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## Operating instructions

Publication No. 1HC0027341 AB

## Surge arresters Type AZ

With ABB metal-oxide resistors in  
metal-encapsulated design  
Without gaps  
For indoor and outdoor use

Mounting and installation, maintenance,  
transportation, storage and disposal

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We reserve the right to make changes

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## **1. ABOUT THIS DOCUMENT**

These operating instructions are part of the AZ surge arrester and describe safe and proper use in all phases of operation.

We reserve the right to make changes in the interest of further development.

### **1.1. Validity**

These operating instructions are valid only for the AZ surge arrester.

### **1.2. Target audience**

The target audience of these operating instructions is professionals in the field of high-voltage technology.

The AZ may only be commissioned and maintained by persons instructed in proper use and handling.

### **1.3. Copyright**

The copyright of these operating instructions belongs to ABB Switzerland AG. These operating instructions are to be handled confidentially and are intended solely for mounting, operating and monitoring personnel. They contain regulations and illustrations of a technical nature which may neither be utilized for competitive purposes nor passed on to others. Handing over to third parties is impermissible and liable for compensation.

All rights, including those regarding the translation, are reserved.

## 1.4. Further applicable documents

These operating instructions apply only in combination with the operating instructions of the switching system and the documents listed here.

The following documents apply, depending on the type of switching system.

Switching system	Document No.	Purpose
All	1HC0028459	Instructions for the correct handling of SF6 insulating gas
	1HC0021348	Instructions for checking for damage
ELK-0 (series 04) EXK-0	1HDI118252_RevA	Instructions for factory and construction site mounting
ELK-14 / 300	1HC0041564	Information about lowering the pressure at inspections / interventions
ELK-3 / 420	1HC0041565	Information about lowering the pressure at inspections / interventions
ELK-3 / 550	1HC0041566	Information about lowering the pressure at inspections / interventions

## 2. SAFETY

### 2.1. Symbols and information



This is a safety sign. It warns you of the danger of injury and material damage. Follow all measures marked with the safety sign to avoid injuries, death and damage to materials.



This safety sign warns you of the danger of death or serious injury from electric shocks. Follow all measures marked with the safety sign to avoid injuries and death.



This mark indicates that an action is to be performed.

Warnings in these operating instructions indicate special dangers and list measures for prevention of the danger. There are three levels of warning:

Warning word	Meaning
<b>DANGER</b>	Immediate, impending endangerment of your life and health
<b>WARNING</b>	Possible impending endangerment of your life and health
<b>CAUTION</b>	Possible impending danger of light injuries or damage to materials

Warnings are structured as follows:



**WARNING  
WORD**

#### The type and source of danger appear here

Possible consequences, which could occur if the measures are not followed, appear here.

- ⊙ **Impermissible** actions appear here.
- ▶ Measures for avoiding the danger appear here.

## 2.2. Basic safety precautions

### 2.2.1. Product safety

The AZ has been constructed using state-of-the-art technology and officially recognized safety-related rules. However, danger to life and limb of the user or third parties could arise or damage of the AZ and other property could occur while the AZ is in use.

- ▶ The AZ is only to be used when it is in technically sound condition, for the intended purpose and with safety and the possible dangers in mind while observing the operating instructions.
- ▶ Keep the operating instructions intact and fully readable and store them in such a way that they are accessible to operating personnel at all times.
- ▶ Decommission and replace overloaded or damaged AZ units.

### 2.2.2. Personnel-related measures

- ▶ Train personnel in professional and safe working with high-voltage technology.
- ▶ Train and instruct personnel in working on the AZ using the operating instructions.
- ▶ Personnel to be trained, taught, instructed or provided with general education may only work with the AZ under constant supervision by an experienced high-voltage technology professional.
- ▶ Instruct personnel in the correct handling of SF6 insulating gas.

### 2.2.3. Organizational measures

- ▶ Observe all safety- and danger-related information regarding the AZ.
- ▶ The safety rules of the owner of the high-voltage system and all regulations of the respective national safety authorities are to be observed.
- ▶ Only trained and instructed professionals may be authorized.
- ▶ Clearly assign areas of responsibility for working with the AZ, make them known and adhere to them.
- ▶ Only personnel who have read and understood the operating instructions, especially the "Basic safety precautions" section, before beginning work may be allowed to carry out activities with the AZ.
- ▶ Check to ensure that work is being performed in a safety-conscious way with awareness of possible dangers and while observing the operating instructions.
- ▶ Ensure correct handling of SF6 insulating gas.

