UPS Uninterruptible Power System

Handling items

- Uninterruptible Power System (UPS)
- Automatic Voltage Regulator (AVR)
- Frequency Converter (F/C)
- Rectifier
- Battery Charge
- Transformer

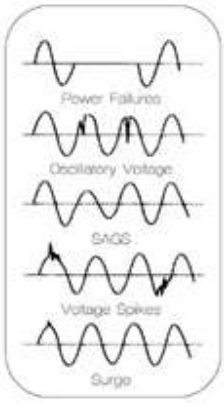
UPS Outline

■Definition

UPS is an uninterruptible power system that prevents power failures due to common blackouts, unexpected blackouts, source voltage fluctuations, etc. and supplies power stably to loadat all times. It is also known as C.V. C. F.(Constant Voltage Constant Frequency).

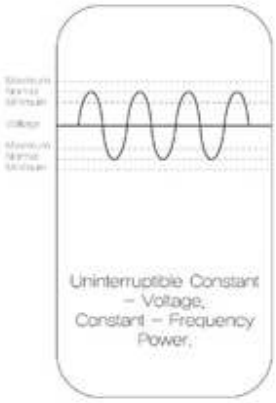
■Necessity of UPS

UPS supplies sine waves with constant and accurate voltage and frequency to protect the load from all kinds of power failures such as momentary power failure, voltage fluctuations, frequency fluctuations, noise, etc.



Examples of unstable power system

1. When the power line alters due to a lightning, it can cause a momentary power failure.
2. Power failure due to lack of capacity in the hydro-electric power, an operation mistake, etc.
3. A drop of electric pressure when using equipment on the same bus.
4. Surge generated due to a lightning or a switch.
5. Noise generated from the equipment.



■Usage

- Computer power
- Measurement/Analysis equipment
- Photoengraving/Printing use
- Quality assurance in the production line
- Broadcasting equipment
- System control
- Testing
- NC machine / MC robot
- Communication data equipment
- CT/X-Ray/medical equipment
- Industrial measuring equipment
- Industrial equipment (Welding machine /Machining power starter/Wire cutter)
- CAD system
- Medical equipment (ME)
- Optical instruments used in laboratories/laboratory power

mki -1000 SERIES

■Features and usage

Optimall.G.B.T ConversionTechnology

- IGBT high-frequencyswitching instantaneous control PWM inverter used
- Increase in life of component by designing the optimal AIR Cycle System
- Ability to permit high-peak current to prevent nonlinear load

Doubled reliability using a high-speed micro-processor

- Complete self-diagnosis and history storage function
- Built-in self-diagnosis
- Built-in LCD display screen
- Various measuring and alerting functions (Input/output voltage, current, frequency, KVA, battery voltage, temperature of equipment, etc.)

User-friendly design concept

- Increase in the ability to decipher visually
- Doubled ability to handle tasks during holiday and at night with the HELP function
- Automatic scheduling function that does not require an additional software (Optional)
- Shows bar graphs by attaching an additional Alarm Status LED besides the LCD display screen to show load capacity and battery status
- Plug-In Type design to make the replacement of expendable components easier (Hot Swap)

Quick and flexible following-up control system

- Saving various warning history up to 1024 pieces, A/S and analysis of outage becomes more objective
- Saves time in repairs using the objective data in the warning history
- Real time checks of the warning incidents at UPS with Real Time Clock

