Kawasaki

Z250
KZ305

Jim Schmidt

Motorcycle Service Manual

Decimal Equivalents

INCH					MM INCH
1/64				.015625	
	1/32			.03125	1mm= .03937 inch
3/64				.046875	
		1/16		.0625	
5/64				.078125	2mm= .07874 inch
	3/32			.09375	
7/64				.109375	3mm= .11811 inch
			1/8	.125	
9/64				.140625	
	5/32			.15625	4mm= .15748 inch
11/64				.171875	
		3/16		.1875	5mm= .19685 inch
13/64				.203125	
	7/32			.21875	
15/64				.234375	6mm= .23622 inch
			1/4	.25	
17/64				.265625	7mm= .27559 inch
	9/32			.28125	
19/64				.296875	
		5/16		.3125	8mm= .31496 inch
21/64				.328125	
	11/32			.34375	9mm= .35433 inch
23/64				.359375	
			3/8	.375	
25/64				.390625	10mm= .39370 inch
	13/32			.40625	
27/64				.421875	11mm= .43307 inch
		7/16		.4375	
29/64				.453125	
	15/32			.46875	12mm= .47244 inch
31/64				.484375	
			1/2	.5	13mm= .51181 inch

INCH					MM INCH
33/64				.515625	
	17/32			.53125	
35/64				.546875	14mm= .55118 inch
		9/16		.5625	
37/64				.578125	15mm= .59055 inch
	19/32			.59375	
39/64				.609375	
			5/8	.625	16mm= .62992 inch
41/64				.640625	
	21/32			.65625	17mm= .66929 inch
43/64				.671875	
		11/16		.6875	
45/64				.703125	18mm= .70866 inch
	23/32			.71875	
47/64				.734375	19mm= .74803 inch
			3/4	.75	
49/64				.765625	
	25/32			.78125	20mm= .78740 inch
51/64				.796875	
		13/16		.8125	21mm= .82677 inch
53/64				.828125	
	27/32			.84375	
55/64				.859375	22mm= .86614 inch
			7/8	.875	
57/64				.890625	23mm= .90551 inch
	29/32			.90625	
59/64				.921875	
		15/16		.9375	24mm= .94488 inch
61/64				.953125	
	31/32			.96875	25mm= .98425 inch
63/64				.984375	
			1	1.	

Unit Conversion Table

cc	x	.0610	=	cu in
cc	x	.02816	=	oz (imp)
cc	x	.03381	=	oz (US)
cu in	x	16.39	=	cc
ft-lbs	x	12	=	in lbs
ft-lbs	x	.1383	=	kg-m
gal (imp)	x	4.546	=	litres
gal (imp)	x	1.201	=	gal (US)
gal (US)	x	3.7853	=	liters
gal (US)	x	.8326	=	gal (Imp)
grams	x	.03527	=	oz
in	x	25.40	=	mm
in lbs	x	.0833	=	ft-lbs
in lbs	x	.0115	=	kg-m
kg	x	2.2046	=	lbs
kg	x	35.274	=	oz
kg-m	x	7.233	=	ft-lbs
kg-m	x	86.796	=	in-lbs
kg/cm^2	x	14.22	=	lbs/in^2
km	x	.6214	=	mile
lb	x	.4536	=	kg
lb/in^2	x	.0703	=	kg/cm^2
litre	x	28.16	=	oz (imp)
litre	x	33.81	=	oz (US)
litre	x	.8799	=	qt (imp)
litre	x	1.0567	=	qt (US)
metre	x	3.281	=	ft
mile	x	1.6093	=	km
mm	x	.03937	=	in
oz (imp)	x	35.51	=	cc
oz (US)	x	29.57	=	cc
oz (weight)	x	28.35	=	grams
qt (imp)	x	1.1365	=	litre
qt (imp)	x	1.201	=	qt (US)
qt (US)	x	.9463	=	litre
qt (US)	x	.8326	=	qt (imp)
kg/cm^2	x	98.07	=	kPa
lbs/in^2	x	6.896	=	kPa
kPa	x	.1450	=	lbs/in^2

$°C \rightarrow °F: \frac{9\ (°C + 40)}{5} - 40 = °F$

$°F \rightarrow °C: \frac{5\ (°F + 40)}{9} - 40 = °C$

List of Abbreviations

ABDC	after bottom dead center
ATDC	after top dead center
BBDC	before bottom dead center
BDC	bottom dead center
BTDC	before top dead center
cc	cubic centimeters
cu in	cubic inches
ft	foot, feet
ft-lbs	foot-pounds
gal	gallon, gallons
hp	horsepower
in	inch, inches
in-lb	inch-pounds
kg	kilogram, kilograms
kg/cm^2	kilograms per square centimeter
kg-m	kilogram meters
km	kilometer
kph	kilometers per hour
lb, lbs	pound, pounds
lbs/in^2	pounds per square inch
ltr	liter, litre
m	meter, meters
mi	mile, miles
mm	milimeters
mph	miles per hour
oz	ounce, ounces
psi	pounds per square inch
qt	quart, quarts
rpm	revolutions per minute
sec	second, seconds
SS	standing start
TDC	top dead center
"	inch, inches
r/min	revolutions per minute
ℓ	liter, litre
kPa	kilo-Pascals

