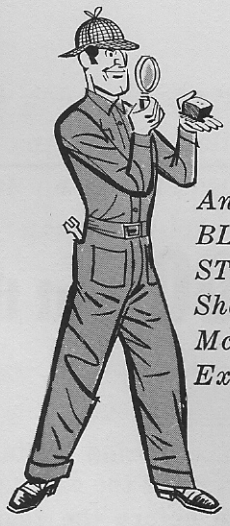
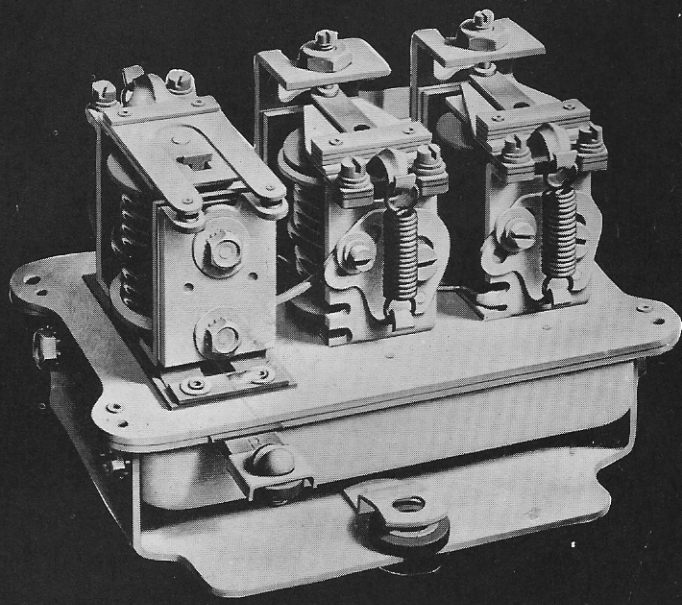
Form No. 1097 C



Another BLUE STREAK Sherlock McKanick Exclusive

Blue Streak *voltage regulator* Manual



BLUE STREAK

STANDARD MOTOR PRODUCTS, Inc. • Long Island City 1, New York

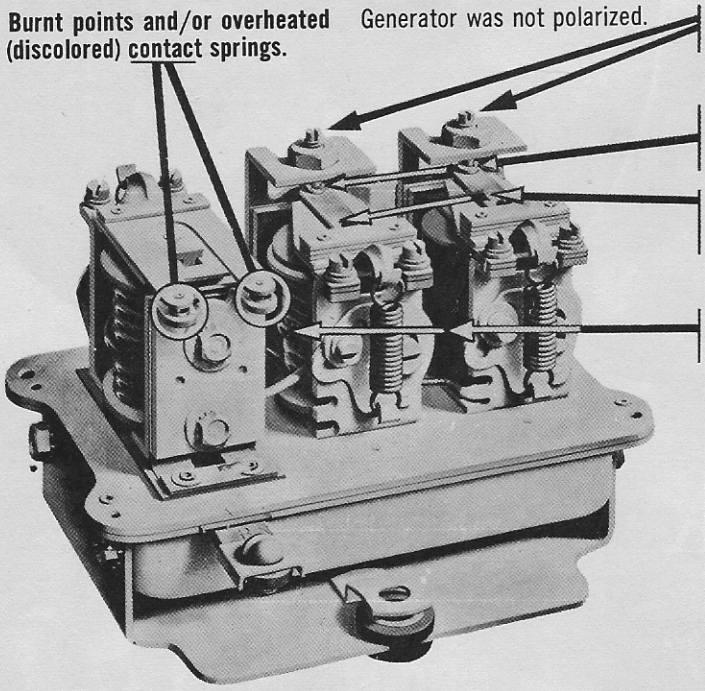
LOOK at the regulator before you condemn or replace it!

In servicing voltage regulators, a thorough analysis of the cause or causes of trouble must be made before the regulator is condemned or replaced. Without this analysis, replacing the regulator will probably not cure the trouble.

In the majority of cases, the cause of the trouble is not in the regulator, but in some condition outside of the regulator, as the regulator is only one unit in the delicately balanced charging system of the car and will operate satisfactorily only if the entire charging system is completely normal. Any unbalance or defect in the system will either bypass the regulator or affect the regulator action, so that it cannot perform its normal function.

The very first step in trouble analysis is a visual examination of the regulator, which may immediately disclose the cause of and indicate a cure for the trouble. Therefore, remove the cover and examine the regulator visually and look for the following symptoms:

INDICATION	CAUSE
CUTOUT	
Burnt points and/or overheated (discolored) contact springs.	Generator was not polarized.