Various remote control and surveillance solution

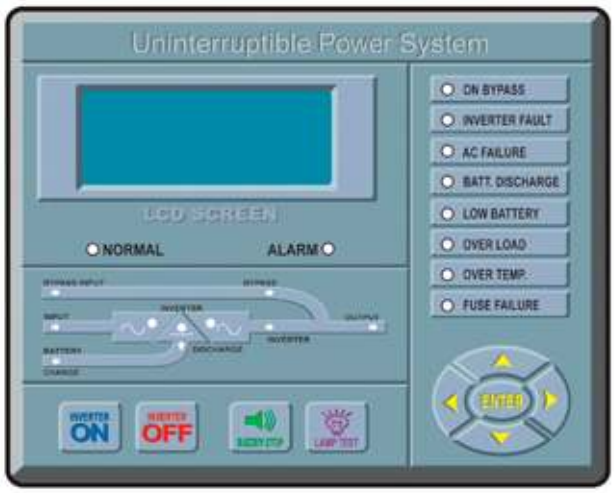
- Equipped with software and numerous communication functions to cope with various OS systems
- Equipped with complete SNVP communication mode (Optional)
- Remote supervisory system using RS-485 communication (Optional)
- Multiple Server Auto-Shutdown(Optional)

Extendibility required in high reliability load

- Isolated Redundantparallel operation
- Dual Inverter function(optional)

DISPLAY

■Features and usage



■Case size for the respective models

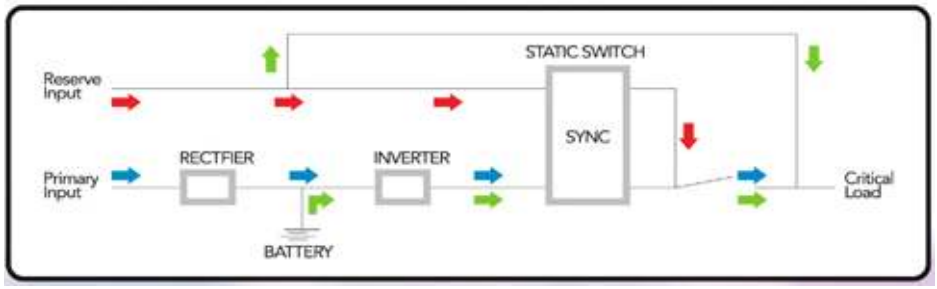
Model	Capacity (KVA)	Case Size (mm)		
		Width	Depth	Hight
UPS - 1000	3	340	620	735
	5			
	7.5	340	660	820
	10	450	800	950
	15			
	20	500	900	1100
	30			
	40	670	800	1330
	50			
	75	750	1000	1505
	100			

* The above standard could be altered for improvement in quality purpose.

■Electric Specification (Input1Φ→Output 1Φ)

Capacity(KVA)		1KVA ~50KVA
General features	Cooling method	Coercive wind-cooling method
	Duty rating	100% Continuous duty (When power factor is 1)
	Rectifier control method	Phase control method
	Rectifier use element	Thyrstor or Diode
	Inverter control method	Control when high frequency (20kHz) ;PWM method
	Inverter use element	IGBT
	Static Switch	Random control switch
	Converter insulating class	H Class
	Communication (Monitoring function)	Built-in SNMP CARD
Power input	Constant	1Φ2W or 3Φ4W
	Duty rating	Set voltage (V)
	Voltage regulation range	Rating±10%, ±15%
	Frequency	50Hz / 60Hz ±5%
Output voltage	Constant	1Φ2W or 3Φ4W
	Duty rating	Set voltage(V)
	Voltage stability	Within±1% of rating
	Frequency	50Hz / 60Hz ±0.5%
	Frequency variation range	±1Hz
	Excessive voltage fluctuation	Within ±5%
	Excessive responding speed	Within 20ms (if restored within ±2%)
	Output voltage adjustment	±5%
	Waveform distortion	THD 3% and below (if 100% linear load)
	Overload	±120% for 10 minutes
	Overall efficiency	90% and above
	Power factor	0.8LAG
	Noise	55dB and above (front 1.5m height 1.5m when measured)
Synchronization switch	Synchronization switch period	4ms
	Momentary power cut period when synchronized	Anti-momentary power cut switch
	Switch conditions	* Inverter disorder *output overload *direct current low voltage *manual switch
Capacitor	Duty rating	2016V, 240V, 360V
	Discharge compensation time	Specify upon purchase
Others	Optional	RS-232C, 422, 485, SNMP communication

