

MODULYS GP

Green Power 2.0 range

25 to 600 kVA/kW

3
LEVEL
TECHNOLOGY

96%
EFFICIENCY

kW
=
kVA



socomec
Innovative Power Solutions

OBJECTIVES

The aim of these specifications is to provide the information required to prepare the system and installation site.

The specifications are intended for:

- installation engineers.
- design engineers.
- engineering consultants.

For detailed information, see the installation and operating manual.

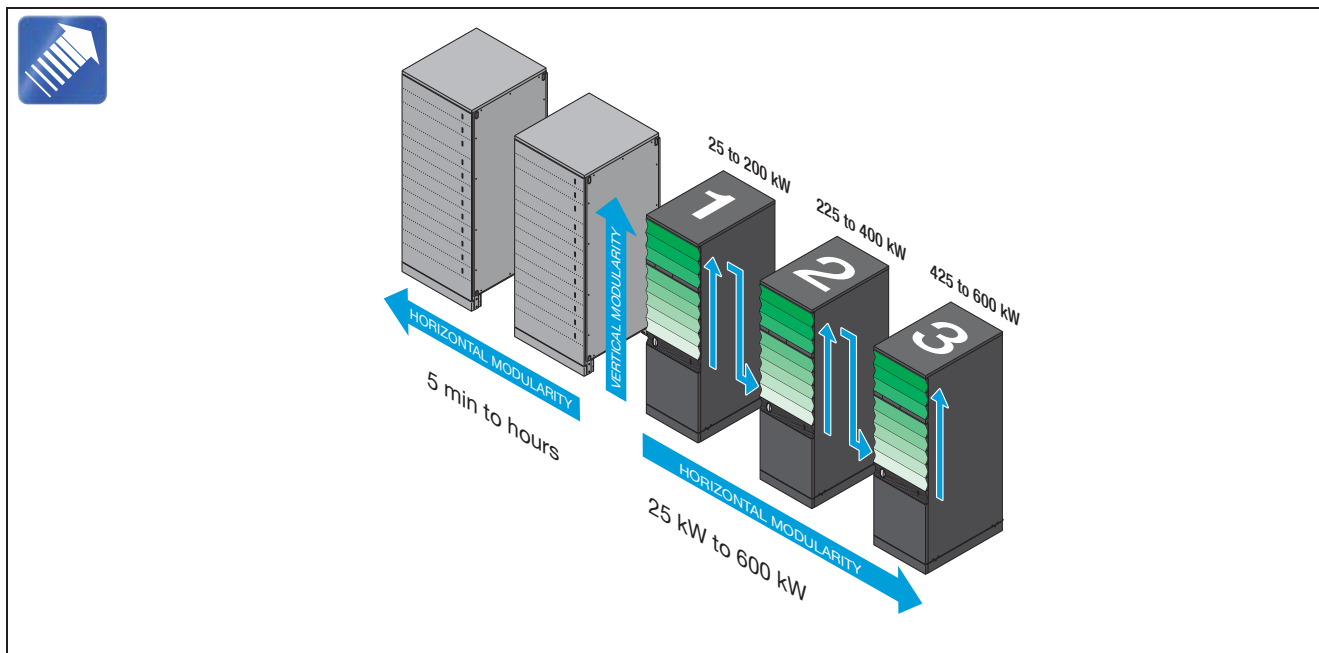
1. ARCHITECTURE

1.1 RANGE AND POWER FLEXIBILITY

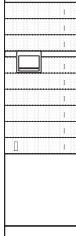
MODULYS GP is a modular, scalable UPS system with power ratings from 25 kW to 600 kW, based on parallelable plug-in power modules.

The vertical modularity allows power scalability by simply plugging one or more additional modules into the existing system (up to 8 modules per system).

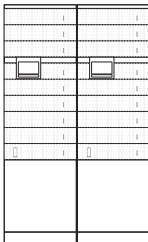
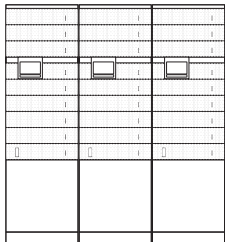
The horizontal modularity enables maximum scalability up 600 kW (24 modules) by coupling three modular systems.



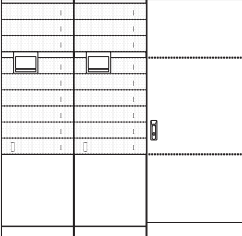
1.1.1 SYSTEM FROM 25 TO 200 KW

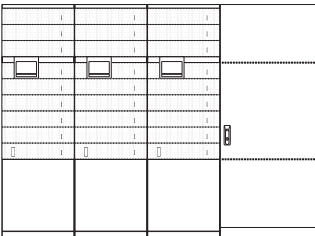
CONFIGURATIONS AND RATED POWER								
	Number of Modules							
	1	2	3	4	5	6	7	8
Power (kW) without redundancy	25	50	75	100	125	150	175	200
Power (kW) N+1 redundant	-	25	50	75	100	125	150	175
Power (kW) N+2 redundant	-	-	25	50	75	100	125	150
								
	M4-S-200-82-0 M4-S-200-82B0							

1.1.2 COMBINABLE SYSTEM

CONFIGURATIONS AND RATED POWER																								
	Number of Modules																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Power (kW) without redundancy	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600
Power (kW) N+1 redundant	-	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575
Power (kW) N+2 redundant	-	-	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550
																								
	1x M4-S-200-87-0								2 x M4-S-200-87-0								3 x M4-S-200-87-0							

1.1.3 FULLY INTEGRATED SOLUTION

CONFIGURATIONS AND RATED POWER																
	Number of Modules															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Power (kW) without redundancy	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400
Power (kW) N+1 redundant	-	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375
Power (kW) N+2 redundant	-	-	25	50	75	100	125	150	175	200	225	250	275	300	325	350
																
	M4-S-400-83-BA															

CONFIGURATIONS AND RATED POWER																								
	Number of Modules																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Power (kW) without redundancy	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600
Power (kW) N+1 redundant	-	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575
Power (kW) N+2 redundant	-	-	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550
																								
	M4-S-600-83-BA																							

1.2 FLEXIBLE BACK-UP TIME

Different extended back-up times are possible by using: (1) the internal battery; (2) a modular battery cabinet; (3) a high capacity battery cabinet. The latter two occupy minimum floor space.

