

# Powerware 9340 UPS 80-100-130 kVA / IEC 62040-3

## Technical Specification - Manufacturer's Declaration

| Subclause            | Characteristic of Equipment             | Manufacturer's Declared Values  |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |
|----------------------|---|---|-----|------|-----|-----|-----|-------------|-----|-----|-----|-----|------------|-----|-----|-----|-----|
| <b>GENERAL</b>       |   |   |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |
|                      | Model catalogue reference               | PW9340-80I-N;<br>PW9340-100I-N;<br>PW9340-130I-N  |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |
|                      | Model power ratings                     | 80 kVA / 64 kW;<br>100 kVA / 80 kW;<br>130 kVA / 104 kW   |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |
|                      | Classification                          | Voltage and Frequency Independent:<br>VFI-SS-111 by IEC 62040-3   |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |
|                      | Topology                                | Double conversion online with automatic<br>bypass switch and manual bypass.   |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |
| 7.3                  | Noise level – ref. ISO 7779             | ? 67 dB(A) at normal mode with rated load;<br>? 65 dB(A) at normal mode with 50% load   |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |
| 6.6.11               | Efficiency – Normal Mode                | <table style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td style="text-align: center;">100%</td> <td style="text-align: center;">75%</td> <td style="text-align: center;">50%</td> <td style="text-align: center;">25%</td> </tr> <tr> <td>Linear load</td> <td style="text-align: center;">92%</td> <td style="text-align: center;">91%</td> <td style="text-align: center;">90%</td> <td style="text-align: center;">87%</td> </tr> <tr> <td>Non-linear</td> <td style="text-align: center;">91%</td> <td style="text-align: center;">90%</td> <td style="text-align: center;">89%</td> <td style="text-align: center;">86%</td> </tr> </table> |     | 100% | 75% | 50% | 25% | Linear load | 92% | 91% | 90% | 87% | Non-linear | 91% | 90% | 89% | 86% |
|                      | 100%                                    | 75%   | 50% | 25%  |     |     |     |             |     |     |     |     |            |     |     |     |     |
| Linear load          | 92%                                     | 91%   | 90% | 87%  |     |     |     |             |     |     |     |     |            |     |     |     |     |
| Non-linear           | 91%                                     | 90%   | 89% | 86%  |     |     |     |             |     |     |     |     |            |     |     |     |     |
|                      | Efficiency – Battery Mode               | 94% with rated non-linear load;<br>95% with rated linear load   |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |
|                      | Efficiency Optimiser™ Function          | 98% with rated non-linear/linear load   |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |
|                      | Standards                               | Safety: EN 50091-1-1, IEC 60950,<br>IEC 62040-1-1<br>EMC: EN 50091-2, IEC 62040-2   |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |
|                      | Approvals                               | CE  |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |
| <b>CONSTRUCTION</b>  |   |   |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |
|                      | Dimensions W x D x H                    | 1100 x 766 x 1917 mm  |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |
|                      | Weight                                  | 1040 kg   |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |
|                      | Paint colour                            | CARDINAL C241-GR308 (~RAL 7035)<br>Powder coating with 50 micrometer thickness  |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |
|                      | Degree of protection – ref. IEC 60529   | IP20 std. (IP22 upon request)   |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |
| <b>ENVIRONMENTAL</b> |   |   |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |
| 4.1.1                | Max. operational altitude at full power | ? 1000 m  |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |
| 4.1.2                | Ambient operational temperature         | 0°C / +40°C with continuous rating,<br>1.5% derating for every degree up to +50°C.  |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |
| 4.1.3                | Relative humidity range                 | 5 to 95% non-condensing   |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |
| 4.1.4                | Ambient storage temperature range       | -25°C / +60°C   |     |      |     |     |     |             |     |     |     |     |            |     |     |     |     |



Photo 1. Powerware 9340 with battery cabinet.

