CHAPTER 9
ELECTRICAL

1999 Ignition Timing Specifications

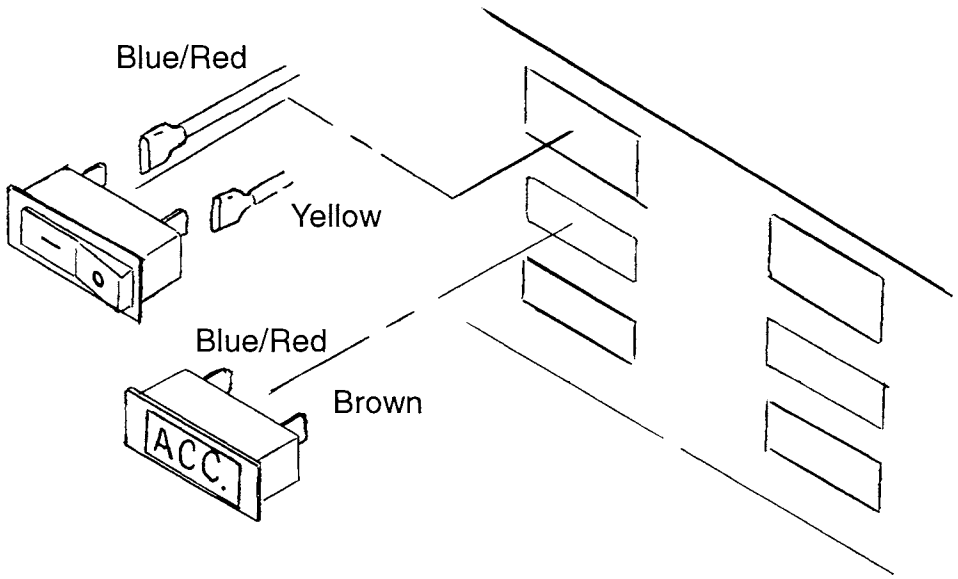
Engine Model	MM BTDC	Inches BTDC	Degrees BTDC @ RPM	Acceptable Range		Operating Timing °BTDC RPM
				MM	Inches	
EC34-2PM051	3.67	.145	26.5±1.5 @ 3000	3.28-4.08	.129-.161	15.5° @ 7000
EC44-3PM025	3.81	.150	26±1.5 @ 3000	3.39-4.25	.133-.167	16° @ 6500
EC45PM011	4.45	.175	27±1.5 3000	3.97-4.93	.157-.195	17° @ 6500
SN44-44-98A1	3.72	.146	25±1.5 @ 3500	3.29-4.16	.129-.163	16° @ 8250
EC50PM044	3.81	.150	26±1.5 3000	3.39-4.25	.133-.167	16° @ 6500
EC55PM011(021)	4.45	.175	27±1.5 @3000	3.97-4.93	.157-.195	17° @ 6500
EC50PL162(172) (192)(202)	4.40	.173	28±1.5 @3000	3.91-4.87	.156-.191	16° @ 7500
EC58PL160	4.40	.173	28±1.5 @3000	3.91-4.87	.156-.191	20° @ 7500
EC58PL131	4.40	.173	28±1.5 @3000	3.91-4.87	.156-.191	20° @ 7500
SN50-44-99A2	.872	.034	12±1.5 @3000	.664-1.08	.026-.042	16° @ 8250
SN60-70-99A1(A2)	.220	.009	6±1.5 @1750	.115-.325	.004-.013	13°@7500
SN70-70-99A1(A2)	.220	.009	6±1.5 @1750	.115-.325	.004-.013	17° @ 7500
SN70-70-99A3	.930	.037	12±1.5 3000	.710-1.15	.033-.041	16° @ 8250
EC70PL011	2.476	.098	20±1.5 @1750	2.10-2.81	.083-.111	18° @ 8100
EC79PL011	4.104	.162	26±1.5 @3250	3.65-4.56	.144-.179	15° @ 8300

* Engine at room temperature

Coil Resistance Specifications

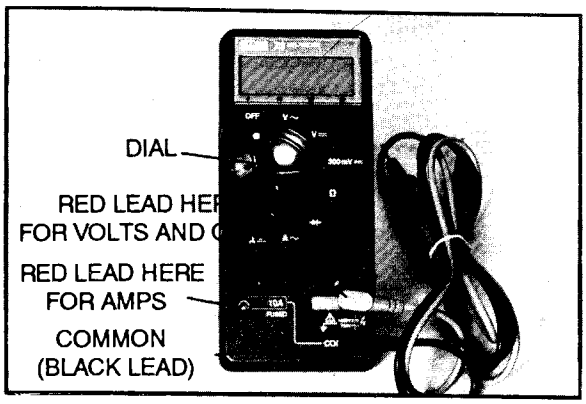
For ignition system component specifications, refer to wiring diagrams at the end of this chapter for the specific model you are working on.

1999 340 Touring



Multimeter Usage

The easiest and most accurate method for testing modern electrical components is with a digital multitester. Any good quality multitester will work. However, due to ease of operation and durability, Polaris recommends the Fluke Model 73 (PN 2870659), or Tektronix DMM155. See photo at right. This instrument will provide a digital readout of the measured value of the test being performed.

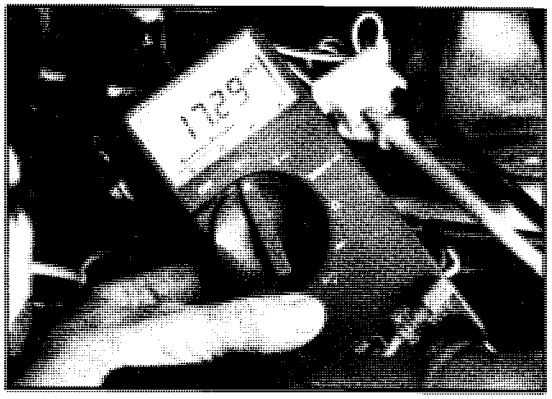


Listed below are the dial symbols, their meaning and what the dial setting can be used for.

Off = Instrument Off

V~ = Volts AC - measuring alternator output

Used to measure AC voltage in an electrical system. AC voltage is produced from every coil on the stator plate when a magnet is passed by it.



Test Method

1. Connect black lead to Com (–) meter terminal.
2. Connect red lead to VΩ (+) meter terminal.
3. Turn selector dial to V~ setting.
4. Connect test leads parallel with test component. The polarity of the leads is not important.

Usage

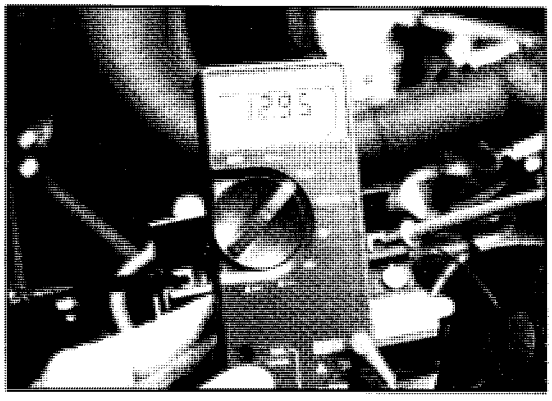
- Test unregulated voltage output of a stator coil
- Test regulated voltage to the lights and handwarmers

V ⎓ = Volts DC - measuring battery voltage, volt drop, etc.

Used to measure DC voltage produced by a battery or rectifier.

Test Method

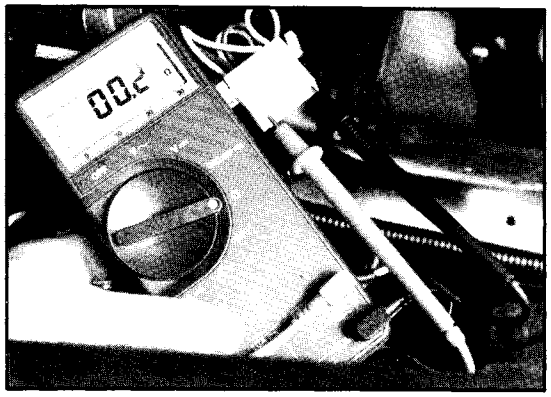
1. Connect black lead to Com (–) meter terminal
2. Connect red lead to VΩ (+) meter terminal.
3. Turn selector dial to V ⎓ setting.
4. Connect test leads parallel with test component. Observe polarity.



Usage

- Test battery voltage
- Test DC regulator
- Test voltage drop for bad connections
- Test supply voltage to electric fuel gauge
- EFI electrical testing

Ω = Ohms, resistance - measuring component resistance values - testing coils, wiring, etc.



Used to test resistance to the flow of electricity in a circuit or component. A reading of OL means an open circuit or infinite resistance. Sometimes the leads themselves will have some resistance. Touch the leads together and subtract this resistance from the component reading to achieve the actual reading.

Test Method

1. Connect black lead to Com (–) meter terminal
2. Connect red lead to VΩ (+) meter terminal.
3. Turn selector dial to Ω setting.
4. Isolate test component from the rest of the electrical circuit by disconnecting wires from harness.
5. Connect test leads to the circuit to be tested.

Usage

- Testing coil resistance
- Testing switch operation
- Testing wire continuity

A~= Amps AC - used to test lighting coil output

Used to test the power of an alternator coil.

Test Method

1. Connect black lead to Com (–) meter terminal
2. Connect red lead to 10A (+) meter terminal.
3. Disconnect engine harness from system.
4. Connect across the specified coil wires.
5. Start engine and let it idle.
6. Readings should be above 5 Amps at any RPM. **NOTE:** It is not necessary to increase RPM. The reading can be obtained at idle.

Usage

- Testing stator coil power output.

A ⎓ = Amps DC - used to check battery charge rate, system draws, etc.

Used to check the current flow to and from the battery.

Test Method

1. Make sure red lead is in the 10A terminal of the meter and the black lead is in the Com (–) terminal of the meter.
2. Disconnect battery ground wire(s) from battery (–) terminal.
3. Connect red meter lead to battery (–) terminal.
4. Connect black meter lead to harness ground wires and cable.

CAUTION:

Do not operate electric starter (if equipped) or meter damage may occur.

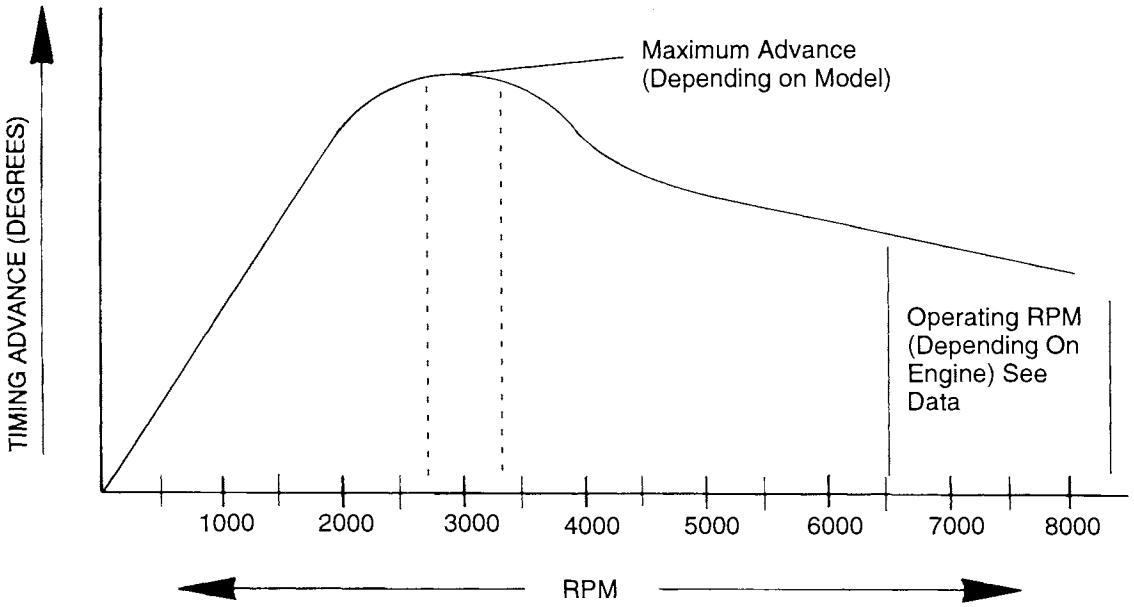
Usage

- Testing key off current draw
- Testing key on current draw
- Testing charging system break even RPM
- Testing DC current flow (direction), is battery charging?

NOTE: When using the DC Amp settings, the red test lead must be moved to the 10A socket on the front of the instrument.

Typical Timing Advance Curves

Ignition Timing



NOTE: Always verify timing of engine at room temperature only (68° F / 20° C) and at the proper RPM.

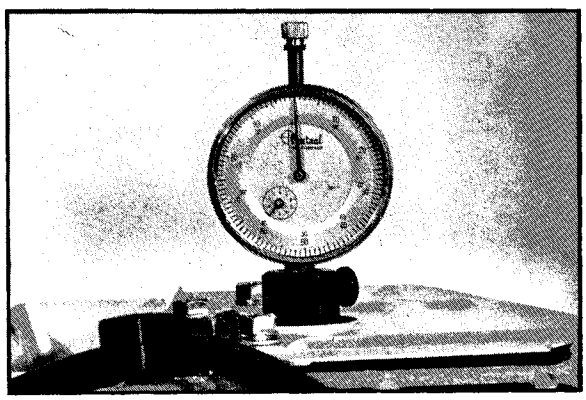
To obtain the best ignition timing accuracy and reduce the chance of error, the ignition timing specification is given at a "flat" portion of the advance curve. This flat portion on the curve is where the ignition timing is specified. Refer to chart on page 9.1. Ignition timing must be checked at the specified RPM, or inaccurate timing will result. Refer to timing specifications at the beginning of this chapter.

If engine damage has occurred due to a suspected ignition related problem, verify the ignition timing is correct at the specified *operating* RPM as outlined on page 9.1.

