WSTECH

APS-ES-Series 1500 V_{DC}

Outdoor Energy Storage hybrid inverters, with output power ranging from 725 kVA up to 5000 kVA.

The APS-Series 1500 V_{DC} outdoor central inverter is the most cost-effective solution for large scale Energy Storage installations.

The APS is a turnkey solution made for the most demanding environments.

- **Ready for 1500 V_{DC} systems –** Breakthrough technology for the newest industry standards.
- **IP65 outdoor cabinet –** Hermetically sealed against heavy dust, sand and rain.
- **Two redundant cooling systems** ensuring energy production up to 60 °C ambient.
- **Low maintenance heat exchangers –** Automatic cleaning function of the water-to-air heat exchanger. Easy to clean air-to-air heat exchanger with no filter mats.
- Internal maintenance free **patented air dehumidifier** to avoid condensation.
- **AC circuit breaker** built-in.
- **Fuse-protected DC combiner**.
- **Modbus TCP or Real-Time Ethernet** communication interfaces.
- **Optional and configurable hybrid system** for storage applications and STATCOM function in the same inverter.

APS-ES-Series 1500 V_{DC} 725 … 5000 kVA

DATASHEET - INTRODUCTION

	1 Cabinet	2 Cabinets
Cabinet options		
Number of Apparent Power Units (APU)	1 / 2	3 / 4
Nominal grid voltage ($U_{AC, nom}$) options	400 V / 440 V / 480 V / 520 V / 550 V / 575 V / 600 V / 630 V / 660 V / 690 V	
Max. AC apparent power (S_{max}) options	From 725 kVA up to 2500 kVA	From 2175 kVA up to 5000 kVA
Max. DC voltage ($U_{DC, max}$)	1500 V	

APS-ES-Series models (1500 V_{DC})

	400 V_{AC}	440 V_{AC}	480 V_{AC}	520 V_{AC}	550 V_{AC}	575 V_{AC}	600 V_{AC}	630 V_{AC}	660 V_{AC}	690 V_{AC}
1 Cabinet & 1 APU	APS0725-ES	APS0800-ES	APS0870-ES	APS0945-ES	APS1000-ES	APS1045-ES	APS1090-ES	APS1140-ES	APS1200-ES	APS1250-ES
1 Cabinet & 2 APUs	APS1450-ES	APS1600-ES	APS1740-ES	APS1890-ES	APS2000-ES	APS2090-ES	APS2180-ES	APS2280-ES	APS2400-ES	APS2500-ES
2 Cabinets & 3 APUs	APS2175-ES	APS2400-ES	APS2610-ES	APS2835-ES	APS3000-ES	APS3135-ES	APS3270-ES	APS3420-ES	APS3600-ES	APS3750-ES
2 Cabinets & 4 APUs	APS2900-ES	APS3200-ES	APS3480-ES	APS3780-ES	APS4000-ES	APS4180-ES	APS4360-ES	APS4560-ES	APS4800-ES	APS5000-ES

APS-ES-Series 1500 V_{DC} – 400 V_{AC} 725 … 2900 kVA

(I) TECHNICAL DATA

	APS0725-ES	APS1450-ES	APS2175-ES	APS2900-ES	COMMENTS
GRID SIDE					
Max. AC apparent power (S_{max})	725 kVA	1450 kVA	2175 kVA	2900 kVA	At nominal grid voltage
Nominal AC power ($P_{AC, nom}$)	725 kW	1450 kW	2175 kW	2900 kW	At (cos ϕ) = 1.0
Number of Apparent Power Units (APU)	1	2	3	4	
Number of independent grids	1		2		
Nominal grid voltage ($U_{AC, nom}$)	400 V				3~, phase to phase
Grid voltage range	+/- 10% of $U_{AC, nom}$				
Nominal grid frequency (f_{nom})	50 Hz				60 Hz option available
Network configuration	IT system				
Max. AC current per APU ($I_{AC, max\ (APU)}$)	1050 A				
Max. AC current – APS ($I_{AC, max\ (APS)}$)	1050 A	2 x 1050 A	3 x 1050 A	4 x 1050 A	
Max. short circuit level ($I_{AC, SC\ (APS)}$)	50 kA				
Short circuit contribution (I'_K)	1060 A	2 x 1060 A	3 x 1060 A	4 x 1060 A	Max. RMS value
Short circuit contribution (I''_K)	1060 A	2 x 1060 A	3 x 1060 A	4 x 1060 A	Max. RMS value
Short circuit contribution (I_P)	1560 A	2 x 1560 A	3 x 1560 A	4 x 1560 A	Max. Peak value
Max. load capability	100%				@ Operating mode Island grid
Time span overload	0.0 s				@ Operating mode Island grid
Power factor (cos ϕ)	> 0.98				At > 20% of nominal AC power
AC current distortion (THD)	< 3%				
AUXILIARY SUPPLY (EXTERNAL)					
Nominal grid voltage ($U_{AC, nom\ (aux)}$)	400 V				3~, phase to phase
Grid voltage range	+/- 10% of $U_{AC, nom\ (aux)}$				
Nominal grid frequency ($f_{nom\ (aux)}$)	50 Hz				
Network configuration	TN-S system				
Max. AC current ($I_{AC, (aux)}$)	3 x K16A				
Max. short circuit level ($I_{AC, SC\ (APS)}$)	6 kA				
Internal buffer time	4.0 s				Only for control supply available

APS-ES-Series 1500 V_{DC} – 400 V_{AC} 725 … 2900 kVA

(II) TECHNICAL DATA

	APS0725-ES	APS1450-ES	APS2175-ES	APS2900-ES	COMMENTS
DC SIDE					
Independent DC sources	1		2		Depending on configuration
Nominal DC voltage ($U_{DC, nom}$)	1000 V				
Max. DC voltage ($U_{DC, max}$)	1500 V				Depending on application
Min. DC voltage ($U_{DC, min}$)	589 V / 648 V				At 100% / 110% nominal grid voltage
Max. DC current ($I_{DC, max}$)	1220 A	2 x 1220 A	3 x 1220 A	4 x 1220 A	
Max. short circuit level ($I_{DC, SC (APS)}$)	6.4 kA / 30 kA / 140 kA (max. 0.5 ms)				Without / With DC fuses / External protection required
Nominal DC power ($P_{DC, nom}$)	737 kW	1474 kW	2210 kW	2947 kW	
Max. capacity against earthing	2000 µF				For each IT system
GENERAL					
Control strategy	CC-CV				
Efficiency	(97.6 | 98.1 | 98.1 | 98.0 | 97.9) %	(97.6 | 98.1 | 98.1 | 98.0 | 97.9) %	(97.6 | 98.1 | 98.1 | 98.0 | 97.9) %	(97.6 | 98.1 | 98.1 | 98.0 | 97.9) %	At (10 | 30 | 50 | 75 | 100) % power, @ $U_{DC, nom}$
Feed-in starting at ($P_{DC, th}$)	200 W	200 W	400 W	400 W	
Standby losses	80 W	90 W	140 W	150 W	
Max. auxiliary power	< 3500 W		< 7000 W		Excluding optional heating

