

Important:

The technical specifications contained in this catalog are provided as general information. The Instruction Manual and the information specified on the actual products are binding for installation, operation and maintenance.

Product designations

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MASTERGUARD Uninterruptible Power Supplies Catalog UPS · 1999

Supersedes:
Catalog USV (UPS) · 1997, Parts 1, 2 and 3

UPS Systems 0.7 kVA to 20 kVA

Series A Series A-19 Series E

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MASTERGUARD Series A and Series E UPS Systems

MASTERGUARD protects

No matter how dirty your electrical power system might be, MASTERGUARD protects it. This Uninterruptible Power Supply provides on-line double conversion technology to ensure highest power security and reliability. So MASTERGUARD equalizes all irregularities in the electrical power system. It makes brief power disruptions harmless, and at the same time has enough reserves to bridge prolonged mains failures (Fig. 1).

Typical applications:

- DP equipment and systems
- Personal computers
- Workstations
- Small office/home office sector (SOHO)
- Servers and networks
- Computer centres
- Process controls
- Control centres/SCADA systems
- Telecommunication systems
- ISDN systems
- Drives in continuous production processes
- Production and automation systems
- Life-support systems in hospitals
- Air-traffic control systems
- Safety systems in power stations
- Broadcasting studios
- Transport systems
- and many others

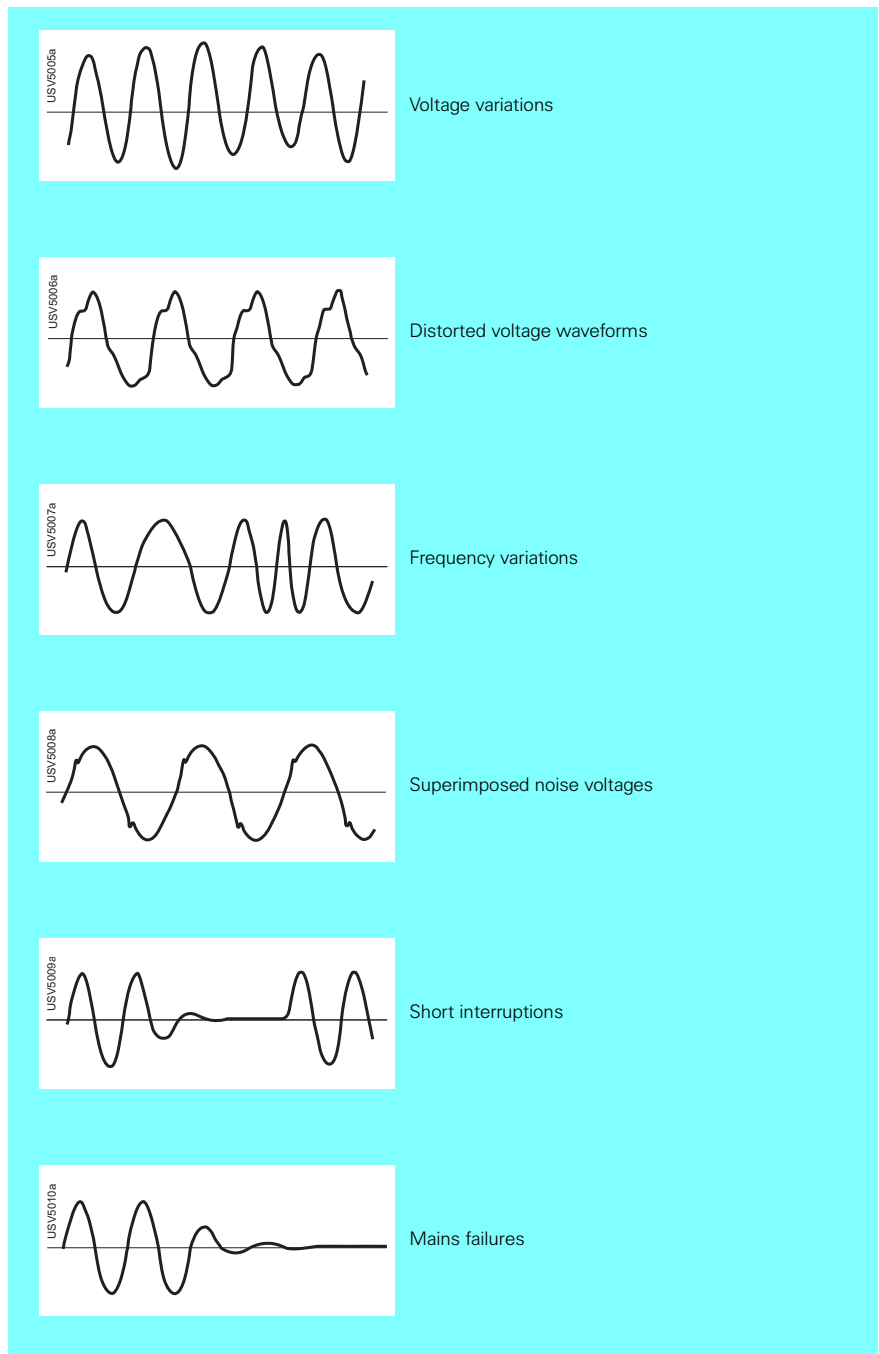
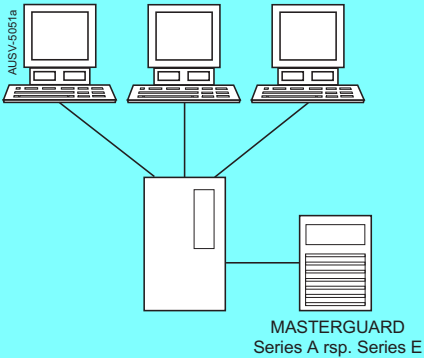


Fig. 1
Types of mains disruptions

MASTERGUARD Series A,
Series A-19 and Series E protect
all single-phase loads

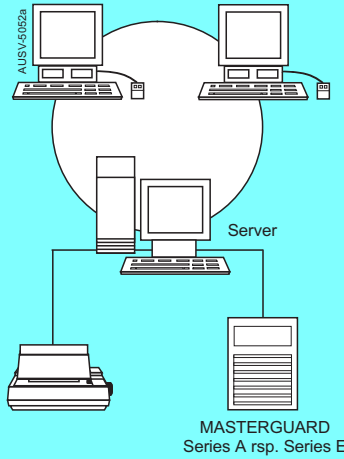
MASTERGUARD Series A and Series E UPS Systems 0.7 kVA to 20 kVA

Areas of application for Series A and Series E in the computer world



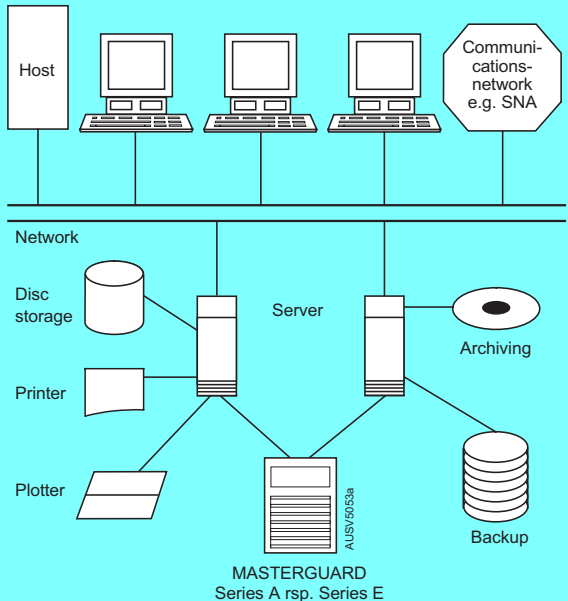
Multi-user systems
Minicomputer-based, e.g.

- Primergy, MX 300/500, RM 300/400/600 (SNI)
- AS/400 (IBM)
- VAX (DEC)



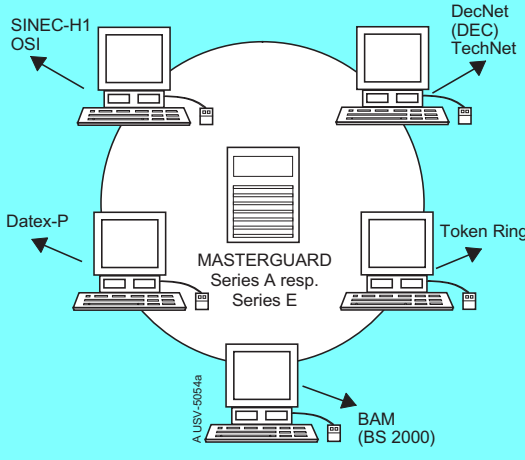
Networks

- Windows NT
- Novell Netware
- UNIX
- IBM LAN



Server applications

- SQL database system
- SAP application
- WEB server
- RAID systems
- Cluster systems
- eCommerce



Exchange equipment/nodes
between different networks/structures, e.g.

