

DC-DC CONVERTER ACR120/Ks

RAILWAY CONVERTER.

FOR CHASSIS MOUNTING



HIGHLIGHTS

- + Output Power up to 150 Watts**
- + Efficiency up to 93%
- + Wide Input Range
- + Wide Temperature Range
- + Hold-up-time > 10ms
- + RoHS compliance
- + According to EN50155

INPUT

Input Voltage Nominal	110 VDC
Input Voltage Operating	77,0-137,5 VDC
Input Voltage Range	66,0-154 VDC (t ≤ 1,0 sec.)
No Load Input Current	See table page 2

OUTPUT

Output Voltage	24 V (other voltages on request)
Initial Set Accuracy	< 2 % (no load) *
Minimum Load	No minimum load
Short circuit	Continuous short circuit proof
Line Regulation	< 0,5 %
Load Regulation	< 2 % (0% - 100% load)
Ripple & Noise	< 2 % pk-pk, 20 MHz bandwidth *
Start Time	< 900 ms
Max. Output Capacitance	500 uF x I _{out nom}
Temperature Coefficient	< 0.01 %/°C

FEATURES

Enable Signal	See page 5
Active Inrush Current Limitation	Max. 6 A (at t > 100µs)
Reverse Polarity Protection	Max. 160 V
Hold-up-time	> 10 ms at P _{out} ≤ 120 W
Adjust	See page 5
Tracking	See page 5

PROTECTION

Over Voltage Protection (OVP)	110-130 % V _{out nom}
Over Current Protection (OCP)	See table page 2
Over Temperature Protection (OTP)	Shutdown at +105-110°C PCB-temp. with about 5°C hysteresis and auto recovery.

GENERAL

Product Standard	EN 50155:2007
Isolation	2200 VDC Input to Output 2200 VDC Input to Earth (PE) 710 VDC Output to Earth (PE)
Switching Frequency	Typ. 120 kHz
Dimensions [mm]	113,5 x 35 x 46
Weight	approx. 320 g
MTBF	TBD

ENVIRONMENTAL

Operating Ambient Temp.	-40°C to +85°C**
Storage Temperature	-55°C to +100°C
Vibration / Shock / Bump	EN 61373:2010, Cat. 1B

EMC

EMC Standard	EN 50121-3-2:2015
Conducted Emissions	EN 55011:2009+A1:2010, Class A***
Radiated Emissions	EN 55011:2009+A1:2010, Class A***
ESD Immunity	EN 61000-4-2:2009, level 3 (6kV/8kV), Criteria A
Burst	EN 61000-4-4:2012, level 3 (2kV), Criteria A
Surge	EN 50121-3-2:2015, line to line ±1kV, 42R, and line to case ±2kV, 42R, Criteria A EN 61000-4-5:2014, line to line ±0,5kV, and line to case ±1kV, Criteria A
Conducted Immunity	EN 61000-4-6:2014, level 3 (10V), Criteria A
Radiated Immunity	EN 61000-4-3:2006+A1:2008+A2:2010, 20V/m, Criteria A

* For T_{amb} = 25°C, V_{in nom}, I_{out nom}

** +70°C continuously, +85°C max. 10 minutes at full load (baseplate temp. must not exceed +90°C).

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

TECHNICAL DATA

For $T_{amb} = 25^{\circ}\text{C}$, $V_{in\ nom}$, $I_{out\ nom}$ unless otherwise specified

SPECIFICATION Input 66 - 154 VDC

TYPE		ACR120/Ks / ACR120/Ks (with pin cover)	
ORDER NUMBER		77 31 24 0522 9 / 77 31 24 0529 1	
CHARACTERISTIC		Unit	
INPUT	Input Voltage Nominal	V	110
	Input Voltage Range	V	66...154
	Under Voltage Turn-on	V	<67,0...76,0
	Under Voltage Turn-off	V	<58,0...66,0 (66,0V < V_{in} < 77,0V at $t > 1$ sec.)
	Input Current @ Full Load	A	1,45
	Input Current @ No Load	A	0,04
	Recommended External Fuse	A	3,15
OUTPUT	Output Voltage Nominal	V	24
	Output Current Nominal	A	6,25
	Output Power	W	150
	Efficiency @ Full Load (typical)	%	93
	Output Current limit	A	7,2...9,0
	Short Circuit Current (typical)		16 (pulse approx. 1Hz)*
	Transient Response 25 % / 75 % Load Step Recovery Time < 1 ms	mV	± 480