Kawasaki

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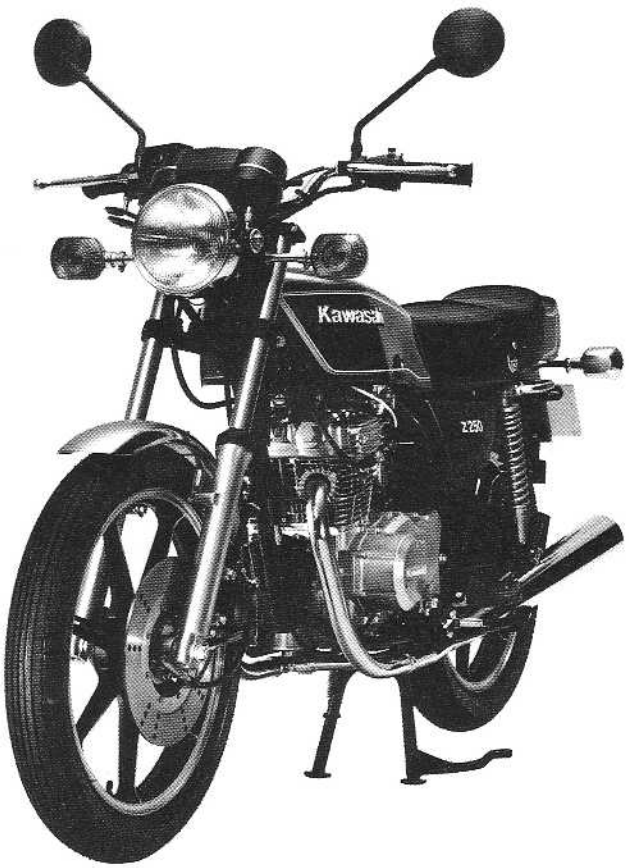


Motorcycle
Service Manual

Fourth Edition ① : Sep. 30, 1981 Ⓜ

EMISSION CONTROL INFORMATION

To protect the environment in which we all live, Kawasaki has incorporated two emission control systems in compliance with the applicable regulations of the United States Environmental Protection Agency.

1. Crankcase Emission Control System

   This system eliminates the release of crankcase vapors into the atmosphere. Instead, the vapors are routed through an oil separator to the intake side of the engine. While the engine is operating, the vapors are drawn into the combustion chamber, where they are burned along with the fuel and air supplied by the carburetors.

2. Exhaust Emission Control System

   This system reduces the amount of pollutants discharged into the atmosphere by the exhaust of this motorcycle. The fuel and ignition systems of this motorcycle have been carefully designed and constructed to ensure an efficient engine with low exhaust pollutant levels.

The Clean Air Act, which is the Federal law covering motor vehicle pollution, contains what is commonly referred to as the Act's "tampering provisions".

"Sec. 203(a) The following acts and the causing thereof are prohibited...

(3)(A) for any person to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this title prior to its sale and delivery to the ultimate purchaser, or for any manufacturer or dealer knowingly to remove or render inoperative any such device or element of design after such sale and delivery to the ultimate purchaser.

(3)(B) for any person engaged in the business of repairing, servicing, selling, leasing, or trading motor vehicles or motor vehicle engines, or who operates a fleet of motor vehicles knowingly to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this title following its sale and delivery to the ultimate purchaser..."

Note: The phrase "remove or render inoperative any device or element of design" has been generally interpreted as follows:

1. Tampering does not include the temporary removal or rendering inoperative of devices or elements of design in order to perform maintenance.

EMISSION CONTROL INFORMATION (CONT.)

2. Tampering could include:
   a. Maladjustment of vehicle components such that the emission standards are exceeded.
   b. Use of replacement parts or accessories which adversely affect the performance or durability of the motorcycle.
   c. Addition of components or accessories that result in the vehicle exceeding the standards.
   d. Permanently removing, disconnecting, or rendering inoperative any component or element of design of the emission control systems.

WE RECOMMEND THAT ALL DEALERS OBSERVE THESE PROVISIONS OF FEDERAL LAW, THE VIOLATION OF WHICH IS PUNISHABLE BY CIVIL PENALTIES NOT EXCEEDING $10,000 PER VIOLATION.

Foreword

This manual is designed primarily for use by motorcycle mechanics in a properly equipped shop, although it contains enough detail and basic information to make it useful to the motorcycle user who desires to carry out his own basic maintenance and repair work. Since a certain basic knowledge of mechanics, the proper use of tools, and workshop procedures must be understood in order to carry out maintenance and repair satisfactorily; the adjustments, maintenance, and repair should be carried out only by qualified mechanics whenever the owner has insufficient experience, or has doubts as to his ability to do the work, so that the motorcycle can be operated safely.

In order to perform the work efficiently and to avoid costly mistakes, the mechanic should read the text, thoroughly familiarizing himself with the procedures before starting work, and then do the work carefully in a clean area. Whenever special tools or equipment is specified, makeshift tools or equipment should not be used. Precision measurements can only be made if the proper instruments are used, and the use of substitute tools may adversely affect safe operation of the motorcycle.

Whenever you see the symbols shown below, heed their instructions! Always follow safe operating and maintenance practices.

WARNING **This warning symbol identifies special instructions or procedures which, if not correctly followed, could result in personal injury, or loss of life.**

CAUTION **This caution symbol identifies special instructions or procedures which, if not strictly observed, could result in damage to, or destruction of equipment.**

"**NOTE**" indicates points of particular interest for more efficient and convenient operation.

This manual is divided into the following chapters:

(1) Adjustment

The adjustment chapter gives the procedure for all adjustments which may become necessary periodically and which do not involve major disassembly.

(2) Disassembly

This chapter shows the best method for the removal, disassembly, assembly, and installation which are necessary for maintenance and repair. Do not disassemble the component parts further than explained here. Since assembly and installation are usually the reverse of disassembly and removal, assembly and installation are not explained in detail in some cases. Instead, assembly notes and installation notes are provided to explain special points.

In cases the removal procedures are apparent without explanation such as for the seat or side stand, no information is given.

(3) Maintenance

The procedures for inspection and repair are described in detail in this chapter.

(4) Appendix

The appendix in the back of this manual contains miscellaneous information, including a special tool list and a wiring diagram.

(5) Supplement

The maintenance and repair procedures, that are unique to later year units since the first publication of the Service Manual, are explained in this chapter per one year unit.

