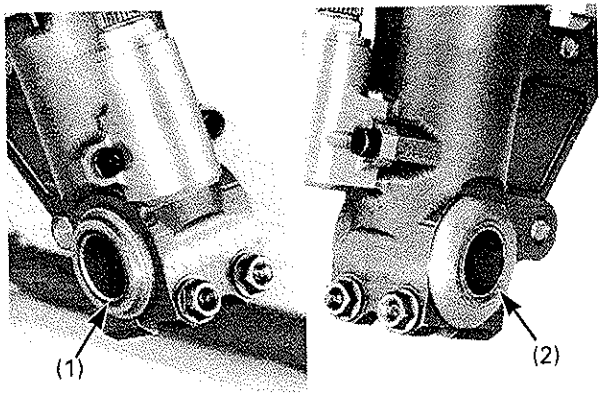


(1) AXLE NUT (2) AXLE SIDE NUT

If the wheel, fork leg, and/or distance collar has been replaced, adjust the axle distance as follow:

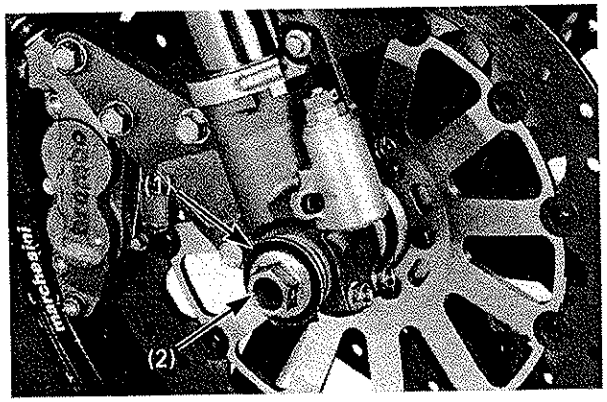
1. Apply molybdenum disulfide grease to the axle nut and axle side nut threads. Install the front axle nut into the left fork axle from the inside, install and tighten the axle side nut to the specified torque.

Torque: 83 N•m (8.5 kgf•m, 61 lbf•ft)



(1) AXLE GUIDE A
(2) AXLE GUIDE B

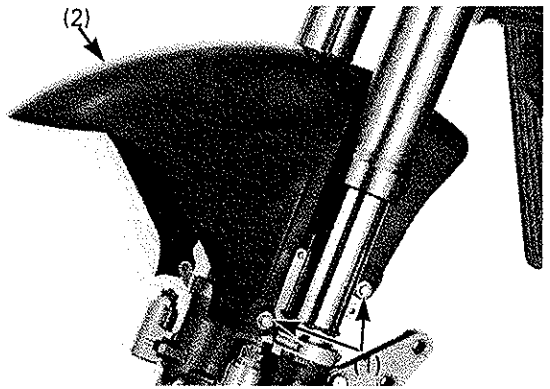
2. Install the front axle guide A and B into the right fork axle.
3. Temporarily install the front wheel between the fork legs and then install the front axle and axle washer but do not tighten.
4. With the front brake applied, pump the fork up and down several times to parallel the fork.
5. Measure the clearance between the right wheel distance collar and axle guide B.
6. Adjust the clearance by inserting shim(s) between the right fork axle holder and axle guide B.



(1) AXLE WASHER
(2) AXLE

Tighten the axle to the specified torque.

Torque: 59 N•m (6.0 kgf•m, 43 lbf•ft)



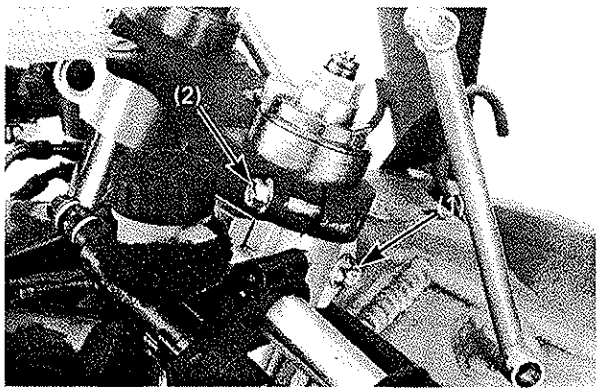
(1) BOLTS
(2) FRONT FENDER

Fork

Removal

Remove the front wheel (page 13-2).

Remove the bolts and front fender.

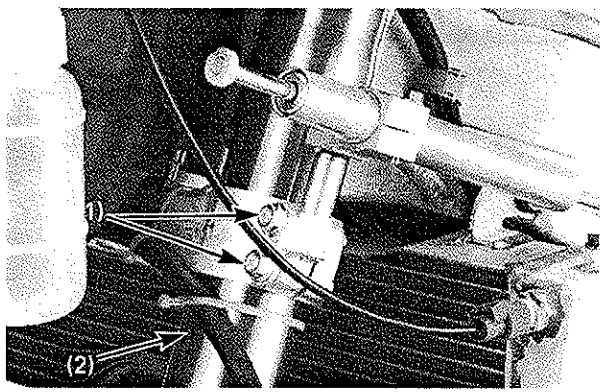


(1) HANDLEBAR HOLDER PINCH BOLT
(2) TOP BRIDGE PINCH BOLT

Loosen the handlebar holder pinch bolts.
Loosen the top bridge pinch bolts.
If the forks are to be disassembled, loosen the fork bolt.

NOTICE

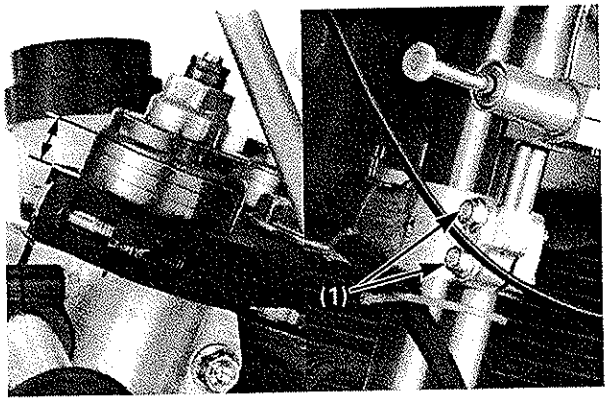
To avoid damaging the fork bolt threads, loosen the top bridge pinch bolt before loosening the fork bolts.



(1) BOTTOM BRIDGE PINCH BOLTS
(2) FORK LEG

Loosen the bottom bridge pinch bolts, and pull the fork tube down and out.

For fork maintenance see your authorized Showa service shop.



(1) 15 mm (0.6 in)
(2) BOTTOM BRIDGE PINCH BOLTS

Installation

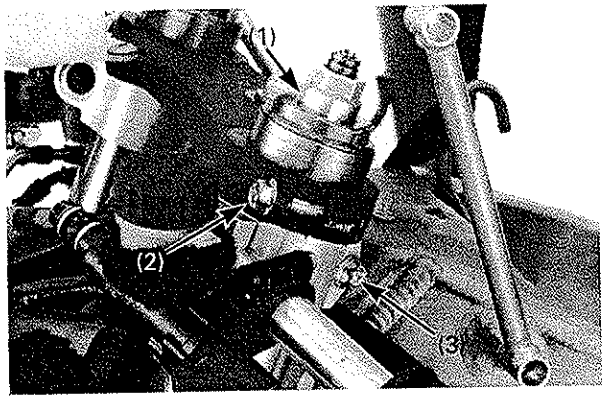
Apply molybdenum disulfide grease to the fork top and bottom pinch bolt threads and install them.
Install the fork leg.
Raise the fork through the bottom bridge, handlebar and top bridge.

Position the upper surface of the outer tube 15 mm (0.6 in) from top of the top bridge.
Tighten the bottom bridge pinch bolts to the specified torque.

Torque: 22 N•m (2.2 kgf•m, 16 lbf•ft)

NOTICE

Overtighten the pinch bolts can deform the outer tube. A deformed outer tube must be replaced.



(1) FORK BOLT
(2) TOP BRIDGE PINCH BOLT
(3) HANDLEBAR PINCH BOLT

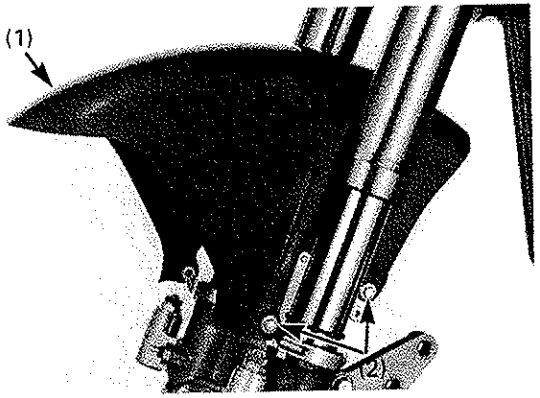
Tighten the fork bolt to the specified torque if it is removed or loosened.

Torque: 25 N•m (2.5 kgf•m, 18 lbf•ft)

Tighten the top bridge pinch bolt to the specified torque.

Torque: 22 N•m (2.2 kgf•m, 16 lbf•ft)

Apply molybdenum disulfide grease to the handlebar pinch bolt threads.
Adjust the handlebar position, tighten the pinch bolt.
Return the spring pre-load/rebound/compression adjusters to their original positions as noted during removal.

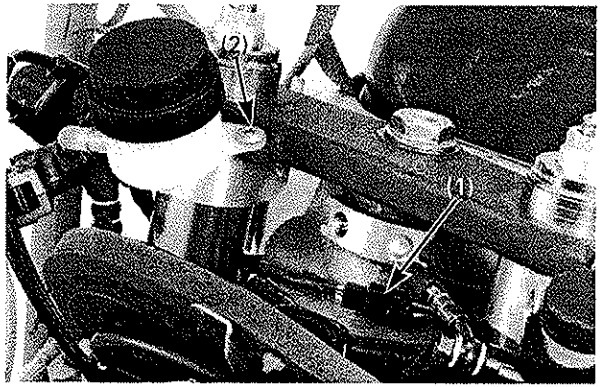


(1) FRONT FENDER
(2) BOLTS

Install the front fender and mounting bolts.

Install the front wheel (page 13-5).

Tighten the front fender mounting bolts securely.

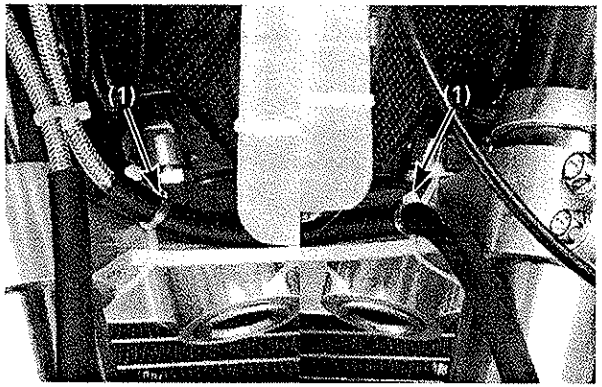


(1) 3P (BLACK) CONNECTOR
(2) RESERVOIR MOUNTING BOLT

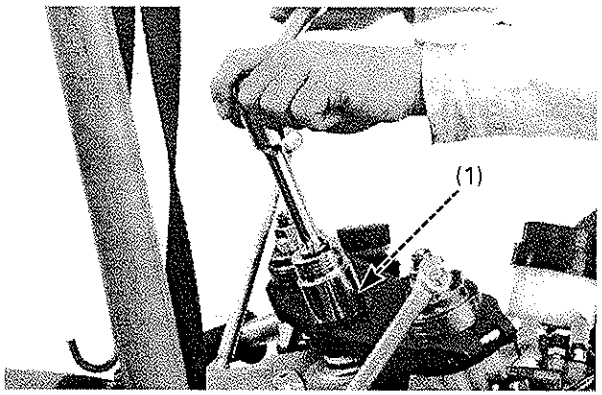
Steering Stem

Removal

Disconnect the engine stop switch 3P (Black) connector.
Remove the front brake master cylinder reservoir mounting bolt.



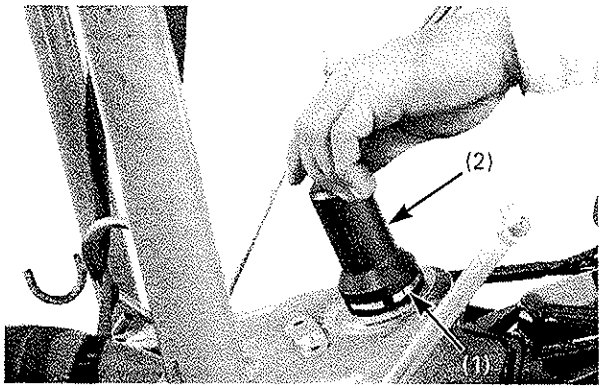
(1) TIE-WRAPS



(1) STEERING STEM NUT

Cut and remove the brake hose tie-wraps.

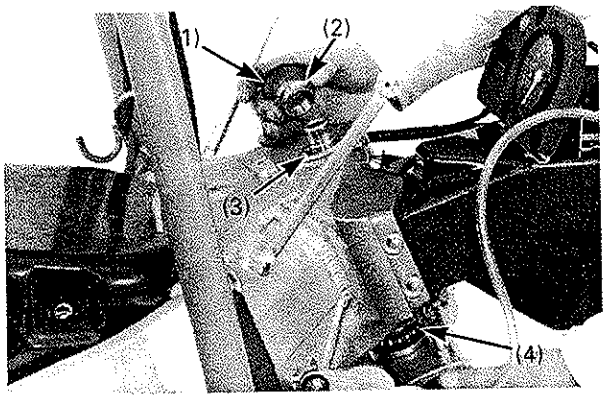
Remove the following:
- Front wheel (page 13-2)
- Steering stem nut
- Fork legs (page 13-9)
- Top bridge



(1) TOP THREAD
(2) STEERING STEM SOCKET

Remove the steering top thread using the special tool.

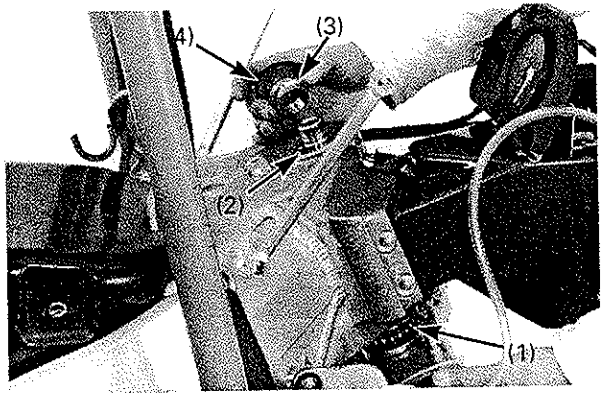
Tool:
Steering stem socket **07HMA-MR70100**



(1) DUST SEAL (2) UPPER INNER RACE
(3) UPPER BEARING (4) LOWER BEARING

Remove the following:
- Dust seal
- Upper inner race
- Upper bearing
- Steering stem/lower bearing

See VTR Service Manual for bearing races replacement.

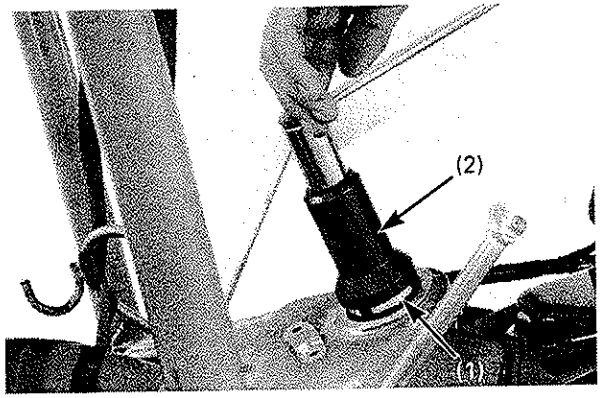


(1) LOWER BEARING (2) UPPER BEARING
(4) UPPER INNER RACE (5) DUST SEAL

Installation

Apply grease to the upper and lower bearings and races.

Install the lower bearing onto the steering stem.
Slide the steering stem through the steering head from the bottom.
Install the upper bearing, inner race and dust seal.

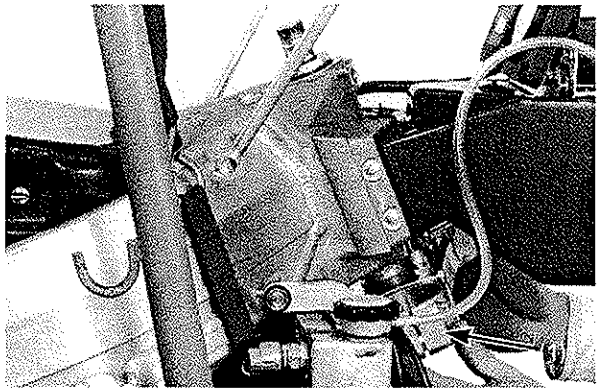


(1) TOP THREAD
(2) STEERING STEM SOCKET

Apply molybdenum disulfide grease to the steering head top thread.
Tighten the steering head top thread to the specified torque using the special tool.

Tool:
Steering stem socket 07HMA-MR70100

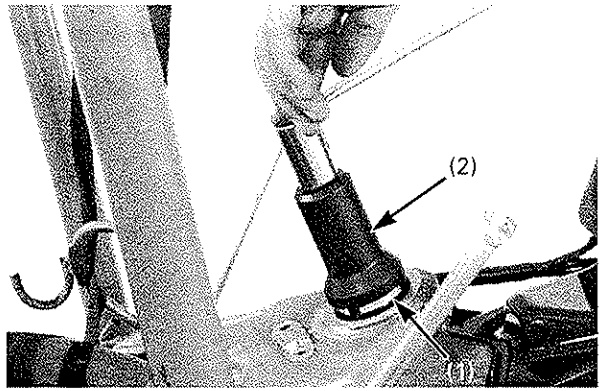
Torque: 25 N·m (2.5 kgf·m, 18 lbf·ft)



(1) STEERING STEM

Move the steering stem right and left, lock-to-lock several times to seat the bearings.

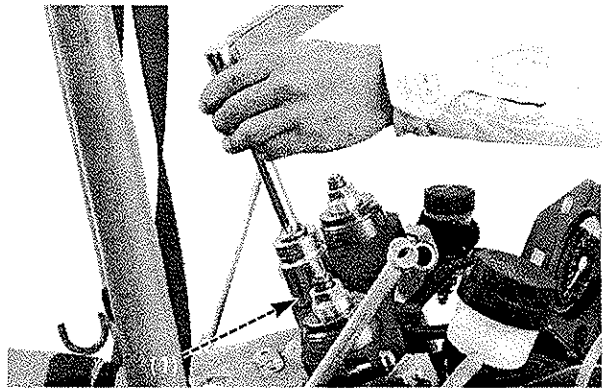
Make sure that the steering stem moves smoothly, without play or binding, then loosen the stem top thread.



(1) TOP THREAD
(2) STEERING STEM SOCKET

Retighten the top threads to the specified torque.

Torque: 16 N•m (1.6 kgf•m, 12 lbf•ft)

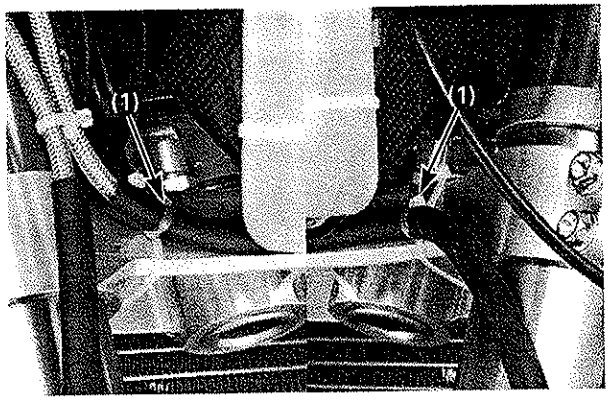


(1) STEERING STEM NUT

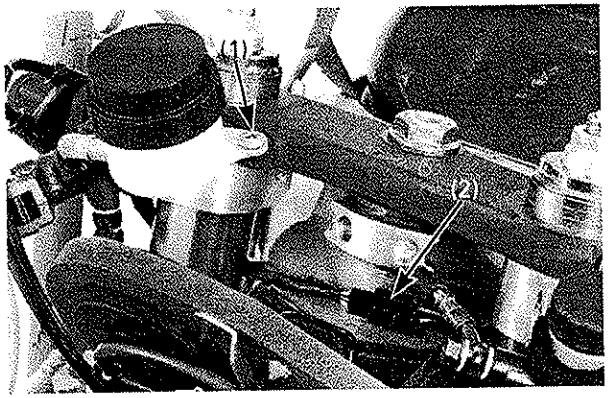
Install the following:
- Fork legs
- Top bridge

Apply molybdenum disulfide grease to the steering stem nut threads.
Install and tighten the steering stem nut to the specified torque.

Torque: 103 N•m (10.5 kgf•m, 76 lbf•ft)



(1) TIE-WRAPS



(1) RESERVOIR BOLT
(2) 3P (BLACK) CONNECTOR

Route the brake hoses properly and clamp the hoses using tie-wraps.

Install the brake master cylinder reservoir onto the top bridge and tighten the bolt.
Route and connect the engine stop switch 3P (Black) connector.

Install the front wheel (page 13-6).

Service Information	14-1	Suspension Linkage	14-9
Troubleshooting	14-1	Shock Absorber	14-9
Rear Wheel	14-2	Swingarm	14-11

Service Information

- Use genuine Honda bolts for the rear suspension linkage and shock absorber pivot and mounting; ordinary bolts lack adequate strength for these applications. Also take note of the installation direction of these bolts since they must be installed correctly.
- For optimum suspension performance and linkage components service life, the swingarm and shock linkage pivot bearings should be disassembled, cleaned, inspected for wear and lubricated with grease after each race.
- Optional rear wheel, sprockets, drive chain, shock absorbers are available. Refer to Parts List.
- A maintenance stand is required to support the machine.
- Refer to section 15 for brake system information.

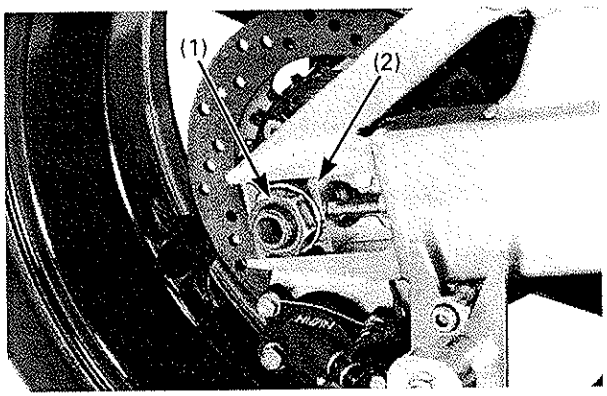
Troubleshooting

Soft suspension
- Weak shock absorber spring
- Oil leakage from damper unit

Hard suspension
- Incorrectly mounted suspension components
- Bent swingarm pivot
- Damaged swingarm pivot bearings

Steers to one side or does not track straight
- Bent rear axle
- Damaged swingarm pivot bearings

Rear wheel wobbling
- Bent wheel rim
- Worn axle bearings
- Faulty tire



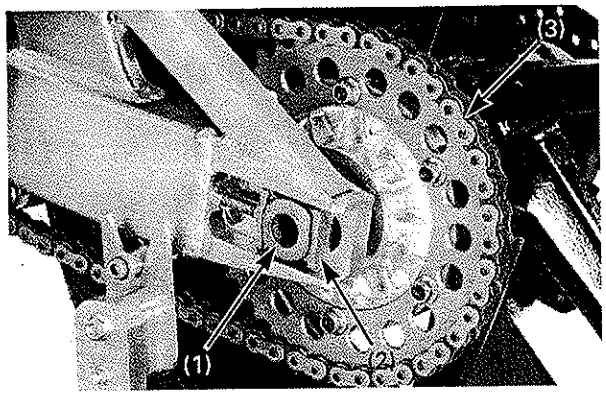
(1) REAR AXLE NUT/WASHER
(2) DRIVE CHAIN ADJUSTING PLATE

Rear Wheel

Removal

Raise the rear wheel off the ground, support the machine with the maintenance stand.

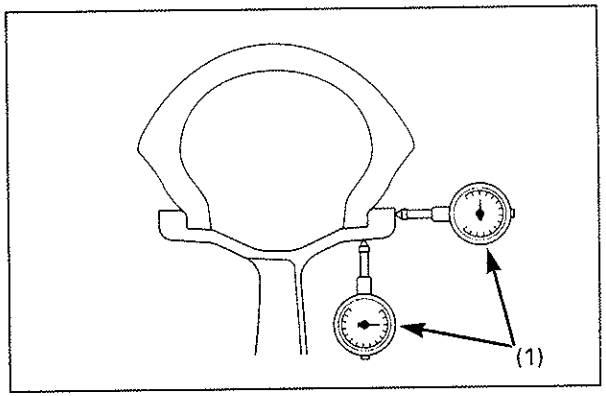
Remove the rear axle nut, washer and drive chain adjusting plate.



(1) REAR AXLE
(2) DRIVE CHAIN ADJUSTING PLATE
(3) DRIVE CHAIN

Push the rear wheel forward, derail the drive chain from the driven sprocket.

Remove the axle and drive chain adjusting plate, then remove the rear wheel.



(1) DIAL INDICATOR

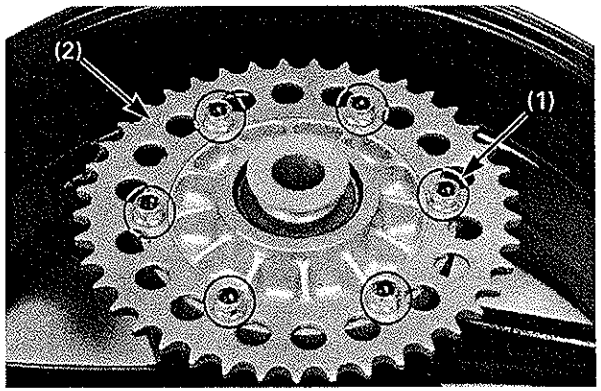
Inspection

Place the rear wheel in an inspection stand.
Spin the rear wheel slowly and measure the runout using a dial indicator.

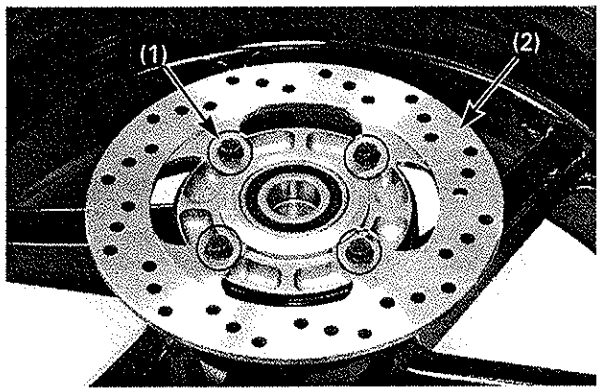
The wheel cannot be repaired and must be replaced with a new one if the runout exceeds the service limit.

Service limit: 0.5 mm (0.02 in)

Check the wheel balance (page 13-2).



(1) NUTS
(2) DRIVEN SPROCKET

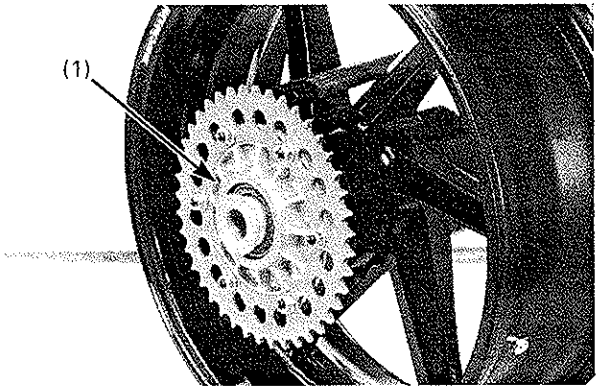


(1) BOLTS
(2) BRAKE DISC

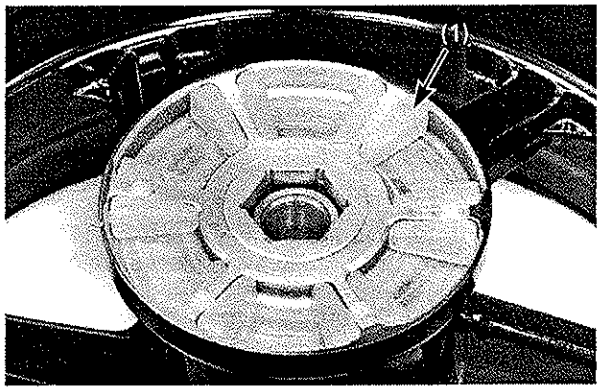
Disassembly

If you will replace the driven sprocket, loosen the driven sprocket nuts.

Remove the bolts and brake disc.



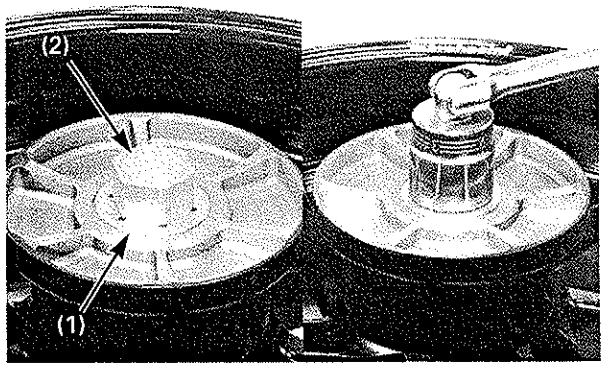
(1) DRIVEN FLANGE



(1) DAMPER RUBBERS

Remove the final driven flange assembly from the left wheel hub.

Remove the damper rubbers.



(1) BEARING RETAINER
(2) RETAINER TOOL

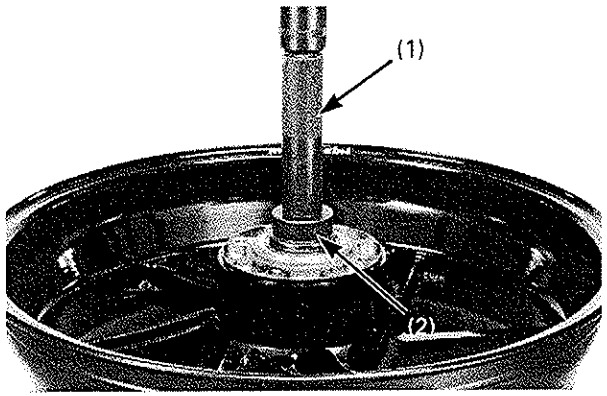
Wheel Bearing Replacement

Remove the wheel bearing retainer using the special tool.
The wheel bearing retainer has left hand threads.

Tool:

Retainer tool	**87000-NL6-000**

Remove the washer.



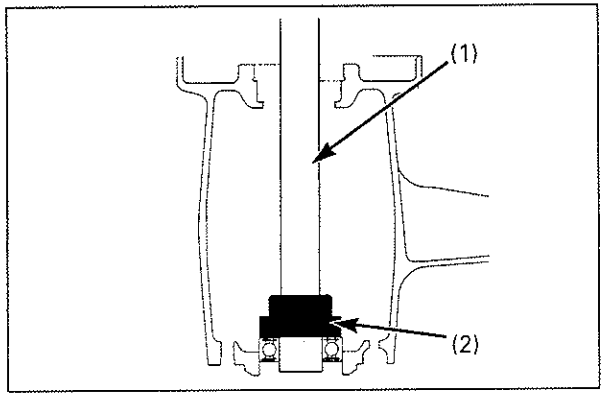
(1) DRIVER
(2) ATTACHMENT/PILOT

Press the right wheel bearing and distance collar using a special tools and a hydraulic press until the left wheel bearing is removed.

NOTICE

Press the right wheel bearing more than necessary, or the right bearing fall into the wheel hub.

Tools:	
Driver	**07749–0010000**
Attachment, 52 X 55 mm	**07746–0010400**
Pilot, 25 mm	**07746–0040600**

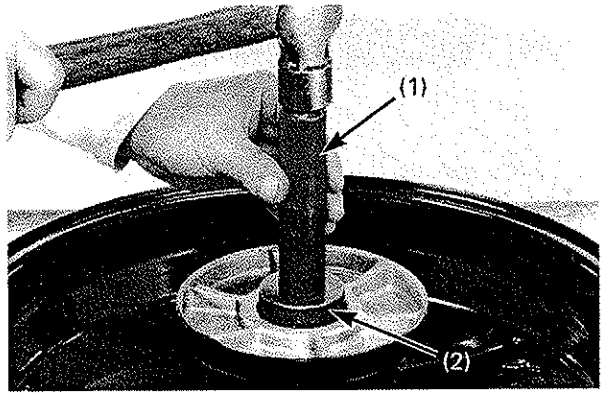


(1) DRIVER
(2) ATTACHMENT/PILOT

Remove the right side bearing using the special tools.

Tools:	
Driver	**07749–0010000**
Attachment, 52 X 55 mm	**07746–0010400**
Pilot, 25 mm	**07746–0040600**

Never install oil bearings; once the bearing have been removed, they must be replaced with new ones.
Replace the wheel bearings in pairs.

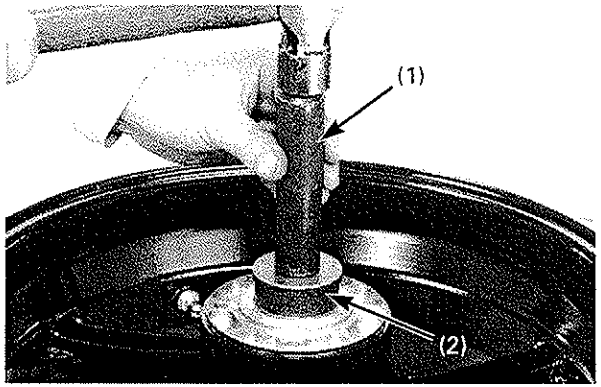


(1) DRIVER
(2) ATTACHMENT/PILOT

Assembly

Apply oil to the bearing outer surface.
Drive the new left wheel bearing into the hub until it seat.

Tools:	
Driver	**07749–0010000**
Attachment, 52 X 55 mm	**07746–0010400**
Pilot, 25 mm	**07746–0040600**

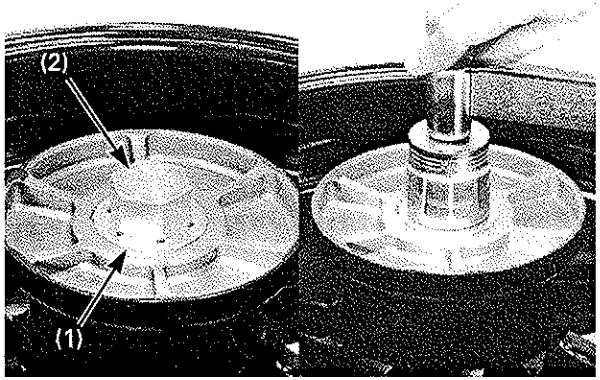


(1) DRIVER
(2) ATTACHMENT/PILOT

Install the distance collar, then drive the right side bearing into the hub using the same tools.

Tools:

Driver	**07749-0010000**
Attachment, 52 X 55 mm	**07746-0010400**
Pilot, 25 mm	**07746-0040600**



(1) BEARING RETAINER
(2) RETAINER TOOL

Install the washer.

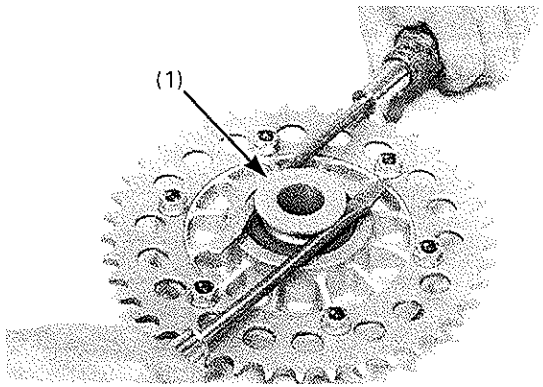
Apply a locking agent to the bearing retainer threads and install it into the hub.
The bearing retainer has left hand threads.

Tighten the bearing retainer to the specified torque.

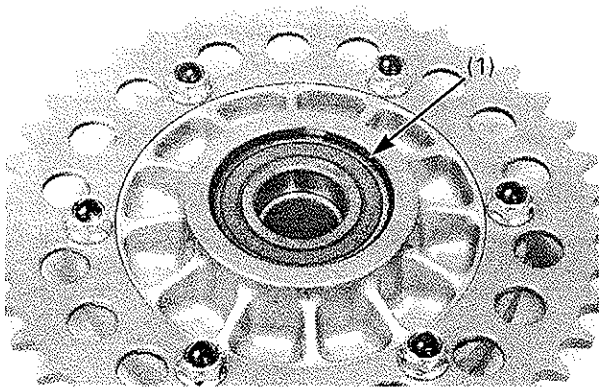
Tool:

Retainer tool	**87000-NL6-000**

Torque: 98 N·m (10.0 kgf·m, 72 lbf·ft)



(1) LEFT SIDE COLLAR



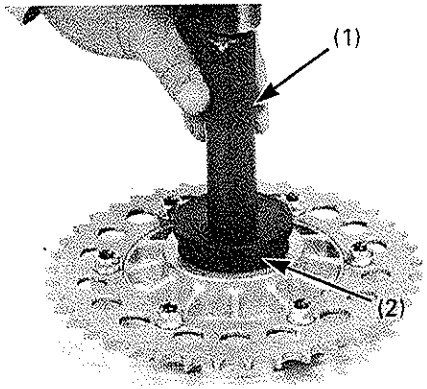
(1) CIRCLIP

Driven flange bearing replacement

Remove the driven flange left side collar using two screwdrivers as shown.

Remove the circlip from the drive flange.

Drive out the driven flange bearing and right side collar as an assembly from the driven flange.

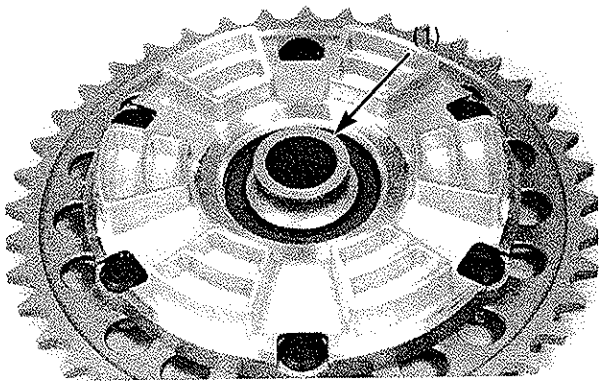


(1) DRIVER
(2) ATTACHMENT/PILOT

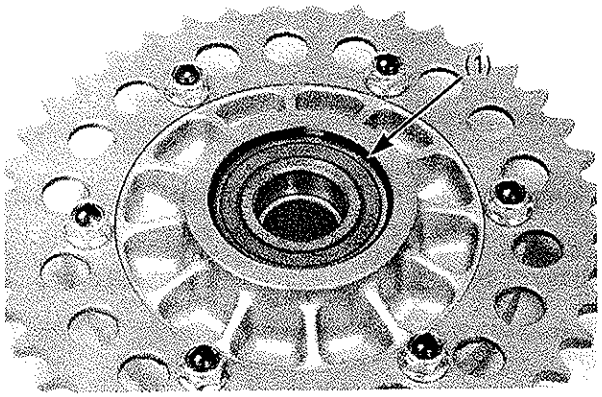
Drive the new driven flange bearing into the driven flange until it seat using the special tools.

Tools:

Driver	**07749-0010000**
Attachment, 62 X 68 mm	**07746-0010500**
Pilot, 25 mm	**07746-0040600**



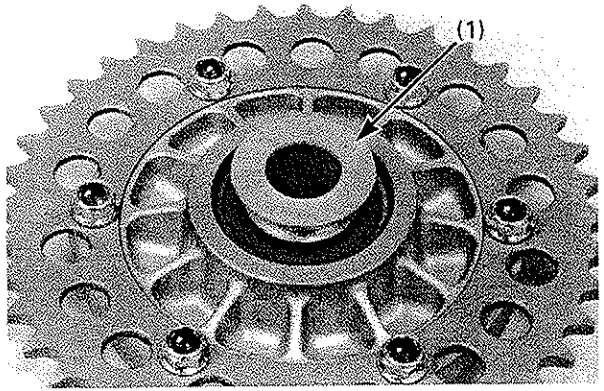
(1) RIGHT SIDE COLLAR



(1) CIRCLIP

Install the driven flange right side collar.

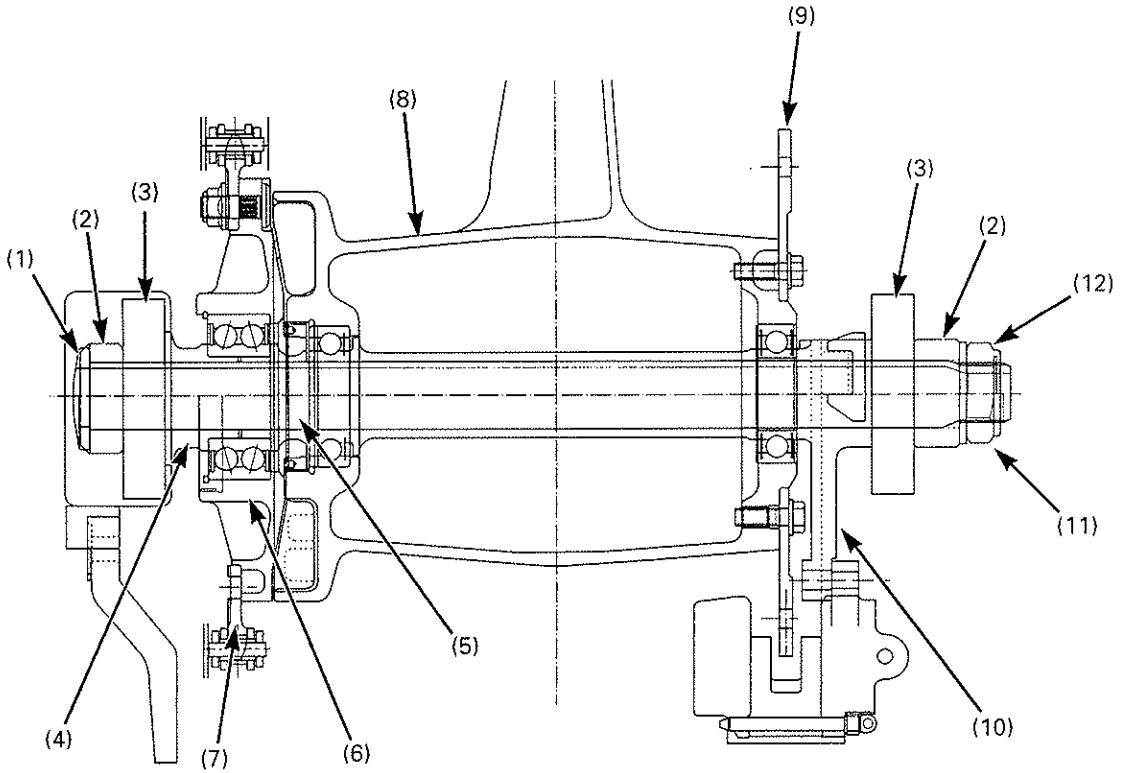
Install the circlip into the groove securely.



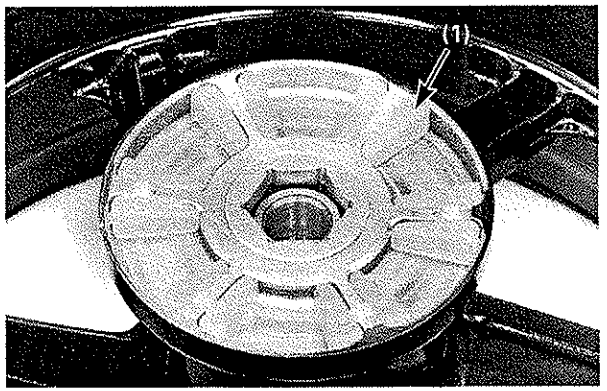
(1) LEFT SIDE COLLAR

Install the driven flange left side collar.

