SUZUKI OUTBOARD MOTOR

DF 40
DF 50 FOUR STROKE

For '03 model
SUPPLEMENTARY SERVICE MANUAL

99501-87J20-01E

DF40/50 "K3" (2003) MODEL

FOREWORD

This supplementary service manual describes the outline, technical data and servicing procedures for the "K3" (2003) models outboard motor.
Please read and thoroughly familiarize yourself with this information before using it for your service activities.

NOTE:
Use this supplement with the following service manual:
DF40/50 Service Manual (P/no, 99500-87J0 • -01E)

CONTENTS

GENERAL INFORMATION

SPECIFICATIONS

Item		Unit	Data			
			DF40T	DF40QH	DF50T/50WT	DF50WQH
PRE-FIX			04001F		05001F	

DIMENSIONS & WEIGHT

Overall length (front to back)		mm (in)	756 (29.8)	852 (33.5)	756 (29.8)	852 (33.5)
Overall width (side to side)		mm (in)	382 (15.0)	382 (15.0)	382 (15.0)	382 (15.0)
Overall height	S	mm (in)	1263 (49.7)	—	1263 (49.7)	—
	L	mm (in)	1390 (54.7)	1390 (54.7)	1390 (54.7)	1390 (54.7)
	UL	mm (in)	—	—	1517 (59.7)	1517 (59.7)
Weight (without engine oil)	S	kg (lbs)	106 (234)	—	106 (234)	—
	L	kg (lbs)	109 (240)	110 (243)	109 (240)	110 (243)
	UL	kg (lbs)	—	—	112 (247)	113 (249)
Transom height	S	mm (in. type)	401 (15)	—	401 (15)	—
	L	mm (in. type)	528 (20)	528 (20)	528 (20)	528 (20)
	UL	mm (in. type)	—	—	655 (25)	655 (25)

PERFORMANCE

Maximum output	kW (PS)	29.4 (40)	36.8 (50)
Recommended operating range	r/min	5200 – 5800	5900 – 6500
Idle speed	r/min	850 ± 50 (in-gear: approx. 850)	

POWERHEAD

Engine type		4-stroke DOHC			
Number of cylinders		3			
Bore	mm (in)	71.0 (2.80)			
Stroke	mm (in)	68.6 (2.70)			
Total displacement	cm^3 (cu in)	815 (49.7)			
Compression ratio	: 1	10			
Spark plug	NGK	DCPR6E			
Ignition system		Full-transistorized ignition			
Fuel supply system		Multi-point sequential electronic fuel injection			
Exhaust system		Through prop exhaust			
Cooling system		Water cooled			
Lubrication system		Wet sump by trochoid pump			
Starting system		Electric			
Throttle control		Remote control	Twist grip	Remote control	Twist grip

Item	Unit	Data			
		DF40T	DF40QH	DF50T/50WT	DF50WQH

FUEL & OIL

Fuel		Suzuki highly recommends that you use alcohol-free unleaded gasoline with a minimum pump octane rating of 87 ($\frac{R+M}{2}$ method) or 91 (Research method). However, blends of unleaded gasoline and alcohol with equivalent octane content may be used.
Engine oil		API classification SE, SF, SG, SH, SJ Viscosity rating 10W-40
Engine oil amounts	L (US/Imp. qt)	2.2 (2.3/1.9) : Oil change only 2.4 (2.5/2.1) : Oil filter change
Gear oil		SUZUKI Outboard Motor Gear Oil (SAE #90 hypoid gear oil)
Gearcase oil capacity	ml (US/Imp. oz)	610 (20.6/21.5)

BRACKET

Trim angle		PTT system	Manual trim and gas assisted tilt system	PTT system	Manual trim and gas assisted tilt system
Number of trim position	Adjustable	PTT system	5	PTT system	5
Maximum tilt angle	degree	73°			

LOWER UNIT

Reversing system	Gear
Transmission	Forward-Neutral-Reverse
Reduction system	Bevel gear
Gear ratio	11 : 25 (2.27)
Drive line impact protection	Spline drive rubber hub
Propeller	Blade × Diam. (in) × Pitch (in)
S : Aluminum propeller SS : Stainless steel propeller	3 × 11-1/2 × 9 (S900) 3 × 11-1/2 × 10 (S1000) 3 × 11-1/2 × 11 (S1100) 3 × 11-5/8 × 12 (S1200) 3 × 11-1/2 × 13 (S1301, SS1300) 3 × 11-3/8 × 14 (S1400, SS1400) 3 × 11-1/4 × 15 (S1500) 3 × 11-1/8 × 16 (S1600, SS1600) 3 × 11 × 17 (S1700)

These specifications are subject to change without notice.

SERVICE DATA

Item	Unit	Data	
		DF40T/40QH	DF50T/50WT/50WQH

POWERHEAD

Recommended operating range	r/min	5200 – 5800	5900 – 6500
Idle speed	r/min	850 ± 50 (in-gear: approx.850)	
*Cylinder compression	kPa (kg/cm², psi)	1300 – 1600 (13 – 16, 185 – 228)	
*Cylinder compression max. difference between any other cylinders	kPa (kg/cm², psi)	100 (1.0, 14)	
*Engine oil pressure	kPa (kg/cm², psi)	300 – 380 (3.0 – 3.8, 43 – 54) at 4000 r/min (at normal operating temp.)	
Engine oil		API classification SE, SF, SG, SH, SJ Viscosity rating SAE 10W-40	
Engine oil amounts	L (US/Imp. qt)	2.2 (2.3/1.9) : Oil change only 2.4 (2.5/2.1) : Oil filter change	
Thermostat operating temperature	°C (°F)	58 – 62 (136 – 144)	

* Figures shown are guidelines only, not absolute service limits.

ENGINE OIL PUMP

Radial clearance	Limit	mm (in)	0.31 (0.012)
Side clearance	Limit	mm (in)	0.15 (0.006)

CYLINDER HEAD/CAMSHAFT

Cylinder head distortion		Limit	mm (in)	0.05 (0.002)	
Manifold seating faces distortion		Limit	mm (in)	0.10 (0.004)	
Cam height	IN	STD	mm (in)	37.530–37.690 (1.4776–1.4839)	38.230–38.390 (1.5051–1.5114)
		Limit	mm (in)	37.430 (1.4736)	38.130 (1.5012)
	EX	STD	mm (in)	37.740–37.900 (1.4858–1.4921)	37.740–37.900 (1.4858–1.4921)
		Limit	mm (in)	37.640 (1.4819)	37.640 (1.4819)
Camshaft journal oil clearance		STD	mm (in)	0.045 – 0.087 (0.0018 – 0.0034)	
		Limit	mm (in)	0.120 (0.0047)	
Camshaft journal (housing) inside diameter	Top, 2nd, 3rd, 4th	STD	mm (in)	23.000 – 23.021 (0.9055 – 0.9063)	
		Limit	mm (in)	23.171 (0.9122)	
Camshaft journal outside diameter	Top, 2nd, 3rd, 4th	STD	mm (in)	22.934 – 22.955 (0.9029 – 0.9037)	
		Limit	mm (in)	22.784 (0.8970)	
Camshaft runout		Limit	mm (in)	0.10 (0.004)	
Cylinder head bore to tappet clearance		STD	mm (in)	0.025 – 0.062 (0.0010 – 0.0024)	
		Limit	mm (in)	0.150 (0.0059)	
Tappet outer diameter		STD	mm (in)	26.959 – 26.975 (1.0614 – 1.0620)	
Cylinder head bore		STD	mm (in)	27.000 – 27.021 (1.0630 – 1.0638)	

