



## AC SERVICE BULLETIN

### AC ELECTRONIC TACHOMETER REPAIR

#### PARTS 1, 2, and 3

**Part 1** — Pages 1 through 22 pertain to General Operating Principles and Servicing of Tachometers using an engine or ignition simulator for testing and calibration.

**Part 2** — Pages 23 through 27 pertain to the use of the \*TC 100 for testing, calibration and service.

**Part 3** — Pages 28 through 31 pertain to the use of an Oscilloscope for troubleshooting the circuit assembly and replacement of defective electrical components.

#### PART 1

##### General Explanation of Operation

The ignition pulse is carried by a single wire from the distributor side of the ignition coil to the insulated terminal on the back of the tachometer case. The additional insulated terminals, if present, are battery terminals used for lighting and/or transistor operation.

This pulse is smoothed out and modified by the various electrical components in the circuit package.

This modified ignition pulse current is then drawn through the meter movement where it causes meter coil and attached pointer deflection, interpreted as the number of pulses per unit time (revolutions per minute), as the pointer moves across the calibrated dial.

##### TOOLS AND EQUIPMENT NEEDED FOR DISASSEMBLY, REASSEMBLY, DIAGNOSIS, AND CALIBRATION

1. Small hand tools.
  - a. No. 10 nut driver
  - b. No. 2 nut driver.
  - c. Medium blade common screwdriver.
  - d. Small tipped, fast-heating, soldering iron.
  - e. Long nose pliers.
  - f. Tweezers.
2. Test Equipment.
  - a. Milliammeter (0 to 1 milliamperes) with an internal coil resistance of 100 ohms  $\pm$  10 (Ideal Precision Meter Company Model 350 P-C or equivalent).

**Ideal Precision Meter Co.**  
**214 Franklin Street**  
**Brooklyn, New York**
  - b. Test tachometer (Type used in performance of automotive service. Combination tach dwell is satisfactory.)
  - c. Variable resistor (10,000 to 100,000 ohms). If unable to obtain, purchase 0 to 100,000 resistor and place 10,000 resistor in series to prevent accidental meter burnout.
  - d. Eight, six, or four cylinder (to match tachometer being serviced) car with negative ground (unless otherwise specified) in which the ignition components are in good working order.

\*Available from Landmesser Tools, 980 S. Cass Lake Road, Pontiac, Mich.

WD, X 131, 132:16, FD

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#### GENERAL

1. Servicing of tachometers which are similar in design and servicing procedures are divided into groups, i.e. 1, 2, and 3. If both the meter movement and circuit package is defective, tachometer replacement is recommended. Tachometers not listed are serviced by replacement.
2. An ignition simulator consisting of a 12 volt battery, primary resistor, ignition coil, distributor cap, all spark plugs and a motor driven 8, 6, or 4 cyl.\* distributor (to match tachometer being serviced) may be used for circuit testing and tachometer calibration. A kit containing a sewing machine motor with variable resistor is available from Clark Bros. Instrument Corp., 10300 Whittier Avenue, Detroit, Michigan for driving a distributor.

\*All the spark plugs should be in the circuit. If more convenient, only one plug may be used, provided all of the distributor towers are wired together to fire the one plug being used.

**Note:** An 8 cyl. engine or an ignition simulator equipped with an 8 cyl. distributor may be used for testing tachometers. Distributor RPM and tachometer reading are as follows:

Type of Tachometer	Dist. RPM	Tach. Should Read—
8 cyl.	1000	2000
6 cyl.	1000	2666
4 cyl.	1000	4000

3. Prior to any disassembly, meter or circuit package testing, the tachometer should be bench tested. If an engine response is being used for evaluation, vary r.p.m. from idle to 2000 r.p.m.—if simulator response is being used, vary indication from idle to 5000 r.p.m. (Do not exceed this value as distributor point bounce can occur, thus causing inaccurate reading.) Note tachometer performance. If no defect is apparent, it is then advisable to disassemble and visually inspect meter air gap for offending particles which could cause intermittent operation.
4. Reassembly. Reassemble all tachometers in reverse order of disassembly. Use masking tape to temporarily secure bezel to case.
5. If the meter assembly zero position has shifted, exert a clockwise or counterclockwise pressure on either front or rear zero adjustment arm to obtain proper adjustment.
6. Static electricity on lucite lens may cause off zero pointer conditions. To eliminate, wipe both sides of lucite lens with a diluted household detergent.
7. When testing the meter movements, the movement of pointer from 0 to full scale should be smooth and even throughout the range of operation. Sluggishness or unequal degree of movement could be caused by tangled hairsprings or improper end play. The end play is factory adjusted and should not be tampered with. Any of the above indications would require the replacement of the meter movement.

If the meter appears sticky, the air gap and magnet surfaces should be examined for metal chips, lint or dirt. These foreign particles may sometimes be removed with long tweezers, or a small piece of folded masking tape. Quite often it is not possible to locate or extract the offending particle and it is then necessary to replace the meter movement.

8. When testing the circuit assemblies, the test milliammeter action should be smooth throughout the range of operation. If no test milliammeter indication is received regardless of potentiometer position, or erratic readings are obtained on test milliammeter, the circuit assembly should be replaced.

Assemblies in which the electrical components are mounted on a ceramic board, do not have an adjustable potentiometer.

9. Commencing with 1968, many tachometers incorporate a new feature in that the circuit board and other internal connections are made by a connecting lug and pin. It is important to note and record the color code before any disconnections are made.

To remove the lug from the pin, with long nose pliers apply a slight circular pulling force to the lug. Do not twist or bend as the pin can be broken at point of attachment.

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Year	Application	RPM	Tachometer	Group
<b>BUICK</b>				
1962-64	8 Cyl.	0-6000	6411300	1
1964	8 Cyl. Wildcat	0-6000	6411580	1
1965-68	8 Cyl. Wildcat	0-6000	6412326	1
<b>BUICK SPECIAL</b>				
1962-63	8 Cyl.	0-6000	1549980	1
1962-64	6 Cyl.	0-6000	6411076	1
1964	8 Cyl.	0-6000	6411300	1
1965-68-69	8 Cyl. Gran Sport	0-6000	6412531	1
1965-68-69	6 Cyl. Gran Sport	0-6000	6412536	1
<b>CHEVROLET</b>				
1963-64	8 Cyl. Super Sport (Exc. 409 Eng.)	0-6000	6411123	1
1963-64	8 Cyl. Super Sport 409 Eng.	0-7000	6411124	1
1961-62	8 Cyl. Super Sport	0-6000	6411241	1
1964	8 Cyl. Breakerless Ign. w/4 Spd.	0-7000	6411985	1
1964	8 Cyl. Breakerless Ign. Exc. 4 Spd.	0-6000	6411992	1
1965	8 Cyl. (Exc. H.P. 409 Eng. w/Close Ratio 4 Speed Trans.	0-6000	6412235	1
1965	8 Cyl. H.P. 409 Eng. w/Close Ratio 4 Speed Trans.	0-7000	6412236	1
1965	8 Cyl. 409 Eng. Breakerless Ign.	0-6000	6412292	1
1965	8 Cyl. 409 Eng. Breakerless Ign.	0-7000	6412293	1
1966	8 Cyl.	0-6000	6412548	3
1966	8 Cyl.	0-7000	6412549	3
1966	8 Cyl. Breakerless Ign.	0-6000	6412571	3
1966	8 Cyl. Breakerless Ign.	0-7000	6412572	3
1966	8 Cyl.	0-7000	6412983	3
1966	8 Cyl. Breakerless Ign.	0-7000	6412984	3
1967	8 Cyl.	0-7000	6468333	3
1967	8 Cyl.	0-7000	6468334	3
1967	8 Cyl.	0-7000	6468336	3
1968	8 Cyl. Regular	0-7000	6468912	3
1968	8 Cyl. Regular	0-7000	6468913	3
1968	8 Cyl. Regular	0-7000	6468914	3
<b>CHEVELLE</b>				
1964-65	8 Cyl. Super Sport	0-6000	6411826	1
1965	8 Cyl. Super Sport	0-6000	6412504	1
1965	8 Cyl. Breakerless Ign.	0-7000	6412735	1
1966	8 Cyl. (Tach. & H'sng. 6412759)	0-6000	6412767	1
1966	8 Cyl. (Tach. & H'sng. 6412764)	0-7000	6412774	1
1966	8 Cyl. Breakerless Ign. (Tach. & H'sng. 6412765)	0-6000	6412778	1
1966	8 Cyl. Breakerless Ign. (Tach. & H'sng. 6412766)	0-7000	6412782	1
1966	8 Cyl. (Tach. & H'sng. 6412816)	0-7000	6412840	1
1966	8 Cyl. Breakerless Ign. (Tach. & H'sng. 6412817)	0-7000	6412844	1
1967	8 Cyl.	0-7000	6468319	3
1967	8 Cyl.	0-7000	6468499	3
1967	8 Cyl.	0-7000	6468500	3
1968	8 Cyl.	0-7000	6468821	3
1968	8 Cyl.	0-7000	6468822	3
1968	8 Cyl.	0-7000	6468823	3

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Year	Application	RPM	Tachometer	Group
<b>CHEVELLE</b>				
1969	8 Cyl.	0-7000	6491312	3
1969	8 Cyl.	0-7000	6491313	3
1969	8 Cyl.	0-7000	6491314	3
<b>CAMARO</b>				
1967	8 Cyl.	0-7000	6468695	3
1967	8 Cyl.	0-7000	6468696	3
1967	8 Cyl.	0-7000	6468697	3
1967	8 Cyl.	0-7000	6468909	3
1967	8 Cyl.	0-7000	6468910	3
1967	8 Cyl.	0-7000	6468911	3
1968	8 Cyl. Clock Tachometer	0-7000	6468713	3
1968	8 Cyl. Clock Tachometer	0-7000	6468714	3
1968	8 Cyl. Clock Tachometer	0-7000	6468715	3
1969	8 Cyl.	0-7000	6469381	3
1969	8 Cyl.	0-7000	6469382	3
1969	8 Cyl.	0-7000	6469383	3
<b>CHEVY II</b>				
1968	8 Cyl.	0-7000	6469100	3
1968	8 Cyl.	0-7000	6469101	3
1969	8 Cyl.	0-7000	6469362	1
1969	6 Cyl.	0-7000	6469361	1
1969	4 Cyl.	0-7000	6469360	1
<b>CORVAIR</b>				
1962	6 Cyl. Monza	0-6000	1549943	1
1963-64	6 Cyl. Spyder	0-6000	6411412	1
1965-66	6 Cyl. Turbo Charged Corsa	0-6000	6412203	3
<b>CHEVROLET TRUCK</b>				
1967-68-69	8 Cyl.	0-5000	6468228	3
1967-68	8 Cyl. Breakerless Ign.	0-5000	6468320	3
1967-68-69	6 Cyl.	0-5000	6468321	3
1967-69	6 Cyl. School Bus	0-5000	6468902	3
1967-69	8 Cyl. School Bus	0-5000	6468903	3
<b>GMC TRUCK</b>				
1965-66	P.M. Generator	0-4000	6411472	2
1967-69	6 Cyl.	0-4000	6468270	3
1967	P.M. Generator	0-3500	6468416	2
1966	P.M. Generator	0-4000	6468521	2
1968	6 Cyl.	0-4100	6468270	3
1969	6 Cyl.	0-4100	6469489	3
<b>OLDSMOBILE</b>				
1961-62	8 Cyl.	0-6000	1549356	1
1963	8 Cyl.	0-6000	6411363	1
1964-66	8 Cyl.	0-6000	6411857	1
1965-66	8 Cyl.	0-6000	6411782	1
1967	8 Cyl. (Tach. & Clock Assy.)	0-7000	6457998	3