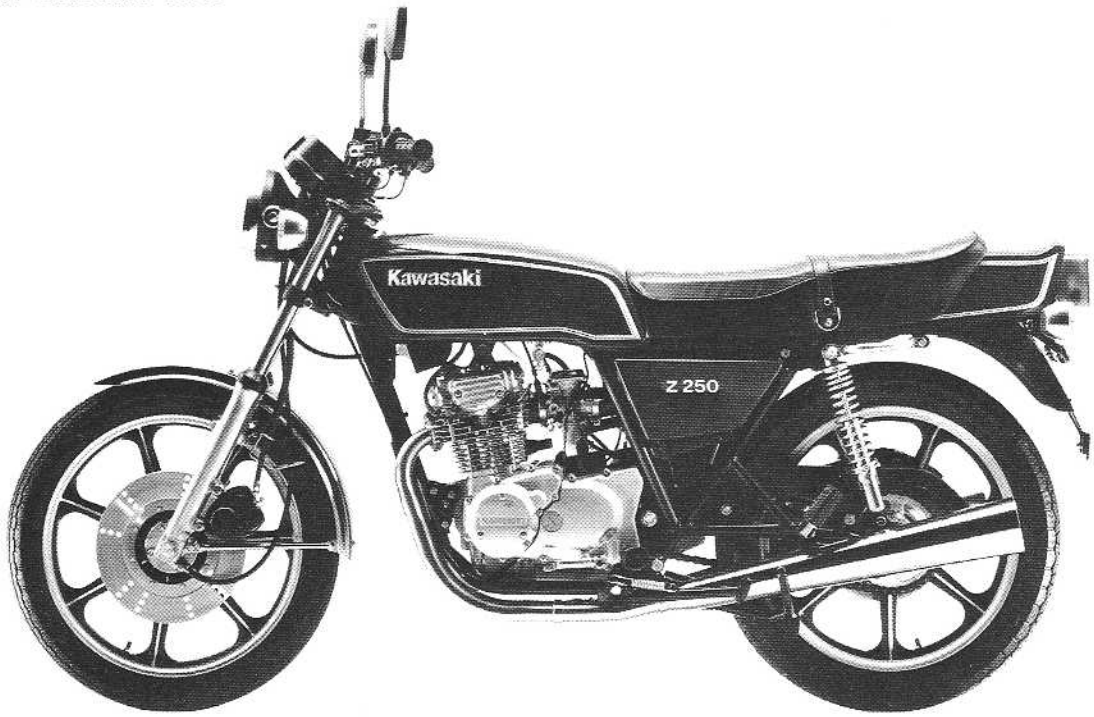
Since the Service Manual is based on the first production units of the 1979 Z250-A1, there may be minor discrepancies between some vehicles and the illustrations and text in this manual. Explanations on major changes and additions pertaining to later year units will be added in the end of the supplement by a new edition, as required.

QUICK REFERENCE GUIDE

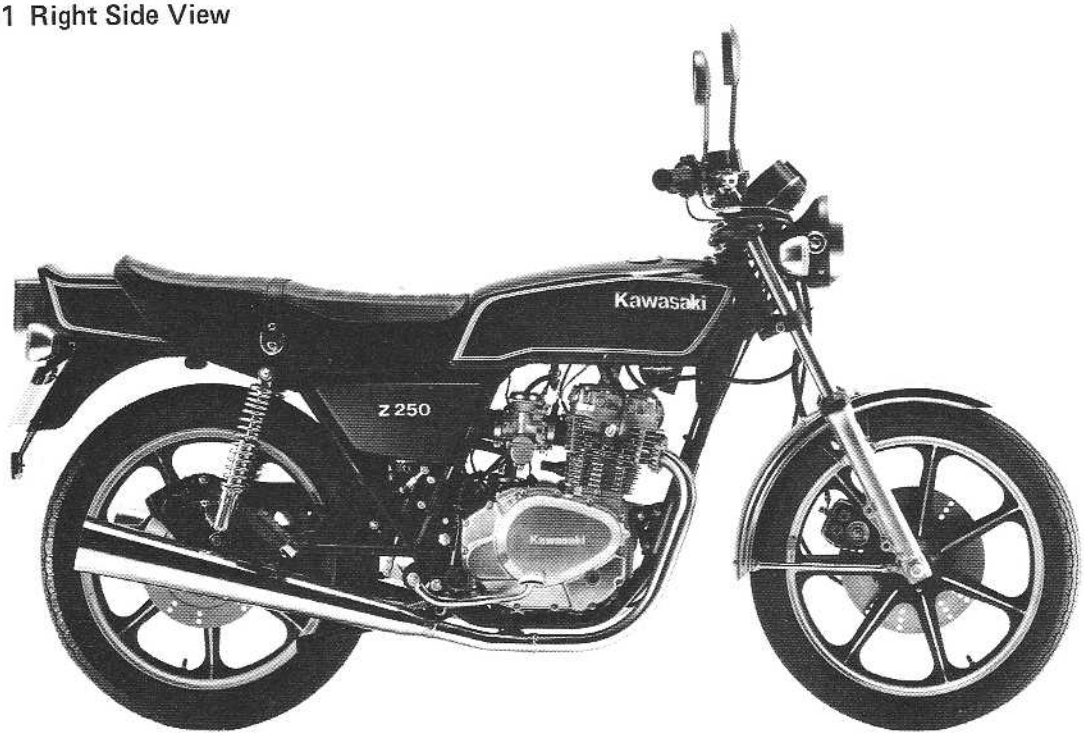
To use, bend the manual back and match the desired section below against the black spot showing at the edge of these pages. ➡

