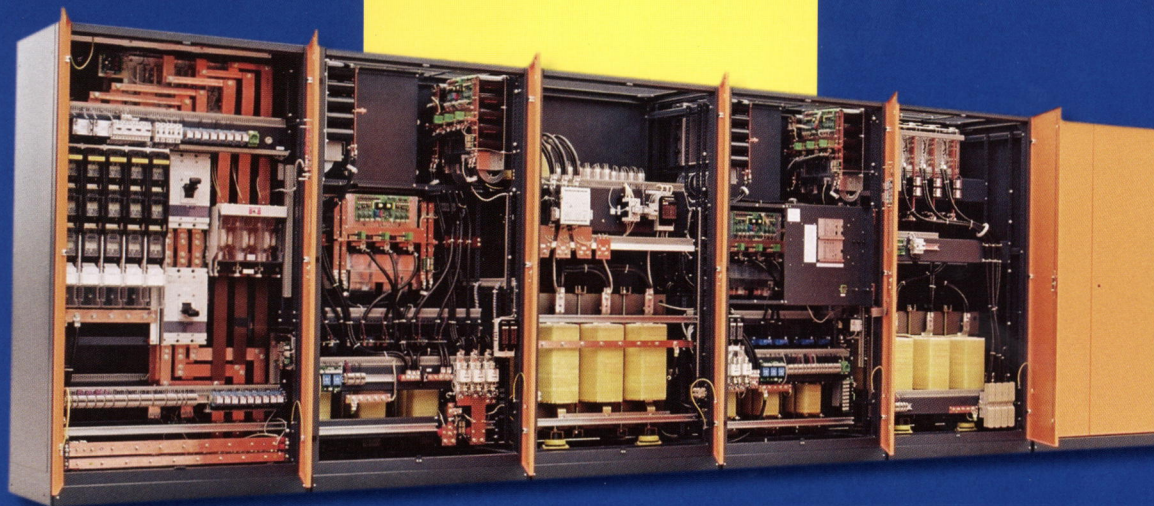
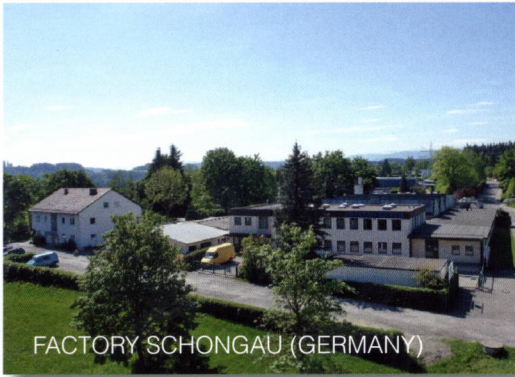


# INVERTER

# INV



**GUSTAV KLEIN**  
POWER SUPPLIES - since 1948



FACTORY SCHONGAU (GERMANY)

## GUSTAV KLEIN – a company introduces itself

The GUSTAV KLEIN company was founded in Schongau, Germany, in 1948.

In 1969, a subsidiary factory was opened in Austria, at that time our principal export country, located in Inzing to the west of Innsbruck. The GUSTAV KLEIN company has approx. 200 employees in this two factories.

The manufacture of transformers was the beginning of our rapidly expanding product palette, followed by stabilizers and mains voltage controllers for broadcast and television stations of the German federal post.

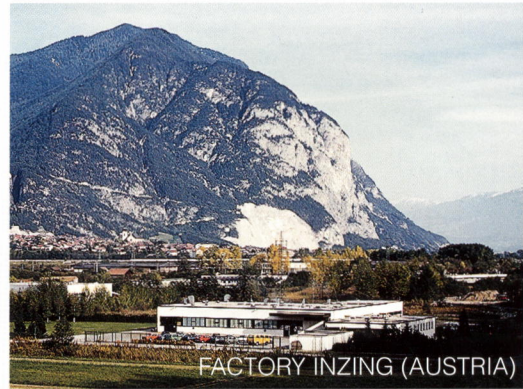
The first thyristor rectifiers were presented in 1960. And since 1962 used together with thyristor controlled inverters as a UPS – uninterruptible power supply. In 1968 the uninterruptible electronic bypass device for inverters was manufactured.

