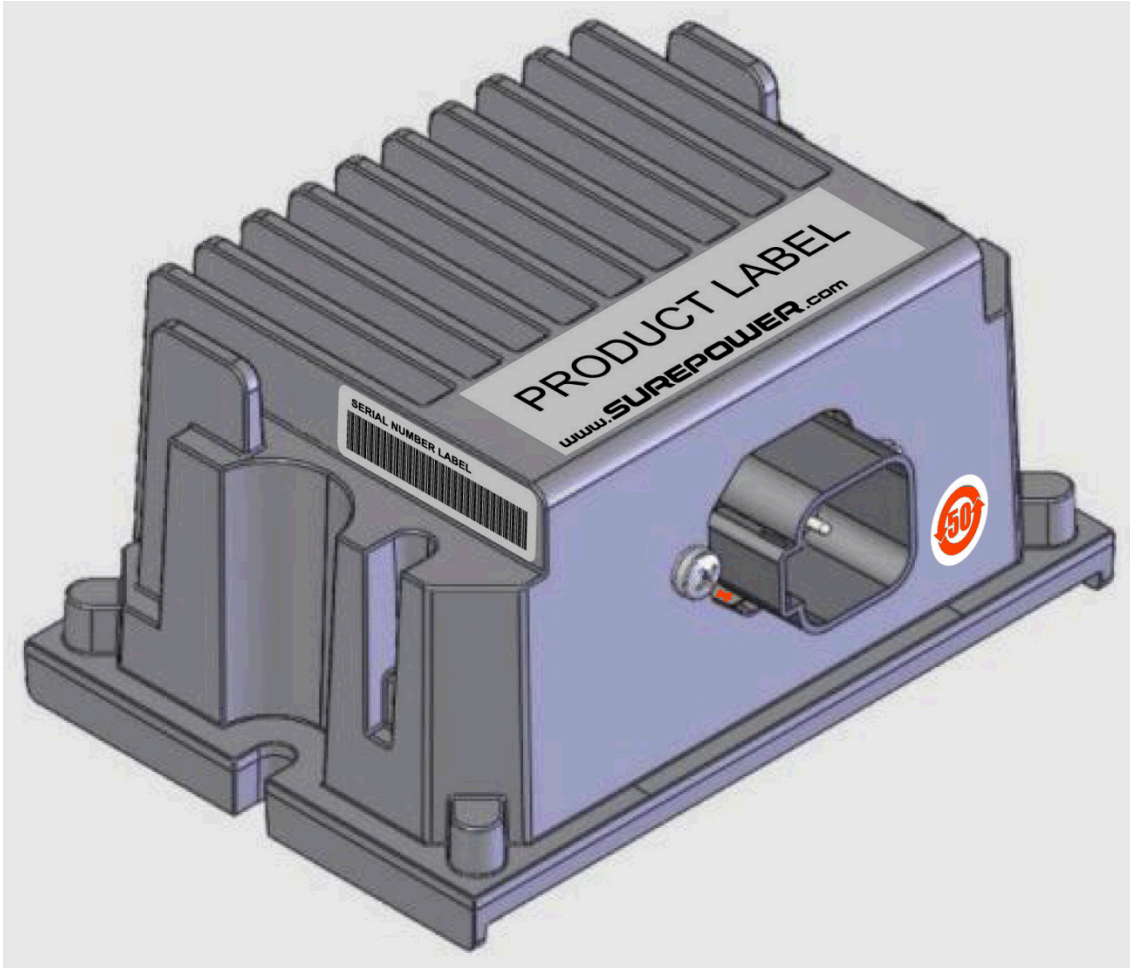



<p>CONFIDENTIAL</p> <p>The information contained in this document is the property of EATON. It is not for public disclosure. Possession of the information does not convey any right to loan, sell or disclose the information. Unauthorized reproduction or use of the information is prohibited. This document is to be returned to EATON upon completion of the purposes for which it is loaned or upon request.</p>	REVISIONS		PLANT DIST CODE(S):		
	REV	DESCRIPTION	DATE	BY	
	003	OMIT PRODUCT AND SERIAL NUMBER LABEL DETAIL	ECO 5627	5/10/10	JT
	04	CORRECTION TO APPLICATION DIAGRAM	BU-U14108	4/2/14	JD
	05	Clarify Output Operational Current Limit	ECO-103079	5/27/16	JD