- ATM
- Firewall system
- DecNet (DEC)
- Transdata (SNI)
- Datex-P, X.25

MASTERGUARD Series A and Series E UPS Systems 0.7 kVA to 20 kVA

Areas of application for Series A and Series E

Computer environments

- Network servers
- PC systems in computer networks
- Workstation systems
- Application and database servers
- Control and automation systems in the factory and production

Critical areas of application

- For multimedia
- For Internet banking
- For provider applications
- In database systems
- For batch functions
- For data backup
- In archiving systems
- For animation, kinematic
- For long calculations (e.g. FEM), simulations

Our Technology	Benefits For You
True on-line operation – load is fully disconnected from the mains	<ul style="list-style-type: none"> • Power failures bridged completely without interruption • Consistently good quality of power supply • Safe operation of sensitive loads
Small, light, low noise emissions, modern office design	<ul style="list-style-type: none"> • Problem-free installation at the workplace • Unit supplied ready for connection
Integrated, automatic bypass	<ul style="list-style-type: none"> • Short-circuit and overload proof • High degree of availability of output voltage
Computer interface in unit	<ul style="list-style-type: none"> • Communication possible with computers
UPS management software (accessory) for intelligent responses during prolonged power failures as well as for UPS monitoring	<ul style="list-style-type: none"> • Integration in SNMP networks • Multi-server shutdown • UPS and computer – one system • No data loss, no system crashes • Configurable computer shutdown • Can be operated with all major operating systems and networks
Ergonomic design	<ul style="list-style-type: none"> • No operator control required while running • Clear indication of states and load by LEDs, as well as by acoustic alarms if faults occur
Fast service (tailored to your needs)	<ul style="list-style-type: none"> • Minimal down-times • Pick-up and return delivery service • Ecologically compatible disposal • Replacement units available immediately

MASTERGUARD Series A and Series A-19

**UPS Systems
0.7 kVA to 3.0 kVA**

MASTERGUARD Series A and Series A-19 UPS Systems 0.7 kVA to 3.0 kVA

Description

Applications

Many electrical devices and systems respond to line faults, such as voltage and frequency variations, short interruptions or mains failures, by malfunctioning. In the case of data processing systems, this often causes processing errors, data loss and in extreme cases permanent software and hardware damage.

You can protect your devices and systems effectively against all types of mains disruptions with the on-line UPS units in Series A (0.7 to 3 kVA), either in the standard version or in the 19-inch rack mounted system. Compact dimensions, low noise emissions and good design mean that these UPS units can easily be integrated in your office and working environment.

The single-phase UPS is simply installed between the mains and the load. A standard interface can be used for communication purposes. Long backup times can be achieved with the aid of additional battery packs (BP).

UPS units are used in all failure-critical applications, such as:

- Small offices-home offices sector (SOHO)
- Personal computers
- Workstations and servers
- Multimedia systems
- Local area networks
- Multi-user systems
- Communication systems
- Electronic Point-of-sale systems (EPOS)
- Automatic cash-dispensing machines
- Automation systems, process controls

Operation

The UPS units operate according to the on-line principle, i.e. connected loads are isolated from the irregularities of the mains supply without interruption and supplied instead by the UPS.

The rectifier, which converts the mains AC voltage to DC voltage, supplies the inverter with power during normal operation. At the same time, the battery is maintained at full charge or is recharged if it has been discharged (see block diagram)

The inverter generates the sine-wave output AC voltage, whose level and frequency are extremely stable, from the DC voltage.

- True on-line operation



Fig. 2
MASTERGUARD A700 and A1000 UPS



Fig. 3
MASTERGUARD A2000 and A3000 UPS

This double voltage conversion disconnects the load from the mains and thus protects it from the following irregularities:

- Voltage variations
- Frequency variations
- Overvoltage/undervoltage
- Voltage peaks
- Interference voltages
- Distorted voltage waveforms.

If a short interruption or mains failure occurs, the battery supplies the inverter instantly and without interruption. When power is restored during battery operation, the changeover to normal operation likewise takes place without interruption.

As no switchover is necessary when power fails or is restored (on-line operation), this UPS unit ensures that even sensitive loads can be operated safely and without any problems. If severe or prolonged overloading or a load short-circuit occurs, the UPS automatically switches to the integrated bypass. The mains power at the UPS input is now available.

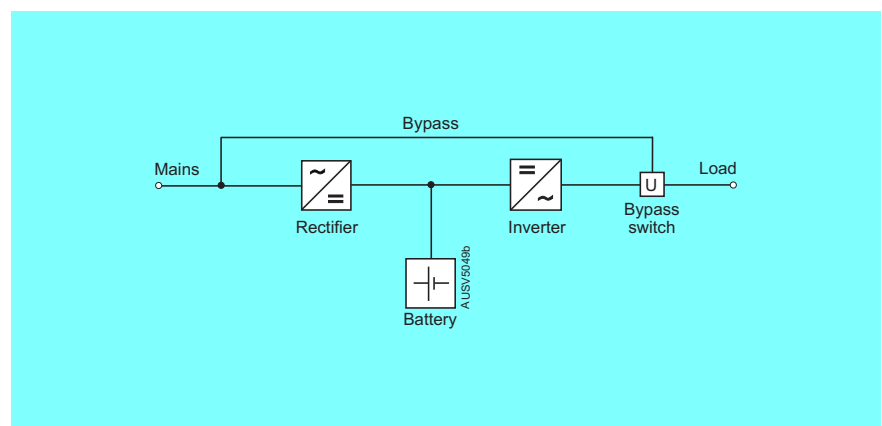


Fig. 4
Block diagram of the on-line double-converter UPS

MASTERGUARD Series A and Series A-19 UPS Systems 0.7 kVA to 3.0 kVA

Description

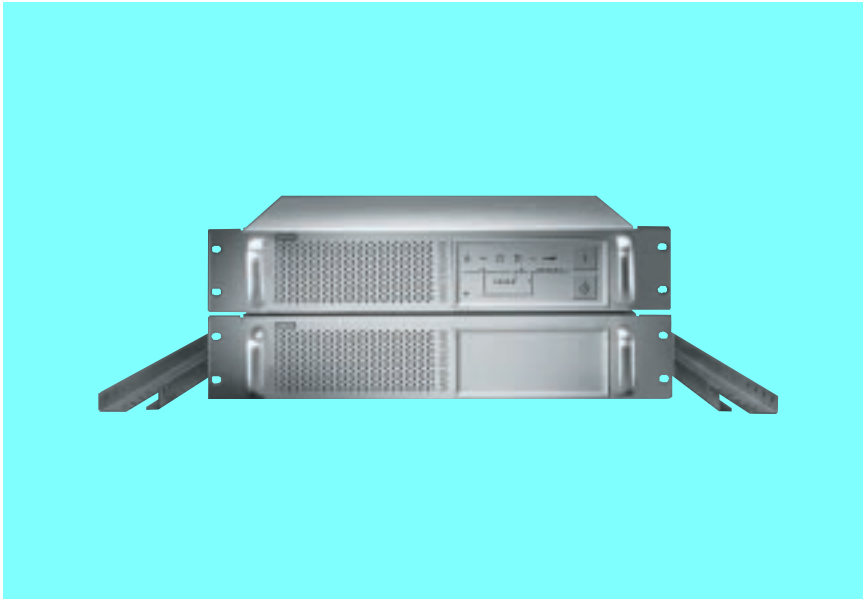


Fig. 5
MASTERGUARD Series A-19 with UPS (top), battery pack (bottom) and slide rails

