

Eaton 93PM 30-50kW UPS Technical Specification

Manufacturer's declaration in accordance with IEC 62040-3

| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 30kW | 40kW | 50kW |
|-----------------------|--------------------------------|---|----------------|----------------|
| | Model catalogue reference | 93PM-30(50)-BB | 93PM-40(50)-BB | 93PM-50(50)-BB |
| | Number of internal batteries | 0 to 6 x 36 blocks | | |
| | UPS options | Long life batteries (LL) Internal maintenance bypass switch (MBS) External maintenance bypass switch External battery cabinets | | |
| | Upgradability | Yes, up to 50 kW | - | |
| 5.1.1 | UPS topology | Double conversion, IGBT converters | | |
| 5.3.4 | UPS performance classification | VFI-SS-111 | | |

MECHANICAL

| | | | | |
|--|--|---|--|--|
| | UPS dimensions (width x depth x height) | 560 x 914 x 1876 mm | | |
| | Weight, UPS and internal batteries | | | |
| | UPS + 0 BAT | 288 kg | | |
| | UPS + 3 BAT | 579 kg | | |
| | UPS + 4 BAT | 676 kg | | |
| | UPS + 5 BAT | 773 kg | | |
| | UPS + 6 BAT | 870 kg | | |
| | Small External Battery Cabinet dimensions (width x depth x height) | 575 x 914 x 1876 mm | | |
| | Large External Battery Cabinet dimensions (width x depth x height) | 1086 x 914 x 1876 mm | | |
| | UPS Cable entry | Bottom entry or Bottom rear entry as standard. Top cable entry with optional kit | | |
| | UPS Degree of protection | IP 21 | | |
| | UPS colour | Black; RAL 9005 | | |

ENVIRONMENTAL

| | | | | |
|-----------------------|--|---|--|--|
| 6.5.5 | Acoustic noise at 1 m, in 25 °C ambient temperature | < 60 dBA in double conversion < 47 dBA in ESS | | |
| 4.1.4 | Ambient UPS storage temperature range | - 25 °C to + 55 °C in the protective package | | |
| 4.2.1.1 and 5.4.2.2 h | Ambient service temperature range UPS Internal battery | + 5 °C to + 40 °C* *No output power derating required. + 20 °C to + 25 °C recommended for optimized battery life time | | |

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Page 1 of 6

Author: Sini Syvänen

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Document: Eaton 93PM 30-50kW technical specification RevB3.docx

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| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 30kW | 40kW | 50kW |
|-----------------------|--------------------------|--|------|------|
| 4.2.1.1 | Relative humidity range | 5 to 95%, no condensation allowed | | |
| 4.2.1.2 | Maximum service altitude | 1000 m (3300 ft) above sea level Maximum 2000 m (6600 ft) with 1% derating per each add. 100m | | |

EFFICIENCY

| | | | | | |
|---------------------|--|-----------|--------|--------|--------|
| 5.3.2 r and 6.4.1.6 | Efficiency in double-conversion, rated linear load | 100% load | 96,6% | 96,5% | 96,3% |
| | | 75% load | 96,6% | 96,6% | 96,6% |
| | | 50% load | 96,1% | 96,5% | 96,6% |
| | | 25% load | 94,0% | 95,1% | 95,7% |
| | Heat dissipation in double conversion | 100% load | 1020 W | 1400 W | 1850 W |
| | | 75% load | 765 W | 1020 W | 1275 W |
| | | 50% load | 585 W | 700 W | 850 W |
| | | 25% load | 450 W | 490 W | 537 W |
| | Efficiency in ESS, rated linear load | 100% load | 99,0% | 99,1% | 99,2% |
| | | 75% load | 99,0% | 99,0% | 99,1% |
| | | 50% load | 98,5% | 98,9% | 99,0% |
| | | 25% load | 97,5% | 98,1% | 98,3% |

ELECTRICAL CHARACTERISTICS

INPUT

| | | | | |
|---------------------|------------------------|--------------------------------|--------------------|--------------------|
| 5.2.1.a and 5.2.1 b | Rated input voltage | 220/380V; 230/400 V; 240/415 V | | |
| | Voltage tolerance | Rectifier input | 230 V -15% / +20% | |
| | | Bypass input | 230 V -15% / +10% | |
| 5.2.1 c and 5.2.1 d | Rated input frequency | 50 or 60 Hz, user configurable | | |
| | Frequency tolerance | 40 to 72 Hz | | |
| 5.2.2 a and 5.2.2 b | Number of input phases | 3 phases + neutral | | |
| | | Rectifier input | 3 phases + neutral | |
| | Bypass input | 3 phases + neutral | | |
| 5.2.2 d | Input power factor | 0,99 | | |
| 5.2.2 c | Rated input current | 48 A r.m.s (380 V) | 64 A r.m.s (380 V) | 80 A r.m.s (380 V) |
| | | 46 A r.m.s (400 V) | 61 A r.m.s (400 V) | 76 A r.m.s (400 V) |
| | | 44 A r.m.s (415 V) | 58 A r.m.s (415 V) | 73 A r.m.s (415 V) |
| 5.2.2 f | Maximum input current | 95 A | | |

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Page 2 of 6

Author: Sini Syvänen

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Document: Eaton 93PM 30-50kW technical specification RevB3.docx



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Eaton 93PM 30-50kW UPS Technical Specification

Manufacturer's declaration in accordance with IEC 62040-3

| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 30kW | 40kW | 50kW |
|-----------------------|--|---|------|------|
| 5.2.2 h and 5.2.2. i | Input current distortion at rated input current | < 4.5% | | < 3% |
| 5.2.2 e | In-rush current | NA. Input filter components only | | |
| 5.2.2 k | AC power distribution system compatibility | TN and TN-S | | |
| | Rectifier ramp-up, rectifier start and load step | 10 A/s (default), configurable. Minimum 1 A/s. | | |
| | Backfeed protection | Yes, for rectifier and bypass lines | | |

