SERVICE BULLETIN No. 83-55

THE 12-VOLT BATTERY MUST BE WATCHED!

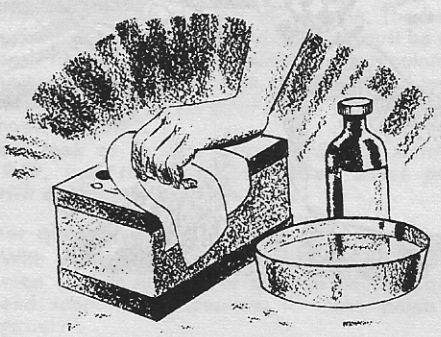
The comparatively new 12 volt electrical car system, which will be universal in the near future, has been successful in improving starting and ignition. However, due to the increased voltage in the system, certain precautions must be exercised to avoid damage to the operating units, especially to the battery.

Even with the 6 volt system, it is a well known fact that leakage can occur if the top of the battery is dirty and damp or electrolyte is spilt on it. If, for instance, enough electrolyte is present on the top of the battery to bridge the comparatively short distance between the positive battery post and the grounded holddown clamp, current will leak from the battery to ground and partially discharge the battery. With double the voltage in the 12 volt battery, twice as much current will be pushed through this leakage path with a proportionately greater battery discharge. To this must be added the fact of ampere hour rating: the 12 volt battery has a much lower ampere hour rating than the 6 volt battery, almost one-half, due to the lower current requirement of the 12 volt system. Therefore, although the possible amount of current leakage will be doubled in the 12 volt system, *the effect on battery discharge and run down will actually be four times as much as in a 6 volt system.* To illustrate: if 5 amperes leaks out of a 100 ampere hour battery, you will be losing 5% of the total battery capacity. But a 10 ampere leak in a 50 ampere hour battery in the 12 volt system will deprive you of 20% of your battery capacity and may completely run down the battery in a comparatively short time.

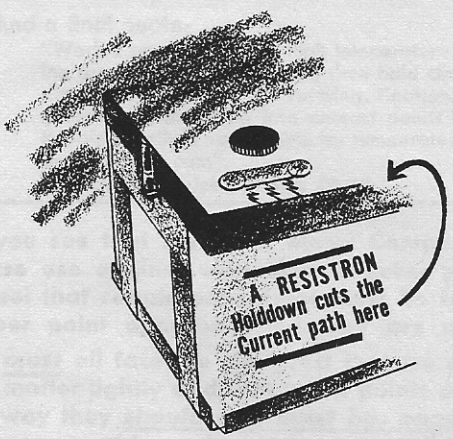
And keep this in mind: *a discharged battery is dead whether it is 6 or 12 volts and you are stuck in either case.*

Therefore the cause of electrolyte leakage must be ascertained promptly and eliminated. Usually this leakage is due to overfilled battery cells, overcharging or a cracked battery case.

To clean the battery, use either dilute ammonia or a soda solution, which will neutralize the electrolytic acid, making sure that the solution does not enter the cells through the vent plugs. The solution should be brushed off with clean water and the battery wiped dry.



As a safeguard against leakage occurrence to the grounded holddown clamp, it is advisable to replace the holddown clamp with a special Neoprene insulated holddown, like our RESISTRON holddown, which will serve the double purpose of protecting the battery from discharge and also providing the battery with a holddown which will not corrode and will support the battery properly.



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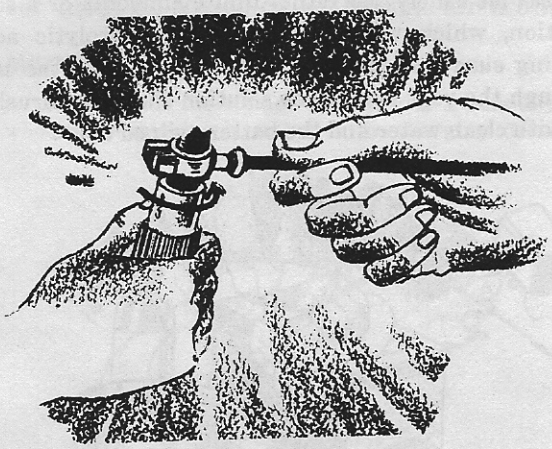
(Continued) THE 12-VOLT BATTERY MUST BE WATCHED!

The battery cables must be tight on the battery posts to prevent undercharge and damage to the regulator. If any suspicion exists that there is either corrosion of the battery posts or the cable terminals or a loose connection between them, disconnect the cables and clean the posts and the terminals with a wire brush like our BP-71. A thin coat of vaseline applied to the battery posts and the cable terminals before they are reconnected will help prevent corrosion.



