1. Specifications Table

Item \ MODEL		40B		50B
		EPTO	EFTO	EFO
Overall length		630 mm (24.8 in)	1120 mm (44.1 in)	
Overall width		354 mm (13.6 in)	384 mm (15.1 in)	
Overall height	Transom (S)	1227 mm (48.3 in)	1260 mm (49.6 in)	
	Transom (L)	1354 mm (53.3 in)	1387 mm (54.6 in)	
	Transom (UL)	1481 mm (58.3 in)	1514 mm (59.6 in)	
Weight	Transom (S)	93.5 kg (206 lb)	96.5 kg (213 lb)	88.5 kg (195 lb)
	Transom (L)	94.5 kg (208 lb)	97.5 kg (215 lb)	89.5 kg (197 lb)
	Transom (UL)	97.0 kg (214 lb)	100.0 kg (221 lb)	92.0 kg (203 lb)
Transom length	Transom (S)	403 mm (15.9 in)		
	Transom (L)	530 mm (20.9 in)		
	Transom (UL)	657 mm (28.9in)		
Engine type		2-stroke gasoline engine direct injection		
Piston displacement		697ml (42.5 cu.in)		
Bore & stroke		68 mm (2.68 in) x 64 mm (2.52 in)		
No. of cylinders		3		
Maximum output		29.4kW(40ps)		36.8kW(50ps)
W. O. T		5150~5850 rpm		
Trolling		700/ 800/ 900 rpm (3stages valiable)		
Idling		700/ 800/ 900 rpm (3stages valiable)		
Full-throttle fuel consumption (approx.)		15.2 L/Hr (4.0 US gal/Hr)	17 L/Hr (4.5 US gal/Hr)	
Starting system		Electric starter motor		
Intake system		Reed valve		
Scavenging system		5-port loop Charge		
Exhaust system		Through hub		
Lubrication system		Oil injection		
Cooling system		Water-cooling		
Water temp. control		Thermostat (with pressure relief valve)		
Ignition system		Inductive ignition		
Ignition timing control		ECU		
Firing order		1-2-3		
Spark plug		NGK:PZFR6H		
Alternator		12V 280W(MAX.)		
Battery		12V 100AH(600CCA or 500MCA)		
		12V 120AH (700CCA or 850MCA)		
Trim angle		8° to 28°		4° to 24°
Trim angle settings		4		6
Maximum tilt-up angle		74°		75°
Transom board thickness		31~70 mm (1.22 ~ 2.76 in)		
Maximum steering angle		70°		80°
Gear shift		Dog clutch (F-N-R)		
Gear ratio		1.85 : 1 (13 : 24)		
Throttle control		Remote control	Tiller handle	
Fuel tank		25L (6.60 US gal)		
Oil tank		2L (2.1 US qt)		
Fuel		Unleaded regular gasoline		
Engine oil		Genuine MD Gold or Platinum, or Egaivalent		
Gear oil		Genuine gear oil (500 ml) or API GL5, SAE#80 to #90 500mℓ (16.89 fl. oz)		

*:Only those products that have been approved.

External Dimensions

Item	50A	Remarks
A	495 mm (19.5 in)	
B	Transom (S) 728 mm (28.7 in)	
	Transom (L) 855 mm (33.7 in)	
	Transom (UL) 982 mm (38.7 in)	
C	Transom (S) 403 mm (15.9 in)	
	Transom (L) 530 mm (20.9 in)	
	Transom (UL) 657 mm (25.9 in)	
D	568 mm (22.4 in)	EFTO, EFO
E	680 mm (26.8 in)	
F	85 mm (3.3 in)	
G	600 mm (23.6 in)	EFTO, EFO
H	520 mm (20.5 in)	
I	440 mm (17.3 in)	
J	31-70 mm (1.2~2.8 in)	
K	490 mm (19.3 in)	
L	Transom (S) 800 mm (31.5 in)	
	Transom (L) 910 mm (35.8 in)	
	Transom (UL) 1025 mm (40.4 in)	
M1	384 mm (15.1 in)	EFTO, EFO
M2	345 mm (13.6 in)	EPTO
N	310 mm (12.2 in)	
O	235 mm (9.3 in)	
P	565 mm (22.2 in)	EFTO, EFO
Q	120deg.	EFTO, EFO
R	12deg.	
S	35deg.	
T	75deg.	
U	161 mm (6.3 in)	
Y	54 mm (2.1 in)	

1. General Precautions for Servicing

Users of this manual should observe the following general precautions when conducting disassembly and assembly work.