ELECTRICAL CHARACTERISTICS

OUTPUT

| | | | | |
|---------------------|---|---|----------------|----------------|
| 5.3.2 f | Number of output phases | 3 phases + neutral | | |
| | Crest factor | 3 | | |
| 5.3.2 b | Rated output voltage | 220/380 V; 230/400 V; 240/415 V, configurable | | |
| 5.3.2 b | Output voltage variation, steady state | < 1% | | |
| 5.3.2 i | Total voltage harmonic distortion | | | |
| | 100% linear load | < 1% | | |
| | 100% non-linear load | < 5% | | |
| 5.3.2 q | Voltage unbalance at reference unbalanced load | < 0,1% | | |
| 5.3.2 j | Voltage transient (r.m.s) at 100% step load | 4% | | |
| | Recovery time to steady state at 100% step load | 50ms | | |
| 5.3.2 c | Rated output frequency | 50 or 60 Hz, configurable | | |
| | Output frequency variation | ± 0,1 Hz | | |
| | Slew rate | 1 Hz/s | | |
| 5.3.2 d and 5.3.2 e | Maximum frequency range for synchronization with bypass | ± 4 Hz as default. User settable 0,5 to 5 Hz. | | |
| | Maximum synchronized phase error | < 1° with static balanced load | | |
| | Maximum slew-rate when synchronizing | 1 Hz/s | | |
| 5.3.2 k | Rated output power | 30 kW / 30 kVA | 40 kW / 40 kVA | 50 kW / 50 kVA |

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Page 3 of 6

Author: Sini Syvänen

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| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 30kW | 40kW | 50kW |
|---------------------------|---|---|-------------------------------------|---------------------------------------|
| 5.3.2 l | Overload capability On inverter | 10 min 102-110% load 60 sec 111-125% load 10 sec 126-150% load 400 ms >150% load | | |
| | Overload capability On inverter, stored energy mode | 10 min 102-110% load 60 sec 111-125% load 400 ms >126% load | | |
| | Overload capability On bypass | Continuous < 125% load 10 ms 1000% load | | |
| 5.3.2 m | Output current limitation, short-circuit capability | 180 A, 400 ms 4 x I _n | 180 A, 400 ms 3 x I _n | 180 A, 400 ms 2,5 x I _n |
| 6.4.2.10.3 and 6.4.2.10.4 | Fault clearing capability | 35 A gG fuse | | |
| 5.3.2 o and 5.3.2 p | Load power factor Rated Permitted range | 1.0 0.8 lagging to 0.8 leading | | |

EARTH LEAKAGE CURRENTS

| | | | |
|--|---|---------------|---------|
| | Protective conductor current, at full resistive load | Online | 40 mA |
| | | Bypass | 40 mA |
| | | Stored Energy | 20 mA |
| | Protective conductor current, at full non-linear load | Online | 50 mA |
| | | Bypass | 200 mA |
| | | Stored Energy | < 10 mA |

ESS MODE CHARACTERISTICS

| | | |
|--|---------------------------------------|--|
| | Transfer time to double-conversion | No break Typically 2 ms |
| | Mains available | |
| | Mains failure | |
| | Acceptable output voltage variation | ±10% of nominal voltage |
| | Acceptable output frequency variation | ± 3 Hz |
| | Storm detection | UPS locks into double-conversion mode when three power line disturbances have forced the unit to double-conversion three times (user adjustable) within a one-hour period (user adjustable). |

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Page 4 of 6

Author: Sini Syvänen

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|-----------------------|-------------------------|------|------|------|
|-----------------------|-------------------------|------|------|------|

| | | | | |
|--|-----------------|--|--|--|
| | High Alert mode | UPS will stay on double-conversion for one hour (user adjustable), after which the unit will automatically return to operate on ESS. | | |
|--|-----------------|--|--|--|

BYPASS

| | | | | |
|--|---|--|----------|-----------|
| | Type of bypass | Static | | |
| | Bypass rating | 50 kW | | |
| | Bypass voltage range | 220/380 V; 230/400 V; 240/415 V tolerance -15% / +10% of 230V | | |
| | Transfer time break | No break | | |
| | Maintenance bypass | Option; internal or external | | |
| | Bypass thyristor i^2t value, $T_{vj} = 25^{\circ}\text{C}$, 8,3 to 10 ms $T_{vj} = 130^{\circ}\text{C}$, 8,3 to 10 ms | 25 000 A ² s 18 000 A ² s | | |
| | Required external bypass protective fuse, recommended rating | 3 x 63 A | 3 x 80 A | 3 x 100 A |

BATTERY CHARACTERISTICS

| | | | | |
|-----------|---------------------------|---|--|--|
| 5.4.2.2 d | Battery technology | 12 V, VRLA | | |
| 5.4.2.2 a | Battery design life | 5 or 10 years | | |
| 5.4.2.2 b | Battery quantity | 36 blocks, 216 cells per battery string | | |
| 5.4.2.2 c | Battery voltage | 432 V | | |
| 5.4.2.2 e | Nominal Ah capacity (C10) | Internal batteries 9 Ah or 7 Ah | | |
| 5.4.2.2 f | Stored energy time | See separate declaration | | |
| 5.4.2.2 o | Recharge profile | ABM or float | | |
| 5.4.2.2 q | End of discharge voltage | 1.67 VPC to 1.75 VPC Configurable or automatic (load adaptive) | | |
| 5.4.2.2 r | Charge current limit | Default 12A, configurable Maximum 22 A | | |
| | Battery start option | Yes | | |

