

# **NISSAN OUTBOARD MOTOR**

**NS 60  
NS 70  
NS 90  
NS 120  
NS 140**

**OWNER'S OPERATING MANUAL**

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# YOUR NISSAN OUTBOARD MOTOR

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## OWNER REGISTRATION AND IDENTIFICATION

Upon purchasing this product, be sure your dealer\* fills out the WARRANTY CARD correctly, completely and mails it to the distributor. This card identifies you as the legal owner of the product and serves as your warranty registration. If this procedure is not followed, your outboard motor will not be covered by warranty.

\* : In this manual, "dealer" always means an authorized NISSAN dealer.

## PRE-DELIVERY CHECK

Be sure that the product has been checked by the dealer before delivery.

## Limited Warranty

This NISSAN product is fully guaranteed against defective materials and workmanship for the period from the date of purchase, provided that the purchase has been registered in accordance with the above.

The limited warranty will not apply to the normal wear and tear of parts, adjustments, tune-ups, or to any damage caused by, but not limited to:

- 1) Use or operation NOT conforming to the instructions described in this owner's manual.
- 2) Participation in or preparation for racing or other competitive activities.
- 3) Water entering the engine.
- 4) Damage from accidents, collisions, contact with foreign materials, or submersion.
- 5) Growth of marine organisms on motor surfaces.
- 6) Any other careless use or operation.
- 7) Normal deterioration.

The limited warranty does not cover maintenance items. The following items are a few examples not covered by the limited warranty:

Spark plugs, Anode, Trim-tab, Propeller, Fuel filter, Oil filter, Carbon brush, Starter rope, Shear-pin, Split-pin, Bolt-nut-washer, Wire cable, Rubber goods: water pump impeller, oil seal, "O"-ring, fuel hose, primer bulb, vinyl tube etc.

The limited warranty will become void if the product has been altered, modified, or repaired by anyone other than a company or service firm authorized by NISSAN.

The limited warranty will cover only your NISSAN product and will not cover the boat the product is mounted on, the trailer, equipment, or accessories associated with the product.

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## Serial Number

In the space below, please record the engine's serial number (indicated both on the lower motor cover and on the cylinder block). This number will come in handy in the event of theft or to help in quickly identifying the product type.

Serial Number : \_\_\_\_\_

## To You, Our Customer:

Thank you for selecting a NISSAN product. You are now the proud owner of an excellent outboard engine that will service you for many years to come.

We would like to point out that carefree usage can only be assured on condition that this manual is read through in its entirety and the maintenance routines described later in this manual are followed carefully. Should difficulty arise with the engine, please follow the troubleshooting procedures listed at the end of this manual. If the problem persists, contact an authorized NISSAN service shop or your dealer.

We hope you will get much enjoyment from this product and wish you good luck in your boating adventures.

**NISSAN MARINE**

## NOTICE: DANGER/WARNING/CAUTION/Note

Before operating your outboard motor, be sure to thoroughly read and understand this Owner's Manual and follow all of the instructions shown. Of particular importance is information preceded by the words "DANGER," "WARNING," "CAUTION," and "Note." Always pay special attention to such information to ensure safe and trouble-free operation at all times.

### **DANGER**

Failure to observe will result in severe personal injury or death.

### **WARNING**

Failure to observe could result in severe personal injury or death.

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## **⚠ CAUTION**

Failure to observe could result in personal injury, or product or property damage.

### **Note:**

This instruction provides special information to facilitate the use or maintenance of the outboard or to clarify important points.

## **EMERGENCY STOP SWITCH**

The Emergency stop switch will stall the engine when the stop switch tether is pulled out. This line can be attached to the body of the operator, effectively preventing injuries from the propeller in case he/she falls overboard.

We highly recommend use of the Emergency stop switch line. However, we would also like to point out the drawbacks of the switch. Accidental activation of the switch (such as the line being pulled out in heavy seas) could cause passengers to lose their balance and even fall overboard, or it could result in loss of power in heavy seas, strong currents, or high winds. Loss of control while mooring is another potential hazard.

To prevent such hazardous situations, the 500 mm (20 inch.) line is coiled and can be extended to a full 1,300 mm (51 inch.).

## **WARNINGS**

As the operator/driver of the boat, you are responsible for the safety of those aboard and those in other crafts around yours, and for following local boating regulations. Therefore you should possess thorough knowledge of correct operation of the boat, engine, and accessories. To learn about the correct operation and maintenance of the engine, please read through this manual carefully.

It is very difficult for a person standing or floating in the water to take evasive action should he or she see a power boat heading in his/her direction, even at a slow speed. Therefore, when your boat is in the immediate vicinity of people in the water, the engine should be shifted to neutral and shut off.

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SERIOUS INJURY IS LIKELY IF A PERSON IN THE WATER MAKES CONTACT WITH A MOVING BOAT, GEAR HOUSING, PROPELLER, OR ANY SOLID DEVICE RIGIDLY ATTACHED TO A BOAT OR GEAR HOUSING.

It is the operator's responsibility to perform all safety checks and to ensure that all lubrication and maintenance instructions are complied with for safe operation. It is also the operator's responsibility to return the unit to the local dealer for periodic inspection.

Correct periodic maintenance and proper care of this outboard engine will lessen the chance of problems and keep overall operating expenses at a minimum.

## **SERVICING, REPLACEMENT PARTS & LUBRICANTS**

Only let an authorized NISSAN service shop perform service or maintenance on this product. Be sure to use genuine parts, genuine lubricants, or recommended lubricants.

## **MAINTENANCE**

As the owner of this outboard engine, you must be acquainted with correct maintenance procedures. Please comply with all instructions concerning lubrication and maintenance, and you should return the engine to the dealer, or service shop, for periodic inspection at the prescribed intervals.

Troublefree operation cannot be expected unless the engine receives adequate periodic maintenance. If proper maintenance is performed, it is not likely that a costly repair will ever be required.

## **USE OF SERVICE SHOP**

We recommend that you use only authorized dealers to carry out all of your maintenance and repair needs.

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# 1 SPECIFICATIONS

Model	60C 70C EF	60C 70C EFO	60C 70C EFTO
Overall Length, mm	Approx. 1,280		
Overall Width, mm	Approx. 360		
Overall Height, mm	L: 1,415      UL:1,542		
Transom Height, mm	L: 517      UL: 644		
Weight, kg (Approx.)	L: 106 UL:108.5	L: 108 UL:110.5	L: 120 UL:122.5
Max. Output, kW	60C: 44.1    70C: 51.5		
Full Throttle Speed range, rpm.	5,150 – 5,850		
No. of Cylinders	3		
Piston Displacement, mL	938		
Bore & Stroke, mm	74 × 72.7		
Exhaust System	Through hub exhaust		
Lubrication	Premixed Fuel	Auto mixing	
Fuel Mixing Ratio	50:1	120:1 – 50:1	
Cooling System	Forced water cooling		
Starting System	Electric starter motor		
Ignition	Flywheel Magneto C.D. Ignition		
Spark Plugs	NGK B8HS-10/BR8HS-10 or Champion L-78C/RL-78C (1.0mm gap)		
Alternator	12V, 130W (12V, 11A)		
No. of Trim Adjustments	5		2 (with PTT)
Engine Oil	Genuine Motor Oil or recommended one (TCW- III )		
Gear Oil	Genuine Gear Oil or API GL5, SAE #80 to #90, approx. 900 mL		
Fuel Tank Capacity, litter (US gal)	25 (6.6)		
Engine Oil Capacity, litter (US gal)	—	Approx. 2.6 (0.69)	
Gear Reduction Ratio	12 : 28		
Fuel	Unleaded regular gasoline pump posted 87 Octane (research octane rating of 91)		

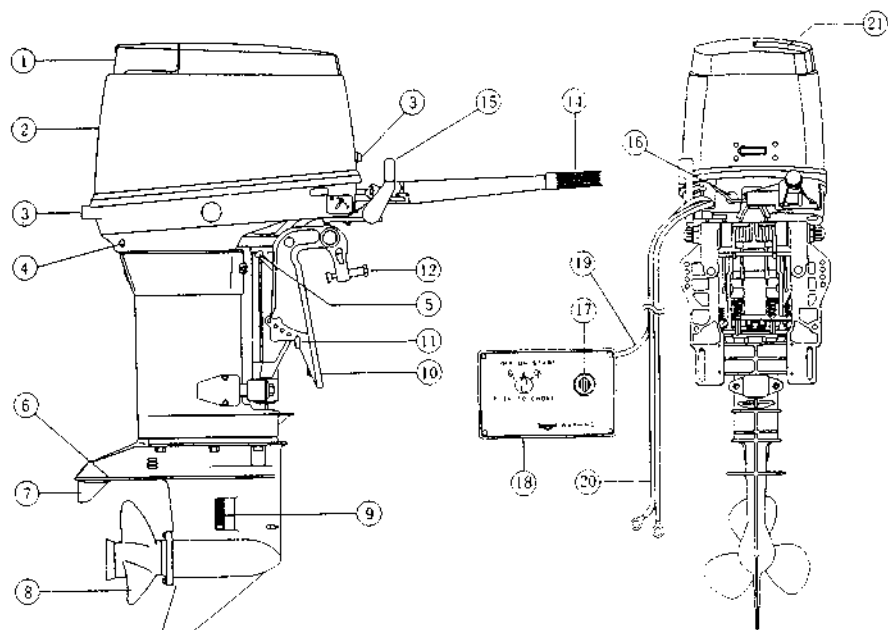
Model	60C 70C EPO	60C 70C EPTO
Overall Length, mm	Approx. 720	
Overall Width, mm	Approx. 360	
Overall Height, mm	L: 1,415    UL: 1,542	
Transom Height, mm	L: 517    UL: 644	
Weight, kg (Approx.)	L: 103 UL: 105.5	L: 115 UL: 117.5
Max. Output, kW	60C: 44.1    70C: 51.5	
Full Throttle Speed range, rpm.	5,150 – 5,850	
No. of Cylinders	3	
Piston Displacement, mL	938	
Bore & Stroke, mm	74 × 72.7	
Exhaust System	Through hub exhaust	
Lubrication	Auto mixing	
Fuel Mixing Ratio	120:1 – 50:1	
Cooling System	Forced water cooling	
Starting System	Electric starter motor	
Ignition	Flywheel Magneto C.D. Ignition	
Spark Plugs	NGK B8HS-10/BR8HS-10 or Champion L-78C/RL-78C (1.0mm gap)	
Alternator	12V, 130W (12V, 11A)	
No. of Trim Adjustments	5	2 (with PTT)
Engine Oil	Genuine Motor Oil or recommended one (TCW- III )	
Gear Oil	Genuine Gear Oil or API GL5, SAE #80 to #90, approx. 900 mL	
Fuel Tank Capacity, litter (US gal)	25 (6.6)	
Engine Oil Capacity, litter (US gal)	Approx. 2.6 (0.69)	
Gear Reduction Ratio	12 : 28	
Fuel	Unleaded regular gasoline pump posted 87 Octane (research octane rating of 91)	

Model	90A EPTO	90A EFO
Overall Length, mm	Approx. 690	
Overall Width, mm	Approx. 360	
Overall Height, mm	L: 1435    UL:1562	
Transom Height, mm	L: 516    UL: 643	
Weight, kg (Approx.)	L: 135 UL:137.5	L: 130 UL: 132.5
Max. Output, kW	66.2	
Full Throttle Speed range, rpm.	5,000 – 5,500	
No. of Cylinders	3	
Piston Displacement, mL	1,267	
Bore & Stroke, mm	86 × 72.7	
Exhaust System	Through hub exhaust	
Lubrication	Auto mixing	
Fuel Mixing Ratio	120:1 – 50:1	
Cooling System	Forced water cooling	
Starting System	Electric starter motor	
Ignition	Flywheel Magneto C.D. Ignition	
Spark Plugs	NGK B8HS-10/BR8HS-10 or Champion L-78C/RL-78C (1.0mm gap)	
Alternator	12V, 130W (12V, 11A)	
No. of Trim Adjustments	2	5
Engine Oil	Genuine Motor Oil or recommended one (TCW- III )	
Gear Oil	Genuine Gear Oil or API GL5, SAE #80 to #90, approx. 900 mL	
Fuel Tank Capacity, litter (US gal)	25 (6.6)	
Engine Oil Capacity, litter (US gal)	3.5 (0.92)	
Gear Reduction Ratio	13 : 26	
Fuel	Unleaded regular gasoline pump posted 87 Octane (research octane rating of 91)	

Model	120A2EPTO	140A2EPTO
Overall Length, mm	Approx. 747	
Overall Width, mm	Approx. 390	
Overall Height, mm	L: 1,560	UL: 1,687
Transom Height, mm	L: 516	UL: 643
Weight, kg (Approx.)	L: 164	UL: 166.5
Max. Output, kW	88.3	103.0
Full Throttle Speed range, rpm.	5,200 – 5,700	
No. of Cylinders	4	
Piston Displacement, mL	1,768	
Bore & Stroke, mm	88 × 72.7	
Exhaust System	Through hub exhaust	
Lubrication	Auto mixing	
Fuel Mixing Ratio	120:1 – 50:1	
Cooling System	Forced water cooling	
Starting System	Electric starter motor	
Ignition	Flywheel Magneto C.D. Ignition	
Spark Plugs	NGK B8HS-10/BR8HS-10 or Champion L-78C/RL-78C (1.0mm gap)	
Alternator	12V, 330W (12V, 27.5A)	
No. of Trim Adjustments	2	
Engine Oil	Genuine Motor Oil or recommended one (TCW- III )	
Gear Oil	Genuine Gear Oil or API GL5, SAE #80 to #90, approx. 900 mL	
Fuel Tank Capacity, litter (US gal)	25 (6.6)	
Engine Oil Capacity, litter (US gal)	6 (1.6)	
Gear Reduction Ratio	13 : 26	
Fuel	Unleaded regular gasoline pump posted 87 Octane (research octane rating of 91)	

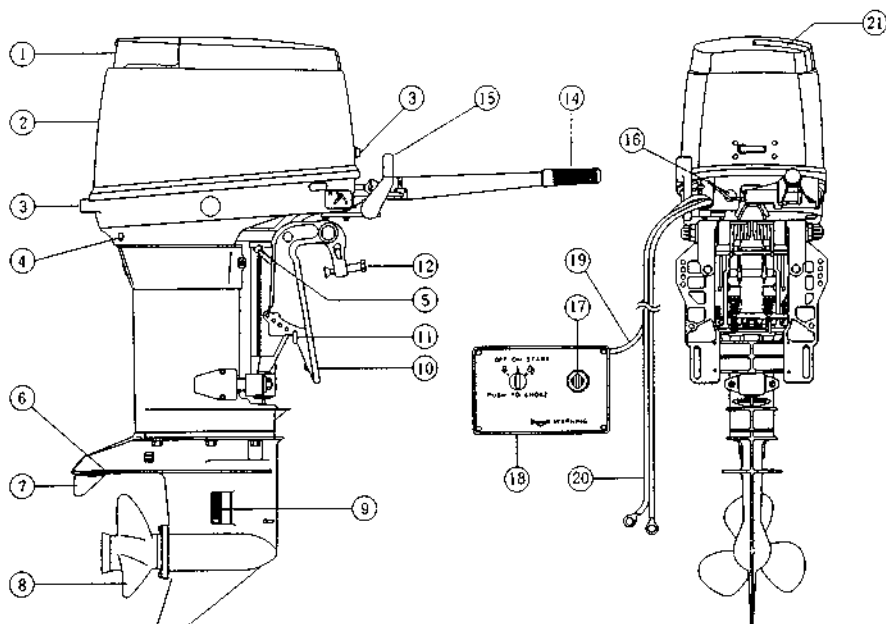
## 2 NAMES OF PARTS

**Model 60C EF**  
**Model 70C EF**



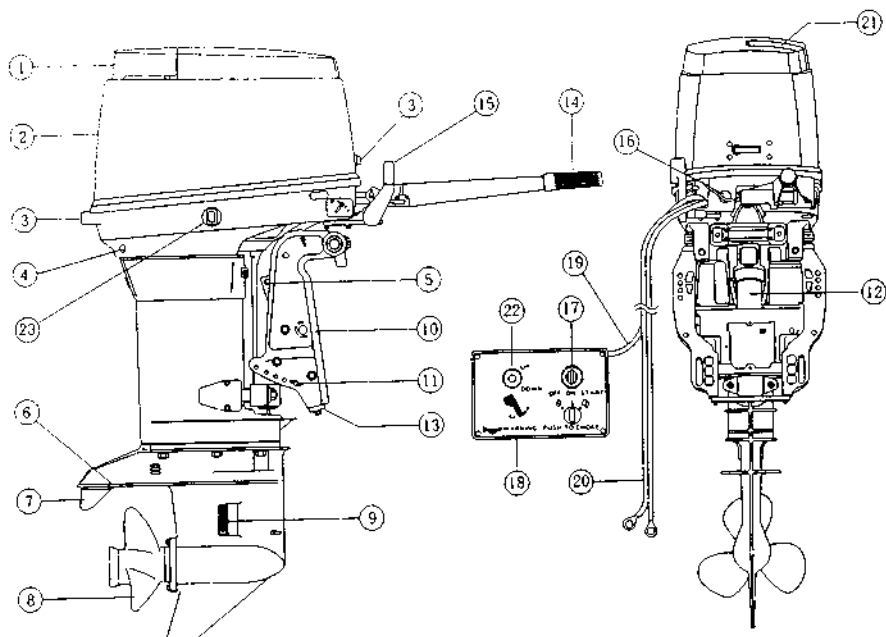
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|--------------------------|-----------------|
| ① Tilt Handle            | ⑪ Thrust Rod    |
| ② Upper Motor Cover      | ⑫ Clamp Screw   |
| ③ Hook Lever             | ⑬ Throttle Grip |
| ④ Water Check Port       | ⑭ Shift Lever   |
| ⑤ Tilt Stopper Lever     | ⑮ Stop Switch   |
| ⑥ Anti-ventilation Plate | ⑯ Main Switch   |
| ⑦ Trim Tab (Anode)       | ⑰ Switch Box    |
| ⑧ Propeller              | ⑱ Cord Ass'y C  |
| ⑨ Water Strainer         | ⑲ Battery Cord  |
| ⑩ Stern Bracket          | ⑳ Filler Lid    |

# **Model 60C EFO** **Model 70C EFO**



- |                          |                 |
|--------------------------|-----------------|
| ① Tilt Handle            | ⑪ Thrust Rod    |
| ② Upper Motor Cover      | ⑫ Clamp Screw   |
| ③ Hook Lever             | ⑬ Throttle Grip |
| ④ Water Check Port       | ⑭ Shift Lever   |
| ⑤ Tilt Stopper Lever     | ⑮ Stop Switch   |
| ⑥ Anti-ventilation Plate | ⑯ Main Switch   |
| ⑦ Trim Tab (Anode)       | ⑰ Switch Box    |
| ⑧ Propeller              | ⑱ Cord Ass'y C  |
| ⑨ Water Strainer         | ⑲ Battery Cord  |
| ⑩ Stern Bracket          | ⑳ Filler Lid    |

# **Model 60C EFTO** **Model 70C EFTO**

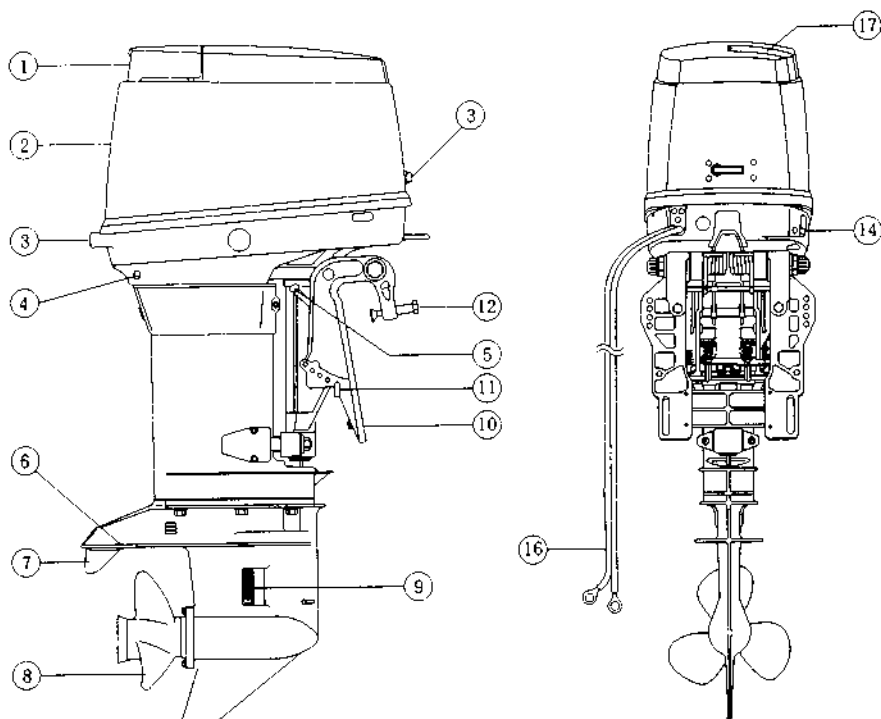


- ① Tilt Handle
- ② Upper Motor Cover
- ③ Hook Lever
- ④ Water Check Port
- ⑤ Tilt Stopper Lever
- ⑥ Anti-ventilation Plate
- ⑦ Trim Tab (Anode)
- ⑧ Propeller
- ⑨ Water Strainer
- ⑩ Stern Bracket