### 3. DESCRIPTION

#### 3.1. Intended use

The AZ is a surge arrester for use in high-voltage applications. Surge arresters are protective devices which protect the insulation of high-voltage apparatuses against the strain of impermissible surges. Surges can occur due to lightning or switching operations in the switching system.

The manufacturer is not liable for damage resulting from unintended use exceeding this. The owner is solely responsible for the risk here.

#### 3.2. Structure and function

The AZ surge arrester consists of the following components:

- Metallic vessel with floor plate or cover
- Partition isolator
- Active part with control cover and contact system
- Gas filling with SF<sub>6</sub> insulating gas under increased pressure
- Accessories:
  - Gas connections
  - Burst protection
  - Bushing insulator for leakage current
  - Density monitoring device

The active part of the AZ surge arrester is constructed from serially connected, non-linear metal-oxide (MO) resistors. These MO resistors have an extremely non-linear resistance property. At the maximum operating voltage of  $U_c$ , only a small capacitive current will flow in the mA range. With an increase in voltage, the MO resistors enter a highly conductive state practically without delay. Thus any further increase in voltage is limited to the specified residual voltage values. Once the surge wave has died down, the arrester returns to the essentially nonconductive state. The MO arrester converts the energy of the surge wave into heat, which it emits into the surrounding air through the encapsulation.

The stack of MO resistors is held together either with strong lugs or tension rods made of fiberglass-reinforced plastic. The control cover ensures linear voltage distribution along the active part. The top electrode (high-voltage electrode) of the active part is connected to the inner electrode of the partition isolator. The base electrode of the active part is connected electrically to a bushing insulator in the floor plate so that the leakage current can be monitored.

This active part is installed in a metal enclosure that is filled with SF6 insulating gas under increased pressure, whereby this is an **impervious pressure system conforming to IEC 60694**.

The partition isolator separates the gas compartment of the AZ surge arrester from the gas compartment of the switching system.

The AZ surge arrester is filled with or drained of the insulating gas via a gas connection. A gas density monitoring device used to monitor the SF6 gas compartment is connected to the other gas connection.

For the highly unlikely case of the AZ surge arrester being overloaded, blow-out valves with gas diversion fittings are mounted as burst protection.

There is a difference between single-phase and three-phase AZ surge arresters. In the case of a three-phase AZ three complete active parts with their respective control cover and contact system are installed in a gas-filled metallic vessel including floor plate and partition insulator. In this case the partition isolator has 3 high-voltage electrodes and 3 bushing insulators for the leakage currents in the floor plate.

Thanks to its very high energy absorbing capability and deep protective level the AZ surge arrester is particularly suitable for the surge protection of metal-encapsulated, SF6 gas-insulated high-voltage switching systems and transformers.

### 3.3. Technical data

The technical data, dimensions and weights are specified in the following documents:

- SF6 gas-insulated ELK AZ surge arrester in the document CHHOS/AR3350
- Data sheets, dimensional drawings, rating plates and project drawings

#### 3.3.1. Technical data on the surge arrester

The rating plate on the surge arrester displays the following data:

Data	Meaning
AZ.....	Type designation
No. HA ...	Serial number
Construction year	Date of manufacture
Max. continuous operating voltage U <sub>c</sub> ... kV	Maximal permissible continuous operating voltage U <sub>c</sub> conforming to IEC 60099-4
Rated voltage (Rating) ... kV	Maximal permissible rated voltage U <sub>r</sub> conforming to IEC 60099-4
BIL ... kV	Basic insulation level at lightning impulse
Rated frequency ... Hz	Frequency of the supply voltage
Nominal discharge current ... kA	Nominal current I <sub>n</sub> at a current pulse 8/20 μs conforming to IEC 60099-4
Line discharge class ...	Line discharge class conforming to IEC 60099-4
Mass ... kg	Total mass of the surge arrester
Volume (SF6) ... dm <sup>3</sup>	Volume of the SF6 insulating gas in the vessel
Mass SF6 gas at filling pressure ... kg	Mass of the SF6 insulating gas at filling pressure (20 °C)
Design overpressure ... kPa	Overpressure for which the vessel is dimensioned

Filling pressure ... kPa	Pressure of the SF6 insulating gas with which the vessel is filled at 20 °C
Refilling pressure ... kPa	Pressure of the SF6 insulating gas at 20 °C at which the vessel has to be refilled
Alarm pressure ... kPa	Pressure of the SF6 insulating gas at 20 °C at which the pressure-operated switch triggers alarm

### 3.3.2. Usage guidelines

The recommendations of IEC 60099-5 apply for the usage and dimensioning of the AZ surge arrester.