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Page 5 of 6

Author: Sini Syvänen

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|--------------------------|--------------------------------|-------------|-------------|-------------|

COMMUNICATION CIRCUITS

| | | |
|-----|---|---|
| 5.6 | Standard connectivity ports | Device USB and Host USB, RS-232 service port, relay output, 5 building alarm inputs and a dedicated EPO Web and SNMP card |
| | Complete list of indications and interface devices | See User's Manual |

COMPLIANCE WITH STANDARDS

| | | |
|----------------|--|--|
| IEC 62040-1 | Safety Degree of protection | Access Restricted access IP 21; protection against medium sized foreign matter (incl. finger), protection against vertically dripping water. |
| IEC 62040-2 | Electromagnetic Compatibility Immunity Emissions | EMC Category C2 EMC Category C2 |

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Page 6 of 6

Author: Sini Syvänen

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Document: Eaton 93PM 30-50kW technical specification RevB3.docx

Eaton 93PM 80-100kW UPS Technical Specification

Manufacturer's declaration in accordance with IEC 62040-3

| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 80kW | 100kW |
|-----------------------|--------------------------------|--|---------------|
| | Model catalogue reference | 93PM-80(100) | 93PM-100(100) |
| | UPS options | Internal Input Switch (IS) Internal Battery Breaker (BB) Internal maintenance bypass switch (MBS) External maintenance bypass switch External battery cabinets | |
| | Upgradability | Yes, up to 100 kW | - |
| 5.1.1 | UPS topology | Double conversion, IGBT converters | |
| 5.3.4 | UPS performance classification | VFI-SS-111 | |

MECHANICAL

| | | |
|--|--|---|
| | UPS dimensions (width x depth x height) | 560 x 914 x 1876 mm |
| | Weight, UPS | |
| | Small External Battery Cabinet dimensions (width x depth x height) | 575 x 914 x 1876 mm |
| | Large External Battery Cabinet dimensions (width x depth x height) | 1086 x 914 x 1876 mm |
| | UPS Cable entry | Bottom entry or Bottom rear entry as standard. Top cable entry with optional kit |
| | UPS Degree of protection | IP 21 |
| | UPS colour | Black; RAL 9005 |

ENVIRONMENTAL

| | | |
|-----------------------|--|--|
| 6.5.5 | Acoustic noise at 1 m, in 25 °C ambient temperature | < 65 dBA in double conversion < 47 dBA in ESS |
| 4.1.4 | Ambient UPS storage temperature range | - 25 °C to + 55 °C in the protective package |
| 4.2.1.1 and 5.4.2.2 h | Ambient service temperature range UPS Battery | + 5 °C to + 40 °C* <i>*No output power derating required.</i> + 20 °C to + 25 °C recommended for optimized battery life time |
| 4.2.1.1 | Relative humidity range | 5 to 95%, no condensation allowed |
| 4.2.1.2 | Maximum service altitude | 1000 m (3300 ft) above sea level Maximum 2000 m (6600 ft) with 1% derating per each add. 100m |

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Page 1 of 6

Author: Sini Syvänen

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Document: Eaton 93PM 80-100kW technical specification Rev A2.docx



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Eaton 93PM 80-100kW UPS Technical Specification

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| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 80kW | 100kW |
|-----------------------|-------------------------|------|-------|
|-----------------------|-------------------------|------|-------|

EFFICIENCY

| | | | | |
|---------------------|--|-----------|--------|--------|
| 5.3.2 r and 6.4.1.6 | Efficiency in double-conversion, rated linear load | 100% load | 96,3% | 96,3% |
| | | 75% load | 96,7% | 96,7% |
| | | 50% load | 96,7% | 96,7% |
| | Heat dissipation in double conversion | 100% load | 2960 W | 3700 W |
| | | 75% load | 1980 W | 2475 W |
| | | 50% load | 1320 W | 1650 W |
| | Efficiency in ESS, rated linear load | 100% load | 99,1% | 99,2% |
| | | 75% load | 99,0% | 99,1% |
| | | 50% load | 99,0% | 99,0% |
| | | 25% load | 98,1% | 98,3% |

ELECTRICAL CHARACTERISTICS

INPUT

| | | | |
|----------------------|---|----------------------------------|--------------------|
| 5.2.1.a and 5.2.1 b | Rated input voltage | 220/380V; 230/400 V; 240/415 V | |
| | Voltage tolerance | Rectifier input | 230 V -15% / +20% |
| | | Bypass input | 230 V -15% / +10% |
| 5.2.1 c and 5.2.1 d | Rated input frequency | 50 or 60 Hz, user configurable | |
| | Frequency tolerance | 40 to 72 Hz | |
| 5.2.2 a and 5.2.2 b | Number of input phases | 3 phases + neutral | |
| | | Rectifier input | 3 phases + neutral |
| | | Bypass input | 3 phases + neutral |
| 5.2.2 d | Input power factor | 0,99 | |
| 5.2.2 c | Rated input current | 127 A r.m.s (380V) | 159 A r.m.s (380V) |
| | | 121 A r.m.s (400V) | 151 A r.m.s (400V) |
| | | 116 A r.m.s (415V) | 145 A r.m.s (415V) |
| 5.2.2 f | Maximum input current | 200A | |
| 5.2.2 h and 5.2.2. i | Input current distortion at rated input current | < 3% | |
| 5.2.2 e | In-rush current | NA. Input filter components only | |

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Page 2 of 6

Author: Sini Syvänen

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Document: Eaton 93PM 80-100kW technical specification Rev A2.docx



Powering Business Worldwide

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| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 80kW | 100kW |
|-----------------------|--|---|-------|
| 5.2.2 k | AC power distribution system compatibility | TN and TN-S | |
| | Rectifier ramp-up, rectifier start and load step | 10 A/s (default), configurable. Minimum 1 A/s. | |
| | Backfeed protection | Yes, for rectifier and bypass lines | |