- ⑪ Thrust Rod
- ⑫ Power Trim & Tilt (PTT)
- ⑬ Anode
- ⑭ Throttle Grip
- ⑮ Shift Lever
- ⑯ Stop Switch
- ⑰ Main Switch
- ⑱ Switch Box
- ⑲ Cord Ass'y C
- ⑳ Battery Cord

- ㉑ Filler Lid
- ㉒ Power Trim & Tilt Switch A
- ㉓ Power Trim & Tilt Switch B

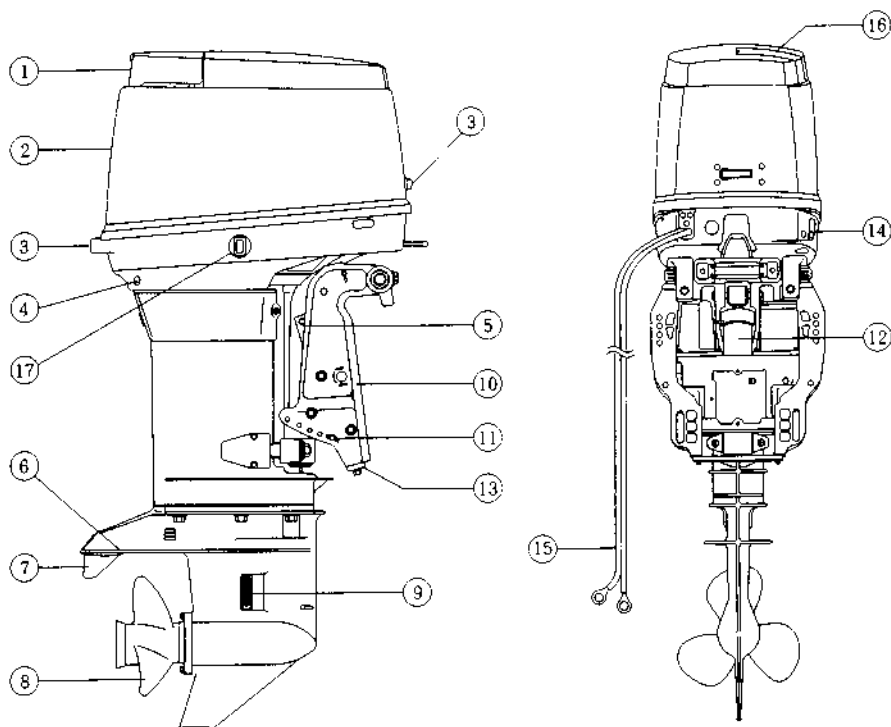
## Model 60C EPO Model 70C EPO



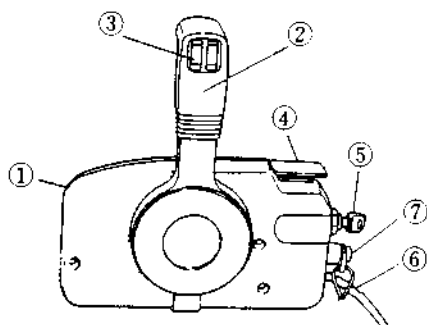
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|--------------------------|------------------|
| ① Tilt Handle            | ⑪ Thrust Rod     |
| ② Upper Motor Cover      | ⑫ Clamp Screw    |
| ③ Hook Lever             | ⑬ Fuel Connector |
| ④ Water Check Port       | ⑭ Battery Cord   |
| ⑤ Tilt Stopper Lever     | ⑮ Filler Lid     |
| ⑥ Anti-ventilation Plate |                  |
| ⑦ Trim Tab (Anode)       |                  |
| ⑧ Propeller              |                  |
| ⑨ Water Strainer         |                  |
| ⑩ Stern Bracket          |                  |



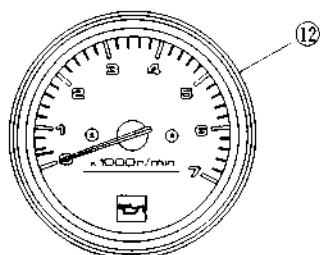
# **Model 60C EPTO** **Model 70C EPTO**



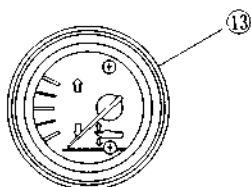
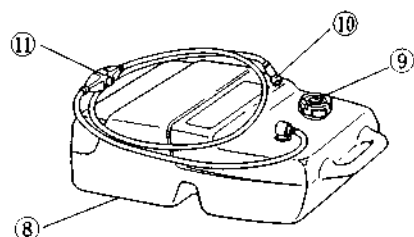
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|--------------------------|------------------------------|
| ① Tilt Handle            | ⑪ Thrust Rod                 |
| ② Upper Motor Cover      | ⑫ Power Trim & Tilt (PTT)    |
| ③ Hook Lever             | ⑬ Anode                      |
| ④ Water Check Port       | ⑭ Fuel Connector             |
| ⑤ Tilt Stopper Lever     | ⑮ Battery Cord               |
| ⑥ Anti-ventilation Plate | ⑯ Filler Lid                 |
| ⑦ Trim Tab (Anode)       | ⑰ Power Trim & Tilt Switch B |
| ⑧ Propeller              |                              |
| ⑨ Water Strainer         |                              |
| ⑩ Stern Bracket          |                              |



for P Type



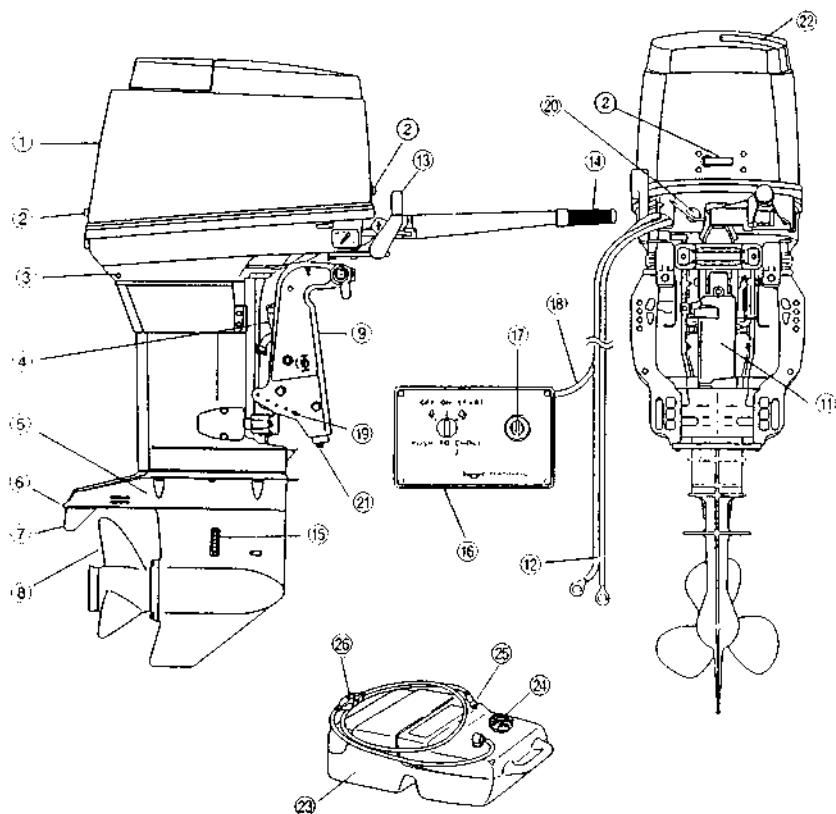
for P Type



for T Type

- |                            |               |
|----------------------------|---------------|
| ① Remote Control Box       | ⑪ Primer Bulb |
| ② Remote Control Lever     | ⑫ Tachometer  |
| ③ Power Trim & Tilt Switch | ⑬ Trim Meter  |
| ④ Neutral Warm-up Lever    |               |
| ⑤ Main Switch              |               |
| ⑥ Harness B                |               |
| ⑦ Stop Switch              |               |
| ⑧ Fuel Tank                |               |
| ⑨ Air Vent Screw           |               |
| ⑩ Fuel Connector           |               |

## 90A EFO

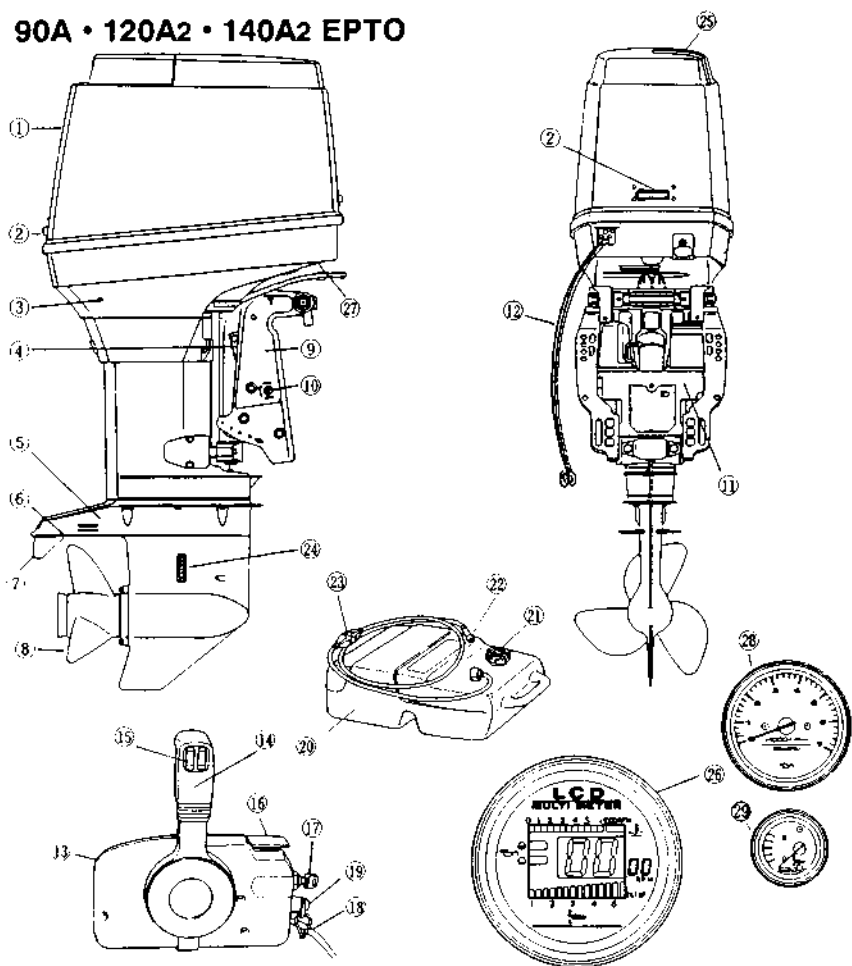


- ① Upper Motor Cover
- ② Cover Hook
- ③ Cooling Water Check Port
- ④ Tilt Stopper
- ⑤ Gear Case
- ⑥ Anti-Ventilation Plate
- ⑦ Trim Tab
- ⑧ Propeller
- ⑨ Stern Bracket

- ⑫ Battery Cables
- ⑬ Shift Lever
- ⑭ Throttle Grip
- ⑮ Water Strainer
- ⑯ Switch Box
- ⑰ Main Switch
- ⑱ Cord Ass'y C
- ⑲ Thrust Rod
- ⑳ Stop Switch
- ㉑ Anode

- ㉒ Filler Lid
- ㉓ Fuel Tank
- ㉔ Air Vent Screw
- ㉕ Fuel Connector
- ㉖ Primer Bulb

## 90A • 120A2 • 140A2 EPTO



- |                            |                            |   |
|----------------------------|----------------------------|---|
| ① Upper Motor Cover        | ⑩ Remote Control Box       | ②⑤ Multi-purpose Meter<br>(120A2 • 140A2)   |
| ② Cover Hook               | ⑪ Remote Control Lever     | ● Tachometer                                |
| ③ Cooling Water Check Port | ⑫ Power Trim & Tilt Switch | ● Trim Gauge                                |
| ④ Tilt Stopper             | ⑬ Neutral Warm-up Lever    | ● Overheat Alert Indicator                  |
| ⑤ Gear Case                | ⑭ Main Switch              | ● Oil Level Indicator                       |
| ⑥ Anti-Ventilation Plate   | ⑮ Harness B                | ②⑦ Power Trim & Tilt Switch<br>(Except 90A) |
| ⑦ Trim Tab                 | ⑯ Stop Switch              | ②③ Tachometer (90A)                         |
| ⑧ Propeller                | ⑰ Fuel Tank                | ②④ Trim Meter (90A)                         |
| ⑨ Stern Bracket            | ⑱ Air Vent Screw           |   |
| ⑩ Manual Valve (Port side) | ⑲ Fuel Connector           |   |
| ⑪ Power Trim and Tilt      | ⑳ Primer Bulb              |   |
| ⑫ Battery Cables           | ㉑ Water Strainer           |   |
|                            | ㉒ Filler Lid               |   |

### 3 INSTALLATION

#### (1) Mounting the engine on boat

##### **⚠ WARNING**

Most boats are rated and certified in terms of their maximum horsepower, and this is shown on the boat's certification plate. Do not equip your boat with an outboard that exceeds this limit. If in doubt, contact your dealer.

Do not operate the engine until it has been securely mounted on the boat in accordance with the instructions below.

##### **Note:**

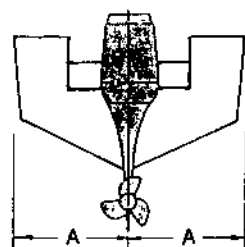
Consult your authorized dealer to receive the proper instructions or ask your dealer to mount the motor as necessary.

##### ① Single outboard installation

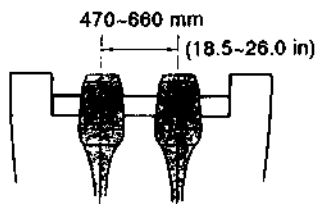
Position the outboard motor at the exact center of the stern, and mount it using a cushioning pad or plate. (Fig. 1)

##### ② Twin outboard installation

Position the outboard motors 470 – 660 mm (18.5 – 26.0 in) apart, measured from the center line of each motor, at the exact center of the stern. (Fig. 2)



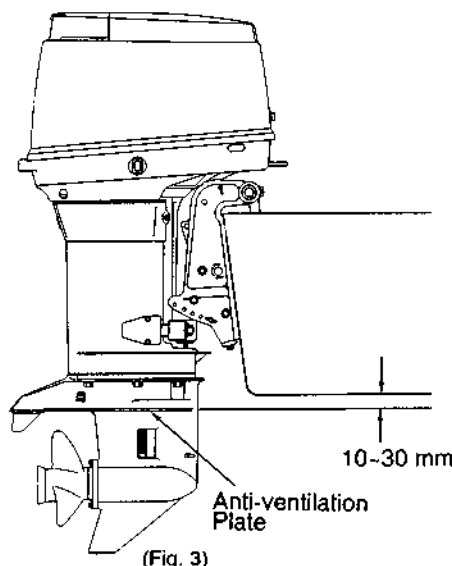
(Fig. 1)



(Fig. 2)

③ Transom height

Install the outboard so that the anti-ventilation plate is at a level of 10 – 30 mm below the bottom line of the boat. (Fig. 3)



**⚠ CAUTION**

The engine may overheat due to lack of cooling water in-flow from water intake port if the anti-ventilation plate is at a level higher than the bottom of the boat.

\* If the height difference exceeds 10 – 30 mm the engine power is likely to be reduced as a result of increased water resistance against the gear case.

**Transom Matching**

Be sure that the anti-cavitation plate of the outboard is below the water surface when running with wide open throttle.

In case the above condition cannot be met due to a bottom shape of your boat, please consult your dealer.

#### ④ Attaching the stern bracket

After positioning the stern bracket, fix it with the clamp screw fitted on the type of "without Shock Absorber" then drill four holes in the transom board, matching the holes in the stern bracket. Secure the engine with the bolts (M12 × 105 mm) and nuts provided. Be sure to use the washers. The small-diameter washers go with the bolts and the larger diameter washers go with the nuts.

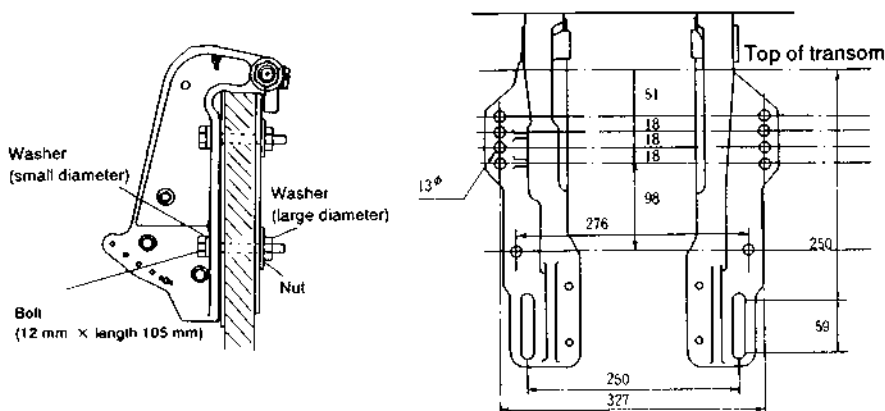
The mounting holes may be drilled beforehand by referring to the dimensional drawing below.

#### Note:

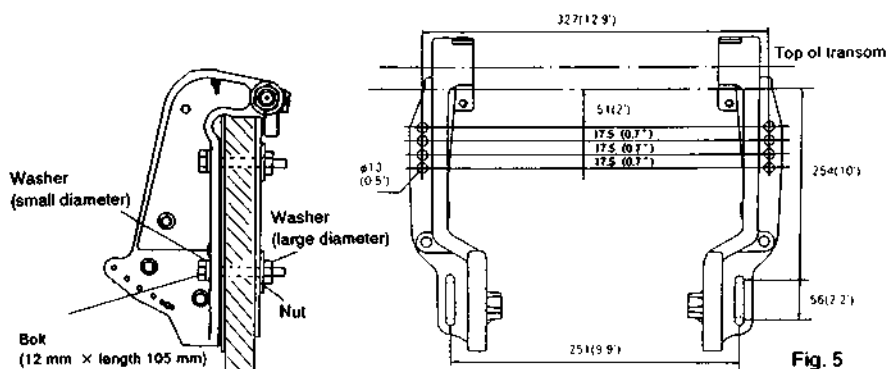
We recommend that the bolt heads of the bolts face inward while the nuts are secured on the inside of the boat to prevent injury to the passengers.

#### Stern Bracket Dimensional Drawing

##### a) Manual tilting type



## b) Power trim and tilt type



### Note:

1. Apply a sealing agent, such as silicon sealer, between the bolts and the transom board holes when tightening the bolts.
2. Be sure to fix the motor securely with the bolts. Consult to the your dealer.

After installing the outboard, make sure that its steering and tilt movements are not obstructed by any part of the boat. Also, the battery cables is fitted, make sure that it does not interfere with the movement of the outboard.

From time to time, check the bolts (and clamp screws) for tightness.

## (2) Installing the Remote Control Device

It is recommendable to consult with your dealer for installation and adjustment of the remote control device.

### ① Installation of the Remote Control Cables (Box side)

Follow the instruction manual provided with the remote control box.

### ② Installation of the Remote Control Box on your boat

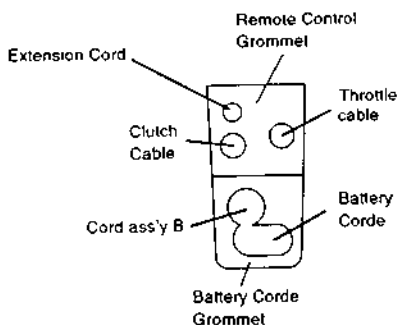
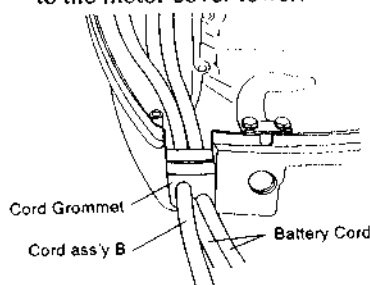
Follow the instruction manual provided with the remote control box.



