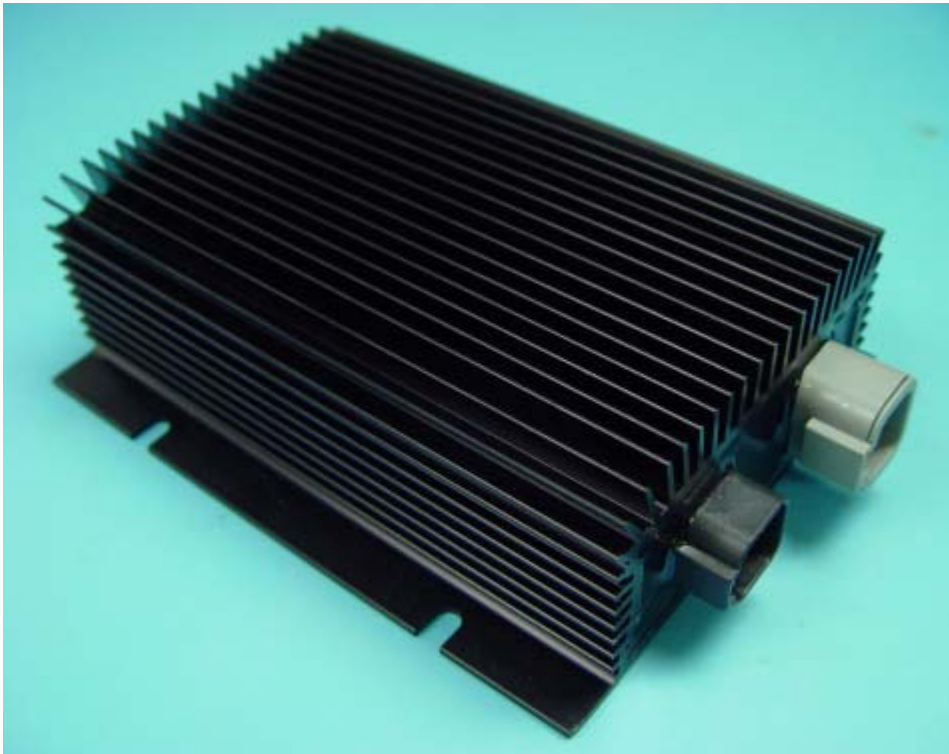


REVISIONS				
REV	ECO	DESCRIPTION	DATE	BY
001	3939	PRODUCTION RELEASE	10/15/03	GF
002	4597	REMOVE 21030E00 REFERENCES	7/15/05	BF
003	4650	ADD 6 & 4 PIN MATING CONN PN'S	10/12/05	BF

Specification Outline

21030C00 DC-DC CONVERTER



<p>UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [MM] TOLERANCES ARE: .XX ± .10 [X.X ± 2.5] .XXX ± .030 [X.XX ± 0.76]</p> <p>INTERPRET GEOMETRIC DIMENSIONS AND TOLERANCING PER ASME Y14.5-1994 DRAWINGS IN THIS DOCUMENT ARE NOT TO SCALE</p>			
<p style="text-align: center;">APPROVALS</p> <p>DRAWN DZD DATE 6/28/05</p> <p>PROJECT ENGR</p> <p>ENGR MANAGER</p> <p>SALES/MRKTG</p>		<p>TITLE</p> <p>MODEL NO: 21030C00 CONVERTER,30A SPECIFICATION OUTLINE</p>	
<p>PROPRIETARY</p> <p>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</p> <p>SURE POWER INC.</p>		<p>SIZE A CAGE CODE NO. 55156 DRAWING NO. 21030C00</p>	<p>REV 003</p> <p>SCALE: NONE FILE: 21030C00-003 SHEET 1 OF 9</p>

REVISIONS				
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General Description

The Sure Power family of converters are designed to provide 24V to 12V power conversion for heavy-duty applications.

The 21030C00 provides a fixed output to power 12V loads directly where a 12V battery is not available. An optional switched output is also available which corresponds to an IGNITION input signal. The two outputs are then summed for maximum output capability.


