



SERVICE BULLETIN

BULLETIN #

SB 1286
APRIL 1986

SUBJECT:

85/125-FORCE OB
PRESTOLITE IGNI-
TION SYSTEM
TEST/ADJUST

IMPORTANT

Attached is a new simplified and more detailed procedure for testing or adjusting the Prestolite ignition system.

This test procedure utilizes the following US Marine Special Tools:

T11259 - Multi Meter
T11269 - Spark Tester
T8978 - Timing Light
T8999 - Test Wheel

This very simple procedure, if followed in its logical sequence, will provide a very quick and accurate diagnosis of ignition problems.

Attachment

85/125 FORCE OUTBOARD - PRESTOLITE IGNITION SYSTEM TEST/ADJUST

EQUIPMENT NEEDED:

T11250 Multimeter

T11260 Spark Tester

T8978 Timing Light

T8909 Test Wheel (for tank testing)

NOTE

If a meter other than the T11250 is used it must have the capability of measuring peak voltages. A conventional Volt-Ohm-Milliammeter (VOM) will not measure peak voltage.

PRODECURE:

1. Set the T11260 Spark Tester to a 7/16" gap setting and attach the tester to a good ground on the engine.
2. Remove the leads from the spark plugs and attach them to the corresponding leads on the spark tester. Remove the spark plugs from the engine.
3. Crank the engine and observe the results. If all cylinders show a spark jumping a 7/16" gap, the system is functioning normally; proceed to the timing sequence. If one or more cylinders are not firing proceed to the next step.
4. Carefully check all grounds and wire connections; repair as necessary. Re-check the spark output. If spark is restored on all cylinders the system is functioning normally. Proceed to the timing sequence. If still no spark, proceed to the next step.
5. Remove the two white leads from the terminal strip on the starter side of the engine (the leads that come from the CD boxes). Make sure these wires are not grounded and crank the engine. If all cylinders spark normally the problem is in the boat wiring system. Repair the boat wiring as necessary. If the system still is not sparking proceed with the components testing.

COMPONENTS TESTING

Stator (CD Charge Coils) Testing

Two different tests are needed to verify the operation of the CD Charge coils; a resistance test and a peak voltage test. The T11259 multimeter is capable of making both of these tests.

Resistance Test - Stator

NOTE: Numbers in Parenthesis () refer to test points on the respective ignition system wiring diagram.

ENGINE	TEST POINT(S)	METER SETTING	ENGINE STATUS	RESULTS
4 cyl	(2) yellow to blue	X100	not cranking	675-800 ohms
4 cyl	(3) yellow to blue	X100	not cranking	675-800 ohms
4 cyl	(2) yellow to (1) ground	X1	not cranking	infinite
4 cyl	(2) blue to (1) ground	X1	not cranking	infinite
4 cyl	(3) yellow to (1) ground	X1	not cranking	infinite
4 cyl	(3) blue to (1) ground	X1	not cranking	infinite
3 cyl	(2) yellow to blue	X100	not cranking	675-800 ohms
3 cyl	(3) yellow to (2) blue	X100	not cranking	675-800 ohms
3 cyl	(2) yellow to (1) ground	X1	not cranking	infinite
3 cyl	(2) blue to (1) ground	X1	not cranking	infinite
3 cyl	(3) yellow to (1) ground	X1	not cranking	infinite

Voltage Test - Stator

NOTE: The DVA settings on the meter are for peak voltage measurements.

4 cyl	(2) yellow to blue	400 DVA	cranking	210V or higher
4 cyl	(3) yellow to blue	400 DVA	cranking	210V or higher
3 cyl	(2) yellow to blue	400 DVA	cranking	210V or higher
3 cyl	(3) yellow to (2) blue	400 DVA	cranking	210V or higher

If your results differ from those above, replace the stator and re-test as necessary. If your test results for the stator are satisfactory, proceed to the Trigger Tests. (See special note after Trigger Testing.)

Trigger Testing

The trigger requires resistance and peak voltage testing to verify its operation. Use the T11259 tester for these tests.

Resistance Test - Trigger

NOTE: Numbers in Parenthesis () refer to test points on the respective ignition system wiring diagram.

