

UNINTERRUPTIBLE POWER SUPPLIES

ePower

Industrial UPS



GUSTAV KLEIN
POWER SUPPLIES - since 1948



Approved reliability and new innovations
a company introduce itself



The GUSTAV KLEIN company was founded in Schongau, Germany, in 1948. In 1969 a subsidiary factory was opened in Inzing, Austria west of Innsbruck.



Since January 1st 2007 Mr. Günther Stensitzki is managing director and sole owner of the company.



Since 1949 Gustav Klein regularly exhibits at German industrial fairs and is with over 60 exhibitions the “middle class company” with the longest history at the Hannover Fair. Meanwhile Gustav Klein presents worldwide itself on several fairs.

The manufacturing of transformers was the beginning of our rapidly expanding product palette, soon followed by voltage stabilizers and AC mains voltage regulators for radio and television broadcast transmitters of the Deutsche Bundespost (at that time the German telecommunications authority). The first thyristor rectifiers were developed and presented in 1960. When the design of the thyristor inverter was ready for production in 1962, these two were combined to form a “UPS system” which was completed in 1968 with the newly developed, fully uninterruptible, electronic AC mains switch device (Bypass).

Switch-mode rectifiers and DC converters were delivered from 1970 on.

As soon as high-current bipolar transistors became available in 1985, GUSTAV KLEIN began production of single-phase and 3-phase pulse-width modulated inverters and UPS equipment with ratings up to 100 kVA. New IGBT transistors made it possible to improve the efficiency of our UPS equipment in 1996. Since the year 2000 UPS systems with microprocessors and Touchscreen-Display are in our product range.



Today not only UPS system ratings up to 1500 kVA can be delivered but also bidirectional high power test and simulation systems for DC and AC are in our production range.

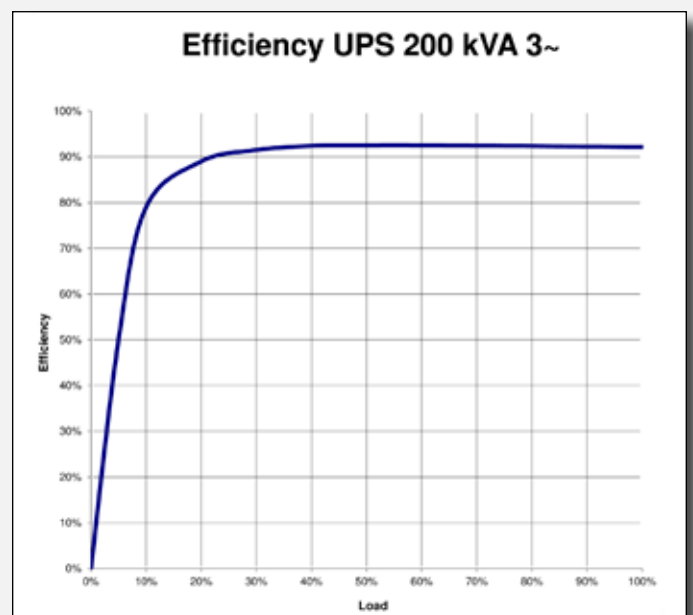
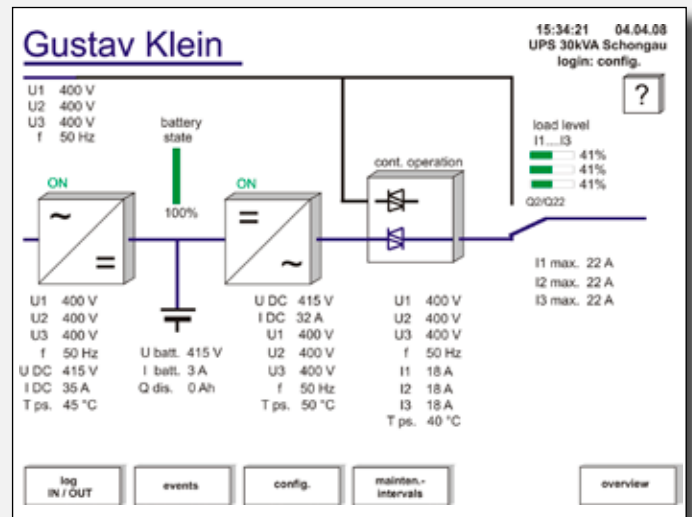
Requirements of industrial power supplies:

