A Few Words About Safety

Service Information

The service and repair information contained in this manual is intended for use by qualified, professional technicians. Attempting service or repairs without the proper training, tools, and equipment could cause injury to you and/or others. It could also damage this Honda product or create an unsafe condition.

This manual describes the proper methods and procedures for performing service, maintenance, and repairs. Some procedures require the use special tools. Any person who intends to use a replacement part, service procedure or a tool that is not recommended by Honda, must determine the risks to their personal safety and the safe operation of this product.

If you need to replace a part, use Honda Genuine parts with the correct part number or an equivalent part. We strongly recommend that you do not use replacement parts of inferior quality.

For Your Customer's Safety

Proper service and maintenance are essential to the customer's safety and the reliability of this product. Any error or oversight while servicing this product can result in faulty operation, damage to the product, or injury to others.

⚠WARNING

Improper service or repairs can create an unsafe condition that can cause your customer or others to be seriously hurt or killed.

Follow the procedures and precautions in this manual and other service materials carefully.

For Your Safety

Because this manual is intended for the professional service technician, we do not provide warnings about many basic shop safety practices (e.g., Hot parts-wear gloves). If you have not received shop safety training or do not feel confident about your knowledge of safe servicing practice, we recommend that you do not attempt to perform the procedures described in this manual.

Some of the most important general service safety precautions are given below. However, we cannot warn you of every conceivable hazard that can arise in performing service and repair procedures. Only you can decide whether or not you should perform a given task.

⚠WARNING

Failure to properly follow instructions and precautions can cause you to be seriously hurt or killed.

Follow the procedures and precautions in this manual carefully.

Important Safety Precautions

Make sure you have a clear understanding of all basic shop safety practices and that you are wearing appropriate clothing and using safety equipment. When performing any service task, be especially careful of the following:

- Read all of the instructions before you begin, and make sure you have the tools, the replacement or repair parts, and the skills required to perform the tasks safely and completely.
- Protect your eyes by using proper safety glasses, goggles, or face shields anytime you hammer, drill, grind, or work around pressurized air, pressurized liquids, springs or other stored-energy components. If there is any doubt, put on eye protection.
- Use other protective wear when necessary, for example gloves or safety shoes. Handling hot or sharp parts can cause severe burns or cuts. Before you grab something that looks like it can hurt you, stop and put on gloves.
- Protect yourself and others whenever you have engine-power equipment up in the air. Anytime you lift this product with a hoist, make sure that the hoist hook is securely attached to the product.

Make sure the engine is off before you begin any servicing procedures, unless the instruction tells you to do otherwise. This will help eliminate several potential hazards:

- Carbon monoxide poisoning from engine exhaust. Be sure there is adequate ventilation whenever you run the engine.
- Burns from hot parts. Let the engine and exhaust system cool before working in those areas.
- Injury from moving parts. If the instruction tells you to run the engine, be sure your hands, fingers and clothing are out of the way.

Gasoline vapors and hydrogen gasses from batteries and explosive. To reduce the possibility of a fire or explosion, be careful when working around gasoline or batteries.

- Use only a nonflammable solvent, not gasoline, to clean parts.
- Never store gasoline in an open container.
- Keep all cigarettes, sparks, and flames away from the battery and all fuel-related parts.

INTRODUCTION

This manual covers the service and repair procedures for Honda GCV145H/GCV170H/GCV200H.

All information contained in this manual is based on the latest product information available at the time of printing. We reserve the right to make changes at anytime without notice.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form, by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission of the publisher. This includes text, figures, and tables.

As you read this manual, you will find information that is preceded by a NOTICE symbol. The purpose of this message is to help prevent damage to this Honda product, other property, or the environment.

SAFETY MESSAGES

Your safety, and the safety of others, are very important. To help you make informed decisions, we have provided safety messages and other safety information throughout this manual. Of course, it is not practical or possible to warn you about all the hazards associated with servicing these products. You must use your own good judgement.

You will find important safety information in a variety of forms, including:

- Safety Labels – on the product.
- Safety Messages – preceded by a safety alert symbol ⚠ and one of three signal words, DANGER, WARNING, or CAUTION. These signal words mean:

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

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

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

- Instructions – how to service these products correctly and safely.

SERVICE RULES

- Use genuine Honda or Honda-recommended parts and lubricants or their equivalents. Parts that do not meet Honda's design specifications may damage the unit.
- Use the special tools designed for the product.
- Install new gaskets, O-rings, etc. when reassembling.
- When torquing bolts or nuts, begin with larger-diameter or inner bolts first and tighten to the specified torque diagonally, unless a particular sequence is specified.
- Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
- After reassembly, check all parts for proper installation and operation.
- Many screws used in this machine are self-tapping. Be aware that cross-threading or overtightening these screws will strip the threads and ruin the hole.

Use only metric tools when servicing this unit. Metric bolts, nuts and screws are not interchangeable with non-metric fasteners. The use of incorrect tools and fasteners will damage the unit.

SYMBOLS

The symbols used throughout this manual show specific service procedures. If supplementary information is required pertaining to these symbols, it would be explained specifically in the text without the use of the symbols.

	Replace the part(s) with new one(s) before assembly.
	Use the recommend engine oil, unless otherwise specified.
	Use multi-purpose grease (lithium based multi-purpose grease NLGI #2 or equivalent).
	Apply a locking agent. Use a medium strength locking agent unless otherwise specified.
	Apply sealant.
(○ x ○) (○)	Indicates the diameter, length, and quantity of metric bolts used.
page 1-1	Indicates the reference page.

ABBREVIATIONS

Throughout this manual, the following abbreviations are used to identify the respective parts or systems

Abbrev. term	Full term
ACG	Alternator
API	American Petroleum institute
Approx.	Approximately
Assy.	Assembly
ATDC	After Top Dead Center
ATF	Automatic Transmission Fluid
ATT	Attachment
BAT	Battery
BDC	Bottom Dead Center
BTDC	Before Top Dead Center
BARO	Barometric Pressure
CKP	Crankshaft Position
Comp.	Complete
CMP	Camshaft Position
CYL	Cylinder
DLC	Data Link Connector
EBT	Engine Block Temperature
ECT	Engine Coolant Temperature
ECM	Engine Control Module
EMT	Exhaust Manifold Temperature
EOP	Engine Oil Pressure
EX	Exhaust
F	Front or Forward
GND	Ground
HO2S	Heated Oxygen sensor
IAC	Idle Air Control
IAT	Intake Air Temperature
I.D.	Inside diameter
IG or IGN	Ignition
IN	Intake
INJ	Injection
L.	Left
MAP	Manifold Absolute Pressure
MIL	Malfunction Indicator Lamp
O.D.	Outside Diameter
OP	Optional Part
PGM-FI	Programmed-Fuel Injection
P/N	Part Number
Qty	Quantity
R.	Right
SAE	Society of Automotive Engineers
SCS	Service Check Signal
STD	Standard
SW	Switch
TDC	Top Dead Center
TP	Throttle Position
VTEC	Variable Valve Timing & Valve Lift Electronic Control

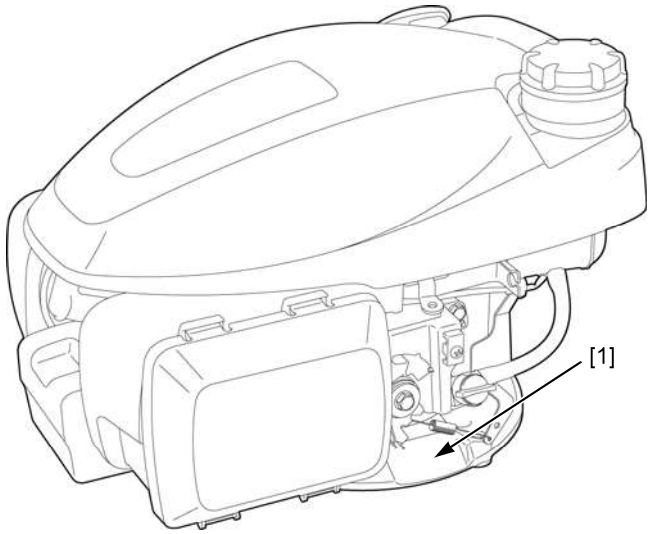
Bl	Black	G	Green	Br	Brown	Lg	Light green
Y	Yellow	R	Red	O	Orange	P	Pink
Bu	Blue	W	White	Lb	Light blue	Gr	Gray

1. SPECIFICATIONS

SERIAL NUMBER LOCATION

The engine serial number and type [1] are stamped on the crankcase.

Refer to them when ordering parts or making technical inquiries.



P.T.O. TYPE VARIATION

P.T.O. type	N1		N2		N3	
Type	A1UV A1G7 N1G7	S1G7	K2KE N2G7	N2EE	S3AL A3HV A3G7 A3T9 S3BL	C3AL
Top cover type	Standard	Optional	Standard		Standard	
Recoil starter short rope type				○		
Starter motor						○
Battery						○

P.T.O. type	N4				LB
Type	S4GB S4HB S4G7 A4G7 S4HV	C4GB C4G7	S4BB	C4BB	NBE
Top cover type	Standard		Optional		Standard
Recoil starter short rope type					
Starter motor		○		○	
Battery		○		○	

DIMENSIONS AND WEIGHTS SPECIFICATIONS

GCV145H

Type	N2EE/N2KE	S3AL/A3HV/ C3AL	S4BB/S4GB/ S4HB/S4G7/ A4G7/S4HV/ C4BB/C4GB/ C4G7
P.T.O. type	N2	N3	N4
Overall length	415 mm (16.3 in)	415 mm (16.3 in)	415 mm (16.3 in)
Overall width	330 mm (13.0 in)	330 mm (13.0 in)	330 mm (13.0 in)
Overall height	340 mm (13.4 in)	359 mm (14.1 in)	340 mm (13.4 in)
Dry weight	10.0 kg (22.0 lbs)	10.1 kg (22.3 lbs)	10.0 kg (22.0 lbs)
Operating weight	11.1 kg (24.5 lbs)	11.2 kg (24.7 lbs)	11.1 kg (24.5 lbs)

GCV170H

Type	A1UV/A1G7/ S1G7	N2EE/N2KE	A3G7/A3T9/ S3BL/S3AL/ A3HV/C3AL	S4HV/S4BB/ S4GB/S4HB/ S4G7/A4G7/ C4BB/C4GB/ C4G7	NBE
P.T.O. type	N1	N2	N3	N4	LB
Overall length	415 mm (16.3 in)	415 mm (16.3 in)	415 mm (16.3 in)	415 mm (16.3 in)	415 mm (16.3 in)
Overall width	330 mm (13.0 in)	330 mm (13.0 in)	330 mm (13.0 in)	330 mm (13.0 in)	330 mm (13.0 in)
Overall height	359 mm (14.1 in)	340 mm (13.4 in)	359 mm (14.1 in)	340 mm (13.4 in)	360 mm (14.2 in)
Dry weight	10.0 kg (22.0 lbs)	10.0 kg (22.0 lbs)	10.1 kg (22.3 lbs)	10.0 kg (22.0 lbs)	10.0 kg (22.0 lbs)
Operating weight	11.1 kg (24.5 lbs)	11.1 kg (24.5 lbs)	11.2 kg (24.7 lbs)	11.1 kg (24.5 lbs)	11.1 kg (24.5 lbs)

GCV200H

Type	S1G7/A1G7/N1G7	N2G7	S3AL/C3AL	S4BB/S4GB/ C4BB/C4GB
P.T.O. type	N1	N2	N3	N4
Overall length	415 mm (16.3 in)	415 mm (16.3 in)	415 mm (16.3 in)	415 mm (16.3 in)
Overall width	330 mm (13.0 in)	330 mm (13.0 in)	330 mm (13.0 in)	330 mm (13.0 in)
Overall height	359 mm (14.1 in)	340 mm (13.4 in)	359 mm (14.1 in)	340 mm (13.4 in)
Dry weight	10.0 kg (22.0 lbs)	10.0 kg (22.0 lbs)	10.1 kg (22.3 lbs)	10.0 kg (22.0 lbs)
Operating weight	11.1 kg (24.5 lbs)	11.1 kg (24.5 lbs)	11.2 kg (24.7 lbs)	11.1 kg (24.5 lbs)

EQUIPMENT VARIATION

Indicated with difference compared with values of P.T.O. variation above.

Variation	Evaporative emission type	Remote type	Non top cover type	Heavy wheel type	Deflector type	Sweeper type	Starter motor type	Non top cover starter motor type
Overall length difference	± 0 mm (0.0 in)	± 0 mm (0.0 in)	- 9 mm (0.35 in)	± 0 mm (0.0 in)	± 0 mm (0.0 in)	± 0 mm (0.0 in)	± 0 mm (0.0 in)	- 9 mm (0.35 in)
Overall width difference	± 0 mm (0.0 in)	± 0 mm (0.0 in)	± 0 mm (0.0 in)	± 0 mm (0.0 in)	+ 15 mm (0.59 in)	+ 32 mm (1.3 in)	+ 7.5 mm (0.30 in)	± 7.5 mm (0.30 in)
Overall height difference	+ 9 mm (0.35 in)	± 0 mm (0.0 in)	± 0 mm (0.0 in)	± 0 mm (0.0 in)	± 0 mm (0.0 in)	± 0 mm (0.0 in)	+ 1.5 mm (0.06 in)	± 0 mm (0.0 in)
Dry weight difference	± 0 kg (0.0 lbs)	+ 0.1 kg (0.2 lbs)	- 0.3 kg (0.7 lbs)	+ 1.6 kg (3.5 lbs)	± 0 kg (0.0 lbs)	± 1.7 kg (3.7 lbs)	+ 1.7 kg (3.7 lbs)	+ 1.3 kg (2.9 lbs)
Operating weight difference	± 0 kg (0.0 lbs)	+ 0.1 kg (0.2 lbs)	- 0.3 kg (0.7 lbs)	+ 1.6 kg (3.5 lbs)	± 0 kg (0.0 lbs)	± 1.7 kg (3.7 lbs)	+ 1.7 kg (3.7 lbs)	+ 1.3 kg (2.9 lbs)

ENGINE SPECIFICATIONS

GCV145H (Except starter motor type)

Model	GCV145H
Description code	GJAMH
Type	4 stroke, overhead valve, single cylinder, horizontal
Displacement	145 cm^3 (8.8 cu-in)
Bore x stroke	56.0 x 59.0 mm (2.20 x 2.32 in)
Net power (SAE J1349) *1	3.1 kW (4.2 HP)/3,600 min^{-1} (rpm)
Continuous rated power	2.1 kW (2.8 HP)/3,000 min^{-1} (rpm)
Maximum net torque (SAE J1349) *1	9.1 N·m (0.93 kgf·m, 6.7 lbf·ft)/2,500 min^{-1} (rpm)
Compression ratio	7.7
Fuel consumption (at continuous rated power)	1.1 Liters (0.29 US gal, 0.24 Imp gal)/h
Ignition system	Transistor type magneto ignition
Ignition timing	B.T.D.C. 20 °
Recommended spark plug	BPR5ES (NGK)
Lubrication system	Forced spray system
Oil capacity	0.40 Liters (0.42 US qt, 0.35 Imp qt)
Recommended oil	SAE 10W-30 API service classification SE or higher
Cooling system	Forced air
Starting system	Recoil starter
Stopping system	Ignition primary circuit ground and a flywheel brake
Carburetor	Butterfly valve
Air cleaner	Dry type (paper)
Governor	Centrifugal weight system
Breather system	Reed valve type
Fuel used	Unleaded gasoline E10
Fuel tank capacity	0.91 Liters (0.240 US gal, 0.200 Imp gal)

*1: The power rating of the engine indicated in this document is the net power output tested on a production engine for the engine model and measured in accordance with SAE J1349 at 3,600 rpm (net power) and at 2,500 rpm (max net torque). Mass production engines may vary from this value. Actual power output for the engine installed in the final machine will vary depending on numerous factors, including the operating speed of the engine in application, environmental conditions, maintenance, and other variables.

GCV145H (Starter motor type)

Model	GCV145H
Description code	GJAMH
Type	4 stroke, overhead valve, single cylinder, horizontal
Displacement	145 cm^3 (8.8 cu-in)
Bore x stroke	56.0 x 59.0 mm (2.20 x 2.32 in)
Net power (SAE J1349) *1	3.1 kW (4.2 HP)/3,600 min^{-1} (rpm)
Continuous rated power	2.1 kW (2.8 HP)/3,000 min^{-1} (rpm)
Maximum net torque (SAE J1349) *1	9.1 N·m (0.93 kgf·m, 6.7 lbf·ft)/2,500 min^{-1} (rpm)
Compression ratio	7.7
Fuel consumption (at continuous rated power)	1.1 Liters (0.29 US gal, 0.24 Imp gal)/h
Ignition system	Transistor type magneto ignition
Ignition timing	B.T.D.C. 20 °
Recommended spark plug	BPR5ES (NGK)
Lubrication system	Forced spray system
Oil capacity	0.40 Liters (0.42 US qt, 0.35 Imp qt)
Recommended oil	SAE 10W-30 API service classification SE or higher
Cooling system	Forced air
Starting system	Starter motor
Stopping system	Ignition primary circuit ground and a flywheel brake
Carburetor	Butterfly valve
Air cleaner	Dry type (paper)
Governor	Centrifugal weight system
Breather system	Reed valve type
Fuel used	Unleaded gasoline E10
Fuel tank capacity	0.91 Liters (0.240 US gal, 0.200 Imp gal)
Voltage	10.8 V
Battery type	Rechargeable lithium-ion battery
Charging generator type	Unregulated half wave diode rectified trickle charger
Power generation output	12 V - 0.5 A/2,800 min^{-1} (rpm)

*1: The power rating of the engine indicated in this document is the net power output tested on a production engine for the engine model and measured in accordance with SAE J1349 at 3,600 rpm (net power) and at 2,500 rpm (max net torque). Mass production engines may vary from this value. Actual power output for the engine installed in the final machine will vary depending on numerous factors, including the operating speed of the engine in application, environmental conditions, maintenance, and other variables.

