

300W DC-DC Converter



Document History

Date	Change	Description
26-Jan-12	Rev A	Original issue
31-Jan-12	Rev B	Waveform for 'chirp mode' added
22-Feb-12	Rev C	Updated wiring diagram

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Introduction

The 300W DC/DC Converter is mainly used in electrical vehicles in order to convert the high battery voltage into a voltage suitable for powering accessory devices. The converter is self-contained with the output galvanically isolated from the input. Output voltage is regulated independently of any line or load variations.

1 Scope

This document outlines the specification of the Sevcon 300W DC/DC Converter product line.

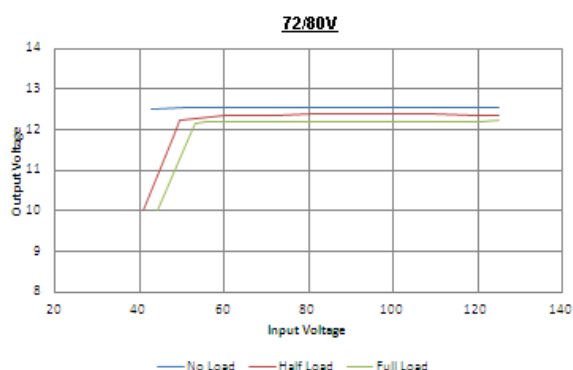
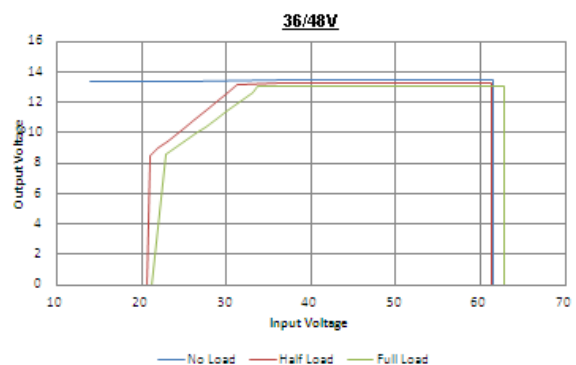
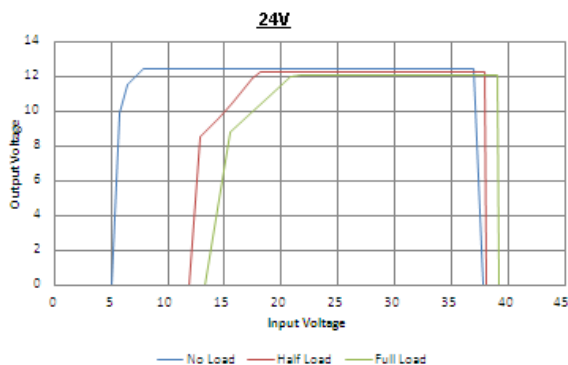
2 Electrical

2.1 Input Voltage

The 300W DC/DC Converter operates with nominal battery voltages of 24V, 36V, 48V, 72V and 80V. Other voltages are available on request. The input voltage range is:

24V:	16V – 35V
36/48V:	22V – 60V
72/80V:	50V – 120V

If the input voltage drops below the minimum the output voltage will shut down momentarily and the converter will restart within 300 milliseconds. Output voltage regulation graphs for 24V, 36/48V and 72/80V are shown below.



2.2 Surge Input Voltage

The peak input surge voltages which can be sustained are:

24V:	40V for 1 second
36/48V:	75V for 1 second
72/80V:	200V for 1 second

2.3 Input Current

Typical quiescent currents (no load condition) are:

24V:	80mA
36V:	40mA
48V:	32mA
72V:	15mA
80V:	15mA

Maximum steady state input current at full load (23A output current):

24V:	16A
36V:	11A
48V:	8A
72V:	5A
80V:	4.5A

2.4 Input Ripple Current

The input ripple current is less than 1A.

2.5 Nominal Output Voltage

The standard output voltages are 12V, 13.5V, or 24V. Other voltages are available on request.

There is an option for an enable input which uses an extra input on the DC/DC connector. The output is enabled by applying battery voltage to this input.