Each battery pack comprises an acid-proof container designed to prevent damage in the case of acid leakage.

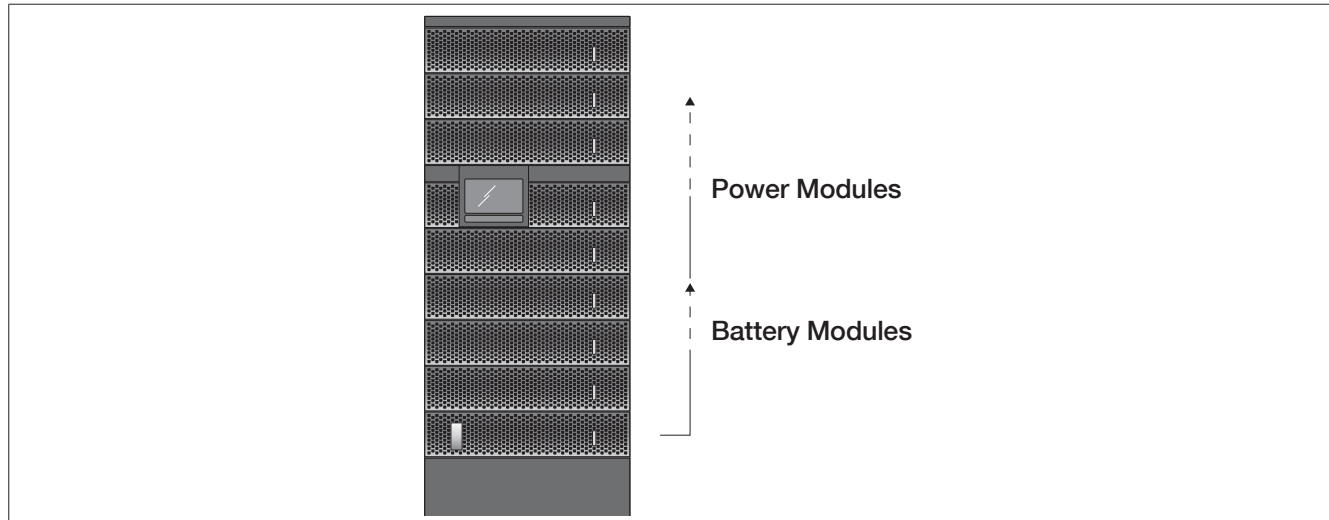
Each Power Module has a powerful embedded battery charger able to provide up to 8 A (without derating).

A special Power Module with double battery charger inside is available when very long back-up times are required.

1.2.1 INTERNAL HOT-SWAP BATTERY

A standard UPS cabinet can house both Power Modules and Battery Boxes, thus providing a compact solution with a small footprint and optimised costs.

Each battery box has its own independent protection and it is hot-swappable.



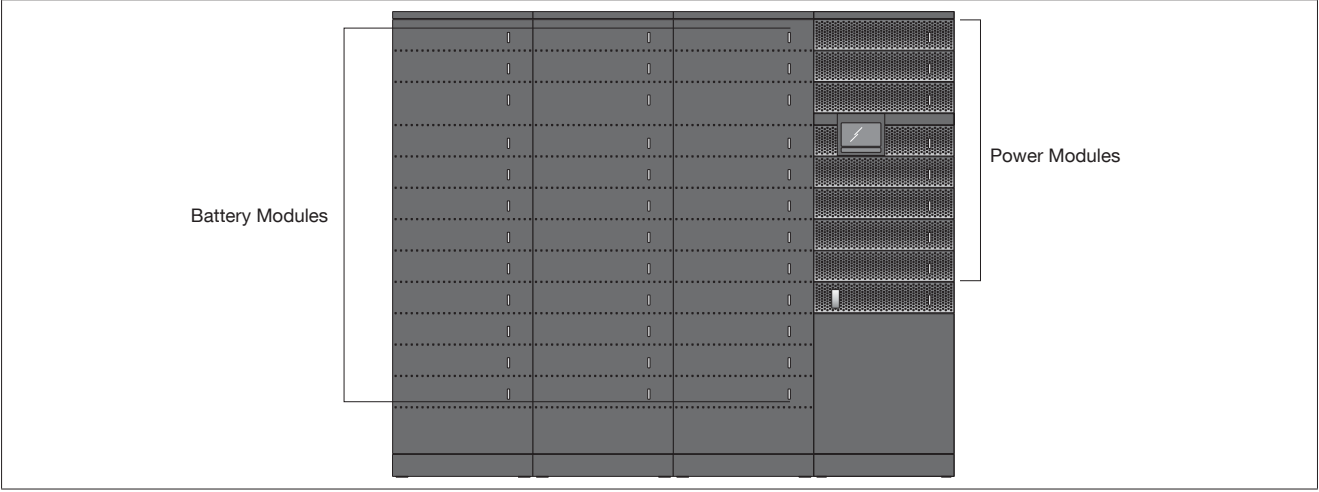
DIMENSIONS AND WEIGHT												
	Number of battery strings											
	1	2	3	4	5	6	7	8	9	10	11	12
Height (mm)	1990											
Depth (mm)	890											
Width (mm)	600											
Weight (kg)	260	360	460	560	660	760	860	960	1060	1160	1260	1360

Internal hot-swap battery Back-up times in minutes @ 75 % of rated load										Internal hot-swap battery Back-up times in minutes @ 75 % of rated load										Internal hot-swap battery Back-up times in minutes @ 75 % of rated load														
			Number of Power Modules											Number of Power Modules											Number of Power Modules									
Without redundancy			1	2	3	4	5	6	7	8	N+1 redundancy			2	3	4	5	6	7	8		N+2 redundancy			3	4	5	6	7	8				
Number of battery strings	1	Cumulative Ah	5	-	-	-	-	-	-	-	Number of battery strings	1	Cumulative Ah	5	-	-	-	-	-	-	-		Number of battery strings	1	Cumulative Ah	5	-	-	-	-	-	-		
	2		10	6	-	-	-	-	-	-				2	10	6	-	-	-	-	-	-				2	10	6	-	-	-	-	-	
	3		15	11	-	-	-	-	-	-				3	15	11	-	-	-	-	-	-				3	15	11	-	-	-	-	-	
	4		20	16	6	-	-	-	-	-				4	20	16	6	-	-	-	-	-				4	20	16	6	-	-	-	-	
	5		25	21	8	-	-	-	-	-				5	25	21	8	-	-	-	-	-				5	25	21	-	-	-	-	-	
	6		30	26	11	-	-	-	-	-				6	30	26	-	-	-	-	-	-				6	30	-	-	-	-	-	-	
	7		35	34	-	-	-	-	-	-		-			7	35	-	-	-	-	-	-		-			7	35	-	-	-	-	-	-