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Year	Application	RPM	Tachometer	Group
<b>OLDSMOBILE F-85</b>				
1962-63	8 Cyl.	0-6000	6411316	1
1964-65	8 Cyl.	0-6000	6411782	1
1964-65	6 Cyl.	0-6000	6411991	1
1966	8 Cyl. (Tach & H'sng. 6412739)	0-6000	6412716	3
1966	6 Cyl. (Tach. & H'sng. 6412911)	0-6000	6412754	3
1966-67	8 Cyl. Rally (Tach. is Intergral w/Cluster Assy.)	0-6000	*6458484	3
1968	8 Cyl. Clock Tachometer	0-7000	6459770	3
1969	8 Cyl.	0-7000	6459770	3
<b>PONTIAC</b>				
1962	8 Cyl.	0-7000	1549831	1
1963-64	8 Cyl.	0-7000	6411451	1
1963-64	8 Cyl. Breakerless Ign.	0-7000	6411585	1
1965-66	8 Cyl.	0-8000	6411753	3
1965-66	8 Cyl. Breakerless Ign.	0-8000	6411835	3
1967	8 Cyl. Hood Mount (Primed)	0-8000	6468410	3
1968-69	8 Cyl. Hood Mount (Primed)	0-8000	6468972	3
<b>PONTIAC TEMPEST</b>				
1963	4 Cyl.	0-7000	6411121	1
1963	8 Cyl.	0-7000	6411284	1
1964	8 Cyl.	0-7000	6411751	1
1964	6 Cyl.	0-7000	6411752	1
1964	8 Cyl. Breakerless Ign.	0-7000	6411950	1
1965	6 Cyl.	0-8000	6412411	3
1965	8 Cyl.	0-8000	6412412	3
1965	8 Cyl. Breakerless Ign.	0-8000	6412413	3
1966	8 Cyl. GTO Rally	0-8000	6412943	3
1966	8 Cyl. GTO Rally Breakerless Ign.	0-8000	6412944	3
1966	6 Cyl. Rally	0-8000	6468019	3
1966	6 Cyl. Breakerless Ign.	0-8000	6468023	3
1967	8 Cyl. Hood Mount (Primed)	0-8000	6468410	3
1967	6 Cyl. Hood Mount (Primed)	0-8000	6468436	3
1967	8 Cyl. Rally Car	0-8000	6468597	3
1967	6 Cyl. Rally Car	0-8000	6468598	3
1968	8 Cyl. Dash Mount	0-8000	6468834	3
1968	6 Cyl. Dash Mount	0-8000	6468833	3
1968	6 Cyl. Hood Mount (Primed)	0-8000	6468956	3
1969	8 Cyl.	0-8000	6469500	3
<b>PONTIAC FIREBIRD</b>				
1967	6 Cyl.	0-8000	6468670	3
1967	8 Cyl.	0-8000	6468675	3
1968-69	8 Cyl. Hood Mount (Primed)	0-8000	6468972	3
1968-69	6 Cyl. Hood Mount (Primed)	0-8000	6468956	3
1969	6 Cyl. Hood Mount (Primed)	0-8000	6469412	3
<b>PONTIAC GRAN PRIX</b>				
1969	8 Cyl.	0-8000	6469478	3
<b>FORD MUSTANG</b>				
1965-66	GT350	0-8000	6412426	3

\*This number is simply for reference in locating specifications, it is not the tachometer number.

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Year	Application	RPM	Tachometer	Group
<b>KEIKHAFER</b>				
1962	4 Cyl.	0-5000	1549423	1
1962	6 Cyl.	0-5000	6411528	1
1962	8 Cyl.	0-5000	6411529	1
1969	8 Cyl. Merc-Cruise	0-5000	6468940	1
1969	6 Cyl. Merc-Cruise	0-5000	6468939	1
1969	4 Cyl.	0-5000	6468938	1
1969	8 Cyl.	0-5000	6411529	1
1969	6 Cyl.	0-5000	6411528	1
1969	4 Cyl.	0-5000	1549423	1
1969	**8 Cyl.	0-6000	6468285	1
1969	**6 Cyl.	0-6000	6469152	1
1969	**4 Cyl.	0-6000	6468285	1
<b>OWENS YACHT</b>				
1962	8 Cyl.	0-5000	1549670	1
1962	8 Cyl.	0-5000	6411552	1
<b>WHITE TRUCK (Gas)</b>				
1962-66	6 Cyl.	0-4000	6411370	1
1962-65	8 Cyl.	0-4000	6411375	1
1963-66	P.M. Generator	0-3500	6411771	2
1965-66	P.M. Generator	0-3000	6468214	2
<b>WHITE TRUCK—DIESEL</b>				
1962-66	(And other Diesel Engines or Equipment using an Indicator Driven by a Permanent Magnet Generator)	0-3000	1549714	2

\*\*Circuit assembly is located externally integral with ignition system.

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### METER TEST SPECIFICATIONS

Tachometer Number	Housing Number	A.			B.		C.	
		Tachometer ROM $\pm 200$	With Variable Resistor set at 100,000 ohms	Milliammeter Indication $\pm 10\%$	Slowly adjust Variable Resistor to a lesser resistance to obtain a Milliammeter reading of	And Tachometer should read $\pm 200$ RPM		
1549356		720		.12	1 Milliampere	6000		
1549423		1200		.12	.5 Milliampere	5000		
1549670		600		.12	1 Milliampere	5000		
1549714		300		.12	1 Milliampere	3000		
1549831		840		.12	1 Milliampere	7000		
1549943		600		.12	1 Milliampere	6000		
1549980		720		.12	1 Milliampere	6000		
6411076		1440		.12	.5 Milliampere	6000		
6411121		1680		.12	.5 Milliampere	7000		
6411123		740		.12	1 Milliampere	6000		
6411124		840		.12	1 Milliampere	7000		
6411238		840		.12	1 Milliampere	7000		
6411241		740		.12	1 Milliampere	6000		
6411284		850		.12	1 Milliampere	7000		
6411300		720		.12	1 Milliampere	6000		
6411316		720		.12	1 Milliampere	6000		
6411363		720		.12	1 Milliampere	6000		
6411370		960		.12	.5 Milliampere	4000		
6411375		480		.12	1 Milliampere	4000		
6411412		600		.12	1 Milliampere	6000		
6411451		840		.12	1 Milliampere	7000		
6411472		480		.12	1 Milliampere	4000		
6411528		1200		.12	.5 Milliampere	5000		
6411529		1200		.12	.5 Milliampere	5000		
6411552		1200		.12	.5 Milliampere	5000		
6411580		720		.12	1 Milliampere	6000		
6411585		840		.12	1 Milliampere	7000		
6411751		840		.12	1 Milliampere	7000		
6411752		1680		.12	1 Milliampere	7000		
6411753		960		.12	1 Milliampere	8000		
6411771		420		.12	1 Milliampere	3500		
6411782		720		.12	1 Milliampere	6000		
6411826		740		.12	1 Milliampere	6000		
6411835		960		.12	1 Milliampere	8000		
6411857		720		.12	1 Milliampere	6000		
6411950		1680		.12	.5 Milliampere	7000		
6411985		1680		.12	.5 Milliampere	7000		
6411991		720		.12	1 Milliampere	6000		
6411992		1480		.12	.5 Milliampere	6000		
6412203		720		.12	1 Milliampere	6000		
6412235		740		.12	1 Milliampere	6000		
6412236		840		.12	1 Milliampere	7000		
6412292		1440		.12	.5 Milliampere	6000		
6412293		1680		.12	.5 Milliampere	7000		
6412323		840		.12	1 Milliampere	7000		
6412326		720		.12	1 Milliampere	6000		
6412411		960		.12	1 Milliampere	8000		
6412412		960		.12	1 Milliampere	8000		
6412413		960		.12	1 Milliampere	8000		

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### METER TEST SPECIFICATIONS

