# DPA144
# 1 AS-Interface-Output
# DIN Rail Power Supply, 85 Watt

- **High efficiency: 89%**
- **ACin 115/230V manual switch**
- **WxHxD = 50x134x120mm**
- **Integrated data decoupling**
- **Meets EMC standards: EN 50081-1, EN 50082-2, NAMUR, EN 61000-4, VDE 0160/2**
- **Design meets VDE 0551**

CE

## Preliminary data sheet — Power Supply DPA144

The DPA144 is a very compact power supply designed for fieldbus applications in which power and data share the same twisted-pair.

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

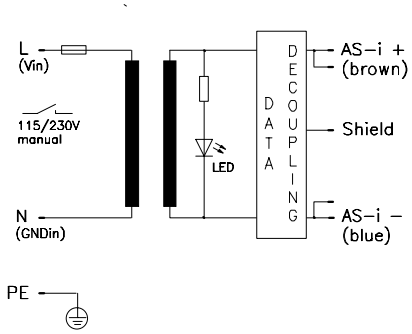
The PELV output circuit has electronic protection against overload and short-circuit. Isolation is equivalent to safety transformers as specified in VDE 0551.

| Vout | Iout | Pout | Features | Order-No. |
|---|---|---|---|---|
| **30.55V** | **2.8A** | 85W | OVP | **DPA144.241** |

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. | ± 3% | includes: production-adjustment, line regulation, and load regulation. |
| Minimum load | | None | Not necessary. |
| Output power Pout | max. | 85W | 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 | | 2W/K | +60° bis +70°C Ta. |
| Operating indicator | | 1 green LED | On the front. |
| Output circuit | | PELV | VDE 0106 |
| Safety | | | VDE 0106, EN 60 950, VDE 0805 |

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

### Input

| | | | |
|---|---|---|---|
| Line input 1 | | 100...127V AC | Switch position 115V. |
| · Range | | 88...132V AC | Full spec. |
| | | 80...150V AC | Derated, see page 2. |
| Line input 2 | | 220...240V AC | Switch position 230V. |
| · Range | | 187...264V AC | Full spec. |
| | | 150...300V AC | Derated, see page 2. |
| Line frequency | | 47...63Hz | DC or 400Hz, see page 2. |
| Input current | max. | 1.8Aeff. / 1.1Aeff. | @ 115 / 230V AC. |
| Noise suppression | | EN 55 022/B | |

| | |
|---|---|
| Mechanical: | Al/Mg alloy housing, snap-on mounting for DIN rail TS35/7.5 (EN 55022), WxHxD = 50 x 134 x 120mm, the depth includes the DIN-rail mounting, see page 4. |
| Weight: | App. 550g |
| Screw terminals: | Input 1 terminal, max. 2.5/4mm$^2$<br>Output 2 terminals, max. 2.5/4mm$^2$, see page 4 |

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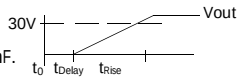
## Output (continued)

| | | | | | |
|---|---|---|---|---|---|
| Voltage regulation: | | | | | |
| · Line regulation | | max. | % | ± 0.2 | 88...132V AC / 187...264V AC, Iout = 2.8A. |
| · Load regulation stat. | $\Delta U_{stat}$ | max. | % | ± 0.5 | Iout = 50%, D Iout = ±50%. |
| · Temperature coefficient | | typ. | %/K | ± 0.02 | |
| Ripple | | max. | mVpp | 50 | 0...20MHz, @ ACnom, Iout = 100%, R or I-load. |
| Current limitation | | | | | |
| · Threshold | | min/max. | A | 2.85 / 3.85 | Fixed, 29V Z-load. |
| · Characteristic | | | | See graph on page 3 | |
| · Short-circuit | | max. | A | 6.5 | |
| Start delay | $t_{Delay}$ | typ. | ms | 20 | After switch on. |
| Vout rise-up time | $t_{Rise}$ | typ. | ms | 350 | Load 2.8A and C-load 15mF. |
| On and off characteristic | | | | | Approximately monotonic. |




## Input (continued)

| | | | |
|---|---|---|---|
| AC input range 1 / 2 | V AC | 88...132 / 187...264 | Full spec. |
| DC input range | V DC | 250...300 | Full spec. |
| Derated AC range 1 / 2 | V AC | 80...88 / 150...187, 150 / 300 for 0.5s | |
| Derated DC range | V DC | 176...250 | Power derating typ. 10% (no start below 196V). |
| | V DC | 300...370 | Full spec, but air- and leakage distances not longer than stated in VDE 0805. |
| Frequency range | Hz | 47...63 | Full spec. |
| Derated frequency range | Hz | 63...400 | Increased leakage currents. |
| In-rush current max. | A | 24 | @ cold-start and 264V AC, NAMUR standard met (Ta = 25° C). |
| Hold-up time min. | ms | 30 | @ 88V AC, Iout = 2.8A. |
| min. | ms | 46 | @ 187V AC, Iout = 2.8A, see figure on page 3. |
| Power factor λ typ. | | 0.70 | @ 88V AC, Iout = 2.8A. |
| Internal fuse | | 5x20mm T2.5A/250V (IEC127/2-5) | To replace, see page 4. |
| Input range selection | | Manual (230V AC set at factory) | 115/230V switch, position 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. |

