

APS-ES-Series 1000 V_{DC}

Outdoor Energy Storage hybrid inverters, with output power ranging from 590 up to 3280 kVA.

The APS-ES-Series 1000 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.

- ✓ **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 dryer** to avoid condensation.
- ✓ **AC circuit breaker** built-in.
- ✓ **Fuse-protected DC combiner**.
- ✓ **Optional DC-coupling** in case of an inverter module fault.
- ✓ **Modbus TCP or optional real-time Ethernet** communication interfaces.
- ✓ **Optional and configurable hybrid system** for storage applications and STATCOM function in the same inverter.



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	300 V / 330 V / 360 V / 400 V / 415 V	
Max. AC apparent power (S_{max}) options	From 590 kVA up to 1640 kVA	From 1770 kVA up to 3280 kVA
Max. DC voltage ($U_{DC, max}$)	1000 V	

APS-ES-Series models (1000 V_{DC})

	300 V _{AC}	330 V _{AC}	360 V _{AC}	400 V _{AC}	415 V _{AC}
1 Cabinet & 1 APU	APS 590-ES	APS 650-ES	APS 710-ES	APS 790-ES	APS 820-ES
1 Cabinet & 2 APUs	APS 1180-ES	APS 1000-ES APS 1300-ES	APS 1420-ES	APS 1580-ES	APS 1640-ES
2 Cabinets & 3 APUs	APS 1770-ES	APS 1950-ES	APS 2130-ES	APS 2370-ES	APS 2460-ES
2 Cabinets & 4 APUs	APS 2360-ES	APS 2600-ES	APS 2840-ES	APS 3160-ES	APS 3280-ES

APS-ES-Series 1000 V_{DC} - 300 V_{AC}

590 ... 2360 kVA

(I) TECHNICAL DATA

	APS 590-ES	APS 1180-ES	APS 1770-ES	APS 2360-ES	COMMENTS
GRID SIDE					
Max. AC apparent power (S_{max})	590 kVA	1180 kVA	1770 kVA	2360 kVA	At nominal grid voltage
Nominal AC power ($P_{AC, nom}$)	590 kW	1180 kW	1770 kW	2360 kW	At ($\cos \phi$) = 1.0
Number of Apparent Power Units (APU)	1	2	3	4	
Number of independent grids	1		2		
Nominal grid voltage ($U_{AC, nom}$)	300 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 ($I_{AC, max (APU)}$)	1137 A	1137 A	1137 A	1137 A	
Max. AC current – APS ($I_{AC, max (APS)}$)	1137 A	2 x 1137 A	3 x 1137 A	4 x 1137 A	
Max. short circuit level ($I_{AC, SC (APS)}$)	50 kA				
Short circuit contribution (I'_{κ})	1137 A				RMS value (nominal)
Short circuit contribution (I''_{κ})	1137 A				RMS value (nominal)
Short circuit contribution (I_p)	1674 A				Peak value (nominal)
Max. load capability	100%				@ Operating mode Island grid
Time span overload	0,0 s				@ Operating mode Island grid
Power factor ($\cos \phi$)	> 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 1000 V_{DC} - 300 V_{AC}

590 ... 2360 kVA

(II) TECHNICAL DATA

	APS 590-ES	APS 1180-ES	APS 1770-ES	APS 2360-ES	COMMENTS
DC SIDE					
Independent DC sources	1		2		Depending on configuration
Nominal DC voltage ($U_{DC, nom}$)	750 V				
Max. DC voltage ($U_{DC, max}$)	900 V				Depending on application
Min. DC voltage ($U_{DC, min}$)	456 V / 502 V				At 100% / 110% nominal grid voltage
Max. DC current ($I_{DC, max}$)	1204 A	2 x 1204 A	3 x 1204 A	4 x 1204 A	
Max. short circuit level ($I_{DC, SC (APS)}$)	6.4 kA / 33 kA				Without / With DC fuses
Nominal DC power ($P_{DC, nom}$)	601 kW	1202 kW	1802 kW	2403 kW	
Max. capacity against earthing	2000 μ F				For each IT system
GENERAL					
Control strategy	CC-CV				
Feed-in starting at ($P_{DC, th}$)	400 W		800 W		
Standby losses	80 W	90 W	150 W		
Max. auxiliary power	< 2000 W		< 3500 W		Excluding optional heating

