Connector Technical Data

General Approvals/ Design Specifications

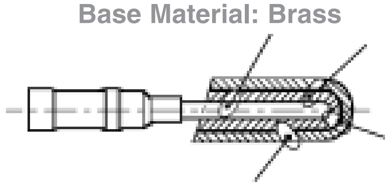
General Design: EPIC® connectors consist of mating male and female inserts of various sizes and electrical characteristics which utilize either screw-clamp, crimp contacts or cage clamp terminations. The inserts are fully enclosed in hoods and housings of either plastic or metal.

Termination:
Screw-Clamp: Screw-clamp insert contacts are made of copper alloy and plated with silver to inhibit corrosion. Clamping and fixing screw are made of galvanized steel with a yellow chromate plating.

Cage-Clamp: Cage-clamp insert contacts are made of copper alloy. The cage-clamp screwless spring termination requires no special tools for termination. The connection is vibration proof and never require re-tightening.

Crimp-Contact: Crimp-contact inserts shall accept either stamped and formed or machined crimp contacts. Crimp contacts feature a base crimp contact and a stainless steel locking spring. Crimp contacts are made of a copper zinc alloy, plated with an appropriate material (tin/lead, gold or silver) to provide corrosion resistance.

Hoods and Bases: Hoods and bases are made of either metal or plastic depending on the application requirement. Metal hoods are made of an anodized aluminum cast material for corrosion resistance. Additionally, metal hoods and bases feature a powder-paint surface for wear resistance. Thermoplastic housings are heat resistant for high temperature applications.



Contact Material Details:
The coating of the base material with a precious metal is necessary to guarantee a long lasting and good connection. The contacts are plated normally by galvanic processes. To reach a long-lasting plating, there are some requirements for the contact and the plating material.

Requirements on contact material:
- Good dimensional stability
- High corrosion resistance
- Good electrical conductivity

Brass (copper zinc alloy) is used for its good mechanical properties and its electrical conductivity. Because it is also relatively economical, it has become one of the most preferred contact materials.

Requirements on contact coatings:
- High abrasion resistance
- Low contact resistance
- High corrosion resistance
- Low porosity
- Good coat formation
- Solderability

Silver or gold are the normal choice for surface coating.

Silver possesses the highest electrical conductivity of any metal and is the most cost-effective precious metal. With sulphur or sulphurous products in the ambient air, a brownish to black oxide coating made up of silver sulfide (Ag2S) will rapidly be formed. However, this coating will break up in the process of mating and will be broken down by high currents, so that the necessary electrical conductivity is maintained. Passivation of the silver surface will delay the formation of the oxide coating and will reduce the mating and unmating forces.

Gold is the most tarnish resistant precious metal. Formation of oxides and sulphides can be discounted. Gold contacts are distinguished by their low mating and unmating forces. They are mainly used for transmission of signals with low current and voltage values.

Alternative materials for surface coating:
Nickel is normally applied as a corrosion protection and blocking layer. Furthermore, the relatively high hardness of the Ni coating has a positive effect on wear characteristics.

Tin or Tin/Lead is one of the most frequently employed metals for contacts, especially in the automotive field. As an aid to soldering, virtually all partially coated strips in the connection are coated with tin or tin/lead. Due to the low hardness of tin, the mating forces are very high and this makes it unsuitable for connectors that are designed for a high number of mating cycles.

Connector Technical Data

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Pollution:
Numerical value which states the anticipated pollution in the micro environment.

Pollution level 1:
No pollution or only dry, non-conductive pollution occurs. This pollution has no influence. **ex.** Open, unprotected insulations in air-conditioned or clean dry rooms.

Pollution level 2:
Only non-conductive pollution occurs. Occasionally, however, it may be anticipated that transient conductivity arises due to condensation. **ex.** Open unprotected insulations in residential, commercial or business premises (fine mechanical engineering workshops, laboratories, test areas, rooms used for medical purposes).

Pollution level 3:
Conductive pollution arises, or dry, non-conductive pollution which becomes conductive because condensation has to be anticipated. **ex.** Open unprotected insulations in rooms of industrial, commercial and agricultural companies, unheated storage rooms, boiler houses and workshops.

Pollution level 4:
Contamination leads to continuous conductivity caused by condensation or other environmental contaminants.

ex. External exposed installation subject to all environmental changes. Pollution level 3 is typical for an industrial environment, while pollution level 2 is typical for households.

Insulation materials:
Insulation materials are categorized into 4 groups according to the CTI values (Comparative Tracking Index)

Insulation material group I	$600 \leq$ CTI
Insulation material group II	$400 \leq$ CTI <600
Insulation material group IIIa	$175 \leq$ CTI <400
Insulation material group IIIb	$100 \leq$ CTI ≤ 175

Comparative Tracking Index:
The test for determination of the comparative index of tracking (CTI or comparative tracking index) as per IEC 112 provides a comparison of the characteristics of various insulating materials under test conditions. By dripping an aqueous solution onto a horizontal surface the electrolytic condition can be measured. This produces a qualitative result. When the insulating material is introduced to the tracking, a quantitative comparison can be measured, ex. the comparative tracking index.

Switch contact:
If the construction of the circuit requires that for safety reasons, the circuit power should remain off until one or more contacts are engaged, or that circuit power be turned off prior to one or more contacts being disengaged, then a connector with switch contacts (HBVE Series) should be used.

EMC (electromagnetic compatibility):
The capacity of an electrical installation to function satisfactorily in its electromagnetic environment without an unacceptable influence to the environment which also includes other installations (DIN/VDE 0870, Section 1)

Coding:
Coding is a system by which it is possible to prevent interfacing confusion between adjacent connectors which are of the same configuration. This is useful if two or more connectors of the same type are mounted on the same unit.

Polarization:
Polarization is a method used on connectors which prevents incorrect mating of male and female inserts ex. pin1 to pin1.

PG TO METRIC CONVERSION

As of December 31, 1999 the safety standard VDE 0619 and the therein referenced standards DIN 46319 for metric dimensions and DIN 46320 for PG dimensions were withdrawn.

The new standard DIN EN 50262 became valid as of January 1, 2000.

A 1 to 1 conversion is not possible!

Lapp North America will continue to support PG and Metric components.

PG	M
7	12
9	16
11	20
13.5	
16	25
21	
29	32
36	40
42	50
48	63