HONDA

Shop Manual News

ENGINE

Power Equipment

News No.	Issue Date
P/P-410	Apr. 2015

SOME PARTS OF CHANGES

Applicable Information	Publication No.	Applicable Page
GX270H/390H1	62Z7B00	1-5, 1-6

CHANGE LOCATIONS

The changed instructions are shown in - - - - .

ENGINE SPECIFICATIONS

GX270H:Page 1-5

Fuel consumption (at continuous rated power)	2.5 Liters (0.66 US gal, 0.55 Imp gal)/h

GX390H1:Page 1-6

Fuel consumption (at continuous rated power)	3.7 Liters (0.98 US gal, 0.81 Imp gal)/h

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 practices, 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 equipment hoisted 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 are 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.

CONTENTS

INTRODUCTION

This manual covers the service and repair procedures for the Honda GX270H/390H1.

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.

ALL INFORMATION, ILLUSTRATIONS, DIRECTIONS, AND SPECIFICATIONS INCLUDED IN THIS PUBLICATION ARE BASED ON THE LATEST PRODUCT INFORMATION AVAILABLE AT THE TIME OF APPROVAL FOR PRINTING. Honda Motor Co., Ltd. RESERVES THE RIGHT TO MAKE CHANGES AT ANY TIME WITHOUT NOTICE AND WITHOUT INCURRING ANY OBLIGATION WHATSOEVER. NO PART OF THIS PUBLICATION MAY BE REPRODUCED WITHOUT WRITTEN PERMISSION. THIS MANUAL IS WRITTEN FOR PERSONS WHO HAVE ACQUIRED BASIC KNOWLEDGE OF MAINTENANCE ON Honda PRODUCTS.

© Honda Motor Co., Ltd.
SERVICE PUBLICATION OFFICE

Date of Issue: September 2012

SERVICE RULES

- Use Honda Genuine 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 will 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 molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1:1).
	Use multi-purpose grease (lithium based multi-purpose grease NLGI #2 or equivalent).
	Use marine grease (water resistant urea based grease).
	Apply a locking agent. Use a medium strength locking agent unless otherwise specified.
	Apply sealant.
	Use automatic transmission fluid.
(○ 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.

Abbreviated. 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
IAB	Intake Air Bypass
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

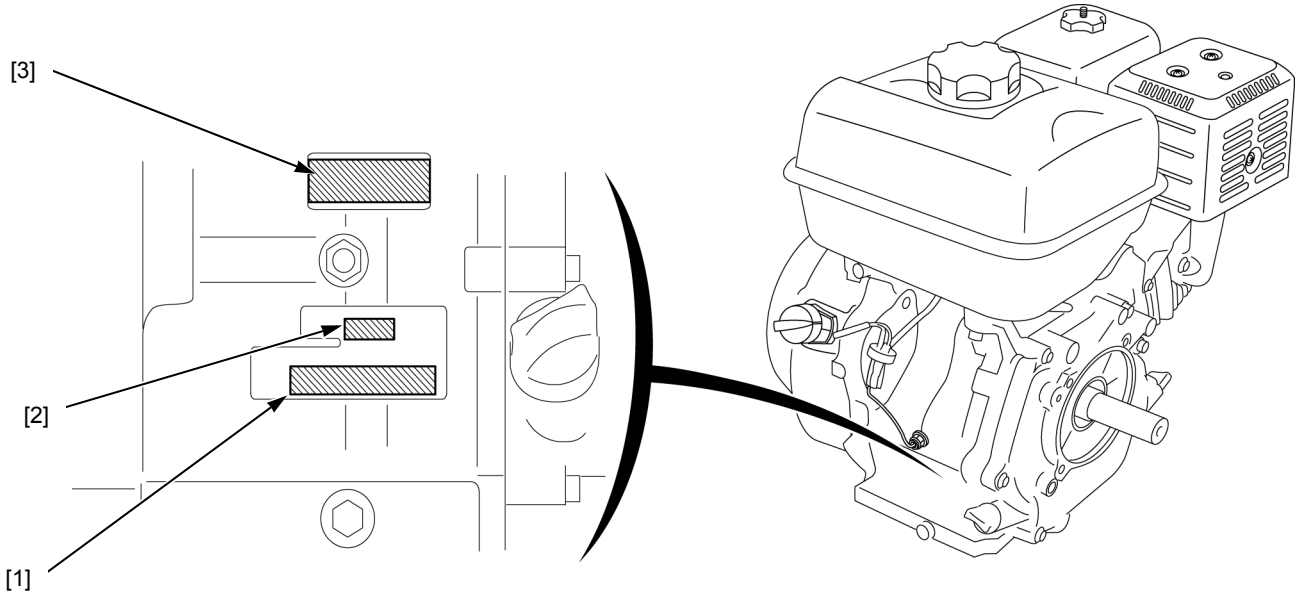
Bl	Black	G	Green	Br	Brown	Lg	Light green
Y	Yellow	R	Red	O	Orange	P	Pink
Bu	Blue	W	White	Lb	Light blue	Gr	Gray

1. SPECIFICATIONS

SERIAL NUMBER LOCATION

The engine serial number [1], type [2] and model [3] is stamped on the crankcase.

Refer to it when ordering parts or making technical inquiries.



TYPE CODE

Model	GX270H						
Type	LH	LH1	LH2	LHB5	LW	PX	QBE1
P. T. O.	L type					P type	Q type

Model	GX270H						
Type	QD	QD1	QH	QHB1	QHB5	QHP1	QMH
P. T. O.	Q type						

Model	GX270H						
Type	QN	QP	QX	QXC9	QXCK	QXE9	QXK
P. T. O.	Q type						

Model	GX270H						
Type	RD	SD	SD1	SH	SH1	SX	VMT
P. T. O.	R type	S type					E type

Model	GX270H						
Type	VKK	VS4	VSD4	VSP	VX	VX1	VXK
P. T. O.	V type						

Model	GX390H1						
Type	ES2	LH	LH1	LH2	LHB5	LHP1	LXE9
P. T. O.	E type	L type					

Model	GX390H1						
Type	PX	QA2	QBE1	QH	QH1	QHB1	QHB3
P. T. O.	P type	Q type					

Model	GX390H1						
Type	QHB5	QHP1	QMH	QN	QP	QX	QXE
P. T. O.	Q type						

Model	GX390H1						
Type	QXEK	QXK	SH	SH1	SHE	SM11	SWE2
P. T. O.	Q type		S type				

Model	GX390H1						
Type	SWX2	SX	SX1	SXC	SXC1	SXE1	SXE
P. T. O.	S type						

Model	GX390H1						
Type	VMT3	VMQ3	VPX4	VS4	VS6	VSB4	VSP
P. T. O.	E type	V type					

Model	GX390H1					
Type	VTE5	VX	VX1	VXE	VXK	VXU1
P. T. O.	V type					

DIMENSIONS AND WEIGHTS SPECIFICATIONS

Model		GX270H	GX390H1
Overall length	E type*	–	365 mm (14.4 in)
	L type*	405 mm (15.9 in)	440 mm (17.3 in)
	P type*	380 mm (15.0 in)	405 mm (15.9 in)
	Q type*	380 mm (15.0 in)	405 mm (15.9 in)
	R type*	440 mm (17.3 in)	–
	S type*	355 mm (14.0 in)	380 mm (15.0 in)
	V type*	400 mm (15.7 in)	425 mm (16.7 in)
Overall width	E type*	–	460 mm (18.1 in)
	L type*	430 mm (16.9 in)	450 mm (17.7 in)
	P type*	430 mm (16.9 in)	450 mm (17.7 in)
	Q type*	430 mm (16.9 in)	450 mm (17.7 in)
	R type*	430 mm (16.9 in)	–
	S type*	430 mm (16.9 in)	450 mm (17.7 in)
	V type*	430 mm (16.9 in)	450 mm (17.7 in)
Overall height	E type*	–	448 mm (17.6 in)
	L type*	410 mm (16.1 in)	443 mm (17.4 in)
	P type*	410 mm (16.1 in)	443 mm (17.4 in)
	Q type*	410 mm (16.1 in)	443 mm (17.4 in)
	R type*	410 mm (16.1 in)	–
	S type*	410 mm (16.1 in)	443 mm (17.4 in)
	V type*	410 mm (16.1 in)	VPX4 only: 447 mm (17.6 in), Othe type: 443 mm (17.4 in)
Dry weight	E type*	–	31.7 kg (69.9 lbs)
	L type*	26.5 kg (58.4 lbs)	35.0 kg (77.2 lbs)
	P type*	25.0 kg (55.1 lbs)	31.5 kg (69.4 lbs)
	Q type*	25.0 kg (55.1 lbs)	31.5 kg (69.4 lbs)
	R type*	30.0 kg (66.1 lbs)	–
	S type*	25.0 kg (55.1 lbs)	31.5 kg (69.4 lbs)
	V type*	25.0 kg (55.1 lbs)	31.5 kg (69.4 lbs)
Operating weight	E type*	–	37.8 kg (83.3 lbs)
	L type*	31.5 kg (69.4 lbs)	41.0 kg (90.4 lbs)
	P type*	29.7 kg (65.5 lbs)	37.6 kg (82.9 lbs)
	Q type*	29.7 kg (65.5 lbs)	37.6 kg (82.9 lbs)
	R type*	35.0 kg (77.2 lbs)	–
	S type*	29.7 kg (65.5 lbs)	37.6 kg (82.9 lbs)
	V type*	29.7 kg (65.5 lbs)	37.6 kg (82.9 lbs)

*: P. T. O. type. (page 1-3)

ENGINE SPECIFICATIONS

GX270H

Model		GX270H
Description code		GCADH
Type		4 stroke, overhead valve, single cylinder, inclined by 25°
Displacement		270 cm^3 (16.5 cu-in)
Bore x stroke		77.0 x 58.0 mm (3.0 x 2.3 in)
Net power (SAE J1349)*		6.0 kW (8.0 HP)/3,600 min^{-1} (rpm)
Continuous rated power		5.1 kW (6.8 HP)/3,600 min^{-1} (rpm)
Maximum net torque (SAE J1349)*		17.7 N·m (1.80 kgf·m, 13.1 lbf·ft)/2,500 min^{-1} (rpm)
Compression ratio		8.2 : 1
Fuel consumption (at continuous rated power)		5.3 Liters (1.40 US gal, 1.17 Imp gal)/h
Ignition system		Transistorized magneto ignition
Ignition timing		B.T.D.C. 20°/1,200 – 4,000 min^{-1} (rpm)
Spark plug	VKK, VMT, VS4, VSD4	BPR5ES (NGK)/W16EPR-U (DENSO)
	Other type	BPR6ES (NGK)/W20EPR-U (DENSO)
Lubrication system		Forced splash
Oil capacity		1.1 Liters (1.16 US qt, 0.97 Imp qt)
Recommended oil		SAE 10W-30 API service classification SE or higher
Cooling system		Forced air
Starting system		Recoil, Recoil and Starter motor
Stopping system		Ignition exciter coil circuit open
Carburetor		Horizontal type, butterfly valve
Air cleaner		Dual type, Dual silent type, Cyclone type, Oil bath type, Semi dry type, Low profile type
Governor		Mechanical centrifugal
Breather system		Flat valve type
Fuel used		Unleaded gasoline with a pump octane rating 86 or higher
Reduction case oil capacity	1/2 reduction chain type	Shared with engine oil
	1/2 reduction clutch type	0.3 Liter (0.32 US qt, 0.26 Imp qt)
Reduction case recommended oil	1/2 reduction chain type	SAE 10W-30 API service classification SE or higher
1/2 reduction clutch type	Type	Centrifugal
	Engagement start	1,800 min^{-1} (rpm)
	Lock	2,200 min^{-1} (rpm)

*: 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.

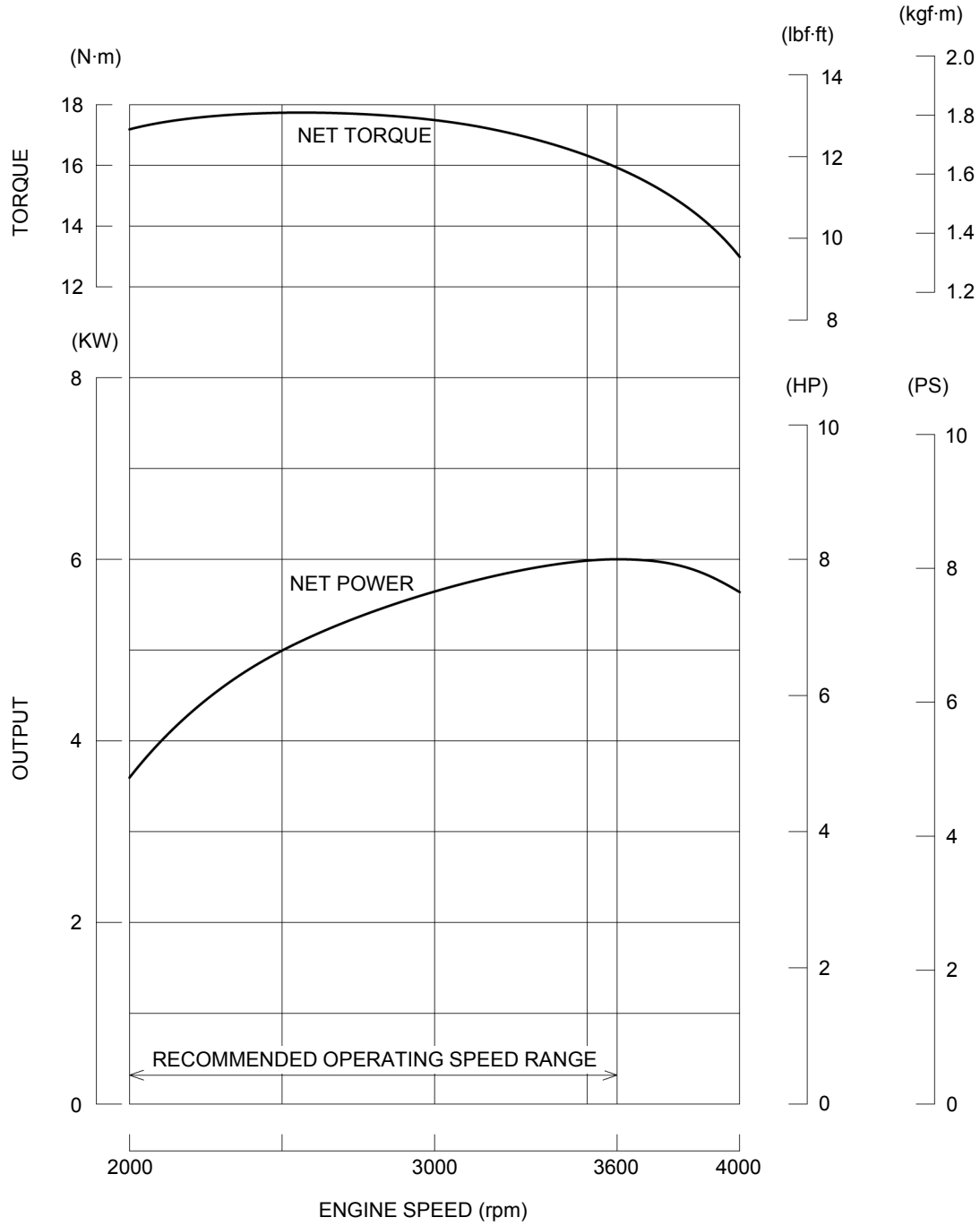
GX390H1

Model		GX390H1
Description code		GCAFH
Type		4 stroke, overhead valve, single cylinder, inclined by 25°
Displacement		389 cm^3 (23.7 cu-in)
Bore x stroke		88.0 x 64.0 mm (3.5 x 2.5 in)
Net power (SAE J1349)*		8.2 kW (11.0 HP)/3,600 min^{-1} (rpm)
Continuous rated power		6.6 kW (8.9 HP)/3,600 min^{-1} (rpm)
Maximum net torque (SAE J1349)*		25.1 N·m (2.56 kgf·m, 18.5 lbf·ft)/2,500 min^{-1} (rpm)
Compression ratio		8.0 : 1
Fuel consumption (at continuous rated power)		6.1 Liters (1.61 US gal, 1.34 Imp gal)/h
Ignition system		Transistorrized magneto ignition
Ignition timing		B.T.D.C. 25°/1,200 – 4,000 min^{-1} (rpm)
Spark plug	ES2, VMT3, VMQ3, VS4, VS6, VSB4	BPR5ES (NGK)/W16EPR-U (DENSO)
	Other type	BPR6ES (NGK)/W20EPR-U (DENSO)
Lubrication system		Forced splash
Oil capacity		1.1 Liters (1.16 US qt, 0.97 Imp qt)
Recommended oil		SAE 10W-30 API service classification SE or higher
Cooling system		Forced air
Starting system		Recoil, Recoil and Starter motor
Stopping system		Ignition exciter coil circuit open
Carburetor		Horizontal type, butterfly valve
Air cleaner		Dual silent type, Oil bath type, Low profile type
Governor		Mechanical centrifugal
Breather system		Flat valve type
Fuel used		Unleaded gasoline with a pump octane rating 86 or higher
Reduction case oil capacity (1/6 reduction gear type)		Shared with engine oil

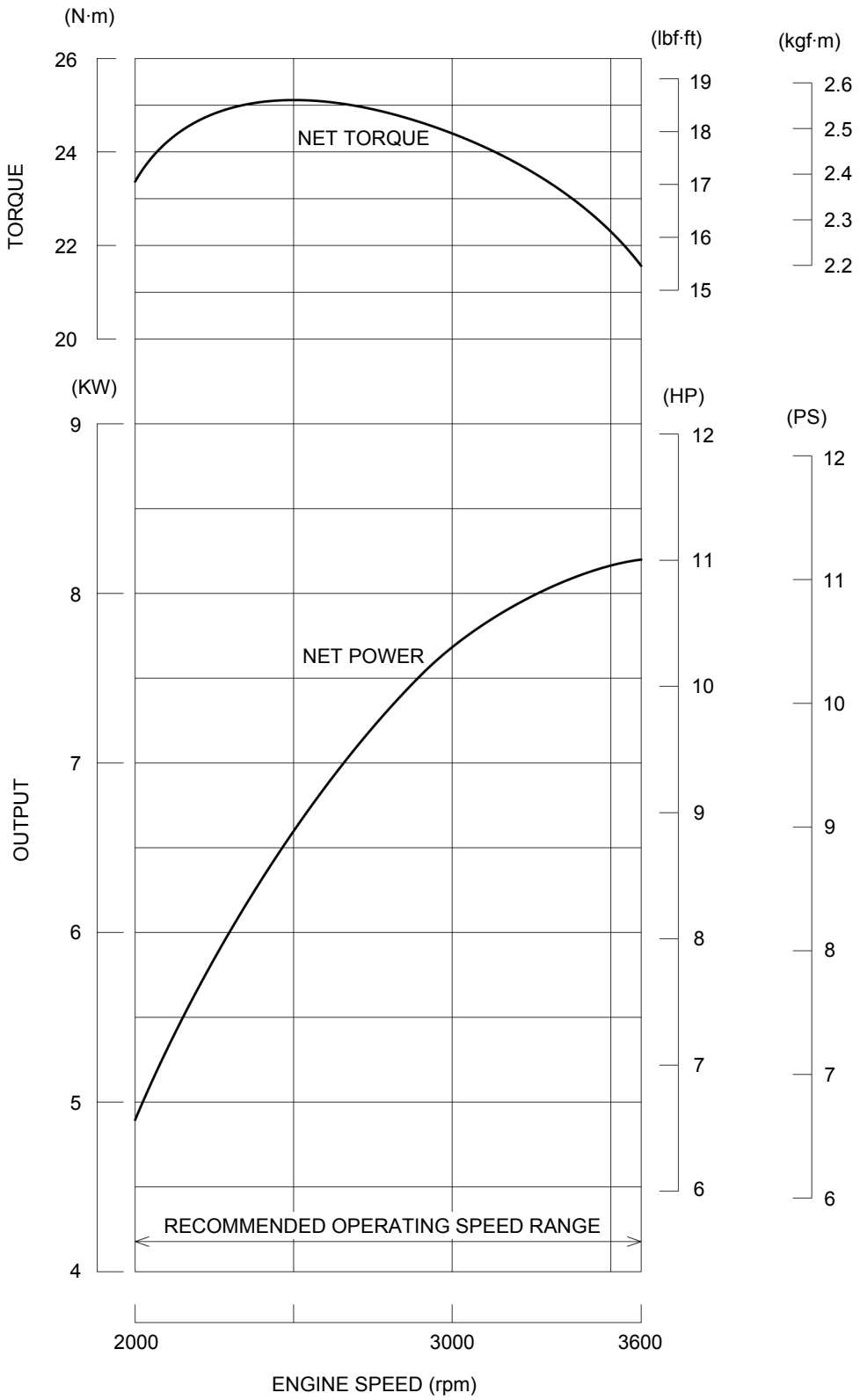
*: The power rating of the engine indicated in this document is the net power output tested on a production engine for the engine model and measured in accordance with SAE J1349 at 3,600 rpm (net power) and at 2,500 rpm (max net torque). Mass production engines may vary from this value. Actual power 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

GX270H



GX390H1

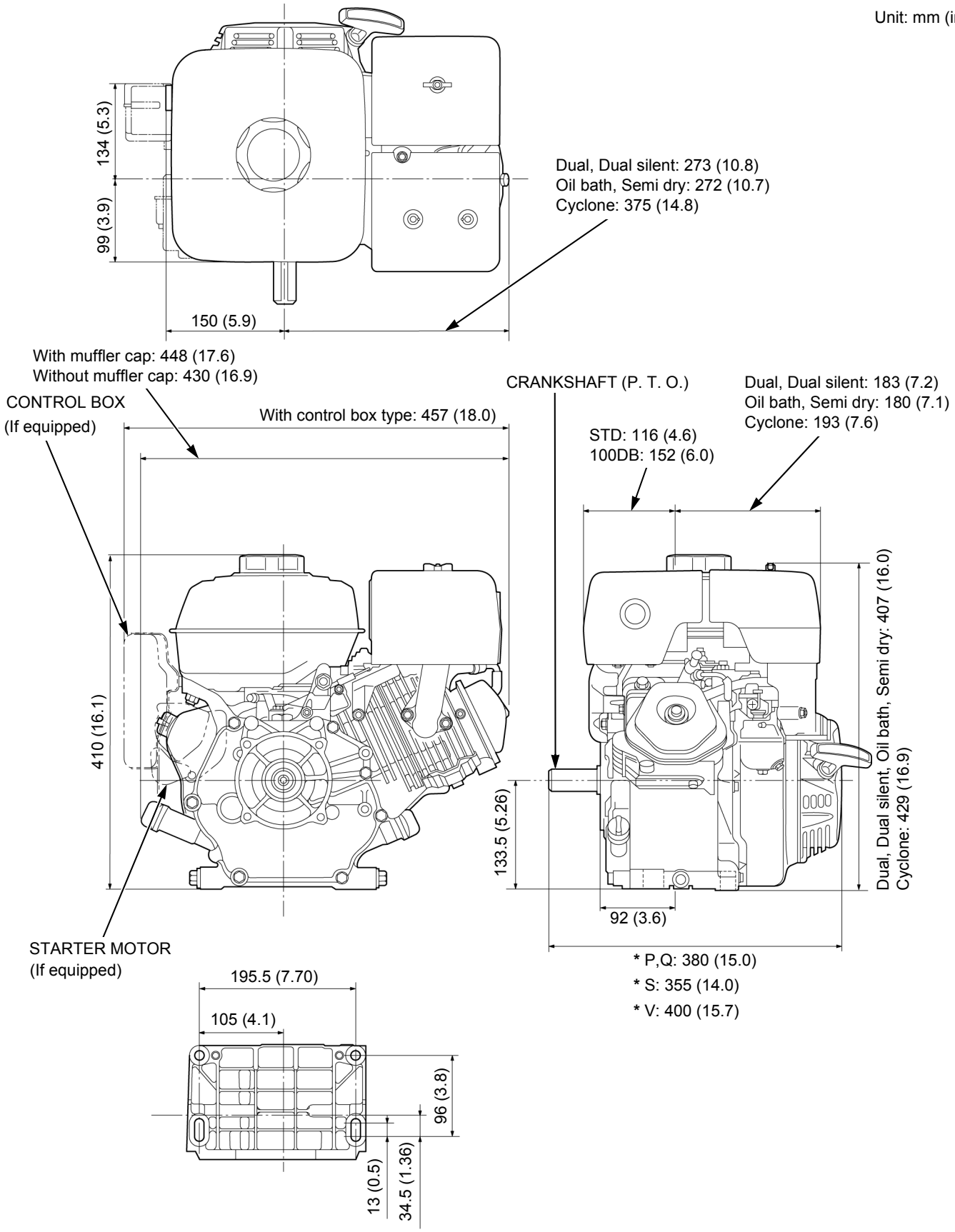

(N·m)
(lbf·ft)
(kgf·m)
26
24
22
20
19
18
17
16
15
2.6
2.5
2.4
2.3
2.2
TORQUE
NET TORQUE
(KW)
(HP)
(PS)
9
8
7
6
5
4
12
11
10
9
8
7
6
12
11
10
9
8
7
6
OUTPUT
NET POWER
RECOMMENDED OPERATING SPEED RANGE
2000
3000
3600
ENGINE SPEED (rpm)

DIMENSIONAL DRAWINGS

*: P. T. O. type. (page 1-3)

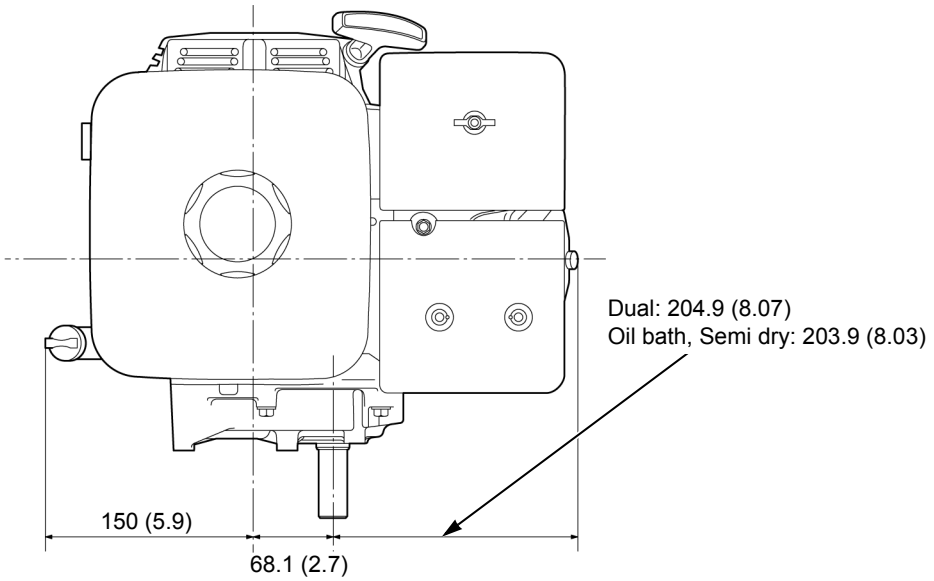
GX270H (WITHOUT REDUCTION)

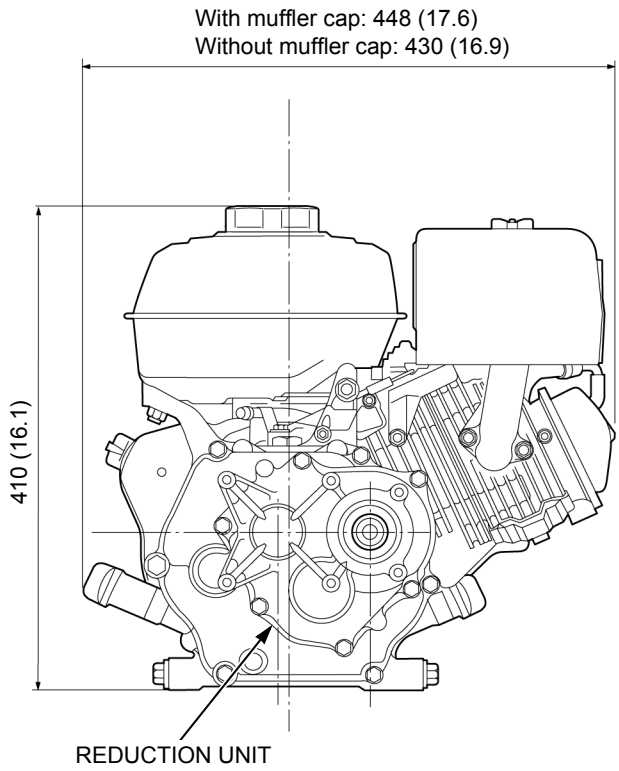
Unit: mm (in)

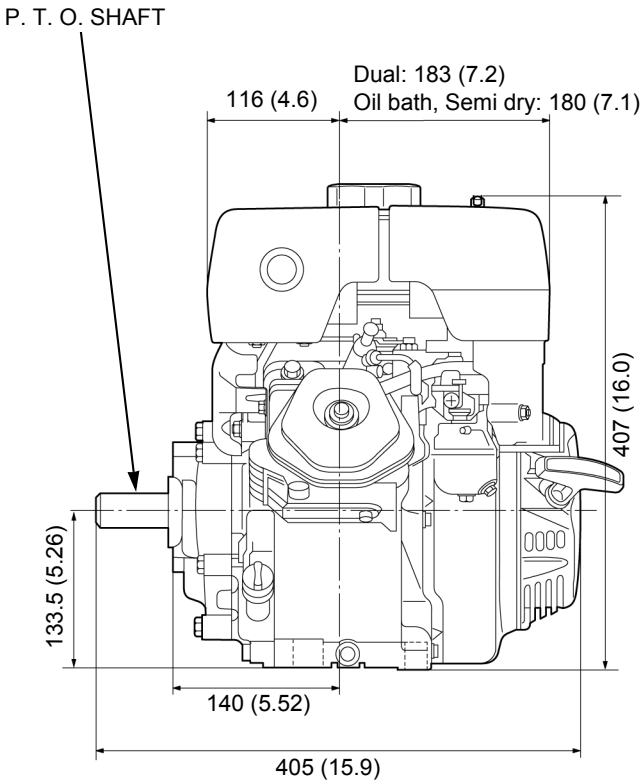


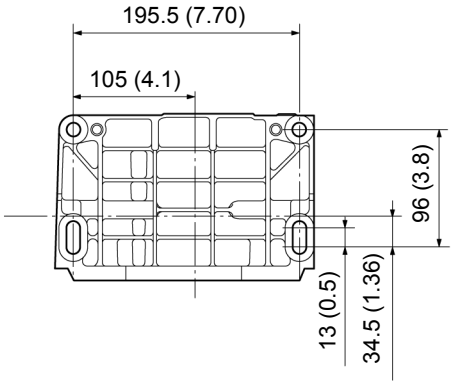
GX270H (WITH REDUCTION)

Unit: mm (in)



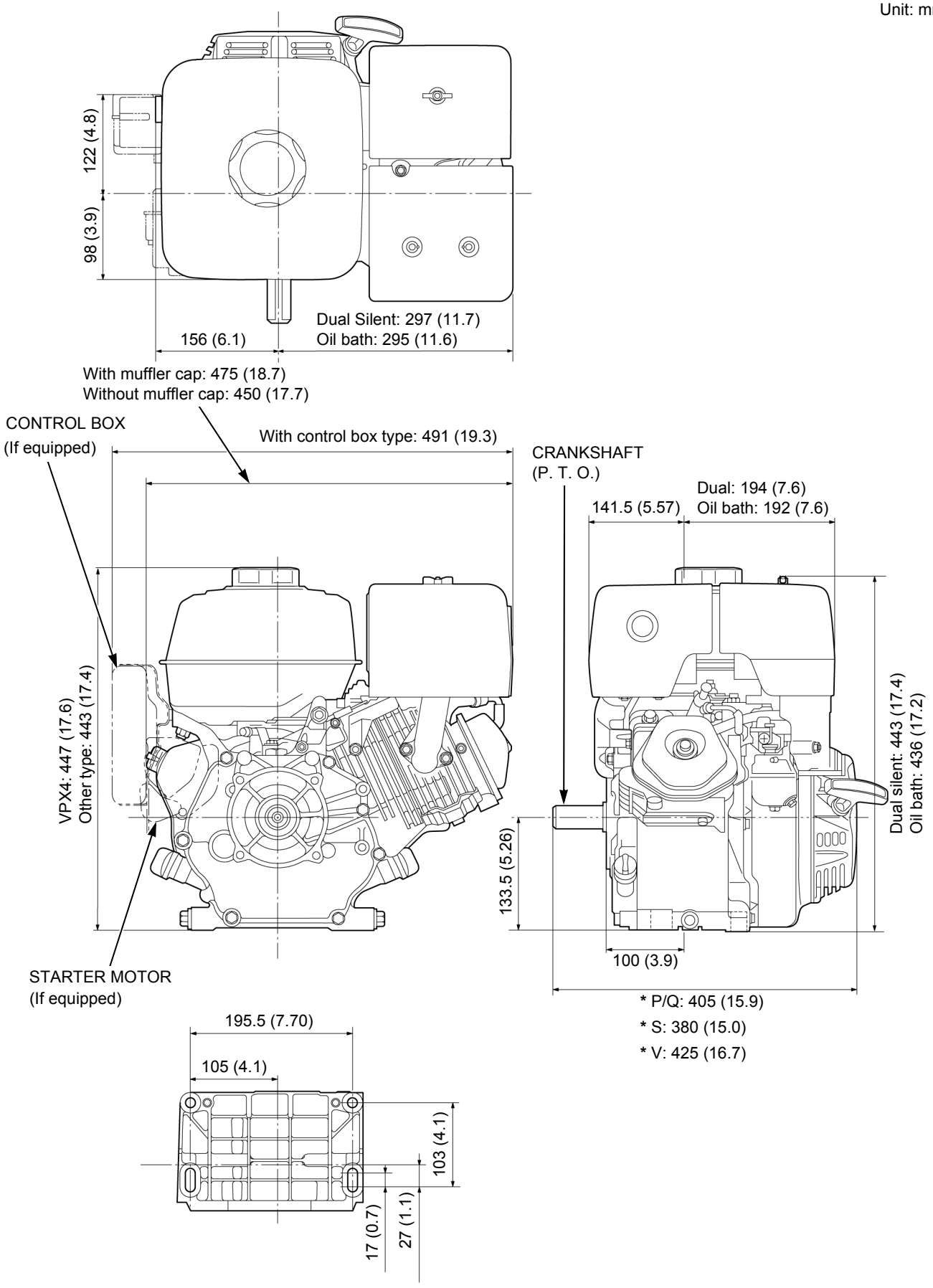






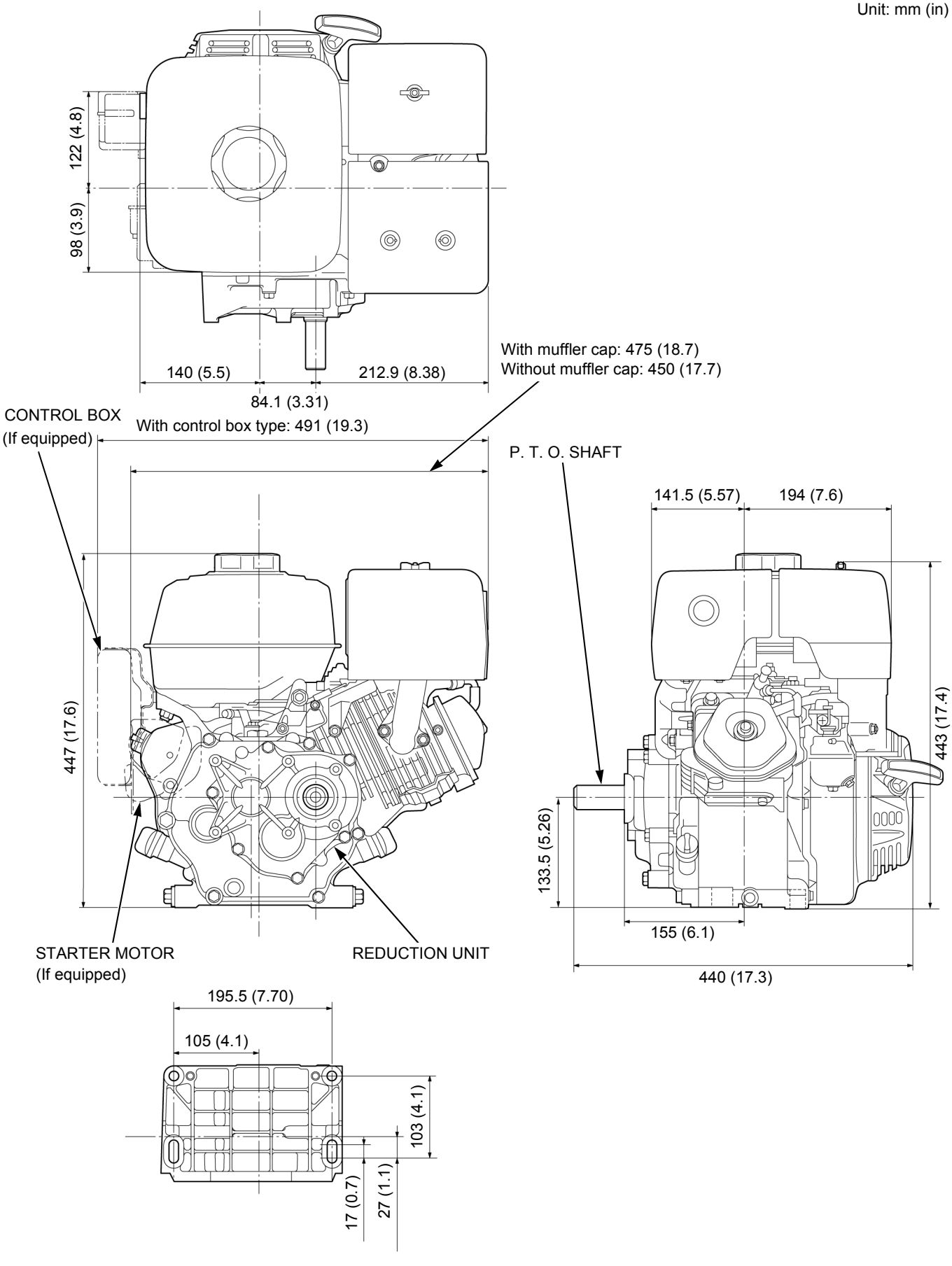
GX390H1 (WITHOUT REDUCTION)

Unit: mm (in)



GX390H1 (WITH REDUCTION)

Unit: mm (in)



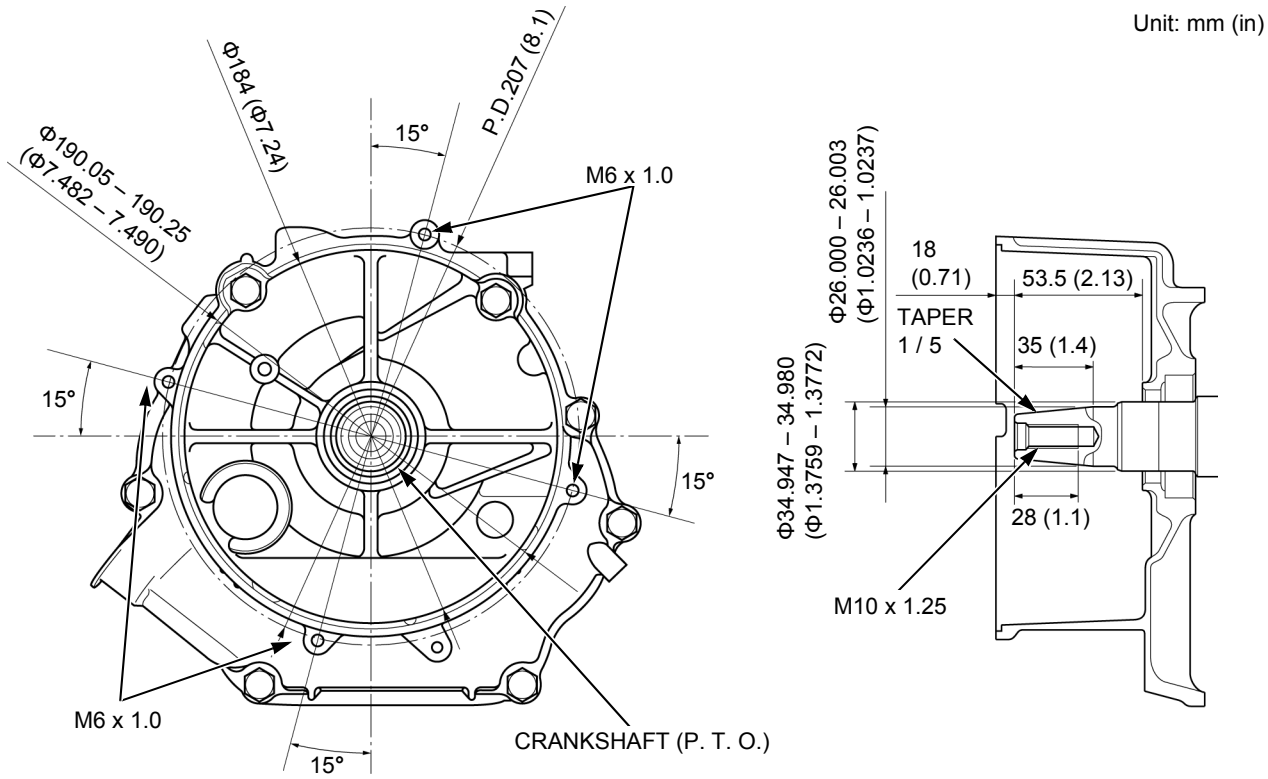
P.T.O. DIMENSIONAL DRAWINGS

*: P. T. O. type. (page 1-3)

GX270H

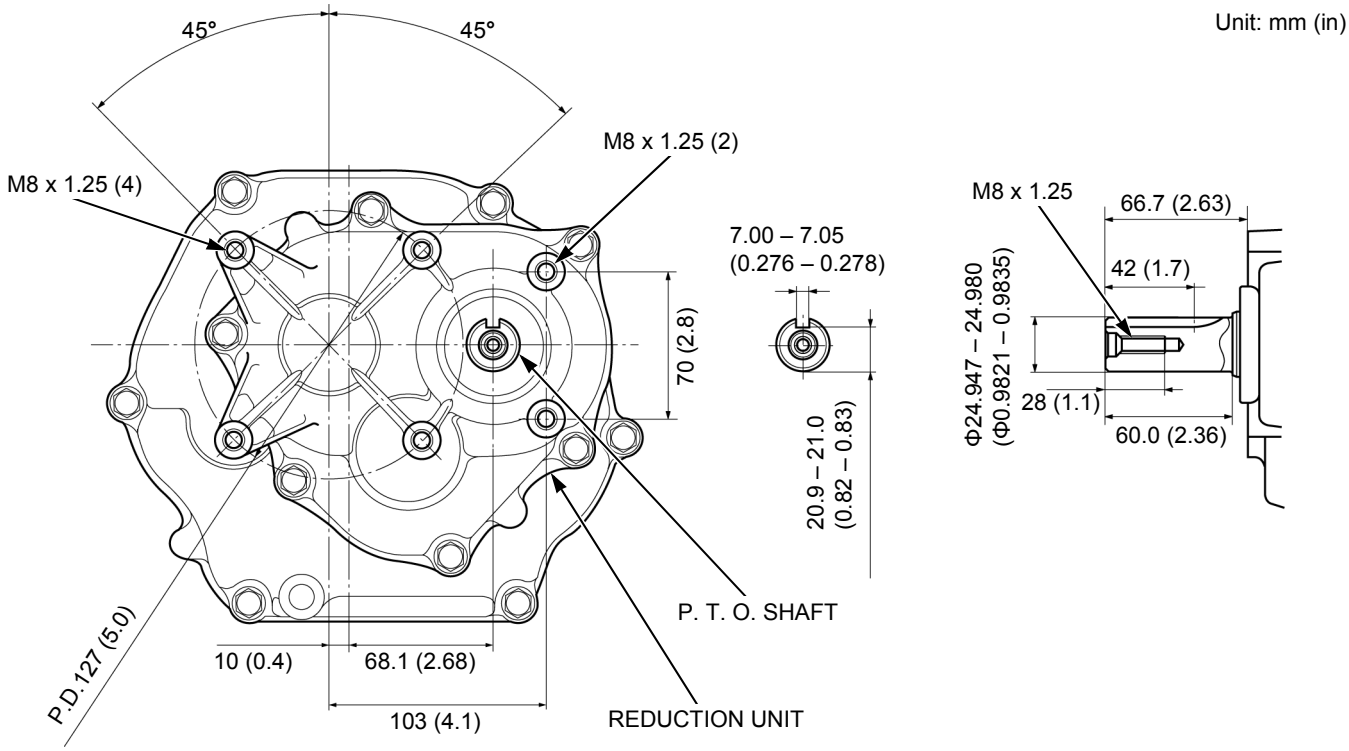
E TYPE*

Unit: mm (in)



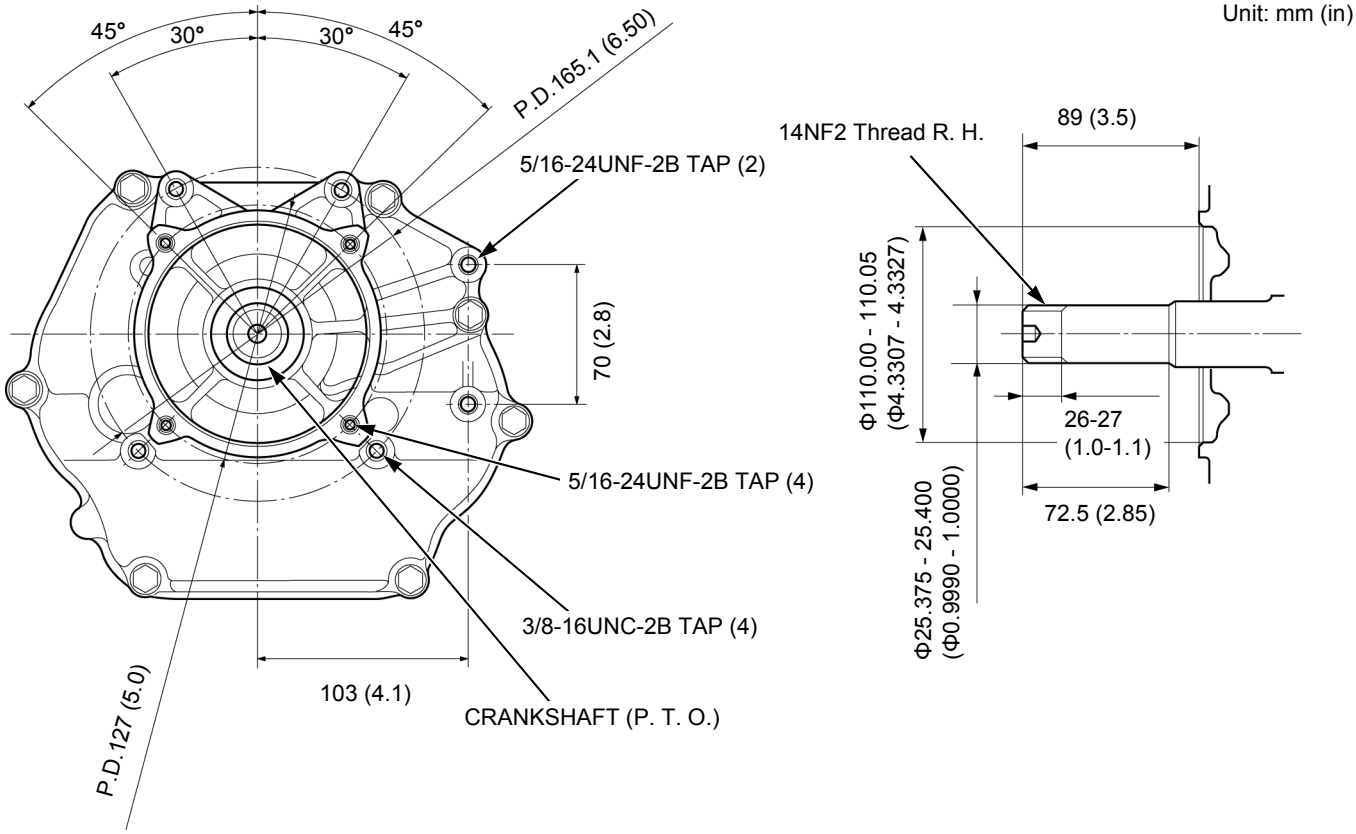
L TYPE* (1/2 REDUCTION CHAIN TYPE)

Unit: mm (in)



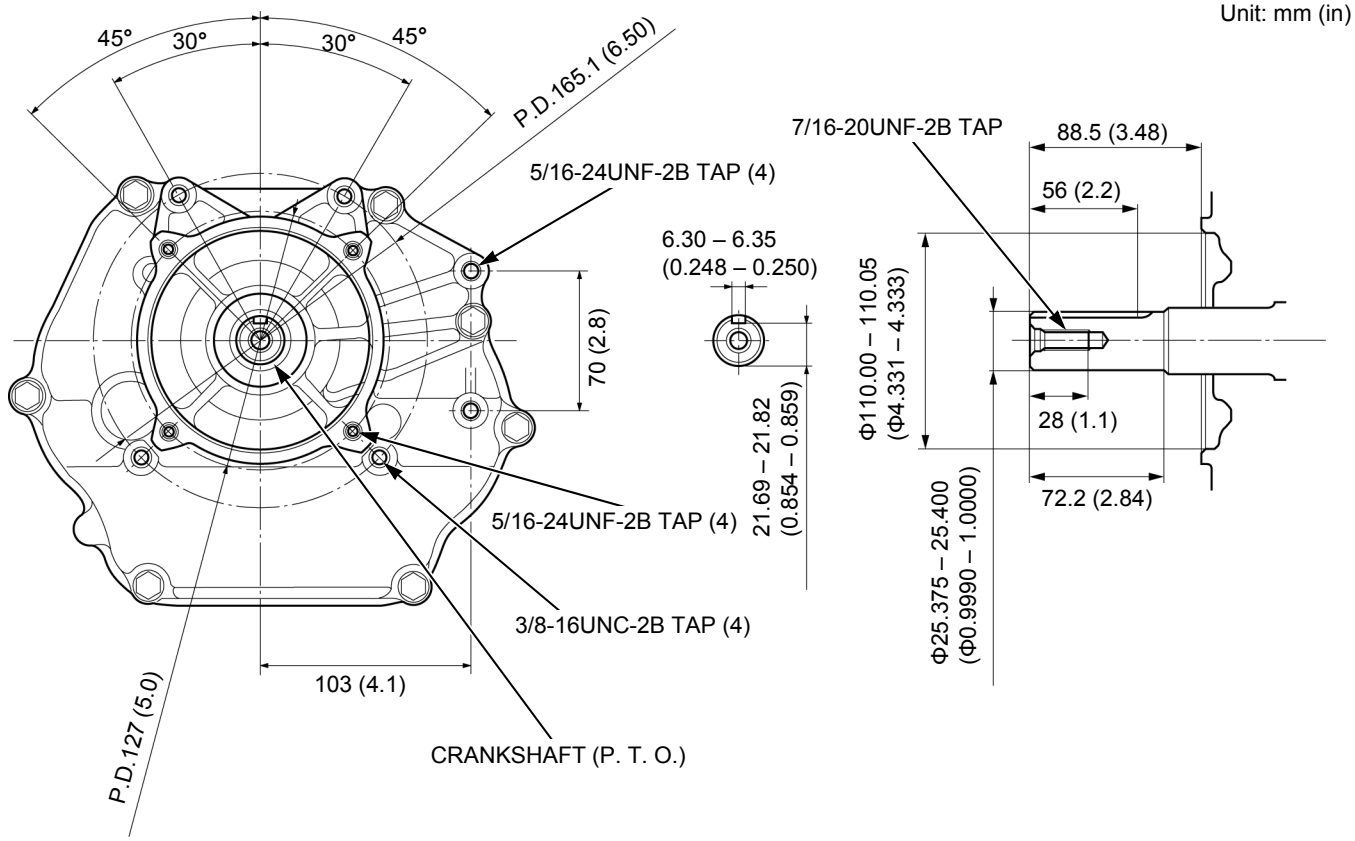
P TYPE*

Unit: mm (in)



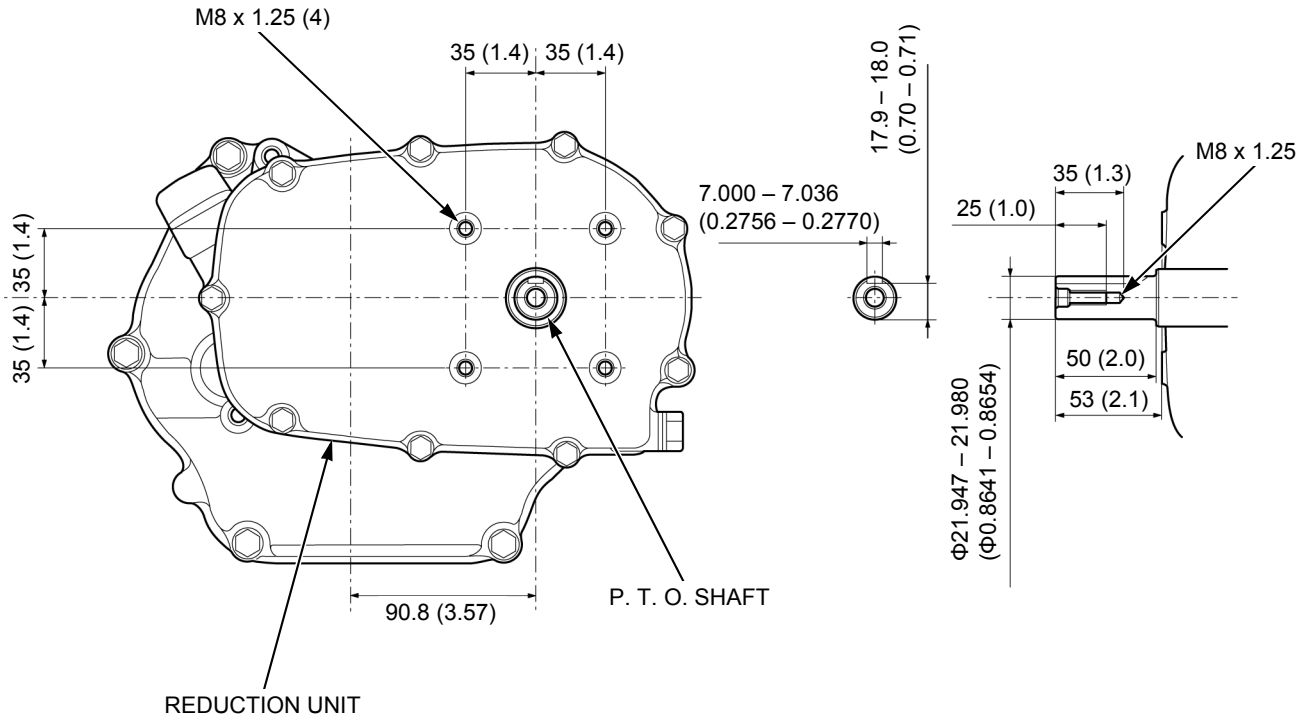
Q TYPE*

Unit: mm (in)



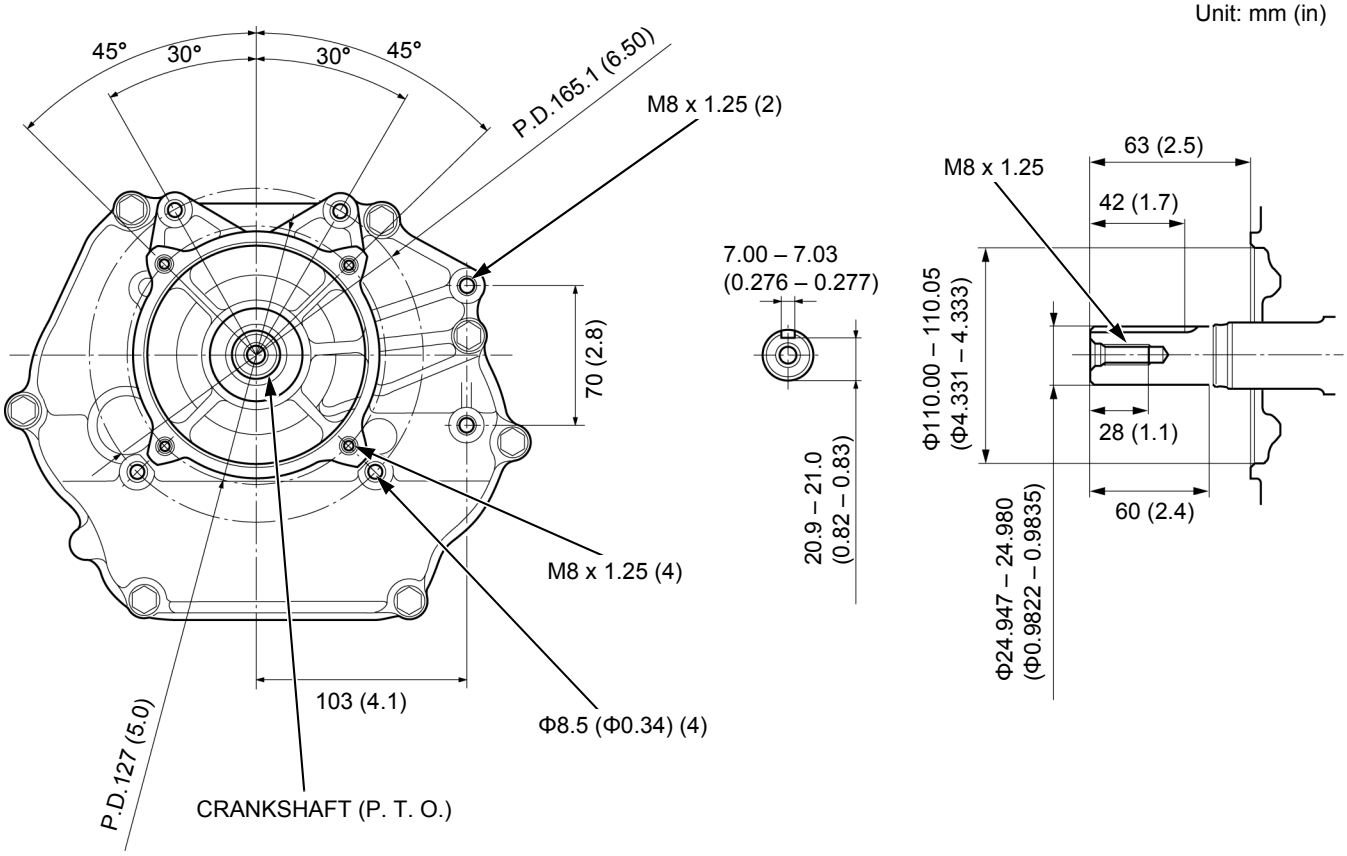
R TYPE* (1/2 REDUCTION CLUTCH TYPE)

Unit: mm (in)



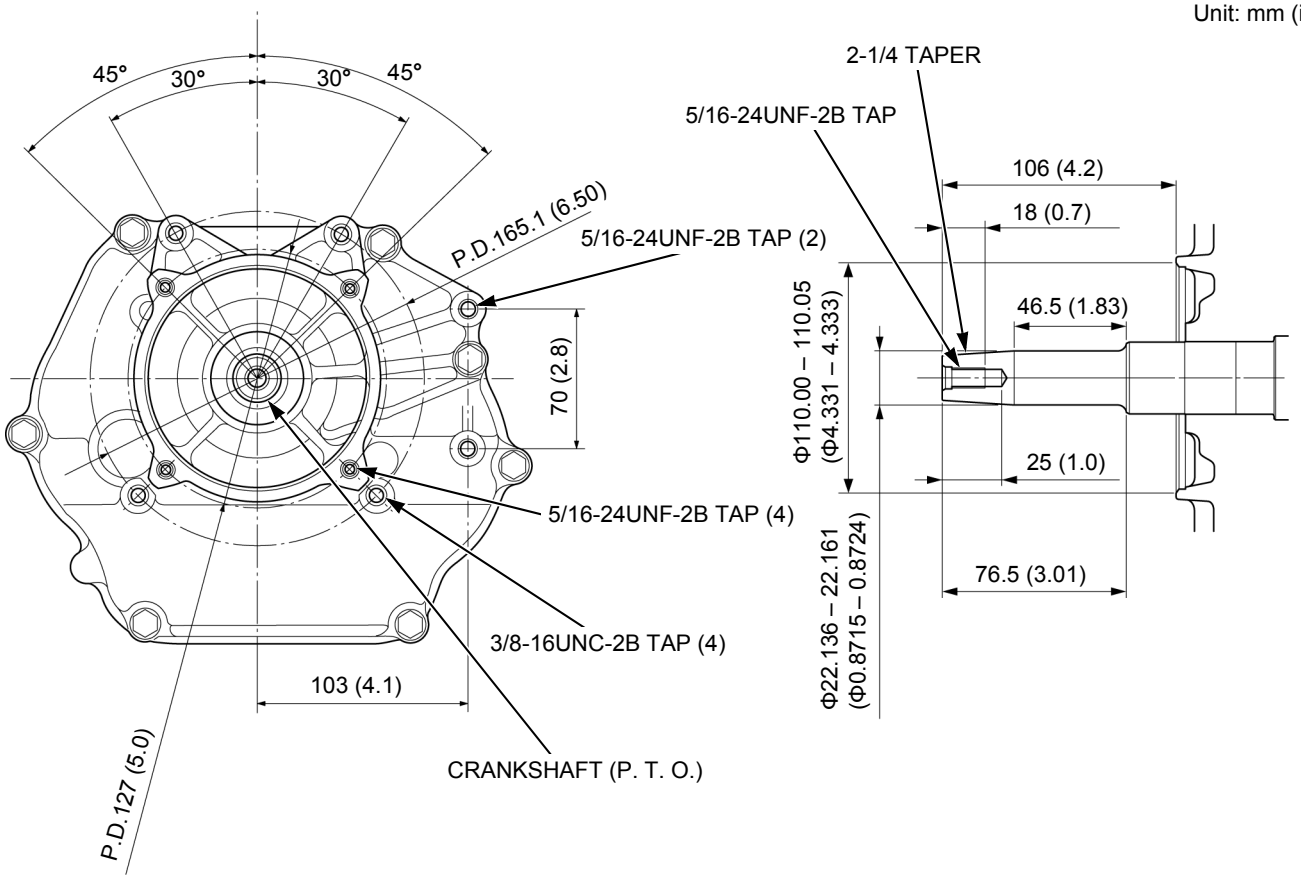
S TYPE*

Unit: mm (in)



V TYPE*

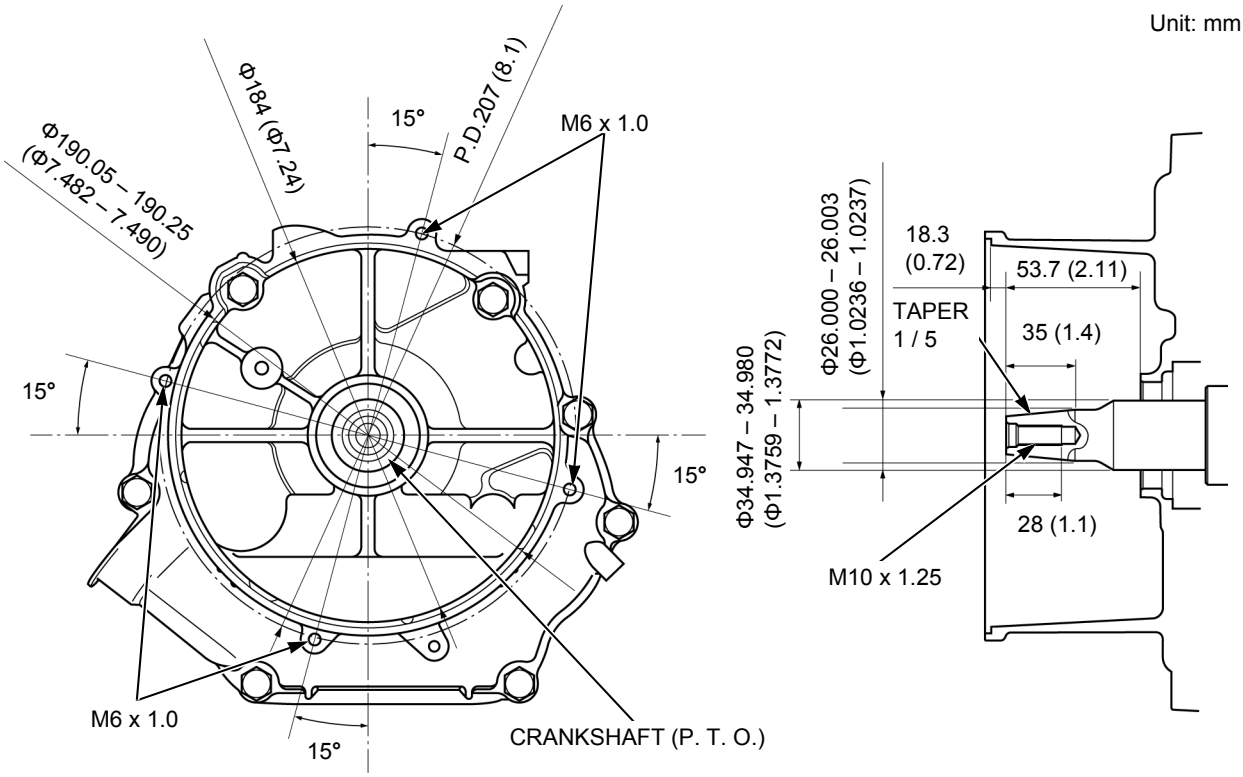
Unit: mm (in)



GX390H1

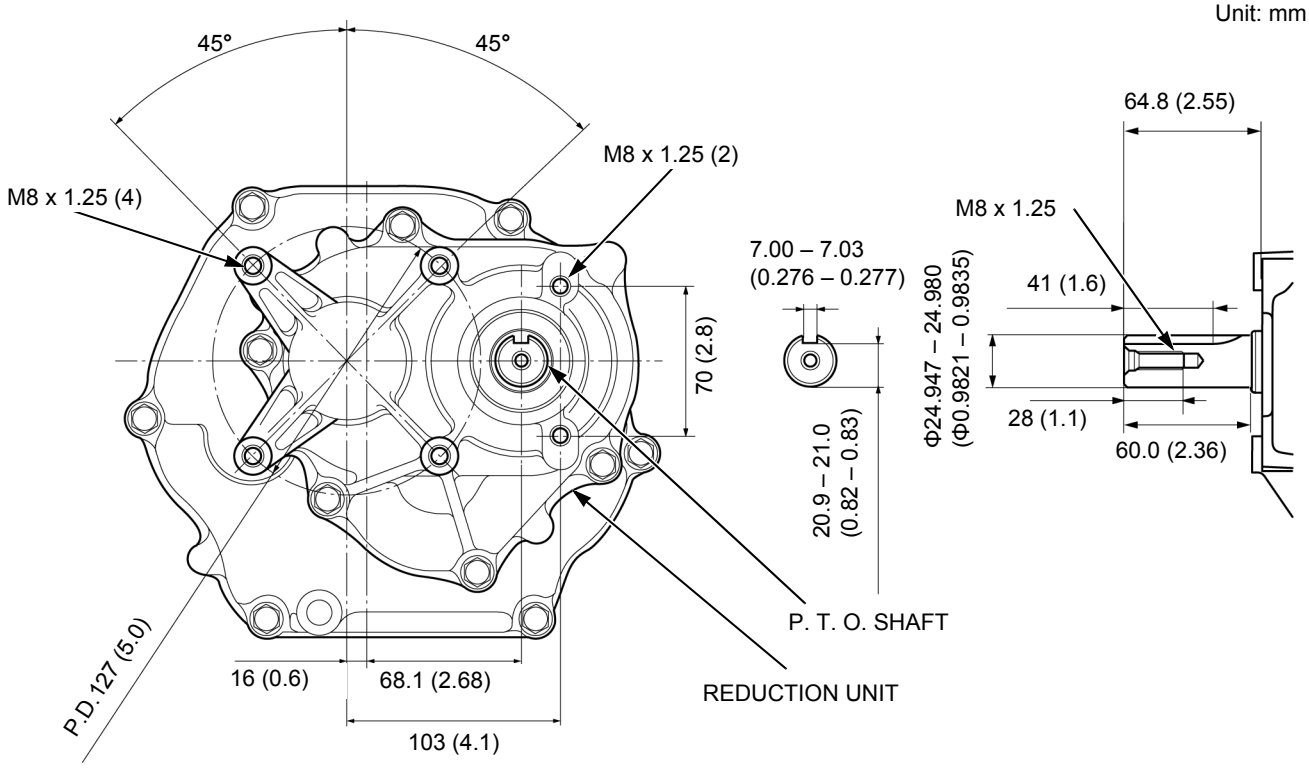
E TYPE*

Unit: mm (in)



