YANMAR

HINSHI-H10012

SERVICE MANUAL

YSG-E

HINSHI-H10-012

YANMAR

SERVICE MANUAL

GASOLINE GENERATOR

MODEL YSG-E series

YSG1700E-5B·YSG2700E-5B·YSG3700E-5B
YSG5500E-5(E)B·YSG6600TE-5(E)B

YANMAR DIESEL ENGINE CO.,LTD.

				Document No.	HINSHI-H10-012
History of Correction				Page No.1	1
Manual Name:		YANMAR SERVICE MANUAL FOR GASOLINE GENERATOR YSG-E Series			
Engine Model:		YSG1700 · 2700 · 3700E-5B · 5500E-5(E)B · 6600TE-5(E)B			
No. of Correction	Date of Correction	Cause for Correction	Outline of Correction	Corrected Item Number.	Corrected by:

Introduction

This manual describes the handling and maintenance for the YANMAR gasoline generator, YSG-E series.

Please use this manual to help you make necessary adjustments accurately, safely, and speedily to maintain your generator in good working condition. Details on operation of the engine can be found in the service manual for the YANMAR HINSHI-H10-020 (air-cooled gasoline engine GA series), and should be used together with this manual which explains the generator. In order to improve the quality of your generator, you will be notified of any modifications which have been made.

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1. FOR SAFE OPERATION

1—1 Warning Symbols

- Most accidents are caused by failing to observe basic safety rules and precautions. To prevent accidents, it is important to recognize the signs of approaching problems, and eliminate the problems in the early stage before they can cause accidents. Please read this manual carefully before starting repairs or maintenance to fully understand safety precautions and appropriate inspection and maintenance procedures. Attempting a repair or maintenance job without sufficient knowledge may cause an unexpected accident.

- It is impossible to cover every possible danger in repair or maintenance in the manual. Sufficient consideration for safety is required in addition to the matters marked ⚠CAUTION. Especially for safety precautions in a repair or maintenance job not described in this manual, receive instructions from a knowledgeable leader.

- Safety marks used in this manual and their meanings are as follows :

⚠ **WARNING** — **WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**

⚠ **CAUTION** — **CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.**

- Any matter marked 【NOTICE】 in this manual is especially important in servicing. If not observed, the product performance and quality may not be guaranteed.

1—2 Precautions for Safe Servicing (Always observe for safe service)

(1) Service Shop (place)

⚠ WARNING

● Place allowing sufficient ventilation

Jobs such as running the generator, welding parts, and polishing paint with sandpaper should be done in a well-ventilated place.

【Failure to Observe】

Very dangerous for human body due to the possibility of inhaling poisonous gas or dust.

⚠ CAUTION

● Sufficiently wide and flat place

The floor space of the service shop for inspection and maintenance should be sufficiently wide and flat without any holes.

【Failure to Observe】

An accident such as a violent fall may be caused.

⚠ CAUTION

● Clean, orderly arranged place

No dust, mud, oil or parts should be left on the floor surface.

【Failure to Observe】

An unexpected accident may be caused.

⚠ CAUTION

● Bright, safety illuminated place

The working place should be illuminated sufficiently and safely.

For a job in a dark place where it is difficult to see, use a portable safety lamp.

The bulb should be covered with a wire cage for protection.

【Failure to Observe】

The bulb may be broken accidentally causing ignition of leaking oil.

⚠ CAUTION

● Place equipped with a fire extinguisher

Keep a first aid kit and fire extinguisher close at hand in preparation for fire emergencies.

(2) Working Wear

⚠ CAUTION

- **Wears for safe operation**

Wear a helmet, working clothes, safety shoes and other safety protectors suited to the job. It is especially important to wear well-fitting work clothes.

【Failure to Observe】

A serious accident such as trapping by a machine may occur.

(3) Tools to be Used

⚠ WARNING

- **Appropriate holding and lifting**

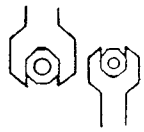
Never operate when the engine is supported with blocks or wooden pieces or only with a jack.

To lift and hold the engine, always use a crane with a sufficient allowance in limit load or a rigid jack.

【Failure to Observe】

A serious accident may occur.

⚠ WARNING



- **Use of appropriate tools**

Use tools appropriate for the jobs to be done. Use a correctly sized tool for loosening or tightening a machine part.

【Failure to Observe】

A serious injury or engine damage may occur.

(4) Use of Genuine Parts, Oil and Grease

⚠ CAUTION

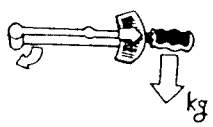
- **Always use genuine parts.**

【Failure to Observe】

Shortening of engine life or an unexpected accident may arise.

