

DVCH1503-400

DC/DC converter



Abbildung ähnlich / device similar to figure



DVCH1503-400-derivate table

Type	Input voltage		Output voltage (configurable)		Output current	Cat. No.
	Nom.	Range	Nom.	Adj. range	Max.	
DVCH1503-400-24	400 VDC	200 - 470 VDC	24 VDC	2 - 30 VDC	56 A	105192/x/yyyy*
DVCH1503-400-12	400 VDC	200 - 470 VDC	12 VDC	2 - 15 VDC	112 A	105193/x/yyyy*

***Order option:**

.../x/...: Accessory variant

- .../0/...without accessory
- .../20/...with heatsink
- More on request

.../yyy: Setting (Standard setting or customized)

- .../000 DC-Standard CAN 2.0A
- .../001 DC-Standard CAN J1939
- Customer-specific parameterization on request

DC/DC converter

DVCH1503-400

Alle Daten gemessen bei 400VDC, 56, 112A und 25°C Umgebungstemperatur, wenn nicht anders gekennzeichnet. | All parameters are specified at 400VDC, 56, 112A and 25°C ambient, if not marked otherwise.
 Technische Änderungen und Irrtümer vorbehalten. | 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. | 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.

1 Input

Input voltage range	-	see DVCH1503-400-derivate table (valid for continuous operation)
Undervoltage range	0 - 200 VDC	Class C*
Lower restricted operation range	200 - 250 VDC	Continuous operation, class B*
Unrestricted operation range	250 - 450 VDC	Continuous operation, class A*
Upper restricted operation range	450 - 470 VDC	Continuous operation, class B*
Overvoltage range	470 - 500 VDC	≤ 10 s, class C*
Max. current consumption	≤ 8,5A	typ. 8 A @U _{IN} = 200VDC, see fig. 9.1
Input capacity	< 8 μF	Attention: No inrush current limitation in the device. Provide a pre-charging section in the application, otherwise there is a risk of a overvoltage damage to the input of the DC/DC converter.
No-load current consumption	< 65 mA	-

* Evaluation criteria for the operation behavior

The following evaluation criteria describe the functional state of the DC/DC converter as a function of the operation input voltage.

Class A	Unrestricted operation range	The DC/DC converter operates as designed in compliance with the tolerances specified in the data sheet.
Class B	Lower and upper restricted operation range	One or more functions may go beyond the specified tolerance. After returning to the unrestricted operation range, the DC/DC converter operates again as designed.
Class C	Undervoltage and overvoltage range	One or more functions do not work as intended. After returning to the unrestricted operation range, the DC/DC converter operates again as designed.

2 Output

Output voltage U_{nom}	-	see DVCH1503-400-derivate table (valid for continuous operation)
Initial accuracy (0-20 Hz)	$\pm 1,0\% U_{nom}$	-
Ripple & Noise	$< 1,8\% U_{nom}$	measurement bandwidth 20 MHz
Max. continuous output current I_{nom}	56A 112A	DVC1503-400-24, see fig. 9.3 DVC1503-400-12
Max. continuous output power P_{nom}	$\leq 1500W$	-
Current limiting	$1,1 \times I_{nom}$	above $1,0 \times I_{nom}$ U_{out} may sink
Recovery time	$< 3ms$	Duration from leaving the tolerance band until the permanently return to the tolerance band after a load step.
Slew rate for setpoint change	30V/s	valid only for controllable version

DC/DC converter

DVCH1503-400

Alle Daten gemessen bei 400VDC, 56, 112A und 25°C Umgebungstemperatur, wenn nicht anders gekennzeichnet. | All parameters are specified at 400VDC, 56, 112A and 25°C ambient, if not marked otherwise.
Technische Änderungen und Irrtümer vorbehalten. | 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. | 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.

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 3 thresholds: - At 1st threshold warning signal via CAN (60°C*) - At 2nd threshold error signal via CAN (90°C*) - At 3rd threshold protective shutdown (95°C*) Automatic power derating in case of overtemperature (≥60°C*) * internal device temperature
Storage temperature	-40°C ... +85°C	-
Humidity	100%	-
Dewing	allowed	-
Shock test acc. to DIN EN 60068-2-27	-	half sinusoidal (Excitation) 250m/s ² (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 ² (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

DC/DC converter

DVCH1503-400

Alle Daten gemessen bei 400VDC, 56, 112A und 25°C Umgebungstemperatur, wenn nicht anders gekennzeichnet. | All parameters are specified at 400VDC, 56, 112A and 25°C ambient, if not marked otherwise.
 Technische Änderungen und Irrtümer vorbehalten. | 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. | 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.

