

JET SKI

JS440 AND JS550

NOTE: Metric fasteners are used throughout vehicle.

General

Engine Make.....	Own
Engine Type.....	Two-Stroke; Water-Cooled
Number of Cylinders.....	2
Bore:	
JS440.....	68 mm (2.68 in.)
JS550.....	75 mm (2.95 in.)
Stroke.....	60 mm (2.36 in.)
Displacement:	
JS440.....	436 cc (26.6 cu. in.)
JS550.....	531 cc (32.4 cu. in.)
Compression Ratio:	
JS440.....	6.1:1
JS550.....	6.0:1 (Prior to 1986) 5.7:1 (After 1985)
Engine Lubrication.....	Pre-Mix
Fuel:Oil Ratio.....	40:1*
Engine Oil Recommendation.....	Kawasaki Jet Ski or Two-Stroke; BIA Certified TC-W

*On models after 1985, manufacturer recommends using a fuel:oil ratio of 24:1 when ambient temperature is 15°C (59°F) or below.

Tune-Up

Engine Idle Speed:	
JS440.....	1700-1900 rpm
JS550.....	1400-1600 rpm
Spark Plug:	
NGK.....	B7ES
Champion.....	N4G
Electrode Gap.....	0.7-0.8 mm (0.027-0.031 in.)
Ignition:	
Type.....	CDI
Timing:	
JS440.....	25° BTDC @ 6000 rpm
JS550.....	28° BTDC @ 6000 rpm (Prior to 1986) 21° BTDC @ 6000 rpm (After 1985)
Carburetor:	
Make.....	Mikuni
Model:	
JS440.....	BN38 Diaphragm
JS550.....	BN38 Diaphragm (Prior to 1986) BN44 Diaphragm (After 1985)
Bore Size:	
BN38.....	34 mm (1.3 in.)
BN44.....	40 mm (1.6 in.)

Sizes—Clearances

Cylinder Bore:	
JS440.....	68.075-68.094 mm (2.6801-2.6809 in.)
Service Limit.....	68.17 mm (2.684 in.)
JS550.....	75.075-75.094 mm (2.9557-2.9564 in.)
Service Limit.....	75.17 mm (2.959 in.)
Piston Diameter Measured 5 mm (0.2 in.) from Skirt Bottom and 90° to Pin Bore:	
JS440.....	67.79-67.98 mm (2.669-2.676 in.)
Service Limit.....	67.79 mm (2.669 in.)
JS550.....	74.921-74.940 mm (2.949-2.950 in.)
Service Limit.....	74.78 mm (2.944 in.)
Piston-to-Cylinder Wall Clearance:	
JS440.....	0.095-0.133 mm (0.0037-0.0052 in.)
JS550.....	0.135-0.173 mm (0.0053-0.0068 in.)
Piston Ring Side Clearance.....	0.12-0.17 mm (0.0048-0.0067 in.)
Service Limit.....	0.22 mm (0.0087 in.)
Piston Ring End Gap.....	0.2-0.4 mm (0.008-0.016 in.)
Service Limit.....	0.7 mm (0.027 in.)
Maximum Cylinder Head Warp.....	0.25 mm (0.01 in.)
Connecting Rod Radial Clearance.....	0.02-0.03 mm (0.0008-0.0012 in.)
Service Limit.....	0.08 mm (0.003 in.)
Connecting Rod Side Clearance.....	0.4-0.5 mm (0.016-0.020 in.)
Service Limit.....	0.7 mm (0.027 in.)
Maximum Connecting Rod Bend or Twist Measured Over a 100 mm (3.9 in.) Length.....	0.2 mm (0.008 in.)
Maximum Crankshaft Runout at Main Bearing Journal.....	0.08 mm (0.003 in.)

Capacities

Fuel Tank.....	13 L (3.5 gal.)
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Tightening Torques

Carburetor Mounting Nuts.....	10 N·m (88 in.-lbs.)
Cylinder Head Nuts.....	22 N·m (16 ft.-lbs.)
Crankcase Cap Screws:	
Large.....	22 N·m (16 ft.-lbs.)
Small.....	6 N·m (53 in.-lbs.)
Engine-to-Engine Mounting Plate Cap Screws.....	48 N·m (35 ft.-lbs.)
Engine Mounting Cap Screws.....	37 N·m (27 ft.-lbs.)
Engine Drive Flange.....	27 N·m (20 ft.-lbs.)
Drive Shaft Drive Flange.....	27 N·m (20 ft.-lbs.)
Intermediate Housing Mounting Cap Screws.....	16 N·m (12 ft.-lbs.)
Intermediate Housing Front Cover Cap Screws.....	16 N·m (12 ft.-lbs.)

Jet Pump Impeller:

JS440.....	Hand Pressure
JS550.....	20 N·m (14 ft.-lbs.)

Jet Pump Mounting Cap Screws.....	22 N·m (16 ft.-lbs.)
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Flywheel Nut.....	160 N·m (115 ft.-lbs.)
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Spark Plug.....	28 N·m (21 ft.-lbs.)
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Standard Fasteners:

5 mm.....	3.4-4.9 N·m (30-43 in.-lbs.)
6 mm.....	5.9-7.8 N·m (52-69 in.-lbs.)
8 mm.....	14-19 N·m (10-14 ft.-lbs.)
10 mm.....	25-39 N·m (18-29 ft.-lbs.)
12 mm.....	44-61 N·m (32-45 ft.-lbs.)
14 mm.....	73-98 N·m (54-72 ft.-lbs.)
16 mm.....	115-155 N·m (85-114 ft.-lbs.)
18 mm.....	165-225 N·m (121-165 ft.-lbs.)
20 mm.....	225-325 N·m (165-239 ft.-lbs.)

LUBRICATION**All Models**

The engine is lubricated by oil mixed with the fuel. Fuel:oil ratio should be 40:1 for both engine break-in and normal service when using Kawasaki Jet Ski Oil or a BIA certified two-stroke TC-W engine oil. During break-in (first five hours or three tankfuls) of a new or rebuilt engine, throttle opening should not exceed $\frac{3}{4}$ and throttle position should be constantly varied.

NOTE: On models after 1985, manufacturer recommends using a fuel:oil ratio of 24:1 when ambient temperature is 15°C (59°F) or below.

Manufacturer recommends regular or no-lead automotive gasoline having a minimum octane rating of 87. Gasoline and oil should be thoroughly mixed.

Grease intermediate housing through grease fitting (F—Fig. JS2-1) with Shell

MP or Alvania EP1 grease every 25 hours or more frequent if needed. Inject Shell MP or Alvania EP1 grease into grease fitting (G—Fig. JS2-2) at rear of jet pump housing every 25 hours or more frequent if needed to grease rear bushing on JS440 models and two guide vane ball bearings on JS550 models. On JS550 models, an Allen head wrench

must be used to remove grease fitting cover to expose grease fitting (G).

Lubricate all cables, linkage and pivots with WD-40 or Bel-Ray 6 in 1 every 25 hours or more frequent if needed.

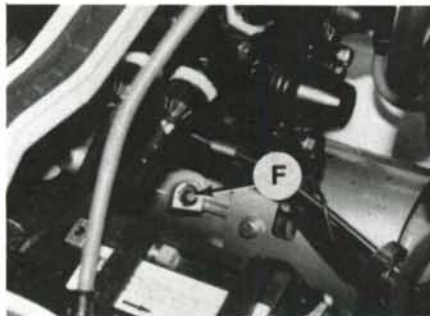


Fig. JS2-1—Intermediate housing is greased through grease fitting (F).

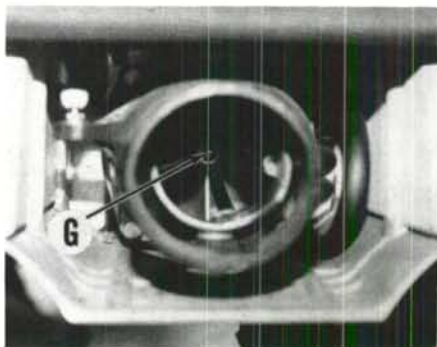


Fig. JS2-2—Jet pump rear bushing on JS440 models and two guide vane ball bearings on JS550 models are greased through grease fitting (G). On JS550 models, an Allen head wrench must be used to remove grease fitting cover to expose grease fitting (G).

FUEL SYSTEM

All Models

CARBURETOR. Refer to Fig. JS2-4 for an exploded view of Mikuni type BN38 diaphragm carburetor used on all JS440 models and JS550 models prior to 1986. On JS550 models after 1985, a Mikuni type BN44 diaphragm carburetor is used. BN44 carburetor is similar to type shown in Fig. JS2-4. Choke plate (21—Fig. JS2-4) is actuated by choke knob (K—Fig. JS2-5) on control panel via a cable and linkage.

On JS440 models and JS550 models prior to 1986, initial setting of low speed mixture needle (22—Fig. JS2-6) is 1 turn out from a lightly seated position. Initial setting of high speed mixture needle (29—Fig. JS2-7) is 5/8 to 7/8 turn out

from a lightly seated position. On JS550 models after 1985, initial setting of pilot needle (P—Fig. JS2-8) is 1-5/16 turns out from a lightly seated position. Initial setting of low speed mixture needle (22—Fig. JS2-9) is 1-1/16 turns out from a lightly seated position. Initial setting of high speed mixture needle (29—Fig.

JS2-8) is 15/16 turn out from a lightly seated position. Final carburetor adjustments must be made with engine at normal operating temperature and running. Adjust pilot needle (P), on models so equipped, until a smooth idle is noted. Adjust low speed mixture needle (22—Fig. JS2-6 or Fig. JS2-9) until smooth acceleration from the idle position is noted. After adjusting low speed mixture needle, adjust idle speed screw (37—Fig. JS2-6 or Fig. JS2-9) until engine idle speed is approximately 1700-1900 rpm on JS440 models or 1400-1600 rpm on JS550 models with throttle lever completely released. To adjust high speed fuel:air mixture, the engine spark plugs must be removed and insulator tip color noted.

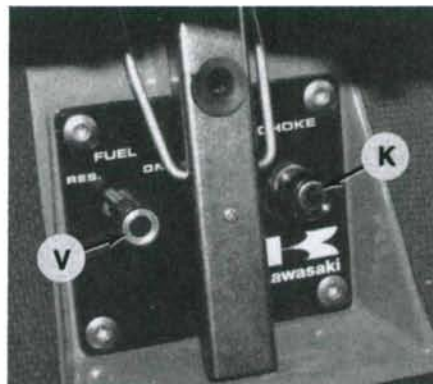


Fig. JS2-5—View identifies location of choke knob (K) and fuel selector valve (V).

