

APPENDIX 3: DEGREES OF PROTECTION

■ 3.1. IP DEGREES OF PROTECTION IN ACCORDANCE WITH STANDARDS IEC 60529 AND EN 60529

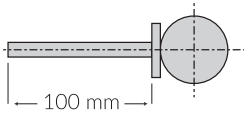
- The degree of protection of an assembly defines its capacity to protect people from direct contact with live parts and to prevent the entry of solid objects or liquids. It is specified by the IP code in accordance with the tests described in standard IEC 60529(see below).
- The IP code required for an assembly in an enclosure depends on its installation conditions and the external influences to which it is subjected. In all cases it must be at least IP 2X.The degree of protection of an open assembly must be at least IP XXB.
- The partner must carry out a visual inspection, once all the components have been assembled, to check that the enclosure and its components comply with the stated degree of protection.
- For example, if control and signalling auxiliaries are installed on doors or panels,their own IP and their installation must comply with the stated IP value. In this case, no additional testing is required.

1st number: protection against the penetration of solid objects			2nd number: protection against liquids			Additional letter IP XX (ABCD): protection against direct contact by access to hazardous live parts		
IP	tests		IP	tests		IP	tests	protection
0		No protection	0		No protection	A		The back of the hand is kept away from hazardous parts
1		Protected against solid objects larger than 50 mm	1		Protected against vertically falling drops of water (condensation)			
2		Protected against solid objects larger than 12.5 mm	2		Protected against dripping water up to 15° from the vertical	B		If a finger is inserted it cannot touch hazardous parts
3		Protected against solid objects larger than 2.5 mm	3		Protected against rainwater up to 60° from the vertical			
4		Protected against solid objects larger than 1 mm	4		Protected against water sprayed from all directions	C		If a tool is inserted (for example, a screwdriver) it cannot touch hazardous parts
5		Protected against dust (no harmful deposits)	5		Protected against water jets from all directions			
6		Totally protected against dust	6		Totally protected against powerful water jets similar to heavy seas	D		If a wire is inserted it cannot touch hazardous parts
			7		Protected against the effects of immersion			
			8		Protected against the effects of prolonged immersion under specified conditions			
			9		Protected against high-pressure and high-temperature water jets			

■ 3.2. MAXIMUM DISTANCES TO HAZARDOUS PARTS ON ADDITIONAL LETTERS (ABCD)

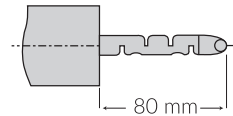
■ ACCESS TEST PROBES

- Access probes for the tests for protection of person against access to hazardous parts.



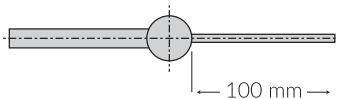
A.
Metal test sphere, \varnothing 50 mm,
on handle and guard of
insulating material, \varnothing 10 mm,
(L=100 mm).

Test force = 50 N



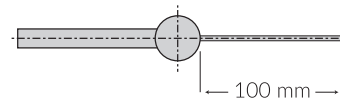
B.
Jointed metal test finger,
 \varnothing 12 mm (L = 80 mm), fitted on
handle of insulating material
with stop face (\varnothing 50 x 20 mm).

Test force 10 N.



C.
Metal test rod, \varnothing 2,5 mm, (L = 100 mm) with
edges free from burrs. Mounted
on stop face, \varnothing 35 mm of insulating
material with insulated handle,
 \varnothing 10 mm (L = 100 mm).

Test force 3N.



D.
Metal test wire, \varnothing 1 mm, (L = 100 mm) with edges
free from burrs. Mounted
on stop face, \varnothing 35 mm of insulating
material with insulated handle,
 \varnothing 10 mm (L = 100 mm).

Test force 1N.

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■ 3.3. IP DEGREES AT PDS SYSTEM

- Standard delivery package in PDS system is IP 53D at Power distribution modules , IP 4XD at drawable module.
The partner can reduce IP protection level aiming to cooling pruposes (see at 9.Thermal Management) till to below explanations.

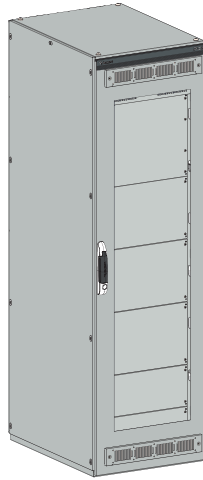
■ PROTECTION DEGREES WHILE THE DOORS ARE CLOSED ■

■ IP 53D DESIGN (IP 4XD AT DRAWABLE MODULE)

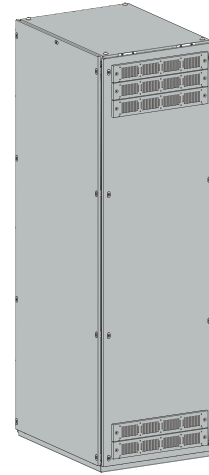
- Ventilation cutouts must be closed with metal filters with its' metal cases