Tachometer Number	Housing Number	A. With Variable Resistor set at 100,000 ohms		B. Slowly adjust Variable Resistor to a lesser resistance to obtain a Milliammeter reading of	C. And Tachometer should read ± 200 RPM
		Tachometer RPM ± 200	Milliammeter Indication ± 10%		
6412426		960	.12	1 Milliampere	8000
6412504		740	.12	1 Milliampere	6000
6412531		720	.12	1 Milliampere	6000
6412536		720	.12	1 Milliampere	6000
6412548		720	.12	1 Milliampere	7000
6412549		840	.12	1 Milliampere	7000
6412571		720	.12	1 Milliampere	6000
6412572		840	.12	1 Milliampere	7000
6412716 (6412739)		720	.12	1 Milliampere	6000
6412735		840	.12	1 Milliampere	7000
6412754 (6412911)		720	.12	1 Milliampere	6000
6412767 (6412759)		740	.12	1 Milliampere	6000
6412774 (6412764)		840	.12	1 Milliampere	7000
6412778 (6412765)		740	.12	1 Milliampere	6000
6412782 (6412766)		840	.12	1 Milliampere	7000
6412840 (6412816)		840	.12	1 Milliampere	7000
6412844 (6412817)		840	.12	1 Milliampere	7000
6412911 (6412754)		720	.12	1 Milliampere	6000
6412943		960	.12	1 Milliampere	8000
6412944		960	.12	1 Milliampere	8000
6412983		840	.12	1 Milliampere	7000
6412984		840	.12	1 Milliampere	7000
6457998		840	.12	1 Milliampere	7000
6458484 (Circuit & Inst. Assy.)		720	.12	1 Milliampere	6000
6459770		840	.12	1 Milliampere	7000
6468019		840	.12	1 Milliampere	8000
6468023		840	.12	1 Milliampere	8000
6468214		360	.12	1 Milliampere	3000
6468228		600	.12	1 Milliampere	5000
6468270		492	.12	1 Milliampere	4100
6468285		1440	.12	.5 Milliampere	6000
6468319		840	.12	1 Milliampere	7000
6468320		600	.12	1 Milliampere	5000
6468321		600	.12	1 Milliampere	5000
6468333		840	.12	1 Milliampere	7000
6468334		840	.12	1 Milliampere	7000
6468336		840	.12	1 Milliampere	7000
6468410		960	.12	1 Milliampere	8000
6468416		400	.12	1 Milliampere	3500
6468436		960	.12	1 Milliampere	8000
6468499		840	.12	1 Milliampere	7000
6468500		840	.12	1 Milliampere	7000
6468521		480	.12	1 Milliampere	4000
6468597		960	.12	1 Milliampere	8000
6468598		960	.12	1 Milliampere	8000
6468662		400	.12	1 Milliampere	3500
6468670		840	.12	1 Milliampere	7000
6468675		840	.12	1 Milliampere	7000



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### METER TEST SPECIFICATIONS

Tachometer Number	A. With Variable Resistor set at 100,000 ohms		B. Slowly adjust Variable Resistor to a lesser resistance to obtain a Milliammeter reading of	C. And Tachometer should read ± 200 RPM
	Tachometer RPM ± 200	Milliammeter Indication ± 10%		
6468695	840	.12	1 Milliampere	7000
6468696	840	.12	1 Milliampere	7000
6468697	840	.12	1 Milliampere	7000
6468713	840	.12	1 Milliampere	7000
6468714	840	.12	1 Milliampere	7000
6468715	840	.12	1 Milliampere	7000
6468821	840	.12	1 Milliampere	7000
6468822	840	.12	1 Milliampere	7000
6468823	960	.12	1 Milliampere	8000
6468828	600	.12	1 Milliampere	5000
6468833	840	.12	1 Milliampere	7000
6468834	960	.12	1 Milliampere	8000
6468902	600	.12	1 Milliampere	5000
6468903	600	.12	1 Milliampere	5000
6468909	840	.12	1 Milliampere	7000
6468910	840	.12	1 Milliampere	7000
6468911	840	.12	1 Milliampere	7000
6468912	840	.12	1 Milliampere	7000
6468913	840	.12	1 Milliampere	7000
6468914	840	.12	1 Milliampere	7000
6468938	1200	.12	.5 Milliampere	5000
6468939	1200	.12	.5 Milliampere	5000
6468940	1200	.12	.5 Milliampere	5000
6468956	960	.12	1 Milliampere	8000
6468972	960	.12	1 Milliampere	8000
6469100	840	.12	1 Milliampere	7000
6469101	840	.12	1 Milliampere	7000
6469152	1440	.12	.5 Milliampere	6000
6469360	840	.12	1 Milliampere	7000
6469361	840	.12	1 Milliampere	7000
6469362	840	.12	1 Milliampere	7000
6469381	840	.12	1 Milliampere	7000
6469382	840	.12	1 Milliampere	7000
6469383	840	.12	1 Milliampere	7000
6469412	960	.12	1 Milliampere	8000
6469424	960	.12	1 Milliampere	8000
6469478	960	.12	1 Milliampere	8000
6469489	492	.12	1 Milliampere	4100
6469499	960	.12	1 Milliampere	8000
6469500	960	.12	1 Milliampere	8000
6491312	840	.12	1 Milliampere	7000
6491313	840	.12	1 Milliampere	7000
6491314	840	.12	1 Milliampere	7000

## AC SERVICE BULLETIN

### AC ELECTRONIC TACHOMETER REPAIR

#### CIRCUIT ASSEMBLY TEST SPECIFICATIONS USING ENGINE OR IGNITION SIMULATOR

Tachometer Number	A. Adjust Potentiometer to provide a Milliammeter indication of 0-	B. Make Final Adjustment to provide a Milliammeter indication of	Tachometer Number	Housing Number	A. Adjust Potentiometer to provide a Milliammeter indication of 0-	B. Make Final Adjustment to provide a Milliammeter indication of
1549356	.33	.33	6412236		.28	.28
(a)1549423	.20	.20	(b)6412292		.17	.17
1549670	.40	.40	(b)6412293		.17	.17
1549714	.67	.67	6412323		.28	.28
1549831	.28	.28	6412326		.33	.33
1549943	.33	.33	(a)6412411		.25	.25
1549980	.33	.33	(a)6412412		.25	.25
(a) (c)6411076	.17	.17	(a) (b)6412413		.25	.25
6411121	.14	.14	(a)6412426		.25	.25
6411123	.33	.33	6412504		.33	.33
6411124	.28	.28	6412531		.33	.33
6411238	.28	.28	6412536		.33	.33
6411241	.33	.33	(a)6412548		.33	.33
6411284	.28	.28	(a)6412549		.28	.28
6411300	.33	.33	(a) (b)6412571		.33	.33
6411316	.33	.33	(a) (b)6412572		.28	.28
6411363	.33	.33	(a)6412716 (6412739)		.33	.33
(a)6411370	.25	.25	6412735		.28	.28
See Note 1			(a)6412754 (6412911)		.33	.33
6411375	.50	.50	6412767 (6412759)		.33	.33
See Note 1			6412774 (6412764)		.28	.28
6411412	.33	.33	(b)6412778 (6412765)		.33	.33
6411451	.28	.28	(b)6412782 (6412766)		.28	.28
6411472	.50	.50	6412840 (6412816)		.28	.28
(a)6411528	.20	.20	(b)6412844 (6412817)		.28	.28
(a)6411529	.20	.20	6412911 (6412754)		.33	.33
(a)6411552	.20	.20	(a)6412943		.25	.25
6411580	.33	.33	(a) (b)6412944		.25	.25
(b)6411585	.28	.28	(a)6412983		.28	.28
6411751	.28	.28	(a) (b)6412984		.28	.28
6411752	.28	.28	6457998		.28	.28
(a)6411753	.25	.25	6458484 (Circuit & Inst. Assy.)		.33	.33
6411771	.43	.43	6459770		.28	.28
6411782	.33	.33	(a)6468019		.25	.25
(a)6411826	.33	.33	(a) (b)6468023		.25	.25
(b)6411835	.25	.25	6468214		.67	.67
6411857	.33	.33	6468228		.40	.40
(b)6411950	.15	.15	6468270		.49	.49
(b)6411985	.15	.15	6468285		.17	—
6411991	.33	.33	6468319		.28	—
(b)6411992	.17	.17	*6468320		.40	.40
(a)6412203	.33	.33				
6412235	.33	.33				

\*Breakerless Ignition.

**Note 1:** This Tachometer is used on a positive ground system.  
 (a) When testing the circuit assembly of this Tachometer, a 100 ohm resistor must be used in series with Milliammeter.  
 (b) Indicates use in a breakerless ignition system.  
 (c) May be stamped 6411993.

# AC SERVICE BULLETIN

## AC ELECTRONIC TACHOMETER REPAIR

### CIRCUIT ASSEMBLY TEST SPECIFICATIONS USING ENGINE OR IGNITION SIMULATOR

Tachometer Number	A.	B.	Tachometer Number	Housing Number	A.	B.
	Adjust Potentio- meter to provide a Milliammeter indication of 0-	Make Final Adjustment to provide a Milliam- meter indication of			Adjust Potentio- meter to provide a Milliammeter indication of 0-	Make Final Adjustment to provide a Milliam- meter indication of
6468321	.40	.40	6468909		.28	.28
6468333	.28	.28	6468910		.28	.28
6468334	.28	.28	6468911		.28	.28
6468336	.28	.28	6468912		.39	—
6468410	.25	.25	6468913		.39	—
6468416	.57	.57	6468914		.39	—
6468436	.25	.25	6468938		.20	.20
6468499	.28	—	6468939		.20	.20
6468500	.28	—	6468940		.20	.20
6468521	.50	.50	6468956		.25	—
6468597	.25	.25	6468972		.25	—
6468598	.25	.25	6469100		.28	—
6468662	.57	.57	6469101		.28	—
6468670	.28	.28	6469152		.17	—
6468675	.28	.28	6469360		.28	—
6468695	.28	.28	6469361		.28	—
6468696	.28	.28	6469362		.28	—
6468697	.28	.28	6469381		.28	—
6468713	.28	—	6469382		.28	—
6468714	.28	—	6469383		.28	—
6468715	.28	—	6469412		.25	.25
6468821	.28	—	6469424		.25	.25
6468822	.28	—	6469478		.25	—
6468823	.25	—	6469489		.50	—
6468828	.40	.40	6469499		.25	—
6468833	.28	—	6469500		.25	—
6468834	.25	—	6491312		.29	—
6468902	.40	—	6491313		.29	—
6468903	.40	—	6491314		.29	—

**Note:** Blank spaces in Column "B" indicate that Circuit Assembly has a Fixed Resistor instead of a Potentiometer, therefore is not adjustable. However, the circuit should provide the Milliammeter Specification shown in Column "A".

# AC SERVICE BULLETIN

## AC ELECTRONIC TACHOMETER REPAIR

### GROUP I TACHOMETERS

The ignition lead-in connected to the insulated "coil" terminal at rear of case so identified. Those assemblies transistor operated have an additional insulated 12V terminal.

In addition, the following special note applies: Chevelle tachometer assemblies 6412759, 6412765, 6412816, and 6412817 external wire identification is as follows:

- a. Brown is the ignition terminal.
- b. Black (with pink stripe) is 12V battery terminal.
- c. Gray is 12V lamp terminal.