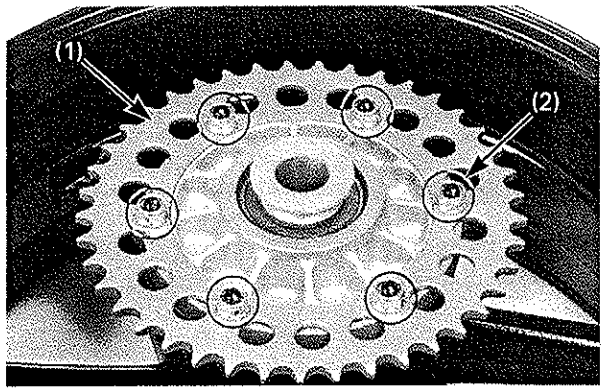
Assembly



(1) REAR AXLE
(2) DRIVE CHAIN ADJUSTING PLATE
(3) SWINGARM
(4) DRIVEN FLANGE LEFT SIDE COLLAR
(5) DRIVEN FLANGE RIGHT SIDE COLLAR
(6) DRIVEN FLANGE
(7) DRIVEN SPROCKET
(8) REAR WHEEL
(9) BRAKE DISC
(10) BRAKE CALIPER BRACKET
(11) THRUST WASHER
(12) REAR AXLE NUT



(1) DAMPER RUBBERS

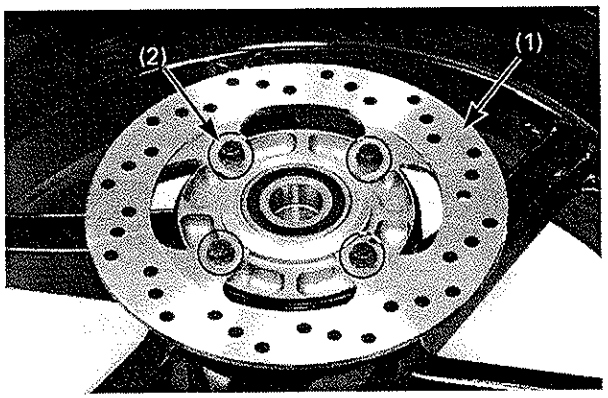


(1) DRIVEN SPROCKET
(2) NUTS

Install the damper rubbers into the left wheel hub.

Install the final driven flange assembly onto the left wheel hub.
If the driven sprocket is removed, apply oil to the driven flange nut threads and seating surfaces.
Tighten the driven sprocket nuts to the specified torque.

Torque: 34 N·m (3.5 kgf·m, 25 lbf·ft)

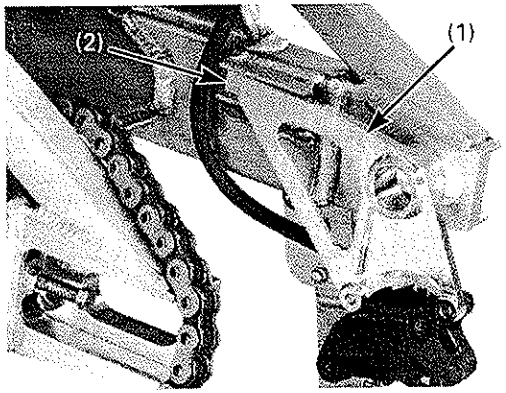


(1) BRAKE DISC
(2) BOLTS

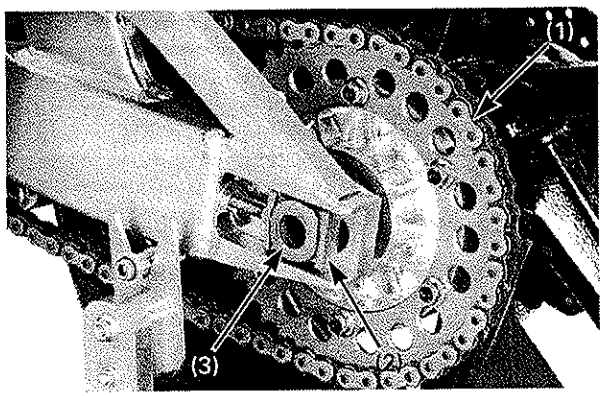
Install the brake disc onto the right wheel hub. Note the direction of the brake disc.

Install and tighten the brake disc mounting bolts to the specified torque.

Torque: 15 N•m (1.5 kgf•m, 11 lbf•ft)



(1) REAR BRAKE CALIPER BRACKET
(2) BOSS/GROOVE

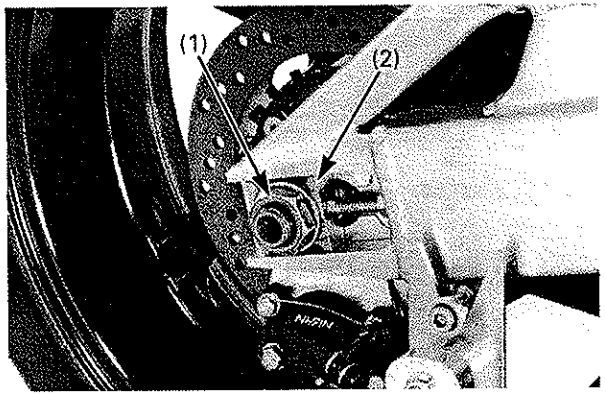


(1) DRIVE CHAIN
(2) DRIVE CHAIN ADJUSTING PLATE
(3) REAR AXLE

Installation

Make sure that the rear brake caliper bracket boss is positioned in the swingarm groove.

Place the rear wheel between the swingarm.
Install the drive chain onto the driven sprocket.
Apply thin coat of grease to the rear axle surface.
Install the drive chain adjusting plate and rear axle from the left side.



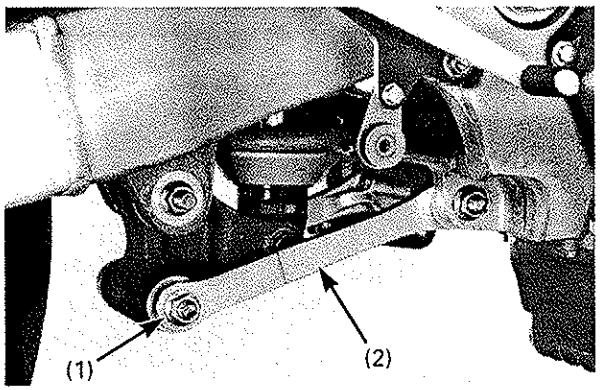
(1) WASHER
(2) REAR AXLE NUT

Install the drive chain adjusting plate and washer. Apply molybdenum disulfide grease to the rear axle nut threads and install it.

Adjust the drive chain slack (page 3-10).

Tighten the axle nut to the specified torque.

Torque: 88 N•m (9.0 kgf•m, 65 lbf•ft)



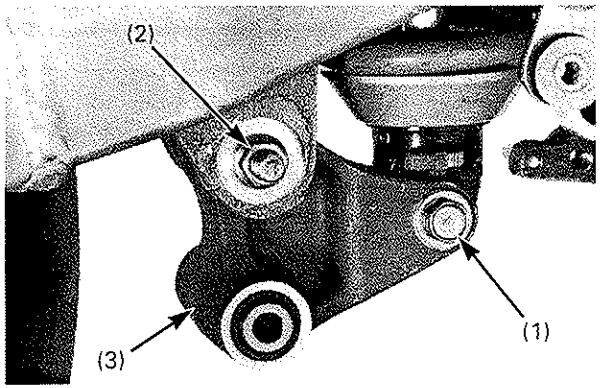
(1) BOLTS/NUTS
(2) SHOCK LINK

Suspension Linkage

Removal

Support the machine securely using a hoist or equivalent.
Remove the exhaust pipe.

Remove the shock link-to-shock arm bolt/nut.
Remove the shock link-to-frame bolt/nut, then remove the shock link.



(1) LOWER MOUNTING BOLT/NUT
(2) BOLT/NUT
(3) SHOCK ARM

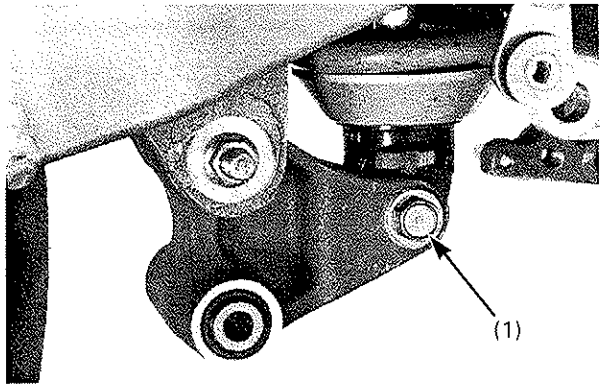
Remove the rear shock absorber lower mounting bolt/nut.
Remove the shock arm-to-swingarm bolt/nut, then remove the shock arm.

See VTR Service Manual for suspension linkage bearing replacement.

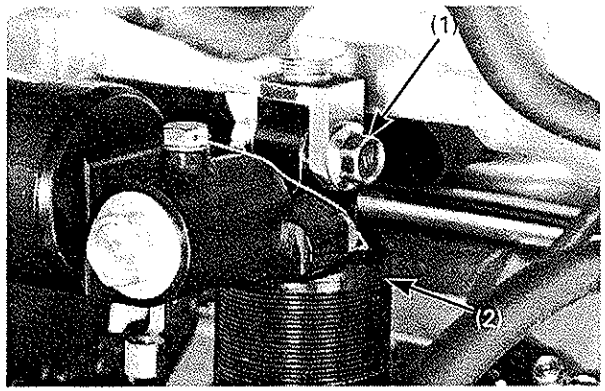
Installation

Installation is in the reverse order of removal.
Tighten the shock arm, shock link and shock absorber lower mounting bolts/nuts to the specified torque.

Torque: 44 N·m (4.5 kgf·m, 33 lbf·ft)



(1) LOWER MOUNTING BOLT/NUT

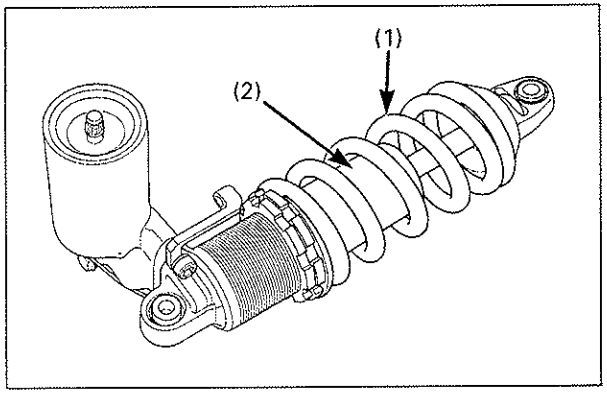


(1) UPPER MOUNTING BOLT/NUT
(2) SHOCK ABSORBER

Shock Absorber

Removal

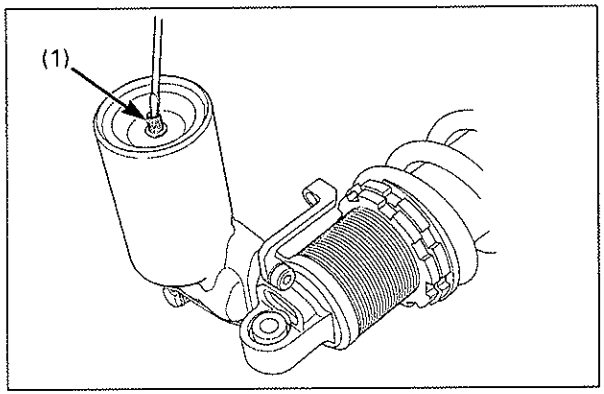
Remove the shock link (see previous steps).
Remove the shock absorber lower mounting bolt/nut.
Remove the shock absorber upper mounting bolt/nut, then remove the shock absorber from the frame.



(1) SPRING
(2) DAMPER UNIT

Inspection

Check the damper unit for leakage or other damage.
Check the upper and lower joint spherical bearing for wear or damage.



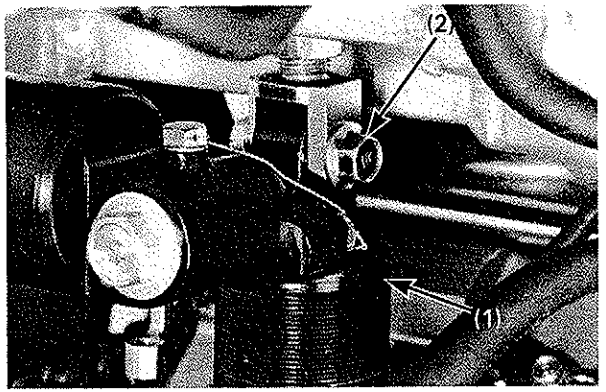
(1) VALVE

Nitrogen releasing procedure

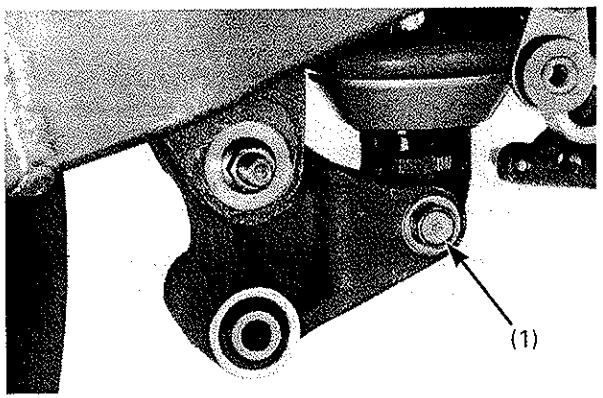
Wear adequate eye protection.
Point the valve away from you to prevent debris getting into your eyes.
Remove the reservoir valve cap.
Release the nitrogen from the reservoir by depressing the valve core until pressure is released.

Before disposal of the shock absorber, release the nitrogen from the reservoir and then remove the valve core.

For shock absorber maintenance see your authorized Showa service.



(1) SHOCK ABSORBER
(2) UPPER MOUNTING BOLT/NUT



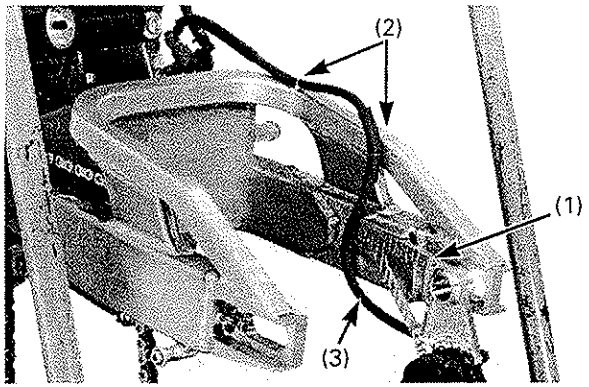
(1) LOWER MOUNTING BOLT/NUT

Install the shock absorber into the frame, install and tighten the upper mounting bolt/nut to the specified torque.

Torque: 44 N•m (4.5 kgf•m, 33 lbf•ft)

Install and tighten the shock absorber lower mounting bolt/nut to the specified torque.

Torque: 44 N•m (4.5 kgf•m, 33 lbf•ft)



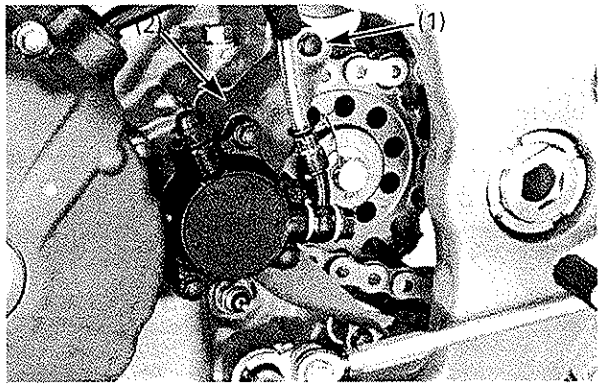
(1) REAR CALIPER BRACKET
(2) TIE-WRAPS
(3) BRAKE HOSE

Swingarm

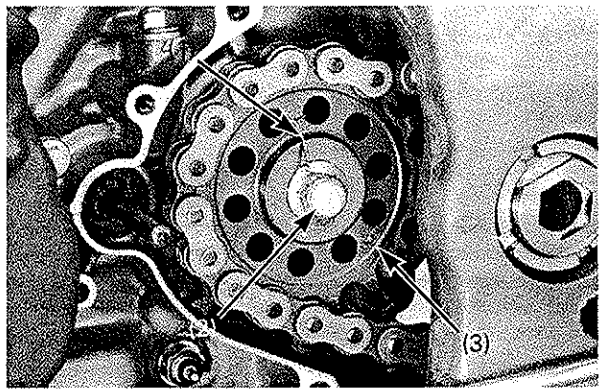
Removal

Remove the following:
- Exhaust system
- Rear wheel (page 14-2)

Cut and remove the rear brake hose tie-wraps.
Remove the rear brake caliper bracket from the swingarm.



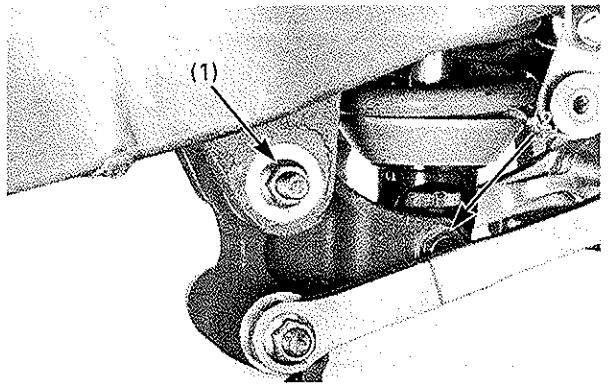
(1) BOLTS
(2) DRIVE SPROCKET COVER



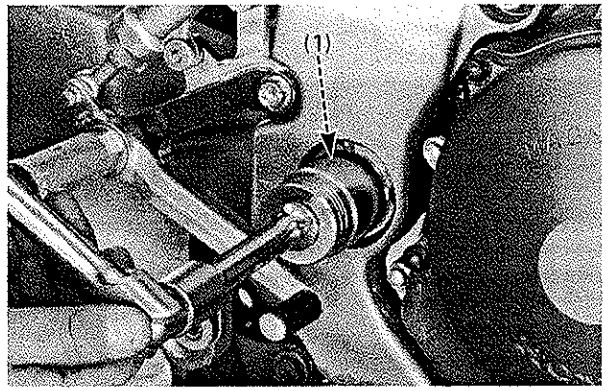
(1) LOCKING WIRE
(2) BOLT/WASHER
(3) DRIVE SPROCKET

Remove the bolts, clutch slave cylinder and drive sprocket cover.

Cut and remove the drive sprocket bolt locking wire.
Remove the drive sprocket bolt, washer and drive sprocket.



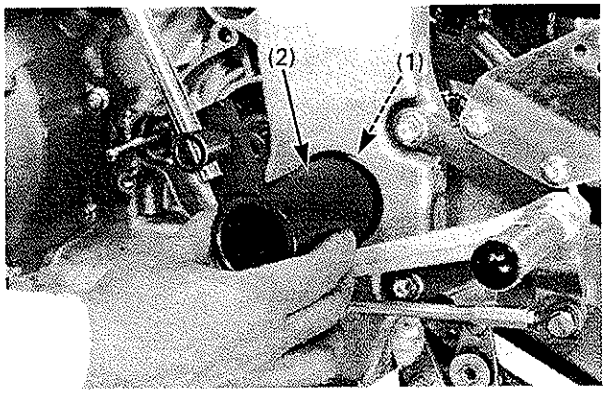
(1) SHOCK ARM BOLT/NUT
(2) LOWER MOUNTING BOLT/NUT



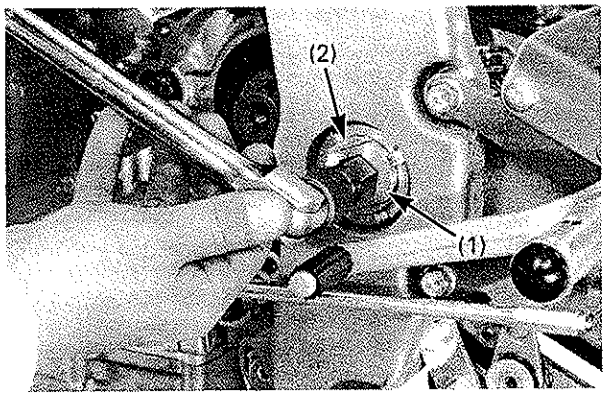
(1) PIVOT NUT/WASHER

Remove the shock arm-to-swingarm bolt/nut.
Remove the shock absorber lower mounting bolt/nut.

Remove the swingarm pivot nut and washer.



(1) LEFT LOCK NUT
(2) LOCK NUT WRENCH

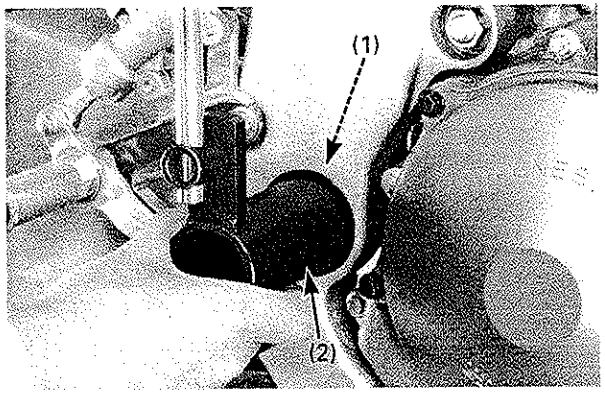


(1) PIVOT BOLT
(2) LEFT ADJUSTING BOLT

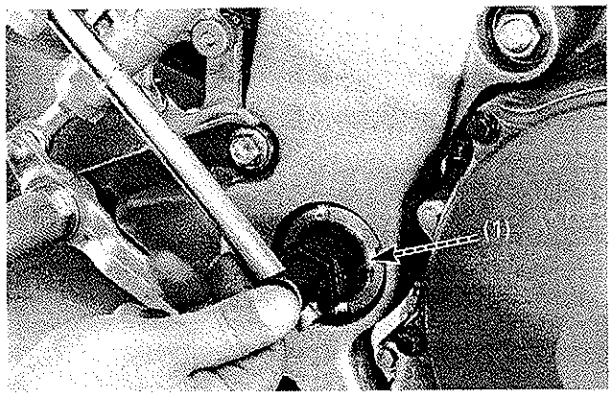
Loosen the left lock nut with the special tool.

Tool:
Lock nut wrench, 5.8 X 46 mm 07YMA-MCF0100

Loosen the left pivot adjusting bolt with the pivot bolt.



(1) RIGHT LOCK NUT
(2) LOCK NUT WRENCH



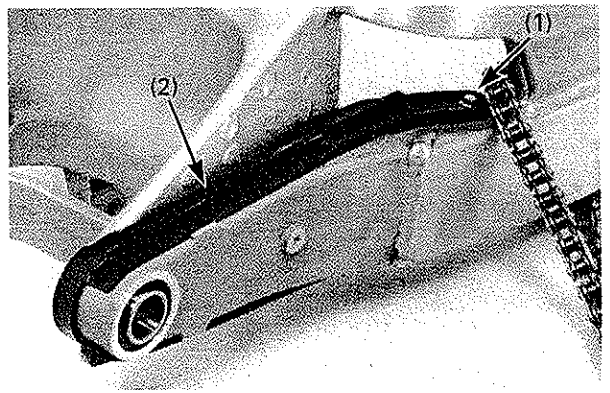
(1) RIGHT ADJUSTING BOLT

Loosen the right lock nut with the special tool.

Tool:
Lock nut wrench, 5.8 X 46 mm 07YMA-MCF0100

Loosen the right pivot adjusting bolt.

Remove the pivot bolt and the swingarm.



(1) BOLTS/COLLARS
(2) DRIVE CHAIN SLIDER

Disassembly

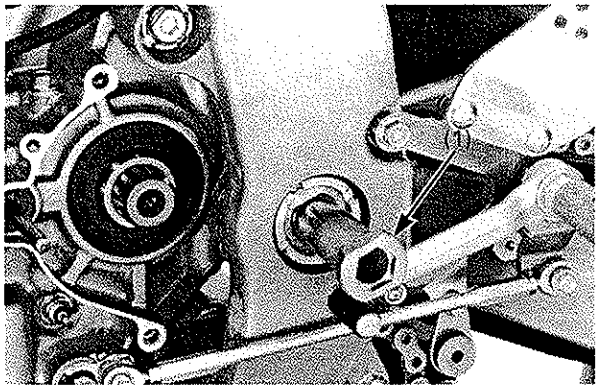
Remove the bolts, collars and drive chain slider.

See VTR Service Manual for swingarm pivot bearing replacement.

Assembly

Install the drive chain slider onto the swingarm. Apply a locking agent to the slider bolt threads. Install the collars and slider bolts, and tighten the bolts to the specified torque.

Torque: 9 N•m (0.9 kgf•m, 6.5 kgf•m)



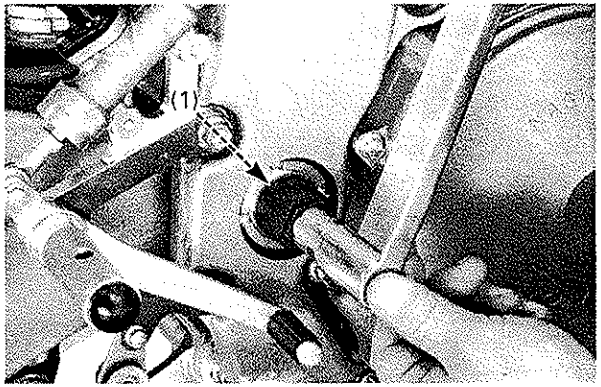
(1) PIVOT BOLT

Installation

When tightening the lock nut with the lock nut wrench, refer to torque wrench reading information on page 14-1 Service Information.

Apply molybdenum disulfide grease to the all the swingarm pivot adjusting bolt threads and lock nut threads.
Install the adjusting bolts into the frame so that the end of the adjusting bolt does not protrude inside of the frame.

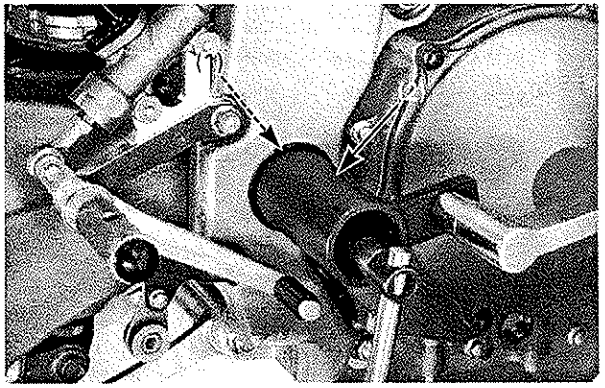
Apply thin coat of grease to the swingarm pivot surface.
Install the swingarm between the engine and frame and insert the pivot bolt from the left side.



(1) RIGHT ADJUSTING BOLT

Tighten the right pivot adjusting bolt to the specified torque.

Torque: 15 N•m (1.5 kgf•m, 11 lbf•ft)

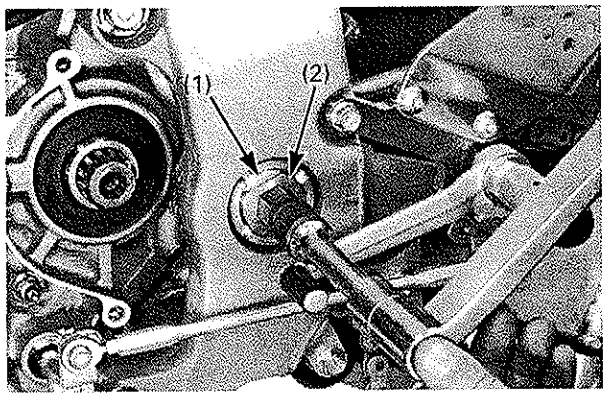


(1) RIGHT LOCK NUT
(2) LOCK NUT WRENCH

Hold the right pivot adjusting bolt and tighten the right pivot lock nut to the specified torque using the special tool.

Tool:
Lock nut wrench, 5.8 X 46 mm 07YMA–MCF0100

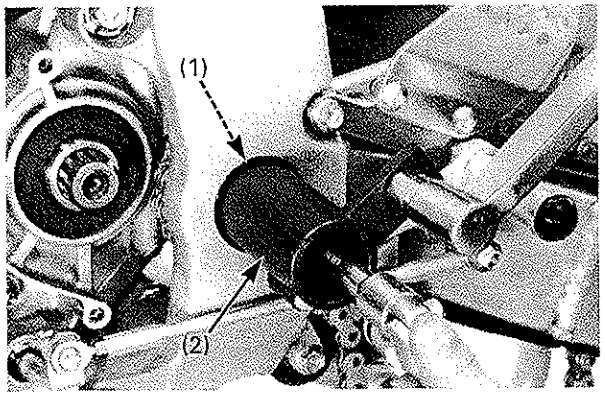
Torque:
Actual:
69 N•m (7.0 kgf•m, 51 lbf•ft)
Scale reading:
62 N•m (6.3 kgf•m, 46 lbf•ft)



(1) LEFT ADJUSTING BOLT
(2) PIVOT BOLT

Tighten the left pivot adjusting bolt with the pivot bolt to the specified torque.

Torque: 15 N•m (1.5 kgf•m, 11 lbf•ft)

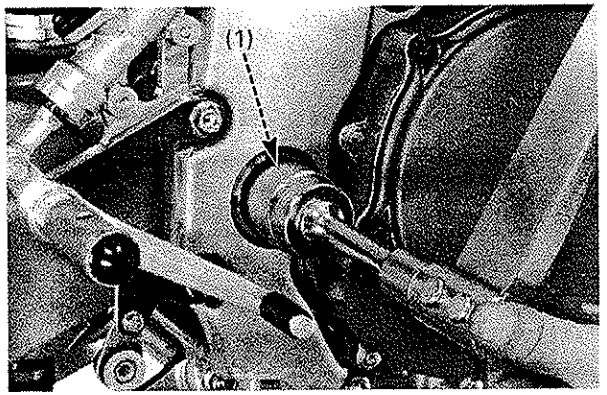


(1) LEFT LOCK NUT
(2) LOCK NUT WRENCH

Hold the right pivot adjusting bolt and tighten the right pivot lock nut to the specified torque using the special tool.

Tool:
Lock nut wrench, 5.8 X 46 mm 07YMA–MCF0100

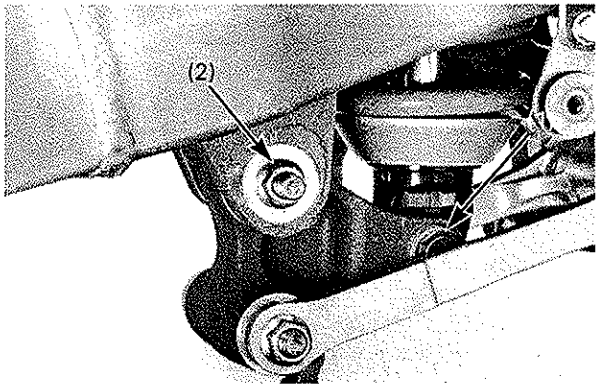
Torque:
Actual:
69 N•m (7.0 kgf•m, 51 lbf•ft)
Scale reading:
62 N•m (6.3 kgf•m, 46 lbf•ft)



(1) WASHER/PIVOT NUT

Install the washer and pivot nut, tighten the nut to the specified torque.

Torque: 127 N•m (13.0 kgf•m, 94 lbf•ft)



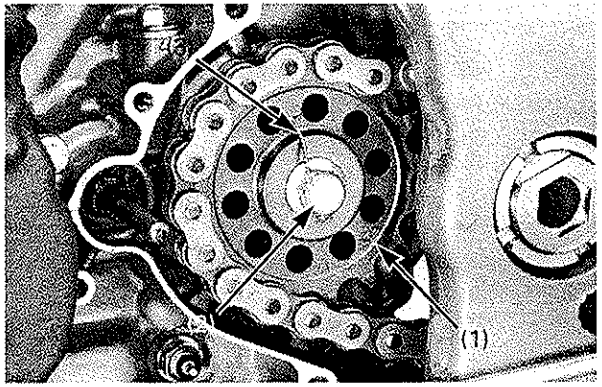
(1) LOWER MOUNTING BOLT/NUT
(2) SHOCK ARM BOLT/NUT

Install and tighten the shock absorber lower mounting bolt/nut to the specified torque.

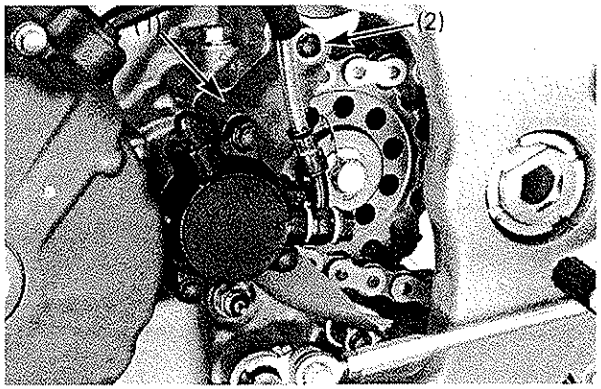
Torque: 44 N•m (4.5 kgf•m, 33 lbf•ft)

Install and tighten the shock arm-to-swingarm bolt/nut to the specified torque.

Torque: 44 N•m (4.5 kgf•m, 33 lbf•ft)



(1) DRIVE SPROCKET
(2) WASHER/BOLT
(3) LOCKING WIRE

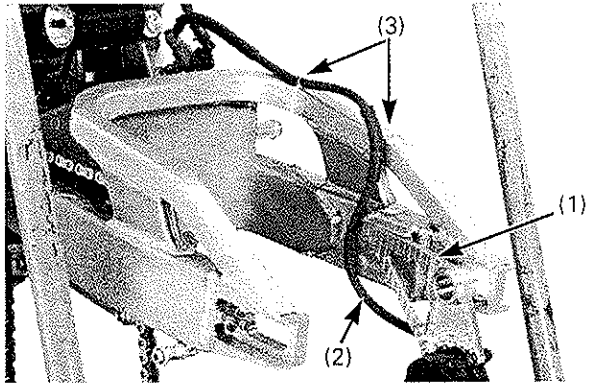


(1) DRIVE SPROCKET COVER
(2) BOLTS

Install the drive sprocket with its marking facing out. Install the washer and bolt, tighten the bolt to the specified torque.

Torque: 54 N•m (5.5 kgf•m, 40 lbf•ft)

Install the drive sprocket cover and clutch slave cylinder, tighten the bolts securely.



(1) REAR BRAKE CALIPER BRACKET
(2) BRAKE HOSE
(3) TIE-WRAPS

Route the brake hose properly, install the rear brake caliper bracket onto the swingarm while aligning the bracket boss with the groove on the swingarm. Secure the brake hose using tie-wraps as shown.

Install the removed parts in the reverse order of removal.

Memo

Service Information	**15-1**	**Rear Brake Caliper**	**15-5**
Troubleshooting	**15-1**	**Front Master Cylinder**	**15-7**
Brake Pad Replacement	**15-2**	**Rear Master Cylinder**	**15-8**
Front Brake Caliper	**15-4**		

Service Information

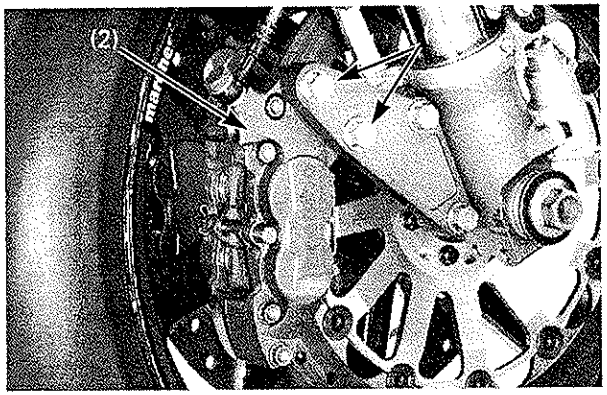
- Bleed the hydraulic system if it has been disassembled or if the brake feels spongy.
- Do not allow foreign material to enter the system when filling the reservoir.
- Always use fresh DOT4 brake fluid from a sealed container.
- Always check the brake operation before riding the machine.

Troubleshooting

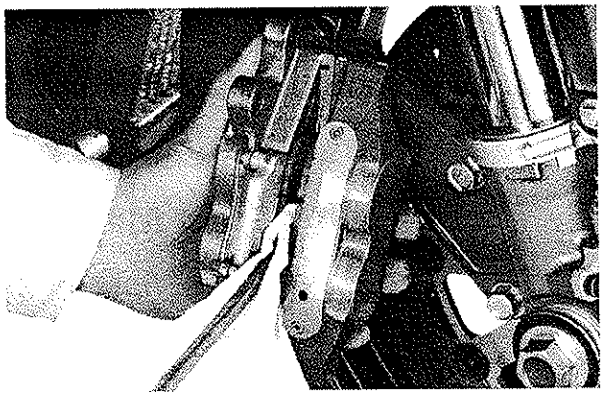
Brake lever (pedal) soft or spongy
- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pads/disc
- Worn caliper piston seal
- Worn master cylinder piston seal
- Worn brake pads/disc
- Contaminated caliper
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master cylinder
- Contaminated master cylinder
- Bent brake lever or pedal

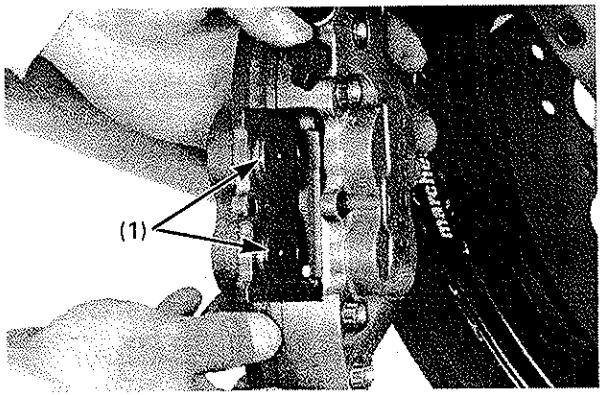
Brake lever (pedal) hard
- Clogged /restricted brake system
- Sticking/worn caliper piston
- Clogged/restricted fluid passage
- Worn caliper piston seal
- Sticking/worn master cylinder piston
- Bent brake lever or pedal

Brake drag
- Contaminated brake pads/disc
- Misaligned wheel
- Worn brake pads/disc
- Warped/deformed brake disc



(1) BOLTS (2) BRAKE CALIPER





(1) CALIPER PISTONS

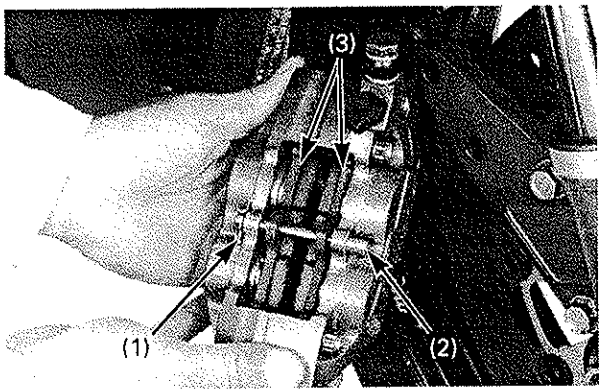
Brake Pad Replacement

Front Brake Pad Replacement

Use genuine parts specified by HRC (listed in the parts list at the end of this manual) for the pads.

Clean the brake disc or pads with a high quality brake degreasing agent if they are contaminated with oil or grease. If the pads can not be cleaned, replace them.

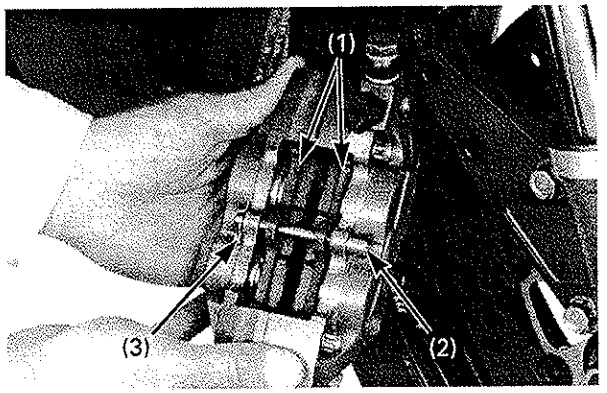
Remove the brake caliper mounting bolts and caliper.



(1) B-CLIP (2) PAD PIN
(3) BRAKE PADS

Push the pistons all the way in to allow installation if new brake pads.
Check the brake fluid level in the reservoir as this operation causes the level to rise.

Remove the B-clip.
Tap the pad pin end with plastic hammer, then remove the pad pin.
Remove the brake pads.

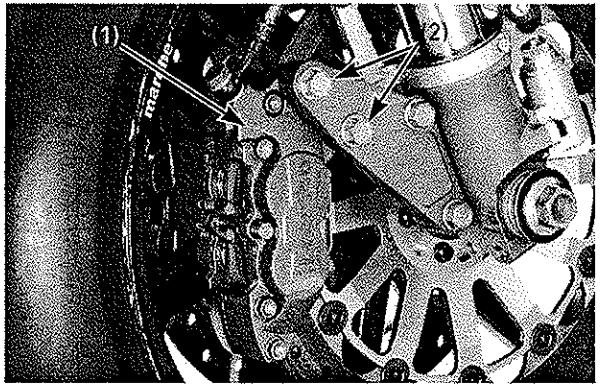


(1) NEW PADS (2) PAD PIN
(3) B-CLIP

Clean inside the brake caliper, especially around the caliper pistons using a neutral detergent and wipe it dry.

Install the new brake pads and pad pin.

Install the pad pin and secure it with a B-clip.

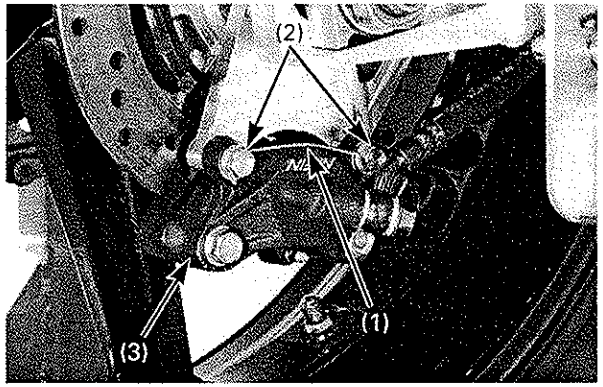


(1) BRAKE CALIPER (2) BOLTS

Install the caliper to the fork slider bracket so the disc is positioned between the pads, being careful not to damage the pads.
Apply molybdenum disulfide grease to the caliper mounting bolt threads.
Install and tighten the mounting bolts to the specified torque.

Torque: 39 N·m (4.0 kgf·m, 29 lbf·ft)

Operate the brake lever to seat the caliper pistons against the pads.

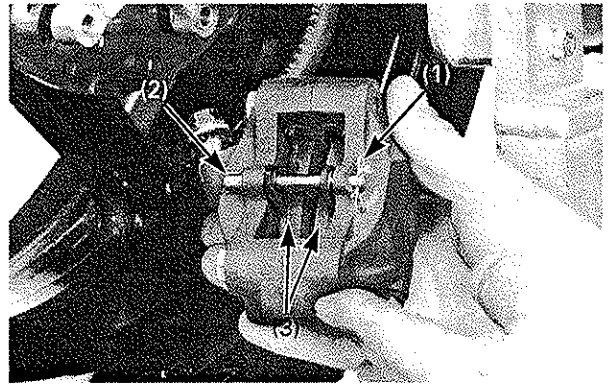


(1) LOCKING WIRE
(2) MOUNTING BOLTS
(3) BRAKE CALIPER

Rear Brake Pad Replacement

Clean the brake disc or pads with a high quality brake degreasing agent they are contaminated with oil or grease. If the pads cannot be cleaned, replace them.