Item			Unit	Data	
				DF40T/40QH	DF50T/50WT/50WQH

VALVE / VALVE GUIDE

Valve diameter		IN	mm (in)	24.6 (0.97)
		EX	mm (in)	21.5 (0.85)
Tappet clearance (Cold engine condition)	IN	STD	mm (in)	0.18 – 0.24 (0.007 – 0.009)
	EX	STD	mm (in)	0.18 – 0.24 (0.007 – 0.009)
Valve seat angle		IN	degree	30°, 45°
		EX	degree	15°, 45°
Valve guide to valve stem clearance	IN	STD	mm (in)	0.020 – 0.047 (0.0008 – 0.0019)
		Limit	mm (in)	0.070 (0.0028)
	EX	STD	mm (in)	0.045 – 0.072 (0.0018 – 0.0028)
		Limit	mm (in)	0.090 (0.0035)
Valve guide inside diameter	IN,EX	STD	mm (in)	5.500 – 5.512 (0.2165 – 0.2170)
Valve guide protrusion	IN,EX	STD	mm (in)	11.0 (0.43)
Valve stem outside diameter	IN	STD	mm (in)	5.465 – 5.480 (0.2152 – 0.2157)
	EX	STD	mm (in)	5.440 – 5.455 (0.2142 – 0.2148)
Valve stem end length	IN,EX	Limit	mm (in)	3.20 (0.126)
Valve stem end deflection	IN	Limit	mm (in)	0.14 (0.006)
	EX	Limit	mm (in)	0.18 (0.007)
Valve stem runout	IN,EX	Limit	mm (in)	0.05 (0.002)
Valve head radial runout	IN,EX	Limit	mm (in)	0.08 (0.003)
Valve head thickness	IN	STD	mm (in)	1.0 (0.04)
		Limit	mm (in)	0.7 (0.03)
	EX	STD	mm (in)	1.15 (0.045)
		Limit	mm (in)	0.5 (0.02)
Valve seat contact width	IN	STD	mm (in)	1.80 – 2.20 (0.071 – 0.087)
	EX	STD	mm (in)	1.65 – 2.05 (0.065 – 0.081)
Valve spring free length		STD	mm (in)	33.1 (1.30)
		Limit	mm (in)	31.8 (1.25)
Valve spring tension		STD	N (kg, lbs)	97 – 113 (9.7–11.3, 21.4–24.9) for 28.5 mm (1.12 in)
		Limit	N (kg, lbs)	89 (8.9, 19.6) for 28.5 mm (1.12 in)
Valve spring squareness		Limit	mm (in)	2.0 (0.08)

Item			Unit	Data	
				DF40T/40QH	DF50T/50WT/50WQH
CYLINDER/PISTON/PISTON RING					
Cylinder distortion		Limit	mm (in)	0.060 (0.0024)	
Piston to cylinder clearance		STD	mm (in)	0.020 – 0.040 (0.0008 – 0.0016)	
		Limit	mm (in)	0.100 (0.0039)	
Cylinder bore		STD	mm (in)	71.000 – 71.020 (2.7953 – 2.7961)	
Cylinder measuring position			mm (in)	50 (2.0) from cylinder top surface	
Piston skirt diameter		STD	mm (in)	70.970 – 70.990 (2.7941 – 2.7949)	
Piston measuring position			mm (in)	19 (0.7) from piston skirt end	
Cylinder bore wear		Limit	mm (in)	0.100 (0.0039)	
Piston ring end gap	1st	STD	mm (in)	0.10 – 0.25 (0.004 – 0.010)	
		Limit	mm (in)	0.70 (0.028)	
	2nd	STD	mm (in)	0.25 – 0.40 (0.010 – 0.016)	
		Limit	mm (in)	1.00 (0.039)	
Piston ring free end gap	1st	STD	mm (in)	Approx. 7.5 (0.30)	
		Limit	mm (in)	6.0 (0.24)	
	2nd	STD	mm (in)	Approx. 11.0 (0.43)	
		Limit	mm (in)	8.8 (0.35)	
Piston ring to groove clearance	1st	STD	mm (in)	0.02 – 0.06 (0.001 – 0.002)	
		Limit	mm (in)	0.10 (0.004)	
	2nd	STD	mm (in)	0.02 – 0.06 (0.001 – 0.002)	
		Limit	mm (in)	0.10 (0.004)	
Piston ring groove width	1st	STD	mm (in)	1.01 – 1.03 (0.040 – 0.041)	
	2nd	STD	mm (in)	1.01 – 1.03 (0.040 – 0.041)	
	Oil	STD	mm (in)	2.01 – 2.03 (0.079 – 0.080)	
Piston ring thickness	1st	STD	mm (in)	0.97 – 0.99 (0.038 – 0.039)	
	2nd	STD	mm (in)	0.97 – 0.99 (0.038 – 0.039)	
Pin clearance in piston pin hole		STD	mm (in)	0.006 – 0.018 (0.0002 – 0.0007)	
		Limit	mm (in)	0.040 (0.0016)	
Piston pin outside diameter		STD	mm (in)	17.996 – 18.000 (0.7085 – 0.7087)	
		Limit	mm (in)	17.980 (0.7079)	
Piston pin hole diameter		STD	mm (in)	18.006 – 18.014 (0.7089 – 0.7092)	
		Limit	mm (in)	18.040 (0.7102)	
Pin clearance in conrod small end		STD	mm (in)	0.003 – 0.015 (0.0001 – 0.0006)	
		Limit	mm (in)	0.050 (0.0020)	
Conrod small end bore		STD	mm (in)	18.003 – 18.011 (0.7088 – 0.7091)	