There are a couple of more things to guard against in the 12 volt system. First is the fact that in a case of hard starting with a 6 volt battery, the battery will stop cranking while its electrolyte is still at a high enough gravity value to keep the battery from freezing. In the 12 volt system, due to the lower current requirements of the starter and the higher voltage of the battery, *the battery will keep on cranking until it is almost completely exhausted.* The electrolyte will then be of such low gravity, that the battery may freeze just under 32 degrees and *thus completely destroy itself.*

The second danger to watch for is *shorting of wiring* in a 12 volt system as a lighter gauge wire is used in the 12 volt system, it would burn up easier, especially considering that 12 volts will push through more current through the wires than 6 volts and *they will burn that much faster.*

We are not trying to frighten you with all these warnings about the 12 volt system, but simply wish to put you on your guard and point out the various precautions to be taken in servicing it.

SERVICE BULLETIN No. 84-55

INSTALLING AN AMMETER ON CARS WITH "NO CHARGE" LIGHTS

Right after we issued Blue Streak Service Bulletin #80-54, describing the functions of the "No Charge" light on Modern Cars, we received many requests for a quick and easy method of installing an ammeter on cars equipped with this light.

These requests are based on a desire to supplement the "No Charge" light with a more positive and definitive means of watching the charging system. After all, the "No Charge" light gives no indication of the amount of current the generator furnishes to the battery — it simply says: "The battery is discharging" or "the battery is charging," but not how much or how little. If, for instance, the generator field coils develop a partial or complete short or the leads from the generator field becomes grounded, the generator will run wild, with a high voltage, high amperage condition which will damage not only the generator, regulator and battery but also burn out ignition points, coils, radios and lights. Yet, the "No Charge" light will remain dark and the car owner will not be aware of anything wrong until important and expensive operating units have been destroyed.

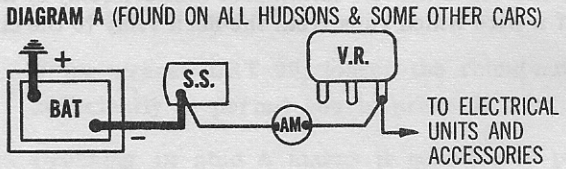
Although car ammeters in the past few years have really become simple charge indicators, as the ammeter dial in modern cars is not always calibrated to read amperes, it still indicates approximately the amount of current delivered to the battery. Most car owners can discern from the position of the ammeter needle when an excessive amount of current is being pumped into the battery for too long a time, and are thereby warned of charging troubles or impending troubles before damage is done. It is true that ammeter indications are sometimes misunderstood or misinterpreted by the car owner, but the ammeter is still a safer method than the "No Charge" light for the majority of drivers.

In our endeavor to comply with requests for a method of installing an ammeter on cars without it, we came up against difficulties: different makes of cars are wired differently and even the same makes have different wiring systems in different years, and the ammeter installation would therefore differ accordingly. We will therefore present to you a few typical car wiring circuits and the methods of installing an ammeter in these circuits and will also give you a general rule for ammeter installation.

The important thing to remember is that the ammeter must indicate only the amount of charging current ***being delivered to the battery*** and not to the various electrical units and accessories. In other words, you may turn on your ignition, headlights and radio, and the generator will have to deliver about 25 amperes for this purpose, but the ammeter must not show any of this amperage, but only the amperage that is ***left over*** for actually charging the battery after the above units have been fed.

Following are three typical diagrams of car wiring and methods of installing an ammeter in each one.

DIAGRAM A (FOUND ON ALL HUDSONS & SOME OTHER CARS)



1. If the electrical units and accessories are connected to the "B" terminals of the voltage regulator, the ammeter must be connected as shown in diagram A.

All you have to do is to disconnect from the "B" terminal of the regulator, the lead that runs to it from the solenoid or starter switch. Connect one end of this lead to one

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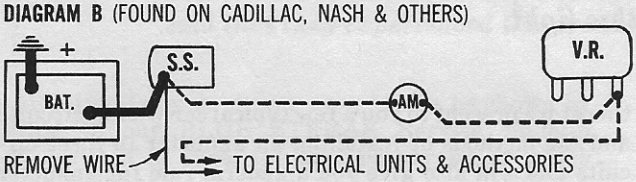
(Continued) INSTALLING AN AMMETER ON CARS WITH "NO CHARGE" LIGHTS.

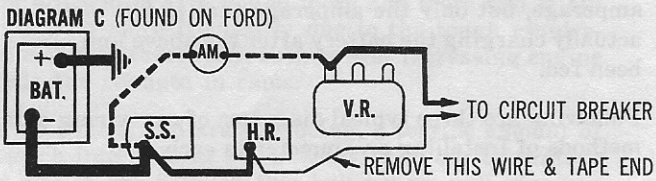
ammeter post and run a wire of the same gauge from the other ammeter post to the "B" terminal of the regulator. If the ammeter shows "Charge" when it should show "Discharge," reverse the connections on the ammeter posts.

