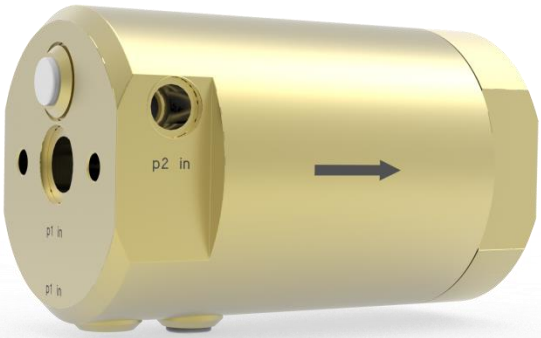
Acetylene Safety Guard

ASG



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1. Introduction

1.1 General information

Validity

This instruction manual is valid for the "Acetylene Safety Guard" (ASG) manufactured by Spectron Gas Control Systems GmbH (hereafter referred to as Spectron).

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Retention and completeness

This instruction manual is a component part of the "Spectron Acetylene Safety Guard" (ASG) and must be stored in a place where it is accessible to users at all times. Under no circumstances may chapters be removed from this instruction manual. If the instruction manual is lost or pages are missing – in particular the chapter "For your safety" – it/they must be replaced immediately.

Copyright

Updates

No update service is provided for this instruction manual by Spectron Gas Control Systems GmbH. Changes to this instruction manual may be made without further notification.

1. Introduction

1.2 Description of the Acetylene Safety Guard (ASG)

The ASG is a safety device for installation in a gas supply system, in particular in an acetylene supply system.
When installed correctly, it safeguards both the high-pressure section and the low-pressure section of the acetylene supply system against the exceeding of predefined response pressures. The ASG thus prevents inert, combustible and toxic gases escaping.

It meets the requirements for a component with safety function as defined by Art.1, Par.2.1.3 of Directive 97/23/EC (from 19.07.2016: Art.2, Par. 4 of Directive 2014/68/EU) which is designed and manufactured in accordance with Art.3, Par.3 of Directive 97/23/EC (from 19.07.2016: Art.4, Par.3 of Directive 2014/68/EU) and thus, in accordance with Annex II, must be used **exclusively** for supply systems as defined by Art.3, Par.3 of Directive 97/23/EC (from 19.07.2016: Art.4, Par.3 of Directive 2014/68/EU). Within this context, it can fully replace the conventionally used safety valve.

The ASG is equipped with an automatic shut-off valve controlled from the high-pressure and the low-pressure side. This valve closes if one of the predefined response pressures is exceeded, thus interrupting the gas supply in the high-pressure area. A display element indicates when the shut-off valve is closed. The valve remains closed even if the pressures within the gas supply system fall below the response pressures of the ASG again. The shut-off valve can only be opened and the ASG enabled via a manually operated bleed screw. The gas supply system can then be operated in normal mode again.

1.3 Intended use

The ASG is installed as a safety device for gas supply systems in the high-pressure area of the system. It is designed for a maximum operating pressure of 25 bar.
See the type plate for details of the permissible gases and pressure ranges for the ASG. The ASG can be approved by Spectron for inert, toxic and combustible gases. Use with corrosive gases is not permissible and is deemed to be improper use. Operation outside the application limits described in Section 1.2 (see Directive 97/23/EC or from 19.7.2016: Directive 2014/68/EU) also constitutes improper use.

Foreseeable misuse

Operation under the following conditions is deemed to be misuse:

- Operation with gases that are not specified on the type plate
- Operation outside of the permissible technical limit values
- Failure to heed and comply with any applicable company and legal regulations and other stipulations
- Failure to comply with this instruction manual
- Failure to carry out inspection and maintenance work
- Failure to heed the information on the type plate and in the product data sheet

1.4 Personnel requirements

The intended users include:

- Operating personnel
- Maintenance personnel (maintenance technicians and engineers)

It is presumed that all users are familiar with the functioning of and dangers associated with the ASG. As a minimum requirement, all users must receive instruction from the operating company on the following topics:

- What to do in the event of faults / leaks
- Basic functions of the ASG
- Instruction manual
- Location of safety devices and equipment (escape routes, fire extinguishers, EMERGENCY OFF pushbuttons, etc.)
- Safety data sheets for all substances used
- PPE (Personal Protective Equipment)

In addition, users must have the requisite physical and mental skills to operate and service the equipment.