### DISASSEMBLY (GENERAL PROCEDURE)

**Caution:** The work area must be very clean (Particularly of metal chips).

1. Pry up bezel, bezel tabs, or crimp and remove glass and bezel gasket.
  - a. Handle sub-dial and set pointer carefully if used.
2. Remove the nut, connector and insulating washer from the insulated terminal at rear of tachometer case.
3. Remove the nuts from tachometer assembly mounting and grounding studs at rear of tachometer case. Lift out the meter movement and circuit package as a unit.
4. Remove meter lead wire from the circuit assembly by unsoldering the connection at the circuit assembly. Note the position and location as a reconnection will have to be made.
5. Remove the screws from back of circuit assembly and separate meter movement from circuit package. (To be performed only if a meter or circuit package replacement is made.)
6. Further disassembly is not recommended.

### TESTING THE METER MOVEMENT (See Figure 1.)

1. Set variable resistor to the 100,000 ohm position.
2. Connect battery, variable resistor, meter movement and milliammeter as shown in Fig. 1.

**Warning:** Do not accidentally short any part of the test circuit to ground.

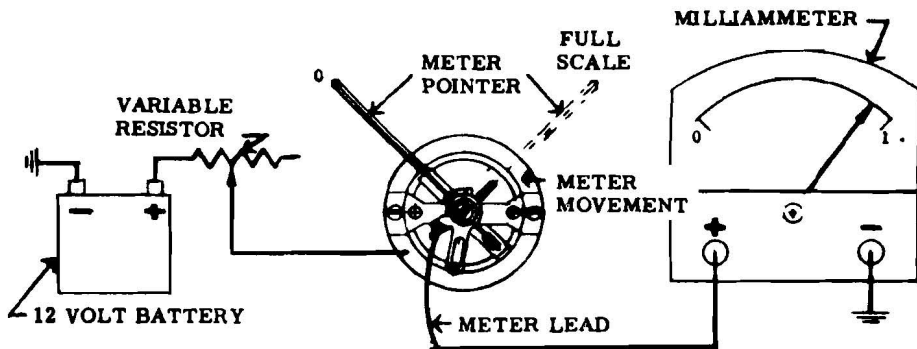


FIGURE 1

# AC SERVICE BULLETIN

## AC ELECTRONIC TACHOMETER REPAIR GROUP I TACHOMETERS (Cont'd.)

3. Tachometer meter movement is satisfactory if the specified readings are obtained under the conditions described in A., B., and C. in the Meter Test Specifications on pages 7, 8 and 9.

### TESTING THE CIRCUIT ASSEMBLY (Figure 2 illustrates a typical test circuit)

1. Attach jumper wire from distributor side of coil (Battery side of coil on transistor ignition) on an eight-cylinder engine or ignition simulator to the insulated coil terminal of the tachometer.
2. Ground circuit assembly with jumper wire.
3. Connect 12V potential to the insulated battery terminal on those tachometers which are transistor operated.
4. Connect negative lead of test milliammeter to the circuit assembly terminal from which the tachometer meter lead was removed. Connect positive lead of milliammeter to ground.
5. Attach test tachometer (Automotive Service Type) to distributor side of ignition coil.
6. Switch test tachometer scale to the same number of cylinders as tachometer being serviced. (If it's a four cylinder and test tachometer does not have a four-cylinder scale, leave it on the eight cylinder position and reduce value in paragraph seven below to 1,000 r.p.m.)
7. Operate engine or drive simulator at 2000 r.p.m. as indicated on the test tachometer.
8. Tachometer circuit assembly is satisfactory if the specified readings are obtained under the conditions described in "A" and "B" in the Circuit Assembly Test Specifications on pages 10 and 11.

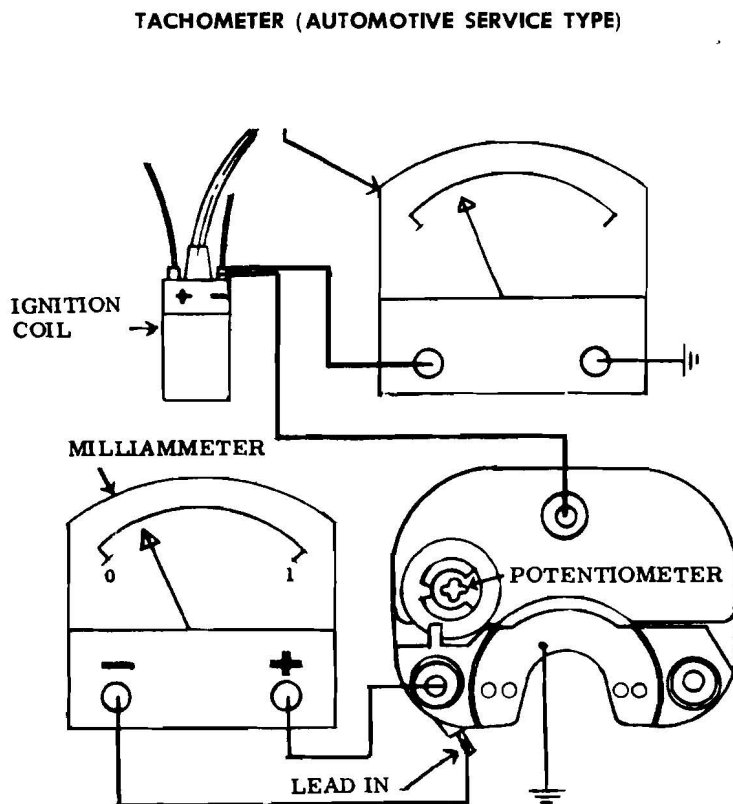


FIGURE 2

# AC SERVICE BULLETIN

## AC ELECTRONIC TACHOMETER REPAIR

### GROUP I TACHOMETERS (Cont'd.)

#### FINAL CALIBRATION AND PERFORMANCE TESTING

1. Attach jumper wire from distributor side of coil (battery side of coil on transistor ignition) on an eight-cylinder engine or ignition simulator to the insulated coil terminal of the tachometer.
2. Connect test tachometer. (Switch scale to same number of cylinders as tachometer being serviced.)
3. Vary engine RPM from idle to 2000 RPM. Electronic tachometer indication should be smooth throughout range of operation and comparable to the test tachometer. Adjust potentiometer at 2000 RPM if necessary.  
If a simulator is being used, check tachometer performance by varying RPM from idle to 5000 RPM.
4. Seal or replace brass plug or tape on the potentiometer opening.
5. Remove tape from bezel and crimp bezel.

### GROUP II TACHOMETERS

(Various Tachometers operated by AC, Permanent Magnet "P.M." generator).

#### APPLICATION

Diesel Engine trucks or other equipment with an engine take-off point or shaft which is used to drive the P.M. Generator.

#### EXPLANATION OF OPERATION

Since a Diesel engine does not employ an electrical ignition circuit, an RPM signaling and sensing device must be utilized. Thus a permanent magnet generator is engine driven, providing an alternating current (AC) signal to tachometer. This signal is rectified to direct current (DC), and is then drawn through the meter movement causing pointer deflection interpreted as the number of pulses per unit time (revolutions per minute) as the pointer moves across the calibrated dial.

#### TOOLS AND EQUIPMENT NEEDED FOR TACHOMETER DISASSEMBLY, REASSEMBLY, DIAGNOSIS, SERVICING AND CALIBRATION

In addition to those tools listed on page 1, the following equipment is needed.

1. Variable speed test stand (or a distributor test stand if available).
2. AC PM generator 6412848. (Available through United Motors Service.)

#### IDENTIFICATION OF TERMINALS

The output signal generated by the PM generator is connected to the one insulated terminal at rear of tachometer case.

#### DISASSEMBLY

1. Pry up bezel and remove bezel, glass, gaskets and subdial. (It may be necessary to use knife edge to separate gasket from case.) Be careful not to allow metal particles to enter case.

# AC SERVICE BULLETIN

## AC ELECTRONIC TACHOMETER REPAIR

### GROUP II TACHOMETERS (Cont'd.)

2. Remove nuts, washers, and insulating washer from insulated stud at rear of case.
3. Remove the nuts from tachometer assembly mounting and grounding studs at rear of tachometer case.  
Lift out the meter movement and circuit assembly as a unit. (Do not misplace the insulating washer which insulates the insulating stud from the inside of case.)
4. Remove the two dial screws and washers and carefully slide the dial up and out. Do not damage pointer.
5. Remove the white meter lead from the circuit board by unsoldering at front side of circuit board.  
Remove the black meter lead from the circuit board by unsoldering at front side of circuit board.  
Note the location, as reconnection will have to be made.
6. Remove the number 2 screws from back of circuit assembly and separate meter movement from circuit assembly. (To be performed only if a meter circuit assembly replacement is to be made.)  
**Note:** Further disassembly is not required.

### TESTING THE METER MOVEMENT (See Fig. 4 on Page 17).

1. Set variable resistor to the 100,000 ohm position.
2. Connect battery, variable resistor, meter movement and milliammeter, as shown in Fig. 4.  
**Warning:** Do not accidentally short any part of the test circuit to ground.
3. Tachometer meter movement is satisfactory if the specified readings are obtained under the conditions described in A, B, and C in the Meter Test Specification on pages 7 to 9.

### TESTING THE CIRCUIT ASSEMBLY

1. Remove plastic drive key (if present) from drive end of permanent magnet generator. In its place insert a short piece of (squared to .104) .130 OD speedometer cable. Connect the other end of the cable to a variable speed test stand.
2. Connect lead from generator to centrally located terminal at rear of circuit board. (This is the insulated terminal which normally receives the generator impulse.)
3. Make remainder of connections as shown in Fig. 3.
4. Run test stand at 750 RPM.
5. Tachometer circuit assembly is satisfactory if the specified readings are obtained under the conditions described in A and B in the Circuit Assembly Test Specifications on pages 10 and 11.

### CALIBRATION OF TACHOMETERS 1549714, 6411472, 6411771, 6468214, 6468521, 6468662

1. Attach jumper wire from PM generator terminal to center insulated terminal of tachometer and ground tachometer case to generator housing with jumper wire.
2. Drive generator at a steady test stand speed of 1000 RPM.
3. Adjust tachometer potentiometer so that tachometer indicates 2000 RPM. Use a clean insulated screwdriver.
4. Vary generator driver from 200 RPM to 1500 RPM. Tachometer indication should be smooth throughout range of operation.

### CALIBRATION OF TACHOMETER 6468416

1. Attach jumper wire from PM generator terminal to center insulated terminal of tachometer and ground tachometer case to generator housing with jumper wire.

## AC SERVICE BULLETIN

### AC ELECTRONIC TACHOMETER REPAIR

#### GROUP II TACHOMETERS (Cont'd.)

2. Drive generator at a steady test stand speed of 2000 RPM.
3. Adjust tachometer potentiometer so that tachometer indicates 1000 RPM.
4. Vary generator drive speed to check tachometer performance. Indication should be smooth and proportional throughout the range operation.