Item		Unit	Data	
			DF40T/40QH	DF50T/50WT/50WQH

CRANKSHAFT / CONROD

Conrod small end inside diameter	STD	mm (in)	18.003 – 18.011 (0.7088 – 0.7091)
Conrod big end oil clearance	STD	mm (in)	0.020 – 0.040 (0.0008 – 0.0016)
	Limit	mm (in)	0.065 (0.0026)
Conrod big end inside diameter	STD	mm (in)	41.000 – 41.018 (1.6142 – 1.6149)
Crank pin outside diameter	STD	mm (in)	37.982 – 38.000 (1.4954 – 1.4961)
Crank pin outside diameter difference (out of round and taper)	Limit	mm (in)	0.010 (0.0004)
Conrod bearing thickness	STD	mm (in)	1.486 – 1.502 (0.0585 – 0.0591)
Conrod big end side clearance	STD	mm (in)	0.100 – 0.250 (0.0039 – 0.0098)
	Limit	mm (in)	0.350 (0.0138)
Conrod big end width	STD	mm (in)	21.950 – 22.000 (0.8642 – 0.8661)
Crank pin width	STD	mm (in)	22.100 – 22.200 (0.8700 – 0.8740)
Crankshaft center journal runout	Limit	mm (in)	0.04 (0.002)
Crankshaft journal oil clearance	STD	mm (in)	0.020 – 0.040 (0.0008 – 0.0016)
	Limit	mm (in)	0.065 (0.0026)
Crankcase bearing holder inside diameter	STD	mm (in)	49.000 – 49.018 (1.9291 – 1.9298)
Crankshaft journal outside diameter	STD	mm (in)	44.982 – 45.000 (1.7709 – 1.7717)
Crankshaft journal outside diameter difference (out of round and taper)	Limit	mm (in)	0.010 (0.0004)
Crankshaft bearing thickness	STD	mm (in)	1.999 – 2.015 (0.0787 – 0.0793)
Crankshaft thrust play	STD	mm (in)	0.11 – 0.31 (0.004 – 0.012)
	Limit	mm (in)	0.35 (0.014)
Crankshaft thrust bearing thickness	STD	mm (in)	2.470 – 2.520 (0.0972 – 0.0992)

LOWER UNIT

Design specification thickness for shim & washer

Pinion gear back-up shim	mm (in)	1.0 (0.04)
Forward gear back-up shim	mm (in)	1.0 (0.04)
Forward gear thrust washer	mm (in)	2.0 (0.08)
Reverse gear thrust washer	mm (in)	2.0 (0.08)
Reverse gear back-up shim	mm (in)	1.0 (0.04)

Item		Unit	Data	
			DF40T/40QH	DF50T/50WT/50WQH

ELECTRICAL

Ignition timing		Degrees at r/min	ATDC 1° – BTDC 27°	ATDC 1° – BTDC 24°
Over revolution limiter		r/min	6500	7000
CKP sensor resistance		Ω at 20°C	168 – 252	
CMP sensor resistance		Ω at 20°C	——	
Ignition coil resistance	Primary	Ω at 20°C	1.9 – 2.5	
	Secondary	k Ω at 20°C	8.1 – 11.1	
Battery charge coil resistance		Ω at 20°C	0.56 – 0.84	
Battery charge coil output (12V)		Watt	216	
Standard spark plug	Type	NGK	DCPR6E	
	Gap	mm (in)	0.8 – 0.9 (0.031 – 0.035)	
Fuse amp. rating		A	Main fuse : 30	
Recommended battery capacity (12V)		Ah (kC)	70 (252) or larger	
Fuel injector resistance		Ω at 20°C	11.0 – 16.5	
IAC valve resistance		Ω at 20°C	21.5 – 32.3	
IAT sensor/Cylinder temp. sensor / Ex-mani. temp. sensor (Thermistor characteristic)		k Ω at 25°C	1.8 – 2.3	
ECM main relay resistance		Ω at 20°C	80 – 120	
Starter motor relay resistance		Ω at 20°C	3.5 – 5.1	
PTT motor relay resistance		Ω at 20°C	3.0 – 4.5	

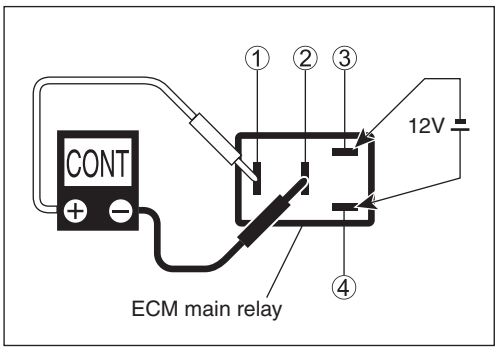
STARTER MOTOR

Max. continuous time of use		Sec.	30
Motor output		kW	0.9
Brush length	STD	mm (in)	17.0 (0.67)
	Limit	mm (in)	10.0 (0.39)
Commutator undercut	STD	mm (in)	0.5 – 0.8 (0.02 – 0.03)
	Limit	mm (in)	0.2 (0.01)
Commutator outside diameter	STD	mm (in)	33.0 (1.30)
	Limit	mm (in)	32.0 (1.26)
Commutator outside diameter difference	STD	mm (in)	0.05 (0.002)
	Limit	mm (in)	0.40 (0.016)
Pinion to ring gear gap	STD	mm (in)	3.0 – 5.0 (0.12 – 0.20)

PTT MOTOR

Brush length	STD	mm (in)	9.8 (0.39)
	Limit	mm (in)	4.8 (0.19)
Commutator outside diameter	STD	mm (in)	22.0 (0.87)
	Limit	mm (in)	21.0 (0.83)

ECM MAIN RELAY



09930-99320 : Digital tester

Tester range : (Continuity)

(1) Disconnect ECM main relay from wire.
(2) Check continuity between terminal ① and ② each time 12 V is applied. Connect positive (+) side to terminal ④, and negative (–) side to terminal ③.

ECM main relay function :

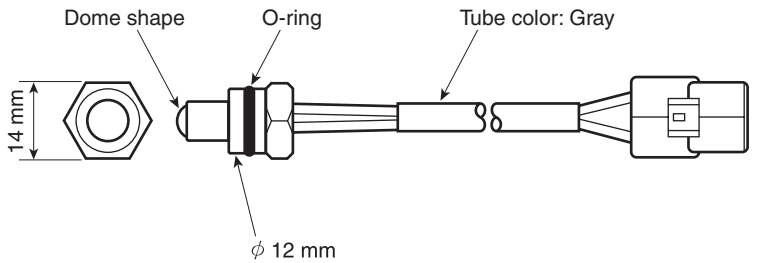
12 V power	Continuity
Applied	Yes
Not applied	No

CAUTION

Be careful not to touch 12 V power supply wires to each other or with other terminals.