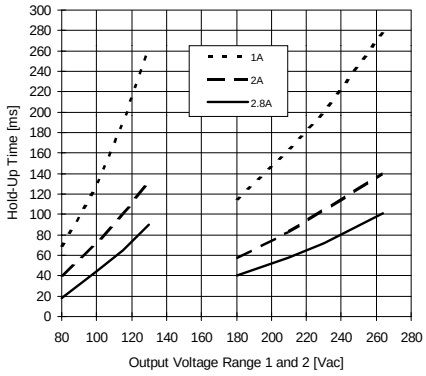
## Logic Functions

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

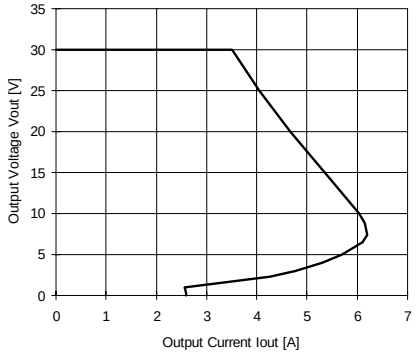
## Electromagnetic Compatibility

| | | |
|---|---|---|
| Emissions according to EN 50081-1 | | EN 50081-2 is also satisfied. |
| · Radio interference,EN 55011, EN 55022 | Class B | |
| Immunity according to EN 50082-2 | No degradation of performance | EN 50082-1 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, ACin and Vout lines: l = 1m. |
| · Fast transients, EN 61000-4-4 | 4kV (level 4) | Coupled to ACin line. |
| | 2kV (level 3) | Coupled to DCout line. |
| · Surge transients IEC 1000-4-5 | 4kV (isolation class 4) | Common mode, unit on. |
| | 2kV (isolation class 4) | Differential mode, unit on. |
| · Conducted disturb., EN 61000-4-6 | 10V (level 3) | 150kHz...80MHz. |
| Immunity according to further standards | | |
| · Transient voltage, IEC 255 | 5kV | Common mode, unit off. |
| · NAMUR-prescription | Satisfied | |
| · Transient resistance, VDE 0160 §5.3.1.1.2 | 750V / 1.3ms (class 2) | Valid for total load range. |
| · Over-voltage resistance (PULS standard) | 150 / 300V AC / 0.5s | Switch position 115 / 230V AC. |

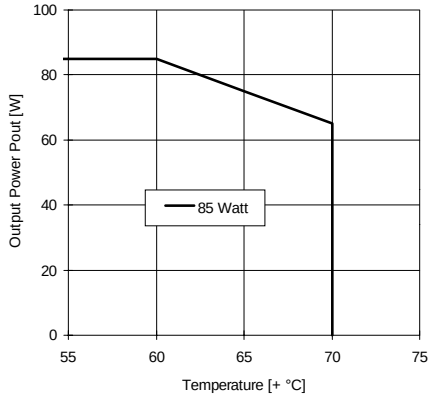
Min. Hold-Up Time



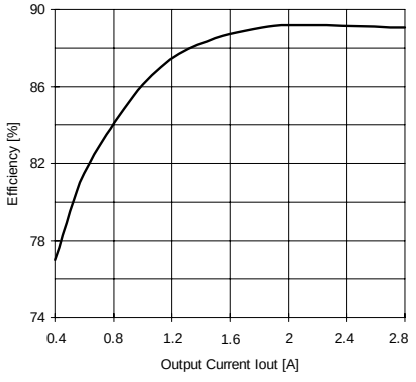

Typ. Output Characteristic




Typ. Derating over Temperature




Typ. Efficiency




## 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 | |
| · ACin range selection | | Manual | Switch for 115/230V AC. |
| Load protection | | | |
| · Over-voltage (OVP) | | Yes | |
| Threshold | typ. | 35V | |
| Accuracy | max. | ± 4% | |
| Method | | — | Independent second regulator. |

## Safety

| | | | |
|---|---|---|---|
| Electrical safety | | | |
| · Test voltage | | 3kV AC | Primary / secondary. |
| according to EN 60 950 | | 2.5kV AC | Primary / PE. |
| for t = 2sec | | 500V AC | Secondary / PE. |
| · Air- and leakage distance | | 6.4 / 8mm | Primary / secondary. |
| | | 4mm | Primary / PE. |
| · Isolation resistance | min. | 5MΩ | VDE 0551. |
| · Protection class | | I | VDE 0106 part 1, IEC 536. |
| · PE resistance | | < 0.1Ω | VDE 0805. |
| · Protection system | | IP20 | DIN 40050, IEC 529. |
| · Leakage current | max. | 0.75mA | EN 60 950 (50Hz line frequency). |
| · Output circuit | | PELV | VDE 0160. |
| · Over-voltage class | | II | VDE 0110 part 1, IEC 664. |
| Touch safety | | Finger test | VDE 0100 §6, EN 60 950, VBG4. |
| Penetration protection | | > ∅ 3mm | e.g. screws, small parts etc. |