#### PERFORMANCE TESTING THE PERMANENT MAGNET GENERATOR

The PM generator is designed for rugged, long lived performance, with no requirements for field service. Special equipment is required to charge and calibrate the special magnet. Bearings are lubricated for the lifetime of the generator. Should it be necessary to check the performance of the unit, proceed as follows:

##### METHOD A

1. Drive generator with a test stand operating at 1000 RPM.
2. A tachometer which is known to be calibrated and in good working order connected to output terminal of generator should indicate 2000 RPM  $\pm$  100.

##### METHOD B

1. Connect "+" lead from AC voltmeter (or a multimeter with selector set to measure AC voltage) to output terminal of generator. Connect "-" lead from voltmeter to frame of generator.
2. Drive generator with a test stand operating at 1000 RPM. The voltmeter should indicate 6 volts  $\pm$  5%.  
Then increase test stand speed to 2000 RPM. The voltmeter should indicate 12 volts  $\pm$  5%.
3. If no voltage or tachometer indication is shown, or the value is above or below the desired figure in either test "A" or "B", the generator should be replaced.

**Note:** If Method "A" or "B" denotes no defect, then the vehicle should be checked for a poor ground.

#### GROUP III TACHOMETERS

This group consists of tachometers in which the electronic components are mounted on an insulated board.

#### IDENTIFICATION OF TACHOMETER TERMINALS

The ignition pulse is applied to the insulated coil terminal so identified. Transistor assemblies have an additional 12V terminal. Assemblies using 12V battery potential for lighting purposes have a 12V terminal marked "lamp".

On Pontiac tachometers without case, (6412411, 6412412, 6412413, 6412943, 6412944, 6468019, and 6468023), (also Chevrolet Corsa 6412203) the following rule applies:

Viewing the rear of circuit board, the insulated terminal on lower right is always the coil terminal. On transistorized assemblies, the insulated terminal on lower left is the 12V battery terminal.

#### DISASSEMBLY (General)

1. Pry up crimped over areas of bezel.
2. Lift off retainer, sub dial, being careful not to damage pointers.
3. Remove the nuts from the mounting and grounding studs at rear of case and lift out tachometer assembly.
4. Remove the black and the white meter leads from circuit board by unsoldering. Carefully note the position as a reconnection will have to be made.



## AC SERVICE BULLETIN

### AC ELECTRONIC TACHOMETER REPAIR GROUP III TACHOMETERS (Cont'd.)

5. Remove nuts from back of circuit board assembly and separate circuit board assembly from meter assembly.  
(To be performed only if a meter or circuit assembly replacement is to be made..)

Further disassembly is not recommended.

#### TESTING THE METER MOVEMENT (See Figure 4)

1. Set variable resistor to the 100,000 ohm position.
2. Connect battery, variable resistor, meter movement and milliammeter as shown in Fig. 4.

**Warning:** Do not accidentally short any part of the test circuit to ground.

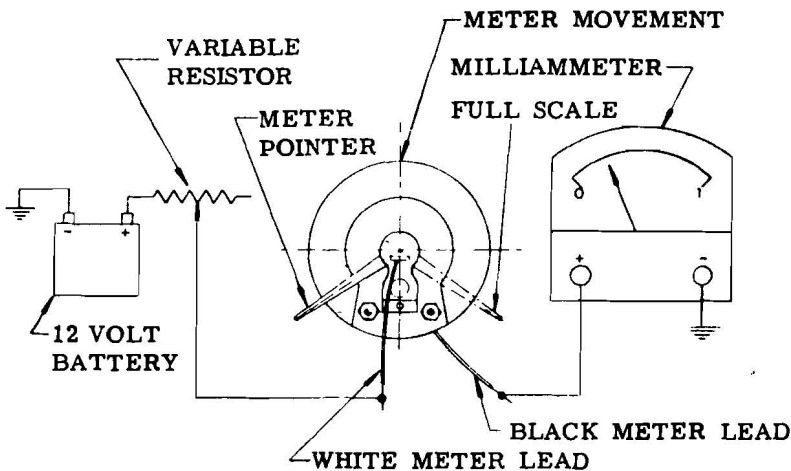


FIGURE 4

3. Tachometer meter movement is satisfactory if the specified readings are obtained under the conditions described in "A", "B" and "C" in the Meter Test Specifications on pages 7, 8 and 9.

#### TESTING THE CIRCUIT ASSEMBLY (Figure 5 illustrates a typical test Circuit)

1. Attach jumper wire from distributor side of coil (battery side of coil on transistor ignition) on an eight cylinder engine or ignition simulator to the insulated coil terminal of tachometer.
2. Ground circuit assembly with jumper wire.
3. Connect 12V potential to the insulated battery terminal on those tachometers which are transistor operated.
4. Connect positive (+) terminal of test milliammeter to the circuit board at the connection point to which the white lead was soldered.
5. Connect negative (-) terminal of test milliammeter to the circuit board at that connection point to which the black meter lead was soldered.
6. Attach test tachometer (automotive service type) to distributor side of ignition coil.
7. Switch test tachometer scale to the same number of cylinders as tachometer being serviced.
8. Operate engine or drive simulator at 2000 RPM as indicated on test tachometer.
9. Tachometer circuit assembly is satisfactory if the specified readings are obtained under the conditions described in "A" and "B" in the Circuit Assembly Test Specifications on pages 10 and 11.

## AC SERVICE BULLETIN

### AC ELECTRONIC TACHOMETER REPAIR

#### GROUP III TACHOMETERS (Cont'd.)

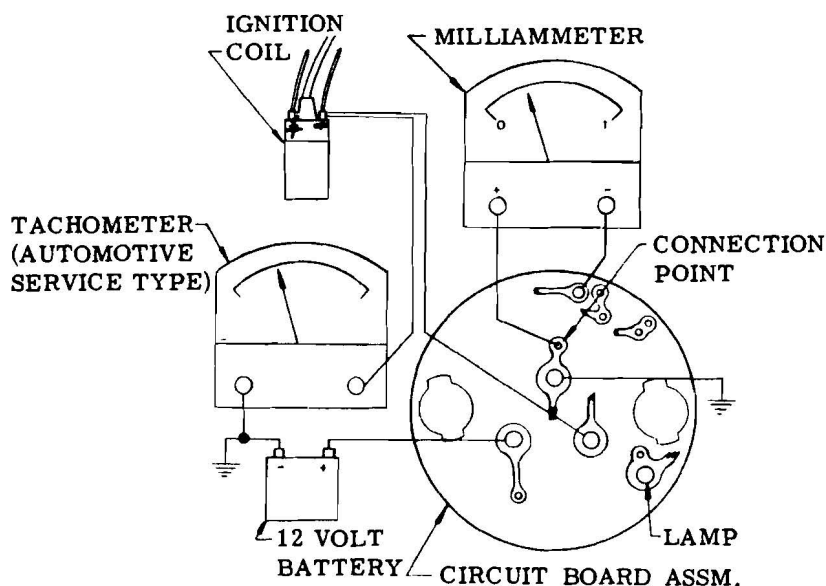


FIGURE 5

### FINAL CALIBRATION AND CHECK OUT

1. Attach jumper wire from distributor side of coil (battery side of coil on transistor ignition) on an eight cylinder engine or ignition simulator to the insulated coil terminal of tachometer.
2. Connect test tachometer. (Switch scale to same number of cylinders as tachometer being serviced.)
3. Vary engine RPM from idle to 2000 RPM. Electronic tachometer indication should be smooth throughout range of operation and comparable to the test tachometer. Adjust potentiometer at 2000 RPM if necessary.

**Note:** When calibrating the tachometer from the 6458484 circuit and instrument cluster assembly and 6457998 combination clock tachometer, solder the white meter lead to the "M+" location on the Tachometer circuit board. Solder the black meter lead to the "M-" location on the circuit board. Connect the heavy black wire on the circuit board to ground with a jumper wire.

If a simulator is being used, check tachometer performance by varying RPM from idle to 5000 RPM.

4. Seal or replace brass plug or tape on the potentiometer opening.
5. Remove tape from bezel and crimp bezel.

Special notes applying to tachometers in Group III.

1. Tachometer and housing assembly 6412911 and 6412739 utilize two miniature lamps (6412563) available from United Motors Service, for lighting purposes. Should failure occur, replacement can be made as follows:
  - a. Cut defective bulb lead-in wires at about 1/4 inch from bulb base.
  - b. Splice new bulb lead-ins to exposed wires and solder connections.
  - c. Secure bulb in position with tape.
2. Due to the design of the Oldsmobile 6458484 circuit and cluster the tachometer used in this assembly will be received by the repair station with the meter separated from the circuit board. After the assembly has been serviced, unsolder the white and black meter leads, carefully pack the assembly and return to dealer.

# AC SERVICE BULLETIN

## AC ELECTRONIC TACHOMETER REPAIR

### GROUP III TACHOMETERS (Cont'd.)

### FINAL CALIBRATION AND CHECK OUT (Cont'd.)

3. The following wiring color codes and special notes may be used for identification purposes.

#### 1967 Chevelle

- a. Light blue wire to directional signal
- b. Black wire to ground
- c. Brown wire to coil negative
- d. Pink wire to fused ignition
- e. Gray wire to lamp.

#### Oldsmobile Tachometer assemblies 6412911 and 6412739

- a. Brown wire is the ignition terminal
- b. Black wire is ground
- c. Gray wire is the 12V lamp terminal.

#### Pontiac hood tachometer

'67

- a. Illumination wire is black
- b. Ground wire (2) is black
- c. Ignition wire is black and pink stripped.

'68-69

- a. Illumination wire (2) is grey
- b. Ground wire is black
- c. Ignition wire is brown.

4. 1967-1968 and 1969 6-cyl. and 8-cyl. Pontiac hood tachometers can be differentiated by the fact that 6-cyl. applications are "red lined" at from 6500 to 8000 while 8-cyl. applications are "red lined" at from 5000 to 8000 RPM.

5. In rare cases water leakage complaints may develop on early production 1967 Pontiac hood tachometers. If the tachometer is being serviced for any reason, apply windshield sealing mastic to area indicated as shown in Figure 6. For 1968 and 1969 applications, follow similar procedure resealing tachometer housing.

