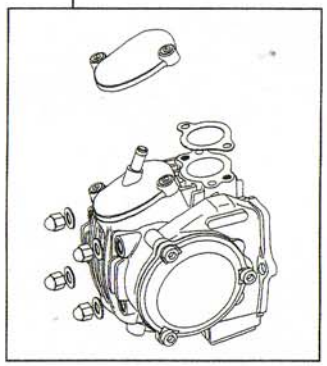
Instruction Manual for Super head+R 88cc Bore-Up kit

Item No.: 01−05−8002H
Applicable models and frame Nos
CRF50F :AE03−1400001～
CRF70F :DE02−1700001～
XR50R :AE03−1000001～
XR70R :DE02−1000001～

・Thank you for purchasing one of our TAKEGAWA's products. Please strictly follow the following instructions in installing and using the products.
・This is a newly-designed Super Head+R / Bore-Up (52x41.4 88cc) kit.
Before fitting the products, please be sure to check the contents of each kit, and follow the instructions in each manual of the kit. Should you have any questions about the products, please kindly contact your dealer.

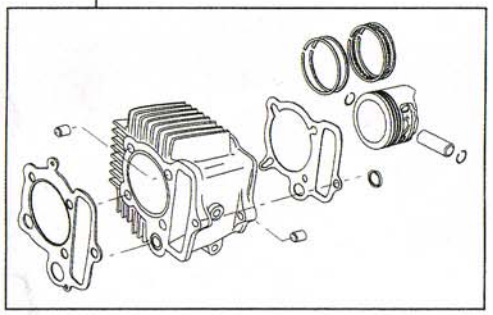
～Kit Contents～

01-03-8004
Super Head+R kit



01-08-0012
Cam shaft S-12

01-04-8088H
88cc H cylinder of the cylinder kit



Please read the following before installation.

◎ We do not take any responsibility for any accident or damage whatsoever arising from the use of the products not in conformity with the instructions in the manual.
◎ This kit is designed for exclusive use in the above-mentioned applicable models with specified frame numbers only. Please take note that this kit cannot be mounted on other types of motorcycles.
◎ Please be informed that, mainly because of improvement in performance, design changes, and cost increase, the product specifications and prices are subject to change without prior notice.

SPECIAL PARTS TAKEGAWA
3-5-16 Nishikiorihigashi Tondabayashi Osaka Japan
TEL : 81-721-25-1357 FAX : 81-721-24-5059 URL : http://www.takegawa.co.jp

Oct./24/" 06

Instruction Manual for CAM SHAFT for Super head+R

SUPER HEAD + R ONLY

01−08−0012 (S12) 01−08−0025 (S25)
01−08−0015 (S15) 01−08−0030 (S30)
01−08−0020 (S20) 01−08−0035 (S35)

Thank you for purchasing one of our products.
This is a special cam shaft for ensuring maximum power of Super Head.
Before installing the kit, please understand the instructions well by going through the instruction manual attentively.

◎ In the case of a 35 cam shaft, it is advisable to adjust securely with a timing protractor and a dial gauge.
Item Nos: 000-01-0061 for a timing protractor,
000-01-0062 for a kit of a timing protractor

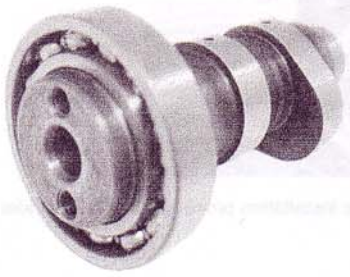
⚠ Caution The following show the envisioned possibility of injuries to human bodies or property damage as a result of disregarding the following cautions.

- Use the right tools for the work. (Otherwise, you may damage parts or suffer injuries.)
- Use a tachometer to make sure that you drive the engine below the upper limit of revolutions. (Over revving not only adversely affects the engine but also causes the engine to break down.)
- Please do checking and maintenance periodically. (Failure to check or perform maintenance of the engine may cause the engine to fail. (The continued use of the damaged parts will result in the engine failure.)
- If you find damaged parts when checking and performing maintenance of your motorcycle, replace them with new ones. (The continued use of these damaged parts as they are could lead to accidents.)

⚠ Warning The following show the envisioned possibility of human death or serious injuries to human bodies as a result of disregarding the following cautions.

- When you notice something abnormal with your motorcycle while riding, stop riding immediately and park your motorcyle in a safe place. (Otherwise, the continued ride could lead to accidents.)
- Always drive the engine in a well-ventilated place, and do not start the engine in an airtight place. (Otherwise, you will suffer from carbon monoxide poisoning.)
- Before starting the installation, stablize the position of engine for the sake of safe work. (Otherwise, the engine could overturn and injure you while you are working.)

◎ Please be informed that, mainly because of improvement in performance, design changes, and cost increase, the product specifications and prices are subject to change without prior notice.
◎ This manual should be retained for future reference.



Parts Name	Qty
Cam shaft COMP.	1

01−08−0012 S−12
● Valve timing (when the valve is moved 1 mm.)

IN OPEN	BTDC 7°
IN CLOSE	ABDC 37°
EX OPEN	BBDC 37°
EX CLOSE	ATDC 7°

01−08−0015 S−15
● Valve timing (when the valve is moved 1 mm.)

IN OPEN	BTDC 10°
IN CLOSE	ABDC 40°
EX OPEN	BBDC 40°
EX CLOSE	ATDC 10°

01−08−0020 S−20
● Valve timing (when the valve is moved 1 mm.)

IN OPEN	BTDC 15°
IN CLOSE	ABDC 45°
EX OPEN	BBDC 45°
EX CLOSE	ATDC 10°

01−08−0025 S−25
● Valve timing (when the valve is moved 1 mm.)

IN OPEN	BTDC 20°
IN CLOSE	ABDC 50°
EX OPEN	BBDC 50°
EX CLOSE	ATDC 20°

01−08−0030 S−30
● Valve timing (when the valve is moved 1 mm.)

IN OPEN	BTDC 24°
IN CLOSE	ABDC 54°
EX OPEN	BBDC 54°
EX CLOSE	ATDC 24°

01−08−0035 S−35
● Valve timing (when the valve is moved 1 mm.)

IN OPEN	BTDC 30°
IN CLOSE	ABDC 60°
EX OPEN	BBDC 60°
EX CLOSE	ATDC 30°

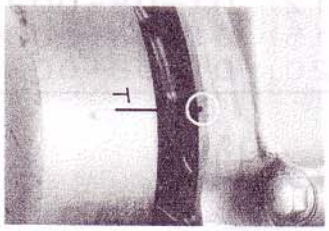
Please select an appropriate cam shaft to suit the uses.

Feb./27/'06

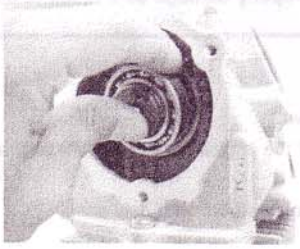
Cautions for use

◎ Do the installation work, following the installation procedures in the instruction manual for Super head+R.
◎ Those who are technically unskilled or inexperienced are required not to do the work.
◎ Carry out periodic checks, referring to the owner's manual for Super Head+R.

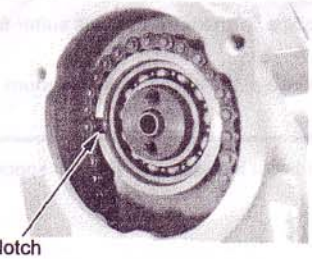
○ Align a "T" mark on the flywheel with an alignment mark on the crankcase. Then set the piston at TDC (Top Dead Center).



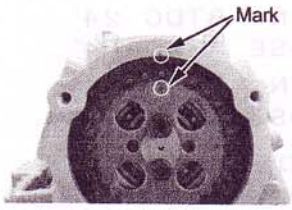
○Apply engine oil to a bearing on the camshaft COMP., which please fit to a cylinder head.

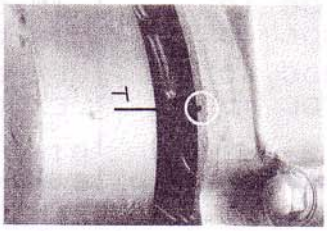


○ Put an 8x12 dowel pin into the camshaft, and attach a camshaft circlip to secure the camshaft. At this stage, set the location of ring end gap of the circlip not to meet the notch on the cam hole of the cylinder head.



○ Fit the cam chain to the cam sprocket, and fix it with a cam sprocket plate of the kit and two M5x12 cap screws (black).
(At this point, apply Aluminum Special a little to the thread of the cap screw.)
Then align an "O" mark on the cam sprocket with an alignment mark on the cylinder head when the "T"mark on the flywheel is aligned with the alignment mark on the crankcase.





○ Secure the crank, and tighten the cap screw to the specified torque which holds the cap sprocket.
⚠Caution: Follow the specified torque.
T=10N · m (1.0 kgf · m)

○ Check that the "T" mark on the flywheel is aligned with the "O" mark on the cam sprocket.

○ Adjust the valve clearance with an adjust screw:
Intake : 0.05～**0.08 (when cool)**
Exhaust: 0.05～**0.08 (when cool)**

○ Fasten the adjust nut to the specified torque.
⚠Caution: Follow the specified torque.
T=10N · m (1.0 kgf · m)

○ Do the work referring to the installation procedures of the cylinder head.

SPECIAL PARTS TAKEGAWA
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⚠ WARNING

Since this cylinder head manual is prepared for those who have acquired basic skills and knowledge in tuning, those who are technically unskilled or inexperienced are required not to do the work.

○Torque unit

1 kgf・m = 9.80665 N・m (=newton meter)

(MO-OIL) ○This mark shows molybdenum solution.

This solution is a mixture of molybdenum grease and engine oil (in the ratio of 1:1).

∴Apply molybdenum solution or assembly paste to the portions where it is indicated that molybdenum solution needs to be applied.

(NEW) ○This mark shows those parts to be replaced with every overhaul.

Do not fail to replace these parts every time they are overhauled.

(AL-SPL) ○This mark means Aluminum Special (heat-resistant lubricating agent).

・Aluminum Special = heat-resistant lubricating paste and grease which prevent galling from high temperatures and heavy loading, and adhesion.

(Purpose: good for those parts which get hot like a spark plug and exhaust manifold.)

☆Never apply this to any parts other than the specified parts.

