













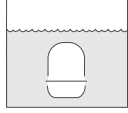



# Waterproof and Dustproof Protection Structure

## Comparing waterproof dustproof protection structure

IP rating \_ Known as "Ingress Protection rating" indicated in two-digit code showing the amount of protection against solid and the liquid.(IEC60529)

# IP 6 7

First Number Protection against solid		Second Number Protection against liquid	
0	 No protection	0	 No protection
1	 Protected against solid objects over 50mm, e.g. accidental touch by persons hands.	1	 Protection against vertically falling drops of water e.g. condensation.
2	 Protected against solid objects over 12.5mm, e.g. persons fingers.	2	 Protection against direct sprays of water up to 15° from the vertical.
3	 Protected against solid objects over 2.5mm (tools and wires).	3	 Protected against direct sprays of water up to 60° from the vertical.
4	 Protected against solid objects over 1mm (tools, wires, and small wires).	4	 Protection against water sprayed from all directions - limited ingress permitted.
5	 Protected against dust limited ingress (no harmful deposit).	5	 Protected against low pressure jets of water from all directions - limited ingress.
6	 Totally protected against dust.	6	 Protected against temporary flooding of water, e.g. for use on ship decks - limited ingress permitted.
		7	 Protected against the effect of immersion between 15 cm and 1 m.
		8	 Protects against long periods of immersion under pressure.

## NEMA SIZE

National Electrical Manufacturers Associations standard for enclosure protection rating, NEMA1-6 and 11-13 type is applicable in Non-Hazardous Locations, NEMA 7-10 is applicable in Hazardous Locations.

Type	Usage place	Environment	Protection rating
1	Indoor Use	Non-explosion proof	Provides protection against falling dirt
2	Indoor Use	Non-explosion proof	Provides protection against falling dirt and dripping/light splashing water
3	Outdoor Use	Non-explosion proof	Provides protection against falling dirt, windblown dust, water (rain, sleet, snow); and prevents damage by the external formation of ice on the enclosure
3R	Outdoor Use	Non-explosion proof	Provides protection against falling dirt, water (rain, sleet, snow); and undamaged by the external formation of ice on the enclosure
3S	Outdoor Use	Non-explosion proof	Provides protection against falling dirt, water (rain, sleet, snow); and external mechanism operable when ice laden
4	Indoor/Outdoor Use	Non-explosion proof	Provides protection against falling dirt, windblown dust, water (rain, sleet, snow splashing water, and hose directed water); undamaged by the external formation of ice on the enclosure
4X		Non-explosion proof	Same as Type4 with additional level of protection against corrosion
5	Indoor Use	Non-explosion proof	Provide protection against falling dirt and settling airborne dust, lint, fibers, and flyings, dripping/light splashing water
6	Indoor/Outdoor Use	Non-explosion proof	Provides protection against falling dirt; and hose directed water and the entry of water during occasional temporary submersion at a limited depth
6P		Non-explosion proof	Provides protection against falling dirt; and hose directed water and the entry of water during prolonged submersion at a limited depth
7	Outdoor Use	Explosion proof	Enclosures constructed for indoor use in hazardous (classified) locations for gas
8	Indoor/Outdoor Use	Explosion proof	Enclosures constructed for either indoor or outdoor use in hazardous (classified) locations for explosion proof construction by oil enclosure
9	Indoor Use	Explosion proof	Enclosures constructed for indoor use in hazardous (classified) locations for dust
10	Indoor/Outdoor Use	Explosion proof	Enclosures constructed to meet the requirements of the Mine Safety and Health Administration, 30 CFR, Part 18.
11	Indoor Use	Non-explosion proof	Provides protection against the corrosive effects of liquids and gases
12	Indoor Use	Non-explosion proof	Provides protection to personnel against access to hazardous parts, against falling dirt and circulating dust, lint, fibers, and dripping/light splashing water
12K	Indoor Use	Non-explosion proof	Same as Type 12 for enclosures constructed with knockouts
13	Indoor Use	Non-explosion proof	Provide protection against falling dirt and circulating dust, lint, fibers, flyings, dripping/light splashing water, spraying, splashing, and seepage of oil and non-corrosive coolants

## NEMA Ratings and IP Ratings Equivalency Chart

The chart below is for comparison between two enclosure ratings. It is only for reference and these two rating standards are not exactly converted.

NEMA ENCLOSURE TYPE	IP ENCLOSURE TYPE
1	IP20
2	IP22
3	IP55
4	IP66
4X	IP66
6	IP67
12	IP54
13	IP54