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Industrial UPS

TYPE USV 7011-7013

WITH NOMINAL POWER BATTERY TEST

The GUSTAV KLEIN company was founded in Schongau, Germany, in 1948. In 1969 a subsidiary factory was opened in Inzing, Austria, west of Innsbruck. The GUSTAV KLEIN company has 220 employees in the two factories.

Static uninterruptible power supplies (also known as UPS systems) are for many applications indispensable today. Statistics show that in Germany on average between two and four extended AC mains failures and more than one hundred short interruptions in the range of milliseconds every year. Systems failures caused by these interruptions can lead to long downtime and data loss.

UPS systems protect against:

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

Our UPS protects your investments and supplies a save power to your resources at any time.

Decades of experience in railway signalling, telecom, power plants, hospitals and all kind of industrial applications stand for our high quality and availability.

Classification

1. **Single phase UPS-systems**
   Type USV-7001 (thyristor rectifier) optional
   Type USV-7011 (transistor rectifier)

2. **Three phase UPS-systems**
   Type USV-7003 (thyristor rectifier) optional
   Type USV-7013 (transistor rectifier)

3. **Small single phase UPS–systems**
   Type Minicompact as well as modular UPS can be found in our special brochure

General

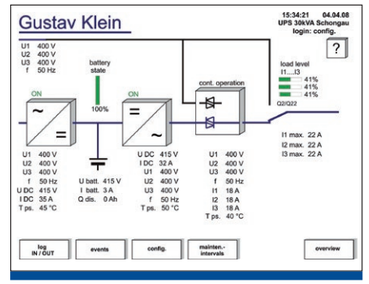
Our UPS are equipped with a coloured TFT Touchscreen-Display and consists of the following components:

- Rectifier (backfeed type for 100% battery test)
- Battery (Energystorage)
- Inverter
- Electronic mains bypass
- Service-bypass

Classification according to EN/IEC 62040-3: class VFI-SS-111

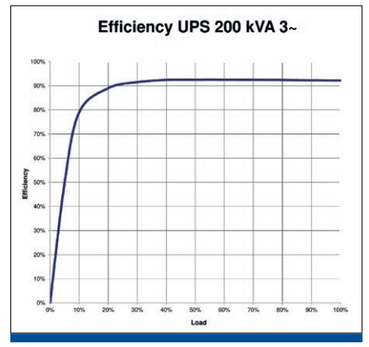
The UPS is built of discrete control and supervision boards (plug in modules with front signalling), each control and supervision board (A2-A4) consists of its own analogue control and microprocessor supervision.

The modular design offers an eminent advantage in time and cost in case of service or maintenance.



The transistor rectifier (sinusoidal input current, lambda >0.99) is designed for the connection on a three phase mains, for the supply of the inverter at rated load and simultaneously for charging the battery. The rectifier has an IU-characteristic with adjustable current limitation.

The following battery types are available: low maintenance lead-acid batteries, maintenance free, sealed lead-acid batteries or NiCd-batteries. The batteries are installed on racks or in cabinets.



Separate inputs for rectifier and bypass supply are provided.