Model Identification

Z250-A1 Left Side View



Z250-A1 Right Side View



A

Specifications

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SPECIFICATIONS

		Z250-A1, A2
Dimensions		
Overall length		2,020 mm, (UK) 2,015 mm, (E) (A) 2,060 mm
Overall width		760 mm, (E) 740 mm
Overall height		1,085 mm, (E) 1,070 mm
Wheelbase		1,340 mm
Road clearance		145 mm, (E) 140 mm
Dry weight		153 kg
Fuel tank capacity		13.6 ℓ
Performance		
Climbing ability		25°
Braking Distance		12.5 m from 50 kph
Minimum turning radius		2.2 m
Engine		
Type		SOHC 2 cylinder, 4 stroke, air cooled
Bore and stroke		55.0 x 52.4 mm
Displacement		248 cc
Compression ratio		9.5
Maximum horsepower		27 HP @10,000 rpm
Maximum torque		2.1 kg-m (15 ft-lbs) @8,500 rpm
Valve timing		
Inlet	Open	21° BTDC
	Close	59° ABDC
	Duration	260°
Exhaust	Open	61° BBDC
	Close	19° ATDC
	Duration	260°
Carburetors		Keihin CV32 x 2
Lubrication system		Forced lubrication (wet sump)
Engine oil		SE class SAE 10W40, 10W50, 20W40 or 20W50
Engine oil capacity		1.8 ℓ
		1.5 ℓ (without filter change)
Starting system		Electric starter
Ignition system		Battery and coil
Ignition timing		From 10° BTDC @1,250 rpm to 40° BTDC @3,000 rpm
Spark plugs		NGK D8EA or ND X24ES-U
		(E) NGK DR8ES or ND X24ESR-U
Transmission		
Type		6-speed, constant mesh, return shift
Clutch		Wet, multi disc
Gear ratio: 1st		2.60 (39/15)
2nd		1.79 (34/19)
3rd		1.41 (31/22)
4th		1.16 (29/25)
5th		1.00 (27/27)
6th		0.89 (25/28)

Primary reduction ratio	3.74 (71/19)
Final reduction ratio	2.33 (35/15)
Overall drive ratio	7.79 (@Top gear)

Electrical Equipment

Alternator Rated Output	13.5 amp. @8,000 rpm, 14V
Regulator/Rectifier	Shindengen SH221-12
Ignition coil	Toyo denso ZC003-12V
Battery	Yuasa YB10L-A2 (12V 10AH)
Starter	Mitsuba SM-725-I
Headlight type	Semi-sealed
Headlight	12V 50/40W, (E) 12V 35/35W, (F) 12V 36/36W
Tail/Brake light	12V 8/27W, (E) (A) 12V 5/21W
City light	12V 3W, (E) 12V 4W
Turn signal lights	12V 23W, (E) 12V 21W
Meter lights	12V 3.4W
Indicator lights	12V 3.4W
Horn	12V 2A

Frame

Type		Tubular, single cradle
Steering angle		40° to either side
Castor		27°
Trail		100 mm
Tire size	Front	3.00S-18 4PR
	Rear	3.50S-18 4PR
Suspension	Front	Telescopic fork
	Rear	Swing arm
Wheel travel	Front	150 mm
	Rear	98 mm
Front fork oil capacity (each fork)		150 cc
Front fork oil type		SAE 5W20

