High-Speed Fuses

CBDH SERIES FUSE



- Semiconductor Protection Fuses – IEC60269-4/EN60269-4 Compliant

Size	Rated Voltage	Operating Class	Rated Breaking Capacity
30	500Vac/dc	aR	500Vac@100kA 500Vdc@20kA

- Series Reference

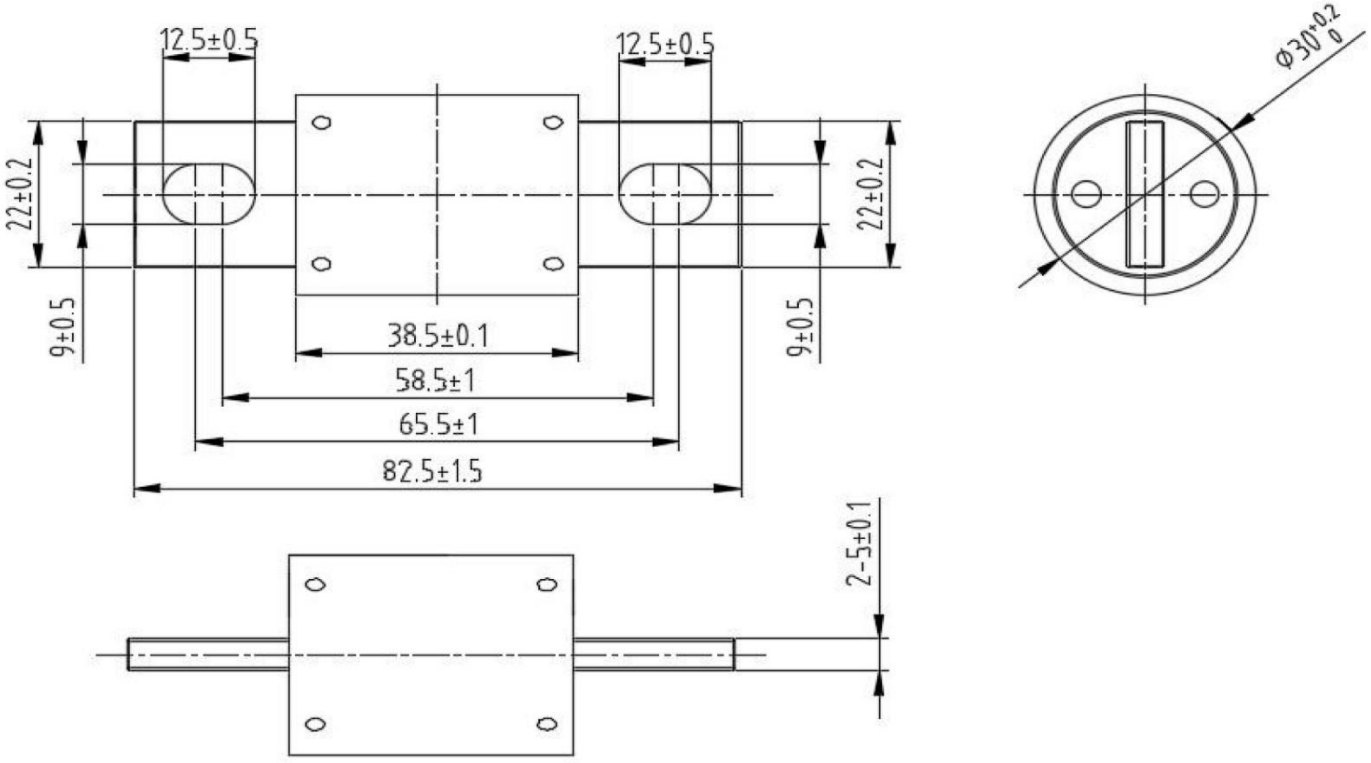
CBDH-(125-200)A

- Key Features

The CBVAC CBDH-(125-200)A series offers excellent electrical performance with fast protection for EV systems. It quickly interrupts fault current to ensure system safety. The design is based on IEC60269-4 and EN60269 standards. Manufacturing complies with IATF16949 quality management system requirements. Products and packaging conform to RoHS standards.

