

## Internal Protection

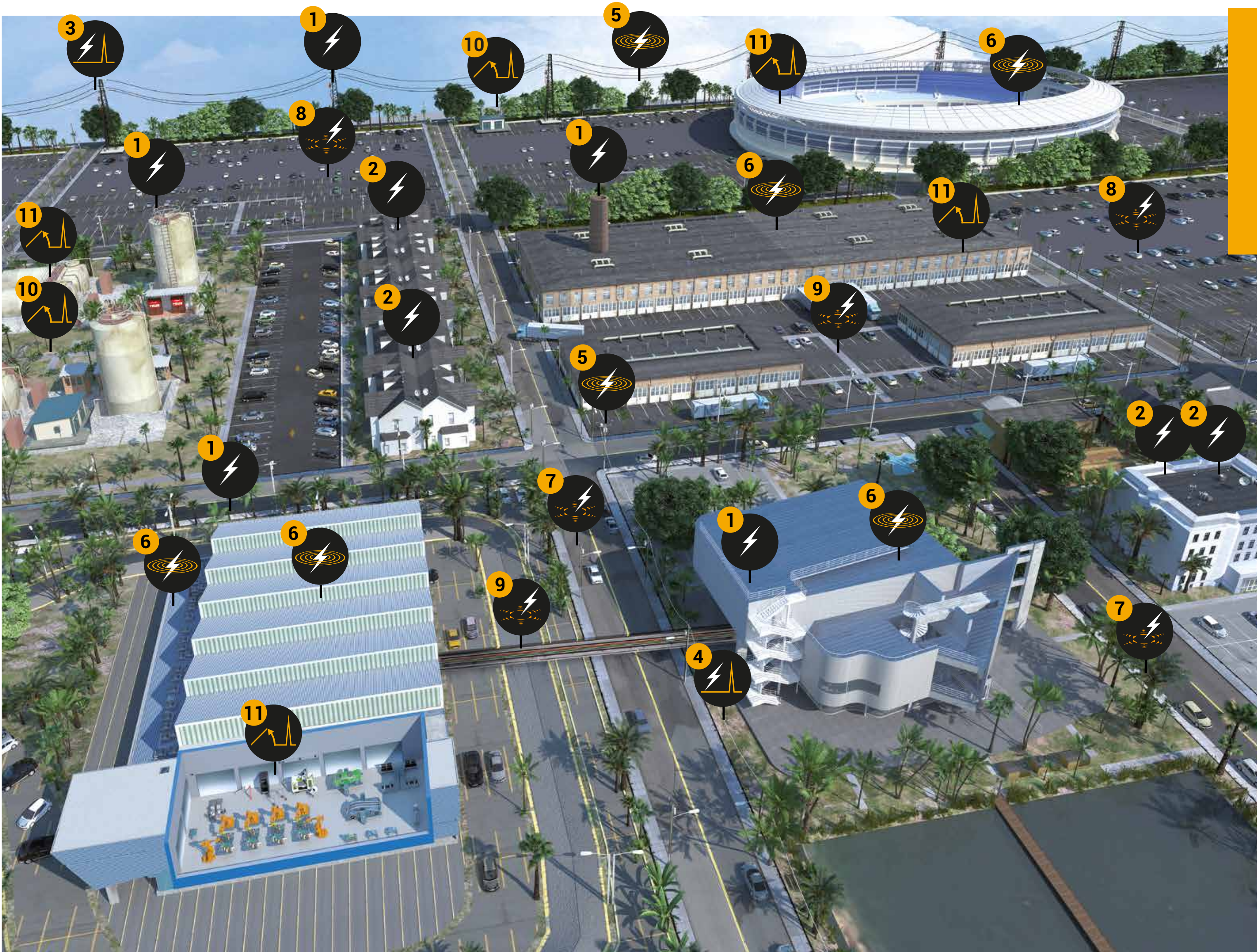
### Transient overvoltages

WASTE REDUCTION  
COMPLIANCE WITH  
INTERNATIONAL  
STANDARDS  
COST SAVINGS

OVER 500  
SOLUTIONS FOR  
SURGE  
PROTECTION

# TRANSIENT OVERVOLTAGES

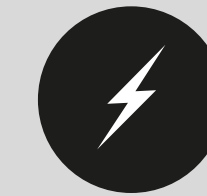
Origin. How they spread



## Causes of surges and propagation mechanisms

The direct and induced **surges** are introduced into the building, damaging electrical and electronic equipment, which can even cause fires and personal injuries.

### Surges due to direct lightning discharges



- 1 Discharges on antennas that spread through their cables.
- 2 Discharges on building elements (corners, chimneys, weather vanes) that spread through the electrical installation.