There is a delay of approximately 3 seconds between the application of the input voltage and the availability of the output voltage.

2.6 Output Voltage Regulation

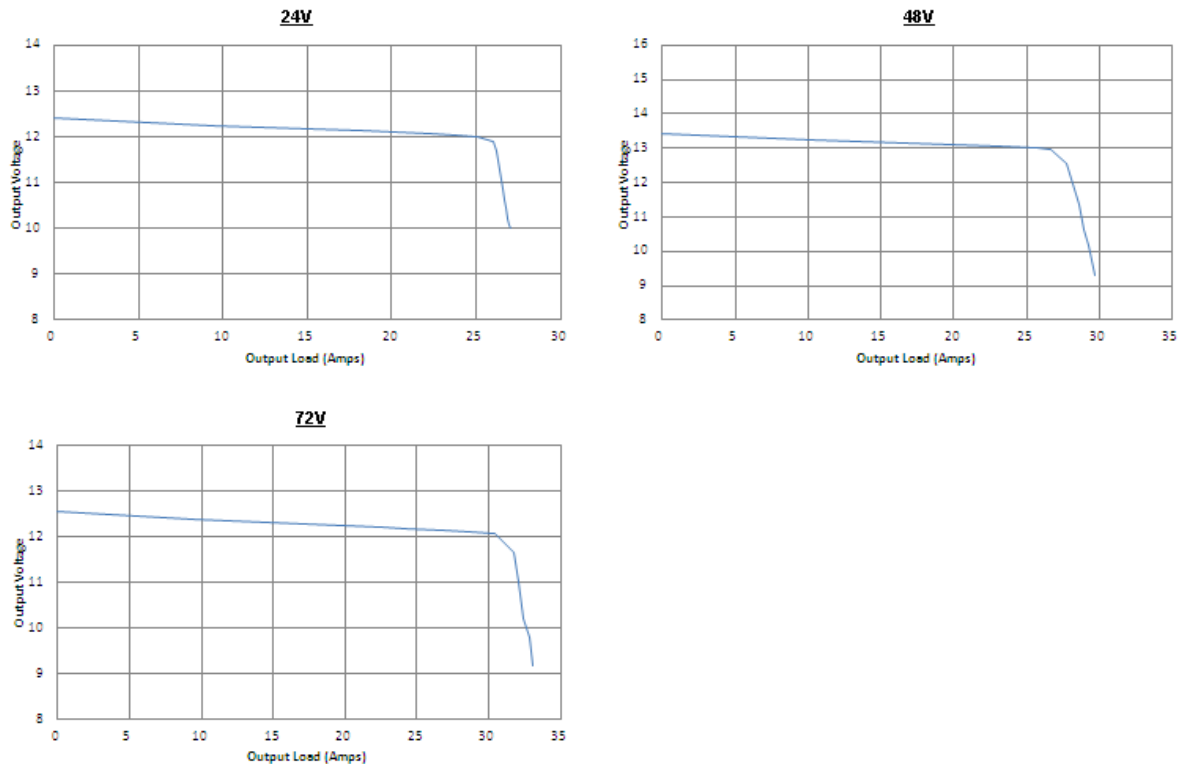
The output voltage will be a regulation band of no greater than +/-5%, which will include the following:

- Load variation from no load to full load.
- Input voltage variation from:

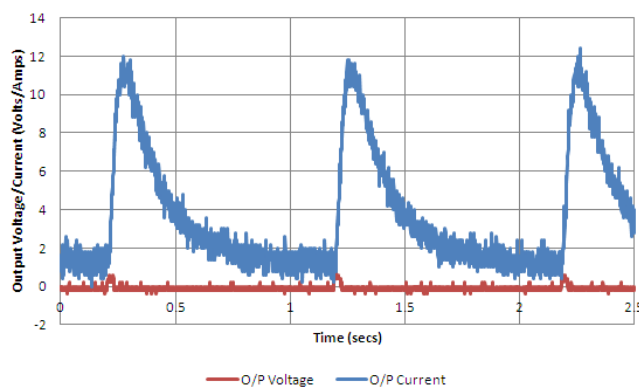
24V:	22V – 35V
36/48V:	34V – 75V
72/80V:	60V – 120V
- Temperature variation from -40°C to +55°C.