1.2.2 MODULAR HOT-SWAP BATTERY CABINET - MEDIUM CAPACITY

The modular battery system is based on vertical and horizontal modularity thanks to independent battery strings connected in parallel, each one made of hot-swap long life battery packs.

Each battery string has its own independent protection and its own independent switch for fast and safe maintenance.



DIMENSIONS AND WEIGHT																																				
	Number of Modular hot-swap battery cabinets - medium capacity																																			
	1												2												3											
	Number of battery strings																																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Height (mm)	1990																																			
Depth (mm)	950																																			
Width (mm)	810												1620												2430											
Weight (kg)	384	508	632	756	880	1004	1128	1252	1376	1500	1624	1748	2132	2256	2380	2504	2628	2752	2876	3000	3124	3248	3372	3496	3880	4004	4128	4252	4376	4500	4624	4748	4872	4996	5120	5244

Vertical modularity using a modular battery cabinet with hot-swap battery boxes provides scalable power back-up with to 12 battery strings per cabinet.

Horizontal modularity provides very high and scalable back-up.

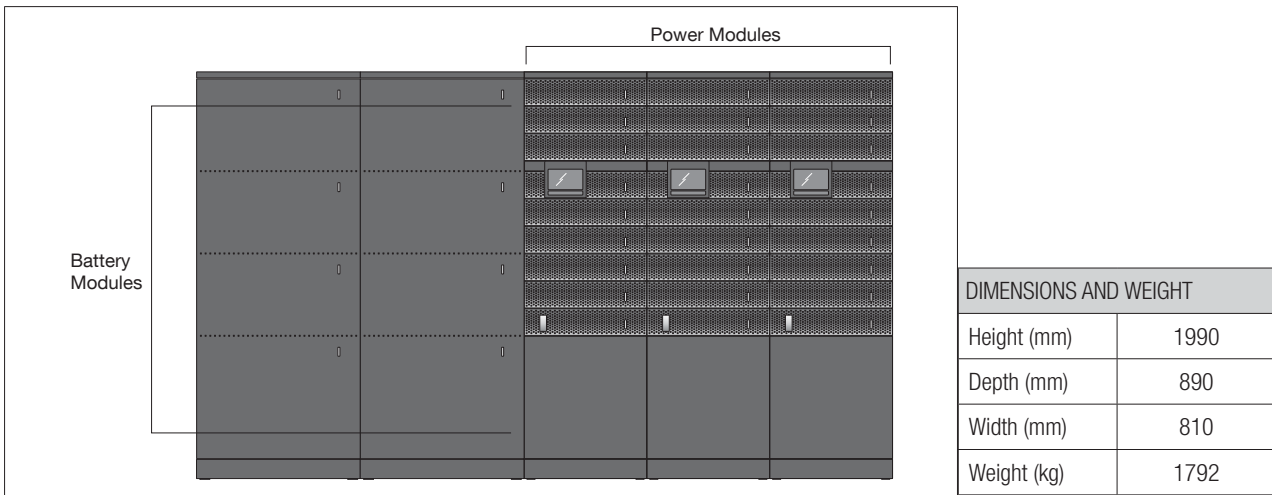
A standard temperature sensor optimises the battery recharging parameters according to the ambient operating temperature to extend battery life.

MODULAR HOT-SWAP BATTERY CABINET - MEDIUM CAPACITY

BACK-UP TIMES IN MINUTES @75% OF RATED LOAD

				Number of Power Modules																							
Without redundancy				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
N+1 redundant				2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	-
N+2 redundant				3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	-	-
Number of battery cabinets	1	Number of battery strings	1	9	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	18	15	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	27	23	9	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			4	36	34	15	8	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			5	45	44	19	11	7	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			6	54	57	23	15	9	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			7	63	68	28	18	12	8	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			8	72	80	34	20	15	11	8	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			9	81	92	40	23	17	13	9	7	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			10	90	103	44	23	19	15	11	9	7	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-
			11	99	116	51	30	21	17	13	10	8	7	6	5	-	-	-	-	-	-	-	-	-	-	-	-
			12	108	129	57	34	23	18	15	12	9	8	6	6	5	-	-	-	-	-	-	-	-	-	-	-
	2	13	117	141	63	38	25	20	16	13	11	9	7	6	5	5	-	-	-	-	-	-	-	-	-	-	
		14	126	151	68	41	28	22	18	15	12	10	8	7	6	5	5	-	-	-	-	-	-	-	-	-	
		15	135	163	73	44	31	23	19	16	14	11	9	8	7	6	5	5	-	-	-	-	-	-	-		
		16	144	177	80	48	34	25	20	17	15	13	11	9	8	7	6	5	5	-	-	-	-	-	-		
		17	153	190	86	53	37	27	22	18	16	14	12	10	9	7	7	6	5	5	-	-	-	-	-		
		18	162	206	92	57	40	29	23	19	17	15	13	11	9	8	7	6	6	5	5	-	-	-	-		
		19	171	221	98	61	42	32	25	21	18	16	14	12	10	9	8	7	6	6	5	5	-	-	-		
		20	180	235	103	65	44	34	26	22	19	17	15	13	11	10	9	8	7	6	6	5	5	-	-		
		21	189	249	109	68	47	37	28	23	20	18	16	14	12	11	9	8	8	7	6	6	5	5	-		
		22	198	261	116	71	51	39	30	25	21	18	17	15	13	12	10	9	8	7	7	6	6	5	5	-	
		23	207	272	123	75	54	41	32	26	22	19	17	16	14	12	11	10	9	8	7	7	6	6	5	5	-
		24	216	282	129	80	57	43	34	27	23	20	18	17	15	13	12	11	9	9	8	7	6	6	6	5	5
	3	25	225	294	135	84	60	44	36	29	24	22	19	17	16	14	13	11	10	9	8	8	7	6	6	5	5
		26	234	310	141	88	63	46	38	31	25	23	20	18	16	15	13	12	11	10	9	8	7	7	6	6	5
		27	243	326	146	92	66	49	40	33	26	23	21	19	17	16	14	13	11	10	9	9	8	7	7	6	6
		28	252	341	151	96	68	52	41	34	28	24	22	19	18	16	15	14	12	11	10	9	8	8	7	7	6
		29	261	354	156	99	81	55	43	36	30	25	23	20	18	17	16	14	13	12	11	10	9	8	8	7	7
		30	270	367	163	103	73	57	44	38	31	26	23	21	19	17	16	15	14	12	11	10	9	9	8	7	7
		31	279	383	180	108	86	59	46	39	33	27	24	22	20	18	17	15	14	16	12	11	10	9	8	8	7
		32	288	402	177	111	80	62	48	41	34	29	25	23	20	19	17	16	15	14	13	11	11	10	9	8	8
		33	297	419	183	116	83	64	51	42	36	30	26	23	21	19	18	17	15	14	13	12	11	10	9	9	8
		34	306	436	190	120	86	66	53	43	37	32	27	24	22	20	18	17	16	15	14	13	12	11	10	9	9
		35	315	451	197	125	89	68	55	44	39	33	28	25	23	21	19	18	17	15	14	13	12	11	10	10	9
		36	324	466	206	129	92	70	57	46	40	34	29	25	23	21	19	18	17	16	15	14	13	12	11	10	9

