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 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.

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CONTENTS

INTRODUCTION

This manual covers the service and repair procedures for the Honda GXR120T/RT.

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.

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

SAFETY MESSAGES

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

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

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

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

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

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

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

SERVICE PUBLICATION OFFICE

Date of Issue: September 2013

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

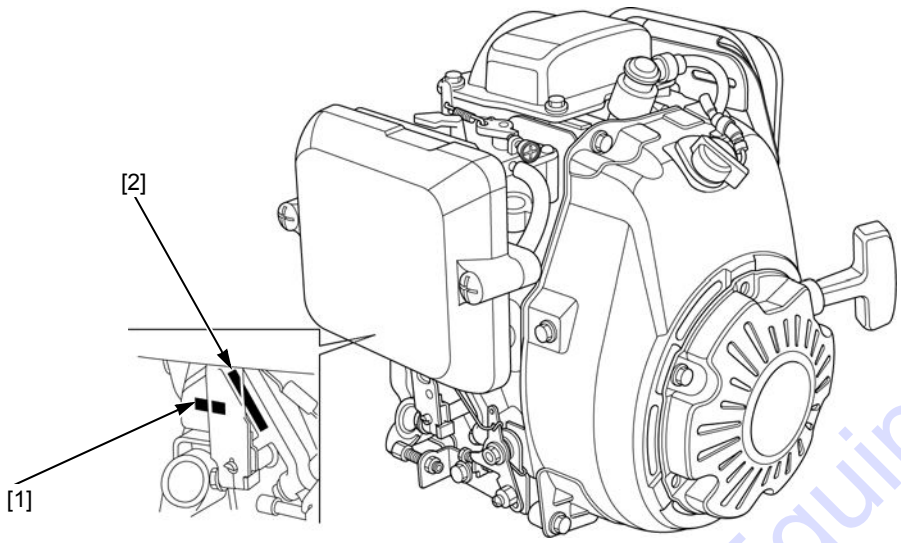
Bl	Black	G	Green	Br	Brown	Lg	Light green
Y	Yellow	R	Red	O	Orange	P	Pink
Bu	Blue	W	White	Lb	Light blue	Gr	Gray

1. SPECIFICATIONS

SERIAL NUMBER LOCATION

The model [1] and engine serial number [2] are stamped on the crankcase.

Refer to them when ordering parts or making technical inquiries.



TYPE VARIATIONS

TYPE		KRH	KRH2	KRGA	KRAA	KRGF	KRDF	KRBF	KRSB	KRWF	KRWB	KRDP	KRDY
Crankshaft	Tapered			○	○	○	○	○		○	○		
	Straight	○	○						○			○	○
Carburetor	Float		○										○
	Floatless	○		○	○	○			○	○			
	Floatless (with primer pump)						○	○			○	○	
Inline fuel filter	Bulge Φ5						○	○	○		○		
	Bulge Φ7												
Air cleaner	Single	○		○		○			○	○	○		
	Dual		○										
	Elbow							○					
P.T.O. flange	P.T.O. flange A						○					○	○
	P.T.O. flange B	○	○						○				
Engine stop switch		○	○				○				○		
Oil level switch				○	○	○				○	○	○	○
Oil alert unit				○	○	○				○	○	○	○

TYPE		KRM	KRB4	KRF2	KRE4	KREU	KRA2	KRG	KREE	KRB5	KRS2	KRMB
Crankshaft	Tapered	○		○		○		○		○	○	○
	Straight		○		○		○		○			
Carburetor	Float		○				○			○	○	
	Floatless	○		○	○	○		○	○			○
	Floatless (with primer pump)											
Inline fuel filter	Bulge Φ5	○	○									
	Bulge Φ7										○	
Air cleaner	Single		○	○							○	
	Dual	○			○	○	○					○
	Elbow									○		
P.T.O. flange	P.T.O. flange A	○	○		○				○			
	P.T.O. flange B			○			○				○	○
Engine stop switch		○	○		○	○	○		○			○
Oil level switch												
Oil alert unit												

DIMENSIONS AND WEIGHTS SPECIFICATIONS

	TYPE	DIMENSIONS AND WEIGHTS
Overall length	KRGA, KRGF, KRWF, KRWB, KREU, KRBF, KRAA, KRG, KRB5	259 mm (10.2 in)
	KRDF, KRDP, KREE, KRM, KRE4, KRB4, KRDY	271 mm (10.7 in)
	KRH, KRH2, KRSB, KRMB, KRF2, KRA2, KRS2	273 mm (10.7 in)
Overall width	KRAA, KRG, KRDY	264 mm (10.4 in)
	KRBF, KRB5	268 mm (10.6 in)
	KRH2, KRM, KRE4, KRA2, KRS2, KRB4	283 mm (11.1 in)
	KRGA, KRGF, KRWF, KRWB, KREU, KRH, KRSB, KRMB, KRF2, KRDF, KRDP, KREE	294 mm (11.6 in)
Overall height	all types	290 mm (11.4 in)
Dry weight	KRBF, KRM, KRE4, KRAA, KRG	10.1 kg (22.3 lbs)
	KRB5	10.2 kg (22.5 lbs)
	KRGA, KRGF, KRWF, KRWB, KREU	10.4 kg (22.9 lbs)
	KRH2	10.9 kg (24.0 lbs)
	KRH	11.0 kg (24.3 lbs)
	KRSB, KRMB, KRF2	11.1 kg (24.5 lbs)
	KRA2, KRS2, KRDY	11.2 kg (24.7 lbs)
	KRDF, KRDP, KREE	11.4 kg (25.1 lbs)
	KRB4	11.5 kg (25.4 lbs)
Operating weight	KRBF, KRM, KRE4, KRAA, KRG	10.3 kg (22.7 lbs)
	KRB5	10.4 kg (22.9 lbs)
	KRGA, KRGF, KRWF, KRWB, KREU	10.6 kg (23.4 lbs)
	KRH2	11.1 kg (24.5 lbs)
	KRH	11.2 kg (24.7 lbs)
	KRSB, KRMB, KRF2	11.3 kg (24.9 lbs)
	KRA2, KRS2, KRDY	11.4 kg (25.1 lbs)
	KRDF, KRDP, KREE	11.6 kg (25.6 lbs)
	KRB4	11.7 kg (25.8 lbs)

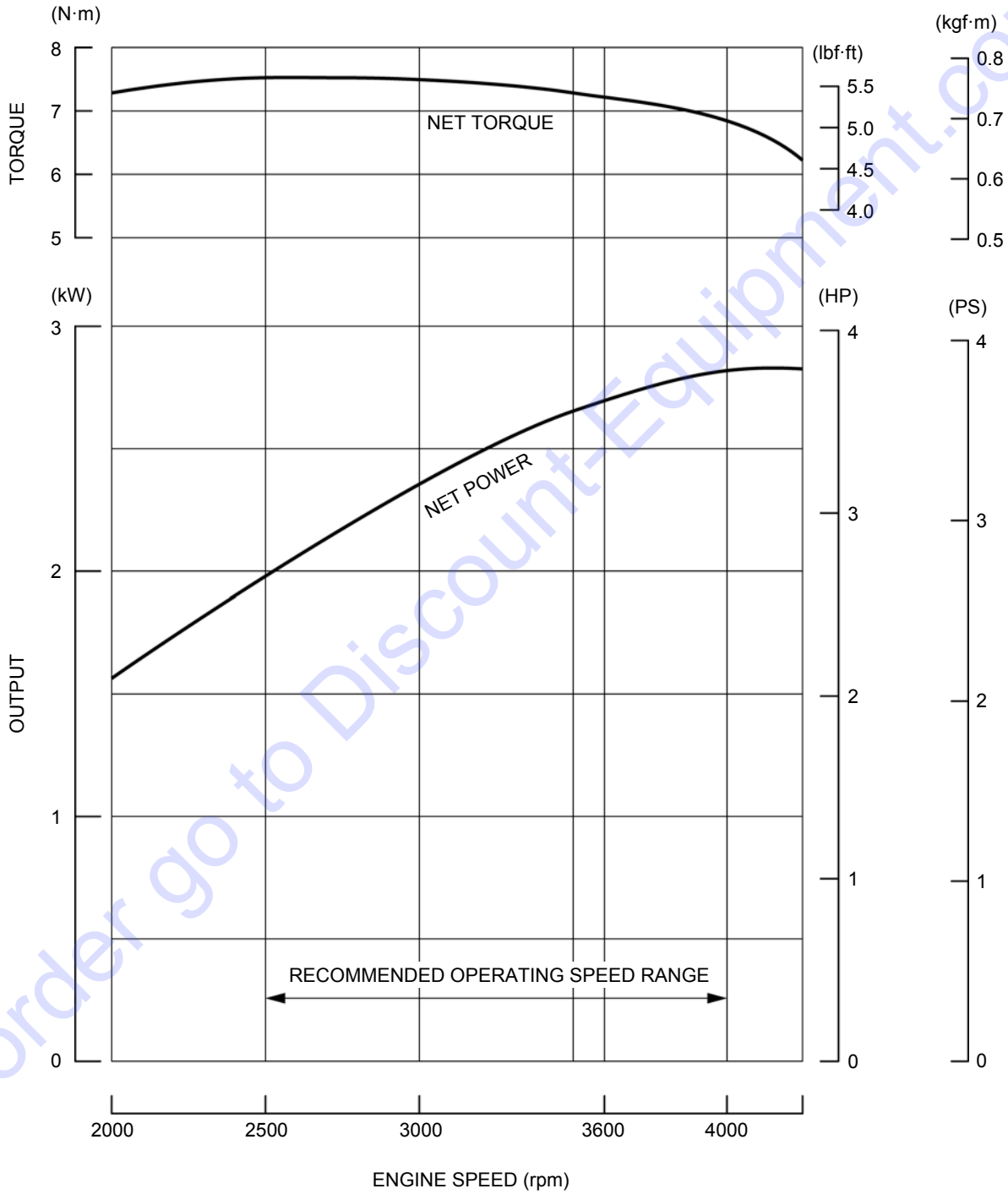
ENGINE SPECIFICATIONS

Model	GXR120T	GXR120RT
Description code	GCCET	GCCDT
Type	4 stroke, overhead camshaft, single cylinder	
Displacement	121 cm^3 (7.4 cu-in)	
Bore x stroke	60.0 x 43.0 mm (2.36 x 1.69 in)	
Net power (SAE J1349) *1	2.7 kW (3.6 HP)/3,600 min^{-1} (rpm)	
Continuous rated power	2.1 kW (2.8 HP)/3,600 min^{-1} (rpm)	
Maximum net torque (SAE J1349) *1	7.5 N·m (0.8 kgf·m, 5.5 lbf·ft)/2,500 min^{-1} (rpm)	
Compression ratio	8.5 : 1	
Fuel consumption (at continuous rated power)	1.0 Liter (0.26 US gal, 0.22 Imp gal)/h	
Ignition system	Transistorized magneto ignition	
Ignition timing	25° B.T.D.C.	
Recommended spark plug	CR5HSB (NGK)/U16FSR-UB (DENSO)	
Lubrication system	Forced splash	
Oil capacity	0.28 Liter (0.30 US qt, 0.25 Imp qt) *2	
Recommended oil	SAE 10W-30 API service classification SE or higher	
Cooling system	Forced air	
Starting system	Recoil	
Stopping system	Ignition primary circuit ground	
Carburetor	Float type, Horizontal butterfly valve type, Diaphragm type	
Air cleaner	Single type, Dual type	Single type, Dual type, Elbow type
Governor	Mechanical centrifugal	
Breather system	Reed valve type	
Fuel used	Regular unleaded gasoline (86 pump octane)	
P.T.O. shaft rotation	Counterclockwise (from P.T.O. side)	