GCV170H (Except starter motor type)

Model	GCV170H
Description code	GJANH
Type	4 stroke, overhead valve, single cylinder, horizontal
Displacement	166 cm^3 (10.1 cu-in)
Bore x stroke	60.0 x 59.0 mm (2.36 x 2.32 in)
Net power (SAE J1349) *1	3.6 kW (4.8 HP)/3,600 min^{-1} (rpm)
Continuous rated power	2.4 kW (3.2 HP)/3,000 min^{-1} (rpm)
Maximum net torque (SAE J1349) *1	11.1 N·m (1.13 kgf·m, 8.2 lbf·ft)/2,500 min^{-1} (rpm)
Compression ratio	8.0
Fuel consumption (at continuous rated power)	1.2 Liters (0.32 US gal, 0.26 Imp gal)/h
Ignition system	Transistor type magneto ignition
Ignition timing	B.T.D.C. 20 °
Recommended spark plug	BPR5ES (NGK)
Lubrication system	Forced spray system
Oil capacity	0.40 Liters (0.42 US qt, 0.35 Imp qt)
Recommended oil	SAE 10W-30 API service classification SE or higher
Cooling system	Forced air
Starting system	Recoil starter
Stopping system	Ignition primary circuit ground and a flywheel brake (light flywheel type)
Carburetor	Butterfly valve
Air cleaner	Dry type (paper)
Governor	Centrifugal weight system
Breather system	Reed valve type
Fuel used	Unleaded gasoline E10
Fuel tank capacity	0.91 Liters (0.240 US gal, 0.200 Imp gal)

*1: The power rating of the engine indicated in this document is the net power output tested on a production engine for the engine model and measured in accordance with SAE J1349 at 3,600 rpm (net power) and at 2,500 rpm (max net torque). Mass production engines may vary from this value. Actual power output for the engine installed in the final machine will vary depending on numerous factors, including the operating speed of the engine in application, environmental conditions, maintenance, and other variables.

GCV170H (Starter motor type)

Model	GCV170H
Description code	GJANH
Type	4 stroke, overhead valve, single cylinder, horizontal
Displacement	166 cm^3 (10.1 cu-in)
Bore x stroke	60.0 x 59.0 mm (2.36 x 2.32 in)
Net power (SAE J1349) *1	3.6 kW (4.8 HP)/3,600 min^{-1} (rpm)
Continuous rated power	2.4 kW (3.2 HP)/3,000 min^{-1} (rpm)
Maximum net torque (SAE J1349) *1	11.1 N·m (1.13 kgf·m, 8.2 lbf·ft)/2,500 min^{-1} (rpm)
Compression ratio	8.0
Fuel consumption (at continuous rated power)	1.2 Liters (0.32 US gal, 0.26 Imp gal)/h
Ignition system	Transistor type magneto ignition
Ignition timing	B.T.D.C. 20 °
Recommended spark plug	BPR5ES (NGK)
Lubrication system	Forced spray system
Oil capacity	0.40 Liters (0.42 US qt, 0.35 Imp qt)
Recommended oil	SAE 10W-30 API service classification SE or higher
Cooling system	Forced air
Starting system	Starter motor
Stopping system	Ignition primary circuit ground and a flywheel brake
Carburetor	Butterfly valve
Air cleaner	Dry type (paper)
Governor	Centrifugal weight system
Breather system	Reed valve type
Fuel used	Unleaded gasoline E10
Fuel tank capacity	0.91 Liters (0.240 US gal, 0.200 Imp gal)
Voltage	10.8 V
Battery type	Rechargeable lithium-ion battery
Charging generator type	Unregulated half wave diode rectified trickle charger
Power generation output	12 V - 0.5 A/2,800 min^{-1} (rpm)

*1: The power rating of the engine indicated in this document is the net power output tested on a production engine for the engine model and measured in accordance with SAE J1349 at 3,600 rpm (net power) and at 2,500 rpm (max net torque). Mass production engines may vary from this value. Actual power output for the engine installed in the final machine will vary depending on numerous factors, including the operating speed of the engine in application, environmental conditions, maintenance, and other variables.

GCV200H (Except starter motor type)

Model	GCV200H
Description code	GJAPH
Type	4 stroke, overhead valve, single cylinder, horizontal
Displacement	201 cm^3 (12.3 cu-in)
Bore x stroke	66.0 x 59.0 mm (2.60 x 2.32 in)
Net power (SAE J1349) *1	4.2 kW (5.6 HP)/3,600 min^{-1} (rpm)
Continuous rated power	2.8 kW (3.8 HP)/3,000 min^{-1} (rpm)
Maximum net torque (SAE J1349) *1	12.7 N·m (1.30 kgf·m, 9.4 lbf·ft)/2,500 min^{-1} (rpm)
Compression ratio	8.0
Fuel consumption (at continuous rated power)	1.4 Liters (0.37 US gal, 0.31 Imp gal)/h
Ignition system	Transistor type magneto ignition
Ignition timing	B.T.D.C. 20 °
Recommended spark plug	BPR5ES (NGK)
Lubrication system	Forced spray system
Oil capacity	0.40 Liters (0.42 US qt, 0.35 Imp qt)
Recommended oil	SAE 10W-30 API service classification SE or higher
Cooling system	Forced air
Starting system	Recoil starter
Stopping system	Ignition primary circuit ground and a flywheel brake (light flywheel type)
Carburetor	Butterfly valve
Air cleaner	Dry type (paper)
Governor	Centrifugal weight system
Breather system	Reed valve type
Fuel used	Unleaded gasoline E10
Fuel tank capacity	0.91 Liters (0.240 US gal, 0.200 Imp gal)

*1: The power rating of the engine indicated in this document is the net power output tested on a production engine for the engine model and measured in accordance with SAE J1349 at 3,600 rpm (net power) and at 2,500 rpm (max net torque). Mass production engines may vary from this value. Actual power output for the engine installed in the final machine will vary depending on numerous factors, including the operating speed of the engine in application, environmental conditions, maintenance, and other variables.

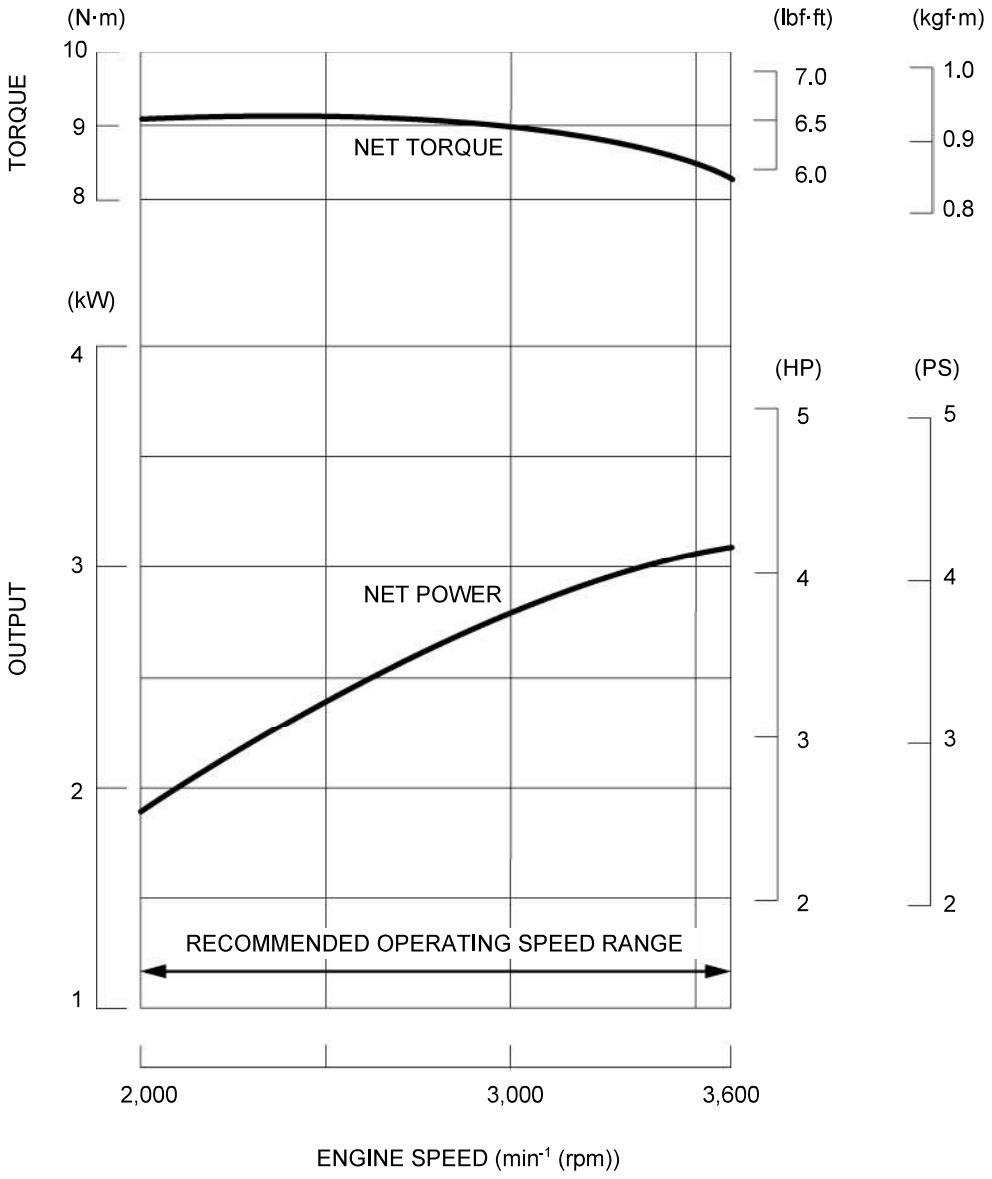
GCV200H (Starter motor type)

Model	GCV200H
Description code	GJAPH
Type	4 stroke, overhead valve, single cylinder, horizontal
Displacement	201 cm^3 (12.3 cu-in)
Bore x stroke	66.0 x 59.0 mm (2.60 x 2.32 in)
Net power (SAE J1349) *1	4.2 kW (5.6 HP)/3,600 min^{-1} (rpm)
Continuous rated power	2.8 kW (3.8 HP)/3,000 min^{-1} (rpm)
Maximum net torque (SAE J1349) *1	12.7 N·m (1.30 kgf·m, 9.4 lbf·ft)/2,500 min^{-1} (rpm)
Compression ratio	8.0
Fuel consumption (at continuous rated power)	1.4 Liters (0.37 US gal, 0.31 Imp gal)/h
Ignition system	Transistor type magneto ignition
Ignition timing	B.T.D.C. 20 °
Recommended spark plug	BPR5ES (NGK)
Lubrication system	Forced spray system
Oil capacity	0.40 Liters (0.42 US qt, 0.35 Imp qt)
Recommended oil	SAE 10W-30 API service classification SE or higher
Cooling system	Forced air
Starting system	Starter motor
Stopping system	Ignition primary circuit ground and a flywheel brake
Carburetor	Butterfly valve
Air cleaner	Dry type (paper)
Governor	Centrifugal weight system
Breather system	Reed valve type
Fuel used	Unleaded gasoline E10
Fuel tank capacity	0.91 Liters (0.240 US gal, 0.200 Imp gal)
Voltage	10.8 V
Battery type	Rechargeable lithium-ion battery
Charging generator type	Unregulated half wave diode rectified trickle charger
Power generation output	12 V - 0.5 A/2,800 min^{-1} (rpm)

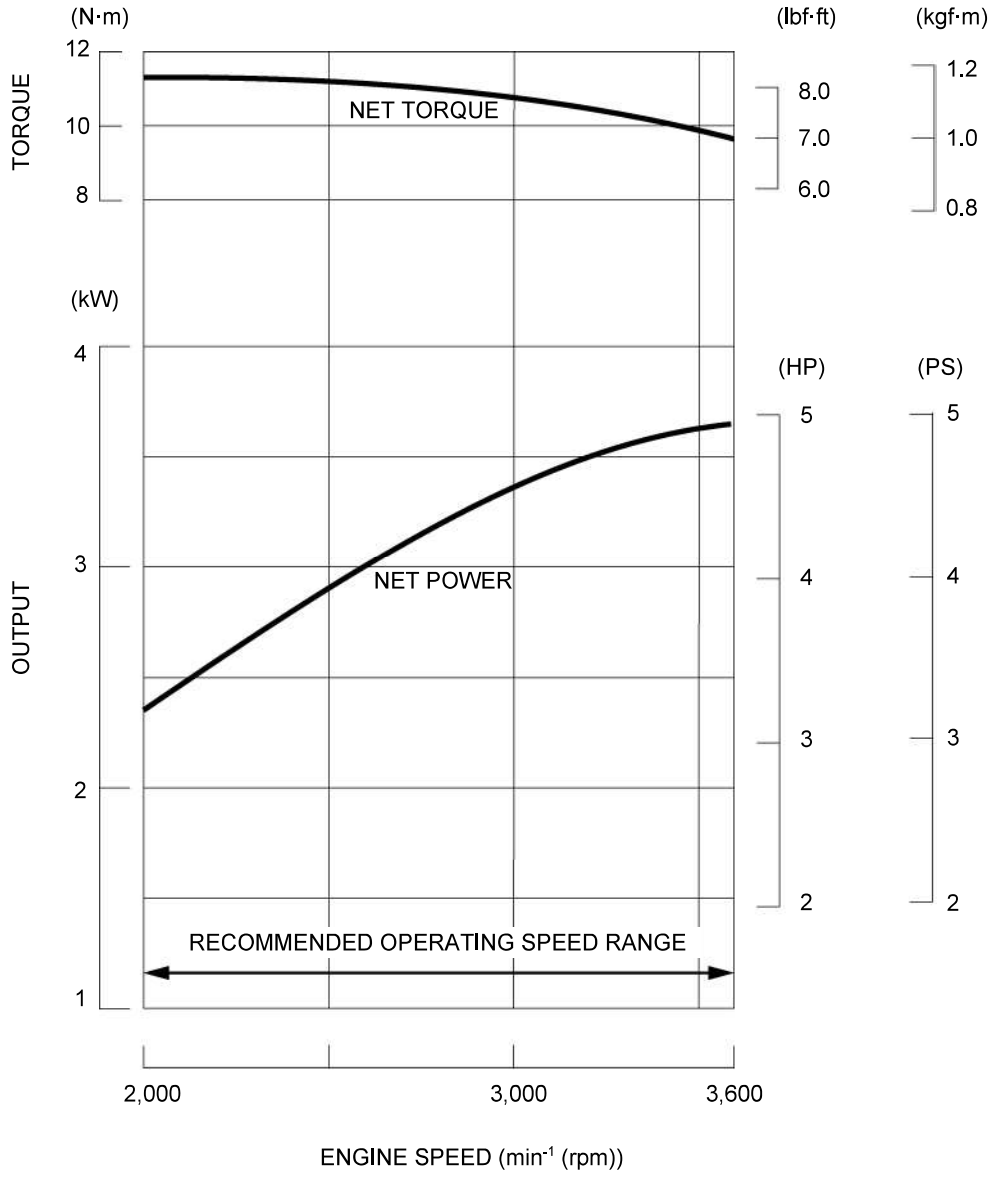
*1: The power rating of the engine indicated in this document is the net power output tested on a production engine for the engine model and measured in accordance with SAE J1349 at 3,600 rpm (net power) and at 2,500 rpm (max net torque). Mass production engines may vary from this value. Actual power output for the engine installed in the final machine will vary depending on numerous factors, including the operating speed of the engine in application, environmental conditions, maintenance, and other variables.

PERFORMANCE CURVES

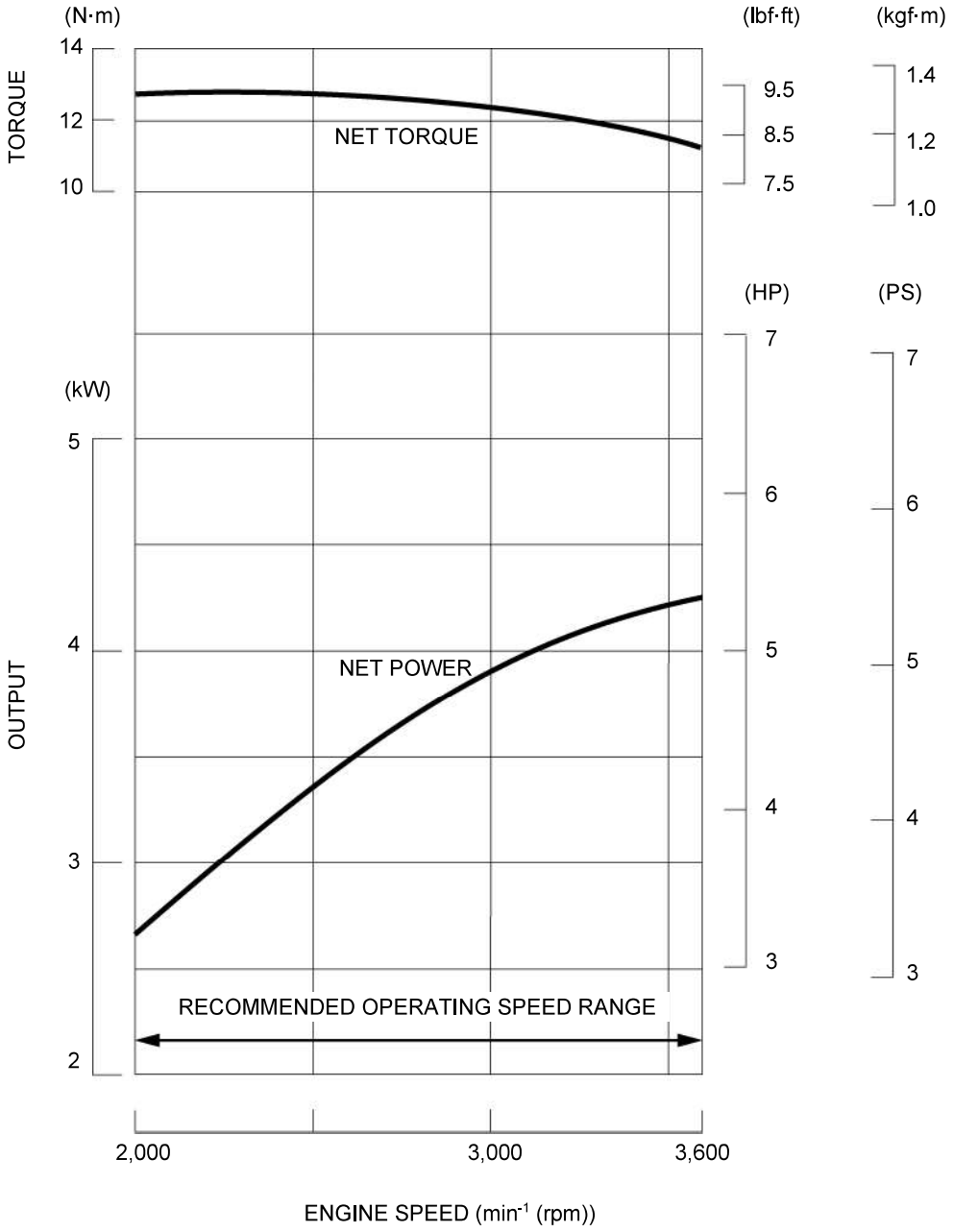
GCV145H



GCV170H


(N·m)
(lbf·ft)
(kgf·m)
TORQUE
12
10
8
NET TORQUE
8.0
7.0
6.0
1.2
1.0
0.8
(kW)
(HP)
(PS)
OUTPUT
4
3
2
1
NET POWER
5
4
3
2
RECOMMENDED OPERATING SPEED RANGE
2,000
3,000
3,600
ENGINE SPEED (min-1 (rpm))

