

Degree of protection of enclosures-clause 10.3 of IEC 61439-1

Let us start with the question: who wants protection?

Protection is a twofold concept. The equipment needs protection, and the people outside the switchgear panel also need protection.

Let us first focus on the protection required by the equipment.

What type of protection is required by the equipment, and the scope of protection goes up to which limit?

It is explained this way that any switchgear panel contains switching devices as basic-level equipment

The switching devices are mechanisms having the ability to close and open based on a manual or automatic electrical command so

Any mechanism has many mechanical parts integrated together to achieve close and open operation when desired. There will be springs, leavers, rotating shafts, rotating cams, arc quenching chamber etc. which need to be clean and free from entry of any foreign bodies like dust and water

If we prevent entry of dust and water in to the mechanism, we can say that the required protection for the equipment is provided. But the next question will be to ask to which degree of protection has been provided

Hence, we need to have a scale or unit of measurement to measure the degree of protection provided by the panel manufacturer

Similarly, the switchgear operating people, who will be in the switchgear room also, need protection against the possibility of electrocution (Coming in contact with the electrically live parts)

Hence ingress protection keeps both equipment and people in mind while specifying the degree of protection

Degree of protection is a two-digit number for example IP52. IP stands for ingress protection, whereas the two digits number represents the degree of protection (52)

The first digit specifies protection provided against entry of solid objects in the panel whereas the second digit specifies the entry of liquids in to the enclosure

The first digit starts from 0 and goes up to 6

The second digit starts from 0 and goes up to 8 and 9k

Please refer to chart -1(For first digit) and chart-2 (For second digit) given below to understand as to what each number in first and second place represent

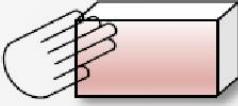
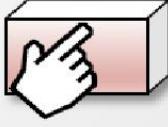
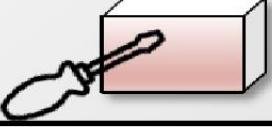
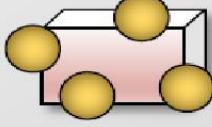
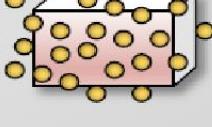
First Index Number	Foreign particle protection
1	Protected against a solid object greater than 50 mm (~2 in), such as a hand 
2	Protected against a solid object greater than 12.5 mm (1/2 in), such as a finger 
3	Protected against a solid object greater than 2.5 mm, such as a screwdriver 
4	Protected against a solid object greater than 1 mm, such as a wire 
5	Dust Proof: Dust must not penetrate to an extent that equipment operation or safety are impaired 
6	Dust-tight: No ingress of dust 

Chart-1

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Second Index Number	Water protection
1	Protected against vertically falling drops of water for 10 minutes at a rate of 1 mm/min
2	Protected against diagonally falling (up to 15-deg) drops of water for 10 minutes at a rate of 3 mm/min
3	Protected against diagonally falling (up to 60-deg) spray (from a hose) for 5 minutes at 0.7 LPM at 80-100 kPa
4	Protected against water splashed from all directions for 5 minutes at 10 LPM at 80-100 kPa
5	Protected against a 6.3 mm water nozzle for 3 minutes at 12.5 LPM at 30 kPa at a distance of 3 m
6	Protected against a 12.5 mm water nozzle for 3 minutes at 100 LPM at 100 kPa at a distance of 3 m
7	Protected against a 30 minutes submersion at a depth of 1 m
8	Protected against continuous submersion at a depth of 3 m
9k	<p>Protection against:</p> <ul style="list-style-type: none"> - water jet at 0, 30, 60 & 90-deg for 30 seconds each - Distance: 10-15 cm - Water Volume: 14-16 LPM - Water Temp: 176-deg F +/- 5-deg - Water Pressure: 80-100 bar

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