

# Lightning and overvoltage protection Water Treatment Plants



**ABB**

# EXPERTISE

## Renowned expertise in lightning protection

ABB Lightning Protection Group has several decades of experience and uses its technological expertise to provide protection against lightning and overvoltage.

In addition to up-to-date expertise with its global lightning protection offer (external and internal), ABB Lightning Protection Group now offers a wide range of lightning conductors and surge arresters dedicated to the water cycle: collection, treatment, storage, transport and distribution...

ABB Lightning Protection Group also has a laboratory comprising various generators capable of testing all equipment under real conditions with different amplitudes of surge currents, in order to optimize protection solutions.



LESPS laboratory in Bagnères-de-Bigorre (65)



Test generator

# OVERALL PROTECTION

## How to protect water treatment plants?

Water is a fundamental utility. Its increased consumption is the reflection of population growth and an improved standard of living. Water and wastewater treatment plants are particularly exposed to lightning risks, due to vast surface areas and exposure of frequently isolated sites. Lightning strikes are a major component in the risk to be assumed, both because of the direct effect of lightning on the structure (External Lightning Protection Installation), and the overvoltages on the facility (Internal Lightning Protection Installation).

The consequences of lightning on treatment plants have repercussions on all equipment and overvoltage will directly affect instrumentation and remote management devices as well as PLCs...

The protection of water cycle facilities against overvoltage involves all types of structures, i.e. **pumping stations, treatment plants, storage, transport and distribution.**



### Protection of storage systems



- Flowmeters
- Level measuring devices
- Temperature measuring devices
- Pressure measuring devices

### Protection of transport - distribution systems



- Probes
- Flowmeters
- Meters

### Protection of treatment plant systems

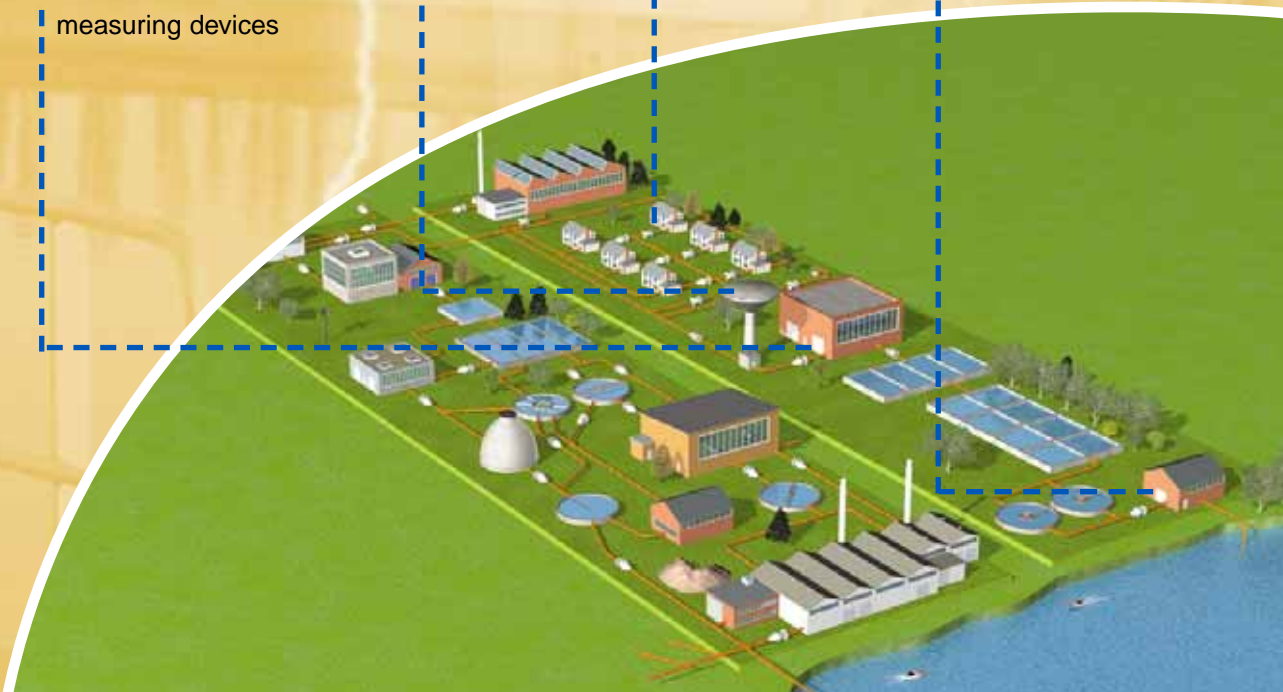


- Flowmeters
- Probes
- Level measuring devices
- Temperature measuring devices
- Pressure measuring devices

