



IP (Ingress Protection) Ratings

IP 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](#)) (IEC/EN 60529). They specify the environmental protection an enclosure provides.

The IP rating has two (or three) numbers:

- First number:** Protection from solid objects or materials.
Second number: Protection from liquids.
Third number: Protection against mechanical impacts (commonly omitted).

Example: Protection level offered by an IP 67 rated protected product

6 = Totally protected from dust.

7 = Protected from the effects of immersion between 15cm and 1m.

Protection against solid objects

First Number

- 0** No protection.
- 1** Protected from solid foreign objects of 50 mm and greater (e.g., accidental touch by hands).
- 2** Protected from solid objects of 12 mm and greater (e.g., fingers).
- 3** Protected from solid objects more than 2.5 mm (e.g., tools and small wires).
- 4** Protected from solid objects more than 1 mm (e.g., small wires).
- 5** Protected from dust; limited entrance (no harmful deposit).
- 6** Totally protected from dust

Protection against liquids

Second Number

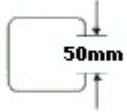
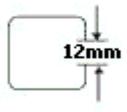
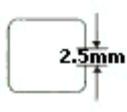
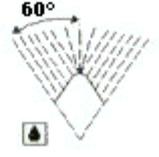
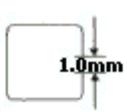
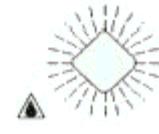
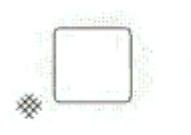
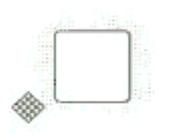
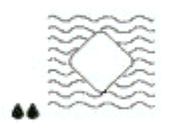
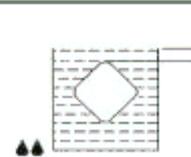
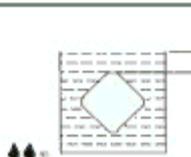
- 0** No protection.
- 1** Protected from vertically-falling drops of water (e.g., condensation).
- 2** Protected from direct sprays of water up to 15° from vertical.
- 3** Protected from direct sprays of water up to 60° from vertical.
- 4** Protected from water sprayed from all directions; limited entrance allowed.
- 5** Protected from low pressure jets of water from all directions; limited entrance allowed.
- 6** Protected from strong jets of water (e.g., for use on ship decks); limited entrance allowed.
- 7** Protected from the effects of immersion between 15cm and 1m for 30 minutes.
- 8** Protected from extended periods of immersion under pressure.

Protection against mechanical impacts (commonly omitted)

Third Number

- 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).



IP54 = IP Letter Code _____ IP			
1st Digit _____ 5		2nd Digit _____ 4	
1st Digit	Protection from solid objects	2nd Digit	Protection from moisture
0	Non protected	0	Non protected
1	 Protected against solid objects greater than 50mm	1	 Protected against dripping water
2	 Protected against solid objects greater than 12mm	2	 Protected against dripping water when tilted up to 15°
3	 Protected against solid objects greater than 2.5mmØ	3	 Protected against spraying water
4	 Protected against solid objects greater than 1.0mmØ	4	 Protected against splashing water
5	 Dust protected	5	 Protected against water jets
6	 Dust tight	6	 Protected against heavy seas
Note: EN 60529 does not specify sealing effectiveness against the following: mechanical damage of the equipment; the risk of explosions; certain types of moisture conditions, e.g. those that are produced by condensation; corrosive vapours; fungus; vermin		7	 Protected against the effects of immersion
		8	 Protected against submersion (see note)



IP Numbers with Hermetically Sealed (HS) or Environmentally Protected (EP) Ratings

Rating	Protection
EP	Dust proof, not protected from moisture or water.
IP42	Protected from small solid objects and direct sprays of water up to 15° from vertical.
IP65	Dust proof, protected from splashes and low-pressure jets.
IP66	Dust proof, protected from strong water jets.
IP67	Dust proof, protected from temporary immersion in water 1 meter deep for 30 minutes.
IP68	Dust proof, protected from continuous immersion in water under more severe conditions.