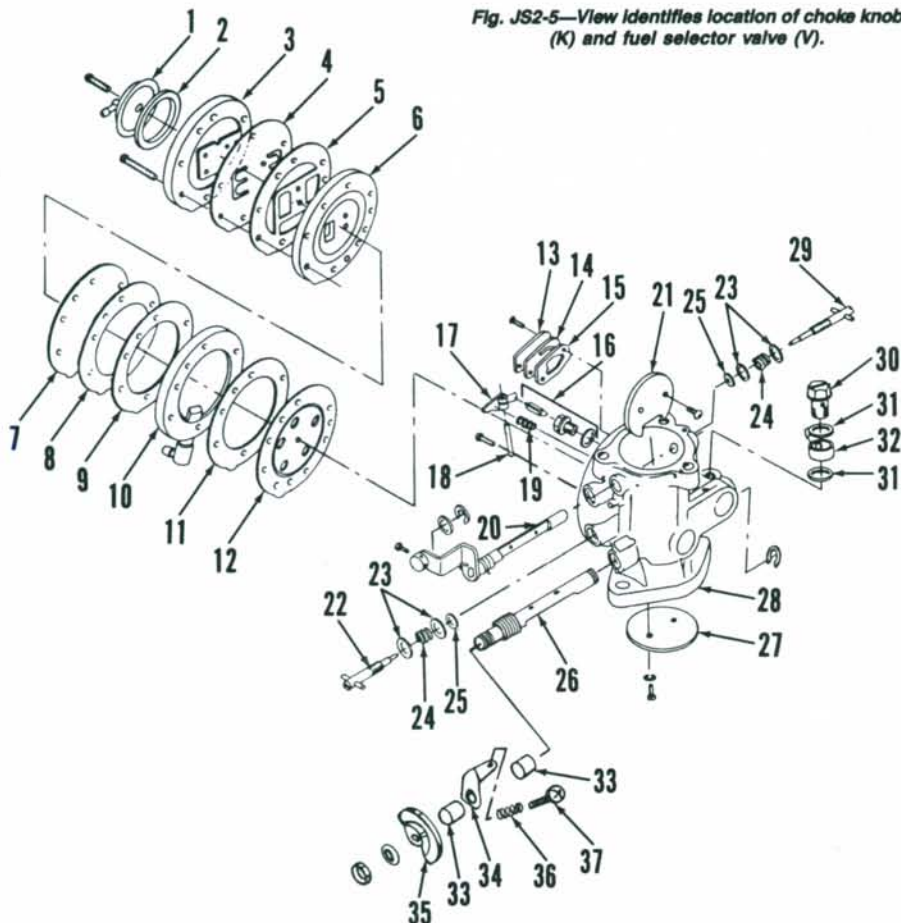


Fig. JS2-4—Exploded view of Mikuni type BN38 diaphragm carburetor used on all JS440 models and JS550 models prior to 1986. On JS550 models after 1985, a Mikuni type BN44 diaphragm carburetor is used. BN44 carburetor is similar. Refer to text.

1. Fuel inlet cover
2. Gasket
3. Inlet body
4. Check valve
5. Diaphragm
6. Pump body
7. Diaphragm
8. Gasket
9. Gasket
10. Diaphragm cover

11. Gasket
12. Regulating diaphragm
13. Plate
14. Diaphragm
15. Gasket
16. Inlet valve assy.
17. Valve lever
18. Pivot shaft
19. Spring
20. Choke shaft

21. Choke plate
22. Low speed mixture needle
23. Washers
24. Springs
25. "O" rings
26. Throttle shaft
27. Throttle plate
28. Body

29. High speed mixture needle
30. Barjo bolt
31. Gaskets
32. Return line fitting
33. Spacers
34. Bracket
35. Cable lever
36. Spring
37. Idle screw



Fig. JS2-6—View identifies location of low speed mixture needle (22) and idle speed screw (37) on JS440 models and JS550 models prior to 1986.

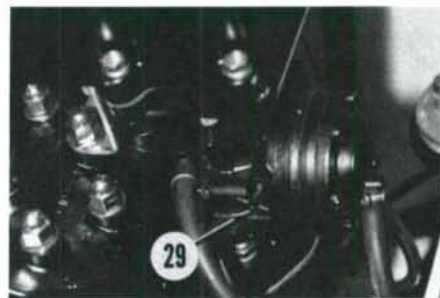


Fig. JS2-7—View identifies location of high speed mixture needle (29) on JS440 models and JS550 models prior to 1986.

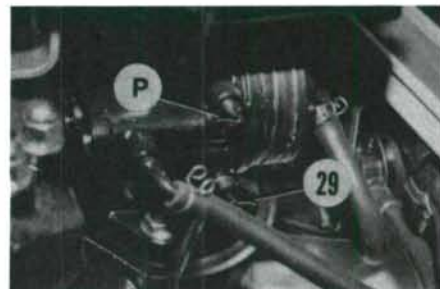


Fig. JS2-8—View identifies location of pilot needle (P) and high speed mixture needle (29) on JS550 models after 1985.

NOTE: Make sure that fuel tank contains a 40:1 fuel mixture.

Make sure cooling system will receive an adequate supply of water, then operate and sustain engine at wide-open throttle for a suitable test period. Stop the engine with throttle in wide-open position. Remove spark plugs and note insulator tip color. Normal insulator tip color is brown to light tan. If insulator tip appears to be light tan to white in color, then mixture is too lean and high speed mixture needle (29—Fig. JS2-7 or Fig. JS2-8) should be rotated outward (counterclockwise) ¼ turn to richen mixture. If insulator tip appears to be dark brown to black in color, then mixture is too rich and high speed mixture needle (29) should be rotated inward (clockwise) ¼ turn to lean mixture. Clean, regap and reinstall spark plugs and continue test procedure until spark plug insulator tip is a normal color.

The fuel pump and regulating diaphragm (12—Fig. JS2-4) can be removed after removing the six through-bolts. Note that alignment tabs on components (3 through 12) are provided to assist in proper alignment during reassembly.

Do not remove choke plate, throttle plate or shafts unless necessary. The choke and throttle plate retaining screws are either staked or retained with a thread locking solution to prevent loosening. If screws are removed, properly stake or apply a suitable thread locking solution on threads prior to assembly. Inlet needle valve lever (17) must be flush with floor of housing recess when needle valve is seated. Refer to Fig. JS2-10. If lever must be adjusted, push down on lever immediately above spring to collapse the spring, then bend the end which contacts needle valve.

FUEL PUMP. The fuel pump is an integral part of the carburetor. The fuel

pump assembly can be overhauled without overhauling the complete carburetor.

With reference to Fig. JS2-4, disassemble the fuel pump assembly. Inspect all components for excessive wear or any other damage and renew if needed. Clean components as needed with a suitable cleaning solution. Blow dry with clean compressed air. If compressed air is not available, use only lint-free cloths to wipe dry. Make sure all passages are clear of any obstructions.

With reference to Fig. JS2-4, reassemble the fuel pump assembly with new gaskets. Securely tighten the six through-bolts.

FUEL FILTER. An inline filter assembly (F—Fig. JS2-12) is located between fuel selector valve (V—Fig. JS2-5) and carburetor fuel pump intake. After every 25 hours of operation or more frequent if needed, unscrew ring nut (N—Fig. JS2-12) and withdraw cup (C) with sealing ring from base. Withdraw filter element. Clean cup (C) and filter element with a suitable cleaning solution. Renew filter element if excessive contamination or damage is noted. Allow cup and filter element to air dry or blow dry with clean, low air pressure. Renew small "O" ring in bottom of filter element, then install filter element. Make sure tension spring is positioned on bottom of filter element. Renew sealing ring and securely tighten nut (N) during installation of cup (C).

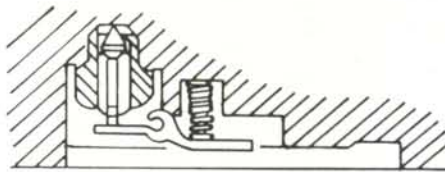


Fig. JS2-10—Inlet needle valve lever should be flush with floor of housing recess as shown.

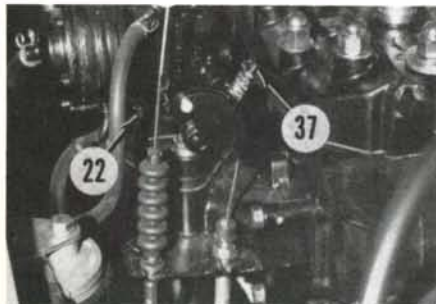


Fig. JS2-9—View identifies location of low speed mixture needle (22) and idle speed screw (37) on JS550 models after 1985.

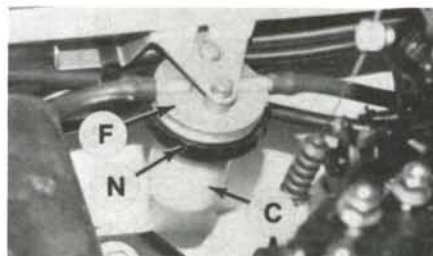


Fig. JS2-12—An inline fuel filter assembly (F) is used on all models. Unscrew ring nut (N) to withdraw cup (C) with sealing ring. Filter element is now accessible.

THROTTLE LEVER FREE PLAY. Throttle lever should have a small amount of free play prior to activating carburetor throttle shaft when throttle lever is in released position. To adjust, rotate locknuts (N—Fig. JS2-14) up or down cable housing end as needed until a small amount of free play is noted. Tighten locknuts (N) to retain adjustment.

FLAME ARRESTOR. On all JS440 models and JS550 models after 1985, a flame arrestor is located beneath cover (C—Fig. JS2-14). Every 25 hours or more frequent if needed, remove two screws (S) on each side of cover and withdraw cover and flame arrestor. Inspect flame arrestor for contamination and use clean compressed air to blow clean. Renew flame arrestor if damage is noted. On JS440 models after 1983 and JS550 models after 1985, install flame arrestor with curved side facing down. Apply Loctite Lock N'Seal or a suitable equivalent on threads of the four cap screws retaining cover (C) and securely tighten.

NOTE: If lower cover is removed, make sure gasket between cover and carburetor top is installed.

On JS550 models prior to 1986, flame arrestor assembly (A—Fig. JS-15) is used. Every 100 hours or more frequent if needed, remove three cap screws (S) and withdraw assembly. Split cover halves and remove flame arrestor. Clean flame arrestor using a suitable cleaning solution and blow dry with clean com-

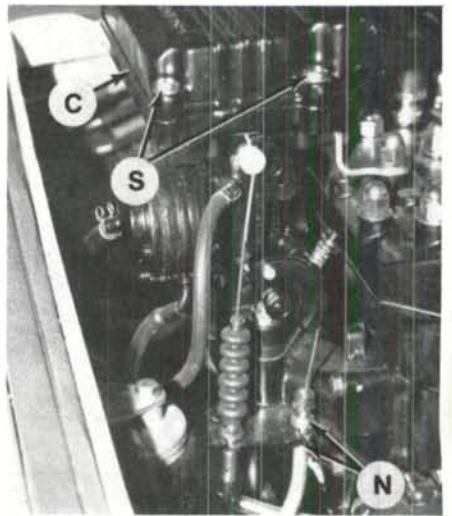


Fig. JS2-14—Rotate locknuts (N) up or down cable housing end as needed to adjust throttle lever free play. On all JS440 models and JS550 models after 1985, remove two cap screws (S) on each side of cover (C) to withdraw cover (C) and flame arrestor.

