PARSUN OUTBOARD ENGINE
SERVICE MANUAL

F25/F25BM(F20/F25W)

SUZHOU PARSUN POWER MACHINE CO., LTD.

NOTICE

This manual includes service instructions for F20, F25 and has been prepared by Parsun Power primarily for use by the dealers when performing maintenance and repair to Parsun outboard engines. Before performing maintenance, please read the manual carefully. When performing maintenance and repair to Parsun outboard engines, please use the service procedure and tools recommended by the manual. If you use other service procedure and tools, please follow guidance from experienced maintenance people, to avoid damage to people and outboard engines.

The manual is based on the sample machines that are produced at the time of printing, so the model being actual purchased may differ a little from the descriptions and illustrations given in this manual. If necessary, our company will distribute the manual revision to dealers.

In this Service Manual, particularly important information is distinguished in the following ways, please read the manual carefully, and perform the instructions correctly and carefully.

⚠ **WARNING:**

Failure to follow WARNING instructions could result in severe injury or death to the machine operator and bystander.

CAUTION:

A CAUTION indicates special precautions that must be taken to avoid damage to the outboard motor.

NOTE:

A NOTE provides key information to make procedures easier or clearer.

The common troubles and solutions are given in the end of the manual, please ready carefully. When performing maintenance and repair to Parsun outboard engines, they will help you judge the outboard engine's status quickly and improve the work efficiency.

Suzhou Parsun Power Machine Co., Ltd.

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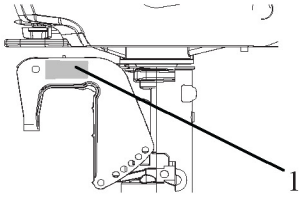
GENERAL INFORMATION

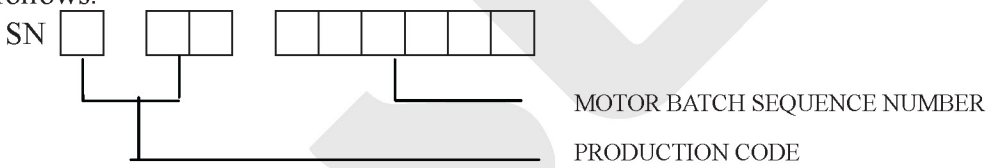
IDENTIFICATION

The outboard motor serial number is marked on the label. The label can be found on the bracket left assembly or on the upper part of the bracket swivel. Record your outboard motor serial number in the spaces provided to assist you in ordering spare parts from your Parsun dealer or for reference in case your outboard motor is stolen.



1. Outboard motor serial number location

Serial number as follows:



PROPELLER SELECTION

The performance of your outboard motor will be critically affected by your choice of propeller, as an incorrect choice could adversely affect performance.

For a greater boat load and a low engine speed, a smaller-pitch propeller is more suitable. Conversely, a large-pitch propeller is more suitable for a smaller operating load as it enables the correct engine speed to be maintained.

When the engine is running at full throttle position, the suitable propeller should be used according to the engine's RPM and the fuel capability. So the outboard engine can supply the best performance.

Propeller sizes	Material
3-9 7/8"×8	Aluminum alloy
3-9 7/8"×9	Aluminum alloy
3-9 7/8"×10 1/2"	Aluminum alloy
3-9 7/8"×11 1/4"	Aluminum alloy
3-9 7/8"×12	Aluminum alloy
3-9 7/8"×13	Aluminum alloy
3-9 7/8"×14	Aluminum alloy

EMERGENCY START

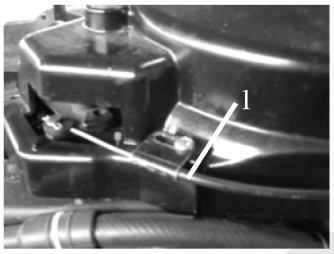
If the starting device is not working, the engine can be started by emergency start cable.

⚠**WARNING:**

- **The start program can only be used in emergency and to return to harbor for repairing.**
- **When you start the engine by emergency start cable, the start-in-gear protection device is not working. So please ensure the shift rod is in NEUTRAL position.**
- **Please ensure nobody standing behind you in case the cable is pulled out to hurt people.**
- **After the engine starts up, don't fit the start device or top cowling. Put clothing or other items far away. Don't touch flywheel or other moving parts.**
- **When starting and operating, don't touch ignition coil, spark plug cap or other electric parts.**

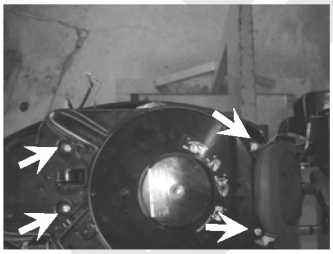
The procedure is as follows:

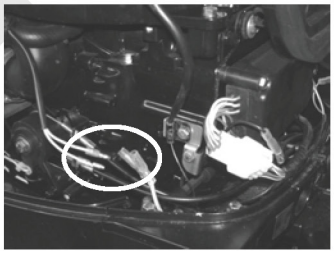
1. Remove the top cowling.
2. Remove the start-in-gear protection device cable.



1. Start-in-gear protection device cable

3. Demount three bolts, break the alarm light and remove starter.

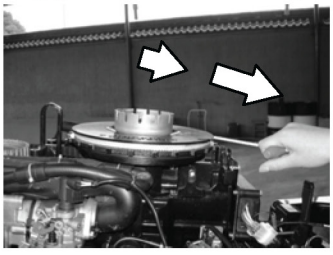




4. Insert the knot of the cable in the notch of flywheel rotor, and wind the cable around flywheel several rounds in clockwise direction..

5. Pull the manual starter handle slowly until you feel resistance.

6. Give a strong pull to start the engine. Repeat if necessary.



SAFETY WHILE WORKING

To prevent the danger or accidents when performing maintenance and repair, and improve the work efficiency, please obey the following safety procedures.

1. FIRE PREVENTION

Gasoline (petrol), lubricant and grease are highly flammable. While working, keep away from heat, sparks and open flames.

2. VENTILATION

Petroleum vapor and engine exhaust gases are violent in toxicity. They are harmful to breathe and deadly if inhaled in large quantities. When test-running an engine indoors, maintain good ventilation.

3. SELF-PROTECTION

Protect your eyes with suitable safety glasses or safety goggles, when drilling, grinding or operating air compressor. Protect hands and feet by wearing protective work clothes, safety gloves and shoes if necessary.

4. LUBRICANTS AND SEALING FLUIDS

When performing maintenance procedures and repair to Parsun outboards, use only products provided or recommended by our Company.

Under normal conditions of 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.

① To protect the skin, the application of a suitable barrier cream to the hands before working is recommended.

② Clothing which has become contaminated with lubricants should be changed as soon as practicable, and washed before further use.

③ Avoid skin contact with lubricants.

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 A supply of clean lint-free cloths should be available for wiping run-off lubricants or grease.

5. GOOD WORKING PRACTICES

① Follow the tightening torque instruction. When tightening bolts, nuts and screws, tighten the large sizes first, and tighten inner-positioned fixings before outer-positioned ones.

② Use the recommended special tools to protect parts from damage. Use the right tool in the right manner.

DISASSEMBLY AND ASSEMBLY

When disassembly and assembly, please follow the following principles:

1. Use special tools when disassembling and assembling.

2. Clean dirt before disassembling the parts.

3. Oil the contact surfaces of moving parts before assembly.

4. Install bearing with the manufacturer's markings on the stipulated side and liberally oil the bearing.

5. When installing oil seals, apply a light coating of water-resistant grease to the ledge and outside diameter.

6. After assembly, check if the moving parts operate normally.

ONE-TIME USE PARTS

One-time use parts are gasket, oil seal, O-ring, cotter pin and spring ring, and etc.. When re-assembling outboard engine, you must change the one-time use parts.

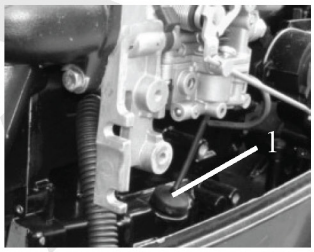
PRE-DELIVERY CHECK

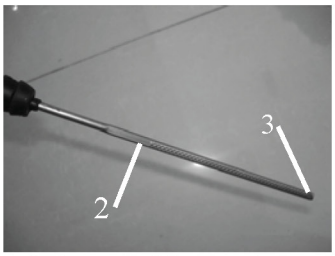
To ensure the using, please inspect the following before delivery.

1. CHECKING FUEL SYSTEM
   Check if the fuel pipe is connected firmly, and if the fuel tank is filled with fuel.

CAUTION:
Do not use pre-mixed fuel for this 4-stoke outboard engine.

2. CHECKING OIL LEVEL
   ① Check the engine oil level
   Remove oil rule, check engine oil level..

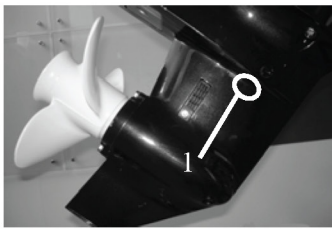




1. Oil rule 2. High position mark 3. Low position mark

Ensure the oil level between the marks of upper and lower. If above upper level, drain engine oil; if below lower mark, add engine oil up to upper level.

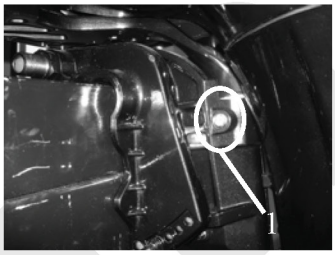
② Check the gear oil level
Remove the oil level plug. Check if the gear oil overflows at the oil level checking hole. If so, install the oil level plug and tighten it according to specified torque. Otherwise please add gear oil.



1. Oil level plug

3. CHECK STEERING SYSTEM

Check if steering is stable.
Check if steering friction is adjusted correctly.
Turn clamp handle screw clockwise to increase resistance.
Turn clamp handle screw counter clockwise to Lower resistance.



1. Clamp handle screw

4. CHECK SHIFT LEVER AND THROTTLE

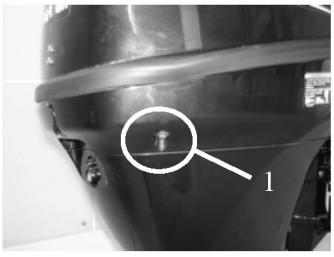
Check if the shift lever is operated smoothly.
Check if the throttle grip is turned smoothly from full closed position to full open position.

5. CHECK ENGINE STOP SWITCH ASSY

Check if the engine stops when pushing the engine stop switch assembly or pulling out the stopper hang rope.

6. CHECK COOLING WATER CHECKING HOLE.

When the engine is running, check if cooling water overflows at the cooling water checking hole.



1. Cooling water checking hole

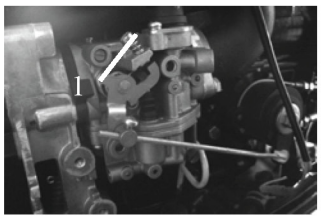
7. BREAKING-IN RUNNING

① Initial 1 hour: operate the engine at 2000 r/min or about a half throttle.
② The second hour: operate the engine at 3000 r/min or about 3/4 throttle.
③ The following 8 hours: operate the engine at full throttle continuously. Each operation time doesn't exceed 5 minutes.

8. INSPECTION AFTER BREAKING-IN RUNNING

① Check if gear oil contains water.
② Check if the fuel line leaks.
③ After breaking-in running, operate the engine at idling speed. Use cleaning tool to wash over the cooling water passage by fresh water.

9. AFTER BREAKING-IN RUNNING, INSPECT IDLING SPEED.
   ① Preheating engine for 5 minutes.
   ② Using the tachometer to measure idling speed RPM.
   If out of specification, adjust it. Idling speed: 925~1025 r/min.
   ③ Turn the throttle stop screw clockwise or counter clockwise until the specified idling speed is attained.
   ④ After adjusting idling speed, picking up RPM several times to check the engine's stability.

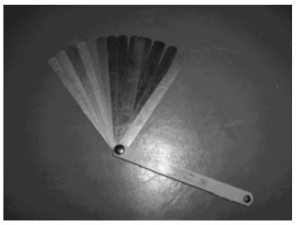


1.Throttle anchoring screw

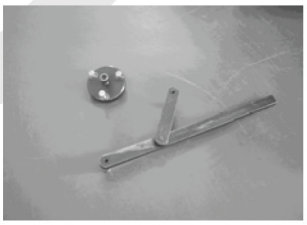
SPECIAL TOOLS AND DETECTION DEVICE

When performing maintenance and repair, you need to use all kinds of special tools and detection device. The use of correct tools will improve the work efficiency and avoid of the damage to the people and outboard engines.

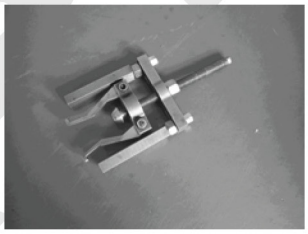
SPECIAL TOOLS:

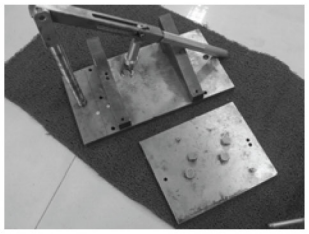

Clearance gauge


Piston slider


Flywheel gripper and puller


Oil cleaner spanner


Bearing puller


Valve spring compressor


Lower casing cover bearing installer


Lower casing cover oil seal installer


Lower casing cover needle bearing installer


Lower casing cover assy. installer


Lower casing needle bearing installer


Drive shaft bearing housing installer

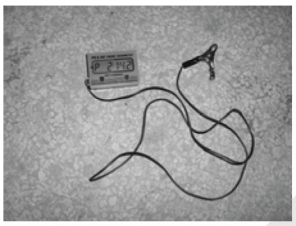
Drive shaft bearing installer

Bearing block oil seal installer

Back gear bearing installer

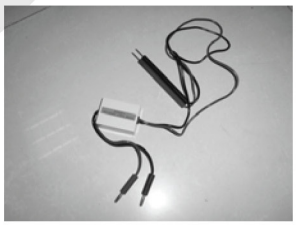
Forward gear bearing housing installer

DETECTION DEVICE:



Digital tachometer

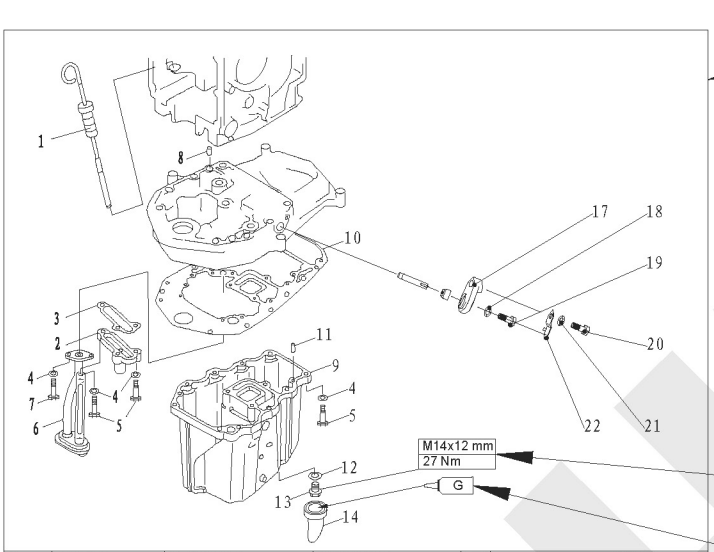
Digital multimeter



Peak voltage adaptor

EXPLOSIVE DRAWING AND SYMBOL

EXPLOSIVE DRAWING



SN. 参照号码	PART NO. 零件编号	DESCRIPTION 零件名称(中文)	DESCRIPTION 零件名称(英文)	QTY 数量	REMARKS 备注
1	F25-00000100	机油尺组件	PLUG, OIL LEVEL	1	
2	F25-02010100	溢流阀组件	RELIEF VALVE AUY	1	
3	F25-02010006	溢流阀垫片	GASKET, RELIEF VALVE	1	
4	GB/T97.1-2000	平垫圈6	WASHER , PLAIN	15	
5	GB/T5783-2000	六角螺栓M6x25	HEXAGON BOLT	13	
6	F25-02010200	粗滤器组件	STRAINER, OIL	1	
7	GB/T5783-2000	六角螺栓M6X16	HEXAGON BOLT	2	
8	F25-00000014	定位销8x12	PIN, DOWEL	2	
9	F25-02000006	油底壳	OIL SUMP	1	
10	F25-02010007	排气歧管座垫	HEXAGON BOLT	1	
11	F15-00000006	定位销6x12	PIN, DOWEL	2	
12	F15-04000003	放油螺塞垫片	GASKET	1	
13	F15-04000002	放油螺塞	BOLT, OIL DRAIN	1	
14	F25-02000007	放油口胶套	JACKET, OIL DRAIN	1	
15	F25-02010005	阳极	ANODE	1	
16	F15-07010009	阳极密封圈	SEAL. ANODE	1	
17	F15-07010011	阳极盖板	COVER , ANODE	1	
18	GB/T97.1-1985	平垫圈5	WASHER	1	
19	GB/T5783-2000	六角螺栓M5x12	BOLT	1	
20	GB/T5783-2000	六角螺栓M6x20	BOLT	1	
21	GB/T97.1-1985	平垫圈6	WASHER	1	
22	F15-07010012	阳极锁止片	PLATE , ANODE	1	

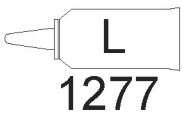
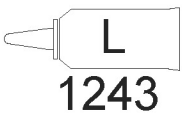
① Parts explosive drawing.

② Screw specification and specified torque.

③ Oil, fluid sealant or locking substance daubing point.

④ Spare parts details.

SYMBOL

				
Daub engine oil	Daub waterproof grease	Daub screw locking substance 1277	Daub screw locking substance 1243	Daub fluid sealant

SPECIFICATIONS

OUTBOARD ENGINE SPECIFICATIONS

Item			Description	Item		Description
Dimension	Overall length (BM/FW)		1151/703mm	Power unit	Ignition system	C.D.I
	Overall width (BM/FW)		430/376mm		Enrichment system	Initial enrichment
	Overall height	S	1153mm		Spark plug	DPR7EA-9
		L	1280mm		Exhaust system	Through propeller wheel hub
	Transom height	S	381mm		Lubrication system	Pressure lubrication
		L	508mm	Fuel and oil	Fuel type	Unleaded regular gasoline
Weight	S (BM/FW)		66/68kg		Fuel standard	PON86
	L (BM/FW)		68/70kg		Recommended engine oil	API: SE, SF, SG, SH, SJ SAE: 10W30, 10W40
Performance	Max output	F20	14.7Kw@5500 r/min		Engine oil quantity (Before changing oil cleaner)	1.7L
		F25	18.4Kw@5500 r/min			
	Full throttle operation		5000～6000 r/min		Recommended gear oil	Hypoid gear oil SAE # 90
	Max fuel consumption	F20	7.3L/h@6000 r/min		Gear oil quantity	320 cm3
		F25	9.2L/h@6000 r/min			
	Idle speed（Neutral）		975±50 r/min	Bracket	Tilt angle	8°, 12°, 16°, 20°, 24°
Power unit	Type		4 stroke, OHC		Tilt-up angle	64°
	Number of cylinders		2		Steering angle	45°+45°
	Displacement		498cm³	Drive unit	Gear positions	F-N-R
	Bore×Stroke		65mm×75mm		Gear ratio	2.08
	Compression ratio		9.87:1		Gear type	Spiral bevel gear
	Min. compression pressure		810kPa		Clutch type	Dog clutch
	Lubricant pressure		80kPa (Idle speed)		Propeller drive system	Spline
	Number of carburetors		1		Propeller direction	Clockwise (back view)

	Control system	Tiller control (BM)			
		Romote control (FW)			
	Start system	Recoil start (BM)			
		Electric start (FW)			

MAINTENANCE INFORMATION

Power unit

Item			Description	Item			Description
Cylinder head	Warp limit		0.1mm	Valve	Valve clearance (cold)	Intake	0.15~0.25mm
	Camshaft inside diameter		37.000~37.025mm			Exhaust	0.25~0.35mm
	Rocker shaft outside diameter		15.971~15.991mm		Face width	Intake	1.84~2.97mm
	Rocker inside diameter		16.000~16.018mm			Exhaust	1.98~3.11mm
Cylinder	Bore		65.00~65.015mm		Seat width	Intake	0.9~1.1mm
	Wear limit		65.1mm			Exhaust	
	Taper limit		0.08mm		Margin thickness	Intake	0.8mm
	Out of round limit		0.05mm			Exhaust	0.9mm
Piston	Piston diameter		64.950~64.965mm		Head diameter	Intake	31.9~32.1mm
	Measuring point height		2mm（from the bottom of piston）			Exhaust	25.9~26.1mm
	Piston-to-cylinder clearance		0.035~0.065mm		Stem diameter	Intake	5.475~5.490mm
	Pin boss inside diameter		15.974~15.985mm			Exhaust	5.460~5.475mm
Piston pin outside diameter			15.965~15.970mm		Guide inside diameter	Intake	5.500~5.512mm
Piston ring	Top ring	Thickness	1.17~1.19mm			Exhaust	
		Breadth	2.25~2.4mm		Stem to guide clearance		0.025~0.052mm
		End gap	0.15~0.30mm		Stem roundness limit		0.03mm
		Side clearance	0.02~0.06mm	Valve spring	Free length		40.0mm
	2nd ring	Thickness	1.47~1.49mm		Free length limit		38.4mm
		Breadth	2.60~2.80mm		Tilt limit		1.7mm
		End gap	0.30~0.50mm	Connecting od	Small end inside diameter.		15.985~15.998mm
		Side clearance	0.02~0.06mm		Big end inside diameter.		36.000~36.016mm
	Oil ring	Thickness	2.36~2.48mm		Big end oil clearance		0.020~0.052mm
		Breadth	2.75mm		Big end	A: Black	1.496~1.490 mm

		End gap	0.20~0.70mm		bearing thickness	B: Brown	1.490~1.484mm
		Side clearance	0.04~0.18mm	Crankshaft	Journal diameter		42.984~43.000 mm
Camshaft	Height	Intake	30.834~31.034mm		Crankpin diamete		32.984~33.000 mm
		Exhaust	30.834~31.034mm		Crankpin width		21.00~21.07mm
	Round diameter		25.90~26.10mm		Big end side clearance		0.05~0.22mm
	Journal diamete	Top	36.925~36.945mm		Round limit		0.05mm
		Middle	36.935~36.955mm	Thermostat	Opening temperature		58~62℃
	Round limit		0.03mm		Full-opening temperature		70℃
	Journal oil clearance		0.050~0.090mm		Valve lift height		3mm
Oil Pump	Type		Gerotor pump	Fuel pump	Displacement		70L@3000 r/min
	Safety valve opening pressure		382~442 kPa		Pressure		49kPa
	Outside rotor to housing clearance		0.09~0.15mm		Plunger lift		5.85~9.65 mm
	Outside rotor to inside rotor clearance		0.12mm	Crankcase	Journal oil clearance		0.012~0.044mm
	Rotor to cover clearance		0.03~0.08mm		Journal bearing clearance	A: Black	1.500~1.494 mm
						B: Brown	1.494~1.488mm

Lower unit

Item		Description	Item		Description
Gear Clearance	Drive gear to forwarder gear	0.30~0.72mm	Gear Clearance	Forwarder gear shim	1.0, 1.1, 1.2, 1.3, 1.4mm
	Drive gear to back gear	0.92~1.65mm		Back gear shim	1.0, 1.1, 1.2, 1.3mm
	Drive gear shim	0.7, 1.0, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6mm			

Electric system

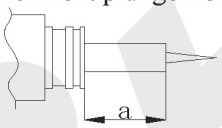
Ignition and ignition control system

Item		Description	Item		Description
Ignition timing	Idle speed	BTDC 8.5°	Charge coil peak voltage	1500 r/min (load)	291V
	6000 r/min	BTDC 30°		3500 r/min (load)	294V

Spark plug gap		0.8~0.9mm	Charge coil resistance		644.4~787.6 Ω
Ignition coil resistance	Primary coil	0.27~0.33 Ω	Power spool output peak voltage	Start (no-load)	24 V
	Secondary coil (including high voltage cap resistance)	11.17~13.53 K Ω		1500 r/min (no-load)	31 V
CDI output peak voltage	Start (load)	264V		3500 r/min (no-load)	71 V
	1500 r/min	265 V		Start (load)	23 V
	3500 r/min	270 V		1500 r/min (load)	31 V
Pulsed coil peak voltage	Start (no-load)	12 V		3500 r/min (load)	70 V
	Start (load)	12V	Power spool resistance		6.9~8.5 Ω
	1500 r/min (load)	12 V	Light coil output	Start (no-load)	40 V
	3500 r/min (load)	12.4V		1500 r/min (no-load)	54 V
Pulsed coil resistance *		265~396 Ω		3500 r/min (no-load)	110 V
Charge coil peak voltage	Start (no-load)	294V	Light coil resistance		0.9~1.1 Ω
	Start (load)	291V			

* The data is for reference only.

Enrichment control system

Item	Description
Initial enrichment plunger length（*1） 	10.7~15.4 mm
Initial enrichment resistance（*2）	17.7~18.7 Ω

（*1）The data is for reference only.
（*2）Measurement condition:
Initial enrichment plunger length =10.7mm
The data is for reference only.

TIGHTENING TORQUE

Specified torque

Part to be tightened		Part name	Thread size	Quantity	Torque
Power unit	Spark plug	—	M12	1	17 Nm
	Flywheel	Nut	M20	1	150 Nm
	Carburetor installation	Bolt	M6	2	8 Nm
	Carburetor bracket	Bolt	M6	3	8 Nm

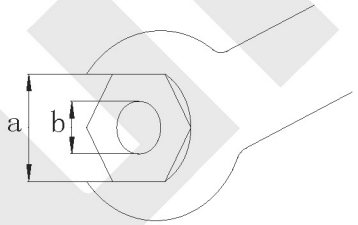
	Cylinder head	1st tightening	Bolt	M9	6	23Nm
		2nd tightening				46 Nm
		1st tightening	Bolt	M6	3	6 Nm
		2nd tightening				12 Nm
	Oil cleaner		—	—	1	18 Nm
	Oil cleaner stud		—	—	1	40 Nm
	Locknut (rocker arm)		Nut	M6x0.75	4	14 Nm
	Power unit assembling		Bolt	M8	8	21 Nm
	Exhaust cover	1st tightening	Bolt	M6	7	6 Nm
		2nd tightening				12 Nm
	Thermostat cover		Bolt	M6	2	7Nm
	Crankcase	1st tightening	Bolt	M8	6	15 Nm
		2nd tightening				30 Nm
		1st tightening	Bolt	M6	6	6 Nm
		2nd tightening				12 Nm
	Connecting rod	1st tightening	Bolt	M6	4	6 Nm
		2nd tightening				17 Nm
	Driven belt pulley		Bolt	M10	1	38 Nm
Lower unit	Lower unit mounting		Bolt	M10	4	37 Nm
	Lower unit housing cover		Bolt	M6	2	11Nm
	Water inlet		Bolt	M5	2	4 Nm
	Oil drain bolt		Bolt	—	1	9 Nm
	Oil inspection hole		Bolt	—	1	9 Nm
	Pinion		Nut	M10	1	50 Nm
	Propeller nut		Nut	M14	1	34 Nm
Upper unit	Steering handle		Nut	M10	1	10 Nm
	Steering handle		Self-locking nut	M10	1	22 Nm
	Exhaust manifold		Bolt	M6	3	10 Nm
	Throttle grip		Bolt	M5	1	3 Nm
	Shift lever bracket		Bolt	M6	4	10 Nm
	Shift leaf spring		Bolt	M6	1	10 Nm
	Bottom cowling small strap		Bolt	M6	2	10 Nm
	Clamp bracket		Self-locking nut	—	2	45 Nm
	Oil drain bolt		Bolt	M14	1	27 Nm

Cont'd

Part to be tightened	Part name	Thread size	Quantity	Torque
Ignition coil	Bolt	M6	2	8 Nm
CDI assembly	Bolt	M6	2	5 Nm
CDI assembly bracket	Bolt	M6	2	5 Nm
Stator coil	Bolt	M5	3	6 Nm
Pulsed coil	Bolt	M5	2	5 Nm

General torque

Nut (a)	Bolt (b)	Torque
8mm	M5	5Nm
10mm	M6	8 Nm
12mm	M8	18 Nm
14mm	M10	36 Nm
17mm	M12	43 Nm



PERIODIC SERVICE

MAINTENANCE TIME TABLE

Items	Contents	Initial maintenace		General maintenance period	
		10 hours (month)	50 hours (3 months)	100 hours (6 months)	200 hours (1 year)
Anode	Inspection/ replacement		○	○	
Anode (Inner)	Inspection/ replacement				○
Cooling water passage	Cleaning		○	○	
Spark plug	Cleaning/ adjustment / replacement	○			○
Grease points	Greasing			○	
Fuel filter	Inspection/ replacement	○	○	○	
Fuel system	Inspection	○	○	○	
Fuel tank	Inspection/ cleaning				○
Idling speed	Inspection/ adjustment	○		○	
Engine oil	Replacement	○		○	
Oil cleaner	Replacement				○
Valve clearance (OHC)	Inspection/ adjustment	○		○	
Ignition timing	Inspection	○		○	
Thermostat	Inspection				○
Gear oil	Replacement	○		○	
Water pump	Inspection				○

Propeller and cotter pin	Inspection/ replacement		○	○	
Timing belt	Inspection/ replacement			○	○
Throttle cable	Inspection/ adjustment				○
Shift lever/Shift cable	Inspection/ adjustment				○

CAUTION:

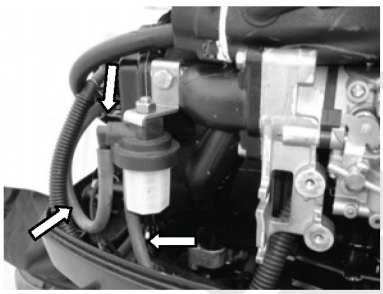
After running the outboard engine in salt water, waste water or mud water, wash over the engine by fresh water immediately.

If using leaded gasoline frequently, check the valve and related components each 100 hours.

Timing belt should be changed every 1000 hours (5 years).

FUEL SYSTEM

1. CHECK FUEL TANK, CARBURETOR, FUEL PUMP AND FUEL PIPE
   Check if fuel tank, carburetor, fuel pump and fuel pipe are damaged or leaked.
   Replace if necessary.
   Check if the fuel filter on the tank is dirty. Clean or replace if necessary.



2. CHECK FUEL COCK AND FUEL JOINT
   Check if fuel cock and fuel joint are cracked, damaged or leaking.
   Replace if necessary.

3. CHECK FUEL FILTER
   Check if fuel filter is cracked, damaged or has dirt inside.
   If so, replace.

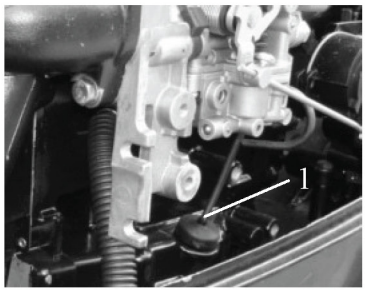
CAUTION:

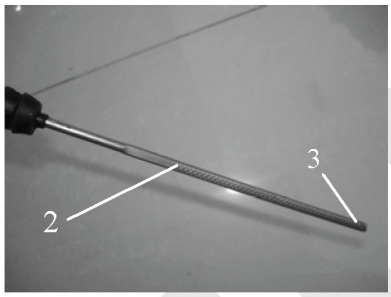
Clean the spilled fuel.

POWER UNIT

Engine oil level

1. Remove oil rule, check if the engine oil level is between the following marks of the upper and lower.





1. Oil rule 2. High position mark 3. Low position mark

2. If above the upper mark, drain the engine oil; if below lower mark, add engine oil up to upper mark.

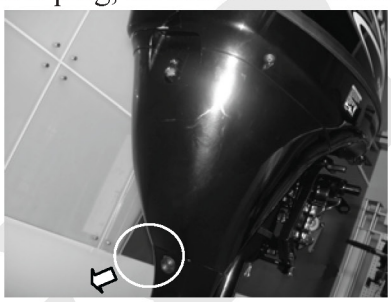
CAUTION:

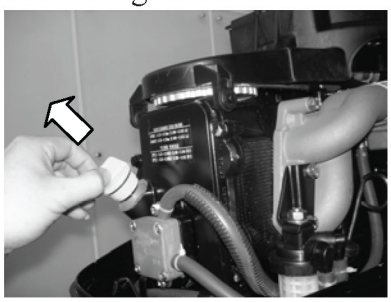
Run the engine and then turn it off, wait for several minutes, and check the engine oil level by the oil rule again.

If the engine oil still not within the proper level, add/drain as needed.

Changing engine oil

1. Remove oil level plug, oil drain bolt and bolt gasket; drain off the engine oil.





2. Install new bolt gasket; install oil drain bolt.

3. Fill engine oil through oil filler hole.
   Engine oil quantity: 1.7 L (Before changing oil cleaner)
   1.9 L (After changing oil cleaner)
   Oil type: API: SE, SF, SG, SH, SJ or SAE: 10W30, 10W40

4. Install oil level plug.

5. Check engine oil level.

Valve clearance

1. Remove stopper hang rope from engine stop switch assy.
   Remove spark plug cap from spark plug.

2. Remove starter and belt cover.

3. Remove fuel pump and cylinder cover.

4. Check if timing belt is slack, aging or damaged. Replace if necessary.

5. Rotate the flywheel clockwise to make the mark "1" on driven pulley align with the mark "▼" on the cylinder head.
   Check the clearance between the intake and exhaust valves of the upper cylinder. Adjust it if necessary.

6. Rotate the flywheel clockwise to make the mark "2" on driven pulley align with the mark "▼" on the cylinder head.
   Check the clearance between the intake and exhaust valves under the lower cylinder.
   Adjust it if necessary.

CAUTION:
Don't rotate the flywheel counter clockwise in case the valve system is damaged.
NOTE:
Adjust the valve clearance when the engine is cold.

Valve clearance (cold position)	Intake valve	0.15~0.25mm
	Exhaust valve	0.25~0.35mm

7. Loose lock nut, rotate adjusting bolt to reach the specified valve clearance.

NOTE:
Rotate adjusting bolt clockwise to reduce the valve clearance.
Rotate adjusting bolt counter clockwise to increase the valve clearance.

8. Re-assemble the spare parts.

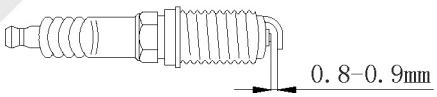
Spark plug

1. Remove spark plug cap and spark plug.

2. Clean off carbon build-up on the electrodes.

3. Check if the electrodes are corroded or have deposit, or if the washer is damaged. If necessary, change the spark plug.
   Spark plug type: DPR7EA 9

4. Inspect if the spark plug gap is within specification. If necessary, change the spark plug.



5. Install spark plug. Use spark plug spanner to tighten it according to specified torque.
   Specified torque: 17 Nm

CONTROL SYSTEM

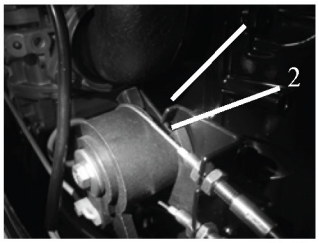
Throttle grip

Backward control:

1. Turn the throttle grip to fully closed position.

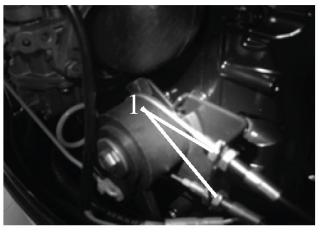
2. Check if the throttle cable is slack, if the throttle lever touches the throttle stop screw, or if the

arresting stop on the throttle accelerograph enforce touches the check plate on the fixed bracket.