(5) Bolt and Nut Tightening Torque

⚠ WARNING



- **Always tighten to the specified torque if designated in the manual.**

【Failure to Observe】

Loosening or falling may cause parts damage or injury.

(6) Operation of Gasoline Generator

⚠ WARNING

• Harness short-circuit(Electric starting)

Disconnect the battery negative ⊖ terminal before starting the service job.

【Failure to Observe】

Short-circuiting of a harness may occur to start a fire.

⚠ WARNING

• Battery charging(Electric starting)

Since flammable gas is generated during battery charging, keep anything which could cause a fire away from the battery.

【Failure to Observe】

Explosions may occur.

⚠ WARNING

• Battery electrolyte(Electric starting)

Since the electrolyte is diluted sulfuric acid, do not let it be splashed onto the clothes or skin.

【Failure to Observe】

The clothes or skin may be burnt.

⚠ WARNING

• Supplying Fuel

Keep cigarettes, matches, etc. away from the area while supplying fuel.

【Failure to Observe】

Fires and explosions may result.

⚠ WARNING

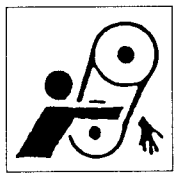
• Hot parts.

Do not touch the engine while it is running, or immediately after it is stopped.

【Failure to Observe】

Burns may be caused by touching a hot part.

⚠ WARNING



• Moving Parts

Do not get the generator wet or operate it with wet hands.

【Failure to Observe】
Injuries may result.

⚠ WARNING

• Electric Shocks

Do not get the generator wet or operate it with wet hands.

【Failure to Observe】
Electric shocks may occur.

(7) Disposal of Waste Materials

⚠ CAUTION

- Do not let waste oil flow into the sewage or a river.
- Always drain oil from the machine into a container. Never let it be drained directly onto the ground.
- When disposing any harmful substance like oil, filter or battery, be sure to observe the applicable law or regulations.

