



ENERGY CONTROL & SAVINGS

LIONESS™

ENERGY MANAGEMENT SYSTEM (EMS)

ENERGY SOFTWARE cloud-based customer and energy load and control with 24/7 user monitoring

BACK UP POWER support for critical facilities and equipment in the event of power outages and reduce costly downtimes

PEAK DEMAND & ENERGY MANAGEMENT allows reduced energy costs by use of LIONESS Energy Management Software

- Time of use energy shifting & arbitrage
- Peak Shaving Modulation

INVERTER/POWER CONVERSION offering high efficiency, grid following collection, storage & energy distribution

POWERSave™

LITHIUM ENERGY STORAGE SYSTEM



FEATURES

APPLICATIONS include indoor & outdoor COMMERCIAL, INDUSTRIAL, MUNICIPALITY, UTILITIES, CRITICAL INFRASTRUCTURE & EV CHARGE STATIONS

SCALABLE- ALL IN ONE DESIGN and Multiple Power and Capacity ranges available. Select from 30KW to 90KW PCS Inverter Power and 100KWh to 190KWh Battery Capacity

HYBRID DC to DC SOLAR COUPLING with optional built in MPPT hybrid controllers to use in place of AC solar coupled system

SAFE & LONG-LIFE CYCLE BATTERIES

LFP (Lithium Iron Phosphate) Batteries offering low thermal runaway, high storage density and long shelf life

FIRE & SAFETY with Clean Agent Fire Suppression, Cross Zoned Smoke and Gas detection. HVAC Thermal Management Meets the requirements of UL9540 and NFPA855

COMPLIANCE: meets the requirements of UL9540, UL9541, UL1741, & NPPA855

WARRANTY & SUPPORT includes 10-Years System & Controls & long cycle & low battery degradation
6000 cycles warranty

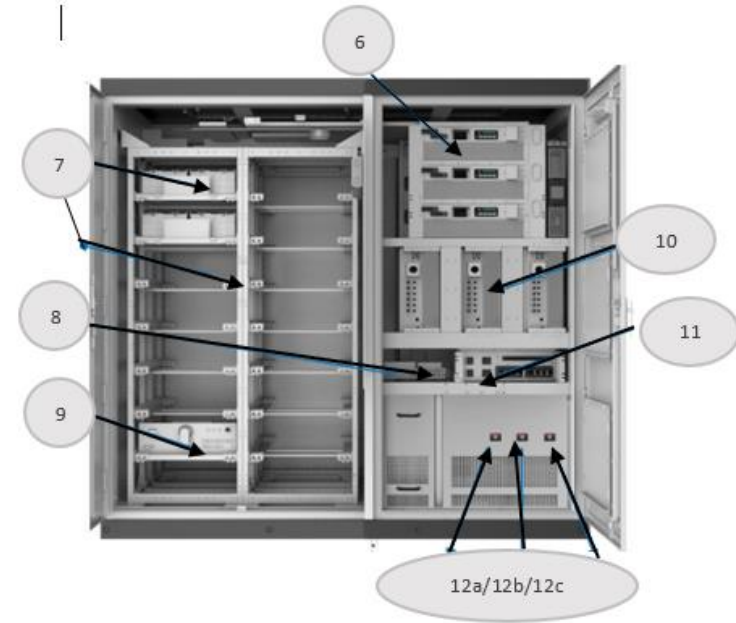
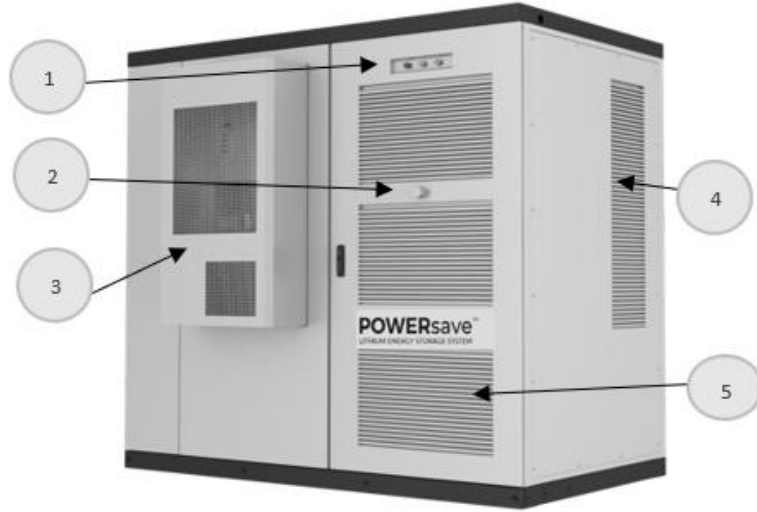
MODELS-POWER/CAPACITY

