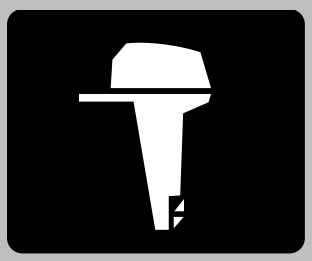
YAMAHA

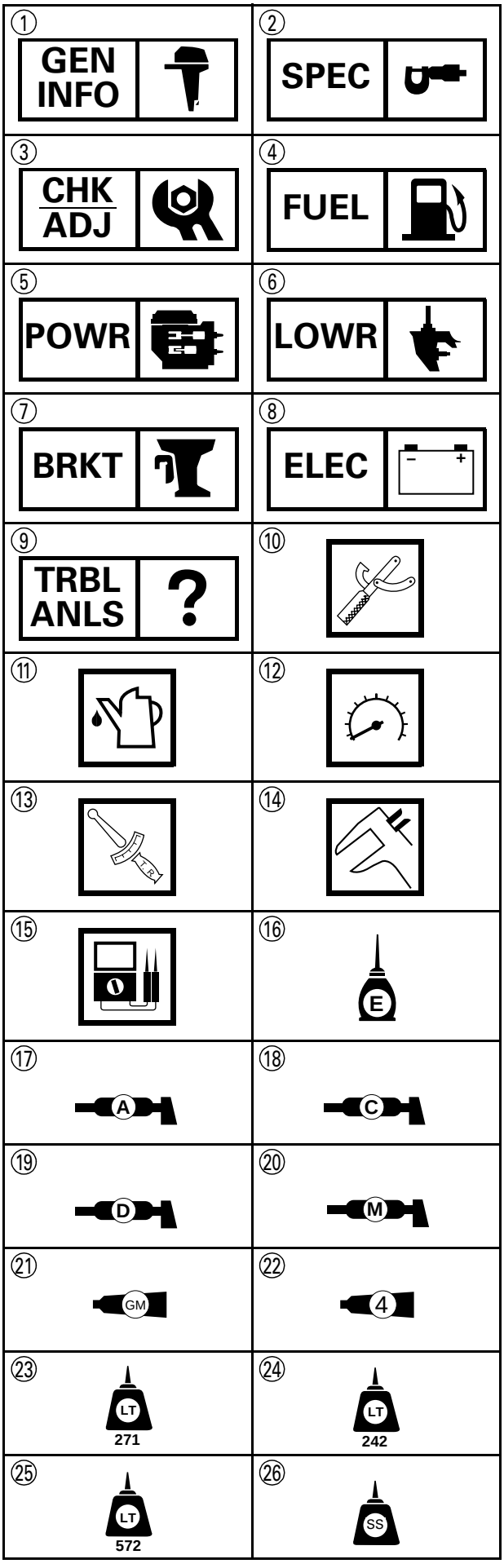


EK25BMH

SERVICE MANUAL

290404

69T-28197-ZA-11



SYMBOLS

Symbols ① to ⑨ are designed as thumb-tabs to indicate the content of a chapter.

① General information
② Specifications
③ Periodic check and adjustments
④ Fuel system
⑤ Power unit
⑥ Lower unit
⑦ Bracket unit
⑧ Electrical systems
⑨ Trouble analysis

Symbols ⑩ to ⑮ indicate specific data.

⑩ Special tool
⑪ Specified liquid
⑫ Specified engine speed
⑬ Specified torque
⑭ Specified measurement
⑮ Specified electrical value [Resistance (Ω), Voltage (V), Electric current (A)]

Symbol ⑯ to ⑳ in an exploded diagram indicate the grade of lubricant and the location of the lubrication point.

⑯ Apply Yamaha 2-stroke motor oil
⑰ Apply water resistant grease (Yamaha grease A, Yamaha marine grease)
⑱ Apply water resistant grease (Yamaha grease C, Yamaha marine grease)
⑲ Apply water resistant grease (Yamaha grease D, Yamaha marine grease)
⑳ Apply molybdenum disulfide grease

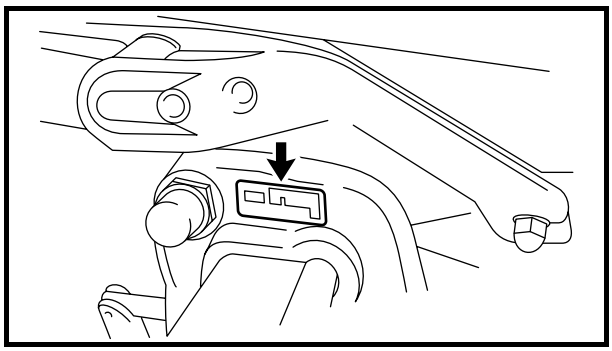
Symbols ㉑ to ㉖ in an exploded diagram indicate the grade of the sealing or locking agent and the location of the application point.

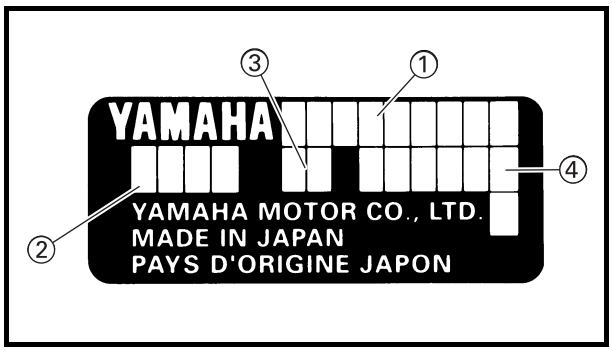
㉑ Apply Gasket Maker®
㉒ Apply Yamabond #4 (Yamaha bond number 4)
㉓ Apply LOCTITE® No.271 (Red LOCTITE)
㉔ Apply LOCTITE® No.242 (Blue LOCTITE)
㉕ Apply LOCTITE® No.572
㉖ Apply silicon sealant

E

CONTENTS

CHAPTER 1
GENERAL INFORMATION





IDENTIFICATION

SERIAL NUMBER

The outboard motor's serial number is stamped on a label which is attached to the port clamp bracket.

NOTE:

As an antitheft measure, a special label on which the outboard motor's serial number is stamped is bonded to the port clamp bracket. The label is specially treated so that peeling it off causes cracks across the serial number.

① Model name
② Approval model code
③ Transom height
④ Serial number

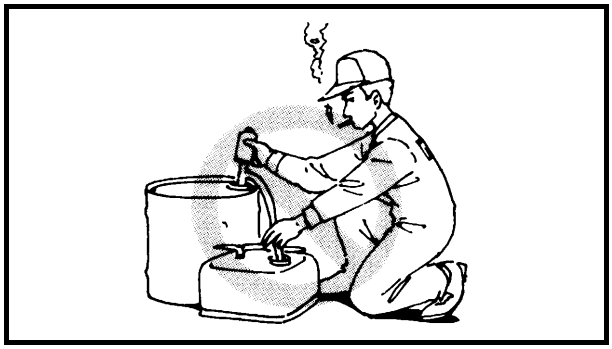
STARTING SERIAL NUMBERS

The starting serial number blocks are as follows:

Model name Worldwide	Approval model code	Starting serial number
EK25BMH	62C	S:100101
		L:400101
		Y:750101

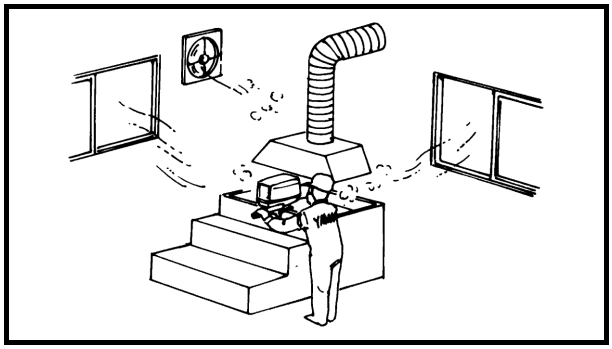
SAFETY WHILE WORKING

The procedures given in this manual are those recommended by Yamaha to be followed by Yamaha dealers and their mechanics.



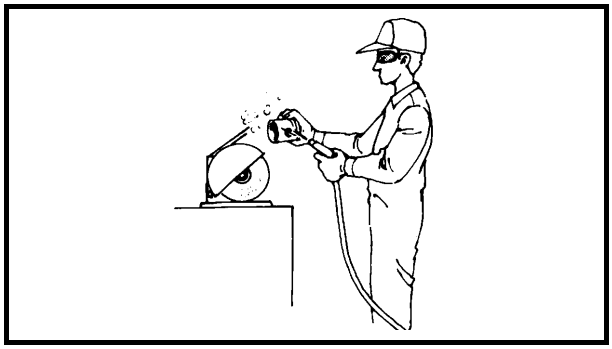
FIRE PREVENTION

Gasoline (petrol) is highly flammable.
Petroleum vapor is explosive if ignited.
Do not smoke while handling gasoline and keep it away from heat, sparks and open flames.



VENTILATION

Petroleum vapor is heavier than air and is deadly if inhaled in large quantities. Engine exhaust gases are harmful to breathe.
When test-running an engine indoors, maintain good ventilation.



SELF-PROTECTION

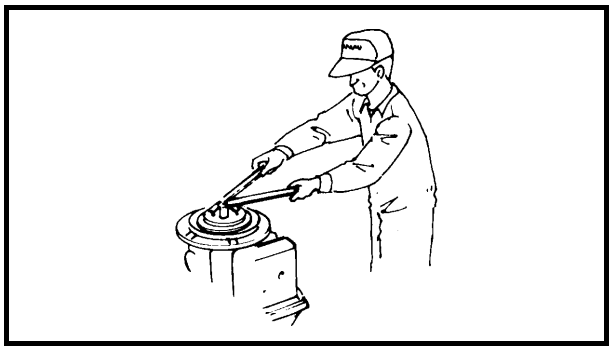
Protect your eyes with suitable safety glasses or safety goggles, when grinding or when doing any operation which may cause particles to fly off. Protect hands and feet by wearing safety gloves or protective shoes if appropriate to the work you are doing.

OILS, GREASES AND SEALING FLUIDS

Use only genuine Yamaha oils, greases and sealing fluids or those recommended by Yamaha.

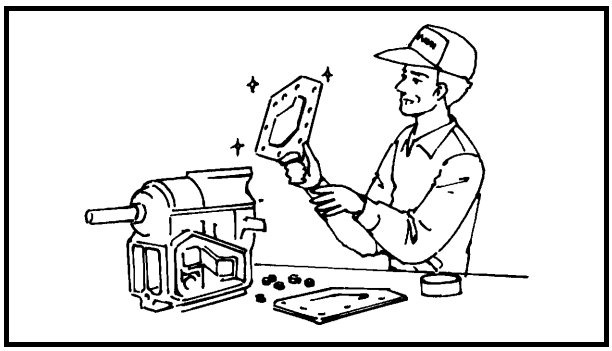
Under normal conditions or use, there should be no hazards from the use of the lubricants mentioned in this manual, but safety is all-important, and by adopting good safety practices, any risk is minimized. A summary of the most important precautions is as follows:

1. While working, maintain good standards of personal and industrial hygiene.
2. Clothing which has become contaminated with lubricants should be changed as soon as practicable, and laundered before further use.
3. Avoid skin contact with lubricants; do not, for example, place a soiled wiping-rag in your pocket.
4. Hands and any other part of the body which have been in contact with lubricants or lubricant-contaminated clothing, should be thoroughly washed with hot water and soap as soon as practicable.
5. To protect the skin, the application of a suitable barrier cream to the hands before working, is recommended.
6. A supply of clean lint-free cloths should be available for wiping purposes.

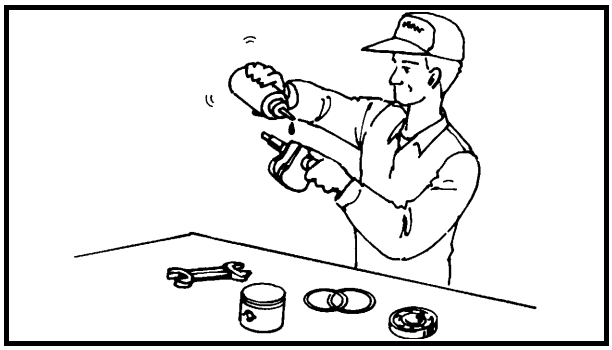


GOOD WORKING PRACTICES

1. The right tools
   Use the recommended special tools to protect parts from damage. Use the right tool in the right manner - do not improvise.
2. Tightening torque
   Follow the tightening torque instructions. When tightening bolts, nuts and screws, tighten the large sizes first, and tighten inner-positioned fixings before outer-positioned ones.

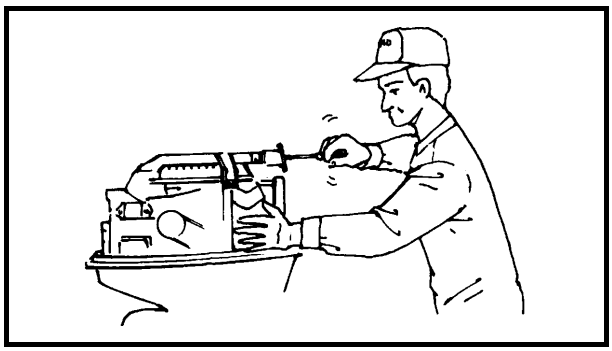


3. Non-reusable items
   Always use new gaskets, packings, O-rings, split-pins, circlips, etc., on reassembly.



DISASSEMBLY AND ASSEMBLY

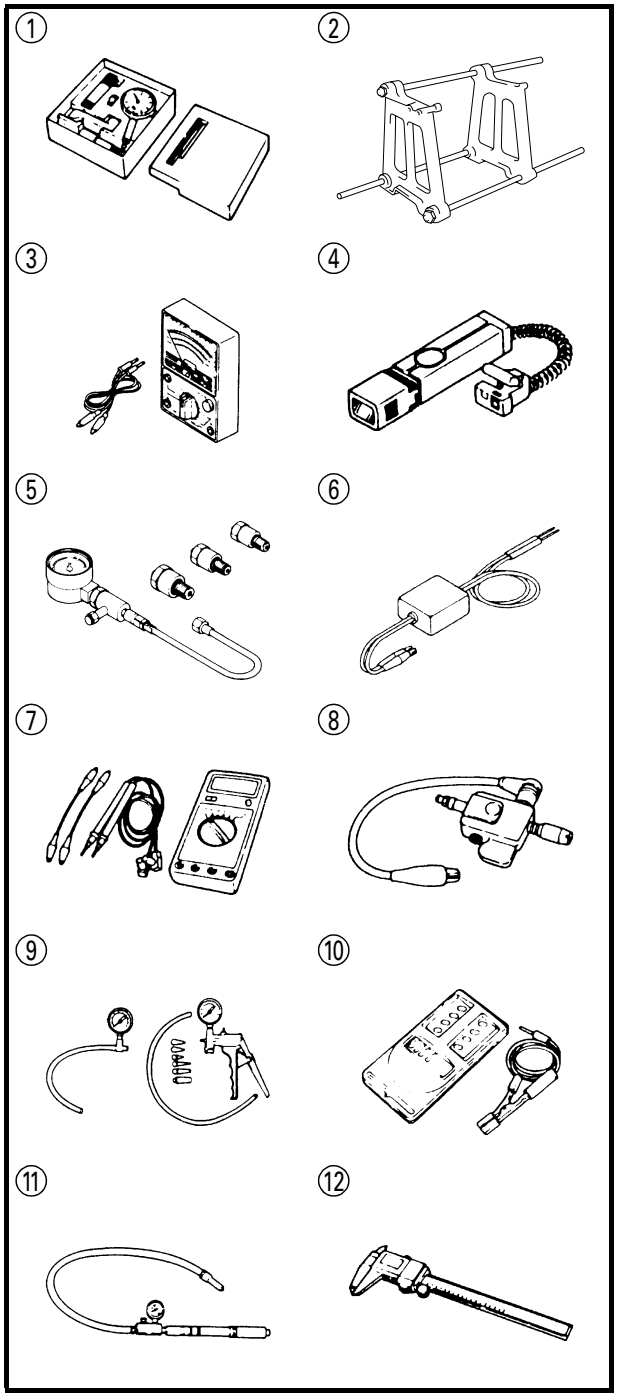
1. Clean parts with compressed air when disassembling.
2. Oil the contact surfaces of moving parts before assembly.