Operating personnel must use appropriate Personal Protective Equipment for the activities to be performed and the associated environmental hazards. The requirements with regard to Personal Protective Equipment (PPE) must be defined by the operating company and in the safety data sheets for the gases used. The operational instructions and the specifications of the employers' liability insurance associations and the safety data sheets must be complied with.

2. For your safety

2.1 Symbols used

The following symbols are used in this instruction manual:

Danger!
The **Danger** symbol draws attention to an immediate danger with a high level of risk. Failure to heed this symbol will result in fatal or serious injury.
The use of this signal word is restricted to extremely dangerous situations.

Warning!
The **Warning** symbol draws attention to a possible danger with moderate risk. Failure to heed this symbol may result in fatal or serious injury.

Note!
Notes facilitate operation of the system or warn of the possibility of damage to property.

2.2 Standards and laws

Note!
The following safety information is intended to supplement the applicable national accident prevention regulations and laws. The relevant accident prevention regulations and laws must always be complied with.

Various laws, regulations, rules and directives must be complied with when handling pressurised gases, in particular acetylene.
The following list lays no claim to be exhaustive; it merely contains a selection of important documents:

- EU Directive 98/24/EC (Dangerous Substances Directive)
- EU Directive 2009/104/EC (Work Equipment Directive)
- EU Directive 1999/92/EC (ATEX 137)
- Industrial Safety Ordinance (implementation of EU Directives 2009/104/EC and 1999/92/EC in German law)
- Ordinance on Hazardous Substances (implementation of EU Directive 98/24/EC in German law)
- DIN EN ISO 14114:2014: Gas welding equipment – Acetylene manifold systems for welding, cutting and allied processes – General requirements
- DIN EN ISO 15615:2013: Gas welding equipment – Acetylene manifold systems for welding, cutting and allied processes – Safety requirements in high-pressure devices
- TRBS (technical regulations on industrial safety and health) publications
- German technical rules for hazardous substances (TRGS)
- TRAS (technical regulations on plant safety) publications
- BGV A1 German trade association basic accident prevention regulations
- BGR 104 German trade association rules on explosion protection

2. For your safety

- BGR 132 German trade association rules for the avoidance of ignition hazards resulting from electrostatic charges
- BGR 500 2.26 German trade association rules on welding, cutting and related work procedures
- BGR 500 2.31 German trade association rules for working on gas lines
- BGR 500 2.32 German trade association rules for the operation of oxygen systems
- BGR 500 2.33 German trade association rules for the operation of systems that handle gas
- Leaflet M034 from the German Social Accident Insurance Institution for the raw materials and chemical industry (BG RCI)
- EIGA documents for the respective gas used (www.eiga.org)
- Safety data sheets for the gases used

2.3 Essential safety information

Danger!
Escaping combustible gas in the ambient air can ignite; there is a risk of fire or explosion.
When working on lines and components with combustible or explosive gases and in explosion-protection zones:
- non-sparking tools must be used!
- there must be no ignition sources present!
- smoking and naked flames are prohibited!

Danger!
Escaping toxic or combustible gas may result in serious to fatal injury to yourself or persons around you.
Before opening the bleed valve, make sure that:
- it is not possible for the gas to ignite
- if necessary, an extraction system is connected to the gas outlet
- there are no other persons in the room
- PPE as prescribed by the operating company and the safety data sheet for the gas used is worn.

Danger!
If the ASG is used at ambient temperatures outside the prescribed range, there is danger of malfunctions, fire or damage to the system.
Observe the environmental and operating parameters listed in the product data sheet!

