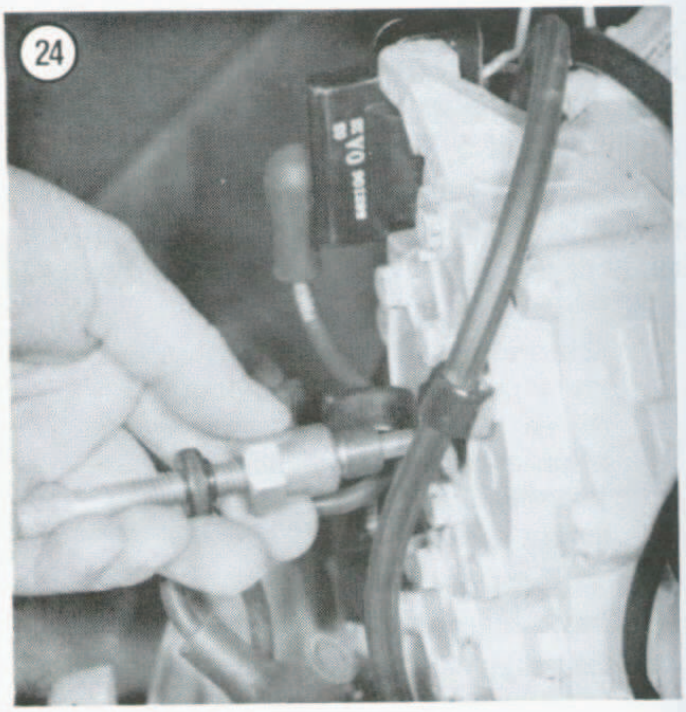
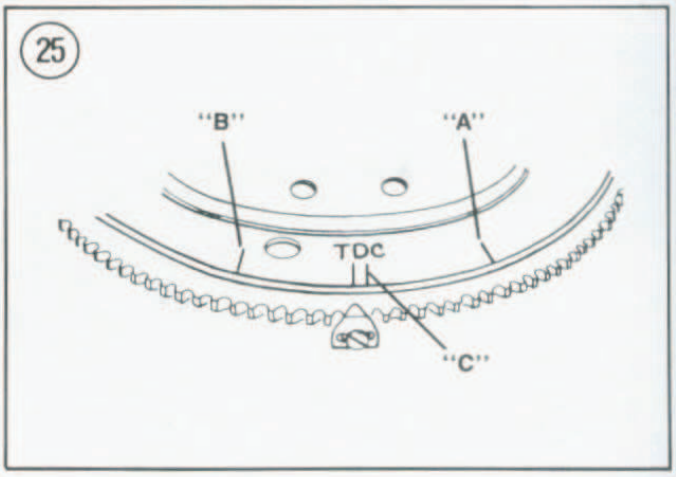
60, 65, 70 AND 75 HP (3-CYLINDER MODELS)

Timing Pointer Alignment

1. Disconnect the spark plug leads. Remove the spark plugs.
2. Install piston stop tool No. 384887 in the No. 1 spark plug hole (**Figure 24**).
3. Rotate the flywheel clockwise until the TDC mark is approximately 1½ in. beyond the pointer. Depress the piston stop plunger until it touches the piston and then tighten the locknut.
4. Mark the flywheel rim directly under the point. This is point "A," **Figure 25**.
5. Continue rotating the flywheel clockwise until the piston contacts the piston stop tool again. Mark the flywheel again directly under the pointer. This is point "B," **Figure 25**.
6. Remove the piston stop tool and measure the distance between the marks made in Step 4 and Step 5. The mid-point between the 2 marks (point "C," **Figure 25**) should fall directly on the TDC mark cast into the flywheel if timing pointer alignment is correct.
7. If the mid-point does not fall on the flywheel TDC mark, the pointer is out of alignment. Rotate the flywheel to align the mid-point with the timing pointer. Hold the flywheel in this position and loosen the pointer screws. Move the pointer to align with the TDC mark cast into the flywheel and tighten the pointer screws.

