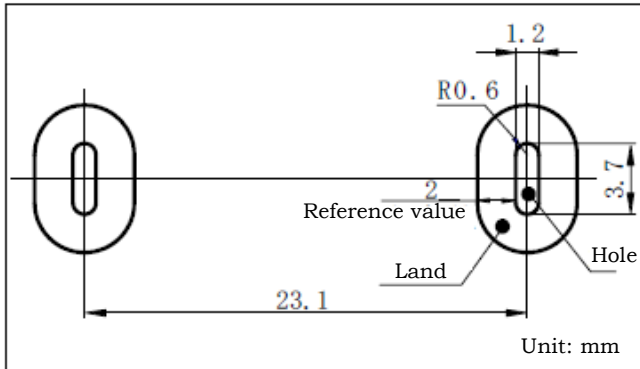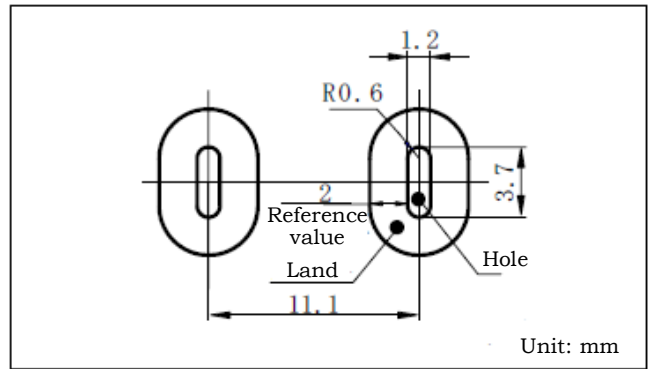⊖ HINODE

Installation design data for the KHK Series fuse

1. Recommended mounting hole pitch

   ·660KHK (600KHK) series   ·400KHK (350KHK) series

2. Clearance and creepage distance

   When the fuse cuts off, a large voltage is applied between both terminals. The recommended values of the distance between the land and from other devices, is shown in the table below.

Product series	Distance between both terminal land		Distance between the fuse and the other device
	Coated mount board	Un-coated mount board	
400KHK (350KHK)	More than 3mm	More than 5mm	More than 4mm
660KHK (600KHK)	More than 5mm	More than 8mm	More than 6mm

   For the application of 400KHK (350KHK), if the distance between the terminals needs to be larger, because of the possibility of insulation decline due to contamination on the mounting board, or if the distance between the terminals is shorter due to your company provisions, please use 660KHK(660KHK) instead.
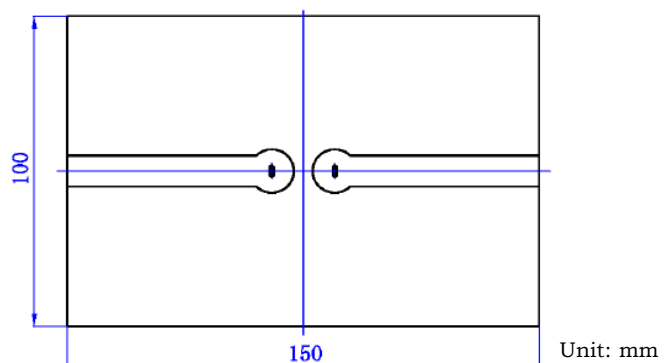
3. Temperature rise