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

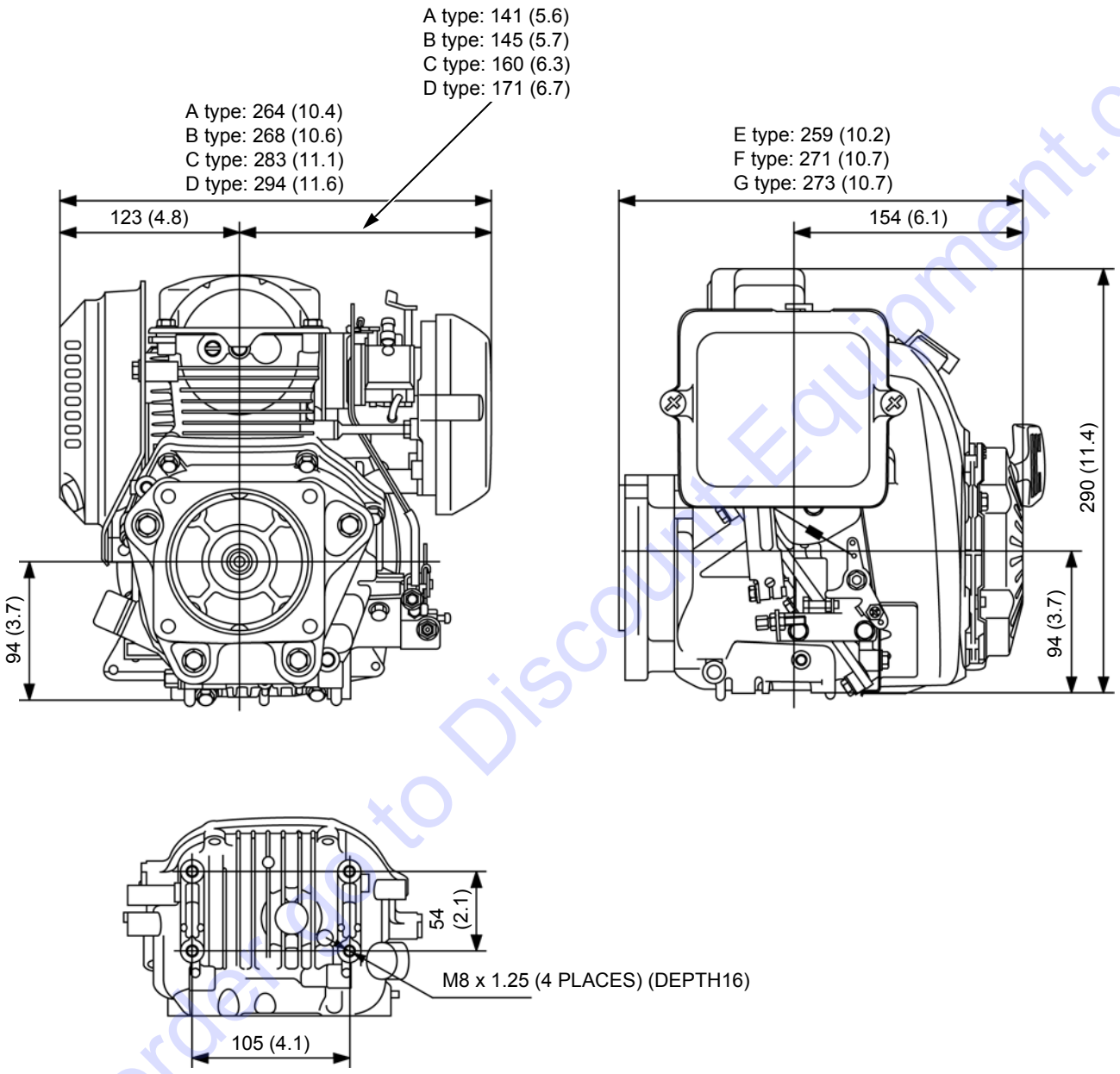
*2: When tilted at 15°

PERFORMANCE CURVES



DIMENSIONAL DRAWINGS

Unit: mm (in)

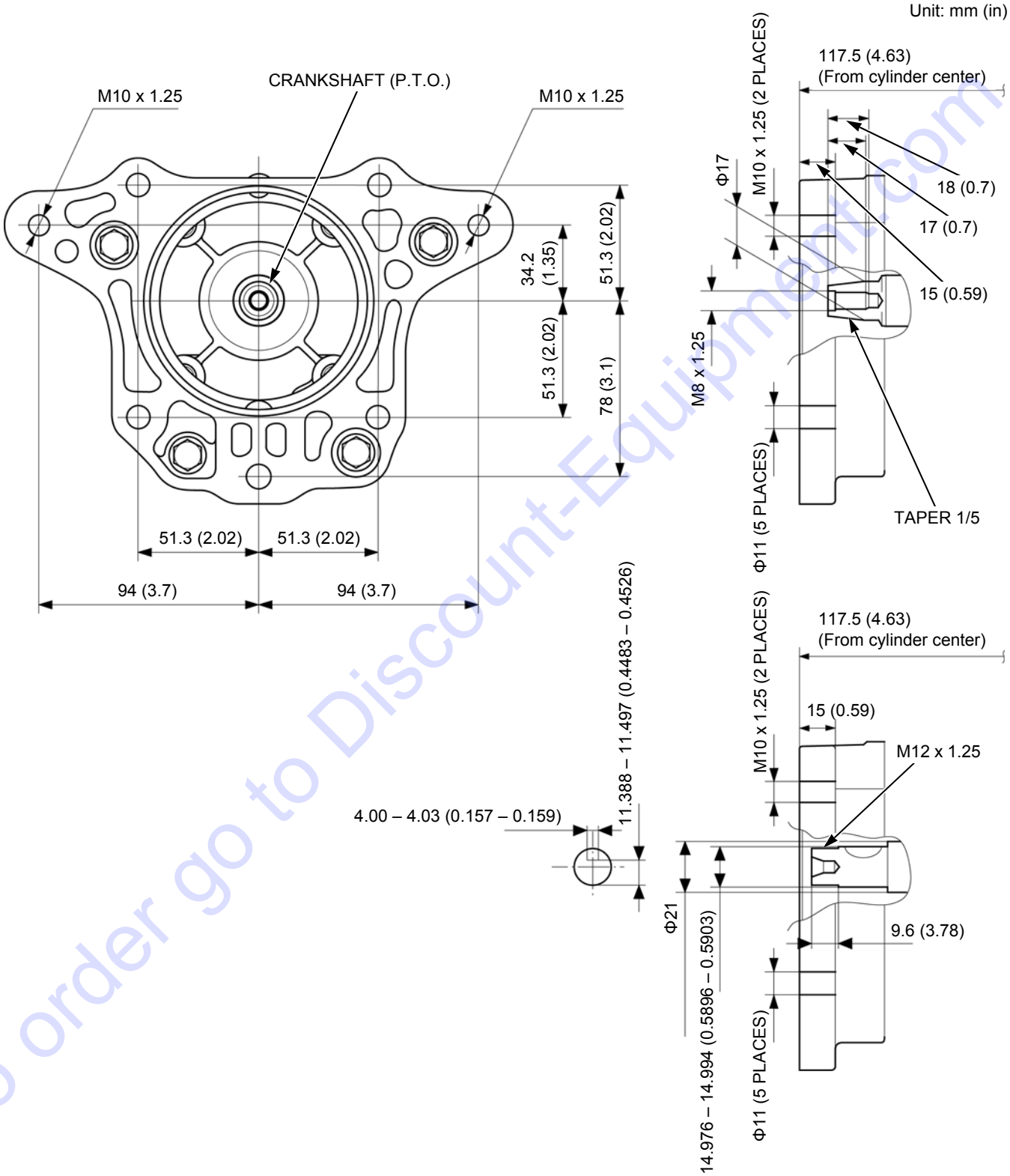


A type: KRAA, KRG, KRDY
B type: KRBF, KRB5
C type: KRH2, KRM, KRE4, KRA2, KRS2, KRB4
D type: KRGA, KRGF, KRWF, KRWB, KREU, KRH, KRSB, KRMB, KRF2, KRDF, KRDP, KREE
E type: KRGA, KRGF, KRWF, KRWB, KREU, KRBF, KRAA, KRG, KRB5
F type: KRDF, KRDP, KREE, KRM, KRE4, KRB4, KRDY
G type: KRH, KRH2, KRSB, KRMB, KRF2, KRA2, KRS2

P.T.O. DIMENSIONAL DRAWINGS

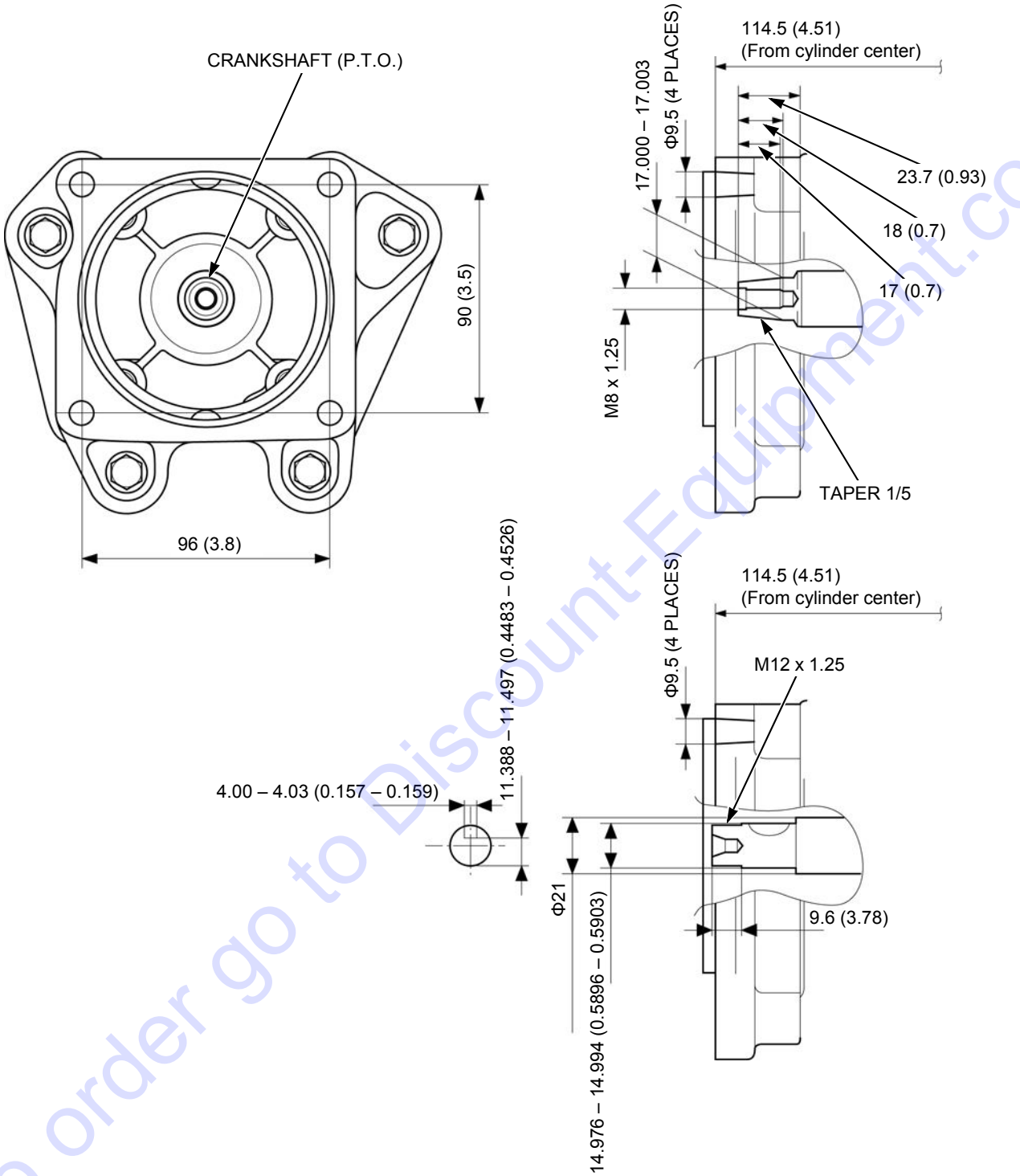
P.T.O. FLANGE A

Unit: mm (in)



P.T.O. FLANGE B

Unit: mm (in)



2. SERVICE INFORMATION

MAINTENANCE STANDARDS

Unit: mm (in)