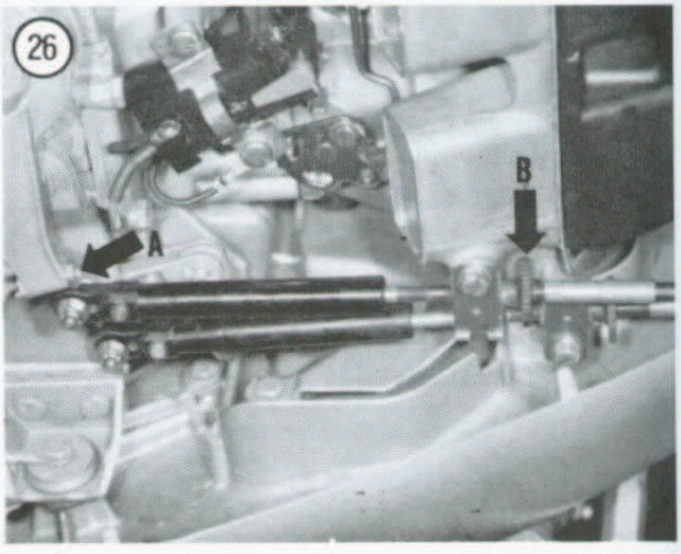




Throttle Cable Adjustment

The throttle cable must be adjusted to allow the throttle lever to return to the idle stop. A cable that is too loose will cause a high and unstable idle, resulting in shifting difficulties. If too tight, shifting will feel stiff and the warm-up lever will move up during a shift into NEUTRAL.

1. Slowly move the control lever back until the throttle lever contacts the idle stop screw (A, **Figure 26**).

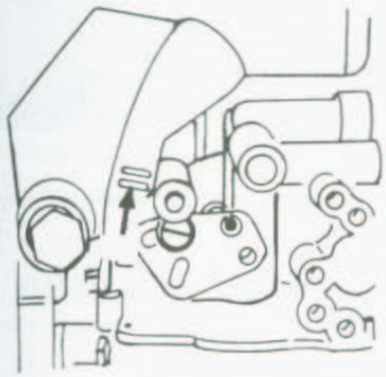


2. If the throttle lever does not contact the stop screw, adjust the trunnion nut (B, **Figure 26**) as required.

Throttle Valve Synchronization

1. Remove the engine cover.
2. Remove the air silencer cover.
3. Retard the throttle lever to a point where the throttle cam roller does not touch the cam.
4. Loosen the upper and lower carburetor lever adjustment screws (A and B, **Figure 27**). The throttle return spring will close the throttle valves.
5. Rotate the throttle shaft partially open, then let it snap back to the closed position. Apply upward finger pressure on the upper adjusting link tab to remove any backlash and tighten the adjustment screw, then repeat to adjust the lower adjusting link.
6. Move the cam follower while watching the throttle valves. If the throttle valves do not start to move at the same time, repeat Steps 3-5.

28 **THROTTLE CAM ADJUSTMENT**



Throttle Cam Follower Pickup Point and Timing

1. Connect a throttle shaft amplifier tool (**Figure 2**) to the top carburetor throttle shaft.
2. Watching the amplifier tool, slowly rotate the throttle cam. As the end of the tool starts to move, check the cam and cam follower alignment. The embossed mark (65 hp) or lower embossed mark (all others) on the cam should align with the center of the cam follower. See **Figure 28** (typical).

