# VP 80 Series: 1-4 outputs, active PFC

**Primary switched mode plug-in power supply with power factor correction for 19" technology in accordance with DIN 41494**

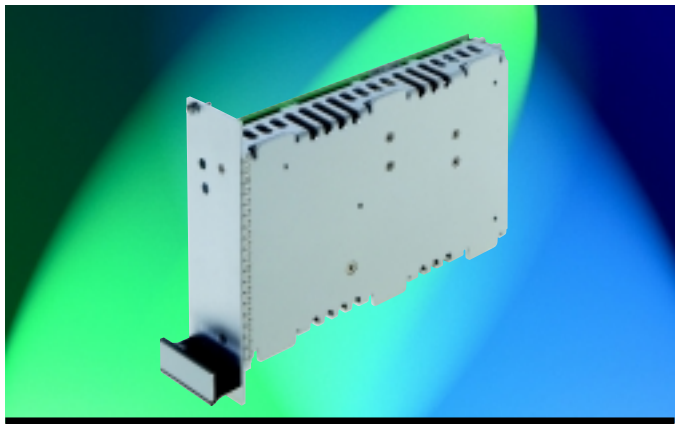
### Features

- Active Harmonic Correction (PF≈1)
- Wide 94 - 253VAC input range, for use worldwide without further adaptation
- Direct plug-up into backplanes
- Compact design (80 Watt in 3U/7HP)
- Power share, V1, V2 and multiple output units
- CE compliant in respect of EMC and LV Directives
- EMC Design (IEEE 1101.10 front panel)
- Safety in accordance with EN60950, UL, CUL
- **18 MONTH WARRANTY**

Available in four basic versions, the single converter technology employed in the VeroPower 2000 Series allows load sharing on multiple outputs. In addition, the power density has increased by more than 30%, enabling the units to supply 80 watts from a cassette measuring only 3U x 7HP (160mm deep).

### VeroPower 2000 as a part of a system

The mechanical design of the power supply allows for operation in systems with integrated backplanes, permitting the power supply to be plugged directly into the board. The physical width of the cassette complies with the 4HP grid used in standard backplane layout, so the 80 Watt version fits into an 8HP wide space. This means that the power supply is only 2 slots wide (guide positions 1 or 2 are possible).



*VP80*

### Technical Data VP80 Series

| Input specification | |
|---|---|
| Input voltage: | 94-264VAC |
| Input frequency: | 47-63Hz |
| Inrush surge current limitation: | <27A (NTC) |
| Input overvoltage protection: | VDR |
| Hold up time (Nominal $V_{IN}$; 100% $I_{OUT}$): | ≥20ms |
| Power Factor: | ≥0,97 |
| Efficiency: | typ. 75% |

| Safety (Compliant with Low Voltage Directive 73/23/EEC) | |
|---|---|
| Safety approvals pending: | EN60950, IEC 950, UL1950, CUL |

| EMC (Compliant with EMC Directive 89/336/EEC) | |
|---|---|
| Emmisions: | EN 55022/B (0,15-30Mhz); EN 55022/B (30-1000Mhz) |
| Immunity: | EN 50082-2 |
| Electro Static Discharge: | EN 61000-4-2 |
| Electrical fast transients/Burst: | EN 61000-4-4 |
| RF Conducted disturbance: | EN 50141 |
| RF Field susceptibility: | EN 50140 |
| Surge susceptibility: | EN 61000-4-5 |
| Harmonic distortion: | EN 61000-3-2 |

| Environmental | |
|---|---|
| Operating temperature: | 0°C to +70°C |
| Storage temperature: | -25°C to +85°C |
| Derating: | 2W/°C above 45°C natural convection<br>4W/°C above 60°C forced air cooling (1m/s) |
| Relative Humidity: | max. 90% non-condensing |
| Temperature coefficient: | ≤0,05%/°C |

| Physical | |
|---|---|
| Case material/ finish: | Steel and aluminium cassette |

### Ordering information

| Description: Mating connectors | Order code |
|---|---|
| Mating connector coded H15 to DIN 41612 | **17-10115K** |
| Coding keys (pkt 10) | **17-10064F** |

