

**INVERTER**

**ePower**

**INV**



**GUSTAV KLEIN**  
POWER SUPPLIES - since 1948

## A company introduces 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 1<sup>st</sup> 2007 Mr. Günther Stensitzki is managing director and sole owner of the company.

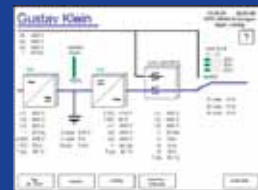


Since 1949 Gustav Klein regularly exhibits at German industrial fairs and is with over 60 exhibitions the "middle class company" with the longest history at the Hannover Fair. Meanwhile Gustav Klein presents worldwide itself on several fairs.

The manufacturing of transformers was the begin 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.



## → Experience

More than 260.000 delivered units speak for themselves. The knowledge of our experienced engineers is also available for YOU.



## → High Product Reliability

Decades of practical experience in high security zones of rail networks, electricity generating stations, test and simulation systems, hospitals and industrial plants guarantee the highest reliability and quality.

## → Competence in Consulting and Support

Starting from your inquiry until After-Sales-Service YOU will be supported by our experienced engineers.

## → Competence in Technique

Own research & development department. Own printed-circuit-board design and our own software programming department emphasise our continuously innovative activities.



## → Custom Designed Power Supplies

Our special competence in producing and developing complete customized solutions match YOUR specific requirements.

## → After-Sales

We guarantee the supply of spare parts for 15 years and a worldwide service. Maintenance contracts and a hot line complete our service for YOU.

## → Trust and Continuance

Gustav Klein produces power supplies for more than 60 years, for famous worldwide customers.

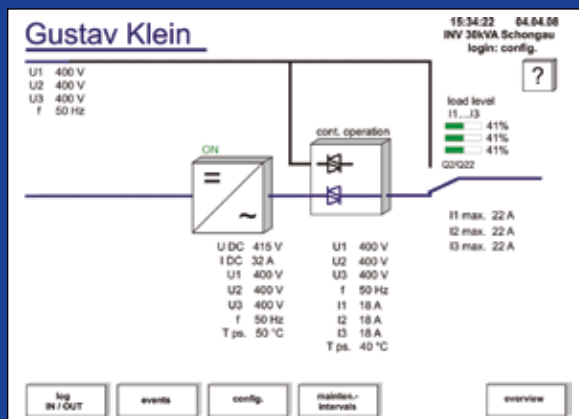


Our three-phase Inverters are equipped with a colored touch-screen display and consist of the following components:

- Inverter
- Electronic Bypass
- Manual Bypass

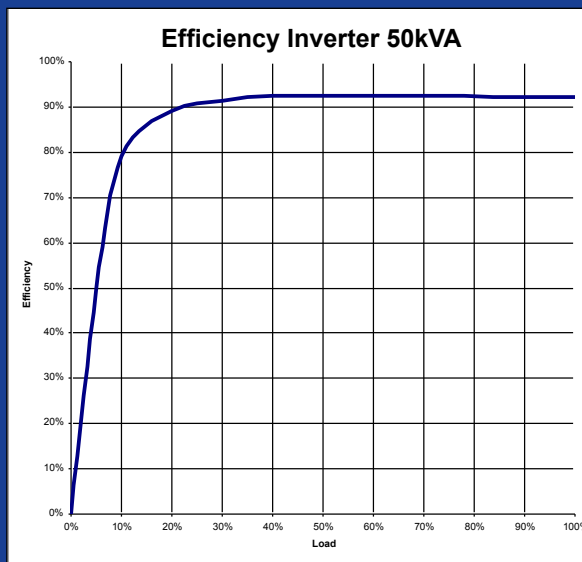
The individual components are matched to each other and controlled by different microprocessors.

At an overload, short circuit at the consumer side or a disturbance of the Inverter and/or a disturbance of the intermediate DC side, the Inverter switches over to the electronic bypass uninterrupted. The automatic retransfer to the Inverter is as well uninterrupted.



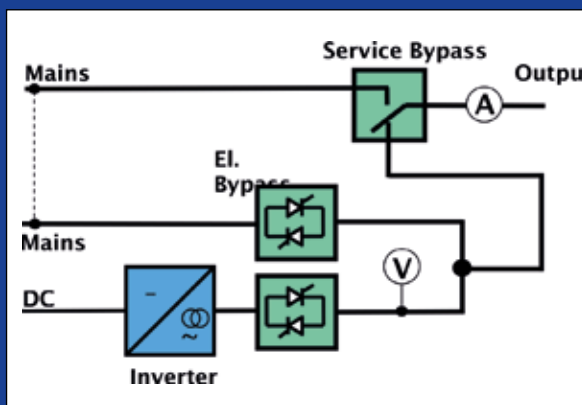
## Principal constituents of the Inverter:

- Input filter
- Inverter bridge with transistors
- Inverter control
- Output transformer (galvanic Isolation)
- Quartz pulse generator
- Synchronisation



