VANN-Bus 90-Series

Boost Regulator System

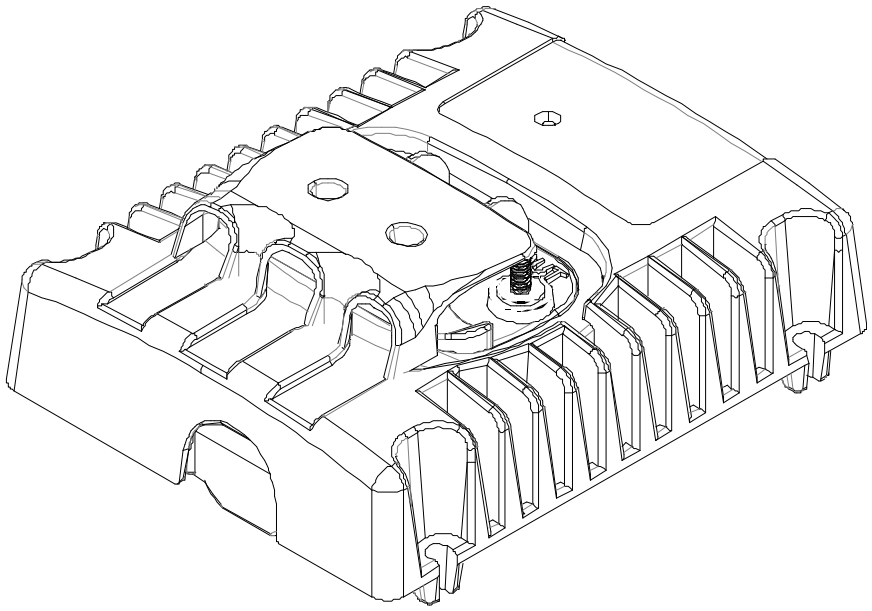


Table of Contents

Introduction

Thank you for purchasing a Vanner *90-30 Boost Regulator*. We are confident that you will be very pleased with its performance because our 90-Series Converters are designed and manufactured by skilled professionals using the highest standards in workmanship. With minimum maintenance and care, you can be assured of many years of trouble free service.

General Description

The Vanner *VAN-Guard System* is an efficient and highly reliable method of maintaining isolation between your 24-Volt DC starting system and your 24-Volt DC auxiliary system. In addition to providing regulated 24-Volt power, the system provides charging to the 24-Volt auxiliary battery, when conditions permit, which significantly extends battery life. Ideally suited for vehicle and alternate energy applications, the *VAN-Guard* is designed to save your batteries and the money you would spend replacing them. Users of the Vanner *VAN-Guard* know that it is the most cost effective and dependable solution for 24-Volt systems.

A typical system would include a 24-Volt DC-starting system, a 24-Volt DC auxiliary system, and the *90-Series*. The *90-Series* connects to the 24-Volt starting system, 24-Volt auxiliary system and ground terminals of the battery system. When the auxiliary battery requires charging, the *VAN-Guard* ensures that the current is transferred from the starting batteries, when conditions permit, and that the auxiliary batteries can not drain the starting batteries when loads are left on. This isolation between the two 24-Volt systems ensures that the starting batteries will maintain the power required to start the vehicle, and provides a stable 24-Volt supply for operating accessories.

NOTE: The Vanner *VAN-Guard System* is an extremely reliable device and, when installed according to the instructions, will provide reliable operation for an indefinite period of time. However, if a system abnormality should develop that would cause a *VAN-Guard* malfunction, damage to the battery system could result if 24-Volt loads are present.