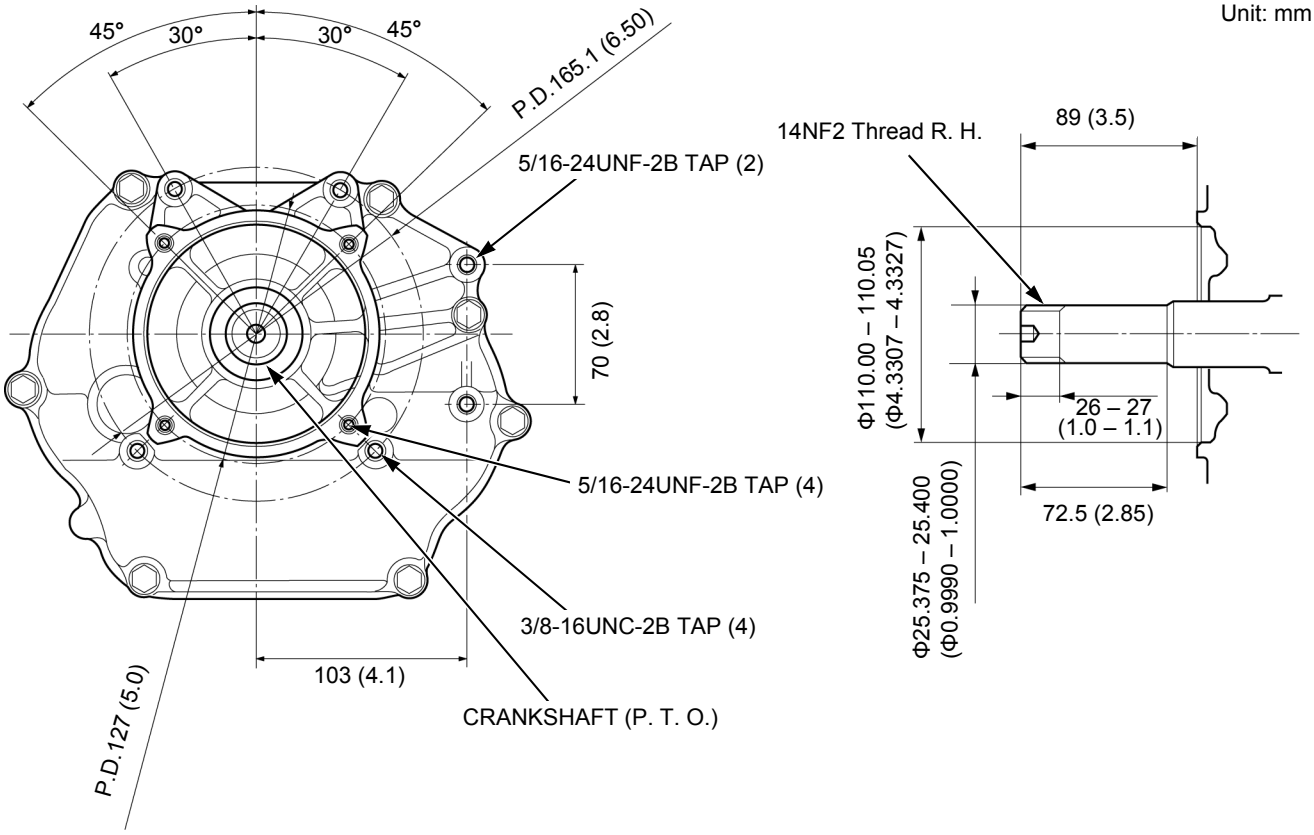
L TYPE* (1/6 REDUCTION GEAR TYPE)

Unit: mm (in)



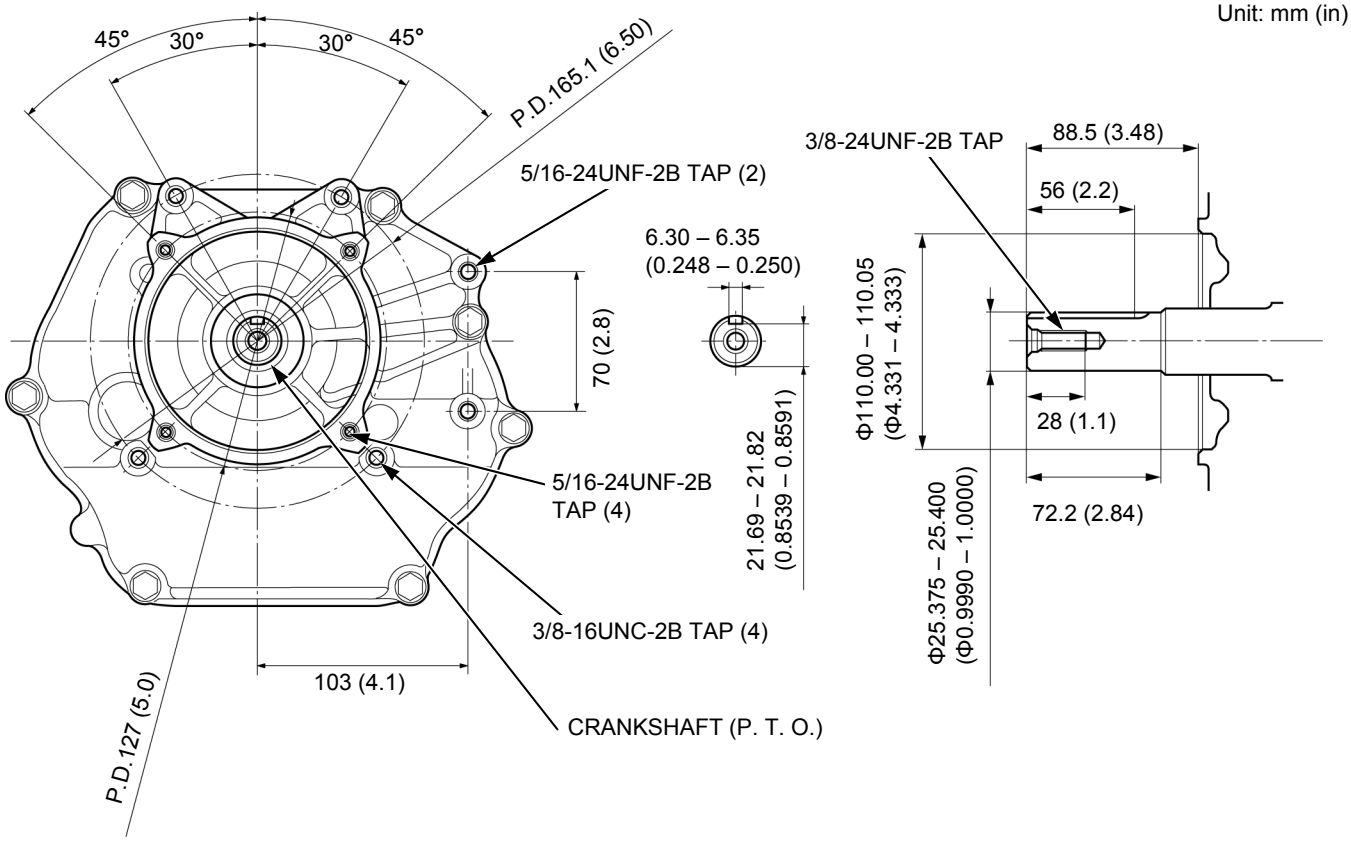
P TYPE*

Unit: mm (in)



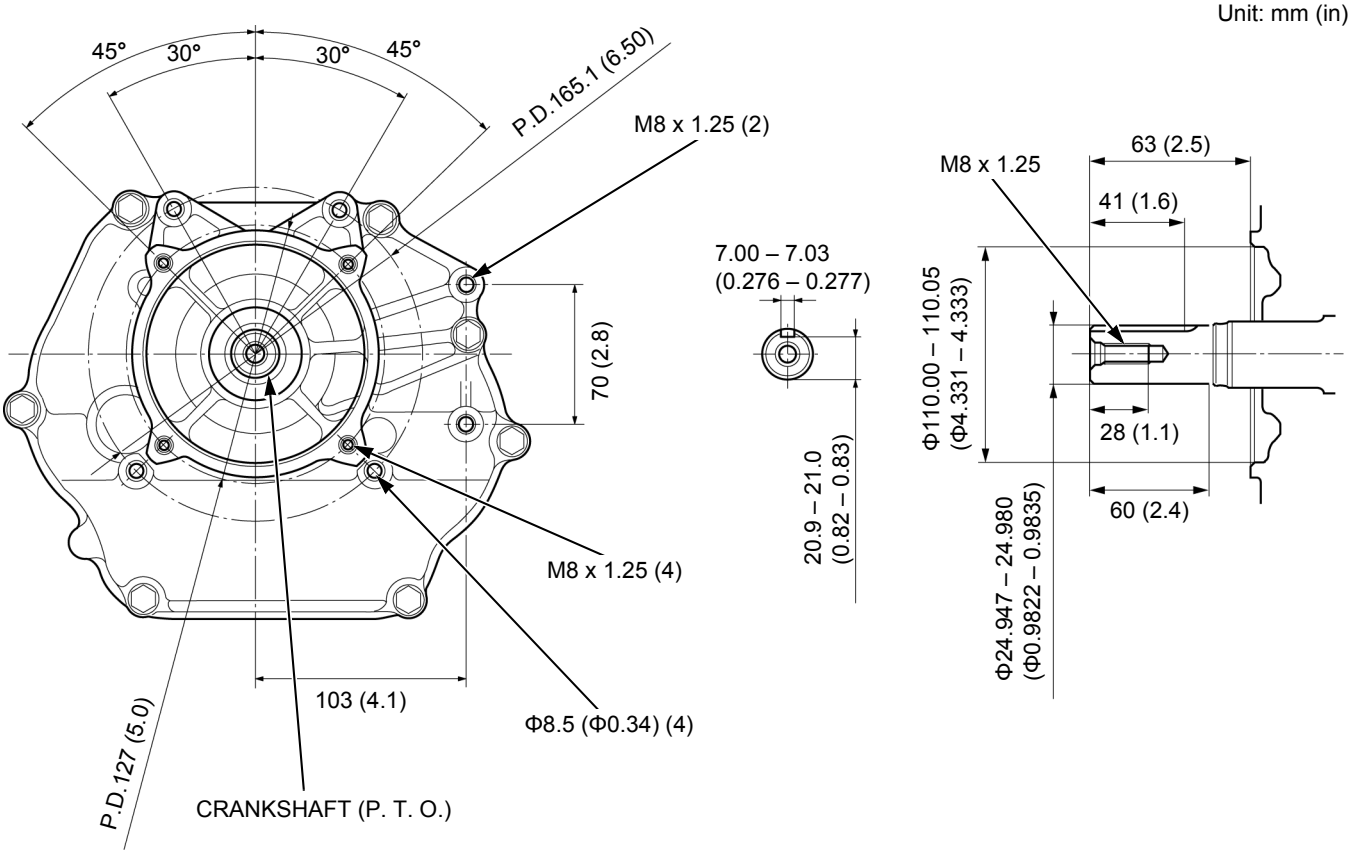
Q TYPE*

Unit: mm (in)



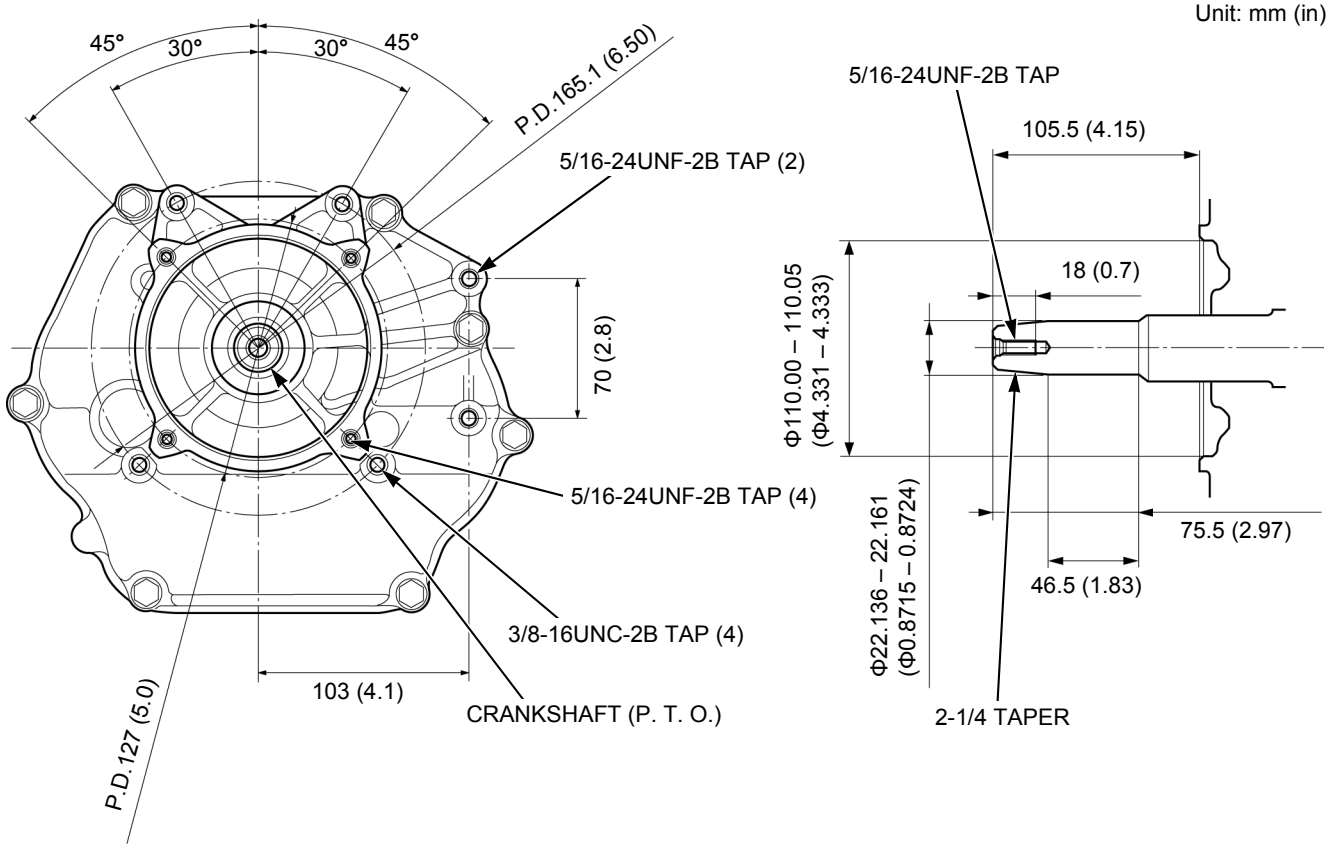
S TYPE*

Unit: mm (in)



V TYPE*

Unit: mm (in)



MEMO

2. SERVICE INFORMATION

MAINTENANCE STANDARDS

GX270H

Unit: mm (in)

Part	Item		Standard	Service limit
Engine	Maximum speed (at no load)		3,850 ± 150 min^{-1} (rpm)	–
	Idle speed		1,400 ± 150 min^{-1} (rpm)	–
	Cylinder compression		1.37 MPa (14.0 kgf/cm^2, 199 psi)/ 1,400 min^{-1} (rpm)	–
Cylinder head	Warpage		–	0.10 (0.004)
Cylinder	Sleeve I.D.		77.000 – 77.017 (3.0315 – 3.0322)	77.17 (3.0381)
Piston	Skirt O.D.		76.975 – 76.985 (3.0305 – 3.0309)	76.85 (3.026)
	Piston-to-cylinder clearance		0.015 – 0.042 (0.0006 – 0.0017)	0.12 (0.005)
	Piston pin bore I.D.		18.002 – 18.008 (0.7087 – 0.7090)	18.042 (0.7103)
Piston pin	Pin O.D.		17.994 – 18.000 (0.7084 – 0.7087)	17.950 (0.7067)
	Piston pin-to-piston pin bore clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.08 (0.003)
Piston rings	Ring side clearance	Top	0.015 – 0.050 (0.0006 – 0.0020)	0.15 (0.006)
		Second	0.030 – 0.065 (0.0012 – 0.0026)	0.15 (0.006)
	Ring end gap	Top	0.200 – 0.350 (0.0079 – 0.0138)	1.0 (0.04)
		Second	0.350 – 0.550 (0.0138 – 0.0217)	1.0 (0.04)
		Oil (side rail)	0.2 – 0.7 (0.01 – 0.03)	1.0 (0.04)
	Ring width	Top	1.170 – 1.190 (0.0460 – 0.0469)	1.140 (0.0449)
		Second	1.155 – 1.175 (0.0455 – 0.0463)	1.140 (0.0449)
Connecting rod	Small end I.D.		18.005 – 18.020 (0.7089 – 0.7094)	18.07 (0.711)
	Big end side clearance		0.10 – 0.40 (0.004 – 0.016)	1.0 (0.04)
	Big end I.D.		33.025 – 33.039 (1.3002 – 1.3007)	33.07 (1.302)
	Big end oil clearance		0.040 – 0.064 (0.0016 – 0.0025)	0.12 (0.005)
Crankshaft	Crankpin O.D.		32.975 – 32.985 (1.2982 – 1.2986)	32.92 (1.296)
	Crankshaft runout		–	0.10 (0.004)
Cylinder barrel (Crankcase)	Camshaft journal I.D.		16.000 – 16.018 (0.6299 – 0.6306)	16.05 (0.632)
Crankcase cover	Camshaft journal I.D.		16.000 – 16.018 (0.6299 – 0.6306)	16.05 (0.632)
Valves	Valve clearance	IN	0.15 ± 0.02	–
		EX	0.20 ± 0.02	–
	Valve stem O.D.	IN	6.575 – 6.590 (0.2588 – 0.2594)	6.44 (0.254)
		EX	6.535 – 6.550 (0.2573 – 0.2579)	6.40 (0.252)
	Valve guide I.D.	IN/EX	6.600 – 6.612 (0.2598 – 0.2603)	6.66 (0.262)
	Guide-to-stem clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.11 (0.004)
		EX	0.050 – 0.077 (0.0020 – 0.0030)	0.13 (0.005)
	Valve seat width		1.0 – 1.2 (0.04 – 0.05)	2.0 (0.08)
	Valve spring free length		39.0 (1.54)	37.5 (1.48)
	Valve spring perpendicularity		–	1.5°
Camshaft	Cam height	IN	31.945 – 32.145 (1.2577 – 1.2655)	31.35 (1.234)
		EX	31.666 – 31.866 (1.2467 – 1.2546)	31.35 (1.234)
	Camshaft O.D.		15.966 – 15.984 (0.6286 – 0.6293)	15.92 (0.627)
Carburetor	Main jet	BE70L A	#85	–
		BE70M A	#92	–
		BE75B C	#85	–
		BE75H A	#88	–
		BE78B A	#85	–
		BE98F A	#90	–
		BE98G A	#92	–
		BE98H A	#92	–
	Pilot screw opening	BE70L A	2-1/8 turns out	–
		BE70M A	2-3/4 turns out	–
		BE75B C	2-1/8 turns out	–
		BE75H A	2-7/8 turns out	–
		BE78B A	2-1/8 turns out	–
		BE98F A	2-5/8 turns out	–
		BE98G A	2-7/8 turns out	–
		BE98H A	2-7/8 turns out	–
	Float height		13.2 (0.52)	–

Part	Item		Standard	Service limit
Spark plug	Gap		0.70 – 0.80 (0.028 – 0.031)	–
Spark plug cap	Resistance (20°C/68°F)		7.5 – 12.5 kΩ	–
Ignition coil	Air gap		0.2 – 0.6 (0.01 – 0.02)	–
	Primary resistance		0.4 – 0.7 Ω	–
	Secondary resistance		8.9 – 13.5 kΩ	–
Starter motor	Brush length		7.0 (0.28)	3.5 (0.14)
	Mica depth		1.0 (0.04)	0.2 (0.01)
Charge coil	Resistance	1 A	3.00 – 4.00 Ω	–
		3 A	0.62 – 0.93 Ω	–
Lamp coil	Resistance	12 V - 50 W	0.29 – 0.44 Ω	–
1/2 reduction clutch type	Clutch friction disc thickness		3.5 (0.14)	3.0 (0.12)
	Clutch plate warpage		–	0.10 (0.004)

GX390H1

Unit: mm (in)

Part	Item		Standard	Service limit
Engine	Maximum speed (at no load)		3,850 ± 150 min^{-1} (rpm)	–
	Idle speed		1,400 ± 150 min^{-1} (rpm)	–
	Cylinder compression		1.37 MPa (14.0 kgf/cm^2, 199 psi)/ 1,400 min^{-1} (rpm)	–
Cylinder head	Warpage		–	0.10 (0.004)
Cylinder	Sleeve I.D.		88.000 – 88.017 (3.4646 – 3.4652)	88.170 (3.4710)
Piston	Skirt O.D.		87.975 – 87.985 (3.4636 – 3.4640)	87.85 (3.459)
	Piston-to-cylinder clearance		0.015 – 0.042 (0.0006 – 0.0017)	0.12 (0.005)
	Piston pin bore I.D.		20.002 – 20.008 (0.7875 – 0.7877)	20.042 (0.7891)
Piston pin	Pin O.D.		19.994 – 20.000 (0.7872 – 0.7874)	19.950 (0.7854)
	Piston pin-to-piston pin bore clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.08 (0.003)
Piston rings	Ring side clearance	Top	0.015 – 0.050 (0.0006 – 0.0020)	0.15 (0.006)
		Second	0.030 – 0.065 (0.0012 – 0.0026)	0.15 (0.006)
	Ring end gap	Top	0.200 – 0.350 (0.0079 – 0.0138)	1.0 (0.04)
		Second	0.350 – 0.550 (0.0138 – 0.0217)	1.0 (0.04)
		Oil (side rail)	0.2 – 0.7 (0.01 – 0.03)	1.0 (0.04)
	Ring width	Top	1.170 – 1.190 (0.0460 – 0.0469)	1.140 (0.0449)
		Second	1.155 – 1.175 (0.0455 – 0.0463)	1.140 (0.0449)
Connecting rod	Small end I.D.		20.005 – 20.020 (0.7876 – 0.7882)	20.07 (0.790)
	Big end side clearance		0.10 – 0.40 (0.004 – 0.016)	1.0 (0.04)
	Big end I.D.		36.025 – 36.039 (1.4183 – 1.4189)	36.07 (1.420)
	Big end oil clearance		0.040 – 0.064 (0.0016 – 0.0025)	0.12 (0.005)
Crankshaft	Crankpin O.D.		35.975 – 35.985 (1.4163 – 1.4167)	35.93 (1.415)
	Crankshaft runout		–	0.10 (0.004)
Cylinder barrel (Crankcase)	Camshaft journal I.D.		16.000 – 16.018 (0.6299 – 0.6306)	16.05 (0.632)
Crankcase cover	Camshaft journal I.D.		16.000 – 16.018 (0.6299 – 0.6306)	16.05 (0.632)
Valves	Valve clearance	IN	0.15 ± 0.02	–
		EX	0.20 ± 0.02	–
	Valve stem O.D.	IN	6.575 – 6.590 (0.2588 – 0.2594)	6.44 (0.254)
		EX	6.535 – 6.550 (0.2573 – 0.2579)	6.40 (0.252)
	Valve guide I.D.	IN/EX	6.600 – 6.615 (0.2598 – 0.2604)	6.66 (0.262)
	Guide-to-stem clearance	IN	0.010 – 0.040 (0.0004 – 0.0016)	0.11 (0.004)
		EX	0.050 – 0.080 (0.0020 – 0.0032)	0.13 (0.005)
	Valve seat width		1.0 – 1.2 (0.04 – 0.05)	2.0 (0.08)
	Valve spring free length		39.0 (1.54)	37.5 (1.48)
	Valve spring perpendicularity		–	1.5°
Camshaft	Cam height	IN	32.498 – 32.698 (1.2794 – 1.2873)	32.198 (1.2676)
		EX	31.985 – 32.185 (1.2592 – 1.2671)	29.886 (1.1766)
	Camshaft O.D.		15.966 – 15.984 (0.6286 – 0.6293)	15.92 (0.627)
Carburetor	Main jet	BE85T B	#92	–
		BE85U A	#95	–
		BE88P A	#105	–
		BE88Q A	#95	–
		BE89K A	#102	–
		BE89L A	#108	–
	Pilot screw opening	BE85T B	1-7/8 turns out	–
		BE85U A	2 turns out	–
		BE88P A	2-1/4 turns out	–
		BE88Q A	2 turns out	–
		BE89K A	2-1/4 turns out	–
		BE89L A	2-1/4 turns out	–
	Float height		13.2 (0.52)	–
Spark plug	Gap		0.70 – 0.80 (0.028 – 0.031)	–
Spark plug cap	Resistance (20°C/68°F)		7.5 – 12.5 kΩ	–
Ignition coil	Air gap		0.2 – 0.6 (0.01 – 0.02)	–
	Primary resistance		0.4 – 0.7 Ω	–
	Secondary resistance		8.9 – 13.5 kΩ	–

Part	Item		Standard	Service limit
Starter motor	Brush length		10.5 (0.41)	4.0 (0.16)
	Mica depth		1.0 (0.04)	0.2 (0.01)
Charge coil	Resistance	1 A	3.00 – 4.00 Ω	–
Lamp coil	Resistance	12 V - 15 W	1.04 – 1.56 Ω	–
		12 V - 25 W	0.30 – 0.46 Ω	–
		12 V - 50 W	0.29 – 0.44 Ω	–

TORQUE VALUES

ENGINE TORQUE VALUES

Item	Tread Dia. (mm)	Torque values			Remark
		N·m	kgf·m	lbf·ft	
Crankcase cover bolt	M8 x 1.25	24	2.4	18	
Cylinder head bolt	M10 x 1.25	35	3.5	26	Apply engine oil to the threads and seating surface.
Oil drain bolt	M12 x 1.5	23	2.3	17	
Connecting rod bolt	M8 x 1.25 (Special bolt)	14	1.4	10	Apply engine oil to the threads and seating surface.
Rocker arm pivot bolt	M8 x 1.25 (Special bolt)	24	2.4	18	
Rocker arm pivot lock nut	M6 x 0.5	10	1.0	7	
Spark plug	M14 x 1.25 (Special)	18	1.8	13	
Oil level switch nut	M10 x 1.25	10	1.0	7	
Flywheel nut	M16 x 1.5 (Special nut)	113	11.5	83	Apply engine oil to the threads and seating surface.
Flywheel nut (With reduction, GX390H1 only)	M16 x 1.5 (Special nut)	157	16.0	116	
Fuel tank nut/bolt	M8 x 1.25	24	2.4	18	
Fuel tank joint	M10 x 1.25	2.0	0.2	1.5	
Air cleaner elbow nut	M6 x 1.0	9.0	0.9	6.6	
Muffler nut	M8 x 1.25	24	2.4	18	
Drive sprocket bolt (With reduction, GX270H only)	M8 x 1.25	24	2.4	18	
Gear case cover bolt (With reduction, GX390H1 only)	M8 x 1.25	24	2.4	18	
Primary drive gear bolt (With reduction, GX390H1 only)	M8 x 1.25	24	2.4	18	
Recoil starter setting screw	M5 x 0.8 (Special bolt)	5.4	0.6	4.0	
Sediment cup	M24 x 1.0	3.9	0.4	2.9	
Starter solenoid nut (GX390H1 only)	M6 x 1.0	2.5	0.3	1.8	
Starter motor housing screw (GX390H1 only)	M5 x 0.8	5.0	0.5	3.7	
Starter motor terminal nut (GX390H1 only)	M6 x 1.0	3.7	0.4	2.7	

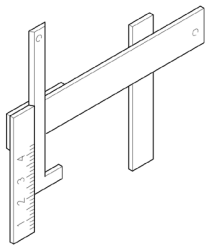
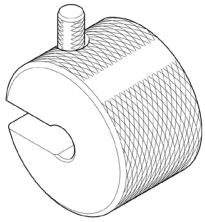
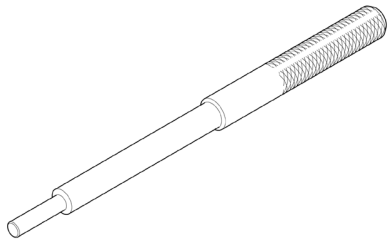
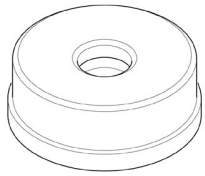
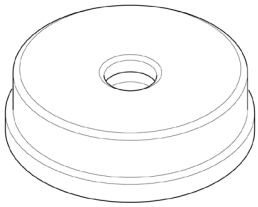
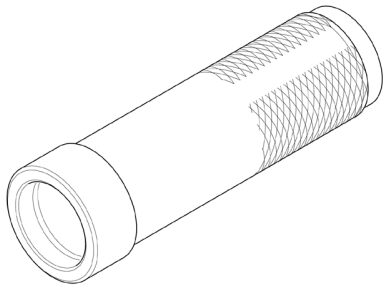
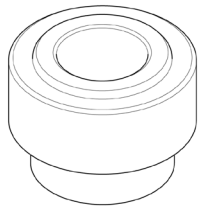
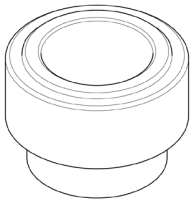
STANDARD TORQUE VALUES

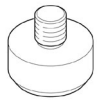
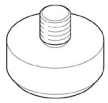
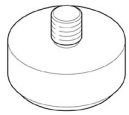
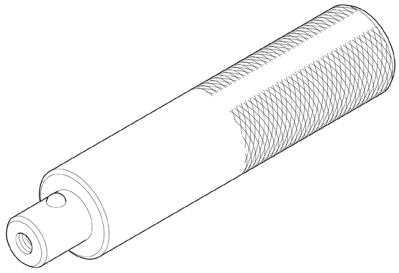
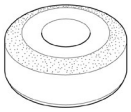
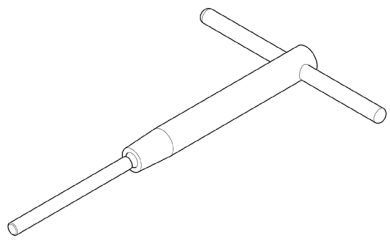
Item	Tread Dia. (mm)	Torque values		
		N·m	kgf·m	lbf·ft
Screw	4 mm	2.1	0.2	1.5
	5 mm	4.3	0.4	3.1
	6 mm	9.0	0.9	6.6
Bolt and nut	5 mm	5.3	0.5	3.9
	6 mm	10	1.0	7
	8 mm	22	2.2	16
	10 mm	34	3.5	25
	12 mm	54	5.5	40
Flange bolt and nut	5 mm	5.3	0.5	3.9
	6 mm	12	1.2	9
	8 mm	23	2.3	17
	10 mm	40	4.0	30
SH (Small head) flange bolt	6 mm	9.0	0.90	6.6
CT (Cutting threads) flange bolt (Retightening)	5 mm	5.4	0.6	4.0
	6 mm	12	1.2	9

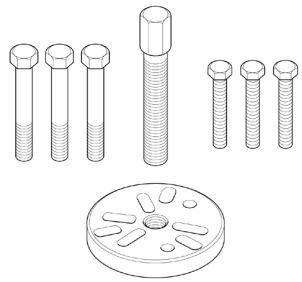
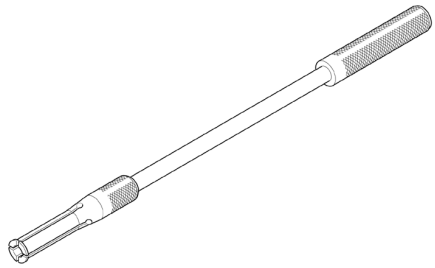
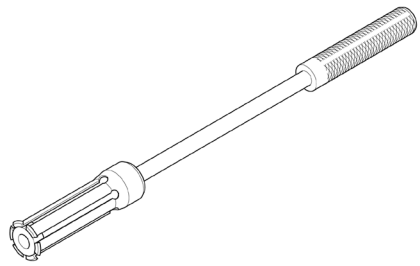
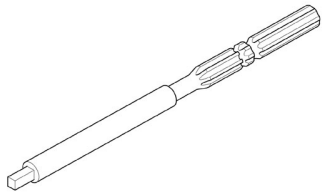
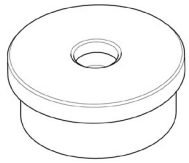
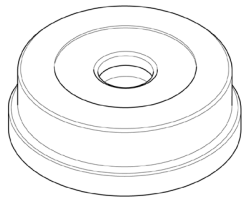
LUBRICATION & SEAL POINT

Material	Location	Remarks
Engine oil	Crankshaft pin and gear teeth	
	Piston outer surface, ring groove and piston pin hole	
	Piston pin outer surface	
	Piston ring entire surface	
	Cylinder inner surface	
	Connecting rod big and small end bearing	
	Connecting rod bolt threads and seating surface	
	Camshaft cam profile and journal	
	Valve lifter pivot, pivot end and slipper surface	
	Valve stem sliding surface and stem end	
	Valve rocker arm tappet surface and pivot	
	Rocker arm pivot threads and pivot	
	Flywheel nut threads and seating surface	
	Governor weight holder gear and sliding surface	
	Governor holder shaft journal	
	Governor arm shaft journal	
	Cylinder head bolt threads and seating surface	
	Balancer shaft bearing and gear (GX390H1)	
	Drive sprocket, P.T.O. shaft gear teeth and journal	Reduction unit
	Drive sprocket, P.T.O. shaft, clutch center gear teeth and journal	
	Countershaft bearing and gears	
Multi-purpose grease	Oil seal lip	
	O-ring	
	Recoil starter reel sliding surface	
	Recoil starter ratchet sliding surface	
	Recoil starter ratchet guide inside	
Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1:1)	Camshaft cam profile	When installing a new camshaft
LOCTITE® 638 or equivalent	Limiter cap inside	

TOOLS

Float level gauge 07401-0010000 	Sliding hammer weight 07741-0010201 	Valve guide driver, 6.45 x 11 mm 07742-0010200 
Attachment, 32 x 35 mm 07746-0010100 	Attachment, 42 x 47 mm 07746-0010300 	Attachment, 52 x 55 mm 07746-0010400 
Attachment, 72 x 75 mm 07746-0010600 	Inner driver handle, 40 mm 07746-0030100 	Attachment, 30 mm 07746-0030300 
Attachment, 35 mm 07746-0030400 	Pilot, 15 mm 07746-0040300 	Pilot, 20 mm 07746-0040500 

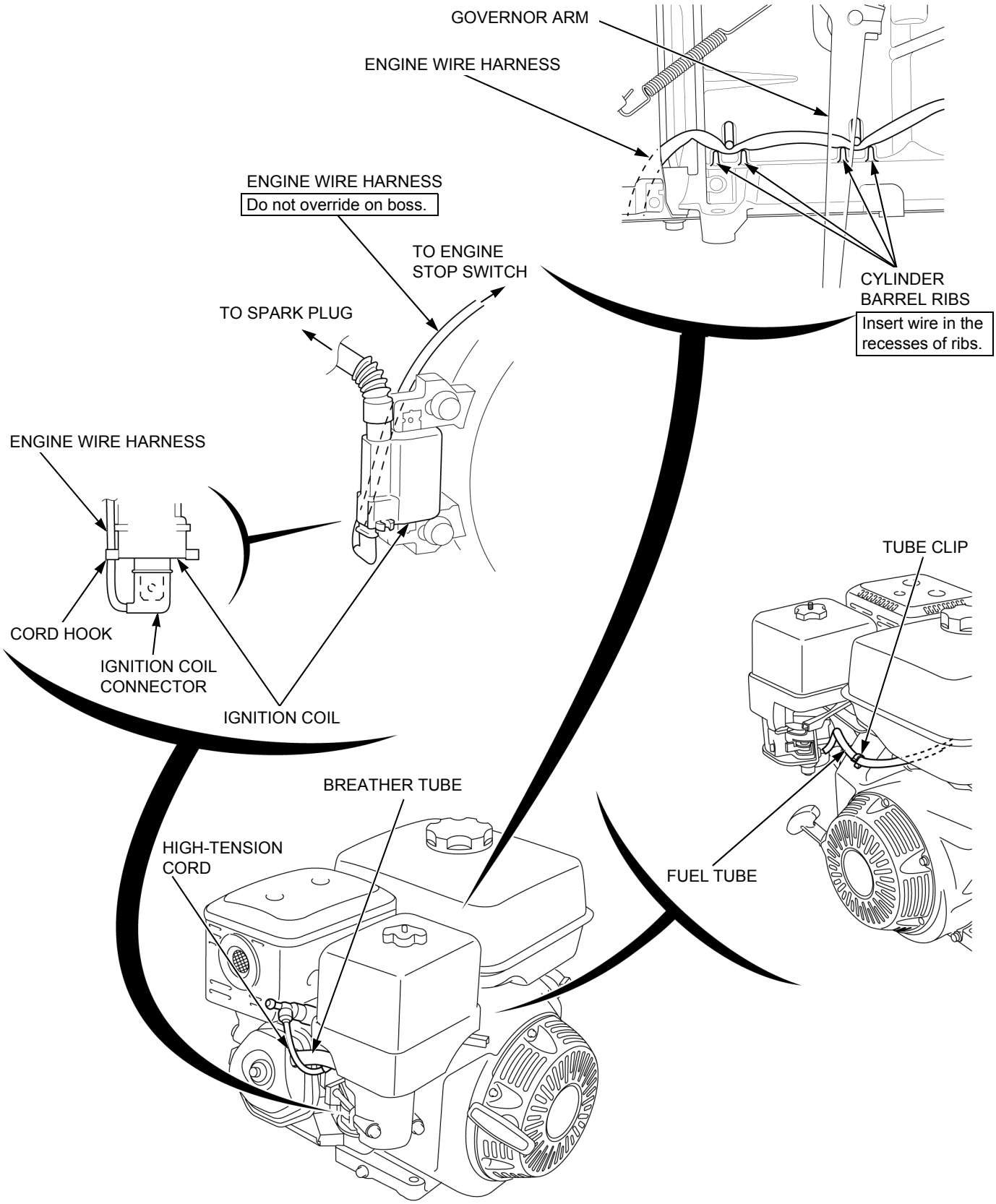
Pilot, 25 mm 07746-0040600 	Pilot, 30 mm 07746-0040700 	Pilot, 35 mm 07746-0040800 
Pilot, 14 mm 07746-0041200 	Driver handle 07749-0010000 	Seat cutter, 29 mm (45° IN) 07780-0010300 
Seat cutter, 27.5 mm (45° EX) 07780-0010200 	Seat cutter, 35 mm (45° IN) 07780-0010400 	Seat cutter, 33 mm (45° EX) 07780-0010800 
Flat cutter, 30 mm (32° IN) 07780-0012200 	Flat cutter, 28 mm (32° EX) 07780-0012100 	Flat cutter, 35 mm (32° IN) 07780-0012300 
Flat cutter, 33 mm (32° EX) 07780-0012900 	Interior cutter, 37.5 mm (60° IN/EX) 07780-0014100 	Cutter holder, 6.6 mm 07781-0010202 

Flywheel puller set 07935-8050004 	Bearing remover shaft set, 15 mm 07936-KC10500 	Bearing remover shaft set, 25 mm 07936-ZV10100 
Valve guide reamer, 6.612 mm 07984-ZE20001 	Attachment, 45 x 50 mm 07946-6920100 	Attachment, 62 x 64 mm 07947-6340400 

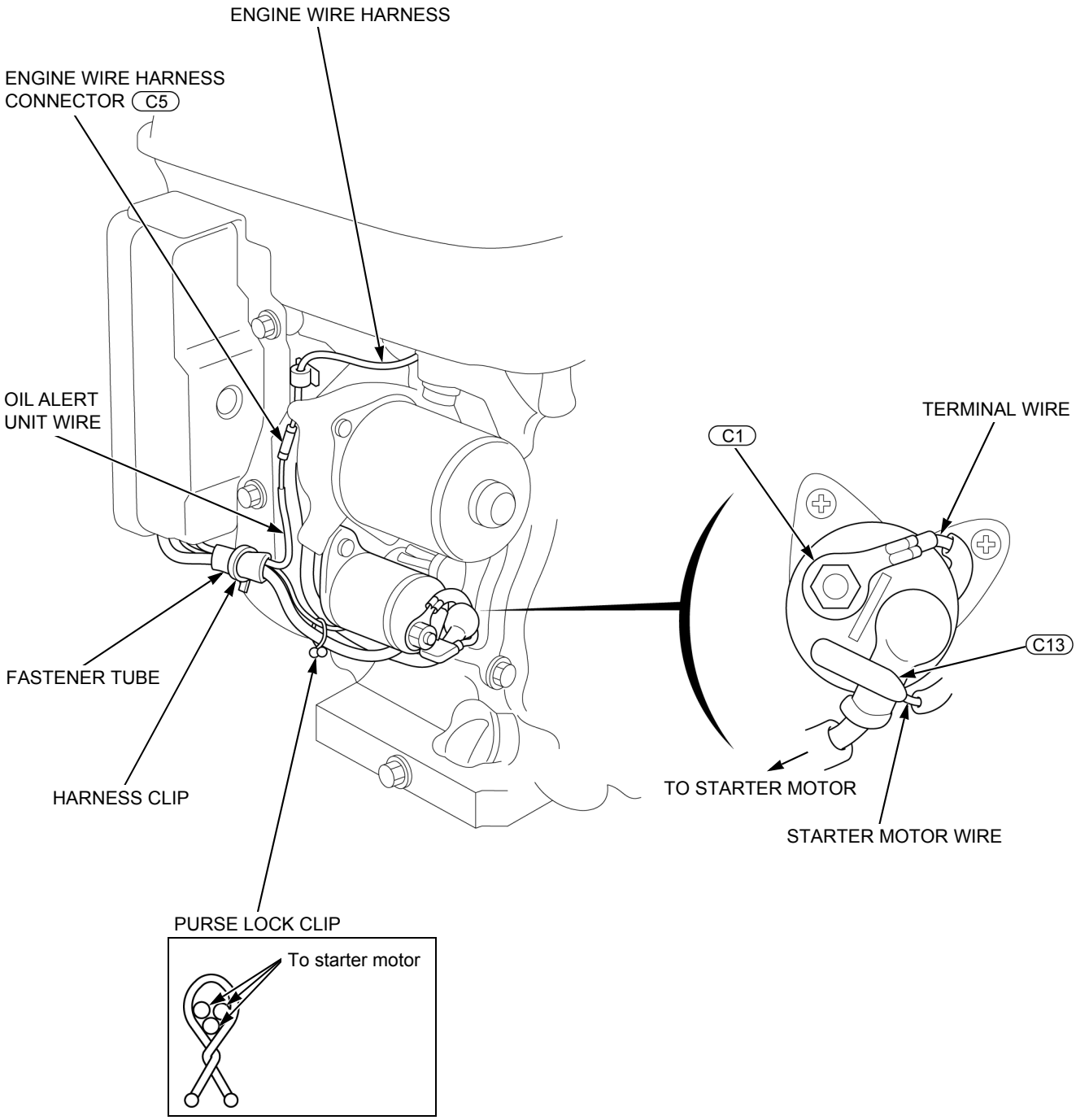
HARNESS AND TUBE ROUTING

Connection of regulator/rectifier, charge/lamp coil, sub wire harness, and auto throttle solenoid are depending on the application of the engine, therefore, it does not indicate those parts in this manual.

ALL TYPE

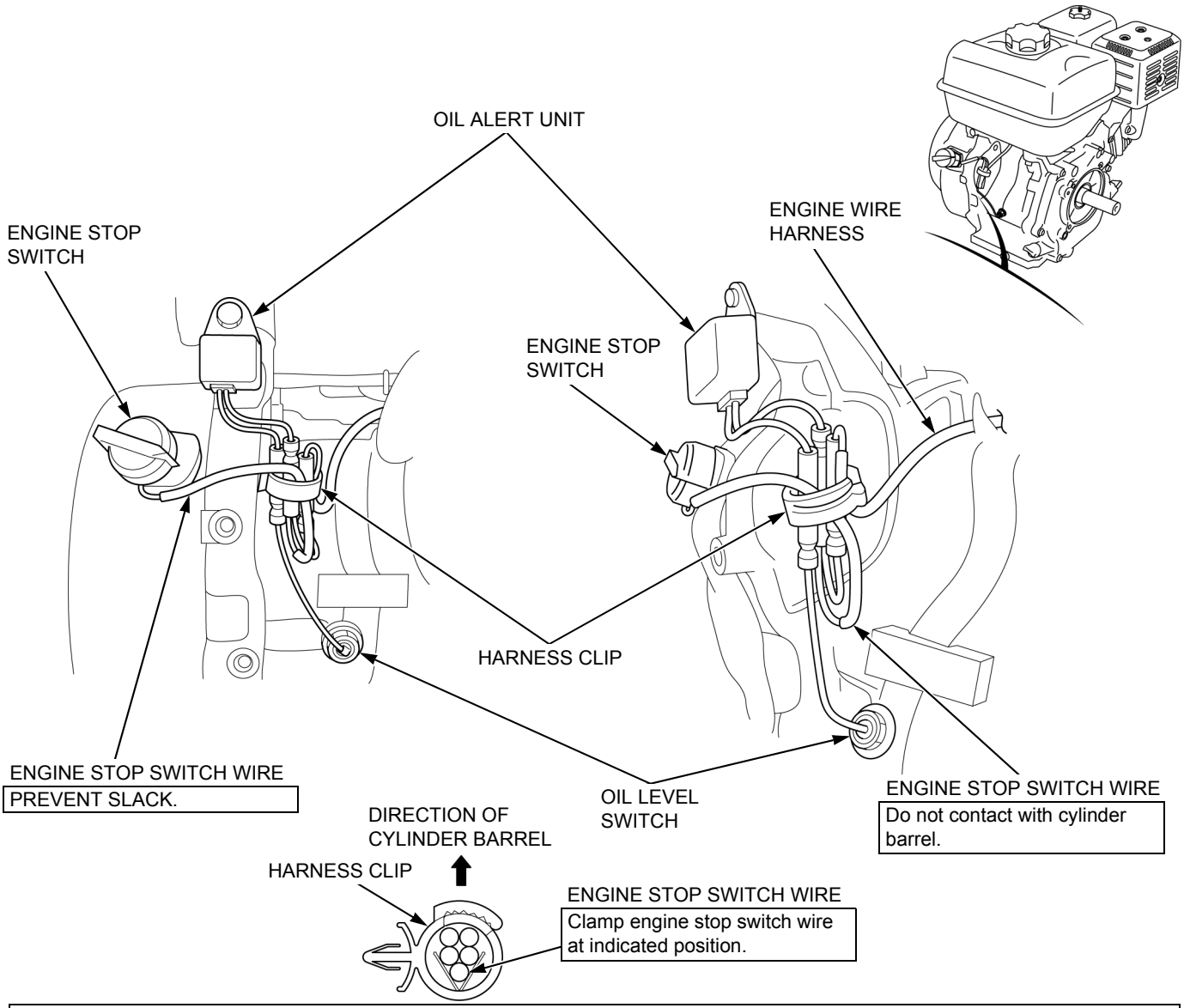


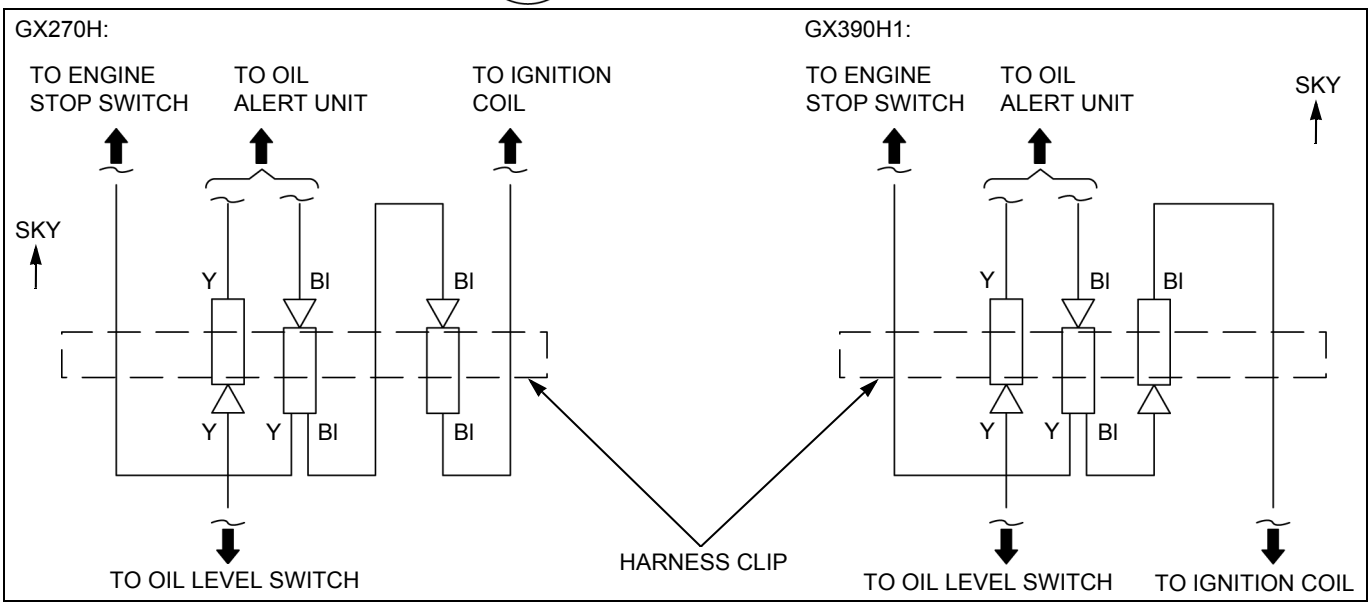
COMBINATION SWITCH (CONTROL BOX) TYPE



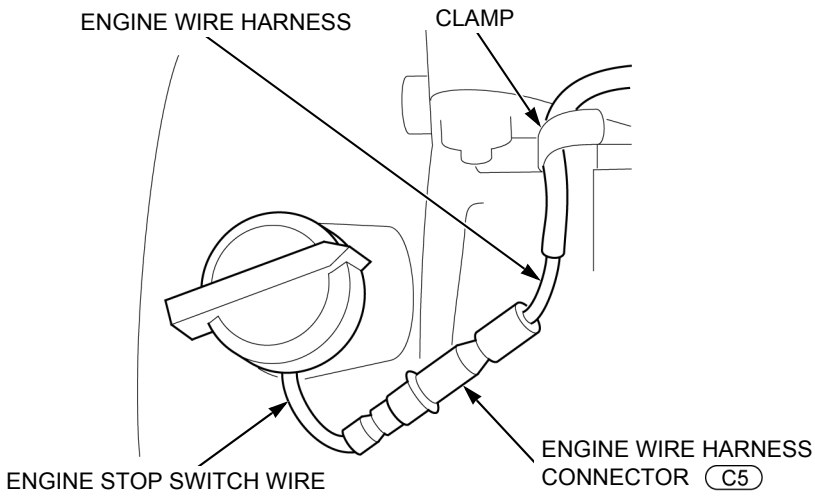
ENGINE STOP SWITCH TYPE

WITH OIL LEVEL SWITCH:



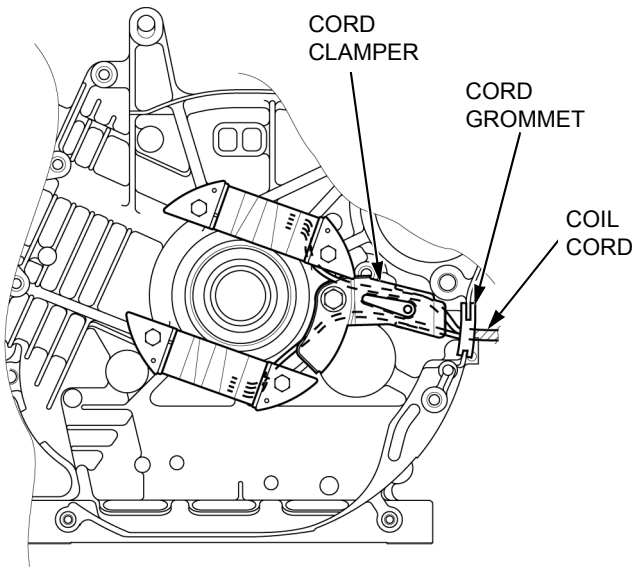


ENGINE STOP SWITCH ONLY:



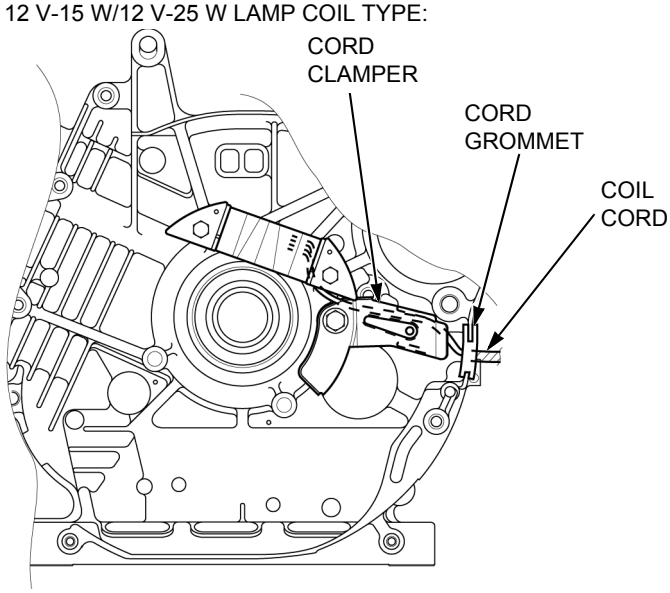
WITH CHARGE COIL / LAMP COIL

12 V-50 W LAMP COIL TYPE:



1 A/3 A CHARGE COIL TYPE:

12 V-15 W/12 V-25 W LAMP COIL TYPE:



MEMO

MAINTENANCE SCHEDULE

REGULAR SERVICE PERIOD (2) ITEM Perform at every indicated month or operating hour interval, whichever comes first.		Each use	First month or 20 hrs.	Every 3 months or 50 hrs.	Every 6 months or 100 hrs.	Every year or 300 hrs.	Refer to page
Engine oil	Check level	○					3-3
	Change		○		○		3-3
Reduction case oil (applicable types)	Check level	○					3-4
	Change		○		○		3-5
Air cleaner	Check	○					3-6
	Clean			○ (1)	○ (*)(1)		3-6
		(Cyclone type) Every 6 months or 150 hours					3-6
	Replace					○(**)	3-6
		(Cyclone type) Every 2 years or 600 hours					3-6
Sediment cup	Clean				○		3-9
Spark plug	Check–adjust				○		3-9
	Replace					○	3-11
Spark arrester (If equipped)	Clean				○ (3)		3-12
Idle speed	Check–adjust					○	3-13
Valve clearance	Check–adjust					○	3-13
Combustion chamber	Clean	After every 1,000 hours					3-15
Fuel tank and filter	Clean				○		3-15
Fuel tube	Check	Every 2 years (Replace if necessary)					3-16

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

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

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

(*) Internal vent carburetor with dual element type only.

(**) Replace paper element type only.

ENGINE OIL LEVEL CHECK/CHANGE

CHECK

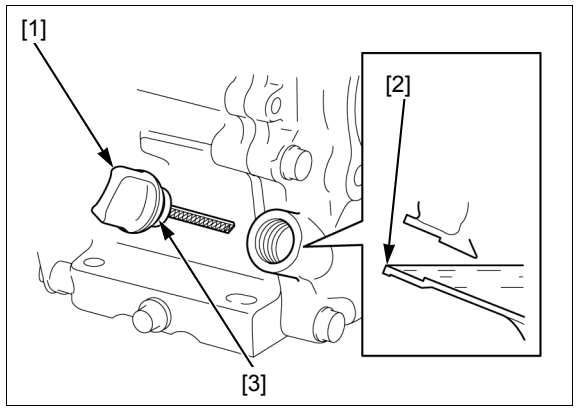
Place the engine on a level surface.

Remove the oil filler cap [1] and check the oil level shown into the oil filler neck [2].

If the oil level is low, fill with recommended oil to the upper level of the oil filler neck (page 3-3).

Check that the oil filler packing [3] is in good condition, replace it if necessary.

Install and tighten the oil filler cap securely.



CHANGE

Place the engine on a level surface and place a suitable container under the drain bolt [1].

Remove the oil filler cap [2], drain bolt, and sealing washer [3] and drain the oil into a suitable container.

Please dispose of used 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 pour it 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.

Install the drain bolt with a new sealing washer and tighten it to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Add the specified amount of recommended oil into the engine.

OIL CAPACITY: 1.1 Liters (1.16 US qt, 0.97 Imp qt)

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.

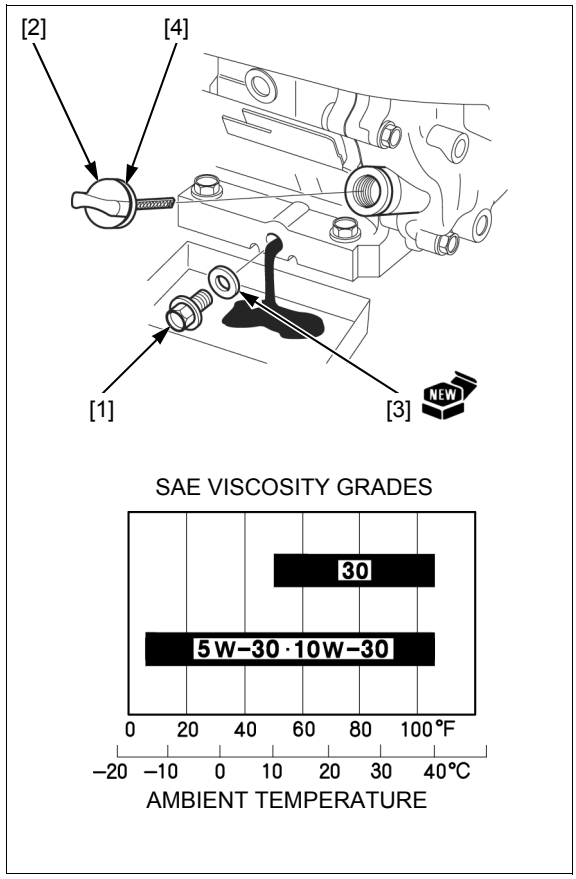
RECOMMENDED OIL:
SAE 10W-30
API service classification: SE or higher

After adding the oil, check the oil level.

Check that the oil filler packing [4] is in good condition, replace it if necessary.

Install and tighten the oil filler cap securely.

Make sure there are no oil leaks.



REDUCTION CASE OIL LEVEL CHECK/ CHANGE

NOTE:

- For the chain type (without clutch), refer to the ENGINE OIL LEVEL CHECK/CHANGE because it shares the reduction oil with the engine oil (page 3-3).

CHECK

1/2 REDUCTION CLUTCH TYPE (GX270H ONLY)

Place the engine on a level surface.

Remove the oil filler cap/oil level gauge [1], and wipe the oil level gauge clean.

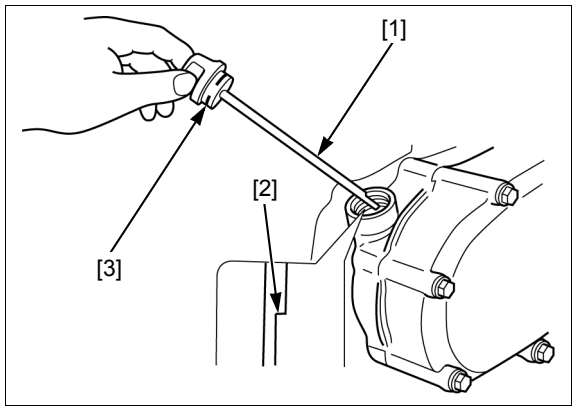
Insert the oil level gauge without screwing it into the oil filler neck.

Remove the oil level gauge and check oil level shown on the oil level gauge.

If the oil level is low, fill with recommended oil to the upper level [2] of the oil level gauge (page 3-5).

Check that the O-ring [3] is in good condition, replace it if necessary.

Install and tighten the oil filler cap/oil level gauge securely.



CHANGE

1/2 REDUCTION CLUTCH TYPE (GX270H ONLY)

Place the engine on a level surface and place a suitable container under the drain bolt [1].

Remove the oil filler cap/oil level gauge [2], drain bolt and sealing washer [3] and drain the oil into a suitable container.

Please dispose of used 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 pour it 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.

Install the drain bolt with a new sealing washer and tighten it to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

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.

Add the specified amount of recommended oil into the reduction case.

OIL CAPACITY: 0.3 Liter (0.32 US qt, 0.26 Imp qt)

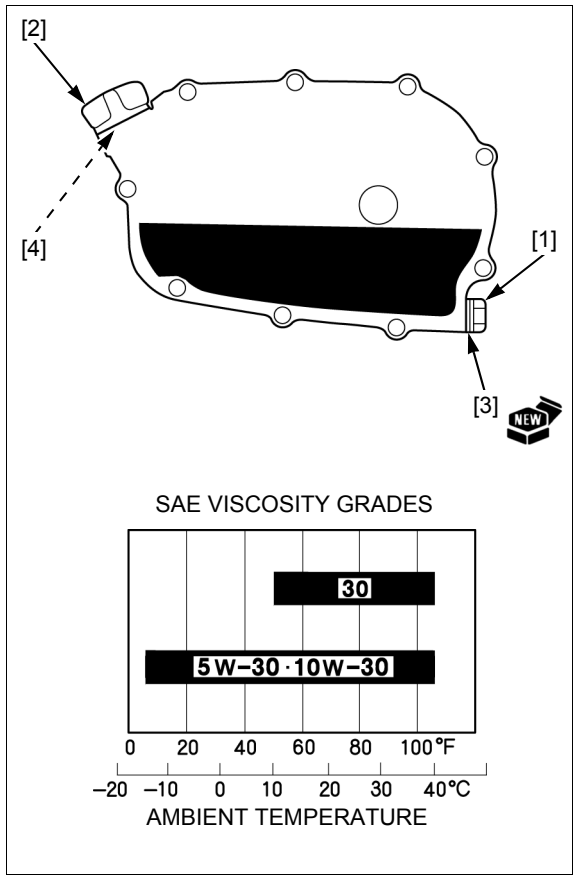
RECOMMENDED OIL:
SAE 10W-30
API service classification: SE or higher

After adding the oil, check the oil level.

Check that the O-ring [4] is in good condition, replace it if necessary.

Install and tighten the oil filler cap/oil level gauge securely.

Make sure there are no oil leaks.



AIR CLEANER CHECK/CLEANING/ REPLACEMENT

DUAL/DUAL SILENT TYPE:

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

NOTICE

Operating the engine without the air filters or with the filter installed loosely will allow dirt to enter the engine, causing rapid engine wear. Install the air filters securely.

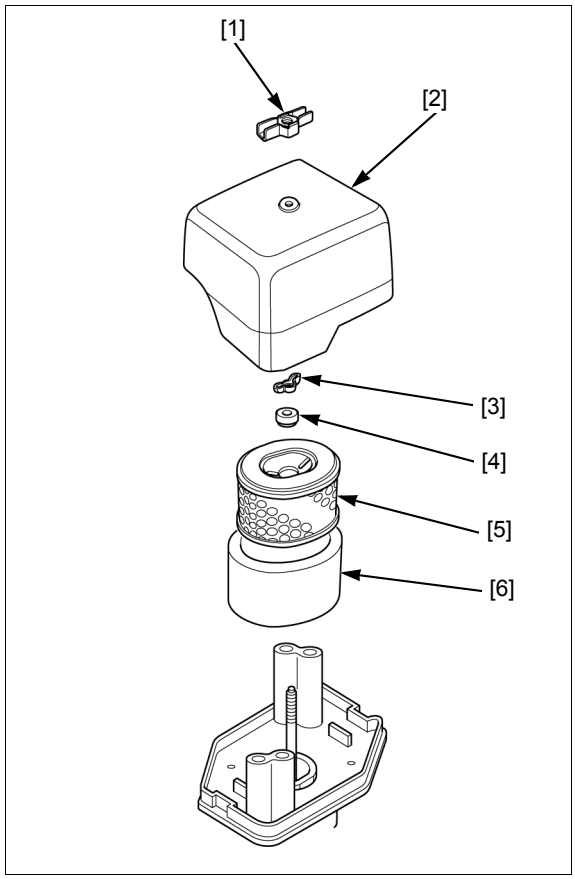
Remove the nut [1] and the air cleaner cover [2].

Remove the wing nut [3], grommet [4] and air filter assembly [5] [6].

Separate the inner filter (Paper) [4] from the outer filter (Foam) [5]. Carefully check both filters for holes or tears and replace if damaged.

Clean the filters if they are to be reused (page 3-8).

Install the elements in the reverse order of removal.



CYCLONE TYPE:

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

NOTICE

Operating the engine without the air filters or with the filter installed loosely will allow dirt to enter the engine, causing rapid engine wear. Install the air filters securely.

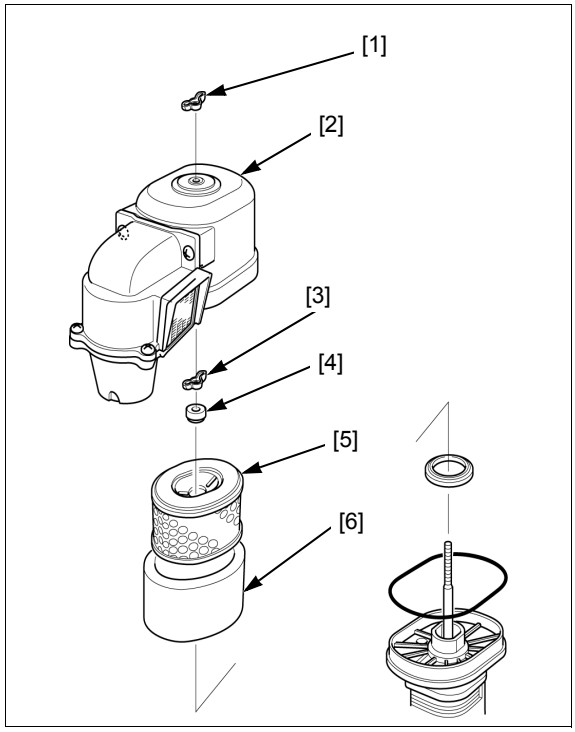
Remove the wing nut [1] and the air cleaner cover [2].

Remove the wing nut [3], grommet [4] and air filter assembly [5] [6].

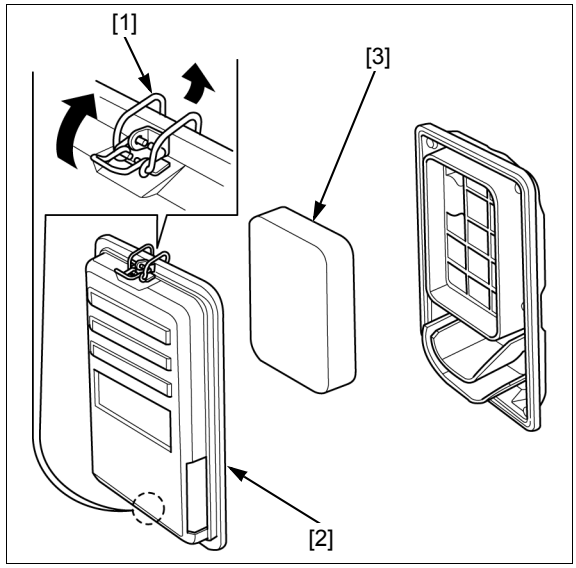
Separate the inner filter (Paper) [4] from the outer filter (Foam) [5]. Carefully check both filters for holes or tears and replace if damaged.

Clean the filters if they are to be reused (page 3-8).

Install the elements in the reverse order of removal.



LOW PROFILE TYPE:



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

NOTICE

Operating the engine without the air filters or with the filter installed loosely will allow dirt to enter the engine, causing rapid engine wear. Install the air filters securely.

Remove the air cleaner wire clip [1] and air cleaner cover [2].

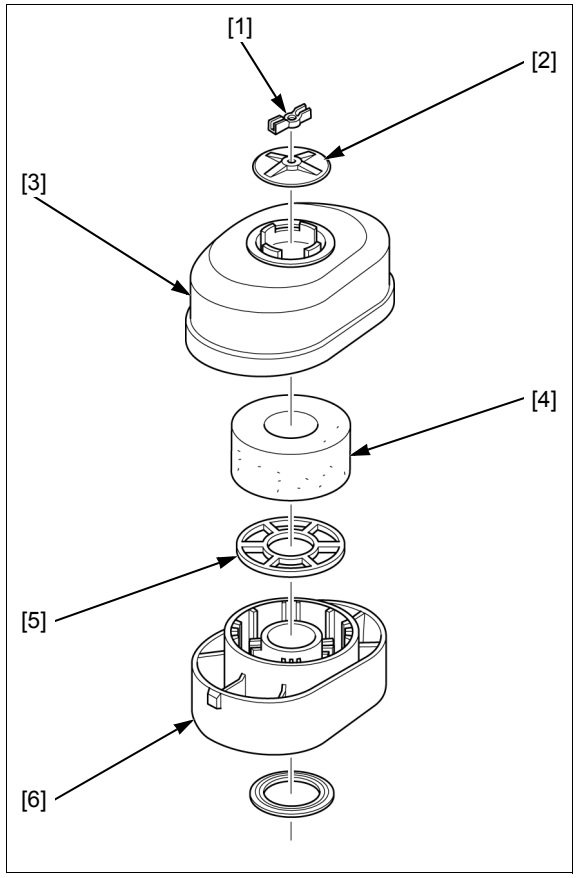
Remove the air cleaner element [3].

Carefully check air cleaner element and replace if damaged.

Clean the filter if it is to be reused (page 3-8).

Install the element in the reverse order of removal.

OIL BATH TYPE



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

NOTICE

Operating the engine without the air filters or with the filter installed loosely will allow dirt to enter the engine, causing rapid engine wear. Install the air filters securely.

Remove the following:

– Wing nut [1]
– Air cleaner cap [2]
– Air cleaner cover [3]
– Air cleaner element [4]
– Air cleaner grid [5]

Carefully check the element for holes or tears and replace if damaged.

Clean the element if it is to be reused (page 3-8).

Check the oil contamination and oil level of the cleaner oil pan [6].

If the oil level is low, fill with the recommended oil to the upper level of the cleaner oil pan.
If the oil is dirty, clean the cleaner oil pan and add the recommended oil to the upper level of the cleaner oil pan.

OIL CAPACITY:
GX270H: 60 cc
GX390H1: 80 cc

Installation is in the reverse order of removal.

SEMI DRY TYPE

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

NOTICE

Operating the engine without the air filters or with the filter installed loosely will allow dirt to enter the engine, causing rapid engine wear. Install the air filters securely.

