

DC-DC Converter AVP-3/KEP-S and ...-3/KEP-SB

Output power up to 87 Watts

Isolated – Triple Output
Standard euro-rack size 19"



Special Features

- Electrostatic discharge: 8kV contact (chassis), 15 kV air, (level 4) according to EN 61000-4-2:2009
- Fast transients (Burst): 2 kV (level 3) / (criterion A) / according to EN 61000-4-4:2004
- Surge: Input and output immunity (criterion A) according to EN 61000-4-5:2006: 2 kV sym./asym.
- Conducted immunity 10V/m according to EN 61000-4-6:2007
- Conducted emission: Input filtering according to EN 55022:2006 class B****
- Zero load operation and short circuit protection
- Overtemperature shutdown
- Remote off (EN) with TTL – L-signal
- Overvoltage protection in the main output, even in case of external supply (OVP)
- Monitoring of the output voltage (fully isolated)
- Reverse polarity protection by internal fuse (diode at $V_{in} = 110V$)
- Fully integrated heatsink on back of converter chassis provides extremely low thermal stress to temperature sensitive components
- Yellow LED indicate operating mode

Technology

- Power section in MOS-FET-technology
- Regulator section in SMT
- Coated assembly
- Coated and glued parts for better vibration resistance

Specifications

at $v_{amb}=25^{\circ}C$, $V_{in nom}$, $I_{out nom}$

Temperature

Ambient air	v_{amb}	= $-40^{\circ}C...+85^{\circ}C$
Storage	v_s	= $-40^{\circ}C...+100^{\circ}C$
Rise inside chassis	Δv_{ci}	$\leq 20K$
Rise on heat sink	Δv_k	$\leq 35K$

Output voltages

Tolerance	$\Delta V_{out1}/\Delta + V_{out2}/\Delta - V_{out2}$	$\leq \pm 1/\pm 0,5/\pm 3\%$
Ripple at $v_{amb} = -40^{\circ}C...+85^{\circ}C$	$V_{out ripple}$	$\leq 3,5\%$
Temperature coefficient	TC	$\leq 0,016\%/K$

Regulation at $v_{amb} = -40^{\circ}C...+85^{\circ}C$

Line reg. for $V_{in range}$	ΔV_{out}	$\leq 2mV$
Load reg. static	$\Delta V_{out1} (+out2/-out2)$	$\leq 10 (20/1220^{**})mV/A$
Load change ($25^{\circ}C$)*	$\Delta V_{out1} (+out2/-out2)$	$\leq 38 (62/132^{**})mV/A$

Output "Power Good"

Admissible voltage	V_{CEO}	$\leq 24 V$
Admissible current	I_C	$\leq 20 mA$
Saturation voltage	$V_{CE(sat)}$	$\leq 1,2 V$

OVP

Starting point /%	$V_{out off}$	$\leq 130\% V_{out nom}$
Admissible continuous external current	I_{ext}	$\leq 6 (3)A$

Isolation voltage-strength

In-/Output	$V_{iso i/o}$	$\geq 1,5 kVrms$
Input to case	$V_{iso i/c}$	$\geq 1,5 kVrms$
Output to case	$V_{iso o/c}$	$\geq 0,5 kVrms$
Resistance In-/Output	R_{iso}	$\geq 1,5 GOhm$
Capacitance In-/Output	C_{iso}	$\leq 8500 (6500) pF$

Degrees of protection (inserted in rack)

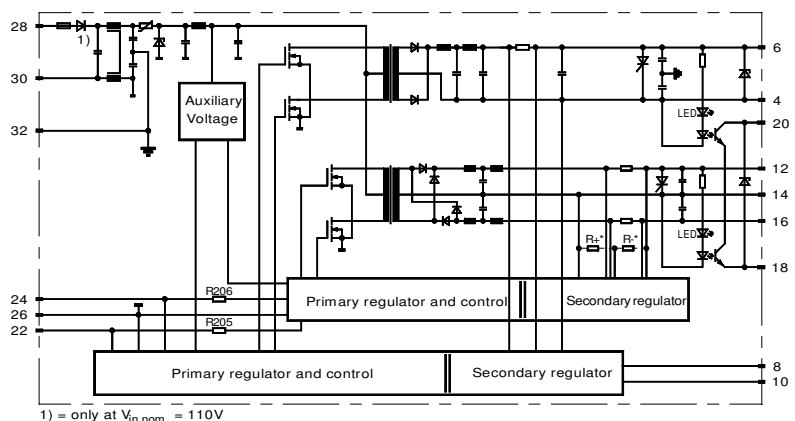
		= IP20***
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Weight AVP-3/KEP-S / AVP-3/KEP-SB M ca. 810g