### Ordering information

| Description: 80Watt VP Series power supplies, 3U x 7HP single output | | Order code | Order code | Order code |
|---|---|---|---|---|
| Model | Output | Without front panel | Std. front panel 8HP | EMC front panel 8HP |
| VP80-1 5V | +5V/16A | **116-020006A** | **116-020015L** | **116-020029F** |
| VP80-1 12V | +12V/6,7A | **116-020007J** | **116-020016H** | **116-020030G** |
| VP80-1 15V | +15V/5,3A | **116-020008F** | **116-020017E** | **116-020031D** |
| VP80-1 24V | +24V/3,3A | **116-020009C** | **116-020018B** | **116-020032A** |
| VP80-2A | +12V/5A; -12V/2A | **116-020010D** | **116-020019K** | **116-020033J** |
| VP80-2B | +15V/4A; -15V/2A | **116-020011A** | **116-020020L** | **116-020034F** |
| VP80-2C | +5V/12A; +12V/2A | **116-020012J** | **116-020021H** | **116-020035C** |
| VP80-2D | +5V/5A; +24V/2,5A | **116-020013F** | **116-020022E** | **116-020036L** |
| VP80-2E | +12V/2A; +24V/2,5A | **116-020014C** | **116-020023B** | **116-020037H** |
| VP80-3A | 5V/12A; ±12V/1A | **116-020000H** | **116-020024K** | **116-020038E** |
| VP80-3B | 5V/12A; ±15V/1A | **116-020001E** | **116-020025G** | **116-020039B** |
| VP80-3C | 5V/12A; +12V/4A; -12V/1A | **116-020002B** | **116-020026D** | **116-020040C** |
| VP80-3D | 5V/12A; +15V/4A; -15/1A | **116-020003K** | **116-020027A** | **116-020041L** |
| VP80-4 | 3,3V/3A; 5V/12A; +12V/4A; -12V/1A | **116-020004G** | **116-020028J** | **116-020042H** |

# VP 80 Series: 1-4 outputs, active PFC

## Output specification

| VP80-1 | V1 | V1 | V1 | V1 |
|---|---|---|---|---|
| Output voltage: | **5V** | **12V** | **15V** | **24V** |
| Output adjustment range: | 4,8-5,5V | 11-13V | 14-16V | 22-26V |
| Output current:**1)** | **16A** | **6,7A** | **5,3A** | **3,3A** |
| Ripple: | | ≤40mV$_{PP}$ | | |
| Current limit: | ≥16,1A | ≥6,75A | ≥5,35A | ≥3,35A |
| Short circuit protection: | | electronic, automatic restart | | |
| Overvoltage protection (OVP): | 6-6,7V | 15,5-18V | 17-21V | 27-32V |
| Powerfail Signal (at full load) >6ms before $V_{OUT}$: | ≤4,8V | ≤11,5V | ≤14,4V | ≤23V |
| Line regulation (100% $I_{OUT}$): $\Delta V_{OUT}$ | | ≤0,2% | | |
| Load regulation static (10...90% $I_{OUT}$): $\Delta V_{OUT}$ | | ≤0,2% | | |
| Transient response (10...90% $I_{OUT}$): | | ≤1ms | | |
| Voltage compensation with SENSE max.: | | 0,5V | | |
| Derating: | 2W/°C above 45°C - natural convection, 4W/°C above 60°C - forced air cooling (1m/s) | | | |

| VP80-2 | Version A | | Version B | | Version C | |
|---|---|---|---|---|---|---|
| | V1 | V2 | V1 | V2 | V1 | V2 |
| Output voltage: | **+12V** | **-12V** | **+15V** | **-15V** | **5V** | **12V** |
| Output adjustment range: | fixed | fixed | fixed | fixed | 4,8-5,5V | fixed |
| Output current:**1)** | **5A** | **2A** | **4A** | **2A** | **12A** | **2A** |
| Ripple: | | | ≤40mV$_{PP}$ | | | |
| Current limit: | >5,1A | >2,1A | >4,1A | >2,1A | >12,1A | >2,1A |
| Short circuit protection: | | | electronic, automatic restart | | | |
| Overvoltage protection (OVP): | — | — | — | — | 6-6,7V | — |
| Powerfail Signal (at full load) >6ms before $V_{OUT}$: | — | — | — | — | <4,8V | — |
| Line regulation (100% $I_{OUT}$): $\Delta V_{OUT}$ | | | ≤0,2% | | | |
| Load regulation static (10...90% $I_{out}$): $\Delta V_{OUT}$ | ≤0,5% | ≤1,5%**2)** | ≤0,5% | ≤1,5%**2)** | ≤0,5% | ≤±4%**2)** |
| Transient response (10...90% $I_{OUT}$): | | | ≤1ms | | | |
| Voltage compensation with SENSE max.: | — | — | — | — | 0,5V | — |
| Derating: | 2W/°C above 45°C - natural convection, 4W/°C above 60°C - forced air cooling (1m/s) | | | | | |