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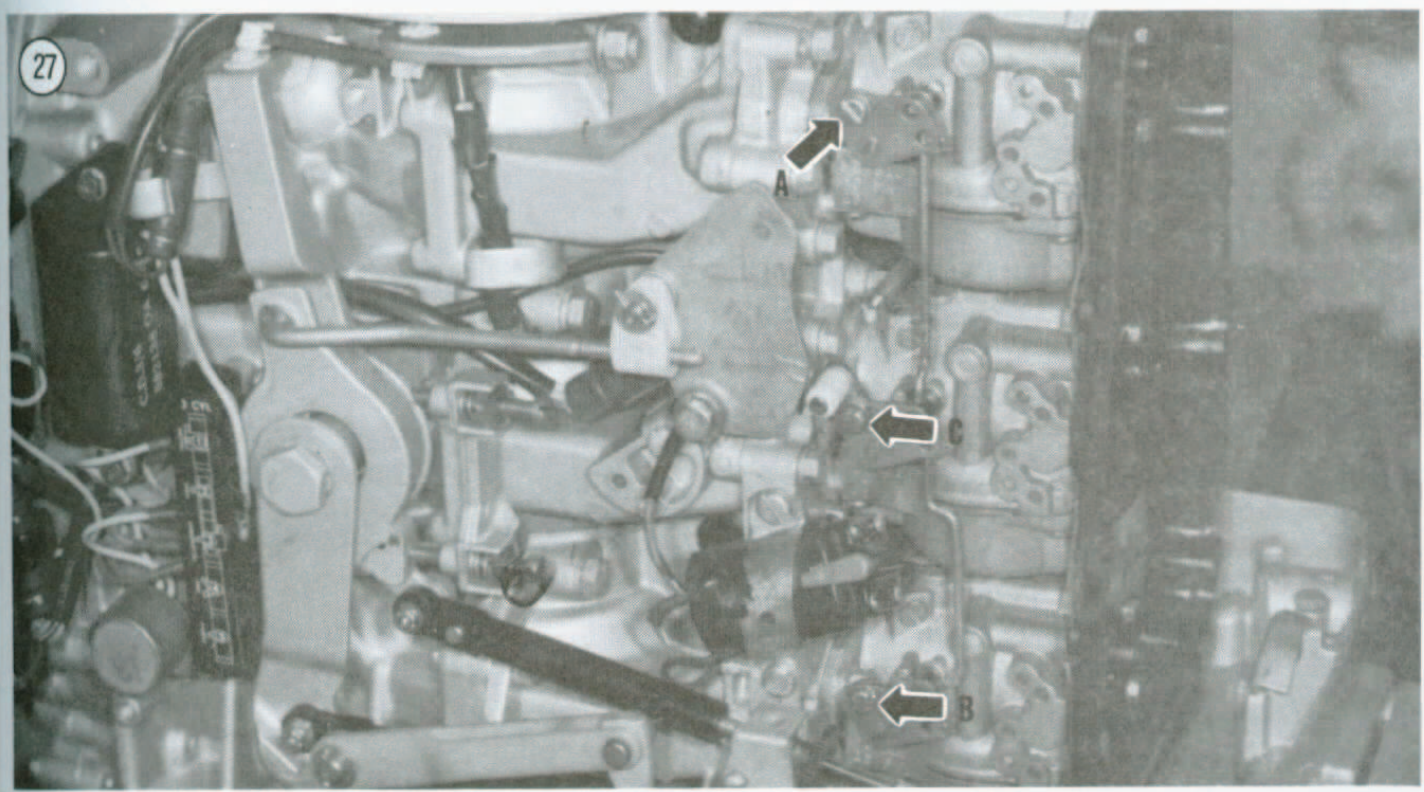
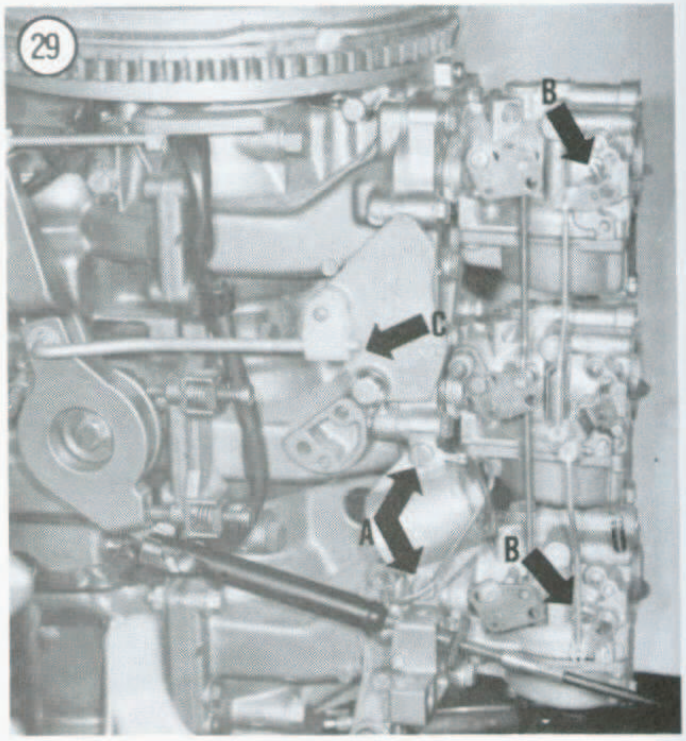
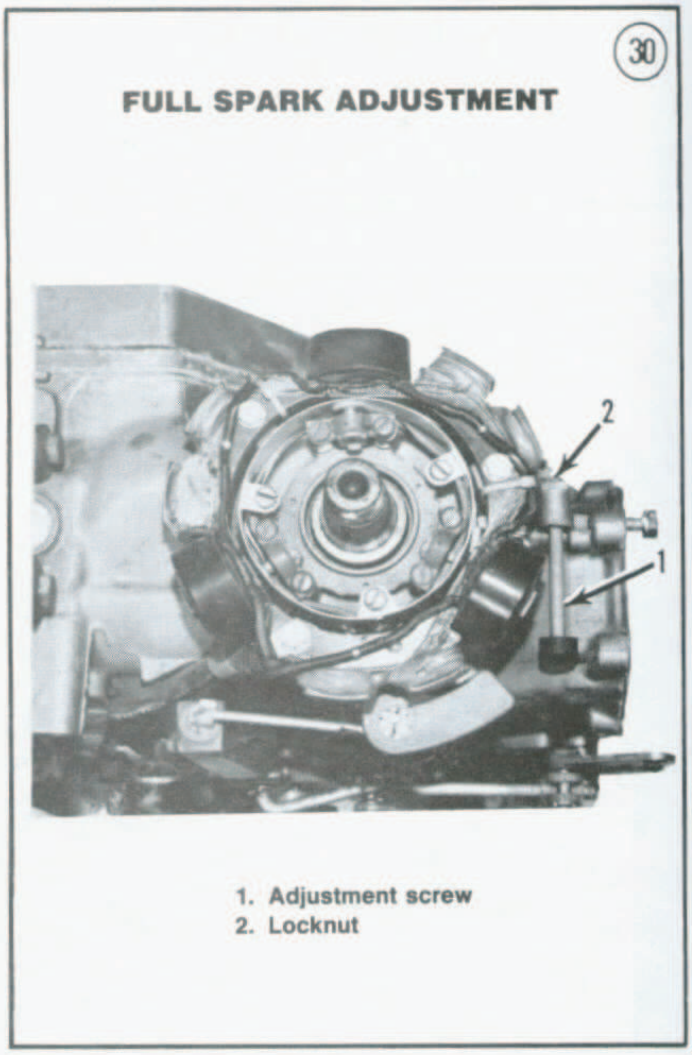