(8) Checking Safety Labels

⚠ CAUTION

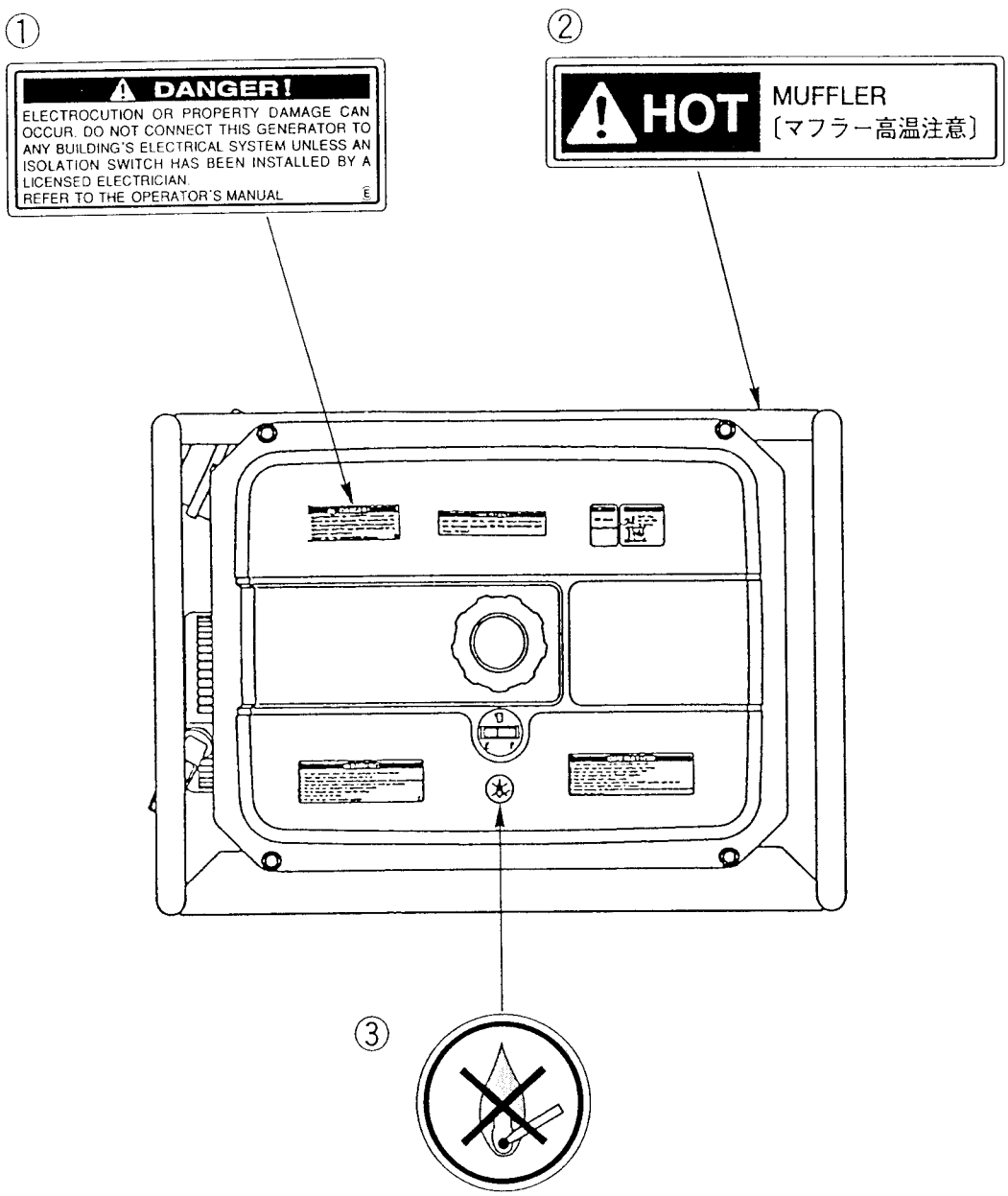
• Safety Labels

To guard against accidents and protect your safety, safety labels are attached to the welder-generator. Should they become damaged or unreadable, be sure to replace them with new ones.

1—3 Location for Warning Labels

In order to ensure your safety during operation, warning labels have been attached at the places shown in the drawings below. Should the labels become lost or damaged, be sure to replace them with new ones.

(1) Location for warning labels

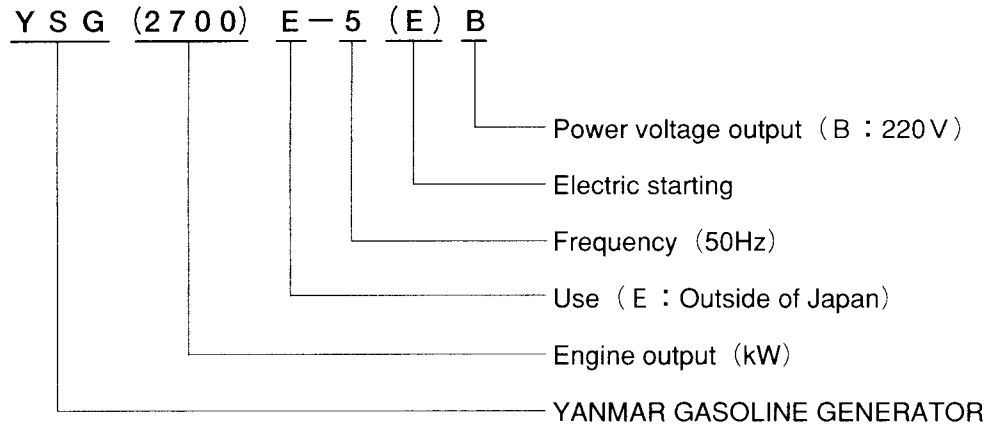


No.	Parts No.	Warning Labels
1	183720—07270	Handling Precautions
2	170001—07230	Burn Precautions
3	183210—07270	No Inflammables

2. OUTLINE

2—1 Use • Regulations

- This generator is to be used as the power source for outdoor jobs and as a portable auxiliary power source. Do not connect to indoor outlets (power from electric companies).
- In order to operate this generator safely, the operator must have sufficient knowledge and ability.
- **Explanation of Machine Name**



( ) indicates changes according to specifications.