1. Check plate 2. Arresting stop

3. Loosen the throttle cable adjusting screw, adjust the throttle cable position, and tighten throttle cable adjusting screw.



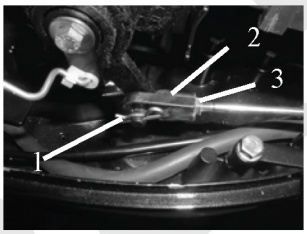
1. Throttle cable stop screw

Forward control:

1. Turn the gear shift lever to neutral position.

2. Check if the arresting stop on the throttle accelerograph enforce touches the check plate on the bracket.

3. Loosen the lock nut and take out the cotter pin, then remove the cable joint.



1. Cotter pin 2. Cable joint 3. Lock nut

4. Adjust the joint position to make the joint hole align with the pin on the throttle accelerograph enforce.

CAUTION:

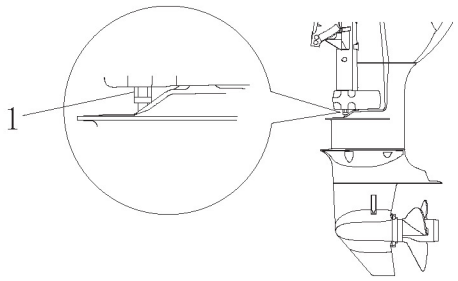
The cable joint must be screwed in for over 8mm.

5. Fit on the cotter pin and tighten the lock nut.

Shift operation

Backward control:

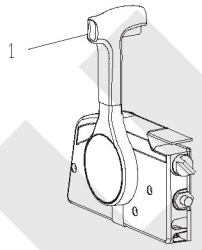
When change from neutral to forward or reverse gear, check if the shift operation is smooth. If necessary, adjust the columned nut.



1. Oolumned nut

Forward control:

1. When change from neutral to forward or reverse gear, check if the shift operation is smooth. If necessary, adjust the length of shift cable.
2. Put the shift lever on the control box in neutral.



1. Shift lever

NOTE:

When the shift lever in neutral, check if the shift lever is in vertical to the engine's fitting surface.

Idling speed

Check idling speed, and adjust it if necessary.

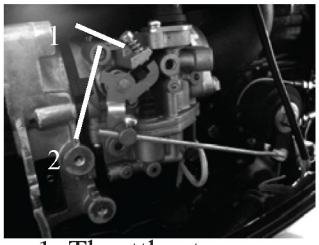
1. Preheat engine for 5 minutes.

2. Attach the tachometer to the spark plug wire to measure idling speed RPM. If out of specification, adjust it.
   Idling speed: 925~1025 r/min

3. Turn the throttle stop screw clockwise or counter clockwise, until the specified idling speed is attained.

NOTE:

Turn clockwise to increase idling speed.
Turn counter clockwise to decrease idling speed.
If necessary, turn the idling speed screw on the carburetor clockwise or counter clockwise, until the specified idling speed is attained.



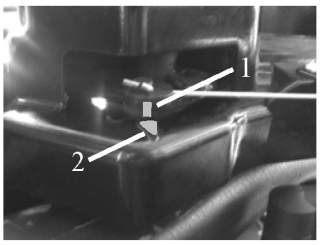
1. Throttle stop screw
2. Idling speed screw

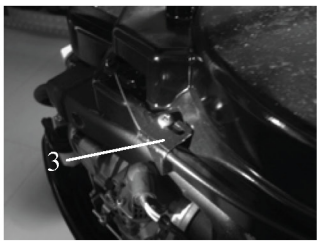
CAUTION:

Before adjusting the idling speed, the throttle cable should be properly adjusted.
After adjusting the idling speed, if necessary, you can adjust the throttle cable again.

Start-in-gear protection

Set the shift lever in neutral, and check if the marking "▮" on the arrester pawl aligns with the marking "▼" of the starter case If necessary, adjust the mounted plate for the arrester tightwire, to align with the marking.





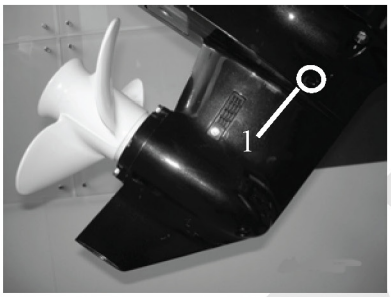
1. "▉ "marking 2. "▼"marking 3. Mounted plate for the arrester tightwire

LOWER UNIT

Gear oil

Check gear oil level:

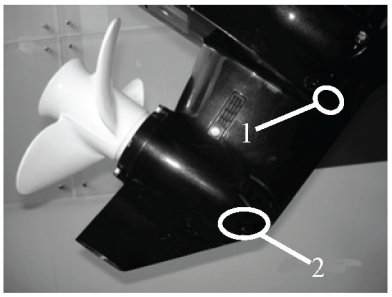
Remove the oil level plug screw. If the gear oil overflows, the oil level is correct; otherwise, add gear oil.



1. Oil level plug screw

Changing gear oil

1. Hold the outboard engine in an upright position.
2. Place a container with enough capacity under the outboard engine.
3. Remove the oil drain screw, and remove the oil level plug screw, and then drain the gear oil..



1. Oil level plug screw 2. Oil drain screw

4. Add gear oil through the oil drain scew hole using pressure filling device.
5. When gear oil overflows through the oil level plug hole, install the oil level plug screw.

6. Install the oil drain screw, then clean overflowing gear oil.

NOTE:

Check the drained gear oil. If the gear oil is milky, check the oil seal. Replace the oil seal if necessary. If the gear oil contains metal chippings, check the gear and bearing.

CAUTION:

Must change oil drain bolt gasket each time.

Lower unit leakage check

Connecting the leakage tester to the oil level plug hole to check for the lower unit leakage. If the pressure drops (pressure: 1kg/cm³), inspect the oil seal and components.

GENERAL INSPECTION

Anode

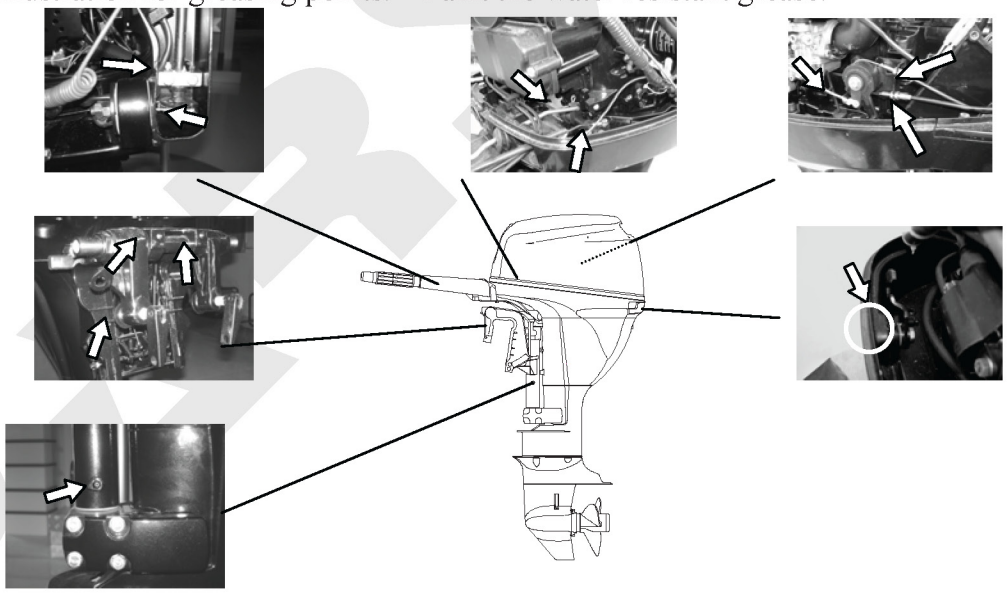
Inspect lower unit anode and engine anode (on the thermostat cover). Clean the greasy dirt and scales. If wear or damage is above 1/2, replace the anode.

CAUTION:

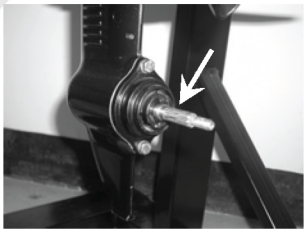
Cannot grease or paint the anode, or it will not operate properly.

Grease points

1. Refer the illustration for greasing points. Paint the water resistant grease.

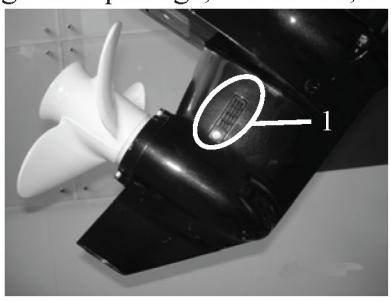


2. Paint anti-corrosion grease on the propeller shaft.



Cooling water passage

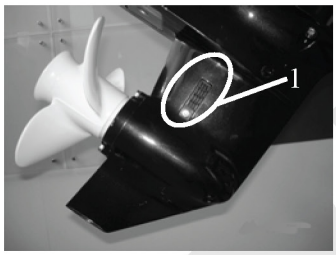
1. Inspect cooling water passage, if blocked, clean it.



1. Cooling water passage inlet

2. Place the outboard engine in the water and ensure the water level is above the anti-vortex plate, then start the engine.

3. Check if water overflows at the cooling water checking hole. If there is no flow or intermittent flow, check the cooling water passage.



1. Cooling water inlet

2. Cooling water checking hole

Thermostat

1. Remove the thermostat cover and thermostat.

2. Hang the thermostat in a container with water.

3. Heat the container.

4. Check the valve open height under the specified water temperatures. If out of order, change it.

Water temperature	Valve open height
58~62℃	0.05mm
Over 70℃	Over 3mm

5. Fit on the thermostat and thermostat cover, then tighten the screws to specification.

Propeller

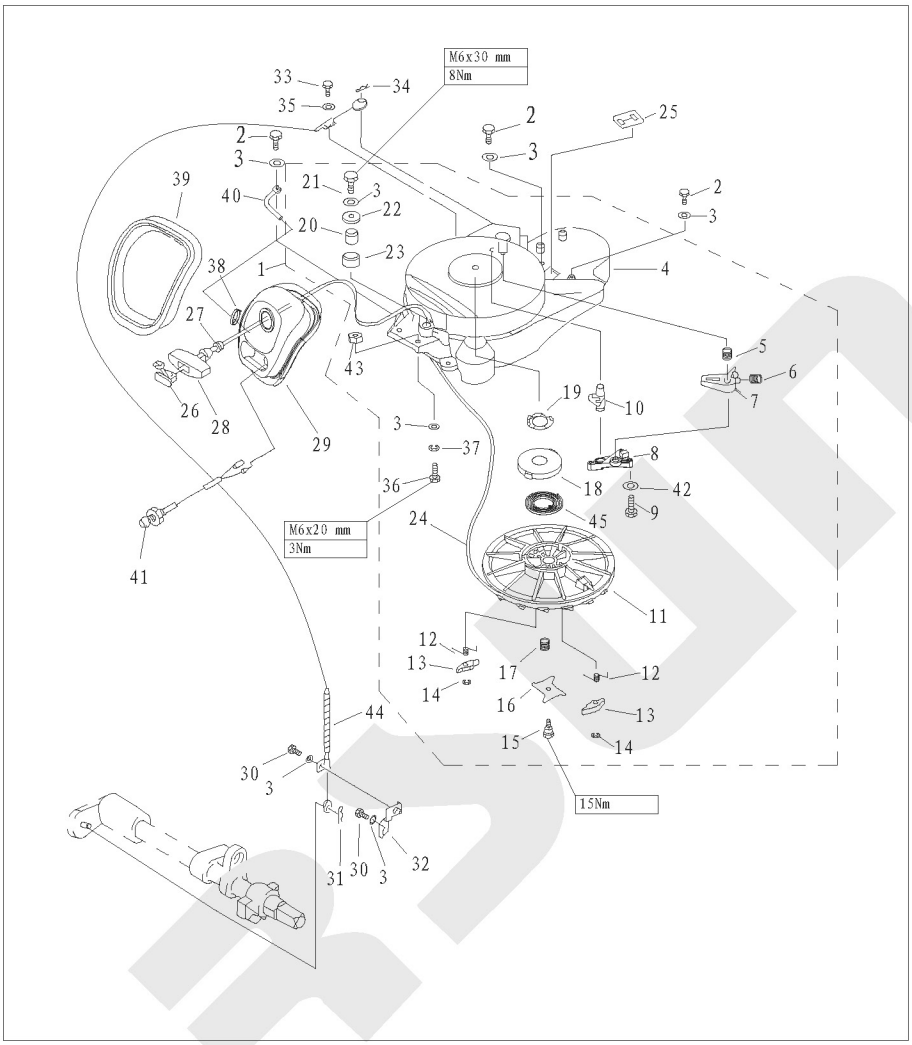
Check if the propeller blades and internal spline are cracked, damaged or worn.
If necessary, replace it.

RECOIL STARTER

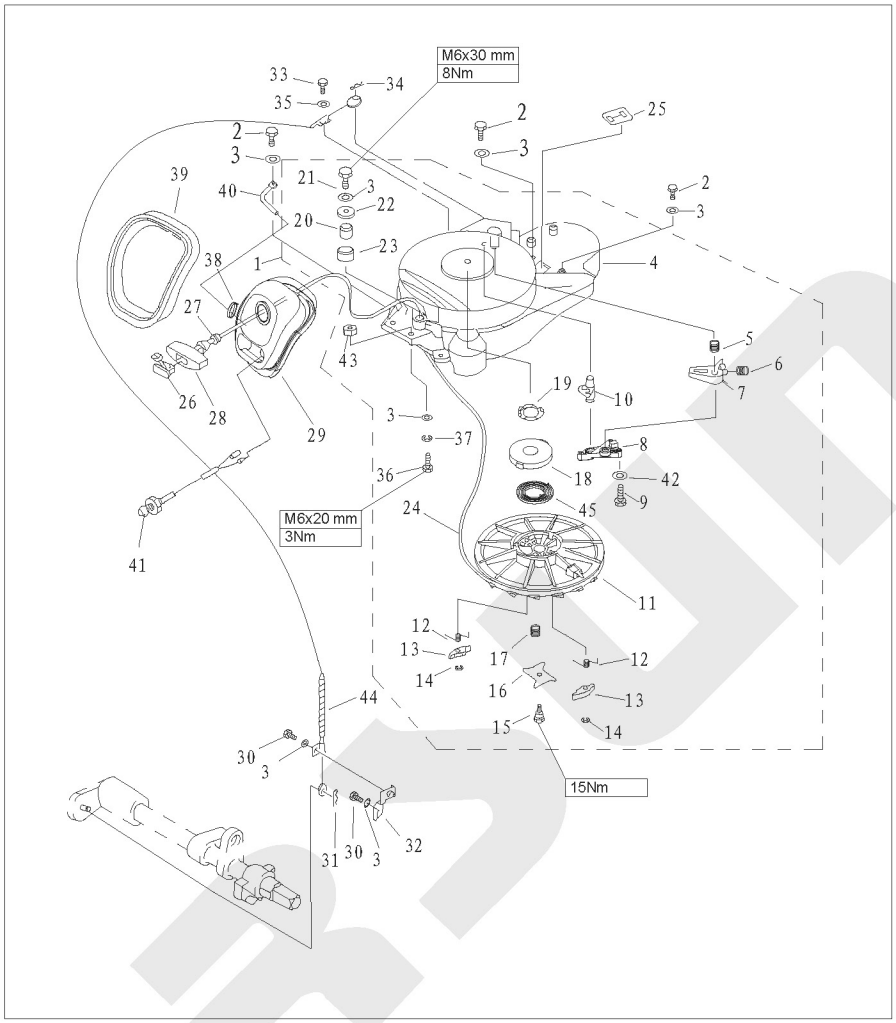
NOTICE

When you service, always wear safety glasses and gloves. To prevent accidental start of the engine, remove the spark plug cap and remove stopper hang rope from stop switch assembly.

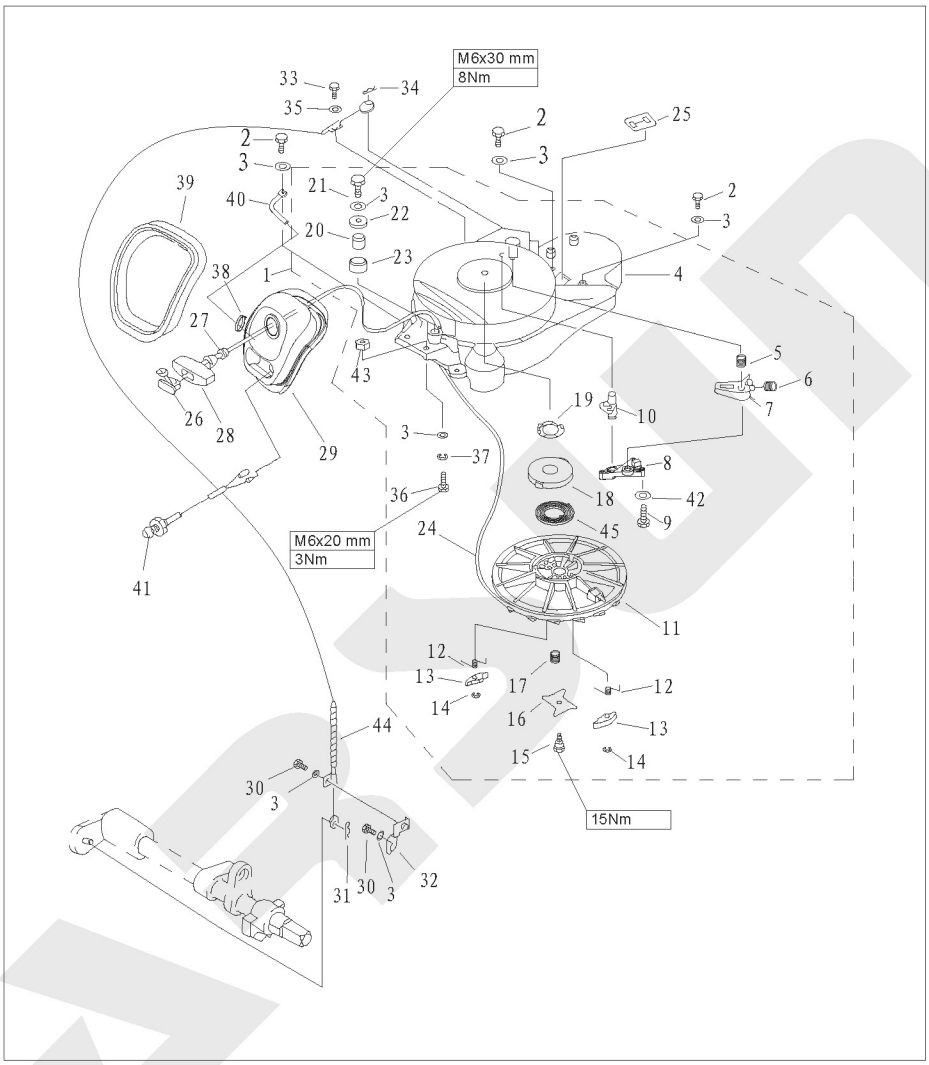
EXPLOSIVE DRAWING



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	F25-05160000	起动器组件	STARTER ASSY	1	
2	GB/T5783-M6x25	六角螺栓M6x25	BOLT M6x25	4	
3	;GB/T97.1-6	平垫圈6	WASHER, PLATE 6	9	
4	F25-05160100	起动器外壳组件	CASE, STARTER	1	
5	F25-05160003	制动器扭簧	SPRING, ARRESTER	1	
6	F25-05160005	卡瓣弹簧	SPRING, TENSION	1	
7	F25-05160001	制动器	ARRESTER	1	
8	F25-05160006	制动器固定盖板	ARRESTER, CHANGELESS	1	
9	GB/T5285-ST4.8x26	六角头自攻螺钉ST4.8x26（F型）	SCREW, TAPPING ST4.8x26	3	
10	F25-05160004	制动器卡瓣	PAWL, ARRESTER	1	
11	F25-05160301	起动轮	WHEEL, START-UP	1	
12	F25-05160304	起动卡瓣扭簧	PAWL, DRIVE SPRING	2	
13	F25-05160305	起动卡瓣	PAWL, DRIVE	2	
14	GB/T896-6	开口档圈6	CIRCLIP 6	2	
15	F25-05160018	压板螺钉	PLATE, DRIVE BOLT	1	



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
16	F25-05160017	起动压板	PLATE, DRIVE	1	
17	F25-05160016	起动压板弹簧	SPRING, DRIVE PLATE	1	
18	F25-05160014	涡形弹簧座	SEAT, SPRING	1	
19	F25-05160013	涡形弹簧座弹性垫片	CUSHION, SPRING, SEAT	1	
20	F25-05160009	起动绳滑轮轴	AXES, PUIIEY	1	
21	GB/T5783-M6x30	六角螺栓M6x30	BOLT M6x30	1	
22	GB/T5287-6	特大垫圈6	WASHER, OUTSIZE 6	1	
23	F25-05160008	起动绳滑轮	PUIIEY, STARTLING	1	
24	F25-05160019	锦纶编织线φ5x1.68米	START LING	1	
25	F25-05160012	橡胶护盖	JACKET, RUBBER	1	
26	F4-04130102	起动手柄盖	COVER	1	
27	F25-05160021	手柄减震圈	DAMPING	1	
28	F25-05160501	起动手柄	HANDLE, STARTER	1	
29	F25-05160401	起动架	FRAME, STARTER	1	
30	GB/T5783-M6x10	六角螺栓 M6x10	BOLT M6x10	2	
31	F15-00000012	夹簧φ1.8	SPRING	1	
32	F25-05000028	制动器固定板	STAY, CABLE COMP	1	
33	GB/T5783-M5x12	六角螺栓 M5x12	BOLT M5x12	1	
34	F25-05160002	夹簧φ1	SPRING	1	
35	GB/T96-5	大垫圈5	BIG WASHER 5	1	



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
36	GB/T5783-M6x20	六角螺栓 M6x20	BOLT M6x20	2	
37	GB/T93-6	弹簧垫圈6	WASHER SPRING 6	2	
38	HT 2.5x60	尼龙扎带60x2.5	CLAMP 2.5x60	1	
39	F25-05160402	发泡密封圈	SEAL, FROTHY RUBBER	1	
40	F25-05160403	开口支脚	NOG, UNCORK	1	
41	F15-07130303	机油指示灯组件	SUMP INDICATOR LIGHT	1	
42	GB/T848-5	A级小垫圈5	SMALL WASHER 5	3	
43	GB/T889.1-M6	非金属嵌件六角锁紧螺母M6	LOCK NUT	2	
44	F25-05160200	制动器钢索组件	CABLE COMP, STARTER STOP	1	
45	F25-05160015	涡形弹簧	SPRING, VOLUTE	1	

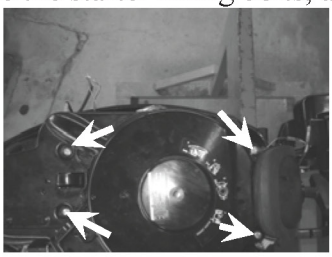
DISASSEMBLING

1. Open the top cowling.

2. Remove the tightwire from the arrester.

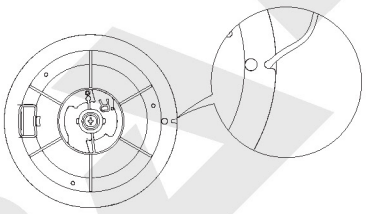
1. Adjusting nut

3. Remove the starter fixing bolts, and remove the starter.



STARTER ROPE REPLACEMENT

1. Pull the starter rope out, and insert it in the notch of the start-up wheel. Turn the start-up wheel clockwise until the volute spring is free.

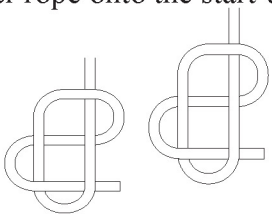


2. Pull the starter rope out completely.

3. Remove the starter handle cover from the starter handle, and remove the starter rope.
   Untie the knot at the end of the starter rope.

4. Pull out the starter rope from the start-up wheel completely.

5. Insert the new starter rope into the starter， and fix the starter rope onto the start-up wheel and starter handle. At the end of the rope tie a knot as shown.



6. Insert the start rope in the notch of the start-up wheel and turn the start-up wheel several rounds in counter clockwise direction.

7. Pull the starter handle many times to check if the start-up wheel rotates stably and if the starter rope is slack. If necessary, repeat step 6 and step 7.

DISASSEMBLING AND INSPECTION

1. Remove the start rope and start frame assy.

2. Remove arrester changeless plate. Remove arrester and arrester pawl.

3. Remove drive plate screw. Remove the drive plate and drive plate spring and drive pawl.

4. Remove the start-up wheel, and remove the volute spring seat and volute spring seat cushion.
⚠**WARNING: Uninstall the start-up wheel carefully, to ensure that the volute spring does not pop out to hurt people**.

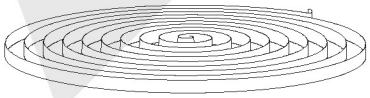
5. Remove the volute spring.

6. Inspect if the arrester and arrester pawl is cracked, worn or damaged. Replace if necessary.

7. Inspect if the drive pawl is cracked, worn or damaged. Replace if necessary.

8. Inspect if the pawl spring is cracked, cranked or damaged. Replace if necessary.

9. Check if the volute spring and volute spring seat are broken, cranked or damaged. Replace if necessary.



ASSEMBLING

Reverse the steps of disassembling starter.

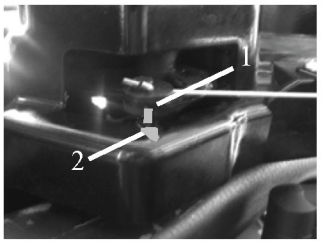
INSTALLATION

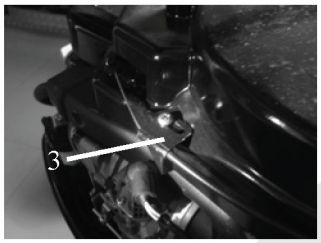
1. Put starter onto the power unit.

2. Screw the hexagon bolt, and tighten it according to the specified torque.

3. Install the arrester tightwire.

4. Adjust the changeless plate on the arrester tightwire, and align the marking of assester pawl with the marking of the starter case.





1. "▉ "marking 2. "▼"marking 3. arrester tightwire changeless plate

IGNITION SYSTEM

NOTICE

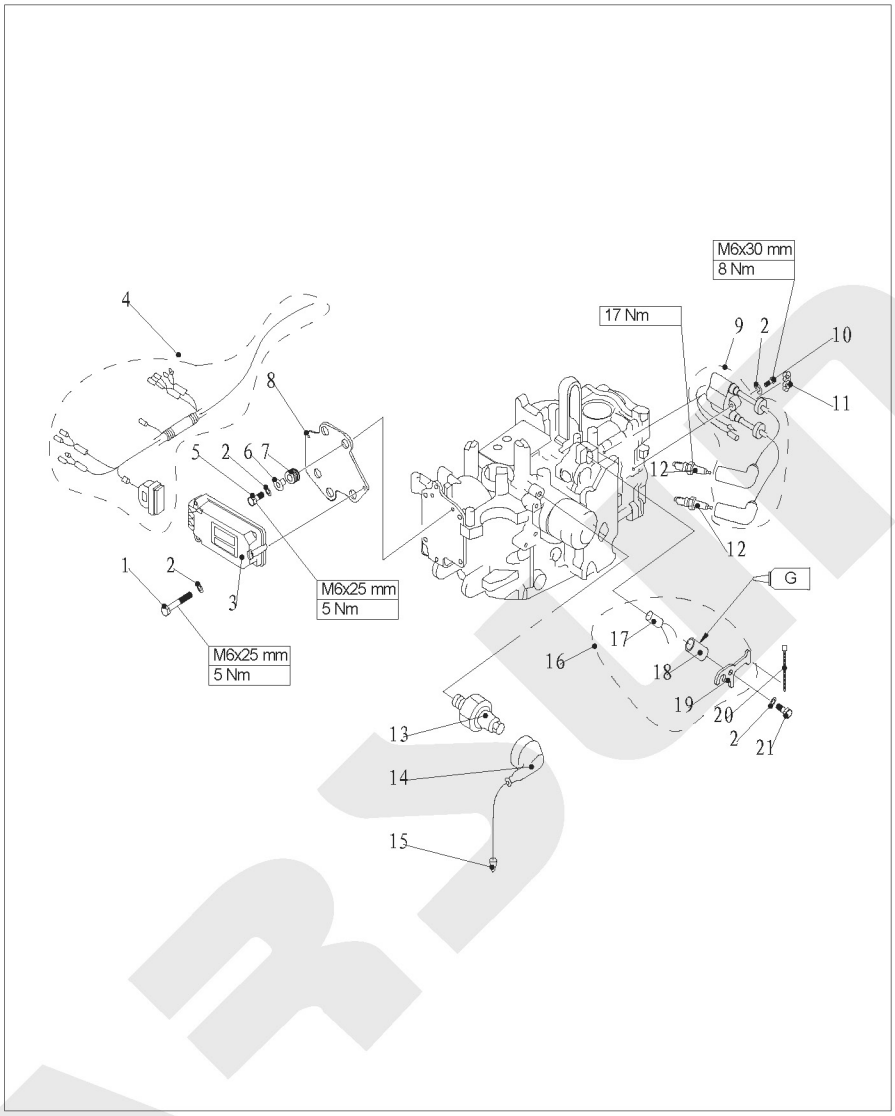
When checking and repairing the ignition system, keep your hand, clothes, hair or personal belongings away from the rotating flywheel.

Check ignition coil on insulated working table, to prevent electricity leak and electroshock.

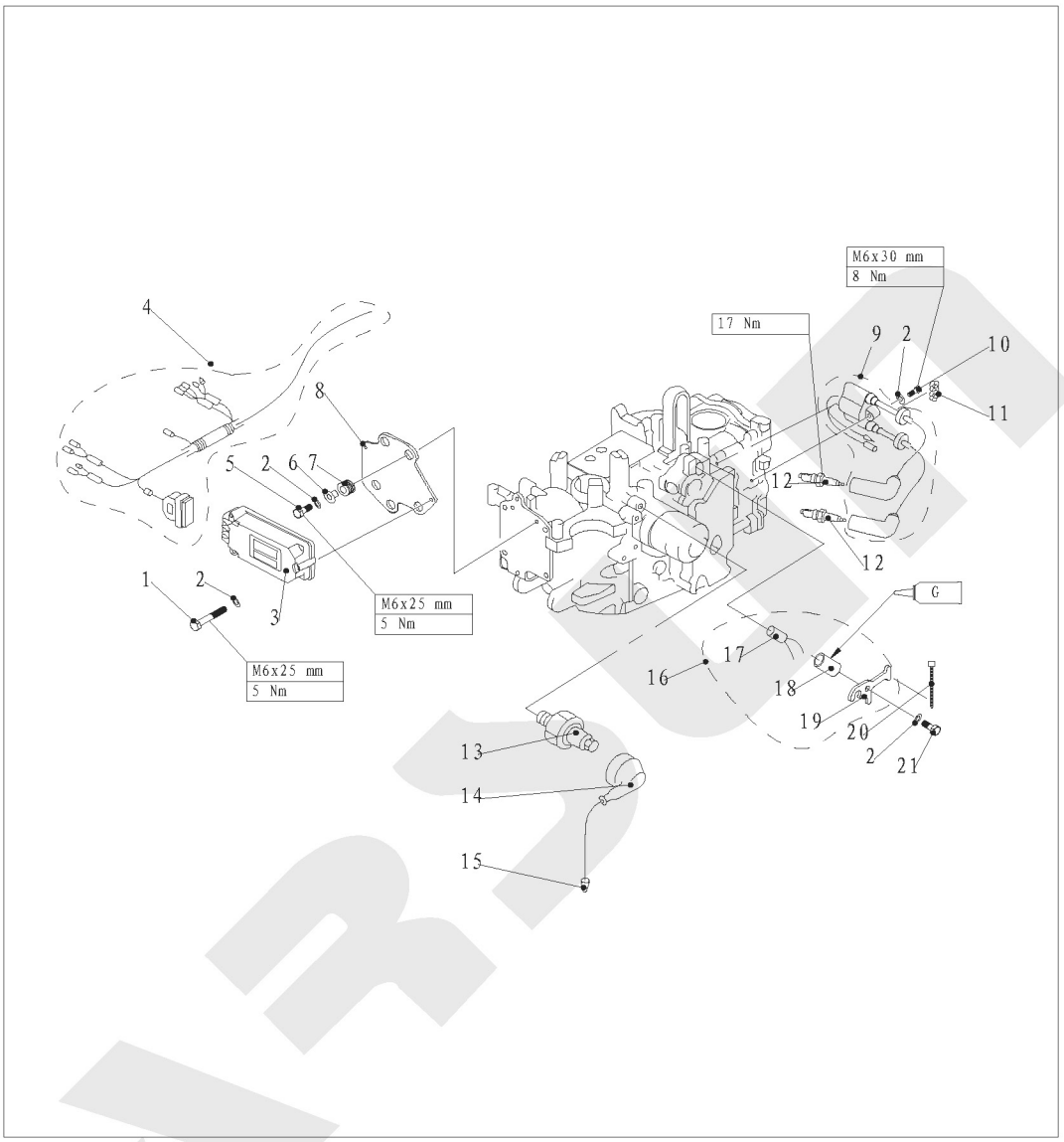
Don't touch the ignition coil or spark plug when the engine is running, to avoid electroshock. Keep the wires away from the rotating flywheel, to prevent the wire from being cut, or the insulating layer of the wire from being worn.

When replacing fixing parts such as nuts and bolts, only parts from original manufacturer or parts made of same material and with strength can be used. Parts must be tightened according to the specified torques.