- High availability
- Spare part supply for 15 years
- Immunity against external EMC according to EN 62040-2
- Front access for all electronic devices
- Short repair time
- Easy repair



Advantages of GK industrial UPS Series 7011(3)

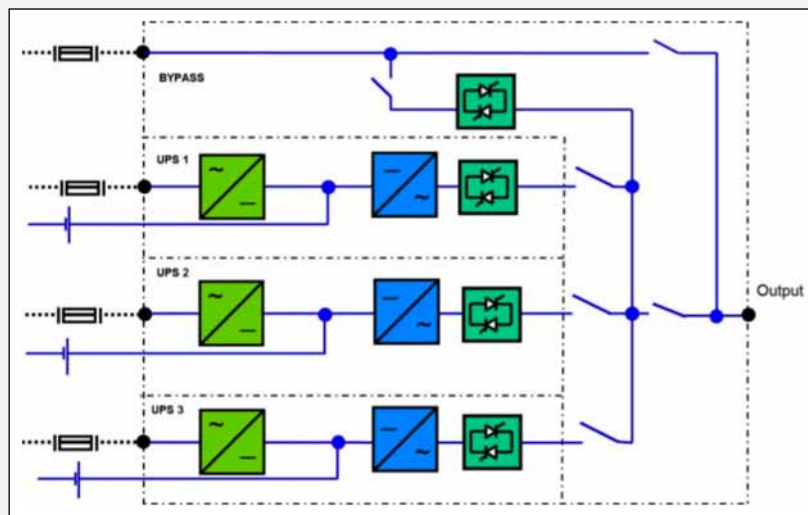
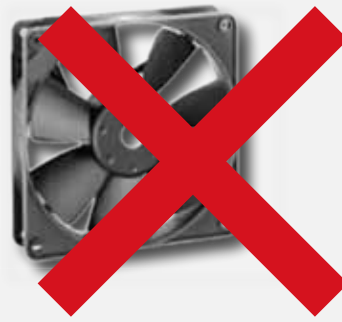
- IGBT PWM technology for rectifier and inverter
- Full time and full power (UPS nominal power) battery test
- Isolation transformer for rectifier and inverter (floating battery voltage)
- Individual control of rectifier, inverter and bypass with separate independent circuit boards
- Microprocessors do only serve for non critical applications, default does not lead to break down of output
- Additional safety by high test voltage (input or output against ground 2 kVAC; input against output 3.75 kVAC)
- Industrial style; generous design of components with reserves to the limit designed for continuous operation at rated load up to 40°C
- TFT display with separate microprocessor control
- proven technology more than 10 years in operation
- Separate feeds for rectifier and bypass
- Paralleling with loop control circuit