1.2.3 MODULAR BATTERY CABINET - HIGH CAPACITY



Modular battery cabinets - high capacity are designed for long BUT also with higher power.

A standard temperature sensor optimizes the battery recharging parameters according to the ambient operating temperature to extend battery life.

MODULAR BATTERY CABINET - HIGH CAPACITY BACK-UP TIMES IN MINUTES @75 % OF RATED LOAD																													
					Number of Power Modules																								
Without redundancy					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
N+1 redundant					2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	-	
N+2 redundant					3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	-	-	
Number of battery cabinets	1	Number of battery strings	1	Cumulative Ah	92	119	56	33	21	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	2		2		184	279	119	75	56	45	33	25	21	17	15	-	-	-	-	-	-	-	-	-	-	-	-		
	3		3		176	447	201	119	84	66	56	49	41	33	27	24	21	18	17	15	-	-	-	-	-	-	-		
	4		4		268	654	279	170	119	89	75	62	56	50	45	39	33	28	25	23	21	19	17	16	15	-	-	-	-
	5		5		460	-	378	226	154	119	92	81	70	60	56	51	47	43	38	33	29	26	24	22	21	19	18	17	16
	6		6		552	-	-	279	201	146	119	96	84	75	66	59	56	52	49	45	41	37	33	30	27	25	24	22	21

2. SPECIFICATIONS

2.1 INSTALLATION PARAMETERS

RATED POWER																								
	Number of Systems																							
	1								2								3							
	Number of Modules																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Power (kW) without redundancy	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600
Power (kW) N+1 redundant	-	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575
Power (kW) N+2 redundant	-	-	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550

The number of modules should be defined according to the load power and the required level of redundancy.

RATED POWER AND MAX CURRENT																								
	Number of Systems																							
	1								2								3							
	Number of Modules																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Rated rectifier input current (A) (EN 62040-3)	38	75	113	152	189	226	264	302	339	377	415	452	490	528	566	603	641	679	716	754	792	829	867	905
Max rectifier input current (A) (EN 62040-3)	45.0	90	135	180	225	270	315	360	405	450	495	540	585	630	675	720	765	810	855	900	945	990	1035	1080
Inverter output current @ nominal voltage (A)	36.2	72	109	145	181	217	253	290	326	362	398	434	471	507	543	579	615	652	688	724	760	796	833	869
Maximum bypass input current (A) (EN 62040-3)	320								640								960							
Max battery current (A)	80	160	240	320	400	480	560	640	720	800	880	960	1040	1120	1200	1280	1360	1440	1520	1600	1680	1760	1840	1920

In case of 3 single-phase distorting loads downstream of the UPS, when the bypass is in operation the neutral current can be 1.5-2 times higher than the phase current. This is due to the harmonic current distortion produced by the load itself, which is no longer corrected by the UPS rectifier as occurs in normal operation.

COOLING																									
		Number of Systems																							
		1								2								3							
		Number of Modules																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Maximum air flow	m3/h	400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000	6400	6800	7200	7600	8000	8400	8800	9200	9600
Max dissipation in nominal conditions ⁽¹⁾	W	1140	2280	3420	4560	5700	6840	7980	8120	10260	11400	12540	13680	14820	14960	17100	18240	19380	20520	21660	22800	23940	25080	26220	27360
	kcal/h	980	1961	2941	3922	4902	5882	6863	7843	8824	9804	10758	11765	12745	13726	14706	15686	16667	17647	18628	19608	20588	21569	22549	23530
	BTU/h	3891	7782	11672	15563	19454	23345	17136	31127	35017	38908	42799	46690	5081	54471	58362	62253	66144	70035	73926	77816	81707	85598	89489	93380
Max dissipation in worst conditions ⁽²⁾	(W)	1350	2650	3950	5250	6550	7850	9150	10450	11800	13100	14400	15700	17000	18300	19600	20900	22250	23550	24850	26150	27450	28750	30050	31350
	kcal/h	1161	2289	3397	4515	5633	6751	7869	8987	10148	11266	12384	13502	14620	15738	16856	17974	19135	20253	21375	22489	23607	24725	25843	26961
	BTU/h	4608	9044	13481	17918	22355	26792	31229	35666	40273	44710	49147	56584	58021	62458	66895	71332	75939	80376	84813	89250	93687	98124	102561	106998

(1) Nominal input voltage and rated output active power (PF1).