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Dimensions

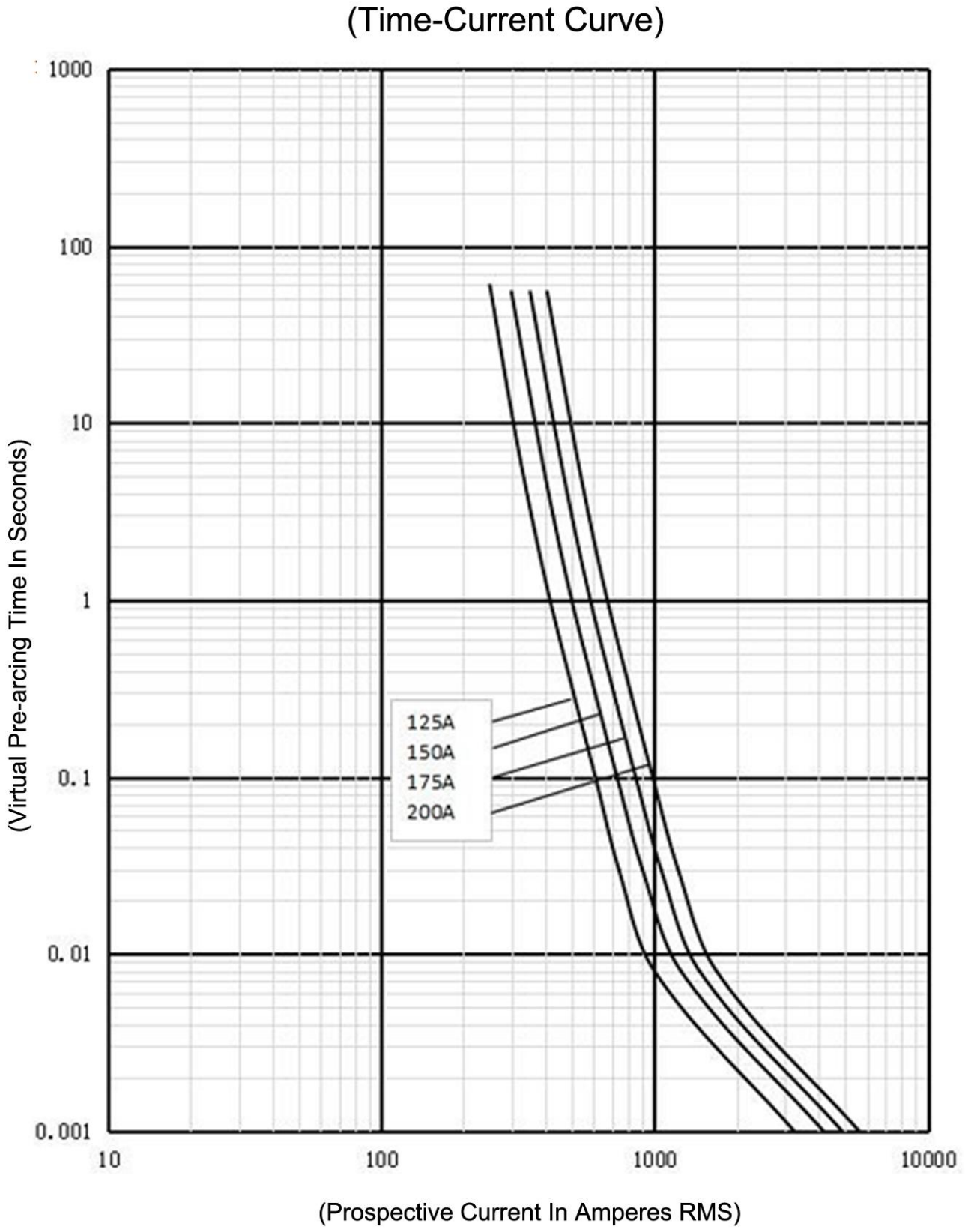


Specification Matrix

Part Number	Rated Current (A)	Rated Voltage (V)	Power Loss (W)	Pre-arcing I²t (A²s)	Total I²t @500V (A²s)
CBDH-125A	125	500	24	800	3800
CBDH-150A	150	500	25	1100	5000
CBDH-175A	175	500	27	1450	6800
CBDH-200A	200	500	30	1900	9400