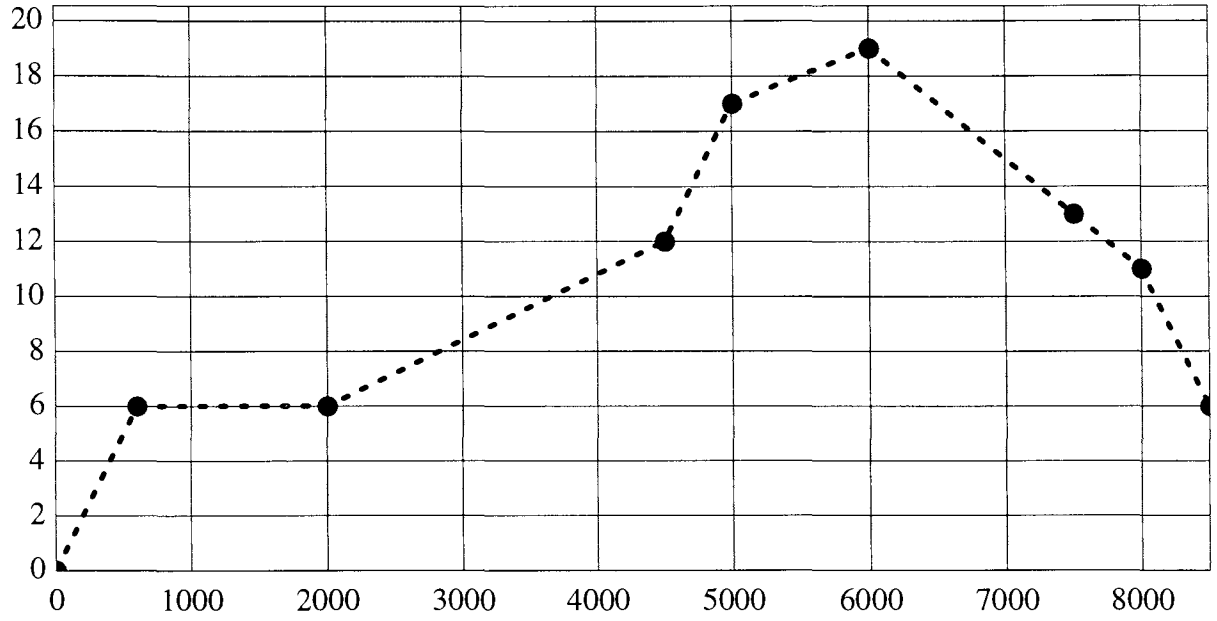
Dial Indicating The Timing Marks

Due to differences between engines, it is necessary to dial indicate the timing marks on all engines before attempting to adjust the ignition timing. To indicate the marks:

1. Remove the mag (RH) cylinder spark plug and install the dial indicator.
2. Rotate the crankshaft by hand while observing the dial indicator. As the piston touches the indicator plunger, the dial will begin to rotate. Find the point where the pointer stops rotating and reverses direction. This will be TDC (Top Dead Center).
3. While holding the crankshaft with the piston at TDC, zero the indicator by rotating the bezel until the 0 on the dial and the pointer align.
4. Rotate the crankshaft opposite the direction of rotation about .250 BTDC (2 1/2 pointer revolutions).
5. Determine the correct ignition timing position from the ignition data charts and rotate the crankshaft in the normal direction of rotation to that position. (**Example:** If engine timing is .150 BTDC, the crankshaft must be rotated in the normal direction of rotation so that the dial indicator pointer does one complete revolution and stops on 50. This should be 1 1/2 pointer revolutions before top center, or .150 BTDC.
6. While holding the crankshaft at the correct timing position, mark the flywheel (with chalk or a white marker) directly in-line with the stationary pointer (or line) on the fan or recoil housing through the timing inspection window.

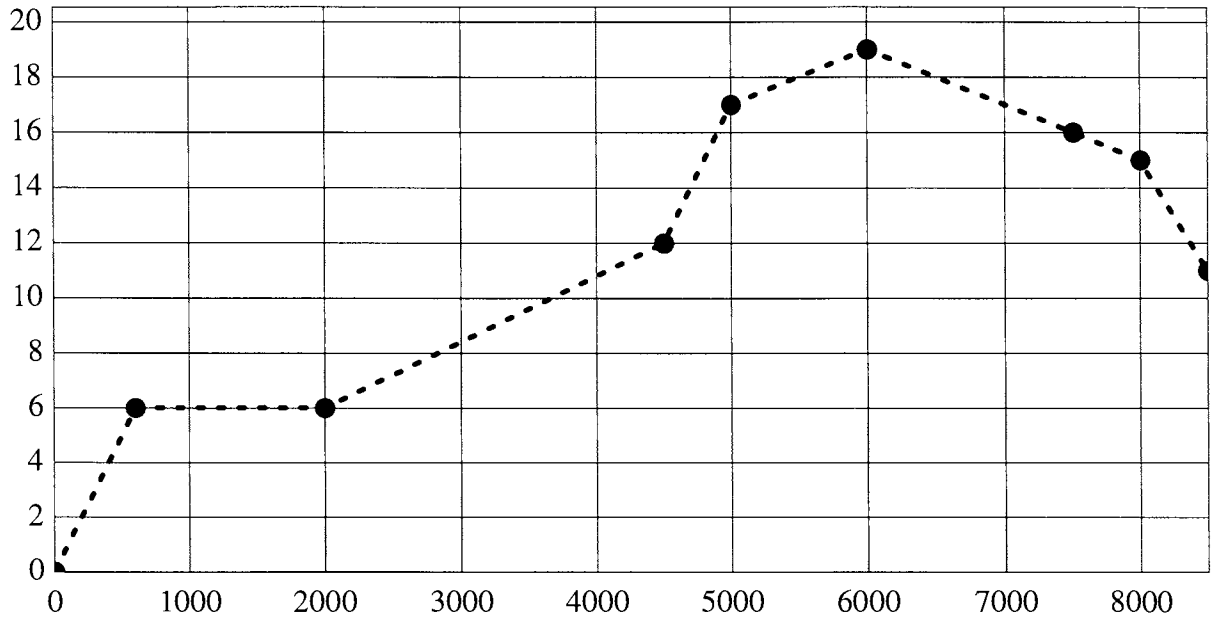


Timing Curve 1999 600 XC / 600 XC SP / 600 RMK



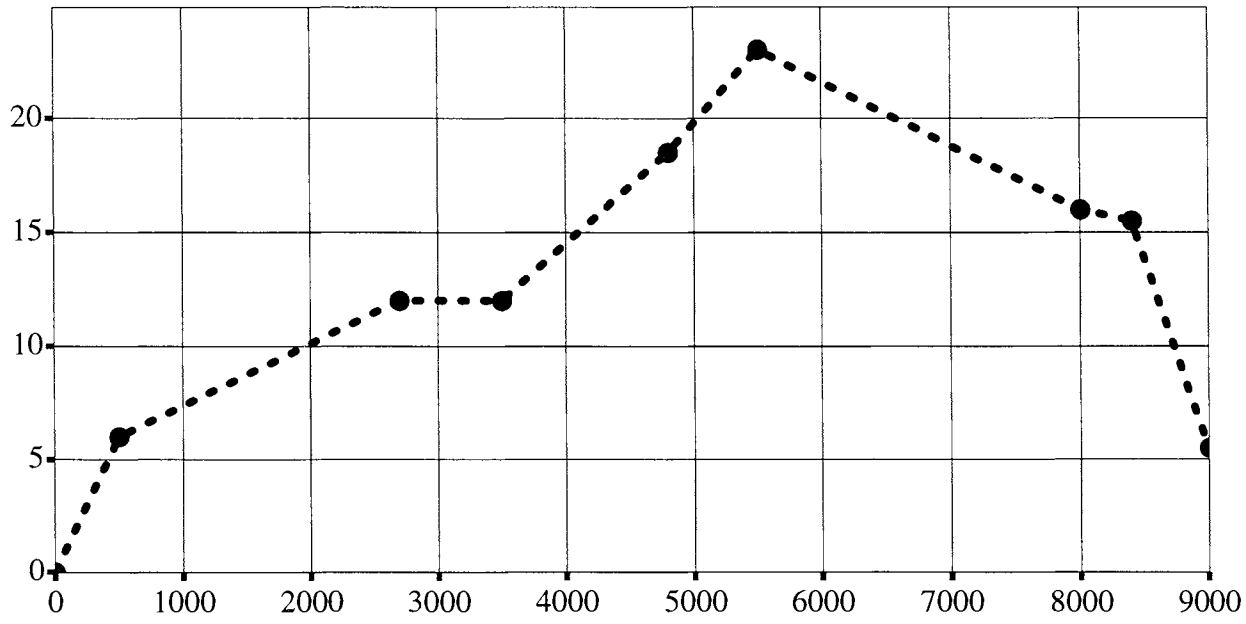
Timing Table	
1999 600 Twin	
RPM	Degrees
600	6°
2000	6°
4500	12°
5000	17°
6000	19°
7500	13°
8000	11°
8500	6°

Timing Curve 1999 700 XC / 700 XC SP / 700 SKS



Timing Table	
1999 700 XC, XC SP, SKS	
RPM	Degrees
600	6°
2000	6°
4500	12°
5000	17°
6000	19°
7500	16°
8000	15°
8500	11°

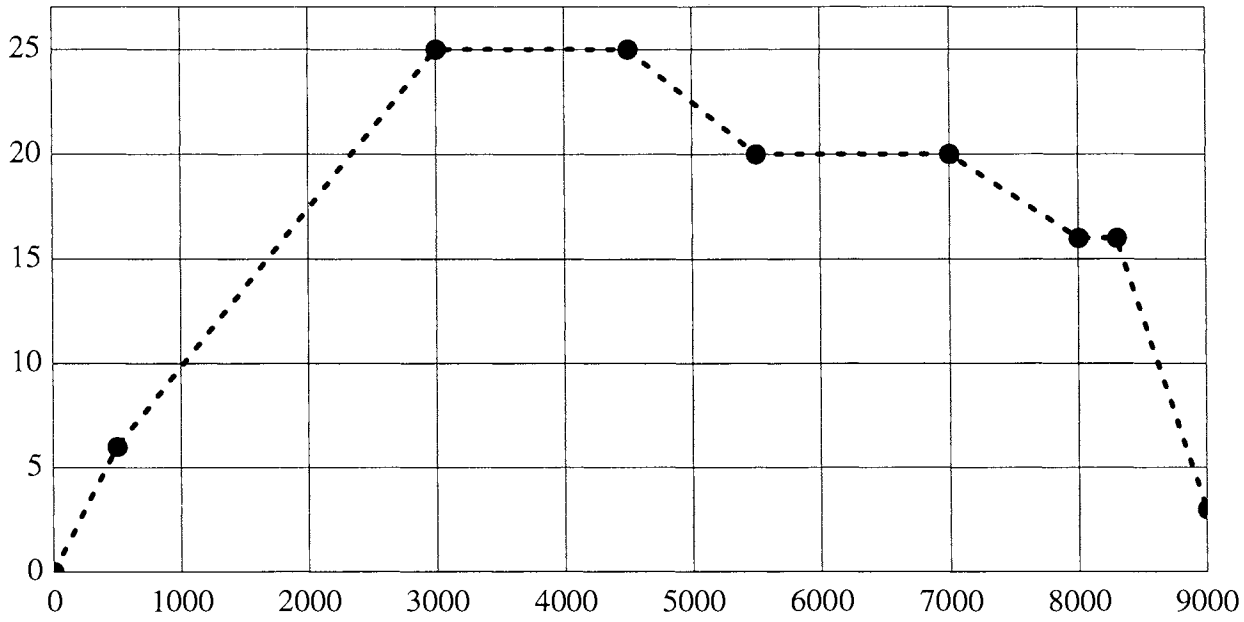
Timing Curve 1999 700 RMK



Timing Table	
1999 700 RMK	
RPM	Degrees
500	6°
2700	12°
3500	12°
4800	18.5°
5500	23°
8000	16°
8400	15.5°
9000	5.5°

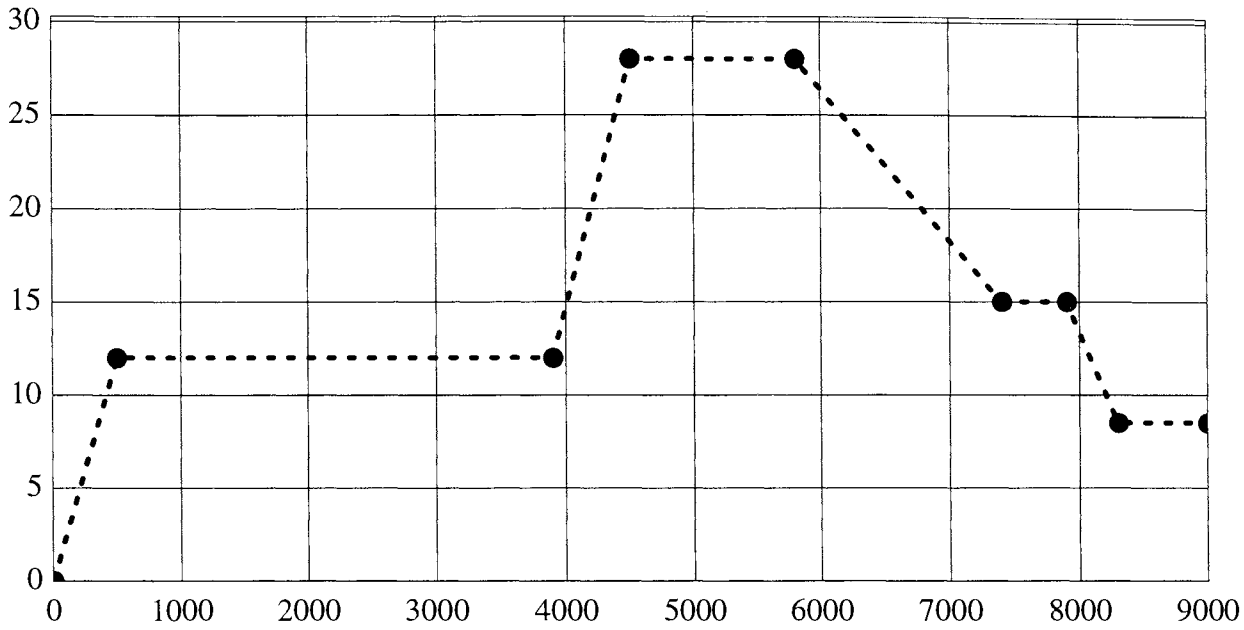
Timing Curve Template

Timing Curve 1999 440 XCR



Timing Table	
1999 440 XCR	
RPM	Degrees
500	6
3000	25
4500	25
5500	20
7000	20
8000	16
8300	16
9000	3

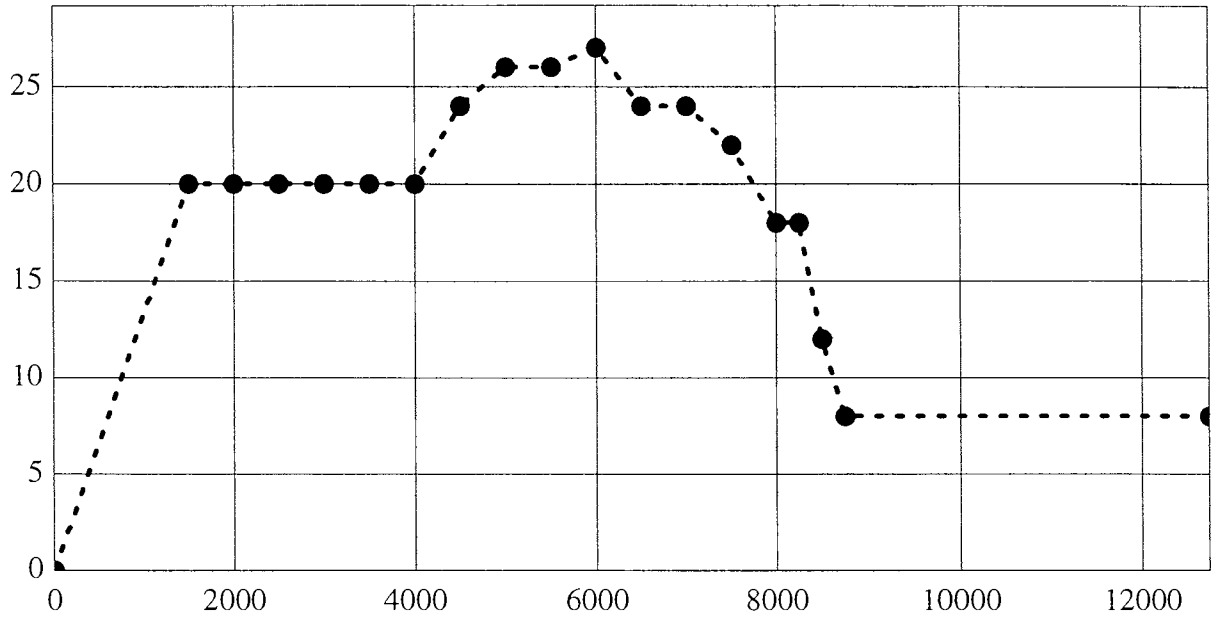
Timing Curve 1999 500 XC / 500 XC SP



Timing Table	
500 XC / 500 XC SP	
RPM	Degrees
500	12
3900	12
4500	28
5800	28
7400	15
7900	15
8300	8.5
9000	8.5