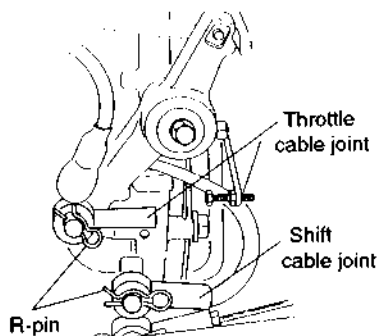
③ Installing the Remote Control Cable (engine side) and the Cord Assembly (Wiring Harness) – 60C/70C

- (a) Detach the bracket and set cord ass'y B and the remote control cables in position.

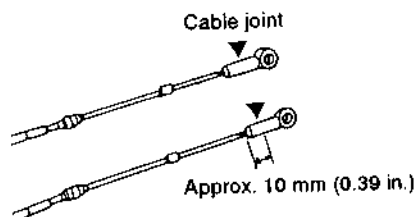
After fixing the remote control cables to the bracket, resecure the bracket to the motor cover lower.



- (b) Detach the throttle and shift cable joints by removing the R-pins.

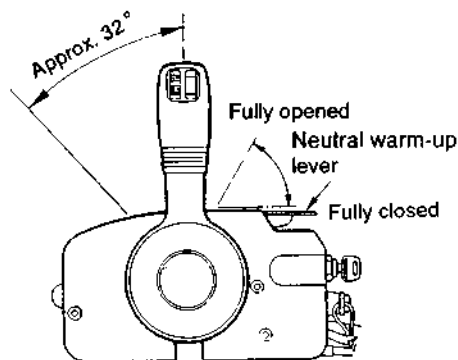


- \* Pass at least 10 mm of the remote control cables through the terminal eyes. Securely lock the terminal eyes with lock nuts.

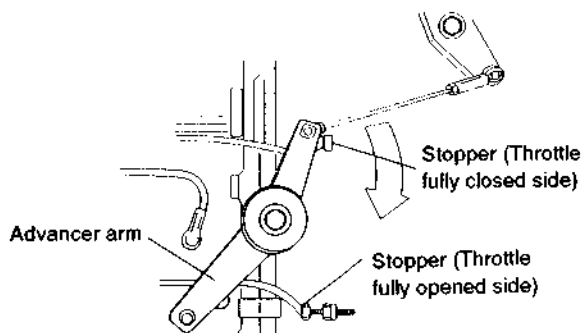


- (c) Move the remote control lever to the "FORWARD" "NEUTRAL" and "REVERSE" positions to confirm that the shift is working properly, then set the lever to "NEUTRAL"

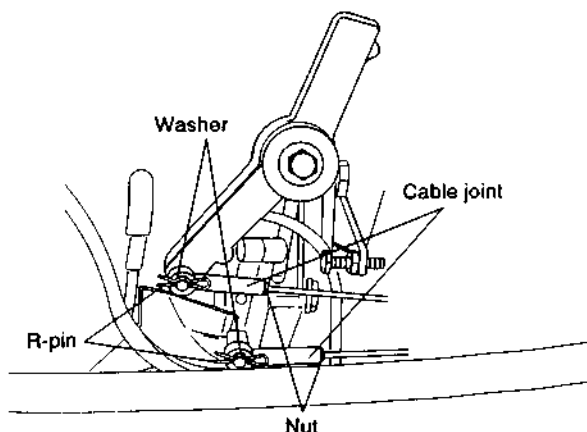
- (d) Double-check that the remote control cables (i.e., the throttle cable and shift cable) have been connected correctly. Move the remote control lever forward to the first point at which it engages (approx.  $32^{\circ}$ ). The cable which moves first when the lever is turned should be the shift cable. Check that the shift lever is in "NEUTRAL" position and that the neutral warm-up lever is fully closed when the remote control cables have been connected.



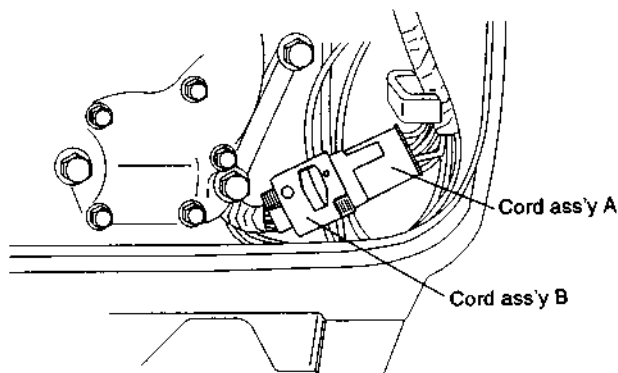
- \* The advancer arm on the engine should be contact with the stopper of the cylinder crank case ass'y so that the throttle valve of the carburetor is to be fully closed condition.



- (e) Adjust the cable joints until the hole of each is aligned with the advancer arm pin.  
After adjustment, lock each cable joint with the nut and secure it with the R-pin.



- (f) Connect cord ass'y B to cord ass'y A.  
Connect the pink and light-blue leads from cord ass'y A and B together.

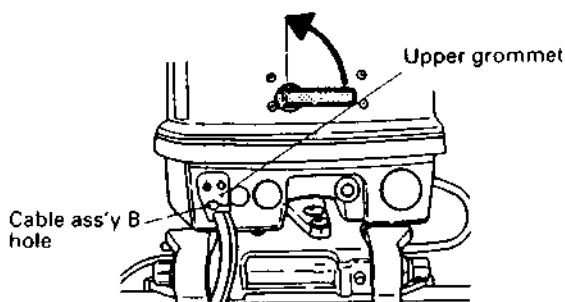


## **⚠ CAUTION**

Do not disconnect the electric couplers while the engine is running, as this will damage the CD unit and could result in a serious electric shock.

③ Installing the Remote Control Cable (engine side) and the Cord Assembly (Wiring Harness) – 90A

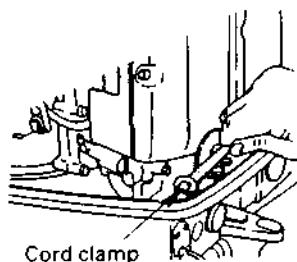
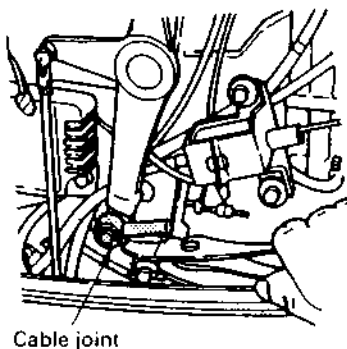
(a) Detach the upper engine cover.



(b) Detach the upper grommet cord clamp bolt.

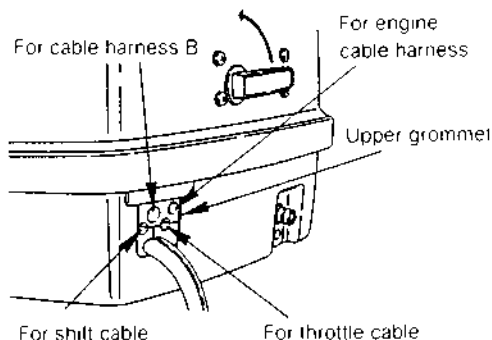
(c) Detach the throttle and shift cable joints by removing the R-shaped pins.

(d) Move the Remote Control lever Forward, to Neutral and to Reverse to confirm the shift is working, and then set the lever to Neutral.



③ Installing the Remote Control Cable (engine side) and the Cord Assembly (Wiring Harness) – 120A2 • 140A2

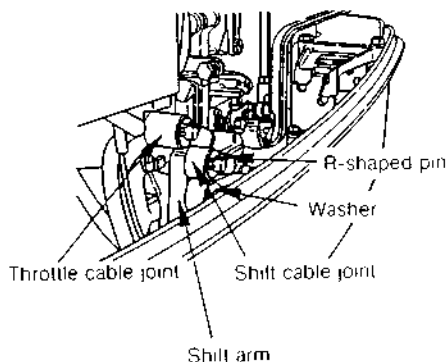
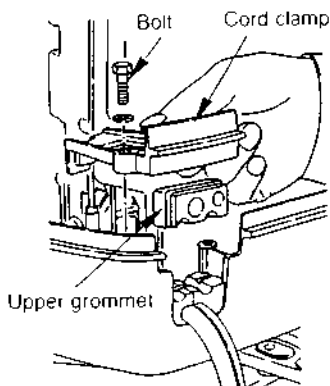
(a) Detach the upper engine cover.



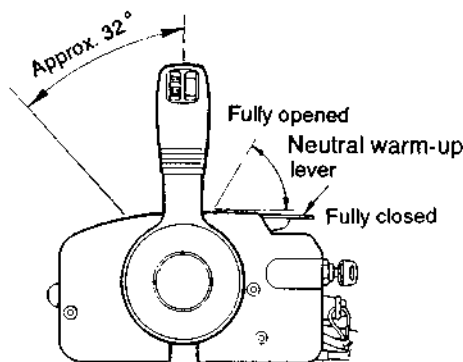
(b) Detach the upper grommet cord clamp bolt.

(c) Detach the throttle and shift cable joints by removing the R-shaped pins.

(d) Move the Remote Control lever Forward, to Neutral and to Reverse to confirm the shift is working, and then set the lever to Neutral.

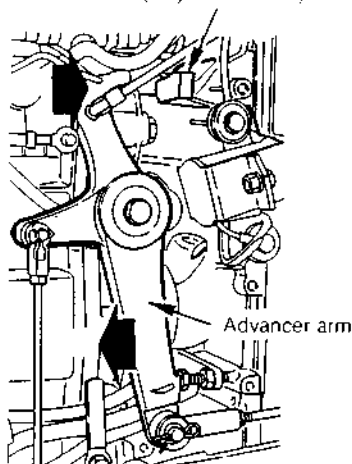


- (e) Double-check that the remote control cables (i.e., the throttle cable and shift cable) have been connected correctly. Move the remote control lever forward to the first point at which it engages (approx.  $32^{\circ}$ ). The cable which moves first when the lever is turned should be the shift cable. Check that the shift lever is in "NEUTRAL" position and that the neutral warm-up lever is fully closed when the remote control cables have been connected.



- \* The advancer arm on the engine should have contact with the stopper of the carburetor throttle valve to enable it to be fully closed.

Carburetor throttle valve stopper  
(fully closed side)



- 
- (f) Connect cable harness B to cable harness A, and connect the meter cable harness.

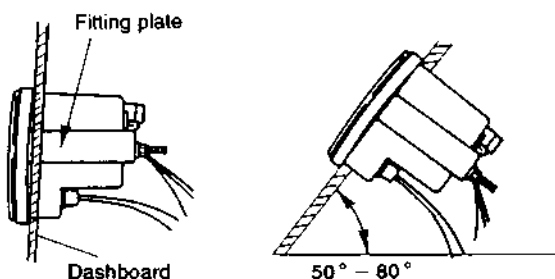
**⚠ CAUTION**

Do not disconnect the electric couplers while the engine is running, as this will damage the C.D. unit and could result in a serious electric shock.

- (g) Connect the pink and light-blue leads from cable harness A and B to each other.
- (h) Using the washers and R-shaped pins to adjust the thread length, connect the throttle and shift cables to the pins on the engine-side.
- (i) Insert the outer groove of each cable into the cable grip provided in the lower engine cover. (120A2 • 140A2)  
Attach the cord clamps and fix the cables securely with the bolts.

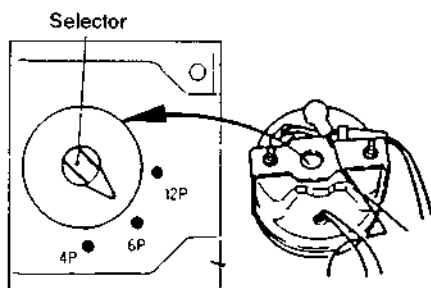
### (3) Installing the Meters (60C • 70C • 90A)

Install the meters securely in the dashboard where they can be easily read and are not exposed to water splashes. The recommended dashboard thickness is 2 ~ 11 mm (0.08 ~ 0.43 in.). For dashboards thicker than 11 mm (0.43 in.), the fitting plate should be cut accordingly. Be sure to tighten the fitting nuts on the fitting plate evenly.

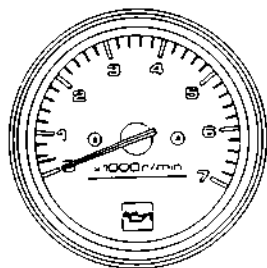


The dashboard inclination should be  $50^{\circ} - 80^{\circ}$ .

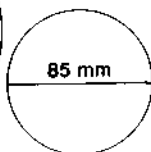
Set the tachometer selector knob to "6P."



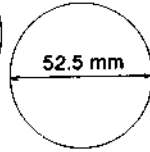
Cut a hole 85 mm (3.346 in.) in diameter for the tachometer, and a hole 52.5 mm (2.067 in.) in diameter for the trim meter.



Tachometer



Trim meter



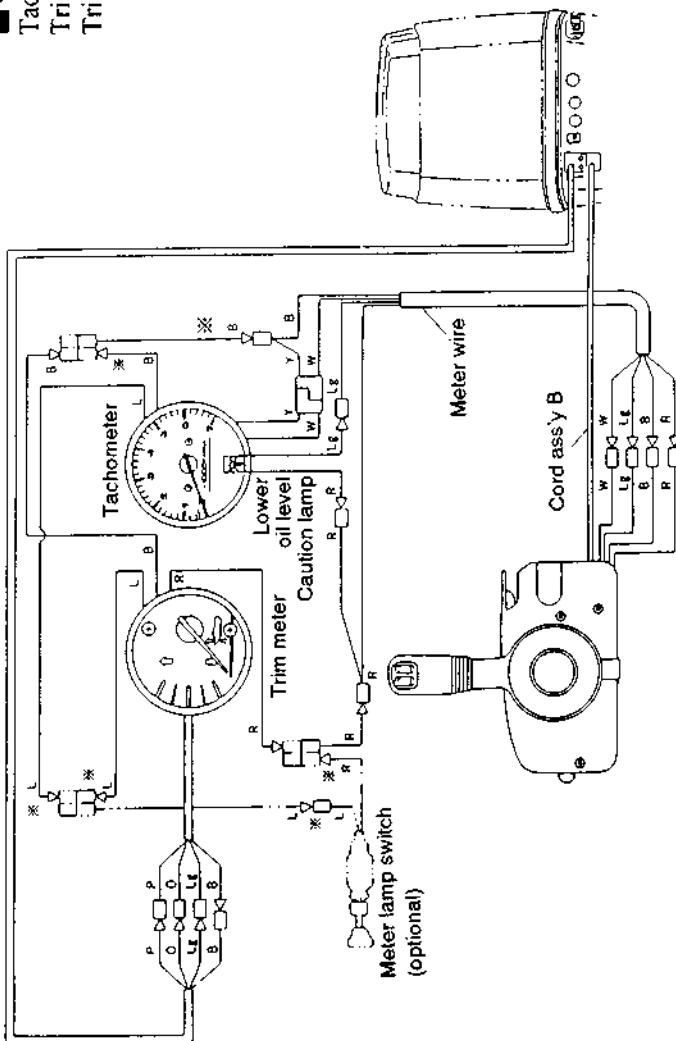


## Connection of Leads

**Tachometer: EPO EPTO**

Trim meter: EPTO

Trim sender: EPTO



## Color Codes

B: black  
L: blue  
Lg: light green  
O: orange  
P: pink  
R: red  
Sb: sky blue  
W: white  
Y: yellow

**Note:**

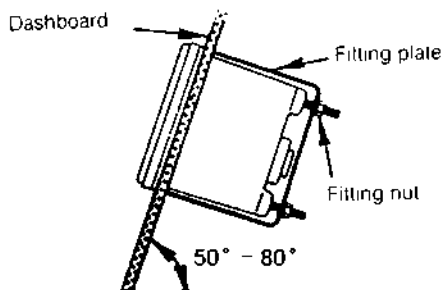
**The parts marked with ※ mark are to be wired when a Meter Lamp Switch (optional) is used.**

## Installing the Multi-purpose Meter (120A2 • 140A2)

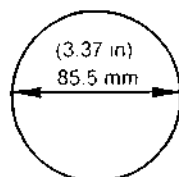
Install the meter securely in the dashboard where the instruments can be easily read. Recommended dashboard thickness is 2–11 mm (0.08–0.4 in). For dashboards thicker than 11 mm (0.4 in), the fitting plate should be cut accordingly.

Be sure to tighten the fitting nuts on the fitting plate evenly.

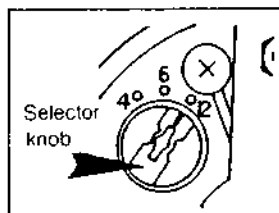
- The dashboard inclination should be  $50^{\circ} - 80^{\circ}$ .



- Cut a hole with 85.5 mm (3.37 in) diameter for the Multi-purpose Meter.

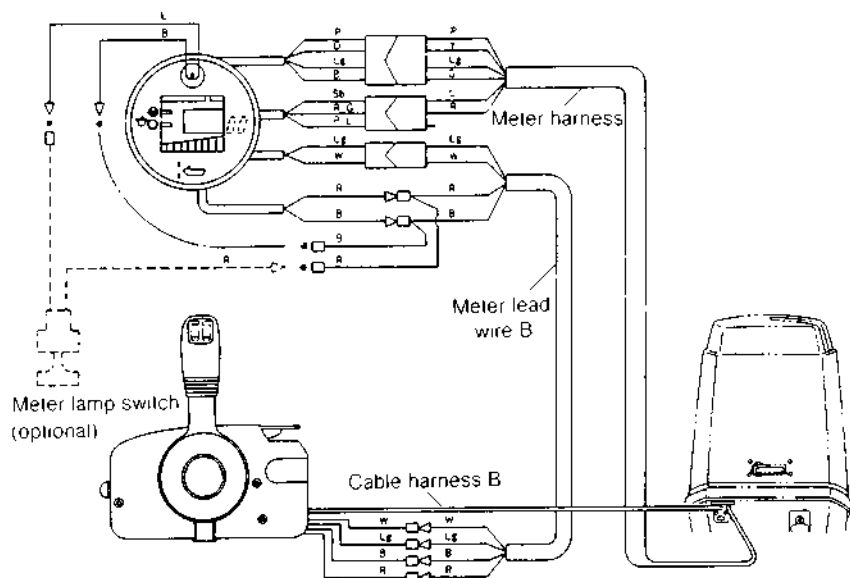


- Turn the selector knob at the back of the meter to the "12" position.



## ■ Wiring Diagram for Multi-purpose Meter

Connect the lead wires of the meter referring to the wiring diagram below.



### Cord colors

B: Black	P: Pink
G: Green	R: Red
L: Blue	Sb: Sky Blue
Lg: Light Green	W: White
O: Orange	Y: Yellow

### Notes:

- Oblique lines (Z) depict cords with a color stripe.
- Only connect leads marked with—when a meter lamp switch (optical) is used.

#### (4) Installing the battery

- ① Place the battery box in a convenient position away from possible spray damage. Securely fasten both the box and battery so they do not shake loose.

A 12V battery with a recommended capacity of 70 AH or more is recommended.

### **⚠ WARNING**

Hydrogen gas is generated when a battery is charged. Therefore, keep the battery well ventilated during charging.

Electric sparks, cigarette smoking and other sources of fire must be avoided in the charging area to prevent explosion of the battery.

\* The battery fluid (electrolyte) contains sulfuric acid.

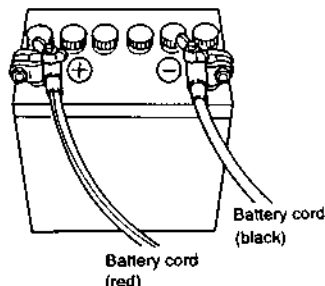
If any electrolyte is spilled on the skin, clothes, etc., wash with copious amounts of water and consult a doctor. Always use safety glasses and rubber gloves when handling the battery.

Remark: Further to notice on the label of your battery.

#### Notes:

- (1) Make sure that the battery leads do not get stuck between the motor and boat when turning, etc.
- (2) The starter motor may fail to operate leads the are incorrectly connected.
- (3) Be sure to correctly connect the (+) and (-) leads. If not, the charging system will be damaged.
- (4) Do not disconnect the battery leads from battery while the engine operation, the electrical parts could be damaged.
- (5) Always use a fully charged battery.

- ② Connect the positive lead (+) to the positive terminal (+) of the battery, and then connect the negative lead (-). When disconnecting the battery always remove the negative lead (-) first. After connecting the positive terminal (+), securely place a cap on it to prevent short circuits.



## (5) Installing the Drag Link Assembly

(Standard accessories for EPTO and EPO types)

Incorrect or unstable installation of the Drag Link assembly can result in accidents while riding the boat or breakage of the hull

Installation of the Drag Link Assembly by your dealer is highly recommended.