APS-ES-Series 1500 V_{DC} – 440 V_{AC} 800 … 3200 kVA

(I) TECHNICAL DATA

	APS0800-ES	APS1600-ES	APS2400-ES	APS3200-ES	COMMENTS
GRID SIDE					
Max. AC apparent power (S_{max})	800 kVA	1600 kVA	2400 kVA	3200 kVA	At nominal grid voltage
Nominal AC power ($P_{AC, nom}$)	800 kW	1600 kW	2400 kW	3200 kW	At (cos ϕ) = 1.0
Number of Apparent Power Units (APU)	1	2	3	4	
Number of independent grids	1		2		
Nominal grid voltage ($U_{AC, nom}$)	440 V				3~, phase to phase
Grid voltage range	+/- 10% of $U_{AC, nom}$				
Nominal grid frequency (f_{nom})	50 Hz				60 Hz option available
Network configuration	IT system				
Max. AC current per APU ($I_{AC, max\ (APU)}$)	1050 A				
Max. AC current – APS ($I_{AC, max\ (APS)}$)	1050 A	2 x 1050 A	3 x 1050 A	4 x 1050 A	
Max. short circuit level ($I_{AC, SC\ (APS)}$)	50 kA				
Short circuit contribution (I'_K)	1060 A	2 x 1060 A	3 x 1060 A	4 x 1060 A	Max. RMS value
Short circuit contribution (I''_K)	1060 A	2 x 1060 A	3 x 1060 A	4 x 1060 A	Max. RMS value
Short circuit contribution (I_P)	1560 A	2 x 1560 A	3 x 1560 A	4 x 1560 A	Max. Peak value
Max. load capability	100%				@ Operating mode Island grid
Time span overload	0.0 s				@ Operating mode Island grid
Power factor (cos ϕ)	> 0.98				At > 20% of nominal AC power
AC current distortion (THD)	< 3%				
AUXILIARY SUPPLY (EXTERNAL)					
Nominal grid voltage ($U_{AC, nom\ (aux)}$)	400 V				3~, phase to phase
Grid voltage range	+/- 10% of $U_{AC, nom\ (aux)}$				
Nominal grid frequency ($f_{nom\ (aux)}$)	50 Hz				
Network configuration	TN-S system				
Max. AC current ($I_{AC, (aux)}$)	3 x K16A				
Max. short circuit level ($I_{AC, SC\ (APS)}$)	6 kA				
Internal buffer time	4.0 s				Only for control supply available

APS-ES-Series 1500 V_{DC} – 440 V_{AC} 800 … 3200 kVA

(II) TECHNICAL DATA

	APS0800-ES	APS1600-ES	APS2400-ES	APS3200-ES	COMMENTS
DC SIDE					
Independent DC sources	1		2		Depending on configuration
Nominal DC voltage ($U_{DC, nom}$)	1000 V				
Max. DC voltage ($U_{DC, max}$)	1500 V				Depending on application
Min. DC voltage ($U_{DC, min}$)	648 V / 713 V				At 100% / 110% nominal grid voltage
Max. DC current ($I_{DC, max}$)	1220 A	2 x 1220 A	3 x 1220 A	4 x 1220 A	
Max. short circuit level ($I_{DC, SC (APS)}$)	6.4 kA / 30 kA / 140 kA (max. 0.5 ms)				Without / With DC fuses / External protection required
Nominal DC power ($P_{DC, nom}$)	813 kW	1626 kW	2439 kW	3252 kW	
Max. capacity against earthing	2000 µF				For each IT system

GENERAL					
Control strategy	CC-CV				
Efficiency	(97.6 | 98.1 | 98.1 | 98.0 | 97.9) %	(97.6 | 98.1 | 98.1 | 98.0 | 97.9) %	(97.6 | 98.1 | 98.1 | 98.0 | 97.9) %	(97.6 | 98.1 | 98.1 | 98.0 | 97.9) %	At (10 | 30 | 50 | 75 | 100) % power, @ $U_{DC, nom}$
Feed-in starting at ($P_{DC, th}$)	200 W	200 W	400 W	400 W	
Standby losses	80 W	90 W	140 W	150 W	
Max. auxiliary power	< 3500 W		< 7000 W		Excluding optional heating

APS-ES-Series 1500 V_{DC} – 480 V_{AC} 870 … 3480 kVA

(I) TECHNICAL DATA

	APS0870-ES	APS1740-ES	APS2610-ES	APS3480-ES	COMMENTS
GRID SIDE					
Max. AC apparent power (S_{max})	870 kVA	1740 kVA	2610 kVA	3480 kVA	At nominal grid voltage
Nominal AC power ($P_{AC, nom}$)	870 kW	1740 kW	2610 kW	3480 kW	At (cos ϕ) = 1.0
Number of Apparent Power Units (APU)	1	2	3	4	
Number of independent grids	1		2		
Nominal grid voltage ($U_{AC, nom}$)	480 V				3~, phase to phase
Grid voltage range	+/- 10% of $U_{AC, nom}$				
Nominal grid frequency (f_{nom})	50 Hz				60 Hz option available
Network configuration	IT system				
Max. AC current per APU ($I_{AC, max\ (APU)}$)	1050 A				
Max. AC current – APS ($I_{AC, max\ (APS)}$)	1050 A	2 x 1050 A	3 x 1050 A	4 x 1050 A	
Max. short circuit level ($I_{AC, SC\ (APS)}$)	50 kA				
Short circuit contribution (I'_K)	1060 A	2 x 1060 A	3 x 1060 A	4 x 1060 A	Max. RMS value
Short circuit contribution (I''_K)	1060 A	2 x 1060 A	3 x 1060 A	4 x 1060 A	Max. RMS value
Short circuit contribution (I_P)	1560 A	2 x 1560 A	3 x 1560 A	4 x 1560 A	Max. Peak value
Max. load capability	100%				@ Operating mode Island grid
Time span overload	0.0 s				@ Operating mode Island grid
Power factor (cos ϕ)	> 0.98				At > 20% of nominal AC power
AC current distortion (THD)	< 3%				
AUXILIARY SUPPLY (EXTERNAL)					
Nominal grid voltage ($U_{AC, nom\ (aux)}$)	400 V				3~, phase to phase
Grid voltage range	+/- 10% of $U_{AC, nom\ (aux)}$				
Nominal grid frequency ($f_{nom\ (aux)}$)	50 Hz				
Network configuration	TN-S system				
Max. AC current ($I_{AC, (aux)}$)	3 x K16A				
Max. short circuit level ($I_{AC, SC\ (APS)}$)	6 kA				
Internal buffer time	4.0 s				Only for control supply available

APS-ES-Series 1500 V_{DC} – 480 V_{AC} 870 … 3480 kVA

(II) TECHNICAL DATA

	APS0870-ES	APS1740-ES	APS2610-ES	APS3480-ES	COMMENTS
DC SIDE					
Independent DC sources	1		2		Depending on configuration
Nominal DC voltage ($U_{DC, nom}$)	1000 V				
Max. DC voltage ($U_{DC, max}$)	1500 V				Depending on application
Min. DC voltage ($U_{DC, min}$)	707 V / 778 V				At 100% / 110% nominal grid voltage
Max. DC current ($I_{DC, max}$)	1220 A	2 x 1220 A	3 x 1220 A	4 x 1220 A	
Max. short circuit level ($I_{DC, SC (APS)}$)	6.4 kA / 30 kA / 140 kA (max. 0.5 ms)				Without / With DC fuses / External protection required
Nominal DC power ($P_{DC, nom}$)	884 kW	1768 kW	2652 kW	3537 kW	
Max. capacity against earthing	2000 µF				For each IT system
GENERAL					
Control strategy	CC-CV				
Efficiency	(97.6 | 98.1 | 98.1 | 98.0 | 97.9) %	(97.6 | 98.1 | 98.1 | 98.0 | 97.9) %	(97.6 | 98.1 | 98.1 | 98.0 | 97.9) %	(97.6 | 98.1 | 98.1 | 98.0 | 97.9) %	At (10 | 30 | 50 | 75 | 100) % power, @ $U_{DC, nom}$
Feed-in starting at ($P_{DC, th}$)	200 W	200 W	400 W	400 W	
Standby losses	80 W	90 W	140 W	150 W	
Max. auxiliary power	< 3500 W		< 7000 W		Excluding optional heating

