DC High-Voltage Fuses

CBP-SBX SERIES FUSES

- Semiconductor Protection Fuses – IEC60269-1/EN60269-1 Standards

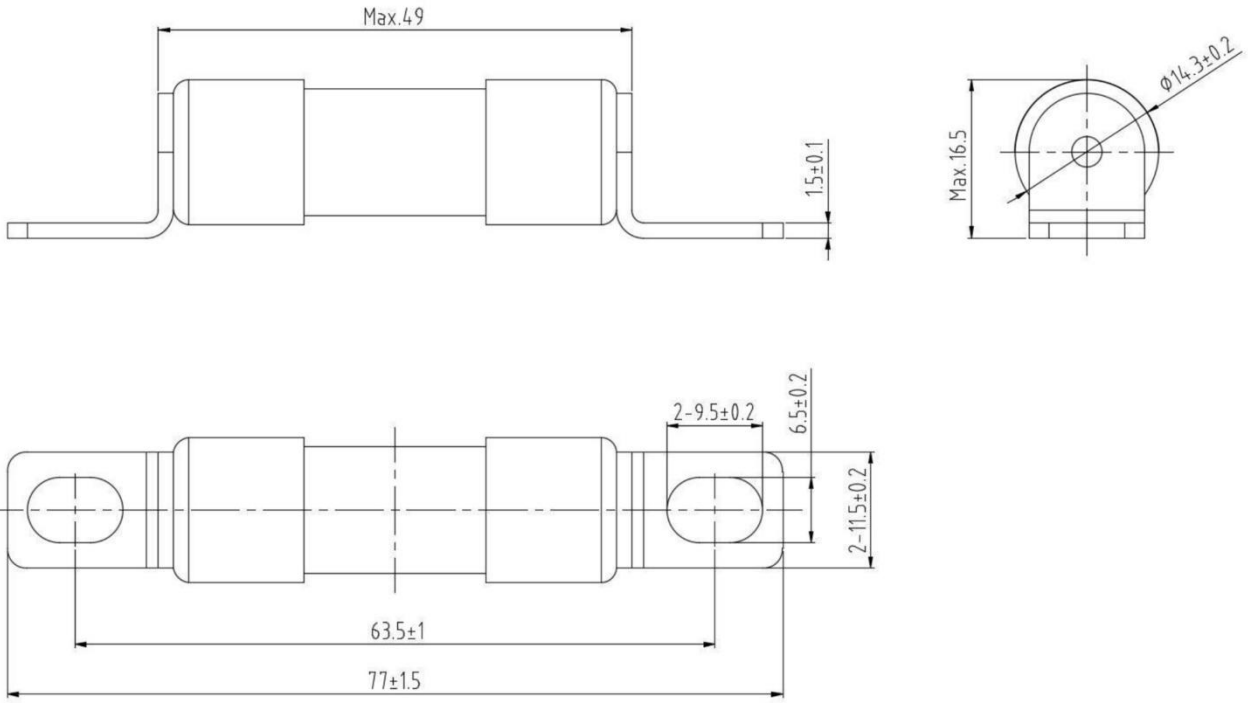
Size	Rated Voltage	Operating Class	Rated Breaking Capacity
14	750Vdc	gG	20kA @ 750V DC

- Product Model

  CBP-SBX-32GP-G

- Key Features & Benefits
  - **Secure Bolted Connection:** Ensures a reliable and mechanically robust connection, ideal for industrial and high-vibration environments.
  - **Superior Overcurrent Protection:** Delivers excellent electrical performance, rapidly interrupting fault currents to safeguard critical system components.
  - **Automotive-Grade Quality:** Manufactured in a facility adhering to the IATF 16949 quality management system.
  - **Environmentally Compliant:** The product and its packaging are fully compliant with RoHS directives.