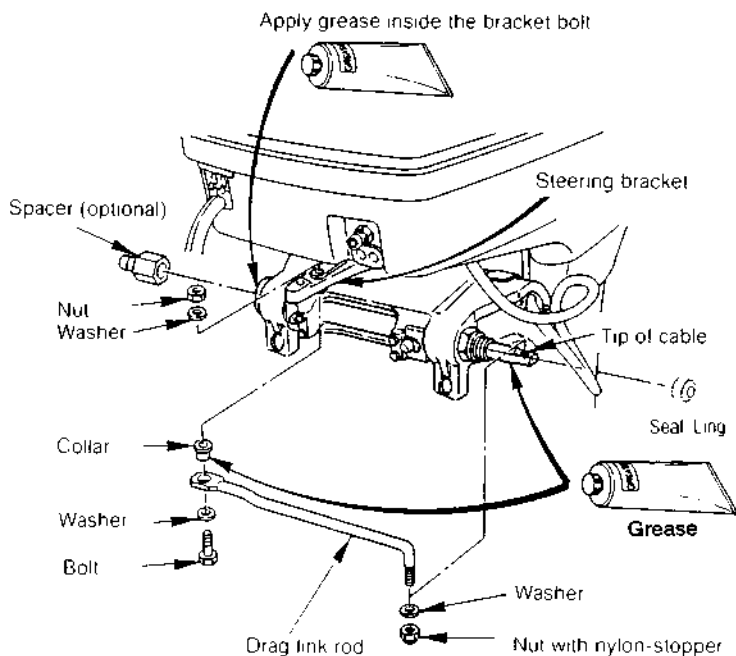
### Note:

Depending on the steering cable manufacture, spacers (optical) may be required.

- ① Connect the Drag Link rod to the tip of the steering cable.  
Tighten the rod using the nut with nylon-stopper, making sure the rod can swing freely.
- ② Connect the other tip of the rod to the steering bracket with a bolt, first applying a collar and washer. The bolt head must face downward.

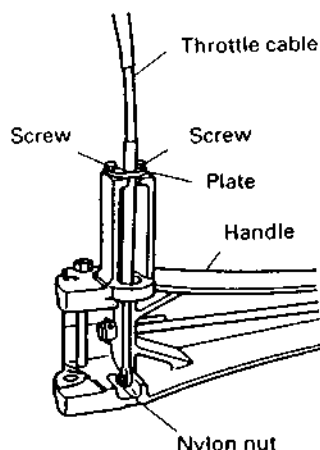
### Note:

Apply grease in required places.

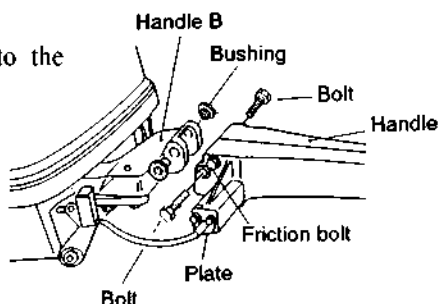


## (6) Installing the steering handle and main switch box (For EF/EFO/EFTO types)

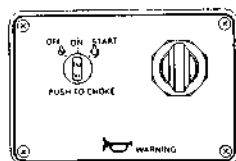
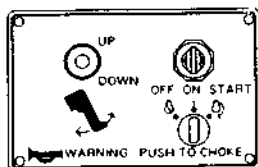
- ① Connect the throttle cable coming from the motor to the handle, then fix it with a nylon nut. After that, place the plate in the outer groove, and fix it with screws.



- ② Install the steering handle to the motor with two bolts.



- ③ Install the main switch box at a place where the driver is able to operate the switches easily. And confirm no obstacles at the cord passage before installing the main switch box. When the cord is excessively long, adjust the length by hauling the cord inside the upper motor cover.



## **4 PROPELLER SELECTION**

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### **▲ CAUTION**

Use of an inappropriate propeller for your particular needs can cause serious damage to your outboard motor. Please check the Propeller selection table at the end of this manual, and consult your dealer for specific recommendations.

## **5 FUEL & ENGINE OIL**

### **Fuel**

- Unleaded, minimum pump posted 87 octane gasoline is recommended.  
(Octane is based on posted rating.)  
(91 based on the research octane rating method)

**Note:**

Use of low-quality gasoline results in a short engine life as well as starting difficulties and other engine problems.

**Note:**

- (1) Gasoline containing alcohol (methanol (methyl), or ethanol (ethyl)), acetone or benzene, may cause:
- ☐ Wear and damage to bearings, cylinder(s), piston(s), piston rings.
  - ☐ Corrosion of metal parts.
  - ☐ Deterioration of rubber parts and plastic parts.
  - ☐ Starting, idling, and other engine performance problems.
- (2) Do not use gasoline that contains more than 10% ethanol or more than 5% methanol.
- (3) Damages resulting from the use of gasolines that contain alcohol, acetone or benzene are not covered under the limited warranty.

Fuel tank capacity- - 25 liters (6.6 U.S. gal)

### **Engine oil**

- Use a genuine engine oil or recommended one (TCW3).  
Will not recommend use of other two stroke engine oil.

### **Fuel Tank**

When using a fixed fuel tank in place of genuine fuel tank, it is recommended to select a one with a structure facilitating interior cleaning.

## **⚠ DANGER**

Gasoline vapors are present, an errant spark could cause an explosion or fire.

- Do not smoke near gasoline.
- Do not overfill gasoline.  
If any gasoline is spilt, wipe it up immediately.
- Stop the engine before fill gasoline into the fuel tank.



## **⚠ CAUTION**

**DO NOT** mix different brands of oil.

Mixing different brand of oil, or different type of oil even if the brand is the same, may cause gelling, resulting in possible filter screen blockage. This could result in serious engine damage because of impaired lubrication performance.

### **1 Non Auto-mixing Model (EF Type)**

Add engine oil into fuel oil tank. The mixing ratio with gasoline is 1 : 50 (one part oil and 50 parts gasoline). Mix well by hand. The mixing ratio during break-in running is 1 : 25.

Mixing Ratio

	Engine Oil	:	Gasoline
During break-in	1	:	25
After break-in	1	:	50

### **2 Auto-mixing Model (EFO • EFTO • EPO • EPTO Type)**

The required amount of engine oil is automatically supplied from the oil tank, through the oil pump, according to the engine running conditions. Gasoline is fed over a separate feeding line.

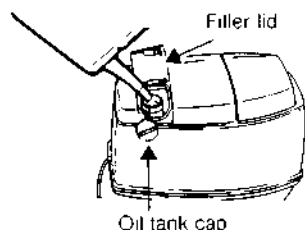
## **⚠ CAUTION**

During break-in of the engine, engine oil must be added to the fuel gasoline in addition to the oil which is automatically supplied from the oil tank.

Mixing Ratio (during break-in on auto-mixing models)

	Engine Oil	:	Gasoline
During break-in	1	:	50
After break-in	Automatic. Fill up engine oil tank regularly		

- ① Replenishing oil in the engine oil tank.
1. Open the filler lid of the upper engine cover.
  2. Remove the oil tank cap.
  3. Fill up the tank with Genuine Engine Oil or recommended oil.



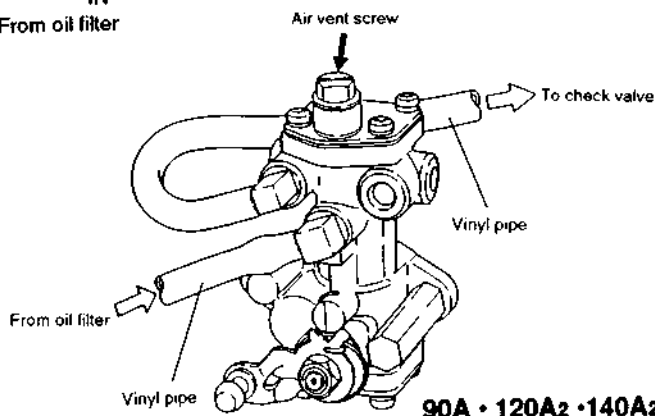
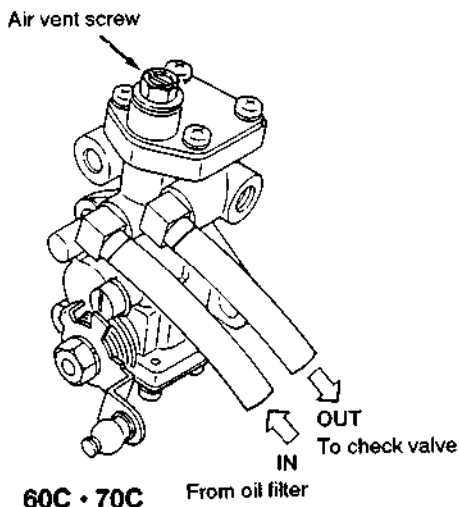
### **▲ CAUTION**

1. In the unlikely event that gasoline by mistake is filled into the oil tank, drain the oil tank completely, and consult an authorized service shop for advice.
2. Check the amount of oil in the oil tank visually before starting the boat. Running out of oil at sea is a cause for potential disaster.

② Oil pump air vent

Visually check whether there is air in the oil through the vinyl pipe connecting the oil tank with the oil pump. If present, purge the air as follows:

■ Loosen the air vent screw on the oil pump to purge the air, and tighten it when all air, as seen through the vinyl pipe on the oil pump side, has been purged.



### Note

Wipe off any spilled oil with a rag, and dispose of it in a appropriate manner.

## 6 ENGINE OPERATION

### (1) Break-in

■ The break-in run time is approximately 10 hours.

The most critical time in the life of your engine is the first 10 hours of operation. Correct operation during this break-in period will prolong the life of the engine and ensure optimum performance. Follow the procedures shown below carefully.

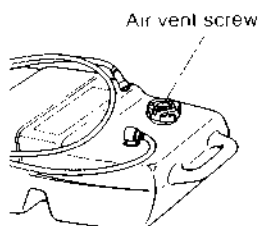
Time	Break-in method	Running Conditions
0 min -	Trolling or idling speed	Cruising at minimum speed
10 min -	Throttle opening < 1/2 about 3,000 rpm	—
1 hr -	Throttle opening < 3/4 about 4,000 rpm	Run with full throttle for 1min-10 min.
2 hrs -	Throttle opening 3/4 about 4,000 rpm	Run with full throttle for short time
10 hs -	Normal running	—

### **▲ CAUTION**

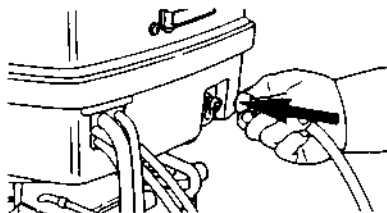
- ① Severe engine damage may be caused if the break-in procedures described above are not observed.
- ② Change new gear oil after 10 hours break-in.

## (2) Starting

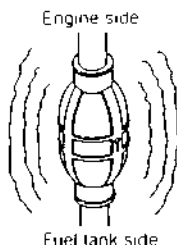
- ① Loosen the air vent screw on the fuel tank cap.



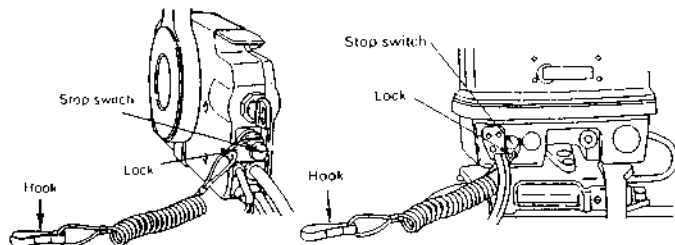
- ② Connect the connector to the engine.



- ③ Feed fuel to the carburetor by squeezing the primer bulb until firm.



- ④ Install the lock in the stop switch



### ⚠ CAUTION

Be sure to connect the emergency stop line to your wrist. The engine is shut down if the stop line switch is disconnected.

This is a safety measure, designed to protect the driver is thrown overboard.

#### Notes:

Be sure that the shift is at neutral when starting the engine.

This model is provided with start in-gear protection.

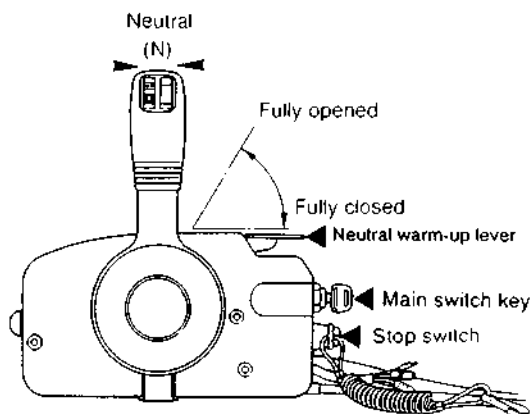
## **⚠ CAUTION**

If motor starts in gear, do not use, contact your authorized dealer.

- ⑤ Insert the key into the main switch.

- ⑥ P Type:

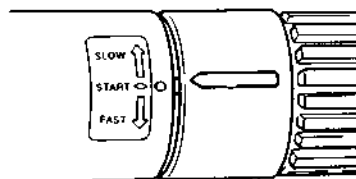
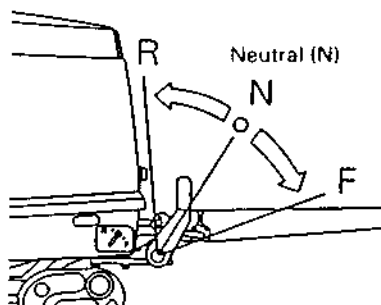
Set the Remote Control lever to Neutral (N), and move the neutral warm-up lever to Open.



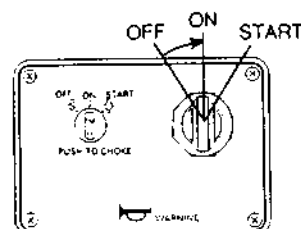
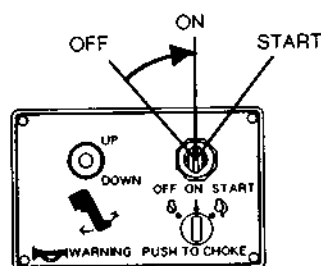
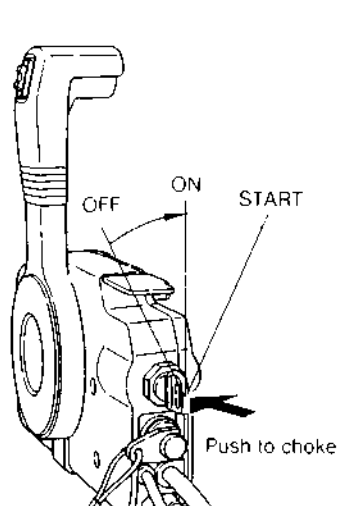
F Type:

Place the shift lever in Neutral.

Turn the throttle grip to the START position.



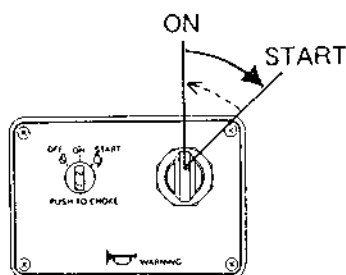
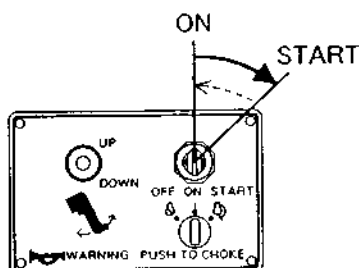
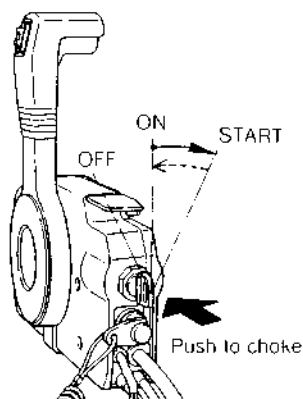
- ⑦ Turn the main switch key to ON, and push on it for choke operation.  
(The key need not be pushed if the engine is warm.)



**Note: for P Type**

The neutral warm-up lever is inoperative unless the Remote Control lever is set to Neutral.

- ⑧ While keeping the key pressed, turn it to START.



- ⑨ When the engine starts, release the key and allow it to return to ON. Then  
P Type: return the neutral warm up lever to the closed position.  
F Type: return the throttle grip to the "SLOW" position.

### **⚠ CAUTION**

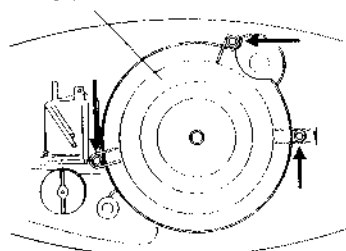
1. Extended operation of the starter motor will run the battery down. Operate the starter motor for maximum 3 seconds. If the engine does not start, wait for 5 seconds before operating the starter motor again.
2. NEVER operate the starter motor once the engine has started.



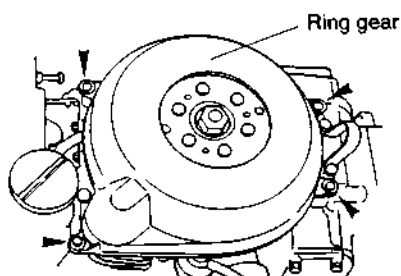
## Manual start - - - In case of trouble with the electric starter motor

- ① Turn the main switch key to OFF and set the shift lever to Neutral (N).
- ② Remove the upper engine cover.
- ③ Take off the ring gear cover, by removing the fixing bolts.

Ring gear cover

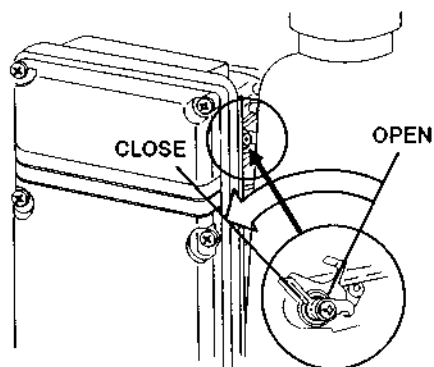


60C • 70C

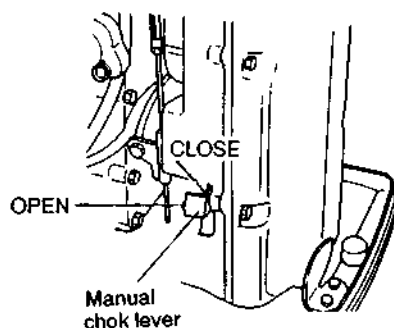


90A • 120A2 • 140A2

- ④ Move the manual choke lever to the Closed position.  
When the engine is warm, turn the manual choke lever to "OPEN" position.



60C • 70C

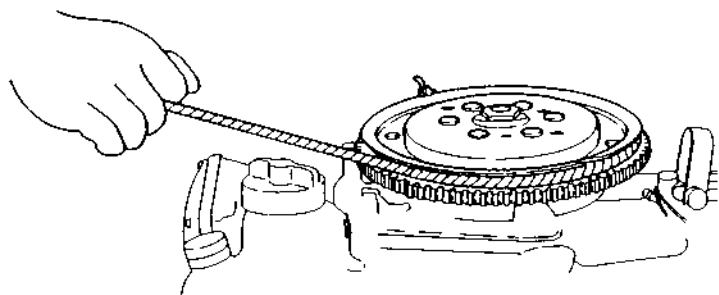


90A • 120A2 • 140A2

- ⑤ Turn the main switch key to ON.
- ⑥ Wind the starter rope around the flywheel a few turns. Give it a sharp tug to start the engine. Use a socket wrench or similar to get a firm grip on the end of the rope.
- ⑦ When the engine starts, return the manual choke lever to the open position.

**Note:**

The battery cables must be connected to the battery also when starting the engine manually.



**▲ WARNING**

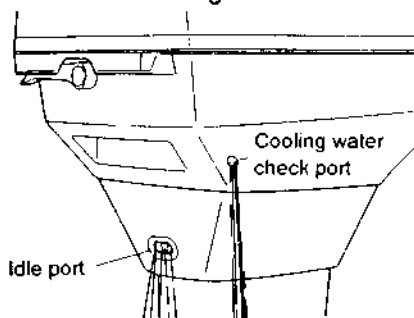
- 1 DO NOT reinstall the ring gear cover after the engine has been started using the emergency start procedure.
- 2 When fitting the motor cover upper on the motor, the shift lever should be "NEUTRAL" position.
- 3 Do not continue to use the emergency start procedure for routine engine starting. Contact your dealer to have the starter system repaired as soon as possible.

### (3) Warm-up

Before driving the boat, let the engine run at low speed for approximately three minutes to let it warm and allow the oil to circulate through the machine. If the engine is not warmed up beforehand, the engine life will shorten greatly. During the warm-up operation, confirm that cooling water is discharged from the check port and idle port.

#### **▲ CAUTION**

If cooling water is not discharged and engine operation is continued, the engine will overheat and damage occur.