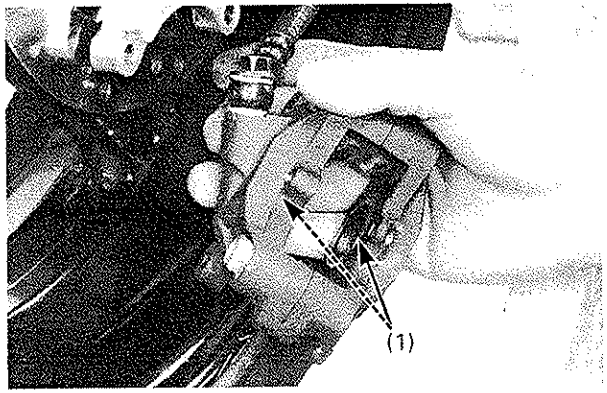
Cut and remove the brake caliper mounting bolts locking wire.
Remove the brake caliper mounting bolts and caliper from the bracket.



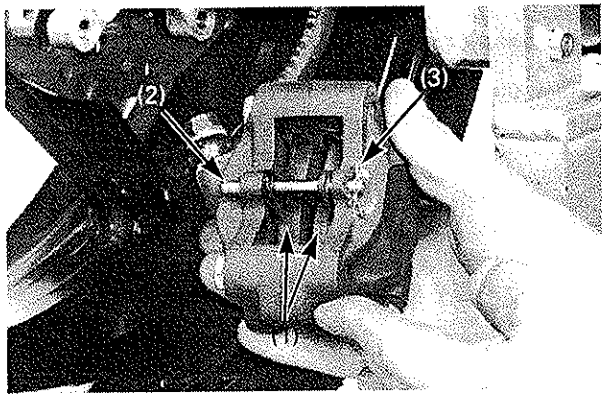
(1) B-CLIP (2) PAD PIN
(3) BRAKE PADS

Push the pistons all the way in to allow installation of new brake pads.
Check the brake fluid level in the reservoir as this operation causes the level to rise.

Remove the B-clip.
Tap the pad pin end with plastic hammer, then remove the pad pin.
Remove the brake pads.



(1) CALIPER PISTONS

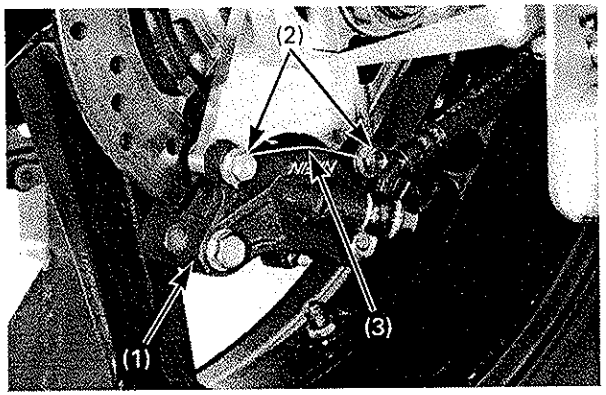


(1) NEW PADS (2) PAD PIN
(3) B-CLIP

Clean inside the brake caliper, especially around the caliper pistons.

Install the new brake pads and pad pin.

Install the pad pin and secure it with a B-clip.



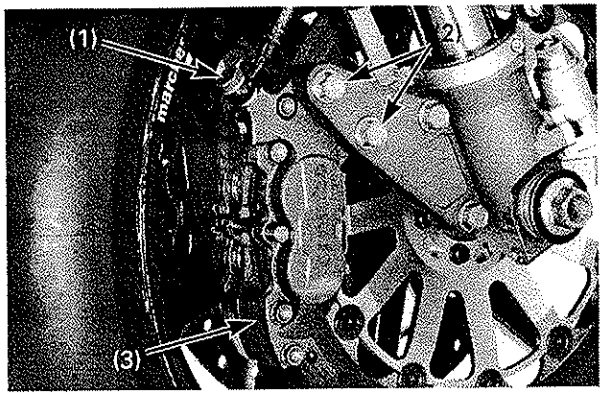
(1) BRAKE CALIPER (2) BOLTS
(3) LOCKING WIRE

Install the caliper to the caliper bracket so the disc is positioned between the pads, being careful not to damage the pads.
Apply molybdenum disulfide grease to the caliper mounting bolt threads.
Install and tighten the mounting bolts to the specified torque.

Torque: 17 N·m (1.7 kgf·m, 12 lbf·ft)

Secure the mounting bolts with a locking wire.

Operate the brake pedal to seat the caliper pistons against the pads.



(1) OIL BOLT (2) BOLTS
(3) BRAKE CALIPER

Front Brake Caliper

Removal

Drain the front brake system.
Place a clean container under the caliper
Avoid spilling brake fluid on painted, plastic or rubber parts. Place a shop rag over these parts whenever the system is serviced.

NOTICE

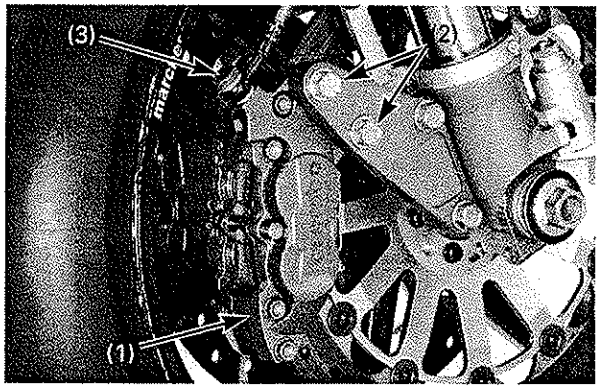
Spilled brake fluid will damage painted, plastic or rubber parts. If fluid does get on these parts, wipe it off with a clean cloth.

Remove the oil bolts, sealing washers and brake hose.
Remove the mounting bolts and brake caliper.

Never disassemble the caliper. If the caliper is damaged, replace the caliper assembly.

NOTICE

Disassembling the caliper may damage it.



(1) BRAKE CALIPER (2) BOLTS
(3) OIL BOLT/NEW SEALING WASHERS

Cleaning

Clean inside the brake caliper, especially around the caliper pistons using a neutral detergent and wipe it dry.
Apply brake fluid to the caliper pistons.
Move the caliper piston in and out so that the piston moves smoothly.

Installation

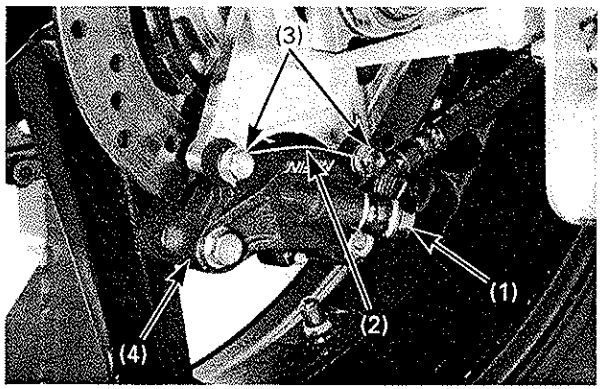
Install the brake pad (page 15-2).
Install the caliper assembly over the brake disc so that the disc is positioned between the pad.
Be careful not to damage the brake pads.
Apply molybdenum disulfide grease to the caliper mounting bolt threads, then tighten them to the specified torque.

Torque: 39 N•m (4.0 kgf•m, 29 lbf•ft)

Install the brake hose eyelet joint with new sealing washers, then install the brake hose oil bolt.
Adjust the brake hose angle, tighten the oil bolt to the specified torque.

Torque: 24 N•m (2.4 kgf•m, 17 lbf•ft)

Fill the brake fluid reservoir and bleed the system.



(1) OIL BOLT (2) LOCKING WIRE
(3) MOUNTING BOLTS (4) CALIPER

Rear Brake Caliper

Removal

Drain the rear brake system.

Remove the oil bolt, sealing washers and brake hose eyelet.

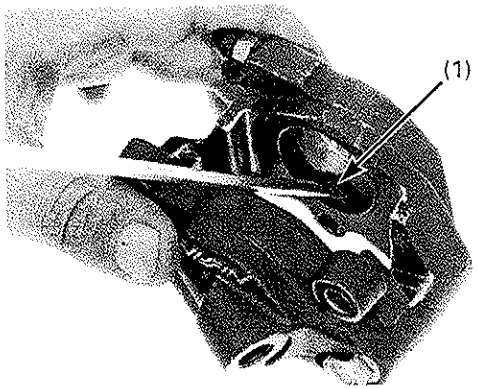
Cut and remove the caliper mounting bolt locking wire.
Remove the caliper mounting bolts and caliper from the bracket.
Remove the brake pads (page 15-3).



Disassembly

Remove the pistons from the caliper.

If necessary, apply low pressure compressed air to the caliper fluid inlet to get the piston out.
Place a card board between the caliper pistons to cushion the pistons when there are forced out.
Use the air in short spurts.

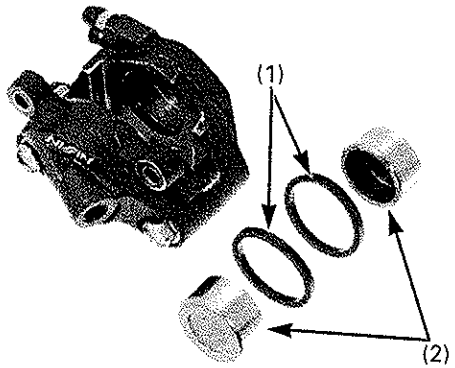


(1) PISTON SEAL

Being careful not to damage the caliper bore, push the piston seals in and lift them out, then discard them.
Clean the seal grooves with brake fluid.

Inspection

Check the caliper cylinder and piston for scoring, scratches or other damage.



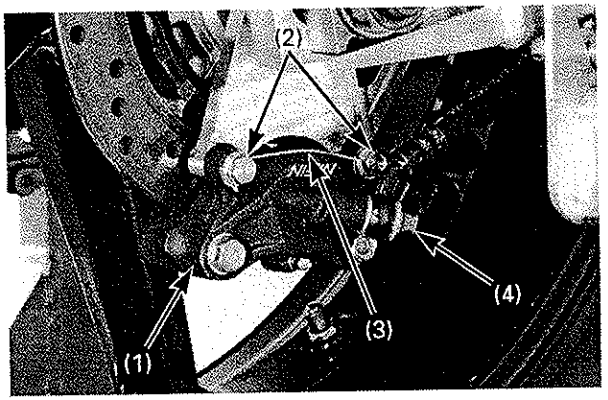
(1) PISTON SEALS (2) CALIPER PISTONS

Assembly

Clean inside the brake caliper, especially around the caliper pistons using a neutral detergent and wipe it dry.

The piston seals must be replaced with new ones whenever they are removed.
Coat the new piston seals with brake fluid before assembly.
Install the piston seals into the caliper grooves.
Install the piston with their open end toward the pad.

Apply brake fluid to the caliper pistons.
Move the caliper piston in and out so that the piston moves smoothly.



(1) CALIPER (2) MOUNTING BOLTS
(3) LOCKING WIRE
(4) NEW SEALING WASHERS/OIL BOLT

Installation

Install the brake pads (page 15-4).

Install the caliper to the caliper bracket so the disc is positioned between the pads, being careful not to damage the pads.
Apply molybdenum disulfide grease to the caliper mounting bolt threads.
Install and tighten the mounting bolts to the specified torque.

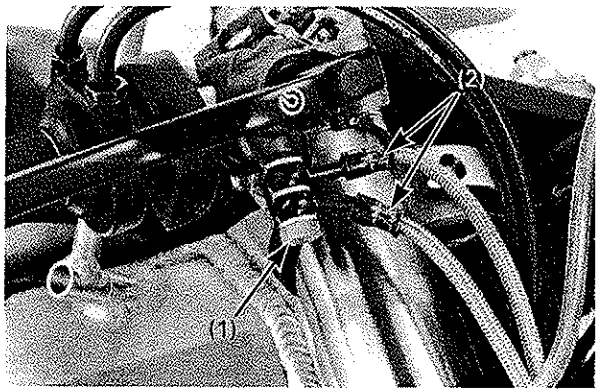
Torque: 17 N•m (1.7 kgf•m, 12 lbf•ft)

Secure the mounting bolts with a locking wire.

Install the brake hose eyelet joint with new sealing washers, then install the brake hose oil bolt.
Adjust the brake hose angle, tighten the oil bolt to the specified torque.

Torque: 24 N•m (2.4 kgf•m, 17 lbf•ft)

Fill the brake fluid reservoir and bleed the system.



(1) OIL BOLT/SEALING WASHERS
(3) BRAKE HOSES

Front Master Cylinder

Removal

Avoid spilling brake fluid on painted, plastic or rubber parts. Place a shop rag over these parts whenever the system is serviced.

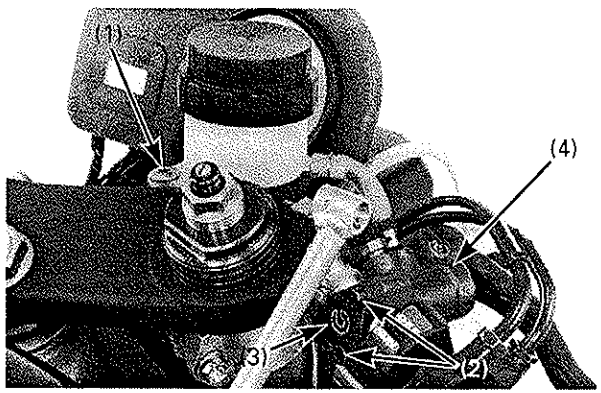
NOTICE

Spilled brake fluid will damage painted, plastic or rubber parts. If fluid does get on these parts, wipe it off with a clean cloth.

When removing the brake hose bolt, cover the end of the hoses to prevent contamination. Secure the hoses to prevent fluid from leaking out.

Drain the brake fluid from the hydraulic system into a suitable container.

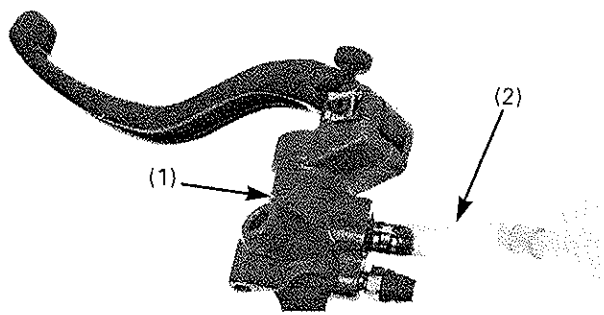
Remove the brake hose oil bolt, sealing washers and eyelet joints.



(1) RESERVOIR BOLT
(2) HOLDER BOLTS (3) HOLDER
(4) MASTER CYLINDER

Remove the master cylinder reservoir mounting bolt.

Remove the holder bolts, holder and master cylinder.



(1) MASTER CYLINDER
(2) RESERVOIR HOSE

Remove the reservoir hose from the master cylinder.

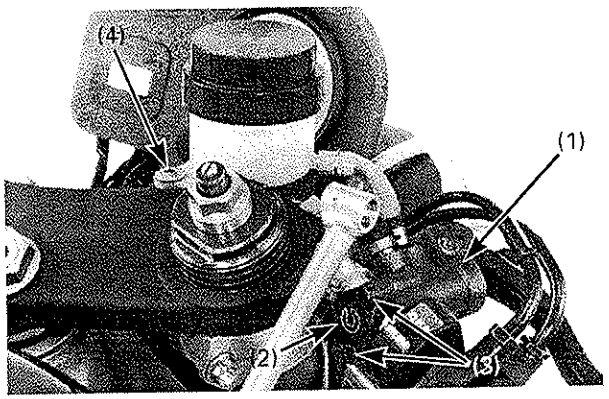
Inspection

Check the master cylinder for leakage or other damage.

Never disassemble the front master cylinder. If the master cylinder is damaged, replace the master cylinder assembly.

NOTICE

Disassembling the master cylinder may damage it.



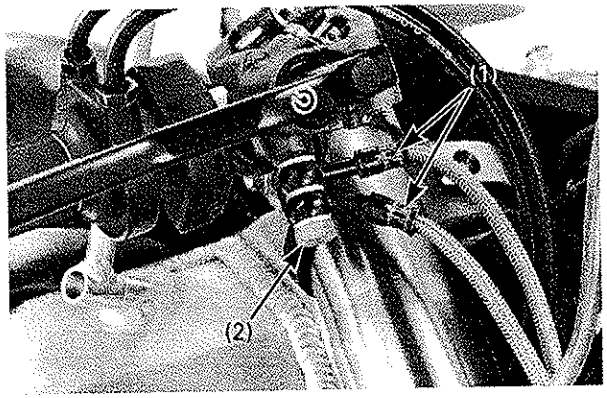
(1) MASTER CYLINDER (2) HOLDER
(3) HOLDER BOLTS
(4) RESERVOIR BOLT

Installation

Connect the reservoir hose to the master cylinder.

Install the master cylinder, holder and bolts onto the handlebar.
Note the installation direction of the holder.

Adjust the brake lever angle (page 3-20).
Tighten the upper holder bolt first, then the lower bolt.

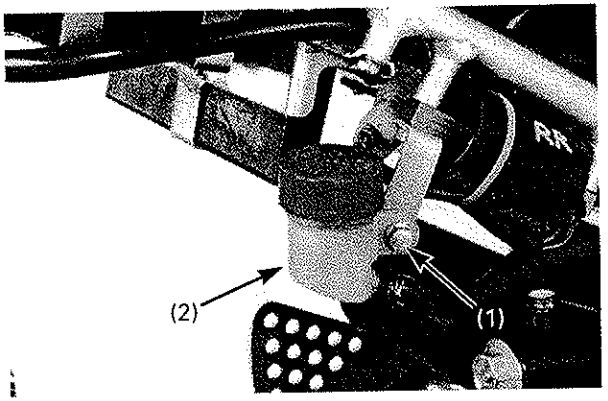


(1) BRAKE HOSES
(2) NEW SEALING WASHERS/OIL BOLT

Install the oil hose eyelet joints to the master cylinder with new sealing washers and oil bolt.
Adjust the oil hoses angle, tighten the oil bolt to the specified torque.

Torque: 24 N·m (2.4 kgf·m, 17 lbf·ft)

Fill the brake fluid reservoir and bleed the system.



(1) BOLT
(2) RESERVOIR

Rear Master Cylinder

Removal

Avoid spilling brake fluid on painted, plastic or rubber parts. Place a shop rag over these parts whenever the system is serviced.

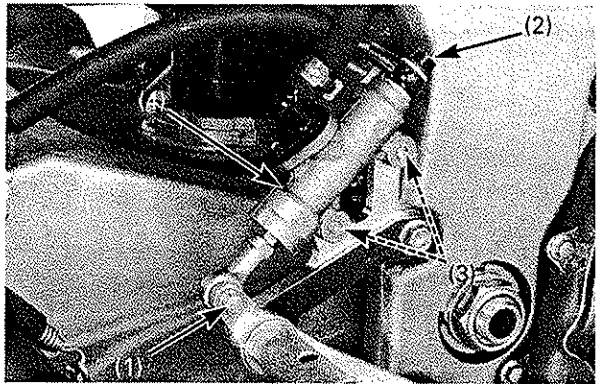
NOTICE

Spilled brake fluid will damage painted, plastic or rubber parts. If fluid does get on these parts, wipe it off with a clean cloth.

When removing the brake hose bolt, cover the end of the hoses to prevent contamination. Secure the hoses to prevent fluid from leaking out.

Drain the brake fluid from the hydraulic system into a suitable container.

Remove the bolt and rear master cylinder reservoir.

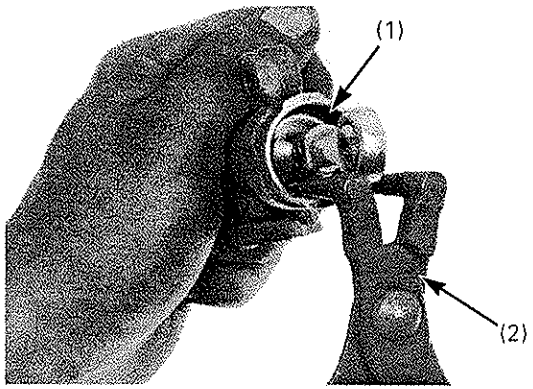


(1) JOINT BOLT/NUT
(2) OIL BOLT/SEALING WASHERS
(3) BOLTS (4) MASTER CYLINDER

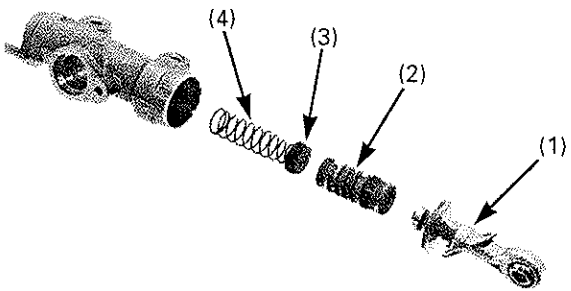
Remove the brake pedal joint bolt/nut.
Remove the brake hose oil bolt, sealing washers and eyelet joints.

Remove the mounting bolts and master cylinder.

Remove the screw and reservoir joint from the master cylinder.



(1) SNAP RING (2) SNAP RING PLIERS

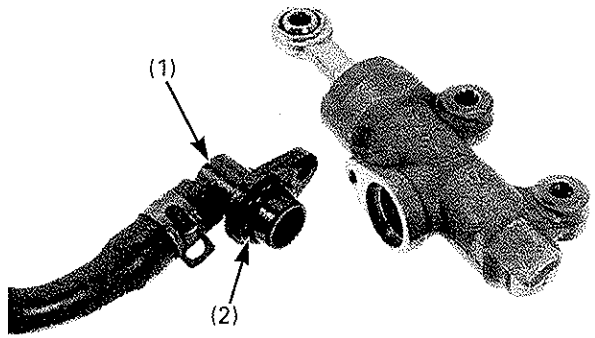


(1) PUSH ROD ASSEMBLY (2) MASTER PISTON
(3) PRIMARY CUP (4) SPRING

Disassembly/Inspection/Assembly

See VTR Service Manual for master cylinder disassembly, inspection and assembly.

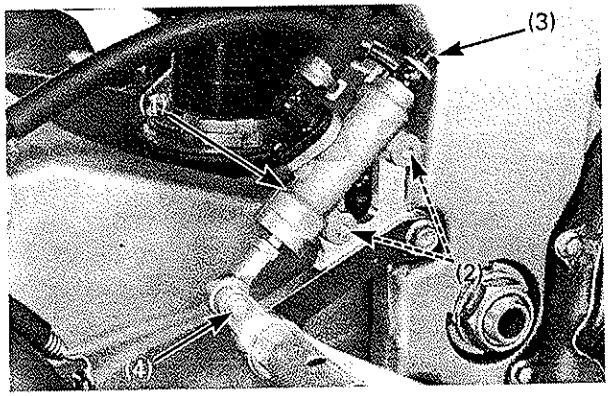
Check the push rod spherical bearing for wear or damage.



(1) HOSE JOINT (2) NEW O-RING

Coat a new O-ring with brake fluid.
Install the reservoir joint to the master cylinder with O-ring.
Apply a locking agent to the hose joint screw threads.
Install and tighten the screw to the specified torque.

Torque: 2 N•m (0.2 kgf•m, 1.4 lbf•ft)



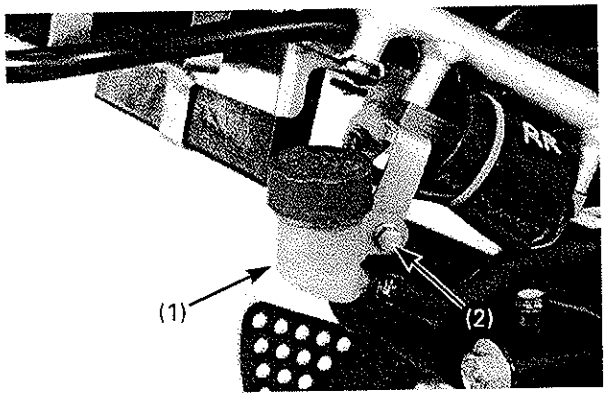
(1) MASTER CYLINDER (2) BOLTS
(3) OIL BOLT/SEALING WASHERS
(4) JOINT BOLT/NUT

Install the master cylinder assembly onto the footpeg holder and tighten the mounting bolts.

Install the oil hose eyelet joint to the master cylinder with new sealing washers and oil bolt.
Push the oil hose against the stopper, tighten the oil bolt to the specified torque.

Torque: 24 N·m (2.4 kgf·m, 17 lbf·ft)

Install the push rod joint to the brake pedal, install and tighten the bolt/nut.



(1) RESERVOIR
(2) BOLT

Install the brake reservoir to the bracket, tighten the bolt securely.

Fill the brake fluid reservoir and bleed the system.

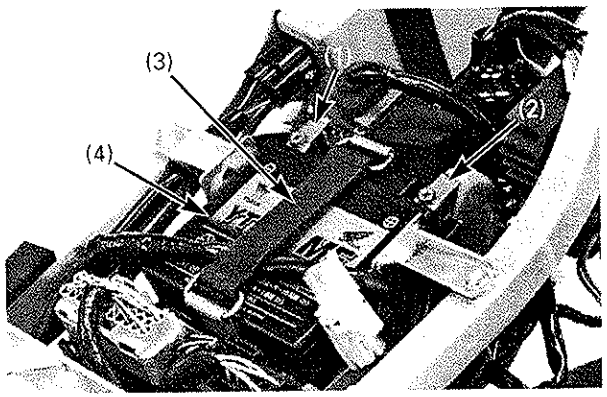
Service Information	16-1	Tachometer	16-3
Troubleshooting	16-1	Coolant Temperature Meter/ Sensor	16-3
Battery	16-2	Starter/Engine Stop Switch	16-4
Alternator Inspection	16-2		

Service Information

- Your machine's exhaust contains poisonous carbon monoxide gas. High levels of carbon monoxide can collect rapidly in enclosed area such as a garage or canopy. Do not turn the engine with the garage door closed. Even with the door open, run the engine only long enough to move your machine out of the garage. If the engine must be run, provide and alternate source of ventilation.
- Use the specified multimeters. Using other equipment may not allow you to obtain the correct results. This is due to the characteristic of semiconductor, which have different values depending on the applied voltage.
- Refer to VTR Service Manual for following items:
  - Ignition coils
  - Ignition pulse generator
  - Starter motor
  - Starter relay switch

Troubleshooting

- See VTR Service Manual for electrical equipment troubleshooting.



(1) NEGATIVE (–) TERMINAL
(2) POSITIVE (+) TERMINAL
(3) HOLDER BAND (4) BATTERY

Battery

Removal/Installation

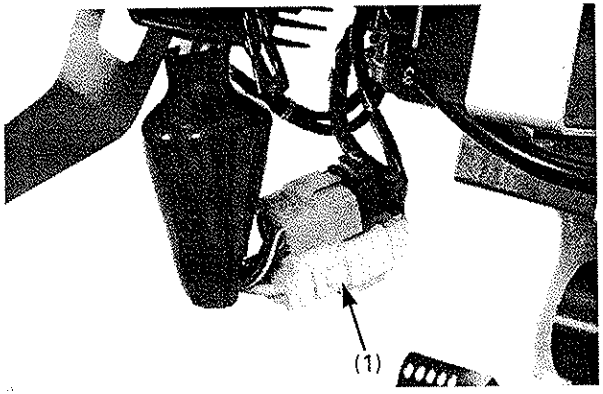
Turn the engine stop switch OFF.
Disconnect the negative (–) cable first, then disconnect the positive (+) cable.
Remove the holder band and battery.

Install the battery in the reverse order of removal.

- Connect the positive (+) cable first, then connect the negative (–) cable.
- After connecting the battery cables, coat the terminals with grease.

See VTR Service Manual for battery voltage inspection and charging.

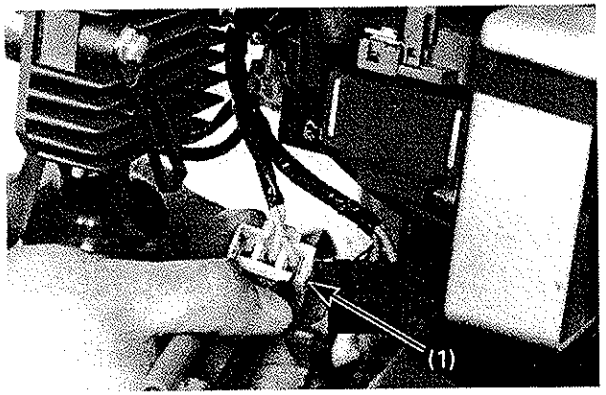
Charging current/time:
Standard: 0.6 A/5 – 10 h
Quick: 3 A/1 h



(1) 3P (WHITE) CONNECTOR

Alternator Inspection

Disconnect the alternator 3P (White) connector at the regulator/rectifier.



(1) 3P (WHITE) CONNECTOR

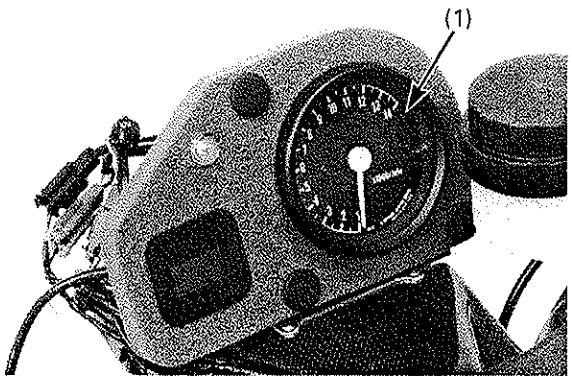
Measure the charging coil resistance between the terminals of the alternator side.

Connection: Yellow – Yellow
Standard: 0.2 – 0.5 Ω (20°C/68°F)

Check for continuity between each wire terminal of the alternator side connector and ground.
There should not be continuity.

Replace the alternator stator if resistance is out of specification, or if any wire has continuity to ground.

See section 10 for alternator stator replacement.



(1) TACHOMETER

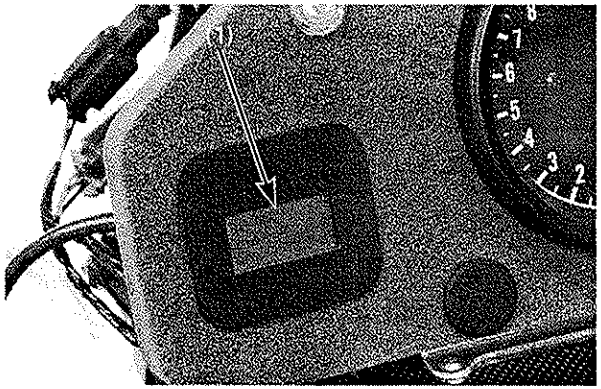
Tachometer

Inspection

This machine's tachometer uses stepping motor type tachometer.
When the engine stop switch to RUN, initially move the tachometer needle to full scale, then return to 1,000 min^{-1} (rpm) position.
When the engine stop switch OFF while the engine is running, the needle stay at this position.
This is not abnormal.

If the tachometer does not initialise movement, or the needle stops while the engine is running, check for the following:
- Poor contact tachometer connector
- Open or short circuit in tachometer related wire

If there is no problem, replace the tachometer.

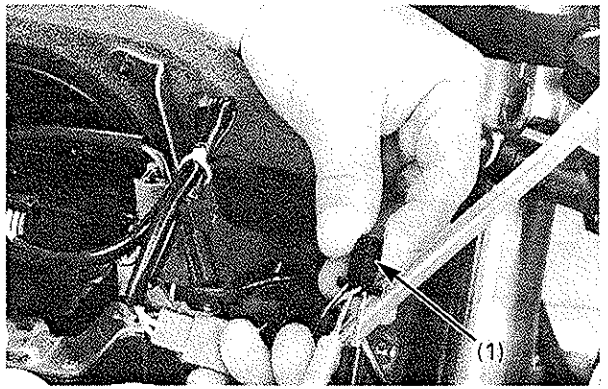


(1) WATER TEMPERATURE METER

Water Temperature Meter/Sensor

System Inspection

If the water temperature meter does not display or display disappear, check for the following:
- Poor contact water temperature meter and sensor connector
- Open or short circuit in water temperature meter related wire



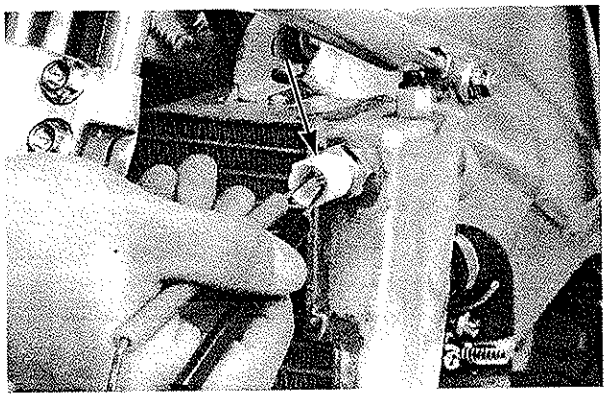
(1) 2P (BLACK) CONNECTOR

Meter Inspection

If the water temperature meter does not display, inspect the following:
Turn the engine stop switch to RUN.
Measure the battery voltage at the water temperature 2P (Black) connector terminals.

Connection: Black/White (+) – Green (–)
Standard: Battery voltage

If there is battery voltage, check the water temperature sensor.
Replace the water temperature meter if sensor is normal.



(1) WATER TEMPERATURE SENSOR

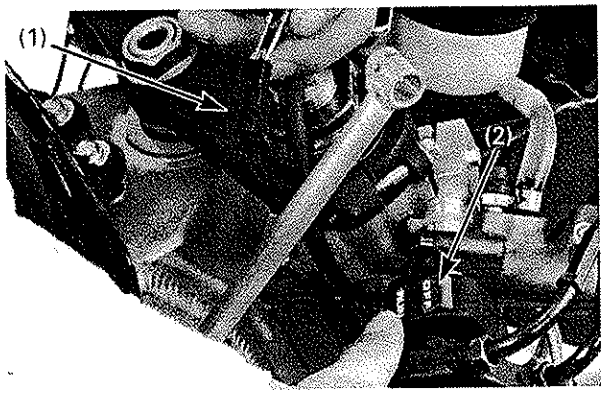
Sensor Inspection

The water temperature does not display below 25°C/77°F.
If the water temperature meter shows "– –" even if the engine is warm, check for water temperature sensor.

Disconnect the water temperature sensor 2P connector.
Measure the resistance between the terminals of the sensor.

Standard: 47.02 – 53.02 kΩ (25°C/77°F)

Replace the water temperature sensor if the resistance is out of specification.



(1) 3P (BLACK) CONNECTOR
(2) STARTER/ENGINE STOP SWITCH

Starter/Engine Stop Switch

Inspection

Disconnect the starter/engine stop switch 3P (Black) connector.
Check the starter switch for continuity with the starter button is pushed.

Connection: Yellow/Red – Black/White
Standard: Continuity

If there is no continuity, replace the starter/engine stop switch.

Check the engine stop switch for continuity with the engine stop switch to RUN.

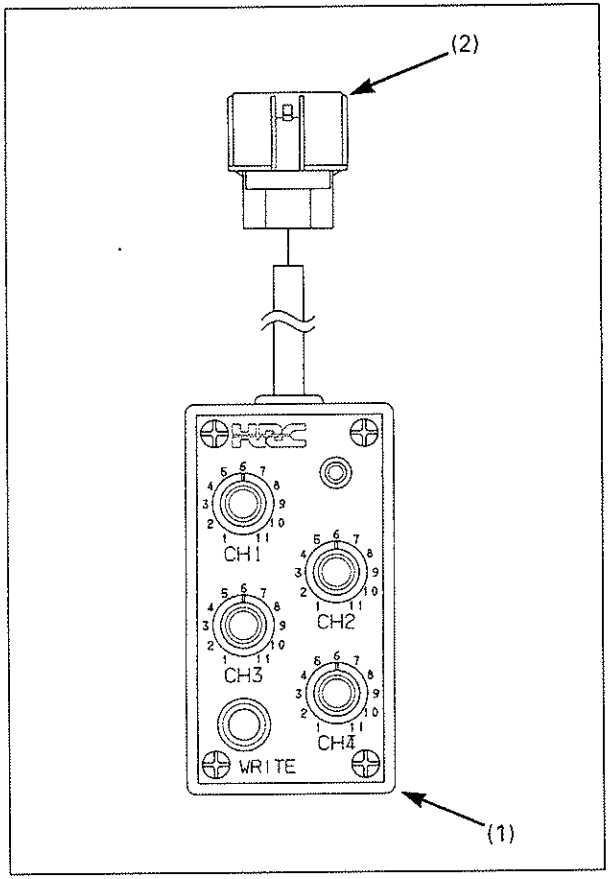
Connection: Red – Black/White
Standard: Continuity

If there is no continuity, replace the starter/engine stop switch.

Service Information	17-1
PGM-FI Setting	17-2
Optional Transmission Gear	17-4

Service Information

- Always start from standard setting when you start any adjustment with your machine.
  If you become confused about the adjustment setting, return to the standard setting and start over.



(1) SETTING BOX
(2) 8P (GRAY) CONNECTOR

PGM-FI Setting

The VTR1100 SP-1's ECM can be adjusted by using the setting box.
The setting box can be changed with the inject fuel quantity, acceleration correction and shift up control (ignition and fuel cut).
Follow this instruction when you adjust the ECM.

Control Box Function

CH1:
The CH1 control volume adjusts inject fuel quantity between throttle 0 to 12.5 degrees.

CH2:
The CH2 control volume adjusts inject fuel quantity between throttle 70 degrees to full throttle.
- At middle range, inject fuel quantity is corrected straightly referring both the CH1 and CH2 throttle opening data.

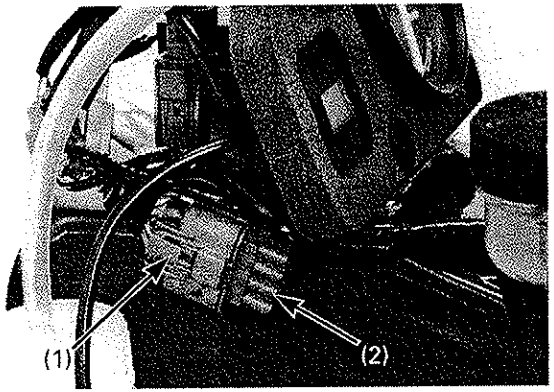
CH3:
The CH3 control volume adjusts acceleration correction.

CH4:
The CH4 control volume adjusts shift up control.
The shift up control is done with the ignition and fuel cut adjustment.

Each channel volume has eleven positions.
The each volume's position 6 is a neutral position.
Be sure the each channel volume is firmly located in a detent, and not between positions.

Write Button
By pushing this button, the setting box data sends to ECM.

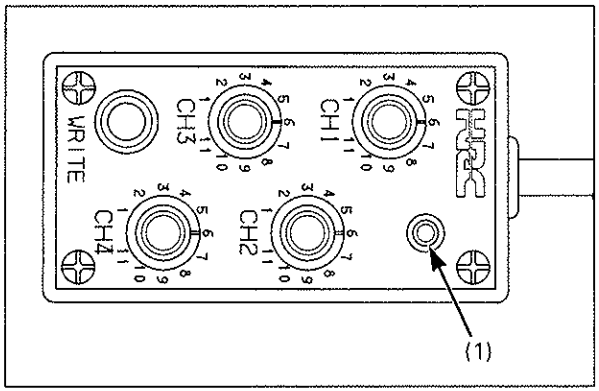
LED indicator:
The LED indicates connection state with ECM or writing progress by lighting or blinking.



(1) AFC 8P (GRAY) CONNECTOR
(2) BLANK CONNECTOR

Setting Box Connection And Functional Check

1. Turn the engine stop switch to OFF.
2. Remove the blank connector from the AFC 8P (Gray) connector.
3. Connect the ECM setting box connector to the AFC 8P (Gray) connector on the right side of air intake duct.



(1) LED

4. Turn the engine stop switch RUN.
   The LED lights about 2 seconds.
   If the ECM setting box function is normal, the LED goes off.

If the ECM setting box function is abnormal, the LED slowly blinking.
If the LED is blinking, check for the following:
- Incorrect channel volume position
- Loose AFC connector connection
- Open or short circuit in setting box harness and main wire harness

If there is OK, the setting box is faulty.
See your authorized HRC service shop.

Setting Procedure

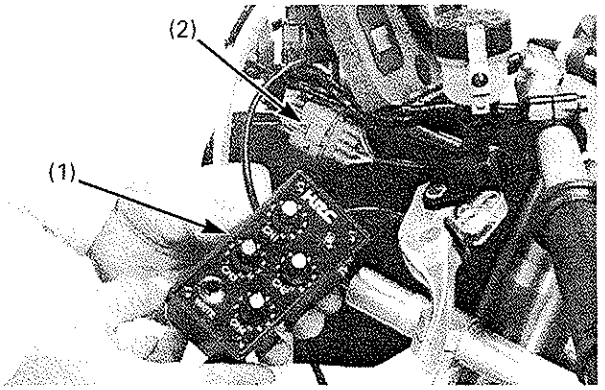
Engine does not running:
Connect the setting box connector to the AFC connector.
Turn the channel volumes to your settings.

When the setting box is connected, ECM gives priority to setting value of setting box over and does all kinds of change.

With the engine running:
While running the engine by turning a dial of BOX can examine a difference of setting.
But at this time, the ECM does not memorized the setting values.
If the setting box is removed, the ECM setting is return previous setting.

According to the following procedures when let the ECM memorize setting value of box.
1. Turn the engine stop switch to RUN.
2. After the LED lights about 2 seconds, wait 1 second and push the writing button more than 1 second.
   At a point, ECM enters movement to memorize setting of box.
   When read and write functions are finished normally, LED blinks for about three seconds.

- Do not remove the setting box or turn off the engine stop switch while data writing.
- If the setting is not differ from previous setting, ECU does not writing setting data when you push the writing button.
  At this time, LED does not blinking, but this is not abnormal.



