

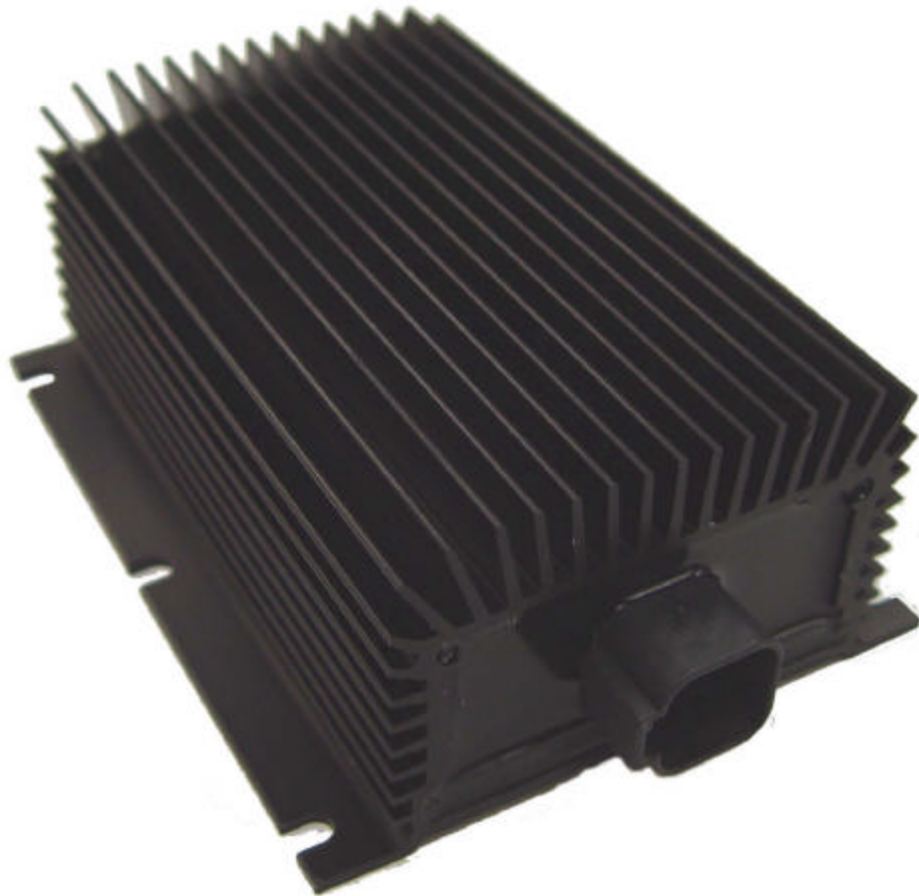
REVISIONS				
REV	ECO	DESCRIPTION	DATE	BY
001	3918	PRODUCTION RELEASE	10/21/03	BF
002	4650	ADD 6 PIN MATING CONNECTOR PN'S	10/12/05	BF


SPECIFICATION OUTLINE

21015C00 Converter

24V to 12V/ 15 Amps

w/ Switched Output



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [MM] TOLERANCES ARE: .XX ± .03 [X.X ± 0.8] .XXX ± [X.XX ±] INTERPRET GEOMETRIC DIMENSIONS AND TOLERANCING PER ASME Y14.5-1994 DRAWINGS IN THIS DOCUMENT ARE NOT TO SCALE			
APPROVALS		DATE	
DRAWN DSR		2/7/03	
PROJECT ENGR			
ENGR MANAGER			
SALES/MRKTG			
TITLE		MODEL NO: 21015C00 24V/12V, 15 AMP CONVERTER WITH SWITCHED OUTPUT SPECIFICATION OUTLINE	
SIZE A	CAGE CODE NO. 55156	DRAWING NO. 21015C00	REV 002
SCALE: NONE		FILE: 21015C00-002	SHEET 1 OF 1

PROPRIETARY

THIS DRAWING IS THE PROPERTY OF SURE POWER INC. and shall not be copied, reproduced, lent, or disposed of, nor used for any purpose other than that for which it is specifically provided without the written permission of

SURE POWER INC.

REVISIONS				
REV	ECO	DESCRIPTION	DATE	BY
		- SEE SHEET 1-		

THEORY OF OPERATION

The 21015C00 is a 15A DC to DC converter. The converter is used to provide energy for 12V apparatus from a 24V source.