#### ■ Engine speed

Recommended idle speed after warm-up operation

MODEL	Clutch disengaged	Clutch engaged
60C • 70C	900 rpm	750 rpm
90A	900 rpm	700 rpm
120A2 • 140A2	900 rpm	700 rpm

#### Full-throttle engine speed

Full-throttle engine speed	60C • 70C	: 5,150 – 5,850 rpm
	90A	: 5,000 – 5,500 rpm
	120A2 • 140A2	: 5,200 – 5,700 rpm

#### (4) Forward and Reverse

### ⚠ CAUTION

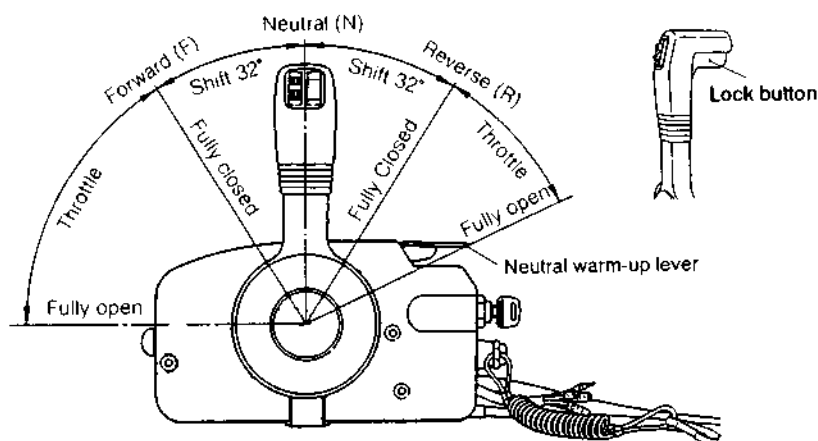
Do not shift into gear unless the engine is running, to avoid possible damage to the shifting mechanism.

### ⚠ CAUTION

It may be dangerous to attempt shifting at high RPM.  
Be sure to slow down to trolling or idling rpm before shifting.

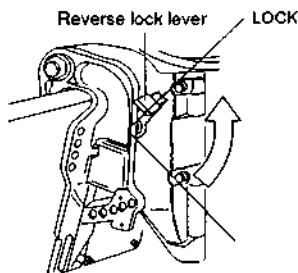
#### ● Remote control type (P type)

While pressing the lock button on the remote control lever upward, swiftly move the lever to "FORWARD" (F) or "REVERSE" (R) to the point at which it engages (approx. 32° forward or backward from "NEUTRAL"). Once the lever is moved further forward or backward, the engine will be accelerated.



## **▲ CAUTION**

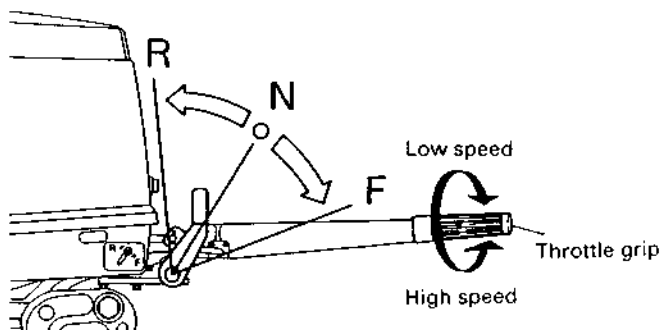
1. At the time of shifting from "FORWARD" to "REVERSE" or from "REVERSE" to "FORWARD," stop once the shift lever at the "NEUTRAL" position and allow the engine to return to idling speed.
2. Before moving the shift lever to "REVERSE" position, make sure the reverse lock is engaged (in UP position). (EPO)



3. Do not increase the engine speed excessively while reversing.

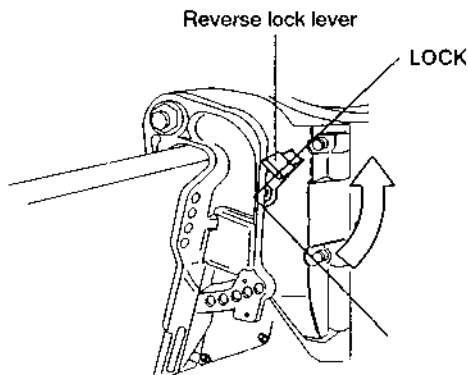
### ● Tiller handle type (F type)

Turn the throttle grip toward "SLOW" and move the shift lever quickly to "FORWARD" (F) or "REVERS" (R) when the engine speed has reached the lowest rpm.



## **▲ CAUTION**

1. Before moving the shift lever to "REVERSE" make sure the reverse lock is engaged (in UP position). (EF/EFO types)
2. Do not increase the engine speed excessively while reversing. A maximum limit of half-throttle is recommended when running in REVERSE for safe running.



### **Note:**

The shift lever cannot be turned from "NEUTRAL" to "REVERSE" unless the throttle grip has been turned fully toward "SLOW".

## (5) Trim adjustment

### ⚠ CAUTION

Incorrect adjustment will cause the boat to sway, reduce the engine performance and may cause unsafe steering conditions.

#### ■ Power Trim & Tilt Type:

The Power Trim & Tilt can be adjusted depending on the desired trim angle of the engine in relation to the transom shape, planing speeds and load. It is imperative that the trim angle is adjusted correctly.

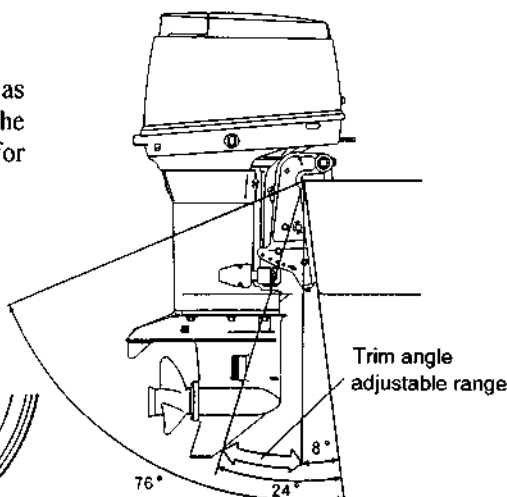
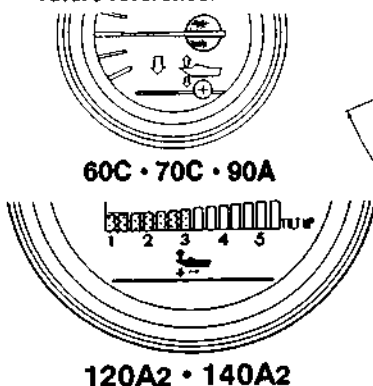
### ⚠ CAUTION

The following precautions should be applied if you are boating in shallow water with the motor trimmed beyond the trim limit cut-out point:

1. Keep the engine speed at IDLING RPM only. This is because the swivel mechanism has no side support when the engine is trimmed beyond the trim limit.
2. Make sure that the water intake port is submerged at all times, to prevent overheating of the engine or water pump impeller damage.

#### ● How to use the trim meter:

When the trim angle is set as desired, take a reading off the trim meter, and record it for future reference.

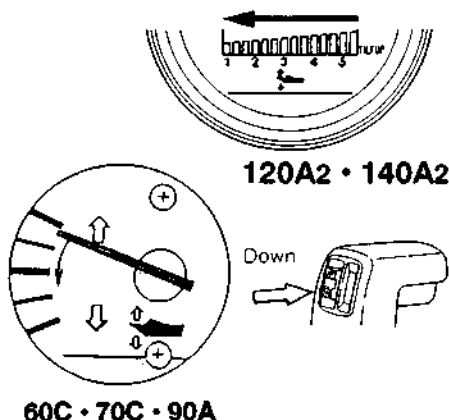


## ● Proper Trim Angle

The trim angle is optimum when the boat is parallel to the water surface while running.

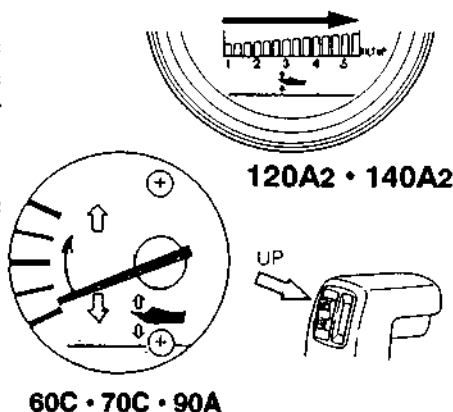
## ● Improper Trim Angle (bow rises too high)

If the trim angle is excessive, the bow will rise out of the water and the speed will decrease. Furthermore, the bow may sway or the bottom may slam the water while cruising. In this case, decrease the trim angle by flicking the switch on the Remote Control lever to "DN".



## ● Improper Trim Angle (bow dips into the water)

If the trim angle is too small, the bow will dip into the water, the speed will decrease, and water may enter the boat. In this case, the trim angle should be increased by flicking the switch on the Remote Control lever to "UP".



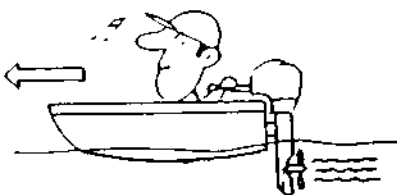


■ With out Power Trim & Tilt Type:

The trim angle is adjusted by setting the thrust rod in the correct thrust rod hole.

● Proper trim angle

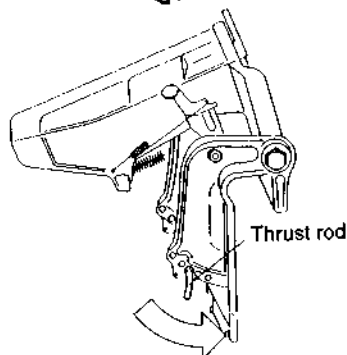
The optimum trim angle is obtained when the boat is parallel to the water surface while in running.



● Improper trim angle (bow rises too high.)

If the trim angle is excessive, the bow will rise out of the water and the speed will decrease. Furthermore, the bow may sway or the bottom may slam the water while cruising.

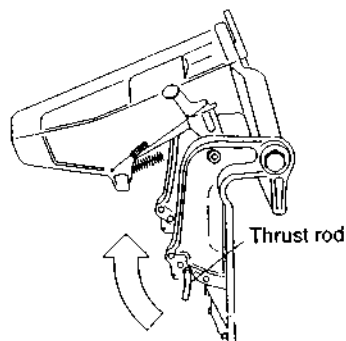
In this case, decrease the trim angle by setting the thrust rod in a lower hole.



- Improper trim angle (bow dips into the water)

If the trim angle is too small, the bow will dip into the water, the speed will decrease, and water may enter the boat.

In this case, the trim angle should be increased by setting the thrust rod in a higher hole.



## (6) Shallow Water Running (EFTO/EPTO)

Shallow water running is available only on the EFTO and EPTO types.

Tilt up the engine using the Power Trim & Tilt System.

Set the outboard at higher position adjusting the same manner with the trim angle adjustment.

### ▲ CAUTION

- When in shallow water running, take care that the water strainer is submerged at all times and that water is continuously running out of the cooling water check port. If the water does not discharge from the cooling water check port, adjust the motor angle to tilt down a little.
- Do not increase the engine speed unnecessarily.
- Do not use long time unnecessarily.
- Make sure that the motor does not strike the bottom, especially when running in REVERSE. If the motor strikes the bottom while reversing, the impact is transmitted to the transom, risking damage to both the motor and the boat.

## (7) Stopping

### **▲ CAUTION**

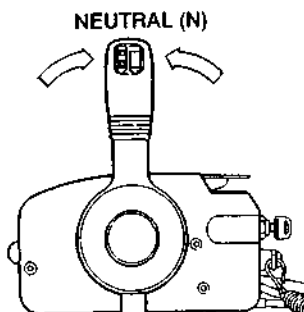
1. NEVER stop the engine immediately after full-throttle running. Keep it running for 2-3 minutes at idling speed (shift lever set to "NEUTRAL") to allow it to cool down.
2. Never disconnect the electrical harness for stopping the engine when motor running.

#### Notes:

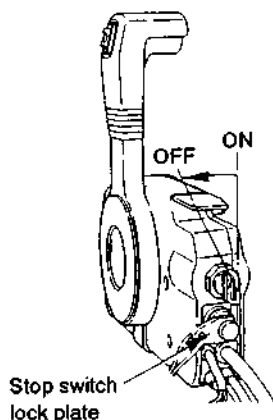
1. When another electrical equipment or accessory is fitted, the electricity will be used for this and the battery discharges until the main switch is off.
2. Disconnect the cables from the battery if the engine will not be used for an extended period of time.

P Type:

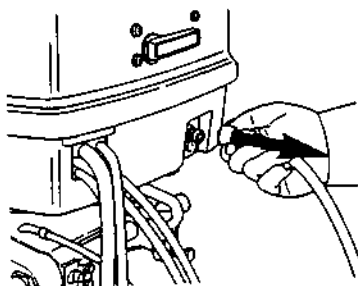
- ① Move the Remote Control lever to Neutral and let the engine idle for 2–3 minutes to allow it to cool down.



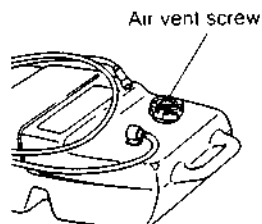
- ② Turn the main switch key counter-clockwise or pull out the stop switch. The engine stops. The engine can also be stopped by pressing on the stop switch.



- ③ Disconnect the fuel connector from the engine.

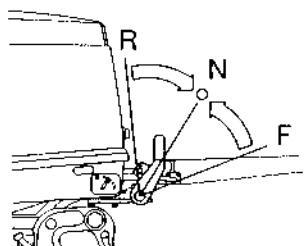
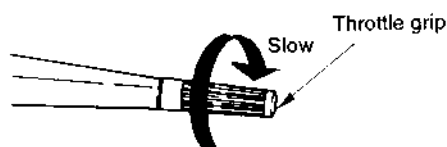


- ④ Close the air vent screw on the fuel tank cap.

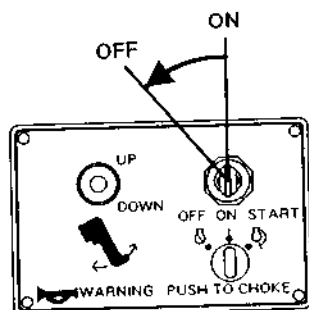
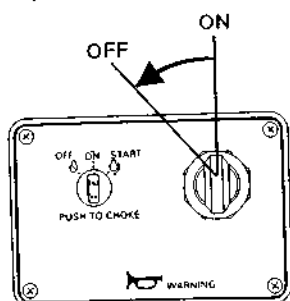


F Type:

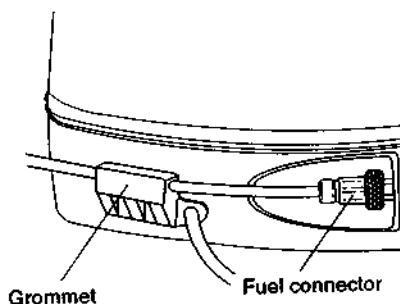
- ① Return the throttle grip to the "Slow" speed position, then shift the shift lever to Neutral (N) position.



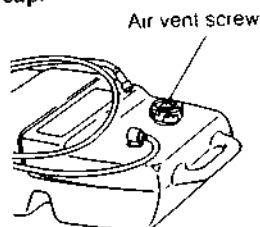
- ② Turn the main switch key to "OFF" position, or take off the stop switch lock plate from the switch.



- ③ Disconnect the fuel connector from the engine.



- ④ Close the air vent screw on the fuel tank cap.



## (8) Tilt up, Tilt down

### ⚠ CAUTION

When mooring your boat for a long time, the outboards should be tilted up and lock it with the tilt stopper.

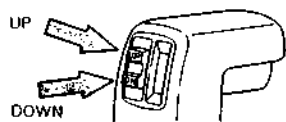
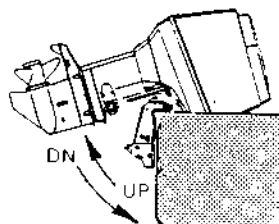
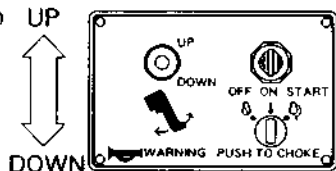
#### Note:

After tilt engine up, disconnect the cables from the battery if the engine will not be used for an extended period of time.

## POWER TRIM & TILT Type:

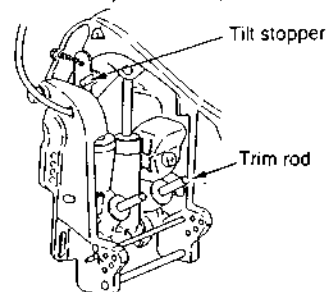
### Tilt up

- ① Disconnect that fuel connector from the engine.
- ② Turn the ignition key to ON.
- ③ Operate the Power Trim & Tilt switch and tilt the engine up



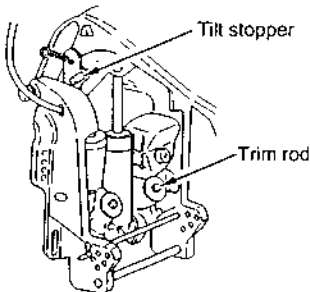
- ④ Lock the tilt stopper.

If the outboards is leaving in the tilt up condition without locking with the tilt stopper, the outboards may be tilted down.



- ⑤ Operate the Power Trim & Tilt switch to DN to retract the trim rods.

If the trim rods are not retracted shells and other foreign matter may stick to the rods, and could cause damage when the rods are later retracted.



- ⑥ Re-turn the ignition key to OFF.

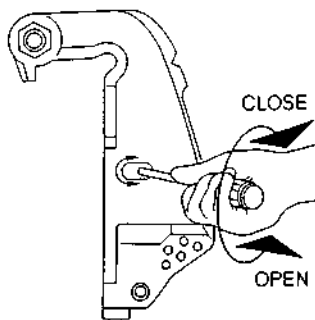
#### Tilt down

- ① Turn the ignition key to ON.
- ② Operate the Power Trim & Tilt switch to UP.
- ③ Un-lock the tilt stopper.
- ④ Operate the Power Trim & Tilt switch to DOWN.

#### Note:

If the battery is dead, and the Power Trim & Tilt switch thus inoperative, turn the manual valve a few turns in the OPEN direction. This will allow manual tilting of the engine.

Always lock the engine in the upper position with the tilt stopper.

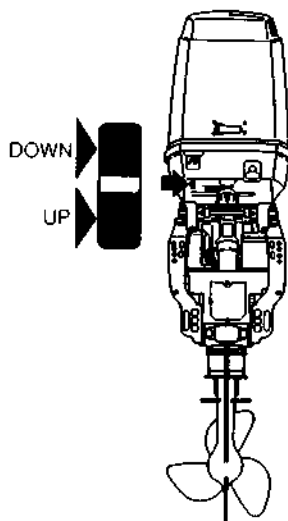


### ⚠ WARNING

When tilting up or down, be sure that no finger or hand is placed in between the swivel bracket and stern bracket.

#### For reference: Engine-mounted Power Trim & Tilt Switch(Except 90A)

In addition to the Power Trim & Tilt switch installed on the Remote Control lever, a similar switch can be found on the lower motor cover.



## MANUAL TILT

### Tilt Up

- ① Disconnect the fuel connector.
- ② Set the reverse lock lever on the port side to "RELEASE" by turning it downward. (Fig. 1)
- ③ Set the tilt lever on the starboard side to "LOCK" by turning it upward. Tilt the outboard up entirely. The outboard will be locked automatically in the raised position. (Fig. 2)

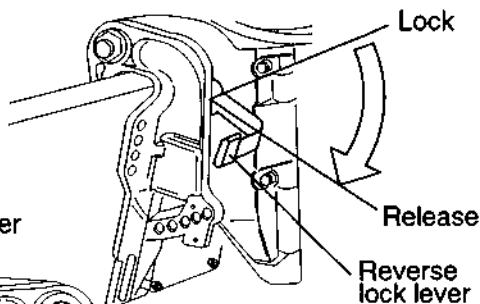


Fig. 1

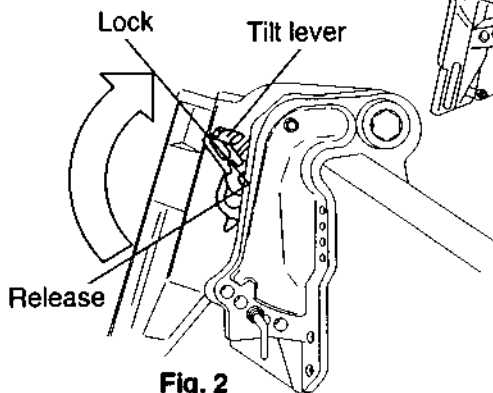


Fig. 2

### Tilt down

To tilt the engine down, turn the tilt stopper lever downward (toward "RELEASE"). Tilt the engine up slightly and then let it back slowly down. (The reverse lock will be set automatically.)