## Operation and Ambient Area

| | | | |
|---|---|---|---|
| Application class | | KSF | DIN 40040. |
| Operation temperature | max. | –10° ... +70°C | Ta (measured at 1cm distance). |
| · Derated range | | +60° ... +70°C | Derating, see diagram. |
| Storage temperature | typ. | –20° ... +100°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 | VDE 0110 part 1. |
| Vibration | | 0.075mm | IEC 68-2-6 (10...60Hz). |
| Shock | | 11ms / 15g | IEC 68-2-27 (3 shocks). |
| Operation height | max. | 2,000m | Above sea level. |

## Efficiency

| | | | |
|---|---|---|---|
| 2.8A load | typ. | 89% | @ 230V ACin, Iout = 100%. |
| 2A load | typ. | 89% | As above. |
| 1A load | typ. | 86% | As above. |

## Reliability and Lifetime

| | | | |
|---|---|---|---|
| MTBF according to Siemens | | | |
| standard SN29500 | typ. | 300,000h | 230VAC, Iout = 100%, +40°C Ta. |
| Only long life (> 2,000h @105° C) electrolytic capacitors are used. | | | |
| Function test | | 100% | Test certificate enclosed. |
| 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 PSU 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.

## 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!

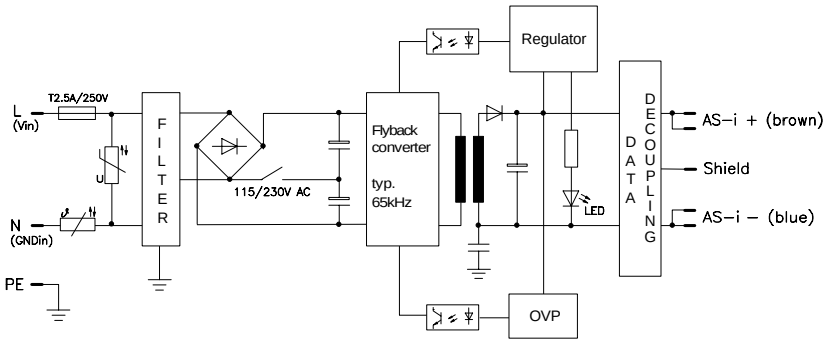
## Operation without AS-Interface

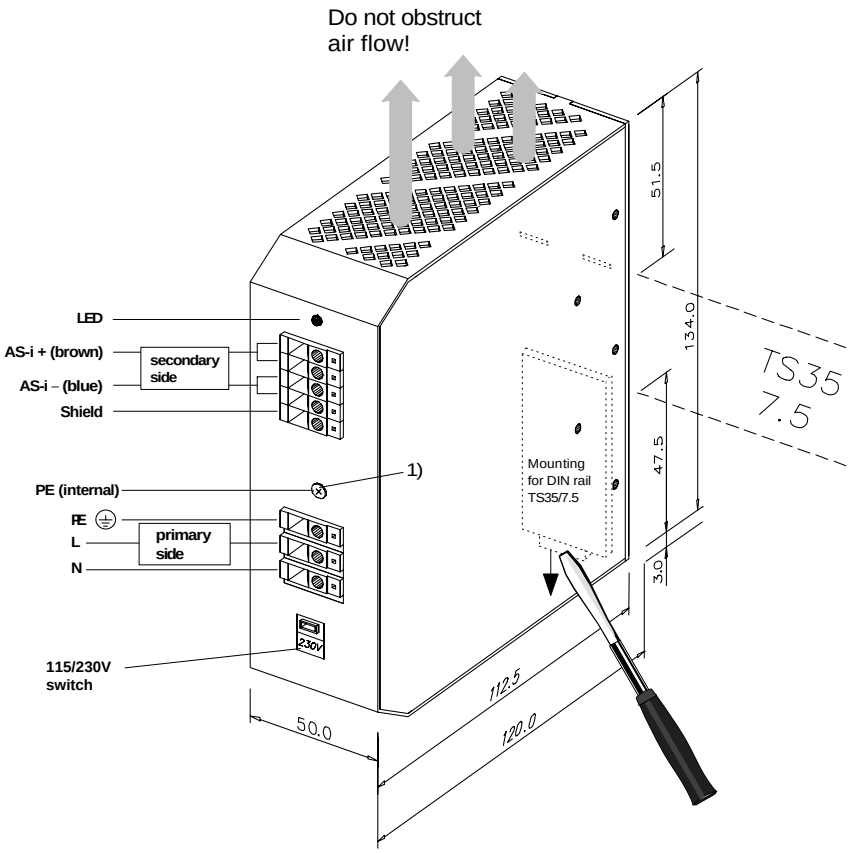
When operating without AS-Interface (e.g. in a lab. test) you should connect a 470µF capacitor between AS-i + and AS-i –, because commercial lab-loads often tend to oscillate. They may resonate with the data decoupling, and the oscillations may exceed the permitted modulation voltage.

## Modifications (contact supplier)

Other output voltages,
OEM-versions.

## Schematic



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