GCV200H

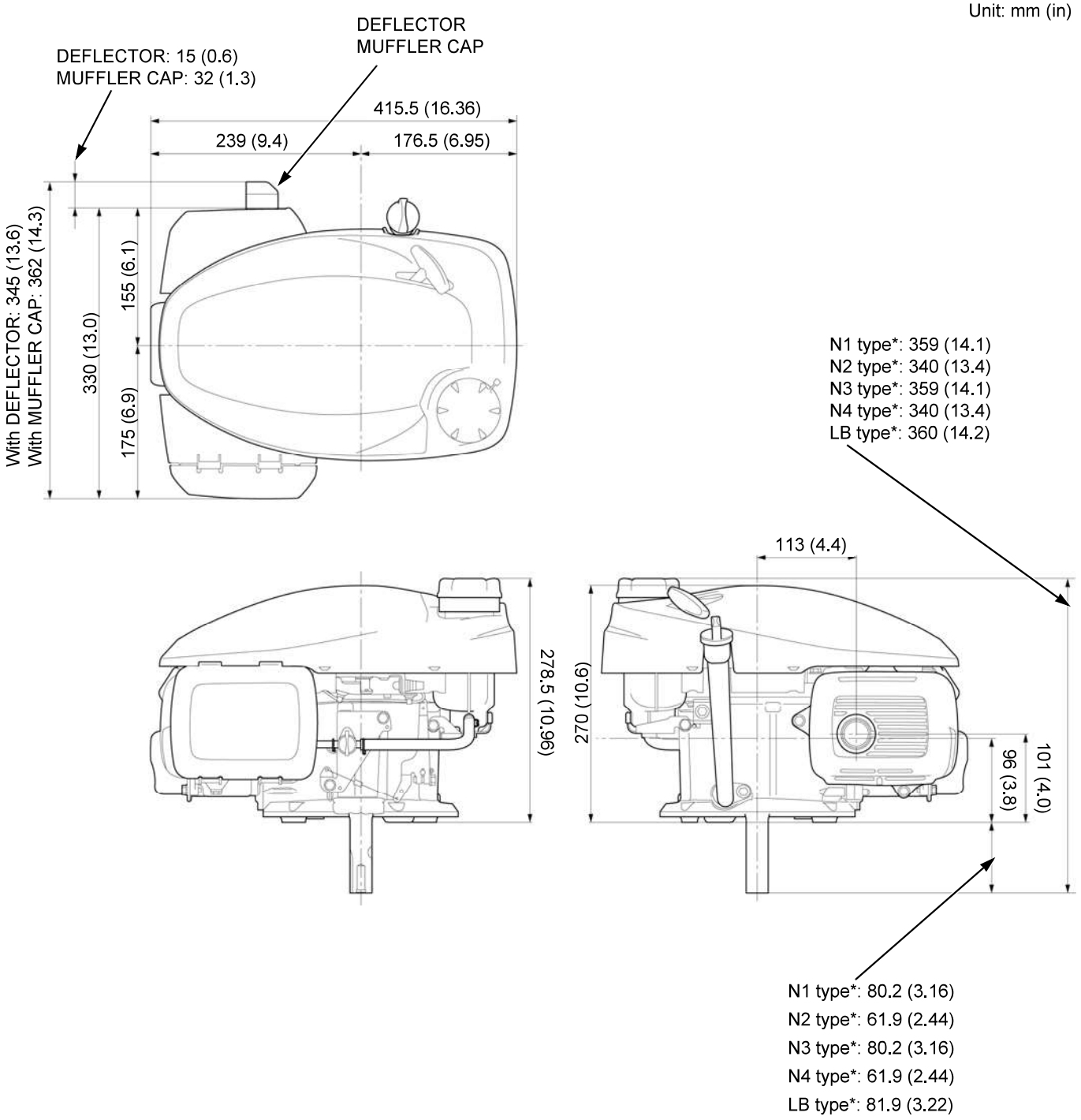

(N·m)
(lbf·ft)
(kgf·m)
14
12
10
TORQUE
NET TORQUE
9.5
8.5
7.5
1.4
1.2
1.0
(HP)
(PS)
7
6
5
4
3
(kW)
5
4
3
2
OUTPUT
NET POWER
RECOMMENDED OPERATING SPEED RANGE
2,000
3,000
3,600
ENGINE SPEED (min-1 (rpm))

DIMENSIONAL DRAWINGS

*: P.T.O. type. (page 1-2)

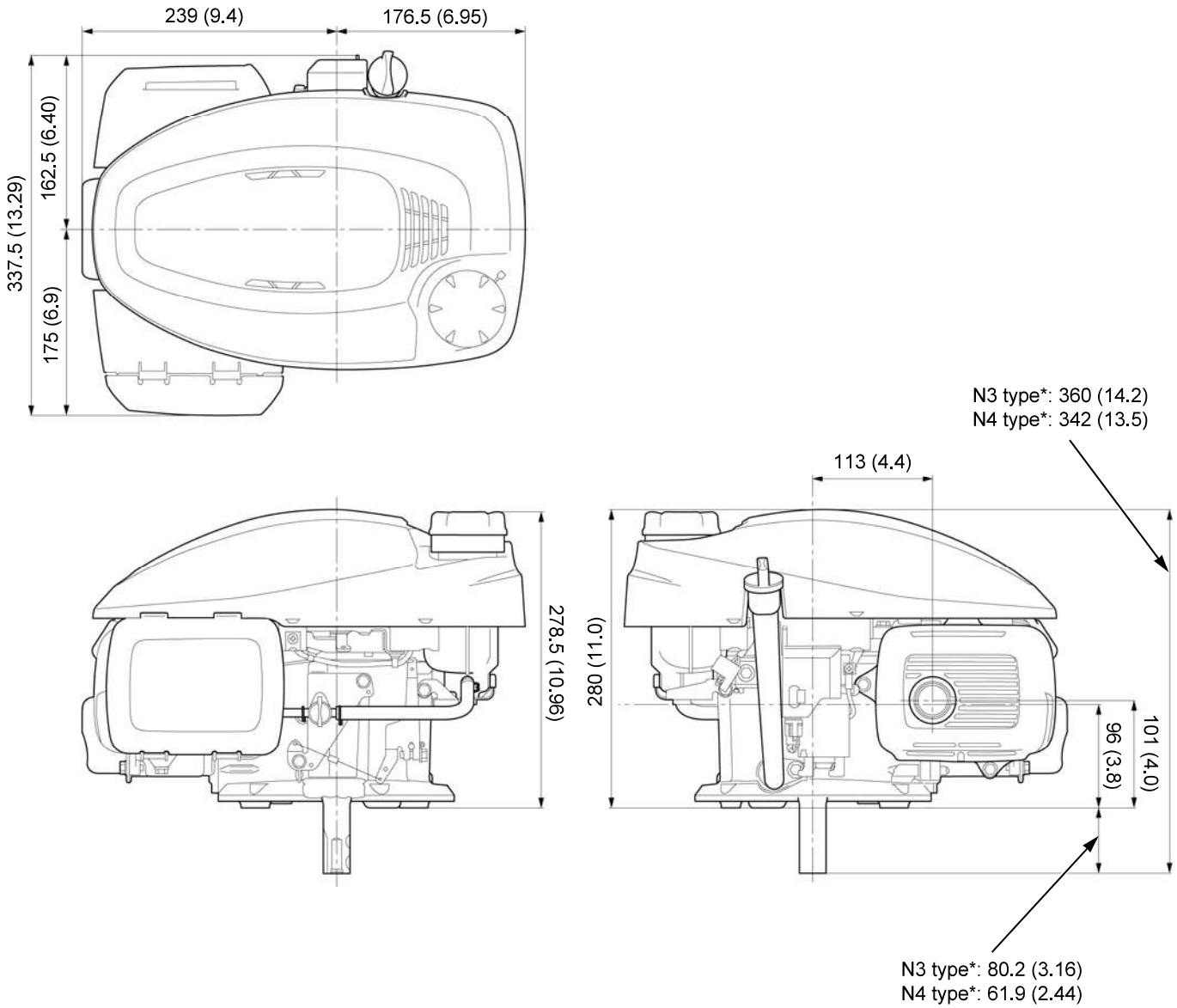
WITHOUT STARTER MOTOR TYPE:

Unit: mm (in)



WITH STARTER MOTOR TYPE:

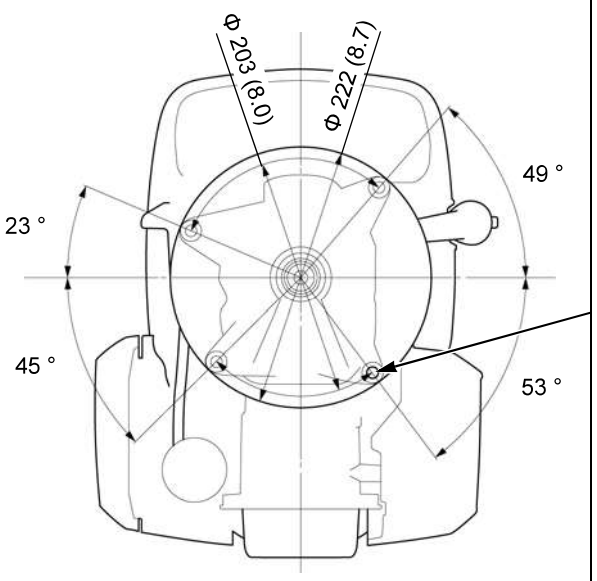
Unit: mm (in)



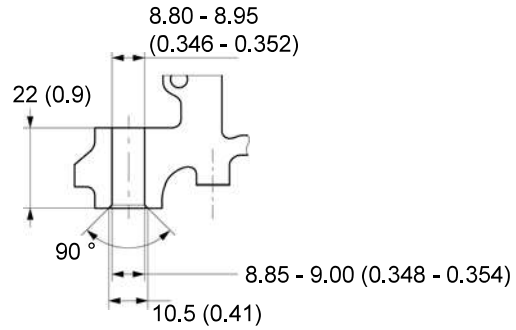
P.T.O. DIMENSIONAL DRAWINGS

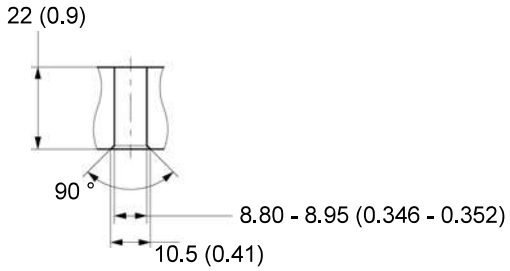
*: P.T.O. type. (page 1-2)

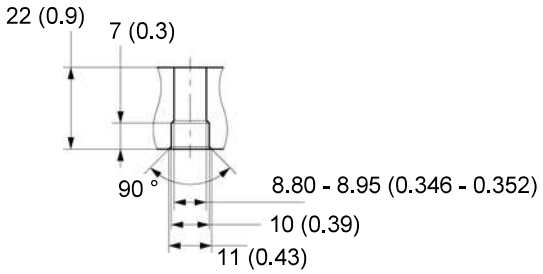
Unit: mm (in)



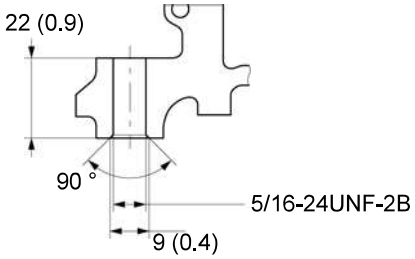
Except A1UV type (either shape)





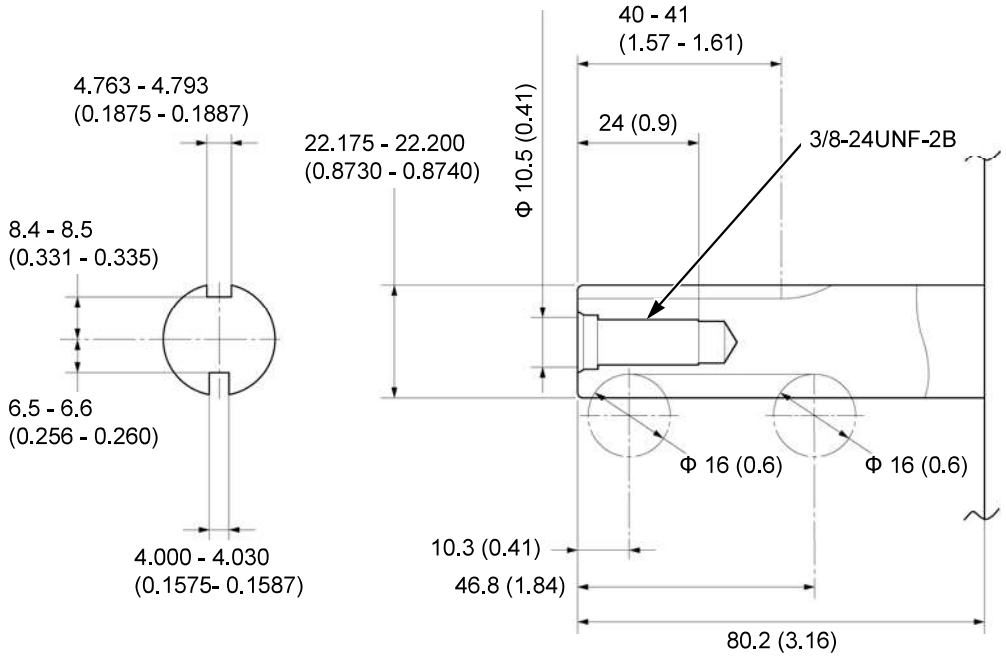


A1UV type



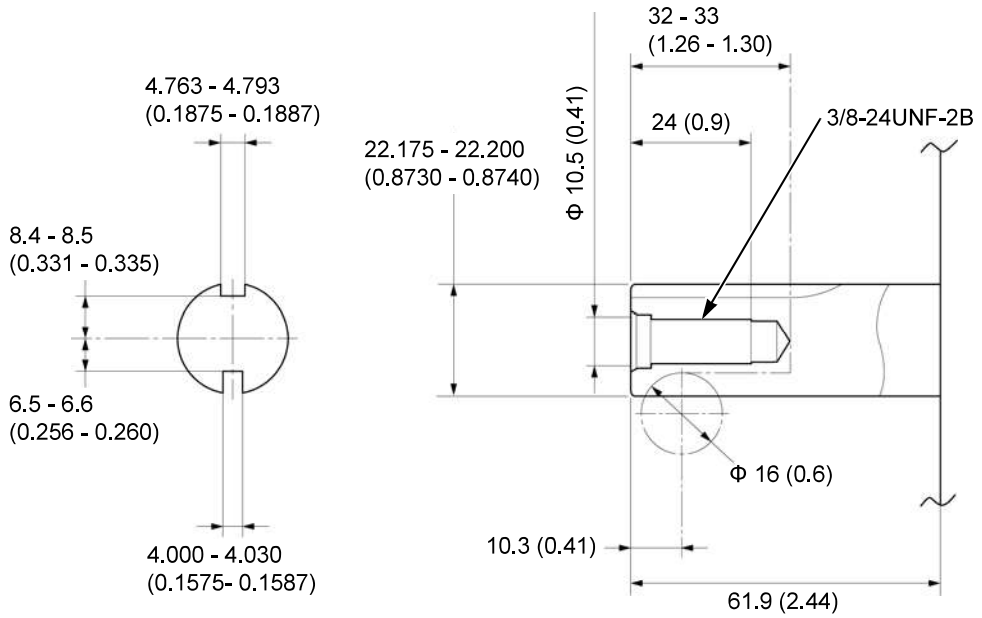
N1 type

Unit: mm (in)



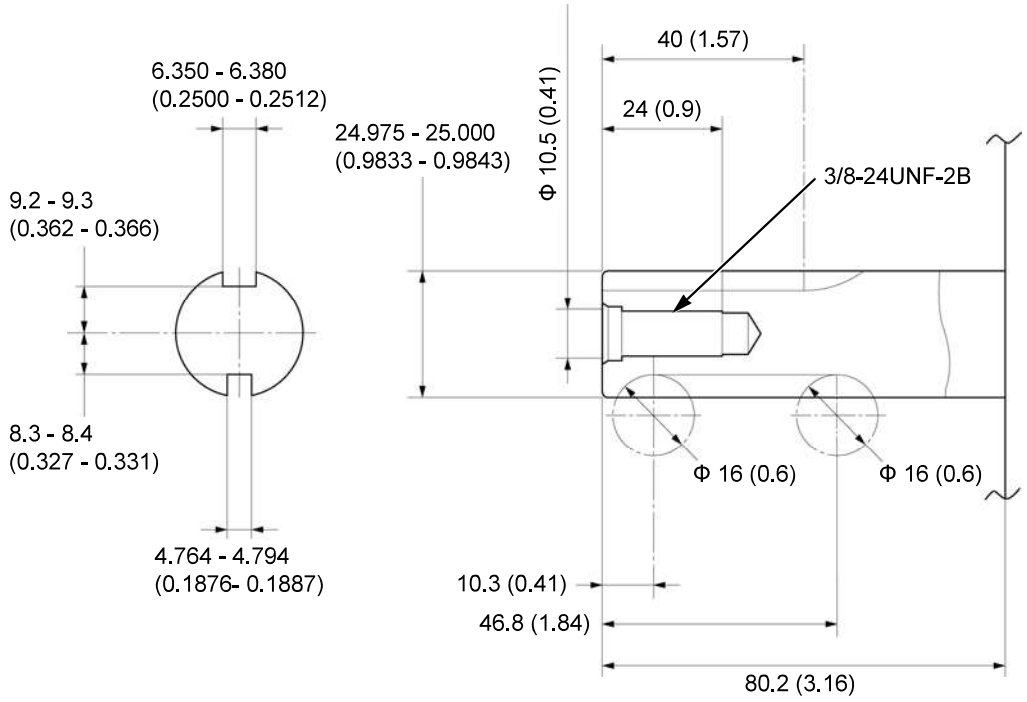
N2 type

Unit: mm (in)