The converter provides both a switched output and an unswitched output. The switched output responds to the IGNITION input. When the IGNITION input is active, the switched output is on. The feature is primarily used when the converter is used to power a radio with memory requirements. When used with a radio, the unswitched output provides power for the radio memory. If a switched output is not required, then the unswitched output should be used, and the ignition and switched output pins can be left unconnected.

The converter is designed to withstand the severe electrical environment of the heavy-duty trucks and off highway equipment. The converter can withstand load dump, reverse battery, short circuit, and over-temperature without damage to the unit.

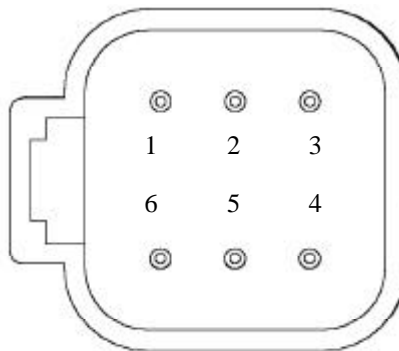
The switched output is implemented using a MOSFET transistor. Due to the MOSFET body diode the switched output should never be connected to a battery or voltage source.

FUNCTIONAL DESCRIPTION

Connections to the unit are made via a 6 pin Deutsch DT style connector. The terminals are as follows:

- Pin 1: +24V Input Voltage. This pin provides the input voltage to the converter.
- Pin 2: Ignition. This pin provides a signal that turns the switched output on and off.
- Pin 3: Ground. This pin should be connected to the system ground.
- Pin 4: +12V (Memory). This pin is the unswitched output voltage.
- Pin 5: +12V Switched. This pin is the switched output voltage.
- Pin 6: Ground.

Connector Pinout



6 PIN MATING CONNECTOR

(DEUTSCH)

HOUSING: DT06-6S

SOCKET: 0462-209-16141

LOCK: W6S



TITLE MODEL NO: 21015C00
**24V/12V,15 AMP CONVERTER
 WITH SWITCHED OUTPUT
 SPECIFICATION OUTLINE**

SIZE A	CAGE CODE NO. 55156	DRAWING NO. 21015C00	REV 002
------------------	-------------------------------	--------------------------------	-------------------


SCALE: NONE	FILE: 21015C00-002	SHEET 2 OF 2
-------------	--------------------	--------------

REVISIONS				
REV	ECO	DESCRIPTION	DATE	BY
		- SEE SHEET 1-		

ENVIRONMENTAL SPECIFICATIONS

Characteristic	Parameter	Unit	Notes:
Operational Temperature Range	-40 to +85	°C	As tested in Tenney T10RC-1.5 thermal chamber.
Maximum Heatsink Temperature	100	°C	Heatsink temperature must be kept below this value to prevent activation of the over-temperature protection circuit.
Storage Temperature Range	-55 to +105	°C	
Over-Temp Limit	105	°C	Approximate heatsink temperature that activates the over-temperature protection circuit.
Humidity	0 to 100	%RH	Tested per SAE J1455, Section 4.2.3
Salt Spray	48	Hrs	Tested per SAE J1455 Section 4.3
Splash			per SAE J1455 Section 4.4, Splash only. See Note 1
Dust			per SAE J1455 Section 4.7. See Note 1
Altitude	12000	ft	per SAE J1455 Section 4.8. See Note 1
Vibration			per SAE J1455 Section 4.9 and Appendix A, Category 2. See Note 1
Handling Shock	Will show damage		per SAE J1455 Section 4.10

Note 1: Specifications not validated at this revision, SAE 1455 represent design intent.