3. After assembly, check that moving parts operate normally.
4. Install bearings with the manufacturer's markings on the side exposed to view, and liberally oil the bearings.
5. When installing oil seals, apply a light coating of water-resistant grease to the outside diameter.

SPECIAL TOOLS

Using the correct special tools recommended by Yamaha, will aid the work and enable accurate assembly and tune-up. Improvising and using improper tools can damage the equipment.



MEASURING

① Dial gauge set
P/N. 90890-01252

② Crank stand alignment
P/N. 90890-03107

③ Pocket tester
P/N. 90890-03112

④ Timing light
P/N. 90890-03141

⑤ Compression Gauge
P/N. 90890-03160

⑥ Peak voltage adaptor
P/N. 90890-03172

⑦ Digital circuit tester
P/N. 90890-03174

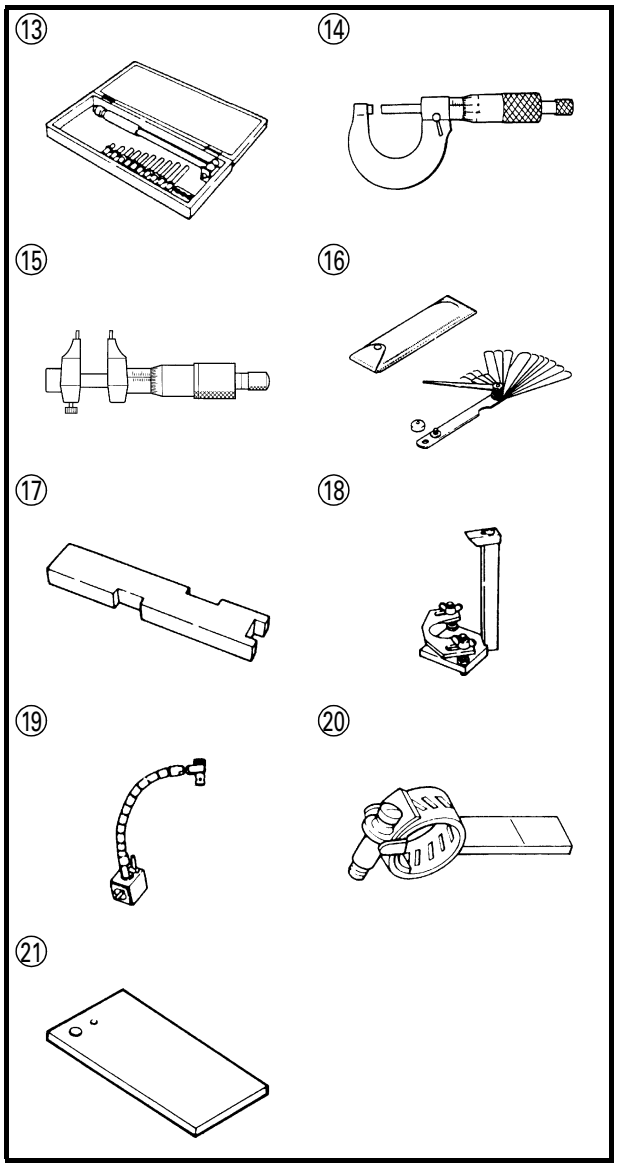
⑧ Ignition tester
P/N. 90890-06754

⑨ Vacuum/pressure pump gauge set
P/N. 90890-06756

⑩ Digital tachometer
P/N. 90890-06760

⑪ Leakage tester
P/N. 90890-06762

⑫ Digital caliper
P/N. 90890-06704



⑬ Cylinder gauge
P/N. 90890-06759

⑭ Outside micrometer
P/N. 90890-03006
P/N. 90890-03008

⑮ Inside micrometer
P/N. 90890-03010

⑯ Thickness gauge
P/N. 90890-03079

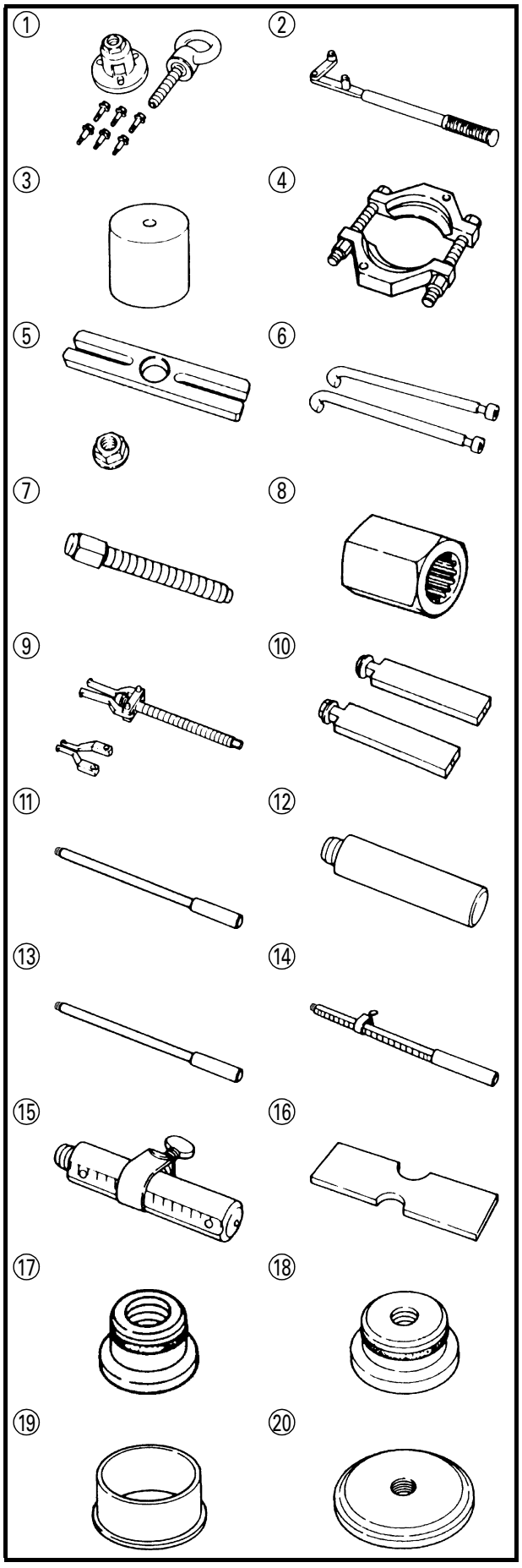
⑰ Shimming plate
P/N. 90890-06701

⑱ Pinion height gauge
P/N. 90890-06702

⑲ Magnet base
P/N. 90890-06705

⑳ Backlash indicator
P/N. 90890-06706

㉑ Magnet base plate
P/N. 90890-07003



REMOVING AND INSTALLING

① Flywheel puller
P/N. 90890-06521

② Flywheel holder
P/N. 90890-06522

③ Small end bearing installer
P/N. 90890-06527

④ Bearing separator
P/N. 90890-06534

⑤ Stopper guide plate
P/N. 90890-06501

⑥ Bearing housing puller claw
P/N. 90890-06564

⑦ Center bolt
P/N. 90890-06504

⑧ Drive shaft holder 3
P/N. 90890-06517

⑨ Bearing puller ass'y
P/N. 90890-06535

⑩ Stopper guide stand
P/N. 90890-06538

⑪ Driver rod LL
P/N. 90890-06605

⑫ Driver rod LS
P/N. 90890-06606

⑬ Driver rod L3
P/N. 90890-06652

⑭ Driver rod SL
P/N. 90890-06602

⑮ Driver rod SS
P/N. 90890-06604

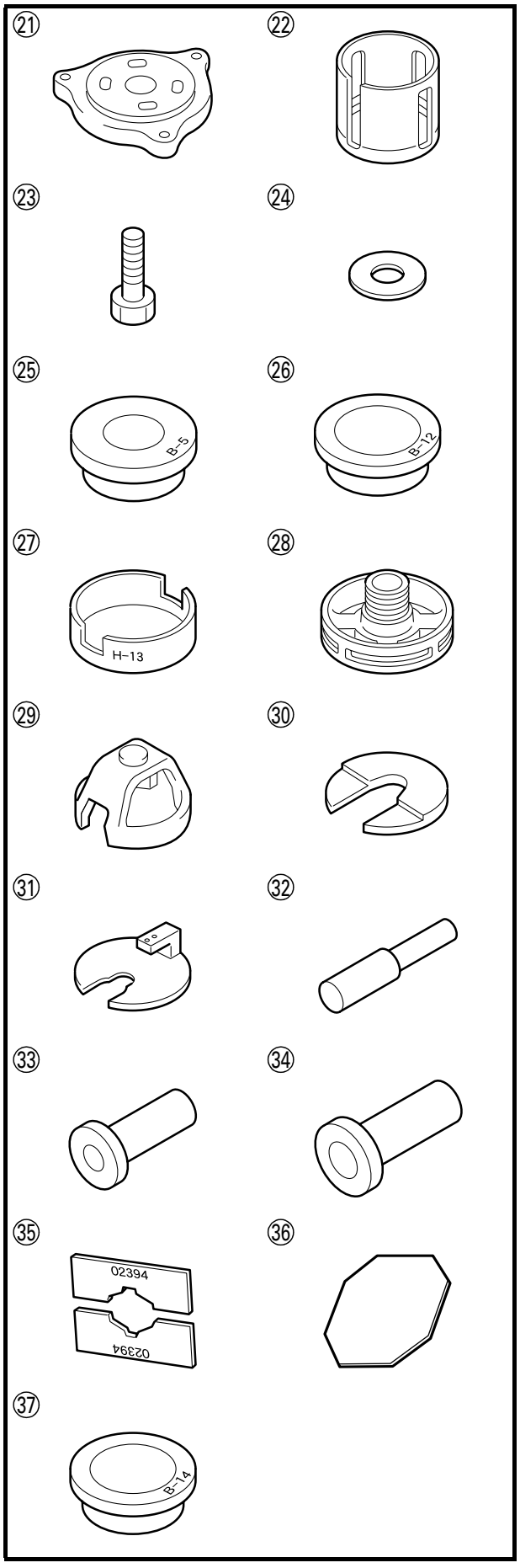
⑯ Bearing depth plate
P/N. 90890-06603

⑰ Needle bearing attachment
P/N. 90890-06608
P/N. 90890-06611
P/N. 90890-06615

⑱ Ball bearing attachment
P/N. 90890-06633

⑲ Bearing inner race attachment
P/N. 90890-06643
P/N. 90890-06644
P/N. 90890-06645

⑳ Bearing outer race attachment
P/N. 90890-06622
P/N. 90890-06628



Crank jig ass'y
P/N. 90890-02421

㉑ Frange
P/N. 90890-02351

㉒ Body
P/N. 90890-02352

㉓ Bolt
P/N. 90890-02353

㉔ Washer
P/N. 90890-02354

㉕ Bushing-5 (D25)
P/N. 90890-02359

㉖ Bushing-12 (D35)
P/N. 90890-02366

㉗ Height ring-13 (H57)
P/N. 90890-02379

㉘ Pressure Plate
P/N. 90890-02384

㉙ Press body
P/N. 90890-02385

㉚ Plate A
P/N. 90890-02386

㉛ Plate B
P/N. 90890-02387

㉜ Pressure pin B
P/N. 90890-02390

㉝ Bearing pressure B
P/N. 90890-02392

㉞ Bearing pressure C
P/N. 90890-02393

㉟ Support
P/N. 90890-02394

㊱ Spacer B
P/N. 90890-02396

㊲ Bushing-14
P/N. 90890-02419

FEATURES AND BENEFITS

POWER UNIT

The EK25B is designed to provide superior fuel economy, serviceability, and durability.
They are based on the previous EK25A with newly designed linkage to control both throttle opening and ignition timing mechanically and simultaneously.
Special attention was paid on the crankshaft bearings. Collar is now added to the upper main journal of the crankshaft. Roller bearing is applied for the center bearing.
The collar added on the upper main journal contributes to get and better serviceability.

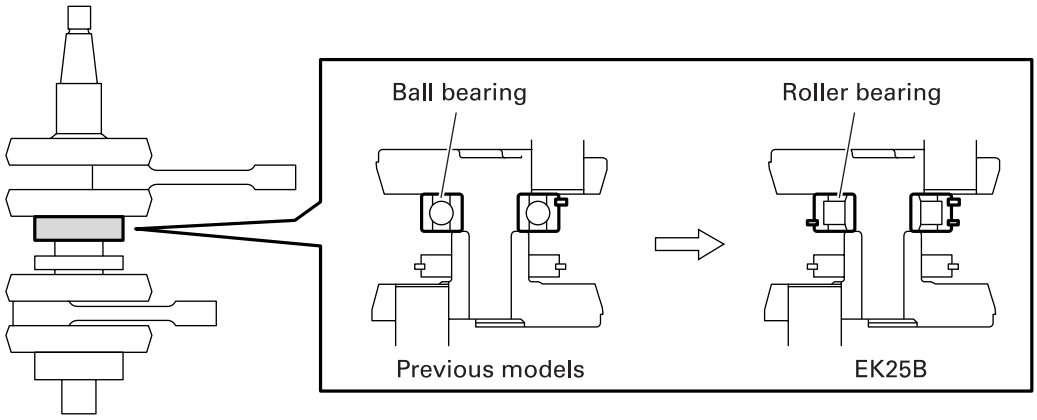


Fig. 1

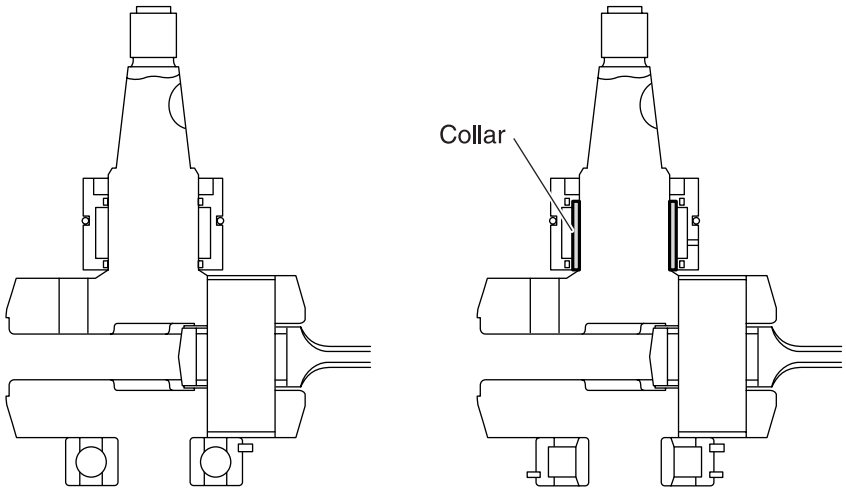


Fig. 2

IGNITION SYSTEM

Ignition system on the EK25B consists of flywheel magnet, charge coil, pulser coil, CDI unit, and ignition coil.
Similar to the previous EK25A, the engine has the mechanical ignition timing advance system that works by way of the linkage.
Superior fuel economy is attained by the modified ignition timing control arrangement.
Also the system restricts the ignition timing advance to prevent engine kickback when the shift is in neutral.