Part	Item		Standard	Service limit
Engine	Maximum speed (at no load)		4,100 ± 100 min^{-1} (rpm)	–
	Idle speed		1,850 ± 150 min^{-1} (rpm)	–
	Cylinder compression		0.50 MPa (5.1 kgf/cm^2, 73 psi)/ 700 min^{-1} (rpm)	–
Cylinder block	Sleeve I.D.		60.000 – 60.015 (2.3622 – 2.3628)	60.165 (2.3687)
Piston	Skirt O.D.		59.971 – 59.985 (2.3611 – 2.3616)	59.870 (2.3571)
	Piston-to-cylinder clearance		0.015 – 0.044 (0.0006 – 0.0017)	0.100 (0.0039)
	Piston pin bore I.D.		13.002 – 13.012 (0.5119 – 0.5123)	13.048 (0.5137)
Piston pin	Pin O.D.		12.994 – 13.000 (0.5116 – 0.5118)	12.954 (0.5100)
	Piston pin-to-piston pin bore clearance		0.002 – 0.018 (0.0001 – 0.0007)	0.080 (0.0031)
Piston rings	Ring side clearance	Top	0.015 – 0.054 (0.0006 – 0.0021)	0.12 (0.0047)
		Second	0.030 – 0.069 (0.0012 – 0.0027)	0.14 (0.0055)
	Ring end gap	Top	0.15 – 0.30 (0.0059 – 0.0118)	0.60 (0.0236)
		Second	0.40 – 0.55 (0.0157 – 0.0217)	0.85 (0.0335)
		Oil (side rail)	0.2 – 0.7 (0.01 – 0.03)	1.0 (0.04)
	Ring width	Top	0.970 – 0.990 (0.0382 – 0.0390)	0.940 (0.0370)
		Second	1.155 – 1.175 (0.0455 – 0.0463)	1.125 (0.0443)
Connecting rod	Small end I.D.		13.005 – 13.020 (0.5120 – 0.5126)	13.070 (0.5146)
	Big end I.D.		26.020 – 26.033 (1.0244 – 1.0249)	26.06 (1.0260)
	Big end side clearance		0.1 – 0.5 (0.004 – 0.020)	0.90 (0.0354)
	Big end oil clearance		0.040 – 0.063 (0.0016 – 0.0025)	0.12 (0.0047)
Crankshaft	Crankpin O.D.		25.970 – 25.980 (1.0224 – 1.0228)	25.920 (1.0205)
	Crankshaft runout		–	0.10 (0.004 in)
Valves	Valve clearance	IN	0.15 ± 0.04 (0.006 ± 0.002)	–
		EX	0.20 ± 0.04 (0.008 ± 0.002)	–
	Valve stem O.D.	IN	3.970 – 3.985 (0.1563 – 0.1569)	3.900 (0.1535)
		EX	3.935 – 3.950 (0.1549 – 0.1555)	3.880 (0.1528)
Valve guide	Valve guide I.D.	IN/EX	4.000 – 4.018 (0.1575 – 0.1582)	4.060 (0.1598)
	Guide-to-stem clearance	IN	0.015 – 0.048 (0.0006 – 0.0019)	0.098 (0.0039)
		EX	0.050 – 0.083 (0.0020 – 0.0033)	0.120 (0.0047)
	Valve guide installation height	IN	7.5 (0.2953)	–
	Valve seat width	IN/EX	0.70 (0.0276)	1.800 (0.0709)
Valve spring	Valve spring free length	IN/EX	25.8 (1.0157)	24.900 (0.9803)
Cam pulley	Cam height		36.483 (1.4363)	35.483 (1.3970)
	Cam pulley I.D.		10.057 – 10.087 (0.3959 – 0.3971)	10.105 (0.3978)
	Cam pulley shaft O.D.		9.972 – 9.987 (0.3926 – 0.3932)	9.920 (0.3906)
Rocker arm	Rocker arm I.D.		6.000 – 6.018 (0.2362 – 0.2369)	6.043 (0.2379)
	Rocker arm shaft O.D.		5.960 – 5.990 (0.2346 – 0.2358)	5.953 (0.2344)
	Rocker arm shaft journal I.D.		6.000 – 6.018 (0.2362 – 0.2369)	6.043 (0.2379)
Carburetor (Float type)	Main jet	BF33S A	#60	–
		BF33R A	#60	–
	Pilot screw opening	BF33S A	3-1/2 turns out	–
		BF33R A	3-3/8 turns out	–
	Float height		15.7 (0.62)	–
Carburetor (Floatless type)	Main jet		#48	–
	Pilot screw opening		2-3/4 turns out	–
Spark plug	Gap		0.60 – 0.70 (0.024 – 0.028)	–
Ignition coil	Resistance	Primary resistance	0.75 – 0.92 Ω	–
		Secondary resistance	6.1 – 9.3 kΩ	–
	Air gap		0.2 – 0.5 (0.01 – 0.02)	–

TORQUE VALUES

Item	Tread Dia. (mm)	Torque values			Remarks
		N·m	kgf·m	lbf·ft	
Spark plug	M10 x 1.0	12	1.2	9	
Connecting rod bolt	M6 x 1.0	9.8	1.0	7.2	Apply engine oil to the threads and seating surface.
Oil drain plug bolt	M10 x 1.25	18	1.8	13	
Valve adjusting lock nut	M5 x 0.5 (Special nut)	7.5	0.76	5.5	
Flywheel nut	M14 x 1.5	64	6.5	47	Apply engine oil to the threads and seating surface.
Governor arm nut	M6 x 1.0	–	–	–	See page 7-2
Stopper plate screw	M3 x 0.5	1	0.1	0.7	
Breather pipe bolt	M4 x 0.7	3.5	0.36	2.6	
Air cleaner stud bolt	M6 x 1.0	12	1.2	9	
Air cleaner case nut (5 mm)	M5 x 0.8	5.5	0.60	4.1	
Air cleaner case nut (6 mm)	M6 x 1.0	8.5	0.87	6.3	
Air cleaner cover bolt	M6 x 1.0	2.3	0.23	1.7	
Muffler nut	M6 x 1.0	12	1.2	9	

STANDARD TORQUE VALUES

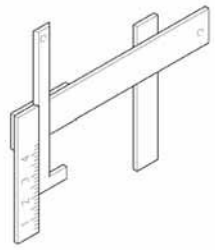
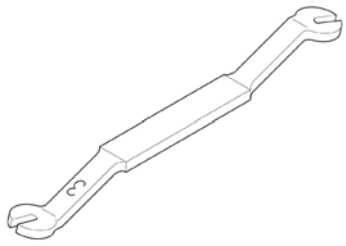
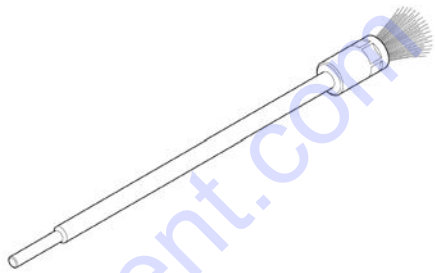
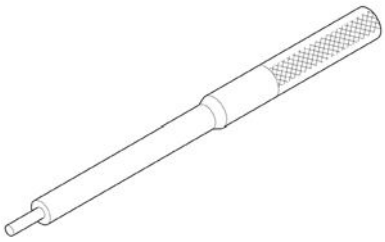
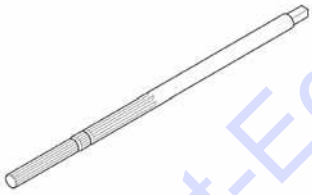
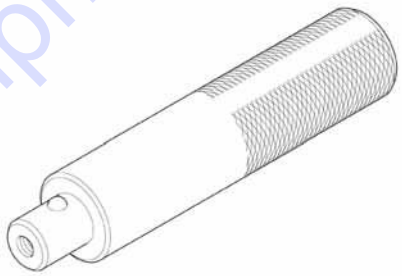
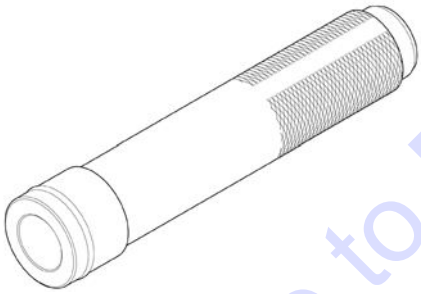
Item	Tread Dia. (mm)	Torque values		
		N·m	kgf·m	lbf·ft
Screw	5 mm	4.3	0.4	3.2
	6 mm	9	0.9	6.6
Bolt and nut	5 mm	5.3	0.5	3.9
	6 mm	10	1.0	7
	8 mm	21.5	2.2	16
	10 mm	34	3.5	25
	12 mm	54	5.5	40
Flange bolt and nut	5 mm	5.5	0.6	4.1
	6 mm	12	1.2	9
	8 mm	26.5	2.7	20
	10 mm	40	4.1	30
SH (Small head) flange bolt	6 mm	9	0.9	6.6
CT (Cutting threads) flange bolt (Retightening)	5 mm	5.5	0.6	4.1
	6 mm	12	1.2	9

LUBRICATION & SEAL POINTS

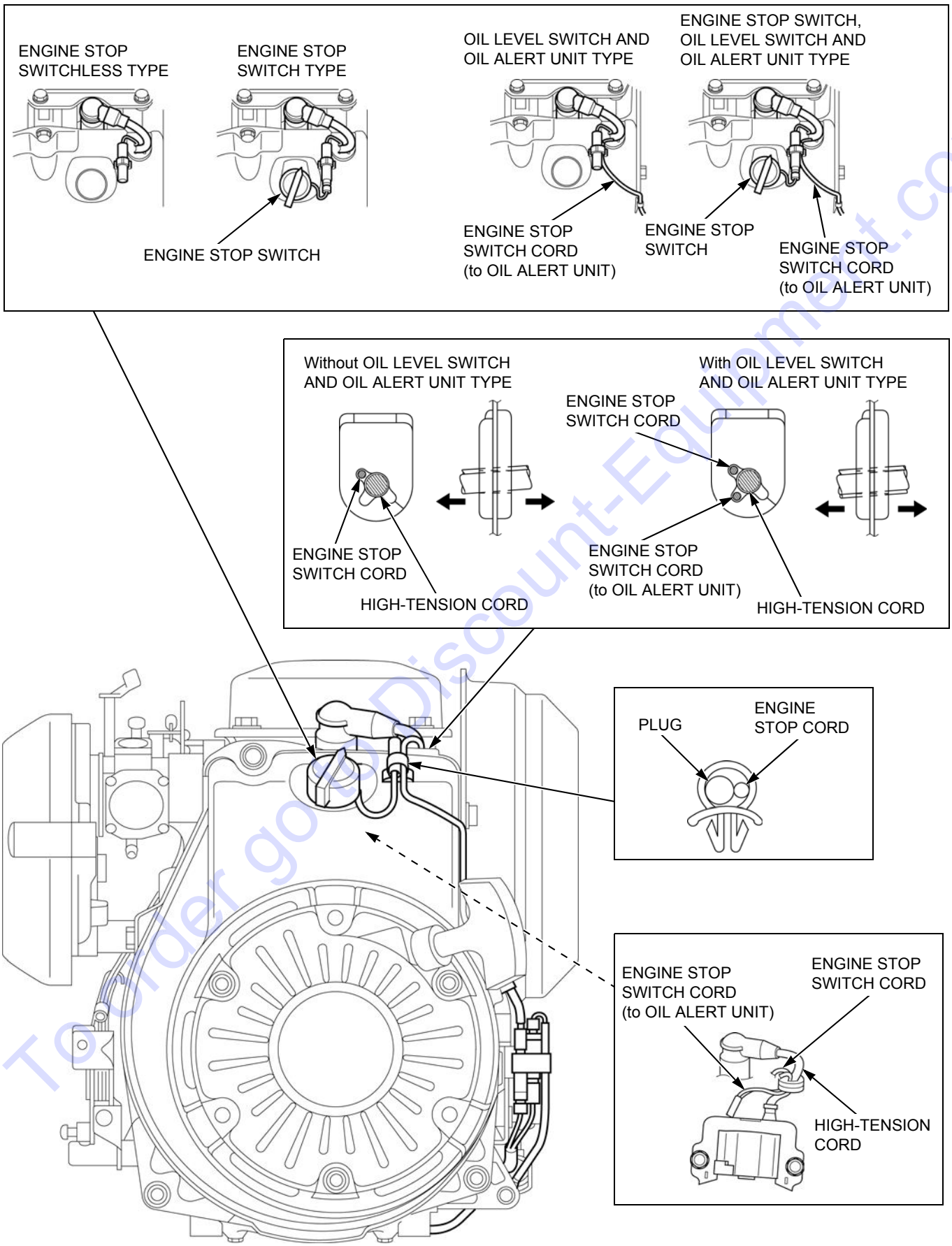
Material	Location	Remarks
Engine oil	Crankshaft pin and gear teeth	
	Piston outer surface, ring groove and piston pin hole	
	Piston pin outer surface	
	Piston ring entire surface	
	Cylinder inner surface	
	Connecting rod big and small end bearing	
	Connecting rod bolt threads and seating surface	
	Cam pulley cam lobe, journal and decompressor area	
	Cam pulley shaft sliding surface	
	Valve stem sliding surface and stem end	
	Valve stem seal lips	
	Valve spring entire surface	
	Valve adjusting screw threads	
	Valve adjusting lock nut threads and seating surface	
	Rocker arm pivot and slipper surface	
	Rocker arm shaft entire surface	
	Timing belt entire surface	
	Flywheel nut threads and seating surface	
	Governor weight holder gear	
	Governor holder shaft journal	
	Governor arm shaft journal	
	Each oil seal outer surface	
Multi-purpose grease	Each O-ring entire surface	
	Each oil seal lips	
	Control lever sliding surface	
	Recoil starter case reel sliding surface	
	Recoil starter ratchet sliding surface	
	Recoil starter ratchet guide inside	
Threebond® 1207B	Head cover mating surface	
	Cylinder barrel mating surface	
	Breather pipe	See page 14-4