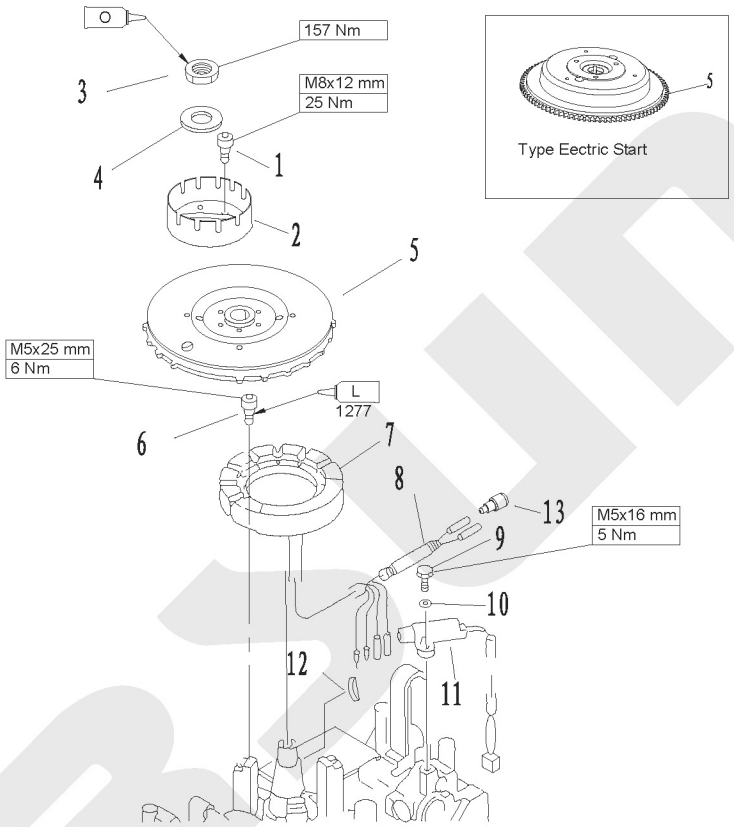
EXPLOSIVE DRAWING



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	GB/T6563-M6x45	六角头自攻锁紧螺钉 M6x45	SCREW , LOCKED M6x45	3	
2	GB/T97.1-6	平垫圈6	WASHER 6	8	
3	F25-05090001	点火模块组件	C.D.I. UNIT ASSY	1	
4	F25-05090002	点火线束组件	C.D.I. LINE ASSY	1	
5	GB/T5783-M6x25	六角螺栓M6x25	BOLT M6x45	3	
6	F25-05090005	点火模块减震圈衬管	BUSH , IGNITION	3	
7	F25-05090004	点火模块减震圈	BUSH , DAMPING	3	

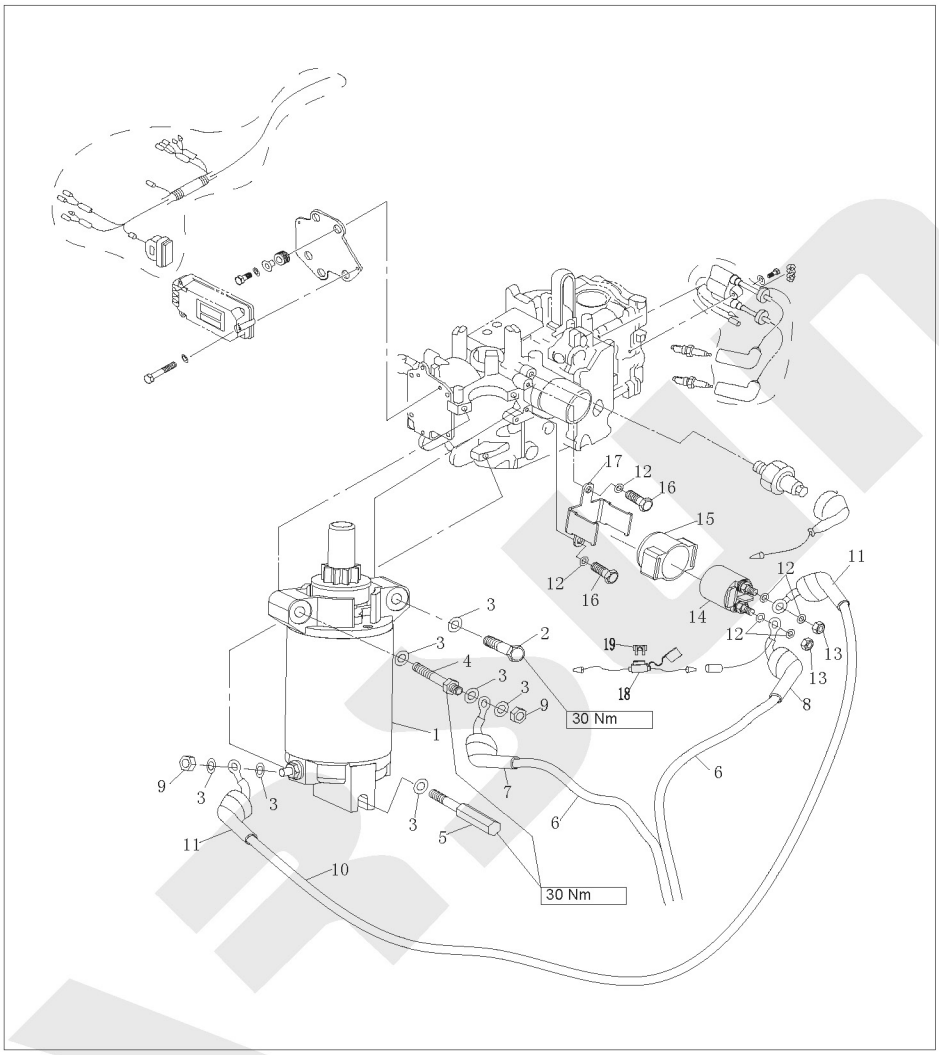


参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
11	F25-05000016	尼龙管夹	CLAMP , NYLON	1	
12	DPR7EA 9 NGK	火花塞	SPARKPLUG	2	
13	F15-07010103	机油压力传感器	OIL PRESSURE SENSOR	1	
14	F15-07010101	绝缘护套	JACKET , INSJULATION	1	
15	F15-07010102	导线组件	LEAD WIRE ASSY	1	
16	F25-05010200	温控器组件	TEMPERATURE CONTROLLER ASSY	1	
17	F25-05010201	温控器	TEMPERATURE CONTROLLER	1	
18	F25-05010202	温控器护套	BUSH, TEMPERATURE CONTROLLER	1	
19	F25-05010203	温控器固定板	PLATE, TEMPERATURE CONTROLLER	1	
20	HT-25x60	尼龙扎带	BAND NYLON 25x60	1	
21	GB/T5783-M6x12	六角螺栓 M6x12	BOLT M6x12	1	



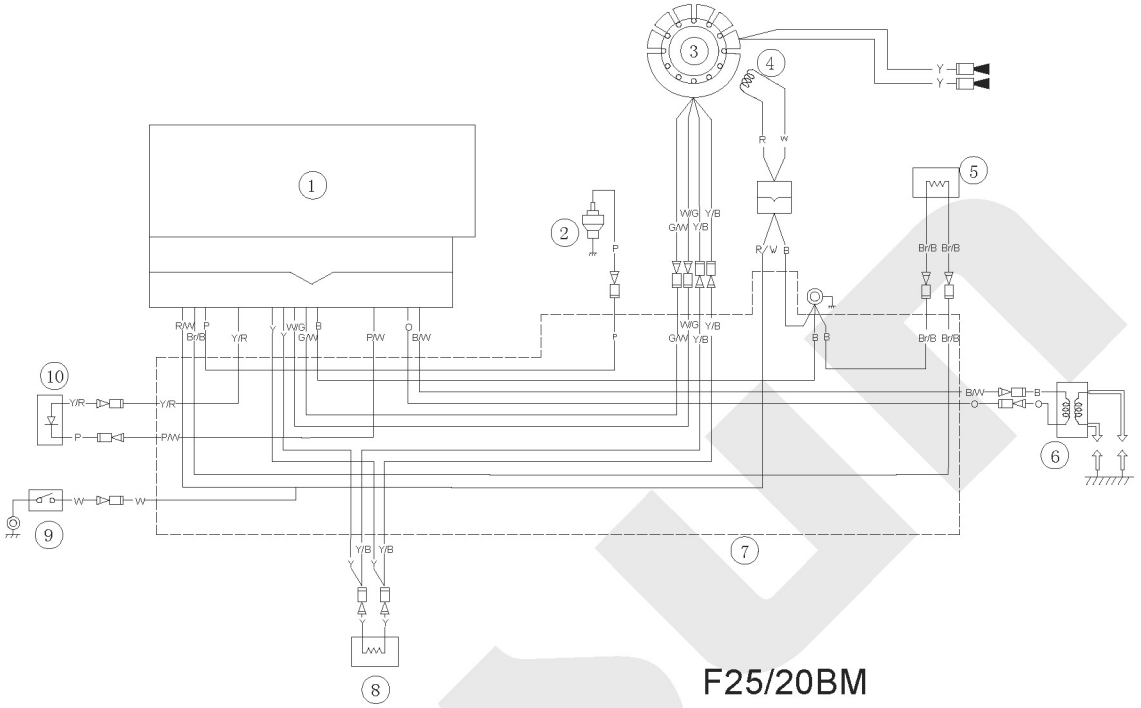
参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	GB/T70.1-M8x12	内六角螺栓M8x12	BOLT M8x12	3	
2	F25-05000027	起动轴套	JUMP START, AXES	1	
3	F25-05000026	飞轮螺母	NUT, FLYWHEEL	1	
4	F25-05000025	飞轮螺母垫圈	WASHER, FLYWHEEL NUT	1	
5	F25-05150000	飞轮组件	FLYWHEEL ASSY	1	
	F25-05150000W	飞轮组件	FLYWHEEL ASSY	1	Type Eectric Start
6	GB/T70.1-M5x25	内六角螺栓M5x25	BOLT M5x25	3	
7	F25-05140000	磁电机线圈组件	STATOR ASSY	1	
8	F25-05000034	波纹管Φ8x90	RIPPLE JACKET	1	
9	GB/T5783-M5x16	六角螺栓M5x16	BOLT M5x16	2	
10	GB/T97.1-5	平垫圈5	WASHER, PLATE 5	2	
11	F25-05110000	触发线圈组件	COIL, PULSER	1	
12	F25-05000024	飞轮半圆键	KEY, SEMISIRCLE FLYWHEEL	1	
13	F25-05110001	绝缘堵头	INSULATED PLUG	2	

Electric start

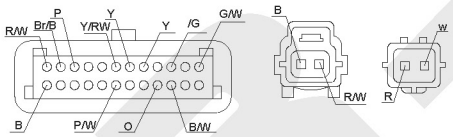


参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	F25-05170100W	启动电机	STARTUP MOTOR	1	
2	GB/T5782-M8×50	六角头螺栓M8×50	HEXAGON BOLT M8X50	1	
3	GB/T97.1-85	平垫圈 8	WASHER 8	7	
4	F25-05170001W	电机固定螺栓M8	FIXATION BOLT, MOTOR	1	
5	F15-07150002W	柱状螺栓M8	COLUMNAR BOLT M8	1	
6	F15-07150200W	电源连接线	LINE, POWER SOURCE	1	
7	F25-05170201W	电源连接线护套A	COVERING A, POWER SOURCE LINE	1	
8	F25-05170202W	电源连接线护套B	COVERING B, POWER SOURCE LINE	1	
9	GB/T6170-M8	六角螺母M8	HEXANGULAR NUT M8	2	
10	F25-05170400W	电机连接线	CONNECTION LINE, MOTOR	1	
11	F25-05170401W	电机连接线护套	JACKET, CONNECTION LINE	2	
12	GB/T97.1-6	平垫圈 6	WASHER 6	6	
13	GB/T6170-M6	六角螺母M6	HEXANGULAR NUT M6	2	HSn62-1
14	F15-07150300W	继电器	RELAY	1	
15	F25-07150301W	继电器护套	RELAY JACKET	1	
16	GB/T5783-M6x12	六角螺栓M6×12	HEXAGON BOLT M6X12	2	
17	F25-07150302W	继电器固定板	PLANK, RELAY	1	
18	F25-05090100W	熔断器组件(JEF-709J)	FUSE ASSY	1	
19	F15-07150001W	保险丝20A	FUSE	1	

WIRING DIAGRAM



F25/20BM

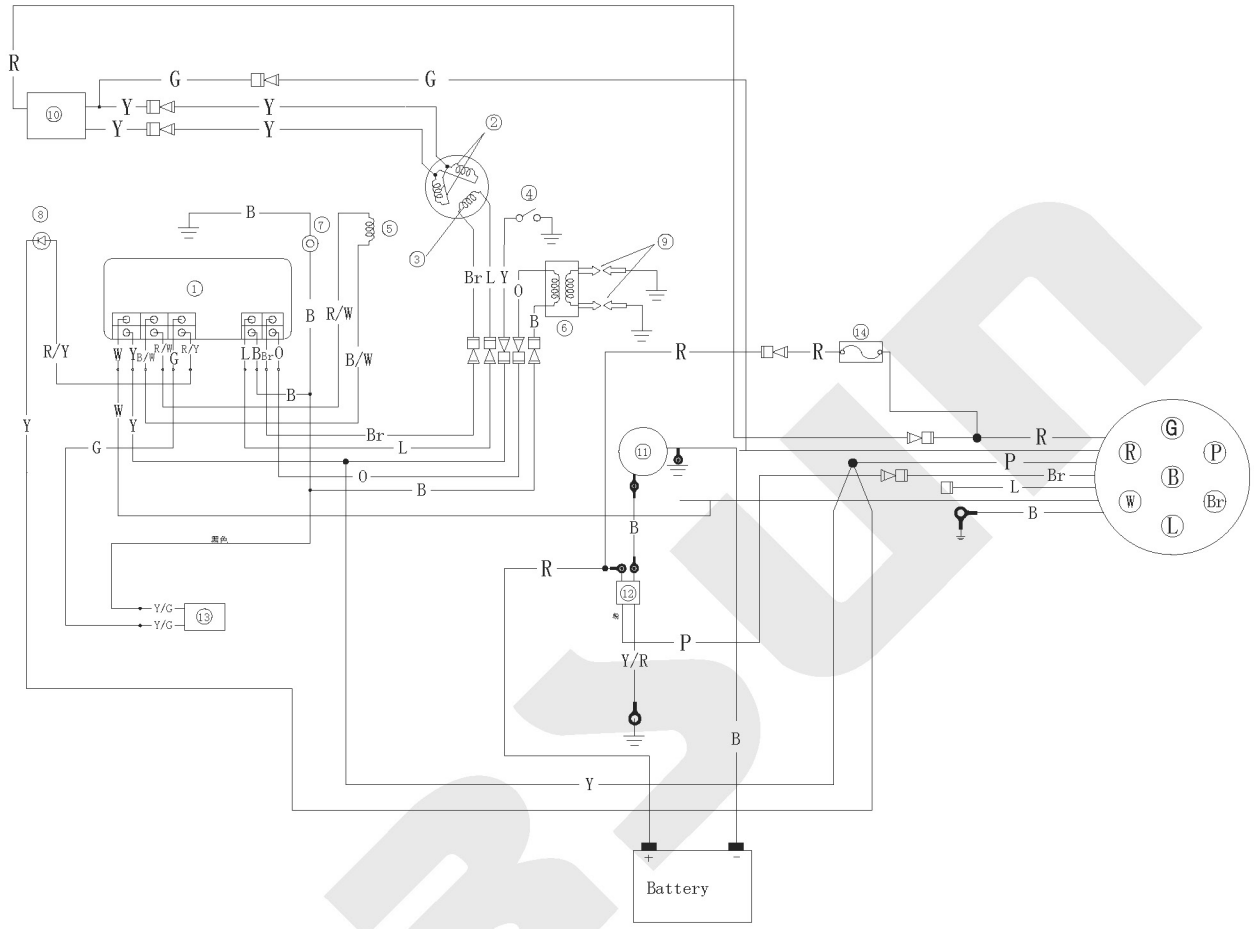


① CDI
② Oil pressure sensor
③ Stator coil
④ Pulsed coil
⑤ Thermostat
⑥ Ignition coil
⑦ CDI line assy
⑧ Initial enrichment valve
⑨ Engine stop switch
⑩ Oil pressure alarm lightt

Wire beam color:

W	White	**P**	Pink	**W/B**	White/Black
B	Black	**G/W**	Green/White	**P/W**	Pink/White
R	Red	**Y/B**	Yellow/Black	**Br/B**	Brown/Black
Y	Yellow	**Y/R**	Yellow/Red	**W/G**	White/Green
O	Orange	**R/W**	Red/White		

Electric start



F25/20FW

① C D I	④ Oil pressure sensor	⑦ Engine stop switch	⑩ Rectifier assy	⑬ Initial enrichment valve
② Charge coil	⑤ Pulsed coil	⑧ Oil pressure alarm light	⑪ Startup motor	⑭ Fuse
③ Lighting coil	⑥ Ignition coil	⑨ Spark plug	⑫ Startup relay	

Wire beam color:

W	White	**L**	Blue
B	Black	**G**	Green
R	Red	**Br**	Brown
Y	Yellow	**Y/R**	Yellow/Red
O	Orange	**R/W**	Red/White

SPARK PLUG IGNITION

1. Remove spark plug cap from spark plug.

2. Connect the ignition tester to the spark plug cap.

3. Start the engine, and observe the sparks through the discharge window of the tester.

⚠WARNING:
Do not touch any joint part of the lead wire of the tester. Keep away from inflammable gas or liquid, to prevent accident resulting from spark ignition.

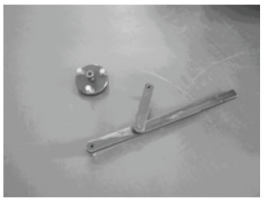
SPARK PLUG CAP

1. Remove the spark plug cap. Check if the spark plug cap is broken. Replace if necessary.

2. Install the spark plug cap.
Turn it clockwise until it is tight.

FLYWHEEL MAINTENANCE

1. Use flywheel gripper to remove the nut and starter bush; use flywheel puller to remove flywheel.



2. Check if the flywheel is damaged or the permanent magnet part is firm. Replace if necessary.

CDI INSPECTION

CDI PEAK VOLTAGE
Use the digital circuit tester and peak voltage adaptor to measure CDI peak voltage.
If below the specification, check the lead wire and measure the impulse and peak voltageoutput of the charge coil.

Digital circuit tester

Peak voltage adaptor

CDI peak voltage output	Start (load)	264V
	1500 r/min	265 V
	3500 r/min	270 V

NOTE:
If the impulse and peak voltage output of the charge coil are just same as or above the specification, and the CDI peak voltage output is below the specification, replace the CDI.

IGNITION COIL INSPECTION

1. Remove the ignition coil and spark plug cap.

2. Measure ignition coil resistance. Replace if out of the specification.
   Resistance: 0.08～0.11 Ω (Tester (+) pole: orange wire; Tester (-) pole: black wire)
   3.4～4.7k Ω (Tester (+) pole: orange wire; Tester (-) pole: high-voltage wire)

PULSED COIL INSPECTION

1. Pulsed coil peak voltage
   Use the digital circuit tester and peak voltage adaptor to measure the peak voltage. If below the specification, check the pulsed coil resistance.


Digital circuit tester Peak voltage adaptor

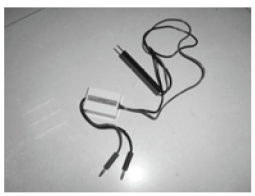
Pulsed coil peak voltage	Start (no-load)	12V
	Start (load)	12V
	1500 r/min (load)	12V
	3500 r/min (load)	12.4V

2. Pulsed coil resistance
   Measure the pulsed coil resistance. Replace if out of specification, replace.
   Resistance: 300～350 Ω (Tester (+) pole: red/white wire; Tester (-) pole: black wire)

Remark:
The data just for reference.

CHARGE COIL INSPECTION

1. Charge coil peak voltage
   Use the digital circuit tester and peak voltage adaptor to measure the peak voltage. If below the specification, check the charge coil resistance.

Digital circuit tester Peak voltage adaptor

Chargecoil peak voltage	Start (no-load)	294V
	Start (load)	291V
	1500 r/min (load)	291V
	3500 r/min (load)	294V

2. Charge coil resistance

   Measure charge coil resistance. Replace if out of specification.

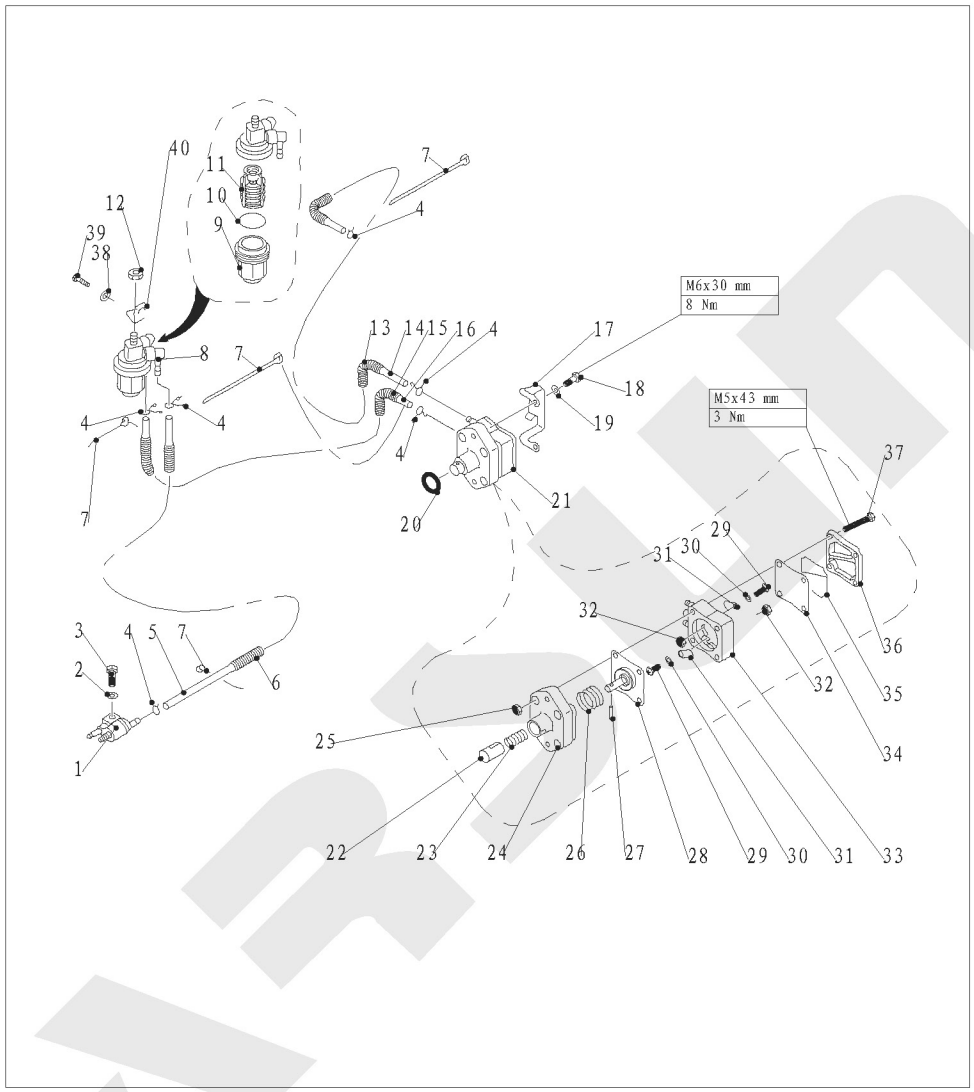
   Resistance: 660～710 Ω (Tester (+) pole: brown wire; Tester (-) pole: blue wire)

FUEL SYSTEM

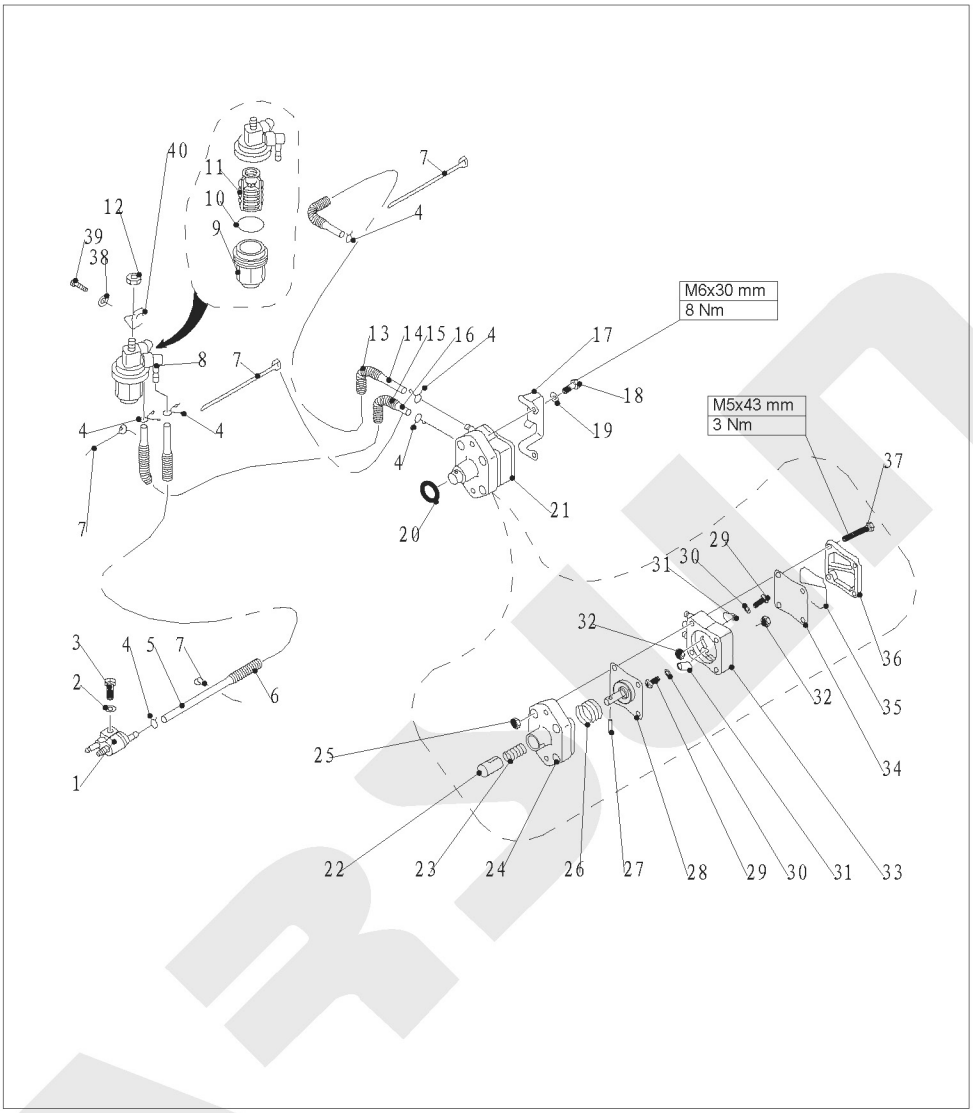
NOTICE

Gasoline is inflammable and highly volatile liquid. Its leakage can cause fire and explosion. Don't start the engine before all joints of the fuel system are connected or installed. When completing all maintenance steps, force short-time pressure to the fuel system to check for leakage.

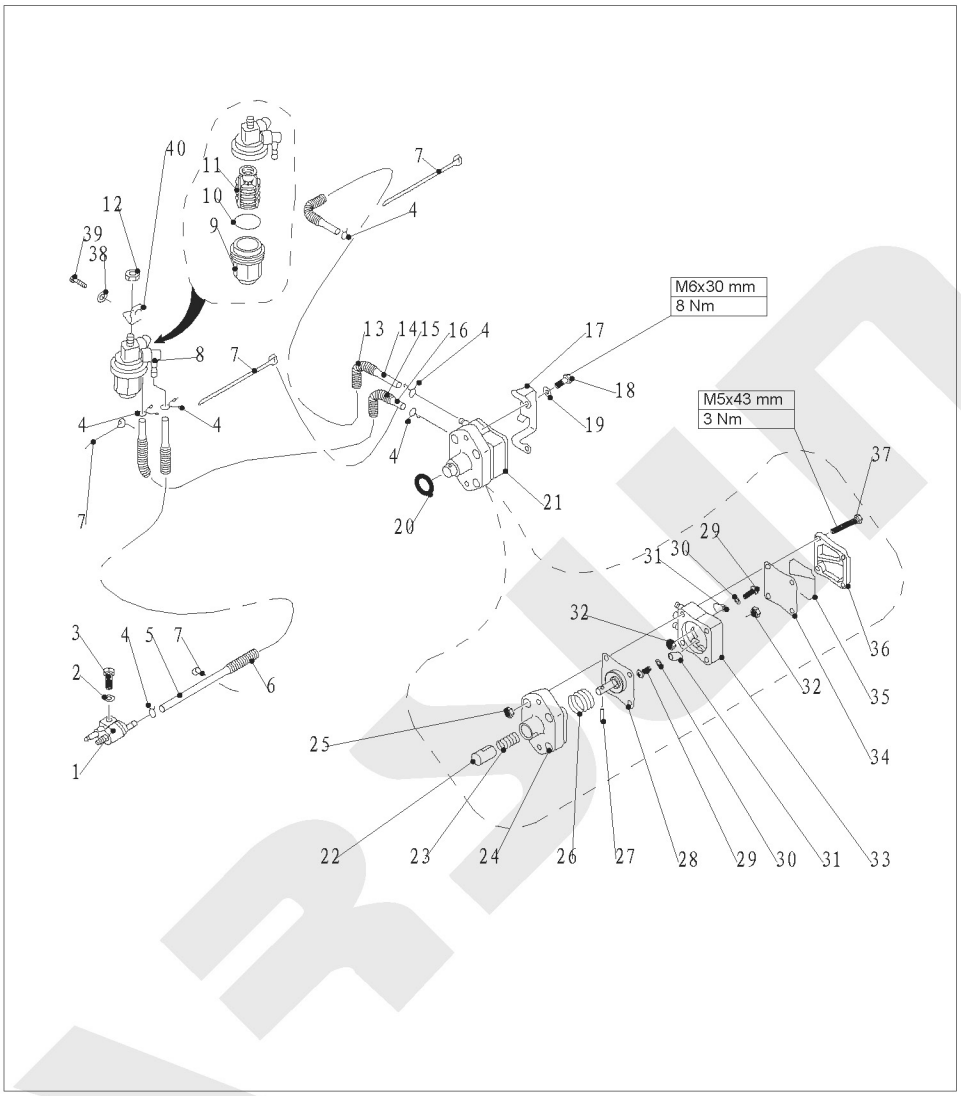
EXPLOSIVE DRAWING



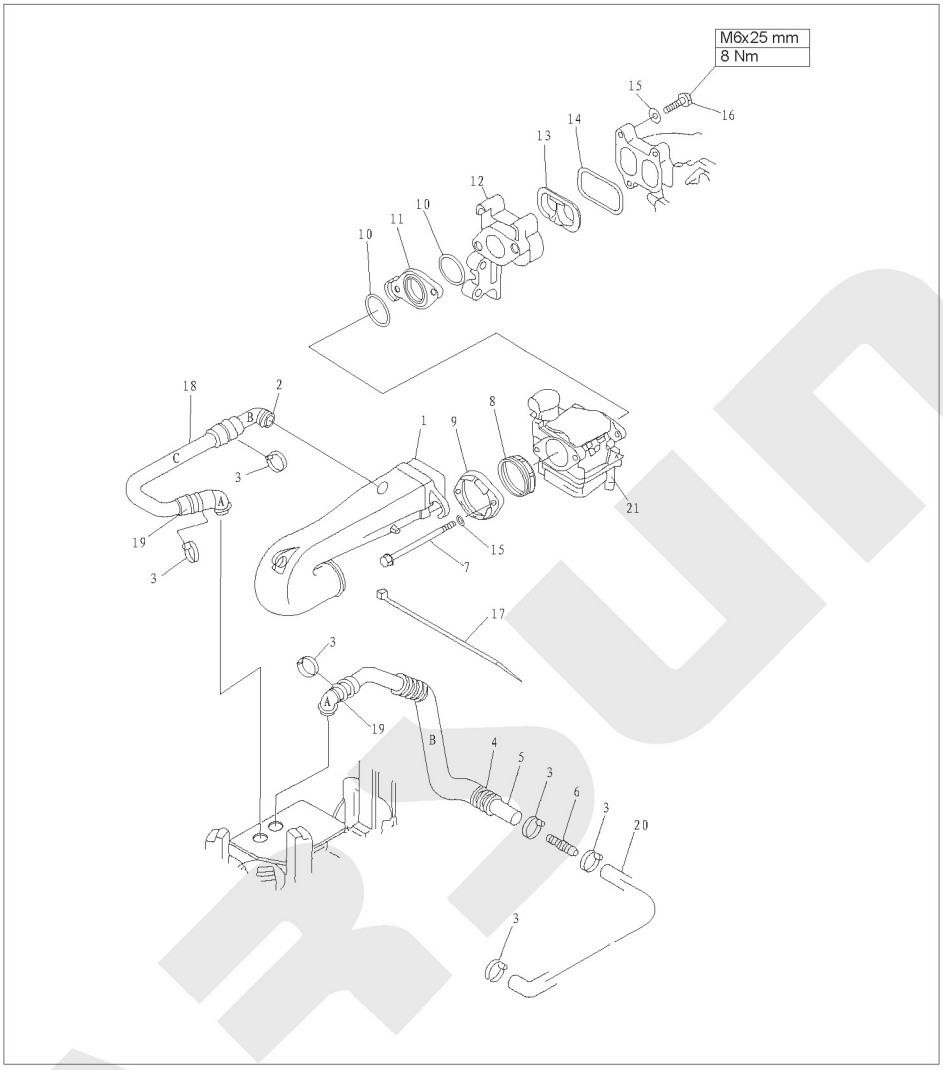
参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	F4-05000200	燃油接头组件	FUEL PIPE TIE-IN ASSY	1	
2	GB/T97.1-6	平垫圈6	WASHER 6	1	
3	GB/T5783-M6x25	六角螺栓M6×25	BOLT M6×25	1	
4	F4-04000030	油管夹簧B	SPRING,FUEL PIPE "B"	5	
5	F25-03000012	燃油管A	PIPE ,FUEL "A"	1	Φ10xΦ5x550
6	F25-03000004	波纹护套	PIPE, WAVE	1	Φ12x120
7	HT-2.5×60	尼龙扎带 2.5×60	CLAMP 2.5×60	6	
8	F15-07080000	滤油杯组件	FILTER ASSY	1	
9	F15-07080002	滤杯	CUP ,FILTER	1	
10	GB/T3452.1-32.5x1.8	滤杯密封圈φ32.5x1.8	WASHER ,CUP FILTER 32.5x1.8	1	
11	F15-07080001	滤网架	ELEMENT, FILTER	1	
12	GB/T6170-M8	六角螺母M8	NUT M8	1	



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
13	F25-05000029	波纹管	PIPE, WAVE	1	Φ12x300
14	F25-05000012	燃油管	PIPE, FUEL	1	Φ10xΦ5x350
15	F25-05000033	波纹管	PIPE, WAVE	1	Φ12x120
16	F25-05000032	油泵燃油管(进)	HOSE	1	
17	F25-05000018	燃油泵固定架	BRACKET, FASTNESS	1	
18	GB/T5783-M6x30	六角螺栓M6x30	BOLT M6x30	2	
19	GB/T97.1-6	平垫圈6	WASHER 6	2	
20	JB/T7757.2-24.7-3.1	O形橡胶密封圈24.7x3.1	O-RING 24.7x3.1	1	
21	F25-05130000	燃油泵组件	FUEL PUMP ASSY	1	
22	F25-05130004	柱塞	PLUNGER	1	
23	F25-05130003	柱塞弹簧	SPRING ,PLUNGER	1	
24	F25-05130001	燃油泵座	SEAT,FUEL PUMP	1	
25	GB/T6170-M5	六角螺母M5	NUT M5	4	
26	F25-05130002	隔膜弹簧	SPRING,DIAP HRAGM	1	
27	GB/T309-3x16.5	滚针Φ3x16.5	ROLLER NEEDLE 3x16.5	1	
28	F25-05130100	隔膜轴组件	DIAP HRAGM ASSY	1	
29	F4-04090011	阀片螺钉M3x5	SCREW, VALVE M3x5	2	



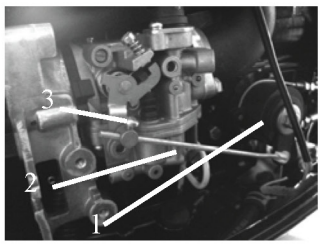
参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
30	GB/T848-3	小垫圈3	SMALL WASHER 3	2	
31	F4-04090005	单向阀片	PLATE	2	
32	GB/T6170-M3	六角螺母M3	NUT 3	2	
33	F25-05130201	燃油泵壳	FUEL PUMP SHELL	1	
34	F25-05130005	上隔膜	DIAPHRAGM, TOP	1	
35	F25-05130006	燃油泵盖密封圈	SEAL ,FUEL PUMP	1	
36	F25-05130007	燃油泵盖	COVER, FUEL PUMP	1	
37	GB/T818-M5x45	十字槽盘头螺钉M5x45	SCREW, PAN HEAD M5x45	4	
38	GB/T97.1-8	平垫圈8	WASHER 8	1	
39	GB/T5783-M8x14	六角螺栓M8×14	BOLT M8×14	1	
40	F25-05000017	滤油杯支架	BRACKET ,FILTER CUP	1	



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	F25-05080100	进气消音器组件	SILENCER ASSY, INTAKE	1	
2	F25-05080009	回气管橡胶接头B	BREATHER ASSY	1	
3	HT-3.6x150	尼龙扎带	CLAMP	6	
4	F25-05000031	波纹管 φ20x250	HOSE	1	
5	F25-05080006	回气管B	HOSE	1	
6	F25-02000018	回气管接头A	PIPE, JOINT	1	
7	GB/T5782-M6x100	六角螺栓 M6X100	BOLT, HEXAGON M6x100	2	
8	F25-05080004	进气消音器橡胶圈	RUBBER, SEAL	1	
9	F25-05080005	进气消音器法兰	FLANGE	1	
10	F25-05000011	化油器垫块O形圈	O-RING	2	
11	F25-05000009	化油器垫块	INSULATOR	1	
12	F25-05060001	进气歧管座	MANIFOLD	1	
13	F25-05060002	进气分流板	INSERT	1	
14	F25-05060003	进气歧管座密封圈	GASKET, MANIFOLD	1	
15	GB/T97.1-6	平垫圈6	WASHER 6	5	
16	GB/T5783-M6x25	六角螺栓 M6X25	BOLT, HEXAGON M6X25	3	
17	HT-3.6x250	尼龙扎带3.6x250	CLAMP 3.6x250	1	
18	F25-05080008	回气管C	HOSE	1	
19	F25-05080007	回气管橡胶接头A	BREATHER ASSY	2	
20	F25-02000017	回气管A	HOSE	1	
21	F25-05070000	化油器总成	CARBURETOR ASSY	1	

THROTTLE CONNECTING ROD ADJUSTMENT

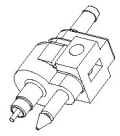
1. Turn throttle accelerograph enforce to full opening position.Turn carburetor throttle rod to full opening position
   1. Throttle accelerograh enforce
   2. Carburetor throttle rod
   3. Lock screw



2. In full opening position, tighten the throttle rod lock screw

FUEL JOINT REMOVAL AND INSPECTION

1. Remove the bolts fixing the fuel joint.
2. Remove the fuel joint.
3. Inspect the fuel joint for crack or damage.



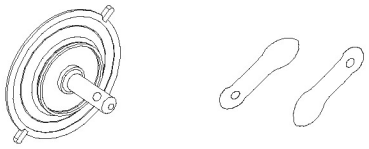
4. Connect the fuel joint exit with a vacuum pressure gauge.
5. Check whether the negative pressure can be maintained for over 10 minutes under the prescribed pressure. Replace if necessary.
   Prescribed pressure: 50kPa

FUEL PUMP REMOVAL AND INSPECTION

1. Remove the bolts fixing the fuel pump.
2. Remove the fuel pump.
3. Connect the fuel pump intake with a vacuum pressure gauge.
4. Block the exit of fuel pump with finger, and force a prescribed positive pressure to check for leakage.
   Prescribed pressure: 50kPa
5. Force a prescribed negative pressure and check for leakage.
   Prescribed pressure: 50kPa
6. Connect the fuel pump exit with a vacuum pressure gauge.
7. Force a prescribed negative pressure and check for leakage. Disassemble the fuel pump to check if necessary.
   Prescribed pressure: 50kPa
8. Remove four bolts, and separate fuel pump cover from fuel pump seat.
9. Remove the valve screw from fuel pump, and remove the valve plate.