Danger!
If the bleed screw of the ASG is opened, it is essential to check that it is gas-tight after closing it again. If it is possible for gas to escape here, the ASG can no longer fulfil its safety function.

Warning!
Unauthorised modification or conversion of the ASG may cause damage and lead to the ASG no longer functioning as intended.

2. For your safety

Warning!
Incorrect handling and improper use may result in danger to the user and other persons and damage to the equipment.

Warning!
Gas escaping in an uncontrolled manner in closed rooms can cause poisoning or displacement of the oxygen in the ambient air. Blow-off pipes and waste gas lines operated in closed rooms must be routed into the open air. Toxic or environmentally harmful gases must be disposed of in accordance with the applicable regulations.

Warning!
Unforeseeable operating states may result if the ASG is used for gases and pressure ranges other than those for which it was designed.
The ASG must be suitable for use with the respective gas and the pressure ranges of the application. Use it only for the gases specified on the type plate!
If you wish to use a gas not specified on the type plate, contact Spectron to inquire whether the ASG is suitable for use with this gas.
Under no circumstances may the ASG be put into operation without this information.

Warning!
If the connecting surfaces or gaskets on fittings are damaged or missing, gas may escape in an uncontrolled manner.
Check the connecting surfaces for damage.
If connecting surfaces are damaged or gaskets missing, you must not continue with the installation of the ASG.

Note!
Dirt particles penetrating into the interior of the ASG can cause malfunctions and damage.
When installing the ASG, it must be ensured that dirt particles cannot penetrate into the interior of the ASG.

2.4 Emergencies and safety devices

Note!
The response pressures for the high-pressure and low-pressure section at which the shut-off valve of the ASG closes are adjustable and must be specified by the operating company. As delivered, the ASG is pre-set to the response pressures specified by the customer!

The ASG is equipped with an automatic shut-off valve which interrupts the gas flow. The valve closes if the factory-set response pressures

- for the high-pressure section of the upstream pipe system or
- for the low-pressure section (immediately downstream of the pressure regulator!) of the pipe system

are exceeded.

3. Description

3.1 General

The ASG is installed in a gas pressure control panel as shown in Figure 3.1-1.

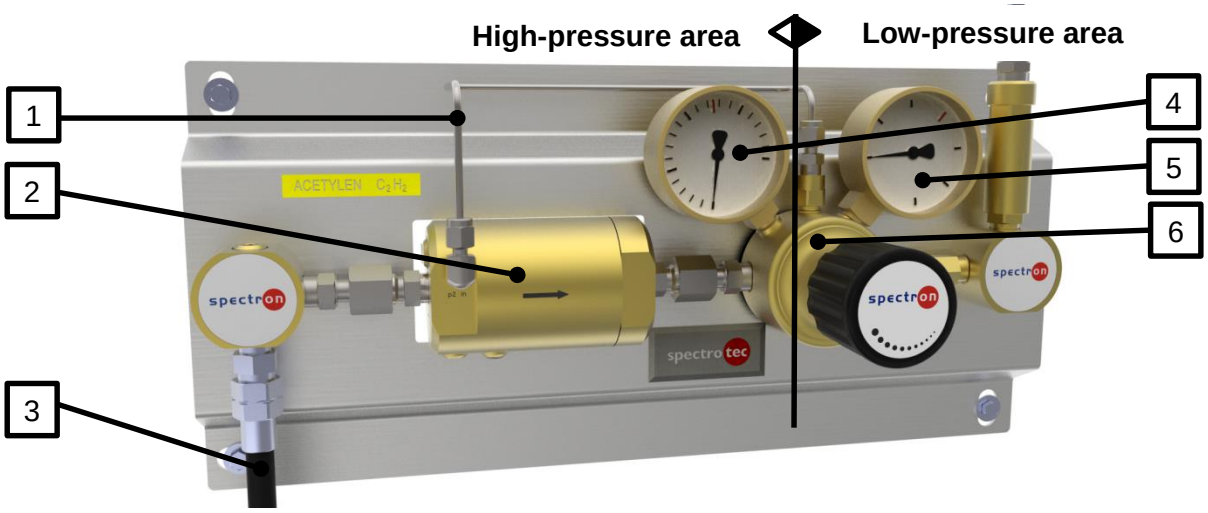

Figure 3.1-1: Installation of the ASG

Pos.	Designation
1	Control pressure line
2	ASG with flow direction arrow
3	Gas source
4	Pressure gauge, high-pressure area
5	Pressure gauge, low-pressure area
6	Pressure regulator