APS-ES-Series 1500 V_{DC} – 520 V_{AC} 945 … 3780 kVA

(I) TECHNICAL DATA

	APS0945-ES	APS1890-ES	APS2835-ES	APS3780-ES	COMMENTS
GRID SIDE					
Max. AC apparent power (S_{max})	945 kVA	1890 kVA	2835 kVA	3780 kVA	At nominal grid voltage
Nominal AC power ($P_{AC, nom}$)	945 kW	1890 kW	2835 kW	3780 kW	At (cos ϕ) = 1.0
Number of Apparent Power Units (APU)	1	2	3	4	
Number of independent grids	1		2		
Nominal grid voltage ($U_{AC, nom}$)	520 V				3~, phase to phase
Grid voltage range	+/- 10% of $U_{AC, nom}$				
Nominal grid frequency (f_{nom})	50 Hz				60 Hz option available
Network configuration	IT system				
Max. AC current per APU ($I_{AC, max\ (APU)}$)	1050 A				
Max. AC current – APS ($I_{AC, max\ (APS)}$)	1050 A	2 x 1050 A	3 x 1050 A	4 x 1050 A	
Max. short circuit level ($I_{AC, SC\ (APS)}$)	50 kA				
Short circuit contribution (I'_K)	1060 A	2 x 1060 A	3 x 1060 A	4 x 1060 A	Max. RMS value
Short circuit contribution (I''_K)	1060 A	2 x 1060 A	3 x 1060 A	4 x 1060 A	Max. RMS value
Short circuit contribution (I_P)	1560 A	2 x 1560 A	3 x 1560 A	4 x 1560 A	Max. Peak value
Max. load capability	100%				@ Operating mode Island grid
Time span overload	0.0 s				@ Operating mode Island grid
Power factor (cos ϕ)	> 0.98				At > 20% of nominal AC power
AC current distortion (THD)	< 3%				
AUXILIARY SUPPLY (EXTERNAL)					
Nominal grid voltage ($U_{AC, nom\ (aux)}$)	400 V				3~, phase to phase
Grid voltage range	+/- 10% of $U_{AC, nom\ (aux)}$				
Nominal grid frequency ($f_{nom\ (aux)}$)	50 Hz				
Network configuration	TN-S system				
Max. AC current ($I_{AC, (aux)}$)	3 x K16A				
Max. short circuit level ($I_{AC, SC\ (APS)}$)	6 kA				
Internal buffer time	4.0 s				Only for control supply available

APS-ES-Series 1500 V_{DC} – 520 V_{AC} 945 … 3780 kVA

(II) TECHNICAL DATA

	APS0945-ES	APS1890-ES	APS2835-ES	APS3780-ES	COMMENTS
DC SIDE					
Independent DC sources	1		2		Depending on configuration
Nominal DC voltage ($U_{DC, nom}$)	1000 V				
Max. DC voltage ($U_{DC, max}$)	1500 V				Depending on application
Min. DC voltage ($U_{DC, min}$)	766 V / 843 V				At 100% / 110% nominal grid voltage
Max. DC current ($I_{DC, max}$)	1220 A	2 x 1220 A	3 x 1220 A	4 x 1220 A	
Max. short circuit level ($I_{DC, SC (APS)}$)	6.4 kA / 30 kA / 140 kA (max. 0.5 ms)				Without / With DC fuses / External protection required
Nominal DC power ($P_{DC, nom}$)	960 kW	1921 kW	2881 kW	3841 kW	
Max. capacity against earthing	2000 µF				For each IT system
GENERAL					
Control strategy	CC-CV				
Feed-in starting at ($P_{DC, th}$)	200 W	200 W	400 W	400 W	
Standby losses	80 W	90 W	140 W	150 W	
Max. auxiliary power	< 3500 W		< 7000 W		Excluding optional heating

APS-ES-Series 1500 V_{DC} – 550 V_{AC} 1000 … 4000 kVA

(I) TECHNICAL DATA

	APS1000-ES	APS2000-ES	APS3000-ES	APS4000-ES	COMMENTS
GRID SIDE					
Max. AC apparent power (S_{max})	1000 kVA	2000 kVA	3000 kVA	4000 kVA	At nominal grid voltage
Nominal AC power ($P_{AC, nom}$)	1000 kW	2000 kW	3000 kW	4000 kW	At (cos ϕ) = 1.0
Number of Apparent Power Units (APU)	1	2	3	4	
Number of independent grids	1		2		
Nominal grid voltage ($U_{AC, nom}$)	550 V				3~, phase to phase
Grid voltage range	+/- 10% of $U_{AC, nom}$				
Nominal grid frequency (f_{nom})	50 Hz				60 Hz option available
Network configuration	IT system				
Max. AC current per APU ($I_{AC, max\ (APU)}$)	1050 A				
Max. AC current – APS ($I_{AC, max\ (APS)}$)	1050 A	2 x 1050 A	3 x 1050 A	4 x 1050 A	
Max. short circuit level ($I_{AC, SC\ (APS)}$)	50 kA				
Short circuit contribution (I'_K)	1060 A	2 x 1060 A	3 x 1060 A	4 x 1060 A	Max. RMS value
Short circuit contribution (I''_K)	1060 A	2 x 1060 A	3 x 1060 A	4 x 1060 A	Max. RMS value
Short circuit contribution (I_P)	1560 A	2 x 1560 A	3 x 1560 A	4 x 1560 A	Max. Peak value
Max. load capability	100%				@ Operating mode Island grid
Time span overload	0.0 s				@ Operating mode Island grid
Power factor (cos ϕ)	> 0.98				At > 20% of nominal AC power
AC current distortion (THD)	< 3%				
AUXILIARY SUPPLY (EXTERNAL)					
Nominal grid voltage ($U_{AC, nom\ (aux)}$)	400 V				3~, phase to phase
Grid voltage range	+/- 10% of $U_{AC, nom\ (aux)}$				
Nominal grid frequency ($f_{nom\ (aux)}$)	50 Hz				
Network configuration	TN-S system				
Max. AC current ($I_{AC, (aux)}$)	3 x K16A				
Max. short circuit level ($I_{AC, SC\ (APS)}$)	6 kA				
Internal buffer time	4.0 s				Only for control supply available

APS-ES-Series 1500 V_{DC} – 550 V_{AC} 1000 … 4000 kVA

(II) TECHNICAL DATA

	APS1000-ES	APS2000-ES	APS3000-ES	APS4000-ES	COMMENTS
DC SIDE					
Independent DC sources	1		2		Depending on configuration
Nominal DC voltage ($U_{DC, nom}$)	1000 V				
Max. DC voltage ($U_{DC, max}$)	1500 V				Depending on application
Min. DC voltage ($U_{DC, min}$)	810 V / 891 V				At 100% / 110% nominal grid voltage
Max. DC current ($I_{DC, max}$)	1220 A	2 x 1220 A	3 x 1220 A	4 x 1220 A	
Max. short circuit level ($I_{DC, SC (APS)}$)	6.4 kA / 30 kA / 140 kA (max. 0.5 ms)				Without / With DC fuses / External protection required
Nominal DC power ($P_{DC, nom}$)	1016 kW	2033 kW	3049 kW	4065 kW	
Max. capacity against earthing	2000 µF				For each IT system
GENERAL					
Control strategy	CC-CV				
Efficiency	(98.3 | 98.7 | 98.7 | 98.6 | 98.4) %	(98.3 | 98.7 | 98.7 | 98.6 | 98.4) %	(98.3 | 98.7 | 98.7 | 98.6 | 98.4) %	(98.3 | 98.7 | 98.7 | 98.6 | 98.4) %	At (10 | 30 | 50 | 75 | 100) % power, @ $U_{DC, nom}$
EU efficiency	98.6%				Including all inverter losses
Feed-in starting at ($P_{DC, th}$)	200 W	200 W	400 W	400 W	
Standby losses	80 W	90 W	140 W	150 W	
Maximum auxiliary power	< 3500 W		< 7000 W		Excluding optional heating

