LR3D

Quick Facts

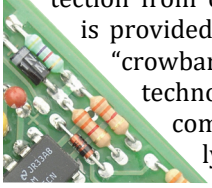
More Than Just Another Regulator

The LR3D is a field-adjustable Alternator Controller that combines three essential devices in one, making it a cost-effective alternative for any aircraft electrical system while also improving safety of flight. First, the LR3D functions as a linear ("quiet") voltage regulator, generating no audio or radio noise (this in contrast to legacy "switching" regulators). Second, it safeguards your electrical system with solid-state "crowbar" over-voltage protection circuitry. And third, it functions as a low-voltage monitoring and warning system, using a panel-mounted warning light (supplied) that illuminates whenever bus voltage drops below 12.7V (or below 25V on a 28V system). The LR3D also features field-adjustable charging voltage, for flexible use with "flooded," SLA/VRSLA, or LiFePO batteries — a uniquely forward-thinking feature that insures proper charging voltage for a variety of battery technologies. The LR3D weighs 9 ounces, and may be mounted on the cockpit side of the firewall for ease of wiring. An optional installation kit that supplies recommended circuit breakers, master switch, wire, and mounting hardware is also available. *Note: LR3D Controllers are designed for use with externally-regulated alternators in a Type-B circuit (see "Application Notes," pg. 2). The LR3D-28 is specifically intended for use with OEM, non-B&C 28V alternators only -- use LS-1A for B&C Alternators in 28V systems.*

OV/LV Protection: Essential for Safety

Discussions of over-voltage and low-voltage events are not merely the aviation industry equivalent of "Dark and Stormy Night" stories — good for a tingle down the spine, but unlikely in the waking world. The simple truth is that such situations can occur. And when they do, aircraft without adequate protection — and those flying them — are placed in very real jeopardy.

The LR3D Controller is designed with these real-world concerns in mind. Protection from over-voltage (OV) events is provided by a built-in solid-state, "crowbar" over-voltage circuit; a technology adapted from the computer industry that nearly instantaneously — and automatically — takes the alternator off-line to arrest the OV condition.



Low-voltage (LV) events, caused by factors such as a broken alternator belt, a faulty field wire, or a sheered drive coupling, also represent a serious concern. Safety of flight can be significantly compromised in these situations, especially if the condition continues unobserved. The LR3D offers LV warning through its low-voltage detection circuitry, which continually monitors the aircraft electrical system. A panel-mounted warning light (included) annunciates the detected LV condition, providing visual indication of the need to conserve vital battery power.

Features

- Linear ("quiet") regulation — no radio or headset noise
- Optimized "crowbar" over-voltage protection circuitry
- Low-voltage monitoring and warning output (compatible with LED and incandescent indicators)
- Field-Adjustable Charging Voltage: 11.0-16.0 volts (LR3D-14) or 22.0-32.0 volts (LR3D-28)
- Designed to DO-160R category Z for RFI emission, and voltage and spike limits; and DO-160 category 5, curve T, for vibration
- Weight: 9 ounces