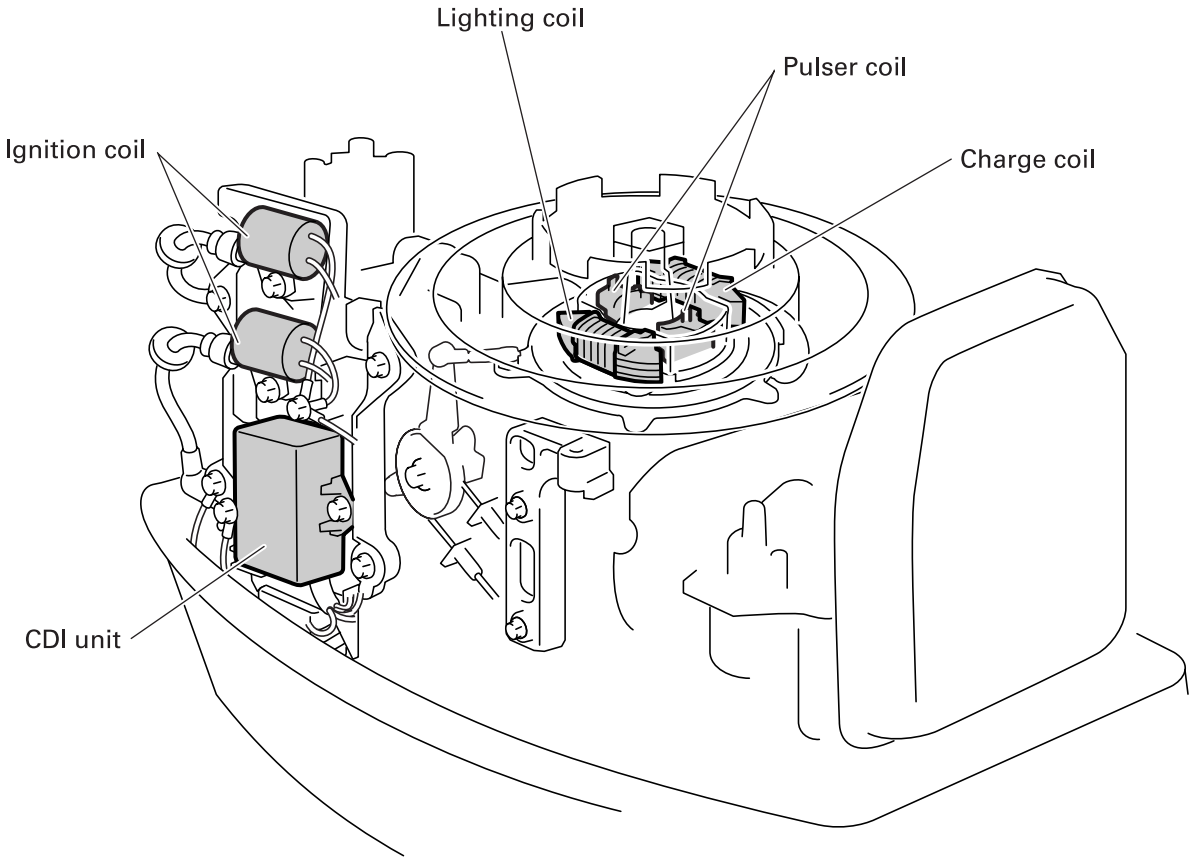


Fig. 3

COOLING SYSTEM

New structure applied to the cooling system provides additional cooling capacity in the upper casing.
With additional cooling water passage (indicated by ⇦), water walls contained in the new upper casing contribute to the reduction of outer surface temperature.

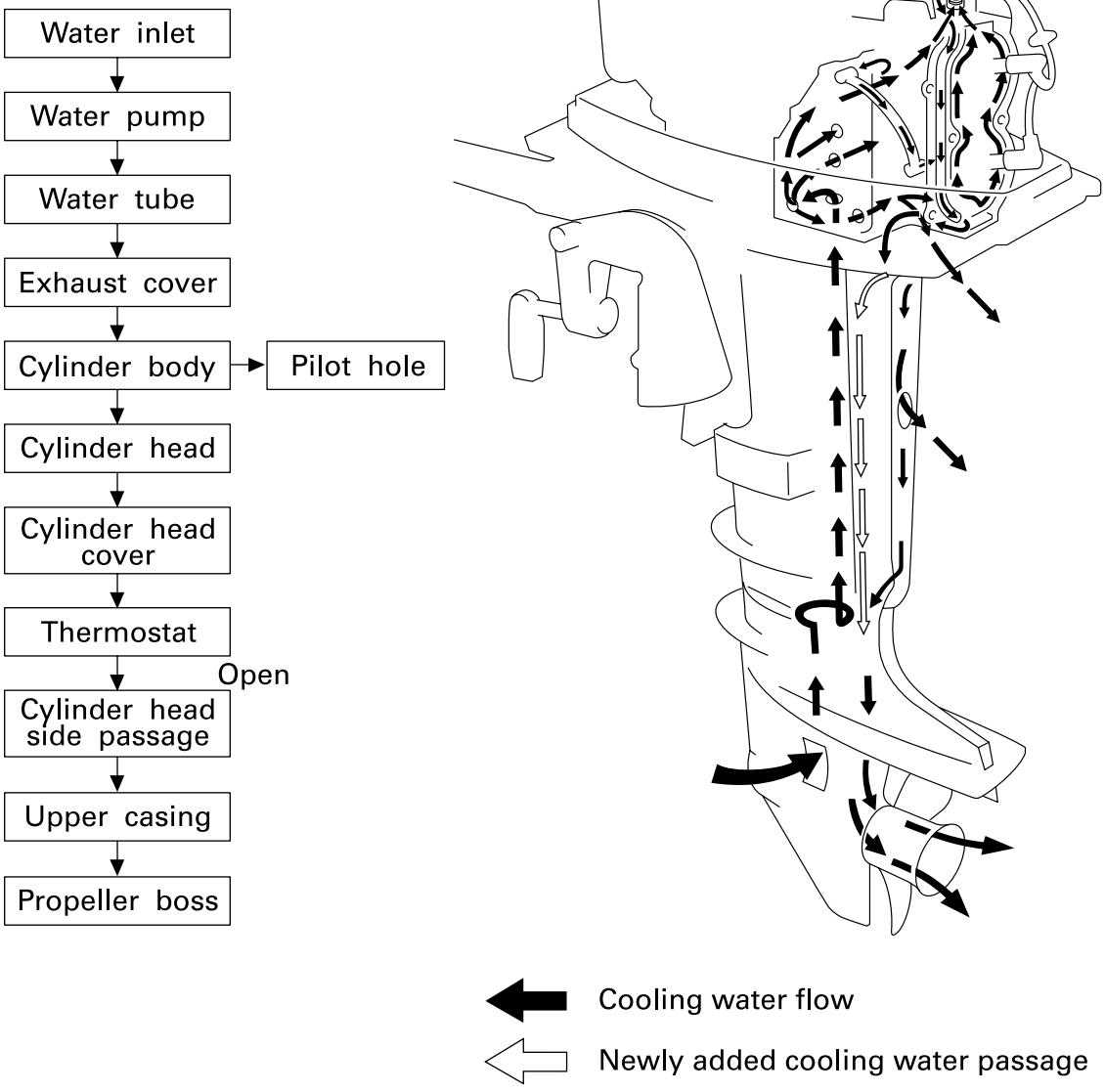


Fig. 4

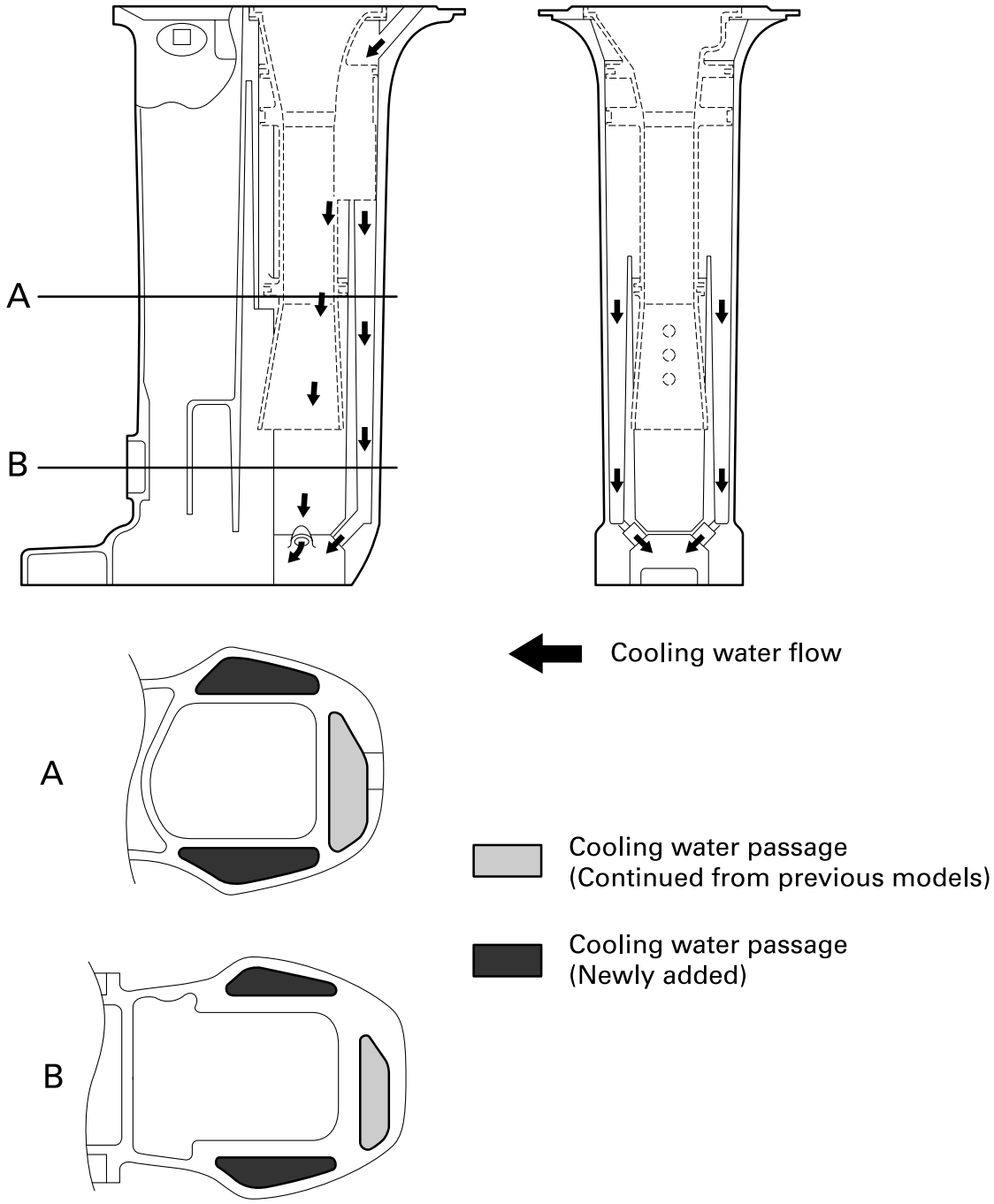

A
B
Cooling water flow
A
B
Cooling water passage
(Continued from previous models)
Cooling water passage
(Newly added)

Fig. 5

TILLER HANDLE

For the throttle grip on the steering handle of the EK25B, 100 degrees of opening angle covers all ranges from full-closed to wide-open positions.
Also, new steering handle parts were developed to assume the long use. Inner diameter of the steering handle engagement area, and both inner and outer diameters of steering bracket are increased.
Please note that if the new steering handle is installed on the previous models, Steering handle 2, Steering bracket, Collar, and Washer must be replaced.

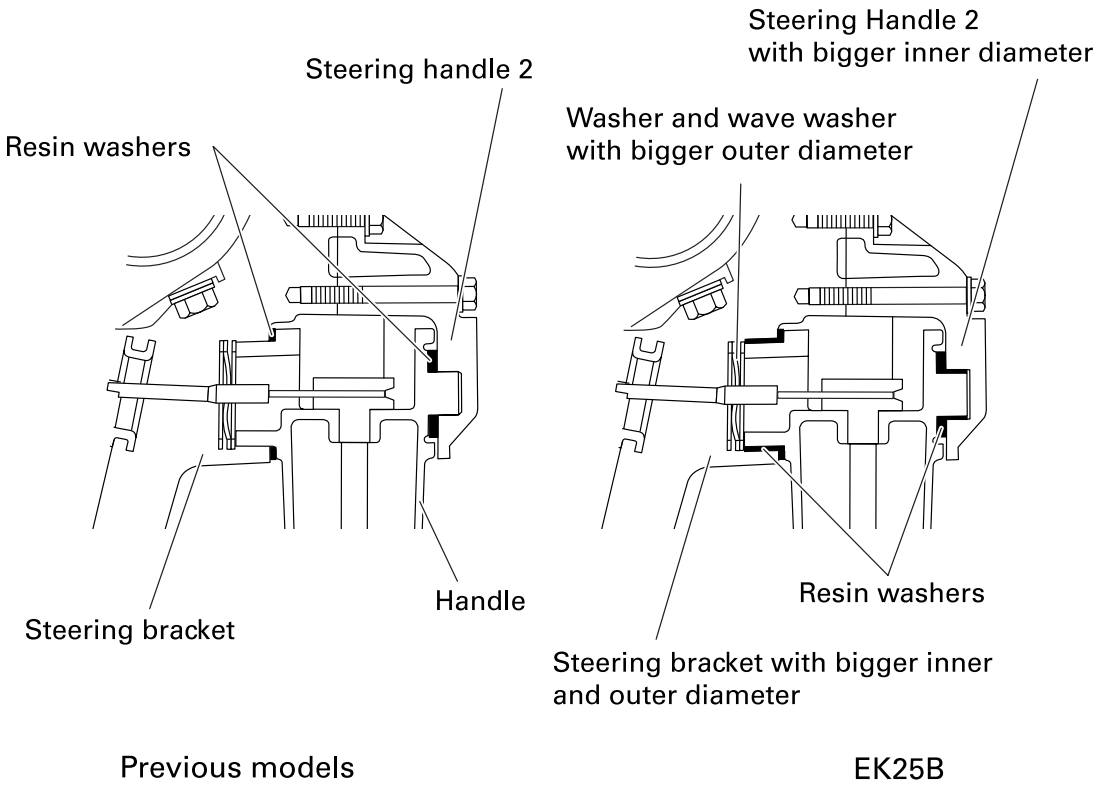


Fig. 6

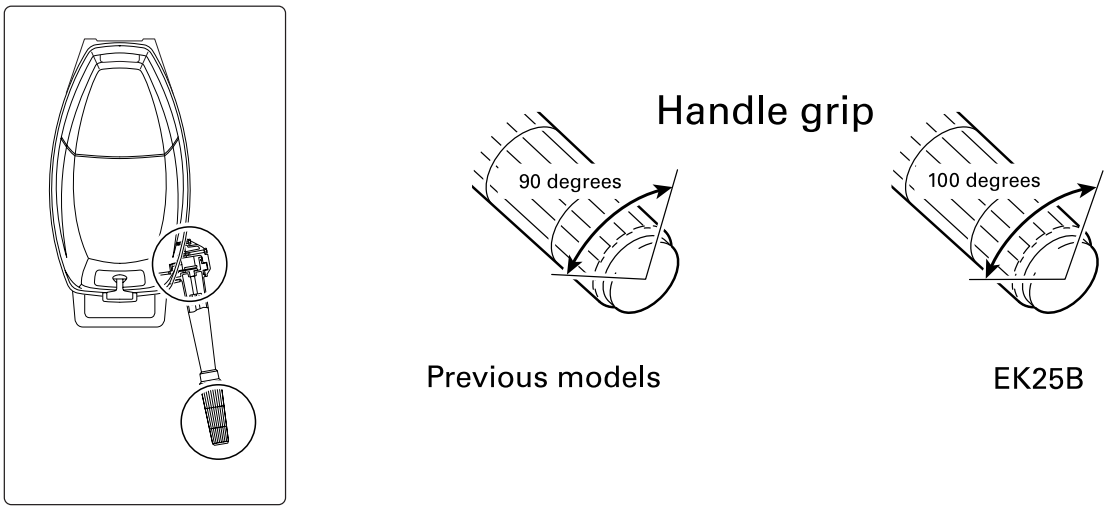


Fig. 7

BRACKET AND BOTTOM COWLING

The Bracket 1 is modified on the EK25B, and newly designed rubber seal is added to provide better sealing ability for the bottom cowling.