## ⚠ WARNING

When tilting up or down, be sure that no finger or hand is placed in between the swivel bracket and stern bracket.



## **(9) Caution while in boating**

While in boating, observe the weather and surrounding conditions at all time for safe. Stop the engine and check when you face the following situations:

<b>Situations required emergency stop</b>	<b>Items to be checked</b>
☆ When hitting driftwood or rock.	<ul style="list-style-type: none"><li>● Check stern bracket bolt for loosening. (Tighten the bolt if it loosens.)</li><li>● Check propeller, gear case, propeller shaft, driveshaft housing, stern bracket, steering handle, etc. for damage.</li></ul>
☆ When the engine rpm suddenly increase.	Check propeller slip and deformation.
When a vinyl sheet or foreign material is caught on the propeller.	Remove vinyl sheet or foreign material.
☆ When the cooling water does not discharge or decrease.	Check cooling water intake port for dust, vinyl sheet, ect.
☆ When abnormal vibration and noise are felt and heard.	Check mounting bolts of the outboards, bolts and nuts of each part for loosening, and check propeller deformation.
☆ When the engine rpm suddenly drop.	Check engine over heating, cooling water discharge volume, propeller and related sections, fuel amount in tank and oil amount in oil tank.

☆ mark items: If the engine condition could not recover or remedy, return your boat to a mariner at low speed as much as possible. And consult a dealer for check and servicing the engine.

## **▲ CAUTION**

If neglected a check for damage and repairing, it may sometimes happen not to be able to run the boat and the outboards.

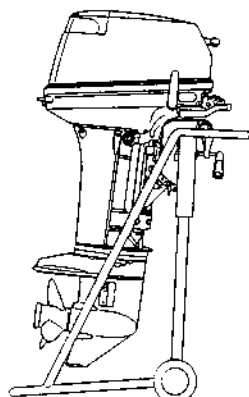
## **7 REMOVING AND CARRYING THE MOTOR**

### **(1) Removing the motor**

- ① Stop the engine.
- ② Disconnect the fuel connector, the remote control cable, the battery cords, bracket fixing bolts and nuts etc.
- ③ Remove the motor from the hull and completely drain the water from the gear case.

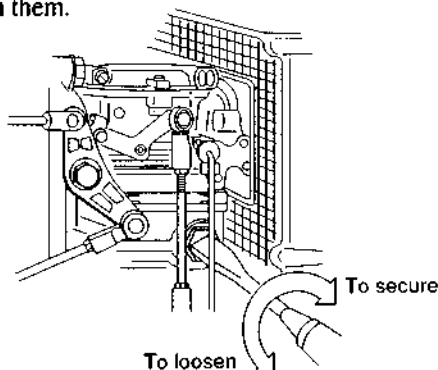
### **(2) Carrying the motor**

Be sure to keep the engine vertical posture whenever you carry the motor.



#### **NOTE:**

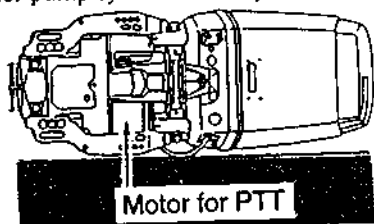
- If, do not carry the engine at upright position, loosen the drain screw on the carburetors to drain fuel from them.



### **⚠ CAUTION**

Beware of explosion danger. Spilled and vaped gasoline may easily catch fire and explode. Be sure to fully discharge gasoline from the carburetors when transporting the engine. Wipe off spilled gasoline with a rag.

- When carrying or putting the engine up for storage, make sure power head side is higher position than the propeller and the side with the oil tank faces down. Otherwise air will enter pump system for the power trim and tilt.



### (3) Storing the motor

Keep the motor vertical posture when you store it.

**Note:**

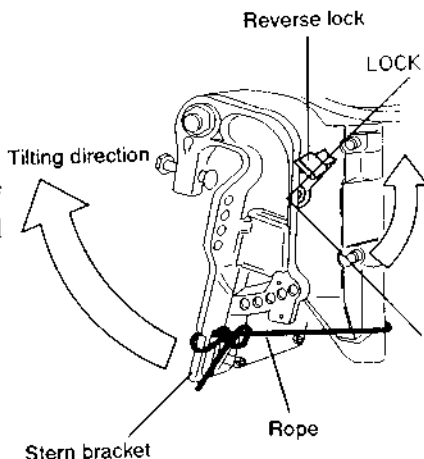
If you store the motor horizontal posture, lay the motor same as above figure.

## EF/EFO/EPO Type

### ⚠ WARNING

When taking out the motor from package or storing the motor taking out from the boat, never release the reverse lock lever. Otherwise it is dangerous since the stern bracket is not locked and up.

- \* Do not touch or get caught the reverse lock lever with a hand or foot.
- \* Fix the stern bracket with a rope.
- \* Be careful not to let a child touch with the reverse lock lever.
- \* Be careful to the tilting direction of the stern bracket to avoid a personal injury hitting the jumping outboard.

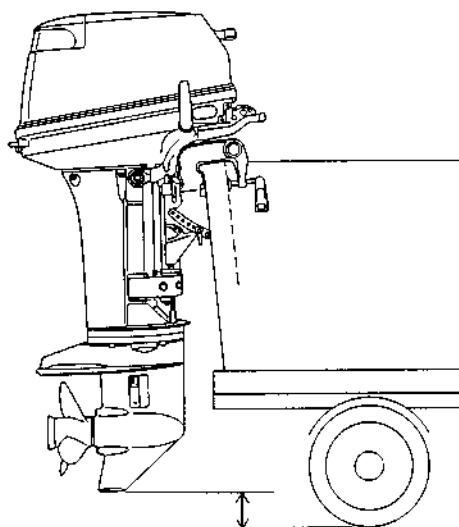


#### (4) Trailering

### ⚠ CAUTION

When trailering the engine installing on a boat, the motor should be in a running position fully tilting down. Trailering at tilted up condition of the motor may cause of damage to the motor, boat, etc. by unexpected tilt lock release getting a shock when trailering.

If trailering the motor at tilt down position is unavailable, fix the motor securely using a device (like a transom saver bar) at the tilting up position.



## 8 WARNING SYSTEM

### (1) Outline

This outboard warns of engine trouble using the following three ways.

- (1) Warning buzzer
- (2) Illumination or flashing (120A2 • 140A2)/Illumination (90A • 70C • 60C) of warning lamp.
- (3) Engine RPM limitation

The warning system includes the following functions.

- (1) Overheat sensor that checks cylinder temperature.
- (2) Water pressure switch that checks pressure of cooling water.  
The switch functions with engine speed over 2800 rpm.  
(60B • 70B: option)
- (3) Oil level sensor that informs oil level in the tank at 3 liters and 1.5 liters.  
(120A2 • 140A2)/ at 0.7 ℓ (90A)/at 0.5 ℓ (60C • 70C).
- (4) Warning buzzer that is built in the remote control box.  
The buzzer can be activated only in forward or reverse shift, and not in neutral.
- (5) Warning lamps that is built in the MULTI-PURPOSE METER. (120A2 • 140A2)/ Tachometer (90A • 70C • 60C).
- (6) ESG (engine revolution limiter) that is built in the CDI unit.  
The device limits engine rpm according to the case.

### (2) Troubleshooting at warning

Use the following table to pinpoint trouble in case the warning system functions.

#### 120A2 • 140A2

Buzzer	Lamp	RPM limitation, (approx.)	Trouble	Action
On	None	2,800 rpm	Cooling water intake is clogged.	Go to (3) - ①.
On	Overheat lamp flashes.	None	Engine overheats.	Go to (3) - ①.
On	Lower oil level indicator B flashes.	2,800 rpm	Remaining oil, less than 1.5 liters.	Go to (3) - ②.
Off	Upper oil level indicator A illuminates.	None	Remaining oil, less than 3 liters.	Go to (3) - ②.
Off	"X 1000RPM" indicator flashes.	6,000 rpm	Over-revolution	Go to (3) - ③.
Off	Engine speed indicates "00"	1,500 rpm	Incorrect connection of wire harness B	Go to (3) - ④.

---

## 90A

Buzzer	Lamp	RPM limitation, (approx.)	Trouble	Action
On	None	3,500 rpm	Cooling water intake is clogged.	Go to (3) - ①.
On	None	3,500 rpm	Engine overheats.	Go to (3) - ①.
On	Oil level indicator illuminates	None	Remaining oil, less than 0.7 liters.	Go to (3) - ②.
Off	None	5,900 rpm	Over-revolution	Go to (3) - ③.

## 60C • 70C

Buzzer	Lamp	RPM limitation, (approx.)	Trouble	Action
On	None	3,500 rpm	Cooling water intake is clogged.	Go to (3) - ①.
On	None	3,500 rpm	Engine overheats.	Go to (3) - ①.
On	Oil level indicator illuminates	None	Remaining oil, less than 0.5 liters.	Go to (3) - ②.
Off	None	6,150 rpm	Over-revolution	Go to (3) - ③.

Remark: Water pressure switch is option.

### **(3) Corrective actions at warning**

Take one of the following actions as applicable, in case a warning condition has occurred.

**① Buzzer and RPM Reduction : Overheat Warning or Water Intake Clogged Warning**

1. Shift into neutral.
2. Check that cooling water is running out of the check port.
3. If no water is running out, check if the water intake is clogged.

**② Buzzer and Lamp : Low Oil Warning**

1. Shift into neutral.
2. Turn the main switch off.
3. Fill the oil tank.
4. Turn the main switch on to check if the buzzer and lamp are off.

**③ Engine RPM is limited to approximately 6,000 and "X 1,000 RPM" indicator flashes. (120A2 • 140A2)/to approximately 5,900 rpm (90A)/to approximately 6,150 rpm (60C • 70C).**

Over-revolution protection function is turned on.

Note :

This function may be turned on in case a propeller has run out of the water. In such a case, the function will be turned off automatically after the propeller gets into the water again.

- a. Shift into neutral.
- b. Check the propeller for damage.

In case the propeller is damaged, return to port immediately at a low or medium speed to replace it with new one.

If the propeller is not damaged, go to step 3. (The propeller pitch may be unfit for the outboard.)

- c. Replace the current propeller with a proper pitch.  
For selection of the propeller, consult with the dealer.

**④ Engine RPM is indicated "00" and limited to approximately 1,500. (120A2 • 140A2)**

Red/yellow lead of wire harness B (For location of the lead, refer to WIRING DIAGRAM of this manual.) is not connected.

1. Shift into neutral.
2. Turn off the engine.
3. Check if the lead is connected.

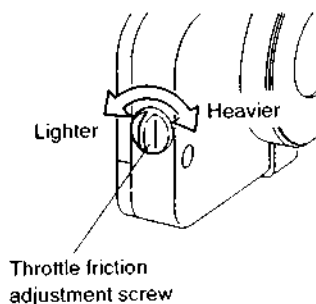
## 9 ADJUSTMENTS

### (1) Remote Control Lever Movement

EPO/EPTO

(Throttle friction adjustment screw)

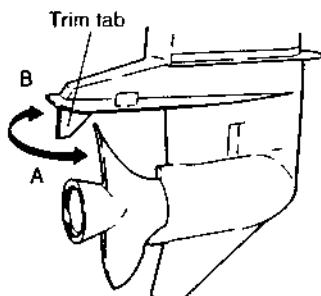
To adjust the movement of the remote control lever, turn the throttle friction adjustment screw on the front of the remote control box. Turn the screw clockwise for heavier movement, and counterclockwise for lighter movement.



### (2) Trim Tab Adjustment

If straight-line cruising cannot be achieved, adjust the trim tab located under the anti-ventilation plate.

- If the boat veers toward the right, set the trim tab in the direction of A.
- If the boat veers toward the left, set the trim tab in the direction of B.





**Note:**

1. The trim tab also acts as an anode to prevent galvanic corrosion. Thus do not paint or grease this part.
2. After adjustment, securely tighten the trim tab fixing bolt.
3. Check for looseness of the bolt and the trim tab at regular intervals. Due to corrosion, the trim tab will wear down over time.

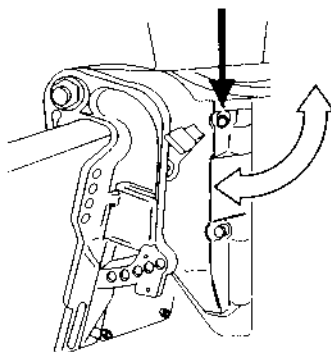
### **(3) Steering Movement Adjustment**

**EF/EFO/EPO**

The steering movement can be adjusted by turning the steering adjustment bolt on the swivel bracket.

Turn the bolt clockwise for heavier movement.

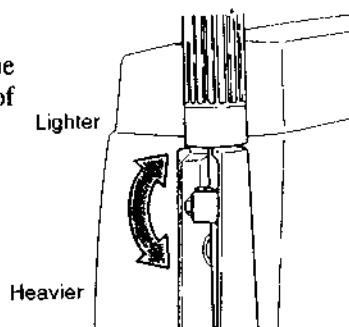
Turn the bolt counterclockwise for lighter movement.



### **(4) Throttle Grip Movement Adjustment**

**EF/EFO/EFTO**

Turn the friction adjustment screw on the steering handle to adjust the movement of the throttle grip.



# **10 INSPECTION AND MAINTENANCE**

## **Care of your outboard motor**

To keep your motor in the best operating condition, it is very important that you perform daily, and periodic, maintenance as suggested in the maintenance schedules that follow.

### **⚠ CAUTION**

- Your personal safety and that of your passengers depends on how well you maintain your outboard motor. Carefully observe all of the inspection and maintenance procedures described in this section.
- The maintenance intervals shown in the checklist apply to an outboard motor in normal use. If you use your outboard motor under severe conditions such as frequent full-throttle operation or frequent operation in brackish water, maintenance should be performed at shorter intervals. If in doubt, consult your dealer for advice.
- We strongly recommend that you use only genuine replacement parts on your outboard motor. Damage to your outboard arising from the use of other than genuine parts is not covered under the warranty.

## **EPA Emissions Regulations**

EPA (United States Environmental Protection Agency) has emission regulations and is controlling air pollution from new outboard motors. All new motors manufactured by us are certified to EPA as conforming to the requirements of the regulations. This certification is depend upon factory standards. Therefore, factory specifications must be followed when servicing emission related controls, or making adjustments.

**Maintenance, replacement, or repair of the emission control devices and systems may be performed by any marine SI (Spark Ignition) engine repair establishment or individual.**

Perform the following checks and inspection before and after use.

### (1) Daily Inspection

Item	Points to Check	Action
Fuel System	<ul style="list-style-type: none"> <li>● Check the amount of fuel in the tank.</li> <li>● Check for debris or water in the fuel filter.</li> <li>● Check rubber hoses for oil leakage.</li> </ul>	Replenish Clean Replace
Lubrication System	<ul style="list-style-type: none"> <li>● Check the amount of engine oil in the oil tank.</li> <li>● Check for debris or water in the oil filter.</li> </ul>	Replenish Clean
Electrical Equipment	<ul style="list-style-type: none"> <li>● Check the spark plugs for dirt, wear and carbon built-up. Spark plugs : NGK B-8HS-10/BR-8HS-10 or CHAMPION L-78C/RL-78C (1.0mm gap)</li> <li>● Check if the main switch functions normally.</li> <li>● Check that the battery electrolyte level and specific gravity are normal.</li> <li>● Check for loose connections on battery terminal.</li> <li>● Check if the emergency stop switch functions normally and make sure the lock plate is present.</li> <li>● Check cords for loose connections and damage.</li> </ul>	Clean or replace  Remedy or replace  Replenish or recharge  Retighten or charge  Remedy or replace  Correct or replace
Choke & Throttle System	<ul style="list-style-type: none"> <li>● Check if the choke solenoid and valve for the carburetor works normally.</li> <li>● Check if the carburetor and magneto work normally when move the throttle control lever and also check links for looseness.</li> </ul>	Adjust or replace  Correct

Item	Points to Check	Action
Clutch and Propeller System	<ul style="list-style-type: none"> <li>● Check if the clutch engages correctly when operating the Remote Control.</li> <li>● Visually check the propeller for bent or damaged blades.</li> <li>● Check that the propeller nut is tightened and the split pin is present.</li> </ul>	Adjust  Replace  Adjust or replace
Installation of Motor	<ul style="list-style-type: none"> <li>● Check all the motor installation bolts with the boat.</li> <li>● Check the thrust rod installation.</li> </ul>	Tighten
Power Trim & Tilt	<ul style="list-style-type: none"> <li>● Check working of the tilt up and down of the motor.</li> </ul>	
Cooling Water	<ul style="list-style-type: none"> <li>● Check that cooling water is discharged from the cooling water check port after the engine has started.</li> </ul>	
Tools and Spares	<ul style="list-style-type: none"> <li>● To be ready tools and spare parts for replacing spark plugs, propeller, etc.</li> <li>● Check if the spare rope is provided.</li> </ul>	
Steering Devices	<ul style="list-style-type: none"> <li>● Check working of steering handle and remote control.</li> </ul>	
Other Parts	<ul style="list-style-type: none"> <li>● Check if the anode and trim tab are securely installed.</li> <li>● Check the anode and trim tab for corrosion and deformation.</li> </ul>	Repair if necessary Replace

## (2) Periodic Inspection

It is important to inspect and maintain your outboard motor regularly. At each interval on the chart below, be sure to perform the indicated servicing. Maintenance intervals should be determined according to the number of hours or number of months, whichever comes first.

Your outboard motor should receive careful, and complete, inspection at 300 hours. This is the best time for major maintenance procedures to be carried out.

Item		Servicing Interval			Action	Remarks
		10 hours or 1 month	50 hours or 3 months	Every 100 hours or 6 months		
Fuel System	* Carbu- retor	○		○	Strip, clean and adjust. Adjust idling.	
	Fuel filter	○	○	○	Check and clean.	
	Piping			○	Check and clean.	
	Fuel tank	○	○	○	Clean	
Ignition	Spark plugs	○	○	○	Check gaps. Remove carbon deposits.	
	* Ignition timing	○		○	Adjust timing.	
Starting System	* Starter motor			○	Check for salt deposits and battery cable condition.	
	Battery	○	○	○	Installation, fluid quantity, gravity	

Item		Servicing Interval			Action	Remarks
		10 hours or 1 month	50 hours or 3 months	Every 100 hours or 6 months		
Lower Unit	Pro-peller	○	○	○	Bend of blades damage, wear	
	Gear oil	○	○	○	Change of oil or replenishment and water leak	
	Water pump		○	○	Check for Wear or damage	Replace impeller every 12 months
Bolt and Nuts		○	○	○	Retighten	
Sliding and Rotating Parts, Grease Nipples			○	○	Apply and pump in grease.	
* Power Trim & Tilt		○		○	Check power unit oil level and refill. Check function of manual release valve.	
* Engine Oil System	Oil tank	○		○	Check for leakage, damage, position of clips and filter conditions.	Repair or consult your dealer
	Oil pipe					
	Oil filter					
Outer Equipment		○	○	○	Check corrosion	
Anode			○	○	Check corrosion and deformation	Replace

For checking the items marked with \*, consult with the dealer.

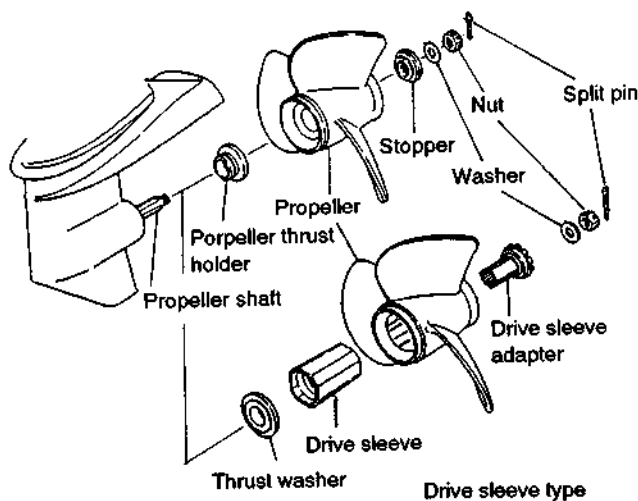
## ■ Replacing the propeller

A worn or bent propeller will affect engine performance and may cause engine trouble

- ① Pull out the split pin and remove the propeller nut and washer.
- ② Remove the propeller by pulling it toward you.
- ③ Apply genuine grease to the propeller shaft, and thrust holder.
- ④ Mount the new propeller.
- ⑤ Fit the stopper and washer, securely tighten the nut and insert the new split pin.

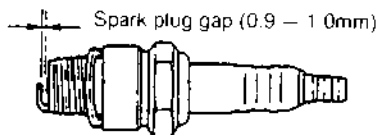
### ⚠ CAUTION

Before removing the propeller, turn the main switch key to OFF, set the remote control lever/shift lever to Neutral (N), and remove the spark plug caps from the spark plugs.