ENGINE	TEST POINT(S)	METER SETTING	ENGINE STATUS	RESULTS
4 cyl	(4) green to orange	x1	not cranking	45-50 ohms
4 cyl	(4) white/green to red	x1	not cranking	45-50 ohms
4 cyl	(5) green to orange	x1	not cranking	45-50 ohms
4 cyl	(5) white/green to red	x1	not cranking	45-50 ohms
4 cyl	(4) green to (1) ground	x1	not cranking	infinite
4 cyl	(4) orange to (1) ground	x1	not cranking	infinite
4 cyl	(4) white/green to (1) ground	x1	not cranking	infinite
4 cyl	(4) red to (1) ground	x1	not cranking	infinite
4 cyl	(5) green to (1) ground	x1	not cranking	infinite
4 cyl	(5) orange to (1) ground	x1	not cranking	infinite

Resistance Test - Trigger - Continued

ENGINE	TEST POINT(S)	METER SETTING	ENGINE STATUS	RESULTS
4 cyl	(5) orange to (1) ground	x1	not cranking	infinite
4 cyl	(5) white/green to (1) ground	x1	not cranking	infinite
4 cyl	(5) red to (1) ground	x1	not cranking	infinite
3 cyl	(4) green to orange	x1	not cranking	45-50 ohms
3 cyl	(4) green to orange (use other grn/orng pair)	x1	not cranking	45-50 ohms
3 cyl	(5) white/green to red	x1	not cranking	45-50 ohms
3 cyl	(4) green to (1) ground	x1	not cranking	infinite
3 cyl	(4) orange to (1) ground	x1	not cranking	infinite
3 cyl	(4) green to (1) ground (other green lead)	x1	not cranking	infinite
3 cyl	(4) orange to (1) ground (other orange lead)	x1	not cranking	infinite
3 cyl	(5) white/green to (1) ground	x1	not cranking	infinite
3 cyl	(5) red to (1) ground	x1	not cranking	infinite

Voltage Test - Trigger

4 cyl	(4) green (neg meter) to orange (pos meter)	2 DVA	cranking	.3V or higher
4 cyl	(4) white/green (pos meter) to red (neg meter)	2 DVA	cranking	.3V or higher
4 cyl	(5) green (neg meter) to orange (pos meter)	2 DVA	cranking	.3V or higher
4 cyl	(5) white/green (pos meter) to red (neg meter)	2 DVA	cranking	.3V or higher
3 cyl	(4) green (neg meter) to orange (pos meter)	2 DVA	cranking	.3V or higher
3 cyl	(4) green (neg meter) to orange (pos meter) NOTE: use other green and orange pair.	2 DVA	cranking	.3V or higher
3 cyl	(5) white/green (pos meter) to red (neg meter)	2 DVA	cranking	.3V or higher

If your results differ from those above, replace the trigger and re-test as necessary. If your test results are satisfactory, proceed to the CD Pack Test.

SPECIAL NOTE

If on either the stator or trigger tests, the resistance values were normal but the voltages were low, the magnets in the flywheel may be weak. Replace the flywheel and re-test as required.

CD Pack Testing

The CD Pack output can only be tested with the peak voltmeter.
Use the T11250 tester for the following tests.