Specifications

90-Series Boost Regulator	
Model Number	90-30CAN
Input Voltage 24v	18 to 32 v
Efficiency (Peak)	>97%
Max 24v Input Amps	32
Output Voltage	??
Output Amps (24v)	0-?
Standby Current	20 milliamps nominal at 28.4V
Operating Temp.	-40°C to +75°C (-40°F to 167°F)
Storage Temp.	-54°C to +95°C (-65°F to 203°F)
Serviceable	Yes
Environmental Considerations	Cast aluminum enclosure provides protection against salt, fungus, dust, water, fuel vapors and all fluids associated with commercial and off-highway vehicle operations. IP rated 56.
Mounting Location	Mount on a flat surface close to the batteries to allow short cable runs. Location should be protected from battery acid and gases.
Weights	8.8 lbs.

90-Series Dimensional Specifications

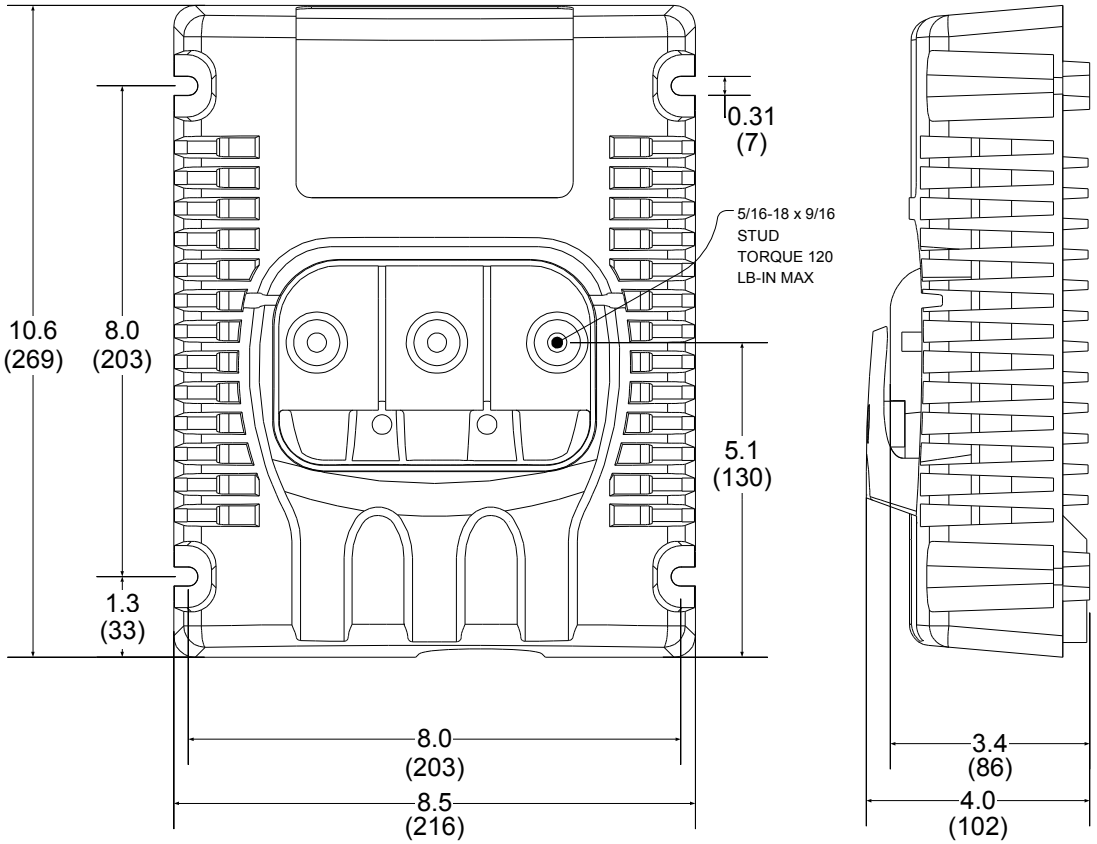


Figure 1 - 90-30 Dimensions

Theory of Operation

