

■ Introduction

In order to meet Energy storage market requirement, BYD successfully developed 480kVA 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 480kVA modularized PCS

■ The principle of system

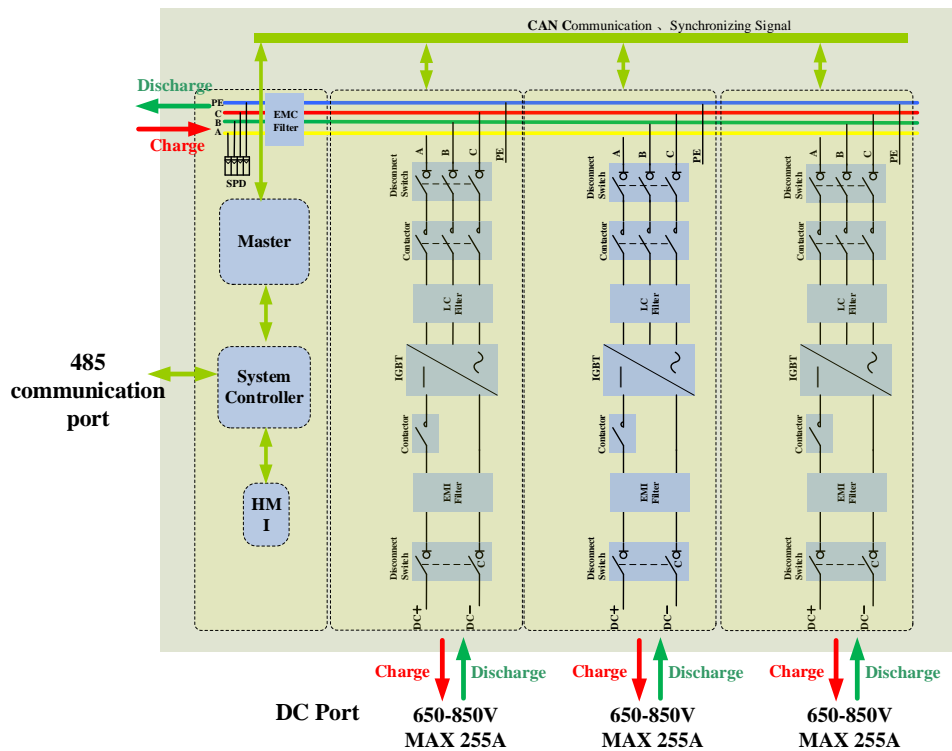


Figure 2: The principle of system



BEM480KTL-E-R1

480kVA PCS Specification

■ System Parameter

| No. | Type | BEM480KTL-E-R1 | Remark |
|-------------------|-------------------------------------|------------------------------------|-------------------|
| DC Side Parameter | | | |
| 1 | DC Voltage | 650-850Vdc | |
| 2 | Max. DC Current | 765A | |
| 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 | 690A | |
| 7 | Nominal Power | 480kVA | |
| 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 | |



BEM480KTL-E-R1

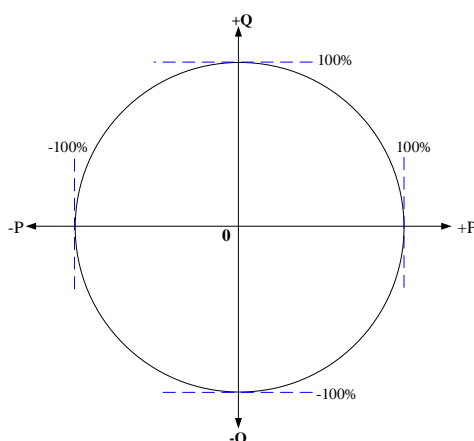
480kVA PCS Specification

| | | | |
|---------------------------------------|--|------------------------------|---------------|
| 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 | 1600VA | |
| 26 | Fresh Air Consumption | 3000m ³ /h | |
| 27 | Display | HMI | |
| 28 | Communication Interface | RS485 | |
| 29 | Communication protocol | Modbus TCP | |
| 30 | Dimension (W×D×H) | 1600mm×600mm×2000mm | |
| 31 | Weight | 1100kg | |
| 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,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

■ Application

BEM480KTL-E-R1

480kVA PCS Specification

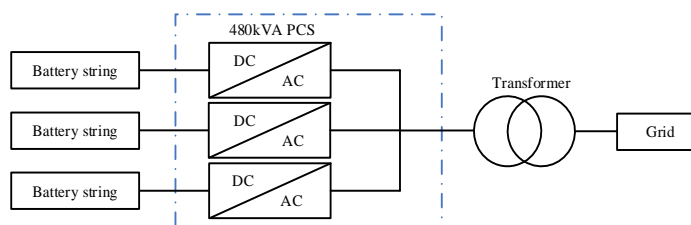


Figure 3: Topology of system

External interface description

| No. | Name | Description | Interface | Remark |
|-----|----------------------------|--------------------------------|-----------|---|
| 1 | DC Input | Voltage Range 650-850V | 12 | 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 |