Block Diagram

- 4 = $-V_{out1}$
- 6 = $+V_{out1}$
- 8 = +S (Sense) V_{out1}
- 10 = -S (Sense) V_{out1}
- 12 = $+V_{out2}$
- 14 = GND V_{out2}
- 16 = $-V_{out2}$
- 18 = -PG (-Power Good)
- 20 = +PG (+Power Good)
- 22 = TR (Tracking)
- 24 = EN (ON/OFF)
- 26 = GND (TR and EN)
- 28 = $+V_{in}$
- 30 = $-V_{in}$
- 32 = ∇ / ϕ

Sense connection is not required.



* $I_{out min} = 0,1 I_{out nom}$

** The respective other output burdens with $I_{out nom}$

*** Higher degrees of protection by properly mounting

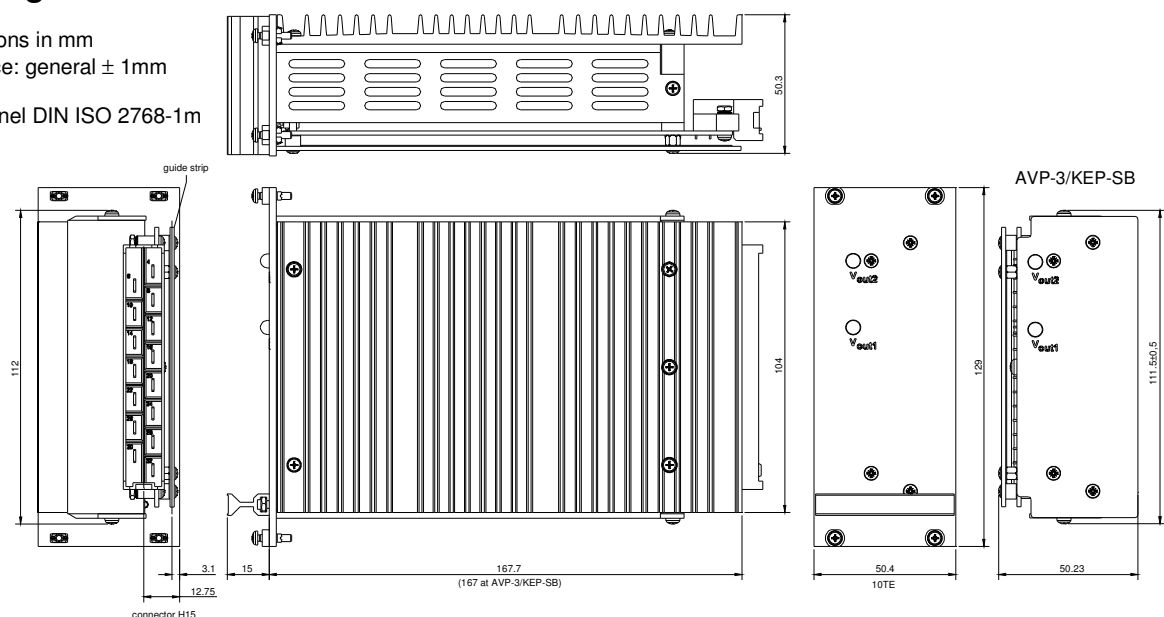
**** In built-in condition our devices may show different EMC properties

Drawing

Dimensions in mm

Tolerance: general ± 1 mm

Front panel DIN ISO 2768-1m



Operating Instructions

Installation: The converters have to be installed according to the guidelines currently in force, like other open electronic component assemblies. Attention must be paid to sufficient ventilation, fastening and protection against accidental contact! Plug in not under voltage if converter connected parallel or in series.

