

# GrapheneUPS

## for AI Data Centers



Figure. GrapheneUPS-500-A1000-E2-CBU/800, Skeleton Technologies' UPS system based on in-house CBU800 supercapacitor modules (right-hand side cabinets).

### Technical data – key specifications

<b>AC nominal voltage range, grid and load side</b>	380-480 V, 50/60 Hz <sup>(1)</sup>	±10%, continuous		AC Voltage Ride Through at nominal input voltage of		415 V: +30% / -100%		480 V: +20% / -100%	
<b>DC nominal voltage</b>	800 V or 1500 V, see ES options for more information								
<b>Type</b>	<i>GrapheneUPS-500-</i>	<i>-A775-E_</i>	<i>-A1000-E_</i>	<i>-A1550-E_</i>	<i>-A1950-E_</i>	<i>-A2900-E_</i>	<i>-A3850-E_</i>	<i>-A4800-E_</i>	<i>-A6650-E_</i>
<b>AC nominal current, grid and load side <sup>(2)</sup></b>		750 A	950 A	1500 A	1900 A	2800 A	3700 A	4650 A	6450 A
<b>AC short-circuit current output, grid and load side <sup>(3)</sup></b>		1064 A	1358 A	2100 A	2660 A	3920 A	5208 A	6510 A	9030 A
<b>AC rated power at cos φ = 0.95</b>	with 415 V	510 kW 540 kVA	650 kW 685 kVA	1025 kW 1080 kVA	1295 kW 1365 kVA	1915 kW 2015 kVA	2525 kW 2660 kVA	3175 kW 3340 kVA	4405 kW 4635 kVA
	with 480 V	590 kW 625 kVA	750 kW 790 kVA	1185 kW 1250 kVA	1500 kW 1580 kVA	2210 kW 2330 kVA	2920 kW 3075 kVA	3670 kW 3865 kVA	5090 kW 5360 kVA
<b>UPS topology</b>	Double-conversion online UPS <sup>(4)</sup>								
<b>AC inverter technology</b>	Three-phase full-4Q SiC-based inverter with grid-forming control, LCL AC filter, and AC/DC common-mode filter								
<b>Energy storage (ES) options</b>	<p>Fully scalable rack cabinet-built Skeleton energy storage system. Following options are available to be selected based on the application requirements:</p> <ol style="list-style-type: none"> <li>Graphene CBU800 or BBU800 cabinet <i>Skeleton Technologies' liquid-cooled supercapacitor or SuperBattery energy storage with gallium-nitride (GaN)-based DC/DC converter integrated into each CBU800 and BBU800 module for nominal DC bus voltage of 800V.</i></li> <li>SkelGrid Industrial Standard Energy Storage Cabinet <i>Skeleton Technologies air-cooled supercapacitor or SuperBattery energy storage with SkelMod-series modules without internal power electronics for nominal DC bus voltages up to 1500V and rack configurations up to 15 modules in series <sup>(5)</sup></i></li> </ol> <p>The number of ES cabinets is scaled based on the application specific energy and power capacity need. Please contact Skeleton Technologies sales for further information on the and the application-specific recommendations on the ES topology.</p>								
<b>Backup time</b>	Configurable from seconds to minutes								
<b>System efficiency</b>	98% at full load <sup>(6)</sup>								
<b>Communications</b>	Modbus TCP <i>Communications interface implemented by the system controller module. Supports concurrent connections.</i>								
<b>HMI</b>	Graphical human-machine interface								
<b>Cooling</b>	Converters: Liquid cooling <sup>(7)</sup> Energy storage: See energy storage options								
<b>Maintenance support</b>	Manual system bypass switch for maintenance. Graphene CBU800 and BBU800 ES modules are hot-pluggable. SkelGrid cabinets are equipped with switchgear modules for protection and disconnection of individual cabinets for maintenance purposes without stopping the entire UPS system. <sup>(8)</sup>								
<b>Features</b>	Grid support according to the applicable grid code requirements Uninterrupted power to IT loads.								
<b>Product compliance standards <sup>(9)</sup></b>	EN IEC 62040-1 / -2 / -3, UL 1741, UL 1778, UL 508, UL 9540, UL 1973								
<b>Quality certificates</b>	ISO QS9000, ISO 14000								

