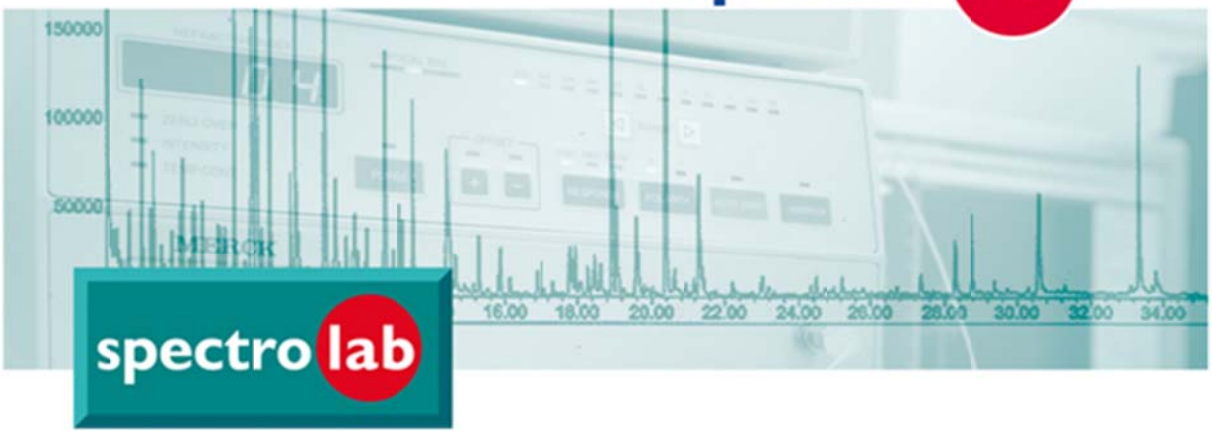

Operating Manual

for the

pressure control panels

BM65-2A-AC series

Table of Contents

1. Introduction

1.1 General information

Validity

This operating manual is valid for the following pressure control panels:

BM65-2A-AC

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Retention and completeness

- This Operating Manual forms part of the BM65-2A-AC pressure control panel, must be kept with the equipment at all times and made available to the relevant authorised persons.
- Under no circumstances may chapters be removed from this Operating Manual. If the Operating 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 Operating Manual by Spectron Gas Control Systems GmbH. Changes may be made to this Operating Manual without prior notification.

1.2 Description of the BM65-2A-AC pressure control panel for acetylene

The Spectron BM65-2A-AC pressure control panel is designed for use in acetylene supply systems.
The BM65-2A-AC is a double-sided panel with a fully automatic change-over panel for switchover between operating and reserve side. When a pressure limit defined by the configuration of the specific pressure control panel is reached, the change-over panel switches to the other supply side, ensuring an uninterrupted supply of process gas to the connected equipment.
BM65-2A-AC pressure control panels are equipped with a relief valve which is integrated in the pressure regulator but has no safety function as defined by EU Directive 2014/68/EU.
Optionally, contact pressure gauges, an automatic quick-action shut-off device, individual shut-off devices for each cylinder and an over-pressure valve can be configured. The over-pressure valve also does not comprise a safety function as defined by EU Directive 2014/68/EU.

1. Introduction

1.3 Intended use

Intended use

The BM65-2A-AC is designed for use with acetylene.
The permissible pressure ranges are specified on the type plate.
Introduction of pressure is effected exclusively via the two connection blocks (5) or the optional shut-off valves (12) fitted upstream of the switchover unit. Appropriate measures must be taken to prevent the introduction of pressure to the pressure regulator outlet via the pipe system installed downstream of the pressure control panel. Pressure control panels without electrical components (such as a contact pressure gauge or pressure transducer) may be used in potentially explosive atmospheres, since they do not have a potential ignition source of their own (ignition hazard evaluated in accordance with DIN EN 13463-1).
The danger of ignition has to be taken into account with pressure control panels with electrical components. The ignition hazard must be evaluated based on the documentation for the respective electrical components, taking into account their incorporation into the overall system, and Directives 2014/34/EU (ATEX 114) and 1999/92/EC (ATEX 137) or their transposed versions in national law. The user can get more detailed information on the Internet at www.spectron.de or directly from the customer support staff at Spectron Gas Control Systems GmbH.

