



RAM METER INC.®

Instrument Sales & Service Center
Electronic Development & Manufacturing
FOUNDED 1936

NEMA Standards Explained

This is a system produced in IEC publication 529 which provides a means of specifying an enclosure on the basis of degree of protection. It does not provide for protection against mechanical damage caused by or within the device. NEMA Publication 250 does test for environmental conditions, such as corrosion, icing and oil. As there are differences in these methods of test and definition there cannot be exact equations between the IEC and NEMA classification codes, but because NEMA meet or exceed the IEC test requirements a cross reference can be made from NEMA to IEC. Figure 1, below, is a conversion of NEMA type numbers to IEC classifications, it cannot be used as a conversion of IEC to NEMA classification.

The tabulation, figure 2, is intended as a guide to determine or select an enclosure code using the IP system. For notation the letters IP are followed by two numbers. The first number is an indication as to the degree of protection to solid foreign objects, i.e. dust or fingers. The second number indicates the degree of protection to ingress of fluids i.e. water.

NEMA Type Number	IEC Classification
1	IP10
2	IP11
3	IP54
3R	IP14
3S	IP54
4 and 4x	IP56
5	IP52
6 and 6P	IP67
12 and 12x	IP52
13	IP54

Figure 1

First Number Protection Against Solid Objects		Second Number Protection Against Liquids	
IP	Tests	IP	Tests
0	No Protection	0	No protection
1	Protected against solid objects up to 50mm e.g. accidental touch by hand	1	Protected against vertically falling drops of water (e.g. condensation)
2	Protected against solid objects up to 12mm e.g. fingers	2	Protected against direct sprays of water up to 15° from the vertical.
3	Protected against solid objects over 2.5mm (tools and wires)	3	Protected against sprays of water up to 60° from the vertical.
4	Protected against solid objects over 1mm (tools, wires, and small wires)	4	Protected against water sprayed from all directions - limited ingress permitted
5	Protected against solid objects over 1mm (tools, wires, and small wires)	5	Protected against water sprayed from all directions - limited ingress permitted
6	Totally protected against dust	6	Protected against strong jets of water (e.g. shipdecks - limited ingress permitted)
7		7	Protected against the effect of immersion between 15cm and 1m
8		8	Protected against long periods of immersion under pressure

Figure 2