### ■ Replacing the spark plug

- ① Remove the upper engine cover.
- ② Remove the spark plug by turning counter-clockwise with the socket wrench (21mm) fitted with the handle. Tap lightly on the spark plugs if they are hard to turn.



Use spark plugs (NGK B8HS-10/BR8HS-10) or recommended ones (CHAMPION L-78C/RL-78C with gap 1.0).

### **⚠ CAUTION**

Do not touch the high tension cords running from the ignition coil to the spark plugs while the engine is running or it is turned by the electric starter motor, not even for testing the high tension cords or the spark plugs.

The high tension cords and the spark plugs generate very high electric voltage, which can cause a serious electric shock if touched.

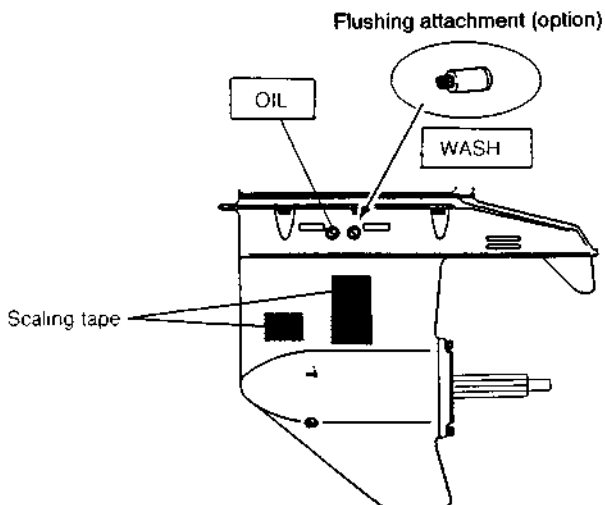


#### ■ Washing with fresh water

When the engine has been used in salt water or polluted water, wash the exterior and flush the cooling passage with fresh water using the flushing attachment.

Screw the included flushing attachment (hose adapter) into the wash hole on the gear case. Connect a water hose to the flushing attachment and flush out with water. (Be sure to secure the water strainer and sub-water strainer on the gear case beforehand.)

Run the engine at low speed in Neutral to flush out fresh water from the cooling system and in the process remove salt, mud and other foreign particles.



### **⚠ WARNING**

To prevent rotation of the propeller, remove it before flushing the passage.

#### **Note:**

Run the engine at low speed when flushing the cooling system.

### ■ Charging Gear Oil

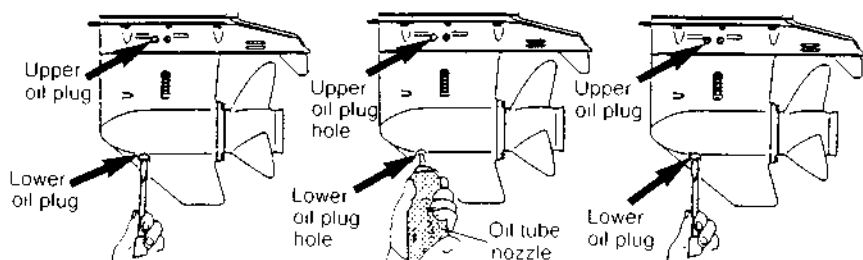
- ① Remove the oil plugs (upper and lower), and drain the gear oil completely.
- ② Insert the oil tube nozzle into the lower oil plug hole, and squeeze the tube until the oil flows out of the upper plug hole.

#### Note:

Use only genuine gear oil or, if not available, an API (American Petroleum Institute) oil grade of GL5, SAE #80 to #90.

Required volume: approx. 900 mL

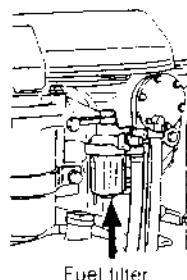
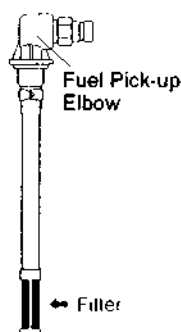
- ③ Install the upper oil plug. Then remove the oil tube nozzle and install the lower oil plug.



### ■ Cleaning Tanks and the Filters

Fuel filters are provided inside the fuel tank and on the engine.

- ① Loosen a Fuel Pick-up Elbow and remove it. Then clean the fuel filter.
- ② Clean the filter on the engine after removing the fuel filter case.



### Cleaning fuel tank

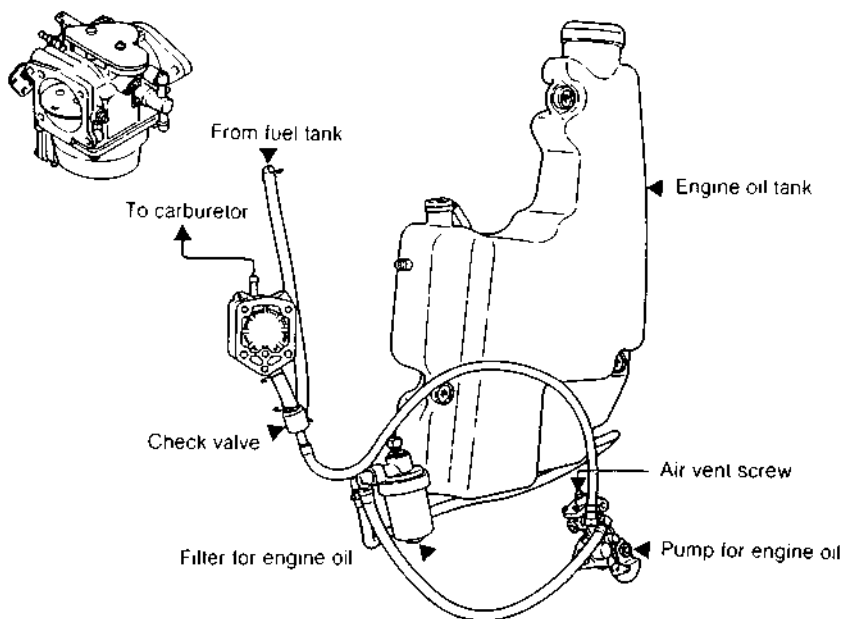
Water or dirt in the fuel tank may cause engine trouble.

Clean the tank at specified times or after long time storage (over three months).

### ■ Cleaning Engine Oil Line

Oil filter and oil tank. Check the oil tank and/or filter for entrapped water and dust.

- ① Disconnect all pipes between the oil tank and oil pump of the outboard engine.
- ② Clean out foreign matter.
- ③ Refit the pipes to the oil tank and pumps, and then fill up with new engine oil.
- ④ For air purging, refer to Item **5**.

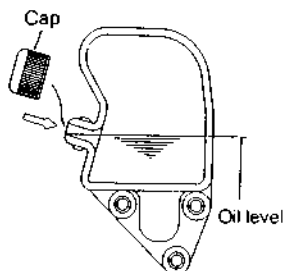


## ■ Checking and Refilling Oil in the Power Trim & Tilt Unit.

### Oil level

Check the oil level of the reservoir tank as shown below while the tank is kept in a vertical position. Tilt the engine up to check the oil level.

Remove the oil cap by turning counter-clockwise, then check if the oil level reaches the bottom line of the cap hole.



### Recommeng oil

Use an automatic transmission fluid approved by GM.

Recommended oils are as shown below.

● MOBIL : MOBIL DTE #22, MOBIL ATF 220

● SHELL : SHELL DEXTRON-II, SHELL TELLUS OIL #22 K22

● ESSO : ESSO AUTOMATIC TRANSMISSION FLUID

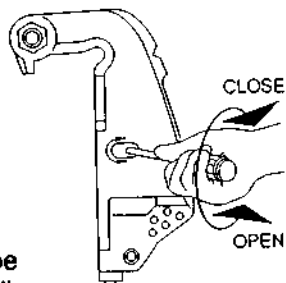
As shipped from the factory, NISSEKI ATF DEXTRON oil has been used.

To prevent oil gelling, do not mix with another brand. Drain the oil completely if another oil brand is to be used.

### Notes:

#### POWER TRIM AND TILT AIR BLEEDING PROCEDURE

1. Fully turn the manual valve to "OPEN" direction.
2. Repeat manual tilt up and down over four times.
3. Fully turn the manual valve to "CLOSE" direction at tilt down position.
4. Tilt-up by the power trim & tilt.
5. Check the oil level of the reservoir tank.
6. In case much air is taken in the oil, it may be necessary to repeat the above steps spending several days to completely air bleed.



### (3) Off-season storage

#### **▲ WARNING**

1. When the motor is out of the water, being transported, or in storage, always remove the positive (+) battery cable to prevent accidental starting of the engine. Accidental starting when the motor is out of the water will cause water pump failure, overheating and damage to the engine due to a lack of cooling water.
2. **DO NOT** disconnect the electrical harness when operating the motor. This model will continue to run and can be started with the electrical harness disconnected. Remove all spark plug connectors from the spark plugs when servicing the engine or propeller.

When your outboard motor is in storage, this is a good opportunity to have it serviced and overhauled by your dealer.

#### ■ Engine

- ① Wash the engine exterior and flush the cooling water system thoroughly with fresh water. Let the water drain completely.  
Wipe off any surface water with an oily rag.
- ② Drain all fuel from the fuel pipes, fuel pump and carburetor, and clean these parts.  
Keep in mind that if gasoline is kept in the carburetor for a long time, gum and varnish will be generated, causing the float valve to stick.
- ③ Remove the spark plugs and feed genuine Engine Oil or storage fogging oil through the spark plug holes.  
The oil will be fed into the crank case from the air silencer attached to the carburetors. Turn the engine over several times while feeding the oil into it and make sure it is evenly distributed.
- ④ Apply grease to the propeller shaft.
- ⑤ Change the gear oil in the gear case.
- ⑥ Apply grease to all sliding parts, joints, nuts and bolts.
- ⑦ Use a dry cloth to completely wipe off water and salt from the electrical components.
- ⑧ Remove the fuel connector from the engine.
- ⑨ Stand the engine vertically in a dry place.

### ■ Battery

- ① Disconnect the battery cables.
- ② Clean the exterior of the battery with fresh water or compressed air. Wipe off any chemical deposits, dirt and grease from the battery.
- ③ Apply grease or vaseline to the battery terminals.
- ④ Charge the battery completely before storing it for the winter.
- ⑤ Recharge the battery once a month to prevent it from discharging and the electrolyte from deteriorating.
- ⑥ Store the battery in a dry place.

### **▲ CAUTION**

1. Do not allow the battery to discharge, since it can be damaged by freezing.
2. When storing your outboard for the winter, open up all the water drain holes in the gear case to permit any remaining water to drain out. If a speedometer is installed, disconnect the pickup tube and allow it to drain, then reconnect it after draining. Trapped water may crack the gear case or water pump case as a result of expansion when frozen. Check and replenish the gear case with case specified Gear Oil before storing the motor, to avoid water leakage into the gear case due to a loose lubricant vent plug or grease fill plug. Inspect the gaskets under the lubricant vent and grease plugs, replace them if necessary, and reinstall the plugs.

### ■ Electric Starter Motor

Coat the pinion gear and shaft of the electric starter motor with grease.

#### **(4) Pre-season check**

Have your dealer check the engine before the season starts, or if you prefer, be sure to check the following items yourself:

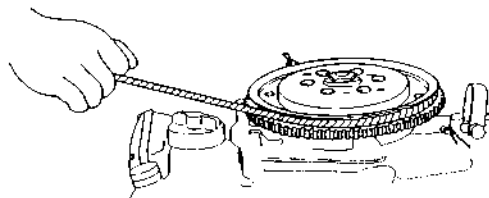
Specific Gravity at 20 °C	Terminal Voltage (V)	Charge Condition
1.120	10.5	Fully discharged
1.160	11.1	1/4 charged
1.210	11.7	1/2 charged
1.250	12.0	3/4 charged
1.280	13.2	Fully charged

- ① Check the electrolyte level, and measure the voltage and specific gravity of the battery.
- ② Check that the battery is secure and the battery cables installed properly.
- ③ Clean the engine oil filter.
- ④ Purge air in the vinyl pipe connecting the oil tank to the oil pump.
- ⑤ Check that the shift and throttle function properly.  
(Be sure to turn the propeller shaft when checking the shift function or else the shift linkage may be damaged.)

### (5) Motor submerged in water

In the event that the engine is accidentally submerged in water, take the following countermeasures before handing it in for service at your dealer.

- ① Take it out of the water immediately and wash it with fresh water to remove all traces of salt and dirt.
- ② Remove the spark plugs, and drain the engine completely of water. Turn the flywheel several times, using the starter rope.
- ③ Drain the fuel line and the carburetor.
- ④ Inject copious amounts of genuine Engine Oil or storage fogging oil into the engine through the spark plug holes and the air silencer. Turn the flywheel several times with the starter rope while injecting the oil to make sure the oil is evenly distributed.



- ⑤ After the above steps, it might be possible to start the engine. However, the electrical components and carburetor will soon deteriorate and become inoperative. Therefore, be sure to have the engine overhauled by your dealer as soon as possible.

### **▲ WARNING**

Keep gasoline away from naked flames and sparks, and always dispose of unwanted fuel in the proper manner.

### **▲ CAUTION**

1. If it is not possible to have the motor serviced promptly resubmerge it immediately in fresh water to avoid exposing it to the air, and arrange to have it overhauled as soon as practicable.
2. If the engine cranks freely and no foreign matter such as weeds, mud, or sand seems to have penetrated it, try starting it again. However, if foreign matter has possibly entered the engine, follow the above procedures and take it to your dealer for servicing.



## **▲ CAUTION**

The following steps must be taken when first using the engine after pre-season storage.

1. In addition to the oil in the oil tank, mix engine oil with the fuel in the following mixing ratio and fill up the fuel tank completely with 25 liters (6.6 U.S. gal.):

Mixing ratio: Gasoline 50:1 Engine oil

Use unleaded gasoline and genuine Outboard Motor Oil. If this oil is not available, use another NMMA TCW3 certified outboard motor oil from another manufacturer.

2. Purge any air from the oil filter assembly.
3. Warm up the engine for 3 minutes with the remote control lever in "NEUTRAL" position.
4. Run the engine for 5 minutes at the slowest speed.
5. Run the engine for 10 minutes at half speed.

In steps 2 and 3 above, the oil used for winter storage inside the engine will be cleaned out, and optimum performance will be assured.

6. When the full volume, 25 liters (6.6 U.S. gal.), of gasoline mixed with oil has been used, fill up the tank with pure gasoline only.

Remark: Except EF Type.

### **(6) Cold weather precautions**

When mooring in cold weather at sub-zero temperatures the water in the cooling water pump may freeze and severely damage the pump, impeller, and associated parts. To avoid this, submerge the lower half of the engine into the water, or tilt the engine and operate the electric starter motor for 5 seconds with the stop switch lock plate taken away to allow the water to drain completely.

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## **(7) Checking after striking under water object**

Striking sea bottom or underwater object may severely damage the outboard. Immediately bring the outboard to your dealer and ask for the following checks.

- (1) Looseness or damage of power unit installation bolts, gear case and extension case bolts, propeller shaft housing bolts, upper and lower mount rubber bolts and nuts, power trim and tilt bolts, and mount rubber cap bolts.

Ask to tighten loose bolts and nuts, and to replace damaged parts.

- (2) Deformation and damage of mount rubber, tilt stopper, thrust rod, gears and clutch, and propeller.

Ask to replace damaged or deformed parts.

## **11 TROUBLESHOOTING**

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If you encounter a problem with the engine, check the list below and locate the problem you are experiencing. Then follow the suggested remedies.

Do not hesitate to contact your dealer, as professional advice and assistance is the best way to keep the engine in optimum condition.

Difficult to start engine	Engine starts, but stops soon	Poor idling	Unstable engine running speed or engine stops	Abnormally high engine speed	Abnormally low engine speed	Can not obtain high engine speeds	Over-heating of engine	Power Trim & Tilt inoperative	
●	●		●						Empty fuel tank
●	●	●	●		●	●	●		Incorrect connection of fuel system
●	●	●	●		●	●	●		Air enters fuel line
●	●	●	●		●	●	●		Deformed or damaged fuel pipe
●	●	●	●		●	●	●		Closed air vent on fuel tank cap
●	●	●	●		●	●	●		Clogged fuel filter, fuel pump or carburetor
		●	●		●	●	●		Use of improper engine oil
●	●	●	●			●	●		Use of improper gasoline
●	●								Excessive supply of gasoline
●	●	●	●		●	●	●		Poor carburetor adjustment
●	●	●	●			●	●		Recirculation pipe broken
●	●	●	●		●	●	●		Use of non-specified spark plugs
●	●	●	●		●	●			Dirt or carbon deposits on spark plugs
●	●	●	●		●	●			No sparks or weak sparks
			●		●	●	●		Insufficient cooling water flow
		●	●			●	●		Faulty thermostat
				●		●	●		Propeller cavitation
				●	●	●	●		Incorrect propeller selection
		●		●	●	●	●		Damaged or bent propeller
				●	●	●	●		Unbalanced load in boat
				●		●	●		Transom too high
					●	●	●		Transom too low
●	●	●			●	●	●		Incorrect adjustment of throttle link
●	●	●			●	●	●		Incorrect adjustment of ignition timing
●									Insufficient battery capacity, loose terminals, corrosion
●									Faulty ignition switch or Power Trim & Tilt switch
●									Remote Control lever not set to Neutral
●									Stop switch lock plate not fitted
●								●	Incorrect wiring, disconnected or broken wire
●									Starter motor failure
								●	Air in power trim & tilt unit

## 12 TOOL KIT AND SPARE PARTS

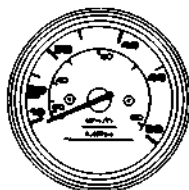
	Name	Q' Ty	Remark
Servicing Tools	Tool Bag	1	
	Socket Wrench (21mm)	1	
	Socket Wrench (10 × 13)	1	
	Socket Wrench Handle	1	
	Pliers	1	
	Screwdriver (Phillips-type and flat head)	1	Adapter-type
Spare Parts	Emergency starter rope (1,600mm)	1	
	Spark Plug	2	NGK B8HS-10 (or BR8HS-10)
	Slit Pin	1	Diameter × length = 3 × 25mm
Parts Packaged with Engine ※	Bracket Fixing Bolts	4	12mm
	Bracket Fixing Nuts	4	12mm
	Washers A, B	4 each	A (large), B (small)
	Fuel Tank (with primer bulb)	1	Removable
	Remote Control Box	1	
	Drag Link	1	
	Multi-purpose Meter	1	For 120A2 • 140A2
	Meter Harness	1	
	Lead Wire for Meter	1	
	Remote Control Box	1	
	Drag Link	1	
	Tachometer	1	For 60C • 70C • 90A EPTO & EPO
	Trim Meter ☆	1	
	Lead Wire for Meters	1	

※ : Not included as standard accessories in some markets.

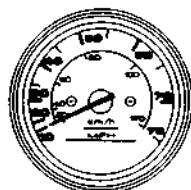
☆ : Not included for EPO.

## 13 ACCESSORIES

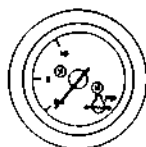
Consult with your dealer for details of the optional accessories.



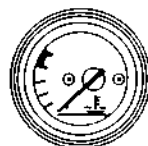
Speedometer  
(50MPH)



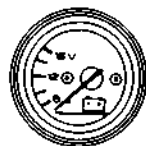
Speedometer  
(75MPH)



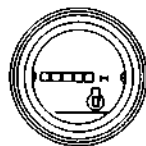
Water Pressure  
Meter



Water Temperature  
Meter



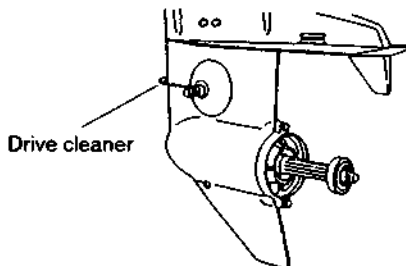
Voltmeter



Hour Meter  
(engine operation  
hour counter)

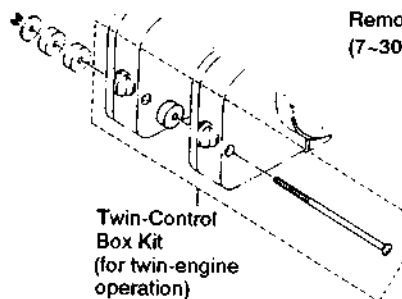


Flushing attachment

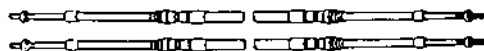




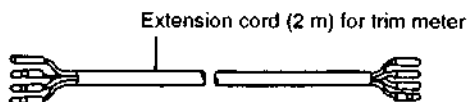
Propeller



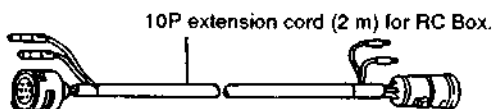
Twin-Control  
Box Kit  
(for twin-engine  
operation)



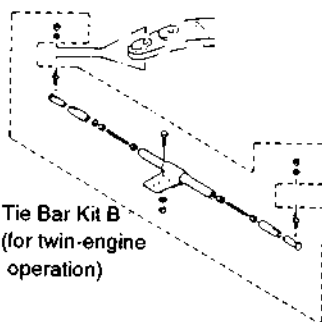
Remote control cable  
(7-30 feet, 19 kind lengths)



Extension cord (2 m) for trim meter



10P extension cord (2 m) for RC Box.