DIAGRAM B (FOUND ON CADILLAC, NASH & OTHERS)



2. If the electrical units and accessories are connected to the battery post of the starter switch (diagram B), remove this wire from the starter switch and run or extend it to the "B" terminal of the regulator. Then run a new heavy gauge wire from the "battery" post of the starter switch to one ammeter post and another wire of the same gauge from the second ammeter post to the "B" terminal of the regulator.

DIAGRAM C (FOUND ON FORD)



3. On the 1954 Ford, the electrical units are normally connected to the "B" terminal of the horn relay by means of a wire which runs from the horn relay to the circuit breaker (diagram C). Another wire runs from the "B" terminal of the voltage regulator to a second post on the circuit breaker.

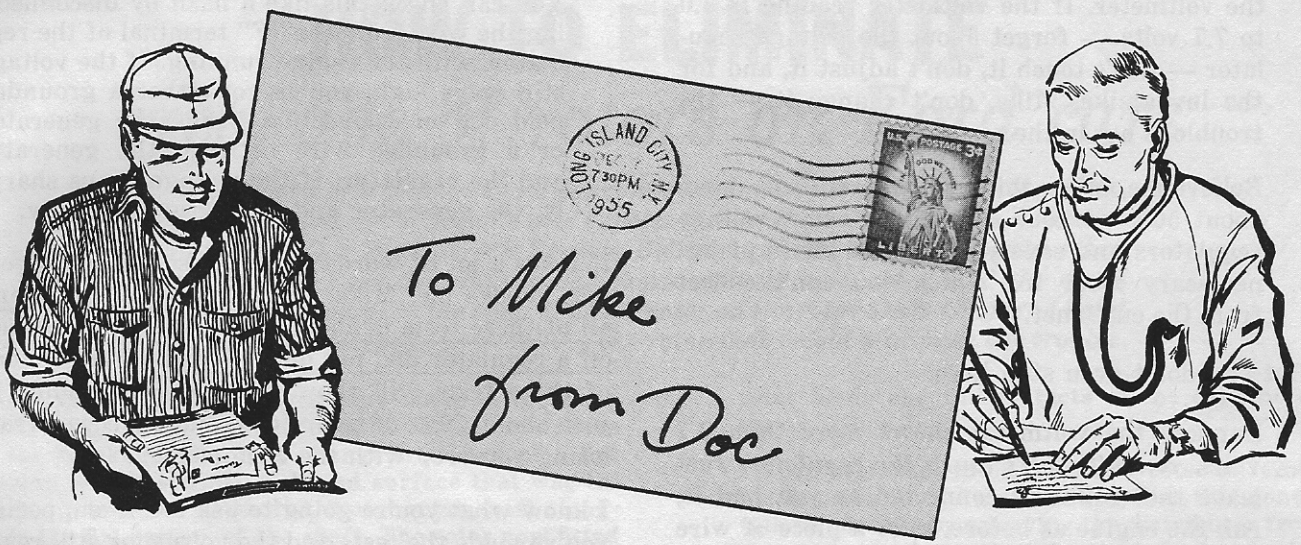
To install an ammeter, remove from the "B" terminal of the horn relay the wire that runs to the circuit breaker and tape the end. This wire will be out of use permanently. Run a new wire from the "B" post of the solenoid switch to one ammeter post and another wire from the second ammeter post to the "B" terminal of the voltage regulator.

The general rule for installing an ammeter must be considered with the understanding that the current feeding the electrical units on the car reaches them in two ways: when the engine is not running and the generator is not charging, all current is furnished by the battery; when the generator is charging, however, all current to the electrical units is provided by the generator.

The general rule for installing an ammeter is that it must *never* be installed in the circuit that feeds the electrical units; it must be installed in a direct circuit between the battery and the "B" terminal of the regulator, even if you have to provide such a circuit as in diagrams "B" and "C".

CAUTION: Any wiring used in ammeter installations must be of the same gauge and positively not lighter than the existing wires on the car that carry the charging current.

SERVICE BULLETIN No. 85-55



Dear Mike:

You and I have been buddies for a long time. Since 1937 you have been asking me questions about your every-day electrical work on the car, and I have been trying to help you in every way I could. I sent you BLUE STREAK Service Bulletins to keep you up-to-date on your work, to tip you off on electrical car troubles, to help you locate them and advise you how to cure them. I told you about point troubles, coil troubles, condenser troubles, but, most of all, I've tried to keep you posted on voltage regulators.