ELECTRICAL CHARACTERISTICS

OUTPUT

| | | | |
|---------------------|---|---|----------------|
| 5.3.2 f | Number of output phases | 3 phases + neutral | |
| | Crest factor | 3 | |
| 5.3.2 b | Rated output voltage | 220/380 V; 230/400 V; 240/415 V, configurable | |
| 5.3.2 b | Output voltage variation, steady state | | |
| 5.3.2 i | Total voltage harmonic distortion 100% linear load 100% non-linear load | < 1% < 5% | |
| 5.3.2 q | Voltage unbalance at reference unbalanced load Phase displacement at reference unbalanced load | | |
| 5.3.2 j | Voltage transient (r.m.s) at 100% step load Recovery time to steady state at 100% step load | | |
| 5.3.2 c | Rated output frequency Output frequency variation Slew rate | 50 or 60 Hz, configurable $\pm 0,1$ Hz 1 Hz/s | |
| 5.3.2 d and 5.3.2 e | Maximum frequency range for synchronization with bypass Maximum synchronized phase error Maximum slew-rate when synchronizing | ± 4 Hz as default. User settable 0,5 to 5 Hz. < 1° with static balanced load 1 Hz/s | |
| 5.3.2 k | Rated output power | 80kW / 80kVA | 100kW / 100kVA |
| 5.3.2 l | Overload capability On inverter | 10 min 102-110% load 60 sec 111-125% load 10 sec 126-150% load 400 ms >150% load | |

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Page 3 of 6

Author: Sini Syvänen

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Document: Eaton 93PM 80-100kW technical specification Rev A2.docx

Eaton 93PM 80-100kW UPS Technical Specification

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| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 80kW | 100kW |
|---------------------------|--|---|-----------------------------------|
| | Overload capability On inverter, stored energy mode | 10 min 102-110% load 60 sec 111-125% load 400 ms >126% load | |
| | Overload capability On bypass | Continuous < 125% load 10 ms 1000% load | |
| 5.3.2 m | Output current limitation, short-circuit capability | 360 A, 400 ms $3 \times I_n$ | 360 A, 400 ms $2,5 \times I_n$ |
| 6.4.2.10.3 and 6.4.2.10.4 | Fault clearing capability | | |
| 5.3.2 o and 5.3.2 p | Load power factor Rated Permitted range | 1.0 0.8 lagging to 0.8 leading | |

EARTH LEAKAGE CURRENTS

| | | |
|--|--|--|
| | Protective conductor current, at full resistive load Online Bypass Stored Energy | |
| | Protective conductor current, at full non-linear load Online Bypass Stored Energy | |

ESS MODE CHARACTERISTICS

| | | |
|--|--|--|
| | Transfer time to double-conversion Mains available Mains failure | No break Typically 2 ms |
| | Acceptable output voltage variation | $\pm 10\%$ of nominal voltage |
| | Acceptable output frequency variation | ± 3 Hz |
| | Storm detection | UPS locks into double-conversion mode when three power line disturbances have forced the unit to double-conversion three times (user adjustable) within a one-hour period (user adjustable). |
| | High Alert mode | UPS will stay on double-conversion for one hour (user adjustable), after which the unit will automatically return to operate on ESS. |

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Page 4 of 6

Author: Sini Syvänen

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Document: Eaton 93PM 80-100kW technical specification Rev A2.docx

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| | | | |
|--------------------------|-------------------------|------|-------|
| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 80kW | 100kW |
|--------------------------|-------------------------|------|-------|

BYPASS

| | |
|--------------------------|--|
| Type of bypass | Static |
| Bypass rating | 100 kW |
| Bypass voltage range | 220/380 V; 230/400 V; 240/415 V tolerance -15% / +10% of 230V |
| Transfer time break | No break |
| Maintenance bypass | Option; internal or external |
| Bypass fuse I^2t value | 13 500 A ² s |

BATTERY CHARACTERISTICS

| | | |
|-----------|--------------------------|---|
| 5.4.2.2 d | Battery technology | 12 V, VRLA |
| 5.4.2.2 b | Battery quantity | 36 blocks, 216 cells per battery string or 40 blocks, 240 cells per battery string |
| 5.4.2.2 c | Battery voltage | 432 V (36 blocks) or 480V (40 blocks) |
| 5.4.2.2 f | Stored energy time | See separate declaration |
| 5.4.2.2 o | Recharge profile | ABM or float |
| 5.4.2.2 q | End of discharge voltage | 1.67 VPC to 1.75 VPC Configurable or automatic (load adaptive) |
| 5.4.2.2 r | Charge current limit | Default 24 A, configurable Maximum 44 A |
| | Battery start option | Yes |

COMMUNICATION CIRCUITS

| | | |
|-----|---|---|
| 5.6 | Standard connectivity ports | Device USB and Host USB, RS-232 service port, relay output, 5 building alarm inputs and a dedicated EPO Web and SNMP card |
| | Complete list of indications and interface devices | See User's Manual |

COMPLIANCE WITH STANDARDS

| | | | |
|----------------|--------|--------------------------------|-----------------------------|
| IEC 62040-1 | Safety | Access Degree of protection | Restricted access IP 21; |
|----------------|--------|--------------------------------|-----------------------------|

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Page 5 of 6

Author: Sini Syvänen

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Document: Eaton 93PM 80-100kW technical specification Rev A2.docx

Eaton 93PM 80-100kW UPS Technical Specification

Manufacturer's declaration in accordance with IEC 62040-3

| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 80kW | 100kW |
|--------------------------|--|---|-------|
| | | protection against medium sized foreign matter (incl. finger), protection against vertically dripping water. | |
| IEC 62040-2 | Electromagnetic Compatibility Immunity Emissions | EMC Category C3 EMC Category C3 | |

The technical specification is subject to change without notice.

