

Index of Enclosure Protection — General

The UL, NEMA and IEC organizations (and other international groups) define degrees of protection provided by electrical enclosures with respect to personnel, equipment within the housing and the ingress of water.

Subtle differences do exist between the test procedures and specifications of these organizations.

To claim ratings to NEMA specifications, the testing is performed and certified by the manufacturers themselves.

To comply to UL and IEC specifications, the manufacturers must submit product samples, materials used and other data to an independent testing laboratory before ratings can be claimed.

In addition, IEC "IP" ratings differ from NEMA in that they do not apply to protection against the risk of explosion or conditions such as humidity, corrosive gases, fungi or vermin. In addition, different parts of the equipment can have different

degrees of protection and still comply.

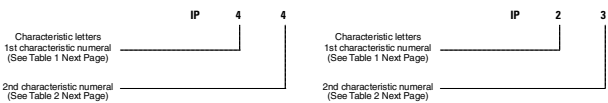
The chart shown below is a comparison of the NEMA/UL/IEC enclosure specifications to be used as an approximate reference only. Do not use the table to convert from IEC to NEMA designations. For a definition of the ratings listed, see examples below and tables on Page 13-3.

NEMA/UL/IEC Enclosure Type Cross-Reference — Approximate

Table with 23 columns (NEMA Enclosure Rating, 1P, 2P, 3P, 4P, 5P, 6P, 7P, 8P, 9P, 10P, 12P, 13P, 1P, 2P, 3P, 4P, 5P, 6P, 7P, 8P, 9P, 10P) and 13 rows (1, 2, 3, 3R, 3S, 4, 4K, 5, 5P, 12, 13) showing enclosure type compatibility with 'X' marks.

NOTE: IEC 529 does not specify equivalents to NEMA Enclosure Types 7, 8, 9 or 10.

IEC Environmental Enclosure Ratings — Examples of Designations



An enclosure with this designation is protected against the penetration of solid objects greater than 1.0 mm and against splashing water.

An enclosure with this designation is protected against the penetration of solid objects greater than 12 mm and against splashing water.



Index of Enclosure Ratings — IEC

Table 1 — 1st Characteristic Numeral

Table 1: 1st Characteristic Numeral. 0: Not protected. 1: Protection against solid objects greater than 50 mm. 2: Protection against solid objects greater than 12 mm. 3: Protection against solid objects greater than 25 mm. 4: Protection against solid objects greater than 10 mm. 5: Dust protected. 6: Dust-tight.

Table 2 — 2nd Characteristic Numeral

Table 2: 2nd Characteristic Numeral. 0: Not protected. 1: Protection against dripping water. 2: Protection against dripping water when tilted up to 15 degrees. 3: Protection against rain. 4: Protection against splashing water. 5: Protection against water jets. 6: Protection against heavy seas. 7: Protection against the effects of immersion. 8: Protection against submersion.

NEC Definitions Pertaining to Hazardous Locations — Article 500

E51 Limit Switch Type Proximity Switches are rated for use in the following locations:

Class I Division 2, Groups A, B, C or D — Indoor Use

- For the definition of a Class I Division 2 location, see National Electrical Code Article 500-5, paragraph (b). For the definitions of Class I Group A, B, C, D Classifications, see the National Electrical Code Article 500-3, paragraph (a).

Class II Division 2, Groups F or G — Indoor Use

- For the definition of a Class II Division 2 location, see National Electrical Code Article 500-6, paragraph (b). For the definitions of Class II Group F and G Classifications, see the National Electrical Code Article 500-3, paragraph (b).

Class III Division 2 — Indoor Use

- For the definition of a Class III Division 2 location, see National Electrical Code Article 500-7, paragraph (b). For the definitions of Class III Classifications, see the National Electrical Code Article 500-7.

NEMA Definitions Pertaining to Non-hazardous Locations — NEMA Standard 250

Type 1 Enclosures are intended for indoor use, primarily to provide a degree of protection against contact with the enclosed equipment.

Type 3 Enclosures are intended for outdoor use, primarily to provide a degree of protection against windblown dust, rain, sleet and external ice formation.

Type 3R Enclosures are intended for outdoor use, primarily to provide a degree of protection against falling rain, sleet and external ice formation.

Type 4 Enclosures are intended for indoor or outdoor use, primarily to provide a degree of protection against windblown dust and rain, splashing water and hose-directed water.

Type 4X Enclosures are intended for indoor or outdoor use, primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water and hose-directed water.

Type 6 Enclosures are intended for indoor or outdoor use, primarily to provide a degree of protection against the entry of water during occasional temporary submersion at a limited depth.

Type 6P Enclosures are intended for indoor or outdoor use, primarily to provide a degree of protection against the entry of water during prolonged submersion at a limited depth.

Type 12 Enclosures are intended for indoor use, primarily to provide a degree of protection against dust, falling dirt, and dripping non-corrosive liquids.

Type 13 Enclosures are intended for indoor use, primarily to provide a degree of protection against dust, spraying of water, oil and non-corrosive coolant.