(1) Make sure that the outboard motor is securely mounted on a work stand before starting work.
(2) Take care not to scratch or damage painted surfaces and the mating surfaces where cylinders, the cylinder head, the crankcase and other parts are joined.
(3) Always replace packing, gaskets, O-rings and split pins with new ones when reassembling engine parts. Make a point of replacing snap rings as well.
(4) When replacing, be sure to use genuine Tohatsu brand parts and lubricants or products recommended by Tohatsu.
(5) Always use the recommended special tools to ensure work is done properly.
(6) When disassembling and assembling components, make note of position marks, adding your own marks if none are provided, as a way to ensure the various parts and components are properly mated when being reassembled.
(7) To prevent smaller parts, such as bolts, nuts and washers from getting lost or damaged, where possible, lightly insert or tighten them back in their original locations.
(8) As normal practice, check disassembled parts for any wear or damage by first wiping them clean; then washing them in solvent.
(9) With reassembly operations it is essential to observe precise detail in centering, vacuum sealing, lubricating (with oil or grease), packing parts and components, and connecting wiring and piping. Also ensure there are no blockages in fluid lines.

1) When reassembling parts requiring numerous nuts and bolts (cylinder, crankcase etc.), begin by alternately tightening diagonally opposed inner bolts, moving in a concentric circle; then tightening the outer bolts. This will ensure that engine parts are assembled evenly and securely. (Use the same procedure in the reverse order when disassembling.)

2) When installing oil seals, be careful not to scratch or reverse the sides that mate with the shaft and always apply grease to the lip surfaces.

3) Confirm the correct quantity and thickness when applying sealant. Applying excessively will result in the excess portion being excreted into or outside of the case, potentially causing damage. Adhere strictly to the written instructions when applying adhesives.

4) Apply penetrating oil spray to nuts or bolts that are difficult to remove due to rust and wait 5 minutes before removing.

5) For the various inspection specifications, torque values, special tools, and the points where sealant, adhesive and grease are to be applied, refer to the relevant tables.

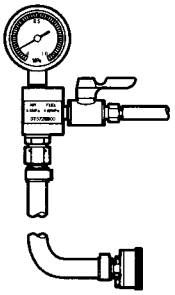
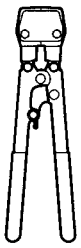
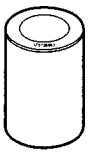
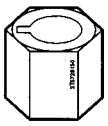
6) The various nuts, bolts and washers referred to in this manual are listed below.

Name	Type	Diameter	Length
H820	Hexagon bolt	8 mm	20 mm
N8	Hexagon Nut(Medium Height Nut)	8 mm	
L8	Hexagon Nut(Thin Nut)	8 mm	
W8	Plain washer	8 mm	
SW8	Spring washer	8 mm	
Screw 620	Pan head screw	6 mm	20 mm

(10) Observe all necessary safety procedures to prevent accidents and injury during work operations.

5. Special Tools

1. List of Special Tool

<table>
<tr>
<td> 
Pressure gauge assembly
3T5-72880-0</td>
<td> 
Crimping pliers
3T5-72864-0</td>
<td> 
Drive pulley press
3T5-72868-0</td>
<td> 
Piston slider
3T5-72871-0</td>
</tr>
<tr>
<td>For measuring air rail fuel and air pressure.</td>
<td>For crimping OETIKER make clamps.</td>
<td>For press fitting in the drive pulley.</td>
<td>For installing the piston in the air compressor.</td>
</tr>
<tr>
<td> 
Crankshaft holder
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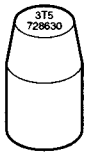
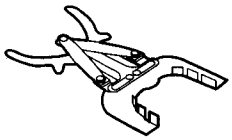
<td> 
O-ring setting tool (ø24)
3T5-72863-0</td>
<td> 
Piston ring wrench
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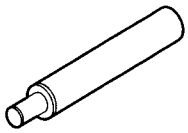
<td> 
Piston pin tool
345-72215-0</td>
</tr>
<tr>
<td>For removing and tightening on the pulley nut.</td>
<td>For installing O-rings on the fuel injectors.</td>
<td>For installing and removing the piston rings.</td>
<td>For installing and removing piston pins.</td>
</tr>
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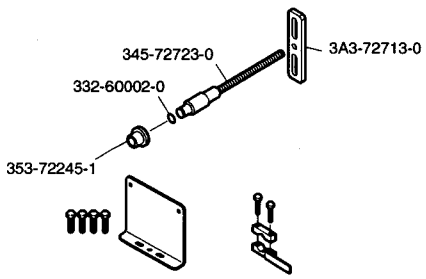
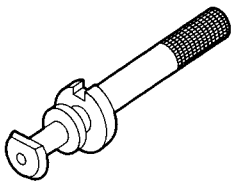
<td colspan="2"> 

