

VoltScaler

Remote Radio Head Boost Converter System



Description

The VoltScaler power boost system provides 9 voltage boosted individual circuits through three plug-in modules in a 1RU shelf. The system safely boosts the output voltage in pre-programmed steps according to the load presented in order to reduce the losses in the feeding cables.

Application

The VoltScaler RRH Boost Converter platform is a DC to DC converter system which mitigates the voltage drop associated with long power feed cables feeding Remote Radio Head (RRH) units at the top of a tower at a cell site. The VoltScaler product actively adjust output voltage in steps to compensate for the voltage drop in the power cables with an aim to deliver a targeted voltage between -54VDC and -58VDC to the RRH load. A modular solution supporting up to 9 loads in a 1RU shelf configuration, the VoltScaler system provides high efficiency power conversion up to 97% in a high density configuration. Each circuit also has an integrated bypass function which automatically passes the input power through to the load connections in case of a converter circuit failure. In all the VoltScaler platform provides highly reliable and effective boosted power feeds for RRH loads.

Features

- Module Dimensions: 13.85" L x 1.63" H x 5.23" W
- Shelf Dimensions: 23.94" L x 19" W x 1.71" H
- Three circuit DC to DC boost converter modules
- Output voltage range 54 VDC to 73 VDC (auto-compensate)
- Individually monitored and remotely controlled circuits, allow for remote resetting of loads
- Extended input voltage range (supports battery discharge)
- Operating temperature range of -20 to +65C (derating to 70C)
- Maximum output power of 2708Watts per circuit at 55 C (designed to deliver 2000W at 54 VDC to the load)
- 97% peak efficiency
- Output over current protection, Over-voltage protection, Over-temperature protection

* UL is a registered trademark of Underwriters Laboratories, Inc.

† CSA is a registered trademark of Canadian Standards Association.

§ This product is intended for integration into end-user equipment. All CE marking procedures of end-user equipment should be followed. (The CE mark is placed on selected products.)

**ISO is a registered trademark of the International Organization of Standards.

Technical Specifications

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only; functional operation of the device is not implied at these or any other conditions in excess of those given in the operations sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect the device reliability.

Parameter	Symbol	Min	Max	Unit
Input Voltage: Continuous	V_{IN}	-38	-58	V_{DC}
Operating Ambient Temperature	T_A	-20	65	$^{\circ}C$
Storage Temperature	T_{stg}	-40	85	$^{\circ}C$

¹See the derating guidelines published in the rectifier data sheet.

Electrical Specifications

Unless otherwise indicated, specifications apply overall operating input voltage, load, and temperature conditions.

INPUT

Parameter	Symbol	Min	Typ.	Max	Unit
Operational Range	V_{IN}	-40	-54	-58	V_{DC}
DC Input Current	I_{IN}	30		38	A_{DC}
Recommended AC Breaker Size Per circuit (max at -40Vdc)		0	49	66	A_{DC}
Per module (single input feeds all three circuits)		0	147	200	
Leakage Current	I_{IN}			5	mA

MAIN OUTPUT

Parameter	Symbol	Min	Typ.	Max	Unit
Output Power (per circuit)	W	0	-	2,708	W
Factory set default set point	V		59.5		V_{DC}
Max output current	I_{OUT}			37.1	A_{DC}
Efficiency (>= 50% load at nominal input voltage, output Voltage and at 25C ambient)	%		>97%		%

Technical Specifications (continued)

General Specifications

Parameter	Min	Typ.	Max	Units	Notes
MTBF		300,000		hours	@25C per Telcordia SR-332
Unpacked Weight		11.3/24.8		Kgs/Lbs	Two-shelf system
Packed Weight		12.4/27.3		Kgs/Lbs	Two-shelf system
Safety/Standards Compliance					
Safety Standards	ANSI/UL* 62368-1 and CAN/CSA† C22.2 No. 62368-1 Recognized, DIN VDE‡ 0868-1/A11:2017 (EN62368-1:2014/A11:2017)				
Certification Marks	CE mark, UL Recognized (Canada and U.S.)				
RoHS	Compliant to RoHS Directive 2011/65/EU and amended Directive (EU) 2015/863.				
NEBS Compliance	GR-63-CORE, GR-1089, GR-3108				

Environmental Specifications

Parameter	Min	Typ.	Max	Units	Notes
Ambient Temperature					Air inlet from sea level to 5,000 feet.
Operating	-20		70	°C	Derating above 65°C
Storage	-40		85	°C	
Humidity					
Operating	5		95	%	Relative humidity, non-condensing
Storage	5		95	%	
Shock and Vibration acceleration			6	Grms	IPC9592 Class II

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Technical Specifications (continued)