2—2 Specifications

	Item \ Model		YSG1700E	YSG2700E	YSG3700E	YSG5500E		YSG6600TE	
			5B	5B	5B	5B	5EB	5B	5EB
Generator	Type		Self excited revolving-field type AC generator (AVR with brush)					Self and separately excited revolving-field type AC generator (AVR with brush)	
	Frequency	Hz	5 0						
	Rated output AC	kVA	1.2	2.0	3.0	4.2		5.0[1.7]	
	Rated output DC	V—A	12-—8.3					———	
	Voltage	V	220					380	
	Current	A	5.5	9.1	13.6	19.1		7.6	
	Rated speed	rpm	3000						
	Power factor	———	1.0					0.8[1.0]	
	Phase number	———	Single phase					Three phases [Single phase]	
	Pole	———	2						
	Excitation system	———	self-excited					self & separately excited	
	Insulator type	———	E						
	Output socket (Terminal) AC	V—A	250—15—2 (socket)					Terminal(Three phases) [250-15(socket)]	
	Output socket (Terminal) DC	V—A	Terminal (2)					———	
Engine	Name	———	GA120E	GA180E	GA240E	GA340E		GA340	
	Type	———	35 degree inclination air cooled 4 cycles spark ignition						
	Ignition system	———	No contact magnet ignition (transistor control)						
	Cylinder×bore×Stroke	mm	1 ×58×43	1 ×68×48	1 ×74×56	1 ×82×64			
	Stroke capacity	ℓ	0.113	0.174	0.240	0.337			
	Rated output	kW/rpm	1.7/3000	2.8/3000	3.9/3000	6.0/3000			
	Cooling system	———	Forced cooling						
	Lubrication system	———	Direct spray						
	Starting system	———	Recoil			Recoil	Electric	Recoil	Electric
	Stoping system	———	ignition stop						
	Charging system	———	———			———	Flywheel magnet	———	Flywheel magnet
	Startingmotor capacity	V-kW	———	———	12-0.8	———	12-0.8		12-0.8
	Battery capacity	V—Ah	———				12—10	———	12—10
	Fuel	———	Lead - free regular gasoline JISK2202(gasoline for the car) be proper						
	Fuel oil capacity	ℓ	11	16					
	Fuel consumption	ℓ／hr	0.9	1.4	2.1	2.6		2.1	
	Lube oil	———	YANMAR genuine 4 cycles gasoline engine oil or SC class or more than gasoline for the car						
	Lube oil capacity (full/available)	ℓ	0.5/0.25	0.6/0.32	1.0/0.5	1.2/0.6			
Set	Length	mm	535	590	590	0.5			
	Width	mm	390	415	485	495			
	Height	mm	450	460	520	530			
	Dry weight	kg	37	45	62	75	82	75	82

Note:[ ] Case for single phase

2—3 Ability

Item			YSG1700E	YSG2700E	YSG3700E	YSG5500E		YSG6600TE	
			5B	5B	5B	5B	5EB	5B	5EB
Max. at no-load		rpm	3350±25						
Ability	Instantaneous	%	≦12						
	Settling	%	≦8						
	Settling time	sec	≦3						
Frequency change		Hz	≦1						
load voltage	AC	V	224±6					391±11 〔226±6〕	
No-load voltage	AC	V	≦244					〔224〕	
Rate of voltage change	AC	%	≦7						
Overload output	AC	%	≧10						
Permissible angle of inclination	Cont.	deg	≧20						
Refilling (reference)	Fuel oil	hr	≧12	≧7.7	≧7.4	≧6			
	Lube oil		≧92	≧72	≧81	≧65			