| | 1~ 1-phase UPS Type UPS-7011 | | | | | | | | | |
|---|------------------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|
| Rated power (power factor 0.8 lag.): | kVA | 10 | 20 | 30 | 50 | 80 | 100 | 120 | 160 | 200 |
| UPS-Input | | | | | | | | | | |
| Mains voltage | V | 3/N/PE AC 400/230V ± 10%, 50 or 60 Hz ± 5% | | | | | | | | |
| Input power factor | □ | IGBT-GR | | | | | | | | |
| Total harmonic distortion THD | % | | | | | | | | | |
| Power consumption from AC mains | | | | | | | | | | |
| - battery fully charged | kVA | 9,35 | 18,30 | 27,16 | 45,27 | 70,91 | 88,64 | 106,37 | 140,35 | 175,44 |
| Input current under charge: (Umains 400V) | A | 16,40 | 32,17 | 47,69 | 79,51 | 124,57 | 155,64 | 186,78 | 246,47 | 308,10 |
| Rectifier | | | | | | | | | | |
| Nominal rectifier output voltage | V | 372 | | | | | | | | |
| Rectifier output voltage range | V | 316-446 | | | | | | | | |
| Rectifier efficiency | % | 93 | 94 | 94 | 94 | 95 | 95 | 95 | 96 | 96 |
| Rectifier nominal output current(current limiting): | A | 27,5 | 54,4 | 80,7 | 134,6 | 213,1 | 266,3 | 319,6 | 426,1 | 532,6 |
| Battery charging current (current limiting): | A | 4,1 | 8,2 | 12,1 | 20,2 | 32,0 | 39,9 | 47,9 | 63,9 | 79,9 |
| Battery charging power | kW | 1,8 | 3,7 | 5,4 | 9,0 | 14,3 | 17,8 | 21,4 | 28,5 | 35,7 |
| Bypass | | | | | | | | | | |
| Bypass voltage | V | 1/N/PE AC 230V ± 10% | | | | | | | | |
| Recommended bypass input fuse (gL/GG): | A | 63 | 100 | 160 | 250 | 400 | 500 | 600 | 800 | 1000 |
| Overload capability for 10 msec. | A | 10 x In | 10 x In | 10 x In | 10 x In | 10 x In | 10 x In | 10 x In | 10 x In | 10 x In |
| Inverter | | | | | | | | | | |
| Inverter output voltage: | V | 1/N/PE AC 230V | | | | | | | | |
| Inverter output voltage adjustment range: | % | ± 5 | | | | | | | | |
| inverter power consumption (power factor=0,8lag): | kW | 8,7 | 17,2 | 25,5 | 42,6 | 67,4 | 84,2 | 101,1 | 134,7 | 168,4 |
| Inverter efficiency | % | 92,0 | 93,0 | 94,0 | 94,0 | 95,0 | 95,0 | 95,0 | 95,0 | 95,0 |
| Voltage tolerance static: | % | ± 1 | | | | | | | | |
| dynamic | % | ± 4 at 100% load step | | | | | | | | |
| assymetric load | % | - | | | | | | | | |
| Regulation time: | ms | <4 (instantenius control) | | | | | | | | |
| Current feedback to DC bus | | < 10 % eff In | | | | | | | | |
| Overload characteristic | | 150% for 1 min., 125% for 10 min., 125% for 10 min., 110% for 20 min. | | | | | | | | |
| Short-circuit characteristic for 5 sec.: | A | 182 | 182 | 545 | 545 | 1090 | 1090 | 1454 | 2180 | 2180 |
| Frequency | Hz | 50 oder 60 Hz +/- 0.1 % crystal controlled or synchronized to AC input | | | | | | | | |
| Synchronization range | % | ± 3 | | | | | | | | |
| Slew rat | | 1Hz/s | | | | | | | | |
| Waveform | | sinusoidal | | | | | | | | |
| Distortion factor | % | ≤ 3 at linear load | | | | | | | | |
| Permissible power factor | | .0 lag. to 0,0 lead, on deviation | | | | | | | | |
| Max. crestfactor of load | | ≤ 2,3 (at 100% Load) | | | | | | | | |
| Common data | | | | | | | | | | |
| Acoustic noise / Design | dB (A) | < 55 | < 60 | < 60 | < 65 | < 70 | < 70 | < 70 | < 70 | < 70 |
| EMC | | EN 62040-2 | | | | | | | | |
| Permissible ambient temperature | Co | 0 ... + 40 °C | | | | | | | | |
| Permissible environment | | 3K3 according to IEC/EN 60721 (85 % rel. humidity, no condensation) | | | | | | | | |
| Maximum altitude | | 1000 m a.m.s.l., with nominal load | | | | | | | | |
| Protection class | | IP 20 according IEC/EN 60529 | | | | | | | | |
| Painted finish | | textured finish, RAL 7035 | | | | | | | | |
| Cooling | | AN | AN | AF | AF | AF | AF | AF | AF | AF |
| Maximum losses | kW | 1,55 | 2,63 | 3,60 | 6,01 | 7,84 | 9,80 | 11,76 | 13,89 | 17,37 |
| UPS efficiency | % | 85,6 | 87,4 | 88,4 | 88,4 | 90,3 | 90,3 | 90,3 | 91,2 | 91,2 |
| Dimensions | | | | | | | | | | |
| Width: | mm | 1000 | 1000 | 1000 | 1200 | 2000 | 2200 | 2400 | 3200 | 3400 |
| Depth: | mm | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 |
| Height: | mm | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 |
| Total weight: | kg | 430 | 580 | 780 | 1105 | 1560 | 1790 | 2060 | 2350 | 2700 |