Foreseeable misuse

The following operating conditions are deemed to constitute misuse:

- Operation with gases that are not specified on the type plate
- Use with gases in their liquid state
- Operation outside the permissible technical limit values
- Failure to heed and comply with any applicable legal regulations and other provisions valid on-site
- Failure to comply with this Operating Manual
- Failure to carry out inspection and maintenance work
- Failure to heed the information on the type plate and in the product data sheet
- Pressurisation in reverse

1.4 Personnel requirements

Definition of "authorised person"

Authorised persons are persons with technical training, who have received technical instruction on the overall system and the associated hazards – gas cylinder – gas type – gas cylinder valve – pressure regulator – and who have successfully completed training courses on "The supply of pressurised gases."

Tasks of the operating personnel

Specialist knowledge and compliance with the instructions in this Operating Manual and existing regulations are required when handling acetylene. Training and regular safety training for operating personnel on the correct procedures for handling this system, combustible gases and pressurised gas vessels is mandatory and must be repeated annually. Incorrect handling and/or use of such systems can endanger operating personnel and other persons, and can lead to damage to the system and in the surrounding area.
This instruction manual must be available to operating personnel at all times. Operating personnel must be able to recognise and – in as far as possible and permissible – remedy faults and irregularities.

1. Introduction

Requirements placed on operating personnel

In order to perform their tasks, operating personnel must meet the following requirements:

- The operating personnel must have received instruction in the operation of the pressure control panel from an authorised person and must have read and understood this Operating Manual in its entirety.

2. For your safety

2.1 Symbols used


Note!


Caution!


Warning!


Danger!

Danger!

This symbol warns that there is a **"risk of fatal injury"** or a health hazard for personnel.

2.2 Essential safety information

Note!

The following safety notes are intended to be used as an addition to the already applicable national accident prevention regulations and laws. Existing accident prevention regulations and laws must be complied with at all times.

Various laws, regulations, rules and directives apply when handling pressurised gases and must be complied with, depending on the gas type.
The following legislation and publications are applicable (this is not necessarily a complete list, but merely represents a selection of applicable laws and publications):

- Directive 2009/104/EC or its transposed version in national law
  (in the Federal Republic of Germany: Betriebssicherheitsverordnung - industrial health and safety ordinance)
- Directive 98/24/EC or its transposed version in national law
  (in the Federal Republic of Germany: Gefahrstoffverordnung - ordinance on hazardous substances)
- Directive 1999/92/EC (ATEX 137) or its transposed version in national law
  (in the Federal Republic of Germany: Gefahrstoffverordnung - ordinance on hazardous substances)
- TRBS publications (technical regulations on industrial safety and health)
  in particular TRBS 1111, 2152, 3145, 3146
- TRGS publications (technical regulations for hazardous substances)
  in particular TRGS 400, 407, 500, 720, 721, 722, 727, 745 and 746
- TRAS publications (technical regulations on plant safety)
- BGV A1 German trade association basic accident prevention regulations

2. For your safety

- BGR 104 German trade association rules on explosion protection
- 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 2.33 German trade association rules for the operation of systems that handle gas
- EIGA documents (e.g. Code Of Practice Acetylene)
- DVS technical specifications 0216 and 0221
- Safety data sheet for acetylene

2.3 Mandatory monitoring of acetylene systems

Acetylene supply systems are subject to monitoring in accordance with Directive 2009/104/EC. The type and scope of monitoring required are prescribed under national law (in the Federal Republic of Germany: Betriebssicherheitsverordnung) and the associated technical rules (in the Federal Republic of Germany: TRBS and TRGS).

2.4 Safety devices

The pressure regulator of the pressure control panel is equipped with an integrated relief valve which serves exclusively to protect the fitting and does not feature a safety function as defined by Directive 2014/68/EU.

Note!

The relief valve allows gas that has to be released as a result of an impermissible rise in the outlet pressure to be blown off.
It does not function as the safety valve for the entire gas supply system.

Caution!

In the event of failure of the pressure regulator and its relief valve, a safety mechanism that meets the requirements of the regulations for operators must be incorporated to protect downstream fittings, pressure vessels and pipes against excess pressure.