Features

- True on-line operation, i.e. complete isolation of the load from the irregularities of the mains supply
- Wide input voltage range
- Series A also in 120 V 50/60 Hz version with plug-in connectors according to NEMA (floor-mounted unit on request)
- Optimum protection of the loads against line faults of all kinds
- High-quality sine wave voltage at the output
- Sine wave input current
- PWM inverter technology
- Compact design, small dimensions
- Light weight achieved by using modern technology
- Quiet operation and modern office design, i.e. the UPS can be installed in the office right next to PCs or workstations
- Simple operation and functional indicators for displaying operating states and load levels
- Integrated computer interface and optional communication software for computer operation
- Integrated, automatic bypass increases availability
- Installation is easy, with mains supply and loads simply connected via the enclosed power cable and IEC sockets integrated in the UPS
- 19-inch units and battery pack each require just 2 height modules in the 19-inch system cubicle
- 19-inch withdrawable battery modules can be added or removed from the electrical supply on-line (hot swapping)
- 19-inch withdrawable modules with rails for easy installation and servicing
- Fully withdrawable modules with telescopic guide supports on request

- 19-inch batteries hot-swappable

Interface

Integrated combined interface (COM A) for:

- Response of a connected computer to power failures and UPS operating states (e.g. shutdown), or
- Monitoring the UPS with a computer/server
- UPS management with additional software
- Monitoring the UPS with a signalling system

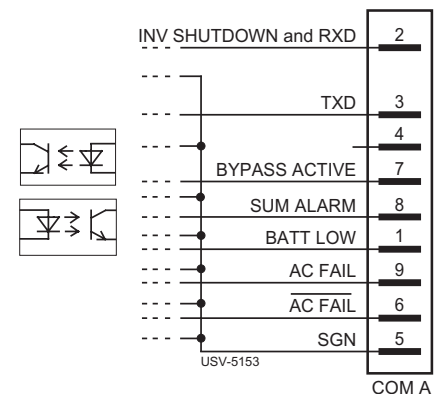


Fig. 6
COM A, interface assignment

Performance if the interface is used

The UPS unit is equipped with an interface that is designed for communication with a computer. If the connected computer is informed of a power failure, for example, via this interface, it can shut down its programs and the operating system in a controlled and orderly manner within the battery's bridging time.

The computer/server requires an RS 232C interface for communication with the UPS unit. Optional standard software available for all major operating systems and for networks monitors the UPS status, generates alarm signals and shuts down the computer automatically.

Please refer to the description of PowerProtect NET for further information about the UPS management software.

Battery expansions

The A1000 to A3000 UPS units can be expanded either with parallel battery cubicles or with 19-inch withdrawable modules. Backup times of up to several hours can be achieved in part-load operation.

MASTERGUARD Series A UPS Systems 0.7 kVA to 3.0 kVA

Description

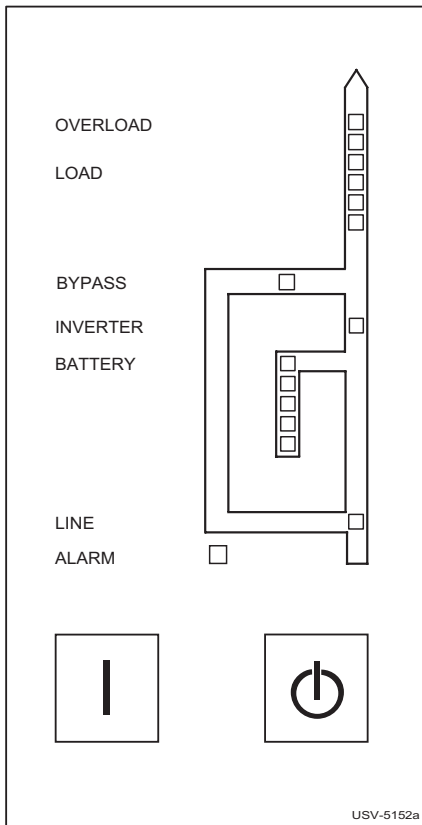


Fig. 7
Indicator and control panel of Series A

Indicator and control panel

The following LEDs

- OVERLOAD – overload
- LOAD – load level
- BYPASS – automatic bypass active
- INVERTER – inverter active
- BATTERY – LED, expanding with capacity
- LINE – mains voltage in range
- ALARM – common alarm

provide a visual indication of the unit's status at any given time. Various acoustic signals are generated in case of a mains failure, when the battery is low and if an overload condition or malfunction occurs. The inverter can be switched ON and OFF (Fig. 7).

Connection

The UPS unit is ready for connection. All the connections can be found at the rear of the unit (Fig. 8). They are plug-in connectors according to IEC 320 for the mains connection (input) and the load connection (output) as well as sub-D connections for the data or computer interface (COM A). The unit is connected to the mains with the enclosed power cable. The UPS unit must be charged for approximately five hours before it is used for the first time (please consult the Operating Instructions and safety regulations).

Scope of supply

The scope of supply includes:

- UPS unit
- Power supply cable
- 1 x IEC 320 multi-outlet distribution unit to triple socket-outlet with earthing contact, length 1.5 m
- Operating Instructions, including installation and maintenance instructions, in several languages (German, English, French, Portuguese, Spanish)

Interfaces and UPS software

See "Accessories" on page 22.

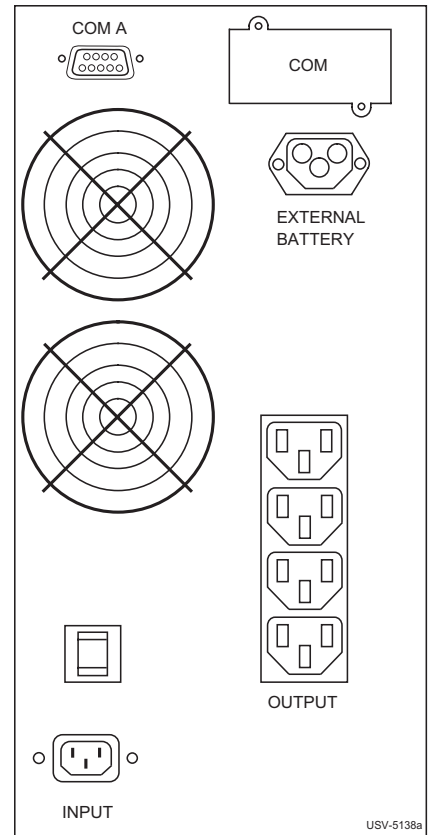


Fig. 8
Rear view of A2000, 230 V version

MASTERGUARD Series A UPS Systems 0.7 kVA to 3.0 kVA

Technical data

Type	A700		A1000		A2000		A3000	
Type of operation	True on-line with double conversion		True on-line with double conversion		True on-line with double conversion		True on-line with double conversion	
Nominal power ($\cos \varphi = 0.7_{ind}$)	VA		700		1000		2000	
Input								
Single-phase Voltage range	230 V unit	V	160 to 276			184 to 276 ¹⁾		
Frequency		Hz	50/60 \pm 5 % (automatic frequency recognition)					
Current			Sine wave, power factor 0.95					
Battery								
Type		V	Valve-regulated lead-acid battery					
Rated voltage		V	24		36		96	
Integrated battery:								
Backup time	at 50% load	min	17		21		26	
	at 100% load	min	6		7		10	
Output								
Single-phase Voltage, frequency	230 V unit		208 V, 220 V, 230 V, 240 V, 50/60 Hz, same as input frequency, voltage set with DIP switch ²⁾					
Voltage tolerance	static/dynamic		\pm 3 %/ \pm 6 %					
Frequency tolerance	mains operation		Output synchronized with mains frequency					
Harmonic distortion	self-clocked operation		\pm 0.5 %					
	linear load		< 4 %					
	non-linear load		< 7 %					
Permissible crest factor			3					
Overload capability			200 % up to 160 ms, 130 % up to 1.5 s, 110 % up to 10 s, short-circuit-proof					
Automatic bypass								
Integrated								
Indicators/alarms								
LEDs	LINE, INVERTER, BYPASS, LOAD level and BATTERY level (2 x light strip), OVERLOAD, ALARM.							
Acoustic signal	Battery operation: 4 s interval, battery low: 1 s interval, overload: 1 s interval, fault: continuous pulse signal. Signal with 4s interval is resettable.							
Data interfaces								
Type	RS 232 and individual signals (level: 5 V to 12 V) and optional interface (see Accessories)							
Unit								
Permissible ambient temperature	operation		+10 °C to +40 °C, recommended temperature: +15 °C to +32 °C ³⁾					
	storage		+10 °C to +35 °C at altitudes between 1500 m and 3000 m					
Relative humidity			-15 °C to +40 °C					
Cooling			20 % to 90 %, no condensation					
Altitude			F (fan)					
			Up to 3000 m above sea level; reduced maximum temperature above 1500 m					
Electrical safety	230 V unit		EN 50091-1, TÜV approved					
Radio interference level	230 V unit		EN 50091-2, class B, corresponds to EN 55022, class B					
Immunity	230 V unit		IEC 801-2 Level 4, IEC 801-3 Level 3, IEC 801-4 Level 4, IEC 801-5 Level 3					
Degree of protection			IP 20					
Efficiency		%	> 83		> 83		> 83	
Noise level		dB(A)	\leq 41		\leq 41		\leq 50	
Dimensions (W x H x D)		mm	145 x 225 x 405		145 x 225 x 405		200 x 350 x 470	
Weight	net	kg	13		16		34	
	gross	kg	14.5		17.5		36	
Colour	Light basic							

1) Lower limit = 160 V with up to 90% UPS output power.