| 3~ 3-phase UPS Type UPS-7013 | | | | | | | | | | | | |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 10 | 20 | 30 | 50 | 80 | 100 | 120 | 160 | 200 | 250 | 330 | 400 | 500 |
| 3/N/PE AC 400/230V ± 10%, 50 or 60 Hz ± 5% | | | | | | | | | | | | |
| IGBT-GR | | | | | | | | | | | | |
| <4 | | | | | | | | | | | | |
| 9,25 | 18,11 | 27,16 | 45,27 | 70,91 | 88,64 | 106,37 | 138,89 | 173,61 | 217,01 | 286,46 | 347,22 | 434,03 |
| 16,26 | 31,89 | 47,76 | 79,51 | 124,77 | 155,98 | 187,12 | 244,82 | 306,00 | 381,37 | 503,44 | 610,24 | 760,98 |
| 372 | | | | | | | | | | | | |
| 316-446 | | | | | | | | | | | | |
| 93 | 94 | 94 | 94 | 95 | 95 | 95 | 96 | 96 | 96 | 96 | 96 | 96 |
| 10,43 | 20,68 | 30,98 | 51,57 | 81,79 | 102,25 | 122,66 | 162,17 | 202,69 | 252,62 | 333,48 | 404,22 | 504,07 |
| 4,1 | 8,2 | 12,2 | 20,2 | 32,3 | 40,4 | 48,4 | 64,6 | 80,7 | 99,2 | 131,0 | 158,8 | 195,8 |
| 1,8 | 3,7 | 5,4 | 9,0 | 14,4 | 18,0 | 21,6 | 28,8 | 36,0 | 44,3 | 58,5 | 70,9 | 87,4 |
| 3/N/PE AC 400/230V | | | | | | | | | | | | |
| 16 | 32 | 50 | 100 | 125 | 160 | 200 | 250 | 315 | 400 | 500 | 630 | 800 |
| 10 x In | 10 x In | 10 x In | 10 x In | 10 x In | 10 x In | 10 x In | 10 x In | 10 x In | 10 x In | 10 x In | 10 x In | 10 x In |
| 3/N/PE AC 400/230V | | | | | | | | | | | | |
| ± 5 | | | | | | | | | | | | |
| 8,6 | 17,0 | 25,5 | 42,6 | 67,4 | 84,2 | 101,1 | 133,3 | 166,7 | 208,3 | 275,0 | 333,3 | 416,7 |
| 93 | 94 | 94 | 94 | 95 | 95 | 95 | 96 | 96 | 96 | 96 | 96 | 96 |
| ± 1 | | | | | | | | | | | | |
| ± 4 at 100% load step | | | | | | | | | | | | |
| ± 2 at 100% unbalanced load | | | | | | | | | | | | |
| <4 (instantaneous control) | | | | | | | | | | | | |
| < 10 % eff In | | | | | | | | | | | | |
| 150% for 1 min., 125% for 10 min., 125% for 10 min., 110% for 20 min. | | | | | | | | | | | | |
| 41 | 83 | 124 | 124 | 248 | 248 | 330 | 496 | 496 | 763 | 763 | | |
| 50 oder 60 Hz +/- 0.1 % crystal controlled or synchronized to AC input | | | | | | | | | | | | |
| ± 3 | | | | | | | | | | | | |
| 1Hz/s | | | | | | | | | | | | |
| sinusoidal | | | | | | | | | | | | |
| ≤ 3 at linear load | | | | | | | | | | | | |
| .0 lag. to 0,0 lead, on deviation | | | | | | | | | | | | |
| ≤ 2,3 (at 100% Load) | | | | | | | | | | | | |
| < 55 | < 60 | < 60 | < 65 | < 70 | < 70 | < 70 | < 70 | < 70 | < 75 | < 75 | < 75 | < 75 |
| EN 62040-2 | | | | | | | | | | | | |
| 0 ... + 40 °C | | | | | | | | | | | | |
| 3K3 according to IEC/EN 60721 (85 % rel. humidity, no condensation) | | | | | | | | | | | | |
| 1000 m a.m.s.l., with nominal load | | | | | | | | | | | | |
| IP 20 according IEC/EN 60529 | | | | | | | | | | | | |
| textured finish, RAL 7035 | | | | | | | | | | | | |
| AN | AN | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF | AF |
| 1,43 | 2,41 | 3,61 | 6,01 | 7,85 | 9,81 | 11,77 | 12,31 | 15,39 | 19,21 | 25,35 | 30,73 | 38,36 |
| 86,5 | 88,4 | 88,4 | 88,4 | 90,3 | 90,3 | 90,3 | 92,2 | 92,2 | 92,2 | 92,2 | 92,2 | 92,2 |
| 800 | 1000 | 1000 | 1200 | 2000 | 2200 | 2400 | 3000 | 3400 | 5000 | 5600 | 6000 | 6000 |
| 600 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 800 | 1000 | 1000 |
| 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 |
| 430 | 580 | 780 | 1105 | 1660 | 2100 | 2300 | 2500 | 2900 | 3800 | 4500 | 4900 | 5300 |