Jet Ski (JS440 & JS550)

pressed air. Renew flame arrestor if damage is noted. Reassemble flame arrestor assembly. Position gasket beneath lower flame arrestor cover and carburetor top. Apply Loctite Lock N'Seal or a suitable equivalent on threads of the three cap screws (S) retaining flame arrestor assembly (A) and securely tighten.

IGNITION

All Models

All models are equipped with a simultaneous capacitor discharge ignition system. The ignition timing is electronically advanced as the magneto base plate is fixed. Ignition timing should not require adjustment, after first being correctly set, unless magneto base plate is moved or an ignition component is renewed.

IGNITION TIMING. Ignition timing should be 25 degrees or 3.53 mm (0.14 in.) before top dead center (BTDC) at 6000 rpm on all JS440 models. Ignition timing should be 28 degrees or 4.42 mm (0.17 in.) BTDC at 6000 rpm on JS550 models prior to 1986. Ignition timing should be 21 degrees or 2.52 mm (0.10 in.) BTDC at 6000 rpm on JS550 models after 1985. Ignition timing can be checked using a suitable power timing light. Remove fuel tank and place to the side of vehicle. Remove flywheel cover

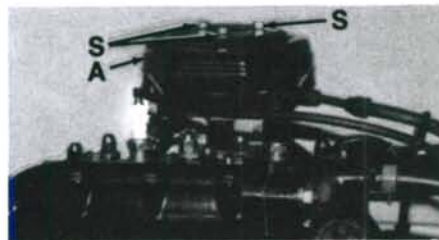


Fig. JS2-15—On JS550 models prior to 1986, remove three cap screws (S) to withdraw flame arrestor assembly (A).



Fig. JS2-17—Engine flywheel is located behind flywheel cover (F).

(F—Fig. JS2-17). Note flywheel timing marks "T" (TDC) and "F" (recommended timing BTDC).

Detach spark plug leads from spark plugs and ground terminals ends. Remove number one cylinder (forward cylinder) spark plug. Position a suitable dial indicator so indicator needle projects through number one cylinder spark plug hole. Rotate flywheel until piston in cylinder is positioned at TDC. Mount a suitable wire pointer (P—Fig. JS2-18) on the engine and position pointer end so "T" (TDC) on flywheel is aligned with pointer end. Remove dial indicator assembly. Reinstall spark plugs and attach spark plug leads. Use two short flywheel cover retaining cap screws and remount starter motor.

Use an adapter and connect a supplemental water supply to cooling system supply hose (H—Fig. JS2-20), leading to fitting on exhaust manifold, after removing hose (H) from jet pump supply line.

NOTE: When using a supplemental water supply, do not turn on water until engine is ready to be started as exhaust flooding could occur. Operate engine only at low rpm or during a test, do not exceed recommended high rpm and only operate for a short period of time.

Connect a tachometer to engine. Start engine, then turn on supplemental water supply. Accelerate engine to 6000 rpm. Use power timing light and check alignment of flywheel timing mark (F—Fig. JS2-18) with wire pointer (P) end. Allow engine to return to idle position, then turn off supplemental water supply and stop engine.

NOTE: Make sure engine is not operated without a supply of water longer than 10-15 seconds or damage to engine and/or exhaust components could result.

NOTE: If ignition timing test must be reperformed, allow engine to idle for a short

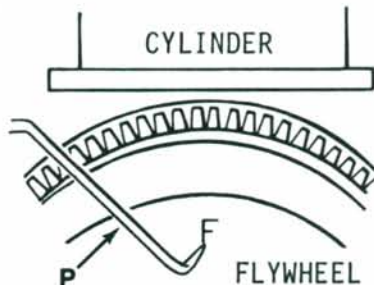


Fig. JS2-18—Mark "F" on flywheel represents recommended ignition timing BTDC when engine is operated at 6000 rpm. Wire pointer (P) end must be positioned as outlined in text in order to correctly verify ignition timing.

PERSONAL WATER VEHICLE

period with supplemental water supply circulating through cooling system. Do not sustain engine at a high rpm for an extended period when not operated under a load and do not exceed the recommended testing rpm of 6000.

If ignition timing is incorrect, remove flywheel retaining nut and washer then use a suitable puller and withdraw flywheel. Loosen magneto base plate screws and rotate base plate as needed. Tighten magneto base plate screws, then reinstall flywheel and tighten retaining nut to 160 N·m (115 ft.-lbs.).

Recheck ignition timing. Continue procedure until correct ignition timing is obtained. Bend tabs on flywheel washer to retain position of flywheel securing nut after correct ignition timing is obtained. Apply a water-resistant grease on flywheel cover (F—Fig. JS2-17) "O" ring. Apply a suitable thread locking solution on threads of flywheel cover retaining screws, then install flywheel cover (F) and securely tighten screws. Reinstall and properly secure fuel tank and hoses.

TROUBLE-SHOOTING. If ignition malfunction occurs, use only approved procedures to prevent damage to the components. The fuel system should be checked first to make certain that faulty running is not caused by con-

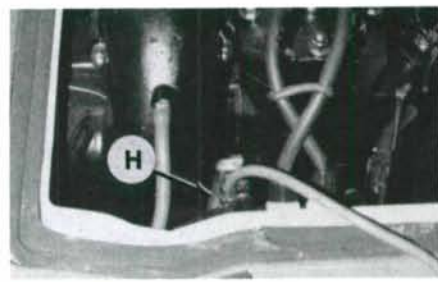


Fig. JS2-20—A supplemental water supply can be connected to cooling system supply hose (H), leading to fitting on exhaust manifold, after removing cooling system supply hose (H) from jet pump supply line.

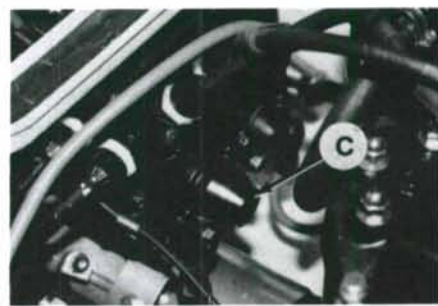


Fig. JS2-22—Remove cap (C) to expose six-wire connector. Refer to text.

taminated fuel. Make sure malfunction is not due to spark plugs, wiring or wiring connection failure. Trouble-shoot ignition circuit using a suitable ohmmeter as follows:

Remove cap (C—Fig. JS2-22) and withdraw six-wire connector. Separate connector halves to expose terminal ends of wires leading to pulser coil (1—Fig. JS2-23) and exciter coil (2). Check condition of pulser coil (1) by attaching one tester lead to terminal end of red wire (R) and attaching other tester lead to terminal end of gray wire (Gr). Pulser coil can be considered satisfactory if resistance reading is within the limits of 20-30 ohms. Check condition of exciter coil (2) by attaching one tester lead to terminal end of red wire (R) and attaching other tester lead to terminal end of black wire (B). Exciter coil can be considered satisfactory if resistance reading is within the limits of 216-324 ohms. Pulser coil and exciter coil are serviceable after removing flywheel cover and flywheel. Make sure a suitable puller is used to withdraw flywheel. Tighten flywheel retaining nut to 160 N·m (115 ft.-lbs.). Recheck ignition timing as previously outlined under IGNITION TIMING. Apply a water-resistant grease on flywheel cover "O" ring. Apply a suitable thread locking solution on threads of flywheel cover retaining screws, then install flywheel cover and securely tighten screws.

Ignition coil secondary winding resistance should be 4500-6700 ohms. If no components are found faulty, then renew CDI module/ignition coil assembly with a known good assembly and recheck engine operation.

CHARGING SYSTEM

All Models

All models are equipped with a charge coil, rectifier/regulator and battery. Standard battery on JS440 models prior

to 1987 and JS550 models prior to 1984 has a 16 ampere hour, 12 volt rating. Standard battery on JS440 models after 1986 and JS550 models after 1983 has a 19 ampere hour, 12 volt rating. The charge coil should produce 12-15 ac volts when engine is operated throughout rpm range. Rectifier/regulator assembly should prevent regulated voltage from exceeding 15 dc volts.

The battery electrolyte level should be checked periodically and filled to maximum level with distilled water if required. The battery should be removed from the vehicle and the battery caps removed when charging. The manufacturer recommends charging the battery at a rate of 1.6 amperes on 16 ampere hour batteries and 1.9 amperes on 19 ampere hour batteries for a period of 10 hours. Do not exceed recommended charging rate.

NOTE: Make sure battery charging area is well ventilated.

The charge coil can be statically tested using a suitable ohmmeter. Remove cap

(C—Fig. JS2-22) and withdraw six-wire connector. Separate connector halves to expose terminal ends of wires leading to charge coil. Refer to Fig. JS2-23. Check condition of charge coil (3) by attaching one tester lead to terminal end of one light green wire (Lt G) and attaching other tester lead to terminal end of remaining light green wire (Lt G). Resistance reading should be 2.4-3.6 ohms. Check resistance between each charge coil wire and black wire. Tester should show 1.2-1.8 ohms resistance at each wire. To check rectifier/regulator assembly, refer to chart shown in Fig. JS2-24. To check rectifier/regulator during operation, first make sure battery is fully charged, charge coil test good and all wiring is in good condition and all connectors fit tightly or are securely fastened. Attach test leads of a suitable voltmeter directly on battery terminals.

Use an adapter and connect a supplemental water supply to cooling system supply hose (H—Fig. JS2-20), leading to fitting on exhaust manifold, after removing hose (H) from jet pump supply line.

Fig. JS2-24—Use adjacent chart and values listed below to test condition of rectifier/regulator assembly.

A. Infinite resistance
B. Continuity

+Tester Lead -Tester Lead	Orange	Black (Ground)	Light Green	Light Green
Orange		A	A	A
Black (Ground)	A		A	A
Light Green	B	B		A
Light Green	B	B	A	

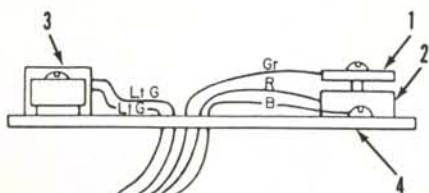
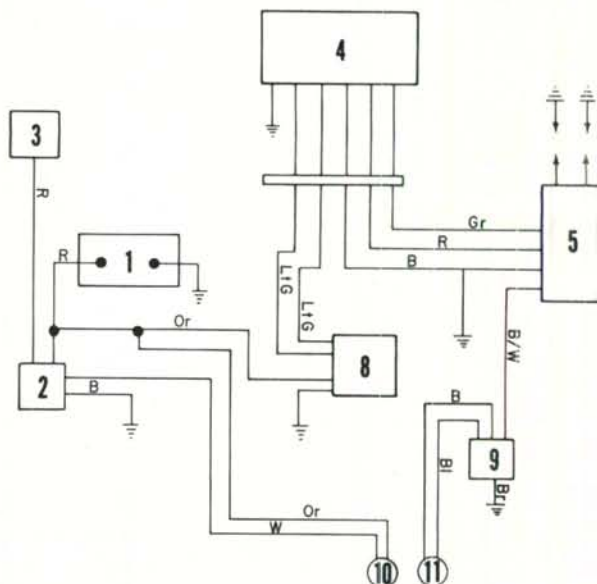


Fig. JS2-23—View identifying magneto components and color of leads.