Reverse polarity protection: The converters are equipped with a soldered-in time-lag fuse corresponding to IEC 127-2 for input protection. For rating of fuse refer to listing below. Pay attention on sufficient current of current source in case of short-circuit!

Connector pin 32 ($\nabla/\oplus$) - Equipotentiality/PE: This pin has to be properly connected in order to assure operation.

Excess temperature protection: In case of inside temperatures exceeding $>101^\circ\text{C}$, typ. 105°C , (due to inadmissible operation conditions) the output voltages are automatically switched off and restarted after cooling down about 10 K, after removing the 0-Ohm-Resistor at R205 only V_{out1} .

External shutdown (EN): $V < 0,8 \text{ V}$ at pin 24 (EN) to pin 26 or connecting an active transistor with open collector to this pins switches off the output. $I_{\text{source}} 500 \mu\text{A}$

Overvoltage protection: Internally caused overvoltage at the outputs leads to a thyristor controlled short-circuit of the concerned positive output and all outputs shut down, also at external caused overvoltages at the positive outputs. After elimination of the overvoltage the output voltages restart automatically. After removing the 0-Ohm-resistor at R205 the output voltages V_{out1} and V_{out2} shut down separately.

Output voltage monitoring (Power Good): Simultan to the lighting of a LED a transistor with open-collector switches on. Level V_{PG} see table below.

Current limiting: $I_{\text{out lim}} = 1,1 \dots 1,2 I_{\text{out nom}}$. At more than 50 % overload, the output switches off and restarts automatically latest after 1s of elimination of the overload.

Tracking operation: If the pins 22 as well as 26 of two or more converters are connected, the output voltages in case of short-circuit or overload go synchronously down and restart at the same moment, after removing the 0-Ohm-resistor at R205 only V_{out1} .

Power Good Output: Simultaneous with the lighting of two LEDs two transistors with open-collector without potential switches on (summary signal). Failure is indicated if one or both LEDs switches off. Level see table below.

Sense operation: Sense connection is not required. If it is accomplished, the voltage at the load is reduced by approx. 100 mV. The voltage drop on the interconnection leads between the converter and the load should not exceed 0,5 V.

Standard converters AVP-3/KEP-S and AVP-3/KEP-SB

V_{out1}	$I_{out1}^{2)}$	$\pm V_{out2}$	$\pm I_{out2}^{2)}$	$\eta^{3)}$	$V_{PG}^{4)}$	$V_{in\ nom}$	$V_{in\ op}$	$V_{in\ max}$	$I_{in\ max}$	Internal Fuse	Order Number	
V	A	V	A	%	VDC	VDC	VDC	A	A	A	AVP-3/KEP-S	AVP-3/KEP-SB
5 ¹⁾	10	12	1,5	84	>3,5/>9,5	24	17...31	15...36	7,2	16	09 53 92 0102 7	09 53 92 0161 3
		15	1,2	84	>3,5/>13						09 53 93 0102 6	09 53 93 0161 2
		12	1,5	83	>3,5/>9,5	48	33...62	32...74	3,6	6,3	09 53 52 0102 6	09 53 52 0161 2
		15	1,2	83	>3,5/>13						09 53 53 0102 5	09 53 53 0161 1
		12	1,5	83	>3,5/>9,5	110	77...138	66...154	1,6	2,5	09 53 72 0102 2	09 53 72 0161 7
		15	1,2	83	>3,5/>13						09 53 73 0102 1	09 53 73 0161 5

Reference numbers for option "EMC fingerstrips" and other options on request

1) Adjustet to 5,1V

2) At -25°C...+70°C. Derating: between 70 °C and 85 °C: 4%/°C

3) At $V_{in\ nom}$ and $I_{out1\ nom}$, $I_{out2\ nom}$: typical

4) V_{PG} = Switching point for the output level for "Power Good"

Autronic Steuer- und Regeltechnik GmbH
Siemensstr. 17
D-74343 Sachsenheim
Tel. +49 (0) 7147/24-240
Fax +49 (0) 7147/24-252
<http://www.autronic.de>
E-Mail: vertrieb@autronic.de

DIN EN ISO 9001 certified