### Surges due to indirect lightning discharges



- 3 Discharges on overhead supply lines.
- 4 Discharges on overhead telephone lines.

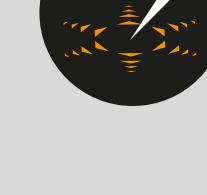
### Induced surges



- 5 Inductions on overhead supply and telephone lines.
- 6 Inductions on supply and data lines inside buildings.



- 7 Direct discharges on elements close to buildings (trees, metallic fences, lampposts).



- 8 Direct discharges to ground.
- 9 Discharges close to underground supply and data lines that connect equipment between different buildings.

### Commutation surges

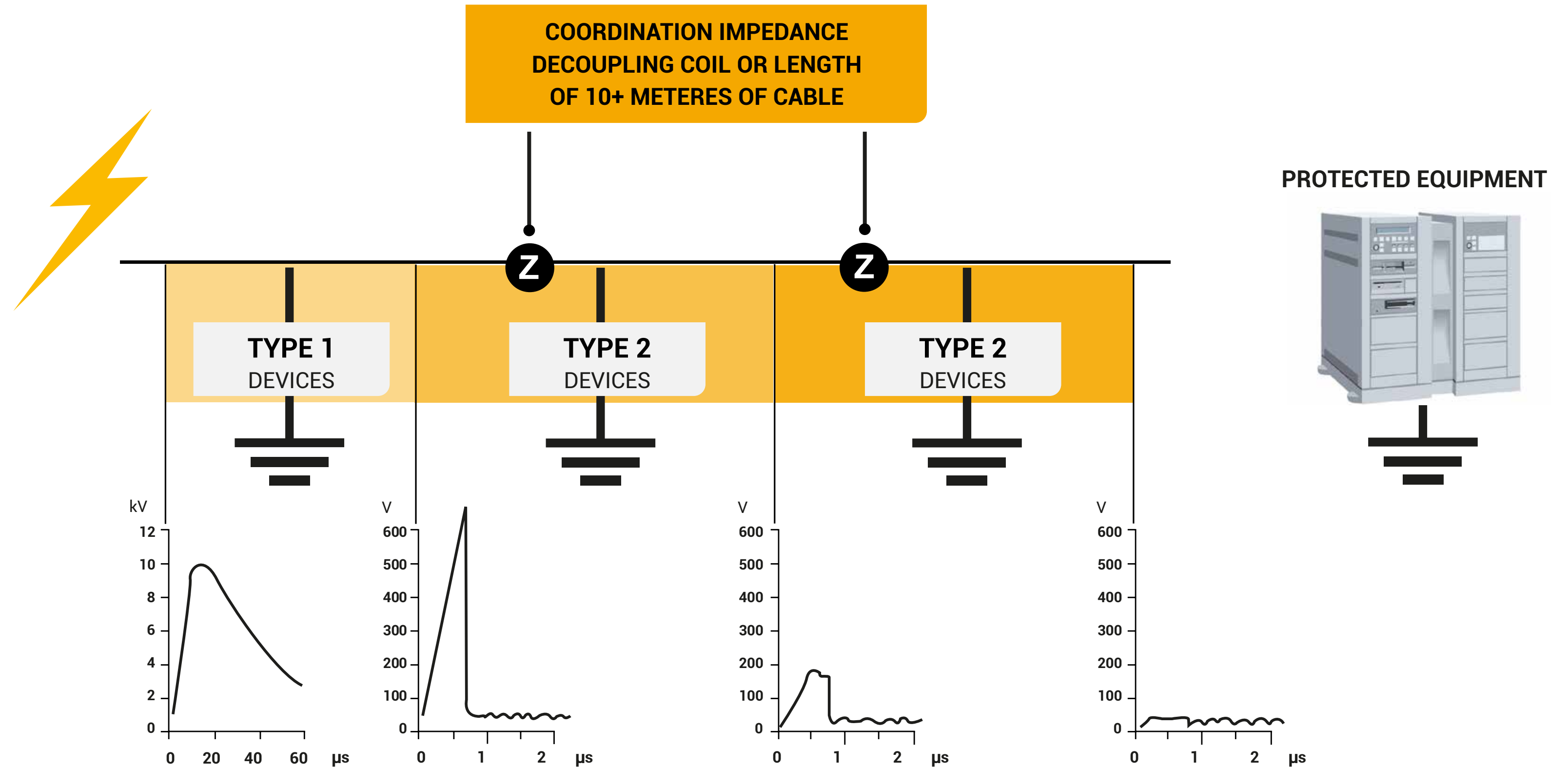


- 10 Power supply switching.
- 11 Commutations in power machinery.