Reference Value List for Cylinder Head Maintenance

Items	Standard	Service Limit	Remarks
Valve clearance (intake)	0.05～0.08mm (when cold)	————	
(exhaust)	0.05～0.08mm (when cold)	————	
Cylinder head distortion	————	0.05mm	Replace
Inside diameter of valve rocker arm	10.000～10.015mm	10.05mm	Replace
Outside diameter of rocker arm shaft (intake / exhaust)	9.978～9.987mm	9.92mm	Replace
Clearance between a rocker arm and a shaft	0.013～0.037mm	0.10mm	Replace
Inside diameter of valve guide (intake / exhaust)	4.500～4.512mm		Replace the guide or the head
Outside diameter of valve stem (intake)	4.475～4.490mm	4.42mm	Replace
(exhaust)	4.460～4.475mm	4.40mm	Replace
Clearance between a valve stem and a guide (intake)	0.01～0.037mm	————	
(exhaust)	0.025～0.052mm	————	
Valve seat contact width (Intake)	0.8～1.0mm	1.5mm	Modify or replace the head
(Exhaust)	1.0～1.2mm	1.7mm	Modify or replace the head
Free length of valve spring (outer)	34.8mm	33mm	Replace
(inner)	30mm	28.5mm	Replace
Valve spring retainer (intake / exhaust)	————	coating peeling	Replace Check once every 500km

○ Valve Overhaul

Compress the valve spring with a valve spring compressor.

⚠CAUTION: Do not compress the valve spring more than necessary.

∴ Specialized Tools : Valve spring compressor Item No. 000-01-07

Valve spring compressor set Item No. 000-01-1005

○ Remove the valve cotters.

If it is hard to remove them, use a magnet to remove the cotters.

○ Detach the valve spring compressor, and remove the following parts.

・Valve spring retainer

・Valve springs (inner / outer)

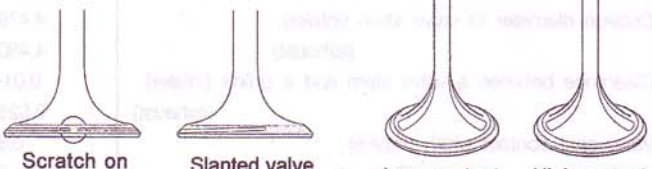
・Valve

○ Check each valve for bending, baking, and damages.
Measure the surface of the exterior valve stem sliding over a guide with a micrometer.
Service Limit Intake : 4.42 mm Exhaust : 4.40 mm
Replace bent, scrached or damaged valves with new ones.

○ Inspection of Valve Spring Retainer
Check the valve-spring-retainer surface to touch the valve spring.
Replace it with a new one if its coating is peeled off or it is damaged.

○ Inspection of Valve Seat
- Remove carbon sediments in the combustion chamber of the cylinder head and in the valves.
- Dissolve red lead primer with oil or the like, and apply the dissolved red lead primer to the valve faces evenly.
- Strike the valves once and lightly with a valve punner to rotate them.
- Wipe off the red lead primer on the valve faces, and strike the valves once and lightly with the valve punner without rotating them, and inspect the contact surfaces.

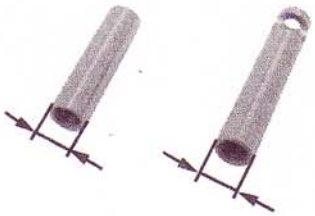
- If there is a scratch on the valve seat, modify the seat.
- If the contact width is too wide, narrow, high or low, modify the seat.
- Ask a specialist shop in internal combustion for the modification work.



○ Inspection of Rocker Arm
- Check the rocker arms for scratches, damages and jamming.
- Measure the internal diameter of the rocker arms.
  ∴ If the internal diameter is more than 10.05, replace the rocker arm.

○ Inspection of Rocker Arm Shaft

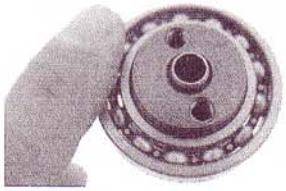
- Check the rocker arm shafts for bending, scratches, and damages.
- Measure the external diameters of the rocker arm shafts.
  ∴ If the diameter is less than 9.92, replace them.
- Measure the clearance between the rocker arms and the rocker arm shafts.
  ∴ If the clearance is more than 0.10, replace them.



○ Inspection of Cam Shaft

- Check the cam shaft for scratches, cracks, and damages.
- Measure the height of each cam top.

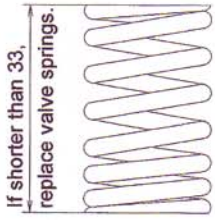
Kind of camshafts	Intake	Exhaust	
S-12 cam shaft	below 28.8	below 28.8	Replace
S-15 cam shaft	below 28.8	below 28.8	Replace
S-20 cam shaft	below 29.0	below 28.8	Replace
S-25 cam shaft	below 29.1	below 28.8	Replace
S-30 cam shaft	below 29.43	below 29.03	Replace
S-35 cam shaft	below 29.43	below 29.03	Replace

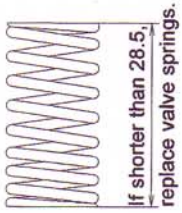


- Check the bearings in the cam shaft.
  Rotate the outer race of the bearings. If the outer race does not rotate smoothly or if it is rickety, replace the cam shaft.

○ Inspection of Valve Springs

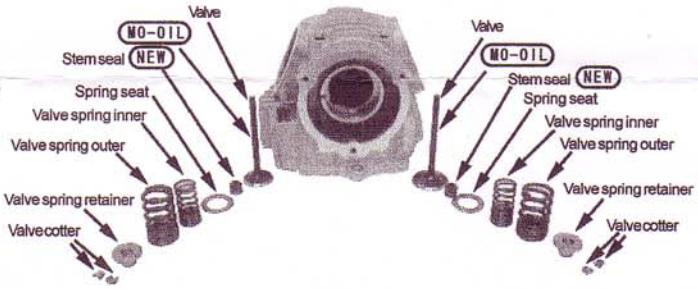
- Check the valve springs for scratches and damages.
- Measure the free length of the valve springs.
  ∴ Outer : If shorter than 33, replace them.
  Inner : If shorter than 28.5, replace them.





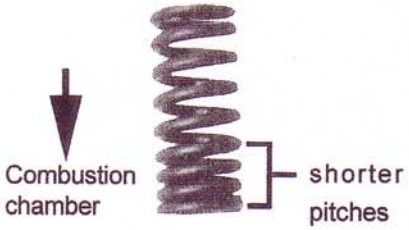
○ Valve Assembly

- Clean up the cylinder head.
- Fix valve spring seats and new valve stem seals.
- Apply molybdenum solution to the sliding surfaces of the valve stems, and fit the valves into the valve guides, rotating valvles slowly with care not to damage the stem seals.



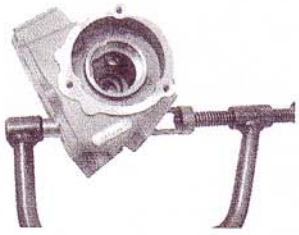
- Attach the valve springs, placing the ones with shorter pitch pointing to the combustion chamber.

⚠ CAUTION: Be sure to place valve springs with shorter pitch to face the combustion chamber side.



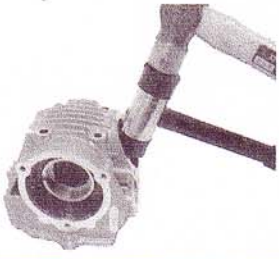
- Apply grease a little to valve cotters. And compressing the valve springs with a valve spring compressor, attach the valve cotters.

⚠ CAUTION: Do not compress the valve spring more than necessary.



- Strike the tops of valve stems a few times so the valves and cotters fit together well.

⚠ CAUTION: Be careful not to damage the valves.



Super head+R Kit Instruction Manual

Item No. : 01−03−8004

Applicable models and frame Nos (excluding the case of combo kit installation)

Monkey	: Z50J-2000001 ～	XR50R	: AE03-1000001 ～
Gorilla	: Z50J-2500001 ～	CRF50F	: AE03-1400001 ～
Monkey BAJA	: Z50J-1700001 ～	XR70R	: DE02-1000001 ～
Monkey R	: AB22-1000017 ～	CRF70F	: DE02-1700001 ～
Monkey RT	: AB22-1007601 ～	CD90	: HA03-1100005 ～

☆This product is applicable to CD90 engines with the above-mentioned frame Nos.

- Thank you for purchasing one of our TAKEGAWA's products. Please strictly follow the following instructions in installing and using the products.
- Before fitting the products, please be sure to check the contents of the kit. Should you have any questions about the products, please kindly contact your dealer.

～Features～

○ This is a totally new design cylinder head with a characteristic appearance completely distinct from that of a C-type engine when compared with a conventional super head. This completely new design cylinder head is equipped with an intake and exhaust valves with a wider valve top diameter and a shorter stem diameter and also is equipped with a new valve-included angle and a newly-shaped port. We have incorporated roller bearings into the slipper of a valve rocker arm. The increased weight caused by incorporation of bearings is offset by adoption of an aluminium-forged rocker arm which consequently brings about power increase at a high rotary area as a result of the synergy effect.
With a conventional C-type engine head, it is difficult to replace the cam shaft with the cylinder head installed. However, with this kit, the cam shaft can be detached without removing the rocker arm, because the bearings on the oil line side of the cam shaft are located on the cylinder head side. Therefore, this makes it easy to change the cam shafts even when the engine is mounted on the vehicle.