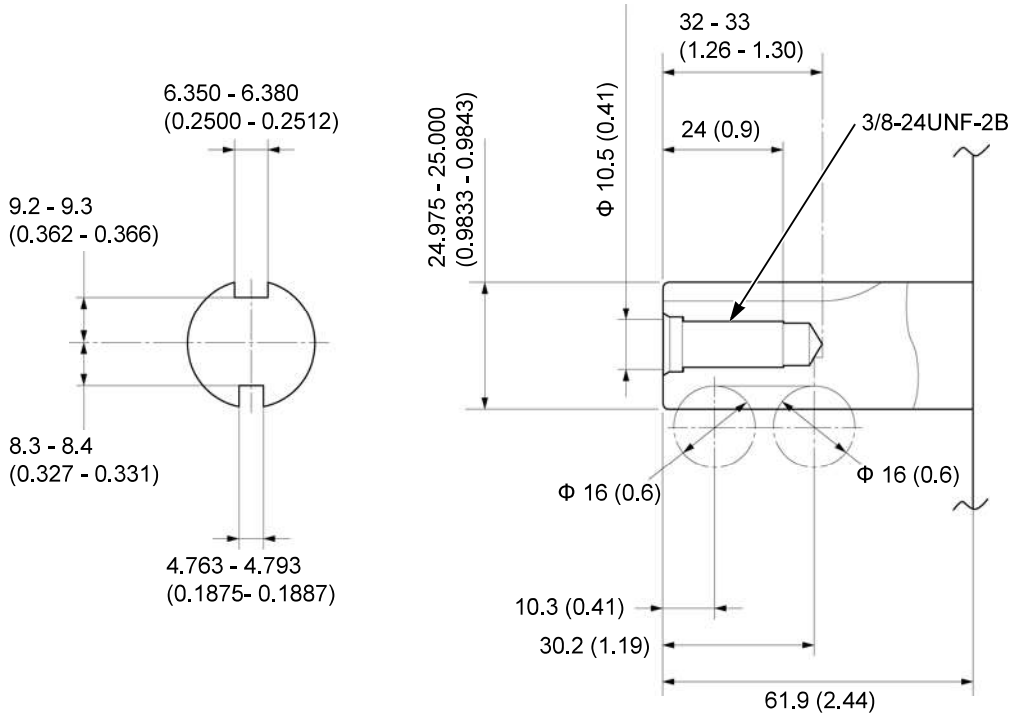
N3 type

Unit: mm (in)



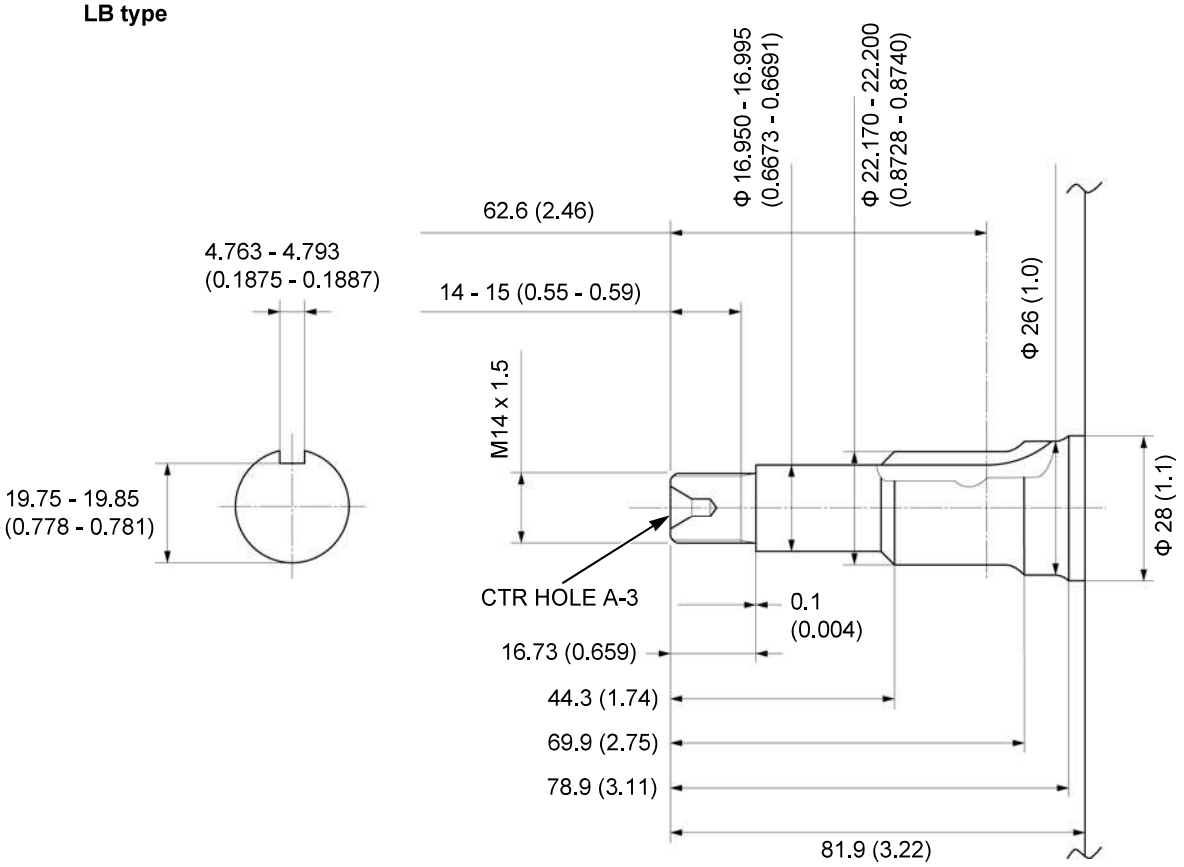
N4 type

Unit: mm (in)



LB type

Unit: mm (in)



2. SERVICE INFORMATION

MAINTENANCE STANDARDS

GCV145H/GCV170H/GCV200H

Unit: mm (in)

Part	Item		Standard	Service limit
Engine	Maximum governed speed	A3T9	2,800 $^{+0}_{-150}$ min^{-1} (rpm)	-
		NBE	2,850 $^{+0}_{-100}$ min^{-1} (rpm)	-
		S4G7/A4G7/A3G7/ A1G7/S4BB/S4GB/ S4HB/S3AL/A3HV/ S4HV/S1G7/S3BL/ N1G7/N2G7/C4BB/ C4GB/C3AL/C4G7	2,900 $^{+0}_{-100}$ min^{-1} (rpm)	-
		A1UV/N2EE/N2KE	3,100 ± 150 min^{-1} (rpm)	-
	Cylinder compression	GCV145H	0.45 MPa (4.6 kgf/cm^2, 65 psi)/600 min^{-1} (rpm)	-
		GCV170H/GCV200H	0.50 MPa (5.0 kgf/cm^2, 71 psi)/600 min^{-1} (rpm)	-
Valves	Valve clearance	IN/EX	0.08 - 0.12 (0.003 - 0.005)	-
	Valve stem O.D.	IN/EX	5.465 - 5.480 (0.2152 - 0.2157)	5.318 (0.2094)
	Valve guide I.D.	IN	5.500 - 5.512 (0.2165 - 0.2170)	5.572 (0.2194)
		EX	5.540 - 5.552 (0.2181 - 0.2186)	5.612 (0.2209)
	Seat width	IN/EX	0.7 - 0.9 (0.03 - 0.04)	1.8 (0.07)
	Valve spring free length	IN/EX	30.5 (1.20)	29.0 (1.14)
Camshaft	Cam height	GCV145H IN/EX/ GCV170H IN/EX	33.779 - 34.179 (1.3299 - 1.3456)	33.754 (1.3289)
		GCV200H IN	34.253 - 34.653 (1.3485 - 1.3643)	34.228 (1.3476)
		GCV200H EX	34.258 - 34.658 (1.3487 - 1.3645)	34.233 (1.3478)
	Camshaft I.D.	Both ends	10.09 - 10.18 (0.397 - 0.401)	10.20 (0.402)
		Center	10.14 - 10.18 (0.399 - 0.401)	10.20 (0.402)
Rocker arm	Rocker arm I.D.		6.000 - 6.030 (0.2362 - 0.2374)	6.043 (0.2379)
	Rocker arm shaft O.D.		5.960 - 5.990 (0.2346 - 0.2358)	5.953 (0.2344)
	Rocker arm shaft bearing I.D.		6.000 - 6.018 (0.2362 - 0.2369)	6.043 (0.2379)
Cylinder	Sleeve I.D.	GCV145H	56.000 - 56.015 (2.2047 - 2.2053)	56.165 (2.2112)
		GCV170H	60.000 - 60.015 (2.3622 - 2.3628)	60.165 (2.3687)
		GCV200H	66.000 - 66.015 (2.5984 - 2.5990)	66.165 (2.6049)
Piston	Skirt O.D.	GCV145H	55.970 - 55.990 (2.2035 - 2.2043)	55.85 (2.1988)
		GCV170H	59.970 - 59.990 (2.3610 - 2.3618)	59.85 (2.3563)
		GCV200H	65.970 - 65.990 (2.5972 - 2.5980)	65.85 (2.5925)
	Piston-to-cylinder clearance		0.010 - 0.045 (0.0004 - 0.0018)	0.085 (0.0033)
	Piston pin bore I.D.		13.002 - 13.016 (0.5119 - 0.5124)	13.048 (0.5137)
Piston pin	Pin O.D.		12.994 - 13.000 (0.5116 - 0.5118)	12.954 (0.5100)
Piston rings	Ring width	Top	0.935 - 0.950 (0.0368 - 0.0374)	0.890 (0.0350)
		Second	0.975 - 0.990 (0.0384 - 0.0390)	0.930 (0.0366)
		Oil	2.380 - 2.460 (0.0937 - 0.9685)	2.370 (0.0933)
	Ring side clearance	Top	0.055 - 0.089 (0.0022 - 0.0035)	0.190 (0.0075)
		Second	0.015 - 0.049 (0.0006 - 0.0019)	0.15 (0.006)
		Oil	0.045 - 0.144 (0.0018 - 0.0057)	0.240 (0.0094)
	Ring end gap	Top	0.20 - 0.30 (0.008 - 0.012)	1.0 (0.04)
		Second	0.30 - 0.40 (0.012 - 0.016)	1.0 (0.04)
		Oil (side rail)	0.20 - 0.45 (0.008 - 0.018)	1.0 (0.04)
Connecting rod	Small end I.D.		13.005 - 13.020 (0.5120 - 0.5126)	13.07 (0.515)
	Big end I.D.		28.020 - 28.033 (1.1031 - 1.1036)	28.066 (1.1050)
	Big end oil clearance		0.040 - 0.063 (0.0016 - 0.0025)	0.120 (0.0047)
	Big end axial clearance		0.10 - 0.50 (0.004 - 0.020)	0.80 (0.031)
Crankshaft	Main journal O.D. (PTO side)		27.980 - 27.993 (1.1016 - 1.1021)	27.933 (1.0997)
	Main journal O.D. (Flywheel side)		25.380 - 25.393 (0.9992 - 0.9997)	25.333 (0.9974)
	Crank pin O.D.		27.970 - 27.980 (1.1012 - 1.1016)	27.920 (1.0992)
Case Cover	Main journal I.D.		25.420 - 25.441 (1.0008 - 1.0016)	25.466 (1.0026)
	Crankshaft axial clearance		0.15 - 0.70 (0.006 - 0.028)	1.0 (0.04)
Crank Case	Main journal I.D.		28.020 - 28.041 (1.1031 - 1.1040)	28.066 (1.1050)
Spark plug	Gap		0.70 - 0.80 (0.028 - 0.031)	-

Part	Item		Standard	Service limit
Ignition coil	Resistance (without starter motor type)	Primary coil	0.43 - 0.52 Ω	-
		Secondary coil	8.32 - 12.4 kΩ	-
	Resistance (with starter motor type)	Primary coil (at 25 °C)	0.847 - 1.047 Ω	-
		Secondary coil (at 25 °C)	8.8 - 12.8 kΩ	-
		Charge coil (at 20 °C)	0.525 - 0.625 Ω	-
	Air gap (at flywheel)		0.30 - 0.50 (0.012 - 0.020)	-
Flywheel brake	Brake shoe thickness		See page 3-7	3.0 (0.12)

TORQUE VALUES

Item	Tread Dia. (mm)	Torque values		
		N·m	kgf·m	lbf·ft
Crankcase cover bolt	M8 x 1.25	24	2.4	18
Cylinder bolt	M8 x 1.25	24	2.4	18
Cylinder bolt	M8 x 1.25	24	2.4	18
Spark plug	M14 x 1.25	20	2.0	15
Connecting rod bolt	M7 x 1.0	12	1.2	9
Valve adjusting lock nut	M5 x 1.0	8	0.8	5.9
Valve lifter bolt	M6 x 1.0	10	1.0	7
Oil extension bolt	M6 x 1.0	12	1.2	9
Governor holder shaft bolt	M6 x 1.0	12	1.2	9
Fuel cock screw	Tapping screw	2.5	0.3	1.8
Air cleaner case nut	M6 x 1.0	8.5	0.9	6.3
Recoil starter bolt	M6 x 1.0	8.5	0.9	6.3
Flywheel nut (Light flywheel type (without gear))	M14 x 1.5	55	5.6	41
Flywheel nut (Light flywheel type (with gear))	M14 x 1.5	55	5.6	41
Flywheel nut (Heavy flywheel type)	M14 x 1.5	75	7.6	55
Special bolt (6 mm)	M6 x 1.0	10	1.0	7
Engine stop switch screw	M4 x 0.7	1.8	0.2	1.3
Screw	M5 x 0.8	1.0	0.1	0.7

STANDARD TORQUE VALUES

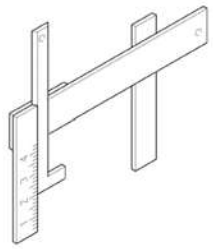
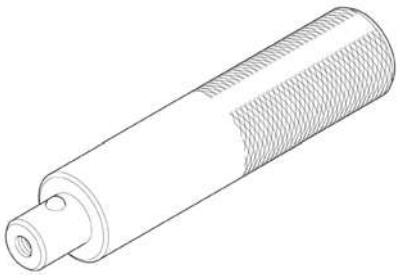
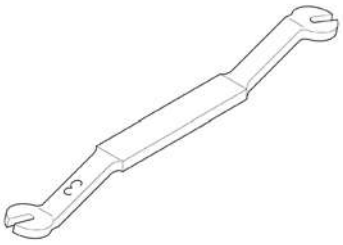
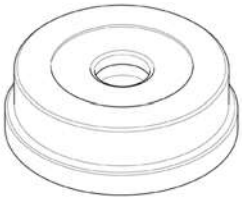
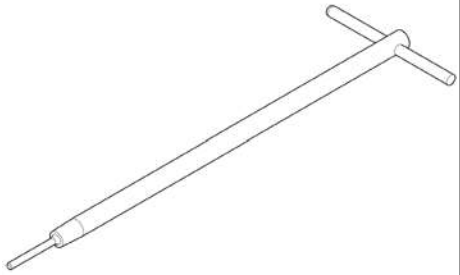
Item	Tread Dia. (mm)	Torque values		
		N·m	kgf·m	lbf·ft
Screw	M5	4.2	0.4	3.1
	M6	9	0.9	6.6
Bolt and nut	M5	5.2	0.5	3.9
	M6	10	1.0	7
	M8	22	2.2	16
	M10	34	3.5	25
	M12	54	5.5	40
Flange bolt and nut	M5	5.5	0.6	4.1
	M6	12	1.2	9
	M8	27	2.8	20
	M10	39	4.0	29
CT (Cutting threads) flange bolt (Retightening)	M6	12	1.2	9
SH (Small head) bolt	M6	9	0.9	6.6

LUBRICATION & SEAL POINTS

Material	Location
Engine oil	Crankshaft journal
	Crankshaft pin
	Crankcase bearing area
	Crankcase cover bearing area
	Piston outer surface and piston pin hole
	Piston pin outer surface
	Piston ring entire surface
	Cylinder inner surface
	Connecting rod big and small end bearing area
	Connecting rod bolt threads and seating surface
	Camshaft bearing, cam profile and decompressor
	Valve stem sliding surface and stem end
	Valve spring whole surface
	Rocker arm sliding surface
	Rocker arm shaft whole surface
	Valve adjusting screw threads
	Valve adjusting lock nut threads and seating surface
	Flywheel nut threads and seating surface
	Governor holder shaft journal
	Governor arm shaft journal
	Timing gear teeth
	Valve lifter sliding surface
	Valve lifter bolt shaft journal
	Thrust washer both sides
Multi-purpose grease	Oil seal lips
	O-ring
Threebond® 1216E or LOCTITE® 5900 or equivalent	Cylinder and cylinder head cover mating surface
	Cylinder and crankcase mating surface
	Crankcase and crankcase cover mating surface
Threebond® 1216E, Hondabond HT, LOCTITE® 5900 or equivalent	Thermo-wax square end