SPECIFICATION OUTLINE

21010C10 Converter

24V to 12V/ 10 Amps, with Switched output



<p>UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [MM]</p> <p>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>	APPROVALS		DATE		 Powering Business Worldwide			
	DRAWN BY JD		04/02/14			TITLE MODEL NO: 21010C10 24V/12V, 10 AMP CONV, RoHS WITH SWITCHED OUTPUT SPECIFICATION OUTLINE		
	PROJECT ENG APPROVAL				SIZE A	PLANT OF ORIGIN	DRAWING NO. 21010C10	REV 05
	ENG MANAGER APPROVAL				SCALE: NONE	FILE: 21010C10-05	SHEET 1 OF 10	
PRODUCT MANAGER APPROVAL								

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THEORY OF OPERATION

The 21010C10 is a 10A 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 enabled. The feature is primarily used when the converter is used to power a radio with memory requirements. If a switched output is not required then the unswitched output should be used, and the ignition input and switched output pins can be left unconnected.

The converter is designed to withstand the severe electrical environment of 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.

Protection circuits include an over voltage monitor for input voltage and over temperature monitor attached to the PCB near the internal FET's. Both monitors can shut the converter off until the corresponding out of range condition is corrected.

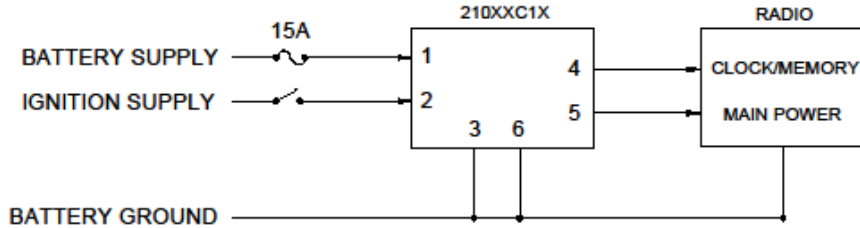


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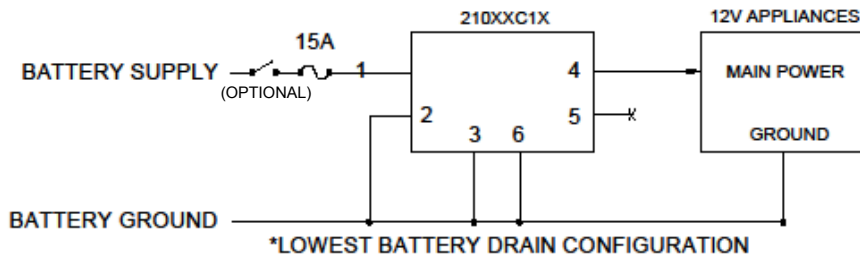
SIZE	PLANT OF ORIGIN	DRAWING NO.	REV
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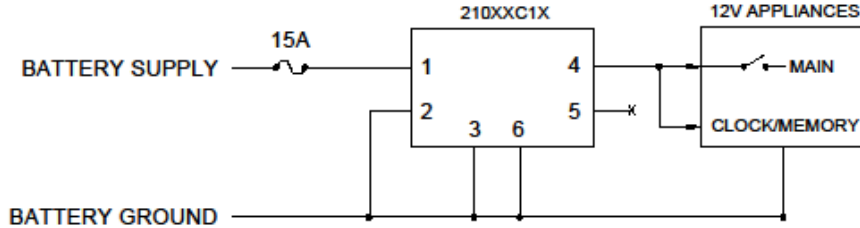
TYPICAL 'IGNITION SWITCHED' APPLICATION
WITH STANDBY OUTPUT



TYPICAL 'ALWAYS ON' APPLICATION



TYPICAL 'APPLIANCE SWITCHED' APPLICATION WITH STANDBY



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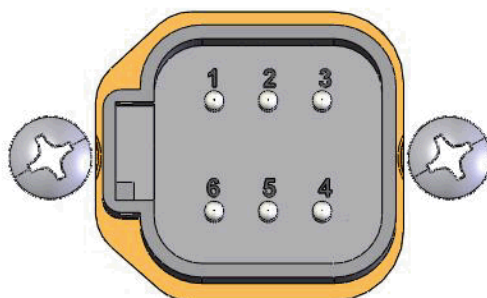
FUNCTIONAL DESCRIPTION

Connections

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

Deutsch connector DT13-6P

Pin 1	+24V Input Voltage	Input voltage to the converter.
Pin 2	Ignition	Switched output control lead , active high.
Pin 3	Ground	System ground.
Pin 4	+12V Unswitched	Unswitched output voltage.
Pin 5	+12V Switched	Switched output voltage, controlled by Pin 2 above.
Pin 6	Ground	System ground.