4 General data

Insulation strenght	500 VDC 4,25 kVDC	Output / Enclosure Input / Output + Enclosure + CAN
Insulation resistance	≥ 30 MΩ at 500 VDC	Input / Output + Enclosure + CAN
Max. Efficiency	typ. 94% @U _{IN} = 400VDC	see fig. 9.2
Average efficiency	typ. 93,2% @U _{IN} = 400VDC	Averaging of the efficiency values at 25%, 50%, 75% und 100% of the nominal output power. see fig. 9.2
Current consumption auxiliary and control circuit	≤ 51 mA	Current consumption pin 3 (KL15) / pin 4 (KL30) without HV voltage applied to input with active communication via CAN siehe fig. 9.4
Dimensions (LxWxH)	ca. (295 x 233 x 68,5) mm	without connections, see fig. 8.1
Enclosure	Aluminium	-
Weight	< 5 kg	-

5 Standards

EMC (Electromagnetic Compatibility)

Title	Standard	Data
Emitted interference	ECE R10.5 EN12895 EN 61204-3	- - acc. to 6.4.2, table H.3, for industrial enviroment (class A, cable length < 3 m)
Immunity	ECE R10.5 EN12895 EN 61204-3	- - acc. to 7.2.3, Noise immunity level for industrial enviroment (cable length < 3 m)

Electrical safety

Title	Standard	Data
Low-voltage switch mode power supplies - Safety requirements	DIN EN 61204-7	-
Safety of industrial trucks - Electrical requirements	designed according to DIN EN 1175*	-
Electrically powered road vehicles	ISO 6469-3	-

* The system integrator is responsible for compliance of all product-specific requirements in the end application.

DC/DC converter

DVCH1503-400

Alle Daten gemessen bei 400VDC, 56, 112A und 25°C Umgebungstemperatur, wenn nicht anders gekennzeichnet. | All parameters are specified at 400VDC, 56, 112A and 25°C ambient, if not marked otherwise.
 Technische Änderungen und Irrtümer vorbehalten. | 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. | 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.

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 (Ø9 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. Attention: Max. ampacity of the HV interlock line ≤ 300 mA.
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

7 Connections

Input

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, FHRL91XC13X (4mm², shielded single conductors)

Output

threaded bolt:

- M12 [max. torque 35Nm]

Enclosure potential

Thread:

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

DC/DC converter

DVCH1503-400

Alle Daten gemessen bei 400VDC, 56, 112A und 25°C Umgebungstemperatur, wenn nicht anders gekennzeichnet. | All parameters are specified at 400VDC, 56, 112A and 25°C ambient, if not marked otherwise.
Technische Änderungen und Irrtümer vorbehalten. | 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. | 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.

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 (10 - 30 VDC) switched plus of ignition starter switch

PIN "4": KL30 (10 - 30 VDC) continuous plus of the battery

PIN "5": Common GND

PIN "6": Digital Input

PIN "7": Digital Input: Inhibit-function* (10 - 30 VDC)

- Control of DCDC converter (output On / Off) via digital input possible

PIN "8": Digital Output

PIN "9": Digital Output: Power-Good function*

- Output of the current device status (output On / Off) possible via digital output
- At supply over KL30 the output voltage corresponds to the voltage on KL30
- If there is no supply via KL30 and high voltage is switched on, the voltage is 12V

PIN "10": n.C.

PIN "11": CAN_{Hi} (CAN High)

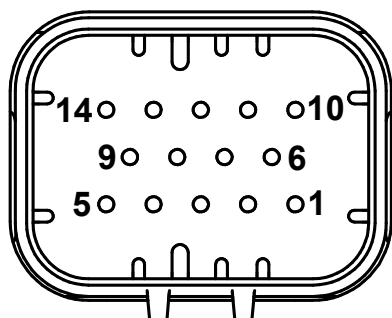
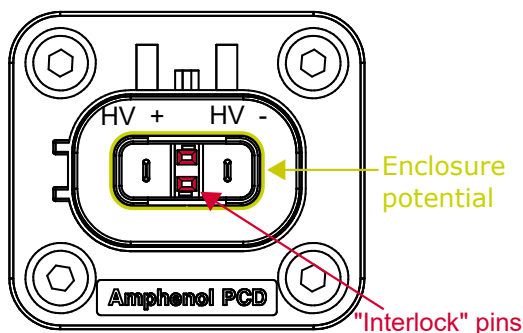
PIN "12": CAN_{Lo} (CAN Low)

PIN "13" / PIN "14": CAN_R

- To terminate the CAN bus with a 120Ω resistor, the CAN_R Pin"13" must be connected to the CAN_R Pin"14".