Please read the following carefully before starting installation

◎ We do not take any responsibility for any accident or damage whatsoever arising from the use of the products not in conformity with the instructions in the manual.
◎ This kit is designed for exclusive use in the above-mentioned applicable models of motorcycles and frame numbers, and for exclusive use in motorcycles equipped with a bore-up and bore-stroke exclusively for this kit as well. Therefore, please take note that this kit cannot be mounted on other applicable models of motorcycles, or motorcycles not equipped with bore-up, etc exclusively for this kit.
◎ Installation of this product requires removal and reinstallation of an engine, and disassembly of a clutch. Please prepare HONDA's genuine service manual for the above-mentioned applicable models, and work with enough care following instructions in the service manual. Besides, this instruction manual, as well as HONDA's service manual, is prepared for those who have acquired basic skill and knowledge in tuning. We recommend those who are technically inexperienced or without right tools to ask a technically-trustworthy specialist shop to do the work.
◎ We shall be held free from any responsibility or compensation whatsoever for any glitch in the parts other than ours if the glitch takes place after the installation and use of the products.
◎ If you make alterations to the products, we shall be held free from any guarantee of the products.
◎ You are kindly requested not to contact us about the combination of our products with other manufacturers'.
◎ A serial number is engraved on the cylinder head. You may be requested to inform us of the number when ordering parts.
◎ Bolts, and nats will be reused. However, be sure to replace worn-down or severely-damaged ones with new ones.
◎ Never use liquid packing. It may plug the oil passage, and in the worst case break the engine.
◎ Be sure to always use premium unleaded petrol. And make sure to check what kind of gasoline is remaining in the fuel tank. Whenever regular gasoline is left in the fuel tank, always replace it with high-octane gasoline.
◎ Determine the heat value of a spark plug depending on how much it is burnt. In vehicles originally with a resistor plug, use a resistor plug.
◎ Never use this kit on the point-ignition system motorcycle.
◎ Please be informed that what we can safely say is that the ignition system of this kit is compatible with ours and stock ignition systems, because no data is available with us on the compatibility with other ignition systems. Therefore, please never use other ignition systems, which may cause technical troubles.
◎ As the stock clutch cannot be used, a centrifugal filter gets unavailable. Therefore, install an oil filter outside.
◎ Please install an oil cooler when necessary.
◎ Engine oil must be API SF or higher class, such as SAE 10W-40 / 15W-50, which are our recommendations.
◎ Change the sprocket with the one which meets the output and specifications.
◎ This kit cannot be used alone if you have purchased a cylinder head kit. If you have not purchased "our special engine parts", please purchase special parts with reference to the attached "Reference data on bore- & stroke-up kit."
◎ This kit is compatible with only those engine parts recommended by us. So, please replace the engine parts not recommended by us with those of our recommendations.
◎ Since this kit is designed and developed for driving in closed races, do not use the kit for running on public roads.
◎ In case you have purchased this product as a combo kit, the above-mentioned applicable models vary depending on the type of drive sprocket.

Jump-Starting and Sudden Acceleration

Idling, sudden acceleration, and sudden engine braking will put a heavy load on the engine, which please note may result in crank shaft damage and engine breakage in the worst case.

◎ Please be informed that, mainly because of improvement in performance, design changes, and cost increase, the product specifications and prices are subject to change without prior notice.
◎ Please be informed that we shall be held harmless against any claim against us whatsoever arising out of use of the products in racing and the like.
◎ This manual should be retained for future reference.

⚠Caution The following show the envisioned possibility of injuries to human bodies or property damages as a result of disregarding the following cautions.

- Since this kit is designed and developed for driving in closed races, do not use the kit for running on public roads.
- Work only when the engine and muffler are cool at below 35 degrees Celsius. Otherwise, you will burn yourself.
- Prepare right tools for the work. (Otherwise, improper work could cause breakage of parts or injuries to yourself.
- As some products and frames have sharp edges or protruding portions, please work with utmost care. (Otherwise, you will suffer injuries.)
- Always use new gasket and packing. (The worn or damaged parts may cause the engine troubles.)

Oct./25/'06

⚠Warning The following show the envisioned possibility of human death or serious injuries to human bodies as a result of disregarding the following cautions.

- Those who are technically unskilled or inexperienced are required not to do the work. (Improper installation because of insufficient skill and knowledge could lead to parts breakage and subsequently to accidents.)
- Before doing work, secure the motorcycle on level ground for safety's sake. (Otherwise, your motorcycle could overturn and injure you while you are working.)
- Always start the engine in a well-ventilated place, and do not turn the engine on in an airtight place. (Otherwise, you will suffer from carbon monoxide poisoning.)
- As gasoline is highly flammable, never place it close to fire. Make sure that nothing flammable is near the gasoline. (It may cause a fire.)
- Always use a torque wrench to screw bolts and nuts tight and securely to the specified torque. (Improper torque could cause these parts to get damaged or fall off.)
- Never use the parts unspecified by us. (This may lead to parts breakage and consequent accidents.)
- If you find damaged parts when checking and performing maintenance, do not use these parts any longer, and replace them with new ones. The continued use of these damaged parts as they are could lead to accidents.)
- When you notice something abnormal with your motorcycle while riding down a road, stop riding immediately and park your motorcyle in a safe place. (Otherwise, the abnormaility could lead to an accident.)
- Before riding, always check every section for slack in parts like screws. If you find slack ones, screw them securely up to the specified torque. (Or improper torque may cause parts to come off.)
- Check or perform maintenance of parts correctly according to the procedures in the instruction manual or a service manual. (Improper checking or maintenance could lead to an accident.)
- Always use high-octane gasoline. (Otherwise, troubles such as engine knocking may cause accidents.)

●Cautions before riding:

①About fuel:
Whenever regular gasoline is remaining in the fuel tank, always replace it with high-octane gasoline.

②With this kit installation, a centrifugal filter will be lost. So, please install a dry-type clutch with an external oil filter or a special clutch.

③About change of a sprocket:

◇The installation of this kit will increase the power of your vehicle. So the use of a stock sprocket will result in severe wears of parts because of too low gear, not only adversely affecting the engine life, but also breaking the engine in the worst case. Therefore, please change the sprockets with the high-geared one.

This kit cannot function on its own. Referring to the attached sheet, please purchase a bore-up or bore-stroke-up kit for exclusive use with this kit. This does not apply if you have purchaed a full kit.)

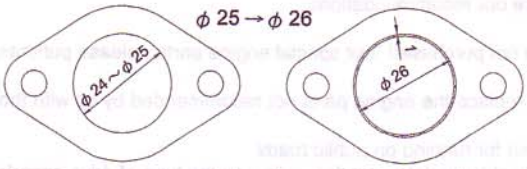
● Others:

Oil cooler:

◇ The installaiton of this kit increases the heat release value of the engine, set off by the increase in power. For a long-time and high load running, we recommend you to install an oil cooler kit which keeps oil at appropriate temperatures and prevents such troubles as oil film shortage at high temperatures.

Carburetor manifold:

◇ The surface of a manifold, compatible with R-Stage & old Super Head, with a port diameter of φ 24～φ 25 on the side of an inlet pipe, will not be level with the cylinder head because of the difference in manifold diameter. Enlarging the manifold's port diameter on the manifold side will bring about smoother output characteristics.



◇ We advise you to use a special carburetor kit for Super Head+R.
For the part numbers of the carburetor kits, please refer to the parts list of our recommendations on page 3.

- Special manifold only for Super Head+R
  VM26: 003-02-2541
  PE28 : 003-02-2551

● About camshaft:

◇If you have purchased a cylinder head kit, a special camshaft is needed separately. Camshafts with a few kinds of profiles are available from us to meet different uses and engine displacement. Even if you have purchased a full kit, you can study to use them as an optional extra in addition to camshafts inclued in the full kit. For more information, please refer to enclosed paper.

● An inspection cap and a breather cap are included in this kit. In case you use a breather cap, please use an oil catch tank at the same time.

●Revolution

◇Upper limt of revolutions varies depending on the installed cam shafts, etc. Referring to the camshaft comparison graph on page 3, install a revolution counter to make sure that you drive the engine at revolutions below the upper limit.

◇Take note that idling and sudden acceleration in the 1st and the 2nd gears particularly tend to exceed the upper limit of revultions. Over revolutions will result in nonsmooth revolutions of the engine, not only adversely affecting the engine life, but also breaking the engine in the worst case.

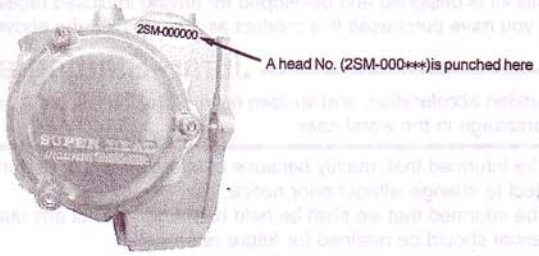
●Valve spring retainer

◇This Super Head comes with a titanium valve spring retainer as a stock equipment. We have succeeded in developing and making the spring retainer lighter than a steel retainer by about 30 percent. Besides, we have given the coating treatment to the surface which has surface hardness of more than HV1500. Through this coating, the spring retainer has become more abrasion-resistant than the conventionally-coated ones. However, when it comes to durability, this retainer lags behind the steel retainer in this point. So check and perform maintainance periodically for damage and wear. Always replace damaged or worn one with a new one. We would recommend those who attach importance to durability to equip a steel valve spring retainer.
HONDA offers a valve spring retainer made of steel (Item No. 14771-MR8-000).

● A serial number is punched on the cylinder head just for the sake of administration. You may be requested to inform us of the number when ordering repair parts.
In case you are not able to order parts because you do not have the repair parts numbers or for other reasons, please place an order in the following way.

☆ Make a note of the number punched on the left side of the cylinder head.

A head No. (2SM-000***)is punched here.
Head No. - 2SM-000001
Example of how to order → Super head kit, repair head No.-2SM-000001 → Intake valve Qty: 1 piece



● For those who have purchased a cylinder head alone, selection sets are available to meet your combination demand for engine displacement, etc. Please study the required contents of the kit, referring to "Reference data on bore & stroke-up kit" on enclosed paper.
Please contact your dealer for more details about the kit or enquiries.

Engine parts of our recommendations:

※This kit is only compatible with those engine parts recommended by us. So, please replace the parts not of our recommendations with those of our recommendations.

Parts of our recommendations			
Clutch	Special clutch kit		
	Dry-type clutch kit		
Ignition system	Stock C.D.I.		
	Hyper C.D.I.		07-02-15
	C.D.I. magnet		05-02-051
Carburetor	Keihin PE28 carburetor kit	MONKEY	03-05-0981
		MONKEY-R	03-05-095
	Mikuni VM26 carburetor kit	MONKEY MONKEY-R	03-05-0484
		CRF50	03-05-3245
Oil pump	Super oil pump kit		01-16-0051
Cam chain (Only in case of a cylinder head kit)	High-duty cam chain kit	88cc 106cc	01-14-002
		124cc	01-14-003
Oil catch tank (Only in case a head breather cap is used.)	Only for the Monkey/Gorilla		09-04-031
			09-04-032

☆ It's impossible to install this product to a CD90 motorcyle because there is no compatible carburetor. Please take note that this product is applicable to engines with the above mentioned CD90 frame Nos only.

