140 160 170 200 Gasoline Engine (Vertical Shaft) Owner's Manual



PREFACE

Thank you for choosing a small general gasoline engine of our company.

The manual gives information with respect to operation and maintenance of the 140 160 170 200general gasoline engine, and be sure to read it carefully first before operation. Only operate as the manual tells, can insure user's safety and get the best results of the engine operation. If a problem should arise or if you have any questions about your gasoline engine, consult an authorized our company servicing dealer.

The vertical shaft gasoline engine series products in this Owner's Manual are mainly used for the high pressure washer, lawn mower and mini tiller.

All information and diagrams of this manual are in accordance with the newest products at the publishing time. If revision and other change of the information descried in this manual are a little different from the actual status, our company will explain it. Our company reserves the right to make change at any time without notice and without incurring any obligation. No part of this publication may be reproduced without written permission.

This manual should be considered a permanent part of the generator and should remain with the generator if resold.

SAFETY MESSAGES

Your safety and the safety of others are very important. We have provided important safety messages in this manual and on the gasoline engine. Please read these messages carefully.

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



You WILL be KILLED or SERIOUSLY HURT if you don't follow instructions.

AWARNING You CAN be HURT if you don't follow instructions.



Your gasoline engine or other property could be damaged if you don't follow instructions.

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I. SAFETY PRECAUTIONS

ADANGER Indicate a possibility of invalid warranty and personal or equipment damage if instructions are not followed.

Please pay special attention to the following:

- Strictly set the engine according to the regulated power on the owner's manual. Do not overload, overrun the engine or run it with low load and at low speed in a long time.
- 2. Use specified grade of gasoline. The fuel should be fully deposited and filtrated before use. Keep clean the fuel filler, change the oil periodically.
- 3. Periodically check the installation, connection and the degree of tightness of the fixed bolt. Tighten it if necessary.
- 4. Periodically clean the element of the air cleaner, change it when necessary.
- 5. The engine is air-cooled, so clean the radiator, wind cover and fan in time in order to make the engine cool normally.
- 6. The operator should be familiar with the working principle and structure of the gasoline engine, knowing how to make an emergent stop and the operation of all controlling parts. Any one without training is forbidden to operate the engine. Keep periodical maintenance. Solve problems in time. Do not run the engine in spite of malfunction.
- Running the engine in a well-ventilated place, keep it at least one meter away from building walls or other equipments, keep away from inflammables such as gasoline, matches and so on to avoid possibility of fire.
- 8. Refuel in a well-ventilated area with the engine stopped, and in places
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refueling or storing gasoline, no smoking and any flames or sparks.

- 9. Refuel the fuel tank not too full so as to avoid fuel's spilling out. If there is spilled fuel around, be sure to clean it thoroughly before starting.
- 10. Do not run the engine in airtight or ill-ventilated places.
- 11. The exhaust muffler is very hot during running the engine even after the engine stops. Never touch it, or you may get burns. Transport or store the engine with it cooling down entirely.
- 12. Safe warning label:

Please carefully read warning label before operating. Our company will not assume any responsibility for person hurt, or equipment damaged caused by disregarding this warning label.



II. PARTS DESCRIPTION

1. Feature



(140)



(160 170)

START HANDLE



2. Model No.

(140 160 170)



(200)

III. PRE-OPERATE INSPECTION 1. Engine Oil

Engine oil is a key factor in deciding the engine's performance. Do not apply engine oil with additives or 2-stroke gasoline engine oil, because they haven't enough lubrication, and may shorten the engines service life.

A WARNING Check the engine with it stopped on a level ground.

Engine oil capacity:	140	0.5L
	160 170 200	0.6L

Engine oil recommended: SAE10W-30

As viscosity varies with regions and temperatures, SF class oil is recommended.



Check method:

- 1) Remove the dipstick and clean it.
- Reinsert the dipstick into the oil Filling hole without screwing it, and check oil level.
- 3) If the oil level is too low, add the recommended engine oil up to the oil upper level.
- 4) Reinstall the dipstick.
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Engine oil change:

Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. It is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil. Please dispose of used engine oil in a manner that is compatible with the environment.