Timing Curve Template

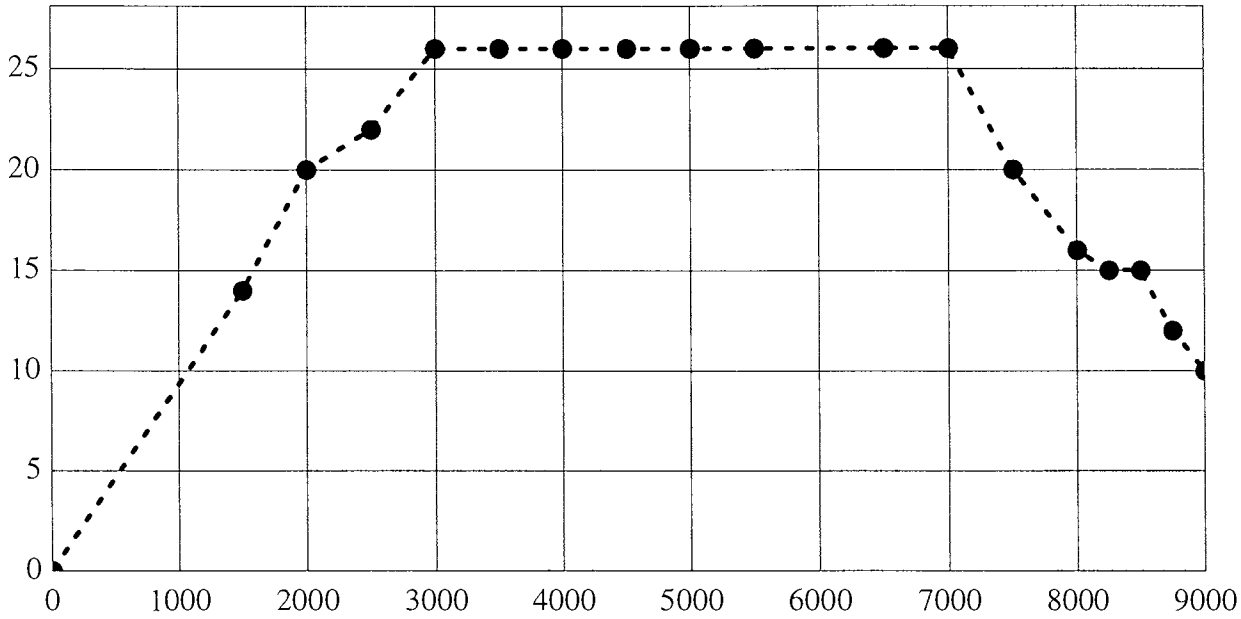
Timing Curve 1999 700 XCR



Timing is measured with throttle position sensor (TPS) unplugged.

Timing Table	
1999 700 XCR	
RPM	Degrees
1500	20
2000	20
2500	20
3000	20
3500	20
4000	20
4500	24
5000	26
5500	26
6000	27
6500	24
7000	24
7500	22
8000	18
8250	18
8500	12
8750	8
12750	8

Timing Curve 1999 800 XCR



Timing is measured with throttle position sensor (TPS) unplugged.

Timing Table	
1999 800 XCR	
RPM	Degrees
1500	14
2000	20
2500	22
3000	26
3500	26
4000	26
4500	26
5000	26
5500	26
6500	26
7000	26
7500	20
8000	16
8250	15
8500	15
8750	12
12750	10

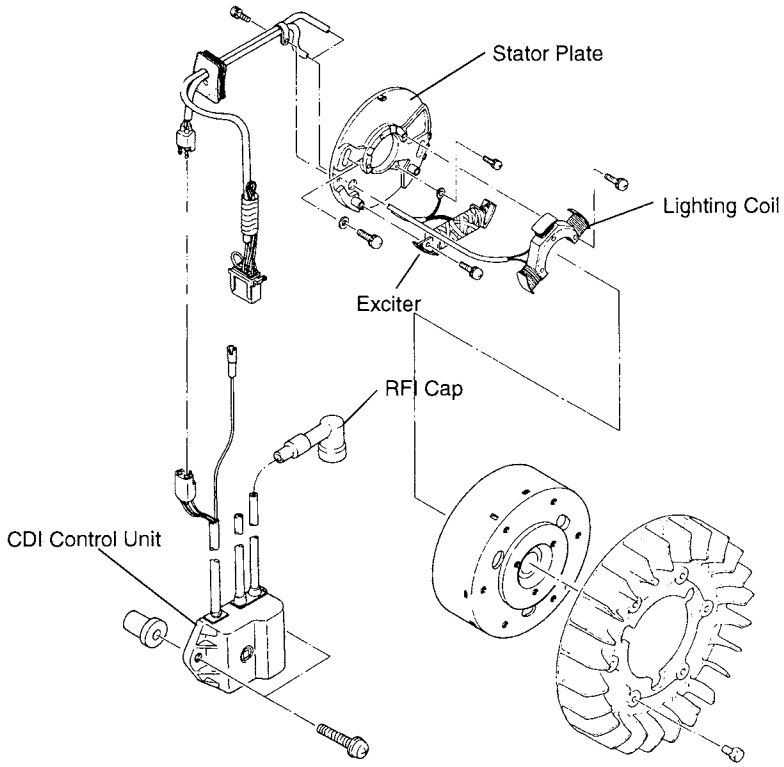
ELECTRICAL
Conversion Chart - Degrees to Piston Position - B.T.D.C.

If the ignition timing specification is listed in degrees only, convert to either inches or mm BTDC and use a dial indicator to verify timing marks. **NOTE:** Due to differing rod lengths and engine strokes, consult the engine model list for correct engine.

	EC40PL EC44-2PM EC44-3PM EC45PL EC50PL EC60PL EC58PL EC65PL		EC45PM EC55PM		EC59PL EC68PL EC70PL EC75PL EC79PL EC80PL		EC34-2PM		EC25PF EC25PS EC44PT EC44PQ EC44PM		Domestic 440 Domestic 500		Domestic 600 Domestic 700	
DEG. BTDC	112 MM ROD 60 MM STROKE		120 MM ROD 65 MM STROKE		125 MM ROD 65 MM STROKE		103 MM ROD 55.6 MM STROKE		120 MM ROD 60 MM STROKE		128 MM ROD 64 MM STROKE		136 MM ROD 68 MM STROKE	
	MM	INCHES	MM	INCHES	MM	INCHES	MM	INCHES	MM	INCHES	MM	INCHES	MM	INCHES
1	0.0058	0.0002	0.0063	0.0002	0.0062	0.0002	0.0054	0.0002	0.0057	0.0002	0.0061	0.0002	0.0065	0.0003
2	0.0232	0.0009	0.0252	0.0010	0.0249	0.0010	0.0215	0.0008	0.0228	0.0009	0.0244	0.0010	0.0259	0.0010
3	0.0521	0.0021	0.0566	0.0022	0.0561	0.0022	0.0484	0.0019	0.0514	0.0020	0.0548	0.0022	0.0582	0.0023
4	0.0926	0.0036	0.1006	0.0040	0.0997	0.0039	0.0860	0.0034	0.0913	0.0036	0.0974	0.0038	0.1035	0.0041
5	0.1447	0.0057	0.1571	0.0062	0.1558	0.0061	0.1343	0.0053	0.1426	0.0056	0.1522	0.0060	0.1617	0.0064
6	0.2083	0.0082	0.2261	0.0089	0.2242	0.0088	0.1933	0.0076	0.2053	0.0081	0.2190	0.0086	0.2327	0.0092
7	0.2833	0.0112	0.3076	0.0121	0.3050	0.0120	0.2630	0.0104	0.2793	0.0110	0.2979	0.0117	0.3166	0.0125
8	0.3698	0.0146	0.4016	0.0158	0.3981	0.0157	0.3432	0.0135	0.3646	0.0144	0.3889	0.0153	0.4132	0.0163
9	0.4677	0.0184	0.5079	0.0200	0.5036	0.0198	0.4341	0.0171	0.4612	0.0182	0.4919	0.0194	0.5226	0.0206
10	0.5770	0.0227	0.6265	0.0247	0.6212	0.0245	0.5355	0.0211	0.5689	0.0224	0.6068	0.0239	0.6448	0.0254
11	0.6976	0.0275	0.7575	0.0298	0.7510	0.0296	0.6474	0.0255	0.6878	0.0271	0.7336	0.0289	0.7795	0.0307
12	0.8294	0.0327	0.9006	0.0355	0.8930	0.0352	0.7698	0.0303	0.8178	0.0322	0.8723	0.0343	0.9268	0.0365
13	0.9724	0.0383	1.0559	0.0416	1.0470	0.0412	0.9025	0.0355	0.9588	0.0377	1.0227	0.0403	1.0867	0.0428
14	1.1265	0.0444	1.2232	0.0482	1.2129	0.0478	1.0456	0.0412	1.1108	0.0437	1.1849	0.0466	1.2589	0.0496
15	1.2917	0.0509	1.4026	0.0552	1.3908	0.0548	1.1989	0.0472	1.2737	0.0501	1.3586	0.0535	1.4435	0.0568
16	1.4678	0.0578	1.5938	0.0627	1.5804	0.0622	1.3624	0.0536	1.4474	0.0570	1.5439	0.0608	1.6404	0.0646
17	1.6548	0.0652	1.7969	0.0707	1.7818	0.0701	1.5359	0.0605	1.6318	0.0642	1.7406	0.0685	1.8494	0.0728
18	1.8526	0.0729	2.0117	0.0792	1.9948	0.0785	1.7195	0.0677	1.8269	0.0719	1.9487	0.0767	2.0705	0.0815
19	2.0611	0.0811	2.2380	0.0881	2.2193	0.0874	1.9130	0.0753	2.0326	0.0800	2.1681	0.0854	2.3036	0.0907
20	2.2802	0.0898	2.4759	0.0975	2.4552	0.0967	2.1163	0.0833	2.2487	0.0885	2.3986	0.0944	2.5485	0.1003
21	2.5098	0.0988	2.7252	0.1073	2.7024	0.1064	2.3294	0.0917	2.4752	0.0974	2.6402	0.1039	2.8052	0.1104
22	2.7497	0.1083	2.9857	0.1175	2.9608	0.1166	2.5521	0.1005	2.7119	0.1068	2.8927	0.1139	3.0735	0.1210
23	3.0000	0.1181	3.2574	0.1282	3.2303	0.1272	2.7843	0.1096	2.9587	0.1165	3.1560	0.1243	3.3532	0.1320
24	3.2603	0.1284	3.5401	0.1394	3.5107	0.1382	3.0260	0.1191	3.2156	0.1266	3.4300	0.1350	3.6444	0.1435
25	3.5307	0.1390	3.8336	0.1509	3.8019	0.1497	3.2769	0.1290	3.4824	0.1371	3.7146	0.1462	3.9467	0.1554
26	3.8110	0.1500	4.1379	0.1629	4.1038	0.1616	3.5370	0.1393	3.7590	0.1480	4.0096	0.1579	4.2602	0.1677
27	4.1010	0.1615	4.4528	0.1753	4.4161	0.1739	3.8062	0.1498	4.0452	0.1593	4.3149	0.1699	4.5846	0.1805
28	4.4007	0.1733	4.7782	0.1881	4.7389	0.1866	4.0843	0.1608	4.3410	0.1709	4.6303	0.1823	4.9197	0.1937
29	4.7098	0.1854	5.1138	0.2013	5.0719	0.1997	4.3712	0.1721	4.6461	0.1829	4.9558	0.1951	5.2655	0.2073
30	5.0282	0.1980	5.4595	0.2149	5.4149	0.2132	4.6667	0.1837	4.9604	0.1953	5.2911	0.2083	5.6218	0.2213
31	5.3559	0.2109	5.8152	0.2289	5.7679	0.2271	4.9708	0.1957	5.2839	0.2080	5.6361	0.2219	5.9884	0.2358
32	5.6926	0.2241	6.1807	0.2433	6.1306	0.2414	5.2832	0.2080	5.6163	0.2211	5.9907	0.2359	6.3651	0.2506
33	6.0381	0.2377	6.5559	0.2581	6.5028	0.2560	5.6039	0.2206	5.9575	0.2345	6.3546	0.2502	6.7518	0.2658
34	6.3924	0.2517	6.9405	0.2732	6.8845	0.2710	5.9326	0.2336	6.3073	0.2483	6.7278	0.2649	7.1482	0.2814
35	6.7552	0.2660	7.3343	0.2888	7.2754	0.2864	6.2693	0.2468	6.6656	0.2624	7.1099	0.2799	7.5543	0.2974
36	7.1263	0.2806	7.7372	0.3046	7.6753	0.3022	6.6138	0.2604	7.0322	0.2769	7.5010	0.2953	7.9698	0.3138
37	7.5057	0.2955	8.1491	0.3208	8.0840	0.3183	6.9658	0.2742	7.4069	0.2916	7.9007	0.3111	8.3945	0.3305
38	7.8931	0.3108	8.5696	0.3374	8.5015	0.3347	7.3253	0.2884	7.7896	0.3067	8.3089	0.3271	8.8282	0.3476
39	8.2883	0.3263	8.9986	0.3543	8.9274	0.3515	7.6920	0.3028	8.1801	0.3221	8.7254	0.3435	9.2708	0.3650
40	8.6912	0.3422	9.4360	0.3715	9.3616	0.3686	8.0659	0.3176	8.5782	0.3377	9.1501	0.3602	9.7220	0.3828

Twin Cylinder Fan CDI Ignition - Exploded View - Timing

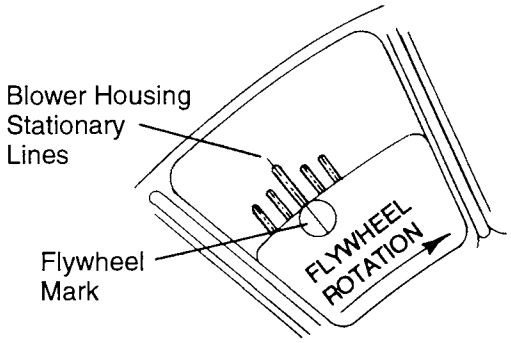
1999 Indy 340, 340 Dlx, 340 Touring, Sport, Sport Touring, Transport, Trail, Trail Touring



180 and 200 Watt Pulseless

NOTE: Always verify timing of engine at room temperature only (68° F/20° C).