About optional camshafts

○ The following camshafts compatible with this kit are available from us.
Referring to the list on the right, please select a camshaft to match your usage and engine displacement to enjoy a ride.

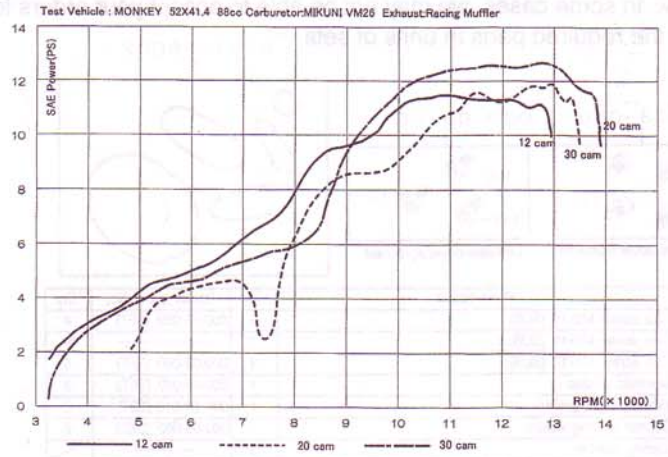
S-12 camshaft	01-08-0012	(Included for CRF / XR) (88 / 106 / 124)
S-15 camshaft	01-08-0015	(Included for the Moneky/Gorilla) (88 / 106)
S-20 camshaft	01-08-0020	(Included for bore stroke-up for the Moneky / Gorilla (124)
S-25 camshaft	01-08-0025	option
S-30 camshaft	01-08-0030	option
S-35 camshaft	01-08-0035	option

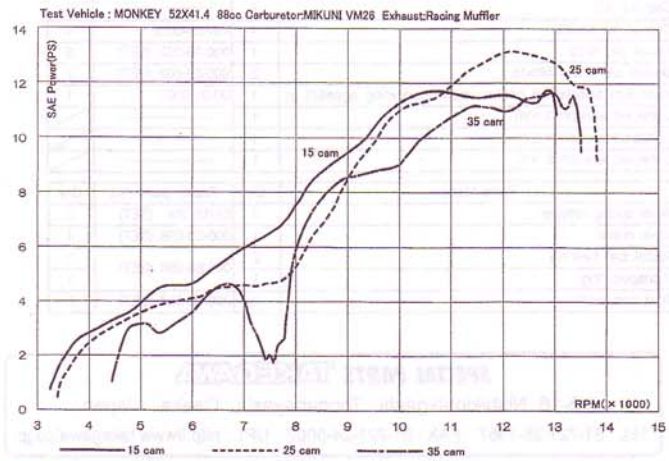
○ Part of the model names of our camshafts are indicated in numbers. To cite an example, the larger the number in S-○○, the wider the camshaft profile operating angle. And the smaller the number, the narrower the profile operating angle. In general, the wide-angle profile is a high-speed rotation type, and the narrow-angle profile is a slow-speed rotation type.
However, various factors like the engine displacement, specifications, usage, etc have to be taken into account in selecting the camprofile. So, referring to the list just as a guideline, select an appropriate camshaft to meet the usage.

☆ Camshaft comparison data list

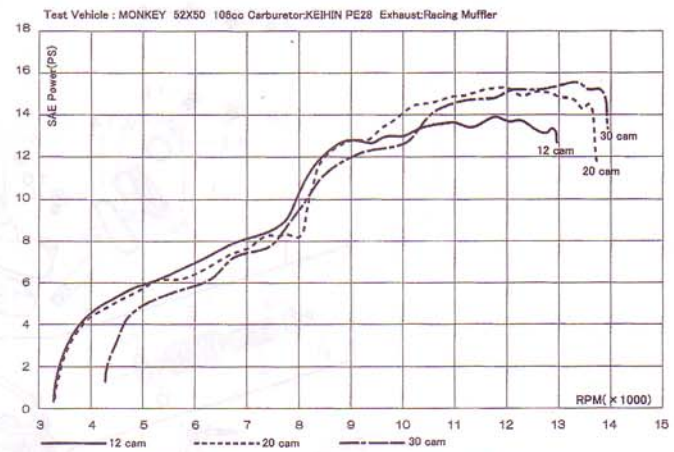
Note: As these are the data measured on a Dyno Jet, the data differ from the actual driving. Please refer to them just for a reference. The engine power varies significantly depending on the temperatures.

88 cc

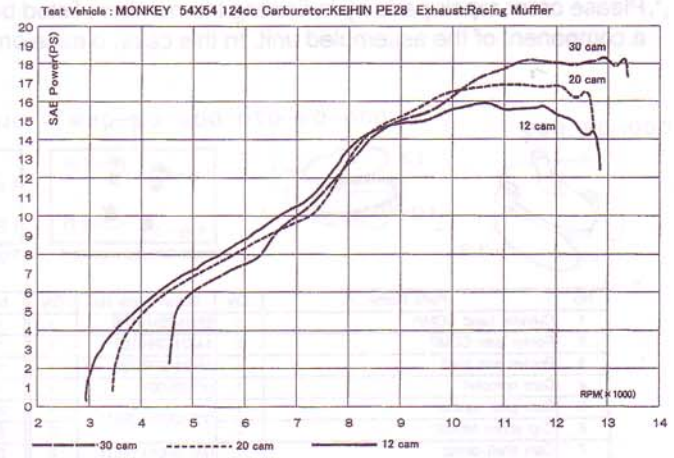


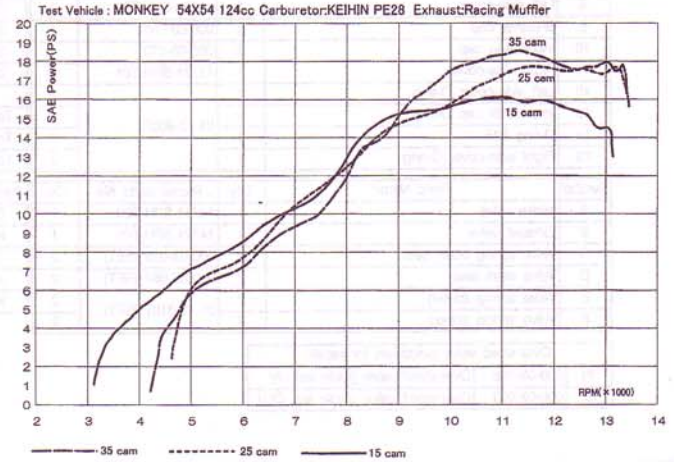


106 cc



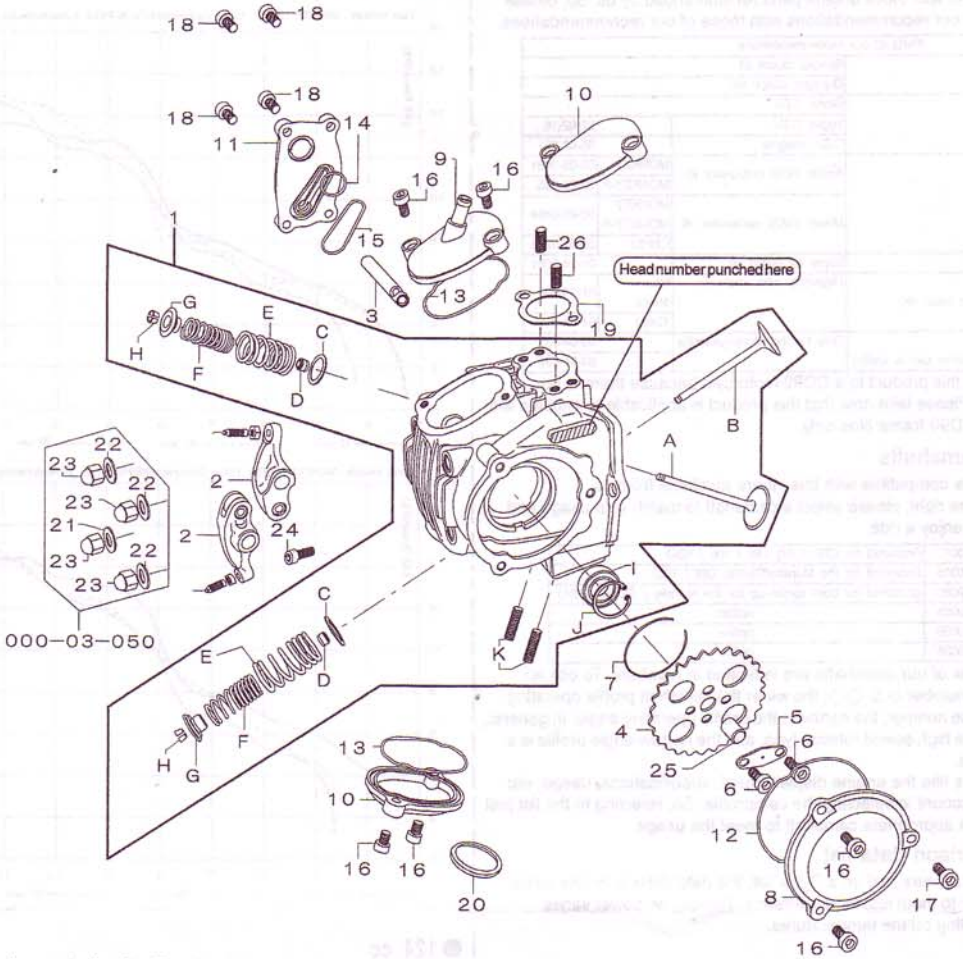
124 cc



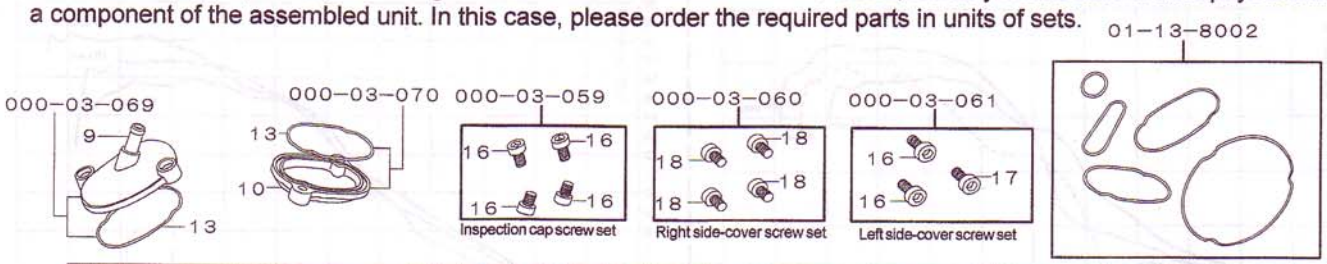


Oct./25/'06

~ Kit Contents ~



∴Please order repair parts by indicating the numbers listed below. In some cases, we may not be able to accept your orders for a component of the assembled unit. In this case, please order the required parts in units of sets.



