



Battery Energy Storage Systems for C&I Applications

Energy Control, Management and Storage
Systems, for large-scale storage



Energy was founded in **2013** with a dream: make clean energy accessible to everyone, and at any time of day. We develop systems that store energy from renewable sources, and together with our advanced software, we empower everyone to store, monitor, and manage energy like never before.

The **zeroCO₂**® product range: small, large, and XL, encapsulates customized energy solutions for every need, **from residential to industrial, to agrisolar and grid scale**. Different sizes for every need, to take a step towards a world where renewable energy is not just a choice, but a way of life.

We design and manage in Italy production, research and development, all the way to after-sales service, stamping a mark of excellence and reliability on every product that leaves our warehouse

More than **60,000 installations** in Italy and Europe mount zeroCO₂ systems from Energy S.p.A.: from homes to large buildings, from companies to electric vehicles: we are radically changing the way we experience electricity.

We power the energy of the future.

Since over 10 years, we have been creating storage systems for renewable energy of all sizes, from home to industry, up to grid scale.



Industry leader

With more than 10 years of experience, Energy has shaped the energy storage industry in Italy, establishing itself as a leader and innovator.



Italian excellence

From battery production to the cloud software, every element is designed and assembled in Italy.



Support from A to Z

Our technical support service is always by your side, from design to start-up to upgrade.

zeroCO₂ XL SOLUTIONS



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zeroCO₂ extra large range



The **zeroCO₂ XL range** is designed to offer a cutting-edge solution in the field of large-scale energy storage, perfectly adaptable to the needs of **commercial, industrial, and large PV installations up to grid scale.**

These storage solutions operate at 400V AC (3Ph+N+PE), and are flexibly adaptable to both new and retrofit installations.

With both **indoor** and **outdoor** configurations, zeroCO₂ XL offers a range of storage capacities from **100 kWh** to over **2.4 MWh**.

An XL system combined with a large-scale PV system allows for increased self-consumption, optimized peak shaving, and management of energy input to the grid at the most advantageous times. In addition, in its off-grid variants, zeroCO₂ XL ensures grid-independent operation.



Pylontech batteries, that we install in our storage systems, are guaranteed 10 years and have been proven in the report of the independent Australian ITP body as the most reliable in durability and capacity maintenance, reporting no outages in ongoing testing since 2017.

Source: Lithium Ion Battery Testing Report - ITP Renewables

zeroCO₂ Cloud

zeroCO₂ Cloud is our platform for remote **control and management** of energy systems: energy **production, storage and consumption** in a **unified platform**.

It uses the latest industry technologies, is entirely cloud-based, and is constantly updated to optimally integrate the Internet of Things (IoT) and artificial intelligence (AI). We are constantly working to optimize software management efficiency to ensure integrated control throughout the system lifecycle.

The integration between hardware and software allows us to offer control services to **energy communities**, and for **supporting grid services**, such as **balancing and managing energy distribution**.

zeroCO₂ Cloud is developed in Italy and keeps data secure on European servers. It is ready for immediate use with all our XL systems, but can be customized to meet the specific needs of each installation.

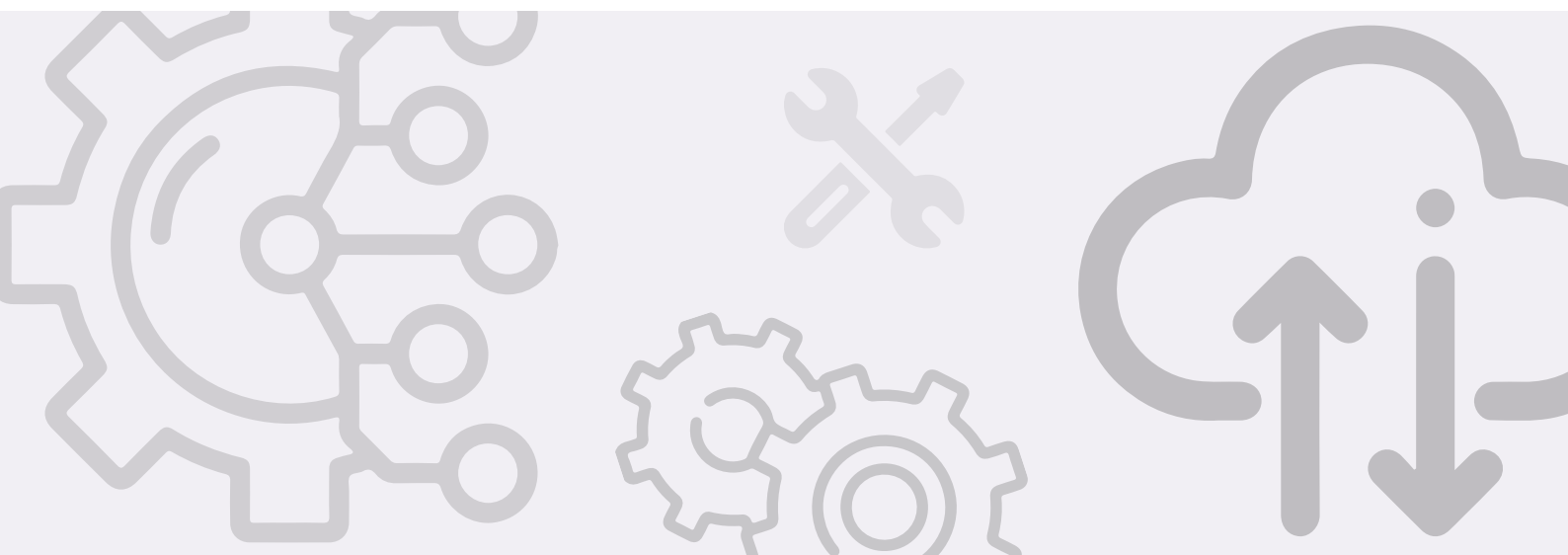
With centralized management, which gathers all data into a single monitoring and analysis platform, allows to create tailored energy consumption models, increasing the efficiency and effectiveness of our storage systems.



Real time monitoring screen



Details with battery cell monitoring



Indoor Solutions

zeroCO₂ XL System

Power in multiples of
60 kW

Capacity at multiples of
125 kWh



High-voltage Li-ion (LFP) battery technology

DC

Built-in DC protection

IP20

System for Indoor Applications

Designed with modular logic, the **zeroCO₂ XL System** is a power **management** and **conversion** system and the zeroCO₂ XL BESS is an energy storage system, which are combined together to achieve systems of **60 kW or more** and storage **from 125 kWh to MWh**.