APS-ES-Series 1000 V_{DC} - 330 V_{AC}

650 ... 2600 kVA

(I) TECHNICAL DATA

	APS 650-ES	APS 1000-ES	APS 1300-ES	APS 1950-ES	APS 2600-ES	COMMENTS
GRID SIDE						
Max. AC apparent power (S_{max})	650 kVA	1000 kVA	1300 kVA	1950 kVA	2600 kVA	At nominal grid voltage
Nominal AC power ($P_{AC, nom}$)	650 kW	1000 kW	1300 kW	1950 kW	2600 kW	At ($\cos \phi$) = 1.0
Number of Apparent Power Units (APU)	1	2		3	4	
Number of independent grids	1			2		
Nominal grid voltage ($U_{AC, nom}$)	330 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 ($I_{AC, max (APU)}$)	1137 A	875 A	1137 A	1137 A	1137 A	
Max. AC current – APS ($I_{AC, max (APS)}$)	1137 A	2 x 875 A	2 x 1137 A	3 x 1137 A	4 x 1137 A	
Max. short circuit level ($I_{AC, SC (APS)}$)	50 kA					
Short circuit contribution (I'_{κ})	1137 A					RMS value (nominal)
Short circuit contribution (I''_{κ})	1137 A					RMS value (nominal)
Short circuit contribution (I_p)	1674 A					Peak value (nominal)
Max. load capability	100%					@ Operating mode Island grid
Time span overload	0,0 s					@ Operating mode Island grid
Power factor ($\cos \phi$)	> 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 1000 V_{DC} - 330 V_{AC}

650 ... 2600 kVA

(II) TECHNICAL DATA

	APS 650-ES	APS 1000-ES	APS 1300-ES	APS 1950-ES	APS 2600-ES	COMMENTS
DC SIDE						
Independent DC sources	1			2		Depending on configuration
Nominal DC voltage ($U_{DC, nom}$)	750 V					
Max. DC voltage ($U_{DC, max}$)	900 V					Depending on application
Min. DC voltage ($U_{DC, min}$)	502 V / 552 V					At 100% / 110% nominal grid voltage
Max. DC current ($I_{DC, max}$)	1204 A	2 x 1204 A		3 x 1204 A	4 x 1204 A	
Max. short circuit level ($I_{DC, SC (APS)}$)	6.4 kA / 33 kA					Without / With DC fuses
Nominal DC power ($P_{DC, nom}$)	662 kW	1018 kW	1324 kW	1986 kW	2648 kW	
Max. capacity against earthing	2000 μ F					For each IT system
GENERAL						
Control strategy	CC-CV					
Efficiency	(98.0 98.5 98.5 98.4 98.2) %	(98.0 98.5 98.5 98.4 98.2) %	(98.0 98.5 98.5 98.4 98.2) %	(98.1 98.5 98.5 98.4 98.2) %	(98.1 98.5 98.5 98.4 98.2) %	At (10 30 50 75 100) % power
EU efficiency	98.4%					Including all inverter losses
Feed-in starting at ($P_{DC, th}$)	400 W			800 W		
Standby losses	80 W	90 W		150 W		
Max. auxiliary power	< 2000 W			< 3500 W		Excluding optional heating

APS-ES-Series 1000 V_{DC} - 360 V_{AC}

710 ... 2840 kVA

(I) TECHNICAL DATA

	APS 710-ES	APS 1420-ES	APS 2130-ES	APS 2840-ES	COMMENTS
GRID SIDE					
Max. AC apparent power (S_{max})	710 kVA	1420 kVA	2130 kVA	2840 kVA	At nominal grid voltage
Nominal AC power ($P_{AC, nom}$)	710 kW	1420 kW	2130 kW	2840 kW	At ($\cos \phi$) = 1.0
Number of Apparent Power Units (APU)	1	2	3	4	
Number of independent grids	1		2		
Nominal grid voltage ($U_{AC, nom}$)	360 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 ($I_{AC, max (APU)}$)	1137 A	1137 A	1137 A	1137 A	
Max. AC current – APS ($I_{AC, max (APS)}$)	1137 A	2 x 1137 A	3 x 1137 A	4 x 1137 A	
Max. short circuit level ($I_{AC, SC (APS)}$)	50 kA				
Short circuit contribution (I'_{κ})	1137 A				RMS value (nominal)
Short circuit contribution (I''_{κ})	1137 A				RMS value (nominal)
Short circuit contribution (I_p)	1674 A				Peak value (nominal)
Max. load capability	100%				@ Operating mode Island grid
Time span overload	0,0 s				@ Operating mode Island grid
Power factor ($\cos \phi$)	> 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 1000 V_{DC} - 360 V_{AC}

