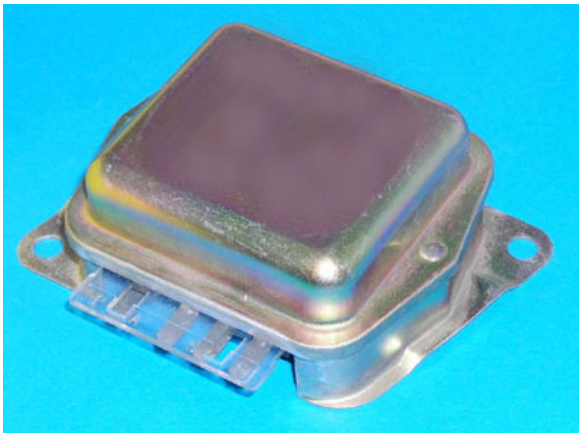
To: aeroelectric-list@matronics.com
Subject: Re: AeroElectric-List: Re: Alternator Voltage Creeping Up (Rev B 11/28/23)

At 09:52 AM 11/22/2023, you wrote: ***Bob, if you had to buy a regulator for an OBAM Âircraft with EFIS and EMS, and conventional lycoming engine, legacy alternator, what would it be?***

Good question . . . and the answer is valid for any and all OBAM aircraft irrespective of the number and class of electrical accessories.

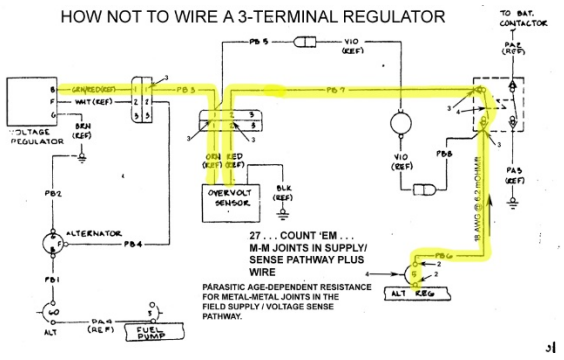
I'm not a diligent observer of the totality of offerings in the market. There are no 'bad' or even 'poor' regulators with respect to voltage. Building a perfectly adequate regulator is a trivial design task. The legacy, 4-terminal 'ford' regulator has been manufactured by the box-car load for many years. They are perfectly adequate.



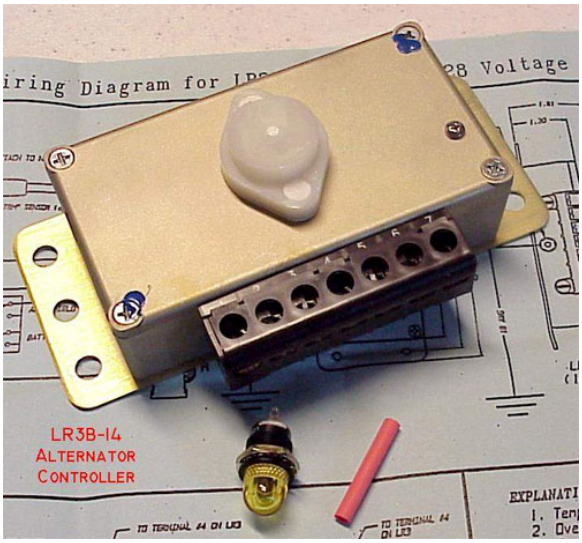
The risk for this and similar regulators is predicated on a combined pathway for the regulator's voltage-sense and alternator field-current When this pathway is polluted with too many or poorly manufactured joints, increasing resistances due to age may combine to a point where the regulator will (1) artificially raise the bus voltage by a few hundred millivolts and (2) ultimately become unstable when these prime directives begin to 'chase' each other. (a) maintain xx.x volts on bus while (b) meeting alternator field current demands consistent with (a).

This is root cause for the relatively rare but irritating 'galloping ammeter' effect usually combined with a constant flickering of panel lights.

Some early Cessna single-engine ships had over two dozen manufactured joints in this pathway setting up a potential risk for the effect. I believe other aircraft have suffered similar effects.



I've only designed one 3-terminal regulator per specs supplied by the customer . . . all subsequent designs featured at least a positive voltage sense; sometimes both positive and negative sense paths. This provided for much improved performance over the lifetime of the regulator.

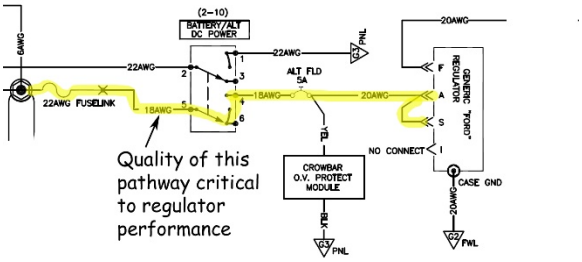


The only regulators I'm aware of with separate sense path are the B&C LR/LS series devices. From the get-go, B&C decided that any such product offered would be an ALTERNATOR CONTROLLER consisting of a remote sense regulator, built in over voltage management and active notification of low voltage.

I used to pitch the LR series regulators over the counter at OSH by stating the product was THREE devices at $75 each making the current price of $225 bargain. I designed the first LR series circa 1985 (Voyager carried two newly minted LR-1's).

There are many examples of separate sense architecture out there. Ebay has many by Lamar, ElectroDelta and others. But these are all used, PMA devices with price tags to match. None will include active notification of low volts . . . only a few will include ov management.

Therefore, burdened by my ignorance of similarly configured products, the B&C LR3 would be my first suggestion. If one were strongly motivated seek lower cost alternatives, I suggest a 'ford' style, 4-terminal regulator teamed with a crowbar OVM and some form of low-volts annunciator.



The 'ford' regulator will be just fine if you take steps to maintain integrity of the v-sense/field-supply path. Make all terminations with gas-tight devices installed with compatible tools.

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Bob . . .

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 < Go ahead, make my day . . .   >
 < show me where I'm wrong.      >
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 In the interest of creative evolution
 of the-best-we-know-how-to-do based
 on physics and good practice.
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