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OPERATING INSTRUCTIONS

Surge arresters

Type AZ



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1 About this document

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

Language of the original operating instructions: German

1.1 Validity

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

1.2 Target group

The target group 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 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-ID	Purpose
All	1HC0028459	Instructions for the correct handling of SF6 insulating gas
	1HC0021348	Instructions for checking for damage
ELK-0 (series 04) EXK-0	1HDG518615	Instructions for the correct handling of gas
ELK-04C / 145	2GHV518900	Product manual
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 advices

Important information and technical notes are emphasised in order to illustrate the correct operation.

Symbol	Meaning
	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
DANGER	Immediate, impending endangerment of your life and health
WARNING	Possible impending endangerment of your life and health
CAUTION	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.

▶ 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 recognised safety-related rules. Danger to life and health of the user or third parties could arise or damage of the AZ and other property could occur while the AZ is in use, however.

- ▶ 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 being trained, instructed or just provided with a 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 Organisational measures

- ▶ Observe all safety- and danger-related information regarding the AZ.
- ▶ The safety rules of the owner of the high- and medium-voltage system and all regulations of the respective national safety authorities are to be observed.
- ▶ Only trained and instructed professionals may be authorised.
- ▶ 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 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 base plate or cover
- Partition insulator
- Active part with grading hood and contact system
- Gas filling with SF6 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 non-conductive 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 grading hood 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 insulator. The base electrode of the active part is connected electrically to a bushing insulator in the base 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. This is an **impervious pressure system conforming to IEC 60694**.

The partition insulator 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, 3 complete active parts with their respective grading hood and contact system are installed in a gas-filled metallic vessel including base plate and partition insulator. In this case the partition insulator has 3 high-voltage electrodes and 3 bushing insulators for the leakage currents in the base 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 surge arrester ELK AZ 04 three-phase for 145-kV-systems in the document 1HC0129378
- SF6 gas-insulated surge arrester ELK AZ 14 single-phase for 245-kV-systems in the document 1HC0063418 and 1HC0099385
- SF6 gas-insulated surge arrester ELK AZ 14 three-phase for 245-kV-systems in the document 1HC0074577
- SF6 gas-insulated surge arrester ELK AZ 14 single-phase for 300-kV-systems in the document 1HC0024207 and 1HC0099384
- SF6 gas-insulated surge arrester ELK AZ 32 single-phase for 420-kV-systems in the document 1HC0030131 and 1HC0079169
- SF6 gas-insulated surge arrester ELK AZ 32 single-phase for 550-kV-systems in the document 1HC0074466
- 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
Type AZ.....	Type designation
Serial No. HA ...	Serial number
Year of Manufacture	Date of manufacture
Max. Cont. Operating Voltage MCOV ... kV	Maximal permissible continuous operating voltage U_c conforming to IEC 60099-4
Rated Voltage „Rating“ ... kV	Maximal permissible rated voltage U_r 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_n at a current pulse 8/20 μ s conforming to IEC 60099-4
Long duration Discharge Class ...	Line discharge class conforming to IEC 60099-4
Standards ...	Title of standard
Mass ... kg	Total mass of the surge arrester
Volume (SF6) ... dm ³	Volume of the SF6 insulating gas in the vessel
Design Pressure p_e ... 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 / Minimum Pressure ... kPa	Pressure of the SF6 insulating gas at 20 °C at which the pressure-operated switch triggers alarm
Mass SF6 Gas at Filling Pressure 20 °C ... kg	Mass of the SF6 insulating gas at filling pressure (20 °C)

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

Tightening torques of bolts and nuts depending on the size and material shall follow the operating instruction of the switchgear as well as instruction HASV600416.

For mounting of the connection cable on the leakage current bushing on the base plate of the surge arrester, the following applies:

Nuts

The values of the following table apply for nuts of steel of the strength class 8.8 and length of thread 0.8d.

Thread	Position	Maximum torque [Nm]	For mounting
M12	Bushing for leakage current in the base plate	35 (counterhold)	Connection cable to the leakage current monitor or to the direct grounding of the leakage current

4 Transporting, unpacking and storage

When delivered, AZ surge arresters are filled with either SF6 insulating gas or nitrogen (N₂) 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).
-

4.1 Transporting



CAUTION!