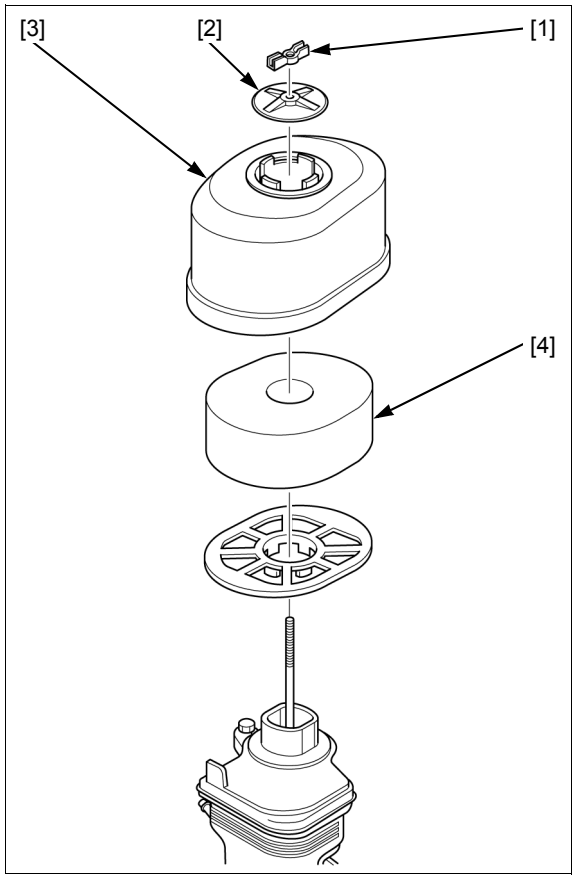
Remove the following:

– Wing nut [1]
– Air cleaner cap [2]
– Air cleaner cover [3]
– Air cleaner element [4]

Carefully check the element for holes or tears and replace if damaged.

Clean the element if it is to be reused (page 3-8).

Installation is in the reverse order of removal.



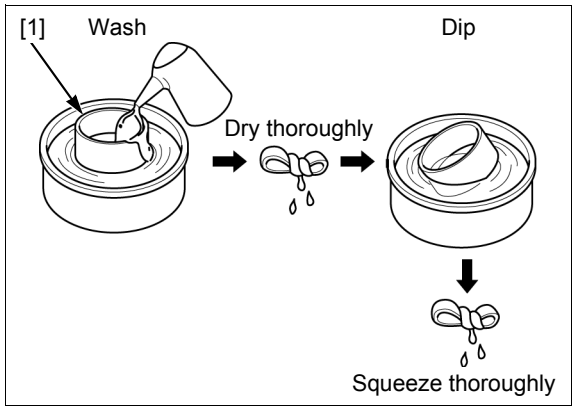
ELEMENT CLEANING

FOAM

Clean the filter [1] in warm soapy water, rinse, and allow to dry thoroughly, or clean with a non-flammable solvent and allow to dry thoroughly.

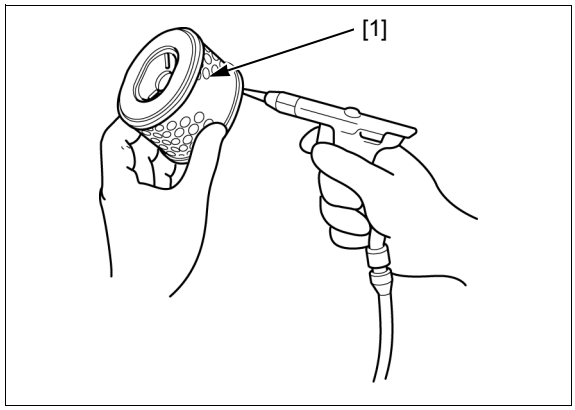
Dip the filter in clean engine oil, and squeeze out all the excess oil.

Excess oil will restrict air flow through the foam element and may cause the engine to smoke at startup.



PAPER

Tap the inner filter [1] lightly several times on a hard surface to remove excess dirt, or blow compressed air lightly (206 kPa (2.11 kgf/cm^2, 30 psi) or less) through the paper filter from the inside out. Never try to brush the dirt off; brushing will force dirt into the fibers.



SEDIMENT CUP CLEANING

⚠WARNING

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

Turn the fuel valve lever [1] to the OFF position.

Remove the following:

– Sediment cup [2]
– O-ring [3]

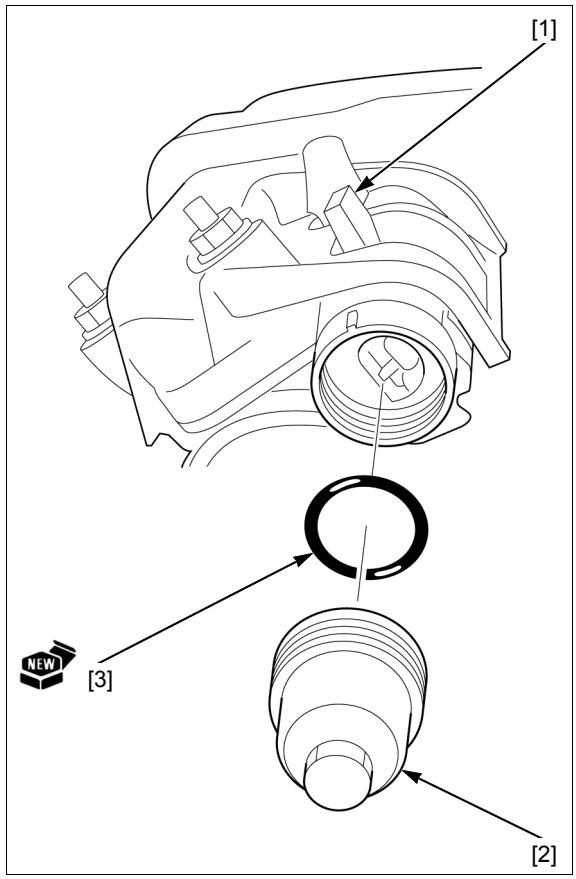
Clean the sediment cup with non-flammable solvent and allow them to dry thoroughly.

Install a new O-ring and sediment cup.

Tighten the sediment cup to the specified torque.

TORQUE: 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft)

Check the installation part of the sediment cup for any sign of fuel leakage.

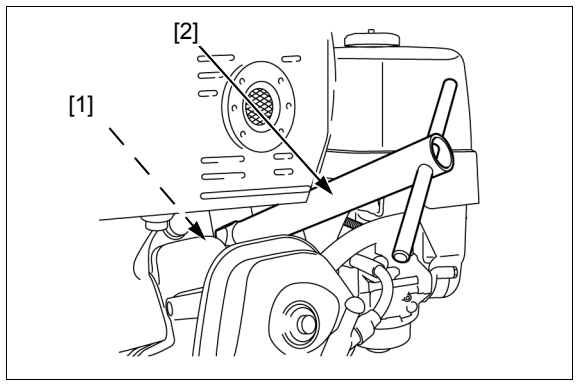


SPARK PLUG CHECK/ADJUSTMENT

⚠CAUTION

If the engine has been running, the engine will be very hot. Allow it to cool before proceeding.

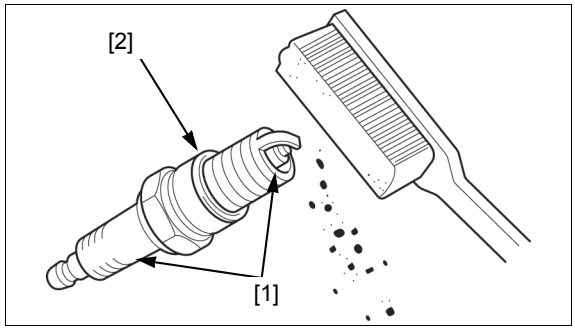
Remove the spark plug cap, and then remove the spark plug [1] using a spark plug wrench [2].



Visually check the spark plug. Replace the plug if the insulator [1] is cracked or chipped.

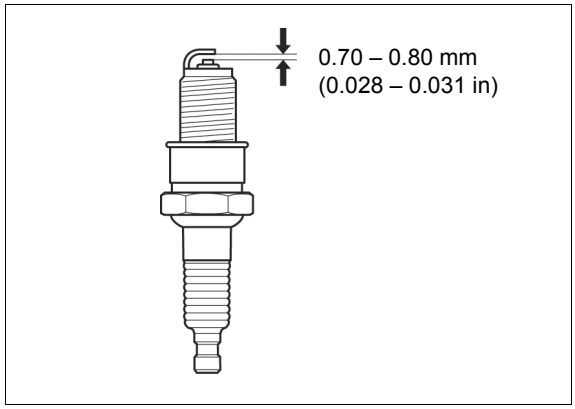
Check the sealing washer [2] for damage.

Replace the spark plug if the sealing washer is damaged (page 3-11).



SPARK PLUG:
GX270H (VKK, VMT, VS4, VSD4):
BPR5ES (NGK)/W16EPR-U (DENSO)
GX270H (OTHER TYPE):
BPR6ES (NGK)/W20EPR-U (DENSO)
GX390H1 (ES2, VMT3, VMQ3, VS4, VS6, VSB4):
BPR5ES (NGK)/W16EPR-U (DENSO)
GX390H1 (OTHER TYPE):
BPR6ES (NGK)/W20EPR-U (DENSO)

Measure the plug gap with a wire-type feeler gauge. If the measurement is out of the specification, adjust by bending the side electrode.



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

Install the spark plug (page 3-11).

NOTICE

A loose spark plug can become very hot and can damage the engine. Overtightening can damage the threads in the cylinder block.

Install the spark plug cap securely.

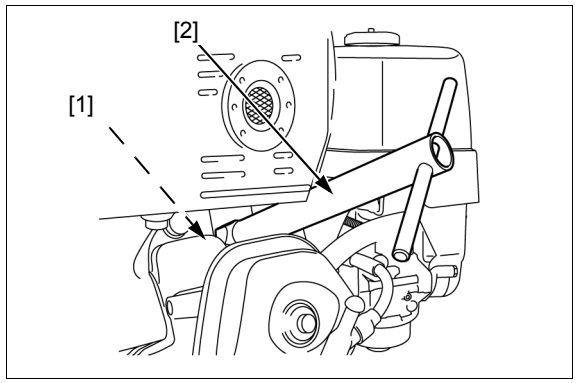
SPARK PLUG REPLACEMENT

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] using a spark plug wrench [3].



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.

SPARK PLUG:
GX270H (VKK, VMT, VS4, VSD4):
BPR5ES (NGK)/W16EPR-U (DENSO)
GX270H (OTHER TYPE):
BPR6ES (NGK)/W20EPR-U (DENSO)
GX390H1 (ES2, VMT3, VMQ3, VS4, VS6, VSB4):
BPR5ES (NGK)/W16EPR-U (DENSO)
GX390H1 (OTHER TYPE):
BPR6ES (NGK)/W20EPR-U (DENSO)

Tighten the spark plug to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Connect the spark plug cap.

SPARK ARRESTER CLEANING

⚠ CAUTION

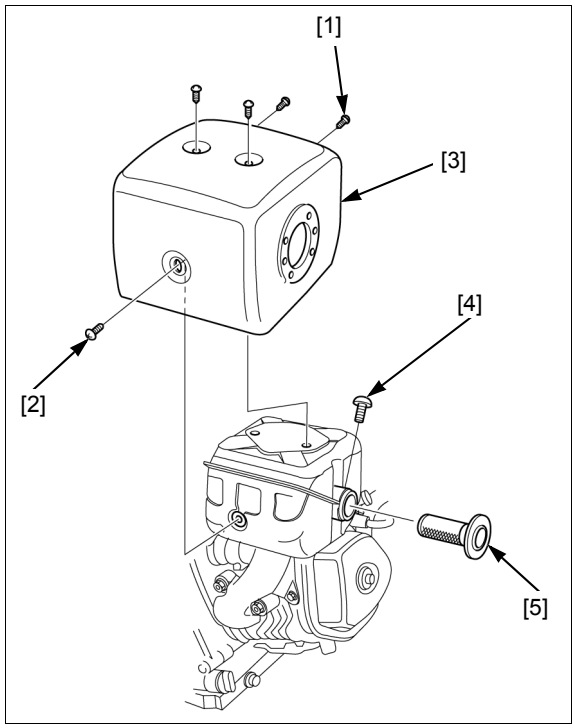
The engine and the muffler becomes very hot during operation and remains hot for a while after stopping the engine. Be careful not to touch the muffler while it is hot. Allow it to cool before proceeding.

SOLID PROTECTOR TYPE

Remove the muffler cover (page 12-2), If equipped.

Remove the tapping screws (5 x 8 mm) [1], tapping screw (6 x 10 mm) [2], and muffler protector [3].

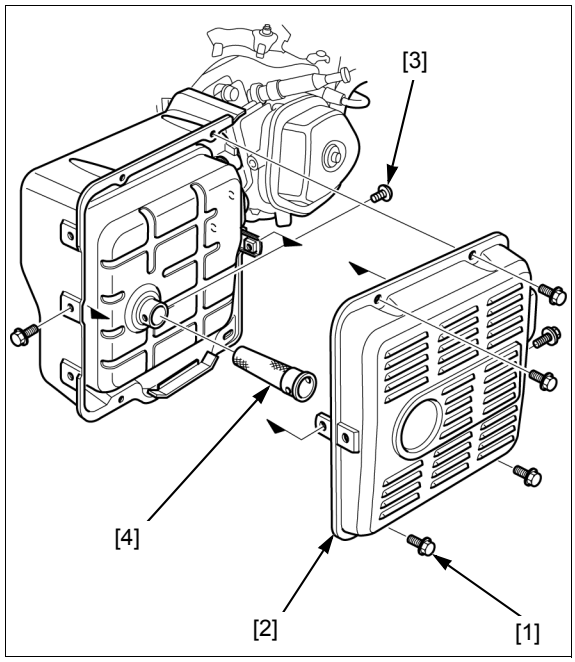
Remove the screw (5 x 8 mm or 4 x 6 mm) [4] and spark arrester [5].



INNER/OUTER PROTECTOR TYPE

Remove the bolts (6 x 10 mm or 6 x 12 mm) [1], and outer muffler protector [2].

Remove the tapping screw (4 x 8 mm) [3], and spark arrester [4].



CLEANING

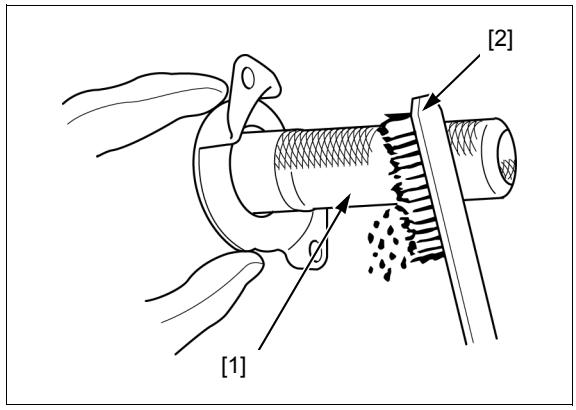
NOTICE

Be careful to avoid damaging the screen.

Clean the carbon deposits from the spark arrester screen [1] with a wire brush [2].

Check the spark arrester screen for damage. If the screen is damaged, replace the spark arrester.

Install the spark arrester in the reverse order of removal.

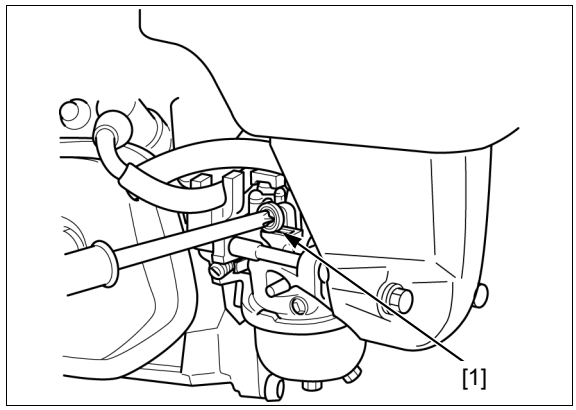


IDLE SPEED CHECK/ADJUSTMENT

Start the engine and allow it to warm up to normal operating temperature. For units equipped with auto throttle, turn the auto throttle switch ON.

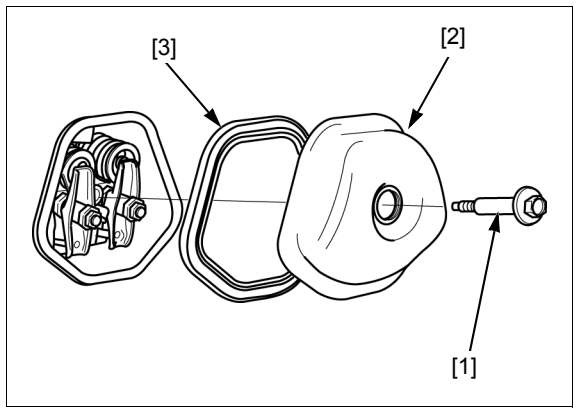
Turn the throttle stop screw [1] to obtain the specified idle speed.

IDLE SPEED: 1,400 ± 150 min^{-1} (rpm)



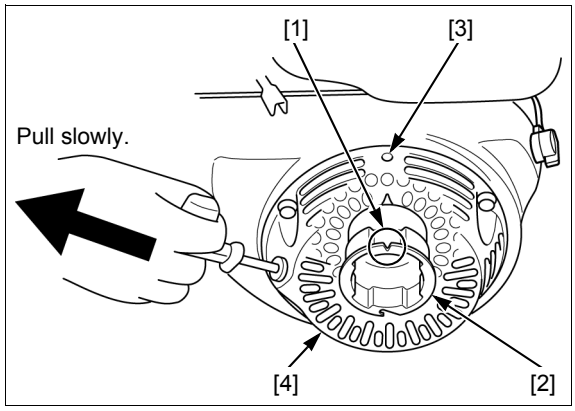
VALVE CLEARANCE CHECK/ ADJUSTMENT

Remove the head cover bolt [1], the head cover [2], and the head cover packing [3].



Set the piston near top dead center of the cylinder compression stroke (both valves fully closed) by pulling the recoil starter slowly. When the piston is near top dead center of the compression stroke, the cutout [1] on the starter pulley [2] will align with the top hole [3] on the recoil starter case [4].

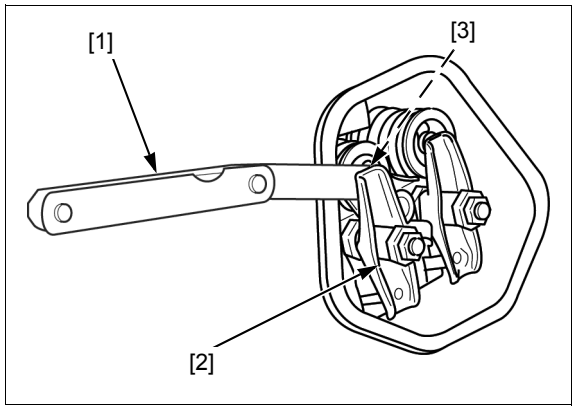
If the exhaust valve is open, use the recoil starter to turn the crankshaft one additional turn and align the triangle mark on the starter pulley with the top hole on the recoil starter case again.



Insert a feeler gauge [1] between the valve rocker arm [2] and valve stem [3] to measure the valve clearance.

VALVE CLEARANCE:
IN: 0.15 ± 0.02 mm
EX: 0.20 ± 0.02 mm

If adjustment is necessary, proceed as follows.



Hold the rocker arm pivot [1] and loosen the rocker arm pivot lock nut [2].

Turn the rocker arm pivot to obtain the specified clearance.

VALVE CLEARANCE:
IN: 0.15 ± 0.02 mm
EX: 0.20 ± 0.02 mm

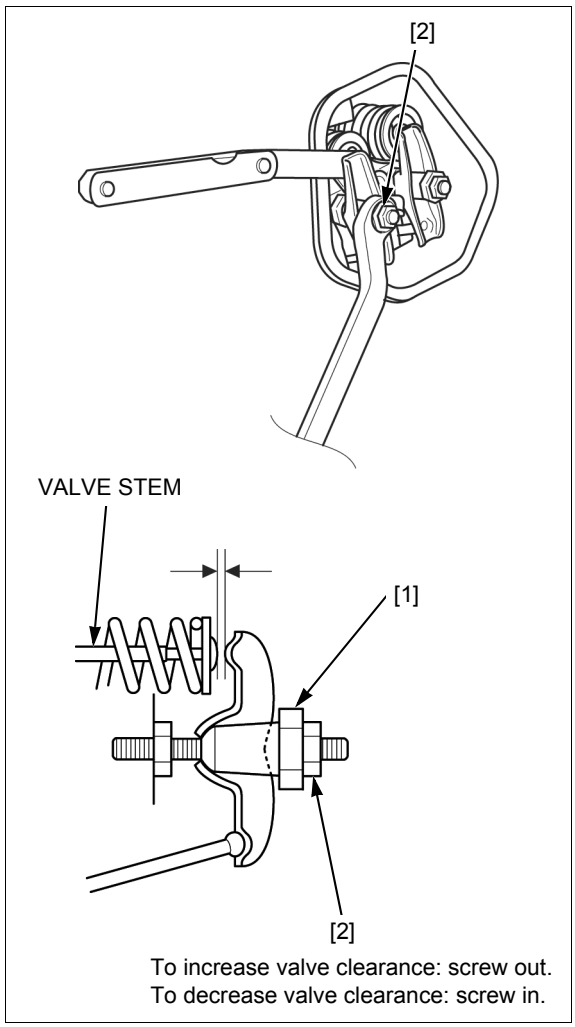
Hold the rocker arm pivot and retighten the rocker arm pivot lock nut to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

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

Check the head cover packing for damage or deterioration, and install it to the head cover.

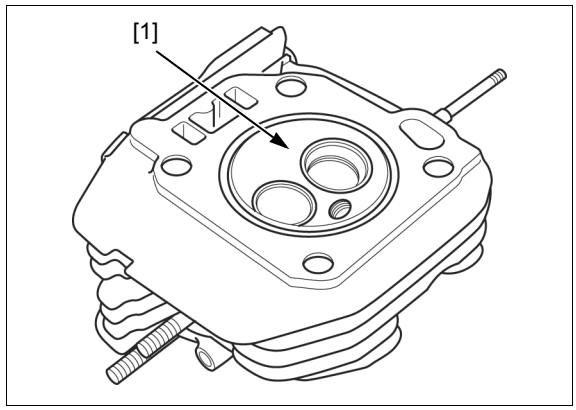
Attach the cylinder head cover to the cylinder head, and tighten the head cover bolt securely.



COMBUSTION CHAMBER CLEANING

Remove the cylinder head (page 13-3).

Clean any carbon deposits from the combustion chamber [1].



FUEL TANK AND FILTER CLEANING

⚠WARNING

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

Drain the fuel into a suitable container.

Remove the fuel tank (page 6-3).

Remove the fuel tank joint [1] and O-ring [2] from the fuel tank [3].

Clean the fuel tank joint and fuel tank with non-flammable solvent, and allow them to dry thoroughly.

Check the screen of the fuel tank joint for clogs or damage, replace if necessary.

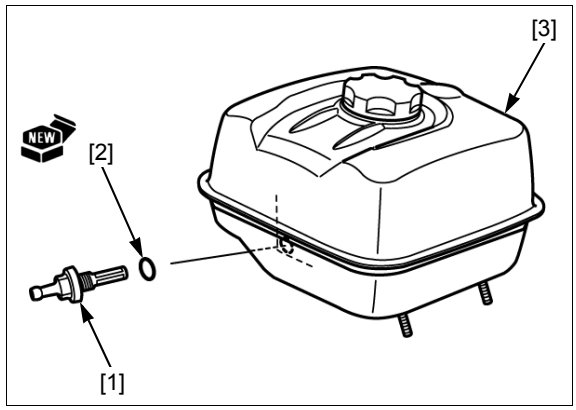
Install a new O-rings to the fuel tank joint and install them to the fuel tank.

Tighten the fuel tank joint to the specified torque.

TORQUE: 2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

Install the fuel tank (page 6-3).

After installation, check for any signs of fuel leakage.

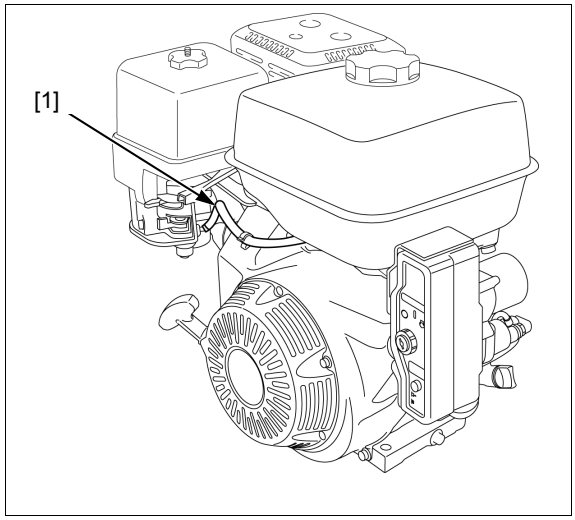


FUEL TUBE CHECK

⚠WARNING

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

Check the fuel tube [1] for deterioration, cracks or signs of leakage.



4. TROUBLESHOOTING

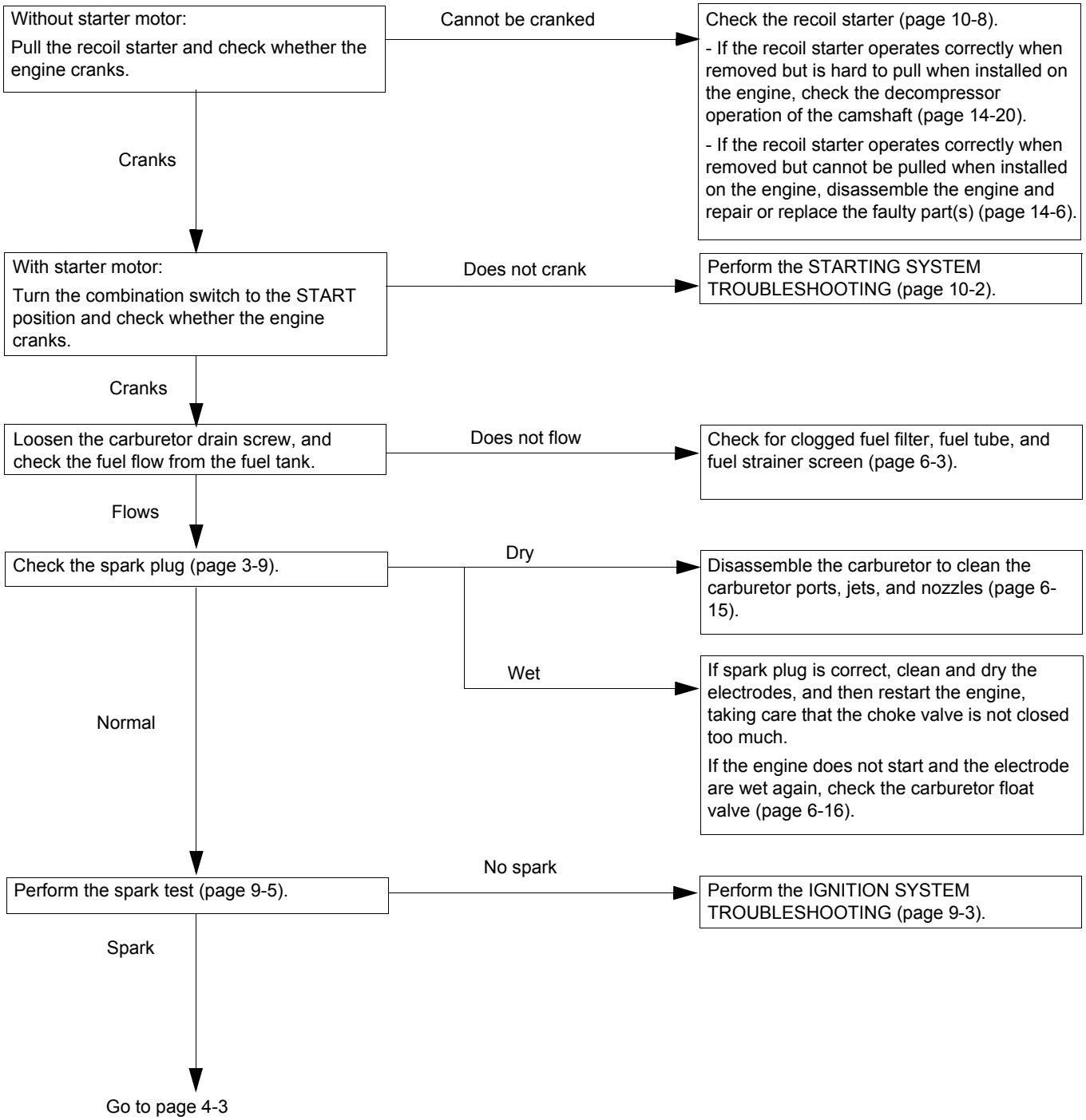
BEFORE TROUBLESHOOTING

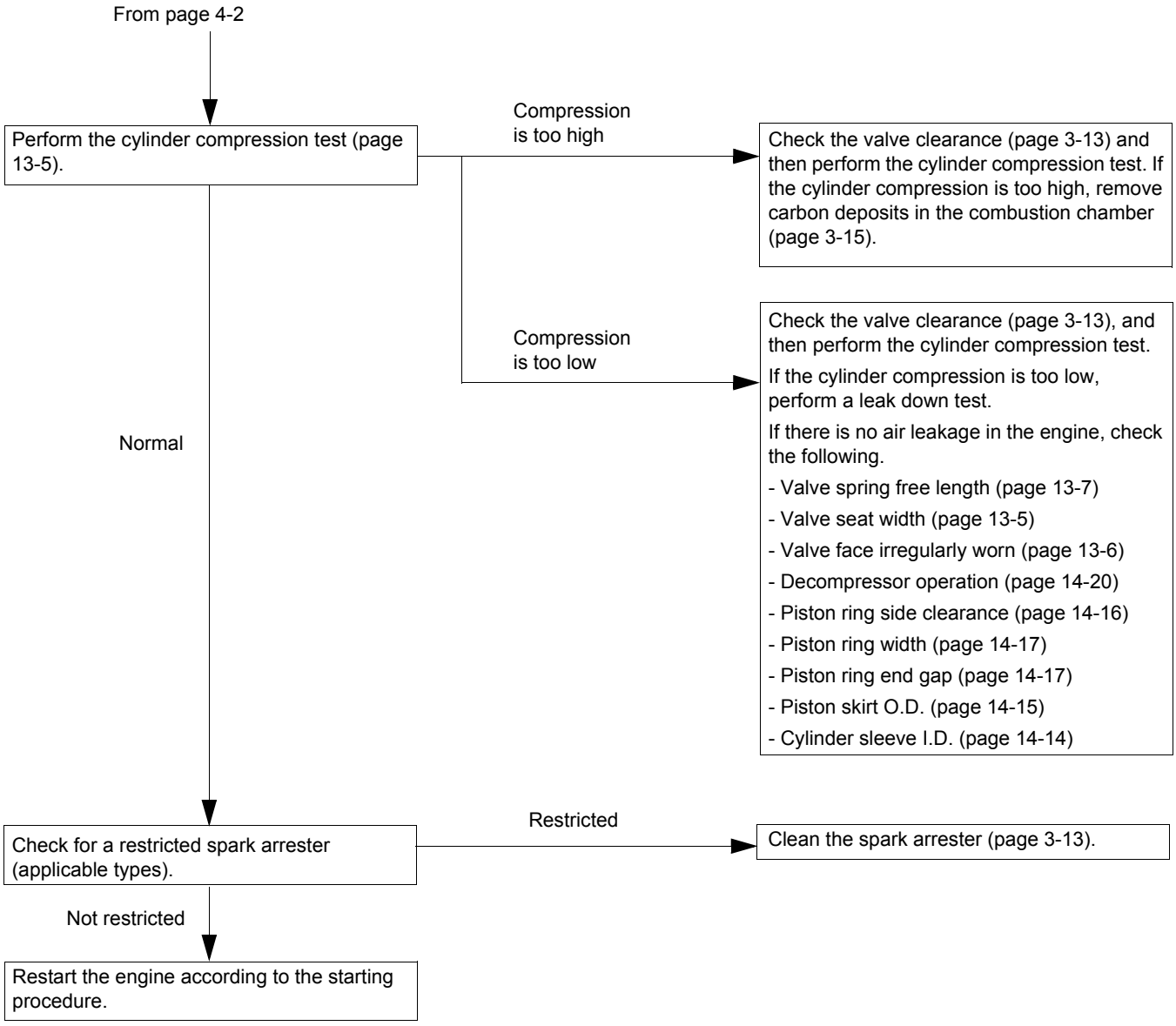
- Use a known-good battery for troubleshooting.
- Check that the connectors are connected securely.
- Check for sufficient fresh fuel in the fuel tank.
- Read the circuit tester's operation instructions carefully, and observe the instructions during inspection.
- Disconnect the battery cable before continuity inspection.

TROUBLESHOOTING

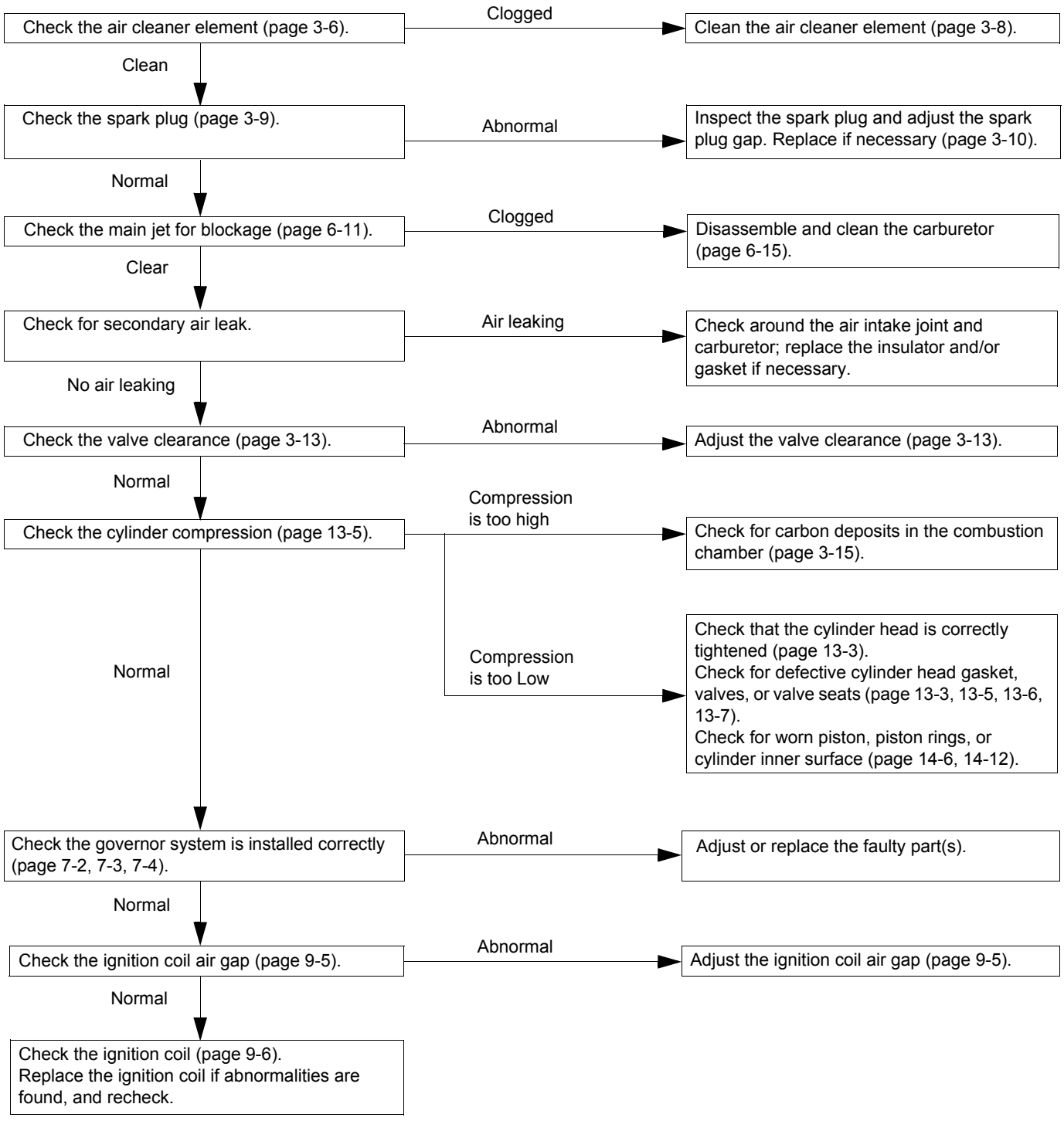
HARD STARTING

- Check the engine oil level before troubleshooting.

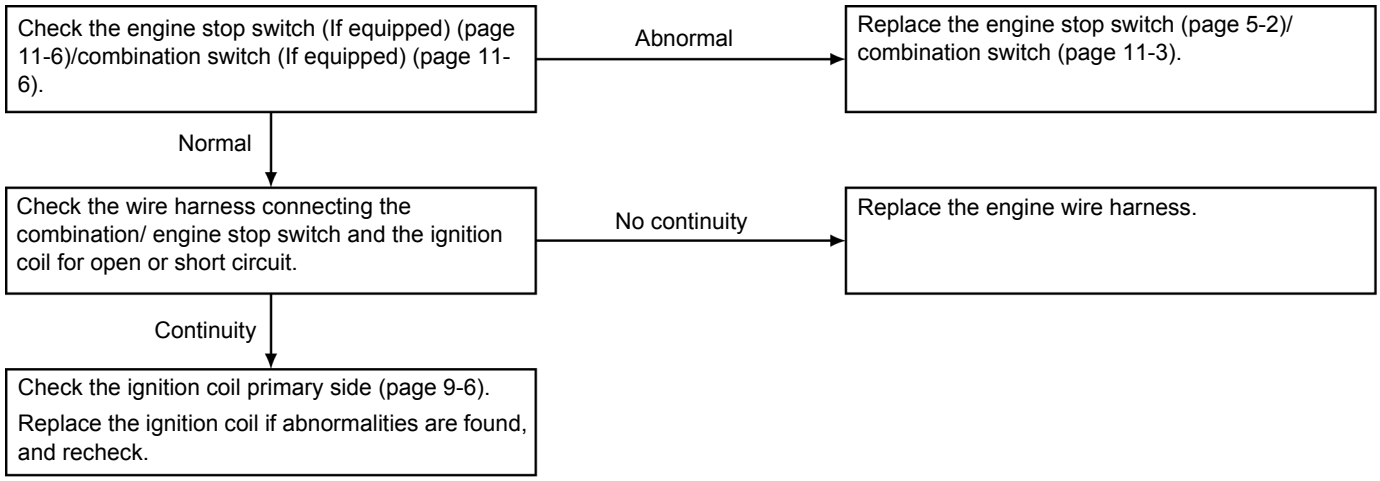



From page 4-2
Perform the cylinder compression test (page 13-5).
Compression is too high
Check the valve clearance (page 3-13) and then perform the cylinder compression test. If the cylinder compression is too high, remove carbon deposits in the combustion chamber (page 3-15).
Compression is too low
Check the valve clearance (page 3-13), and then perform the cylinder compression test.
If the cylinder compression is too low, perform a leak down test.
If there is no air leakage in the engine, check the following.
- Valve spring free length (page 13-7)
- Valve seat width (page 13-5)
- Valve face irregularly worn (page 13-6)
- Decompressor operation (page 14-20)
- Piston ring side clearance (page 14-16)
- Piston ring width (page 14-17)
- Piston ring end gap (page 14-17)
- Piston skirt O.D. (page 14-15)
- Cylinder sleeve I.D. (page 14-14)
Normal
Restricted
Check for a restricted spark arrester (applicable types).
Clean the spark arrester (page 3-13).
Not restricted
Restart the engine according to the starting procedure.

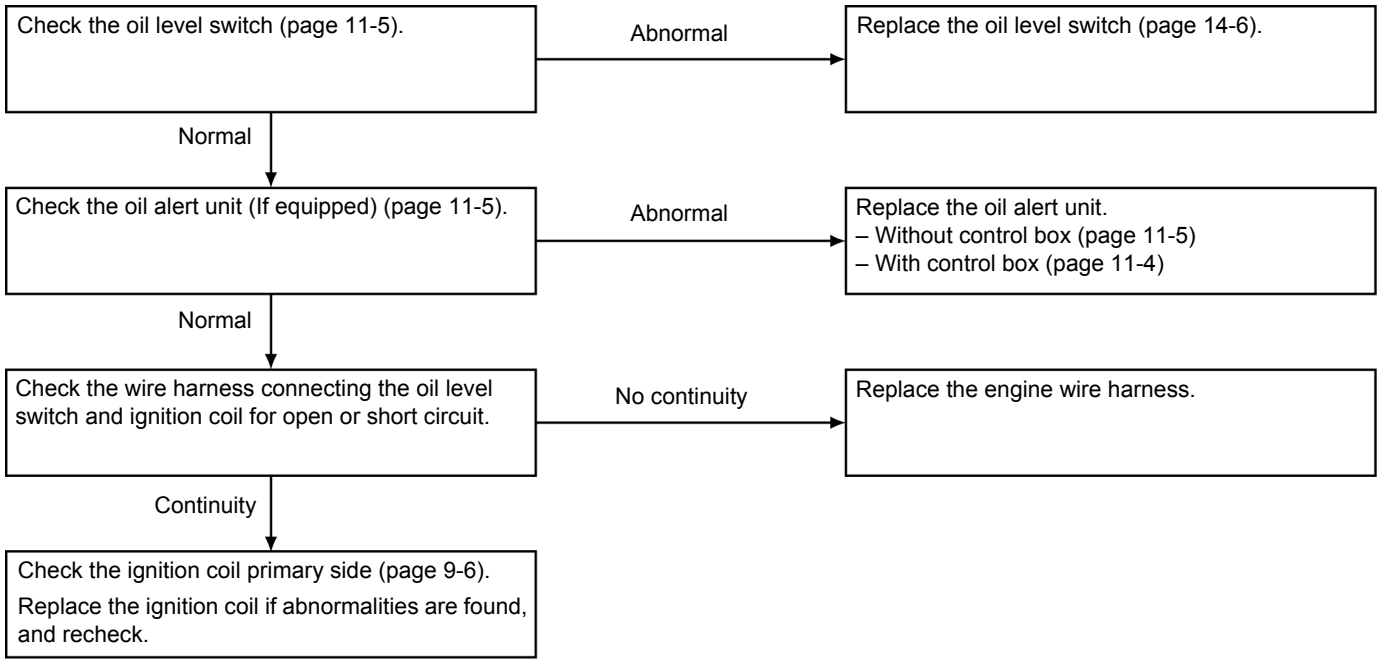
ENGINE SPEED DOES NOT INCREASE OR STABILIZE



ENGINE DOES NOT STOP WHEN COMBINATION/ ENGINE STOP SWITCH IS TURNED OFF



ENGINE DOES NOT STOP WHEN ENGINE OIL LEVEL IS LOW



MEMO

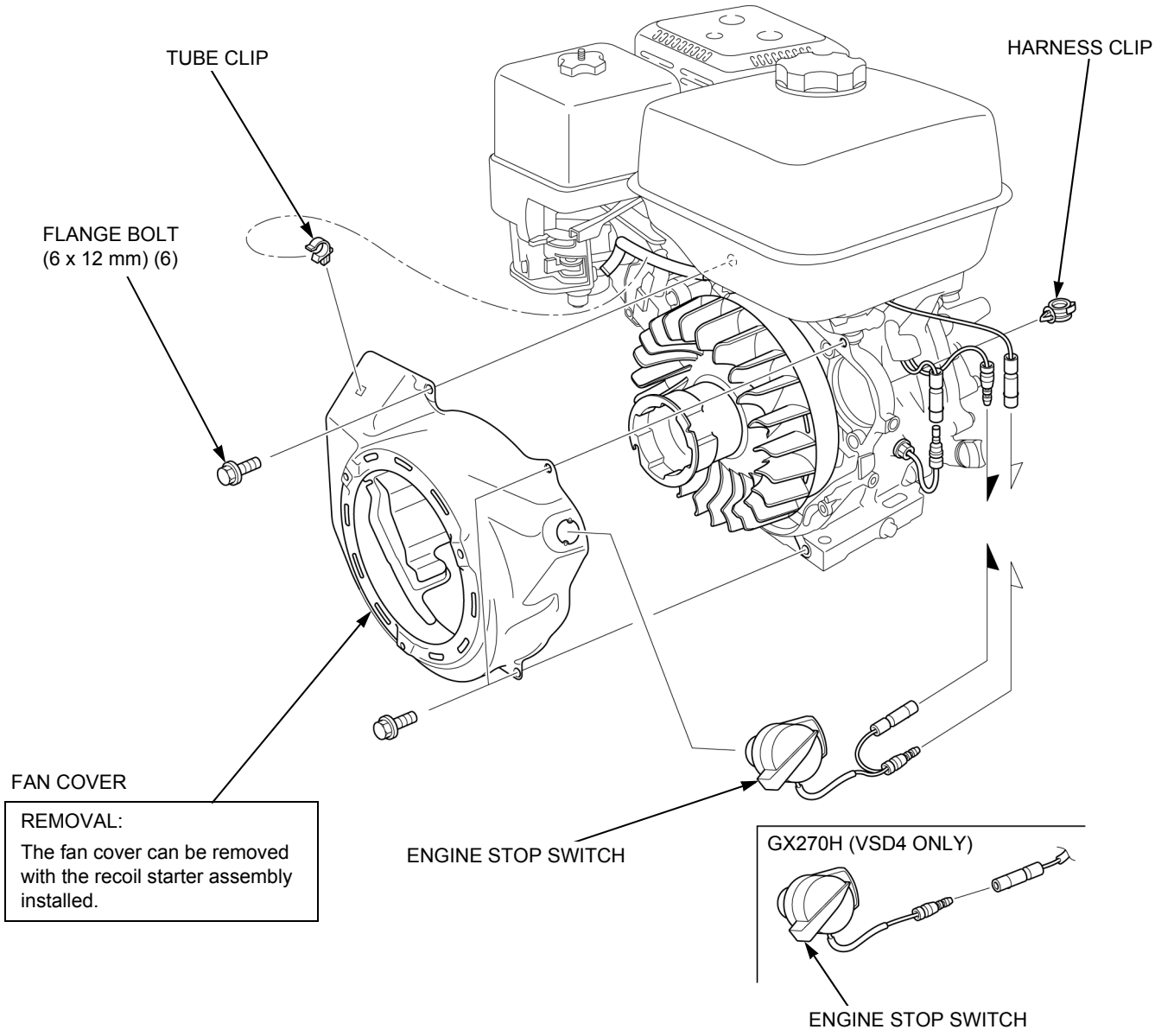
FAN COVER REMOVAL/INSTALLATION

Remove the recoil starter (page 10-3).

Remove the auto throttle (If equipped) (page 7-5).

Open the harness clip and disconnect the engine wire harness connector (Without control box type).

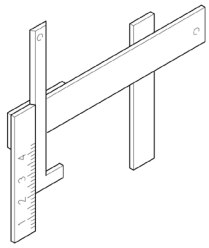
When installing, refer to the HARNESS AND TUBE ROUTING (page 2-10).



6. FUEL SYSTEM

TOOL

Float level gauge
07401-0010000



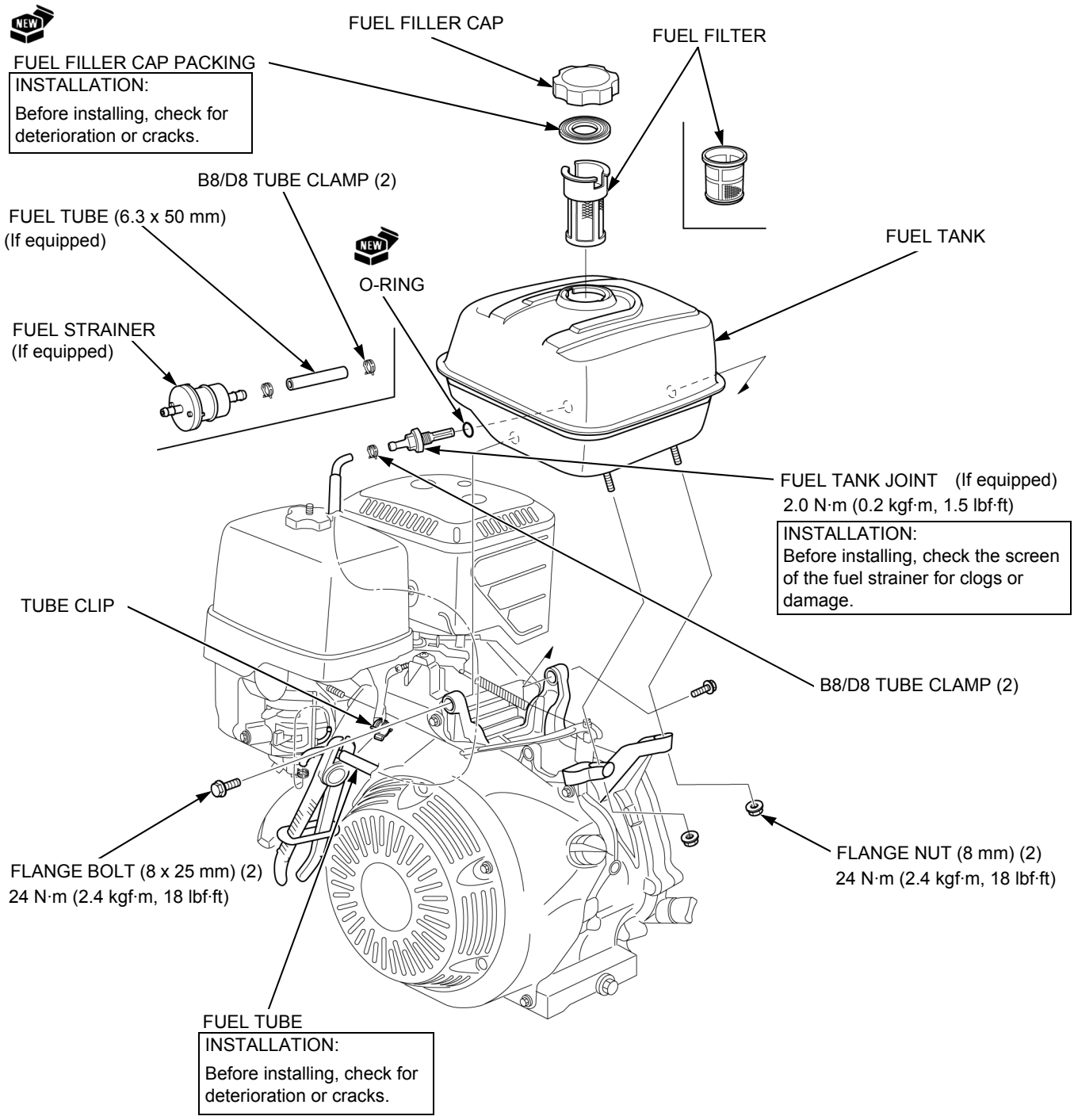
FUEL TANK REMOVAL/INSTALLATION

⚠WARNING

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

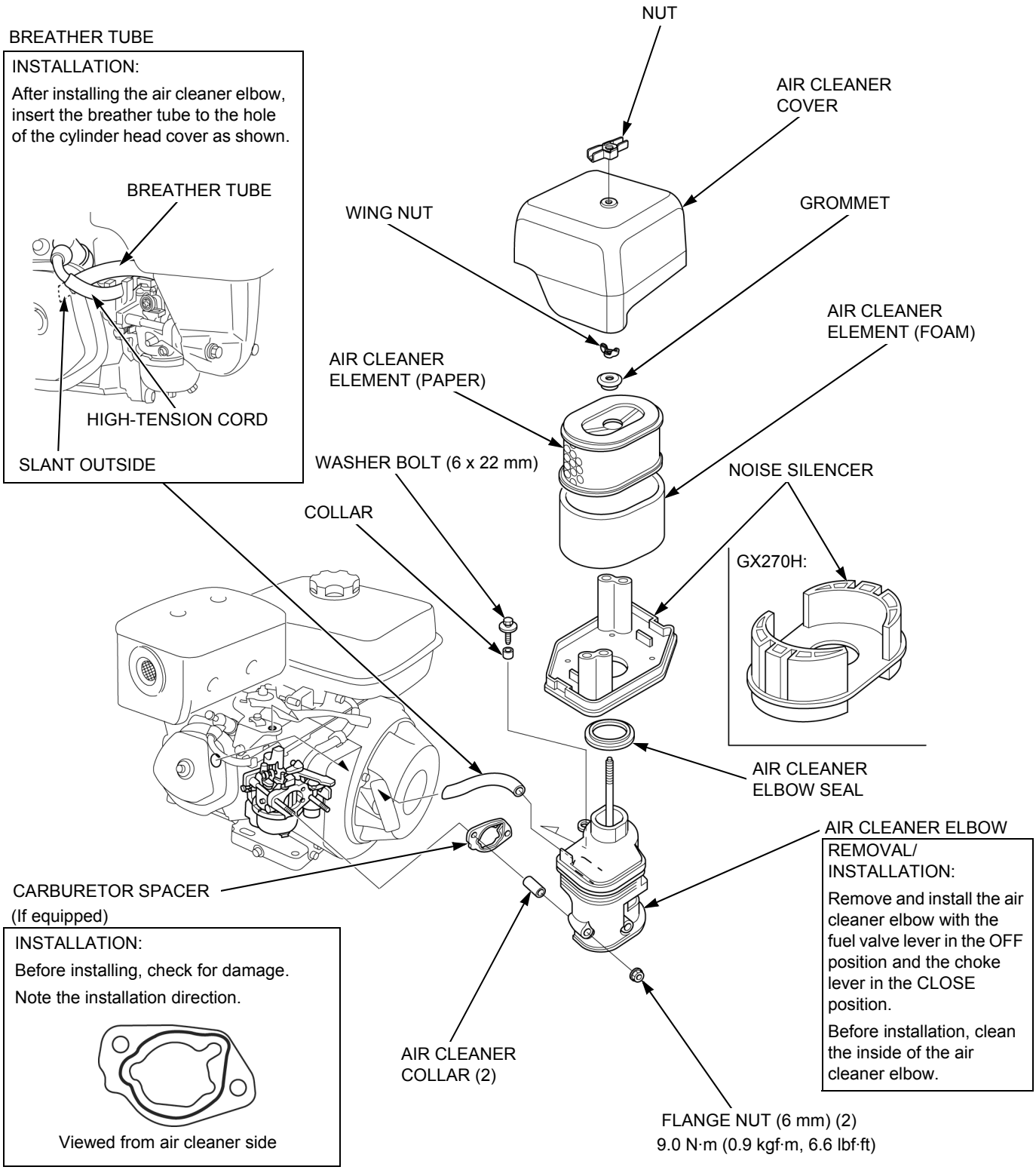
Turn the fuel valve lever to the OFF position.

Set a commercially available tube clip to the fuel tube.

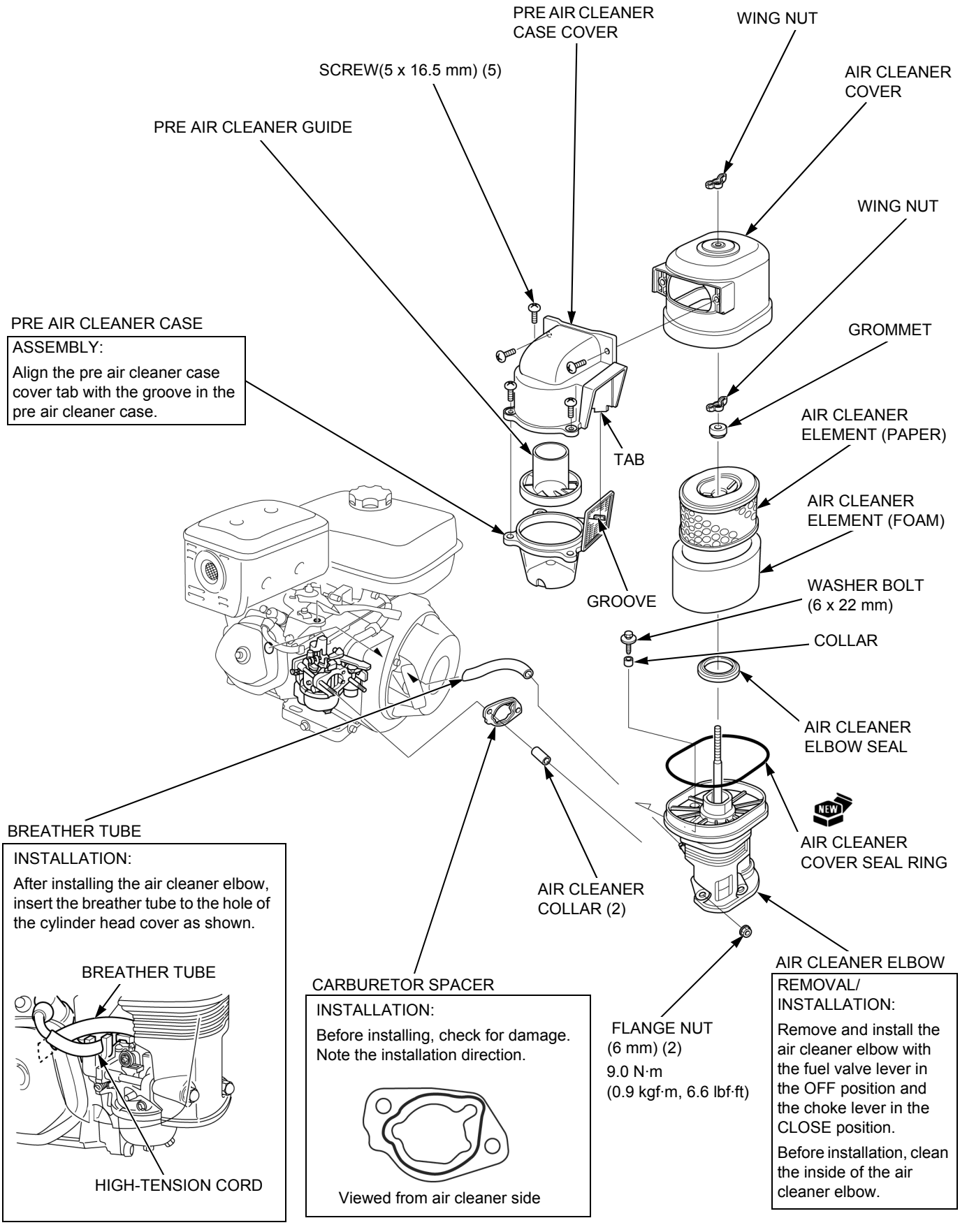


AIR CLEANER REMOVAL/ INSTALLATION

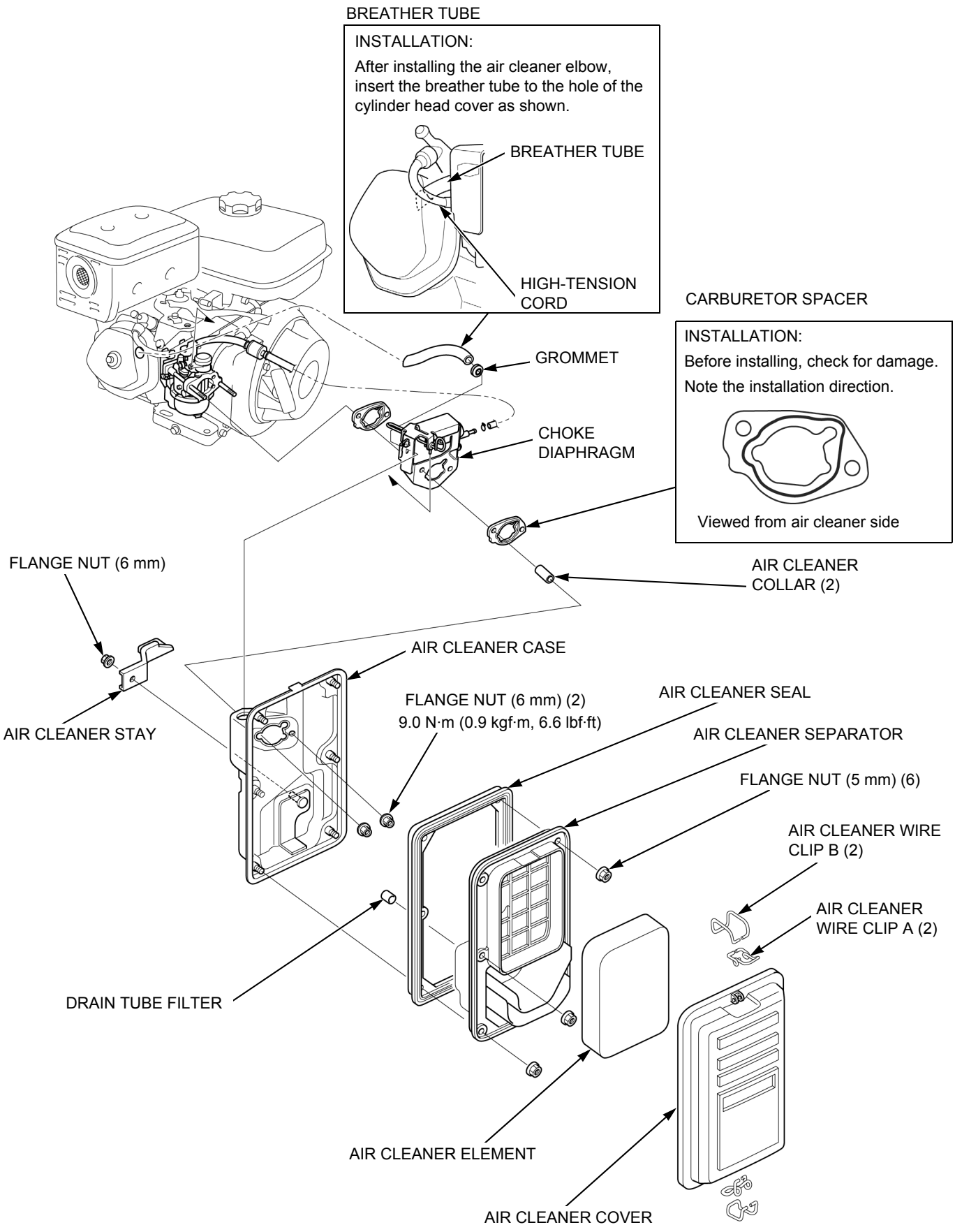
DUAL/DUAL SILENT TYPE:



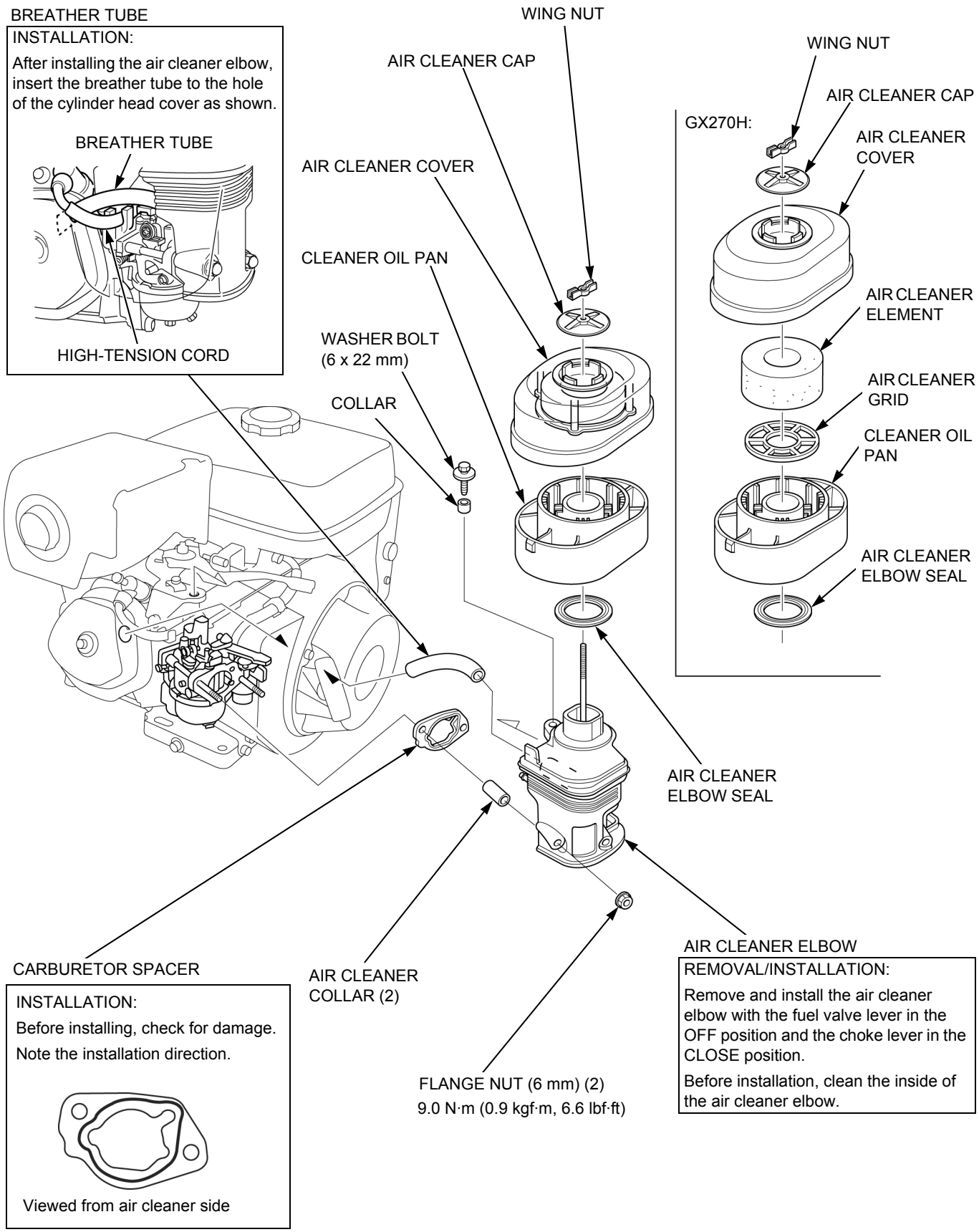
CYCLONE TYPE:



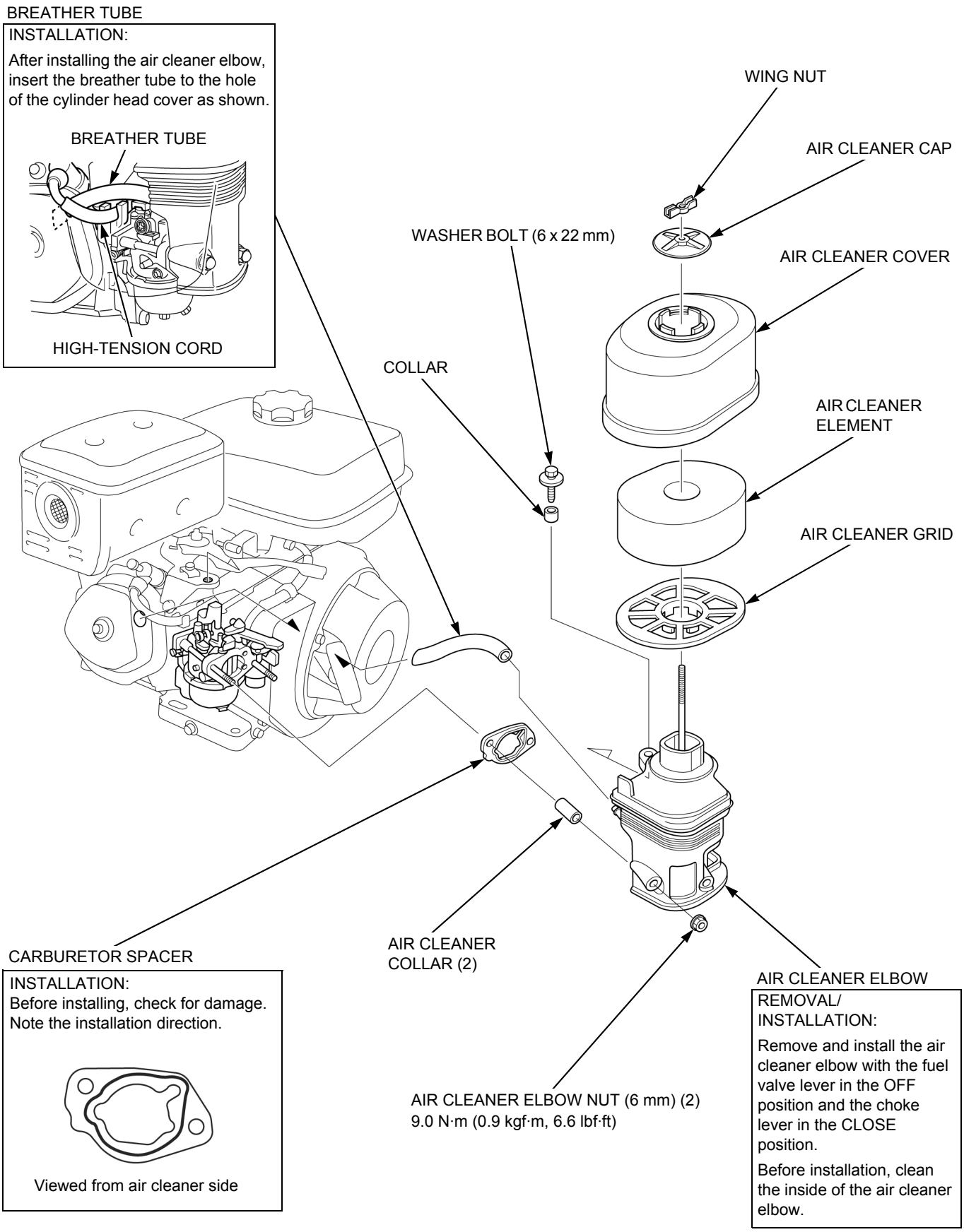
LOW PROFILE TYPE:



OIL BATH TYPE:



SEMI DRY TYPE:



CARBURETOR REMOVAL/ INSTALLATION

DUAL/DUAL SILENT/CYCLONE/OIL BATH/SEMI DRY TYPE AIR CLEANER:

⚠ WARNING

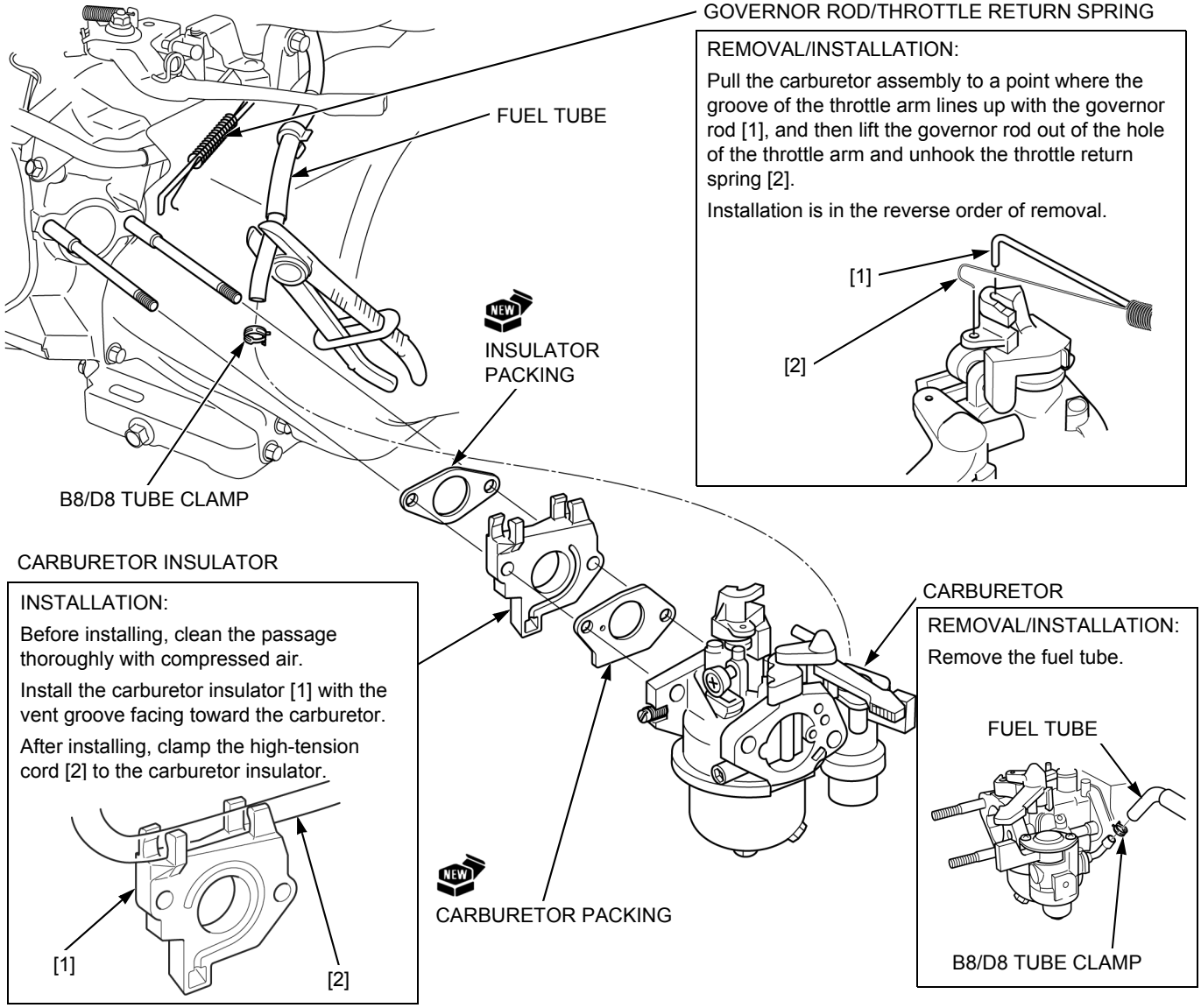
Gasoline is highly flammable and explosive.You can be burned or seriously injured when handling fuel.
- Keep heat, sparks, and flame away.
- Handle fuel only outdoors.
- Wipe up spills immediately.