BandC.com

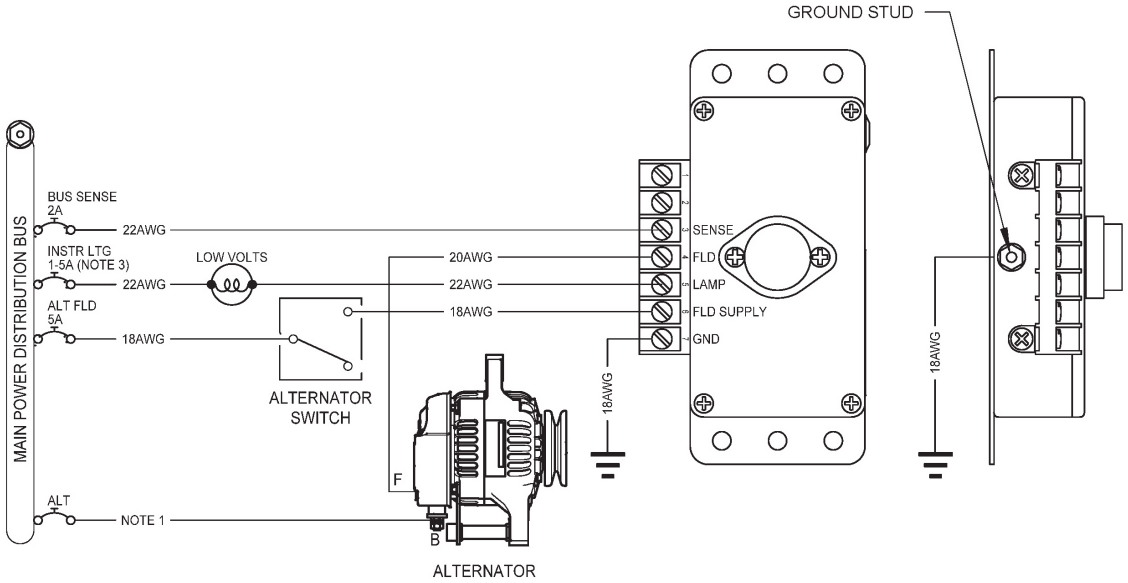
Pricing

LR3D-14 Controller, 14V (Homebuilt), *for Type "B" 14V Alternators*	$230
LR3D-28 Controller, 28V (Homebuilt), *for OEM 28V Alternators*	$230
LR-INSTALL Installation Kit (optional), 14v/28v	$83

Also of Interest

LS-1A Controller, 28V (Homebuilt), *for B&C Alternators in 28V*	$230

LR3D WIRING DIAGRAM



EXPLANATION OF TERMINALS 1 THRU 7	
1	Battery Temp input (optional)
2	Over-Voltage Test input (optional)
3	Bus Voltage Sense input
4	Field output
5	Low-Voltage Warning output
6	Bus Field Supply input
7	Ground input

This part is not STC'd or PMA'd and is sold for amateur-built aircraft only.

THE BENEFITS OF LINEAR REGULATION

The most common type of regulator found in use today is the "switching" variety — known for the way in which it switches "on" or "off" in order to regulate electrical current. In fact, a switching regulator commonly performs this on-off function many hundreds of times per second under normal operating conditions. While switching regulators are compact, and inexpensive to produce, they do have drawbacks — mainly, the many "pulses" of the on-off switching creates electrical noise. As a result, the conventional wisdom has been to locate the regulator as far away from the radio gear as practical. Often, that meant putting the regulator on the engine side of the firewall — and exposing its electronics to the hostile operating temperatures found there.

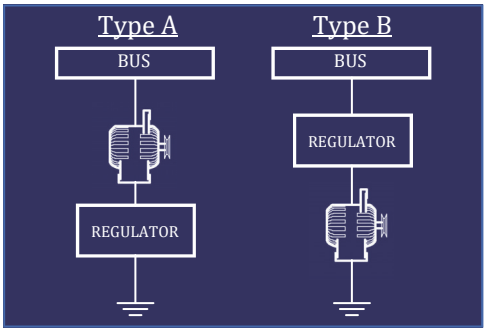
Enter the "linear" regulator — a device that controls regulator output by adjusting alternator voltage, without ever turning the output completely off. In operation, then, it is more like a "dimmer" than an on-off switch, reaching its desired operating voltage in a smooth — and electrically "quiet" — fashion instead of through distinct on-off switching.

This is where the benefits of a linear regulator emerge. Since linear regulation is "quiet", the need to banish the regulator to the engine compartment vanishes. This permits locating the device on the cockpit-side of the firewall — a more temperature-friendly environment. Moreover, when mounted in this location, the regulator may be wired into the aircraft electrical system with greater convenience, and with fewer wires through the firewall.

APPLICATION NOTES: TYPE A OR TYPE B?

One potential challenge in selecting a new regulator stems from the fact that two types of alternator systems are used in modern aircraft; these are commonly called "Type-A" and "Type-B" systems.

The difference between the two is a matter of system architecture — essentially, where the regulator was designed to function in the electrical system. As the diagram illustrates, the Type-A system (a.k.a. the "Motorola system") drives the alternator field directly from the electrical bus; the field is then connected to the regulator, and ultimately, to ground. In contrast to this, a Type-B system has the bus connected to the regulator *first,* after which the system is connected to the alternator field (and again, ultimately to ground).



The LR3D Controller is compatible with Type-B alternators only. So as to avoid potential damage, installations involving an existing alternator should proceed only after careful system review.

Note: all B&C wound-field Alternators are designed for installation in Type-B systems.

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