Backlash measuring tool</td>
<td> 
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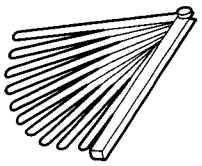
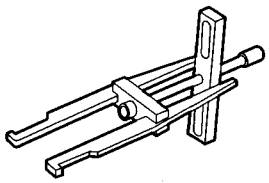
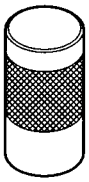
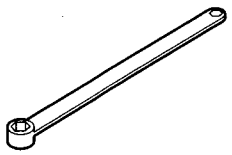
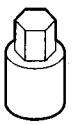
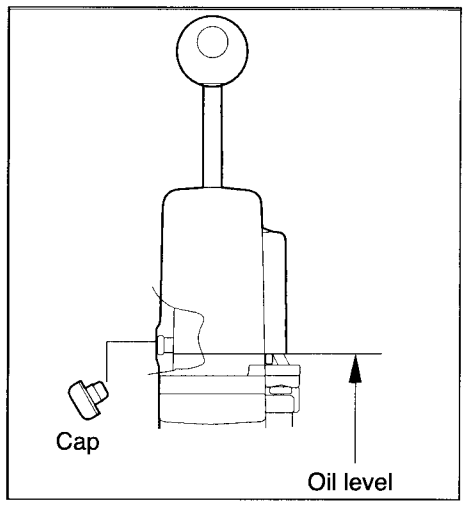
<td> 
Filler gauge
353-72251-0</td>
</tr>
<tr>
<td colspan="2">For measuring backlash between bevel gears A and B.</td>
<td>For measuring between bevel gears A and B.</td>
<td>For measuring clearances.</td>
</tr>
<tr>
<td> 
Bevel gear A bearing puller assembly
345-72224-2</td>
<td> 
Bevel gear A bearing Setting tool
3C8-72719-0</td>
<td> 
Bevel gear B nut wrench
346-72231-0</td>
<td> 
Bevel gear B nut socket
346-72232-0</td>
</tr>
<tr>
<td>For removing bearing from bevel gear A.</td>
<td>For installing bevel gear A bearing.</td>
<td colspan="2">For removing and installing bevel gear B nut.</td>
</tr>
</table>

8. Inspecting Power Trim and Tilt System

Checking Oil Level

Note that the oil level is checked by first tilting up the outboard engine (see figure), so that the reserve tank is in a perpendicular position. To check level, turn the oil plug counterclockwise to remove it; then confirm that oil level is even with the bottom of the oil plug hole.
When replenishing oil, add until oil begins to overflow from the oil plug hole.



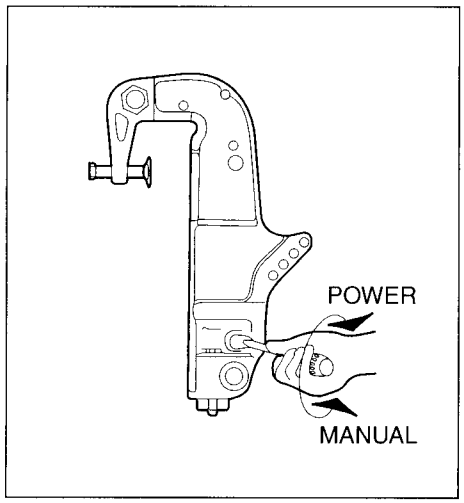
Caution:

In order to avoid damage and accidental injury that can occur when the tilted up (for storage and inspections etc.) outboard engine accidentally tilts back down, be use to insert the tilt stopper when tilted up.

Oil Type

Automatic transmission fluid (ATF) or equivalemt

Note that the presence of air in the oil can cause the engine to not tilt up and down properly.
If this occurs, bleed out the air using the following procedure.



- With the outboard engine installed on the boat, turn the manual valve to the MANUAL position (counter clockwise) and move the engine the full tilt up and down stroke 5 or 6 times; then turn the manual valve back to the POWER position (clockwise).

9. Inspecting Air Rail Pressure

Refer to the description for ② Pressure Gauge Assembly, listed under section 5. (Special Tools) in Chapter 2 (Servicing Information).

Disassembling Air Rail

Remove the following components.

① Fuel hose assembly and nipples

Disassemble and pull out the stopper plate.

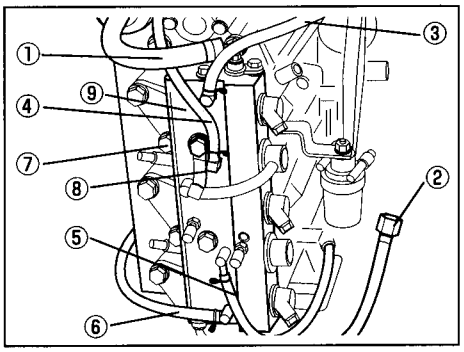
② Air hose assembly
Disconnect the hose joint on the compressor side.

③ Cooling water outlet hose

④ Fuel return hose

⑤ Air discharge hose

⑥ Cooling water inlet hose



Remove the following components.