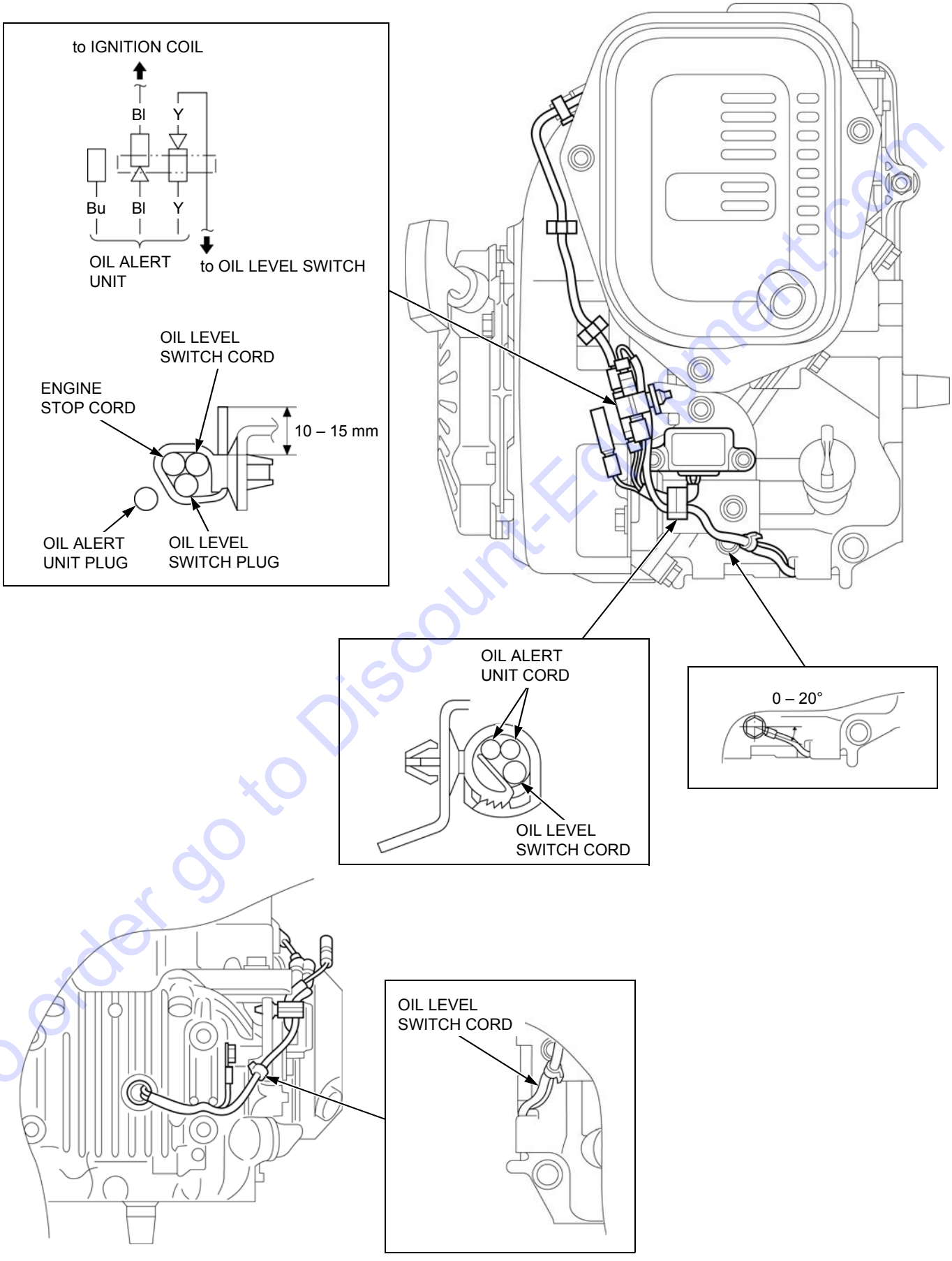
TOOLS

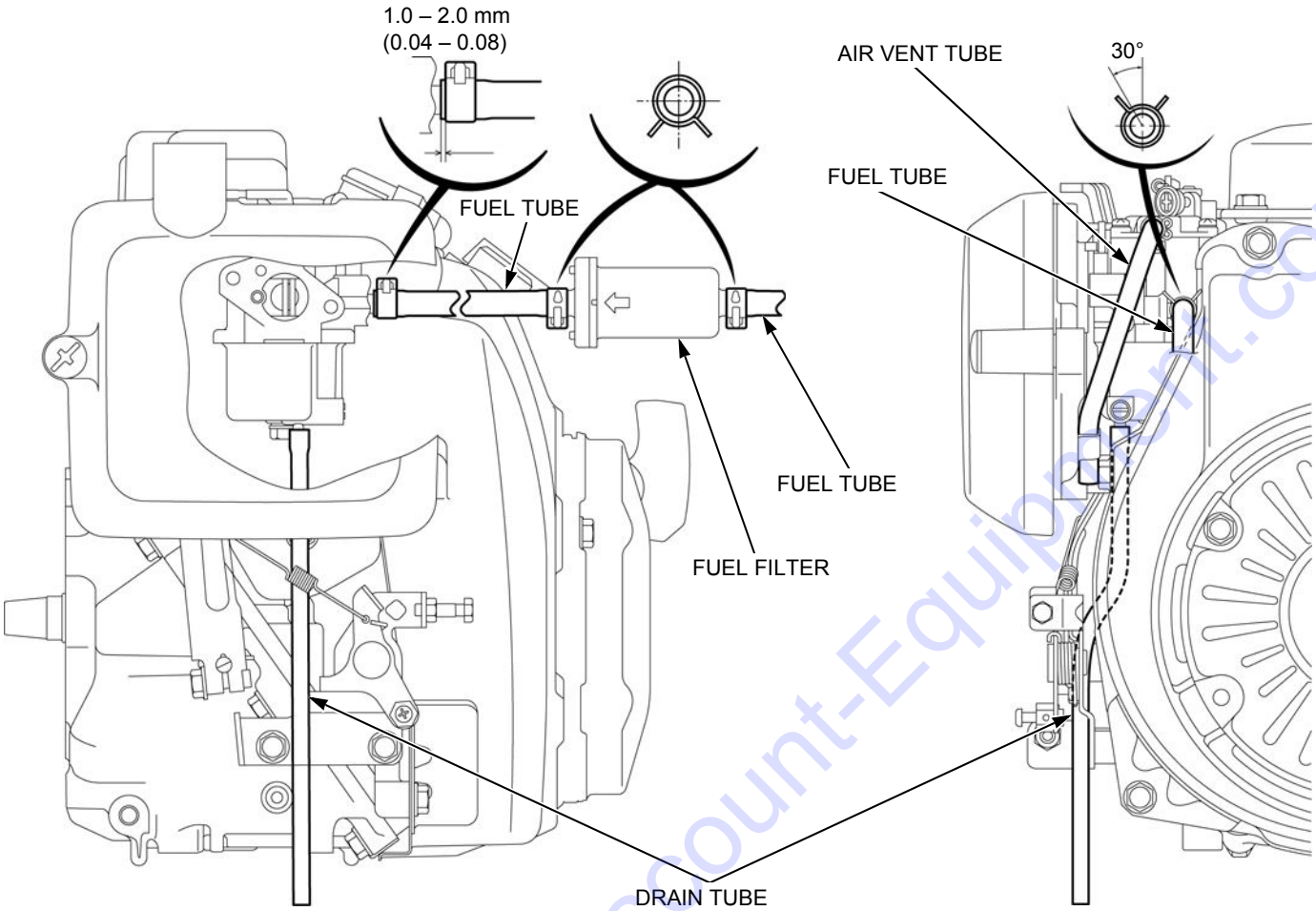
SPECIAL TOOLS

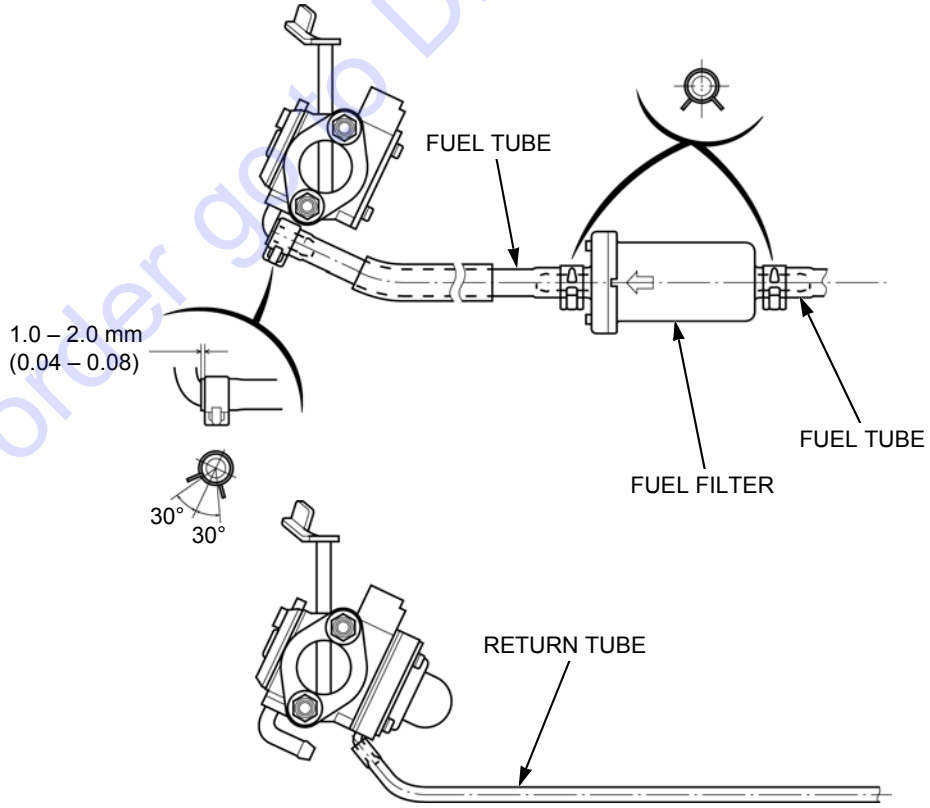
Float level gauge 07401-0010000 	Valve adjuster wrench, 3 mm 07908-KE90200 	Cleaning brush 07998-VA20100 
Valve guide driver, 3.6 x 8.0 mm 07JMD-KY20100 	Valve guide reamer, 4.008 mm 07MMH-MV90100 	Driver 07749-0010000 
Driver, 22 mm I.D. 07746-0020100 	Attachment, 44 x 49.5 mm 07945-3330300 	Attachment, 32 x 35 mm 07746-0010100 
Attachment, 37 x 40 mm 07746-0010200 	Pilot, 22 mm 07746-0041000 	