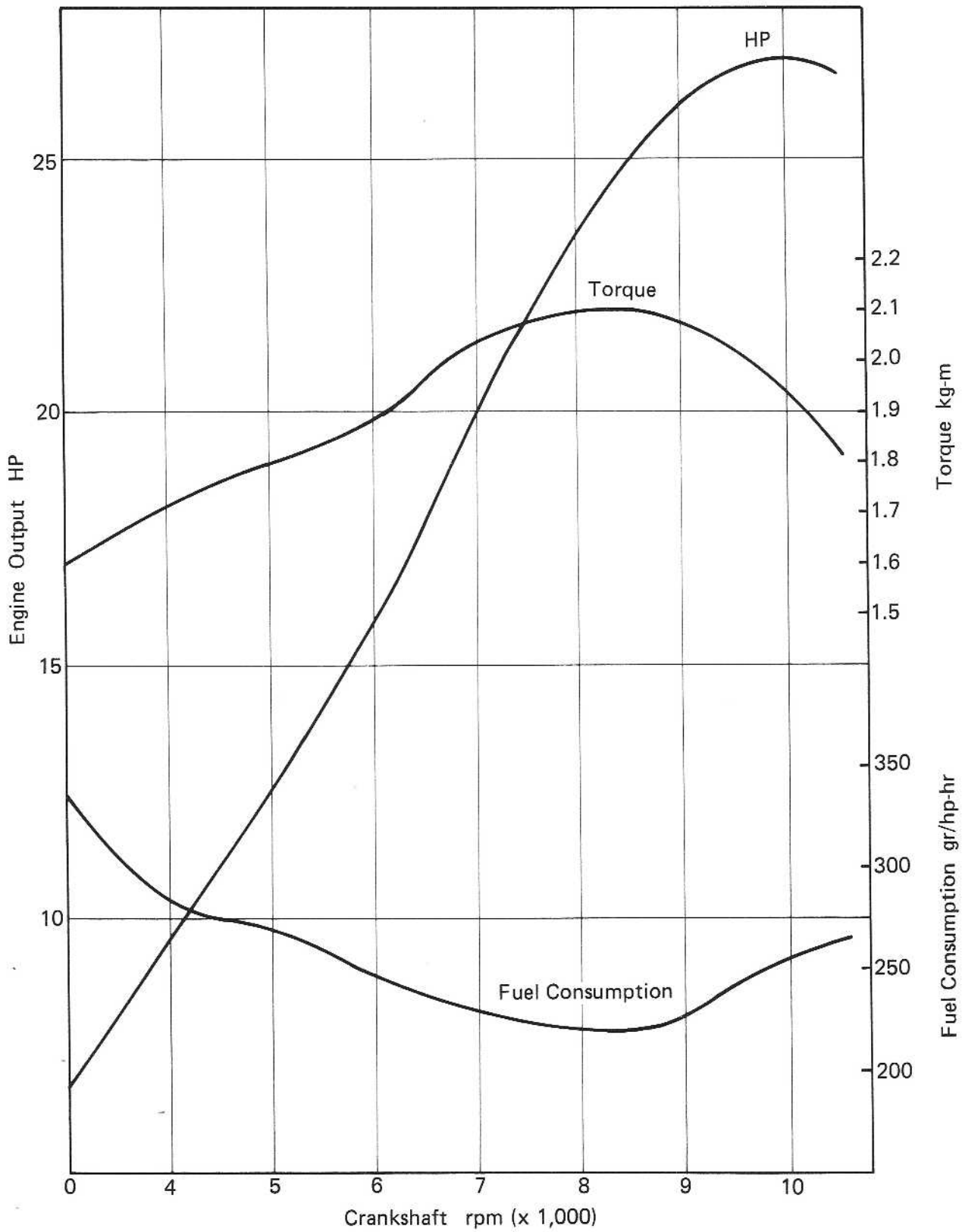
Brakes

Type	Front and Rear	Disc brake
Effective disc diameter	Front	230 mm
	Rear	218 mm

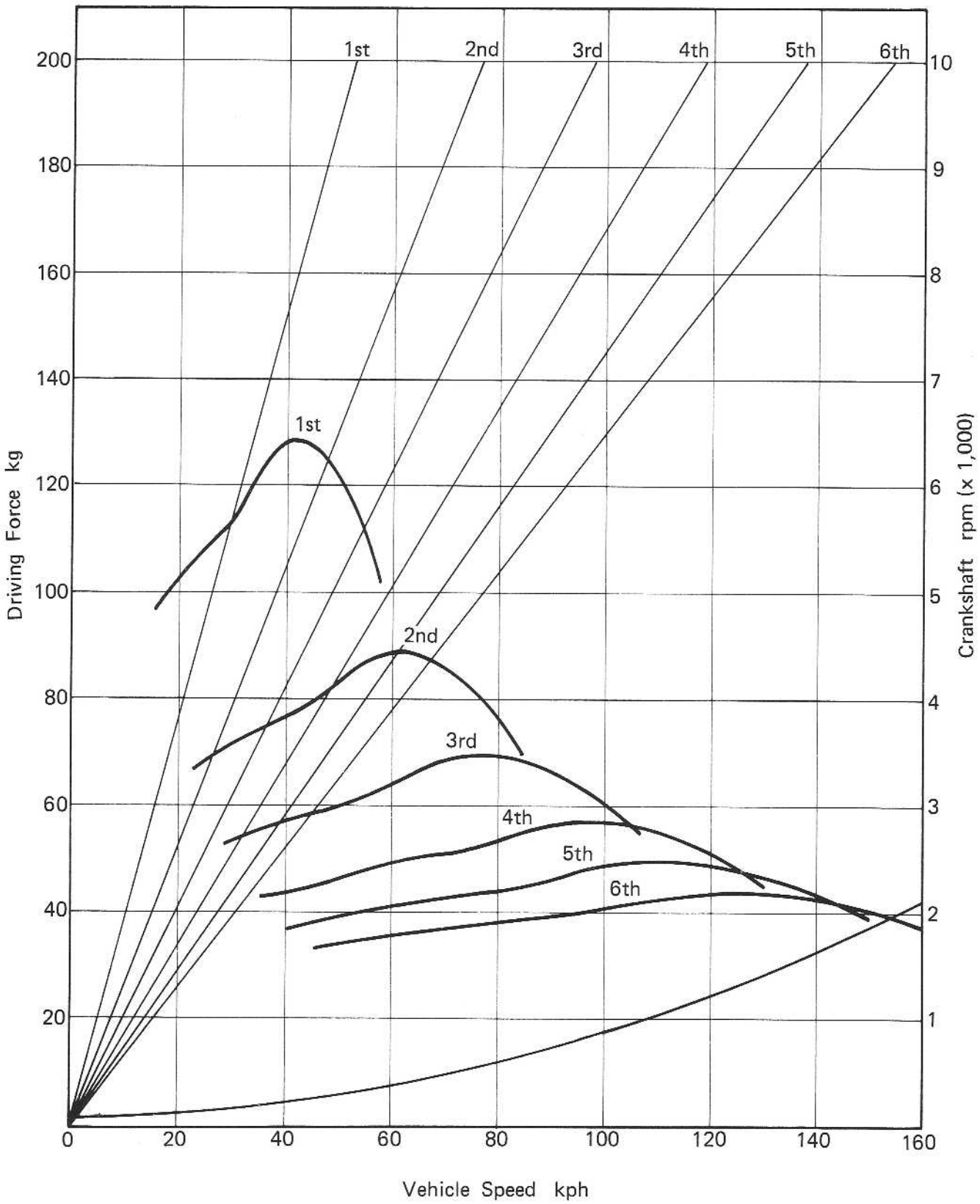
(E) : European model, (EI) : European model except Italian model, (F) : French model,
(UK) : U.K. model, (A) : Australian model

Specifications subject to change without notice, and may not apply to every country.

ENGINE PERFORMANCE CURVES (Z250-A1 ~ A4)



RUNNING PERFORMANCE CURVES (Z250-A1 ~ A4, B1 ~ B3)



PERIODIC MAINTENANCE CHART (Z250-A1, A2)

OPERATION \ FREQUENCY	Whichever comes first ➡ / Every ⬇	ODOMETER READING * km 800	5,000	10,000	15,000	20,000	25,000	30,000	See Page
Battery electrolyte level — check †	month	•	•	•	•	•	•	•	156
Brake adjustment — check †		•	•	•	•	•	•	•	25
Brake wear — check †			•	•	•	•	•	•	145~150
Brake fluid level — check †	month	•	•	•	•	•	•	•	145
Brake fluid — change	year			•		•		•	145
Clutch — adjust		•	•	•	•	•	•	•	20
Carburetors — adjust		•	•	•	•	•	•	•	18
Throttle cables — adjust		•	•	•	•	•	•	•	17
Steering play — check †		•	•	•	•	•	•	•	26
Drive chain wear — check †			•	•	•	•	•	•	144
Front fork — inspect/clean		•	•	•	•	•	•	•	151
Rear shock absorbers — inspect		•	•	•	•	•	•	•	24
Nuts, Bolts, Fasteners — check and torque		•		•		•		•	34
Spark plugs — clean and gap †		•	•	•	•	•	•	•	12
Camshaft chain — adjust		•	•	•	•	•	•	•	16
Points, timing — check †		•	•	•	•	•	•	•	12
Valve clearance — check †		•	•	•	•	•	•	•	16
Air cleaner element — clean			•		•		•		115
Air cleaner element— replace	5 cleanings		•		•		•		115
Fuel system— clean		•	•	•	•	•	•	•	22
Tire tread wear — check †			•	•	•	•	•	•	140
Engine oil — change	year	•	•	•	•	•	•	•	22
Oil filter — change		•		•		•		•	22
General lubrication — perform			•	•	•	•	•	•	29
Front fork oil — change				•		•		•	152
Timing advancer — lubricate				•		•		•	162
Swing arm — lubricate				•		•		•	30
Wheel bearings — grease	2 years					•			143
Speedometer gear housing — grease	2 years					•			89
Steering stem bearings — grease	2 years					•			150
Drive chain — lubricate	Every 300 km								144
Drive chain — adjust	Every 800 km								24