(1) SETTING BOX
(2) AFC 8P (GRAY) CONNECTOR

Setting Box Removal

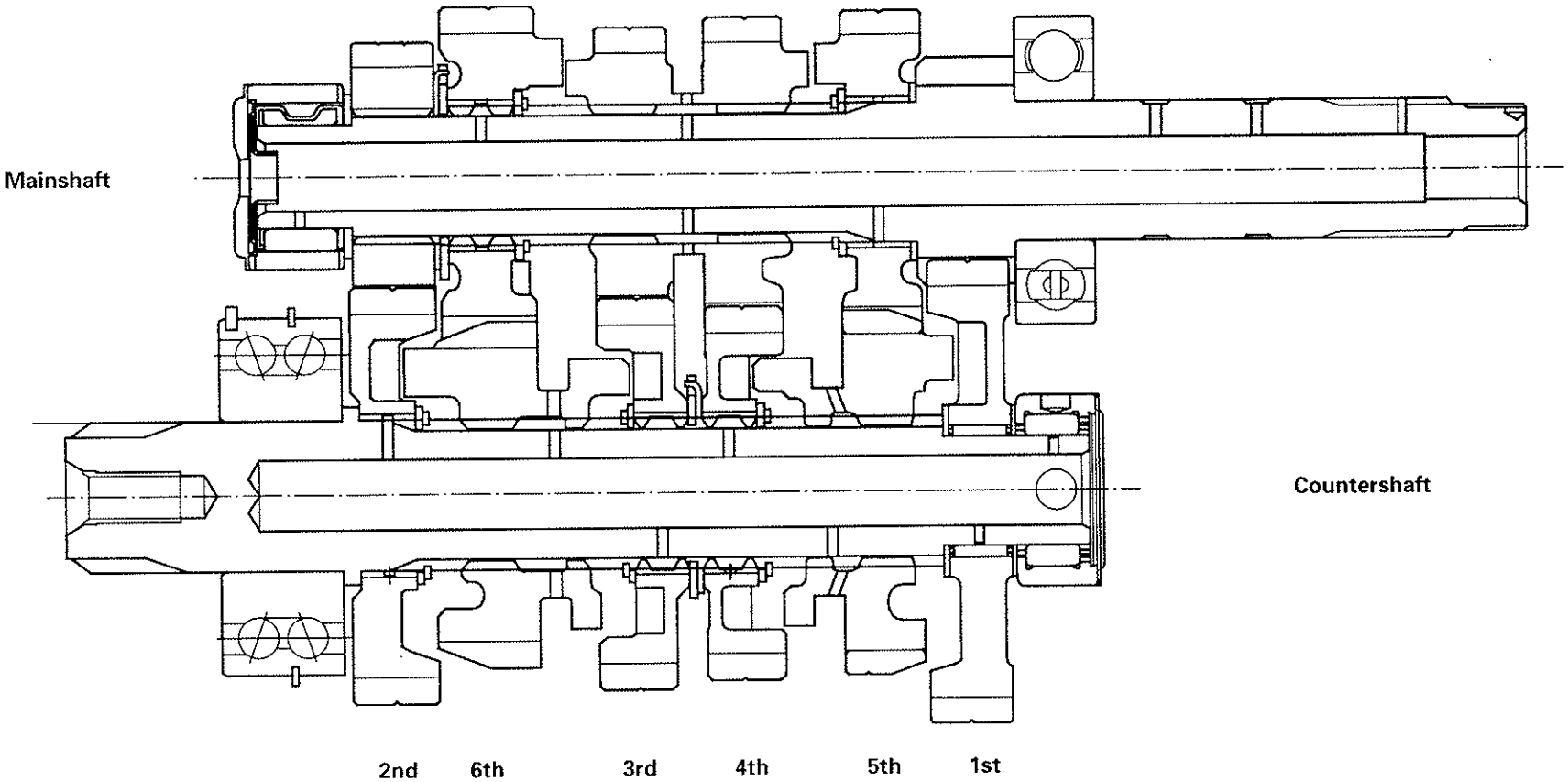
Turn the engine stop switch OFF.
Remove the setting box connector from the AFC connector.
Avoid damaging the entering the water or debris, always install the blank connector to the AFC connector.

The setting box is not waterproof;
- If you using the setting box in rain condition, be careful not to get water in the box.
- Wipe water from the setting box and keep it in dry place.

Do not excessive force to the adjusting volume dial. Excessive force can bend the shaft and damage the volume dial.
If the machine is ride with the setting box connected, the setting data will slipped off by vibration and you can be serious injured.
Do not ride the machine with the setting box is connected.

Optional Transmission Gear

Optional transmission gears are available for use in the transmission. Care should be taken when substituting optional gears for the standard gears. The optional gear has marking groove on the outer surface of gear for identification.



Gears		Marking and parts number				Number of teeth		
		Main		Counter		Main	Counter	Ratio
1st	P–1	No mark	23211-NL6-000	1 groove	23421-NL6-000	14T	31T	2.214
	P–2	1 groove	23212-NL6-000	2 grooves	23422-NL6-000	16T	33T	2.063
2nd	P–1	2 grooves	23431-NL6-000	1 groove	23441-NL6-000	19T	31T	1.632
	P–2	3 grooves	23432-NL6-000	2 grooves	23442-NL6-000	17T	29T	1.706
3rd	P–1	1 groove	23451-NL6-000	1 groove	23461-NL6-000	19T	26T	1.368
	P–2	2 grooves	23452-NL6-000	2 grooves	23462-NL6-000	20T	29T	1.450
4th	P–1	1 groove	23451-NL6-000	1 groove	23481-NL6-000	22T	28T	1.273
	P–2	2 grooves	23452-NL6-000	2 grooves	23482-NL6-000	25T	31T	1.240
5th	P–2	1 groove	23491-NL6-000	1 groove	23501-NL6-000	26T	30T	1.154
6th	P–1	1 groove and P1 marking	23511-NL6-000	No mark	23521-NL6-000	25T	26T	1.040
	P–2	2 grooves and P2 marking	23512-NL6-000	1 groove	23522-NL6-000	27T	29T	1.074

M3/M4 gear combination table

M3 / M4	P–1 (19T)	P–2 (20T)
	Name	Name
P–1 (22T)	P–1	P–3
P–2 (25T)	P–2	P–4

Speed List (11,000 rpm) Primary reduction: 40/68, Tire radius: 0.315 m

Gears		No. of teeth		Gear ratio	17	17	17	16	17	16	17	16	15	16	15	16	15	15	15	Drive
		M	C		38	39	40	38	41	39	42	40	38	41	39	42	40	41	42	Driven
1st	P–1	14	31	2.214	155	151	147	146	143	142	140	138	136	135	133	132	130	126	123	
	P–2	16	33	2.063	166	162	158	156	154	152	150	149	147	145	143	141	139	136	133	
2nd	P–2	17	29	1.706	201	196	191	189	186	184	182	180	177	175	173	171	168	164	160	
	P–1	19	31	1.632	210	205	200	198	195	193	190	188	185	183	181	179	176	172	168	
3rd	P–2	20	29	1.450	237	230	225	223	219	217	214	211	209	206	203	201	198	193	189	
	P–1	19	26	1.368	251	244	238	236	232	230	227	224	221	219	215	213	210	205	200	
4th	P–1	22	28	1.273	270	263	256	254	250	247	244	241	238	235	232	229	226	220	215	
	P–2	25	31	1.240	277	270	263	260	256	254	250	247	244	241	238	236	232	226	221	
5th	P–1	26	30	1.154	297	290	283	280	276	273	269	266	262	259	256	253	249	243	237	
6th	P–2	27	29	1.074	320	311	304	301	296	293	289	286	282	279	275	272	268	261	255	
	P–1	25	26	1.040	330	322	314	311	306	303	299	295	291	288	284	281	277	270	263	

Since the values in the speed list differ somewhat depending on the tire manufacturer and size, selection should be made based on the gear ratio.

Service Information	18-1
Engine Performance Kit	18-2
Frame Performance Kit	18-4
Crankcase Chamfering	18-7
Frame modifying	18-8
Swingarm Modifying	18-10

Service Information

- Some racing kit parts are required to modify your base machine before installing them. Read this section carefully before you installing the racing kit parts.

Engine Performance Kit

Following engine performance kits are available for convert your standard VTR to racing machine.

Items	Q'ty	Remarks
Oil pan set:	1	• Material: magnesium
– Oil pan	1	• Flat bottom surface
– Oil pan gasket	1	
– Oil strainer comp.	1	
Cylinder head cover set:	1	• Material: magnesium
– Breather joint	1	
– Front head cover	1	
– Rear head cover	1	
– Breather plate	1	
– Breather plate gasket	1	
– Flange bolt, 6 X 12 mm	2	
Camshaft set:	1	• High performance spec
– Camshaft comp., front IN	1	• High lift
– Camshaft comp., rear IN	1	
– Camshaft comp., front EX	1	
– Camshaft comp., rear EX	1	
Valve set:	1	• Material: Inlet: Titanium
– Valve stem seal (exhaust)	8	
– Inlet valve	4	
– Exhaust valve	4	
– Valve spring set	8	
– Valve spring retainer	8	
– Valve spring outer seat	8	
– Valve spring inner seat	8	
Injector set:	1	• Big bore throttle body (Ø62)
– Throttle body insulator	2	NOTE:
– Insulator band	2	• Use with special injectors and
– Throttle body assembly	1	pressure regulator.
– Air funnel	1	
– Air funnel, 40 mm	1	
– MAP sensor assembly	2	
– IAT sensor assembly	1	
– Socket bolt, 5 X 14 mm	4	
– Washer, 5.2 X 11 X 1	4	
– Screw/washer, 4 X 12	2	
– Screw/washer, 5 X 16	2	

Items	Q'ty	Remarks
Clutch set	1	• Equipped back torque limiter
– Clutch center	1	and setting parts
– Clutch lifter cam plate comp.	1	
– Clutch center B	1	
– Clutch center guide	1	
– Stroke shim, 1.8	1	
– Stroke shim, 1.9	1	
– Stroke shim, 2.0	1	
– Stroke shim, 2.1	1	
– Stroke shim, 2.2	1	
– Stroke shim, 2.3	1	
– Clutch VC spring	1	
– Clutch friction disc, 517D (A)	7	
– Clutch friction disc, 2500 (A)	2	
– Clutch plate, 1.97	8	
– Clutch plate, 1.85	8	
– Clutch pressure plate comp.	1	
– Clutch lifter plate	1	
– Clutch spring	1	
– Thrust washer, 28.2 X 56 X 2	1	
– Clutch shim, 0.9	2	
– Clutch shim, 1.0	2	
– Clutch shim, 1.1	2	
– Clutch shim, 1.2	2	
– Clutch shim, 1.3	2	
– Clutch shim, 1.4	2	
– Clutch shim, 1.5	2	
Transmission set:	1	• For special gear ratio
– Mainshaft, P-1	1	
– Mainshaft, P-2	1	
– C1 gear, P-1	1	
– C1 gear, P-2	1	
– M2 gear, P-1	1	
– M2 gear, P-2	1	
– C2 gear, P-1	1	
– C2 gear, P-2	1	
– M3/4 gear, P-1	1	
– M3/4 gear, P-2	1	
– M3/4 gear, P-3	1	

Items	Q'ty	Remarks
Transmission set (cont'd):		
– M3/4 gear, P-4	1	
– C3 gear, P-1	1	
– C3 gear, P-2	1	
– C4 gear, P-1	1	
– C4 gear, P-2	1	
– M5 gear	1	
– C5 gear	1	
– M6 gear, P-1	1	
– M6 gear, P-2	1	
– C6 gear, P-1	1	
– C6 gear, P-2	1	
– Radial ball bearing, 28 X 62 X 16	2	
Alternator set:	1	• Material: magnesium
– Alternator cover comp.	1	• Add oil return line
– Oil return joint	1	
– Flywheel	1	
– Alternator wire clamp	1	
– Drain plug washer, 14 mm	1	
– SH flange bolt, 6 X 10 mm	1	
– SH flange bolt, 6 X 14 mm	2	
– SH flange bolt, 6 X 25 mm	3	
LUB H45	1	• Special lubricant
Front cylinder head assembly	1	• Special port arrangement
Rear cylinder head assembly	1	• Special port arrangement
Piston	2	• Forged piston
Piston top ring	2	
Piston second ring (100 X 1.0 X 2.6)	2	
Piston oil ring (100 X 1.5 X 2.6)	2	
Front connecting rod assembly	1	
Rear connecting rod assembly	1	
Crankshaft comp.	1	
Oil pump plate	1	
Oil pump inner rotor	1	
Oil pump shaft	1	
Oil pump outer rotor	1	
Relief valve spring	1	
Relief valve spring seat	1	

Items	Q'ty	Remarks
Orifice, 1.4 mm	1	
Orifice, 1.8 mm	1	
Water pump cover comp.	1	
3-way joint	1	
Water front pipe	1	
Water rear pipe	1	
Water hose B	2	
Spark plug, R7279–10 (IR)	2	
Flange bolt, 12 X 30	1	
Taper plug	1	
Special flange bolt, 10 X 22 mm	1	
Drain bolt, 12 mm	1	
Washer, 10.2 X 37 X 3	1	

Frame Performance Kit

Following frame performance kits are available for convert your standard VTR to racing machine.

Items	Q'ty	Remarks
Fuel pump set:		
– Fuel pump assembly	1	
– Fuel pump filter comp.	1	
– Fuel tank unit sub. assembly	1	
– Fuel pump hose	1	
– Fuel pump insert rubber	1	
– Fuel pump clip	1	
– Fuel tube joint	1	
– Fuel pump O-ring	1	
– Front fuel return hose	1	
– Rear fuel return hose	1	
– Fuel feed hose comp.	1	
– Banjo bolt, 12 mm	1	
– Sealing nut A, 12 mm	1	
– Sealing washer, 12 mm	4	
– D12 tube clamp	2	
– Fuel hose clamp, 15.5	2	
– Screw/washer, 4 X 8	12	
– Clip, 2 X 50	1	
– Tube clamp, D10.5	2	
Fuel tank set, blind:		
– Fuel tank cap	1	
– Fuel cap packing	1	
– Fuel tank cap base	1	
– Fuel tank blind cap	1	
– O-ring, 82 X 2.8	2	
– Truss screw, 4 X 81	8	
Fuel tank set:		
– Fuel tank rear pivot cushion	2	
– Fuel tank comp.	1	
– Baffle sponge	6	
– Fuel tank mounting collar	2	
– Rear fender mounting rubber	2	
– Bolt/washer, 6 X 28	2	
Oil cooler set:		
– Oil cooler comp.	1	
– Oil cooler pipe comp., IN	1	

Items	Q'ty	Remarks
Oil cooler set (cont'd):		
– Oil cooler pipe comp., OUT	1	NOTE:
– Pad mounting rubber	2	• Need frame modification.
– Radiator mounting collar	2	
– Flange bolt, 8 X 22	2	
– Bolt/washer, 6 X 25	2	
– Flange bolt, 6 X 20	4	
– O-ring, 11.1 X 3.5	2	
– O-ring, 10 X 2.6	2	
Radiator set:		
– Upper radiator comp.	1	NOTE:
– Lower radiator comp.	1	• Need frame modification.
– Filler cap comp.	1	
– Radiator mounting rubber	5	
– Radiator mounting collar	4	
– Radiator connecting hose	1	
– Radiator upper hose	1	
– Pad lower pipe	1	
– Radiator engine hose	1	
– Water hose clamp A	10	
– Front head water hose	2	
– Catch tank 250	1	
– Bolt/washer, 6 X 25	4	
– Water check bolt, 6 X 10	1	
– Front fork drain bolt packing	1	
– Tube clip, C9	1	
– Vinyl tube, 6 X 9 X 500	1	
Electric set (SP):		
– Noise suppressor cap assembly	2	
– Battery, YTZ7S	1	
– Wire harness	1	
– Harness clamper	1	
– Tie-wrap base	1	
– Sub-harness (F/P)	1	
– Battery/starter magnet cable	1	
– Starter motor cable	1	
– Throttle body harness	1	
– Throttle body harness gromment	1	

Items	Q'ty	Remarks
Electric set (SP) (cont'd):		
– Battery ground cable	1	
– Starter/engine stop switch assembly	1	
– Engine stop sensor assembly	1	
– Starter magnet switch	1	
– Shock rubber	1	
– Tachometer assembly	1	
– Water temperature meter assembly	1	
– FI warning indicator LED assembly	1	
– ECT sensor assembly	1	
– PGM-FI/IGN unit assembly	1	
– ECU setting box	1	
– SH flange bolt, 6 X 18	2	
– SH flange bolt, 6 X 20	2	
– Flange bolt, 6 X 40	2	
– Tie-wrap	2	
– Socket bolt, 5 X 9	2	(for starter magnet SW)
– Special washer, 12 mm	1	
Final sprocket set 520:		
– Drive sprocket, 15T (520)	1	
– Drive sprocket, 16T (520)	1	
– Drive sprocket, 17T (520)	1	
– Drive chain (GB520HRVZ2)	1	
– Final driven sprocket, 37T	1	
– Final driven sprocket, 38T	1	
– Final driven sprocket, 39T	1	
– Final driven sprocket, 40T	1	
– Final driven sprocket, 41T	1	
– Final driven sprocket, 42T	1	
– Final driven sprocket, 43T	1	
Holder step set:		
– Change pedal comp.	1	
– Rod end A, 6 mm	1	
– Gear change arm	1	
– Rod end B, 6 mm	1	
– Rod end, 6 mm	1	
– Master cylinder oil cap comp.	1	
– Master cylinder tube assembly	1	

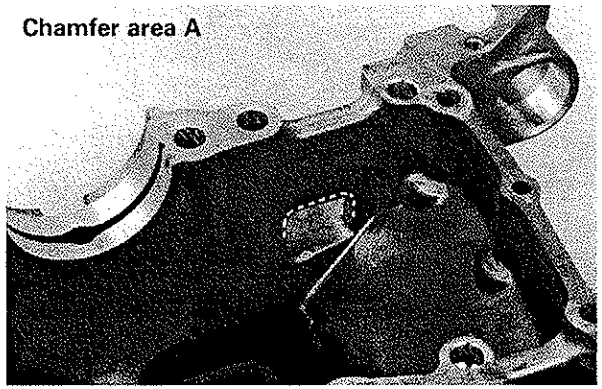
Items	Q'ty	Remarks
Holder step set (cont'd):		
– Master cylinder cap	1	
– Rear oil cup stay	1	
– Push rod	1	
– Stopper	1	
– Diaphragm plate	1	
– Diaphragm	1	
– Master cylinder circlip	1	
– Brake pedal comp.	1	
– Step arm	2	
– Step arm end	2	
– Right step holder	1	
– Left step holder	1	
– Collar, 16 X 8.2	2	
– Left step guard	1	
– Flange bolt, 6 X 20	1	
– Change bar	1	
– Special bolt, 6 X 22	2	
– Tie-rod B nut	1	
– U-nut, 6 mm	2	
– Collar, 22 X 8.2	1	
– Washer, 8.5 X 26	3	
– Plain washer, 6 mm	1	
– O-ring, 14.8 X 2.4	1	
– Hex nut, 6 mm	2	
– Hex nut, 6 mm	1	
– Flange nut, 6 mm	4	
– Plain washer, 6 mm	5	
– Tube clamp D, 10.5	2	
– Flange bolt, 6 X 25	2	
– Flange bolt, 6 X 35	1	
– SH flange bolt, 6 X 12	1	
– SH flange bolt, 6 X 16	3	
– SH flange bolt, 6 X 18	2	
– SH flange bolt, 8 X 25	4	
– SH flange bolt, 8 X 40	1	
– SH flange bolt, 8 X 45	1	
Steering damper set:		
– Steering damper assembly	1	

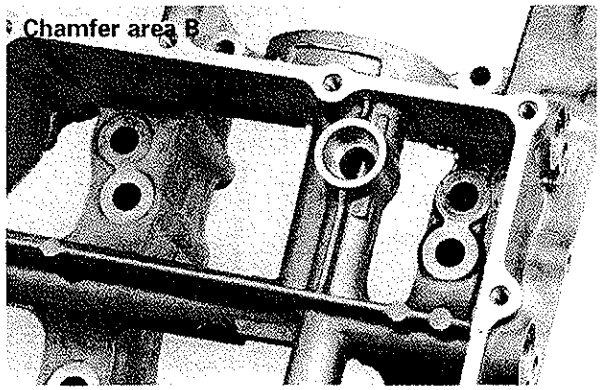
Items	Q'ty	Remarks
Steering damper set (cont'd):		
– Steering damper holder	1	
– Steering damper spacer	2	
– Steering damper spacer	1	
– Hex bolt, 8 X 30	1	
– Plain washer, 8 mm	2	
– SH flange bolt, 6 X 28	1	
– Socket bolt, 8 X 60	1	
Frame patch:		
– Frame patch set	1	

Crankcase Chamfering

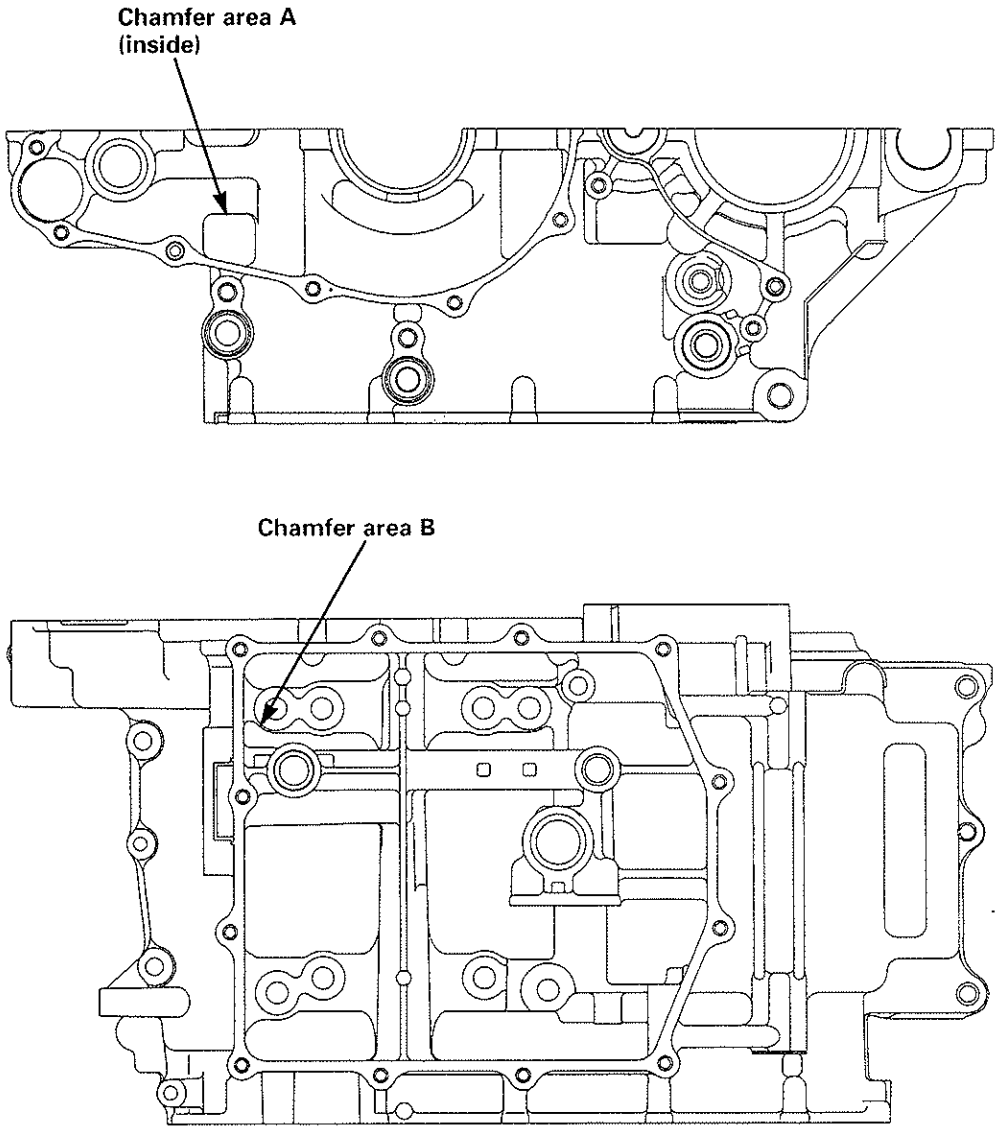
Before installing the engine performance kit, disassemble the engine completely, and check each part for wear or damage.

Chamfer inside edge of the lower crankcase using a emery cloth or equivalent as shown.





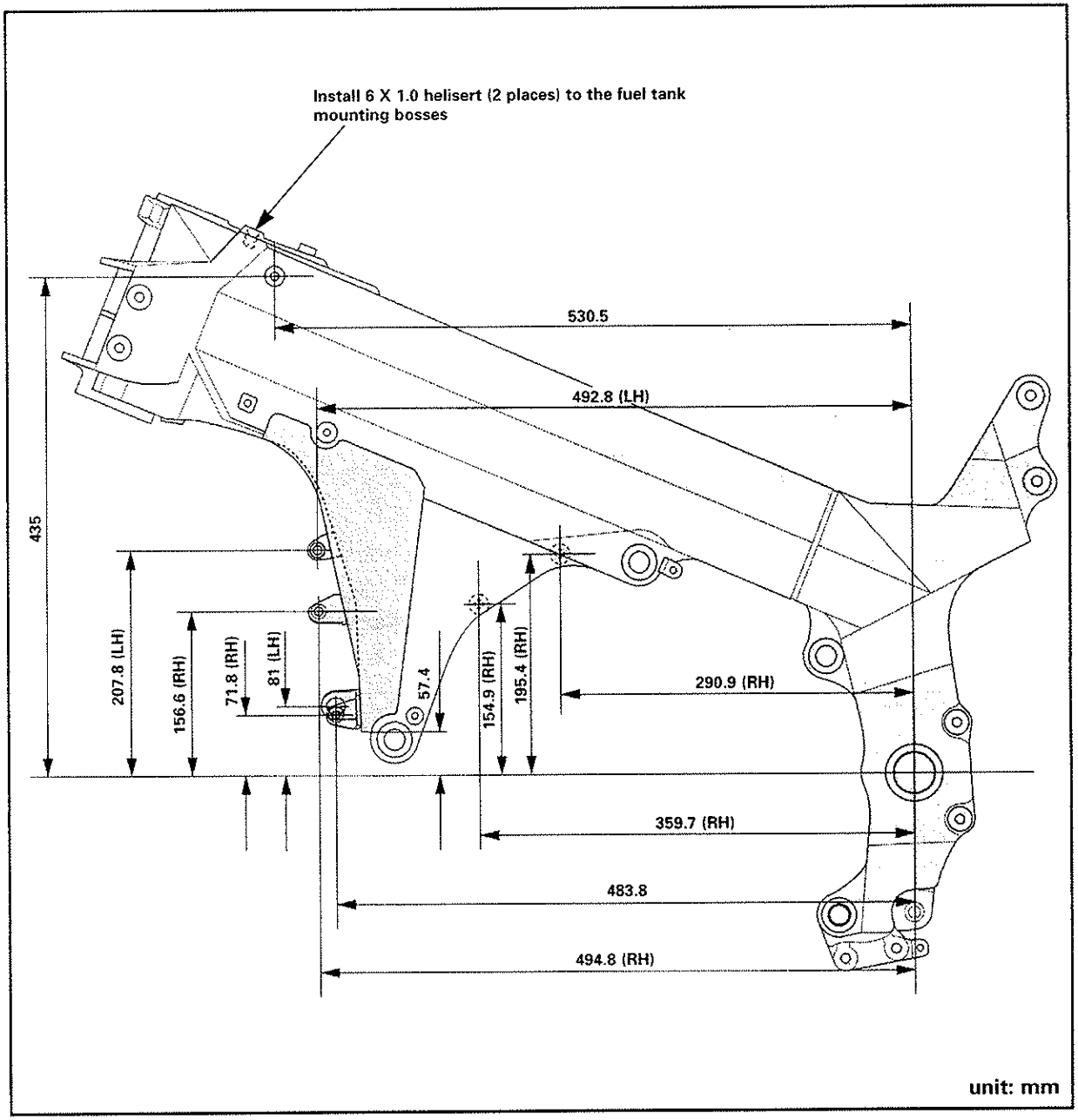
Lower crankcase

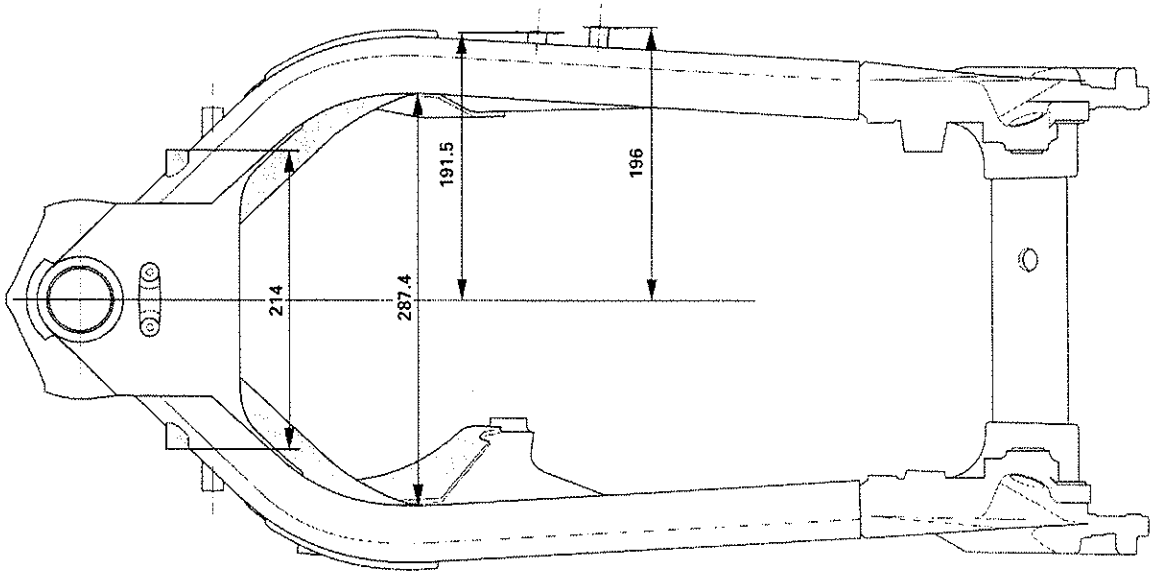


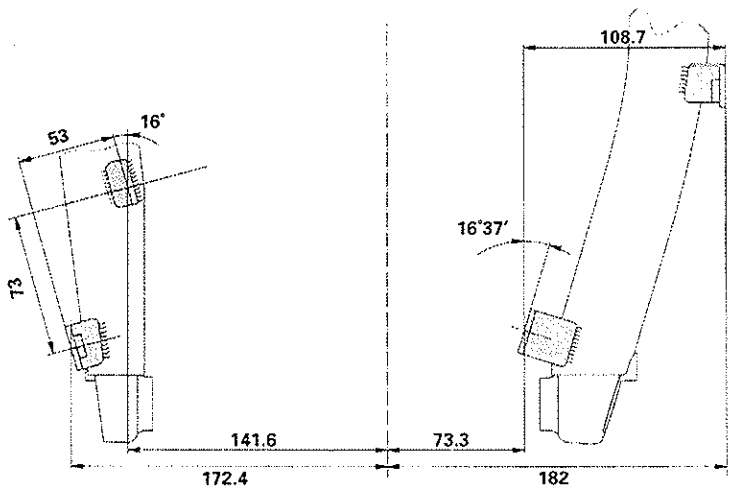
Frame Modifying

Weld the frame patches included in the frame patch kit as shown.

The frame modification is required before installing the following racing kits.
- Radiator kit
- Oil cooler kit



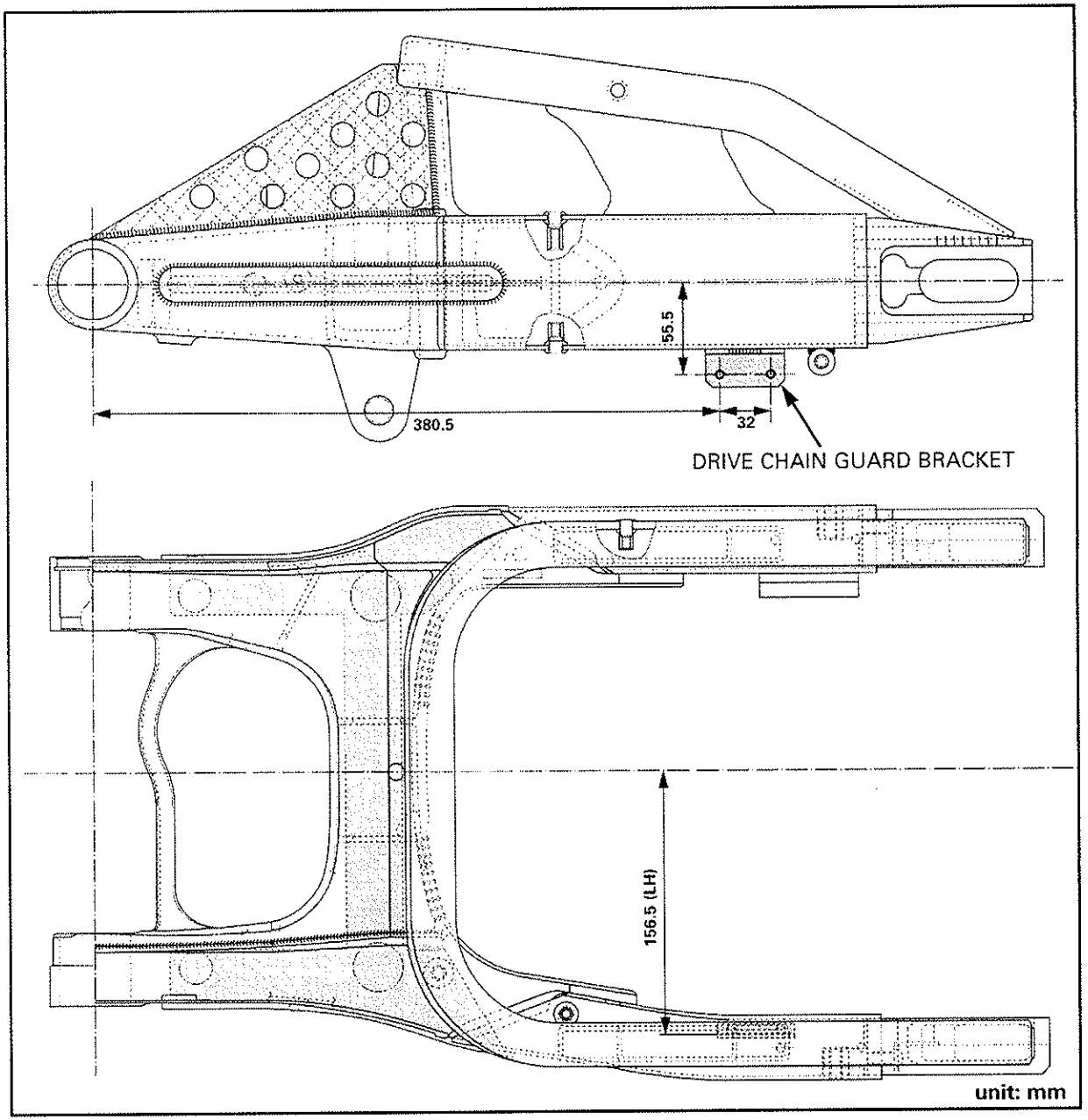




unit: mm

Swingarm Modifying

If you convert your standard VTR swingarm to racing use, remove the shadowed area as shown in the illustration.
Add drive chain guard bracket.



2000-VTR1000 SP-1 PARTS LIST

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INSTRUCTIONS FOR USE OF PARTS LIST

This parts list is to be used when ordering replacement parts; it contains all parts for model 2000-VTR1000 SP-1.

I. How to order parts

● Information required

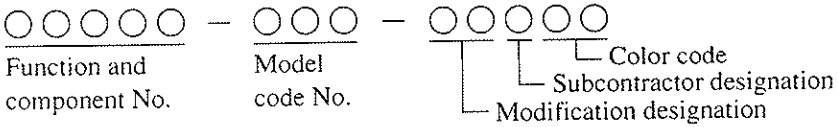
Replacement parts orders/must contain both the part number and the stamped number(s) as described below. This is because any changes and modifications of parts are registered at HONDA with the pertinent parts and stamped numbers.

- If quantities are shown in ( ), the parts are optional.
- If "N" is indicated in the quantity column, the parts quantity is to be determined as required.

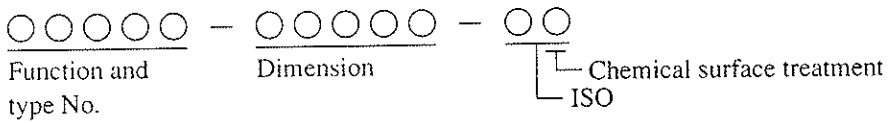
II. How to read this parts list

● Make-up of the part number

(Example) General parts



(Example) Bolts, nuts and other standard parts



● Abbreviations

The following abbreviations are used in this parts list.

A.C. ..... Alternating current	M. ..... Middle
ASSY. ..... Assembly	mm ..... Millimeter
C. ..... Center	R. ..... Right
COMP. ..... Complete	STD. ..... Standard
G. ..... Gram	T(22T). ..... Tooth (22 Teeth)
L. ..... Left	T.W. ..... Thermo Water
L (100L). ..... Link (100 Links)	

● Serial number

Frame No. JH2SC45R□YM 900001~ (2000)
Engine No. JH2SC45E 9000001~ (2000)

IMPORTANT INFORMATION

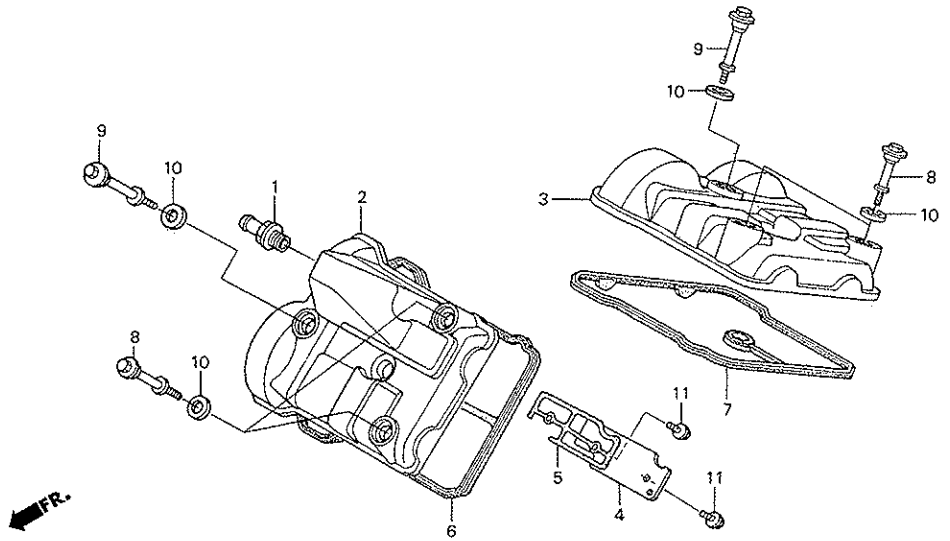
- The parts which have a dot "●" on the left side of the "Ref. No." are exclusive for HRC products. To purchase these parts, consult your Honda dealer.
- The parts which have no dot are Honda products and can be purchased from your nearest Honda motorcycle dealer, or from HRC-JAPAN/ EUROPE if you can't obtain the parts locally.

MEMO

Block No.

E-1

Cylinder head cover
2000 VTR1000SP-1



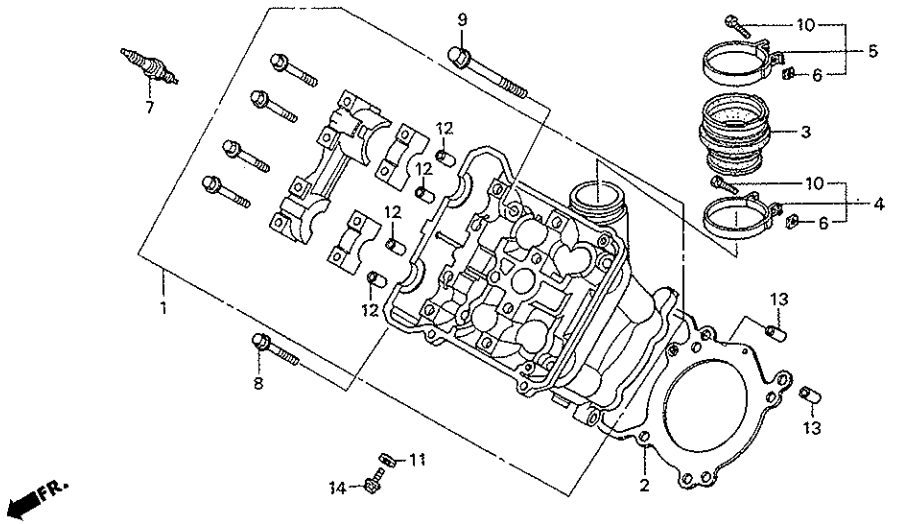
Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	12109-MT7-300	JOINT, BREATHER	1	
• 2	12311-NL6-010	COVER, FRONT HEAD	1	
• 3	12321-NL6-010	COVER, REAR HEAD	1	
• 4	12322-NL6-000	PLATE, BREATHER	1	
• 5	12325-NL6-000	GASKET, BREATHER PLATE	1	
6	12391-MCF-000	GASKET, FRONT HEAD COVER	1	
7	12396-MCF-000	GASKET, REAR HEAD COVER	1	
8	90017-MAL-600	BOLT, HEAD COVER	3	
9	90017-MCF-000	BOLT, HEAD COVER	3	
10	90543-MV9-670	RUBBER, MOUNT	6	
11	95701-06012-08	BOLT, FLANGE, 6X12	2	

Ref. No.	Part No.	Description	Reqd. No.	Remarks

Block No.

E-2

Cylinder head FR
2000 VTR1000SP-1



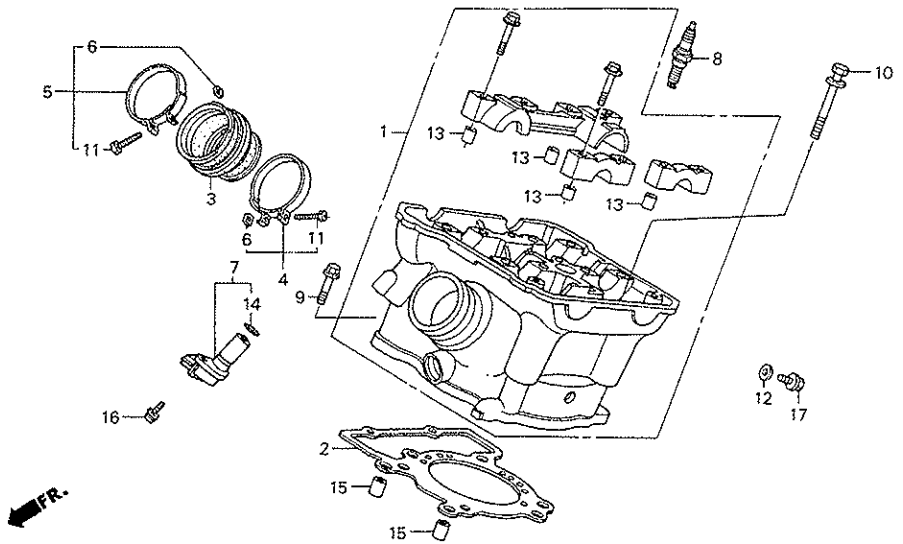
Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	**12010-NL6-000**	**HEAD ASSY., FRONT**	1	
2	12251-MCF-003	GASKET, CYLINDER HEAD FRONT	1	
• 3	**16211-NL6-000**	**INSULATOR, THROT BODY**	1	
4	16219-MBB-000	BAND, INSULATOR	1	
• 5	**16219-NL6 -000**	**BAND, INSULATOR**	1	
6	16222-MV4-300	NUT, SQUARE 5	2	
• 7	**31910-NL6 -003**	**SPARK PLUG R7279-10**	1	
8	90004-GHB-720	BOLT, FLANGE, NSHF, 6X45	2	
9	90004-MCF-000	BOLT-WASH, 11X105	4	
10	90023-MM5-000	BOLT, RECEESSED, 5X28	2	
11	90463-ML7 -000	WASHER, SEALING, 6.5MM	1	
12	90701-MR7 -000	PIN, DOWEL, 9X14	4	
13	94301-10160	PIN, DOWEL,10X16	2	
14	96001-06014-00	BOLT, FLANGE, SH, 6X14	1	

Ref. No.	Part No.	Description	Reqd. No.	Remarks

Block No.