[ ] Case for single phase

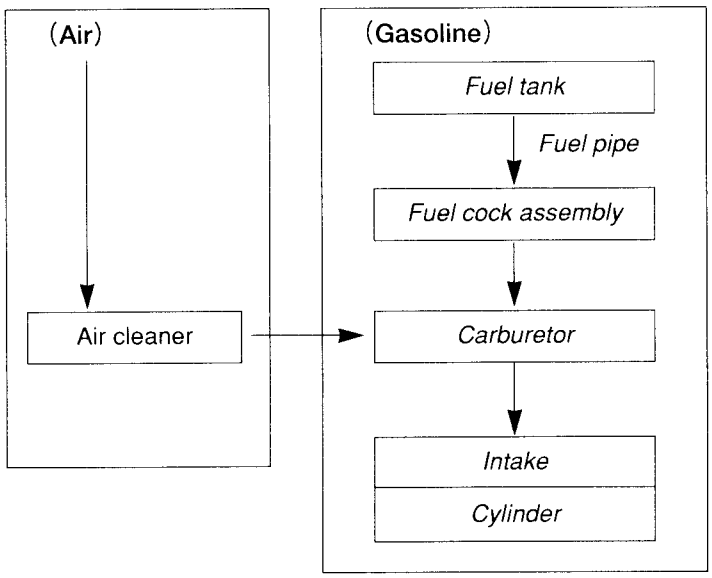
Performance: adjust for after 30 hours

2—4 Explanation for Mechanism of Main Parts

(1) Engine

• Fuel system

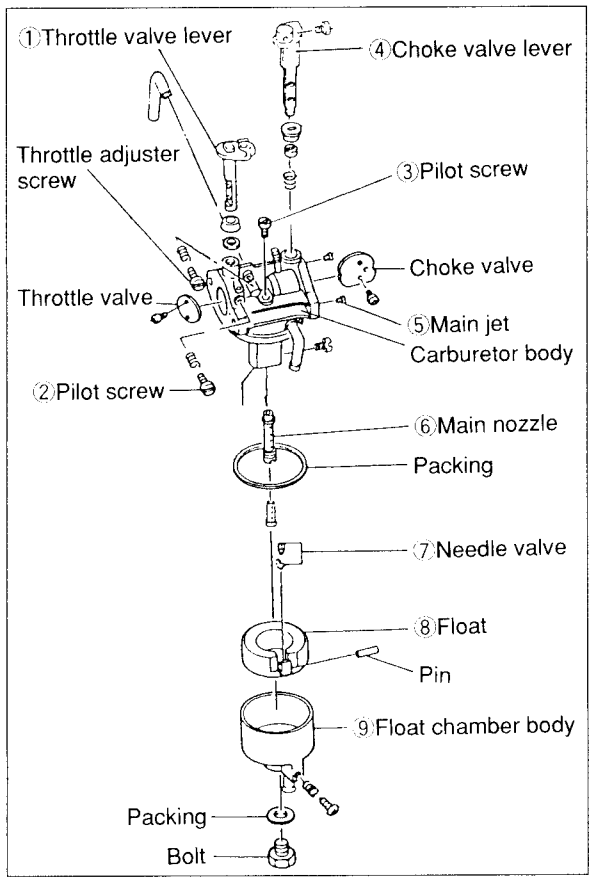
The fuel system supplies a mixture of air and fuel (gasoline) to the cylinders and is composed of the following equipment.



1) Carburetor

• Structure of the carburetor

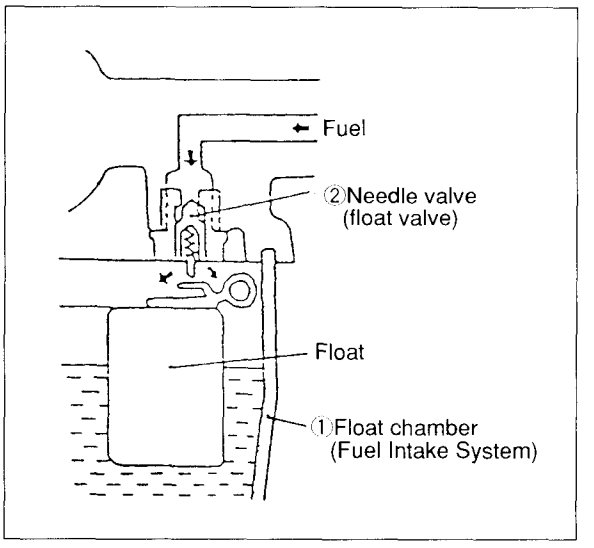
The carburetor consists of the float valve, butterfly valve, side blow type, and works on a mixture of air and fuel (gasoline). The structure and names of the parts are shown below.



No	Part Name	Controls	Use
①	Throttle valve lever	Air mixture	Adjusts the flow of air through the venturi
②	Pilot screw	Low speed fuel	Adjust to stabilize low-speed revolution
③	Pilot jet	Low speed fuel	Measures fuel for low-speed running
④	Choke valve lever	Air intake	Measures fuel for starting under cold conditions
⑤	Main jet	All-speed fuel	Measures fuel for middle- and high-speed running
⑥	Main nozzle	High-speed fuel	Supplies the mixture for middle- and high-speed running
⑦	Needle valve	Inflow fuel	Controls opening and closing for flow of fuel to float chamber
⑧	Float	Inflow fuel	Maintains the level of fuel in the float chamber
⑨	Float chamber body	Inflow fuel	Temporarily stores fuel

The carburetor assembly is divided into the following systems in accordance with their operation conditions.

- System where fuel is drawn into the carbure tor from the fuel tank.
- System where fuel passes through a low-speed fuel system for low-speed operation.
- System where fuel passes through a high-speed fuel system for high-speed operation.
- Starting fuel system to promote starting unde cold conditions.

