



# Andhra Pradesh State Skill Development Corporation



## Basics of induction Motors

### Name plate details of induction motor Part 2



## Different Electrical Standards:

NEMA: National Electrical Manufacturers Association

BIS: Bureau of Indian Standards

IEC: International Electrotechnical Commission

ISI: Indian standard institute

CCC: China Compulsory Certification

CSA: Canadian Standards Association

CE: European Conformity (Conformité Européene)

UL: Underwriters Laboratories Inc

## Ingress Protection (IP)

Protections of motors from solids and Liquids are given

The IP Code, International Protection Marking, IEC standard 60529, sometimes interpreted as Ingress Protection Marking, classifies and rates the degree of protection provided against intrusion (body parts such as hands and fingers), dust, accidental contact, and water by mechanical casings and electrical enclosures. It is published by the International Electro technical Commission (IEC).

The standard aims to provide users more detailed information than vague marketing terms such as waterproof. For example, a cellular phone rated at IP68 is "dust resistant" and can be "immersed in 1.5 meters of freshwater for up to 30 minutes". Similarly, an electrical socket rated IP22 is protected against insertion of fingers and will not be damaged or become unsafe during a specified test in which it is exposed to vertically or nearly vertically dripping water.

IP22 or IP2X are typical minimum requirements for the design of electrical accessories for indoor use. The digits indicate conformity with the conditions summarized in the tables below. The digit 0 is used where no protection is provided. The digit is replaced with the letter X when insufficient data has been gathered to assign a protection level.

IP indication	First digit: Solid particle protection	Second digit: Liquid ingress protection	Third digit: Mechanical impact resistance	Additional letter: Other protections
IP	Single numeral: 0–6	Single numeral: 0–9	Single numeral: 0–9	Single letter
Mandatory	Mandatory	Mandatory	No longer used	Optional



## First digit: Solid particle protection

The first digit indicates the level of protection that the enclosure provides against access to hazardous parts (e.g., electrical conductors, moving parts) and the ingress of solid foreign objects.

Level sized	Effective against	Description
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, slender screws, large ants 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.
6	Dust tight	No ingress of dust; complete protection against contact (dust tight). A vacuum must be applied. Test duration of up to 8 hours based on air flow.

## Second digit: Liquid ingress protection

The second digit indicates the level of protection that the enclosure provides against harmful ingress of water. The ratings for water ingress are not cumulative beyond IPX6. A device which is compliant with IPX7, covering immersion in water, need not be compliant with IPX5 or IPX6, covering exposure to water jets. A device which meets both tests is indicated by listing both tests separated by a slash, e.g. IPX5/IPX7.



Level	Protection against	Effective against	Details
0	None	—	—
1	Dripping water	Dripping water (vertically falling drops) shall have no harmful effect on the specimen when mounted in an upright position onto a turntable and rotated at 1 RPM.	Test duration: 10 minutes Water equivalent to 1 mm rainfall per minute