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

* The Inhibit and Power-Good functions can be activated via setting, further information can be found in the DC-CAN documentation.



8 Dimensions

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

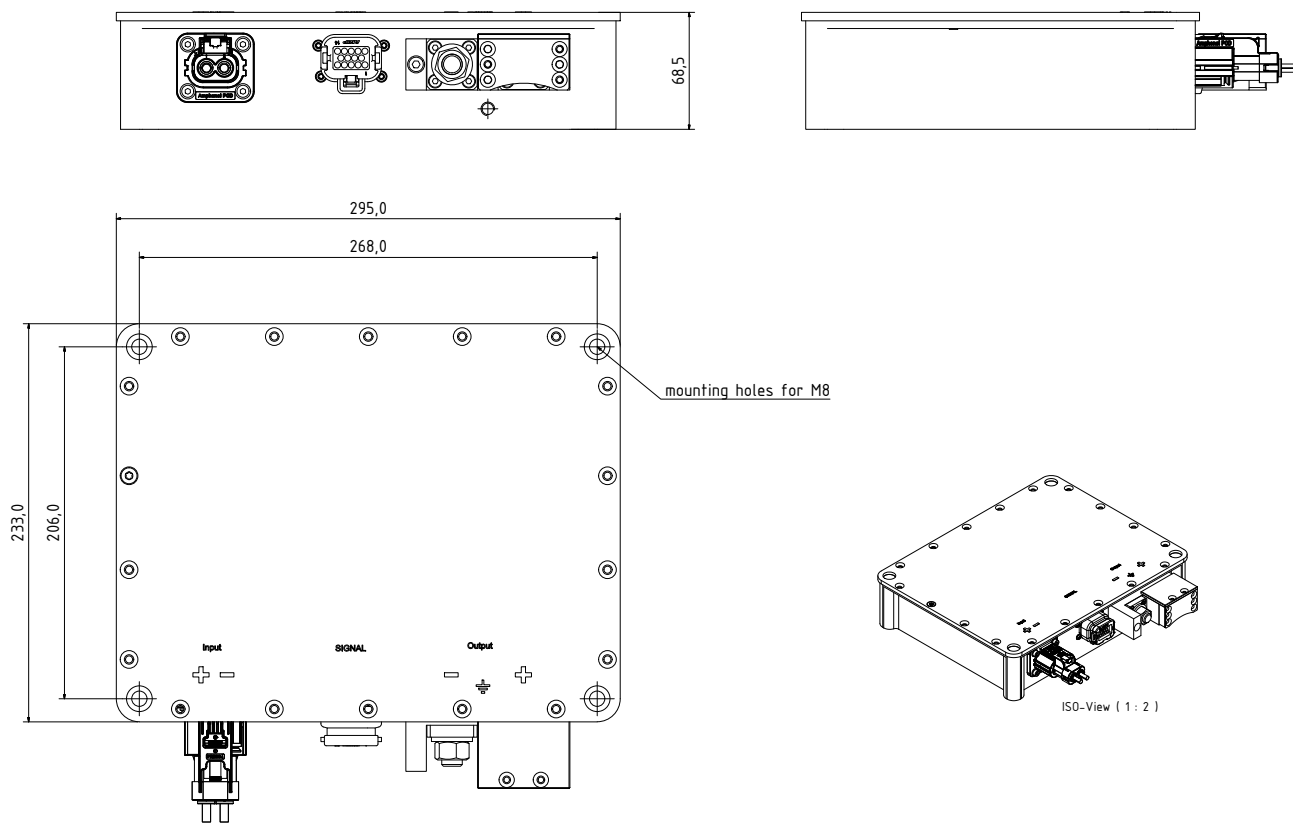


Figure 8.1: Dimensions

DC/DC converter

DVCH1503-400

Alle Daten gemessen bei 400VDC, 56, 112A und 25°C Umgebungstemperatur, wenn nicht anders gekennzeichnet. | All parameters are specified at 400VDC, 56, 112A and 25°C ambient, if not marked otherwise.
 Technische Änderungen und Irrtümer vorbehalten. | 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. | 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.

