

DC/DC

DVC

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DVC953

DC/DC converter module



Abbildung ähnlich / device similar to figure

- wide range input
- Galvanical isolated switching regulator
- Power range up to 1280 W
- High efficiency – up to – typ. 93%
- Short-circuit, no load and over temperature protection
- IP-protection class IP67
- Parallel connectable
- Particularly flat and compact design
- CAN J1939 (controllable output voltage and current)



DVC953-derivate table

Type	Input voltage		Output voltage	Output current	Cat. No.
	Nom.	Tol.	Nom.	Continuous	
DVC953-48/80-13,8-CAN	48 - 80 VDC	34 - 104 VDC	13,8 VDC	80 A	105185/20/001

1 Input

Input voltage range	-	see DVC953-derivate table on page 1 (valid for continuous operation)
Max. current consumption	< 39,5 A	@U _{set} = 16 VDC, I _{max} see fig. 10.3
Input capacity	approx. 19 µF	Attention: No inrush current limitation in the device. Provide precharge section in the application.
No-load current consumption	< 30 mA < 100 mA	device in standby mode device in Buck-mode see fig. 10.1
No-load input power	< 1,6 W < 3,8 W	device in standby mode device in Buck-mode see fig. 10.2

2 Output

Nominal output voltage U_{nom}	13,8 VDC	see DVC953-derivate table on page 1
Output voltage range U_{set}	2 - 16 VDC	for an set value below 10,5 VDC see also chapter 8
Initial accuracy N_{initial}	+0,2% / -0,8% U _{nom}	includes adjust accuracy and component tolerances
Input regulation tolerance N_{input}	±0,6% U _{nom}	-
Load regulation tolerance N_{load}	+0,8% / -0,5% U _{nom}	-
Ripple & Noise N_{RN}	< ±3% U _{nom}	U _{RN} < 828 mVpp Measurement bandwidth 20 MHz
Overall tolerance N_{overall} (0-20Hz)	+1,6% / -1,9% U _{nom}	N _{overall} = N _{initial} + N _{input} + N _{load} Value represents worst case scenario for a bandwidth from 0 Hz up to 20 Hz.
Overall tolerance N_{overall} (0-20MHz)	+4,6% / -4,9% U _{nom}	N _{overall} = N _{initial} + N _{input} + N _{load} + N _{RN} Value represents worst case scenario for a bandwidth from 0 Hz up to 20 MHz.
Ambient temperature tolerance N_{temp}	+2% / -1,5% U _{nom}	-
Max. continuous output current I_{max}	80 A	-
Max. continuous output power P_{max}	< 1280 W	@U _{set} = 16 VDC
Current limiting	< I _{max} + 10 %	From 1.0 x I _{max} U _{out} can drop

3 Enviroment

Working temperature (envrioment)	-10°C ... +45°C	-
Max. permissible temperature of the mounting surface	< +45°C	-
Overtemperature protection	+90°C (internal)	Automatic switch-off in case of overtemperature. Automatic turn on after 5°C hysteresis, see also chapter 8
Storage temperature	-40°C ... +85°C	-
Humidity	< 95%	-
Dewing	allowed	-
Shock test acc. to DIN EN 60068-2-27	-	half sinusoidal (Excitation) 250m/s ² (Peak acceleration) 6ms (Duration) 3.000 schocks to each axis (Quantity) ±X, ±Y, ±Z (Axis)
Vibration test acc. to DIN EN 60068-2-6	-	sinusoidal (Excitation) 30m/s ² (acceleration) 10 - 500Hz (frequenc, floating) 2h per axis (Duration), 1 Oct/min X, Y, Z (Axis)
Degree of protection acc. to EN60529	IP67	Limited by connection technology

4 General data

Insulation strenght	1 kVDC 1 kVDC 1kVDC 500VDC	Input / Enclosure Input / Output Input / CAN Output / Enclosure
Max. efficiency	< 94,5%	see fig. 10.4
Average efficiency	< 93%	Averaging of the efficiency values at 25%, 50%, 75% and 100% of the nominal output power. See fig 10.5
Dimensions		see fig. 9.1
Enclosure	Aluminium	-
Weight	approx. 4,5 kg	-

5 Standards

EMC (Electromagnetic Compatibility)

Title	Standard	Data
Emitted interference	EN12895	-
Immunity	EN12895	-

Electrical safety

Title	Standard	Data
Safety of industrial trucks - Electrical requirements	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	-	Mounting over 4x M6 threads Tightening torque: 6 Nm see fig. 9.1
Installation orientation	-	any
Connection input / output	-	see chapter 7
Input fuse	-	No integrated input fuse. A fuse must be provided externally by the customer application.
Reverse polarity protection	-	No reverse polarity protection at the input or output of the device. If the polarity is reversed at the input, the input fuse to be connected in series is tripped.
Precharge section	-	Attention: No inrush current limitation in the device. Provide precharge section in the application.

The general installation and safety instructions for DC/DC converters can be found at: www.deutronic.com

7 Connections

Input

AMPHENOL, PL082X-61-6:

- 2 pole connector
- Matching mating connector: AMPHENOL, PL182X-61-6
- cable cross section: 6 mm²

Output

Cables with lugs

- 2 integrated cables with cable lug
- cable cross section: 16 mm²

+Uout red, length: 865 mm, end with M10 not isolated cable lug

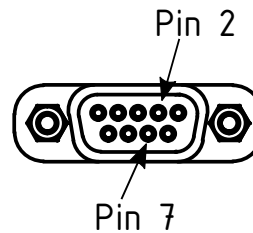
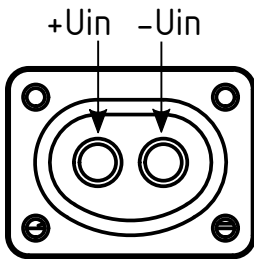
-Uout black, length: 600 mm, end with M8 not isolated cable lug

Signal (CAN)

SUB-D 9-pole:

PIN 2: CAN Low

PIN 7: CAN High



8 Operating condition

Following errors and warnings are also transmitted via CAN (J1939)

operating condition	operating status		threshold value	unit	note
	error (device off)	warning (power derating possible)			
input voltage above maximum threshold value		X	104	V	hysteresis at 100 V
input voltage below minimum threshold value	X		21	V	no hysteresis
output voltage above maximum threshold value		X	16	V	no set point greater than 16V accepted; external voltage greater than 16V triggers warning
output voltage below minimum threshold value		X	10,5	V	
output current equal to or greater than maximum threshold value		X	80	A	
internal converter temperature above warning level, but below maximum threshold value		X	85	°C	
internal converter temperature above maximum threshold value	X		90	°C	hysteresis at 85°C