Switched-mode rectifiers and DC converters were delivered since 1970.

Later, high-current transistors became available on the market, and in 1985 the GUSTAV KLEIN company began to manufacture pulse-width modulated transistor inverters and UPS equipment 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 equipment with microprocessors and IGBT-rectifiers are in our product range.

Today we manufacture not only secured power supplies, but also high power test systems up to 1000 V DC and frequency converters in IGBT technology.



FACTORY INZING (AUSTRIA)

## REASONS for choosing GUSTAV KLEIN:

- ▶ **Experience**  
More than 250.000 delivered units speak for themselves.  
The knowledge of our experienced engineers is also available for YOU.
- ▶ **Confidence and Consistency**  
GUSTAV KLEIN is established since 1948 on the market of power supplies. Renowned companies from the Railway, Telecom Power Stations, Chemical and Industry are from the beginning our regular customers.
- ▶ **High Product Reliability**  
Decades of practical experience in high security zones of rail networks, electricity power stations, telecommunications networks, 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**  
In-house development in the fields of equipment and microprocessor technology, as well as our own printed-circuit design and our own software programming department, emphasise our continuously innovative activities.
- ▶ **Custom Designed Power Supplies**  
Our special competence is to produce complete customized solutions to match YOUR specific requirements.
- ▶ **After-Sales**  
We guarantee the supply of spare parts for 15 years and a worldwide service.

Static uninterruptible power supply is for many applications indispensable today.

Statistics shows that in Germany an average between two and four extended AC mains failures, and more than one hundred short interruptions in the range of milliseconds every year. System failures caused by these interruptions can lead to long downtime and data losses.

**UPS systems protect from:**

- short-duration interruptions
- AC mains failure
- Voltage variations
- Superimposed interference voltages
- Frequency variations
- AC mains voltage waveform distortion

In most data processing applications and in many automation and control installations, the increasing safety and reliability requirements can only be met by UPS equipment.

**Sensitive users include:**

- Railway signaling
- Control equipment for power plants
- Drives of power circuit breakers
- Remote control facilities for electricity supply utilities
- Traffic control installations
- Vital medical equipment in operating theatres
- Process control equipment and automation in manufacturing plants
- Data centers
- Air traffic control systems
- Telecommunication systems
- Tunnel surveillance and lighting

The reliability and lifetime of the system is determined by the rectifier decisively. The rectifiers and operation mode must therefore be designed that all demands regarding battery charge and discharge are fulfilled.

**Our Inverter-systems**  
**protect your investments**  
**and supplies a save power**  
**to your resources at any time**

Transistor-inverters are divided in following main groups according to the required dc-input voltage, power and application:

1. Single phase inverters  
Type WE-SFUP Cat.No. 5080
2. Three phase inverters  
Type WE-SFUP Cat.No. 5081
3. Inverters in modular design with a DC input voltage of 24V – 220V can be found in our special brochure.



Extensive certifications

Many years of experience, together with our extensive range of systems, guarantee that we have the comprehensive professional competence to find the technically and economically optimal solution for your problem in accordance with our motto:

Your Partner  
for all aspects of  
power supply  
equipment

worldwide

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

- Inverter
- Electronic Bypass
- Manual Bypass
- Single phase inverters have a LCD-Display (page 6)

