

# DVCH1503

## DC/DC converter

### DC/DC converter for vehicles and other applications



- Wide range input
- Power range up to 1500W
- High efficiency – typ. 94%
- Short-circuit, no load and over temperature protection
- IP-protection class IP65, IP67, IP6K9K
- Parallel connectable
- Galvanical isolated switching regulator
- HV-Interlock
- CAN (controllable output voltage)

Abbildung ähnlich / device similar to figure



DVCH1503-derivate table

Type	Input voltage		Output voltage (configurable)		Output current	Cat. No.
	Nom.	Tol.	Nom.	adj. range		
DVCH1503-400-24	400 VDC	200 - 480 VDC	24 VDC	0 - 30 VDC	56 A	105192
DVCH1503-400-12	400 VDC	200 - 480 VDC	12 VDC	0 - 15 VDC	112 A	105193

## 1 Input

<b>Input voltage range</b>	-	see DVCH1503-derivate table (valid for continuous operation)
<b>Max. current consumption</b>	< 8,5A	typ. 8 A @ $U_{IN} = 200$ VDC, see fig. 9.1
<b>Input capacity</b>	< 7 $\mu$ F	Attention: No inrush current limitation in the device. Recommendation: Provide pre-charging section in the application.
<b>No-load current consumption</b>	$\leq 5$ mA	-

## 2 Output

<b>Output voltage <math>U_{nom}</math></b>	-	see DVCH1503-derivate table (valid for continuous operation)
<b>Initial accuracy</b>	$\pm 1,0\% U_{nom}$	-
<b>Ripple &amp; Noise</b>	$< 1,8\% U_{nom}$	measurement bandwidth 20 MHz
<b>Max. continuous output current <math>I_{nom}</math></b>	56A 112A	DVC1503-400-24 DVC1503-400-12, see fig. 9.3
<b>Max. continuous output power <math>P_{nom}</math></b>	$\leq 1500$ W	-
<b>Current limiting</b>	$1,1 \times I_{nom}$	above $1,0 \times I_{nom}$ $U_{out}$ may sink
<b>load regulation static (0-100% <math>P_{nom}</math>)</b>	$< 2,0\% U_{nom}$	-
<b>transient load change (20-80% <math>P_{nom}</math>)</b>	$< 12,5\% U_{nom}$	bei $\frac{dI}{dt} < 100$ A/ms, without additional capacitance or inductance, measured directly at the output sockets
<b>Recovery time</b>	< 3ms	Duration from leaving the tolerance band until the permanently return to the tolerance band after a load step.
<b>Voltage setpoint speed</b>	30V/s	valid only for controllable version

## 3 Environment

Working temperature (environment)	-40°C ... +70°C	-
Max. permissible temperature of the mounting surface	< 50°C	-
Overtemperature protection	-	Automatic shutdown in case of overtemperature with 2 thresholds: - At 1st threshold warning via CAN. - At 2nd threshold protective shutdown. On request: Automatic power derating in case of overtemperature.
Storage temperature	-40°C ... +85°C	-
Humidity	100%	-
Dewing	allowed	-
Shock test acc. to DIN EN 60068-2-27	-	half sinusoidal (Excitation) 250m/s <sup>2</sup> (Peak acceleration) 6ms (Duration) 1.000 shocks to each axis (Quantity) ±X, ±Y, ±Z (Axis)
Vibration test acc. to DIN EN 60068-2-6	-	sinusoidal (Excitation) 30m/s <sup>2</sup> (acceleration) 5 - 100Hz (frequenc, floating) 5g (acceleration) 10 - 500Hz (frequenc, floating) 9h per axis (Duration), 1 Oct/min X, Y, Z (Axis)
Degree of protection acc. to EN 60529	IP65, IP67, IP6K9K	Using the appropriate mating connectors; except M12 screw connection points at the output

## 4 General data

Insulation strength	500 VDC 4,25 kVDC	Output / Enclosure Input / Output + Enclosure
Max. Efficiency	typ. 94% @U <sub>IN</sub> = 400VDC	see fig. 9.2
Average efficiency	typ. 93,2% @U <sub>IN</sub> = 400VDC	Averaging of the efficiency values at 25%, 50%, 75% und 100% of the nominal output power. see fig. 9.2
Dimensions (LxWxH)	ca. (295 x 233 x 68,5) mm	without connections, see fig. 8.1
Enclosure	Aluminium	-
Weight	< 5 kg	-

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 Technische Änderungen und Irrtümer vorbehalten. I Technical modifications and mistakes reserved.