9 Dimensions

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

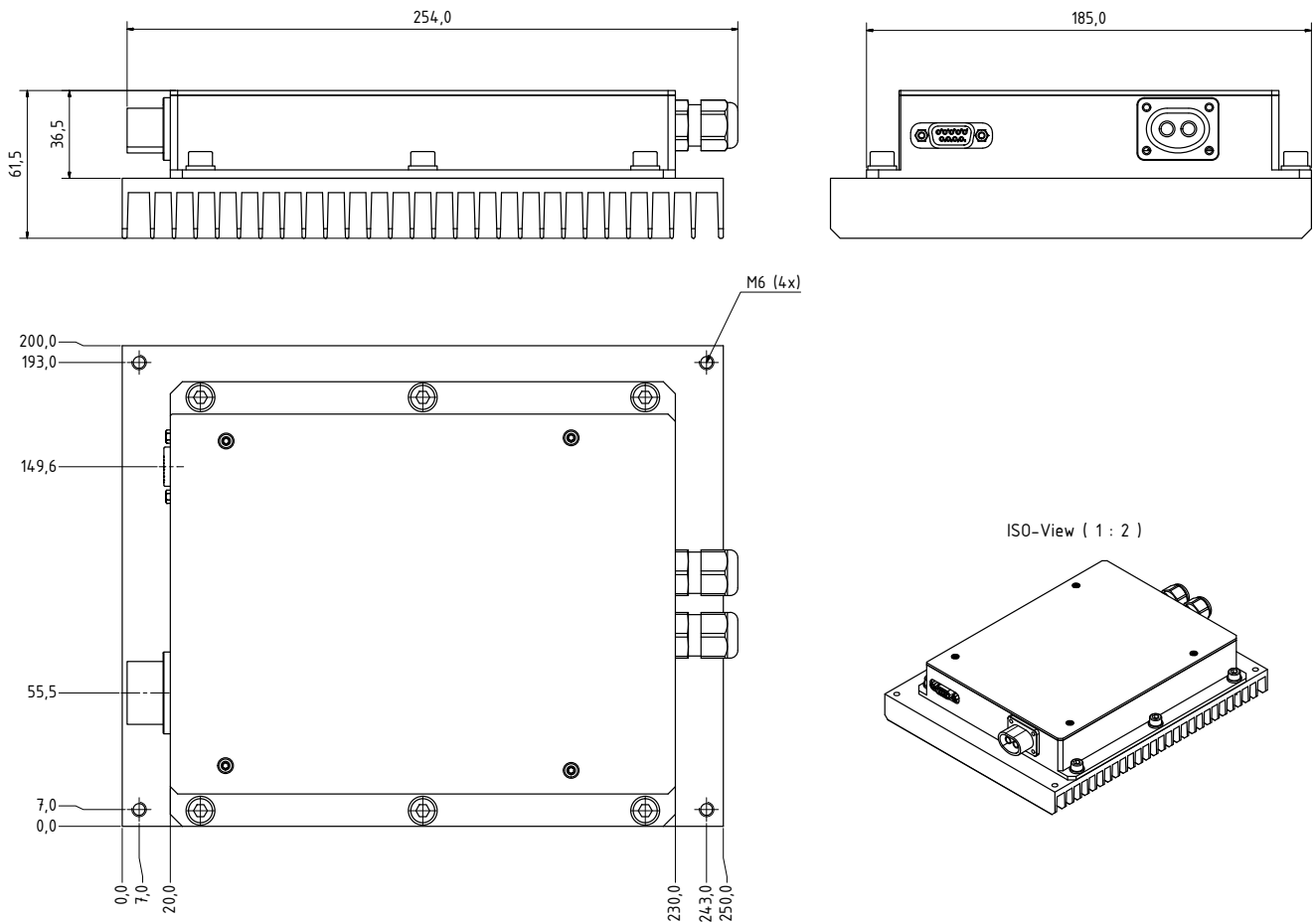


Figure 9.1: Dimensions

10 Characteristics

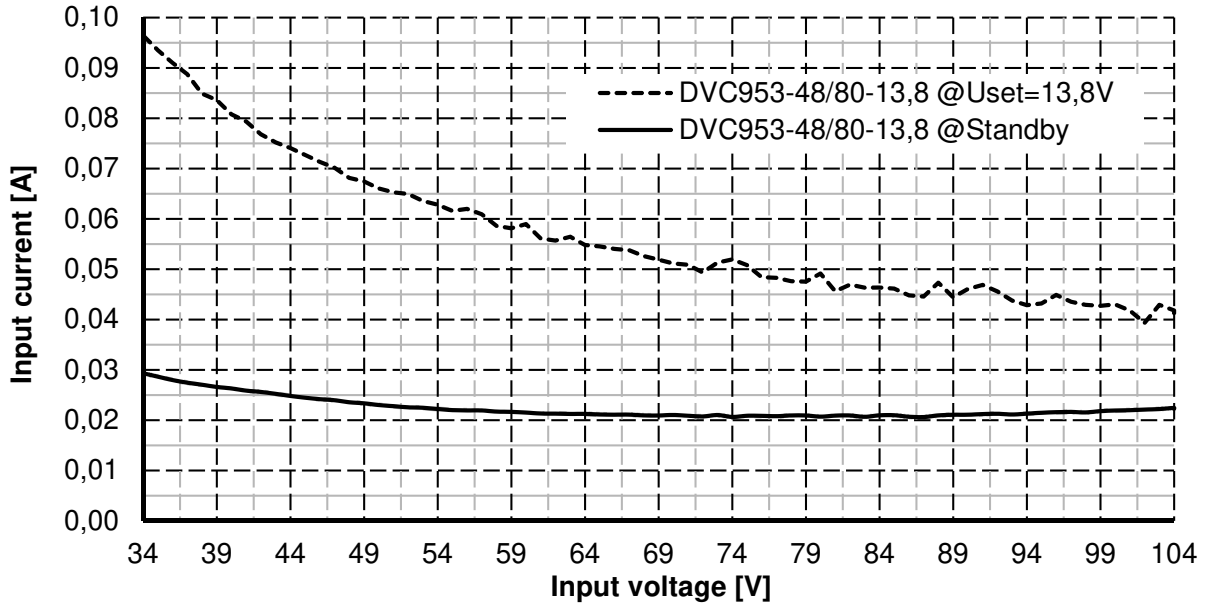


Figure 10.1: No-load current consumption

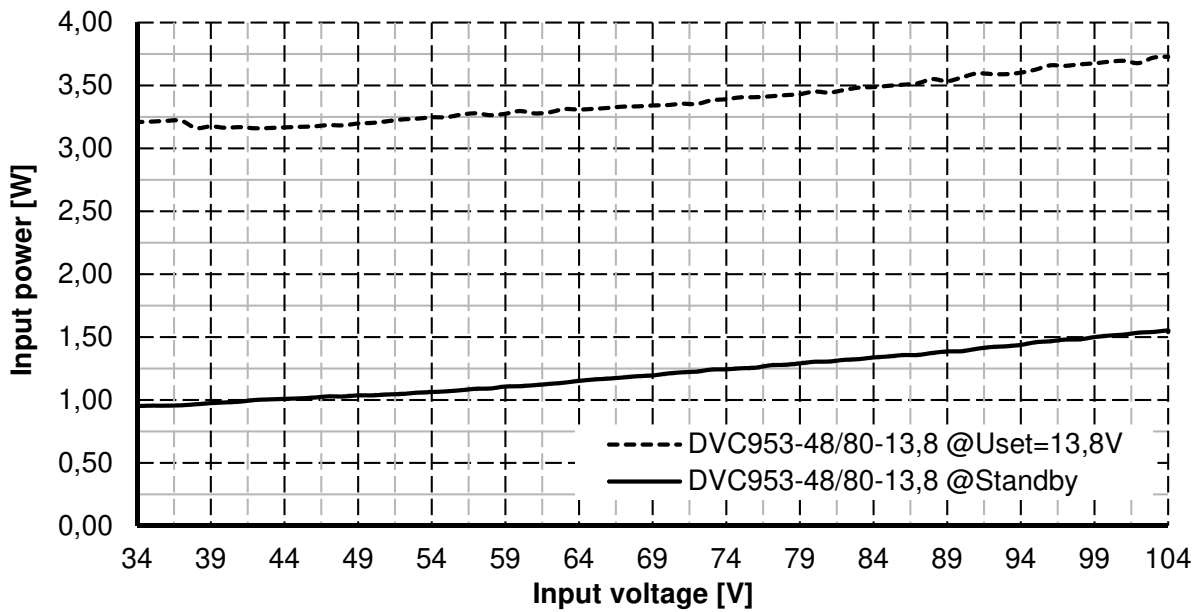


Figure 10.2: No-load input power

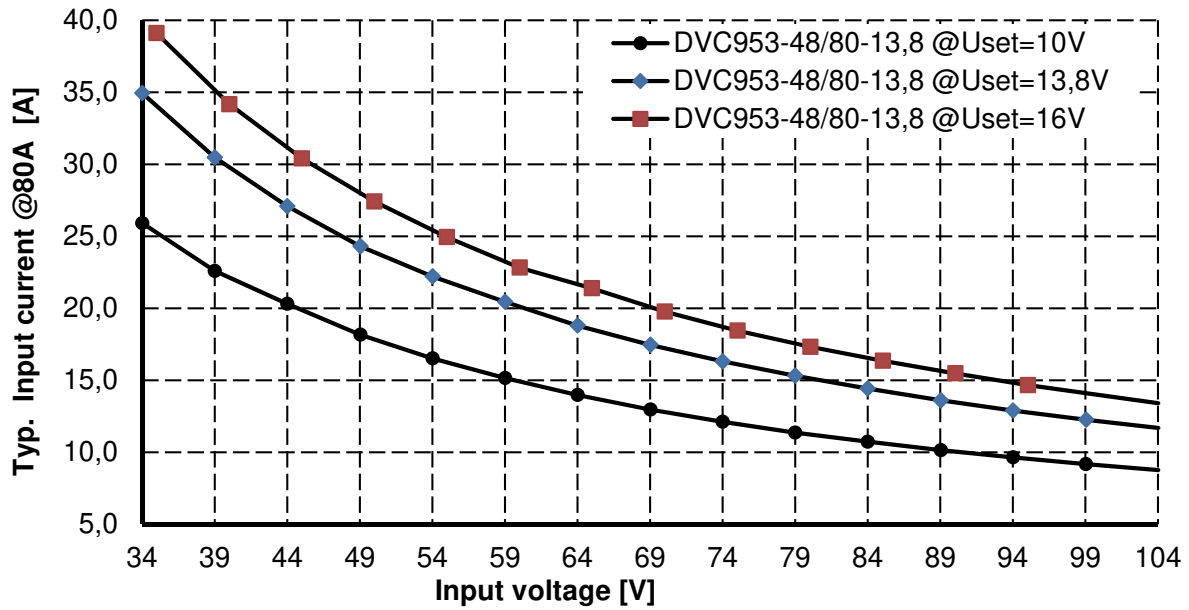


Figure 10.3: current consumption at maximum output current

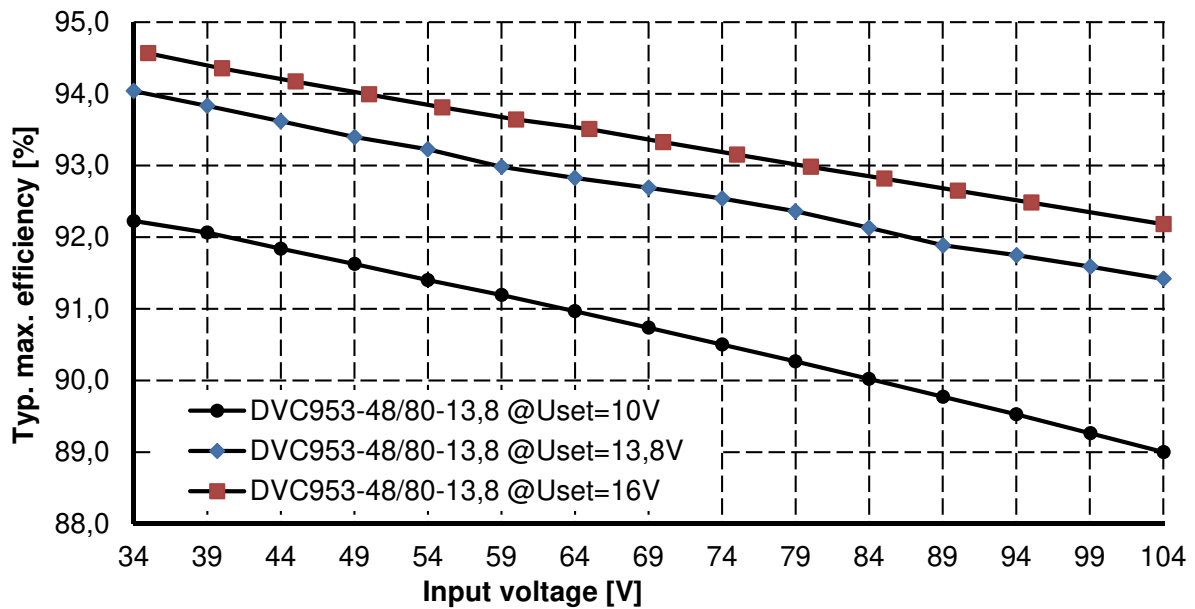


Figure 10.4: Maximum efficiency depending on input voltage

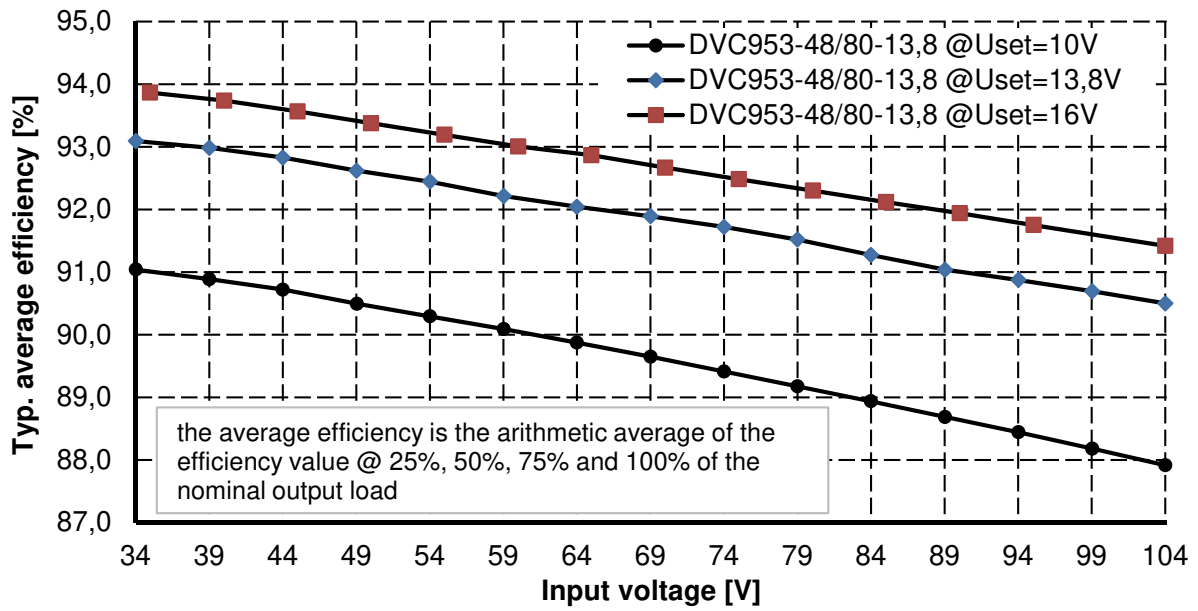


Figure 10.5: Average efficiency depending on input voltage

DVC853

DC/DC converter

DC/DC converter for vehicles and other applications



- wide range input
- Galvanical isolated switching regulator
- Power range up to 966 W
- Short-term peak power of up to 2208 W
- High efficiency – up to – typ. 92%
- Short-circuit, no load and over temperature protection
- IP-protection class IP54
- Parallel connectable
- Particularly flat and compact design

On request: Changed output voltage and current

On request: Changed input voltage range

Abbildung ähnlich / device similar to figure



DVC853-derivate table

Type	Input voltage		Output voltage	Output current		Cat. No.
	Nom.	Tol.	Nom.	Continuous	Boost*	
DVC853-48/80-13,8	48 - 80 VDC	34 - 104 VDC	13,8 VDC	70 A	160 A	105149/0/000

*For max. 4s with subsequent recovery time of > 16s

1 Input

Input voltage range	-	see DVC853-derivate table on page 1 (valid for continuous operation)
Max. current consumption	< 37 A < 75 A (Boost)	-
Input capacity	approx. 19 μ F	Attention: No inrush current limitation in the device. Provide a pre-charging section in the application, otherwise there is a risk of a over-voltage damage to the input of the DC/DC converter!
No-load current consumption	< 100 mA	@ U_{in} = 48 VDC

2 Output

Output voltage U_{nom}	-	see DVC853-derivate table on page 1 (valid for continuous operation)
Initial Accuracy	$\pm 1,0\% U_{nom}$	-
Max. continuous output current I_{nom}	70 A	DVC853-48/80-13,8
Max. shortterm output current I_{boost}	160 A	for $t_{boost} \leq 4$ s with subsequent recovery phase $t_{pause} \geq 16$ s
Max. continuous output power P_{nom}	≤ 966 W	DVC853-48/80-13,8
Max. shortterm output power P_{boost}	≤ 2208 W	for $t_{boost} \leq 4$ s with subsequent recovery phase $t_{pause} \geq 16$ s
Current limiting	< $I_{max} + 10\%$	Depending on the device status, I_{max} can correspond to the nominal current I_{nom} or the boost current I_{boost} . From $1.0 \times I_{max}$ U_{out} can drop
Load regulation static (0-100% P_{nom})	$\pm 0,85\% U_{nom}$	-
Recovery time	< 3ms	Duration from leaving the tolerance band until the permanently return to the tolerance band after a load step
Input regulation (min. - max U_{in})	$\pm 0,1\% U_{nom}$	-
Ripple & Noise	< 1,8% U_{nom}	measurement bandwidth 20 MHz

3 Enviroment

Working temperature (envrioment)	-40°C ... +75°C	-
Max. permissible temperature of the mounting surface	< +50°C	-
Overtemperature protection	+95°C	Automatic switch-off in case of overtemperature. On request: Automatic power derating in case of overtemperature.
Storage temperature	-40°C ... +85°C	-
Humidity	< 95%	-
Dewing	allowed	-
Shock test acc. to DIN EN 60068-2-27	-	half sinusoidal (Excitation) 250m/s ² (Peak acceleration) 6ms (Duration) 3.000 schocks to each axis (Quantity) ±X, ±Y, ±Z (Axis)
Vibration test acc. to DIN EN 60068-2-6	-	sinusoidal (Excitation) 30m/s ² (acceleration) 10 - 500Hz (frequenc, floating) 2h per axis (Duration), 1 Oct/min X, Y, Z (Axis)
Degree of protection acc. to EN60529	IP54	Limited by connection technology, version with increased degree of protection and other connection technology on request

4 General data

Insulation strenght	1 kVDC 1 kVDC	Input / Enclosure Input / Output
Max. efficiency	typ. 93%	-
Average efficiency	typ. 92% (48 VDC) typ. 90,5% (80 VDC)	Averaging of the efficiency values at 25%, 50%, 75% and 100% of the nominal output power.
Dimensions (LxWxH)	ca. (200 x 180 x 21,5) mm	without connections, see fig. 7.1
Enclosure	Aluminium	-
Weight	approx. 1,8 kg	-

5 Standards

EMC (Electromagnetic Compatibility)

Title	Norm	Werte
Emitted interference	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	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 (PRN2014)	-

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	-	6x Mounting holes (Ø6,5 mm) see fig. 7.1
Installation orientation	-	any
Connection input	+U _{in} (M8) / -U _{in} (M8)	Tightening torque: 9 Nm Thread depth: 8 mm Recommended cable cross section: 16 mm ²
Connenction input	+U _{out} (M8) / -U _{out} (M8)	Tightening torque: 9 Nm Thread depth: 8 mm Recommended cable cross section: 25 mm ²
Input fuse	-	No integrated input fuse. A fuse must be provided externally by the customer application.
Reverse polarity protection	-	No reverse polarity protection at the input or output of the device. If the polarity is reversed at the input, the input fuse to be connected in series is tripped.
Precharge section	-	Attention: No inrush current limitation in the device. Provide precharge section in the application.

The general installation and safety instructions for DC/DC converters can be found at: www.deutronic.com

7 Dimensions

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

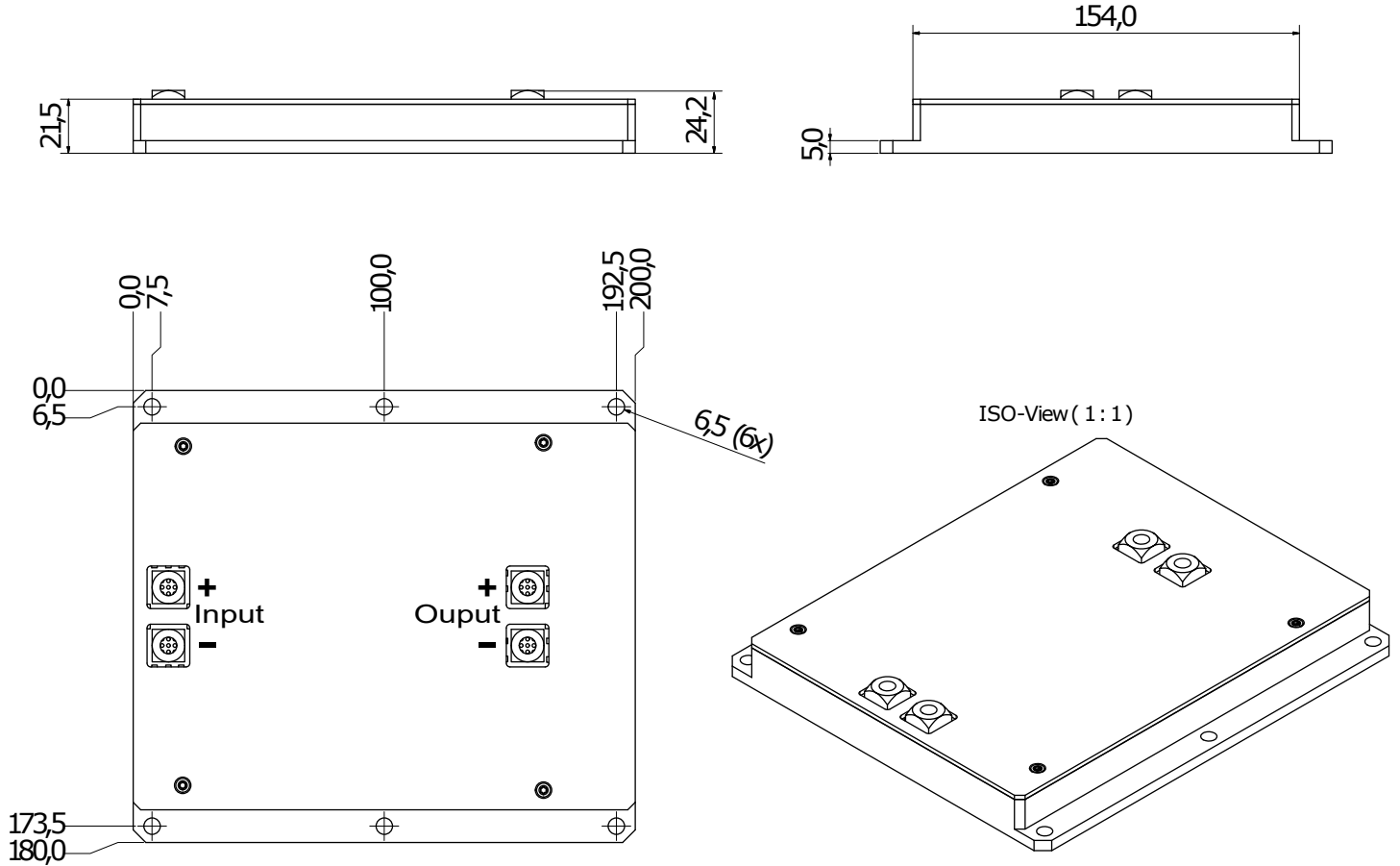


Figure 7.1: Dimensions

DVC453

DC/DC converter

DC/DC converter for vehicles and other applications

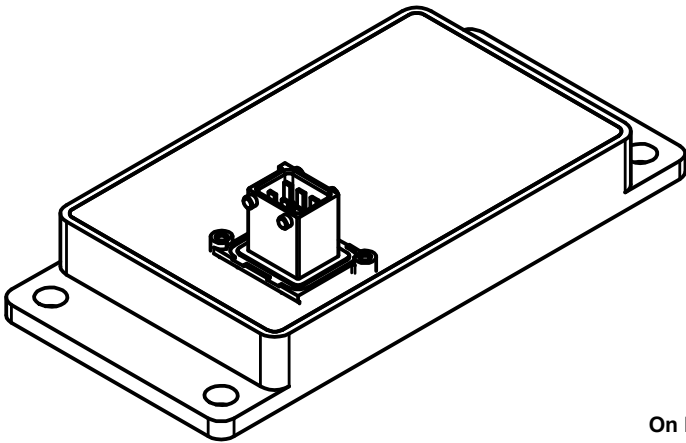


Abbildung ähnlich / device similar to figure

- wide range input
- Power range up to 450W
- High efficiency - typ. 92%
- Short-circuit, no load and over temperature protection
- IP-protection class IP65
- Parallel connectable
- Galvanical isolated switching regulator
- Particularly flat and compact design

On Request: Extended input voltage range

On Request: additional output voltages



DVC453 - derivate table

Type	Input voltage Nom. (Tol.)	Output voltage	Max. output current	Cat. No.
DVC453-24/36-24	24 - 36 VDC (17 - 47 VDC)	24,3 VDC	18,5 A	105176/0/000
DVC453-48/80-24	48 - 80 VDC (34 - 104 VDC)	24,3 VDC	18,5 A	105177/0/000

1 Input

Input voltage range		see DVC453 - derivate table (valid for continuous operation)
Input capacity	< 20 μ F < 50 μ F	DVC453-24/36-24 DVC453-48/80-24 Attention: No inrush current limitation in the device. Provide a precharging section in the application, otherwise there is a risk of an overvoltage damage to the input of the DC/DC converter.
Turn on voltage	typ. 15,5 VDC typ. 23 VDC	DVC453-24/36-24 (Above typ. $U_{IN} > 17$ VDC U_{OUT} within tolerances) DVC453-48/80-24 (Above typ. $U_{IN} > 34$ VDC U_{OUT} within tolerances)
Turn off voltage	typ. 4 VDC typ. 22.5 VDC	DVC453-24/36-24 (Below $U_{IN} < 17$ VDC U_{OUT} may sink) DVC453-48/80-24 (Below $U_{IN} < 34$ VDC U_{OUT} may sink.)
Start up delay	typ. 1,0 s	Time from applying the input voltage until the output voltage is statically within the permissible tolerances.
No-load power	typ. 2,0 W (24 VDC) typ. 2,3 W (36 VDC) typ. 2,1 W (48 VDC) typ. 2,3 W (80 VDC)	-
No-load current consumption	typ. 90 mA (24 VDC) typ. 90 mA (36 VDC) typ. 70 mA (48 VDC) typ. 53 mA (80 VDC)	-
Input current at full load	typ. 19,5 A (24VDC) typ. 13,6 A (36VDC) typ. 9,9 A (48VDC) typ. 6,1 A (80VDC)	see fig. 9.1

2 Output

Output voltage U_{nom}	24,3 VDC	@ $I_{out} = 0$ A
Initial tolerance $N_{initial}$	$U_{nom} \pm 0,5\%$	-
Ripple & Noise N_{RP}	$U_{nom} \pm 1\%$	< 453 mVpp, measuring bandwidth 20 MHz
load regulation tolerance N_{load}	$U_{nom} + 0\% / - 1,1\%$	-
Overall tolerance $N_{overall}$ (0 Hz - 20 Hz)	$U_{nom} + 0,5\% / - 1,6\%$	$N_{overall} = N_{initial} + N_{load}$
Overall tolerance $N_{overall}$ (0 Hz - 20 MHz)	$U_{nom} + 1,5\% / - 2,6\%$	$N_{overall} = N_{initial} + N_{load} + N_{RP}$
Max. continuous output current I_{nom}	18,5A	-
Max. Output power	≤ 450 W	DVC453-24/36-24: < 450 W @ $U_{IN} < 25$ VDC siehe Abb. 9.5
Current limiting	1,1 x I_{nom}	above 1,0 x I_{nom} U_{out} may decrease

recovery time	< 2 ms	Duration from leaving the overall tolerance until the permanently return to the tolerance band after a load step. (at $\frac{dI}{dt} < 1 \text{ A}/\mu\text{s}$)
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3 Enviroment

Working temperature (envrioment)	-25°C ... +50°C	-
Max. permissible temperature of the mounting surface	< +50°C	-
Operation temperature	< 85°C	measured at temperature reference point, see fig. 8.1
Overtemperature protection	> 85°C	Protective shutdown with self-reset. Measured at the temperature reference point.
Storage temperature	-40°C ... +85°C	-
Humidtiy	95%	-
Dewing	allowed	-
Shock test (acc. to 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 EN 60068-2-6)		sinusoidal (Excitation) 30m/s ² (Peak acceleration) 10 - 500Hz (frequency, floating) 2h per axis (Duration) X, Y, Z (Axis)
Degree of protection acc. to EN60529	IP65	-

4 General data

Insulation strenght	1,2 kV _{RMS} 1,2 kV _{RMS}	Input / output and enclosure Output / enclosure
Max. efficiency	typ. 93,4% (24 VDC) typ. 92,5% (36 VDC) typ. 94,5% (48 VDC) typ. 92,9% (80 VDC)	see fig. 9.3
Average efficiency	typ. 92,6% (24 VDC) typ. 91,6% (36 VDC) typ. 93,7% (48 VDC) typ. 91,6% (80 VDC)	Averaging of the efficiency values at 25%, 50%, 75% und 100% of the nominal output power. see fig. 9.4
Dimensions (LxWxH)	approx. (180 x 85 x 46,5)mm approx. (180 x 85 x 23,5)mm	with connectors see fig. 8.1 without connectors see fig. 8.1

Enclosure	Aluminium	-
Weight	approx. 700g	-

5 Standards

EMC (Electromagnetic Compatibility)

Title	Norm	Werte
Emitted interference	EN12895	-
Immunity	EN12895	-

Electrical safety

Title	Standard	Data
Safety of industrial trucks - Electrical requirements	DIN EN 1175 (PRN2014)	-

6 Installation and safety instructions

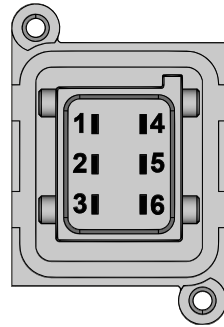
In addition to the general installation and safety instructions for DC/DC converters, the following values and supplements apply:

Mounting points	-	4x Mounting holes (Ø9 mm) see fig. 8.1
Installation orientation	-	any
Connection input / output	-	see fig. 7.1
Input fuse	-	No integrated input fuse. A fuse must be provided externally by the customer application.
Reverse polarity protection	-	No reverse polarity protection integrated at the input or output of the device. Reverse polarity protection is ensured exclusively by the plug connector. If the polarity is reversed at the input, then the input fuse to be connected in series will trip.

