

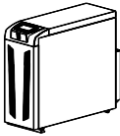
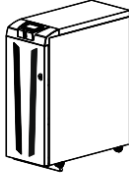
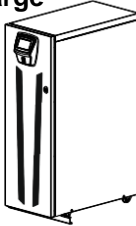
Technical Data

On-Line UPS system **SM / ST 10-20 kVA**

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The J. Schneider SM / ST is a highly efficient ($\eta > 96.5\%$), transformerless on-line continuous converter UPS system according to IEC / EN 62040-3 (VFI-SS-111) with sinusoidal output voltage in all operating modes and output power factor 1 (kVA = kW). The SM / ST has an interactive, touch-sensitive control monitor, RS232 interface, USB connection, alarm contacts, emergency stop function, 2 slots for communication cards, shutdown software for all modern Windows systems incl. server versions, Mac and Linux systems, as well as VMware and Hyper-V virtualisation platforms. Up to 8 systems can optionally be connected in parallel. The operating modes On- Line, Line-Interactive or Smart Active, as well as Stand-By Off can be set. The autonomy time of the systems is designed according to customer requirements by connecting battery modules. The Battery Care System ensures the charging of all common battery types. The intelligent ventilation system provides additional energy savings.



		SM / ST – S Small	SM / ST – M Medium	SM / ST + L Large
Mechanical features				
Type of cabinet		Free-standing with wheels and clamps/switches on the rear side	Free-standing with wheels and clamps/switches on the front side	Free-standing with wheels and clamps/switches on the front side
Range [kW]		10-15-20 (1 -phase) 10-15-20 (3 -phase)	10-15-20 (1 -phase) 10-15-20 (3 -phase)	10-15-20 (1 -phase) 10-15-20 (3 -phase)
Internal battery		Suitable for: (20+20) 7/9-Ah-blocks	Suitable for: 2 x (20+20) 7/9-Ah-blocks	Suitable for: 3 x (20+20) 7/9-Ah-blocks (output transformer alternatively to internal battery)
Weight without battery [kg]	10 kVA	48	72	103
	15 kVA	50	74	105
	20 kVA	52	76	107

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	SM / ST – S Small	SM / ST – M Medium	SM / ST + L Large
dimensions [mm] <ul style="list-style-type: none"> width depth height 	<ul style="list-style-type: none"> 280 840 700 	<ul style="list-style-type: none"> 380 850 1025 	<ul style="list-style-type: none"> 440 840 1320
ventilation	Forced ventilation, from front to rear side		
IP-protective system of the cabinet	- IP20 protected against access with a finger (with cabinet door open or closed). No other IP protection classes available	- IP20 protected against access with a finger (with cabinet door open or closed). No other IP protection classes available	- IP20 protected against access with a finger (with cabinet door open or closed). IP21/31 optional
Cable entry	Underside rear	Underside front	Underside front
Colour	RAL 7016		
EMC compatibility	class EN 62040-2 C2		
Audible noise level at 1 m distance (according to EN62040-3) [dBA +/- 2 dBA]	10 kVA:		51 at 50 % load 55 at 100 % load
	15 - 20 kVA:		55 at 50 % load 60 at 100 % load
UPS-ambient temperature	0 - 40 °C		
Recommended ambient temperature for Battery	20 - 25 °C		
Relative Ambient humidity	5 - 95 % (non condensing)		
Maximum operating height	Up to 1000 m above sea level (1 % reduction per 100 m between 1000 and 4000 m)		
Storage temperature	from -25 °C to 60 °C (UPS) -15 °C, +40 °C (for batteries)		

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On-Line UPS system **SM / ST 10-20 kVA**



TECHNICAL DATA 10 - 20 kVA – Version with 3-phase output (ST)

INPUT		ST		
		10	15	20
Nominal voltage	[V]	380–400–415 V AC 3-phasing + N		
Voltage range (without switchover to battery current)	[V]	320 – 480 V at 100 % load 240 – 480 V at 50 % load		
Maximum load with ONE missing input phase ⁽¹⁾	-	66 %		
Maximum load with TWO missing input phase ⁽¹⁾	-	33 %		
Nominal frequency	[Hz]	50 or 60		
Tolerance of frequency	[Hz]	40 to 72		
Maximum input current ⁽²⁾	[A]	21	31.5	40
Total harmonic distortion (THDI) at full load and mains THDU <1 %	[%]	≤3		
Total power factor	-	≥0.99		
„Hold-Up time“	[ms]	20		
Power Walk-in Duration	[Sek.]	Programmable from 1 to 120 seconds in steps of 1 second		
Power Walk-in start delay	[Sek.]	Programmable from 1 to 120 seconds in steps of 1 second(standard: 3 seconds)		
Inverter technology	-	High frequency IGBT		
PFC-control	-	Digital ACM PFC-Controller (at each phase)		

⁽¹⁾ Start of the UPS with one phase possible, if the phase is L1 .