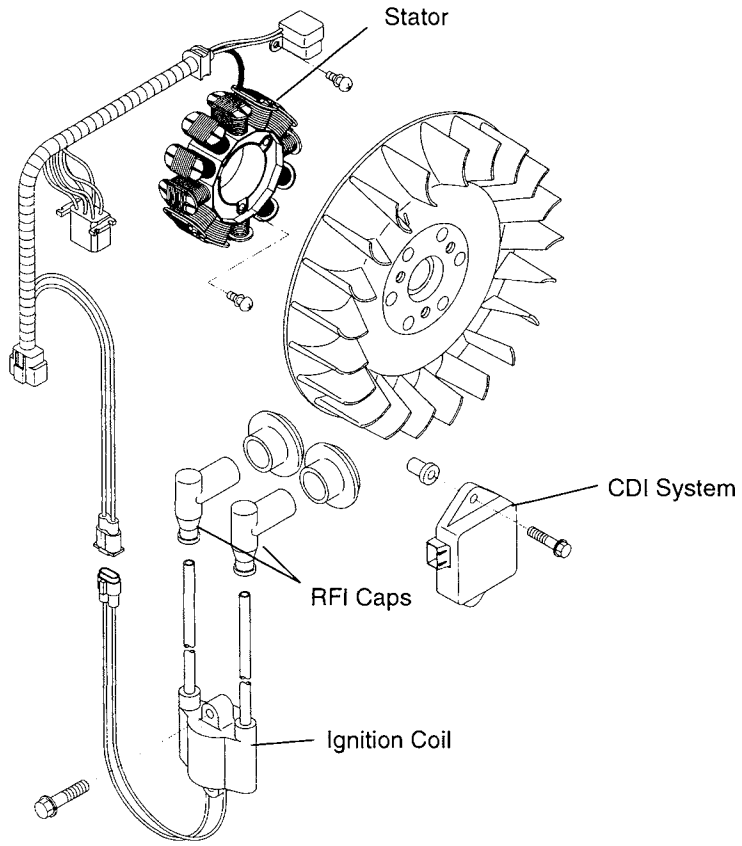
Refer to ignition timing procedure on page 9.22.



NOTE: Acceptable variance is usually one line on either side of the dial indicated blower housing stationary line.

Twin Cylinder Fan CDI Ignition - Exploded View - Timing

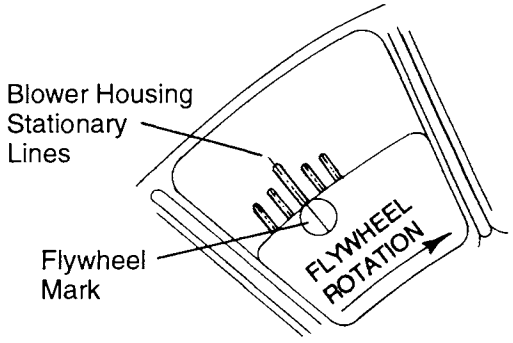
1999 XCF, Super Sport, Trail RMK



240 Watt System

NOTE: Always verify timing of engine at room temperature only (68° F/20° C).

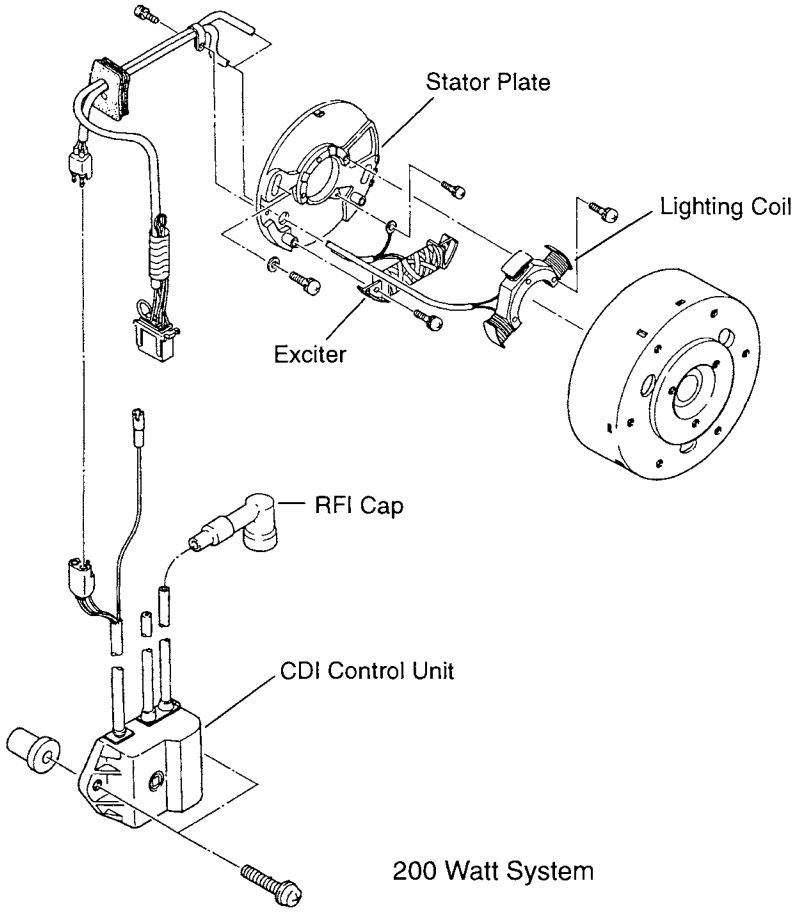
Refer to ignition timing procedure on page 9.22.



NOTE: Acceptable variance is usually one line on either side of the dial indicated blower housing stationary line.

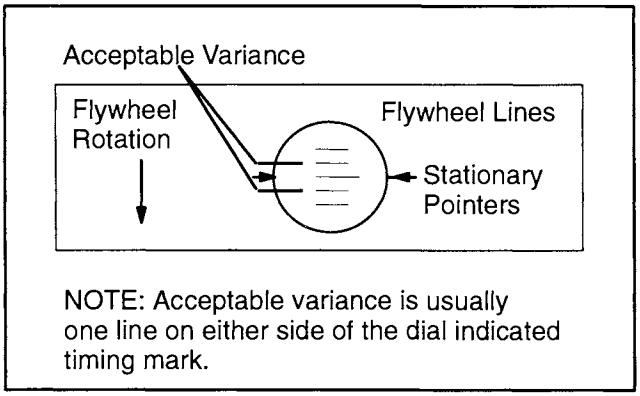
Fuji Twin Cylinder Liquid CDI Ignition - Exploded View - Timing

1999 Indy 500, 500 RMK, 500 Classic, Classic Touring, Widetrak LX



NOTE: Always verify timing of engine at room temperature only (68° F/20° C).

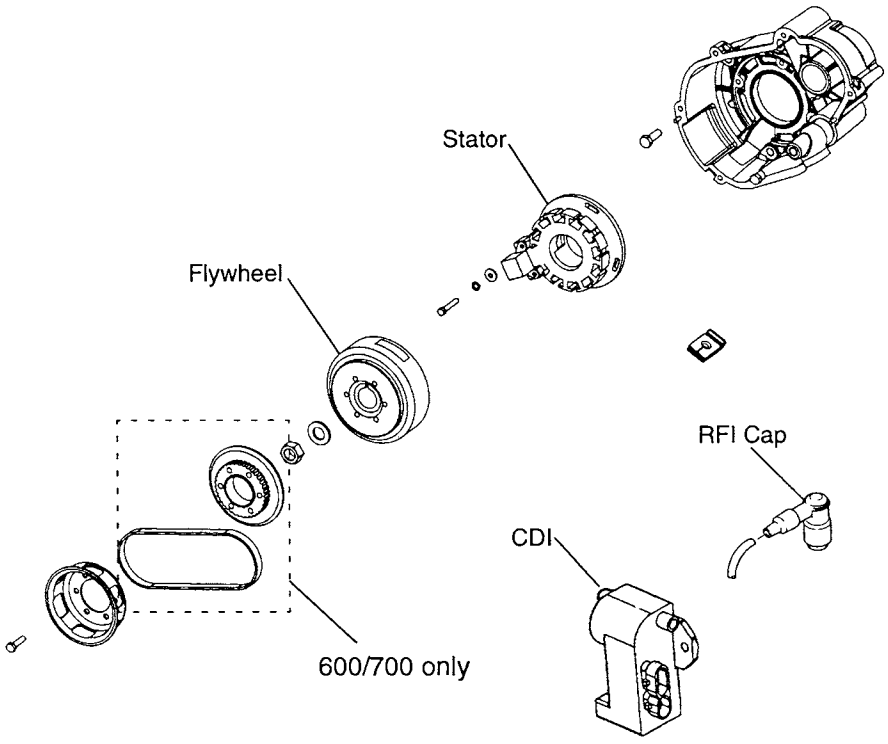
Refer to ignition timing procedure on page 9.22.



NOTE: Acceptable variance is usually one line on either side of the dial indicated timing mark.

Domestic Twin Cylinder CDI Ignition - Exploded View - Timing

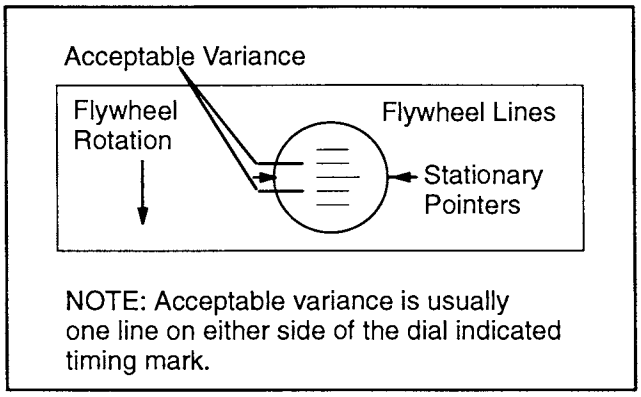
1999 440 XCR, 500 XC/SP, 600 XC/SP, 600 RMK, 700 XC/SP, 700 SKS, 700 RMK



280 Watt System

NOTE: Always verify timing of engine at room temperature only (68° F/20° C).

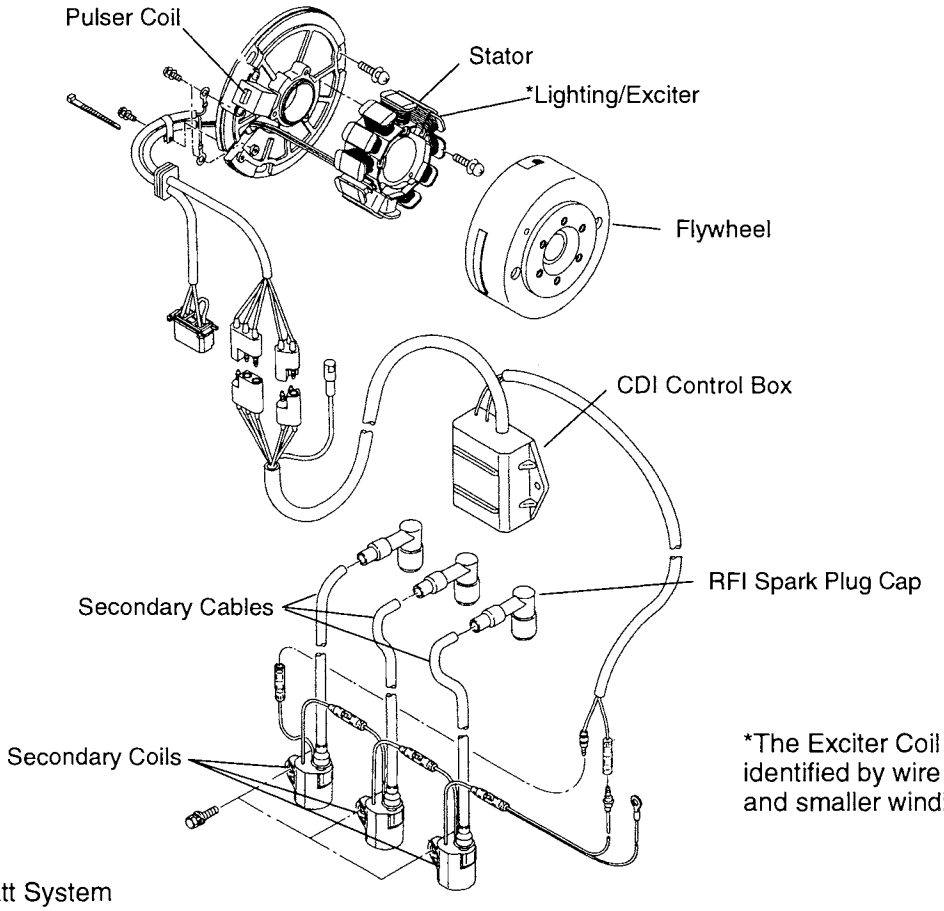
Refer to ignition timing procedure on page 9.22.



NOTE: Acceptable variance is usually one line on either side of the dial indicated timing mark.

Three Cylinder CDI Ignition Timing - Exploded View (Typical)

XLT Special, XLT Classic, XLT Touring

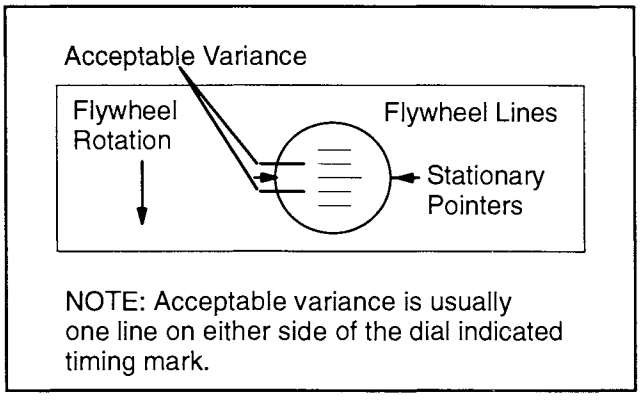


*The Exciter Coil can be identified by wire color and smaller windings.

280 Watt System

NOTE: Always verify timing of engine at room temperature only (68° F/20° C).