(2) Low input voltage, battery recharge and rated output active power (PF1).

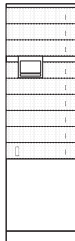
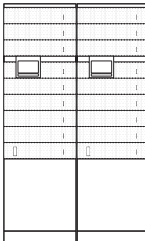
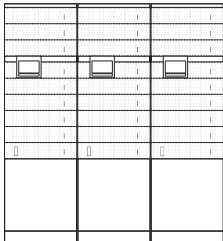
ACOUSTIC NOISE																									
	Number of Systems																								
	1								2								3								
	System Power (kW)																								
Without redundancy	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600	
N+1 redundant	-	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	
N+2 redundant	-	-	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	
Acoustic noise at 1m (dBA) ⁽¹⁾	51	53	54	55	56	57	58	59	60	60	60	60	62	62	62	62	63	63	63	63	63	63	63	63	

(1) 75 % of nominal load.

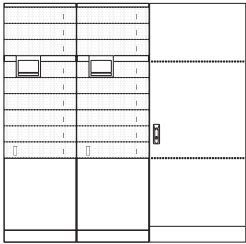
2.1.1 SYSTEM FROM 25 TO 200 KW

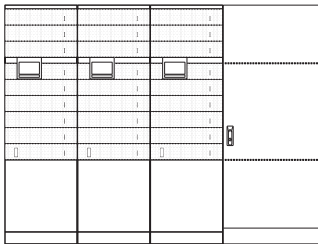
CONFIGURATIONS AND RATED POWER								
	Number of Modules							
	1	2	3	4	5	6	7	8
								
	M4-S-200-82-0 M4-S-200-82B0							
Height (mm)	1990							
Depth (mm)	890							
Width (mm)	600							
Weight (kg)	286	319	352	385	418	451	484	517

2.1.2 COMBINABLE SYSTEM

CONFIGURATIONS AND RATED POWER																								
	Number of Modules																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
																								
	1x M4-S-200-87-0								2 x M4-S-200-87-0								3 x M4-S-200-87-0							
Height (mm)	1990																							
Depth (mm)	890																							
Width (mm)	600								1200								1800							
Weight (kg)	290	323	356	389	422	455	488	521	811	844	877	910	943	976	1009	1042	1332	1365	1398	1431	1464	1497	1530	1563

2.1.3 FULLY INTEGRATED SOLUTION

CONFIGURATIONS AND RATED POWER																
	Number of Modules															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
																
	M4-S-400-83-BA															
Height (mm)	2000															
Depth (mm)	895															
Width (mm)	2049															
Weight (kg)	840	873	906	939	972	1005	1038	1071	1104	1137	1170	1203	1236	1269	1302	1335

CONFIGURATIONS AND RATED POWER																								
	Number of Modules																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
																								
	M4-S-600-83-BA																							
Height (mm)	2000																							
Depth (mm)	895																							
Width (mm)	2665																							
Weight (kg)	1122	1155	1188	1221	1254	1287	1320	1353	1386	1419	1452	1485	1518	1551	1584	1617	1650	1683	1716	1749	1782	1815	1848	1881

ENVIRONMENT	
Storage temperature	-5 to +50 °C
Operating temperature	0 to 40 °C ⁽¹⁾⁽²⁾
Maximum relative humidity	95 % condensation-free
Degree of protection	IP20

(1) According to EN 62040-3.

(2) For best battery lifetime the suggested temperature range is 15 °C - 25 °C.

2.2 ELECTRICAL CHARACTERISTICS

2.2.1 ELECTRICAL CHARACTERISTICS INDEPENDENT OF THE NUMBER OF SYSTEMS/MODULES

Electrical characteristics - Input	
Rated mains supply voltage (V)	400 V 3-phase+N
Voltage tolerance at full load	340 V to 480 V (+20/-15 %)
Voltage tolerance at derated load	up to 240 V @ 50 % of nominal load (linear decrease)
Rated frequency (Hz)	50/60 ± 10 %
Power factor	$> 0.99^{(1)}$
Total harmonic input current distortion (THDi)	$\leq 3\%$ (@: Pn, Resistive load, Mains THDv $\leq 1\%$)
Max inrush current at start-up	Power walk-in/Soft-start (selectable parameters)

(1) $P_{out} \geq 50\% S_n$.

Electrical characteristics - Bypass	
Bypass rated voltage (V)	Nominal output voltage $\pm 15\%$ ($\pm 20\%$ if GENSET is used)
Bypass rated frequency (Hz)	50/60
Bypass frequency tolerance (Hz)	$\pm 2\%$ selectable ($\pm 8\%$ if GENSET is used)
Bypass frequency variation speed	50/60 $\pm 10\%$

Electrical characteristics - Inverter	
Rated output voltage (V)	(3ph + N) 400/380/400/415 ⁽²⁾ selectable
Output voltage tolerance (Hz)	± 1
Rated output frequency (Hz)	50/60 (selectable)
Output frequency tolerance	$\pm 0.05\%$ (on battery mode)
Load crest factor	$\geq 2.7:1$
Total output voltage distortion (THDv)	$\leq 1\%$ (Ph/Ph); $\leq 2\%$ (Ph/N) (@: Pn, Resistive load)

Electrical characteristics - Stored energy operating mode	
Number of battery blocks (VRLA)	From 18+18 to 24+24

Electrical characteristics - Efficiency	
Efficiency (on-line mode)	up to 96.5 %
Efficiency (eco-mode)	up to 99.3 %

2.2.2 ELECTRICAL CHARACTERISTICS DEPENDENT ON THE NUMBER OF SYSTEMS/MODULES

ELECTRICAL CHARACTERISTICS - Inverter overload and short-circuit																									
		System Power (kW)																							
Without redundancy		25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600
N+1 redundant		-	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575
N+2 redundant		-	-	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550
Inverter overload (kW) (1)	10'	31.2	62.4	94	125	157	188	219	250	282	313	344	376	407	438	470	501	532	563	595	626	657	689	720	751
	5'	33.3	66.5	100	133	166	200	233	266	299	333	366	399	432	466	499	532	565	599	632	665	698	732	765	798
	1'	37.5	75.0	113	150	188	225	263	300	338	375	413	450	488	525	563	600	638	675	713	750	788	825	863	900
Inverter short-circuit (A) Ik1 = Ik2 = Ik3	40 ms	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
	40 to 100 ms	80	160	240	320	400	480	560	640	720	800	880	960	1040	1120	1200	1280	1360	1440	1520	1600	1680	1760	1840	1920

(1) Initial condition $P_{out} \leq 80\% P_n$.