Shelf terminations



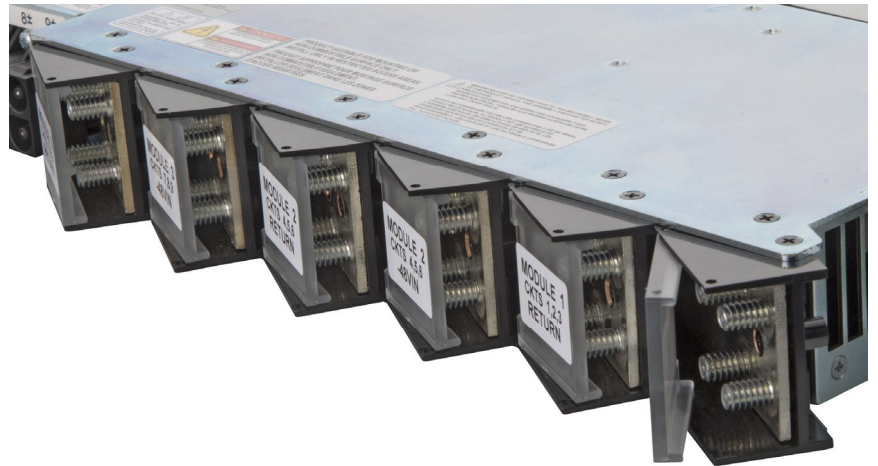
↑
Output
Terminations

↑
Input
Terminations

↑
Alarm
Connections

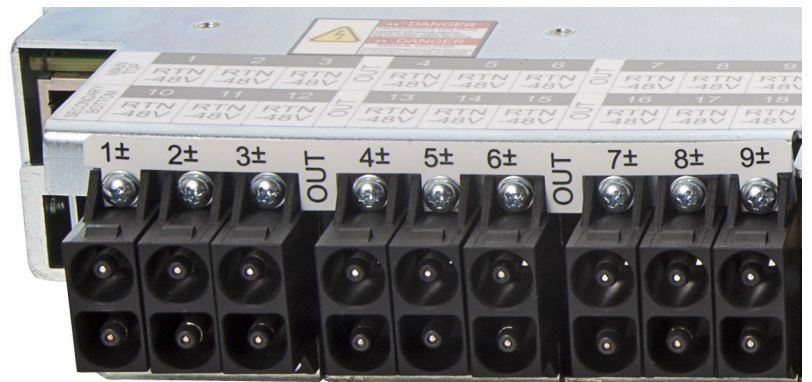
DC Input Connections

Wire size: 2 AWG
Torque: 13-16 In-Lb. (1.47-1.80 Nm)
Type: Two hole lug (1/4-20 x 3/8 spacing)



DC Output Connections

Wire size: 8 - 6 AWG
Crimp on pins
Keyed Pluggable connectors



Technical Specifications (continued)

Customer Output Connector Instructions

Tools Required:

- Generic Wire Strippers
- Crimp Tool - Burndy Y8MRB-1 or Daniels M300BT

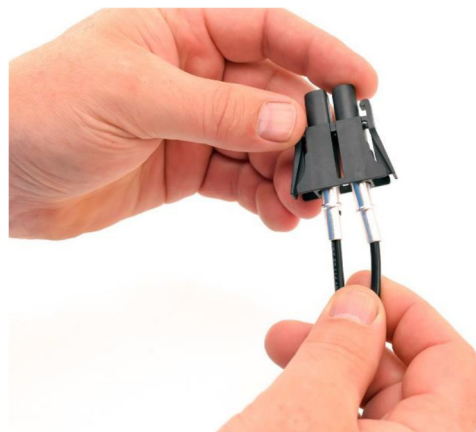
Instructions

Step 1: Strip wire 7/16"

Step 2: Crimp pins on bare end of wire



Step 3: Install pins into connector chassis
(push until pins "snap" into place)



Step 4: Install pin separator into connector chassis
(push until the retainer "snaps" into place)



Technical Specifications (continued)

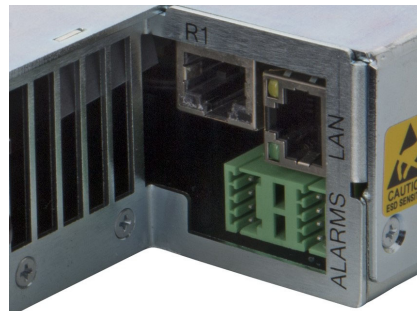
Ground Connections



Wire size: 6AWG
 SCREW MCH #10-32
 Lug landings: #10 double hole on 0.625 inch center
 Torque: 30±1.5In-lb. (3.4Nm)

Control & Alarm Signals

RJ45 Connector for Controller LAN interface
 Plug-in screw terminal connectors for alarms