Mit den Angaben im Katalog und in den Datenblättern werden Produkte beschrieben, nicht Eigenschaften zugesichert. Belastung mit „Grenzwerten“ (einfache Kombination) ist zulässig ohne bleibende Schäden der Produkte. Betrieb der Geräte mit Grenzwertbelastung für längere Zeit kann die Zuverlässigkeit beeinträchtigen. Grenzwerttoleranzen unterliegen üblichen Schwankungen. I Products are described by information contained in catalogs and data-sheets. It is not be considered as assured qualities. Stresses listed under „Maximum Rating“(one at a time) may be applied to devices without resulting in permanent damage. The operation of the equipment for extended periods may affect device reliability. Limiting value tolerance are subject to usual fluctuation margins.

## 5 Standards

### EMC (Electromagnetic Compatibility)

Bezeichnung	Norm	Werte
Emitted interference	ECE R10.5 EN12895 EN61204-3	- - according to 6.4.2, Table H.3, for residential, commercial and light industrial environments (Class B, cable length < 10 m, internal frequencies < 108 MHz)
Immunity	ECE R10.5 EN12895 EN61204-3	- - according to 7.2.3: Immunity level for industrial environment (cable length < 10 m)

### Electrical safety

Title	Standard	Data
Safety of industrial trucks - Electrical requirements	DIN EN 1175	-

## 6 Installation and safety instructions

In addition to the general installation and safety instructions for DC/DC converters, the following values and supplements apply:

Mounting points	-	4x Mounting holes ( $\varnothing 9$ mm) see fig. 8.1
Installation orientation	-	any
Connection input / output	-	see chapter 7
Interlock-function	-	realized by HV-connector plugs. Guide via signal connection plug, see chapter 7.
Input fuse	-	No integrated input fuse. A fuse must be provided externally by the customer application.
Input discharge duration	< 5s	Time from disconnecting the input voltage to $U_{in} < 60$ VDC
Reverse polarity protection input	-	reverse polarity protection through connection plug
Reverse polarity protection output	< 30VDC	Note: DVCH1503 self-protection, does not protect the application from reverse polarity.

The general installation and safety instructions for DC/DC converters can be found at: [www.deutronic.com](http://www.deutronic.com)

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## 7 Connections

### Inout

#### AMPHENOL, Excel Mate Eco HVSL282 02 2 A:

- 2 pole HV connector with interlock contacts.
- Matching mating connector: AMPHENOL, Excel Mate Eco HVSL282 06 2 A 104
- Contacts for mating connector: AMPHENOL, Excel Mate Eco, socket contact, crimp connection: C310003612
- HV-cable: Huber+Suhner, FHLR91XC13X (4mm<sup>2</sup>, shielded single conductors)

### Output

#### threaded bolt:

- M12 [max. torque 35Nm]

### Enclosure potential

#### Thread:

- M8 (below the output connections, see fig. 8.1)

### Signal (CAN)

#### TE connectivity AMPSEAL, 14-polig:

- 14-pin automotive connector (TE-Nr.: 776267-1)
- Matching mating connector: TE-connectivity AMPSEAL 14-pin, socket housing (TE-Nr.: 776273-1)
- Contacts for mating connector: TE-connectivity AMPSEAL socket contact, crimp connection (TE-Nr.: 770854-1)

#### PIN "1" / PIN "2": Interlock

- If the HV connector is properly connected to the input, PIN "1" and PIN "2" are connected via the HV connector.
- If the HV connector is disconnected from the device, the internal connection between PIN "1" and PIN "2" is also disconnected.