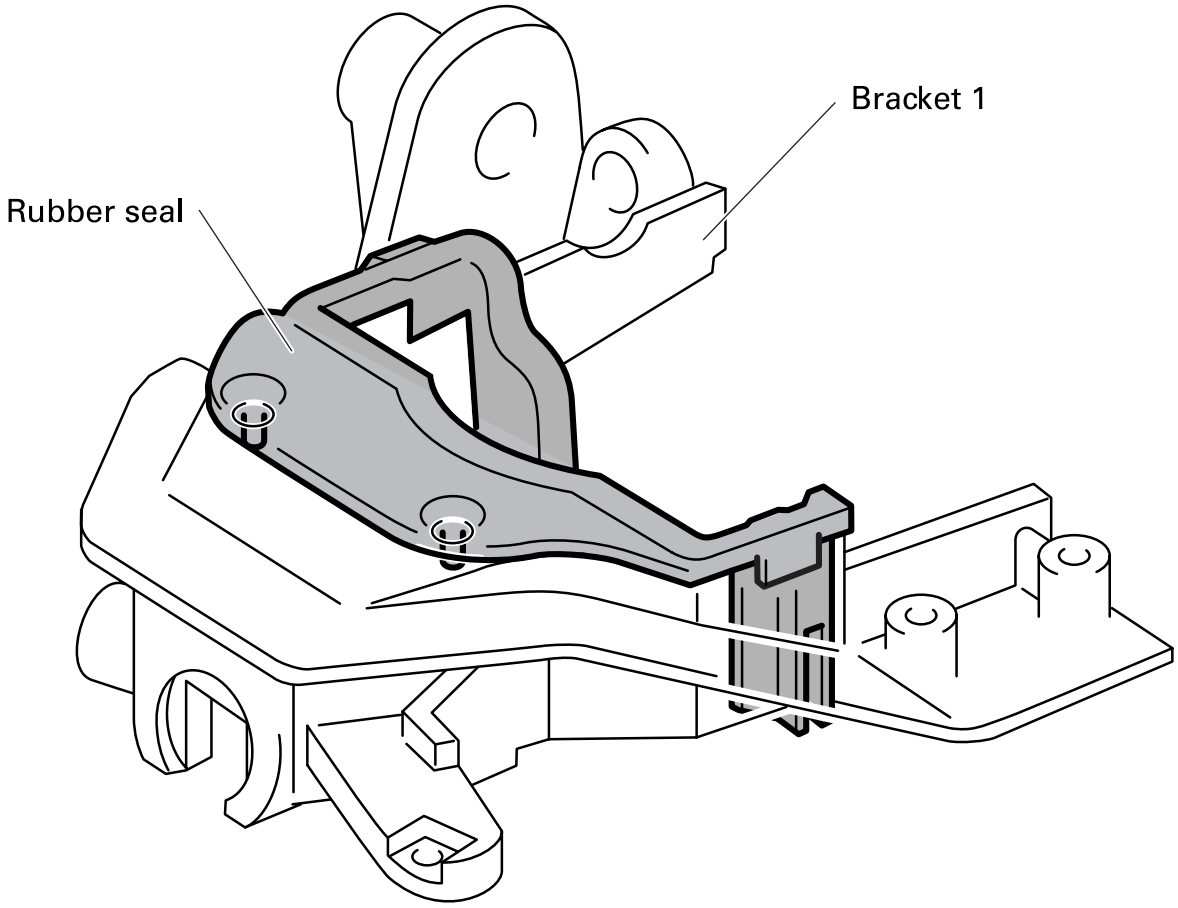


Fig. 8

CHAPTER 2
SPECIFICATIONS

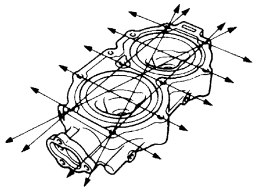
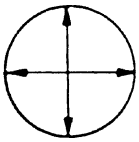
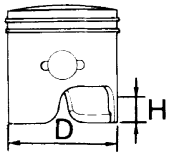
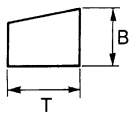
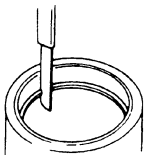
GENERAL SPECIFICATIONS

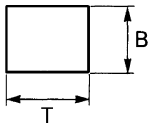
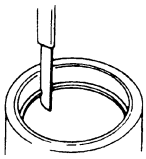
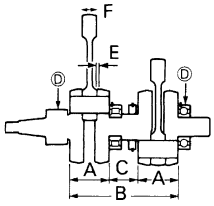
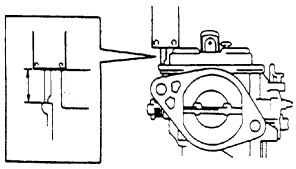
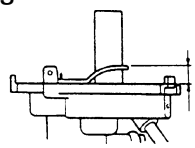
Item (Worldwide)	Unit	Model EK25BMH
DIMENSIONS		
Overall length	mm (in)	843 (33.2)
Overall width	mm (in)	399 (15.7)
Overall height		
(S)	mm (in)	1,146 (45.1)
(L)	mm (in)	1,273 (50.1)
(Y)	mm (in)	1,320 (52.0)
Boat transom height		
(S)	mm (in)	381 (15.0)
(L)	mm (in)	508 (20.0)
(Y)	mm (in)	559 (22.0)
WEIGHT		
(S)	kg (lb)	53.0 (116.9)
(L)	kg (lb)	54.5 (120.2)
(Y)	kg (lb)	55.0 (121.3)
PERFORMANCE		
Maximum output (ISO)	kW (hp) @5,000 r/min	18.4 (25.0)
Full throttle operating range	r/min	4,500 - 5,500
Maximum fuel consumption	L (US gal, Imp gal) @5,500 r/min	13.8 (3.6, 3.0) Gasoline / Kerosene
POWER UNIT		
Type		2 stroke
Number of cylinders		2
Displacement	cm^3 (cu. in)	496 (30.3)
Bore and stroke	mm (in)	72.0 × 61.0 (2.83 × 2.40)
Compression ratio	kPa (kgf/cm^2, psi)	#1: 5.3 (0.05, 0.8), #2: 5.7 (0.06, 0.8)
Compression pressure	kPa (kgf/cm^2, psi)	#1: 680 (6.8, 98.6), #2: 730 (7.3, 105.9)
<Minimum>	kPa (kgf/cm^2, psi)	#1: 540 (5.4, 78.3), #2: 580 (5.8, 84.1)
Spark plug(NGK)		B7HS-10
Number of carburetor		1
Enrichment system		Chock valve
Intake system		Reed valve
Induction system		Loop charge
Exhaust system		Through propeller boss

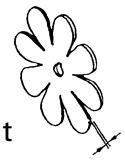
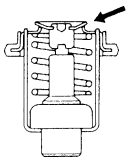
Item (Worldwide)	Unit	Model EK25BMH
Lubrication system		Mixed (Gasoline and oil, Kerosene and oil)
Cooling system		Water
Ignition control system		CDI
Alternator output	V - W	12 - 80
POWER UNIT		
Starting system		Manual
Control system		Mechanical
Advanced system		Mechanical
CARBURETOR		
ID mark		69T00
FUEL AND OIL		
Fuel type		
(Main)		Kerosene
Mixing ratio		30 : 1
(Sub)		Unleaded regular gasoline
Mixing ratio		50 : 1
Engine oil type		2 stroke outboard engine oil
Engine oil grade		TC - W3
Gear oil		Hypoid gear oil
Gear oil grade		SAE #90 (API GL - 4)
Gear oil capacity	cm^3(US oz, Imp oz)	320 (10.8, 11.3)
BRACKET		
Tilt angle	Degree	4, 8, 12, 16, 20
Tilt-up angle	Degree	76
Shallow water angle from transom	Degree	Tilt angle + 20
Steering angle	Degree	40 + 40
DRIVE UNIT		
Gear shift positions		F - N - R
Gear ratio		2.08 (27/13)
Gear type		Spiral bevel
Propeller direction (rear view)		Clockwise
Propeller drive system		Spline
Propeller mark		F

MAINTENANCE SPECIFICATIONS

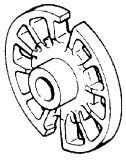
POWER UNIT

Item	Unit	Model
Worldwide		EK25BMH
CYLINDER HEAD		
Warpage limit	mm (in)	0.1 (0.004)
 (lines indicate straightedge position)		
CYLINDERS		
Bore size 	mm (in)	72.00 - 72.02 (2.8346 - 2.8354)
Wear limit	mm (in)	72.10 (2.8386)
Taper limit	mm (in)	0.08 (0.0031)
Out-of-round limit	mm (in)	0.05 (0.0020)
PISTON		
Piston side "D"	mm (in)	71.94 - 71.96 (2.8323 - 2.8331)
Measuring point "H" 	mm (in)	10.0 (0.3937)
Piston-cylinder clearance	mm (in)	0.060 - 0.065 (0.0024 - 0.0026)
<Limit>	mm (in)	0.1 (0.0039)
Oversize piston diameter 1st	mm (in)	72.25 (2.8445)
2nd	mm (in)	72.50 (2.8543)
Pin boss inside diameter	mm (in)	19.904 - 19.915 (0.7836 - 0.7841)
PISTON PINS		
Outside diameter	mm (in)	19.895 - 19.900 (0.7833 - 0.7835)
PISTON RING (1st)		
Type 		Keystone
(B)	mm (in)	2.0 (0.079)
(T)	mm (in)	3.0 (0.118)
End gap (installed) 	mm (in)	0.20 - 0.35 (0.008 - 0.014)
<Limit>	mm (in)	0.35 (0.014)
Side clearance	mm (in)	0.03 - 0.05 (0.0012 - 0.0020)
<Limit>	mm (in)	0.05 (0.0020)

Item	Unit	Model	
Worldwide		EK25BMH	
PISTON RING (2nd)			
Type 		Plain	
(B)	mm (in)	2.0 (0.079)	
(T)	mm (in)	3.0 (0.118)	
End gap (installed) 	mm (in)	0.20 - 0.35 (0.0079 - 0.0137)	
<Limit>	mm (in)	0.35 (0.014)	
Side clearance	mm (in)	0.03 - 0.07 (0.0012 - 0.0028)	
<Limit>	mm (in)	0.07 (0.0028)	
CRANKSHAFT			
Crank width (A)	mm (in)	56.90 - 56.95 (2.2401 - 2.2421)	
 (B)	mm (in)	153.7 - 154.0 (6.0512 - 6.0630)	
(C)	mm (in)	39.9 - 40.1 (1.5709 - 1.5787)	
Runout limit (D)	mm (in)	0.03 (0.0012)	
Side clearance (E)	mm (in)	0.2 - 0.7 (0.0079 - 0.0276)	
Maximum axial play (F)	mm (in)	2.0 (0.079)	
CONNECTING ROD			
Small end diameter	mm (in)	23.904 - 23.917 (0.941 - 0.942)	
CARBURETOR		Kerosene carburetor	Gasoline carburetor
Main jet (M.J.)	#	155	—
Main air jet (M.A.J.)	ϕmm (in)	1.3 (0.051)	—
Main nozzle (M.N.)	ϕmm (in)	2.8 (0.110)	—
Pilot jet (P.J.)	#	50	48
Pilot air jet (P.A.J.)	mm (in)	0.92 (0.036)	0.90 (0.035)
Pilot screw (P.S.)	turns out	1/2 + 2 1/2 - 1/2	1 - 1/2 ± 1/2
Valve seat size (V.S.)	mm (in)	1.4 (0.055)	1.2 (0.047)
Float height 	mm (in)	18 (0.079)	—
Float arm height 	mm (in)	—	3 (0.118)
Idle speed	r/min	1,300 ± 50	

Item (Worldwide)	Unit	Model: EK25BMH
REED VALVES 		
Thickness		0.2 (0.008)
Valve stopper height		
(Standard)	mm (in)	3.46 - 3.50 (0.136 - 0.138)
(for Sri Lanka)	mm (in)	4.20 - 4.60 (0.165 - 0.181)
Valve bending limit	mm (in)	0.2 (0.008)
THERMOSTAT		
Valve opening temperature 	°C (°F)	48 - 52 (118 - 126)
Full-open temperature	°C (°F)	60 (140)
Minimum valve lift	mm (in)	3 (0.12)

LOWER UNIT

Item (Worldwide)	Unit	Model: EK25BMH
GEAR BACKLASH		
Pinion - forward gear	mm (in)	0.31 - 0.72 (0.012 - 0.028)
Pinion - reverse gear	mm (in)	0.93 - 1.65 (0.037 - 0.065)
Pinion gear shims	mm	0.7 / 1.0 / 1.1 / 1.2 / 1.3 / 1.4 / 1.5 / 1.6
Forward gear shims	mm	1.0 / 1.1 / 1.2 / 1.3 / 1.4
Reverse gear shims	mm	1.0 / 1.1 / 1.2 / 1.3
PROPELLER		
Material		Aluminium
No. of blades × diameter × pitch	in	3 × 9 - 7/8 × 11 - 1/4 3 × 9 - 7/8 × 8 3 × 9 - 7/8 × 9 3 × 9 - 7/8 × 10 - 1/2 3 × 9 - 7/8 × 12 3 × 9 - 7/8 × 13 3 × 9 - 7/8 × 14
Test propeller 	P/N.	90890-01629
	r/min	5,250 - 5,450

ELECTRICAL

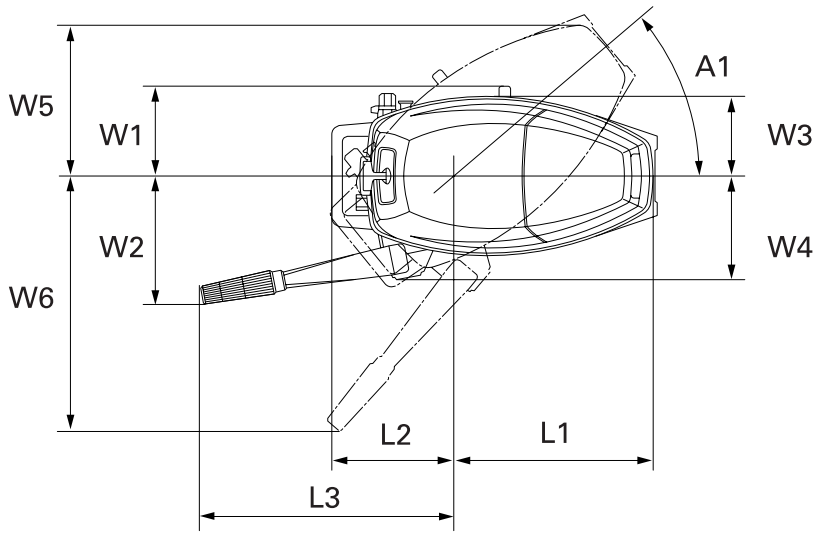
Item	Unit	Model
Worldwide		EK25BMH
IGNITION SYSTEM		
Ignition timing		
(Full retard)	Degree	ATDC 2 ± 2
(Full advanced)	Degree	BTDC 22 ± 2
Spark plug gap	mm (in)	0.9 - 1.0 (0.035 - 0.039)
Ignition spark gap		
(Minimum)	mm (in)	8.0 (0.31)
Ignition coil resistance		
(Primary)	Ω	0.18 - 0.24
(Secondary)	kΩ	2.70 - 3.70
Charge coil resistance (Br - L)	Ω	342 - 418
Charge coil output peak voltage (Br - L)		
@ cranking 1*1	V	146
@ cranking 2*1	V	146
@ 1,500 r/min	V	150
@ 3,500 r/min	V	150
Pulser coil resistance (W/R - B , W/B - B)	Ω	311 - 381
Pulser coil output peak voltage (W/R - B , W/B - B)		
@ cranking 1*1	V	6.8
@ cranking 2*1	V	6.7
@ 1,500 r/min	V	16.0
@ 3,500 r/min	V	26.0
CDI unit resistance	Ω	Refer to the "CDI UNIT" on page 8-10
CDI unit output peak voltage (B/O - B , B/W - B)		
@ cranking 1*1	V	5.5
@ cranking 2*1	V	130.0
@ 1,500 r/min	V	135.0
@ 3,500 r/min	V	135.0

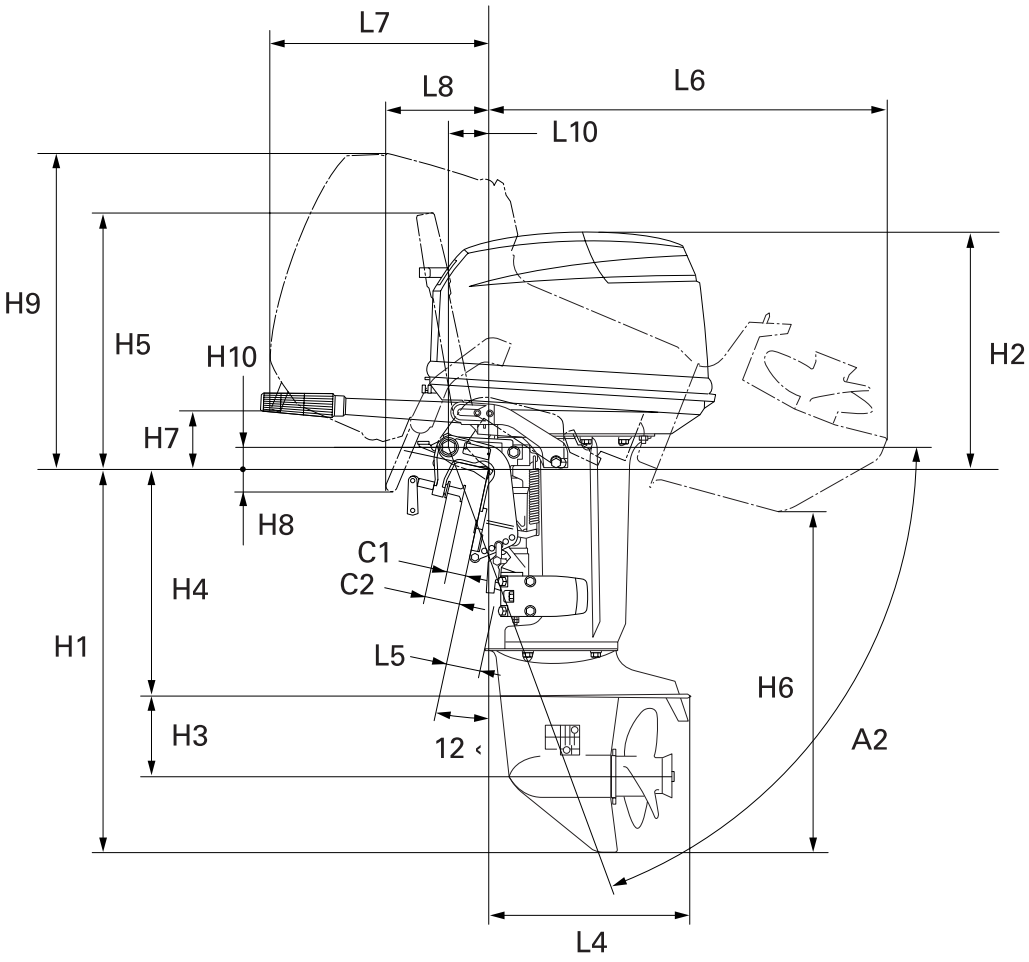
*1 Cranking 1: Open circuit.
Cranking 2: Related parts are connected.