Page 6 of 6

Author: Sini Syvänen

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Document: Eaton 93PM 80-100kW technical specification Rev A2.docx

Eaton 93PM 120-150kW UPS Technical Specification

Manufacturer's declaration in accordance with IEC 62040-3

| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 120kW | 150kW |
|-----------------------|--------------------------------|--|---------------|
| | Model catalogue reference | 93PM-120(150) | 93PM-150(150) |
| | UPS options | Internal Input Switch (IS) Internal Battery Breaker (BB) Internal maintenance bypass switch (MBS) External maintenance bypass switch External battery cabinets | |
| | Upgradability | Yes, up to 150 kW | - |
| 5.1.1 | UPS topology | Double conversion, IGBT converters | |
| 5.3.4 | UPS performance classification | VFI-SS-111 | |

MECHANICAL

| | | |
|--|--|---|
| | UPS dimensions (width x depth x height) | 560 x 914 x 1876 mm |
| | Weight, UPS | |
| | Small External Battery Cabinet dimensions (width x depth x height) | 575 x 914 x 1876 mm |
| | Large External Battery Cabinet dimensions (width x depth x height) | 1086 x 914 x 1876 mm |
| | UPS Cable entry | Bottom entry or Bottom rear entry as standard. Top cable entry with optional kit |
| | UPS Degree of protection | IP 21 |
| | UPS colour | Black; RAL 9005 |

ENVIRONMENTAL

| | | |
|-----------------------|---|--|
| 6.5.5 | Acoustic noise at 1 m, in 25 °C ambient temperature | < 65 dBA in double conversion < 47 dBA in ESS |
| 4.1.4 | Ambient UPS storage temperature range | - 25 °C to + 55 °C in the protective package |
| 4.2.1.1 and 5.4.2.2 h | Ambient service temperature range UPS Battery | + 5 °C to + 40 °C* <i>*No output power derating required.</i> + 20 °C to + 25 °C recommended for optimized battery life time |
| 4.2.1.1 | Relative humidity range | 5 to 95%, no condensation allowed |
| 4.2.1.2 | Maximum service altitude | 1000 m (3300 ft) above sea level Maximum 2000 m (6600 ft) with 1% derating per each add. 100m |

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Page 1 of 6

Author: Sini Syvänen

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Document: Eaton 93PM 120-150kW technical specification RevA2.docx

Eaton 93PM 120-150kW UPS Technical Specification

Manufacturer's declaration in accordance with IEC 62040-3

| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 120kW | 150kW |
|-----------------------|-------------------------|-------|-------|
|-----------------------|-------------------------|-------|-------|

EFFICIENCY

| | | | | |
|---------------------|--|-----------|--------|--------|
| 5.3.2 r and 6.4.1.6 | Efficiency in double-conversion, rated linear load | 100% load | 96,3% | 96,3% |
| | | 75% load | 96,7% | 96,7% |
| | | 50% load | 96,7% | 96,7% |
| | Heat dissipation in double conversion | 100% load | 4440 W | 5550 W |
| | | 75% load | 2970 W | 3712 W |
| | | 50% load | 1980 W | 2475 W |
| | Efficiency in ESS, rated linear load | 100% load | 99,1% | 99,2% |
| | | 75% load | 99,0% | 99,1% |
| | | 50% load | 99,0% | 99,0% |
| | | 25% load | 98,1% | 98,3% |

ELECTRICAL CHARACTERISTICS

INPUT

| | | | |
|----------------------|---|----------------------------------|--------------------|
| 5.2.1.a and 5.2.1 b | Rated input voltage | 220/380V; 230/400 V; 240/415 V | |
| | Voltage tolerance | Rectifier input | 230 V -15% / +20% |
| | | Bypass input | 230 V -15% / +10% |
| 5.2.1 c and 5.2.1 d | Rated input frequency | 50 or 60 Hz, user configurable | |
| | Frequency tolerance | 40 to 72 Hz | |
| 5.2.2 a and 5.2.2 b | Number of input phases | 3 phases + neutral | |
| | | Rectifier input | 3 phases + neutral |
| | | Bypass input | 3 phases + neutral |
| 5.2.2 d | Input power factor | 0,99 | |
| 5.2.2 c | Rated input current | 190 A r.m.s (380V) | 238 A r.m.s (380V) |
| | | 181 A r.m.s (400V) | 226 A r.m.s (400V) |
| | | 174 A r.m.s (415V) | 217 A r.m.s (415V) |
| 5.2.2 f | Maximum input current | 300 A | |
| 5.2.2 h and 5.2.2. i | Input current distortion at rated input current | < 3% | |
| 5.2.2 e | In-rush current | NA. Input filter components only | |

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Page 2 of 6

Author: Sini Syvänen

Updated: 10.07.2013

Document: Eaton 93PM 120-150kW technical specification RevA2.docx



Powering Business Worldwide

Eaton 93PM 120-150kW UPS Technical Specification

Manufacturer's declaration in accordance with IEC 62040-3

| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 120kW | 150kW |
|-----------------------|--|---|-------|
| 5.2.2 k | AC power distribution system compatibility | TN and TN-S | |
| | Rectifier ramp-up, rectifier start and load step | 10 A/s (default), configurable. Minimum 1 A/s. | |
| | Backfeed protection | Yes, for rectifier and bypass lines | |