2.7 Output Current

The 300W DC/DC converter will deliver up to a minimum of 23A. Current limit will occur at currents greater than this. This is accomplished via primary power limiting and the output voltage will decay when the maximum current has been exceeded. See the graph below which shows typical output voltages for increasing load currents.



As the load increases the output voltage will eventually fall to 9V. At this voltage the primary undervoltage lockout circuit stops the DC/DC converter. The DC/DC will then power up again and stop if the load is still too high. This will carry on indefinitely while the output short circuit is maintained. This is defined as the "chirp mode" operation of the converter and it allows the DC/DC converter to have an instantaneous protection for output short circuit and to withstand a permanent output short circuit with low power loss. The waveforms below show typical output voltages and currents when a short-circuit is present on the output terminals of the DC/DC Converter.



2.8 Input/Output Isolation

The input and output are isolated from the baseplate to 1000VDC (700VAC), the input is isolated from the output to 2500VDC (1750VAC).

Both input and output have Class Y capacitors connected to the baseplate for EMI suppression.

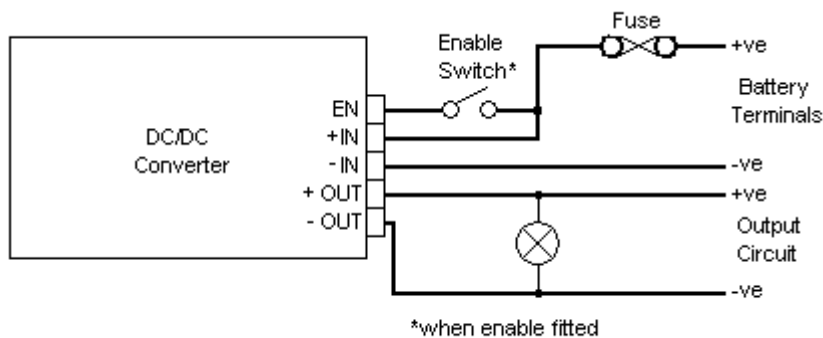
2.9 Efficiency

Minimum efficiency is 84% minimum at half load.

Minimum efficiency is 80% minimum at full load (75% for the 24V input version).

2.10 Power Wiring

The DC/DC Converter is wired as shown below.



The fuse must be fitted for protection, ratings are:

24V:	20A
36/48V:	20A
72/80V:	15A

Options are available where the fuse is incorporated within the DC/DC Converter.

3 *Environmental*

The following sections define the environmental aspects of the converter.

3.1 Temperature

Operating: -30 °C to +55 °C

Storage: -40 °C to +70 °C

Operating temperature is defined as the ambient temperature surrounding the outside of the converter.

3.2 Humidity

The converter will operate over a humidity range of 0% to 90% condensing over operating temperature range. The 300W DC/DC Converter is completely potted.