### Coordination

For a correct protection against overvoltages, stepped and coordinated protection is required, with several protection stages acting sequentially, so that, on one hand they are capable of **supporting all the discharge current**, and on the other hand, leave a **residual voltage that is not harmful to existing equipment** or that which may be installed in the future.



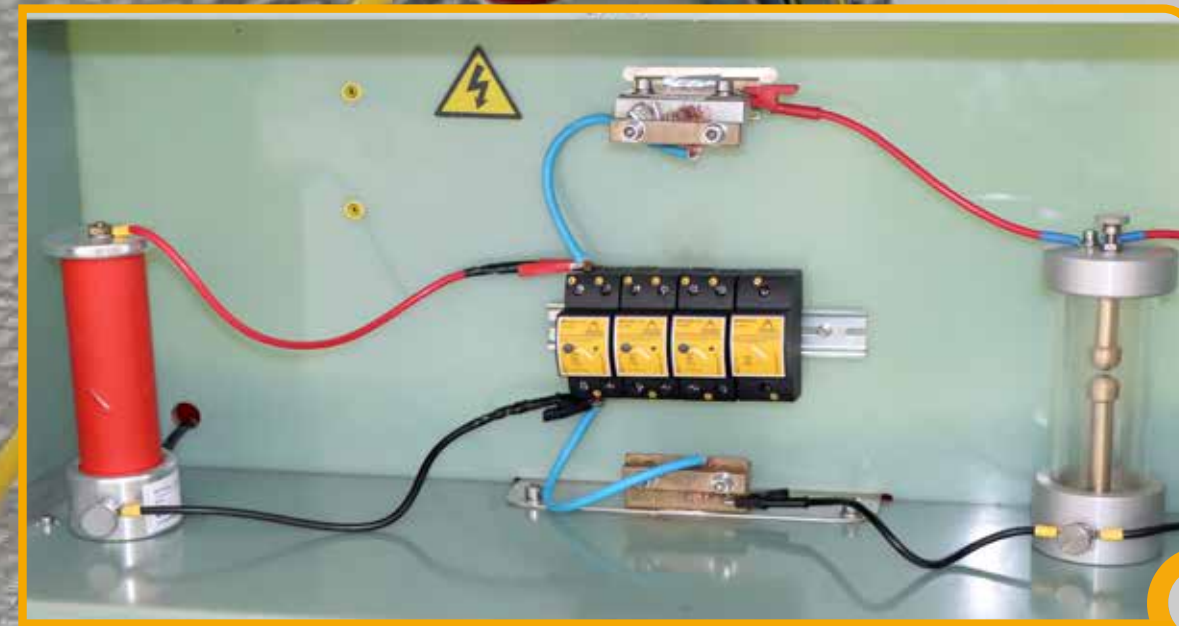
Transient surge suppression through a stepped protection.

## TRANSIENT OVERVOLTAGES

Protection types 1, 2 & 3. Coordinated protection



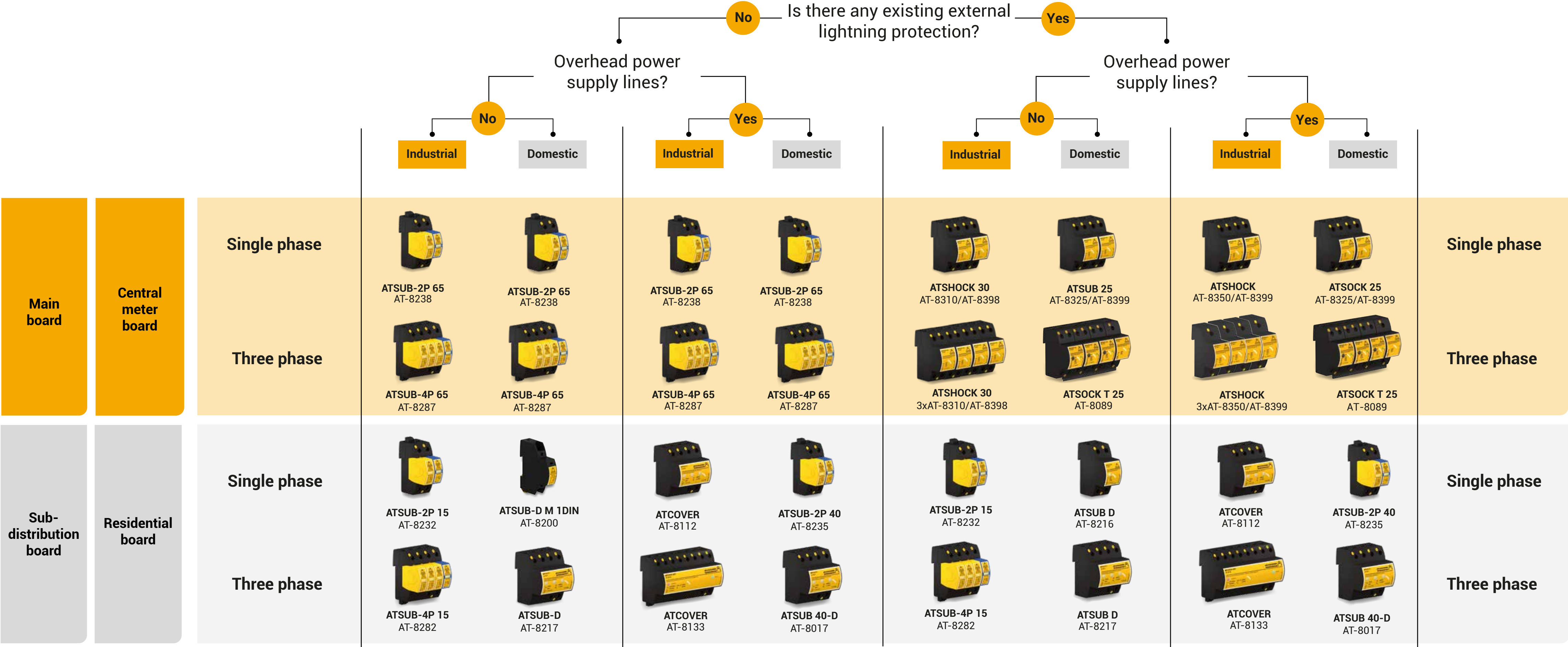
Test according to IEC 61643 to determine  $I_n$  and  $I_{max}$  up to 250 kA of current wave 8/20  $\mu$ s