The ASG [1] is installed between the gas source [3] and the pressure regulator [6] in the high-pressure line. It is installed in the flow direction (arrow) indicated on the ASG housing. The control pressure line [1] connects the ASG with the low-pressure area. In the installation configuration shown in Figure 3.1-1, the current pressure on the inlet and outlet pressure side can be monitored via the pressure gauges [4;5] on the pressure regulator [6].

Note!
Never install the ASG against the flow direction, as otherwise, the ASG will no longer fulfil its safety function and will no longer close.

3. Description

3.2 Structure and connections

The ASG offers two options for connection of the gas inlet [3]. Either in the same axis as the gas outlet [6] or at an angle of 90° [4]. The control line is connected to the ASG via the control pressure connection [2].

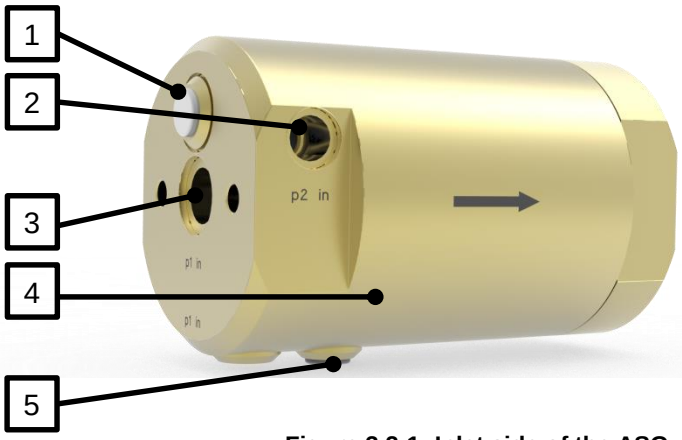

Figure 3.2-1: Inlet side of the ASG

Pos.	Designation	Size
1	Control valve	fitted with plug and sealed
2	Control pressure connection	⅛ NPT, optionally with screw fitting
3	Gas inlet	¼ NPT, optionally with screw fitting
4	optional gas inlet	¼ NPT, sealed with corresponding threaded plug
5	Pressure-limiting valve	fitted with plug and sealed

Danger!
Control valve and pressure-limiting valve are set and sealed at the factory. The ASG must NOT be installed if the seals are damaged or missing. Unforeseeable operating states may occur.
Contact Spectron.

Note!
The manufacturer accepts no liability for damage resulting from unauthorised repairs or modifications effected by the user or third parties.

3. Description

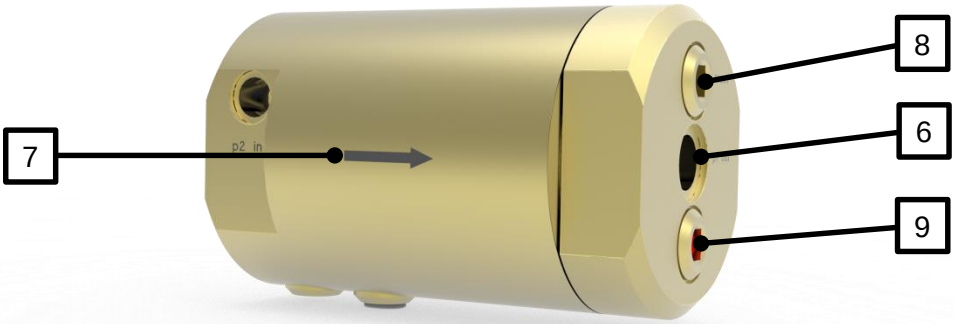

Figure 3.2-2: Outlet side of the ASG

Pos.	Designation	Size
6	Gas outlet	¼ NPT, optionally with screw fitting
7	Flow direction arrow	-
8	Venting device	Hexagon socket WAF3
9	Display element	-

Note!
If the ASG is equipped with cutting ring or compression ring fittings, it is essential to follow the screw fitting manufacturer's installation instructions.