No.	Parts Name	Qty	Repair parts No.	Qty
1	Cylinder head COMP.	1	SP/H-2SM-T000	1
2	Rocker arm COMP.	2	14431-SPH-T00	1
3	Rocker arm shaft	1	14451-SPR-T00	1
4	Cam sprocket	1	000-08-003	1
5	Cam gear washer	1	000-03-063 (SET)	1
6	Cap screw M5x12	2		2
7	Cam shaft circlip	1	000-08-010 (SET)	3
8	Left side-cover	1	11134-SPH-T00	1
9	Breather cap	1	000-03-069	1
10	Inspection cap	2	000-03-070	1
11	Right side-cover	1	11121-SPH-T01	1
12	Left side-cover O-ring	1	01-13-8002	3
13	Inspection cap O-ring	2		3
14	O-ring S15	1		6
15	Right side-cover O-ring	1		3

No.	Parts Name	Qty	Repair parts No.	Qty
16	Cap screw M5x15 (SUS)	6	000-03-059 (SET)	4
17	Cap screw M5x10 (SUS)	1	———	
18	Cap screw M5x12 (SUS)	4	000-03-060 (SET)	4
19	Manifold gasket	1	000-13-053 (SET)	3
20	Exhaust pipe gasket	1	000-13-046 (SET)	2
21	Copper sealing washer	1	000-03-052 (SET)	2
22	Sealing washer	3	———	
23	Cap nut M6	4	———	
24	Cap screw M6x18	1	BW-00-0008	4
25	Knock pin 8x12	1	000-03-092 (SET)	3
26	Socket set screw M6x15	2	000-03-062 (SET)	2
	Aluminum Special(the heat-resistant lubricating agent)(5 g)	1	00-01-0001	1
Tool	L-shaped wrench 3 mm	1	———	
Tool	L-shaped wrench 4 mm	1	———	
Tool	L-shaped wrench 5 mm	1	———	

Symbol	Parts Name	Qty	Repair parts No.	Qty
A	Intake valve	1	14711-SPH-T00	1
B	Exhaust valve	1	14721-SPH-T00	1
C	Valve spring outer seat	2	000-03-055 (SET)	2
D	Valve stem seal	2	000-03-064 (SET)	2
E	Valve spring (outer)	2	01-12-0101 (SET)	2
F	Valve spring (inner)	2		2

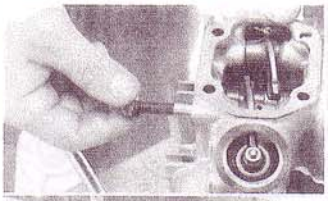
Symbol	Parts Name	Qty	Repair parts No.	Qty
G	Valve spring retainer	2	01-12-084 (SET)	2
H	Valve cotter	4	000-03-056 (SET)	4
I	Radial ball bearing	2	000-03-058 (SET)	1
J	C-shaped ring	1		1
K	Stud bolt 6x32	2	000-03-057 (SET)	2

Over-sized valve guide set for repair		
IN	000-03-098	Over-sized valve guide set, IN
EX	000-03-099	Over-sized valve guide set, OUT

SPECIAL PARTS TAKEGAWA
3-5-16 Nishikiorihigashi Tondabayashi Osaka Japan
TEL : 81-721-25-1357 FAX : 81-721-24-5059 URL : http://www.takegawa.co.jp

～Cylinder Head Installation Procedures～

○ Removethe rocker arm shaft and adjusting bolts and nuts on the original cylinder head.

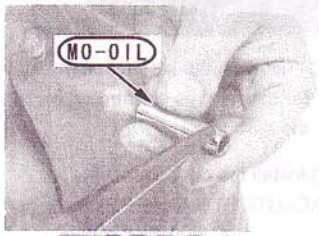


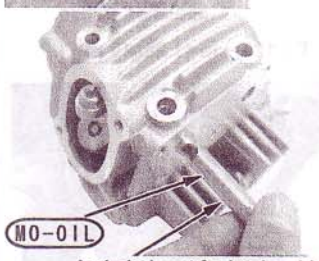
○ Apply engine oil to the removed adjusting bolts, and fixthese bolts to rocker arms of the kit.

○ Fix the rocker arms to the Super Head.

Apply molybdenum solution to the original rocker arm shaft, and fix it on the exhaust side.

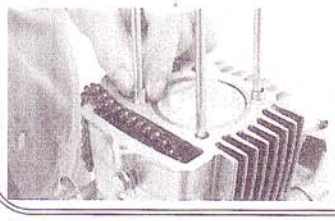
Apply molybdenum solution to a rocker arm shaft of the kit as well, and fix it with its slit part pointing to the cam chain side.





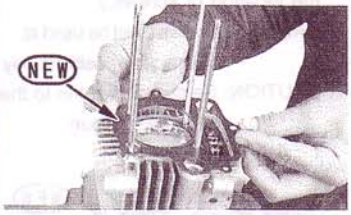
Included part for intake side

○ Fix 8x14 dowel pins of the kit into the dowel pin holes on the cylinder.

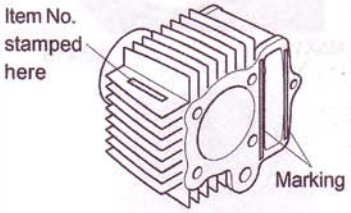


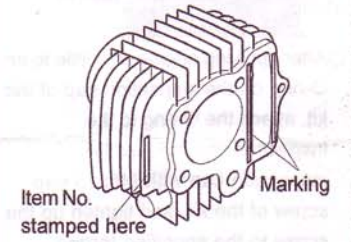
○ Thoroughly degrease the upper surface of the cylinder.

○ In the case of a V, H or S (for SCUT) cylinder, attach a cylinder head gasket.



Note: These cylinders have a marking on the cylinder head surface or its Item No. is stamped on the fin side.



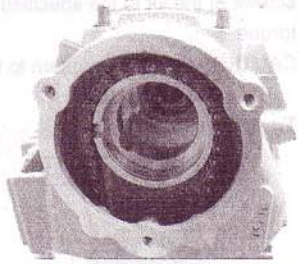


○ In the case of a cylinder with no Item No. or stamped marking or a supplied cylinder coming with a green rubber gasket, attach a cylinder head gasket, black rubber packing and green rubber gasket.

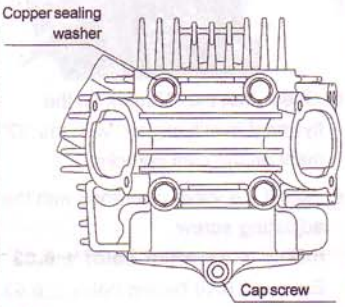
The above applies only to the old-type cylinder kits.

○ Set the piston at the top dead center position, and install the cylinder head.

○Fix the cam chain so it will not fall into the crankcase.



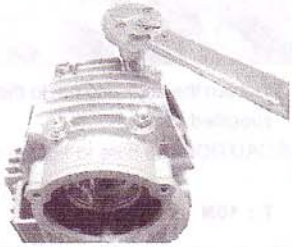
○ After applying Aluminum Special a little to the threaded part of the cylinder head stud bolts, fix a copper washer of the kit to the lower-left part (oil line) and washers of the kit to other parts. Then fix four cap nuts of the kit and M6x18 cap screws as indicated in the figure below, and loosely tighten them.



○ Tighten nuts on the stud bolt diagonally to the specified torque in a few steps.

⚠CAUTION : Be sure to tighten to the specified torque.

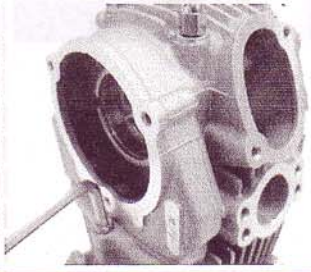
T : 12N · m (1.2kgf · m)



○ Tighten the side bolt on the cylinder side and the cap screws on the cylinder head side to the specified torque.

⚠CAUTION : Be sure to tighten to the specified torque.

T : 12N · m (1.2kgf · m)

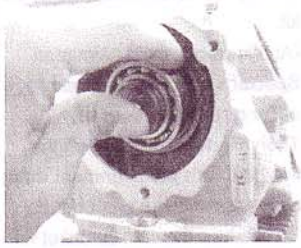


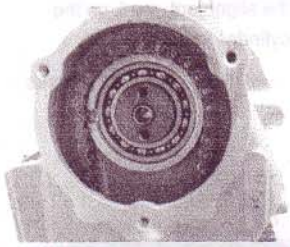
○ Tighten a cam chain guide roller of the cylinder to the specified torque.

⚠CAUTION : Be sure to tighten to the specified torque.

T : 10N · m (1.0kgf · m)

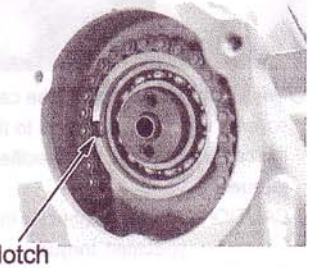
○ Apply engine oil to a bearing on the camshaft COMP., which please fit to a cylinder head. And put a provided 8x12 dowel pin into the center hole in the camshaft.





○ Fix a cam shaft circlip of the kit, and fix the cam shaft.

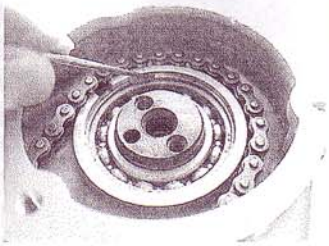
At this stage, set the location of ring end gap of the circlip not to meet the notch on the cylinder head cam hole.