10. Press the plunger and diaphragm, rotate the fuel pump seat, and align the notch with the notch on the plunger. Take the roller needle out.

11. Inspect the diaphragm for crack and valve for damage. Replace if necessary.

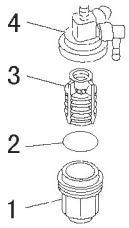


12. Reverse above step 8 to step 10 to install the fuel pump.

FILTER INSPECTION

Check if the filter element is clogged or with foreign matter. Check the filter cup for damage or leakage. Use gasoline to clean it, or replace if necessary.

NOTE:
Coat a layer of gasoline onto the O-ring before installing the filter cup.



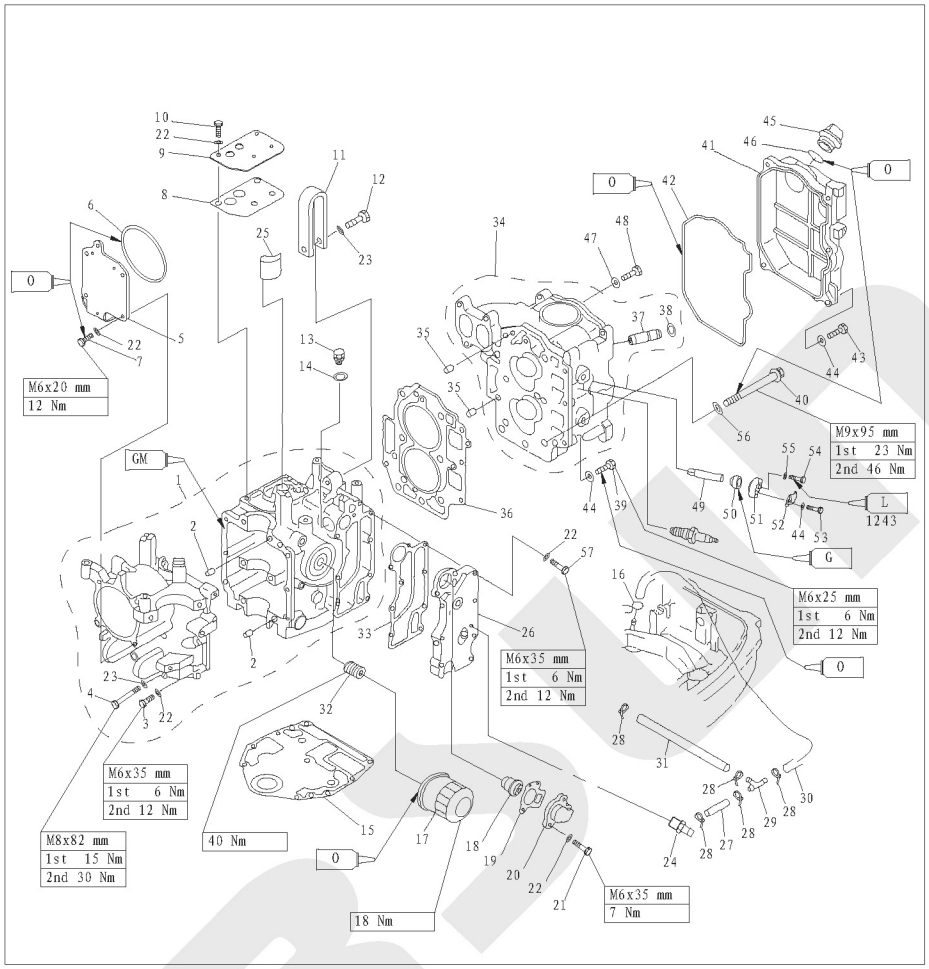
1. Filter cup
2. O-ring
3. Filter element
4. Filter cap

POWER UNIT

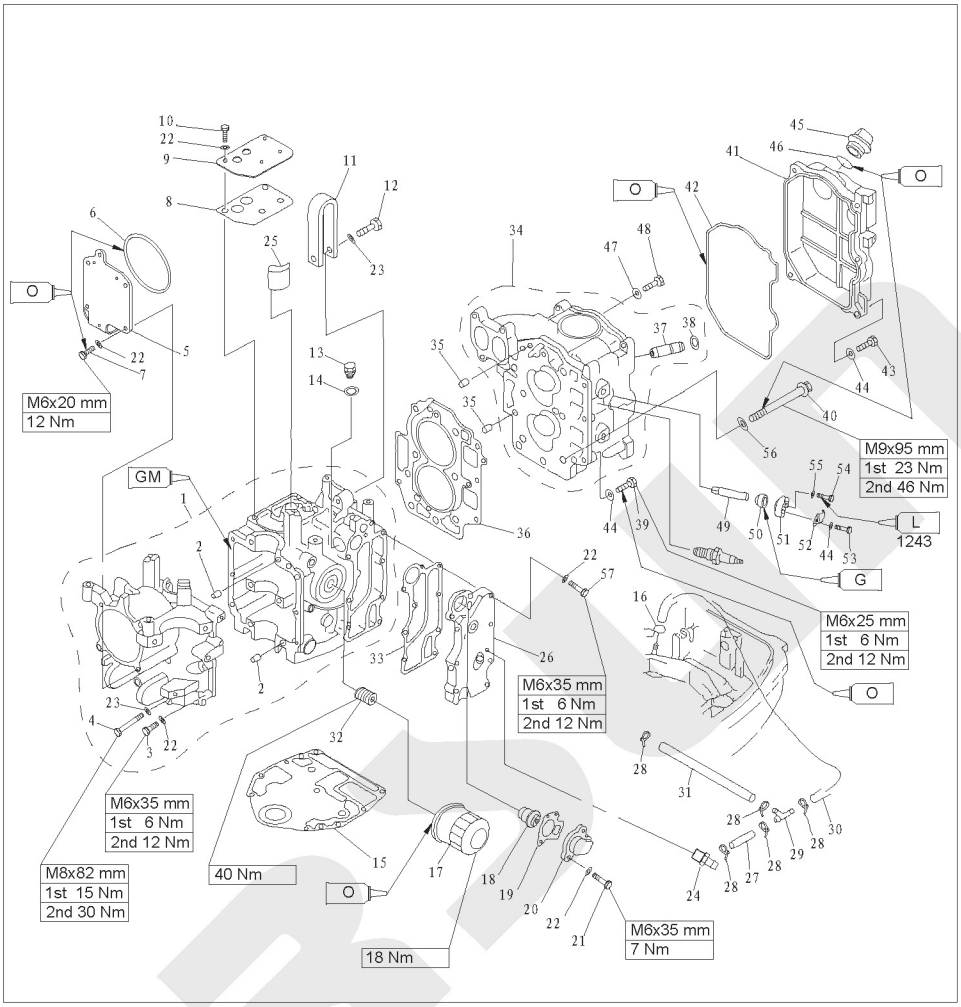
NOTICE

To avoid accidental start of outboard engine during maintenance, please take enough safety measures to disconnect the ignition system. For instance, remove the engine stop lanyard from engine stop switch assembly, and remove spark plug cap from spark plug.

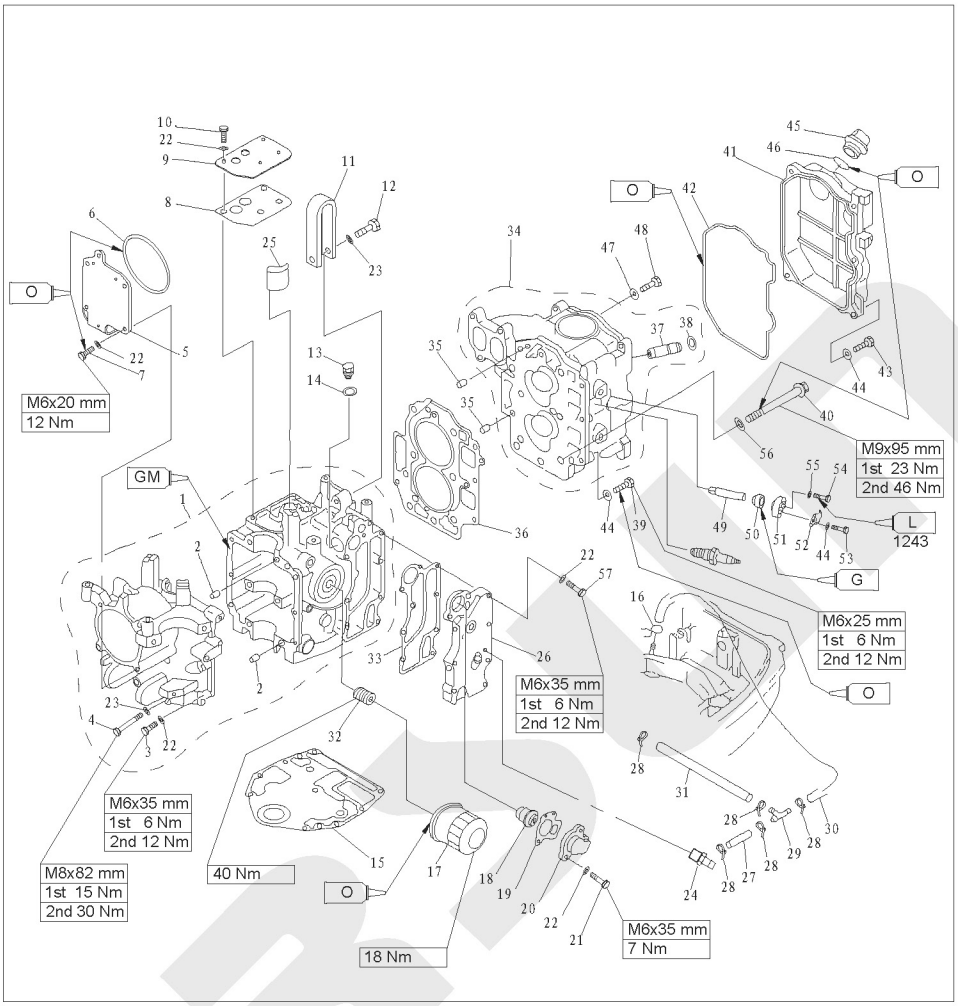
EXPLOSIVE DRAWING



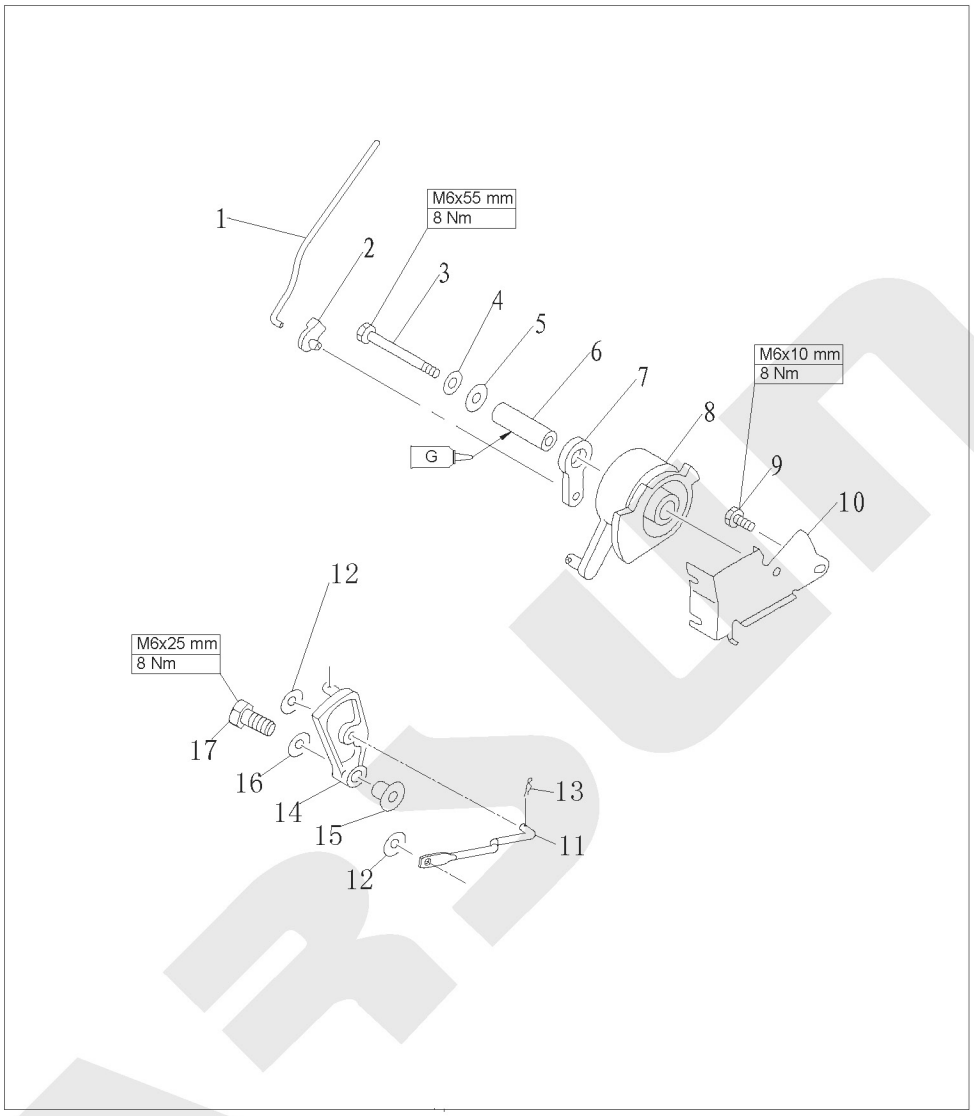
参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	F25-05010000	机体机座组件	CRANKCASE ASSY	1	
2	F25-00000014	定位销φ8x12	PIN, DOWEL	2	
3	GB/T5782-M6x35	六角螺栓M6X35	BOLT, HEXAGON M6x35	6	
4	GB/T5782-M8x80	六角螺栓M8X80	BOLT, HEXAGON M8x80	6	
5	F25-05000007	平衡缸盖板	BALANCE CYLINDER COVER	1	
6	F25-05000010	0型圈 97.5x1.9	SEAL 97.5x1.9	1	
7	GB/T5783-M6x20	六角螺栓M6X20	BOLT, HEXAGON M6x20	4	
8	F25-05010108	呼吸器橡胶密封垫	GASKET, BREATHER COVER	1	
9	F25-05010109	呼吸器盖板	COVER, BREATHER	1	
10	GB/T5783-M6x20	六角螺栓M6X20	BOLT, HEXAGON M6x20	4	
11	F25-05010106	发动机悬挂钩	HANGER, ENGINE	1	
12	GB/T5782-M8x35	六角螺栓 M8X35	BOLT HEXAGON M8x35	1	
13	F15-04000002	放油螺栓	BOLT, OIL DRAIN	1	
14	F15-04000003	放油螺栓垫片	WASHER	1	
15	F25-00000013	发动机密封垫	GASKET, ENGINE	1	
16	F4-04000030	油管夹簧B	SPRING, FUEL PIPE"B"	1	
17	F15-07010023	机油滤清器	OIL CLEANER	1	
18	F4-04000036	节温器	THERMOSTAT	1	



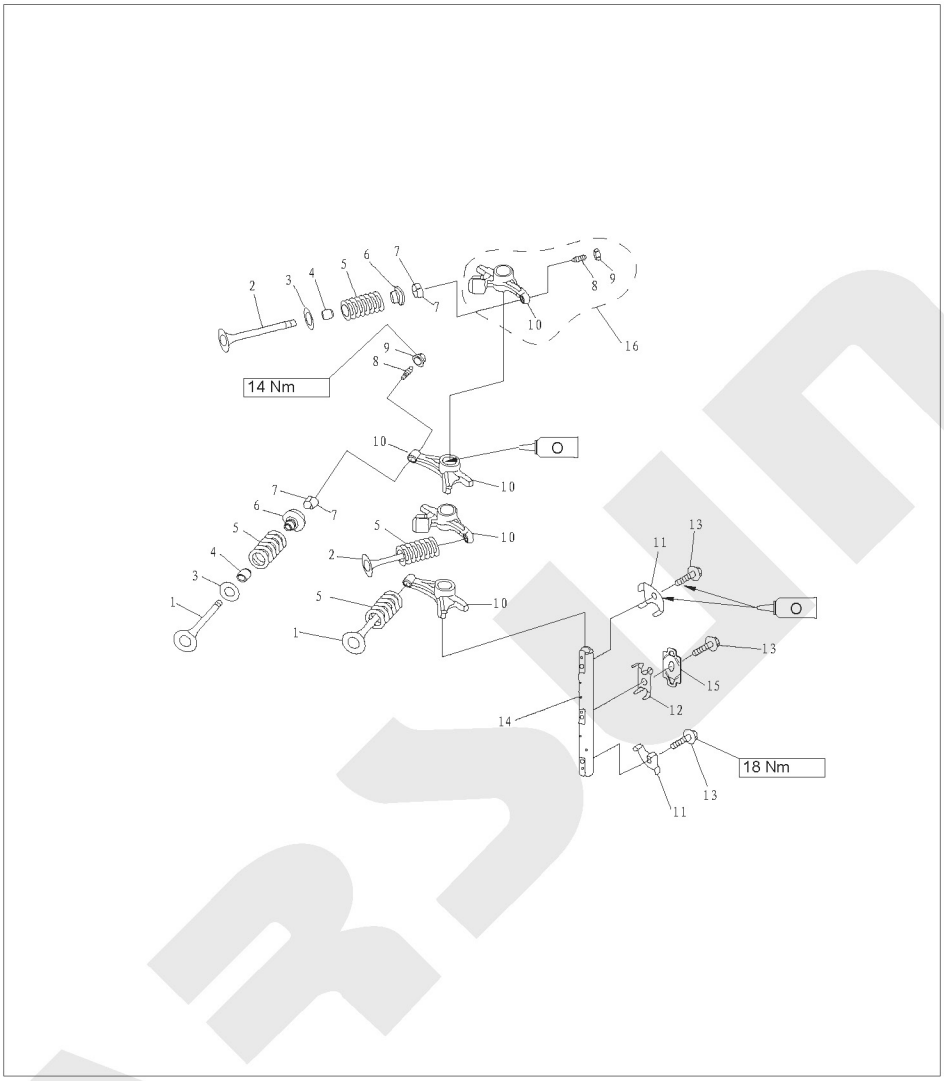
参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
19	F15-07010022	节温器垫	GASKET, THERMOSTAT	1	
20	F15-07010021	节温器盖板	COVER, THERMOSTAT	1	
21	GB/T5783-M6x25	六角螺栓M6X25	BOLT M6x25	2	
22	GB/T97.1-6	平垫圈6	WASHER 6	17	
23	GB/T97.1-8	平垫圈8	WASHER 8	7	
24	F25-05010113	出水嘴接头	NIPPLE, HOSE	1	
25	F25-05010107	呼吸器滤网	CLEANER	1	
26	F25-05010112	排气盖板	OUTER COVER, EXHAUST	1	
27	F25-03000008	水管A	HOSE	1	
28	HT-2.5x60	尼龙扎带	CLAMP	5	
29	F15-05000011	三通	THREE-WAY PIPE	1	
30	F25-03000011	水管C	HOSE	1	
31	F25-03000009	水管B	HOSE	1	
32	F15-07010003	机滤螺柱	BOLT, UNION	1	
33	F25-05010111	排气盖板密封垫	GASKET, EXHAUST OUTER COVER	1	
34	F25-05050100	气缸头组件	CYLINDER HEAD ASSY	1	
35	F25-00000014	定位销 ϕ8x12	PIN, DOWEL	2	
36	F25-05040000	气缸垫组件	GASKET, CYLINDER HEAD	1	
37	F25-05050104	气门导管	VALVE GUIDE BUSH	4	
38	F15-07040105	气门导管卡簧	CIRCLIP, GUIDE BUSH	4	
39	GB/T5783-M6X25	六角头螺栓M6X25	BOLT, HEXAGON M6X25	3	
40	F25-05000002	六角头凸缘螺栓M9X95	BOLT, FLANGE	6	



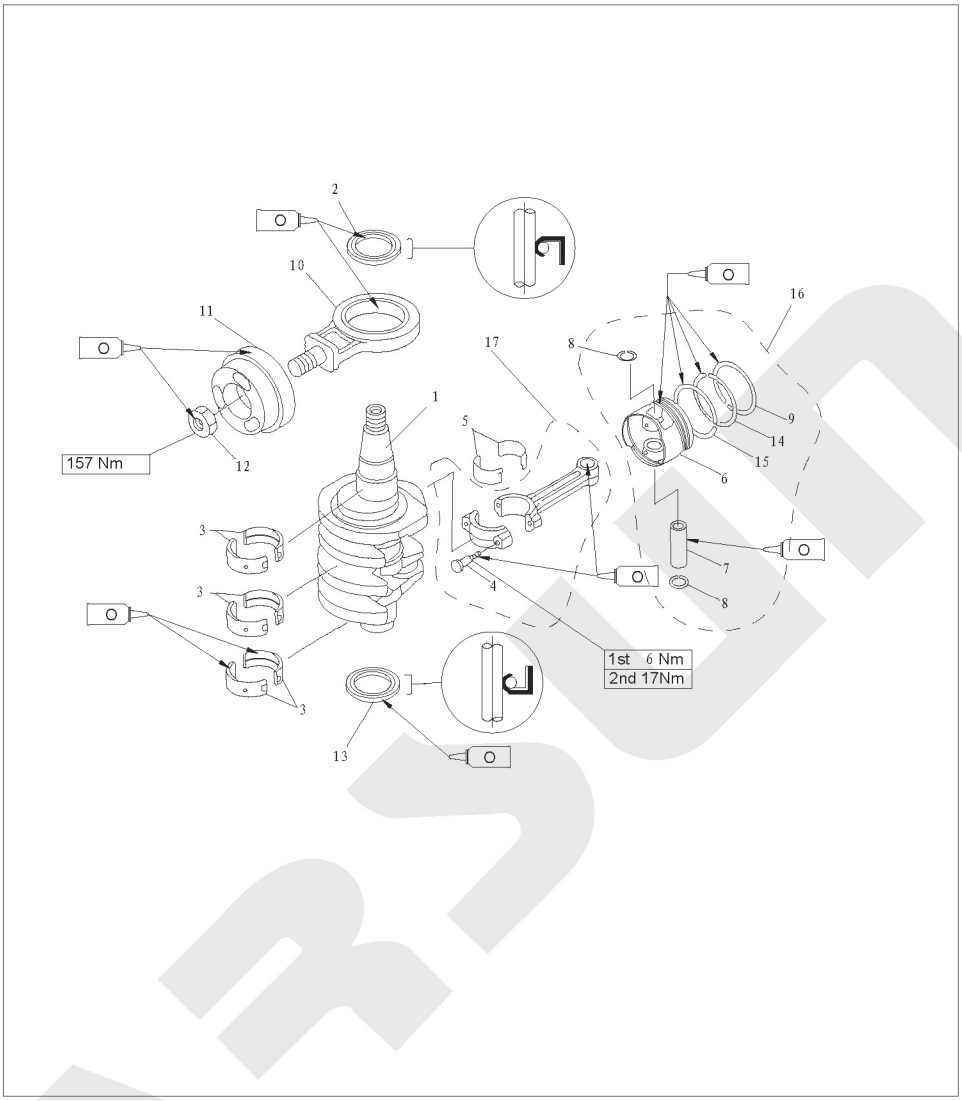
参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
41	F25-05000005	气缸头罩	COVER, CYLINDER HEAD	1	
42	F25-05000004	气缸头罩密封圈	SEAL, CYLINDER COVER	1	
43	GB/T5783-M6X20	六角头螺栓M6X20	BOLT, HEXAGON M6X20	5	
44	GB/T97.1-6	平垫圈6	WASHER, PLATE 6	10	
45	F15-07050004	加油口盖	PLUG, OIL	1	
46	JASO F404 31-025	加油口盖O形圈 31-025	O-RING 31-025	1	
47	F25-05050007	凸轮轴限位螺栓垫片	GASKET	1	
48	F25-05050006	凸轮轴限位螺栓	BOLT	1	
49	F25-02010005	阳极	ANODE	2	
50	F15-07010009	阳极密封圈	GROMMET, ANODE	2	
51	F15-07010011	阳极盖板	COVER, ANODE	2	
52	F15-07010012	阳极锁止片	PLATE, ANODE	2	
53	GB/T5783-M6X20	六角螺栓M6X20	BOLT, HEXAGON M6X20	2	
54	GB/T5783-M5X12	六角螺栓M5X12	BOLT, HEXAGON M5X12	2	
55	GB/T97.1-5	平垫圈5	WASHER, PLATE 5	2	
56	F25-05000003	平垫圈9	WASHER, PLATE 9	6	
57	GB/T5783-M6X35	六角螺栓M6X35	BOLT M6X35	7	



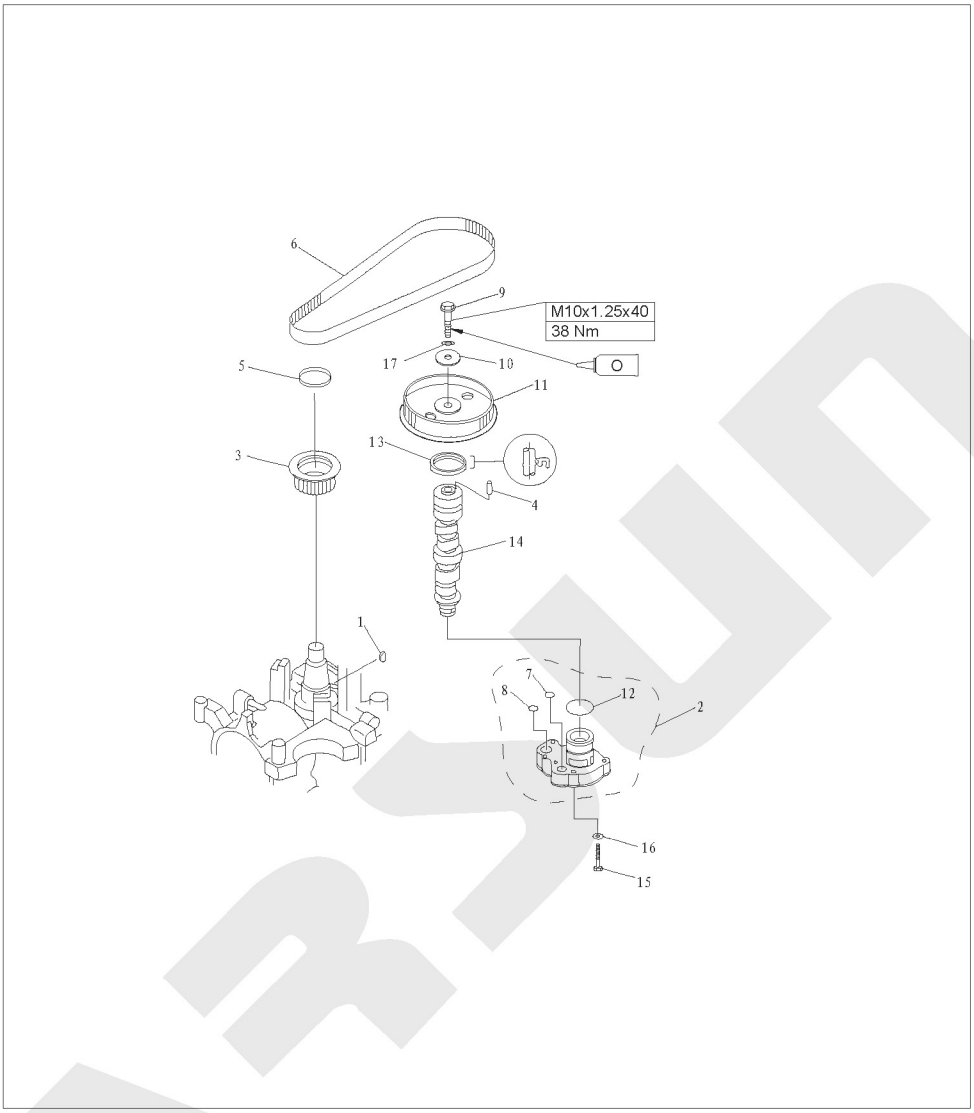
参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	F25-05000008	油门控制器连杆	LINK , ACCELEROGRAPH CONTROL	1	
2	F15-07000016	油门控制器连杆接头	JOINT ACCELEROGRAPH CONTROL	1	
3	GB/T5782-M6x55	六角螺栓M6x55	BOLT M6x55	1	
4	GB/T97.1-6	平垫圈6	WASHER 6	6	
5	GB/T96-6	大垫圈6	LARGE WASHER 6	1	
6	F15-07000012	油门执行器衬管	BUSH , ACCELEROGRAPH ENFORCE	1	
7	F15-07000014	油门执行器从动滑轮	PULLEY , PASSIVITY	1	
8	F15-07000013	油门执行器主动滑轮	PULLEY , DRIVE	1	
9	GB/T5783-M6x10	六角螺栓M6x10	BOLT M6x10	1	
10	F15-07000011	控制钢索固定架	BRACKET , CONTROL TIGHTWIRE	1	
11	F25-03030004W	变挡连接杆B	LINK ROD , SHIFT	1	Type Electric Start
12	GB/T96-5	大垫圈 5	BIG WASHER 5	2	Type Electric Start
13	F25-05160002	夹簧 φ1	SPRING	1	Type Electric Start
14	F25-03000027W	变挡限位板	PLATE , SHIFT	1	Type Electric Start
15	F25-03000028W	限位板衬管	BUSH , LIMITED PLATE	1	Type Electric Start
16	GB/T5287-6	特大垫圈 6	SUPPER WASHER 6	1	Type Electric Start
17	GB/T5783-M6x25	六角螺栓M6×25	BOLT M6X25	1	Type Electric Start