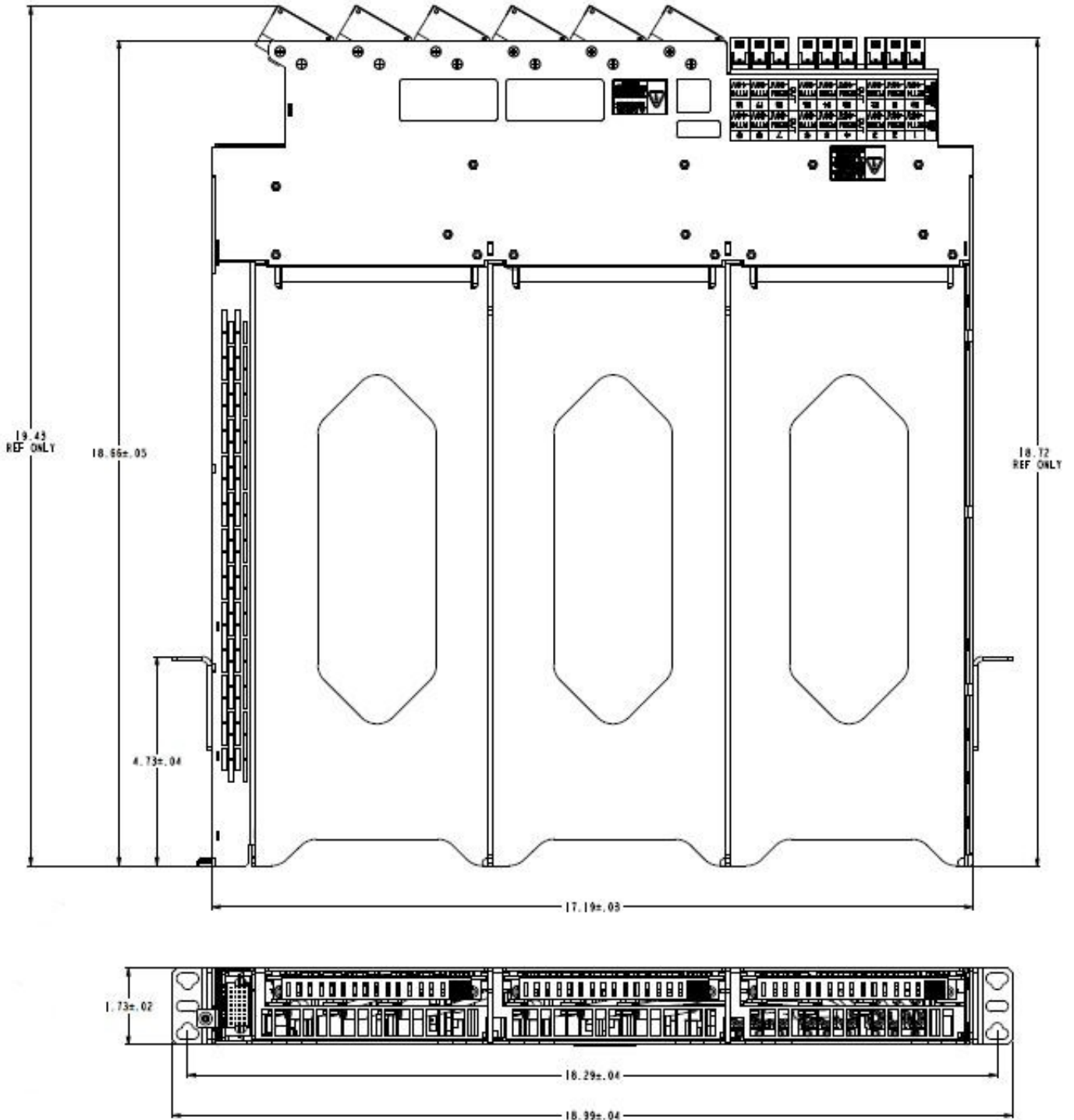
Alarm connector: ALARM-RECT 1, ALARM-RECT 2 Connector

For Rectifier 1

Pin	Signal	Pin	Signal
1	5VA	7	FAULT_1
2	LOG_GND	8	PG_1
3	ISHARE_1	9	MODULE_PRESENT_1
4	LOG_GND	10	EXT_RTN_1
5	VPROG_1	11	REMOTE1 ON/OFF
6	LOG_GND	12	N/A

Technical Specifications (continued)

Shelf Outline Drawing



Technical Specifications (continued)

Ordering Information

Component	Description	Ordering code
Primary Shelf	VOLTSCALER 1U SYSTEM PLUGGABLE OUTPUT Shelf supports 1 controller and up to 3, 3 circuit Voltscaler modules (9 Circuits) (Includes J2015003L011, 9 output connector kits)	1600483758A
Supplemental Shelf	VOLTSCALER SUPPLEMENTAL SHELF PLUGGABLE OUTPUT Add on shelf to expand existing 1U shelf by up to 3 additional , 3 circuit Voltscaler modules (Includes J2015003L011, 9 output connector kits)	1600483759A
2 Shelf System	VOLTSCALER 2U SYSTEM PLUGGABLE OUTPUT 2 Shelf system supporting 1 controller and up to 6, 3 circuit Voltscaler modules (18 Circuits)	1600483757A
Power Module	NE105DC73A BOOST-BYPASS MODULE 3 Circuit Boost Module with built in Bypass circuit. Up to 2708W per circuit @ 73VDC out	1600446983A
Controller	VS841E_014R_DS Voltscaler Pulsar Edge Controller Equipped with display and 4 Input/Output Alarms	1600483761A
Output Connector	VOLTSCALER Output Terminal Kit Supports 6 - 8AWG cables	4600481351P

Change History (excludes grammar & clarifications)

Version	Date	Description of the change
0.1	03/23/2024	Initial draft
0.2	07/09/2024	Add photographs of shelf and features
1.0	09/18/2024	Initial Release

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