Application of 10 8/20  $\mu$ s current impulses with a peak current of 25 kA to obtain their characteristics of nominal current ( $I_n$ ) and maximum current ( $I_{max}$ )



### Quick selection guide



# TRANSIENT OVERVOLTAGES

## Protection types 1, 2 & 3. Coordinated protection



### Industrial installation



ATSOCKET



ATSUB



ATCOVER

Power supply		
TYPE 1 (direct lightning effects)	1	ATSHOCK
Is there more than 10m of separation cable?		
YES		
		Decoupling coil
		ATLINK
2	TYPE 2 (attenuated lightning effects) ATSHIELD   ATSUB   ATCOVER	
3	TYPE 3 (attenuated electromagnetic effects) ATSOCKET   ATPLUG	

Telecommunication & data		
TYPE 2 + 3 (coordinated)	4	ATFONO
	5	ATLINE
	6	ATFREQ
	7	ATLAN

- power supply line
- telephone line
- data line
- IT line
- coaxial line



# TRANSIENT OVERVOLTAGES

Protection types 1, 2 & 3. Coordinated protection



## Residential installation



Power supply		
TYPE 1 + 2 (attenuated lightning effects)	1	ATSHIELD ATSUB ATCOVER
TYPE 3 (attenuated electromagnetic effects)	2	ATSOCKET ATPLUG

Telecommunication & data		
TYPE 2 + 3 (coordinated)	3	ATFONO
	4	ATFREQ

— power supply line  
— telephone line  
— coaxial line



# TRANSIENT OVERVOLTAGES

Protection types 1, 2 & 3. Coordinated protection



## Office installation



ATSUB



ATLAN

Power supply		
TYPE 1 (direct lightning effects)	1	ATSHIELD
Is there more than 10m of separation cable?		
YES		
NO		Decoupling coil
		ATLINK
2	TYPE 2 (attenuated lightning effects) ATSUB   ATCOVER	
3	TYPE 3 (attenuated electromagnetic effects) ATSOCKET   ATPLUG	

Telecommunication & data	
TYPE 2 + 3 (coordinated)	4 ATFONO
	5 ATLAN
	6 ATFREQ

- power supply line
- telephone line
- IT line
- coaxial line





# TRANSIENT OVERVOLTAGES

Protection types 1, 2 & 3. Coordinated protection



## Photovoltaic installations



ATPV



ATSHIELD

Direct current		
TYPE 2 (attenuated lightning effects)	1	ATPV

Power supply		
TYPE 1 + 2 (direct or attenuated lightning effects)	2	ATSHIELD ATSUB





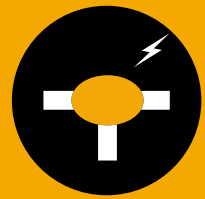
LOCAL STORM  
DETECTION



AIR TERMINALS  
AND ACCESSORIES



EARTHING



EXOTHERMIC  
WELDING



TRANSIENT  
OVERVOLTAGES



PERMANENT  
OVERVOLTAGES



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