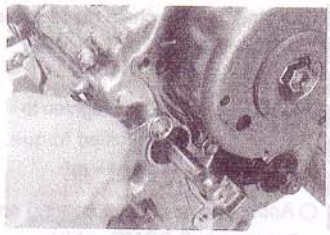
Notch

○Check that the circlip is right in the circlip groove.

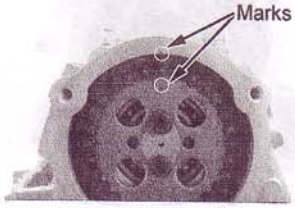
⚠Warning : Do the checking without fail.

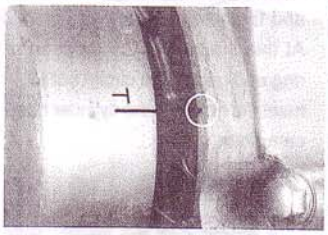


○ Remove the side bolt on the cam chain tensioner.



○ Attach the cam chain to the cam sprocket, and fix them with a cam sprocket plate and two M5x12 (black) cap screws included in the kit.
(At this point, apply Aluminum Special a little to the threaded parts of the cap screws.)
Then align the "T" mark on the flywheel with the alignment mark on the crank case, and align an "O" mark on the cam sprocket with the alignment mark on the cylinder head.





○Holding the crank, tighten the cap screws, which are attached to fix the cam sprocket, to the specified torque.

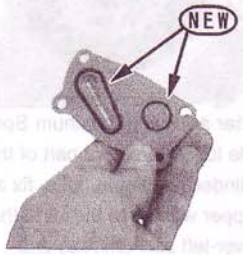
⚠CAUTION: Be sure to tighten to the specified torque.

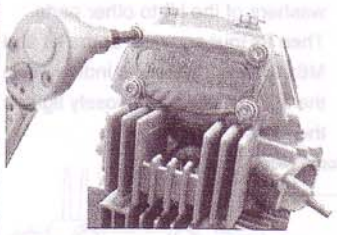
T : 10N · m (1.0kgf · m)

○ Apply engine oil a little to two kinds of O-rings for the right side cover, and fix them to the right side cover. Then tighten them with M5x12 cap screws of the kit to the specified torque.

⚠CAUTION: Be sure to tighten to the specified torque.

T : 6N · m (0.6kgf · m)





○ Check that the "T" mark on the flywheel is still aligned with the "O" mark on the cam sprocket.

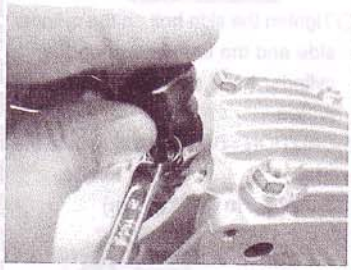
○ Adjust the valve clearance with the adjusting screw.

Intake : 0.08(when cold) ± 0.03
Exhaust : 0.10 (when cold) ± 0.03

○Tighten the adjusting nut to the specified torque.

⚠CAUTION: Be sure to tighten to the specified torque.

T : 10N · m (1.0kgf · m)

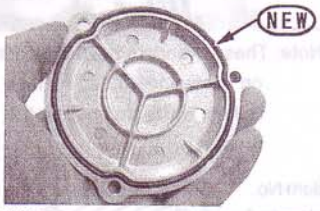


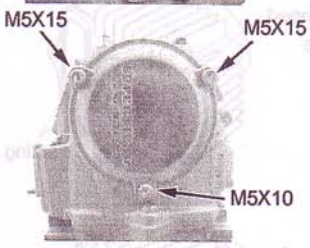
○Apply engine oil a little to a left-side-cover O-ring of the kit, and fix it to the left side cover. Then fix them to the cylinder head with two M5x15 cap screws and with a M5x10 cap screw of the kit and tighten them to the specified torque. (Be careful of the location of screws.)

⚠CAUTION: Screws must be used at the specified positions only.

⚠CAUTION: Be sure to tighten to the specified torque.

T : 6N · m (0.6kgf · m)





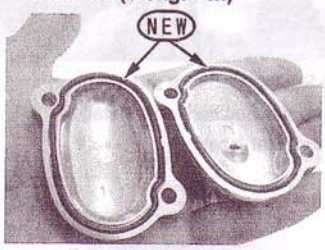
○After applying engine oil a little to an O-ring on the inspection cap of the kit, attach the O-ring to the inspection cap, and fix the inspection cap with M5x15 cap screw of the kit, and tighten up the screw to the specified torque.

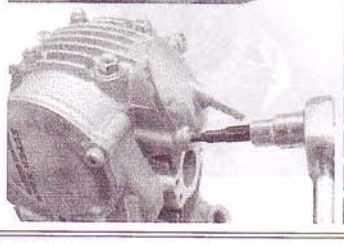
● In case a breather cap is used:

○ Apply engine oil a little to insection cap O-rings of the kit, and fix them to the breather cap and the inspection cap. Then fix and tighten the breather cap on the intake side and the inspection cap on the exhaust side with M5x15 cap screws of the kit to the specified torque.

⚠CAUTION: Be sure to tighten to the specified torque.

T : 6N · m (0.6kgf · m)

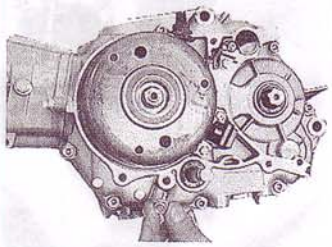




○ Pour engine oil from the side bolt hole in the cam chain tensioner, and tighten the side bolt.

⚠CAUTION: Be sure to tighten to the specified torque.

T : 8N · m (0.8kgf · m)



○ With reference to the service manual, mount the engine on the frame.

⚠CAUTION: Be sure to follow the instructions in the manual.

○ Install socket cap screws of the kit to two taps on the cylinder head ports which will not be used for manifold installation, and tighten them to the specified torque.

⚠CAUTION: Be sure to tighten to the specified torque.

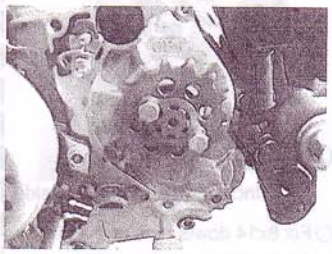
T : 5N · m (0.5kgf · m)

○ Following the instruction manual for the relative carburetor, install the carburetor.

○ Install the drive sprocket.

⚠CAUTION: Be sure to tighten to the specified torque.

T : 12N · m (1.2kgf · m)

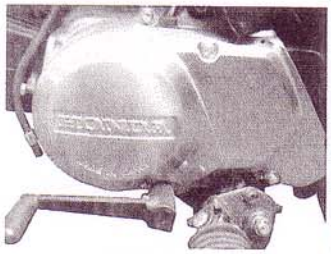


○ Install the generator cover.

⚠CAUTION: Be sure to tighten to the specified torque.

T : 7～11N・m

(0.7～1.1kgf・m)



○ Add engine oil in amount specified by the clutch kit you use.

○ With reference to the service manual, attach the drive chain.

☆ In the case of a three-point support crank shaft (3B) kit, fix a generator cover according to crank-kit installation instructions.

○ In case you use a breather cap, fix a breather hose according to oil-catch-tank installation instructions.

∴ In case you use a breather cap, fix a breather hose according to oil-catch-tank installation instructions.

・Item No. for a blade hose set (1 m, with clips)
: 000-03-054

☆ Engine Starting ☆

○ Check that the ignition key and the fuel cock are turned OFF.

○ Continue kicking the starter for a while to circulate the engine oil all around the engine.

○ Install the spark plug. Apply Aluminum Special a little to the threaded part of the plug, and fix it.

⚠CAUTION: Be sure to tighten to the specified torque.

○Attach the plug cap to the spark plug.

○ Wipe off the dirt and dust on the engine.

○ Turn ON the fuel cock and ignition key, and start the engine.

⚠WARNING: Work only in a well-ventilated place.

○ Check for any abnormality such as an abnormal sound.

○ If nothing abnormal is detected, carry out a shakedown for about 30 to 50 km, and check the valve clearance again.

⚠CAUTION: Work only when the engine and the muffler are cool.

○ Carry out a shakedown again for about 100 to 150 km.

○ After the shakedown, double-check for any abnormality such as an abnormal sound and blow-by gas. (If any abnormality is detected, disassemble the engine again and check each section.)

⚠WARNING: Never re-use parts which cannot be re-used.

Super head+R / Instruction Manual for Cylinder Set

Exclusively for our Super Head +R

Item Nos : 01－04－8088H (88cc)
01－04－8106H (106cc)

- Thank you for purchasing one of our TAKEGAWA's products.
- This is a piston and cylinder set exclusively for Super Head+R of our own manufacture. In using this set, please strictly observe the following.
- We have designed the piston to be light in weight, and given molybdenum coating to the skirt for better comfortability.
- An M5 temperature sensor can be installed.

Please read the following instructions before installation.

◎ We do not take any responsibility for any accident or damage whatsoever arising from the use of the products not in conformity with the instructions in the manual.
◎ We shall be held free from any responsibility or compensation whatsoever for any glitch in parts other than ours if the glitch takes place after the installation and use of this product.
◎ If you make alterations to the products, we shall be held free from any guarantee of the products.
◎ This set is exclusively for Super Head+R of our TAKEGAWA's manufacture.
◎ This kit alone cannot function on its own. So, you are required to purchase a special cylinder head and recommended parts.
◎ In case these products are to be used in a stock crankcase, a portion where a sleeve is to be attached needs processing as the case may be. In this case, please process the crankcase carefully, referring to the installation procedures.
◎ This set is for exclusive use in CDI motorcycle, but is compatible only with a stock CDI and CDI of our own make.
◎ Please be informed that we shall be held harmless against any claim against us whatsoever arising out of use of the products in racing and the like.

⚠ Caution The following show the envisioned possibility of injuries to human bodies or property damages as a result of disregarding the following cautions.

- Since this kit is designed and developed for driving in closed races, do not use the kit for running on public roads.
- Work only when the engine and the muffler are cool. (Otherwise, you will burn yourself.)
- Prepare right tools for the work, and do the work in the proper and right way.(Otherwise, improper work could cause breakage of parts or injuries to yourself.)
- As some products and frames have sharp-pointed or protruding portions, please work with greatest care. (Otherwise, you will suffer injuries.)