- 1) Screw the oil dipstick out.
- 2) Tilt the gasoline engine and let the oil overflowing out from the hole.

2. Air Cleaner

Never run the engine without an air cleaner, or severe wear of the engine may be resulted in.



- 1) Remove the air cleaner housing.
- 2) Remove foam element or paper element, paying attention to prevent dust and foreign matter entering into air cleaner.
- 3) Check, clean or replace damaged air cleaner parts.
- 4) Reinstall the air cleaner parts back.

3. Fuel Check

- Remove the fuel tank cap and check fuel level.
- If the level is too low, refuel the tank. Remember adding fuel not over the fuel upper level.



COVER

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- 1. Gasoline is extremely flammable and is explosive under certain conditions.
- 2. Refueling in a well-ventilation area with the engine stopped. Do not smoke and allow flames or sparks in the area where gasoline is stored or where the fuel tank is refueled.
- 3. Do not overfill the fuel tank (there should be no fuel in the filling neck). After refueling, make sure the fuel tank cap is set back securely.
- 4. Be careful not to spill fuel when refueling. Spilled fuel or fuel vapor may ignite. If any fuel is spilled, make sure the area is dry before starting the engine.
- 5. Avoid repeated or prolonged contact with skin or breathing of fuel vapor. Keep out of reach of children.

Fuel tank capacity: 1.0L

Only use unleaded gasoline and recommend gasoline grade 90#over.

Unleaded gasoline can reduce gasoline engine carbon deposit and prolong the exhaust system service life.

Never use contaminated gasoline or mixed gasoline with oil. Don't allow the dust, foreign matter or water entering into fuel tank.

Fuel may damage the oil paint and plastic. Be careful not to spill fuel when refueling. Any damage due to oil spilling is not within valid warranty. "Light knocking" or "spark exploding" sound can be hear when the engine overloading. It is normal. Do not worry about that.

If " knocking" or "spark exploding" sound occur at a steady speed under normal load, change brand of gasoline; if such phenomena still happen, consult your dealer for help, otherwise the engine may be damaged.

When the engine is running, continuously "Knocking" or "spark exploding" sound occurring will damage engine.

"Knocking" or "spark exploding" sound from misusing will not be within the valid warranty.

IV. STARTING THE ENGINE

- 1. Starting method:
- A. Turn the throttle lever and brake lever along with direction of arrow to bottom. ("OPEN" position), As shown as following.



B. Turn the throttle lever along with direction of arrow to bottom.("OPEN" position) and turn the engine stop switch to "ON" state as shown as following.



C. Put the choke cable to "OPEN" position and turn the engine stop switch turn to "ON" position at the same time as shown on the following drawing:



Don't pull the throttle level if the gasoline engine is hot. Assemble the choke cable according to user requirement.

D. Starting primer gasbag operation is important operation of the starting engine. Turn the stop engine switch to "ON" state. For cold starting, slightly press the primer gasbag three to five times in succession and quickly pull the recoil cable grip. For hot starting, directly pull the starter cable grip.



2. STARTING THE ENGINE

Pull the starter grip lightly until resistance is felt, then, briskly pull to syncline upper 30 degree out.



NOTICE

Don't allow the starter grip to snap back against the engine. Return it gently to prevent damage to the starter

V. RUNNING THE ENGINE

- 1. After starting, push the choke lever in the direction of the arrow to bottom.
- 2. After preheating the engine a period of time, you can fix a load.



- 3. Pull the choke cable from the "OPEN" position to "RUNNING" position after starting engine.
- 4. Change the engine speed by adjusting the governor screw. For high speed, turn clockwise, and for low speed, turn counterclockwise. Please operate carefully. If you have any question, please contact our company authorized dealer unless the user have the proper tool and professional ability.



VI. STOPPING THE ENGINE

1. Slowly turn the throttle lever to "IDLE" position



2. If the engine is controlled by brake lever, only turn the brake lever to "CLOSE" position for stopping engine (as shown on the following Fig.1) If the engine is controlled by engine stop switch, For stopping the engine, directly turn the stop engine switch to "0" position (as shown on the following Fig.2) or press down the "STOP" for 5 seconds over by first finger, then loosen it (as shown on the following Fig.3). The engine stop engine is device of the opening and closing ignition circuit. (as shown on the following Fig.2)



Sudden stopping at high speed under heavy load is forbidden, otherwise damage will result.