			
TITLE MODEL NO: 21015C00 24V/12V,15 AMP CONVERTER WITH SWITCHED OUTPUT SPECIFICATION OUTLINE			
SIZE A	CAGE CODE NO. 55156	DRAWING NO. 21015C00	REV 002
SCALE: NONE		FILE: 21015C00-002	SHEET 3 OF 3

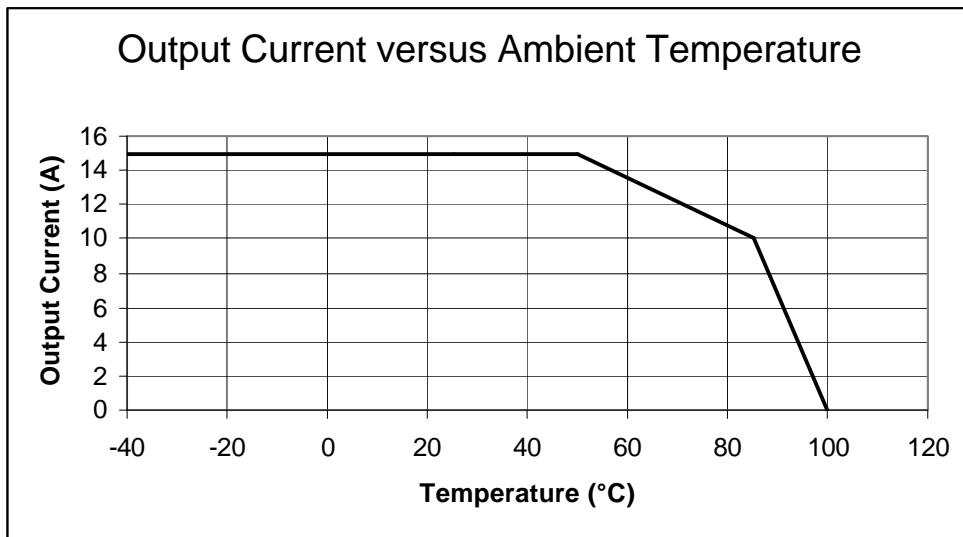
REVISIONS				
REV	ECO	DESCRIPTION	DATE	BY
		- SEE SHEET 1-		

ELECTRICAL SPECIFICATIONS

MAXIMUM RATINGS:

Maximum ratings establish the maximum electrical rating to which the unit may be subjected without damage.

Characteristic	Parameter	Unit	Notes:
Standoff Voltage	80	V	This is maximum voltage applied between input and GND that the unit will standoff without causing damage to the unit.
Time at Standoff	5	min	
Reverse Polarity	-32	V	This is the maximum reverse voltage that may be applied between input and GND pins.
Time at Reverse Polarity	5	min	Tested at 85°C. Per SAE J1455, Section 4.11.1
Input Current	10.5	A	Maximum input current.
Output Continuous Load	15	A	Output load is the sum of the currents from the switched and unswitched outputs. Temperature versus output current rating of product is to be determined.



TITLE MODEL NO: 21015C00
24V/12V,15 AMP CONVERTER WITH SWITCHED OUTPUT SPECIFICATION OUTLINE

SIZE A	CAGE CODE NO. 55156	DRAWING NO. 21015C00	REV 002
------------------	-------------------------------	--------------------------------	-------------------

SCALE: NONE	FILE: 21015C00-002	SHEET 4 OF 4
-------------	--------------------	--------------

REVISIONS

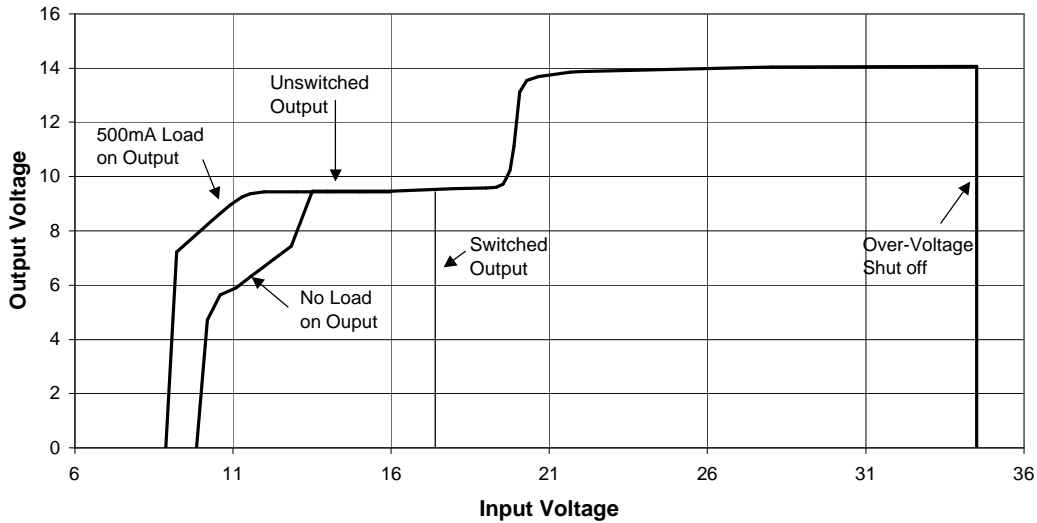
REV	ECO	DESCRIPTION	DATE	BY
		- SEE SHEET 1-		

ELECTRICAL CHARACTERISTICS

Unless otherwise stated, conditions apply to full temperature range and full input voltage range.