⁽²⁾ The input current refers to the following input values:

- Input voltage 364 Volt
- Battery charging current 6 A (10–15–20 kVA)

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On-Line UPS system **SM / ST 10-20 kVA**



DC circuit		ST		
		10	15	20
Battery arrangement	-	20+20 Blocks with central neutral point		
Number of battery cells	-	120+120		
Float voltage (2.27 V/Z, adjustable)	[V]	273+273		
Fast charging voltage (2.38 V/Z, adjustable)	[V]	286+286		
Final discharge voltage – Depending on load (1.6 V/Z, adjustable)	[V]	190+190		
Standard-battery charging current ⁽³⁾	[A]	4 at full load 6 at 94% load	6	
Extended battery charging current ⁽³⁾ (ER-Ausführung)	[A]	4 at full load 7 at 90% load 9 at 80% load 11 at 70 % load 12 at 65 % load	6 at full load 11 at 90% load 15 at 80% load 18 at 70 % load 20 at 65% load	
Maximum current drawn from the batteries during UPS operation with nominal power	[A]	27.5	41	55
Battery charging method (Standard)	-	Charging with two voltage levels		
Low frequency ripple (<1 kHz)	-	< 2 % C10 (at 9-Ah-battery)		
Temperature compensation (with active battery temperature sensor)	[V]	20 mV/°C (12-Volt-block)		

⁽³⁾ The current values refer to input voltages ≥ 346 Volt

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On-Line UPS system **SM / ST 10-20 kVA**



INVERTER		ST		
		10	15	20
Nominal power	[kVA]	10	15	20
Aktive nominal power	[kW]	10	15	20
Nominal power with load factor 0.8 inductiv up to 0.8 capacitiv – without power reduction (0 – 40 °C)	[kVA]	10	15	20
Nominal voltage	[V]	380/400/415 V AC 3-phase + N		
Reduction for different output voltages	[%]	220 Volt [Ph-N]: - 4 % 208 Volt [Ph-N]: -10 % 200 Volt [Ph-N]: -13 %		
Nominal frequency	[Hz]	50 oder 60		
Static stability	[%]	± 0.5 %		
Dynamic stability	-	Ohmic load: +/- 1 %		
		at 20 -> 100 % and 100 -> 20 within 20 ms at full load		
		mains/battery/mains within 20 ms Non-linear load: EN 62040-3 class 1		
Voltage distortion with linear load and load distortion(EN 62040-3)	[%]	< 1 % at linear load ≤ 1.5 % non-linear load		
Stability of inverter frequency without bypass synchronisation	[%]	0.01		
Speed of frequency adjustment	[Hz/s]	1 Hz/s (adjustable 0.5 to 2)		
Voltage difference with symmetrical and asymmetrical load	[%]	± 1 %		
Voltage difference with symmetrical and asymmetrical load	[°]	120 ± 1°		
Inverter overload (at 40 °C)	[Min.] / [Sek.]	103 % infinite 110 % 60 Min. 125 % 10 Min. 150 % 60 Sek. 200 % 0.5 Sek. > 200 % 0.2 Sek.		
Short-circuit current (Ph-N)	[In x ms]	2.7 x In for 200 ms + 1.5 x In for 300 ms		
Maximum efficiency in battery operation	[%]	95.9	96.4	96.4
Technology of the inverters	-	High frequency 3 Level IGBT		
Inverter control	-	DSP-signal processing for voltage/current		

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On-Line UPS system **SM / ST 10-20 kVA**