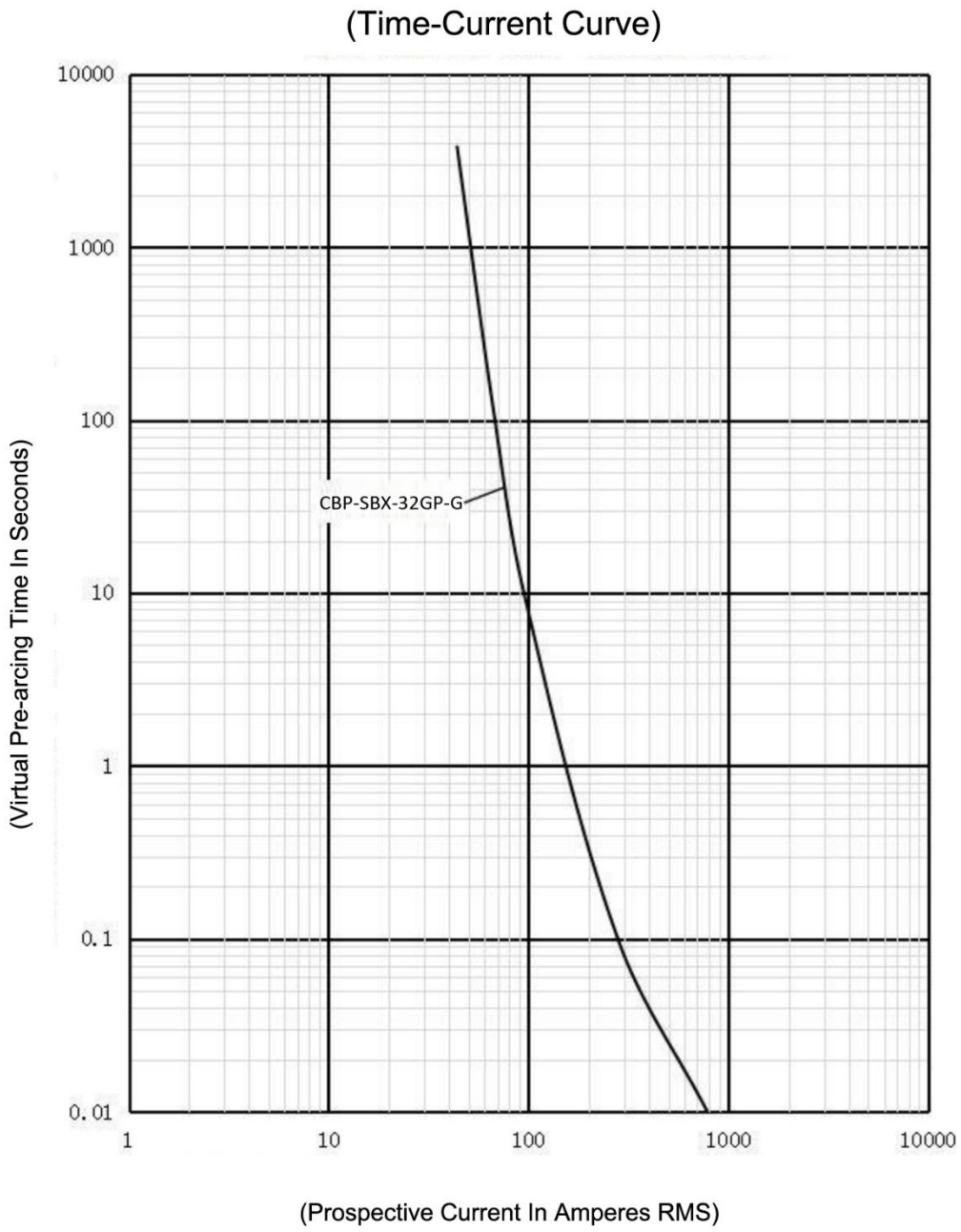
Mechanical Dimensions



Specification Matrix

Rated Current (A)	Rated Voltage (V)	Part Number	Power Loss (W) (typ.)	Pre-arcing I²t (A²s)	Total Clearing I²t @ 750V (A²s)	Weight (kg/pc) (approx.)	Pack Qty
32	750Vdc	CBP-SBX-32GP-G	7.6	2,650	5,700	0.029	1