■Configuration and operation function



Operating normally

Operating normally

Operating bypass when a problem occurs with the inverter

Operating Emergency (Maintenance) mode

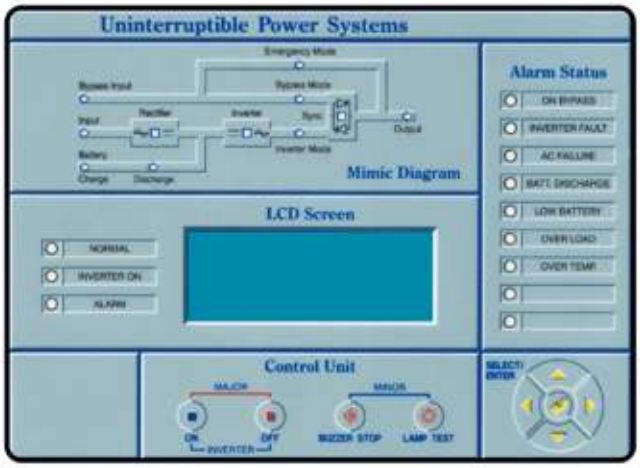
UPS-3000 SERIES

■Features and usage

- Micro-Processor Control Action
- Optimall.G.B.T ConversionTechnology
- Wider range of input power supply (+10%, -15%)
- LCD Displayand MIMIC displays operation status for convenience
- Addition Alarm Status LED besides the LCD
- 12 measuring signs such as voltage and current
- Built-in self-diagnosis / History Log function
- Extendibility required in high reliability load
- Equipped with Help function for convenience
- Displays graphs of load capacity and battery status
- Equipped with software and numerous communication functions to cope with various OS systems

DISPLAY

■Features and usage



■Case size for the respective models

Model	Capacity (KVA)	Case Size (mm)		
		Width	Depth	Hight
MKI-3000	10	450	800	950
	20	500	900	1100
	30			
	40	670	800	1330
	50			
	75	750	1000	1505
	100			

*The above standard could be altered for improvement in quality purpose.

■Electric Specification (Input 3Φ→ Output 3Φ)

Capacity(KVA)		10KVA ~200KVA
General features	Cooling method	Coercive wind-cooling method
	Duty rating	100% Continuous duty
	Rectifier control method	Phase control method
	Rectifier use element	Thyrstor
	Inverter control method	Control when high frequency (20kHz) ;PWM method
	Inverter use element	IGBT
	Static Switch	Switch method
	Converter insulating class	H Class
Power input	Constant	3Φ3W or 3Φ4W
	Duty rating	Set voltage (V)
	Voltage regulation range	Rating ±10%, ±15%
	Frequency	50Hz / 60Hz ±5%
Output voltage	Constant	3Φ3W or 3Φ4W
	Duty rating	Set voltage (V)
	Voltage stability	Within ±1% of rating
	Frequency	50Hz / 60Hz ±0.5%
	Frequency variation range	±1Hz
	Excessive voltage fluctuation	Within ±5%
	Excessive responding speed	Within 20ms (if restored within ±2%)
	Output voltage adjustment	±5%
	Waveform distortion	THD 3% and below (if 100% linear load)
	Overload	±120% for 10 minutes
	Overall efficiency	90% and above
	Power factor	0.8LAG
	Noise	55dB and above (front 1.5m height 1.5m when measured)
Capacitor Others	Synchronization switch period	4ms
	Momentary power cut period when synchronized	Anti-momentary power cut switch
	Switch conditions	* Inverter disorder *output overload *direct current low voltage *manual switch
Capacitor	Duty rating	2016V, 240V, 360V
	Discharge compensation time	Specify upon purchase
Others	Optional	RS-232C, 422, 485, SNMP communication