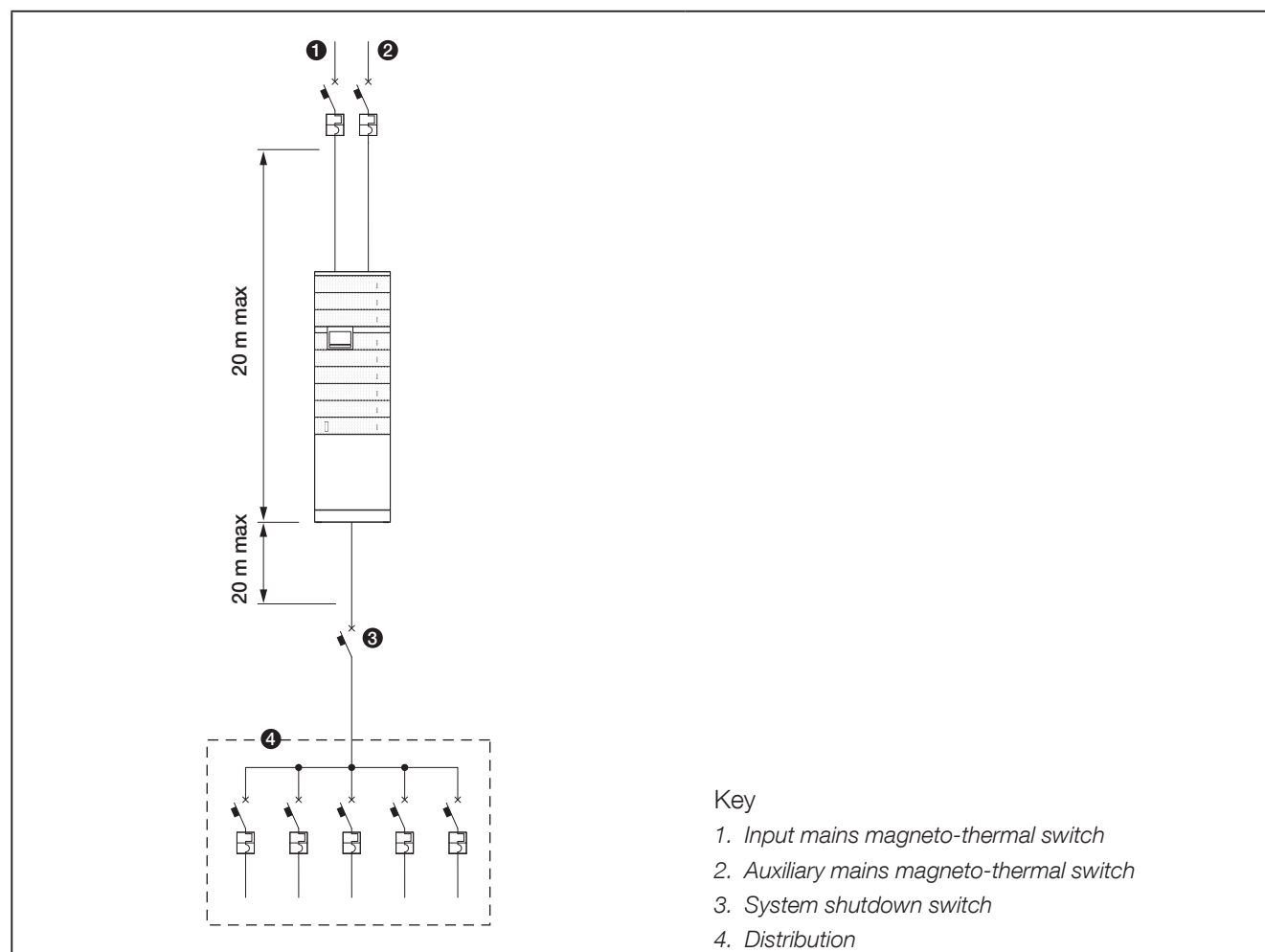
ELECTRICAL CHARACTERISTICS - Bypass overload and short-circuit																									
		Number of Systems																							
		1								2								3							
System Power (kW)																									
Without redundancy		25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600
N+1 redundant		-	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575
N+2 redundant		-	-	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550
Bypass overload (A)	Nominal	290								580								870							
	Continuous	350								640								960							
	10'	362								724								1086							
	1'	450								900								1350							
	1"	510								1020								1530							
Bypass max. short-circuit current (A)	20 ms	9000								18000								27000							

ELECTRICAL CHARACTERISTICS - Bypass rating																									
		Number of Systems																							
		1								2								3							
Bypass I _{2t} (A ² s)		400000								1600000								3600000							
Bypass Max Peak Current (A)		9000								18000								27000							

ELECTRICAL CHARACTERISTICS - Battery charger max. current																									
	System Power (kW)																								
Without redudancy	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600	
N+1 redundant	-	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	
N+2 redundant	-	-	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	
Standard max. current (A)	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160	168	176	184	192	
Enhanced battery charger max. current (A)	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	256	272	288	304	320	336	352	368	384	

2.3 RECOMMENDED PROTECTION

2.3.1 SYSTEM FROM 25 TO 200 KVA



The installation and system should comply with national plant regulations.

The electrical distribution panel should have a sectioning and protection system installed for input and auxiliary mains.

SYSTEM CABLES - MAX SECTION		Number of Modules							
		1	2	3	4	5	6	7	8
Rectifier terminals (mm ²)	Flexible	2x150							
	Rigid	2x150							
Bypass terminals (mm ²)	Flexible	2x150							
	Rigid	2x150							
Battery terminals (mm ²)	Flexible	2x150							
	Rigid	2x150							
Output terminals (mm ²)	Flexible	2x150							
	Rigid	2x150							

Max section is determined by the size of the terminals.