3. If the cam follower and cam mark do not align in Step 2, manually align the throttle cam mark with the center of the cam follower. Loosen the center carburetor throttle arm screw (C, **Figure 27**) and let the throttle shaft return spring close the throttle valves. Tighten the throttle arm screw.
4. Repeat Step 2 to check the adjustment. If incorrect, repeat Step 3, then repeat Step 2 as required.
5. When adjustment is correct, connect a timing light to the No. 1 cylinder according to manufacturer's instructions.
6. Slowly move the throttle lever until the tip of the amplifier tool starts to move. Remove the tool without disturbing the throttle lever position.
7. Start the engine and check the spark advance with the timing light, advancing the idle speed screw as required to keep the engine running. Refer to **Table 1** for proper pickup timing.
8. If the pickup timing is incorrect in Step 7, disconnect the throttle cam yoke rod (C, **Figure 29**) from the throttle control lever or loosen the control lever jam nut (1, **Figure 8**), as equipped.
   a. Throttle cam yoke rod—Align the throttle cam mark with center of the cam follower. Move the carburetor throttle arm until the throttle valves are closed. Rotate the cam yoke rod as required to maintain the alignment and reattach the rod to the throttle control lever.
   b. Jam nut—Turn the top of the thumbwheel (2, **Figure 8**) toward the engine (to advance) or away from the engine (to ret rd) as required to bring pickup timing within specifications.
9. Repeat Step 6 and Step 7 to check the adjustment. If incorrect, repeat Step 8, then repeat Step 6 and Step 7 as required.

Choke Valve Synchronization (Models with Choke Solenoid)