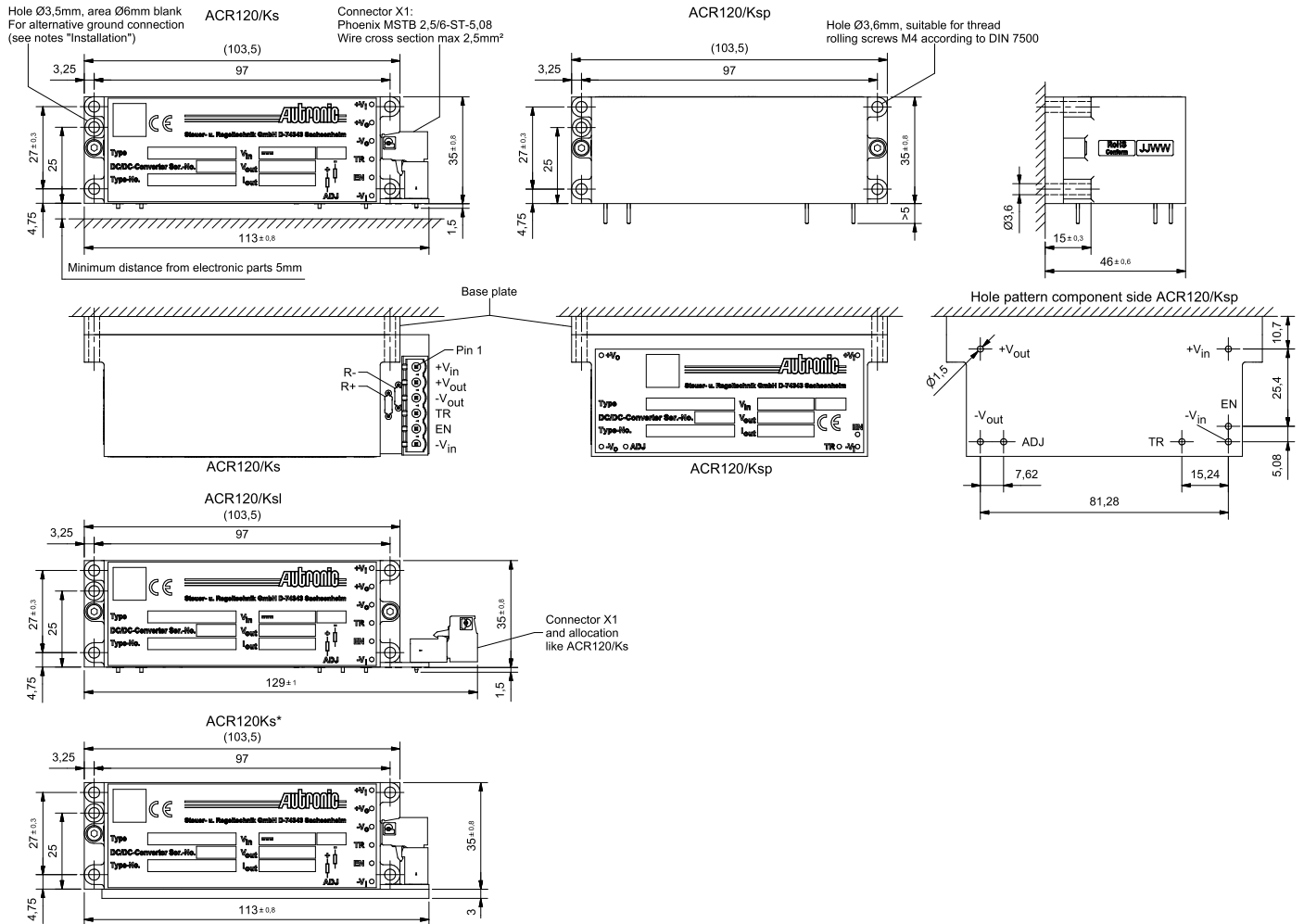
* Pulsating current time duration 50 ms

TECHNICAL DATA

For $T_{amb} = 25^{\circ}\text{C}$, $V_{in\ nom}$, $I_{out\ nom}$ unless otherwise specified

MECHANICAL DETAILS

- Dimensions are in mm
- Unless otherwise specified, general tolerances $\pm 0,5$ are for values in brackets (XX)
Values not in brackets are according to ISO-2768-1 m



Resin compound: Polyurethane black, UL94-V0, EN45545-2:2016-02 HL-HL2-HL3 (R24)

*For models with pin cover

TECHNICAL DATA

For $T_{amb} = 25^{\circ}\text{C}$, $V_{in\ nom}$, $I_{out\ nom}$ unless otherwise specified