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	F25-05050001	进气门	VALVE, INTAKE	2	
2	F25-05050002	排气门	VALVE, EXHAUST	2	
3	F25-05050003	气门弹簧垫圈	SEAL, VALVE SPRING	4	
4	PS-2700.04.03	气门油封	SEAL, VALVE STEM	4	
5	F25-05050005	气门弹簧	SPRING, VALVE	4	
6	F15-07040006	气门弹簧座圈	RETAINER, VALVE SPRINGRE	4	
7	F15-07040007	气门弹簧卡圈	COTTER, VALVE	8	
8	F15-07040303	调整螺钉	SCREW, VALVE ADJUSTING	1x4	
9	F15-07040304	调整螺母	NUT	1x4	
10	F25-05050301	摇臂	ROCKER	1x4	
11	F25-05050009	摇臂轴固定板A	PLATE A, BOLT STOPPER	2	
12	F25-05050011	摇臂轴限位弹簧板	SPRING	1	
13	F25-05050019	摇臂轴六角法兰螺栓	BOLT	3	
14	F25-05050008	摇臂轴	SHAFT, ROCKER	1	
15	F25-05050012	摇臂轴固定板B	PLATE B, BOLT STOPPER	1	
16	F25-05050300	摇臂组件	ROCKER ASSY	4	

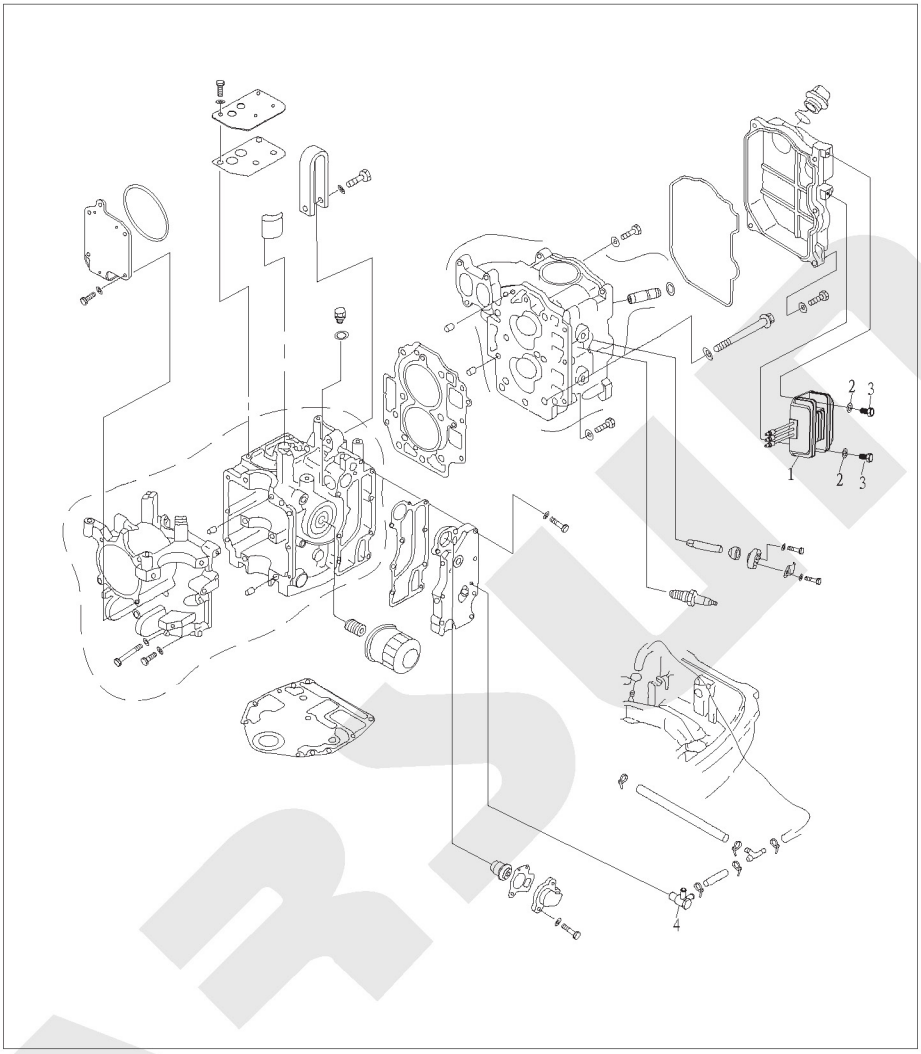


参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	F25-05020001	曲轴	CRANK SHAFT	1	
2	F25-05020002	曲轴油封 B	OIL SEAL B	1	
3	F25-05010302-1	曲轴轴瓦	MAIN BEARING	6	
	F25-05010302-2	曲轴轴瓦	MAIN BEARING	6	UR: BROWN
4	F25-05020204	连杆螺栓	BOLT, CONNECTING ROD	2	
5	F25-05020203-1	连杆轴瓦	PLANE BEARING, CONNECTING ROD	2	UR: BLACK
	F25-05020203-2	连杆轴瓦	PLANE BEARING, CONNECTING ROD	2	
6	F25-05020101	活塞	PISTON	2	
7	F25-05020105	活塞销	PIN, PISTON	2	
8	F25-05020106	活塞销挡圈	CIRCLIP	4	
9	F25-05020102	活塞环I	PISTON RING I	2	
10	F25-05020310	平衡缸连杆组件	CON-ROD ASSY, BALANCE	1	
11	F25-05020301	平衡缸活塞	PISTON, BALANCE	1	
12	F25-05000026	飞轮螺母	NUT	1	
13	F25-05020002	曲轴油封 A	OIL SEAL A	1	
14	F25-05020103	活塞环II	PISTON RING II	2	
15	F25-05020104	组合油环	COMBINA OIL RING	2	
16	F25-05020100	活塞组件	PISTON ASSY	2	
17	F25-05020200	连杆组件	ROD, CONNECTING	2	



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	F4-04000019	半圆键	KEY, WOODRUFF	1	4x5.3x13
2	F25-05050400	机油泵组件	OIL PUMP ASSY	1	
3	F25-05000021	正时带轮	BELT PULLEY, TIMING	1	
4	F25-05050016	从动轮定位销	PIN, DOWEL	1	5x3.8
5	F25-05000022	正时带轮垫圈	BUSH, SPRING	1	
6	F25-05000023	正时皮带	BELT, TIMING	1	
7	F25-05050013	机油泵O形圈A	O-RING A	1	11.6x1.22
8	F25-05050014	机油泵O形圈B	O-RING B	1	13.8x1.9
9	GB/T5785-M10x1.25x40	六角螺栓 M10x1.25x40	BOLT M10x1.25x40	1	
10	F25-05050018	从动轮垫圈	WASHER, PLATE	1	
11	F25-05050017	从动轮	BELT PULLEY, DRIVEN	1	33.5x1.9
12	F25-05050015	机油泵O形圈C	O-RING C	1	
13	F25-05050021	凸轮轴油封 37X50X7R	OIL SEAL 37X50X7R	1	
14	F25-05050200	凸轮轴组件	CAMSHAFT ASSY	1	
15	GB/T5782-M6x35	六角螺栓M6x35	BOLT M6x35	4	
16	GB/T97.1-6	平垫圈6	WASHER, PLATE 6	4	
17	GB/T97.1-10	平垫圈10	WASHER, PLATE 10	1	

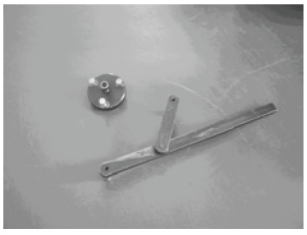
Electrical start type



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	F25-05170500W	整流器组件	RECTIFIER ASSY	1	
2	GB/T97.1-6	平垫圈 6	WASHER 6	2	
3	GB/T5783-M6x12	六角螺栓M6X12	BOLT, HEXAGON M6X12	2	
4	F25-05010400W	出水嘴接头组件	NOZZLE, ASSY	1	

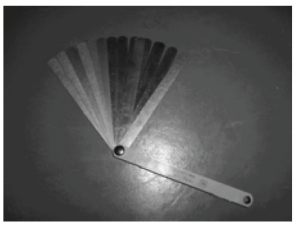
SPECIAL TOOLS

Piston slider



Flywheel gripper and flywheel puller

Valve spring compressor



Space gauge

Oil cleaner spanner

COMPRESSION PRESSURE INSPECTION

1. Start the engine and preheat it for 5 minutes. Then stop it.

2. Remove stopper hang rope.

3. Remove spark plug and attach pressure gauge to spark plug hole.

CAUTION:

Before removing spark plug, use compressed air to clean the spark plug notch, to prevent dust and other foreign matter from entering cylinder.

4. Open the choke completely, and rotate the crankshaft with starter. When the pressure gauge readings become stable, check the cylinder pressure.

NOTE:

Please don't change the choke position when checking the cylinder pressure.

For models that use control box, remove the throttle link and open completely the carburetor throttle rod by hand, and then measure the pressure.

5. If the measured pressure is below the specification or there is difference between cylinders, add a little oil into cylinders and measure again.

   Compression pressure: 810 kPa

NOTE:

If the cylinder pressure increases continuously, check piston and piston ring for damage. Replace if necessary.

If the cylinder pressure doesn't increase at all, check valve clearance, valve, valve seat, cylinder liner, cylinder cover and cylinder cover gasket. Adjust or replace if necessary.

The outboard engine comes with an automatic decompression device, so the pressure data measured may have variance.

OIL PRESSURE INSPECTION

1. Start the engine and preheat it for 5 minutes. Then stop it.

2. Remove the oil pressure switch and attach the pressure gauge

NOTE:

Please use the pressure gauge equipped with 1/8in pitch thread adapter.

3. Check the oil pressure.

   Oil pressure (reference data): 80kPa (Idling speed)

OIL PRESSURE SWITCH INSPECTION

1. Remove the oil pressure switch and attach the vacuum pressure gauge.

2. Load the stated pressure on oil pressure switch.
   Inspect the continuity of oil pressure switch with digital circuit tester. Replace if unqualified

Pressure	Continuity
Above 14.7kPa	Discontinuous
Below 14.7kPa	Continuous

DISASSEMBLING POWER UNIT

1. Open the top cowling.
2. Remove starter.
3. Remove throttle cable.
4. Remove carburetor.
5. Remove flywheel with special tool.

Flywheel gripper and flywheel puller

6. Remove bolts connecting power unit and upper casing.
7. Lift the engine and remove the pin.
8. Remove the woodruff key.
9. Disconnect the engine stop switch wire and ground wire.
10. Remove throttle cable (manual start models) or cable joint (electric start models).
11. Remove charge coil, lighting coil and pulsed coil.
12. Remove high-pressure assembly, CDI unit, ignition coil, oil pressure switch and spark plug.

BELT PULLEY AND TIMING BELT

1. Rotate the flywheel clockwise. Align the mark "1" on the driven belt pulley with the mark "▼" on the cylinder cover.

CAUTION:
Please don't rotate the flywheel counter clockwise. Otherwise, valve system will be damaged.

2. Remove timing belt from side of driven belt pulley

CAUTION:
Please don't rotate the belt pulley before timing belt is fixed. Otherwise, valve system will be damaged.

3. Remove driven belt pulley bolt, driven belt pulley and woodruff key.

NOTE:

Please remove driven belt pulley bolt with flywheel gripper.

Please don't rotate camshaft while unscrewing the timing belt pulley.

4. Remove timing belt pulley gasket, timing belt pulley and woodruff key.

5. Check belt pulley and timing belt for crack, damage and wear. Replace if necessary.

6. Assemble woodruff key and driven belt pulley.
   Align the mark "1" on the driven belt pulley with the mark "▼" on the cylinder cover. Tighten the driven belt pulley bolt temporarily.

CAUTION:

Please don't rotate the belt pulley before timing belt is fixed. Otherwise, valve system will be damaged.

7. Assemble wood ruff key and timing belt pulley:

Align the notch mark on the timing belt pulley with the mark "▼" on the crankcase.

8. Assemble new timing belt. Remember to put the timing belt part number vertical and upward.

CAUTION:

Please don't distort, rotate or bend the timing belt. Otherwise, it will be damaged.

Please keep timing belt from gasoline or oil.

Please don't rotate belt pulley counter clockwise. Otherwise, the valve system will be damaged.

9. Rotate timing belt pulley clockwise for two loops to eliminate the slack of timing belt pulley.
   Check whether alignment marks are aligned well.

10. Tighten bolt and nut
    Locking torque: Driven belt pulley bolt 38 Nm.

NOTE:

Remove driven belt pulley bolt with flywheel gripper.

Tighten timing belt pulley nut with special timing belt pulley nut barrel spanner.

DISASSEMBLING AND INSPECTION

CYLINDER COVER

Disassembling

1. Remove the bolts of cylinder head cover

2. Remove the bolts of the cylinder cover according to the reverse numbering sequence marks on the cylinder cover.

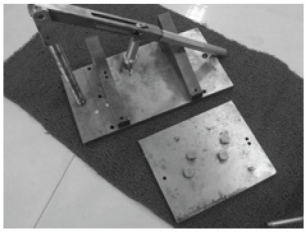
3. Remove the cylinder cover. Remove the oil pump.

4. Remove the rocker arm shaft, spring and rocker arm assy.

NOTE:

Before removing rocker arm shaft, unscrew lock nut and adjust screw to slack.

5. Use the valve spring compressor to remove intake valve and exhaust valve.

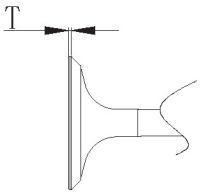


Valve and valve guide bush

1. Inspect the valve seat width. If not in the prescribed range, repair the valve seat.
   Valve seat width:

Valve seat width: Intake valve	1.84～2.97mm
Exhaust valve	1.98～3.11mm

2. Inspect the valve margin thickness (T). If not as in the prescribed value, replace the valve.
   The margin thickness of valve:

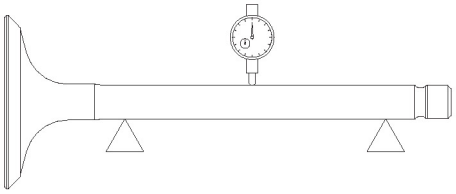


Intake value	0.8 mm
Exhaust value	0.9 mm

3. Inspect the valve stem diameter. If not as in the prescribed value, replace the valve.
   The diameter of valve stem:

Intake value	5.475～5.490mm
Exhaust value	5.460～5.475mm

4. Measure the valve stem runout. If exceeding the limit, replace the valve.
   Value stem runout limit: 0.03mm



5. Measure the inside diameter of the valve guide bush.
   The inside diameter of the valve guide bush: 5.500～5.512mm

CAUTION:
When replacing the valve, use a new valve guide bush and valve oil seal.

Valve Spring

1. Measure the free length of valve spring. If less than prescribed value, replace.
   The minimum free length: 38.4 mm

2. Measure the valve spring tilt. If exceeding the prescribed limit, replace.
   The maximum tilt limit: 1.7 mm

Valve rocker arm and rocker shaft

1. Check the interface between the valve rocker arm and rocker shaft for wear. Replace if necessary.
2. Measure whether the inside diameter of valve rocker arm and outside diameter of rocker shaft are within prescribed value.
   The inside diameter of valve rocker arm: 16.000～16.018mm
   The outside diameter of rocker shaft: 15.971～15.991mm

Camshaft

1. Check the camshaft size.
   Replace if necessary.

Height	30.834~31.034 mm
Base circle diameter	25.90~26.10 mm

2. Check camshaft run out. Replace if necessary.
   Roundness limit: 0.03mm

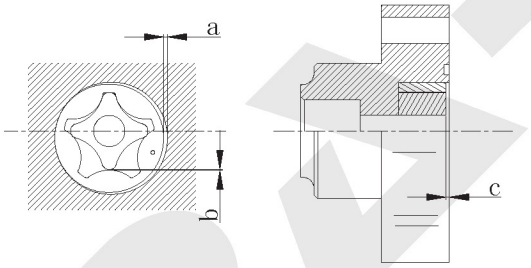
3. Check main journal diameter of camshaft. Replace if necessary.
   Main journal diameter (TOP): 36.925~36.945mm
   Main journal diameter (CENTER): 36.935~36.955mm

4. Check the automatic decompression device for crack and damage. Replace the camshaft if necessary.

Oil pump check

1. Remove screw and oil pump.

2. Check rotor clearance of oil pump. Replace if out of specification.



Clearance between external rotor and casing a	0.09~0.15 mm
Clearance between external rotor and internal rotor b	0.12 mm
Clearance between rotor and cover c	0.03~0.08 mm

Valve guide bush replacement

1. Knock out the valve guide bush from the direction of combustion room.

2. Knock in the new valve guide bush from the direction of the top of cylinder cover.

NOTE:
Coat the oil on the surface of pipe before installation.

3. Bore the inside diameter of pipe to the prescribed value by reamer.
   Inside diameter of valve pipe: 5.500～5.512mm

NOTE:

When taking out the reamer, don't rotate it in counter clockwise direction.

Valve seat inspection

1. Clean the carbon on the valve.

2. Coat a thin layer of bluing dye evenly onto the seal face of the valve seat.

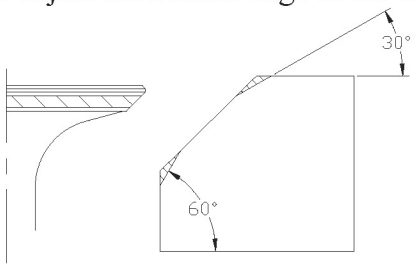
3. Lap the valve on the valve seat by valve lapping tool.

4. Measure the valve seat width.
   The valve face is with bluing dye.
   If the valve and valve seat do not match, or the valve seat width does not conform to specified value, reface and grind the valve seat.
   If the contact surface is not even, replace the valve guide bush.
   The valve seat width: 0.9～1.1mm

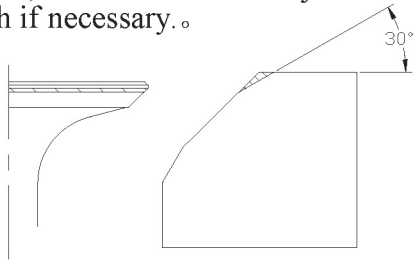
Valve seat cutting

1. Use 45° valve seat cutter to adjust the valve seat width. Turn the cutter clockwise until the valve seat face is smooth.

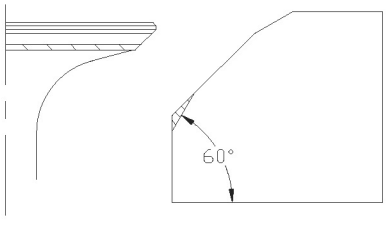
2. If the valve seat is centered on the valve face but it's too wide, to reduce the valve seat width, use 30° cutter to adjust the top edge of the seat, and use 60° cutter to adjust the bottom edge of the seat.



3. If the valve seat is too narrow and on the top edge of valve surface, use 30° cutter to adjust the top margin of the seat, and use 45° cutter to adjust the valve seat width if necessary.。



4. If the valve seal surface is too narrow and on the bottom edge of valve surface, use 60° cutter to adjust the bottom edge of the seat, and use 45° cutter to adjust the valve seat width if necessary



5. Coat evenly a thin layer of lapping compound onto valve seat, and lap the valve by lapping tool.

6. Clean up the remaining lapping compound.

7. Inspect again the valve seat width.

CAUTION:

Do not overlap the valve. Turn the lapping tool evenly with a downward force of 40~50N. Do not contaminate push rod and valve guide bush with lapping compound.

Valve installation

1. Install new valve oil seal and spread engine oil to the inside of the valve guide bush.

2. Install valve, valve spring seal, valve spring and valve spring retainer in sequence.

3. Compress the valve spring with valve spring compressor and install valve cotter.

4. Knock valve spring retainer slightly with plastic or rubber hammer to fix the valve cotter.

Assembling cylinder cover

1. Install new oil seal with special tool.

2. Install camshaft into cylinder cover from the direction of oil pump.

3. Check whether spline position is facing the conjunction surface of cylinder. Adjust if necessary.

4. Install rocker arm assembly, spring and rocker shaft.

5. Assemble oil pump.

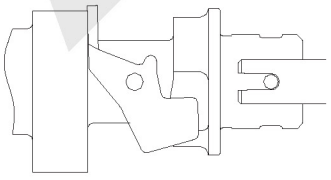
NOTE:

Ensure mark on the external rotor is facing the oil pump cover.

6. Align oil pump drive shaft with camshaft pin, then install oil pump.

CAUTION:

Before installing oil pump, make sure the oil passage is through, and fill the oil pump with oil.



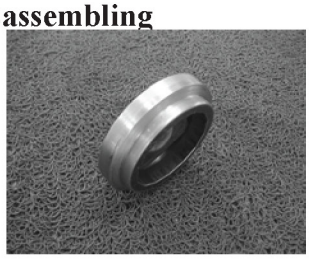
CRANKCASE

Disassembling

1. Remove the oil cleaner with special tool.

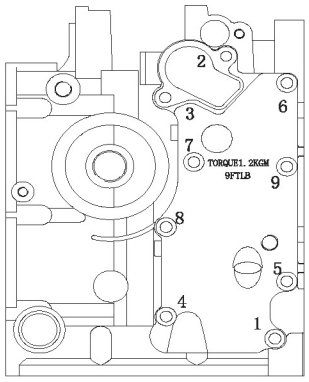
NOTE:

Put one piece of cloth under oil cleaner.



Oil cleaner spanner

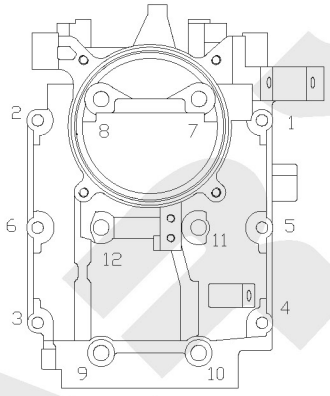
2. Remove the bolts according to the sequence shown in the picture.



3. Remove the thermostat cover, exhaust outer cover, gasket and pins.。
Clean the anode surface and check the anode. Replace if the corrosion of anode is abnormal.
Check the exhaust outer cover for crack, distortion or corrosion. Replace if necessary.

4. Remove the balance cylinder cover, and remove nut and balance cylinder piston.

5. Remove the crankcase bolts according to the sequence shown in the picture, and remove the base.



6. Remove the connecting rod bolts and connecting rod cover, remove the crank, and remove connecting rod and piston assy.

7. Remove piston pin circlip with plier, and remove piston pin and piston.

8. Remove oil seal, pin and main bearing.

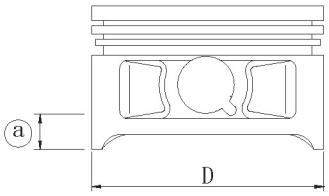
Balance cylinder piston and connecting rod

1. Check the balance cylinder piston for crack or damage. Replace it if necessary.

2. Check the balance cylinder connecting rod assy for crack or damage. Replace it if necessary.

Piston

1. Measure piston outside diameter at the specified measuring point.
If out of specification, replace.
Piston diameter: 64.950～64.965 mm
Measuring point ⓐ: 2 mm

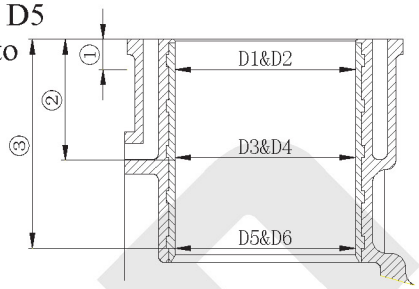


2. Check the piston pin inside diameter.
If out of specification, replace

Piston pin inside diameter: 15.974～15.985mm

Cylinder bore

1. Measure cylinder bore separately at measuring point ①, ②, ③.
   At each point, measure the cylinder bore at places D1, D3, D5 parallel to the crankshaft and at places D2, D4, D6 ertical to the crankshaft.



   Measuring point height: ①20 mm;
   ②40 mm;
   ③60 mm
   Cylinder bore: 65.000～65.015 mm

2. Calculate taper limit and round limit. If out of specification, replace crankcase.
   Taper limit: 0.08mm (D1-D5, D2-D6)
   Round limit: 0.05 mm (D2-D1, D6-D5)

Piston pin outside diameter

Measure piston pin outside diameter. If out of specification, replace it.
Piston pin outside diameter: 15.965～15.985mm

Piston ring

1. Push the piston ring parallel with the piston into the specified measuring point of the cylinder (20mm from conjunction surface).

2. Measure end gap by space gauge. If out of specification, replace the piston ring.
   End gap (installed): Top ring 0.15～0.30mm
   2nd ring 0.30～0.50mm
   Oil ring 0.20～0.70mm

3. Install piston ring to piston, and measure side clearance between piston ring and its slot by space gauge. If out of specification, replace the piston ring.
   Side clearance: Top ring: 0.02～0.06 mm
   2nd ring: 0.02～0.06 mm
   Oil ring: 0.04～0.18 mm

Connecting rod small end inner diameter

Measure the connecting rod small end inner diameter. If out of specification, replace it.。
Connecting rod small end inner diameter: 15.985～15.998mm

Connecting rod big end side clearance

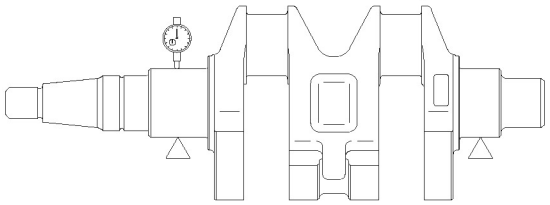
Measure connecting rod big end side clearance. If out of specification, replace connecting rod or crankshaft, or replace both.
Connecting rod large end side clearance: 0.05～0.22 mm

Crankshaft

1. Measure diameter of crankshaft main journal, crankpin diameter and crankpin width. If out of specification, replace the crankshaft.

Diameter of crankshaft main journal	42.984~43.000 mm
Crankpin diameter	32.984~33.000 mm
Crankpin width	21.000~21.070mm

2. Measure crankshaft run out. If out of specification, replace it.



Crankshaft run out limit: 0.05mm

Crankpin oil clearance

1. Put a piece of plastic space gauge on to the crankpin in parallel to the crankshaft.

2. Assemble connecting rod and main bearing to the crankpin.

3. Tighten the connecting rod bolts to the specified torque.
   Tightening torque: First tightening 6 Nm
   Second tightening 17 Nm

4. Remove the connecting rod, measure the compressed width of the plastic space gauge. If out of specification, replace the main bearing.
   Oil clearance: 0.020～0.052mm

NOTE:
Don't rotate the connecting rod before completing measurement.

Main journal oil clearance

1. Clean main bearing, main journal and fitting surface of crankcase and crankcase base.

2. Install main bearing and crankshaft to crankcase.

3. Put one plastic space gauge on the main journal, paralleling with crankshaft.

NOTE:
Don't put plastic space gauge on the oil hole of main journal.

4. Install main bearing onto crankcase base and install crankcase base onto crankcase.

5. Following the numbering sequence on the crankcase base, tighten the bolts at specified torques.

Tightening torques:

First tightening	M8	15 Nm
Second tightening		30 Nm
First tightening	M6	6 Nm
Second tightening		12 Nm

6. Remove crankcase and measure the compressed width of each plastic gauge. If out of specification, replace the main bearing.
   Oil clearance: 0.012～0.044mm

NOTE:
Please don't rotate the crankshaft before the measurement is completed.

Crankcase and crankcase base

1. Inspect crankcase base and crankcase for crack, damage or wear. Replace if necessary.
2. Inspect cooling water passage for dirt or clog. Clean if necessary.

FULL INSTALLATION

Piston connecting rod installation

Install piston, connecting rod, piston pin and piston pin circlip.

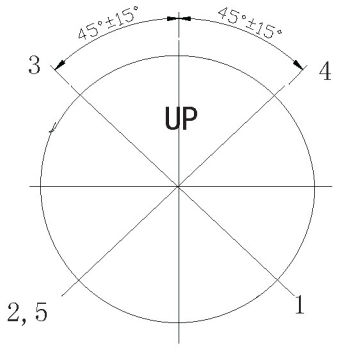
NOTE:
When installing, make sure that the mark on the connecting rod is on the same side as the mark on the piston crown.

Piston ring installation

1. Install oil ring, 2nd ring and top ring.

NOTE:
Make sure that the mark is toward the piston crown when installing the 2nd ring.

2. Picture of the piston ring gap
   Oil ring end gap 1 (lower rail)
   Oil ring end gap 2 (expanded ring)
   Oil ring end gap 3 (upper rail)
   2nd piston ring end gap 4
   Top piston ring end gap 5



Piston installation

Use piston slider to install piston, and make sure that the piston crown "UP" is toward the flywheel side

NOTE:
Apply engine oil to the piston and piston ring side when installing.

Crankshaft installation

1. Install main bearing to crankcase.

NOTE:
Insert the protruding part of main bearing into the corresponding slot of crankcase.

2. Install balance cylinder connecting rod to crankshaft.

3. Install the crankshaft to crankcase. Install oil seal.

NOTE:
Apply engine oil to the inner side of oil seal before installing.

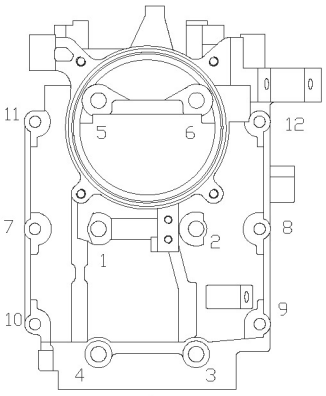
4. Install connecting rod cover onto the connecting rod, and tighten the connecting rod bolt to the specified torque in two steps.
Tighten torque: First tightening 6 Nm
Second tightening 17 Nm

NOTE:
Align the marking on connecting rod cover with the marking on connecting rod.
Apply engine oil to connecting rod bolt before installing.

Assembling power unit

1. Install the main bearing to crankcase base.

2. Apply fluid sealant to conjunction surface of the crankcase base, and install dowel pin and crankcase base. Tighten the bolts twice according to the sequences on the right picture.
Tighten torque:

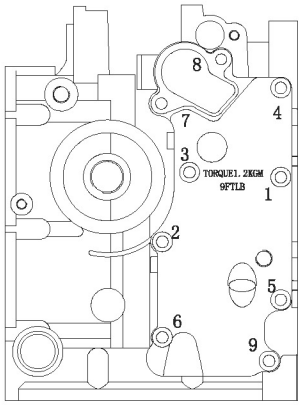


First tightening	M8	15 Nm
Second tightening		30 Nm
First tightening	M6	6 Nm
Second tightening		12 Nm

NOTE:
Apply engine oil to moving parts before installing.
Apply engine oil to the bolt before installing.

3. Install balance cylinder piston, and tighten the piston nut at specified torques
Tighten torque: 157 Nm

NOTE:
Apply engine oil to the nut before installing.



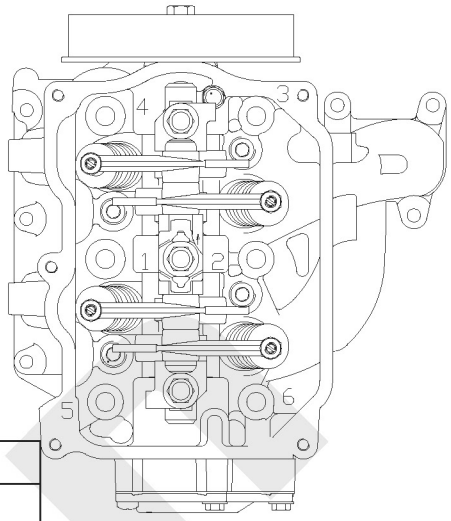
4. Install new O-rings and balance cylinder cover, and tighten the bolt at specified torque.
Tighten torque: 12 Nm

NOTE:
Apply engine oil to the bolt before installing.

5. Install oil cleaner by special tool and tighten it at specified torques.
Tighten torque: 18 Nm

NOTE;
Pour engine oil into oil channel before installing.

6. Install exhaust outer cover, thermostat and thermostat cover.
   Tighten bolts twice according to sequences as shown in picture.
   Tighten torque: First tightening 6 Nm
   Second tightening 12 Nm



7. Install dowel pin, cylinder gasket and cylinder cover assembly.

8. Inspect the position of woodruff key slot on camshaft.

9. Tighten the cylinder cover bolts twice to specified torque according to sequences on right picture.
   Tighten torque:

First tightening	M9	23 Nm
Second tightening		46 Nm
First tightening	M6	6 Nm
Second tightening		12 Nm

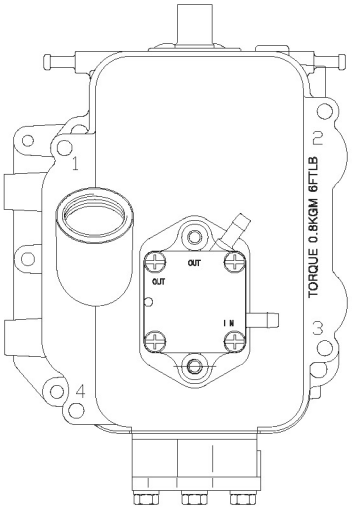
NOTE:
Do not use the old gasket

10. Install timing belt pulley, driven belt pulley, timing belt and breather pipe.

NOTE:
When installing, make ensure that the marking on the driven belt pulley is aligned with the "▼" on the cylinder cover; and the marking on the timing belt pulley is aligned with the "▼" mark on the crankcase.

11. Adjust valve clearance.

12. Install cover of cylinder cover and tighten bolt according to sequences on right picture.



13. Install throttle cable bracket and throttle accelerograph enforce.

14. For electric start models, install gear shift limitative rod firstly.

15. Install oil pressure switch, ignition coil, C.D.I. unit assy. and rectifier and regulator assy.

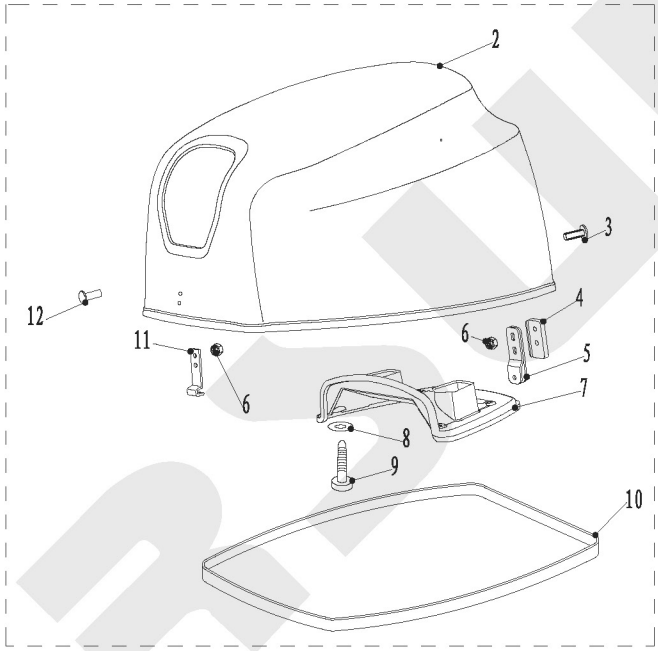
16. Install pulsed coil, lighting coil and charge coil.