710 ... 2840 kVA

(II) TECHNICAL DATA

	APS 710-ES	APS 1420-ES	APS 2130-ES	APS 2840-ES	COMMENTS
DC SIDE					
Independent DC sources	1		2		Depending on configuration
Nominal DC voltage ($U_{DC, nom}$)	750 V				
Max. DC voltage ($U_{DC, max}$)	900 V				Depending on application
Min. DC voltage ($U_{DC, min}$)	547 V / 602 V				At 100% / 110% nominal grid voltage
Max. DC current ($I_{DC, max}$)	1204 A	2 x 1204 A	3 x 1204 A	4 x 1204 A	
Max. short circuit level ($I_{DC, SC (APS)}$)	6.4 kA / 33 kA				Without / With DC fuses
Nominal DC power ($P_{DC, nom}$)	723 kW	1446 kW	2169 kW	2892 kW	
Max. capacity against earthing	2000 μ F				For each IT system
GENERAL					
Control strategy	CC-CV				
Efficiency				(98.2 98.6 98.6 98.5 98.3) %	At (10 30 50 75 100) % power
EU efficiency	98.5%				Including all inverter losses
Feed-in starting at ($P_{DC, th}$)	400 W		800 W		
Standby losses	80 W	90 W	150 W		
Max. auxiliary power	< 2000 W		< 3500 W		Excluding optional heating

APS-ES-Series 1000 V_{DC} - 400 V_{AC}

790 ... 3160 kVA

(I) TECHNICAL DATA

	APS 790-ES	APS 1580-ES	APS 2370-ES	APS 3160-ES	COMMENTS
GRID SIDE					
Max. AC apparent power (S_{max})	790 kVA	1580 kVA	2370 kVA	3160 kVA	At nominal grid voltage
Nominal AC power ($P_{AC, nom}$)	790 kW	1580 kW	2370 kW	3160 kW	At ($\cos \phi$) = 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 ($I_{AC, max (APU)}$)	1137 A	1137 A	1137 A	1137 A	
Max. AC current – APS ($I_{AC, max (APS)}$)	1137 A	2 x 1137 A	3 x 1137 A	4 x 1137 A	
Max. short circuit level ($I_{AC, SC (APS)}$)	50 kA				
Short circuit contribution (I'_{κ})	1137 A				RMS value (nominal)
Short circuit contribution (I''_{κ})	1137 A				RMS value (nominal)
Short circuit contribution (I_p)	1674 A				Peak value (nominal)
Max. load capability	100%				@ Operating mode Island grid
Time span overload	0,0 s				@ Operating mode Island grid
Power factor ($\cos \phi$)	> 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 1000 V_{DC} - 400 V_{AC}

790 ... 3160 kVA

(II) TECHNICAL DATA

	APS 790-ES	APS 1580-ES	APS 2370-ES	APS 3160-ES	COMMENTS
DC SIDE					
Independent DC sources	1		2		Depending on configuration
Nominal DC voltage ($U_{DC, nom}$)	750 V				
Max. DC voltage ($U_{DC, max}$)	900 V				Depending on application
Min. DC voltage ($U_{DC, min}$)	608 V / 669 V				At 100% / 110% nominal grid voltage
Max. DC current ($I_{DC, max}$)	1204 A	2 x 1204 A	3 x 1204 A	4 x 1204 A	
Max. short circuit level ($I_{DC, SC (APS)}$)	6.4 kA / 33 kA				Without / With DC fuses
Nominal DC power ($P_{DC, nom}$)	804 kW	1609 kW	2413 kW	3218 kW	
Max. capacity against earthing	2000 μ F				For each IT system
GENERAL					
Control strategy	CC-CV				
Feed-in starting at ($P_{DC, th}$)	400 W		800 W		
Standby losses	80 W	90 W	150 W		
Max. auxiliary power	< 2000 W		< 3500 W		Excluding optional heating

