This power supply is designed to meet a wide range of applications. Output voltage is stable with ripple and noise below 60mVpp over the total range of up to 120W. The high-efficiency flyback converter provides for greater reliability and economy.

Multiple supplies can be used in parallel to increase system power without extra control wiring, as the current is automatically shared between units (AP155.133 only).

The design ensures immunity to disturbances according to EN 61000-4, and VDE 0160 pulses (class 2 for total range!). The unit is also protected against over-voltage and short-circuits. Construction and design meet all relevant safety standards such as EN 60950, VDE 805 and VBG 804.

48V and 60V versions are available for telecommunications and motor control applications.

### Data Sheet

- **High efficiency:** 88% (@ 24V)
- **ACIn 115/230V manual switch**
- **8 HP plug in width**
- **H15 standard pinout**
- **Parallel mode automatic load sharing (@ AP155.133)**
- **Meets EMC standards**
  - EN 50081-1 (EN 55022/B), EN 50082-2, EN 61000-4, VDE 0160/2 and NAMUR

### Schematic

![Schematic Diagram]

### Mechanical

- **8HP/3U board (DIN 41494),** A/M g alloy cover for component side, plastic cover for bottom side.
- **LxWxH = 171.93 x 40.64 x 110mm (100),** the length includes the connector, see page 4.
- **Weight:** App. 510g
- **Connector:** H15 (DIN 41612), coding option, max. load per pin 11A @70°C.

### Specifications

<table>
<thead>
<tr>
<th>Vout</th>
<th>Iout</th>
<th>Pout</th>
<th>Features</th>
<th>Order-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V</td>
<td>8A</td>
<td>96W</td>
<td>OVP</td>
<td>AP155.111</td>
</tr>
<tr>
<td>12V</td>
<td>8A</td>
<td>96W</td>
<td>OVP, PF, PG, SD</td>
<td>AP155.112</td>
</tr>
<tr>
<td>15V</td>
<td>7A</td>
<td>105W</td>
<td>OVP</td>
<td>AP155.121</td>
</tr>
<tr>
<td>15V</td>
<td>7A</td>
<td>105W</td>
<td>OVP, PF, PG, SD</td>
<td>AP155.122</td>
</tr>
<tr>
<td>24V</td>
<td>5A</td>
<td>120W</td>
<td>OVP</td>
<td>AP155.131</td>
</tr>
<tr>
<td>24V</td>
<td>5A</td>
<td>120W</td>
<td>OVP, PF, PG, SD</td>
<td>AP155.132</td>
</tr>
<tr>
<td>24V</td>
<td>5A</td>
<td>120W</td>
<td>OVP, parallel mode</td>
<td>AP155.133</td>
</tr>
<tr>
<td>27.6V</td>
<td>4A</td>
<td>110W</td>
<td>OVP, Vout adjustable</td>
<td>AP155.141</td>
</tr>
<tr>
<td>48V</td>
<td>2.5A</td>
<td>120W</td>
<td>OVP</td>
<td>AP155.151</td>
</tr>
<tr>
<td>60V</td>
<td>2A</td>
<td>120W</td>
<td>OVP</td>
<td>AP155.161</td>
</tr>
</tbody>
</table>

*F* appended to Order-No. means: 8HP front panel included and fitted.

### Accessories
- **H15 connector, 6.3mm flat contacts:** ZP100
- **H15 connector with soldering pins:** ZP120
- **Warranty:** 2 years from date of delivery.

### Output

- **Vout adjustable**
  - **Accuracy** min. ±2% max. ±5%
  - **Sense lines** None
  - **Minimum load** None
  - **Output power Pout** max. 120W
  - **Noise, Ripple**
    - **Including spikes** max. 80mVpp
    - **Over-voltage protection** typ. 1.2 x Vout
  - **Derating** 2W/K +55°C to +70°C Ta.
  - **Operating indicator** 1 green LED
  - **Isolation Vout to Vin** SELV

- **Input**

<table>
<thead>
<tr>
<th>Line input AC 1</th>
<th>Range</th>
<th>Line input AC 2</th>
<th>Range</th>
<th>Line frequency</th>
<th>Input current rms</th>
<th>Noise suppression</th>
</tr>
</thead>
<tbody>
<tr>
<td>100..120V AC</td>
<td></td>
<td>220...240V AC</td>
<td></td>
<td>max. 47Hz..63Hz</td>
<td>max. 3.0Aeff. / 1.4Aeff.</td>
<td>EN 55 022/B</td>
</tr>
<tr>
<td>88...132V AC</td>
<td>Full spec.</td>
<td>187...264V AC</td>
<td>Full spec.</td>
<td>@ 115/230V AC</td>
<td>10KHz...30MHz, conducted.</td>
<td></td>
</tr>
<tr>
<td>80...150V AC</td>
<td>Derated, see page 2.</td>
<td>150...300V AC</td>
<td>Derated, see page 2.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Specifications are valid at 230V AC, unless otherwise stated. They are subject to change without prior notice.
AP155 1 Output ◆ 19” Power Supply ◆ 96 to 120 Watt