- | | |
|------------------------|-------------------|
| 1. Pulser coil | B. Black |
| 2. Exciter coil | R. Red |
| 3. Battery charge coil | Gr. Gray |
| 4. Magneto base plate | Lt G. Light green |

Fig. JS2-25—Wiring diagram typical of all JS440 models. Components (2, 5, 8 and 9) are contained within electric box. A ground wire is located between engine and electric box.

1. Battery
 2. Starter solenoid
 3. Starter motor
 4. Magneto assy.
 5. CDI module/ignition coil assy.
 8. Rectifier/regulator
 9. Stop switch relay
 10. Start switch
 11. Stop switch
- B. Black
 R. Red
 W. White
 Bl. Blue
 Br. Brown
 Gr. Gray
 Or. Orange
 B/W. Black/white
 Lt G. Light green



Jet Ski (JS440 & JS550)

NOTE: Do not turn on water until engine is ready to be started as exhaust flooding could occur.

Start engine, then turn on supplemental water supply. Accelerate engine while observing voltmeter. The voltmeter should show approximately 15 dc volts. Allow engine to return to idle position then turn off supplemental water supply and stop engine.

NOTE: Make sure engine is not operated without a supply of water longer than 10-15 seconds or damage to engine and/or exhaust components could result.

RPM LIMITER

JS550 Models

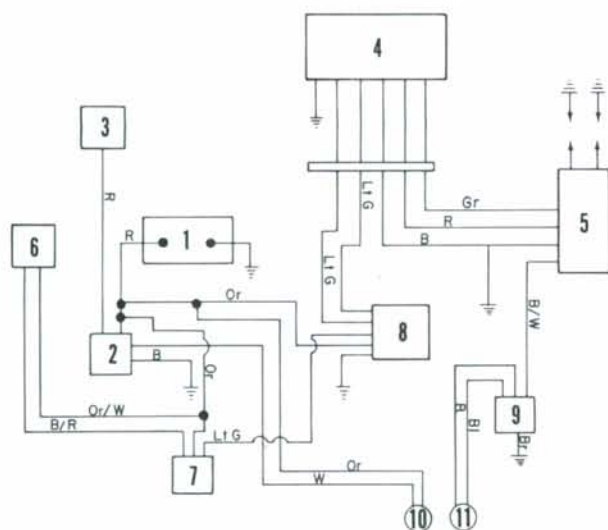
All JS550 models are equipped with a rpm limiter to prevent engine from ex-

ceeding maximum rpm when jet pump impeller is not operated under a load, e.g., breaking clear of water. Engine rpm should not exceed limit range of 6600-7500 rpm. When engine rpm is near predetermined limit, rpm limiter valve (6—Fig. JS2-26) will activate, thus opening a passage to supply additional fuel through rpm limiter hose (L—Fig. JS2-27) to the engine. The additional fuel causes a too rich condition in the engine, thus limiting engine rpm.

NOTE: If a too rich condition is noted during normal operation, rpm limiter valve could be faulty.

If a malfunction is noted, first make sure all hoses are in good condition and fit tightly onto fittings. To test rpm limiter valve, proceed as follows. Disconnect rpm limiter hose (L) and fuel return hose (R) from carburetor fittings.

Fig. JS2-26—Wiring diagram typical of all JS550 models. Components (2, 5, 7, 8 and 9) are contained within electric box. A ground wire is located between engine and electric box.



1. Battery
 2. Starter solenoid
 3. Starter motor
 4. Magneto assy.
 5. CDI module/ignition coil assy.
 6. Rpm limiter valve
 7. Rpm limiter relay
 8. Rectifier/regulator
 9. Stop switch relay
 10. Start switch
 11. Stop switch
- B. Black
 R. Red
 W. White
 BL. Blue
 Br. Brown
 Gr. Gray
 Or. Orange
 B/W. Black/white
 B/R. Black/red
 Or/W. Orange/white
 Lt G. Light green

PERSONAL WATER VEHICLE

Disconnect fuel return hose at fuel tank and plug hose opening. Unscrew cap (C—Fig. JS2-28) at electric box and withdraw wires to expose wire connectors. Disconnect orange/white and black/red wires at connectors. Connect a pressure pump or a low air pressure supply to fuel return hose (R—Fig. JS2-27) and blow air through hose into rpm limiter valve (V). No air should be felt expelling out rpm limiter hose (L). Connect terminal end of orange/white wire, leading to rpm limiter valve, to the positive terminal of a 12 volt battery. Connect terminal end of black/red wire, leading to rpm limiter valve, to the negative terminal of a 12 volt battery.

NOTE: DO NOT connect rpm limiter valve wires to a 12 volt battery supply until test is ready to be performed. If wires are connected directly to 12 volt battery supply longer than 15 seconds, damage to rpm limiter valve could result.

Blow air into valve through fuel return hose (R). Air should be felt expelling out rpm limiter hose (L). If rpm limiter valve (V) does not correctly restrict and permit air flow, then valve must be renewed. If rpm limiter valve tests good and rpm limiter circuit still malfunctions, then renew rpm limiter relay (7—Fig. JS2-26).

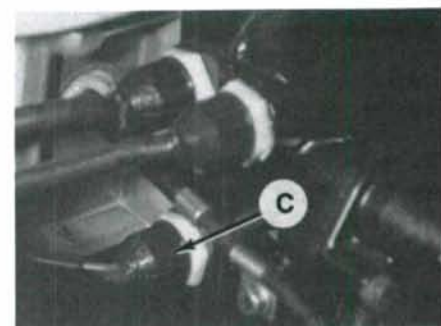


Fig. JS2-28—Unscrew cap (C) and withdraw wires to expose wire connectors to test rpm limiter valve on JS550 models. Refer to text.

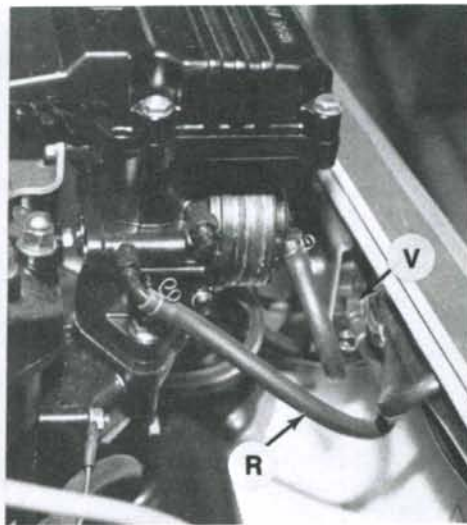
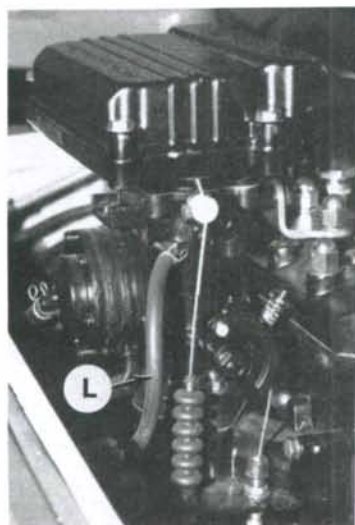


Fig. JS2-27—View identifies rpm limiter hose (L), fuel return hose (R) and location of rpm limiter valve (V) used on JS550 models.

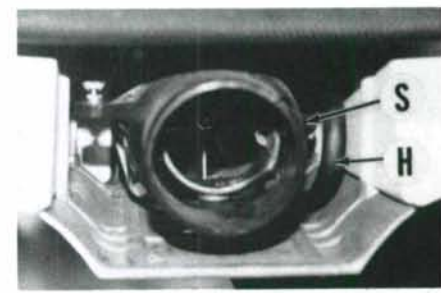


Fig. JS2-30—View identifies jet pump cooling system supply hose (H) and bilge siphon hose (S).

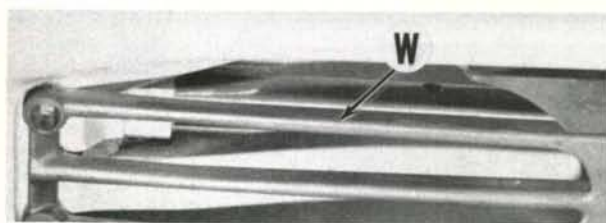


Fig. JS2-31—Jet pump water intake grill (W) must be kept clean of all foreign debris.

COOLING SYSTEM

All Models

All models are water-cooled. Forced water is supplied to the engine through jet pump outlet fitting and directed through hose (H—Fig. JS2-30) to fitting on exhaust manifold. As jet pump impeller rpm increases, so does water circulation through cooling system.

Make sure jet pump water intake grill (W—Fig. JS2-31) is kept clean. Inspect all hoses periodically for cracks, kinks or any other damage and renew if needed. The cooling system should be flushed out after each operating period when vehicle is used in contaminated or salt water. The cooling system should be flushed out prior to extended periods of storage and prior to usage after extended periods of storage.

To flush the cooling system, use an adapter and connect a supplemental water supply to cooling system supply hose (H—Fig. JS2-20), leading to fitting on exhaust manifold, after removing hose (H) from jet pump supply line. Use only clean, fresh water.

NOTE: Do not turn on water until engine is ready to be started as exhaust flooding could occur. Operate engine only at low rpm.

Start engine, then turn on supplemental water supply. Allow water to circulate through system for several minutes. Turn off supplemental water supply. If vehicle is to be stored for an extended period, raise rear of vehicle and quickly accelerate engine between idle and one-quarter throttle a couple of times. This is to force out all water within exhaust system, thus preventing damage from developing contaminants or freezing.

NOTE: Make sure engine is not operated without a supply of water longer than 10-15 seconds or damage to engine and/or exhaust components could result.

ENGINE

All Models

REMOVE AND REINSTALL. Disconnect battery cables from battery and

remove battery from vehicle. Remove throttle cable and choke cable from carburetor. Remove hoses from carburetor, label if needed and plug openings. Remove exhaust manifold. Remove cap (C—Fig. JS2-22) and withdraw six-wire connector. Separate connector halves. Detach spark plug leads, disconnect starter motor lead and all other electrical wiring that will interfere with engine removal and label for reassembly. Remove drive coupler shield (S—Fig. JS2-46). Remove four cap screws and washers retaining engine to vehicle hull. Note shims located under engine mounts and identify each shim for installation in original location. Remove any other components that will interfere with engine removal. Use a suitable lifting device to hoist engine assembly from vehicle. Place engine assembly on a clean work bench.