This product is designed to withstand the severe electrical environment of the heavy-duty trucks and off highway equipment:

Features

- Under and Over Voltage Protection
- Reverse Voltage Protection
- Voltage Transient Protection
- Over load and Short Circuit Protection
- Thermal Overload Shutdown
- Sealed from Environmental Element

Part Number / Ordering Information

Sure Power Part Number	Output Current	Converter
21030C00	30 Amps	Converter w/ switched output

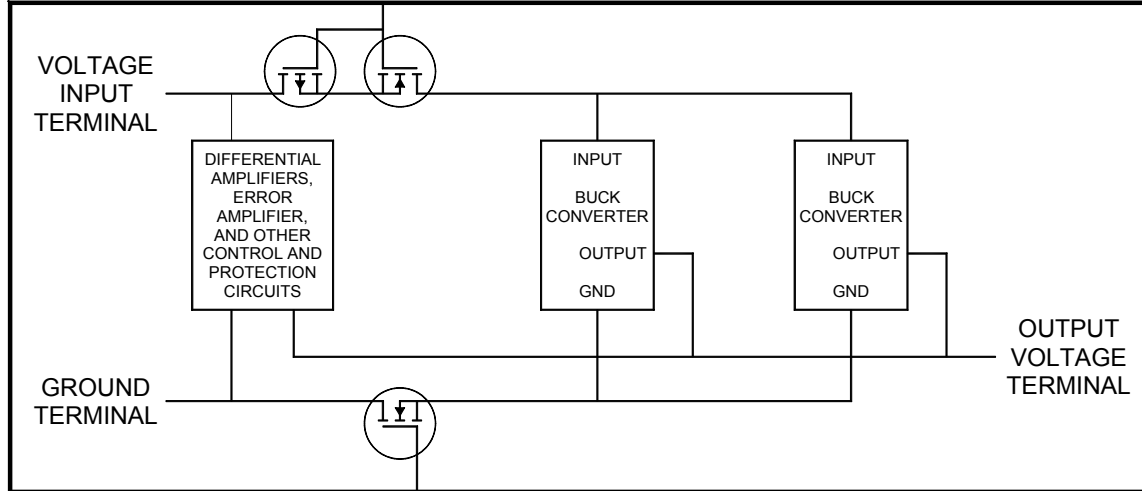
			
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Theory of Operation

The 21030C00 converter utilizes paralleled buck converters to step down the input voltage in order to achieve the appropriate output voltage.



Block Diagram

Description of Features

Included are a number of protection and added features.

PROTECTION FEATURES:

Reversal of the input polarity is protected with MOSFET devices in series with the input.

Reversal of the output polarity is protected with MOSFET devices in series with the ground connection.

A Metal Oxide Varistor circuit is used to protect the input from load dump and inductive transients.

Input under-voltage and over-voltage conditions cause the unit to safely turn off. The converters all have over-voltage protection. The switched output has under-voltage protection and will turn all loads off during an under-voltage condition. The un-switched output does not have an under-voltage shutdown and will operate down to lower voltages to keep power applied to loads during starting conditions.

Short circuit and current limiting protection is supplied by monitoring the output current. Detection of a short circuit or overload limits the output current to 1.2 to 1.4 times the maximum steady state output rating. Upon removal of this condition the output voltage will return to its normal state.

Monitoring the heat sink temperature provides thermal protection. Detection of extreme temperature shuts the unit off. When the heat sink cools approximately 15°C the unit will automatically turn back on.

Loss of ground protection ensures no damage occurs to the unit.



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ELECTRICAL SPECIFICATIONS


ABSOLUTE MAXIMUM RATINGS:

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

Parameter	Value	Notes:
Standoff Voltage	80V	Note 1
Reverse Polarity	-36V	Note 2
Output Current	30A	Note 3
Heat Sink Temperature	100°C	Note 4
Operating Temperature Range	-40°C - +85°C	Note 3
Storage Temperature Range	-55°C- 105°C	

Notes:

1. This is maximum voltage applied between VBAT and GND that the unit will standoff without causing damage to the unit.
2. This is the maximum reverse voltage that may be applied between INPUT and GND, or between OUTPUT and GND.
3. Units can be operated up to 85°C at a reduced output current.
4. The unit generates a significant amount of heat (as shown in the ELECTRICAL CHARACTERISTICS section). When determining a mounting location it is important to account for this heat. Adequate ventilation should be provided.