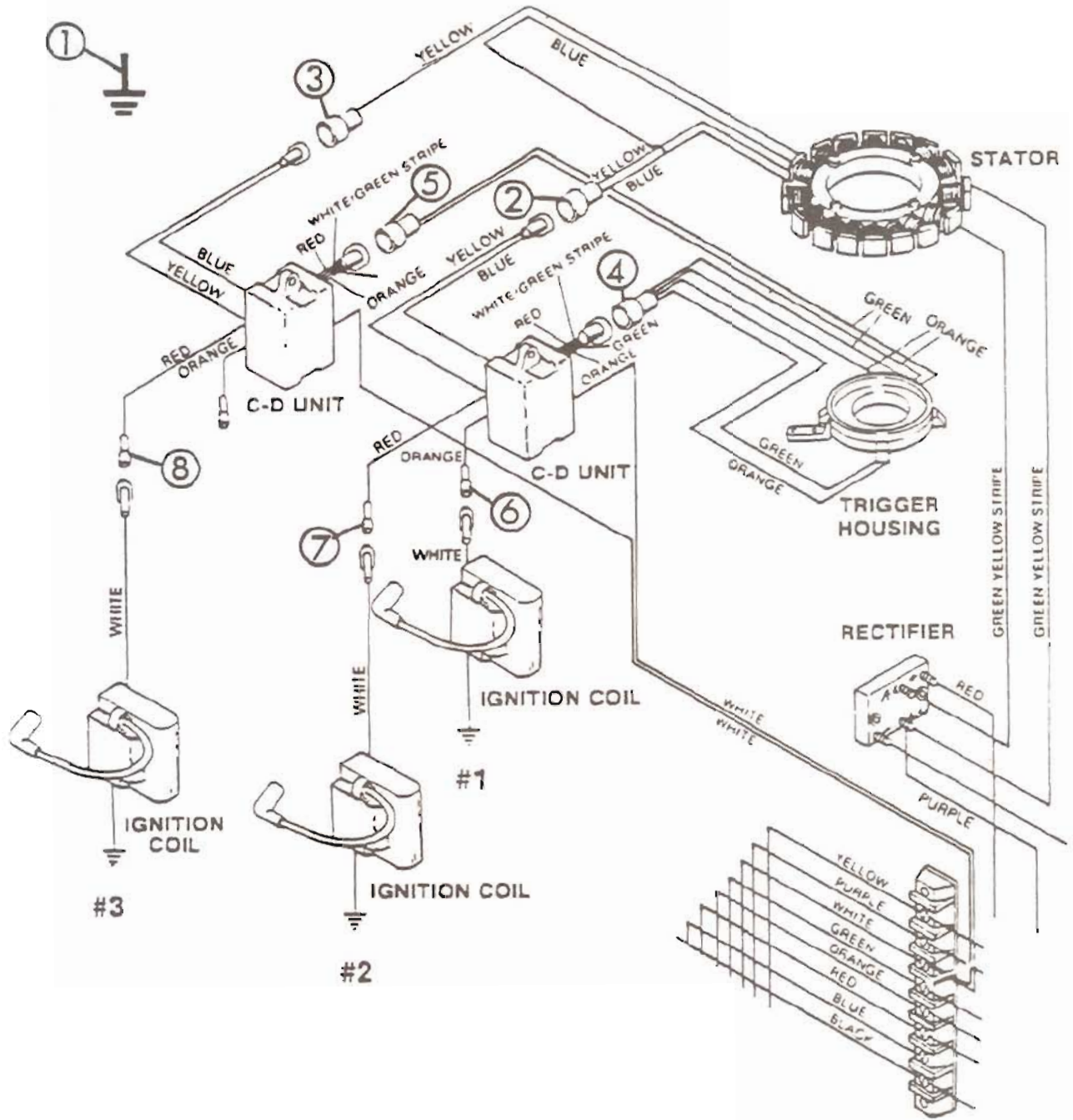
Voltage Test - CD Pack

NOTE: Numbers in Parenthesis () refer to test points on the respective ignition system wiring diagram.