Use a suitable lifting device to hoist engine assembly into vehicle. Make sure coupler is located between engine drive flange and drive shaft drive flange. Install shims into original locations under engine mounts. Lay a straightedge (S—Fig. JS2-33) across top of engine drive flange and drive shaft drive flange. Engine drive flange should be 0-0.3 mm (0-0.012 in.) higher than drive shaft drive flange. Measure distance (A—Fig. JS2-34) and distance (B). Distance (B) should not exceed distance (A) by more than 0.6 mm (0.024 in.). Measure clearance between engine drive flange and coupler and drive shaft drive flange and coupler. Total of the two clearance measurements should not exceed 0.5 mm (0.020 in.). If recommended settings are not measured, then adjust thickness of shims located under engine mounts until recommended settings are obtained. Apply Loctite Lock N'Seal or a suitable equivalent on threads of four engine retaining cap screws and tighten cap screws to 37 N·m (27 ft.-lbs.). Remeasure as previously outlined to verify engine drive flange to drive shaft flange settings are as recommended. Adjust shim thickness if needed.

Complete reassembly in reverse order of disassembly. Make sure "O" ring is positioned between cap (C—Fig. JS2-22) and electric box.

DISASSEMBLY. Remove engine mounting plate. Remove flame arrestor

assembly, carburetor and spark plugs. Remove cylinder head nuts, then tap cylinder head with a soft-faced mallet to separate components and lift cylinder head off cylinder block. Tap cylinder block with a soft-faced mallet to break loose from top crankcase half, then carefully withdraw cylinder block. Rotate crankshaft to position piston for number one cylinder (front) at top of stroke. Remove piston pin retaining clips. Use a suitable piston pin puller and extract piston pin. Lift piston off connecting rod. Remove needle bearing from small end of connecting rod. Keep piston components together and place to the side. Label components "number one cylinder" for reference during reassembly. Repeat procedure to remove piston for number two cylinder and label accordingly.

Remove flywheel cover. Hold flywheel with a suitable tool and rotate engine drive flange off crankshaft using Kawasaki tool 57001-276. Remove electric starter motor. Remove nut and washer retaining flywheel, then use a suitable puller and withdraw flywheel. Note mark on magneto base plate that aligns with split line of crankcase halves. If magneto base plate position has been altered during ignition timing adjustment, then a new mark should be scribed in magneto base plate to align with split line of crankcase halves to ensure correct position during reassembly. Remove magneto base plate with ignition components. Stand crankcase assembly on ends of cylinder studs. Remove ten large cap screws and washers and three small cap screws and washers securing crankcase halves together. Use a soft-faced mallet and tap

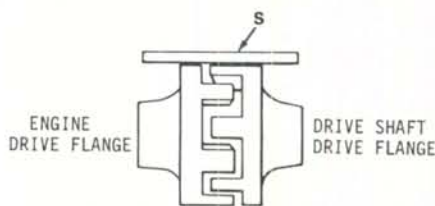


Fig. JS2-33—Engine drive flange should be 0-0.3 mm (0-0.012 in.) higher than drive shaft drive flange. Lay straightedge (S) across components and use a feeler gage to measure.

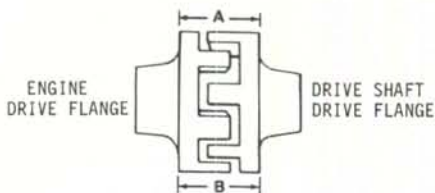


Fig. JS2-34—Distance (B) should not exceed distance (A) by more than 0.6 mm (0.024 in.).

crankcase halves to separate. Lift bottom crankcase half off top crankcase half. Crankshaft assembly can now be withdrawn from top crankcase half.

Engine components are now ready for overhaul as outlined in the appropriate following paragraphs. Refer to the following section for assembly procedure.

ASSEMBLY. Make sure all joint and gasket surfaces are clean, free from nicks and burrs and hardened cement or carbon.

Whenever the engine is disassembled, it is recommended that all gasket surfaces and mating surfaces without gaskets be carefully checked for nicks, burrs and warped surfaces which might interfere with a tight seal. Cylinder head and mating surfaces of crankcase halves should be checked on a surface plate and lapped, if necessary, to provide a smooth surface. Do not remove any more metal than is necessary.

When assembling engine, first lubricate all friction surfaces and bearings with engine oil. Apply a high temperature grease on lip and outside surface of seals. Properly assemble components on crankshaft. Install crankshaft assembly into top crankcase half. Make sure two bearing stop rings (8 and 18—Fig. JS2-38) are properly seated in grooves and pin (14) in center oil seal assembly properly seats in hole in top crankcase half. Wipe mating surfaces of crankcase halves clean and make sure surfaces are dry. Apply a coating of Kawasaki Bond or a suitable form-in-place gasket compound on crankcase mating surface of bottom crankcase

half. Position bottom crankcase half on to top crankcase half. Install ten large cap screws and washers and three small cap screws and washers which secure crankcase halves together. Use tightening sequence shown in Fig. JS2-36 and tighten ten large cap screws in increments of 7 N·m (5 ft.-lbs.) until a final torque of 22 N·m (16 ft.-lbs.) is obtained. Tighten three small cap screws to 6 N·m (53 in.-lbs.).

Install magneto base plate with ignition components and properly align mark on magneto base plate with split line of crankcase halves. Apply Loctite Superflex or a suitable equivalent on threads of magneto base plate retaining screws, then install screws with flat washers and lockwashers and securely tighten. Install flywheel, tab washer and retaining nut. Tighten nut to 160 N·m (115 ft.-lbs.). Bend tabs on flywheel washer to retain position of nut. Install engine drive flange and tighten to 27 N·m (20 ft.-lbs.) using Kawasaki tool 57001-276. Apply a water-resistant grease on flywheel cover "O" ring. Apply a suitable thread locking solution on threads of flywheel cover retaining screws, then install flywheel cover and securely tighten screws.

Rotate crankshaft to position connecting rod for number two cylinder (rear) at top of stroke. Install needle bearing

in small end of connecting rod and liberally lubricate with engine oil. Position piston assembly on connecting rod with arrow on piston crown facing cylinder exhaust port side and lubricate piston pin bores with engine oil. Use a suitable tool and install piston pin. Install new piston pin retaining clips with openings facing top or bottom of piston. Repeat procedure to install number one cylinder piston assembly. Install cylinder block base gasket. Install piston supports under piston skirts. Use suitable ring compressors and compress piston rings. Liberally lubricate cylinder bores with engine oil. Slide cylinder block on to top crankcase half and remove piston ring compressors as piston assemblies slide into cylinders. Remove piston supports. Apply a thin coating of Loctite Superflex or a suitable RTV silicone sealer onto both sides of cylinder head gasket. Use care not to block passage holes in gasket. Install cylinder head gasket with reference tab facing front of engine and aligned with cylinder head water hose fitting. Install cylinder head and tighten retaining nuts first to 14 N·m (10 ft.-lbs.) then to a final torque of 22 N·m (16 ft.-lbs.) following tightening sequence shown in Fig. JS2-37.

Complete remainder of assembly by reversing disassembly procedure.

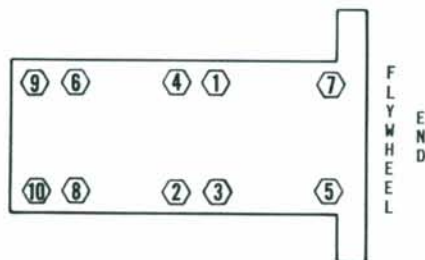


Fig. JS2-36—Tighten ten large crankcase cap screws in sequence shown. Refer to text for tightening torque specification.

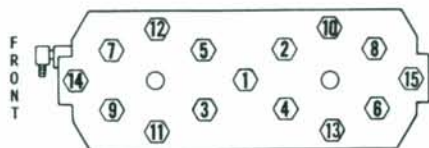


Fig. JS2-37—Tighten cylinder head nuts in sequence shown. Refer to text for tightening torque specifications.

Fig. JS2-38—Exploded view of typical crankshaft assembly used on all models.

1. Piston ring
2. Piston
3. Piston pin
4. Retaining clip
5. Needle bearing
6. Crankshaft & connecting rod assy.
7. Seal
8. Stop ring
9. "O" ring
10. Bearing
11. Shim
12. Spacer shim
13. Key
14. Pin
15. Shim
16. Bearing
17. "O" ring
18. Stop ring
19. "O" ring
20. Spacer
21. Seal
22. Seal
23. Washer

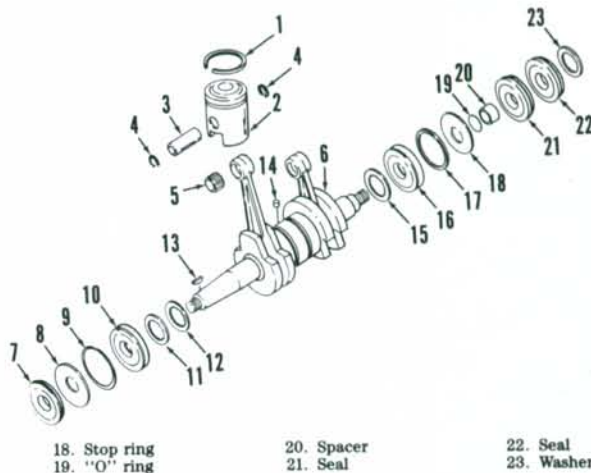
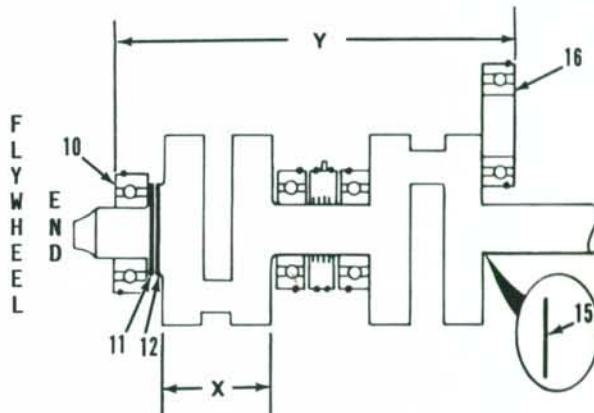


Fig. JS2-40—Refer to text for procedures in determining correct thickness of shims (11 and 15) for obtaining recommended crankshaft end play. Spacer shim (12) is a standard thickness of 1.0 mm (0.04 in.).



PISTONS, PINS, RINGS AND CYLINDERS. Recommended piston skirt-to-cylinder clearance is 0.095-0.133 mm (0.0037-0.0052 in.) on JS440 models and 0.135-0.173 mm (0.0053-0.0068 in.) on JS550 models. Bore cylinder to 0.50 mm (0.020 in.) oversize if measured piston skirt-to-cylinder clearance is beyond limit. Piston and piston ring are available in 0.50 mm (0.020 in.) oversize. Inspect cylinder walls for scoring. If minor scoring is noted, cylinders should be honed to smooth out cylinder walls.

