

Battery Energy Storage system (BESS)

Complete Unique Modular Redundant Solution

From 25kW to 2500kW

The Battery Energy Storage System (BESS) has been specially designed and manufactured to enable transportation to different sites and ease of connection.

The Battery Energy Storage System as standard is manufactured in the UK and is available in sizes from 25kW to 2500kW. Each Container size from 25kW to 200kW has the potential to be paralleled with additional units for added security or in case of unexpected or necessary load increases. The BESS system also has the ability to be internally down scaled, only outputting the power you need at any particular time.



BESS Full Modular System

- Plug-in Power Module
- Plug-in Battery modules
- Plug-in Auxiliary Mains bypass module
- Power Module compatibility guarantee for 20+years
- Allows for the implementation of future module technology.

BESS Totally redundant design

- N+1, N+X redundancy level
- Designed with reduced single point of failure.
- No centralised parallel control
- Total independent power modules
- Redundant parallel bus connection

BESS Enhanced Serviceability performance

- Power module automatic firmware alignment.
- Fast and safe Maintenance based on hot swap parts (power modules, auxiliary mains bypass, electronic boards).
- Load fully protected during power module replacement.
- Battery can be hot swapped without shutting down the Converter.
- Ready for concurrent maintenance.

BESS Standard Electrical Features

- Input mains 3phase 400V 50hz (other options available)
- Internal Maintenance Auxiliary Mains bypass
- Back-feed protection: detection circuit
- EBS (expert battery System) for battery Management
- Automatic battery test
- Battery temperature sensor
- Energy Saver mode

BESS Converter Standard Communications features

- User friendly 7" touch screen multilingual Colour graphic display
- 2 slots for communication options
- USB port to download Converter report and log file
- Ethernet port for service purposes
- Commissioning Wizard
- Dry contact interface (configurable voltage-free contacts)
- MODBUS
- Remote view Supervision software

BESS Hybrid bypass architecture

- Distributed Converter bypasses in parallel to segregated centralized Auxiliary Mains bypass creating a redundant solution.

The system has been designed so that a variety of site solutions can be achieved, you can either supply a BESS for the site maximum load, supply smaller individual systems for separate areas or build up from small loads to larger loads by adding complete BESS's.

Each BESS comprises:

- Heavy Duty Container 10ft / 20ft or 40ft container
- External input Mains quick release sockets (for smaller power outputs only)
- External output quick release plugs (for smaller power outputs only)
- Internal Input isolation
- Internal output isolation
- Internal wrap around bypass
- High Powered redundant rectifiers
- High powered redundant converters
- Internal Automatic bypass
- Manual Maintenance bypass
- Li-Ion or VRLA Batteries sized for required autonomy
- Li-Ion Battery monitoring with interfaced control cabinet
- Automatic ventilation system
- Fire alarm system
- Intruder alarm system
- Remote monitoring
- Fault alert system
- Container lifting points.
- Optional container finish
 - Painted + Company Livery
 - Plain container
- Optional external beacons for
 - Fire alarm activation
 - Bypass activation
 - Entry alert
- Optional external Sounders for
 - Fire alarm
 - Bypass activation
 - Entry alert

An important feature of the BESS , if the site supply capacity available is lower than required for the site load, the BESS will utilise this incoming supply and supplement a higher output load level to ensure that the Mains input supply is not overloaded where fuses may rupture or MCCB's disconnect. The BESS must be sized correctly to achieve this feature as follows:

- 1) The input maximum site supply must be known.
- 2) The Output load profile must be calculated.
- 3) The duration of the high load level throughout the working day must be calculated.

- 4) The duration of the low load level throughout the working day must be calculated.
- 5) The period of No load during out of hours needs to be known/assessed.
- 6) Operational days throughout the working week including weekends needs to be known/assessed.

Each BESS can be monitored remotely by our service team to ensure correct operation, which gives added security and peace of mind. The monitoring parameters primarily include but are not limited to:

- In Correct operational mode
- Input Voltage and current levels within parameters
- Output Voltage and current levels within parameters
- Bypass activation alert
- DC voltage levels within defined limits
- DC capacity levels within defined limits
- Operating Temperatures within correct operational parameters
- Environment temperatures within correct operational parameters
- Battery compensation levels correct
- Common fault alarm level 1 alert
- Common Fault level alarm critical alert
- Fire alarm fault
- Fire alarm activation alert
- Non authorised entry alert
- Unauthorised Activation of isolation points within container