*For higher odometer readings, repeat at the frequency interval established here.
†Replace, add or adjust if necessary.

Adjustment–Engine

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B

SPARK PLUGS

Neglecting the spark plugs eventually leads to difficult starting and poor performance. During normal operation, the electrodes gradually burn away and carbon builds up along the insulator. In accordance with the Periodic Maintenance Chart (Pg. 10), the plugs should be removed for inspection, cleaning, and to reset the gaps.

- Remove the spark plugs using a spark plug wrench.
- Clean the spark plugs, preferably in a sand-blasting device, and then clean off any abrasive particles. The plug may also be cleaned using a hgh flash-point solvent and a wire brush or other suitable tool. If the spark plug electrodes are corroded or damaged, or if the insulator is cracked, replace the plug. Use the standard plug or its equivalent.
- Measure the spark plug gaps with a thickness gauge. If the gap is incorrect, carefully bend the side electrode with a suitable tool to obtain the correct gap.

Spark Plug Gap

B1

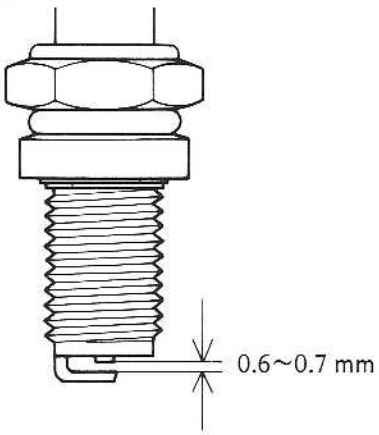


Table B1 Spark Plugs

Type	NGK D8EA or ND X24ES-U (EI) NGK DR8ES or ND X24ESR-U
Gap	0.6~0.7 mm
Tightening Torque	2.0 kg-m (14.5 ft-lbs)

(EI) : European model except Italian model

- Screw the spark plugs into the cylinder head and tighten them to the specified torque. Connect the spark plug leads.

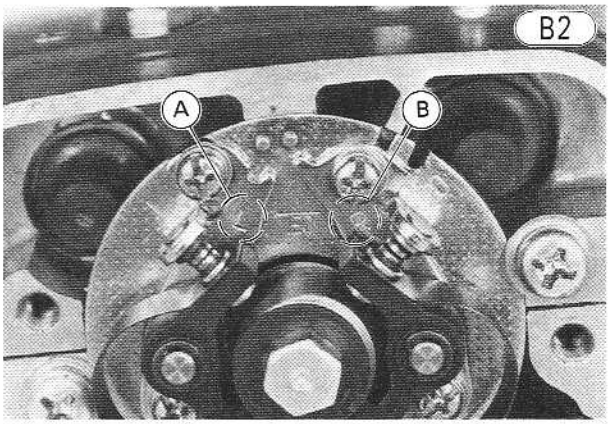
NOTE: Refer to the electrical maintenance section, Pg. 163, for detailed spark plug information.

IGNITION TIMING

Incorrect ignition timing can cause poor performance, knocking, overheating, and serious engine damage. Periodic adjustment will be necessary to compensate for wear of parts, and the ignition timing must be checked whenever ignition related parts have been disassembled or replaced.

Correct ignition timing is achieved by first obtaining the correct contact breaker point gap (this can also be achieved by adjusting the dwell angle to the specified amount) and then changing the position of the contact breaker mounting plate. Setting the points often returns the timing very close to the correct setting. Once the timing has been adjusted, it may be checked for accuracy by the use of a strobe light.

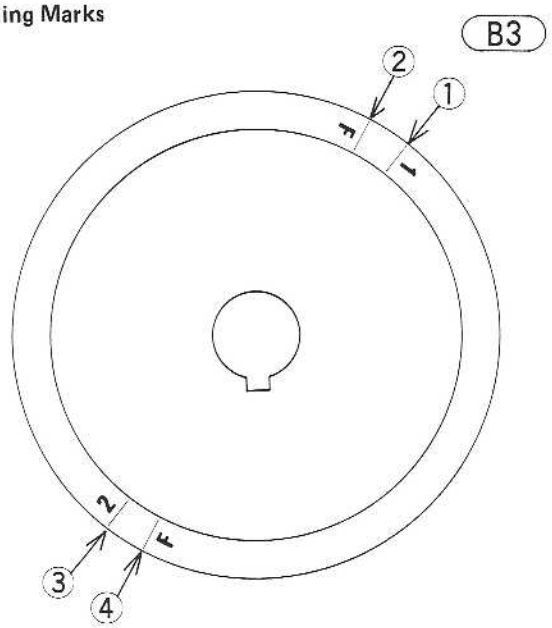
There are two sets of contact breaker points: the left set marked "L" fires the spark plug on the left, and the right set marked "R" fires the spark plug on the right 180° later. The gap for each set of points must be adjusted separately.



