



## Splashproof? Waterproof?

### IP Rating/IP Code or Ingress Protection Rating

The IP system is a rating system used by engineers that rates a switch (or other item) by describing the degrees of protection provided against the intrusion of **solid objects** (including body parts like hands and fingers), dust, accidental contact, and **liquids** in electrical enclosures (and in mechanical casings).

At the macro level the ratings describe whether (for example) fingers can be inserted into the enclosure, and thus pertain to safety issues; the higher number ratings describe dust and water ingress, and can in our context usefully describe the otherwise loosely-defined description of 'waterproof'. We have always stayed clear of the descriptor 'waterproof', because while a manufacturer might use it to describe 'splashproof', a user might understand the term to mean 'submersible'. IP Rating is used by engineers as a guide.

The system consists of the letters IP followed by two digits or one digit and one letter and an optional letter as defined in international standard IEC 60529.

The digits indicate conformity with the conditions in the tables. Where there is no protection rating with regard to one of the criteria, the digit is replaced with the letter X.

**DUSTPROOF?** [TABLE 1](#) represents the first digit in the IP number and refers to ingress by solids (including dust and powder).

Dust ingress can be an important consideration in industrial conditions such as those encountered in Mining and Agriculture.

**WATERPROOF?** [TABLE 2](#) represents the second digit in the IP number and refers to ingress by water.

Water ingress can be an important consideration in conditions such as those encountered in Marine environments, but also Off-Road (Construction) and in rainsplash and salt spray on highways.



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### IP Rating/IP Code or Ingress Protection Rating

**TABLE 1 represents the first digit in the IP number** and refers to ingress by solids (including dust and powder). Dust ingress can be an important consideration in industrial conditions such as those encountered in Mining and Agriculture.

Level	Object size protected against	Effective against
0	—	No protection against contact and ingress of objects
1	>50 mm	Any large surface of the body, such as the back of a hand, but no protection against deliberate contact with a body part
2	>12.5 mm	Fingers or similar objects
3	>2.5 mm	Tools, thick wires, etc.
4	>1 mm	Most wires, screws, etc.
5	Dust protected	Ingress of dust is not entirely prevented, but it must not enter in sufficient quantity to interfere with the satisfactory operation of the equipment; complete protection against contact
6	Dust tight	No ingress of dust; complete protection against contact

**WATERPROOF? TABLE 2 represents the second digit in the IP number** and refers to ingress by water. Water ingress can be an important consideration in conditions such as those encountered in Marine environments, but also Off-Road (Construction) and in rainsplash and salt spray on highways. [SEE NEXT PAGE](#)

For example, a switch with any of these three ratings might be considered 'waterproof' by some:]

**An electrical switch rated IP66 is dustproof and withstands powerful water jets.**

**An electrical switch rated IP67 is dustproof and withstands immersion at one meter for 30 minutes.**

**An electrical switch rated IP68 is dustproof and withstands continuous immersion in water... although such a switch is not necessarily certified for use on underwater equipment.**



Cole Hersee brand  
Master Battery Disconnect Switch [75920](#)  
is rated IP68.

**WATERPROOF?** TABLE 2 represents the second digit in the IP number and refers to ingress by water.

Water ingress can be an important consideration in conditions such as those encountered in Marine environments, but also Off-Road (Construction) and in rainsplash and salt spray on highways.

Level	Protected against	Testing for	Details
0	Not protected		
1	Dripping water	Dripping water (vertically falling drops) shall have no harmful effect.	Test duration: 10 minutes Water equivalent to 1mm rainfall per minute
2	Dripping water when tilted up to 15°	Vertically dripping water shall have no harmful effect when the enclosure is tilted at an angle up to 15° from its normal position.	Test duration: 10 minutes Water equivalent to 3mm rainfall per minute
3	Spraying water	Water falling as a spray at any angle up to 60° from the vertical shall have no harmful effect.	Test duration: 5 minutes Water volume: 0.7 litres per minute Pressure: 80–100 kN/m <sup>2</sup>
4	Splashing water	Water splashing against the enclosure from any direction shall have no harmful effect.	Test duration: 5 minutes Water volume: 10 litres per minute Pressure: 80–100 kN/m <sup>2</sup>
5	Water jets	Water projected by a nozzle (6.3mm) against enclosure from any direction shall have no harmful effects.	Test duration: at least 3 minutes Water volume: 12.5 litres per minute Pressure: 30 kN/m <sup>2</sup> at distance of 3m
6	Powerful water jets	Water projected in powerful jets (12.5mm nozzle) against the enclosure from any direction shall have no harmful effects.	Test duration: at least 3 minutes Water volume: 100 litres per minute Pressure: 100 kN/m <sup>2</sup> at distance of 3m
7	Immersion up to 1 m	Ingress of water in harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time (up to 1 m of submersion).	Test duration: 30 minutes Immersion at depth of 1m
8	Immersion beyond 1 m	The equipment is suitable for continuous immersion in water under conditions which shall be specified by the manufacturer. Normally, this will mean that the equipment is hermetically sealed. However, with certain types of equipment, it can mean that water can enter but only in such a manner that it produces no harmful effects.	Test duration: continuous immersion in water Depth specified by manufacturer