				
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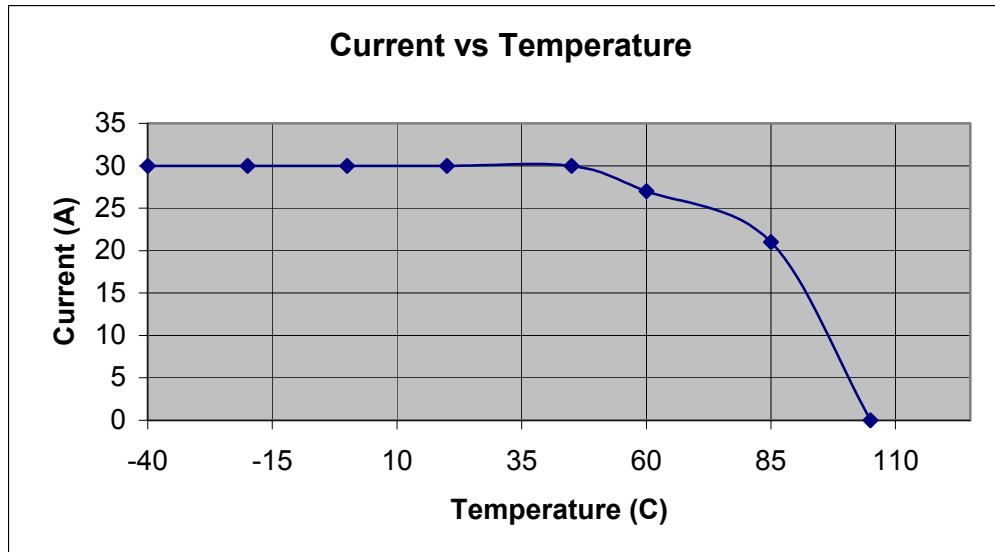
REVISIONS

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ELECTRICAL CHARACTERISTICS

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

Characteristic	Min	Typ	Max	Unit	Notes:
Input Under Voltage Turn ON	20	20.5	21	V	Below this input voltage the unit will set the output to half the input to protect itself. The unit will shut down at $V_{in}=13V$
Input Under Voltage Hysteresis		0.5		V	
Input Over Voltage Turn OFF	32	33	34	V	
Input Over Voltage Hysteresis		0.4		V	
Quiescent Current		10	15	mA	Current draw from the INPUT with no load attached to OUTPUT. $V_{IN} = 24V$
Output Voltage	13	13.5	14	V	
Input current		21		A	Maximum input current
Current Limit	30	32		A	
Over-Temp Limit		105		°C	The trip point for over-temp shutdown
Over-Temp Hysteresis		15		°C	



TITLE

**MODEL NO: 21030C00
CONVERTER, 30A
SPECIFICATION OUTLINE**

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ELECTROMAGNETIC COMPATIBILITY:

Transient Immunity Tests	Level	Notes:
Load Dump	$28 + 122e^{t/(0.4)}$	IAW with SAE J1455 Rev 8/94 Section 4.11.2.2, Table 4a. Pulse applied to Vbat and ignition terminal.
Inductive Switching Kick	$28 \pm 600e^{t/(0.001)}$	IAW with SAE J1455 Rev 8/94 Section 4.11.2.2, Table 4a. Pulse applied to all I/O.
Mutual Inductance	$28 \pm 300e^{t/(0.00015)}$	IAW with SAE J1455 Rev 8/94 Section 4.11.2.2, Table 4a. Pulse applied to all I/O.