ELECTRICAL CHARACTERISTICS

OUTPUT

| | | | |
|---------------------|---|---|----------------|
| 5.3.2 f | Number of output phases | 3 phases + neutral | |
| | Crest factor | 3 | |
| 5.3.2 b | Rated output voltage | 220/380 V; 230/400 V; 240/415 V, configurable | |
| 5.3.2 b | Output voltage variation, steady state | | |
| 5.3.2 i | Total voltage harmonic distortion 100% linear load 100% non-linear load | < 1% < 5% | |
| 5.3.2 q | Voltage unbalance at reference unbalanced load Phase displacement at reference unbalanced load | | |
| 5.3.2 j | Voltage transient (r.m.s) at 100% step load Recovery time to steady state at 100% step load | | |
| 5.3.2 c | Rated output frequency Output frequency variation Slew rate | 50 or 60 Hz, configurable $\pm 0,1$ Hz 1 Hz/s | |
| 5.3.2 d and 5.3.2 e | Maximum frequency range for synchronization with bypass Maximum synchronized phase error Maximum slew-rate when synchronizing | ± 4 Hz as default. User settable 0,5 to 5 Hz. < 1° with static balanced load 1 Hz/s | |
| 5.3.2 k | Rated output power | 120kW / 120kVA | 150kW / 150kVA |
| 5.3.2 l | Overload capability On inverter | 10 min 102-110% load 60 sec 111-125% load 10 sec 126-150% load 400 ms >150% load | |

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Page 3 of 6

Author: Sini Syvänen

Updated: 10.07.2013

Document: Eaton 93PM 120-150kW technical specification RevA2.docx

Eaton 93PM 120-150kW UPS Technical Specification

Manufacturer's declaration in accordance with IEC 62040-3

| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 120kW | 150kW |
|---------------------------|--|---|-----------------------------------|
| | Overload capability On inverter, stored energy mode | 10 min 102-110% load 60 sec 111-125% load 400 ms >126% load | |
| | Overload capability On bypass | Continuous < 125% load 10 ms 1000% load | |
| 5.3.2 m | Output current limitation, short-circuit capability | 540 A, 400 ms $3 \times I_n$ | 540 A, 400 ms $2,5 \times I_n$ |
| 6.4.2.10.3 and 6.4.2.10.4 | Fault clearing capability | | |
| 5.3.2 o and 5.3.2 p | Load power factor Rated Permitted range | 1.0 0.8 lagging to 0.8 leading | |

EARTH LEAKAGE CURRENTS

| | | |
|--|--|--|
| | Protective conductor current, at full resistive load Online Bypass Stored Energy | |
| | Protective conductor current, at full non-linear load Online Bypass Stored Energy | |

ESS MODE CHARACTERISTICS

| | | |
|--|--|--|
| | Transfer time to double-conversion Mains available Mains failure | No break Typically 2 ms |
| | Acceptable output voltage variation | $\pm 10\%$ of nominal voltage |
| | Acceptable output frequency variation | ± 3 Hz |
| | Storm detection | UPS locks into double-conversion mode when three power line disturbances have forced the unit to double-conversion three times (user adjustable) within a one-hour period (user adjustable). |
| | High Alert mode | UPS will stay on double-conversion for one hour (user adjustable), after which the unit will automatically return to operate on ESS. |

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Page 4 of 6

Author: Sini Syvänen

Updated: 10.07.2013

Document: Eaton 93PM 120-150kW technical specification RevA2.docx

Eaton 93PM 120-150kW UPS Technical Specification

Manufacturer's declaration in accordance with IEC 62040-3

| | | | |
|--------------------------|-------------------------|-------|-------|
| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 120kW | 150kW |
|--------------------------|-------------------------|-------|-------|

BYPASS

| | |
|--------------------------|--|
| Type of bypass | Static |
| Bypass rating | 150 kW |
| Bypass voltage range | 220/380 V; 230/400 V; 240/415 V tolerance -15% / +10% of 230V |
| Transfer time break | No break |
| Maintenance bypass | Option; internal or external |
| Bypass fuse i^2t value | 16 500 A ² s |

BATTERY CHARACTERISTICS

| | | |
|-----------|--------------------------|---|
| 5.4.2.2 d | Battery technology | 12 V, VRLA |
| 5.4.2.2 b | Battery quantity | 36 blocks, 216 cells per battery string or 40 blocks, 240 cells per battery string |
| 5.4.2.2 c | Battery voltage | 432 V (36 blocks) or 480V (40 blocks) |
| 5.4.2.2 f | Stored energy time | See separate declaration |
| 5.4.2.2 o | Recharge profile | ABM or float |
| 5.4.2.2 q | End of discharge voltage | 1.67 VPC to 1.75 VPC Configurable or automatic (load adaptive) |
| 5.4.2.2 r | Charge current limit | Default 36 A, configurable Maximum 66 A |
| | Battery start option | Yes |

COMMUNICATION CIRCUITS

| | | |
|-----|---|---|
| 5.6 | Standard connectivity ports | Device USB and Host USB, RS-232 service port, relay output, 5 building alarm inputs and a dedicated EPO Web and SNMP card |
| | Complete list of indications and interface devices | See User's Manual |

COMPLIANCE WITH STANDARDS

| | | |
|----------------|------------------------------------|--|
| IEC 62040-1 | Safety Degree of protection | Access Restricted access IP 21; protection against medium sized foreign matter (incl. finger), protection against vertically dripping water. |
|----------------|------------------------------------|--|

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Page 5 of 6

Author: Sini Syvänen

Updated: 10.07.2013

Document: Eaton 93PM 120-150kW technical specification RevA2.docx

Eaton 93PM 120-150kW UPS Technical Specification

Manufacturer's declaration in accordance with IEC 62040-3

| | | | |
|--------------------------|--|------------------------------------|-------|
| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 120kW | 150kW |
| IEC 62040-2 | Electromagnetic Compatibility Immunity Emissions | EMC Category C3 EMC Category C3 | |