PIN "3": KL15 (switched plus of ignition starter switch)

PIN "4": KL30 (Continuous plus of the battery)

PIN "5": Common GND

PIN "6": Digital Input

PIN "7": Digital Input

PIN "8": Digital Output

PIN "9": Digital Output

PIN "10": n.C.

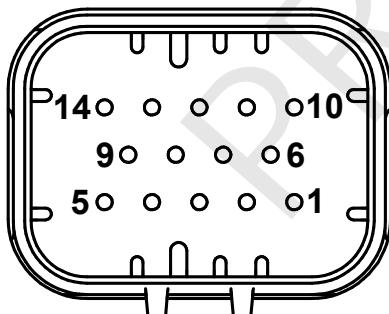
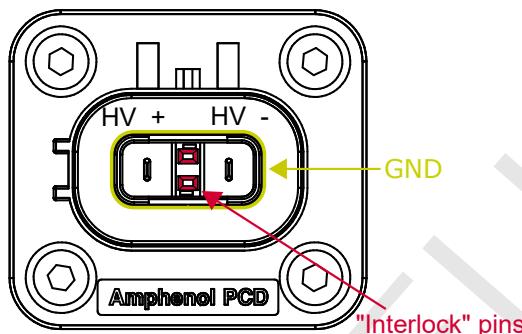
PIN "11": CAN<sub>Hi</sub> (CAN High)

PIN "12": CAN<sub>Lo</sub> (CAN Low)

PIN "13" / PIN "14": CAN<sub>R</sub>

- To terminate the CAN bus with a 120Ω resistor, the CAN<sub>R</sub> Pin"13" must be connected to the CAN<sub>R</sub> Pin"14".

**PIN "1" to PIN "14" are galvanically isolated from the input and output circuit.**



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## 8 Dimensions

All dimensions are given in millimeters and have a general tolerance according to DIN ISO 2768 - m.