2) 208 V with connection between two phases and without N conductor on request.

3) If the ambient temperature is permanently higher than 25 °C, the battery service life is reduced by half for each 10 °C temperature increase.

MASTERGUARD Series A

UPS Systems 0.7 kVA to 3.0 kVA

Technical data

Type	A700	A1000	A2000	A3000
Installation				
Mains connection	230 V unit	IEC 320, 10 A With power supply cord (socket with earthing contact), length 1.5 m		IEC 320, 16 A
Load connection	230 V unit	4 x IEC 320, 10 A	2 x IEC 320, 10 A	4 x IEC 320, 10 A
Interfaces		Sub-D, 9-pole, male		
Required mains fuse	230 V unit	A 6	10	12
				16

Ordering data

Type	A700	A1000	A2000	A3000
Order No.	230 V unit 120 V unit	6SU50 61-1AA00 On request	6SU50 62-1AA00 On request	6SU50 63-1AA00 On request
				6SU50 64-1AA00 On request

Accessories

Type	–	BP A1000	BP A3000	BP A3000
Parallel battery cubicle for battery expansion (max. 2)		For A1000 UPS	For A2000 UPS	For A3000 UPS
Back-up time with 1 battery cubicle	at 50 % load min –	85	115	74
	at 100 % load min –	36	49	30
with 2 battery cubicles	at 50 % load min –	145	215	140
	at 100 % load min –	60	92	57
Dimensions (W x H x D)	mm –	145 x 225 x 405	200 x 350 x 470	200 x 350 x 470
Weight net/gross	kg –	19/20	48/51	48/51
Order No.	–	6SU54 13-0CA00	6SU54 13-0GA00	6SU54 13-0GA00

Configuration data

Connected load		Typical back-up time in min. for UPS type or UPS type plus battery pack(s) (BP)									
VA	W	A700	A1000	A1000 with 1 BP	A1000 with 2 BPs	A2000	A2000 with 1 BP	A2000 with 2 BPs	A3000	A3000 with 1 BP	A3000 with 2 BPs
100	70	55	70	390							
200	140	37	52	250							
300	210	23	39	170	280						
400	280	14	27	120	200						
500	350	10	21	85	145	55	235	450			
600	420	7	17	70	125	46	195	345	48	205	370
700	490	6	14	60	110	37	170	300	43	175	330
800	560	–	12	49	90	33	150	265	39	160	280
1000	700	–	7	36	60	26	115	215	31	120	230
1250	875	–	–	–	–	20	90	165	23	95	180
1500	1050	–	–	–	–	16	70	125	17	74	140
1750	1225	–	–	–	–	12	60	100	14	63	120
2000	1400	–	–	–	–	10	49	92	12	51	100
2250	1575	–	–	–	–	–	–	–	10	43	85
2500	1750	–	–	–	–	–	–	–	8	40	75
2750	1925	–	–	–	–	–	–	–	7,5	35	65
3000	2100	–	–	–	–	–	–	–	6	30	57

Description

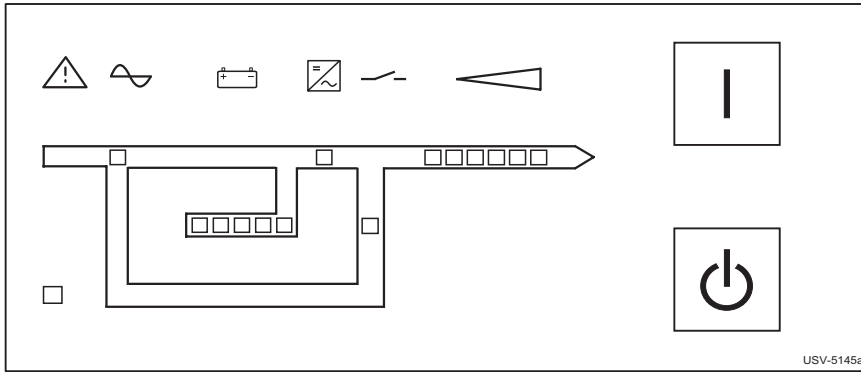


Fig. 9
Indicator and control panel of Series A-19

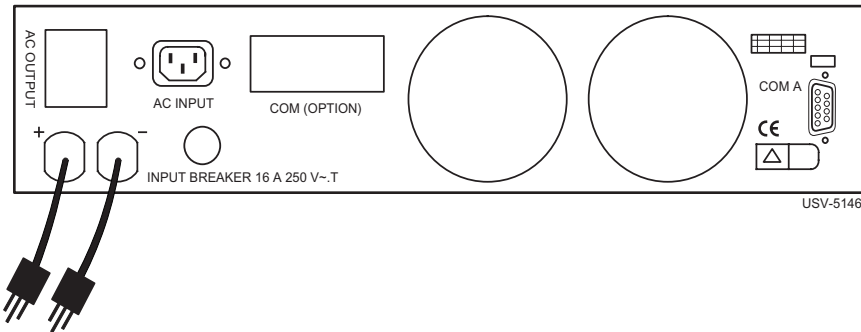


Fig. 10
Rear view of A3000-19 with connections

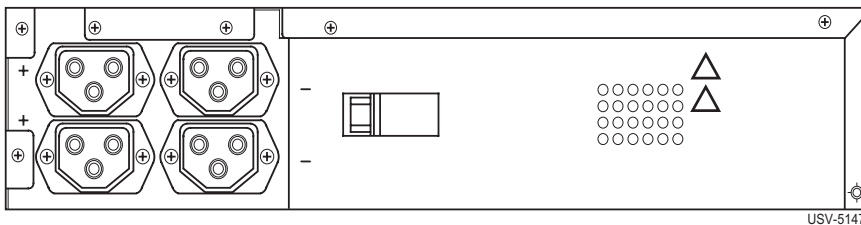


Fig. 11
Rear view of battery pack (BP) for A3000-19 with connections

Indicator and control panel

LEDs provide a visual indication of the operating status of the UPS at any given time. The light strips show the load of the UPS and the charge of the battery (capacity). Each of the symbols at the top of the control panel is assigned either to one of the LEDs below or to a light strip.

The LEDs have the following meanings (from left to right):

- UPS fault
- Mains voltage within permissible operating range
- Battery capacity
- Inverter operation
- Bypass active
- Load level (5 levels, green)
- Overload (yellow)

The buttons on the right-hand side of the control panel are used to switch the inverter on (I) and off (O). Acoustic signals of the UPS can be acknowledged by pressing the I button.

Mechanical installation

The 19-inch UPS and battery enclosures are supported by horizontal sliding rails on both sides. These rails allow the withdrawable modules to be inserted and removed easily. Captive crews between the front panel and the 19-inch rack secure the modules in the draw-out plane.

The front panel dimensions comply with DIN 41 494.

Installation prerequisites:

- Required height: Between two and twelve height modules (HU), depending on the configuration and the power output; the battery must always be underneath and the UPS on top
- Vertical mounting rails, also at the rear, on both sides for fastening the horizontal rack-side sliders; distance between vertical front and rear rail varies depending on manufacturer of the rack
- Cubicle width and depth: at least 600 mm

Electrical connection of the UPS and batteries

The UPS unit comes ready for connection. All the connections can be found at the rear of the unit (see Fig. 10, A3000-19, for example). They are plug-in connectors according to IEC 320 for the mains connection (input) and the load connection (output) as well as sub-D connections for the COM A interface. The unit is connected to the mains with the enclosed power cable. If one or more battery packs are used, the + and – leads (see rear view of the UPS unit in Fig. 10) must be connected to the battery section underneath (Fig. 11). The plugs are polarized and thus cannot be connected incorrectly. The connection to the next battery pack is made in the same way using the two leads enclosed with the pack.