A. L Mark **B. R Mark**

There are two sets of timing marks on the rotor. One set marked "1" or "L" is for timing the left cylinder, and the other set marked "2" or "R" is for timing the right cylinder. The "F" mark of each set is for checking the timing before advancing, and the "advanced timing marks" (a pair of lines) are for checking the timing after it has advanced.

Timing Marks

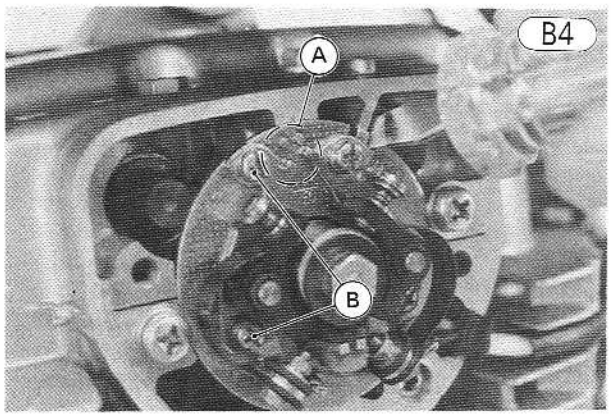


1. Left Cylinder TDC Mark
2. Left Cylinder "F" Mark
3. Right Cylinder TDC Mark
4. Right Cylinder "F" mark

Point Gap Adjustment

- Remove the contact breaker cover and gasket.
- Remove the alternator cover.

- Clean the points with a piece of clean paper or cloth using an oil-free solvent. A business card soaked in trichloroethylene can be used to remove traces of oil. To repair light damage, use emery cloth or an oilstone. If the points are badly worn down or damaged, or if the spring is weak, replace the contact breaker.
- Lubricate the point cam felt sparingly with suitable point cam lubricant. Do not overlubricate. Replace the felt if it is worn.
- Using a 14 mm wrench on the crankshaft, turn the engine counterclockwise until the contact breaker points are at their widest opening.
- Measure the contact breaker point gap with a thickness gauge. The proper gap is 0.3~0.4 mm.
- If the gap is incorrect, loosen the contact breaker base screws (2) just enough to allow the base to move. Use a slot screwdriver on the pry points until the correct point gap is obtained. Tighten the screws.



A. Pry Points **B. Base Screws**

- Turn the crankshaft until the other point gap is opened, and adjust it if necessary.
- Adjust the ignition timing.

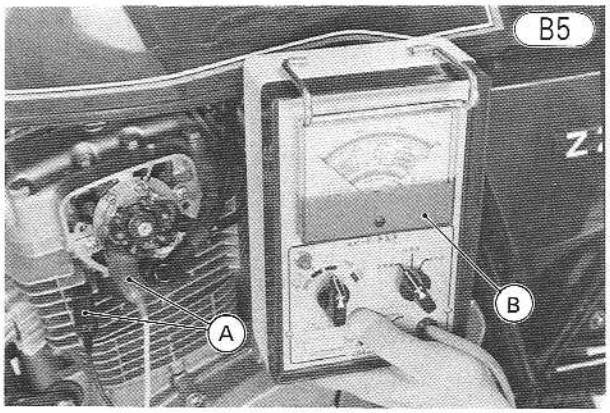
Dwell Angle Adjustment

The most precise means to set the point gap is to use a dwell angle tester instead of a thickness gauge. If a dwell angle tester is available, adjust the dwell angle (point gap) in the following manner.

NOTE: The dwell angle is the angular range for which the contact breaker points are closed. This allows the current to flow in the ignition coil primary winding.

WARNING **To prevent an injury when measuring the dwell angle, make sure that no tools, clothes, or tester leads touch the spinning camshaft.**

- Remove the contact breaker cover and gasket.
- Clean the points with a piece of clean paper or cloth using an oil-free solvent. A business card soaked in trichloroethylene can be used to remove traces of oil. To repair light damage, use emery cloth or an oilstone. If the points are badly worn down or damaged, or if the spring is weak, replace the contact breaker.
- Lubricate the point cam oil felt sparingly with suitable point cam lubricant. Do not overlubricate. Replace the oil felt if it is worn.
- Connect the dwell angle tester (–) lead to chassis ground and the (+) lead to the contact breaker spring.



A. Tester Leads **B. Dwell Angle Tester**

- If the dwell angle tester is calibrated in degrees, turn the selector knob to the lowest cam lobe setting.
- Start the engine and let it idle.
- Note the reading on the tester. The dwell angle specification is 97 ~ 112° for a tester calibrated in degrees and 27 ~ 31% for one calibrated in percentage. If the tester setting is for two cylinders, the reading must be doubled to obtain the true dwell angle.

Table B2 Dwell Angle

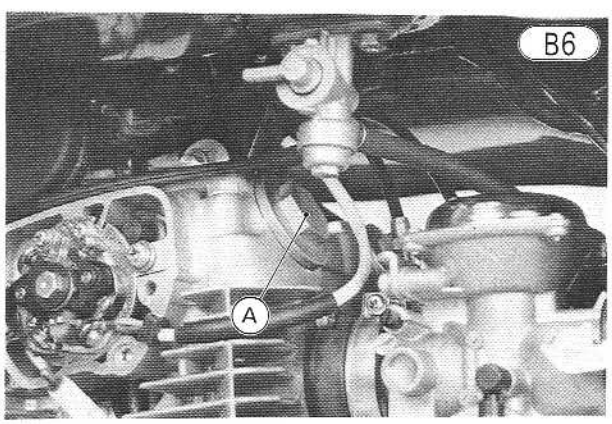
Selector Knob Setting	Dwell Angle
1 Cylinder	97° ~ 112°
2 Cylinders	48.5° ~ 56°

- If the dwell angle is incorrect, loosen the contact breaker base screws (2) just enough to allow the base to move. Use a slot screwdriver on the pry points until the correct dwell angle is obtained. Tighten the screws.
- Check the dwell angle for the other contact breaker, and adjust it if necessary.
- Stop the engine and disconnect the tester leads.
- Adjust the ignition timing.