Turn the fuel valve lever to the OFF position.

Remove the air cleaner (page 6-4).

Set a commercially available tube clip to the fuel tube. Disconnect the fuel tube from the carburetor.

Remove the drain screw of the carburetor to drain completely.



LOW PROFILE TYPE AIR CLEANER:

⚠WARNING

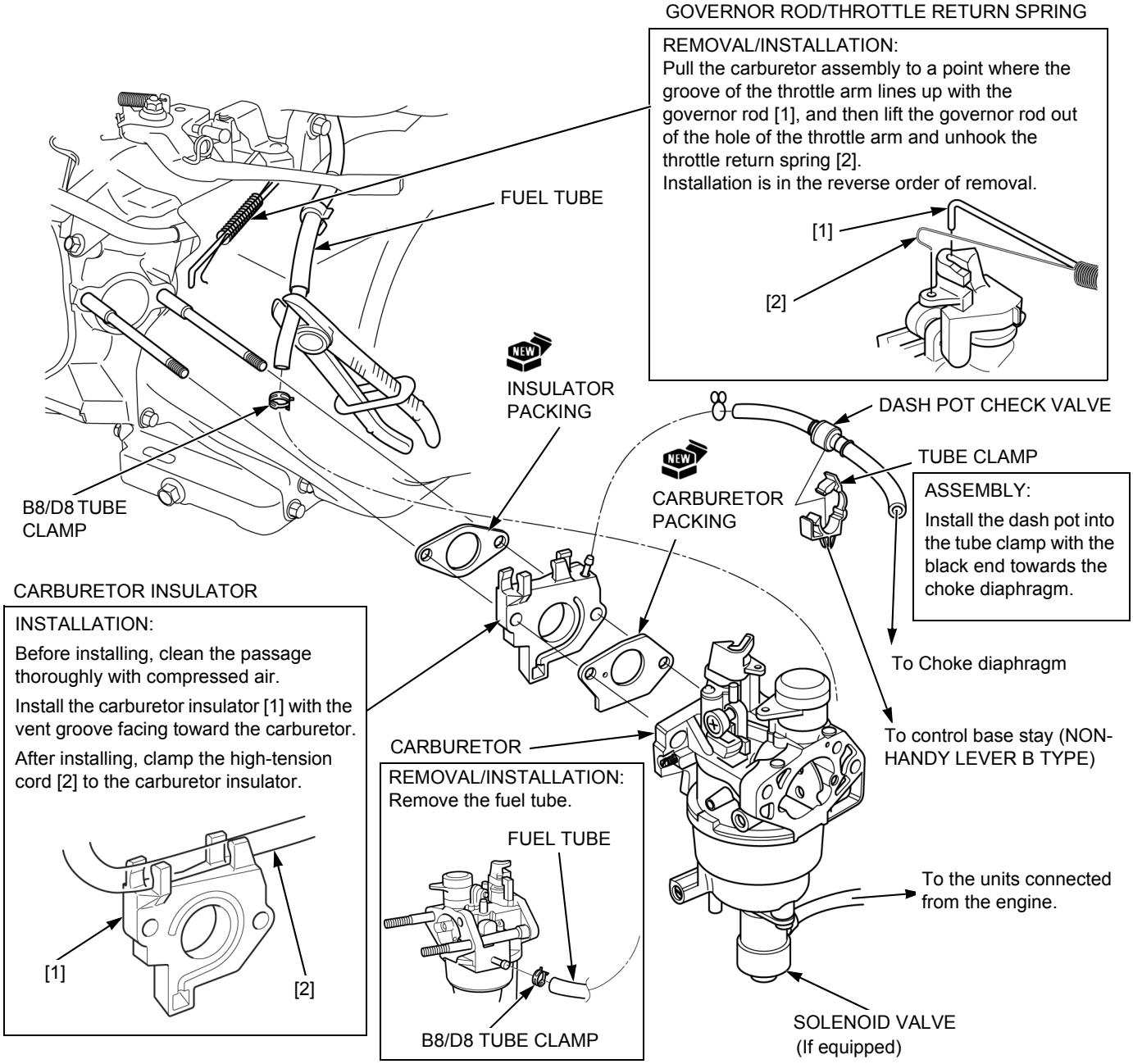
Gasoline is highly flammable and explosive.You can be burned or seriously injured when handling fuel.
- Keep heat, sparks, and flame away.
- Handle fuel only outdoors.
- Wipe up spills immediately.

Turn the fuel valve lever to the OFF position.

Remove the air cleaner (page 6-6).

Set a commercially available tube clip to the fuel tube. Disconnect the fuel tube from the carburetor.

Remove the drain screw of the carburetor to drain completely.



CARBURETOR DISASSEMBLY/ ASSEMBLY

DUAL/DUAL SILENT/CYCLONE/OIL BATH/SEMI DRY TYPE AIR CLEANER:

⚠ WARNING

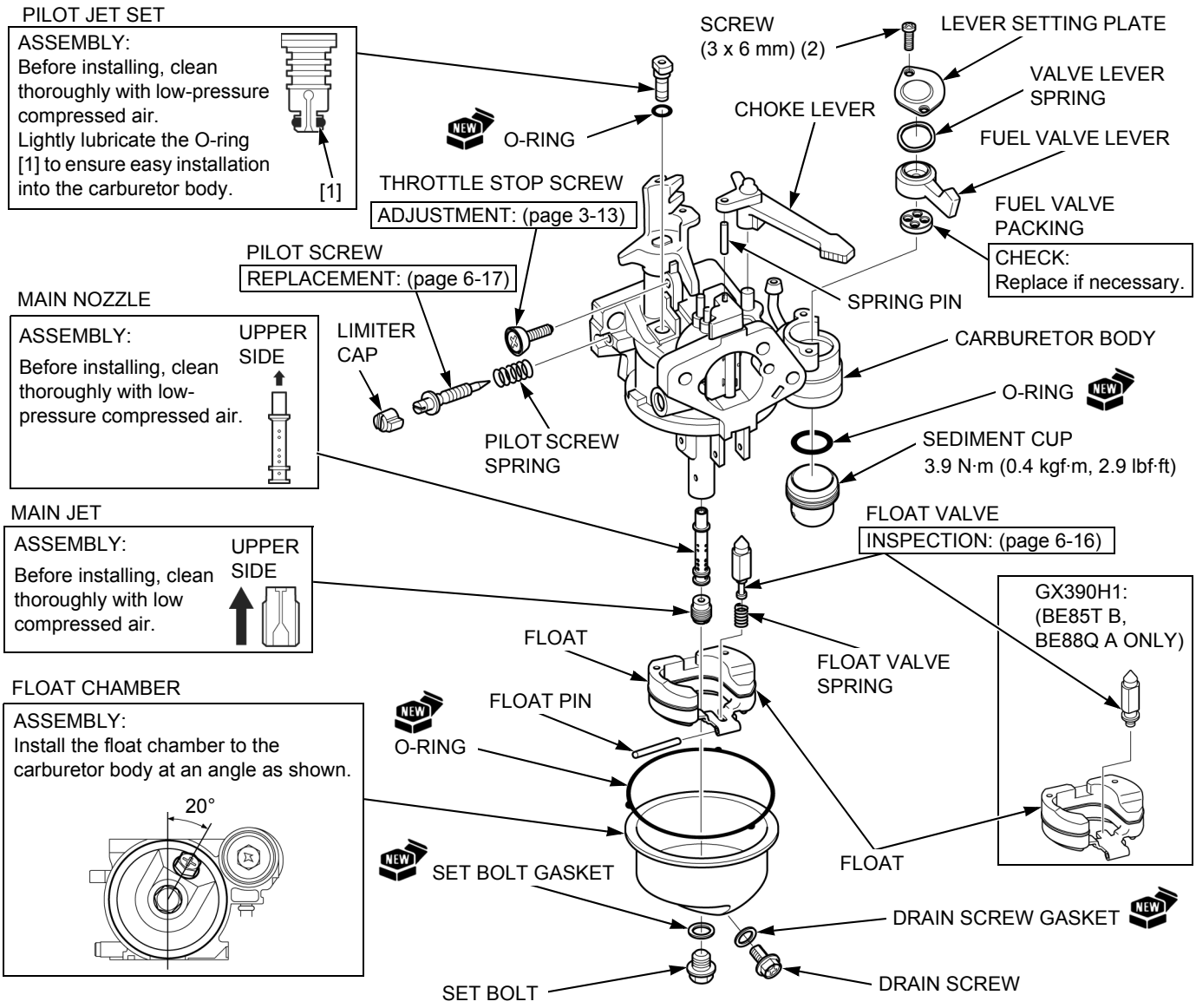
Gasoline is highly flammable and explosive.You can be burned or seriously injured when handling fuel.
- Keep heat, sparks, and flame away.
- Handle fuel only outdoors.
- Wipe up spills immediately.

⚠ CAUTION

To prevent serious eye injury, always wear safety goggles or other eye protection when using compressed air.

Remove the carburetor (page 6-9).

Before disassembly, clean the outside of the carburetor.



LOW PROFILE TYPE AIR CLEANER:

⚠WARNING

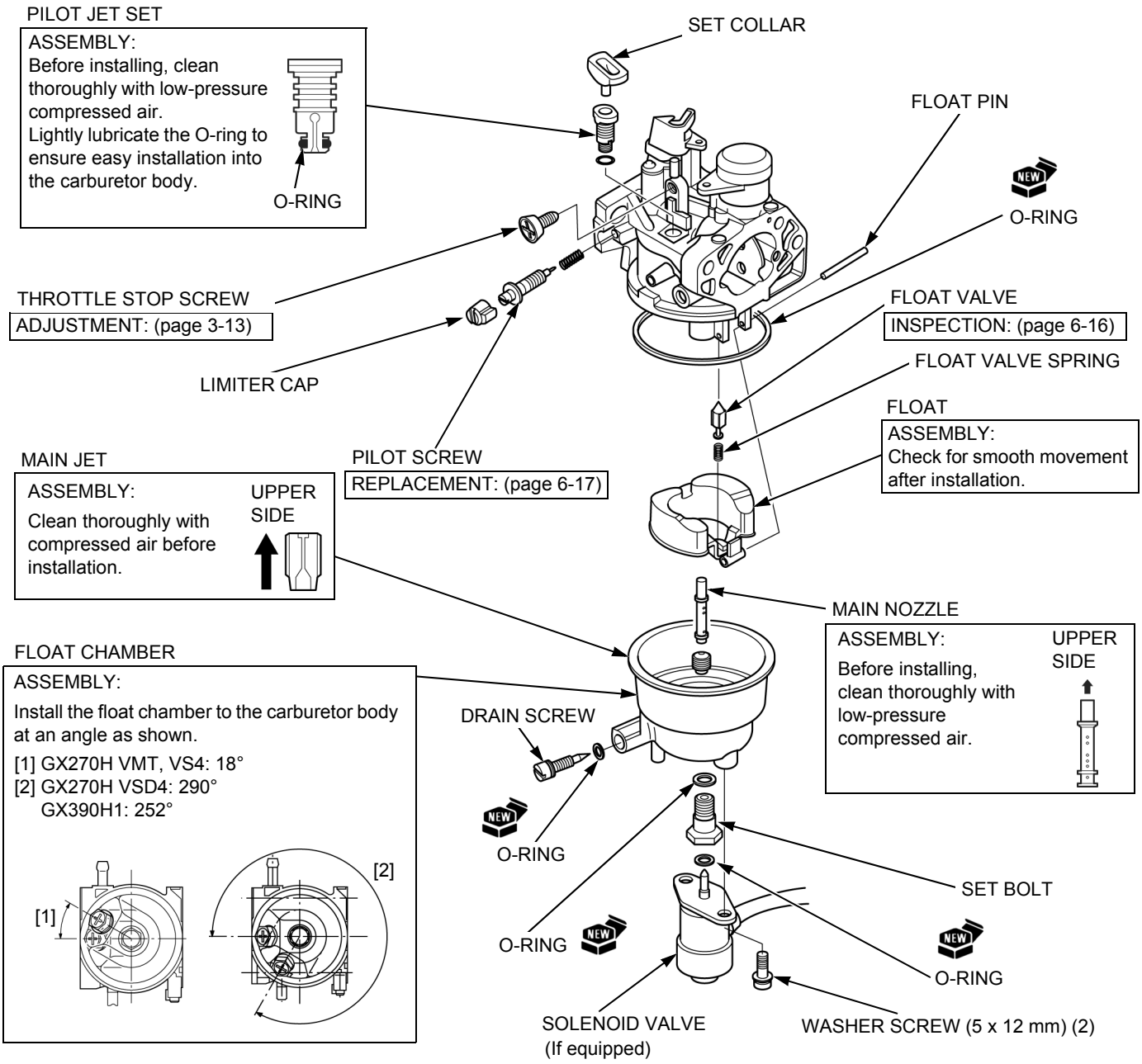
Gasoline is highly flammable and explosive.You can be burned or seriously injured when handling fuel.
- Keep heat, sparks, and flame away.
- Handle fuel only outdoors.
- Wipe up spills immediately.

⚠CAUTION

To prevent serious eye injury, always wear safety goggles or other eye protection when using compressed air.

Remove the carburetor (page 6-9).

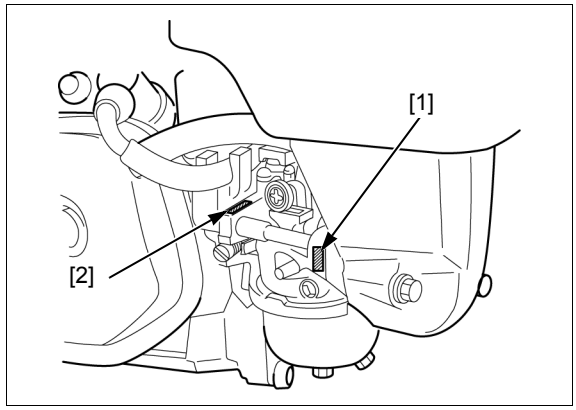
Before disassembly, clean the outside of the carburetor.



MAIN JET NUMBER:

GX270H:

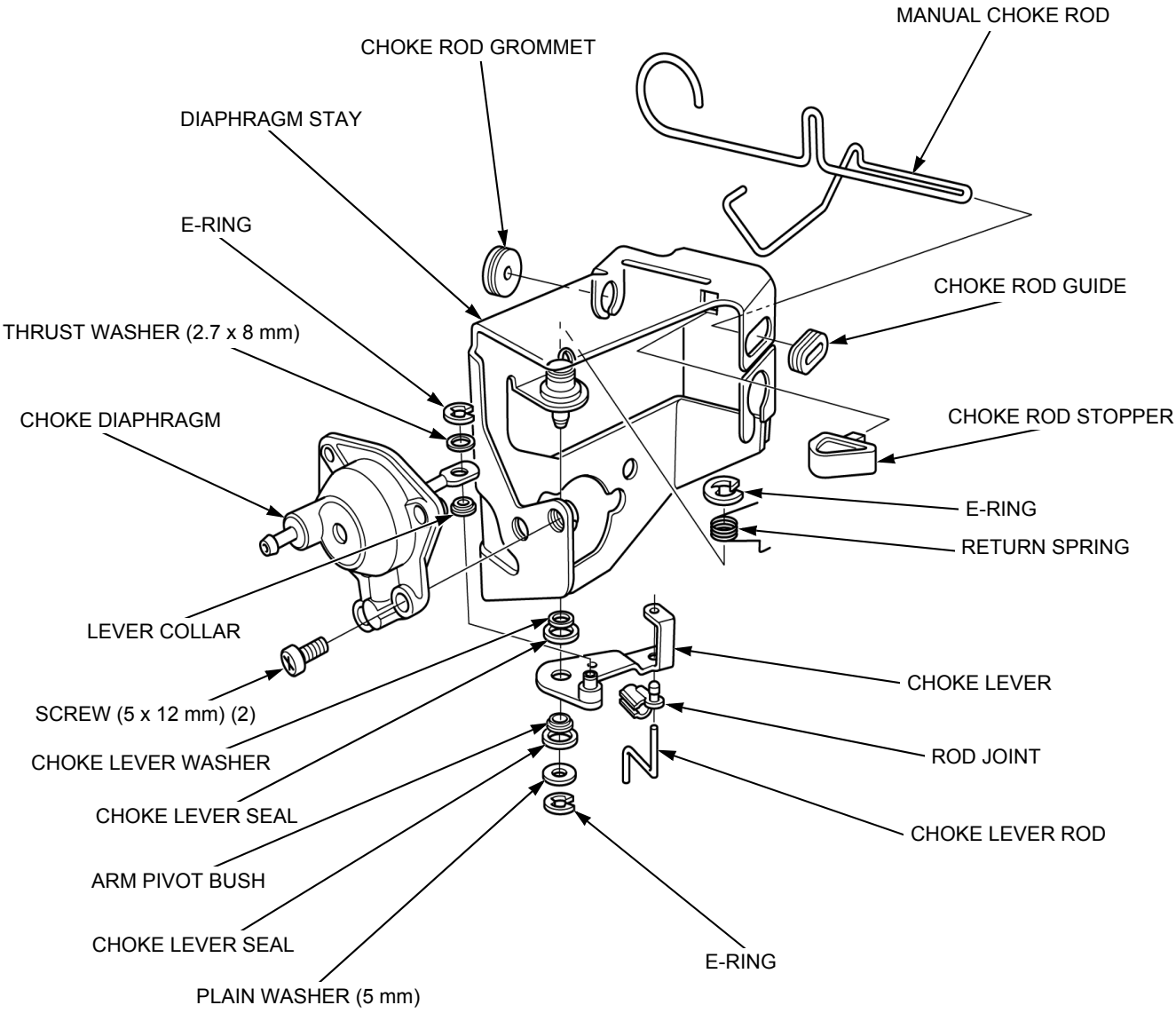
Carburetor identification Number [1] + [2]	Main Jet Number
BE70L A	#85
BE70M A	#92
BE75B C	#85
BE75H A	#88
BE78B A	#85
BE98F A	#90
BE98G A	#92
BE98H A	#92



GX390H1:

Carburetor identification Number [1] + [2]	Main Jet Number
BE85T B	#92
BE85U A	#95
BE88P A	#105
BE88Q A	#95
BE89K A	#102
BE89L A	#108

CHOKE DIAPHRAGM DISASSEMBLY/ ASSEMBLY



CARBURETOR BODY CLEANING

⚠ CAUTION

To prevent serious eye injury, always wear safety goggles or other eye protection when using compressed air.

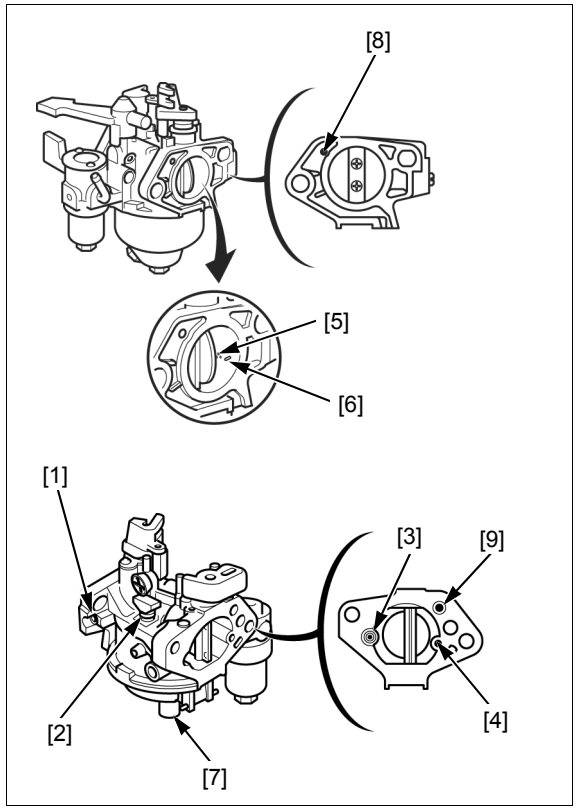
NOTICE

- *Some commercially available chemical cleaners are very caustic. These cleaners may damage plastic parts such as the O-ring, the float and the float seat of the carburetor. Check the container for instructions. If you are in doubt, do not use these products to clean Honda carburetors.*
- *High air pressure may damage the carburetor body. Use low air pressure (30 psi or less) when cleaning passages and ports.*

Clean the carburetor body with non-flammable solvent.

Clean thoroughly the following passages and ports with low-pressure compressed air.

– Pilot screw hole [1]
– Pilot jet hole [2]
– Pilot air jet [3]
– Main air jet [4]
– Transition ports [5]
– Pilot outlet [6]
– Main nozzle holder [7]
– External vent port [8]
– Internal vent port [9]



CARBURETOR INSPECTION

FLOAT LEVEL HEIGHT

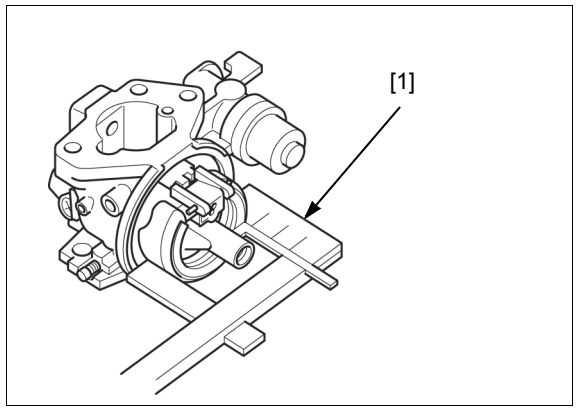
Place the carburetor in the position as shown. Measure the distance between the float top and carburetor body when the float just contacts the seat without compressing the valve spring.

TOOL:
Float level gauge [1] 07401-0010000

FLOAT HEIGHT: 13.2 mm (0.52 in)

If the measured float height is out of specification, check the float valve and the float valve spring (page 6-16).

If the float valve and the float valve spring are normal, replace the float (page 6-11).

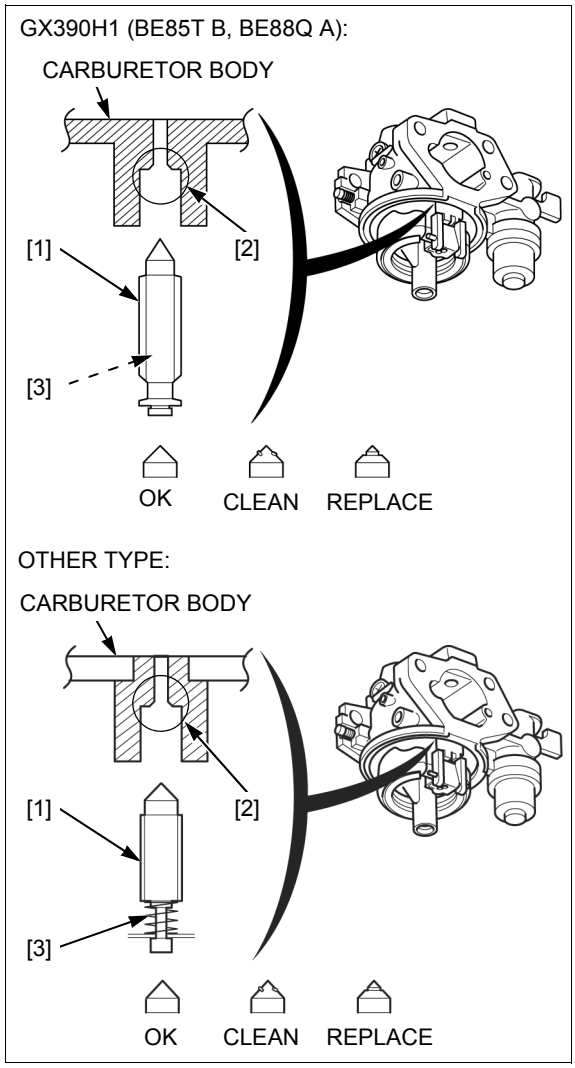


FLOAT VALVE

Check the float valve [1] and its seat [2] for wear or contamination.

Before installation, check for wear or a weak spring [3].

Check the operation of the float valve.

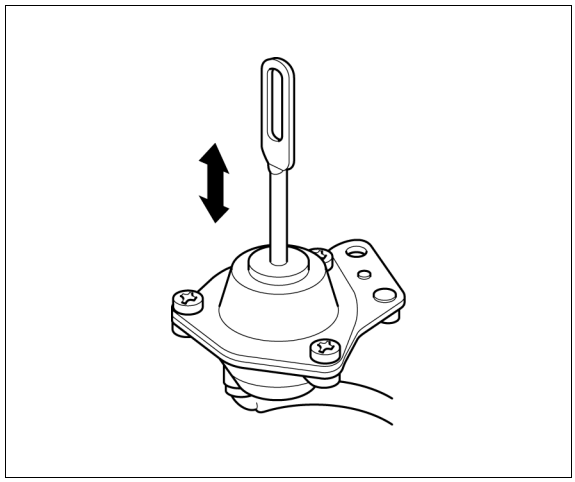


CHOKE DIAPHRAGM INSPECTION

Check for smooth operation by pressing the rod with a finger.

Connect a vacuum pump to the choke diaphragm and apply vacuum.The diaphragm should hold.

Replace the choke diaphragm if necessary.



PILOT SCREW REPLACEMENT

Leave the pilot screw [1] and limiter cap [2] in place during carburetor cleaning. Remove only if necessary for carburetor repair.

Removal of the limiter cap requires breaking the pilot screw. A new pilot screw and limiter cap must be installed.

When the limiter cap has been broken off, remove the broken pilot screw.

Place the spring on the replacement pilot screw, and install it on the carburetor.

Turn the pilot screw in until it is lightly seated, then turn the screw out the required number of turns.

GX270H:

Carburetor identification Number = [3] + [4]	Pilot screw opening
BE70L A	2-1/8 turns out
BE70M A	2-3/4 turns out
BE75B C	2-1/8 turns out
BE75H A	2-7/8 turns out
BE78B A	2-1/8 turns out
BE98F A	2-5/8 turns out
BE98G A	2-7/8 turns out
BE98H A	2-7/8 turns out

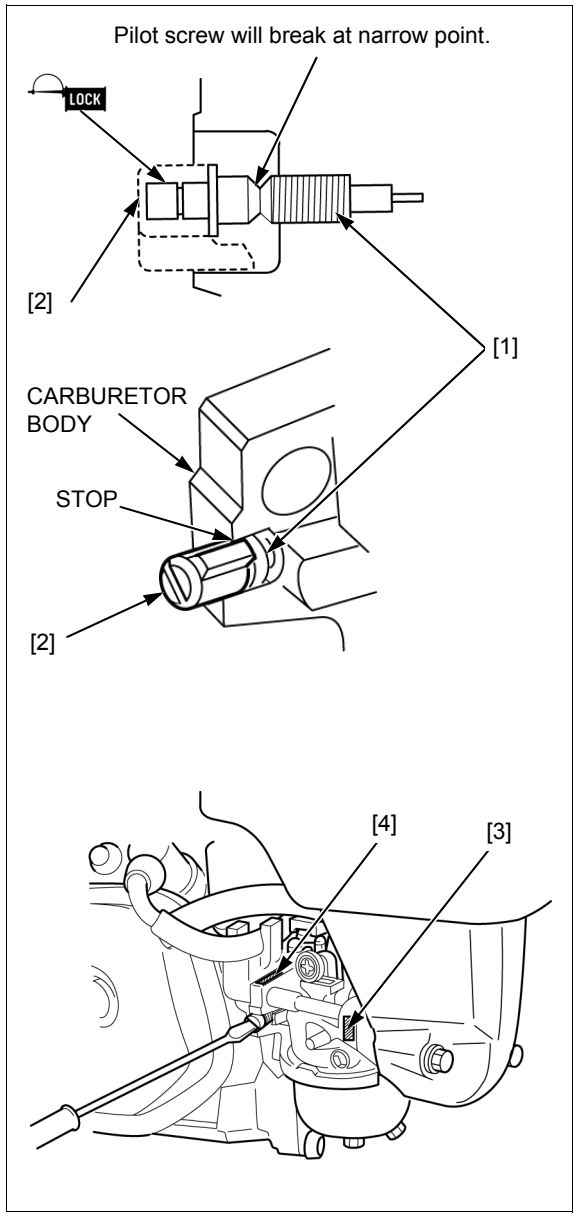
GX390H1:

Carburetor identification Number = [3] + [4]	Pilot screw opening
BE85T B	1-7/8 turns out
BE85U A	2 turns out
BE88P A	2-1/4 turns out
BE88Q A	2 turns out
BE89K A	2-1/4 turns out
BE89L A	2-1/4 turns out

Refer to the appropriate shop manual for carburetor pilot? screw initial opening setting.

Apply LOCTITE® 638 to the inside of the limiter cap, then install the cap so the stop prevents the pilot screw from being turned counterclockwise.

Be careful to avoid turning the pilot screw while installing the limiter cap. The pilot screw must stay at its required setting.



CHOKE SET REPLACEMENT

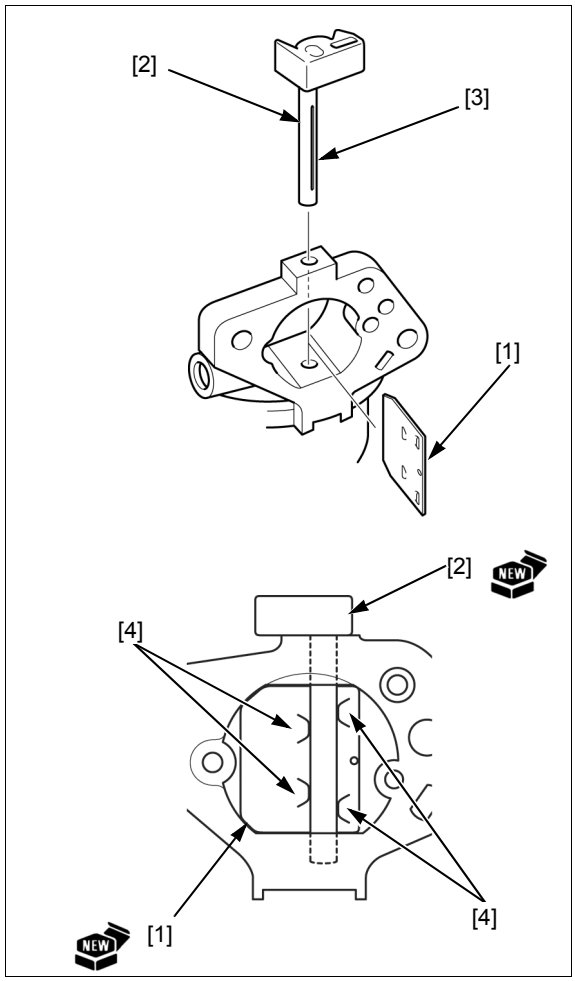
Remove the carburetor (page 6-9).

Pull out the choke valve plate [1].

Remove the choke shaft [2] and install a new choke shaft.

Insert a new choke valve plate into the slit [3] of the choke shaft.

Be sure the choke shaft is in the position between the projections [4] of the choke valve plate.



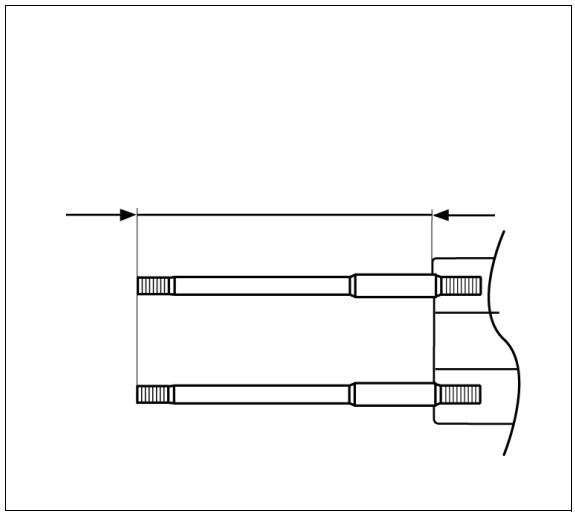
CYLINDER STUD BOLT REPLACEMENT

Thread two nuts onto the stud bolt and tighten them together, and then use a wrench to turn the stud bolt out.

Install new stud bolts.

SPECIFIED LENGTH

GX270H	
8 x 98 mm:	**82 mm (3.23 in)**
8 x 123 mm:	**107 mm (4.21 in)**
GX390H1	
8 x 106 mm:	**90.0 mm (3.54 in)**
8 x 131.5 mm:	**115.5 mm (4.55 in)**



7. GOVERNOR SYSTEM

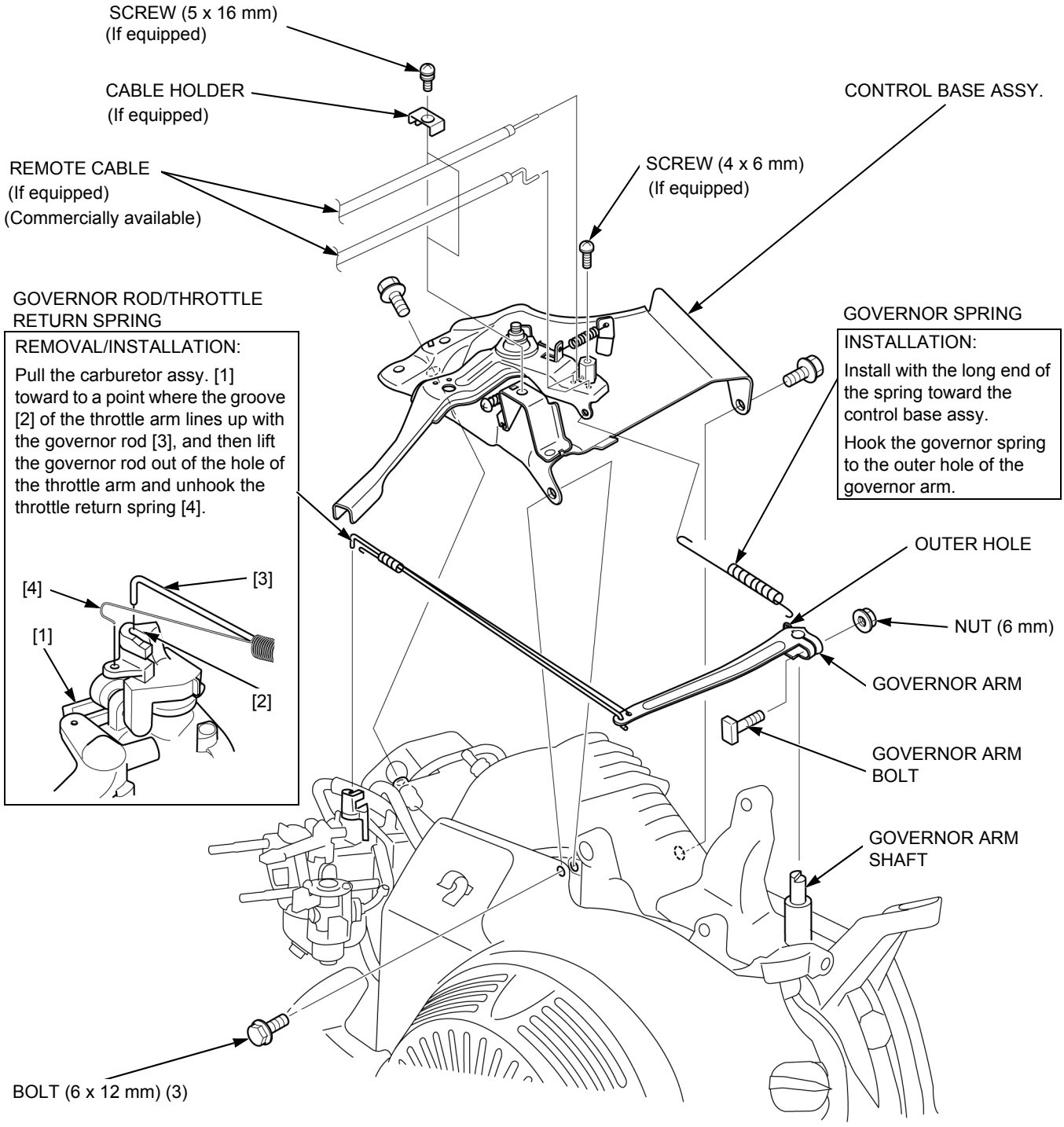
GOVERNOR ARM/CONTROL BASE ASSY. REMOVAL/INSTALLATION

MANUAL OPERATION TYPE

Remove the following parts.

- Air cleaner (page 6-4)
- Muffler (page 12-2)
- Fuel tank (page 6-3)
- Tube clamp (page 6-9)

Installation is in the reverse of removal.
Adjust the maximum speed (page 7-8).

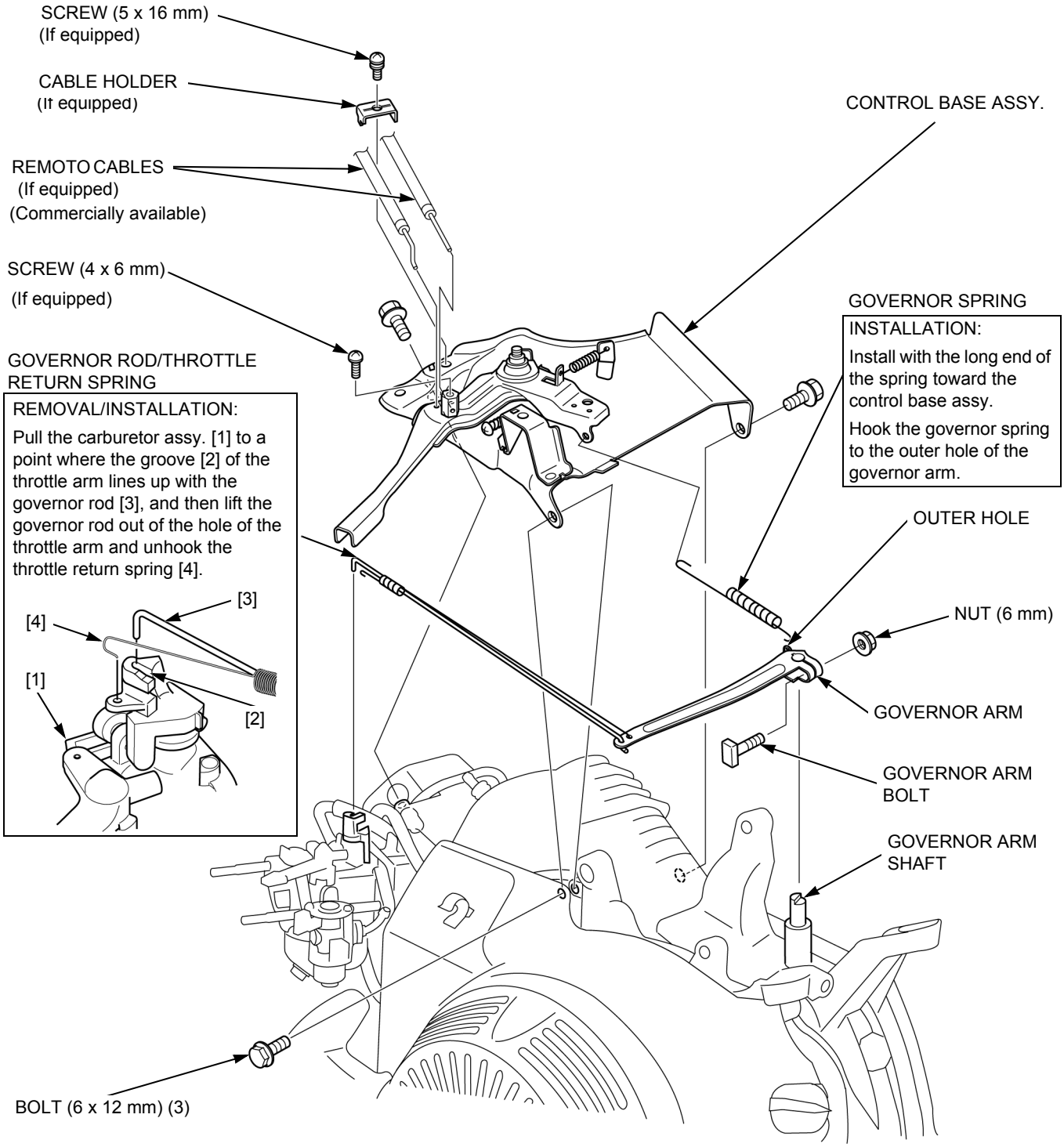


MANUAL OPERATION A TYPE

Remove the following parts.

– Air cleaner (page 6-4)
– Muffler (page 12-2)
– Fuel tank (page 6-3)
– Tube clamp (page 6-9)

Installation is in the reverse of removal.
Adjust the maximum speed (page 7-8).

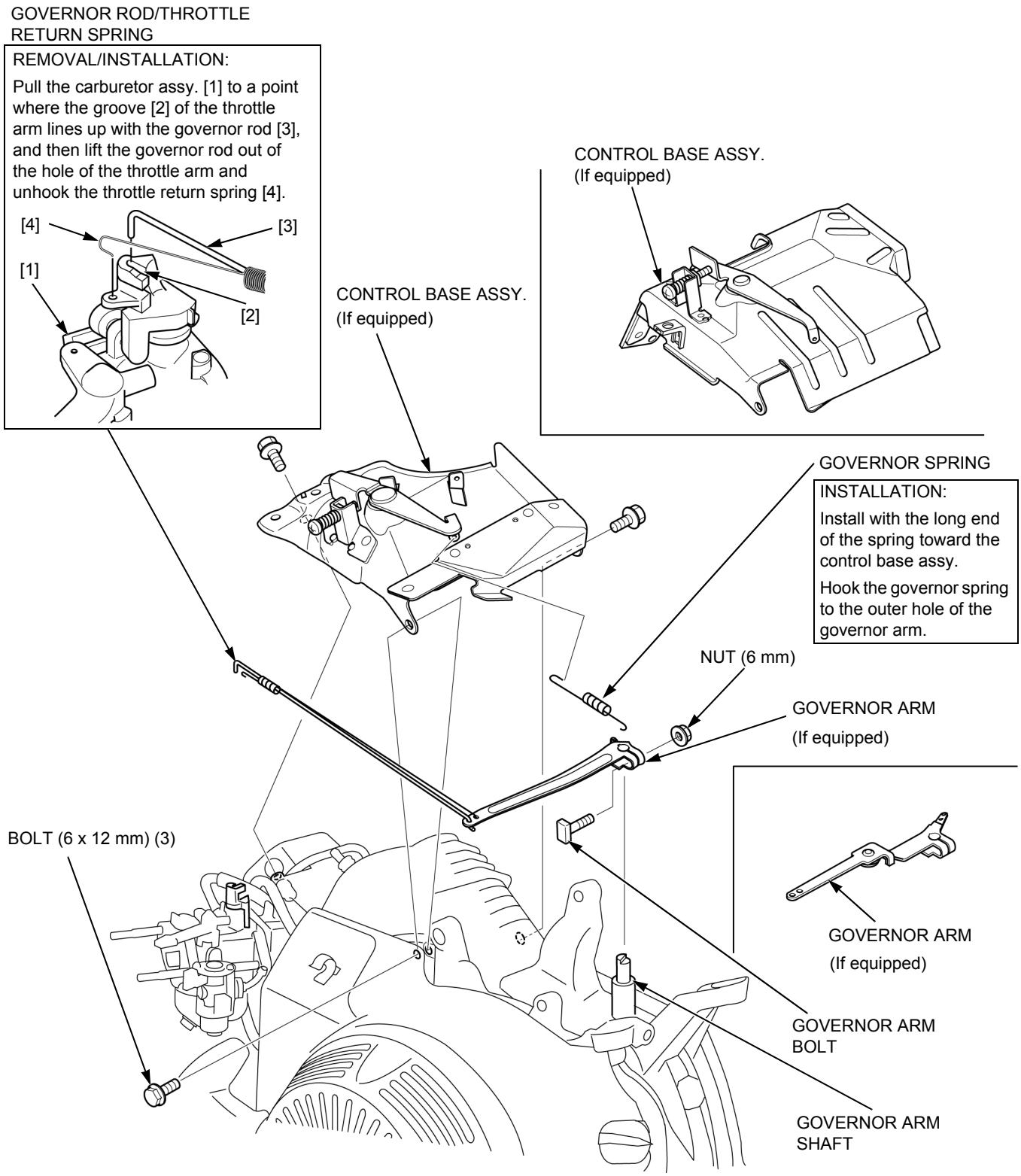


EXCEPT MANUAL OPERATION TYPE

Remove the following parts.

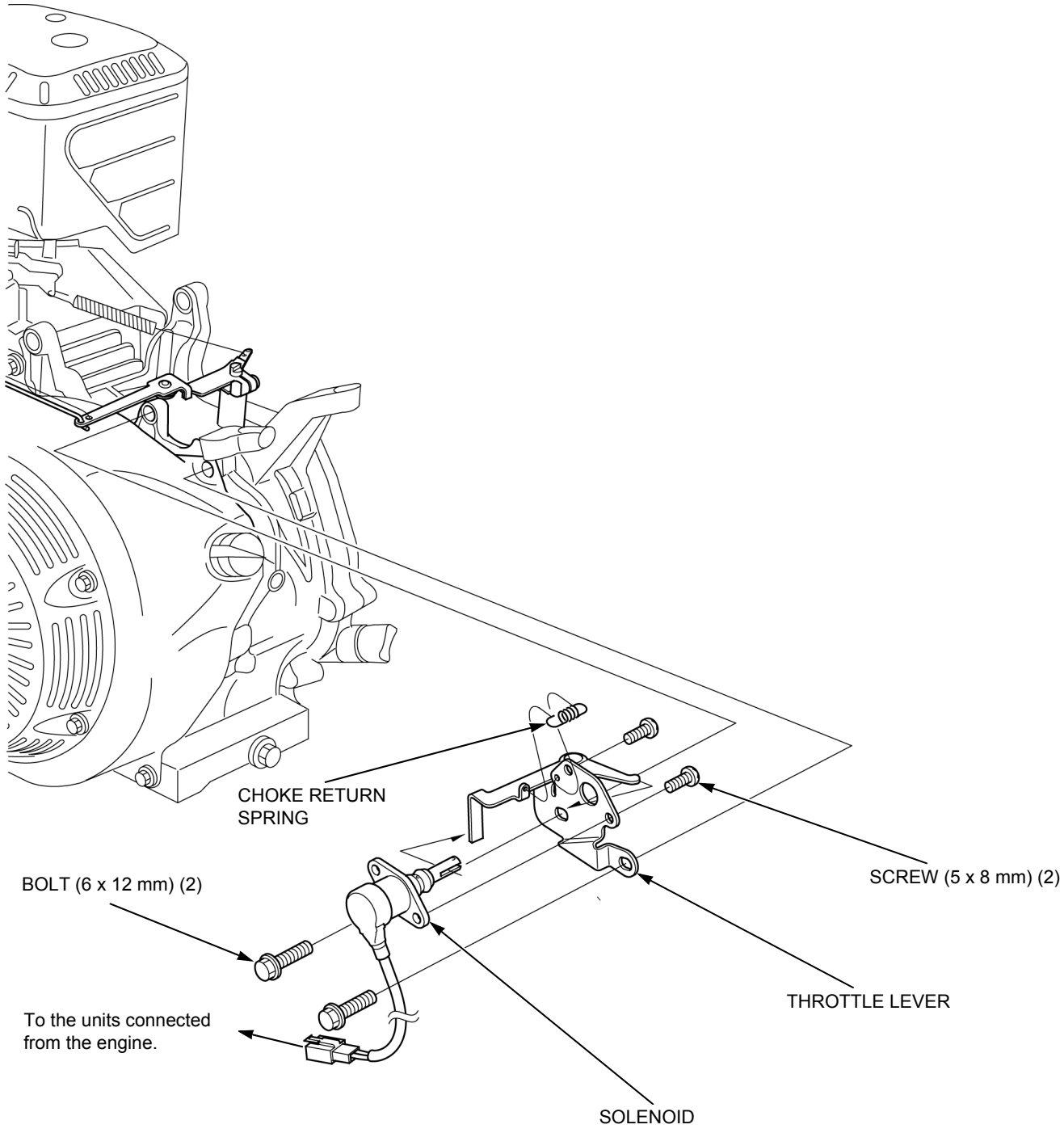
– Air cleaner (page 6-4)
– Muffler (page 12-2)
– Fuel tank (page 6-3)
– Tube clamp (page 6-9) (If equipped)

Installation is in the reverse of removal.
Adjust the governor (page 7-8)



AUTO THROTTLE (IF EQUIPPED) REMOVAL/INSTALLATION

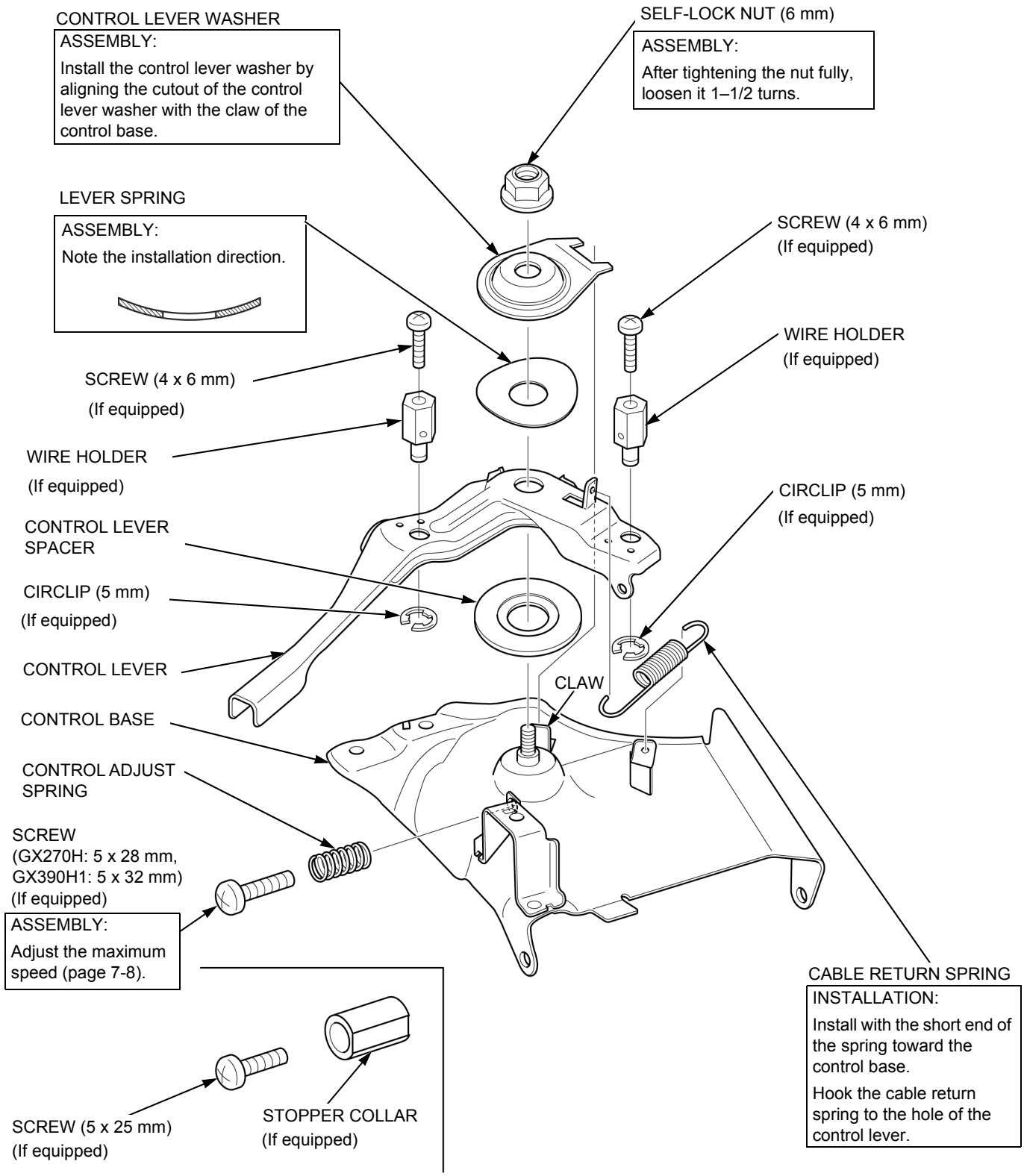
Remove the fuel tank (page 6-3).



CONTROL BASE ASSY. DISASSEMBLY/ASSEMBLY

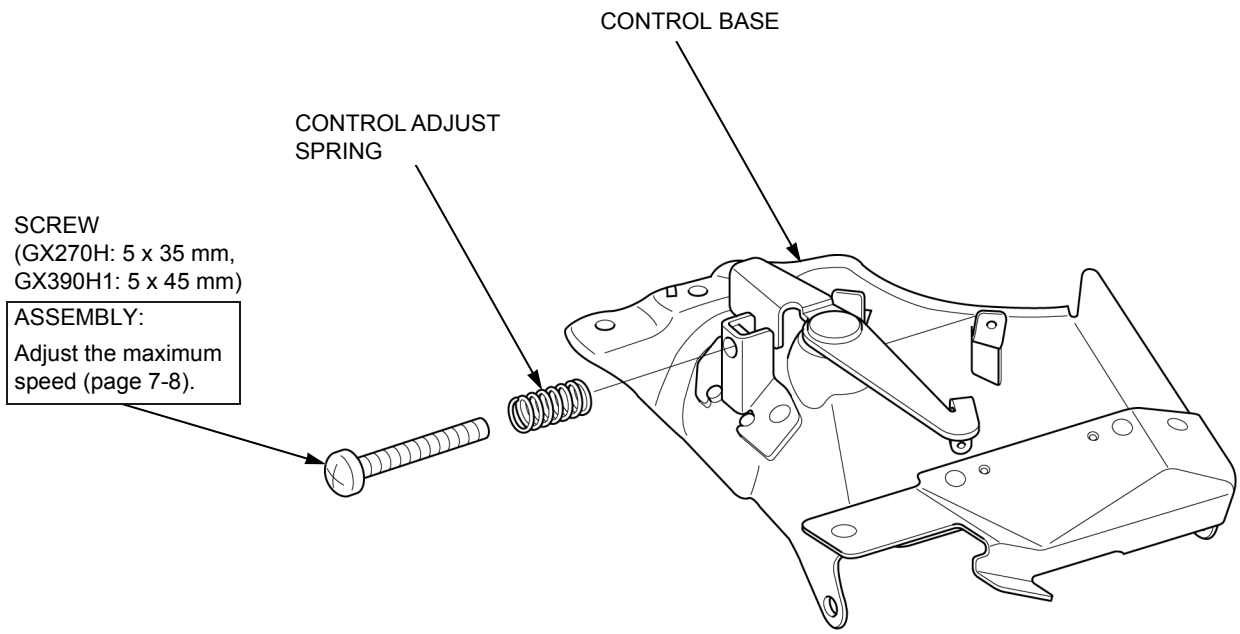
MANUAL OPERATION TYPE

Remove the control base assy (page 7-2).



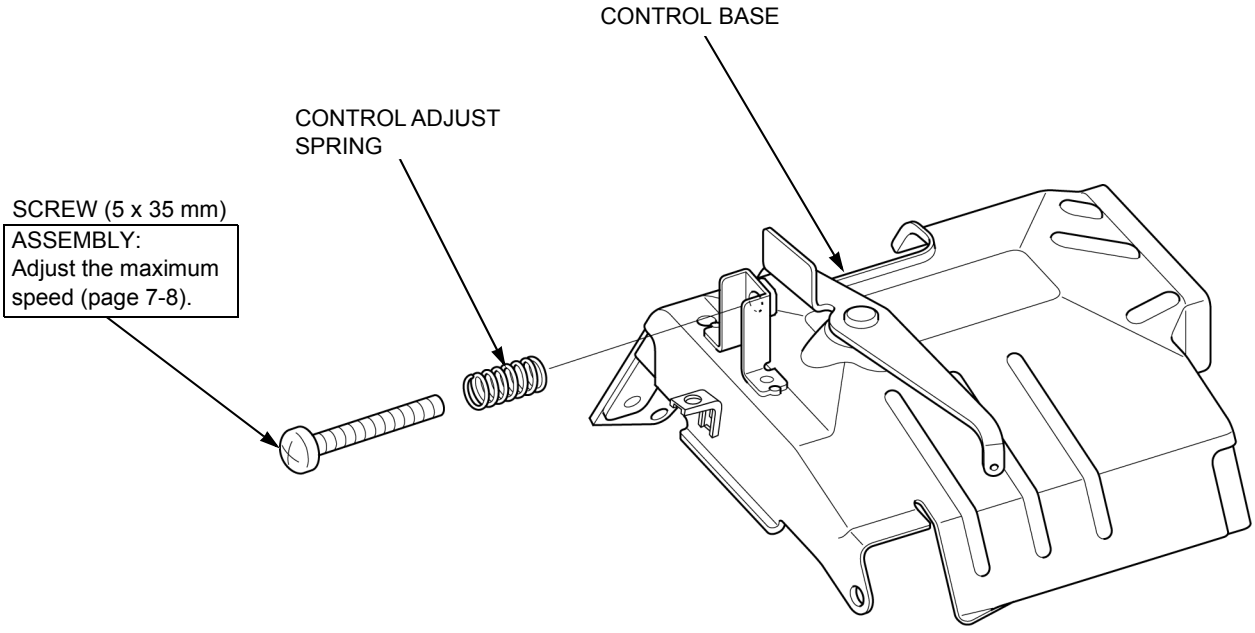
NON-HANDY LEVER A TYPE

Remove the control base assy (page 7-2).



NON-HANDY LEVER B TYPE

Remove the control base assy (page 7-2).



MAXIMUM SPEED ADJUSTMENT

MANUAL CONTROL TYPE

Remove the fuel tank (page 6-3).

Loosen the nut (6 mm) [1] of the governor arm.

Turn the governor arm [2] counter clockwise to fully open the carburetor throttle valve [3].

Rotate the governor arm shaft [4] as far as it will go in the same direction the governor arm moved to open the throttle valve.

Tighten the nut (6 mm) securely.

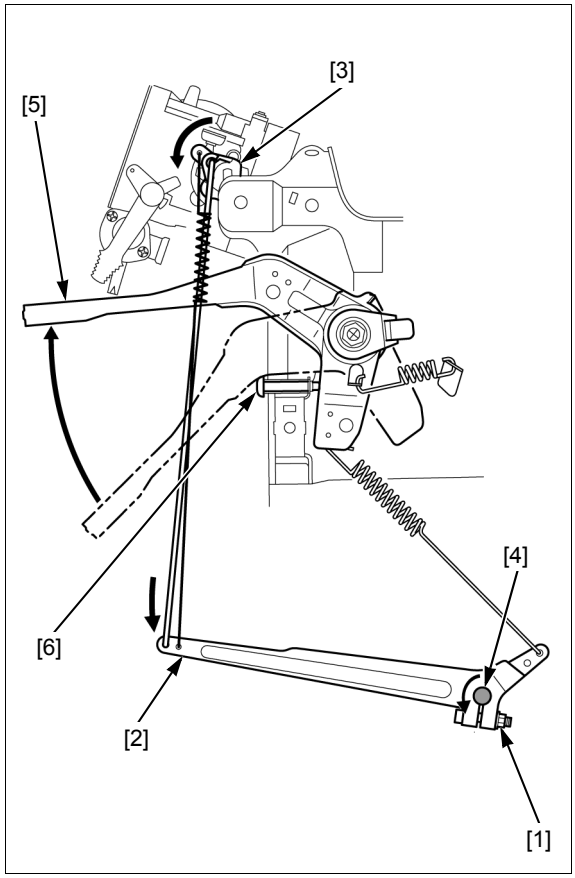
Install the fuel tank (page 6-3).

Start the engine and allow it to warm up to normal operating temperature.

Move the control lever [5] to run the engine at the specified maximum speed, and hold the control lever.

Turn the screw [6] of the control to obtain the specified maximum speed.

MAXIMUM SPEED: 3,850 ± 150 min^{-1} (rpm)

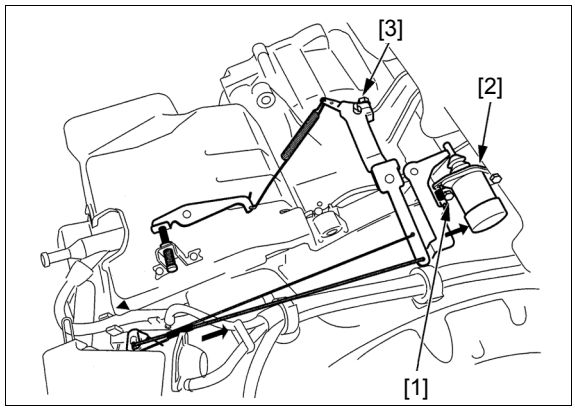


AUTO THROTTLE TYPE

Remove the fuel tank (page 6-3).

Loosen the two bolts (6 x 12 mm) [1], and move the auto throttle assy. [2] away from the governor arm.

Loosen the nut (6 mm) [3] on the governor arm bolt.



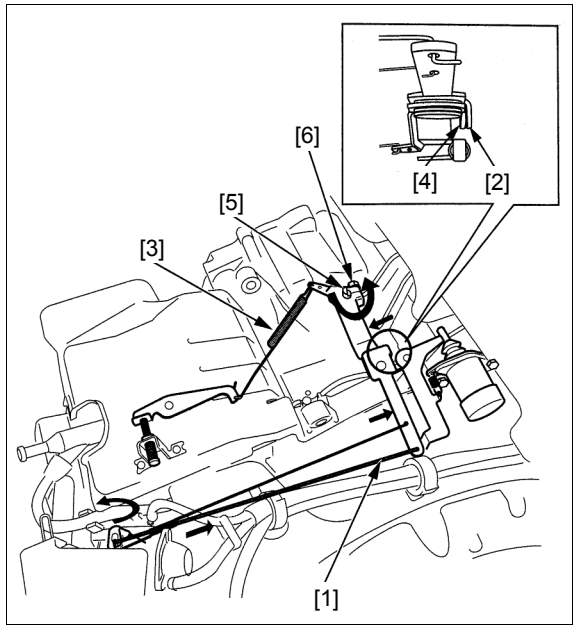
Move the governor rod [1] end [2] of the governor arm in the direction shown.

Move the governor spring [3] end [4] of the governor arm in the direction shown.

Holding both sections of the governor arm in alignment so that the two stops are in contact with one another, move the governor arm in the direction shown until the throttle is completely open, and hold it in that position.

Rotate the governor arm shaft [5] as far as it will go in the same direction it was just moved by the governor arm, and then tighten the nut (6 mm) [6].

There may be a slight bend in the governor arm when it is released; this will not affect governor operation.



Move the auto throttle assy. [1] until its throttle lever [2] just contacts the governor arm [3], and tighten the two bolts (6 mm) [4].

Install the fuel tank (page 6-3).

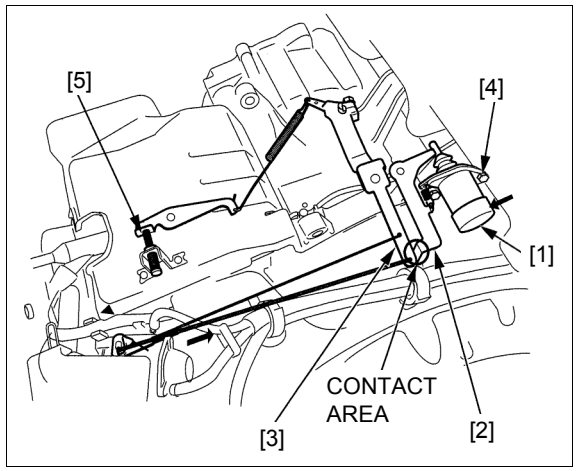
Turn the auto throttle switch to the OFF position, and start the engine. Allow it to warm to normal operating temperature.

Move the control lever to run the engine at the specified maximum speed, and hold the control lever.

Turn the screw [5] to obtain the specified maximum speed.

MAXIMUM SPEED: 3,850 ± 150 min^{-1} (rpm)

Check the auto throttle speed, and adjust if necessary (page 3-13).

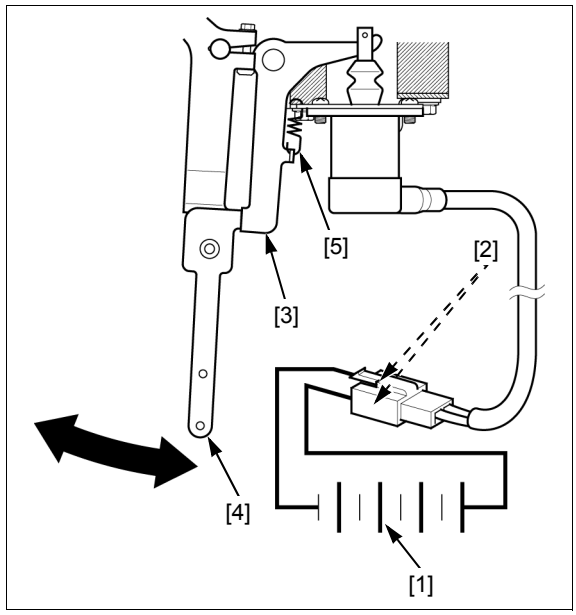


SOLENOID (AUTO THROTTLE) INSPECTION

Remove the fuel tank (page 6-3).

Connect a 12V battery [1] to the solenoid terminals [2] and check for proper operation.

The throttle lever [3] and governor arm [4] should move with the battery connected. The choke return spring [5] should bring the throttle lever and governor arm to its normal position when the battery is removed.

