



GUSTAV KLEIN
POWER SUPPLIES - since 1948

BSV

**Special Power Supply for operating rooms according to
German Standard
VDE0558-507 and VDE 0100-710**



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.



Factory Schongau (Germany)



Factory Inzing (Austria)

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.

REASONS for choosing GUSTAV KLEIN:

- **Experience**
More than 260.000 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.

BSV rated power	kVA	5	7,5	10	15	20	25	30
BSV input								
AC mains voltage	V	400/230 V, ± 10%, 3-phase, N, PE, 50 or 60 Hz ± 5%						
Input power factor Lambda		>0.99 at 10 % load						
Power consumption from AC-mains:								
with battery fully charged	kVA	5.0	7.4	9.8	14.4	19.0	23.6	28.3
under battery charge condition	kVA	12.0	17.9	23.7	35.3	45.3	56.7	66.8
Max. input current per phase	A	19	29	38	57	73	91	108
Recommended input fuse:								
for rectifier input	A	25	40	50	80	100	125	160
for bypass AC input	A	35	50	63	80	100	125	160
DC intermediate circuit:								
DC voltage (-15 +20%)	V	220	220	220	220	220	220	220
Power consumption with inverter power factor 0.8 lagging	kW	4.4	6.6	8.7	12.9	17.2	21.4	25.7
Inverter input current at nominal voltage	A	20.0	29.8	39.5	58.8	78.2	97	117
Rectifier rated current	A	40	60	80	120	155	195	230
Battery charging current	A	20	30	40	61	77	98	113
Rectifier voltage tolerance	%	± 1 (constant-voltage, constant-current to DIN 41772)						
Inverter part								
Nominal output voltage	V	230V, 1-phase, N, PE						
Voltage regulation, static	%	± 1						
Voltage regulation, dynamic	%	± 4 with 100% load step						
Regulation time	ms	<4 (instantaneous value regulation)						
Overload characteristic		150% for 1 min. / 125% for 10 min. / 110% for 20 min						
Short circuit current	A	100	150	150	200	300	300	400
Short-circuit characteristic		short circuit current for 5s. to EN 62040-1						
Frequency	Hz	50 or 60 ± 0.1% crystal-controlled or synchronized to the AC mains						
Synchronization range		±3%						
Waveform		sinusoidal						
Distortion factor	%	≤3% with linear load						
EMC		to EN 62040-2						
Permissible power factor		any power factor (rated power is reduced if power factor deviates from 0.8 lagging)						
Crest factor of the load current		≤ 2.3 (with 100% rated load)						
Acoustic noise	dB (A)	<60			<65			
Standard data								
Permissible ambient temperature	°C	0 to 40						
Permissible climate		moderate climate, 3K3 to IEC60721						
Permissible operating altitude		1000 m above m.s.l. with rated load						
Protection class		IP 20 to EN 60529						
Paint finish		RAL 7035, textured finish						
Cooling		"AN" convection cooling			"AF" forced-air cooling			
Losses (max.) ¹⁾	kW	1.6	2.2	2.8	3.9	4.7	5.6	6.0
Efficiency RECT.	%	90.0	90.5	91.0	91.6	92.2	92.6	93.0
Efficiency INV.	%	91.0	91.5	92.0	92.7	93.0	93.3	94.5
Efficiency (overall)	%	81.9	82.8	83.7	84.9	85.7	86.4	87.9
Dimensions : ²⁾								
width	mm	1000	1000	1000	1200	1800	1800	1800
depth	mm	800	800	800	800	800	800	800
height	mm	2000	2000	2000	2000	2000	2000	2000
Weight	kg	480	510	585	630	785	860	930

1) boost charge battery / nominal load inverter

2) others dimensions apply if options are included (from 20 kVA incl.. 600mm width connection cabinet)