APS-ES-Series 1500 V_{DC} – 575 V_{AC} 1045 … 4180 kVA

(I) TECHNICAL DATA

	APS1045-ES	APS2090-ES	APS3135-ES	APS4180-ES	COMMENTS
GRID SIDE					
Max. AC apparent power (S_{max})	1045 kVA	2090 kVA	3135 kVA	4180 kVA	At nominal grid voltage
Nominal AC power ($P_{AC, nom}$)	1045 kW	2090 kW	3135 kW	4180 kW	At (cos ϕ) = 1.0
Number of Apparent Power Units (APU)	1	2	3	4	
Number of independent grids	1		2		
Nominal grid voltage ($U_{AC, nom}$)	575 V				3~, phase to phase
Grid voltage range	+/- 10% of $U_{AC, nom}$				
Nominal grid frequency (f_{nom})	50 Hz				60 Hz option available
Network configuration	IT system				
Max. AC current per APU ($I_{AC, max\ (APU)}$)	1050 A				
Max. AC current – APS ($I_{AC, max\ (APS)}$)	1050 A	2 x 1050 A	3 x 1050 A	4 x 1050 A	
Max. short circuit level ($I_{AC, SC\ (APS)}$)	50 kA				
Short circuit contribution (I'_K)	1060 A	2 x 1060 A	3 x 1060 A	4 x 1060 A	Max. RMS value
Short circuit contribution (I''_K)	1060 A	2 x 1060 A	3 x 1060 A	4 x 1060 A	Max. RMS value
Short circuit contribution (I_P)	1560 A	2 x 1560 A	3 x 1560 A	4 x 1560 A	Max. Peak value
Max. load capability	100%				@ Operating mode Island grid
Time span overload	0.0 s				@ Operating mode Island grid
Power factor (cos ϕ)	> 0.98				At > 20% of nominal AC power
AC current distortion (THD)	< 3%				
AUXILIARY SUPPLY (EXTERNAL)					
Nominal grid voltage ($U_{AC, nom\ (aux)}$)	400 V				3~, phase to phase
Grid voltage range	+/- 10% of $U_{AC, nom\ (aux)}$				
Nominal grid frequency ($f_{nom\ (aux)}$)	50 Hz				
Network configuration	TN-S system				
Max. AC current ($I_{AC, (aux)}$)	3 x K16A				
Max. short circuit level ($I_{AC, SC\ (APS)}$)	6 kA				
Internal buffer time	4.0 s				Only for control supply available

APS-ES-Series 1500 V_{DC} – 575 V_{AC} 1045 … 4180 kVA

(II) TECHNICAL DATA

	APS1045-ES	APS2090-ES	APS3135-ES	APS4180-ES	COMMENTS
DC SIDE					
Independent DC sources	1		2		Depending on configuration
Nominal DC voltage ($U_{DC, nom}$)	1000 V				
Max. DC voltage ($U_{DC, max}$)	1500 V				Depending on application
Min. DC voltage ($U_{DC, min}$)	874 V / 932 V				At 100% / 110% nominal grid voltage
Max. DC current ($I_{DC, max}$)	1220 A	2 x 1220 A	3 x 1220 A	4 x 1220 A	
Max. short circuit level ($I_{DC, SC (APS)}$)	6.4 kA / 30 kA / 140 kA (max. 0.5 ms)				Without / With DC fuses / External protection required
Nominal DC power ($P_{DC, nom}$)	1062 kW	2124 kW	3186 kW	4248 kW	
Max. capacity against earthing	2000 µF				For each IT system
GENERAL					
Control strategy	CC-CV				
Efficiency	(98.3 | 98.8 | 98.8 | 98.6 | 98.5) %	(98.3 | 98.8 | 98.8 | 98.6 | 98.5) %	(98.3 | 98.8 | 98.8 | 98.6 | 98.5) %	(98.3 | 98.8 | 98.8 | 98.6 | 98.5) %	At (10 | 30 | 50 | 75 | 100) % power, @ $U_{DC, nom}$
EU efficiency	98.7%				Including all inverter losses
Feed-in starting at ($P_{DC, th}$)	200 W	200 W	400 W	400 W	
Standby losses	80 W	90 W	140 W	150 W	
Maximum auxiliary power	< 3500 W		< 7000 W		Excluding optional heating

APS-ES-Series 1500 V_{DC} – 600 V_{AC} 1090 … 4360 kVA

(I) TECHNICAL DATA

	APS1090-ES	APS2180-ES	APS3270-ES	APS4360-ES	COMMENTS
GRID SIDE					
Max. AC apparent power (S_{max})	1090 kVA	2180 kVA	3270 kVA	4360 kVA	At nominal grid voltage
Nominal AC power ($P_{AC, nom}$)	1090 kW	2180 kW	3270 kW	4360 kW	At (cos ϕ) = 1.0
Number of Apparent Power Units (APU)	1	2	3	4	
Number of independent grids	1		2		
Nominal grid voltage ($U_{AC, nom}$)	600 V				3~, phase to phase
Grid voltage range	+/- 10% of $U_{AC, nom}$				
Nominal grid frequency (f_{nom})	50 Hz				60 Hz option available
Network configuration	IT system				
Max. AC current per APU ($I_{AC, max\ (APU)}$)	1050 A				
Max. AC current – APS ($I_{AC, max\ (APS)}$)	1050 A	2 x 1050 A	3 x 1050 A	4 x 1050 A	
Max. short circuit level ($I_{AC, SC\ (APS)}$)	50 kA				
Short circuit contribution (I'_K)	1060 A	2 x 1060 A	3 x 1060 A	4 x 1060 A	Max. RMS value
Short circuit contribution (I''_K)	1060 A	2 x 1060 A	3 x 1060 A	4 x 1060 A	Max. RMS value
Short circuit contribution (I_P)	1560 A	2 x 1560 A	3 x 1560 A	4 x 1560 A	Max. Peak value
Max. load capability	100%				@ Operating mode Island grid
Time span overload	0.0 s				@ Operating mode Island grid
Power factor (cos ϕ)	> 0.98				At > 20% of nominal AC power
AC current distortion (THD)	< 3%				
AUXILIARY SUPPLY (EXTERNAL)					
Nominal grid voltage ($U_{AC, nom\ (aux)}$)	400 V				3~, phase to phase
Grid voltage range	+/- 10% of $U_{AC, nom\ (aux)}$				
Nominal grid frequency ($f_{nom\ (aux)}$)	50 Hz				
Network configuration	TN-S system				
Max. AC current ($I_{AC, (aux)}$)	3 x K16A				
Max. short circuit level ($I_{AC, SC\ (APS)}$)	6 kA				
Internal buffer time	4.0 s				Only for control supply available

APS-ES-Series 1500 V_{DC} – 600 V_{AC} 1090 … 4360 kVA

(II) TECHNICAL DATA

	APS1090-ES	APS2180-ES	APS3270-ES	APS4360-ES	COMMENTS
DC SIDE					
Independent DC sources	1		2		Depending on configuration
Nominal DC voltage ($U_{DC, nom}$)	1000 V				
Max. DC voltage ($U_{DC, max}$)	1500 V				Depending on application
Min. DC voltage ($U_{DC, min}$)	884 V / 972 V				At 100% / 110% nominal grid voltage
Max. DC current ($I_{DC, max}$)	1220 A	2 x 1220 A	3 x 1220 A	4 x 1220 A	
Max. short circuit level ($I_{DC, SC (APS)}$)	6.4 kA / 30 kA / 140 kA (max. 0.5 ms)				Without / With DC fuses / External protection required
Nominal DC power ($P_{DC, nom}$)	1108 kW	2215 kW	3323 kW	4431 kW	
Max. capacity against earthing	2000 µF				For each IT system
GENERAL					
Control strategy	CC-CV				
Efficiency	(98.4 | 98.9 | 98.8 | 98.7 | 98.5) %	(98.4 | 98.9 | 98.8 | 98.7 | 98.5) %	(98.4 | 98.9 | 98.8 | 98.7 | 98.5) %	(98.4 | 98.9 | 98.8 | 98.7 | 98.5) %	At (10 | 30 | 50 | 75 | 100) % power, @ $U_{DC, nom}$
EU efficiency	98.7%				Including all inverter losses
Feed-in starting at ($P_{DC, th}$)	200 W	200 W	400 W	400 W	
Standby losses	80 W	90 W	140 W	150 W	
Max. auxiliary power	< 3500 W		< 7000 W		Excluding optional heating