Danger!

In the case of acetylene systems, an exhaust pipe must be connected to the relief valve to allow safe discharge of the gas.
The factory setting of the relief valve must not be changed!

2.5 Protection areas

For details of the regulations governing the protection areas around acetylene systems, see the respective national regulations based on EU Directives 98/24/EC and 2009/104/EC. In the Federal Republic of Germany, these are in particular TRGS 745 and 746 and TRBS 3145 and 3146.

2. For your safety

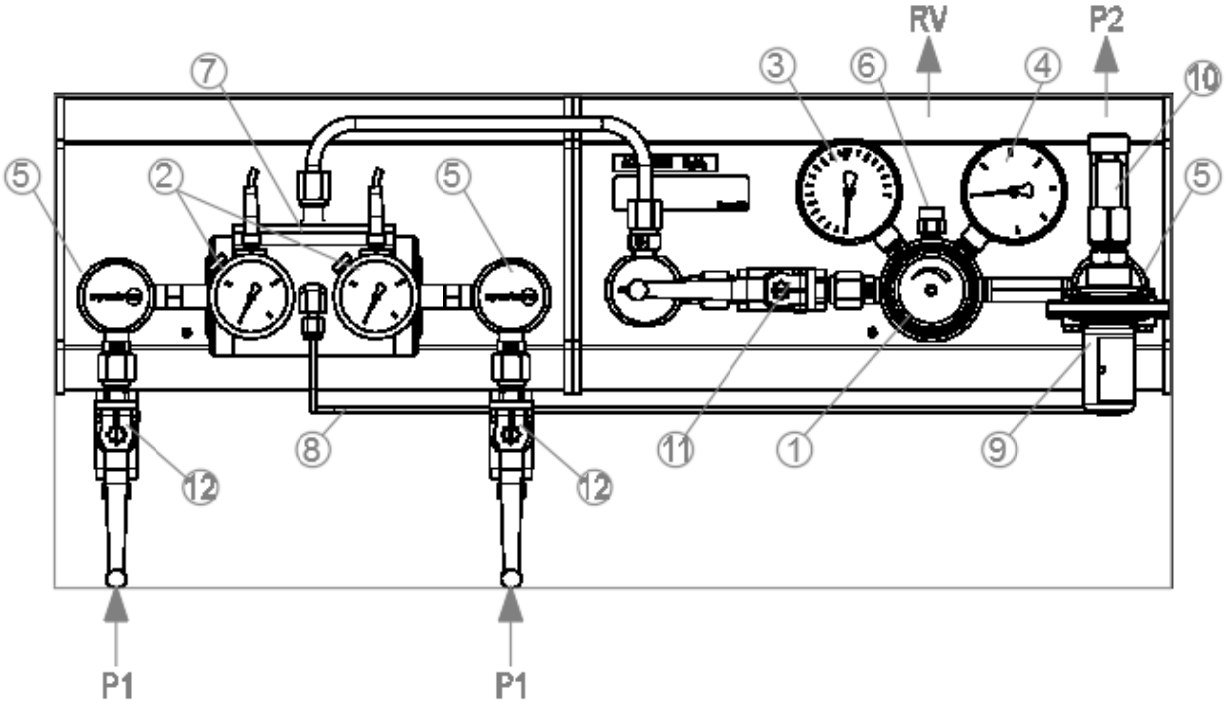
Possible hazard	Prevention measures
Risk of fatal injury! Gas escaping into the ambient air can ignite; there is a risk of fire and explosion.	Smoking and naked flames are strictly prohibited in the vicinity of gas supply systems!
Risk of fatal injury! The pressure control panel may be damaged by unauthorised modifications or conversions and may no longer work as intended. There is a risk of the system malfunctioning, catching fire or being damaged.	No changes or modifications may be made without the written approval of the manufacturer's authorised technical experts!
Risk of fatal injury! Gas escaping in an uncontrolled manner in closed rooms can reduce the oxygen content in the air to a potentially fatal level.	The blow-off pipe of systems operated in closed rooms must always be routed into the open air!
If the pressure control panel is used outside the specified ambient temperature range, there is a risk of the system malfunctioning, catching fire or getting damaged.	Do not use the pressure control panel at ambient temperatures below -30°C or above +60°C!
If dirt particles get into the pressure regulator of the pressure control panel, this can damage it or cause it to malfunction.	It must be ensured that no dirt particles of any kind can get into the pressure regulator. That is why a filter is incorporated into the process gas inlet of the pressure control panel.
Improper handling and impermissible use can lead to danger for the user, other persons as well as damage to the device.	Use and handle the pressure control panel only as instructed in this Operating Manual.
If the connecting surfaces or gaskets of the fittings are damaged or missing, there is a danger of gas escaping in an uncontrolled manner.	Check the connecting surfaces for damage, and do not install the fittings if the connecting surfaces are damaged or gaskets are missing.