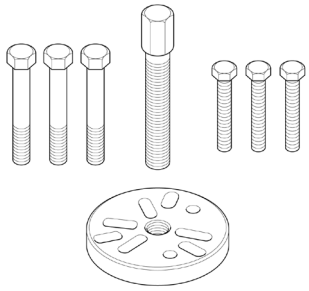


MEMO

8. CHARGING SYSTEM

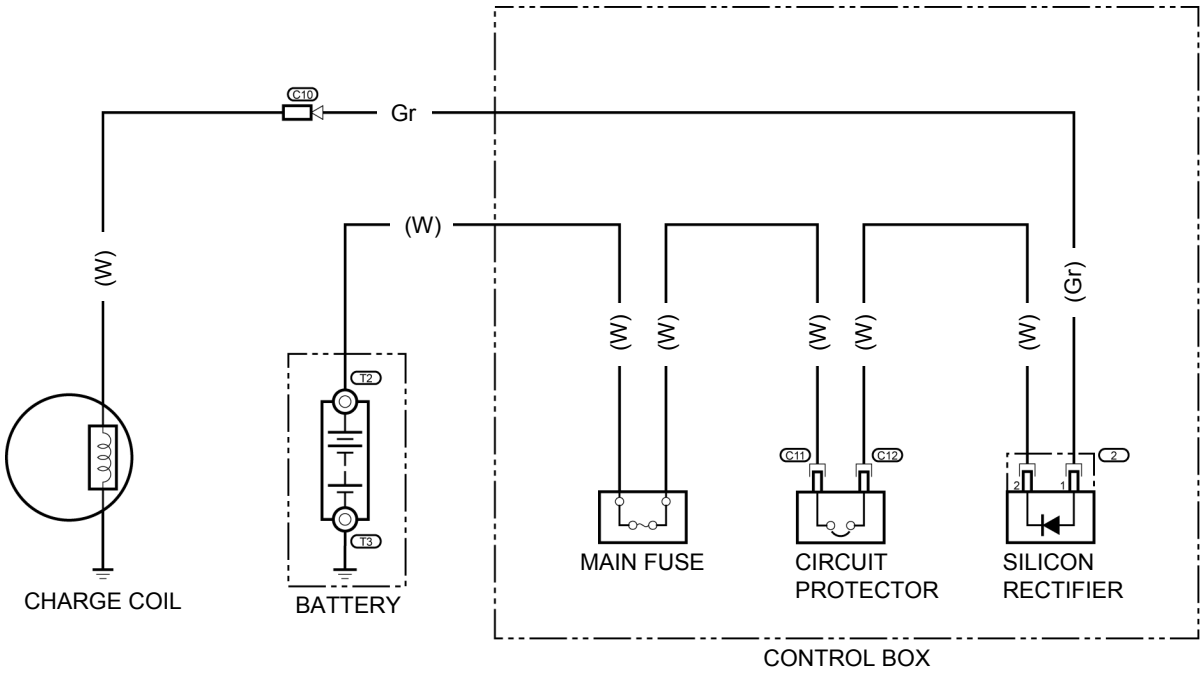
TOOL

Flywheel puller set
07935-8050004



SYSTEM DIAGRAM

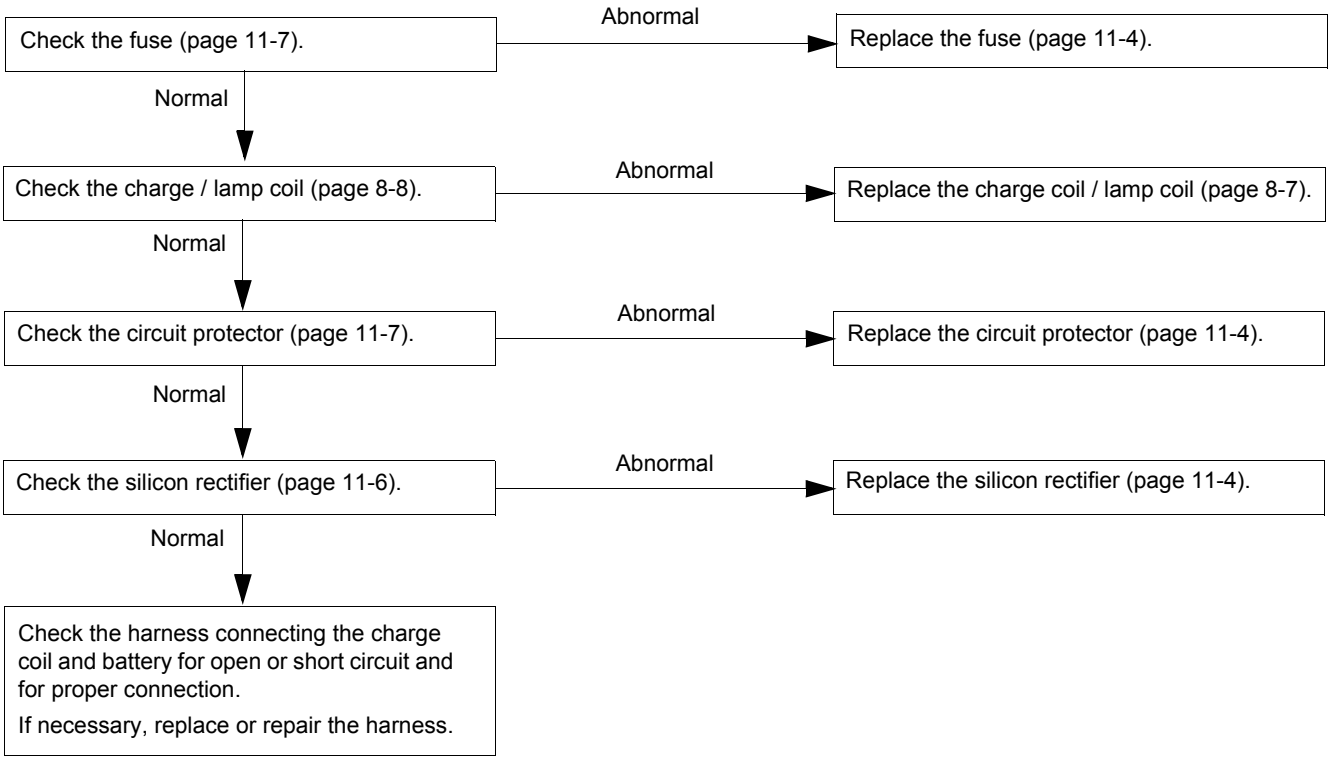
1 A/3 A CHARGE COIL TYPE:



BEFORE TROUBLESHOOTING

- Use a known-good battery for troubleshooting.
- Check that the connectors are connected securely.
- Read the circuit tester's operation instructions carefully, and observe the instructions during inspection.
- Disconnect the battery cable before continuity inspection.

TROUBLESHOOTING

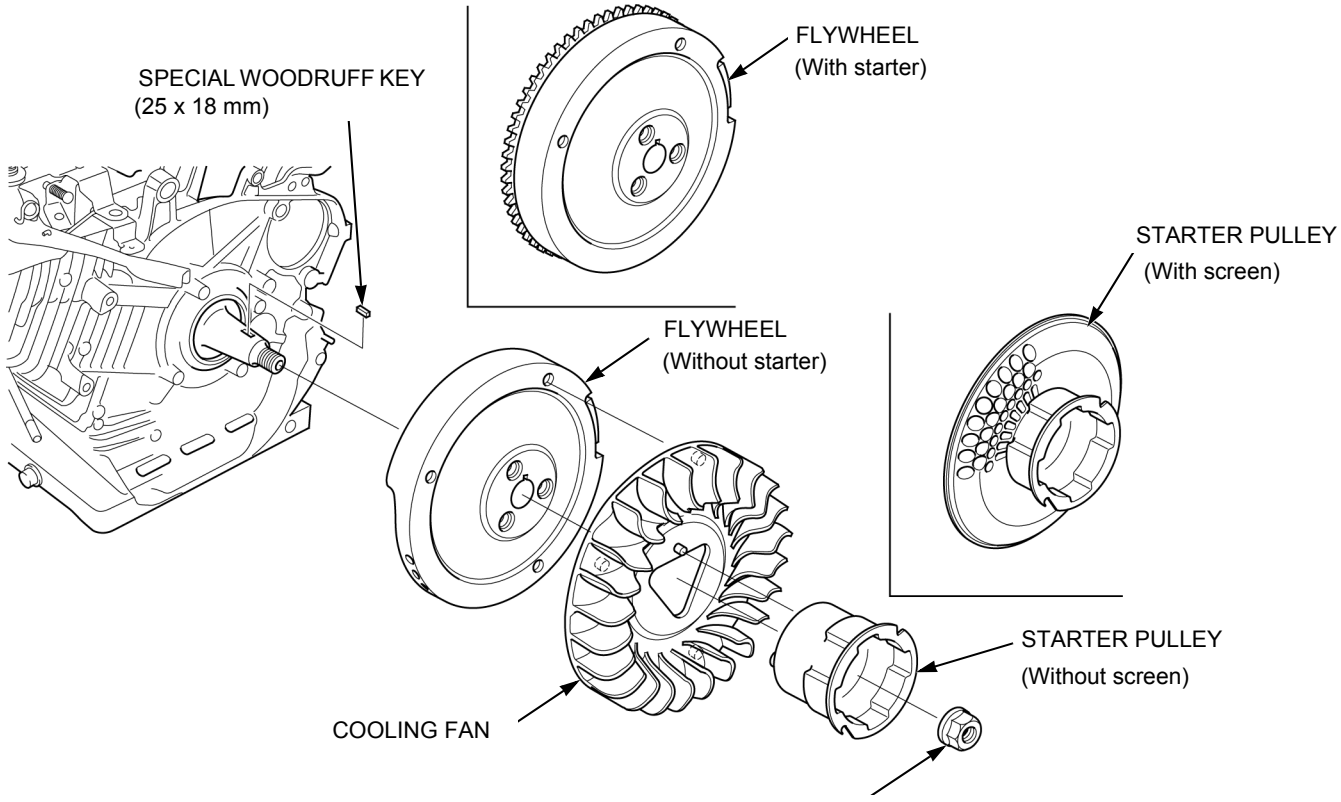


COOLING FAN/FLYWHEEL REMOVAL/ INSTALLATION

REMOVAL

Remove the following parts:

– Fan cover (page 5-2).
– Ignition coil (page 9-4).



FLYWHEEL

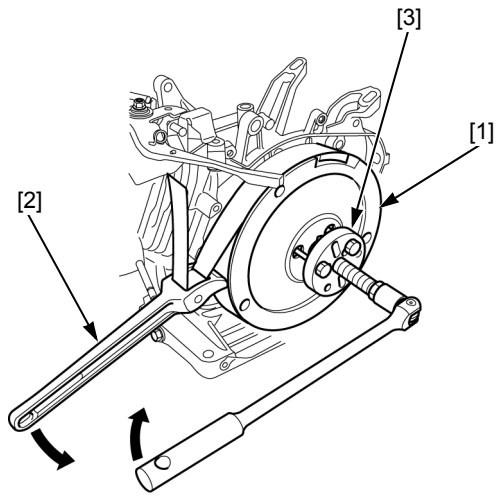
REMOVAL:

Hold the flywheel [1] with a commercially available strap wrench [2] and use the special tool to remove the flywheel.

Do not hit the flywheel with a hammer.

TOOL:

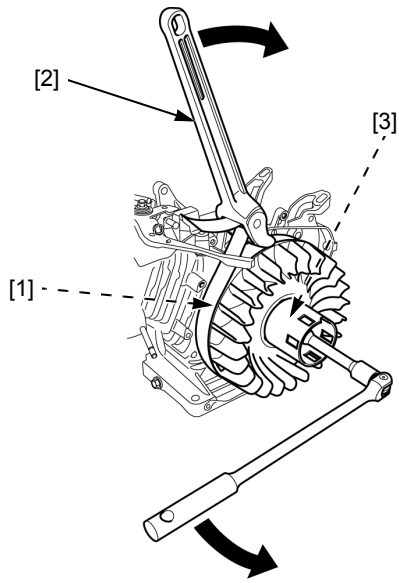
FLYWHEEL PULLER SET [3] 07935-805004



REMOVAL:

Hold the flywheel [1] with a commercially available strap wrench [2] and remove the special nut (16 mm) [3].

Take care not to damage the cooling fan.

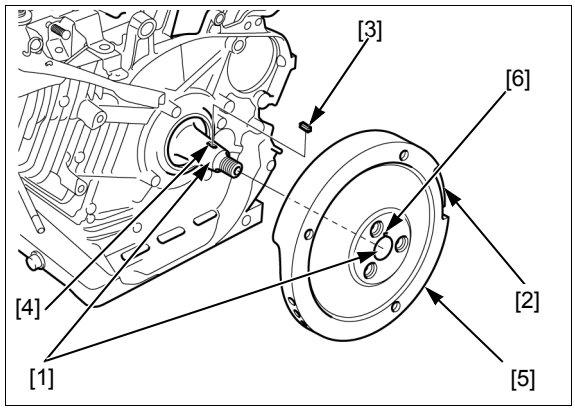


INSTALLATION

Clean the tapered parts [1] of dirt, oil, grease, and other foreign material before installation. Be sure there are no metal parts or other foreign material on the magnet part [2] of the flywheel.

Set the special woodruff key (25 x 18 mm) [3] in the key groove [4] of the crankshaft securely.

Set the flywheel [5] by aligning the key slot [6] with special woodruff key on the crankshaft.

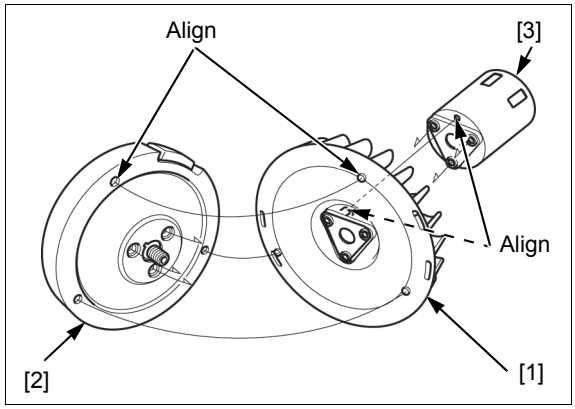


NOTICE

The flywheel may push the special woodruff key (25 x 18 mm) out of its slot; check after installation.

Attach the cooling fan [1] to the flywheel [2] by aligning the three projections of the cooling fan with the holes of the flywheel.

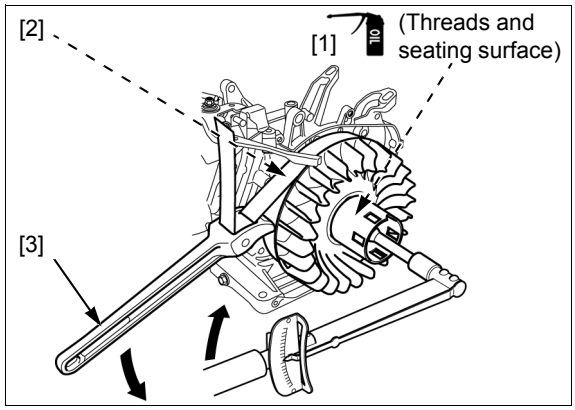
Attach the starter pulley [3] by aligning the hole of the pulley with the projection at the center of the cooling fan.



Apply a light coat of oil to the threads and the seating surface of the special nut (16 mm) [1], and loosely tighten the nut.

Hold the flywheel [2] with a commercially available strap wrench [3], and tighten the special nut (16 mm) to the specified torque.

WITH REDUCTION (GX390H1 ONLY):
TORQUE: 157 N·m (16.0 kgf·m, 116 lbf·ft)
OTHER TYPE:
TORQUE: 113 N·m (11.5 kgf·m, 83 lbf·ft)



Install the following parts:

– Ignition coil (page 9-4).
– Fan cover (page 5-2).

CHARGE/LAMP COIL (IF EQUIPPED) REMOVAL/INSTALLATION

Remove the following parts:

– Fan cover (page 5-2).
– Ignition coil (page 9-4).
– Remove the flywheel (page 8-5).

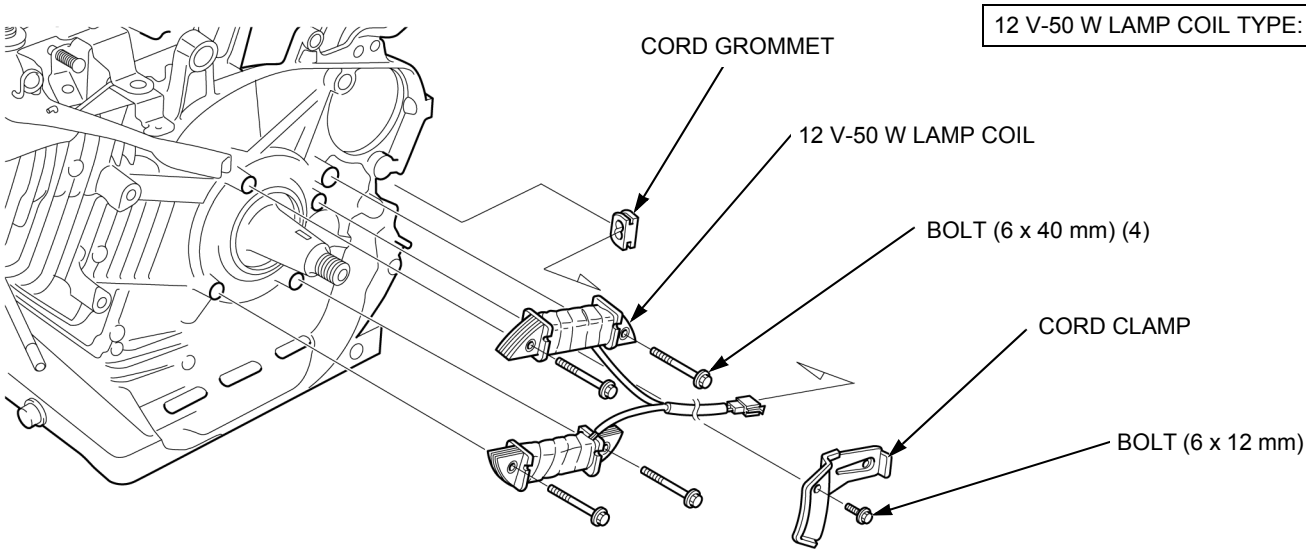
Remove the coil connector or connectors.

Installation is in the reverse of removal.

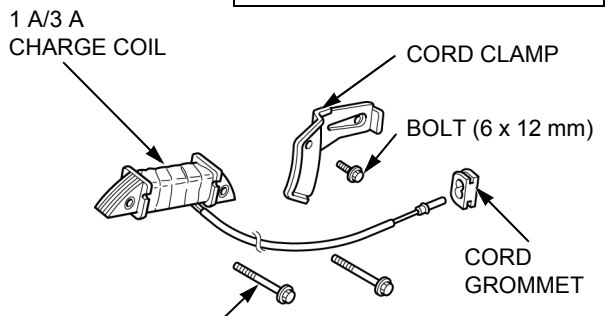
Install the cord clamp. (page 2-10)

Adjust the maximum speed (page 7-8)

12 V-50 W LAMP COIL TYPE:

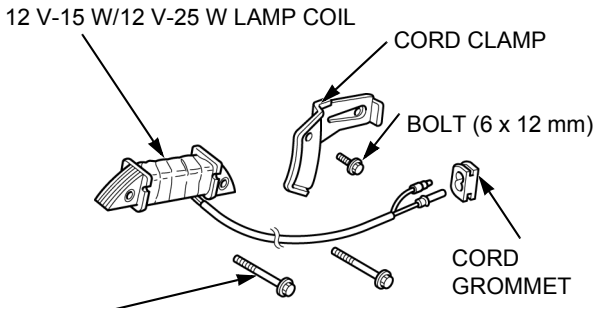


1 A/3 A CHARGE COIL TYPE:



3 A CHARGE COIL TYPE: BOLT (6 x 40 mm) (2)
1 A CHARGE COIL TYPE: BOLT (6 x 35 mm) (2)

12 V-15 W/12 V-25 W LAMP COIL TYPE:

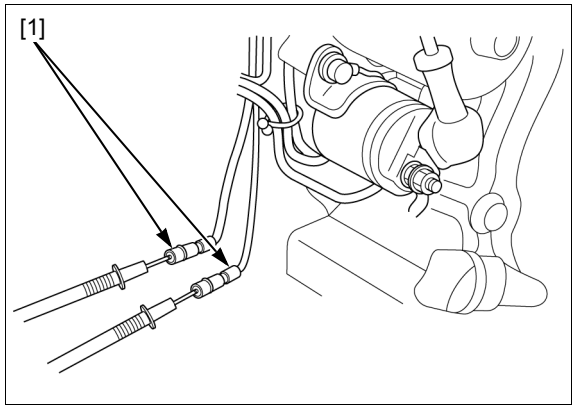


12 V-15 W LAMP COIL TYPE: BOLT (6 x 32 mm) (2)
12 V-25 W LAMP COIL TYPE: BOLT (6 x 40 mm) (2)

CHARGE/LAMP COIL INSPECTION

12 V-15 W/12 V-25 W LAMP COIL TYPE

Disconnect the lamp coil connectors [1].



Measure the resistance between the terminals of the charge/lamp coil.

Resistance:

lamp coil 12 V-15 W:	**1.04 – 1.56 Ω**
lamp coil 12 V-25 W:	**0.30 – 0.46 Ω**

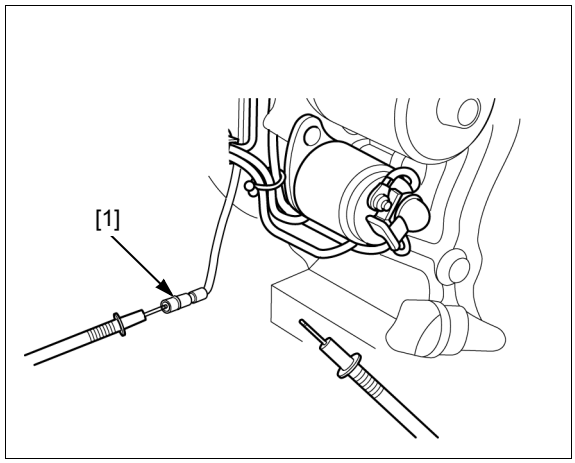
Check for continuity between each terminal and engine ground.

There should be no continuity.

- If the measured resistance is not within the range specification or if any wire has continuity to engine ground, replace the lamp coil (page 8-7).
- If the resistance is good and the flywheel is ok, replace the lamp coil and retest.

1 A/3 A CHARGE COIL/12 V-50 W LAMP COIL TYPE

Disconnect the charge/lamp coil connector [1].



Check for continuity between terminal and engine ground.

Resistance:

charge coil 1 A:	**3.00 – 4.00 Ω**
charge coil 3 A:	**0.62 – 0.93 Ω**
Lamp coil 12 V-50 W:	**0.29 – 0.44 Ω**

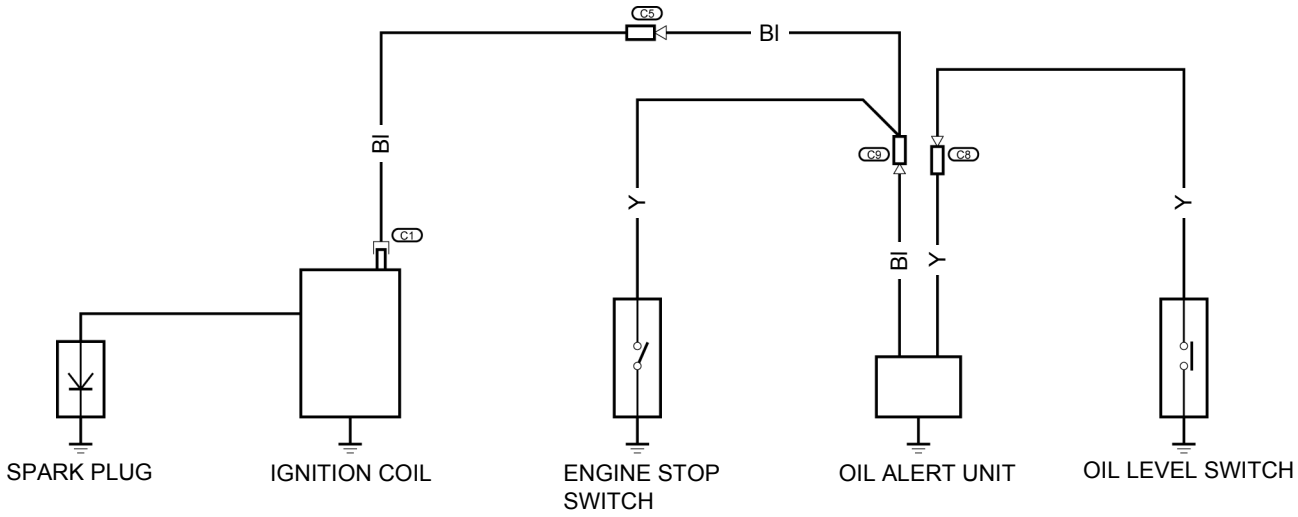
There should be no continuity.

If the resistance is good and the flywheel is ok, replace the charge/lamp coil and retest.

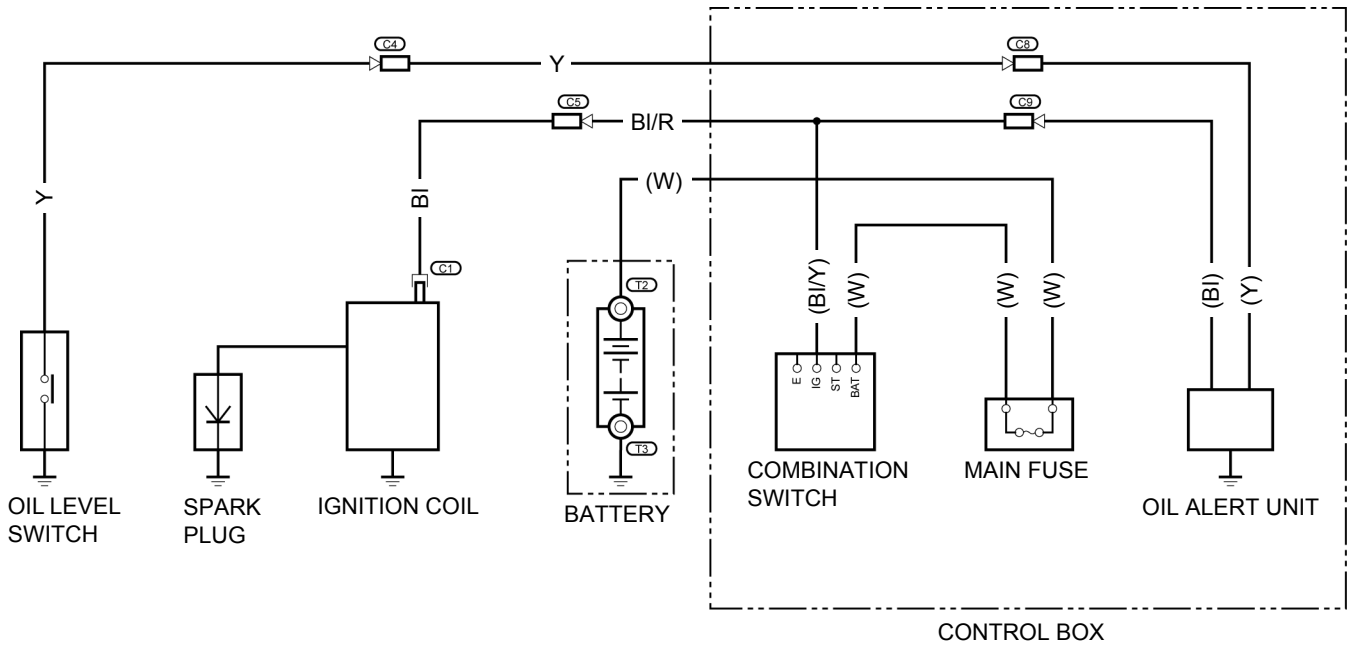
9. IGNITION SYSTEM

SYSTEM DIAGRAM

ENGINE STOP SWITCH TYPE:



CONTROL BOX TYPE:

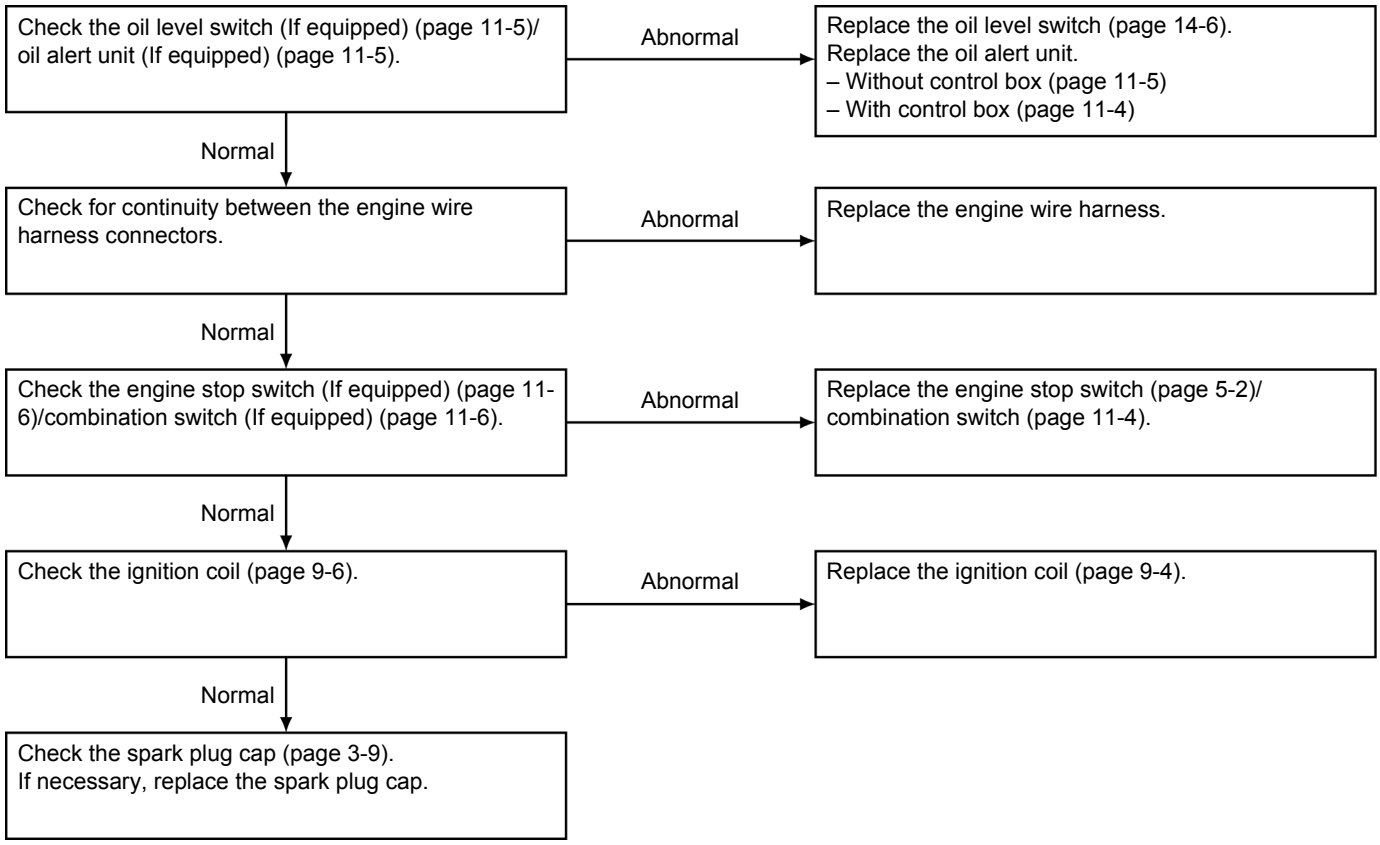


TROUBLESHOOTING

NO OR WEAK SPARK AT SPARK PLUG

Check the following before troubleshooting:

– Loose connectors
– Spark plug (page 3-9)
– Engine oil level (page 3-3)



IGNITION COIL REMOVAL/ INSTALLATION

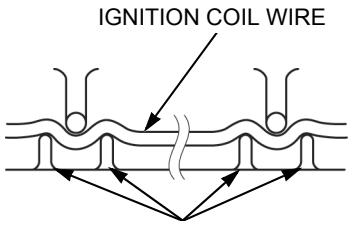
Remove the following parts:

- Air cleaner (page 6-4)
- Fuel tank (page 6-3)
- Fan cover (page 5-2)

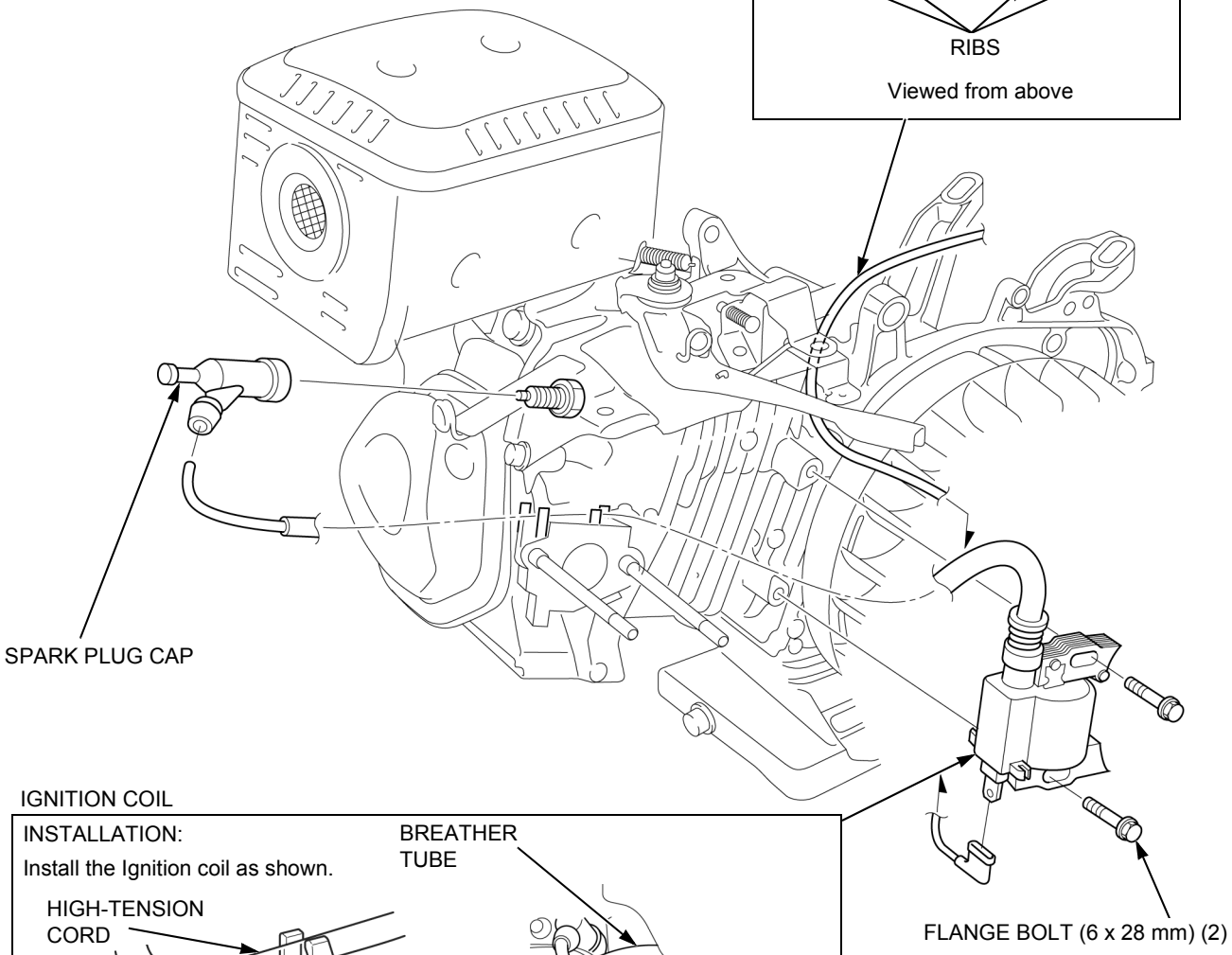
IGNITION COIL WIRE

INSTALLATION:

Clamp the ignition coil wire to the ribs of the cylinder barrel as shown.



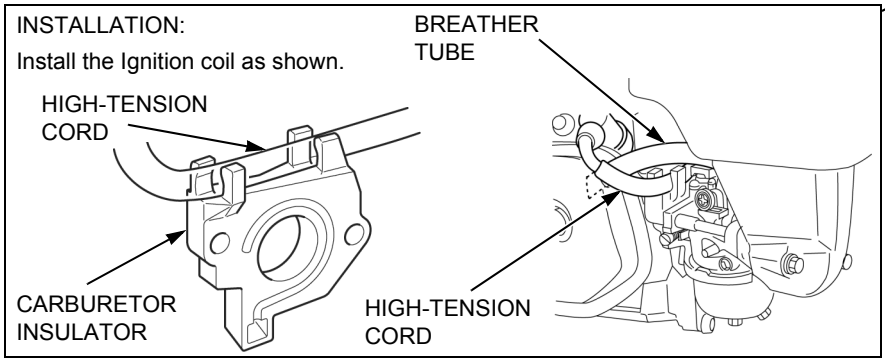
Viewed from above



IGNITION COIL

INSTALLATION:

Install the Ignition coil as shown.



IGNITION COIL AIR GAP CHECK/ ADJUSTMENT

Remove the fan cover (page 5-2).

Insert the feeler gauge [1] of proper thickness between the ignition coil [2] and the flywheel [3].

IGNITION COIL AIR GAP:
0.2 – 0.6 mm (0.01 – 0.02 in)

NOTICE

- *Avoid the magnet part of the flywheel when adjusting.*
- *Adjust the ignition coil air gap equally on both side.*

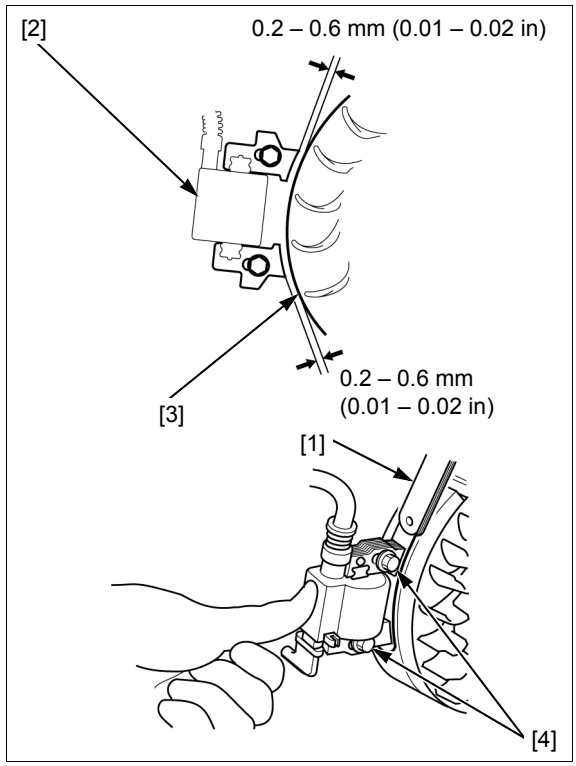
If measured clearance is out of specification, adjust the air gap.

Loosen the two bolts (6 x 25 mm) [4].

Insert the feeler gauge of proper thickness between the ignition coil and flywheel.

Push the ignition coil firmly against the flywheel and tighten the ignition coil bolts securely.

Remove the feeler gauge.



SPARK TEST

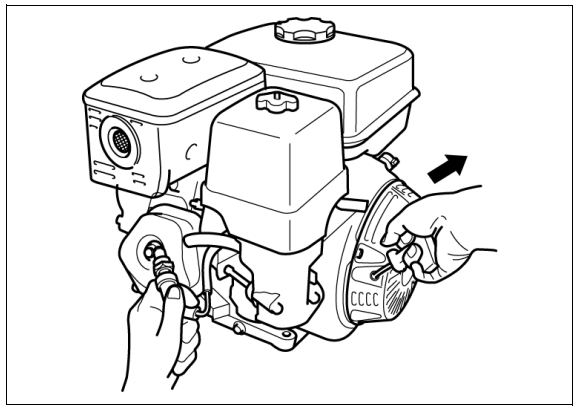
Inspect the following before spark test.

- Faulty spark plug
- Loose spark plug cap
- Water in the spark plug cap (Leaking the ignition coil secondary voltage)
- Loose ignition coil connector.

Disconnect the spark plug cap from the spark plug.

Connect a known-good spark plug to the spark plug cap and ground the spark plug to the cylinder head.

Crank the engine by pulling the recoil starter forcefully and check whether sparks jump across the electrode.

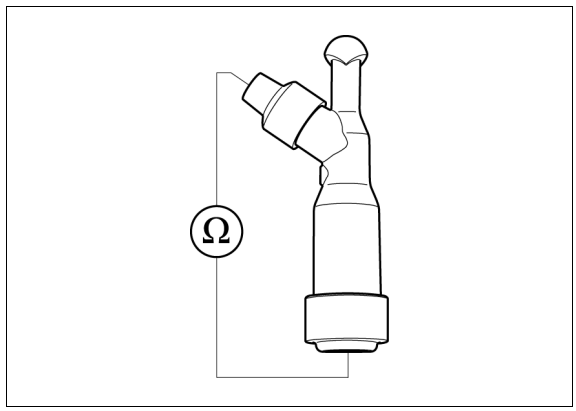


SPARK PLUG CAP INSPECTION

Measure the resistance of the spark plug cap [1] by attaching one ohmmeter probe to the terminal in the spark plug cap and the other to the high-tension cord terminal.

RESISTANCE: 7.5 – 12.5 kΩ (20°C/68°F)

If measured resistance is out of specification, replace the spark plug cap.



IGNITION COIL INSPECTION

Remove the fan cover (page 5-2).

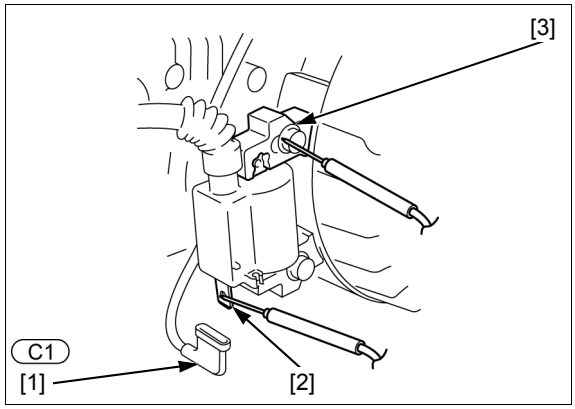
PRIMARY SIDE

Disconnect the ignition coil connector [1].

Measure the resistance of primary coil by attaching one ohmmeter probe to the ignition coil terminal [2] and the other at the iron core [3].

RESISTANCE: 0.4 – 0.7 Ω

If measured resistance is out of specification, replace the ignition coil.



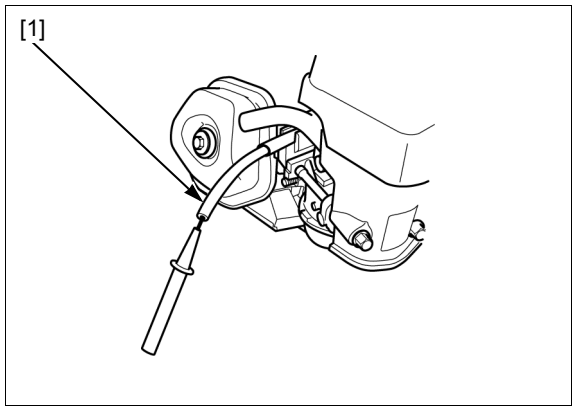
SECONDARY SIDE

Disconnect the spark plug cap from the high-tension cord [1].

Measure the resistance of secondary coil by attaching one ohmmeter probe to the high-tension cord and the other at the iron core.

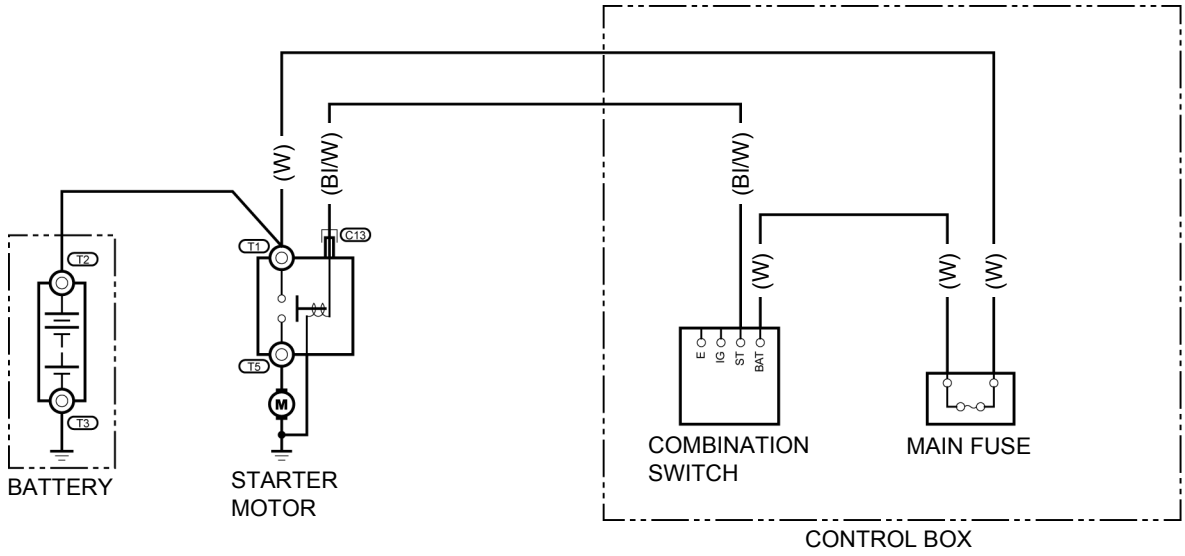
RESISTANCE: 8.9 – 13.5 kΩ

If measured resistance is out of specification, replace the ignition coil.



10. STARTING SYSTEM

SYSTEM DIAGRAM



TROUBLESHOOTING

STARTER MOTOR DOES NOT OPERATE

Check the battery condition.
- Abnormal → Replace with a known-good battery. If the battery runs down again, perform the CHARGING SYSTEM TROUBLESHOOTING (page 8-4).
- Normal ↓

Check the fuse (page 11-7).
- Abnormal → Replace the fuse (page 11-4).
- Normal ↓

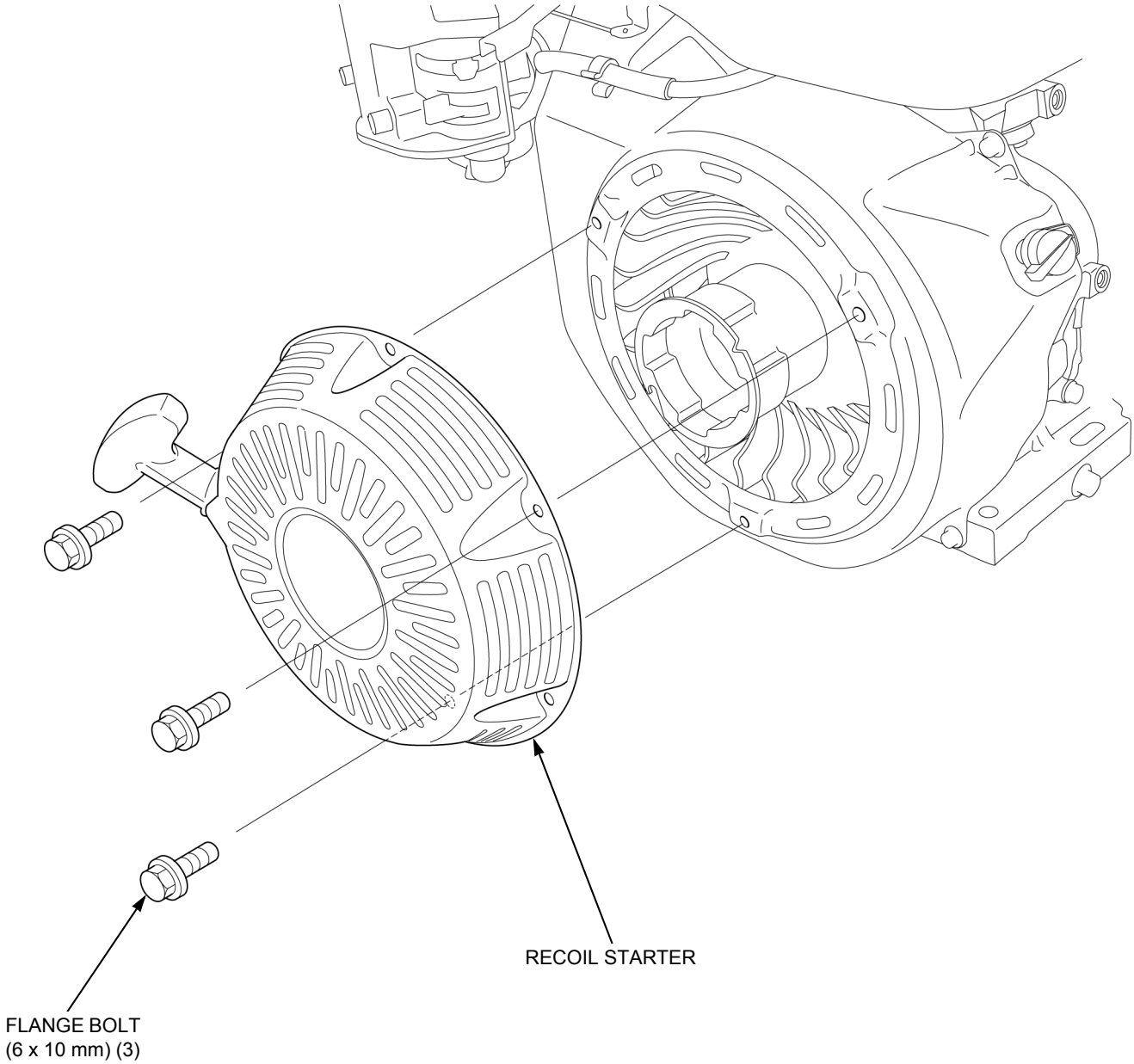
Check the combination switch (page 11-6).
- Abnormal → Replace the combination switch (page 11-4).
- Normal ↓

Check the starter solenoid (page 10-12).
- Abnormal → Replace the starter solenoid (page 10-10, 10-11).
- Normal ↓

Check the wire harness.
- Abnormal → Replace the wire harness.
- Normal ↓

Disassemble the starter motor (page 10-10, 10-11) and check the each parts (page 10-12).

RECOIL STARTER REMOVAL/ INSTALLATION



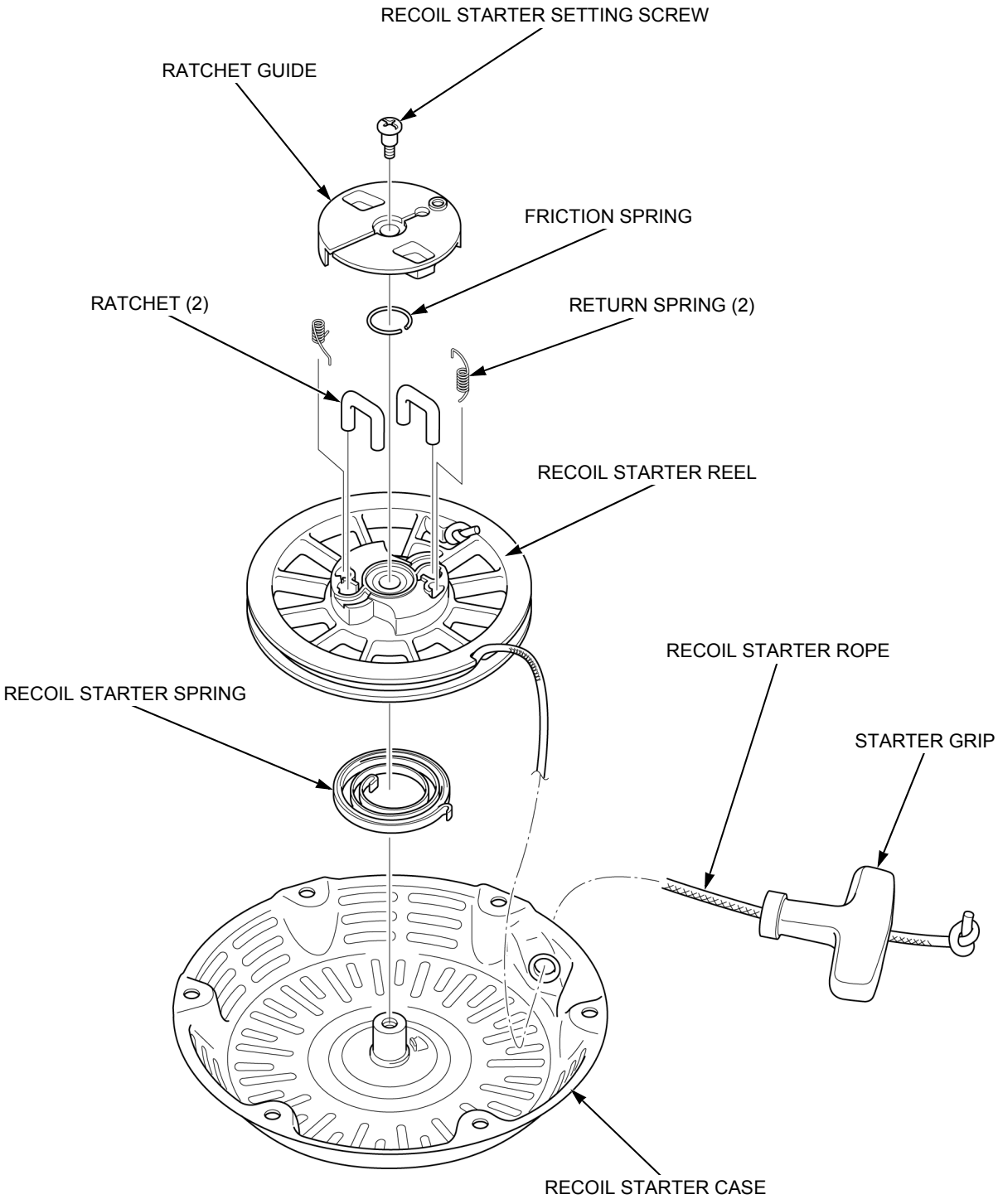
RECOIL STARTER Assy. DISASSEMBLY/ASSEMBLY

⚠ CAUTION

- Wear gloves and eye protection.
- During disassembly/assembly, take care not to allow the spring to come out.

DISASSEMBLY

Remove the recoil starter Assy. (page 10-3).

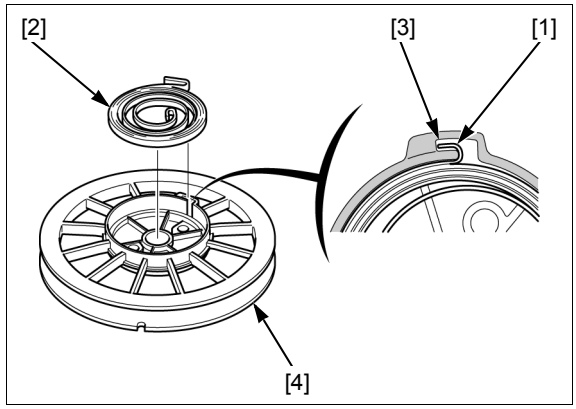


ASSEMBLY

⚠ CAUTION

- Wear gloves and eye protection.
- During reassembly, take care not to allow the spring to come out.

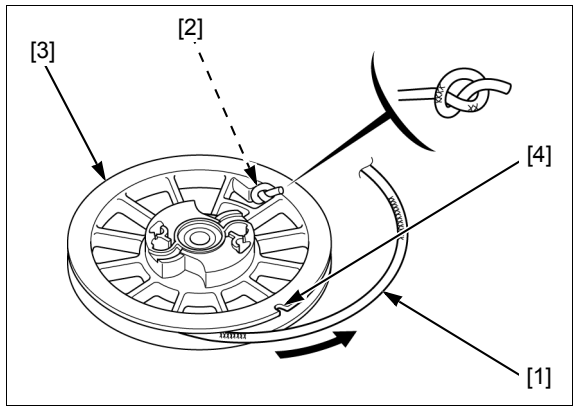
Hook the outer hook [1] of the recoil starter spring [2] to the groove [3] in the recoil starter reel [4], and install the spring by winding it.



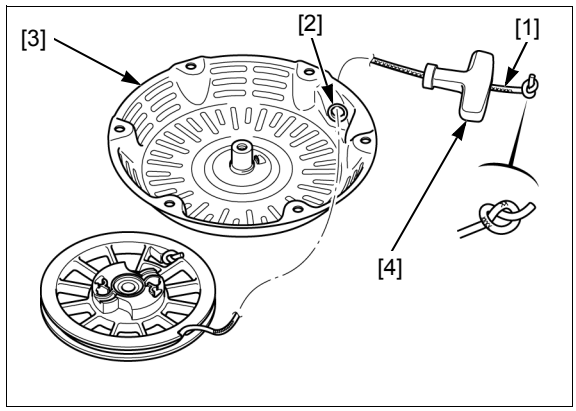
Check the recoil starter rope [1] and replace it if it is frayed or worn.

Pass the rope through the hole [2] in the reel [3] and then tie the rope as shown.

Wind the rope onto the reel 1-3/4 turns counterclockwise as shown and hook it to the notch [4] in the reel.

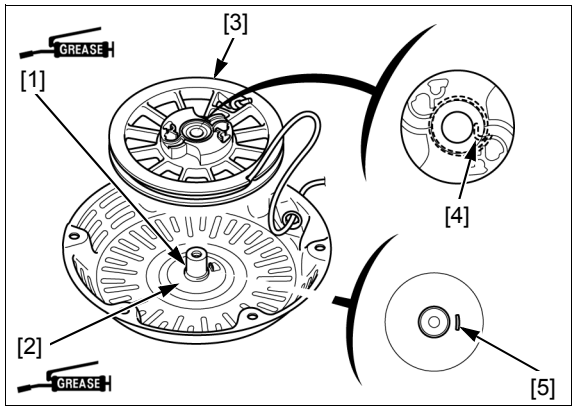


Pass the rope [1] through hole [2] of the recoil starter case [3] and starter grip [4] and then tie the rope as shown.



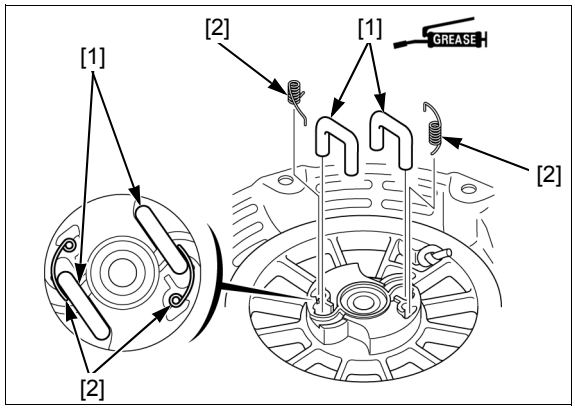
Apply 1 – 2 g (0.04 – 0.07 oz) of grease to the shaft [1] of the case, and 1 – 2 g (0.04 – 0.07 oz) to the reel sliding surface [2]

Install the reel [3] into the case by aligning the inner hook [4] of the spring with the boss [5] of the case as shown.

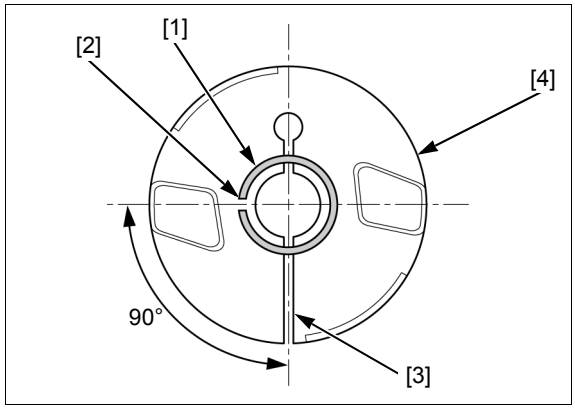


Apply grease to the sliding surface of the ratchets [1].

Install the return springs [2] and ratchets into the reel as shown.



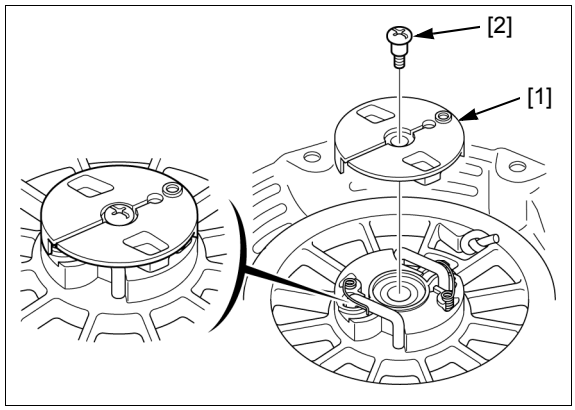
Install the friction spring [1] so that the end gap [2] is positioned 90° from the cutout [3] in the ratchet guide [4].



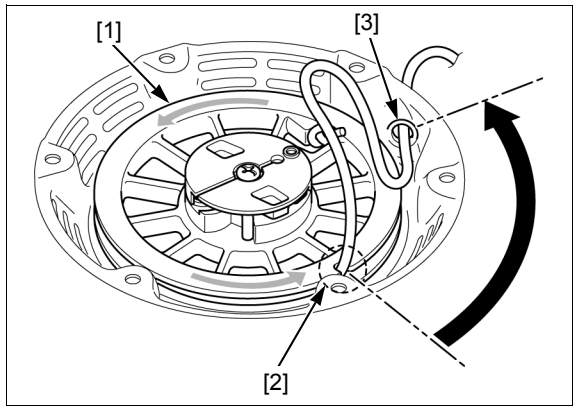
Install the ratchet guide [1] onto the reel.

Install the setting screw [2] and tighten it to the specified torque while holding the ratchet guide.

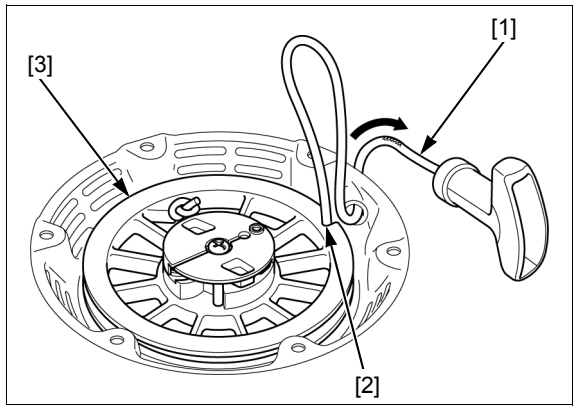
TORQUE: 5.4 N·m (0.6 kgf·m, 4.0 lbf·ft)



With the slack in the rope, turn the recoil starter reel [1] counterclockwise until the notch [2] align with the hole [3], then further turn it 3 turns to preload the recoil starter spring.



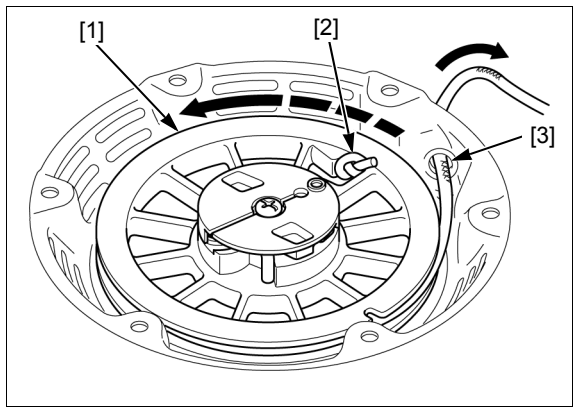
Remove the slack by pulling the rope [1], unhook it from the notch [2], and release the rope to wind in the reel [3].



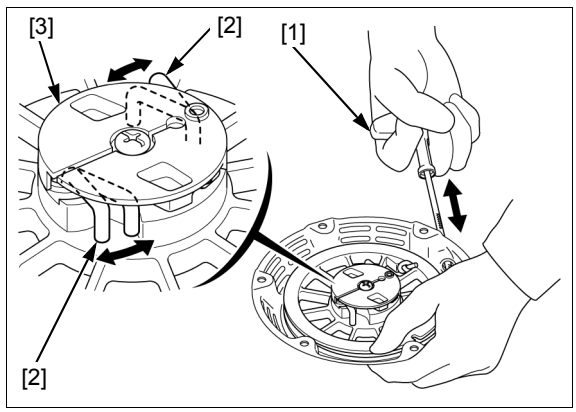
Pull the rope out of the reel [1] completely and check that the knot [2] of the rope comes to the hole [3] in the case.

If the reel can be further turned from this position, the assembly is normal.

If the knot does not come to the hole, the recoil starter spring is excessively preloaded.



Pull the starter grip [1] several times to inspect that the ratchets [2] are operated properly (the ratchet ends come out from the ratchet guide [3]).

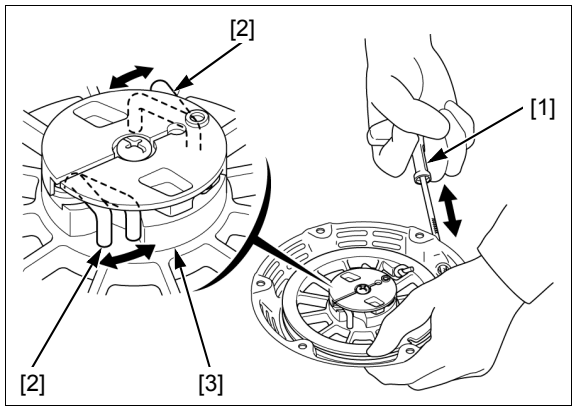


RECOIL STARTER INSPECTION

RECOIL STARTER OPERATION

Remove the recoil starter Assy. (page 10-3).

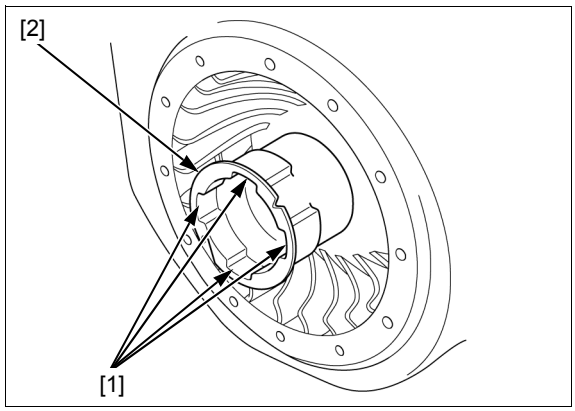
Pull the starter grip [1] several times to inspect that the ratchets [2] are operated properly (the ratchet ends come out from the ratchet guide [3]).



STARTER PULLEY

Remove the recoil starter Assy. (page 10-3).

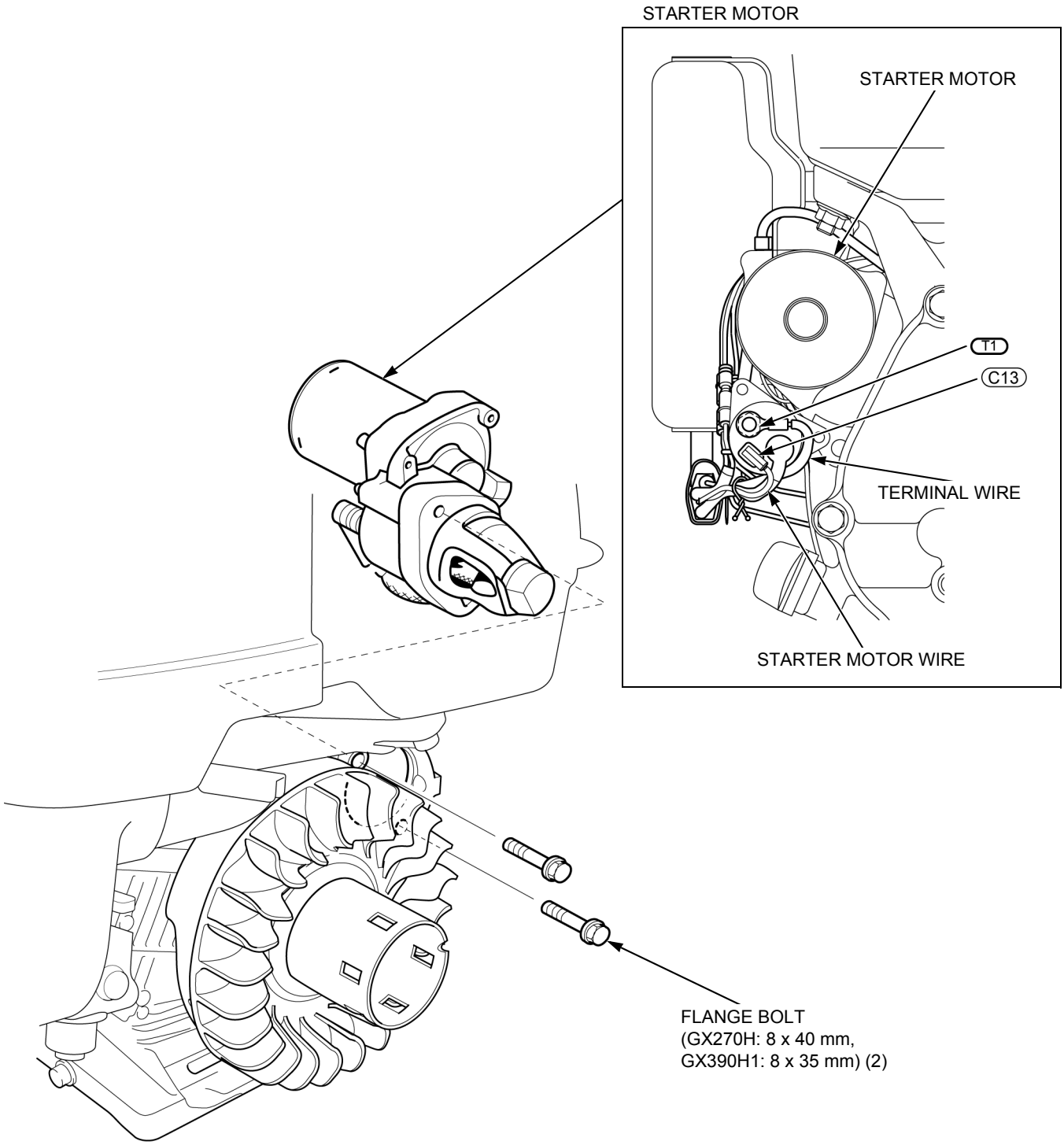
Inspect the square dogs [1] of the starter pulley [2] for deformation.