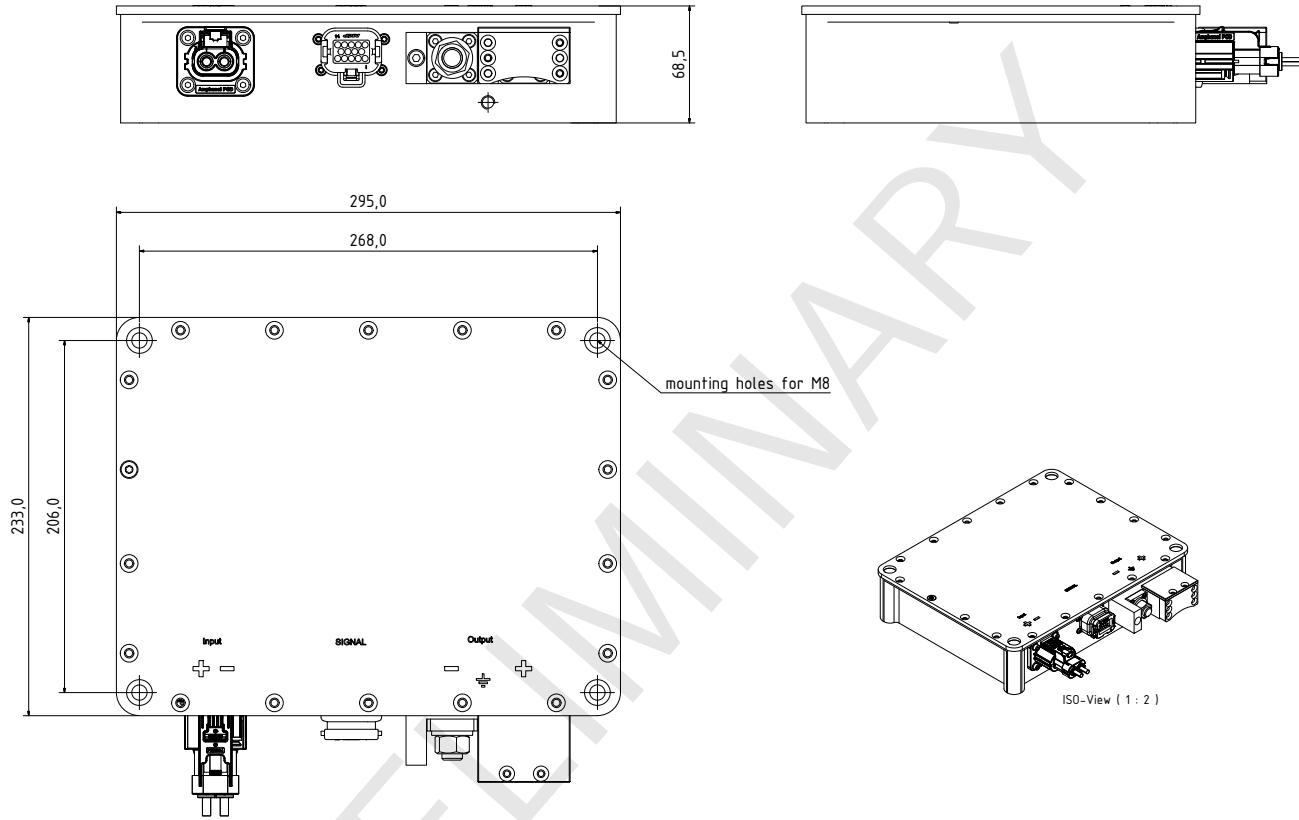


Figure 8.1: Dimensions

## 9 Characteristics

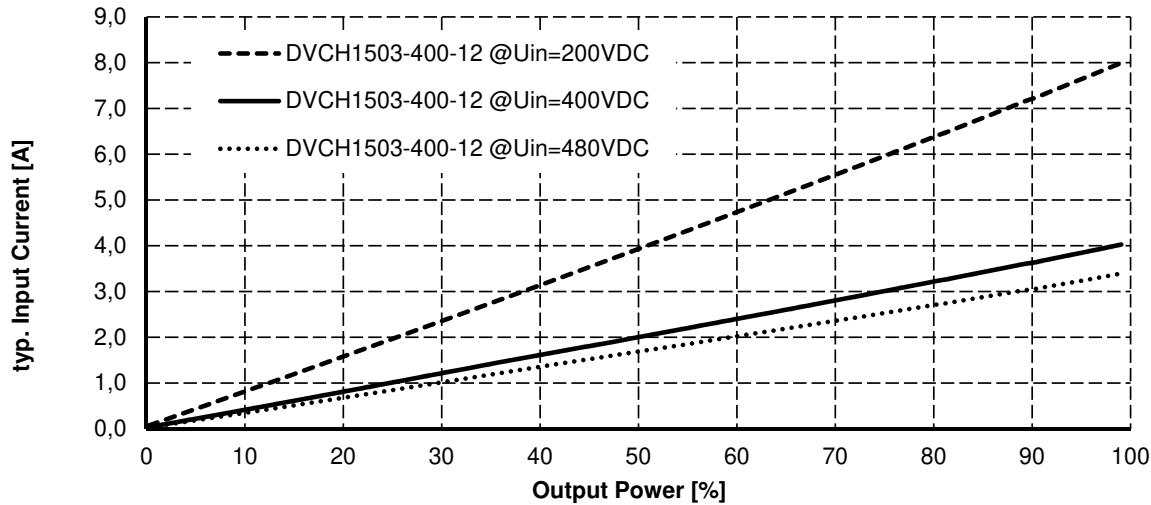


Figure 9.1: Current consumption depending on the output power