3. Description

3.1 Overview of the pressure control panel

Drawing of the pressure control panel

Example configuration: BM65-2A-K-KH-SV-V



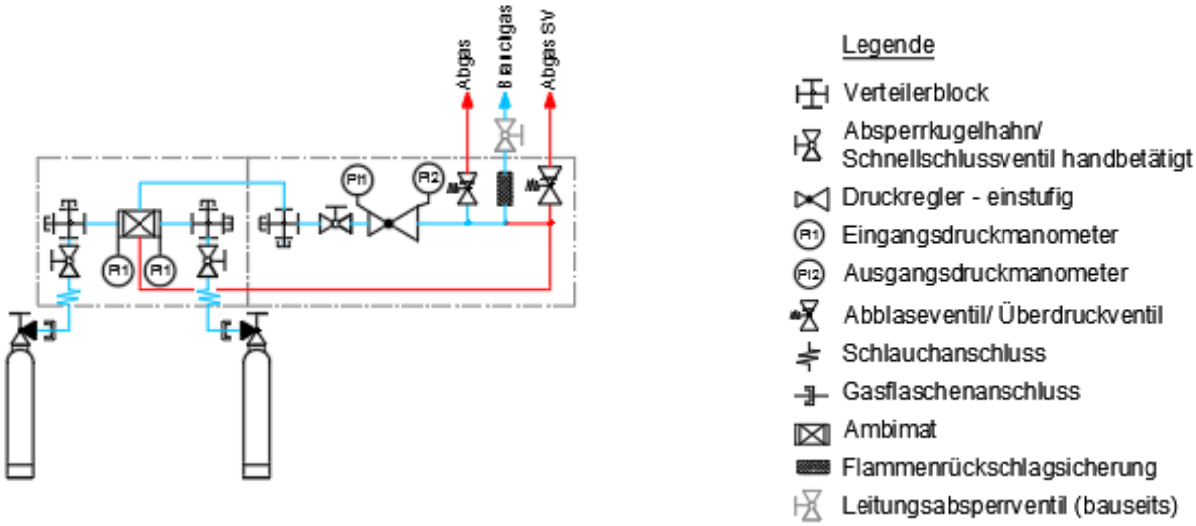
Elements of the pressure control panel

Pos.	Designation	Function
1	Pressure regulator	Regulates the variable inlet pressure to achieve a preset outlet pressure level
2	Pressure gauge *Optional contact pressure gauge*	Indicates the current cylinder pressure *Display and electr. monitoring of the pressure*
3	Pressure gauge *Optional contact pressure gauge*	Indicates the current inlet pressure of the pressure regulator *Display and electr. monitoring of the pressure*
4	Pressure gauge *Optional contact pressure gauge*	Indicates the current outlet pressure of the pressure regulator *Display and electr. monitoring of the pressure*
5	Connection block	Connecting point for the pipe system
6	Relief valve	Protects the pressure control panel against impermissibly high outlet pressure - is not a safety valve as defined by 2014/68/EU!
7	Switchover unit "Ambimat"	Fully automatic switchover unit with fixed, preset switchover points
8	Outlet pressure line	Required for setting the switching pressure

3. Description

Pos.	Designation	Function
9	Over-pressure valve *optional*	Discharges gas in the event of over-pressure, thus protecting the pressure control panel against impermissibly high outlet pressure - is not a safety valve as defined by 2014/68/EU!
10	Flashback arrestor	Prevents dangerous acetylene decomposition in order to protect the cylinder and bundle systems
11	Quick-action shut-off device *optionally automatic*	Manual or, optionally, automatic shut-off in the event of danger
12	Individual shut-off devices *optional*	Optional shut-off of both cylinders via ball valves

Flow chart of gas supply with a pressure control panel



3.2 Functional description

BM65-2A-AC acetylene pressure control panels reduce the normal inlet pressure of approx.18 bar cylinder pressure at 20°C to an outlet pressure which is adjustable but must not exceed 1.5 bar. The pressure is reduced by the pressure regulator, which is fitted downstream of the automatic switchover unit (Ambimat).