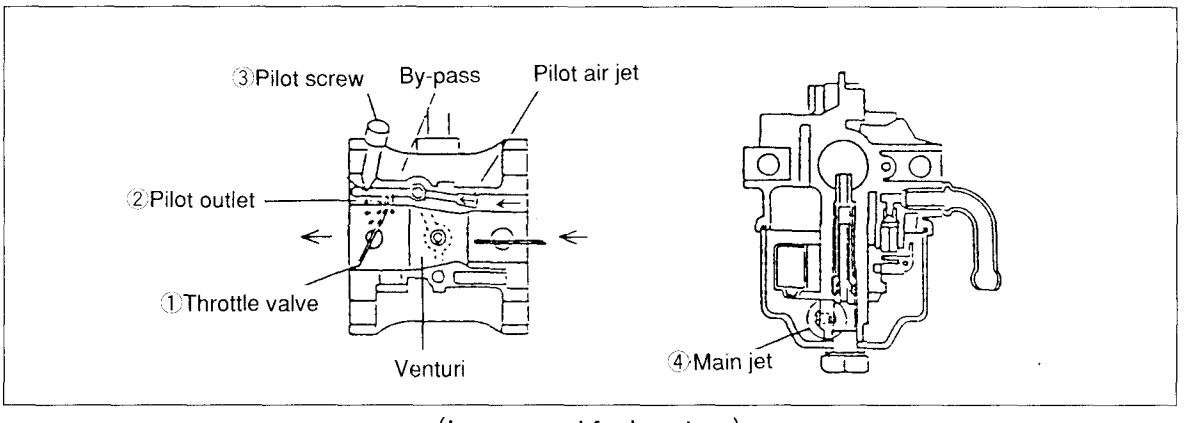


(Fuel Intake System)

- **System for drawing in fuel (float and needle valve)**

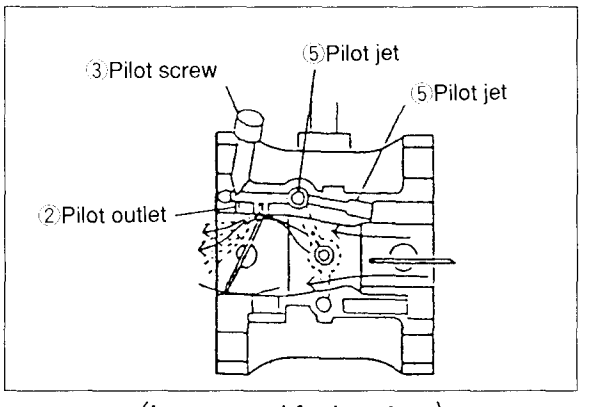
Device where fuel is kept at a constant level in the float chamber ① (fuel chamber at the bottom of the carburetor) and the floating and sinking action of the float is used to open and close the needle valve ② at the inlet.

- **Low-speed fuel system (pilot jet, pilot air jet)**



(Low-speed fuel system)

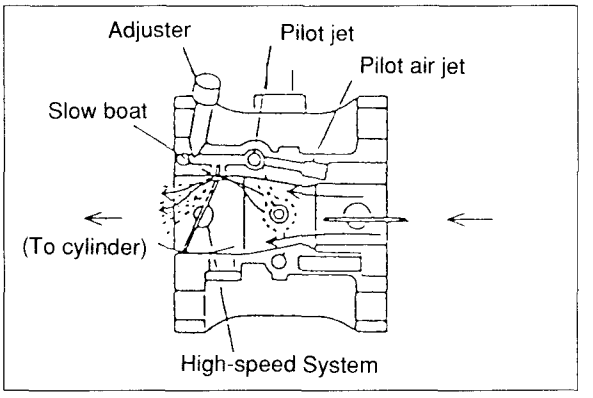
During idling, the throttle valve ① is only slightly open so that the gap between the throttle valve ① and the venturi is narrow causing the air to be drawn out quickly through the pilot outlet ② at this section. Pilot screw ③ is the needle valve which adjusts the amount of fuel coming out of the pilot outlet ② and adjusts the mixture during idling. Since the throttle valve ① is almost entirely closed, there is only a small amount of air being drawn in, the speed of the air current around the main jet is slow, and fuel is not sent from the main system.



(Low-speed fuel system)

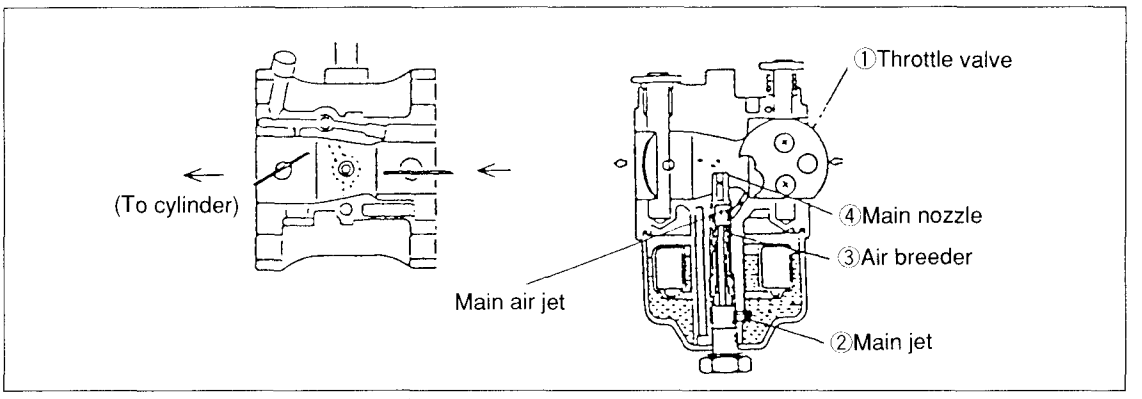
In the low-speed system, fuel passes through the oil hole from the main jet hole ④, continues into the pilot jet ⑤ where it is mixed with air coming from the air bleeder in front of the venturi thus creating emulsion, and is drawn out of the pilot outlet ② after passing through the gap adjusted by the pilot screw.