1. Make sure the manual choke lever is in the OFF position.





1. Adjustment screw
2. Locknut

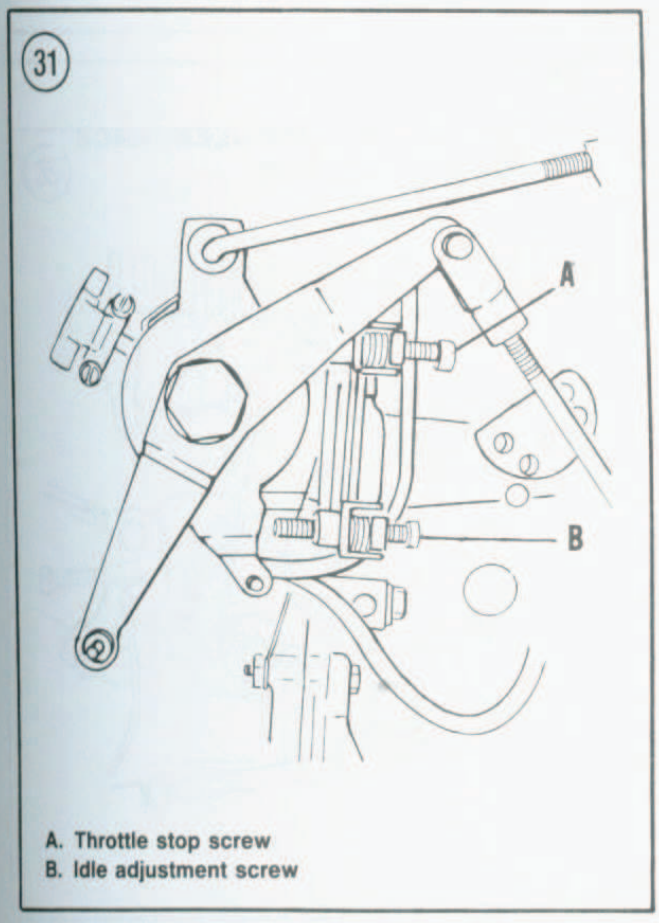
2. Loosen the choke solenoid bracket screws (A, **Figure 29**). Move the solenoid back until it touches the engine boss, then tighten the bracket screws.
3. Loosen the upper and lower choke lever retaining screws. See B, **Figure 29**.
4. Close both chokes with finger pressure on the upper and lower choke shaft levers and tighten the retaining screws.

Maximum Spark Advance Adjustment

CAUTION

This procedure should be performed in a test tank with the proper test wheel installed on the engine. The use of the propeller and/or a flushing device can result in an incorrect setting and possible engine damage.

1. Connect a timing light to the No. 1 cylinder according to manufacturer's instructions.



A. Throttle stop screw
B. Idle adjustment screw

2. Connect a tachometer according to manufacturer's instructions.
3. Start the engine and run in forward gear as follows:
   a. 60 hp—5,000-5,400 rpm.
   b. 65 hp—4,300-4,600 rpm.
   c. 1974-1983 70 hp—4,600-5,000 rpm.
   d. 1975-1983 75 hp—4,800-5,200 rpm.
   e. 1984-on 70 and 75 hp—5,000-5,400 rpm.
4. Check the timing mark position with the timing light. The specified mark (**Table 1**) on the flywheel grid should align with the engine mark.

NOTE

*Compare the specification in **Table 1** with the "Maximum Advance" specification on the engine decal. Use the decal specification if it differs.*

WARNING

Do not attempt to adjust the spark advance with the engine running in Step 5. The adjustment screw on many engines is located close to the moving flywheel and vibrates slightly when the engine is running. If the screwdriver slips out of the screw, serious personal injury can result.

5. If the timing marks do not align as specified, shut the engine off. Loosen the adjusting screw locknut. **Figure 30** shows the adjusting screw and locknut location with the flywheel removed for clarity. Adjust the screw clockwise (to retard) or counterclockwise (to advance) as required, then tighten the locknut. One full turn in either direction changes timing approximately one degree.
6. Restart the engine and repeat Step 4. If timing mark alignment is still incorrect, repeat Step 5, then Step 3 and Step 4 as required.
7. When the timing marks align as specified, open the throttle to the full throttle position and hold it there.
8. Loosen the throttle stop screw locknut and adjust the stop screw (A, **Figure 31**) to allow the

throttle valves to open fully without loading the throttle shaft. Tighten the locknut.

Idle Speed Adjustment

This procedure should be performed with the boat floating unrestrained in the water and the correct propeller installed.

1. Remove the engine cover.
2. Connect a tachometer according to manufacturer's instructions.
3. Start the engine and warm to normal operating temperature.

4A. 65 hp—With the engine running, shift into REVERSE and adjust the idle screw (B, **Figure 31**) to set the idle speed at 650 rpm.

4B. All others—With the engine running, shift into FORWARD and adjust the idle screw (B, **Figure 31**) to set the idle speed at 700-750 rpm.

5. Shut the engine off. Remove the timing light and tachometer. Install the engine cover.

65 HP (3-CYLINDER TILLER MODELS)

Timing Pointer Alignment

See *60, 65, 70 and 75 hp Timing Pointer Alignment* in this chapter.