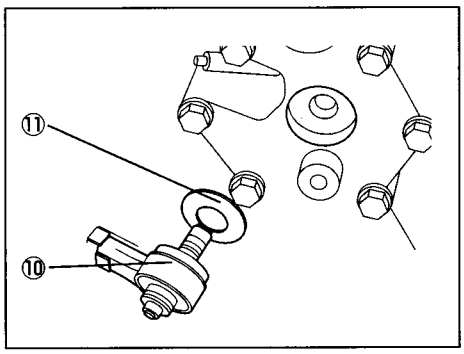
⑦ Bolt: type H865 at 2 locations

⑧ Clamp

⑨ Air rail assembly

⑩ Air injector: at 3 locations

⑪ Air injector set piece: at 3 locations



Inspect the following components.

① Bushing

② Oil pump driven gear

Check for wear and damage.

Assembling Oil Pump

Assemble the following components

① Bushing

② Oil pump driven gear

Oil to apply	① and ② Genuine engine oil

• Make sure that ① faces right side up. • Section with large hole faces to the front.

Assembling Oil Pump and Oil Tank

Assemble the following components. (Refer to chapter 1.)

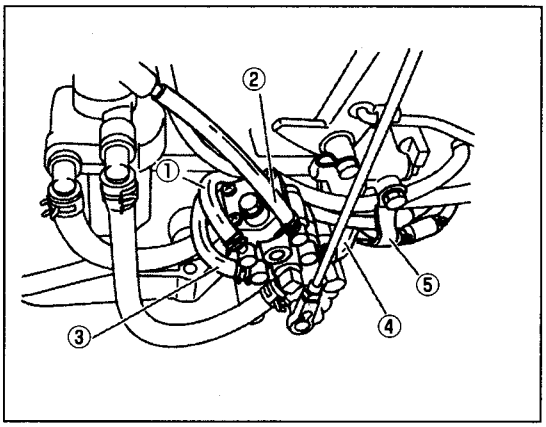
① Oil discharge pipe ⇨ #1 air box

② Oil discharge pipe ⇨ compressor

③ Oil discharge pipe ⇨ #2 air box

④ Oil discharge pipe ⇨ #3 air box

⑤ Clamp



• Pass ③ and ④ through the rear of the oil pump. • Secure ①, ③ and ④ using the clamp ⑤.
Make sure that check valve faces in proper direction.

• Install the oil filter on the bracket.

Install the following components.

• Insert the oil tank into the lower rubber mount.

• Connect the oil level sensor.

• Secure the oil pipe using the clamp.

Install the following components.

• Bolt: type H630

• Washer

• Collar

• Rubber mount

Install the following components.

- Thermostat
- Thermostat cap gasket ⇨ Replace with new one.
- Thermostat cap
- Bolt: at 2 locations

Torque: 4.6 to 6.3 N-m: 0.47 to 0.64 kg-m
: 3.4 to 4.6 lb-ft

Caution:

Be sure to tighten M6 bolts only after tightening the M8 bolts on the head cover. Never tighten the M6 bolts first.

Assembling Exhaust Cover

Clean away any dirt or foreign matter on the mating surfaces of the cylinder and inner and outer exhaust covers; then degrease.

Assemble the following components.

- Exhaust cover gasket⇨ Replace with new one.
- Inner exhaust cover
- Exhaust cover gaske ⇨ Replace with new one.
- Outer exhaust cover
- Fuel filter band
- Washers: at 14 locations
- Bolt: type H625 at 14 locations

Tighten in the order of the embossed numbers.

Partial torque: 3.9 to 5.9 N-m: 0.4 to 0.6 kg-m
: 2.9 to 4.3 lb-ft
Full torque : 7.8 to 9.8 N-m: 0.8 to 1.0 kg-m
: 5.8 to 7.2 lb-ft

Installing Recirculator Hose

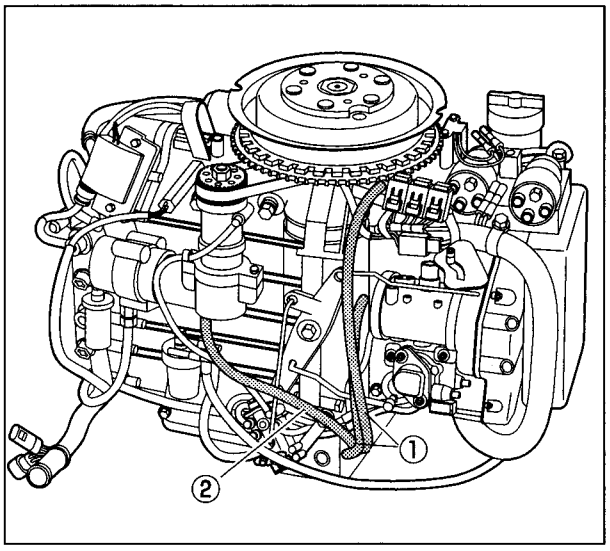
Install the following components.