The general installation and safety instructions for DC/DC converters can be found at: www.deutronic.com

7 Connectors

Input / Output



TE Connectivity 1-929180-1, 6-pole:

PIN "1": $V_{OUT, +}$
 PIN "2": $V_{OUT, -}$
 PIN "3": $V_{IN, +}$
 PIN "4": N.C.
 PIN "5": N.C.
 PIN "6": $V_{IN, -}$

- Matching mating connector TE Connectivity 1-963212-1
- Connection cross-section at mating connector min. 2,5 mm²
- max. number of mating cycles: 10
- Individual connection technology on customer request for input and output possible

Figure 7.1: Pin - assignment

8 Dimensions

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

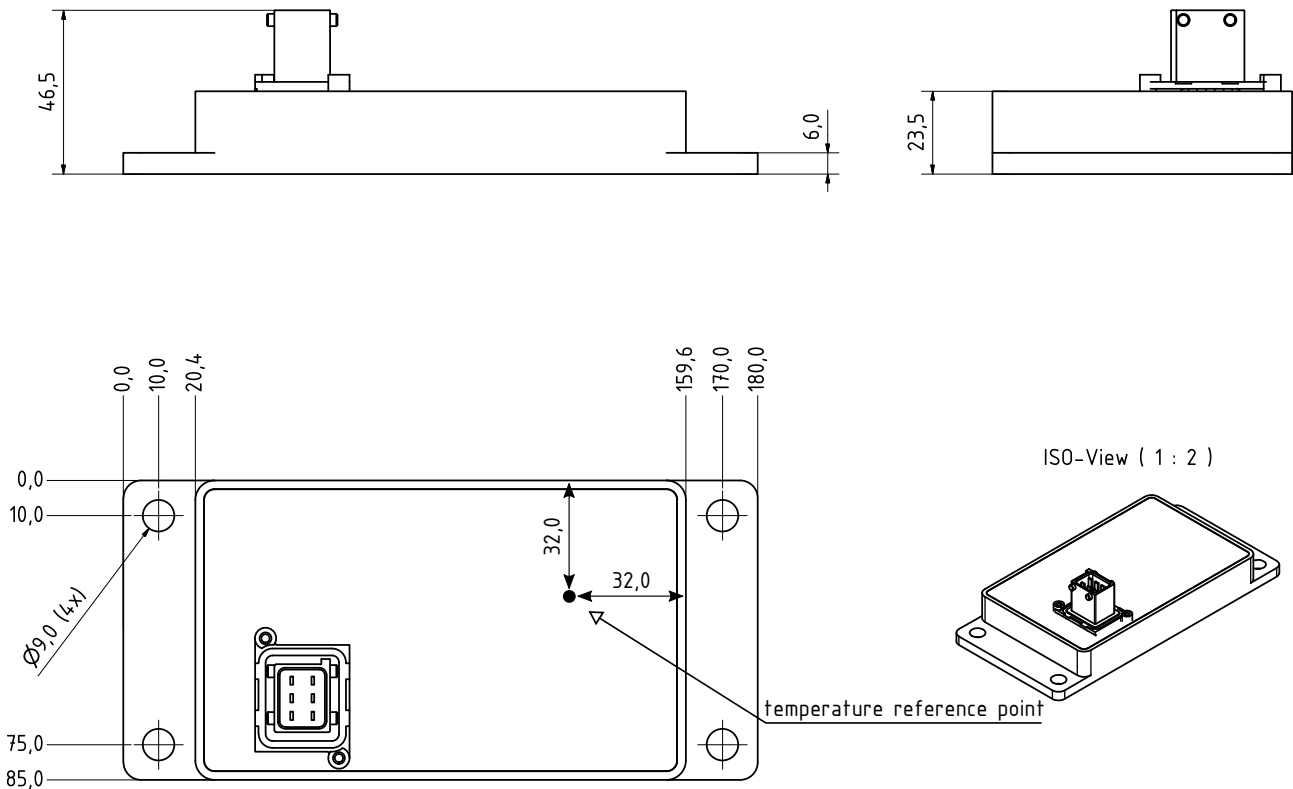


Figure 8.1: dimensions

DC/DC converter

DVC453

9 Characteristics

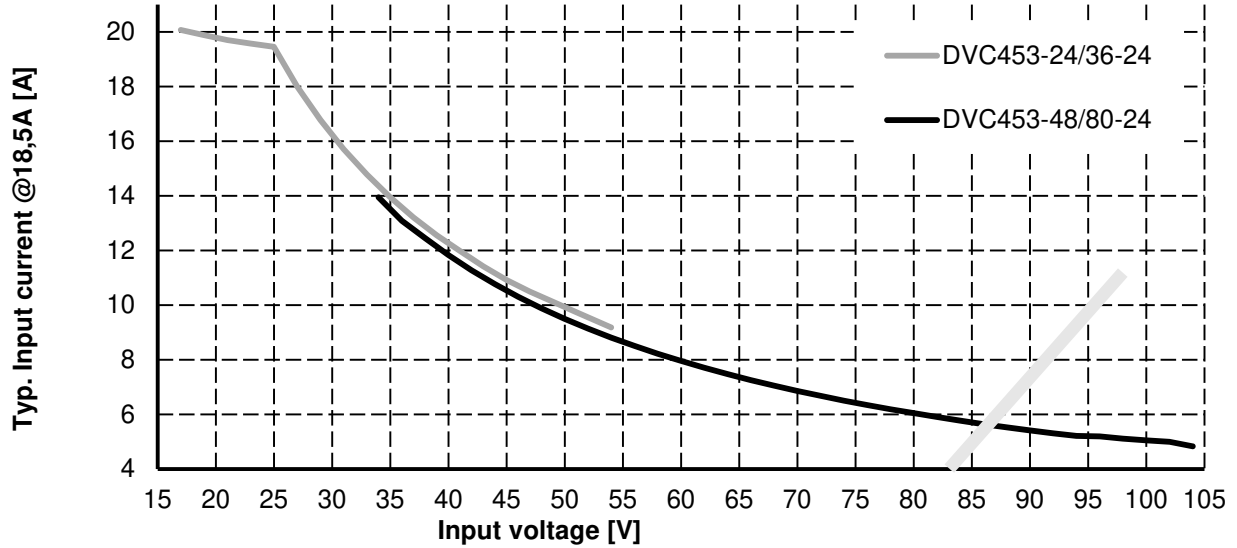


Figure 9.1: Current consumption at full load depending on the input voltage

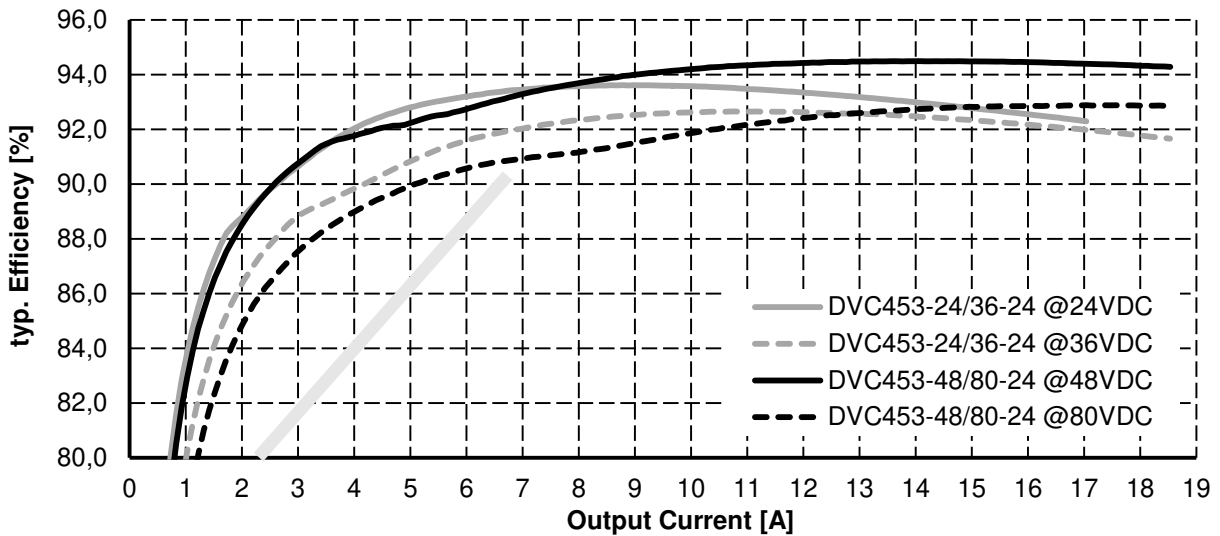


Figure 9.2: Efficiency as a function of the output current

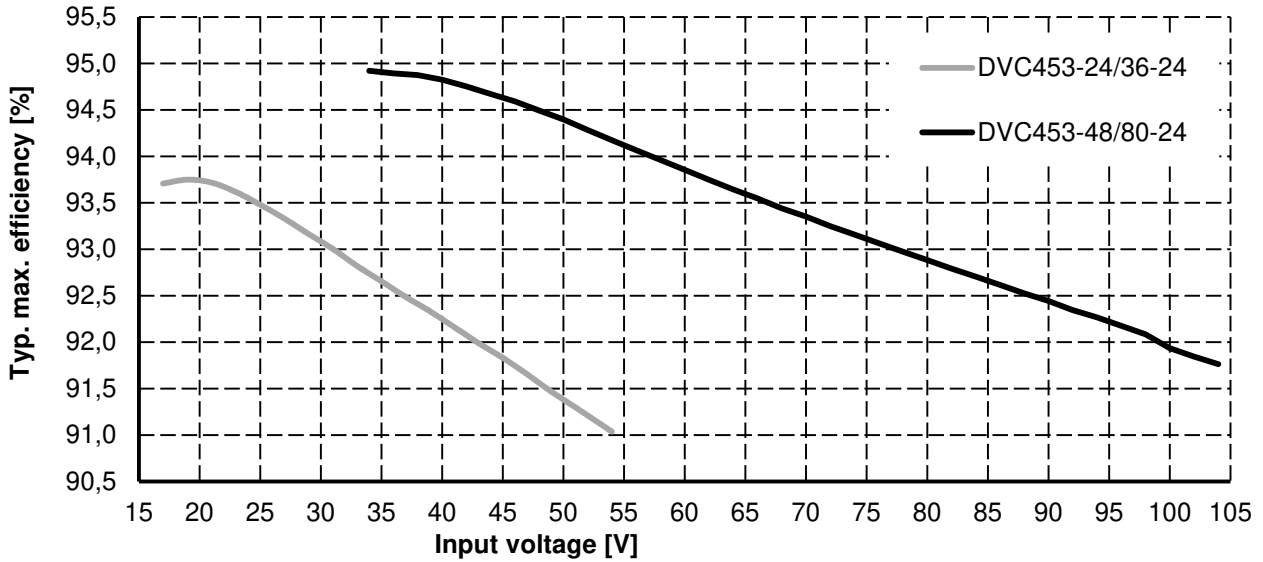


Figure 9.3: Max. efficiency depending on the input voltage

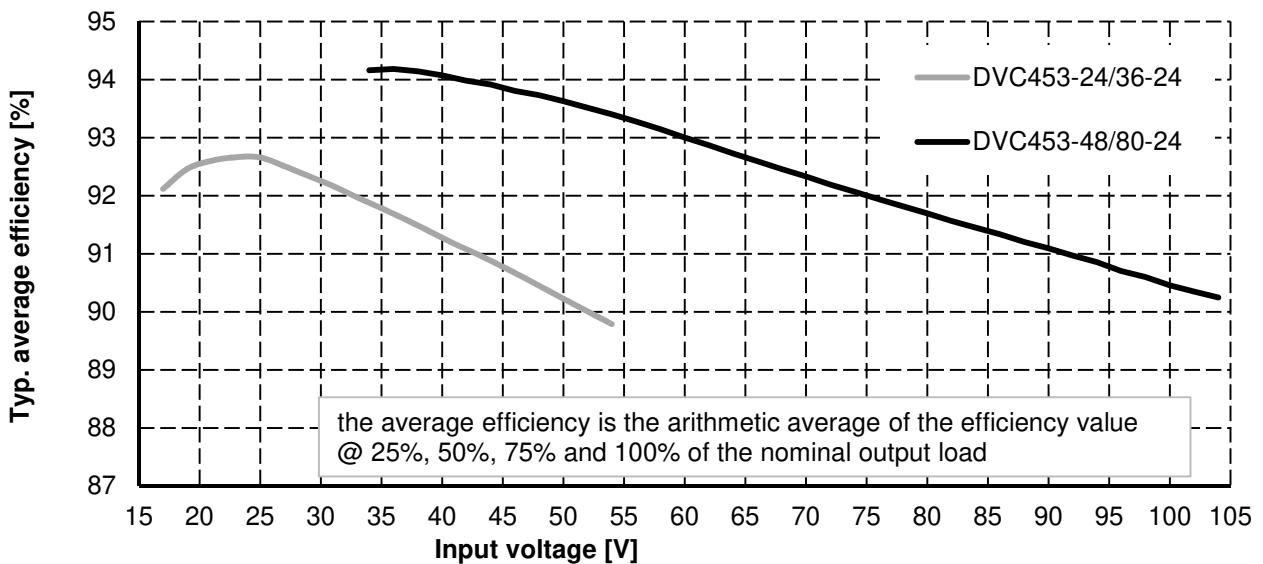


Figure 9.4: Average efficiency depending on the input voltage

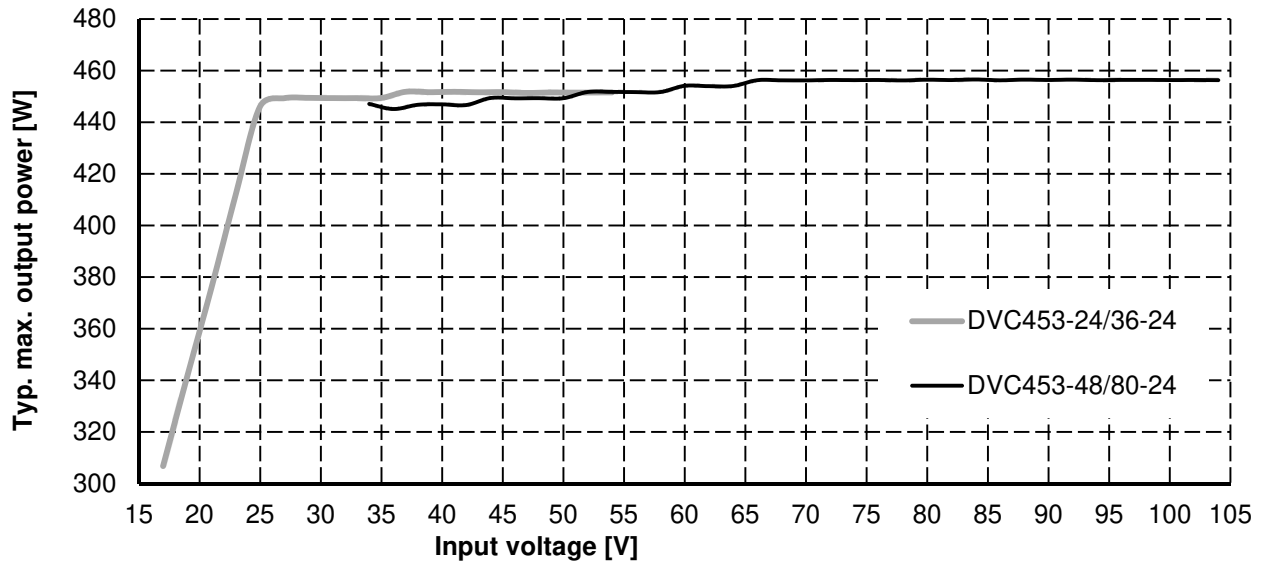


Figure 9.5: Typ. maximum output power depending on the input voltage

DVC153

DC/DC converter

DC/DC converter for vehicles and other applications

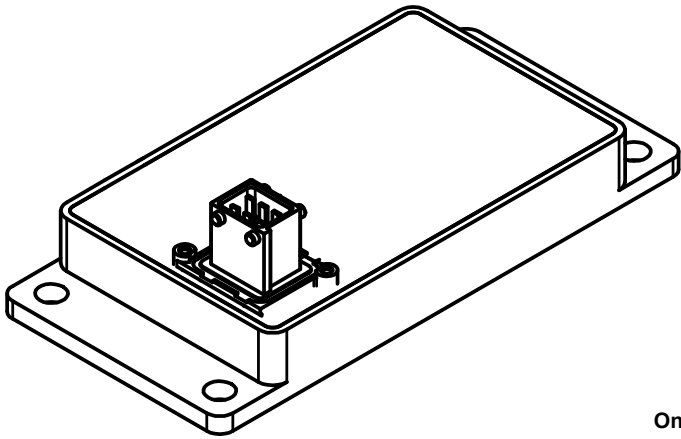


Abbildung ähnlich / device similar to figure

- Wide range input
- Power range up to 160 W
- High efficiency – typ. 90%
- Short-circuit, no load and over temperature protection
- IP-protection class IP65
- Parallel connectable
- Galvanical isolated switching regulator
- Particularly flat and compact design
- Electrolyte free