Technical Specification up to 150kW

Number of Converters		2	4	6
Power	kW	50	100	150
Power	kVA	50	100	150
INPUT				
Input Mains Voltage	V	400V 3phase +N 340V to 480V (+20/-15%)		
Input Mains frequency	Hz	50/60 +/-10%		
Input Power factor	p.f	> 0.99 / <1.5%		
OUTPUT				
Power Factor	p.f.	1 (IEC/EN 62040-3)		
Output Voltage	V	380/400/415 selectable +/- 1%		
Output frequency	Hz	50/60 selectable +/- 0.1%		
Voltage distortion		<1% (linear load), <3% (non-linear load IEC/EN 62040-3)		
Short-Circuit Current	A	Up to 3 x In		
Overload	%	125% for 10mins or 150% for 1minute		
Overload	10mins	kW	62.5	125
	1min	kW	75	150
Crest factor		3:1		
Internal Automatic Bypass				
Bypass Input Voltage	V	Rated Output voltage +/- 15% (config. from 10% to 20%)		
Bypass Input Frequency	Hz	50/60 +/- 2% selectable (+/-8% if generator Used)		
Stored Energy Mode of operation				
Number of batteries	40ps	Nominal voltage 480Vdc		
Battery type	Li-Ion	Installed on Battery Stands		
	VRLA	Installed on Battery Stands		
EFFICIENCY				
Normal mode of operation		Up to 96.5%		
Environmental Equipment				
Operating temperature	°C	0 to 40°C		
Storage Temperature	°C	-5 to +50°C		
Relative Humidity	%	0 to 95% condensation free		
Altitude (max)	m	1000 without de-rating (3000 with de-rating)		
Acoustic noise level at 1m	dBA	52	55	56
Required cooling capacity	M ³ /h	800	1600	2400
Dissipated Power (max)	W	3000	6000	9000
Dissipated Power (max)	BTU/h	10240	20480	30720
Converter Dimensions and Weight				
Dimensions (W x D x H)	mm	600 x 890 x1975		
Empty Cabinet	kg	228		
Individual module	kg	33		
Internal bypass module	kg	25		
Standards				
Safety		EN/IEC 62040-1		
EMC		EN/IEC 62040-2		
Performance		EN/IEC 62040-3		
Environmental		EN/IEC 62040-4		
Seismic Compliance		Uniform Building Code IEC 60068-2		
Product marks		CE -RCM - EAC		
Degree of protection		IP20 (EN/IEC 60529)		
Power Module				
MTBF		>1 000 000hours (calculated and verified)		

Technical Specification 200kW up to 600kW

Number of Converters			2-8	2-16	2-24
Power	kW		50 to 200	50 to 400	50 to 600
Power	kVA		50 to 200	50 to 400	50 to 600
INPUT					
Input Mains Voltage	V		400V 3phase +N 340V to 480V (+20/-15%)		
Input Mains frequency	Hz		50/60 +/-10%		
Input Power factor	p.f		> 0.99 / <1.5%		
OUTPUT					
Power Factor	p.f.		1 (IEC/EN 62040-3)		
Output Voltage	V		380/400/415 selectable +/- 1% 3ph+N		
Output frequency	Hz		50/60 selectable +/- 0.1%		
Voltage distortion			<1% (linear load), <3% (non-linear load IEC/EN 62040-3)		
Short-Circuit Current	A		Up to 3 x In		
Overload	%		125% for 10mins or 150% for 1minute		
Overload	10mins	kW	62.5 to 250	62.5 to 500	62.5 to 750
	1min	kW	75 to 300	75 to 600	75 to 900
Crest factor			3:1		
Internal Automatic Bypass					
Bypass Input Voltage	V		Rated Output voltage +/- 15% (config. from 10% to 20%)		
Bypass Input Frequency	Hz		50/60 +/- 2% selectable (+/-8% if generator Used)		
Stored Energy Mode of operation					
Number of batteries	40ps		Nominal voltage 480Vdc		
Battery type	Li-Ion		Installed on Battery Stands		
	VRLA		Installed on Battery Stands		
EFFICIENCY					
Normal mode of operation			Up to 96.5%		
Environmental Equipment					
Operating temperature	°C		0 to 40°C		
Storage Temperature	°C		-5 to +50°C		
Relative Humidity	%		0 to 95% condensation free		
Altitude (max)	m		1000 without de-rating (3000 with de-rating)		
Acoustic noise level at 1m	dBA		55	55	56
Required cooling capacity	M ³ /h		800 to 3200	800 to 6400	800 to 9600
Dissipated Power (max)	W		3000 to 12000	3000 to 24000	3000 to 36000
Dissipated Power (max)	BTU/h		10240 to 40960	10240 to 81920	10240 to 122880
Converter Dimensions and Weight					
Dimensions (W x D x H)	mm		600 x 890 x 1975	2010 X 890 X 1975	2610 X 890 x 1975
Empty Cabinet	kg		228	780	1010
Individual module	kg		33		
Internal bypass module	kg		25		
Standards					
Safety			EN/IEC 62040-1		
EMC			EN/IEC 62040-2		
Performance			EN/IEC 62040-3		
Environmental			EN/IEC 62040-4		
Seismic Compliance			Uniform Building Code IEC 60068-2		
Product marks			CE -RCM - EAC		
Degree of protection			IP20 (EN/IEC 60529)		
Power Module					
MTBF			>1 000 000hours (calculated and verified)		