## Special characteristics of our UPS systems:

- State-of-the-art technology with transistors in PWM technique
- High efficiency
- Good dynamic regulation
- Power ratings 5 – 500 kVA
- System ratings up to 1500 kVA (n+1-operation)
- Customized adaption possible
- Parallel operation of up to 8 unit possible



Inverter:		Type WR-5080 Single phase	Type WR-5081 Three phase
<b>Rated power</b>	<b>kVA</b>	<b>2,5 – 200</b>	<b>2,5 – 500</b>
<b>Inverter Input</b>			
DC voltage <sup>1)</sup>	V	24, 48, 60, 110, 220, 372	
Voltage tolerance <sup>1)</sup>		-15... +20 <sup>2)</sup>	
Permissible voltage ripple	% eff.	≤ 5	
Permissible current ripple	% eff	≤ 10	
Inrush current		≤ I <sub>nom</sub>	
<b>Inverter Output</b>			
Nominal output voltage	V	230, 1-ph., N, PE	400/230, 3-ph., N, PE
Voltage regulation	%	± 5	
	Static	± 1	
	Dynamic	± 4 at 100% load step	
	Unbalanced load	± 2 bei 100% unbalanced load	
Regulation time	ms	≤ 4 (instantaneous valve regulation)	
Overload character		150% für 1 min. / 125% für 10 min. / 110 % für 20 min.	
Motor load		100% possible (depending on start current)	
Short circuit behaviour		short circuit proof	
Frequency:	HZ	50 oder 60 ± 0,1% crystal controlled or synchronised to the mains	
Synchronisation range	%	± 3	
Waveform		Sinusoidal	
Distortion factor	%	≤ 3 with linear load	
EMC		Gemäß EN 62040-2	
Permissible power factor		any power factor (power derating, if power factor deviates from cos φ = 0,8 lagging)	
Crest factor of the load current		≤ 2,3 (at 100% Load)	
Efficiency (overall)	%	up to 96%	
Acoustic noise level	dB(A)	50 – 70	
<b>Standard data</b>			
Permissible ambient temperature	C°	0 bis +40	
Permissible climate		3K3 to IEC 60721-3-3 (85% rel. humidity, no condensation)	
Permissible operating altitude		1000m above m.s.l. without derating	
Protection class		IP 20 according to EN 60529	
Paint finish		RAL 7035, structured finish, other painting on request	
Cooling		„AN“ natural cooling or „AF“ forced air cooling	
Instrumental		TFT full graphic coloured touch screen display incl. fault history	
Remote signaling		8 floating contacts	

<sup>1)</sup> other values on request

<sup>2)</sup> at 24/ 48/ 60 V: -10 + 20%

- Convection colling for high power systems („AN“ natural colling)
- Isolation transformer at the bypass
- Enlarged inverter for a higher short circuit current
- RS 232 interface
- Remote panel
- Remote monitoring via modem type „Datafern“
- Special output frequency
- Power plant design
- SNMP adapter incl. software
- Profibus, Modbus
- Event printer
- Different IP rating
- Battery cabinets
- Distributions
- External manual bypass



Inverter with plug-in technology, please see our special brochure.

<b>UPS-Systems</b>	1-phase:	1 – 200 kVA
	3-phase:	5 – 500 kVA*
<b>Inverter</b> (24 – 1000 V DC, 16,7 Hz – 400 Hz)	1-phase:	1,0 – 200 kVA
	3-phase:	3 – 500 kVA*
<b>Rectifier systems</b> Thyristor technology Switch mode technology Transistor technology (IGBT) Ferrous magnetic technology	24 – 1000 V	5 – 1500 A
<b>DC – voltage converter</b> (24 – 220 V)	System performance:	0,1 – 7 kW 50 kW
<b>Static Transfer System</b>	3-phase:	50 – 1500 kVA
<b>Frequency converter</b> (16,7 Hz – 800 Hz)		1 – 500 kVA*
<b>Mains voltage regulator</b>		1 – 1600 kVA
<b>Battery test – and simulation systems</b>		5 – 500 kW *
<b>Mains simulation systems</b>		5 – 500 kW *
<b>AC-Load (Back feed)</b>		5 – 500 kW *
<b>AIC Active Infeed Converter</b>		100 - 500 kW *

\*system performance up 4 MVA (MW)



*We provide the technical base for innovative future projects.*



Power stations and power lines



Test and simulation system



Stationary power supply for urban traffic and railway lines



Operating theaters

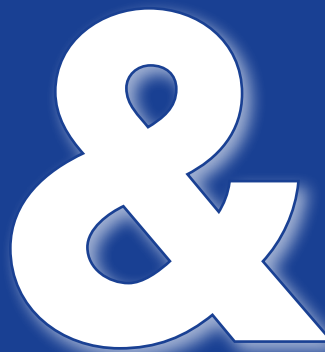


Chemical industry / Oil and Gas



High Power Storage Systems

**Technology**  
**Competence**  
**Quality**



**Reliability**  
**Experience**  
**Innovation**

**Your Partner for all aspects of power supply equipment**



**worldwide**



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