APS-ES-Series 1000 V_{DC} - 415 V_{AC}

820 ... 3280 kVA

(I) TECHNICAL DATA

	APS 820-ES	APS 1640-ES	APS 2460-ES	APS 3280-ES	COMMENTS
GRID SIDE					
Max. AC apparent power (S_{max})	820 kVA	1640 kVA	2460 kVA	3280 kVA	At nominal grid voltage
Nominal AC power ($P_{AC, nom}$)	820 kW	1640 kW	2460 kW	3280 kW	At ($\cos \phi$) = 1.0
Number of Apparent Power Units (APU)	1	2	3	4	
Number of independent grids	1		2		
Nominal grid voltage ($U_{AC, nom}$)	415 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 ($I_{AC, max (APU)}$)	1137 A	1137 A	1137 A	1137 A	
Max. AC current – APS ($I_{AC, max (APS)}$)	1137 A	2 x 1137 A	3 x 1137 A	4 x 1137 A	
Max. short circuit level ($I_{AC, SC (APS)}$)	50 kA				
Short circuit contribution (I'_{κ})	1137 A				RMS value (nominal)
Short circuit contribution (I''_{κ})	1137 A				RMS value (nominal)
Short circuit contribution (I_p)	1674 A				Peak value (nominal)
Max. load capability	100%				@ Operating mode Island grid
Time span overload	0,0 s				@ Operating mode Island grid
Power factor ($\cos \phi$)	> 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 1000 V_{DC} - 415 V_{AC}

820 ... 3280 kVA

(II) TECHNICAL DATA

	APS 820-ES	APS 1640-ES	APS 2460-ES	APS 3280-ES	COMMENTS
DC SIDE					
Independent DC sources	1		2		Depending on configuration
Nominal DC voltage ($U_{DC, nom}$)	750 V				
Max. DC voltage ($U_{DC, max}$)	900 V				Depending on application
Min. DC voltage ($U_{DC, min}$)	631 V / 694 V				At 100% / 110% nominal grid voltage
Max. DC current ($I_{DC, max}$)	1204 A	2 x 1204 A	3 x 1204 A	4 x 1204 A	
Max. short circuit level ($I_{DC, SC (APS)}$)	6.4 kA / 33 kA				Without / With DC fuses
Nominal DC power ($P_{DC, nom}$)	835 kW	1670 kW	2505 kW	3340 kW	
Max. capacity against earthing	2000 μ F				For each IT system
GENERAL					
Control strategy	CC-CV				
Feed-in starting at ($P_{DC, th}$)	400 W		800 W		
Standby losses	80 W	90 W	150 W		
Max. auxiliary power	< 2000 W		< 3500 W		Excluding optional heating

APS-ES-Series 1000 V_{DC} – 300, 330, 360, 400, 415 V_{AC}

590 ... 3280 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	< 1600 kg	< 2000 kg	< 3000 kg	< 3400 kg	
Shelter surface	Painted				
Corrosivity category	C4-high				Others on request
Colour	RAL7035				Others on request

APS-ES-Series models (1000 V_{DC})

	300 V _{AC}	330 V _{AC}	360 V _{AC}	400 V _{AC}	415 V _{AC}
1 Cabinet & 1 APU	APS 590-ES	APS 650-ES	APS 710-ES	APS 790-ES	APS 820-ES
1 Cabinet & 2 APUs	APS 1180-ES	APS 1000-ES APS 1300-ES	APS 1420-ES	APS 1580-ES	APS 1640-ES
2 Cabinets & 3 APUs	APS 1770-ES	APS 1950-ES	APS 2130-ES	APS 2370-ES	APS 2460-ES
2 Cabinets & 4 APUs	APS 2360-ES	APS 2600-ES	APS 2840-ES	APS 3160-ES	APS 3280-ES

APS-ES-Series 1000 V_{DC} – 300, 330, 360, 400, 415 V_{AC}

590 ... 3280 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 (1000 V_{DC})

	300 V _{AC}	330 V _{AC}	360 V _{AC}	400 V _{AC}	415 V _{AC}
1 Cabinet & 1 APU	APS 590-ES	APS 650-ES	APS 710-ES	APS 790-ES	APS 820-ES
1 Cabinet & 2 APUs	APS 1180-ES	APS 1000-ES APS 1300-ES	APS 1420-ES	APS 1580-ES	APS 1640-ES
2 Cabinets & 3 APUs	APS 1770-ES	APS 1950-ES	APS 2130-ES	APS 2370-ES	APS 2460-ES
2 Cabinets & 4 APUs	APS 2360-ES	APS 2600-ES	APS 2840-ES	APS 3160-ES	APS 3280-ES