MODEL/ OPTION	POWER (PCS/Inverter)	BATTERY CAPACITY	DESCRIPTION
PSC-30-100	30KW	100KWh	Standard system (without below optional equipment)
PSC-30-100-01 (Optional)	30KW	100KWh	Includes 45KW DC to DC Solar Controller (built in)(up to 3)
PSC-30-100-02 (Optional)	30KW	100KWh	Includes 3M Novec Fire Suppression & Detection System
PSC-30-100-03 (Optional)	30KW	100KWh	Includes 100KW ATS (built in)auto transfer switch
PSC-30-100-04 (Optional)	30KW	100KWh	Includes external Isolation Transformer 480V Delta/480Y, 480V Delta/208Y
PSC-60-100	60KW	100KWh	Standard system (without below optional equipment)
PSC-60-100-01 (Optional)	60KW	100KWh	Includes 45KW DC to DC Solar Controller (built in)(up to 3)
PSC-60-100-02 (Optional)	60KW	100KWh	Includes 3M Novec Fire Suppression & Detection System
PSC-60-100-03 (Optional)	60KW	100KWh	Includes 100KW ATS (built in)auto transfer switch
PSC-60-100-04 (Optional)	60KW	100KWh	Includes external Isolation Transformer 480V Delta/480Y, 480V Delta/208Y
PSC-90-100	90KW	100KWh	Standard system (without below optional equipment)
PSC-90-100-01 (Optional)	90KW	100KWh	Includes 45KW DC to DC Solar Controller (built in)(up to 3)
PSC-90-100-02 (Optional)	90KW	100KWh	Includes 3M Novec Fire Suppression & Detection System
PSC-90-100-03 (Optional)	90KW	100KWh	Includes 100KW ATS (built in)auto transfer switch
PSC-90-100-04 (Optional)	90KW	100KWh	Includes external Isolation Transformer 480V Delta/480Y, 480V Delta/208Y
PSC-30-145	30KW	145KWh	Standard system (without below optional equipment)
PSC-30-145-01 (Optional)	30KW	145KWh	Includes 45KW DC to DC Solar Controller (built in)(up to 3)
PSC-30-145-02 (Optional)	30KW	145KWh	Includes 3M Novec Fire Suppression & Detection System
PSC-30-145-03 (Optional)	30KW	145KWh	Includes 100KW ATS (built in)auto transfer switch
PSC-30-145-04 (Optional)	30KW	145KWh	Includes external Isolation Transformer 480V Delta/480Y, 480V Delta/208Y