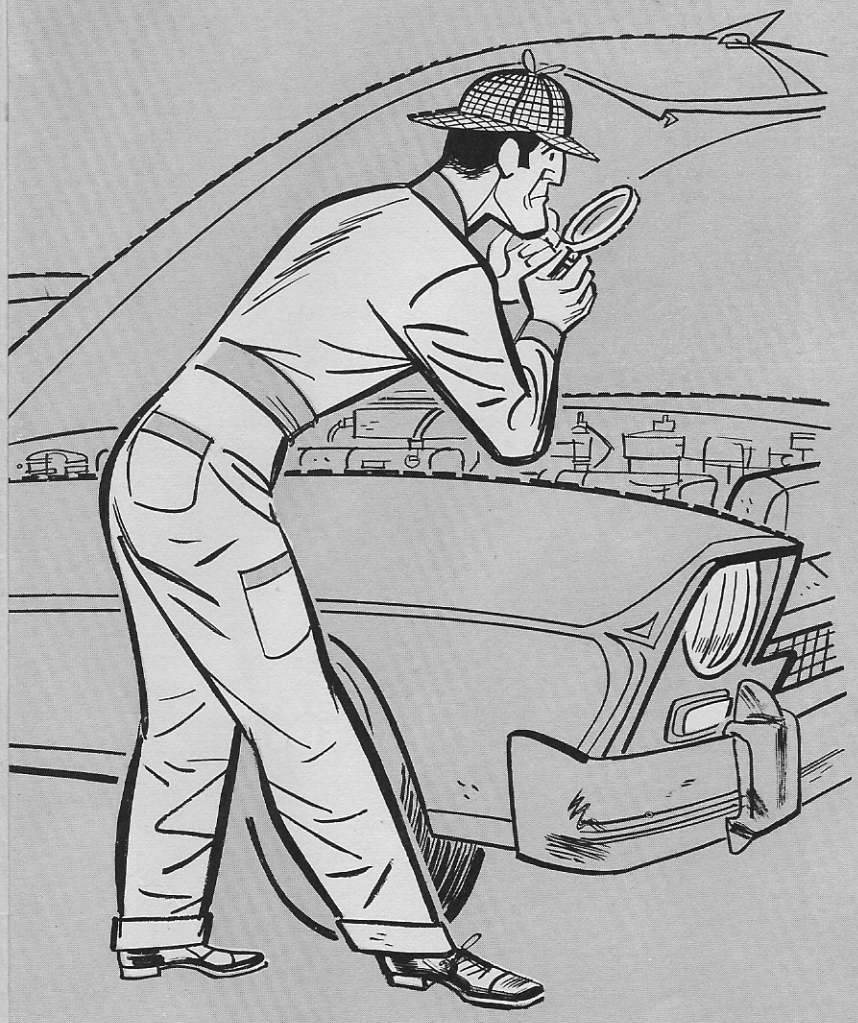


INDICATION	CAUSE
VOLTAGE AND CURRENT UNITS	
Distorted slots in contact screws.	Attempt to change air gaps.—Regulator will not operate with wrong air gaps.
Burnt points.	High resistance or bad ground in charging system.
Overheated (discolored) contact springs.	Crossed connections on regulator.—Shorted generator field coils—shorted wiring.
Burnt windings.	Open circuit (broken connection) or very high resistance in charging system.
Excessive metal build-up or bad pitting or fusing.	Radio condenser connected to "F" terminal of generator or regulator.—Wrong model regulator for particular generator.—Wrong polarity regulator.—High resistance in charging system.
Dirty or oxidized points.	Insufficient maintenance. Regulator points require cleaning like ignition points.
Voltage unit points OK but current unit points burnt.	Trouble in generator or wiring, causing current unit to operate continuously with abnormal current.
Corrosion of parts.	Action of salt, water or acid fumes.

As you can see from the above chart, a visual check up of the regulator will account for 90% of charging circuit troubles which cannot be cured by a mere replacement of the regulator. There are other possible causes of trouble outside of the regulator which are described in the Blue Streak Service bulletins.

Before you install or adjust the voltage regulator

There are many possible defects in the generator-battery circuit of the automotive vehicle that can affect voltage regulator performance and which must be considered in analyzing charging troubles before a new regulator is installed or an old one is adjusted.



1. **THE BATTERY.** — The heart of the system. No matter what you do to the regulator, you will not get results unless the battery is in perfect condition. You cannot even adjust a regulator correctly if:
   - **(a). The battery is old.**
   - **(b). The battery is partially charged.**
   - **(c). The battery is hot or has been damaged by overheating.**
   - **(d). The battery plates are sulphated.**
   - **(e). The battery cable terminals are corroded or oxidized (lead terminals).**

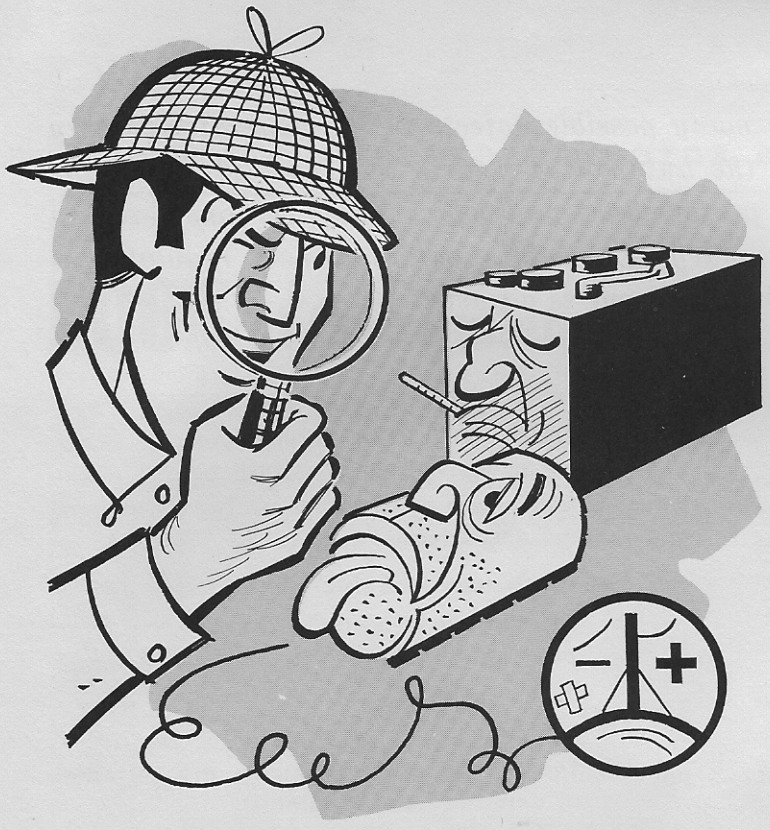
2. **THE GENERATOR.** — The source of all electrical energy in the system. You cannot install or adjust a regulator if:
   - **(a). The generator does not generate enough current (loose belt, worn brushes, bad armature, open field coils).**
   - **(b). The generator produces abnormal current (shorted or partially shorted, or grounded field coils).**

3. **WIRING.** — The connecting link between the various units in the generator-battery circuit. You cannot install or adjust a regulator if:
   - **(a). Wiring has one or more loose connections.**
   - **(b). One or more wires are broken.**
   - **(c). One or more wires are shorted to ground.**
   - **(d). The engine ground strap is loose or broken — this one is very important and often overlooked.**

To sum up:

You cannot get regulator performance or even try to adjust a regulator unless all of the above possible defects are traced down and corrected. Any one of the above defects will result in trouble no matter whose regulator you use or how many regulators you install.