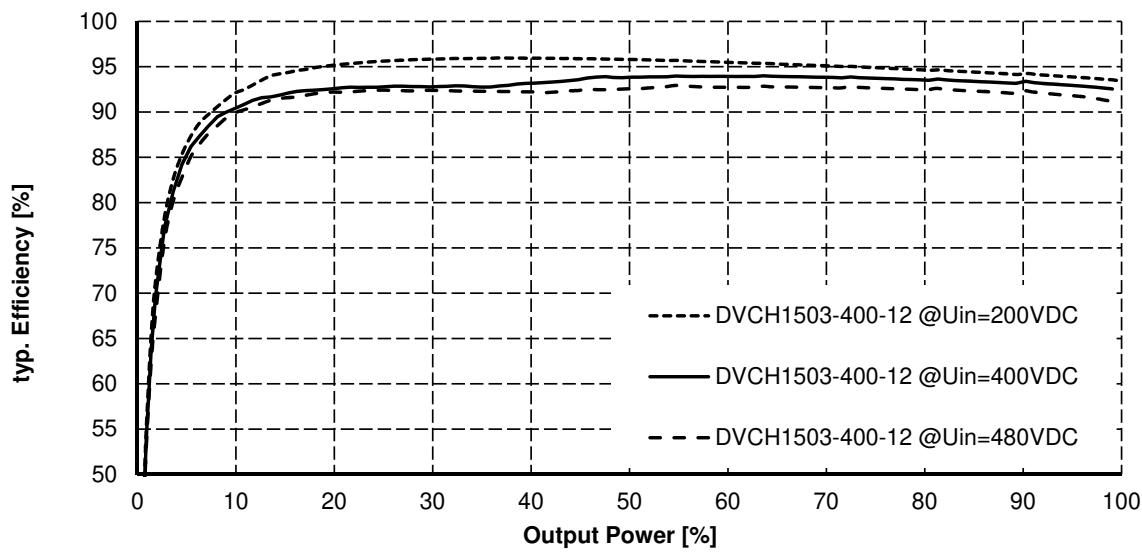


Figure 9.2: Efficiency as a function of output power

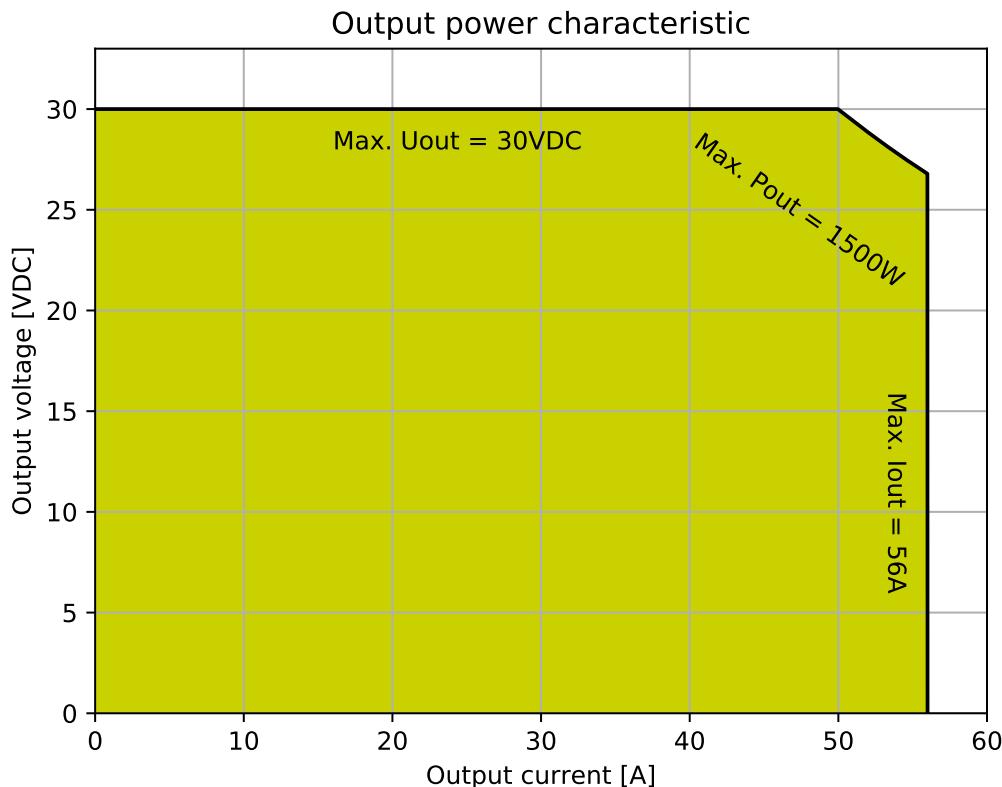


Figure 9.3: Output power