E-3

Cylinder head RR
2000 VTR1000SP-1



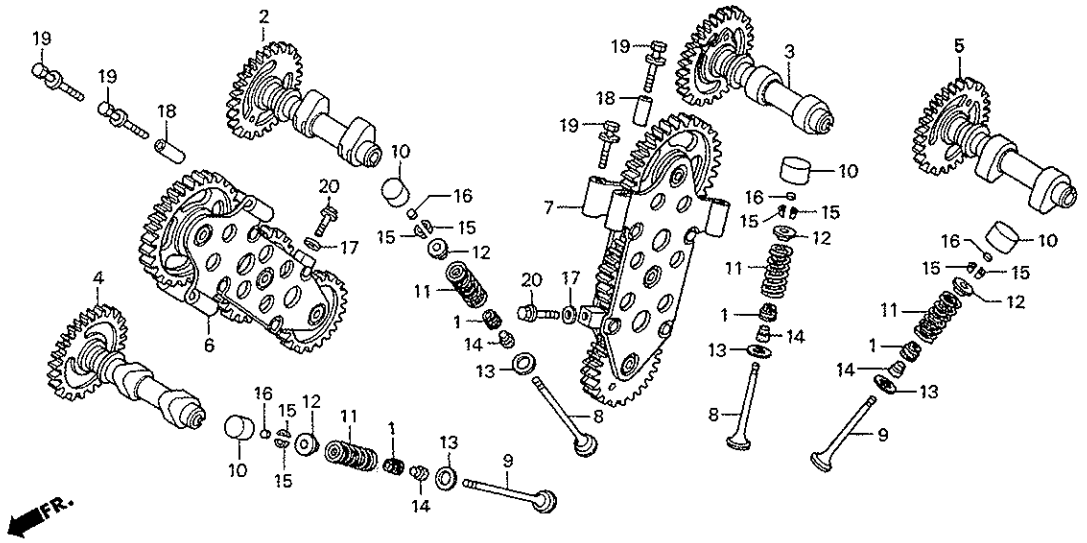
Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	**12020-NL6 -000**	**HEAD ASSY., REAR**	**1**	
2	12252-MCF-003	GASKET, CYLINDER HEAD REAR	1	
• 3	**16211-NL6 -000**	**INSULATOR, THROT BODY**	**1**	
4	16219-MBB-000	BAND, INSULATOR	1	
• 5	**16219-NL6 -000**	**BAND, INSULATOR**	**1**	
6	16222-MV4-300	NUT, SQUARE 5	2	
7	28810-P7Z-004	PICK UP ASSY.	1	
• 8	**31910-NL6 -003**	**SPARK PLUG R7279-10**	**1**	
9	90004-GHB-720	BOLT, FLANGE, NSHF, 6X45	2	
10	90004-MCF-000	BOLT-WASH, 11X105	4	
11	90023-MM5-000	BOLT, RECEESSED, 5X28	2	
12	90463-ML7-000	WASHER, SEALING, 6.5MM	1	
13	90701-MR7-000	PIN, DOWEL, 9X14	4	
14	91309-PX4-003	O-RING,16X2.1	1	
15	94301-10160	PIN, DOWEL, 10X16	2	
16	95701-06018-07	BOLT, FLANGE, 6X18	1	
17	96001-06014-00	BOLT, FLANGE, SH, 6X14	1	

Ref. No.	Part No.	Description	Reqd. No.	Remarks

Block No.

E-4

Cam Shaft / Valve
2000 VTR1000SP-1

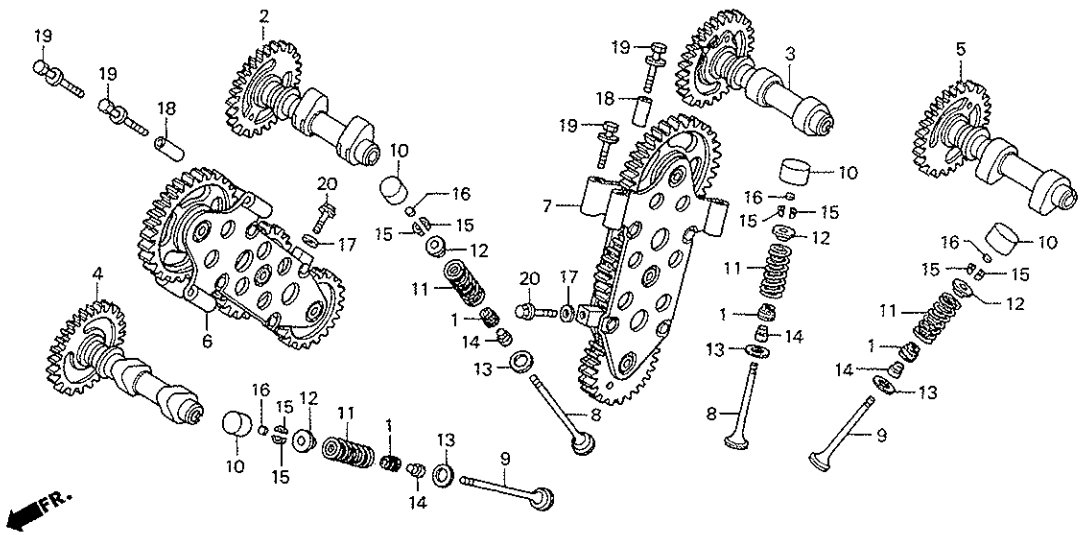


Ref. No.	Part No.	Description	Reqd. No.	Remarks
1	12208-MBB-003	SEAL, VALVE STEM (EXH)	8	
• 2	**14110-NL6 -000**	**CAM SHAFT COMP., FR-IN.**	**1**	
• 3	**14120-NL6 -000**	**CAM SHAFT COMP., RR-IN.**	**1**	
• 4	**14130-NL6 -000**	**CAM SHAFT COMP., FR-EXH.**	**1**	
• 5	**14140-NL6 -000**	**CAM SHAFT COMP., RR-EXH.**	**1**	
6	14410-MCF-000	GEAR TRAIN COMP., FR.	1	
7	14420-MCF-000	GEAR TRAIN COMP., RR.	1	
• 8	**14711-NL6-000**	**VALVE, INLET**	**4**	
• 9	**14721-NL6-000**	**VALVE, EXHAUST**	**4**	
10	14731-MCF-003	LIFTER, VALVE	8	
• 11	**14750-NL6 -000**	**SPRING SET, VALVE**	**8**	
• 12	**14771-NL6 -000**	**RETAINER, VALVE SPRING**	**8**	
• 13	**14775-NL6 -000**	**SEAT, VALVE SPRING OUTER**	**8**	
• 14	**14776-NL6 -000**	**SEAT, VALVE SPRING INNER**	**8**	
15	14781-MBB-003	COTTER, VALVE	16	
16	14901-MBB-000	SHIM, TAPPET 1.20	8	
	14902-MBB-000	SHIM, TAPPET 1.225	8	
	14903-MBB-000	SHIM, TAPPET 1.250	8	
	14904-MBB-000	SHIM, TAPPET 1.275	8	
	14905-MBB-000	SHIM, TAPPET 1.30	8	
	14906-MBB-000	SHIM, TAPPET 1.325	8	
	14907-MBB-000	SHIM, TAPPET 1.350	8	
	14908-MBB-000	SHIM, TAPPET 1.375	8	
	14909-MBB-000	SHIM, TAPPET 1.40	8	
	14910-MBB-000	SHIM, TAPPET 1.425	8	
	14911-MBB-000	SHIM, TAPPET 1.450	8	
	14912-MBB-000	SHIM, TAPPET 1.475	8	
	14913-MBB-000	SHIM, TAPPET 1.50	8	
	14914-MBB-000	SHIM, TAPPET 1.525	8	
	14915-MBB-000	SHIM, TAPPET 1.550	8	
	14916-MBB-000	SHIM, TAPPET 1.575	8	
	14917-MBB-000	SHIM, TAPPET 1.60	8	
	14918-MBB-000	SHIM, TAPPET 1.625	8	
	14919-MBB-000	SHIM, TAPPET 1.650	8	
	14920-MBB-000	SHIM, TAPPET 1.675	8	
	14921-MBB-000	SHIM, TAPPET 1.70	8	
	14922-MBB-000	SHIM, TAPPET 1.725	8	
	14923-MBB-000	SHIM, TAPPET 1.750	8	
	14924-MBB-000	SHIM, TAPPET 1.775	8	
	14925-MBB-000	SHIM, TAPPET 1.80	8	
	14926-MBB-000	SHIM, TAPPET 1.825	8	
	14927-MBB-000	SHIM, TAPPET 1.850	8	
	14928-MBB-000	SHIM, TAPPET 1.875	8	

Block No.

E-4

Cam Shaft / Valve
2000 VTR1000SP-1



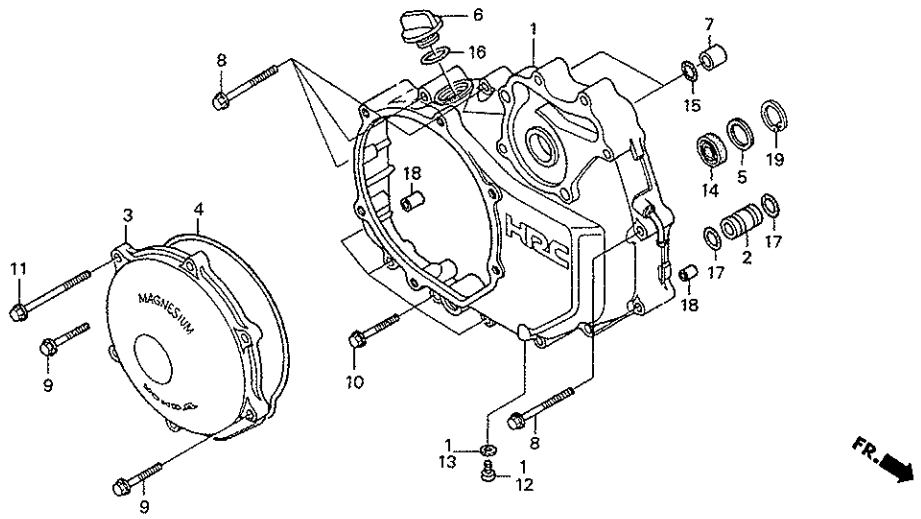
Ref. No.	Part No.	Description	Reqd. No.	Remarks
	14929-MBB-000	SHIM, TAPPET 1.90	8	
	14930-MBB-000	SHIM, TAPPET 1.925	8	
	14931-MBB-000	SHIM, TAPPET 1.950	8	
	14932-MBB-000	SHIM, TAPPET 1.975	8	
	14933-MBB-000	SHIM, TAPPET 2.00	8	
	14934-MBB-000	SHIM, TAPPET 2.025	8	
	14935-MBB-000	SHIM, TAPPET 2.050	8	
	14936-MBB-000	SHIM, TAPPET 2.075	8	
	14937-MBB-000	SHIM, TAPPET 2.10	8	
	14938-MBB-000	SHIM, TAPPET 2.125	8	
	14939-MBB-000	SHIM, TAPPET 2.150	8	
	14940-MBB-000	SHIM, TAPPET 2.175	8	
	14941-MBB-000	SHIM, TAPPET 2.20	8	
	14942-MBB-000	SHIM, TAPPET 2.225	8	
	14943-MBB-000	SHIM, TAPPET 2.250	8	
	14944-MBB-000	SHIM, TAPPET 2.275	8	
	14945-MBB-000	SHIM, TAPPET 2.30	8	
	14946-MBB-000	SHIM, TAPPET 2.325	8	
	14947-MBB-000	SHIM, TAPPET 2.350	8	
	14948-MBB-000	SHIM, TAPPET 2.375	8	
	14949-MBB-000	SHIM, TAPPET 2.40	8	
	14950-MBB-000	SHIM, TAPPET 2.425	8	
	14951-MBB-000	SHIM, TAPPET 2.450	8	

Ref. No.	Part No.	Description	Reqd. No.	Remarks
17	90441-ME9-000	WASHER, SEALING, 8MM	2	
18	91104-KT7-000	PIN, DOWEL, 8X31.5	4	
19	93411-06050-08	BOLT-WASH., 6X50	8	
20	95701-08040-00	BOLT, FLANGE, 8X40	2	

Block No.

E-5

R.H.Crankcase cover
2000 VTR1000SP-1



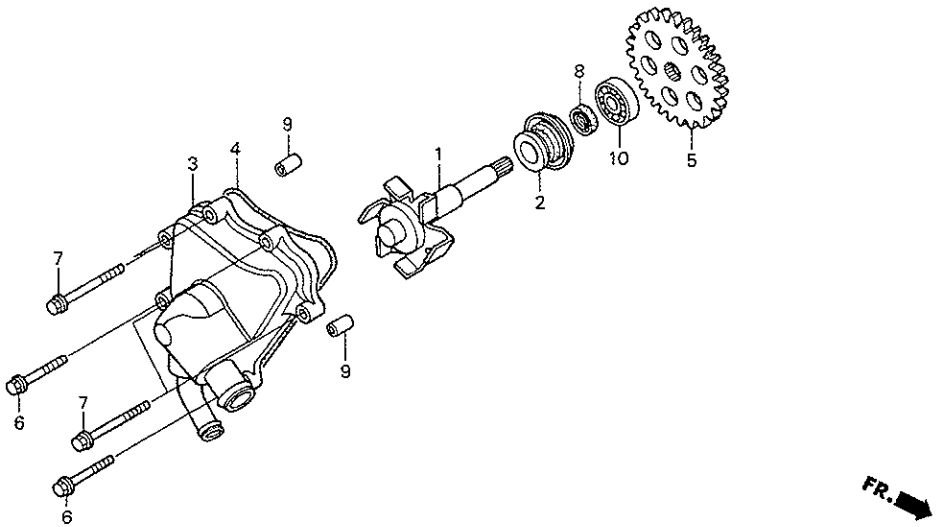
Ref. No.	Part No.	Description	Reqd. No.	Remarks
1	11330-MCF-000	COVER COMP., SUB, R.	1	
2	11332-MCF-000	COLLAR, SPL.	1	
3	11350-MCF-000	COVER COMP., CLUTCH	1	Use only the cover
4	11356-MCF-000	GASKET, CLUTCH COVER	1	
5	15414-300-000	SEAT, SPRING OIL FILTER	1	
6	15611-KA4-710	CAP, OIL FILLER	1	
7	51486-087-711	COLLAR, OUTER	2	
8	90004-GHB-690	BOLT, FLANGE, NSHF, 6X32	7	
9	90004-GHB-710	BOLT, FLANGE, NSHF, 6X40	4	
10	90005-GHB-660	BOLT, FLANGE, NSHF, 6X22	5	
11	90005-GHB-760	BOLT, FLANGE, NSHF, 6X65	1	
12	90119-SD9-000	BOLT, SEALING, 8MM	1	
13	90475-703-000	WASHER C, 8MM	1	
14	91201-MCF-003	OIL SEAL,16X30X6.5	1	
15	91301-MCF-000	O-RING, 19.9X3.1	2	
16	91307-KF0 -003	O-RING, 18X3	1	
17	91310-PH3 -003	O-RING, 18X2.4	2	
18	94301-08200	PIN, DOWEL, 8X20	2	
19	94520-32000	CIRCLIP, IN. 32	1	

Ref. No.	Part No.	Description	Reqd. No.	Remarks

Block No.

E-6

Water pump
2000 VTR1000SP-1



Ref. No.	Part No.	Description	Reqd. No.	Remarks
1	19210-MCF-000	IMPELLER COMP., WATER PUMP	1	
2	19217-MAL-300	SEAL, MECHANICAL	1	
• 3	**19220-NL6-000**	**COVER COMP., WATER PUMP**	**1**	
4	19226-MCF-000	GASKET, W/PUMP COVER	1	
5	19231-MCF-300	GEAR, WATER PUMP DRIVEN	1	
6	90004-GHB-680	BOLT, FLANGE, NSHF, 6X28	2	
7	90004-GHB-740	BOLT, FLANGE, NSHF, 6X55	4	
8	91201-148-003	OIL SEAL,12X22X5	1	
9	94301-08140	PIN, DOWEL, 8X14	2	
10	96100-62003-00	BEARING, BALL RADIAL 6200	1	

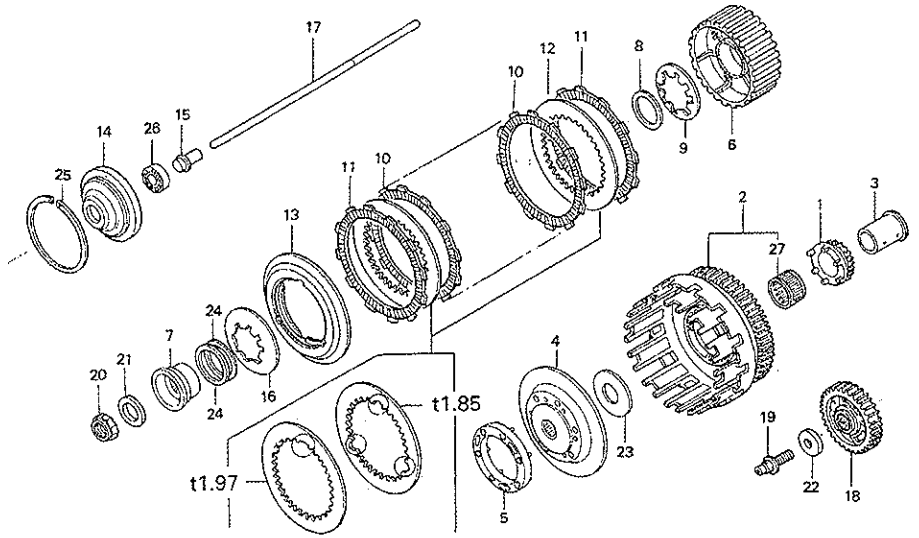
Ref. No.	Part No.	Description	Reqd. No.	Remarks

Block No.

E-7

Clutch

2000 VTR1000SP-1



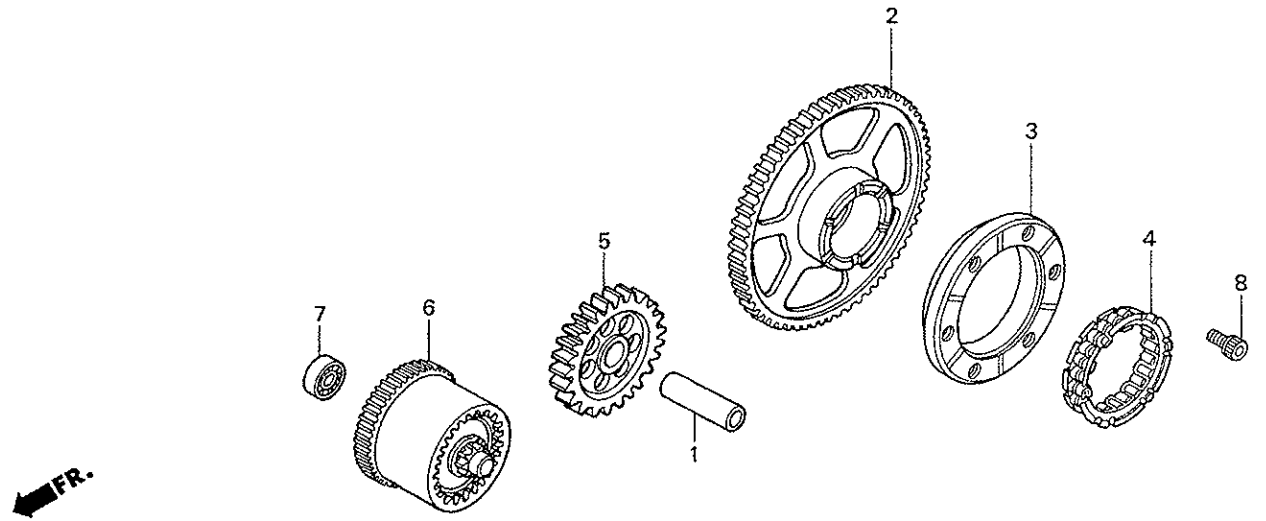
Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	15131-NL6-000	**SPROCKET, OIL PUMP DRIVE**	1	
2	22100-MCF-000	OUTER COMP., CLUTCH	1	
3	22116-MCF-000	GUIDE, CLUTCH OUTER	1	
• 4	22121-NL6-000	**CENTER, CLUTCH**	1	
• 5	22122-NL6-010	PLATE COMP., CLUTCH LIFTER CAM	1	
• 6	22131-NL6-000	**CENTER B, CLUTCH**	1	
• 7	22132-NL6-000	**GUIDE, CLUTCH CENTER**	1	
• 8	22134-NL6-000	**SHIM, STROKE 1.8**	1	MARK 18
•	22135-NL6-000	**SHIM, STROKE 1.9**	1	MARK 19
•	22136-NL6-000	**SHIM, STROKE 2.0**	1	MARK 20
•	22137-NL6-000	**SHIM, STROKE 2.1**	1	MARK 21
•	22138-NL6-000	**SHIM, STROKE 2.2**	1	MARK 22
•	22139-NL6-000	**SHIM, STROKE 2.3**	1	MARK 23
• 9	22172-NL6-000	**SPRING, CLUTCH VC**	1	
• 10	22201-NL6-000	**DISK, CLUTCH FRICTION 517D(A)**	7	BLUE
• 11	22202-NL6-000	**DISK, CLUTCH FRICTION 2500(A)**	2	GREEN
• 12	22321-NL6-000	**PLATE, CLUTCH 1.97**	8	
•	22322-NL6-000	**PLATE, CLUTCH 1.85**	8	
• 13	22350-NL6-000	**PLATE COMP., CLUTCH PRESSURE**	1	
• 14	22353-NL6-000	**PLATE, CLUTCH LIFTER**	1	
15	22366-MS2-611	JOINT PIECE, CLUTCH	1	

Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 16	22441-NL6-000	**SPRING, CLUTCH**	1	
17	22850-MBB-000	ROD COMP., CLUTCH LIFTER	1	
18	23103-MCF-000	GEAR, PRIMARY DRIVE	1	
• 19	90001-NL6-000	**BOLT, FLANGE, 12X30**	1	
20	90231-MS2-610	NUT, LOCK, 25MM	1	
21	90401-MB8-000	WASHER, 25. 1X37X5	1	
22	90402-MV1-000	WASHER, 12.2X40X5	1	
• 23	90403-NL6-000	**WASHER, THRUST, 28.2X56X2**	1	
• 24	90567-NL6-000	**SHIM, CLUTCH 0.9**	2	MARK 09
•	90568-NL6-000	**SHIM, CLUTCH 1.0**	2	MARK 10
•	90569-NL6-000	**SHIM, CLUTCH 1.1**	2	MARK 11
•	90570-NL6-000	**SHIM, CLUTCH 1.2**	2	MARK 12
•	90571-NL6-000	**SHIM, CLUTCH 1.3**	2	MARK 13
•	90572-NL6-000	**SHIM, CLUTCH 1.4**	2	MARK 14
•	90573-NL6-000	**SHIM, CLUTCH 1.5**	2	MARK 15
25	90601-MB0-771	CIRCLIP, IN. 95	1	
26	91009-MAS-003	BEARING, BALL RADIAL 16003	1	
27	91025-MT7-003	BEARING, NEEDLE, 35X42X26	1	

Block No.

E-8

Starting clutch
2000 VTR1000SP-1



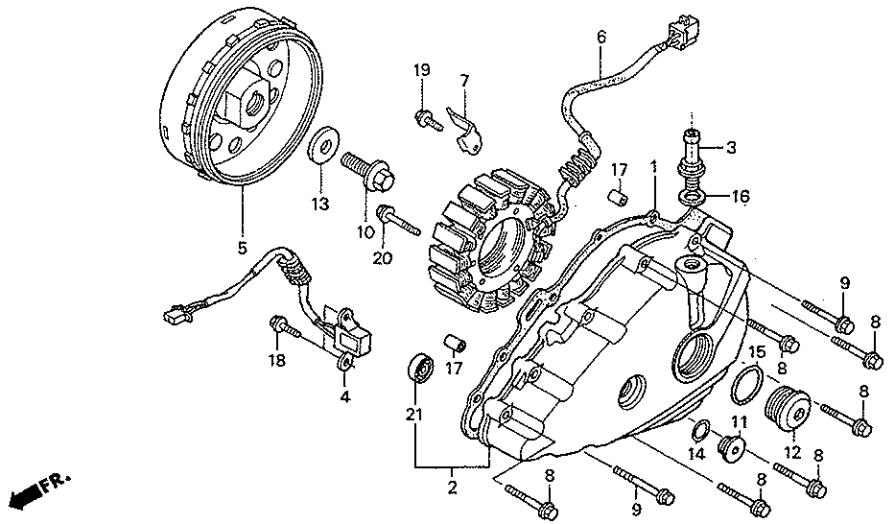
Ref. No.	Part No.	Description	Reqd. No.	Remarks
1	13111-166-000	PIN, PISTON	1	
2	28110-MCF-000	GEAR COMP., STARTING DRIVEN	1	
3	28121-MAH-000	OUTER, STARTING CLUTCH	1	
4	28126-MBB-003	CLUTCH, ONEWAY	1	
5	28131-MCF-000	GEAR, START IDLE	1	
6	28140-MCF-003	LIMITTER ASSY.	1	
7	96100-60000-00	BEARING, BALL, RADIAL 6000	1	
8	96700-08016-10	BOLT, SOCKET, 8X16	6	

Ref. No.	Part No.	Description	Reqd. No.	Remarks

Block No.

E-9

Generator
2000 VTR1000SP-1

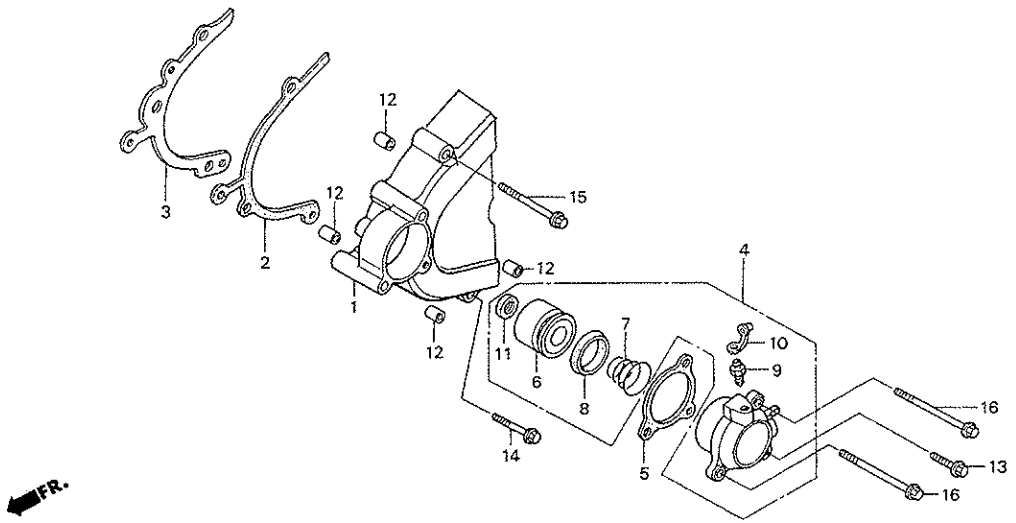


Ref. No.	Part No.	Description	Reqd. No.	Remarks
1	11636-MCF-000	GASKET, A.C.G. COVER	1	
• 2	**11640-NL6-000**	**COVER COMP., A.C.G.**	**1**	
• 3	**15514-NL6-000**	**JOINT, OIL RETURN**	**1**	
4	30300-MCF-000	PULSE GEN ASSY.	1	
• 5	**31110-NL6-003**	**FLYWHEEL COMP.**	**1**	
• 6	**31120-NL6-003**	**STATOR COMP.**	**1**	
• 7	**31131-NL6-000**	**CLAMPER, A.C.G. CORD**	**1**	
8	90004-GHB-690	BOLT, FLANGE, NSHF, 6X32	9	
9	90004-GHB-710	BOLT, FLANGE, NSHF, 6X40	2	
10	90023-MBT-010	BOLT, FLANGE, 12X45	1	
11	90084-MN8-010	CAP, 14MM	1	
12	90087-KT7-000	CAP, 30MM	1	
13	90402-MBB-000	WASHER, 12.5X36X6	1	
14	91303-377-000	O-RING, 13.8X2.5	1	
15	91356-425-003	O-RING, 30MM	1	
16	94109-14000	WASHER, PLAIN, 14MM	1	
17	94301-08140	PIN, DOWEL, 8X14	2	
18	95701-06014-00	BOLT, FLANGE, 6X14	2	
19	96001-06010-00	BOLT, FLANGE, SH, 6X10	1	
20	96001-06025-00	BOLT, FLANGE, SH, 6X25	3	
21	96100-62000-00	BEARING, BALL RADIAL 6200	1	

Block No.

E-10

L.H. Crankcase cover
2000 VTR1000SP-1



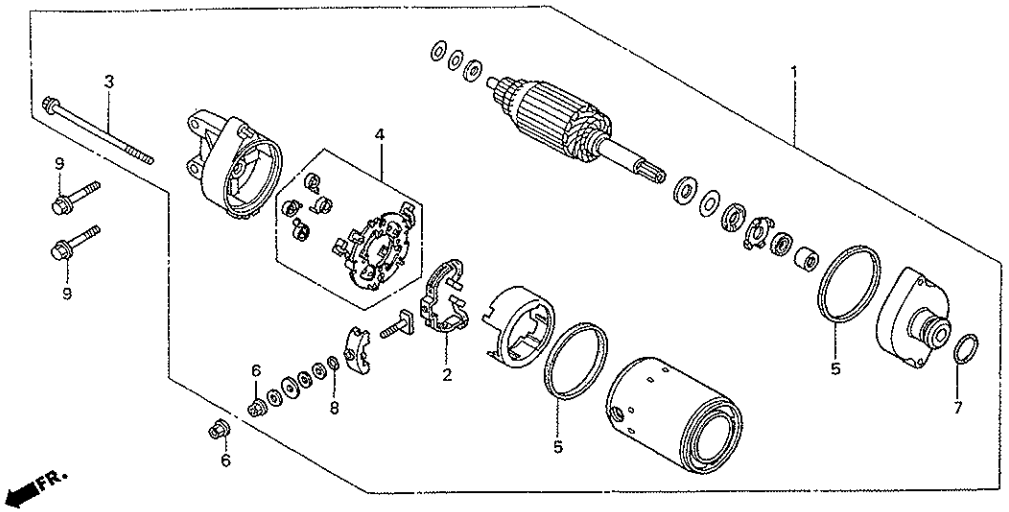
Ref. No.	Part No.	Description	Reqd. No.	Remarks
1	11340-MCF-000	COVER COMP., L.	1	Use only the cover
2	11344-MCF-000	GASKET, L. COVER	1	
3	11365-MBT-000	PLATE, DRIVE CHAIN GUIDE	1	
4	22860-MT7-000	SLAVE CYLINDER ASSY.	1	
5	22862-MW7-650	GASKET, SLAVE CYLINDER	1	
6	22863-MJ8 -003	PISTON, SLAVE CYLINDER	1	
7	22864-MT7-006	SPRING, SLAVE CYLINDER	1	
8	22865-MJ8-003	CUP, SLAVE CYLINDER	1	
9	22866-MF2-711	SCREW, BLEEDER	1	
10	43353-461-771	CAP, BLEEDER	1	
11	91209-MB0-003	OIL SEAL, 8X18X5	1	
12	94301-08140	PIN, DOWEL, 8X14	4	
13	96001-06020-07	BOLT, FLANGE, SH, 6X20	1	
14	96001-06040-07	BOLT, FLANGE, SH, 6X40	1	
15	96001-06050-07	BOLT, FLANGE, SH, 6X50	1	
16	96001-06060-07	BOLT, FLANGE, SH, 6X60	2	

Ref. No.	Part No.	Description	Reqd. No.	Remarks

Block No.

E-11

Starting motor
2000 VTR1000SP-1



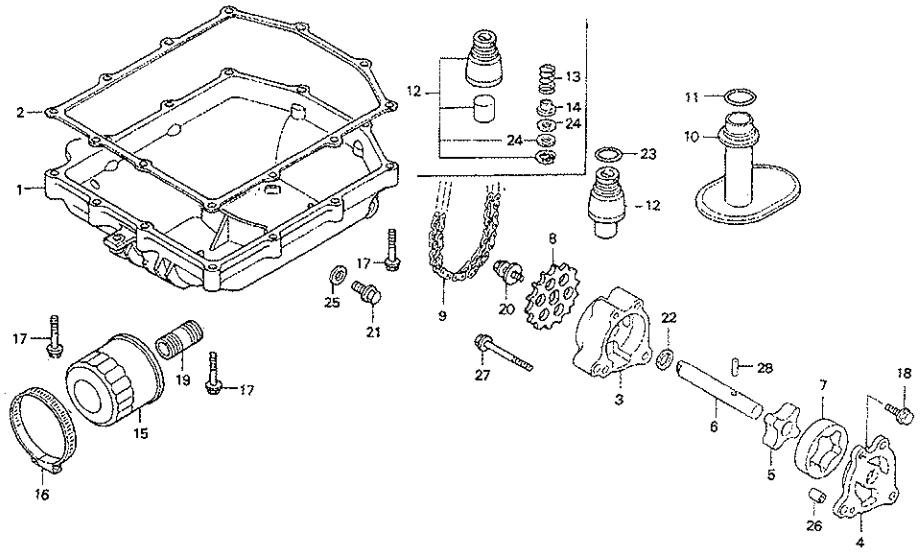
Ref. No.	Part No.	Description	Reqd. No.	Remarks
1	31200-MCF-003	MOTOR ASSY., STARTER	1	
2	31201-MR6-008	TERMINAL SET, BRUSH	1	
3	31205-MR1-008	BOLT, SETTING	2	
4	31206-MR6-008	HOLDER SET, BRUSH	1	
5	31207-KS5-901	RING	2	
6	90071-MB0-000	NUT-WASH, 6MM	1	
7	91309-425-003	O-RING, 24.4X3.1	1	
8	91320-MB0-000	O-RING,	1	
9	95701-06025-00	BOLT, FLANGE, 6X25	2	

Ref. No.	Part No.	Description	Reqd. No.	Remarks

Block No.

E-12

OIL Pump
2000 VTR1000SP-1



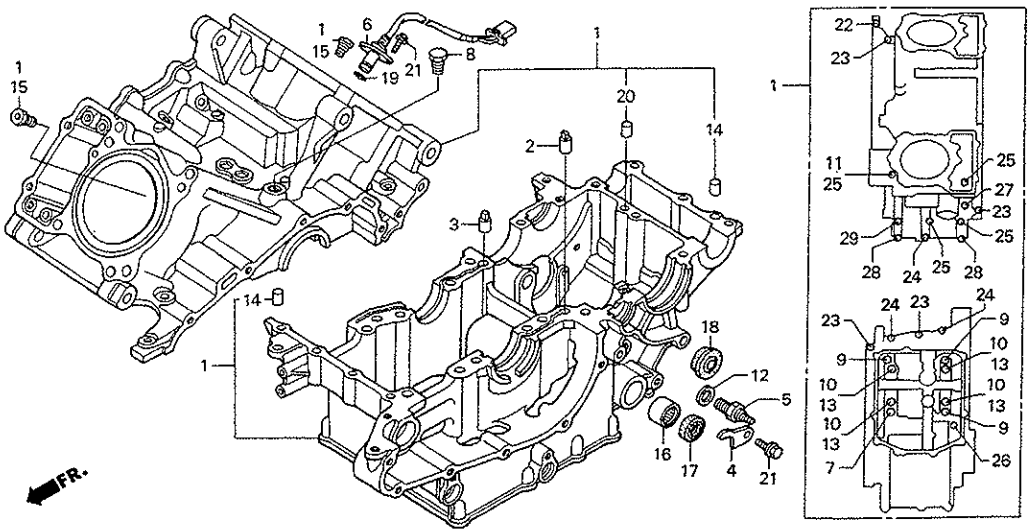
Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	**11210-NL6-000**	**OIL PAN**	1	
• 2	**11316-NL6-000**	**GASKET, OIL PAN**	1	
• 3	**15101-MCF-000**	**BODY, OIL PUMP**	1	
• 4	**15102-NL6-000**	**PLATE, OIL PUMP**	1	
5	15131-414-000	ROTOR, INNER OIL PUMP	1	
• 6	**15132-NL6-000**	**SHAFT, OIL PUMP**	1	
7	15133-414-000	ROTOR, OIL PUMP OUTER	1	
8	15134-KE8-010	SPROCKET, OIL PUMP DRIVEN	1	
9	15140-415-003	CHAIN, OIL PUMP	1	
• 10	**15150-NL6-000**	**STRAINER COMP., OIL**	1	
11	15154-MM5-000	PACKING,OIL STRAINER	1	
12	15220-MCF-000	VALVE ASSY., RELIEF	1	
• 13	**15232-NL6-000**	**SPRING, RELIEF VALVE**	1	
• 14	**15233-NL6-000**	**SEAT, RELIEF VALVE SPRING**	1	
15	15410-MT7-003	CARTRIDGE, OIL FILTER	1	
16	50252-GC4-830	BAND, SUB TANK	1	
17	90004-GHB-690	BOLT, FLANGE, NSHF, 6X32	12	
• 18	**90012-MV9-671**	**BOLT, 6X16 CT200**	1	
19	90019-MB0-000	BOSS,OIL FILTER	1	
20	90021-MM5-000	BOLT-WASH, 6X12	1	

Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 21	**90081-NX4-000**	**BOLT, DRAIN,12MM**	1	
22	90456-333-000	WASHER, THRUST, 11MM	1	
23	91313-MB0-003	O-RING,14.7X2.2	1	
24	94101-05700	WASHER, PLAIN, 5MM	2	
25	94109-12000	WASHER, PLUG, DRAIN, 12MM	1	
26	94301-08100	PIN, DOWEL, 8X10	1	
27	95701-06040-00	BOLT, FLANGE, 6X40	3	
28	96220-40158	ROLLER, 4X15.8	1	

Block No.

E-13

Crankcase
2000 VTR1000SP-1



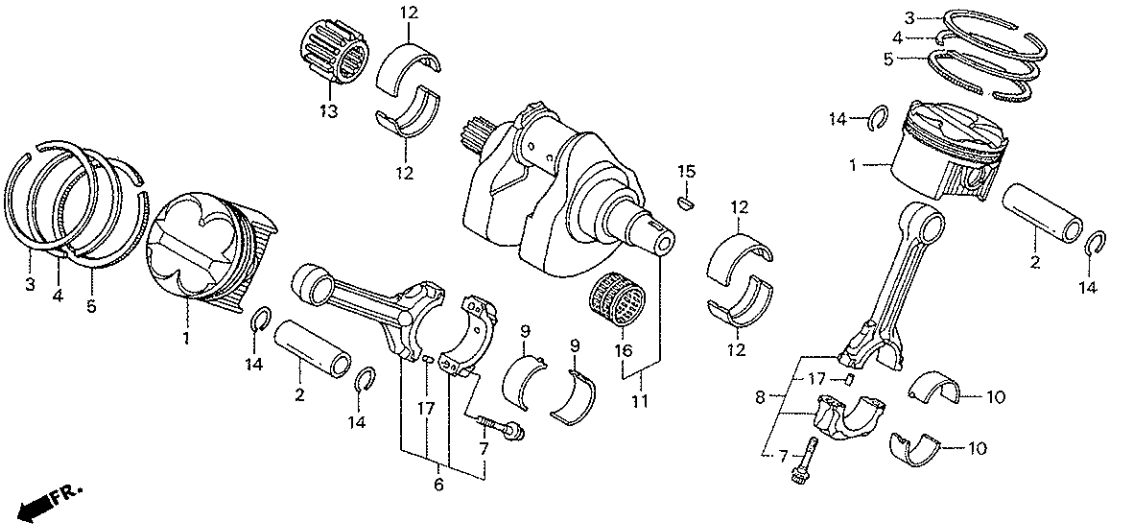
Ref. No.	Part No.	Description	Reqd. No.	Remarks
1	11000-MCF-000	CRANK CASE SET	1	
• 2	**15515-NL6-000**	**ORIFICE, 1.4MM**	**1**	
• 3	**15516-NL6-000**	**ORIFICE, 1.8MM**	**1**	
4	24612-MAL-600	PLATE, SPINDLE	1	
5	35600-KE8-003	SW. ASSY., NEUTRAL	1	
6	37700-MAL-601	SENSOR ASSY., SPEED	1	
7	90001-MBB-003	BOLT, WASH. 10X80	1	
• 8	**90003-NL5-000**	**PLUG, TAPER**	**1**	
9	90009-MBB-003	BOLT, WASH.10X115	3	
10	90009-MCF-000	BOLT, FLANGE, 10X115	4	
11	90442-028-000	WASHER, SEALING, 8MM	1	
12	90443-MJ6-000	WASHER, NEUTRAL	1	
13	90453-KCY-670	WASHER, PLAIN, 10MM	4	
14	90701-MV9-670	PIN, DOWEL, 10X16	2	
15	90901-MCF-000	JET, OIL #80	2	
16	91106-KM1-013	BEARING, NEEDLE, 14X22X16	1	
17	91203-KA4-771	OIL SEAL, 14X22X5	1	
18	91204-MG8-003	OIL SEAL, 8X25X7	1	
19	91302-MAL-601	O-RING, 18.1X3.6	1	
20	94302-08140	PIN, DOWEL, 8X14	1	

Ref. No.	Part No.	Description	Reqd. No.	Remarks
21	95701-06014-00	BOLT, FLANGE, 6X14	3	
22	95701-06028-00	BOLT, FLANGE, 6X28	1	
23	95701-06045-00	BOLT, FLANGE, 6X45	4	
24	95701-08050-00	BOLT, FLANGE, 8X50	3	
25	95701-08070-00	BOLT, FLANGE, 8X70	4	
26	95701-08080-00	BOLT, FLANGE, 8X80	1	
27	95701-08090-00	BOLT, FLANGE, 8X90	1	
28	95701-10050-00	BOLT, FLANGE, 10X50	2	
29	95701-10105-00	BOLT, FLANGE, 10X105	1	

Block No.

E-14

Crankshaft
2000 VTR1000SP-1

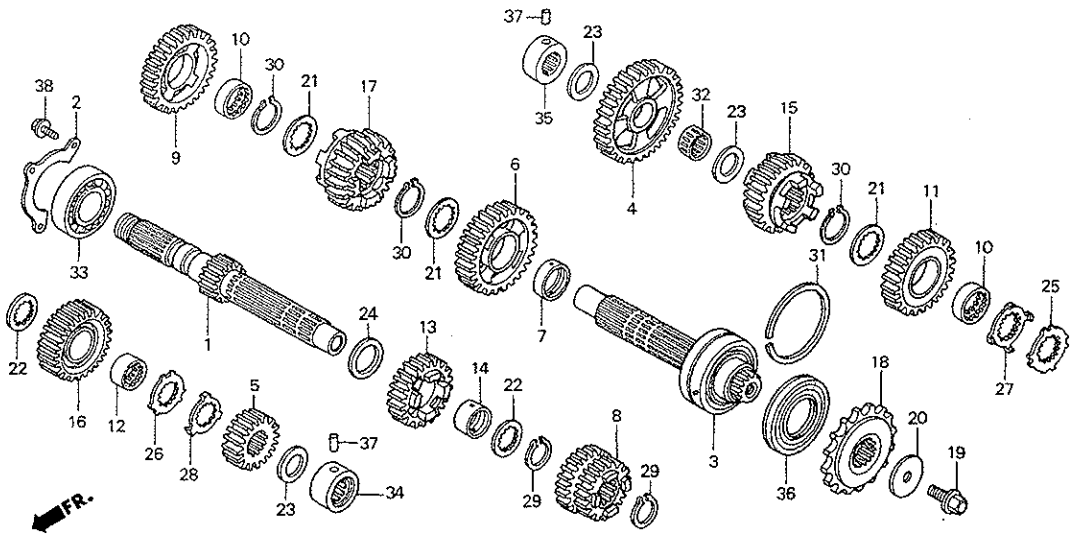


Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	**13101-NL6-000**	**PISTON**	2	
2	13111-MCF-000	PIN, PISTON	2	
• 3	**13121-NL6-000**	**RING, PISTON TOP**	2	
• 4	**13131-NL6-003**	**RING, PISTON 2ND. 100X1.0X2.6**	2	
• 5	**13141-NL6-003**	**RING, PISTON OIL 100X1.5X2.25**	2	
• 6	**13210-NL6-000**	**CONN-ROD ASSY., FRONT**	1	
7	13213-MCF-003	BOLT, CONN-ROD	4	
• 8	**13220-NL6-000**	**CONN-ROD ASSY., REAR**	1	
9	13224-MCF-003	BEARING A, FR. CONN-ROD	2	(BLUE)
	13225-MCF-003	BEARING B, FR. CONN-ROD	2	(BLACK)
	13226-MCF-003	BEARING C, FR. CONN-ROD	2	(BROWN)
	13227-MCF-003	BEARING D, FR. CONN-ROD	2	(GREEN)
	13228-MCF-003	BEARING E, FR. CONN-ROD	2	(YELLOW)
10	13234-MCF-003	BEARING A, RR. CONN-ROD	2	(BLUE)
	13235-MCF-003	BEARING B, RR. CONN-ROD	2	(BLACK)
	13236-MCF-003	BEARING C, RR. CONN-ROD	2	(BROWN)
	13237-MCF-003	BEARING D, RR. CONN-ROD	2	(GREEN)
	13238-MCF-003	BEARING E, RR. CONN-ROD	2	(YELLOW)
• 11	**13310-NL6-000**	**CRANK SHAFT COMP**	1	
12	13313-MCF-003	BEARING A, CRANK SHAFT	4	(BLUE)
	13314-MCF-003	BEARING B, CRANK SHAFT	4	(BLACK)
	13315-MCF-003	BEARING C, CRANK SHAFT	4	(BROWN)
	13316-MCF-003	BEARING D, CRANK SHAFT	4	(GREEN)
	13317-MCF-003	BEARING E, CRANK SHAFT	4	(YELLOW)
13	14406-MCF-000	GEAR, TIMING	1	
14	90602-MBN-670	CLIP, PISTON PIN, 23MM	4	
15	90741-413-000	KEY, SPECIAL WOODRUFF, 25X14	1	
16	91021-MBB-003	BEARING, NEEDLE, 34X44X24	1	
17	94303-04065	PIN, DOWEL, 4X6.5	4	

Block No.