Recommended piston ring end gap is 0.2-0.4 mm (0.008-0.016 in.) with a service limit of 0.7 mm (0.027 in.). Install piston ring on piston with manufacturer's mark facing top of piston. Make sure piston ring properly aligns with locating pin in ring groove.

When reassembling, install piston on connecting rod so arrow on top of piston faces toward exhaust side of cylinder after assembly. Install new piston pin retaining clips; openings of retaining clips must face top or bottom of piston. Coat bearings, pistons, rings and cylinder bores with engine oil during assembly.

CONNECTING RODS, CRANKSHAFT AND BEARINGS. The crankshaft assembly should only be disassembled if the necessary tools and experience are available to service this type of crankshaft. Connecting rods, crankpins and crank halves are only available as a complete crankshaft assembly.

Maximum crankshaft runout measured at main bearing journals with crankshaft ends supported in lathe centers is 0.08 mm (0.003 in.). Connecting rod radial clearance should be 0.02-0.03 mm (0.0008-0.0012 in.) with a service limit of 0.08 mm (0.003 in.). Connecting rod side clearance should be 0.4-0.5 mm (0.016-0.020 in.) with a service limit of 0.7 mm (0.027 in.). Maximum allowable connecting rod bend or twist measured over a 100 mm (3.9 in.) length is 0.2 mm (0.008 in.).

The crankshaft end play must be properly adjusted or premature failure of crankshaft and/or main bearings

Fig. JS2-42—Use "TABLE B" to determine correct thickness of shim (15—Fig. JS2-40). Refer to text.

could result. If the crankshaft is disassembled or the front and rear main bearings are renewed, then refer to Fig. JS2-40 and the following procedure to properly set crankshaft end play. Measure distance "X" and refer to "TABLE A" in Fig. JS2-41. Install recommended thickness of shim (11—Fig. JS2-40) between spacer shim (12) and main bearing (10). Place pto end main bearing (16) against crankshaft as shown in Fig. JS2-40 and measure distance "Y." Refer to "TABLE B" in Fig. JS2-42. Install recommended thickness of shim (15—Fig. JS2-40) between crankshaft and main bearing. Shim (15) is available in thicknesses of 0.1 mm (0.004 in.) through 0.6 mm (0.024 in.) in increments of 0.1 mm (0.004 in.). When required thickness exceeds 0.6 mm (0.024 in.), then shims must be stacked to obtain recommended thickness. Installed crankshaft end play should be less than 0.75 mm (0.029 in.).

ELECTRIC STARTER

All Models

All models are equipped with electric starter shown in Fig. JS2-44. Disassembly is evident after inspection of unit and reference to exploded view.

When servicing starter motor, scribe reference marks across motor frame to aid in reassembly.

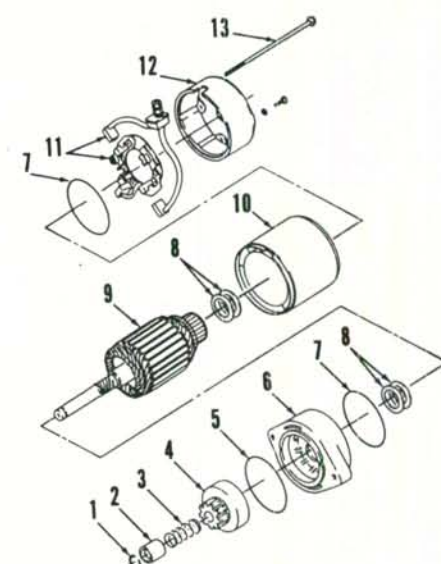


Fig. JS2-44—Exploded view of electric starter motor.

1. "C" ring
2. Stop
3. Spring
4. Drive
5. "O" ring
6. Frame head
7. "O" ring
8. Thrust washers
9. Armature
10. Frame
11. Brush assy.
12. End housing
13. Through-bolt

TABLE A

Distance "X"	Recommended Shim Thickness
49.66 - 49.87 mm (1.955 - 1.963 in.)	No Shim
49.45 - 49.65 mm (1.946 - 1.954 in.)	0.2 mm (0.008 in.)
49.22 - 49.44 mm (1.938 - 1.945 in.)	0.4 mm (0.016 in.)

Fig. JS2-41—Use "TABLE A" to determine correct thickness of shim (11—Fig. JS2-40). Refer to text.

TABLE B

Distance "Y"	Recommended Shim Thickness
188.77 - 188.98 mm (7.432 - 7.440 in.)	No Shim
188.67 - 188.76 mm (7.428 - 7.431 in.)	0.1 mm (0.004 in.)
188.57 - 188.66 mm (7.424 - 7.427 in.)	0.2 mm (0.008 in.)
188.47 - 188.56 mm (7.420 - 7.423 in.)	0.3 mm (0.012 in.)
188.37 - 188.46 mm (7.416 - 7.419 in.)	0.4 mm (0.016 in.)
188.27 - 188.36 mm (7.412 - 7.415 in.)	0.5 mm (0.020 in.)
188.17 - 188.26 mm (7.408 - 7.411 in.)	0.6 mm (0.024 in.)
188.07 - 188.16 mm (7.404 - 7.407 in.)	0.7 mm (0.028 in.)
187.97 - 188.06 mm (7.400 - 7.403 in.)	0.8 mm (0.032 in.)
187.87 - 187.96 mm (7.396 - 7.399 in.)	0.9 mm (0.036 in.)
187.77 - 187.86 mm (7.392 - 7.395 in.)	1.0 mm (0.040 in.)
187.67 - 187.76 mm (7.388 - 7.391 in.)	1.1 mm (0.044 in.)
187.57 - 187.66 mm (7.384 - 7.387 in.)	1.2 mm (0.048 in.)

Starter brushes have a standard length of 15 mm (0.47 in.) and should be renewed if worn to 9 mm (0.33 in.). Commutator undercut should be 0.5-0.8 mm (0.02-0.03 in.). If under is 0.2 mm (0.007 in.) or less, then use a suitable tool to remove mica between commutator sections until undercut between each section is within the recommended range. Armature end play should be 0.05-0.30 mm (0.002-0.012 in.) with a limit of 1.0 mm (0.04 in.). To check, remove components (1 through 4) and use a suitable dial indicator to measure end play. If end play is not within limits, then remove or add thrust washers (8), as needed, at brush end of armature until end play is within recommended range.

During reassembly, apply Loctite Superflex or a suitable RTV silicone sealer around frame opening for terminal end of positive brush assembly and on sealing surfaces of frame, frame head and end housing where components mate. After reassembly, bench test starter motor before installing on engine.

BILGE PUMP

All Models

When the vehicle is operated, the jet pump forces water past siphon hose (S—Fig. JS2-30) opening. The passing force of water creates a vacuum effect, thus drawing (siphoning) any water out of vehicle bilge. Make sure all hoses and strainer (R—Fig. JS2-46) are kept clean of all foreign debris. Disassemble and clean or renew components if needed. Make sure all hose connections are tight or vacuum loss will result in siphoning system malfunction. An antisiphon loop is positioned at top, rear of engine compartment to prevent water from being drawn into hull when engine is not being operated. Make sure small breather hole in plastic fitting of antisiphon loop

is clear. If hole is plugged, water could be drawn into engine compartment when engine is stopped or idling. Clean hole only with compressed air. Using a tool to clean hole could enlarge hole size, thus causing a vacuum loss at bilge strainer during operation. The lower vacuum will result in a decrease in bilge siphoning efficiency.

INTERMEDIATE HOUSING AND DRIVE FLANGE

All Models

R&R AND OVERHAUL. Disconnect battery cables from battery and remove battery from vehicle. Remove throttle cable and choke cable from carburetor. Remove hoses from carburetor, label if needed and plug openings. Remove exhaust manifold. Remove cap (C—Fig. JS2-22) and withdraw six-wire connector. Separate connector halves. Detach spark plug leads, disconnect starter motor lead and all other electrical wiring that will interfere with engine removal and label for reassembly. Remove drive coupler shield (S—Fig. JS2-46). Remove four cap screws and washers retaining engine to vehicle hull. Note shims located under engine mounts and identify each shim for installation in original location. Remove any other components that will interfere with engine removal. Use a suitable lifting device to hoist engine assembly from vehicle. Place engine assembly on a clean work bench.

Remove jet pump water intake grill (W—Fig. JS2-51) and cover (R). Detach steering linkage joint (J) at ball joint on steering nozzle (N). Remove bilge siphon hose and cooling system supply hose from fittings on jet pump housing. Remove four jet pump mounting cap

screws (two at front and two at rear). Be careful and use a suitable sharp tool and cut silicone sealer between jet pump water intake nozzle and vehicle hull. Slide jet pump assembly off rear of drive shaft. Note shims located under jet pump housing mounting flanges.

On JS440 models, use a suitable tool and rotate impeller counterclockwise to remove from drive shaft.

On all models, remove intermediate housing (H—Fig. JS2-48) four mounting cap screws. Withdraw intermediate housing with drive flange and drive shaft. Note shims located behind intermediate housing mounting flanges and label for installation in original locations.

Hold drive shaft with Kawasaki tool W56019-003 or a suitable equivalent, then use Kawasaki tool T57001-276 or a suitable equivalent to rotate drive flange off drive shaft. Remove three front cover retaining cap screws then withdraw front cover. Remove any shims located between front cover and drive shaft front bearing. Use a soft-faced mallet and tap intermediate housing off rear of drive shaft. Use correct fixtures and press drive shaft bearings and spacer off drive shaft if needed. Inspect all components for excessive wear or any other damage and renew if needed. Drive shaft runout should not exceed 0.1 mm (0.004 in.) when measured in intermediate housing area and 0.5 mm (0.020 in.) when measured midway between shaft ends. Renew all seals and "O" ring during reassembly. Apply Shell MP and Alvania EP1 grease on front cover and intermediate housing grease seals prior to installation. Install grease seals with open sides facing away from drive shaft bearings. Fill gap between seals with previously recommended grease. Apply recommended grease onto drive shaft bearings. Slide intermediate housing onto rear of drive shaft and tap intermediate housing onto drive shaft bearings with a soft-faced mallet until seated. If original in-

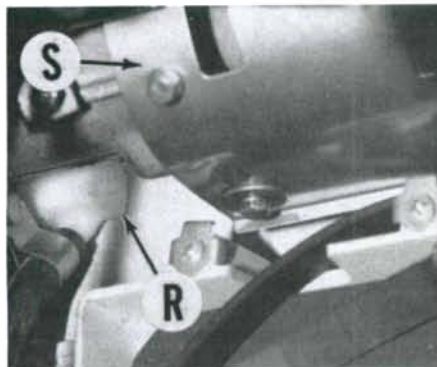


Fig. JS2-46—View identifies drive coupler shield (S) and location of bilge strainer (R).