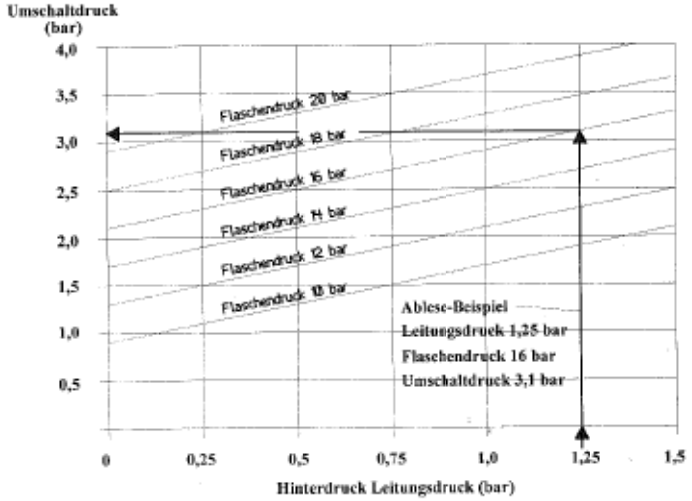
When the switching pressure preset at the factory is reached, the Ambimat switches from the supply side currently in operation to the supply side in reserve position. Selection of the operating side and switchover to the reserve side are performed completely automatically. When the pressure control panel is put into operation, the supply side which was first pressurised goes into operation first. When the cylinder or bundle pressure on this operating side gradually sinks and reaches the switching pressure, the Ambimat switches fully automatically to the reserve side, which is still equipped with full gas cylinders or bundles. After the switchover process, the supply side which has just been taken out of operation is completely isolated from the gas supply. The empty gas cylinders or cylinder bundles can be replaced. When the cylinders or bundles have been changed, all cylinder valves and all shut-off valves upstream of the Ambimat are opened, so that this supply side is ready for operation and is now the reserve side.

3. Description

It must be noted here that the switching pressure depends on the pressures pending on the two supply sides. On the one hand, switchover only takes place when the pressure on the operating side drops to the switching pressure or below, while on the other hand, the pressure on the reserve side must be at a certain minimum level that allows it to function as the actuating pressure for switchover to the reserve side.

This is shown and further clarified in the diagram below.

Diagram, switching pressure



Explanation of the example reading:

With a pressure regulator outlet pressure of 1.25 bar and a reserve cylinder pressure of 16 bar, switchover to the reserve side takes place at a remaining cylinder pressure of 3.1 bar on the current operating side.

A manual or, optionally, automatic quick-action shut-off device is fitted in the pressure control panel before the pressure regulator. Downstream of the pressure regulator, there is a flashback arrestor with integrated gas non-return valve, thermal cut-off valve and optional SV73 over-pressure valve.

Installation of this over-pressure valve ensures that the operating pressure of the downstream pipeline is limited to a maximum outlet pressure defined by the setting of the over-pressure valve, whereby the over-pressure valve has no safety function as defined by EU Directive 2014/68/EU.

A line shut-off valve must be installed in the pipeline behind the pressure control panel in accordance with ISO 14114.

Note!

In accordance with ISO 14114, a line shut-off valve must be installed directly downstream of the pressure control panel.

Note!

Optionally, the pressure control panel can be equipped with contact pressure gauges. These issue a switching signal when a specific pressure limit is violated or, in the same way as pressure transducers, supply a current that varies continuously with the pressure (4-20 mA).
The switching signal or variable electrical current can be processed by means of connected control units, resulting, for example, in the issue of a gas shortage alarm.
When these contact pressure gauges or pressure transducers are used in areas where there is a risk of fire or explosion, Directives 2014/34/EU (ATEX 114) and 1999/92/EC (ATEX 137) or their respective transposed versions in national law must be observed.