APS-ES-Series 1000 V_{DC} – 300, 330, 360, 400, 415 V_{AC}

590 ... 3280 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 (1000 V_{DC})

	300 V _{AC}	330 V _{AC}	360 V _{AC}	400 V _{AC}	415 V _{AC}
1 Cabinet & 1 APU	APS 590-ES	APS 650-ES	APS 710-ES	APS 790-ES	APS 820-ES
1 Cabinet & 2 APUs	APS 1180-ES	APS 1000-ES APS 1300-ES	APS 1420-ES	APS 1580-ES	APS 1640-ES
2 Cabinets & 3 APUs	APS 1770-ES	APS 1950-ES	APS 2130-ES	APS 2370-ES	APS 2460-ES
2 Cabinets & 4 APUs	APS 2360-ES	APS 2600-ES	APS 2840-ES	APS 3160-ES	APS 3280-ES

APS-ES-Series 1000 V_{DC} – 300, 330, 360, 400, 415 V_{AC}

590 ... 3280 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 *)	<u>No transformer</u> : fuse-protected output at APU 3/4 with 25 A (3~, PE)
	O *)	<u>With transformer</u> : with internal 8 kVA transformer (3~, N, PE)

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

APS-ES-Series models (1000 V_{DC})

	300 V _{AC}	330 V _{AC}	360 V _{AC}	400 V _{AC}	415 V _{AC}
1 Cabinet & 1 APU	APS 590-ES	APS 650-ES	APS 710-ES	APS 790-ES	APS 820-ES
1 Cabinet & 2 APUs	APS 1180-ES	APS 1000-ES APS 1300-ES	APS 1420-ES	APS 1580-ES	APS 1640-ES
2 Cabinets & 3 APUs	APS 1770-ES	APS 1950-ES	APS 2130-ES	APS 2370-ES	APS 2460-ES
2 Cabinets & 4 APUs	APS 2360-ES	APS 2600-ES	APS 2840-ES	APS 3160-ES	APS 3280-ES