DEUTSCH MATING CONNECTOR

HOUSING:	DT06-6S
SOCKET:	0462-209-16141
LOCK:	W6S

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ENVIRONMENTAL SPECIFICATIONS

Characteristic	Parameter	Unit	Notes:
Operational Temperature Range	-40 to +85	°C	Ambient temperature
Storage Temperature Range	-55 to +105	°C	
Over-Temp Limit	105	°C	Approximate case temperature that activates the over-temperature protection circuit.
Maximum Heatsink Temperature	100	°C	Heatsink temperature must be kept below this value to prevent activation of over-temperature shutdown circuit.
Humidity	0 to 95	%RH	SAE J1455, Rev Aug 94, Section 4.2
Salt Spray	96	Hrs	ASTM B117-07
Handling Shock	Will show damage		SAE J1455, Rev Aug 94, Section 4.10
Sealing	+/-35	kPa	Sealed against water and water vapor.
Vibration	9.26Grms, 20 – 2kHz		MIL-STD-202G, Method 214A, Fig. 214-1, Test Condition 1C
Immersion	1 meter		1 meter for ½ hour. IEC 60529, Rev 2.1, IP67
Pressure wash			SAE J1455, Rev June 2006, Section 4.5
Shock	30g, 11mS, ½ sine		MIL-STD-202G, Method 213B, Conditions J
Thermal Cycle	-40 to +85 100 cycles	°C	SAE J1455, Rev June 2006 Sect 4.1.3.1, Fig 2B
Thermal Shock	-40 to +85 20 cycles	°C	SAE J1455, Rev June 2006 Sect 4.1.3.2, Fig 2C



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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	Applied between pins 1 and 2 relative to pins 3 and 6. Unit must remain functional after this voltage is removed.
Time at Standoff	5	min	25°C
Reverse Polarity	-32	V	This is the maximum reverse voltage that may be applied between pins 1 and 2 relative to pins 3 and 6 without permanent unit damage.
Time at Reverse Polarity	1	Hr	Tested at 85°C per SAE J1455, Rev Aug 94, Section 4.11.1
Maximum Allowable load	10	A	Output current is the sum of the currents from the switched and unswitched outputs.



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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 voltage operating range	18	27.5	32	V	Output voltage to remain within specified output range under full load.
Input Over Voltage Turn OFF	34		36	V	Converter will shutdown within this range and above, 25°C.
Input Voltage for Turn ON	18			V	Converter must have this input voltage level to start up into specified maximum load.
Maximum Input Current			8.9	A	Input voltage 18V, load of 10A, 25°C
Quiescent Current		5	7	mA	Input Voltage 24V. Current draw from the input with no load attached to either output, and ignition off. 25°C.
Efficiency	85%	90%			Over entire input voltage range at rated output current at 25°C.
Output Voltage	13.2	13.7	14.2	V	Over entire input voltage range at rated output current at 25°C.
Output Operational Current Limit	11			A	Sum of unswitched and switched outputs with output voltage within specified range.
Recommended Input Fuse		15A			External Fuse on input wiring
Output Short Circuit Current Limit			18	A	Input voltage 18V, output voltage less than 2 Volts.
			18	A	Input voltage 27.5V, output voltage less than 2 Volts.
			18	A	Input voltage 32V, output voltage less than 2 Volts.

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ELECTROMAGNETIC COMPATIBILITY

Immunity to Radiated Electromagnetic Fields	Level	Notes:
Bulk Current Injection (BCI) Method	60 mA	SAE J1113-4, Rev Aug 2004 Requirements = Class B, Region 2
30 MHz to 18 GHz, Absorber-Lined Chamber	60 V/m	SAE J1113-21, Rev Oct 2005 Requirements = Status 2

Conducted Immunity	Level	Notes
250 kHz to 400 MHz Direct Injection of Radio Frequency (RF) Power	200mW	SAE J1113-3, Rev Sep 2006 Requirements = Class B, Region 2, Level 3

Emissions	Level	Notes:
Conducted Emissions	Class 2	SAE J1113-41, REAF May 2000 Section 5 Conducted Emissions - Component/Module
Radiated Emissions	Class 2	SAE J1113-41, REAF May 2000 Section 7 Radiated Emissions - Component/Module

Transient Immunity Test	Level	Notes:
Inductive Switching	24V Vehicle	SAE J1455, Rev Aug 94, table 4B compliant.
Mutual Coupling	24V Vehicle	SAE J1455, Rev Aug 94, table 4B compliant.
Load Dump	24V Vehicle	SAE J1455, Rev Aug 94, table 4B compliant.