STARTER MOTOR REMOVAL/ INSTALLATION

Disconnect the starter motor wires from the starter motor.

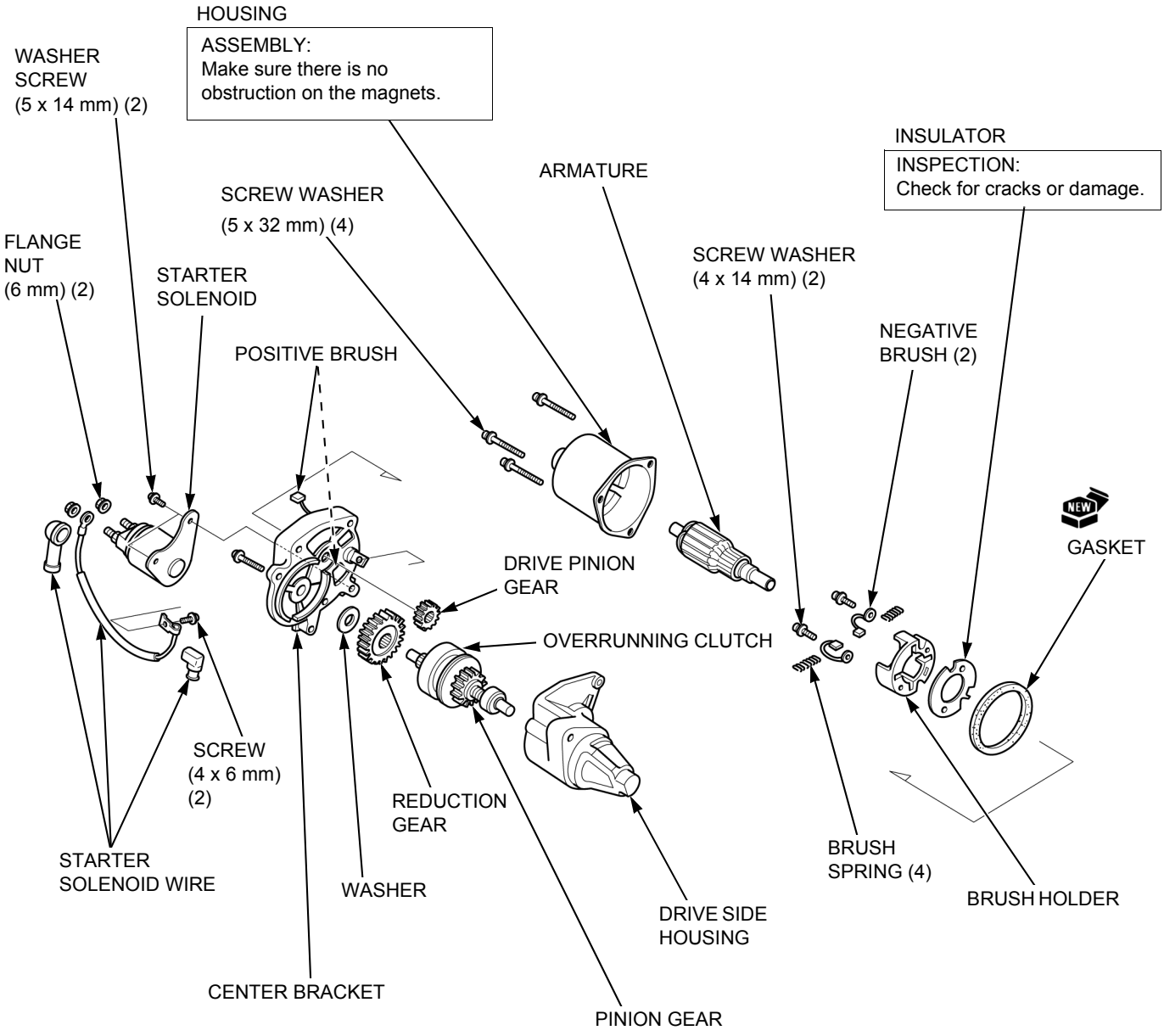
Remove the fan cover (page 5-2).



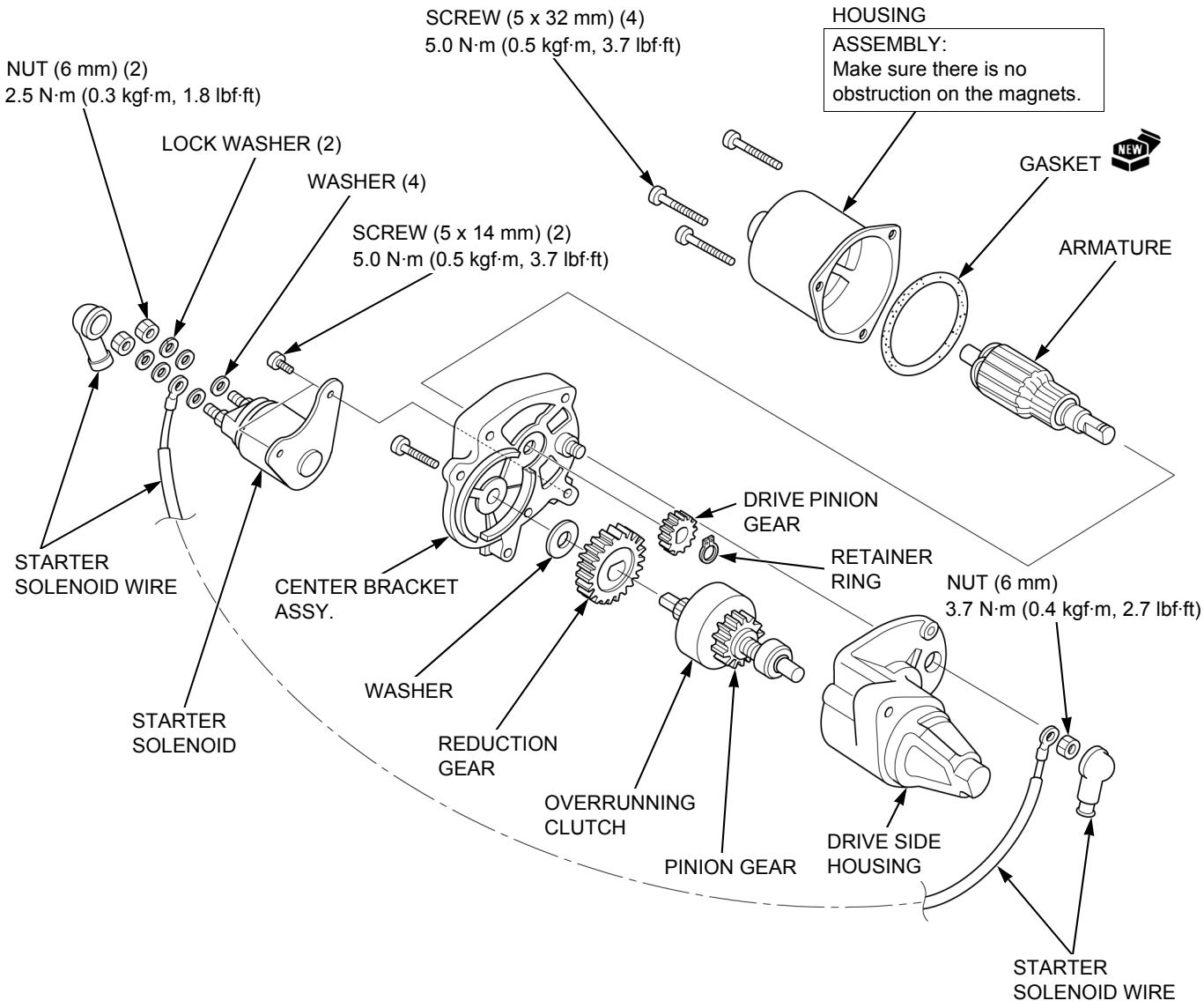
STARTER MOTOR DISASSEMBLY/ ASSEMBLY

Remove the starter motor (page 10-9).

GX270H:



GX390H1:

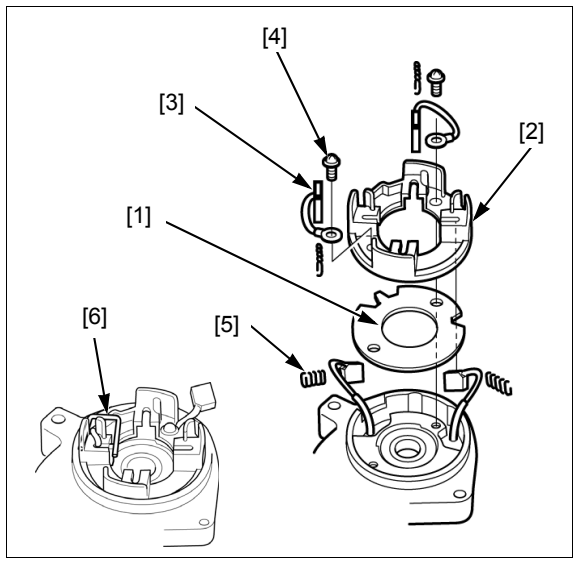


BRUSH HOLDER INSTALLATION (GX270H ONLY)

Note the installation direction.

Install the insulator [1], brush holder [2], negative brush terminals [3], and two 4 x 14 mm screws [4] to the center bracket as shown.

Install the brush springs [5] and brushes, and push the brushes in the holders with a suitable wire [6] so that they do not interfere with the commutator.



STARTER MOTOR INSPECTION

PERFORMANCE TEST

Measure starter performance while cranking the engine.

STARTER MOTOR PERFORMANCE:
UNDER LOAD:
CRANKING VOLTAGE: 9.9 V
CRANKING CURRENT: 103 A
ENGINE CRANKING SPEED: 2,300 min^{-1} (rpm) min.
NO LOAD:
CRANKING VOLTAGE: 11.5 V
CRANKING CURRENT: 31 A max.

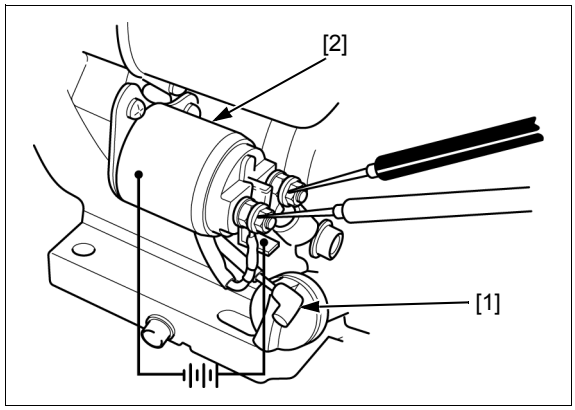
- To get accurate results, the test must be conducted in the normal ambient temperature.
- Battery: 55B24 (12 V 36 AH/5 HR)
- Battery cable: 15 sq. x 1.5 m (4.9 ft.) each for battery positive cable and battery negative cable.

If the measurement is out of specification, disassemble and inspect the starter motor.

STARTER SOLENOID

Remove the starter solenoid wire [1] from the starter solenoid [2].

Connect the positive (+) lead of a 12 V battery to the solenoid terminal and the negative (–) lead to the solenoid body. Measure the resistance between the battery and starter motor terminals as shown. Continuity should exist when the battery is connected and not exist when the battery is disconnected.



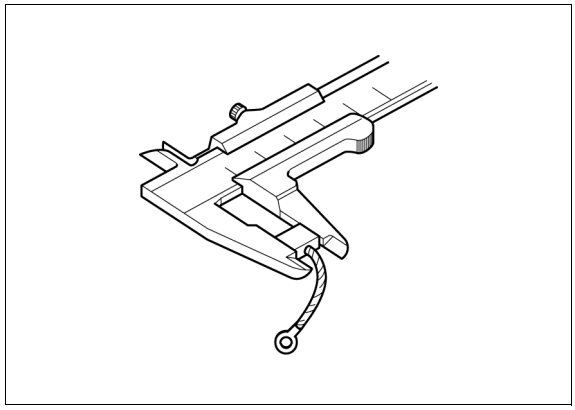
BRUSH LENGTH

Measure the brush length.

If the negative brush length is less than the service limit, replace the brush and brush holder.

If the positive brush length is less than the service limit, replace the center bracket and brush holder.

STANDARD:
GX270H: 7.0 mm (0.28 in)
GX390H1: 10.5 mm (0.41 in)
SERVICE LIMIT:
GX270H: 3.5 mm (0.14 in)
GX390H1: 4.0 mm (0.16 in)



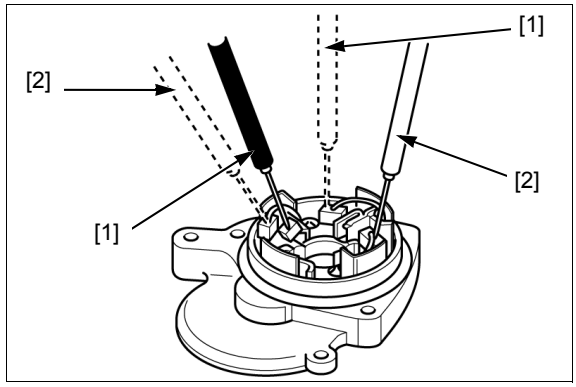
BRUSH CONTINUITY CHECK

Check for continuity between the positive (+) brushes [1] and negative (–) brushes [2].

There should be continuity between both the positive brushes.
There should be continuity between both the negative brushes.
There should be no continuity from either positive brush to either negative brush.

If the correct continuity of the positive (+) brushes is not obtained, replace the center bracket (page 10-10).

If the correct continuity of the negative (–) brushes is not obtain, replace the negative (–) brushes.



ARMATURE

Visually inspect the commutator [1] surface for dust, rust, or other damage.

If necessary, wipe it with a clean lint-free cloth.

If rusted or damaged, dress with a fine emery cloth.

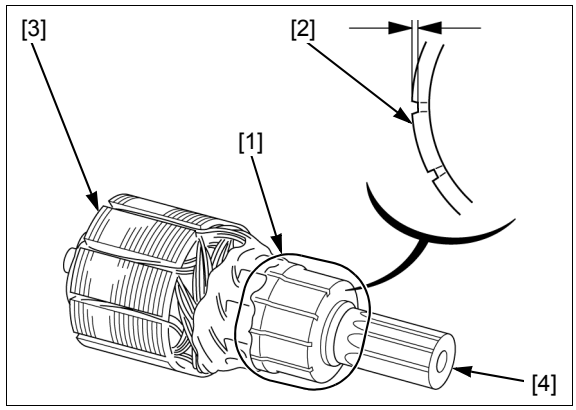
Measure the mica depth.

STANDARD: 1.0 mm (0.04 in)
SERVICE LIMIT: 0.2 mm (0.01 in)

If the mica depth is less than the service limit, replace the armature.

Check the continuity as follows:

– There should be continuity between each segment [2].
– There should be no continuity between each segment and armature core [3].
– There should be no continuity between each segment and armature shaft [4].



OVERRUNNING CLUTCH

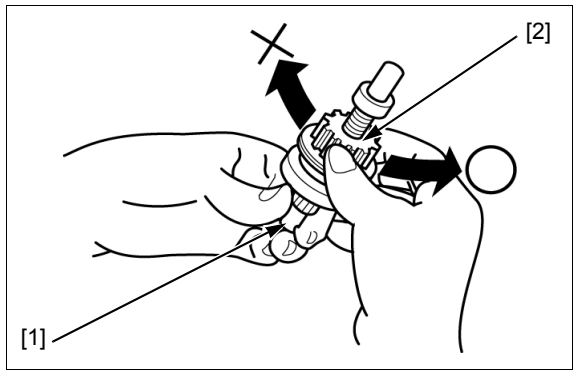
Check the pinion gear shaft [1] for smooth axial movement.

Apply oil or replace the overrunning clutch if necessary.

Check the pinion gear [2] operation by holding the pinion gear shaft and turning the pinion gear. The pinion gear should turn counterclockwise freely and should not turn clockwise.

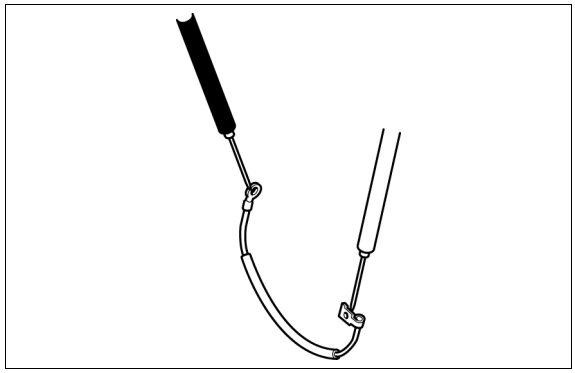
Check the pinion gear for wear or damage, and replace the overrunning clutch if necessary.

If the pinion gear is worn or damaged, the flywheel ring gear must be inspected.



STARTER SOLENOID WIRE

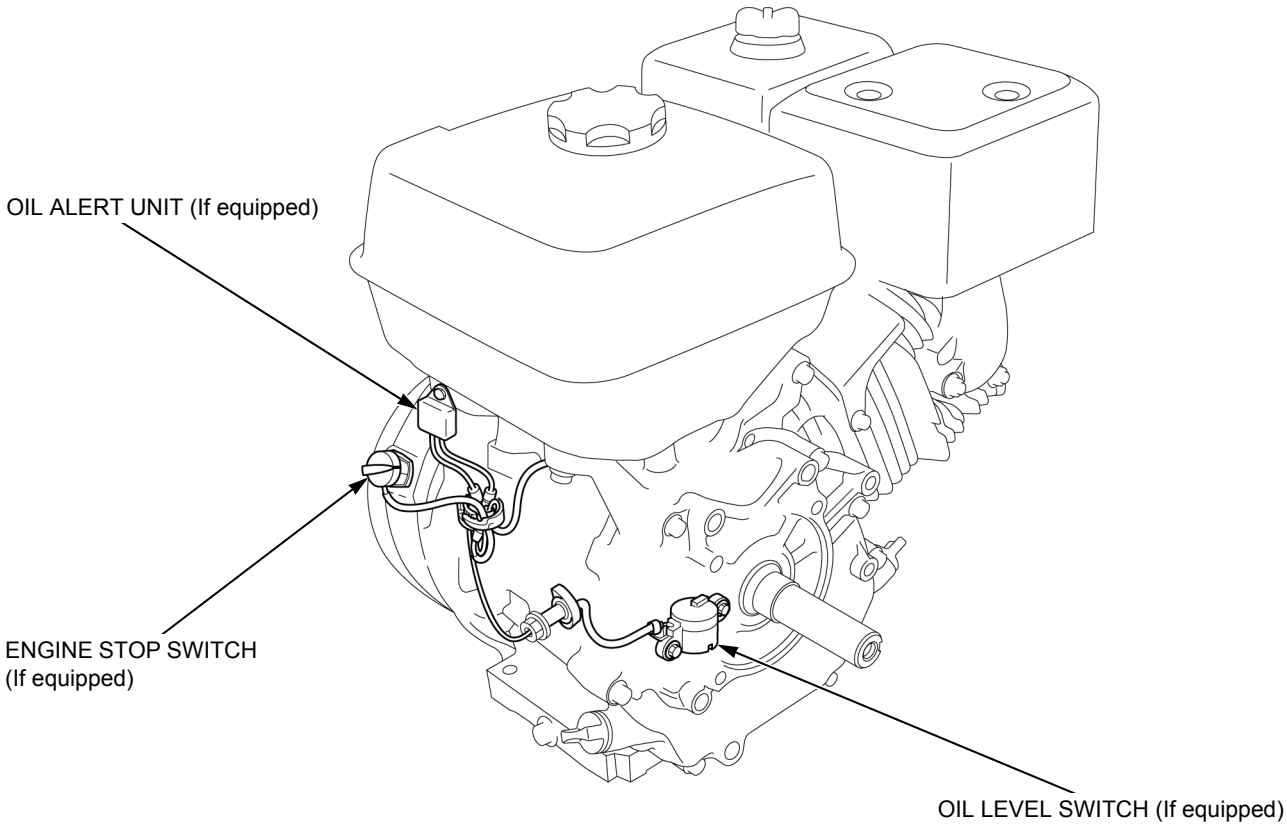
Check the starter solenoid wire for continuity.



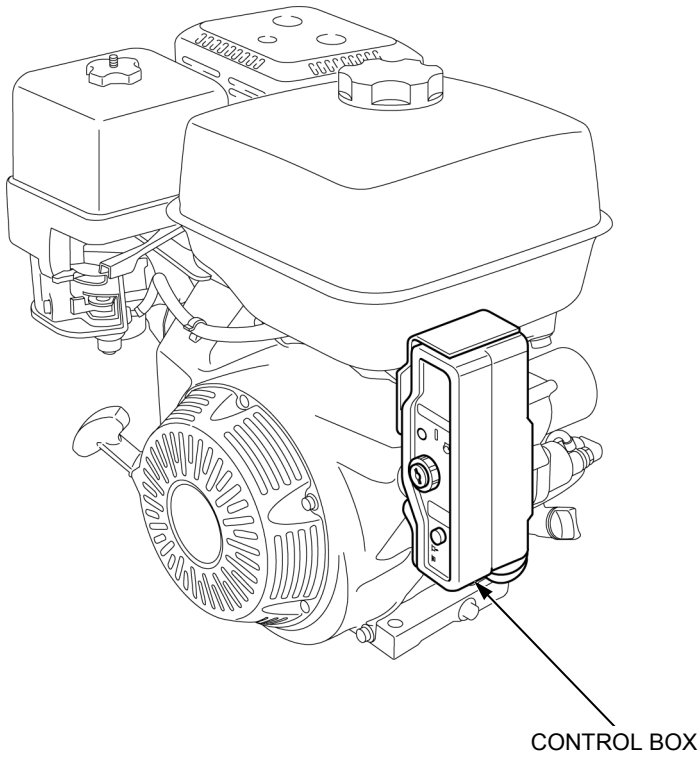
11. OTHER ELECTRICAL

COMPONENT LOCATION

WITHOUT CONTROL BOX:



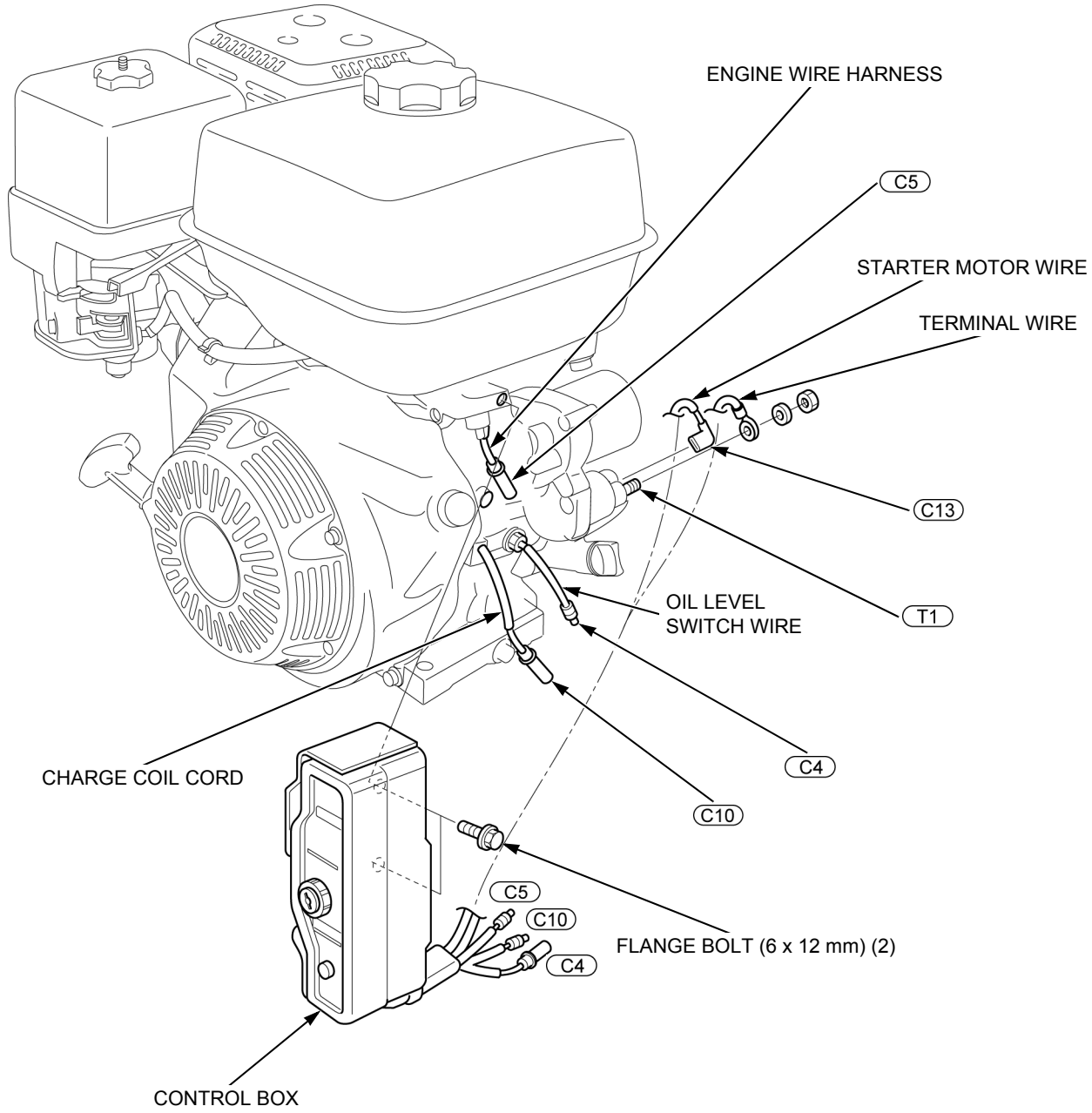
WITH CONTROL BOX:



CONTROL BOX REMOVAL/ INSTALLATION

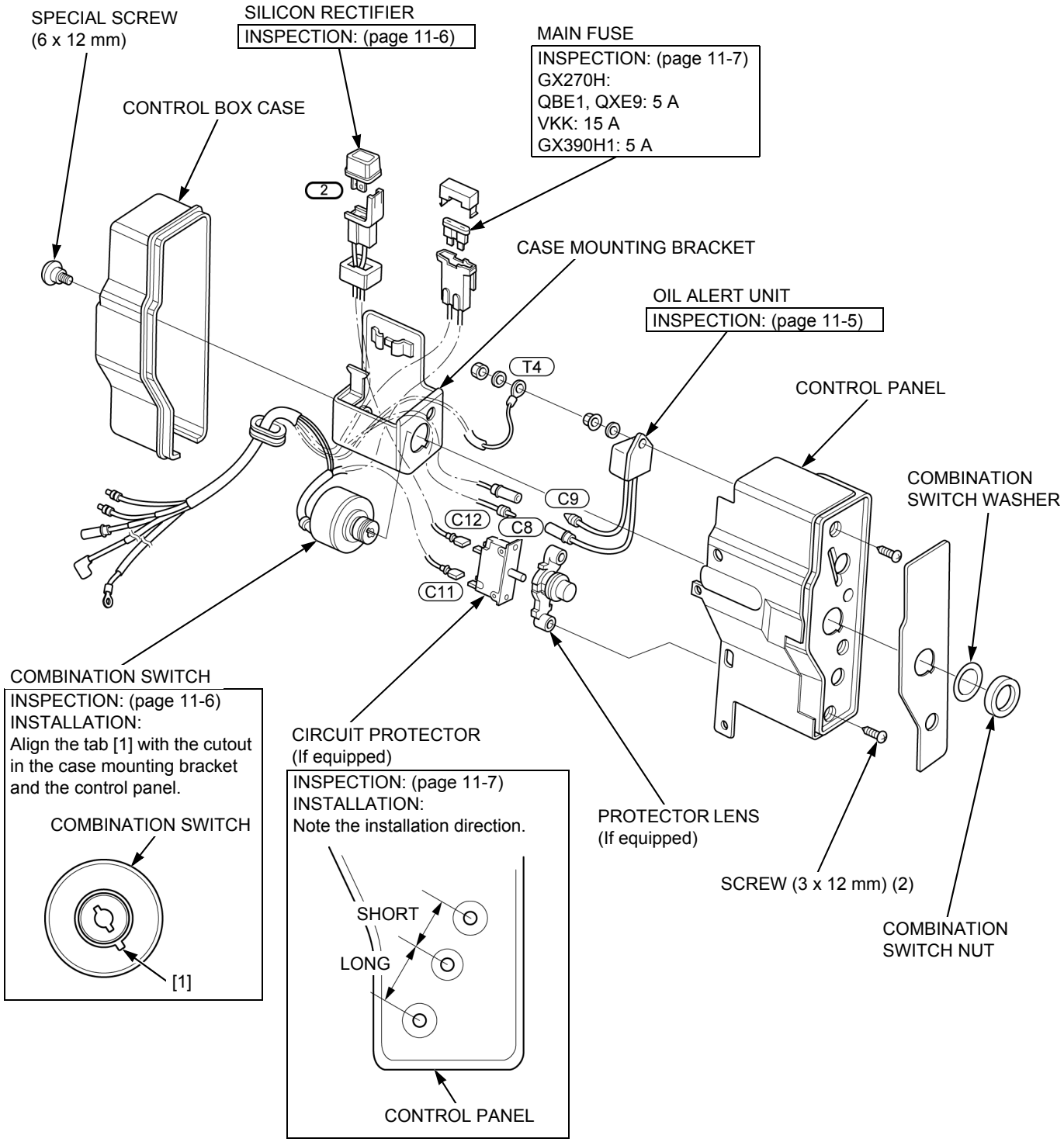
Disconnect the control box wires.

When installing, refer to the HARNESS AND TUBE ROUTING (with circuit protector) (page 2-10).



CONTROL BOX DISASSEMBLY/ ASSEMBLY

Remove the control box (page 11-3).



OIL ALERT UNIT REMOVAL/ INSTALLATION

With control box: Disassemble the control box (page 11-4).

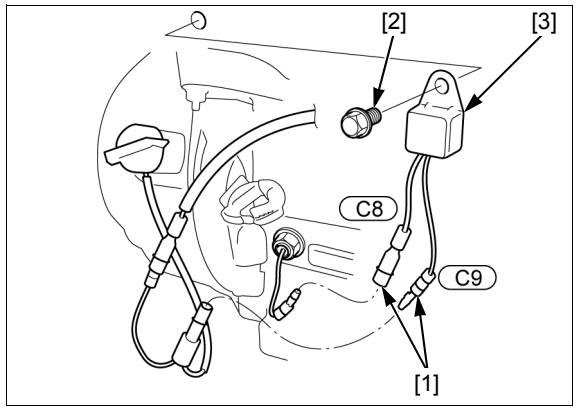
Without control box: Disconnect the oil alert unit connectors [1].

Remove the bolt (6 x 12 mm) [2] and oil alert unit [3].

Installation is in the reverse order of removal.

NOTE:

- Route the wire harness properly (page 2-10).



OIL ALERT UNIT INSPECTION

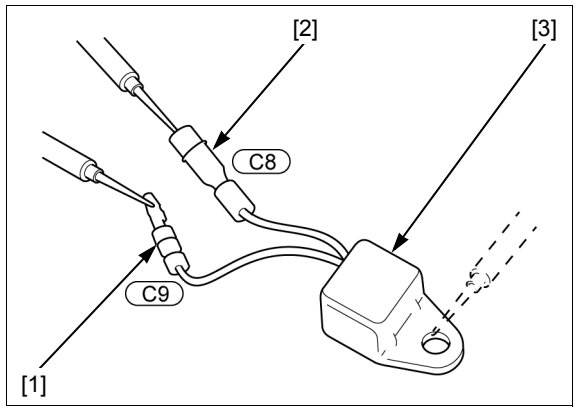
Remove the oil alert unit.

– Without control box (page 11-5)
– With control box (page 11-4)

Check the continuity between the terminals, and oil alert unit body.

Unit: kΩ

		(+)		
		Bl [1]	Y [2]	Body [3]
(–)	Bl [1]	–	0.5 – 10	∞
	Y [2]	0.5 – 10	–	∞
	Body [3]	∞	∞	–



OIL LEVEL SWITCH INSPECTION

Check the oil level (page 3-3).

Without control box: Disconnect the oil alert unit connector [1].

With control box: Disconnect the oil level switch connector [1].

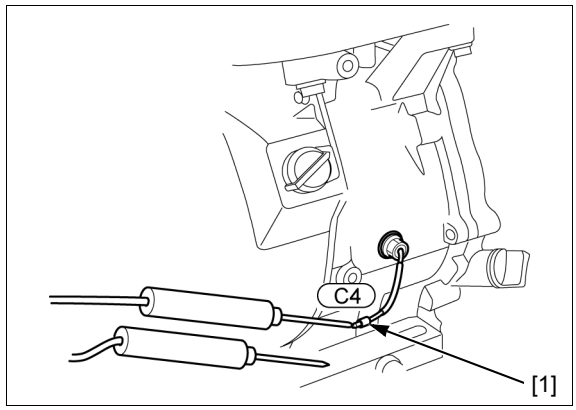
Check the continuity between the switch terminal and engine ground.
There should be no continuity when the engine is full of oil.

Drain the engine oil completely (page 3-3).

Check the continuity between the switch terminal and engine ground.
There should be continuity.

Check the continuity between the switch terminals while filling the engine with oil.
The ohmmeter reading should go from continuity to no continuity as the oil is filled.

If the correct continuity is not obtained, replace the oil level switch (page 14-6).



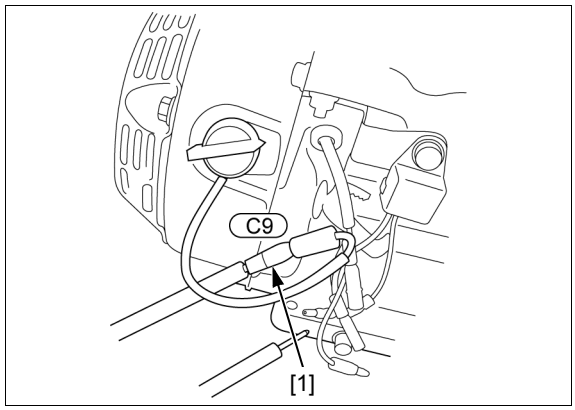
ENGINE STOP SWITCH INSPECTION

Remove the engine wire harness connector [1].

Check the continuity between the terminals at each switch position.

Switch position	Continuity
ON	No
OFF	Yes

If the correct continuity is not obtained, replace the engine stop switch (page 5-2).



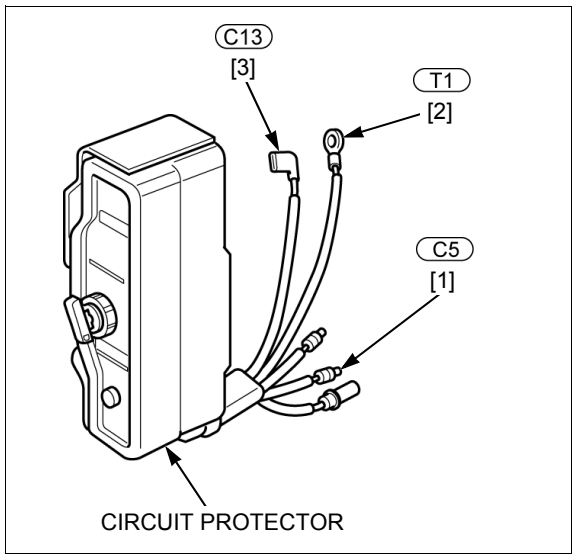
COMBINATION SWITCH INSPECTION

Disconnect the combination switch connectors.

Check the continuity between the terminals at each switch position.

	Bl/R [1]	Ground	W [2]	Bl/W [3]
OFF	○	○		
ON				
START			○	○

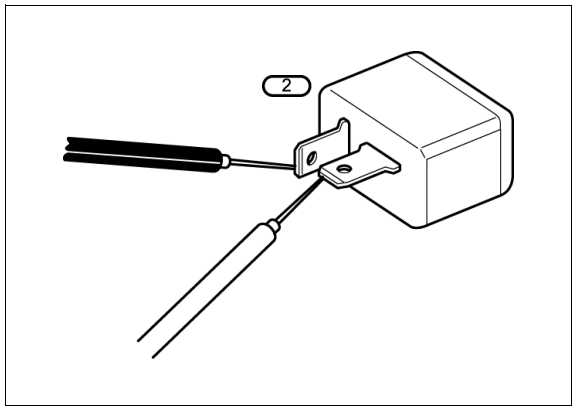
If the correct continuity is not obtained, replace the combination switch (page 11-4).



SILICON RECTIFIER INSPECTION

Remove the silicon rectifier (page 11-4).

Check continuity between the terminals. There should be continuity in one direction only. Replace the rectifier if there is continuity in both directions or in neither direction.



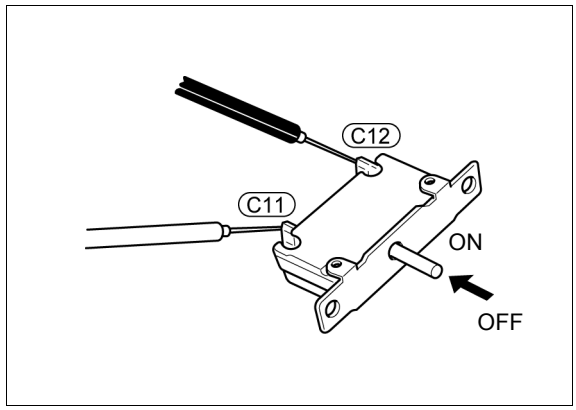
CIRCUIT PROTECTOR INSPECTION

Remove the circuit protector (page 11-4).

Check the continuity between the terminals.

Switch position	Continuity
ON	Yes
OFF	No

If the correct continuity is not obtained, replace the circuit protector.



FUSE INSPECTION

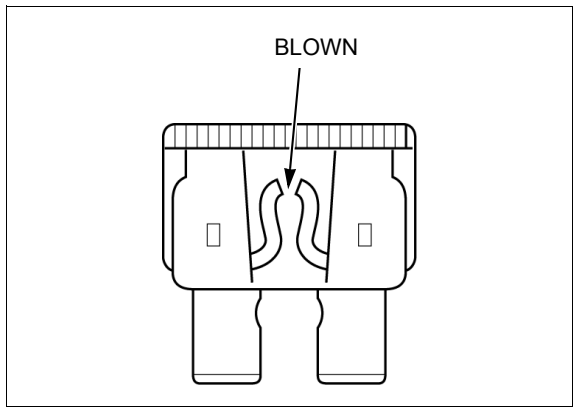
Remove the main fuse (page 11-4).

Visually inspect the fuse to see if it is blown.

Check continuity across the two blades.

Replace the fuse if it is blown or there is no continuity across the blades.

MAIN FUSE:
GX270H:
QBE1, QXE9: 5 A
VKK: 15 A
GX390H1: 5 A



MEMO

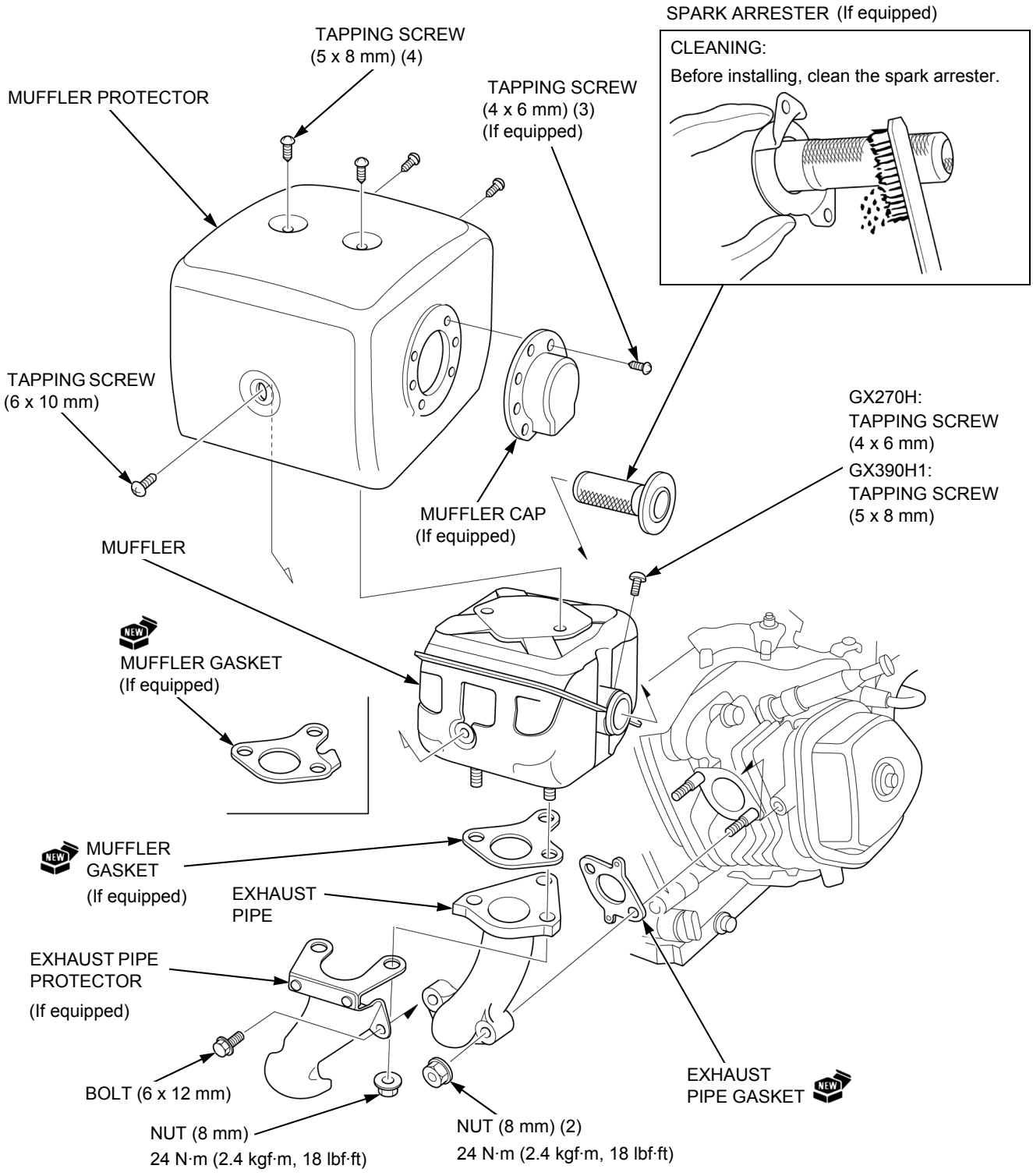
12. MUFFLER

MUFFLER REMOVAL/INSTALLATION

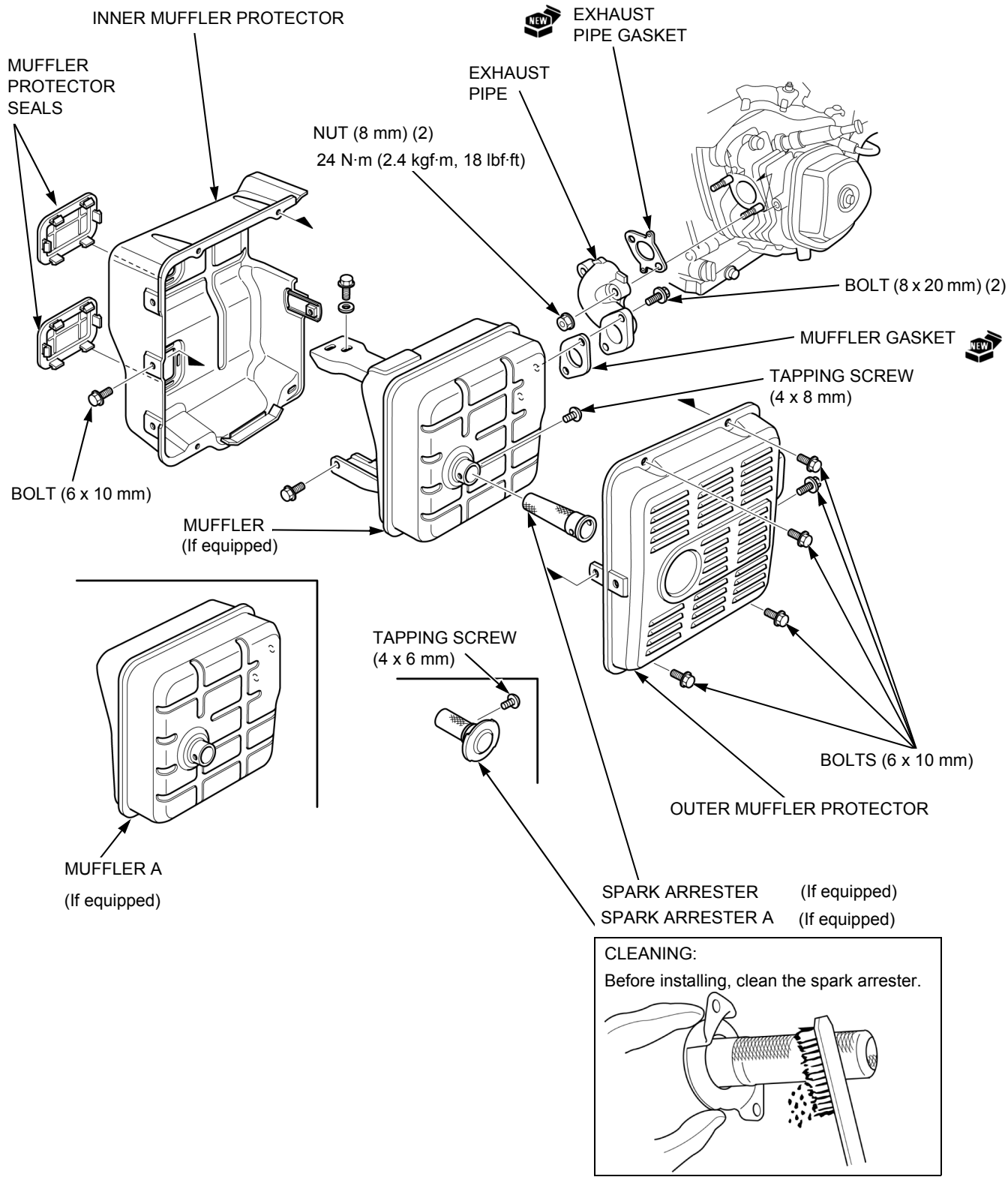
⚠CAUTION

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.

SOLID PROTECTOR TYPE



INNER/OUTER PROTECTOR TYPE

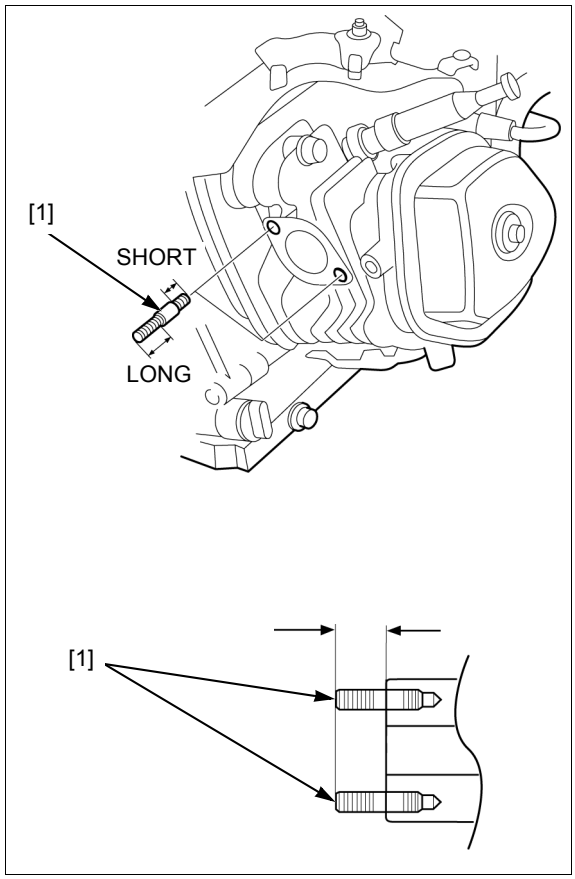


EXHAUST PIPE STUD BOLT REPLACEMENT

Thread two nuts onto the exhaust pipe stud bolt [1] and tighten them together, then use a wrench to turn the stud bolt out.

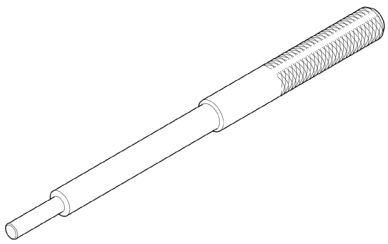
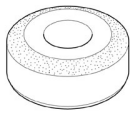
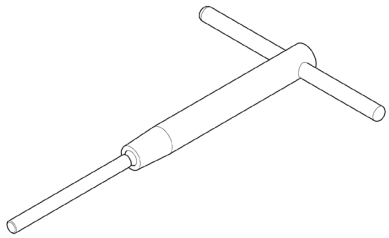
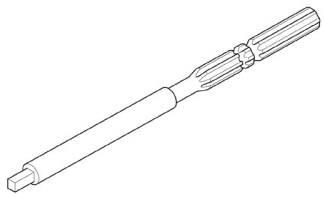
Install new stud bolts.

SPECIFIED LENGTH:
8 x 32 mm: 16 mm (0.63 in)



13. CYLINDER HEAD/VALVES

TOOLS

Valve guide driver, 6.45 x 11 mm 07742-0010200 	Seat cutter, 29 mm (45° IN) 07780-0010300 	Seat cutter, 27.5 mm (45° EX) 07780-0010200 
Seat cutter, 35 mm (45° IN) 07780-0010400 	Seat cutter, 33 mm (45° EX) 07780-0012900 	Flat cutter, 30 mm (32° IN) 07780-0012200 
Flat cutter, 28. mm (32° EX) 07780-0012100 	Flat cutter, 35 mm (32° IN) 07780-0012300 	Flat cutter, 33 mm (32° EX) 07780-0010800 
Interior cutter, 37.5 mm (60° IN/EX) 07780-0014100 	Cutter holder, 6.6 mm 07781-0010202 	Valve guide reamer, 6.612 mm 07984-ZE20001 

CYLINDER HEAD REMOVAL/ INSTALLATION

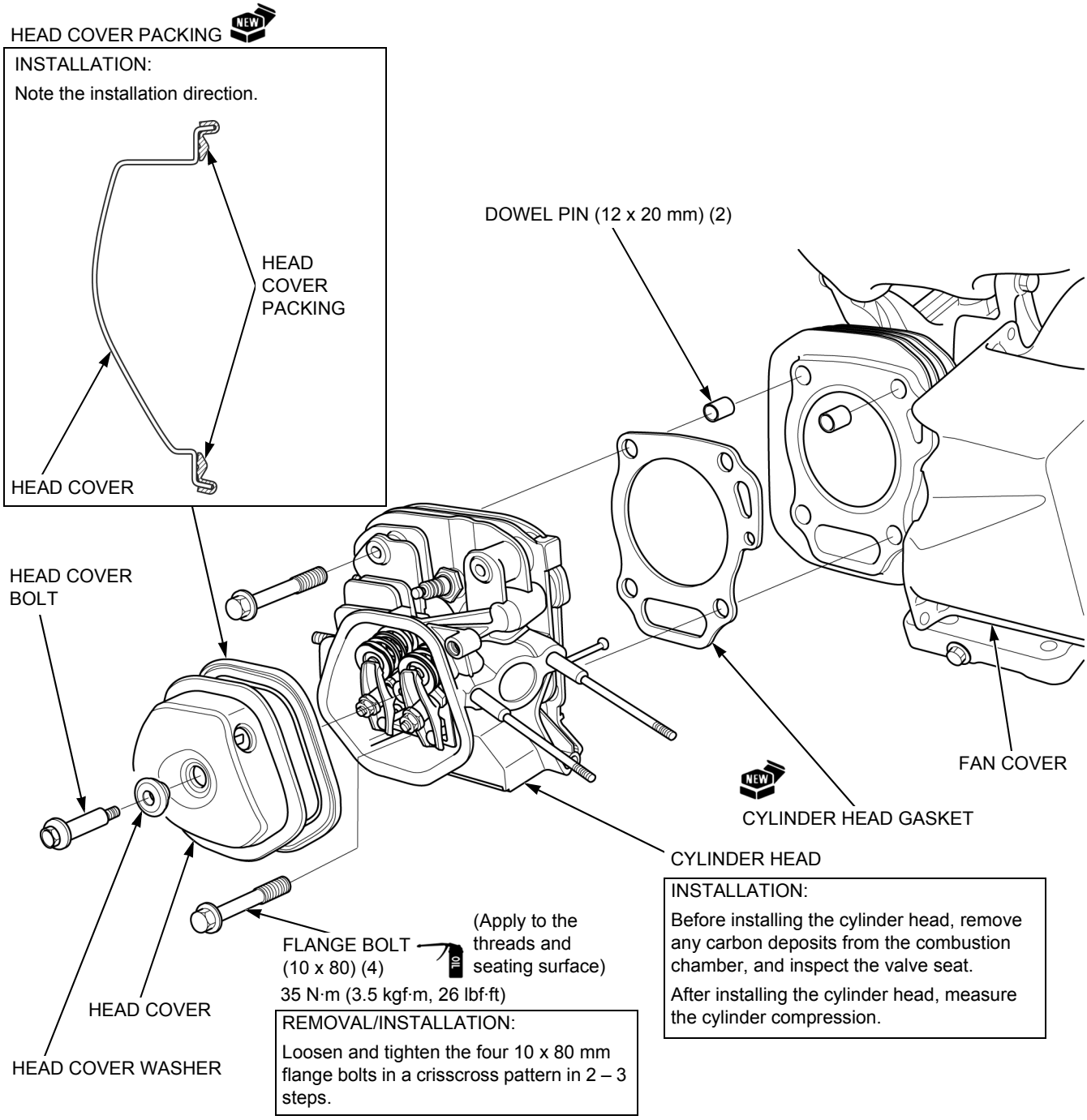
Set the piston at top dead center of the cylinder compression stroke (page 3-13).

Remove the following parts:

– Air cleaner (page 6-4)
– Carburetor (page 6-9)
– Control base assy (page 7-2)
– Muffler (page 12-2)

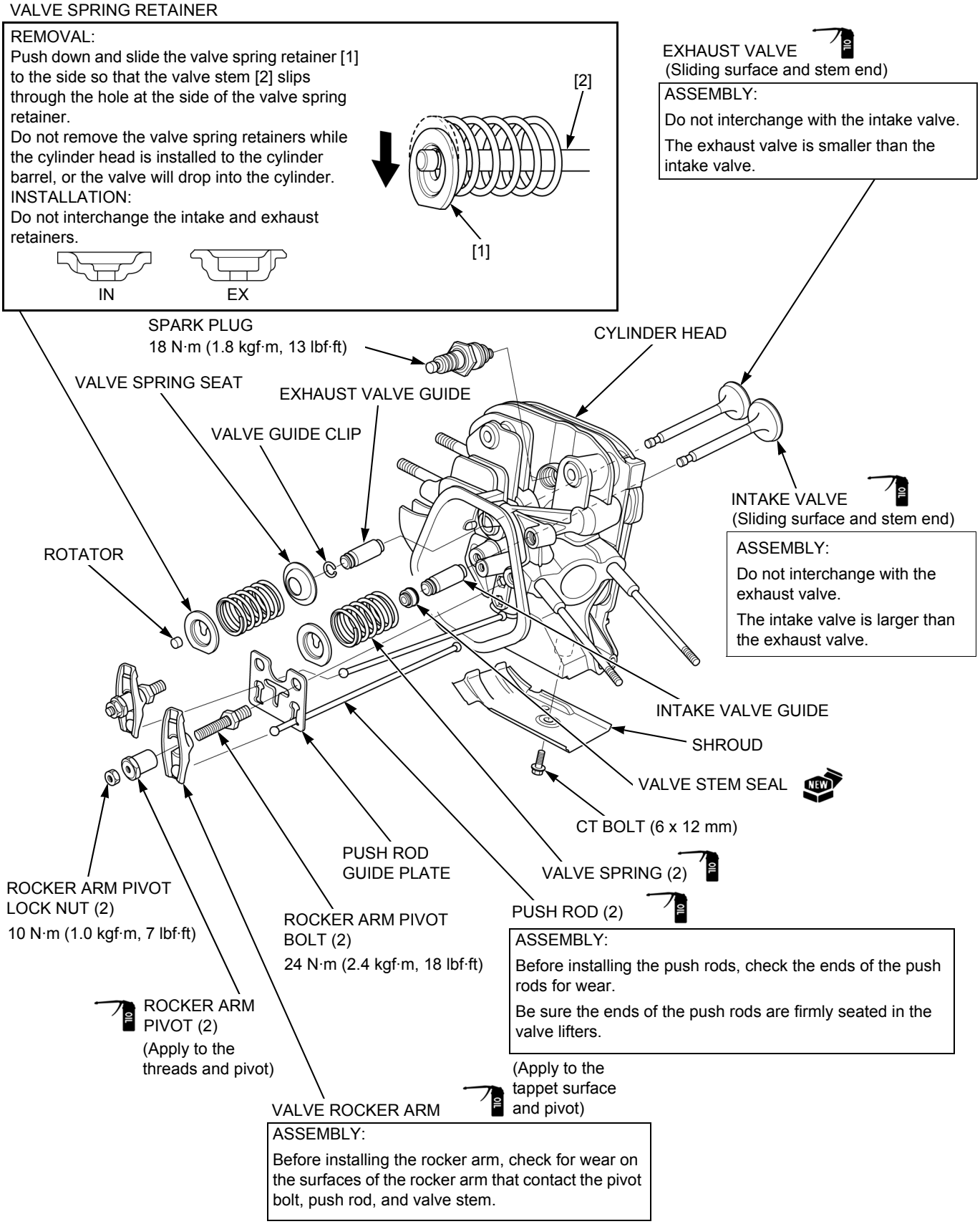
Installation is in the reverse order of removal.

Check the valve clearance, and if necessary, adjust the clearance.



CYLINDER HEAD DISASSEMBLY/ ASSEMBLY

Remove the cylinder head (page 13-3).



CYLINDER HEAD/VALVES INSPECTION

CYLINDER COMPRESSION CHECK

Start the engine and warm up to normal operating temperature.

Turn the fuel valve lever to the OFF position, and then remove the drain screw to drain the carburetor.

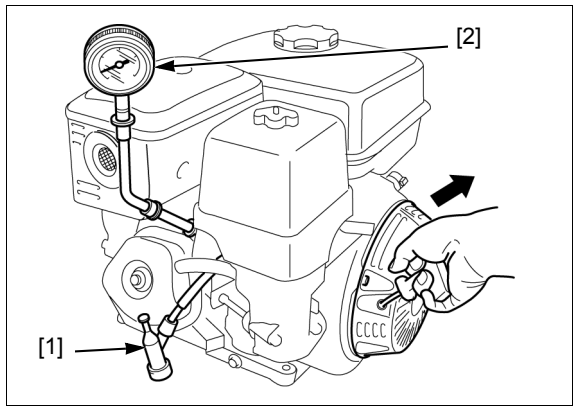
Remove the spark plug cap [1] from the spark plug.

Remove the spark plug using a spark plug wrench.

Pull the recoil starter several times to expel unburned gas.

Attach a commercially available compression gauge [2] to the spark plug hole.

Pull the recoil starter forcefully to measure stable cylinder compression.



CYLINDER COMPRESSION:
1.37 MPa (14.0 kgf/cm^2, 199 psi) / 1400 min^{-1} (rpm)

CYLINDER HEAD WARPAGE

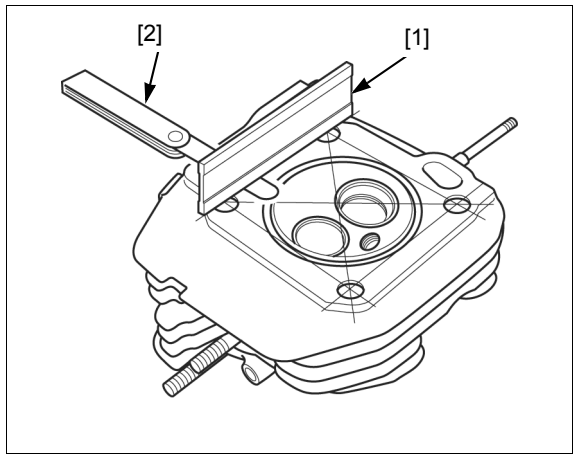
Remove the carbon deposits from the combustion chamber (page 3-15).

Check the spark plug hole and valve areas for cracks.

Check the cylinder head warpage using a straightedge [1] and feeler gauge [2].

SERVICE LIMIT: 0.10 mm (0.004 in)

If the measurement is more than the service limit, replace the cylinder head (page 13-4).



VALVE SEAT WIDTH

Remove the carbon deposits from the combustion chamber (page 3-15).

Inspect each valve for face irregularities.

If necessary, replace the valve (page 13-4).

Apply a light coat of Prussian Blue or erasable felt-tipped marker ink to each valve seat.

Insert the valve, and snap it closed against its seat several times. Be sure the valve does not rotate on the seat.

The transferred marking compound will show any area of the valve face that is not concentric.

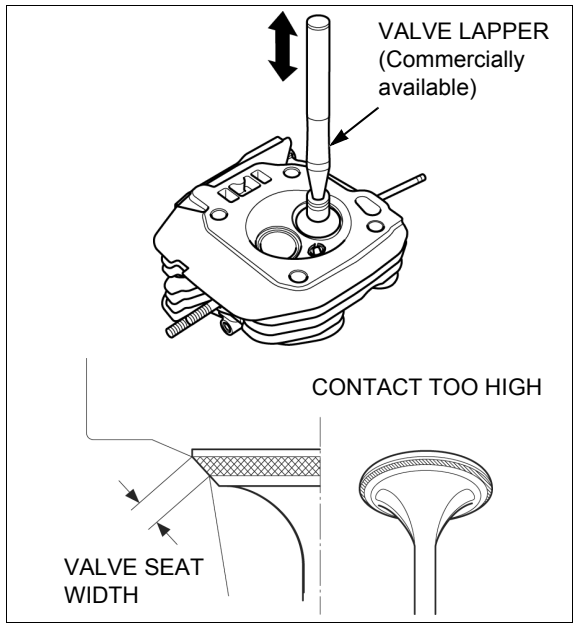
Measure the valve seat width of the cylinder head.

STANDARD: 1.0 – 1.2 mm (0.04 – 0.05 in)
SERVICE LIMIT: 2.0 mm (0.08 in)

If the measurement is more than the service limit, recondition the valve seat (page 13-10).

Check whether the valve seat contact area of the valve is too high.

If the valve seat is too high or too low, recondition the valve seat (page 13-10).



VALVE GUIDE I.D.

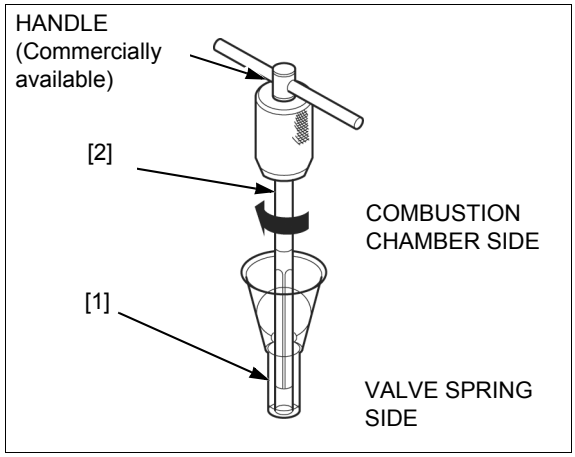
Ream the valve guide [1] to remove any carbon deposits before measuring.

TOOL:
Valve guide reamer, 6.612 mm [2] 07984-ZE20001

NOTICE

Turn the special tool (Valve guide reamer) clockwise, never counterclockwise.

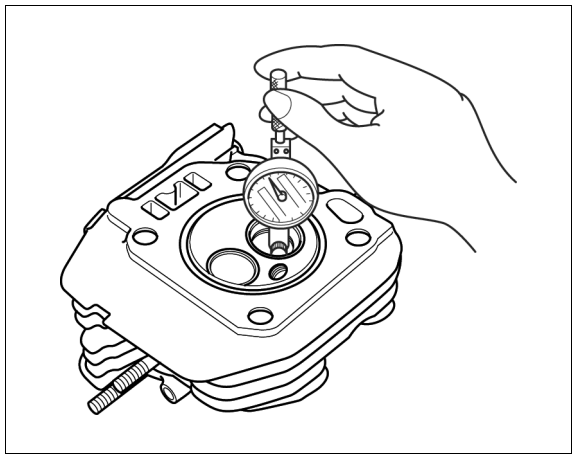
Continue to rotate the special tool while removing it from the valve guide.



Measure and record each valve guide I.D.

GX270H:
STANDARD:
6.600 – 6.612 mm (0.2598 – 0.2603 in)
SERVICE LIMIT: 6.66 mm (0.262 in)
GX390H1:
STANDARD:
6.600 – 6.615 mm (0.2598 – 0.2604 in)
SERVICE LIMIT: 6.66 mm (0.262 in)

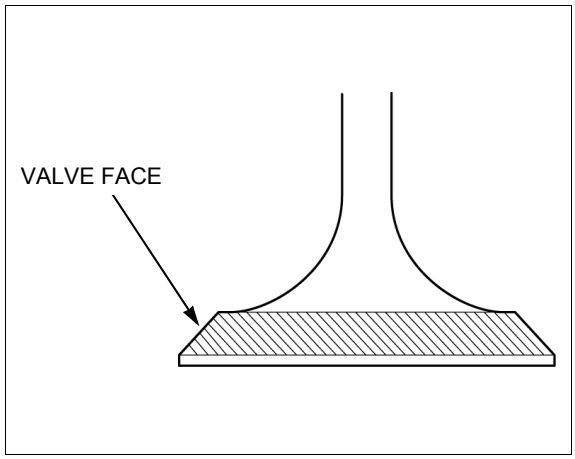
If the measured valve guide I.D. is more than the service limit, replace the valve guide (page 13-8).



VALVE FACE

Inspect each valve for face irregularities.

If necessary, replace the valve (page 13-4).



VALVE STEM O.D.

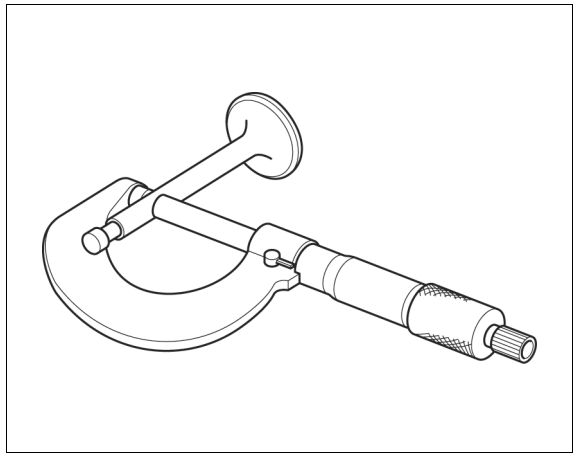
Inspect each valve for bending or abnormal stem wear.

If necessary, replace the valve (page 13-4).

Measure and record each valve stem O.D.

STANDARD:
IN: 6.575 – 6.590 mm (0.2588 – 0.2594 in)
EX: 6.535 – 6.550 mm (0.2573 – 0.2579 in)
SERVICE LIMIT:
IN: 6.44 mm (0.254 in)
EX: 6.40 mm (0.252 in)

If the measurement is less than the service limit, replace the valve (page 13-4).



GUIDE-TO-STEM CLEARANCE

Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the guide-to-stem clearance.

GX270H:
STANDARD:
IN: 0.010 – 0.037 mm (0.0004 – 0.0015 in)
EX: 0.050 – 0.077 mm (0.0020 – 0.0032 in)
SERVICE LIMIT:
IN: 0.11 mm (0.004 in)
EX: 0.13 mm (0.005 in)
GX390H1:
STANDARD:
IN: 0.010 – 0.040 mm (0.0004 – 0.0016 in)
EX: 0.050 – 0.080 mm (0.0020 – 0.0032 in)
SERVICE LIMIT:
IN: 0.11 mm (0.004 in)
EX: 0.13 mm (0.005 in)

If the calculated clearance is more than the service limit, replace the following:

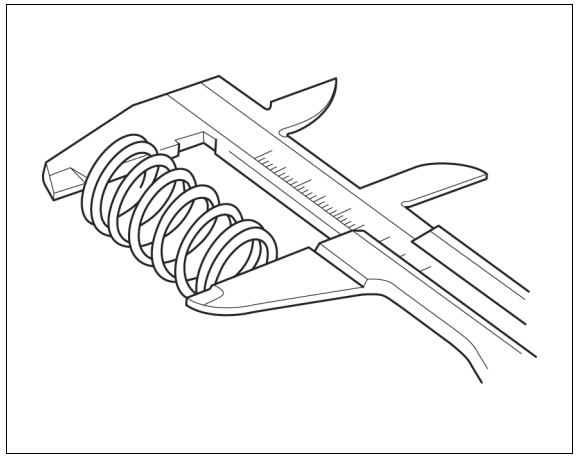
– Valves (page 13-4)
– Valve guide (page 13-8)

VALVE SPRING FREE LENGTH

Measure the valve spring free length.