3. Description

3.3 Manifold size and output

The withdrawal rate per acetylene cylinder should not exceed 500 l/h in continuous operation. This prevents solvent being withdrawn from the cylinders.

3.4 Technical data

Note!

The technical data can be taken from the Spectron data sheet for the relevant product. If this is not available, you can view and download it at www.spectron.de.

The maximum inlet and outlet pressures and the gas type are indicated on the type plate.

3.5 Connection options

- Inlet connection: M16 x 1.5 external thread
- Outlet connection, flashback arrestor: 1/4“ NPT female thread
- Outlet connection, relief valve: 1/8“ NPT female thread
- Outlet connection, over-pressure valve: welding stub 14x2

4. Operation

4.1 Labelling

On the baseplate of the pressure control panel, there is a type plate with information on type, date of manufacture, gas type, pressure range and part number.

Prior to delivery, all pressure control panels undergo a 100% leak and function test. To document this, an inspection sticker is attached on the mounting plate on the back of each panel.

Note!

The pressure control panel must be labelled accordingly.

Warning!

The pressure control panel may only be used for acetylene. Use (alternating) for other gases is not permitted.

4.2 Installing the pressure control panel

Step	Activity
	Installation must be performed by personnel with the requisite expertise and who have received the appropriate training and instruction on safety engineering. These courses of instruction must be repeated at the specified intervals.
	All parts of the pressure control panel are leak and function tested prior to delivery. All apertures are closed off. The necessary seals and labelling form part of the scope of delivery. As far as possible, the equipment is delivered pre-assembled.
	Installation of the two baseplates is performed as described in installation manual MA_BM+BE. You can view and download this manual at www.spectron.de.
1	The waste gas line at the relief valve of the pressure regulator (Pos. 6) is connected with a cutting or compression ring fitting for the pipe diameter selected in accordance with the configuration. The waste gas line on over-pressure valve SV73 (Pos. 9) is connected by welding it to the 14x2 port. **The waste gas lines must be routed into the open air!** **Furthermore, pipelines for acetylene must not be made of copper or alloys with more than 70% Cu. This applies to the piping system to the tapping points and to the waste gas lines. For information on materials, see DVS leaflet 0216.**
2	Place the cylinders in front of the brackets and secure with safety chain or strap.
3	Check that the gas cylinder valve connections and threads, hose line connection and gaskets are undamaged The high-pressure hose line must not be connected if there is any damage. Connect the pressure control panel and the gas cylinder with an acetylene high-pressure hose.
4	After installation and before putting it into operation, the entire system must be tested for leakage.

4. Operation

4.3 Putting the pressure control panel into operation

Caution!

When putting the system into operation for the first time or putting it back into operation after conversions, Directives 2009/104/EC and 98/24/EC and their transposed versions in national law (in the Federal Republic of Germany: Betriebssicherheitsverordnung and Gefahrstoffverordnung) must be observed.

Furthermore, before putting the equipment into operation for the first time, the entire pressure control panel must be purged via the connection block right up to the connected equipment! It is imperative to adhere to the direction of the gas flow when doing this! Purging must not be carried out counter to the usual direction of flow (from the tapping point to the pressure control panel), since this can flush debris resulting from the installation work, for example, back into the pressure regulator.

Safe discharge of the acetylene must be ensured when purging the system.

The connecting threads and connecting surfaces as well as the sealing rings of the high-pressure hoses must be checked to ensure that they are in perfect condition.

Filling of the downstream piping system must be carried out slowly. Audible oscillation or vibration of the pressure regulator must be avoided, as these could result in damage to the pressure regulator.

Always turn shut-off valves slowly and as far as the stop when opening or closing them!

