

## IP - Ingress Protection Ratings

### *IP - Ingress Protection rating is used to specify the environmental protection of electrical equipment*

Ingress Protection (IP) ratings are developed by the European Committee for Electro Technical Standardization ([CENELEC](http://www.cenelec.eu)) (described IEC/EN 60529), specify the environmental protection an enclosure provides.

The IP rating normally has two (or three) numbers:

1. Protection from solid objects or materials
2. Protection from liquids
3. Protection against mechanical impacts (commonly omitted)

### Example - IP Rating

With the IP rating IP 54, 5 describes the level of protection from solid objects and 4 describes the level of protection from liquids.

### IP First number - Protection against solid objects

0	No protection.
1	Protected against solid objects up to 50mm, e.g. accidental touch by hands.
2	Protected against solid objects up to 12mm, e.g. fingers.
3	Protected against solid objects over 2.5mm (tools and wires).
4	Protected against solid objects over 1mm (tools, wire, and small wires).
5	Protected against dust limited ingress (no harmful deposit).
6	Totally protected against dust.

### IP Second number - Protection against liquids

0	No protection.
1	Protection against vertically falling drops of water e.g. condensation.
2	Protection against direct sprays of water up to 15° from the vertical.
3	Protected against direct sprays of water up to 60° from the vertical.
4	Protection against water sprayed from all directions ð limited ingress permitted.

5	Protected against low pressure jets of water from all directions Ø limited ingress.
6	Protected against low pressure jets of water, e.g. for use on ship decks - limited ingress permitted.
7	Protected against the effect of immersion between 15cm and 1m.
8	Protects against long periods of immersion under pressure.

**IP Third number - Protection against mechanical impacts (commonly omitted)**

0	No protection.
1	Protects against impact of 0.225 joule (e.g. 150g weight falling from 15cm height).
2	Protected against impact of 0.375 joule (e.g. 250g weight falling from 15cm height).
3	Protected against impact of 0.5 joule (e.g. 250g weight falling from 20cm height).
4	Protected against impact of 2.0 joule (e.g. 500g weight falling from 40cm height).
5	Protected against impact of 6.0 joule (e.g. 1.5kg weight falling from 40cm height).
6	Protected against impact of 20.0 joule (e.g. 5kg weight falling from 40cm height).

In order to comply with stringent requirements for [CE Marking](#), machine makers today are fitting their machines with parts that are certified according to EU (European Union) and international standards.