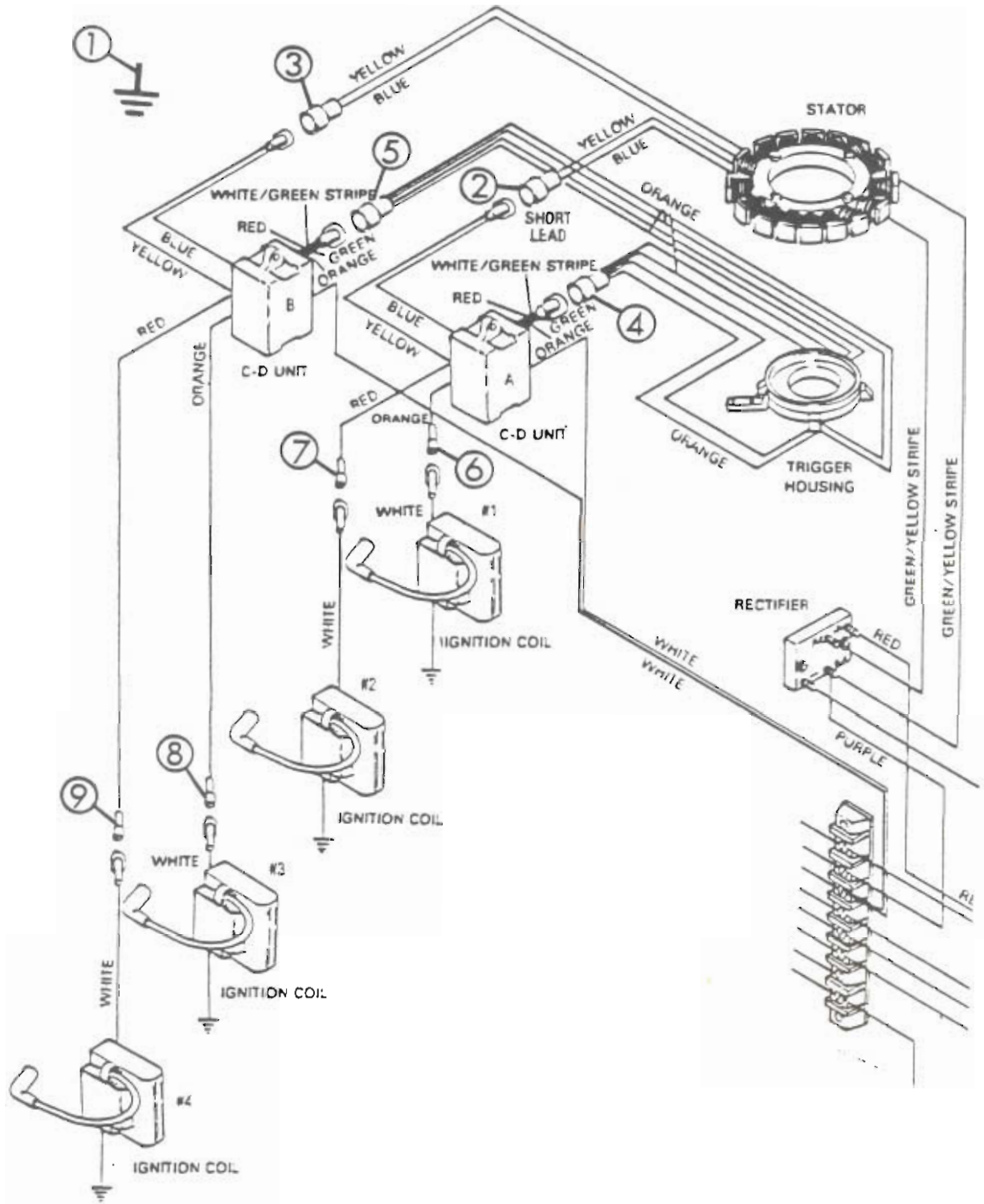
ENGINE	TEST POINT(S)	METER SETTING	ENGINE STATUS	RESULTS
3-4 cyl	(6) orange (neg meter) to (1) ground (pos meter)	400 DVA	cranking	220V or higher
3-4 cyl	(7) red (neg meter) to (1) ground (pos meter)	400 DVA	cranking	220V or higher
4 cyl	(8) ground (neg meter) (1) ground (pos meter)	400 DVA	cranking	220V or higher
4 cyl	(9) red (neg meter) to (1) ground (pos meter)	400 DVA	cranking	220V or higher
3 cyl	(8) red (neg meter) to (1) ground (pos meter)	400 DVA	cranking	220V or higher

If your results differ from those above, replace the defective CD Pack. If your test results are satisfactory, replace the coil on the misfiring cylinder.