On request: Changed input voltage range

On request: Changed output voltage

On request: customized connectors



DVC153 - derivate table

Type	Input voltage	Output voltage	Output current	Cat. No.
	Nom. (Tol.)	Nom.	Max.	
DVC153-36-12	36VDC (25 - 47VDC)	12,5VDC	12A	105173
DVC153-48-12	48VDC (34 - 62VDC)	12,5VDC	12A	105174
DVC153-80-12	80VDC (56 - 104VDC)	12,5VDC	12A	105175

1 Input

Input voltage range		see DVC153 - derivate table (valid for continuous operation)
Input capacity	< 20 μ F < 15 μ F < 10 μ F	DVC153-36-12 DVC153-48-12 DVC153-80-12
Turn on voltage	typ. 17,5 VDC typ. 23,2 VDC typ. 54 VDC	DVC153-36-12 (Above typ. $U_{IN} > 17,5$ VDC U_{OUT} within tolerances) DVC153-48-12 (Above typ. $U_{IN} > 30$ VDC U_{OUT} within tolerances) DVC153-80-12 (Above typ. $U_{IN} > 54$ VDC U_{OUT} within tolerances)
Turn off voltage	typ. 10 VDC typ. 20 VDC typ. 37 VDC	DVC153-36-12 (Below $U_{IN} < 17$ VDC U_{OUT} may sink) DVC153-48-12 (Below $U_{IN} < 30$ VDC U_{OUT} may sink.) DVC153-80-12 (Below $U_{IN} < 51$ VDC U_{OUT} may sink.)
Start up delay	typ. 75 ms (36VDC) typ. 90 ms (48VDC) typ. 270 ms (80VDC)	Time from applying the input voltage until the output voltage is statically within the permissible tolerances.
No-load power	typ. 1,9 W (36 VDC) typ. 2,3 W (48 VDC) typ. 2,6 W (80 VDC)	see fig. 9.1
No-load current consumption	typ. 54 mA (36 VDC) typ. 48 mA (48 VDC) typ. 34 mA (80 VDC)	see fig. 9.2
Current consumption at full load	typ. 4,7 A (36 VDC) typ. 3,5 A (48 VDC) typ. 2,1A (80 VDC)	see fig. 9.3

2 Output

Output voltage U_{nom}	12,5 VDC	-
Initial tolerance $N_{initial}$	$U_{nom} \pm 0,2\%$	see fig. 9.8
load regulation tolerance N_{load}	$U_{nom} \pm 1,0\%$	-
Overall tolerance $N_{overall}$	$U_{nom} \pm 1,2\%$	$N_{overall} = N_{initial} + N_{load}$
Continuous output current I_{nom}	≤ 12 A	-
Max. output power $P_{out,max}$	160 W	-
Current limiting	$< 1,1 \times I_{nom}$	ab $1,0 \times I_{nom}$ U_{out} may sink
Ripple & Noise	< 200 mVpp	measurement bandwidth 20 MHz
recovery time	< 3 ms	Duration from leaving the overall tolerance until the permanently return to the tolerance band after a load step. (at $\frac{dI}{dt} < 1$ A/ μ s)

3 Enviroment

Working temperature (envrioment)	-25°C ... +50°C	-
Max. permissible temperature of the mounting surface	< +50°C	-
Overtemperature protection	approx... 95°C	Protective shutdown with self-reset. Measured at the temperature reference point.
Storage temperature	-40°C ... +85°C	-
Humidity	95%	-
Dewing	allowed	-
Shock test acc. to DIN EN 60068-2-27	-	half sinusoidal (Excitation) 250m/s ² (Peak acceleration) 6ms (Duration) 3.000 schocks to each axis (Quantity) ±X, ±Y, ±Z (Axis)
Vibration test acc. to DIN EN 60068-2-6	-	sinusoidal (Excitation) 30m/s ² (acceleration) 10 - 500Hz (frequenc, floating) 2h per axis (Duration), 1 Oct/min X, Y, Z (Axis)
Degree of protection acc. to EN 60529	IP65	-

4 General data

Insulation strenght	1,2 kV _{RMS} 1,2 kV _{RMS}	Input / Output and enclosure Output / Enclosure
Max. efficiency	typ. 90,6% (36 VDC) typ. 90,5% (48 VDC) typ. 91,8% (80 VDC)	see fig. 9.5
Average efficiency	typ. 89,8% (36 VDC) typ. 89,1% (48 VDC) typ. 90,7% (80 VDC)	Averaging of the efficiency values at 25%, 50%, 75% und 100% of the nominal output power. see fig. 9.6
Dimensions (LxWxH)	ca. (180 x 85 x 46,5)mm ca. (180 x 85 x 23,5)mm	with connections see fig. 8.1 without connections see fig. 8.1
Enclosure	Aluminium	-
Weight	approx. 700g	-

5 Standards

EMC (Electromagnetic Compatibility)

Title	Norm	Werte
Emitted interference	EN 12895	-
Immunity	EN 12895	-

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:

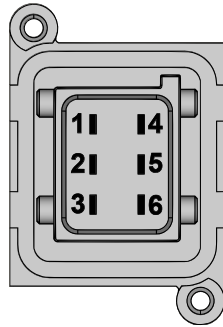
Mounting points	-	4x Mounting holes (Ø9 mm) see fig. 8.1
Installation orientation	-	any
Connection input / output	-	see fig. 7.1
Input fuse	-	No integrated input fuse. A fuse must be provided externally by the customer application.
Reverse polarity protection	-	No reverse polarity protection integrated at the input or output of the device. Reverse polarity protection is ensured exclusively by the plug connector. If the polarity is reversed at the input, then the input fuse to be connected in series will trip.

The general installation and safety instructions for DC/DC converters can be found at: www.deutronic.com

7 Connections

Input / Output

TE Connectivity 1-929180-1, 6-pole:



PIN "1": not assigned
 PIN "2": not assigned
 PIN "3": $V_{IN, +}$
 PIN "4": $V_{OUT, +}$
 PIN "5": $V_{OUT, -}$
 PIN "6": $V_{IN, -}$

- Suitable mating connector TE Connectivity 1-963212-1
- Connection cross section at mating connector min. 1,5 mm²
- max. number of mating cycles: 10
- Individual connection technology on customer request for input and output possible