Tie Bar Kit B  
(for twin-engine  
operation)



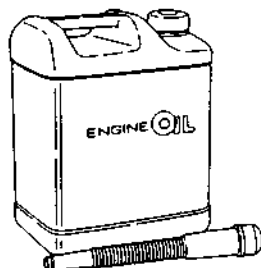
Grease  
(250g)



Gear Oil  
(500 mL)



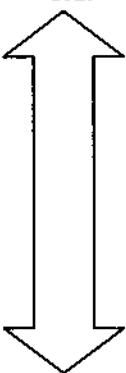
Touch-up Paint



Engine Oil  
(0.4L, 1L, 4L, 20L)

## 14 PROPELLER TABLE

To ensure optimum performance, the propeller should match the boat type and its load.

 Heavier Load boat       Lighter Load boat	Mark	
	A11	M11
	A13	M13
	A15	M15
	V1500	
	V1700	M17
	V1900	M19
	V2100	M21

### PROPELLER

Use a genuine propeller.

A propeller must be selected so that the engine rpm measured at wide open throttle while cruising is within the recommended range,

5,200 to 5,700 rpm (120A2 • 140A2).

5,000 to 5,500 rpm (90A).

5,150 to 5,850 rpm (60C • 70C).



## **15 WIRING DIAGRAM**

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### **60C • 70C**

- |  |                                     |
|--|-------------------------------------|
| 1 Magneto                              | 21 Starter cord                     |
| 2 C.D. Unit                            | 22 Water pressure switch            |
| 3 Ignition coil                        | 23 Battery                          |
| 4 Rectifier complete                   | 24 Main switch                      |
| 5 Starter motor                        | 25 Stop switch                      |
| 6 Starter solenoid                     | 26 Overheat & oil level buzzer      |
| 7 Power trim & tilt (PTT)              | 27 Neutral switch                   |
| 8 Solenoid switch A, Power trim & tilt | 28 Power trim & tilt switch         |
| 9 Solenoid switch B, Power trim & tilt | 29 Tachometer                       |
| 10 Trim sender                         | 30 Trim meter                       |
| 11 Fuse wire                           | 31 Meter lead wire                  |
| 12 Choke solenoid                      | 32 Warning lamp, Oil level          |
| 13 Oil level sensor                    | 33 Speedometer (option)             |
| 14 Overheat sensor                     | 34 Water pressure meter (option)    |
| 15 Water temperature sensor            | 35 Hour meter (option)              |
| 16 Battery cable                       | 36 Voltmeter (option)               |
| 17 Cord harness A                      | 37 Water temperature meter (option) |
| 18 Cord harness B                      | 38 Fuel meter (option)              |
| 19 Cord harness C                      | 39 Meter lamp switch (option)       |
| 20 Power trim & tilt switch B          | 40 Extension cord, Trim sender      |

#### **Colour of Cord**

- B Black  
Br Brown  
G Green  
L Blue  
Lg Light green  
Or Orange  
P Pink  
R Red  
Sb Sky Blue  
W White  
Y Yellow

Note: ( / ) means stripe cord colour

## 90A • 120A<sub>2</sub> • 140A<sub>2</sub>

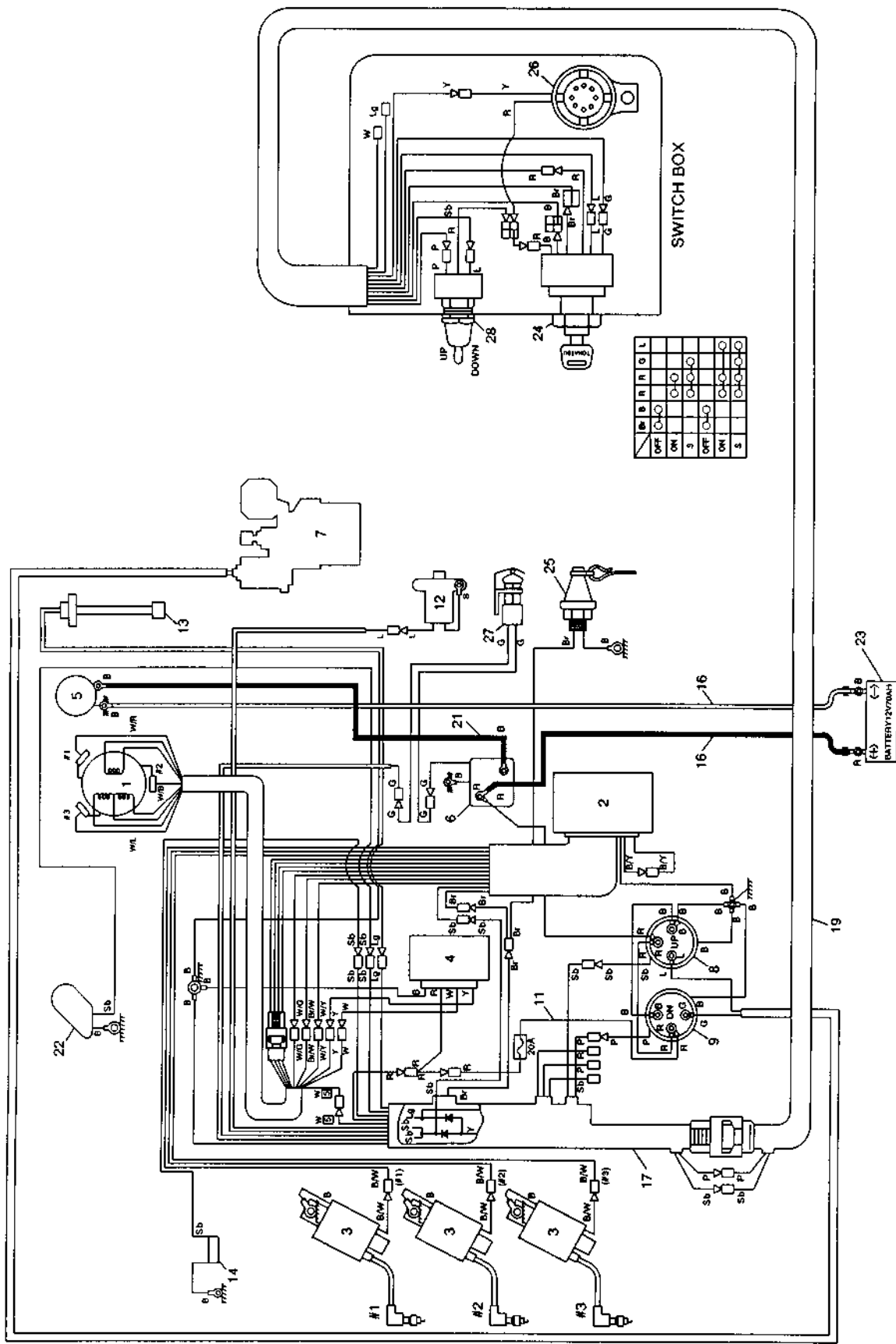
- |  |  |
|--|--|
| 1 Magneto                              | 26 Overheat buzzer                           |
| 2 C.D. Unit                            | 27 Neutral switch                            |
| 3 Ignition coil                        | 28 Multi-purpose meter                       |
| 4 Rectifier complete                   | 29 Meter cord assembly                       |
| 5 Starter motor                        | 30 Meter lead wire                           |
| 6 Starter solenoid                     | 31 Speedometer (option)                      |
| 7 Power trim & tilt                    | 32 Water pressure meter (option)             |
| 8 Solenoid switch A, power trim & tilt | 33 Hour meter (option)                       |
| 9 Solenoid switch B, power trim & tilt | 34 Voltmeter (option)                        |
| 10 Trim sender                         | 35 Cooling water temperature meter (option)  |
| 11 Fuse wire                           | 36 Fuel meter (option)                       |
| 12 Choke solenoid                      | 37 Cooling water temperature sensor (option) |
| 13 Oil level sensor                    | 38 Meter lamp switch (option)                |
| 14 Overheat sensor                     | 39 Electric bracket                          |
| 15 Water pressure switch               | 40 Ground wire                               |
| 16 Battery cable                       | 41 Tachometer                                |
| 17 Cord harness A                      | 42 Warning lamp, oil level                   |
| 18 Cord harness B                      | 43 Trim meter                                |
| 19 Cord harness C                      | 44 Extension cord, trim sender               |
| 20 Power trim & tilt switch B          |  |
| 21 Starter cord                        |  |
| 22 Battery (Provided on the market)    |  |
| 23 Main switch                         |  |
| 24 Stop switch                         |  |
| 25 Power trim & tilt switch            |  |

### Colour of Cord

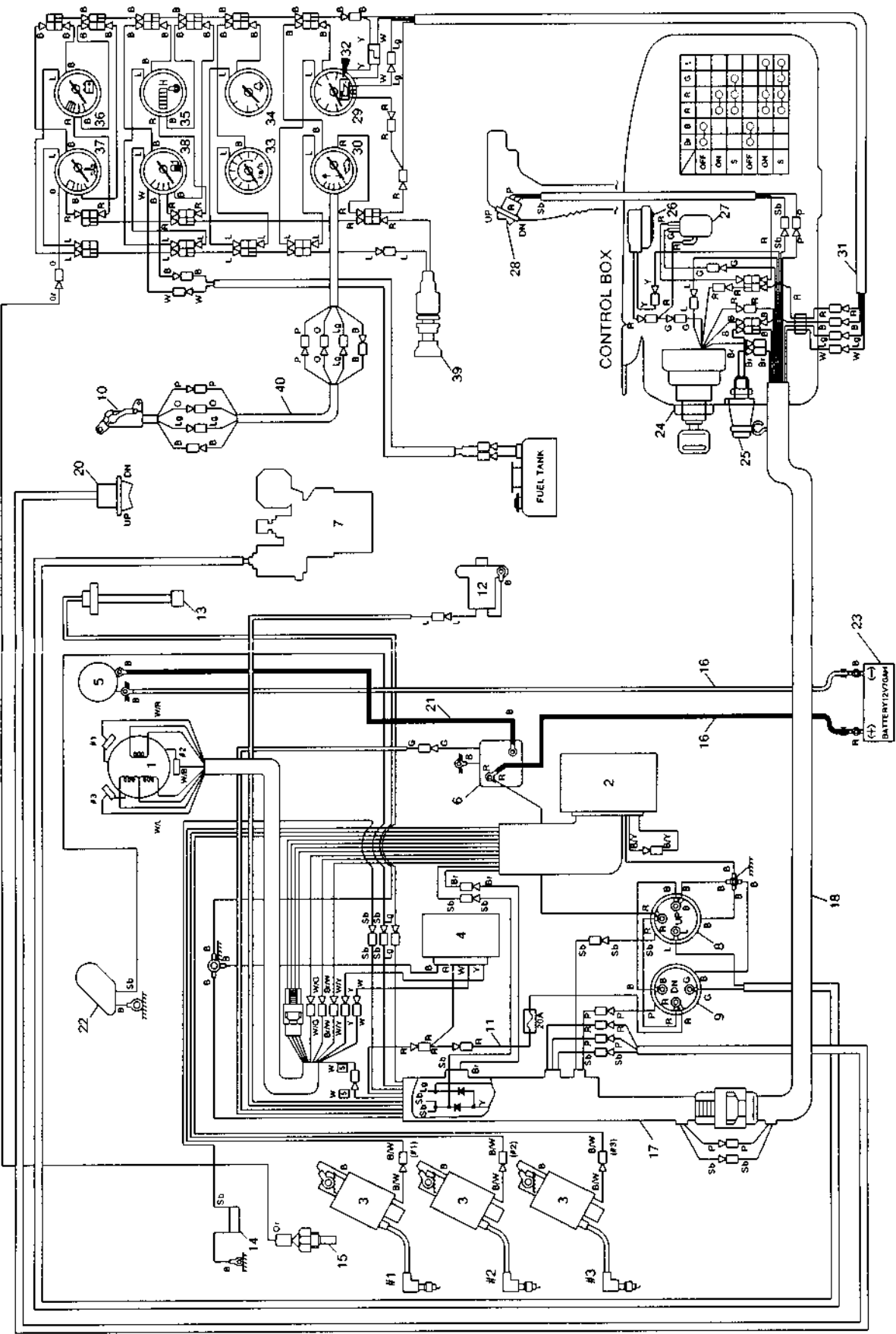
- B Black  
Br Brown  
G Green  
L Blue  
Lg Light green  
Or Orange  
P Pink  
R Red  
Sb Sky Blue  
W White  
Y Yellow

Note: { / } means stripe cord colour

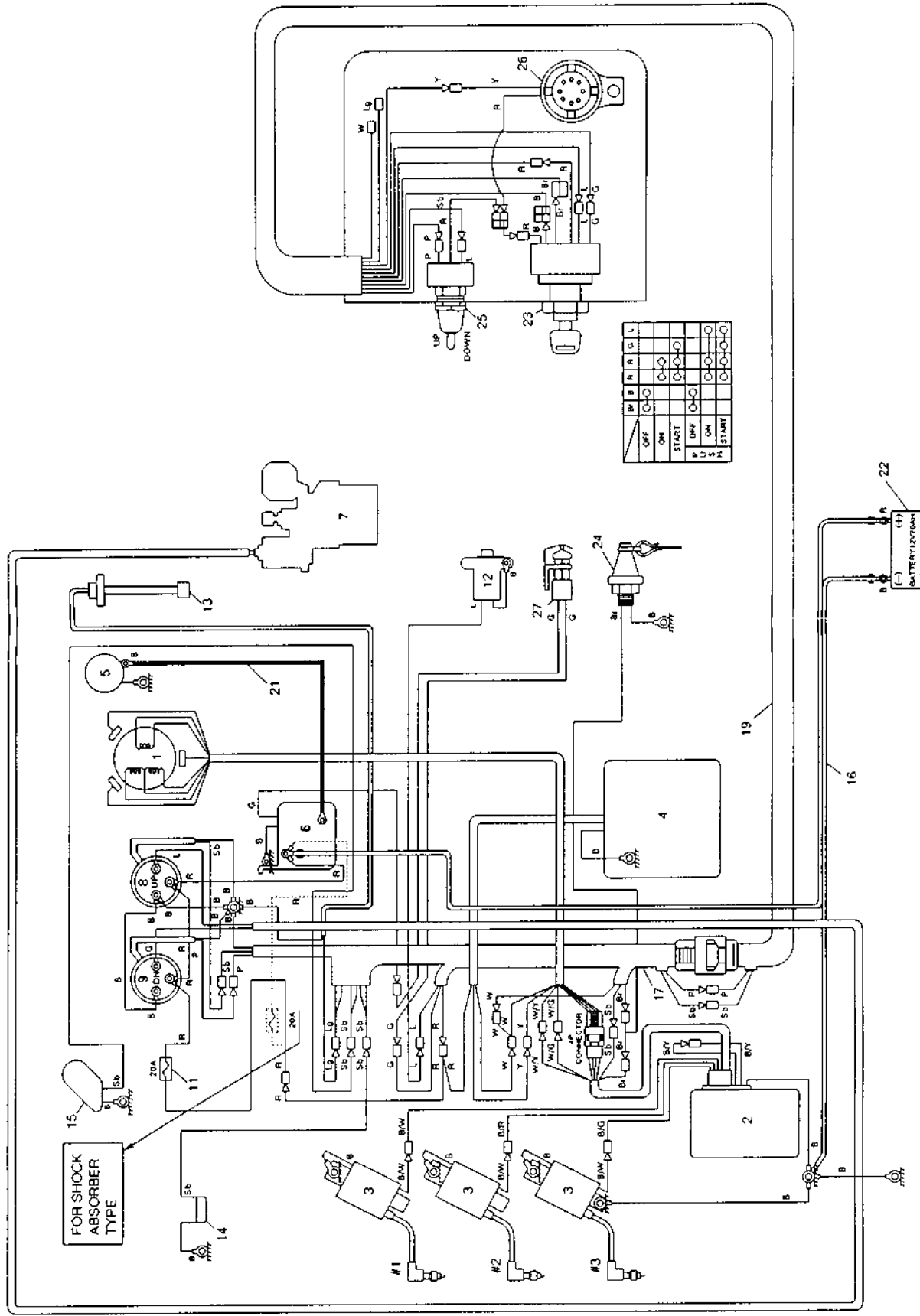
## 60C 70C EFO/EFTO









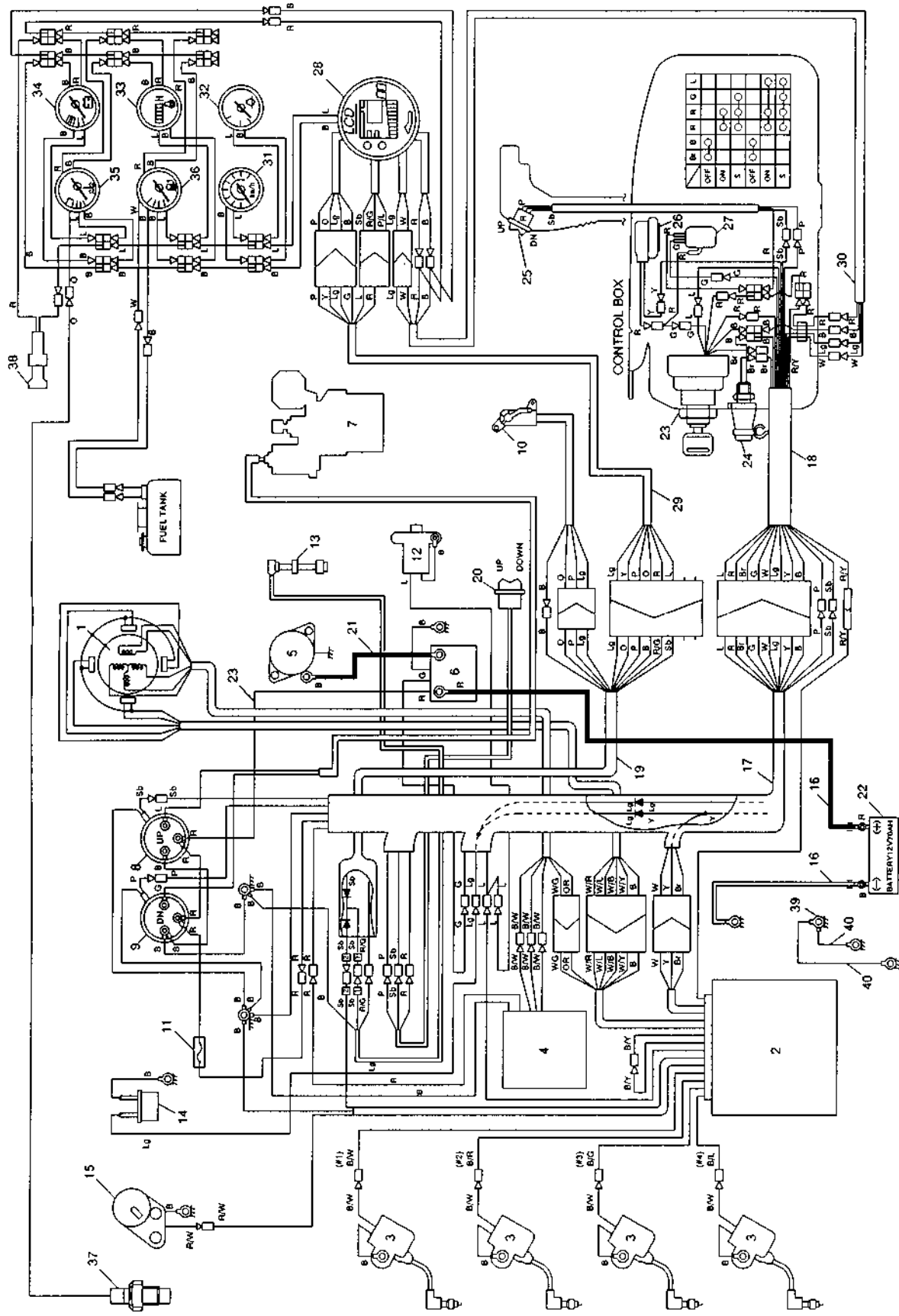














**WARNING:**

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

**NISSAN**