Frequency Converter

■Features and usage

FEATURES

- Multi – P.W.M (Pulse Width Modulation) Type
- Digital Control method
- I.G.B.T High Frequency Switching
- High Efficiency& Low Audible Noise
- ConstantVoltage: ±1%
- Constant Frequency: ±0.5%
- When approving the existing method of load using semiconductor transformation variation, a voltage fluctuation occurs.
- Output Frequency : 50, 60, 45~500Hz (Variable)
- Output Voltage: 0~300V)(Variable)

APPLICATIONS

- Developing, producing and testing electronic appliances
- For converting frequency in laboratories
- Testing reliability
- Testing transformers
- Testing motors
- Standard AC Power Source
- All testing facilities that require constant voltage and frequency.

DISPLAY

SPECIFICATIONS

MODEL	mki P/C-1WD SERIES, mki P/C-3000 SERIES
output capacity	1KVA 3KVA 5KVA 7.5KVA 10KVA 15KVA 20KVA 30KVA 50KVA 75KVA 100KVA
circuit type	M.P.W.M (multi-pluse width modulation)
input voltage	100V/110V/115V/120V/200V/220V/230V/240V/380V/440V,1PHASE or 3PHASE(±10%)
input frequency	50Hz / 60Hz
output voltage	0-300V, 1PHASE or 3PHASE
voltage stability	≤ ±1%
output frequency	50, 60, 45~500Hz (variable)
frequency stability	±0.5%
T.H.D	±3%
protector	electronic circuit / over load / short circuit
frequency meter	LED digital display
V.A-meter	true RMS digital display
temperature	0 ~ 40℃
humidity	0 ~ 90%
transfer time	zero break
option	output voltage : 0 ~ 700V
option	remote control (RS-232C : variable voltage, variable frequency) / remote multi control(RS-485)

Rectifier

■SCR Method

Outline

- Rectifier is a device that transforms a wave with both positive and negative instantaneous value to a wave that has either positive or negative instantaneous value to obtain a direct current. Rectifier is used in electroplating, electro-coating, anodizing, electrolysis and other industrial electric processes that require a direct current.

Outline

- Breakless, continuous–It does not have a problem with breaking connections because it's breakless and continuous.
- Constant voltage, constant current – When constant voltage and current system is set, it is automatically controlled within a range of ±1.5%.
- Advancement of service function –the service function is improved to repair the system at the front.
- Improvement in safety and reliability – all models are built with automatic constant voltage and current control function and are equipped with complete protection and facilities to improve safety and reliability.

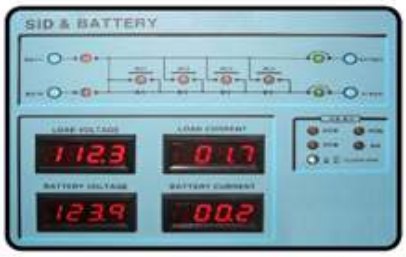
Usage

- Communication, industrial use, handling other rectifiers, plating

High frequency rectifier

- High frequency method using IGBT
- High-tech function with Full Digital method
- High efficiency of 90% and above. High power factor performance of 99% and above
- All settings available at MIMIC
- Manufactured into 19 degrees rack type or could be manufactured otherwise

DISPLAY



■Electric specification

High frequency method

Input rating	Constant	Phase 1, Phase 3
	Rated frequency	47Hz~63Hz
	Duty rating	220, 380, 400, 440 ±15%
Output voltage	Duty rating	DC 110V(24V, 48V, 60V, 72V, 125V, 220V, 250V, 기타)
	Rated current	30A~200A
	Voltage adjustment range	-30% ~+10% of rate voltage
	Voltage variation	Within 0.1%, 15% if input voltage varies
	Voltage variation	Within 0.2%. 10%~100% if load varies
	Current restriction specification	100% and below of rated current
Efficiency and power factor		Efficiency: 92% and above;Power factor: 99% and above
Ripple		1% P-P and below