Throttle Cable/Initial Throttle Cam Adjustment

1. Rotate the tiller handle idle speed adjustment knob counterclockwise to the minimum speed position.
2. Rotate twist grip to its full open position and check the throttle roller position in the throttle cam slot (**Figure 32**). It should be approximately 1/4 in. from the end of the slot.
3. Rotate the twist grip to its fully closed position and check the throttle roller position in the throttle cam slot (**Figure 33**). It should be approximately 1/4 in. from the end of the slot.
4. If the roller is not properly positioned in the cam slot in Step 2 or Step 3, loosen the throttle cable connector retaining screw or throttle cable

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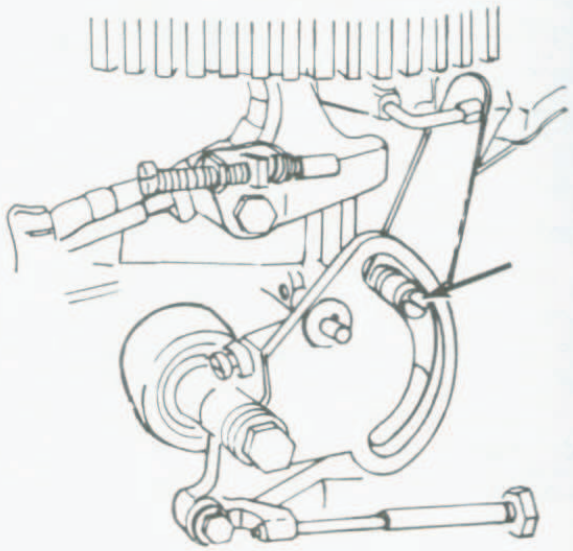
THROTTLE CAM CLEARANCE CHECK (STEP 1)



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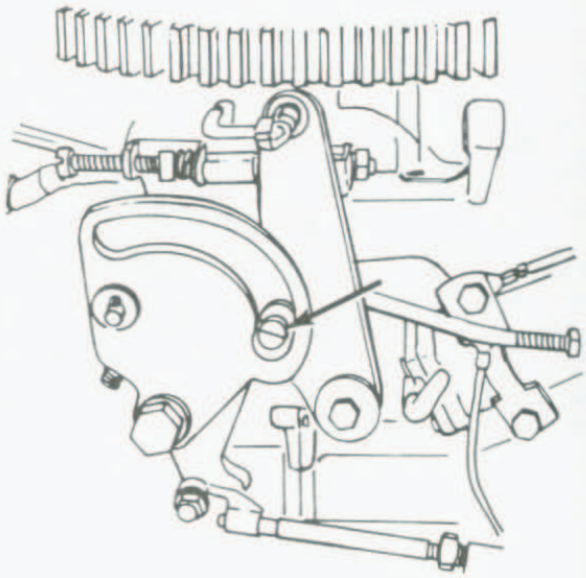
THROTTLE CAM CLEARANCE CHECK (STEP 2)



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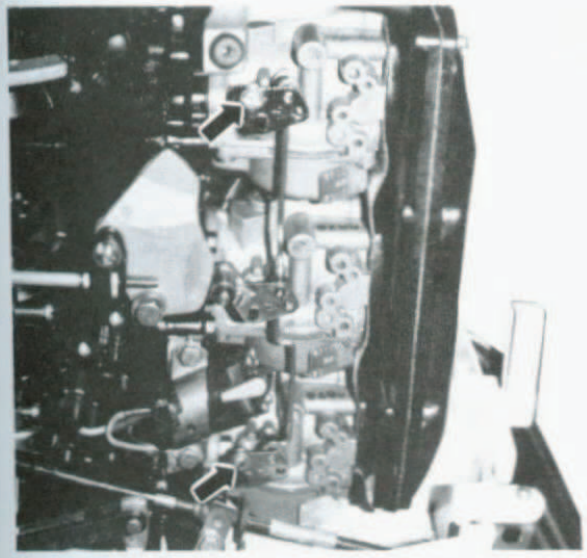
TYPICAL



jam nut (as equipped). Rotate the cable connector until the roller comes to rest about ¼ in. from each end of the cam slot as the twist grip is opened and closed. Tighten the retaining screw or jam nut.

Throttle Valve Synchronization

1. Remove the engine cover.
2. Remove the air silencer cover.
3. Retard the throttle lever to a point where the throttle cam roller does not touch the cam.
4. Loosen the upper and lower carburetor lever adjustment screws (**Figure 34**).
5. Rotate the throttle shaft partially open, then let it snap back to the closed position. Apply upward finger pressure on the upper adjusting link tab to remove any backlash and tighten the adjustment screw, then repeat to adjust the lower adjusting link.
6. Move the cam follower while watching the throttle valves. If the throttle valves do not start to move at the same time, repeat Steps 3-5.