Characteristic	MIN	TYP	MAX	Unit	Notes:
Sw. Output Under-Voltage Turn Off			18	V	Below this voltage the switched output will turn off.
Ignition Turn On Voltage	17			V	Minimum voltage required on the ignition pin to turn the switched output on.
Input Over Voltage Turn OFF	34		36	V	Voltage on input that causes the converter to turn off.
Quiescent Current		5	7	mA	Input Voltage 24V. Current draw from the input with no load attached to either output, and ignition off.
Efficiency	85%	90%			Over entire input voltage range at rated output current.
Output Voltage	13.2	13.7	14.2	V	For input voltage above 22V. See graph below.
Output Current Limit	15	16		A	Sum of unswitched and switched outputs

Typical Output Voltage vs Input Voltage



SP SURE POWER
INDUSTRIES, INC.

TITLE **MODEL NO: 21015C00**
24V/12V,15 AMP CONVERTER
WITH SWITCHED OUTPUT
SPECIFICATION OUTLINE

SIZE A	CAGE CODE NO. 55156	DRAWING NO. 21015C00	REV 002
SCALE: NONE		FILE: 21015C00-002	SHEET 5 OF 5

REVISIONS

REV	ECO	DESCRIPTION	DATE	BY
		- SEE SHEET 1-		

ELECTROMAGNETIC COMPATIBILITY

The unit meets the following requirements for a functional status classification of **Class A** (refer to SAE J1113/1).

Radiated Immunity Test	Level	Notes:
Absorber Lined Chamber 30MHz to 1GHz	100V/m	Ref. SAE J1113/21. Unit also passes ISO13766.
Stripline Test Method 20MHz to 150MHz	100V/m	Ref. SAE J1113/23. Unit also passes ISO13766.

Transient Immunity Test	Level	Notes:
Test Pulse 1 Inductive Load Switching	-600V	Region II performance. Ref. SAE J1113/11 and ISO 7637-2.
Test Pulse 2a Mutual Coupling	+100V	Region I performance. Ref. SAE J1113/11 and ISO 7637-2.
Test Pulse 2b DC Motor Field Decay	1 ohm	Region II performance. Ref. SAE J1113/11 and ISO 7637-2.
Test Pulse 3a Switching Spikes	-200V	Region I performance. Ref. SAE J1113/11 and ISO 7637-2.
Test Pulse 3b Switching Spikes	+200V	Region I performance. Ref. SAE J1113/11 and ISO 7637-2.
Test Pulse 5 Load Dump	150V	Region II performance. Ref. SAE J1113/11 and ISO 7637-2.

Electrostatic Discharge Immunity	Level	Notes:
ESD, In Vehicle	±8kV direct ±15kV air	Ref. SAE J1113/13. All connections and exposed parts.
ESD, Package and Handling	±8kV direct ±15kV air, 8KV max on pin 5	Ref. SAE J1113/13.

Emissions Limit Test	Level	Notes:
Conducted Emissions, Broadband and Narrowband	CLASS 2	Ref. SAE J1113/41. Unit also passes ISO13766.
Radiated Emissions, Broadband and Narrowband	CLASS 2	Ref. SAE J1113/41. Unit also passes ISO13766.