The **EMS (Energy Management System)** is the product that allows real-time scheduling and monitoring of battery charging and discharging according to the needs of the utility, setting various scenarios: from maximum self-consumption to peak shaving to scheduling on time slots to maximize the return on investment.

The **zeroCO₂ XL BESS** cabinet holds 23 to 26 Pylontech H32148-C batteries connected in series and managed by the BMS that monitors their state of charge and safety.

Conversion cabinet



Composed of one to four PCS modules for active power management



Modular power from 60 kW to 240 kW for each rack



EMS, Energy Management System for intelligent energy management



Possibility of retrofit installation for large systems



Input of 400V three-phase AC type compatible with any type of renewable or non-renewable source system




Self-use working modes, peak-shaving and energy trading



AC and DC side disconnect switches included

MODEL	60K	120K	180K	240K
Item code	90110005	90110010	90110015	90110020
Dimensions [WxHxD, mm]	700 x 1683 x 776			
Weight [kg]	181	214	252	285
Sound power [dB]	<70	<71	<73	<74
PCS technology	Transformerless			
zeroCO ₂ - BESS 125K minimum number	1	2	3	4
ENERGY MANAGEMENT SYSTEM PARAMETERS				
Power supply [V - Hz]	230 - 50			
Self-consumption power [W]	150			
Standby power [W]	<5			
AC PARAMETERS				
Maximum power [kW]	60	120	180	240
Maximum apparent power [kVA]	60	120	180	240
AC input type	5 Wire (3Ph + N + PE)			
N° and max. connection cable section per phase [mmq]	1 x 120		2 x 120	
Voltage range [V]	400 (±10%)			
Rated electric current [A]	±89	±178	±267	±356
Maximum electric current [A]	±100	±200	±300	±400
Rated voltage and frequency [V-Hz]	400 - 50/60			
Power factor	0,8 ~ 1 (leading / lagging)			
Current DC component [%]	≤ 0,5			
Harmonic content THDi [%]	≤ 3			
AC and DC start function	Yes			
Current switching time [ms]	≤ 10			
Conversion efficiency [%]	≥ 97			
Standby power consumption [W]	<25	<50	<75	<100
Permissible short-circuit current of short duration (I _{cw}) [kA]	6 (1")			
DC PARAMETERS				
Maximum power [kW]	60	120	180	240
Voltage range [V]	680 - 1000			
Rated electric current [A]	±72	±144	±216	±288
Maximum electric current [A]	±88	±176	±264	±352
COMMUNICATION				
Communication interfaces	RS485, LAN, WAN			
SAFETY				
IP protection rating	IP20			
Voltage resistance: input and output - PE [V DC]	3535			
Voltage resistance: input and output - CAN [V DC]	2828			
Surge: Input & Output - PE [kV]	6			
EMC Features	Low Voltage Directive 2014/35/EC - Electromagnetic compatibility 2014/30/EC			
MTBF (Average Time Expected Between Failures) [h]	100000			
Compliance with connection standards	CEI 0-21, CEI 0-16, VDE ARN 4105			
Warranty [years]	2			

CEI 0-21 CEI 0-16 

zeroCO₂ XL BESS

Storage battery cabinet

Single rack capacity
125 kWh



Integrated BMS controller for battery pack management



Built-in DC protection



DC disconnector included



UN 38.3 certification for the transport of lithium batteries



Ability to parallel multiple racks to increase storage capacity

Configurations

	kWh											
kW	125	250	375	500	625	1125	1750	2125	2500	3125	4125	5125
60	+	+	+	+	+							
120	+	+	+	+	+	+						
180		+	+	+	+	+	+	+				
240		+	+	+	+	+	+	+	+	+		
300				+	+	+	+	+	+	+		
360				+	+	+	+	+	+	+	+	
420				+	+	+	+	+	+	+	+	
480				+	+	+	+	+	+	+	+	
540					+	+	+	+	+	+	+	+
600					+	+	+	+	+	+	+	+
1200						+	+	+	+	+	+	+
1800								+	+	+	+	+
2400									+	+	+	+
3000										+	+	+

The above are some typical examples of combinations of charge and discharge power and storage capacity, however intermediate sizes are also possible thanks to the modularity of the system.

MODEL	zeroCO ₂ - BESS 125K
Item code	90110030
Dimensions [WxHxD, mm]	1200 x 1683 x 776
Weight [kg]	1500
Cell technology	Li-ion (LFP)
Battery module model	H32148-C
BMS Controller Name	SC1000-200J-C
Charge / discharge test current [A] (4)	29,6
Rated charge/discharge current [A]	74
Max charge/discharge current [A]	148
Rated module voltage [V]	32
Nominal module capacity [kWh/Ah]	4.74 / 148
Efficiency [%]	95
DC PARAMETERS	
System rated voltage [V]	832
System charge/discharge voltage range [V]	754 ~ 936
Nominal capacity [kWh/Ah]	123 / 148
DOD discharge depth [%]	90% (8 - 98% SOC)
Usable capacity [kWh/Ah]	111 / 133
Battery modules quantity [n]	24 ~ 26
COMMUNICATION	
Communication interfaces	CAN, LAN, Modbus RTU, TCP/IP
AMBIENT CONDITIONS	
Working temperature range [°C]	0 ~ 50
Working humidity range [RH%]	0 ~ 95 (without condensation)
Storage temperature range [°C]	-20 ~ 60
Storage humidity range [RH%]	0 ~ 95 (without condensation)
Cooling	Natural cooling
Altitude [m]	<3000
SAFETY	
IP protection rating	IP20
Operational life [years]	15+
Dangerous goods transport certificate	UN38.3
Warranty [years]	10

(*) Current value used to determine the capacity of the battery during test.



Configuration zeroCO₂ XL System and zeroCO₂ XL BESS



All-In-One Solutions

zeroCO₂ XL 100



Power from
60 kW

Capacity of
100 kWh

Indoor Solution

zeroCO₂ XL 100 is our **All-In-One** solution composed of Pylontech **H32148-C** LFP batteries and a proprietary **EMS** for **peak shaving** and **maximizing self-consumption**.

For **Indoor** applications, it is a **60 kW** of power and **100 kWh** of storage capacity, **plug & play** system for managing, converting and utilizing energy in systems with high power demand and storage sizes that result in deferred multi-hour usage of all stored energy.