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

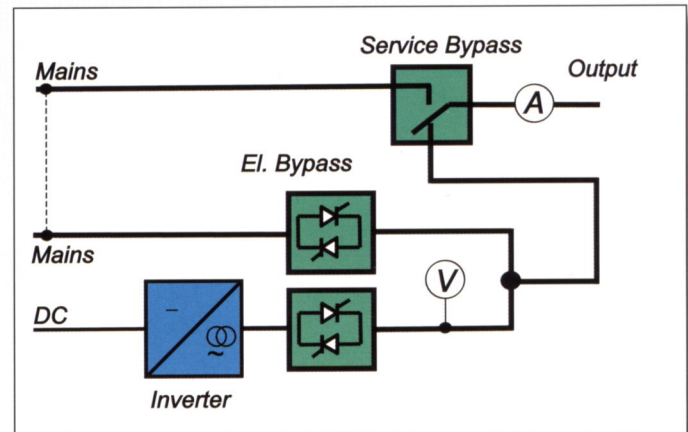
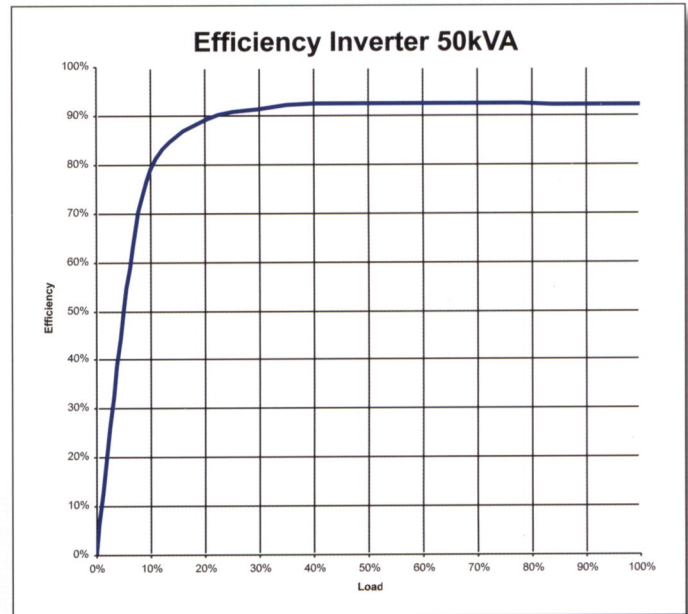
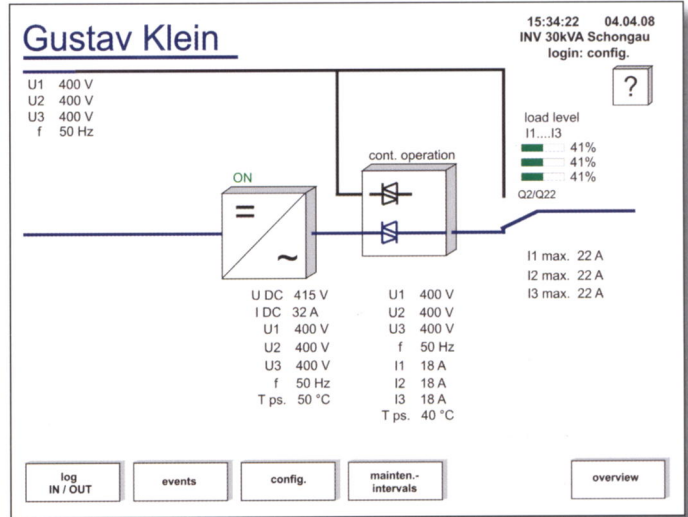
At an overload, short circuit at the consumer side or a disturbance of the Inverter and/or a disturbance of the intermediate DC side, the inverter switches over to the electronic **bypass** uninterrupted. The automatic retransfer to the Inverter is as well uninterrupted.