### Protection of pumping station systems



- Recorders
- Sensors
- Flowmeters
- Level measuring devices
- Temperature measuring devices



# INDIRECT STRIKES

## Protection of treatment plants and pumping stations

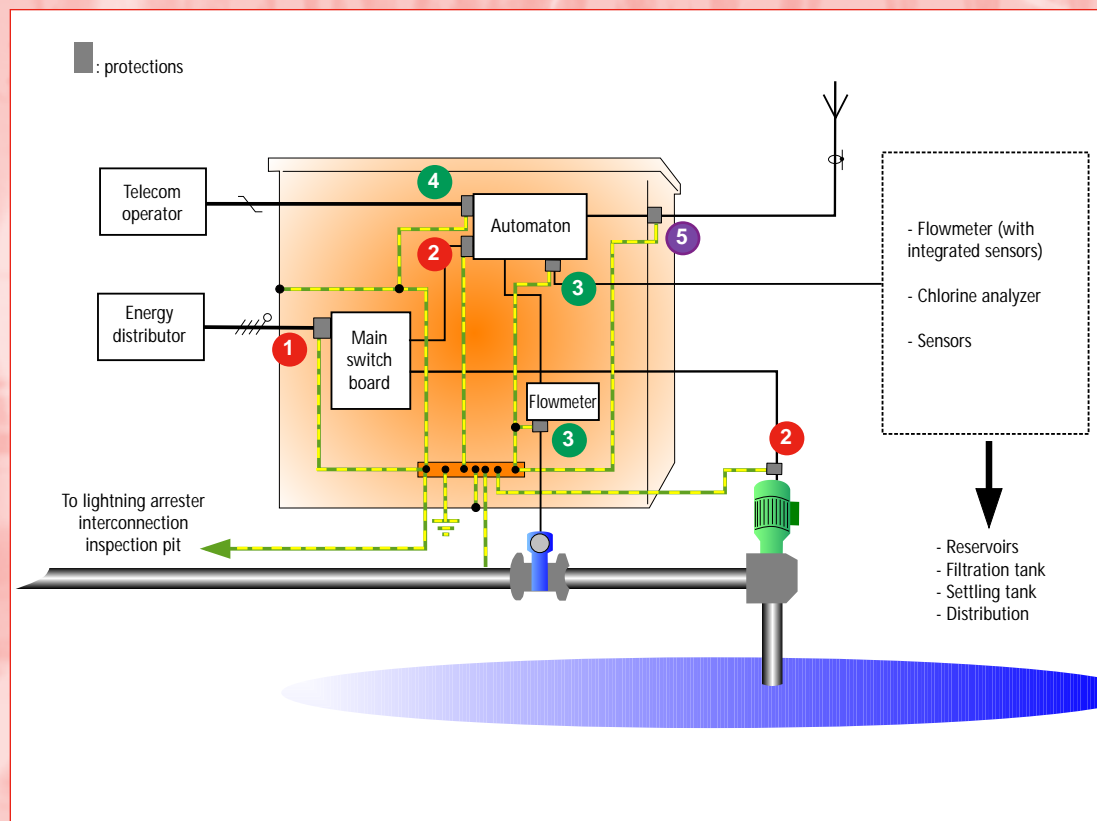
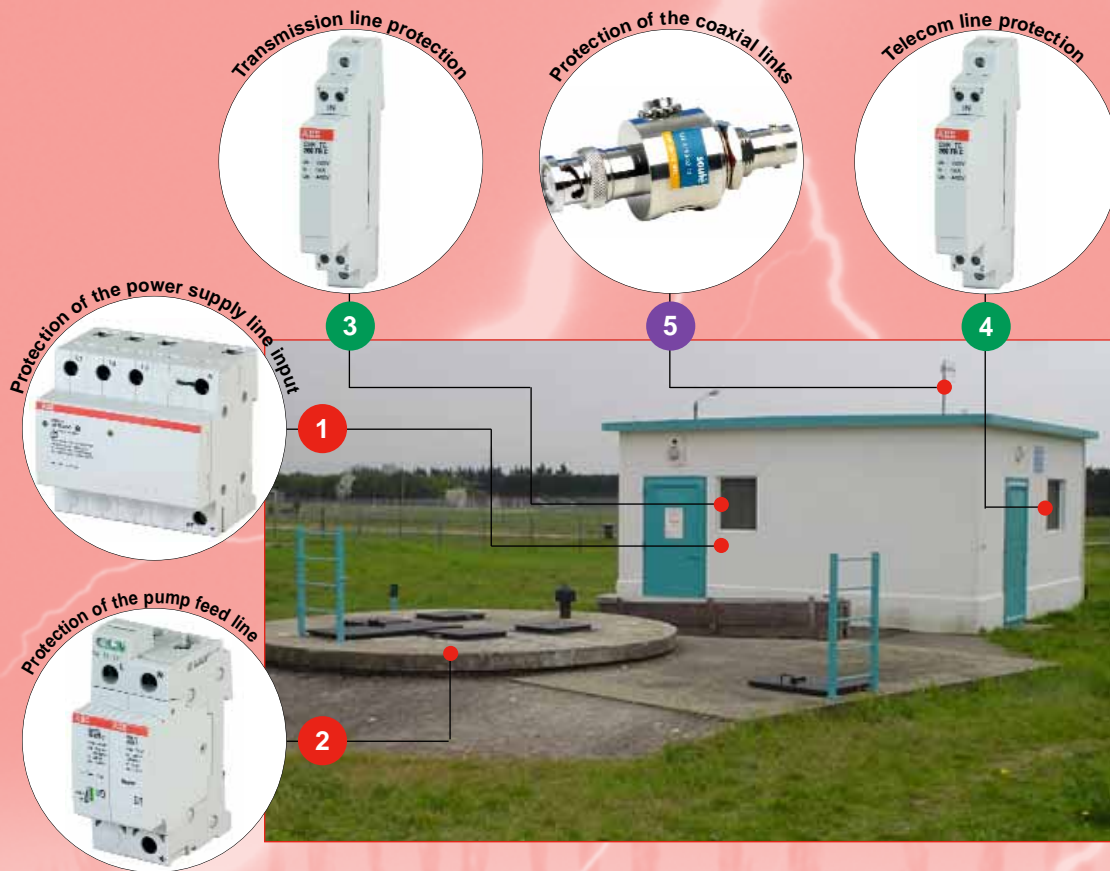