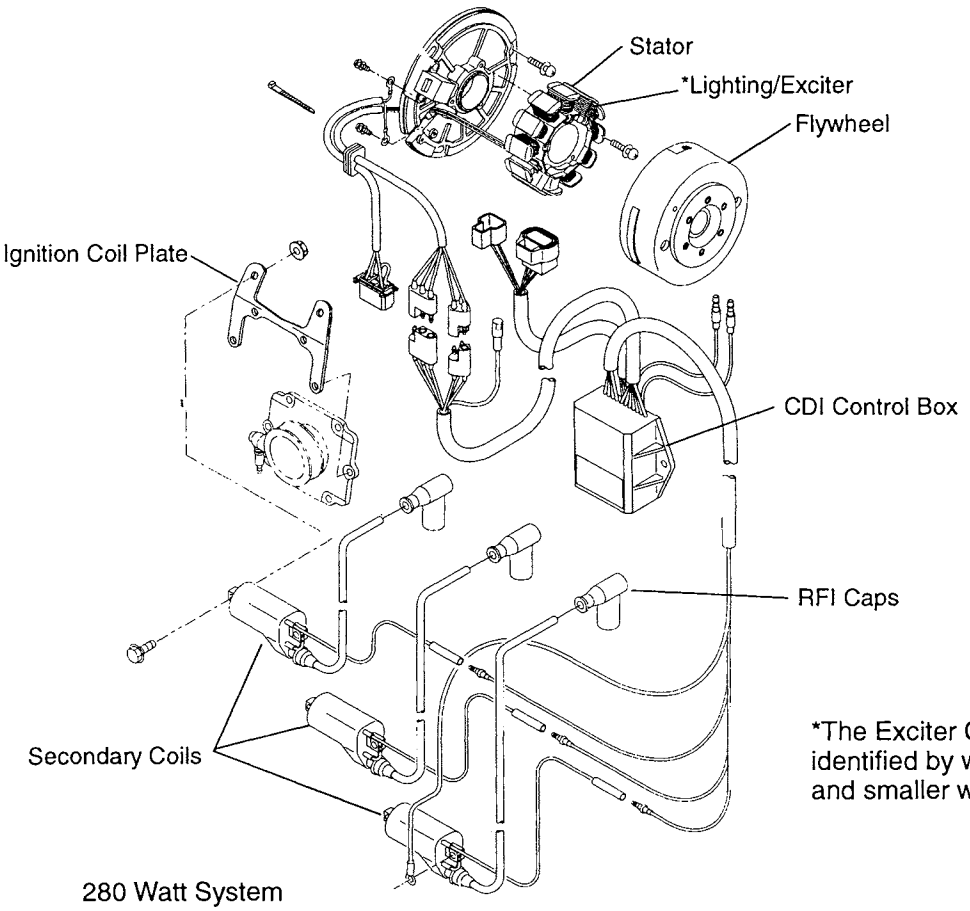
Refer to ignition timing procedure on page 9.22.



NOTE: Acceptable variance is usually one line on either side of the dial indicated timing mark.

Three Cylinder CDI Ignition - Exploded View

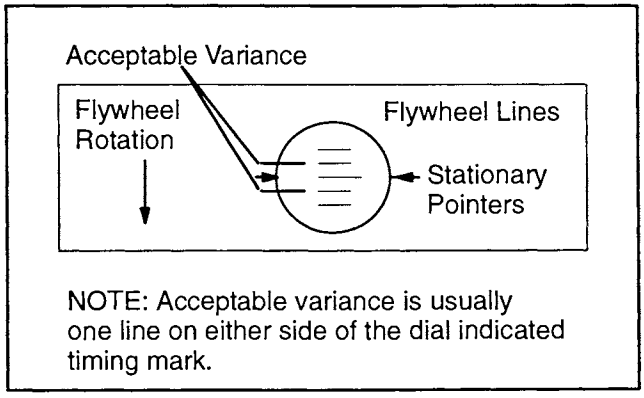
1999 700 XCR, 800 XCR



280 Watt System

NOTE: Always verify timing of engine at room temperature only (68° F/20° C) with TPS unplugged.

Refer to ignition timing procedure on page 9.22.



NOTE: Acceptable variance is usually one line on either side of the dial indicated timing mark.

Timing Procedure - All Models

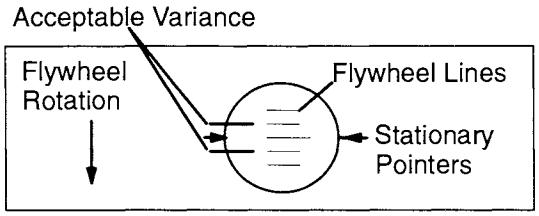
NOTE: Always check ignition timing with the engine at room temperature only (20°C/68°F).

1. Refer to the timing specification charts at the beginning of this section to determine the proper ignition timing for the engine you are working on.
2. Use a dial indicator to place the piston in the proper timing position and mark the flywheel at this point (follow procedure on page 9.7).
3. Connect an accurate tachometer and a good quality timing light to the engine according to manufacturer's instructions. *Disconnect the TPS (Throttle Position Sensor) connector from carburetor on 700 XCR and 800 XCR.*
4. Start engine and increase RPM to the point specified in the timing specification chart on page 9.1 (1750, 3000, 3250). Hold the throttle to maintain specified timing RPM.
5. Point the timing light at the timing inspection hole.
6. With your head positioned so there is a straight line between your eye, the stationary pointer and the crankshaft center line, note the relative position between the marked flywheel line and the stationary pointer. If the stationary pointer is aligned with the mark made in Step 2, (or within the acceptable ± variance) the timing is correct.
7. If the pointer is outside the variance, the stator will have to be rotated either with crankshaft rotation (to retard the timing) or *against* rotation to advance it.

NOTE: Rotate stator plate approximately the same distance as the marks must move.

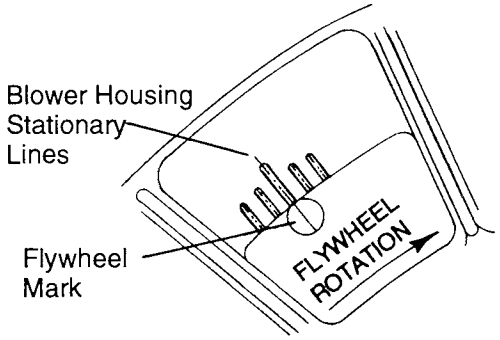
NOTE: In most cases, the recoil starter housing, recoil drive hub, and flywheel must be removed to loosen the stator bolts and change the timing. On some engines, the stator plate retaining screws can be accessed through the flywheel.

8. Torque stator plate screws and flywheel nut to specified torque. Apply Loctite 262 (red) to crankshaft flywheel taper if required. Refer to the Specifications section for torque specifications and flywheel installation procedure for engine type.



NOTE: Acceptable variance is usually one line on either side of the dial indicated timing mark.

Liquid Cooled



Fan Cooled

Operating RPM Timing Check - All Models

CAUTION:

Due to the high RPM necessary and the possible danger involved, special care must be observed whenever performing an operating RPM timing check to avoid serious personal injury.

This check need not be performed unless symptoms leading to poor performance and possible engine damage are present.

- Never operate the engine with the clutch guard open or removed.
- Do not stand over or around the clutch while performing this test.
- Perform the test as quickly as possible. Avoid prolonged periods of engine free-rev.

Operating RPM Timing Test Procedure

1. Using the charts at the beginning of this unit, determine the ignition advance BTDC at the operating RPM.
2. Remove the mag side spark plug and install a dial indicator in that cylinder.
3. Zero the dial indicator as explained on page 9.6.
4. Turn the crankshaft in the opposite direction of rotation to a point approximately .100" (2.5 mm) before the operating ignition timing point.
5. Turn the crankshaft in the proper direction of rotation until the dial indicator shows the proper piston position BTDC for operating RPM ignition timing. **NOTE:** The charts only indicate degrees BTDC. This figure must be converted using the tables on page 9.14. Example: The operating timing and RPM for an engine is 16° at 7500 RPM. Using the chart, 16° on this engine is .058 BTDC at 7500 RPM. Using a properly installed and zeroed dial indicator, back the engine up to approximately .150 BTDC. Then rotate the crank in the proper direction of rotation to .058 BTDC.
6. While holding the crankshaft at the ignition timing point (as shown on dial indicator), make a timing mark on the flywheel or fan blade using a piece of chalk or marker.
7. Remove the dial indicator and reinstall spark plug.
8. Start the engine. Advance and hold the throttle at the operating RPM specified on the charts. View the timing mark with the timing light. The marks should be between the allowable +/- variance indicated on the operating RPM timing specification.
9. If the operating RPM timing greatly varies from the specification, but the standard ignition timing (1750, 3000, or 3250 RPM) is correct, refer to the ignition troubleshooting section in this unit for corrective action.

Preparing a New Battery for Service

To ensure maximum service life and performance from a battery, it must have proper initial servicing. To service a new battery, the following steps must be taken. **NOTE:** Do not service the battery unless it will be put into regular service within 30 days.

1. Remove vent plug from vent fitting.
2. Fill battery with electrolyte to the upper level marks on the case.
3. Set battery aside and allow it to cool and stabilize for 30 minutes.
4. Add electrolyte to bring the level back to the upper level mark on the case. **NOTE:** This is the last time that electrolyte should be added. If the level becomes low after this point, add only distilled water.
5. Charge battery at 1/10 of its amp/hour rating.
   Example:1/10 of 9 amp battery = .9 amps, 1/10 of 14 amp battery = 1.4 amps, 1/10 of 18 amp battery = 1.8 amps (recommended charging rates).
6. Check specific gravity of each cell with a hydrometer to ensure each has a reading of 1.270 or higher.

Battery Testing

There are three easy tests which can determine battery condition. Whenever the complaint is related to either the starting or charging systems, the battery should be checked first.

Lead-acid batteries should be kept at or as near full charge as possible. If the battery is stored or used in a partially charged condition, hard crystal sulfation will form on the plates, reducing their efficiency and possibly ruining the battery.

Open Circuit Voltage Test (OCV)

Battery voltage should be checked with a digital multitester. Readings of 12.6 or less require further battery testing and charging.

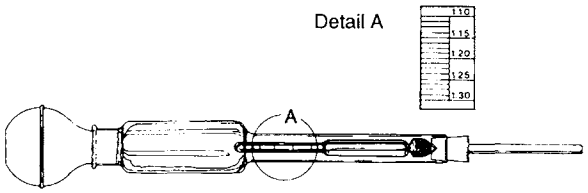
Specific Gravity Test

A tool such as the battery hydrometer (PN 2870836) can be used to measure electrolyte strength or specific gravity. As the battery goes through the charge/discharge cycle, the electrolyte goes from a heavy , more acidic state at full charge to a light, more water state when discharged. The hydrometer can measure state of charge and differences between cells in a multi-cell battery. Readings of 1.270 or greater should be observed in a fully charged battery. Differences of more than .025 between the lowest and highest cell readings indicate a need to replace the battery.

State Of Charge	Conventional Lead-acid	Yumacron Type
100% Charged	12.60V	12.70V
75% Charged	12.40V	12.50V
50% Charged	12.10V	12.20V
25% Charged	11.90V	12.0V
0% Charged	Less Than 11.80V	Less Than 11.9V

State Of Charge*	Conventional Lead-acid	Yumacron Type
100% Charged	1.265	1.275
75% Charged	1.210	1.225
50% Charged	1.160	1.175
25% Charged	1.120	1.135
0% Charged	Less Than 1.100	Less Than 1.115

*at 80° F



NOTE: Subtract .01 from the specific gravity for electrolyte at 40° F and compare these values to the chart.

Load Test

NOTE: This test can only be performed on machines equipped with electric start. This test cannot be performed if the engine or starting system is not working properly.

A battery may indicate a fully charge condition on the OCV test and the specific gravity test, but still not have the storage capacity necessary to properly function in the electrical system. For this reason, a battery capacity or load test should be conducted whenever poor battery performance is encountered.

To perform the test, hook a multitester to the battery in the same manner as in the OCV test. The reading should be 12.6 volts or greater. Engage the electric starter and view the registered battery voltage while cranking the engine. Continue the test for 15 seconds. During this cranking period, the observed voltage should not drop below 9.5 volts. If the beginning voltage is 12.6 or higher and the cranking voltage drops below 9.5 volts during the test, replace the battery.

Refilling a Low Battery

The normal charge/discharge cycle of a battery causes the cells to give off gases. These gases, hydrogen and oxygen, are the components of water. Because of the loss of these gases and the lowering of the electrolyte level, it will be necessary to add pure, clean distilled water to bring the fluid to the proper level. After filling, charge the battery to raise the specific gravity to the fully charged position (1.270 or greater).

Off Season Storage

To prevent battery damage during extended periods of non-use, the following basic maintenance items must be performed.

1. Remove battery from machine and wash the case and battery tray with a mild solution of baking soda and water. Rinse with lots of fresh water after cleaning. **CAUTION:** Do not allow any of the baking soda solution to enter the battery or the acid will be neutralized.
2. Using a wire brush or knife, remove any corrosion from the cables and terminals.
3. Make sure the electrolyte is at the proper level. Add distilled water if necessary.
4. Charge at a rate no greater than 1/10 of the battery's amp/hr capacity until the electrolyte's specific gravity reaches 1.270 or greater.
5. The battery may be stored either in the machine with the cables disconnected, or on a piece of wood in a cool place. **NOTE:** Stored batteries lose their charge at the rate of 1% per day. They should be fully recharged every 30 to 60 days during a non-use period. If stored during winter months, the electrolyte will freeze at higher temperatures as the battery discharges. The chart indicates freezing points by specific gravity.

Specific Gravity of Electrolyte	Freezing Point
1.265	-75° F
1.225	-35° F
1.200	-17° F
1.150	+5° F
1.100	+18° F
1.050	+27° F

Charging Procedure

Charge battery with a charger no larger than 1/10 of the battery's amp/hr rating for as many hours as needed to raise the specific gravity to 1.270 or greater.

⚠ WARNING

The gases given off by a battery are explosive. Any spark or open flame near a battery can cause an explosion which will spray battery acid on anyone close to it. If battery acid gets on anyone, wash the affected area with large quantities of cool water and seek immediate medical attention.

⚠ WARNING

Battery electrolyte is poisonous. It contains acid!

Serious burns can result from contact with the skin, eyes, or clothing.

ANTIDOTE:

EXTERNAL: Flush with water.

INTERNAL: Drink large quantities of water or milk. Follow with milk of magnesia, beaten egg, or vegetable oil. Call physician immediately.

EYES: Flush with water for 15 minutes and get prompt medical attention.

Batteries produce explosive gases. Keep sparks, flame, cigarettes, etc. away. Ventilate when charging or using in closed space. Always shield eyes when working near batteries.

KEEP OUT OF REACH OF CHILDREN.