PSC-60-145	60KW	145KWh	Standard system (without below optional equipment)
PSC-60-145-01 (Optional)	60KW	145KWh	Includes 45KW DC to DC Solar Controller (built in)(up to 3)
PSC-60-145-02 (Optional)	60KW	145KWh	Includes 3M Novec Fire Suppression & Detection System
PSC-60-145-03 (Optional)	60KW	145KWh	Includes 100KW ATS (built in)auto transfer switch
PSC-60-145-04 (Optional)	60KW	145KWh	Includes external Isolation Transformer 480V Delta/480Y, 480V Delta/208Y
PSC-30-190	30KW	190KWh	Standard system (without below optional equipment)
PSC-30-190-01 (Optional)	30KW	190KWh	Includes 45KW DC to DC Solar Controller (built in)(up to 3)
PSC-30-190-02 (Optional)	30KW	190KWh	Includes 3M Novec Fire Suppression & Detection System
PSC-30-190-03 (Optional)	30KW	190KWh	Includes 100KW ATS (built in)auto transfer switch
PSC-30-190-04 (Optional)	30KW	190KWh	Includes external Isolation Transformer 480V Delta/480Y, 480V Delta/208Y
PSC-60-190	60KW	190KWh	Standard system (without below optional equipment)
PSC-60-190-01 (Optional)	60KW	190KWh	Includes 45KW DC to DC Solar Controller (built in)(up to 3)
PSC-60-190-02 (Optional)	60KW	190KWh	Includes 3M Novec Fire Suppression & Detection System
PSC-60-190-03 (Optional)	60KW	190KWh	Includes 100KW ATS (built in)auto transfer switch
PSC-60-190-04 (Optional)	60KW	190KWh	Includes external Isolation Transformer 480V Delta/480Y, 480V Delta/208Y
PSC-90-190	90KW	190KWh	Standard system (without below optional equipment)
PSC-90-190-01 (Optional)	90KW	190KWh	Includes 45KW DC to DC Solar Controller (built in)(up to 3)
PSC-90-190-02 (Optional)	90KW	190KWh	Includes 3M Novec Fire Suppression & Detection System
PSC-90-190-03 (Optional)	90KW	190KWh	Includes 100KW ATS (built in)auto transfer switch
PSC-90-190-04 (Optional)	90KW	190KWh	Includes external Isolation Transformer 480V Delta/480Y, 480V Delta/208Y