APS-ES-Series 1500 V_{DC} – 630 V_{AC} 1140 … 4560 kVA

(I) TECHNICAL DATA

	APS1140-ES	APS2280-ES	APS3420-ES	APS4560-ES	COMMENTS
GRID SIDE					
Max. AC apparent power (S_{max})	1140 kVA	2280 kVA	3420 kVA	4560 kVA	At nominal grid voltage
Nominal AC power ($P_{AC, nom}$)	1140 kW	2280 kW	3420 kW	4560 kW	At (cos ϕ) = 1.0
Number of Apparent Power Units (APU)	1	2	3	4	
Number of independent grids	1		2		
Nominal grid voltage ($U_{AC, nom}$)	630 V				3~, phase to phase
Grid voltage range	+/- 10% $U_{AC, nom}$				
Nominal grid frequency (f_{nom})	50 Hz				60 Hz option available
Network configuration	IT system				
Max. AC current per APU ($I_{AC, max\ (APU)}$)	1050 A				
Max. AC current – APS ($I_{AC, max\ (APS)}$)	1050 A	2 x 1050 A	3 x 1050 A	4 x 1050 A	
Max. short circuit level ($I_{AC, SC\ (APS)}$)	50 kA				
Short circuit contribution (I'_K)	1060 A	2 x 1060 A	3 x 1060 A	4 x 1060 A	Max. RMS value
Short circuit contribution (I''_K)	1060 A	2 x 1060 A	3 x 1060 A	4 x 1060 A	Max. RMS value
Short circuit contribution (I_P)	1560 A	2 x 1560 A	3 x 1560 A	4 x 1560 A	Max. Peak value
Max. load capability	100%				@ Operating mode Island grid
Time span overload	0.0 s				@ Operating mode Island grid
Power factor (cos ϕ)	> 0.98				At > 20% of nominal AC power
AC current distortion (THD)	< 3%				
AUXILIARY SUPPLY (EXTERNAL)					
Nominal grid voltage ($U_{AC, nom\ (aux)}$)	400 V				3~, phase to phase
Grid voltage range	+/- 10% of $U_{AC, nom\ (aux)}$				
Nominal grid frequency ($f_{nom\ (aux)}$)	50 Hz				
Network configuration	TN-S system				
Max. AC current ($I_{AC, (aux)}$)	3 x K16A				
Max. short circuit level ($I_{AC, SC\ (APS)}$)	6 kA				
Internal buffer time	4.0 s				Only for control supply available

APS-ES-Series 1500 V_{DC} – 630 V_{AC} 1140 … 4560 kVA

(II) TECHNICAL DATA

	APS1140-ES	APS2280-ES	APS3420-ES	APS4560-ES	COMMENTS
DC SIDE					
Independent DC sources	1		2		Depending on configuration
Nominal DC voltage ($U_{DC, nom}$)	1000 V				
Max. DC voltage ($U_{DC, max}$)	1500 V				Depending on application
Min. DC voltage ($U_{DC, min}$)	928 V / 1021 V				At 100% / 110% nominal grid voltage
Max. DC current ($I_{DC, max}$)	1220 A	2 x 1220 A	3 x 1220 A	4 x 1220 A	
Max. short circuit level ($I_{DC, SC (APS)}$)	6.4 kA / 30 kA / 140 kA (max. 0.5 ms)				Without / With DC fuses / External protection required
Nominal DC power ($P_{DC, nom}$)	1159 kW	2317 kW	3476 kW	4634 kW	
Max. capacity against earthing	2000 µF				For each IT system
GENERAL					
Control strategy	CC-CV				
Efficiency	(98.4 | 98.9 | 98.9 | 98.8 | 98.6) %	(98.4 | 98.9 | 98.9 | 98.8 | 98.6) %	(98.4 | 98.9 | 98.9 | 98.8 | 98.6) %	(98.4 | 98.9 | 98.9 | 98.8 | 98.6) %	At (10 | 30 | 50 | 75 | 100) % power, @ $U_{DC, nom}$
EU efficiency	98.8%				Including all inverter losses
Feed-in starting at ($P_{DC, th}$)	200 W	200 W	400 W	400 W	
Standby losses	80 W	90 W	140 W	150 W	
Max. auxiliary power	< 3500 W		< 7000 W		Excluding optional heating

APS-ES-Series 1500 V_{DC} – 660 V_{AC} 1200 … 4800 kVA

(I) TECHNICAL DATA

	APS1200-ES	APS2400-ES	APS3600-ES	APS4800-ES	COMMENTS
GRID SIDE					
Max. AC apparent power (S_{max})	1200 kVA	2400 kVA	3600 kVA	4800 kVA	At nominal grid voltage
Nominal AC power ($P_{AC, nom}$)	1200 kW	2400 kW	3600 kW	4800 kW	At (cos ϕ) = 1.0
Number of Apparent Power Units (APU)	1	2	3	4	
Number of independent grids	1		2		
Nominal grid voltage ($U_{AC, nom}$)	660 V				3~, phase to phase
Grid voltage range	+/- 10% of $U_{AC, nom}$				
Nominal grid frequency (f_{nom})	50 Hz				60 Hz option available
Network configuration	IT system				
Max. AC current per APU ($I_{AC, max\ (APU)}$)	1050 A				
Max. AC current – APS ($I_{AC, max\ (APS)}$)	1050 A	2 x 1050 A	3 x 1050 A	4 x 1050 A	
Max. short circuit level ($I_{AC, SC\ (APS)}$)	50 kA				
Short circuit contribution (I'_K)	1060 A	2 x 1060 A	3 x 1060 A	4 x 1060 A	Max. RMS value
Short circuit contribution (I''_K)	1060 A	2 x 1060 A	3 x 1060 A	4 x 1060 A	Max. RMS value
Short circuit contribution (I_P)	1560 A	2 x 1560 A	3 x 1560 A	4 x 1560 A	Max. Peak value
Max. load capability	100%				@ Operating mode Island grid
Time span overload	0.0 s				@ Operating mode Island grid
Power factor (cos ϕ)	> 0.98				At > 20% of nominal AC power
AC current distortion (THD)	< 3%				
AUXILIARY SUPPLY (EXTERNAL)					
Nominal grid voltage ($U_{AC, nom\ (aux)}$)	400 V				3~, phase to phase
Grid voltage range	+/- 10% of $U_{AC, nom\ (aux)}$				
Nominal grid frequency ($f_{nom\ (aux)}$)	50 Hz				
Network configuration	TN-S system				
Max. AC current ($I_{AC, (aux)}$)	3 x K16A				
Max. short circuit level ($I_{AC, SC\ (APS)}$)	6 kA				
Internal buffer time	4.0 s				Only for control supply available

APS-ES-Series 1500 V_{DC} – 660 V_{AC} 1200 … 4800 kVA

(II) TECHNICAL DATA

	APS1200-ES	APS2400-ES	APS3600-ES	APS4800-ES	COMMENTS
DC SIDE					
Independent DC sources	1		2		Depending on configuration
Nominal DC voltage ($U_{DC, nom}$)	1100 V				
Max. DC voltage ($U_{DC, max}$)	1500 V				Depending on application
Min. DC voltage ($U_{DC, min}$)	972 V / 1069 V				At 100% / 110% nominal grid voltage
Max. DC current ($I_{DC, max}$)	1220 A	2 x 1220 A	3 x 1220 A	4 x 1220 A	
Max. short circuit level ($I_{DC, SC (APS)}$)	6.4 kA / 30 kA / 140 kA (max. 0.5 ms)				Without / With DC fuses / External protection required
Nominal DC power ($P_{DC, nom}$)	1220 kW	2439 kW	3659 kW	4878 kW	
Max. capacity against earthing	2000 µF				For each IT system
GENERAL					
Control strategy	CC-CV				
Efficiency	(98.5 | 98.9 | 98.9 | 98.8 | 98.6) %	(98.5 | 98.9 | 98.9 | 98.8 | 98.6) %	(98.5 | 98.9 | 98.9 | 98.8 | 98.6) %	(98.5 | 98.9 | 98.9 | 98.8 | 98.6) %	At (10 | 30 | 50 | 75 | 100) % power, @ $U_{DC, nom}$
EU efficiency	98.8%				Including all inverter losses
Feed-in starting at ($P_{DC, th}$)	200 W	200 W	400 W	400 W	
Standby losses	80 W	90 W	140 W	150 W	
Max. auxiliary power	< 3500 W		< 7000 W		Excluding optional heating

