Lightning protection system
Early streamer emission air terminal

Power and productivity
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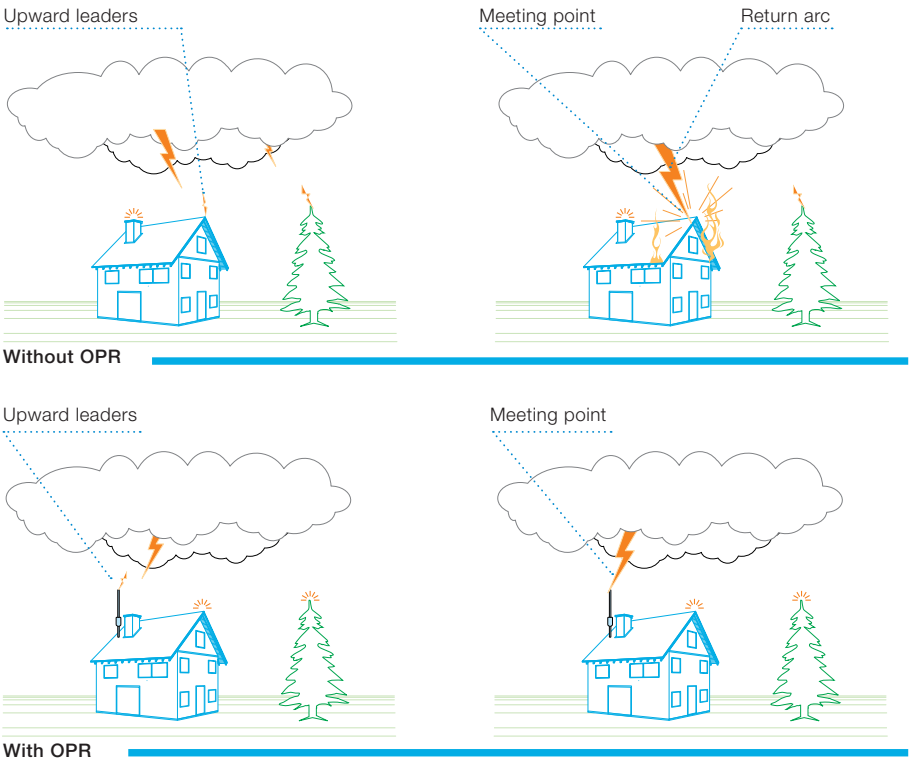
OPR Early streamer emission air terminal

The OPR efficiency (ΔT)

Lightning is one of the most spectacular meteorological phenomena. Generated by the interaction of clouds elements (water and ice), it can kill, injure and damage. The unique efficiency of the OPR Early streamer emission is based on the difference (ΔT), measured in a laboratory, in between the emission time of the OPR and the one from a simple rod. The OPR ESE air terminal is composed of a striking point connected to a down conductor to conduct the lightning to the ground.

Complete autonomy

During a storm the ambient electric field may rise from 600 V to 10-20 kV/m. When the electric field reach this level representing a minimum risk for a lightning, the OPR begins to get activated and generates high voltage pulses, helping to create and propagating an upward leader. After a strike on the OPR, the lightning current is driven to ground by the down conductor to the earth termination system.

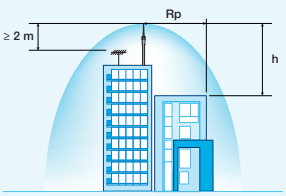


Radius of protection

The radius of protection (Rp) of the OPR is calculated according to the NF C 17-102 (edition 2011). It depends on the OPR efficiency (ΔT) expressed in micro-seconds. The maximum value for ΔT is 60µs.

The risk assessment shall be calculated according to the NFC 17-102 Annex A / IEC 62305-2 and will define the protection level (LPL I, II, III or IV) which will be used in the determination of the OPR radius of protection.

	LPL I	LPL II	LPL III	LPL IV
Rolling sphere radius r(m)	20	30	45	60



Rp(h) : Protection radius at a given height (h)
$Rp(h) = \sqrt{2rh - h^2 + \Delta(2r + \Delta)}$ (for $h \geq 5$ m)

For h < 5 m, refer to the table below

h : Height of the OPR tip above the surface(s) to be protected

r(m) : Standardized striking distance

Δ(m) = 10^5 .ΔT (OPR efficiency)

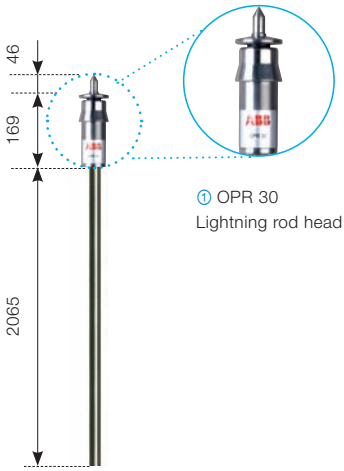
OPR radius of protection

Protection level	I (r = 20 m)		II (r = 30 m)		III (r = 45 m)		IV (r = 60 m)	
OPR	OPR 30	OPR 60	OPR 30	OPR 60	OPR 30	OPR 60	OPR 30	OPR 60
h (m)	Radius of protection Rp (m)							
2	19	32	22	35	25	40	28	44
3	28	48	33	52	38	59	42	65
4	38	64	44	69	50	78	57	87
5	**48**	**79**	**55**	**86**	**63**	**97**	**71**	**107**
6	48	79	55	87	64	97	72	107
8	49	79	56	87	65	98	73	108
10	49	79	57	88	66	99	75	109
15	50	80	58	89	69	101	78	111
20	50	80	59	89	71	102	81	113
45	50	80	60	90	75	105	89	119
60	50	80	60	90	75	105	90	120