9 Characteristics

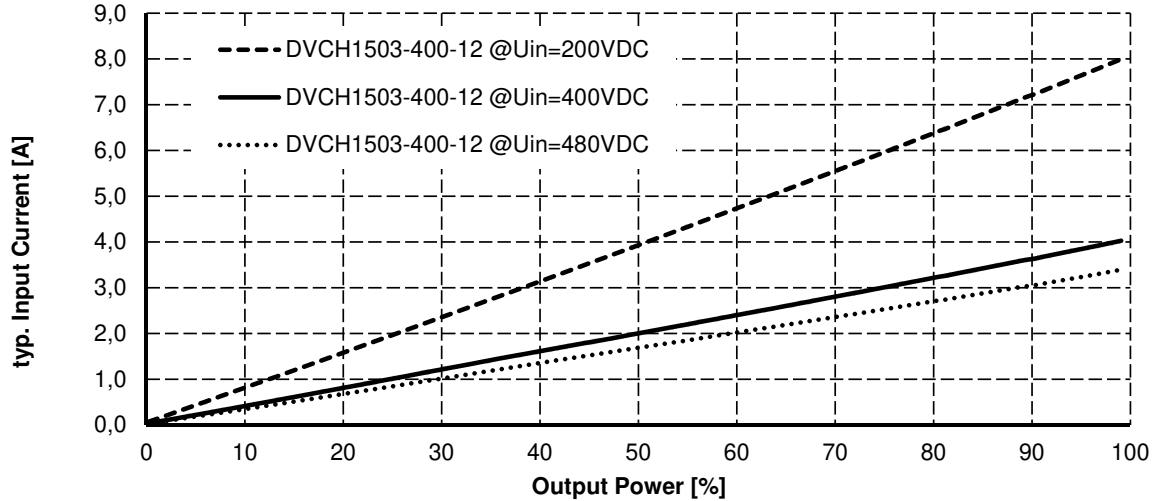


Figure 9.1: Current consumption depending on the output power

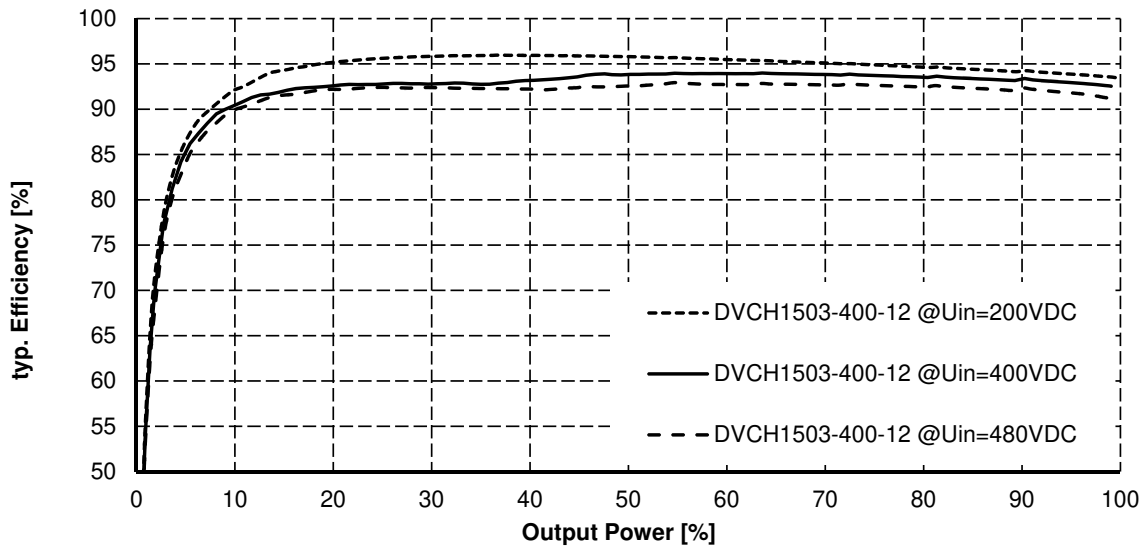


Figure 9.2: Efficiency as a function of output power

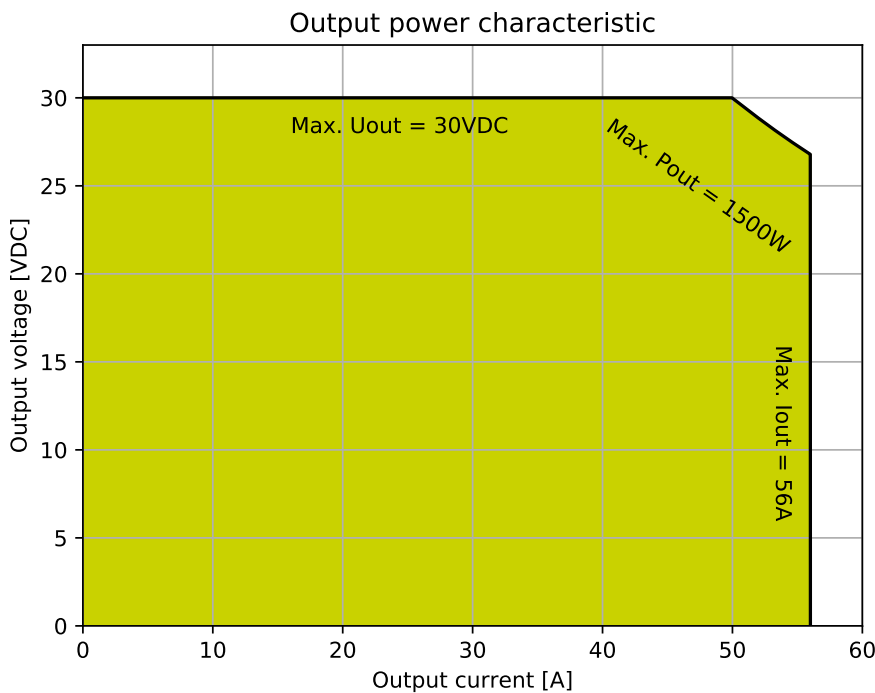


Figure 9.3: Output power

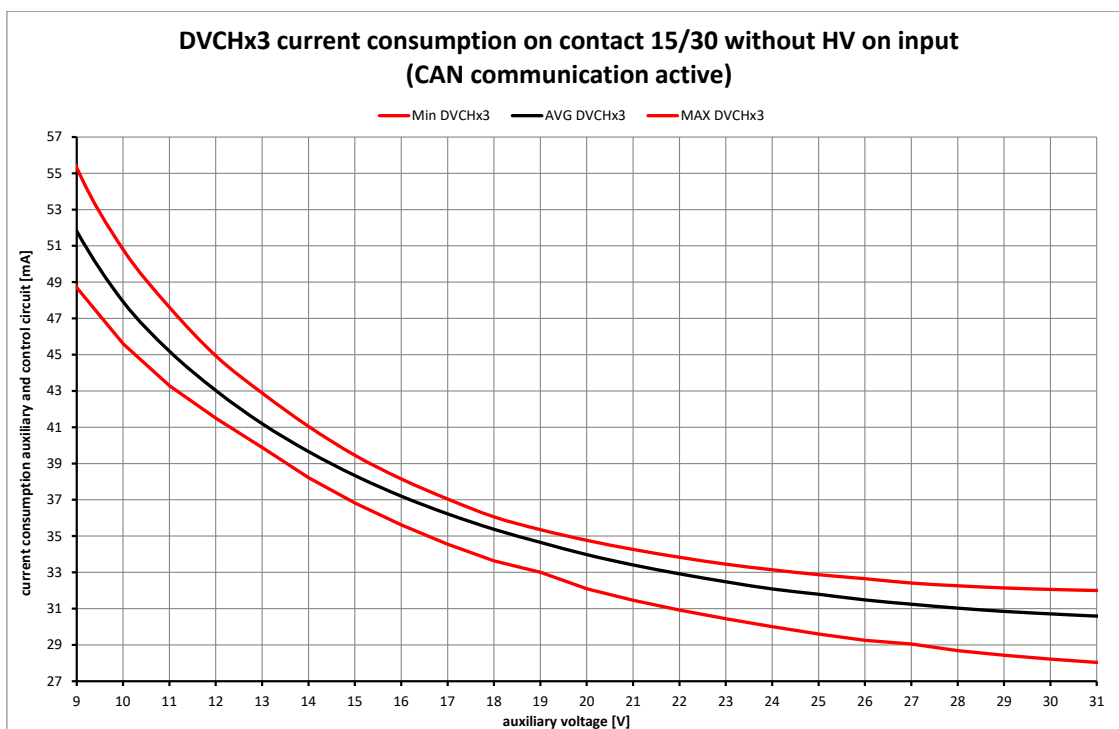


Figure 9.4: Current consumption auxiliary and control circuit

DC/DC converter

DVCH1503-400

Alle Daten gemessen bei 400VDC, 56, 112A und 25°C Umgebungstemperatur, wenn nicht anders gekennzeichnet. | All parameters are specified at 400VDC, 56, 112A and 25°C ambient, if not marked otherwise.
 Technische Änderungen und Irrtümer vorbehalten. | 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. | 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.