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| <b>CONTROL AND MONITORING SIGNALS</b>     |  |  |
|---|--|--|
| 5.8                                       | List of indications and remote alarm / monitoring or interface devices | See User's and Installation Manual   |
| <b>ELECTRICAL CHARACTERISTICS – INPUT</b> |  |  |
| 5.2.2                                     | Number of input phases   | 3 x L + (N) + PE<br>Neutral is not required for functional UPS operation                                 |
| 5.2.2 and 6.3.2.1                         | Rated input voltage  | 380 VAC, 5-wire 3 x L + (N) + PE<br>400 VAC, 5-wire 3 x L + (N) + PE<br>415 VAC, 5-wire 3 x L + (N) + PE |
|   | Input voltage tolerance  | 342 to 456 V with full charging capacity;<br>300 V without depleting battery                             |
| 5.2.2 and 6.3.10                          | Rated input current  | PW9340-80I-N: 3 x 102 A<br>PW9340-100I-N: 3 x 127 A<br>PW9340-130I-N: 3 x 165 A                          |
| 5.2.2 and 6.3.9.2                         | Maximum input current  | PW9340-80I-N: 3 x 154 A<br>PW9340-100I-N: 3 x 192 A<br>PW9340-130I-N: 3 x 250 A                          |
| 5.2.2 and 6.3.3                           | Inrush current   | Inrush current limited to 100% nominal.<br>Current soft ramp-up feature as standard.                     |
| 5.2.2                                     | Current harmonics  | 3% THD at rated current;<br>6% THD at 50% load (e.g. Parallel Hot Sync™ 1+1)                             |
| 5.2.2 and 6.3.2.2                         | Rated input frequency  | 50/60 Hz; 47 to 65 Hz freq. tolerance.   |
| 5.2.2 and 6.3.10                          | Input power factor   | > 0.99   |

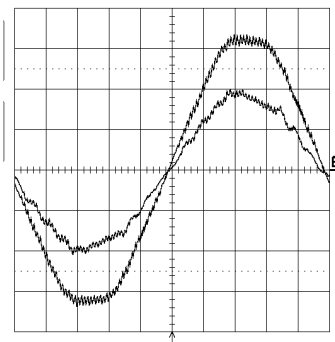


Photo 2. Sine input voltage and current waves with >0.99 power factor.

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| <b>ELECTRICAL OUTPUT CHARACTERISTICS - STATIC CHARACTERISTICS - NORMAL MODE</b>  |  |   |
|--|--|---|
| 5.3.2  | Number of output phases  | 3 x L + (N) + PE  |
| 5.3.2  | Rated output apparent power  | PW9340-80I-N: 80 kVA<br>PW9340-100I-N: 100 kVA<br>PW9340-130I-N: 130 kVA  |
| 5.3.2  | Rated output active power across linear and non-linear loads   | PW9340-80I-N: 64 kW<br>PW9340-100I-N: 80 kW<br>PW9340-130I-N: 104 kW  |
| 5.3.2 and 6.3.4  | Range of load power factor permitted - non-linear / linear loads   | <u>Non-linear loads (computers):</u><br>0.7 to 0.8<br><u>Linear loads (inductive/resistive/capacitive):</u><br>0.6 to 0.8 lagging/leading     |
| 5.3.2  | Rated output voltage   | 380 VAC (selectable);<br>400 VAC (factory setting);<br>415 VAC (selectable)   |
| 5.3.1.2  | Output wave shape  | Sinusoidal  |
| 6.3.4.4  | Output voltage variation   | ? 1 % stability   |
| 6.3.4.4  | Rated peak output voltage variation  | 560 to 571 V  |
| 6.3.4.2 and 6.3.8.1  | Total output voltage distortion  | 3% THD linear load;<br>5% THD normative non-linear load   |
| 5.3.2 and 6.3.4.5  | Output voltage unbalance at reference unbalance load   | ? 3%  |
| 5.3.2 and 6.3.4.5  | Maximum phase angle variation  | ? 3°  |
| 6.3.4.6  | Output volts - d.c. component, linear load   | None  |
|  | Rated output current   | PW9340-80I-N: 3 x 116 A<br>PW9340-100I-N: 3 x 145 A<br>PW9340-130I-N: 3 x 188 A   |
| 5.3.2 and 6.3.5.1  | Overload capability  | 101 to 110% for 10 min (online)<br>111 to 125% for 1 min (online)<br>126 to 150% for 30 sec (online)<br>1000% for 1 cycle (bypass)            |
| 5.3.2 and 6.3.5.3  | Short circuit capability   | 520 Amp one phase to neutral 300 ms,<br>300 Amp phase to phase 300 ms, or<br>limited by bypass source impedance and fusing.                   |
|  | Rated output frequency   | 50 / 60 Hz, selectable  |
| 6.3.2.2  | Output frequency variation   | ± 0,05 Hz free running, selectable ±0.5 to<br>±3 Hz (default ±2 Hz), synchronised to<br>input with slew rate of changes <0.5 Hz<br>per second |
| 6.3.2.3  | Output frequency synchronised phase error at change of mode  | 0 degrees at bypass +/- 3Hz from nominal  |
| <b>ELECTRICAL OUTPUT CHARACTERISTICS - DYNAMIC CHARACTERISTICS - NORMAL MODE</b> |  |   |
| 5.3.2 and 6.3.6.1 and 6.3.6.2  | Output voltage dynamic variation during transfer normal / stored energy mode of operation and vice versa | None  |
| 6.3.7.1 and 6.3.8.4  | Output voltage dynamic variation due to load changes   | ?5% at 100% load step, recovery in less than 3 ms to steady state; see Figure 1   |
|  | Maximum rate of change of output frequency   | 0.5 Hz / s  |