Figure 7.1: Pin - Assignment

8 Dimensions

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

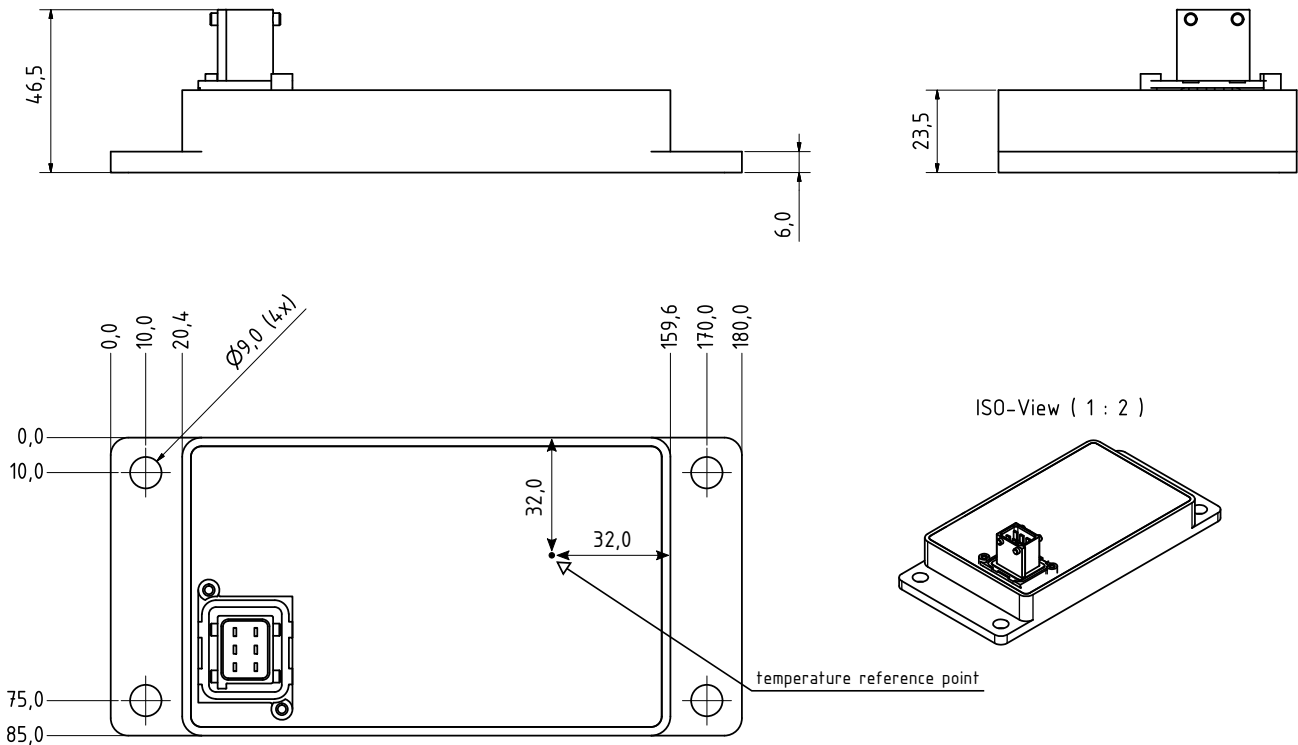


Figure 8.1: Dimensions

9 Characteristics

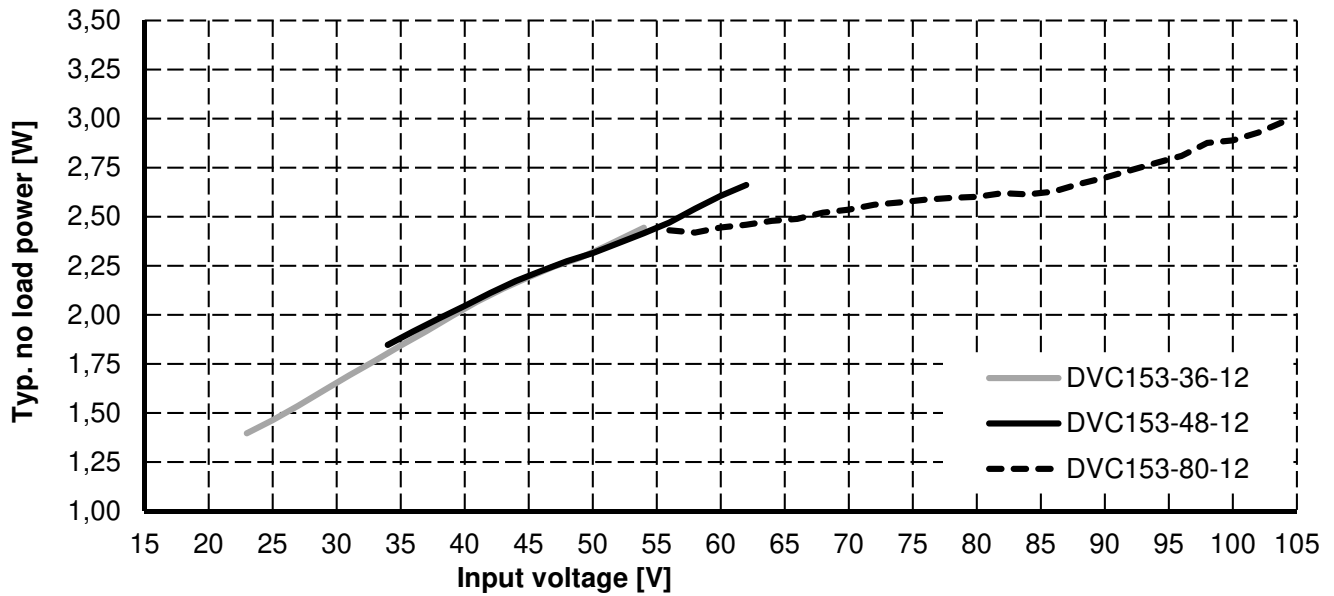


Figure 9.1: No-load power depending on the input voltage

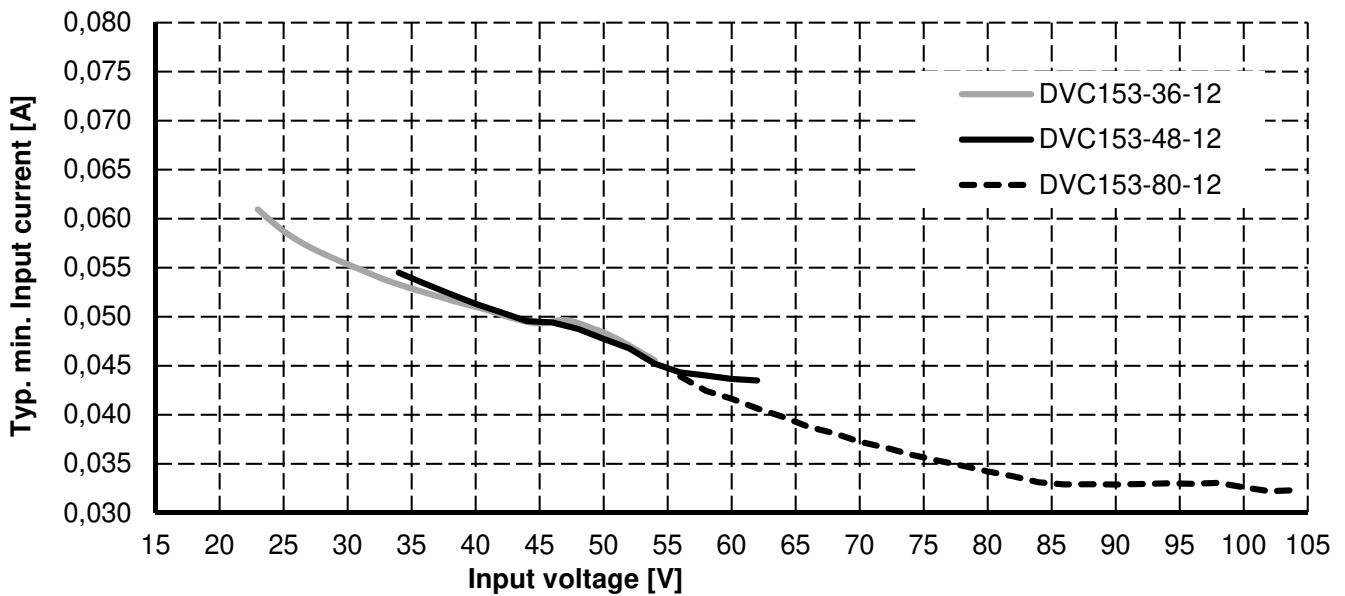


Figure 9.2: No load current consumption depending on the input voltage

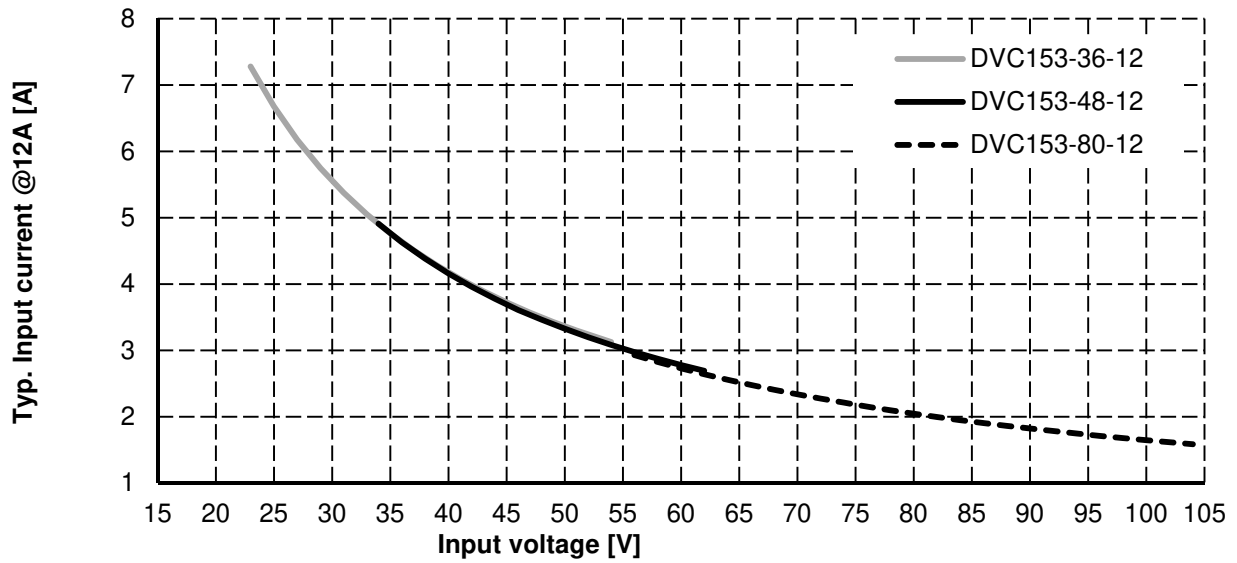


Figure 9.3: Current consumption at full load depending on the input voltage

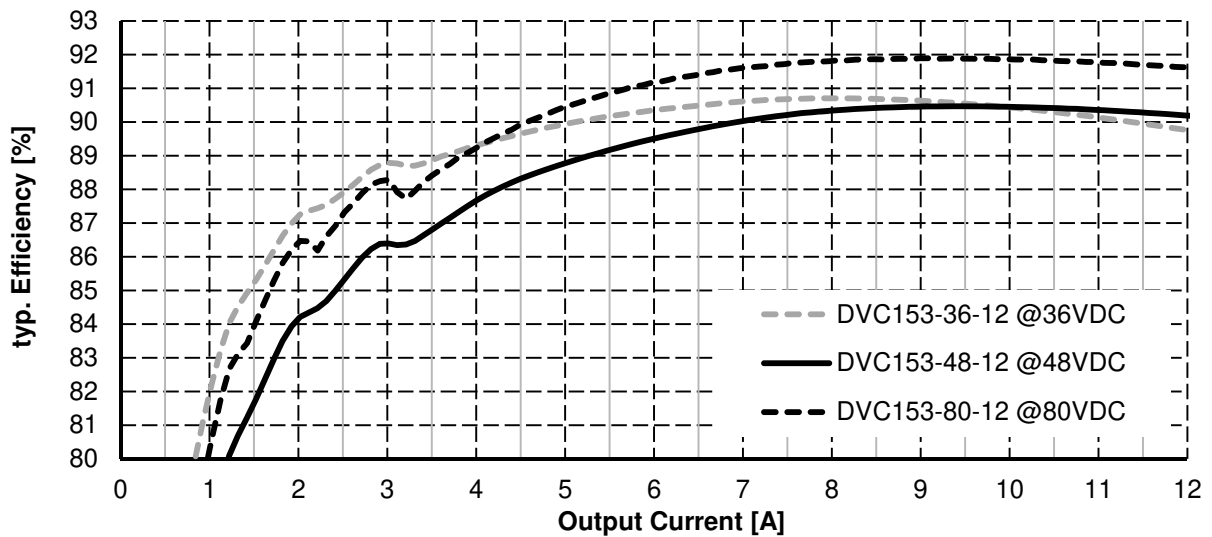


Figure 9.4: Efficiency as a function of the output current

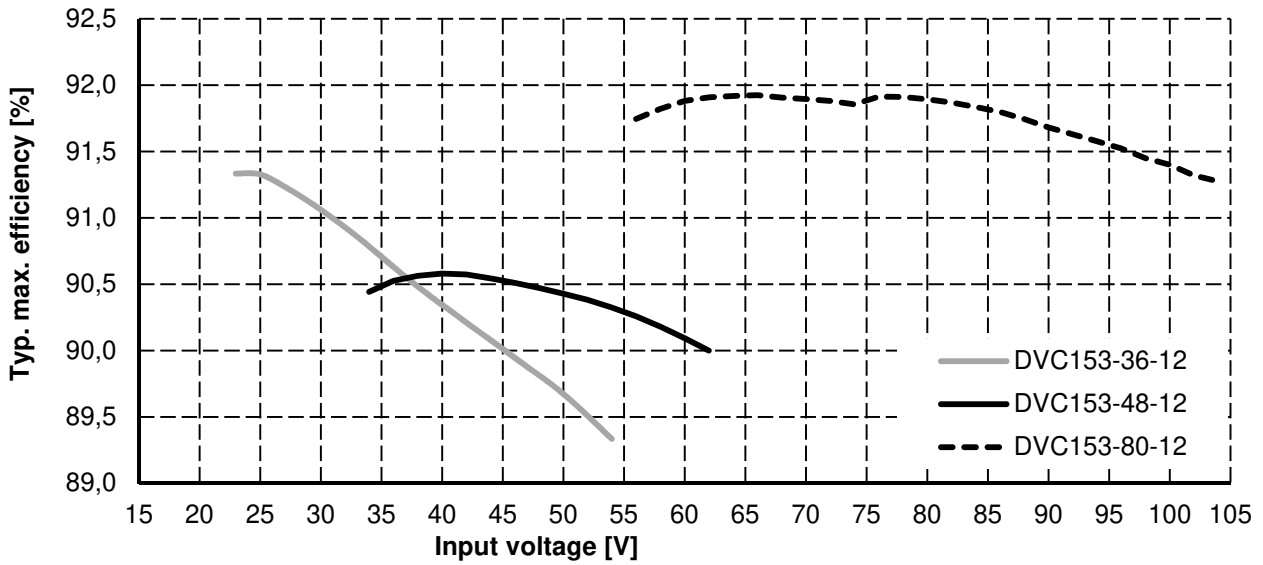


Figure 9.5: Max. efficiency depending on the input voltage

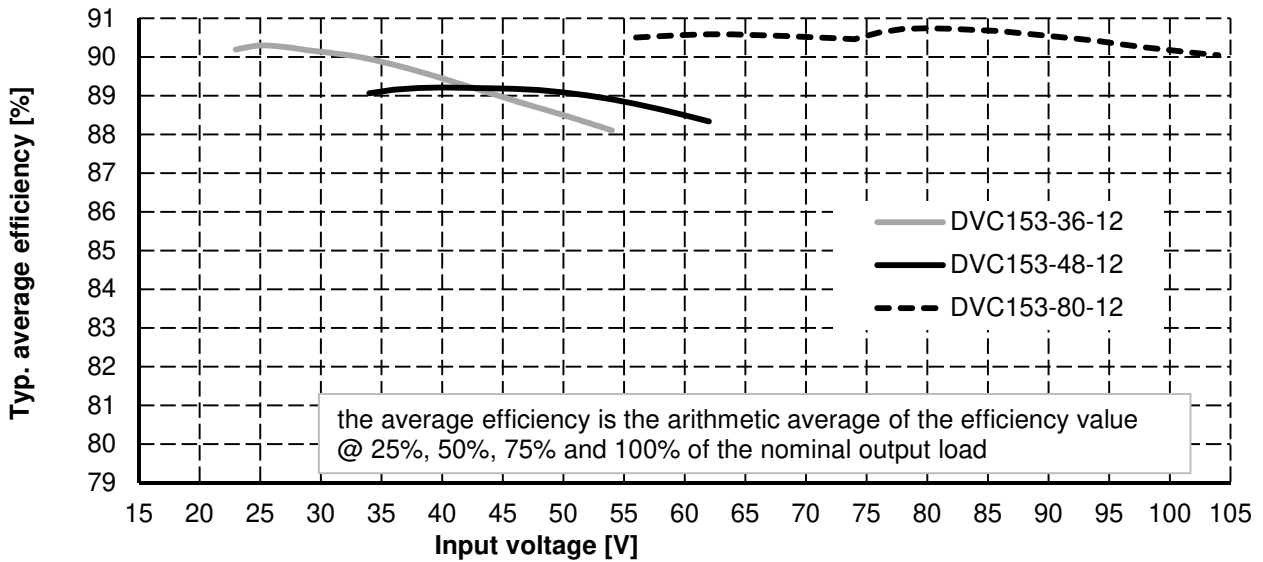


Figure 9.6: Average efficiency depending on the input voltage

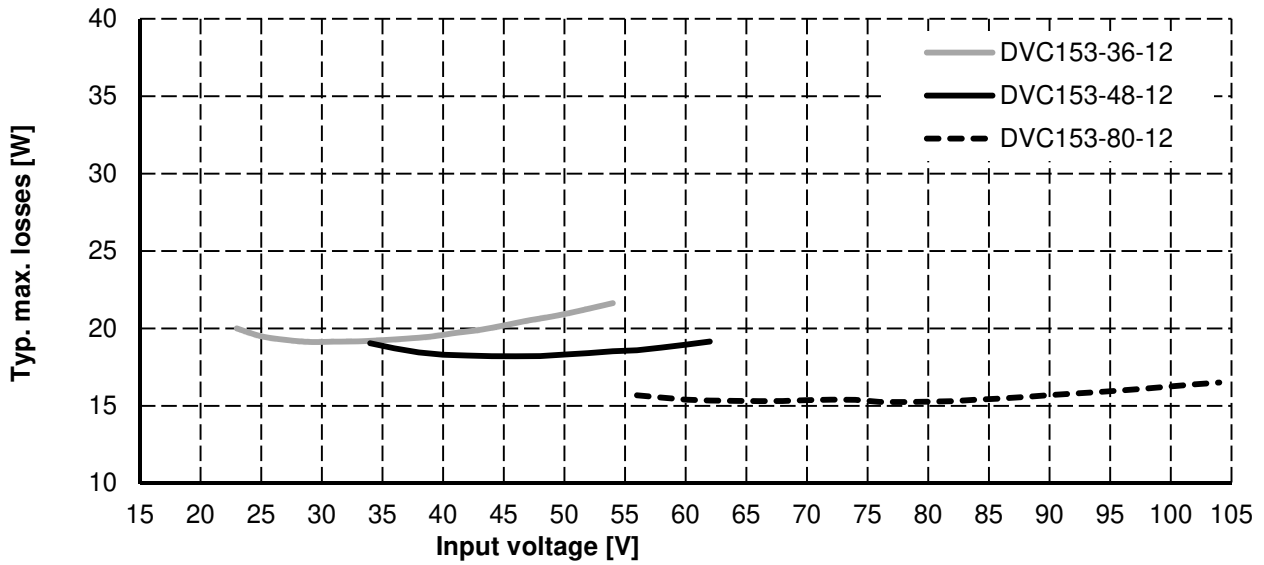


Figure 9.7: Typ. maximum power loss depending on the input voltage

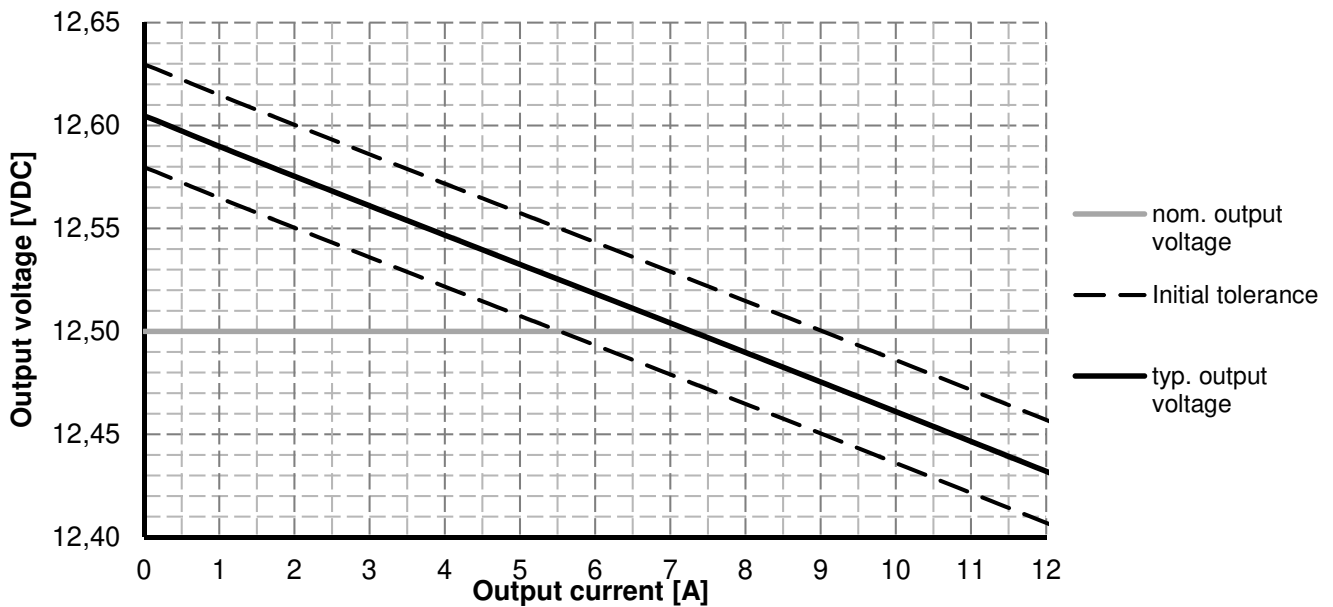


Figure 9.8: Typ. output voltage and initial tolerance

DVC500

(nom. 500Watt)

Gleichspannungswandler für Fahrzeuge und allgemeine
Anwendungen

DC/DC converter for vehicles and other applications



Optionen (auf Anfrage):

- Kundenspezifische Ausführungen (z.B. spez. Kabelbaum, alternative Eingangs-/Ausgangsspannungen etc.)
- Ausführung mit "E" Prüfzeichen (E1 Zulassung) für KFZ Straßeneinsatz

Options (on request):

- Customized devices (e.g. individual cable loom, alternative input and output voltages etc.)
- Version with "E" mark (E1 approval) for road vehicle use

Konzipiert für den Einsatz in rauer Umgebung
Rüttelsicherer Aufbau / vergossenes Gerät
Schutz gegen ungünstige Umwelteinflüsse
DC/DC Weitbereichseingang
Gefiltert gegen Bordnetzstörungen
Potentialtrennung 1,5kV
Elektrische Sicherheit: EN61204-7
EMV: EN61204-3
Geregelter Ausgang, sehr hoher Wirkungsgrad
Kurzschluss- und Leerlaufest
Übertemperaturschutz
Parallel schaltbar (Option: Weiche Kennlinie)

*Designed for use in rough environment
Rugged construction / potted device
Protection against unfavourable environmental conditions
DC/DC wide range input
Filtered against vehicle on-board disturbances
Galvanic separation 1,5kV
Electrical safety: EN61204-7
EMC: EN61204-3
Regulated output, very high efficiency
Short-circuit / No-load protection
Over Temperature protection
Parallel connectable (Option: Smart output characteristic)*

Type	Input Voltage	Output Voltage	Output Current	Cat. No.
DVC500-36-24	36VDC (25-70VDC)	24VDC	21A	105119
DVC500-48-12	48VDC (33-90VDC)	12,5VDC	40A	105114
DVC500-48-13,8	48VDC (40-90VDC)	13,8VDC	36A	105112
DVC500-48-13,8/ITO12	48VDC (40-90VDC)	13,8VDC	36A	105112/1
DVC500-48-24	48VDC (33-90VDC)	24VDC	21A	105115
DVC500-80-12	72/80/96/110VDC (56-154VDC)	12,5VDC	40A	105116
DVC500-80-13,8	72/80/96/110VDC (56-154VDC)	13,8VDC	36A	105109
DVC500-80-24	72/80/96/110VDC (56-154VDC)	24VDC	21A	105117

Auf Anfrage: Option Inhibit Freigabe-Eingang, siehe Seite 2/3
On request: Option Inhibit Turn-on-Input, see page 2/3

Galvanisch getrennter Schaltregler
Insulated switching regulator

DVC500

Eingang Input

Eingangsspannungsbereich <i>Input voltage range</i>	siehe Tabelle (gilt für Dauerbetrieb) <i>see table (valid for continuous operation)</i>
mit eingeschränkter Funktion <i>With reduced functionality</i>	40V (@IN 80VDC) / 24V (@IN 48VDC) / 22V(@IN 36VDC) /
Kurzzeit Überspannung (20ms, einmalig) <i>Transient over voltage (20ms, one time)</i>	220V (@IN 80VDC) / 100V (@IN 48VDC) / 80V (@IN 36VDC)
Filterung <i>Filtering</i>	Gefiltert gegen Bordnetzstörungen <i>Filtered against vehicle on board disturbances</i>
Eingangssicherung (ist extern in Reihe vorzuschalten) <i>Input fuse (to switch external in series)</i>	T20A/250V (@IN 48/80 VDC); T35A/32V (@IN 24/36 VDC);
Verpolschutz <i>Reverse polarity protection</i>	Bei Verpolung löst die vorzuschaltende Eingangssicherung aus <i>On reverse polarity external input fuse (upstream) is blown</i>
Leistungsaufnahme im Leerlauf <i>No-load power</i>	$U_{out} = U_{nominal}$: 6,3W (@IN 48VDC); 6,8W (@IN 80VDC)
Leistungsaufnahme mit Inhibit-Funktion <i>No-load power with option control-input</i>	$U_{out} = 0$ VDC: 1,3W (@IN 48VDC); 2,0W (@IN 80VDC)

Ausgang Output

Ausgangsspannung (Einstellgenauigkeit) <i>Output voltage (initial setting)</i>	12,5V ($\pm 1\%$); 13,8V ($\pm 1\%$); 24,3V ($\pm 1\%$);
Stromgrenzeinstellungen <i>Current limitation</i>	typ. 1,1 x I-nominal (I-const)
Regelabweichung Uout <i>Regulation accuracy Uout</i>	
bei Laständerung stat. 10%- 90% / 0-100% <i>Load regulation stat. 10%-90% / 0-100%</i>	$\pm 0,5\%$ (typ. 0,3% = 80mV) / $\pm 1\%$
bei Laständerung dyn. 20% - 80% <i>Load regulation dyn.20% - 80%</i>	$\pm 1,5\%$ (@OUT 24VDC) / $\pm 3,5\%$ (@OUT 12/13,8VDC)
Ausregelzeit ($\Delta U < 1\%$) <i>Regulation time ($\Delta U < 1\%$)</i>	< 1ms
bei Eingangsänderung (min.-max.) <i>Line regulation (min.-max.)</i>	$\pm 0,1\%$
Temperaturdrift <i>Temperature drift</i>	-25°C .. +70°C: < 1% (typ. 0,5%); 0°C .. +60°C: typ. 0,2%
Parallel zur Leistungserhöhung schaltbar <i>Parallel connectable for power increase</i>	Keine Ausgleichsleitung erforderlich (auch seriell betreibbar) <i>No control lead necessary (can be connected in series)</i>
Restwelligkeit, Schaltspitzen <i>Ripple & noise (p-p), Switching spikes</i>	100mVss
Überspannungsschutz am Ausgang <i>Over voltage protection (output)</i>	Zweiter Regelkreis begrenzt auf U nominal +20% (typ.) <i>Safety redundant regulation circuit, limiting action to U nominal +20% (typ.)</i>