APS-ES-Series 1500 V_{DC} – 690 V_{AC} 1250 … 5000 kVA

(I) TECHNICAL DATA

	APS1250-ES	APS2500-ES	APS3750-ES	APS5000-ES	COMMENTS
GRID SIDE					
Max. AC apparent power (S_{max})	1250 kVA	2500 kVA	3750 kVA	5000 kVA	At nominal grid voltage
Nominal AC power ($P_{AC, nom}$)	1250 kW	2500 kW	3750 kW	5000 kW	At (cos ϕ) = 1.0
Number of Apparent Power Units (APU)	1	2	3	4	
Number of independent grids	1		2		
Nominal grid voltage ($U_{AC, nom}$)	690 V				3~, phase to phase
Grid voltage range	+/- 10% of $U_{AC, nom}$				
Nominal grid frequency (f_{nom})	50 Hz				60 Hz option available
Network configuration	IT system				
Max. AC current per APU ($I_{AC, max\ (APU)}$)	1050 A				
Max. AC current – APS ($I_{AC, max\ (APS)}$)	1050 A	2 x 1050 A	3 x 1050 A	4 x 1050 A	
Max. short circuit level ($I_{AC, SC\ (APS)}$)	50 kA				
Short circuit contribution (I'_K)	1060 A	2 x 1060 A	3 x 1060 A	4 x 1060 A	Max. RMS value
Short circuit contribution (I''_K)	1060 A	2 x 1060 A	3 x 1060 A	4 x 1060 A	Max. RMS value
Short circuit contribution (I_P)	1560 A	2 x 1560 A	3 x 1560 A	4 x 1560 A	Max. Peak value
Max. load capability	100%				@ Operating mode Island grid
Time span overload	0.0 s				@ Operating mode Island grid
Power factor (cos ϕ)	> 0.98				At > 20% of nominal AC power
AC current distortion (THD)	< 3%				
AUXILIARY SUPPLY (EXTERNAL)					
Nominal grid voltage ($U_{AC, nom\ (aux)}$)	400 V				3~, phase to phase
Grid voltage range	+/- 10% of $U_{AC, nom\ (aux)}$				
Nominal grid frequency ($f_{nom\ (aux)}$)	50 Hz				
Network configuration	TN-S system				
Max. AC current ($I_{AC, (aux)}$)	3 x K16A				
Max. short circuit level ($I_{AC, SC\ (APS)}$)	6 kA				
Internal buffer time	4.0 s				Only for control supply available

APS-ES-Series 1500 V_{DC} – 690 V_{AC} 1250 … 5000 kVA

(II) TECHNICAL DATA

	APS1250-ES	APS2500-ES	APS3750-ES	APS5000-ES	COMMENTS
DC SIDE					
Independent DC sources	1		2		Depending on configuration
Nominal DC voltage ($U_{DC, nom}$)	1100 V				
Max. DC voltage ($U_{DC, max}$)	1500 V				Depending on application
Min. DC voltage ($U_{DC, min}$)	1016 V / 1118 V				At 100% / 110% nominal grid voltage
Max. DC current ($I_{DC, max}$)	1220 A	2 x 1220 A	3 x 1220 A	4 x 1220 A	
Max. short circuit level ($I_{DC, SC (APS)}$)	6.4 kA / 30 kA / 140 kA (max. 0.5 ms)				Without / With DC fuses / External protection required
Nominal DC power ($P_{DC, nom}$)	1220 kW	2439 kW	3659 kW	4878 kW	
Max. capacity against earthing	2000 µF				For each IT system
GENERAL					
Control strategy	CC-CV				
Efficiency	(98.5 | 99.0 | 98.9 | 98.8 | 98.7) %	(98.5 | 99.0 | 98.9 | 98.8 | 98.7) %	(98.5 | 99.0 | 98.9 | 98.8 | 98.7) %	(98.5 | 99.0 | 98.9 | 98.8 | 98.7) %	At (10 | 30 | 50 | 75 | 100) % power, @ $U_{DC, nom}$
EU efficiency	98.8%				Including all inverter losses
Feed-in starting at ($P_{DC, th}$)	200 W	200 W	400 W	400 W	
Standby losses	80 W	90 W	140 W	150 W	
Max. auxiliary power	< 3500 W		< 7000 W		Excluding optional heating

APS-ES-Series 1500 V_{DC} – 400 … 690 V_{AC} 725 … 5000 kVA

(I) GENERAL DATA

	1 Cabinet & 1 APU (model list below)	1 Cabinet & 2 APUs (model list below)	2 Cabinets & 3 APUs (model list below)	2 Cabinets & 4 APUs (model list below)	COMMENTS
Ambient working temperature	From -10°C up to 60°C (From 14°F up to 140°F)				Others on request
Ambient storage temperature	From -40°C up to 60°C (From -40°F up to 140°F)				
Storage relative humidity	< 90%				
Maximum altitude	1500 m above sea level				Without power derating
Cooling type	Forced air and water cooling				
Protection class	IP65				
Dimensions (L × W × H)	1950 × 1170 × 3740		3510 × 1170 × 3740		Dimensions in millimeters
Weight	< 1525 kg	< 2150 kg	< 3275 kg	< 3900 kg	
Shelter surface	Painted				
Corrosivity category	C4-high				Others on request
Colour	RAL7035				Others on request

APS-ES-Series models (1500 V_{DC})

	400 V_{AC}	440 V_{AC}	480 V_{AC}	520 V_{AC}	550 V_{AC}	575 V_{AC}	600 V_{AC}	630 V_{AC}	660 V_{AC}	690 V_{AC}
1 Cabinet & 1 APU	APS0725-ES	APS0800-ES	APS0870-ES	APS0945-ES	APS1000-ES	APS1045-ES	APS1090-ES	APS1140-ES	APS1200-ES	APS1250-ES
1 Cabinet & 2 APUs	APS1450-ES	APS1600-ES	APS1740-ES	APS1890-ES	APS2000-ES	APS2090-ES	APS2180-ES	APS2280-ES	APS2400-ES	APS2500-ES
2 Cabinets & 3 APUs	APS2175-ES	APS2400-ES	APS2610-ES	APS2835-ES	APS3000-ES	APS3135-ES	APS3270-ES	APS3420-ES	APS3600-ES	APS3750-ES
2 Cabinets & 4 APUs	APS2900-ES	APS3200-ES	APS3480-ES	APS3780-ES	APS4000-ES	APS4180-ES	APS4360-ES	APS4560-ES	APS4800-ES	APS5000-ES

APS-ES-Series 1500 V_{DC} – 400 … 690 V_{AC} 725 … 5000 kVA

(II) GENERAL DATA

	1 Cabinet & 1 APU (model list below)	1 Cabinet & 2 APUs (model list below)	2 Cabinets & 3 APUs (model list below)	2 Cabinets & 4 APUs (model list below)	COMMENTS
EMC and security standards	IEC 61000-6-2, IEC 61000-6-4 + AMD1, IEC 62109-1, IEC 62109-2.				
CE-conformity	Complies				
Grid connection standards	IEC 62116, BDEW (Germany), PEA & MEA (Thailand), EN 50549-2 (Turkey), NEPRA (Pakistan), PO 12.3 (Spain), C10/11 (Belgium), Order 30/2013 (Romania), South African Grid Code, Chilean Grid Code, G59-3 (UK), Egyptian Grid Code, DEWA (Dubai), NEPCO (Jordan), Malaysian Grid Code, Arrêté 23-2008 (France), Italian Grid Code, CRE-3025 (Mexico), ABNT NBR 16149/16150 + NDU-015 (Brazil), Saudi Arabian Grid Code.				
Efficiency standard	IEC 61683				
UL / CSA standards	UL 1741 2nd edition (including IEEE 1547, IEEE 1547.1, SA), California Rule 21, CSA C22.2 No.107.1				To be ordered as an option
Seismic standards	IEEE 693-2005, EN60068-3-3:1993, EN 60068-2-6:2008, EN 60068-2-47:2005				To be ordered as an option