### 3.3.3. SF6 insulating gas

Sulphur hexafluoride (SF6) is a gas that has the following properties:

- Excellent electrical insulation qualities
- Colorless
- Odorless
- Non-combustible
- Heavier than air

The displayed gas pressure depends on the temperature. The filling pressure at the ambient temperature is calculated from the filling pressure at 20 °C in accordance with rating plate by using the following equation:

$$P_{T^{\circ}\text{C}} = P_{20^{\circ}\text{C}} \times (T + 273.15) / 293.15$$

$P_{20^{\circ}\text{C}}$  = Specific filling pressure at 20 °C in accordance with rating plate

$T$  = Current ambient temperature of the AZ surge arrester in °C

$P_{T^{\circ}\text{C}}$  = Filling pressure at the ambient temperature  $T$

### 3.3.4. Recommended torques and screw-in depths

#### Bolts

The values of the following table apply for bolts of steel of the strength class 8.8.

Thread	Position	Maximum torque [Nm]	Minimum screw-in depth [mm]	For mounting
M8	Floor plate	15	12	Gas coupling for density monitoring devices
M10	Floor plate	30	8	Burst protection monitor for leakage current
M12	Floor plate	48	17	Burst protection
M16	Floor plate	105	23	Grounding
M16	Floor plate	105	23	Ring bolt for transportation

#### Nuts

The values of the following table apply for nuts of steel of the strength class 8.8.

Thread	Position	Maximum torque [Nm]	Minimum thickness of the nuts [mm]	For mounting
M12	Bushing for leakage current in the floor plate	35	9.6	Connection cable to the leakage current monitor or to the direct grounding of the leakage current
M16	Vessel on partition isolator	105	12.8	Ring nut for transportation
M16	Partition isolator of the vessel, system end	105	12.8	Connection with GIS system

## 4. TRANSPORTING, UNPACKING AND STORING

When delivered, AZ surge arresters are filled with SF6 insulating gas and a pressure of 120 kPa (at 20 °C) (see label at the gas connection).



**WARNING**

### Damaged AZ surge arrester

Death through suffocation through escaping SF6 insulating gas

- ▶ Transport the AZ surge arrester correctly.
- ▶ If the AZ surge arrester is damaged:
  - Check immediately for leaks.
  - If necessary, ensure the correct handling of SF6 insulating gas (see document 1HC0028459).



**CAUTION**

### Transporting

#### Surge arresters not secured and impermissible accelerations during transportation

Damage to surge arresters

- ▶ Secure surge arresters against sliding or falling before transportation.
- ▶ During transportation ensure that accelerations on the transport packaging do not reach or exceed the value of **10 g**.
- ▶ Observe safety precautions printed on the packaging during transportation and storage.

## Unpacking



### WARNING

#### Damaged surge arresters

Material damage and personal injury due to the installation and commissioning of damaged surge arresters

- ⊘ Do **not** use damaged surge arresters.
  - ▶ Examine shipment immediately to check for damage (see document 1HC0021348).
  - ▶ Notify the insurance company, the shipper and the supplier of the damage immediately and create a damage log.
- 

The surge arresters provided are packaged in stable wooden crates. The accessories packaged in plastic bags are included in the wooden crates.

The logs for final electrical inspection in the factory are included in the packaging material.

- ▶ After receiving the shipment, compare the order and delivery documents immediately to check for completeness and accuracy of the shipment. In case of incompleteness or deviations, inform the supplier and shipper immediately.

## Storing

The original packaging materials can be used for storage.

- ▶ Store AZ surge arresters in a well-ventilated, clean room.
- ▶ Do not open parts that are packed in plastic films until immediately before installation.
- ▶ Store parts made of rubber (sealings) dry, cool and protected against light.