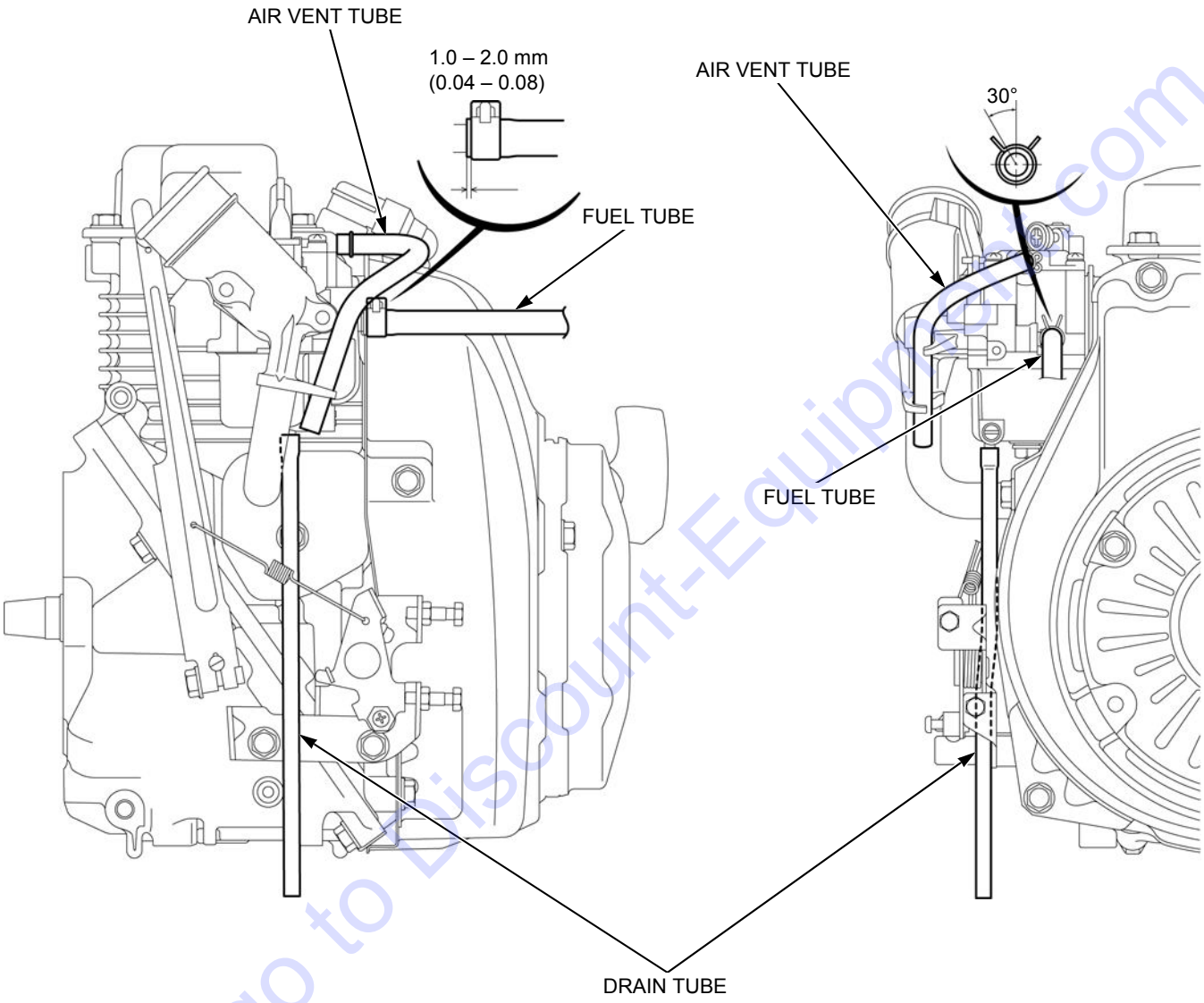
HARNESS AND TUBE ROUTING





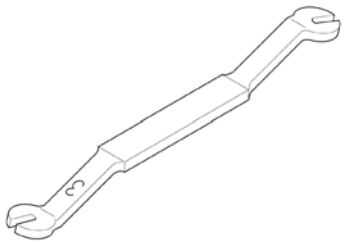
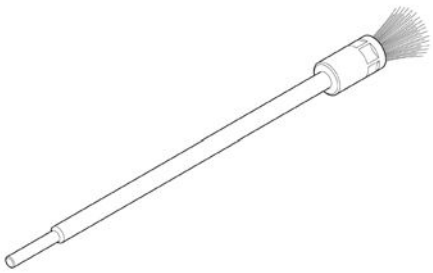






MEMO

TOOLS

Valve adjuster wrench, 3 mm 07908-KE90200 	Cleaning brush 07998-VA20100 

MAINTENANCE SCHEDULE

ITEM	Perform at every indicated month or operating hour interval, whichever comes first.	REGULAR SERVICE PERIOD (1)					Refer to page
		Each use	First month or 20 hrs.	Every 3 months or 50 hrs.	Every 6 months or 100 hrs.	Every year or 200 hrs.	
Engine oil	Check level	○					3-3
	Change		○		○		3-3
Air cleaner	Check	○					3-4
	Clean			○ (2)			3-4
	Replace					○ (2)	3-4
Spark plug	Check-adjust				○		3-5
	Replace					○	3-5
Timing belt	Check	After every 300 hrs (3)					3-6
Spark arrester (applicable types)	Clean				○ (4)		–
Idle speed	Check-adjust					○	3-6
Combustion chamber	Clean	After every 300 hrs					3-7
Valve clearance	Check-adjust					○	3-7
Fuel tank and filter	Clean				○		–
Fuel tube	Check	Every 2 years (Replace if necessary)					–

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

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

(3) Check for cracks or abnormal wear; replace if necessary.

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

ENGINE OIL LEVEL CHECK/CHANGE

CHECK

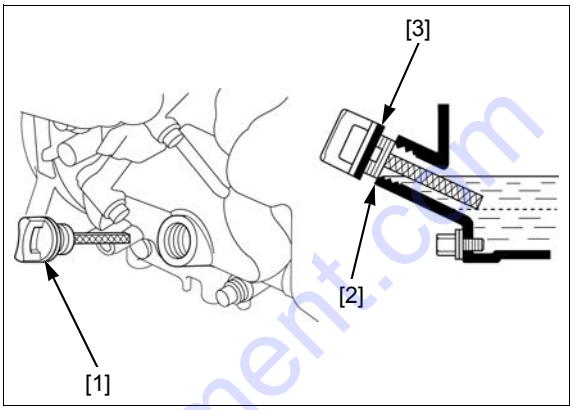
Place the engine on a level surface.

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

If the oil level is low, fill with recommended oil to the upper level of the oil filler neck.

Check that the oil filler cap 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 plug bolt [1].

Remove the oil filler cap [2], drain plug bolt, and drain plug washer [3], and drain the engine 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 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 oil.

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

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Add the specified amount of recommended oil into the engine.

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

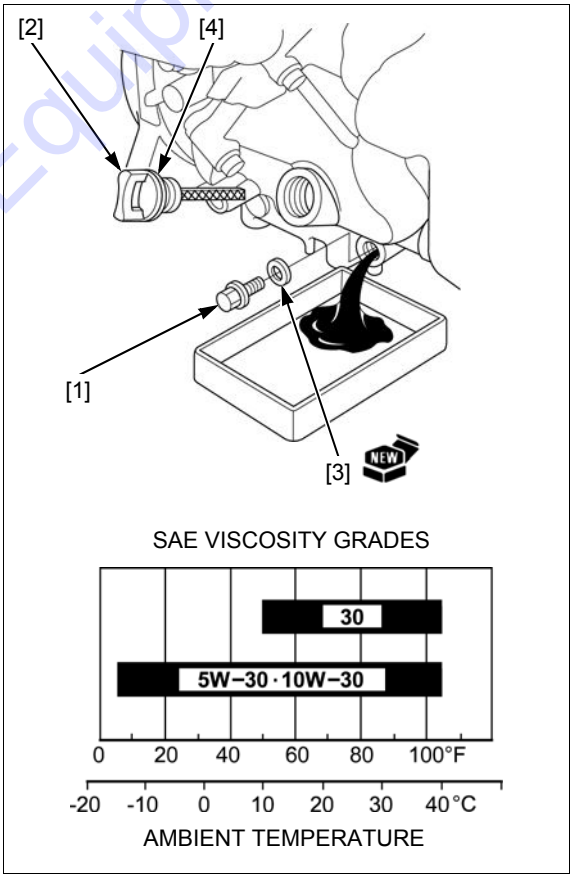
OIL CAPACITY: 0.28 Liter (0.30 US qt, 0.25 Imp qt)

After adding the engine oil, check the oil level.

Check that the oil filler cap 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.



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.

AIR CLEANER CHECK/CLEANING/ REPLACEMENT

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.

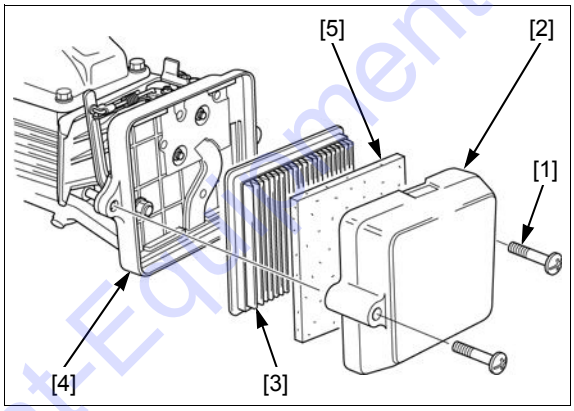
NOTICE

- *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 cover bolt (6 x 40 mm) (2) [1] and air cleaner cover [2].

Remove the paper element [3] from the air cleaner case [4].

Dual type: Remove the foam element [5] from the air cleaner cover.



Check both air cleaner elements for holes or tears and replace if damaged.

Clean both air cleaner elements if they are to be reused (page 3-4).

Installation is in the reverse order of removal.

TORQUE:
Air cleaner cover bolt:
2.3 N·m (0.23 kgf·m, 1.7 lbf·ft)

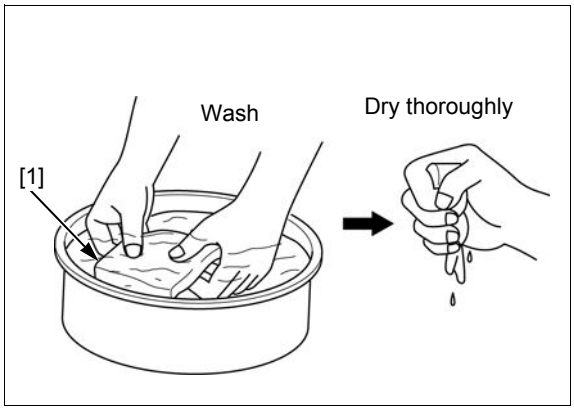
ELEMENT CLEANING

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.

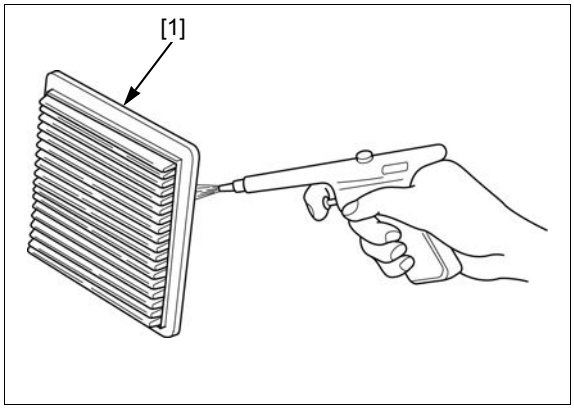
Dip the filter in clean engine oil, and squeeze out all the excess oil.

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



PAPER

Tap the element [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.



SPARK PLUG CHECK/ADJUSTMENT

Remove the spark plug (page 3-5).

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

Check the following and replace if necessary.

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

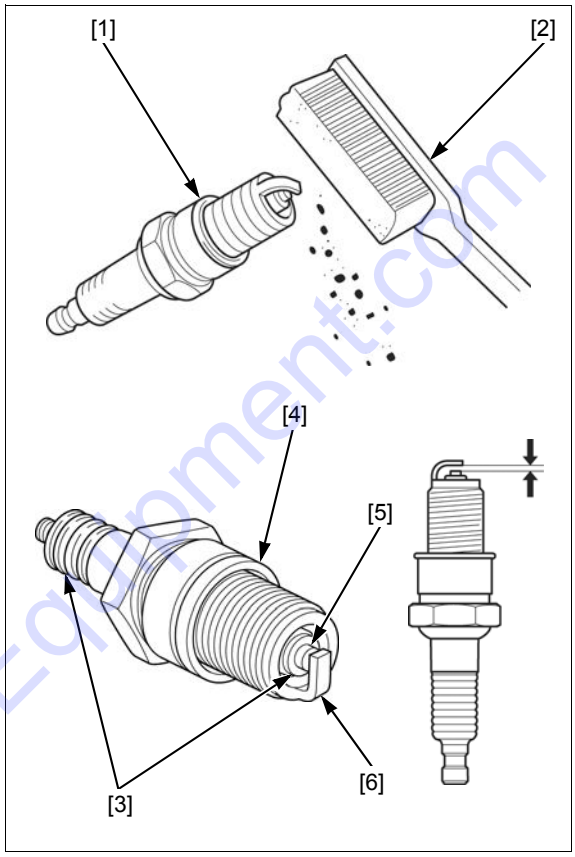
RECOMMENDED SPARK PLUG:
CR5HSB (NGK)
U16FSR-UB (DENSO)

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

PLUG GAP: 0.60 – 0.70 mm (0.024 – 0.028 in)

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

Install the spark plug (page 3-5).



SPARK PLUG REPLACEMENT

REMOVAL

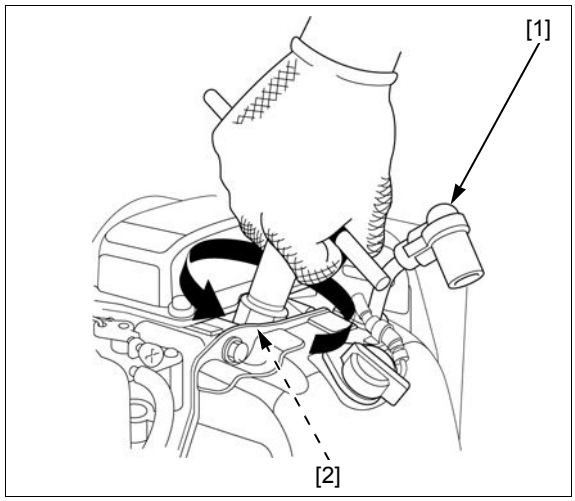
⚠ CAUTION

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

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

NOTE:

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



INSTALLATION

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

RECOMMENDED SPARK PLUG:
CR5HSB (NGK)
U16FSR-UB (DENSO)

Tighten the spark plug to the specified torque.