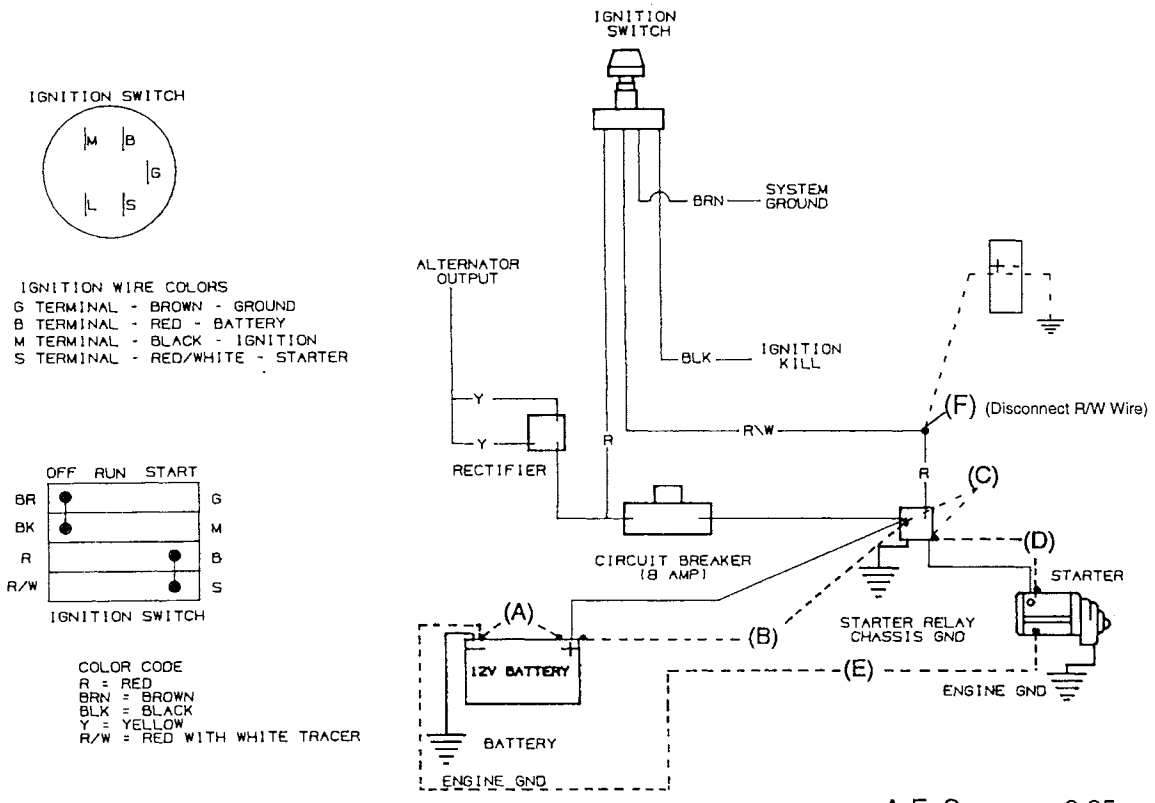
Dynamic Testing of Electric Starter System

Condition: Starter fails to turn motor or motor turns slowly.

NOTE: Be sure the engine crankshaft is free to turn before proceeding. For this test a digital multitester must be used. Meter connections are shown on page 9.24.

With tester on VDC, place tester black lead on battery negative (-) terminal and tester red lead on battery positive (+) terminal. (A) Page 9.26. Reading should be 12.6V or greater. Is it? No→ Yes↓	Remove battery, test and/or service. Install a fully charged shop battery to continue the test. (Continue with left column)
Disconnect red engagement coil wire from start solenoid. Connect black tester wire to an appropriate ground and red lead to red harness wire at solenoid. (F) page 9.26. Rotate ignition key to the start position. Meter should read battery voltage. Does it? No→ Yes↓	With black tester lead on ground, check for voltage at large relay in terminal,, circuit breaker in and out terminals, and across both sides (red and red/white) of the ignition switch with switch on start. Repair or replace any defective parts.
Reconnect solenoid, connect tester black lead to battery positive terminal and red tester lead to solenoid end of battery to solenoid cable. (B) Page 9.26. Turn key to start position. The reading must be less than .1V DC. Is it? No→ Yes↓	Clean battery to solenoid cable ends or replace cable.
Connect black tester lead to solenoid end of battery to solenoid cable and red tester lead to solenoid end of solenoid to starter cable. (C) Page 9.26. Turn key to start position. The reading must be less than .1V DC. Is it? No→ Yes↓	Replace starter solenoid.
Connect black tester lead to solenoid end of solenoid to starter cable and red tester lead to starter end of same cable. (D) Page 9.26. Turn key to start position. The reading must be less than .1V DC. Is it? No→ Yes↓	Clean solenoid to starter cable ends or replace cable.
Connect black tester lead to starter frame. Connect red tester lead to battery negative (-) terminal. (E) Page 9.26. Turn key to start position. The reading should be less than .1V DC. Is it? No→ Yes↓	Clean ends of engine to battery negative cable or replace cable.
If all these tests indicate a good condition, yet the starter still fails to turn, or turns slowly, the starter must be remove for static testing and inspection.	

ELECTRICAL
Electric Starter System Testing (Static)
Starter Motor Static Testing



A-E See page 9.25

1. Remove starter motor and disassemble. (See page 9.27 for exploded view) Mark end covers and housing for proper reassembly.
2. Remove pinion retaining snap ring, spring and pinion gear.
3. Remove brush end bushing dust cover.
4. Remove housing through bolts.
5. Slide brush end frame off end of starter. **NOTE:** The electrical input post must stay with the field coil housing.
6. Slide positive brush springs to the side, pull brushes out of their guides and remove brush plate.
7. Clean and inspect starter components. **NOTE:** Some cleaning solvents may damage the insulation in the starter. Care should be exercised when selecting an appropriate solvent. The brushes must slide freely in their holders. If the commutator needs cleaning, use only an electrical contact cleaner and/or a non-metallic grit sandpaper. Replace brush assembly when worn to 5/16" (.8 cm) or less.

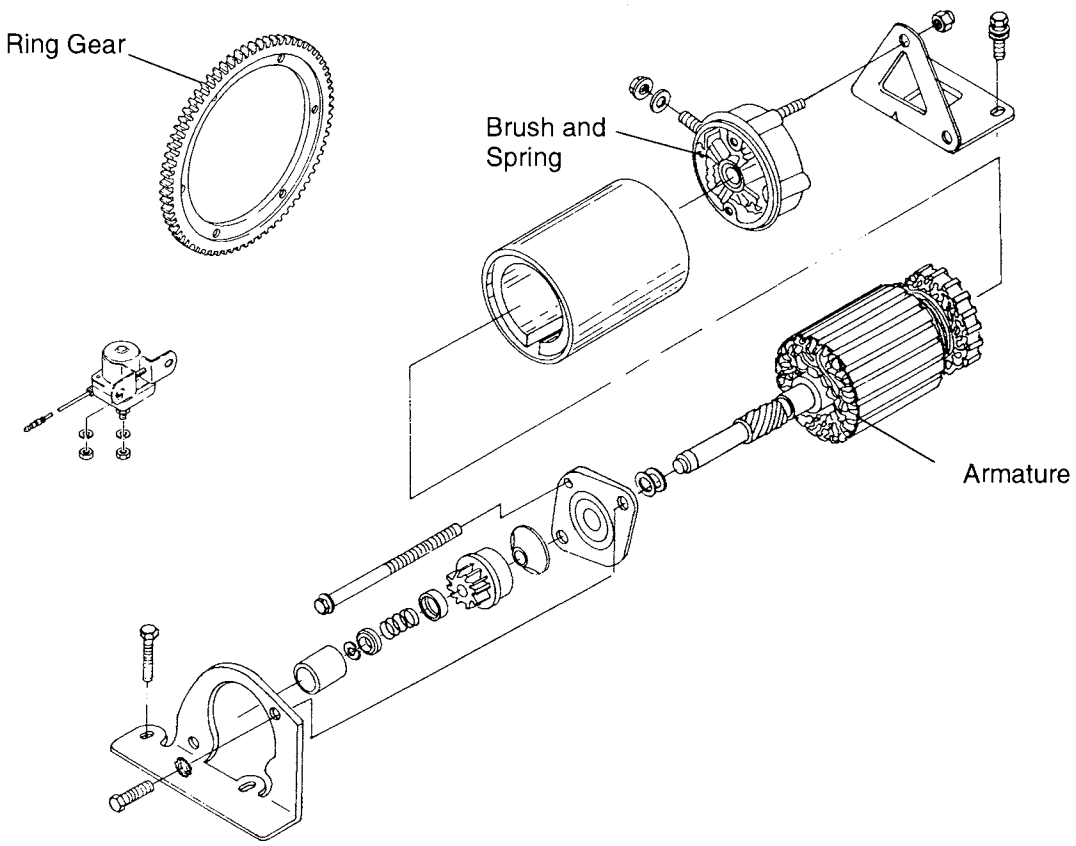
Starter Housing and Field Coil Inspection

1. Using a digital multitester, measure resistance between starter input terminal and insulated brushes. The reading should be .3 ohms or less.
2. Measure resistance between insulated brushes and field coil housing. The reading should be infinite.
3. Inspect insulated brush wire and field coil insulation for damage. Repair or replace components as required.

Armature Testing

1. Using a digital multitester, measure resistance between each of the segments of the commutator. The reading should indicate .3 ohms or less.
2. Measure resistance between commutator and armature shaft. Reading should be infinity.
3. Place armature in a growler. With the growler on, position a hacksaw blade lengthwise 1/8" (.03 cm) above armature coil laminates. Rotate armature 360°. If hacksaw blade is drawn to the armature on any pole, the armature is shorted and must be replaced.

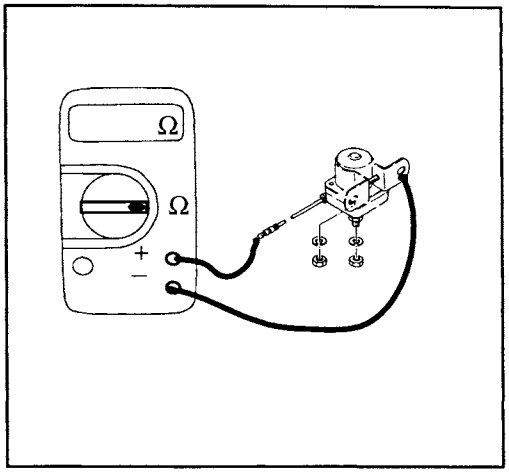
Starter Assembly



1. Slide armature into field coil housing.
2. Lightly grease drive end bushing and install drive end frame on armature.
3. Mount starter vertically in a vice with brush end up.
4. While holding negative brushes out against their springs, slide brush plate down onto the commutator.
5. While holding positive brush springs to the side, slide positive brushes into their holders and correctly position the springs on top of the brushes.
6. Using a non-petroleum grease, lubricate brush end bushing and slide it onto end of armature.
7. Align threaded holes in brush plate and install dust cover and screws.
8. Reinstall through bolts and properly tighten all screws.
9. Lightly grease pinion shaft and install pinion, spring stopper and snap ring.

Starter Solenoid Bench Test

The only test which can be done on the bench is the pull in coil resistance, which should be 3.4 ohms.



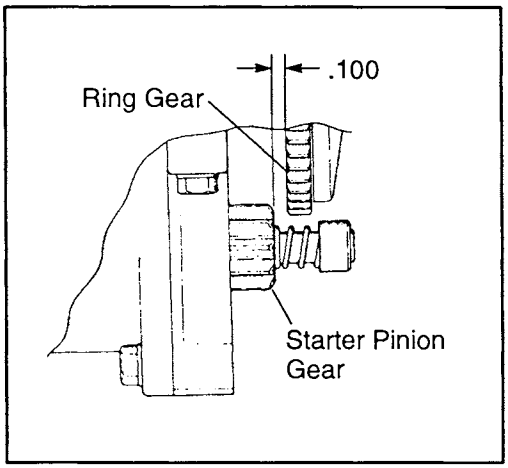
Starter Installation

1. Position starter motor so there is no less than .100" clearance between the ring gear and the starter motor pinion gear.
2. Torque through bolt mount bracket nuts to specification.
3. Torque 8mm (drive end) mount bolts to specification.
4. Torque 6mm (brush end) bracket to specification.

8mm Drive End Mount Bolt Torque - 15 ft. lbs. (2.07 kgm)

6mm Drive End Mount Bolt Torque - 5 ft. lbs. (.69 kgm)

Mounting Bracket Nut Torque - 30-42 in. lbs. (.34-.48 kgm)



Unregulated Voltage - continued

1. Test resistance of lighting coil and compare to specifications in the model specific wiring diagram. Reminder: Meter resistance must be subtracted from reading.

NOTE: 0.3 to 0.5 ohms may be less than the internal resistance of your meter leads or meter. Before measuring the stator resistance, short the meter leads together and read the display and record this measurement. Subtract this reading from the stator resistance readings.

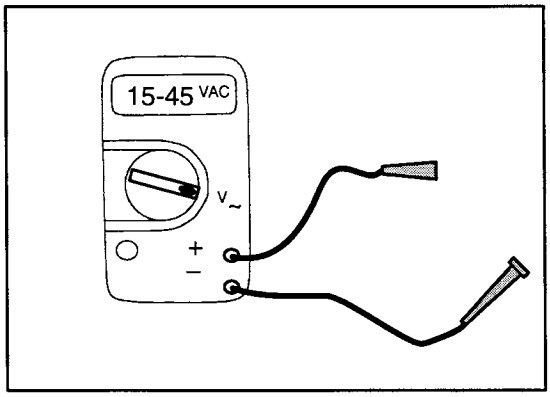
EXAMPLE: Short meter leads together, meter reads 0.7 ohms. Measure stator resistance, meter reads 1.10 ohms. Subtract 0.7 ohms (meter/lead resistance) from 1.10 ohms (reading obtained when checking yellow lead to brown lead). True reading is: 1.10 ohms (observed reading when checking stator)

–0.7 ohms (meter/lead resistance)

= 0.4 ohms (true stator resistance)

Unregulated Voltage - continued

2. Turn the multitester dial to the Volts AC (V~) position.
3. Disconnect the alternator to main harness connector at engine.
4. Connect one of the tester leads to the yellow alternator wire and the other lead to the brown alternator wire. **NOTE:** On floating alternators, the yellow/red stator wire should connect to the brown stator wire. If it does not, the system will not have a ground and will not operate.
5. Start the engine. While observing the voltage reading, increase the engine speed to about 3000 RPM. Readings of between 15 and 45 VAC are considered normal.



Short Circuit Current (AC Amp Test)

1. Turn multitester dial to A~.
2. Connect red lead to 10A terminal.
3. Connect black lead to Com (–) meter terminal.
4. Disconnect lighting/charge coil wires from system. Connect meter leads to coil wires leading to stator coils.
5. Start and idle engine. Readings should be above 5 amps. Refer to Amps AC on page 9.4.

Regulated Voltage

1. Connect the alternator to main harness connector.
2. Insert one of the tester leads along the side of the yellow regulator wire connector between the insulation and the terminal.
3. Ground the other tester lead.
4. Start engine and observe headlight output. Increase engine RPM. If the headlights seem dim above 3500 RPM, let the engine return to idle and disconnect the yellow wire from the regulator. Carefully observe the voltage reading. *Do not* allow voltage to increase above 14.0 volts.
5. Slowly increase RPM. Voltage above 12 volts at 2500 - 3000 and a bright headlight, indicates a good lighting coil. Voltage below 10 volts at 3000 indicates excessive system loads, poor flywheel magnets, lighting coil problems, or wires harness problems. Check for partially grounded (shorted) yellow wire.
6. Reconnect the yellow regulator wire and increase the RPM. If the headlight was bright with the regulator disconnected and dim when connected at the same RPM, the regulator or regulator ground is at fault.