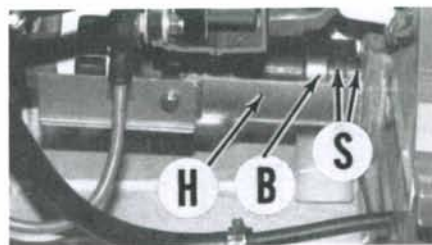


Fig. JS2-48—Cutaway view showing a typical intermediate housing setup. After removing intermediate housing assembly as outlined in text, remove drive shaft drive flange and front cover. Tap intermediate housing (H) off rear of drive shaft using a soft-faced mallet. Bearing (B) is located on drive shaft at front and rear of intermediate housing. Two seals (S) are located in rear of intermediate housing and two seals are located in front cover. A shim is used around outside of front cover and front drive shaft bearing.

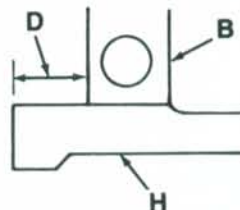


Fig. JS2-49—Refer to text after reassembling intermediate housing. Measure distance (D) between surface of intermediate housing (H) and surface of drive shaft front bearing (B) to determine if a shim is needed between front cover and bearing.

intermediate housing and original drive shaft bearings are used, then original shim located between front cover and front drive shaft bearing can be used. If intermediate housing or drive shaft bearings have been renewed, then proceed as follows. Measure distance (D—Fig. JS2-49) from surface of intermediate housing (H) to surface of drive shaft front bearing (B). If distance measured is between 12.90 mm (0.5079 in.) and 13.05 mm (0.5138 in.), no shims need to be added between front cover and bearing. If distance measured is between 13.06 mm (0.5142 in.) and 13.20 mm (0.5197 in.), add Kawasaki shim 92025-502 between front cover and bearing. If distance measured is between 13.21 mm (0.5201 in.) and 13.32 mm (0.5244 in.), add Kawasaki shim 92025-503 between front cover and bearing. Install front cover and tighten cap screws to 16 N·m (12 ft.-lbs.). Install drive flange on drive shaft and tighten to 27 N·m (20 ft.-lbs.).

Install shims in their original locations between intermediate housing mounting flanges and vehicle hull. If vehicle hull has been renewed, then the drive shaft must be properly aligned to mate with jet pump. The drive shaft must be positioned so drive shaft center is 77 mm (3.03 in.) from top of jet pump mounting surface and equally centered from side-to-side. Adjust thickness of shims located under intermediate housing mounting flanges until correct drive shaft alignment is obtained. Tighten intermediate housing mounting cap screws to 16 N·m (12 ft.-lbs.) and recheck drive shaft alignment.

On JS440 models, remove grease fitting (G—Fig. JS2-51) at rear of jet pump housing. Install impeller on drive shaft and tighten using hand pressure. Do not overtighten impeller. Lightly grease lips of jet pump housing grease seals and rear surface of drive shaft with Shell MP or Alvania EP1 grease.

On JS550 models, apply Shell MP or Alvania EP1 grease on drive shaft

splines. Make sure "O" ring is located inside impeller shaft and is in good condition.

On all models, apply Loctite Superflex or a suitable RTV silicone sealer on jet pump inlet area where intake mates with vehicle hull. Slide jet pump assembly onto drive shaft.

On JS440 models, thickness of shims located under jet pump housing mounting flanges must be adjusted so clearance (C—Fig. JS2-52) between impeller and impeller housing is at least 0.1 mm (0.004 in.) measured throughout entire impeller circumference. Tighten jet pump housing mounting cap screws, then recheck impeller-to-impeller housing clearance. After recommended clearance is obtained, remove each jet pump housing mounting cap screw and apply Loctite Stud N'Bearing Mount or a suitable equivalent on threads of each screw, then install and tighten to 22 N·m (16 ft.-lbs.). Install grease fitting (G—Fig. JS2-51) and inject Shell MP or Alvania EP1 grease through grease fitting as needed.

On JS550 models, install shims in original locations under jet pump housing mounting flanges. Apply Loctite Stud N'Bearing Mount or a suitable equivalent on threads of each jet pump housing mounting cap screw, then install and tighten to 22 N·m (16 ft.-lbs.).

On all models, reconnect bilge siphon hose and cooling system supply hose on to fittings on jet pump. Reattach steering linkage joint (J) onto ball joint on steering nozzle (N). Install jet pump cover (R) and water intake grill (W) and tighten retaining screws to 10 N·m (88 in.-lbs.).

Use a suitable lifting device to hoist engine assembly into vehicle. Make sure coupler is located between engine drive flange and drive shaft drive flange. Install shims into original locations under engine mounts. Lay a straightedge (S—Fig. JS2-33) across top of engine drive flange and drive shaft drive flange. Engine drive flange should be 0-0.3 mm

(0-0.012 in.) higher than drive shaft drive flange. Measure distance (A—Fig. JS2-34) and distance (B). Distance (B) should not exceed distance (A) by more than 0.6 mm (0.024 in.). Measure clearance between engine drive flange and coupler and drive shaft drive flange and coupler. Total of the two clearance measurements should not exceed 0.5 mm (0.020 in.). If recommended settings are not measured, then adjust thickness of shims located under engine mounts until recommended settings are obtained. Apply Loctite Lock N'Seal or a suitable equivalent on threads of four engine retaining cap screws and tighten cap screws to 37 N·m (27 ft.-lbs.). Remeasure as previously outlined to verify engine drive flange to drive shaft flange settings are as recommended. Adjust shim thickness if needed.

Complete reassembly in reverse order of disassembly. Make sure "O" ring is positioned between cap (C—Fig. JS2-22) and electric box.

JET PUMP

Model JS440

R&R AND OVERHAUL. Disconnect battery cables from battery. Remove jet pump water intake grill (W—Fig. JS2-51) and cover (R). Detach steering linkage joint (J) at ball joint on steering nozzle (N). Remove bilge siphon hose and cooling system supply hose from fittings on jet pump housing. Remove four jet pump mounting cap screws (two at front and two at rear). Be careful and use a suitable sharp tool and cut silicone sealer between jet pump intake nozzle and vehicle hull. Slide jet pump assembly off rear of drive shaft. Note shims located under jet pump housing mounting flanges. Label shims for

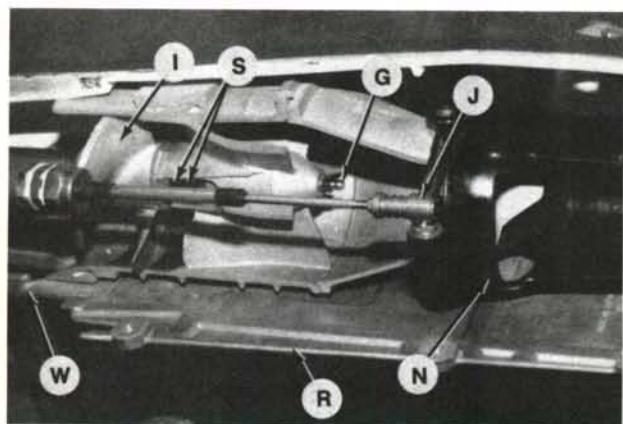


Fig. JS2-51—Cutaway view of jet pump assembly used on JS440 models and related components common to both JS440 and JS550 models.

- G. Grease fitting
- I. Impeller
- J. Steering linkage joint
- N. Steering nozzle
- R. Jet pump cover
- S. Seals
- W. Water intake grill

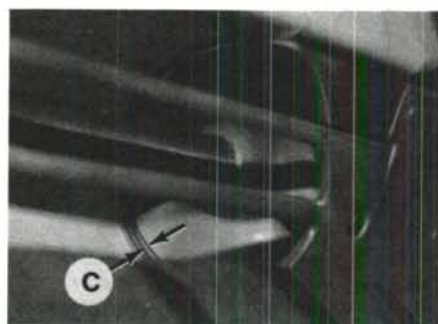


Fig. JS2-52—On JS440 models, clearance (C) between impeller and impeller housing should be at least 0.1 mm (0.004 in.) and should not exceed 0.87 mm (0.034 in.) measured throughout entire impeller circumference. On JS550 models, clearance between impeller and impeller housing should be at least 0.2-0.3 mm (0.008-0.012 in.) and should not exceed 0.6 mm (0.024 in.) measured throughout entire impeller circumference.

reassembly in original locations. Use a suitable tool and rotate impeller counterclockwise to remove from drive shaft.

Inspect impeller and impeller housing for excessive wear or any other damage. Diameter of impeller housing should not exceed 122.7 mm (4.83 in.). Renew jet pump housing if impeller housing is worn beyond limit or any other damage is noted. Minimum impeller diameter is 120 mm (4.72 in.). Inspect all other components for any type of damage. Remove snap ring and withdraw seals (S) using a suitable slide hammer. Diameter of drive shaft bushing in jet pump housing should not exceed 20.2 mm (0.79 in.). Renew bushing if worn beyond limit. Cool bushing and warm bushing area of jet pump to 93° C (200°F) to ease in installation. Install Shell MP or Alvania EP1 grease on seals in jet pump housing prior to installation. Install thick seal next to bushing and install both seals with open side facing toward snap ring groove. Install snap ring. Fill gap between seals with previously recommended grease. If output nozzle was removed, apply a thin coating of Loctite Superflex or a RTV silicone sealer on jet pump housing surface where output nozzle mates and install output nozzle. Apply Loctite Stud N'Bearing Mount or a suitable equivalent on threads of output nozzle mounting cap screws and tighten in a crisscross pattern to 16 N·m (12 ft.-lbs.).

Remove grease fitting (G) at rear of jet pump housing. Install impeller on drive shaft and tighten using hand pressure. Do not overtighten impeller. Lightly grease lips of jet pump housing grease seals and rear surface of drive shaft with Shell MP or Alvania EP1 grease. Apply Loctite Superflex or a suitable RTV silicone sealer on jet pump intake area where intake mates with vehicle hull. Slide jet pump assembly onto drive shaft. Install shims located under jet pump housing mounting flanges in

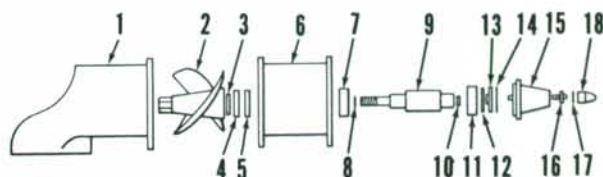
Fig. JS2-55—Exploded view showing correct arrangement of jet pump components on JS550 models.