Item	Unit	Model
Worldwide		EK25BMH
CHARGING SYSTEM		
Lighting coil resistance (G - G)	Ω	0.31 - 0.37
Lighting coil output peak voltage (G - G)		
@ cranking 1*1	V	4.6
@ cranking 2*1	V	—
@ 1,500 r/min	V	—
@ 3,500 r/min	V	—
@ 1,500 r/min (Open circuit)	V	14.7
@ 3,500 r/min (Open circuit)	V	30.0

*1 Cranking 1: Open circuit.
Cranking 2: Related parts are connected.

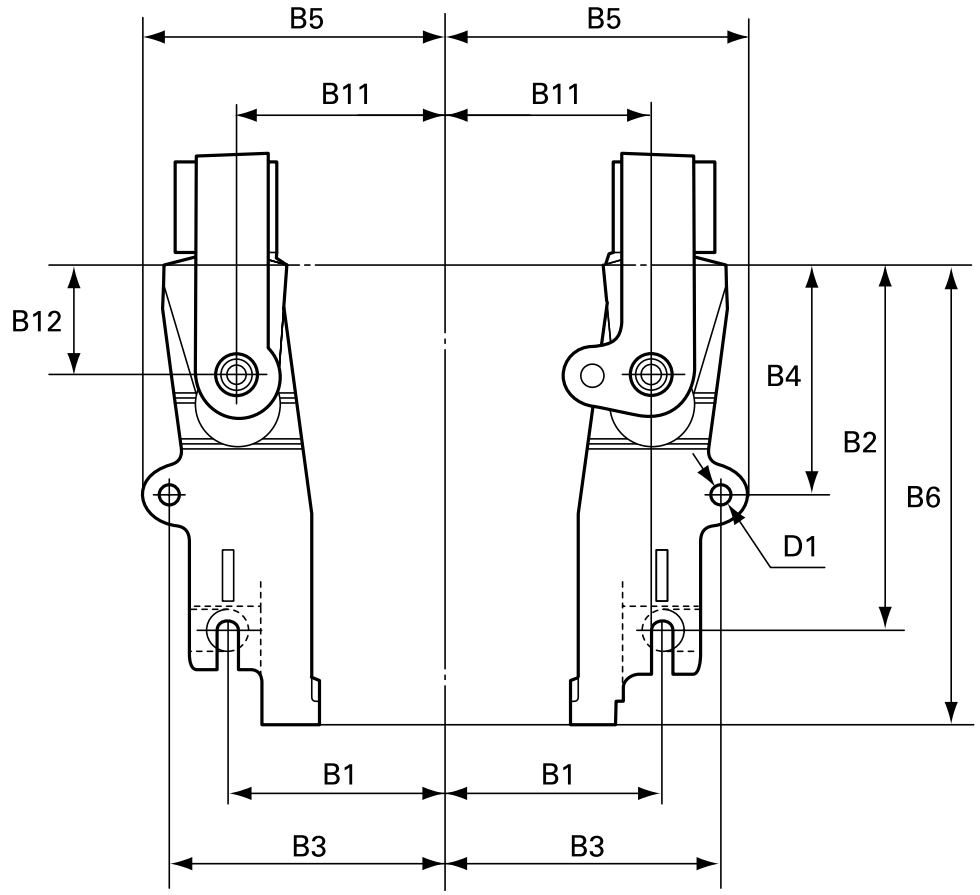
DIMENSIONS


W5
W1
W2
W6
A1
W3
W4
L2
L1
L3


L7
L8
L6
L10
H9
H5
H10
H7
H8
H2
C1
C2
H4
H1
L5
H6
H3
12 ‹
A2
L4

DIMENSIONS

Symbol	Worldwide	Unit	Model
			EK25BMH
L1		mm (in)	429 (16.89)
L2		mm (in)	180 (7.09)
L3		mm (in)	420 (16.54)
L4		mm (in)	385 (15.16)
L5	(S)	mm (in)	61 (2.40)
	(L)	mm (in)	83 (3.27)
	(Y)	mm (in)	83 (3.27)
L6	(S)	mm (in)	736 (28.98)
	(L)	mm (in)	854 (33.62)
	(Y)	mm (in)	897 (35.31)
L7		mm (in)	405 (15.94)
L8		mm (in)	195 (7.68)
L10		mm (in)	74.2 (2.92)
H1	(S)	mm (in)	707 (27.83)
	(L)	mm (in)	834 (32.83)
	(Y)	mm (in)	881 (34.68)
H2		mm (in)	439 (17.28)
H3		mm (in)	144 (5.67)
H4	(S)	mm (in)	423 (16.65)
	(L)	mm (in)	550 (21.65)
	(Y)	mm (in)	597 (23.50)
H5		mm (in)	466 (18.35)
H6	(S)	mm (in)	621 (24.45)
	(L)	mm (in)	701 (27.60)
	(Y)	mm (in)	730 (28.74)
H7		mm (in)	118 (4.65)
H8		mm (in)	30 (1.18)
H9		mm (in)	596 (23.46)
H10		mm (in)	40.3 (1.59)
W1		mm (in)	166 (6.54)
W2		mm (in)	233 (9.17)
W3		mm (in)	148 (5.83)
W4		mm (in)	192 (7.56)
W5		mm (in)	302 (11.89)
W6		mm (in)	472 (18.58)
A1		Degree	40
A2		Degree	68
C1		mm (in)	35 (1.38)
C2		mm (in)	65 (2.56)



Symbol	Worldwide	Unit	Model
			EK25BMH
B1		mm (in)	89 (3.50)
B2		mm (in)	140 (5.51)
B3		mm (in)	112.5 (4.43)
B4		mm (in)	96.5 (3.80)
B5		mm (in)	122.5 (4.82)
B6		mm (in)	176 (6.93)
B11		mm (in)	85 (3.35)
B12		mm (in)	51 (2.01)
D1		ϕmm (in)	8.5 (0.33)

TIGHTENING TORQUES

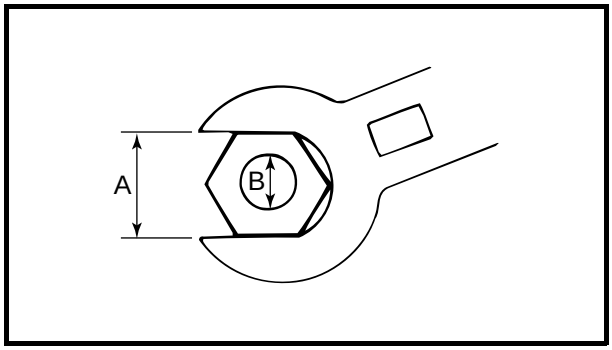
SPECIFIED TORQUES

Part to be tightened		Part name	Thread size	Q'ty	Tightening torques			Remarks
					N•m	kgf•m	ft•lb	
POWER UNIT								
Recoil starter mounting		Bolt	M6	3	12	1.2	8.9	
Recoil starter center boit		Bolt	M12	1	15	1.5	11	
Recoil starter center Nut		Nut	—	1	10	1.0	7.4	
Flywheel magnet		Nut	M12	1	140	14	103	E
Power unit mounting	1st	Bolt	M8	6	11	1.1	8.1	572
	2nd				22	2.2	16	
Intake manifold mounting	1st	Bolt	M6	9	4	0.4	3.0	572
	2nd				8	0.8	5.9	
Spark plug		—	M14	2	25	2.5	18	
Cylinder head mounting	1st	Bolt	M8	11	15	1.5	11	572
	2nd				30	3.0	22	
Exhaust cover mounting	1st	Bolt	M6	15	4	0.4	3.0	572
	2nd				8	0.8	5.9	
Crankcase mounting	1st	Bolt	M8	10	15	1.5	11	572
	2nd				30	3.0	22	
LOWER UNIT								
Propeller		Nut	—	1	35	3.5	26	D
Lower unit mounting		Bolt	M10	6	37	3.7	27	572
		Nut	M10	6	37	3.7	27	572
Propeller shaft housing		Bolt	M6	2	11	1.1	8.1	572
Pinion gear nut		Nut	M8	1	50	5.0	37	
Water inlet		Bolt	M5	2	5	0.5	3.7	
BRACKET								
Shift actuator mounting		Bolt	M6	4	11	1.1	8.1	
		Nut	M10	1	17	1.7	13	572
Shift lever		Bolt	M6	1	11	1.1	8.1	241
Mount rubber(side upper)		Nut	M10	2	17	1.7	13	572
Mount rubber(lower front)		Bolt	M8	2	17	1.7	13	572
Steering bracket mounting		Bolt	M6	4	11	1.1	8.1	241
Clamp bracket nylon		Nut	—	2	45	4.5	33	
ELECTRICAL								
CDI unit		Bolt	M6	2	4	0.4	3.0	
Ignition coil		Bolt	M6	2	8	0.8	5.9	
Engine stop switch		Nut	M16	1	35	3.5	26	

* Do not apply too much torque.

TIGHTENING TORQUES

Nut (A)	Bolt (B)	General torque specifications		
		N•m	kgf•m	ft•lb
8 mm	M5	5	0.5	3.7
10 mm	M6	8	0.8	5.9
12 mm	M8	18	1.8	13
14 mm	M10	36	3.6	27
17 mm	M12	43	4.3	32



GENERAL TORQUES

This chart specifies tightening torques for standard fasteners with a standard ISO thread pitch. Tightening torque specifications for special components or assemblies are provided in applicable sections of this manual. To avoid warpage, tighten multi-fastener assemblies in a crisscross fashion and progressive stages until the specified tightening torque is reached. Unless otherwise specified, tightening torque specifications require clean, dry threads.
Components should be at room temperature.

CHAPTER 3
PERIODIC CHECK AND ADJUSTMENT

MAINTENANCE INTERVAL CHART

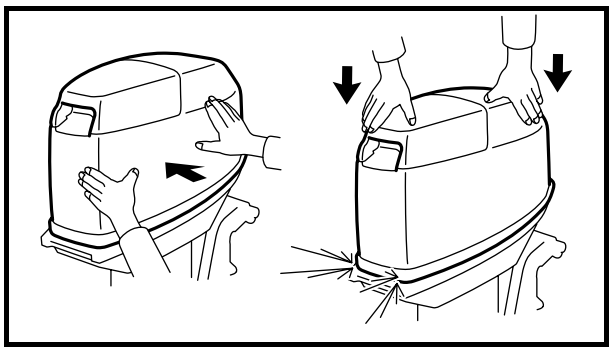
Frequency of maintenance operations may be adjusted according to the operating conditions, but the following table gives general guidelines.

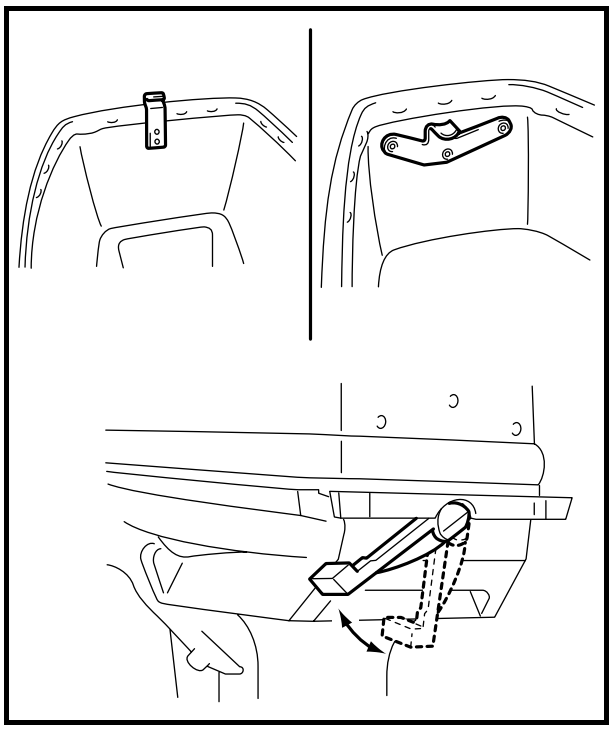
The mark (●) indicates the check-ups which maybe carried out by owner.
The mark (○) indicates work to be carried out by Yamaha dealer.

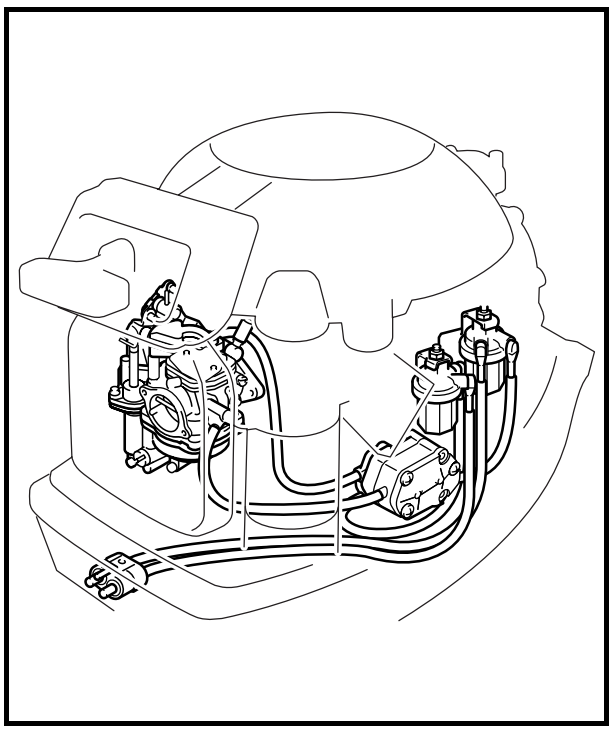
Item	Remarks	Initial		Every		Refer page
		10 hours	50 hours (3 months)	100 hours (6 months)	200 hours (1 year)	
FUEL SYSTEM						
Fuel filter	Clean	●	●	●		3-3
Fuel system	Check			○		3-2
Fuel tank	Clean				●	—
POWER UNIT						
Carburetor setting	Check	○		○		3-15
	Adjust	○		○		3-15
Cooling water passage	Clean	●		●	○	—
Exhaust leakage	Check	○	○	○		—
Water leakage	Check	○	○	○		—
CONTROL SYSTEM						
Ignition timing	Check	○		○		3-4
	Adjust	○		○		3-4
Idle speed	Check			○		3-15
	Adjust			●		3-15
LOWER UNIT						
Gear oil	Change	●		●		3-19
Propeller	Check		○	○		3-23
GENERAL						
Spark plug	Clean	●	●	●		3-22
	Adjust	●	●	●		3-22
	Replace	●	●	●		3-22
Wiring and connectors	Check	○	○	○		—
Greasa points	Grease			●		3-24
Bolts and nuts	Retighten	○		○		3-23
Anode	Check	○	○	○		3-21
Motor exterior	Check		○	○		—

NOTE:

Cooling water passages:
When operating in salt water, turbid or muddy water, the engine should be flushed with clean water after each use.