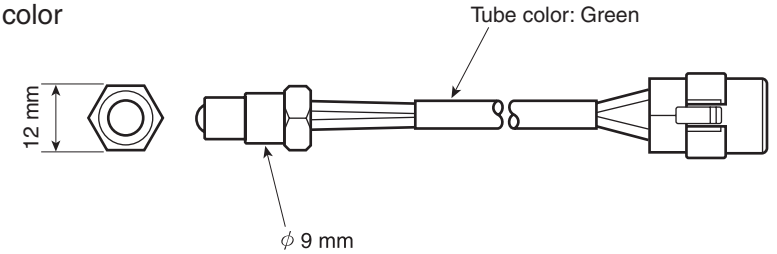
EXHAUST MANIFOLD TEMPERATURE SENSOR AND CYLINDER TEMPERATURE SENSOR

The shape of temperature sensor has been changed. from the middle of 2002 year model.



The temperature sensor has been changed 2003 year model.

- Change of connector
- Elimination of O-ring
- Change of tube color

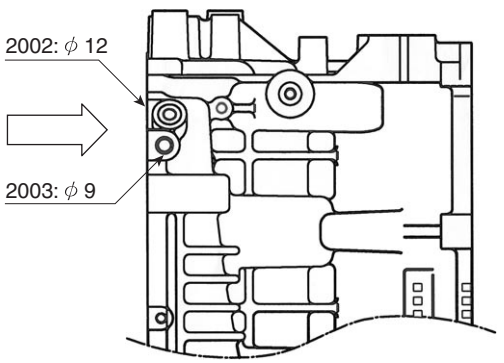


NOTE:
Exhaust manifold temperature sensor does not contact with cooling water from 2003 year model.

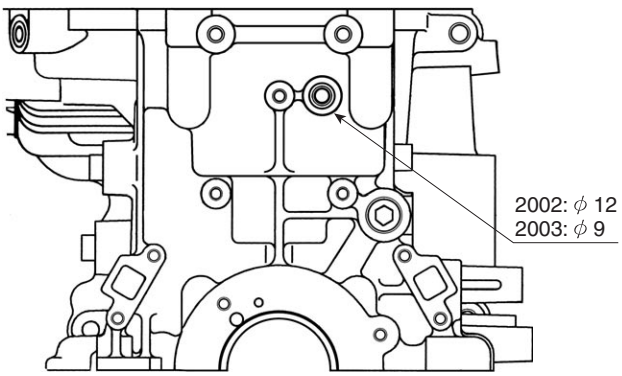
CYLINDER BLOCK

Cylinder block has been changed because of the change of temperature sensor.

Hole for exhaust temperature sensor



Hole for cylinder temperature sensor



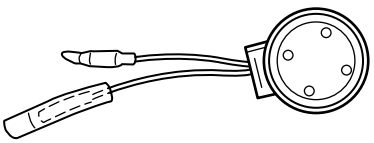
BUZZER

Buzzer in the remote control box (side-mount-type) has been changed in function and shape.

Early

Buzzer has function for intermittent sounding itself.

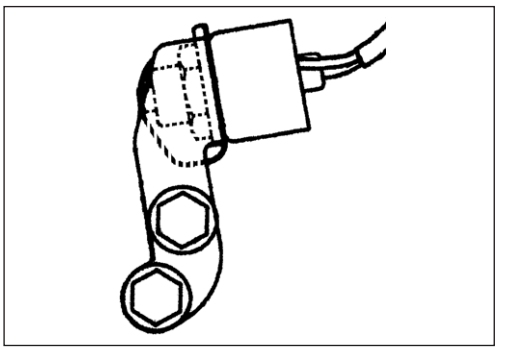
Late



Buzzer has function for continuous sounding only.

NOTE:
Buzzer sounding pattern when caution or the other system activates is the same as the pattern on 2002.

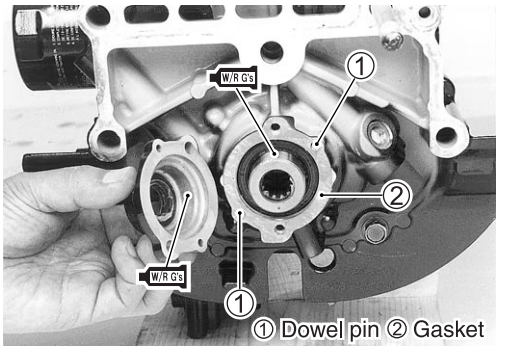
NEUTRAL SWITCH BRACKET



The neutral switch bracket has been changed to be secured with two bolt from the middle of 2002 year model.

NOTE:
When install a late type neutral switch bracket to the early cylinder, secure the neutral switch bracket with one bolt. In this case use the upper side bolt hole on the neutral switch bracket, and apply Thread Lock 1342 to the bolt.

UNDER OIL SEAL HOUSING



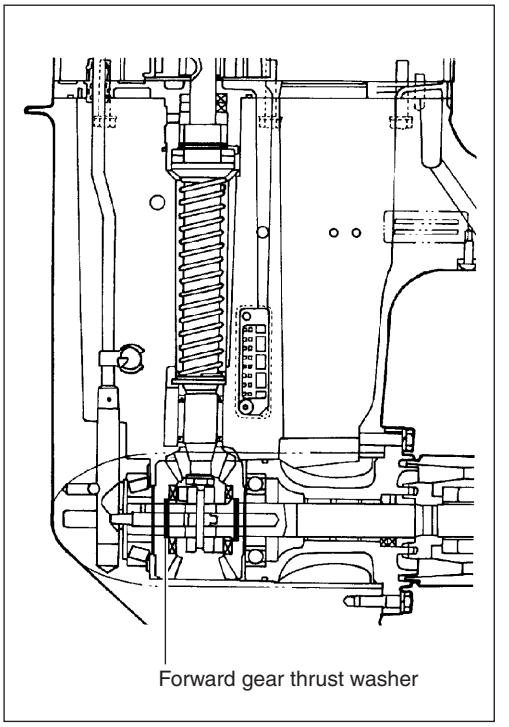
Before installing under oil seal housing, apply grease to oil seal lip, under oil seal housing and crankshaft.