Galvanisch getrennter Schaltregler
Insulated switching regulator

DVC500

Parallelschaltbarkeit	unbegrenzt, 100% Redundanz benötigt externe Dioden, Option: Weiche Kennlinie aktivierbar für gleichmäßigere Stromaufteilung im Parallelbetrieb (ca. 500mV Spannungshub min/max)
<i>Parallel operation</i>	<i>unlimited, 100% redundancy requires external diodes, Option: Soft output regulation for more equal current partitioning in parallel mode (app. 500mV voltage rise min/max)</i>
Freigabe Steuereingang (OPTION) (Turn-ON Inhibit, potentialfreier Eingang)	Freigabe der (selbst blockierten) Ausgangsspannung oder alternativ Abschaltung des Ausgangs durch Einspeisen von 2mA Steuerstrom in den Steuereingang (2-Draht Leitung / a.A. 5V / 12V etc.)
<i>Control Input (OPTION) (Turn-ON Inhibit, galv. insulated control input)</i>	<i>Release of (self inhibiting) output voltage or alternative turn-off output voltage by feeding 2mA into control input (2-wire cable / o.r. 5V / 12V etc.)</i>

Umgebung *Environment*

Arbeitstemperatur <i>Ambient temperature operating</i>	-40°C~+75°C (max. Temperatur Basisplatte 100°C) <i>(max. temperature base plate 100°C)</i>
Lagertemperatur <i>Storage temperature</i>	-40°C~+85°C
Übertemperaturschutz <i>Over temperature protection</i>	Schutzabschaltung (auto-reset bei Abkühlung) <i>Protective shut down (auto reset after cool down)</i>
Feuchtigkeit <i>Humidity</i>	100% relative Feuchte (Betauung zulässig) <i>100% relative humidity (dewing permitted)</i>
Kühlung <i>Cooling</i>	Luftkonvektion / Kontaktkühlung auf Montagefläche <i>Natural convection / Cooling via contact to mounting surface</i>
Elektrische Sicherheit <i>Electrical safety</i>	EN61204-7
Schutzgrad <i>Protective degree</i>	IP67
Isolationsfestigkeit <i>Insulation strength</i>	1,5kV eff Eingang/Ausgang – Eingang/Gehäuse <i>Input / Output – Input / Case</i> 500V eff Ausgang / Gehäuse <i>Output / Case</i>
EMV	EN61204-3 [nach 6.4.2, Tabelle H.3, für Wohnbereich, Geschäfts- und Gewerbebereiche sowie Kleinbetriebe, Klasse B, Leitungslänge < 10 m. Interne Frequenzen < 108 MHz. nach 7.2.3. Störfestigkeitspegel für industrielle Umgebung. Leitungslänge < 10 m.]
EMC	EN61204-3 <i>[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.</i> <i>according to 7.2.3. Immunity level for industrial environment. Cable length < 10 m.]</i>
Wirkungsgrad / Efficiency	typ. ca. 92% (typabhängig / depending on type) Eingang / Input: +Uin (M5) / -Uin (M8)

Galvanisch getrennter Schaltregler
Insulated switching regulator

DVC500

Anschlüsse / Connectors

Ausgang / Output: +Uout (M6) / -Uout (M8)

Wichtiger Sicherheitshinweis

Wenn am Ausgang eine externe Energiequelle (z.B. Batterie) angeschlossen wird, muss die Zuführungsleitung (+ Pol) in der Nähe der Quelle abgesichert werden.

Important safety note

Empfohlener Sicherungswert: $1,1 \dots 1,2 \times I_{nom}$

If an external energy source (e.g. battery) is connected to the output of the converter, the supply line (+ pole) must be fused close by the source.

Recommended fusing: $1,1 \dots 1,2 \times I_{nom}$

Abmessungen (LxBxH)

222 (220)x 166(122) x 71(47) mm

Dimensions (LxWxH)

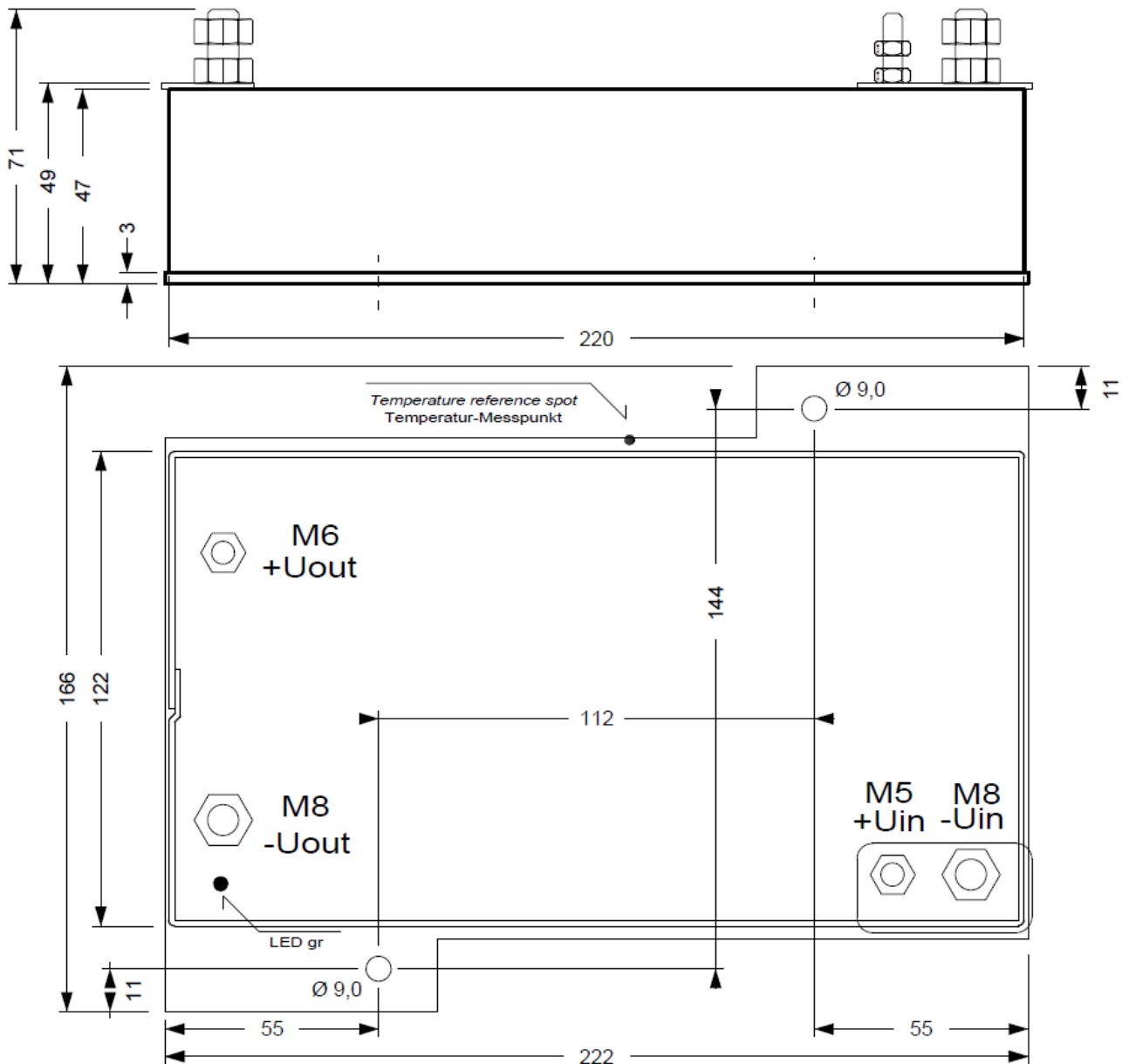
Gehäuse / Case

Aluminium

Galvanisch getrennter Schaltregler
Insulated switching regulator

DVC500

Abmessungen / Dimensions



Galvanisch getrennter Schaltregler
Insulated switching regulator

DVC500

DVC251

(nom. 137-252Watt)

Gleichspannungswandler für Fahrzeuge und allgem. Anwendungen
DC/DC converter for vehicles and other applications



Konzipiert für den Einsatz in rauer Umgebung
 Rüttelsicherer Aufbau / vergossenes Gerät
 Schutz gegen ungünstige Umwelteinflüsse
 DC/DC Weitbereichseingang
 Gefiltert gegen Bordnetzstörungen
 Potentialtrennung 1,5kV (500V beim 12/24VDC Eingang)
 Elektrische Sicherheit: EN61204-7
 EMV: EN61204-3
 Geregelter Ausgang, hoher Wirkungsgrad
 Kurzschluss- und Leerlaufest
 Übertemperaturschutz
 Parallel schaltbar

Optionen (auf Anfrage):

- Kundenspezifische Ausführungen (z.B. spez. Kabelbaum, alternative Eingangs-/Ausgangsspannungen etc.)
- Ausführung mit "E" Prüfzeichen (E1 Zulassung) für KFZ Straßeneinsatz

Options (on request):

- Customized devices (e.g. individual cable loom, alternative input and output voltages etc.)
- Version with "E" mark (E1 approval) for road vehicle use

*Designed for use in rough environment
 Rugged construction / potted device
 Protection against unfavourable environmental conditions
 DC/DC wide range input
 Filtered against vehicle on-board disturbances
 Galvanic separation 1,5kV (500V at 12/24VDC input voltage)
 Electrical safety: EN61204-7
 EMC: EN61204-3
 Regulated output, high efficiency
 Short-circuit / No-load protection
 Over Temperature protection
 Parallel connectable*

Type	Input Voltage	Output Voltage	Output Current	Cat. No.
DVC251-12-12	12VDC (10-20VDC)	12,5VDC	11A	105120
DVC251-12-24	12VDC (10-20VDC)	24VDC	7A	105121
DVC251-24-12	24VDC (19-45VDC)	12,5VDC	18A	105122
DVC251-24-24	24VDC (19-45VDC)	24VDC	9,5A	105123
DVC251-24-27,6	24VDC (22-45VDC)	27,6VDC	8,2A	105141
DVC251-48-12	48VDC (34-100VDC)	12,5VDC	20A	105124
DVC251-48-24	48VDC (32-100VDC)	24VDC	10,5A	105125
DVC251-80-12	72/80/96/110VDC (56-154VDC)	12,5VDC	20A	105126
DVC251-80-13,8	72/80/96/110VDC (56-154VDC)	13,8VDC	18A	105130
DVC251-80-24	72/80/96/110VDC (56-154VDC)	24VDC	10,5A	105127

Version EUT: EXTENDED HOLD-UP TIME

Type	Nom. Input Voltage	Output Voltage	Output Current	Cat. No.
DVC251-EUT-12-24	12VDC (8,5-20VDC)	24VDC	6A	105131
DVC251-EUT-24-24	24VDC (17-40VDC)	24VDC	8A	105133

EUT: Zur Überbrückung von Spannungseinbrüchen z.B. beim Motorstart (ca. 3,5 ... 5Ws Energiereserve)
 To bridge voltage break down e.g. at an engine start (ca. 3,5 ... 5Ws buffer energy)

Galvanisch getrennter Schaltregler
Insulated switching regulator

DVC251

Eingang / Input

<p>Eingangsspannungsbereich <i>Input voltage range</i> mit eingeschränkter Funktion / <i>with reduced functionality</i></p>	<p>siehe Tabelle (gilt für Dauerbetrieb) <i>see table (valid for continuous operation)</i> 48V (@IN 80VDC) / 28V (@IN 48VDC) / 22V (@IN 36VDC) / 18V (@IN 24VDC) / 17V (EUT-Type @IN 24VDC) / 9V (@IN 12VDC) / 8V (EUT-Type @IN 12VDC)</p>
<p>Kurzzeit Überspannung (20ms, einmalig) / <i>Transient over voltage (20ms, one time)</i></p>	<p>220V (@IN 80VDC) / 110V (@IN 48VDC) / 90V (@IN 36VDC) / 52V (@IN 24VDC) / 35V (@IN 12VDC) Anmerkung zur Variante mit IN12VDC: Der kurzfristige Anschluss einer 24VDC Batterie am Geräteeingang wird ohne Schaden überstanden. <i>Note concerning variant with IN12VDC: The short time connection of a 24VDC battery at the device's input is endured without any damage.</i></p>
<p>Filterung / Filtering</p>	<p>Gefiltert gegen Bordnetzstörungen <i>Filtered against vehicle on board disturbances</i></p>
<p>Eingangssicherung (ist extern in Reihe vorzuschalten) <i>Input fuse (to switch external in series)</i></p>	<p>T10A/250V (@IN 80/48 VDC); T20A/32V (@IN 36/24VDC); T35A/32V (@IN 12VDC)</p>
<p>Verpolschutz <i>Reverse polarity protection</i></p>	<p>Bei Verpolung löst die vorzuschaltende Eingangssicherung aus <i>On reverse polarity external input fuse (upstream) is blown</i></p>
<p>Leistungsaufnahme im Leerlauf / <i>No-load power</i></p>	<p>typ. 0,4..2,0W (max. 2,5W) typabhängig / depending on type</p>

Ausgang / Output

<p>Ausgangsspannung (Einstellgenauigkeit) <i>Output voltage (initial setting)</i></p>	<p>@OUT 27,6VDC: 27,6V (± 1%); @OUT 24VDC: 24,3V (± 1%); @OUT 20VDC: 20,3V (± 1%); @OUT 13,8VDC: 13,8V (± 1%); @OUT 12VDC: 12,5V (± 1%);</p>
<p>Stromgrenzeinstellung (Arbeitspunkt) <i>Current limitation (working point)</i></p>	<p>typ. 1,1 x I-nominal (I-const) Kurzschlußstrom / Short circuit current typ. (1,25..2,0) x I-nominal</p>
<p>Parallelschaltbarkeit zur Leistungserhöhung <i>Parallel operation for increased output power</i></p>	<ul style="list-style-type: none"> - Unbegrenzt parallel schaltbar, keine Ausgleichsleitung erforderlich - Weiche Kennlinie für gleichmäßigere Stromaufteilung im Parallelbetrieb (ca. 500mV Spannungshub min/max) - Anm.: Für eine 100%-Redundanz wird eine externe Diode benötigt - Unlimited connectable in parallel, no additional control cable needed - Smart output regulation for optimized DC current distribution in parallel operation (approx. 500mV between min/max output voltage) - Note: For a 100% redundancy an external diode is required
<p>Serienschaltung zum Aufbau höherer Spannungen <i>Serial connection for higher output voltages</i></p>	<p>Seriell schaltbar (bis max. 4 Einheiten) ACHTUNG: Sicherheitsvorschriften beachten (PELV, SELV)! Für höhere Spannungen bitte den Hersteller kontaktieren. <i>Serial connectable (of up to max. 4 units)</i> ATTENTION: Follow safety requirements (PELV, SELV)! <i>For higher output voltages please contact manufacturer.</i></p>

Galvanisch getrennter Schaltregler
Insulated switching regulator

DVC251

Regelabweichungen / Regulation accuracy

Laständerung stat. 10-90% / 0-100% <i>Load regulation stat. 10-90% / 0-100%</i>	±1% / ±2,5%
Laständerung dyn. 20-80% <i>Load regulation dyn. 20-80%</i>	±1,5% (@OUT 24VDC) / ±1,5% (@OUT 20VDC) / ± 3,5% (@OUT 12VDC) ±1,5% (@OUT 27,6VDC) / ± 3,5% (@OUT 13,8VDC)
Ausregelzeit ($\Delta U < 1\%$) <i>Regulation time ($\Delta U < 1\%$)</i>	< 1ms
bei Eingangsänderung (min.-max.) <i>Line regulation (min.-max.)</i>	±0,1%
Temperaturdrift <i>Temperature drift</i>	-25°C ... +70°C: < 1% (typ. < 0,5%; @0-60°C: typ. 0,2%)
Restwelligkeit, Schaltspitzen <i>Ripple & noise (p-p), Switching spikes</i>	100mVss
Überspannungsschutz am Ausgang <i>Over voltage protection (output)</i>	Zweiter Regelkreis begrenzt auf $U_{\text{nominal}} + 30\%$ (typ.) Safety redundant regulation circuit, limiting action to $U_{\text{nominal}} + 30\%$ (typ.)

Anwenderhinweise:

Weiterführende Informationen, insbesondere zur Parallel-/Serienschaltung, Alarmgabe, Ein/Aus Funktion sowie Sicherheitshinweise erhältlich über Vertrieb Deutronic.

User notes:

Further information, especially concerning parallel / series connection, alarming, remote on/off function as well as additional safety related informations, please contact Deutronic sales department.