1. Inlet housing
2. Impeller
3. Shim
4. Seal
5. Seal
6. Vane housing
7. Bearing
8. "O" ring
9. Impeller shaft

10. Plug
11. Bearing
12. Shim

13. Cap plug
14. "O" ring
15. Cap

16. Grease fitting
17. "O" ring
18. Cover



original locations. Tighten jet pump housing mounting cap screws, then check impeller-to-impeller housing clearance. Clearance (C—Fig. JS2-52) should not exceed 0.87 mm (0.034 in.) measured between impeller and impeller housing throughout entire impeller circumference. Adjust thickness of shims located under jet pump housing mounting flanges if measured clearance is not equal around impeller circumference. If measured clearance is beyond recommended limit, then renew excessively worn or damaged component. After correct setting is obtained, remove each jet pump housing mounting cap screw and apply Loctite Stud N'Bearing Mount or a suitable equivalent on threads of each screw, then install and tighten to 22 N·m (16 ft.-lbs.). Install grease fitting (G—Fig. JS2-51) and inject Shell MP or Alvania EP1 grease through grease fitting as needed. Reconnect bilge siphon hose and cooling system supply hose onto fittings on jet pump. Reattach steering linkage joint (J) onto ball joint on steering nozzle (N). Install jet pump cover (R) and water intake grill (W) and tighten retaining screws to 10 N·m (88 in.-lbs.).

Model JS550

R&R AND OVERHAUL. Disconnect battery cables from battery. Remove jet pump water intake grill (W—Fig. JS2-51) and cover (R). Detach steering linkage joint (J) at ball joint on steering nozzle (N). Remove bilge siphon hose and cool-

ing system supply hose from fittings on jet pump housing. Remove four jet pump mounting cap screws (two at front and two at rear). Be careful and use a suitable sharp tool and cut silicone sealer between jet pump intake nozzle and vehicle hull. Slide jet pump assembly off rear of drive shaft. Note shims located under jet pump housing mounting flanges. Label shims for reassembly in original locations. Place jet pump assembly on a clean work bench.

Remove steering nozzle (N—Fig. JS2-54). Remove four through-bolts (B), two on top and two on bottom, then separate inlet housing (1) and outlet nozzle (O) and vane housing (6). Insert Kawasaki impeller shaft holder 57001-3005 into impeller shaft (9—Fig. JS2-55) end. Position a suitable tool on impeller (2) nut and rotate impeller clockwise (L.H. threads), while not permitting impeller shaft to rotate, to remove impeller (2) from impeller shaft (9). Note shims (3) located behind impeller (2). Remove grease fitting cover (18) with "O" ring (17), grease fitting (16) and three cap screws to remove cap (15) with "O" ring (14) and cap plug (13). Place Kawasaki impeller shaft seal protector 57001-3003 on shaft end, then tap impeller shaft (9) with two roller bearings (7 and 11) out rear of vane housing (6). If plug (10) must be removed, use a suitable punch and hammer and drive plug (10) out rear of impeller shaft (9). Remove seals (4 and 5) from vane housing (6) using a suitable slide hammer. Use a suitable press and fixtures to remove bearings (7 and 11) from impeller shaft (9).

Inspect impeller (2) and impeller case of inlet housing (1) for excessive wear or any other damage. Manufacturer recommends renewing inlet housing (1) if any scratches noted in impeller case are deeper than 1 mm (0.04 in.). Inspect all other components for any type of damage. Renew components as needed.

Apply Shell MP or Alvania EP1 grease on seals (4 and 5) prior to installation. Install seal (5) (plain outer circumference) into vane housing (6), until seated, with open side facing toward impeller. Fill seal with previously recommended grease. Install seal (4) (ribbed outer circumference) into vane housing

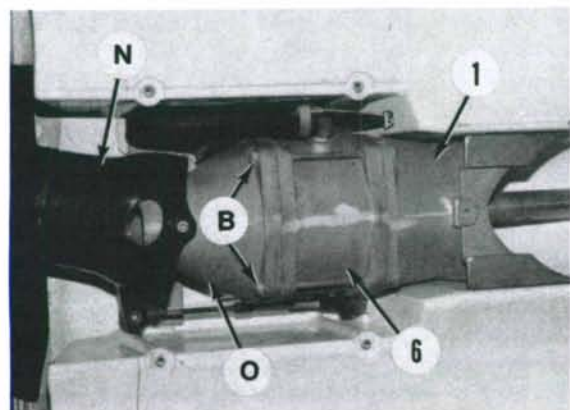


Fig. JS2-54—On JS550 models, jet pump inlet housing (1), vane housing (6) and outlet nozzle (O) are held together by four through-bolts (B), two on top and two on bottom. Steering nozzle (N) pivots on outlet nozzle (O).

(6), until rib fits into stopper groove, with open side facing toward impeller. Fill seal with previously recommended grease.

Install plug (10) into pump shaft (9) with flat side of plug facing down. Do not lubricate plug prior to installation. Press bearings (7 and 11) onto impeller shaft (9) making sure bearings properly seat against large center section of impeller shaft. Place Kawasaki seal protector 57001-3003 onto impeller shaft end and install impeller shaft assembly into vane housing (6). Use a soft-faced mallet and tap impeller shaft end to properly seat assembly in vane housing. Measure distance from vane housing (6) surface to bearing (11) surface and record as measurement "A." Measure distance end of cap (15) will protrude into vane housing (6) when assembled and record as measurement "B." Subtract measurement "B" from measurement "A" and refer to "TABLE C" in Fig. JS2-56. Install recommended thickness of shim (12—Fig. JS2-55) between bearing (11) and cap (15). Shim (12) is available in thicknesses of 0.15 mm (0.006 in.) and 0.30 mm (0.012 in.). When required thickness exceeds 0.30 mm (0.012 in.), then shims must be stacked to obtain recommended thickness. Install cap (15) with "O" ring (14) and cap plug (13) and tighten retaining cap screws to 6 N·m (52 in.-lbs.). Install grease fitting (16) and inject Shell MP or Alvania EP1 grease through grease fitting opening until grease expels out from around lip of grease seal (4). Install grease fitting cover (18) with "O" ring (17) and securely tighten.

Lightly grease impeller shaft (9) threads with previously recommended grease. Install original thickness of shims (3) onto impeller shaft, then position impeller (2) on impeller shaft and rotate counterclockwise to thread onto impeller shaft. Insert Kawasaki impeller shaft holder 57001-3005 into impeller shaft (9) end. Position a suitable torque wrench and tool onto impeller (2) nut and rotate impeller counterclockwise, while not permitting impeller shaft to rotate, until a torque of 20 N·m (14 ft.-lbs.) is obtained on impeller. Temporarily reassemble inlet housing (1—Fig. JS2-54) and outlet nozzle (0) onto vane housing (6). Install four through-bolts (B) and slowly tighten bolts in a crisscross pattern while rotating impeller to be sure free rotation is noted. Tighten bolts to 5.5 N·m (48 in.-lbs.) if no binding is noted prior to final tightening. If binding is noted, repair cause or decrease shim (3—Fig. JS2-55) thickness as needed until no binding is obtained. Measure clearance between impeller (2) and impeller case of inlet housing (1). Recommended clearance is 0.2-0.3 mm

(0.008-0.012 in.) and should not exceed 0.6 mm (0.024 in.) measured throughout entire impeller circumference. If measured clearance is beyond recommended limit, then adjust thickness of shims (3) until clearance is less than 0.6 mm (0.024 in.) limit. Adding a 1 mm (0.04 in.) thick shim will reduce clearance approximately 0.144 mm (0.0057 in.).

After correct setting is obtained, disassemble inlet housing (1—Fig. JS2-54) and outlet nozzle (0) from vane housing (6). Apply a thin coating of Loctite Superflex or a suitable RTV silicone sealer onto inlet housing (1) and outlet nozzle (0) where surfaces mate with vane housing (6). Reinstall components and place Loctite Lock N'Seal or a suitable equivalent onto threads of through-bolts (B) and tighten to 5.5 N·m (48 in.-lbs.) using a crisscross pattern. Install steering nozzle (N).

Apply Shell MP or Alvania EP1 grease on drive shaft splines. Make sure "O" ring (8—Fig. JS2-55) is located inside of impeller shaft (9). Apply Loctite Superflex or a suitable RTV silicone sealer onto jet pump intake area where intake mates with vehicle hull. Slide jet pump assembly onto drive shaft. Install shims located under jet pump housing mounting flanges in original locations. Apply Loctite Stud N'Bearing Mount or a suitable equivalent on threads of each jet pump housing mounting cap screw, then install and tighten to 22 N·m (16 ft.-lbs.). Reconnect bilge siphon hose and cooling system supply hose onto fit-

tings on jet pump. Reattach steering linkage joint (J—Fig. JS2-51) onto ball joint on steering nozzle (N). Install jet pump cover (R) and water intake grill (W) and tighten retaining screws to 10 N·m (88 in.-lbs.).

STEERING

All Models

ADJUSTMENT. With steering handlebar in straight ahead position, jet pump steering nozzle (N—Fig. JS2-51)

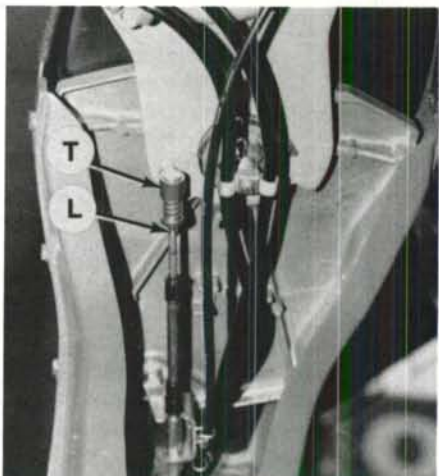


Fig. JS2-58—Loosen locknut (L) and remove joint (T) from ball joint on handlebar pivot plate and rotate joint (T) up or down on threaded end of steering cable as needed to center jet pump steering nozzle when steering handlebar is in a straight ahead position.

TABLE C

"A" Minus "B" Equals	Recommended Shim Thickness
0.10 - 0.25 mm (0.004 - 0.009 in.)	No Shim
0.26 - 0.40 mm (0.010 - 0.015 in.)	0.15 mm (0.006 in.)
0.41 - 0.55 mm (0.016 - 0.021 in.)	0.30 mm (0.012 in.)
0.56 - 0.70 mm (0.022 - 0.027 in.)	0.45 mm (0.018 in.)
0.71 - 0.85 mm (0.028 - 0.033 in.)	0.60 mm (0.024 in.)
0.86 - 0.94 mm (0.034 - 0.037 in.)	0.75 mm (0.030 in.)

Fig. JS2-56—Use "TABLE C" to determine correct thickness of shim (12—Fig. JS2-55). Refer to text.

Jet Ski (JS440 & JS550)

should be centered or at a 90 degree angle to stern of vehicle. If not, raise handle pole and loosen locknut (L—Fig. JS2-58) below steering linkage joint (T). Remove joint (T) from ball joint on handlebar pivot plate. Rotate joint (T)

up or down threaded end of steering cable as needed to properly center jet pump steering nozzle. After correct adjustment is obtained, reinstall steering linkage joint (T) onto ball joint and tighten locknut (L).

PERSONAL WATER VEHICLE

NOTE: If steering linkage joint (T) must be rotated out to where minimal threads on steering cable engage joint (T), then rotate joint (T) onto threaded end of steering cable to obtain safe thread engagement and complete adjustment on joint (J—Fig. JS2-51) at jet pump.

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