VII. EXHAUST CONTROL SYSTEM SERVICE

With the engine running, carbon monoxide, oxide of nitrogen and hydrocarbon will produce, and in certain conditions, oxide of nitrogen and hydrocarbon will react chemically each other to make smoke while carbon monoxide is toxic, so exhaust control of them is very important. The company decreases the exhaust emissions by introducing poor-fuel carburetors and other devices into the engine to solve the problem.

To keep the exhaust of your engine with in the standard exhaust emission, pay attention to the following:

1. Maintenance

Maintain the engine periodically in accordance with the maintenance schedule in the manual. The maintenance schedule is made out on the base of normal use in normal conditions, if using under heavy load, dusty or wet circumstances or in high temperature, service of the engine should be done more often.

2. Replacing Parts

To ensure the best quality and reliability, use only new genuine our company parts or their equivalents for repair and replacement.

3. Tampering and Altering

Tampering with or altering the emission control system may increase emissions beyond the legal limit. Among those acts that constitute tampering are:

- 1) Removal or alteration of any part of the intake, fuel, or exhaust systems.
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 Altering or defeating the governor linkage or speed-adjusting mechanism to cause the engine to operate outside its design parameters.

4. Problems Affecting Exhaust Emissions

- 1) Difficult starting or difficult stopping.
- 2) Unstable idle speed.
- 3) Give off black smoke or consume too much fuel.
- 4) Poor ignition sparks or sparks returned.
- 5) Too early ignition.

VIII. MAINTENANCE

1. Maintenance Schedule

In order to keep the engine well, must periodically service and adjust the engine. Service shall be as following schedule.

Item	Frequency	Each time	First month or	Each season or	Every 6 month or	Each year or
nem			20 hrs	50 hrs	100 hrs	300 hrs
Engine oil	Oil level check	\checkmark				
	Replace		\checkmark		\checkmark	
Air alaanar	Check	\checkmark				
Air cleaner	Clean – replace			\checkmark		
Currente articure	Clean, adjust				\checkmark	
	Replace				\checkmark	
Oil strainer	Clean				\checkmark	
Valve clearance	Check- adjust					$\sqrt{*}$
Cylinder head	Clean					$\sqrt{*}$
Fuel tank	Replace	Every three years				

MAINTENANCE SCHEDULE

* These items should be serviced by company authorized dealer, unless you have the proper tools and mechanically proficient.

Service more frequently when used in dusty areas.

2. Maintenance Method

1) Replacement of engine oil

Drain the engine oil rapidly and completely out when the engine is hot.

- (1) Remove the oil dipstick, drain plug and washer and drain engine oil thoroughly. Reinstall the drain plug and screw in it securely.
- (2) Fill the recommended engine oil and check oil level with oil dipstick.
- (3) Reinstall the oil dipstick and tighten it securely.

Please dispose of used engine oil and the oil containers in a manner that is compatible with the environment. We suggest you take used oil in a sealed container to your local recycling center or service station for reclamation. Do not throw it in the trash or pour it on the ground or down a drain.

2) Maintenance of air cleaner

A dirty or damaged air cleaner will allow dust entering into the engine, causing rapid engine wear. So, service the air cleaner in time.

- . Remove the bolt and air cleaner cover. Be careful to prevent dirt and debris from falling into the air cleaner base opening.
- . Remove the foam element or paper element.
- . Check, clean or replace the damaged air cleaner parts.
- . Reinstall the air cleaner parts, then bolt and screw down it.

Never clean the air cleaner element with gasoline or low flash-point detergents, or explosion may happen.

Clean the foam filter with soapy water, blow the paper element with compressed air or lightly tap off dust and never dry to brush .

MWARNING

- (1) Gasoline is extremely flammable and explosive in certain condition. Keep cigarette, sparks and fire away.
- (2) After reinstalling the deposit cup, don't start the engine until the area around is dry.
- 3) Maintenance of spark plug

In order to ensure the engine normal running, gap of the spark plug must be correct and no deposit around the spark plug.