Designed and assembled in Italy

Like the whole XL range, we assemble XL 100 at our production site in the province of Padua, Italy.

All-In-One Size

Designed to manage, monitor and store energy in a single cabinet



Triple section rack, galvanized sheet metal supporting structure painted with polyester powder

IP20 Protection class



Factory prewired electrical panel up to user-side interfaces



Management of diversified sources, renewable or nonrenewable



AC disconnect switch, DC disconnect switch and circuit breaker included



Suitable for New Construction or Retrofit Installations



AC 400V 3Ph +N + PE type power supply for On-Grid systems



CEI-021 and CEI-016 Certificates of Conformity

MODEL	zeroCO ₂ - XL 100
Item code	90110750
Dimensions [WxHxD, mm]	1200x1758x800
Weight [kg]	1400
Sound power [dB]	<70
Sound pressure [dB(A)]	56 (*)
PCS technology	Trasformerless
AC PARAMETERS	
Rated / apparent power [kW/kVA]	60 / 66
AC input type	5 wire (3Ph + N + PE)
Number and maximum connection cable section per phase [mm ²]	1 x 10/35 (L1, L2, L3, N, PE) screw connection
Voltage range [V]	400 (±10%)
Rated / max electric current [A]	±89 / 100
Frequency [Hz]	50/60
Power factor	0,8 ~ 1 (Leading / Lagging)
Current DC component [%]	≤ 0,5
Harmonic content THDi [%]	≤ 3
AC and DC start function	Yes
Current switching time [ms]	≤ 10
Conversion efficiency [%]	≥ 97
Standby power consumption [W]	<300
Permissible short-circuit current of short duration [kA]	6
DC PARAMETERS	
Rated power [kW]	60
Voltage range [V]	680 - 1000
Rated/Max electric current [A]	±72 / ±88
Voltage and current measurement accuracy [%]	±1
Current / Voltage limiting characteristic	Yes
ENERGY STORAGE	
Efficiency [%]	95
System rated voltage [V]	736
Charge/discharge system voltage range [V]	680 ~ 828
Rated/usable capacity [kWh]	109 / 98
Depth of discharge DOD [%]	90% (8 - 98% SOC)
AMBIENT CONDITIONS	
Working temperature range [°C]	0 ~ 50 (Derating above 45°C)
Working humidity range [RH%]	<95 (without condensation)
Storage temperature range [°C]	-20 ~ +60
Storage humidity range [RH%]	0 ~ 95 (without condensation)
PCS cooling	Forced convection (fan with smart regulation to reduce consumption and noise)
Altitude	<3000
COMMUNICATION	
Communication interfaces	RS485, LAN, WAN, CAN, ModBus RTU, TCP/IP
SAFETY	
Degree protection	IP20
EMC features	2014/35/CE Low Voltage Directive - 2014/30/CE Electromagnetic compatibility
MTBF [h]	100000
Compliance with connection standards	CEI 0-21, CEI 0-16
LFP Batteries transport certificate	UN38.3 / ADR
Design Life [years]	15+
Warranty [years]	2 (electrical/electronic parts) 10 or 6000 cycles (batteries)

(*) Sound pressure level referred to a 2m distance from the device.

CEI 0-21 CEI 0-16

zeroCO₂ XL Shell 100

Power from
60 kW

Capacity of
100 kWh



Outdoor Solutions

The outdoor version of our XL 100 is **zeroCO₂ XL Shell 100**: a system that, like the Indoor version, has **60 kW** of power and **100 kWh** of storage capacity.

With a climate control system to maintain temperatures, XL Shell 100 is our most versatile outdoor system. All the power and functionality of XL 100, but on an all-weather structure.

Designed and assembled in Italy

Like the whole XL range, we assemble XL 100 at our production site in the province of Padua, Italy.

All-In-One Size

Designed to manage, monitor and store energy in a single cabinet



Triple-section bearing structure made of galvanized sheet metal with polyester powder coating

IP54 Suitable for outdoor installation



Installed batteries and factory prewired switchboard up to user-side interfaces



Management of diversified sources, renewable or nonrenewable



AC disconnect switch, DC disconnect switch and circuit breaker included



Suitable for New Construction or Retrofit Installations



AC 400V 3Ph +N + PE type power supply for On-Grid systems



Fire detection as an optional accessory

MODEL	zeroCO ₂ - XL Shell 100
Item code	90110760
Dimensions [WxHxD, mm]	1300x1683x876
Weight [kg]	3700
Sound power [dB]	<73
Sound pressure [dB(A)]	59 (*)
PCS technology	Trasformerless
AC PARAMETERS	
Rated / apparent power [kW/kVA]	60 / 66
AC input type	5 Fili (3Ph + N + PE)
Number and maximum connection cable section per phase [mmq]	2 x 120 (L1, L2, L3, N) Tip - 1 x 10 Eyelet M6 (PE)
Voltage range [V]	400 (±10%)
Rated / max electric current [A]	±89 / 100
Frequency [Hz]	50/60
Power factor	0,8 ~ 1 (Leading / Lagging)
Current DC component [%]	≤ 0,5
Harmonic content THDi [%]	≤ 3
AC and DC start function	Yes
Current switching time [ms]	≤ 10
Conversion efficiency [%]	≥ 97
Standby power consumption [W]	<1000
Permissible short-circuit current of short duration [kA]	6
DC PARAMETERS	
Rated power [kW]	60
Voltage range [V]	680 - 1000
Rated/Max electric current [A]	±72 / ±88
Voltage and current measurement accuracy [%]	±1
Current / Voltage limiting characteristic	Yes
ENERGY STORAGE	
Efficiency [%]	95
System rated voltage [V]	736
Charge/discharge system voltage range [V]	680 ~ 828
Rated/usable capacity [kWh]	109 / 98
Depth of discharge DOD [%]	90% (8 - 98% SOC)
AMBIENT CONDITIONS	
Working temperature range [°C]	0 ~ 50 (Derating above 45°C)
Working humidity range [RH%]	<95 (without condensation)
Storage temperature range [°C]	-20 ~ +60
Storage humidity range [RH%]	0 ~ 95 (without condensation)
PCS cooling	Forced convection (fan with smart regulation to reduce consumption and noise)
System cooling	Air cooled monoblock unit
Altitude	<3000
COMMUNICATION	
Communication interfaces	RS485, LAN, WAN,CAN, ModBus RTU, TCP/IP
SAFETY	
Degree protection	IP54
EMC features	2014/35/CE Low Voltage Directive - 2014/30/CE Electromagnetic compatibility
MTBF [h]	100000
Compliance with connection standards	CEI 0-21, CEI 0-16
LFP Batteries transport certificate	UN38.3 / ADR
Design Life [years]	15+
Warranty [years]	2 (electrical/electronic parts) 10 or 6000 cycles (batteries)

(*) Sound pressure level referred to a 2m distance from the device and air conditioning unit running at full speed.