Static Ignition Timing

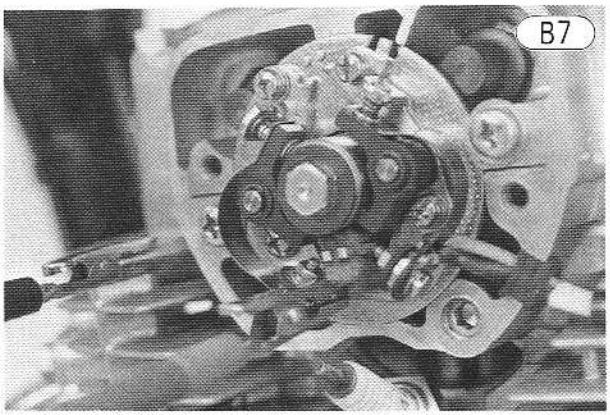
Check and adjust the static ignition timing for both cylinders using each "F" mark, first for the left cylinder and then the right cylinder.

- Turn off the ignition switch and engine stop switch.
- Remove the inlet valve adjusting cap on the left cylinder.

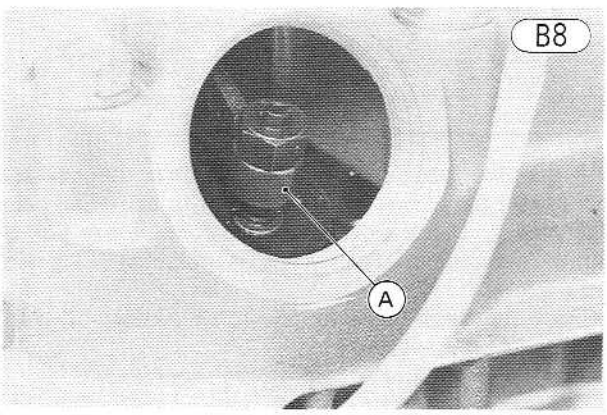


A. Inlet Valve Adjusting Cap

●Connect a timing tester or circuit tester across the left-hand set of contact breaker points by securing one lead to the contact breaker spring or lead, and the other lead to the chassis ground.

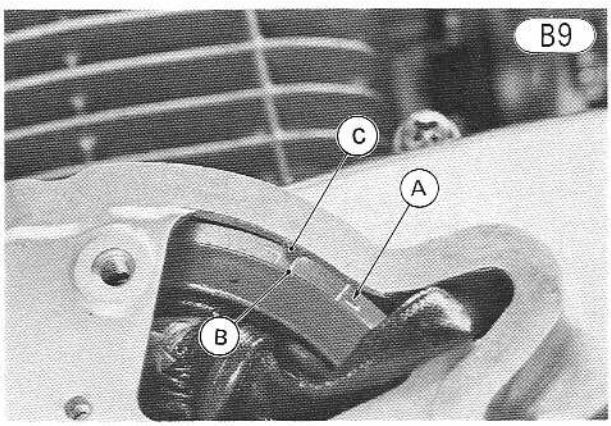


●Using a 14 mm wrench, turn the crankshaft counterclockwise until the inlet valve rocker arm on the left cylinder goes downward (valve opening) and returns upward (valve closing).



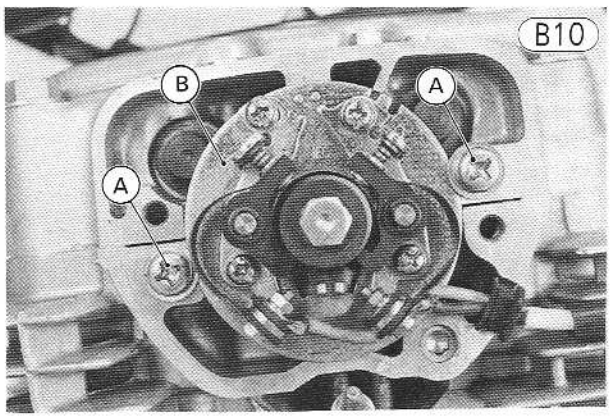
A. Rocker Arm

●Continue turning the crankshaft counterclockwise another half turn so that the "F" mark near the number "1" or "L" on the rotor is aligned with the timing mark on the left engine cover.



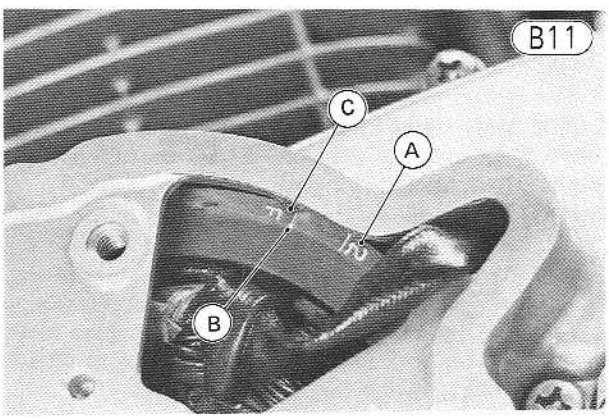
A. Number "1" or "L" **C. Timing Mark**
B. "F" Mark

●The circuit tester needle should flicker when the "F" mark and timing mark are aligned, indicating that the points have just opened. When using an audible timing tester, there should be a change in tone of the tester at this point.
●If the timing is not correct, loosen the mounting screws (2), and use a slot screwdriver on the pry points to adjust the mounting plate. Tighten the screws securely and recheck the timing.



A. Mounting Screws (2) **B. Mounting Plate**

●Move the tester leads to the right-hand set of points to check the ignition timing for the right cylinder.
●Turn the crankshaft counterclockwise a half turn so that the "F" mark near the number "2" or "R" on the rotor is aligned with the timing mark on the left engine cover.



A. Number "2" or "R" **C. Timing Mark**
B. "F" Mark

●If the circuit tester needle does not flicker when the "F" mark and timing mark are aligned, loosen the base screws (2) on the right contact breaker and adjust the point gap to within its specification (0.3~0.4 mm) until the correct ignition timing is obtained.