| VP80-2 | Version D | | Version E | |
|---|---|---|---|---|
| | V1 | V2 | V1 | V2 |
| Output voltage: | **5V** | **24V** | **12V** | **24V** |
| Output current adjustment: | fixed | 22-26V | fixed | 22-26V |
| Output current:**1)** | **5A** | **2,5A** | **2A** | **2,5A** |
| Ripple: | | ≤40mV$_{PP}$ | | |
| Current limit: | ≥5,1A | ≥2,5A | ≥2,1A | ≥2,5A |
| Short circuit protection: | | electronic, automatic restart | | |
| Overvoltage protection (OVP): | 6-6,7V | — | — | — |
| Powerfail Signal (at full load) >6ms before $V_{OUT}$: | ≤4,8V | — | — | — |
| Line regulation (100% $I_{OUT}$): $\Delta V_{OUT}$ | | ≤0,2% | | |
| Load regulation static (10...90% $I_{OUT}$): $\Delta V_{OUT}$ | ≤0,5% | ≤1,5%**2)** | ≤0,5% | ≤1,5%**2)** |
| Transient response (10...90% $I_{OUT}$): | | ≤1ms | | |
| Voltage compensation with SENSE max.: | 0,5V | — | — | — |
| Derating: | 2W/°C above 45°C - natural convection, 4W/°C above 60°C - forced air cooling (1m/s) | | | |

**1) Maximum output current: 80 Watt, see derating**
**2) $P_{OUT}$ V1 min. 5Watt**

# VP 80 Series: 1-4 outputs, active PFC

## Output specification

| VP80-3 | Version A | | Version B | |
|---|---|---|---|---|
| | V1 | V2/V3 | V1 | V2/V3 |
| Output voltage: | **5V** | **±12V** | **5V** | **±15V** |
| Output voltage adjustment: | 4,8-5,5V | fixed | 4,8-5,5V | fixed |
| Output current:**1)** | **12A** | **1A** | **12A** | **1A** |
| Ripple: | ≤40mV$_{PP}$ | ≤10mV$_{PP}$ | ≤40mV$_{PP}$ | ≤10mV$_{PP}$ |
| Current limit: | ≥12,1A | ≥1,01A | ≥12,1A | ≥1,01A |
| Short circuit protection: | electronic, automatic restart | | | |
| Overvoltage protection (OVP): | 6-6,7V | — | 6-6,7V | — |
| Powerfail Signal (full load) >6ms before $V_{OUT}$: | ≤4,8V | — | ≤4,8V | — |
| Line regulation (100% $I_{OUT}$): $\Delta V_{OUT}$ | ≤0,2% | | | |
| Load regulation static (10...90% $I_{OUT}$): $\Delta V_{OUT}$ | ≤0,5% | ≤1,5%**2)** | ≤0,5% | ≤1,5%**2)** |
| Transient response (10...90% $I_{OUT}$): | ≤1ms | | | |
| Voltage compensation with SENSE max.: | 0,5V | — | 0,5V | — |
| Derating: | 2W/°C above 45°C - natural convection, 4W/°C above 60°C - forced air cooling (1m/s) | | | |