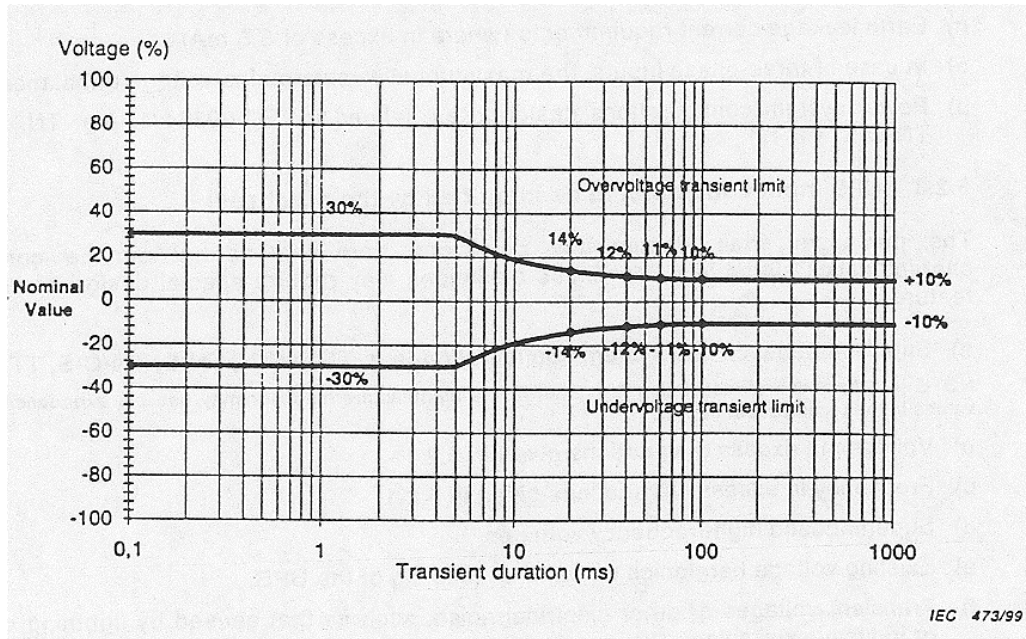
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| <b>ELECTRICAL OUTPUT CHARACTERISTICS - STATIC CHARACTERISTICS - STORED ENERGY</b>  |  |   |
|--|--|---|
| 5.3.2  | Number of output phase   | 3 x L + (N) + PE<br>Neutral is not required for functional UPS operation  |
| 5.3.2  | Rated output apparent power                                      | PW9340-80I-N: 80 kVA<br>PW9340-100I-N: 100 kVA<br>PW9340-130I-N: 130 kVA  |
| 5.3.2  | Rated output active power across linear and non-linear loads     | PW9340-80I-N: 64 kW<br>PW9340-100I-N: 80 kW<br>PW9340-130I-N: 104 kW  |
| 5.3.2  | Range of load power factor permitted - non-linear / linear loads | <u>Non-linear loads (computers):</u><br>0.7 to 0.8<br><u>Linear loads (inductive/resistive/capacitive):</u><br>0.6 to 0.8 lagging/leading |
| 5.3.1  | Rated output voltage   | 380 VAC (selectable);<br>400 VAC (factory setting);<br>415 VAC (selectable)   |
| 5.3.1.2  | Wave shape stored energy mode                                    | Sinusoidal  |
| 6.3.4.3  | Rated peak output voltage  | 566 V   |
| 6.3.4.4  | Output voltage variation   | ? 1 % stability   |
| 6.3.4.4  | Rated peak output voltage variation                              | 560 to 571 V  |
| 6.3.4.4  | Total output voltage distortion                                  | 3% THD linear load;<br>5% THD normative non-linear load   |
|  | Rated output current   | PW9340-80I-N: 3 x 116 A<br>PW9340-100I-N: 3 x 145 A<br>PW9340-130I-N: 3 x 188 A   |
| 5.3.2 and 6.3.5.2  | Overload capability  | 101 to 110% for 10 min (online);<br>110 to 125% for 1 min (online);<br>125 to 150% for 30 sec (online);<br>1000% for 1 cycle (bypass)     |
| 5.3.2 and 6.3.5.4  | Short circuit capability   | 520 Amp phase to neutral 300 ms,<br>300 Amp phase to phase 300 ms   |
| 5.3.2  | Output frequency   | 50 / 60 Hz, selectable  |
| 5.3.2  | Output frequency variation                                       | ± 0,05 Hz free running  |
| <b>ELECTRICAL OUTPUT CHARACTERISTICS - DYNAMIC CHARACTERISTICS - STORED ENERGY</b> |  |   |
| 6.3.7.1  | Output voltage dynamic variation due to load changes             | ?5% at 100% load step, recovery in less than 3 ms to steady state; see Figure 1   |
|  | Maximum rate of change of output frequency                       | 0.5 Hz / s  |

