

■ Introduction

In order to meet Energy storage market requirement, BYD successfully developed 160kVA modularized PCS (Power Conversion System) which use the most advanced three-level inverter technology and modular structure design. It is mainly used for energy conversion, power- and frequency regulating function and with high conversion efficiency, low output harmonic containing rate, big permissible working environment temperature range. The compact design of PCS also makes maintenance easier, humanized touch screen operation interface helps operation in site and querying information more convenient. Remote monitoring system can be used to inspect and modify the system settings with fast the maintenance response.



Figure 1: Picture of 160kVA modularized PCS

■ The principle of system

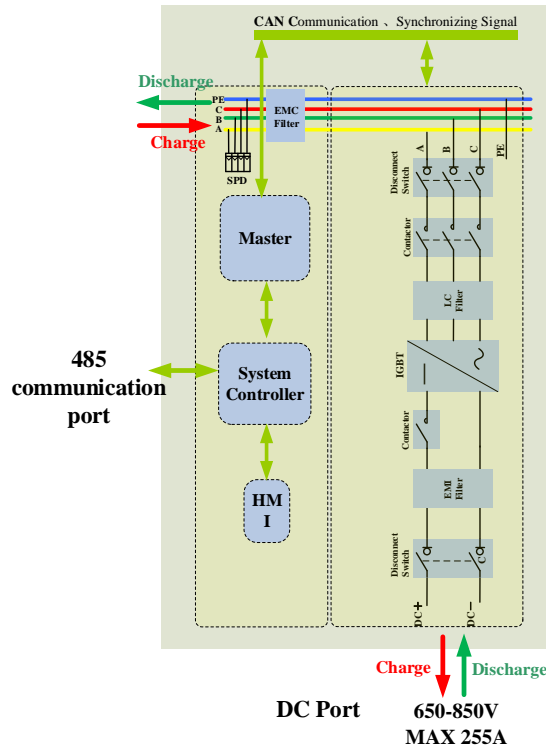


Figure 2: The principle of system



BEM160KTL-E-R1

160kVA PCS Specification

■ System Parameter

No.	Type	BEM160KTL-E-R1	Remark
DC Side Parameter			
1	DC Voltage	650-850Vdc	
2	Max. DC Current	255A	
3	DC Max. input current for each way	255A	
AC Side Parameter			
4	Nominal AC Voltage	400Vac	
5	Voltage Range	360Vac~440Vac	
6	Max. AC Current	230A	
7	Nominal Power	160kVA	
8	Nominal Grid Frequency	50Hz	
9	Grid Frequency Range	47~52Hz	
10	Power Factor	-1~1	
11	THD	<5%	@Nominal Power
12	Active Power Accuracy	±2kW	
13	Reactive Power Accuracy	±3kvar	
14	Response Time	Within 200ms	
15	overload capability	110% overload continuous operation	Temp@40°C, AC400V
16		120% overload operation 60s	
System Parameter			
17	Insulation Method	Without Transformer	
18	Max. Efficiency	98.70%	
19	Enclosure Protection Grade	IP20 (Indoor)	
20	Permissible Environment Temperature	-25~+50°C	



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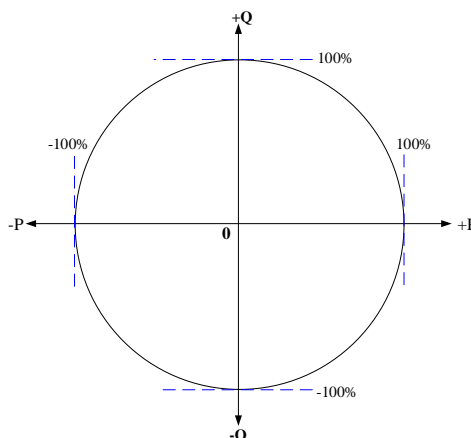
160kVA PCS Specification

21	Permissible Humidity	5~95%	No condensing
22	Permissible Altitude	≤2000m	
23	Noise	<70dB	
24	Cooling Method	Smart Forced Wind Cooling	
25	External power source consumption	800VA	
26	Fresh Air Consumption	1000m ³ /h	
27	Display	HMI	
28	Communication Interface	RS485	
29	Communication protocol	Modbus TCP	
30	Dimension (W×D×H)	800mm×600mm×2000mm	
31	Weight	500kg	
Protect Function			
32	Short Cut Protection	√	
33	Over Load Protection	√	
34	DC Over/Under Voltage Protection	√	
35	Grid Monitoring	√	
36	Over Temperature Protection	√	
37	Direct Current Electrode Positive Protection	√	
Function			
38	P/Q	√	
39	LVRT	√	
40	Island Protection	Active and passive detection	
Reference standards and certification			

41	EMC	EN61000-6-2:2005	
42		EN61000-6-4:2007+A1:2011	
43		EN 61000-3-11: 2000	
44		EN 61000-3-12: 2011	
45	Safety	EN 62477-1:2012+A11:2014	
46	Certification	CE ,G59/3,BDEW,SAA	

■ Reactive Power Capability

The PCS independently controls the real power (P) and reactive power (Q). Providing independent control of the real and reactive power allows the system operator to use the reactive capacity of the PCS during times where the real power demand is low, providing voltage support or power factor compensation. The reactive power capacity of the PCS as defined below. Independent values for P,Q and S power limits can be programmed into the PCS.



The continuous VAR capability is 100% of the nominal rating, as shown in the above diagram.

■ Performance Characteristics

- Wide DC input voltage range, the highest voltage is up to 1000V
- Maximum efficiency is as high as 98.7%
- Small current harmonic
- Thin film capacitor design improve the service life of the system
- Modular design, easy to maintenance

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160kVA PCS Specification

■ Application

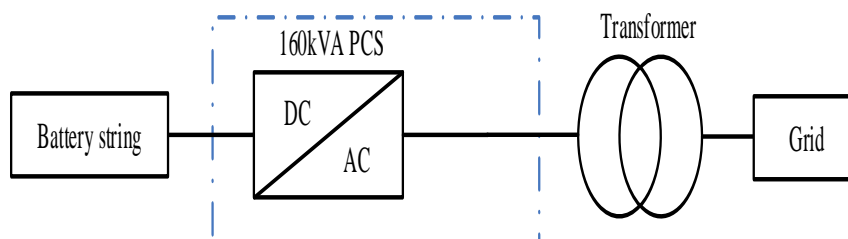


Figure 3: Topology of system

■ External interface description

No.	Name	Description	Interface	Remark
1	DC Input	Voltage Range 650-850V	4	4 Way in Each Modular Cabinet
2	AC Output	3 phase 3 line AC400V/50Hz	1	AC output, 2 aperture, aperture diameter: 13mm
3	Distribution Interface	AC230V/50Hz	2	One way control circuit power supply, One way non control circuit power supply
4	Communication Interface	RS485/CAN	1	Recommended Cable 2*20AWG
5	Grounding Interface	Cabinet Grounding Interface	1	1 aperture, aperture diameter: 13mm