3.3 Functional description

The ASG is a component with safety function as defined by EU Directive 97/23/EC Par. 2.1.3., with the restrictions described in Section 1.2 of this instruction manual. The safety function is provided via the automatic closing of a shut-off valve when response pressures are exceeded and the required manual resetting or unlocking of the valve.

The safety function can be triggered by two independently occurring events:

- The set response pressure is exceeded in the high-pressure area, which in terms of flow is UPSTREAM of the ASG.
- The response pressure set for the control valve [1] is exceeded in the low-pressure area.

3. Description

If one of these two events occurs, the integrated automatic shut-off valve is closed and the flow of gas interrupted. A visual display element [9] shows that the valve has been closed:
A red pin emerges from the housing cover and protrudes visibly (see Figure 3.3-1).

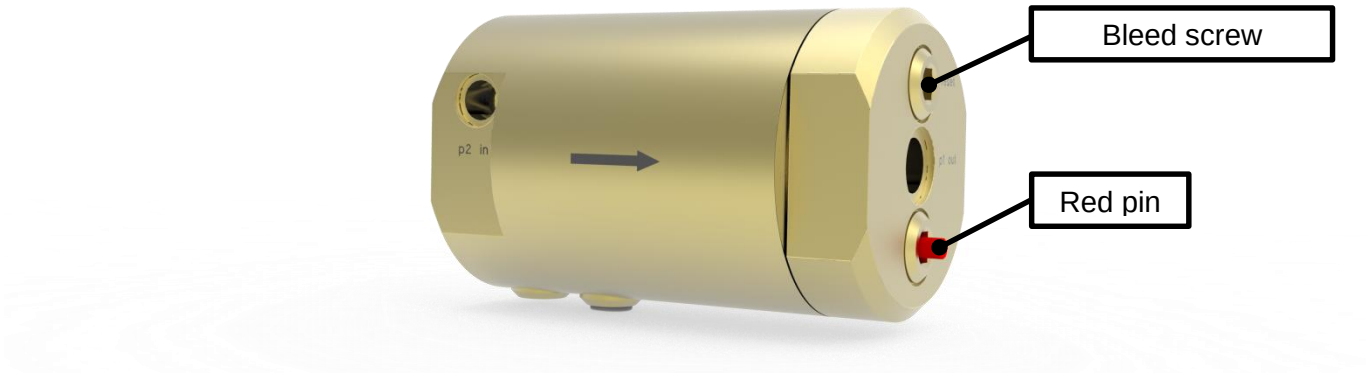

Figure 3.3-1: Visual display element

When the gas supply system returns to normal mode, i.e. pressure falls below the set response pressures, the shut-off valve remains closed and the gas flow is still interrupted. The bleed screw [8] must be operated manually in order to open the shut-off valve. To unlock the valve, turn the bleed screw anti-clockwise, wait a moment and then close it again.

Danger!
The ASG must be unlocked by a qualified person. The cause for the triggering of the ASG must first be located and remedied.
Ensure that the entire gas supply system is in fault-free condition.

Note!
When remedying the causes for the closing of the ASG, note that the ASG interrupts the lines in both directions only as far as the nearest closed shut-off device.
It does not provide a safety function for the areas downstream of the shut-off device.

If the pin of the display element is fully retracted, the ASG has been vented and the flow of gas is possible.

3.4 Technical data

See the product data sheet for the ASG for the technical data.