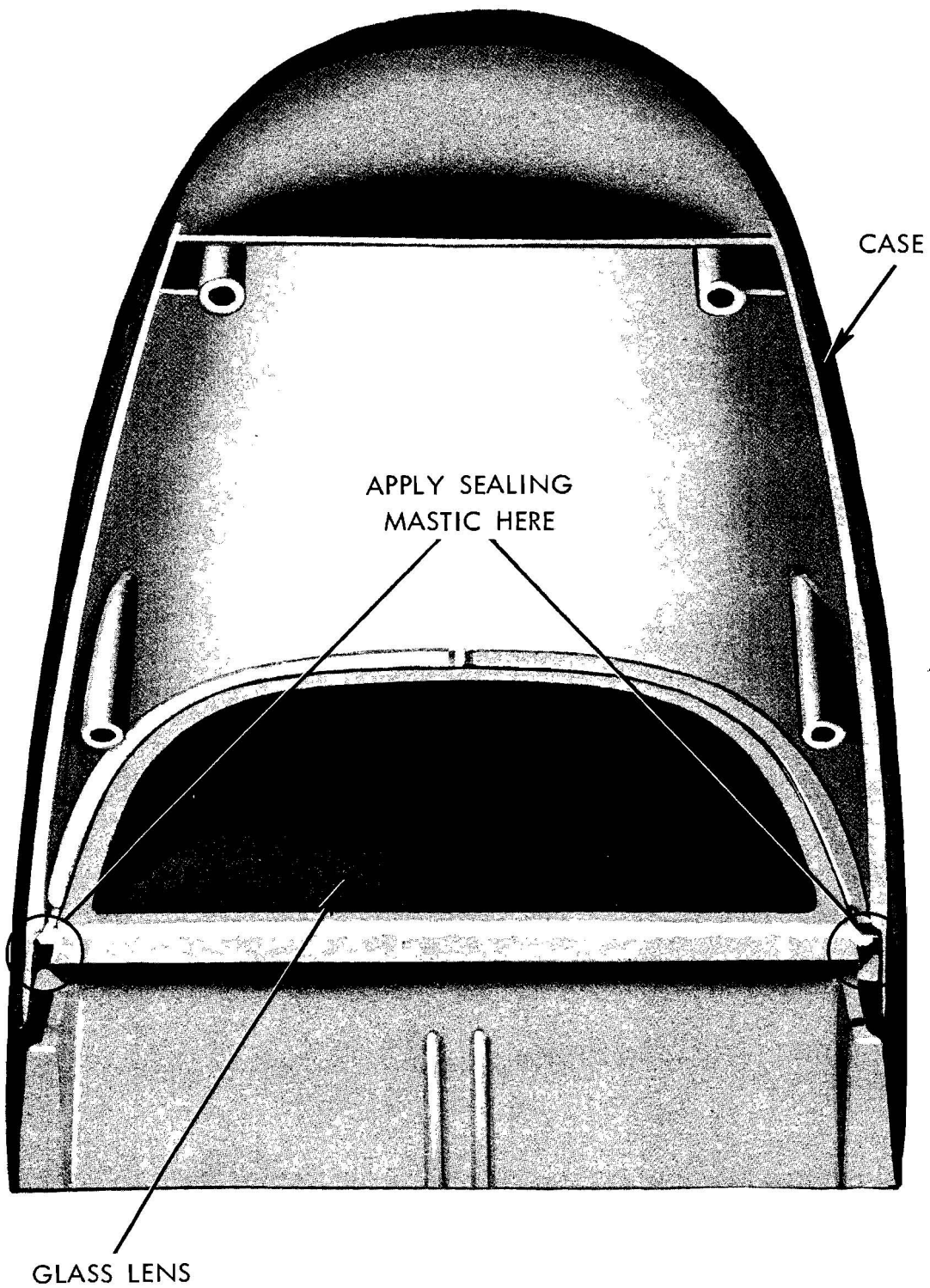


FIGURE 6

## AC SERVICE BULLETIN

### AC ELECTRONIC TACHOMETER REPAIR

### PART 2 (USING TC\* 100 TESTER FOR TESTING AND CALIBRATION.)

#### General Information

The following outlined procedures differ from Part I only in that the power and signal source is from the 110 volt operated \*TC 100 tester instead of a battery and ignition coil. The \*TC 100 tester will not reliably test the circuit assemblies of 1965 and earlier GM original equipment breakerless ignition systems. However, it will test the meter movement of all AC tachometers.

The \*TC 100 tester (see figure 7) has the following lead connections:

1. 110 Volt Power Input
2. Ground
3. Signal
4. 14 Volt
5. Meter

It has three controls:

1. On-Off, and low voltage power switch.
2. Variable potentiometer (except early models) by which the meter output can be varied from .10 to 1 milli-ampere.
3. RPM switch (by which signal frequency can be varied)—See Calibration and Check Out Chart, Page 22).



FIGURE 7

#### PRELIMINARY BENCH TESTING OF COMPLETE TACHOMETER

- A. Connect tester-calibrator leads as follows:

# AC SERVICE BULLETIN

## AC ELECTRONIC TACHOMETER REPAIR

### INDUCTOR TYPES See Fig. 8, Page 27.

1. Signal lead to insulated "coil" terminal or connector.
2. Ground lead to tachometer case.

### TRANSISTORIZED TYPES See Fig. 9 and 10, Pages 28 and 29.

1. "Signal" lead to tachometer insulated "coil" terminal or connector.
2. "14V" lead to tachometer "BAT" terminal.
3. "Ground" lead to tachometer case.

B. Connect to 110 volt AC supply line and turn power switch on. (Red indicator light should glow).

C. Operate RPM selector switch from "A" thru "D" positions (if applicable) as shown in the **Calibration And Check Out Chart**.

D. Observe the following:

Condition 1 — If tachometer registers proper RPM, place power switch in the "Low Voltage" position. (at position "A" and "B" only)

- a. If pointer moves down scale more than 100 RPM replace circuit assembly.
- b. If pointer remains stationary (within 100 RPM) proceed to Condition 2.

Condition 2 — If tachometer registers proper RPM or can be adjusted to proper RPM, tachometer is satisfactory. In some cases where erratic operation is suspected, allow the unit to run for several minutes and make a recheck. If performance is satisfactory, then a problem in the car wiring and/or ignition system is indicated.

Condition 3 — If tachometer reads low or is completely dead, first perform meter test, then circuit test. Replace defective component.

Condition 4 — If tachometer performs erratically, perform both meter and circuit tests. Replace defective components.

## CALIBRATION AND CHECK OUT CHART

### Tachometer Engine Applications

Selector Position	Engines with one pos. ign. pulse/rev.	4 Cylinder 4 Cycle	6 Cylinder 4 Cycle	8 Cylinder 4 Cycle
A	3600 RPM	1800 RPM	1200 RPM	900 RPM
B	—	5400 RPM	3600 RPM	2700 RPM
C	—	—	6000 RPM	4500 RPM
D	—	—	—	6300 RPM

# AC SERVICE BULLETIN

## AC ELECTRONIC TACHOMETER REPAIR

### METER TEST

- A. Adjust pointer to "O" position if required.
- B. Disconnect meter lead or leads from circuit assembly.
- C. Set tester potentiometer to maximum resistance (Late model tester only).
- D. Connect tester ground lead to black meter lead and red lead from tester meter jack to the white wire on the meter. (Or meter frame if no white wire is visible.) Turn power switch "ON"—Meter should read below 1000 RPM.

+200.

- E.\*Adjust TC 100 potentiometer so that meter indicates full scale deflection -200.
  - 1. 1/2 milliamperemeters should register full scale with scribe line on potentiometer knob aligned with Blue Dot.
  - 2. 1 milliamperemeter should register full scale with scribe line on potentiometer knob aligned with Red Dot.
- F. If required, meter coil resistance can be measured with an ohmmeter. It should be between 60 and 300 ohms. (Do not use RXI range as meter can be damaged by excessive current.)

Meters which cannot meet the specifications under "E" and "F" should be replaced.

### CIRCUIT TEST

- A. Refer to the proper circuit test illustrations as shown in Part I. Note that when the TC 100 is being used, it replaces the ignition coil and the automotive type test tachometer is not required.
- B. Connect Tester—Calibrator and Milliamperemeter leads as follows:
  - 1. Connect signal lead to coil terminal.
  - 2. Connect lead from 14V Jack to battery terminal if transistorized circuit assembly is being tested.
  - 3. Connect ground lead to ground on circuit assembly.
  - 4. Connect milliamperemeter positive lead to ground on circuit assembly.
  - 5. Connect milliamperemeter negative lead to terminal from which black meter lead was removed.
- C. Turn RPM selector switch to position "B" for all 4, 6, or 8 cylinder engines.
- D. Refer to test specifications on pages 23—25. Circuit assemblies which cannot meet specifications should be repaired or replaced.

\*Late model testers only. If early model tester is used, 1/2 milliamperemeters will register full scale, 1 milliamperemeters will register 1/2 scale.