I found you to be a real clever guy in your work, but you've really got me up a tree on voltage regulators — you just don't seem to get it. You keep on taking them off and putting them on and getting nowhere. No matter what happens, you rip off the regulator, shove on a new one and think you've done something, but you wind up behind the eight ball, because you only used your screw driver and not your head.

Look, Mike, I'm going to talk turkey to you and tell you, as one friend to another, that unless you wise up and get down to business on voltage regulators, you are not going to have any regulator business — your customers are not going to come back to you if you keep on kidding them instead of fixing them up. It will do you no good to try this make of regulator or that make — they all work in a certain way and none of them will fix up a bad battery, nor will they grab a wrench and tighten a loose connection or splice a broken wire. That's *your* job, and if you don't do it, it's just too bad for you.

And it's a damn shame that you get yourself into a mess with voltage regulators because it's so easy to wise up on them and really do a better job than your competitors. Listen, Mike, I'm going to give you a few tips on voltage regulators that will cut your troubles at least 50% and maybe as much as 70%. Just follow me and do just what I tell you and see if you don't find yourself ahead of the game.

The first thing you do is get yourself a voltmeter, a good one, as it will pay for itself in the first few jobs you do. It has to read in tenths of a volt and must have a scale of 10 volts for 6-volt cars and 20 volts for 12-volt cars.

From what you have been telling me, your biggest trouble is when the ammeter needle on the car stays to the right all the time, or, as you call it, the charge doesn't cut down. All right, Mike, this is it — this is where you **don't** rip off the regulator but do just this:

> Run the engine for about 15 minutes at about 25 miles per hour, with the radio turned on, or any other accessory that takes about 10 amperes; now put one terminal of the voltmeter on the "B" terminal of the regulator and the other voltmeter terminal on a ground and read

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the voltmeter. If the voltmeter reading is 7.0 to 7.7 volts — forget about the voltage regulator — don't touch it, don't adjust it, and for the luvvamike, Mike, don't change it — the trouble is not in the regulator.

Believe me, Mike, this little test will cut down about 50% of your complaints about voltage regulators and save you a lot of hours of unnecessary labor for which you can't collect from the customer.

But you don't even stop here.

Suppose the voltmeter shows more than 7.7 volts, ***you still don't touch the regulator.*** Just leave the voltmeter connected as you had it, run the engine as before, grab a piece of wire and connect one end to the regulator base and the other end to a good clean ground. It might throw you to find that the voltmeter will now show the correct reading, because you had a defective ground, like the mounting screws of the regulator being rusty.

Yes, Mike, about 15% of so called regulator troubles are caused by bad grounds.

All right, the meter still shows high voltage, so you go to the next trouble maker — the engine ground. You know how it is: the generator is grounded to the engine and the battery and regulator are grounded to the chassis; well, with all engines rubber mounted and practically insulated from the chassis, it's the engine ground strap that grounds the engine to the chassis and, believe it or not, it sometimes breaks. To test for this, again leave the voltmeter connected and engine running as before and connect a piece of wire between the regulator base and any bolt on the engine itself. If the voltage drops, you had better replace the engine ground.

If after these quick tests the voltage still reads high, don't give up—there is still one more chance that the trouble isn't in the regulator: it may be in the generator or in the wiring.

You can check this like a flash by disconnecting the wire from the "F" terminal of the regulator, with the engine running. If the voltage still stays high, you've got either a grounded field coil or connection inside the generator or a grounded wire between the generator and the regulator. If the voltage drops sharply, the generator and wiring aren't guilty.

It takes a lot of words to tell these things to you, but, believe me, Mike, the actual time of making all of these tests is about ½ what it takes to pull off a regulator and put on a new one. Besides, one of these tests will show you the real trouble in just about 70% of your jobs, and save you from losing your rep with the customer.

I know what you're going to ask me — supposing you've made the tests and the voltmeter still reads high, what then? Easy as rolling off a log — the regulator is now warm after all the testing, so grab the BLUE STREAK Voltage Regulator Manual, look up page 7 and adjust the regulator to the correct voltage. With the exclusive BLUE STREAK tension spring cam adjustment, where you don't have to bend or twist anything, it takes about one minute for this adjustment and you're all done. But remember this, Mike, do exactly like the Manual tells you and **don't begin to monkey around with the contact screws** — that changes the gap between the armature and the magnetic core of the regulator and puts everything out of commission. **Just stick to the tension spring cam adjustment.**

If you've done all of this and the charge is still high and, I want to tell you this again, that this will be at least 70% of the time, forget about the regulator, the trouble is elsewhere, and I will write you another letter soon and tell you what troubles to look for.

Let's hear from you if something in this letter isn't quite clear.

Yours for Service,

Doc

EK-JC