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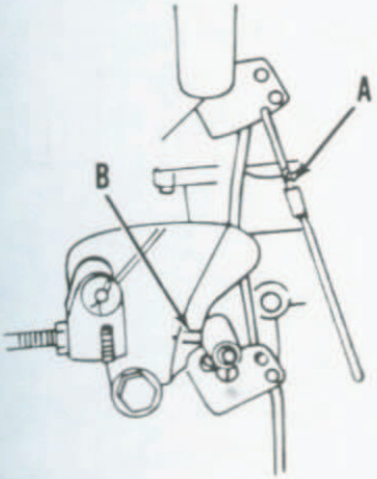

Throttle Cam Follower Pickup Point and Timing

1. Connect a throttle shaft amplifier tool (**Figure 2**) to the top carburetor throttle shaft. See A, **Figure 35**.
2. Watching the amplifier tool, slowly rotate the throttle cam. As the end of the tool starts to move, check the cam and cam follower alignment. The lower embossed mark on the cam (B, **Figure 35**) should align with the center of the cam follower.
3. If the cam follower and cam mark do not align in Step 2, loosen the cam follower screw (below the roller) and let the throttle spring close the throttle valves. Align the cam mark and follower and press on the cam follower lever to maintain the alignment while tightening the screw.
4. Repeat Step 2 to check the adjustment. If incorrect, repeat Step 3, then repeat Step 2 as required.

5. When adjustment is correct, connect a timing light to the No. 1 cylinder according to manufacturer's instructions.
6. Slowly move the throttle lever until the tip of the amplifier tool starts to move. Remove the tool without disturbing the throttle lever position.
7. Start the engine and check the spark advance with the timing light, advancing the idle speed adjustment knob as required to keep the engine running. Refer to **Table 1** for proper pickup timing.
8. If the pickup timing is incorrect in Step 7, loosen the cam rod jam nut and turn the thumbwheel (**Figure 36**) toward the engine (advance) or away from the engine (retard) as required to bring pickup timing within specifications.
9. Repeat Step 6 and Step 7 to check the adjustment. If incorrect, repeat Step 8, then repeat Step 6 and Step 7 as required. Tighten the cam rod jam nut.

Maximum Spark Advance Adjustment

CAUTION

This procedure should be performed in a test tank with the proper test wheel installed on the engine. The use of the propeller and/or a flushing device can result in an incorrect setting and possible engine damage.

1. Connect a timing light to the No. 1 cylinder according to manufacturer's instructions.
2. Connect a tachometer according to manufacturer's instructions.
3. Start the engine and run in forward gear at a minimum of 5,000 rpm (timer base fully advanced).
4. Check the timing mark position with the timing light. The specified mark (**Table 1**) on the flywheel grid should align with the engine mark.

NOTE

*Compare the specification in **Table 1** with the "Maximum Advance" specification on the engine decal. Use the decal specification if it differs.*

5. If the timing marks do not align as specified, shut the engine off. Remove the spark advance rod (**Figure 37**). Shorten the rod by bending its

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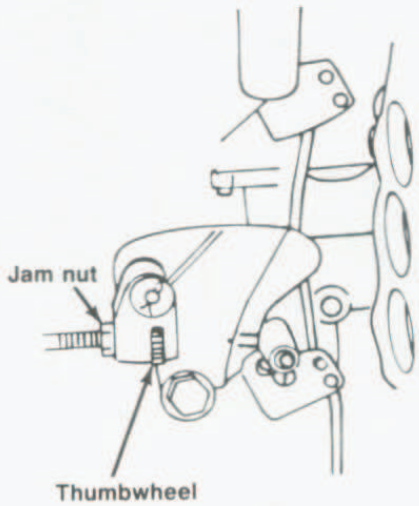