Electrostatic Discharge Immunity	Level	Notes:
ESD – Handling	± 15 kV	IAW with SAE J1455 Rev 8/94 Section 4.11.2.2.5.1
ESD – In Vehicle	± 8 kV direct ± 15 kV air	IAW with SAE J1113-13 Rev 2/95. Class C

Radiated Immunity Test	Level	Notes:
Absorber Lined Chamber 20MHz to 1GHz	100V/m	SAEJ1113/21. Units also pass ISO13766
Stripline Test Method 10kHz to 200MHz	100V/m	SAEJ1113/23. Units also pass ISO13766

Emissions Test	Level	Notes:
Radiated	Class 2	SAEJ1113/41. Units also pass ISO13766
Conducted	Class 2	SAEJ1113/41. Units also pass ISO13766




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ENVIRONMENTAL SPECIFICATIONS

Parameter	Level	Conditions / Notes
Thermal Shock		per SAE J1455 Section 4.1 Rev 8/94.
Thermal Cycle		
Humidity	0 – 100 %RH	per SAE J1455, Section 4.2.3 Rev 8/94. See Note 1
Splash		per SAE J1455 Section 4.4 Rev 8/94, Splash only See Note 1
Pressure Wash		per SAE J1455 Section 4.5 Rev 8/94. See Note 1
Dust Bombardment	0.88 g/m ³	per SAE J1455 Section 4.7 Rev 8/94. See Note 1
Salt Spray	96 Hrs	per SAE J1455 Section 4.3 Rev 8/94. See Note 1
Altitude	12000 ft	per SAE J1455 Section 4.8 Rev 8/94. See Note 1
Mechanical Vibration		per SAE J1455 Section 4.9 Rev 8/94 and Appendix A, Category 2 See Note 1
Handling Shock	Will Show Damage	per SAE J1455 Section 4.10 Rev 8/94.

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

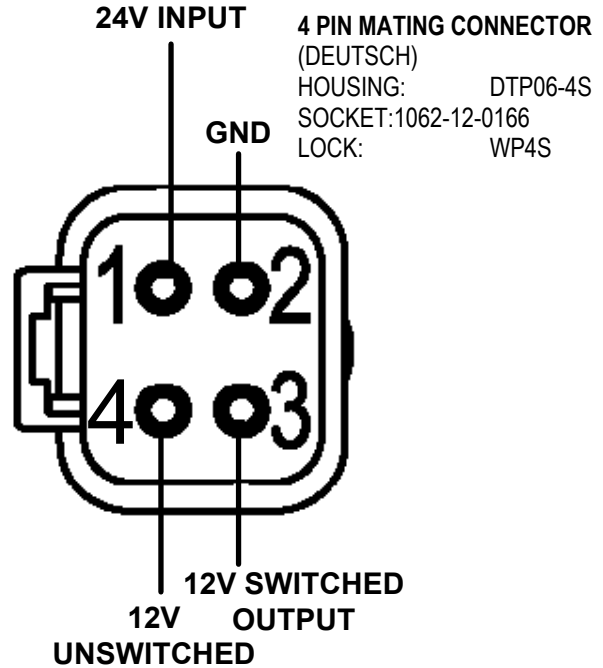
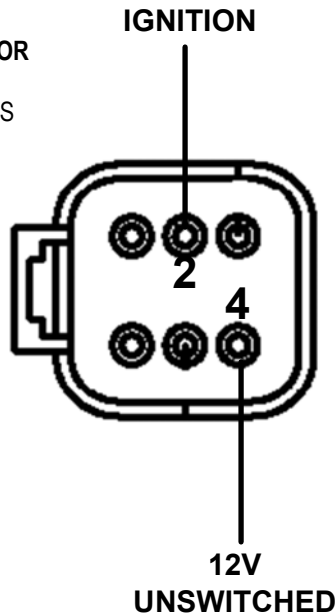
			
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**FUNCTIONAL DESCRIPTION:
UNIT CONNECTIONS:**

**6 PIN MATING CONNECTOR
(DEUTSCH)**
HOUSING: DT06-6S
SOCKET:0462-209-16141
LOCK: W6S



Deutsch 4 Pin Connector

24V INPUT: Pin 1

This terminal is connected to the +24V side of the battery stack.

GND: Pin 2

This is the terminal for grounding the unit. All internal operating currents are returned to this terminal.

12V SWITCHED OUTPUT: Pin 3

This is the Switched Output. It can be connected to the desired 12V switched loads.

12V UNSWITCHED: Pin 4

This is the unswitched output. This pin will normally be wired in parallel with Pin 4 of the 6-pin connector.

