

# Solid-State Circuit Breakers

## Introduction

The 8 kA/3.6 kV Solid-State Circuit Breaker (SSCB) is a high-performance power protection core device tailor-made for the excitation and quench protection of superconducting coils in fusion devices. Utilizing semiconductor devices and precise control technology, it is configured for high parameters of 3.6 kV rated voltage and 8 kA rated current, meeting the operational requirements of fusion device superconducting coils under extreme conditions such as ultra-low temperature, strong magnetic fields, and high energy storage. It ensures stable and continuous current conduction during excitation and achieves high-speed, reliable breaking within microseconds ( $\leq 10 \mu\text{s}$ ) upon quench failure, providing safe, reliable, and ultra-fast electrical protection for fusion devices.



## Parameters

Parameters	
Rated Voltage	3.6 kV
Rated Current	8 kA
Conduction Voltage Drop	4 V max
Breaking Time	10 $\mu\text{s}$ max

Environment	
Operating Temperature	-25°C~45°C
Storage Temperature	-25°C~70°C
Humidity	≤90%RH, No condensation

Others	
Communication interface	RS485,EtherCAT,Optical Port, Network Port
Cooling Method	Water Cooling
Insulation Withstand Voltage	5000 VDC
Protection	Quench Protection,Overcurrent, Short Circuit
Size	1150 mm*1100 mm*2260 mm

## Applications

Solid-state circuit breakers can also be applied in numerous fields, such as rapidly developing DC transmission systems, rail transportation, and superconducting energy storage magnets. In these DC power systems and their specialized loads, circuit breakers will play a critical role.