   Fuse temperature changes according to the width of the pattern and the conduction current. The temperature rise characteristics, as shown below, follow a pattern that becomes 1A/mm (copper foil thickness:35μm) at the time of conducting a current that is 50% of the fuse's rated current. Please refer to the data when designing a pattern.
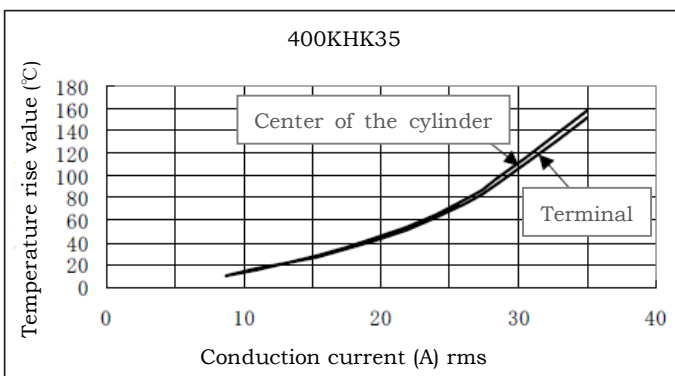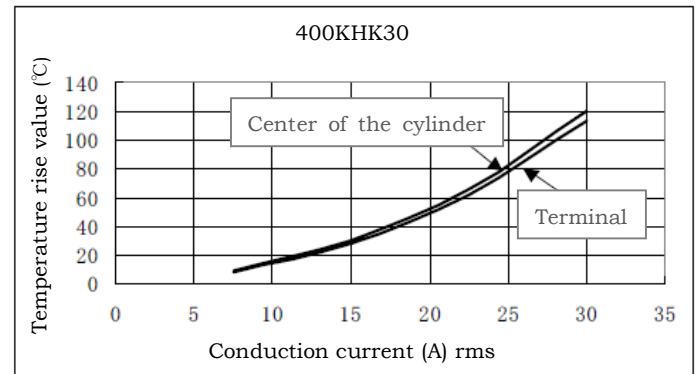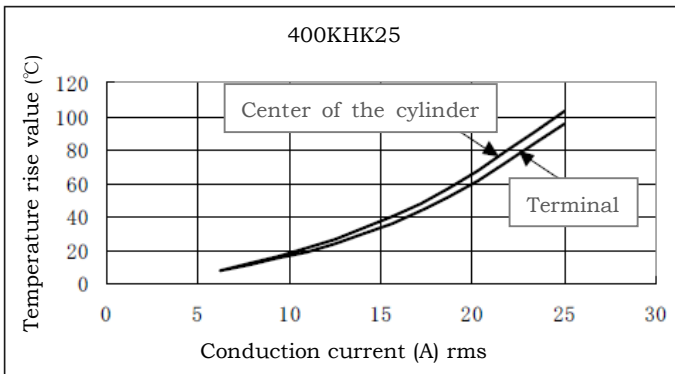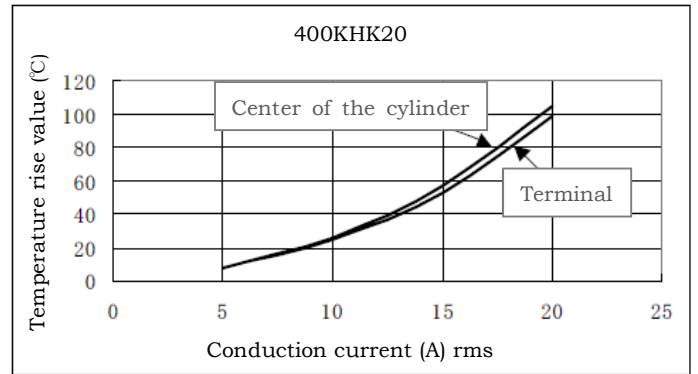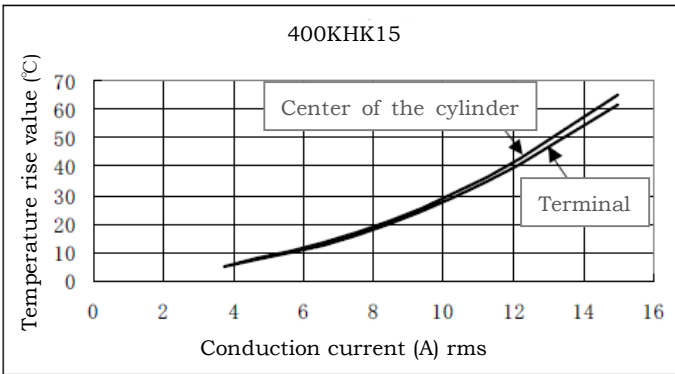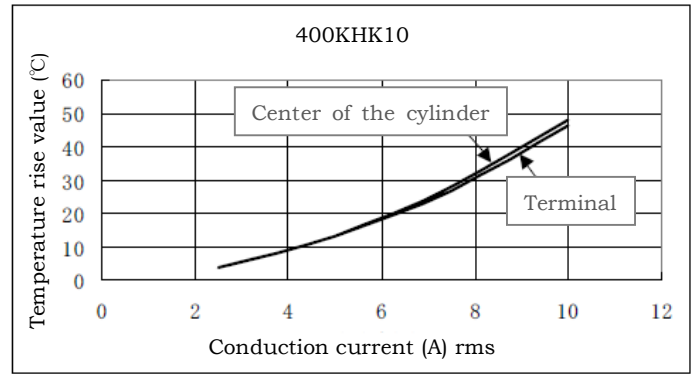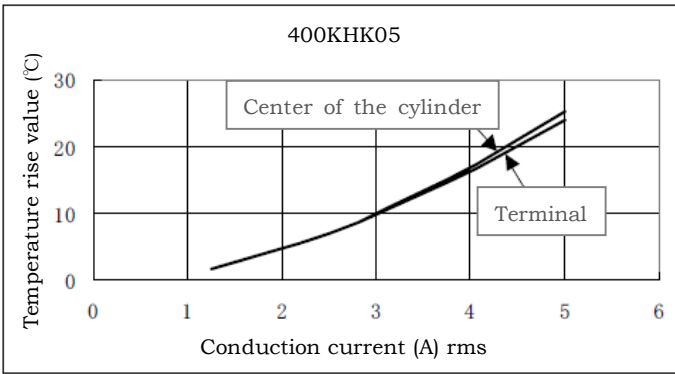
   ● Conditions

