

Insulation and Regulation

Common Terms

External Clearance

The shortest distance through air, between conductive input and output leads, measured in mm. Refer to Figure 4.

Comparative Tracking Index (CTI)

Outer molding material characterization in the presence of aqueous contaminants. The higher the CTI value, the more resistant the material is to electrical arc tracking. CTI is often used with creepage by safety agencies to determine working voltage.

External Creepage

The shortest distance along the outside surface, between input and output leads, measured in mm. Refer to Figure 4.

Dielectric Insulation Voltage Withstand Rating

The ability to withstand without breakdown a 60 second application of a defined dielectric insulation voltage between input and output leads.

Distance Through Insulation

Distance between the photo-emitter and photodetector inside optocoupler cavity (also called internal clearance). Refer to Figure 4.

Installation Class

- I Equipment in closed systems (e.g., telecom) protected against overvoltage with devices such as diverters, filters, capacitors, etc.
- II Energy consuming equipment (e.g., appliances) supplied through a fixed installation.
- III Primarily equipment in fixed installations (e.g., fixed industrial equipment).
- IV Primary supply level for industrial factories.

Insulation

Operational - required for correct equipment operation but not as a protection against electric shock.
Basic - protects against electric shock.

Supplementary - independently applied to basic insulation to protect against shock in the event of its failure.

Double - composed of both basic and supplementary. Reinforced - A single insulation system composed of several layers (e.g., single and supplementary).

Internal Clearance

See Distance Through Insulation.

Internal Creepage

The shortest border distance between two separate insulating materials measured between emitter and detector.

Material Group (see Comparative Tracking Index)

- I 600 < CTI
- II 400 < CTI < 600
- IIIa 175 < CTI < 400
- IIIb 100 < CTI < 175

Partial Discharge

Electric discharge that partially bridges the insulation between two electrodes. Avago supports partial discharge measurements per IEC/EN/DIN EN 60747-5-2, a technique developed to evaluate the integrity of insulating materials. IEC/EN/DIN EN 60747-5-2 philosophy is that partial discharge testing offers advantages over Dielectric Withstand Voltage testing, which might adversely affect the insulating material, and over through insulation distance requirements which not only increase manufacturing costs but also do not necessarily result in acceptable insulating capability.

Pollution Degree

- 1 - Nonconductive pollution only.
- 2 - Only occasional, temporary conductivity due to condensation.
- 3 - Frequent conductive pollution due to condensation.
- 4 - Persistent conductive pollution due to dust, rain or snow.

Rated Mains Voltage

Primary power voltage declared by manufacturer. Used to categorize optocoupler maximum allowable working voltage.