3. Description

3.5 Labelling / type plate

Example labelling:

Manufacturer: Spectron Gas Control Systems GmbH

Date of manufacture: 2015.07
Type number: ASG-27-2,0
Part No.: 60UE0002
Product standard: EN-ISO 15615:2013-8

Gas type: C_2H_2
Operating pressure P1: 4 - 25 bar
Response pressure P1: 27 bar
Control pressure P2: 1.5 bar
Response pressure P2: 2.0 bar

Direction of gas flow indicated by arrow

Note!
The labelling of the ASG must indicate the gas type! If the type plate is not labelled with the gas type, contact Spectron.

4. Installation, operation and dismantling

Danger!
Before commencing installation and commissioning, check the labelling to verify that the ASG is suitable for the nominal pressure and gas type of your intended application. The ASG must be used exclusively for the gas type shown on the type plate.

Warning!
All connection threads and connecting surfaces and the sealing rings must be checked to ensure that they are in perfect condition. Over-tightening screw connections can damage the sealing lips and may lead to leakage.
Prior to commissioning, it is imperative for the operating company or installer to check that all necessary approvals have been obtained and to notify the relevant regulatory bodies or authorities.

4.1 Installation and commissioning

Danger!
Installation must be carried out by qualified persons and exclusively in accordance with this instruction manual. If cutting ring or compression ring fittings are used, it is essential to follow the relevant manufacturer's instructions during installation.
Safe and reliable operation can only be guaranteed if original spare parts are used.

Warning!
The ASG must be installed in an easily accessible position.
Visual inspection from all sides must be possible.

The ASG must not be put into operation until it has been installed and connected to a gas supply system. The following tests must be performed on the ASG before the gas supply system is put into operation:

- Check all closing functions of the safety valve with purge gas or compressed air
- Check the entire ASG for leak-tightness

For safe and reliable operation, the ASG must be installed in a gas supply system as shown in the flow diagram below.

The ASG may be triggered during commissioning as a result of the initial application of pressure. In this case, a red pin protrudes from the housing of the ASG, indicating that it has been triggered (see Figure 3.3-1)

The ASG must then be reset as described in Section 4.2 by operating the bleed screw (see Figure 3.3-1). After doing this, it is essential to check that the bleed screw is gas-tight. If the bleed screw has not been closed gas-tight, the ASG cannot fulfil its safety function.

4. Installation, operation and dismantling

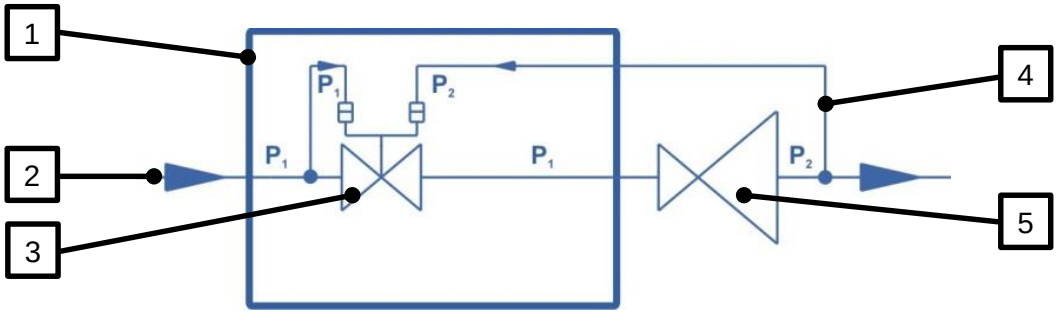

Figure 4.1-1: Flow diagram for connected ASG

Pos.	Designation
1	ASG
2	Main line
3	Shut-off valve
4	Control pressure line with control valve (in the ASG)
5	Pressure regulator

4.2 Operation

The ASG is a safety device which in normal operation is always open in the flow direction.

If one of the factory-set response pressures for the maximum permissible gas supply system pressure is reached, the automatic shut-off valve closes. The red display element moves out. It shows that the gas flow in the ASG has been interrupted.