     Board size: 150mm X 100mm
     Board material: FR-4
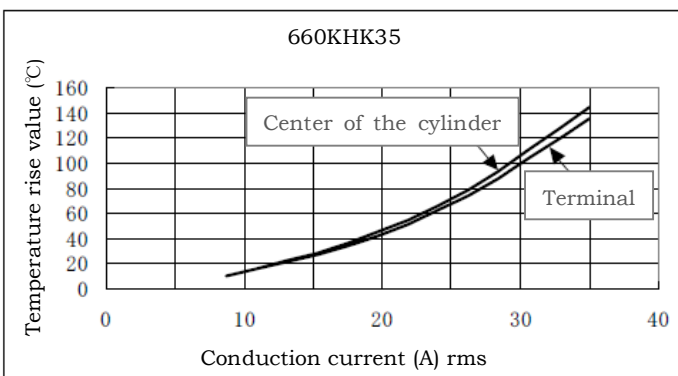   Copper foil thickness: 35μm

● 400KHK (350KHK) Temperature rise characteristics

400KHK05

Temperature rise value (℃) vs Conduction current (A) rms

Center of the cylinder

Terminal

400KHK10

Temperature rise value (℃) vs Conduction current (A) rms

Center of the cylinder

Terminal

400KHK15

Temperature rise value (℃) vs Conduction current (A) rms

Center of the cylinder

Terminal

400KHK20

Temperature rise value (℃) vs Conduction current (A) rms

Center of the cylinder

Terminal

400KHK25

Temperature rise value (℃) vs Conduction current (A) rms