CEI 0-21 CEI 0-16

Outdoor Solutions

zeroCO₂ XL Shell

XL Shell is our high-capacity solution for outdoor applications.

Made from a painted galvanized sheet metal supporting structure, with insulated and sealed double-paneled infills, it includes **air conditioning** and **fire protection** systems.

Inside are Pylontech's LFP batteries (**H32148-C for 0.5C systems or HM3A180 for 1C systems**), and our proprietary **EMS** for system **control** and **management**.

It is a **plug & play** system and has the same functionality as the entire zeroCO₂ XL range. Multiple XL Shells can be connected in parallel to expand power, and, the ability to customize each individual design allows us to respond optimally to all kinds of demands.

Power from
120 to 300 kW

Capacity of
545 kWh
up to 1 MWh



Designed and assembled in Italy

Like the entire XL range, we assemble XL Shell at our production site in the province of Padua, Italy

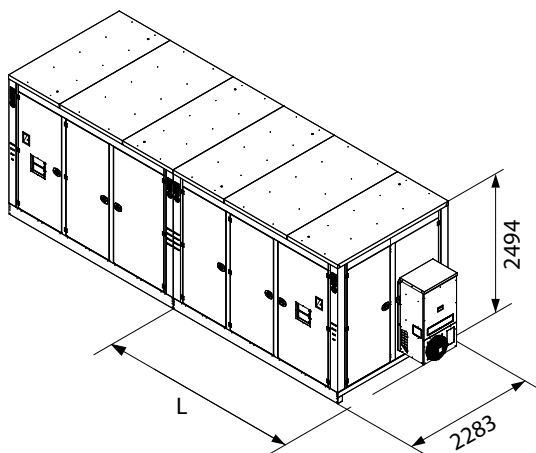
Expandable sizes

Several sizes available and possibility of installing more in parallel

Integrated Security

Integrated fire protection and air conditioning system. IP54 protection so suitable for outdoor installation

Coupling between mirrored versions



Single Shelter configurations with **increased capacity** can be made upon request.

To increase capacity, multiple Shelters can be parallelized in standard configuration or in mirrored execution in blocks of two.


Configuration Encoding Read Key

	CODE	DESCRIPTION
1. Size of system / battery type	54K, 76K, 98K	0.5C
	59K, 83K, 107K	1C
2. Prefix of system power	03, 06, 09	30, 60, 90 kW (OFF-GRID version only)
	12, 18, 24, 30	120, 180, 240, 300 kW (ON-GRID version only)
3. N. of battery piles	01, 02, 03, 04, 05, 07, 09	Quantity of battery modules
4. AC Connection	[], [IS]	ON-GRID, OFF-GRID

54K	12	04	IS
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zeroCO₂ - XL Shell (54/98)K


For charge/discharge regimes up to 0.5C

CEI 0-21 CEI 0-16 

Size						
W= 4010 mm					+899 mm	+899 mm
kW	54K				76K	98K
120	12 - 02	12 - 03	12 - 04	12 - 05	12 - 07	12 - 09
180		18 - 03	18 - 04	18 - 05	18 - 07	18 - 09
240			24 - 04	24 - 05	24 - 07	24 - 09
300				30 - 05	30 - 07	30 - 09
↓	218	327	436	545	763	981
	kWh					
2x180		2x18 - 03	2x18 - 04	2x18 - 05	2x18 - 07	2x18 - 09
2x240			2x24 - 04	2x24 - 05	2x24 - 07	2x24 - 09
2x300				2x30 - 05	2x30 - 07	2x30 - 09
...

zeroCO₂ - XL Shell (59/107)K

For charge/discharge regimes up to 1C

CEI 0-21 CEI 0-16 

Size						
W= 4010 mm					+899 mm	+899 mm
kW	59K				83K	107K
120	12 - 01	12 - 02	12 - 03	12 - 04	12 - 05	12 - 07
180		18 - 02	18 - 03	18 - 04	18 - 05	18 - 07
240			24 - 03	24 - 04	24 - 05	24 - 07
300				30 - 04	30 - 05	30 - 07
↓	119	238	357	476	595	833
	kWh					
2x180		2x18 - 02	2x18 - 03	2x18 - 04	2x18 - 05	2x18 - 07
2x240			2x24 - 03	2x24 - 04	2x24 - 05	2x24 - 07
2x300				2x30 - 04	2x30 - 05	2x30 - 07
...