① Lubrication pipe
② Oil return pipe from compressor

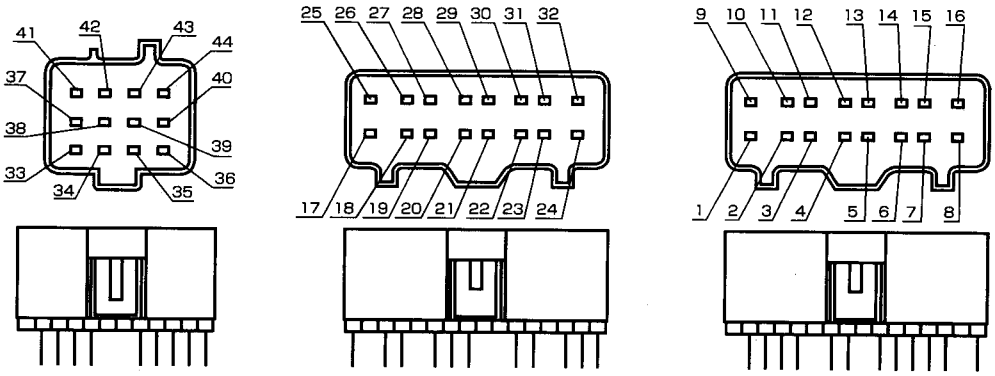
- Hose clips: 3 sets (6pcs)

Caution:

Insure proper installation of the check valve inside the hose.



Wire Connection



NO	Component	Cable color addreviations	
1	TPS 1	L/R	Blue/Red
2			
3	Key switch (PUSH)	L	Blue
4	CPS(Crank position sensor)	L/B	Blue/Black
5	Warning lamp(Oil)	L/g	light green
6	Warning lamp(Temp.)	Y/R	Yellow/Red
7	Warning lamp(Battery)	G/R	Green/Red
8			
9	Buzzer	Y	Yellow
10	Tachomet er	W	White
11			
12	CPS(crank position sensor)	G/R	Green/Red
13	TPS 1	B/R	Black/Red
14	TPS 1	R	Red
15	key switch(Power source)	R/Y	Red/Yellow
16			
17	#1 Fuel injector	Y/R	Yellow/Red
18	#2 Fuel injector	Y/W	Yellow/White
19	#3 Fuel injector	Y/B	Yellow/Black
20			
21	WTS(Water temp. sensor)	G/Y	Green/Yellow
22	WTS(Water temp. sensor, TPS 2 and Oil level sensor Ground)	B/W	Black/White
23			
24			
25	#1 Air injector	Lg/R	Light green/Red
26	#2 Air injector	Lg/W	Light green/White
27	#3 Air injector	Lg/B	Light green/Black
28			
29	Oil level sensor	Lg	Light green
30	TPS 2	R/W	Red/White
31			
32	TPS 2	L/W	Blue/White
33	Ground	B	Black
34	Ground	B	Black
35	Ground	B	Black
36	Stop switch	Br	Brown
37	FFP(Fuel feed pump)	Y	Yellow
38	Electric oil pump [for MD70/90B only]	B/Y	Black/Yellow
39			
40	Power source(25A Fuse, #1,2,3 Air injector, #1,2,3 Fuel injector)	L	Blue
41	#1 Ignition coil	B/R	Black/Red
42	#1 Ignition coil	B/W	Black/White
43	#1 Ignition coil	B/G	Black/Green
44			

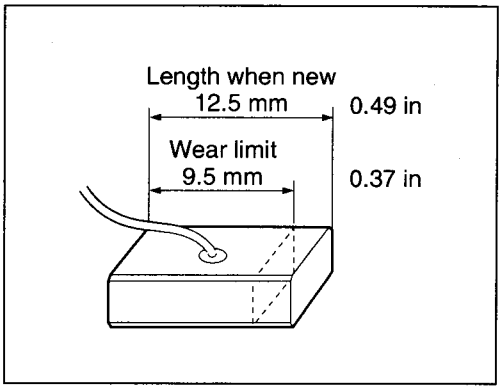
Note: Slash (/) shows shripe color of cable.

Starter Motor

Brushes and Springs

① Check the brushes for wear.

When brush length is 9.5 mm (0.37 in) or less ⇨ Replace with new one.

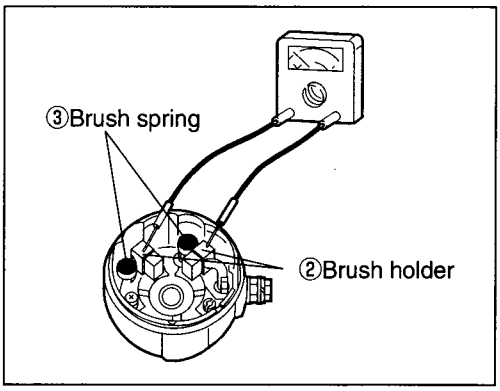


② Inspect insulation between brush holders.

