DPA154
1 AS-Interface-Output
DIN Rail DC/DC Converter, 92 Watt

- **High efficiency: 88%**
- **DCin Wide Range: 18...32V DC**
- **WxHxD = 49x134x120mm**
- **Meets EMV standards:**
  EN 61000-6-3, EN 61000-6-2, EN 61000-4-x

CE

Data sheet — DC/DC Converter DPA154

The DPA154 is a very compact DC/DC Converter designed for fieldbus applications in which power and data share the same twisted-pair.

The unit supplies power, decouples data from the DC/DC Converter, and makes the two cables symmetrical with respect to the shield terminal. The decoupling allows the use of unshielded cables.

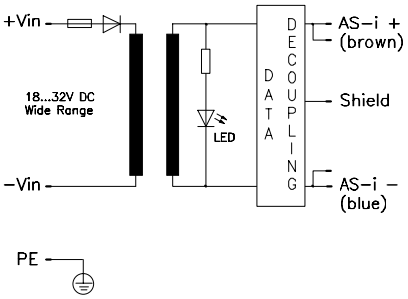
The PELV output circuit has electronic protection against overload and short-circuit.

Vout	Iout	Pout	Features	Order-No.
30.55V	**3A**	92W	OVP	**DPA154.141**

Warranty: 2 years from date of delivery.

See the web for current data sheet version:
www.puls.power.de

Schematic



Output

Voltage Vout		30.55V	Fixed.
Accuracy	max.	± 1.05V	includes: production-adjustment, line regulation, and load regulation.
Minimum load		None	Not necessary.
Output power Pout	max.	92W	Mounting side by side possible.
Noise, Ripple	max.	50mVpp	0...20MHz, constant current or R-load.
Modulation voltage	max.	5.6Vrms	Analogous 16Vpp sine.
Over-voltage protection	typ.	35V	Threshold accuracy ± 4%.
Derating		3W/K	
· Vin=18VDC		2,7W/K	+55° to +70°C Ta.
· Vin=24...32VDC		2W/K	+60° to +70°CTa.
Operating indicator		1 green LED	On the front.
Output circuit		PELV	EN 50178
Safety		SELV	EN 60950-1

The output is protected against open-circuit, short-circuit, and overload.

Mechanical:	Al/Mg alloy housing, snap-on mounting for DIN rail TS35/7.5 (EN 55022), WxHxD = 490 x 134 x 120mm, the depth includes the DIN-rail mounting,
Weight:	App. 550g
Screw terminals:	Input 1 terminal, max. 2.5/4mm^2 Output 2 terminals, max. 2.5/4mm^2,

Input

Line input DC		24V DC	
· Range		18...32V DC	Full spec.
		16...40V DC	Short time, no start below 18V.
DC-Input current	max.	6A	@ 24V DC.

Output (continued)

Voltage regulation:					
· Line regulation		max.	%	± 0.2	@ 18...40V DC, Iout = 3A
· Load regulation stat.	ΔU_{stat}	max.	%	± 0.5	Iout = 50%
· Temperature coefficient		typ.	%/K	± 0.02	
Ripple		max.	mVpp	50	0...20MHz, DCnom, Iout = 100%, R or I-load.
Current limitation					
· Threshold		min/max.		1.05...1.2 x Iout	
· Characteristic				See graph on page 3	
· Short-circuit		max.		1.67 Iout	
Start delay	t_{Delay}			acc. to AS-i specification	
Vout rise-up time	t_{Rise}			acc.to AS-i specification	
On and off characteristic					

Input (continued)

DC input range		V DC	18...32	Hysteresis: Uon=18V, Uoff=16V
· short term		V DC	16...40	
In-rush current	max.	A	8	@ Vin = 32V
Hold-up time	min.	ms	5.2	@ Vin = 24 V
Internal fuse			5x20mm T10A/250V (IEC127/2-5)	To replace, see page 4.

Data Decoupling / Earth Symmetrization

According to AS-Interface-specifications

Output inductance	100µH ± 10%	Meassured between AS-i + und AS-i – .
Terminating impedance	2 x 39Ω ± 1%	As above.
Symmetry tolerance	± 1%	AS-i + / AS-i – to shield.
Electric strength	500V	As above.

Logic Functions

LED for output voltage	LED	If Vout < 29,5V or Iout > threshold of the current limitation the LED is off.