Umgebung / Environment

Arbeitstemperatur <i>Ambient temperature operating</i>	-40°C~+75°C (max. Temperatur Basisplatte 100°C) <i>(max. temperature base plate 100°C)</i>
Lagertemperatur <i>Storage temperature</i>	-40°C~+85°C
Übertemperaturschutz <i>Over temperature protection</i>	Schutzabschaltung, selbst-reset bei Abkühlung <i>Protective shut down, self reset after cool down</i>
Feuchtigkeit <i>Humidity</i>	100% relative Feuchte (Betauung zulässig) <i>100% relative humidity (dewing permitted)</i>
Kühlung <i>Cooling</i>	Luftkonvektion / Kontaktkühlung auf Montagefläche <i>Natural convection / Cooling via contact to mounting surface</i>
Elektrische Sicherheit <i>Electrical safety</i>	EN61204-7
Schutzgrad (ohne Stecker) <i>Protective degree (without plug)</i>	IP67
Isolationsfestigkeit <i>Insulation strength</i>	IN/OUT – IN/CASE 1,5kVeff (@IN 36/48/80 VDC) / 500Veff (@IN 12/24 VDC) OUT/CASE 500Veff

Galvanisch getrennter Schaltregler
Insulated switching regulator

DVC251

EMV	EN61204-3 [nach 6.4.2, Tabelle H.3, für Wohnbereich, Geschäfts- und Gewerbebereiche sowie Kleinbetriebe, Klasse B, Leitungslänge < 10 m. Interne Frequenzen < 108 MHz. nach 7.2.3. Störfestigkeitspegel für industrielle Umgebung. Leitungslänge < 10 m.]
EMC	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. according to 7.2.3. Immunity level for industrial environment. Cable length < 10 m.]
Wirkungsgrad / Efficiency	typ. ca. 90% (@IN 80/48 VDC) typabhängig / depending on type typ. ca. 88% (@IN 24 VDC) typ. ca. 85% (@IN 12 VDC)
Anschlüsse	ca. 10cm Kabel mit 6poligem AMP Stecker MATE-N-LOK (andere Kabel/Steckverbinder möglich) Varianten mit 12VDC-Eingangsspannung: 0,5m Ausgangskabel (offene Enden)
Connectors	<i>ca. 10cm cable with 6-pole AMP connector MATE-N-LOK (different cable/connector possible on customers request)</i> <i>Variant with 12VDC input voltage:</i> <i>0,5m cable (open ends – no connector plug)</i>
Wichtiger Sicherheitshinweis	Wenn am Ausgang eine externe Energiequelle (z.B. Batterie) angeschlossen wird, muss die Zuführungsleitung (+ Pol) in der Nähe der Quelle abgesichert werden. Empfohlener Sicherungswert: 1,1 .. 1,2 x I_{nom}
Important safety note	<i>If an external energy source (e.g. battery) is connected to the output of the converter, the supply line (+ pole) must be fused close by the source.</i> <i>Recommended fusing: 1,1 .. 1,2 x I_{nom}</i>
Abmessungen (LxBxH) <i>Dimensions (LxWxH)</i>	153 (150)x 131 (100) x 50 mm
Gehäuse <i>Case</i>	Aluminium
Gewicht <i>Weight</i>	ca. 1500g

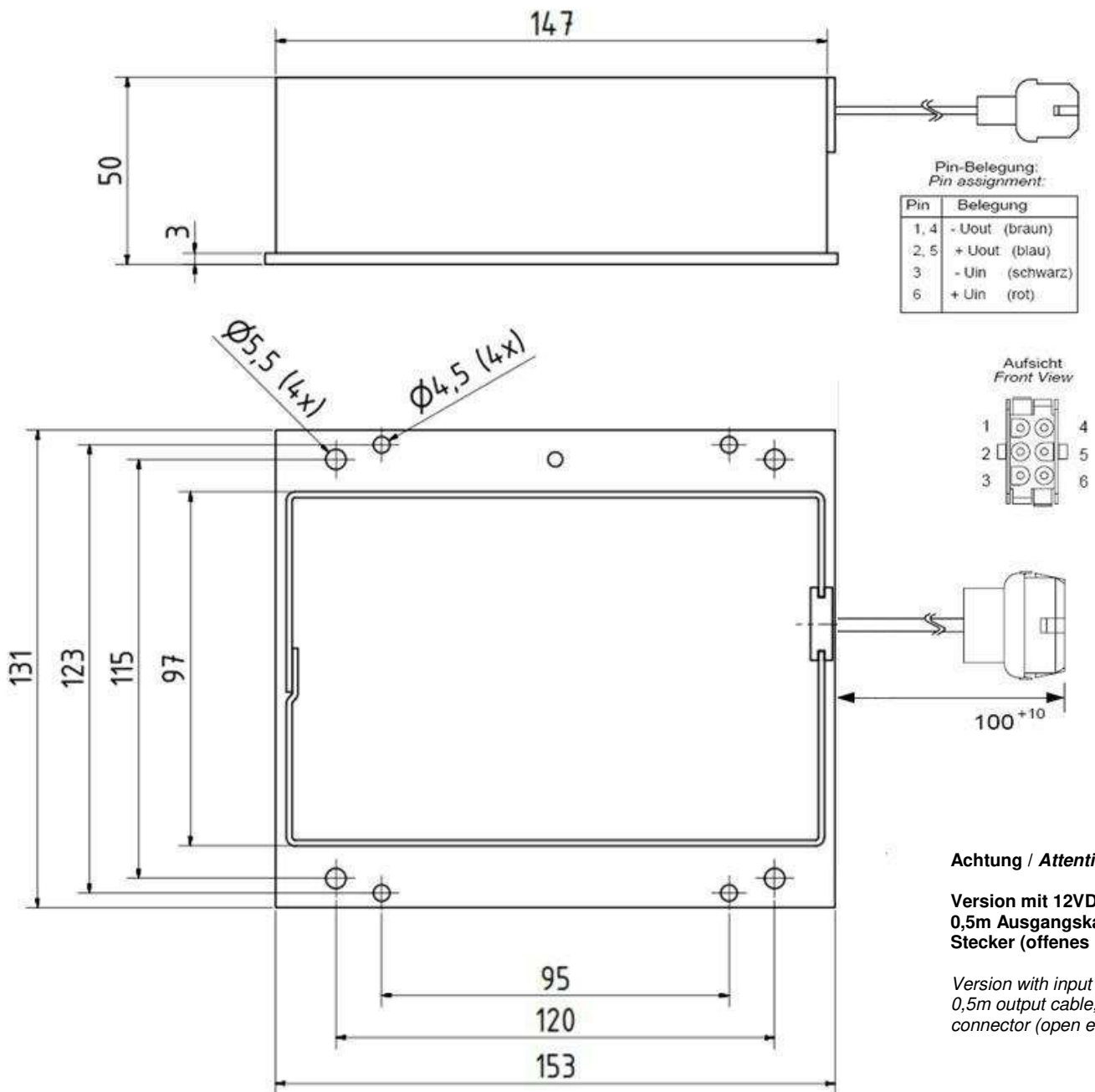
Galvanisch getrennter Schaltregler
Insulated switching regulator

DVC251

Varianten und Bestelloptionen / *Variants and order options*

Ausgangskennlinie (OPTION) <i>Output characteristic (OPTION)</i>	Hart <i>Hard</i>
Freigabe Steuereingang (OPTION) (Turn-ON Inhibit, potentialfreier Eingang) <i>Control Input (OPTION)</i> <i>(Turn-ON Inhibit, galv. insulated control input)</i>	Freigabe der (selbst blockierten) Ausgangsspannung oder alternativ Abschaltung des Ausgangs durch Einspeisen von 2mA Steuerstrom in den Steuereingang (2-Draht Leitung / +5V) <i>Release of (self inhibiting) output voltage or alternative turn-off output voltage by feeding 2mA into control input (2-wire cable / +5V)</i>
LED (OPTION)	Leistungseffiziente LED grün (Ø5mm) zur Signalisierung von regulärem Betrieb, auch im Parallelbetrieb <i>Power efficient LED green (Ø5mm) signalizes regular operation, also valid for parallel operation</i>
Power Good (OPTION)	<ul style="list-style-type: none">- Alarm Modul (2-kanalig) zur Unterspannungsüberwachung (U-nom - 10%) am Eingang und Ausgang- Alarmgabe über je 1 Optokoppler (Darlington, schwebend), 10mA (max. 20mA) / max. 30Vdc- <i>Alarming module (2-channels) for undervoltage supervision (U-nom - 10%) at input and output</i>- <i>Alarming via an optocoupler for each channel (Darlington, uncommitted), 10mA (max. 20mA) / max. 30Vdc</i>

Abmessungen / Dimensions



Hinweis: DVC251 ist montagekompatibel zur DVC250-Serie
 Note: DVC251 is mounting compatible to DVC250 series

Galvanisch getrennter Schaltregler
Insulated switching regulator

DVC251

DVC125 / DVC150

(nom. 97,5-156Watt)

DC/DC-Wandler für Fahrzeuge und allgemeine Anwendungen
DC/DC converter for vehicles and other applications



Optionen (auf Anfrage):

- Kundenspezifische Ausführungen (z.B. spez. Kabelbaum, alternative Eingangs-/Ausgangsspannungen etc.)
- Ausführung mit "E" Prüfzeichen (E1 Zulassung) für KFZ Straßeneinsatz

Options (on request):

- Customized devices (e.g. individual cable loom, alternative input and output voltages etc.)
- Version with "E" mark (E1 approval) for road vehicle use

Konzipiert für den Einsatz in rauer Umgebung
 Rüttelsicherer Aufbau / vergossenes Gerät
 Schutz gegen ungünstige Umwelteinflüsse
 DC/DC Weitbereichseingang
 Gefiltert gegen Bordnetzstörungen
 Potentialtrennung 1,5kV
 Elektrische Sicherheit: EN61204-7
 EMV: EN61204-3
 Geregelter Ausgang, hoher Wirkungsgrad
 Kurzschluss- und Leerlauffest
 Übertemperaturschutz
 Parallel schaltbar

*Designed for use in rough environment
 Rugged construction / potted device
 Protection against unfavourable environmental conditions
 DC/DC wide range input
 Filtered against vehicle on-board disturbances
 Galvanic separation 1,5kV
 Electrical safety: EN61204-7
 EMC: EN61204-3
 Regulated output, high efficiency
 Short-circuit / No-load protection
 Over Temperature protection
 Parallel connectable*

Type	Input Voltage	Output Voltage	Output Current	Cat. No.
DVC125-24-12	24VDC (17-40VDC)	12,5VDC	8A	105078
DVC125-24-15	24VDC (20-40VDC)	15VDC	6,5A	105071
DVC125-24-24	24VDC (17-40VDC)	24VDC	5A	105079
DVC125-36-24	36VDC (25-70VDC)	24VDC	5,5A	105107
DVC125-48-12	48VDC (33-90VDC)	12,5VDC	10A	105086
DVC125-48-20	48VDC (33-90VDC)	20VDC	5,5A	105104
DVC125-48-24	48VDC (33-90VDC)	24VDC	5,5A	105080
DVC125-80-12	72/80/96/110VDC (56-154VDC)	12,5VDC	10A	105087
DVC125-80-24	72/80/96/110VDC (56-154VDC)	24VDC	5,5A	105082
DVC150-48-12	48VDC (33-90VDC)	12,5VDC	12A	105088
DVC150-48-24	48VDC (33-90VDC)	24VDC	6,5A	105089
DVC150-80-12	72/80/96/110VDC (56-154VDC)	12,5VDC	12A	105090
DVC150-80-24	72/80/96/110VDC (56-154VDC)	24VDC	6,5A	105091

Auf Anfrage: Option Inhibit Freigabe-Eingang, siehe Seite 2/3 (z.B. DVC125-48-12/I-S)
 On request: Option Inhibit Turn-on-Input, see page 2/3 (e.g. DVC125-48-12/I-S)

Galvanisch getrennter Schaltregler
Insulated switching regulator

DVC125 / DVC150

Eingang / Input

Eingangsspannungsbereich <i>Input voltage range</i>	siehe Tabelle/gilt für Dauerbetrieb <i>see table/valid for continuous operation</i>
mit eingeschränkter Funktion <i>With reduced functionality</i>	17 V (@IN 24VDC) / 20 V (@IN 36VDC) / 24V (@IN 48VDC) / 40V (@IN 80VDC)
Kurzzeit Überspannung (20ms, einmalig) <i>Transient over voltage (20ms, one time)</i>	50 V (@IN 24VDC) / 80 V (@IN 36VDC) / 100V (@IN 48VDC) / 220V (@IN 80VDC)
Filterung <i>Filtering</i>	Gefiltert gegen Bordnetzstörungen. <i>Filtered against vehicle on board disturbances</i>
Eingangssicherung (ist extern in Reihe vorzuschalten) <i>Input fuse (to switch external in series)</i>	T10A/250V (@IN 48/80VDC); T15A/32V (@IN 24VDC)
Verpolschutz <i>Reverse polarity protection</i>	Bei Verpolung löst die vorzuschaltende Eingangssicherung aus <i>On reverse polarity external input fuse (upstream) is blown</i>
Leerlaufleistung <i>No-load power</i>	Typ. 1,5W

Ausgang / Output

Ausgangsspannung (Einstellgenauigkeit) <i>Output voltage (initial setting)</i>	12,5V (± 1%); 24,3V (± 1%);
Stromgrenzeinstellungen <i>Current limitation</i>	ca. 1,2 x Inenn (I-const); 1,3 x Inenn (@DVC125-24-15)
Regelabweichung Uout <i>Regulation accuracy Uout</i>	
bei Laständerung stat. 10%- 90% / 0-100% <i>Load regulation stat. 10%-90% / 0-100%</i>	±0,5% (typ. 0,3% = 80mV) / ± 1%
bei Laständerung dyn. 20% - 80% <i>Load regulation dyn.20% - 80%</i>	±1,5%
Ausregelzeit (ΔU<1%) <i>Regulation time (ΔU<1%)</i>	< 0,5ms
bei Eingangsänderung (min.-max.) <i>Line regulation (min.-max.)</i>	±0,1%
Temperaturdrift <i>Temperature drift</i>	-25°C .. +70°C: < 1% (typ. < 0,5%); 0°C .. +60°C: typ. 0,2%
Parallel zur Leistungserhöhung schaltbar <i>Parallel connectable for power increase</i>	Keine Ausgleichsleitung erforderlich (auch seriell betreibbar) <i>No control lead necessary (can be connected in series)</i>
Restwelligkeit, Schaltspitzen <i>Ripple & noise (p-p), Switching spikes</i>	100mVss
Überspannungsschutz am Ausgang <i>Over voltage protection (output)</i>	Zweiter Regelkreis begrenzt auf U nominal +20% (typ.) <i>Safety redundant regulation circuit, limiting action to U nominal +20% (typ.)</i>

OPTION - Freigabe Steuereingang
Turn-ON (Inhibit)

Durch Einspeisen von 2mA Steuerstrom (+5V) in Turn-ON Eingang, Freigabe der (selbst blockierten) Ausgangsspannung. Bezugspotential Inhibit wahlweise primär oder sekundär, feste Einstellungen ab Werk

Galvanisch getrennter Schaltregler
Insulated switching regulator

DVC125 / DVC150

Bestell-Nr. Zusatz: /I-P (GND primärseitig an Minuspol)
 /I+P (GND primärseitig an Pluspol)
 /I-S (GND sekundärseitig an Minuspol)
 /I+S (GND sekundärseitig an Pluspol)
 /I (ohne GND-Bezugspotential – floatend)

OPTION - Control Input
 Turn-ON (Inhibit)

By feeding 2mA (+5V) into Turn-ON input, release of (self inhibiting) output voltage. Reference ground of control input can be selected for primary or secondary side. Fixed setting during production

Supplement to Cat. No. /I-P (GND to primary negative pole)
 /I+P (GND to primary positive pole)
 /I-S (GND to secondary negative pole)
 /I+S (GND to secondary positive pole)
 /I (Potential-free – floating)

Umgebung / Environment

Arbeitstemperatur <i>Ambient temperature operating</i>	-40°C~+75°C (max. Temperatur Basisplatte 100°C) <i>(max. temperature base plate 100°C)</i>
Lagertemperatur <i>Storage temperature</i>	-40°C~+85°C
Übertemperaturschutz <i>Over temperature protection</i>	Schutzabschaltung (auto-reset bei Abkühlung) <i>Protective shut down (auto reset after cool down)</i>
Feuchtigkeit <i>Humidity</i>	100% relative Feuchte (Betauung zulässig) <i>100% relative humidity (dewing permitted)</i>
Kühlung <i>Cooling</i>	Luftkonvektion/Kontaktkühlung auf Montagefläche <i>Natural convection/Cooling via contact to mounting surface</i>
Elektrische Sicherheit <i>Electrical safety</i>	EN61204-7
Schutzgrad (ohne Stecker) <i>Protective degree (not connector)</i>	IP67
Isulationsfestigkeit <i>Insulation strength</i>	1,5kV eff Eingang/Ausgang – Eingang/Gehäuse <i>Input / Output – Input / Case</i> 500V eff Ausgang / Gehäuse <i>Output / Case</i>
EMV	EN61204-3 [nach 6.4.2, Tabelle H.3, für Wohnbereich, Geschäfts- und Gewerbebereiche sowie Kleinbetriebe, Klasse B, Leitungslänge < 10 m. Interne Frequenzen < 108 MHz. nach 7.2.3. Störfestigkeitspegel für industrielle Umgebung. Leitungslänge < 10 m.]
EMC	EN61204-3 <i>[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.</i> <i>according to 7.2.3. Immunity level for industrial environment. Cable length < 10 m.]</i>
Wirkungsgrad <i>Efficiency</i>	ca. 90% (ca. 85% @IN 24VDC)

Galvanisch getrennter Schaltregler
Insulated switching regulator

DVC125 / DVC150

Anschlüsse

Connectors

**ca. 10cm Kabel mit 4poligem AMP Stecker MATE-N-LOK
andere Kabel/Steckerverbinder möglich**

*ca. 10cm cable with 4-pole AMP connector MATE-N-LOK
different cable/connector possible on customers request*

Wichtiger Sicherheitshinweis

Important safety note

**Wenn am Ausgang eine externe Energiequelle (z.B. Batterie)
angeschlossen wird, muss die Zuführungsleitung (+ Pol) in der Nähe
der Quelle abgesichert werden.**

Empfohlener Sicherungswert: 1,1 .. 1,2 x I_{nom}

*If an external energy source (e.g. battery) is connected to the output of the
converter, the supply line (+ pole) must be fused close by the source.*

Recommended fusing: 1,1 .. 1,2 x I_{nom}

Abmessungen (LxBxH)

Dimensions (LxWxH)