E-15

Transmission
2000 VTR1000SP-1



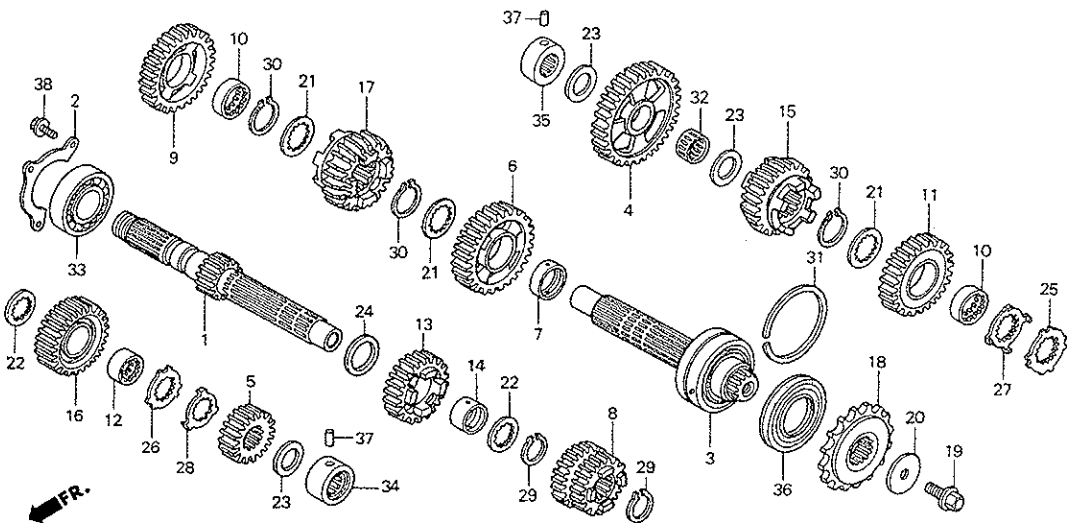
Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	23211-NL6-000	**SHAFT, MAIN P-1**	1	14T
•	23212-NL6-000	**SHAFT, MAIN P-2**	1	16T
2	23212-MCF-000	PLATE, BEARING SET	1	
3	23220-MBB-000	SHAFT COMP., COUNTER	1	
• 4	23421-NL6-000	**GEAR, C-1 P-1**	1	31T
•	23422-NL6-000	**GEAR, C-1 P-2**	1	33T
• 5	23431-NL6-000	**GEAR, M-2 P-1**	1	19T
•	23432-NL6-000	**GEAR, M-2 P-2**	1	17T
• 6	23441-NL6-000	**GEAR, C-2 P-1**	1	31T
•	23442-NL6-000	**GEAR, C-2 P-2**	1	29T
7	23442-MS2-610	COLLAR, 30X11.2	1	
• 8	23451-NL6-000	**GEAR, M-3 M-4 P-1**	1	19T,22T
•	23452-NL6-000	**GEAR, M-3 M-4 P-2**	1	19T,25T
•	23453-NL6-000	**GEAR, M-3 M-4 P-3**	1	20T,22T
•	23454-NL6-000	**GEAR, M-3 M-4 P-4**	1	20T,25T
• 9	23461-NL6-000	**GEAR, C-3**	1	26T
•	23462-NL6-000	**GEAR, C-3 P-2**	1	29T
10	23462-MAT-000	COLLAR, SPLINE, 30X11	2	
• 11	23481-NL6-000	**GEAR, C-4 P-1**	1	28T
•	23482-NL6-000	**GEAR, C-4 P-2**	1	31T
12	23482-MR7-000	COLLAR, SPLINE, 28X13.5	1	

Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 13	23491-NL6-000	**GEAR, M-5**	1	26T
14	23495-MM5-000	COLLAR, 28X13	1	
• 15	23501-NL6-000	**GEAR, C-5**	1	30T
• 16	23511-NL6-000	**GEAR, M-6 P-1**	1	25T
•	23512-NL6-000	**GEAR, M-6 P-2**	1	27T
• 17	23521-NL6-000	**GEAR, C-6 P-1**	1	26T
•	23522-NL6-000	**GEAR, C-6 P-2**	1	29T
• 18	23801-NL6-000	**SPROCKET, DRIVE 15T(520)**	1	
•	23802-NL6-000	**SPROCKET, DRIVE 16T(520)**	1	
•	23803-NL6-000	**SPROCKET, DRIVE 17T(520)**	1	
• 19	90004-492-010	**SPL BOLT, FLANG, 10X22**	1	
• 20	90402-NL6 -000	**WASHER,10.2X37X3**	1	
21	90452-MAT-000	WASHER, SPLINE, 30X36X1.5	3	
22	90452-MR7-000	WASHER, SPLINE, 28X34X1.5	2	
23	90455-ML7-000	WASHER B, THRUST, 22MM	3	
24	90458-729-920	WASHER, THRUST, 28MM	1	
25	90463-MAT-000	WASHER, SPLINE, 30MM	1	
26	90463-MR7-000	WASHER, SPLINE, 28MM	1	
27	90464-MAT-000	WASHER, LOCK, 30MM	1	

Block No.

E-15

Transmission
2000 VTR1000SP-1



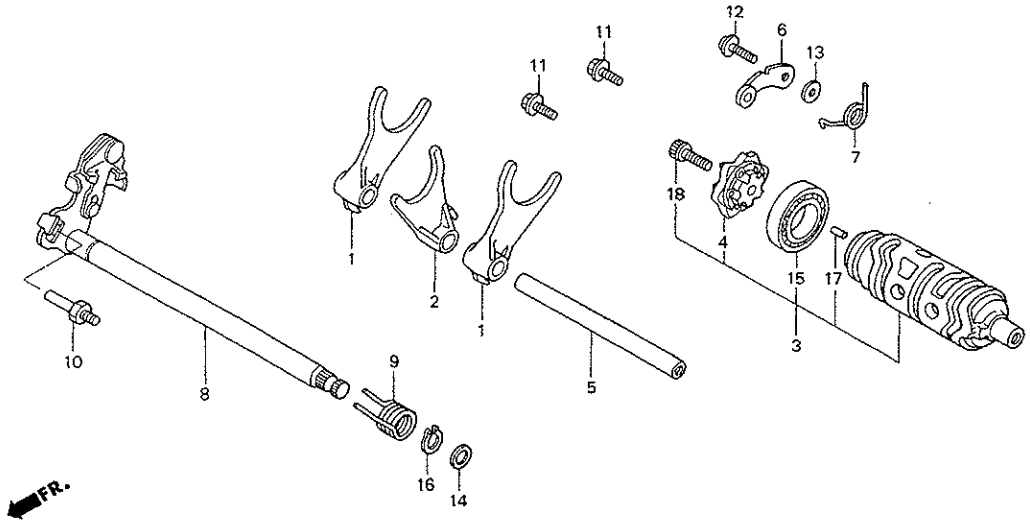
Ref. No.	Part No.	Description	Reqd. No.	Remarks
28	90464-MR7-000	WASHER, LOCK, 28MM	1	
29	90603-MN4-000	CIRCLIP, 28MM	2	
30	90604-MM5-000	CIRCLIP, 30MM	3	
31	90605-MM5-000	SNAP RING, 72MM	1	
32	91001-MB6-680	BEARING, NEEDLE, 22X26X13	1	
33	91004-MBT-003	BEARING, BALL RADIAL, 28X62X16	1	
34	91022-MCF-003	BEARING, NEEDLE, 22X38X16	1	
35	91025-MCF-003	BEARING, NEEDLE, 22X38X19.3	1	
36	91207-MBB-003	OIL SEAL, 39X72X8	1	
37	94302-08100	PIN, DOWEL, 8X10	2	
38	95701-06014-00	BOLT, FLANGE, 6X14	3	

Ref. No.	Part No.	Description	Reqd. No.	Remarks

Block No.

E-16

Gearshift
2000 VTR1000SP-1



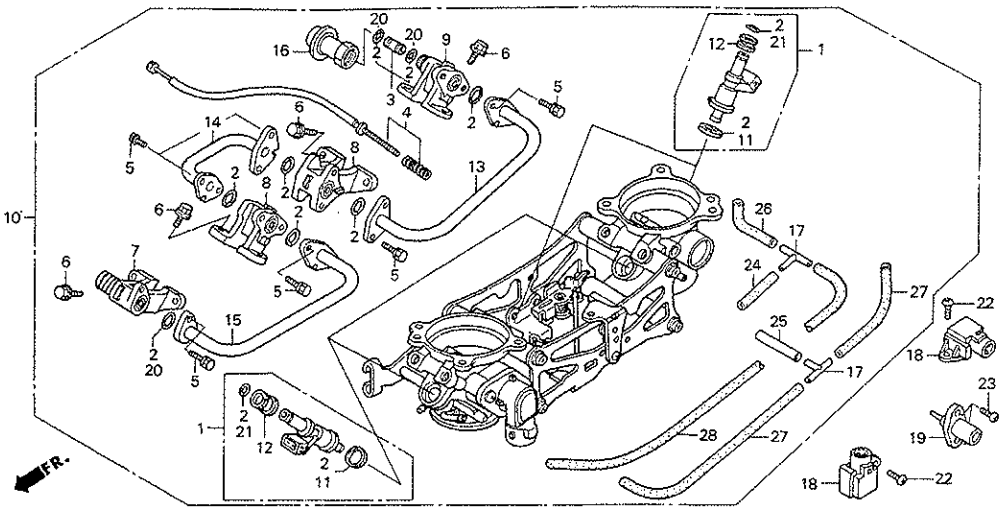
Ref. No.	Part No.	Description	Reqd. No.	Remarks
1	24211-MCF-000	FORK R/L., GEAR SHIFT	2	
2	24212-MBB-000	FORK C, GEAR SHIFT	1	
3	24310-MCF-000	DRUM COMP., GEAR SHIFT	1	
4	24315-MAS-E00	CENTER COMP., SHIFTDRUM	1	
5	24321-MAS-000	SHAFT, GEAR SHIFT FORK	1	
6	24430-MBB-000	STOPPER COMP., DRUM	1	
7	24435-MCF-000	SPRING, SHIFT DRUM STOPPER	1	
8	24610-MCF-000	SPINDLE COMP., SHIFT	1	
9	24651-MAS-E00	SPRING, SHIFT RETURN	1	
10	24652-035-000	PIN, SHIFT RETURN SPRING	1	
11	90021-MM5-000	BOLT-WASH, 6X12	2	
12	90022-MY5-600	PIVOT, SHIFT DRUM STOPPER ARM	1	
13	90417-360-000	WASHER, DRUM STOPPER	1	
14	90451-155-000	WASHER, 14MM	1	
15	91008-374-003	BEARING, BALL 16005	1	
16	94510-14000	CIRCLIP, EX. 14	1	
17	96220-40080	ROLLER, 4X8	1	
18	96600-08020-10	BOLT, SOCKET, 8X 20	1	

Ref. No.	Part No.	Description	Reqd. No.	Remarks

Block No.

E-17

Throttle body
2000 VTR1000SP-1

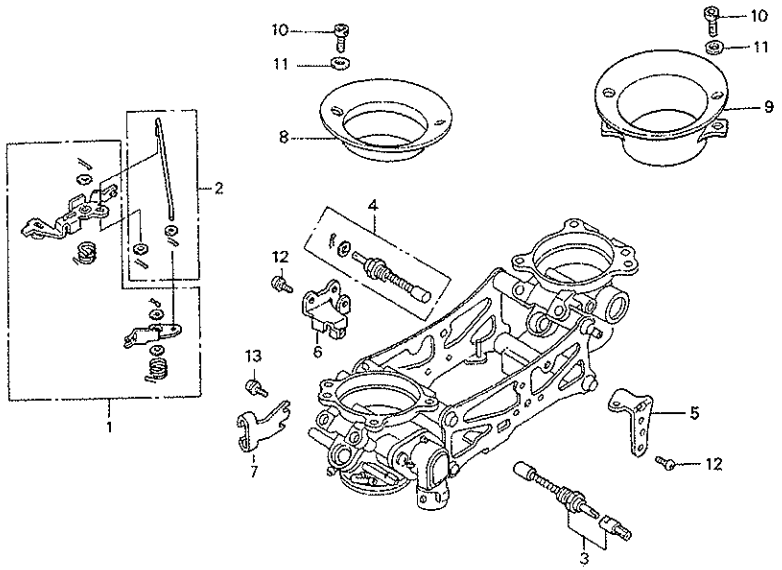


Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	06164-NL6-003	**PACKING SET, INJECTOR**	4	
• 2	16010-NL6-003	**GASKET SET**	1	
3	16024-MAT-E01	JOINT, SET	1	
• 4	16029-NL6-003	**SCREW SET, STOP**	1	
5	16080-MCF-003	BOLT-WASH., 5X14	11	
• 6	16081-NL6-003	**BOLT-WASH., 5X20**	8	
• 7	16120-NL6-003	**STAY COMP., FUEL**	1	
8	16129-MCF-003	STAY A, PIPE	2	
9	16130-MCF-003	STAY C, PIPE	1	
• 10	16400-NL6 -003	**THROTTLEBODY ASSY.**	1	
11	16472-MCF-003	SEAL RING, INJECTOR	4	
12	16473-PD6-000	RING, CUSHION	4	
• 13	16610-NL6-003	**PIPE COMP. A, FUEL**	1	
• 14	16620-NL6-003	**PIPE COMP. B, FUEL**	1	
• 15	16630-NL6-003	**PIPE COMP. C, FUEL**	1	
• 16	16740-NL6 -003	**REGULATOR ASSY., PRESSURE**	1	
17	17201-MG9-000	T JOINT	2	
18	37830-MAT-E01	SENSOR ASSY., MAP	2	
19	37880-P05-A00	SENSOR ASSY., TA	1	
20	91301-MJ0-003	O-RING, 7.8X1.9	3	
21	91301-PM7-003	O-RING, 7.3X2.2	4	
22	93891-04012-08	SCREW-WASH., 4X12	2	
23	93891-05016-08	SCREW-WASH., 5X16	2	
24	95005-35040-20	TUBE, 3.5X40	1	ϕ3.5X40MM
25	95005-35050-20	TUBE, 3.5X50	1	ϕ3.5X50MM
26	95005-35085-20	TUBE, 3.5X85	1	ϕ3.5X85MM
27	95005-35220-20	TUBE, 3.5X220	2	ϕ3.5X220MM
28	95005-35500-20	TUBE, 3.5X500	1	ϕ3.5X500MM
	95005-35001-20M	TUBE, 3.5X1M	–	ϕ3.5X1M

Block No.

E-18

Throttle body
2000 VTR1000SP-1



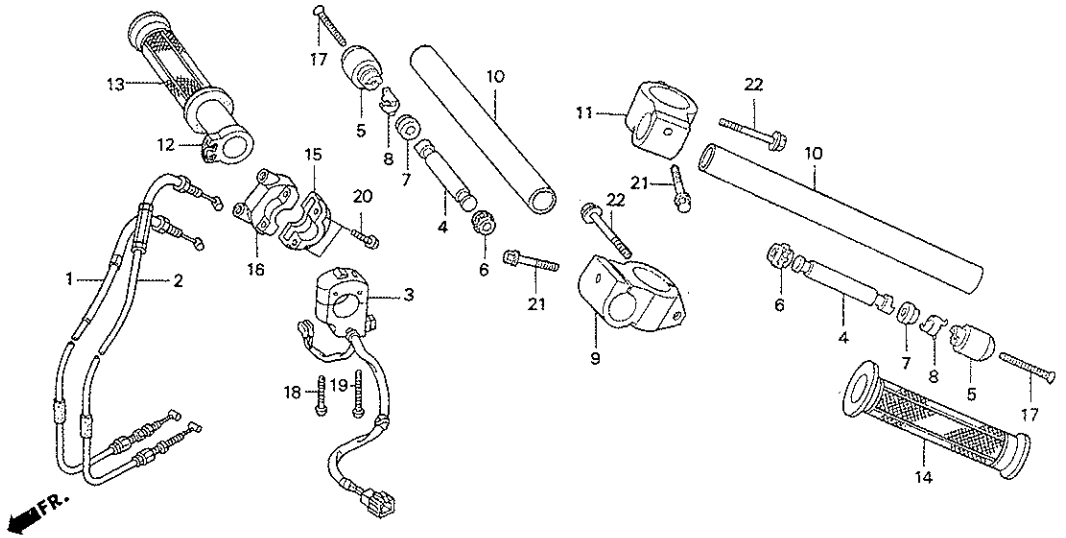
Ref. No.	Part No.	Description	Reqd. No.	Remarks
1	16018-MCF-003	LEVER SET, STARTER	1	
2	16019-MCF-003	ROD SET, STARTER	1	
3	16046-MCF-003	VALVE SET, STARTER	1	
4	16047-MCF-003	VALVE COMP., STARTER	1	
• 5	**16118-NL6-003**	STAY, PB SENSOR	1	
6	16121-MCF-003	STAY, CHOKE WIRE	1	
• 7	**16169-NL6-003**	**STAY, WIRE**	1	
• 8	**17237-NL6-000**	**FUNNEL, AIR**	1	
• 9	**17238-NL6-000**	**FUNNEL, AIR 40MM**	1	
• 10	**90049-NL6-000**	**BOLT, SOCKET 5X14**	4	
• 11	**90401-NL6-000**	**WASHER, 5.2X11X1**	4	
12	93892-04008-00	SCREW-WASH, 4X8	4	
13	93892-05014-10	SCREW-WASH, 5X14	2	

Ref. No.	Part No.	Description	Reqd. No.	Remarks

Block No.

F-1

Cable handle pipe
2000 VTR1000SP-1

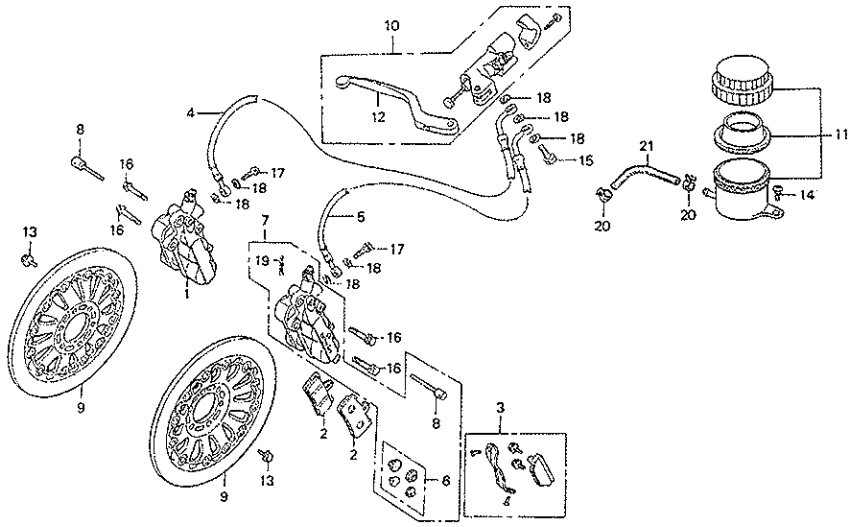


Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	17910-NL6-000	**CABLE COMP. A, THROTTLE**	1	
• 2	17920-NL6-000	**CABLE COMP. B, THROTTLE**	1	
• 3	35130-NL6-000	**SW. ASSY., START STOP**	1	
4	53104-MK4-620	WEIGHT B, HANDLE	2	
5	53105-MJ0-000	WEIGHT, STRG. HANDLE	2	
6	53107-MB6-630	RUBBER B, HANDLE WT.	2	
7	53107-MJ0-000	RUBBER B, HANDLE WT.	2	
8	53108-KAZ-000	SNAPRING, HANDLE WT.	2	
• 9	53110-NL6-000	**HOLDER R., HANDLE**	1	
• 10	53111-NL6-000	**PIPE, HANDLE**	2	
• 11	53120-NL6-000	**HOLDER L., HANDLE**	1	
• 12	53141-MT7-000	**PIPE, THROTTLE GRIP**	1	
13	53165-KT8-710	GRIP, R. HANDLE	1	
14	53166-KT8-710	GRIP, L. HANDLE	1	
15	53167-KV3-700	HOUSING, UP. THROTTLE	1	
16	53168-KV3-701	HOUSING, UND. THROTTLE	1	
17	90191-MJ0-000	SCREW, OVAL, 6X50	2	
18	93500-04032-0G	SCREW, PAN, 4X32	1	
19	93500-04045-0G	SCREW, PAN, 4X45	1	
20	93500-05020-0G	SCREW, PAN, 5X20	2	
21	96001-06020-00	BOLT, FLANGE, SH, 6X20	2	
22	96300-08035-00	BOLT, FLANGE, DR, 8X35	2	

Block No.

F-2

FR. brake
2000 VTR1000SP-1



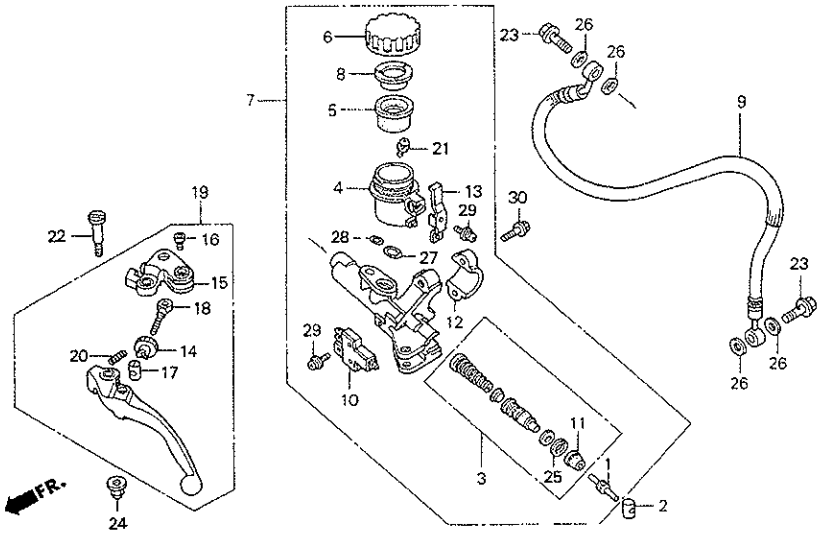
Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	45100-NL5-700	CALIPER ASSY., R. FR.	1	
• 2	45105-NL6-000	PAD COMP., FR. N608	4	
• 3	45110-NL5-700	GUIDE SET, FR. DISK	1	
• 4	45124-NL6-000	HOSE, R. FR. BRAKE	1	
• 5	45125-NL6-000	HOSE, L. FR. BRAKE	1	
• 6	45130-NL5-700	SPEAR, RADIATOR	2	
• 7	45200-NL5-700	CALIPER ASSY., L. FR.	1	
• 8	45215-NL5-305	PIN, HANGER FR.	2	
• 9	45250-NL5-800	DISK COMP., FR. 320	2	
• 10	45500-NL5-701	MASTER CYLINDER ASSY., BR L.18	1	
• 11	45520-NL5-701	CUP ASSY., FR. MASTER CYLINDER	1	
• 12	53160-NL5-701	LEVER, FR. BRAKE L18P	1	
13	90003-MC7-000	BOLT, FLANGE 6X20	12	
14	90104-GT8-600	SCREW-SPL, 6X14	1	
• 15	90106-NL6-000	OIL BOLT, 10X32	1	
• 16	90111-NX4-000	BOLT, FRANGE,10X31	4	
• 17	90145-NX5-004	OIL BOLT, 10X19	2	
18	90601-ZE1-000	WASHER, PLUG DRAIN	7	
19	94251-06000	PIN, LOCK, 6MM	2	
20	95002-40850-08	CLAMP D8.5, TUBE	2	

Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 21	95003-11015-60	V, TUBE, 5X9X150	1	

Block No.

F-3

Clutch master cylinder
2000 VTR1000SP-1

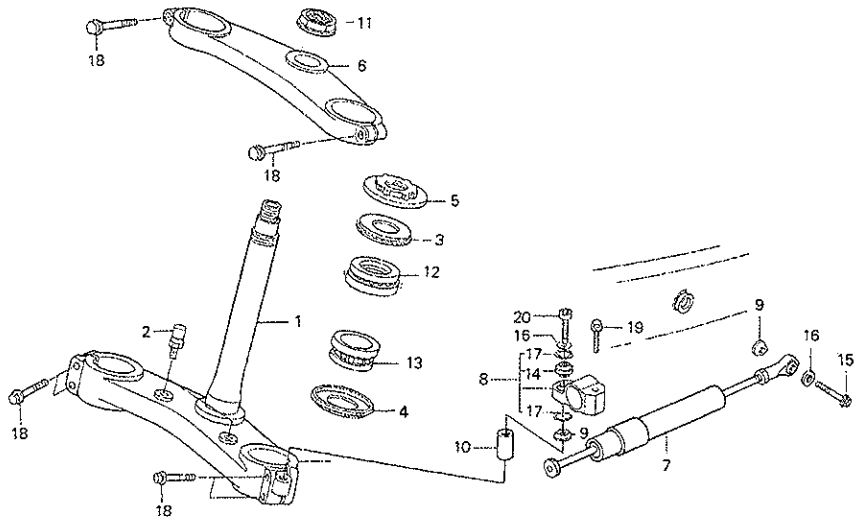


Ref. No.	Part No.	Description	Reqd. No.	Remarks
1	22884-MAT-E01	PUSH ROD	1	
2	22885-MB0-006	BUSH	1	
3	22886-MAT-E01	PISTON SET, MASTER CYLINDER	1	
4	22887-MBB-006	CUP COMP., OIL	1	
5	22888-MR7-006	DIAPHRAGM	1	
6	22889-MR7-006	CAP, OIL CUP(CLUTCH)	1	
7	22890-MCF-006	CYLINDER SUB ASSY., CLUTCH MASTER	1	
8	22890-MR7-006	PLATE, DIAPHRAGM	1	
• 9	**22900-NL6-000**	**HOSE, CLUTCH**	1	
10	35330-MB0-003	SW. ASSY., CLUTCH	1	
11	45504-MAT-E01	BOOT COMP.	1	
12	45517-166-006	HOLDER MASTER CYLN.	1	
13	45535-MR8-901	PLATE, STOP	1	
14	53172-MJ4-702	KNOCKER, CLUTCH	1	
15	53172-KV0-006	ADJUSTER, HANDLE LEVER R.	1	
16	53177-KV0-006	BOLT, LEVER SOCKET, 5X5	1	
17	53179-KV0-006	JOINT, LEVER	1	
18	53180-KV0-006	BOLT, ADJUST	1	
19	53180-MZ1-792	LEVER ASSY., L HNDL	1	
20	53181-KV0-006	SPRING, HANDLE LEVER	1	
21	90101-MR7-006	TRIPLE SCREW	1	
22	90114-MA5-671	BOLT, HANDLE LEVER	1	
23	90145-MS9-612	BOLT, OIL,10X22	2	
24	90201-415-000	NUT, CAP, 6MM	1	
25	90651-MA5-671	CIRCLIP	1	
26	90601-ZE1-000	WASHER, PLUG DRAIN	4	
27	91212-422-006	O-RING, 14.8X2.4	1	
28	91355-MG9-006	O-RING,	1	
29	93893-04012-17	SCREW-WASH., 4X12	2	
30	96001-06022-07	BOLT, FLANGE, SH, 6X22	2	

Block No.

F-4

Steering
2000 VTR1000SP-1

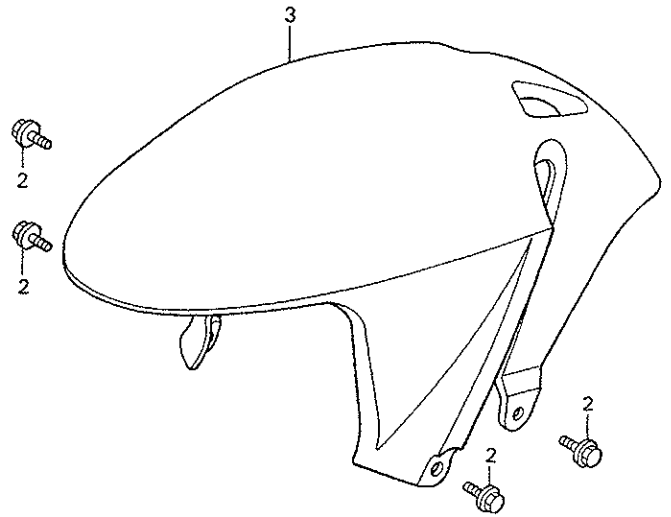


Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	53200-NL6-000	**STEM COMP., STEERING 27.5**	1	
•	53210-NL6-000	**STEM COMP., STEERING 30**	(1)	
•	53220-NL6-000	**STEM COMP., STEERING 25**	(1)	
• 2	53204-NL6-000	**BOLT, HANDLE STOPPER**	2	
3	53214-KA4-701	DUST SEAL, (STRG. HD.)	1	
4	53214-MR7-003	DUST SEAL, (STRG, HD)	1	
5	53220-MW0-000	THREAD COMP., TOP	1	
• 6	53230-NL6-000	**BRIDGE, FORK TOP 27.5**	1	
•	53240-NL6-000	**BRIDGE, FORK 30**	(1)	
•	53250-NL6-000	**BRIDGE, FORK 25**	(1)	
• 7	53700-NL0-003	**DAMPER ASSY., STEERING**	1	
• 8	53705-NF5-760	**HOLDER ASSY., STEERING DAMPER**	1	
• 9	53713-NC8-000	**SPACER, STEERING DAMPER**	2	
• 10	53713-NL6-000	**SPACER, STEERING DAMPER**	1	
11	90304-MCF-000	NUT, FLANGE STEERING STEM	1	
12	91015-KT8-005	BEARING, HEAD PIPE UP	1	
13	91016-MR7-003	BEARING, HEAD PIPE	1	
• 14	91060-NL0-003	**BEARING, SPHERICAL 8MM**	1	
15	92201-08030-0A	BOLT, HEX, 8X30	1	
16	94102-08000	WASHER, PLAIN, 8MM	2	
17	94601-17000	CLIP, PISTON PIN, 17MM	2	
18	96400-08040-00	BOLT, FLANGE, DR.8X40	6	
19	96001-06028-00	BOLT, FLANGE, SH, 6X28	1	
20	96700-08060-10	SOCKET BOLT, 8X 60	1	

Block No.

F-5

FR. fender
2000 VTR1000SP-1



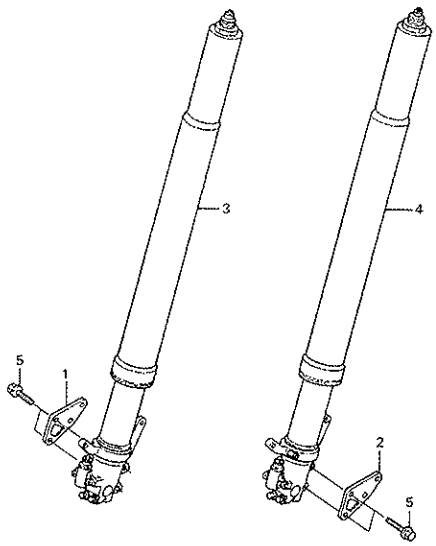
Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	**61100-NL6-010**	**FENDER, FR.**	1	
2	90108-GK1-000	BOLT, FLANGE SH, 6X12	4	

Ref. No.	Part No.	Description	Reqd. No.	Remarks

Block No.

F-6

FR. cushion
2000 VTR1000SP-1



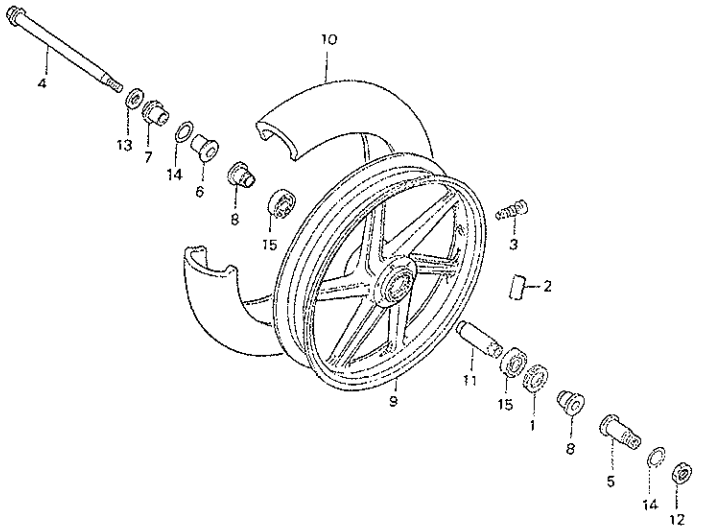
Ref. No.	Part No.	Description	Reqd. No.	Remarks
1		BRKT, L. FR. BRAKE CALIPER	1	SHOWA (No sale by HRC)
2		BRKT, R. FR. BRAKE CALIPER	1	SHOWA (No sale by HRC)
3		FORK ASSY., R. FR.	1	SHOWA (No sale by HRC)
4		FORK ASSY., L. FR.	1	SHOWA (No sale by HRC)
• 5	90121-NL5 -700	**BOLT, FLANGE, 10X26**	**4**	

Ref. No.	Part No.	Description	Reqd. No.	Remarks

Block No.

F-7

FR. wheel
2000 VTR1000SP-1



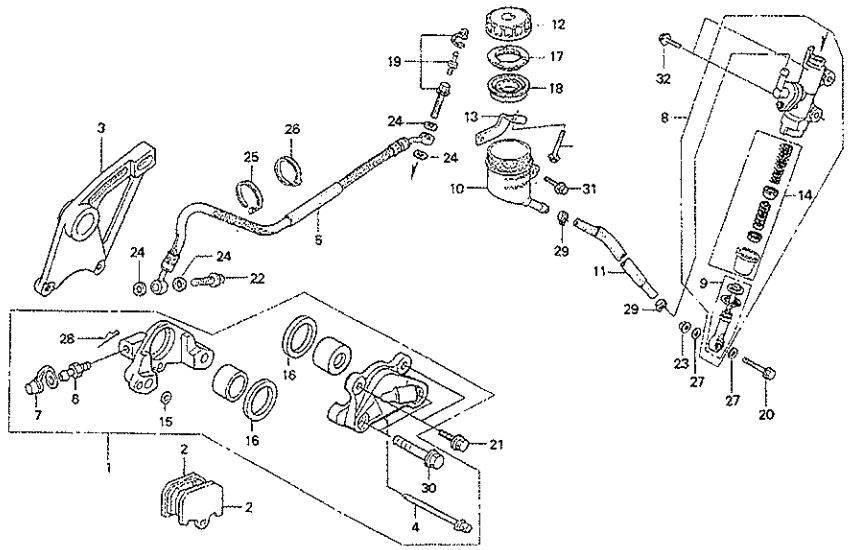
Ref. No.	Part No.	Description	Reqd. No.	Remarks
1	41231-KZ4-000	RETAINER, RR. WHEEL BEARING	1	
• 2	**42720-NC8-000**	**WEIGHT, 10G**	**1**	
•	**42721-NC8-000**	**WEIGHT, 20G**	**1**	
3	42753-ML7-004	VALVE, RIM (DUN)	1	
• 4	**44301-NL6-000**	**AXLE, FR. WHEEL**	**1**	
• 5	**44303-NL6-000**	**NUT, FR. AXLE**	**1**	
• 6	**44304-NL6-000**	**GUIDE A, FR. AXLE**	**1**	
• 7	**44305-NL6-000**	**GUIDE B, FR. AXLE**	**1**	
• 8	**44311-NL6-000**	**COLLAR, FR. WHEEL SIDE**	**2**	
• 9	**44601-NL6-000**	**WHEEL FR., 17X3.50**	**1**	
•	**44603-NL6-000**	**WHEEL FR., 17X3.75**	**(1)**	
10		TIRE, FRONT	1	No sale by HRC
• 11	**44620-NL6-010**	**COLLAR, FR. WHEEL DISTANCE**	**1**	
• 12	**90305-NL6-000**	**NUT, M28X1.0**	**1**	
• 13	**90503-NL6-000**	**WASHER, 45X22X3**	**1**	
• 14	**90525-NL6-000**	**SHIM 0.2, FR. FORK SIDE**	**2**	
•	**90526-NL6-000**	**SHIM 0.3, FR. FORK SIDE**	**N**	
15	91051-KZ4-J21	BRG, BALL RADIAL, 6905 2RS	2	

Ref. No.	Part No.	Description	Reqd. No.	Remarks

Block No.

F-8

RR. brake
2000 VTR1000SP-1



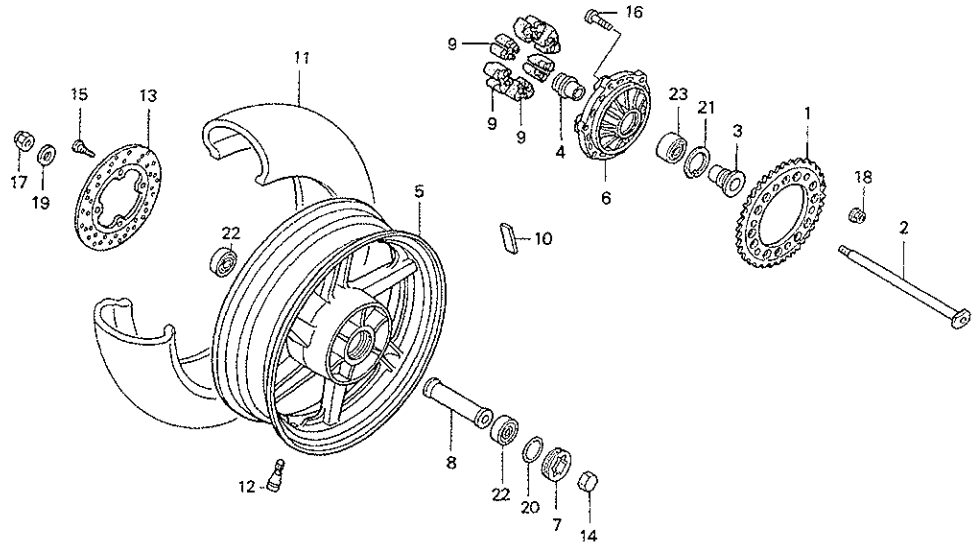
Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	**43100-NL5-701**	**CALIPER ASSY., RR.**	**1**	
• 2	**43105-NL5-700**	**PAD COMP., RR.(X95A)**	**2**	
• 3	**43110-NL6-000**	**BRKT, RR. CALIPER**	**1**	
• 4	**43215-NL5-701**	**PIN, HANGER RR.**	**1**	
• 5	**43310-NL6-000**	**HOSE COMP., RR. BRAKE**	**1**	
6	43352-568-003	SCREW, BLEEDER	2	
7	43353-461-771	CAP, BLEEDER	2	
• 8	**43500-NL6-000**	**MASTER CYLINDER ASSY., REAR**	**1**	
• 9	**43504-NF4-770**	**ROD ASSY.**	**1**	
10	43511-KS6-702	CUP COMP., MASTER CYLINDER OIL	1	
• 11	**43512-NN1-700**	**TUBE ASSY., MASTER CYLINDER**	**1**	
12	43513-KS6-701	CAP, MASTER CYLINDER	1	
• 13	**43517-NL6-000**	**STAY, RR OIL CUP**	**1**	
14	43520-MB2-305	PISTON SET, MASTER CYLINDER	1	
15	45103-MR7-006	SEAL JOINT	1	
• 16	**45209-KV3-951**	**SEAL, PISTON**	**2**	
17	45518-GM9-711	PLATE, DIAPHRAGM	1	
18	45520-GM9-711	DIAPHRAGM	1	
• 19	**45530-NF4-650**	**BOLT ASSY., OIL BLEEDER**	**1**	
20	90002-GHB-670	BOLT, FLANGE, SHF, 6X25	1	

Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 21	**90101-NL6-000**	**BOLT, FLANGE, 7X21**	**2**	
22	90145-MS9-612	OIL BOLT, 10X22	1	
23	90301-473-003	NUT, U, 6MM	1	
24	90601-ZE1-000	WASHER, PLUG DRAIN	4	
• 25	**90651-NC8-000**	**TY-LAP, 3.6X281**	**2**	
26	91058-MG9-681	BAND, SELF LOCK	2	
27	94101-06000	WASHER, PLAIN, 6MM	2	
28	94251-05000	PIN, LOCK, 5MM	1	
29	95002-41050-00	CLAMP, D10.5, TUBE	2	
30	95701-08040-00	BOLT, FLANGE, 8X40	2	
31	96001-06016-00	BOLT, FLANGE, SH, 6X16	1	
32	96001-06018-00	BOLT, FLANGE, SH, 6X18	2	

Block No.