If conductive, determine cause or replace insulation.

③ Brush spring tension

When there is a loss of tension ⇨ replace spring.

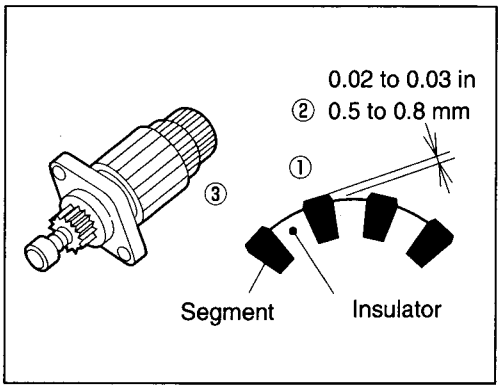


Armature

① Measure the depth of the insulator on the commutator.

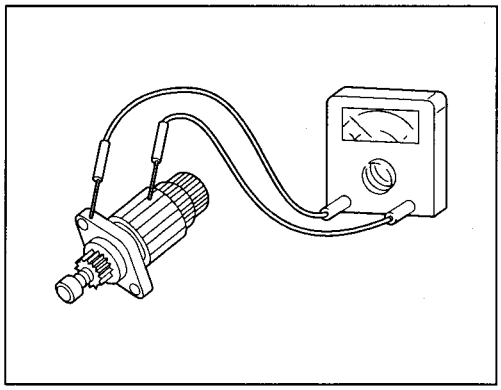
② When the distance at location ② does not fall within the 0.5 to 0.8 mm (0.02 to 0.03 in) range or when deformed from excessive wear, repair the teeth attached to the plate so that they conform to the designated range.

③ To remove excessive carbon buildup on the commutator, select a sandpaper in the #500 to #600 range.



④ Inspect the armature insulation.

When conductive ⇨ Replace starter motor assembly.