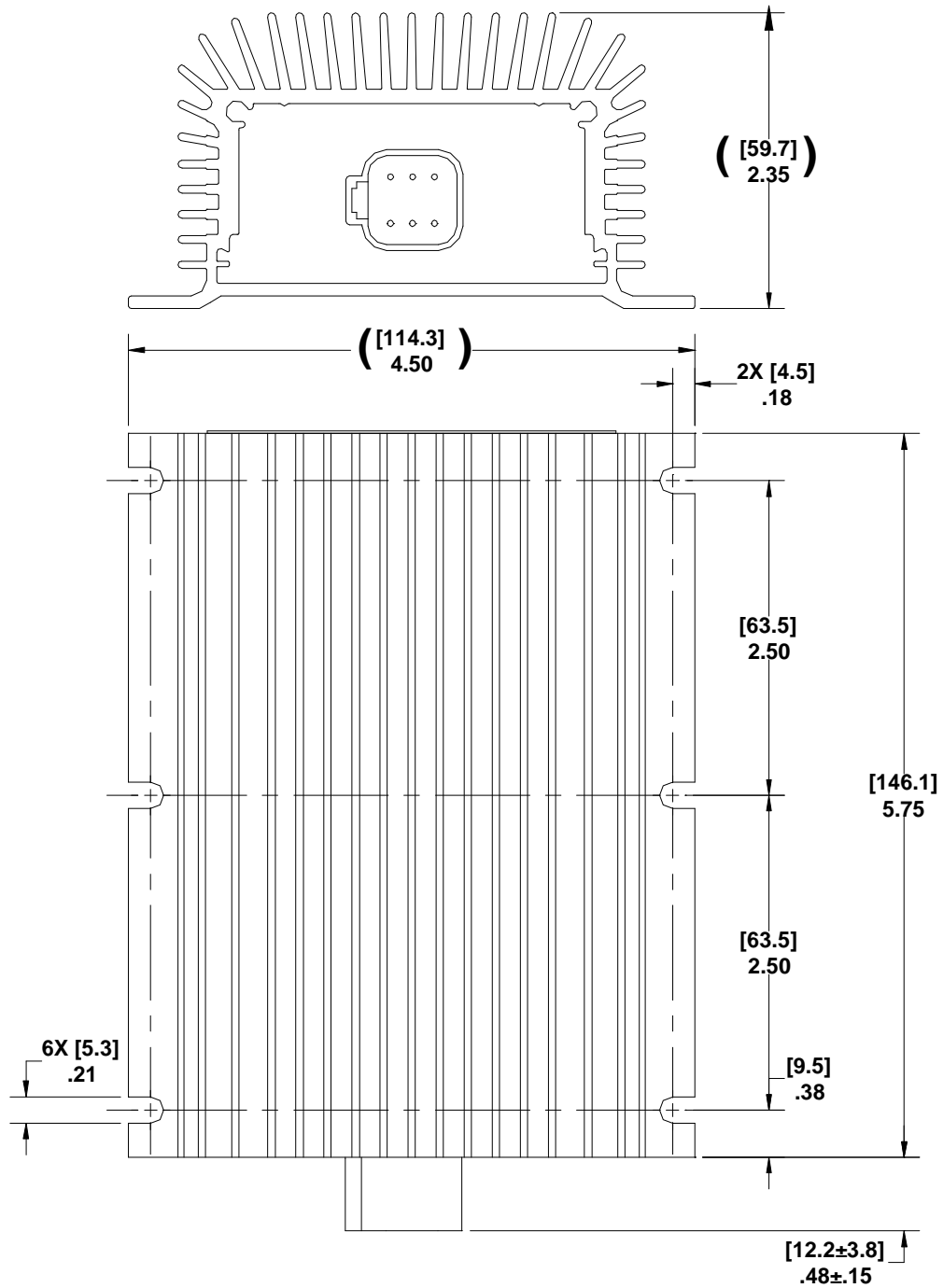


TITLE MODEL NO: 21015C00
24V/12V,15 AMP CONVERTER
WITH SWITCHED OUTPUT
SPECIFICATION OUTLINE

SIZE A	CAGE CODE NO. 55156	DRAWING NO. 21015C00	REV 002
SCALE: NONE		FILE: 21015C00-002	SHEET 6 OF 6

REVISIONS				
REV	ECO	DESCRIPTION	DATE	BY
- SEE SHEET 1-				

UNIT DIMENSIONS



TITLE MODEL NO: 21015C00
 24V/12V, 15 AMP CONVERTER
 WITH SWITCHED OUTPUT
 SPECIFICATION OUTLINE

SIZE	CAGE CODE NO.	DRAWING NO.	REV
A	55156	21015C00	002
SCALE: NONE		FILE: 21015C00-002	SHEET 7 OF 7