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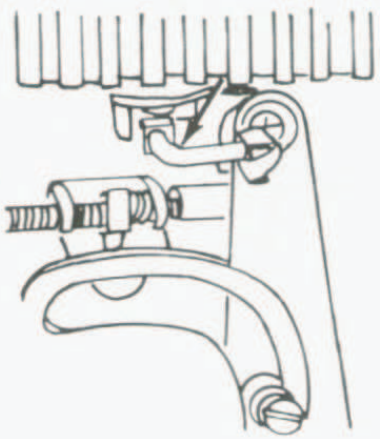
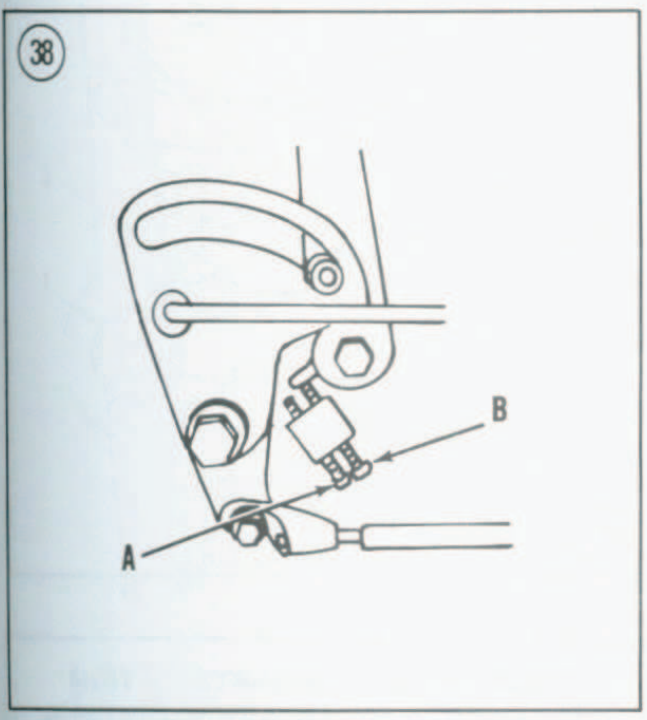
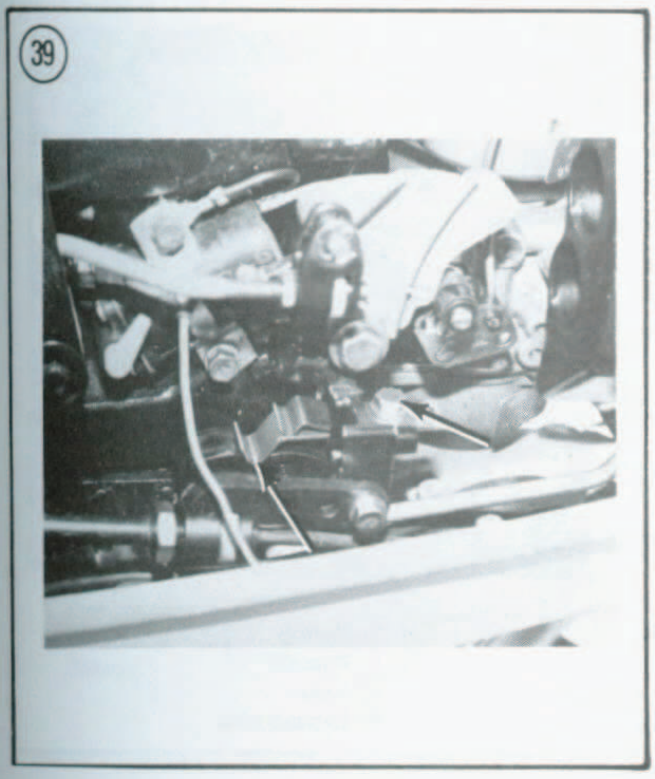
MAXIMUM SPARK ADVANCE ADJUSTMENT



ends together to advance timing; lengthen it by expanding the ends to retard timing.
6. Reinstall the spark advance rod if adjustment was necessary and repeat Step 3 and Step 4. If timing mark alignment is still incorrect, repeat Step 5, then Step 3 and Step 4 as required.





Wide-open Throttle Stop Adjustment

1. Move the throttle control to the full throttle position.
2. Use a toothpick as described in this chapter to check that each roll pin is exactly vertical.
3. If adjustment is necessary, turn the wide-open throttle stop screw (A, **Figure 38**) until the roll pins are vertical.

Shift Lever Detent Adjustment

1. Place the shift lever in its NEUTRAL position.
2. If the lower detent spring is not completely engaged in the shift lever detent notch (**Figure 39**), loosen the detent spring screw. Move the spring until it fully engages the notch, then tighten the screw snugly.

Idle Speed Adjustment

This procedure should be performed with the boat floating unrestrained in the water and the correct propeller installed.
1. Remove the engine cover.
2. Connect a tachometer according to manufacturer's instructions.
3. Start the engine and warm to normal operating temperature.
4. Shift the engine into FORWARD gear and note the idle speed on the tachometer. It should be 700-750 rpm.
5. If idle speed requires adjustment, shut the engine off as a safety precaution and rotate the idle speed screw (B, **Figure 38**) clockwise (to increase) or counterclockwise (to decrease) as required to being idle speed within specifications.
6. Start the engine and recheck idle speed. If not within specifications, repeat Step 5 as required.
7. When idle speed is correct, shut the engine off. Remove the tachometer and install the engine cover.