17. Install fuel system.

UPPER UNIT

TOP COWLING

Explosive drawing



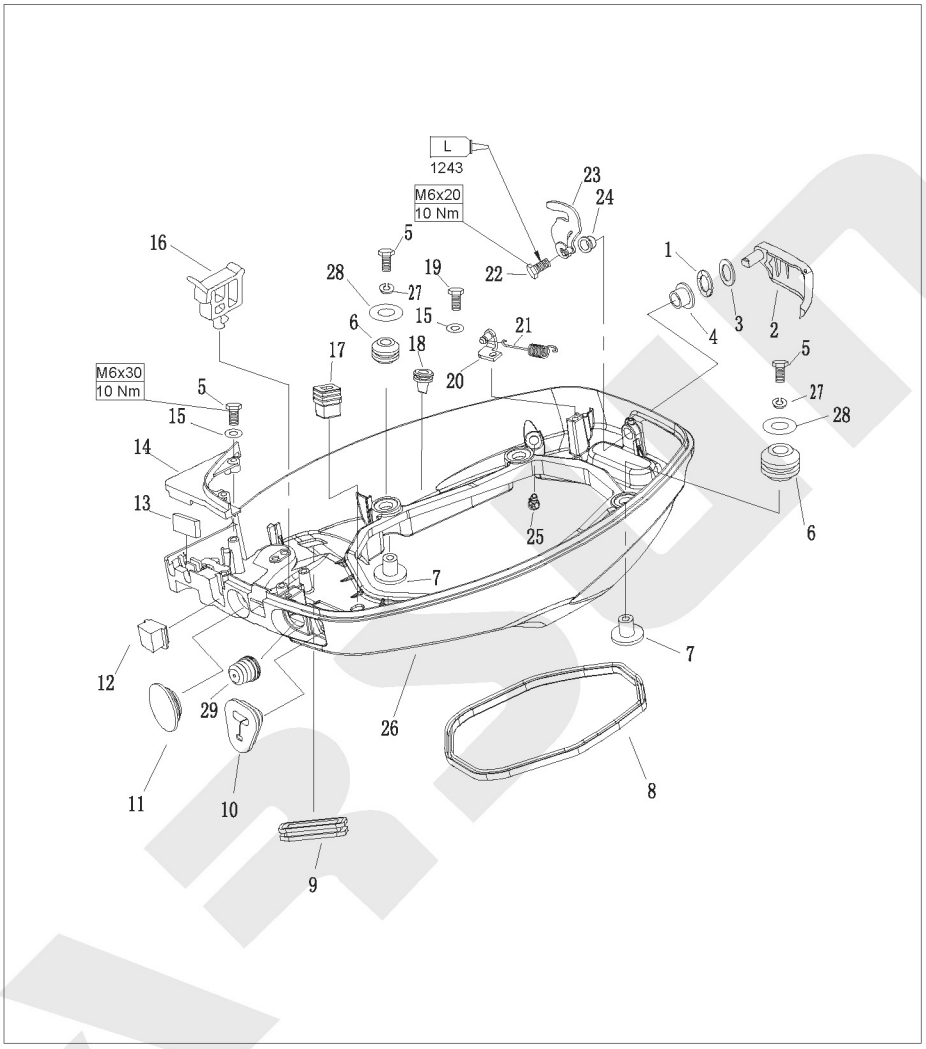
参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	F25-06000000	顶罩组件	TOP COWLING ASSY	1	
2	F25-06000001	顶罩	TOP COWLING	1	
3	F25-06000007	扁头螺栓	FLAT BOLT	2	
4	F25-06000005	后挂钩垫块	LUSHION, BACK POTHOOK	1	
5	F25-06000100	后挂钩组件	BACK POTHOOK ASSY	1	
6	GB/T6184-M6	金属嵌件六角锁紧螺母M6	NUT M6	4	
7	F25-06000003	顶罩消音器盖	COVER, TOP COWLING MUFFLE	1	
8	F4-06000004	橡胶垫片	WASHER, RUBBER	4	
9	GB/T845-5.5x19	十字槽盘头自攻螺钉ST5.5x19	SCREW, PAN HEAD ST5.5x19	4	
10	F25-06000002	顶罩密封橡胶条	SEAL	1	
11	F25-06000004	前挂钩	POTHOOK, FRONT	1	
12	F25-06000006	扁头螺栓B	FLAT BOLT "B"	2	

Disassembling and inspection

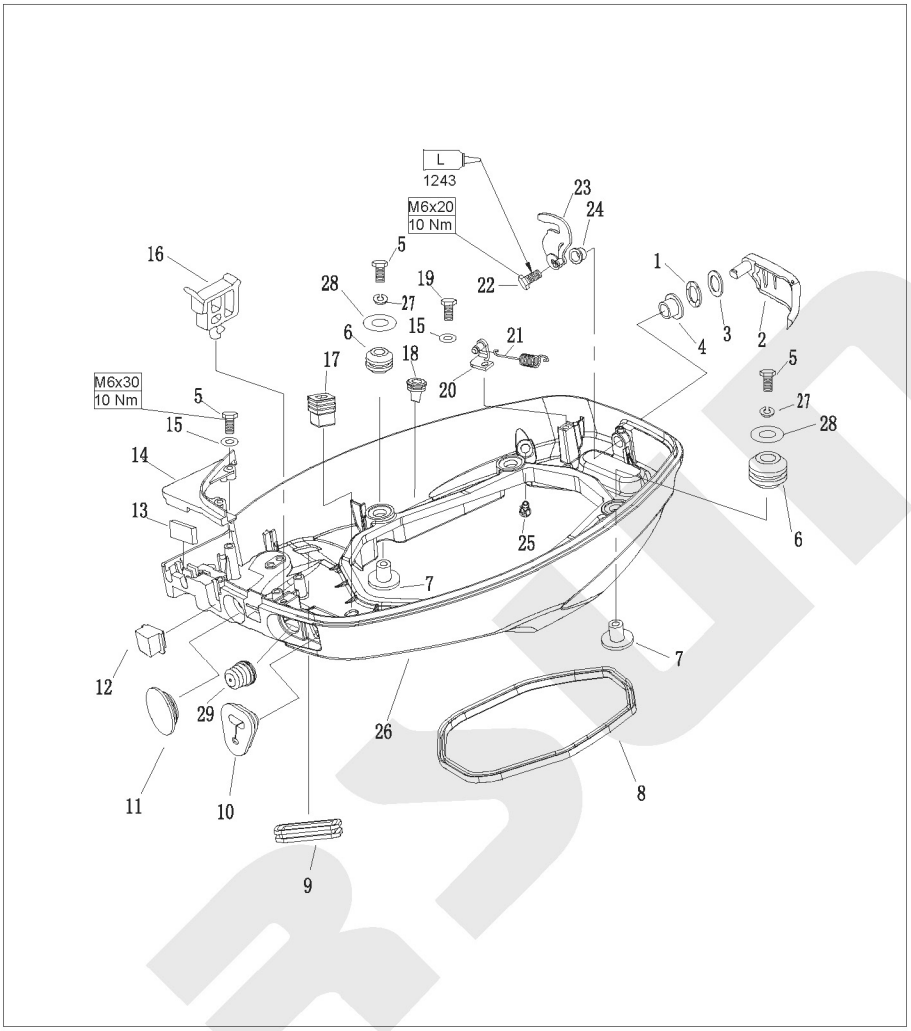
1. Remove rubber seal.
2. Remove top cowling muffle cover screw and rubber underlay.
3. Remove top cowling muffle cover.
4. Remove locking hook and pothook.
5. Inspect top cowling for crack or damage. Replace if necessary.
6. Inspect rubber seal for crack or damage. Replace if necessary.
7. Inspect top cowling muffle cover for crack or damage. Replace if necessary.
8. Inspect lock hook and pothook for crack, deform or damage. Replace if necessary.

BOTTOM COWLING

Explosive drawing

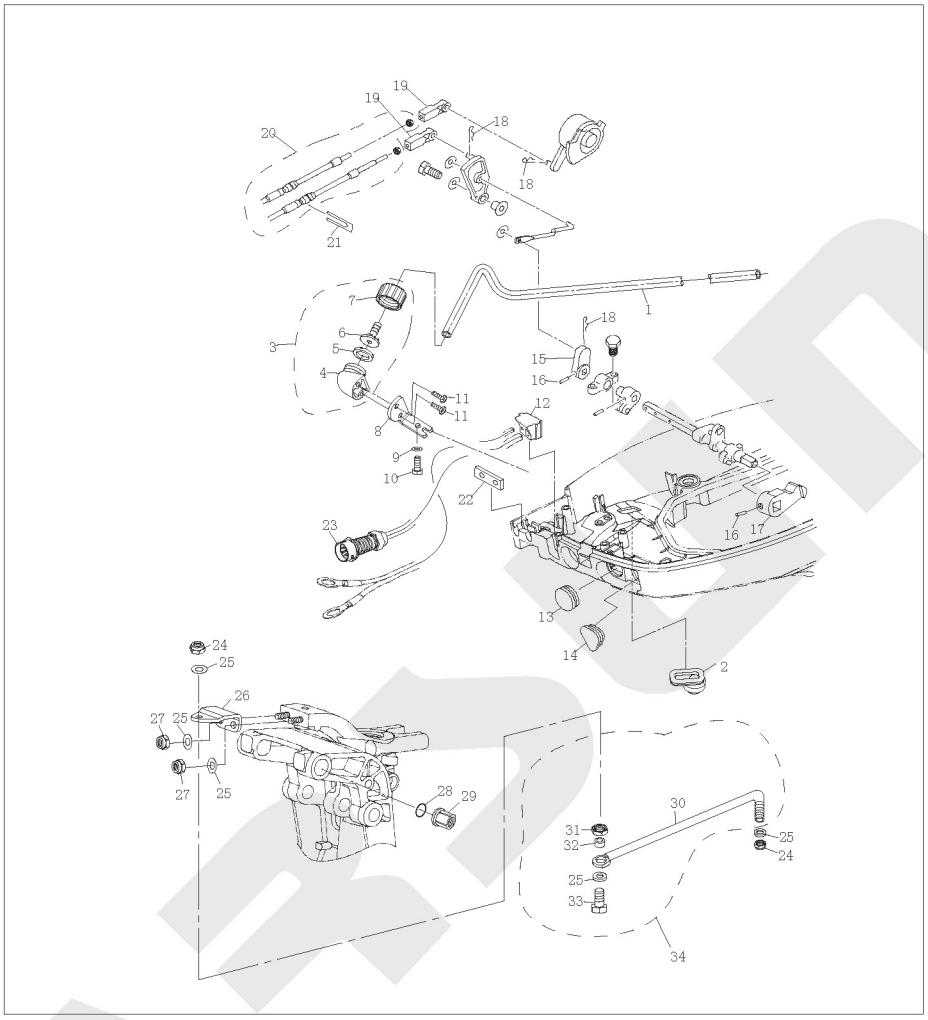


参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	F15-05000023	波形垫圈	WASHER , WAVE	1	
2	F25-03010000	顶罩锁紧手柄组件	LOCKING ASSY, TOP COWLING	1	
3	F25-03000015	平垫圈Φ12.4xΦ17	WASHER	1	
4	F15-05000022	顶罩锁紧手柄尼龙套A	BUSHING A	1	
5	GB/T5783-M6x30	六角螺栓M6x30	BOLT, HEXAGON M6x30	6	
6	F25-03000006	减震圈	DAMPER	4	
7	F25-03000007	减震圈垫管	BUSHING, DAMPER	4	
8	F25-03000002	底罩密封条	SEAL, BOTTOM COWLING	1	
9	F15-05000003	长方形橡胶闷头	RUBBER PLUG, QUADRATE	1	
10	F15-01000015	油门钢索护套	JACKET, CABLE	1	
11	F25-03000003	圆形橡胶闷头	RUBBER PLUG, CIRCULAR	1	
12	F25-03000013	异形橡胶闷头	RUBBER PLUG, ABNORMAL	1	
13	F15-05000017	方形橡胶密封条	SEAL, RUBBER	1	
14	F25-03000014	底罩小盖板	COVER BOARD, BOTTOM COWLING	1	
15	GB/T97.1-6	平垫圈6	WASHER 6	3	

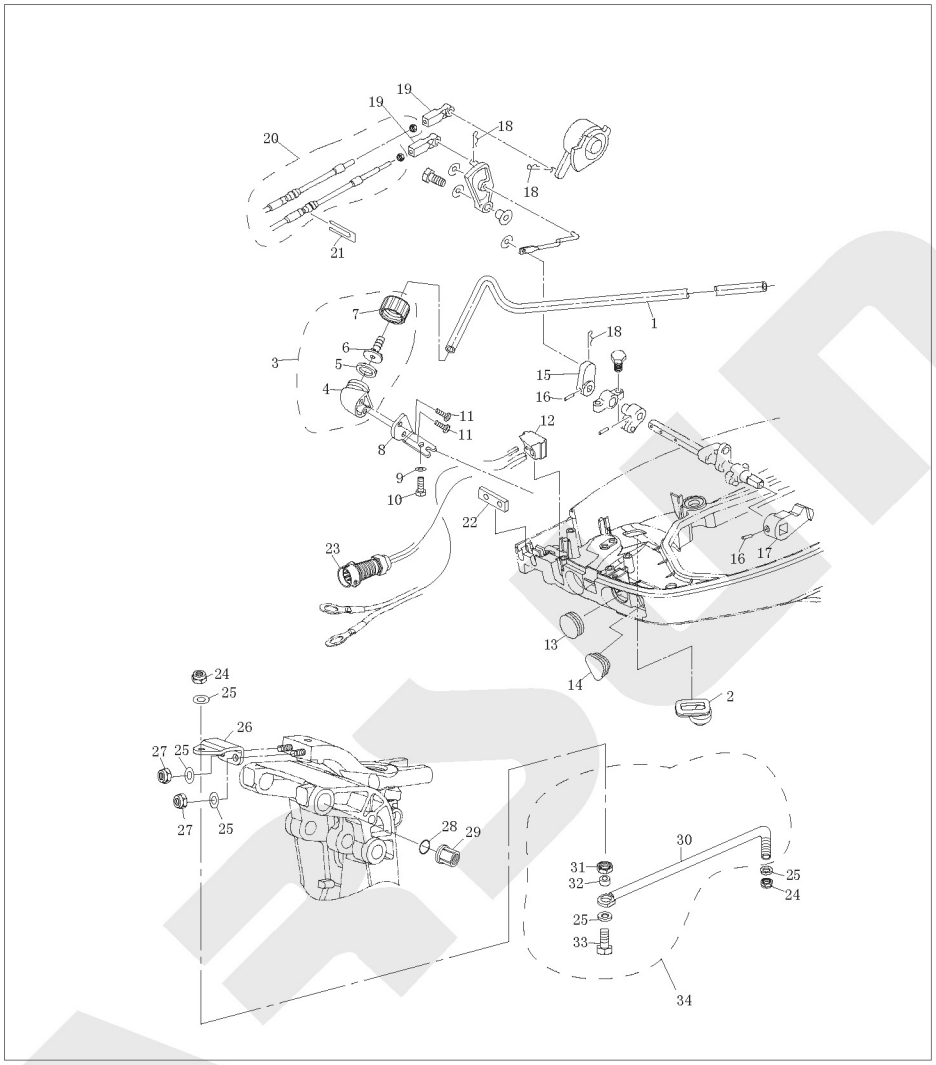


参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
16	F15-05000008	方形线夹A	CLAMP A	1	
17	F15-05000033	变档连接杆护套	JACKET, LEVER	1	
18	F25-03000005	橡胶出水嘴	NIPPLE, RUBBER	6	
19	GB/T5783-M6x20	六角螺栓M6x20	BOLT, HEXAGON M6x20	1	
20	F25-03000019	拉簧支架组件	BRACKET ASSY, TENSIONAL SPRING	1	
21	F15-05000026	锁紧块拉簧	SPRING, TENSION	1	
22	GB/T5783-M6x12	六角螺栓M6x12	BOLT, HEXAGON M6x12	1	
23	F25-03020000	顶罩锁紧块组件	LOCKING ASSY, TOP COWLING	1	
24	F15-05000036	顶罩锁紧手柄尼龙套B	BUSHING B	1	
25	F15-05000009	塑料出水嘴	NIPPLE, PLASTIC	1	
26	F25-03000001	底罩	BOTTOM COWLING	1	
27	GB/T93-6	弹簧垫圈6	WASHER , SPRING 6	4	
28	F25-00000004	特大垫圈6	BIG WASHER 6	4	
29	F15-05000006	波纹橡胶套	SHEATH, WAVE	1	

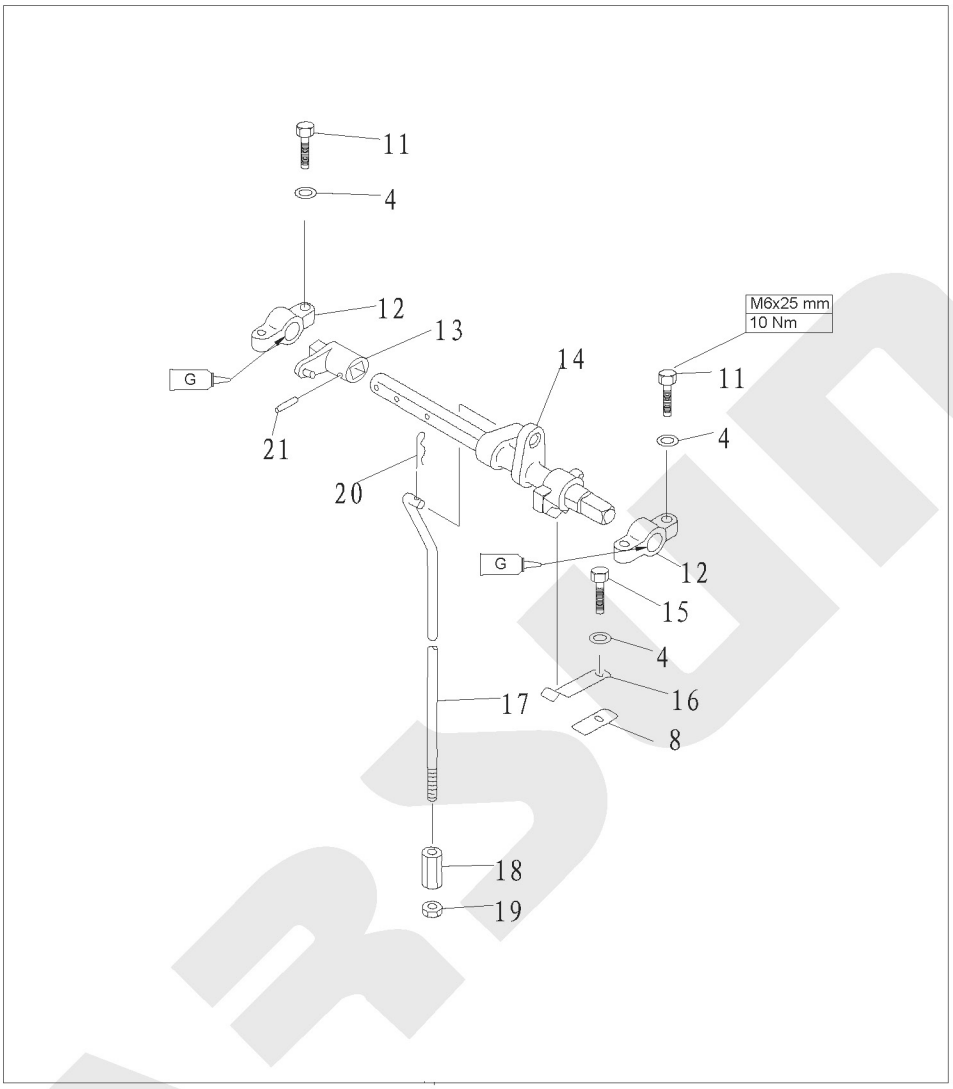
Eletric start type



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	F25-03000021W	定形水管	WATER PIPE ,FIGURATION	1	
2	F25-03000022W	水管波纹护套	JACKET, WATER PIPE	1	
3	F25-03000100W	水管堵塞组件	JAM ASSY	1	
4	F25-03000101W	堵塞本体	JAM	1	
5	F25-03000102W	堵塞橡胶圈	BUSH ,RUBBER JAM	1	
6	F25-03000103W	堵塞接头	TIE-IN, JAM	1	
7	F25-03000104W	堵塞螺母	NUT, JAM	1	
8	F25-03000023W	堵塞支架	BRACKET,JAM	1	
9	GB/T97.1-85	平垫圈 6	WASHER 6	1	
10	GB/T5783-2000	六角螺栓M6×20	BOLT M6X20	1	
11	GB/T84.5-85	十字槽盘头自攻螺钉ST5.5×19	SCREW ,PAN HEAD ST5.5X19	2	
12	F25-03000013W	异形橡胶闷头	JAM ,ABNORNOMITY RUBBER	1	
13	F25-03000024W	圆形橡胶闷头B	JAM "B"	1	
14	F25-03000025W	油门钢索堵头	JAM ,ACCELEROGRAPH CABLE	1	
15	F25-03030003W	制动器摇臂B	ROCKER ,STOPPER	1	
16	GB/T879.2-2000	轻型直槽弹性圆柱销φ3×20	COLUMNIFORM PIN	2	
17	F25-03030005W	制动器摇臂C	ROCKER ,STOPPER	1	
18	F15-00000012	夹簧φ1.8	SPRING	3	
19	F25-07000005W	操控钢索接头A	TIE-IN, CONTROL CABLE	2	
20	F25-07000200W	操控钢索组件	CONTROL CABLE, ASSY	2	



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
21	F25-07000003W	开口限位板	PLATE, RINGENT	1	
22	F25-03000029W	长方形橡胶密封条	JAM ,RECTANGLE	1	
23	F25-05090002W	点火线束组件	C.D.I. CABLE ASS'Y	1	
24	F25-07000006W	非金属嵌件六角锁紧螺母	THIN LOCKNUT	2	
25	GB/T97.1-85	平垫圈 10	WASHER 10	5	
26	F25-01000007W	转向连接板	PLATE	1	
27	GB/T889.2-2000	非金属嵌件六角锁紧螺母M10X1.25	THIN LOCKNUT M10X1.25	2	
28	JASO F404 24-016	O形密封圈	O-RING	1	
29	F25-01010012W	塑料装饰螺母B	NUT ,PLASTIC	1	
30	F25-07000301W	转向连杆	LINK ROD , TURNING	1	
31	F25-07000304W	六角螺母3/8"	NUT	1	
32	F25-07000303W	螺栓垫管	TUBE ,BOLT	1	
33	F25-07000302W	转向连杆螺栓	BOLT	1	
34	F25-07000300W	转向连杆组件	LINK ROD ASSY	1	



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	GB/T5783-M6x25	六角头螺栓M6x25	BOLT M6x25	4	
2	GB/T97.1-6	平垫圈6	WASHER 6	6	
3	F15-05040002	变档杆支座	BRACKET ,SHIFT ROD	2	
4	F25-03030001	制动器摇臂	ROCKER ,STOPPER	1	
5	F15-05040100	变档杆芯轴组件	LEVER ,SHIFT ROD	1	
6	GB/T5783-M6x20	六角螺栓M6x20	BOLT M6x20	1	
7	F15-05000031	档位弹簧片	SPRING	1	
8	F25-03030002	变档连接杆	SHIFT ROD	1	L
	F25-03030002	变档连接杆	SHIFT ROD	1	S
9	F15-05000035	柱状螺母	COLUMNED NUT	1	
10	GB/T6172.1-M6	六角薄螺母M6	NUT M6	1	
11	F15-00000012	夹簧	SPRING	1	
12	GB/T879.4-3x20	标准型卷制弹性圆柱销 ϕ 3x20	PIN ,SPRING	1	

Disassembling and inspection

1. Remove rubber plug, wave sheath and throttle cable jacket.

Remove C.D.I. cable assy.
(Applicable to model with forward control and electric start).

2. Remove bolts fixing bottom cowling cover board, and remove cover board.
   Remove rubber seal. Remove ringent limitative plate and quadrate rubber plug.
   (Applicable to model with forward control and electric start).

3. Remove top cowling locking handle screws, remove top cowling locking handle and top cowling locking block.

4. Remove top cowling locking handle bushing A and top cowling locking handle bushing B.

5. Remove wave washer.

6. Remove fixing bolt of shift rod bracket.

7. Remove cotter pin of shift rod.

8. Remove shift rod, spring pin and stopping rocker.

9. Remove shift spring plate.

10. Inspect bottom cowling for crack or damage. Replace if necessary.

11. Inspect top cowling locking handle and top cowling lock block for crack or damage. Replace if necessary.

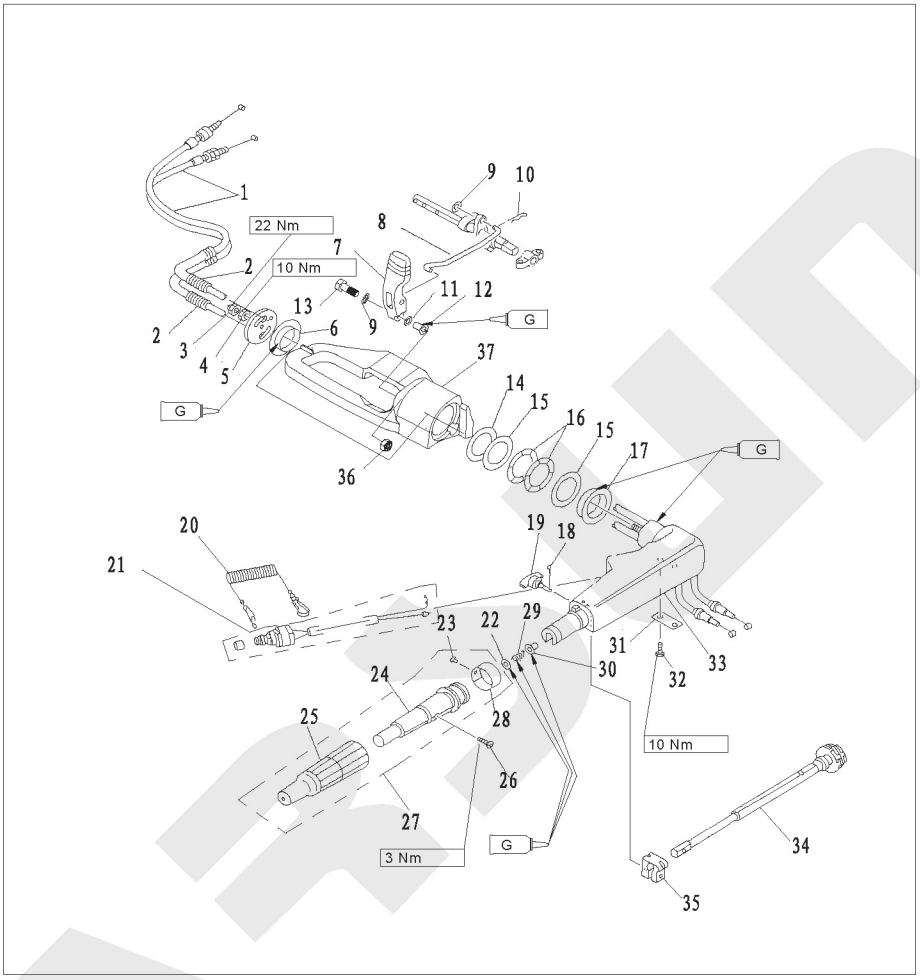
12. Inspect wave washer and locking handle bushing A for crack or damage. Replace if necessary.

13. Inspect shift rod bracket and stopping rocker for crack or damage. Replace if necessary.

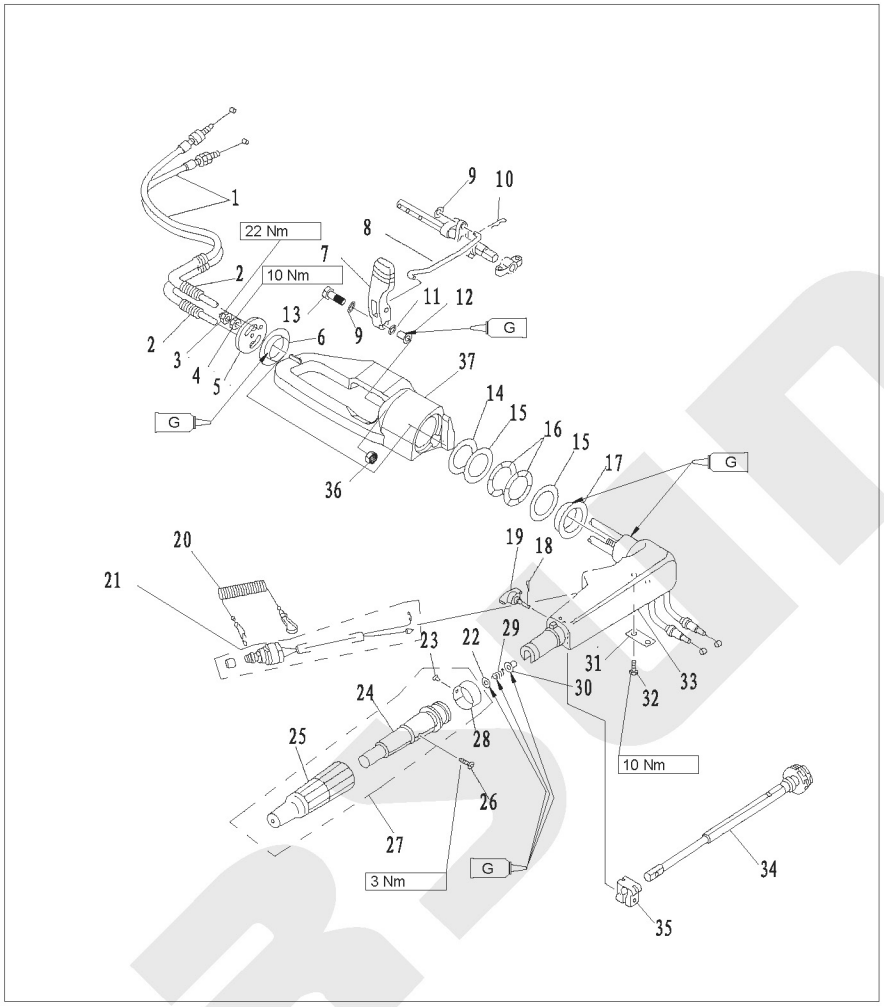
14. Inspect shift spring plate for crack, crank or damage. Replace if necessary.

STEERING HANDLE

Explosive drawing



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	F25-01030101	油门钢索组件	THROTTLE CABLE ASSY	2	
2	F25-01030002	波纹塑管φ8xφ10x140	TUBE ,WAVE PLASTIC	2	
3	GB/T889.2-M10x1.25	细牙非金属嵌件六角锁紧螺母M10×1.25	LOCKNUT M10x1.25	1	
4	GB/T6171-M10×1.25	六角螺母M10×1.25	NUT M10×1.25	1	
5	F15-01000013	手柄定位盖板	PLATE ,HANDLE ORIENTATION	1	
6	F15-01000011	手柄衬套(低)	WASHER ,HANDLE (LOW)	1	
7	F15-00000007	变档手柄	HANDLE ,GEAR SHIFT	1	
8	F25-00000009	变档连杆	LINK ,SHIFT ROD	1	
9	GB/T97.1-6	平垫圈6	WASHER ,PLAIN 6	2	
10	F15-00000012	夹簧	SPRING ,CLAMP	1	
11	F15-00000009	波形垫圈	WASHER ,WAVE	1	
12	F15-00000008	凸缘垫管	TUBE ,FLANGE	1	
13	GB/T5783-M6x35	六角头螺栓M6×35	HEXAGON BOLT M6×35	1	
14	F15-01000012	衬套尼龙圈	WASHER ,NYLON	1	
15	F15-01000008	衬套垫圈	WASHER	2	
16	F15-01000009	衬套波形垫圈	WASHER ,WAVE	2	
17	F15-01000007	手柄衬套(高)	BUSH ,HANDLE	1	
18	GB/T91-1.6x12	开口销φ1.6×12	PIN ,COTTER 1.6x12	1	
19	F15-01030200	阻力调整旋钮组件	BOLT	1	
20	F4-01090401	引擎停止安全索	STOPER ,HANG ROPE ASSY	1	



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
21	T15-01020003	急停开关组件	ENGINE STOP SWITCH ASSY	1	
22	GB/T848-10	小垫圈10	SMALL WASHER 10	1	
23	GB/T827-2x5	标牌铆钉2×5	RIVET ,SEMICIRCLE 2x5	1	
24	F4-01090301	操舵手柄塑胶套	GRIP ,STEERING HANDLE	1	
25	F4-01090302	操舵手柄橡胶套	RUBBER ,HANDLE	1	
26	GB/T820-M5x25	十字槽半沉头螺钉M5×25	SCREW M5X25	1	
27	F4-01090300	操舵手柄塑胶套组件	STEERING HANDLE ASSY	1	
28	F4-01090303	油门标志牌	INDICATOR THROTTLE	1	
29	F4-01090007	压缩弹簧	SPRING ,COMPRESSION	1	
30	F4-01090006	衬套	BUSH	1	
31	F15-01030005	节气门固定板	STAY	1	
32	GB/T5783-M6X20	六角头螺栓M6×20	HEXAGON BOLT M6x20	2	
33	F15-01030001	操舵手柄	HANDLE STEERING	1	
34	F15-01030100	节气门杆组件	LEVER ,THROTTLE ASSY	1	
35	F4-01090003	操舵手柄湿把摩擦块	FRICTION	1	
36	GB/T6170-M6	六角螺母M6	NUT M6	1	
37	F25-01030001	手柄托架	BRACKET, HANDLE	1	

Disassembling and inspection

1． Remove handle bracket，remove gear shift handle, remove steering handle.

2. Remove steering handle cover.

3. Remove handle bush, bush washer, wave washer.

4. Remove cotter pin and friction adjusting bolt.

5. Remove steering handle.

6. Remove throttle cable.

7. Remove throttle lever stay and throttle lever.

8. Remove engine stop switch.

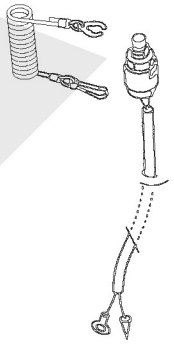
9. Inspect gear shift handle for crack or damage. Replace if necessary.

10. Inspect steering handle for crack or damage. Replace if necessary.

11. Inspect bush, bush washer and wave washer for crack or damage. Replace if necessary.

11. Inspect throttle cable for wear or crack. Replace if necessary.

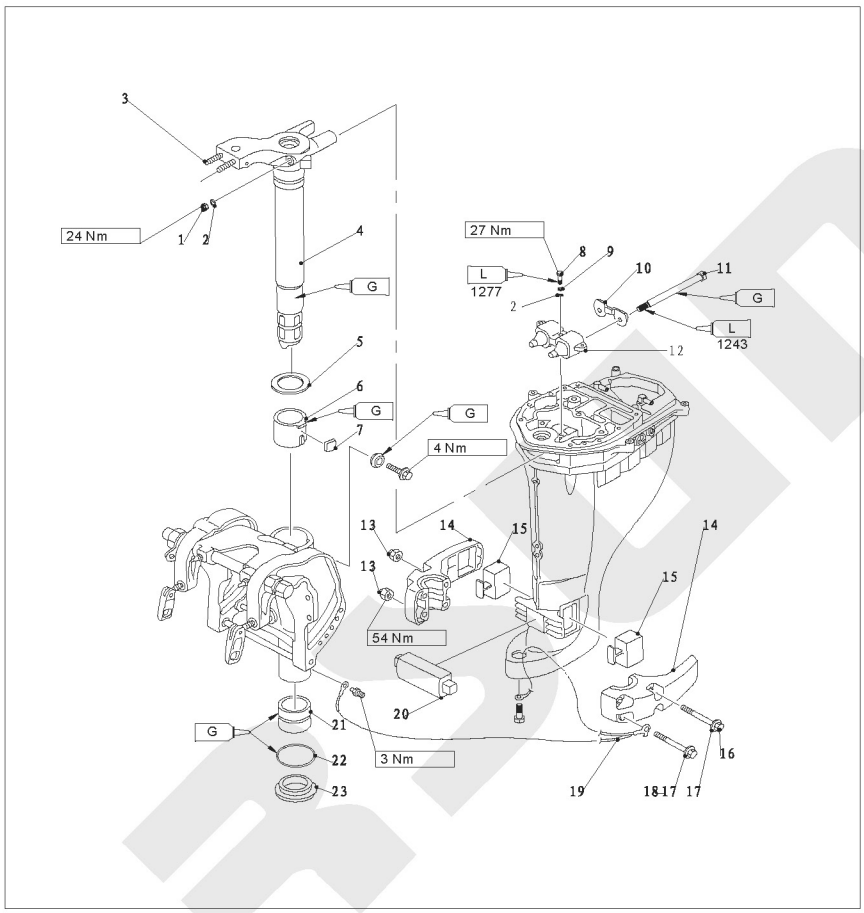
12. Inspect the conduction of engine stop switch. If not to specification, replace it.