Deutsch 6 Pin Connector

12V UNSWITCHED: Pin 4

The Memory terminal is connected to the 12V un-switched loads. If this pin is not wired in parallel with PIN 4 of the 4-pin connector, it should be fused with a 20A rated fuse

IGNITION: Pin 2

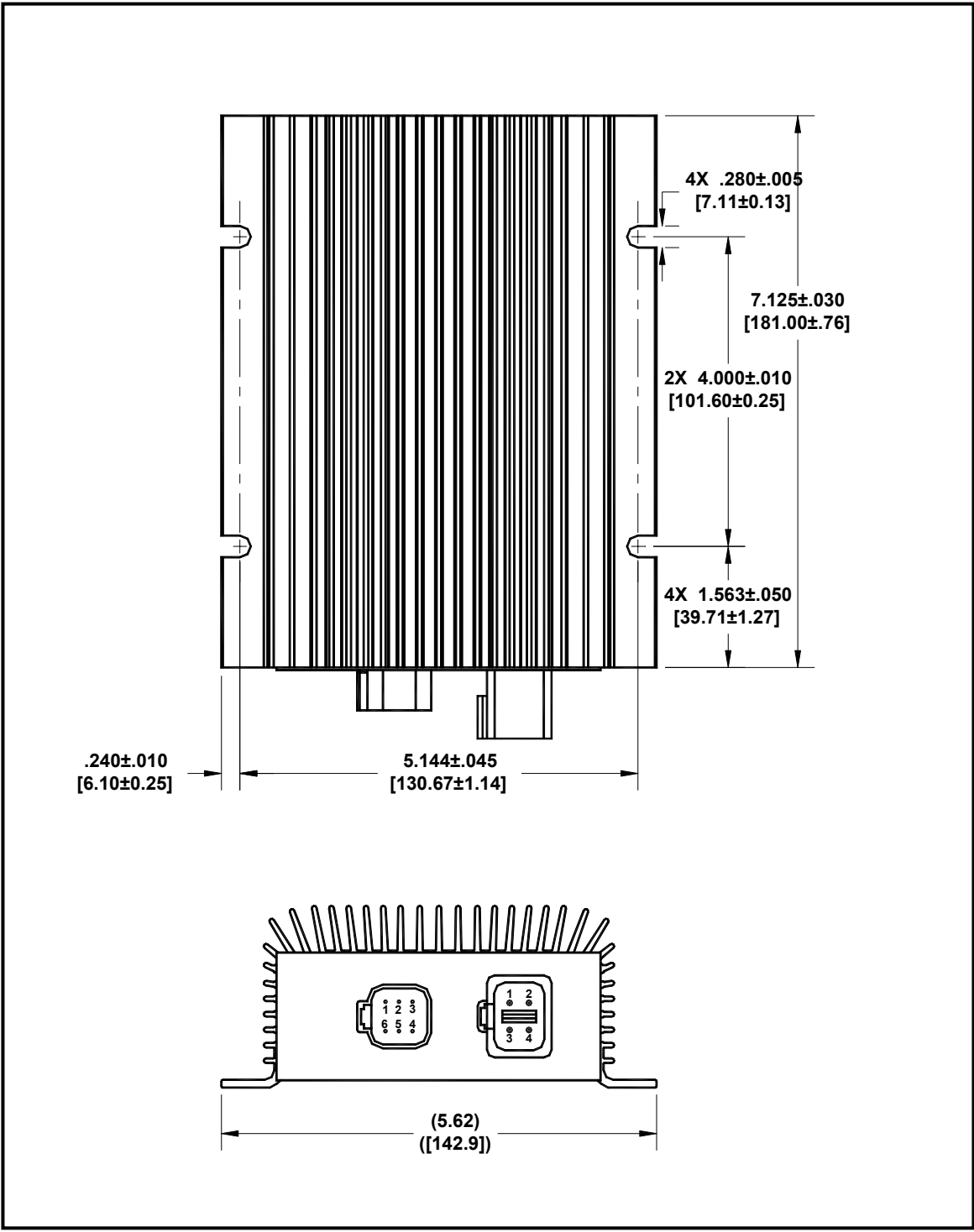
This is the ignition input terminal. Connecting this to an ignition signal will enable the switched output loads.



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UNIT DIMENSIONS



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