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.
-

4.2 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.

4.3 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 personal protective clothing and equipment.



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!

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!

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 either SF₆ insulating gas or nitrogen (N₂) 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.

The AZ surge arrester can be placed with the base plate on three (or four, when using AZ 04 E) supporting wooden blocks (see Fig. 1).

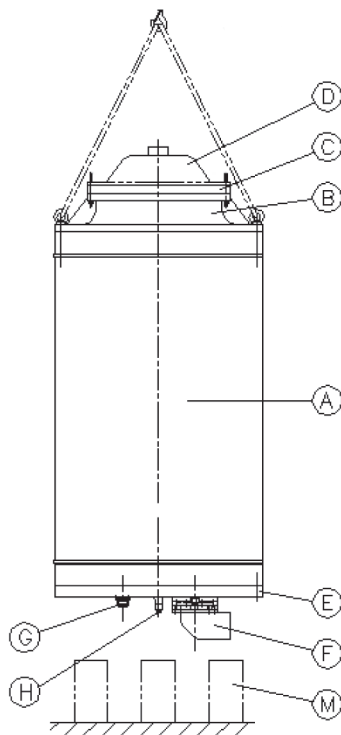


Fig.1

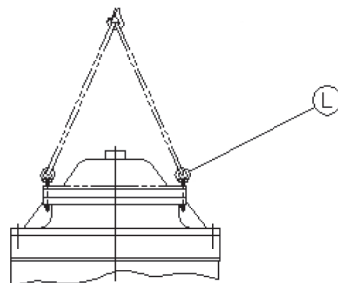


Fig. 2

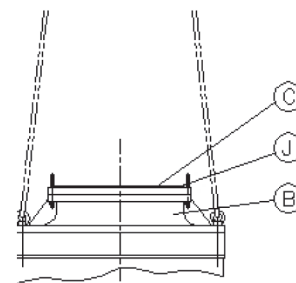


Fig. 3

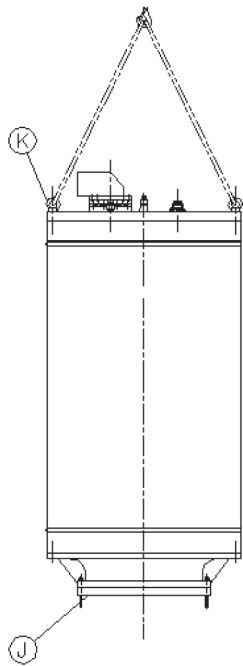


Fig. 4

- A Housing/vessel
- B Housing attachment, if present
- C Partition insulator
- D Protective cover for partition insulator
- E Base plate
- F Burst protection with diversion
- G Gas connection

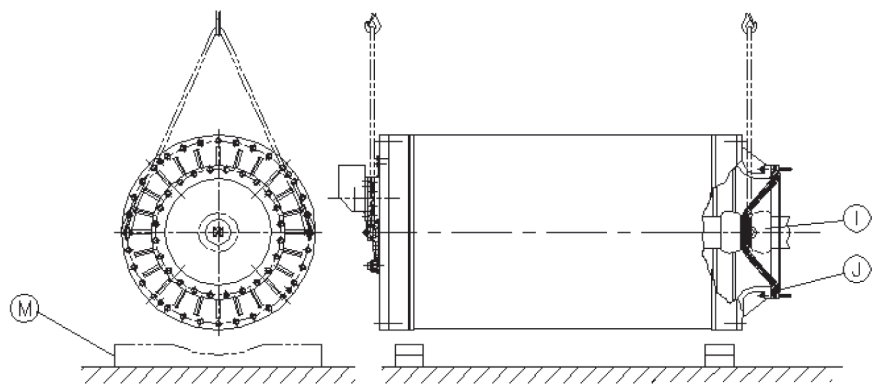


Fig. 5

- H Bushing insulator for leakage current
- I Contact system of tulip and contact tube
- J Sealing ring
- K Ring bolt
- L Ring nut
- M Pedestal made of wood (transport box) or wooden blocks

5.4.3 Preparing the surge arrester

When delivered, the AZ surge arrester is filled with either SF6 insulating gas or nitrogen (N₂) and a pressure of 120 kPa (at 20 °C) (see label at the gas connection).