Scope of supply

- UPS unit with set of slide rails, power supply cable, multi-socket distribution board to triple socket-outlet with earthing contact, length 1.5 m and instructions
- Battery pack with set of slide rails, battery leads (1 piece: BP A1000-19, 1 pair: BP A3000-19) and safety regulations.

Note

Rack-side sliding rails depend on 19" rack-system. Information of these rails on request. Delivery after clarification of necessary adaption data and rack-data.

MASTERGUARD Series A-19

UPS Systems 0.7 kVA to 3.0 kVA

Technical data

Type	A700-19	A1000-19	A2000-19	A3000-19
Type of operation	True on-line with double conversion	True on-line with double conversion	True on-line with double conversion	True on-line with double conversion
Nominal power (cos $\phi_{ind} = 0.7$)	700 VA	1000	2000	3000
Input				
Single-phase Voltage range	V	160 to 276	184 to 276 ²⁾	
Frequency	Hz	50/60, $\pm 5\%$ (automatic frequency recognition)		
Current		Sine wave, power factor 0.95		
Battery				
Type	Valve-regulated lead-acid battery			
Rated voltage	V	24	36	96
Integrated battery:				
Stored energy time	at 50% load	min	12	–
	at 100% load	min	6	–
Output				
Single-phase Voltage, frequency		220 V, 230 V , 240 V, 50/60 Hz, same as input frequency, voltage set with DIP switch		
Voltage tolerance	linear load	$\pm 3\%$		
Frequency tolerance	mains operation	Output synchronized with mains frequency		
	self-clocked operation	$\pm 0.5\%$		
Harmonic distortion	linear load	$< 4\%$		
	non-linear load	$< 8\%$		
Permissible crest factor		3		
Overload capability		130 % up to 1.5 s, 110 % up to 10 s, short-circuit-proof		
Automatic bypass		integrated		
Indicators/alarms				
LEDs		LINE, INVERTER, BYPASS, LOAD level and BATTERY level (2 x light strip), OVERLOAD, ALARM		
Acoustic signal		Battery operation: 4 s interval, battery low: 1 s interval, overload: 1 s interval, fault: continuous pulse signal. Signal with 4s interval is resettable		
Data interface				
Type		RS 232 and individual signals (level: 5 V to 12 V) and optional interface (see Accessories)		
Unit				
Permissible ambient temperature	operation	+ 10 °C bis + 40 °C, recommended temperature: + 15 °C bis + 32 °C ¹⁾ , + 10 °C bis + 35 °C at altitudes between 1500 m und 3000 m		
	storage	– 15 °C bis + 40 °C		
Relative humidity		20 % to 90 %, no condensation		
Cooling		F (fan)		
Altitude		Up to 3000 m above sea level; reduced maximum temperature above 1500 m		
Electrical safety		EN 50 091-1, TÜV-approved		
Radio interference level		EN 50 091-2 class B, corresponds to EN 55 022 class B		
Immunity		IEC 801-2 Level 4, IEC 801-3 Level 3, IEC 801-4 Level 4, IEC 801-5 Level 3 and EN 50 091-2		
Efficiency	%	> 83		
Noise level	dB(A)	≤ 42	≤ 42	≤ 45
Dimensions, body (W x H x D)	mm	410 x 87 x 410	410 x 87 x 410	410 x 87 x 440
Mounting depth without front handles	mm	480	480	510
Front clearance for handles	mm	40	40	40
No. of height modules	HU	2	2	2
Weight	net	kg	13	16
	gross	kg	15	18
Colour		Light basic		
Installation				
Mains connection		IEC 320, 10 A		IEC 320, 16 A
Load connection		4 x IEC 320, 10 A		1 x IEC 320, 16 A
Interfaces		Sub-D, 9-pole		
Required mains fuse	A	6	10	12
				16

1) If the ambient temperature is permanently higher than 25 °C, the battery service life is reduced by half for each 10 °C temperature increase.

2) Lower limit = 160 V with up to 90% UPS output power.

MASTERGUARD Series A-19 UPS Systems 0.7 kVA to 3.0 kVA

Ordering data

Typ	A700-19	A1000-19	A2000-19	A3000-19
Order No.	6SU50 81-1BB00	6SU50 82-1BB00	6SU50 83-1BA00	6SU50 84-1BA00

Accessories

Type	–	BP A1000-19	BP A3000-19	BP A3000-19
Parallel 19-inch withdrawable battery module				
Dimensions (19-inch) modules	HU	–	2	2
Weight	kg	–	21.5	27
No. of connectable battery modules per UPS	St.	–	2	5
Order No.	–	6SU50 90-0BB01	6SU50 90-0BB02	6SU50 90-0BB02
Interfaces and adapter	See end of catalog			

Configuration data

Connected load		Typical back-up time in min. for UPS type resp. UPS type plus 19-inch battery pack(s) (BP)													
VA	W	A700	A1000	A1000 + 1 BP	A1000 with 2 BPs	A2000 + 1 BP	A2000 with 2 BPs	A2000 + 3 BPs	A2000 + 4 BPs	A2000 + 5BPs	A3000 + 1 BP	A3000 + 2 BPs	A3000 + 3 BPs	A3000 + 4 BPs	A3000 + 5BPs
100	70	33	–	–	–	–	–	–	–	–	–	–	–	–	–
200	140	23	31	156	292	–	–	–	–	–	–	–	–	–	–
300	210	14.5	26	112	209	–	–	–	–	–	–	–	–	–	–
350	245	12	24	95	175	–	–	–	–	–	–	–	–	–	–
400	280	10.5	21	80	150	64	149	246	350	460	–	–	–	–	–
500	350	9	17	62	116	51	119	193	278	366	–	–	–	–	–
600	420	7	14	50	94	43	100	164	233	307	41	95	157	223	293
700	490	6	11	42	79	36	84	138	196	258	34	80	131	189	248
800	560	–	9	36	67	31	72	119	169	222	29	70	114	163	216
1000	700	–	6	27	51	23	56	92	130	171	22	54	90	128	168
1250	875	–	–	–	–	19	43	71	102	133	19	42	70	100	131
1500	1050	–	–	–	–	16	35	56	80	105	16	34	57	80	106
1750	1225	–	–	–	–	13	28	48	68	89	13	27	47	67	88
2000	1400	–	–	–	–	11	24	40	57	75	11	24	40	56	73
2250	1575	–	–	–	–	–	–	–	–	–	9	22	35	49	65
2500	1750	–	–	–	–	–	–	–	–	–	7	19	30	44	57
2750	1925	–	–	–	–	–	–	–	–	–	6	18	26	39	51
3000	2100	–	–	–	–	–	–	–	–	–	5	16	23	34	45

Built-in mechanical components

Information about built in mechanical components for Knürr and Rittal cubicles can be supplied on request.

MASTERGUARD Series E

**UPS-Systems
6 kVA to 20 kVA**

MASTERGUARD Series E UPS Systems 6 kVA bis 20 kVA

Description

Operation

The UPS units operate according to the true on-line principle, i.e. connected loads are isolated from the irregularities of the mains supply without interruption and supplied instead by the UPS.

The rectifier, which converts the mains AC voltage to DC voltage, supplies the inverter with power during normal operation. At the same time, the battery is maintained at full charge or is recharged if it has been discharged (see block diagram).

The inverter generates the sine-wave output AC voltage, whose level and frequency are stable, from the DC voltage.

This double voltage conversion isolates the load from the mains and thus protects it from the following irregularities:

- Voltage variations
- Frequency variations
- Overvoltage/undervoltage
- Voltage peaks
- Interference voltages
- Distorted voltage waveforms.

If a short interruption or mains failure occurs, the battery supplies the inverter instantly and without interruption. When power is restored during battery operation, the changeover to normal operation likewise takes place without interruption.

As no switchover is necessary when power fails or is restored (on-line operation), this UPS unit ensures that even sensitive loads can be operated safely and without any problems. If severe or prolonged overloading, a load short-circuit, overvoltage or undervoltage levels at the output or UPS faults occur, the UPS automatically switches to the integrated bypass. The mains power at the UPS input is then available.