## 5. COMMISSIONING

### 5.1. Safety



**DANGER**

#### System uses high voltage

Death, serious bodily harm and damage to the switching system may result from an electric shock

- ▶ Allow only authorized professionals to perform work on the surge arrester.
- ▶ Observe the safety rules of EN 50110-1 before working on the system:
  - Disconnect the system from the power supply.
  - Secure the system against being switched on again.
  - Ensure that the system is de-energized.
  - Ground the system and short-circuit it.
  - Cover or cordon off neighboring energized parts.



**DANGER**

#### Leaking AZ surge arrester

Death through suffocation through escaping SF6 insulating gas

- Do **not** open the AZ surge arrester.
- Do **not** vent SF6 insulating gas into the environment.
- Do **not** breath in the SF6 insulating gas.
- Do **not** let the SF6 insulating gas come into contact with skin or eyes.
- ▶ Ensure the correct handling of SF6 insulating gas (see document 1HC0028459).
- ▶ Use protective clothing.



**DANGER**

#### Arc at overloading of the surge arrester

Death, serious bodily harm and damage to property through hot plasma gas

- **Do not** stay or stand in front of the blow-out orifice of the burst protection.
- ▶ Do not store combustible materials in the area of the blow-out orifice of the burst protection.

### 5.2. Checking before commissioning

Each AZ surge arrester is tested by the manufacturer. The log of the electrical test and the leak test are included with the packaging.

Additional electrical testing before commissioning is not necessary.

### 5.3. Installation location and protective distance

Surge arresters only protect high-voltage apparatuses when they are located within the protective distance.

- ▶ Always mount surge arresters as close as possible to the apparatus to be protected within the protective distance. The length of the connection cables is decisive here.
- ▶ If in doubt, calculate the protective distance according to the formulas in the "Surge arrester application guidelines".

### 5.4. Mounting

#### 5.4.1. Checking the technical data, rating plate



**CAUTION**

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#### Incorrect system voltage or technical data

Damage to the switching system and the surge arrester

- ▶ Before mounting, ensure that the characteristic data on the rating plate of the surge arrester matches the requirements of the mains supply at the facility of the system owner. Observe the usage guidelines of IEC 60099-5.
  - ▶ Ensure that the system voltage applied at the terminals of the arrester does not exceed the maximum permissible continuous operating voltage of the surge arrester.
- 

#### 5.4.2. Transporting during mounting



**DANGER**

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#### Impermissible transportation