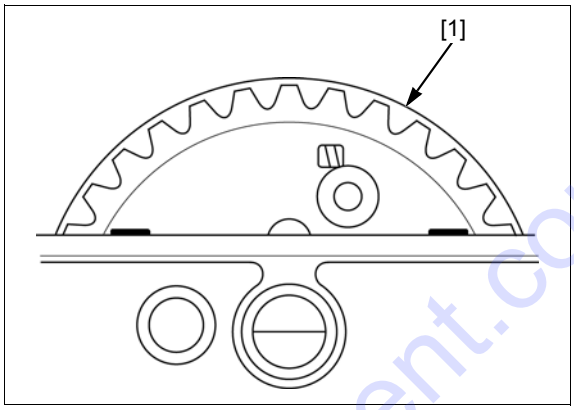
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the spark plug cap.

TIMING BELT CHECK

Check the timing belt [1] for deterioration or cracks.

Replace if necessary (page 14-4).



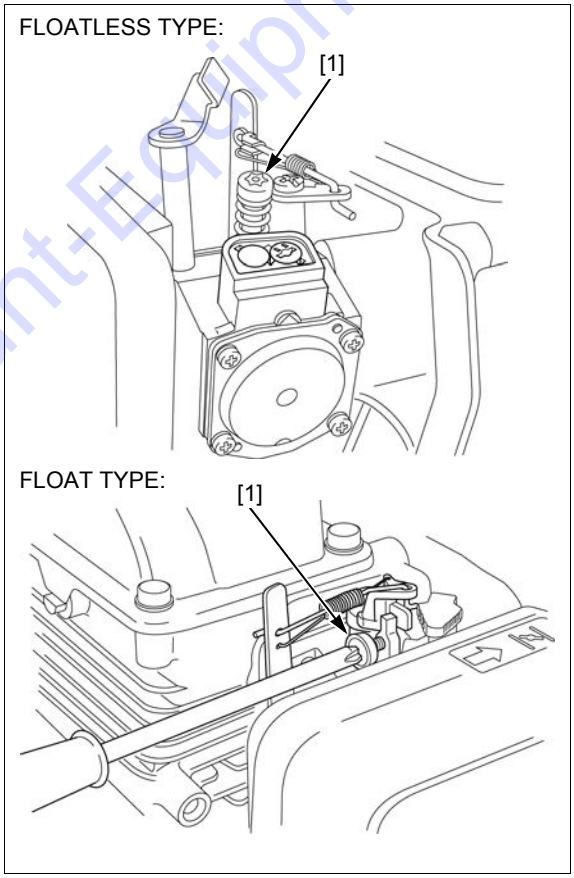
IDLE SPEED CHECK/ADJUSTMENT

Use a tachometer with graduations of 50 min^{-1} (rpm) or smaller that will accurately indicate a 50 min^{-1} (rpm) change.

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

With the engine idling, turn the throttle stop screw [1] to obtain the standard idle speed.

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



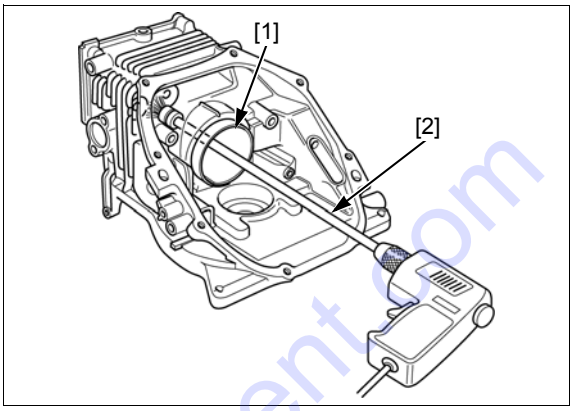
COMBUSTION CHAMBER CLEANING

Remove the piston/connecting rod assembly (page 14-4).

Prepare a cylinder of a thick paper or equivalent material [1], which diameter is as large as to fit against the inner wall of the cylinder, and insert the paper into the cylinder.

Attach the special tool to an electric drill and clean any carbon deposits from the combustion chamber.

TOOL:
Cleaning brush [2] **07998-VA20100**



NOTICE

- *Be sure to insert a thick paper into the cylinder to protect the inner wall of the cylinder during clearing of the combustion chamber.*
- *Do not press the cleaning brush with force against the combustion chamber.*

VALVE CLEARANCE CHECK/ ADJUSTMENT

NOTICE

- *Inspect and adjust the valve clearance while the engine is cold.*

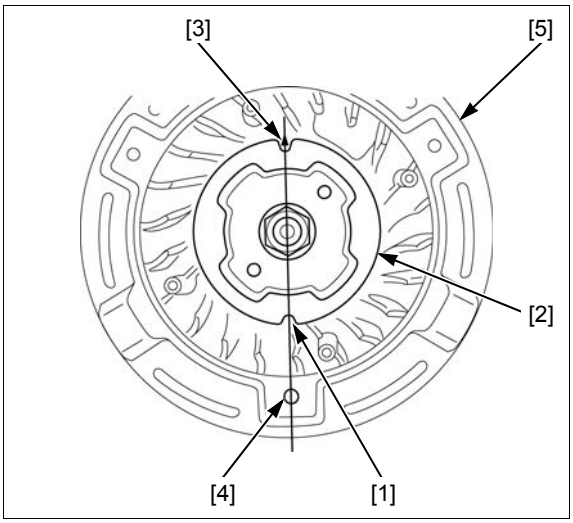
CHECK

Remove the following:

– Recoil starter (page 10-2)
– Head cover (page 13-4)

Set the piston to top dead center of the compression stroke (both valves fully closed).

Top dead center of the compression stroke is the point where the cutout [1] in the starter pulley [2] (i.e. opposite side from the mark [3] on the flywheel) is in alignment with the lower bolt hole [4] of the fan cover [5].



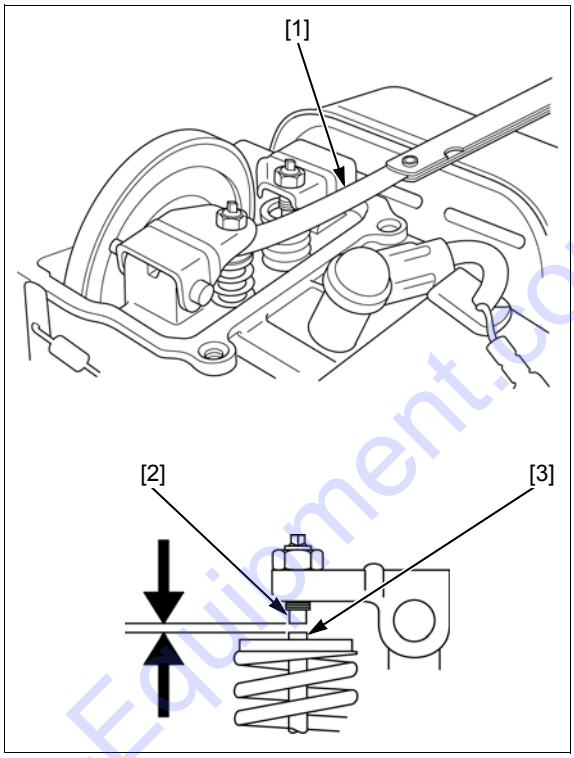
NOTE:

- If the exhaust valve opens when the cutout in the starter pulley is aligned with the lower bolt hole on the fan cover, turn the flywheel one turn and align the marks.

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

VALVE CLEARANCE:
IN: 0.15 ± 0.04 mm (0.006 ± 0.002 in)
EX: 0.20 ± 0.04 mm (0.008 ± 0.002 in)

If adjustment is necessary, proceed as follows.



ADJUSTMENT

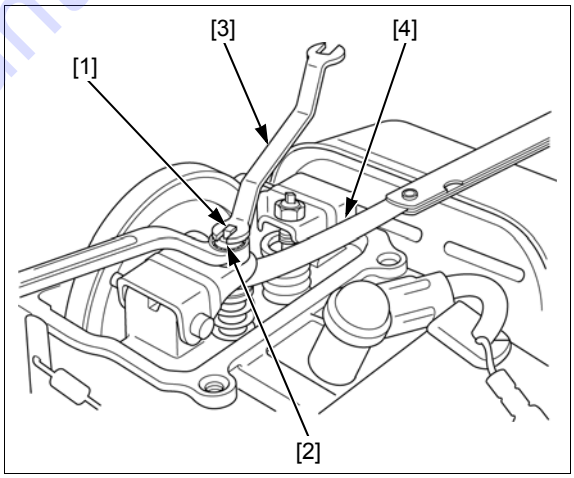
Hold the valve adjust screw [1] using the special tool, and loosen the pivot lock nut [2].

TOOL:
Valve adjuster wrench, 3 mm [3] 07908-KE90200

Insert a feeler gauge [4] between the valve adjust screw and the valve stem.

Adjust by turning the adjusting screw until there is a slight drag on the feeler gauge.

VALVE CLEARANCE:
IN: 0.15 ± 0.04 mm (0.006 ± 0.002 in)
EX: 0.20 ± 0.04 mm (0.008 ± 0.002 in)



Hold the valve adjust screw using the special tool, and retighten the lock nut to the specified torque.

TORQUE: 7.5 N·m (0.76 kgf·m, 5.5 lbf·ft)

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

Install the following:

– Head cover (page 13-4)
– Recoil starter (page 10-2)

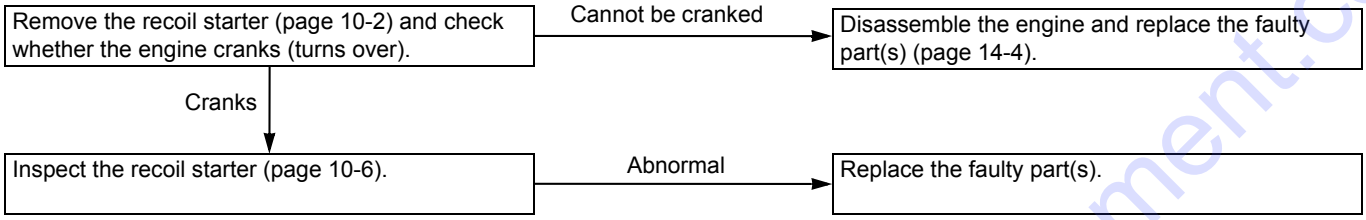
4. TROUBLESHOOTING

BEFORE TROUBLESHOOTING

- Check that the electrical 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.