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- Time- Current Characteristics Curve



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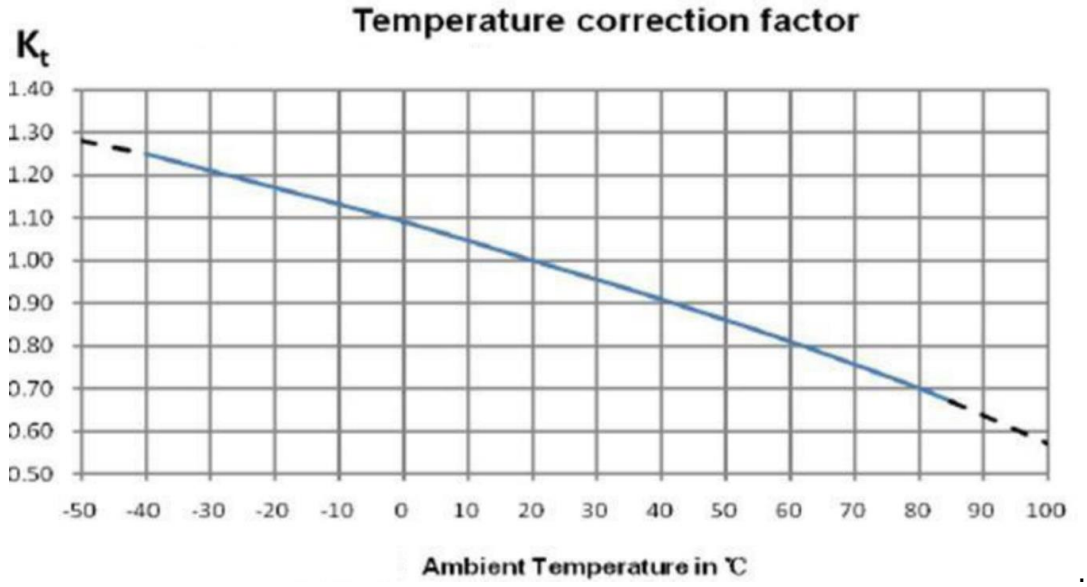
Fuse Current Rating Selection Formula

To ensure reliable performance and prevent nuisance tripping, the fuse's nominal current rating (I_n) must be properly selected based on the system's operating conditions. Use the following formula to calculate the required minimum fuse rating:.

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

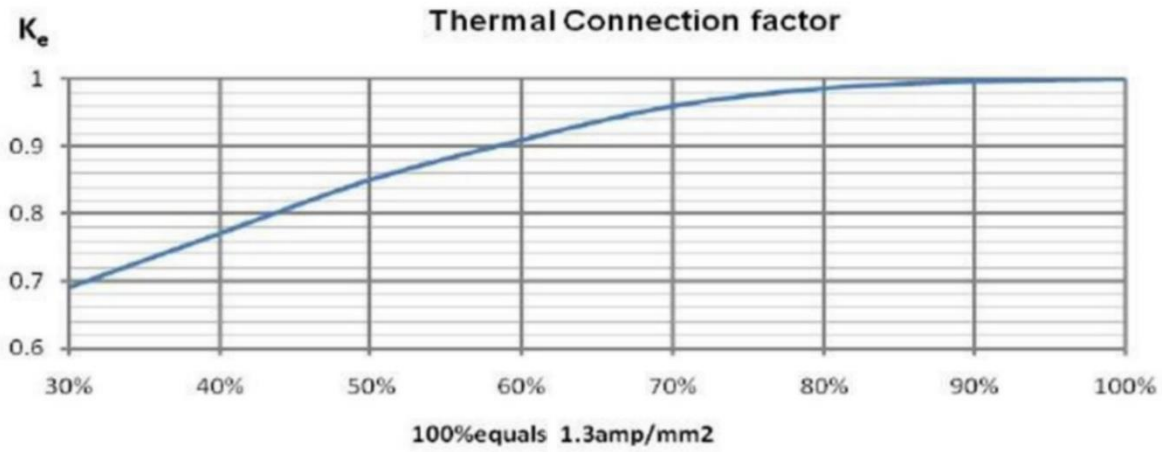
Temperature Derating Factor (K_t)

Fuses operating under different ambient temperatures will affect the thermal radiation effect of the fuse's heat. The correction factor K_t values for different ambient temperatures are shown in the following curves.