APS-ES-Series models (1500 V_{DC})

	400 V_{AC}	440 V_{AC}	480 V_{AC}	520 V_{AC}	550 V_{AC}	575 V_{AC}	600 V_{AC}	630 V_{AC}	660 V_{AC}	690 V_{AC}
1 Cabinet & 1 APU	APS0725-ES	APS0800-ES	APS0870-ES	APS0945-ES	APS1000-ES	APS1045-ES	APS1090-ES	APS1140-ES	APS1200-ES	APS1250-ES
1 Cabinet & 2 APUs	APS1450-ES	APS1600-ES	APS1740-ES	APS1890-ES	APS2000-ES	APS2090-ES	APS2180-ES	APS2280-ES	APS2400-ES	APS2500-ES
2 Cabinets & 3 APUs	APS2175-ES	APS2400-ES	APS2610-ES	APS2835-ES	APS3000-ES	APS3135-ES	APS3270-ES	APS3420-ES	APS3600-ES	APS3750-ES
2 Cabinets & 4 APUs	APS2900-ES	APS3200-ES	APS3480-ES	APS3780-ES	APS4000-ES	APS4180-ES	APS4360-ES	APS4560-ES	APS4800-ES	APS5000-ES

APS-ES-Series 1500 V_{DC} – 400 … 690 V_{AC} 725 … 5000 kVA

(I) FEATURES & OPTIONS – APS - ENERGY STORAGE APPLICATION

	1 Cabinet & 1 APU / 1 Cabinet & 2 APUs / 2 Cabinets & 3 APUs / 2 Cabinets & 4 APUs / (model list below)	COMMENTS
IP65 outdoor cabinet made for desert installations	F	
Insulation monitor	F	
Monitored surge arresters on AC side	F	
Status display on the shelter	F	
Air dehumidifier inside the shelter	F	
External heat exchanger for dusty/moist ambient and extreme climatic conditions	F	
Low voltage ride trough (LVRT) handling	F	
Modbus TCP communication interface	F	
Powerlink communication interface (Real-time Ethernet)	O	
Internal data logger	F	
Service access via VNC	F	
FTP server for log log data	F	

(O) – Optional (F) – Feature

APS-ES-Series models (1500 V_{DC})

	400 V_{AC}	440 V_{AC}	480 V_{AC}	520 V_{AC}	550 V_{AC}	575 V_{AC}	600 V_{AC}	630 V_{AC}	660 V_{AC}	690 V_{AC}
1 Cabinet & 1 APU	APS0725-ES	APS0800-ES	APS0870-ES	APS0945-ES	APS1000-ES	APS1045-ES	APS1090-ES	APS1140-ES	APS1200-ES	APS1250-ES
1 Cabinet & 2 APUs	APS1450-ES	APS1600-ES	APS1740-ES	APS1890-ES	APS2000-ES	APS2090-ES	APS2180-ES	APS2280-ES	APS2400-ES	APS2500-ES
2 Cabinets & 3 APUs	APS2175-ES	APS2400-ES	APS2610-ES	APS2835-ES	APS3000-ES	APS3135-ES	APS3270-ES	APS3420-ES	APS3600-ES	APS3750-ES
2 Cabinets & 4 APUs	APS2900-ES	APS3200-ES	APS3480-ES	APS3780-ES	APS4000-ES	APS4180-ES	APS4360-ES	APS4560-ES	APS4800-ES	APS5000-ES

APS-ES-Series 1500 V_{DC} – 400 … 690 V_{AC} 725 … 5000 kVA

(II) FEATURES & OPTIONS – APS - ENERGY STORAGE APPLICATION

	1 Cabinet & 1 APU / 1 Cabinet & 2 APUs / 2 Cabinets & 3 APUs / 2 Cabinets & 4 APUs / (model list below)	COMMENTS
Network Interface: fiber-optic multimode	F	
Network Interface: fiber-optic singlemode	O	
Heating	O	
Alternative grid voltage range (+/- xx %)	O	Only with external control voltage supply
Grid frequency 60 Hz	O	
Power limitation [kVA]	O	
Area for customer's installations (H x W X D) 400 x 500 x 200 mm	F	Including: 1-phase, 230V, TN, 1000 VA, network connection
UL certified	O	
Seismic IEEE 693 / EN 60068	O	
Island grid functionality	O	Refer to P(Q) diagram for $U_{DC, min}$ requirement
Additional auxiliary output	O *)	No transformer: fuse-protected output at APU 3/4 with 25 A (3~, PE)
	O *)	With transformer: with internal 8 kVA transformer (3~, N, PE)

(O) – Optional (F) – Feature (*)) – Only one option possible

APS-ES-Series models (1500 V_{DC})

	400 V_{AC}	440 V_{AC}	480 V_{AC}	520 V_{AC}	550 V_{AC}	575 V_{AC}	600 V_{AC}	630 V_{AC}	660 V_{AC}	690 V_{AC}
1 Cabinet & 1 APU	APS0725-ES	APS0800-ES	APS0870-ES	APS0945-ES	APS1000-ES	APS1045-ES	APS1090-ES	APS1140-ES	APS1200-ES	APS1250-ES
1 Cabinet & 2 APUs	APS1450-ES	APS1600-ES	APS1740-ES	APS1890-ES	APS2000-ES	APS2090-ES	APS2180-ES	APS2280-ES	APS2400-ES	APS2500-ES
2 Cabinets & 3 APUs	APS2175-ES	APS2400-ES	APS2610-ES	APS2835-ES	APS3000-ES	APS3135-ES	APS3270-ES	APS3420-ES	APS3600-ES	APS3750-ES
2 Cabinets & 4 APUs	APS2900-ES	APS3200-ES	APS3480-ES	APS3780-ES	APS4000-ES	APS4180-ES	APS4360-ES	APS4560-ES	APS4800-ES	APS5000-ES