PINNING

Pin	Function
X1-1	+V _{in}
X1-2	+V _{out}
X1-3	-V _{out}
X1-4	TR
X1-5	EN
X1-6	-V _{in}
not connected on X1	ADJ

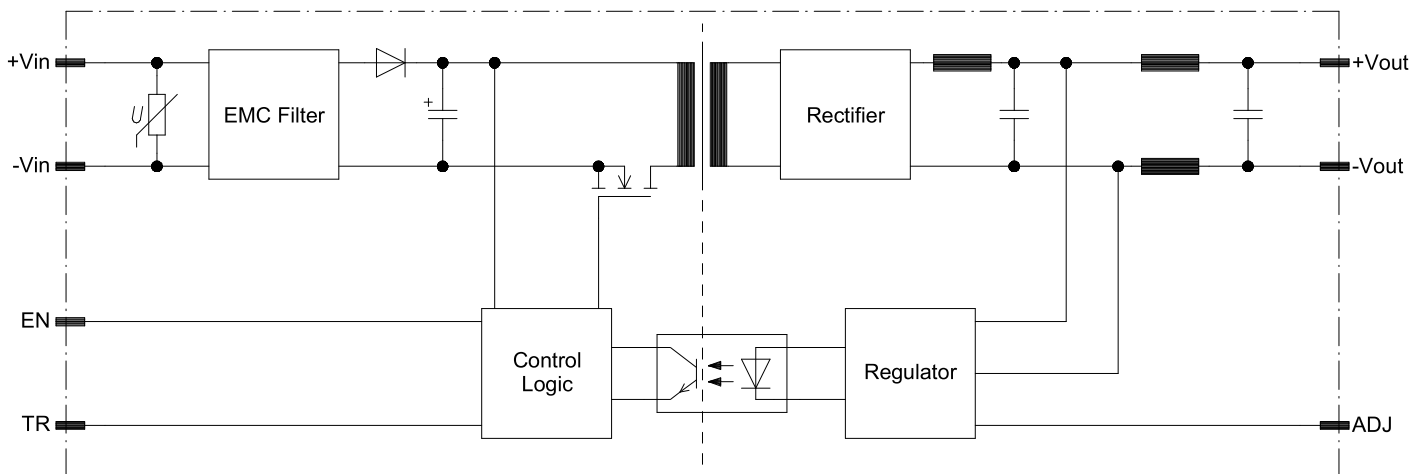
NOTES

Installation instructions:

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, carry off heat, fastening and protection against accidental contact. Plug in not under voltage. The mounting surface must be flat and able to remove the thermal energy of the baseplate (baseplate temperature must not exceed +90°C). The base plate has to be grounded by using thread rolling screws M 4 according to DIN 7500. An alternative connection to ground can be realized by a special mounting hole, which is free of anodizing surface.

Fault protection: For input protection a time-lag fuse corresponding to IEC 60127-2 must be installed. For recommended rating of the fuse refer to specification table above. Pay attention on sufficient current source in case of short circuit. In some applications 2 fuses would be necessary, one in each input line.

BLOCK DIAGRAM



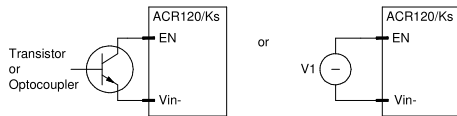
DESCRIPTION OF FEATURES

For $T_{amb} = 25^{\circ}\text{C}$, $V_{in\ nom}$, $I_{out\ nom}$ unless otherwise specified

ENABLE SIGNAL

The module may be disabled by pulling EN below 1,0 V with respect to the –Input.

This may be done with an open collector transistor, relay, optocoupler, or an external control voltage (V1).



Open-collector:

Leakage current $\leq 100\ \mu\text{A}$

Min. $V_{CE0} \geq 20\ \text{V}$

V1:

3...5 V (Enable active)

0...0,8 V (Enable inactive)

When not in use, leave Enable pin not-connected.

ADJUST

Inserting a wire to "R+" increases the output voltage of about 8%. Intermediate values are obtained by means of a resistor. Adding a resistor for "R-" ensures that the output may be lowered by max. 8%.

When not in use, leave Adjust pin not-connected.

TRACKING

If the TR pins of two or more converters are connected, the output voltages in case of short-circuit or overload go synchronously down.

The module may be disabled by pulling EN below 0,8 V with respect to the –Input.

This may be done with an open collector transistor, relay, optocoupler, or an external control voltage (V1).

For parallel connection a minimum load is required. External adjustment of the output voltages could be necessary.

When not in use, leave Tracking pin not-connected.