| VP80-3 | Version C | | | Version D | | |
|---|---|---|---|---|---|---|
| | V1 | V2 | V3 | V1 | V2 | V3 |
| Output voltage: | **5V** | **+12V** | **-12V** | **5V** | **+15V** | **-15V** |
| Output voltage adjustment: | 4,8-5,5V | fixed | fixed | 4,8-5,5V | fixed | fixed |
| Output current:**1)** | **12A** | **4A** | **1A** | **12A** | **4A** | **1A** |
| Ripple: | ≤40mV$_{PP}$ | ≤40mV$_{PP}$ | ≤10mV$_{PP}$ | ≤40mV$_{PP}$ | ≤40mV$_{PP}$ | ≤10mV$_{PP}$ |
| Current limit: | ≥12,1A | ≥4,1A | ≥1,01A | ≥12,1A | ≥4,1A | ≥1,01A |
| Short circuit protection: | electronic, automatic restart | | | | | |
| Overvoltage protection (OVP): | 6-6,7V | — | — | 6-6,7V | — | — |
| Powerfail Signal (full load) >6ms before $V_{OUT}$: | ≤4,8V | — | — | ≤4,8V | — | — |
| Line regulation (100% $I_{OUT}$): $\Delta V_{OUT}$ | ≤0,2% | | | | | |
| Load regulation static (10...90% $I_{OUT}$): $\Delta V_{OUT}$ | ≤1% | ≤±4%**2)** | ≤1,5%**2)** | ≤1% | ≤±4%**2)** | ≤1,5%**2)** |
| Transient response (10...90% $I_{OUT}$): | ≤1ms | | | | | |
| Derating: | 2W/°C above 45°C - natural convection, 4W/°C above 60°C - forced air cooling (1m/s) | | | | | |

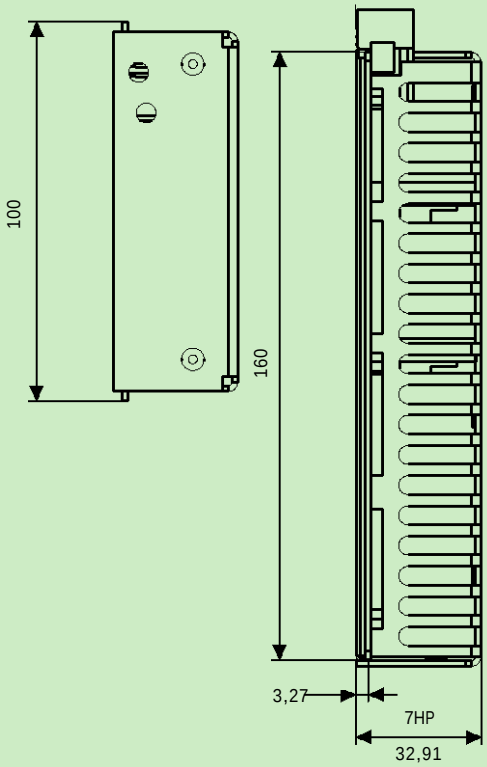
| VP80-4 | V1 | V2 | V3 | V4 |
|---|---|---|---|---|
| Output voltage: | **+3,3V** | **+5V** | **+12V** | **-12V** |
| Output voltage adjustment: | fixed | 4,8-5,5V | fixed | fixed |
| Output current:**1)** | **3,0A** | **12A** | **4A** | **1A** |
| Ripple: | ≤20mV$_{PP}$ | ≤40mV$_{PP}$ | ≤40mV$_{PP}$ | ≤10mV$_{PP}$ |
| Current limit: | ≥3,01A | ≥12,1A | ≥4,1A | ≥1,01A |
| Short circuit protection: | electronic, automatic restart | | | |
| Overvoltage protection (OVP): | — | 6-6,7V | — | — |
| Powerfail Signal (full load) >6ms before $V_{OUT}$: | — | ≤4,8V | — | — |
| Line regulation (100% $I_{OUT}$): $\Delta V_{OUT}$ | ≤0,2% | | | |
| Load regulation static (10...90% $I_{OUT}$): $\Delta V_{OUT}$ | ≤±4% | ≤1% | ≤1,5%**3)** | ≤1,5%**3)** |
| Transient response (10...90% $I_{OUT}$): | ≤1ms | | | |
| Derating: | 2W/°C above 45°C - natural convection, 4W/°C above 60°C - forced air cooling (1m/s) | | | |