Also, in checking and correcting the above possible defects, you will often find additional profitable jobs and will be assured of customer satisfaction.



Instructions for the servicing and adjusting of BLUE STREAK voltage regulators

The first step in servicing or adjusting the Blue Streak Voltage Regulator is a visual inspection of the regulator.

VISUAL CHECKS

1. **Examine the regulator** for evidence of abnormal heat. If windings, contacts, contact springs, or any other parts of the regulator are burnt, it indicates that the regulator has been overloaded by a defect in the charging circuit outside of the regulator. While burnt contacts may be replaced, it is impractical to replace burnt windings or wiring.
2. **Check the regulator** for visual corrosion due to salt, or acid. When such corrosion is present the regulator cannot be repaired.
3. **Carefully check** for evidence of water having been inside of the regulator. The effects of water will permanently damage the regulator.
4. **Examine the cutout contacts** for bad burns, which may have been caused by a failure to polarize the generator when the regulator was installed. Examine the two phosphor bronze flat springs that carry the contacts, for signs of overheating, which may be caused either by a failure to polarize the generator or by a current overload due to a defective generator or wiring. If the contacts are slightly burned, they can be cleaned by using a *fine* file like our TF-3. Do not take off too much contact metal. If the contacts are badly burned or the phosphor bronze springs have been overheated enough to lose their temper, they must be replaced. (See listing of parts below).
5. **Examine the voltage control** and current control contacts and contact springs. If the contact surfaces are burnt or deeply pitted, they must be replaced, otherwise they can be cleaned with a *fine* file like our TF-3. (Never use emery cloth or sandpaper, as particles of the abrasive may become embedded in the contacts and cause them to burn). After the surfaces have been cleaned, make sure that no dirt particles remain on them, as they would cause erratic regulator action. If you find that the contact springs show heat discoloration or distortion, the armature must be replaced. (See listing of parts below).

If the visual inspection is satisfactory and the worn or burnt parts have been replaced, you may proceed with the mechanical and electrical adjustment.

VOLTAGE REGULATOR REPAIR PARTS

FOR CUTOUT UNIT

Armature:	6 volt	VRP-4
	12 volt	VRP-5
Contact Plate:		VRP-6
Tension Spring:		VRP-1

FOR VOLTAGE CONTROL UNIT

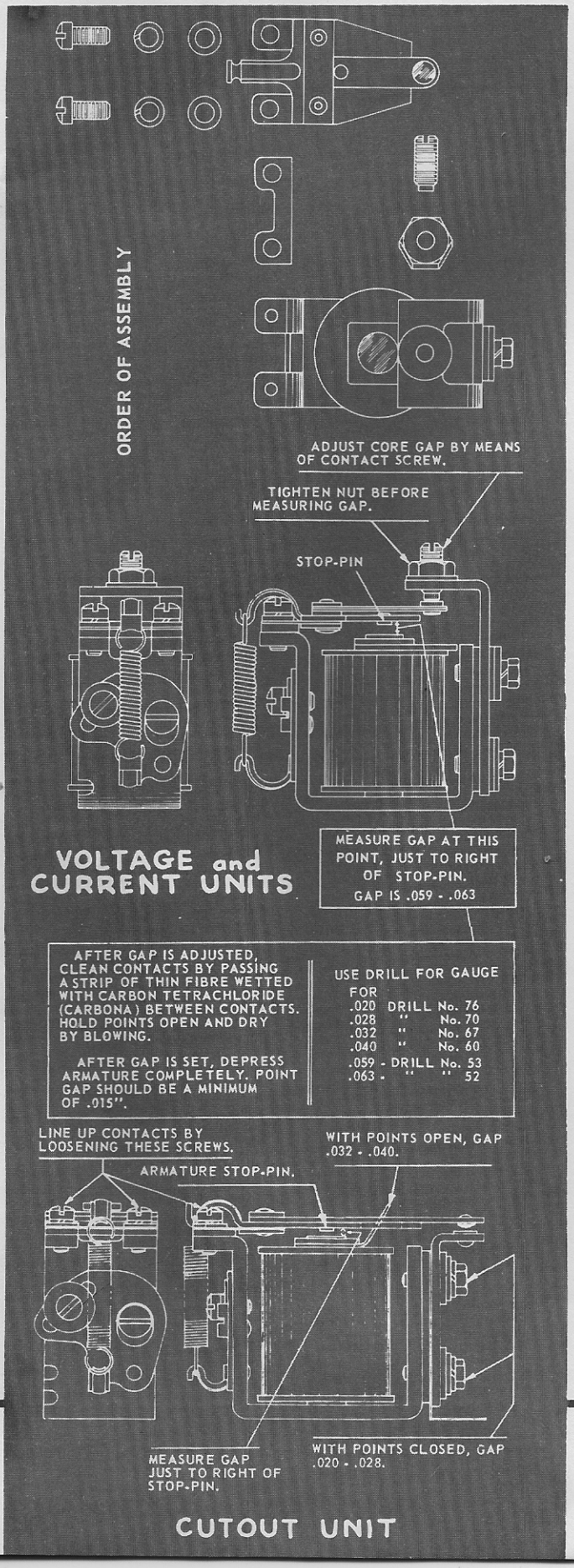
Armature:	Negative & Ford	VRP-7
	Positive	VRP-8
Contact Screw:	Negative & Ford	VRP-2
	Positive	VRP-3
Tension Spring		VRP-1

FOR CURRENT CONTROL UNIT

Armature: (Not Compensated)	Negative & Ford		VRP-7
	Positive		VRP-8
*Armature: (Compensated)	Negative:	6 v.	VRP-9
		12 v.	VRP-10
*Armature: (Compensated)	Positive:	6 v.	VRP-11
		12 v.	VRP-12
Contact Screw:	Negative & Ford		VRP-2
	Positive		VRP-3
Tension Spring:			VRP-1

MECHANICAL CHECKS AND ADJUSTMENTS.