- True on-line operation

Features

- True on-line operation, i.e. complete isolation of the load from the irregularities of the mains supply
- Wide input voltage range
- Optimum protection of the loads against line faults of all kinds
- High-quality sine wave voltage at the output
- Sine wave input current
- PWM inverter technology
- Compact design, small dimensions
- Battery expansion with parallel battery cubicle, e.g. for 3 h back-up time at 7 kVA load



Fig. 12
MASTERGUARD E60 UPS



Fig. 13
MASTERGUARD E80 and E100 UPS

- Light weight achieved by using modern technology
- Castors allow easy positioning on site
- Simple operation and functional indicators for displaying operating states and load levels
- Integrated interface and optional communication software for computer operation
- Integrated, automatic bypass increases availability
- Installation is easy

Interface

Integrated combined interface (COM A) for:

- Response of a connected computer to power failures and UPS operating states (e.g. shutdown), or
- Monitoring the UPS with a computer/server
- UPS management with additional software
- Monitoring the UPS with a signalling system

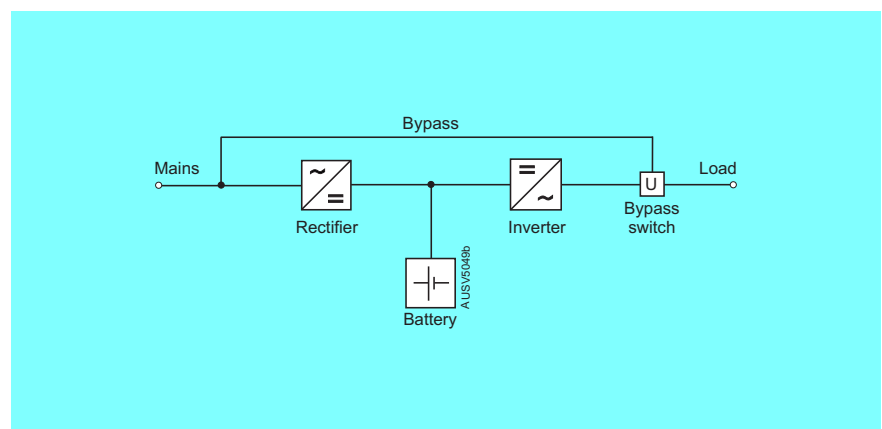


Fig. 14
Block diagram of the true on-line double-converter UPS

Description

Performance if the interface is used

The UPS unit is equipped with an interface that is designed for communication with a computer. If the connected computer is informed of a power failure, for example, via this interface, it can shut down its programs and the operating system in a controlled and orderly manner within the battery's back-up time.

The computer/server requires an RS 232 interface for communication with the UPS unit. Optional standard software available for all major operating systems and for networks monitors the UPS status, generates alarm signals and shuts down the computer automatically.

Please refer to the description of PowerProtect NET for further information about the UPS management software.

Interface assignment as for Series A (see page 7).

Battery expansions

The E60 to E200 UPS units can be expanded with parallel battery cubicles. Back-up times of several hours can be achieved in part-load operation.

Indicator and control panel

The following LEDs:

OVERLOAD – overloading
LOAD – load level
BYPASS – automatic bypass active
INVERTER – inverter in operation
BATTERY – expanding LED row
LINE – mains voltage in range
ALARM – common UPS alarm

provide a visual indication of the unit's status at any given time. Various acoustic signals are generated in case of a mains failure, when the battery is low and if an overload condition or malfunction occurs. The inverter can be switched ON and OFF.

Installation

The UPS units and the battery cubicles can be positioned easily on site thanks to the castors mounted underneath them. They can be locked in their final position by means of height-adjustable feet.

Connection

The UPS unit is ready for connection. All the connections can be found at the rear of the unit. They are clamp-type connectors according to IEC 320 for the mains connection (input) and the load connection (output) as well as sub-D connections for the data or computer interface (COM A). The UPS unit must be charged for approximately eight hours before it is used for the first time (please consult the operation instruction and safety regulations).



Fig. 15
E150 and E200 UPS with battery cubicle

Scope of supply

The scope of supply includes:

- UPS unit
- Operating instructions, including installation and maintenance instructions, in several languages (German, English, French, Portuguese, Spanish)
- 2 x IEC 320-16 multi-socket distribution board to triple socket-outlet with earthing contact (E60 only)

- Communication packages for all major micro-computer systems and networks
- Manual bypass cubicles to allow isolation or replacement of the UPS with no disconnection of the load

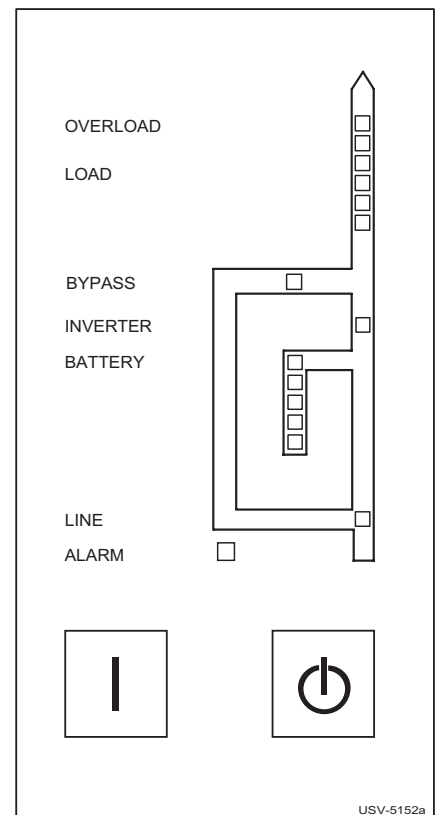


Fig. 16
Indicator and control panel of Series E

MASTERGUARD Series E UPS Systems 6 kVA to 20 kVA

Technical data

Type	E60		E100	
Type of operation	True on-line with double conversion		True on-line with double conversion	
Apparent power (cos $\phi_{ind} = 0,7$)	6 kVA		10	
Input				
Single-phase, Voltage range	V	170 to 276		176 to 276
Frequency	Hz	50/60, $\pm 5\%$ (automatic frequency recognition)		
Current		Sine wave, power factor > 0.97		
Battery				
Type	Valve-regulated lead-acid battery			
Rated voltage	V	240		240
Integrated battery				
Back-up time		at 50% load	min	25
		at 100% load	min	8
				30 ¹⁾
				12 ¹⁾
Output				
Single-phase Voltage, frequency	208 V, 220 V, 230 V, 240 V, 50/60 Hz, same as input frequency, voltage set with DIP switch ²⁾			
Voltage tolerance	$\pm 3\%$			
Frequency tolerance	mains operation	Output synchronized with mains frequency		
	self clocked operation	$\pm 0.5\%$		
Harmonic distortion	linear load	< 4%		
	non-linear load	< 7%		
Permissible crest factor		3		
Overload capability	130% up to 2 s, 110% up to 10 s, short-circuit-proof			
Automatic bypass				
Integrated				
Indicators/alarms				
LEDs	LINE, INVERTER, BYPASS, LOAD level and BATTERY level (2 x light strip), OVERLOAD, ALARM			
Acoustic signal	Battery operation: 4 s interval, battery low: 1 s interval, overload: 1 s interval, fault: continuous pulse signal. Signal with 4s interval is resettable			
Data interface				
Type	RS 232 and individual signals (level: 5 V to 12 V) and optional interface			
Unit				
Permissible ambient temperature	operation	+ 10 °C to + 40 °C, recommended temperature: + 15 °C bis + 32 °C ³⁾		
	storage	- 15 °C to + 40 °C		
Relative humidity		20% to 90%, no condensation		
Cooling		F (fan)		
Altitude		Up to 3000 m above sea level; maximum temperature above 1500 m: 35 °C		
Electrical safety		EN 50 091-1, TÜV-approved		
Radio interference level		EN 50 091-2		
Immunity		IEC 801-2 Level 4, IEC 801-3 Level 3		IEC 801-4 Level 4, IEC 801-5 Level 3
Degree of protection		IEC 801-4 Level 4, IEC 801-5 Level 4		IEC 801-4 Level 4, IEC 801-5 Level 3
		IP 20		
Efficiency	%	> 86		> 90
Noise level	dB(A)	≤ 50		≤ 55
Dimensions (W x H x D)	mm	270 x 705 x 570		340 x 965 x 645
Weight	kg	net 90		180
	gross	kg 105		210
Colour		Light basic		

1) No battery expansion possible.