Technical Data

		USV-7011 – 3-phase input; single phase output: 372V DC IGBT rectifier								
Rated power (power factor 0.8 lag.)	kVA	10	20	30	50	80	100	120	160	200
Rectifier type		IGBT, galvanically isolated								
Inverter type		IGBT, galvanically isolated								
Rectifier										
Input voltage		3/N/PE AC 400/230V ± 10%								
Frequency		50 or 60 Hz ± 5%								
Input power factor		> 0,99								
Total harmonic distortion THDi		< 6%								
Power consumption										
- battery fully charged	kVA	9.4	18.3	27.2	45.3	70.9	88.6	106.4	140.4	175.4
- battery under charge	kVA	11.3	22.2	32.9	54.9	86.0	107.4	128.9	170.1	212.6
Max. input current under charge (Umains 400V)	A	18.2	35.6	52.8	88.1	138.0	172.4	206.9	273.1	341.3
Recommended input fuse	A	20	40	63	100	160	200	225	315	355
Nominal output voltage	V	372								
Voltage range	V	316-446								
Voltage tolerance		± 1%(IU-charging according to DIN 41772)								
Nominal output current	A	27.5	54.4	80.7	134.6	213.1	266.3	319.6	426.1	532.6
Battery charging current	A	4.1	8.2	12.1	20.2	32.0	39.9	47.9	63.9	79.9
Output power	kW	10.5	20.9	30.9	51.6	81.7	102.0	122.4	163.3	204.1
Battery charging power	kW	1.8	3.7	5.4	9.0	14.3	17.8	21.4	28.5	35.7
Efficiency		93%	94%	94%	94%	95%	95%	95%	96%	96%
Bypass										
Input voltage		1/N/PE AC 230V ± 10%								
Frequency		50 Hz + 5 %								
Input current	A	43.5	87.0	130.4	217.4	347.8	434.8	521.7	695.7	869.6
Recommended input fuse	A	63	100	160	250	400	500	600	800	1000
Overload performance for 10ms		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/UPS Output										
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
Current feedback to DC bus		≤ 10 % rms								
Output voltage		1/N/PE AC 230V								
Voltage tolerance static		± 1%								
dynamic		± 4% at 100% load step								
assymetric load		-								
Inverter output voltage adjustment range		± 5%								
Regulation time		< 4ms (instantenius control)								
Wave form		sinusoidal								
Distortion factor		≤ 3 at linear load								
Frequency		50 or 60 Hz +/- 0.1 % crystal controlled or synchronized to AC input								
Synchronization range		± 3%								
Slew rate		1 Hz/s								
Overload performance		150% for 1 min., 125% for 10 min., 110% for 20 min.								
Short-circuit performance for 5 sec.	A	182	182	545	545	1090	1090	1454	2180	2180
Permissible power factor		0.0 lag. to 0.0 lead, on deviation of power factor 0.8 lag reduction of UPS-rating								
Permissible crestfactor of load		≤ 2.3 (at 100% Load)								
Inverter efficiency with nominal load		92.0%	93.0%	94.0%	94.0%	95.0%	95.0%	95.0%	95.0%	95.0%
UPS efficiency with nominal load		85.6%	87.4%	88.4%	88.4%	90.3%	90.3%	90.3%	91.2%	91.2%
Total power losses max.	kW	1.5	2.5	3.5	5.8	7.7	9.6	11.5	13.5	16.9
General data										
Acoustic noise level	dB (A)	< 55	< 60	< 60	< 65	< 70	< 70	< 70	< 70	< 70
EMC		EN 62040-2								
Permissible environmental conditions		Storage acc. EN 60721-3-1 l (long term) 1K2/1M3: 0 to +40°C/transport acc. EN 60721-3-2 (short term) 2K2/2M2: -25 to +60°C/operation acc. EN 60721-3-3 3K3/3M2: 0 to +40°C/ 85 % rel. humidity without condensation								
Permissible operation altitude		1000 m NN 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
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