All mechanical checks and adjustments are to be made before any electrical adjustments are attempted in accordance with the following instructions:



ELECTRICAL CHECKS AND ADJUSTMENTS.

Electrical checks and adjustments can be made either on the car or on a test bench. It must be understood, however, that the mere adjustment of a regulator to correct specifications may not always result in successful operation if other units in the charging system of the car are defective.

For instance: An old battery, a partially charged battery, a hot battery or one that had been subjected to excessive heat will cause a high charging rate even with a correctly adjusted regulator; a defective ground or one that has any resistance in it will cause a high generator voltage, which the regulator cannot overcome. The same thing applies to a loose or broken engine ground strap. On the other hand, a battery with hard or sulphated plates or high resistance separators will cause a low charging rate regardless of regulator adjustment.

By the same token, a generator with defective field coils, brushes or armature will also cause trouble which a correctly adjusted regulator cannot overcome. Defective wiring, that is, shorted wires or loose connections will also interfere with proper regulator performance.

Therefore, before any regulator adjustments are made, the entire charging circuit and its units must be thoroughly checked and any possible defects or irregularities removed.

Another angle of good voltage regulator performance has been described in detail in our BLUE STREAK Service Bulletin #78-54 "Tailor The Setting To The Job," and we strongly urge you to read this bulletin if you intend to handle and adjust voltage regulators successfully.

Remember also that before a new regulator is installed, you must determine why the replacement is required. If the old regulator is burnt out, you must find the cause; if an external defect in the charging circuit caused the old regulator to overload and burn out, the new regulator will also burn out if the cause is not removed. If the complaint is "no charge" and you install a new regulator, two things may happen:

(a) With the new regulator, the same "no charge" condition will also prevail if the trouble is external;

(b) The new regulator will cause the ammeter needle to show maximum charge for a considerable length of time until the battery has been brought back to a fully charged condition after having been depleted by the previous "no charge" period.

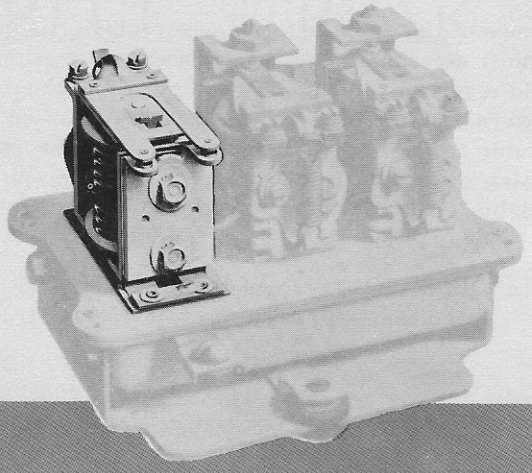
A common complaint is that "the charge does not cut down," that is, the car owner finds that his car ammeter shows a high charge even when his battery is fully charged. This may happen even when the voltage regulator setting is correct and the charging circuit is com-

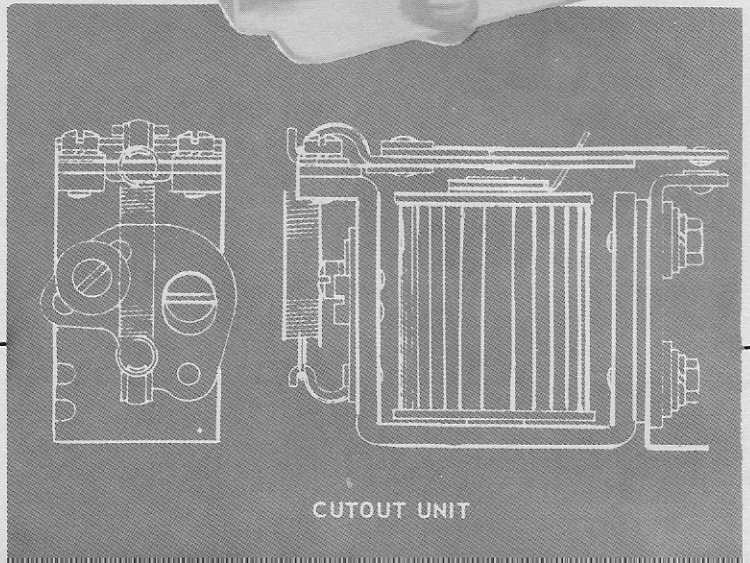
pletely normal. The condition is caused by an overheated battery, when the car is driven considerable distances in hot weather. When the battery is hot it will pull a higher charging current than normal, which will heat it still further and cause it to draw still more current, thus establishing a vicious cycle which may kill the battery. For instance, with a 7.4 setting of the voltage regulator a fully charged battery would draw 4 amperes when it is at an 80 degree temperature, but when the battery heats up to 120 degrees it will draw 25 amperes with the same 7.4 setting.