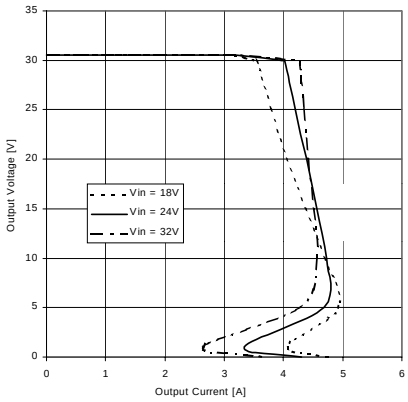
Electromagnetic Compatibility

Emissions according to EN 61000-6-3		EN 61000-6-4 is also satisfied.
· Radio interference, EN 55011, EN 55022	Class B	
Immunity according to EN 61000-6-2	No degradation of performance	EN 61000-6-1 is also satisfied.
· Electrostatic discharge ESD EN 61000-4-2	8kV direct discharge (level 4) 15kV air discharge (level 4)	
· Radiated fields, EN 61000-4-3	10V/m (level 3)	80MHz...1000MHz, DCin and Vout lines: l = 1m.
· Fast transients, EN 61000-4-4	4kV (level 4)	Coupled to DCin line.
	2kV (level 3)	Coupled to DCout line.
· Surge transients EN 61000-4-5	2kV (isolation class 3)	Common mode, unit on.
	1kV (isolation class 3)	Differential mode, unit on.
· Conducted disturb., EN 61000-4-6	10V (level 3)	150kHz...80MHz.

Protection

Unit protection			
· Overload		Yes	See current limit.
· Short-circuit proof		Yes	Automatic voltage recovery.
· Open-circuit proof		Yes	
· Over-temperature (OTP)		—	
· Reverse battery prot.		Yes	serial diode.
Load protection			
· Over-voltage (OVP)		Yes	
Threshold	typ.	35V	
Accuracy	max.	± 4%	
Method		—	Independent second regulator.

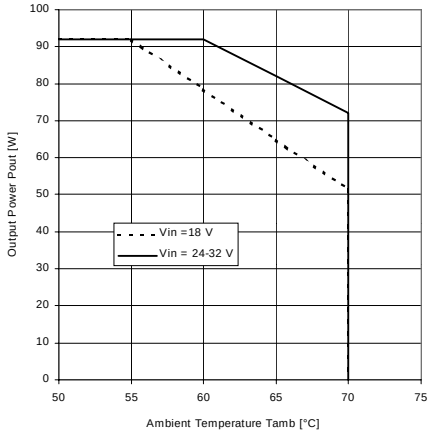
Typ. Output Characteristic



Safety

Electrical safety			
· Test voltage		1.5kV AC	Primary / secondary conn. to PE.
· according to EN 60 950 for t = 2sec		500V AC	Secondary / PE.
· Air- and leakage distance		4mm	Primary / secondary.
		3mm	Primary / PE.
· Isolation resistance	min.	5MΩ	
· Protection class		I	EN 60950-1.
· PE resistance		< 0.1Ω	EN 60950-1.
· Protection system		IP20	IEC 60529.
·		SELV	EN 60950-1
· Output circuit		PELV	EN 50178
· Over-voltage class		II	IEC 60664.
Touch safety		Finger test	EN 60950-1.
Penetration protection		> ∅ 3mm	e.g. screws, small parts etc.

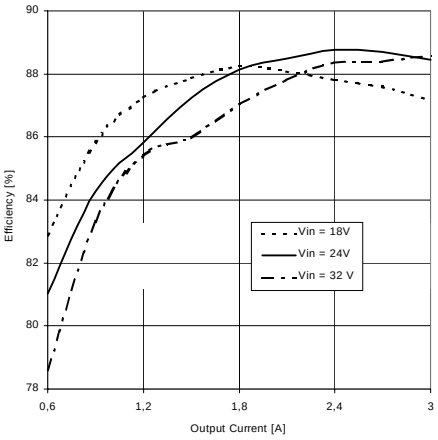
Typ. Derating over Temperature



Operation and Ambient Area

Application class		KSF	
Operation temperature	max.	–10° ... +70°C	Ta (measured at 1cm distance).
· Derated range		+55° ... +70°C	Derating, see diagram.
Storage temperature	typ.	–20° ... +80°C	Ta.
Humidity	max.	95%	Non-condensing.
Mechanical usage		Vertical	See page 4.
· Lateral spacing		None	No gap needed.
Cooling		Normal convection	Don't obstruct air flow.
Dirt protection level	max.	2	EN 60950-1.
Vibration		0.075mm	IEC 60068-2-6 (10...60Hz).
Shock		11ms / 15g	IEC 60068-2-27 (3 shocks).
Operation height	max.	2,000m	Above sea level.

Typ. Efficiency



Efficiency

Efficiency	typ.	88%
Loss	typ.	13W

Reliability and Lifetime

MTBF according to Siemens standard SN29500	typ.	250,000h	+40°C Ta.
Only long life (> 2,000h @105° C) electrolytic capacitors are used.			
Function test		100%	Test certificate enclosed.
In-circuit test		yes	
Run-in (burn-in)		24h	Full load, Ta = +60° C, on/off cycle.