### CIRCUIT ASSEMBLY TEST SPECIFICATIONS USING TC 100

Tachometer Number	A.	B.	Tachometer Number	Housing Number	A.	B.
	Adjust Potentiometer to provide a Milliammeter indication of 0-	Make Final Adjustment to provide a Milliammeter indication of			Adjust Potentiometer to provide a Milliammeter indication of 0-	Make Final Adjustment to provide a Milliammeter indication of
1549356	.45	.45	6412236		.39	.39
(a) 1549423	.27	.27	(b) 6412292		.22	.22
1549670	.54	.54	(b) 6412293		.18	.18
1549714	.90	.90	6412323		.39	.39
1549831	.39	.39	6412326		.45	.45
1549943	.45	.45	(a) 6412411		.34	.34
1549980	.45	.45	(a) 6412412		.34	.34
(a), (c) 6411076	.23	.23	(a), (b) 6412413		.34	.34
6411121	.18	.18	(a) 6412426		.34	.34
6411123	.45	.45	6412504		.45	.45

# AC SERVICE BULLETIN

## AC ELECTRONIC TACHOMETER REPAIR

### CIRCUIT ASSEMBLY TEST SPECIFICATIONS USING TC 100 (Cont'd.)

Tachometer Number	A. Adjust Potentio- meter to provide a Milliammeter indication of 0-	B. Make Final Adjustment to provide a Milliam- meter indication of	Tachometer Number	Housing Number	A. Adjust Potentio- meter to provide a Milliammeter indication of 0-	B. Make Final Adjustment to provide a Milliam- meter indication of
6411124	.39	.39	6412531		.45	.45
6411238	.39	.39	6412536		.45	.45
6411241	.45	.45	(a)6412548		.39	.39
6411284	.39	.39	(a)6412549		.39	.39
6411300	.45	.45	(a),(b)6412571		.45	.45
6411316	.45	.45	(a),(b)6412572		.39	.39
6411363	.45	.45	(a)6412716 (6412739)		.45	.45
(a)6411370	.34	.34	6412735		.39	.39
See Note 1			(a)6412754 (6412911)		.45	.45
6411375	.68	.68	6412767 (6412759)		.45	.45
See Note 1			6412774 (6412764)		.39	.39
6411412	.45	.45	(b)6412778 (6412765)		.45	.45
6411451	.39	.39	(b)6412782 (6412766)		.39	.39
6411472	.68	.68	6412840 (6412816)		.39	.39
(a)6411528	.27	.27	(b)6412844 (6412817)		.39	.39
(a)6411529	.27	.27	6412911 (6412754)		.45	.45
(a)6411552	.27	.27	(a)6412943		.34	.34
6411580	.45	.45	(a),(b)6412944		.34	.34
(b)6411585	.39	.39	(a)6412983		.39	.39
6411751	.39	.39	(a),(b)6412984		.39	.39
6411752	.39	.39	6457998		.39	.39
(a)6411753	.34	.34	6458484 (Circuit & Inst. Assy.)		.45	.45
6411771	.77	.77				
6411782	.45	.45	6459770		.39	.39
(a)6411826	.45	.45	(a)6468019		.34	.34
(b)6411835	.34	.34	(a),(b)6468023		.34	.34
6411857	.45	.45	6468214		.90	.90
(b)6411950	.18	.18	6468228		.54	.54
(b)6411985	.18	.18	6468270		.69	.69
6411991	.45	.45	6468285		.23	—
(b)6411992	.22	.22	6468319		.39	—
(a)6412203	.45	.45	6468320		.54	.54
6412235	.45	.45	6468909		.39	.39
6468321	.54	.54	6468910		.39	.39
6468333	.39	.39	6468911		.39	.39
6468334	.39	.39	6468912		.39	—
6468336	.39	.39	6468913		.39	—
6468410	.34	.34	6468914		.39	—
6468416	.77	.77	6468938		.27	.27
6468436	.34	.34	6468939		.27	.27
6468499	.39	—	6468940		.27	.27
6468500	.39	—	6468956		.34	—
6468521	.68	.68	6468972		.34	—
6468597	.34	.34	6469100		.39	—
6468598	.34	.34	6469101		.39	—
6468662	.77	.77	6469152		.23	—
6468670	.39	.39	6469360		.39	—
6468675	.39	.39				



# AC SERVICE BULLETIN

## AC ELECTRONIC TACHOMETER REPAIR

### CIRCUIT ASSEMBLY TEST SPECIFICATIONS USING TC 100 (Cont'd.)

Tachometer Number	A. Adjust Potentiometer to provide a Milliammeter indication of 0-	B. Make Final Adjustment to provide a Milliammeter indication of	Tachometer Number	A. Adjust Potentiometer to provide a Milliammeter indication of 0-	B. Make Final Adjustment to provide a Milliammeter indication of
6468695	.39	.39	6469361	.39	—
6468696	.39	.39	6469362	.39	—
6468697	.39	.39	6469381	.39	—
6468713	.39	—	6469382	.39	—
6468714	.39	—	6469383	.39	—
6468715	.39	—	6469412	.34	.34
6468821	.39	—	6469424	.34	.34
6468822	.39	—	6469478	.34	—
6468823	.34	—	6469489	.69	—
6468828	.54	—	6469499	.34	—
6468833	.39	—	6469500	.34	—
6468834	.34	—	6491312	.39	—
6468902	.54	—	6491313	.39	—
6468903	.54	—	6491314	.39	—

**Note:** Blank spaces in column "B" indicate that circuit assembly has a fixed resistor instead of a potentiometer, therefore is not adjustable. However, the circuit should provide the milliammeter specification shown in column "A".

### PART 3 SERVICING OF THE CIRCUIT ASSEMBLY BY THE SIGNAL TRACING AND "REPLACEMENT OF DEFECTIVE ELECTRICAL COMPONENT" METHOD.

#### Equipment Required

1. TC 100 Tachometer Tester.
2. DC coupled oscilloscope.

#### Procedure

1. Connect TC 100 as outlined under "Preliminary Bench Testing of Complete Tachometer".
2. Connect oscilloscope to points A, B, C, etc. as shown in test circuit diagrams Fig 8, 9, and 10 until an improper wave shape is shown.
3. Replace the defective component found to have caused the malfunction using the parts listed in the following table.

**TABLE 1**

**Use The Following Standard Electronic Parts (or equivalent) For Replacement Purposes.**

***Circuit Designation	Electrical Description	Manufacturer	Manufacturer's Type Number
**L1	100 Millihenry	South Haven Coil Co., Inc.	100-12
R1	330 ohms 2W, 10%	Ohmite	—

## AC SERVICE BULLETIN

### AC ELECTRONIC TACHOMETER REPAIR

#### CIRCUIT ASSEMBLY TEST SPECIFICATIONS USING TC 100 (Cont'd.)

***Circuit Designation	Electrical Description	Manufacturer	Manufacturer's Type Number
R2	1000 ohms	Irc-Cts* Clarostat* or Mallory*	X201-1000 U39-1000 MTC-4-1000
R3	3.9K, 1/2W, 10%	Ohmite	—
R4	1.8K, 1/2W, 10%	Ohmite	—
R5	3.9K, 1/2W, 10%	Ohmite	—
R6	680 ohms, 1/2W, 10%	Ohmite	—
R7	3.3K, 1/2W, 10%	Ohmite	—
VR1	9.1V, 400 MW, 5%	International Rectifier	IN757A
CR1	300 V, Minature	International Rectifier	10D3
CR2	300V, Minature	International Rectifier	10D3
CR3	300V, Minature	International Rectifier	10D3
Q1	NPN Silicon	General Electric	2N2714
C1	*MFD, 200V, 10%	Cornel-Dubilier	2P
	*MFD, 35V, 10%	Sprague	150D
C2	.068 MFD, 200V, 10%	Sprague	192P

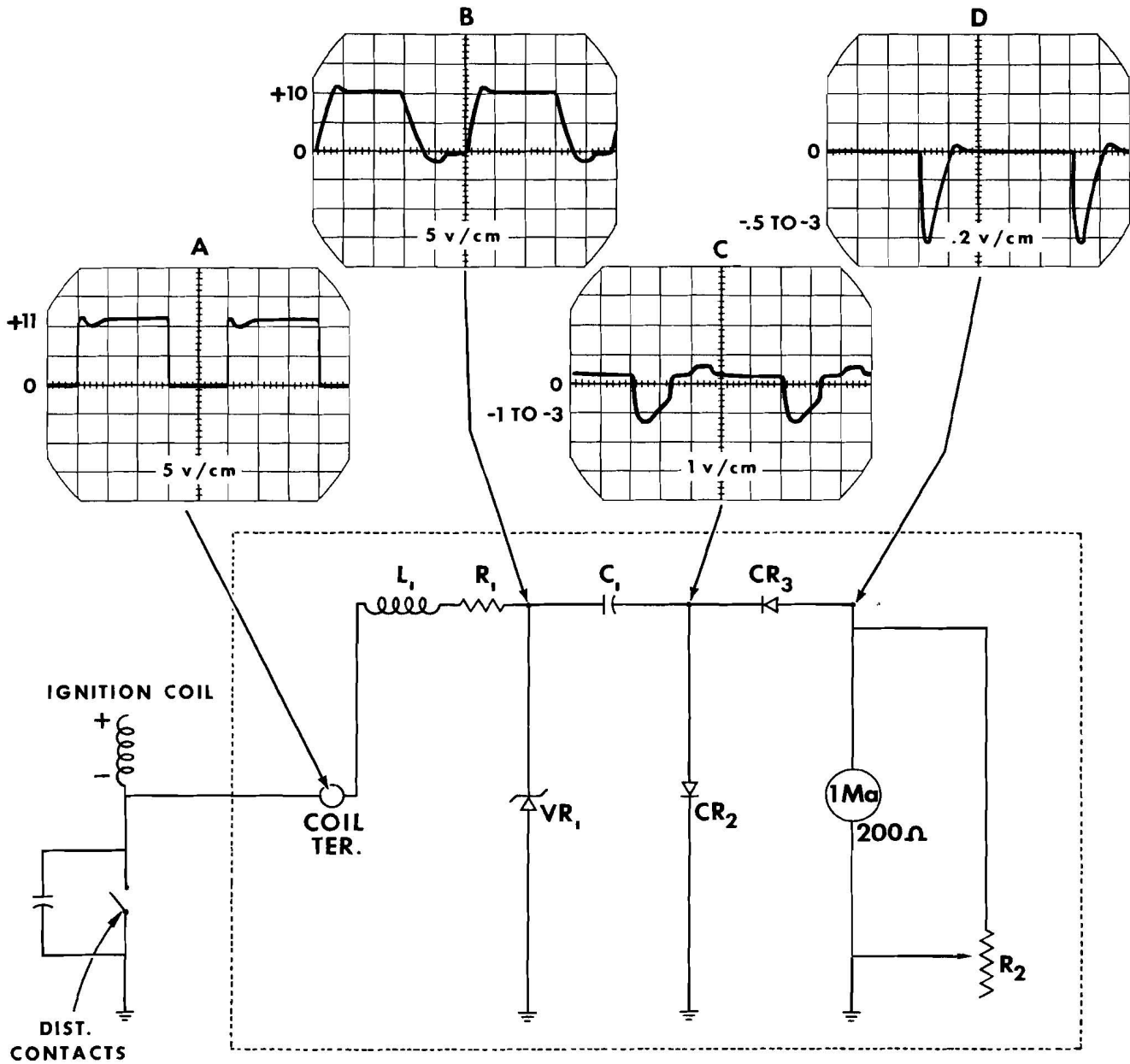
\*Where more than one type is listed use the style or rating which matches the component to be replaced.

\*\*South Haven Coil, Inc., 516 Williams St., South Haven, Michigan 49090. Price \$.50 each, minimum order \$5.00.

\*\*\*Circuit Designation No.'s are to be used as part numbers on Warranty Claims.