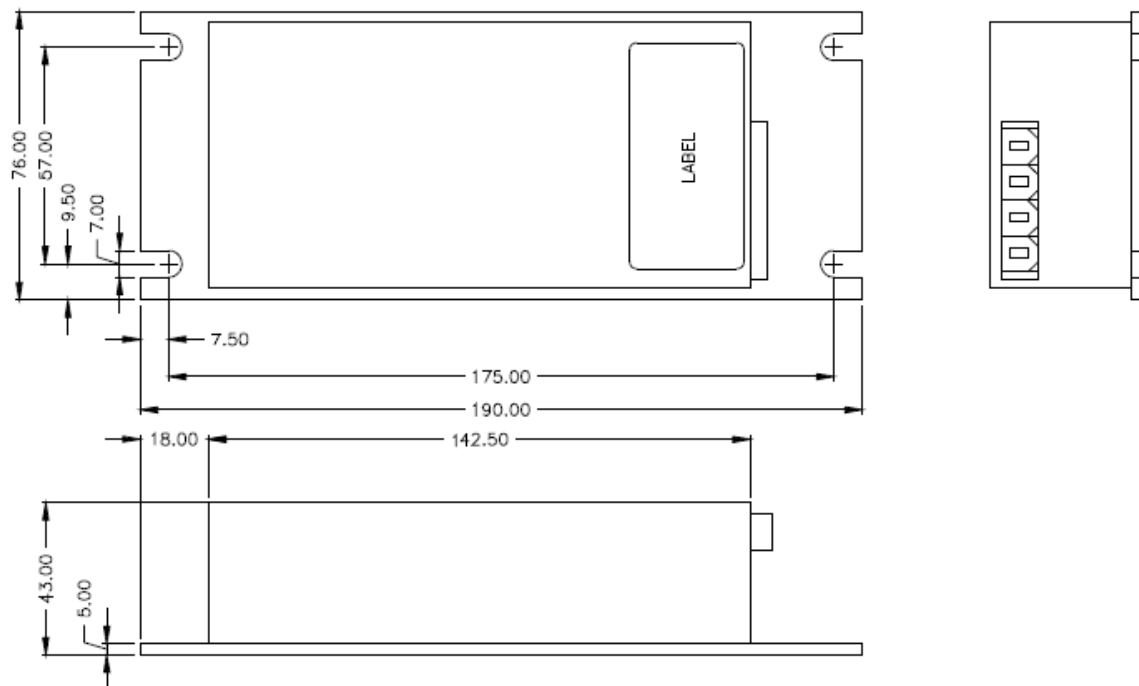
3.3 Vibration

6G force in x, y and z axes from 0Hz to 200Hz for 1 hour.

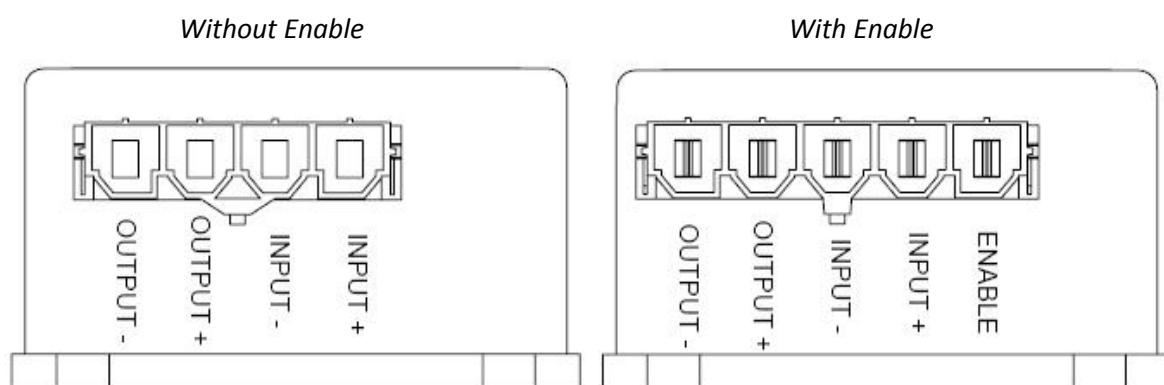
4 Mechanical

4.1 Dimensions

The DC/DC Converter is a rectangular construction and mounted on an aluminium base 190mm long x 76mm wide x 5mm thick.
The DC/DC Converter is 43mm high.



4.2 Input/Output Connections



Mating connectors (Molex Mini-Fit Sr):

Without Enable - 661/27081 connector kit

4-way Molex housing 946/40044
Terminals (10-12AWG) 922/10082 (4 pcs)

With Enable - 661/27093 connector kit

5-way Molex housing 946/40046
Terminals (14-16AWG) 922/10091 (5 pcs)

4.3 Mounting

The converter must be mounted on a flat surface for adequate thermal transfer and to meet the output power requirements.

There are four M6 mounting slots on 57mm x 175mm centres.

4.4 Input Fuse

An option for a 1¼ inch input fuse is available. Fuse rating is 10A to 20A depending on input voltage.

5 *Standards Compliance*

5.1 Standards

The 300W DC/DC Converter range meets the requirements of the following standards:

- UL1950
- CSA 234
- IEC-950
- EN12895