# Block diagram

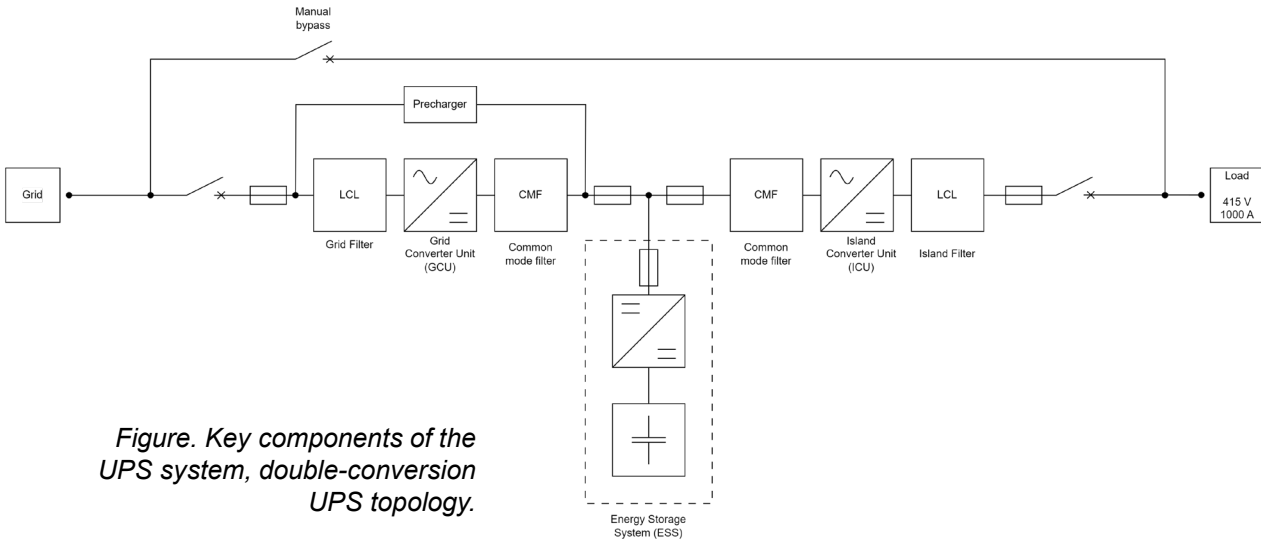
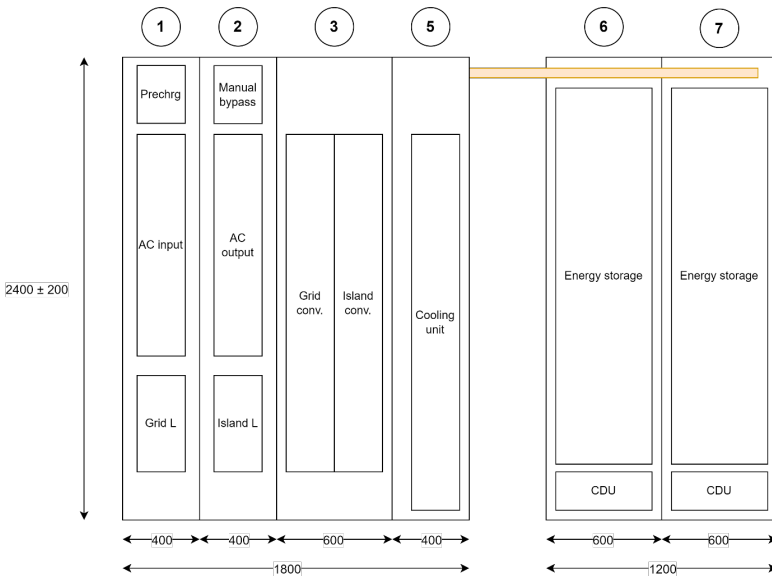


Figure. Key components of the UPS system, double-conversion UPS topology.

## GrapheneUPS-500-A1000-E2-CBU/800 – Layout and Dimensions Example



## Product Type Code Structure

GrapheneUPS - 500 - A1000 - E2 - CBU / 800

Product family	AC voltage class	AC current class*	ES size in cabinets E+no. cab.	ES module type	DC voltage class
AC voltage class	500 : 380–500V 700 : 520–690V	ES module type	CBU : CBU800 BBU : BBU800		
DC voltage class	800 : 750/800V 1500 : 1500V	ES module type	SMA : SkelMod 102V94F SMB : SkelModSB 96V30Ah		

\*See the table on page 1

## CBU800 Module

Figure. Graphene CBU800, Skeleton Technologies' supercapacitor energy storage module.



<sup>1</sup> Low voltage system voltages supported up to 690V (1500V DC bus voltage only). Medium-voltage grid connection with an integrated transformer available

<sup>2</sup> 10% overload for maximum 1 minute at a time allowed between every 5 minutes.

<sup>3</sup> Short-term controlled current injection available for maximum 3 seconds.

<sup>4</sup> Manual bypass for maintenance always included. Other bypass options available on request. Contact Skeleton Technologies sales for further information.

<sup>5</sup> The module type, and the number of modules in series per cabinet and the number of cabinets depend on the application-specific energy and power need and are fully scalable. Example for high-power continuous cycling: SkelMod 102V94F-F+AF in 15s1p cabinet configuration. Example for backup power: SkelModSB 96V30Ah-B in 10s1p cabinet configuration.

<sup>6</sup> Estimate, depends on the ES configuration. The inverter efficiency at full load is 99.1%.

<sup>7</sup> Connection configurable: One connection via system cooling or separate cooling connections for the drive section and the energy storage cabinets.

<sup>8</sup> Contact Skeleton Technologies sales for further information on SkelGrid cabinet and switchgear module options.

<sup>9</sup> Details depend on the selected ES technology and selected ES product options.