2) 208 V with connection between two phases (without N conductor) on request.

3) If the ambient temperature is permanently higher than 20 °C, the battery service life is reduced by half for each 10 °C temperature increase.

MASTERGUARD Series E UPS Systems 6 kVA to 20 kVA

Technical data

Type	E60	E100
Mains connection	Fixed-mounted	
Maximum permissible conductor cross-section	mm ² 16	20
Minimum conductor cross-section	mm ² 4	10
Maximum current at 230 V	A 30	49
Battery connection	3-pole plug	Fixed-mounted
Load connection	Fixed-mounted/plug	Fixed-mounted
Maximum permissible conductor cross-section	mm ² 16	20
Minimum conductor cross-section	mm ² 4	10
Plug connection	2 x IEC 320, 16 A	–
Data interface	Sub-D, 9-pole, male	
Required mains fuse	A 35	63

Ordering data

Type	E60	E100
Order No. (unit with integrated battery)	6SU50 65-1AA00	6SU50 66-1AA00
Order No. (unit without integrated battery)	–	6SU50 66-1AN00

Accessories

Type	BP E60	BP E100
Battery expansion with separate battery cubicle	For E60 UPS	For E100 UPS without integrated battery Order No. 6SU50 66-1AN00
Backup time	See "Configuration data" table	See "Configuration data" table below
Dimensions (W x H x D)	mm 270 x 705 x 570	380 x 965 x 670
Weight net/gross	kg 125/145	398/431
Connection via	Cable, enclosed	Cable, enclosed
Battery recharging, e.g. during storage	After 3 months at the latest	After 3 months at the latest
Order No.	6SU54 13-0KA00	6SU54 13-0PA00

Configuration data

Connected load		Typical back-up time in min. for UPS type or UPS type plus battery pack(s) (BP)				
VA	W	E60	E60 with 1 BP E60	E100	E100 with 1 BP	E100 mit 2 BPs
1 500	1 050	57	245	–	–	–
2 000	1 400	45	190	–	–	–
2 500	1 750	35	135	65	245	420
3 000	2 100	25	94	58	215	400
4 000	2 800	15	62	42	152	302
5 000	3 500	10	46	30	95	240
6 000	4 200	8	38	24	80	200
7 000	4 900	–	–	22	70	180
8 000	5 600	–	–	18	60	148
9 000	6 300	–	–	15	50	130
10 000	7 000	–	–	12	45	110

Unit variations

UPS unit with special isolating transformer	Type	E60-T	E100-T
Output voltages		120 V/240 V	120 V/240 V
Back-up time	at 100 % load	min 7	11
Dimensions (B x H x T)		mm 260 x 800 x 555	340 x 960 x 640
Weight		kg 121	235
Load connection, plug-in		NEMA 5-15R	NEMA 5-15R
Order No.		6SU50 65-1AA03	6SU50 66-1AA03

MASTERGUARD Series E

UPS Systems 6 kVA to 20 kVA

Technical data

Type	E80-3	E100-3	E150-3	E200-3
Type of operation	True on-line with double conversion	True on-line with double conversion	True on-line with double conversion	True on-line with double conversion
Nominal power (cos $\phi_{ind} = 0.7$)	8 kVA	10	15	20
Input				
Three-phase	3 AC, N			
Voltage range	V	304 to 478	304 to 456	
Frequency	Hz	50/60, $\pm 5\%$, (automatic frequency recognition)		
Current		Sine wave, power factor > 0.95		
Battery				
Type	Valve-regulated lead-acid battery			
Rated voltage	V	240	240	240
Integrated battery (optional) ¹⁾		32	30	–
Back-up time	at 50% load at 100% load	min min	13	12
Battery expansion	See "Accessories"			
Output				
Single-phase	208 V, 220 V, 230 V , 240 V, 50/60 Hz, same as input frequency, voltage set with DIP switch			
Voltage, frequency	$\pm 3\%$			
Voltage tolerance	Output synchronized with mains frequency			
Frequency tolerance	mains operation	$\pm 0.5\%$		
Harmonic distortion	self-clocked operation	< 3.5 %		
	linear load	< 5 %		
	on-linear load			
Permissible crest factor		3	2,5	
Overload capability	< 130 % of rated load: 10 s; 130 % of rated load: 2 s			
Automatic bypass				
Integrated				
Indicators/alarms				
LEDs	LINE, INVERTER, BYPASS, LOAD level and BATTERY level (2 x light strip), OVERLOAD, ALARM			
Acoustic signal	Battery operation: 4 s interval, battery low: 1 s interval, overload: 1 s interval, fault: continuous pulse signal. Signal with 4s interval is resettable			
Data interface				
Type	RS 232 and individual signals (level: 5 V to 12 V) and optional interface			
Unit				
Permissible ambient temperature	operation	+ 10 °C to + 40 °C, recommended temperature: + 15 °C to + 32 °C ²⁾		
	storage	– 15 °C to + 40 °C		
Relative humidity	20 % to 90 %, no condensation			
Cooling	F (fan)			
Altitude	Up to 3000 m above sea level; maximum temperature above 1500 m: 35 °C			
Electrical safety	EN 50 091-1, TÜV-approved			
Radio interference level	EN 50 091-2			
Immunity	IEC 801-2 Level 4, IEC 801-3 Level 3, IEC 801-4 Level 4, IEC 801-5 Level 3			
Degree of protection	IP 20			
Efficiency	%	> 90	> 90	> 90
Noise level	dB(A)	≤ 60	≤ 60	≤ 65
Dimensions (W x H x D)	mm	340 x 965 x 645	340 x 965 x 645	380 x 965 x 670
Weight (without/with battery)	net	kg	81/180	81/180
	gross	kg	101/200	101/200
Colour	Light basic			

1) No battery expansion possible

2) If the ambient temperature is permanently higher than 20 °C, the battery service life is reduced by half for each 10 °C temperature increase.

MASTERGUARD Series E UPS Systems 6 kVA to 20 kVA

Technical data

Type	E80-3	E100-3	E150-3	E200-3
Installation				
Mains connection (3AC/N)		Fixed-mounted		
Maximum permissible conductor cross-section	mm ² 16	16	35	35
Minimum conductor cross-section	mm ² 10	10	25	35
Maximum current at 400 V	A 39	49	69	92
Load connection (1 AC/N)		Fixed-mounted		
Maximum permissible conductor cross-section	mm ² 16	16	35	35
Minimum conductor cross-section	mm ² 10	10	25	35
Maximum current at 230 V	A 39	49	72	96
Data interface	Sub-D, 9-pole, male			
Mains fuse	A 50	50	80	100

Ordering data

Type	E80-3	E100-3	E150-3	E200-3
Order No. (unit with integrated battery)	6SU51 08-0BA00	6SU51 10-0BA00	–	–
Order No. (unit without integrated battery)	6SU51 08-0AA00	6SU51 10-0AA00	6SU51 15-0AA00	6SU51 20-0AA00

Accessories

Type	BP E100	BP E100	BP E100	BP E100
Separate battery cubicles				
Connection to UPS type (Order No.)	6SU51 08-0AA00	6SU51 10-0AA00	6SU51 15-0AA00	6SU51 20-0AA00
Back-up time with 1 battery cubicle	at 50 % load	min 150	95	70
	at 100 % load	min 69	45	27
Back-up time with 2 battery cubicles	at 50 % load	min 360	240	120
	at 100 % load	min 145	110	60
Dimensions (W x H x D)	mm 380 x 965 x 640	380 x 965 x 640	380 x 965 x 640	380 x 965 x 640
Weight	net/gross kg 398/431	398/431	398/431	398/431
Order No.	6SU54 13-0PA00	6SU54 13-0PA00	6SU54 13-0PA00	6SU54 13-0PA00
Service switch/external manual bypass	Type HU-E-50 A	HU-E-100 A		
Order No.	6SU55 33-0CA00		6SU55 33-0EA00	
Interfaces and adapter	See page 22 "Accessories"			

MASTERGUARD Series A, Series A-19 and Series E

Accessories for Series A, A-19 and E

Various interface modules can be used in the units belonging to Series A, A-19 and E.