ABB Lightning Protection Group offers a comprehensive range of surge arresters adapted to the protection of water and wastewater treatment plants. ABB recommends the installation of Type 1 lightning arresters upstream of the facilities. In addition, Type 2 fine protections must be positioned as near to the equipment needing protection as possible. Transmission lines, telephone lines, computer connection or current loop must also be protected against overvoltages. In this case, ABB Lightning Protection Group recommends pluggable OVR TC P surge arresters.

\* Switch Telecom Network : analog telecom line

### 1 Protection of the power supply line input

Name	Iimp (10/350)	I <sub>max</sub> (8/20)	Reference	Function / Comment
OVR T1 3N 25 255-7	25kA	-	2CTB815101R8800	Type 1

### 2 Protection of the pump feed line

Name	Iimp (10/350)	I <sub>max</sub> (8/20)	Reference	Function / Comment
OVR T2 1N 40 275 s P TS	-	40 kA	2CTB803952R0200	Type 2

### 3 Transmission line protection

Name	Iimp (10/350)	I <sub>max</sub> (8/20)	Reference	Function / Comment
OVR TC 6V P	-	10 kA	2CTB804820R0000	RS422/RS485 - Profibus DP

### 3 Transmission line protection

Name	Iimp (10/350)	I <sub>max</sub> (8/20)	Reference	Function / Comment
OVR TC 24V P	-	10 kA	2CTB804820R0200	LS - 4/20mA - 4/20Ma HART - Profibus PA

### 4 STN link protection

Name	Iimp (10/350)	I <sub>max</sub> (8/20)	Reference	Function / Comment
OVR TC 200FR P	-	10 kA	2CTB804820R0500	STN*

### 5 Protection of the coaxial links

Name	Iimp (10/350)	I <sub>max</sub> (8/20)	Reference	Function / Comment
PHF AN 50 BNC m/f	-	20 kA	8150 02 12	Antenna protection

OVR TC P surge arresters are equipped with pluggable cartridges to facilitate maintenance operations.