In such cases the only remedy is to reduce the voltage setting of the regulator to a lower value, but not lower than 6.9 volts. The cutout closing voltage setting must of course be reduced accordingly, as the cutout must always close at a lower voltage than the voltage control unit setting. The regulator will have to be reset to a normal setting when the abnormal driving conditions no longer prevail.

to check and adjust the cutout relay

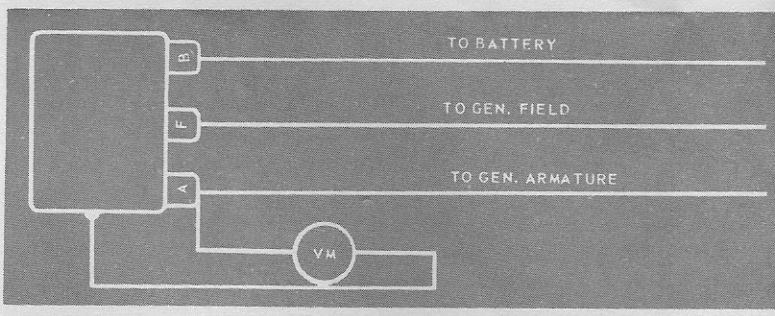
(end unit with heavy wire winding)





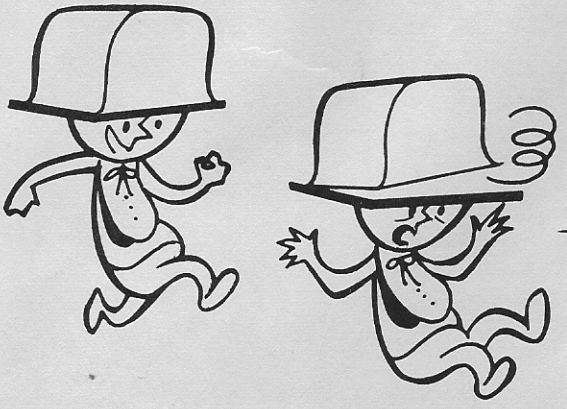
After mechanical adjustments have been made as explained under "Mechanical Adjustments" on page 4.

1. Connect the regulator in the usual manner.
2. Before starting the engine, polarize the generator according to the instructions given on the instruction sheet packed with each regulator.



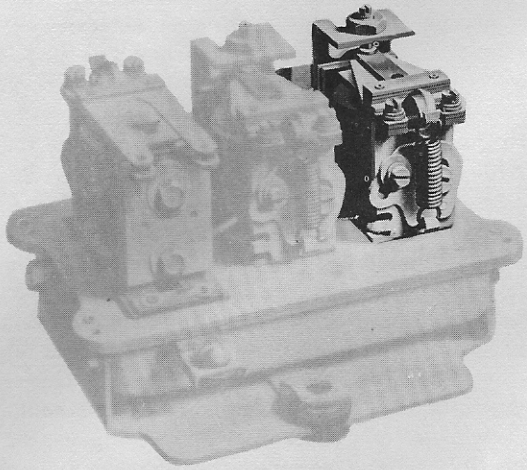
3. Connect one lead of a voltmeter to the "A" terminal of the regulator, and the other lead to the regulator base.
4. Start the engine and slowly increase the generator speed and watch the voltmeter needle; it will move up until at a certain generator speed it will momentarily drop back or jerk. Note the voltage at which the needle jerks, as that is the closing voltage of the relay. If this value of voltage does not check with the specified "C.O. Closing Voltage," adjust the cutout relay tension spring by loosening the set screw and moving the eccentric adjusting cam clockwise to increase the closing voltage and counter-clockwise to decrease it and tighten the set screw. If the closing voltage is too high, move the eccentric cam counter-clockwise and then bring the voltage up to the proper value by a clockwise turn. Reduce the generator speed until the relay opens and then bring the speed up until the points close again and note the voltage. Repeat the adjustment until the specified closing voltage is obtained.

CAUTION: Make sure that the set screw is tight after each adjustment and that the cover is on in its correct position. Of course, after all adjustments have been made, the cover must be firmly fastened with the two fastening screws.

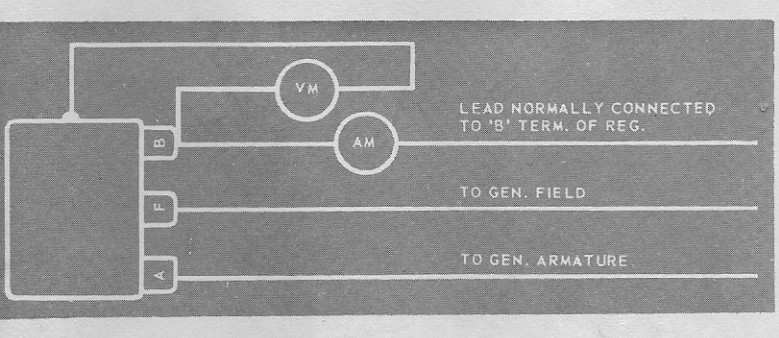


to check and adjust the voltage control unit

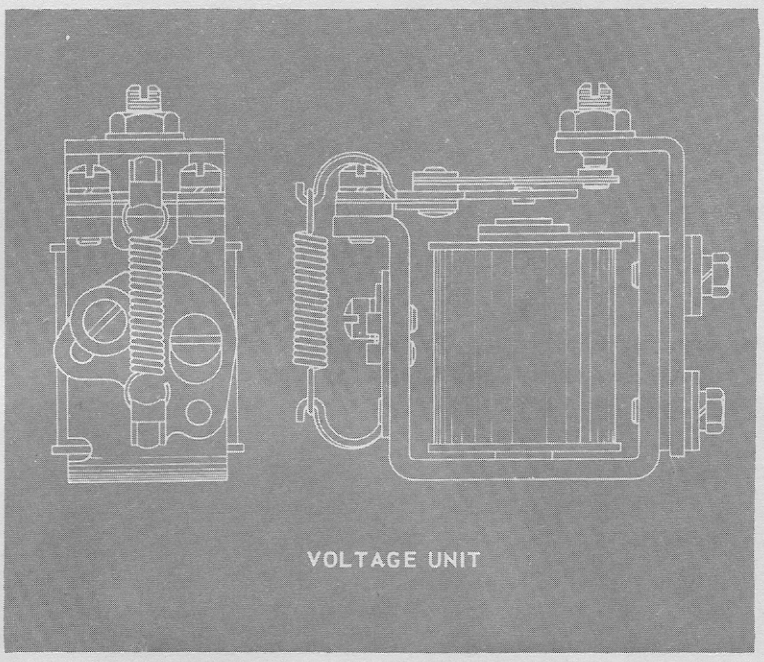
(end unit without heavy wire winding)



1. Disconnect the lead from the "B" terminal of the regulator and connect it to one terminal of an ammeter. Connect the other terminal of the ammeter to the lead which you have just taken off the "B" terminal of the regulator.