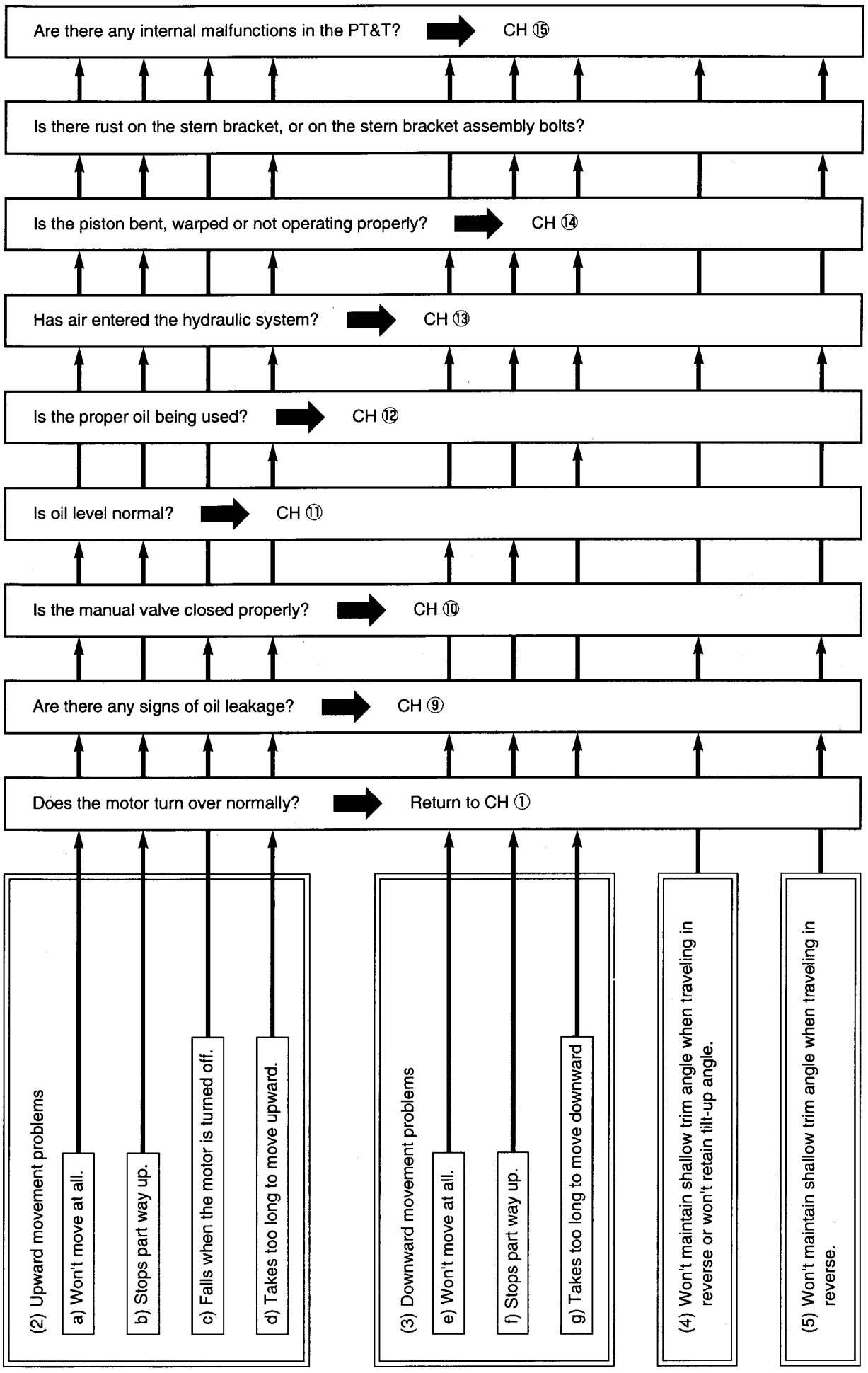
3. Inspection

Inspect the following components.

Component	Inspection points	Remarks
Bevel gears A, B, C and clutch	• Wear and damage on pawls of bevel gears A and C.	Replace.
	• Wear and damage on clutch pawl.	Replace.
	• Meshing of bevel gears A, B and C and backlash*.	Replace as necessary.
	• Wear on bearings for bevel gears A and C.	Replace as necessary.
Propeller shaft	• Play between clutch and spline.	Replace as necessary.
Drive shaft	• Misalignment of drive shaft.	Replace.★
	• Wear on spline area.	Replace as necessary.
	• Wear contact surface of needle roller bearing.	Replace as necessary.
Water pump	• Wear on pump impellor.	Replace.
	• Wear and defamation of pump case liner.	Replace.
	• Wear on pump guide plate.	Replace as necessary.
	• Wear and cracking on the lip area of pump case lower oil seal.	Replace as necessary.

* : Refer to the table on the next page listing the backlash readings and corresponding adjusting shim sizes.

★ : Refer to Chapter 2-2.

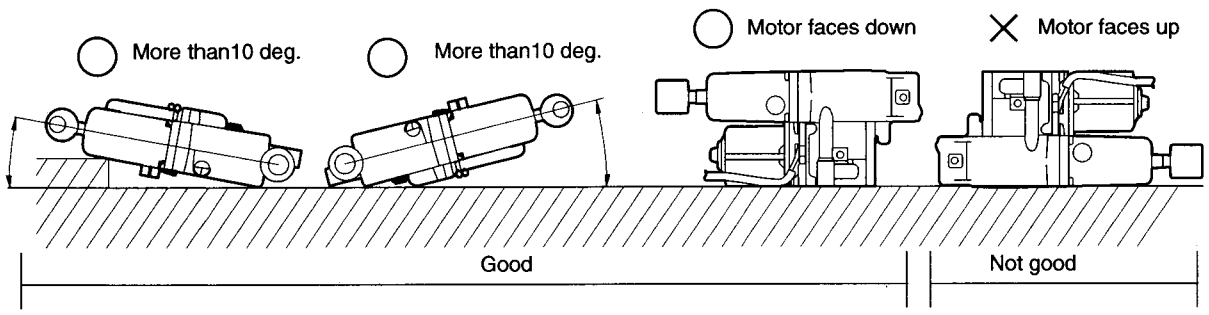

Are there any internal malfunctions in the PT&T? CH ⑮
Is there rust on the stern bracket, or on the stern bracket assembly bolts?
Is the piston bent, warped or not operating properly? CH ⑭
Has air entered the hydraulic system? CH ⑬
Is the proper oil being used? CH ⑫
Is oil level normal? CH ⑪
Is the manual valve closed properly? CH ⑩
Are there any signs of oil leakage? CH ⑨
Does the motor turn over normally? Return to CH ①
(2) Upward movement problems
a) Won't move at all.
b) Stops part way up.
c) Falls when the motor is turned off.
d) Takes too long to move upward.
(3) Downward movement problems
e) Won't move at all.
f) Stops part way up.
g) Takes too long to move downward
(4) Won't maintain shallow trim angle when traveling in reverse or won't retain tilt-up angle.
(5) Won't maintain shallow trim angle when traveling in reverse.

CH⑬ **Has air entered the hydraulic system?**

- The presence of the air in the lines is relatively easy to detect, as the PTT unit will occasionally generate sluggish sounds.
- Air Bleeding Procedure(oil cap must be closed during air removal procedure):
  With the manual valve opened, repeat a full stroke manual tilt up and down operation five or more times. Complete the operation by tilting up and checking the oil level.
- Be sure to close the manual valve immediately after inspection.
- When air has found its way into the core of the system:
  A single air bleeding operation is not sufficient to remove air that has found its way into the center of the system. This must be removed by repeating the air bleeding operation over a period of several days.