SIC contact interface

The SIC interface module can optionally be inserted in the COM interface slot. In this case, the COM1 contact assignment (Fig. 17) is still available. Contact rating: 1 A/120 V AC or 1 A/24 V DC.

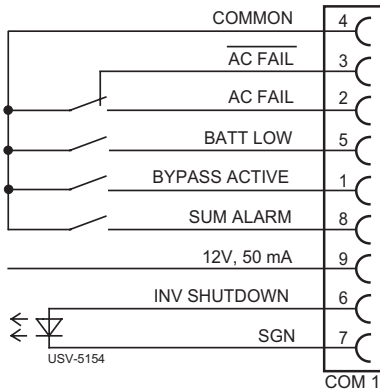


Fig. 17
COM 1, interface assignment

SNMP adapter

An SNMP adapter SC 21 can optionally be connected to the COM slot.

Data power connection: BNC and RJ-45 UTP twisted pair.

The network to be connected must be equipped with a Network Management System (NMS), e.g. HP OpenView or Transview. Please refer to the enclosed Management Information Base (MIB) for further details about the NMS.

Scope of supply:

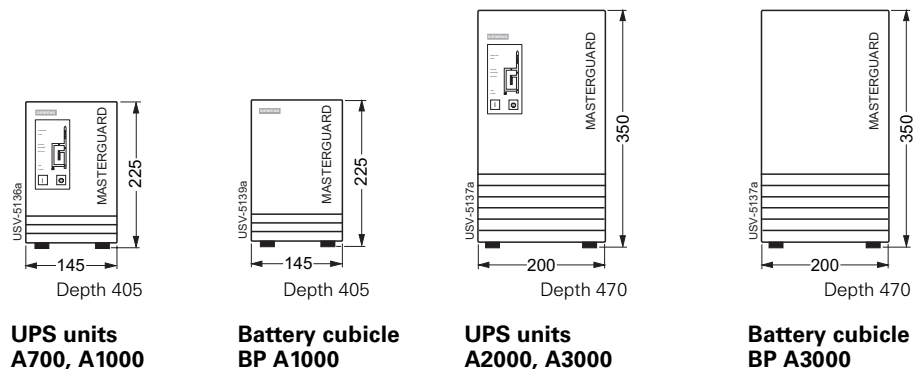
- Adapter
- MIB on floppy disk (DOS-Intel und UNIX)
- Instructions

The UPS management software, line multiplexers and networking accessories are described in a separate catalog.

Ordering data

SIC contact interface Order No.	6SU54 71-0AA00
SNMP adapter module SC21 Order No.	6SU59 31-0BB21

MASTERGUARD Series A



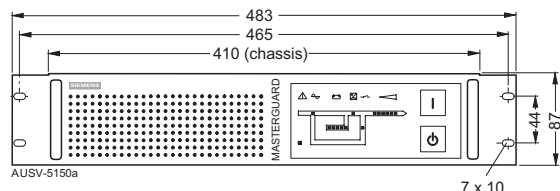
**UPS units
A700, A1000**

**Battery cubicle
BP A1000**

**UPS units
A2000, A3000**

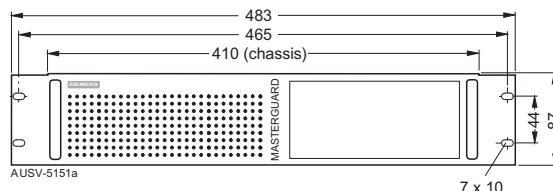
**Battery cubicle
BP A3000**

MASTERGUARD Series A-19



**UPS units
A700-19, A1000-19,
A2000-19, A3000-19**

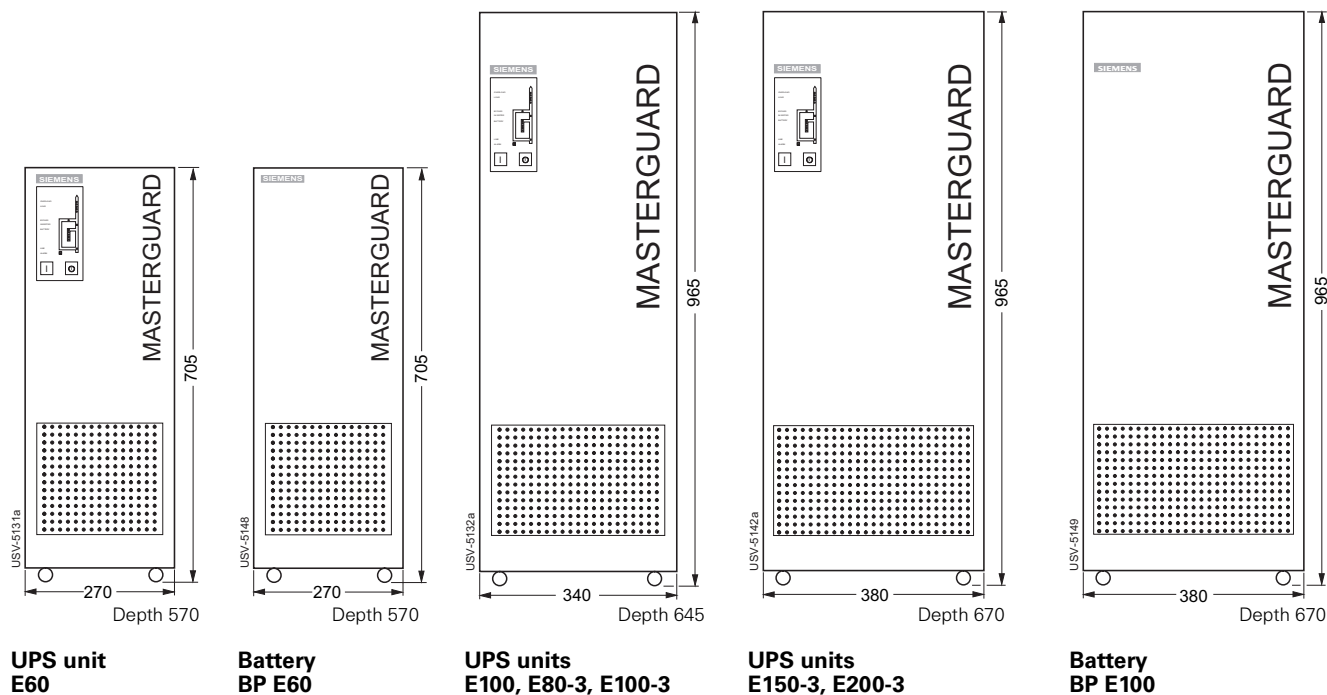
Depth 410 (A700-19, A1000-19)
440 (A2000-19, A3000-19)
(without front handles)



**Battery packs
BP A1000-19,
BP A3000-19**

Depth 410 (BP A1000-19)
440 (BP A3000-19)
(without front handles)

MASTERGUARD Series E



**UPS unit
E60**

**Battery
BP E60**

**UPS units
E100, E80-3, E100-3**

**UPS units
E150-3, E200-3**

**Battery
BP E100**

All dimensions in mm

Conditions of Sale and Delivery

Outside Germany:

Subject to the General Conditions of Supply and Delivery for Products and Services of the Electrical and Electronic Industry and to any other conditions agreed upon with the recipients of Masterguard pricelists.



The technical data, dimensions and weights are subject to change unless otherwise stated on the individual pages of this catalog.

The illustrations are for reference only. We reserve the right to adjust the prices and shall charge the prices applying on the date of delivery.

Year 2000 compliance

The turn of the new millenium has consequences not only for computer systems, but also for all products, systems and plants that are used in automation and drive engineering.

Aside from the hardware and software components, the millenium change will have the greatest effect on all user programs that are required to process calendar dates.

We at Masterguard are currently devoting considerable effort to providing solutions for our automation products and systems that will make our customers' transition to the next millenium as smooth as possible.

We have carried out a detailed study of our products' behaviour on the basis of the internationally recognized test profiles drawn up by the British Standards Institution. You can find the results of this study on the Internet in our Year 2000 Product Database:

<http://www.ad.siemens.de/jahr2000>.

Certain combinations of products and systems in complex plants, as well as customer modifications to and/or expansions of

such products and systems, may result in constellations that cause either individual products or the complete system or plant to malfunction on the roll-over date.

Your local Masterguard and Siemens contact will be glad to provide further information.