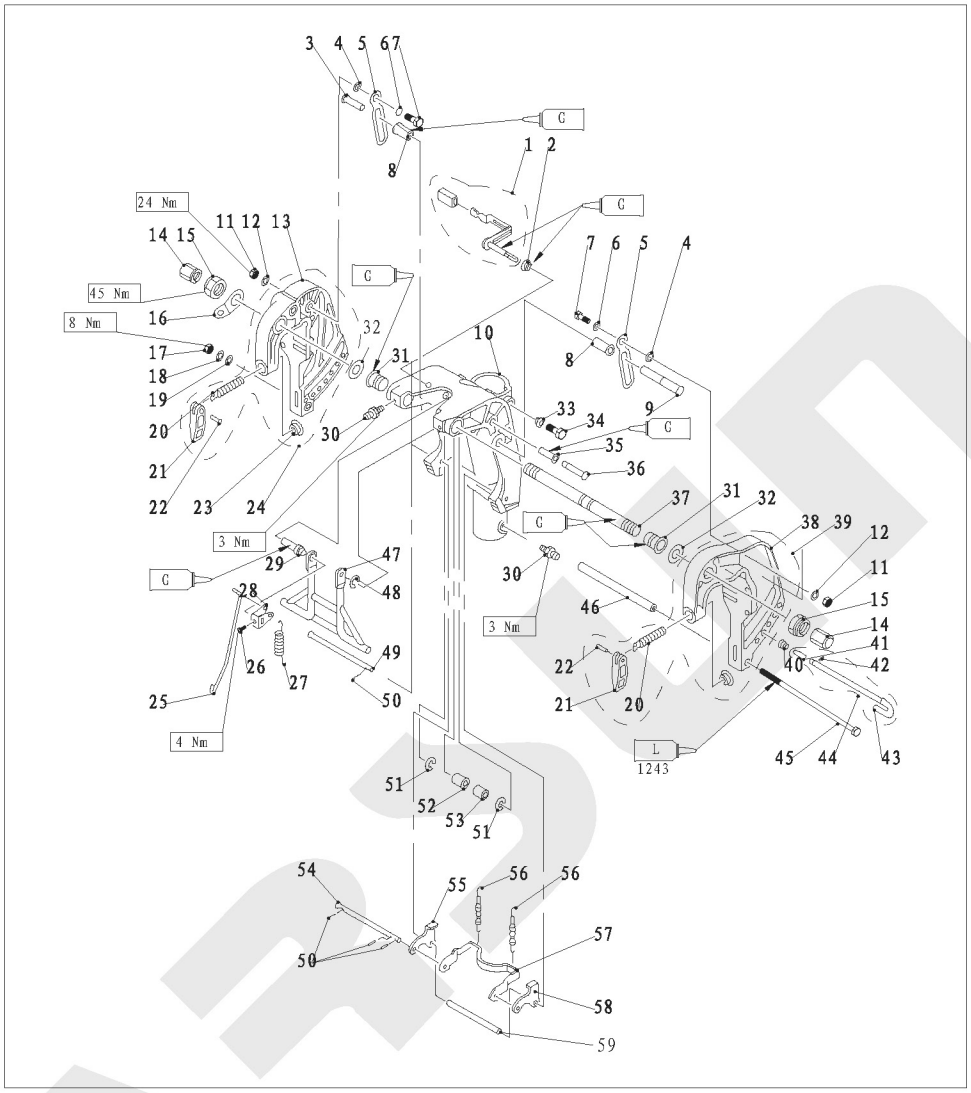
Remove lockplate:	Conducting
Install lockplate:	Not conducting
Push stop switch button:	Conducting

BRACKET

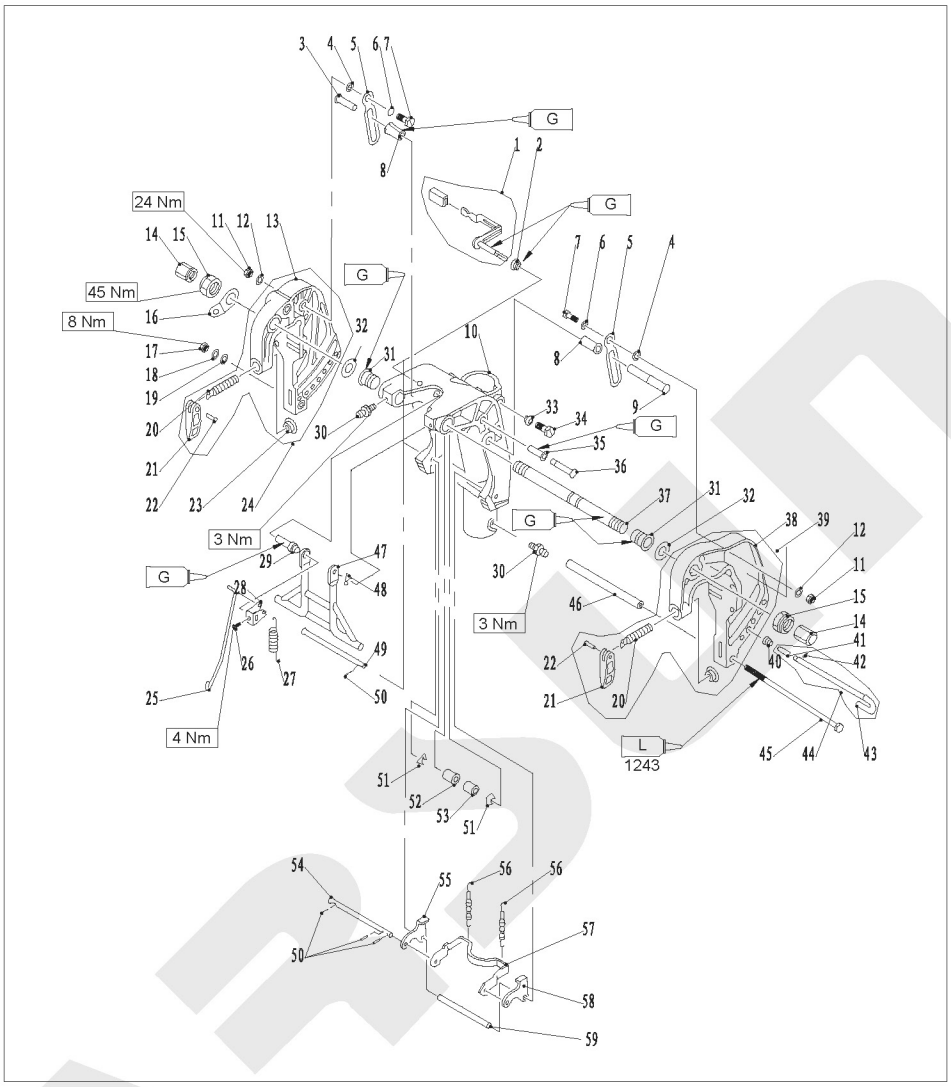
Explosive drawing



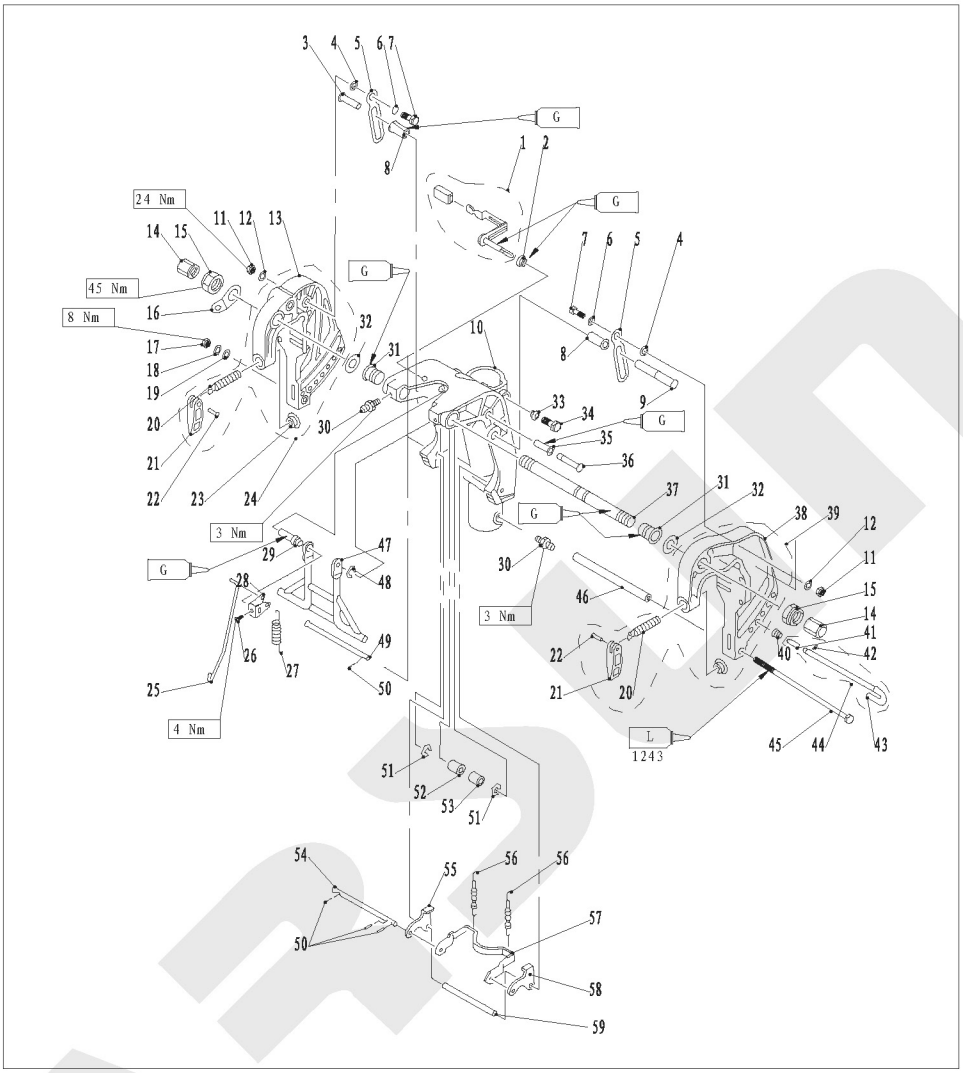
参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	GB/T889.2-M8x1.0	细牙I型非金属嵌件六角锁紧螺母M8×1.0	LOCKNUT M8x1.0	2	
2	GB/T97.1-8	平垫圈8	WASHER 8	5	
3	F25-01020002	双头螺柱	BOLT , DOUBLE HEAD	2	
4	F25-01020001	操舵托架	BRACKET , STEERING	1	L
	F25-01020001S	操舵托架	BRACKET , STEERING	1	S
5	F25-01000003	旋转支架上垫圈	WASHER , ABOVE	1	
6	F25-01000001	旋转支架上衬套	BUSH , ABOVE	1	
7	F25-01000002	上衬套锁紧块组件	PLATE , FRICTION	1	
8	GB/T5783-M8x30	六角螺栓M8×30	BOLT M8x30	3	
9	GB/T93-8	弹簧垫圈8	WASHER, SPRING 8	3	
10	F25-02000015	减震器垫板	PLATE	1	
11	F25-02000016	长螺栓	LONG BOLT	2	
12	F25-02030000	双孔减震器组件	DOUBLE HOLE SHOCK ABSORBER ASSY	1	
13	F25-00000005	六角法兰面螺母M10	NUT M10	4	
14	F25-00000001	减震块外壳	SHELL ,MOUNT DAMPER	2	
15	F25-00000002	左右减震块	MOUNT DAMPER ,LEFT AND RIGHT	2	
16	F25-00000006	六角螺栓M10×120	BOLT M10x120	2	
17	GB/T97.1-10	平垫圈10	WASHER 10	4	
18	F25-00000007	六角螺栓M10×80	BOLT M10x80	2	
19	F25-02000002	接地钢索	TIGHTWIRE ,EARTHING	1	
20	F25-00000003	前减震块	MOUNT DAMPER , FRONT	1	
21	F25-01000004	旋转支架下衬套	BUSH , BELOW	1	L
	F25-01000004S	旋转支架下衬套	BUSH , BELOW	1	S
22	F25-01000005	下衬套O形圈	O-RING	1	L
	F25-01000005S	下衬套O形圈	O-RING	1	S
23	F25-01000006	旋转支架下垫圈	WASHER , BELOW	1	



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	F25-01010312	角度锁紧手柄组件	TILT CLAMP HANDLE ASSY	1	
2	F25-01010311	锁紧手柄衬圈	WASHER	1	
3	F25-01010318	制动板销轴（短）	PIN, DETENT(S)	1	
4	F25-01010009	尼龙垫圈	WASHER, NYLON	2	
5	F25-01010321	倾斜制动板	PLATE, TILT DETENT	2	
6	F25-01010008	波形垫圈	WASHER , WAVE	2	
7	F25-01010007	扁六角轴位螺钉	SCREW , PROLATE HEXAGON	2	
8	F25-01010319	销轴尼龙衬套（高）	GASKET , NYLON	2	
9	F25-01010322	制动板销轴（长）	PIN, DETENT	1	
10	F25-01010301	旋转支架	BRACKET , ROTARY	1	L
	F25-01010301S	旋转支架	BRACKET , ROTARY	1	S
11	GB/T6182-M8	非金属嵌件六角锁紧螺母M8	LOCKNUT M8	2	
12	F25-01010010	厚垫片8	THICK WASHER	2	
13	F25-01010201	右夹紧托架	BRACKET , RIGHT	1	
14	F25-01010011	塑料装饰螺母	NUT , PLASTIC	2	
15	F15-01010007	托架夹紧螺母	NUT, SELF-LOCKING	2	
16	F25-01010004	双孔固定板	PLATE , TWO HOLE	1	
17	GB/T6170-M8	六角螺母M8	NUT M8	1	
18	GB/T93-8	弹簧垫圈8	WASHER , SPRING 8	1	
19	GB/T97.1-8	平垫圈8	WASHER 8	1	



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION	数量 QTY	备注 REMARKS
20	F25-01010104	艉板夹紧螺杆 SCREW , CLAMP	2	
21	F25-01010102	艉板夹紧手柄 CLAMP HANDLE	2	
22	F25-01010103	艉板夹紧手柄铆钉 RIVET	2	
23	F4-01010003	艉板夹紧圆盘 CLAMP PLATE	2	
24	F25-01010200	右夹紧托架组件 RIGHT BRACKET ASSY	1	
25	F25-01010315	角度锁紧支架连杆 ROD , BRACKET	1	
26	GB/T818-M5x6	十字槽盘头螺钉M5×6 SCREW, PAN HEAD M5x6	1	
27	F25-01010314	角度支撑架拉簧 SPRING , TENSION	1	
28	F25-01010313	角度定位件 LEVER ,ANGLE ORIENTATION	1	
29	F25-01010309	锁紧手柄轴套 BUSHING ,HANDLE	1	
30	GB/T7940.1-M6	直通式压注油杯M6 OIL, CUP M6	3	
31	F25-01010002	螺管尼龙衬套 BUSH , NYLON	2	
32	F25-01010003	螺管垫圈 WASHER	2	
33	F25-01010302	锁紧螺栓密封圈 WASHER , SEAL	1	
34	F25-01010303	六角凸缘螺栓M8×20 HEXAGON BOLT M8x20	1	
35	F25-01010317	销轴衬套 BUSH , PIN	1	
36	F25-01010316	角度支撑架销轴 SHAFT , ANGLE BRACKET	1	
37	F15-01010001	夹紧托架双头螺管 BOLT, CLAMP BRACKET	1	
38	F25-01010101	左夹紧托架 BRACKET , LEFT	1	
39	F25-01010100	左夹紧托架组件 LEFT BRACKET ASSY	1	



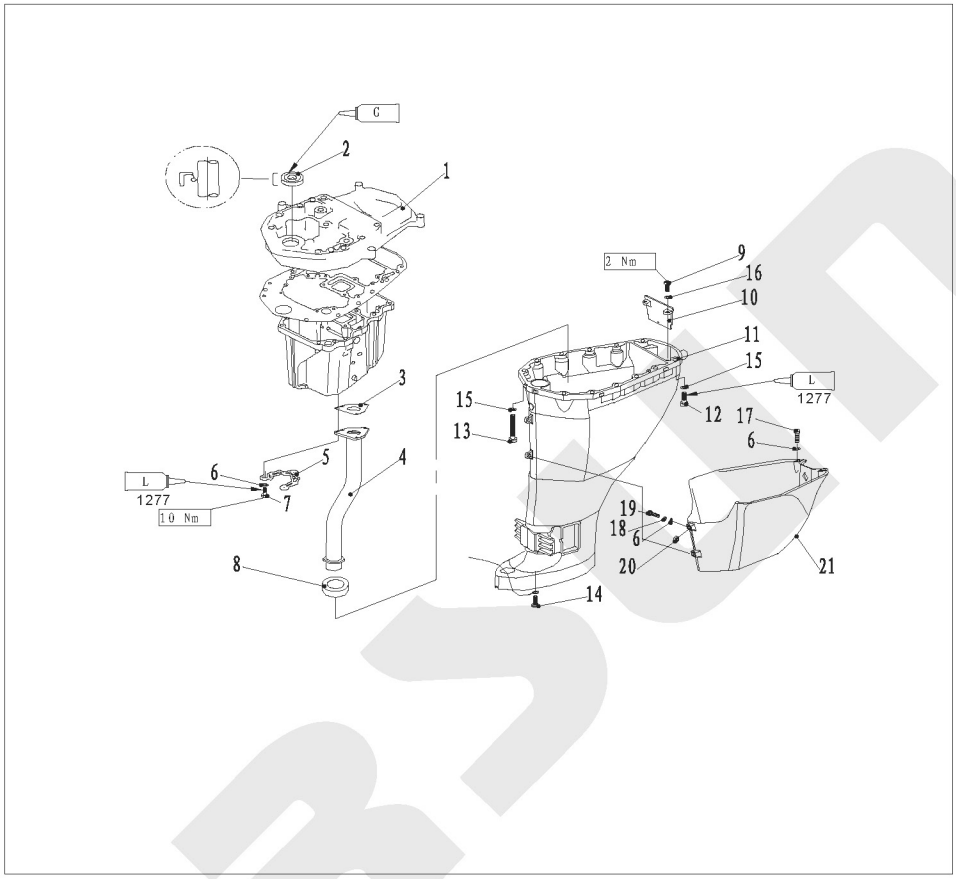
参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
40	F25-01010403	锥形弹簧	CONICAL SPRING	1	
41	F25-01010402	防脱落支脚	PLATE, PREVENT DESQUAMATION	1	
42	GB/T879.2-3x10	弹性圆柱销3×10	PIN, SPRING 3x10	1	
43	F25-01010401	角度限位杆	ROD , LIMITATIVE ANGLE	1	
44	F25-01010400	角度限位杆组件	ROD ASSY, LIMIT ANGLE	1	
45	F25-01010005	六角长螺栓M8×255	LONG BOLT M8x255	1	
46	F25-01010006	螺栓套管	TUBE , BOLT	1	
47	F25-01010308	角度支撑组件	SUPPORT ASSY	1	
48	GB/T896-1986	开口档圈8	CIRCLIP	1	
49	F25-01010305	锁紧架长轴	LONG SHAFT , BRACKET	1	
50	GB/T91-2x10	开口销 ф2x12	PIN, COTTER 2x10	4	
51	GB/T896-9	开口档圈9	CIRCLIP 9	2	
52	F25-01010324	销轴尼龙衬套（低）	GASKET , NYLON	1	
53	F25-01010323	尼龙衬管	TUBE , NYLON	1	
54	F25-01010307-3	外支架短轴	SHORT SHAFT , OUTER BRACKET	1	
55	F25-01010307-4	角度锁紧外支架（B）	BRACKET , ANGLE LOCKED	1	
56	F25-01010304	角度锁紧架拉簧	SPRING , TENSION	2	
57	F25-01010307-1	角度锁紧内支架	ARM , TILT LOCK	1	
58	F25-01010307-2	角度锁紧外支架（A）	PLATE , TILT LOCK	1	
59	F25-01010306	长轴套管	TUBE , LONG SHAFT	1	

Disassembling and inspection

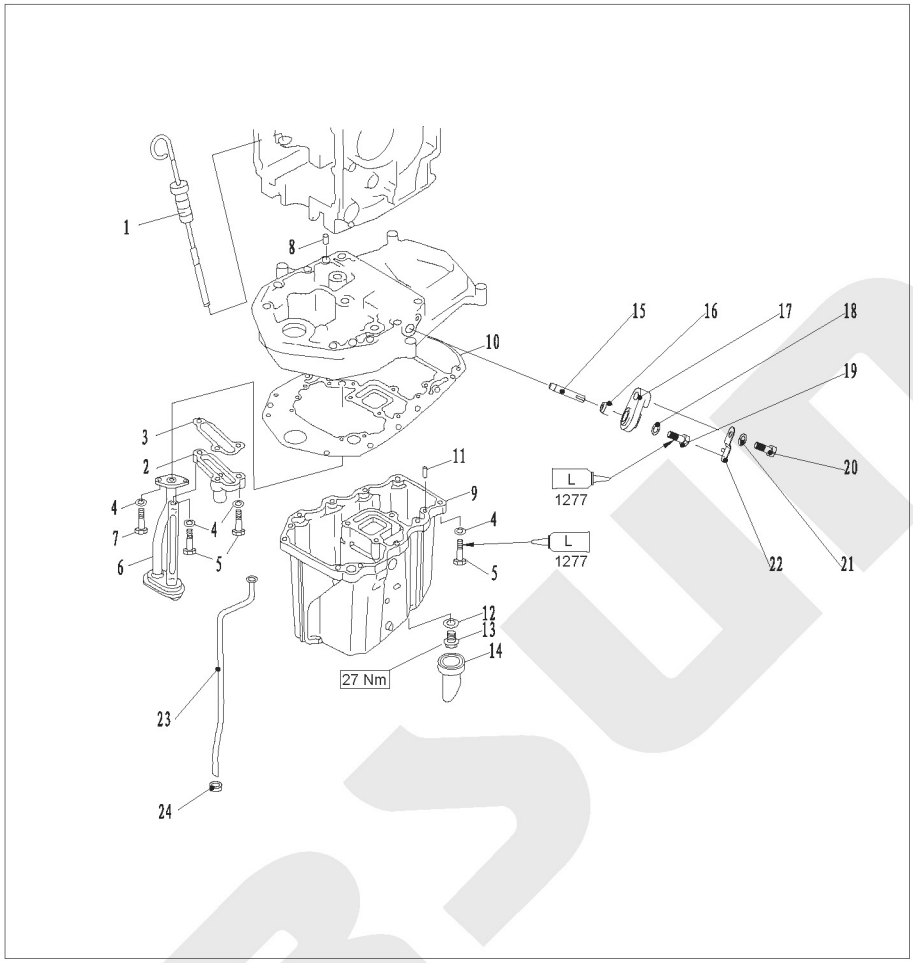
1. Remove limitative rod and bolt (M6X145).
2. Remove nut and bolt of tilt stopper plate, and remove the tilt stopper plate.
3. Remove clamp bracket nut, double hole plate, and double head bolt of clamp bracket.
4. Remove clamp bracket.
5. Remove rotary bracket.
6. Remove lock angle handle and lock bracket rod. Remove tension spring and angle orientation lever.
7. Remove orientation bushing and nylon bush.
8. Remove lock angle long shaft and short shaft.
9. Remove lock angle bracket, torsion spring, tension spring and inner bracket.
10. Inspect rotary bracket and clamp bracket for damage or crack. Replace if necessary.
11. Inspect bush and gasket for damage or crack. Replace if necessary.
12. Inspect lock angle bracket and support bracket for deform. Replace if necessary.

UPPER UNIT

Explosive drawing



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	F25-02010001	排气歧管座	GUIDE EXHAUST	1	
2	F25-02010002	排气歧管座油封	OIL SEAL	1	
3	F25-02000011	排气导管垫	GASKET, EXHAUST PIPE	1	
4	F25-02020000	排气导管组件	EXHAUST PIPE ASSY	1	L
	F25-02020000S	排气导管组件	EXHAUST PIPE ASSY	1	S
5	F25-02000012	V形垫板	PLATE, "V"	1	
6	GB/T97.1-6	平垫圈6	WASHER 6	7	
7	GB/T5782-M6x50	六角螺栓M6x50	BOLT M6x50	3	
8	F25-02000014	排气管密封圈	SEAL, EXHAUST PIPE	1	
9	GB/T818-M5x16	十字槽盘头螺钉M5x16	SCREW, PAN HEAD M5x16	2	
10	F25-02000003	排气隔板	CLAPBOARD, EXHAUST	1	
11	F25-02000001	水上装置壳体	UPPER CASING	1	L
	F25-02000001S	水上装置壳体	UPPER CASING	1	S
12	GB/T5783-M8x30	六角螺栓M8x30	BOLT M8x30	4	
13	GB/T5782-M8x80	六角螺栓M8x80	BOLT M8x80	8	
14	GB/T818-M6x10	十字槽盘头螺钉M6x10	**SCREW, PAN HEAD M6x10**	1	
15	GB/T97.1-8	平垫圈8	WASHER 8	12	
16	GB/T97.1-5	平垫圈5	WASHER 5	2	
17	GB/T5783-M6x14	六角螺栓M6x14	BOLT M6x14	2	
18	GB/T93-6	弹性垫圈6	WASHER, SPRING 6	2	
19	GB/T818-M6x25	十字槽盘头螺钉M6x25	SCREW, PAN HEAD M6x25	2	
20	GB/T6170-M6	六角螺母M6	NUT M6	2	
21	F25-00000200	水上装置罩壳	MANTLE, UPPER CASING	1	



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	F25-00000100	机油尺组件	PLUG, OIL LEVEL	1	
2	F25-02010100	溢流阀组件	RELIEF VALVE AUY	1	
3	F25-02010006	溢流阀垫片	GASKET, RELIEF VALVE	1	
4	GB/T97.1-6	平垫圈6	WASHER, PLAIN 6	15	
5	GB/T5783-M6x25	六角螺栓M6x25	HEXAGON BOLT M6x25	13	
6	F25-02010200	粗滤器组件	STRAINER, OIL	1	
7	GB/T5783-M6x16	六角螺栓M6X16	HEXAGON BOLT M6x16	2	
8	F25-00000014	定位销8x12	PIN, DOWEL	2	
9	F25-02000006	油底壳	OIL SUMP	1	
10	F25-02010007	排气歧管座垫	HEXAGON BOLT	1	
11	F15-00000006	定位销6x12	PIN, DOWEL 6x16	2	
12	F15-04000003	放油螺塞垫片	GASKET	1	
13	F15-04000002	放油螺塞	BOLT, OIL DRAIN	1	
14	F25-02000007	放油口胶套	JACKET, OIL DRAIN	1	
15	F25-02010005	阳极	ANODE	1	
16	F15-07010009	阳极密封圈	SEAL. ANODE	1	
17	F15-07010011	阳极盖板	COVER , ANODE	1	
18	GB/T97.1-5	平垫圈5	WASHER 5	1	
19	GB/T5783-M5x12	六角螺栓M5x12	BOLT M5x12	1	
20	GB/T5783-M6x20	六角螺栓M6x20	BOLT M6x20	1	
21	GB/T97.1-6	平垫圈6	WASHER 6	1	
22	F15-07010012	阳极锁止片	PLATE , ANODE	1	
23	F25-02000004	水管	TUPE, WATER	1	L
	F25-02000004S	水管	TUPE, WATER	1	S
24	F25-02000005	水管圆形橡胶圈	GASKET, WATER PIPE	1	

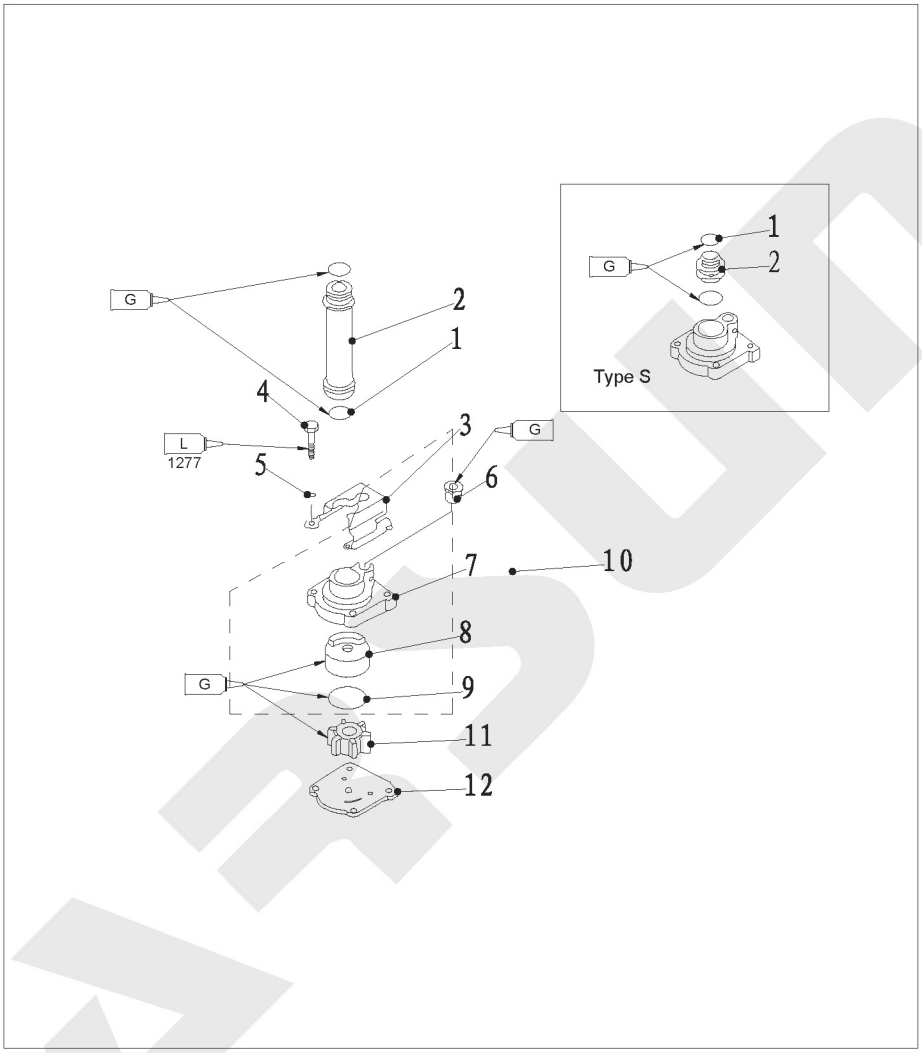
Disassembling and inspection

1. Drain the oil.
2. Remove upper unit and lower unit fixing bolts, and remove upper unit.
3. Remove exhaust guide plate, and remove oil sump.
4. Remove exhaust pipe, oil drain bolt, oil drain jacket and exhaust pipe seal from oil sump.
5. Remove oil strainer and relief valve auy from exhaust guide plate.
6. Remove double hole shock absorber assy, exhaust clapboard, rubber water pipe gasket and water pipe.
7. Check the upper casing and oil sump for crack or wear. Replace if necessary.
8. Check water pipe for deform or erosion. Replace if necessary.
9. Check the relief valve auy for crack or wear. Replace if necessary.
10. Check exhaust clapboard for damage, wear or crack. Replace if necessary.