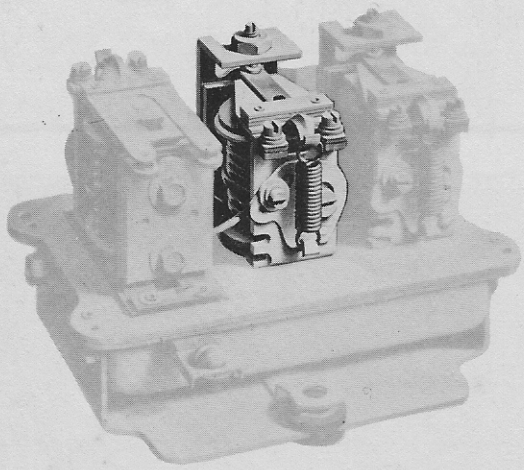
2. Connect one voltmeter lead to the "B" terminal of the regulator and the other lead of the voltmeter to the regulator ground.
3. Turn on the engine and run it at a speed corresponding to about 30 miles per hour. Turn on enough accessories to show a 20 ampere load on the ammeter. Keep the cover on the regulator and operate it in this manner for 15 minutes to bring it up to operating temperature.



4. At the end of 15 minutes operation, cycle the generator by reducing the generator speed to the point where it ceases charging (when the cutout points open) and the ammeter shows discharge. Bring the generator up to full charging speed again and take a voltage reading. If the reading is not within the specified limits, remove the regulator cover and readjust the tension spring of the voltage control unit as described under "To Check And Adjust Cutout Relay." Restore the cover and check the voltage again in the same manner as you did before. Repeat until the voltage reading is within specifications.

NOTE: Remember that while the specifications permit a voltage setting of 7.0 to 7.7 or 7.8 volts on some regulators, the correct voltage setting must be "Tailored" to the driving requirements of the particular car owner, as explained in Blue Streak Service Bulletin #78-54. A normal average setting is 7.3 to 7.4 volts.

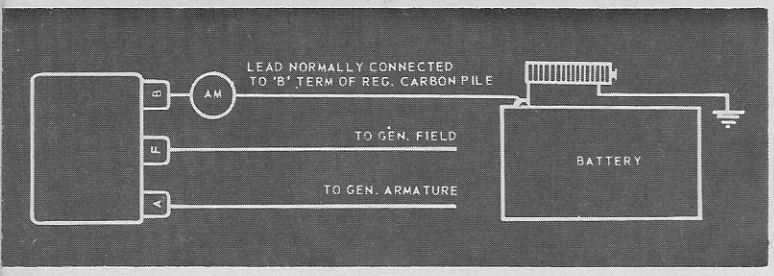
CAUTION: The regulator cover must be in its exact position on the regulator. If the cover is allowed to come in contact with any of the operating units of the regulator, the regulator will burn out, as the cover also makes contact with the grounded regulator base and thus can provide a direct short circuit between the live parts of the regulator and the grounded cover.



to check and adjust current control unit

(middle unit of three unit regulators)

Remove the voltmeter connections from the regulator but leave the ammeter connected as in the voltage control test.



It now becomes necessary to provide an artificial load which would be high enough to cause the current regulator to operate. Several methods have been suggested by various manufacturers of voltage regulators, which, in our opinion, are not quite safe or decisive. One suggested method is to turn on lights and accessories in order to provide the load and to pull down the voltage and then to short out the voltage control contacts. With this method it is possible to burn out lights and accessories as, with the voltage control contact shorted, the generator voltage may reach very high value. Another suggested method is to discharge the battery by cranking the engine for 30 seconds with the ignition turned off. This method is also uncertain as the amount of current drained from the battery is not always the same and, also, there is the danger of damaging the starter.

Still another recommended method is to turn on enough lights and accessories to provide sufficient load for operating the current regulator. It may be found that not enough load can be provided in this way.

The only safe and positive method is to use a carbon pile resistor across the battery as a load on the battery, which will cause the generator to produce a high enough amperage to operate the current regulator without the danger of burning out lights or accessories.

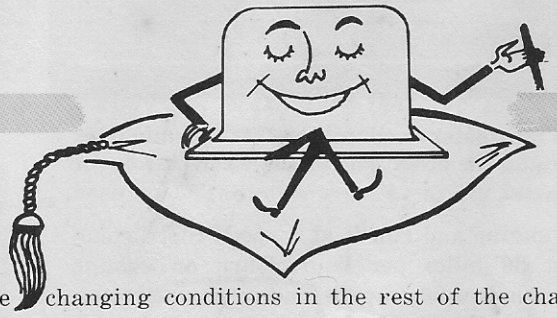
The best way to connect the carbon pile is to connect the two leads from the pile directly to the two battery posts.

With the carbon pile load connected, operate the engine to provide a generator speed of approximately 50% above the rated output speed of the particular generator. Adjust the current control unit to specifications by changing the spring tension as described under "To Check and Adjust Cutout Relay." (see page 6)

Some of the newer types of voltage regulators are temperature compensated and will pass a higher amperage from the generator when the battery and the other operating units in the charging circuit are cold. As the battery warms up, the temperature compensator on the current unit of the regulator automatically cuts down the maximum generator output to normal.