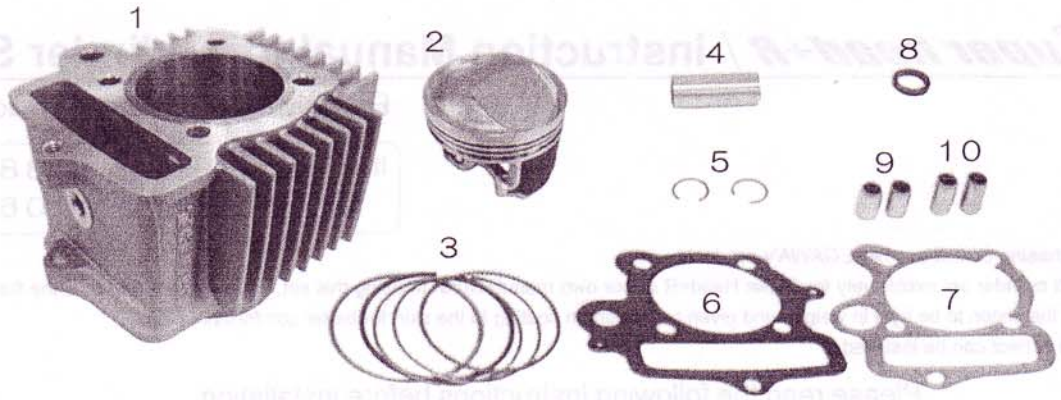
⚠ Warning The following show the envisioned possibility of human death or serious injuries to human bodies as a result of disregarding the following cautions.

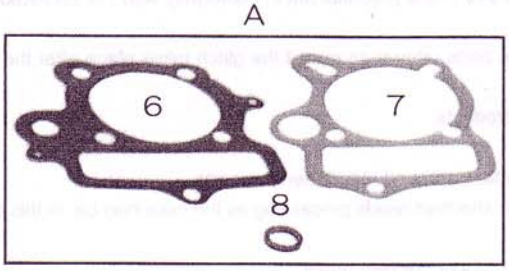
- Those who are technically unskilled or inexperienced are required not to do the work. (Improper installation due to unskilled technique or lack of knowledge could lead to parts breakage and consequently to accidents.)
- Always use new piston pin circlips, gaskets and packing. (Wear and damage to these parts are likely to cause parts breakage and accidents.)
- Before doing work, place the motorcycle on level ground to stablize the position of your motorcycle for safety's sake. (Otherwise, your motorcycle could overturn and injure you while you are working.)
- If you find damaged parts when checking and performing maintenance of your motorcycle, do not use these parts any longer, and replace them with new ones. The continued use of these damaged parts as they are could lead to accidents.)
- Always start the engine in a well-ventilated place, and do not start it in an airtight place. (Otherwise, you will suffer from carbon monoxide poisoning.)
- Before riding, always check every section for slack in parts like screws. If you find slack ones, screw them up securely to the specified torque. (Or improper torque may cause parts to come off, leading to accidents.)
- When you notice something abnormal with your motorcycle while riding down a road, immediately stop riding and park your motorcyle in a safe place. (Otherwise, the abnormaility could lead to accidents.)
- As gasoline is highly flammable, never place it close to fire. Make sure that nothing flammable is near the gasoline. (Otherwise, there will be a danger of causing fires.)
- Check or perform maintenance of parts correctly according to the procedures in the instruction manual or a service manual. (Improper checking or maintenance could lead to an accident.)
- Never use any other part than the specified parts. (Otherwise, there is a possibility of parts breakage, leading to accidents.)
- Always use a torque wrench to screw bolts and nuts tight and securely to the specified torque. (Otherwise, improper torque may result in the breakage or coming off of the bolts and nuts, leading to accidents.)
- As the accumulation of vaporized gasoline is at the high risk of explosion, work in a well-ventilated place.
- Always use high-octane gasoline. (Otherwise, troubles such as engine knocking may cause accidents.)

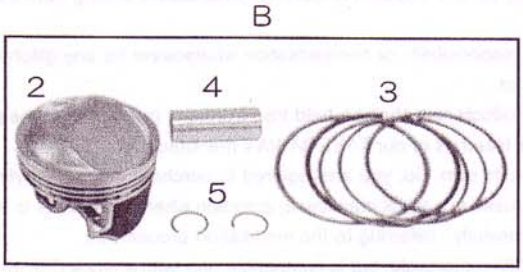
◎ Please be informed that the product specifications, design and prices are subject to change without prior notice.
◎ We shall be held free from any guarantee whatsoever of any trouble caused by the combined use of our products with parts not specified by us.
◎ This manual should be retained for future reference.

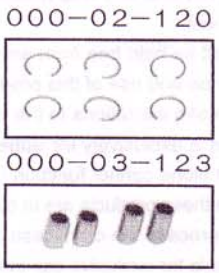
Oct./25/'06

～Kit Contents～









No.	Parts Name	Qty	Repair Parts Item No.		Qty
1	Aluminum cylinder	1	52mm	01-01-0241H	1
2	Piston	1	88cc	13101-2SM-T01 (for 88cc)	1
		1	106cc	13101-2SM-T01-L (for 106cc)	1
3	Piston ring set (top, 2nd, oil)	1	52mm	01-15-014	1
4	Piston pin	1	000-02-102		1
5	Piston pin circlips	2	000-02-120		6
6	Cylinder head gasket	1	12251-GFL-T20		1
7	Cylinder gasket	1	000-13-054		2
8	Rubber packing (black)	1	000-13-048		2
9	Dowel pins 8x12	2	000-03-123		2
10	Dowel pins 8x14	2			2

No.	Repair Parts Item No.		Parts Name
A	01-13-8003V		Gasket kit
B	88cc	01-02-8080	Piston kit
	106cc	01-02-8060	

∴ In placing repair parts order with us, please quote the Repair Parts Item Nos.
In some cases, we may not be able to accept your orders for the disassembled components of the above-mention assembled unit.
In this case, please order the components in units of a set component.

※ Composition and gasket shapes of the gasket kit differ depending on the kind of cylinder head and cylinder. Therefore, please always use the special gasket for the cylinder head or cylinder.

SPECIAL PARTS TAKEGAWA
3-5-16 Nishikiorihigashi Tondabayashi
Osaka Japan
TEL : 81-721-25-1357
FAX : 81-721-24-5059
URL : http://www.takegawa.co.jp

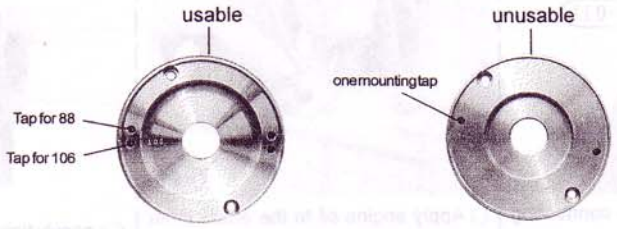
～Installation Procedures～

⚠ **Caution: Always be sure to tighten parts to the specified torque using a torque wrench.**

⚠ **Notice: The unskilled or those without proper knowledge are requested not to do the installation work.**

○The following show the products of our own make to which this kit cannot be installed.

◇ On the use of an old-type inner rotar CDI

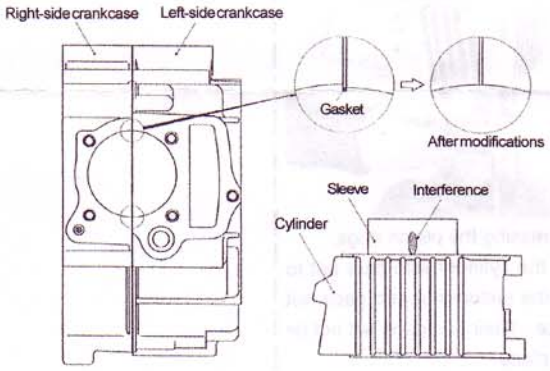


○ Some products involve detachment and installation of an engine and sepration of a crank case, etc. Do the installation work infallibly, following Honda's genuine parts service manual.

○ Referring to the service manual, detach the engine from the frame and disassemble it.

○ The product for Item No. 01-04-8124H (124cc) entails the boring of the crankcase. Please proces the boring of the crankcase referring to the attached sheet.

○ As for the products for Item Nos 01-04-8088 H(88cc) and 01-04-8106H (106cc), they do not entail the boring of the crankcases.
However, depending on the individual crankcases, the crankcase may interfere with the cylinder sleeve in some cases. In such a case, please modify the crankcase.

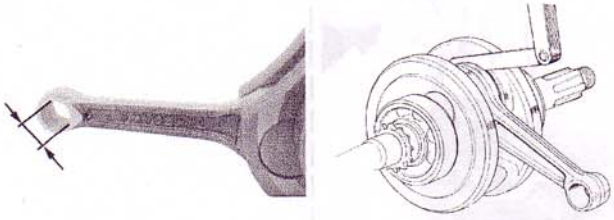


o Check every part.

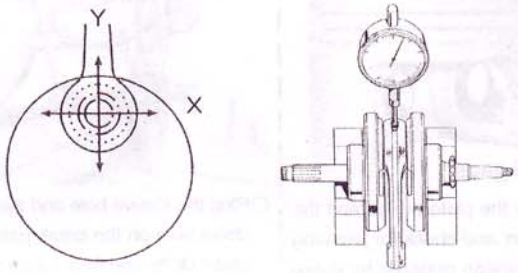
⚠Caution: Infallibly inspect every part and check consumable parts for damage and wear.

What to check:

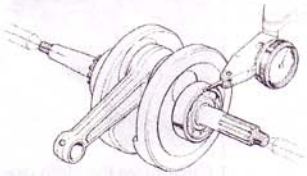
- Measure the internal diameter at the small end of the con'rod.
  ∴ If larger than 13.03 mm, replace it.
- Measure the clearance at the big end of the con'rod in the axial direction.
  ∴ If larger than 0.6mm, replace it.