Spark recommended using plug modelNGK:BP6ES/BPR6ESDENSO:W16EPR-U/W16EP-UCHAMPION:RN9YC4NHSP:F7TC/F7RTCTORCH:F7TC/F7RTC



Don't touch the muffler to avoid burn in the engine running or just stopping a moment.

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- (1) Remove the spark plug cap.
- (2) Clear away dirt around the spark plug base.
- (3) Dismantle the spark plug with a spark plug wrench.
- (4) Visually check the spark plug. Clean with a steel brush. If the insulator is damaged, replace the spark plug instead.
- (5) Measure the spark plug clearance with a feeler. The clearance should be 0.7~0.8mm. If adjustment is necessary, bend the side electrode carefully.
- (6) To avoid cross-threading, first, screw in spark plug by hand, then tighten with a spark plug wrench to compress the gasket.
- (7) If a new spark plug is used, please replace it with same spark plug model as can as possible, and more twist 1/2 turns after compressing the gasket.
- (8) If reinstalling the used spark plug, just more twist 1/8-1/4 turns.

- (1) The spark plug must be tightened securely, or it may become very hot to damage the engine.
- (2) Only use recommended spark plug or the equivalent. Incorrect heat range of the spark plug may damage the engine.
- 4) Idle speed adjustment of the carburetor
- . (1) Start the engine and preheat it to normal operating temperature.
- . (2) Adjust the throttle stopping screw to obtain minimum idle speed. Minimum idle speed:(1,900±100) r/min.

IX. TRANSPORT AND STORAGE

Do not incline the engine so as to avoid fuel's spill in transporting. Spilled fuel or fuel vapor may ignite to cause fire. If suspension for a long time, storage should be as following:

- 1. The storage area is dry and free of dust.
- 2. Completely drain fuel out of the fuel tank and carburetor.

AWARNING Fuel is extremely flammable and explosive under certain conditions. Keep smoke, fire and spark away from operating site.

- 3. Replace engine oil.
- Remove the spark plug. Fill about a spoon of fresh engine oil onto the cylinder. Crank the engine up to distribute engine oil evenly. Reinstall the spark plug.
- 5. Lightly pull the recoil starter rope until the resistance is felt. Close the choke to protect the dust from entering in.
- 6. Cover the engine to protect dust entering.

X. TROUBLESHOOTING

1. Start Engine Difficultly (By using recoil starter)

T	ROU	BLE		CAUSE	REMEDY
		-i	t pply.	There is no enough fuel in fuel tank and fuel cock is closed.	Fill fuel, open fuel cock.
		ten	ou	Air vent in the fuel filler cap is clogged	Dredge air vent.
	sys sys y is fuel		y is fuel	Fuel cock is clogged	Clean first and then dredge
	parl	ppl ppl		Improper or clogged main oil	Readjust or clean, blow to get
	g Sl	le f	or	flow hole.	through.
	plu	th th	Fue oth	Needle valve is not closed prop-	Dismantle needle valve and re-
	ark	wit	mo	Electic democratic line	pair, clean, blow to get through.
ion	spé	guo	s	Float is damaged of sticking.	Repair noat
oressi	ormal	g wro	/ IS	rated	Replace
luic	ž	hin	ylqc .lai	There is water in fuel.	Replace
ler c		ometi	el suj norn	Too much fuel in engine	Drain extra fuel, dry up spark plug electrodes.
line		Ň	Fu	Wrong fuel brend	Select proper fuel brand corre-
l cy				wiong fuel brand	sponding with the requirements.
ma		sh - bark	ions	Too much carbon deposit	Clear away.
Noi	ten	hig ne splug		Electrodes are burn damaged	
	sys mal ark		ark] d cc	seriously or insulators damaged	Replace spark plug.
	ply Nor Sp n ba		Sp n bë	Improper electrodes gap.	Adjust to proper value.
	i supj		. <u> </u>	High -tension line is dam-	Replace
	fue	spa	nal plug	Ignition coil is damaged.	Replace
	mal	h-te no	lorn	Magneto loses magnetism.	Replace
	Nor	Hig line	spi	Wrong gap between ignition	Adjust gap between ignition and
				Coll and flywheel	flywheel
'n.		lal		over its wear limit	Replace
ssic	m.	orn		Piston ring is broken.	Replace
pre	yste	T .		Piston ring is sticking.	Clear up carbon fouling.
com	ly s.	n ou tem		Spark plug is not installed	Tighten with a gasket in.
ler	ddn	l ru sys		ughten of without a gasket.	Check cylinder gasket, and
lind	fuel su on coil snition				the flatness of the surface by
cy				Air leakage between cylinder	which cylinder block contact-
mal	nal	ig		block and cylinder head.	ing with cylinder head
nor	Nor	h-te			Tighten cylinder head bolts in stip-
Abi	~	Hig			ulated order to stipulated torque.
				Air leakage in the valves	tightness, repair if necessary.