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Page 6 of 6

Author: Sini Syvänen

Updated: 10.07.2013

Document: Eaton 93PM 120-150kW technical specification RevA2.docx

Eaton 93PM 160-200kW UPS Technical Specification

Manufacturer's declaration in accordance with IEC 62040-3

| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 160kW | 200kW |
|-----------------------|--------------------------------|---|---------------|
| | Model catalogue reference | 93PM-160(200) | 93PM-200(200) |
| | UPS options | External maintenance bypass switch External battery cabinets | |
| | Upgradability | Yes, up to 200 kW | - |
| 5.1.1 | UPS topology | Double conversion, IGBT converters | |
| 5.3.4 | UPS performance classification | VFI-SS-111 | |

MECHANICAL

| | | |
|--|--|---|
| | UPS dimensions (width x depth x height) | 760 x 914 x 1876 mm |
| | Weight, UPS | 556 kg |
| | Small External Battery Cabinet dimensions (width x depth x height) | 575 x 914 x 1876 mm |
| | Large External Battery Cabinet dimensions (width x depth x height) | 1086 x 914 x 1876 mm |
| | UPS Cable entry | Bottom entry or Bottom rear entry as standard. Top cable entry with optional kit |
| | UPS Degree of protection | IP 21 |
| | UPS colour | Black; RAL 9005 |

ENVIRONMENTAL

| | | |
|-----------------------|---|--|
| 6.5.5 | Acoustic noise at 1 m, in 25 °C ambient temperature | < 65 dBA in double conversion < 47 dBA in ESS |
| 4.1.4 | Ambient UPS storage temperature range | - 25 °C to + 55 °C in the protective package |
| 4.2.1.1 and 5.4.2.2 h | Ambient service temperature range UPS Battery | + 5 °C to + 40 °C* <i>*No output power derating required.</i> + 20 °C to + 25 °C recommended for optimized battery life time |
| 4.2.1.1 | Relative humidity range | 5 to 95%, no condensation allowed |
| 4.2.1.2 | Maximum service altitude | 1000 m (3300 ft) above sea level Maximum 2000 m (6600 ft) with 1% derating per each add. 100m |

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Page 1 of 6

Author: Sini Syvänen

Updated: 10.07.2013

Document: Eaton 93PM 160-200kW technical specification RevA2.docx

Eaton 93PM 160-200kW UPS Technical Specification

Manufacturer's declaration in accordance with IEC 62040-3

| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 160kW | 200kW |
|-----------------------|-------------------------|-------|-------|
|-----------------------|-------------------------|-------|-------|

EFFICIENCY

| | | | | |
|---------------------|--|-----------|--------|--------|
| 5.3.2 r and 6.4.1.6 | Efficiency in double-conversion, rated linear load | 100% load | 96,3% | 96,3% |
| | | 75% load | 96,7% | 96,7% |
| | | 50% load | 96,7% | 96,7% |
| | Heat dissipation in double conversion | 100% load | 5920 W | 7400 W |
| | | 75% load | 3960 W | 4950 W |
| | | 50% load | 2640 W | 3300 W |
| | Efficiency in ESS, rated linear load | 100% load | 99,1% | 99,2% |
| | | 75% load | 99,0% | 99,1% |
| | | 50% load | 99,0% | 99,0% |
| | | 25% load | 98,1% | 98,3% |

ELECTRICAL CHARACTERISTICS

INPUT

| | | | |
|----------------------|---|----------------------------------|--------------------|
| 5.2.1.a and 5.2.1 b | Rated input voltage | 220/380V; 230/400 V; 240/415 V | |
| | Voltage tolerance | Rectifier input | 230 V -15% / +20% |
| | | Bypass input | 230 V -15% / +10% |
| 5.2.1 c and 5.2.1 d | Rated input frequency | 50 or 60 Hz, user configurable | |
| | Frequency tolerance | 40 to 72 Hz | |
| 5.2.2 a and 5.2.2 b | Number of input phases | 3 phases + neutral | |
| | | Rectifier input | 3 phases + neutral |
| | | Bypass input | 3 phases + neutral |
| 5.2.2 d | Input power factor | 0,99 | |
| 5.2.2 c | Rated input current | 254 A r.m.s (380V) | 317 A r.m.s (380V) |
| | | 241 A r.m.s (400V) | 301 A r.m.s (400V) |
| | | 232 A r.m.s (415V) | 290 A r.m.s (415V) |
| 5.2.2 f | Maximum input current | 400 A | |
| 5.2.2 h and 5.2.2. i | Input current distortion at rated input current | < 3% | |
| 5.2.2 e | In-rush current | NA. Input filter components only | |
| 5.2.2 k | AC power distribution system compatibility | TN and TN-S | |

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Page 2 of 6

Author: Sini Syvänen

Updated: 10.07.2013

Document: Eaton 93PM 160-200kW technical specification RevA2.docx



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Eaton 93PM 160-200kW UPS Technical Specification

Manufacturer's declaration in accordance with IEC 62040-3

| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 160kW | 200kW |
|-----------------------|--|---|-------|
| | Rectifier ramp-up, rectifier start and load step | 10 A/s (default), configurable. Minimum 1 A/s. | |
| | Backfeed protection | Yes, for rectifier and bypass lines | |