W/R G's **99000-25160 : Water Resistant Grease**

FORWARD GEAR THRUST WASHER

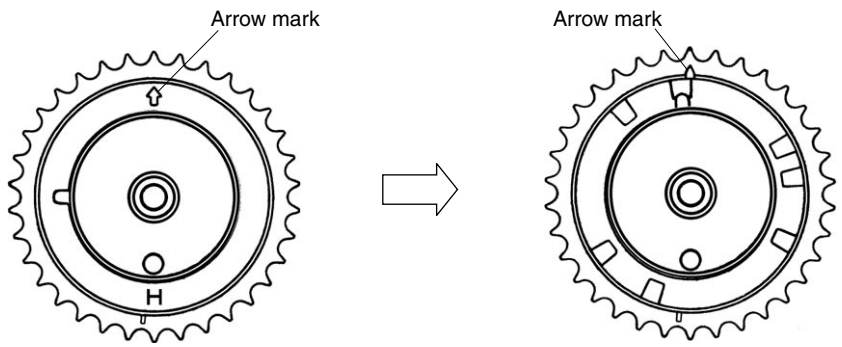
Available thickness

2.0 mm and 2.2 mm	→	2.0 mm only
Early		Late

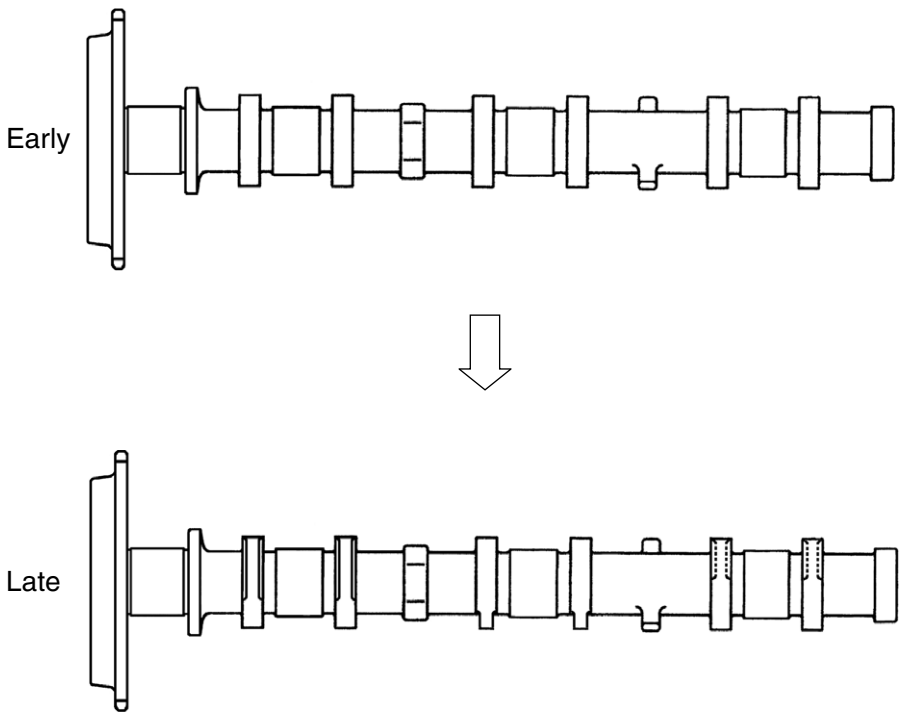


EXHAUST CAM SHAFT

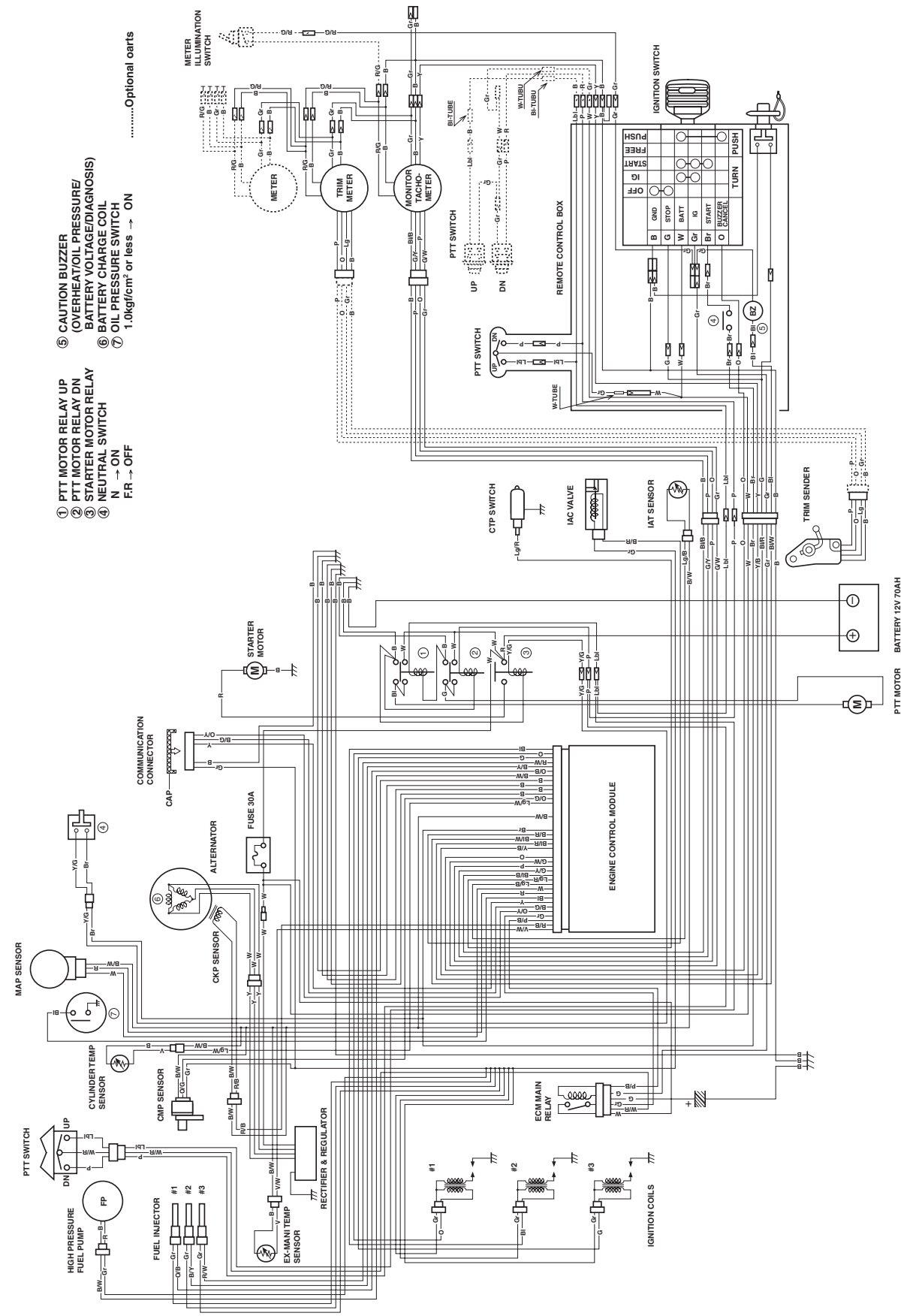
The shape of exhaust cam shaft and exhaust cam sprocket have been changed from the middle of 2002 year model.