Response specification	25ms and below
Noise	55dB and below (FAN noise standard)
Direct current spark specification	Within 1V
Insulation resistance	500V / 50Mb and above
Impulse surge	6KV (1.2 x 50㎲), 3KA(8 x 20㎲)
Withstand voltage specification	2,000V for 1 minute
Cooling method	Cohesive wind-cooling method (automatic temperature control)
Coating	40㎲ and above
Control method	IGBT
Panel protection rating	IP 21
Standard weight	20kg, 25kg, 35kg, 45kg, 65kg, 75kg

AVR

AVR - SERIES

■Features and usage

AVR – SERIESsupply power to load constantly and stably.

AVR – SERIESbrings the best result with the least cost from unstable voltage and inflow of disturbing elements such as noise, sag. Impulse, etc.

■AVR – SERIES main features

- Excellent noise blocking
- Efficiency of 95% and above
- Very little loss in no load
- Semi-permanent life
- Wave-form factor of 0.3% and below
- No noise generated
- No interference with the load
- Easy to operate and maintain
- Fast responding speed of 008~0.045 second
- Very low possibility of generating harmonic wave
- Usable with computers and any load including inductive loads
- Built-in overvoltage, low-voltage, overcurrent cutoff to protect the surrounding facilities when an error occurs

■AVR – SERIES Usage

- Power of computers and data processing equipment
- System control
- Optical instruments
- Testing purpose
- Industrial measuring instruments
- Photoengraving purpose
- Measuring and analyzing equipment
- Quality assurance in the production line
- NC machine and robot
- Medical equipment (X-Ray, Ct, etc.)
- Laboratory power
- Various industrial equipment

■Phase 1 DIMESIONS

No.	Capacity (KVA)	Demension (mm)		
		Width	Depth	Hight
1	1 2	275	415	295
2	3 5 7.5	280	500	475
3	10 15	400	480	710
4	20	450	550	815
5	30	530	630	1005
6	40 50	590	690	1130

■Phase 3 DIMESIONS

No.	Capacity (KVA)	Demension (mm)		
		Width	Depth	Hight
1	10 15	450	550	815
2	20 25	530	630	1005
3	30	590	690	1130
4	40	650	750	1275
5	50 75	700	800	1510
6	100	800	950	1660

■SPECIFICATION

classification		Specification
Input rating	Constant	☐ 1Φ 2W ☐ 3Φ 3W ☐ 3Φ 4W
	Duty rating	110V AC ☐ 220V AC ☐ 380V AC ☐ 440V AC ☐ 480V AC
	Voltage regulation range	±15% and above
	Rated frequency	☐ 60hz ☐ 50Hz
Output voltage	Constant	☐ 1Φ 2W ☐ 3Φ 3W ☐ 3Φ 4W
	Duty rating	110V AC ☐ 220V AC ☐ 380V AC ☐ 440V AC ☐ 480V AC
	Rated frequency	☐ 60hz ☐ 50Hz
	Responding speed	Within 0.008~0.048 second
	Voltage stability	Within ±2%
	Waveform distortion	±3% (100% Linear load)
	Power factor	0.7 Lag and above
Efficiency		95% and above
Warning temperature		-10℃ ~ 40℃
Protective device		Overvoltage, low-voltage, overcurrent

■Specification comparative table for AVR series

Form / Specification	AVR - SERIES
Adjustment method	Electric tab conversion type
Control element	TRIAC, PT, IC
Input voltage range	±15%
Output voltage stability	±2%
Responding speed	0008 ~ 0.048 second
Efficiency	95%
Wave-form factor	0.3% and below
Generation of self-harmonic	None
Radio interference	Suitable to American FCC or German VDE regulations
Usage function load	Compatible to all computers and other facilities
Noise	None
Frequency used	Both 50Hz, 60Hz possible
Loss in no load	Very little
Influence in load interference	None