### 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 2000 kVA (n+1-operation)
- Customized adaption possible
- Parallel operation of up to 8 units possible

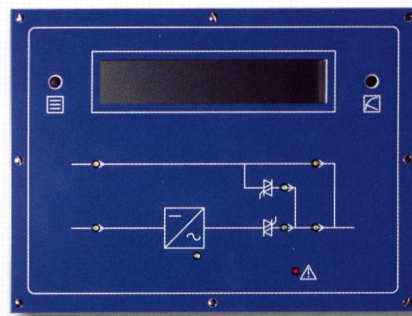


Inverter Type		WE-SFUP 1-phase Cat.No. 5080	WE-SFUP 3-phase Cat.No. 5081
Rated Power	kVA	2,5 – 200	2,5 – 500
<b>Inverter input</b>			
DC voltage <sup>1</sup>	V	24 / 48 / 60 / 110 / 125 / 220 / 372	
Voltage tolerance <sup>1</sup>	%	– 15... + 20 <sup>2</sup>	
Permissible voltage ripple	% eff.	≤ 5	
Permissible current ripple	% eff.	≤ 10	
Inrush current		≤ I <sub>nom</sub>	
<b>Inverter output</b>			
Nominal output voltage <sup>1</sup>	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 at 100% unbalanced load
Regulation time	ms	< 4 (instantaneous value regulation)	
Overload character		150% for 1 min., 125% for 10 min., 110% for 20 min.	
Short circuit character		2x I <sub>nom</sub> for 5 sec.	2-4x I <sub>nom</sub> for 5 sec.
Motorload		100% possible (depending on short current)	
Frequency <sup>1</sup>	Hz	50 or 60 ± 0,1% crystal controlled or synchronised to the mains	
Synchronisation range	%	± 3	
Waveform		sinusoidal	
Distortion factor	%	≤ 3 with linear load	
EMC		accordance to 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 96,5	
Acoustic noise level	dB (A)	50 – 70	
<b>Standard data</b>			
Permissible ambient temp.	°C	0 to + 40	
Permissible climate		3K3 to IEC 60721-3-3 (85% rel. humidity, no condensation)	
Permissible operating altitude		1000 m 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	
Display		LCD-Display	TFT full graphic coloured touch-screen display incl. fault history

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

<sup>2)</sup> at 24/48/60V –10 +20%

- Convection cooling for high power systems ("AN" natural cooling)
- 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



<b>UPS systems</b>	1-phase: 3-phase: System performance:	1 – 200 kVA 5 – 500 kVA – 2000 kVA
<b>Inverter</b> (24 – 1000 V DC, 16 <sup>2</sup> / <sub>3</sub> Hz – 400 Hz)	1-phase: 3-phase: System performance:	1,0 – 200 kVA 3 – 500 kVA – 2000 kVA
<b>Rectifier systems</b>	Thyristor technology (24 – 700 V DC) Switch mode technology (24 – 372 V DC) Transistor technology (60 – 1000 V DC) Ferrous magnetic technology (24 – 220 V DC)	5 – 8000 A 5 – 4000 A 5 – 1000 A 5 – 800 A
<b>DC-voltage converter</b> (24 – 220 V)	System performance:	0,1 – 4 kW – 50 kW
<b>Frequency converter</b>	(16 <sup>2</sup> / <sub>3</sub> Hz – 400 Hz)	1 – 500 kVA
<b>High power test systems</b> (up to 1000 V DC, up to 400 Hz)		5 – 400 kVA
<b>Mains voltage regulator</b>		1 – 1600 kVA
<b>Customer specific systems</b>		

# Power supply solutions

**Made in  
Germany & Austria**

**Industrial applications  
Power stations supply  
Stationary railway supply  
Frequency converters  
Laboratory power supply  
Battery simulation  
Charge- and discharge units  
Industrial UPS  
Special UPS for hospitals**



**GUSTAV KLEIN** GmbH  
& Co. KG

D-86956 **Schongau** · Im Forchet 3  
D-86952 Schongau, Postfach 12 48  
Tel. +49(0)8861/209-0  
Fax +49(0)8861/209-180

E-Mail: [vertrieb@gustav-klein.com](mailto:vertrieb@gustav-klein.com)

**GUSTAV KLEIN** GmbH  
& Co. KG

A-6401 **Inzing**/Tirol · Schießstand 2  
Tel. +43(0)5238/54209-0  
Fax +43(0)5238/54209-23

Internet: <http://www.gustav-klein.com>