(Regulators of this type can be recognized by the yellow color of the current control unit hinge. The uncompensated regulators have a blue colored hinge).

To check and adjust temperature compensated current control units, the regulator should be operated for an additional 15 minutes at full load (with the carbon pile across the battery) and then adjusted to the lower limits shown in the specifications. This is the important setting, as the higher limit shown in the specifications is a temporary charging rate which prevails only when the charging system is cold right after starting the engine.



Maintenance of Blue Streak Voltage Regulators

The voltage regulator is the most delicate and precise electrical unit on the car and must be handled accordingly. The voltage control contacts vibrate at the rate of approximately 15,000 times per minute, which means that in each minute of operation the contacts open and close an electrical inductive circuit 15,000 times. Some sparking between the contacts must and does occur, so that the contacts have to be cleaned more or less often depending upon the use of the particular car.

The idea that any regulator can operate indefinitely without check up, cleaning of points and resetting to changing conditions in the rest of the charging system is erroneous. Just as you take it for granted that ignition points in the distributor must be cleaned or even changed periodically, or that brakes must be adjusted, you must apply the same procedure to a regulator.

If a regulator is maintained properly, the contacts examined and cleaned if necessary, the gaps readjusted after the cleaning and the setting checked and adjusted in accordance with the individual car requirements, it will render satisfactory service for many years.

F1097—45825

Printed in U.S.A.

BLUE STREAK VOLTAGE REGULATORS • SPECIFICATIONS

The following specifications apply to all BLUE STREAK Voltage Regulators:

AIR GAP	CUTOUT RELAY ..... *points open*	*.032"—.040"*
	points closed	*.020"—.028"*
	VOLTAGE & CURRENT CONTROL	*.059"—.063"*
VOLTAGE SETTING ON 6 VOLT	CUTOUT RELAY *closing voltage (hot)*	*6.2 to 6.7 volts*
	VOLTAGE CONTROL SETTING *(hot)*	*7.0 to 7.7 volts*
ON 12 VOLT	CUTOUT RELAY *closing voltage (hot)*	*11.8 to 13.6 volts*
	VOLTAGE CONTROL SETTING *(hot)*	*14.0 to 15.0 volts*