TOP COWLING

CHECKING THE TOP COWLING FIT

Check:

- Top cowling
  Cracks/damage → Replace.
- Hook
  Bent → Correct.
- Rivet
  Damage → Repair.
- Rubber of trim
  Peel/tear → Repair.

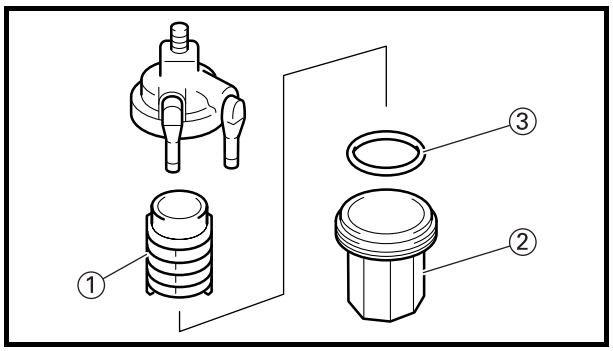
NOTE:
Hooks and latches are unadjustable.

FUEL SYSTEM

CHECKING THE FUEL LINE

Check:

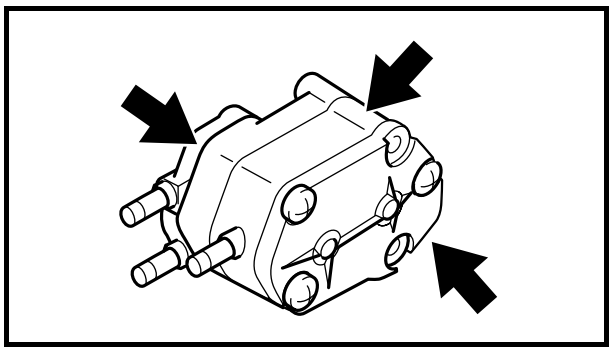
- Fuel hose
  Cracks/damage/leak → Replace.
  Refer to "FUEL JOINT, FUEL FILTER, AND FUEL PUMP" on page 4-1.



CHECKING THE FUEL FILTER

Check:

- Fuel filter element ①
  Foreign matter → Clean.
- Fuel filter cup ②
  Cracks/damage/leak → Replace.
- O-ring ③
  Cracks/damage → Replace.

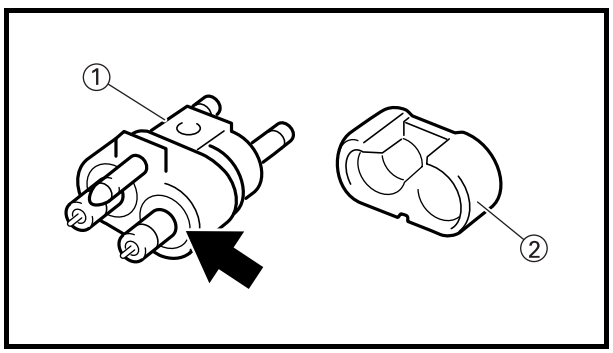


CHECKING THE FUEL PUMP

Check:

- Fuel pump
  Cracks/damage/leak → Repair/replace.
  Refer to "DISASSEMBLING THE FUEL PUMP" on page 4-4.

NOTE:
Observe pump with naked eyes.



CHECKING THE FUEL JOINT

Check:

- Fuel joint ①
  Cracks/damage/leak → Replace.
- Seal ②
  Cracks/damage → Replace.

CONTROL SYSTEM

ADJUSTING THE IGNITION TIMING

CAUTION:

Ignition timing adjustment on the running engine must be performed in the test tank with a test propeller installed on the engine.

Test propeller
90890-01629

⚠ WARNING

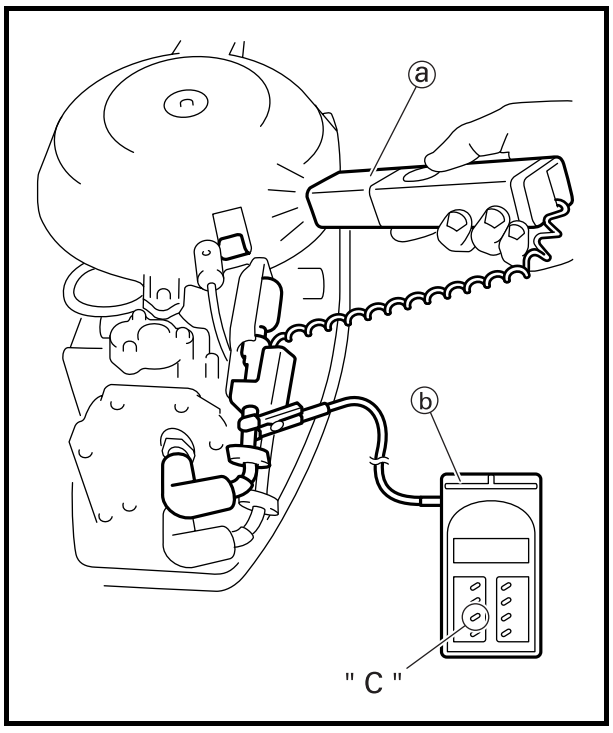
While checking the engine, do not touch the rotating part (flywheel), CDI unit, ignition coil, and any other hazardous areas.

1. Check:
   - Ignition timing

     Out of specification → Adjust.

Ignition timing (at idle)
ATDC 2° ± 2°
Ignition timing (at full advance)
BTDC 22° ± 2°

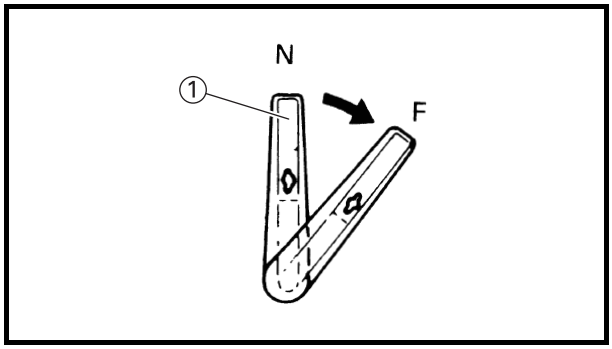
Engine idle speed
1,300 ± 50 r/min
Full throttle operating range
5,350 ± 100 r/min



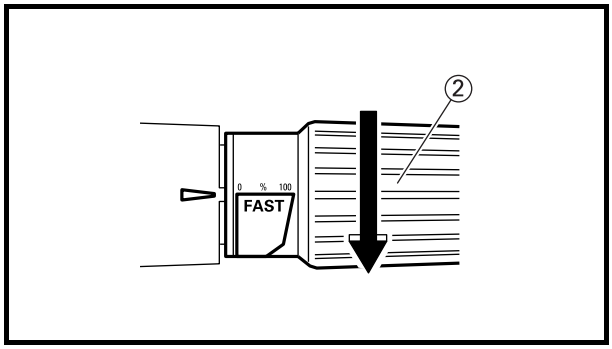
Checking steps

(1) Install the timing light ⓐ onto the spark plug lead of cylinder #1.
(2) Install the digital tachometer ⓑ onto the spark plug lead of cylinder #1.
(3) Press the position key "C" on the digital tachometer.
(4) Start the engine and allow it to warm up for a few minutes.

Timing light ..... ⓐ
90890-03141
Digital tachometer ..... ⓑ
90890-06760

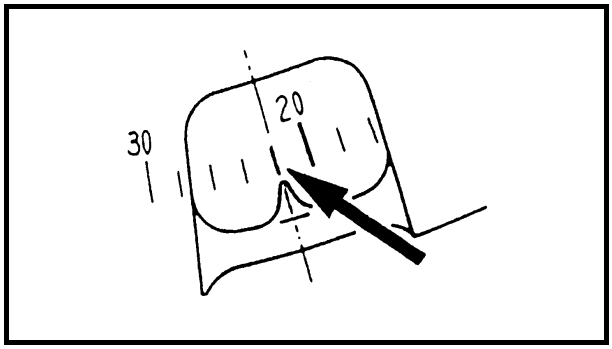


(5) Set the shift lever ① in forward position.



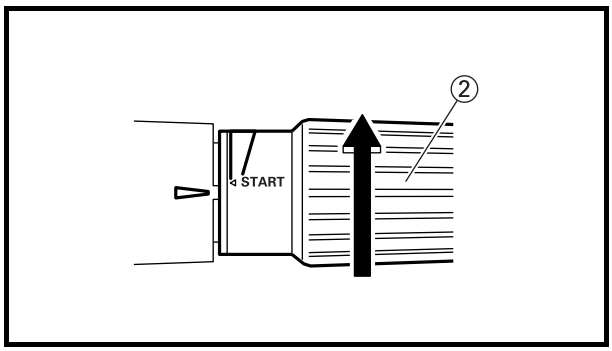
(6) Fully open the throttle by moving the throttle ② to the "FAST" position.

Full throttle operating range
5,350 ± 100 r/min



(7) Check the ignition timing by pointing the timing light at the timing indicator on the starter case.

Ignition timing (at full advance)
BTDC 22° ± 2°

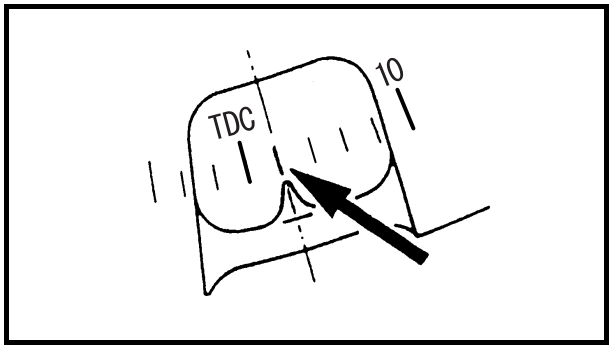


(8) Move the throttle ② to full-close position.

Engine idle speed
1,300 ± 50 r/min

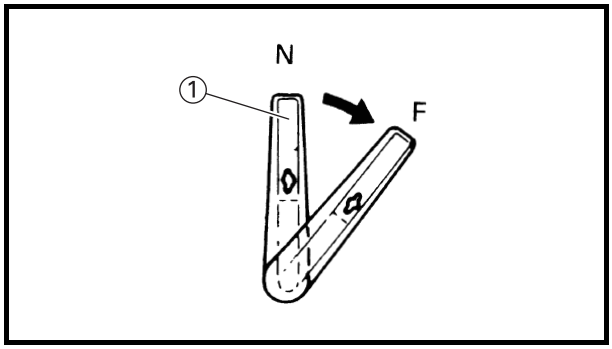
(9) Check the ignition timing by pointing the timing light at the timing indicater on the starter case.

Ignition timing (at idle)
ATDC 2° ± 2°



NOTE:

- Ignition timing adjustment is not required if the timing indicator reading falls within the specification.
- If the reading is out of specification, adjust the timing by the following procedure.



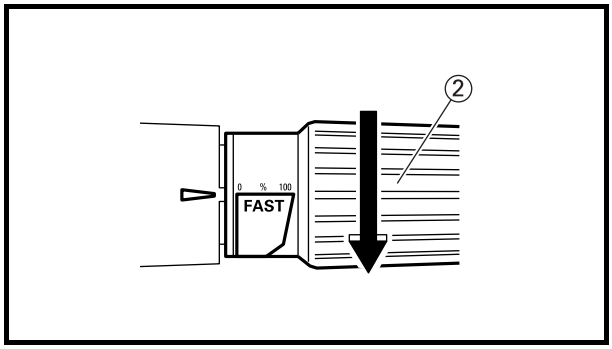
2. Adjustment with full-open throttle:
   • Magnet base stopper

CAUTION:

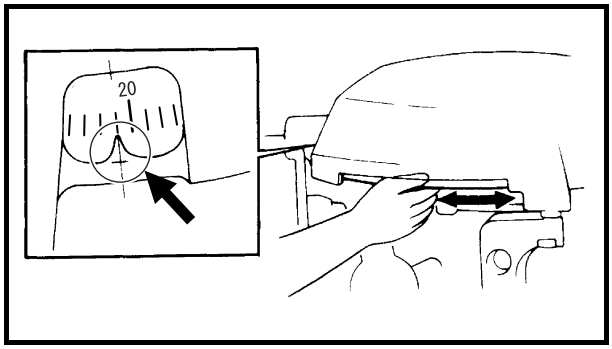
- **Make sure that engine is not running.**
- **Remove the plug caps.**

Adjustment steps

(1) Set the shift lever ① in forward position.

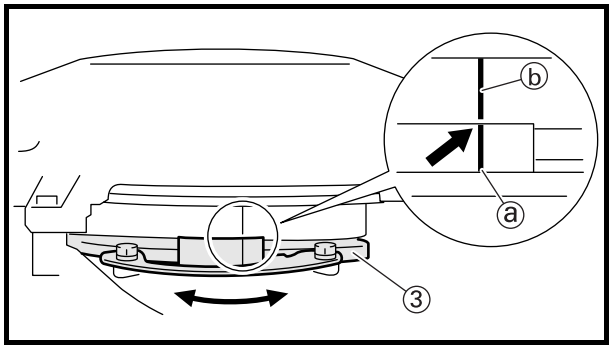


(2) Move the throttle ② to full-open position.

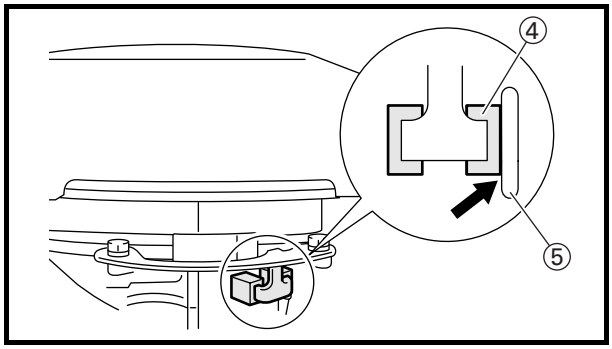


(3) Slowly turn the flywheel clockwise to align the full advanced timing mark with the specified position on the timing indicator.

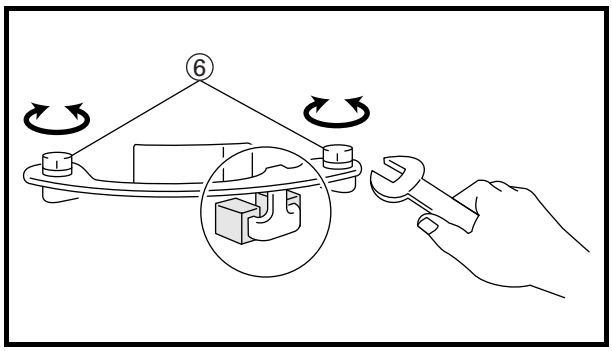
Ignition timing (at full advance)
BTDC 22° ± 2°



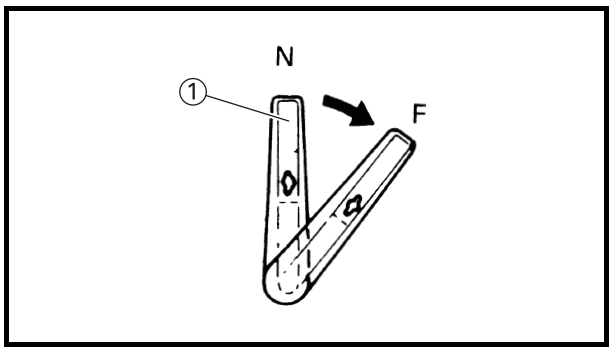
(4) Turn the magnet base ③ until the timing mark ⓐ stamped on the port side comes in line with the ignition mark ⓑ on the rotor.



(5) Check that the magnet base stopper ④ is in contact with the stopper on the engine body (full-open end stopper) ⑤.