  Note: Paying close attention to engine position is important to prevent air from entering the system.

The figure below shows storage positions that will prevent air contamination.
(Do not stand the motor upside down.)



CH⑭ **Is the piston rod bent, warped or not operating properly?**

- With the manual valve opened, perform a manual tilt up and down motion to confirm the piston moves freely.
- Conduct a visual inspection.

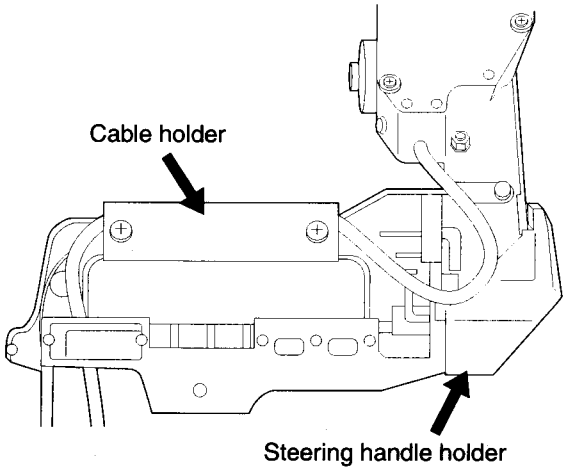
3. Installing Handle Assembly

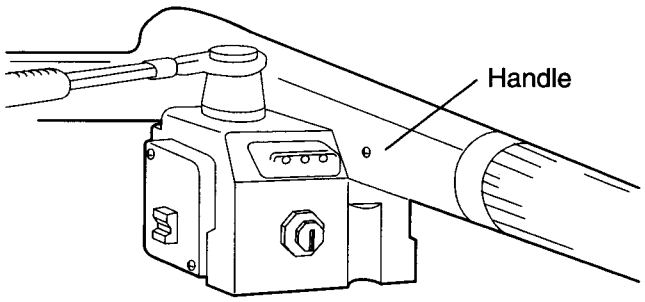
(1) Install the switch box on the handle using the bolt.

(2) Position the cable holder so that one end is approximately 200 mm from the cable outlet of the cable assembly C switch box; then press into place and secure to the steering bracket using the screws .

- Position the span of cable between the switch box outlet and the cable holder 200 mm away so that it is tucked against the underside of the steering handle holder.

- After installation, confirm that there is no excessive pulling or bending stress applied to the cable by moving the handle up and down.





4. Installing Handle To Engine

(1) Pass the cable assembly C cable the battery cables together through the grommet, install handle bracket; then insert the grommet into lower cover.

(2) Connect cable assembly C to both cable assembly A and the neutral switch.

- Apply silicon grease to the plugs and seal surface of the neutral switch and connect.

- Secure cable assembly C and the oil hose together to the gearshift lever stopper to prevent them from interfering with the gearshift mechanism.

Cause		Remedy (see chapter on Servicing Information for specs.)
3-2-8.	Fuel regulator leakage.	Refer to steps 2-2-12.
3-2-9.	Fuel leakage.	Refer to step 2-2-13.
3-2-10.	Low compression in air rail.	Refer to step 2-3.
3-2-11.	Faulty fuel regulator.	Replace.
3-2-12.	Return circuit from fuel regulator outlet to vapor separator is clogged.	Inspect and repair.
3-3-1.		Refer to step 2-3.
3-3-2.		
3-4-1.		Refer to step 2-4-3.
3-4-2.	Loose cap.	Inspect.
3-4-3.	Faulty cap.	Replace.
3-4-4.	Faulty components or connections.	Inspect, repair and replace as necessary. Refer to step 2-4-11
3-4-5.	TPS initial values incorrect.	Refer to step 2-4-13.
3-4-6.	TPS (*1) and/or ECU have been replaced.	Refer to step 2-4-13.
3-4-7.	Malfunction.	Connect operational injector to each harness and confirm that injector generates clicking sound of normal operation when engine is turned over. Clean and replace as necessary.
4-1-1.	Idling speed setting was changed.	Use variable idling switch to set idling speed.
4-1-2.	TPS initial values in correct.	Refer to step 2-4-13.
4-1-3.	TPS (*1) and/or ECU have been replaced.	Refer to step 2-4-13.
		Refer to step 2-4-5.
		Refer to step 10-1.
		Refer to step 3-3
		Refer to steps 2-4-12 and 2-4-13.
6-1-1.	Remote control cable not properly installed.	Inspect and replace as necessary.
6-1-2.	Disfiguration or wear of throttle link components.	Inspect and adjust.
6-1-3.	Scratches on piston or cylinder liner.	Inspect and repair as necessary.
6-1-4.	Carbon buildup in combustion chamber.	
6-1-5.	Excessive wear or sticking of piston ring.	

(*1) TPS: Throttle position sensor.