TOOLS

SPECIAL TOOLS

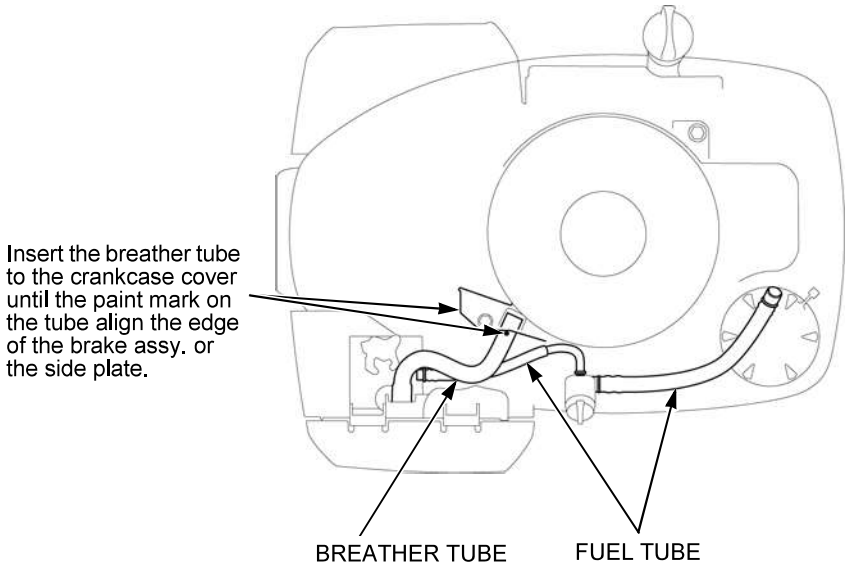
Float level gauge 07401-0010000 	Bearing driver attachment, 37 x 40 mm 07746-0010200 	Driver handle 07749-0010000 
Seat cutter, 27.5 mm (45° IN/EX) 07780-0010200 	Flat cutter, 30 mm (32° IN/EX) 07780-0012200 	Interior cutter, 30 mm (60° IN/EX) 07780-0014000 
Valve adjusting wrench 07908-KE90000 	Bearing driver attachment, 62 x 64 mm 07947-6340400 	Cutter holder, 5.5 mm 07981-VA20101 
Cleaning brush 07998-VA20100 		

HARNESS AND TUBE ROUTING

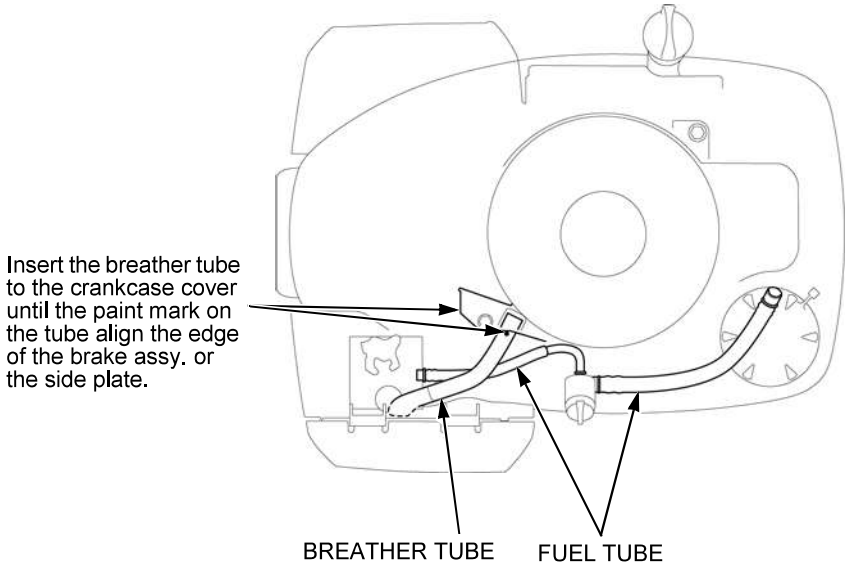
Connection of stop switch cord and tubes are depending on the application of the engine, therefore, the routing of these parts is not indicated in this manual.

TUBE ROUTING

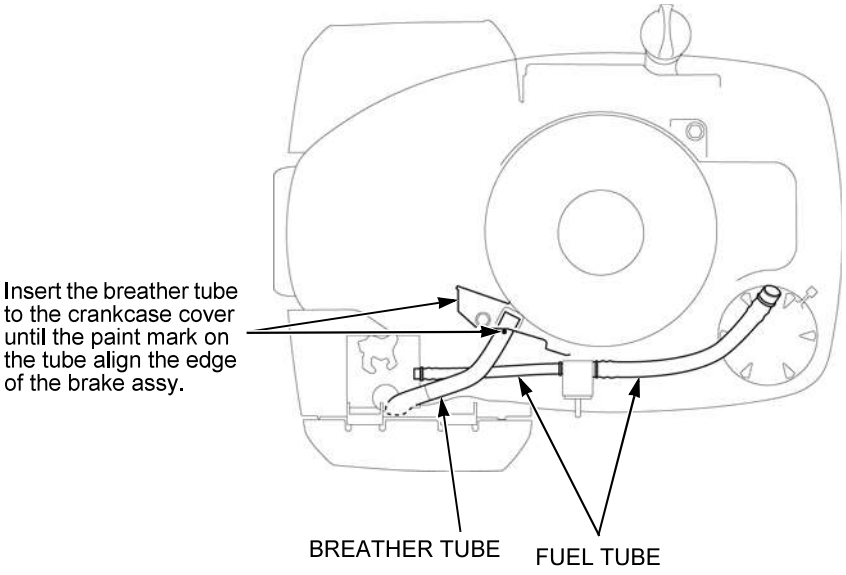
Manual choke and manual throttle type



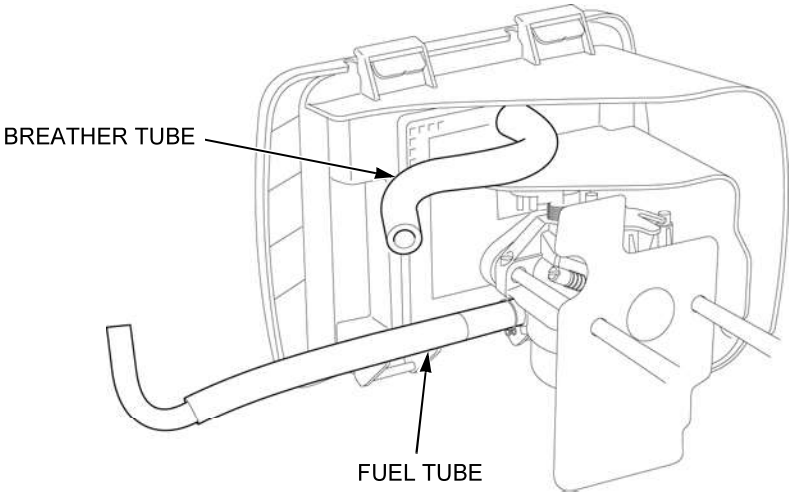
Automatic choke and manual throttle type



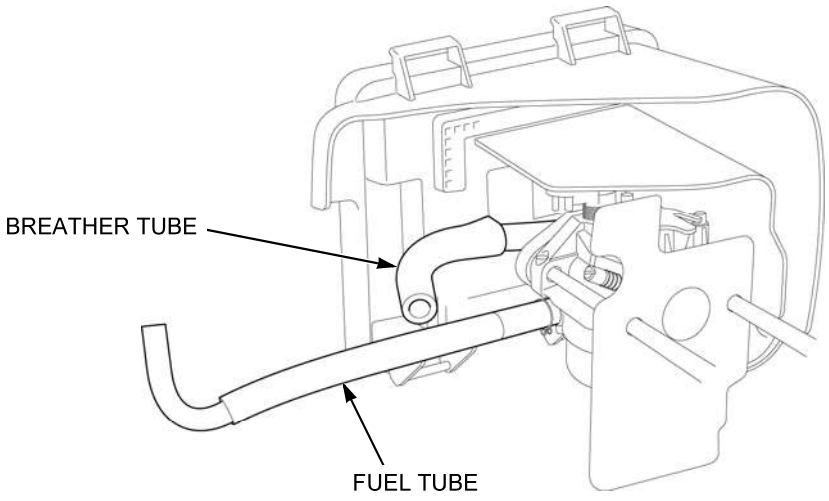
Automatic choke and fixed throttle type



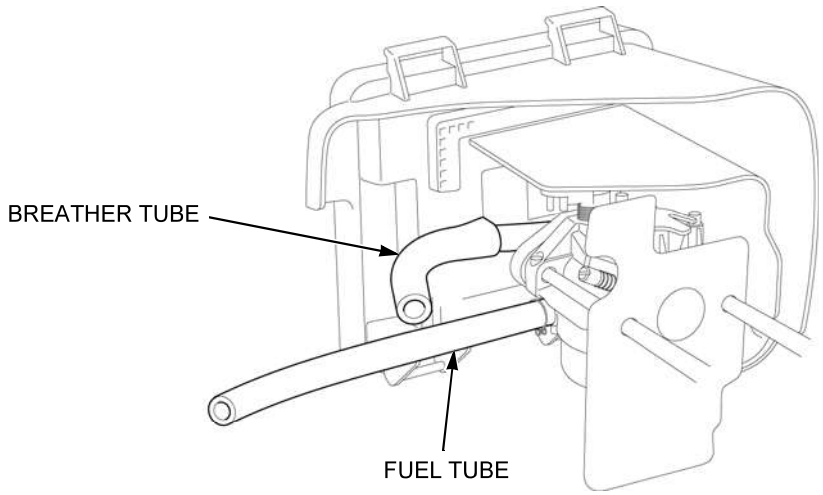
Manual choke and manual throttle type



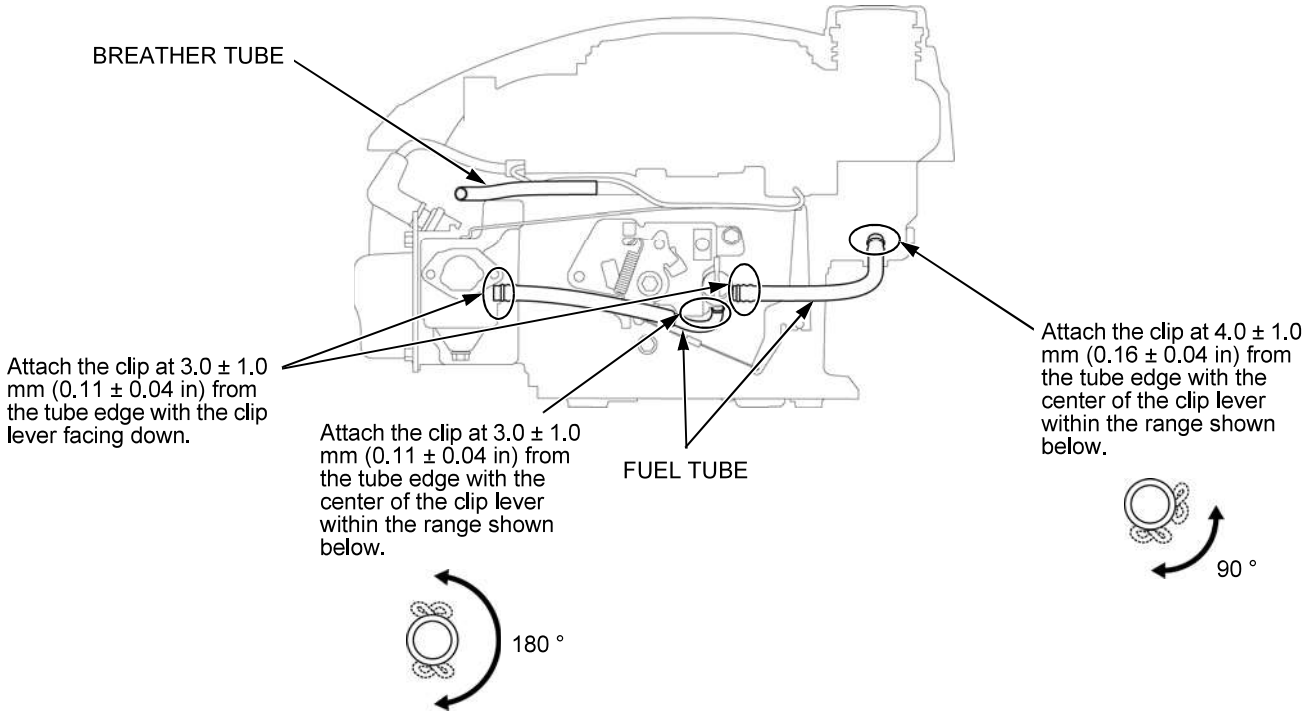
Automatic choke and manual throttle type



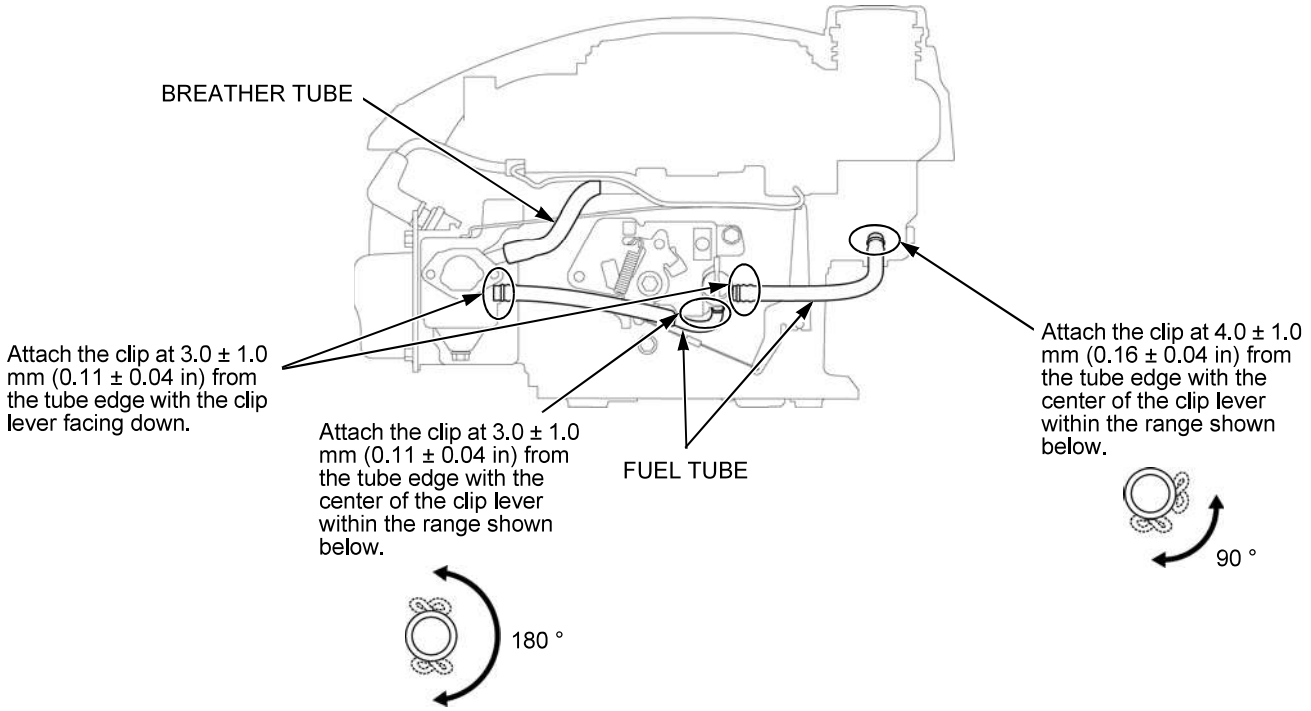
Automatic choke and fixed throttle type



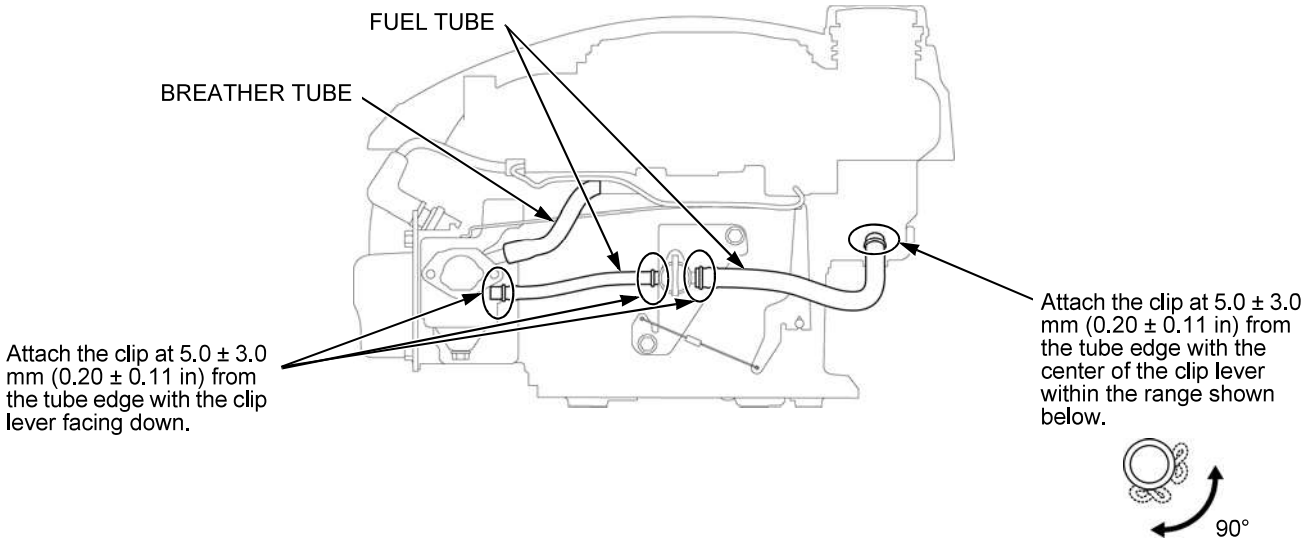
Manual choke and manual throttle type



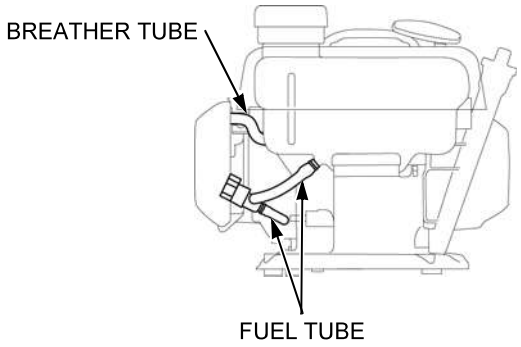
Automatic choke and manual throttle type