XL Shell 54K	120K	180K	240K	300K
Dimensions [WxHxD, mm]	4010x2494x2283			
Number of batteries pile in the basic version	2	3	4	5
Number of optional additional batteries [n]	from 1 to 3	from 1 to 2	1	0
Weight [kg]	5950+(n x 1150)	7100+(n x 1150)	8250+(n x 1150)	9400
Sound power [dB]	<79			
Sound pressure [dB(A)] (*)	<65			
PCS technology	Transformerless			
AC PARAMETERS				
Rated power [kW]	120	180	240	300
Maximum apparent power [kVA]	132	198	264	330
AC input type	5 wire (3Ph + N + PE)			
N° and max. connection cable section per phase [mmq]	2 x 185 (L1, L2, L3) - 1 x 185 (N, PE) / Eyelet M8			
Voltage range [V]	400 (±10%)			
Rated/Max electric current [A]	±176 / ±200	±264 / ±300	±352 / ±400	±440 / ±500
Rated frequency [V-Hz]	400 - 50/60			
Power factor	0.8 ~ 1 (Leading / Lagging)			
Current DC component [%]	≤ 0.5			
Harmonic content THDi [%]	≤ 3			
AC and DC start function	Yes			
Current switching time [ms]	≤ 10			
Conversion efficiency [%]	≥ 97			
Standby power consumption [W]	<3200			
Permissible short-circuit current of short duration [kA]	6			
DC PARAMETERS				
Rated power [kW]	120	180	240	300
Voltage range [V]	680 - 1000			
Voltage error, Constant voltage accuracy, Voltage and current limiting characteristic [%]	±1			
ENERGY STORAGE				
Cell technology	Li-ion (LFP)			
Battery module	H32148-C			
Controller BMS	SC1000-200J-C (internal power supply)			
Module efficiency [%]	95			
Battery module quantity	46+(n x 23)	69+(n x 23)	92+(n x 23)	115
Rated electric current [A]	148+(n x 74)	222+(n x 74)	296+(n x 74)	370
Maximum electric current [A]	296+(n x 148)	444+(n x 148)	592+(n x 148)	740
Nominal capacity [kWh/Ah]	218+(n x 109)	327+(n x 109)	436+(n x 109)	545
Depth of Discharge DOD [%]	90% (8 - 98% SOC)			
Usable capacity [kWh]	196+(n x 98)	294+(n x 98)	392+(n x 98)	491
AMBIENT CONDITIONS				
Working temperature range [°C]	0 ~ 50 (Derating over 45°C) / -20 ~ +60			
Working humidity range [RH%]	<95 / 0 ~ 95 (without condensation)			
System cooling	Air cooled monoblock unit			
Altitude	<3000			
COMMUNICATION				
Communication interfaces	RS485, LAN, WAN,CAN, ModBus RTU, TCP/IP			
SAFETY				
Battery overvoltage protection	Software protection			
Battery overcurrent protection	Software protection and DC fuse			
Fire protection systems	Detection, alarm, multipurpose powder extinguishing			
IP protection rating	IP54			
Voltage resistance: input and output - PE [V DC]	3535			
Voltage resistance: input and output - CAN [V DC]	2828			
Surge: Input & Output - PE [kV]	6			
EMC characteristics	2014/35/CE Low Voltage Directive - 2014/30/CE Electromagnetic compatibility			
MTBF (Mean expected time between two malfunctions) [h]	100000			
Compliance with connection regulations	EN 50549 - VDE AR-N 4105			
Operational life [years]	15+			
Dangerous goods transport certificate	UN38.3			
Warranty [years]	2 (electrical/electronic parts) 10 or 6000 cycles (batteries)			

(*) Sound pressure level referred to a 2m distance from the device.

NB: Upper sizes from 76K and 98K can be found on the website.

XL Shell 59K	120K	180K	240K	300K
Dimensions [WxHxD, mm]	4010x2494x2283			
Number of batteries pile in the basic version	1	2	3	4
Number of optional additional batteries [n]	from 1 to 4	from 1 to 3	from 1 to 2	1
Weight [kg]	4980+(n x 1330)	6310+(n x 1330)	7640+(n x 1330)	8970+(n x 1330)
Sound power [dB]	<79			
Sound pressure [dB(A)] (*)	<65			
PCS technology	Transformerless			
AC PARAMETERS				
Rated power [kW]	120	180	240	300
Maximum apparent power [kVA]	132	198	264	330
AC input type	5 wire (3Ph + N + PE)			
N° and max. connection cable section per phase [mmq]	2 x 185 (L1, L2, L3) - 1 x 185 (N, PE) / Eyelet M8			
Voltage range [V]	400 (±10%)			
Rated/Max electric current [A]	±176 / ±200	±264 / ±300	±352 / ±400	±440 / ±500
Rated frequency [V-Hz]	400 - 50/60			
Power factor	0.8 ~ 1 (Leading / Lagging)			
Current DC component [%]	≤ 0.5			
Harmonic content THDi [%]	≤ 3			
AC and DC start function	Yes			
Current switching time [ms]	≤ 10			
Conversion efficiency [%]	≥ 97			
Standby power consumption [W]	<3200			
Permissible short-circuit current of short duration [kA]	6			
DC PARAMETERS				
Rated power [kW]	120	180	240	300
Voltage range [V]	680 - 1000			
Voltage error, Constant voltage accuracy, Voltage and current limiting characteristic [%]	±1			
ENERGY STORAGE				
Cell technology	Li-ion (LFP)			
Battery module	HM3A180			
Controller BMS	S1000-M3A180J (internal power supply)			
Module efficiency [%]	95			
Battery module quantity	21+(n x 21)	42+(n x 21)	63+(n x 21)	84+(n x 21)
Rated electric current [A]	74+(n x 74)	148+(n x 74)	222+(n x 74)	296+(n x 74)
Maximum electric current [A]	180+(n x 180)	360+(n x 180)	540+(n x 180)	720+(n x 180)
Nominal capacity [kWh/Ah]	119+(n x 119)	238+(n x 119)	357+(n x 119)	476
Depth of Discharge DOD [%]	90% (8 - 98% SOC)			
Usable capacity [kWh]	107+(n x 107)	214+(n x 107)	333+(n x 107)	452+(n x 107)
AMBIENT CONDITIONS				
Working temperature range [°C]	0 ~ 50 (Derating over 45°C) / -20 ~ +60			
Working humidity range [RH%]	<95 / 0 ~ 95 (without condensation)			
System cooling	Air cooled monoblock unit			
Altitude	<3000			
COMMUNICATION				
Communication interfaces	RS485, LAN, WAN, CAN, ModBus RTU, TCP/IP			
SAFETY				
Battery overvoltage protection	Software protection			
Battery overcurrent protection	Software protection and DC fuse			
Fire protection systems	Detection, alarm, multipurpose powder extinguishing			
IP protection rating	IP54			
Voltage resistance: input and output - PE [V DC]	3535			
Voltage resistance: input and output - CAN [V DC]	2828			
Surge: Input & Output - PE [kV]	6			
EMC characteristics	2014/35/CE Low Voltage Directive - 2014/30/CE Electromagnetic compatibility			
MTBF (Mean expected time between two malfunctions) [h]	100000			
Compliance with connection regulations	EN 50549 - VDE AR-N 4105			
Operational life [years]	15+			
Dangerous goods transport certificate	UN38.3			
Warranty [years]	2 (electrical/electronic parts) 10 or 6000 cycles (batteries)			

(*) Sound pressure level referred to a 2m distance from the device.

NB: Upper sizes from 83K and 107K can be found on the website.