Alternator Output - Pulse System

2-pulse, 3-pulse, 6 pulse Alternators

The difference between a 2 pulse, 3 pulse, and 6 pulse alternator system is the number of AC sine waves created by the alternator in one revolution of the crankshaft. For example, on a 6 pulse system, the alternator will create 6 pulses, or 6 complete AC sine waves, in one crankshaft revolution. The tachometer reads these sine waves, therefore giving you accurate RPM readings. A 3 pulse tachometer cannot be used on a 6 pulse system. If this is done, the tachometer will read double RPM. Refer to the following text for applications.

All Polaris Snowmobiles:

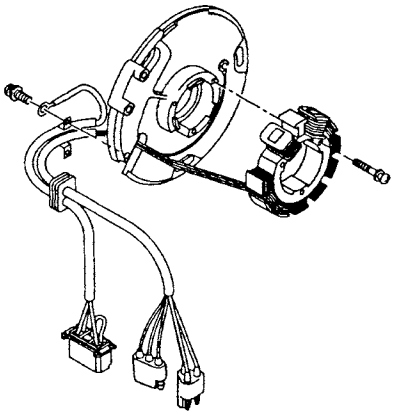
All Fuji single cylinder and twin cylinder engines ..... 2 pulse
All Polaris Domestic twin cylinder engines/1999 440 & 550 fan cooled .. 6 pulse
Early model three cylinder engines (500, 600, 650, 750, early 800) .... 3 pulse
Late model three cylinder engines (580, 600, 680, 700, 800) ..... 6 pulse

All Polaris ATVs:

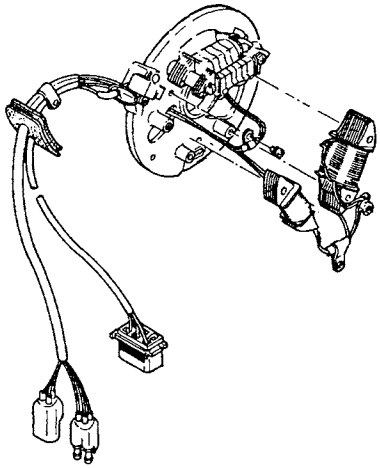
All 150 watt alternators and earlier ..... 2 pulse
All 200 watt and 250 watt ..... 6 pulse

All Polaris PWC:

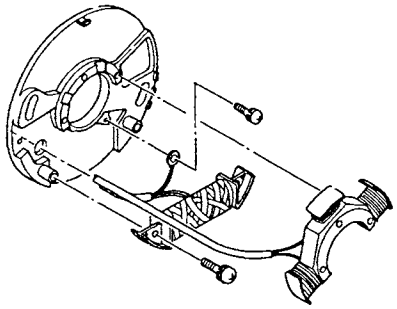
All PWC ..... 6 pulse



6 Pulse



3 Pulse



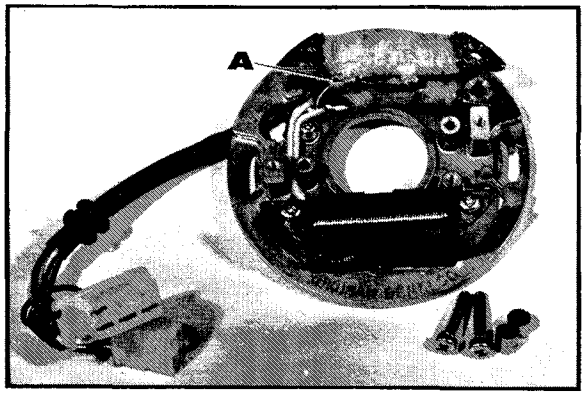
2 Pulse

Tachometers:

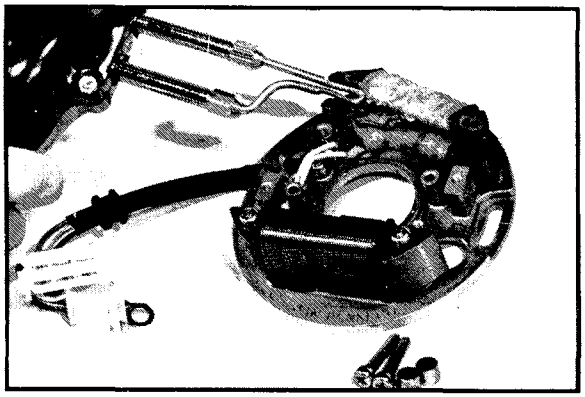
Tachometers for snowmobiles will have an identification marking on the back side. For example: The tachomter for a 500 XC will have "6 pulse" (or 6P) written on it.

Typical Exciter, Pulser or Lighting Coil Replacement

1. Remove coil retaining screws and spacers.
2. Using a pliers, remove epoxy from solder joints (A) on the coil to be replaced.

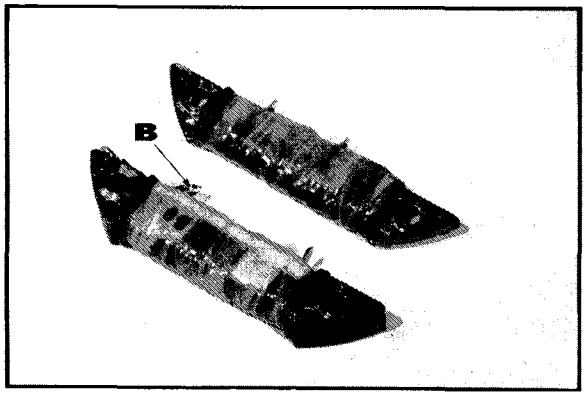


3. Unsolder connection from coil.



4. Clean solder terminals (B) on the replacement coil and re-solder to their proper wires.

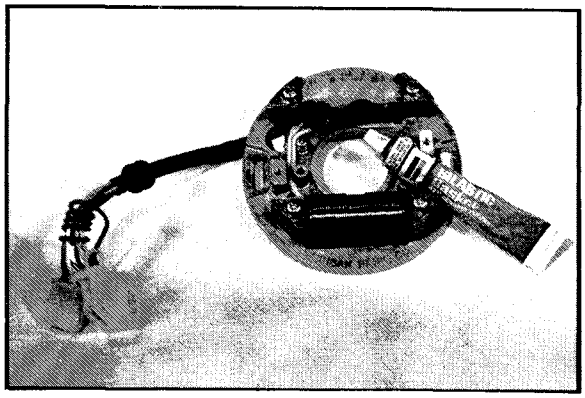
NOTE: Always position with numbers towards the *outsid*



5. Reinstall retaining screws and spacers.
6. Using a moisture-proof sealant, seal solder joints as shown. **NOTE:** All soldering must be done using rosin core solder.
7. Test resistance of each coil prior to stator plate installation.

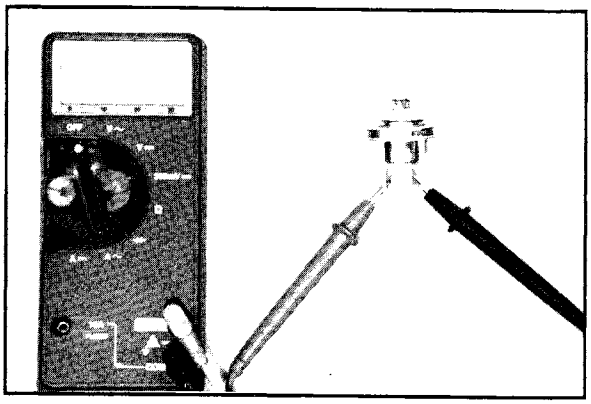
NOTE: Lighting and pulseless coils are replaced in a similar manner.

IMPORTANT: After the stator plate is reinstalled on the engine, check placement of all coil leads to prevent possible contact with the flywheel.



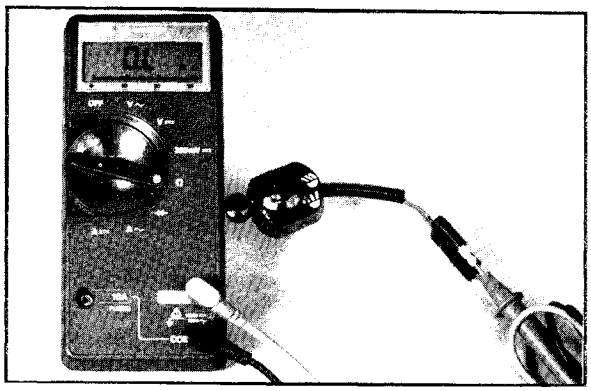
Headlight Bulb Filament Continuity Test

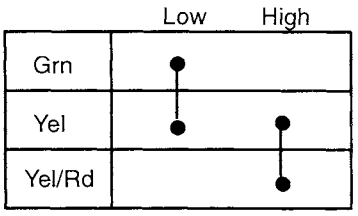
1. Turn the Multitester dial to the ohms (Ω) position.
2. Disconnect the wire harness from the headlight bulb.
3. Viewing the end of the bulb with the terminal blades at the 9, 12 and 3 o'clock position, connect the black multitester lead to the 9 o'clock blade.
4. Touch the red tester lead to the 12 o'clock terminal and then to the 3 o'clock terminal, noting the resistance value of each. A reading of between 2 and 5 ohms is good. An open reading indicates a bad element.



Hi/Lo Beam Switch Testing

1. Set the multitester dial to the ohms (Ω) position.
2. If the Hi/Lo switch has not been removed from the machine, disconnect the switch to harness plug in connector.
3. With the Hi/Lo switch in the *Lo beam* position, check the resistance between the yellow and the green switch wires. The reading should be less than .4 ohms.
4. Turn the Hi/Lo switch to the *Hi beam* position and the multitester should indicate an open circuit (OL) reading.
5. Move one of the tester leads from the green to the red switch wire. The multitester should now read less than .4 ohms.
6. Turn the Hi/Lo Switch back to the *Lo beam* position and the meter should again read an open circuit (OL).

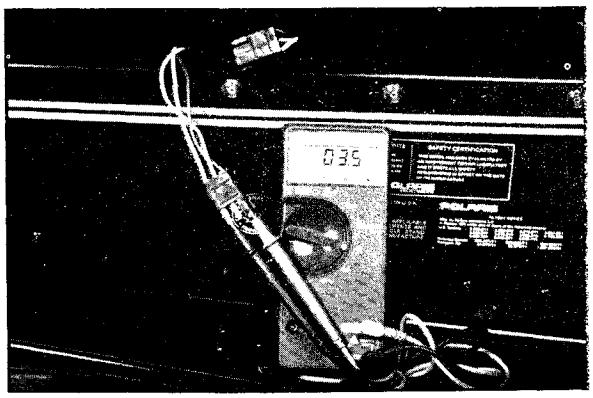




High/Low Switch

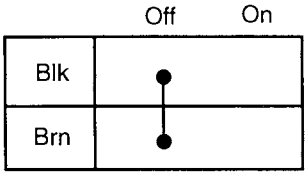
Seat Harness Troubleshooting

1. Remove the taillight lens.
2. Remove the two taillight bulbs and the brakelight bulb.
3. Separate the seat harness from the main harness by unplugging the connector at the right rear of the tank.
4. With the multitester dial set on ohms (Ω) connect either meter test lead to the brown seat harness wire.
5. Touch the other tester lead to first the yellow wire and then the orange wire. Observe the readings. Readings other than an open circuit indicate a shorted harness or bulb socket. **NOTE:** The bulb socket tangs sometimes short to ground with the bulb removed.
6. Check between the yellow and orange wires in the same manner to check for a short between the brake and running lights. If damaged wiring is found, remove the seat.
7. Tip the seat over and remove the right side seat cover staples. Locate and repair the harness problem.
8. Reinstall the staples and re-check the seat harness.



Ignition Switch Testing (Non-Electric Start)

1. Set the multitester dial to the ohms (Ω) position. Connect one of the tester leads to either of the switch terminals and the other tester lead to the other switch terminal.
2. With the switch off, the reading should be less than .4 ohms. With the switch on, the reading must be an open circuit (OL).
3. Check the resistance between each of the switch terminals and the switch body. With the switch still in the on position, there must be an open circuit (OL) reading. Readings other than those listed indicate a defective switch.

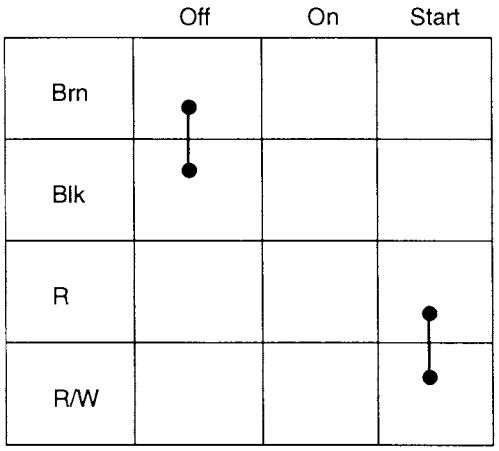


Ignition Switch

Ignition Switch Testing (Electric Start Models)

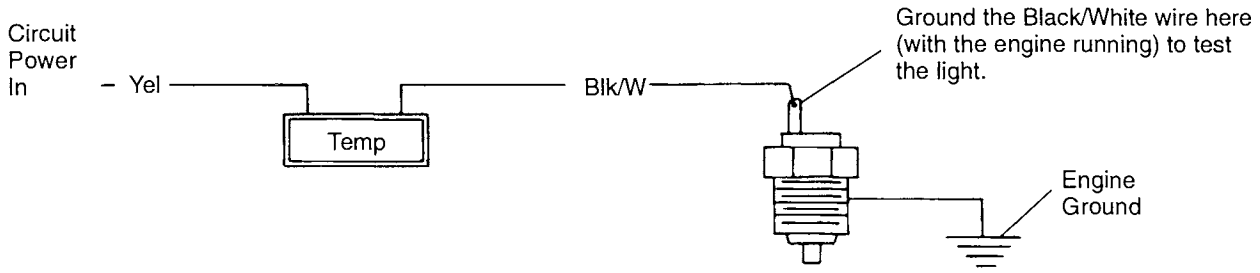
NOTE: Refer to the appropriate model and year wiring diagram for ignition switch wire colors and connections.

1. Disconnect wires. Set the multitester dial to the ohms (Ω) position.
2. With the key in the off position, check the resistance between the G (Ground, brown) terminal and the M (Mag, black) terminal. This reading must be less than .4 ohms.
3. Turn the key to the on position. The multitester should now read an open circuit (OL).
4. Move the tester lead from the G terminal to the switch housing and re-check the reading. It should also be an open circuit (OL).
5. Place one of the tester leads on the B (Battery, red) terminal and the other tester lead on the S (Starter, blue) terminal. With the key in the on position, there must be an open circuit (OL) reading.
6. Turn the key to the start position. The reading should be less than .4 ohms. Readings other than the ones listed indicate a defective switch.



Ignition Switch - Electric Start

Coolant High Temperature Indicator Testing



The indicator light is controlled by a temperature/warning switch installed into the engine cooling system. When engine coolant temperature reaches approximately 205° F, the switch closes, completing the circuit through the indicator light to ground. The system should be tested periodically for proper operation.