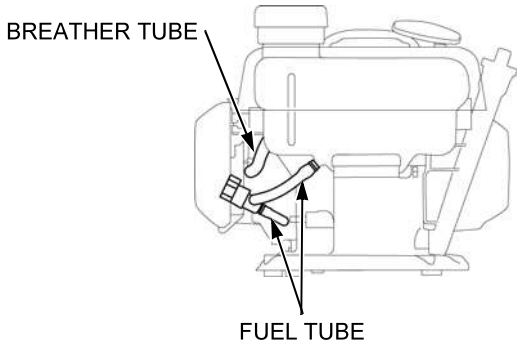
Automatic choke and fixed throttle type



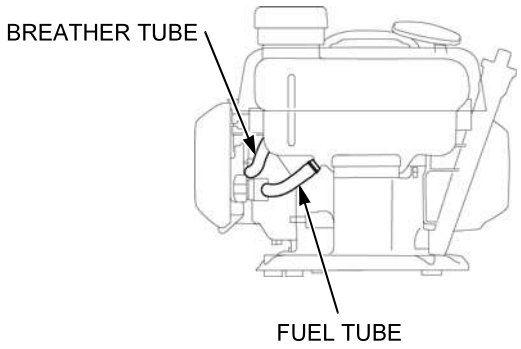
Manual choke and manual throttle type



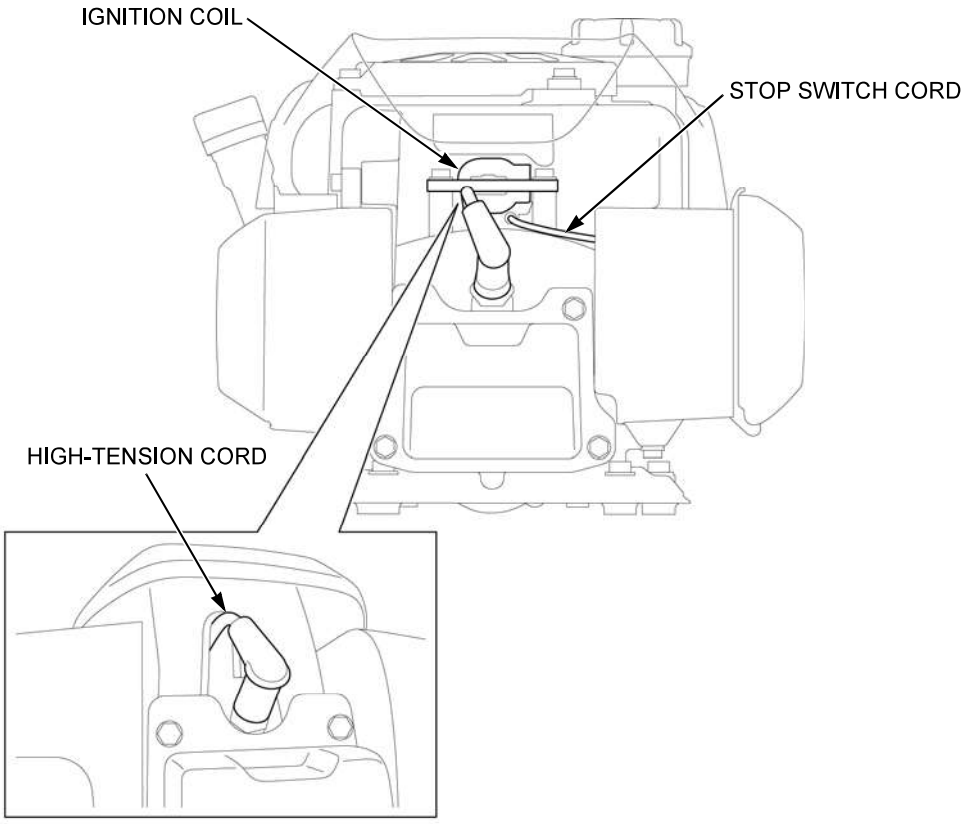
Automatic choke and manual throttle type



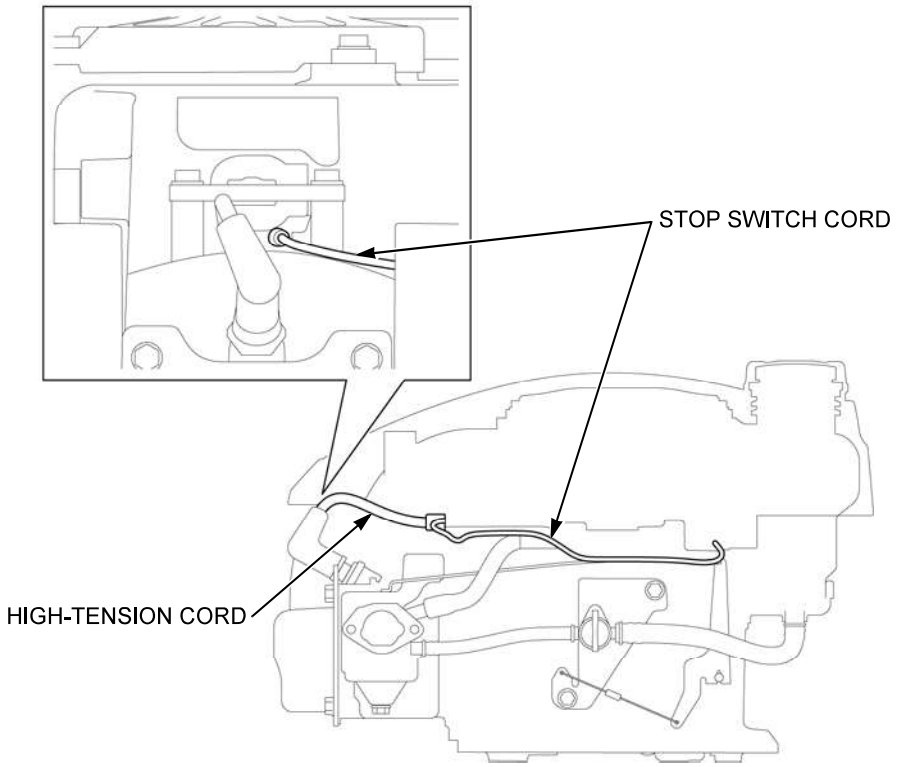
Automatic choke and fixed throttle type



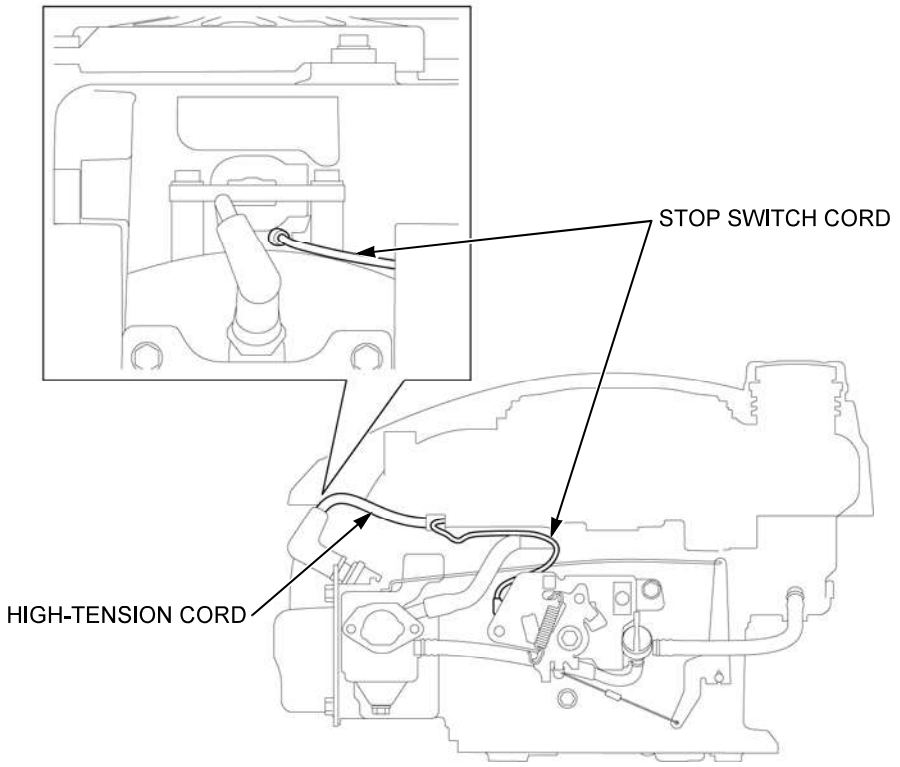
HARNESS ROUTING (WITHOUT STARTER MOTOR TYPE)