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| <b>STORED ENERGY MODE OF OPERATION</b> |  |  |
|--|--|--|
|  | Battery Management   | ABM with temperature compensation and automatic discharge testing  |
|  | Battery type   | Valve Regulated Lead Acid; 10 years design.  |
| 6.3.9.1                                | Stored energy time   | Varies with the battery used (5-45+ min.)  |
|  | Nominal battery voltage                                    | 384 VDC which equals to 192 cells  |
| 6.3.9.1                                | Battery cut-off voltage:<br>- nominal full load conditions | 1.7 VDC per cell, at full rated output,<br>higher at lower discharge levels  |
|  | DC bus voltage reference in float mode                     | 2.31VPC (10...25°C), 2.26VPC (50°C)  |
| 6.3.9.2                                | Restored energy time to 90% charge                         | 10 times discharge time is typical and depends on the Ah rating of battery bank.   |
|  | Battery charging current                                   | Charging current depends on the UPS load:<br>0 to 90 kW, max. charging 30 A (selectable)<br>90 to 95 kW, max. charging 20 A<br>95 to 104 kW, max. charging 10 A.<br>>104, max. charging 5 A  |
| <b>BYPASS CHARACTERISTICS</b>          |  |  |
| 5.5.2                                  | Type of bypass   | Automatic and Manual bypass as standard  |
| 5.5.2                                  | Mechanical / static  | Mechanical (manual); Static (automatic)  |
| 5.5.2                                  | No break transfer / break transfer                         | No break transfer  |
| 5.5.2                                  | Break time / make time                                     | No break transfer  |
| 5.5.2                                  | Maintenance bypass   | Yes (Mechanical bypass)  |
| 5.5.2                                  | Bypass protection (fixed wiring)                           | 80 kVA: 125 A, type gL fuses or breaker;<br>100 kVA: 160 A, type gL fuses or breaker;<br>130 kVA: 200 A, type gL fuses or breaker<br><i>Note!</i> A readily accessible disconnect device must be incorporated in the fixed wiring. |
| 5.5.2                                  | Galvanic isolation fitted                                  | Ext. bypass isolation upon request.  |
| <b>SYNCHRONIZATION</b>                 |  |  |
| 6.3.6.4                                | Acceptable voltage difference                              | +10% to -15%, selectable   |
| 6.3.2.2                                | Range of frequency synch                                   | ?3 Hz, selectable ?0.5 to ?3 Hz,<br>default ?2 Hz  |
| 6.3.6.4                                | Maximum phase error  | 3°   |
| <b>ELECTROMAGNETIC COMPATIBILITY</b>   |  |  |
|  | Immunity   | EN 50091-2, IEC 62040-2  |
|  | Emission   | EN 50091-2, IEC 62040-2  |

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**Figure 1 - Output dynamic performance classification 1**

UPS conforming to this standard shall have output voltage dynamic performance characteristics not exceeding the limits of figure 1 under the following conditions by IEC 62040-3:

- a) Change of operating mode
- b) Application of increasing/decreasing load steps under linear and reference non-linear load