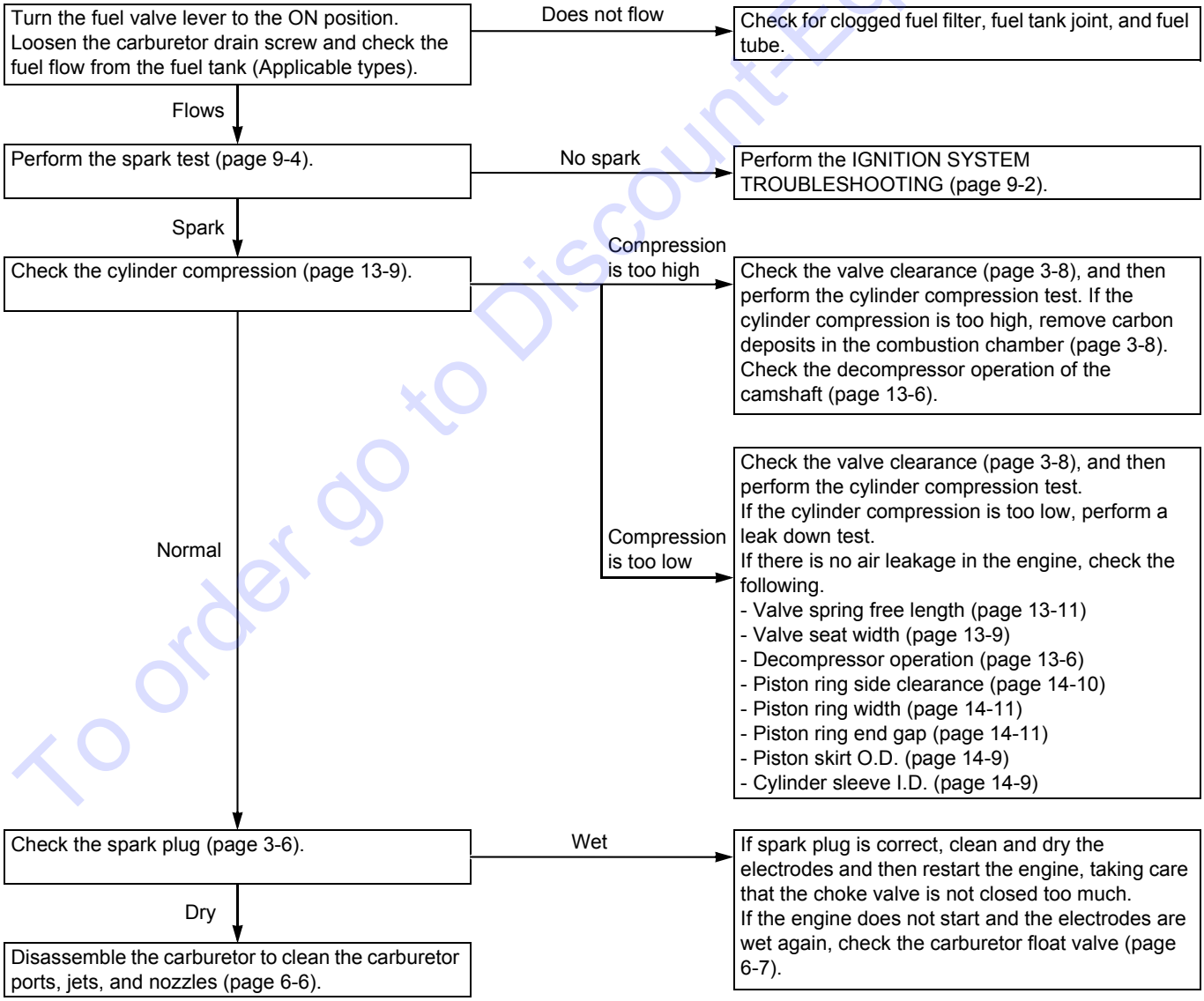
TROUBLESHOOTING

ENGINE DOES NOT CRANK

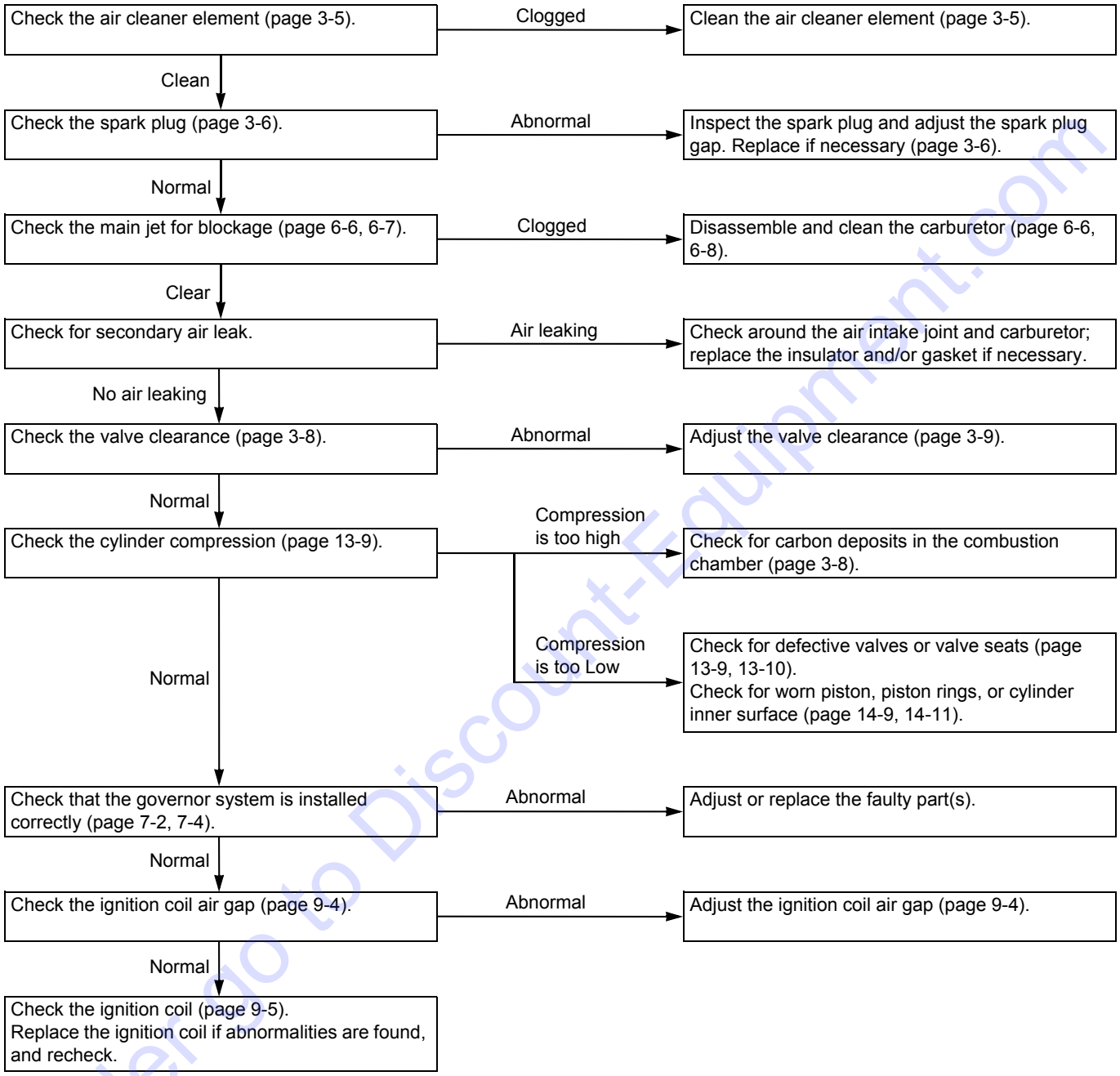


ENGINE CRANKS BUT WON'T START

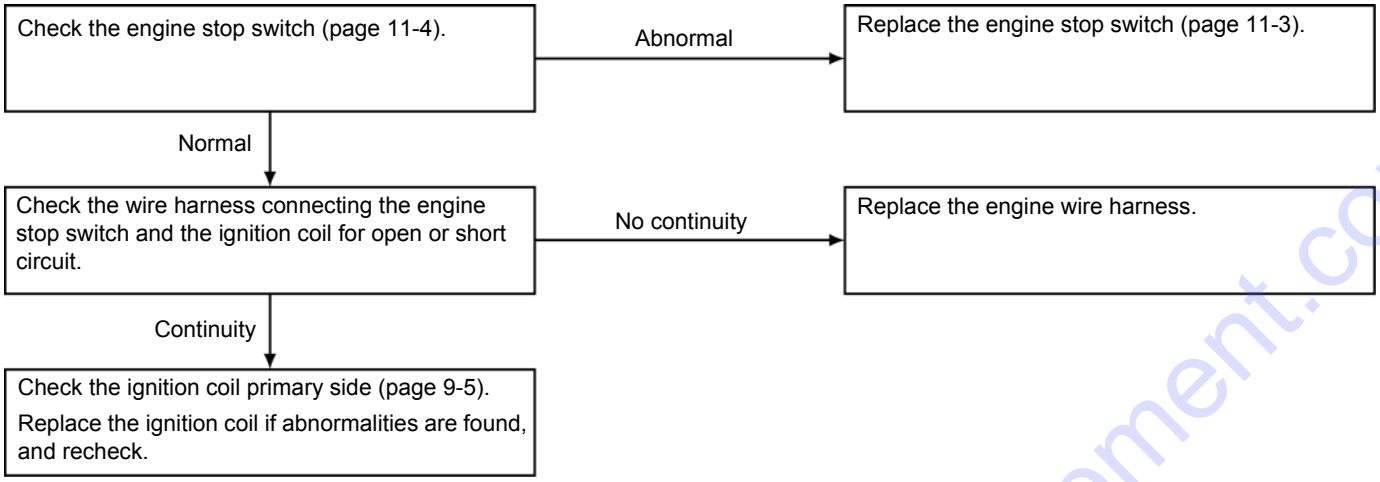
- Check the oil level before troubleshooting (page 3-3).



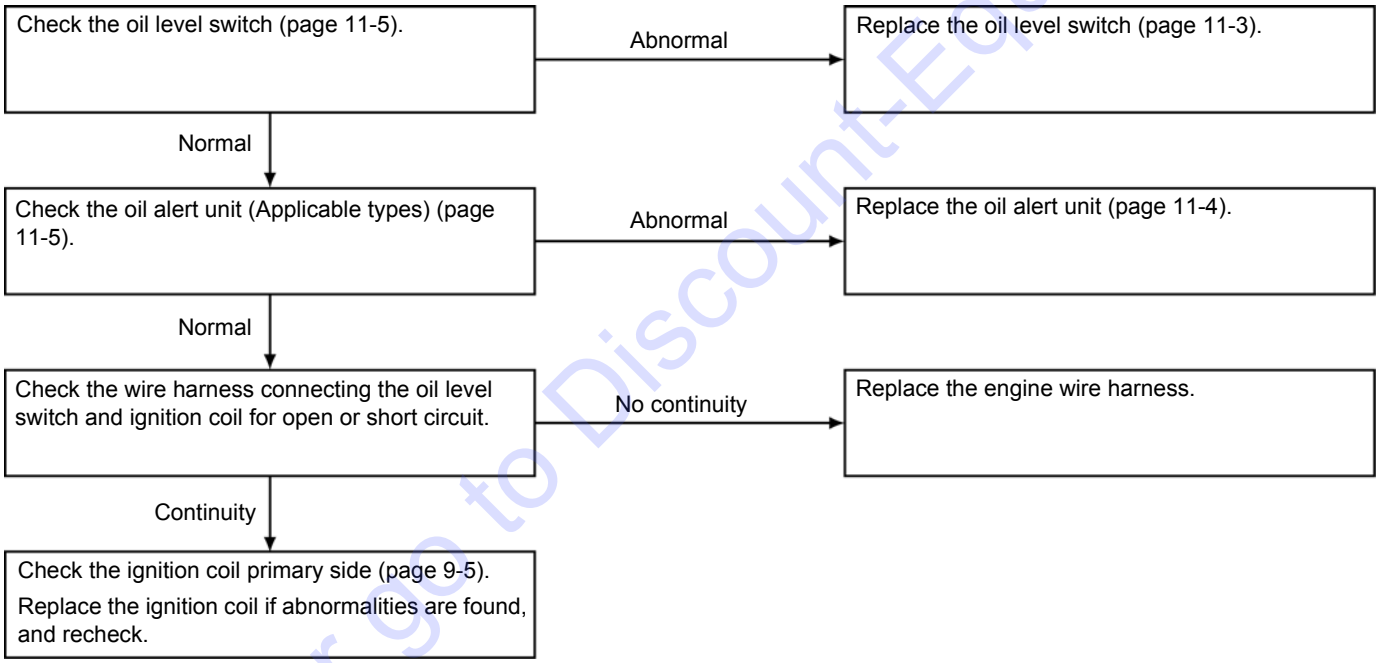
ENGINE SPEED DOES NOT INCREASE OR STABILIZE



ENGINE DOES NOT STOP WHEN ENGINE STOP SWITCH IS TURNED OFF (Applicable types)



ENGINE DOES NOT STOP WHEN ENGINE OIL LEVEL IS LOW (Applicable types)



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.