ELECTRICAL CHARACTERISTICS

OUTPUT

| | | | |
|---------------------|---|---|----------------|
| 5.3.2 f | Number of output phases | 3 phases + neutral | |
| | Crest factor | 3 | |
| 5.3.2 b | Rated output voltage | 220/380 V; 230/400 V; 240/415 V, configurable | |
| 5.3.2 b | Output voltage variation, steady state | | |
| 5.3.2 i | Total voltage harmonic distortion 100% linear load 100% non-linear load | < 1% < 5% | |
| 5.3.2 q | Voltage unbalance at reference unbalanced load Phase displacement at reference unbalanced load | | |
| 5.3.2 j | Voltage transient (r.m.s) at 100% step load Recovery time to steady state at 100% step load | | |
| 5.3.2 c | Rated output frequency Output frequency variation Slew rate | 50 or 60 Hz, configurable $\pm 0,1$ Hz 1 Hz/s | |
| 5.3.2 d and 5.3.2 e | Maximum frequency range for synchronization with bypass Maximum synchronized phase error Maximum slew-rate when synchronizing | ± 4 Hz as default. User settable 0,5 to 5 Hz. < 1° with static balanced load 1 Hz/s | |
| 5.3.2 k | Rated output power | 160kW / 160kVA | 200kW / 200kVA |
| 5.3.2 l | Overload capability On inverter | 10 min 102-110% load 60 sec 111-125% load 10 sec 126-150% load 400 ms >150% load | |
| | Overload capability On inverter, stored energy mode | 10 min 102-110% load 60 sec 111-125% load 400 ms >126% load | |

The technical specification is subject to change without notice.

Page 3 of 6

Author: Sini Syvänen

Updated: 10.07.2013

Document: Eaton 93PM 160-200kW technical specification RevA2.docx

Eaton 93PM 160-200kW UPS Technical Specification

Manufacturer's declaration in accordance with IEC 62040-3

| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 160kW | 200kW |
|---------------------------|---|---------------------------------|--|
| | Overload capability | On bypass | Continuous < 125% load 10 ms 1000% load |
| 5.3.2 m | Output current limitation, short-circuit capability | 725 A, 400 ms $3 \times I_n$ | 725 A, 400 ms $2,5 \times I_n$ |
| 6.4.2.10.3 and 6.4.2.10.4 | Fault clearing capability | | |
| 5.3.2 o and 5.3.2 p | Load power factor | Rated Permitted range | 1.0 0.8 lagging to 0.8 leading |

EARTH LEAKAGE CURRENTS

| | | | |
|--|---|-----------------------------------|--|
| | Protective conductor current, at full resistive load | Online Bypass Stored Energy | |
| | Protective conductor current, at full non-linear load | Online Bypass Stored Energy | |

ESS MODE CHARACTERISTICS

| | | | |
|--|---------------------------------------|----------------------------------|--|
| | Transfer time to double-conversion | Mains available Mains failure | No break Typically 2 ms |
| | Acceptable output voltage variation | | $\pm 10\%$ of nominal voltage |
| | Acceptable output frequency variation | | ± 3 Hz |
| | Storm detection | | UPS locks into double-conversion mode when three power line disturbances have forced the unit to double-conversion three times (user adjustable) within a one-hour period (user adjustable). |
| | High Alert mode | | UPS will stay on double-conversion for one hour (user adjustable), after which the unit will automatically return to operate on ESS. |

BYPASS

| | | |
|--|----------------|--------|
| | Type of bypass | Static |
| | Bypass rating | 200 kW |

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Page 4 of 6

Author: Sini Syvänen

Updated: 10.07.2013

Document: Eaton 93PM 160-200kW technical specification RevA2.docx

Eaton 93PM 160-200kW UPS Technical Specification

Manufacturer's declaration in accordance with IEC 62040-3

| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 160kW | 200kW |
|-----------------------|--------------------------|--|-------|
| | Bypass voltage range | 220/380 V; 230/400 V; 240/415 V tolerance -15% / +10% of 230V | |
| | Transfer time break | No break | |
| | Maintenance bypass | Option; internal or external | |
| | Bypass fuse i^2t value | 69 500 A ² s | |

BATTERY CHARACTERISTICS

| | | | |
|-----------|--------------------------|---|--|
| 5.4.2.2 d | Battery technology | 12 V, VRLA | |
| 5.4.2.2 b | Battery quantity | 36 blocks, 216 cells per battery string or 40 blocks, 240 cells per battery string | |
| 5.4.2.2 c | Battery voltage | 432 V (36 blocks) or 480V (40 blocks) | |
| 5.4.2.2 f | Stored energy time | See separate declaration | |
| 5.4.2.2 o | Recharge profile | ABM or float | |
| 5.4.2.2 q | End of discharge voltage | 1.67 VPC to 1.75 VPC Configurable or automatic (load adaptive) | |
| 5.4.2.2 r | Charge current limit | Default 48 A, configurable Maximum 88 A | |
| | Battery start option | Yes | |

COMMUNICATION CIRCUITS

| | | | |
|-----|--|---|--|
| 5.6 | Standard connectivity ports | Device USB and Host USB, RS-232 service port, relay output, 5 building alarm inputs and a dedicated EPO Web and SNMP card | |
| | Complete list of indications and interface devices | See User's Manual | |

COMPLIANCE WITH STANDARDS

| | | | |
|-------------|--------|--------------------------------|--|
| IEC 62040-1 | Safety | Access Degree of protection | Restricted access IP 21; protection against medium sized foreign matter (incl. finger), protection against vertically dripping water. |
|-------------|--------|--------------------------------|--|

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Page 5 of 6

Author: Sini Syvänen

Updated: 10.07.2013

Document: Eaton 93PM 160-200kW technical specification RevA2.docx

Eaton 93PM 160-200kW UPS Technical Specification

Manufacturer's declaration in accordance with IEC 62040-3

| | | | |
|--------------------------|--|------------------------------------|-------|
| IEC 62040-3 Subclause | MODEL RATING (1.0 p.f.) | 160kW | 200kW |
| IEC 62040-2 | Electromagnetic Compatibility Immunity Emissions | EMC Category C3 EMC Category C3 | |

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Page 6 of 6

Author: Sini Syvänen

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