3 CYLINDER IGNITION SYSTEM TEST POINTS

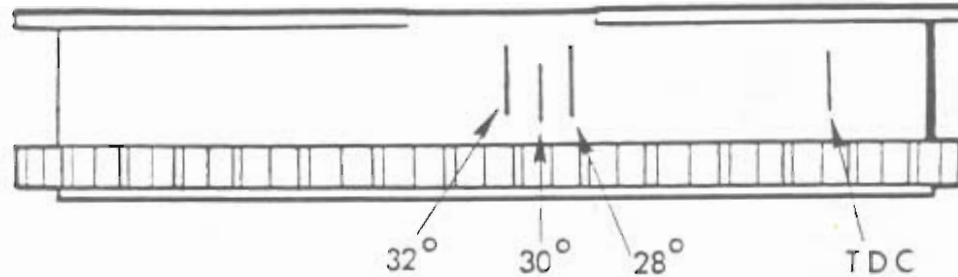


4 CYLINDER IGNITION SYSTEM TEST POINTS

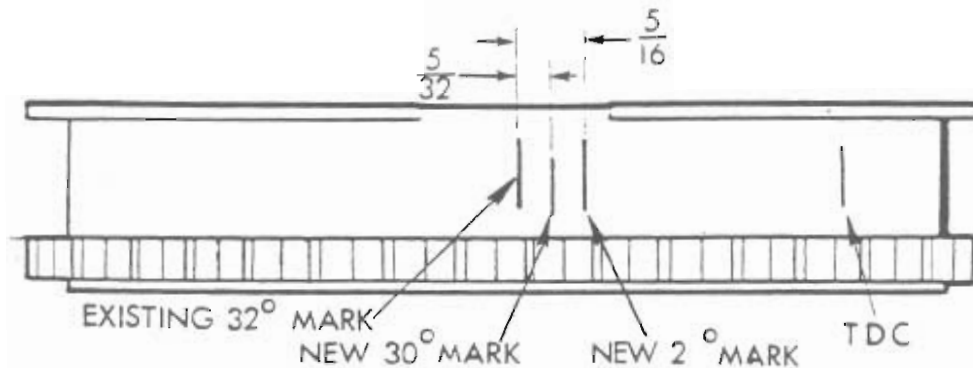


IGNITION TIMING SEQUENCE - FORCE THREE & FOUR CYLINDER ENGINES

The engine timing specification for all FORCE engines with adjustable timing has been changed to 30° Before Top Dead Center (BTDC) at Wide Open Throttle (WOT). All current production three and four cylinder engines have timing marks on their flywheels as in Figure 1.



Older production flywheels may not have all the markings as indicated in Figure 1. The older flywheels are marked as in Figure 2.



In order to accurately time the engines with the old style flywheels, it is necessary to add the timing marks for 28° and 30° . These marks are added by simply scribing one line $\frac{5}{32}$ of an inch to the right of the 32° line and another line $\frac{5}{16}$ of an inch to the right of the 32° line. See Figure 2.

There are two methods for timing these engines depending on their location. The first method is for timing the engine out of the water at cranking speed. The second is for timing at actual Wide Open Throttle operating RPM.

Timing At Cranking Speed

1. Remove the spark plugs and attach the T11260 spark tester to the engine and to the spark plug leads.
2. Place the Tower Shaft in the wide open throttle position (WOT). NOTE: In order to accomplish the WOT setting, the engine will have to be in gear. It is suggested that the prop be removed during this operation.
3. Put a jumper wire across the neutral safety switch leads so the engine will crank in gear.
4. Connect the T8978 Timing Light to the number one spark plug lead. Also connect the two battery leads to a 12VDC source.
5. In order to attain a 30° timing while the engine is actually running, it will be necessary to time the engine to 28° at cranking speed. Crank the engine and observe the timing marks.
6. Adjust the timing as necessary and re-check the timing with the timing light. Tighten the lock nut on the timing rod.
7. Remove the test equipment from the engine and reinstall the prop. If possible, water test the engine and check the timing under actual operation conditions. (See timing at WOT below.)

Timing at WOT (Running Engine)

1. Remove the prop and install the T8000 test wheel.
2. Place the engine in a test tank and hook up the controls, fuel, etc. or put the boat in the water at an appropriate location.
3. Connect the timing light to the number one spark plug lead. Connect the power leads to a 12VDC power source.
4. Start the engine and let it warm up.
5. Push the throttle to the WOT position and check the timing. When timing at operating RPM, the timing should be set to 30° BTDC.
6. Throttle down and shut off the engine. Adjust the timing and re-check as necessary. Tighten the lock nut on the timing rod.
7. Disconnect the timing light, remove the test wheel and reinstall the prop.