F-9

RR. wheel
2000 VTR1000SP-1



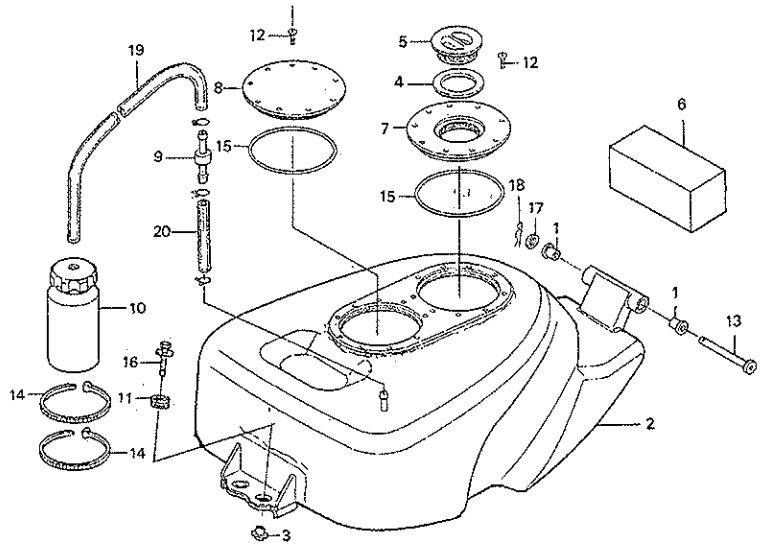
Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	41237-NL6-000	SPROCKET, FINAL DRIVEN 37T	1	
•	41238-NL6-000	SPROCKET, FINAL DRIVEN 38T	1	
•	41239-NL6-000	SPROCKET, FINAL DRIVEN 39T	1	
•	41240-NL6-000	SPROCKET, FINAL DRIVEN 40T	1	
•	41241-NL6-000	SPROCKET, FINAL DRIVEN 41T	1	
•	41242-NL6-000	SPROCKET, FINAL DRIVEN 42T	1	
•	41243-NL6-000	SPROCKET, FINAL DRIVEN 43T	1	
2	42301-MCF-000	AXLE, REAR WHEEL	1	
• 3	42311-NL6-000	COLLAR, DRIVEN FLANGE L. SIDE	1	
• 4	42312-NL6-000	COLLAR, DRIVEN FLANGE R. SIDE	1	
• 5	42603-NL6-000	WHEEL, REAR 6.00-17	1	
•	42605-NL6-000	WHEEL, REAR 6.25-17	1	
•	42606-NL6-000	WHEEL, REAR 6.00-16.5	1	
•	42608-NL6-000	WHEEL, REAR 6.25-16.5	1	
• 6	42609-NL6-000	FLANGE, FINAL DRIVEN	1	
• 7	42621-NL6-000	RETAINER, RR. WHEEL BEARING	1	
• 8	42624-NL6-000	COLLAR, RR. WHEEL DISTANCE	1	
• 9	42633-NL6-003	DAMPER, RR. WHEEL(81)	6	
• 10	42720-NC8-000	WEIGHT, 10G	N	
•	42721-NC8-000	WEIGHT, 20G	N	

Ref. No.	Part No.	Description	Reqd. No.	Remarks
11		TIRE, 17"	1	No sale by HRC
		TIRE, 16.5"	1	No sale by HRC
12	42753-ML7-004	VALVE, RIM (DUN)	1	
• 13	43121-NL6-000	DISK, RR. BRAKE	1	
• 14	87000-NL6-000	TOOL, RR. WHEEL RETAINER	1	
15	90003-MC7-000	BOLT, FLANGE, 6X20	4	
• 16	90120-NL6-300	BOLT, DRIVEN SPROCKET	6	
17	90305-KZ4-J20	U NUT, 22MM	1	
18	90309-KF0-003	NUT, FLANGE, 8MM	6	
19	90401-MAZ-000	WASHER, 22X38X2.5	1	
• 20	90501-NL6-000	WASHER, RR. WHEEL BEARING	1	
21	90651-ML0-731	CIRCLIP, IN. 62	1	
• 22	91051-NL6-000	BEARING, BALL RADIAL 6205 2RS	2	
• 23	91052-NL6-003	BEARING, ANGULAR 30X62X23.8	1	

Block No.

F-10

Fuel tank
2000 VTR1000SP-1



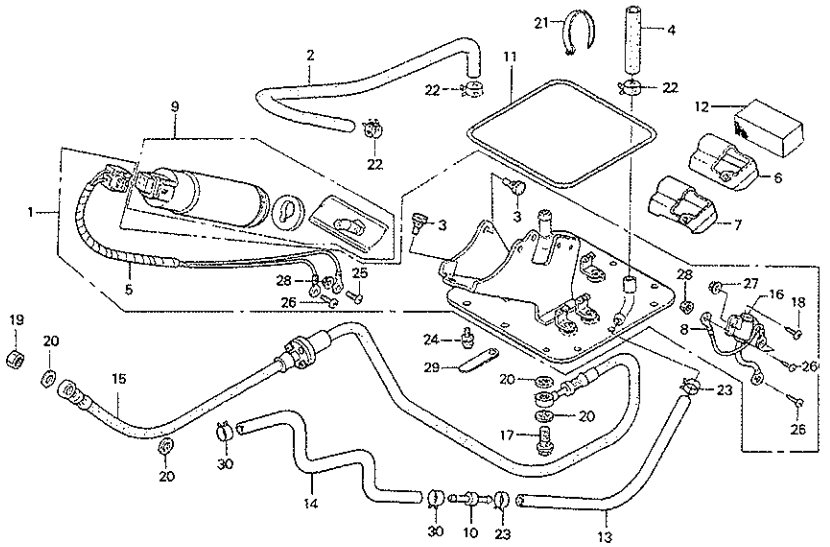
Ref. No.	Part No.	Description	Reqd. No.	Remarks
1	17506-MB1-000	CUSHION, FUEL TANK PIVOT	2	
• 2	17510-NL6-000	TANK COMP., FUEL	1	
• 3	17515-NL6-000	COLLAR, FUEL TANK MOUNT	2	
• 4	17515-NX5-770	PACKING, FUEL CAP	1	
• 5	17521-NX4-680	CAP, FUEL TANK	1	
• 6	17522-NF5-690	SPONGE, BUFFLE	6	
• 7	17560-NL5-700	BASE, FUEL TANK CAP	1	
• 8	17565-NL5-700	CAP, FUEL TANK BLIND	1	
• 9	17625-NX5-771	VALVE COMP., DASHPOT CHECK	1	
• 10	19602-NF4-810	TANK, CATCH 250	1	
11	80106-382-770	RUBBER, RR. FENDER MOUNT	2	
• 12	90101-NL5-000	SCREW, TRUSS, 4X8	18	
• 13	90135-NL6-000	PIN, TANK HINGE	1	
• 14	90651-NC8-000	TY-LAP, 3.6X281	2	
• 15	91353-NL5-701	O-RING, 82X2.8	2	
16	93404-06032-00	BOLT-WASH., 6X 32	2	
17	94101-08000	WASHER, PLAIN, 8MM	1	
18	94251-08000	PIN, LOCK, 8MM	1	
19	95003-11005-31	V TUBE, 5X9X50	1	No sale by HRC I.D. 5mmX50mm
20	95003-11065-31	V TUBE, 5X9X650	1	No sale by HRC I.D. 5mmX650mm

Ref. No.	Part No.	Description	Reqd. No.	Remarks

Block No.

F-11

Fuel pump
2000 VTR1000SP-1



Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	16705-NL6-010	UNIT SUB ASSY., FUEL TANK	1	
• 2	16711-NL6-000	HOSE, FUEL PUMP	1	
3	16712-SF1-930	STOPPER RUBBER, FUEL PUMP	3	
• 4	16714-NL6-000	HOSE, FUEL PUMP RETURN	1	
• 5	16715-NL6-000	WIRE COMP., LEAD	1	
• 6	16716-NL6-000	RUBBER, IN. FUEL UNIT	1	
• 7	16717-NL6-000	RUBBER, OUT. FUEL UNIT	1	
• 8	16729-NL6-000	WIRE COMP., EARTH	1	
9	16730-MCF-003	PUMP SUB ASSY., FUEL	1	
10	16959-MF2-000	JOINT, FUEL TUBE	1	
• 11	17502-NL6-000	O-RING, FUEL PUMP	1	
• 12	17522-NL6-000	SPONGE, FUEL PUMP FILTER	1	
• 13	17525-NL6-000	HOSE, FR. FUEL RETURN	1	
• 14	17526-NL6-000	HOSE, RR. FUEL RETURN	1	
• 15	17527-NL6-000	HOSE COMP., FUEL FEED	1	
16	37810-MW4-000	FUEL RES SENSOR	1	
17	90108-MBG-000	BOLT, BANJO, 12MM	1	
18	90161-MN5-000	SCREW-WASH., 3X8	2	
19	90201-PD1-000	NUT A, SEALING, 12MM	1	
20	90428-PD6-003	WASHER, SEALING, 12MM	4	

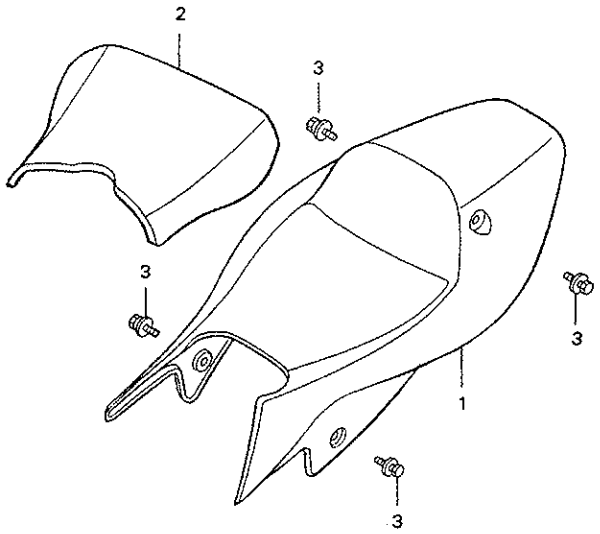
Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 21	90651-NC8-000	TY-LAP, 3.6X281	1	
22	91405-PD1-004	CLAMP D12, TUBE	3	
23	91406-SL0-931	CLAMP 15.5, FUEL HOSE	2	
24	93891-04008-00	SCREW-WASH., 4X8	12	
25	93891-04008-08	SCREW-WASH., 4X8	1	
26	93893-04008-08	SCREW-WASH., 4X8	3	
27	94001-03080-0S	NUT, HEX., 3MM	2	
28	94001-04080-0S	NUT, HEX., 4MM	2	
29	94591-25000	CLIP, 2X50	1	
30	95002-41050-08	CLAMP D 10.5, TUBE	2	

Block No.

F-12

Seat

2000 VTR1000SP-1



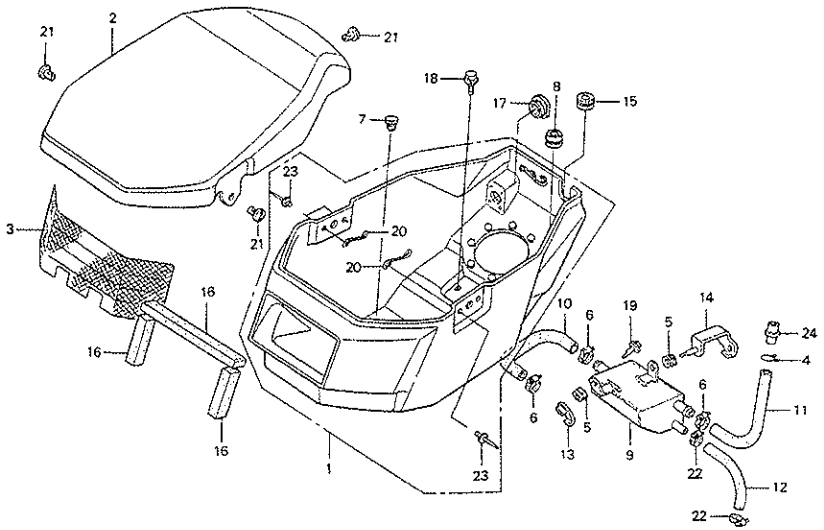
Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	77210-NL6-000	**COWL COMP., SEAT**	1	
• 2	77230-NL5-000	**RUBBER, SEAT(10)**	1	
3	93404-06012-00	BOLT-WASH., 6X12	4	

Ref. No.	Part No.	Description	Reqd. No.	Remarks

Block No.

F-13

Air box / Breather case
2000 VTR1000SP-1

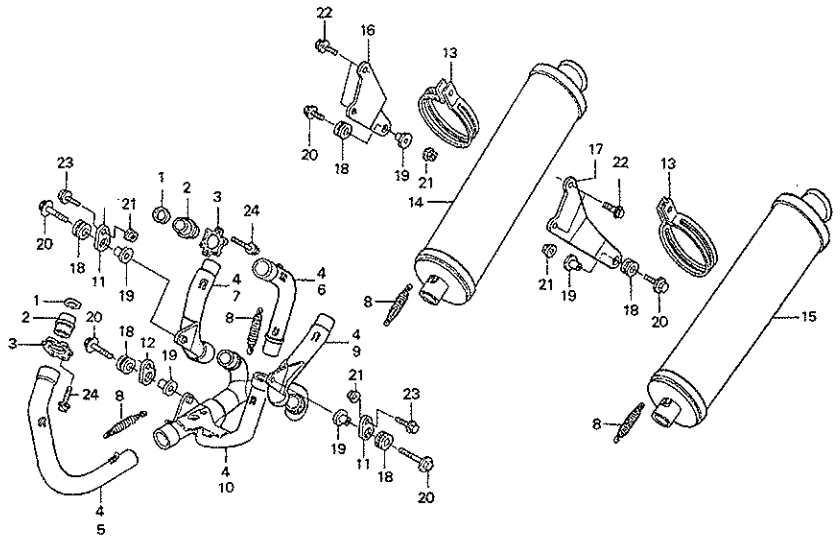


Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	17221-NL6-000	LOWER CASE, AIR BOX	1	
• 2	17231-NL6-000	COVER, AIR BOX	1	
• 3	17250-NL6-000	FILTER COMP., AIR BOX	1	
4	17724-102-700	CLIP	1	
5	18315-GAG-750	RUBBER A, PROTR.	2	
6	19505-KS6-700	CLAMP A, WATER HOSE	3	
7	32170-647-000	GROMMET, WIND DEFROSTER	1	
8	45146-300-000	GROMMET, BRAKE HOSE	1	
• 9	55200-NL6-000	CASE COMP., BREATHER	1	
• 10	55210-NL6-000	TUBE, BREATHER	1	
• 11	55220-NL6-000	TUBE, BREATHER RETURN	1	
• 12	55230-NL6-000	HOSE, OIL RETURN	1	
• 13	55231-NL6-000	STAY, BREATHER TANK FR.	1	
• 14	55232-NL6-000	STAY, BREATHER TANK RR.	1	
15	61328-MJ6-000	RUBBER, HEAD LIGHT MOUNT	1	
• 16	64234-MR8-300	SEAL, HEAD LIGHT	3	
17	77226-GB0-900	RING, SEAT LOCK	1	
18	90108-GK1-000	BOLT, FLANGE SH, 6X12	1	
19	90110-147-000	BOLT, FLANGE, 6MM	1	
• 20	90653-NC8-000	SPRING, FASTNER, 35	3	
• 21	90655-NC8-000	STUD, FASTENER, 35	3	
22	90670-GHB-610	CLAMP, WATER HOSE	2	
• 23	91081-NL6-300	RIVET, FLAT, 3.2X8.0	6	
24	91463-MAL-600	JOINT, TUBE(14.5)	1	

Block No.

F-14

Exh. muffler
2000 VTR1000SP-1

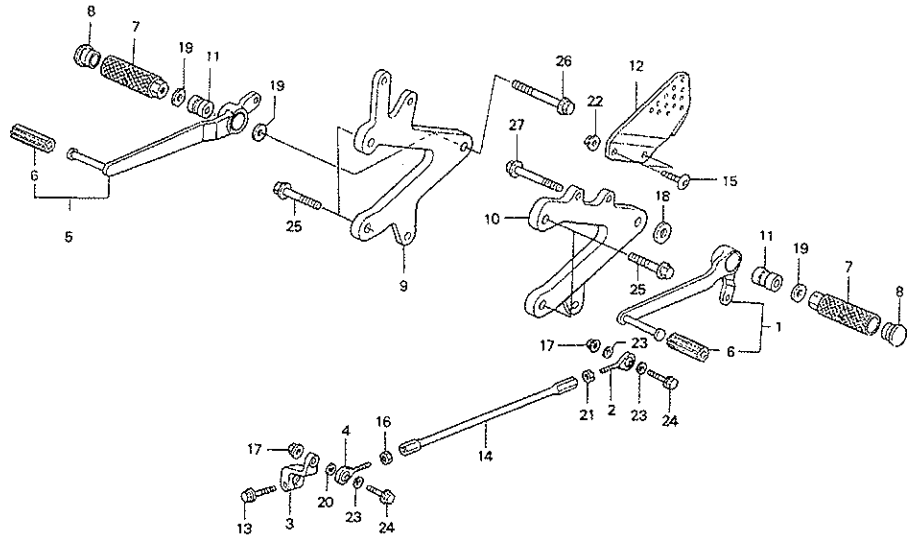


Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	18291-NL6-000	GASKET, EXH. PIPE	2	
• 2	18292-NL6-000	COLLAR, EXH. PIPE	2	
• 3	18293-NL6-000	FLANGE, EXH.	2	
• 4	18300-NL6-000	PIPE ASSY., EXH.	1	
• 5	18310-NL6-000	PIPE COMP., FR. EXH.	1	
• 6	18320-NL6-000	PIPE COMP., RR. EXH.	1	
• 7	18330-NL6-000	PIPE COMP., R. TAIL	1	
• 8	18334-NL6-000	SPRING, EXH. PIPE	16	
• 9	18340-NL6-000	PIPE COMP., L. TAIL	1	
• 10	18350-NL6-000	JOINT COMP., EXH.	1	
• 11	18355-NL5-800	STAY, EXH. MID	2	
• 12	18355-NL6-000	STAY, EXH. MID	1	
• 13	18371-NL6-710	BAND, MUFFLER	2	
• 14	18380-NL6-710	MUFFLER COMP., R.	1	
• 15	18390-NL6-710	MUFFLER COMP., L.	1	
• 16	18391-NL6-000	STAY, RH. MUFFLER	1	
• 17	18392-NL6-000	STAY, LH. MUFFLER	1	
18	19051-KA3-830	RUBBER. RADIATOR MOUNT	5	
19	19052-KA3-830	COLLAR, RADIATOR MT.	5	
20	93404-06025-00	BOLT-WASH., 6X 25	5	
21	94050-06000	NUT, FLANGE, 6MM	4	
22	96001-06012-00	BOLT, FLANGE, SH, 6X12	4	
23	96001-06014-00	BOLT, FLANGE, SH, 6X14	2	
24	96400-08020-00	BOLT, FLANGE, DR. 8X20	4	

Block No.

F-15

Step / Pedal
2000 VTR1000SP-1

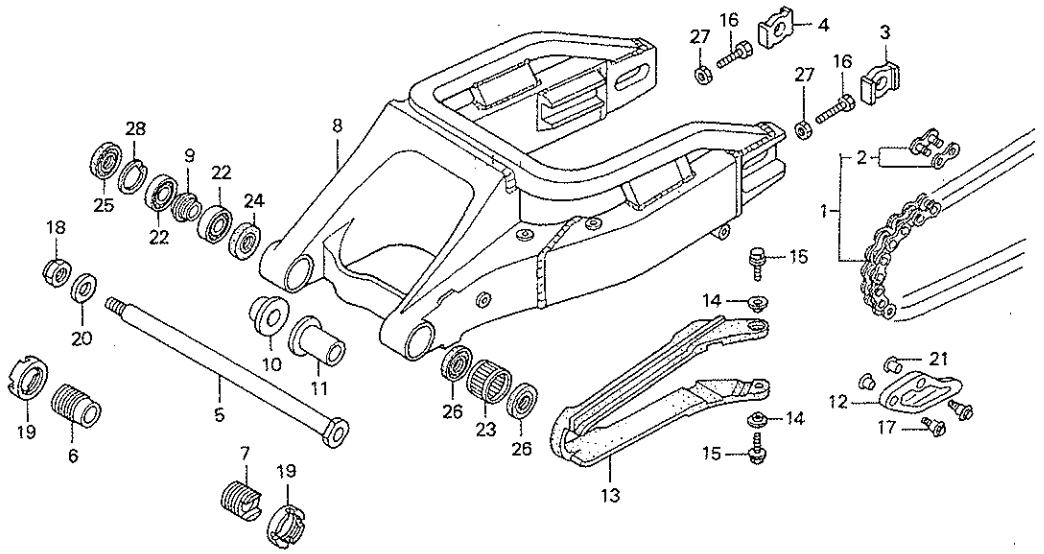


Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	24700-NL6-000	PEDAL COMP., CHANGE	1	
• 2	24711-NL5-000	ROD END, 6MM A	1	
• 3	24711-NL6-000	ARM, GEAR CHANGE	1	
• 4	24712-NX5-004	ROD END, 6MM B	1	
• 5	46500-NF4-780	PEDAL COMP., BRAKE	1	
• 6	46501-ND4-750	RUBBER, PEDAL	2	
• 7	50610-NL5-760	ARM, STEP	2	
• 8	50612-NL5-760	END, STEP ARM	2	
• 9	50630-NL6-000	HOLDER, R. STEP	1	
• 10	50640-NL6-000	HOLDER, L. STEP	1	
• 11	50643-NL5-760	COLLAR, 16X8.2	2	
12	50707-MAS-E00	GUARD, L. STEP	1	
13	90051-KS7-830	BOLT, FLANGE, 6X20	1	
• 14	90065-NL6-000	BAR, CHANGE	1	
15	90085-KFB-000	BOLT SPECIAL, 6X22	2	
16	90201-KV3-700	NUT, TIE-ROD B	1	
17	90301-473-003	NUT, U, 6MM	2	
• 18	90502-NL6-000	COLLAR, 22X8.2	1	
19	90504-MA6-000	WASHER 8.5X26	3	
20	90512-ZV0-000	WASHER, PLAIN, 6MM	1	
21	94001-06020-0S	NUT, HEX, 6MM	1	
22	94050-06000	NUT, FLANGE,6MM	2	
23	94101-06000	WASHER, PLAIN, 6MM	3	
24	96001-06025-00	BOLT, FLANGE, SH, 6X25	2	
25	96300-08025-00	BOLT, FLANGE, DR, 8X25	4	
26	96300-08040-00	BOLT, FLANGE, DR, 8X40	1	
27	96300-08045-00	BOLT, FLANGE, DR, 8X45	1	

Block No.

F-16

Drive chain / Swingarm
2000 VTR1000SP-1

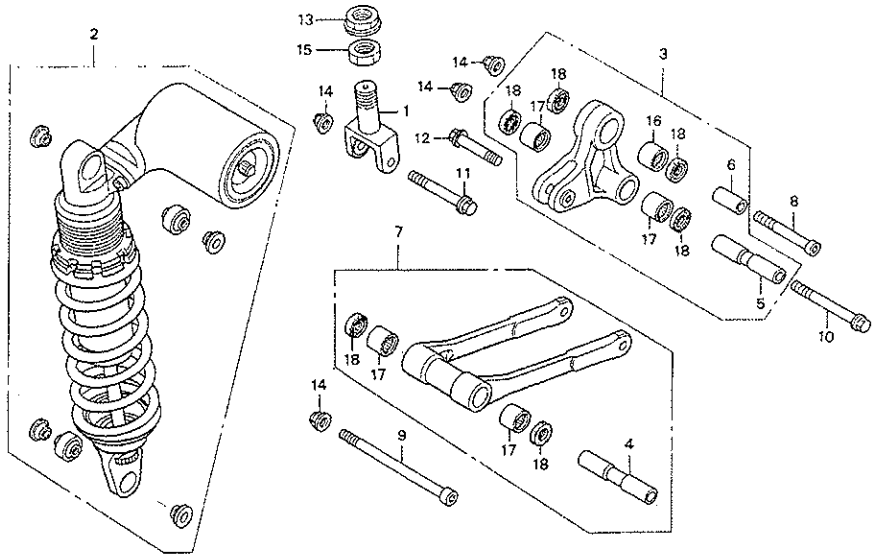


Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	40530-NL6-003	**CHAIN, DRIVE GB520HRVZ2-120LJ-F**	1	
• 2	40535-NL6-003	**JOINT, DRIVE CHAIN**	1	
3	42305-MCF-000	COLLAR L., RR. AXLE	1	
4	42306-MCF-000	COLLAR R., RR. AXLE	1	
5	52101-MCF-000	BOLT, SWINGARM PIVOT	1	
• 6	52108-NL6-000	**BOLT, R. ADJUST PIVOT**	1	
• 7	52109-NL6-000	**BOLT, L. ADJUST PIVOT**	1	
• 8	52110-NL6-000	**SWINGARM COMP., REAR**	1	
9	52141-MCF-000	CENTER COLLAR, PIVOT DISTANCE	1	
10	52142-MCF-000	COLLAR, PIVOT DISTANCE R.	1	
11	52143-MCF-000	COLLAR, PIVOT DISTANCE L.	1	
12	52156-GAN-670	GUARD, CHAIN	1	
13	52170-MCF-000	SLIDER, CHAIN	1	
14	81312-GJ5-000	COLLAR	2	
15	90105-MY9-000	BOLT, FLANGE SH, 6X18	2	
16	90106-KS6-700	BOLT, HEX, 8X49	2	
17	90110-GE0-710	BOLT, FLANGE, 6MM	2	
18	90305-MAZ-000	U NUT, 22MM	1	
19	90354-MCF-000	NUT, LOCK, 36MM	2	
20	90401-MAZ-000	WASHER, 22X38X2.5	1	
21	90522-028-000	WASHER, CHAIN CASE SETTING	2	
22	91052-KZ4-J21	BEARING,BALL RADIAL, 6905RS	2	
23	91071-MCF-003	BEARING, NEEDLE, 32X42X30	1	
24	91251-MCF-003	DUST SEAL, 31X40X5	1	
25	91252-MCF-003	DUST SEAL, 32X45X6	1	
26	91253-MCF-003	DUST SEAL, 32X42X6	2	
27	94001-08000-0S	NUT, HEX, 8MM	2	
28	94520-45000	CIRCLIP, IN. 45	1	

Block No.

F-17

RR. cushion
2000 VTR1000SP-1



Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	50232-NL6-000	**BRAKET, RR. CUSHION UP.**	1	
2		CUSHION ASSY., REAR	1	SHOWA (No sale by HRC)
• 3	52460-NL6-000	**ARM ASSY., CUSHION**	1	
4	52462-ML0-000	COLLAR, CONN-ROD PIVOT		
5	52463-MR7-000	COLLAR, CUSHION, ARM	1	
• 6	52463-KV3-000	**COLLAR, CUSHION ARM**	1	
• 7	52470-NL6-000	**CONN-ROD ASSY., CUSHION**	1	
8	90110-MR7-000	BOLT, SOCKET, 10X70	1	
9	90111-MR7-000	BOLT, SOCKET, 10X130	1	
10	90115-MR7-003	BOLT, FLANGE DR, 10X113	1	
11	90126-KT2-000	BOLT, FLANGE, 10X42	1	
• 12	90153-NL5-700	**BOLT, FLANGE, 10X40**	1	
• 13	90201-NL5-000	**NUT, LOCK, 16MM**	1	
14	90304-GA6-003	NUT, AXLE	4	
• 15	90320-NL5-700	**NUT, HEX, 16MM SPL**	1	
16	91071-KV3-005	BEARING, NEEDLE (KOYO)	1	
17	91071-MY1-005	BEARING, NEEDLE, 17X24X17	4	
18	91262-KV3-831	DUST SEAL, 17X24X5	6	

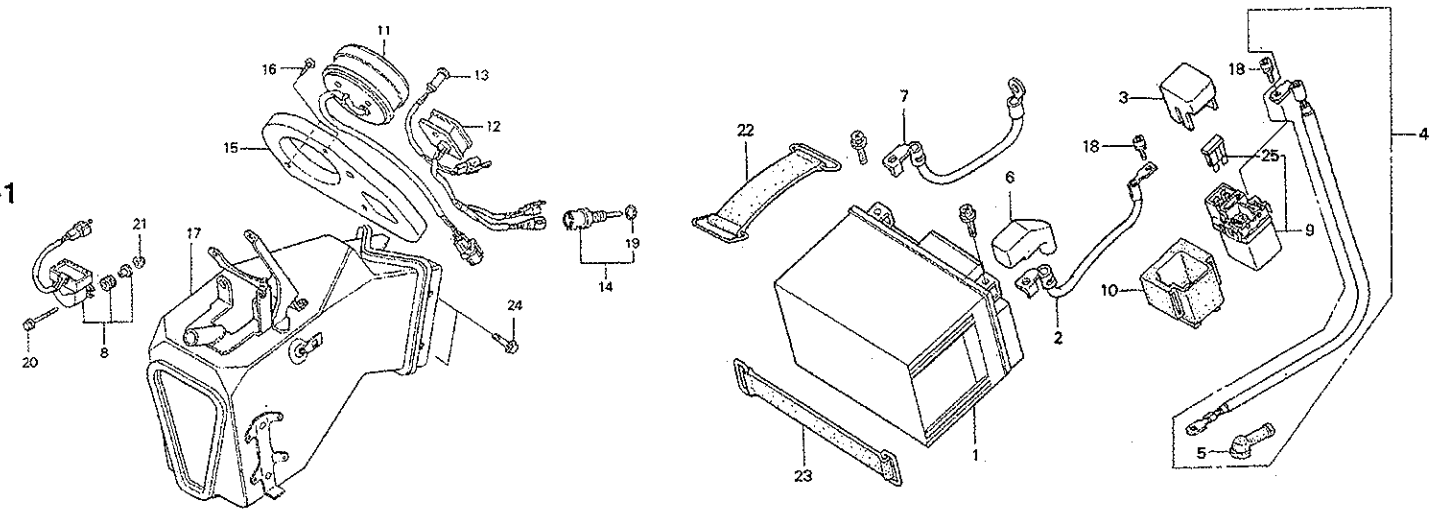
Ref. No.	Part No.	Description	Reqd. No.	Remarks

Block No.

F-18

Battery

2000 VTR1000SP-1

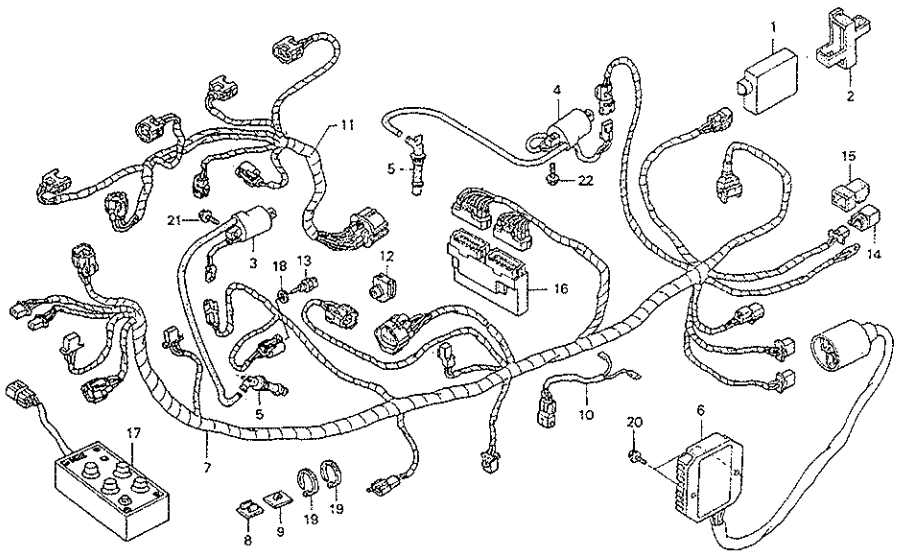


Ref. No.	Part No.	Description	Reqd. No.	Remarks
1	31500-GEE-007	BATTERY YTZ7S	1	
• 2	**32401-NL6-000**	**CABLE, BATTERY-STARTER MAGNETIC**	**1**	
3	32406-MT4-000	COVER, STARTER MAGNETIC TERMINAL	1	
• 4	**32410-NL6-000**	**CABLE, STARTER MOTOR**	**1**	
5	32411-253-000	COVER, STARTING MOTOR TERMINAL	1	
6	32412-MV4-000	COVER, BATTERY TERMINAL	1	
• 7	**32601-NL6-000**	**CABLE, BATTERY EARTH**	**1**	
• 8	**35160-NKC-000**	**SENSOR ASSY., STOP**	**1**	
9	35850-MT4-000	SWITCH ASSY., STARTER MAGNETIC	1	
10	35856-KBH-000	RUBBER, SHOCK	1	
• 11	**37250-NL6-003**	**TACHOMETER ASSY.**	**1**	
• 12	**37460-NX4-701**	**METER ASSY., WATER TEMP.**	**1**	
• 13	**37560-NL6-000**	**LED ASSY., FI WARNING**	**1**	
• 14	**37870-NF4-611**	**SENSOR ASSY., T.W.**	**1**	
• 15	**50815-NL6-000**	**PANEL, METER**	**1**	
• 16	**50816-NX4-000**	**CLIP, XMAS TREE**	**3**	
• 17	**64501-NL6-000**	**DUCT, AIR INTAKE**	**1**	
18	90111-MR5-000	BOLT, SOCKET, 5X9(ST MG SW)	2	
19	91307-PK2-005	O-RING, 9.5X1.5	1	
20	93891-04025-07	SCREW-WASH., 4X25	2	
21	94050-04000	NUT, FLANGE, 4MM	2	
22	95012-12001	BAND B1, BATTERY	1	
23	95012-15001	BAND D, BATTERY	1	
24	96300-06014-00	BOLT, FLANGE, DR, 6X14	4	
25	98200-33000	FUSE, BLADE 30A	1	

Block No.

F-19

Wire harness
2000 VTR1000SP-1

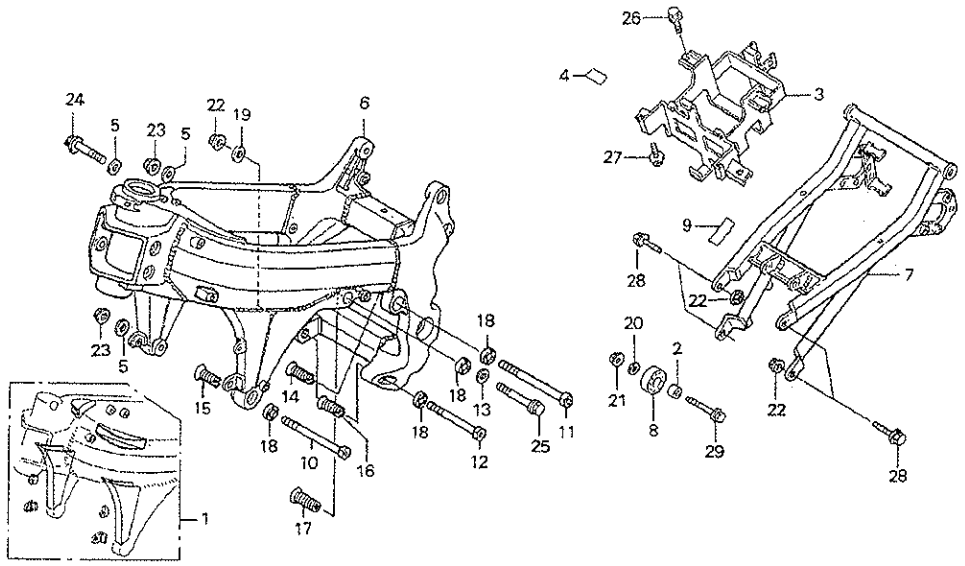


Ref. No.	Part No.	Description	Reqd. No.	Remarks
1	30450-MCF-003	CONVERTER UNIT, C.D.I.	1	
2	30455-MCF-000	SUSPENSION, C.D.I. CONVERTER	1	
3	30501-MCF-641	COIL, FR. IGNITION	1	
4	30502-MCF-641	COIL, RR. IGNITION	1	
• 5	**30700-NL6-000**	**CAP ASSY., NOISE SUPPRESOR**	2	
6	31600-MCF-003	RECTIFIER ASSY., REGULATOR	1	
• 7	**32100-NL6-000**	**HARNESS, WIRE**	1	
• 8	**32112-NF5-950**	**CLAMPER, HARNESS**	1	
• 9	**32114-NF4-780**	**BASE, TYLAP**	1	
• 10	**32160-NL6-000**	**SUB HARNESS(FUEL POMP)**	1	
• 11	**32500-NL6-000**	**THROTTLE BODY HARNESS**	1	
• 12	**32510-NL6-000**	**GROMMET, THROTTLE BODY HARNESS**	1	
13	37870-MBG-003	SENSOR ASSY., T.W.	1	
14	38501-GN2-014	RELAY COMP., STARTER	1	
15	38506-GC7-611	SUSPENSION, STARTER RELAY.	1	
• 16	**38770-NL6-003**	**UNIT ASSY., PGM.-FI/IGN.**	1	
• 17	**38890-NL6-000**	**E.C.U. SETTING BOX**	1	
18	90454-MC7-000	WASHER, SPECIAL, 12MM	1	
• 19	**90651-NC8-000**	**TY-LAP, 3.6X281**	2	
20	95701-06040-00	BOLT, FLANGE, 6X40	2	
21	96001-06018-00	BOLT, FLANGE, SH, 6X18	2	
22	96001-06020-00	BOLT, FLANGE, SH, 6X20	2	

Block No.

F-20

Frame body
2000 VTR1000SP-1

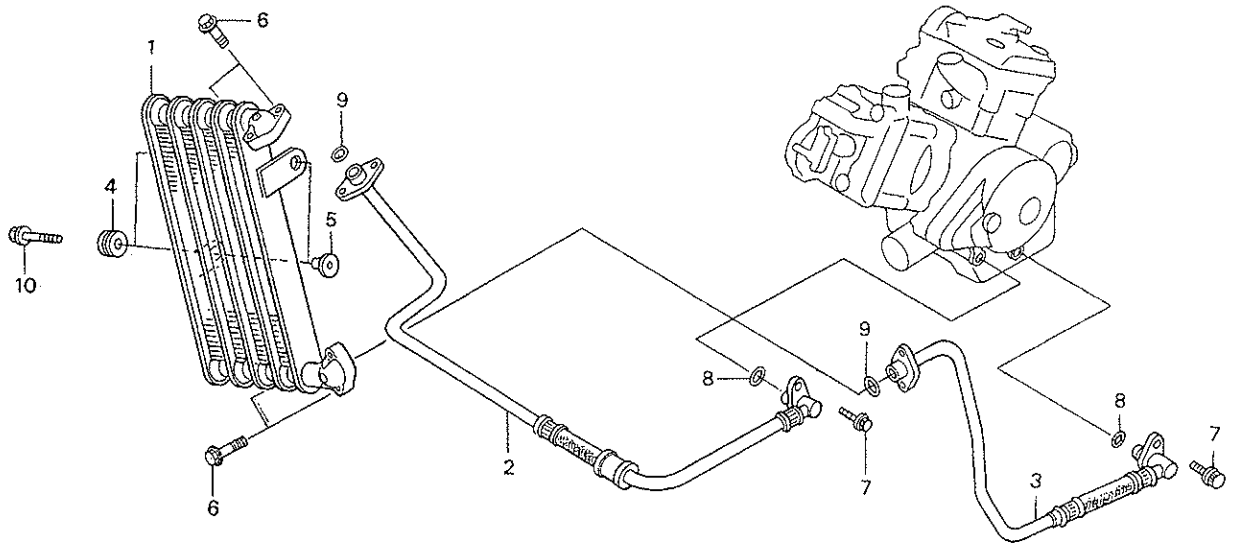


Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	06501-NL6-000	**GUSSET SET, FRAME BODY**	1	
2	18309-GN3-670	COLLAR B, MUFFLER STAY	1	
• 3	31510-NL6-000	**TRAY COMP., BATTERY**	1	
• 4	31512-NL5-000	**SPONGE, MOUNT**	1	
5	45224-KV3-951	WASHER-A, FR. DISK	3	
6		FRAME BODY COMP.	1	No sale by HRC sale only gusset set
• 7	50200-NL6-000	**SEAT RAIL COMP.**	1	
8	52175-KZ3-J10	ROLLER COMP., CHAIN	1	
• 9	77105-NL6-000	**RUBBER, SEAT RAIL**	2	
10	90102-MCF-000	BOLT, SPECIAL, 12X280	1	
11	90103-MCF-000	BOLT, SPECIAL,12X294	1	
12	90104-MCF-000	BOLT, FLANGE,10X249	1	
13	90122-GS3-000	WASHER, 12MM	1	
14	90151-MCF-000	BOLT, ADJUSTING, M20X1.5 X68.5	1	
15	90152-MCF-000	BOLT, ADJUSTING, M20X1.5 X48.5	1	
16	90153-MCF-000	BOLT, ADJUSTING, M20X1.5 X48.5	1	
17	90154-MCF-000	BOLT, ADJUSTING, M20X1.5 X68.5	1	
18	90201-MW0-000	NUT, LOCK, 20MM	4	
19	90410-KR0-000	WASHER, 10MM	1	
20	90501-MK4-600	WASHER, PLAIN, 8MM	1	
21	94050-08000	NUT, FLANGE, 8MM	1	
22	94050-10000	NUT, FLANGE,10MM	5	
23	94050-12000	NUT, FLANGE,12MM	2	
24	95801-12055-00	BOLT, FLANGE, 12X 55	1	
25	95801-12100-00	BOLT, FLANGE, 12X100	1	
26	96001-06012-00	BOLT, FLANGE, SH, 6X12	2	
27	96001-06018-00	BOLT, FLANGE, SH, 6X18	2	
28	96300-10025-00	BOLT, FLANGE, DR, 10X25	4	
29	96400-08050-00	BOLT, FLANGE, DR, 8X50	1	

Block No.

F-21

Oil cooler
2000 VTR1000SP-1



Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	**15600-NL6-000**	**COOLER COMP., OIL**	1	
• 2	**15650-NL6-000**	**PIPE COMP., IN. OIL COOLER**	1	
• 3	**15660-NL6-000**	**PIPE COMP., OUT. OIL COOLER**	1	
4	19051-KA3-830	RUBBER, RADIATOR MOUNT	2	
5	19052-MAC-680	COLLAR, RADIATOR MOUNT	2	
• 6	**90003-NL6-000**	**BOLT, FLANGE, 6X20**	4	
• 7	**90004-NL5-000**	**BOLT, FLANGE, 8X22**	2	
8	91255-MJ1-000	O-RING, 11.1X3.5	2	
9	91314-ME5-003	O-RING, 10X2.6	2	
10	93404-06025-00	BOLT-WASH., 6X 25	2	

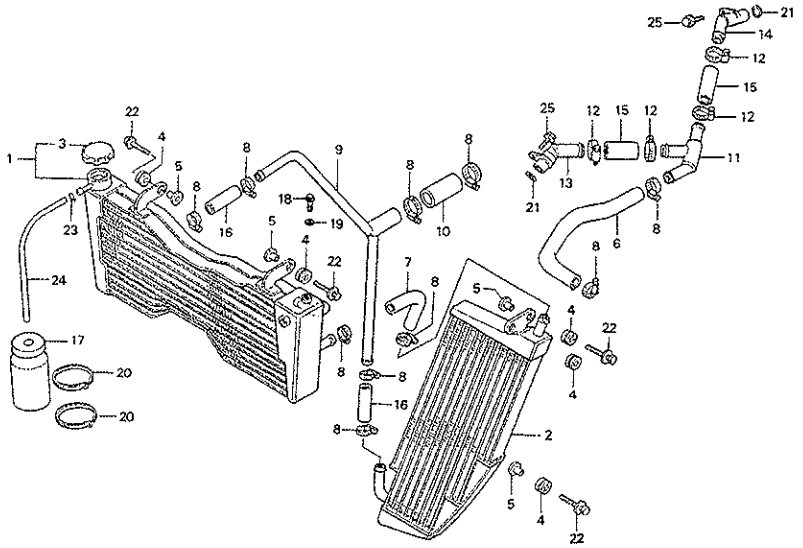
Ref. No.	Part No.	Description	Reqd. No.	Remarks

Block No.