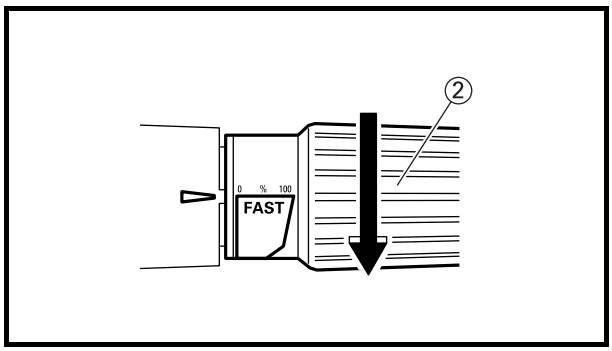
(6) If they are not in contact, loosen the set bolt ⑥, adjust until they are correctly in contact with each other, and secure the bolt again.



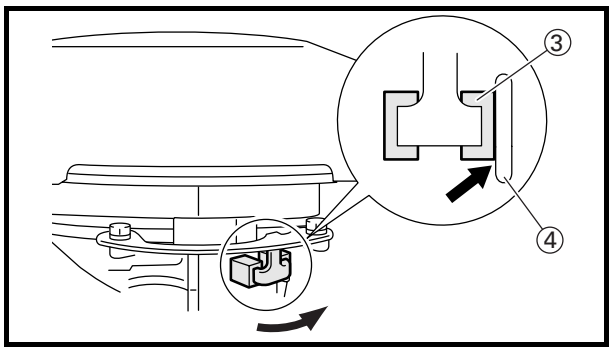
3. Adjusting the carburetor control link:
   - Accelerator cam
   - Carburetor control link

Adjustment steps

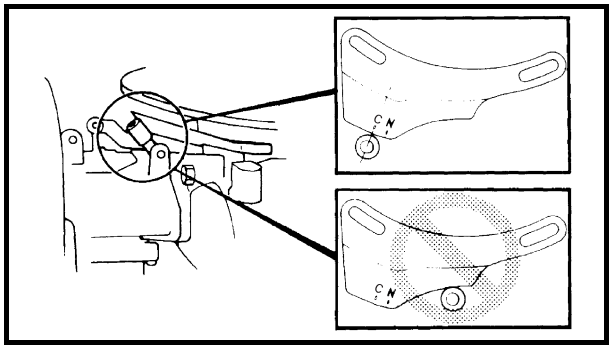
(1) Set the shift lever ① in forward position.



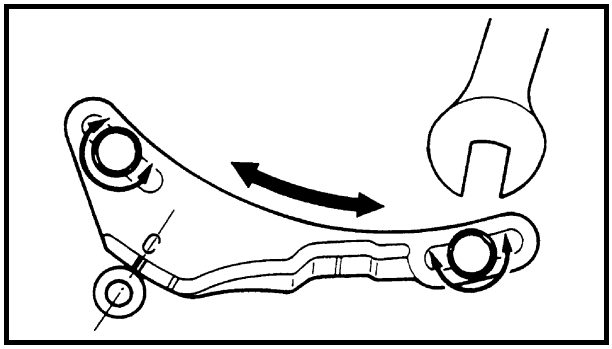
(2) Move the throttle ② to full-open position.



(3) Make sure that the magnet base stopper ③ is in contact with the stopper on the engine body (full-open end stopper)④.

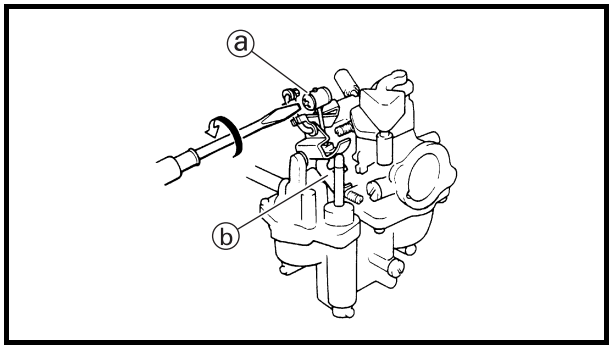


(4) Check to see that the full-open marking "C" on the accelerator cam aligns with the center of the cam roller.



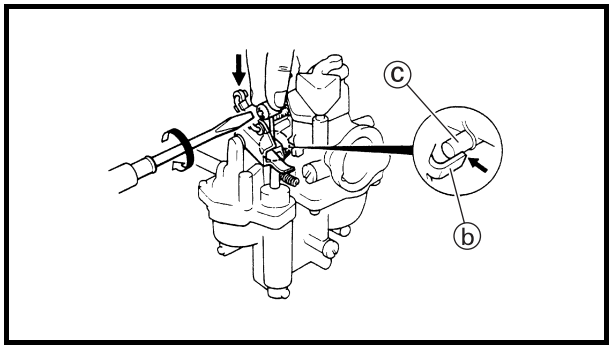
(5) "Loosen the bolt, and align the full-open marking "C" with the center of carburetor throttle roller, and tighten the set-bolt."

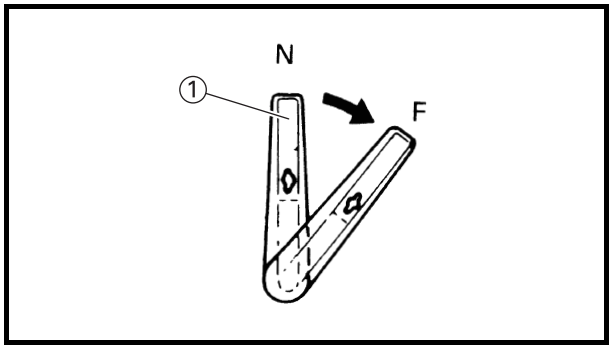
NOTE:
Remove the manual starter before adjusting.



(6) "Loosen the rod tightening screw ⓐ. While pushing the rod with your finger, tighten the screw so that the throttle is full-open (the full-open stopper ⓑ is pushed against the stopper ⓒ), and lock the screw."

NOTE:
After adjustment, open and close the throttle repeatedly for several times to reassure that the full-open position of the accelerator cam and the positioning of the carburetor control link stopper are correct.

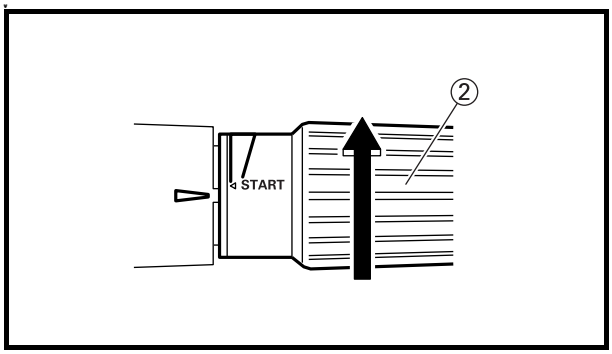




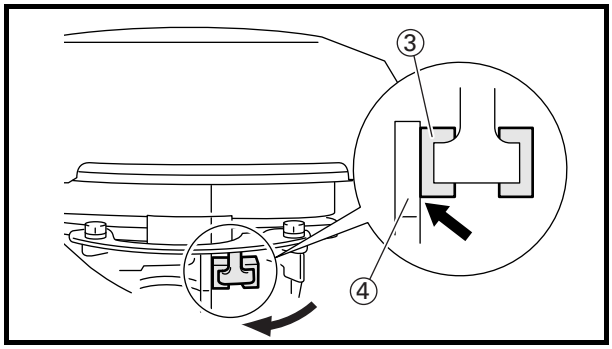
4. Adjustment with full-closed throttle:
   - Accelerator cam
   - Carburetor control link

Adjustment steps

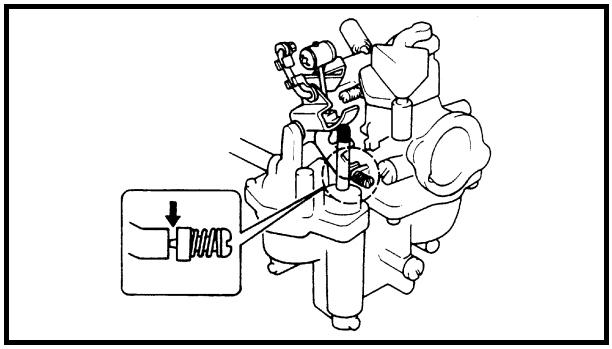
(1) Set the shift lever ① in forward position.



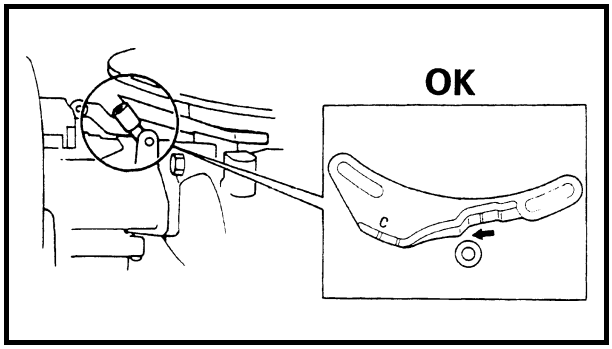
(2) Move the throttle ② to full-close position.



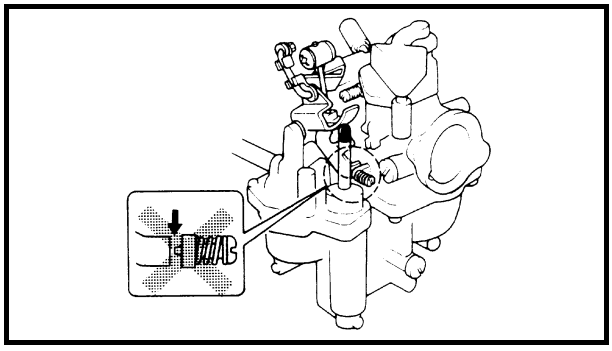
(3) Make sure that the magnet base stopper ③ is in contact with the stopper on the engine body (full-close end stopper)④.



(4) Make sure that the lever is in contact with the carburetor throttle stop screw.



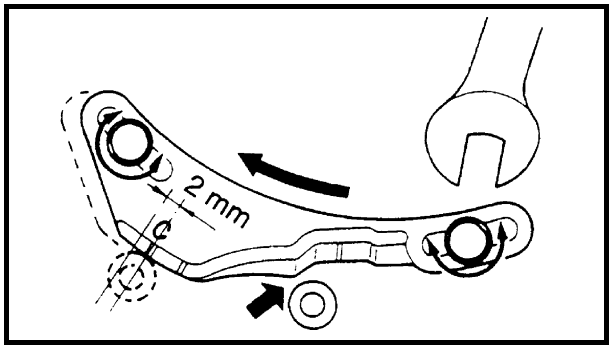
(5) Correct adjustment has been established if the cam roller is not in contact with the accelerator cam.

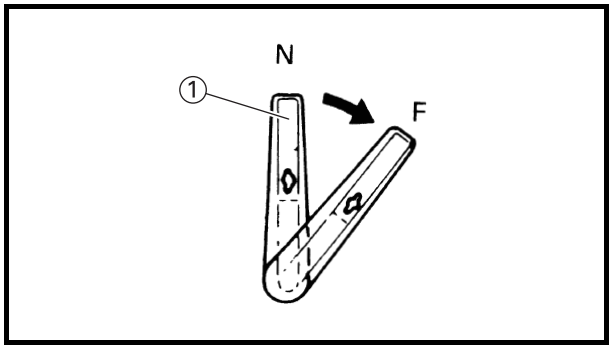


(6) If the lever is not in contact with the throttle stop screw move the plate cam to the left so that the lever comes to contact with the throttle stop screw.

NOTE:

- When shifting the plate cam slightly, do not shift it more than 2 mm (0.079 in) to the left from the point at which the marking line of the full-open mark "C" aligns with the centerline of the roller cam at full-throttle.
- After adjustment, open and close the throttle for several times, and reassure that the lever is in contact with the throttle stop screw on the carburetor, and that the cam roller is not in contact with the accelerator cam.



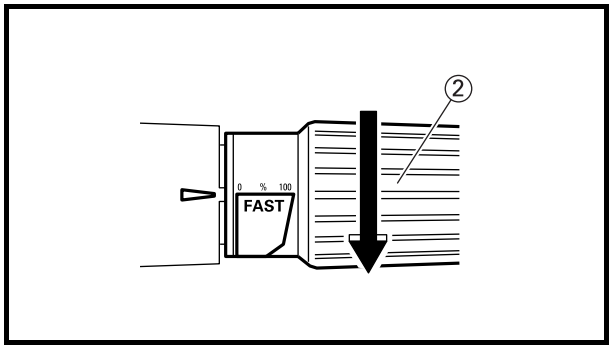


5. Adjusting the throttle cable
- Throttle cable

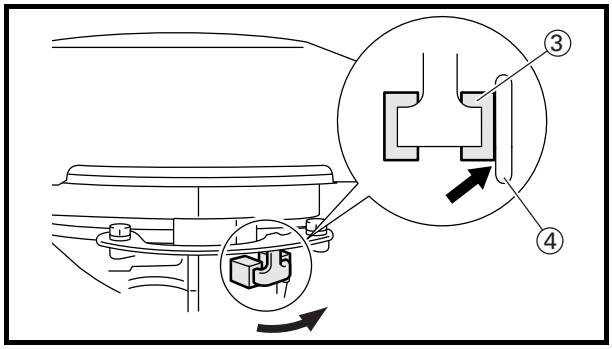
Adjusting steps

NOTE:
After adjustment, open and close the throttle for several times for reassurance.

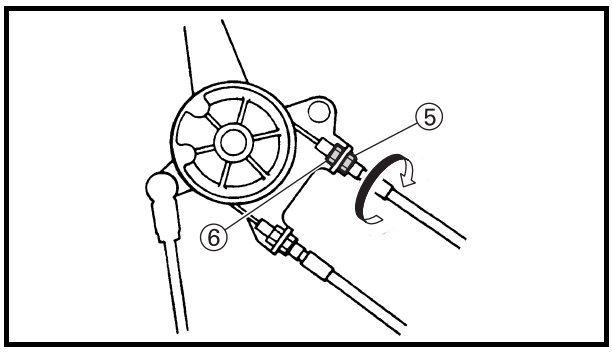
(1) Set the shift lever ① in forward position.



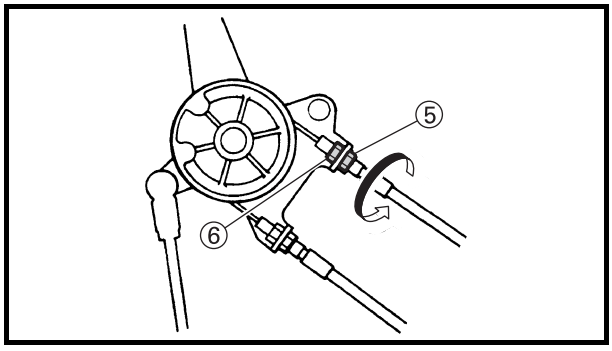
(2) Move the throttle ② to full-open position.



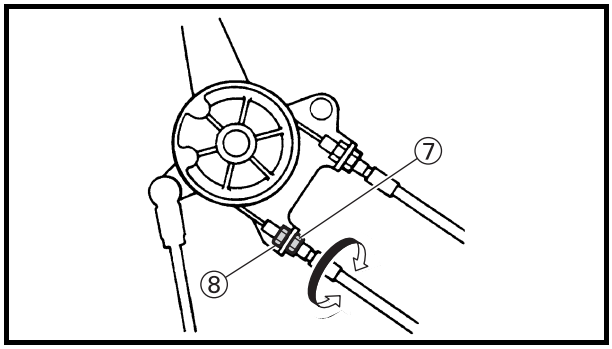
(3) Check that the magnet base stopper ③ is in contact with the stopper on the engine body (full-open end stopper) ④.



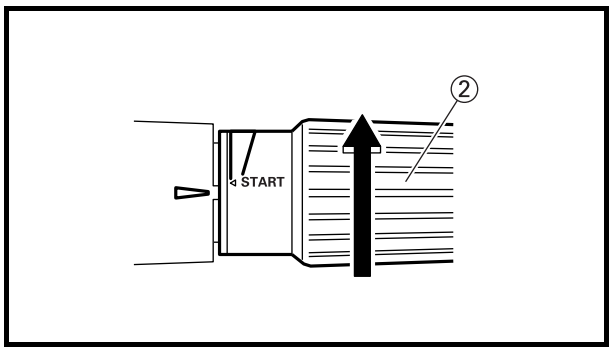
(4) If the stoppers come in contact before the throttle is fully open, loosen the lock nut ⑥ on the throttle-opening cable, turn-in the adjusting nut ⑤ until the cerrect positioning is attained, and then secure it by the lock nut ⑥.