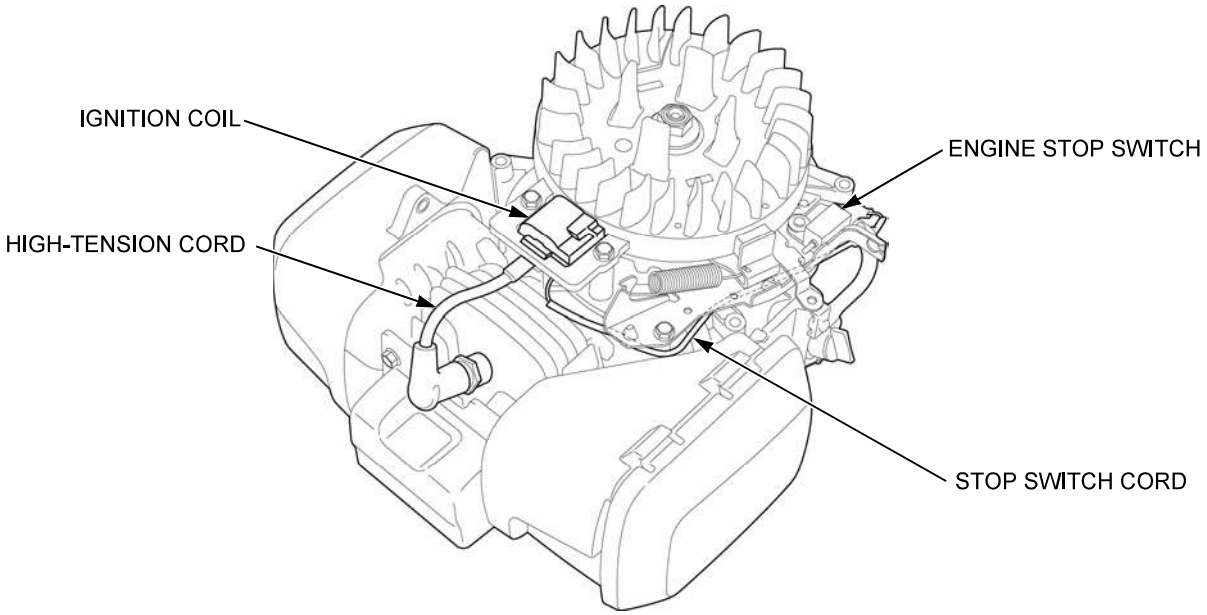
Light flywheel type



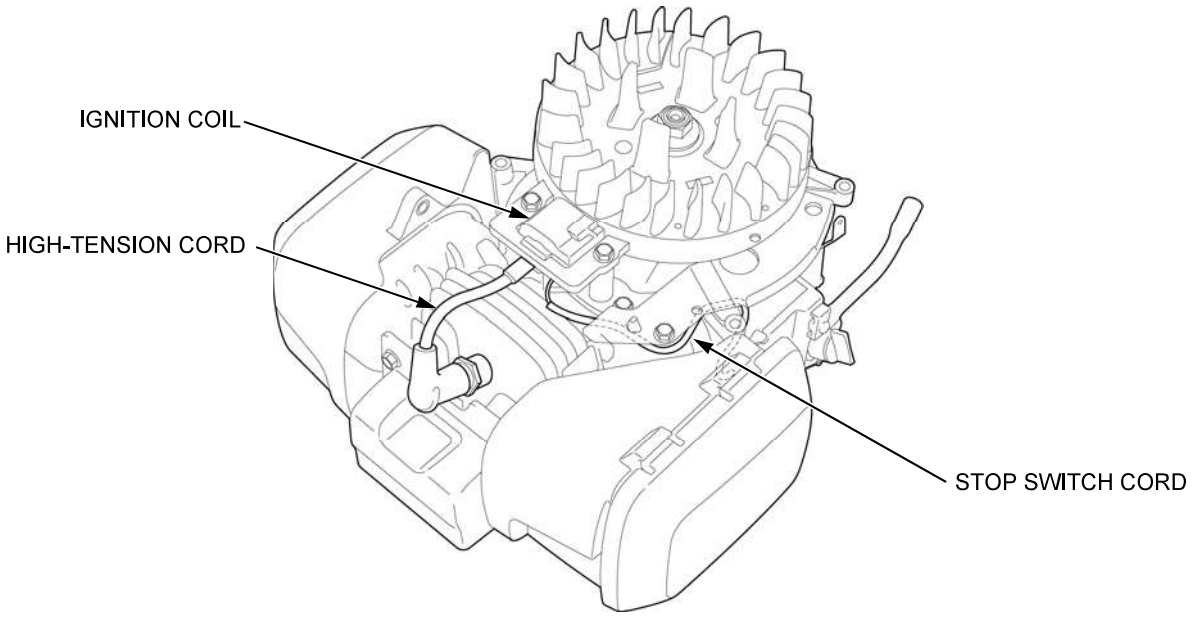
Heavy flywheel type



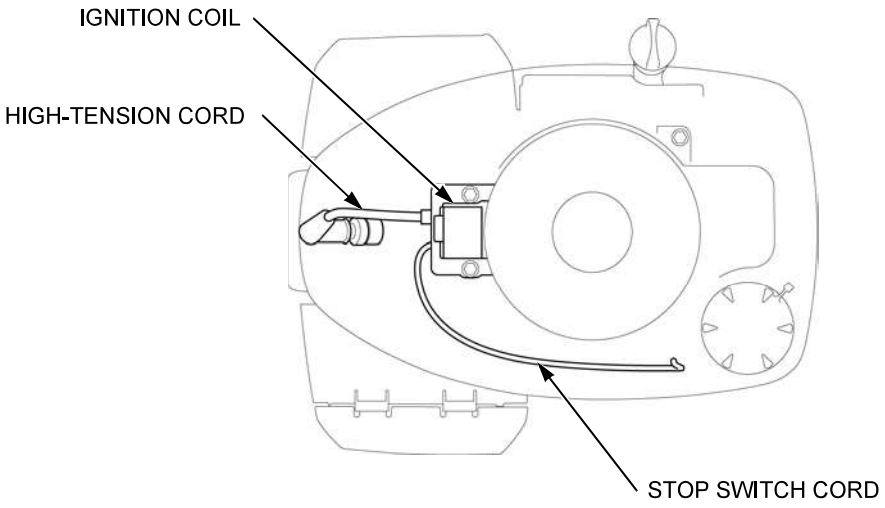
Light flywheel type



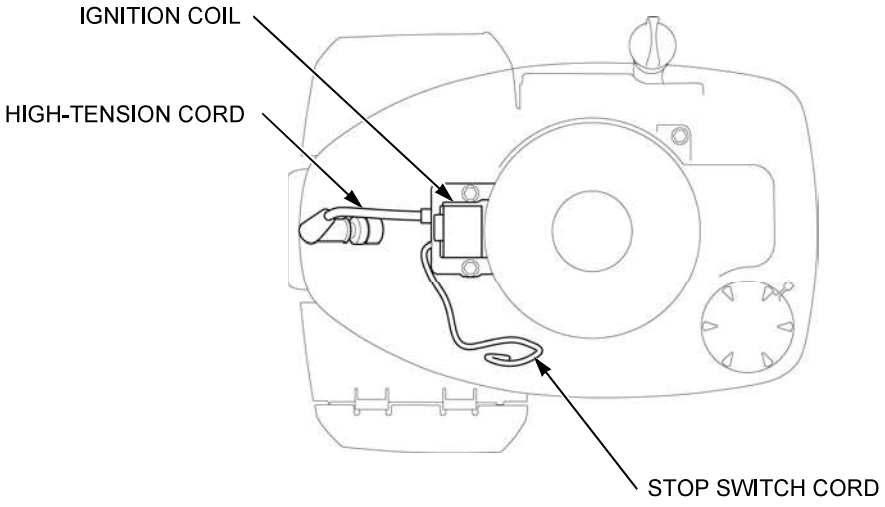
Heavy flywheel type



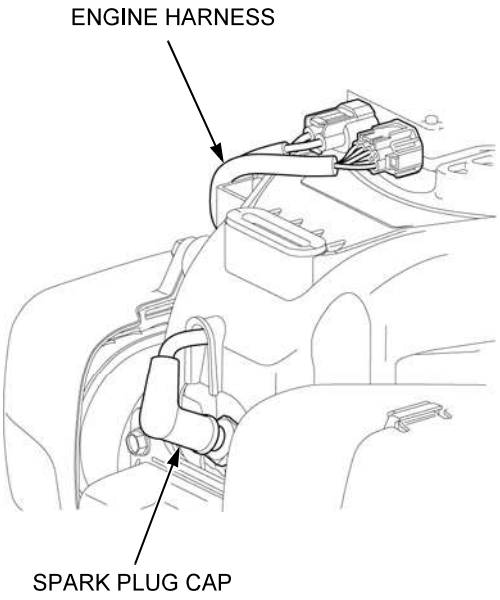
Light flywheel type

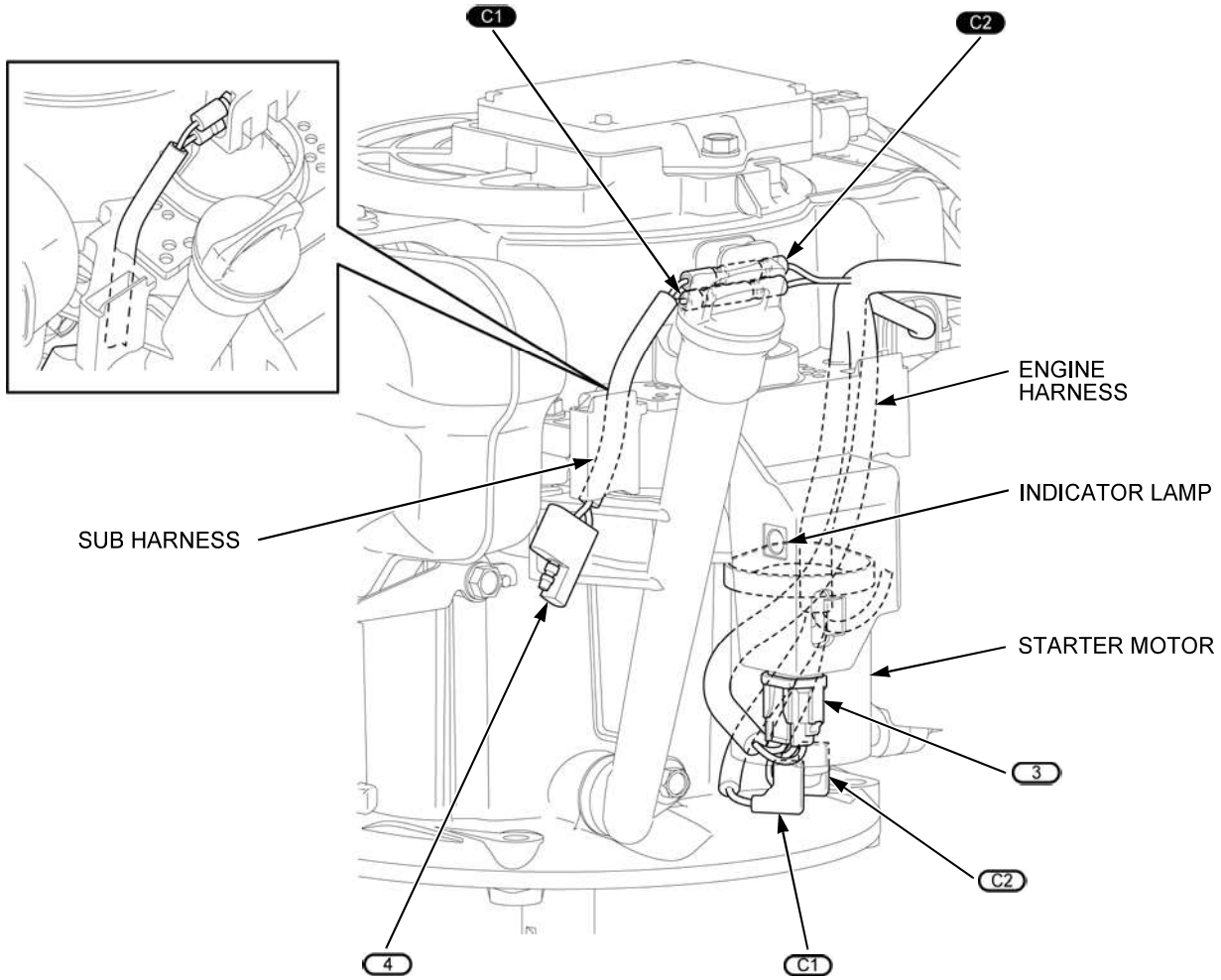


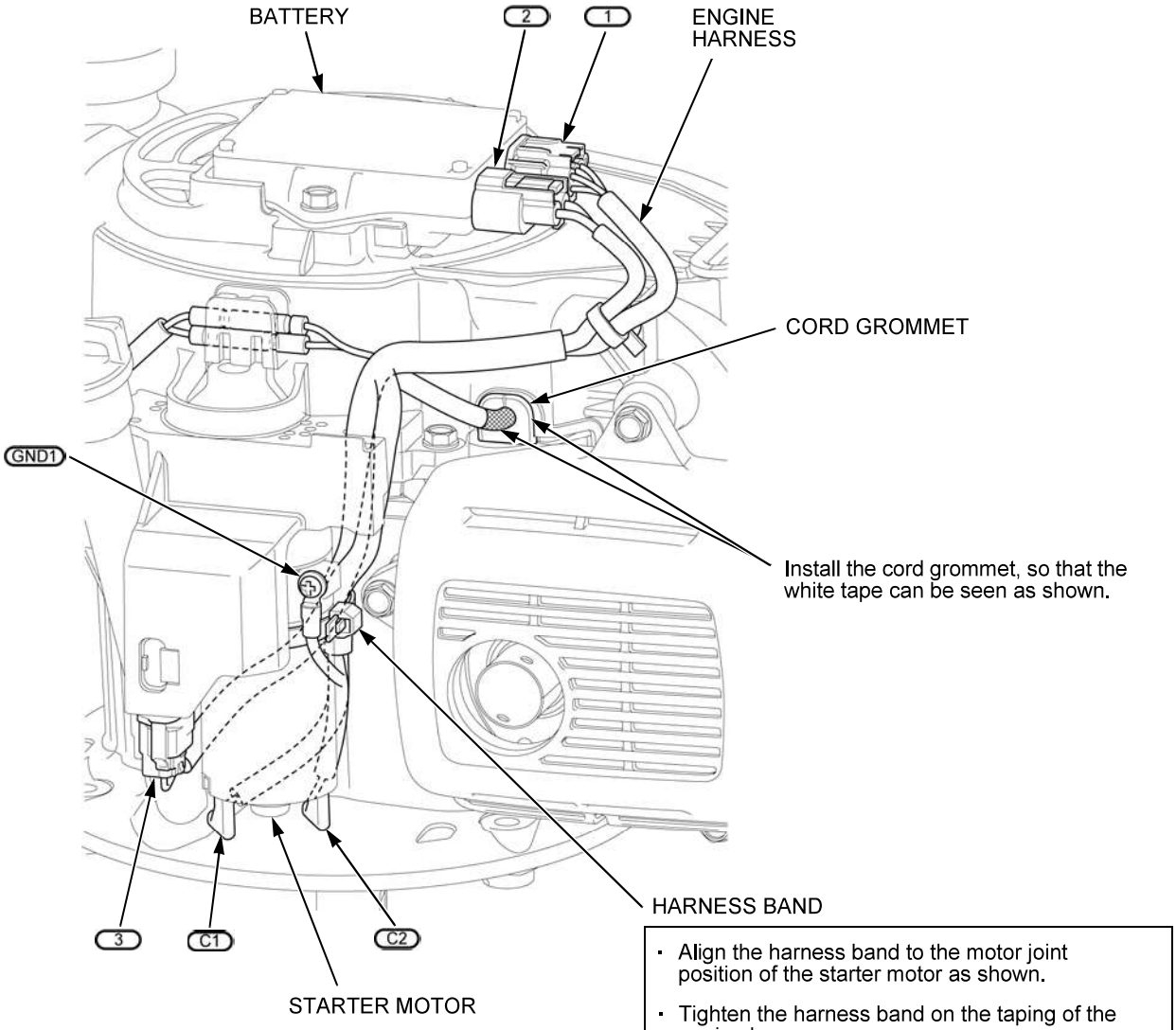
Heavy flywheel type



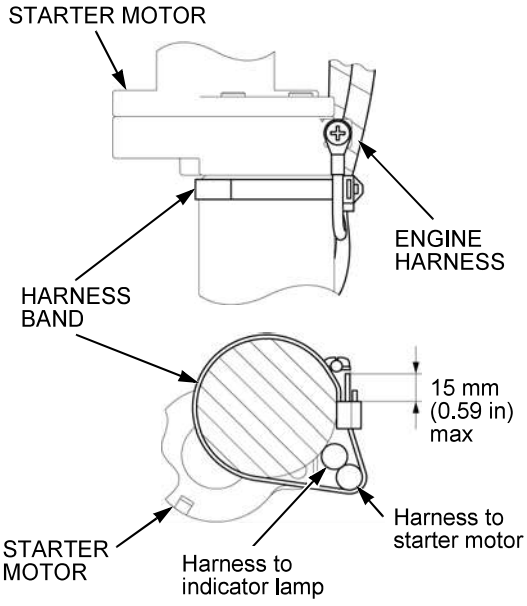
HARNESS ROUTING (WITH STARTER MOTOR TYPE)

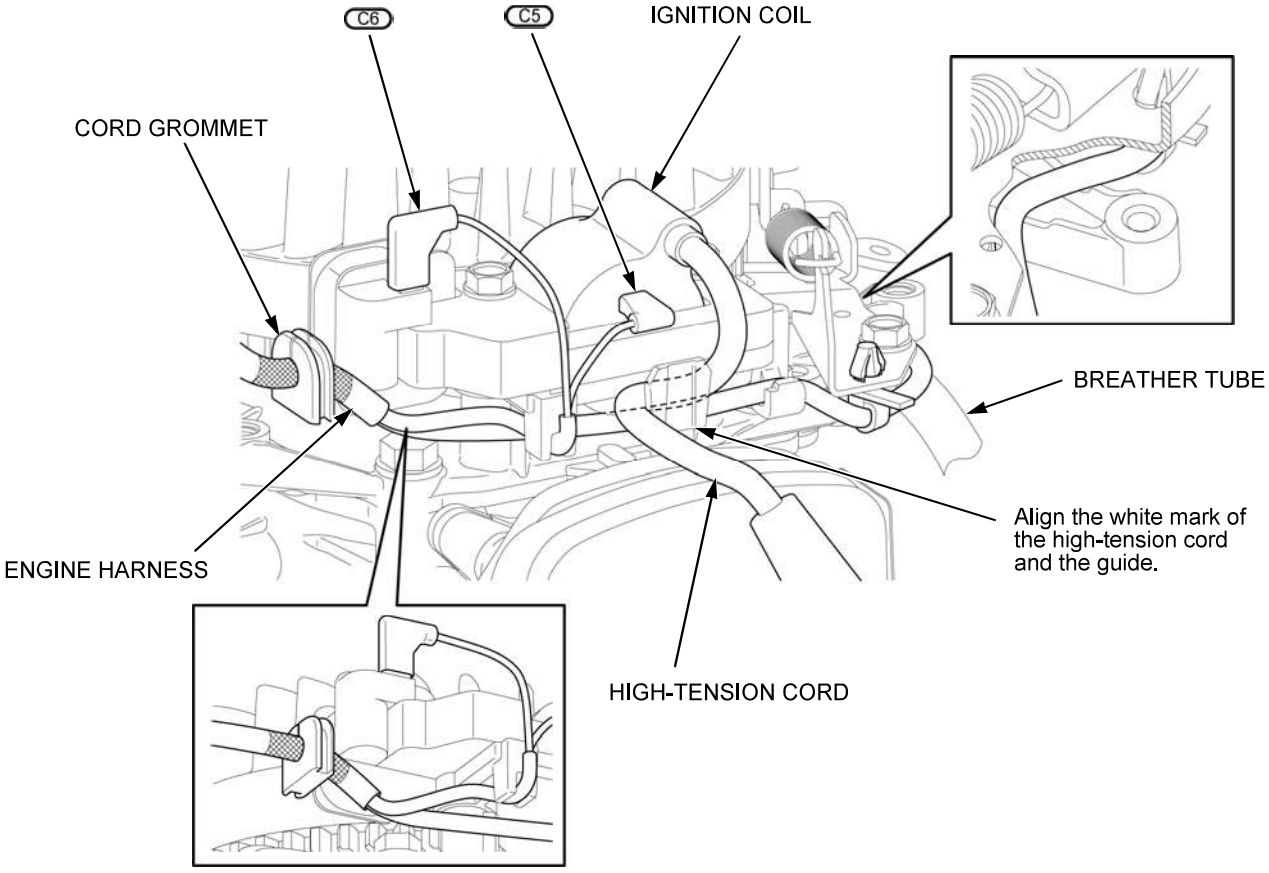


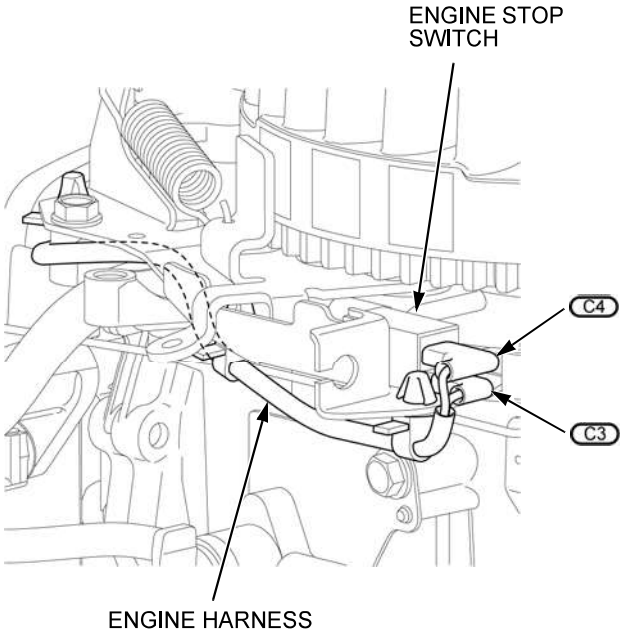




- Align the harness band to the motor joint position of the starter motor as shown.
- Tighten the harness band on the taping of the engine harness.




C6
C5
IGNITION COIL
CORD GROMMET
BREATHER TUBE
Align the white mark of the high-tension cord and the guide.
ENGINE HARNESS
HIGH-TENSION CORD


ENGINE STOP SWITCH
C4
C3
ENGINE HARNESS

MEMO

MAINTENANCE SCHEDULE

ITEM	Perform at every indicated month or operating hour interval, whichever comes first.	REGULAR SERVICE PERIOD (1)							Refer to page
		Each use	First month or 5 hrs.	Every 3 months or 25 hrs.	Every 6 months or 50 hrs.	Every year or 100 hrs.	150 hrs.	Every 2 years or 250 hrs.	
Engine oil	Check level	○							3-3
	Change		○		○ (2)				3-4
Air cleaner	Check	○							3-5
	Clean			○ (3)					3-5
	Replace							○	3-5
Flywheel brake shoe (applicable types)	Check				○				3-7
Spark plug	Check-adjust					○			3-6
	Replace							○	3-6
Spark arrester (applicable types)	Clean					○ (4)			3-7
Idle speed	Check					○			7-4
Fuel tank and filter	Clean					○			3-9
Valve clearance	Check-adjust						○		3-7
Combustion chamber	Clean	After every 250 hrs.							3-9
Fuel tube	Check	Every 2 years (Replace if necessary)							3-10

(1) For commercial use, log hours of operation to determine proper maintenance intervals.

(2) Change engine oil every 25 hours when used heavy load or in high ambient temperature.

(3) Service more frequently when used in dusty areas.

(4) In Europe and other countries where the machinery directive 2006/42/EC is enforced, this service should be done by your servicing dealer.

ENGINE OIL LEVEL CHECK/CHANGE

CHECK

Place the engine on a level surface.

Remove the oil filler cap [1] and wipe the dipstick [2] clean.

Insert the dipstick in the oil filler neck, but do not screw it in.
Remove the dipstick and check the oil level.

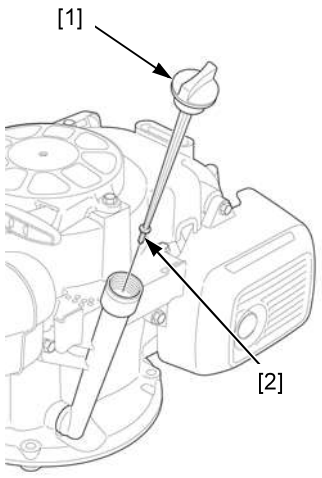
If the oil level is near or below the lower limit mark [3] on the dipstick, fill with the recommended oil to the upper limit mark [4]. Do not overfill.

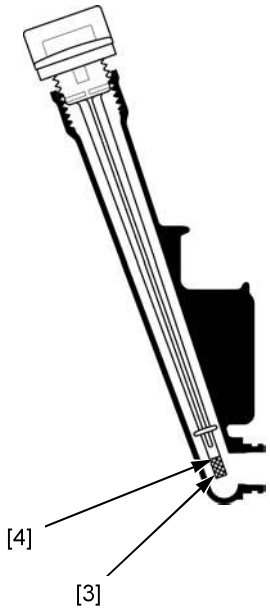
RECOMMENDED ENGINE OIL:
SAE 10W-30
API Service classification SE or later

Oil is a major factor affecting performance and service life. Use 4-stroke automotive detergent oil.

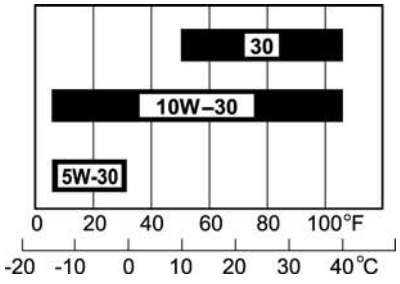
SAE 10W-30 is recommended for general use. Other viscosities shown in the chart may be used when the average temperature in your area is within the recommended range.

Reinstall the oil filler cap securely.





SAE VISCOSITY GRADES



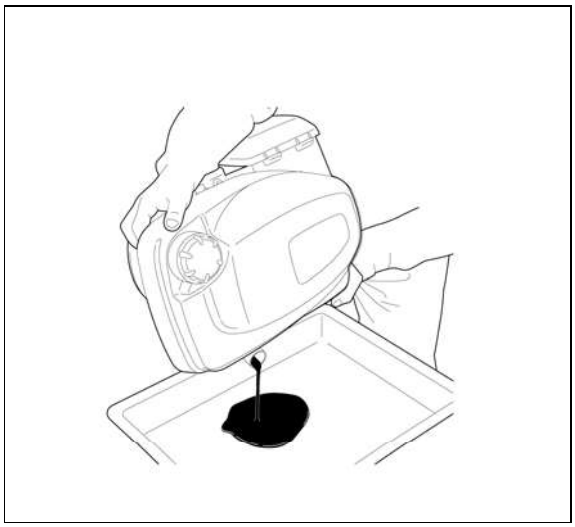
AMBIENT TEMPERATURE

CHANGE

Drain the used oil while the engine is warm. Warm oil drains quickly and completely.

Turn the fuel valve OFF position and check that the fuel tank cap is tightened securely.

Remove the oil filler cap.
Tilt the engine toward the oil filler extension side and drain the used engine oil into a suitable container.
Please dispose of used motor oil 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, pour it on the ground, or down a drain.



⚠CAUTION

Used engine oil contains substances that have been identified as carcinogenic.
If repeatedly left in contact with the skin for prolonged periods, it may cause skin cancer.
Wash your hands thoroughly with soap and water as soon as possible after contact with used engine oil.