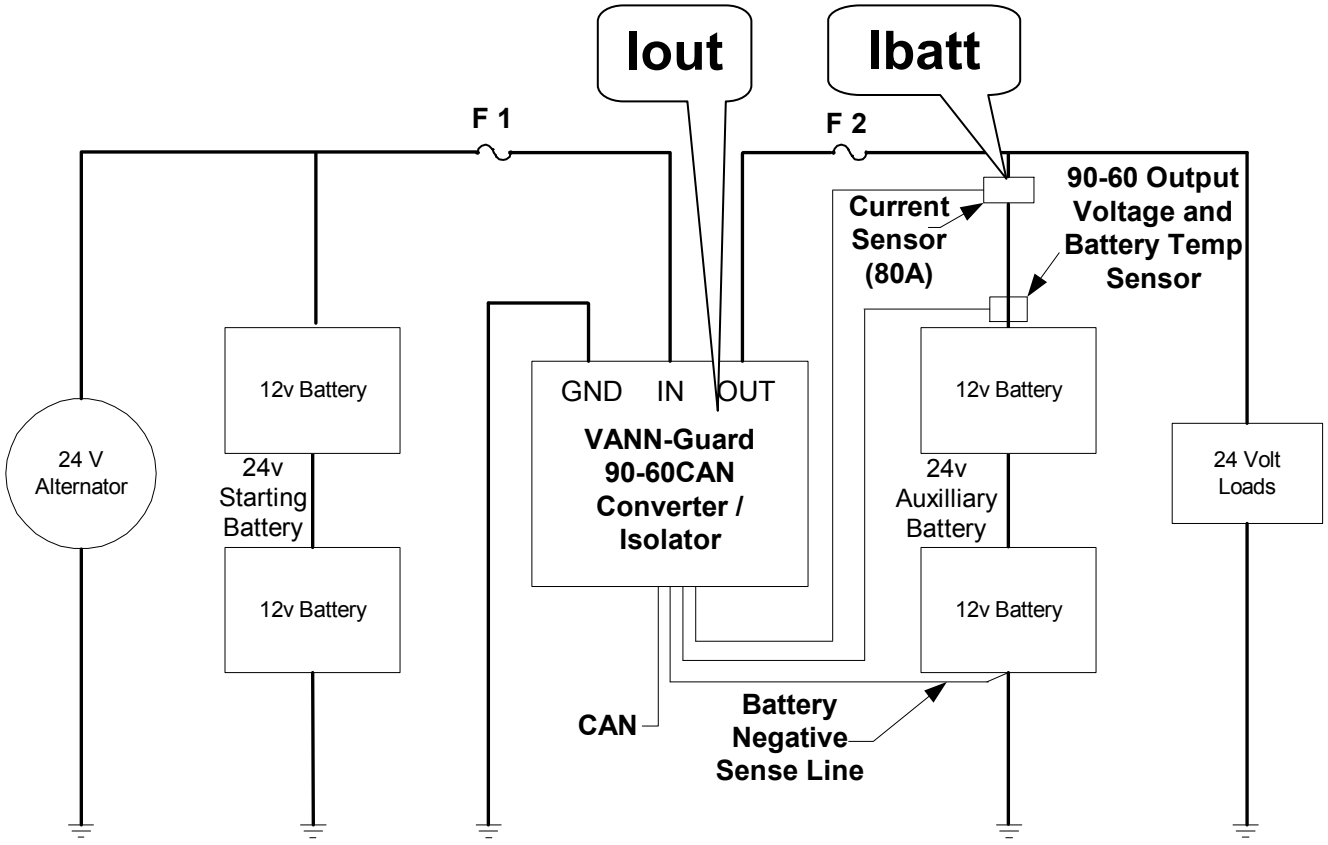


Figure 2 - 90-30 Stand Alone System

The Boost Regulator is a state of the art device that implements software controlled power management. When the unit has been installed and the system is engaged, the 90-Series will look at the input voltage line to determine if there is sufficient voltage to turn the unit on. If there is not, then the unit does not turn on. If there is then the unit performs a "soft start" cycle that will ramp up the output current to the default setpoint of 30-Amps DC. If at some point during the soft start cycle the output voltage plateaus at a lower value than 20-Volts, then the Output current limits to a lower value than 30-Amps. If the Output Voltage climbs to the default setpoint of 20-Volts, then the unit will continue operation, regulating the output voltage to the default values.