POWERsave™

LITHIUM ENERGY STORAGE SYSTEM

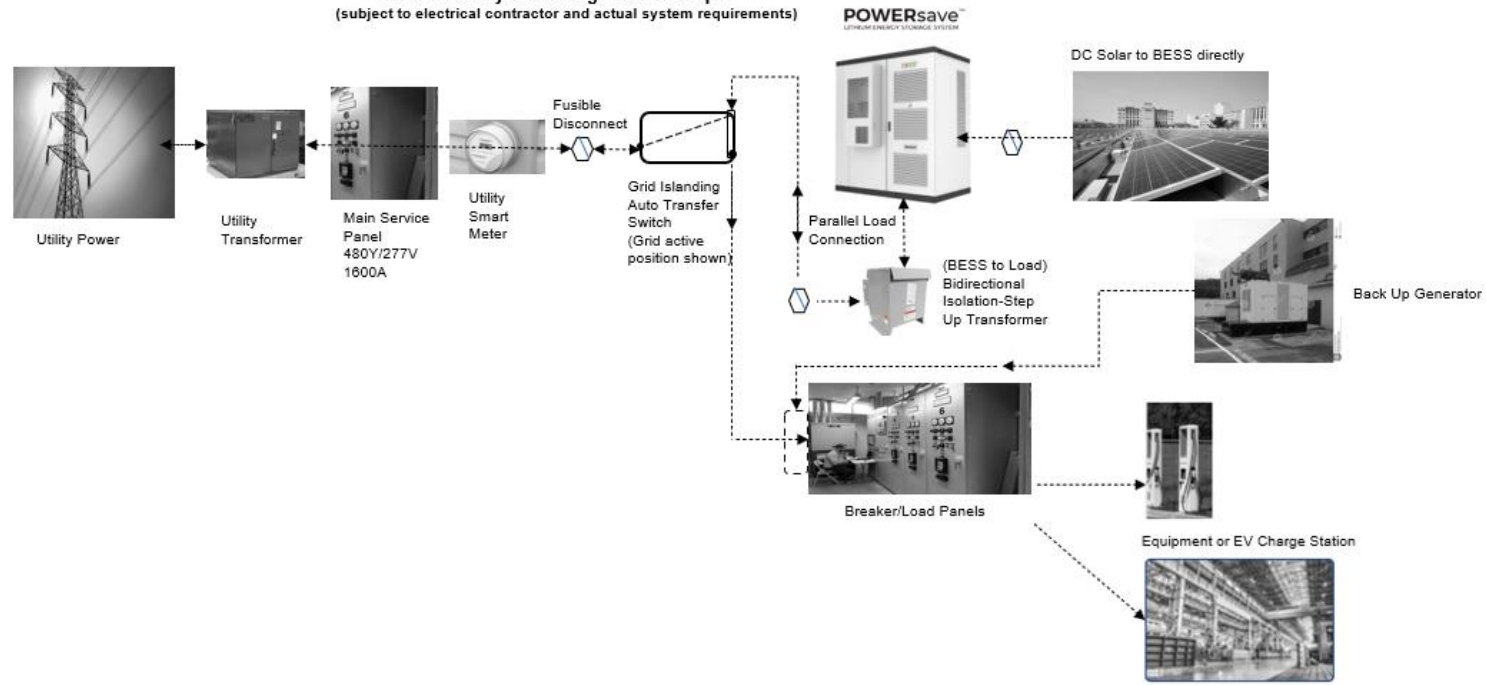


EQUIPMENT & OPTIONS

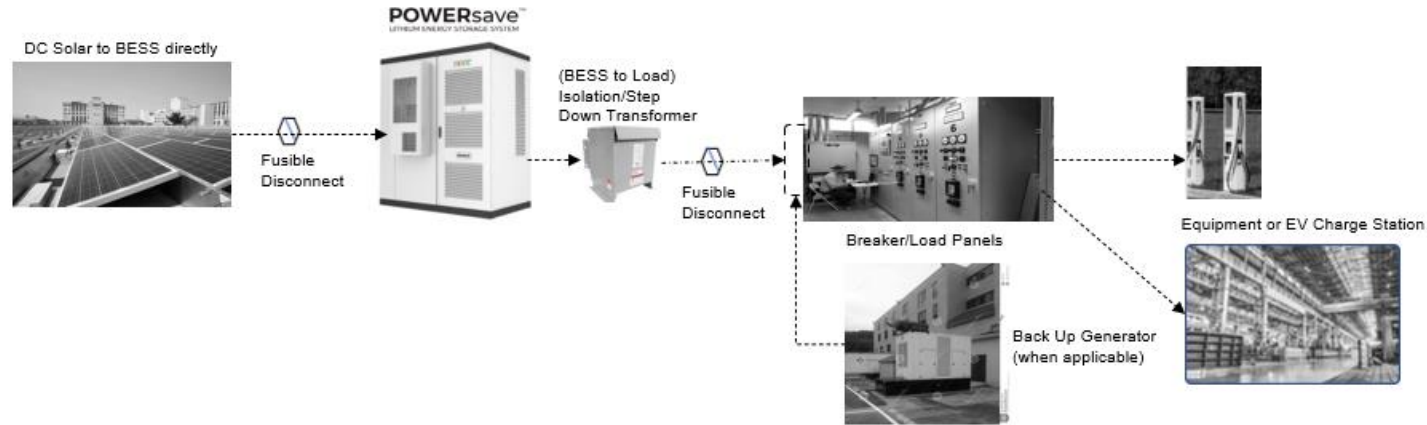
- 1- INDICATOR LIGHTS
- 2- EMERGENCY STOP
- 3- HVAC UNIT/THERMAL MANAGEMENT
- 4- AIR INLET
- 5- AIR OUTLET
- 6- 30KW PCS INVERTER(up to 3 as shown)
- 7- BATTERY MODULES/RACKS (up to 13 racks
190KWh capacity depending on sub model)
- 8- GATEWAY CONTROLLER
- 9- PDU/BATTERY HIGH VOLTAGE CONTROLLER

- 10- DC TO DC SOLAR CONTROLLER (45KW rating) up to 3 each per cabinet (optional equipment)
- 11- ATS (automatic transfer switch)(100KW rating) (optional equipment)
- 12a- Grid Side Circuit Breaker
- 12b- Load Side Circuit Breaker
- 12c- PCS side Circuit Breaker
- 13- Not shown Fire Suppression & Detection (optional equipment)
- 14- Not shown External Isolation/Step Transformer (optional equipment)

GRID TIED- System Integration Example
(subject to electrical contractor and actual system requirements)



OFF GRID-SOLAR DC COUPLED- System Integration Example
(subject to electrical contractor and actual system requirements)