As specified in EN 62040-3 Appendix 3 (Non-Linear Load Reference), in the event of three-phase non-linear loads connected downstream of the UPS, the neutral current on the load can be 1.5 - 2 times higher than the phase current. This should be taken into account when estimating the correct size of the output and the auxiliary neutral cables.

RECOMMENDED PROTECTION DEVICES - Rectifier									
		Number of Modules							
		1	2	3	4	5	6	7	8
		System Power (kW)							
Without redundancy		25	50	75	100	125	150	175	200
N+1 redundant		-	25	50	75	100	125	150	175
N+2 redundant		-	-	25	50	75	100	125	150
C curve circuit breaker (A)	Min	50	100	160	200	250	320	400	400
	Max	400	400	400	400	400	400	400	400
Gg fuse (A)	Min	50	100	160	200	250	315	350	400
	Max	400	400	400	400	400	400	400	400

A circuit breaker switch is recommended with a magnetic tripping threshold of $\geq 10 I_n$ (curve C). A D curve selective breaker should be fitted if an optional external transformer is used.

The minimum value depends on the size of the power cables in the installation, while the maximum value is limited by the UPS cabinet.

The system can accept the max. value of protection, whatever the number of modules installed, in order to allow future scalability, while the min. value depends on the size of the power cables in the installation. A value of protection less than Max shall be used when the mains network structure cannot support the full power load, and shall be chosen between max. and min. values (as per the table above) according to mains network design.

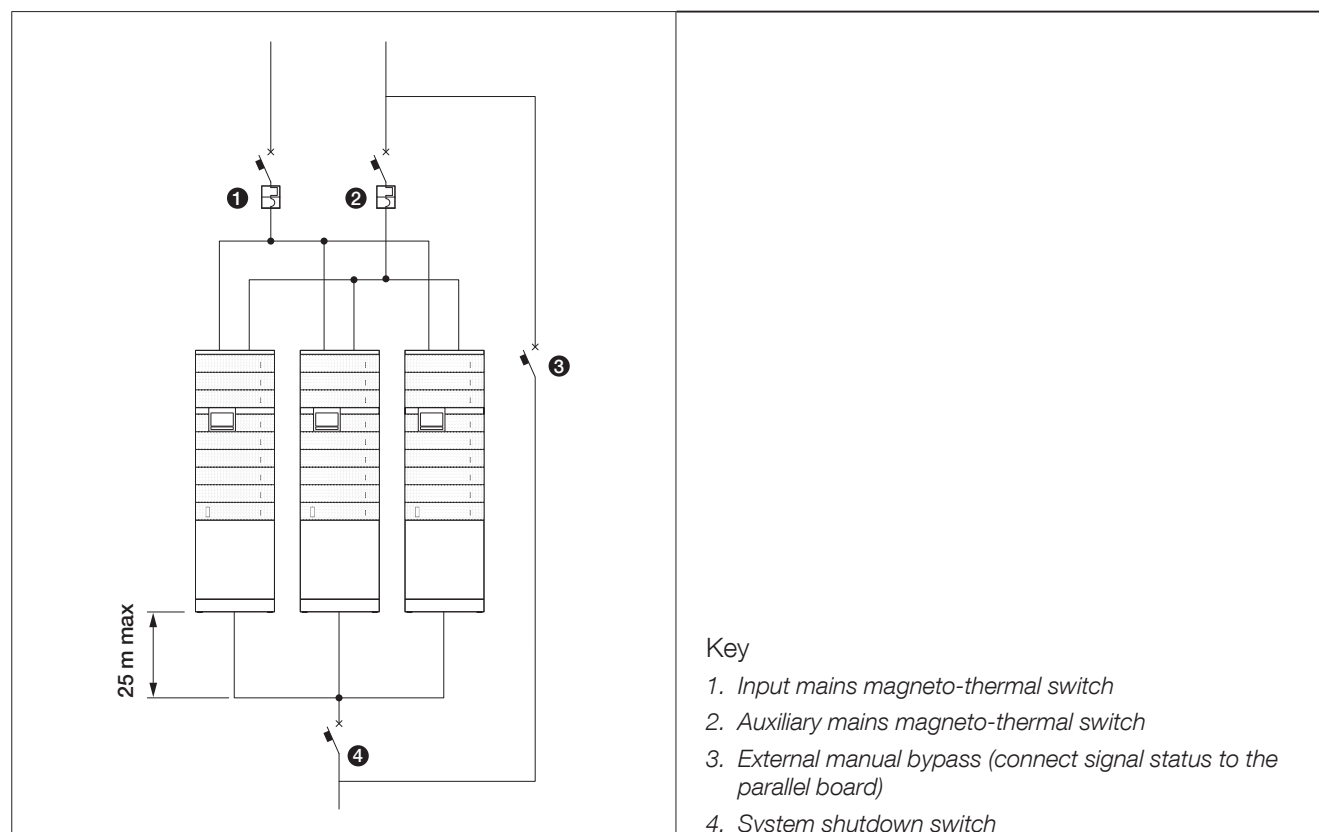
Rectifier protection should be taken into account in the event of separate inputs; when the auxiliary mains and rectifier inputs are combined (common input), the general input protection rating should be higher than both (auxiliary mains or rectifier).

RECOMMENDED PROTECTION DEVICES - Auxiliary mains									
		Number of Modules							
		1	2	3	4	5	6	7	8
		System Power (kW)							
Without redundancy		25	50	75	100	125	150	175	200
N+1 redundant		-	25	50	75	100	125	150	175
N+2 redundant		-	-	25	50	75	100	125	150
C curve circuit breaker (A)	Min	50	100	160	200	250	320	400	400
	Max	400	400	400	400	400	400	400	400
Gg fuse (A)	Min	50	100	160	200	250	315	350	400
	Max	400	400	400	400	400	400	400	400

If an optional external transformer is used, a D curve selective breaker should be used.

Auxiliary mains protection should be taken into account in the event of separate inputs; when the auxiliary mains and rectifier inputs are combined (common input), the general input protection rating should be higher than both (auxiliary mains or rectifier).

