Autronic
Steuer- und Regeltechnik / Sachsenheim

# DC-DC Converter AVP-3/KEP
# 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. criterion A
- 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 of 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

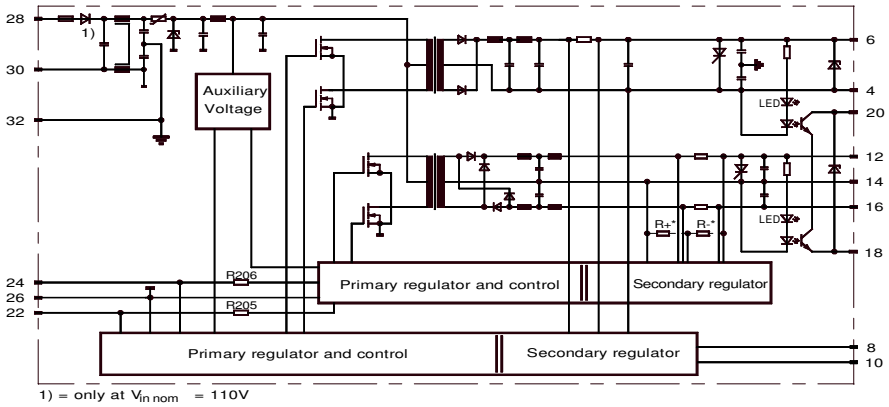
## Specifications

at $\vartheta_{amb}$=25°C, $V_{in\ nom}$, $I_{out\ nom}$

| | | |
|---|---|---|
| **Temperature** | | |
| Ambient air | $\vartheta_{amb}$ | = -40°C...+85°C |
| Storage | $\vartheta_S$ | = -40°C...+100°C |
| Rise inside chassis | $\Delta\vartheta_{Ci}$ | ≤ 20K |
| Rise on heat sink | $\Delta\vartheta_K$ | ≤ 35K |
| **Output voltages (output 1)** | | |
| Tolerance | $\Delta V_{out}$ | ≤ ±0,5%* |
| Ripple at $\vartheta_{amb}$ = -40°C...+85°C | $V_{out\ ripple}$ | ≤ 3,5% |
| Temperature coefficient | $TC$ | ≤ 0,016%/K |
| **Regulation at $\vartheta_{amb}$ = -40°C...+85°C** | | |
| Line reg. for $V_{in\ range}$ | $\Delta V_{out}$ | ≤ 2mV |
| Load reg. static | $\Delta V_{out}$ | ≤ 10mV/A |
| Load change (25°C)** | $\Delta V_{out}$ | ≤ 38 (23)mV/A |
| **Output “Power Good”** | | |
| Admissible voltage | $V_{CEO}$ | ≤ 24 V |
| Admissible current | $I_C$ | ≤ 20 mA |
| Saturation voltage | $V_{CE(sat)}$ | ≤ 1,2 V |
| **OVP** | | |
| Starting point /% | $V_{out\ off}$ | ≤ 130% $V_{out\ nom}$ |
| Admissible continuous external current | $/_{ext}$ | ≤ 6 (3)A |
| **Isolation – voltage strength** | | |
| In-/Output | $V_{iso\ i/o}$ | ≥ 1,5 kVrms |
| Input to case | $V_{iso\ i/c}$ | ≥ 1,5 kVrms |
| Output to case | $V_{iso\ i/c}$ | ≥ 0,5 kVrms |
| Resistance In-/Output | $R_{iso}$ | ≥ 1,5 GOhm |
| Capacitance In-/Output | $C_{iso}$ | ≤ 8500 (6500) pF |
| Degrees of protection (inserted in rack) | | = IP20*** |
| Weight AVP-3/KEP | $M$ | 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 = ⏚ / ⏚
Sense connection is not required.