STANDARD: 39.0 mm (1.54 in)
SERVICE LIMIT: 37.5 mm (1.48 in)

If the measured length is less than the service limit, replace the valve spring (page 13-4).

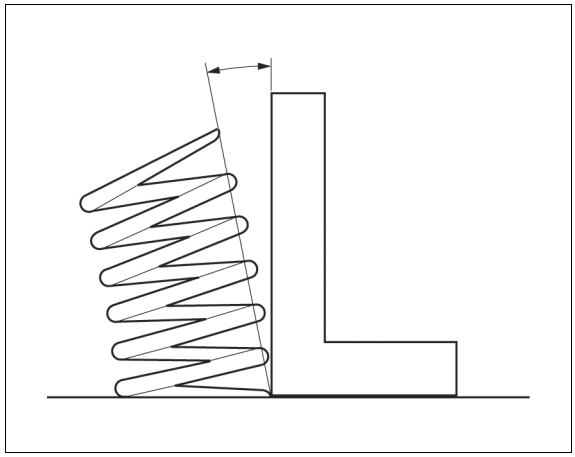


VALVE SPRING PERPENDICULARITY

Measure the valve spring perpendicularity.

SERVICE LIMIT: 1.5°

If the measured perpendicularity is more than the service limit, replace the valve spring (page 13-4).

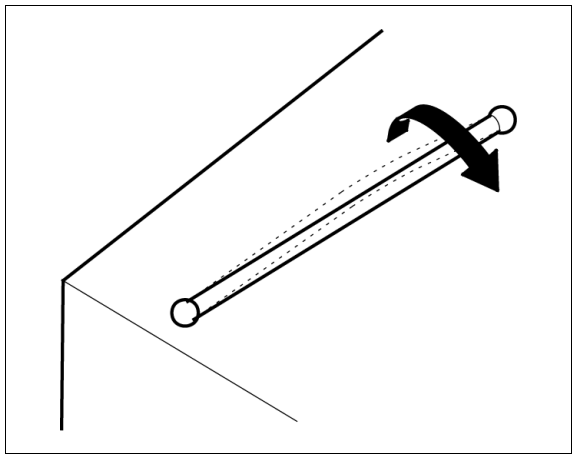


PUSH ROD RUNOUT

Check both ends of the push rod for wear.

Check the push rod for straightness.

If necessary, replace the push rod (page 13-4).



VALVE GUIDE REPLACEMENT

Chill the replacement valve guides in the freezer section of a refrigerator for about an hour.

Use a hot plate or oven to heat the cylinder head evenly to 150°C (300°F).

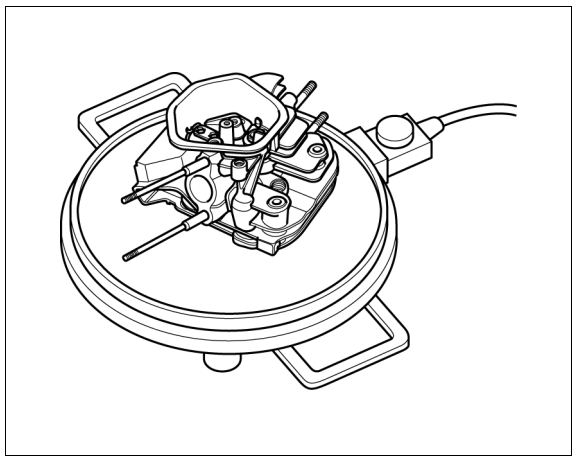
⚠CAUTION

To avoid burns, use heavy gloves when handling the heated cylinder head.

NOTICE

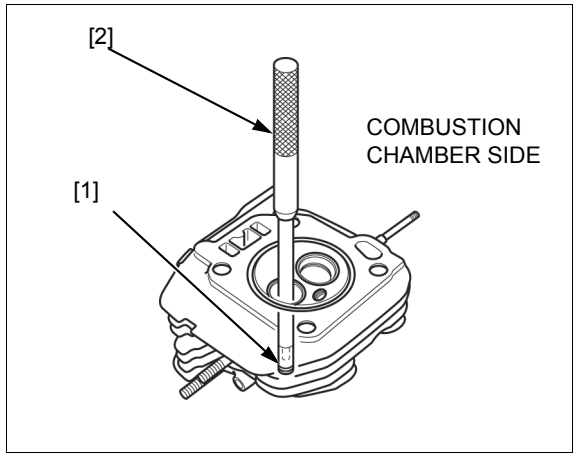
- *Do not use a torch to heat the cylinder head; warpage of the cylinder head may result.*
- *Do not get the cylinder head hotter than 150°C (300°F); excessive heat may loosen the valve seat.*

Remove the heated cylinder head from the hot plate and support it with wooden blocks.



Drive the valve guides [1] out of the cylinder head from the combustion chamber side.

TOOL:
Valve guide driver, 6.45 x 11 mm [2] 07742-0010200



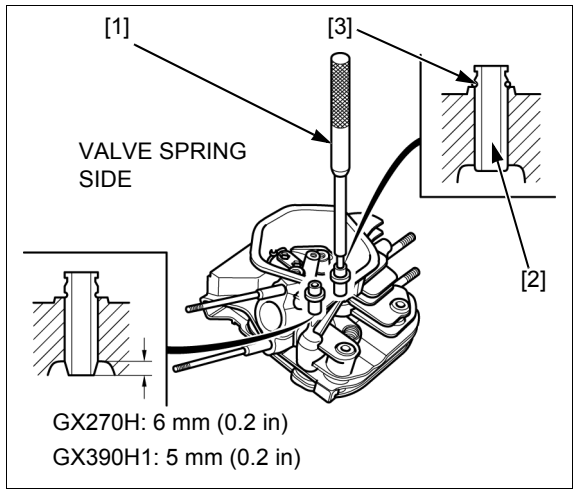
NOTICE

When driving the valve guides out, be careful not to damage the cylinder head.

Remove new valve guides from the refrigerator one at a time as needed.

Install new valve guides from the valve spring side of the cylinder head.

TOOL:
Valve guide driver, 6.45 x 11 mm [1] 07742-0010200



Exhaust valve guide [2]:

Drive the exhaust valve guide until the valve guide clip [3] is fully seated as shown.

Intake valve guide (4):

Drive the intake valve guide to the specified height (measured from the end of the valve guide to the cylinder head as shown).

IN VALVE INSTALLATION HEIGHT:
GX270H: 6 mm (0.2 in)
GX390H1: 5 mm (0.2 in)

After installing the valve guide, check the guide for damage.

Replace the valve guide if damaged.

Let the cylinder head cool to room temperature.

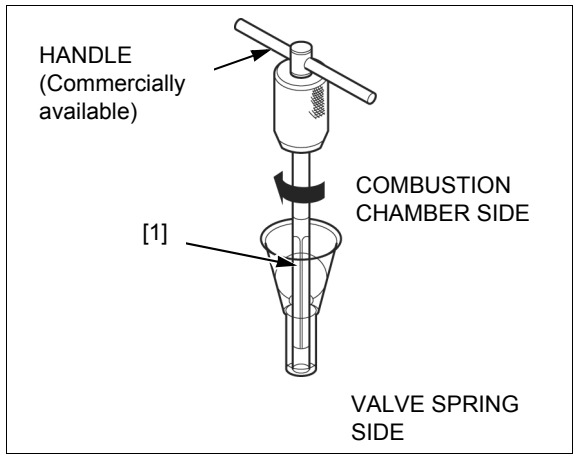
Ream the valve guide.

VALVE GUIDE REAMING

For best results, be sure the cylinder head is at room temperature before reaming valve guides.

Coat the reamer and valve guide with cutting oil.

TOOL:
Valve guide reamer, 6.612 mm [1] 07984-ZE20001



Rotate the reamer clockwise through the valve guide the full length of the reamer.

NOTICE

Turn the special tool (valve guide reamer) clockwise, never counterclockwise.

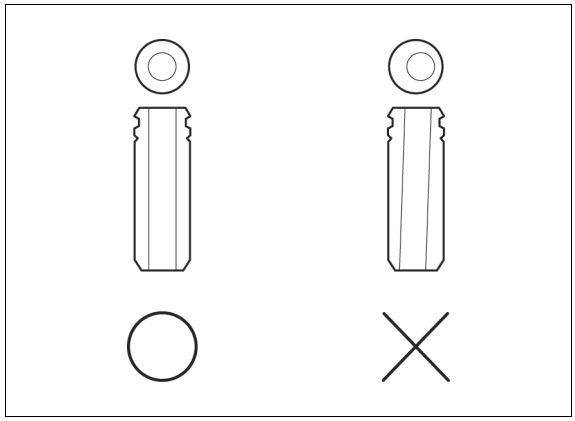
Continue to rotate the special tool while removing it from the valve guide.

Thoroughly clean the cylinder head to remove any cutting residue.

Check the valve guide bore; it should be straight, round and centered in the valve guide. Insert the valve and check operation. If the valve does not operate smoothly, the guide may have been bent during installation.

Replace the valve guide if it is bent or damaged.

Check the valve guide-to-stem clearance.



VALVE SEAT RECONDITIONING

Thoroughly clean the combustion chamber and valve seats to remove carbon deposits (page 3-15).

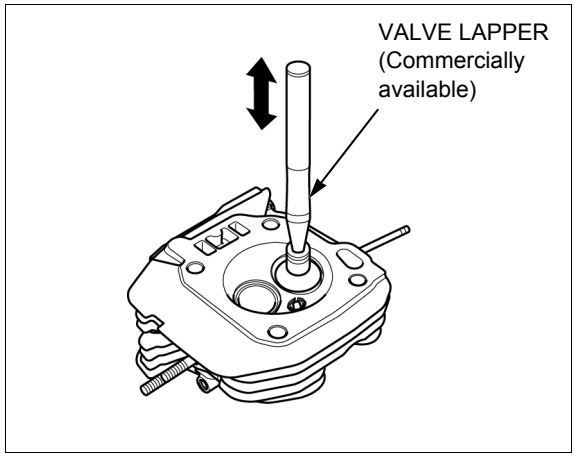
Apply a light coat of Prussian Blue or erasable felt-tipped marker ink to the valve seat.

Insert the valve, and snap it closed against its seat several times. Be sure the valve does not rotate on the seat. The transferred marking compound will show any area of the seat that is not concentric.

Measure the valve seat width of the cylinder head.

STANDARD: 1.0 – 1.2 mm (0.04 – 0.05 in)
SERVICE LIMIT: 2.0 mm (0.08 in)

If the measurement is more than the service limit, recondition the valve seat.



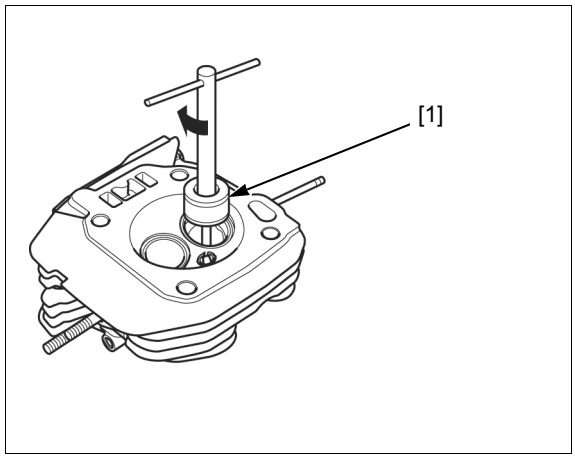
Check whether the valve seat contact area of the valve is too high.

If the valve seat is too high or too low, recondition the valve seat.

Valve seat cutters [1]/grinder or equivalent valve seat refacing equipment is recommended to correct a worn valve seat.

NOTICE

Turn the cutter clockwise, never counterclockwise. Continue to turn the cutter as you lift it from the valve seat.



The 32° cutter removes material from the top edge (contact too high).

TOOLS (GX270H):
Cutter holder, 6.6 mm 07781-0010202
Flat cutter, 28 mm (32° EX) 07780-0012100
Flat cutter, 30 mm (32° IN) 07780-0012200
TOOLS (GX390H1):
Cutter holder, 6.6 mm 07781-0010202
Flat cutter, 33 mm (32° EX) 07780-0012900
Flat cutter, 35 mm (32° IN) 07780-0012300

The 60° cutter removes material from the bottom edge (contact too low).

TOOLS:
Cutter holder, 6.6 mm 07781-0010202
Interior cutter, 37.5 mm (60° IN/EX) 07780-0014100

Be sure that the width of the finished valve seat is within specification.

STANDARD: 1.0 – 1.2 mm (0.04 – 0.05 in)
SERVICE LIMIT: 2.0 mm (0.08 in)

Make a light pass with the 45° cutter to remove any possible burrs at the edge of the seat.

TOOLS (GX270H):
Cutter holder, 6.6 mm 07781-0010202
Seat cutter, 27.5 mm (45° EX) 07780-0010200
Seat cutter, 29 mm (45° IN) 07780-0010300
TOOLS (GX390H1):
Cutter holder, 6.6 mm 07781-0010202
Seat cutter, 33 mm (45° EX) 07780-0010800
Seat cutter, 35 mm (45° IN) 07780-0010400

After resurfacing the seats, inspect for even valve seating.

Apply Prussian Blue compound or erasable felt-tipped marker ink to the valve seat. Insert the valve, and snap it closed against its seat several times. Be sure the valve does not rotate on the seat.

The seating surface, as shown by the transferred marking compound, should have good contact all the way around.

Thoroughly clean the cylinder head to remove any cutting residual.

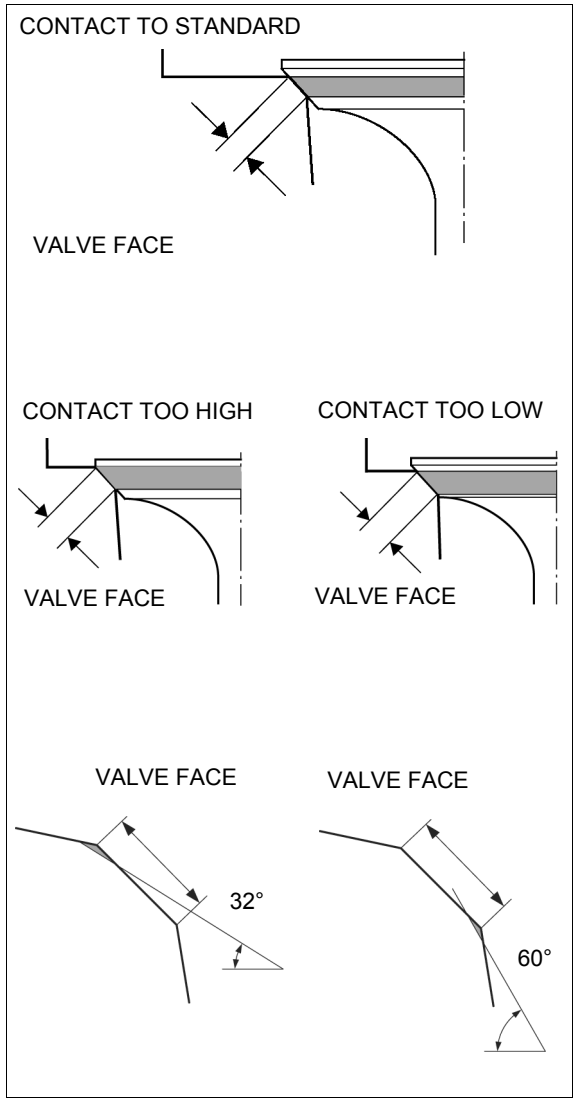
Lap the valves into their seats, using a commercially available valve lapper [1] and lapping compound.

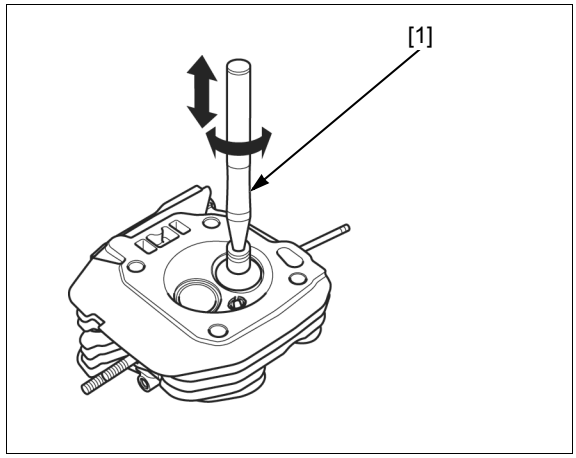
After lapping, wash all residual compound off the cylinder head and valve.

NOTICE

- *Do not push the valve against the seat with force during lapping. Apply a light pass with the valve lapper.*
- *Avoid lapping the valve in the same position as it causes uneven wear. Lap the valve by turning the lapper slowly.*
- *Take care not to allow the lapping compound to enter the gap between the stem and guide.*

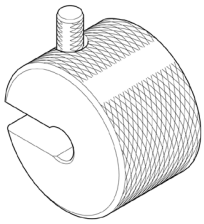
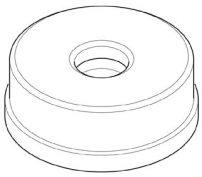
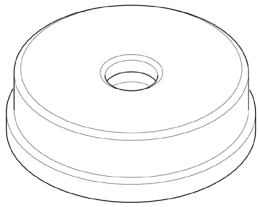
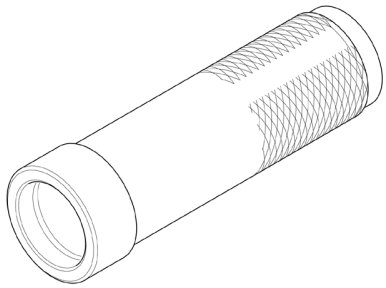
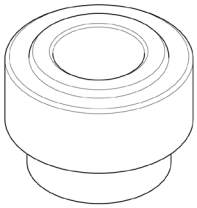
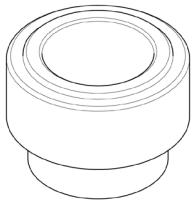
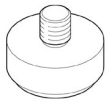
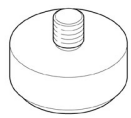
Adjust the valve clearance after assembly (page 3-13).

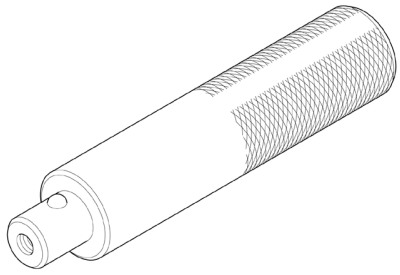
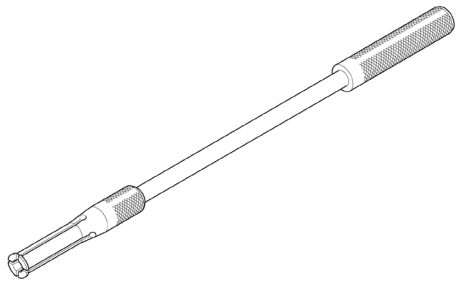
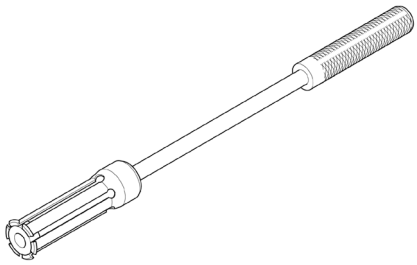
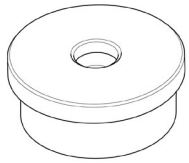
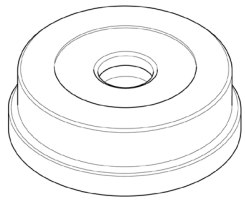




MEMO

TOOLS

Sliding hammer weight 07741-0010201 	Bearing driver attachment, 32 x 35 mm 07746-0010100 	Attachment, 42 x 47 mm 07746-0010300 
Attachment, 52 x 55 mm 07746-0010400 	Attachment, 72 x 75 mm 07746-0010600 	Inner driver handle, 40 mm 07746-0030100 
Attachment, 30 mm 07746-0030300 	Attachment, 35 mm 07746-0030400 	Pilot, 15 mm 07746-0040300 
Pilot, 20 mm 07746-0040500 	Pilot, 30 mm 07746-0040700 	Pilot, 35 mm 07746-0040800 

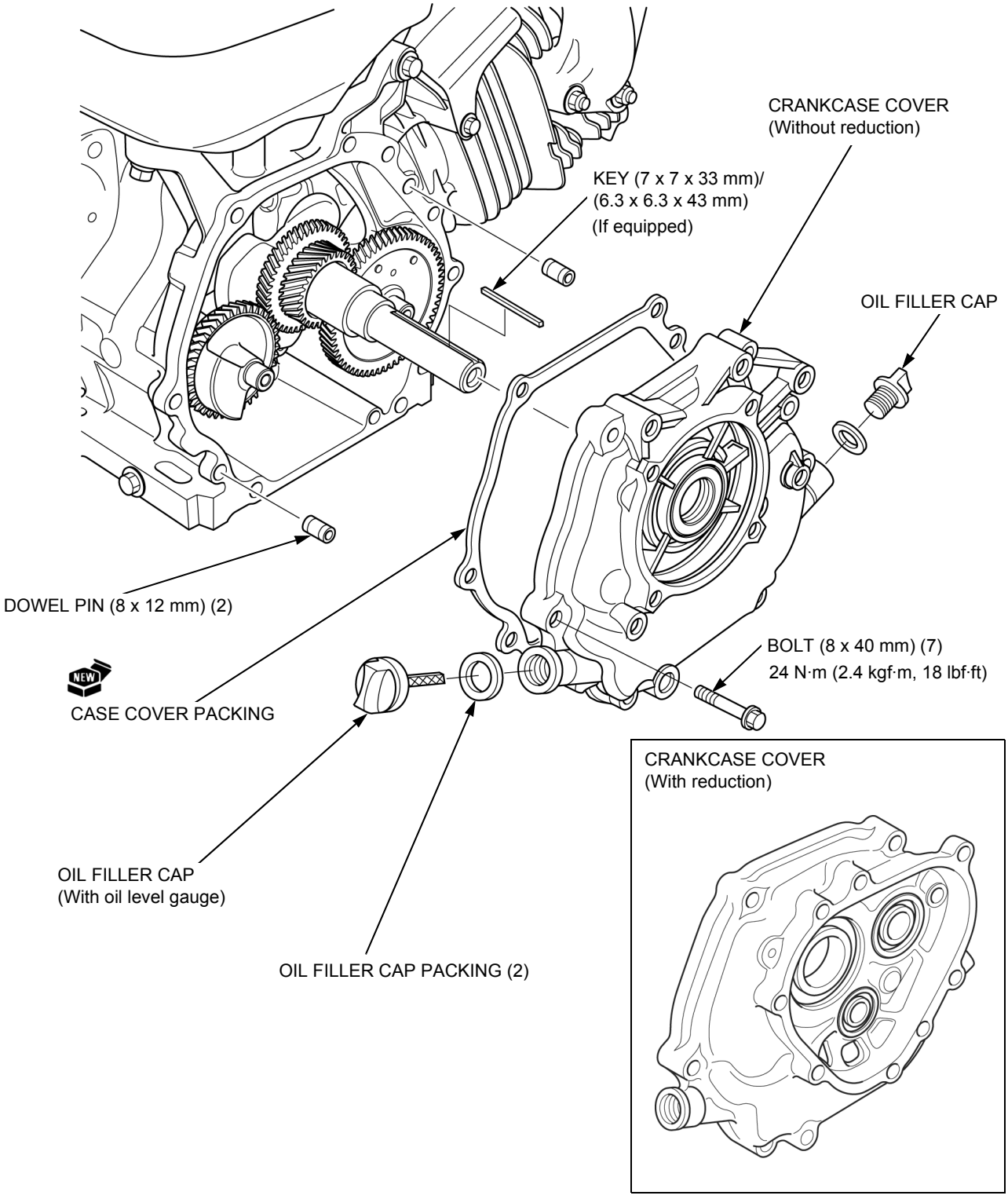
Pilot, 14 mm 07746-0041200 	Driver handle 07749-0010000 	Bearing remover shaft set, 15 mm 07936-KC10500 
Bearing remover shaft set, 25 mm 07936-ZV10100 	Attachment, 45 x 50 mm 07946-6920100 	Attachment, 62 x 64 mm 07947-6340400 

CRANKCASE COVER REMOVAL/ INSTALLATION

EXCEPT E TYPE

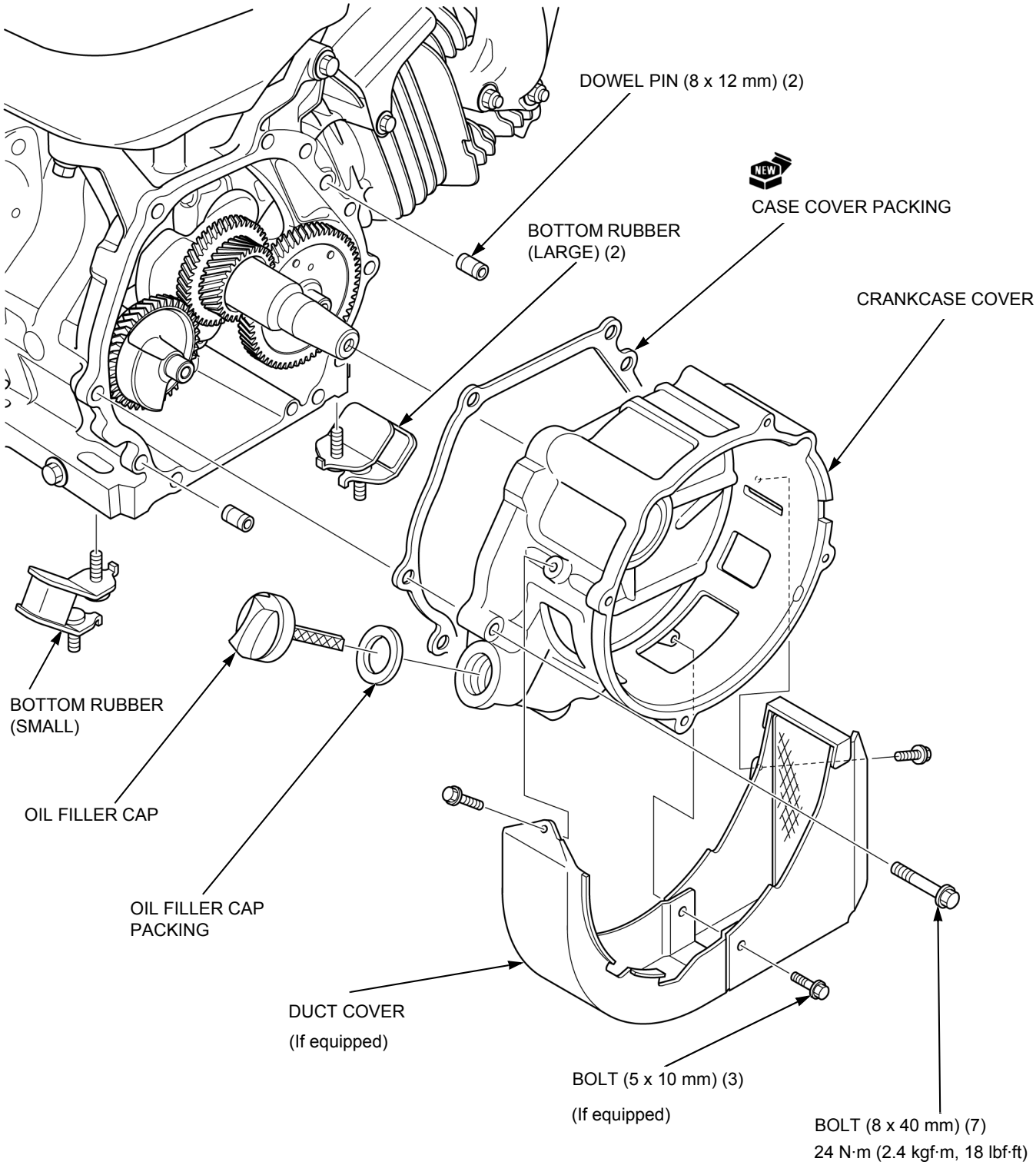
Drain the engine oil (page 3-3).

Remove the key (7 x 7 x 33 mm)/(6.3 x 6.3 x 43 mm) (If equipped).



E TYPE

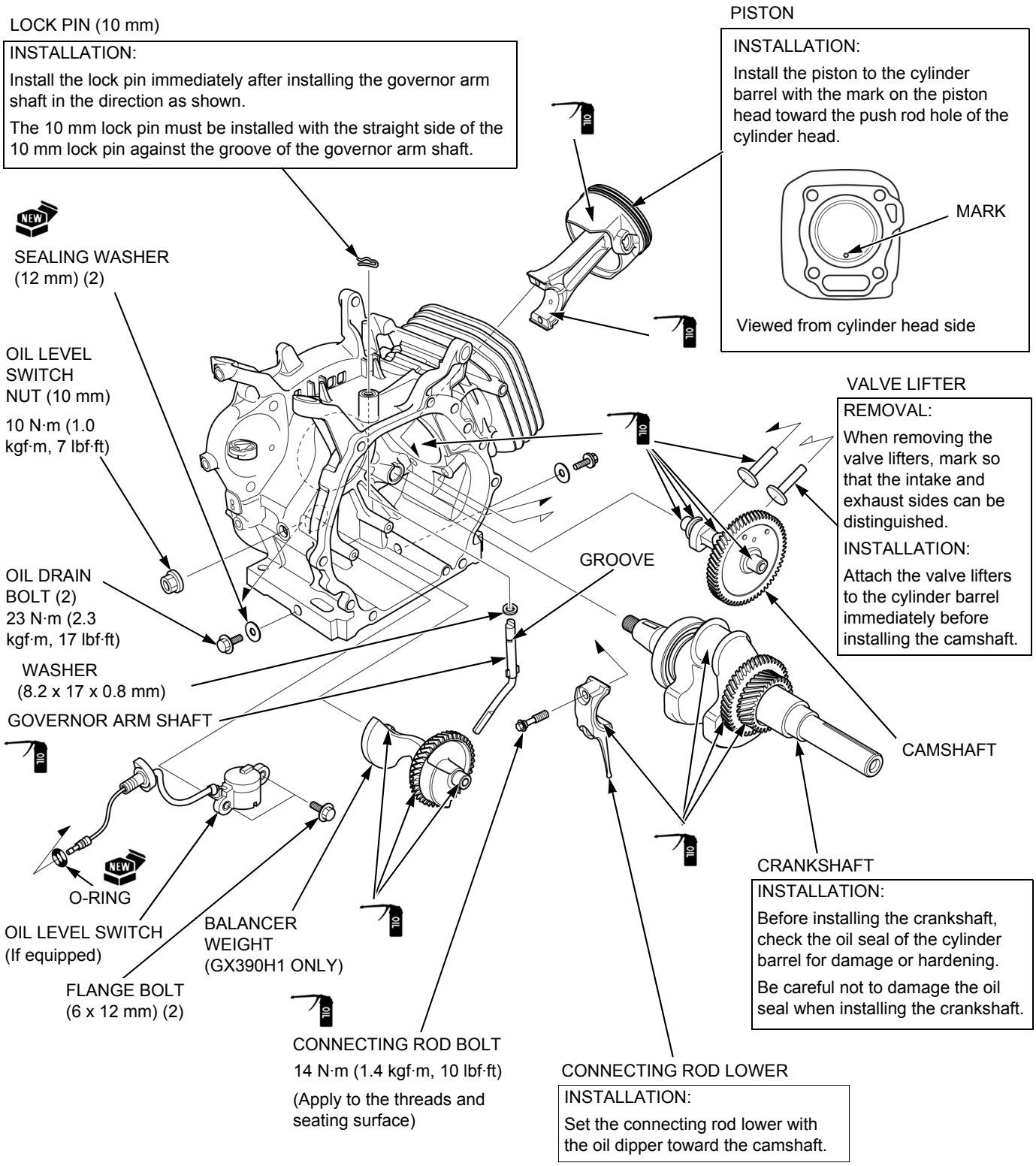
Drain the engine oil (page 3-3).



CRANKSHAFT/BALANCER/PISTON REMOVAL/INSTALLATION

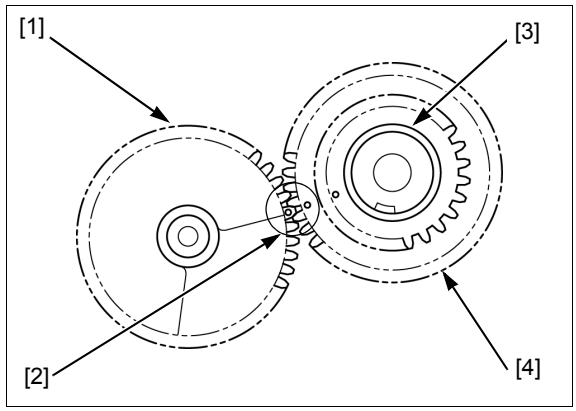
Remove the following:

- Cylinder head (page 13-3)
- Fuel tank (page 6-3)
- Flywheel (page 8-5)

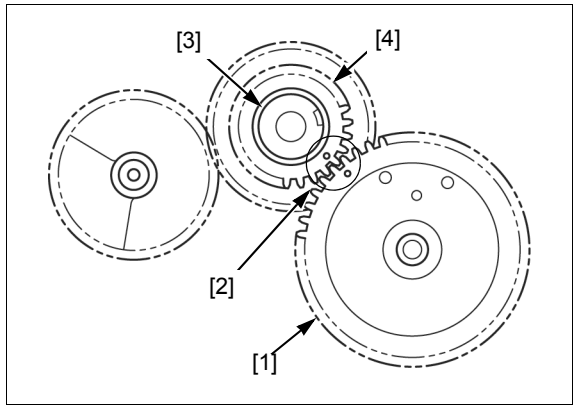


BALANCER WEIGHT/CAMSHAFT INSTALLATION (GX390H1 ONLY)

Install the balancer weight [1] to the cylinder barrel by aligning the punch marks [2] of the balancer weight and the crankshaft [3] (marked on the balancer drive gear [4]).



Install the camshaft [1] to the cylinder barrel by aligning the punch marks [2] of the camshaft and the crankshaft [3] (marked on the timing gear [4]).



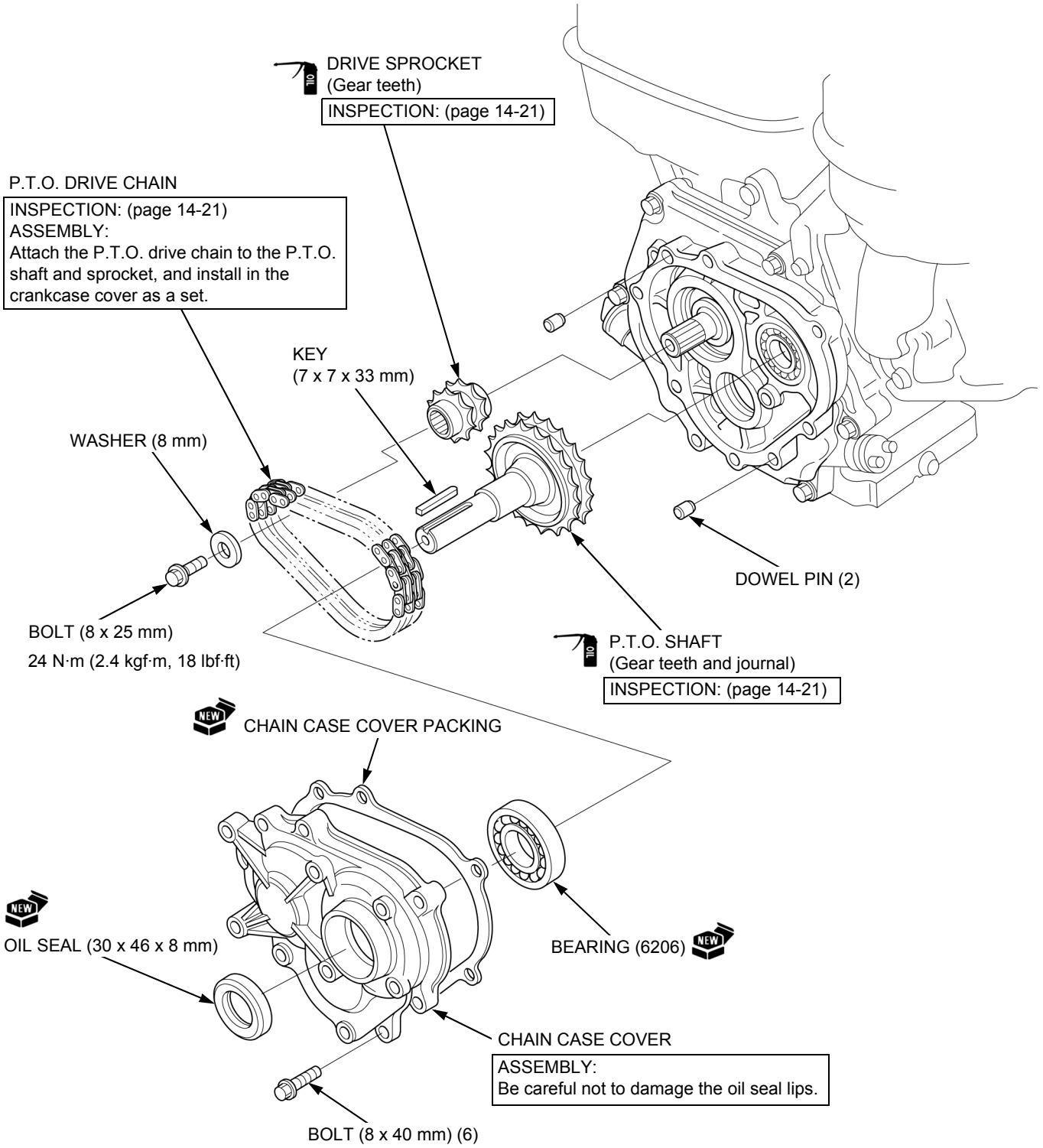
REDUCTION UNIT DISASSEMBLY/ ASSEMBLY

Remove the recoil starter (page 10-3).

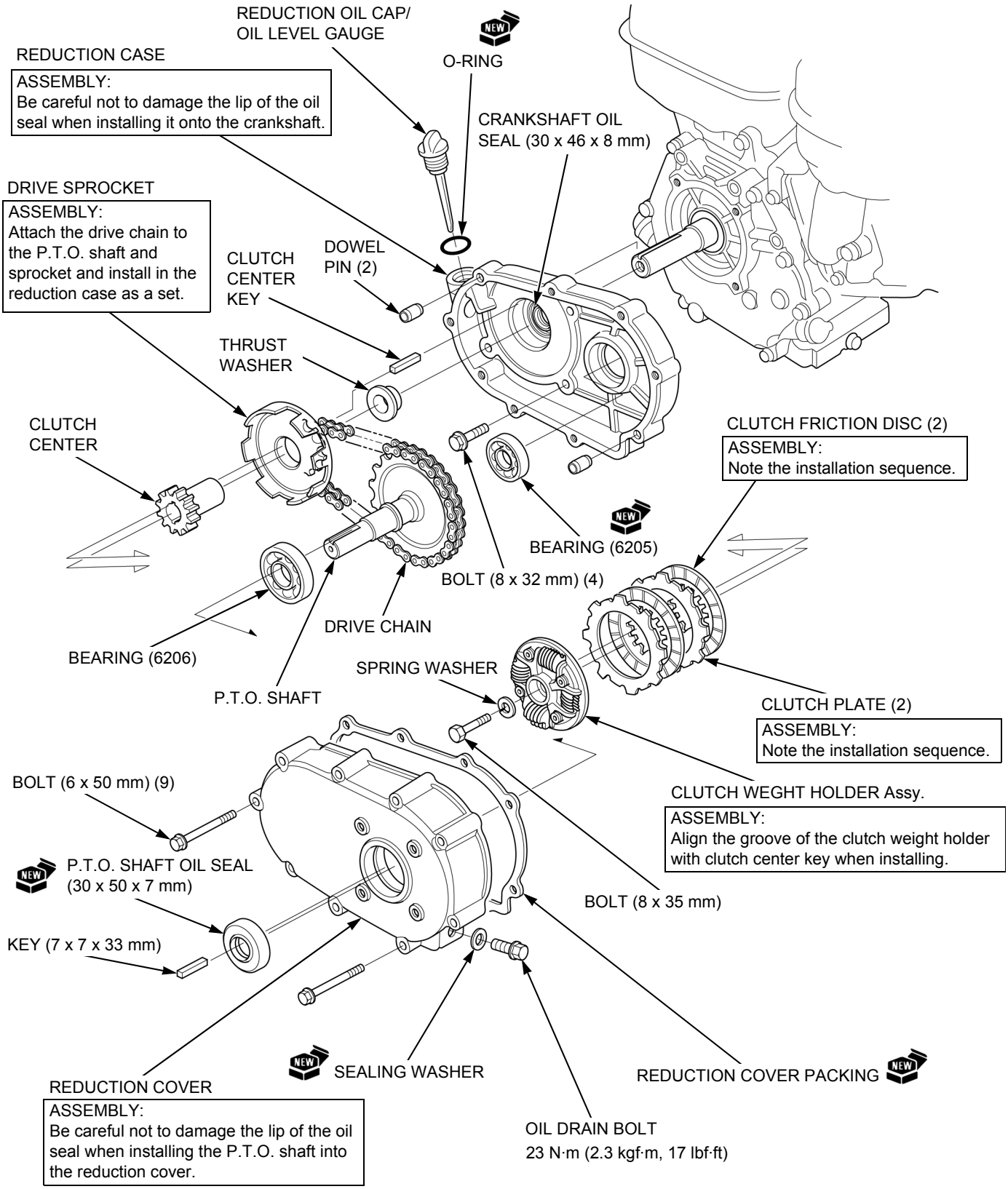
Drain the oil (page 3-3).

After installation, fill the oil (page 3-3).

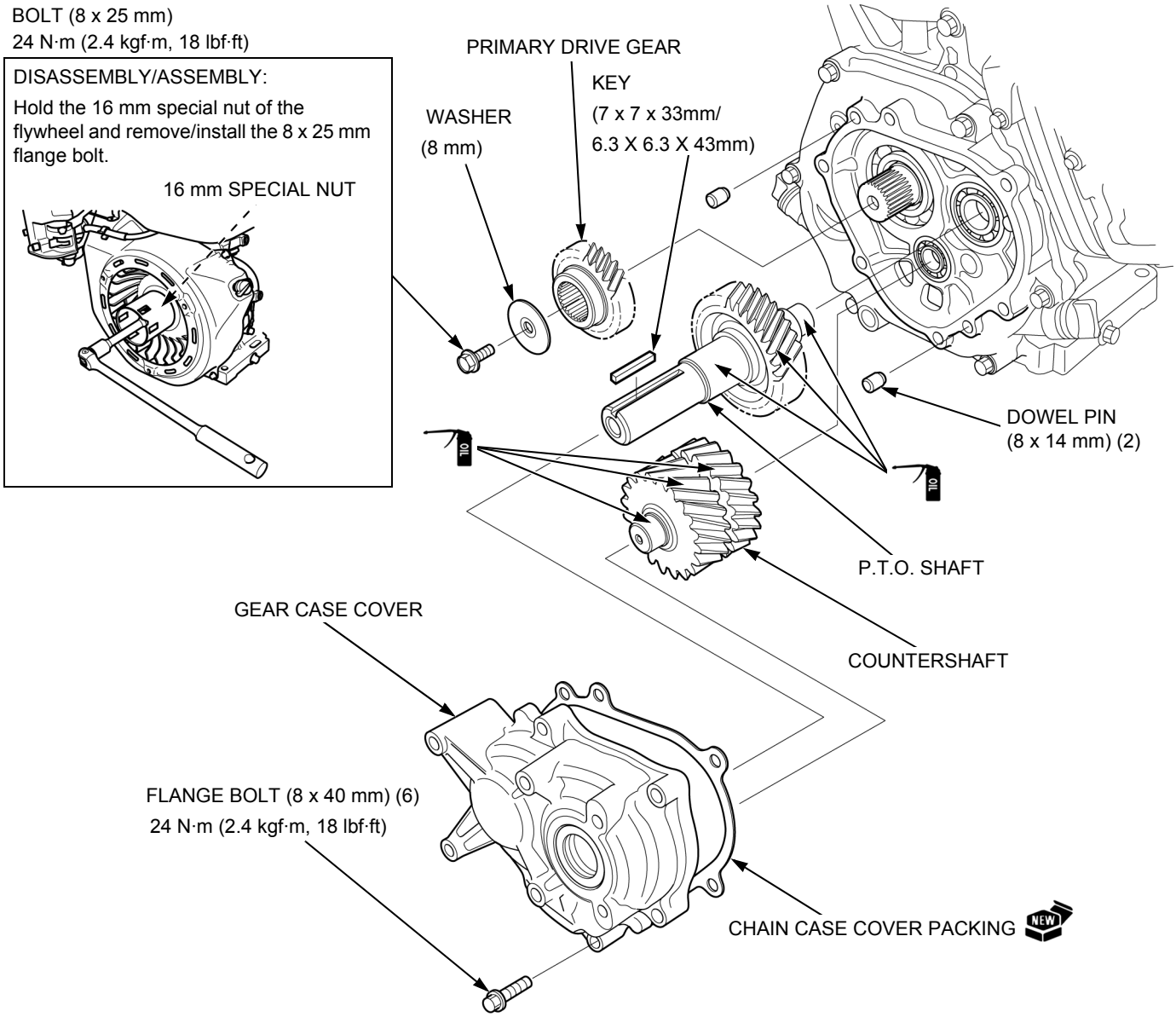
1/2 REDUCTION CHAIN TYPE (GX270H ONLY)



1/2 REDUCTION CLUTCH TYPE (GX270H ONLY)

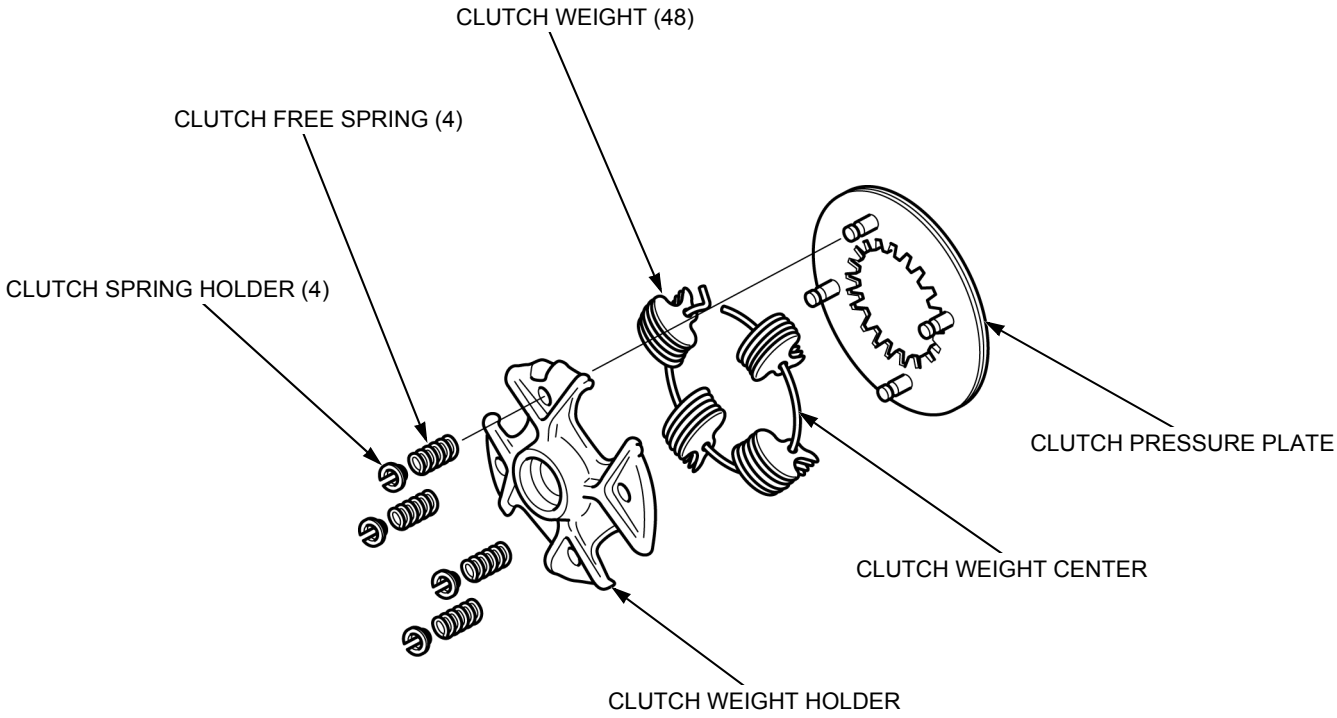


1/6 REDUCTION GEAR TYPE (GX390H1 ONLY)



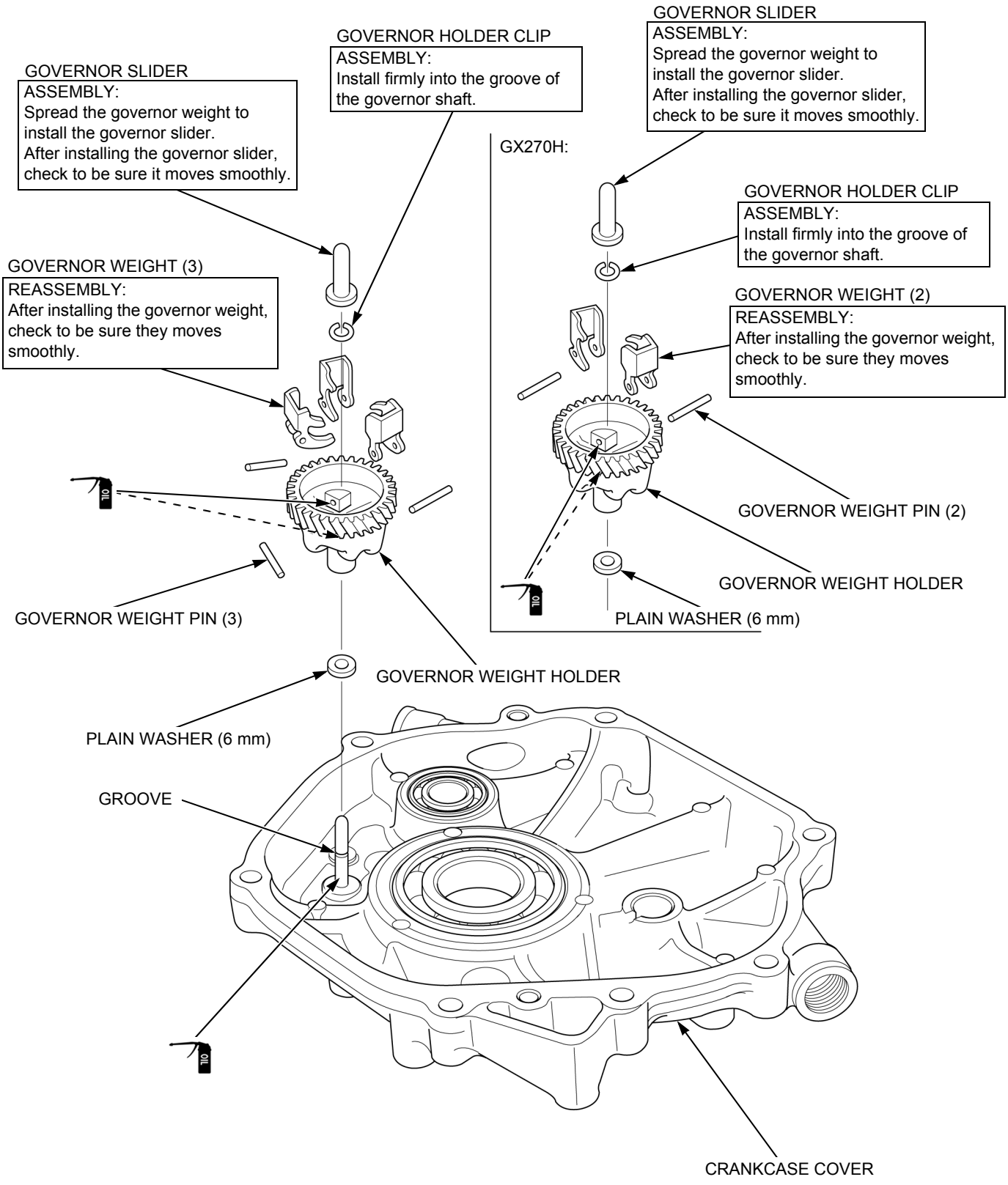
CLUTCH WEIGHT HOLDER Assy. DISASSEMBLY/ASSEMBLY

Remove the clutch weight holder Assy. (page 14-9).



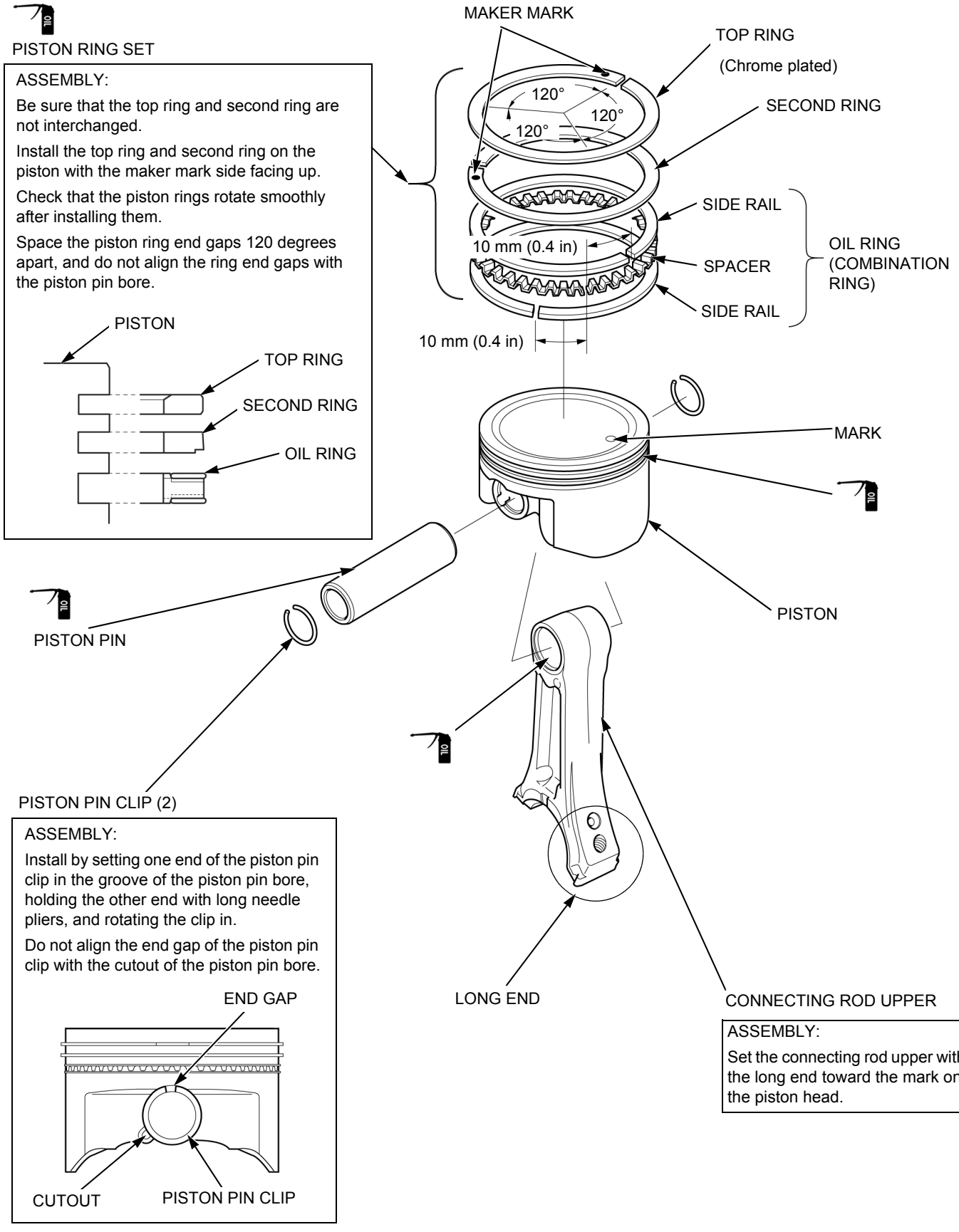
GOVERNOR DISASSEMBLY/ ASSEMBLY

Remove the crankcase cover (page 14-4).



PISTON DISASSEMBLY/ASSEMBLY

Remove the piston(page 14-6).



CRANKCASE COVER/CYLINDER BARREL/PISTON/CONNECTING ROD/ CRANKSHAFT/CAMSHAFT INSPECTION

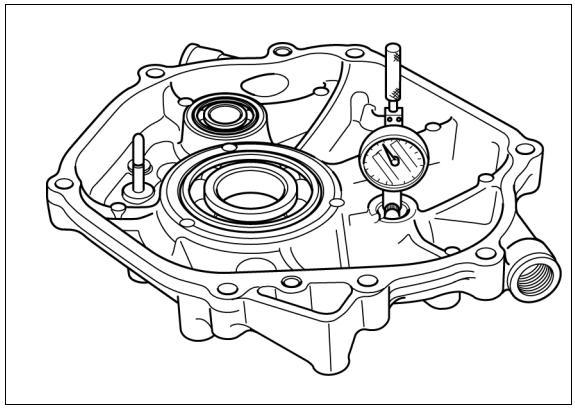
CAMSHAFT JOURNAL I.D.: CRANKCASE COVER SIDE

Measure the camshaft journal I.D. of the crankcase cover.

STANDARD: 16.000 – 16.018 mm (0.6299 – 0.6306 in)
SERVICE LIMIT: 16.05 mm (0.632 in)

If the measurement is more than the service limit, replace the crankcase cover (page 14-4).

Inspect the camshaft O.D. with this inspection (page 14-20).



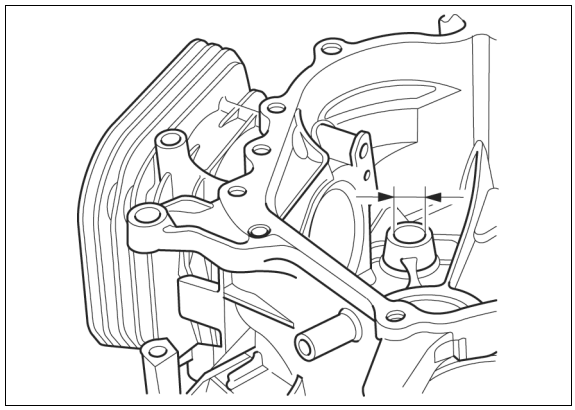
CAMSHAFT JOURNAL I.D.: CYLINDER BARREL SIDE

Measure the camshaft journal I.D. of the cylinder barrel assembly.

STANDARD: 16.000 – 16.018 mm (0.6299 – 0.6306 in)
SERVICE LIMIT: 16.05 mm (0.632 in)

If the measurement is more than the service limit, replace the cylinder barrel.

Inspect the camshaft O.D. with this inspection (page 14-20).



CYLINDER SLEEVE I.D.

Measure and record the cylinder I.D. at three levels in both the “X” axis (perpendicular to crankshaft) and the “Y” axis (parallel to crankshaft). Take the maximum reading to determine cylinder wear and taper.

GX270H:

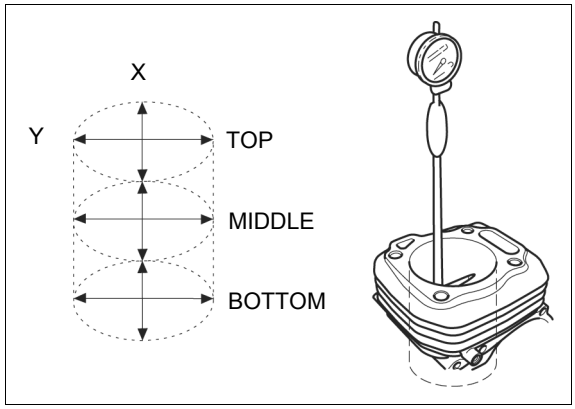
STANDARD: 77.000 – 77.017 mm (3.0315 – 3.0322 in)
SERVICE LIMIT: 77.17 mm (3.0381 in)

GX390H1:

STANDARD: 88.000 – 88.017 mm (3.4646 – 3.4652 in)
SERVICE LIMIT: 88.170 mm (3.4710 in)

If the measurement is more than the service limit, replace the cylinder barrel (page 14-6).

Inspect the piston skirt O.D. with this inspection (page 14-15).



PISTON SKIRT O.D.

Measure and record the piston skirt O.D. at a point 10 mm (0.4 in) from the bottom of the skirt and 90 degrees to the piston pin bore.

GX270H:

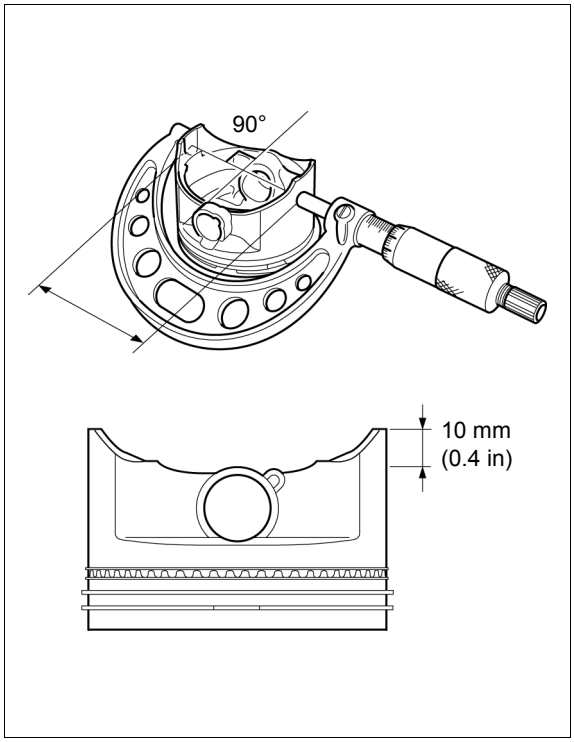
STANDARD: 76.975 – 76.985 mm (3.0305 – 3.0309 in)
SERVICE LIMIT: 76.85 mm (3.026 in)

GX390H1:

STANDARD: 87.975 – 87.985 mm (3.4636 – 3.4640 in)
SERVICE LIMIT: 87.85 mm (3.459 in)

If the measurement is less than the service limit, replace the piston (page 14-13).

Inspect the cylinder sleeve I.D. with this inspection (page 14-14).



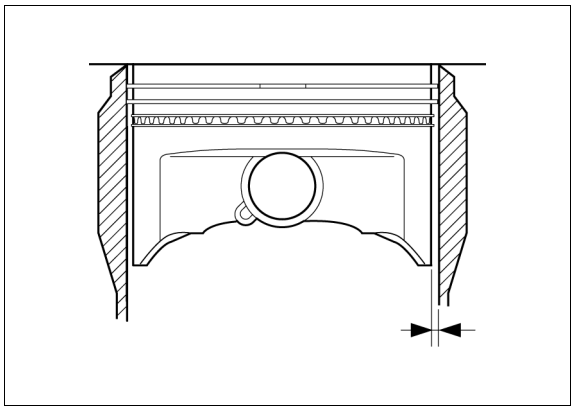
PISTON-TO-CYLINDER CLEARANCE

Subtract the piston skirt O.D. from the cylinder sleeve I.D. to obtain the piston-to-cylinder clearance.

STANDARD: 0.015 – 0.042 mm (0.0006 – 0.0017 in)
SERVICE LIMIT: 0.12 mm (0.005 in)

If the calculated clearance is more than the service limit, replace the piston (page 14-13) and recheck the clearance.

If the clearance is still more than the service limit with the new piston, replace the cylinder barrel (page 14-6).



PISTON PIN BORE I.D.

Measure and record the piston pin bore I.D. of the piston.

GX270H:

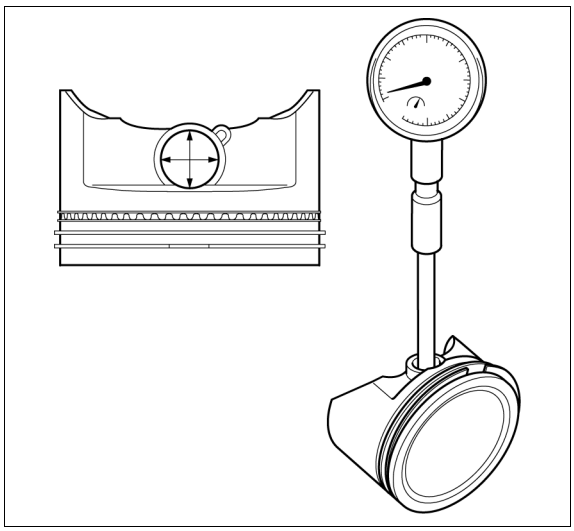
STANDARD: 18.002 – 18.008 mm (0.7087 – 0.7090 in)
SERVICE LIMIT: 18.042 mm (0.7103 in)

GX390H1:

STANDARD: 20.002 – 20.008 mm (0.7875 – 0.7877 in)
SERVICE LIMIT: 20.042 mm (0.7891 in)

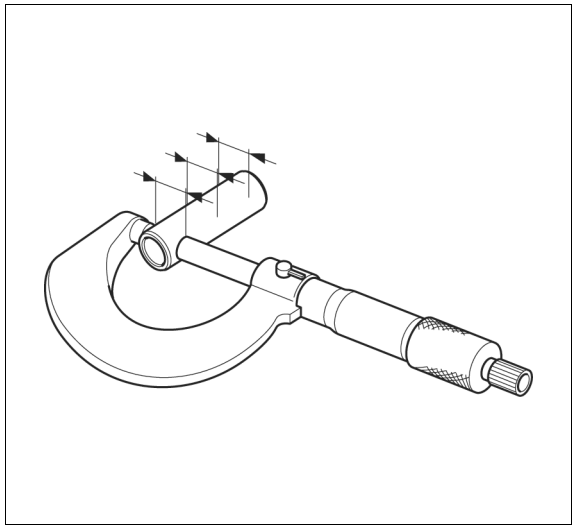
If the measurement is less than the service limit, replace the piston (page 14-13).

Inspect the piston pin O.D. with this inspection (page 14-16).



PISTON PIN O.D.

Measure and record the piston pin O.D. at three points (both ends and middle). Take the minimum reading to determine piston pin O.D.



GX270H:

STANDARD: 17.994 – 18.000 mm (0.7084 – 0.7087 in)
SERVICE LIMIT: 17.950 mm (0.7067 in)

GX390H1:

STANDARD: 19.994 – 20.000 mm (0.7872 – 0.7874 in)
SERVICE LIMIT: 19.950 mm (0.7854 in)

If the measurement is less than the service limit, replace the piston pin.

Inspect the piston pin bore I.D. (page 14-15).

Inspect the connecting rod small end I. D. (page 14-18) with this inspection.

PISTON PIN-TO-PISTON PIN BORE CLEARANCE

Subtract the piston pin O.D. from the piston pin bore I.D. to obtain the piston pin-to-piston pin bore clearance.

STANDARD:
0.002 – 0.014 mm (0.0001 – 0.0006 in)

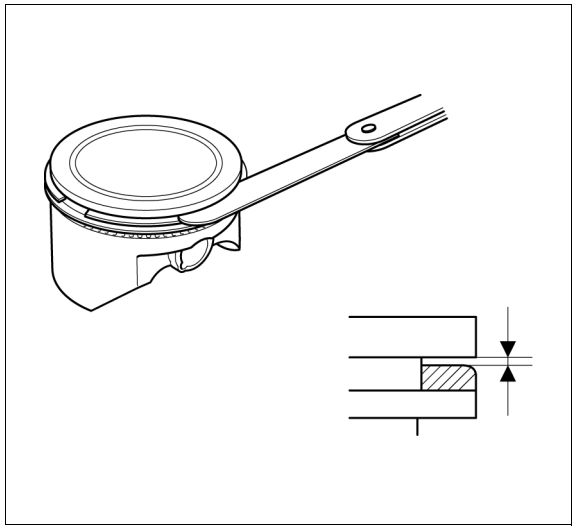
SERVICE LIMIT: 0.08 mm (0.003 in)

If the calculated clearance is more than the service limit, replace the piston pin (page 14-13) and recheck the clearance.

If the clearance is still more than the service limit with the new piston pin, replace the piston (page 14-13).

PISTON RING SIDE CLEARANCE

Measure the clearance between each piston ring and ring groove of the piston using a feeler gauge.



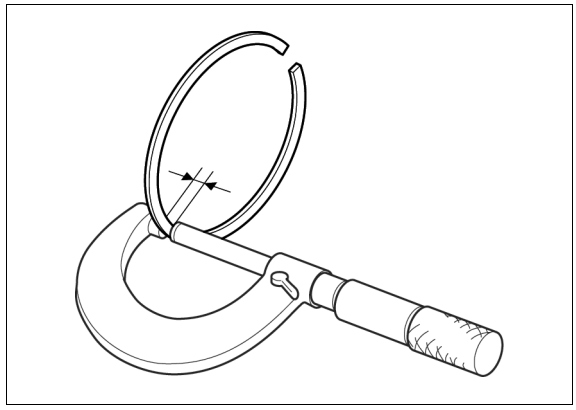
STANDARD:
Top: 0.015 – 0.050 mm (0.0006 – 0.0020 in)
Second: 0.030 – 0.065 mm (0.0012 – 0.0026 in)
SERVICE LIMIT:
Top/second: 0.15 mm (0.006 in)

If any of the measurements is more than the service limit, inspect the piston ring width.