Electrostatic Discharge Immunity	Level	Notes:
ESD, Powered (In Vehicle)	±8kV direct ±15kV air	SAE J1113/13, Rev Nov 2004 All connections and exposed parts.
ESD, Package and Handling	±8kV direct ±15kV air	SAE J1113/13, Rev Nov 2004 8kV max on pin 5

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Regulatory Requirements	Level	Notes:
Radiated Emissions	Per Standard	EU Directive 2004/108/EC as amended, ISO 13766 and EN13309
Emissions	Per Standard	EU Directives 72/245/EEC as amended
Immunity	Per Standard	EU Directives 72/245/EEC as amended
Restriction of the use of certain Hazardous Substances in electrical And electronic equipment	Per Standard	EU Directive 2002/95/EC as amended
End of Life Vehicles	Per Standard	EU Directive 2000/53/EC as amended
Requirements for concentration limits for certain hazardous substances in electronic information products	Per Standard	People's Republic of China legislation SJ/T 11363-2006

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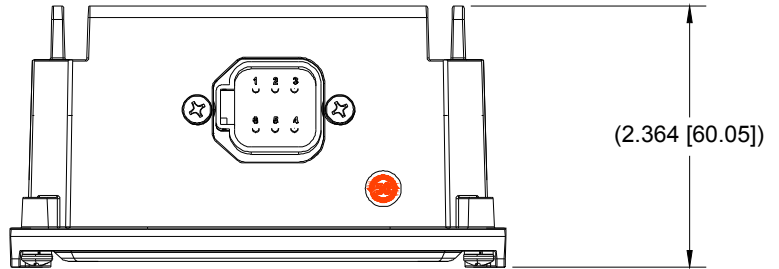
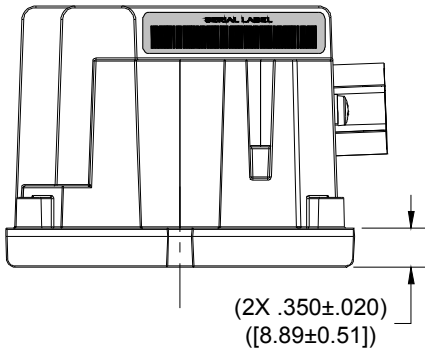
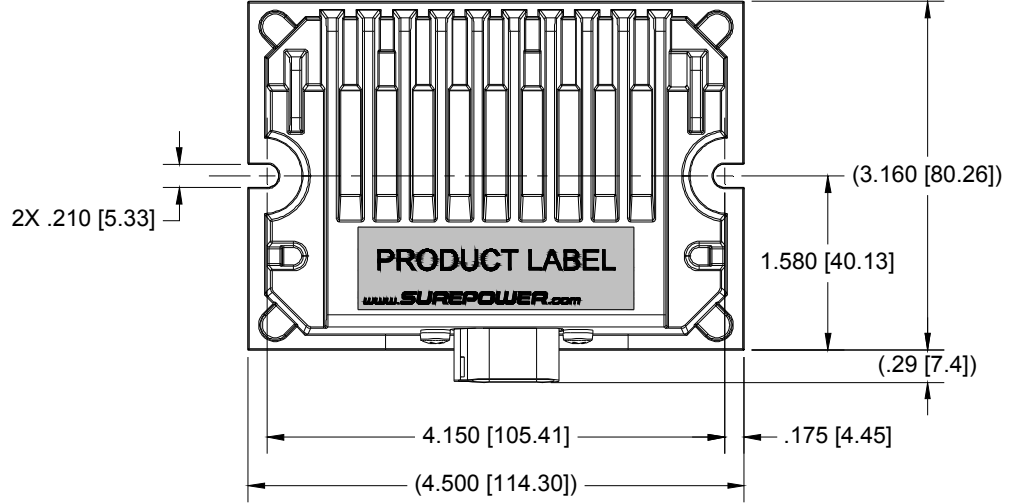
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MECHANICAL SPECIFICATIONS

CONVERTER WEIGHT: 560 ± 56 grams

UNIT DIMENSIONS: Inches [Millimeters]



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