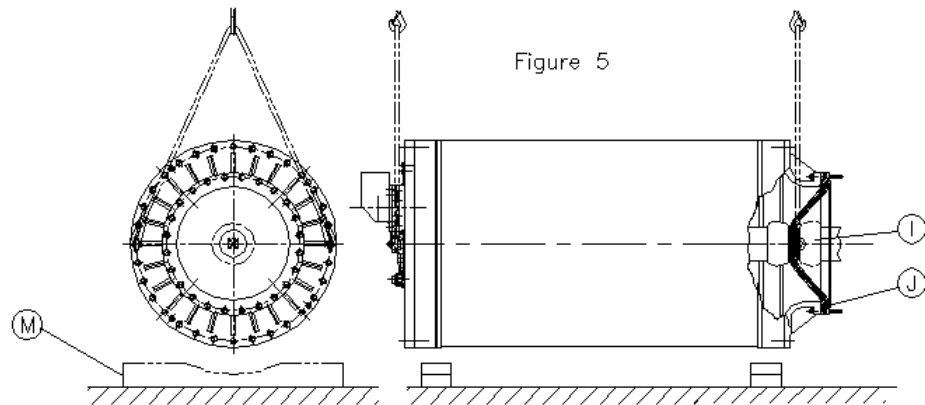
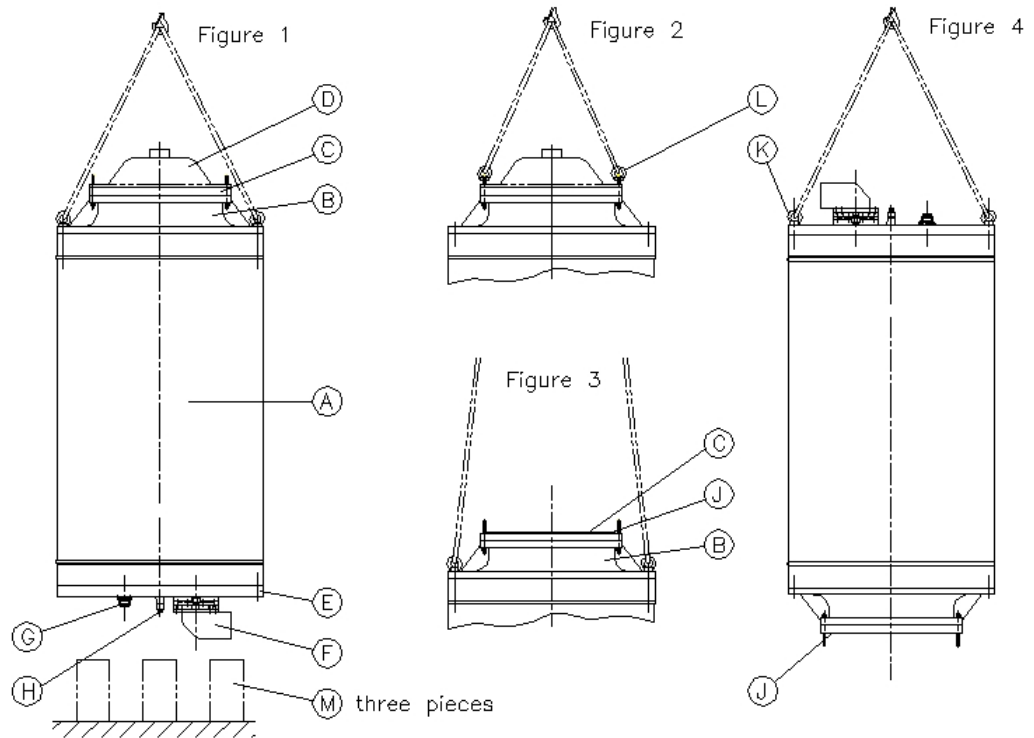
Death and damage to materials due to falling transported goods

- ▶ Use hoisting equipment with sufficient carrying force when mounting.
  - ▶ Do not stay or stand under suspended loads.
  - ▶ Correct handling during transportation ensures that the AZ surge arrester is not subject to bumping or vibrations.
- 

When delivered the AZ surge arrester is filled with SF6 insulating gas and a pressure of 120 kPa (at 20 °C) (see label at the gas connection).

- ▶ Attach crane cables to the AZ surge arrester in accordance with the following figures (see Figure 1–5, P. 16).

The AZ surge arrester can be placed with the floor plate on three supporting wooden blocks (see Figure 1, P. 16).



Bilderoriginal: 1HC0027335

- |   |   |
|---|---|
| ( ) Housing/vessel  | ( ) Housing attachment, if present          |
| ( ) Partition isolator  | ( ) Protective cover for partition isolator |
| ( ) Floor plate   | ( ) Burst protection with diversion         |
| ( ) Gas connection  | ( ) Bushing insulator for leakage current   |
| ( ) Contact system of tulip and contact tube                    | ( ) Sealing ring                            |
| ( ) Ring bolt   | ( ) Ring nut                                |
| ( ) Pedestal made of wood (transport box)<br>or 3 wooden blocks |   |

### 5.4.3. Preparing the surge arrester

When delivered the AZ surge arrester is filled with SF6 insulating gas and a pressure of 120 kPa (at 20 °C) (see label at the gas connection).

- ▶ Verify the gas filling.
- ▶ Remove the protective cover **D** from the partition isolator **C**. Loosen all the system-end nuts at the flange and remove the cover. Keep the protective cover for any transportation later on.
- ▶ Clean the surface of the partition isolator **C** with a soft, lint-free and clean cloth.
- ▶ Mount the contact tulip that is provided at the system end per phase on the inside contact of the partition isolator (see mounting instructions of the GIS switching system).
- ▶ Grease the contact surface of the sealing ring **J** with silicone grease.

### 5.4.4. Mounting the AZ at the switching system

AZ surge arresters can be mounted vertically (suspended or standing) and horizontally.