Even if the pressure in the gas supply system falls below the set ASG response pressures, the automatic shut-off valve remains closed. The ASG can be enabled again by manual operation of the bleed screw (cf. Figure 3.3-1). To unlock the valve, turn the bleed screw anti-clockwise, wait a moment and then close it again. After doing this, it is essential to check that the bleed screw is gas-tight. If the bleed screw has not been closed gas-tight, the ASG cannot fulfil its safety function.

Danger!
The ASG must be unlocked by a qualified person. The cause for the triggering of the ASG must first be located and remedied. Ensure that the gas supply system is in fault-free condition.

4. Installation, operation and dismantling

4.3 De-installation

The ASG can only be removed from a gas supply system after taking the system out of operation and completely venting the entire gas supply system.

The relevant local safety regulations, the safety data sheets for the gases used and the specifications of the operating company must be observed when de-installing the ASG.

Warning!
If the ASG is used with toxic or combustible gases, it must be completely flushed with inert gas before de-installation.
The gas supply system must be depressurised before removing the ASG.

5. Fault

Faults/cause	Remedy
There is a leak. This indicates a defective gasket or threaded connection.	As the ASG is also used in gas supply systems for toxic gases, move away from the system immediately. Cordon off the area and observe all local regulations and emergency plans. When it is safe to enter the area again, close all valves. Check the gaskets and threads of all connections before putting the equipment back into operation. Have the ASG checked by Spectron. Observe Chap. 6.4 of this manual.
The ASG is not triggered despite the fact that the pressure values are above the response pressures	If it is safe to do so: Check that the bleed screw has been closed correctly. If this is not the case, take the gas supply system out of operation. Have the ASG checked by Spectron. Observe Chap. 6.4 of this instruction manual.
The ASG has been triggered, the cause of the fault has been remedied, but it is not possible to reset the ASG	The ASG may have been triggered due to a chemical reaction of the process gas. As a result, gaskets may have been damaged or particles may have entered the interior of the ASG. Reliable operation of the ASG is no longer possible. Have the ASG checked by Spectron. Observe Chap. 6.4 of this instruction manual.

6. Maintenance, cleaning and repairs

6.1 Regular maintenance work and visual inspection

Regular visual inspection

Regular visual inspection by the user is essential for cost-effective operation and to ensure that the fittings remain in good condition.

Visual inspection of all parts for	Interval
• Damage • Correct functioning • Leaks • Integrity/stability • Corrosion	At least once per working day, before putting the equipment into operation.

Do not put the ASG into operation if you find defects during a visual inspection! Have the fitting checked by Spectron without delay.

Regular maintenance and inspection work carried out by Spectron.

To ensure problem-free and reliable operation and operational safety at all times, the ASG must be inspected at least once per year by Spectron or a specialist company trained and authorised by Spectron.

During such inspections, all functions (see Chap.3 and Chap. 4) of the ASG must be tested and the entire ASG checked for leakage.

All official and statutory regulations applicable at the operation location of the gas supply system must be complied with

Note!
Where gases are used, the durability and service life of the fitting depends to a great extent on the moisture content of the respective gases. Use dry gases and purge the system in accordance with the instructions of the operating company to prevent the accumulation of moisture.

6.2 Regular cleaning

If required, the user can clean the outside of the ASG using a damp, non-linting cloth.

Warning!
Cleaning agents or disinfectants can damage and destroy the gaskets of the ASG. Do not use cleaning agents or disinfectants!

6. Maintenance, cleaning and repairs

6.3 Repair information

Warning!
Repairs must be performed by Spectron or a specialist company trained and authorised by Spectron. Following repairs, the entire ASG must be checked in accordance with the original Spectron inspection instructions. Safe and reliable operation can only be guaranteed if original spare parts are used.

Note!
The manufacturer accepts no liability for damage resulting from unauthorised repairs or modifications effected by the user or third parties.

6.4 Returns

If it has come into contact with toxic or combustible gases, the ASG must be purged with inert gas before returning it to Spectron for inspection, maintenance or repair. Spectron can only carry out inspection if proof of purging is provided.

7. List of illustrations

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