Thermal Connection Factor (K_e)

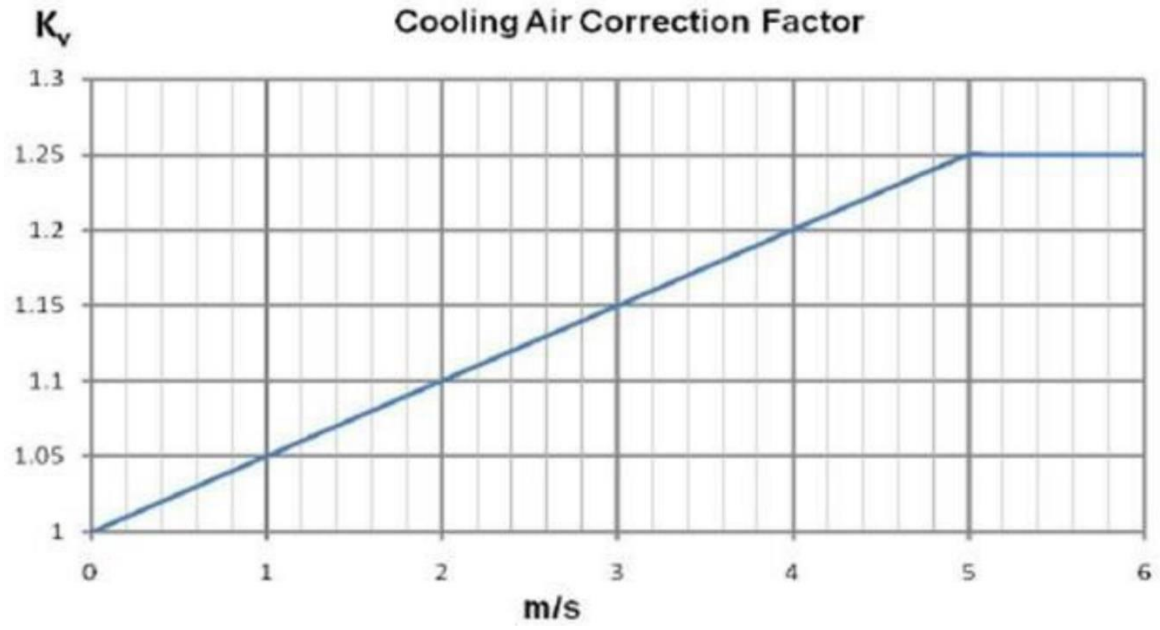
When CBDH-FUSES are installed, the specifications of the copper bars or wires (wire harnesses) directly connected to the fuses will affect the heat conduction effect of the fuses. For different connection copper bars (or wires) selected, the thermal connection correction factor K_e value is shown in the following curve.