BLUE STREAK REGULATORS	REPLACES ORIGINAL NUMBER	USED WITH GENERATOR NUMBER	CURRENT CONTROL SETTING *(hot) Amperes*
VR-300X 6 Volts	VRB-4002D, 4004B, 4008C, 4010A, 4012A, A1; VRP-4001C, 4002B, 4004D, 4006C, D	GCO-4801B, C; 4803A, 4807, A; GDA-4801A, C, D, E; 4803A, 4804A; GES-4801	**27-29 Positive**
VR-301X 6 Volts	VRB-4003A, 4005A; VRP-4004G, 4101A, 2A	GBW-4803A, C, D, E; 4804A	**21-23 Positive**
VR-308X 6 Volts	5559, 5596, 97; 5807, 08, 10, 11, 13, 18, 28, 31, 61, 67; 1118215, 230, 234, 350	916D, H, K; 930A, B, F, G, H; 934A, C, F, H, M, P, S, U, W, Y, Z; 961J, M; 973M; 651, 52, 53, 54, 55, 677; 1102656, 1105526, 527, 529, 530, 532, 752	**26-28 Positive**
VR-313X 6 Volts	VRB-4004A; VRP-4001B, D; 4004B, C, C-1, D	GCE-4804B; GEB-4801A, B, D; 4803A; 4806A, D; 4822A; 4824A	**29-31 Positive**
VR-320X 6 Volts	5865, 5874; 1118208, 271, 303	9U; 62U; 72U; 1102667, 8, 9; 1102670, 1, 2, 3, 4, 6, 7, 9; 680, 5; 713, 4; 739; 749; 761; 1105878, 9, 80, 1, 2, 3, 4, 5, 6, 7, 9; 890; 1106589	**28-30 Positive**
VR-321X 6 Volts	VRP-4005A; 4007C, C-1, C-2, D; 6003A	GDZ-4801L; 4811BN; 4817A; 6001C, D	**34-36 Negative**
VR-322X 6 Volts	VRB-4012B-1; VRP-4001A; 4002A, C; 4003A, B; 4004A, F, F-1, F-2, H; 4008B; 4201A, A-1; 5501A, A-1; 4401A, A-1; 4402A; 4403B; 4501A; 4503A; 6001A, A-2; 6002A; 6101A	GDZ-4801A, B, C, D, F, G, K, Q, R, T, V; 2A, 2B, 3A, B; 4A; 5A; 6A, B; 7A; 9A; 10A; 11A; 12B; 13A, 13D, 13E, 13F; 18; 4866B; 6001A, B, E, F; GEA-4801A; 2A-1; 3A; 4A; GES-4801	***35-45 Positive**
VR-323X 6 Volts	VBE-6102A; 6104A	GGW-4801B; 4802A; 6003A	***45-57 Positive**
VR-324X 6 Volts	VBA-4201A; VBE-6001A; 6101A; VRP-4503B; 6004A; 6005A	GGW-4810A, B, C, E, F; 4802A, B; 6001A, B, C, D, H, J, K, L, P, Q; 6002A, B, C, D, S, S1; 6007A, B; 6008B, C, D, E, F, G, J, K; 6009A, B; 6010A, B; 6011A; 6012A, B; 6013A; 6014A; 6016A, C, D, E, F; 6017A, B; GDZ-6001A	***45-57 Positive**
VR-325X 6 Volts	VBE-6105A	GGW-4801D, EN	***45-57 Negative**
VR-326X 6 Volts	VAV-6001A, B	GGU-6001A, E, F, G, H, K, R, T, Y; 6002A; 6004A; 6005A; 6006C, G; 6008C, D; 6009 C; 6012A, 6013B, C, D	***50-60 Positive**
VR-340X 6 Volts	1118300, 347, 357, 364, 725, 727, 729, 843, 5	1100028; 1102700, 1, 4, 6, 7, 8, 9, 18, 29; 740, 1; 750 54, 57; 771, 4; 784	***40-46 Negative**
VR-341X 6 Volts	5848; 5853; 5872, 5; 1118201, 207, 223, 224, 229, 242, 301, 352, 720	9U; 62U; 72U; 1100013; 1102657; 1102662, 3, 4, 5, 7, 8, 9; 670, 1, 2, 3, 4, 5, 9; 680; 691, 3, 4; 701; 710, 11, 19; 736, 7, 9; 742, 3, 4, 9; 761; 1106403, 406	***32-40 Negative**
VR-342X 6 Volts	5871, 7; 1118202, 278, 302, 331, 380, 731, 841, 864	9U; 72U; 1100013, 19, 21, 25; 1102661, 66, 671; 682, 4, 6; 693, 4; 9, 702; 705; 712; 728; 730; 733; 776; 789; 808	***32-40 Positive**
VR-343X 6 Volts	5885; 1118212, 238, 314	1102590, 685, 713, 14; 1105858; 865, 875, 76, 77, 91; 1106584, 587	**39-41 Positive**
VR-346X 6 Volts	1118360, 382, 392, 393, 830, 842, 846	7U; 1100031; 1102700; 715, 17; 745, 6, 7, 8; 752, 3; 782; 1105003, 6, 9; 010, 11, 13; 893, 6; 1106768	***40-46 Positive**
VR-347X 6 Volts	1118725, 727, 729, 827, 852	1100018; 1102769; 770, 1, 4, 5, 9; 780, 1, 4, 5, 6; 793, 4, 7, 8; 1813611, 24, 63	***45-51 Negative**
VR-348X 6 Volts	1118726, 730, 2; 743; 828, 9; 950	1100018; 1102773, 7, 8; 785, 7, 8; 793	***45-51 Positive**
VR-349X 6 Volts	VRP-4401C; 4402C; 6001B; 6101B	GDZ-6001B; GEG-6001A; GGW-6001E, F, G, R, V; 6003A	**40 Positive**
VR-351X 6 Volts	1118244, 333, 5; 854	1106591, 751, 3, 5, 9; 763, 6	**49-51 Positive**
VR-360X 6 Volts	78-10505; 8A-10505A; 8M-10505A; 01A-10505A, C; 11A-10505; 51A-10505A, C, H; 59A-10505; 81A-10505; 81T-10505; 91A-10505, A; FAB-10505A; FAC-10505A	01A-1000A, B; 1AG-10000A; INC-10000; 21A-10000, B; 2GA-10000A; 5EA-10000; 7HA-10000B; 81T-10000A, B; 82A-10000D, E; 91A-10000; 8BA-10002A; 81A-10002A; FAA-10002A, B; FBC-10002A	**35-37 Positive**
VR-361X 6 Volts	8L-10505; 5EH-10505C; FAD-10505A	8BA-10002B; 8EL-10002A, B; OHA-10000B; FAA-10002B, FAB-10002A, C; B5S-10002A	**39-41 Positive**
VR-362X 6 Volts	FAJ-10505A	FBB-10002A	**49-51 Positive**
VR-410X 12 Volts	1118749, 750, 825, 826 1119001, 3, 123	1100323, 24; 1102002, 3, 5, 6, 7, 8, 9, 11, 14, 18, 20, 21, 22, 25, 28, 41, 42, 43, 49, 56; 1103011; 1105947; 1813612 (Canadian)	***27-33 Negative**
VR-411X 12 Volts	1118945, 1119000, 122	1100304, 310, 21, 26; 1102041	***23-27 Negative**
VR-412X 12 Volts	1118953	1102022	***27-33 Positive**
VR-414X 12 Volts	B6A-10505-A FAP-10505-A, B, C	B6A-10002A, H; B6S-10002A; B7S-10002A; FAS-10002A, B, D	**29-31 Negative**
VR-415X 12 Volts	VRX-6008A, 9A, 6201A	GJC-7001A, B, 2A, 2B, 2D, 2E, 2F, 2G, 3A, 3AA, 3B, 3BA, 3C, 3CA, 3E, 3G, 3GA, 3H, 4A, 6A, 6B, 6C, 7A, 7B, 8A, 8B, 9B, 9C, 10A, 11A	***30-40 Negative**
VR-416X 12 Volts	1119002, 1119162, 1119168	1102051, 53, 61, 66, 67, 69, 70	***32-37 Negative**
VR-417X 12 Volts	VAT-6201A	GGA-6001K, L, M, N, P, X, V; 6002A, AA, B, BA, C; 6003A, B; 6004B; 6005B	***40-51 Negative**
VR-418X 12 Volts	1118279, 339, 368, 838, 880	1106802, 5, 8, 9, 10, 11, 15, 18, 21, 22, 23, 26, 27, 30, 37, 42, 46, 48, 49; 904, 7, 9	**49-51 Positive**
VR-419X 12 Volts	FBF-10505A	FGP-10000A, B; FGP-10002A	**39-41 Negative**
VR-10X 6 Volts	5599; 5819; 5854; 1118207, 216, 221, 233, 272, 311, 349, 869	916A, D; 934C, E, F, M, S, U; 1102673, 674, 675, 677, 713, 725, 726, 737; 1105531, 532, 881	**27-29 Negative**
VR-11X 6 Volts	VRW-4001A, BX; 4002A; 5A, 5B, 5BX, 5C; 4101AM; 5005B, BX, C; 6002A, BX; 6003AM; 8002BX	GBW-4808-1; GCP-4801, 2; GDZ-4822A; 4822A-1; 6003; GEJ-4805; GGE-4803; 4804M; 4805M, 4806C; 4807M; 4808M; GGP-4801A, B	**14-16 Positive**

*Temperature Compensated