External Door
Sapareted System



Internal Sapareted System with
External Single Door



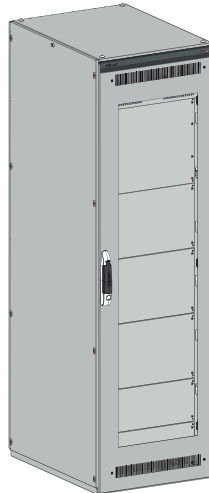
Rear Panel

■ IP 2XD DESIGN

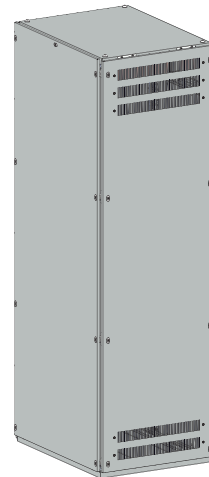
- In case of IP 2XD protection metal cases and metal filters must be remove out from the panels.



External Door
Sapareted System



Internal Sapareted System with
External Single Door



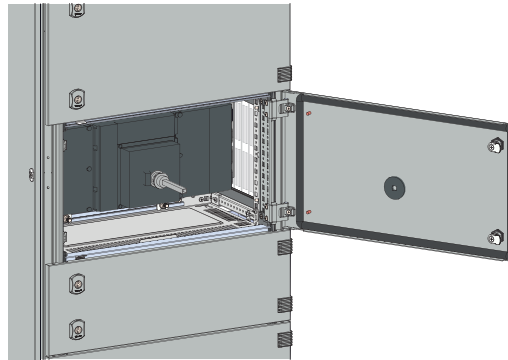
Rear Panel

APPENDIX 3: DEGREES OF PROTECTION (IP)

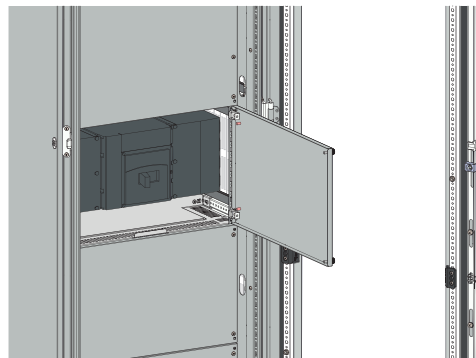
■ 3.3. IP DEGREES AT PDS SYSTEM

■ PROTECTION DEGREES WHILE THE DOORS ARE OPENED ■

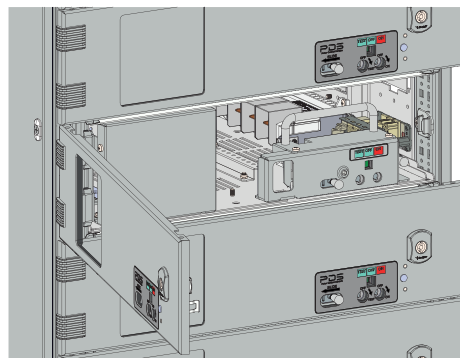
- While the doors are opened , the PDS system is protected IPXXD without any cutouts for the equipments.
- In case of making cutouts for equipments , partner must be sure the protection must be at least IP XXB.



External Door System



Internal Panel System



Drawable system

APPENDIX 3: DEGREES OF PROTECTION (IP)

■ 3.4.SELECTION OF ENCLOSURES ACCORDING TO THE PREMISES

			PDS MODULES PROTECTION		
	Minimum Requirement		Fixed Modules IP2X/ IK08-10	Fixed Modules IP53 /IK08-10	Withdrawable Modules IP40 / IK08
INDUSTRIAL FACILITIES	IP	IK			
Slaughter houses	55	08	*	*	*
Batteries (manufacture)	33	07	*	✓	*
Acid (manufacture and storage)	33	07	*	✓	*
Alcohol (manufacture and storage)	33	07	*	✓	*
Aluminium (manufacture and storage)	51	08	*	✓	*
Livestock (raising, fattening and sale)	45	07	*	✓	*
Asphalt and bitumen storage	53	07	*	✓	*
Wool beating and carding	50	08	*	✓	*
Industrial laundry	25	07	*	✓	*
Wood (processing)	50	08	*	✓	*
Meat packers	25	07	*	✓	*
Bakeries	50	07	*	✓	*
Breweries	24	07	*	*	*
Brickworks	53	08	*	✓	*
Rubber (production and processing)	54	07	*	*	*
Carbide (manufacture and storage)	51	07	*	✓	*
Ammunition factories	53	08	*	✓	*
Carton board (production)	33	07	*	✓	*
Quarries	55	08	*	*	*
Celluloid (manufacture of objects)	30	08	*	✓	✓
Cellulose (manufacture)	34	08	*	*	*
Coal (depots)	53	08	*	✓	*
Farm products	25	07	*	*	*
Boiler-making works	30	08	*	✓	✓
Lime kilns	50	08	*	✓	*
Rag (storage)	30	07	*	✓	✓
Chlorine (manufacture and storage)	33	07	*	✓	*
Chrome-plating	33	07	*	✓	*
Cement works	50	08	*	✓	*
Coking plant	53	08	*	✓	*
Adhesives (production)	33	07	*	✓	*
Bottling lines	35	08	*	*	*
Liquid fuels (storage)	33	08	*	✓	*
Fats (processing)	51	07	*	✓	*
Leather (tanning and storage)	31	08	*	✓	*
Copper (ore processing)	31	08	*	✓	*
Paint stripping	54	08	*	*	*
Detergents (manufacture)	53	07	*	✓	*
Distilleries	33	07	*	✓	*
Electrolysis	33	08	*	✓	*
Ink manufacturing	31	07	*	✓	*
Fertilisers (manufacture and storage)	53	07	*	✓	*
Explosives (manufacture and storage)	55	08	*	*	*
Iron (production and processing)	51	08	*	✓	*
Spinning mills	50	07	*	✓	*
Furriers (beating process)	50	07	*	✓	*
Cheese factories	25	07	*	*	*
Gas (production and storage)	31	08	*	✓	*
Tar (processing)	33	05	*	✓	*
Seed production	50	07	*	✓	*
Metal engraving	33	07	*	✓	*
Oils (extraction)	31	07	*	✓	*
Petroleum products (manufacture)	34	08	*	✓	*
Printworks	20	08	✓	✓	✓