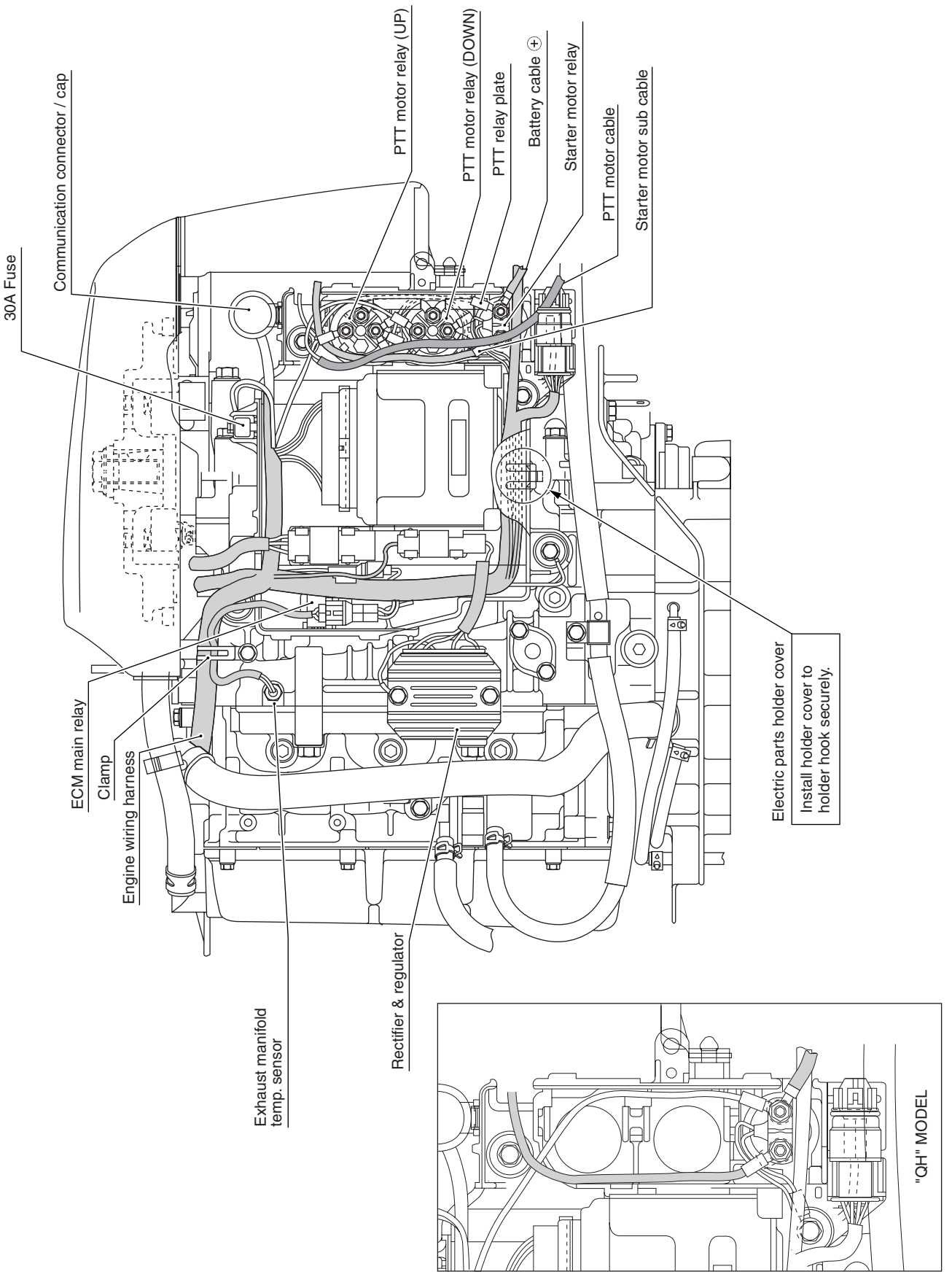
Early Exhaust cam sprocket Late

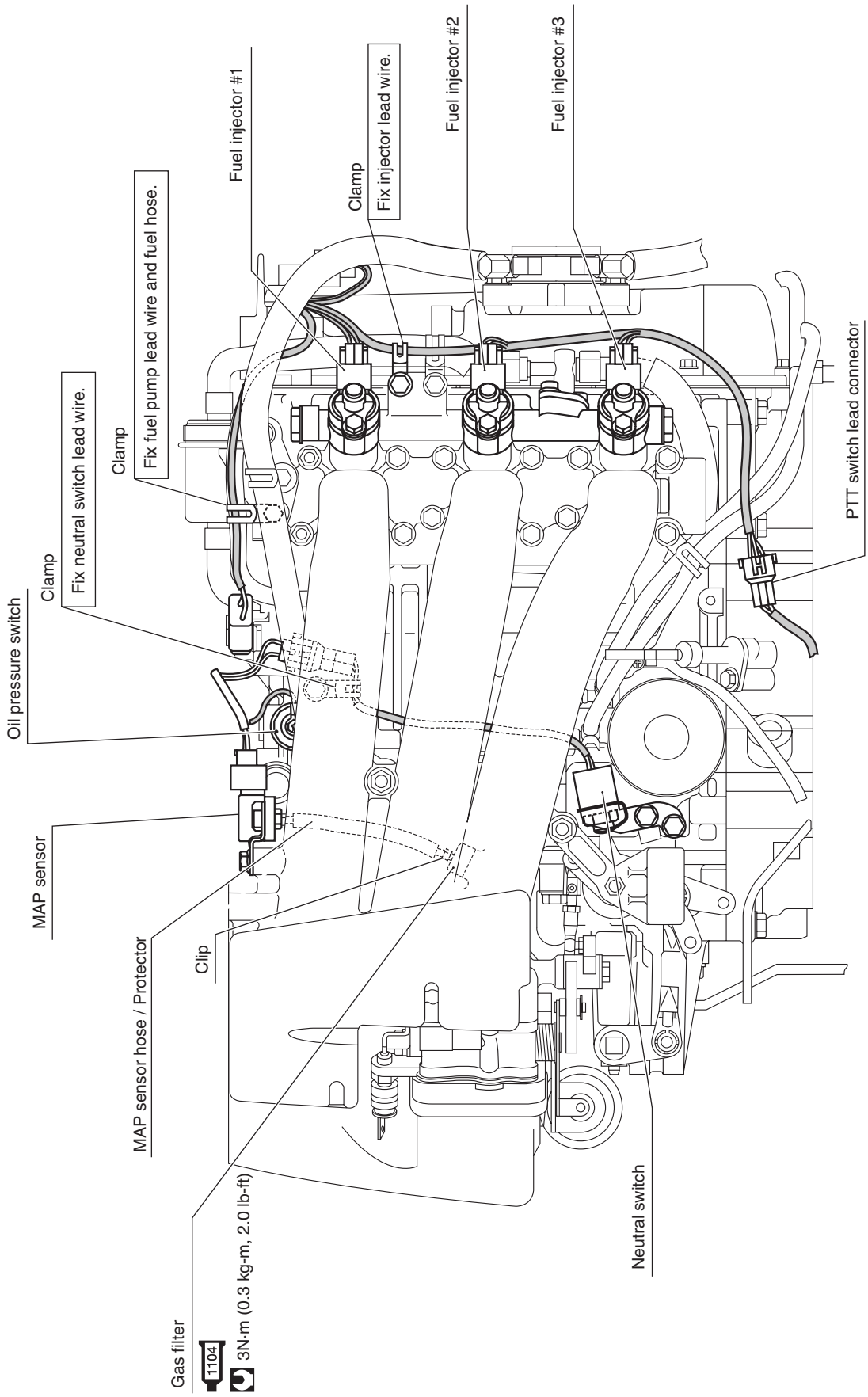


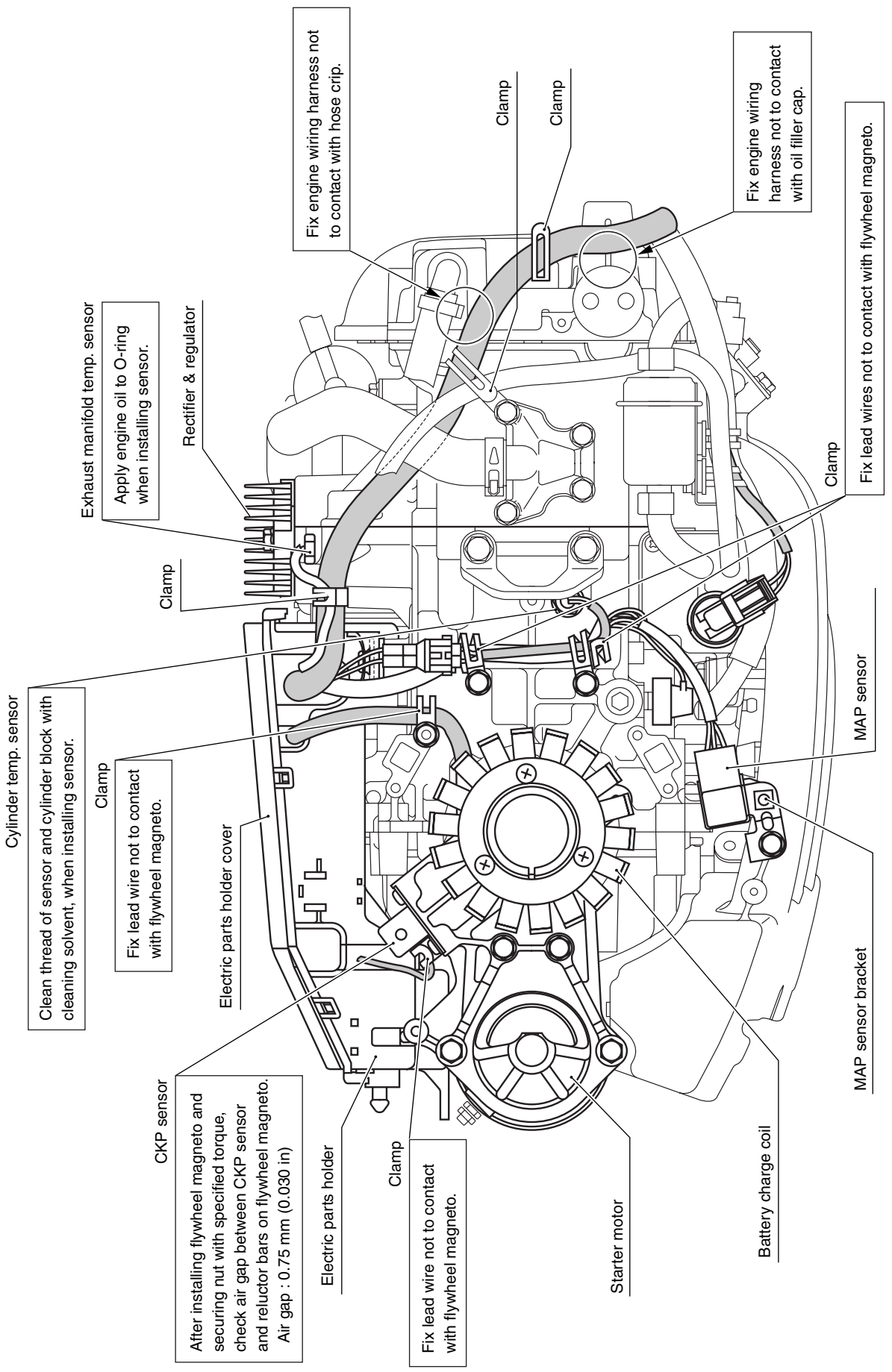
WIRING DIAGRAMS

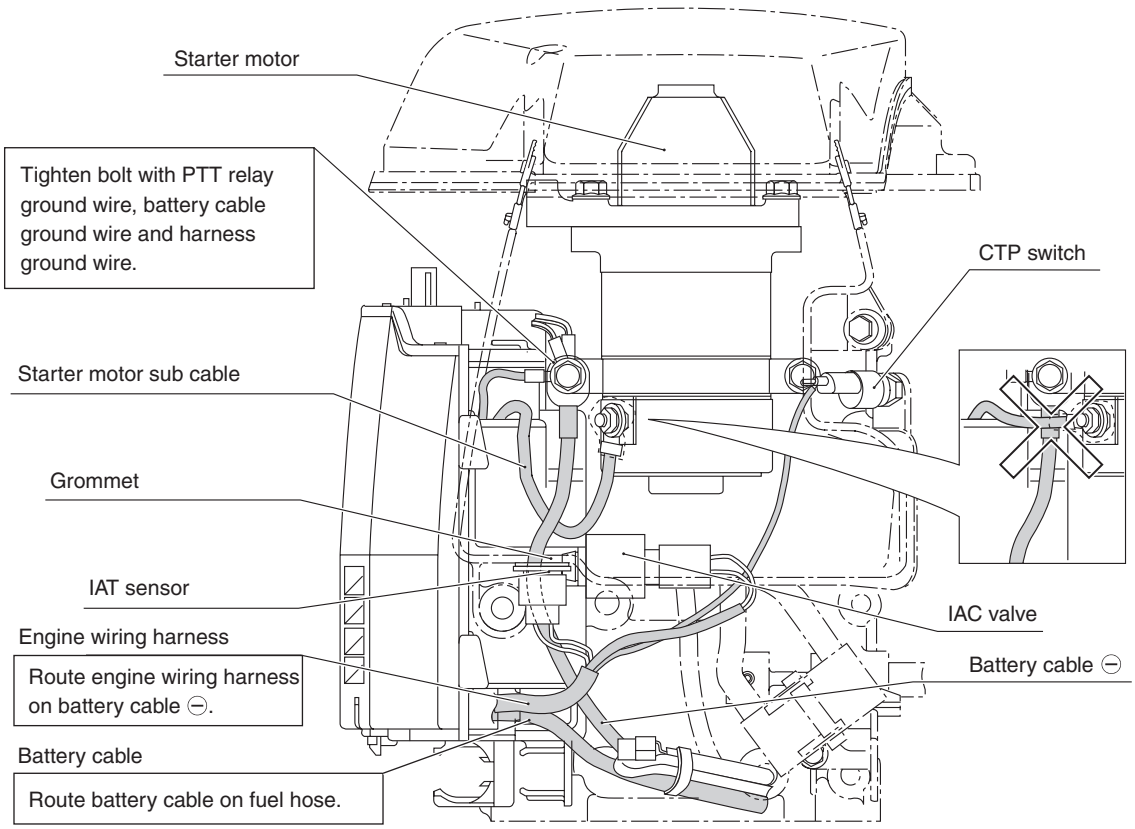


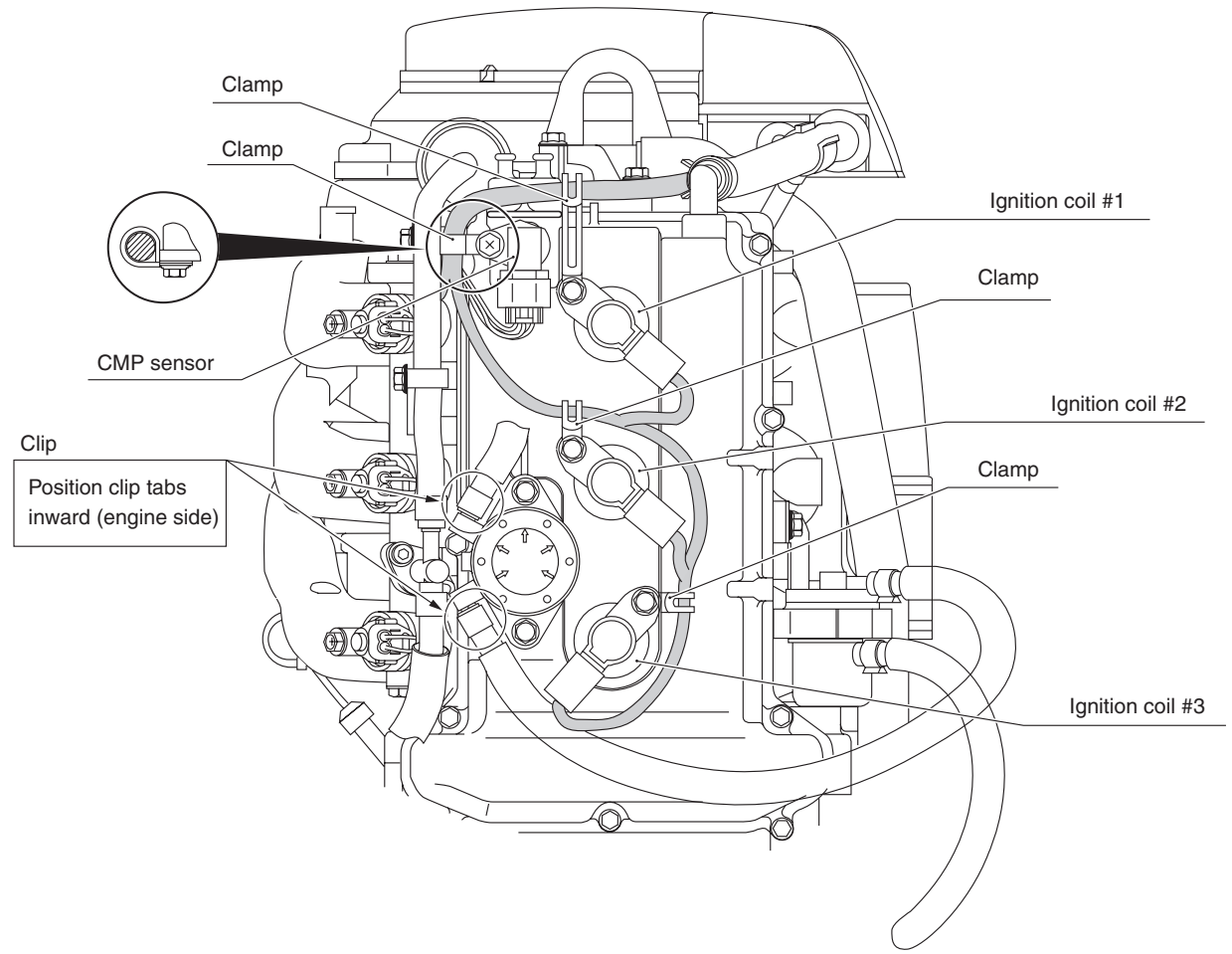
WIRE ROUTING




Fuel injector #1
Clamp
Fix injector lead wire.
Fuel injector #2
Fuel injector #3
Clamp
Fix fuel pump lead wire and fuel hose.
Clamp
Fix neutral switch lead wire.
Oil pressure switch
MAP sensor
MAP sensor hose / Protector
Clip
Gas filter
1104
3N·m (0.3 kg-m, 2.0 lb-ft)
Neutral switch
PTT switch lead connector


Cylinder temp. sensor