Off-Grid Outdoor Solutions

XL Shell is perfect for large On-Grid systems, but we also provide an **Off-Grid** version with power ratings of **30, 60 and 90 kW** and storage capacity of **545 kWh**, capable of handling stand-alone systems.



zeroCO₂ - XL Shell (54/98)K IS

For charge/discharge regimes $\leq 0.5C$

CEI 0-21 CEI 0-16 VDE

		Size							
		W= 4010 mm						+899 mm	+899 mm
kW	54K						76K	98K	
30	03 - 01 IS	03 - 02 IS	03 - 03 IS	03 - 04 IS	03 - 05 IS	03 - 07 IS	03 - 09 IS		
60		06 - 02 IS	06 - 03 IS	06 - 04 IS	06 - 05 IS	06 - 07 IS	06 - 09 IS		
90			09 - 03 IS	09 - 04 IS	09 - 05 IS	09 - 07 IS	09 - 09 IS		
	109	218	327	436	545	763	981		
		kWh							
2x60		2x06 - 02 IS	2x06 - 03 IS	2x06 - 04 IS	2x06 - 05 IS	2x06 - 07 IS	2x06 - 09 IS		
2x90			2x09 - 03 IS	2x09 - 04 IS	2x09 - 05 IS	2x09 - 07 IS	2x09 - 09 IS		
3x90			3x09 - 03 IS	3x09 - 04 IS	3x09 - 05 IS	3x09 - 07 IS	3x09 - 09 IS		
...				

PV Input data

MODEL	zeroCO ₂ Shell (54-98)K IS		
PCS POWER [kW]	30	60	90
DC INPUT (PV SIDE)			
Max. input power [kW]	45	90	135
Max. input voltage [V]	830		
Startup voltage [V]	250		
MPPT voltage range [V]	200 ~ 810 (430 ~ 750 @ Full load)		
MPPT number / Max. strings number	3/6	6/12	9/18
Max. MPPT current [A]	3 x 35	6 x 35	9 x 35

XL Shell 54K IS	30K	60K	90K
Dimensions [WxHxD, mm]	4010x2494x2283		
Number of batteries pile in the basic version	1	2	3
Number of optional additional batteries [n]	from 1 to 4	from 1 to 3	from 1 to 2
Weight [kg]	4800+(n x 1150)	5950+(n x 1150)	7100+(n x 1150)
Sound power [dB]	<79		
Sound pressure [dB(A)] (*)	<65		
PCS technology	Transformerless		
AC PARAMETERS			
Rated power [kW]	30	60	90
Maximum apparent power [kVA]	33	66	100
AC input type	5 wire (3Ph + N + PE)		
N° and max. connection cable section per phase [mmq]	2 x 185 (L1, L2, L3) - 1 x 185 (N, PE) / Eyelet M8		
Voltage range [V]	400 (±10%)		
Rated/Max electric current [A]	±43 / ±48	±86 / ±96	±129 / ±144
Rated frequency [V-Hz]	400 - 50/60		
Power factor	0.8 ~ 1 (Leading / Lagging)		
Current DC component [%]	≤ 0.5		
Harmonic content THDi [%]	≤ 3		
AC and DC start function	Yes		
Current switching time [ms]	≤ 10		
Conversion efficiency [%]	≥ 97		
Standby power consumption [W]	<3200		
Permissible short-circuit current of short duration [kA]	6		
DC PARAMETERS			
Rated power [kW]	30	60	90
Voltage range	150 - 750		
Voltage error, Constant voltage accuracy, Voltage and current limiting characteristic [%]	±1		
ENERGY STORAGE			
Cell technology	Li-ion (LFP)		
Battery module	H32148-C		
Controller BMS	SC1000-200J-C (internal power supply)		
Module efficiency [%]	95		
Battery module quantity	23+(n x 23)	46+(n x 23)	69+(n x 23)
Rated electric current [A]	74+(n x 74)	148+(n x 74)	222+(n x 74)
Maximum electric current [A]	148+(n x 148)	296+(n x 148)	444+(n x 148)
Nominal capacity [kWh/Ah]	109+(n x 109)	218+(n x 109)	327+(n x 109)
Depth of Discharge DOD [%]	90% (8 - 98% SOC)		
Usable capacity [kWh]	98+(n x 98)	196+(n x 98)	294+(n x 98)
AMBIENT CONDITIONS			
Working temperature range [°C]	0 ~ 50 (Derating over 45°C) / -20 ~ +60		
Working humidity range [RH%]	<95 / 0 ~ 95 (without condensation)		
System cooling	Air cooled monoblock unit		
Altitude	<3000		
COMMUNICATION			
Communication interfaces	RS485, LAN, WAN,CAN, ModBus RTU, TCP/IP		
SAFETY			
Battery overvoltage protection	Software protection		
Battery overcurrent protection	Software protection and DC fuse		
Fire protection systems	Detection, alarm, multipurpose powder extinguishing		
IP protection rating	IP54		
Voltage resistance: input and output - PE [V DC]	3535		
Voltage resistance: input and output - CAN [V DC]	2828		
Surge: Input & Output - PE [kV]	6		
EMC characteristics	2014/35/CE Low Voltage Directive - 2014/30/CE Electromagnetic compatibility		
MTBF (Mean expected time between two malfunctions)[h]	100000		
Compliance with connection regulations	EN 50549 - VDE AR-N 4105		
Operational life [years]	15+		
Dangerous goods transport certificate	UN38.3		
Warranty [years]	2 (electrical/electronic parts) 10 or 6000 cycles (batteries)		

(*) Sound pressure level referred to a 2m distance from the device.

Containerized Solutions

zeroCO₂ XL Box

The zeroCO₂ - XL Box (118/236)K series is our containerized solution, containing the Pylontech H32148-C storage batteries and the power switchboard including PCS converters, proprietary EMS device, on-board **disconnect switches** and switchboard **protections**. XL Box is also fully factory prewired and controlled by our zeroCO₂ Cloud.

The configurations available on 20ft or 40ft containers, the modular logic achieved on the storage side and inverter side, and the ability to connect multiple systems in parallel without a maximum limit, make it particularly suitable for outdoor installations with large floor area, arranging storage of more than one MWh per single box.