- Convection cooling for high power systems (“AN” natural cooling)
- Isolation transformer at the bypass
- 12- or 6-pulse rectifier
- Enlarged rectifier for higher battery charging current
- Enlarged bypass lines
- Intermediate voltage 60V / 110V / 220V
- Enlarged inverter for a higher short circuit current
- Redundant power inputs via 2 mains (e.g. 50 Hz / 16 2/3 Hz)
- Temperature controlled charge voltage
- Fans failure control (battery room fan)
- Earth fault monitoring (AC/DC)
- Battery circuit monitoring
- RS 485 interface
- Remote panel
- Remote monitoring
- Special input and output frequency
- SNMP adapter incl. software
- Profibus, Modbus
- Event printer
- Different IP rating
- Battery cabinets
- Distribution (AC/DC)
- External manual bypass
- gland plates
- certified eye bolts



| | | |
|--|----------------------|-------------------------------|
| UPS-Systems | 1-phase: 3-phase: | 1 – 200 kVA 5 – 500 kVA* |
| Inverter (24 – 1000 V DC, 16,7 Hz – 400 Hz) | 1-phase: 3-phase: | 1,0 – 200 kVA 3 – 500 kVA* |
| Rectifier systems Thyristor technology, switch mode, Transistor technology (IGBT) | 24 – 1000 V | 5 – 1500 A |
| DC-voltage converter (24 – 220 V) | System performance: | 0,1 – 7 kW 50 kW |
| Static Transfer System | 3-phase: | 50 – 1500 kVA |
| Frequency converter | (16,7 Hz – 800 Hz) | 1 – 500 kVA* |
| Mains voltage regulator | | 1 – 1600 kVA |
| Battery test- and simulation systems | | 5 – 500 kW* |
| Mains simulation systems | | 5 – 500 kW* |
| AIC Active Infeed Converter (high power storage) | | 30 – 500 kW* |
| AC/DC-Load (Back feed) | | 5 – 500 kW* |
| Customer specific systems an demand | | |

*system performance 4 MVA (MW)