The pilot adjuster screw on the side of the pilot screw which during the idling time adjusts the throttle valve lever which limits the degree of openness at the top of the throttle valve must be adjusted at the same time.



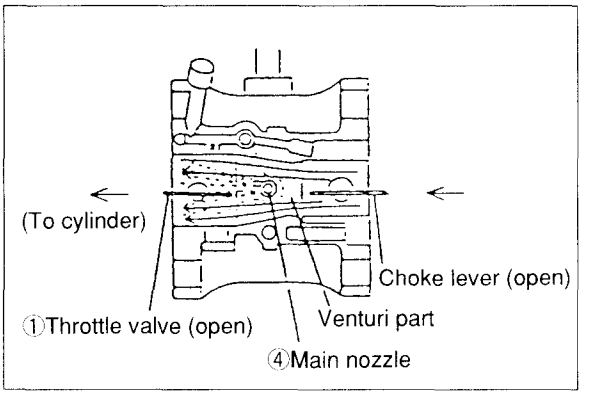
(Fuel Inflow System)

- **High-Speed Fuel System (main nozzle, main air jet)**



(High-Speed Fuel System)

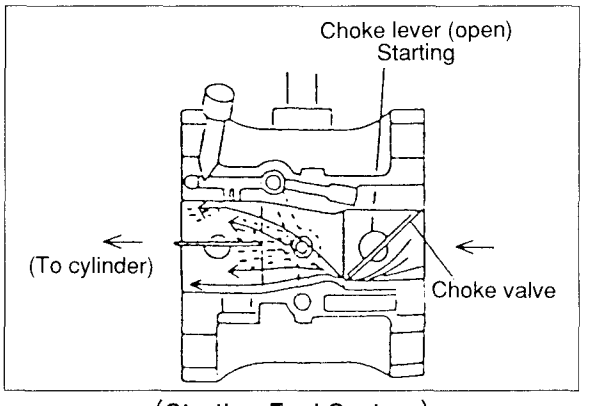
For high-speed use, the throttle valve ① is almost fully open. Air entering from the air cleaner passes from the intake inlet through the venturi and around the throttle valve ①, and is sucked into the cylinder. The air passing through the narrow passage of the venturi builds up negative pressure. Float chamber fuel passes through the main jet ② and is mixed with air coming from the air hole ③ creating emulsion, and from the main nozzle ④ is sprayed out from the venturi part. Then, the mixture is mixed with the main air current and flows into the cylinder.



(High-Speed Fuel System)

- **Starting Fuel System (choke valve)**

When starting during cold weather, by closing the choke, air intake is reduced and at the same time negative pressure is built up making starting easier. When the choke is closed for starting, a large negative pressure is built up in the part after the choke (fuel chamber side) causing a large amount of fuel to be sucked in. A rich mixture is sprayed from the main nozzle into the venturi part.

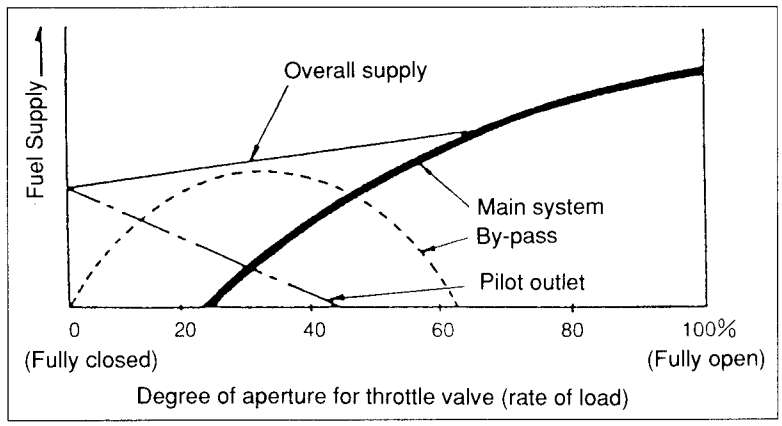


(Starting Fuel System)

- **Changes in amount of fuel flow for different systems**

  Fuel flows out from the main nozzle and from the pilot outlet.

  The different mechanisms are explained elsewhere, but the figure to the right shows the overall supply of fuel suitable for the load for the different mechanisms.