Time- Current Characteristics Curve



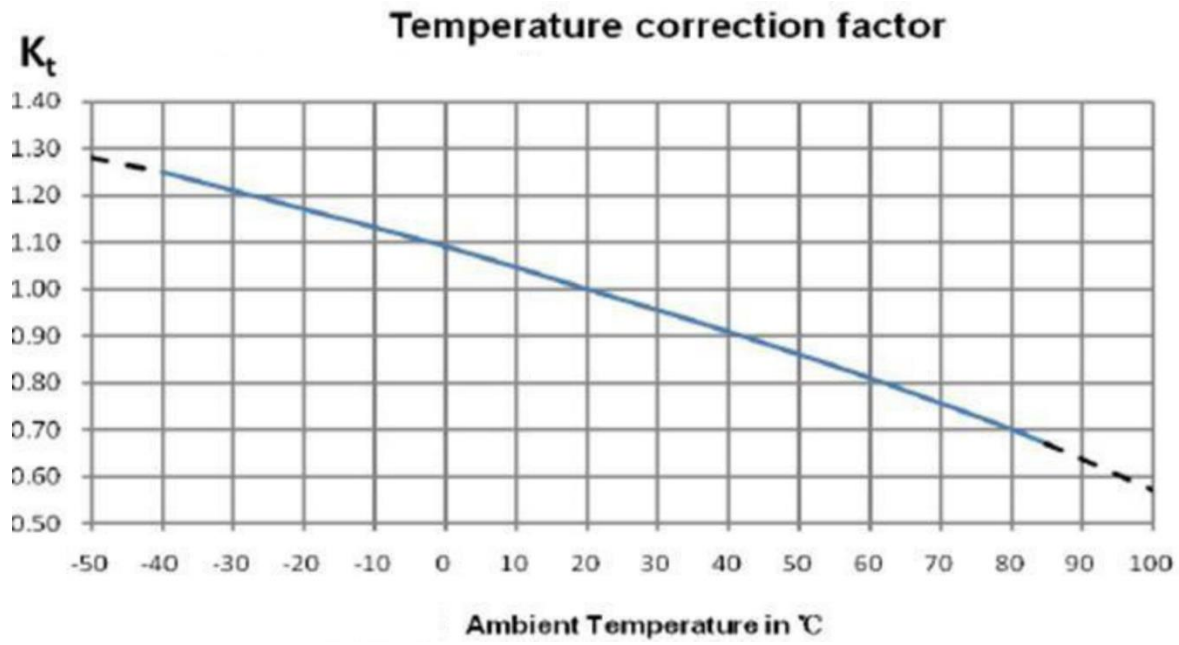
Selection For The Fuse Amperage

To ensure proper circuit protection, the fuse's rated current (In) must be selected according to the system's operating parameters. Use the following formula to determine the required fuse rating

$$I_n \geq \frac{I_{RMS} \times G}{K_t \times K_e \times K_v \times K_f \times K_a \times K_b}$$