Center of the cylinder

Terminal

400KHK30

Temperature rise value (℃) vs Conduction current (A) rms

Center of the cylinder

Terminal

400KHK35

Temperature rise value (℃) vs Conduction current (A) rms

Center of the cylinder

Terminal

● 660KHK (600KHK) Temperature rise characteristics

660KHK05

660KHK10

660KHK15

660KHK20

660KHK25

660KHK30

660KHK35
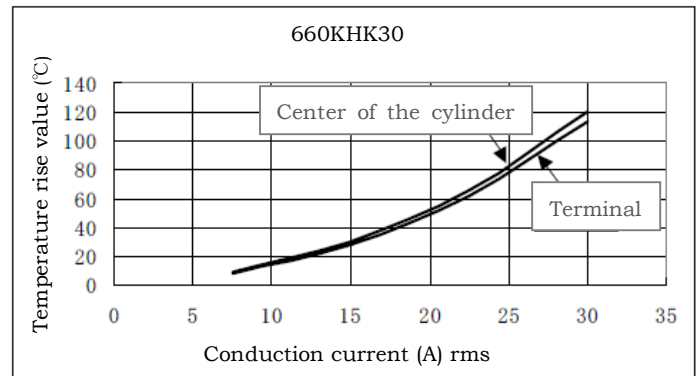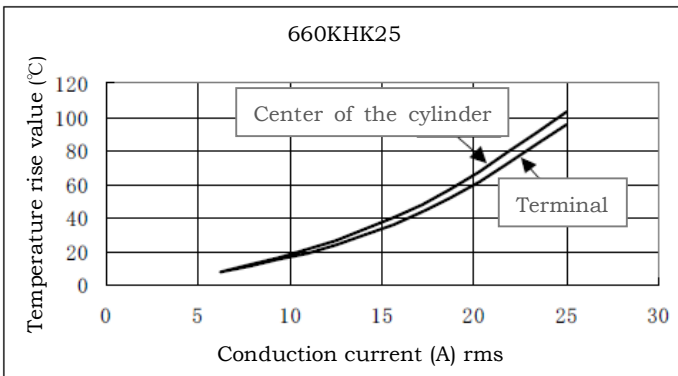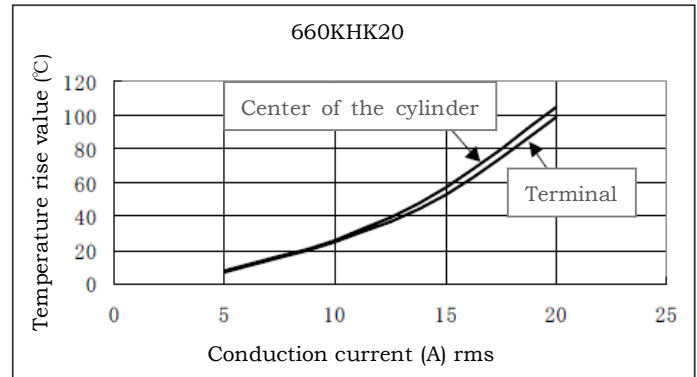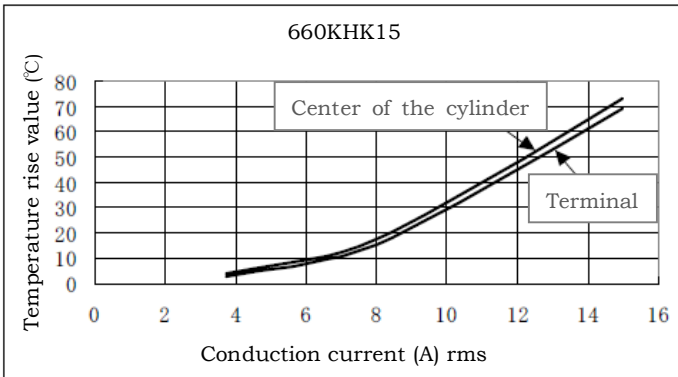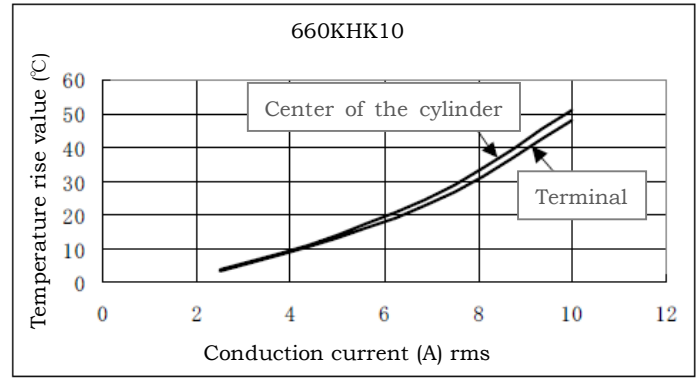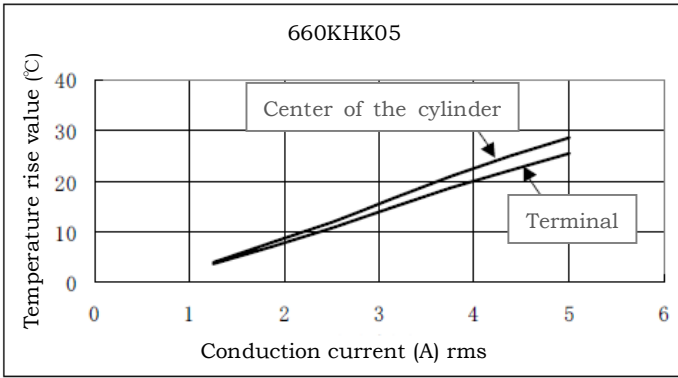
4. Temperature rise value of the board