Technical Specification 200kW up to 1200kW

Number of Power Modules			1	4	6
Power	kW		200	800	1200
Power	kVA		200	800	1200
INPUT					
Input Mains Voltage	V	400V 3phase +N 340V to 480V (+20/-15%)			
Input Mains frequency	Hz	50/60 +/-10%			
Input Power factor	p.f	> 0.99 / <2.5%			
OUTPUT					
Power Factor	p.f.	1 (IEC/EN 62040-3)			
Output Voltage	V	380/400/415 selectable +/- 1%			
Output frequency	Hz	50/60 selectable +/- 0.1% - free running			
Voltage distortion		<1.5% (linear load), <3% (non-linear load IEC/EN 62040-3)			
Short-Circuit Current	A	Up to 3 x In			
Overload	%	125% for 10mins or 150% for 1minute			
Overload	10mins	kW	62.5	125	188
	1min	kW	75	150	225
Crest factor		3:1			
Internal Automatic Bypass					
Bypass Input Voltage	V	Rated Output voltage +/- 15% (config. from 10% to 20%)			
Bypass Input Frequency	Hz	50/60 +/- 5% selectable (+/-8% if generator Used)			
Stored Energy Mode of operation					
Number of batteries	40ps	Nominal voltage 480Vdc			
Battery type	Li-Ion	Installed on Battery Stands			
	VRLA	Installed on Battery Stands			
EFFICIENCY					
Normal mode of operation		Up to 96.5%			
Environmental Equipment					
Operating temperature	°C	0 to 40°C			
Storage Temperature	°C	-5 to +50°C			
Relative Humidity	%	0 to 95% condensation free			
Altitude (max)	m	1000 without de-rating			
Acoustic noise level at 1m	dBA	<75	55	56	
Required cooling capacity	M ³ /h	800	1600	2400	
Dissipated Power (max)	W	3000	6000	9000	
Dissipated Power (max)	BTU/h	10240	20480	30720	
Converter Dimensions and Weight					
Power Hub	Dimensions (W x D x H) and weight (kg)	mm & kg	1200 x 975 x 2120	Weight	750
Power Slot	Dimensions (W x D x H) and weight (kg)	mm & kg	550 X 975 X 2120	Weight	130
Power module	Dimensions (W x D x H) and weight (kg)	mm & kg	500 X 950 X 1940	Weight	450
Type		Hot Plug-in / Hot Swappable			
Standards					
Safety		EN/IEC 62040-1			
EMC		EN/IEC 62040-2			
Performance		EN/IEC 62040-3			
Environmental		EN/IEC 62040-4			
Seismic Compliance		Uniform Building Code IEC 60068-2			
Product marks		CE - EAC			
Degree of protection		IP20 (EN/IEC 60529)			
Power Module					
MTBF		>1 000 000hours (calculated and verified)			

Certificate and Conditions of Warranty

The Battery Energy Station System is guaranteed against any Manufacturing or Material defects.

The Warranty for the Power equipment is valid for 12months from the Delivery date, provided activation is carried out by Ability Power Energy Solutions Limited personnel or personnel from a support Centre authorised by Ability Power Energy Solutions Limited.

The Warranty is valid ex-works and covers labour and parts used to repair the faults, we reserve the right to charge for travelling time and costs.

The Warranty shall not apply in the following cases:

- Failure due to unforeseen circumstances or force majeure (lightening, floods etc.).
- Failure due to negligence or improper use (use outside limits: temperature, humidity, ventilation, electric power supply, applied load, batteries).
- Insufficient or inappropriate maintenance.
- When maintenance, repairs or modifications have not been carried out by Ability Power Energy Solutions Limited.
- If the battery has not been recharged in the event of long periods of storage or Converter inactivity.

Ability Power Energy Solutions Limited may, at its own discretion, opt for the repair of the product or the replacement of faulty or defective parts with new parts, or with used parts of equivalent quality to new parts with regards to function and performance.

Replacement or repair of parts or any modifications to the product during the warranty period will not extend the duration of the warranty.

Ability Power Energy Solutions Limited will not be responsible for damages under any circumstances (including, without limitations, damage for loss of earnings, interruption of activity, loss of information or other financial losses) arising from the use of the product.

Ability Power Energy Solutions Limited reserves the right to make changes to the information provided without prior notice.