Potenza
da 120 kW
a 1.2 MW

Capacità
da 1,2 MWh
o 2.4 MWh



Available in 20ft or 40ft containers

IP54 Suitable for outdoor installation



Pylontech H32148-C storage batteries for 0.5C charge/discharge regime



Integrated fire protection system



Possibility of parallel connection of multiple XL Boxes to expand power

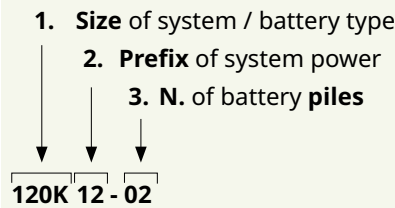


Air conditioning with cell operating temperature control, integrated

20ft version of the zeroCO₂ XL Box

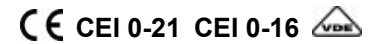


Configuration Encoding Read Key



	CODE	DESCRIPTION
1. SIZE	118K, 236K	0.5C
2. POWER	12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78, 84, 90, 96, 102, 108, 114, 120	120, 180, 240, 300, 360, 420, 480, 540, 600, 660, 720, 780, 840, 900, 960, 1020, 1080, 1140, 1200 kW
3. N. PILES	02, 03, 04, 05, ...20	Quantity of battery modules

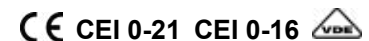
zeroCO₂ XL Box in 20ft container



Size									
118K									
kW	12 - 02	12 - 03	12 - 04	12 - 05	12 - 06	12 - 07	12 - 08	12 - 09	12 - 10
120		18 - 03	18 - 04	18 - 05	18 - 06	18 - 07	18 - 08	18 - 09	18 - 10
180			24 - 04	24 - 05	24 - 06	24 - 07	24 - 08	24 - 09	24 - 10
240				30 - 05	30 - 06	30 - 07	30 - 08	30 - 09	30 - 10
300					36 - 06	36 - 07	36 - 08	36 - 09	36 - 10
360						42 - 07	42 - 08	42 - 09	42 - 10
420							48 - 08	48 - 09	48 - 10
480								54 - 09	54 - 10
540									60 - 10
600									
	236	354	472	590	708	826	944	1062	1180
kWh									
2x360					2x36 - 06	2x36 - 07	2x36 - 08	2x36 - 09	2x36 - 10
2x420						2x42 - 07	2x42 - 08	2x42 - 09	2x42 - 10
2x480							2x48 - 08	2x48 - 09	2x48 - 10
...				

The configuration includes a 20 ft long container with a maximum capacity of 1180 kWh for 0.5C charge/discharge rates. Multiple containers can be parallelized to increase power.

zeroCO₂ XL Box in 40ft container



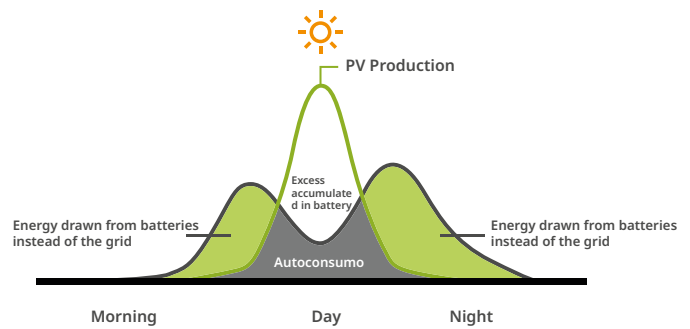
Size										
236K										
kW	66 - 11	66 - 12	66 - 13	66 - 14	66 - 15	66 - 16	66 - 17	66 - 18	66 - 19	66 - 20
660		72 - 12	72 - 13	72 - 14	72 - 15	72 - 16	72 - 17	72 - 18	72 - 19	72 - 20
720			78 - 13	78 - 14	78 - 15	78 - 16	78 - 17	78 - 18	78 - 19	78 - 20
780				84 - 14	84 - 15	84 - 16	84 - 17	84 - 18	84 - 19	84 - 20
840					90 - 15	90 - 16	90 - 17	90 - 18	90 - 19	90 - 20
900						96 - 16	96 - 17	96 - 18	96 - 19	96 - 20
960							102 - 17	102 - 18	102 - 19	102 - 20
1020								108 - 18	108 - 19	108 - 20
1080									114 - 19	114 - 20
1140										120 - 20
1200										
	1298	1416	1534	1652	1770	1888	2006	2124	2242	2360
kWh										
2x660	2x66 - 11	2x66 - 12	2x66 - 13	2x66 - 14	2x66 - 15	2x66 - 16	2x66 - 17	2x66 - 18	2x66 - 19	2x66 - 20
2x720		2x72 - 12	2x72 - 13	2x72 - 14	2x72 - 15	2x72 - 16	2x72 - 17	2x72 - 18	2x72 - 19	2x72 - 20
2x780			2x78 - 13	2x78 - 14	2x78 - 15	2x78 - 16	2x78 - 17	2x78 - 18	2x78 - 19	2x78 - 20
...				

The configuration includes a 40 ft long container with a maximum capacity of 2360 kWh for 0.5C charge/discharge rates. Multiple containers can be parallelized to increase power.

Why install storage batteries?

A storage system allows you to store surplus energy produced by PV, and then use it at times when production is lower, such as at night or during cloudy days.

You use all the energy you produce, saving significantly on energy costs.



Possible functions



Self-consumption

Self-consumption is based on using locally generated energy, such as solar energy, to directly meet a facility's energy needs by reducing dependence on the power grid.



Peak shaving

Peak shaving is a strategy for limiting peak energy consumption by storing energy to release it at times of higher demand.

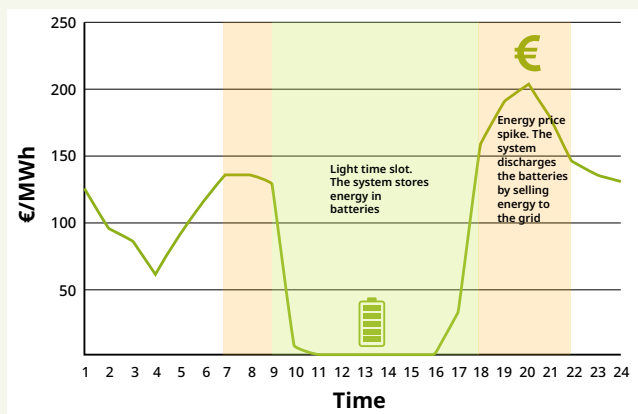
This approach is advantageous for large facilities such as industrial plants or commercial centers, significantly reducing energy costs.



Energy Trading

With energy trading, owners of storage systems can store solar energy at low cost and then sell it on the market when demand and prices are higher.

This not only generates an economic return, but also helps stabilize the local power grid.



Not just solar energy

Our XL storage systems are open to all sources of energy-whether you want to connect it to a photovoltaic, wind, or any generation system, zeroCO₂ XL is perfect for making your system smarter.