BSV rated power	kVA	40	50	60	80	100	120	160	200
BSV input									
AC mains voltage	V	400/230 V, ± 10%, 3-phase, N, PE, 50 or 60 Hz ± 5%							
Input power factor Lambda		>0.99 at 10 % load							
Power consumption from AC-mains:									
with battery fully charged	kW	37.6	46.9	56.3	75.0	93.6	112.2	149.4	186.8
under battery charge condition	kW	90.0	113.2	136.4	179.9	223.3	269.5	356.3	446.1
Max. input current per phase	A	145	182	220	290	360	434	574	718
Recommended input fuse:									
for rectifier input	A	160	200	224	250	350	425	500	800
for bypass AC input	A	200	250	315	400	500	600	800	1000
Rectifier intermediate circuit:									
DC voltage (-15 +20%)	V	220	220	220	220	220	220	220	220
Power consumption with inverter power factor 0.8 lagging	kW	34.2	42.7	51.2	68	85	102	136	170
Inverter input current at nominal voltage	A	155	194	233	310	387	465	619	774
Rectifier rated current	A	310	390	470	620	770	930	1230	1540
Battery charging current	A	155	196	237	310	383	465	611	766
Rectifier voltage tolerance	%	± 1 (constant-voltage, constant-current to DIN 41772)							
Inverter part									
Nominal output voltage	V	230V, 1-phase, N, PE							
Voltage regulation, static	%	± 1							
Voltage regulation, dynamic	%	± 4 with 100% load step							
Regulation time	ms	<4 (instantaneous value regulation)							
Overload characteristic		150% for 1 min. resp. 125% for 10 min. bzw. 110% for 20 min							
Short circuit current	A	400	600	600	800	1000	1200	1600	1800
Short-circuit characteristic		Short circuit current for 5s. to EN 62040-1							
Frequency	Hz	50 or 60 ± 0.1% crystal-controlled or synchronized to the AC mains							
Synchronization range		±4%							
Waveform		sinusoidal							
Distortion factor	%	≤3% with linear load							
EMC		to EN 62040-2							
Permissible power factor		any power factor (rated power is reduced if power factor deviates from 0.8 lagging)							
Crest factor of the load current		≤2.3 (with 100% rated load)							
Acoustic noise	dB (A)	<65						<70	
Standard data									
Permissible ambient temperature	°C	0 to 40							
Permissible climate		moderate climate, 3K3 to EN 60721							
Permissible operating altitude		1000 m above m.s.l. with rated load							
Protection class		IP 20 to IEC 60529							
Paint finish		RAL 7035, textured finish							
Cooling		"AF" forced-air cooling							
Losses (max.) ¹⁾	kW	7.9	9.7	11.4	14.2	17.1	20.6	26.9	33.6
Efficiency RECT.	%	93.1	93.3	93.5	94.0	94.1	94.1	94.2	94.2
Efficiency INV.	%	94.5	94.5	94.5	94.5	94.8	94.9	94.9	94.9
Efficiency (overall)	%	88.0	88.2	88.4	88.8	89.2	89.3	89.4	89.4
Dimensions : ²⁾									
width	mm	2600	2600	2600	3000	3600	4000	4200	4800
depth	mm	800	800	800	800	800	800	800	800
height	mm	2000	2000	2000	2000	2000	2000	2000	2000
Weight	kg	1265	1380	1555	1830	2130	2510	3010	3310

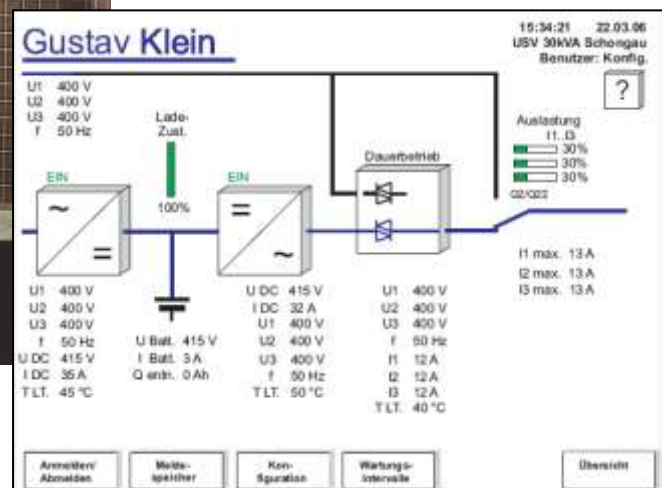
1) boost charge battery / nominal load inverter

2) others dimensions apply if options are included (from 20 kVA incl.. 600mm width connection cabinet

BSV

Special Power Supply according to German Standard VDE0558-507 Type BSV-7021 or Type BSV-7023