* : Need Enclosed room to cover required IP level

✓ : Covers required IP level

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■ 3.4.SELECTION OF ENCLOSURES ACCORDING TO THE PREMISES

	Minimum Requirement		PDS MODULES PROTECTION		
			Fixed Modules IP2X/ IK08-10	Fixed Modules IP53 /IK08-10	Withdrawable Modules IP40 / IK08
INDUSTRIAL ESTABLISHMENTS	IP	IK			
Dairies	25	07	*	✓	*
Public wash-houses	25	07	*	✓	*
Liqueurs (production)	21	07	*	✓	*
Halogenated liquids (use)	21	08	*	✓	*
Infl ammable products (storage and work-shops)	21	08	*	✓	*
Magnesium (production, storage and use)	31	08	*	✓	*
Machine rooms	20	08	*	✓	*
Plastics (production)	51	08	*	✓	*
Cabinet makers	50	08	*	✓	*
Metals (processing)	33	08	*	✓	*
Combustion engines (testing of)	30	08	*	✓	*
Ammunition storage	33	08	*	✓	*
Nickel (ore processing)	33	08	*	✓	*
Household waste (processing)	54	07	*	*	*
Paper (production)	33	07	*	✓	*
Paper (storage)	31	07	*	✓	*
Perfume (production and storage)	31	07	*	✓	*
Pulp mill	35	07	*	*	*
Paint (production and storage)	33	08	*	✓	*
Plaster (processing and storage)	50	07	*	✓	*
Gunpowder factory	55	08	*	*	*
Chemicals (production)	50	08	*	✓	*
Oil refi neries	35	07	*	*	*
Salt preserve factories	33	07	*	✓	*
Soap (production)	31	07	*	✓	*
Saw mills	50	08	*	✓	*
Metalwork shops	30	08	*	✓	✓
Grain or sugar silos	50	07	*	✓	*
Silk and artifi cial hair factories	50	08	*	✓	*
Sodium carbonate (processing and storage)	33	07	*	✓	*
Sulphur (processing)	51	07	*	✓	*
Spirits (storage)	33	07	*	✓	*
Sugar mills	55	07	*	*	*
Tanners	35	07	*	*	*
Dye works	35	07	*	*	*
Textile and fabric (production)	51	08	*	✓	*
Varnish (production and application)	33	08	*	✓	*
Glass works	33	08	*	✓	*
Zinc works	31	08	*	✓	*
Water treatment facilities	25	08	*	*	*

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	Minimum Requirement		PDS MODULES PROTECTION		
			Fixed Modules IP2X/ IK08-10	Fixed Modules IP53 /IK08-10	Withdrawable Modules IP40 / IK08
PUBLIC and GENERAL ESTABLISHMENTS	IP	IK			
Hotels	20	02	√	√	√
Libraries and documentation centres	20	02	√	√	√
Exhibitions halls and rooms	20	02	√	√	√
Exhibitions areas for equipment	20	02	√	√	√
Hospitals operating room	20	07	√	√	√
Residence operating room	20	02	√	√	√
TECHNICAL LOCATIONS	IP	IK			
Battery rooms	23	07	*	√	*
Lifts (machine rooms and pulley rooms)	20	08	√	√	√
Electrical rooms	20	07	√	√	√
Control rooms	20	02	√	√	√
Workshops	23	08	*	√	*
Laboratories	23	07	*	√	*
Air conditioning washers	24	07	*	*	*
Machine rooms	31	08	*	√	*
Water pressurisers -Boiler rooms coal fuel	61	08	*	*	*
storage areas coal	60	08	*	*	*
storage areasoil	20	08	√	√	√
Cinder tips	50	08	*	√	*
Pump rooms	23	08	*	√	*
Pressure reduction rooms (gas)	20	08	√	√	√
Steam or hot water facilities	23	08	*	√	*
Expansion vessel rooms	21	02	*	√	*
Compressor room	21	08	*	√	*

* : Need Enclosed room to cover required IP level

√ : Covers required IP level