H32148-C and HM3A180

High voltage lithium battery

H32148-C
Modules
4.74 kWh

HM3A180
Modules
5.68 kWh



Designed to ensure reliable power delivery, for various types of equipment and systems



H32148-C modules work in the charge/discharge regime at 0.5C.
HM3A180 modules work in the charge/discharge regime at 1C.



10-year warranty



Ease of expansion, to increase storage



Long life and efficiency over time

MODEL	H32148-C	HM3A180
Item code	90040280	90040266
ELECTRICAL DATA		
Cell technology	Li-ion (LFP)	
Nominal voltage [V]	32	38.4
Nominal capacity [kWh/Ah]	4.736 / 148	5.683 / 148
Depth of discharge DOD [%]	90 (8-98%)	95 (*)
Nominal Current [A]	74	74
Charge voltage [min~max, V]	30 ~ 36	32.4 ~ 43.2
Max charge / discharge current [A]	148	180
Efficiency [%]	96	95*
BUS		
Communication Bus	RS485\CAN	
GENERAL DATA		
Dimensions [WxHxD, mm]	330x150.5x628	375x171.5x820
Weight [kg]	48	61
Working temperature [°C]	0 ~ 50°C	10 ~ 40°C
Storage temperature [°C]	-20 ~ 60°C	-20 ~ 60°C
Protection class	IP20	
Operation life [years]	+10	
Life cycles	4000	5000
Transfer certificate	UN38.3	
EMC Standard	TÜV (IEC62619)	

(*) The DoD of 95% refers to the usable capacity of a single rack.

For parallel operation of multiple racks, consider the DoD of 90% to calculate the usable capacity.



BMS

Battery Management System



The **BMS** (battery management system) can manage and monitor cell information, including voltage, current, and temperature, as well as keep the cells balanced during the charge/discharge process in order to improve battery performance and lifetime. Multiple battery stacks can be connected in parallel to increase capacity and thus power output over a longer working period.

The battery management system (BMS) has **protection functions for overcharge, overvoltage, overcurrent, and high/low temperature.**

To ensure excellent charge/discharge performance and durability, the operating temperature range is 0°C to 50°C.

MODEL	SC1000-200J-C	S1000M3A180J	S1500M3A180L
Item code	90040281	90040279	tbd
ELECTRICAL DATA			
Related product	H32148-C	PowerCube-M3A-180	
Battery modules quantity [pcs]	up to 26	13~21	1~32
Self-consumption power [W]	6	-	-
Self-consumption power, Power-Relay OFF [W]	-	5 + (n x 1.5)	9 + (n x 1.5)
Self-consumption power, Power-Relay ON [W]	-	15 + (n x 1.5)	19.5 + (n x 1.5)
Operating voltage [V]	200~1000	-	-
System working voltage [V]	200~1000	400~1000	0~1500
Discharge voltage [V]	200~1000	32.4 x n	
Max. Charging current [A]	148	180	
Communication	Modbus RTU\CAN\LAN		
GENERAL DATA			
Dimension [WxHxD, mm]	330x150.5x628	375x171.5x710	
Weight [kg]	13		
Operating temperature [°C]	0~50		
Storage temperature [°C]	-40~80		
Protection Class	IP20		
Operation life [years]	15+		
Transfer certificate	UN38.3		
EMC Standard	TUV, CE		



Active plants throughout Italy



XL systems installed
60+


Total power
5+ MW

Total storage capacity
10+ MWh

Industrial facility

Features: Self-consumption and Peak-Shaving
Location: Lombardia
Installed system: zeroCO₂ XL 100

Power	Storage
60 kW	100 kWh



Cold storage logistics center

Features: Self-consumption
Location: Abruzzo
Installed system: zeroCO₂ XL System and zeroCO₂ XL BESS


Power	Storage
240 kW	960 kWh



Agrivoltaic plant

Features: Energy trading
Location: Sicilia
Installed system: zeroCO₂ XL System and zeroCO₂ XL BESS

Power	Storage
600 kW	600 kWh



Item Codes

CODE	DESCRIPTION
Vedi a pg. 7	zeroCO2 - XL Shell
Vedi a pg. 15	zeroCO2 - XL Box
90110750	zeroCO2 - XL 100- BESS all in one 60kW / 109 kWh system
90110760	zeroCO2 - XL SHELL 100 - BESS all in one 60kW / 109 kWh system
90110005	zeroCO2 - XL System 60K - DC Bus 680-1000V
90110010	zeroCO2 - XL System 120K - DC Bus 680-1000V
90110015	zeroCO2 - XL System 180K - DC Bus 680-1000V
90110020	zeroCO2 - XL System 240K - DC Bus 680-1000V
90110030	zeroCO2 BESS 125K - H32148-C
99990040	REMOTE COMMISSIONING zeroCO2 XL

Accessories and spare parts codes

CODE	DESCRIPTION
90900305	Three-phase meter Eastron SDM630MCT Modbus RS485 MID for external sensors ESCT-xxx-5
90900315	Eastron three-phase meter kit with external CT (SDM630MCT + 3x ESCT-T24-5)
90900323	Medium Voltage Meter PM3250
90100080	UPS Module 3 kVA 2U -19"
90110100	Annual license fee zeroCO2 - XL Cloud Monitoring System
90900754	Optional accessory for XL SHELL 100 - smoke detection system and alarm signal, to be ordered at the same time as art. 90110760
90090015	P 60K A - PCS 60 kW 400V/50Hz - DCBHV - Trasformerless
90900380	Connection Cable kit BESS 125K - 26 modules (H32148-C)
90920655	Kit AC Breaker 100 A
90920695	Kit DC Breaker 1000 V - 160 A
90100005	PC board IEI WAFER-AL-N2-RL.R10
90100020	Power supply ATX 1U ACE-A615C-RS-R11 150 W
90100075	8 Gigabit ports LAN Switch
90100076	Switch 19" 1U - 24 Gigabit Ethernet Ports 10/100/1000 Mb/s - Layer2 and Layer Management
90100077	Switch DGS-108 - 8 Gigabit 10/100/1000 ports - Dim. 138 x 85 x 22
90101000	EMS - Energy Management System with LAN communication
90102000	EMS DOUBLE - Energy Management System with LAN communication
90040280	Pylontech H32148C - 4,74 kWh battery
90040281	Pylontech BMS SC1000-200J-C with internal power supply (for H32148C)
90040266	Pylontech HM3A180 battery
90040279	BMS S1000M3A180J
tbd	BMS S1500M3A180L

SPARE PARTS



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PC019 - Rev.001 ENG

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