

I.P. Ingress Protection Classifications

I.P. Ingress Protection Classifications to DIN VDE 0470/EN 60529*

Important: We accept no liability for quoted standards.

The protection classification offered by an enclosure is shown by the letters IP Ingress Protection, and two digits. The first digit indicates two factors (protection for persons and equipment). The second digit indicates only one factor, protection against water.

Example: IP 54

–first digit 5= protection against dust and wire contact with dangerous parts



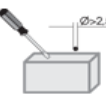
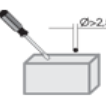
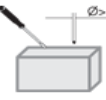

–second digit 4= protection against splashing water

Important note: The protection classifications given for the enclosures refer to unmachined enclosures as supplied. In the case of protection against water in particular (second digit), the test conditions will be met if, during the given time for the experiment, no water has penetrated, or not in harmful quantities. As the tests to show protection classifications take no account of ageing, the maintenance of the protection classification throughout the lifetime


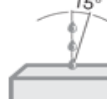
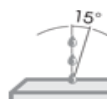
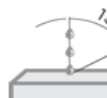
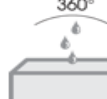


of the equipment is not guaranteed.


Similarly, changes in temperature, as may occur, for example in the open air, are not taken into account. Such changes in temperature may cause a loss of pressure in the enclosure, and moisture may be absorbed through the seal area. Rose and Bopla can supply pressure compensation elements for this purpose.

First digit: Protection for Persons and Equipment

Digit	Persons		Equipment	
	Brief Description	Definition	Brief Description	Definition
 0	Not protected	-	Not protected	-
 1	Protection against the back of the hand touching dangerous parts	A round body, 50mm in diameter, must be at a sufficient distance from dangerous parts	Protection against a solid foreign body of 50mm or more in diameter	A round body, 50mm in diameter, must not fully penetrate
 2	Protection against a finger touching dangerous parts	The test finger, jointed, 12mm in diameter and 80mm long, must be at a sufficient distance from dangerous parts	Protection against a solid foreign body of 12.5mm or more in diameter	A round body, 12.5mm in diameter, must not penetrate at all
 3	Protection against a tool touching dangerous parts	A body, 2.5mm in diameter, must not be able to penetrate	Protection against a solid foreign body of 2.5mm or more in diameter	A round body, 2.5mm in diameter, must not penetrate at all
 4	Protection against a wire touching dangerous parts	A body, 1.0mm in diameter, must not be able to penetrate	Protection against a solid foreign body of 1.0mm or more in diameter	A round body, 1.0mm in diameter, must not penetrate at all
 5	Protection against a wire touching dangerous parts	A body, 1.0mm in diameter, must not be able to penetrate	Protection against dust	No dust penetration



Second digit: Protection Against Water

Digit	Brief Description	Definition
 0	Not protected	-
 1	Protection against vertical water drops	Drops of water falling vertically onto the enclosure must not have any harmful effects
 2	Protection against vertical water drops when the enclosure is inclined at 15°	Drops of water falling vertically onto the enclosure must not have any harmful effects if the enclosure is inclined by up to 15° on both sides of the vertical
 3	Protection against water spray	Water sprayed onto the enclosure at up to 60° on both sides of the vertical must not have any harmful effects
 4	Protection against water spray	Water splashed onto the enclosure from any direction must not have any harmful effects
 5	Protection against water jet	Water splashed onto the enclosure from any direction must not have any harmful effects
 6	Protection against powerful water jet	A strong water jet directed at the enclosure from any direction must not have any harmful effects

	6	Protection against a wire touching dangerous parts	A body, 1.0mm in diameter, must not be able to penetrate	Sealed against dust	No dust penetration
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An enclosure must only be designated with the **first digit** (protection against penetration) for a degree of protection when it also meets all lower degrees of protection.

¹⁾Dust must not penetrate in sufficient quantities to prevent the equipment from operating satisfactorily, or to impair safety.

	7	Protection against the effect of temporary immersion in water	Water must not enter in a quantity that could have harmful effects if the enclosure is temporarily immersed in water under standardized pressure and time conditions
	8	Protection against the effects of constant submersion in water	Water must not enter in a quantity that could have harmful effects if the enclosure is kept permanently under water under conditions agreed between the manufacturer and the user; however, these must be more severe than those under figure 7

Up to digit 6, the **second digit** (protection against water) must only be used for a degree of protection for an enclosure if it also meets all lower degrees of protection. However, an enclosure which is only designated with the second digit 7, 8 (protection against immersion is considered to be unsuitable for use with a jet of water (digit 5 or 6)). This means that it does not need to meet the requirements indicated by digits 5 or 6. Only an enclosure with a double designation meets the requirements regarding resistance to a jet of water and to immersion/jet of steam.