This technical information is valid for +25° C ambient temperature and 5 min. run in time, unless otherwise stated.

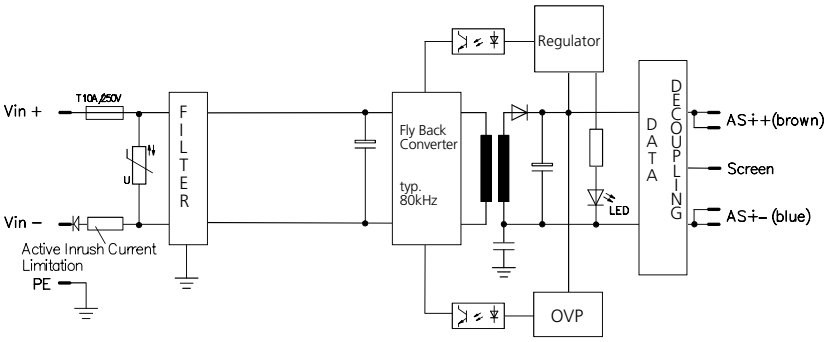
Fuse

The DC/DC converter has electronic protection against external short-circuits. In case of an internal defect, a fuse disconnects the unit. It can only be replaced by opening the unit which should be done by the supplier.

Installation for Operating

Install DIN rail TS35/7.5 horizontally, ensuring correct orientation.
For other installation considerations consult your representative. Ensure free air flow.

Schematic



Dimensions and Connections

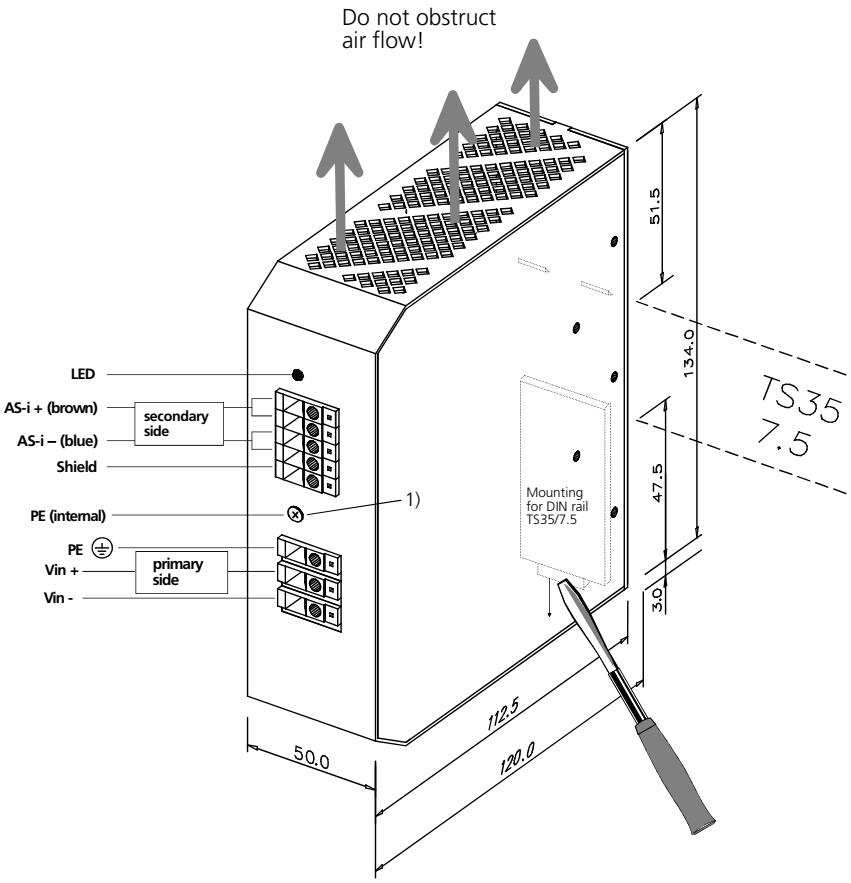
Fully enclosed Al/Mg alloy housing. All mechanical dimensions are in mm.

1) Do not remove PE screw.

The shield terminal should be connected to earth or to the shield of the load cable.

Screw terminals:
On the front side. These accept wire of up to 4mm^2 cross section (single-core cable) or 2.5mm^2 cross section (multi-core flex).
Remove 9 to 15mm of insulation from wire.
Take care of standards which must be satisfied, e.g. VDE 0100 or EN 60 950.

Caution:
Do not remove any screws on box, as internal safety connections could be disconnected!



Operation without AS-Interface

When operating without AS-Interface (e.g. in a lab. test) you should connect a 470µF capacitor between AS-i + and AS-i –, because commercial lab-loads often tend to oscillate. They may resonate with the data decoupling, and the oscillations may exceed the permitted modulation voltage.

Modifications (contact supplier)

Other output voltages,
OEM-versions.