Gehäuse

Case

Gewicht

Weight

156 (140)x 85 x 40 mm

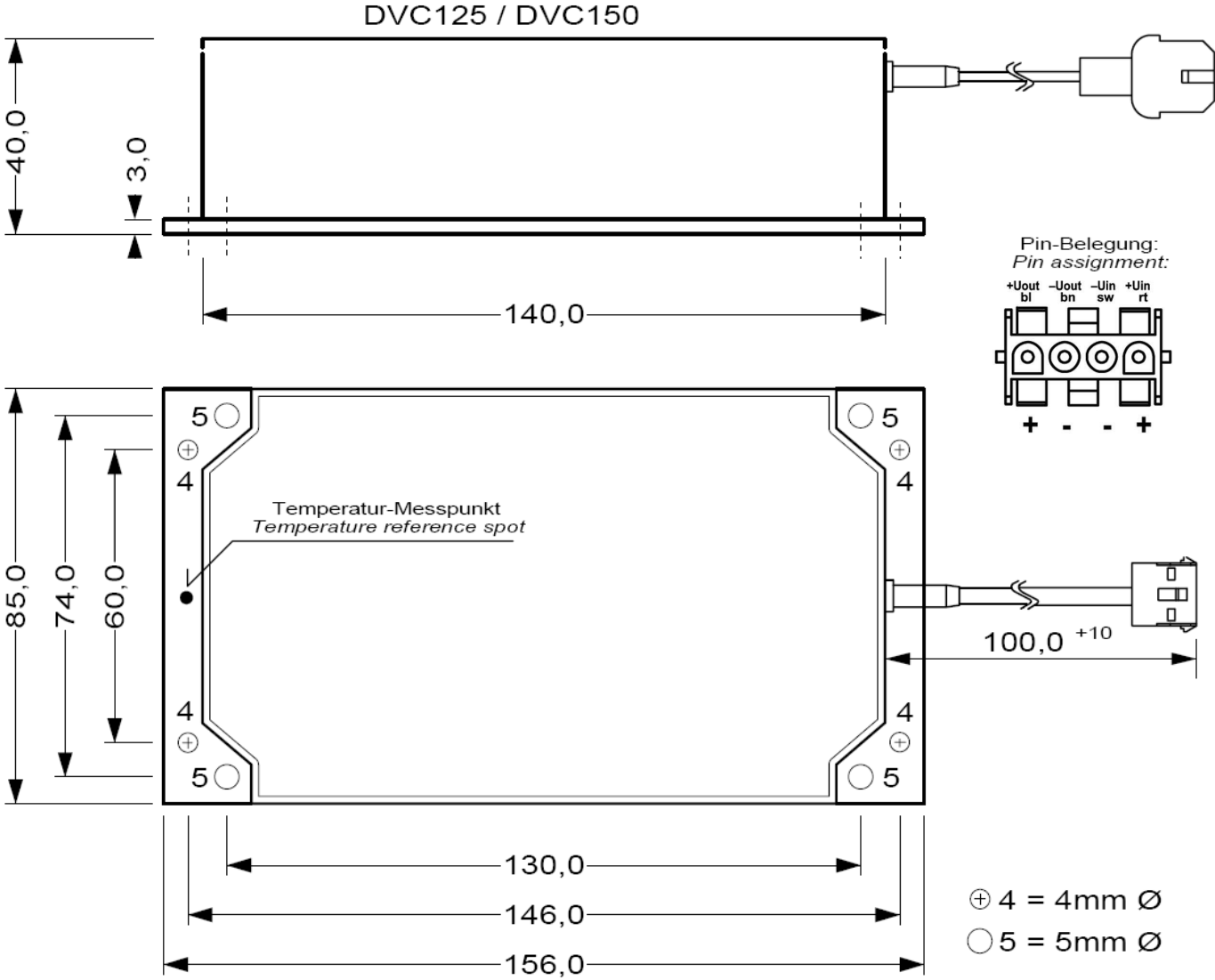
Aluminium

ca. 1000g

Galvanisch getrennter Schaltregler
Insulated switching regulator

DVC125 / DVC150

Abmessungen / Dimensions



Galvanisch getrennter Schaltregler
Insulated switching regulator

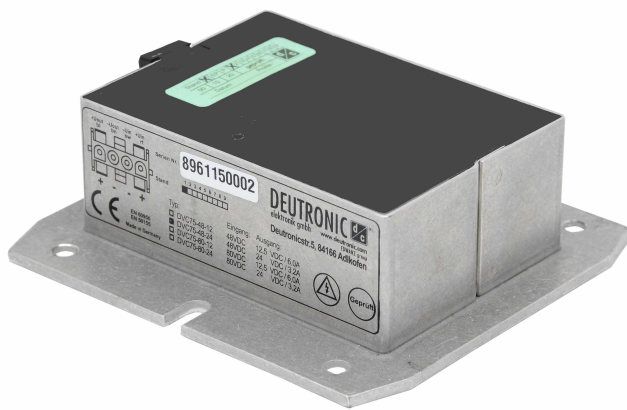
DVC125 / DVC150

DVC75

(nom. 40-77Watt)

Gleichspannungswandler für Fahrzeuge und allgemeine Anwendungen

DC/DC converter for vehicles and other applications



Optionen (auf Anfrage):

- Kundenspezifische Ausführungen (z.B. spez. Kabelbaum, alternative Eingangs-/Ausgangsspannungen etc.)
- Ausführung mit "E" Prüfzeichen (E1 Zulassung) für KFZ Straßeneinsatz

Options (on request):

- Customized devices (e.g. individual cable loom, alternative input and output voltages etc.)
- Version with "E" mark (E1 approval) for road vehicle use

Konzipiert für den Einsatz in rauer Umgebung
 Rüttelsicherer Aufbau / vergossenes Gerät
 Schutz gegen ungünstige Umwelteinflüsse
 DC/DC Weitbereichseingang
 Gefiltert gegen Bordnetzstörungen
 Potentialtrennung 1,5kV
 Elektrische Sicherheit: EN61204-7
 EMV: EN61204-3
 Geregelter Ausgang, hoher Wirkungsgrad
 Kurzschluss- und Leerlauffest
 Übertemperaturschutz
 Parallel schaltbar

*Designed for use in rough environment
 Rugged construction / potted device
 Protection against unfavourable environmental conditions
 DC/DC wide range input
 Filtered against vehicle on-board disturbances
 Galvanic separation 1,5kV
 Electrical safety: EN61204-7
 EMC: EN61204-3
 Regulated output, high efficiency
 Short-circuit / No-load protection
 Over Temperature protection
 Parallel connectable*

Type	Input Voltage	Output Voltage	Output Current *)	Cat. No.
DVC75-24-5	24VDC (17-40VDC)	5VDC	8A	105100
DVC75-24-12	24VDC (17-40VDC)	12,5VDC	4A	105101
DVC75-24-20	24VDC (17-40VDC)	20VDC	2,5A	105103
DVC75-24-24	24VDC (17-40VDC)	24,5VDC	2A	105102
DVC75-36-12	36VDC (25-70VDC)	12,5VDC	5A	105051
DVC75-36-24	36VDC (25-70VDC)	24,5VDC	2,8A	105053
DVC75-48-12	48VDC (33-90VDC)	12,5VDC	6A	105083
DVC75-48-15	48VDC (33-90VDC)	15VDC	5A	105049
DVC75-48-24	48VDC (33-90VDC)	24,5VDC	3,2A	105092
DVC75-80-12	80VDC (56-154VDC)	12,5VDC	6A	105085
DVC75-80-24	80VDC (56-154VDC)	24,5VDC	3,2A	105093
DVC75-80-24/RA	80VDC (56-154VDC)	24,5VDC	3,2A	105048
DVC75-80-24/RA	80VDC (56-154VDC)	24,5VDC	3,2A	105048/2

*) Siehe Stromgrenzeinstellungen (Seite 2) / See current limitation (page 2)

Galvanisch getrennter Schaltregler
Insulated switching regulator

DVC75

Eingang Input

Eingangsspannungsbereich <i>Input voltage range</i>	siehe Tabelle (gilt für Dauerbetrieb) <i>see table (valid for continuous operation)</i>
mit eingeschränkter Funktion <i>With reduced functionality</i>	40V(@IN 80VDC) / 24V(@IN 48VDC) / 22V(@IN 36VDC) / 16V(@IN 24VDC)
Kurzzeit Überspannung (20ms, einmalig) <i>Transient over voltage (20ms, one time)</i>	220V(@IN 80VDC) / 100V(@IN 48VDC) / 80V(@IN 36VDC) / 50V(@IN 24VDC)
Filterung <i>Filtering</i>	Gefiltert gegen Bordnetzstörungen. <i>Filtered against vehicle on board disturbances</i>
Eingangssicherung (ist extern in Reihe vorzuschalten) <i>Input fuse (to switch external in series)</i>	T10A/250V; T10A/32V (@IN 24VDC)
Verpolschutz <i>Reverse polarity protection</i>	Verpolschutzdiode integriert <i>Reverse polarity diode integrated</i>

Ausgang Output

Ausgangsspannung (Einstellgenauigkeit) <i>Output voltage (initial setting)</i>	± 1% (@OUT 12,5 / 15 / 24,5VDC) / ± 3% (@OUT 5VDC)
Stromgrenzeinstellungen <i>Current limitation</i>	@IN 48 / 80VDC: ~ 1,2 x Inom (I-const) @IN 24 / 36VDC: ~ 1,1 x Inom (I-const)
Regelabweichung Uout <i>Regulation accuracy Uout</i>	
bei Laständerung stat. 10%- 90% / 0-100% <i>Load regulation stat. 10%-90% / 0-100%</i>	±0,5% (typ. 0,3% = 80mV) / ± 1%
bei Laständerung dyn. 20% - 80% <i>Load regulation dyn.20% - 80%</i>	±1,5%
Ausregelzeit ($\Delta U < 1\%$) <i>Regulation time ($\Delta U < 1\%$)</i>	< 0,5ms
bei Eingangsänderung (min.-max.) <i>Line regulation (min.-max.)</i>	±0,1%
Temperaturdrift <i>Temperature drift</i>	0-60°C < 2%
Parallel zur Leistungserhöhung schaltbar <i>Parallel connectable for power increase</i>	Keine Ausgleichsleitung erforderlich (auch seriell betreibbar) <i>No control lead necessary (can be connected in series)</i>
Restwelligkeit, Schaltspitzen <i>Ripple & noise (p-p), Switching spikes</i>	100mVpp
Überspannungsschutz am Ausgang <i>Over voltage protection (output)</i>	Zweiter Regelkreis begrenzt auf U nominal +20% (typ.) <i>Safety redundant regulation circuit, limiting action to U nominal +20% (typ.)</i>

Galvanisch getrennter Schaltregler
Insulated switching regulator

DVC75

Umgebung *Environment*

Arbeits Temperatur <i>Ambient temperature operating</i>	-40°C~+75°C (max. Temperatur Basisplatte 100°C) <i>(max. temperature base plate 100°C)</i> (bei niedrigen Temperaturen verminderte Ausgangsspannung unter Last) <i>(at low temperature reduced output voltage under load)</i>
Lagertemperatur <i>Storage temperature</i>	-40°C~+85°C
Übertemperaturschutz <i>Over temperature protection</i>	Schutzabschaltung, selbst-reset bei Abkühlung <i>Protective shut down, self reset after cool down</i>
Feuchtigkeit <i>Humidity</i>	100% relative Feuchte, Betauung zulässig <i>100% relative humidity, dewing permitted</i>
Kühlung <i>Cooling</i>	Luftkonvektion/Kontaktkühlung auf Montagefläche <i>Natural convection/Cooling via contact to mounting surface</i>
Elektrische Sicherheit <i>Electrical safety</i>	EN61204-7
Schutzgrad (ohne Stecker) <i>Protective degree (not connector)</i>	IP67
Isolationsfestigkeit <i>Insulation strength</i>	1,5kV eff Eingang/Ausgang – Eingang/Gehäuse <i>1,5kV eff input/output – input/case</i> 500V eff Ausgang/Gehäuse <i>output/case</i>
EMV	EN61204-3 [nach 6.4.2, Tabelle H.3, für Wohnbereich, Geschäfts- und Gewerbebereiche sowie Kleinbetriebe, Klasse B, Leitungslänge < 10 m. Interne Frequenzen < 108 MHz. nach 7.2.3. Störfestigkeitspegel für industrielle Umgebung. Leitungslänge < 10 m.]
EMC	EN61204-3 <i>[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.</i> <i>according to 7.2.3. Immunity level for industrial environment. Cable length < 10 m.]</i>
Wirkungsgrad <i>Efficiency</i>	typ. 84 – 90% (82% @U_{out} 5VDC)
Anschlüsse	ca. 10cm Kabel mit 4poligem AMP Stecker MATE-N-LOK andere Kabel/Steckerverbinder möglich. Zuordnung Litzenfarben: IN: [+]rot / [-]schwarz OUT: [+]blau / [-]braun *Art-Nr. 105048 (DVC75-80-24/RA): Kabeltyp halogenfrei, Ausgangskabellänge 1m (Kabelenden verzinnt) Zuordnung Litzenfarben: IN: [+]rot / [-]schwarz OUT: [+]weiß / [-]braun Art-Nr. 105048/2: wie 105048 nur Ausgangskabellänge ist 225mm

Galvanisch getrennter Schaltregler
Insulated switching regulator

DVC75

Connectors

about 10cm cable with 4 pol AMP connector MATE-N-LOK
different cable/connector possible on customers request

Assignment flying leads:

IN: [+] red / [-] black

OUT: [+] blue / [-] brown

*Cat-No: 105048 (DVC75-80-24 RA): Type of cable halogen-free,
Output cable length 1m (cable ends tinned)

Assignment flying leads:

IN: [+] red / [-] black

OUT: [+] white / [-] brown

Cat.-No. 105048/2: like 105048 only output cable length is 225mm

Wichtiger Sicherheitshinweis

Wenn am Ausgang eine externe Energiequelle (z.B. Batterie) angeschlossen wird, muss die Zuführungsleitung (+ Pol) in der Nähe der Quelle abgesichert werden.

Empfohlener Sicherungswert: 1,1 .. 1,2 x I_{nom}

Important safety note

If an external energy source (e.g. battery) is connected to the output of the converter, the supply line (+ pole) must be fused close by the source.

Recommended fusing: 1,1 .. 1,2 x I_{nom}

Abmessungen (LxBxH)

Dimensions (LxWxH)

Gehäuse

Case

Gewicht

Weight

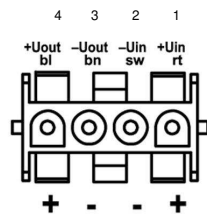
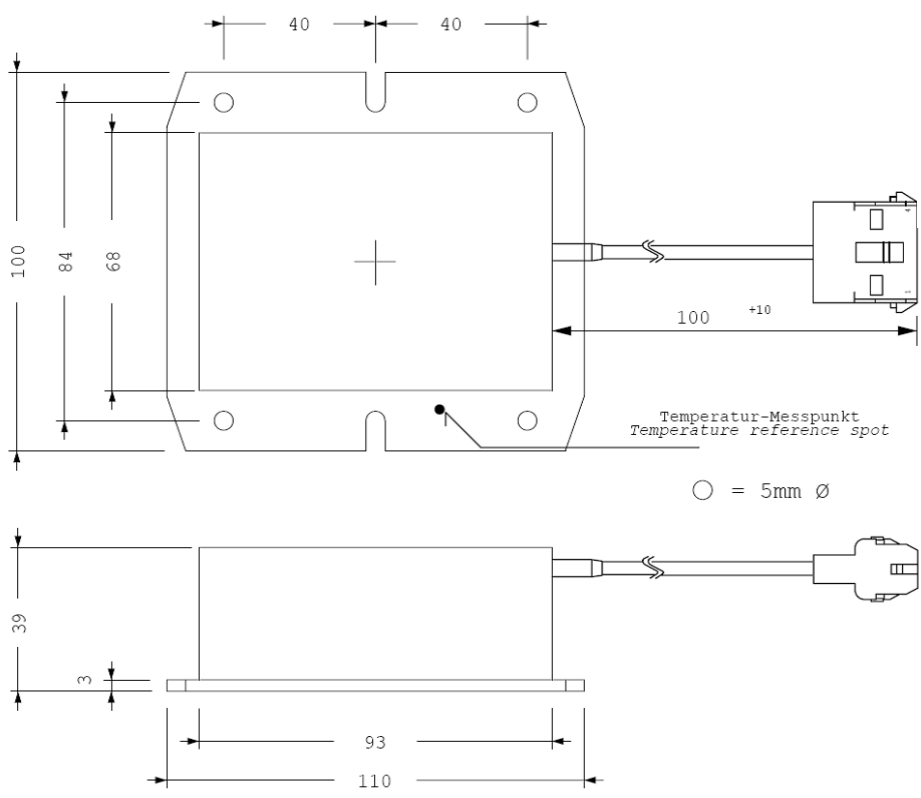
110 (93)x 100 (68) x 39 mm

Aluminium

ca. 600g

Galvanisch getrennter Schaltregler
Insulated switching regulator

DVC75



STANDARD - VERSION

Pin Belegung: Pin assignment:	Farbe: color:
1 + Uin	rot (red)
2 Masse / GND in	schwarz (black)
3 Masse / GND out	braun (brown)
4 + Uout	blau (blue)

RA - VERSION

Pin Belegung: Pin assignment:	Farbe: color:
1 + Uin	rot (red)
2 Masse / GND in	schwarz (black)
3 Masse / GND out	braun (brown)
4 + Uout	weiß (white)

Galvanisch getrennter Schaltregler
Insulated switching regulator

DVC75

DVC1903



- extremely compact design
- very powerful
- Option: Can / RS232
- Option: other input/output voltage ranges
- 160A boost ($t \leq 4s$)

• Typelist:

Type	Input voltage	Output voltage	Output current	Cat. no.
DVC1903-48/80-24	34-104V	24V (0-25V)	80A (160A boost $t \leq 4s$)	

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