**1) Maximum output current: 80 Watt, see derating**
**2) $I_{OUT}$ V1 min. 1A**
**3) $I_{OUT}$ V2 min. 1A**

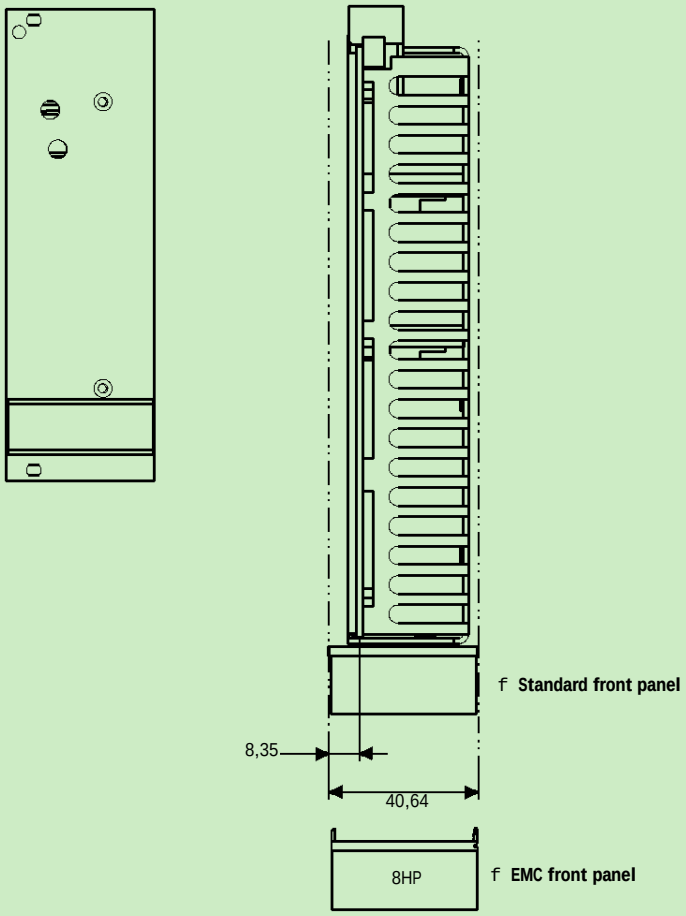
# VP 80 Series: 1-4 outputs, active PFC

**Mechanical details**

**Basic module**



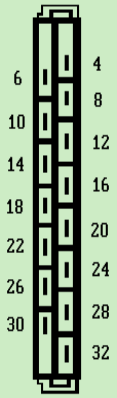

**Basic module with standard front panel**




Weight:VP80 650g

**Connector pin allocation H15 DIN41612**

| PIN | Function | | | | | | |
|---|---|---|---|---|---|---|---|
| | *VP80-1* | *VP80-2* | | | *VP80-3* | | *VP80-4* |
| | | A+B | C+E | D | A+B | C+D | |
| 4 | +V1 | — | +V1 | +V1 | +V1 | +V1 | +V2 |
| 6 | +V1 | — | +V1 | +V1 | +V1 | +V1 | +V2 |
| 8 | GNDV1 | — | GNDV1 | GNDV1 | GNDV1 | GND | GNDV1/V2 |
| 10 | GNDV1 | — | GNDV1 | GNDV1 | GNDV1 | GND | GNDV1/V2 |
| 12 | +SENSE | — | +SENSE | — | +SENSE | +SENSE | +V1 |
| 14 | -SENSE | — | -SENSE | — | -SENSE | -SENSE | — |
| 16 | PF | — | PF | — | PF | PF | PF |
| 18 | — | +V1 | — | — | +V2 | +V2 | +V3 |
| 20 | — | GNDV1/V2 | +V2 | +V2 | GNDV2/V3 | GND | GNDV3/V4 |
| 22 | — | -V2 | GNDV2 | GNDV2 | -V3 | -V3 | -V4 |
| 24 | — | — | — | — | — | — | — |
| 26 | — | — | — | — | — | — | — |
| 28 | N | N | N | N | N | N | N |
| 30 | L | L | L | L | L | L | L |
| 32 | E | E | E | E | E | E | E |




*Note: Sense lines must be connected. For maximum compensation for supply lead voltage drop they should be connected as close to the load as possible*