

IP Rated Enclosures Explained

What is an IP rating?

IP (or "Ingress Protection") ratings are defined in international standard EN 60529 (British BS EN 60529:1992, European IEC 60509:1989). They are used to define levels of sealing effectiveness of electrical enclosures against intrusion from foreign bodies (tools, dirt etc) and moisture.

What do the numbers in an IP Rating mean?

The numbers that follow IP each have a specific meaning. The first indicates the degree of protection (of people) from moving parts, as well as the protection of enclosed equipment from foreign bodies. The second defines the protection level that the enclosure enjoys from various forms of moisture (drips, sprays, submersion etc). The tables below should help make sense of it:

First Digit (intrusion protection)

0. (or X - see section below): No special protection. Not rated (or no rating supplied) for protection against ingress of this type.
1. Protection from a large part of the body such as a hand (but no protection from deliberate access); from solid objects greater than 50mm in diameter.
2. Protection against fingers or other object not greater than 80mm in length and 12mm in diameter (accidental finger contact).
3. Protection from entry by tools, wires etc, with a diameter of 2.5 mm or more.
4. Protection against solid objects larger than 1mm (wires, nails, screws, larger insects and other potentially invasive small objects such as tools/small etc).
5. Partial protection against dust that may harm equipment.
6. Totally dust tight. Full protection against dust and other particulates, including a vacuum seal, tested against continuous airflow.

Second Digit (moisture protection)

0. (or X - see section below): No protection.
1. Protection against vertically falling droplets, such as condensation. ensuring that no damage or interrupted functioning of components will be incurred when an item is upright.
2. Protection against water droplets deflected up to 15° from vertical
3. Protected against spray up to 60° from vertical.
4. Protected against water splashes from all directions. Tested for a minimum of 10 minutes with an oscillating spray (limited ingress permitted with no harmful effects).
5. Protection against low-pressure jets (6.3 mm) of directed water from any angle (limited ingress permitted with no harmful effects).
6. Protection against direct high pressure jets.
7. Protection against full immersion for up to 30 minutes at depths between 15 cm and 1 metre (limited ingress permitted with no harmful effects).
8. Protection against extended immersion under higher pressure (i.e. greater depths). Precise parameters of this test will be set and advertised by the manufacturer and may include additional factors such as temperature fluctuations and flow rates, depending on equipment type.
9. (K): Protection against high-pressure, high-temperature jet sprays, wash-downs or steam-cleaning procedures - this rating is most often seen in specific road vehicle applications (standard ISO 20653:2013 Road Vehicles - Degrees of protection).