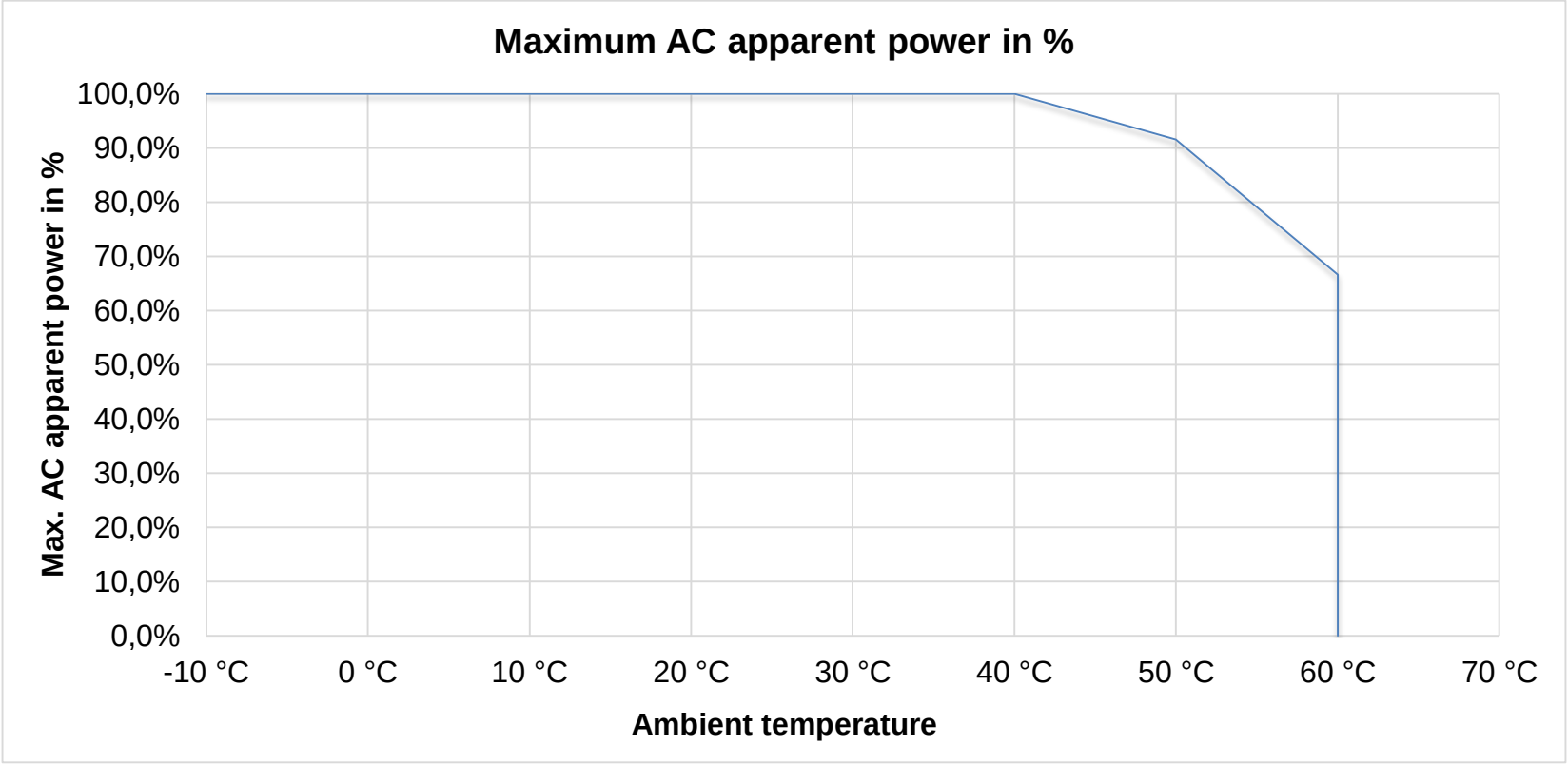
APS-ES-Series 1500 V_{DC} – 400 … 690 V_{AC} 725, 800, 870, 945, 1000, 1045, 1090, 1140, 1200 & 1250 kVA

FEATURES & OPTIONS – APU - ENERGY STORAGE APPLICATION

	Apparent Power Unit (APU) – Energy Storage Application	COMMENTS
DC-charge circuit	F	
AC-charge circuit	O	
Operating mode: CC-CV	F	
Operating mode: STATCOM	O	
Operating mode: Island grid	O	
Fuse protected DC Inputs U2XL-1IGZ/1500/H XXXA	O (1 up to 8)	
Fuse protected DC Inputs U3L-1IGZ/1500/H XXXA	O (1 up to 7)	
DC-current monitoring	O	
DC disconnector	F	
Monitored surge arresters on DC side	O	
AC circuit-breaker	F	
DC coupling	F	
Insulation monitoring – positive grounding	O	
Insulation monitoring – negative grounding	O	

(O) – Optional (F) – Feature (-) – Not available

POWER DERATING



APS-ES-Series 1500 V_{DC} – 400 … 690 V_{AC} 725 … 5000 kVA

(I) MECHANICAL DRAWINGS

APS-ES-Series 1500 V_{DC}	One-cabinet version with 1-2 APUs	Two-cabinet version with 3-4 APUs

APS-ES-Series models (1500 V_{DC})

	400 V_{AC}	440 V_{AC}	480 V_{AC}	520 V_{AC}	550 V_{AC}	575 V_{AC}	600 V_{AC}	630 V_{AC}	660 V_{AC}	690 V_{AC}
1 Cabinet & 1 APU	APS0725-ES	APS0800-ES	APS0870-ES	APS0945-ES	APS1000-ES	APS1045-ES	APS1090-ES	APS1140-ES	APS1200-ES	APS1250-ES
1 Cabinet & 2 APUs	APS1450-ES	APS1600-ES	APS1740-ES	APS1890-ES	APS2000-ES	APS2090-ES	APS2180-ES	APS2280-ES	APS2400-ES	APS2500-ES
2 Cabinets & 3 APUs	APS2175-ES	APS2400-ES	APS2610-ES	APS2835-ES	APS3000-ES	APS3135-ES	APS3270-ES	APS3420-ES	APS3600-ES	APS3750-ES
2 Cabinets & 4 APUs	APS2900-ES	APS3200-ES	APS3480-ES	APS3780-ES	APS4000-ES	APS4180-ES	APS4360-ES	APS4560-ES	APS4800-ES	APS5000-ES

APS-ES-Series 1500 V_{DC}

725 … 5000 kVA

EQUIVALENT MODEL NAME

400 V_{AC}	
APS0725-ES	APS0725-ES-1-400-5
APS1450-ES	APS1450-ES-2-400-5
APS2175-ES	APS2175-ES-3-400-5
APS2900-ES	APS2900-ES-4-400-5

440 V_{AC}	
APS0800-ES	APS0800-ES-1-440-5
APS1600-ES	APS1600-ES-2-440-5
APS2400-ES	APS2400-ES-3-440-5
APS3200-ES	APS3200-ES-4-440-5

480 V_{AC}	
APS0870-ES	APS0870-ES-1-480-5
APS1740-ES	APS1740-ES-2-480-5
APS2610-ES	APS2610-ES-3-480-5
APS3480-ES	APS3480-ES-4-480-5

520 V_{AC}	
APS0945-ES	APS0945-ES-1-520-5
APS1890-ES	APS1890-ES-2-520-5
APS2835-ES	APS2835-ES-3-520-5
APS3780-ES	APS3780-ES-4-520-5

550 V_{AC}	
APS1000-ES	APS1000-ES-1-550-5
APS2000-ES	APS2000-ES-2-550-5
APS3000-ES	APS3000-ES-3-550-5
APS4000-ES	APS4000-ES-4-550-5

575 V_{AC}	
APS1045-ES	APS1045-ES-1-575-5
APS2090-ES	APS2090-ES-2-575-5
APS3135-ES	APS3135-ES-3-575-5
APS4180-ES	APS4180-ES-4-575-5

600 V_{AC}	
APS1090-ES	APS1090-ES-1-600-5
APS2180-ES	APS2180-ES-2-600-5
APS3270-ES	APS3270-ES-3-600-5
APS4360-ES	APS4360-ES-4-600-5

630 V_{AC}	
APS1140-ES	APS1140-ES-1-630-5
APS2280-ES	APS2280-ES-2-630-5
APS3420-ES	APS3420-ES-3-630-5
APS4560-ES	APS4560-ES-4-630-5

660 V_{AC}	
APS1200-ES	APS1200-ES-1-660-5
APS2400-ES	APS2400-ES-2-660-5
APS3600-ES	APS3600-ES-3-660-5
APS4800-ES	APS4800-ES-4-660-5

690 V_{AC}	
APS1250-ES	APS1250-ES-1-690-5
APS2500-ES	APS2500-ES-2-690-5
APS3750-ES	APS3750-ES-3-690-5
APS5000-ES	APS5000-ES-4-690-5

WSTECH

CONTACT

SALES DEPARTMENT GERMANY

WSTECH GmbH
Eckernfoerder Landstrasse 78
24941 Flensburg
Germany

Phone: +49 (0) 461 430 1220
Mail: info@wstech.com

SALES DEPARTMENT WORLDWIDE

WSTECH (Spanish office)
Carrer de l'Enginy, Nave 7
08840 Viladecans, Barcelona
Spain

Phone: +34 936 334 416
Mail: info@wstech.com