APS-ES-Series 1000 V_{DC} – 300, 330, 360, 400, 415 V_{AC}

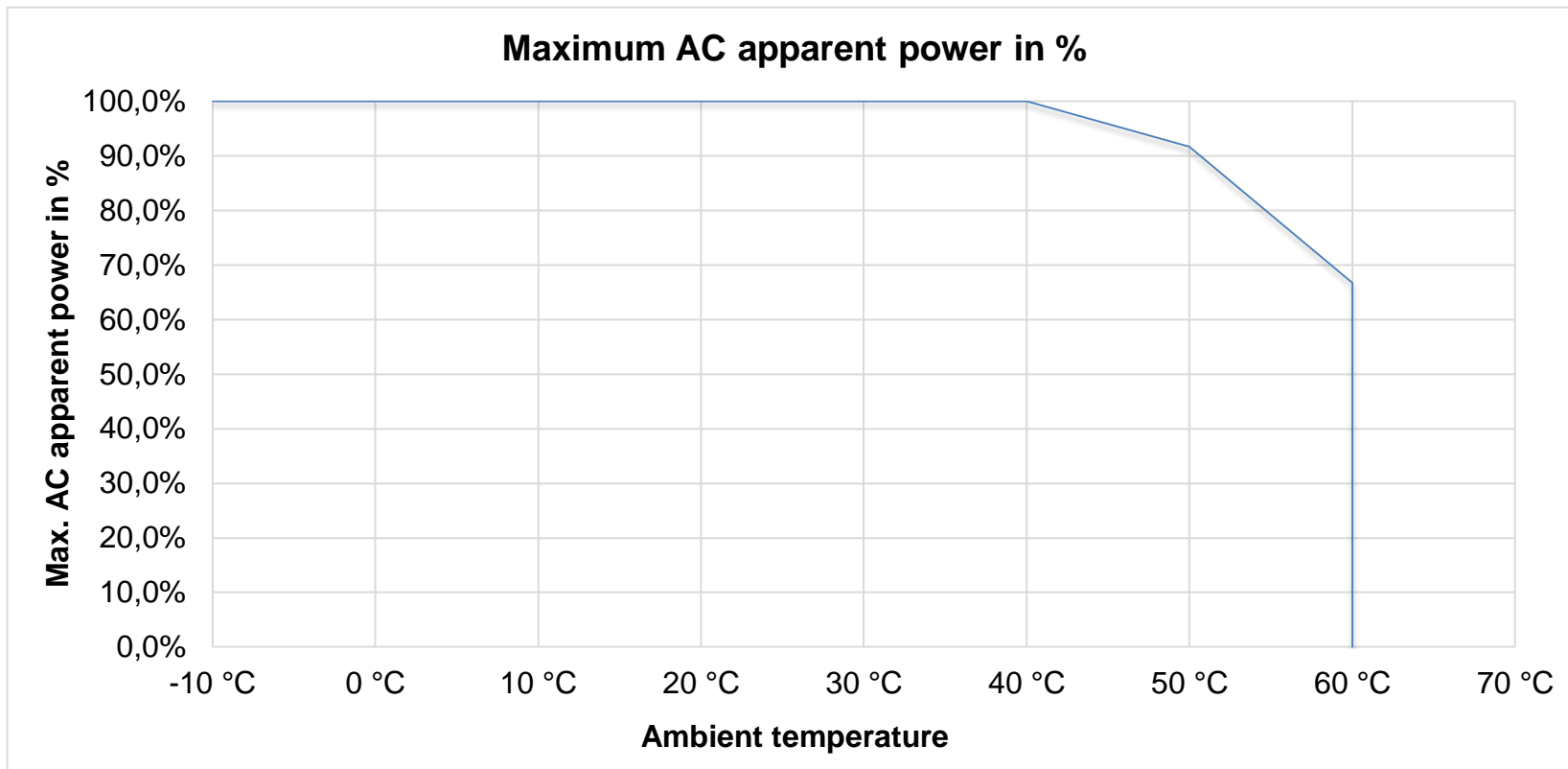
590, 650, 710, 790 & 820 kVA

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 NH02 250A	O (1 up to 8)	
Fuse protected DC Inputs NH03 400A	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 Included

POWER DERATING



APS-ES-Series 1000 V_{DC} – 300, 330, 360, 400, 415 V_{AC}

590 ... 3280 kVA

MECHANICAL DRAWINGS

APS-ES-Series 1000 V_{DC}

One-cabinet version with 1-2 APUs

Two-cabinet version with 3-4 APUs



APS-ES-Series models (1000 V_{DC})

	300 V _{AC}	330 V _{AC}	360 V _{AC}	400 V _{AC}	415 V _{AC}
1 Cabinet & 1 APU	APS 590-ES	APS 650-ES	APS 710-ES	APS 790-ES	APS 820-ES
1 Cabinet & 2 APUs	APS 1180-ES	APS 1000-ES APS 1300-ES	APS 1420-ES	APS 1580-ES	APS 1640-ES
2 Cabinets & 3 APUs	APS 1770-ES	APS 1950-ES	APS 2130-ES	APS 2370-ES	APS 2460-ES
2 Cabinets & 4 APUs	APS 2360-ES	APS 2600-ES	APS 2840-ES	APS 3160-ES	APS 3280-ES

APS-ES-Series 1000 V_{DC}

590 ... 3280 kVA

EQUIVALENT MODEL NAME

300 V_{AC}

APS 590-ES	APS590-ES-1-300-1
APS 1180-ES	APS1180-ES-2-300-1
APS 1770-ES	APS1770-ES-3-300-1
APS 2360-ES	APS2360-ES-4-300-1

330 V_{AC}

APS 650-ES	APS650-ES-1-330-1
APS 1000-ES	APS1000-ES-2-330-1
APS 1300-ES	APS1300-ES-2-330-1
APS 1950-ES	APS1950-ES-3-330-1
APS 2600-ES	APS2600-ES-4-330-1

360 V_{AC}

APS 710-ES	APS710-ES-1-360-1
APS 1420-ES	APS1420-ES-2-360-1
APS 2130-ES	APS2130-ES-3-360-1
APS 2840-ES	APS2840-ES-4-360-1

400 V_{AC}

APS 790-ES	APS790-ES-1-400-1
APS 1580-ES	APS1580-ES-2-400-1
APS 2370-ES	APS2370-ES-3-400-1
APS 3160-ES	APS3160-ES-4-400-1

415 V_{AC}

APS 820-ES	APS820-ES-1-415-1
APS 1640-ES	APS1640-ES-2-415-1
APS 2460-ES	APS2460-ES-3-415-1
APS 3280-ES	APS3280-ES-4-415-1

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