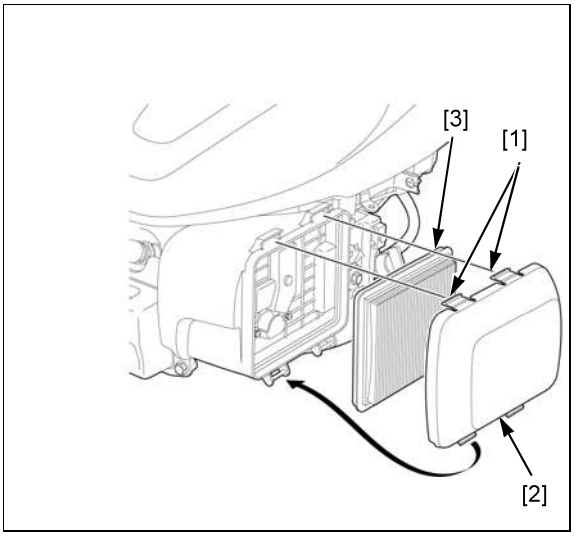
With the engine on a level surface, refill with the recommended engine oil to the upper limit mark.

ENGINE OIL CAPACITY:
0.40 Liters (0.42 US qt, 0.35 Imp qt)

Tighten the oil filler cap securely.

AIR CLEANER CHECK/CLEANING/REPLACEMENT

A dirty air cleaner element will restrict air flow to the carburetor, reducing engine performance. If the engine is operated in dusty areas, clean the air cleaner element more often than specified in the MAINTENANCE SCHEDULE.



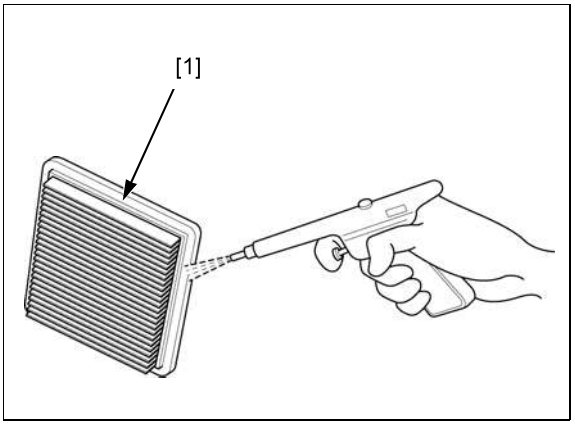
NOTICE

Operating the engine without an air cleaner element or with a damaged air cleaner element, will allow dirt to enter the engine, causing rapid engine wear.

Press the latch tabs [1] on the top of the air cleaner cover [2], and remove the cover.
Remove the paper element [3] from the air cleaner case.

Inspect the air cleaner element, and replace if it is damaged.

ELEMENT CLEANING



Tap the element [1] several times on a hard surface to remove dirt, or blow compressed air (not exceeding 200 kPa (2.0 kgf/cm^2, 29 psi)) through the element from the inside.

Never try to brush off dirt; brushing will force dirt into the paper fibers.

Wipe dirt from the inside of the air cleaner cover and air cleaner case, using a moist rag.
Be careful to prevent dirt from entering the air duct that leading to the carburetor.

Install the air cleaner element and air cleaner cover.

SPARK PLUG CHECK/ADJUSTMENT

Remove the spark plug (page 3-6).

Clean the spark plug [1] electrodes with a wire brush [2] or special plug cleaner.

Check the following and replace if necessary.

– Insulator [3] and sealing washer [4] for damage
– Center electrode [5] and side electrode [6] for wear
– Burning condition, coloration

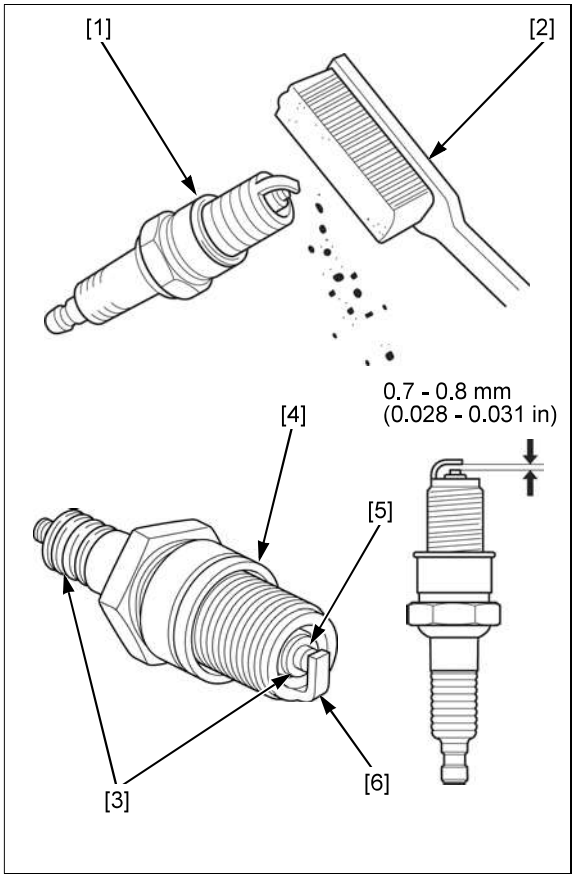
RECOMMENDED SPARK PLUG:
BPR5ES (NGK)

Measure the plug gap with a wire-type feeler gauge.

PLUG GAP: 0.70 – 0.80 mm (0.028 – 0.031 in)

If the measurement is out of the specification, adjust by bending the side electrode.

Install the spark plug (page 3-6).



SPARK PLUG REPLACEMENT

REMOVAL

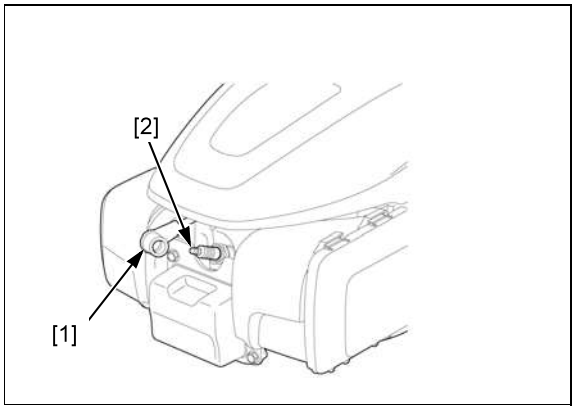
⚠ CAUTION

The engine and the muffler becomes very hot during operation and remains hot for a while after stopping the engine. Be careful not to touch the muffler while it is hot. Allow it to cool before proceeding.

Disconnect the spark plug cap [1] and remove the spark plug [2].

NOTE:

- Clean around the spark plug base with compressed air before removing the spark plug and be sure that no debris is allowed to enter into the combustion chamber.



INSTALLATION

Install and hand tighten the spark plug to the cylinder head.

RECOMMENDED SPARK PLUG:
BPR5ES (NGK)

Tighten the spark plug to the specified torque.

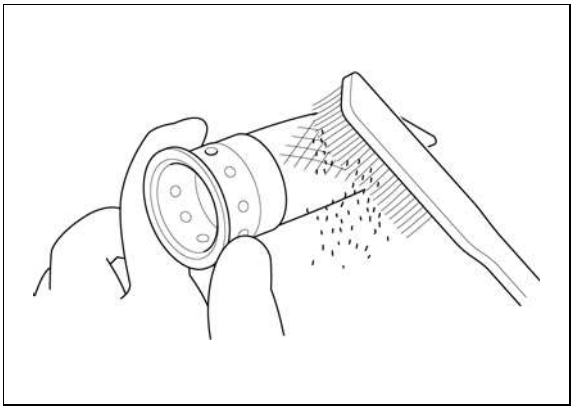
TORQUE: 20 N·m (2.0 kgf·m, 15 lbf·ft)

Connect the spark plug cap.

SPARK ARRESTER CLEANING (APPLICABLE TYPES)

⚠ CAUTION

The engine and the muffler becomes very hot during operation and remains hot for a while after stopping the engine. Be careful not to touch the muffler while it is hot. Allow it to cool before proceeding.



Remove the spark arrester (page 12-2).

Clean the carbon deposits from the spark arrester screen with a wire brush.

NOTICE

Be careful to avoid damaging the screen.

Check the spark arrester screen for damage.

Replace the spark arrester if it is damaged.

Install the spark arrester (page 12-2).

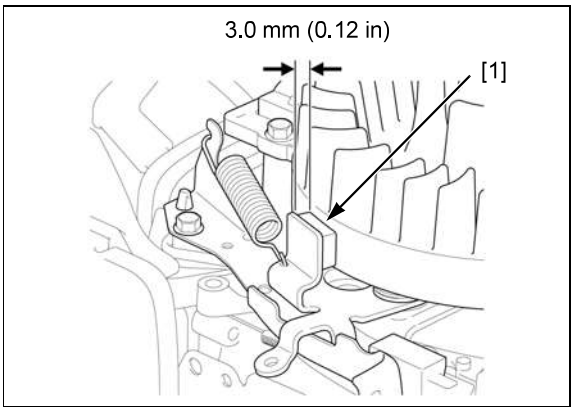
FLYWHEEL BRAKE SHOE CHECK (LIGHT FLYWHEEL TYPE)

Remove the fan cover (page 5-3).

Measure the thickness of the brake shoe lining [1].

SERVICE LIMIT: 3.0 mm (0.12 in)

If the brake shoe lining thickness is less than the service limit, replace the brake assy. (page 11-5).



VALVE CLEARANCE CHECK/ADJUSTMENT

- Valve clearance inspection and adjustment must be performed with the engine cold.

CHECK

Applicable types: Remove the top cover (page 5-2).

Remove the cylinder head cover (page 13-5).

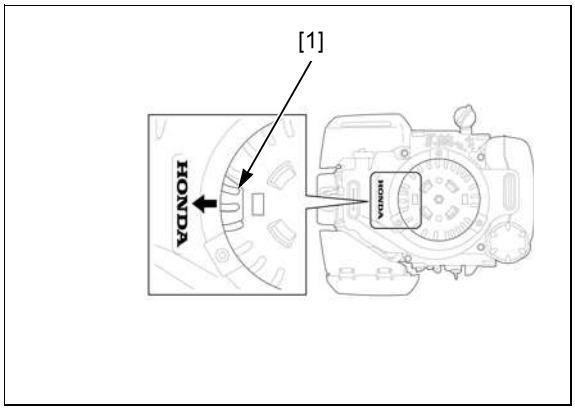
NOTICE

Using too much force can deform the cylinder head cover. The cylinder head cover must be replaced if it is deformed.

Rotate the flywheel clockwise until the magnet inside the flywheel [1] heads the direction of the cylinder head.

If it is hard to rotate the flywheel, remove the spark plug.

This will set the piston at near the top dead center of the compression stroke (both valves are fully closed).



Insert a thickness gauge [1] between the valve adjusting screw [2] and valve stem [3] while pushing the rocker arm shaft [4] to measure the valve clearance.

VALVE CLEARANCE:
IN: 0.08 – 0.12 mm (0.003 – 0.005 in)
EX: 0.08 – 0.12 mm (0.003 – 0.005 in)

If adjustment is necessary, proceed as follows.

ADJUSTMENT

Hold the valve adjusting screw using the special tool and loosen the valve adjusting lock nut [5].

TOOL:
Valve adjusting wrench [6] 07908-KE90000

Turn the adjusting screw to obtain the specified clearance.

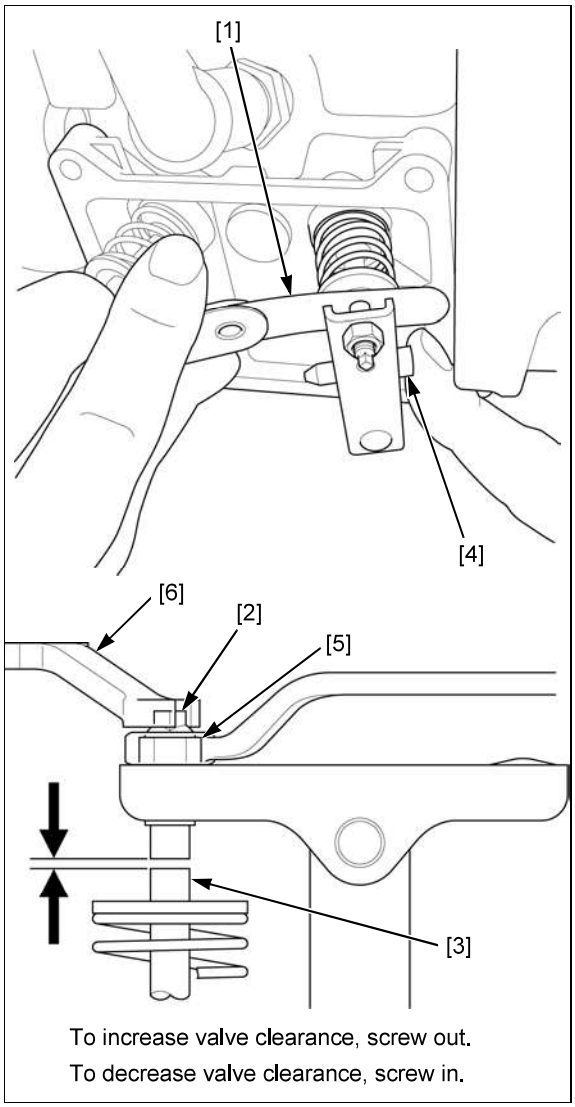
Hold the valve adjusting screw and retighten the valve adjusting lock nut to the specified torque.

TORQUE:
Valve adjusting lock nut:
8 N·m (0.8 kgf·m, 5.9 lbf·ft)

Recheck the valve clearance, and if necessary, readjust the clearance.

Apply liquid gasket to the cylinder head cover installation surface (page 13-6).

Installation is in the reverse order of removal.



To increase valve clearance, screw out.
To decrease valve clearance, screw in.

COMBUSTION CHAMBER CLEANING

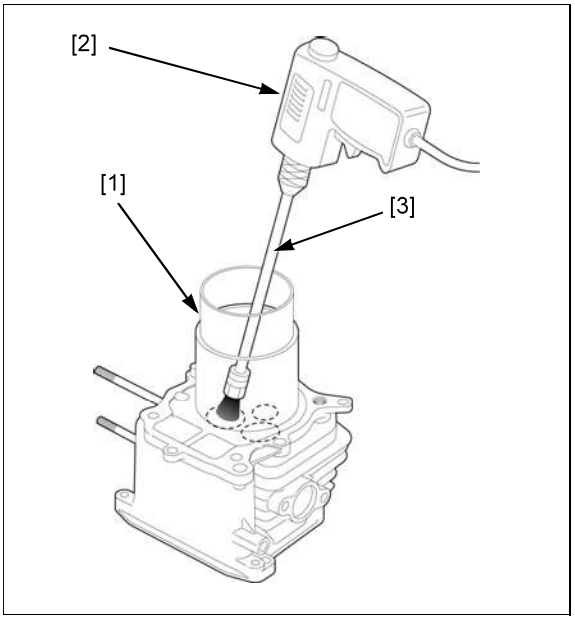
Remove the cylinder (page 13-5).

Prepare a cylinder of thick paper or equivalent material [1], with a large enough diameter to fit against the inner wall of the cylinder.

Insert thick paper into the cylinder to protect the inner wall of the cylinder when cleaning the combustion chamber.

Attach the cleaning brush to an electric drill [2] and clean the combustion chamber.

TOOL:
Cleaning brush [3] **07998-VA20100**



NOTICE

- *Clean the combustion chamber when the valves have been installed in the cylinder.*
- *Do not press the cleaning brush with force against the combustion chamber.*

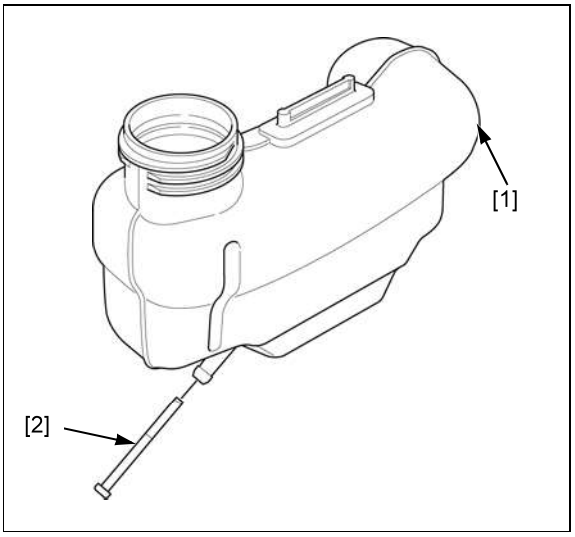
FUEL TANK AND STRAINER CLEANING

⚠WARNING

Gasoline is highly flammable and explosive. You can be burned or seriously injured when handling fuel.
- Keep heat, sparks and flames away.
- Handle fuel only outdoors.
- Wipe up spills immediately.

Remove the fuel tank (page 6-4).

Drain the fuel from the fuel tank [1].
Wash inside the fuel tank with nonflammable solvent to remove any foreign material and water from the tank.
Remove the dust and foreign material from the strainer [2] by running solvent through the outlet tube.



FUEL TUBE CHECK

⚠WARNING

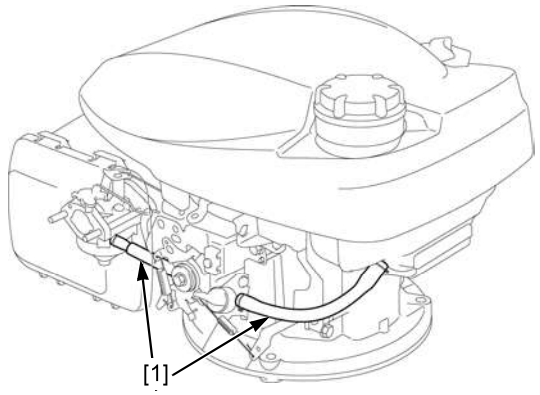
Gasoline is highly flammable and explosive.
You can be burned or seriously injured when handling fuel.
- Keep heat, sparks, and flames away.
- Wipe up spills immediately.
- Handle fuel only outdoors.

Check the fuel tubes [1] for damage, fuel leakage, corrosion, and other abnormalities. Check that the tubes are not interfering with the neighboring parts.

Start the engine and check for fuel leakage.

Replace the tube if there is damage, fuel leakage, corrosion, etc.

Manual throttle type



Fixed throttle type