Clean thread of sensor and cylinder block with cleaning solvent, when installing sensor.
Clamp
Fix lead wire not to contact with flywheel magneto.
Electric parts holder cover
CKP sensor
After installing flywheel magneto and securing nut with specified torque, check air gap between CKP sensor and reluctor bars on flywheel magneto. Air gap : 0.75 mm (0.030 in)
Electric parts holder
Clamp
Fix lead wire not to contact with flywheel magneto.
Starter motor
Battery charge coil
MAP sensor bracket
MAP sensor
Clamp
Fix lead wires not to contact with flywheel magneto.
Fix engine wiring harness not to contact with oil filler cap.
Clamp
Clamp
Fix engine wiring harness not to contact with hose crip.
Rectifier & regulator
Clamp
Exhaust manifold temp. sensor
Apply engine oil to O-ring when installing sensor.


Starter motor
Tighten bolt with PTT relay ground wire, battery cable ground wire and harness ground wire.
CTP switch
Starter motor sub cable
Grommet
IAT sensor
IAC valve
Engine wiring harness
Route engine wiring harness on battery cable ⊖.
Battery cable ⊖
Battery cable
Route battery cable on fuel hose.


Clamp
Clamp
Ignition coil #1
Clamp
CMP sensor
Ignition coil #2
Clip
Position clip tabs inward (engine side)
Clamp
Ignition coil #3

Prepared by

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