Due to the heating of the fuse and/or from the pattern, the board temperature around the fuse increases. Please consider this when designing the placement of devices. The curves below show the relationship of the surrounding temperature distribution on the board at each amperage. Please refer to the data when designing.

● 400KHK (350KHK)

Terminal-Copper foil
Relationship between distance and temperature rise

Temperature rise ratio (%) — Distance (mm)

Standard value
Temperature rise value of the terminal

Copper foil line-Board
Relationship between distance and temperature rise

Temperature rise ratio (%) — Distance (mm)

Standard value
Temperature rise value on a copper foil line

● 660KHK (600KHK)

Terminal-Copper foil
Relationship between distance and temperature rise

Temperature rise ratio (%) — Distance (mm)

Standard value
Temperature rise value of the terminal

Copper foil line-Board
Relationship between distance and temperature rise

Temperature rise ratio (%) — Distance (mm)

Standard value
Temperature rise value on a copper foil line

※ "ON COPPER FOIL LINE" means a centerline that connects the copper foil at the both ends.   This includes the fuse on the same line.

※ If the conduction current value is lower than the fuse rated value (lower than 25%), temperature rise ratio may decrease by about 20%.

● Calculation of the temperature rise value at a random point

For example）When conducting 25A current into 400KHK25

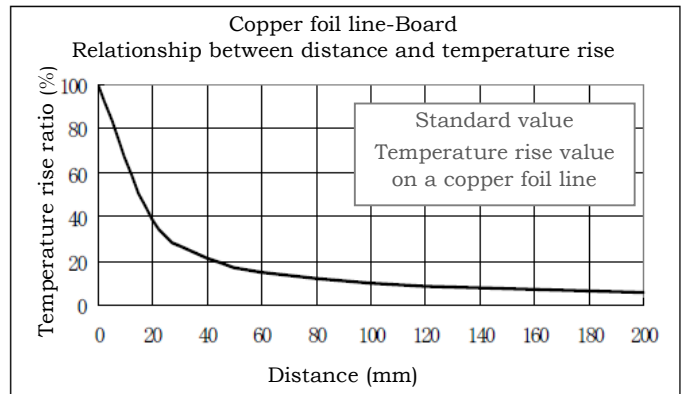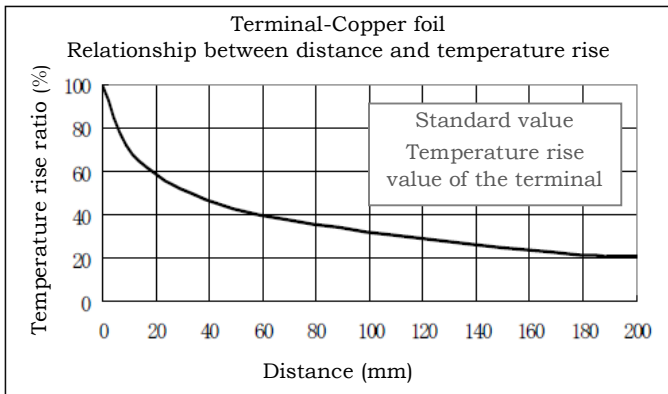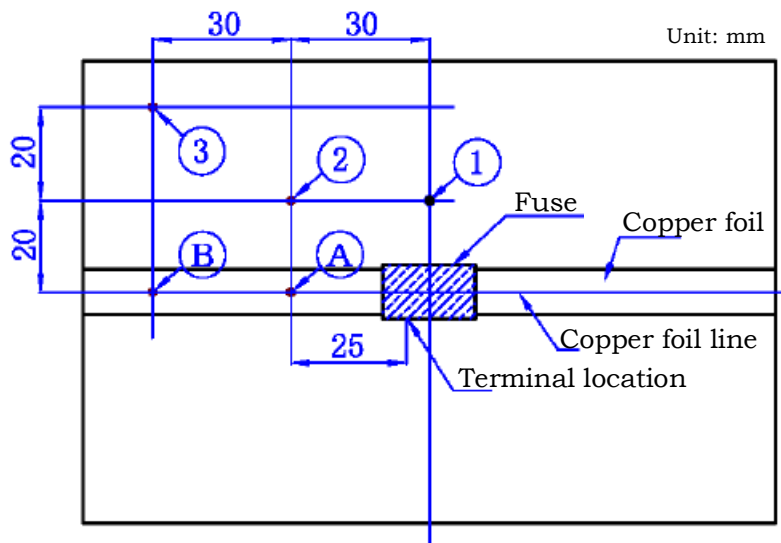※ Terminal location is about 5mm apart from the center of the fuse.

From the 400KHK25 Temperature Rise Characteristics graph, the temperature rise value of the fuse and fuse terminal are read as follows;

　・Temperature rise value at the center of the cylinder: About 100℃