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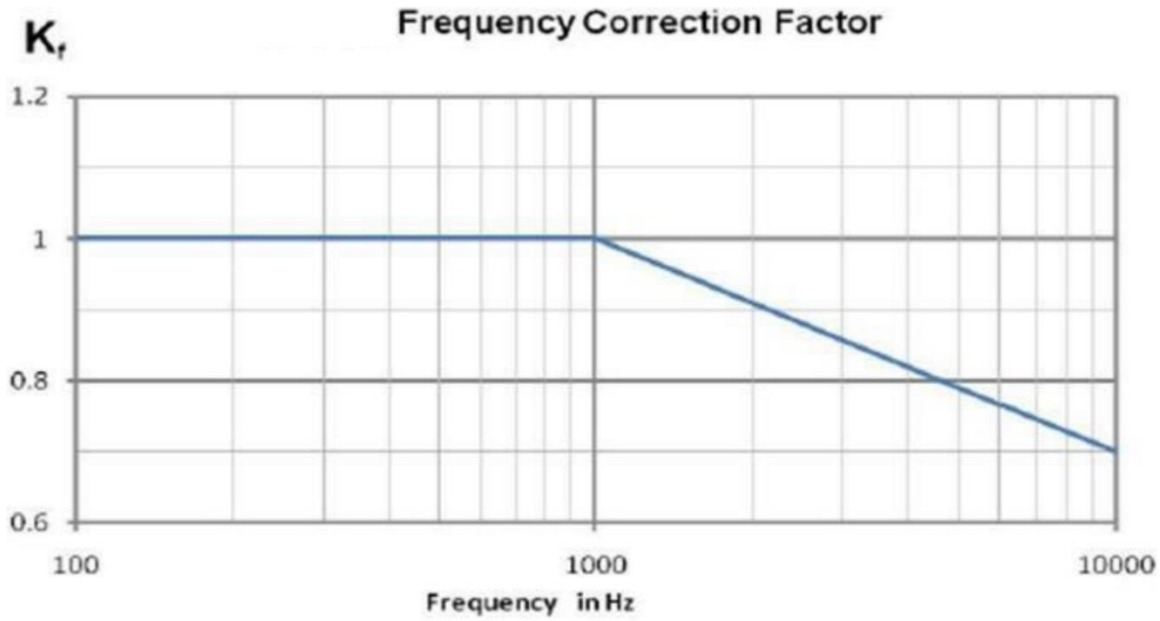
Forced Cooling Correction Factor (K_v)

K_v For CBDH-FUSES, forcibly increasing air cooling (or liquid cooling) will enhance the thermal convection effect of the fuse's heat, which can increase the fuse's flow rate. The forced cooling correction factor K_v value is shown in the following curve.



Frequency Derating Factor (K_f)

When there are high-frequency harmonics in the power grid and the frequency reaches above 1000Hz, due to the influence of high-frequency distortion on the resistance, the capacity of the CBDH-FUSES needs to be reduced. The coefficients are as follows.



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Altitude Derating Factor (K_a)

- The normal operating altitude for the CBDH-FUSES is 2000 meters. When the altitude increases, the air becomes thinner, which adversely affects the occurrence of thermal radiation. The impact on heat dissipation can be considered as a derating of 3% to 5% for every 1000 meters of elevation. At the same time, due to geographical conditions, the ambient temperature typically decreases by approximately 6°C for every 1000-meter increase in altitude. To avoid double-counting with the temperature correction factor (K_e), this effect can be considered as offsetting.
- For the CBDH-FUSES used in enclosed environments, if the ambient air temperature inside the sealed enclosure does not significantly decrease with increasing altitude, and can still reach above 40°C, then derating the rated current is required. The rated current should be derated by 3% to 5% for every 1000 meters increase in altitude.
- Regarding the impact of high altitude on insulation strength, since the CBDH-FUSES itself is a conductor during normal operation, only the insulation level of the live parts of the fuse relative to the casing (ground) needs to be considered. Therefore, the impact of high altitude on this aspect can be integrated as part of the overall system's electrical components and does not need to be treated separately for the fuse.

Installation Environment Factor (K_b)

- CBDH-FUSES installed in open-type enclosures: G = 1
- CBDH-FUSES installed in sealed enclosures: G = 0.9–0.95
- CBDH-FUSES installed in MSD with bolt fastening: G = 0.8
- CBDH-FUSES installed in MSD with plug-in connection: G = 0.7

Load Constant (G)

Different types of load conditions can generate varying levels of inrush current, and the following considerations need to be taken into account:

- Principle: Purely resistive load, no inrush current, G = 1.
- Resistive load with peak current: G = 1.1–1.2.
- Highly capacitive load with high peak inrush current: G = 1.5–1.7.

Usage Conditions

Operating Voltage: ≤500Vac
Normal Ambient Temperature: -5℃to 40℃
Allowed Operating Temperature: -40℃to 125℃
Relative Humidity: 5% to 95%
Altitude: ≤2000m (normal), up to 5500m allowed with derating
Atmospheric Pressure: 61.6kPa – 106.2kPa
Storage: -5℃to 85℃(normal), -40℃to 120℃allowed
Installation Torque: M8, 12±1N·m
Pollution Level: III

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