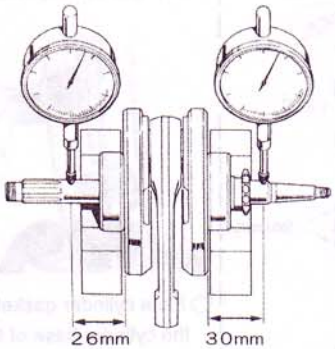
- Measure the misalignment at two points at the big end of the con'rod at right angles to the shaft as shown in the figure on the right.
  ∴ If larger than 0.05mm, replace it.



- Measure the misalignment on the journal bearing of the crank shaft.
  ∴ Shaft direction:If larger than 0.10 mm, replace it.
  Bearing direction: If larger than 0.05 mm, replace it.



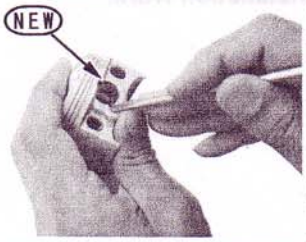
- Measure the deflection of the crank shaft.
  ∴ If larger than 0.10 mm, replace it.



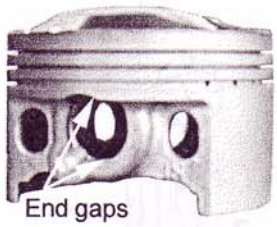
o Assemble the crank case referring to the service manual.

~ Cylinder Installation Procedures ~

○ Attach a piston pin circlip to one of two pin holes on the piston.

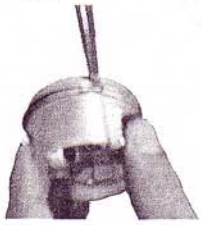


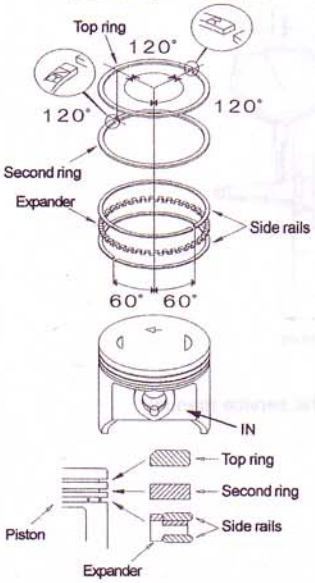
○Attach the piston pin circlip so the ring end gap does not meet with the notch on the piston pin hole, and it should be either on the top or at the bottom of the piston as illustrated in the fig. 1 below.



○ Air-blow the piston rings and the piston pin, and check for jamming of any foreign material by these parts.

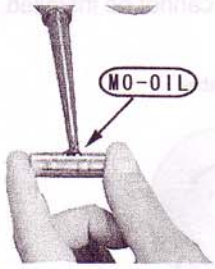
○Apply engine oil to grooves for piston rings, and, with reference to the figure below, fix piston rings and arrange the location of piston ring end gaps.



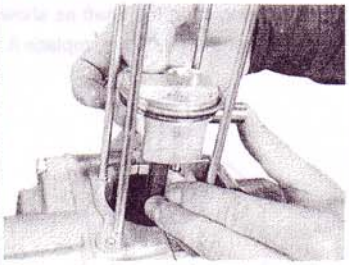


Pay attention to the cross section as well ! !

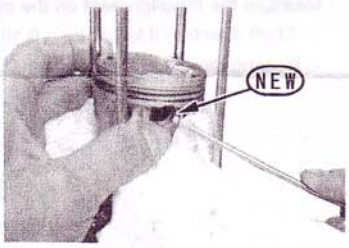
○ Apply molybdenum solution to the piston pin and the holes on the connecting rod small end.



○ Install the piston to the connecting rod so the IN mark on the piston faces the intake side.

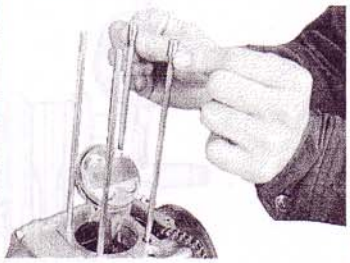


○Plug the sleeve hole and the cam chain hole on the crank case with a clean cloth, and fix a piston pin circlip.

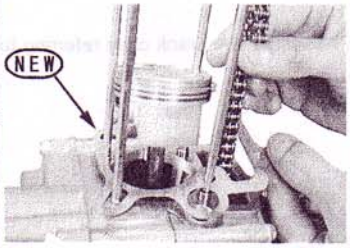


○Remove the cloth used to plug holes.

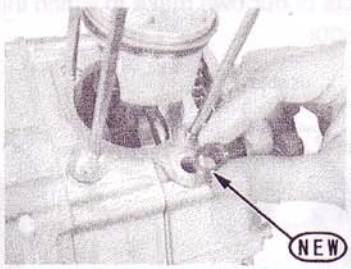
○ Degrease the cylinder base of the crankcase, and fix 8x12 dowel pins onto the dowel pin holes.



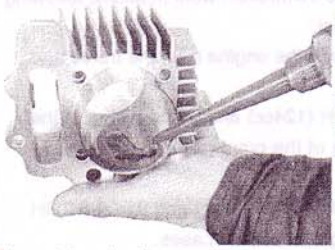
○ Fix a cylinder gasket of the kit into the cylinder base of the crankcase.



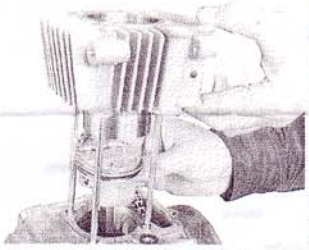
○ Fix a new rubber packing (black) of the kit onto the oil-return hole on the cylinder base of the crank case.



○ Apply engine oil to the entire inner surface of the aluminum cylinder bore.

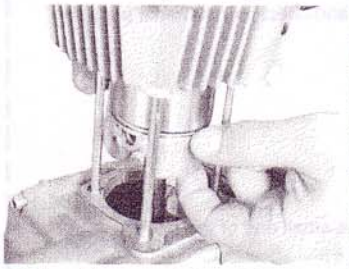


○Insert the aluminum cylinder into the stud bolts.

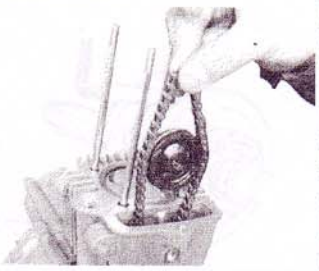


○ Compressing the piston rings, install the cylinder with care not to move the piston-ring end gaps out of place. Their end gaps will not be out of place.

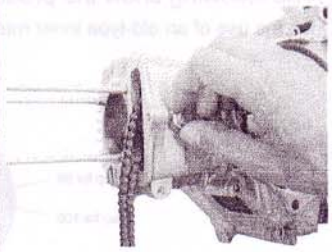
⚠CAUTION: Be careful not to damage the piston rings.



○ Place the cam chain guide roller on the cam chains.



○ Loosely tighten the cam chain guide roller and the cylinder side bolt.



○Loosely tighten an original hex bolt which holds the crank case on the cylinder side.

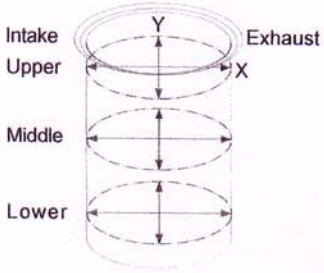
○ Install the cylinder head with reference to the instruction manual.

Reference Value List for Cylinder and Piston Maintenance

Item			Stock	Service limit	Remarks
Cylinder	Distortion		————	0.05 mm	Replace
	Internal diameter	φ52	52.012~52.050 mm	52.10 mm	Replace
		φ54	54.015~54.070 mm	54.10 mm	Replace
Piston	External diamter (7 mm from the hem of a skirt)	φ52	51.980~52.000 mm	51.96 mm	Replace
	(7 mm from the hem of a skirt)	φ54	53.980~54.000 mm	53.97 mm	Replace
	Internal diameter of a pin hole		13.002~13.008 mm	13.03 mm	Replace
External diameter of a piston pin			12.994~13.000 mm	12.98 mm	Replace
Piston ring end gap size		Top	0.15~0.38 mm	0.50 mm	Replace
		2nd	0.20~0.45 mm	0.50 mm	Replace
		Oil	0.20~0.70 mm	0.90 mm	Replace
Clearance between cylinder and piston			————	0.12 mm	Replace
Clearance between piston and pin			0.002~0.014 mm	0.05 mm	Replace

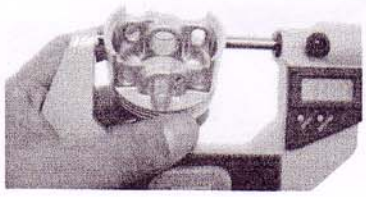
○ Inspection of Cylinder

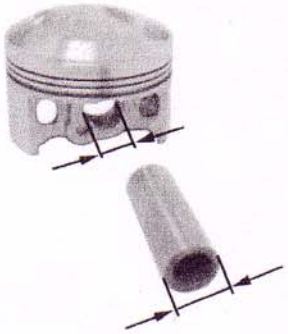
- Check the inside of cylinder for wear and damage.
- Measure the internal diameters of the cylinder bore at 6 positions; at the piston pin angle and at the right angle to it (X-Y) each at upper, middle and lower parts of the cylinder bore.
  Treat the largest value as its internal diameter.
  ∴ If larger than 52.10mm at φ 52, replace it.
  If larger than 54.10mm at φ 52, replace it.
  Calculate the clearance between a cylinder and a piston.



○ Inspection of Piston

- Clear the piston of the remaining carbon residue.
- Fit a piston ring into the piston, and measure the clearance between the piston ring and ring groove with a thickness gauge.
  ∴ If larger than 0.17mm, replace it.
- Check the piston for damages.
- Measure the external diameter of the piston at the specified place at the bottom edge of the piston skirt at the right angle to the piston holes.
  ∴ If smaller than 51.96mm at φ 52, replace it.
  If smaller than 53.97mm at φ 54, replace it.
- Measure the internal diameter of the piston pin hole.
  ∴ If larger than 13.03mm, replace it.
- Calculate the clearance between the piston and the piston pin.





○ Inspection of Piston Ring

- Press down a piston ring into the piston with the piston head, and measure the clearance of the ring-end gap at the horizontal position with a thickness gauge.
  ∴ Top and 2nd : If larger than 0.5mm, replace them.
  Oil : If larger than 0.9mm, replace it.