USV-7013 – 3-phase input; 3-phase output: 372V DC IGBT rectifier													
10	20	30	50	80	100	120	160	200	250	330	400	500
IGBT, galvanically isolated												
IGBT, galvanically isolated												
3/N/PE AC 400/230V ± 10%												
50 or 60 Hz ± 5%												
> 0,99												
< 6%												
9.2	18.1	27.2	45.3	70.9	88.6	106.4	138.9	173.6	217.0	286.5	347.2	434.0
11.2	22.0	33.0	54.9	86.1	107.6	129.1	168.9	211.1	263.1	347.4	421.1	525.1
18.0	35.3	52.9	88.1	138.2	172.8	207.3	271.2	339.0	422.5	557.8	676.1	843.1
20	40	63	100	160	200	250	315	355	500	630	800	1000
372												
316-446												
± 1% (IU-charging according to DIN 41772)												
27.2	53.8	80.7	134.6	213.1	266.3	319.6	421.7	527.1	658.9	869.7	1054.2	1317.7
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
10.4	20.7	31.0	51.6	81.8	102.2	122.7	162.2	202.7	252.6	333.5	404.2	504.1
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
93%	94%	94%	94%	95%	95%	95%	96%	96%	96%	96%	96%	96%
3/N/PE AC 400/230V												
50 Hz ± 5 %												
14.5	29.0	43.5	72.5	115.9	144.9	173.9	231.9	289.9	362.3	478.3	579.7	724.6
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
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
≤ 10 % rms												
3/N/PE AC 400/230V												
± 1%												
± 4% bei 100% load step												
± 2% at 100% unbalanced load												
± 5%												
< 4ms (instantenius control)												
sinusoidal												
≤ 3 at linear load												
50 or 60 Hz +/- 0.1 % crystal controlled or synchronized to AC input												
± 3%												
1 Hz/s												
150% for 1 min., 125% for 10 min., 110% for 20 min.												
41	83	124	124	248	248	330	496	496	763	763	943	1650
0,0 lag. to 0,0 lead, on deviation of power factor 0.8 lag reduction of UPS-rating												
≤ 2.3 (at 100% Load)												
93%	94%	94%	94%	95%	95%	95%	96%	96%	96%	96%	96%	96%
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%
1.4	2.3	3.5	5.8	7.7	9.6	11.5	12.1	15.1	18.9	24.9	30.2	37.7
< 55	< 60	< 60	< 65	< 70	< 70	< 70	< 70	< 70	< 75	< 75	< 75	< 75
EN 62040-2												
Storage acc. EN 60721-3-1 l (long term) 1K2/1M3: 0 to +40°C/transport acc. EN 60721-3-2 (short term) 2K2/2M2: -25 to +60°C/operation acc. EN 60721-3-3 3K3/3M2: 0 to +40°C/ 85 % rel. humidity without condensation												
1000 m NN 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
800	1000	1000	1200	2000	2200	2400	3000	3400	5x1000	3x5400	5x6200	5x7200
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

Requirements and Advantages

Requirements for industrial UPS:

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

Advantages

- IGBT PWM technology for rectifier and inverter
- Sinusoidal input current
- Operation modes: start up-, standby- and continuous operation
- 100% battery test by rectifier backfeed
- Isolation transformer for rectifier and inverter (ungrounded battery)
- TFT-display with separate microprocessor control
- With emergency key switching also possible after failure of TFT-display
- Individual control of rectifier, inverter and bypass with separate independent circuit boards
- Control circuits are identical for all powers
- High safety by combination of analogue and digital control
- Additional safety by high test voltage (input or output against ground 2 kVAC; input against output 3.75 kVAC)
- Separate feeds for rectifier and bypass
- Paralleling with loop control circuit
- Easy transport by fork lift by removable ground cover plate
- Easy cable connection
- Highest level according to EN62040-3, VFI-SS-111
- Industrial style; generous design of components with reserves to the limit designed for continuous operation at rated load up to 40°C
- Up to 80 kVA systems without fans
- Proven technology with more than 20 years of experience
- Own soft- and hardware development, production and service

Options

- Convection cooling for high power systems (“AN” natural cooling)
- Isolation transformer at the bypass
- Enlarged bypass lines
- 12- or 6-pulse rectifier
- Enlarged rectifier for higher battery charging current
- Intermediate voltage 60V/110V/220V
- Enlarged inverter power for high short circuit current and overload behaviour
- Redundant power inputs via 2 mains (e.g. 50 Hz/16 2/3 Hz)
- Operation mode diesel operation
- Temperature controlled charge voltage
- Fans failure control (battery room fan)
- Earth fault monitoring (AC/DC)
- Battery circuit monitoring
- Fan supervision
- Remote panel
- Remote monitoring
- Special input and output frequency
- Power plant design
- SNMP adapter incl. software
- RS485 interface
- Profibus
- Modbus
- Event printer
- Battery cabinets
- Distribution cabinets
- External manual bypass
- Certified eye bolts
- Reinforced mech. design for high seismic stress
- Special lacquer
- High protection class
- Halogen free cabling
- Wire marking
- Cabinet light
- Cabinet heating
- Sealed cable entry