LOWER UNIT

WATER PUMP ASSEMBLY

Explosive drawing



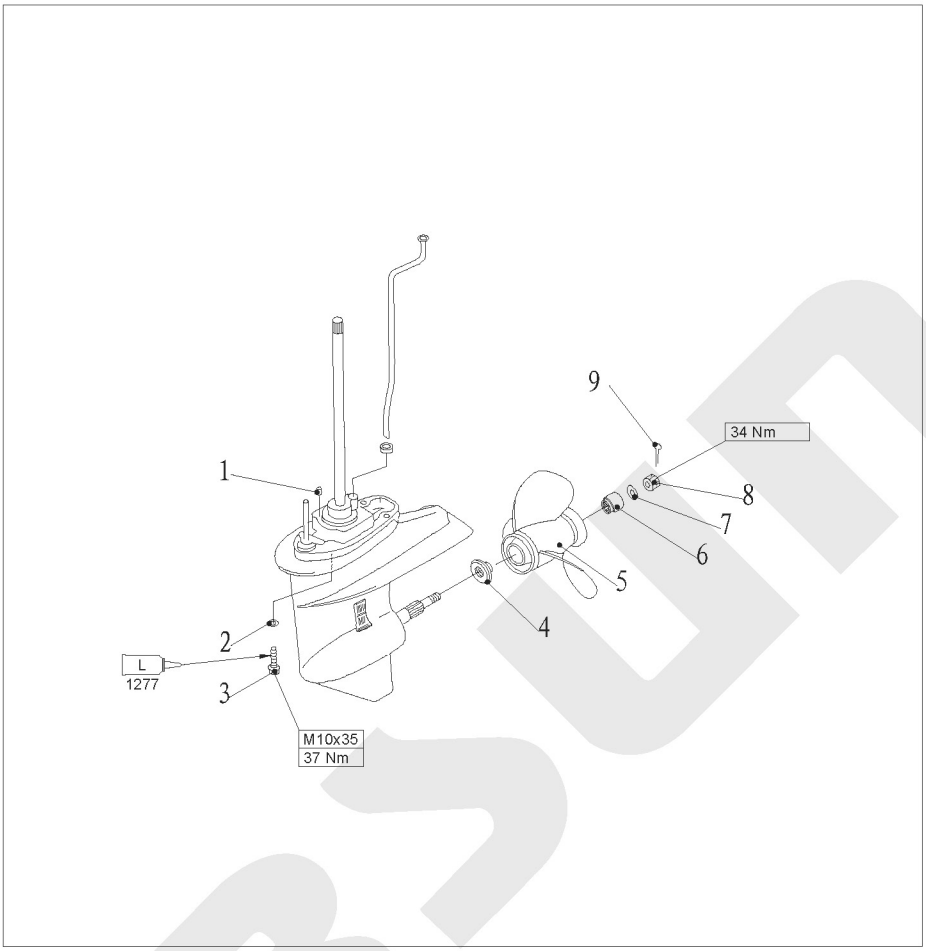
参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	GB/T3452.1-25.8x2.65	O形圈25.8x2.65	O-RING 25.8x2.65	2	
2	F25-04000017	驱动轴尼龙套	TUBE ,WATER	1	L
	F25-04000017S	驱动轴尼龙套	TUBE ,WATER	1	S
3	F25-04000016	泵壳异形固定板	FIXED PLATE,WATER PUMP	1	
4	GB/T5782-M6x40	六角螺栓M6×40	BOLT M6x40	4	
5	GB/T97.1-6	平垫圈6	WASHER 6	4	
6	F25-04050004	水管密封圈	DAMPER ,WATER PIPE	1	
7	F25-04050001	水泵壳体	SHELL ,WATER PUMP	1	
8	F25-04050002	水泵内壳	SHELL ,INNER	1	
9	F25-04050003	水泵壳体O形密封圈	O-RING	1	
10	F25-04050000	水泵壳体组件	SHELL ASSY, WATER PUMP	1	
11	F25-04040000	水泵叶轮组件	IMPELLER ASSY	1	
12	F25-04000014	外档板	OUTER PLATE	1	

Disassembling and inspection

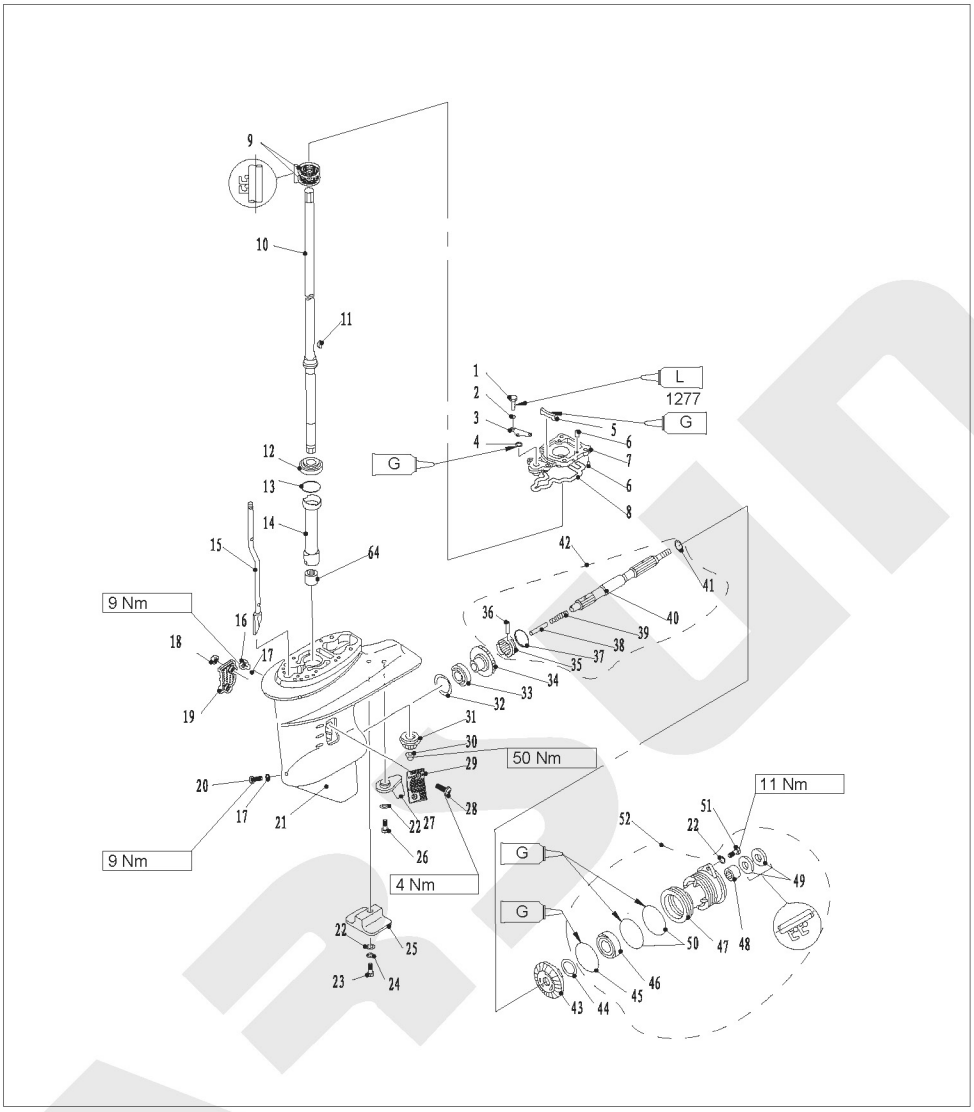
1. Remove water pump fixed plate.
2. Remove water pump shell.
3. Remove impeller and water pump inner shell.
4. Remove woodruff key and outer plate.
5. Check water pump shell and outer plate for crack, crank or damage. Replace if necessary.
6. Check inner water pump inner shell and impeller for crack, deform, burn or wear. Replace if necessary.

LOWER UNIT

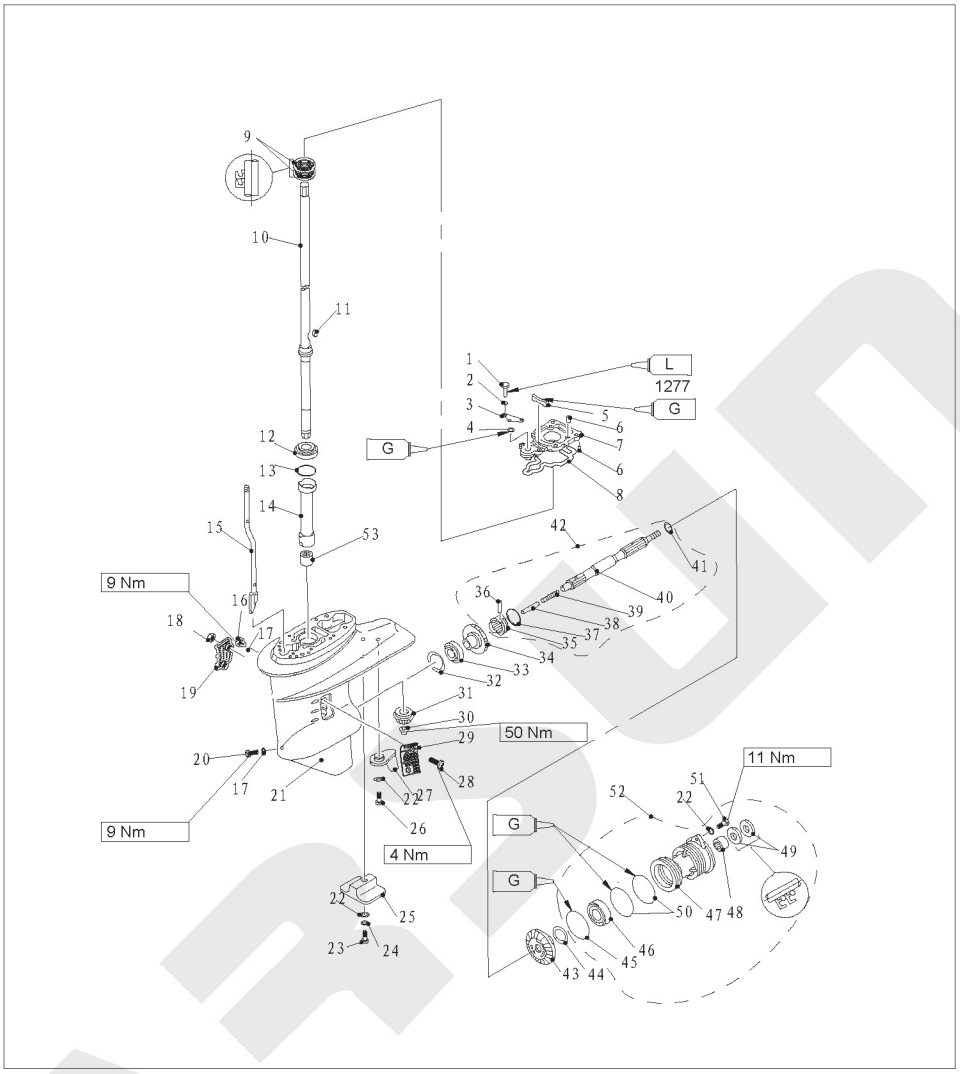
Explosive drawing



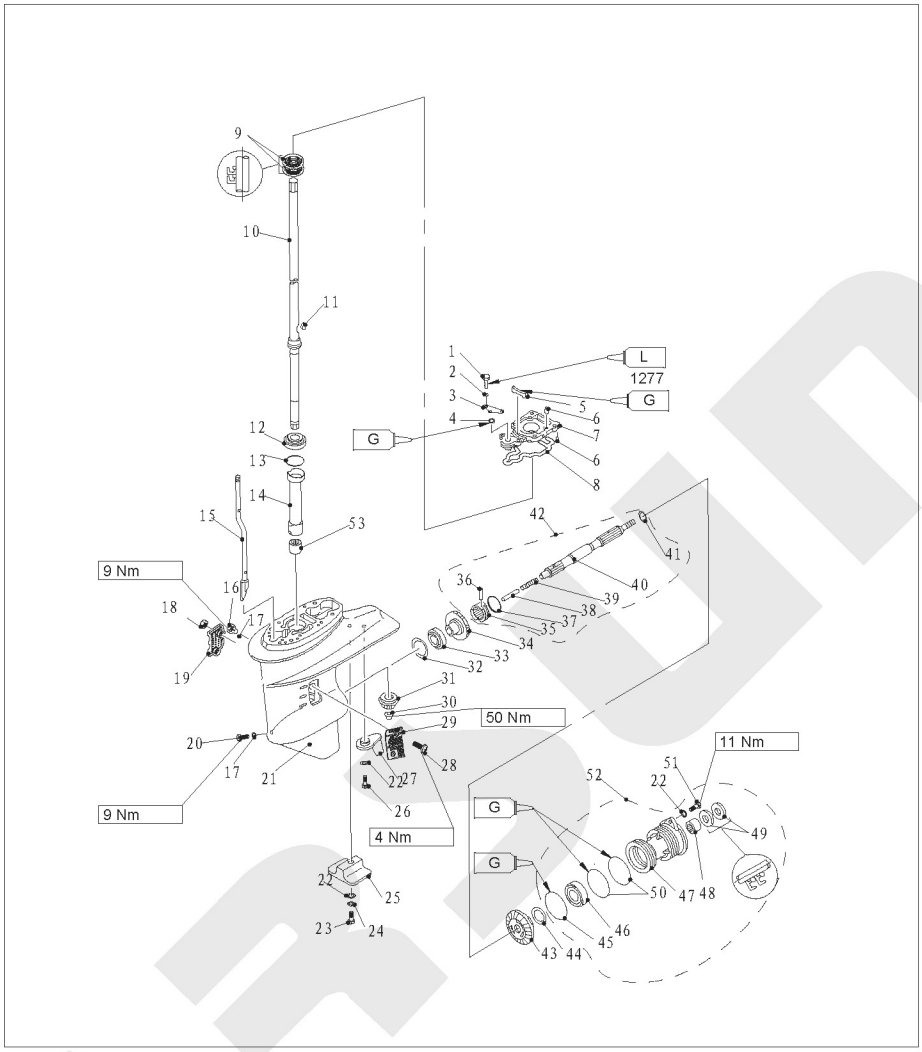
参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	F15-00000006	定位销 φ6x12	PIN, DOWEL	2	
2	GB/T97.1-10	平垫圈10	WASHER 10	4	
3	F25-00000011	凸缘螺栓M10x1.25x35	BOLT M10x1.25x35	4	
4	F25-04000024	螺旋桨垫块	SPACER, PROPELLER	1	
5	F25-04080000	螺旋桨组件	PROPELLER ASSY	1	
6	F25-04000025	花键垫块	SPACER	1	
7	GB/T97.1-14	平垫圈14	WASHER 14	1	
8	F25-04000027	开槽六角螺母	NUT	1	
9	GB/T91-2.5x22	开口销 φ2.5x22	PIN, COTTER 2.5x22	1	



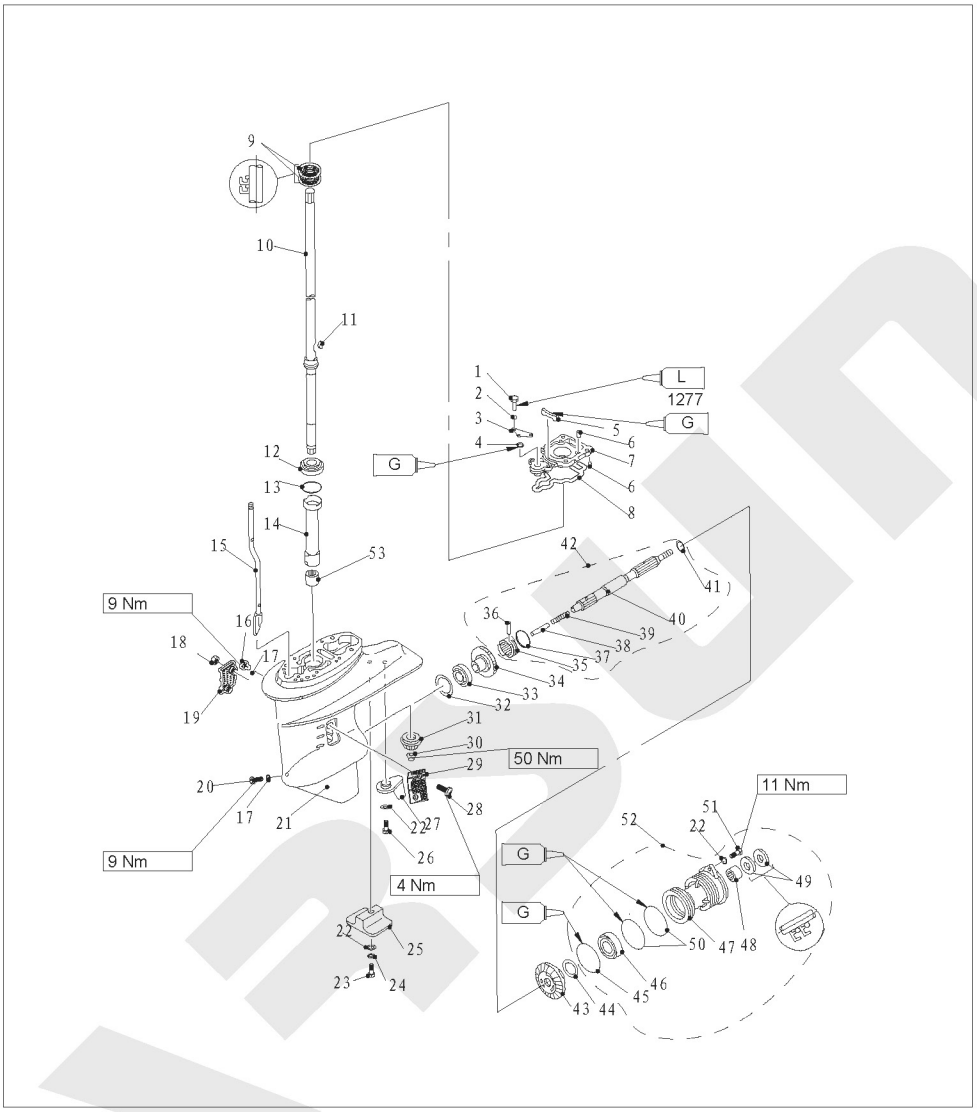
参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
1	B/T5783-M6×25	六角螺栓M6×25	BOLT M6×25	2	
2	GB/T97.1-6	平垫圈6	WASHER 6	2	
3	F25-04000012	O形圈档板	PLATE ,O-RING	1	
4	F15-06020004	O形密封圈	O-RING	1	
5	F25-04000013	水封	WATER SEAL	1	
6	F25-04000007	定位销Φ4x10	PIN,DOWEL 4x10	3	
7	F25-04000008	驱动轴座	BASE ,DRIVE SHAFT	1	
8	F25-04000009	异形密封圈	SEAL	1	
9	F25-04010003	驱动轴油封22x36x6	OIL SEAL ,DRIVE SHAFT 2x36x6	2	
10	F25-04010000	驱动轴组件	DRIVE SHAFT ASSY	1	L
	F25-04010000S	驱动轴组件	DRIVE SHAFT ASSY	1	S
11	F25-04000015	半圆键	SEMICIRCULAR KEY	1	
12	HI-CAP 32004JR KOYO	驱动轴圆锥滚子轴承	HOUSING,BEARING	1	
13	F25-04000003-1	驱动轴填隙片(t:0.7毫米)	SHIM(t:0.7mm)		
	F25-04000003-2	驱动轴填隙片(t:1.0毫米)	SHIM(t:1.0mm)		



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
	F25-04000003-3	驱动轴填隙片(t:1.1毫米)	SHIM(t:1.1mm)		
	F25-04000003-4	驱动轴填隙片(t:1.2毫米)	SHIM(t:1.2mm)		
	F25-04000003-5	驱动轴填隙片(t:1.3毫米)	SHIM(t:1.3mm)		
	F25-04000003-6	驱动轴填隙片(t:1.4毫米)	SHIM(t:1.4mm)		
	F25-04000003-7	驱动轴填隙片(t:1.5毫米)	SHIM(t:1.5mm)		
	F25-04000003-8	驱动轴填隙片(t:1.6毫米)	SHIM(t:1.6mm)		
14	F25-04000002	长尼龙套管	BUSHING ,NYLON	1	
15	F25-04030000	变档凸轮组件	CAM ASSY,SHIFT ROD	1	L
	F25-04030000S	变档凸轮组件	CAM ASSY,SHIFT ROD	1	S
16	F4-03000023	注油孔螺塞	PLUG,HOLE OIL	1	
17	F4-03000024	注油孔螺塞垫圈	GASKET	2	
18	GB/T889.1-M5	I型非金属嵌件六角锁紧螺母M5	NUT,LOCKING M5	2	
19	F25-04000023	进水口B	WATER INLET "B"	1	
20	F25-04000031	放油螺塞	PLUG,DRAIN	1	
21	F25-04000001	水下装置壳体	LOWER CASING	1	
22	GB/T97.1-6	平垫圈6	WASHER 6	4	
23	GB/T5782-M6x35	六角螺栓M6×35	BOLT M6×35	1	
24	GB/T861.1-6	内齿锁紧垫圈6	WASHER,LOCKING 6	1	
25	F15-06000004	水下装置阳极	ANODE,LOWER	1	
26	GB/T5783-M6x20	六角螺栓M6×20	BOLT M6×35	1	



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION		数量 QTY	备注 REMARKS
27	F25-04000021	航向调整片	TAB, COURSE	1	
28	GB/T820-M5x30	十字槽半沉头螺钉M5×30	SCREW, PAN HEAD M5×30	1	
29	F25-04000022	进水口A	WATER INLET "A"	1	
30	F25-04000006	小齿轮螺母	NUT, PINION	1	
31	F25-04000005	小齿轮	PINION	1	
32	F25-04000004-1	正档齿轮填隙片(t:1.0毫米)	SHIM(t:1.0mm)		
	F25-04000004-2	正档齿轮填隙片(t:1.1毫米)	SHIM(t:1.1mm)		
	F25-04000004-3	正档齿轮填隙片(t:1.2毫米)	SHIM(t:1.2mm)		
	F25-04000004-4	正档齿轮填隙片(t:1.3毫米)	SHIM(t:1.3mm)		
	F25-04000004-5	正档齿轮填隙片(t:1.4毫米)	SHIM(t:1.4mm)		
33	NTN 4T 30205 HN	圆锥滚子轴承	TAPER ROLLER BEARING	1	
34	F25-04020000	正档齿轮组件	GEAR, FORWARD	1	
35	F25-04060003	爪形离合器	CLUTCH, DOG	1	
36	F15-06070004	离合器销	PIN, CLUTCH	1	
37	F15-06070005	离合器簧环	RING, CLUTCH	1	
38	F25-04060006	变档柱塞	PLUNGER, SHIFT	1	
39	F25-04060002	离合器弹簧	SPRING, CLUTCH	1	
40	F25-04060001	螺旋桨轴	SHAFT, PROPELLER	1	
41	F25-04060007	倒档齿轮垫圈	PLATE, REVERSE GEAR	1	
42	F25-04060000	螺旋桨轴组件	PROPELLER SHAFT ASSY	1	



参照号码 SN.	零件编号 PART NO.	零件名称 DESCRIPTION	数量 QTY	备注 REMARKS
43	F25-04070004	倒档齿轮 GEAR, REVERSE	1	
44	**F25-04070005-1**	**倒档齿轮填隙片(t:1.0毫米)** SHIM(t:1.0mm)		
	F25-04070005-2	**倒档齿轮填隙片(t:1.1毫米)** SHIM(t:1.1mm)		
	F25-04070005-3	**倒档齿轮填隙片(t:1.2毫米)** SHIM(t:1.2mm)		
	F25-04070005-4	**倒档齿轮填隙片(t:1.3毫米)** SHIM(t:1.3mm)		
45	F25-04070002	**水下装置壳体盖O形圈A** O-RING A	1	
46	KOYO 6006C3	深沟球轴承 BALL BEARING	1	
47	F25-04070001	滚针轴承26x20x16 ROLLER GEARING	1	
48	**NTN HK2016 HU**	油封20x34x6.5 OIL SEAL 20x34x6.5	1	
49	F25-04070006	水下装置壳体盖 **COVER, LOWER CASING**	2	
50	F25-04070003	**水下装置壳体盖O形圈B** O-RING B	2	
	GB/T5783-M6x20	六角头螺栓M6x20 BOLT M6x20	2	
52	F25-04070000	**水下装置壳体盖组件** **COVER ASSY,LOWER CASING**	1	
53	F2020	滚针轴承 NEEDLE BEARING	1	

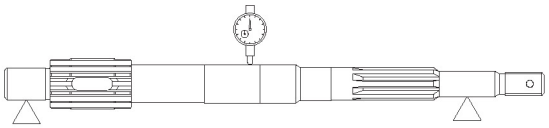
Disassembling and inspection

1. Drain oil, and remove the cotter pin.
2. Put a piece of wood between propeller and anti-swirl baffle. Remove hexagon nut, anode and water inlet.
3. Remove propeller assembly and cushion.
4. Remove anode.
5. Remove the lower casing cover. Remove reverse gear and shim. Remove oil seal.
6. Remove propeller shaft assembly.
7. Remove shift plunger.
8. Remove clutch ring, remove clutch pin and dog clutch. Remove clutch spring.
9. Remove drive shaft base.
10. Remove the pinion nut by using female spline spanner. Remove drive shaft. Remove drive shaft nylon bushing..

11. Remove shift rod cam assy and forward gear.
12. Remove rolling needle bearing from lower unit.
13. Remove oil seal from the drive shaft base, and remove the bearing from forward gear.

Propeller shaft and clutch block

1. Check dog clutch for crack or damage. Replace if necessary.
2. Check propeller shaft for wear or crank. Replace if necessary.
3. Check the run out of propeller shaft. If out of specification, replace.

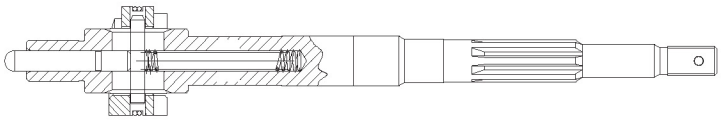


Run out limit: 0.02 mm

Dog clutch installation

1. Put clutch spring into the hole at the end of the propeller shaft.

2. Install the dog clutch as shown. Make sure the "F"or "●" mark is toward the forward gear. Install clutch pin.



3. Install clutch ring and shift plunger.

Lower casing cover

1. Check bearing for rust or rumbling when run. Replace if necessarily.

2. Remove bearing and oil seal by bearing puller.

NOTE:

Don't remove bearing unless changing it.

3. Remove rolling needle bearing by using special tool.

NOTE:

Use new parts when reinstalling the oil seal and rolling needle bearing.

4. Clean casing cover by a soft brush and solvent.

5. Check casing cover for crack or damage. Replace if necessary.

Lower casing cover oil seal and bearing installation

1. Install oil seal.

2. Install new bearing on the reverse gear.

NOTE:

Install oil seal and bearing by using special tools.

Take note of the direction and depth when installing.

Make sure the manufacturer mark of the bearing is toward the reverse gear.

Installing depth:

Needle Bearing		31.0~31.5 mm
Oil seal	Depth1	13.0~13.5 mm
	Depth2	6.0~6.5 mm

Lower casing cover bearing installer

Lower casing cover oil seal installer

Lower casing cover needle bearing installer

Reverse gear bearing installer

3. Install reverse gear and shim.

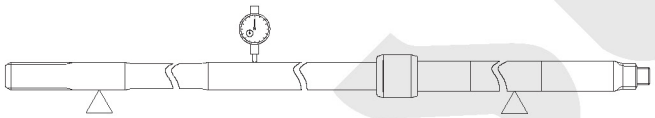
NOTE:

Adjust the shims when install the new reverse gear and bearing.

Drive shaft

1. Inspect the drive shaft for crank or wear. Replace if necessary.

2. Check the run out of drive shaft.



Run out limit: 0.05 mm

Shift rod cam

Check the shift rod cam for wear or deform. Replace if necessary.

Gear

Inspect the forward gear, reverse gear and pinion for wear or damage. Replace if necessary.

Forward gear bearing

Inspect bearing for rust or rumbling when rotating. Replace if necessary.

NOTE:

Don't remove bearing unless replace it.

Adjust the shim when install new bearing.

Lower casing inspection

Check lower casing for crack or damage, check cooling water inlet for clog. Replace if necessary.

Assembling lower casing

1. Install the rolling needle bearing by using special tool.

Rolling needle bearing installer

2. Install new forward gear bearing (if replace).

Forward gear bearing housing installer

3. Install drive shaft base oil seal.

Drive shaft oil seal installer

4. Install nylon bushing, shift rod cam assy, gasket, and drive shaft base. Install forward gear, drive shaft, shim, and pinion.

CAUTION:

Adjust shim when install new drive shaft base or drive shaft.

5. Tighten the pinion nut.
   Specified torque: 50Nm

6. Install propeller shaft assy.

7. Install lower casing cover.

Lower casing cover installer

8. Check if gearshift works normally.

9. Install water pump assy.

10. Install anode and water inlet.

11. Install propeller and hexagon nut. Put a piece of wood between propeller and anti-swirl baffle. Tighten the nut according to specified torque.
Specified torque: 34Nm

NOTE:
If the nut slot is not aligned with the hole of the propeller shaft cotter pin, tighten the nut until aligned.

Lower unit installation

1. Install dowel pin.

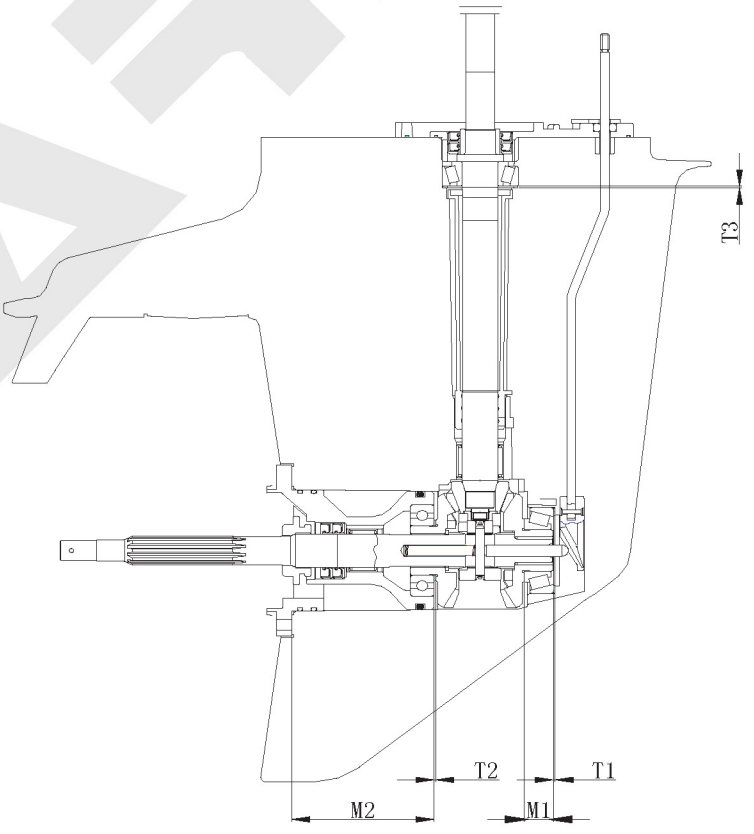
2. Move the shift rod cam assy to reverse gear position. Install the lower unit to upper casing, tighten the bolts according to specified torque.
Specified torque: 37 Nm

3. Connect the columned nut and shift rod cam assy. Change shift, and check if the operation is normal. Adjust the columned nut position if necessary. Tighten the nut thoroughly.

4. Add gear oil using the pressure filling device.

Shim selection

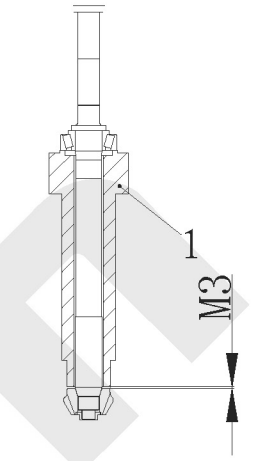
Adjust the shim when replacing the spare parts in lower unit or assembling a new lower unit.



Pinion shim

1. Install drive shaft onto special tool. Install pinion and tighten it according specified torque.
   Specified torque: 50 Nm

2. Mearsure the clearance between special tool and pinion by clearance gauge, and calculate the thickness of T3 according to the formula.
   Calculation formula: T3=M3



1. Special tool

3. Select the shim according to the table below.

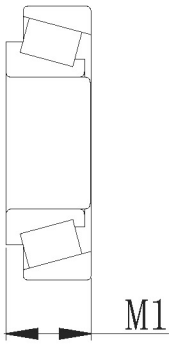
T3		Shim size selection
From	To	
1.10	1.20	1.2
1.20	1.30	1.3
1.30	1.40	1.4
1.40	1.50	1.5
1.50	1.60	1.6
1.60	1.70	0.7+1.0
1.70	1.83	0.7+1.1
Optional shim size: 0.7, 1.0, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6		

Unit: mm

Forward gear shim

1. Rotate the outer ring of forward gear, to make the roller fall completely inside the bearing housing.

2. Measue the height of bearing, calculating the thickness of T1 according to formula.
   Calculation formula: T1=17.5-M3



NOTE:
Use three measuring points to measure the thickness.
Apply the average.

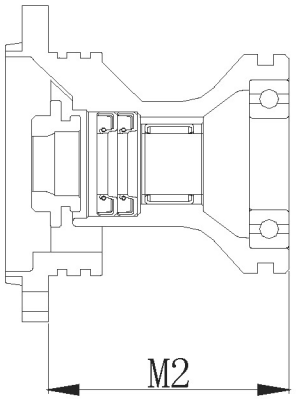
3. Select the shim according the table below.

T1		Shim size selection
From	To	
0.99	1.10	1.0
1.10	1.20	1.1
1.20	1.30	1.2
1.30	1.40	1.3
1.40	1.50	1.4
Optional shim size: 1.0, 1.1, 1.2, 1.3, 1.4		

Unit: mm

Reverse gear shim

1. Measure the size according to picture below.



2. Calculate the thickness of T2 according to formula.
   Calculation formula: T2=80-M2

3. Select the shim according the table below.

T2		Shim size selection
From	To	
0.99	1.10	1.0
1.10	1.20	1.1
1.20	1.30	1.2
1.30	1.32	1.3
Optional shim size: 1.0, 1.1, 1.2, 1.3		

Unit: mm

COMMON TROUBLES AND SOLUTIONS

Trouble type	Possible reason	Recovery action
Starter will not operate	Starter components are faulty	Repair or replace
	Shift lever is not in the neutral position	Move to the neutral position
Engine will not start	Fuel tank is empty	Fill tank with clean, fresh fuel
	Fuel is contaminated or stale	
	Fuel cleaner is obstructed	Replace fuel cleaner
	Fuel pump is faulty	Inspect or replace
	Air vent screw on fuel tank is not loosened	Loosen air vent screw
	Spark plug(s) fouled or of incorrect type.	Inspect spark plug(s). Clean or replace with recommended type
	Spark plug cap(s) fitted incorrectly	Check and re-fit cap(s)
	Ignition wiring is faulty	Check wires. Tighten all loose connections. Replace worn or broken wires
	Ignition parts are faulty	Replace
	Engine stop switch lanyard is not attached	Attach lanyard
	Engine inner parts are damaged	Repair
Engine idles irregularly or stalls	Spark plug(s) fouled or of incorrect type.	Inspect spark plug(s). Clean or replace with recommended type
	Fuel system is obstructed	Check for pinched or kinked fuel line or other obstructions in fuel system
	Fuel is contaminated or stale	Fill tank with clean, fresh fuel
	Fuel cleaner is obstructed	Replace
	Spark plug clearance is incorrect	Inspect and adjust as specified
	Ignition wiring is faulty	Check wires. Tighten all loose connections. Replace worn or broken wires
	Specified engine oil is not being used	Check and replace oil as specified
	Thermostat is faulty	Replace
	Carburetor is faulty	Replace
	Fuel pump is faulty	Replace
	Air vent screw on fuel tank is not loosened	Loosen air vent screw
	Fuel joint connection is incorrect	Connect correctly
	Choke knob is pulled out	Return to home position
	Motor angle is too high	Return to normal operating position

Cont'd

Trouble type	Possible reason	Recovery action
Engine power loss	Propeller is damaged	Repair or replace propeller
	Trim angle is incorrect	Adjust trim angle to achieve most efficient angle
	Motor is mounted at incorrect transom height	Adjust motor to proper transom height
	Boat bottom is fouled with marine growth	Clean boat bottom
	Weeds or other foreign matter are tangled on gear housing	Remove foreign matter and clean lower unit
	Spark plug(s) fouled or of incorrect type.	Inspect spark plug(s). Clean or replace with recommended type
	Fuel system is obstructed	Check for pinched or kinked fuel line or other obstructions in fuel system
	Fuel cleaner is obstructed	Replace fuel cleaner
	Fuel is contaminated or stale	Fill tank with clean, fresh fuel
	Spark plug clearance is incorrect	Inspect and adjust as specified
	Ignition wiring is faulty	Check wires. Tighten all loose connections. Replace worn or broken wires
	Ignition parts have failed	Replace
	Specified engine oil is not being used or oil is added too much	Check and replace oil as specified, or adjust engine oil to specified position
	Thermostat is faulty	Replace
	Fuel pump is faulty	Replace
	Fuel joint connection is incorrect	Connect correctly
	Specified spark plug(s) are not being used	Check and replace spark plug(s) as specified
Engine vibrates excessively	Propeller is damaged	Repair or replace propeller
	Propeller shaft is damaged	Replace
	Weeds or other foreign matter are tangled on propeller	Remove and clean propeller
	Motor mounting bolt is loose	Tighten bolt
	Steering pivot is loose	Tighten steering pivot
	Steering pivot is damaged	Replace