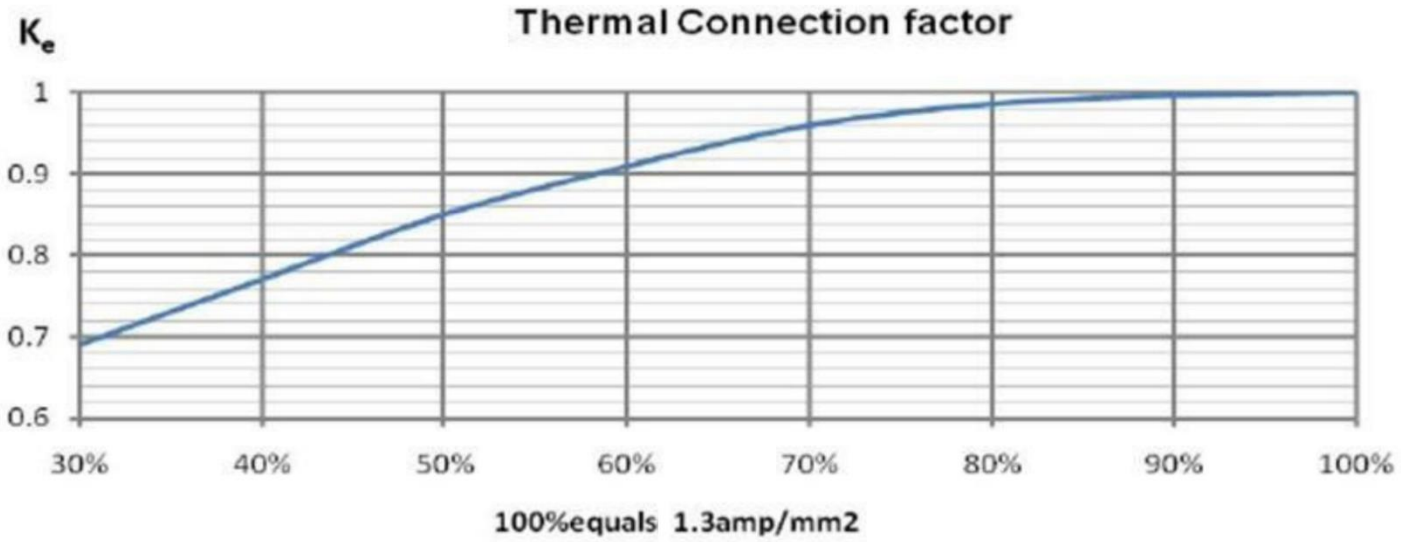
Temperature Correction Factor K_t

The fuse's performance is influenced by the ambient operating temperature, which affects its rate of thermal dissipation. The correction factor K_t should be applied to adjust for ambient temperatures that differ from the standard reference.



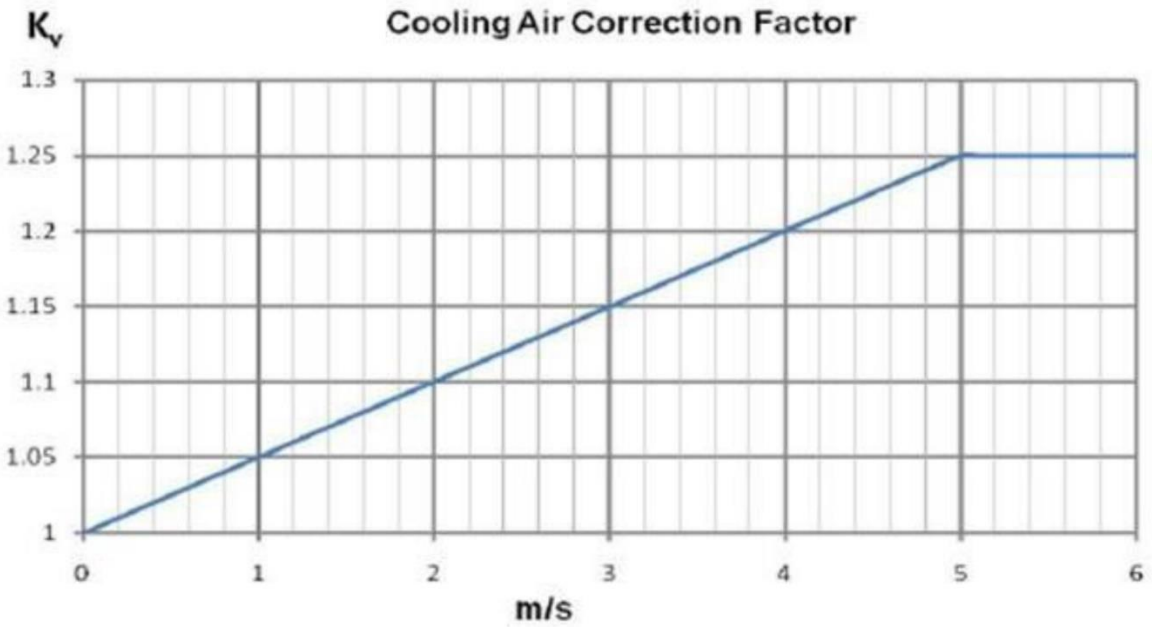
Thermal Connection Correction Factor K_e

The size and material of the connected conductors (e.g., busbars, wires) significantly impact the fuse's ability to dissipate heat through conduction. This effect must be accounted for using the K_e factor, selected based on the conductor's specifications and current density.