If during normal operations the unit should have an output voltage dip, below 20-Volts, again the unit will limit the current below the 30-Amp Default. If the unit's output voltage rises above 30-Volts then the unit will power off for 10 seconds and perform a restart procedure including the soft start sequence. Furthermore, if the unit experiences an over temperature condition, it will also enter into a current limit (a 10% reduction in the output current capacity) to reduce internal temperatures. If this condition persists, the unit will again reduce current output, until the unit gets out of the internally monitored thermal danger zone. If the temperature continues to rise, the unit will again power off for 10 seconds and attempt a restart. If the temperature remains high, then the unit will NOT operate until the temperature is within the rated operating temperatures.

Installation Instructions

Do not exceed the specified torque of 120 in-lbs. *when connecting cables to the terminal posts (Input, Output, and GND) during installation of all the VAN-Guard Models. Torque values higher than specified may damage the product, reduce performance, and/or create hazardous conditions. Products damaged by improper torque are not covered by the warranty.*

Do not connect more than one conductor per terminal post on any Vanner VAN-Guard*. Multiple wires and cables may overstress internal components, resulting in poor performance or creating hazardous conditions. Products damaged by the installation of multiple conductors per post are not covered by the warranty.*

Fault protection devices MUST be installed between the VAN-Guard and the power source (battery)*. A fault protection device would be any fuse or circuit breaker properly rated for the maximum DC current obtainable. This advisory is in accordance with SAE, NEC and UL, for mobile power applications. Install per applicable codes or within 18" of the battery. See Wire and Fuse Sizing Chart on page 10 of this manual or contact Vanner at 1-800-227-6937 or pwrsales@vanner.com if assistance is needed in sizing fault protection devices.*

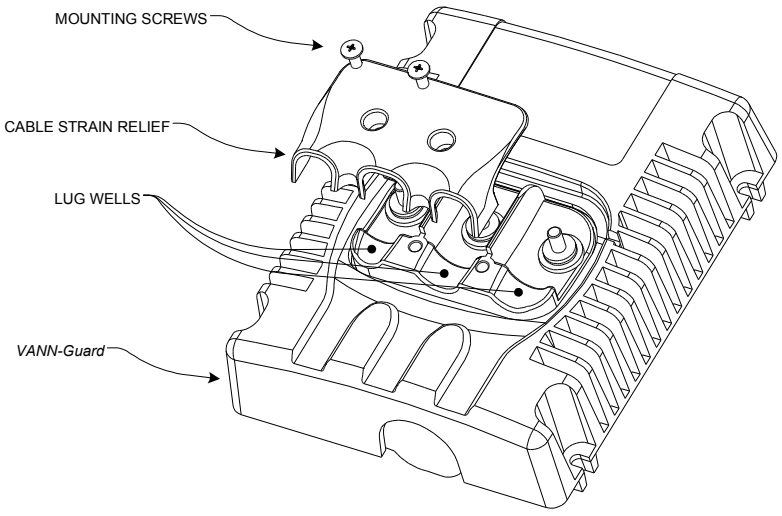
Caution: This equipment tends to produce arcs and sparks during installation. To prevent fire or explosion, compartments containing batteries or flammable materials must be properly ventilated. Safety goggles should always be worn when working near batteries

Mounting Location –The *VAN-Guard* may be mounted in any orientation, on a flat mounting surface suitable to support the *VAN-Guard* during application. Do not mount in zero-clearance compartment that may result in the *VAN-Guard* overheating. Locate so that contact by people is unlikely.