Voltage regulation:
- Line regulation max. % ± 0.2 ± 0.2 ± 0.2 ± 0.2 ± 0.2
- Load regulation stat. ΔUstat max. % ± 0.75 ± 0.75 ± 4.0 ± 0.75 ± 0.75
- Load regulation dyn. ΔUdyn max. % ± 0.5 ± 0.5 ± 2.5 ± 0.5 ± 0.5

Response time tRise max. μs 800 800 1500 800 800
Temperature coefficient typ. %/K ± 0.01 ± 0.01 ± 0.01 ± 0.01 ± 0.01
Ripple max. mVpp 25 25 25 25 60
- incl. spikes max. mVpp 30 50 50 50 80

Current limitation
- Threshold min/max. A 105% ... 120% of Iout Fixed.
- Characteristic Short-circuit max. A 220% of Iout

Start delay tDelay typ. ms 100
Vout rise-up time tRise typ. ms 30

Power back immunity UBck max. V 1.2 x Vout

Input (continued)
- AC input range 1 / 2 V AC 88...132 / 187...264 Full spec.
- DC input range V DC 25...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 / 300...370

Frequency range Hz 47...63
Derated frequency range Hz 63...400

In-rush current max. A 16
Hold-up time min. ms 23 20 20 22 20
min. ms 31 27 27 30 27

Power factor λ typ. 0.63

Internal fuse 5x20mm T5A/250V (IEC127/2-5)

Logic Functions
- Power Fail signal PF
  - PF high if ACin > 74/155V AC
  - Hold-up time from Power failure to PF-signal min. ms 21 17 17 20 17
  - from PF-signal min. ms 5 5 5 5 5
- PG-signal
  - PG high if
- SD remote switch off
- Parallel operation for AP155.133 units Unlimited Equal
- Current distribution
- Connection No additional wiring needed.
- Vout adjustment for AP155.141 min. % ± 5

Electromagnetic Compatibility
- Emissions according to EN 50081-1
  - Radio interference, EN 55011, EN 55022
  - Immunity according to EN 50082-2
  - Electrostatic discharge ESD, EN 61000-4-2
  - Radiated fields, EN 61000-4-3
  - Fast transients, EN 61000-4-4
  - Surge transients, EN 61000-4-5
  - Transient voltage, IEC 255
  - NAM UR-prescription
  - Transient resistance, VDE 0160 §5.3.1.1.2
  - Over-voltage resistance (PULS standard)

Class B
EN 50081-2 is also satisfied
Conducted 10kHz, 30MHz
EN 50082-1 is also satisfied
8kV direct discharge (level 4)
15kV air discharge (level 4)
10V/m (level 3)
4kV (level 4)
2kV (level 3)
2kV (level 4) cap. coupling
4kV (isolation class 4)
2kV (isolation class 4)
5kV
Satisfied
750V / 1.3ms (class 2)
150/300V AC / 0.5s
Valid for total load range.
Switch position 115 / 230V AC.

PULS Munich
Tel.: +49 (0)89 / 92 78-2 44
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Protection

Unit protection
- Overload Yes See current limit.
- Short-circuit proof Yes Auto restart.
- Open-circuit proof Yes
- Over-temperature (OTP) —
- Reverse battery protect. Yes
- ACin range selection Manual Switch for 115/230V AC.

Load protection
- Over-voltage (OVP) Yes

Threshold typ. 15.0V AP155.111, 112.
typ. 18.0V AP155.121, 122.
typ. 29.0V AP155.131, 132, 133.
typ. 32.0V AP155.141.
typ. 58.0V AP155.151.
 typ. 70.0V AP155.161.

Accuracy max. ±4%
Restart After line disconnection; wait time 1min.

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 / secondary.
- 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 (47...63Hz line).
- Safe low voltage SELV EN 60 950, VDE 0805, 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. 0°...+70°C Ta (measured at 1cm distance).
- Derating range +55°...+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 and Power Loss

AP155.111 and .112 typ. 86% / 15.6W @230V ACin, Iout = 100%.
AP155.121 and .122 typ. 86% / 17.0W As above.
AP155.131 to .133 typ. 88% / 16.4W As above.
AP155.141 typ. 88% / 15.1W As above.
AP155.151, 161 typ. 89% / 14.8W As above.

Reliability and Lifetime

M TBF 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.
In-circuit test Yes
Run-in (burn-in) 24h Full load, Ta = +55° C, on/off cycle.

This technical information is valid for+25° C ambient temperature and 5 min. run-in time, unless otherwise stated.
AP155  1 Output ♦ 19" Power Supply ♦ 96 to 120 Watt

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
The unit is constructed for 19” systems:
Ensure that pin 4 of H15 connector is on top. For other installation considerations consult your representative. Ensure free air flow.
Important: Use non-conductive (plastic) guide rails only; conductive rails would inadmissibly reduce leakage distance.

Dimensions and Connections
19" board, with Al/Mg alloy cover on component side, and a plastic cover on the bottom side. 8HP plug in width. See figure below for dimensions.

1) Do not remove any screws on box, as internal safety connections could be disconnected!
2) Vout adjustable at trimmer on AP155.141 (min. ± 5%).

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