TECHNICAL SPECIFICATIONS

GENERAL SPECIFICATIONS	
DIMENSIONS-ENCLOSURE BESS Cabinet	82.68" L x 47.25" W x 92.45" H (2100mm x 1200mm x 2348 mm)
WEIGHT-90KW/100KWH (Model PSC-90-100-03)	5188 lbs. (2353KG)
WEIGHT-90KW/145KWH (Model PSC-90-145-03)	5882 lbs. (2668KG)
WEIGHT-90KW/190KWH (Model PSC-90-190-03)	6576 lbs. (2983KG)
ENCLOSURE RATING	IP54/NEMA3R Indoor/Outdoor, Optional Salt Spray Corrosion Resistant
OPERATING TEMPERATURE	-20F to 122F (-20C to 50C)
MAX ELEVATION	3000m/10,000ft
COOLING/HVAC	5KW built in Forced Air Cooling (Power Electronics) for Battery System & Controls
COMPLIANCE (Main System Assembled)	UL9540, Meets Requirements NFPA855 and CEC for Interconnection Listing
INSTALLATION/MOUNTING	Above Ground Only, Concrete Pad Mount, Free Space or 3 ft. Wall Offset
PARALLEL AC Load Connectivity	Up to 6 individual POWERSave BESS Cabinet Systems can be interconnected to AC loads as single parallel configuration
SAFETY	Safety E-Stop, Visual Alarm Strobe, Built in Electrical Protection as listed each section
ENERGY MANAGEMENT/EMS	PEAK SHAVING, FREQUENCY CONTROL, BACK UP POWER, ENERGY SHIFT
AC POWER (Electrical Requirements)	
AC INPUT Voltage at PCS Inverter	480V 3 Phase Δ 3 wire Delta + separate ground (size as required/codes)
AC OUTPUT Voltage at PCS Inverter	480V 3 Phase Δ 3 wire Delta
AC INPUT/OUTPUT AMPS	Based on total connected PCS/Inverter ratings (see PCS/Inverter section)
ISOLATION & STEP UP/DOWN TRANSFORMER (when required)	Connected external between loads and Battery Storage Unit (BESS) AC Input. Isolation Transformer must be rated for BESS PCS Inverter rated KVA, bi-directional type with primary voltage 480V 3 phase Delta and secondary rated at 480V
POWER CONTROL UNIT/INVERTER (Specification for each 30KW PCS Inverter)	
CAPABILITY	30KW each Inverter/PCS up to max of 3 (90KW max) per Cabinet
GENERAL SPECIFICATIONS (each 30KW PCS Inverter)	1-DIMENSIONS: 440 x 173 x 596mm/WEIGHT: 33kg/TEMP: -40C-60C 2-Forced Air Cooling/TEMP Range: -30C-60C/IP20 Rating/Non Isolation 3-CERTS: UL1741, IEC62109-1/IP66
COMMUNICATION PORT	CAN/RS485/Ethernet/Wi-Fi
COMPLIANCE/LISTINGS/CERTIFICATION	UL9540,UL1741, CA Rule 21,UL1741SA,IEEE1547, FCC
BATTERY SIDE	1-CHARGE-DISCHARGE VOLTAGE RANGE: 150V-750V(350V-750V @ full load)/RATED POWER:30KW/MAX POWER: 33KW 2-MAX CHARGE-DISCHARGE CURRENT: 90A/OVER VOLTAGE-OVER CURRENT PROTECTION: Software and DC Fuse
DC BUS SIDE	RATED POWER: 45KW/INPUT VOLTAGE RANGE:700V-830V/MAX INPUT CURRENT: 32.5A x 2
AC GRID TIED OUTPUT	1-RATED OUTPUT POWER:30KW/MAX APPARENT POWER: 33KVA/MAX ACTIVE POWER:33KW 2-RATED GRID VOLTAGE: 3-PE, 480VAC/POWER FACTOR: 0.8-1 (lead or lag)
AC OFF GRID OUTPUT	1-RATED OUTPUT POWER:30KW/MAX APPARENT POWER: 33KVA/MAX ACTIVE POWER:33KW 2-RATED GRID VOLTAGE: 3-PE, 480VAC/POWER FACTOR: 0.8-1 (lead or lag) 3-OVERLOAD CAPACITY: 110-120%-10 min,120%-150% 200ms
PROTECTION (Other)	OTP, AC OVP/UVP, OFP/UFP,EPO, AC Phase Reverse, Fan/Relay Failure, OLP, DC GFDI, Anti Islanding
PEAK EFFICIENCY	97.30%