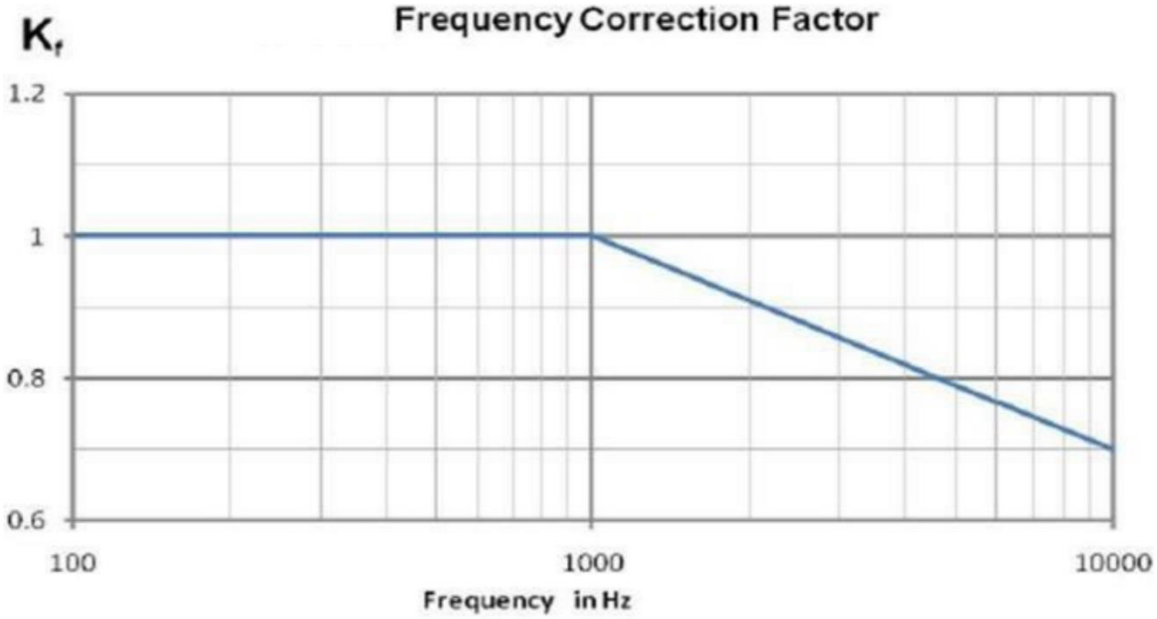
Forced Cooling Correction Factor K_v

Applying forced cooling, such as from a fan (air cooling) or a liquid cooling system, enhances the thermal convection from the fuse body. This allows the fuse to handle a higher continuous current. Use the K_V correction factor from the chart below based on the cooling airflow velocity.



Frequency Correction Factor K_f

High-frequency harmonics in the power grid (typically above 1 kHz) can increase the fuse's operating temperature due to resistive effects (skin and proximity effects). This requires derating the fuse's current-carrying capacity. Apply the K_f factor based on the system's operating frequency.:



Altitude Correction Factor K_a

- **Standard Operation:** The standard operating altitude for this fuse is up to 2000 meters. Above this level, the reduced air density impairs natural convection cooling. As a general rule, a current derating of 3% to 5% for every 1000 meters of elevation gain is recommended.
- **Temperature Offset:** Ambient temperature typically decreases with altitude (approx. 6°C per 1000m). In many open-air applications, this temperature drop can offset the reduced cooling efficiency. To avoid redundant corrections, the effects of temperature (K_t) and altitude (K_a) can often be considered to cancel each other out.
- **Enclosed Applications:** For fuses used in sealed enclosures where the internal ambient temperature does not decrease with increasing external altitude, the derating of 3% to 5% per 1000m must be applied if the internal temperature exceeds 40°C.
- **Insulation Considerations:** The impact of high altitude on the fuse's dielectric strength (insulation) should be evaluated as part of the overall system's electrical design rather than a separate derating factor for the fuse itself.

Installation Environment Correction Factor K_b

- Open-type Enclosure: $K_b = 1.0$
- Sealed Enclosure: $K_b = 0.9 – 0.95$
- Installed in MSD with Bolt Fastening: $K_b = 0.8$
- Installed in MSD with Plug-in Connection: $K_b = 0.7$

Load Constant G

- Principle:
  - Purely Resistive Load (no inrush): G = 1.0
  - Resistive Load with moderate peak current: G = 1.1 – 1.2
  - Highly Capacitive Load (high peak inrush current): G = 1.5 – 1.7

Operating and Storage Conditions

No	Item	Requirements
1	Operating Voltage	≤750Vdc
2	Operating Environment	
	Standard Operating Temp	-5℃～40℃
	Operating Temp. Range	-40℃～125℃
	Relative Humidity	5%～95%
3	Altitude	
	Standard Altitude	≤2000m
	Maximum Mounted Altitude	≤5500m
	Atmospheric Pressure	61.6kPa～106.2kPa
4	Storage Environment	
	Standard Storage	-5℃～85℃ RH＜75%
	Allowed Storage	-40℃～120℃
5	Mounting Torque	M6 Terminals: 6 ± 1 Nm
6	Pollution level	III (Industrial Environment)
Note:	If operating conditions exceed the standard parameters, derating or other corrections may be necessary. Please consult the correction factor charts or contact Component Basics for application support.	

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