(Changes in amount of fuel flow for different systems)

(Carburetor Assembly)

Name	YSG1700E	YSG2700E	YSG3700E	YSG5500E,YSG6600TE
Type	BV18-11	BV20-15	BV24-16	BV26-20
Bore (mm)	ϕ18	ϕ20	ϕ24	ϕ26
Venturi (mm)	ϕ11	ϕ15	ϕ17	ϕ20
Main jet	#63.8	#80	#92.5	#102.5
Pilot jet	#42.5	#37.5	#42.5	#50
Throttle valve	#170	#110	#160	#170
Pilot screw (degree of aperture)	1 revolution	2 1/2 revolutions	2 revolution	1 revolution
Oil level in float chamber (mm)	28	28	31	31

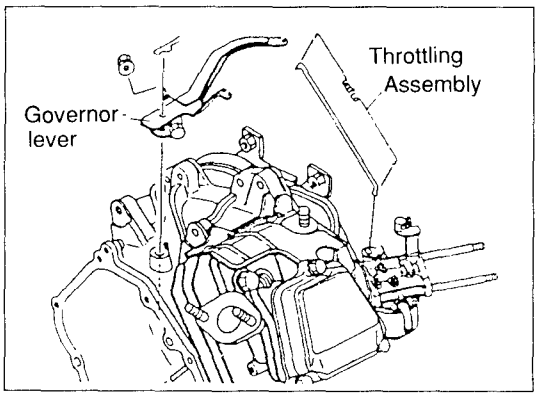
2) Governor

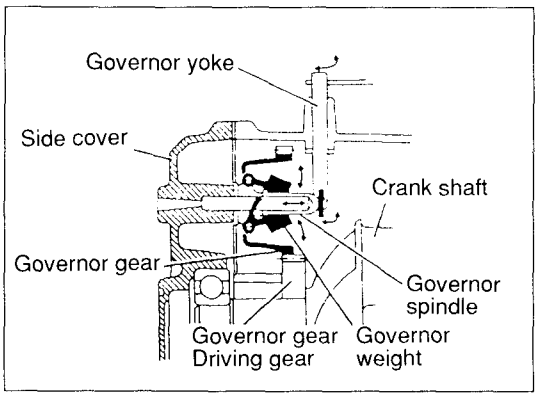
When the engine is running at regular speed the system which moderates the supply mixture according to load and maintains rotation at a constant speed is the governor system. The main governor system is a centrifugal force type for all speeds and is called a mechanical structure.

① When the engine speed is increased, the governor weight moves by centrifugal force to open on the outside (opens and closes with engine speed), and this movement causes the governor spindle to move to the left and right.

② The action of the governor spindle is transmitted to the governor yoke.

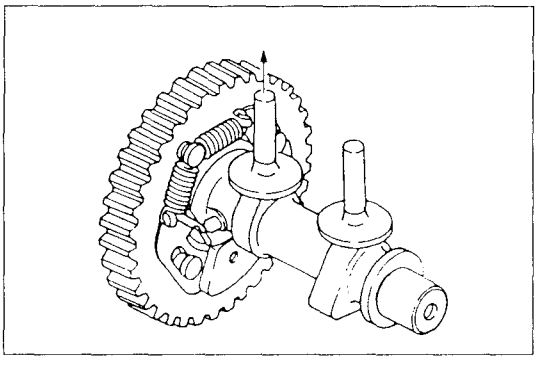
③ The governor yoke is connected to the governor lever and through the throttle link opens and closes the carburetor throttle valve (tension and balance of the regulator spring) and keeps the speed steady.





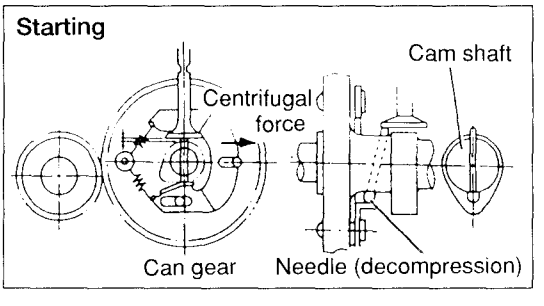
3) Mechanical Decompression

The automatic decompression using a mechanical weight is attached to the cam shaft assembly. It reduces the amount of power needed to pull the starter rope to open the exhaust valve at the time of starting and makes starting easier.



① Starting the Engine

The centrifugal weight pushes the decompression needle and the tappet, opening the exhaust valve so that the recoil can be pulled creating compression and making easy turning.



② Running the Engine

After the engine has started and the speed is 850 ~950rpm or greater, centrifugal force causes the centrifugal weight to move to the outside and the decompression needle to be pulled in. The exhaust valve then returns to the normal operating condition.