BATTERIES	
TYPE	(LFP) Lithium Iron Phosphate
CELL	280Ah/3.2VDC (Nominal)Hard Aluminum Enclosure/Safety Venting
MODULE PACK	1P16S/51.2VDC/14.4KWh (Nominal)
RACK QTY (Total KWh Capacity)	Capacity depends on model size and option selected (Example: 100KWH, 145KWH, 190KWH)
CHARGE CURRENT/TEMP up to 90% DOD	CHARGE: Rated 0.5C, Max 1C Charge--- TEMP CHARGE: 32F-132F(0-50C)
DISCHARGE CURRENT/TEMP up to 90% DOD	DISCHARGE: Rated 0.5C, Max 1C Charge--- TEMP DISCHARGE: -4F-122F(-20-55C)
SAFETY/PROTECTION	BMS(Battery Protection System)- Overcharge/Undercharge, Over Temp/Under Temp
CYCLE LIFE rated up to 90% DOD	6000 R/T Cycles at 90% DOD at 70% retention (longer cycles depending on DOD and cycle rate)
CERTIFICATIONS/STANDARDS	Meets the requirements of UL9540A Thermal Runaway Testing
SOLAR-DC -DC CONTROLLER (optional)	
TYPE	MPPT type-Bi-Directional Hybrid DC Converter- High Power Conversion- Rack Mount
POWER LEVEL	60KW(45KW when connected to 30KW PCS Inverter)
SOLAR PV Side & INPUT	1-Max Input Voltage: 1100VDC (830VDC when working with 30KW PCS Inverter) 2-Rated Input Voltage: 600VDC, Start-Up Voltage 250VDC 3-MPPT Voltage Range: 250-960VDC(810VDC when working with 30KW PCS Inverter) 4-Number of MPPT per controller=3, Number of Strings per MPPT= 2 (Total 6 strings) 5-Max Input Current each MPPT= 32A per MPPT total controller 96A
DC BUS Side (Output)	1-Max Output Voltage:830VDC/ Working Voltage Range: 600V-830VDC/ Rated Voltage 700VDC 2- Max Working Current: 75A/Rated Current: 65A
PROTECTION	PV Reverse/Insulation Impedance/PV Slide Switch/Temperature/Dc Arc/PID Repairment/PV SPD/BUS SPD
GENERAL SPECIFICATIONS	1-DIMENSIONS: 482.6 x 175 x 580mm/WEIGHT: 9.5kg/TEMP: -40C-60C 2-COMMUNICATION: RS485/PV TERMINAL: MC4/DISPLAY: Led/NOISE: <65dB 3-CERTS: UL1741, IEC62109-1/IP66
ATS- AUTO TRANSFER SWITCH (optional)	
TYPE-FEATURES	Auto Grid Islanding/Back Up Function/Power Compensation/Supports Parallel Mutiple 30KW PCS Inverters
AC POWER RATING	100KVA/Max Output Current 145A/400-480V 3 phase
AC GRID TIED OUTPUT	1- Grid Type: TN-C-S,TN-S, TT, TN-C 2-Rated Grid Voltage: 380V/400V/480VAC, 50/60Hz
AC OFF-GRID OUTPUT	1-Rated Voltage: Single Phase 220V/230V, 3 Phase: 380V/400V/480V, 50/60Hz 2-Max Output Current: 145A
SWITCHING TIME	ACTIVE: Seamless/PASSIVE SWITCHING: 30ms-120ms
CONNECTIVITY/MAX PCS INVERTERS	Up to 3 each 30KW PCS Inverters
FIRE SUPPRESSION & DETECTION (optional) (contact manf. for additional specs)	
FIRE SUPPRESSION	3M NOVEC 1230 Clean Agent pressurized built in overhead total flooded cabinet, External Fire Control Panel Interface
SMOKE DETECTION	Cross Zoned overhead mount
GAS DETECTION	Cross Zoned overhead H2 and mid section H2s type sensors
COMPLIANCE	UL9540, NFPA855, NFPA2001