If the piston ring width is normal, replace the piston (page 14-13) and reinspect the clearance.
If necessary, replace the piston rings (top, second, oil) as a set (page 14-13) and reinspect the clearance.
If any of the measurements is still more than the service limit with the new piston rings, replace the piston (page 14-13).

PISTON RING WIDTH

Measure each piston ring width.



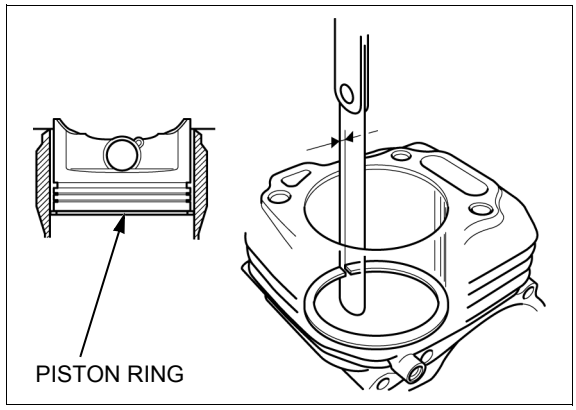
STANDARD:
Top: 1.170 – 1.190 mm (0.0460 – 0.0469 in)
Second: 1.155 – 1.175 mm (0.0455 – 0.0463 in)
SERVICE LIMIT:
Top: 1.140 mm (0.0449 in)
Second: 1.140 mm (0.0449 in)

If any of the measurements is less than the service limit, replace the piston rings (top, second, oil) as a set (page 14-13).

PISTON RING END GAP

Before inspection, check whether the cylinder sleeve I.D. is within the specification.

Measure each piston ring end gap using a feeler gauge.

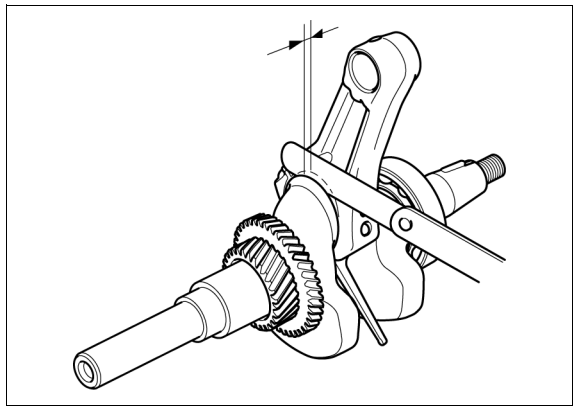


STANDARD:
Top: 0.200 – 0.350 mm (0.0079 – 0.0138 in)
Second: 0.350 – 0.550 mm (0.0138 – 0.0217 in)
Oil (side rail) 0.2 – 0.7 mm (0.01 – 0.03 in)
SERVICE LIMIT:
Top: 1.0 mm (0.04 in)
Second: 1.0 mm (0.04 in)
Oil (side rail) 1.0 mm (0.04 in)

If any of the measurements is more than the service limit, replace the piston rings (top, second, oil) as a set (page 14-13).

CONNECTING ROD BIG END SIDE CLEARANCE

Measure the clearance between the connecting rod big end and crankshaft using a feeler gauge.

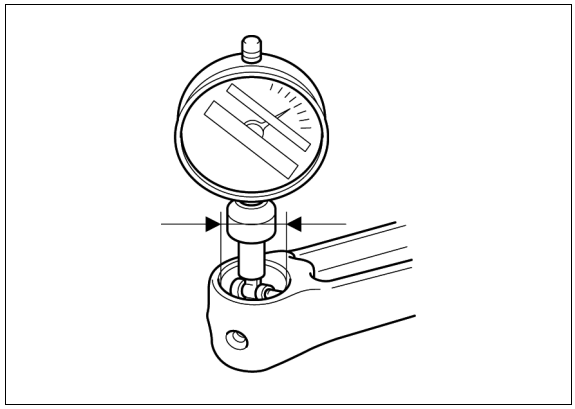


STANDARD: 0.10 – 0.40 mm (0.004 – 0.016 in)
SERVICE LIMIT: 1.0 mm (0.04 in)

If the measurement is more than the service limit, replace the connecting rod (page 14-13) and recheck the clearance.

If the clearance is still more than the service limit with the new connecting rod, replace the crankshaft (page 14-6).

CONNECTING ROD SMALL END I.D.



Measure the connecting rod small end I.D.

GX270H:

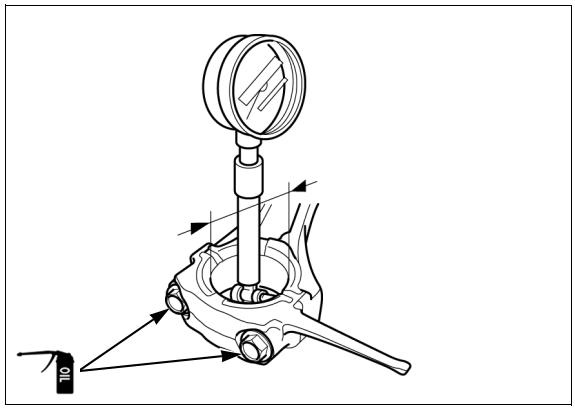
STANDARD: 18.005 – 18.020 mm (0.7089 – 0.7094 in)
SERVICE LIMIT: 18.07 mm (0.711 in)

GX390H1:

STANDARD: 20.005 – 20.020 mm (0.7876 – 0.7882 in)
SERVICE LIMIT: 20.07 mm (0.790 in)

If the measurement is more than the service limit, replace the connecting rod (page 14-13).

CONNECTING ROD BIG END I.D.



Apply engine oil to the connecting rod bolt threading surface.

Set the connecting rod lower to the connecting rod upper and tighten the connecting rod bolts to the specified torque.

TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)

Measure the connecting rod big end I.D.

GX270H:

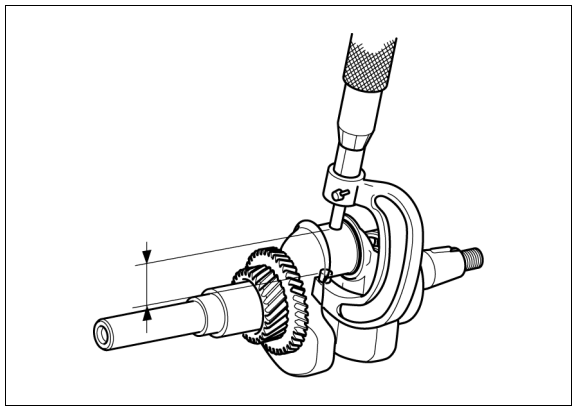
STANDARD: 33.025 – 33.039 mm (1.3002 – 1.3007 in)
SERVICE LIMIT: 33.07 mm (1.302 in)

GX390H1:

STANDARD: 36.025 – 36.039 mm (1.4183 – 1.4189 in)
SERVICE LIMIT: 36.07 mm (1.420 in)

If the measurement is more than the service limit, replace the connecting rod (page 14-13).

CRANKPIN O.D.



Measure the crankpin O.D. of the crankshaft.

GX270H:

STANDARD: 32.975 – 32.985 mm (1.2982 – 1.2986 in)
SERVICE LIMIT: 32.92 mm (1.296 in)

GX390H1:

STANDARD: 35.975 – 35.985 mm (1.4163 – 1.4167 in)
SERVICE LIMIT: 35.93 mm (1.415 in)

If the measurement is less than the service limit, replace the crankshaft (page 14-6).

CONNECTING ROD BIG END OIL CLEARANCE

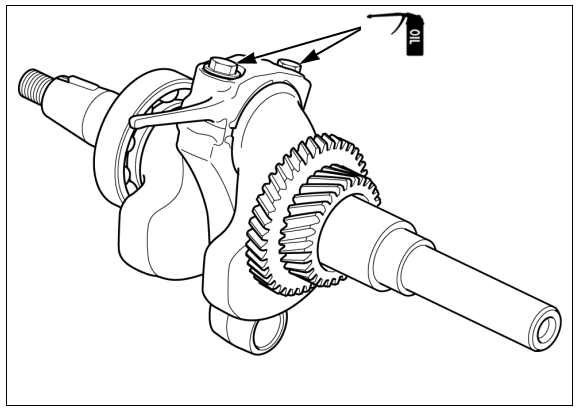
Clean all oil from the crankpin and connecting rod big end surface.

Apply engine oil to the connecting rod bolt threading surface.

Place a piece of plastigauge on the crankpin, install the connecting rod upper and the connecting rod lower, and tighten the connecting rod bolts to the specified torque.

TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)

NOTE:
Do not rotate the crankshaft while the plastigauge is in place.

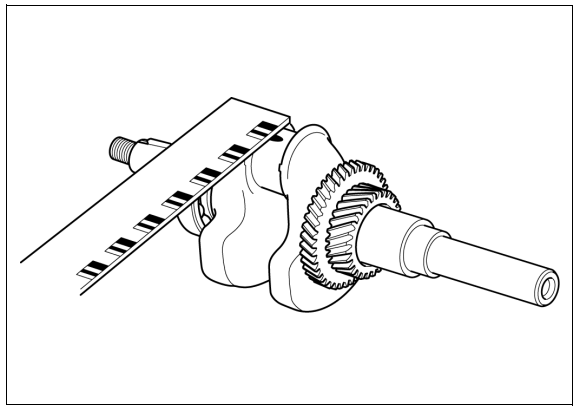


Remove the connecting rod and measure the plastigauge.

STANDARD: 0.040 – 0.064 mm (0.0016 – 0.0025 in)
SERVICE LIMIT: 0.12 mm (0.005 in)

If the clearance is more than the service limit, inspect the connecting rod big end I.D. and the crankpin O.D.

If necessary replace the part that is not within the service limit and reinspect the clearance.



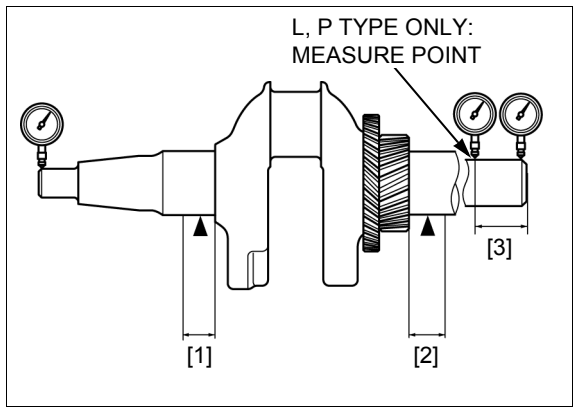
CRANKSHAFT RUNOUT

Set the crankshaft on V-blocks and measure the runout using a dial indicator.

[1] 16 mm (0.6 in)
[2] GX270H: 16 mm (0.6 in)
GX390H1: 17 mm (0.7 in)
[3] GX270H L TYPE: 31 mm (1.2 in)
GX270H P TYPE: 32 mm (1.3 in)
GX390H1 L TYPE: 36 mm (1.4 in)
GX390H1 P TYPE: 32 mm (1.3 in)

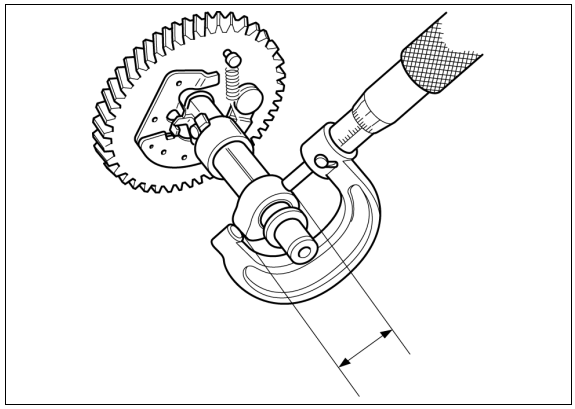
SERVICE LIMIT: 0.10 mm (0.004 in)

If the measured runout is more than the service limit, replace the crankshaft (page 14-6).



CAMSHAFT CAM HEIGHT

Measure the cam height of the camshaft.



GX270H:

STANDARD:
IN: 31.945 – 32.145 mm (1.2577 – 1.2655 in)
EX: 31.666 – 31.866 mm (1.2467 – 1.2546 in)
SERVICE LIMIT:
IN: 31.35 mm (1.234 in)
EX: 31.35 mm (1.234 in)

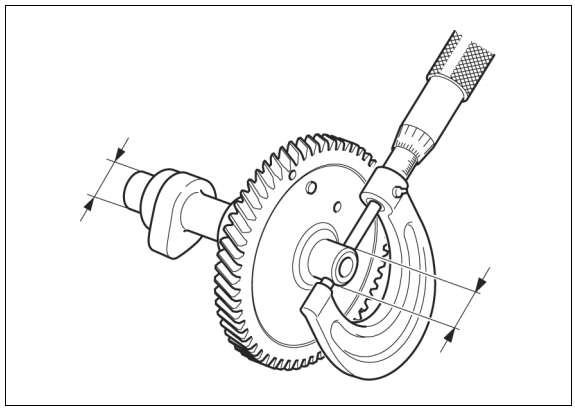
GX390H1:

STANDARD:
IN: 32.498 – 32.698 mm (1.2794 – 1.2873 in)
EX: 31.985 – 32.185 mm (1.2592 – 1.2671 in)
SERVICE LIMIT:
IN: 32.198 mm (1.2676 in)
EX: 29.886 mm (1.1766 in)

If the measurement is less than the service limit, replace the camshaft(page 14-6).

CAMSHAFT O.D.

Measure the camshaft O.D.of the camshaft.



STANDARD: **15.966 – 15.984 mm (0.6286 – 0.6293 in)**
SERVICE LIMIT: **15.92 mm (0.627 in)**

If the measurement is less than the service limit, replace the camshaft (page 14-6).

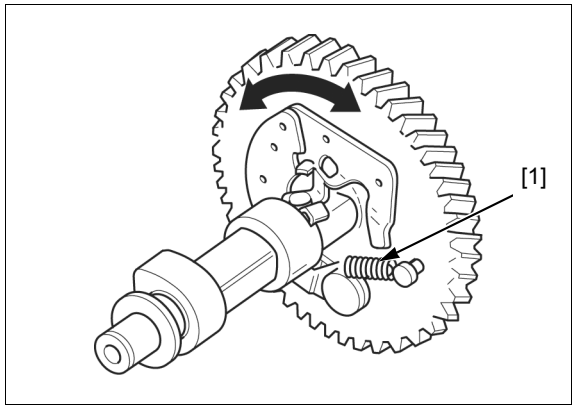
DECOMPRESSOR WEIGHT

Check for worn and weakened spring.

If the return spring [1] is worn or weakened, replace the weight return spring.

Check that the decompressor weight moves smoothly.

If the decompressor weight does not move correctly, replace the camshaft (page 14-6).

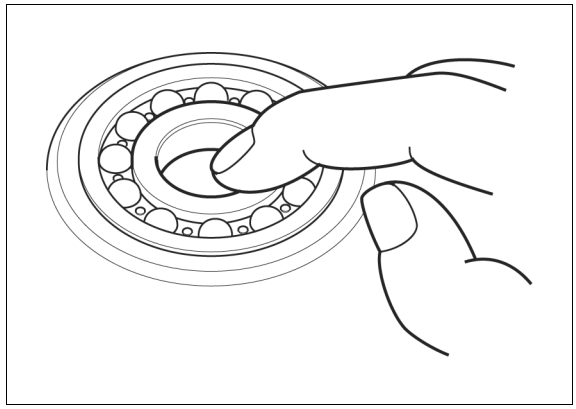


RADIAL BALL BEARING

Clean the bearing with solvent and dry it thoroughly.

Turn the inner race (outer race: cylinder barrel side crankshaft bearing only) of the radial ball bearing with your finger and check for play.

Replace the radial ball bearing if it is noisy or has excessive play.



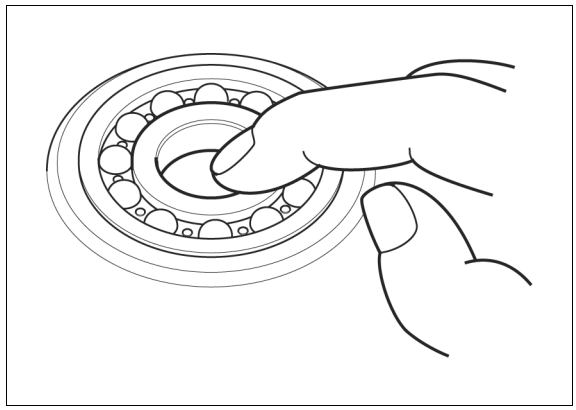
REDUCTION UNIT INSPECTION

RADIAL BALL BEARING

Clean the bearing with solvent and dry it thoroughly.

Turn the inner race of the radial ball bearing with your finger and check for play.

Replace the radial ball bearing if it is noisy or has excessive play.



CHAIN TYPE

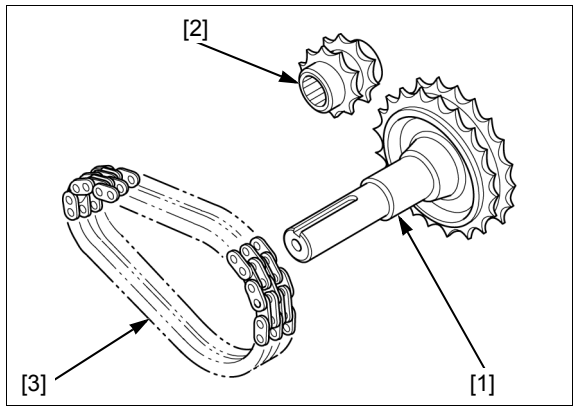
P.T.O. SHAFT, DRIVE SPROCKET, DRIVE CHAIN

Check the following for wear or damage:

– P.T.O. shaft [1]
– Drive sprocket [2]
– Drive chain [3]

NOTE:

• Replace the P.T.O. shaft, drive sprocket and drive chain as a set.

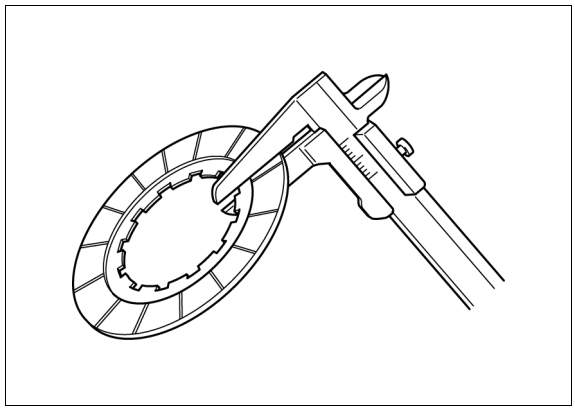


CLUTCH TYPE

CLUTCH FRICTION DISC

Measure the clutch friction disc thickness.

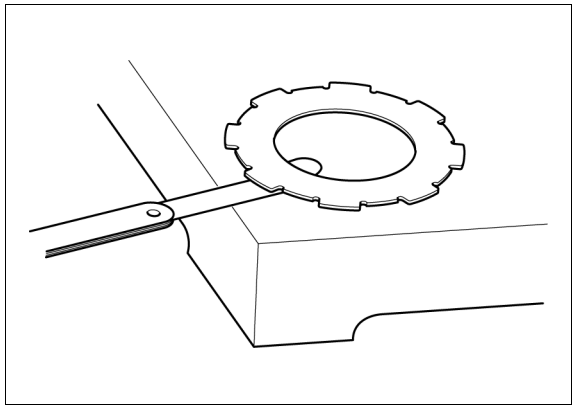
STANDARD: 3.5 mm (0.14 in)
SERVICE LIMIT: 3.0 mm (0.12 in)



CLUTCH PLATE

Check the clutch plate warpage on a flat plate using a feeler gauge.

SERVICE LIMIT: 0.1 mm (0.004 in)



P.T.O. SHAFT, DRIVE SPROCKET, DRIVE CHAIN, CLUTCH CENTER

Check the following for wear or damage:

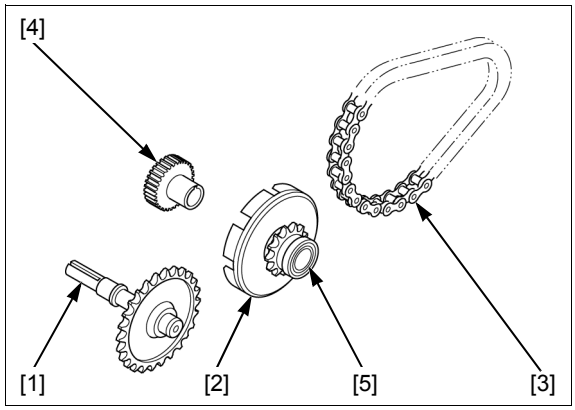
– P.T.O. shaft [1]
– Drive sprocket [2]
– Drive chain [3]
– Clutch center [4]

NOTE:

• Replace the P.T.O. shaft, drive sprocket and drive chain as a set.

Check the grooves of the drive sprocket for damage or wear caused by the clutch plate, replace it if necessary.

Check the drive sprocket bushing [5] for damage or excessive wear, replace the drive sprocket if necessary.

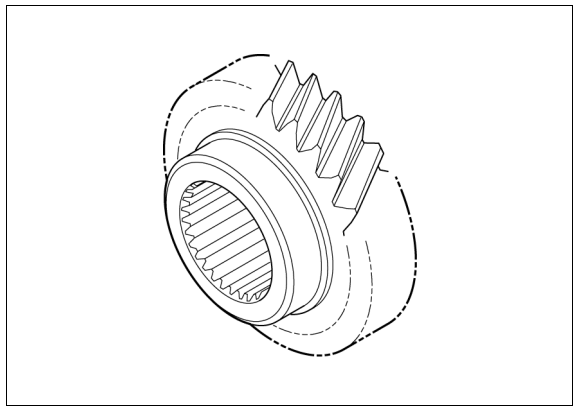


GEAR TYPE

PRIMARY DRIVE GEAR

Check for worn and weakened primary drive gear.

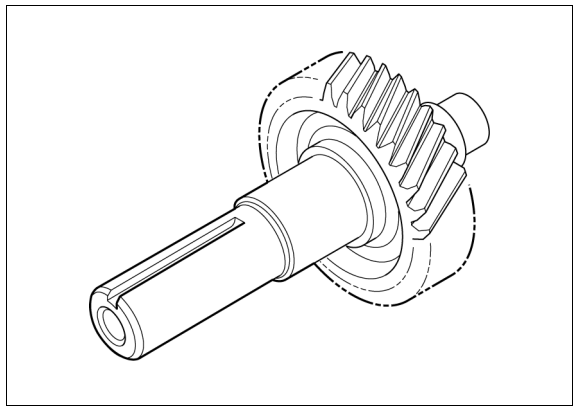
If necessary, replace the primary drive gear (page 14-10).



P.T.O. SHAFT

Check for worn and weakened gear of the P.T.O. shaft.

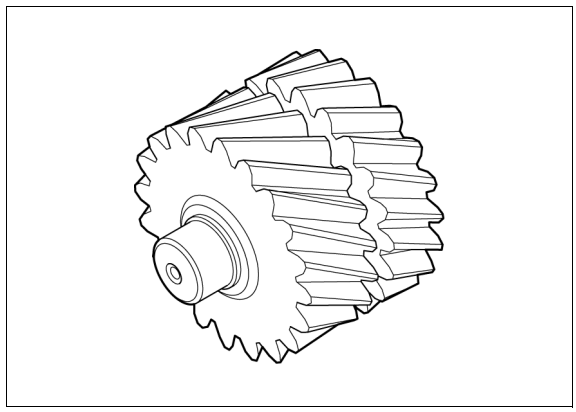
If necessary, replace the P.T.O. shaft (page 14-10).



COUNTERSHAFT

Check for worn and weakened gears of the countershaft.

If necessary, replace the countershaft (page 14-10).



CRANKSHAFT/BALANCER WEIGHT BEARING/OIL SEAL REPLACEMENT (CRANKCASE COVER SIDE)

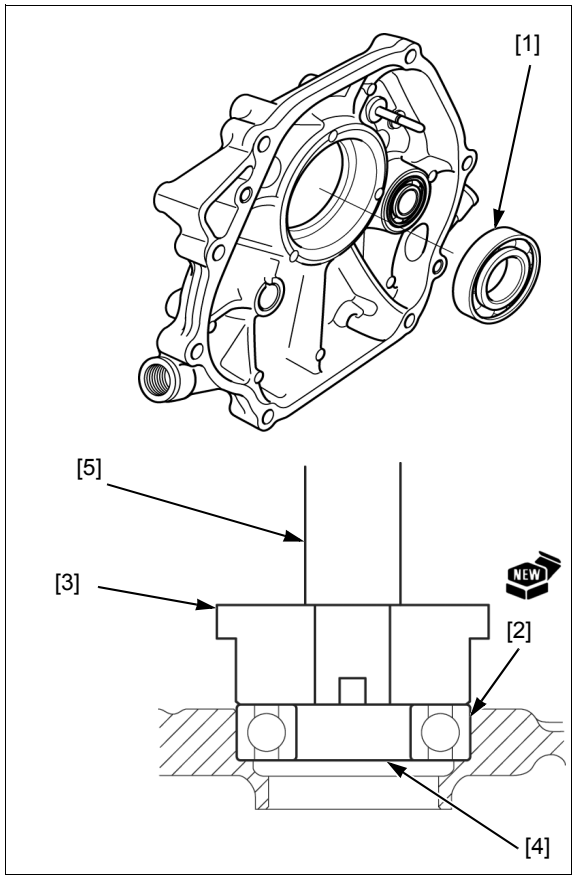
CRANKSHAFT BEARING

Drive out the radial ball bearing [1].

Drive a new bearing [2] until it is fully seated on the end using the special tools.

TOOLS:

GX270H (6206):	
Attachment, 62 x 64 mm [3]	**07947-6340400**
Pilot, 30 mm [4]	**07746-0040700**
Driver handle [5]	**07749-0010000**
GX390H1 (6207):	
Attachment, 72 x 75 mm [3]	**07746-0010600**
Pilot, 35 mm [4]	**07746-0040800**
Driver handle [5]	**07749-0010000**



CRANKSHAFT OIL SEAL

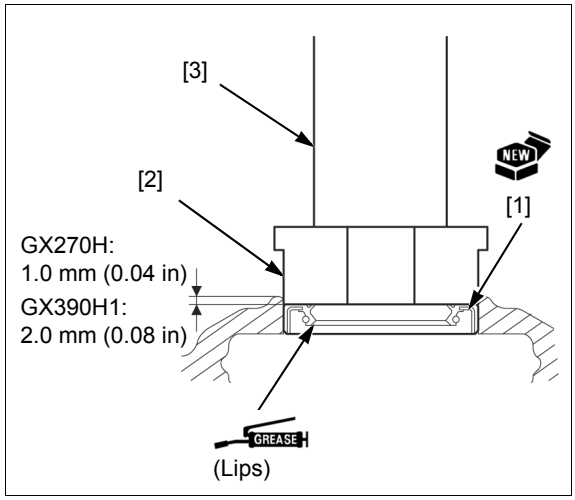
Remove the oil seal from the crankcase cover.

Drive a new oil seal [1] in the position as shown using the special tools.

TOOLS:

GX270H (30 x 46 x 8 mm):	
Attachment, 45 x 50 mm [2]	**07946-6920100**
Driver handle [3]	**07749-0010000**
GX390H1 (35 x 52 x 8 mm):	
Attachment, 52 x 55 mm [2]	**07746-0010400**
Driver handle [3]	**07749-0010000**

Apply grease to the lip of a oil seal.



BALANCER WEIGHT BEARING (6202) (GX390H1 ONLY)

Pull out the radial ball bearing [1] using the special tools.

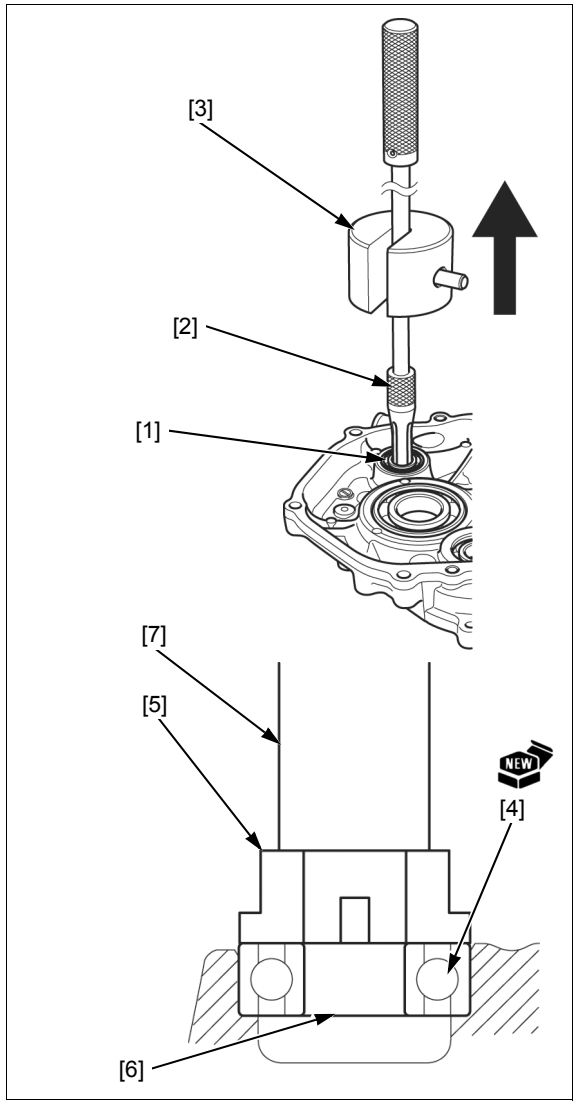
TOOLS:

Bearing remover shaft set, 15 mm [2]	**07936-KC10500**
Sliding hammer weight [3]	**07741-0010201**

Drive a new bearing [4] until it is fully seated on the end using the special tools.

TOOLS:

Attachment, 32 x 35 mm [5]	**07746-0010100**
Pilot, 15 mm [6]	**07746-0040300**
Driver handle [7]	**07749-0010000**



CRANKSHAFT BEARING REPLACEMENT (FLYWHEEL SIDE)

CRANKSHAFT BEARING (6206)

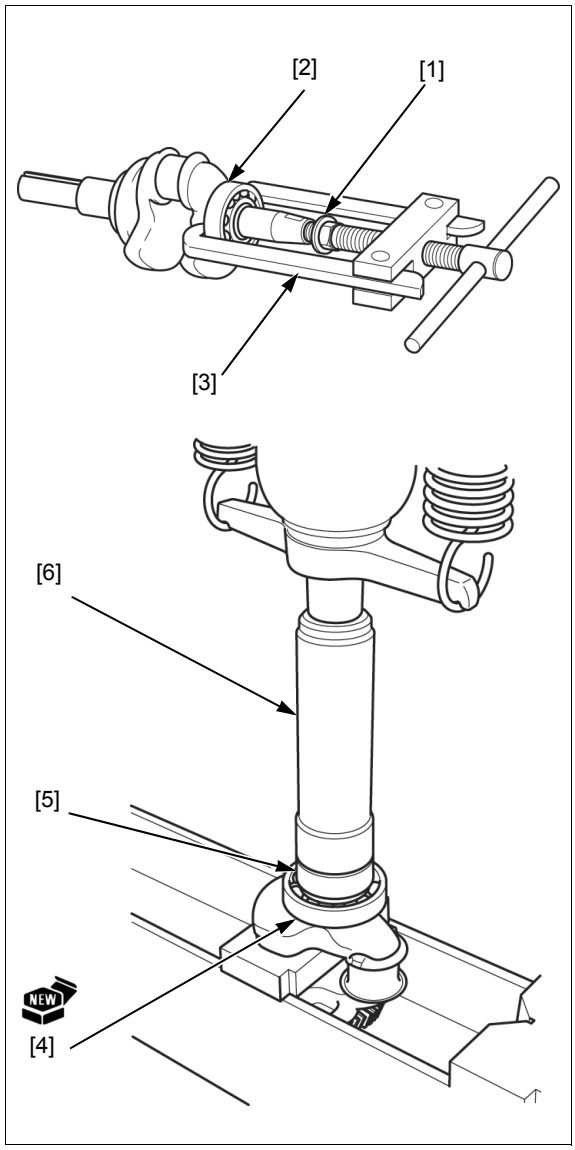
Install the 16 mm special nut [1] tightening the flywheel to protect the crankshaft threads.

Pull out the radial ball bearing [2] using a commercially available bearing puller [3].

Drive a new bearing [4] until it is fully seated on the end using the special tools and hydraulic press.

TOOLS:

GX270H (6206):	
Attachment, 30 mm [5]	**07746-0030300**
Inner driver handle, 40 mm [6]	**07746-0030100**
GX390H1 (6207):	
Attachment, 35 mm [5]	**07746-0030400**
Inner driver handle, 40 mm [6]	**07746-0030100**



GX270H CRANKSHAFT OIL SEAL REPLACEMENT (CYLINDER BARREL SIDE)

CRANKSHAFT OIL SEAL (30 x 46 x 8 mm)

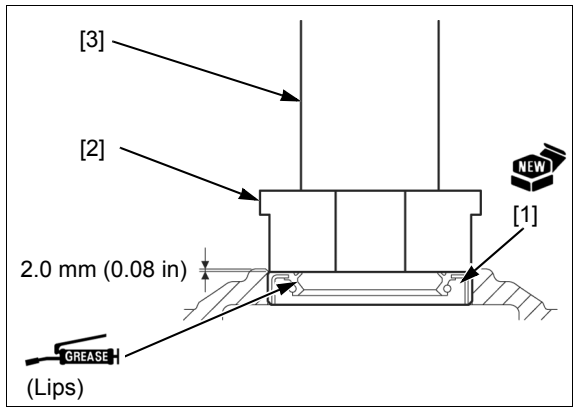
Remove the oil seal from the cylinder barrel.

Drive a new oil seal [1] in the position as shown using the special tools.

TOOLS:

Attachment, 45 x 50 mm [2]	**07946-6920100**
Driver handle [3]	**07749-0010000**

Apply grease to the lip of a oil seal.



GX390H1 BALANCER WEIGHT BEARING/GOVERNOR ARM SHAFT OIL SEAL/CRANKSHAFT OIL SEAL REPLACEMENT (CYLINDER BARREL SIDE)

BALANCER WEIGHT BEARING (6202)

Pull out the radial ball bearing [1] using the special tools.

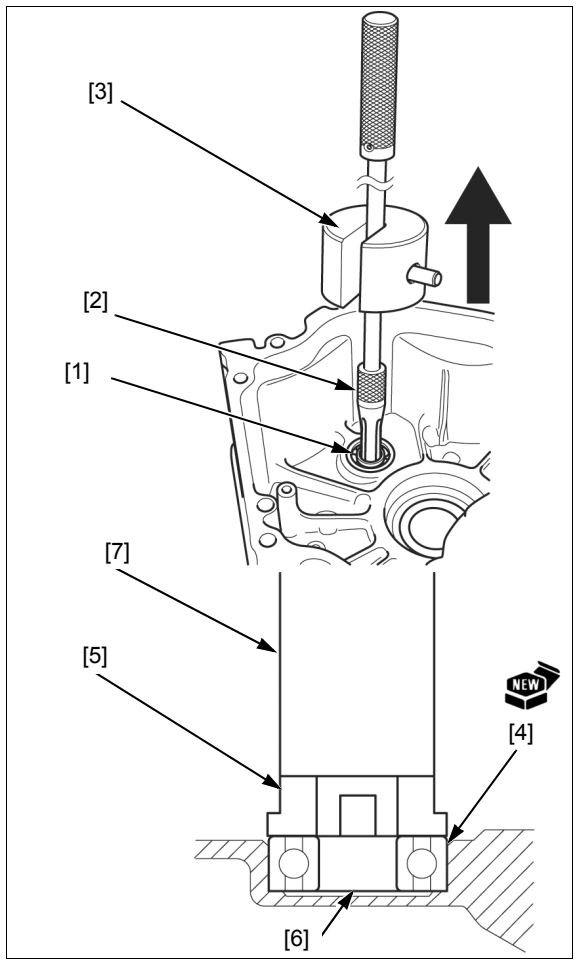
TOOLS:

Bearing remover shaft set, 15 mm [2]	**07936-KC10500**
Sliding hammer weight [3]	**07741-0010201**

Drive a new bearing [4] until it is fully seated on the end using the special tools.

TOOLS:

Attachment, 32 x 35 mm [5]	**07746-0010100**
Pilot, 15 mm [6]	**07746-0040300**
Driver handle [7]	**07749-0010000**



GOVERNOR ARM SHAFT OIL SEAL (8 x 14 x 5 mm)

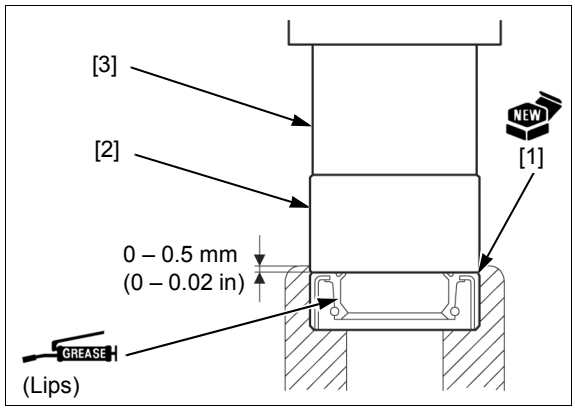
Remove the oil seal from the cylinder barrel.

Drive a new oil seal [1] in the position as shown using the special tools.

TOOLS:

Pilot, 14 mm [2]	**07746-0041200**
Driver handle [3]	**07749-0010000**

Apply grease to the lip of a oil seal.



CRANKSHAFT OIL SEAL (35 x 52 x 8 mm)

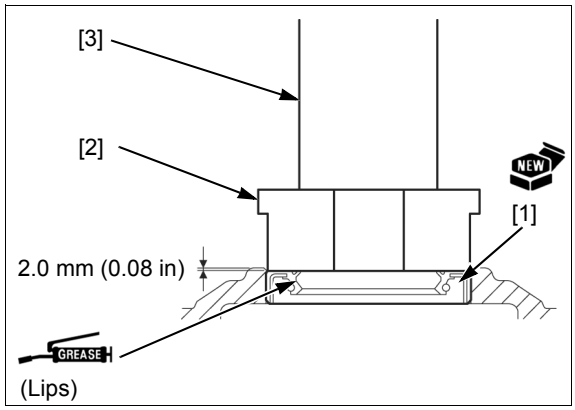
Remove the oil seal from the cylinder barrel.

Drive a new oil seal [1] in the position as shown using the special tools.

TOOLS:

Attachment, 52 x 55 mm [2]	**07746-0010400**
Driver handle [3]	**07749-0010000**

Apply grease to the lip of a oil seal.



GX270H CRANKSHAFT/P.T.O.SHAFT OIL SEAL REPLACEMENT (1/2 REDUCTION CLUTCH TYPE)

P.T.O.SHAFT OIL SEAL (30 x 50 x 7 mm)

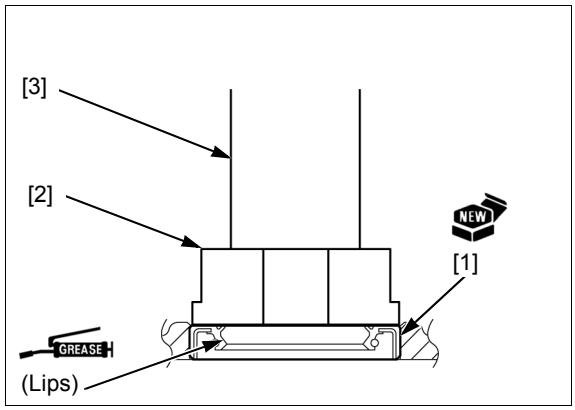
Remove the oil seal from the reduction cover.

Drive a new oil seal [1] in the position as shown using the special tools.

TOOLS:

Attachment, 45 x 50 mm [2]	**07946-6920100**
Driver handle [3]	**07749-0010000**

Apply grease to the lip of a oil seal.



CRANKSHAFT OIL SEAL (30 x 46 x 8 mm)

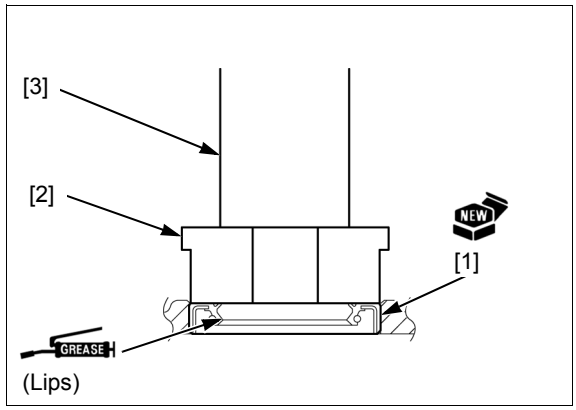
Remove the oil seal from the reduction case.

Drive a new oil seal [1] in the position as shown using the special tools.

TOOLS:

Attachment, 45 x 50 mm [2]	**07946-6920100**
Driver handle [3]	**07749-0010000**

Apply grease to the lip of a oil seal.



P.T.O. SHAFT BEARING (6205)

Pull out the P.T.O. shaft bearing [1] using the special tools.

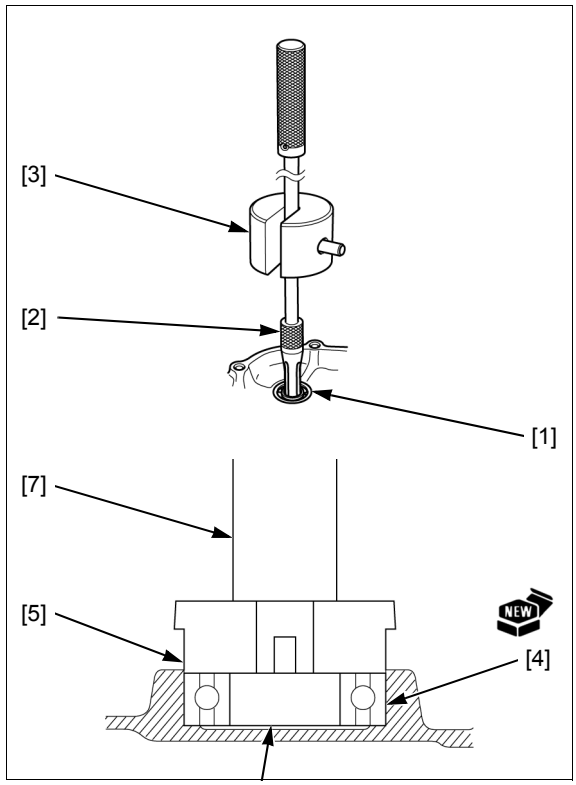
TOOLS:

Bearing remover shaft set, 25 mm [2]	**07936-ZV10100**
Sliding hammer weight [3]	**07741-0010201**

Drive a new P.T.O. shaft bearing [4] until it is fully seated on the end using the special tools.

TOOLS:

Bearing driver attachment, 52 x 55 mm [5]	**07746-0010400**
Pilot, 25 mm [6]	**07746-0040600**
Driver handle [7]	**07749-0010000**



REDUCTION COVER SIDE P.T.O. SHAFT BEARING (6206)

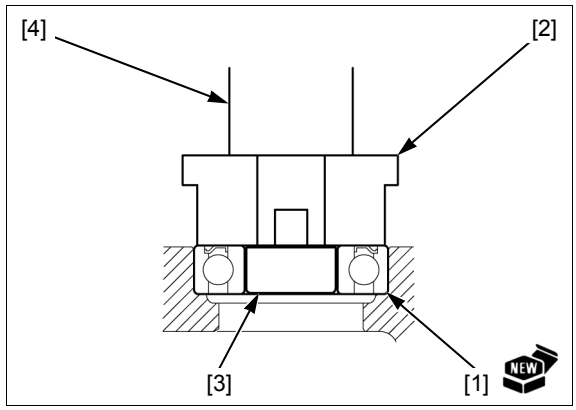
REDUCTION COVER SIDE P.T.O. SHAFT BEARING (6206)

Remove the oil seal and drive out the P.T.O. shaft bearing.

Drive a new P.T.O. shaft bearing [1] until it is fully seated on the end using the special tools.

TOOLS:

Bearing driver attachment, 62 x 64 mm [2]	**07947-6340400**
Pilot, 30 mm [3]	**07746-0040700**
Driver handle [4]	**07749-0010000**



GX390H1 COUNTERSHAFT/P.T.O. SHAFT BEARING/OIL SEAL REPLACEMENT (1/6 REDUCTION GEAR TYPE)

COUNTERSHAFT BEARING (6202) (6302)

Pull out the radial ball bearing [1] using the special tools.

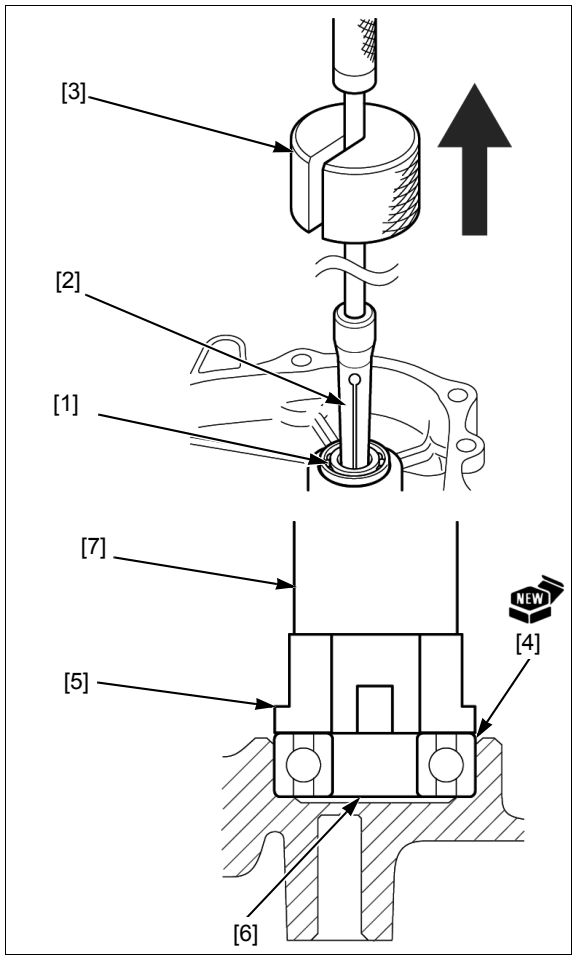
TOOLS:

Bearing remover shaft set, 15 mm [2]	**07936-KC10500**
Sliding hammer weight [3]	**07741-0010201**

Drive a new bearing [4] until it is fully seated on the end using the special tools.

TOOLS:

Attachment, 32 x 35 mm [5]	**07746-0010100**
Pilot, 15 mm [6]	**07746-0040300**
Driver handle [7]	**07749-0010000**



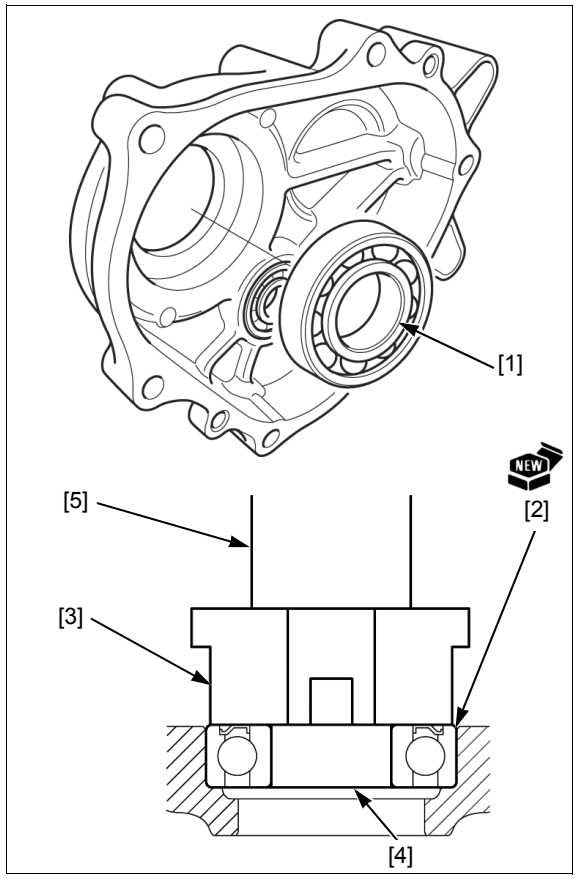
P.T.O. SHAFT BEARING (6206)

Drive out the radial ball bearing [1].

Drive a new bearing [2] until it is fully seated on the end using the special tools.

TOOLS:

Attachment, 62 x 64 mm [3]	**07947-6340400**
Pilot, 30 mm [4]	**07746-0040700**
Driver handle [5]	**07749-0010000**



P.T.O. SHAFT OIL SEAL (30 x 46 x 8 mm)

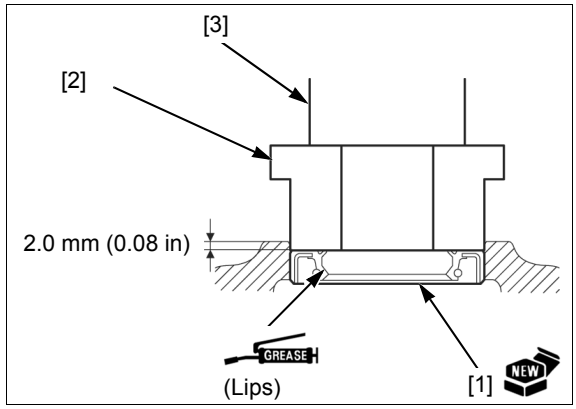
Remove the oil seal from the crankcase cover.

Drive a new oil seal [1] in the position as shown using the special tools.

TOOLS:

Attachment, 45 x 50 mm [2]	**07946-6920100**
Driver handle [3]	**07749-0010000**

Apply grease to the lip of a oil seal.



GX270H COUNTERSHAFT/P.T.O. SHAFT BEARING REPLACEMENT (CRANKCASE COVER SIDE)

P.T.O. SHAFT BEARING (6204)

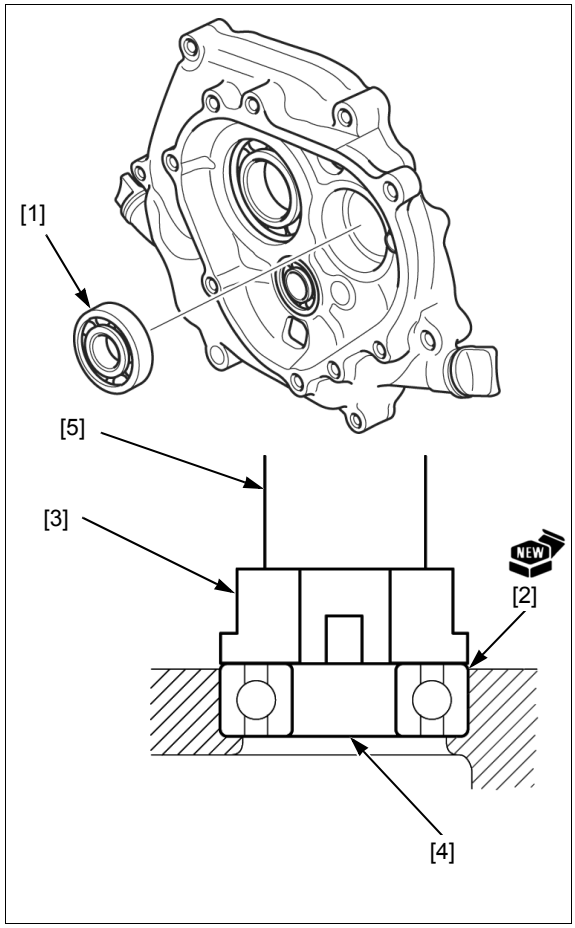
Remove the crankcase cover (page 14-4).

Drive out the radial ball bearing [1].

Drive a new bearing [2] until it is fully seated on the end using the special tools.

TOOLS:

Attachment, 42 x 47 mm [3]	**07746-0010300**
Pilot, 20 mm [4]	**07746-0040500**
Driver handle [5]	**07749-0010000**



GX390H1 COUNTERSHAFT/P.T.O. SHAFT BEARING REPLACEMENT (CRANKCASE COVER SIDE)

COUNTERSHAFT BEARING (6202)

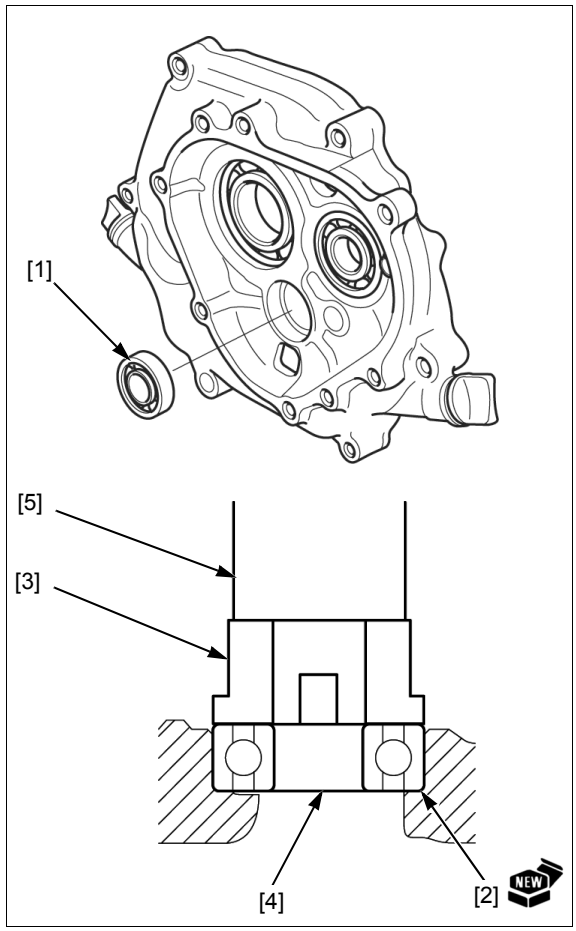
Remove the crankcase cover (page 14-4).

Drive out the radial ball bearing [1] using the special tools.

Drive a new bearing [2] until it is fully seated on the end using the special tools.

TOOLS:

Attachment, 32 x 35 mm [3]	**07746-0010100**
Pilot, 15 mm [4]	**07746-0040300**
Driver handle [5]	**07749-0010000**



P.T.O. SHAFT BEARING (6204)

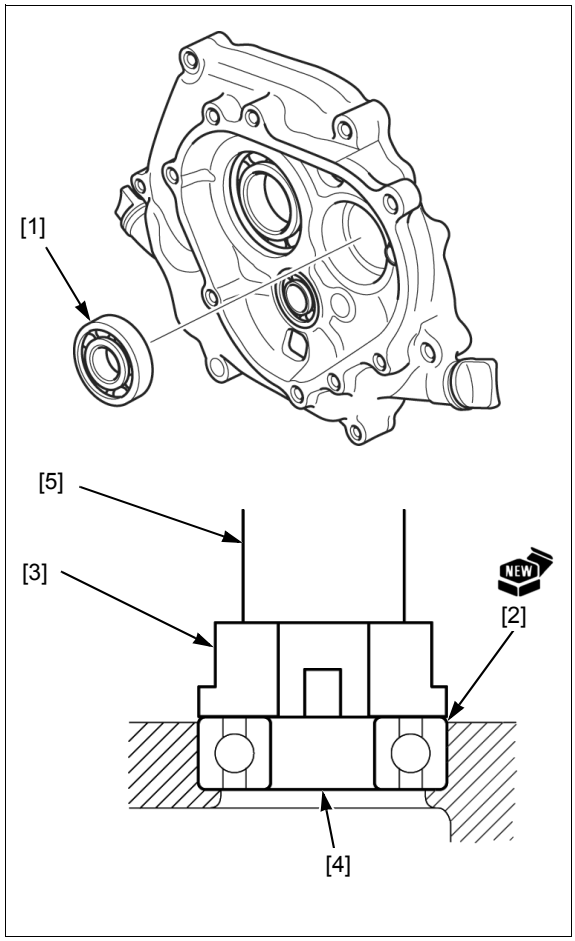
Remove the crankcase cover (page 14-4).

Drive out the radial ball bearing [1].

Drive a new bearing [2] until it is fully seated on the end using the special tools.

TOOLS:

Attachment, 42 x 47 mm [3]	**07746-0010300**
Pilot, 20 mm [4]	**07746-0040500**
Driver handle [5]	**07749-0010000**



15. WIRING DIAGRAMS

HOW TO READ A WIRING DIAGRAM & RELATED INFORMATION

The wiring diagram, connector general layout drawing, connector drawings, and the symbols used in troubleshooting are explained in this section.

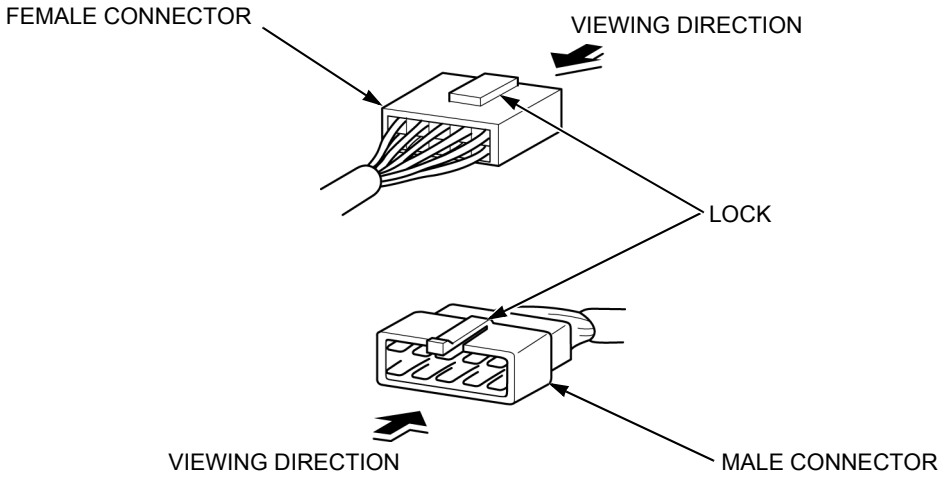
HOW TO READ CONNECTOR DRAWINGS

Connector drawings show the terminal arrangement, terminal No., number of pins, and the shape of terminal (male or female).

Both the male and female connectors are shown for the common connectors, while only the main wire harness side connectors are shown for the dedicated connectors.

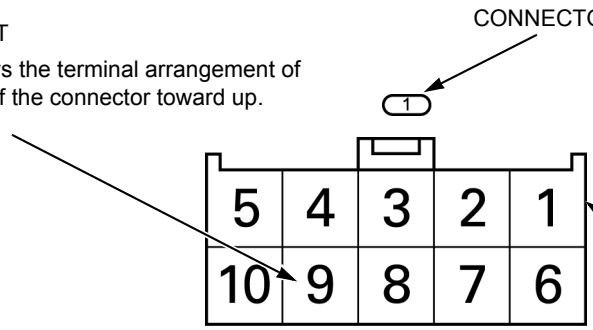
The double frame connectors represent the male connectors and the single frame connectors represent the female connectors.

Both the male and female connectors are shown by viewing them from the terminal side.



TERMINAL ARRANGEMENT

The connector drawing shows the terminal arrangement of the connector with the lock of the connector toward up.



FEMALE CONNECTOR DRAWING

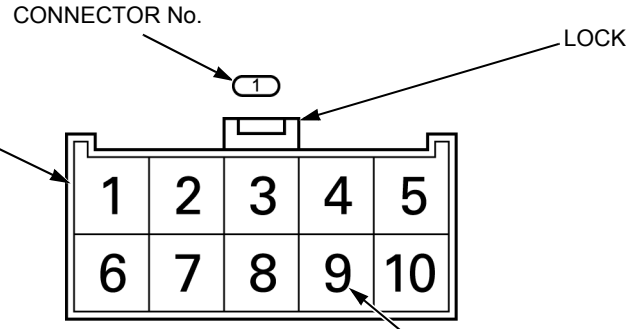
(SINGLE FRAME)

Female connector viewed from the terminal side.

MALE CONNECTOR DRAWING

(DOUBLE FRAME)

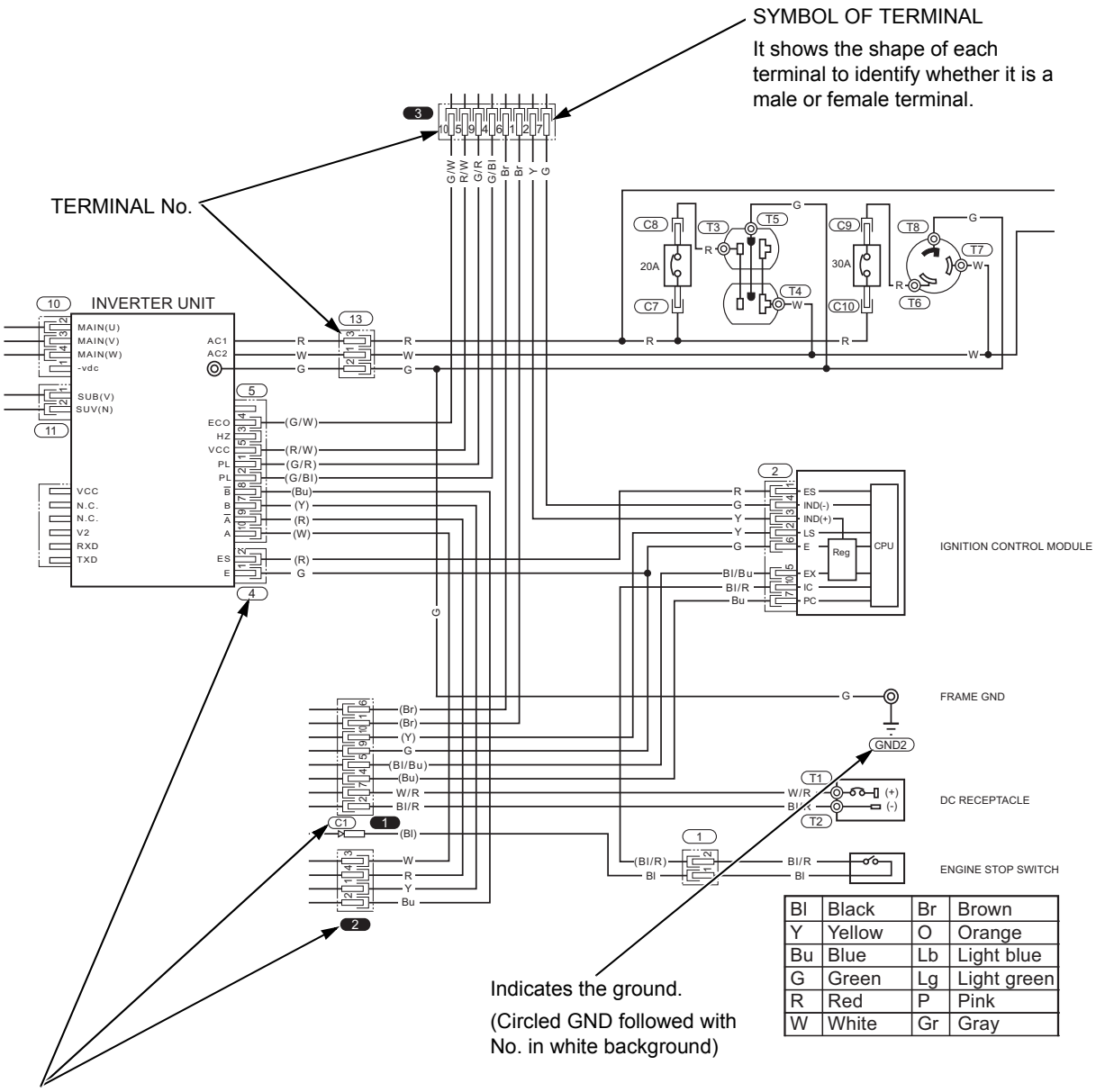
Male connector viewed from the terminal side.



TERMINAL No.

The system drawing shows the No.9 terminal of the connector.

HOW TO READ WIRING DIAGRAM



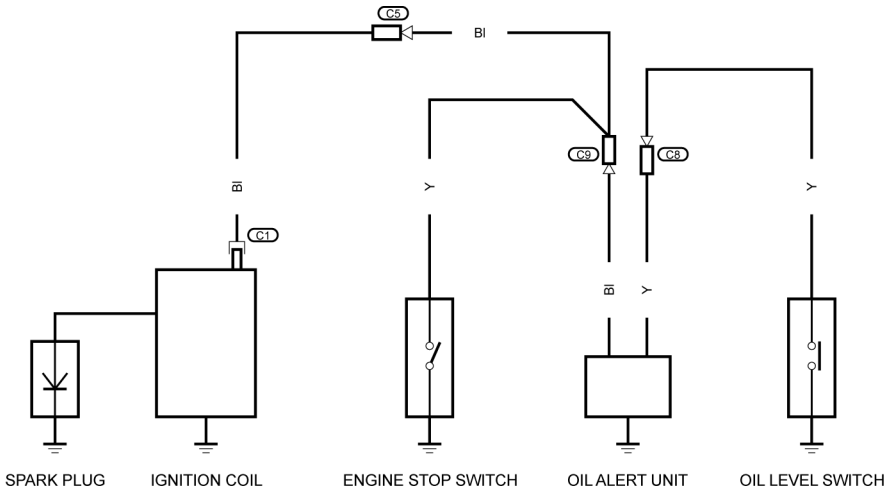
Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray

Every connector and terminal has a number to help the users find the location and shape of the connector and the terminal arrangement by referring to the “Connector general layout drawing” and/or the “Connector drawing.” All the connector/terminal numbers shown in this Service Manual are either of those shown in this section.

- (1) : Connector that relays from a harness to a harness (Circled No. in black background)
- (1) : Connector that connects to electrical equipment (Circled No. in white background)
- (C1) : Connector (Circled C followed with No. in white background)
- (T1) : Terminal (Circled T followed with No. in white background)
- (GND1) : Ground (Circled GND followed with No. in white background)

WIRING DIAGRAMS

NO CHARGE COIL TYPE

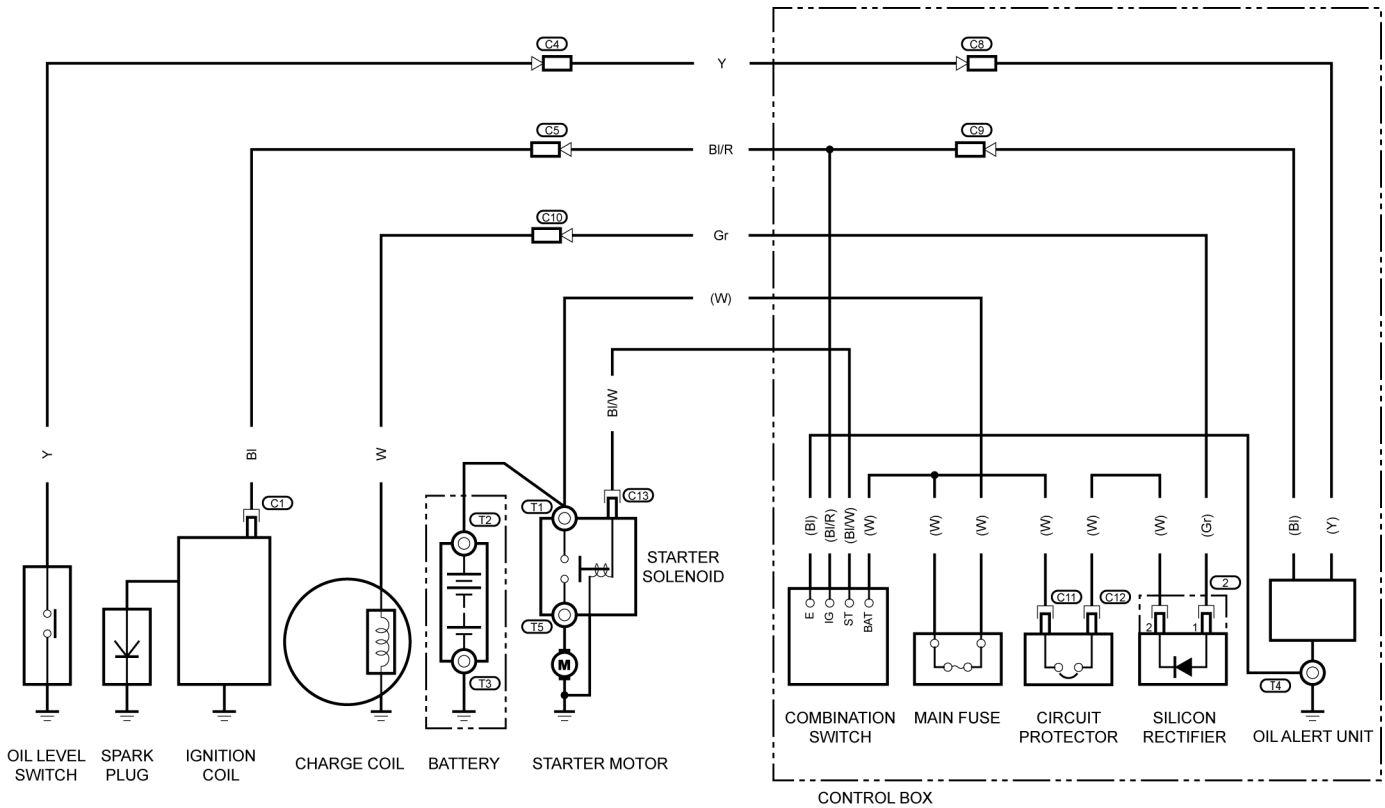


ENGINE STOP SWITCH

	IG	E
OFF	○	○
ON		

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

1 A/3 A CHARGE COIL TYPE



COMBINATION SWITCH

	IG	E	BAT	ST
OFF	○	○		
ON				
ST			○	○

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

INDEX