BYPASS		ST		
		10	15	20
Nominal power	[kVA]	10	15	20
Nominal voltage	[V]	380-400-415 V AC 3-phase + N		
Maximum rated output current	[A]	16.5	24.2	33
Bypass-voltage range	[V]	From 312 V to 460 V (adjustable in steps of 4 V)		
Rated frequency	[Hz]	50/60		
Bypass input frequency range	[Hz]	40-72		
Switchover time bypass to inverter (UPS in ECO operating mode)	[ms]	2 ms standard		
Max. current for short-circuit for: 20 ms (Tj 25 °C)	[A at 20 m s]	1500	1500	1500
Melting integral [I2T at Tj 25 °C]	[A²S]	11250	11250	11250
Overload capacity on bypass line	[Min.] / [ms]	110 % infinite 125 % 60 Min. 150 % 10 Min. 200 % 1 Min. >200 % 20 Sek.		
Operation	-	Continuous operation at nominal load even with ventilation fault		
efficiency AC/AC at full load	[%]	96.11	96.24	95.98
efficiency AC/AC at 75 % load	[%]	96.05	96.32	96.26
efficiency AC/AC at 50 % load	[%]	95.60	96.20	96.29
efficiency AC/AC at 25 % load	[%]	94.39	95.28	95.67
Power loss at nominal ohmic load (pf = 1) and charged battery *	[kW kcal/h BTU/h]	0.41 353 1402	0.59 508 2017	0.84 725 2880
Self-consumption: UPS in operating mode ON LINE without load	[W]	100	119	
Self-consumption: UPS in operating mode ON LINE without load	[W]	20		
Self-consumption: UPS in operating mode ECO at 50% load	[W]	99.00	99.42	
Self-consumption: UPS in operating mode ECO at 100% load	[W]	99.31	99.55	

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On-Line UPS system **SM / ST 10-20 kVA**



TECHNICAL DATA 10 - 20 kVA – Version with 1-phase output (SM)

INPUT		SM		
		10	15	20
Rated voltage	[V]	380-400-415 V AC 3-phase + N or 220-230-240 V AC 1-phase + N ⁽⁶⁾		
Voltage range(without switch over on battery current)	[V]	320 - 480 V bei 100 % Last / 240 - 480 V at 50 % load (3 -phase) 184 - 276 V bei 100 % Last / 140 - 276 V at 50 % load (1 -phase)		
Maximum load with ONE missing input phase ⁽⁴⁾ (at 3-phase input)	-	66 %		
Maximum load with TWO missing input phase ⁽⁴⁾ (at 3-phase input)	-	33 %		
Nominal frequency	[Hz]	50 or 60		
Tolerance of frequency	[Hz]	40 up to 72		
Maximum input current ⁽⁵⁾ 3 -phase/1 -phase	[A]	21/63	31,5/94,5	40/120
Total harmonic distortion (THDI) at full load and mains THDU <1 % at 3-phase input	[%]	≤3		
Total harmonic distortion (THDi) at full load and mains THDU <1 % at 1-phase input	[%]	≤2.5		
Power factor (3-phase/1 -phase)	-	0,99/0,99		
„Hold-Up time“	[ms]	20		
Power Walk-in Duration	[Sek.]	Programmable from 1 to 120 seconds in steps of 1 second		
Power Walk-in start delay	[Sek.]	Programmable from 1 to 120 seconds in steps of 1 second (standard: 3 seconds)		
Technology of inverter	-	IGBT three level with high frequency		
PFC-control	-	DAC PFC-Controller (at each phase)		

⁽⁴⁾ Start of the UPS with one phase possible, if this is L1.

⁽⁵⁾ The input current refers to the following input values:

- input voltage 346 Volt
- battery charging current 6 A

⁽⁶⁾ According to VDE-AR-N 4100, single-phase loads >4.6kVA on the low-voltage grid may only be operated via a operated via a balancing device

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DC circuit		SM		
		10	15	20
Battery arrangement	-	20+20 blocks with central neutral point		
Number of battery cells	-	120+120		
Float voltage (2.27 V/Z, adjustable)	[V]	273+273		
Fast charging voltage (2.38 V/Z, adjustable)	[V]	286+286		
Final discharge voltage – Load dependent (1.6 V/Z, adjustable)	[V]	190+190		
Standard-battery charging current ⁽⁷⁾	[A]	4 at full load 6 at 94% load	6	6
Extended battery charging current ⁽⁷⁾ (ER-version)	[A]	4 at full load 7 at 90% load 9 at 80% load 11 at 70 % load 12 at 65 % load	6 at full load 11 at 90% load 15 at 80% load 18 at 70 % load 20 at 65% load	
Maximum current drawn from batteries during UPS operation at rated power	[A]	27.5	41	55
Battery charging method (Standard)	-	Charging with two voltage levels		
Residual ripple	-	< 2 % C10 (with 9-Ah-battery)		
Temperature compensation (with active temperature sensor)	[V]	20 mV/°C (12-Volt-block)		

⁽⁷⁾ The current values refer to input voltages ≥ 346 Volt

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On-Line UPS system **SM / ST 10-20 kVA**