- ▶ In the case of horizontal mounting support the encapsulation in the area of the floor plate **E** with a frame that was dimensioned for the loads that occur.
- ▶ Use the hoisting equipment to lift the AZ surge arrester that has been prepared for mounting to the switching system and bring it into the planned position (see project drawing).
- ▶ Insert the conductor tube carefully into the contact tulip in the axial direction. Ensure that the conductor tube slides and does not tilt.
- ▶ Turn in all the nuts at the partition isolator flange and tighten them cross-wise using the specified torque.
- ▶ In the case of horizontal mounting, mount the support of the floor plate **E** on the frame so that the screwed connection at the partition isolator flange is relieved.

### 5.4.5. Preparing the burst protection

- ▶ Screw off any existing transport cover of the burst protection.
- ▶ Check the bursting disc visually for damage. Replace a damaged bursting disc.
- ▶ Mount the optional gas diversion fittings of the burst protection (see the supplied attachment drawing).  
Take the planned blow-out direction of the diversion fittings into account (see the project drawing).

### 5.4.6. Monitoring the leakage current

The optional devices for monitoring the leakage current (counter, milliamperemeter) are included in the case together with the mounting material.

- ▶ If devices for monitoring the leakage current are used, mount the devices in accordance with the enclosed attachment drawing and mounting instructions. Take the torques into account.
- ▶ If no devices for monitoring the leakage current are used, connect the bushings **H** via a conductor to the floor plate **E**. Observe the conductor cross-section (see Section 5.4.7, P. 19).
- ▶ Carefully clean contact surfaces before mounting and lubricate with acid-free contact grease.

The bushing for leakage current **H**<sup>1)</sup> is to be connected to the grounded floor plate either directly or via the devices for monitoring the leakage current.



**DANGER**

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#### System uses high voltage

Death or serious bodily harm may result from an electric shock

- ▶ For surge arresters without monitoring devices of the leakage current.
    - Do **not** interrupt connections between bushings for leakage current **H** and grounded floor plate if the switching system is operating.
  - ▶ For surge arresters with monitoring devices of the leakage current:
    - Do **not** interrupt the connection between the bushing for leakage current **H** and the monitoring device for leakage current if the switching system is operating.
    - Do **not** interrupt the connection between the monitoring device for leakage current and the grounded floor plate if the switching system is operating.
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<sup>1)</sup> In the case of 3-phase arresters there are 3 units

### 5.4.7. Grounding the floor plate

The floor plate has several M16 threaded holes that are to be used for the ground connection.

- ▶ Carefully remove paint from the contact surface of the screwed connection before mounting and lubricate it with acid-free contact grease.
- ▶ Observe national regulations and the requirements of the system owner with regard to grounding.
- ▶ Connect the floor plate **E** of the AZ surge arrester to the system ground via the shortest path.
- ▶ Observe the recommended minimum diameters for ground wires:
  - Copper                    dia. 80 mm<sup>2</sup>
  - Aluminum                dia. 150 mm<sup>2</sup>

### 5.4.8. Filling with SF<sub>6</sub> insulating gas



**DANGER**

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#### Bursting of the partition isolator

Death and damage to materials due to parts flying around

- ⊙ Do **not** subject the partition isolator to bumping or vibrations.
  - ▶ Ensure the maximum permissible differential pressures in accordance with the further applicable documents (see Chapter 1.4, P. 4).
- 

- ▶ Evacuate the gas compartment of the connecting module in accordance with operating instructions of the switching system.
- ▶ Fill the AZ surge arrester with SF<sub>6</sub> insulating gas.  
Take the calculation of the filling pressure at the ambient temperature into account (see Section 3.3.3, P. 10).
- ▶ Remove the label at the gas connection.
- ▶ Install and set a density monitoring device in accordance with the operating instructions of the switching system.
- ▶ Check for gas leaks in accordance with the system manual before commissioning.

## 6. MAINTENANCE, SERVICE

### 6.1. Safety



**DANGER**

#### System uses high voltage

Death, serious bodily harm and damage to the switching system may result from an electric shock

- ▶ Allow only authorized professionals to perform work on the surge arrester.
- ▶ Observe the safety rules of EN 50110-1 before working on the system:
  - Disconnect the system from the power supply.
  - Secure the system against being switched on again.
  - Ensure that the system is de-energized.
  - Ground the system and short-circuit it.
  - Cover or cordon off neighboring energized parts.
- ⊘ Do **not** interrupt the connection between the bushing for leakage current **H** and the grounded floor plate if the switching system is operating.
- ⊘ Do **not** interrupt the connection between the bushing for leakage current **H** and the monitoring device for leakage current if the switching system is operating.
- ⊘ Do **not** interrupt the connection between the monitoring device for leakage current and the grounded floor plate if the switching system is operating.