Name	Reference
OVR TC 6V C	2CTB804821R0000
OVR TC 24V C	2CTB804821R0200
OVR TC 200FR C	2CTB804821R0500

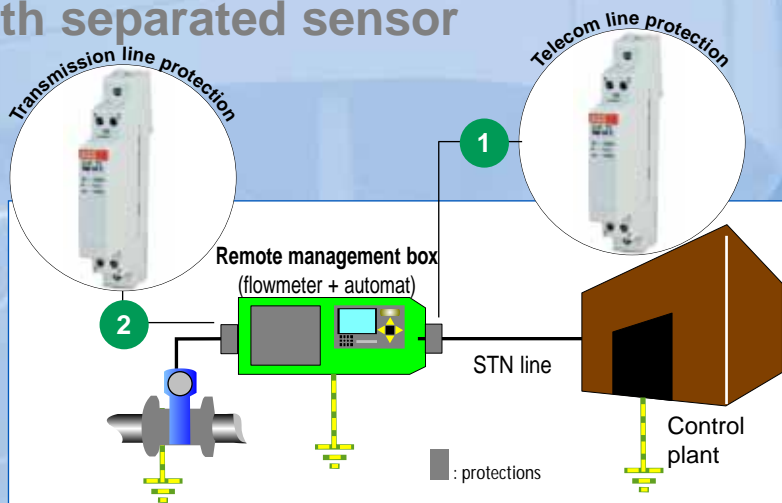


# INDIRECT STRIKES

## Protection of transport - distribution systems

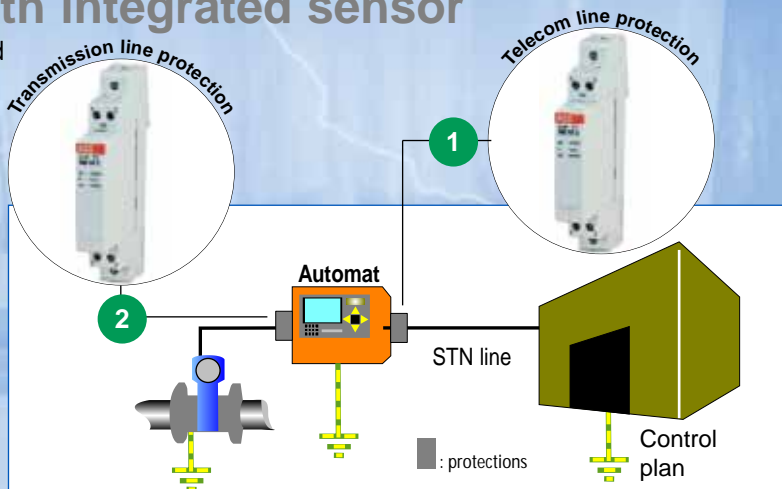
### Flowmeter with separated sensor

It is necessary to protect remote management boxes in transport and distribution systems. Surge arresters are positioned on the one side on the STN transmission line connecting the automat with the control plant and, on the other, on the 4/20mA connection linking the flowmeter with the sensor.



### Flowmeter with integrated sensor

When the sensor is integrated into the flowmeter, only the automat needs protection. In this case, a surge arrester must be installed on the 4/20mA connection linking the automat with the flowmeter. The STN\* transmission line connecting the automat with the control plant must also be protected as explained in the example above.



#### 1 STN link protection

Name	$I_{max}$ (8/20)	Reference	Function / Comment
OVR TC 200FR P	10 kA	2CTB804820R0500	STN*

#### 2 Transmission line protection

Name	$I_{max}$ (8/20)	Reference	Function / Comment
OVR TC 6V P	10 kA	2CTB804820R0000	RS422/RS485 - Profibus DP