- No transfer at mains failure
- Designed for medical rooms according to German Standard VDE 0558-507
- Single phase output up to 200 kVA (high short circuit current for selective fuse tripping)
- Sinusoidal rectifier input current
- No reactive power consumption (input power factor 1)
- Separate manual bypass (up to 15 kVA in wall mounted cabinet)
- Floating battery voltage (including earth fault supervision)
- Capacity and function test during normal operation
- Capacity test at full rated power via feed back to mains
- Robust design
- Best solution for connection of generator
- Easy operation and service
- Customized design possible by many options
- Extreme high overload behaviour
- Extensive monitorings
- Coloured TFT-Panel



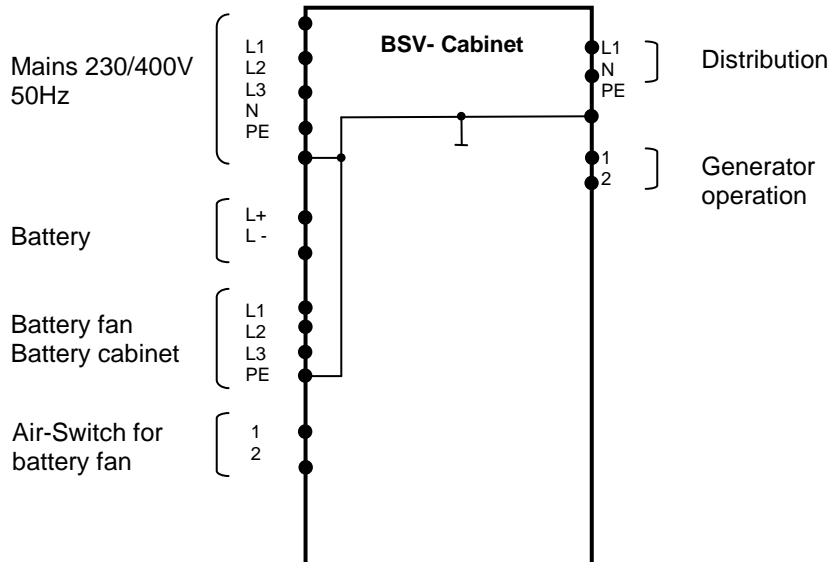
Options:

- 3-phase output
- different voltages and frequency
- Special design with increased overload and short circuit behaviour
- Battery on racks or in cabinet
- Acid tray
- Monitored fan for battery cabinet
- Fan for battery room
- DC control voltage from separate power supply
- Up to max. 30 separate remote tableaus
- Bypass cabinet with integrated distribution
- Isolating transformers according to VDE 0100 part 710 in bypass cabinet
- Paralleling device
- Battery circuit monitoring
- Remote Signalling
- Shock absorber
- Special painting (different colours)

