

Control Engineering



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ONLINE EXTRA

**IEC 529/IP
Environmental Ratings**

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The degree of protection provided by an enclosure is indicated by the IP code in the following way: **IP 2 3**

First characteristic numeral - e.g. protection against solid foreign objects of 12.5mm diameter and greater

Second characteristic numeral - e.g. protected against spraying water

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Degrees of Protection Against Solid Objects		
Description	Definition	First Characteristic Numeral
Non-protected		0
Protected against solid foreign objects of 50mm diameter and greater	The object probe, sphere of 50mm diameter shall not fully penetrate	1
Protected against solid foreign objects of 12.5mm diameter and greater	The object probe, sphere of 12.5mm diameter shall not fully penetrate	2
Protected against solid foreign objects of 2.5mm diameter and greater	The object probe, sphere of 2.5mm diameter shall not penetrate at all	3
Protected against solid foreign objects of 1.0mm diameter and greater	The object probe, sphere of 1.0mm diameter shall not penetrate	4
Dust protected	Ingress of dust is not totally prevented, but dust shall not penetrate in a quantity to interfere with satisfactory operation of the apparatus or to impair safety	5
Dust tight	No ingress of dust	6

Degrees of Protection Against Water		
Second characteristic	Description	Definition

numeral		
0	No protection	
1	Protected against vertically falling water drops	Vertically falling water drops shall have no harmful effects
2	Protected against vertically falling water drops when enclosure tilted up to 15 degrees	Vertically falling water drops shall have no harmful effects when the enclosure is tilted at any angle up to 15 degrees on either side of the vertical axis
3	Protected against spraying water	Water sprayed at an angle up to 60 degrees on either side of the vertical axis shall have no harmful effects
4	Protected against splashing water	Water splashed against the enclosure from any direction shall have no harmful effects
5	Protected against water jets	Water projected in jets against the enclosure from any direction shall have no harmful effects
6	Protected against powerful water jets	Water projected in powerful water jets against the enclosure from any direction shall have no harmful effects
7	Protected against the effects of temporary immersion in water	Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is continuously immersed in water under standardized conditions of pressure and time
8	Protected against the effects of continuous immersion in water	Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is continuously immersed in water under conditions which shall be agreed between manufacturer and user but which are more severe than for numeral 7

NEMA Type rating	UL Type rating	CSA Type rating	Apprx. IEC/IP classification
1	1	1	IP23
2	2	2	IP30
3	3	3	IP64
3R	3R	3R	IP32

4	4	4	IP66
4X	4X	4X	IP66
6	6	6	IP67
12	12	12	IP55
13	13	13	IP65

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