\* Switch Telecom Network : analog telecom line

#### 2 Transmission line protection

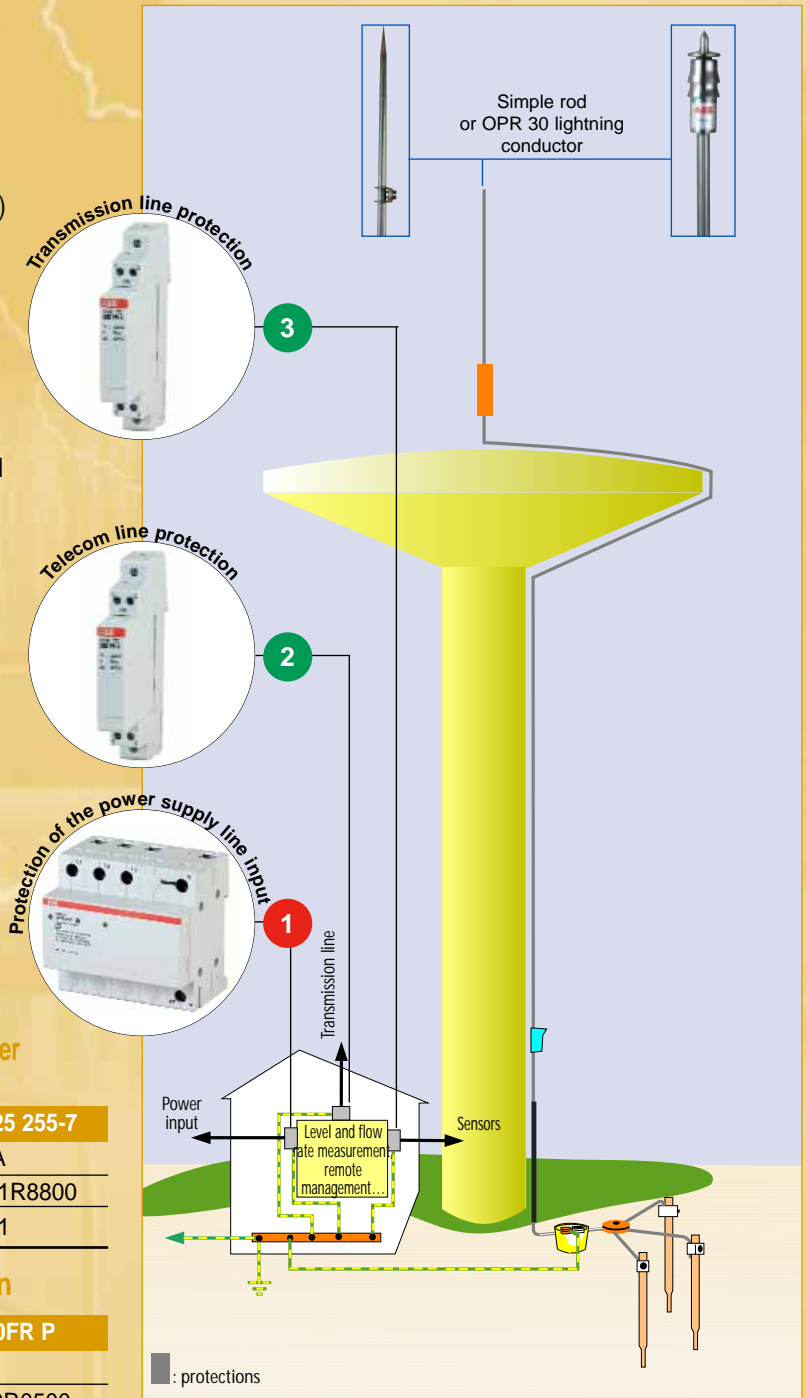
Name	$I_{max}$ (8/20)	Reference	Function / Comment
OVR TC 24V P	10 kA	2CTB804820R0200	LS - 4/20mA - 4/20mA HART - Profibus PA



# Protection of storage systems against DIRECT STRIKES

Protection against direct strikes on structures such as water towers requires the installation of an ESE or a simple rod lightning conductor (on the upper part) and implementation of an efficient earthing connector. The resistance of the lightning earthing connector must be less than 10 ohms. Appropriate inspection equipment is used to check this resistance at the time of installation.

According to the IEC 62305-4, the installation of a Type 1 SPD upstream of the facility is necessary in case of an external lightning protection system.



## 1 Protection of the power supply line input

Name	OVR T1 3N 25 255-7
limp (10/350)	25 kA
Reference	2CTB815101R8800
Function	Type 1

## 2 STN line protection

Name	OVR TC 200FR P
I <sub>max</sub> (8/20)	10 kA
Reference	2CTB804820R0500
Function	STN

## 3 Transmission line protection

Name	OVR TC 24V P
I <sub>max</sub> (8/20)	10 kA
Reference	2CTB804820R0200
Function	LS; 4/20mA; 4/20mA HART; Profibus PA





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**ABB Lightning Protection Group**

22, rue du 8 Mai 1945

95340 - Persan

France

Tel : +33 (0) 1 30 28 60 88

Fax : +33 (0) 1 30 28 60 79