　・Temperature rise value at the terminal: About 90℃

a) Plot point A:

From the graph, Terminal-Copper foil Relationship between distance and temperature rise, the temperature rise ratio at the distance of 25mm is about 70%.

90℃ (the terminal temperature rise) X 70% (temperature rise ratio) = 63℃

The temperature rise value at plot point A is around 63℃.

b) Plot point B:

From the graph, Terminal-Copper foil Relationship between distance and temperature rise, the temperature rise ratio at the distance of 55mm is about 55%.

90℃ (the terminal temperature rise) X 55% (temperature rise ratio) = 50℃

The temperature rise value at plot point B is around 50℃.

c) Plot point ①:

From the graph, Copper foil line-board Relationship between distance and temperature rise, the temperature rise ratio at the distance of 20mm is about 35%.

100℃ (the temperature rise at the center of the cylinder) X 35% (temperature rise ratio) = 35℃

The temperature rise value at plot point ① is around 35℃.

d) Plot point ②:

From the graph, Copper foil line-board Relationship between distance and temperature rise, the temperature rise ratio at the distance of 20mm is about 35%.

63℃ (the temperature rise value at plot point A) X 35% (temperature rise ratio) = 22℃

The temperature rise value at plot point ② is around 22℃.

e) Plot point ③:

From the graph, Copper foil line-board Relationship between distance and temperature rise, the temperature rise ratio at the distance of 40mm is about 22%.

50℃ (the temperature rise value at plot point B) X 22% (temperature rise ratio) = 11℃

The temperature rise value at plot point ③ is around 11℃.

※ To calculate the temperature rise value at a random point, it is necessary at first to measure the temperature rise value on the copper foil line that is vertical to the random point.