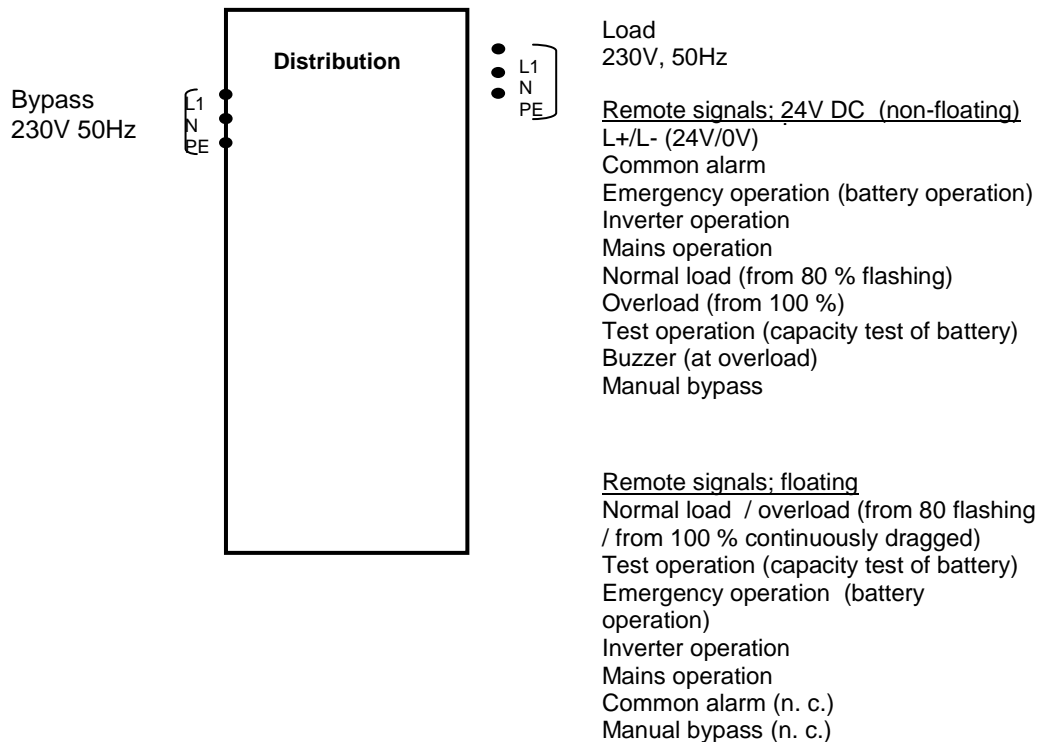


Connections

BSV-Cabinet



Distribution Cabinet (implemented in the BSV-cabinet up to 15 kVA in standard design)



Max. current of remote contacts:
6 A 24 V/DC or 230 V/AC

Fuse tripping in standard design

BSV-nominal power [kVA] 1~

Diazed
Fuse tripping < 500ms
Neozed
Fuse tripping < 500ms
NH
Fuse tripping < 500ms

	5	7.5	10	15	20	25	30	40
Diazed	16	20	20	25	35	35	50	50
Neozed	16	16	16	25	35	35	35	35
NH	16	20	20	25	35	35	50	50

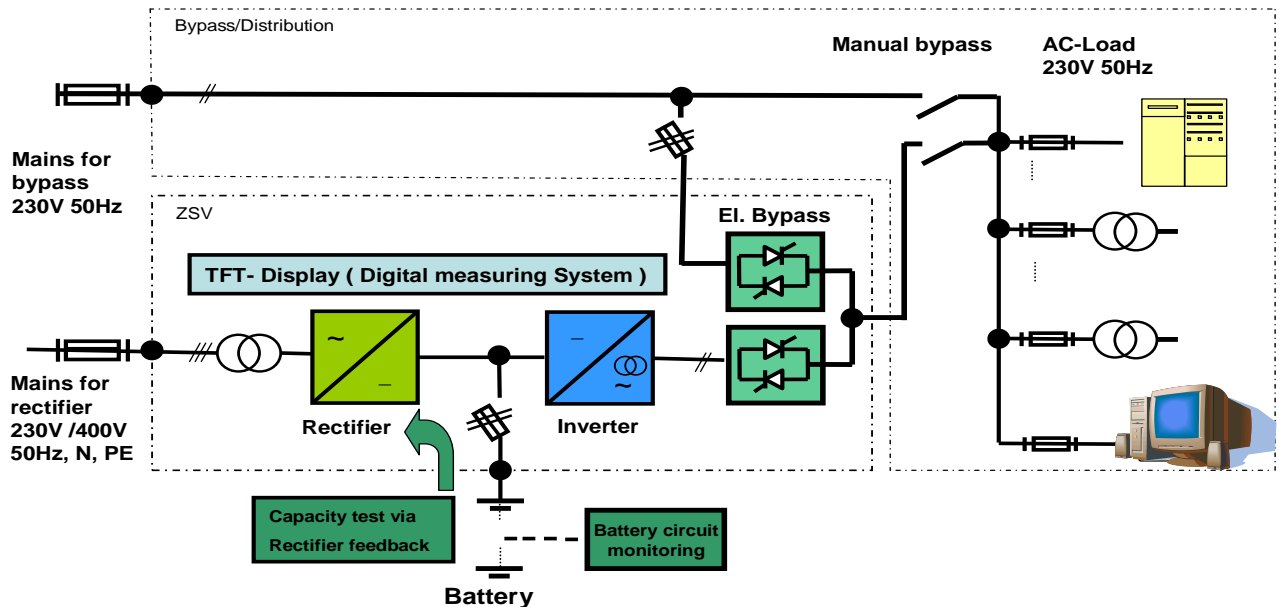
BSV-nominal power [kVA] 1~

Diazed
Fuse tripping < 500ms
Neozed
Fuse tripping < 500ms
NH
Fuse tripping < 500ms

	50	60	80	100	120	160	200
Diazed	63	63	100				
Neozed	63	63	63	100			
NH	63	63	100	100	125	160	160

Higher values on demand

Bloc diagram



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