If still can't starting, have the engine to our authorized dealer for repairing.

- When testing the spark plug, never hold the high- voltage wire of the spark plug with wet hand.
- Make sure there is no spilled fuel outside the engine and that the spark plug isn't dipped with fuel.
- To prevent fire, keep sparks far away from the spark plug mounting hole.

2. Gasoling Engine Power Output Insufficiency

TROU- BLE	CAUSE		REMEDY	
		Air in fuel line or fuel line clogged	Exhaust air or dredge fuel line	
Jr		Main oil flow hole is not ad- justed properly	Readjust	
slow c	ystem	In carburetor, needle valve hole and main oil flow hole clogged.	Clean and blow to get through	
ase uing	ly s	Fuel cock is clogged up.	Clean, replace damaged part	
hrottle, speed increa case and stop runn Fuel suppl		Too much carbon deposit in combusting chamber.	Clear away	
		Too much car bon fouling in muffler and exhaust pipe.	Clear away	
		Air cleaner is clogged up.	Clean air cleaner filter ele- ment	
ng 1 decr		Intake pipe is leaking	Repair or replace	
ncreasi even (Piston or cylinder or piston ring		Replace the worn	
an ir	essi	Air leakage from the surface by		
Vhe		which cylinder block contacting	Replace cylinder gasket	
	COL	with cylinder head.		
Poor		Too big or too small valve clear- ance.	Readjust	
		Valve tightness is poor.	Repair	

TROUBLE	CAUSE	REMEDY
	Piston, cylinder or piston ring is worn excessively.	Replace the worn
Knocking	Piston pin and piston pin hole are worn excessively.	Replace piston or piston pin
sound	Tie rod small head is worn excessively.	Replace tie rod
	Roller bearing for crankshaft main shaft is worn.	Replace roller bearing
	Engine is too hot	Shoot trouble
Abnormal com-	Too much carbon deposit in combustion chamber	Clear away
bustion	Improper gasoline brand or low gasoline quality	Replace with qualified gaso- line
	There is water in float cham- ber	Clean
Spark lacking	improper spark plug elec- trodes clearance	Adjust
	Something wrong with in- duced coil, and so on	Check and replace dam- aged parts

3. Gasoline Engine Gannot Running Unsmoothly

4. Stop Suddenly When Running

TROUBLE	CAUSE		REMEDY
		Fuel is finished	Refill fuel
	Fuel sup-	Carburetor is clogged	Check fuel line and dredge
	ply sys-	Float chamber is leaking	Repair
	tem	Needle valve is sticked.	Dismantle float chamber and eliminate it
		Spark plug is punctured,	D 1 1 1
Stop sud- denly when	Ignition system	bon deposit	Replace spark plug
		Side electrode of spark plug is dropped out	Replace spark plug
		High-tension wire is dropped out	Weld on
		Ignition coil is punctured or short-circuited	Replace ignition coil
		Parking wire is located on	Find out meeting and insu-
		engine body	late
	The other	Cylinder is seriously scored	Repair or replace damaged
		and valve dropped out	parts