INVERTER		SM		
		10	15	20
Nominal power	[kVA]	10	15	20
Active nominal power	[kW]	10	15	20
Nominal power with load factor 0.8 inductiv up to 0.8 capacitiv – without power reduction (0 - 40 °C)	[kVA]	10	15	20
Nominal voltage	[V]	220/230/240 V AC 1-phase + N		
Reduction for different output voltages	[%]	220 Volt [Ph-N]: -4 % 208 Volt [Ph-N]: -10 % 200 Volt [Ph-N]: -13 %		
Nominal frequency	[Hz]	50 or 60		
Static Stability	[%]	± 0.5		
Dynamic stability	-	Ohmic load: +/- 1 % at 20 -> 100 % and 100 -> 20 % within 20 ms at full load mains/battery/mains within 20 ms		
		Nichtlineare Last: EN 62040-3 Klasse 1		
Voltage distortion at linear load and load distortion (EN 62040-3)	[%]	< 1 % at linear load ≤ 1.5 % at non-linear load		
Inverter frequency stability without Bypass synchronisation	[%]	0.01		
Speed of frequency adjustment	[Hz/s]	1 Hz/s (adjustable from 0.5 to 2)		
Inverter overload (at 40 °C)	[Min.] / [Sek.]	103 % infinite 110 % 60 min. 125 % 10 min. 150 % 60 sec. 200 % 0.5 sec. > 200 % 0.2 sec.		
Short-circuit current (Ph-N)	[In x ms]	2.7 x In for 200 ms + 1.5 x In for 300 ms		
Maximum efficiency in battery operation	[%]	95.9		
Converter technology	-	High frequency 3 level IGBT		
Inverter control	-	DSP signal processing for voltage/current		

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On-Line UPS system **SM / ST 10-20 kVA**



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BYPASS		SM		
		10	15	20
Nominal power	[kVA]	10	15	20
Nominal voltage	[V]	220-230-240 V AC 1-phasig + N		
Maximum nominal output current	[A]	48	72	96
Bypass-voltage range	[V]	from 180 V to 264 V (adjustable in steps of 4 V)		
Nominal frequency	[Hz]	50/60		
Bypass-input frequency range	[Hz]	40 - 72		
Switchover time bypass to inverter (UPS in ECO operating mode)	[ms]	2 ms standard		
Max. current for short-circuit: 20 ms (Tj 25 °C)	[A bei 20 ms]	2000	2650	2650
Melting integral [I²t at Tj 25 °C]	[A²S]	20000	35000	35000
Overload capacity on bypass line	[Min.] / [Sek.]	110 % infinite 125 % 60 min. 150 % 10 min. 200 % 1 min. >200 % 20 sec.		
Operation	-	Continuous operation at nominal load even with ventilation fault		
Efficiency AC/AC at full load	[%]	95.94	96.06	95.75
Efficiency AC/AC at 75 % load	[%]	95.9	96.29	96.05
Efficiency AC/AC at 50 % load	[%]	95.88	96.13	96.19
Efficiency AC/AC at 25 % load	[%]	94.43	94.95	95.67
Power loss at nominal ohmic load (pf = 1) and charged battery *	[kW kcal/h BTU/h]	0.423 363 1444	0.615 529 2100	0.887 763 3030
Self-consumption: UPS in operation mode ON LINE without load	[W]	100	120	
Self-consumption: UPS in operation mode STANDBY without Last	[W]	20		
Self-consumption: UPS in operation mode ECO at 50% load	[W]	99.02	99.02	
Self-consumption: UPS in operation mode ECO at 100 % load	[W]	99.09	98.9	

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INTERFACES AND ACCESSORIES

User interfaces	SM / ST		
	10	15	20
Communication ports	1 x 5-Zoll-Touchscreen (480 x 272 Pixel) 1 x USB 1 x RS232 (RJ10) 4 x programmable output alarms 5 x Programmable opto-isolated input commands 2 x Communication card slots		
Auxiliary commands	1 x REPO (Remote Emergency Power Off) 1 x input for external synchronisation 1 x input temperature sensor		
SNMP network card for direct connection to a network	Optional available		
Network version of UPSmon6 Shutdown-Software	Optional available		
Multicom 352 Interface-card for doubling the present interfaces	Optional available		
Multicom 302 Interface-card for connection to MODBUS / JBUS	Optional available		
Profibus Converter Multicom 411 The connection is realized at Multicom 302	Optional available		
Multicom 384 Card with 4 changeover contacts (3A / 230V) and EMERGENCY connection.	Optional available		
Multicom 392 Card with 6 changeover contacts (3A / 24V) and EMERGENCY connection.	Optional available		
Multi Panel: Remote display with graphic screen.	Optional available		
Cable set for connection to AS/400 systems	Optional available		