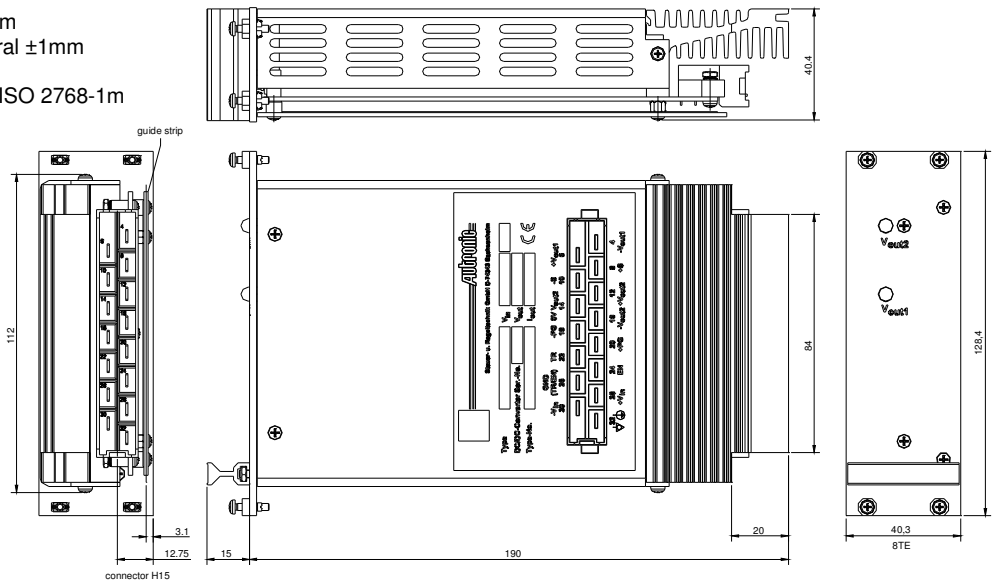



* $I_{out\ min}$ = 0,1 $I_{out\ nom}$
** Higher degrees of protection by properly mounting
*** In built-in condition our devices may show different EMC properties

## Drawing

Dimensions in mm
Tolerance: general ±1mm

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 (⏚/⏚ ) - Equipotentiality/PE:** This pin has to be properly connected in order to assure operation.
**Excess temperature protection:** In case of inside temperatures exceeding >101°C, typ. 105°C, (due to inadmissible operation contitions) the output voltages are automatically switched off and restarted after cooling down about 10K.
**External shutdown (EN):** V< 0,8 V at pin 24 (EN) to pin 26 or connecting an active transistor with open collector to this pins switches off the outputs, after removing the 0-Ohm-Resistor at R205 only $V_{out1}$. $I_{source}$ 500 µA
**Overvoltage protection:** Internally caused overvoltages at the outputs lead 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 overvoltages the outputs restart automatically. After removing the 0-Ohm-Resistor at R205 the output voltages $V_{out1}$ and $V_{out2}$ shut down separatly.**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:** $I_{out\,lim}$ = 1,1...1,2 $I_{out\,nom}$. At more than 1,5 $I_{out\,nom}$, the ouput switches off and restarts automatically latest after 5s 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 the 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

| $V_{out1}$ | $I_{out1}$ [2] | $\pm V_{out2}$ | $\pm I_{out2}$ [2] | $\mu$ [3] | Type | VPG [4] | $V_{in\ nom}$ | $V_{in\ op}$ | $V_{in\ max}$ | $I_{in\ max}$ | Internal Fuse | Oder Number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V | A | V | VDC | % | | VDC | VDC | VDC | VDC | VDC | A | |
| 5 [1] | 10 | 12 | 1,5 | 84 | AVP-3/KEP | >3,5/>9,5 | 24 | 17…31 | 15…36 | 7,2 | 16 | 09 51 92 0102 6 |
| | | 15 | 1,2 | 84 | | >3,5/>13 | | | | | | 09 51 93 0102 5 |
| | | 12 | 1,5 | 83 | | >3,5/>9,5 | 48 | 33…62 | 32…74 | 3,6 | 6,3 | 09 51 52 0102 5 |
| | | 15 | 1,2 | 83 | | >3,5/>13 | | | | | | 09 51 53 0102 4 |
| | | 12 | 1,5 | 83 | | >3,5/>9,5 | 110 | 77…138 | 66…154 | 1,6 | 2,5 | 09 51 72 0102 1 |
| | | 15 | 1,2 | 83 | | >3,5/>13 | | | | | | 09 51 73 0102 9 |

Reference numbers for option “EMC fingerstrips” and other options on request

1) Adjustet to 5,1V
2) At -25℃…+70℃
Derating: between 70℃ and 85℃: 4%/℃
3) At $V_{in\ nom}$ and $I_{out1\ nom}$, $_{out2\ nom}$, typical
4) $V_{Pg}$ = Switching point for the output level “Power Good”

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DIN EN ISO 9001 certified