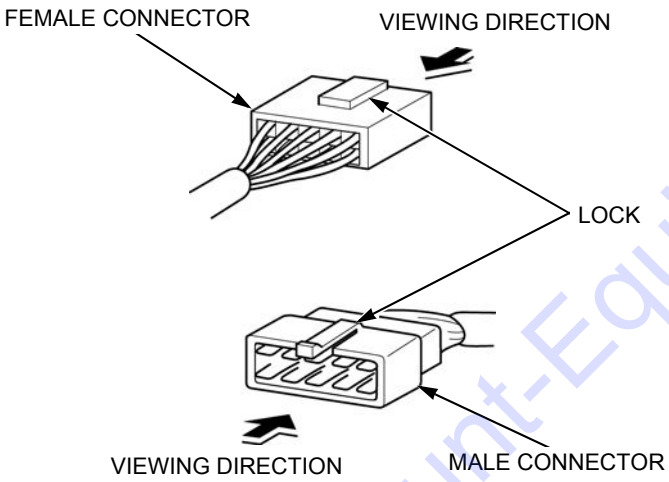
HOW TO READ CONNECTOR DRAWINGS

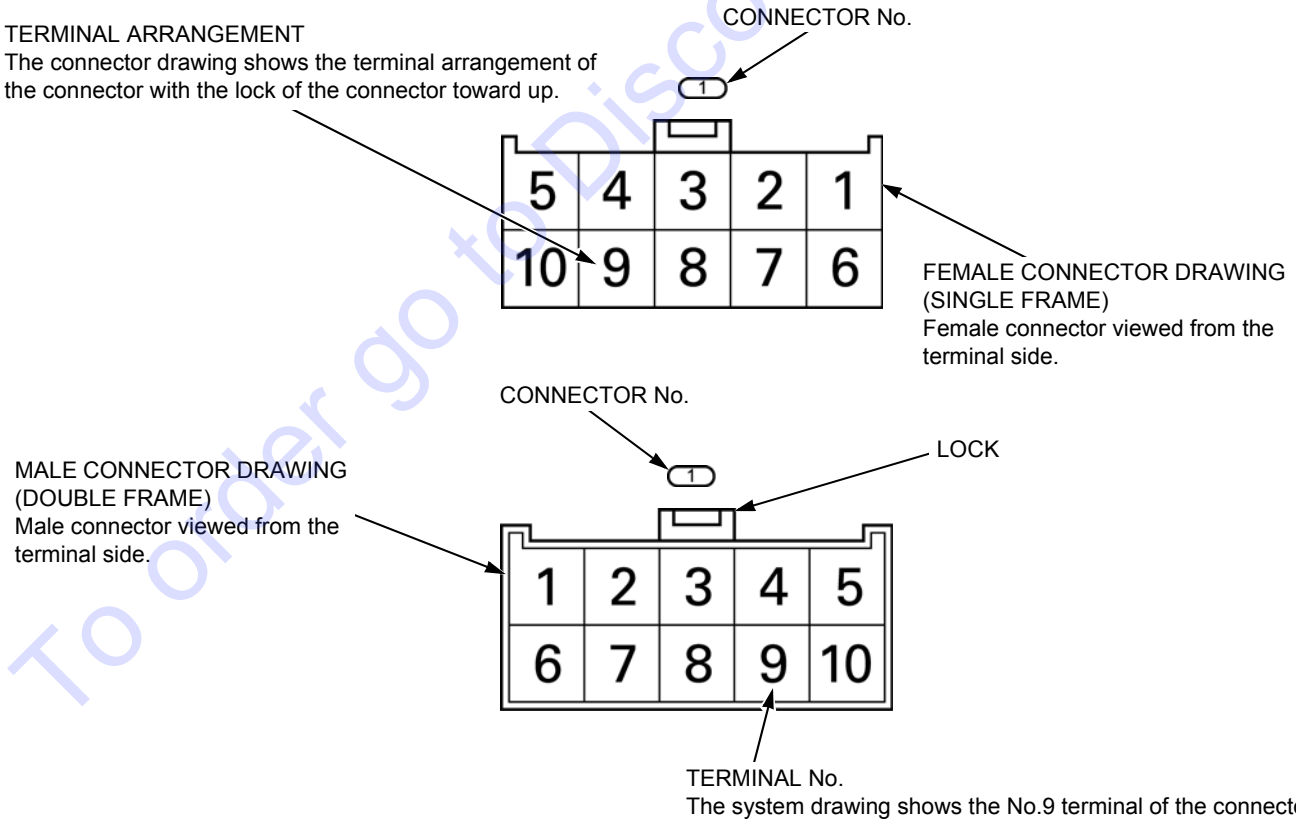
Connector drawings show the terminal arrangement, terminal No., number of pins, and the shape of terminal (male or female).

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.

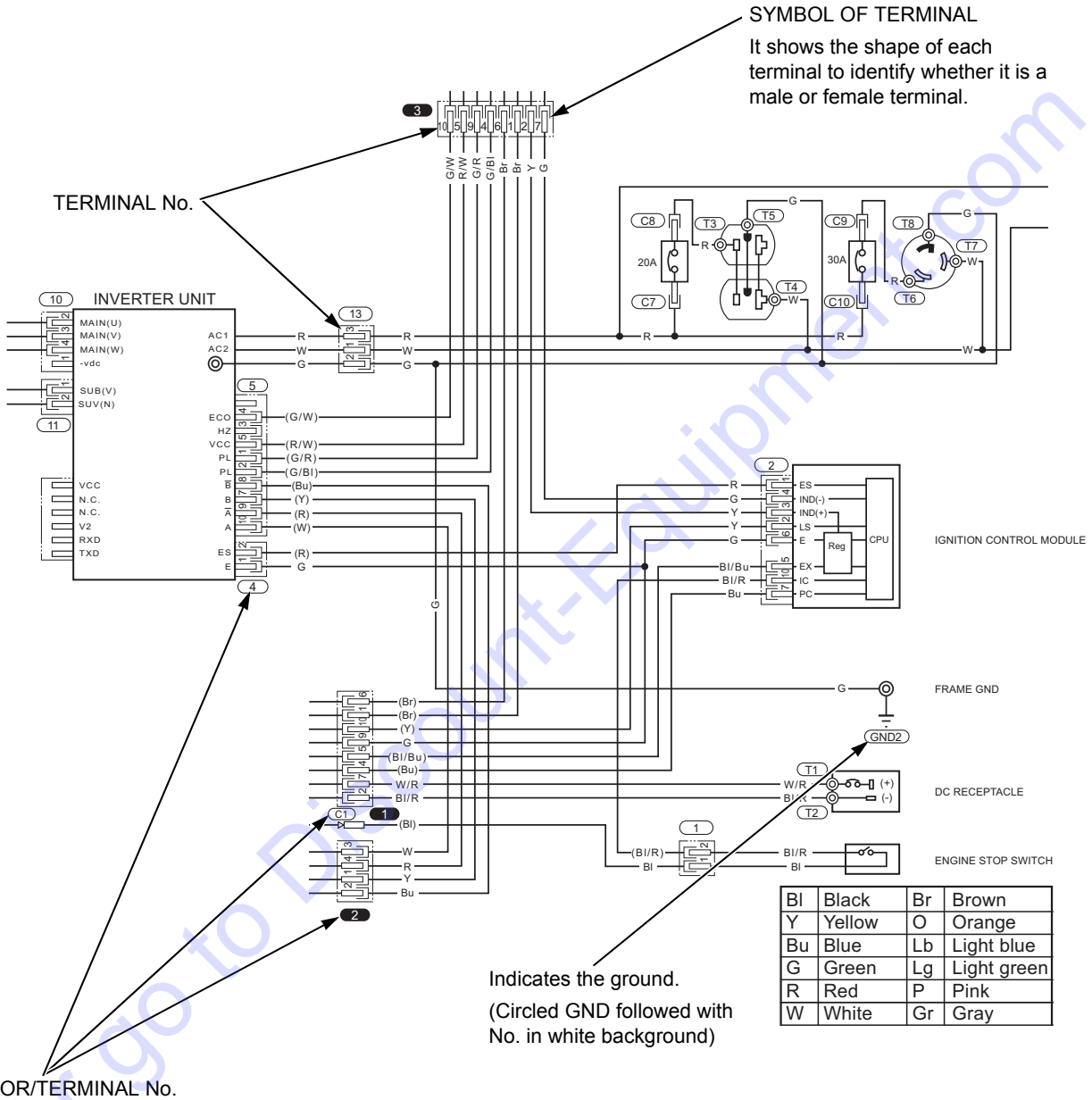
The double frame connectors represent the male connectors and the single frame connectors represent the female connectors.

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





HOW TO READ WIRING DIAGRAM



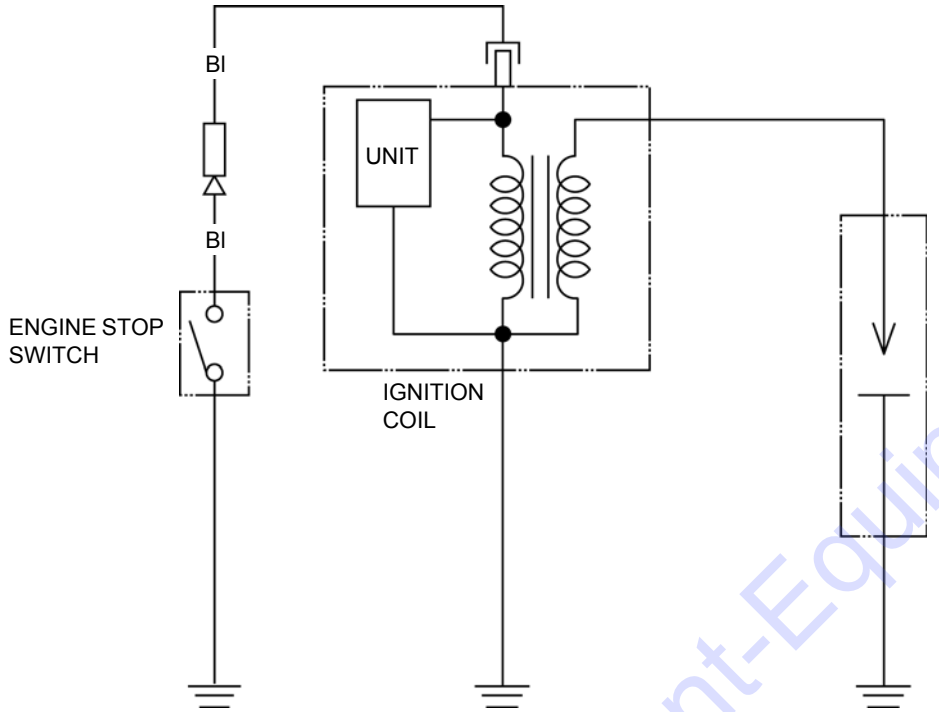
Bl	Black	Br	Brown
Y	Yellow	O	Orange
Bu	Blue	Lb	Light blue
G	Green	Lg	Light green
R	Red	P	Pink
W	White	Gr	Gray

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)

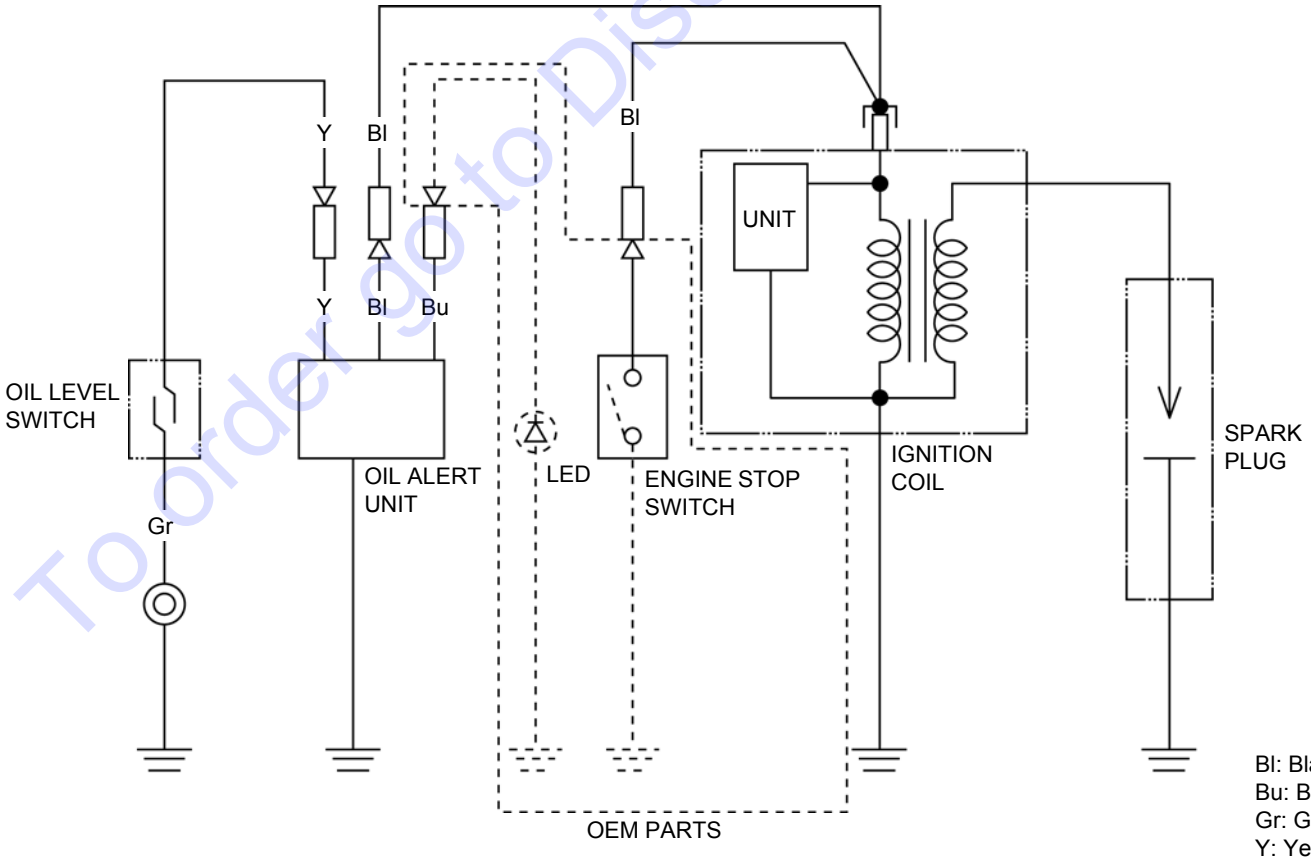
WIRING DIAGRAMS

ENGINE STOP SWITCH TYPE



Bl: Black

OIL LEVEL SWITCH AND OIL ALERT UNIT TYPE



Bl: Black
Bu: Blue
Gr: Green
Y: Yellow

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