A complete expertise

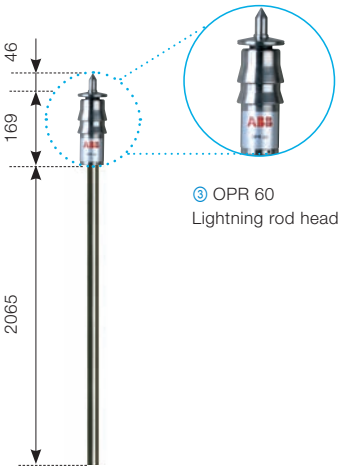
OPR ordering details

ΔT µs	L mm	Description	Type	Order code	Weight kg
30	215	Lightning rod head ①	OPR 30	**2CTB 899 800 R7000**	2.19
30	2280	Lightning conductor ②	OPR 30	**2CTB 899 800 R7300**	5.19
60	215	Lightning rod head ③	OPR 60	**2CTB 899 800 R7100**	2.36
60	2280	Lightning conductor ④	OPR 60	**2CTB 899 800 R7400**	5.36



① OPR 30
Lightning rod head

② OPR 30
Lightning conductor

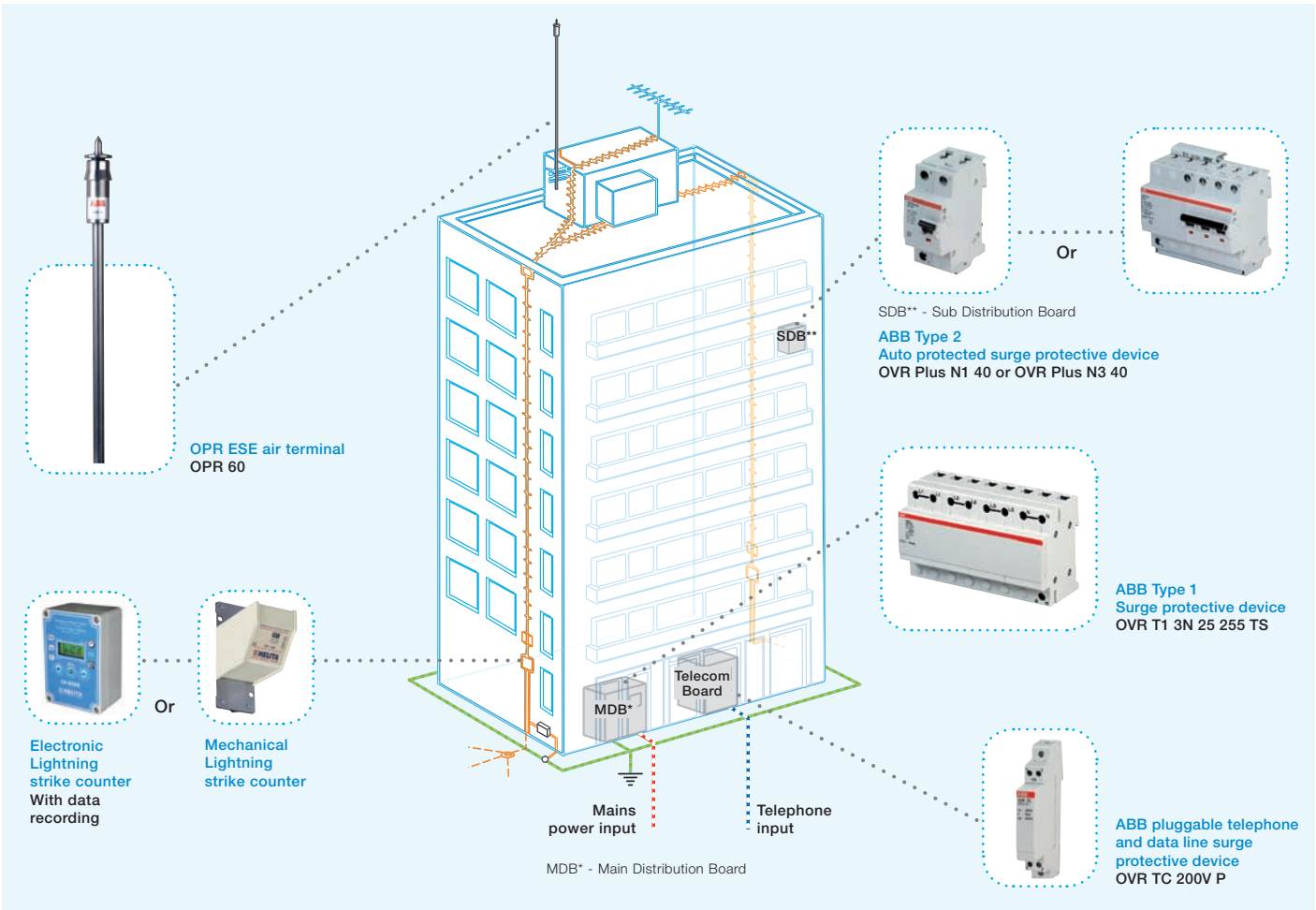


③ OPR 60
Lightning rod head

④ OPR 60
Lightning conductor

Installing / testing

The installation and verification of lightning protection systems using one or more OPR units must be performed in accordance with the manufacturer's recommendations and to the NF C 17-102 standard.



Contact us

ABB France
Low Voltage Products Division
Pôle Foudre Soulé & Hélita
465, avenue des Pré Seigneurs - La Boisse
F-01124 Montluel cedex / France

www.abb.com

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