

## IP Ratings

In the United States and Canada, NEMA, UL, and CSA are the organizations generally recognized. Their ratings are based on similar application descriptions and expected performance. UL and CSA both require the enclosure to be tested in their labs. Both organizations can also send site inspectors to ensure that the manufacturer is conforming to the correct manufacturing methods and material specifications. NEMA does not require testing, and the responsibility is with the manufacturer to ensure the products meet the NEMA ratings.

The first number defines the level of protection against penetration of solid objects into the housing. The second number defines the level of protection against penetration of liquids into the housing. Additional information can be found in the 1976 IEC Publication, Classification of Degrees of Protection Provided by Enclosures.

### IP s l      s = solids and l=liquids

Number	Degree of Protection (Solids)	Number	Degree of Protection (Liquids)
0	No protection against contact or entry of solids.	0	No protection.
1	Protection against accidental contact by hand, but not deliberate contact. Protection against large objects. (greater than 50mm)	1	Protection against drops of condensed water. Condensed water falling on housing shall have no effect.
2	Protection against contact by fingers. Protection against medium-size foreign objects. (greater than 12mm)	2	Protection against drops of liquid. Drops of falling liquid shall have no effect when housing is tilted to 15 degrees from vertical.
3	Protection against contact by tools, wire, etc. Protection against small foreign objects. (greater than 2.5mm)	3	Protection against rain. No harmful effect from rain at angle less than 60 degrees from vertical.
4	Protection against contact by small tools and wires. Protection against small foreign objects. (greater than 1mm)	4	Protection against splashing from any direction.
5	Complete protection against contact with live or moving parts. Protection against harmful deposits of dust.	5	Protection against water jets from any direction.
6	Complete protection of live or moving parts. Protection against penetration of dust.	6	Protection against conditions on ships' decks. Water from heavy seas will not enter.
		7	Protection against immersion in water. Water will not enter under stated conditions of pressure and time.
		8	Protection against indefinite immersion in water under a specified pressure.