Environmental Protection – Your *VAN-Guard* has been designed to withstand direct exposure to rain and moisture. The *VAN-Guard* has also been tested for exposure to direct pressure spray, but continual exposure to direct pressure spraying may reduce the *VAN-Guard* serviceable life. Vanner covers any damage due to water contamination only through the terms of our factory warranty.

Wiring Sequence– The *VAN-Guard* is internally protected for reverse polarity. The wiring sequence is not an issue with the *VAN-Guard* products.

Strain Relief – The *VAN-Guard* has an integral strain relief. The *VAN-Guard* is designed with wells for the lug to sit into to resist bolt loosening from cable movement, and the strain relief is designed to further inhibit cable movement. The diagram below shows the proper orientation for the attachment of the strain relief and the #10-32 mounting hardware that is supplied.



Wire Size and temperature rating

Cables connecting the *VAN-Guard* to the batteries must be sufficiently sized to prevent unwanted voltage drops. These voltage drops (loss) must be less than 0.05 VDC between the *VAN-Guard's* +24 volt terminal and the battery +24 volt terminal (Battery B positive terminal), less than 0.10 VDC between the *VAN-Guard's* Input terminal and the battery +24 volt terminal (the jumper between Battery A and Battery B), and less than 0.05 VDC between the *VAN-Guard's* GND terminal and the battery ground terminal (Battery A negative terminal that is connected to chassis ground). In most installations, the *VAN-Guard's* terminals are wired directly to the battery terminals (reference fault protection) to prevent voltage loss that could occur in switch contacts, connections, and long wire runs. Since the *VAN-Guard* can be operated in temperatures up to 75ºC, use wire rated at least 90ºC. See Wire and Fuse Size Chart.

Wire and Fuse Size Chart

Wire Size AWG	Ring Terminal AMP or UL recognized equal	Max wire length, in feet, between *VAN-Guard* and battery to keep voltage drop under 0.1 volt. The chart assumes wire carries no other load and wire temperature is below 80ºC.
		90-30
#8	33462	4.2
#6	33466	6.4
#4	33470	11.8
#2	322870	14.4
#1	321867	21.8
Fuse F1		60 amp
Fuse F2		50 amp

Crimp the ring terminals using ***AMP*** ROTA-CRIMP 300850 (2/0 - 8ga).
AMP Product Information Center: 800-522-6752
AMP Tooling Assistance Center: 800-722-1111

Testing and Troubleshooting

CAUTION

Servicing of electrical systems should only be performed by trained and qualified technical personnel.

Equipment Required

Voltmeter having 0.01 volt resolution. (Fluke Model 87, or higher, Multimeter recommended).
Clamp-on current meter (Fluke Model 36 Clamp-on Meter recommended).

Vanner Repair Service

Vanner offers a quick turn around factory repair service. Send the unit to the address below with a note instructing us to repair it. Include your name, phone number, shipping address (not a P.O. Box Number), and your purchase order number.

Test Procedure for *VAN-Guard* 90-Series Systems

The VAN-Guard is working properly if:

1. The 24 volt DC loads are being operated continuously and are within the rated capacity of the VAN-Guard and;

Vanner *VAN-Guards* are electronically protected against reverse polarity damage therefore the DC connection sequence is not an issue.

Vanner *VAN-Guards* will not function properly unless all three-battery connections are made. Battery A and Battery B voltages both must be above 8 volts for the unit to turn ON.

Vanner *VAN-Guards* may be used in parallel with other *VAN-Guards* and Vanner Equalizer models.

Please note that the Input, Output and GND stud positions and orientation are different on *VAN-Guard* 90-Series than on other Vanner Equalizers.

Vanner Incorporated
4282 Reynolds Drive
Hilliard, Ohio 43026

1-800-AC POWER
(1-800-227-6937)
Tel: 614-771-2718
Fax: 614-771-4904

www.vanner.com
e-mail: pwrsales@vanner.com

Part Number D913649-A
August, 27th 2009
Printed in U.S.A.