Lamp Circuit Test

1. Remove wire from temperature sensing switch located under thermostat housing.
2. With engine idling, ground wire to engine. The temperature warning lamp on the console should light. If not, replace the lamp assembly or inspect wiring for shorts or open circuit.

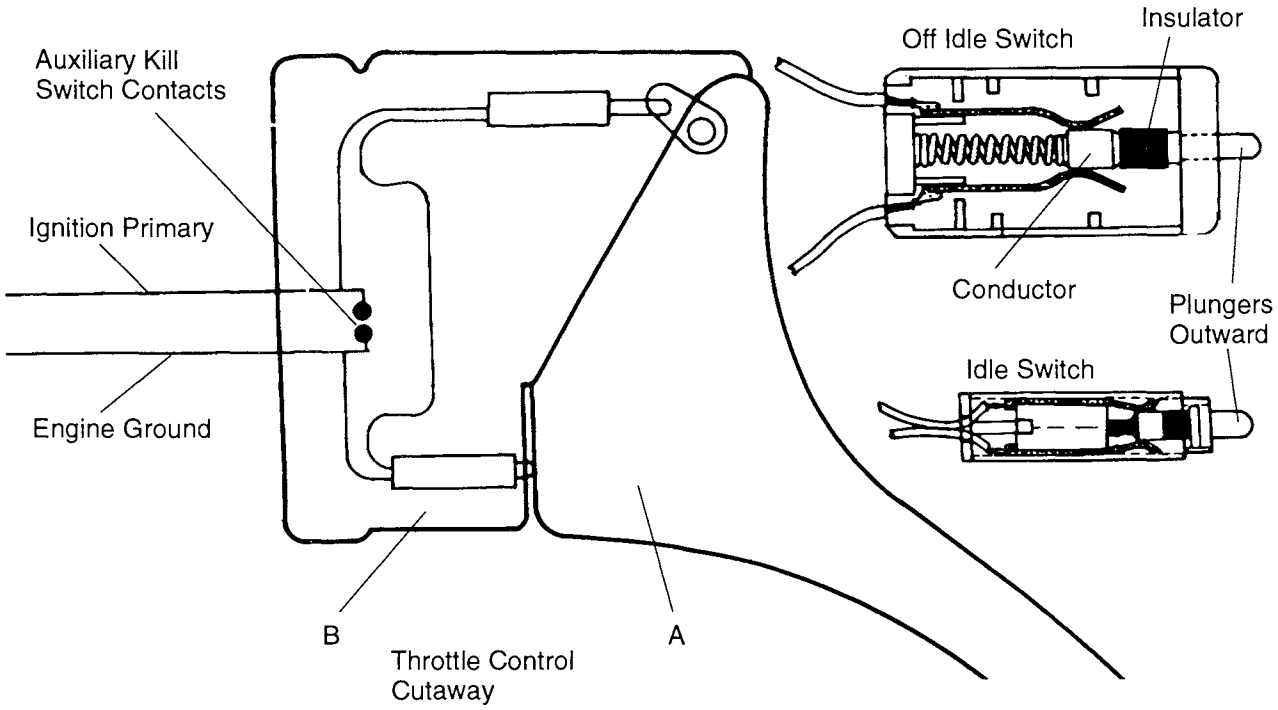
Temp Light Temperature Sensor Test

The temperature/warning switch is normally open.

1. Set the multitester on the ohms (Ω) scale.
2. Disconnect the lamp wire.
3. Connect one test probe to the switch terminal and the other to engine ground. The meter should show an open circuit (OL). This indicates a normally open switch. If the switch were heated to approximately 205° F, the contact in the switch would close and the reading would be less than .4 ohms.

CAUTION:

If attempting to heat the sensor to close the contacts, heat only in a water bath. Never subject the sensor to an open flame to attempt to close the contacts as sensor damage will result.



The speed control assurance consists of two series connected switches. If one or both switch plungers are positioned inward, the circuit is open and the engine will run.

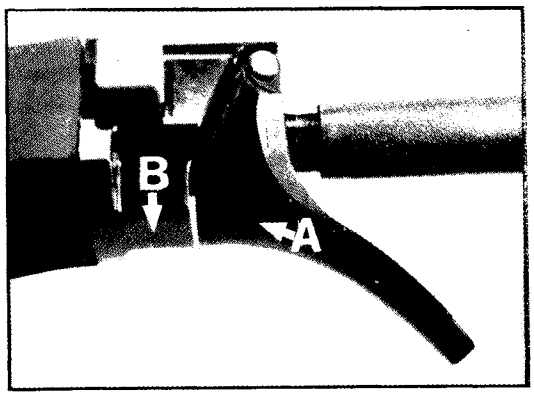
At idle, with the throttle lever properly adjusted, the bottom switch circuit is open and the plunger is inward. The top switch circuit is closed, and the plunger is outward. The speed control circuit is open, allowing the engine to run.

As the throttle lever is actuated to an off idle position, the top switch circuit is opened (plunger in) and the bottom switch circuit is closed (plunger out). The speed control circuit is still open, allowing the engine to run.

In the event the carburetor or controls malfunction and allow the throttle cable to become slack, the circuit will close (both switch plungers out), grounding the ignition system and causing the engine to stop.

Speed Control Assurance Adjustment

Throttle lever free play must always provide a specified clearance between throttle lever (A) and throttle block (B). This clearance is controlled by the throttle cable sleeve(s) and the idle speed screw(s).



Throttle Lever Freeplay -

Regular Throttle - .010 - .030″ (.25 - .8 mm)
EZ Throttle - .050 - .060″ (1.27 - 1.5 mm)

If the idle speed screw(s) is adjusted inward and the cable sleeve(s) is not adjusted to take up the throttle lever to throttle block clearance, the engine may misfire or kill upon initial throttle opening.

CAUTION:

After any idle speed adjustments are made, the throttle lever to throttle block clearance and oil pump adjustment must be checked and adjusted.

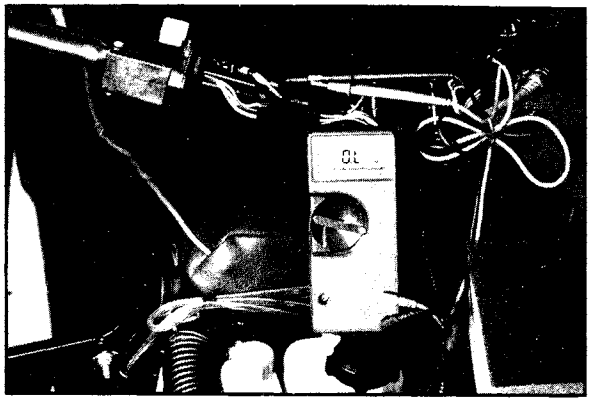
NOTE: When adjustments are made on models which have more than one carburetor, refer to Section 6, Carburetion, for proper carburetor synchronization adjustments.

Speed Control Assurance Testing

1. Set the multitester in the ohms (Ω) position.
2. Disconnect the switch harness from the main wire harness.
3. Connect the two multitester leads to the two switch wires.

Test 1 - Open Circuit - Run

With the auxiliary shut-off switch in the **ON** position, the multitester should read an open circuit (OL). As the throttle lever is moved from idle to off idle, the tester should continue to read an open circuit. If the tester fluctuates and the throttle lever to throttle block clearance is adjusted properly, the switch assembly must be replaced.



Test 2 - Closed Circuit - Kill

The two speed control switches must make a complete circuit to kill the engine. To check the switches, pull the throttle lever out away from the throttle block. With the switch plungers outward and the auxiliary shut-off switch in the **ON** position, the multitester must read less than .4 ohms resistance. Inspect wires and repair if damaged, or replace switch assembly.

Test 3 - Auxiliary Shut-Off

The multitester should read less than .4 ohms in the **OFF** position and an open circuit in the the **ON** position. Inspect wires and repair if damaged, or replace switch assembly.

Speed Control Assurance Replacement

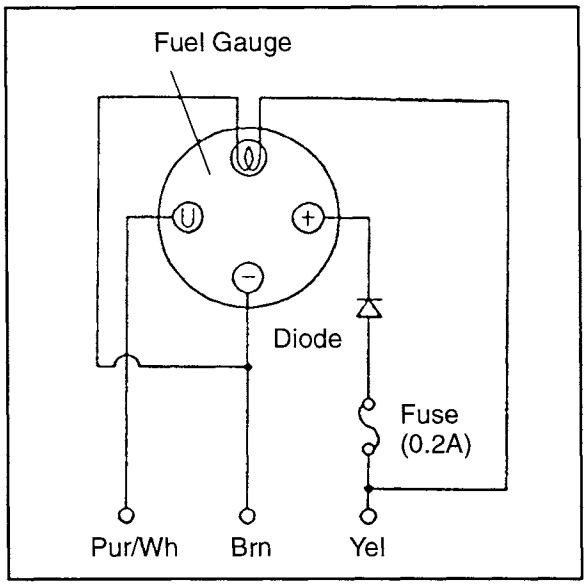
Auxiliary shut-off and speed control assurance switches are connected and replaced as a unit from the back side of the throttle block.

1. Remove the handlebar pad and/or throttle block backing plate.
2. Slide out the auxiliary shut-off portion of the switch.
3. Remove the two screws securing the two speed control assurance switches.
4. Remove the switches noting their placement in the throttle block.
5. Replace the assembly and check its operation.

Use the multitester ohmmeter to test the resistance of the fuel sender.

Position	Ohms	Range
Empty	95 Ω	90 - 97.5 Ω
Full	7 Ω	4.5 - 13 Ω

The supply voltage to the gauge should be 13.5 VAC.



Handlebar Warmer Testing

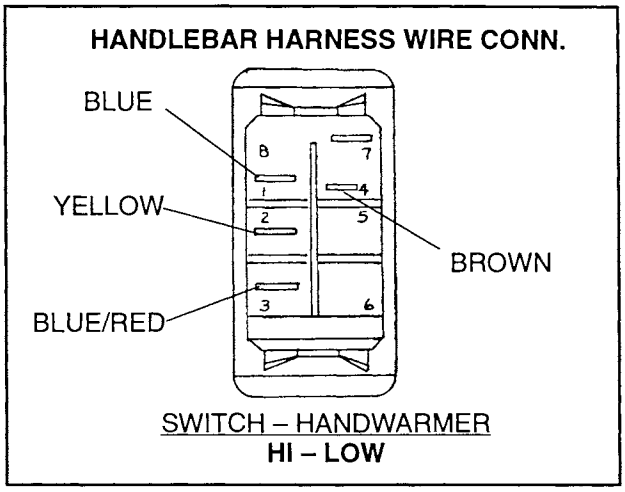
High-Low Handwarmer Toggle Switch

Below are the correct wire to PIN numbers:

1. Blue – High Circuit
2. Yellow – Regulated Power (A.C.)
3. Blue/Red – Low Circuit
4. Blank
5. Blank
6. Blank
7. Brown – Ground Circuit
8. Blank

Testing

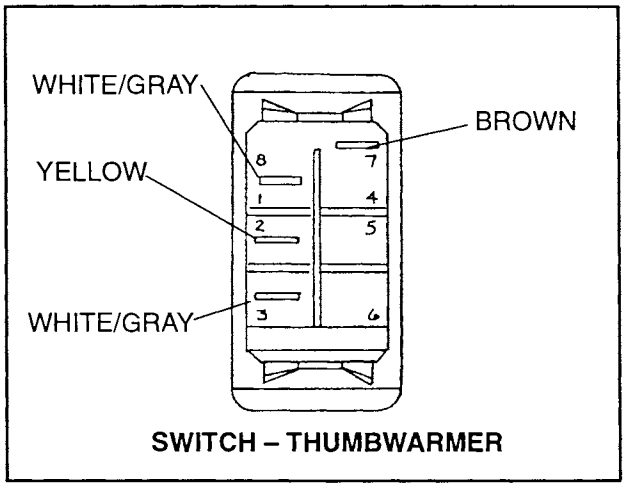
1. Disconnect handwarmer connector at the handwarmer.
2. Measure the low range resistance between the Blue and Brown wires. The resistance should be 19.2 Ω.
3. Measure the high range resistance between the Brown and Blue/Red. The resistance should be 9.6 Ω.



Thumbwarmer Toggle Switch

Below are the correct wire to PIN numbers:

1. White/Gray – To Thumbwarmer
2. Yellow – Regulated Power (A.C.)
3. White/Gray – To Thumbwarmer
4. Blank
5. Blank
6. Blank
7. Brown – Ground Circuit
8. Blank



Condition: No Spark

Disconnect the single black (black/white) wire from the CDI Module to the ignition kill circuit. Does it have a spark? Yes→ No↓	Check the ignition switch, wire harness, throttle safety switches and kill switch for proper adjustment or short to ground. Repair or replace as necessary.
Disconnect the stator to CDI module wires. Test the resistance values of the stator coils as per the wiring diagrams. Are the resistance values within specs? Yes→ No↓	All except 3 cylinders: If the parts of the ignition system under the flywheel check OK, the only remaining component is the coil/CDI module assembly. Replace the module with another with the same CU number. (See ignition data) All 3 cylinders: Disconnect and check the secondary ignition coil resistances. Refer to the resistance values listed in wiring diagrams. If the coil resistance values are within specs, replace the CDI module.
Isolate which component's resistance is not within specs. Remove the flywheel and stator. Recheck the resistances; look for pinched or bare harness wires; or replace the coil. Refer to page 9.31 for coil replacement procedures.	

Condition: Incorrect Advance/Retard

Follow the engine timing procedure for checking running timing at recommended RPM. Is the timing within limits? No→ Yes ↓	Adjust the ignition timing by rotating the stator plate to correct the timing. After adjusting the recommended RPM timing, continue with operating RPM timing if poor performance exists. (Continue on with left column.) See ignition timing page 9.1.
Follow the engine timing procedure for checking operating RPM timing from page 9.22. Is the timing within limits? Yes→ No↓	If the running and operating RPM timing are within limits, no other testing is necessary.
Remove the ignition kill circuit by disconnecting the single black wire between the CDI module and the machine harness. Is the timing now correct? Yes→ No↓	Check the ignition switch, throttle safety switches, kill switch and harness for damage which can cause intermittent shorting problems. Correct the problem.
Verify the correct CDI module by comparing the CU code on the box to the information listed in the ignition data charts at the beginning of this section. Is it the right module? No→ Yes↓	Replace the module with the correct part and readjust the ignition timing.
Check the resistance of the coils under the flywheel. Compare these values on wiring diagram. Are they within limits? No→ Yes↓	Check the wiring connecting the coils and/or replace the coils as necessary.
If the running RPM timing is within limits but the operating RPM timing is not acceptable, replace the CDI module.	

NOTE: 3 cylinder engines fire three times per revolution. At 7500 RPM the ignition is firing 21,500 times per minute. Use of a timing light not capable of handling these RPMs may provide an incorrect operating RPM timing reading. Use timing light PN 2870630 or equivalent.

Timing Light PN 2870630