**DANGER**

#### Arc at overloading of the surge arrester

Death, serious bodily harm and damage to property through hot plasma gas

- ⊘ Do **not** stay or stand in front of the blow-out orifice of the burst protection.
- ⊘ Do **not** store combustible materials of the area of the blow-out orifice of the burst protection.



**DANGER**

#### Escaping SF6 insulating gas

Death due to poisoning and damage to material through corrosion

- ⊘ Do **not** open the AZ surge arrester.
- ⊘ Do **not** vent SF6 insulating gas into the environment.
- ⊘ Do **not** breathe in the SF6 insulating gas.
- ⊘ Do **not** let the SF6 insulating gas come into contact with skin or eyes.
- ▶ Ensure the correct handling of SF6 insulating gas (see document 1HC0028459).
- ▶ Use protective clothing.



**CAUTION**

**Loss of gas in the vessel**

Damage to the surge arrester and the switching system

- ▶ Monitor the gas pressure in the surge arrester.
- ▶ Refill the system when the refilling pressure has been reached.
- ▶ Switch off the system if the gas pressure falls below the alarm pressure.



**CAUTION**

**Blowing out of the surge arrester at overloading**

Switching system is no longer protected when the surge arrester is damaged

- ▶ Replace damaged surge arresters.

**6.2. Maintenance work**

The surge arresters do not contain wearing parts and are therefore maintenance-free. Replacement parts are not needed.

- ▶ Check every 5 years:

Gas humidity	Setpoint value < 100 ppm <sub>w</sub>
Gas purity	Setpoint value > 99 %
Gas pressure	Setpoint value > Refilling pressure
Density monitoring device	Check the alarm thresholds
Ground connection	Visual inspection of the corrosion state
Monitoring device for leakage current	Reading of the count events

## 7. DISPOSAL

AZ surge arresters are environmentally-friendly products which must be disposed of based on the respective applicable regional regulations in an environmentally-friendly manner. The materials should be given up for recycling.

The most important constituent components are:

- Vessel and floor plate made of aluminum
- Partition isolator and insulating body made of epoxy resin, partially with molded-in metal electrodes
- SF6 insulating gas (sulphur hexafluoride)
- Mounting sections and other parts made of aluminum
- Metal-oxide varistors
- Lugs or tension rods made of fiberglass-reinforced plastic, partially with pressed-on metal electrodes
- Steel mounting hardware
- Connecting cables made of copper, partially tin-plated
- Seals made of EPDM

### **Metal-oxide varistors**

The metal-oxide varistors are sintered ceramic consisting up to 90 % of ZnO. The following additions are also contained:

- percent by weight over 1 %:  $\text{Bi}_2\text{O}_3$  and  $\text{Sb}_2\text{O}_3$ , which are considered to be dangerous substances according to EU regulations
- percent by weight between 0.1 and 1 %: NiO and  $\text{Cr}_2\text{O}_3$ , which are considered poisonous and dangerous materials pursuant to EU Directive 91/689/EEC

Metal-oxide varistors are coated with a thin glass coating containing lead-oxide (< 0.1 % of the weight).

The substances are present as an oxide in metal-oxide varistors. A wash-out test in accordance with an EPA specification (Federal Register/vol. 45, No 98 /Rules and regulations) has shown that the sintered metal-oxide varistors can be disposed of as industrial waste without infringing on EEC guidelines.

No danger to personal health or the environment is present during normal operation.

## SF6 insulating gas (sulphur hexafluoride)

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**DANGER**

### Escaping SF6 insulating gas

Death due to poisoning and damage to material through corrosion

- ⊘ Do **not** vent SF6 insulating gas into the environment.
  - ⊘ Do **not** breathe in the SF6 insulating gas
  - ⊘ Do **not** let the SF6 insulating gas come into contact with skin or eyes.
  - ▶ Ensure the correct handling of SF6 insulating gas (see document 1HC0028459).
  - ▶ Use protective clothing.
- 

The SF6 insulating gas is to be recycled in accordance with the local regulations and laws.