5. Gasoline Engine Is Overheat

TROUBLE	CAUSE	REMEDY
	Oil insufficient or wrong oil ratio in the gasoline	Refill engine oil
	Exhaust pipe blocked up	Clean exhaust pipe
	Shroud leaking	Repair damaged part
Gasolina	Cooling fins blocked by foreign matter	Clear cooling fins
engine is	Connection rod deformation to make piston and cylinder bushing side wear	Replace connection rod
overneat	Cylinder or piston or piston ring is worn to make hunting between cyl- inder and crankcase	Replace the worn parts
	Improper adjustment of engine gov- ernor to produce speed high.	Readjust engine governor
	Crankshaft main bearing burnt out	Replace main bearing

The gasoline engine should be kept about $80 \sim 110$ °C temperature around the outlet of the shroud. If the temperature is too high, it will indicate the gasoline engine overheating.

6. Abnormal Noise Exist When Engine Running

TROUBLE	CAUSE	REMEDY	
	Piston, piston ring or cylinder is worn	Replace the worn part	
	Connection rod or piston pin and piston	Replace the worn	
Beating sound	pin hole are worn	part	
	Crankshaft main neck is worn	Replace bearing	
	Piston ring is broken	Replace piston ring	
Matal hasting	Too much carbon deposit in combust-	Clear away carbon	
wietal beating	ing chamber	deposit	
sound when au-	Improper fuel brand	Replace fuel	
tion accura	Engine is everheet	Find a cause and	
tion occurs	Engine is overheat	eliminate it	
	Improper value algorance	Readjust valve	
The other	improper varve clearance	clearance properly	
The outer	Fly wheel is not connected with crank-	Connect tightly	
	shaft tightly	Connect ughtry	

XI. SPECIFICATIONS

1. Main Specificaton

items	140	160	170	200	
L×W×H(not including crank- shaft output terminal)(mm)	365×291×275	395×3	48×282	404 x 356 x 292	
Dry Weight(kg)	10	12.1	12.5	13	
Engine Type	sin	gle cylinder ho	orizontal,4-strok	e, (OHV)	
Displacement(ml)	139.36	163	173.2	196.2	
Bore × Stroke(mm)	65×42	68×45	70×45	70×51	
Theoretical Maximum Power	2.3kw/3,600r/min	3.0kw/3,600r/min	3.2 kw/3,600r/min	3.5kw/3600r/min	
Recommended Using Power	1.5kw/3,000r/min	2.3kw/3,000r/min	2.4kw/3,000r/min	2.5kw/3000r/min	
Maximum Torque	6.3N·m/2,500r/min	8.8N·m/2,500r/min	9.0N·m/2,500r/min	10.5N•m/2500r/min	
Fuel Consumption	395g/kw·h				
Cooling System	Forced air				
Ignition System	capacitance discharge type				
PTO Shaft Rotation		vertical shaft output			

Data Adjustment

Items	Technical data	Service
Spark plug clearance	0.7-0.8mm	To see P23
Carburetor idle speed	1900±100r/min	To see P24
Valva algoranga (gold angina)	intake: 0.15±0.02mm	Serviced by our com-
varve clearance (cold elignie)	exhaust: 0.20±0.02mm	pany authorized dealer

Specification is subject to change without notice. For further information, please contact our company dealer.

2. Torque Of Important Bolts

Itama	Specifications	Torque valve		
Items	specifications	N • m	kg • m	
Connection-rod bolt	M7×1.25	12	1.2	
Cylinder head bolt	M8×1.5	26	2.6	
Flywheel nut	M14×1.5	52	5.2	
Crankcase cover bolt	M8×1.5	26	2.6	
Valve clearance adjusting nut	M6×0.5	10	1.0	
Valve rocker bolt	M8×1.25	24	2.4	

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XII. ELECTRIC DIAGRAM



XIII. EASY WORN PARTS AND ACCESSORIES LIST

Easy worn parts list:

- Cylinder head cover gasket
- Cylinder head gasket
- Spark plug
- Oil sealing
- Breath groove gasket
- Crankcase gasket
- Recoil starter
- Carburetor gasket
- Carburetor insulation gasket
- Insulation plate gasket
- Air cleaner gasket
- Exhaust vent gasket

Accessories list :

Socket

Force bar

93004-Z030430-0000