F-22

Radiator

2000 VTR1000SP-1

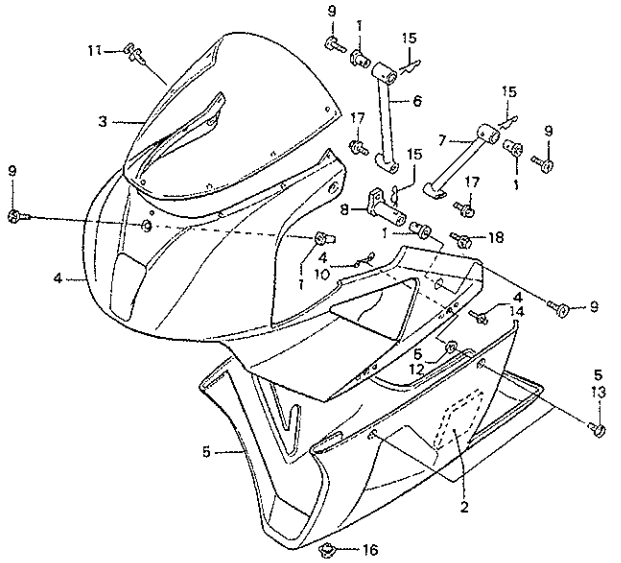


Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	19010-NL6-000	**RADIATOR COMP., UP**	1	
• 2	19020-NL6-000	**RADIATOR COMP., LWR**	1	
• 3	19037-NX5-003	**FILLER CAP COMP.**	1	
4	19051-KA3-830	RUBBER, RADIATOR MOUNT	5	
5	19052-MAC-680	COLLAR, RADIATOR MOUNT	4	
• 6	19501-NL6-000	**HOSE, RADIATOR UP**	1	
• 7	19502-NL6-000	**HOSE, RADIATOR CONNECT**	1	
8	19503-MB1-870	CLAMP, WATER HOSE	10	
• 9	19503-NL6-000	**PIPE, RADIATOR LWR**	1	
• 10	19505-NL6-000	**HOSE, RADIATOR ENG**	1	
• 11	19506-NL6-000	**JOINT, 3WAY**	1	
12	19517-ML7-691	CLAMP, HOSE 22-29	4	
• 13	19523-NL6-000	**PIPE , WATER FRONT**	1	**WHITE PAINT**
• 14	19524-NL6-000	**PIPE, WATER REAR**	1	
• 15	19525-NL6-000	**HOSE B, WATER**	2	
16	19528-MW4-000	HOSE, FR. HEAD WATER	2	
• 17	19602-NF4-810	**TANK, CATCH 250**	1	
• 18	90037-NX5-000	**BOLT, WATER CHECK, 6X10**	1	
19	90543-273-000	PACKING, FRONT FORK DRAIN COCK	1	
• 20	90651-NC8-000	**TY-LAP, 3.6X281**	2	
21	91312-KE7-003	O-RING, 19X3	2	
22	93404-06025-00	BOLT-WASH., 6X 25	4	
23	95002-50000	CLIP C9, TUBE	1	
24	95003-14050-10	V-TUBE, 6X9X500	1	No sale by HRC I.D. 6MMX500MM
25	96001-06018-00	BOLT, FLANGE, SH, 6X18	2	

Block No.

F-23

Fairing
2000 VTR1000SP-1



Ref. No.	Part No.	Description	Reqd. No.	Remarks
• 1	50803-NF4-610	NUT, COWL STAY	5	
• 2	64109-NF5-750	SHEET, HEAT PROOF	5	
• 3	64200-NL6-000	SCREEN, WIND	1	
• 4	64210-NL6-000	COWL COMP., UPPER	1	
• 5	64420-NL6-000	COWL COMP., LOWER	1	
• 6	64502-NL6-000	STAY, R. COWL SIDE UP	1	
• 7	64503-NL6-000	STAY, L. COWL SIDE UP	1	
• 8	64511-NL6-000	STAY, UPPER COWL SIDE	2	
• 9	90106-NF4-770	BOLT, COWL SET, 6X13	5	
• 10	90653-NC8-000	SPRING, FASTNER, 35	4	
• 11	90656-NX4-000	RIVET, 4X7	7	
• 12	90654-NC8-000	GROMMET, FASTNER	4	
• 13	90655-NC8-000	STUD, FASTENER, 35	4	
• 14	91080-NC8-300	RIVET, 3.2X6.4	8	
15	94252-16100	PIN, LOCK, 16MM	4	
16	95550-20000	BLIND PLUG,20	1	
17	96001-06012-00	BOLT, FLANGE, SH, 6X12	2	
18	96001-06012-07	BOLT, FLANGE, SH, 6X12	2	

Ref. No.	Part No.	Description	Reqd. No.	Remarks

KIT

Block No.

K-1

Part No.	Description	Reqd. No.	Remarks (Block No.)
• **06100-NL6-020**	**ENG PARTS KIT**	**1**	
06110-NL6-000	OIL PAN SET	1	K−1
06120-NL6-010	HEAD COVER SET	1	K−1
06130-NL6-000	CAM SHAFT SET	1	K−1
06140-NL6-000	VALVE SET	1	K−1
06170-NL6-000	INJECTOR SET	1	K−1
06220-NL6-010	CLUTCH SET	1	K−2
06230-NL6-000	TRANS MISSION SET	1	K−2
06310-NL6-000	A.C.G. SET	1	K−2
06880-NL5-000	LUB H45	1	—
12010-NL6-000	HEAD ASSY., FRONT	1	E−2
12020-NL6-000	HEAD ASSY., REAR	1	E−3
13101-NL6-000	PISTON	2	E−14
13121-NL6-000	RING, PISTON TOP	2	E−14
13131-NL6-003	RING, PISTON 2ND. 100X1.0X2.6	2	E−14
13141-NL6-003	RING, PISTON OIL 100X1.5X2.25	2	E−14
13210-NL6-000	CONN-ROD ASSY., FRONT	2	E−14
13220-NL6-000	CONN-ROD ASSY., REAR	1	E−14
13310-NL6-000	CRANK SHAFT COMP.	1	E−14
15102-NL6-000	PLATE,OIL PUMP	1	E−12
15131-414-000	ROTOR, INNER OIL PUMP	1	E−12
15132-NL6-000	SHAFT, OIL PUMP	1	E−12
15133-414-000	ROTOR, OIL PUMP OUTER	1	E−12
15232-NL6-000	SPRING, RELIEF VALVE	1	E−12
15233-NL6-000	SEAT, RELIEF VALVE SPRING	1	E−12
15515-NL6-000	ORIFICE,1.4MM	1	E−13
15516-NL6-000	ORIFICE,1.8MM	1	E−13
19220-NL6-000	COVER COMP., WATER PUMP	1	E−6
19506-NL6-000	JOINT, 3WAY	1	F−22
19523-NL6-000	PIPE , WATER FRONT	1	F−22
19524-NL6-000	PIPE, WATER REAR	1	F−22
19525-NL6-000	HOSE B, WATER	2	F−22
31910-NL6-003	SPARK PLUG R7279-10	2	E−2,3
90001-NL6-000	BOLT, FLANGE, 12X30	1	E−7
90003-NL5-000	PLUG,TAPER	1	E−13
90004-492-010	SPL. BOLT, FLANG, 10X22	1	E−15
90081-NX4-000	BOLT, DRAIN,12MM	1	E−12
90402-NL6-000	WASHER,10.2X37X3	1	E−15

Part No.	Description	Reqd. No.	Remarks (Block No.)
• **06110-NL6-000**	**OIL PAN SET**	**1**	
11210-NL6-000	OIL PAN	1	E−12
11316-NL6-000	GASKET, OIL PAN	1	E−12
15150-NL6-000	STRAINER COMP., OIL	1	E−12
• **06120-NL6-010**	**HEAD COVER SET**	**1**	
12109-MT7-300	JOINT,BREATHER	1	E−1
12311-NL6-010	COVER, FRONT HEAD	1	E−1
12321-NL6-010	COVER, REAR HEAD	1	E−1
12322-NL6-000	PLATE, BREATHER	1	E−1
12325-NL6-000	GASKET, BREATHER PLATE	1	E−1
95701-06012-08	BOLT, FLANGE, 6X12	2	E−1
• **06130-NL6-000**	**CAM SHAFT SET**	**1**	
14110-NL6-000	CAM SHAFT COMP., FR.-IN.	1	E−4
14120-NL6-000	CAM SHAFT COMP., RR.-IN.	1	E−4
14130-NL6-000	CAM SHAFT COMP., FR.-EXH.	1	E−4
14140-NL6-000	CAM SHAFT COMP., RR.-EXH.	1	E−4
• **06140-NL6-000**	**VALVE SET**	**1**	
12208-MBB-003	SEAL, VALVE STEM (EXH)	8	E−4
14711-NL6-000	VALVE, INLET	4	E−4
14721-NL6-000	VALVE, EXHAUST	4	E−4
14750-NL6-000	SPRING SET, VALVE	8	E−4
14771-NL6-000	RETAINER, VALVE SPRING	8	E−4
14775-NL6-000	SEAT, VALVE SPRING OUTER	8	E−4
14776-NL6-000	SEAT, VALVE SPRING INNER	8	E−4
• **06170-NL6-000**	**INJECTOR SET**	**1**	
16211-NL6-000	INSULATOR, THROT BODY	2	E−2,3
16219-NL6-000	BAND, INSULATOR	2	E−2,3
16400-NL6-003	THROTTLEBODY ASSY.	1	E−17
17237-NL6-000	FUNNEL, AIR	1	E−18
17238-NL6-000	FUNNEL, AIR 40MM	1	E−18
37830-MAT-E01	SENSOR ASSY., MAP	2	E−17
37880-P05-A00	SENSOR ASSY., TA.	1	E−17
90049-NL6-000	BOLT, SOCKET, 5X14	4	E−18
90401-NL6-000	WASHER, 5.2X11X1	4	E−18
93891-04012-08	SCREW-WASH., 4X10	2	—
93891-05016-08	SCREW-WASH., 5X10	2	—

KIT

Block No.

K-2

Part No.	Description	Reqd. No.	Remarks (Block No.)
• 06220-NL6-010	**CLUTCH SET**	1	
22121-NL6-000	CENTER, CLUTCH	1	E-7
22122-NL6-010	PLATE COMP., CLUTCH LIFTER CAM	1	E-7
22131-NL6-000	CENTER B, CLUTCH	1	E-7
22132-NL6-000	GUIDE, CLUTCH CENTER	1	E-7
22134-NL6-000	SHIM, STROKE 1.8	1	E-7
22135-NL6-000	SHIM, STROKE 1.9	1	E-7
22136-NL6-000	SHIM, STROKE 2.0	1	E-7
22137-NL6-000	SHIM, STROKE 2.1	1	E-7
22138-NL6-000	SHIM, STROKE 2.2	1	E-7
22139-NL6-000	SHIM, STROKE 2.3	1	E-7
22172-NL6-000	SPRING, CLUTCH VC	1	E-7
22201-NL6-000	DISK, CLUTCH FRICTION 517D(A)	7	E-7
22202-NL6-000	DISK, CLUTCH FRICTION 2500(A)	2	E-7
22321-NL6-000	PLATE, CLUTCH 1.97	8	E-7
22322-NL6-000	PLATE, CLUTCH 1.85	8	E-7
22350-NL6-000	PLATE COMP., CLUTCH PRESSURE	1	E-7
22353-NL6-000	PLATE, CLUTCH LIFTER	1	E-7
22441-NL6-000	SPRING, CLUTCH	1	E-7
90403-NL6-000	WASHER, THRUST, 28.2X56X2	1	E-7
90567-NL6-000	SHIM, CLUTCH 0.9	2	E-7
90568-NL6-000	SHIM, CLUTCH 1.0	2	E-7
90569-NL6-000	SHIM, CLUTCH 1.1	2	E-7
90570-NL6-000	SHIM, CLUTCH 1.2	2	E-7
90571-NL6-000	SHIM, CLUTCH 1.3	2	E-7
90572-NL6-000	SHIM, CLUTCH 1.4	2	E-7
90601-MB0-771	CIRCLIP, IN. 95	1	E-7
91009-MAS-003	BEARING, BALL RADIAL 16003	1	E-7

Part No.	Description	Reqd. No.	Remarks (Block No.)
• 06230-NL6-000	**TRANS MISSION SET**	1	
23211-NL6-000	SHAFT, MAIN P-1	1	E-15
23212-NL6-000	SHAFT, MAIN P-2	1	E-15
23421-NL6-000	GEAR, C-1 P-1	1	E-15
23422-NL6-000	GEAR, C-1 P-2	1	E-15
23431-NL6-000	GEAR, M-2 P-1	1	E-15
23432-NL6-000	GEAR, M-2 P-2	1	E-15
23441-NL6-000	GEAR, C-2 P-1	1	E-15
23442-NL6-000	GEAR, C-2 P-2	1	E-15
23451-NL6-000	GEAR, M-3 M-4 P-1	1	E-15
23452-NL6-000	GEAR, M-3 M-4 P-2	1	E-15
23453-NL6-000	GEAR, M-3 M-4 P-3	1	E-15
23454-NL6-000	GEAR, M-3 M-4 P-4	1	E-15
23461-NL6-000	GEAR, C-3	1	E-15
23462-NL6-000	GEAR, C-3 P-2	1	E-15
23481-NL6-000	GEAR, C-4 P-1	1	E-15
23482-NL6-000	GEAR, C-4 P-2	1	E-15
23491-NL6-000	GEAR, M-5	1	E-15
23501-NL6-000	GEAR, C-5	1	E-15
23511-NL6-000	GEAR, M-6 P-1	1	E-15
23512-NL6-000	GEAR, M-6 P-2	1	E-15
23521-NL6-000	GEAR, C-6 P-1	1	E-15
23522-NL6-000	GEAR, C-6 P-2	1	E-15
91004-MBT-003	BEARING, BALL RADIAL, 28X62X16	2	E-15
• 06310-NL6-000	**A.C.G. SET**	1	E-9
11640-NL6-000	COVER COMP., A.C.G.	1	E-9
15514-NL6-000	JOINT, OIL RETURN	1	E-9
31110-NL6-003	FLYWHEEL COMP.	1	E-9
31120-NL6-003	STATOR COMP.	1	E-9
31131-NL6-000	CLAMPER, A.C.G. CORD	1	E-9
94109-14000	WASHER, PLAIN, 14MM	1	E-9
96001-06010-00	BOLT, FLANGE, SH, 6X10	1	E-9
95701-06014-00	BOLT, FLANGE, SH, 6X14	2	—
96001-06025-00	BOLT, FLANGE, SH, 6X25	3	E-9

KIT

Block No.

K-3

Part No.	Description	Reqd. No.	Remarks (Block No.)
• 06167-NL6-020	**FUEL PUMP SET**	**1**	
16705-NL6-010	UNIT SUB ASSY., FUEL TANK	1	F-11
16711-NL6-000	HOSE, FUEL PUMP	1	F-11
16714-NL6-000	HOSE, FUEL PUMP RETURN	1	F-11
16716-NL6-000	RUBBER, IN. FUEL UNIT	1	F-11
16717-NL6-000	RUBBER, OUT. FUEL UNIT	1	F-11
16730-MCF-003	PUMP SUB ASSY., FUEL	1	F-11
16959-MF2-000	JOINT, FUEL TUBE	1	F-11
17502-NL6-000	O-RING, FUEL PUMP	1	F-11
17522-NL6-000	SPONGE, FUEL PUMP FILTER	1	F-11
17525-NL6-000	HOSE, FR. FUEL RETURN	1	F-11
17526-NL6-000	HOSE, RR. FUEL RETURN	1	F-11
17527-NL6-000	HOSE COMP., FUEL FEED	1	F-11
90108-MBG-000	BOLT, BANJO, 12MM	1	F-11
90201-PD1-000	NUT A, SEALING, 12MM	1	F-11
90428-PD6-003	WASHER, SEALING, 12MM	4	F-11
90651-NC8-000	TY-LAP, 3.6X281	1	F-11
91405-PD1-004	CLAMP D12, TUBE	3	F-11
91406-SL0-931	CLAMP 15.5, FUEL HOSE	2	F-11
93891-04008-00	SCREW WASH., 4X8	12	F-11
94591-25000	CLIP, 2X50	1	F-11
95002-41050-08	CLAMP D 10.5, TUBE	2	F-11
• 06174-NL6-000	**BLIND, FUEL TANK SET**	**1**	
17515-NX5-770	PACKING, FUEL CAP	1	F-10
17521-NX4-680	CAP, FUEL TANK	1	F-10
17560-NL5-700	BASE, FUEL TANK CAP	1	F-10
17565-NL5-700	CAP, FUEL TANK BLIND	1	F-10
91353-NL5-701	O-RING, 82X2.8	2	F-10
90101-NL5-000	SCREW, TRUSS, 4X8	18	F-10
• 06175-NL6-000	**TANK SET, FUEL**	**1**	
17506-MB1-000	CUSHION, FUEL TANK PIVOT	2	F-10
17510-NL6-000	TANK COMP., FUEL	1	F-10
17522-NF5-690	SPONGE, BUFFLE	6	F-10
17515-NL6-000	COLLAR, FUEL TANK MOUNT	2	F-10
80106-382-770	RUBBER, RR. FENDER MOUNT	2	F-10
93404-06028-00	BOLT-WASH., 6X 28	2	F-10

Part No.	Description	Reqd. No.	Remarks (Block No.)
• 06185-NL6-000	**OIL COOLER SET**	**1**	F-21
15600-NL6-000	COOLER COMP., OIL	1	F-21
15650-NL6-000	PIPE COMP., IN. OIL COOLER	1	F-21
15660-NL6-000	PIPE COMP., OUT. OIL COOLER	1	F-21
19051-KA3-830	RUBBER, RADIATOR MOUNT	2	F-21
19052-MAC-680	COLLAR, RADIATOR MOUNT	2	F-21
90003-NL6-000	BOLT, FLANGE,6X20	4	F-21
90004-NL5-000	BOLT, FLANGE 8X22	2	F-21
91255-MJ1-000	O-RING, 11.1X3.5	2	F-21
91314-ME5-003	O-RING, 10X2.6	2	F-21
93404-06025-00	BOLT-WASH, 6X 25	2	F-21
• 06190-NL6-000	**RADIATOR SET**	**1**	
19010-NL6-000	RADIATOR COMP.,UP	1	F-22
19020-NL6-000	RADIATOR COMP.,LWR	1	F-22
19037-NX5-003	FILLER CAP COMP.	1	F-22
19051-KA3-830	RUBBER, RADIATOR MOUNT	5	F-22
19052-MAC-680	COLLAR, RADIATOR MOUNT	4	F-22
19502-NL6-000	HOSE, RADIATOR CONNECT	1	F-22
19501-NL6-000	HOSE, RADIATOR UP	1	F-22
19503-NL6-000	PIPE, RADIATOR LWR	1	F-22
19505-NL6-000	HOSE, RADIATOR ENG	1	F-22
19503-MB1-870	CLAMP, WATER HOSE	10	F-22
19528-MW4-000	HOSE, FR. HEAD WATER	2	F-22
19602-NF4-810	TANK, CATCH 250	1	F-22
90037-NX5-000	BOLT, WATER CHECK, 6X10	1	F-22
90543-273-000	PACKING, FRONT FORK DRAIN COCK	1	F-22
93404-06025-00	BOLT-WASH., 6X 25	4	F-22
95002-50000	CLIP C9, TUBE	1	F-22
95003-14050-10	V-TUBE, 6X9X500	1	F-22

KIT

Block No.

K-4

Part No.	Description	Reqd. No.	Remarks (Block No.)
• 06304-NL6-010	**ELECTRIC SET(SP)**	1	
30700-NL6-000	CAP ASSY., NOISE SUPPRESOR	2	F−19
31500-GEE-007	BATTERY YTZ7S	1	F−18
32100-NL6-000	HARNESS, WIRE	1	F−19
32112-NF5-950	CLAMPER, HARNESS	1	F−19
32114-NF4-780	BASE, TYLAP	1	F−19
32160-NL6-000	SUB HARNESS(FUEL PUMP)	1	F−19
32401-NL6-000	CABLE, BATTERY-STARTER MAGNETIC	1	F−18
32410-NL6-000	CABLE, STARTER MOTOR	1	F−18
32500-NL6-000	THROTTLE BODY HARNESS	1	F−19
32510-NL6-000	GROMMET, THROTTLE BODY HARNESS	1	F−19
32601-NL6-000	CABLE, BATTERY EARTH	1	F−18
35130-NL6-000	SWITCH ASSY., START STOP	1	F−1
35160-NKC-000	SENSOR ASSY., STOP	1	F−18
35850-MT4-000	SWITCH ASSY., STARTER MAGNETIC	1	F−18
35856-KBH-000	RUBBER, SHOCK	1	F−18
37250-NL6-003	TACHOMETER ASSY.	1	F−18
37460-NX4-701	METER ASSY., WATER TEMP.	1	F−18
37560-NL6-000	LED ASSY., FI WARNING	1	F−18
37870-NF4-611	SENSOR ASSY., T.W.	1	F−18
38770-NL6-003	UNIT ASSY., PGM.-FI/IGN.	1	F−19
38890-NL6-000	E.C.U. SETTING BOX	1	F−19
90111-MR5-000	BOLT, SOCKET, 5X9(ST MG SW)	2	F−18
90454-MC7-000	WASHER, SPECIAL,12MM	1	F−19
90651-NC8-000	TY-LAP 3.6X281	2	F−19
95701-06040-00	BOLT, FLANGE, 6X40	2	F−19
96001-06018-00	BOLT, FLANGE, SH, 6X18	2	F−19
96001-06020-00	BOLT, FLANGE, SH, 6X20	2	F−19
• 06412-NL6-000	**FINAL SET, SPRKT 520**	1	
23801-NL6-000	SPROCKET, DRIVE 15T(520)	1	F−15
23802-NL6-000	SPROCKET, DRIVE 16T(520)	1	F−15
23803-NL6-000	SPROCKET, DRIVE 17T(520)	1	F−15
40530-NL6-003	CHAIN, DRIVE GB520HRVZ2-120LJ-F	1	F−16
41237-NL6-000	SPROCKET, FINAL DRIVEN 37T	1	F−9
41238-NL6-000	SPROCKET, FINAL DRIVEN 38T	1	F−9
41239-NL6-000	SPROCKET, FINAL DRIVEN 39T	1	F−9
41240-NL6-000	SPROCKET, FINAL DRIVEN 40T	1	F−9
41241-NL6-000	SPROCKET, FINAL DRIVEN 41T	1	F−9
41242-NL6-000	SPROCKET, FINAL DRIVEN 42T	1	F−9
41243-NL6-000	SPROCKET¡,FINAL DRIVEN 43T	1	F−9

Part No.	Description	Reqd. No.	Remarks (Block No.)
• 06506-NL6-000	**HOLDER, STEP SET**	1	
24700-NL6-000	PEDAL COMP., CHANGE	1	F−15
24711-NL5-000	RAD END, 6MM A	1	F−15
24711-NL6-000	ARM, GEAR CHANGE	1	F−15
24712-NX5-004	ROD END, 6MM B	1	F−15
43511-KS6-702	CUP COMP., MASTER CYLINDER OIL	1	F−8
43504-NF4-770	ROD ASSY.	1	F−8
43512-NN1-700	TUBE ASSY., MASTER CYLINDER	1	F−8
43513-KS6-701	CAP., MASTER CYLINDER	1	F−8
43517-NL6-000	STAY, RR. OIL CUP	1	F−8
45518-GM9-711	PLATE, DIAPHRAGM	1	F−8
45520-GM9-711	DIAPHRAGM	1	F−8
46182-500-013	CIRCLIP, MASTER CYLINDER	1	−
46500-NF4-780	PEDAL COMP., BRAKE	1	F−15
50610-NL5-760	ARM, STEP	2	F−15
50612-NL5-760	END, STEP ARM	2	F−15
50630-NL6-000	HOLDER, R. STEP	1	F−15
50640-NL6-000	HOLDER, L. STEP	1	F−15
50643-NL5-760	COLLAR, 16X8.2	2	F−15
50707-MAS-E00	GUARD, L. STEP	1	F−15
90051-KS7-830	BOLT, FLANGE, 6X20	1	F−15
90065-NL6-000	BAR, CHANGE	1	F−15
90085-KFB-000	BOLT SPECIAL, 6X22	2	F−15
90201-KV3-700	NUT, TIE-ROD B	1	F−15
90301-473-003	NUT, U, 6MM	2	F−15
90502-NL6-000	COLLAR, 22X8.2	1	F−15
90504-MA6-000	WASHER 8.5X26	3	F−15
90512-ZV0-000	WASHER, PLAIN 6MM	1	F−15
91212-422-006	O-RING, 14.8X2.4	1	−
94001-06200-0S	NUT, HEX., 6MM	1	F−15
94050-06000	NUT, FLANGE,6MM	2	F−15
94101-06000	WASHER, PLAIN, 6MM	3	F−8,15
95002-41050-00	CLAMP, D10.5,TUBE	2	F−8
95801-06025-00	BOLT, FLANGE 6X25	2	F−15
95801-06035-00	BOLT, FLANGE 6X35	1	−
96001-06012-00	BOLT, FLANGE, SH, 6X12	1	−
96001-06016-00	BOLT, FLANGE, SH, 6X16	3	F−8

KIT

Block No.

K-5

Part No.	Description	Reqd. No.	Remarks (Block No.)
96001-06018-00	BOLT, FLANGE, SH, 6X18	2	F—8
96300-08025-00	BOLT, FLANGE, DR, 8X25	4	F—15
96300-08040-00	BOLT, FLANGE, DR, 8X40	1	F—15
96300-08045-00	BOLT, FLANGE, DR, 8X45	1	F—15
• **06537-NL6-000**	**DAMPER, STEERING SET**	**1**	
53700-NL0-003	DAMPER ASSY., STEERING	1	F—4
53705-NF5-760	HOLDER ASSY., STEERING DAMPER	1	F—4
53713-NC8-000	SPACER, STEERING DAMPER	2	F—4
53713-NL6-000	SPACER, STEERING DAMPER	1	F—4
92201-08030-0A	BOLT, HEX, 8X 30	1	F—4
94102-08000	WASHER, PLAIN, 8MM	2	F—4
96001-06028-00	BOLT, FLANGE, SH, 6X28	1	F—4
96700-08060-10	SOCKET BOLT, 8X60	1	F—4

Part No.	Description	Reqd. No.	Remarks (Block No.)

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Part No.	Block
06000	
06100-NL6-020	K- 1
06110-NL6-000	K- 1
06120-NL6-010	K- 1
06130-NL6-000	K- 1
06140-NL6-000	K- 1
06164-NL6-003	E-17
06167-NL6-020	K- 3
06170-NL6-000	K- 1
06174-NL6-000	K- 3
06175-NL6-000	K- 3
06185-NL6-000	K- 3
06190-NL6-000	K- 3
06220-NL6-010	K- 2
06230-NL6-000	K- 2
06304-NL6-010	K- 4
06310-NL6-000	K- 2
06412-NL6-000	K- 4
06501-NL6-000	F-20
06506-NL6-000	K- 4
06537-NL6-000	K- 5
11000	
11000-MCF-000	E-13
11210-NL6-000	E-12
11316-NL6-000	E-12
11330-MCF-000	E- 5
11332-MCF-000	E- 5
11340-MCF-000	E-10
11344-MCF-000	E-10
11350-MCF-000	E- 5
11356-MCF-000	E- 5
11365-MBT-000	E-10
11636-MCF-000	E- 9
11640-NL6-000	E- 9
12000	
12010-NL6-000	E- 2
12020-NL6 -000	E- 3
12109-MT7-300	E- 1
12208-MBB-003	E- 4
12251-MCF-003	E- 2
12252-MCF-003	E- 3
12311-NL6-010	E- 1
12321-NL6-010	E- 1
12322-NL6-000	E- 1
12325-NL6-000	E- 1
12391-MCF-000	E- 1
12396-MCF-000	E- 1
13000	
13101-NL6-000	E-14
13111-166-000	E- 8
13111-MCF-000	E-14
13121-NL6-000	E-14
13131-NL6-003	E-14
13141-NL6-003	E-14
13210-NL6-000	E-14
13213-MCF-003	E-14
13220-NL6-000	E-14
13224-MCF-003	E-14
13225-MCF-003	E-14
13226-MCF-003	E-14
13227-MCF-003	E-14
13228-MCF-003	E-14
13234-MCF-003	E-14
13235-MCF-003	E-14
13236-MCF-003	E-14
13237-MCF-003	E-14
13238-MCF-003	E-14
13310-NL6-000	E-14
13313-MCF-003	E-14
13314-MCF-003	E-14
13315-MCF-003	E-14
13316-MCF-003	E-14
13317-MCF-003	E-14
14000	
14110-NL6 -000	E- 4
14120-NL6 -000	E- 4
14130-NL6 -000	E- 4
14140-NL6 -000	E- 4
14406-MCF-000	E-14
14410-MCF-000	E- 4
14420-MCF-000	E- 4
14711-NL6-000	E- 4
14721-NL6-000	E- 4
14731-MCF-003	E- 4
14750-NL6 -000	E- 4
14771-NL6 -000	E- 4
14775-NL6 -000	E- 4
14776-NL6 -000	E- 4
14781-MBB-003	E- 4
14901-MBB-000	E- 4
14902-MBB-000	E- 4
14903-MBB-000	E- 4
14904-MBB-000	E- 4
14905-MBB-000	E- 4
14906-MBB-000	E- 4
14907-MBB-000	E- 4
14908-MBB-000	E- 4
14909-MBB-000	E- 4
14910-MBB-000	E- 4
14911-MBB-000	E- 4
14912-MBB-000	E- 4
14913-MBB-000	E- 4
14914-MBB-000	E- 4
14915-MBB-000	E- 4
14916-MBB-000	E- 4
14917-MBB-000	E- 4
14918-MBB-000	E- 4
14919-MBB-000	E- 4
14920-MBB-000	E- 4
14921-MBB-000	E- 4
14922-MBB-000	E- 4
14923-MBB-000	E- 4
14924-MBB-000	E- 4
14925-MBB-000	E- 4
14926-MBB-000	E- 4

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Part No.	Block
14927-MBB-000	E- 4
14928-MBB-000	E- 4
14929-MBB-000	E- 4
14930-MBB-000	E- 4
14931-MBB-000	E- 4
14932-MBB-000	E- 4
14933-MBB-000	E- 4
14934-MBB-000	E- 4
14935-MBB-000	E- 4
14936-MBB-000	E- 4
14937-MBB-000	E- 4
14938-MBB-000	E- 4
14939-MBB-000	E- 4
14940-MBB-000	E- 4
14941-MBB-000	E- 4
14942-MBB-000	E- 4
14943-MBB-000	E- 4
14944-MBB-000	E- 4
14945-MBB-000	E- 4
14946-MBB-000	E- 4
14947-MBB-000	E- 4
14948-MBB-000	E- 4
14949-MBB-000	E- 4
14950-MBB-000	E- 4
14951-MBB-000	E- 4
15000	
15101-MCF-000	E-12
15102-NL6-000	E-12
15131-414-000	E-12
15131-NL6-000	E- 7
15132-NL6-000	E-12
15133-414-000	E-12
15134-KE8-010	E-12
15140-415-003	E-12
15150-NL6-000	E-12
15154-MM5-000	E-12
15220-MCF-000	E-12
15232-NL6-000	E-12
15233-NL6-000	E-12
15410-MT7-003	E-12
15414-300-000	E- 5
15514-NL6-000	E- 9
15515-NL6-000	E-13
15516-NL6-000	E-13
15600-NL6-000	F-21
15611-KA4-710	E- 5
15650-NL6-000	F-21
15660-NL6-000	F-21
16000	
16010-NL6-003	E-17
16018-MCF-003	E-18
16019-MCF-003	E-18
16024-MAT-E01	E-17
16029-NL6-003	E-17
16046-MCF-003	E-18
16047-MCF-003	E-18
16080-MCF-003	E-17
16081-NL6-003	E-17
16118-NL6-003	E-18
16120-NL6-003	E-17
16121-MCF-003	E-18
16129-MCF-003	E-17
16130-MCF-003	E-17
16169-NL6-003	E-18
16211-NL6-000	E- 2
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16219-MBB-000	E- 2
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16219-NL6 -000	E- 2
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16222-MV4-300	E- 2
	E- 3
16400-NL6 -003	E-17
16472-MCF-003	E-17
16473-PD6-000	E-17
16610-NL6-003	E-17
16620-NL6-003	E-17
16630-NL6-003	E-17
16705-NL6-010	F-11
16711-NL6-000	F-11
16712-SF1-930	F-11
16714-NL6-000	F-11
16715-NL6-000	F-11
16716-NL6-000	F-11
16717-NL6-000	F-11
16729-NL6-000	F-11
16730-MCF-003	F-11
16740-NL6 -003	E-17
16959-MF2-000	F-11
17000	
17201-MG9-000	E-17
17221-NL6-000	F-13
17231-NL6-000	F-13
17237-NL6-000	E-18
17238-NL6-000	E-18
17250-NL6-000	F-13
17502-NL6-000	F-11
17506-MB1-000	F-10
17510-NL6-000	F-10
17515-NL6-000	F-10
17515-NX5-770	F-10
17521-NX4-680	F-10
17522-NF5-690	F-10
17522-NL6-000	F-11
17525-NL6-000	F-11
17526-NL6-000	F-11
17527-NL6-000	F-11
17560-NL5-700	F-10
17565-NL5-700	F-10
17625-NX5-771	F-10
17724-102-700	F-13
17910-NL6-000	F- 1
17920-NL6-000	F- 1
18000	
18291-NL6-000	F-14
18292-NL6-000	F-14
18293-NL6-000	F-14

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Part No.	Block
18300-NL6-000	F-14
18309-GN3-670	F-20
18310-NL6-000	F-14
18315-GAG-750	F-13
18320-NL6-000	F-14
18330-NL6-000	F-14
18334-NL6-000	F-14
18340-NL6-000	F-14
18350-NL6-000	F-14
18355-NL5-800	F-14
18355-NL6-000	F-14
18371-NL6-710	F-14
18380-NL6-710	F-14
18390-NL6-710	F-14
18391-NL6-000	F-14
18392-NL6-000	F-14
19000	
19010-NL6-000	F-22
19020-NL6-000	F-22
19037-NX5-003	F-22
19051-KA3-830	F-14
	F-21
	F-22
19052-KA3-830	F-14
19052-MAC-680	F-21
	F-22
19210-MCF-000	E- 6
19217-MAL-300	E- 6
19220-NL6-000	E- 6
19226-MCF-000	E- 6
19231-MCF-300	E- 6
19501-NL6-000	F-22
19502-NL6-000	F-22
19503-MB1-870	F-22
19503-NL6-000	F-22
19505-KS6-700	F-13
19505-NL6-000	F-22
19506-NL6-000	F-22
19517-ML7-691	F-22
19523-NL6-000	F-22
19524-NL6-000	F-22
19525-NL6-000	F-22
19528-MW4-000	F-22
19602-NF4-810	F-10
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22000	
22100-MCF-000	E- 7
22116-MCF-000	E- 7
22121-NL6-000	E- 7
22122-NL6-010	E- 7
22131-NL6-000	E- 7
22132-NL6-000	E- 7
22134-NL6-000	E- 7
22135-NL6-000	E- 7
22136-NL6-000	E- 7
22137-NL6-000	E- 7
22138-NL6-000	E- 7
22139-NL6-000	E- 7
22172-NL6-000	E- 7
22201-NL6-000	E- 7
22202-NL6-000	E- 7
22321-NL6-000	E- 7
22322-NL6-000	E- 7
22350-NL6-000	E- 7
22353-NL6-000	E- 7
22366-MS2-611	E- 7
22441-NL6-000	E- 7
22850-MBB-000	E- 7
22860-MT7-000	E-10
22862-MW7-650	E-10
22863-MJ8 -003	E-10
22864-MT7-006	E-10
22865-MJ8-003	E-10
22866-MF2-711	E-10
22884-MAT-E01	F- 3
22885-MB0-006	F- 3
22886-MAT-E01	F- 3
22887-MBB-006	F- 3
22888-MR7-006	F- 3
22889-MR7-006	F- 3
22890-MCF-006	F- 3
22890-MR7-006	F- 3
22900-NL6-000	F- 3
23000	
23103-MCF-000	E- 7
23211-NL6-000	E-15
23212-MCF-000	E-15
23212-NL6-000	E-15
23220-MBB-000	E-15
23421-NL6-000	E-15
23422-NL6-000	E-15
23431-NL6-000	E-15
23432-NL6-000	E-15
23441-NL6-000	E-15
23442-MS2-610	E-15
23442-NL6-000	E-15
23451-NL6-000	E-15
23452-NL6-000	E-15
23453-NL6-000	E-15
23454-NL6-000	E-15
23461-NL6-000	E-15
23462-MAT-000	E-15
23462-NL6-000	E-15
23481-NL6-000	E-15
23482-MR7-000	E-15
23482-NL6-000	E-15
23491-NL6-000	E-15
23495-MM5-000	E-15
23501-NL6-000	E-15
23511-NL6-000	E-15
23512-NL6-000	E-15
23521-NL6-000	E-15
23522-NL6-000	E-15
23801-NL6-000	E-15
23802-NL6-000	E-15
23803-NL6-000	E-15

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24000	
24211-MCF-000	E-16
24212-MBB-000	E-16
24310-MCF-000	E-16
24315-MAS-E00	E-16
24321-MAS-000	E-16
24430-MBB-000	E-16
24435-MCF-000	E-16
24610-MCF-000	E-16
24612-MAL-600	E-13
24651-MAS-E00	E-16
24652-035-000	E-16
24700-NL6-000	F-15
24711-NL5-000	F-15
24711-NL6-000	F-15
24712-NX5-004	F-15
28000	
28110-MCF-000	E- 8
28121-MAH-000	E- 8
28126-MBB-003	E- 8
28131-MCF-000	E- 8
28140-MCF-003	E- 8
28810-P7Z-004	E- 3
30000	
30300-MCF-000	E- 9
30450-MCF-003	F-19
30455-MCF-000	F-19
30501-MCF-641	F-19
30502-MCF-641	F-19
30700-NL6-000	F-19
31000	
31110-NL6-003	E- 9
31120-NL6-003	E- 9
31131-NL6-000	E- 9
31200-MCF-003	E-11
31201-MR6-008	E-11
31205-MR1-008	E-11
31206-MR6-008	E-11
31207-KS5-901	E-11
31500-GEE-007	F-18
31510-NL6-000	F-20
31512-NL5-000	F-20
31600-MCF-003	F-19
31910-NL6-003	E- 2
	E- 3
32000	
32100-NL6-000	F-19
32112-NF5-950	F-19
32114-NF4-780	F-19
32160-NL6-000	F-19
32170-647-000	F-13
32401-NL6-000	F-18
32406-MT4-000	F-18
32410-NL6-000	F-18
32411-253-000	F-18
32412-MV4-000	F-18
32500-NL6-000	F-19
32510-NL6-000	F-19
32601-NL6-000	F-18
35000	
35130-NL6-000	F- 1
35160-NKC-000	F-18
35330-MB0-003	F- 3
35600-KE8-003	E-13
35850-MT4-000	F-18
35856-KBH-000	F-18
37000	
37250-NL6-003	F-18
37460-NX4-701	F-18
37560-NL6-000	F-18
37700-MAL-601	E-13
37810-MW4-000	F-11
37830-MAT-E01	E-17
37870-MBG-003	F-19
37870-NF4-611	F-18
37880-P05-A00	E-17
38000	
38501-GN2-014	F-19
38506-GC7-611	F-19
38770-NL6-003	F-19
38890-NL6-000	F-19
40000	
40530-NL6-003	F-16
40535-NL6-003	F-16
41000	
41231-KZ4-000	F- 7
41237-NL6-000	F- 9
41238-NL6-000	F- 9
41239-NL6-000	F- 9
41240-NL6-000	F- 9
41241-NL6-000	F- 9
41242-NL6-000	F- 9
41243-NL6-000	F- 9
42000	
42301-MCF-000	F- 9
42305-MCF-000	F-16
42306-MCF-000	F-16
42311-NL6-000	F- 9

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Part No.	Block
42312-NL6-000	F- 9
42603-NL6-000	F- 9
42605-NL6-000	F- 9
42606-NL6-000	F- 9
42608-NL6-000	F- 9
42609-NL6-000	F- 9
42621-NL6-000	F- 9
42624-NL6-000	F- 9
42633-NL6-003	F- 9
42720-NC8-000	F- 7
	F- 9
42721-NC8-000	F- 7
	F- 9
42753-ML7-004	F- 7
	F- 9
43000	
43100-NL5-701	F- 8
43105-NL5-700	F- 8
43110-NL6-000	F- 8
43121-NL6-000	F- 9
43215-NL5-701	F- 8
43310-NL6-000	F- 8
43352-568-003	F- 8
43353-461-771	E-10
	F- 8
43500-NL6-000	F- 8
43504-NF4-770	F- 8
43511-KS6-702	F- 8
43512-NN1-700	F- 8
43513-KS6-701	F- 8
43517-NL6-000	F- 8
43520-MB2-305	F- 8
44000	
44301-NL6-000	F- 7
44303-NL6-000	F- 7
44304-NL6-000	F- 7
44305-NL6-000	F- 7
44311-NL6-000	F- 7
44601-NL6-000	F- 7
44603-NL6-000	F- 7
44620-NL6-010	F- 7
45000	
45100-NL5-700	F- 2
45103-MR7-006	F- 8
45105-NL6-000	F- 2
45110-NL5-700	F- 2
45124-NL6-000	F- 2
45125-NL6-000	F- 2
45130-NL5-700	F- 2
45146-300-000	F-13
45200-NL5-700	F- 2
45209-KV3-951	F- 8
45215-NL5-305	F- 2
45224-KV3-951	F-20
45250-NL5-800	F- 2
45500-NL5-701	F- 2
45504-MAT-E01	F- 3
45517-166-006	F- 3
45518-GM9-711	F- 8
45520-GM9-711	F- 8
45520-NL5-701	F- 2
45530-NF4-650	F- 8
45535-MR8-901	F- 3
46000	
46500-NF4-780	F-15
46501-ND4-750	F-15
50000	
50200-NL6-000	F-20
50232-NL6-000	F-17
50252-GC4-830	E-12
50610-NL5-760	F-15
50612-NL5-760	F-15
50630-NL6-000	F-15
50640-NL6-000	F-15
50643-NL5-760	F-15
50707-MAS-E00	F-15
50803-NF4-610	F-23
50815-NL6-000	F-18
50816-NX4-000	F-18
51000	
51486-087-711	E- 5
52000	
52101-MCF-000	F-16
52108-NL6-000	F-16
52109-NL6-000	F-16
52110-NL6-000	F-16
52141-MCF-000	F-16
52142-MCF-000	F-16
52143-MCF-000	F-16
52156-GAN-670	F-16
52170-MCF-000	F-16
52175-KZ3-J10	F-20
52460-NL6-000	F-17
52462-ML0-000	F-17
52463-MR7-000	F-17
52463-KV3-000	F-17
52470-NL6-000	F-17
53000	
53104-MK4-620	F- 1
53105-MJ0-000	F- 1
53107-MB6-630	F- 1
53107-MJ0-000	F- 1
53108-KAZ-000	F- 1
53110-NL6-000	F- 1

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53111-NL6-000	F- 1
53120-NL6-000	F- 1
53141-MT7-000	F- 1
53160-NL5-701	F- 2
53165-KT8-710	F- 1
53166-KT8-710	F- 1
53167-KV3-700	F- 1
53168-KV3-701	F- 1
53172-KV0-006	F- 3
53172-MJ4-702	F- 3
53177-KV0-006	F- 3
53179-KV0-006	F- 3
53180-KV0-006	F- 3
53180-MZ1-792	F- 3
53181-KV0-006	F- 3
53200-NL6-000	F- 4
53204-NL6-000	F- 4
53210-NL6-000	F- 4
53214-KA4-701	F- 4
53214-MR7-003	F- 4
53220-MW0-000	F- 4
53220-NL6-000	F- 4
53230-NL6-000	F- 4
53240-NL6-000	F- 4
53250-NL6-000	F- 4
53700-NL0-003	F- 4
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90087-KT7-000	E- 9	90151-MCF-000	F-20	90417-360-000	E-16	90568-NL6-000	E- 7
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90101-NL5-000	F-10	90153-MCF-000	F-20	90441-ME9-000	E- 4	90570-NL6-000	E- 7
90101-NL6-000	F- 8	90153-NL5-700	F-17	90442-028-000	E-13	90571-NL6-000	E- 7
90102-MCF-000	F-20	90154-MCF-000	F-20	90443-MJ6-000	E-13	90572-NL6-000	E- 7
90103-MCF-000	F-20	90161-MN5-000	F-11	90451-155-000	E-16	90573-NL6-000	E- 7
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		91252-MCF-003	F-16	93404-06012-00	F-12	94101-05700	E-12
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91022-MCF-003	E-15	91303-377-000	E- 9	93500-05020-0G	F- 1	94251-06000	F- 2
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95701-06028-00	E-13
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96001-06016-00	F- 8
96001-06018-00	F- 8
	F-19
	F-20
	F-22
96001-06020-00	F- 1
	F-19
96001-06020-07	E-10
96001-06022-07	F- 3
96001-06025-00	E- 9
96001-06025-00	F-15
96001-06028-00	F- 4
96001-06040-07	E-10
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