- ▶ Verify the gas filling. When in doubt about the gas content always consult the manufacturer.
- ▶ Remove the protective cover **D** from the partition insulator **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 insulator **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 insulator (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 upright) and horizontally.

- ▶ In the case of horizontal mounting support the encapsulation in the area of the base 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 insulator flange and tighten them cross-wise using the specified torque.
- ▶ In the case of horizontal mounting, mount the support of the base plate **E** on the frame so that the screwed connection at the partition insulator 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.
- ▶ In case of a damaged bursting disc, contact the manufacturer immediately.

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 base plate **E**. Observe the conductor cross-section (see Section 5.4.7).
- ▶ Carefully clean contact surfaces before mounting and lubricate with acid-free contact grease

The bushing for leakage current **H** (in the case of 3-phase arresters there are 3 units) is to be connected to the grounded base plate either directly or via the devices for monitoring the leakage current.



DANGER!

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 base 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 base plate if the switching system is operating.
-

5.4.7 Grounding the base plate

The base plate has several 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 base plate **E** of the AZ surge arrester to the system ground via the shortest path.
- ▶ Observe the recommended minimum diameters for ground wires
 - Copper \varnothing 80 mm²
 - Aluminum \varnothing 150 mm²

5.4.8 Filling with SF6 insulating gas



DANGER!

Unintended mixing of SF6 insulating gas with nitrogen (N₂) transportation gas.

Damage to the surge arrester and switchgear.

- ▶ Check label on the gas connection.
 - If in doubt with regard to the gas content, always consult the manufacturer.
- ▶ If the arrester has been transported with nitrogen (N₂), the gas compartment of the arrester is to be evacuated in accordance with the operating instructions of the switchgear.



DANGER!

Bursting of the partition insulator.

Death and damage to materials due to parts flying around.

- ▶ Do not subject the partition insulator to bumping or vibrations.
 - ▶ Ensure the maximum permissible differential pressures in accordance with the further applicable documents (see Chapter 1.3).
-
- ▶ Evacuate the gas compartment of the connecting module in accordance with operating instructions of the switching system.
 - ▶ Fill the AZ surge arrester with SF6 insulating gas. Take the calculation of the filling pressure at the ambient temperature into account (see Section 3.3.3).
 - ▶ 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 base 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 base 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 _w
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 base plate made of aluminum
- Partition insulator 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 bodies composed mainly of ZnO (90%). In accordance with the rules of the European Union for hazardous substances, with reference to the Regulation (EC) 1272/2008 on classification, labelling and packaging of substances and mixtures and the Directive 2008/98/EC on waste, the following other substances exist in the metal-oxide varistors:

- Bi₂O₃ >1% by weight
- Sb₂O₃, Co₂O₃, NiO, Cr₂O₃ >0,1% by weight

After sinter production process, these oxides are part of a new composition within the ZnO-varistor ceramic bulk material, which is chemically bonded. No exposition occurs. In addition, the metal-oxide varistors are coated with a thin glass layer (<0,1% by weight) containing PbO.

A leaching test, according to the Council Decision of 19 December 2002 and directive 1999/31/EC on acceptance of waste at landfills has therefore been performed. The test is much more arduous than reality since the test is performed with material in ground form. Despite this, all substances listed in the Council Decision of 19 December 2002, except Pb, fulfilled the criteria for inert non-hazardous waste. It is very likely that a test performed on metal-oxide varistor blocks, parted but not ground, would fulfil the criteria for inert non-hazardous waste for all substances. Regrettably, no such test has been performed so far.

SF6 insulating gas (sulphur hexafluoride)



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 personal protective clothing and equipment.

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

For more information please contact:

ABB Schweiz AG
High Voltage Products
Surge Arresters
Jurastrasse 45
CH-5430 Wettingen/Schweiz
Tel.: +41 58 585 29 11
Fax: +41 58 585 55 70
E-Mail: sales.sa@ch.abb.com

www.abb.com/arrestersonline

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