2.3.2 COMBINABLE SYSTEM

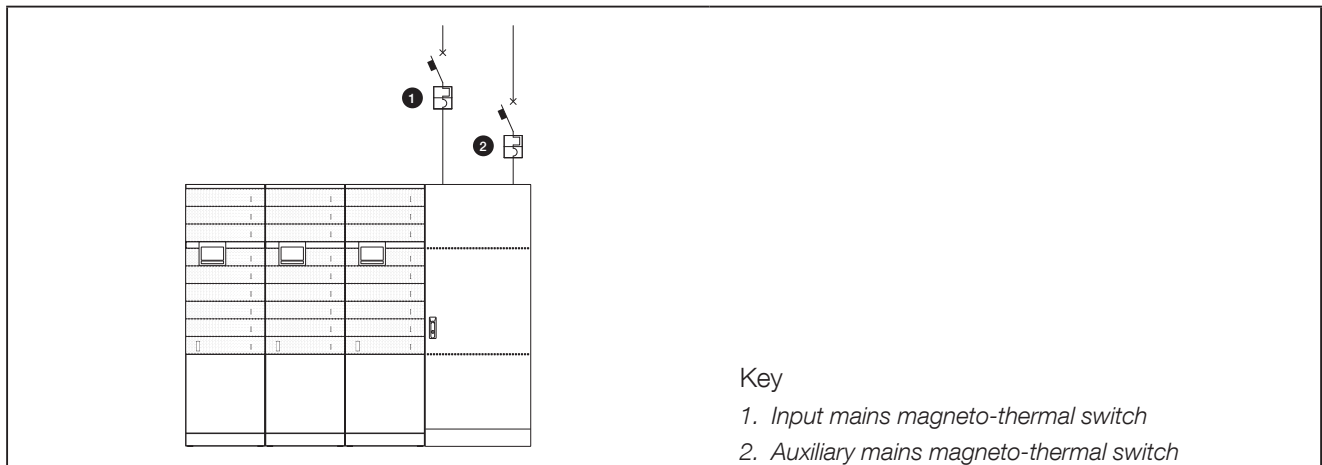


The installation and system should comply with national plant regulations.

The electrical distribution panel should have a sectioning and protection system installed for input and auxiliary mains.

SYSTEM CABLES - MAX SECTION																											
		Number of Modules																									
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Power (kW) without redundancy		25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600		
Rectifier recommended protection		800																1000									
Aux. Mains recommended protection		800																1000									
Rectifier terminals (mm²)	Flexible	2x150																									
	Rigid	2x150																									
Bypass terminals (mm²)	Flexible	2x150																									
	Rigid	2x150																									
Battery terminals (mm²)	Flexible	2x150																									
	Rigid	2x150																									
Output terminals (mm²)	Flexible	2x150																									
	Rigid	2x150																									

2.3.3 FULLY INTEGRATED SOLUTION



The installation and system should comply with national plant regulations.

The electrical distribution panel should have a sectioning and protection system installed for input and auxiliary mains.

SYSTEM CABLES - MAX SECTION		Number of Modules															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Power (kW) without redundancy		25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400
Rectifier recommended protection		800															
Aux. Mains recommended protection		800															
Rectifier terminals (mm ²)	Flexible	2x240															
	Rigid	2x240															
Bypass terminals (mm ²)	Flexible	2x240															
	Rigid	2x240															
Battery terminals (mm ²)	Flexible	2x70															
	Rigid	2x70															
Output terminals (mm ²)	Flexible	2x240															
	Rigid	2x240															

SYSTEM CABLES - MAX SECTION		Number of Modules																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Power (kW) without redundancy		25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600
Rectifier recommended protection		1000																							
Aux. Mains recommended protection		1000																							
Rectifier terminals (mm ²)	Flexible	2x240																							
	Rigid	2x240																							
Bypass terminals (mm ²)	Flexible	2x240																							
	Rigid	2x240																							
Battery terminals (mm ²)	Flexible	2x70																							
	Rigid	2x70																							
Output terminals (mm ²)	Flexible	2x240																							
	Rigid	2x240																							

RECOMMENDED PROTECTION DEVICES - Input residual current circuit breaker																								
	Number of Systems																							
	1								2								3							
	Number of Modules																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Input residual current circuit breaker (A)	1																							

An RCD is not necessary when the UPS is installed in TN-S system. RCDs are not allowed on TN-C systems. If an RCD is required, a B type should be used.

Caution!

Use four-pole selective (S) residual current detectors (RCDs). Load leakage currents are to be added to those generated by the UPS and during transitory phases (power failures and power returns) short current peaks may occur. If loads with high leakage current are present, adjust the residual current protection. It is advisable in all cases to carry out a preliminary check on the earth current leakage with the UPS installed and operating with the definitive load, so as to prevent the sudden activation of the RCD switch.

OUTPUT SELECTIVITY ON BATTERY MODE (AUX MAINS NOT PRESENT)																								
	Number of Power Modules																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	System Power (kW)																							
Without redundancy	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600
N+1 redundant	/	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575
N+2 redundant	/	/	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550
B curve circuit breaker (A)	≤ 20	≤ 40	≤ 50	≤ 80	≤ 100	≤ 100	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125
C curve circuit breaker (A)	≤ 10	≤ 20	≤ 25	≤ 40	≤ 50	≤ 50	≤ 63	≤ 80	≤ 100	≤ 100	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125	≤ 125

Selectivity of distribution downstream of UPS with downstream short-circuit (AUX MAINS not present).

3. REFERENCE STANDARDS AND DIRECTIVES

3.1 OVERVIEW

The construction of the equipment and choice of materials and components comply with all laws, decrees, directives and standards currently in force. In particular, the equipment is fully compliant with all European Directives concerning CE marking.

2006/95/EC

Council Directive 2006/95/EC, dated 16 February 2007, on the reconciliation of legislation within Member States regarding electrical material for use within specific voltage ranges.

2004/108/EC

On the approximation of the laws of the Member States relating to electromagnetic compatibility.

3.2 STANDARDS

STANDARD	
Safety	IEC 62040-1
EMC	IEC62040-2 (C2)
Performance	IEC 62040-3 (VFI-SS-111)
Product certifications	CE - TUV SÜD
Degree of protection standard	IP20