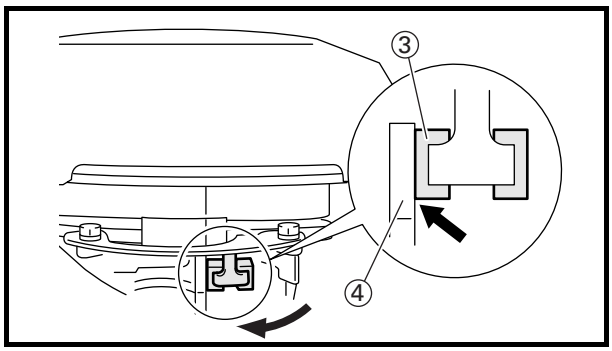
(5) If the stoppers do not come in contact at full-open throttle, then turn-out the adjusting nut ⑤ on the throttle-opening cable until the correct positioning is attained, and secure it by the lock nut ⑥.



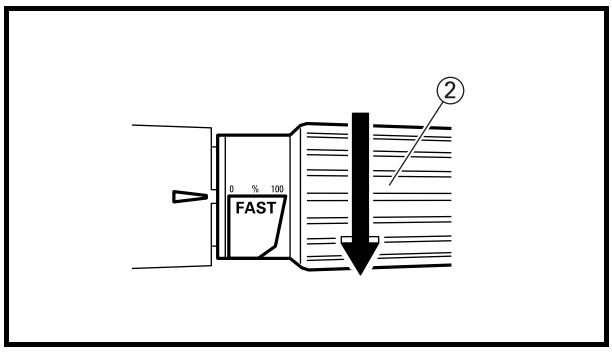
(6) After confirming the positive contact of stoppers at full-open throttle position, turn the adjusting nut ⑦ on the throttle-closing cable so that the cable has a little slack, and then secure it by the lock nut ⑧.



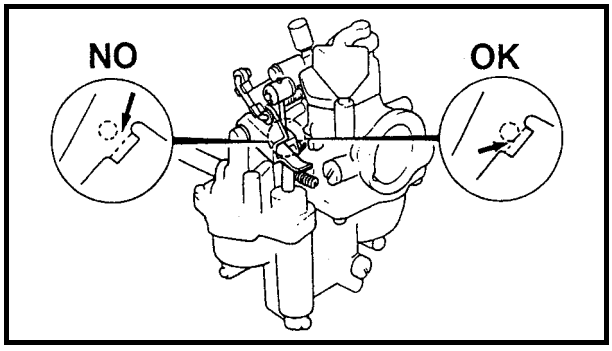
(7) Once the adjustment under full-open throttle is completed, move the throttle ② to full-close position.



(8) Make sure that the magnet base stopper ③ is in contact with the stopper on the engine body (full-close end stopper) ④.



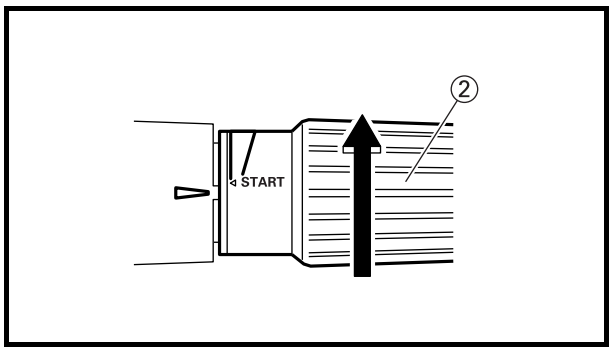
(9) Move the throttle ② to full-open position.



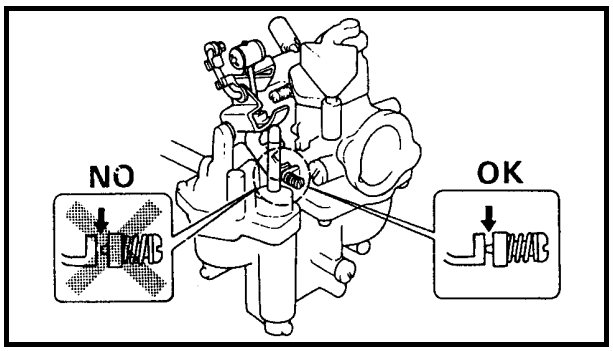
(10) In this condition, make sure that the full-open stopper is in contact with the stopper.

NOTE:
If they are not in contact, adjust the carburetor control link.

Refer to "Adjusting the carburetor control link:" on page 3-7.



(11) Move the throttle ② to full-close position.

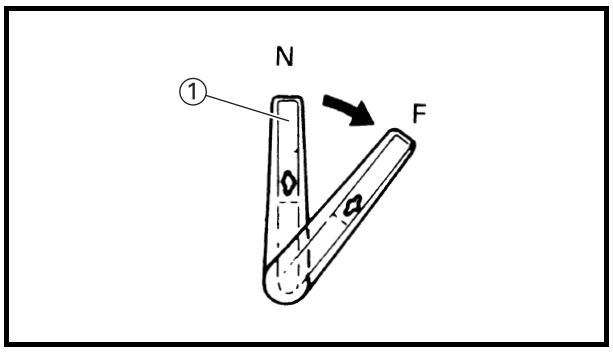


(12) At this point, make sure that the throttle lever is in contact with the throttle stop screw on the carburetor.

NOTE:

- After adjustment, open and close the throttle for several times for reassurance.
- If they are not in contact, adjust the carburetor control link.

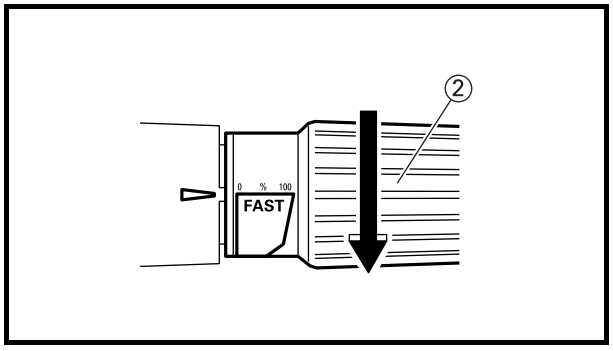
Refer to "Adjusting the carburetor control link:" on page 3-7.



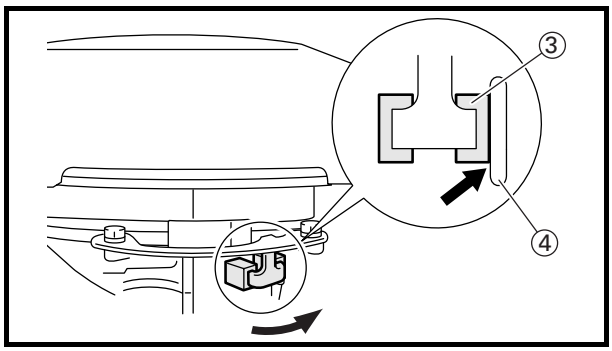
6. Adjusting the throttle control lever:
   - Throttle control lever

Adjustment steps

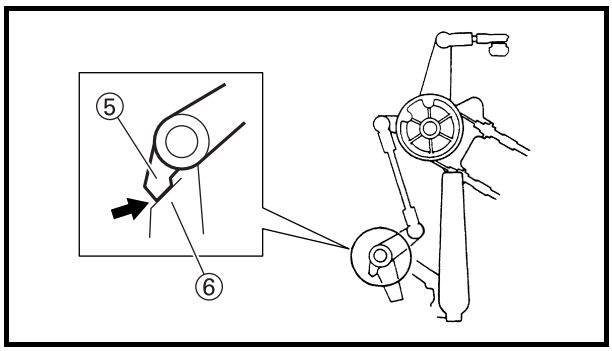
(1) Set the shift lever ① at the forward position.



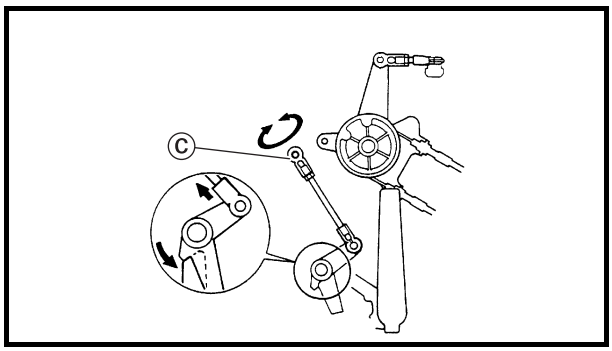
(2) Move the throttle ② to full-open position.



(3) Check that the magnet base stopper ③ is in contact with the stopper on the engine body (full-open end stopper) ④.

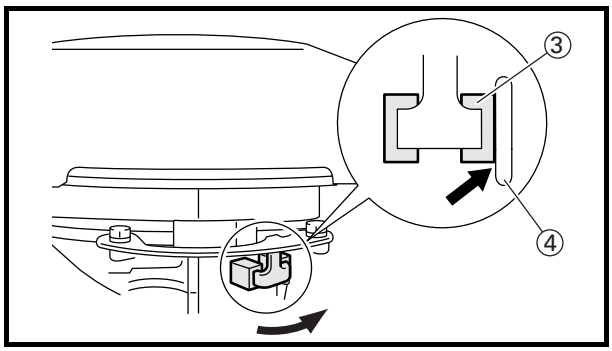


(4) Check that the throttle control lever ⑤ is in contact with the stopper ⑥ on the bottom cowling.



(5) If they are not in contact, adjust the length of the joint link ⓒ that the throttle control lever seats on the stopper on the bottom cowling.

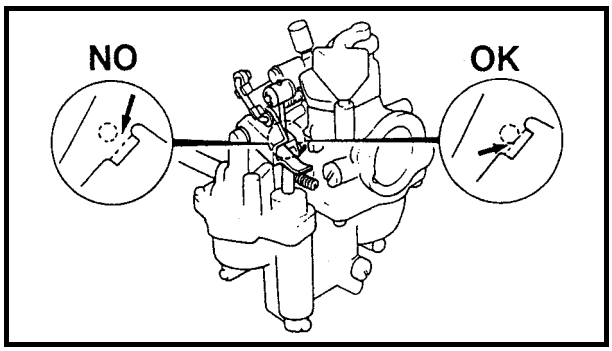
NOTE:
After adjustment, open and close the throttle repeatedly for several times to reassure the correct positioning.



(6) Check that the magnet base stopper ③ is in contact with the stopper on the engine body (full-open end stopper) ④.

NOTE:
If they are not in contact, perform the adjustment with full-open throttle.

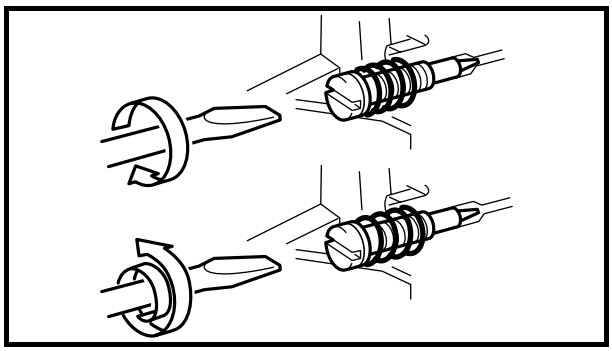
Refer to "Adjustment with full-open throttle:" on page 3-6.

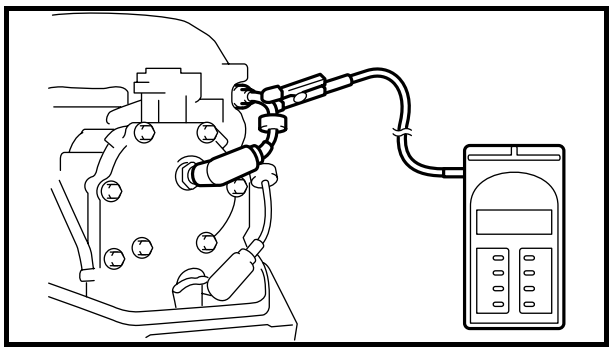


(7) In this condition, make sure that the full-open stopper is in contact with the stopper.

NOTE:
If they are not in contact, adjust the carburetor control link.

Refer to "Adjusting the carburetor control link:" on page 3-7.





7. Adjusting the engine idle speed:
   - Engine idle speed

Adjustment steps

(1) Adjust the pilot screw.

Pilot screw turn-out
Gasoline carburetor:
1 - 1/2 ± 1/2
Kerosene carburetor:
1/2 + 2
1/2 - 1/2

(2) Adjust the idling stop screw

Engine idle speed
1,300 ± 50 r/min

Refer to "ADJUSTING THE ENGINE IDLE SPEED" on page 3-15.

ADJUSTING THE ENGINE IDLE SPEED

NOTE:
- The engine should be warmed up for the adjustment. Correct adjustment cannot be obtained when the engine is cold.
- Make sure that the pilot screw adjustment is normal before implementing idling stop screw adjustment.

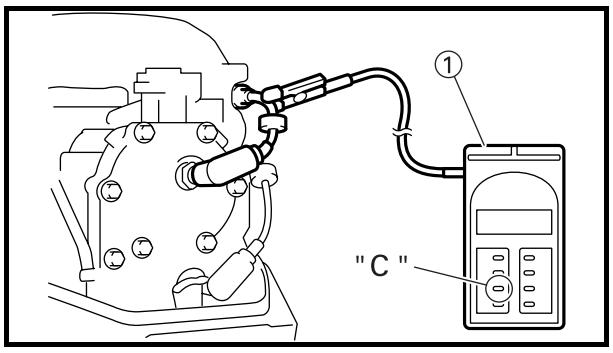
1. Measure:
   - Engine idle speed

     Out of specification → Adjust.

	Engine idle speed **1,300 ± 50 r/min**

CAUTION:

Install the engine in the test tank to check the engine idle speed.



Measuring steps

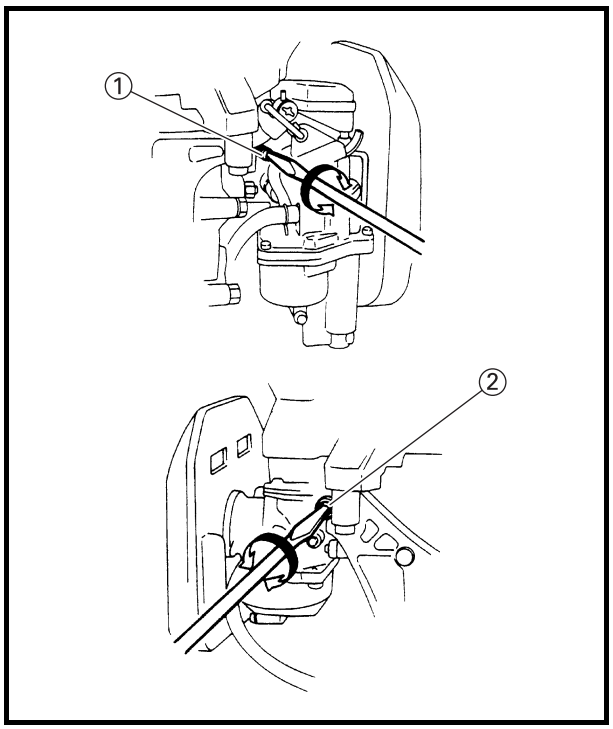
(1) Start the engine and allow it to warm up for a few minutes.

(2) Install the digital tachometer ① onto the spark plug lead of cylinder #1.

(3) "Press the position key "C" on the digital tachometer."

	Digital Tachometer.....① **90890-06760**

2. Adjust:
- Carburetor pilot screw



CAUTION:

Do not adjust the carburetor when it is operating properly. Excessive adjustment may cause the engine poor performance.

Adjustment steps

(1) Turn in the pilot screw (①:Gasoline, ②:Kerosene) until they are lightly seated.

(2) Turn out the pilot screws by specified number of turns.

	Pilot screw turn-out **Gasoline carburetor:** **1 - 1/2 ± 1/2** **Kerosene carburetor:** **1/2 + 2** **1/2 - 1/2**