# AC SERVICE BULLETIN

## AC ELECTRONIC TACHOMETER REPAIR



**FIGURE 8**  
 Inductor Type of Tachometer

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## AC ELECTRONIC TACHOMETER REPAIR

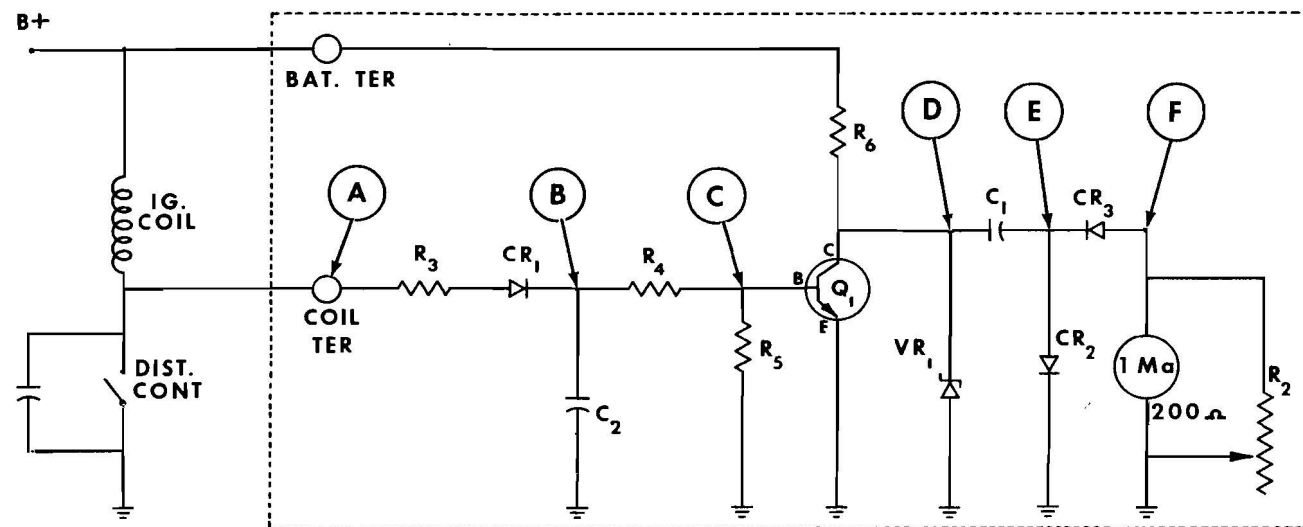
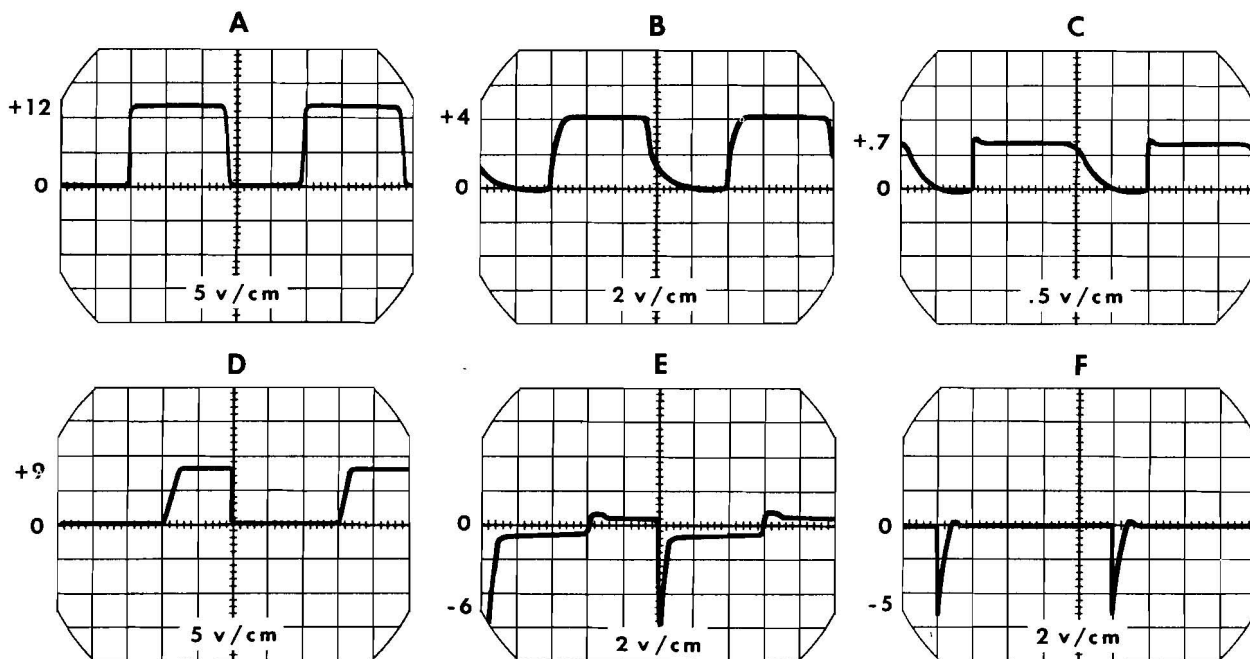


FIGURE 9  
 Transistorized Type of Tachometer  
 used with Standard Ignition Systems

# AC SERVICE BULLETIN

## AC ELECTRONIC TACHOMETER REPAIR

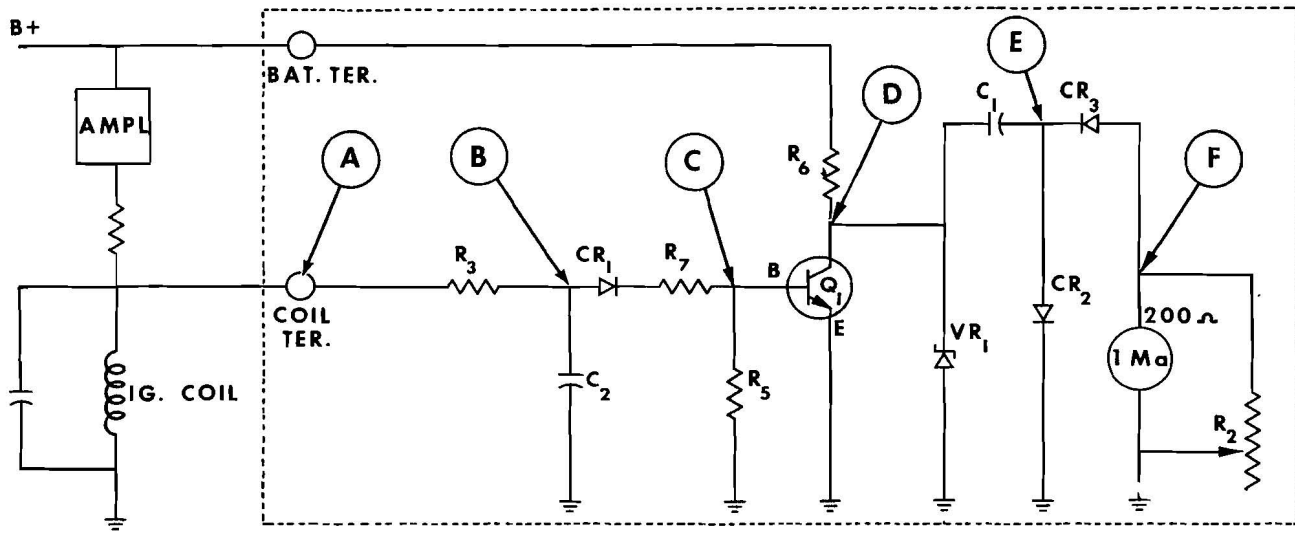
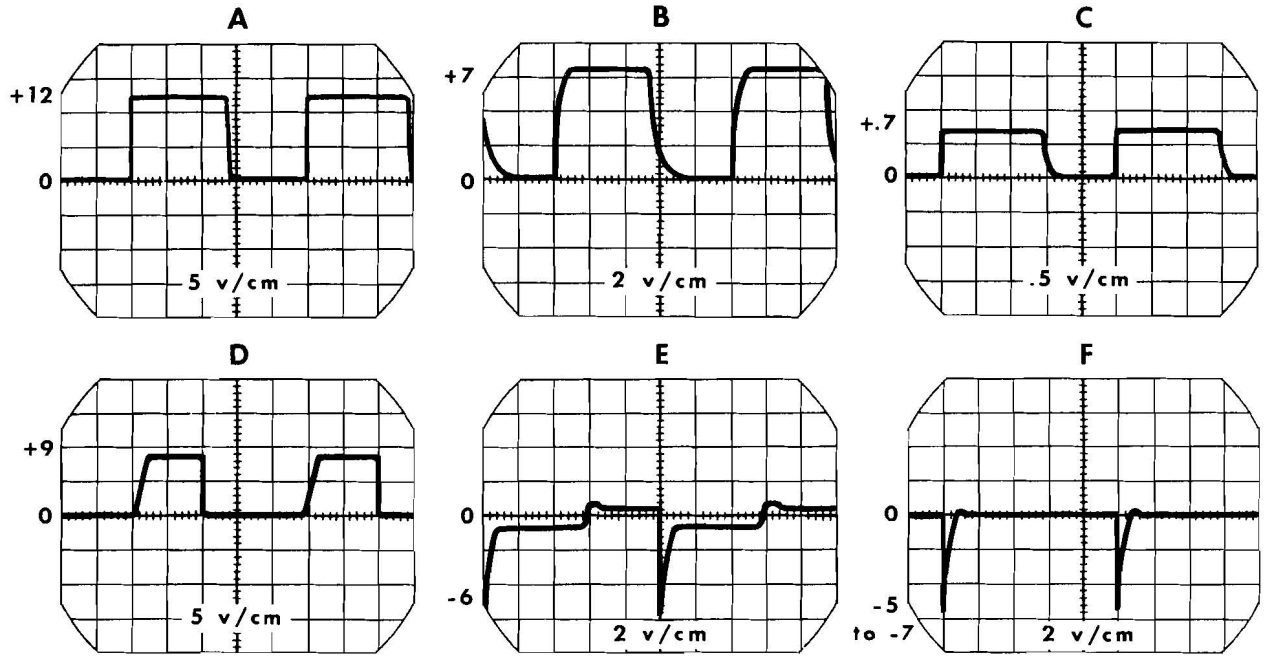


FIGURE 10  
Transistor Type of Tachometer used with  
Transistorized (Breakerless) Ignition Systems