Step	Activity
1	Make sure that • the gas type you are using is specified on the pressure control panel, • all protective caps have been removed, • installation has been carried out properly, • the high-pressure hoses and other connecting points have been checked for leaks and that • the pressure on the pressure regulator has been released.
2	Slowly open the gas cylinder valve on the side which is to go into operation first.
3	Slowly open the gas cylinder valve on the reserve side.
4	Set the pressure regulator to the desired outlet pressure by turning the handwheel clockwise. No oscillation or vibrations should be audible when filling the downstream pipe, since otherwise the pressure regulator could be damaged.
5	Slowly open the shut-off valve downstream of the pressure regulator and fill the downstream pipe system with process gas slowly and in a controlled manner.
6	Check the entire pressure control panel and all detachable connections for leakage.
7	Gas can now be drawn.

4. Operation

4.4 Changing the cylinder

Caution!

Once it is put into operation, both sides of the panel must always be connected.
Each time you change the cylinder, check that the gasket between the gas cylinder valve and the cylinder connection is in perfect condition and replace it if necessary.

Note!

Each time you change the cylinder, ambient air gets into the connecting parts of the system. To prevent the gas and the entire system from being contaminated, the connection must be purged before gas is drawn from the cylinder again. This can be done by means of multiple pressure purges with process gas or by carrying out one purging process right up to the connected equipment.

Step	Activity
1	Close the gas cylinder valve of the emptied gas cylinder.
2	• Release acetylene high-pressure hose from the gas cylinder valve, change the gas cylinder. • Connect the acetylene high-pressure hose to the new gas cylinder in accordance with the regulations. • Check the cylinder connection and all of the connections you loosened for leakage again.
3	Slowly open the gas cylinder valve of the new gas cylinder.
4	Check the gas cylinder connection and all detachable connections for leakage.

4.5 Taking out of operation

Taking out of operation or interrupting operation for a short period

When interrupting operation for a short period, all you need to do is close the gas cylinder valves.

Taking out of operation or interrupting operation for a longer period

Step	Activity
1	Close the gas cylinder valves.
2	The pressure in the pressure control panel must be released by allowing the gas to flow away via the consumer. It must be ensured that the indicators of the two pressure gauges then point to zero [0] – visual check!
3	Where applicable, close the individual shut-off devices (12) for each gas cylinder.
4	Close the shutoff valve downstream of the pressure regulator.
5	Relieve the pressure regulator.

5. Faults

Note!

The durability of the materials and thus a long service life for the pressure control panel can only be guaranteed with the use of dry gas and if lines and fittings are dry-purged. Faulty installation, leaking screw fittings or an impermissibly high withdrawal quantity (see Section 3.3) can shorten the service life of the equipment.

Faults/cause	Remedy
Gas is blown off from the relief valve. Impermissible increase in the outlet pressure.	Close all valves immediately. Have the pressure control panel checked immediately by the manufacturer or an authorised specialist company.
The pressure regulator is making noises. This indicates a defect in the regulator insert.	Close all valves immediately. Have the pressure control panel checked immediately by the manufacturer or an authorised specialist company.
There is a leak. This indicates a defect in a pressure regulator component.	Close all valves immediately. Have the pressure control panel checked immediately by the manufacturer or an authorised specialist company.
Inlet pressure or gas cylinder pressure on the reserve side drops.	There is an empty pressure vessel or a pressure vessel which does not have the required minimum pressure for switchover connected on the reserve side.
You notice that the acetylene cylinders are heating up.	This indicates the risk of so-called acetylene decomposition. Immediately close all valves within your direct reach and move away from the system as quickly as possible. Call the fire service, informing them that acetylene cylinders are heating up, and warn persons in the vicinity of the acetylene system of the imminent danger.

6. Maintenance, cleaning and repairs

6.1 Regular maintenance work and visual inspections

Regular maintenance work

To ensure problem-free and reliable operation, the pressure control panel should be checked once a year by a specialist.
Above and beyond this, the legal stipulations as described under Section 2.3 must be complied with.

Regular visual inspections

Visual inspection of all parts for	Interval
• Damage • Function • Leaks • Integrity/stability • Corrosion	Regular inspections at intervals of 12 months and each time the device is put into operation make an important contribution to the cost-effectiveness and preservation of the value of the fittings.

Note!

If you find defects during the visual inspection, do not put the pressure control panel into operation! Have the pressure control panel inspected immediately by the manufacturer or an authorised specialist company.

6.2 Regular cleaning

Warning!

Detergents or disinfectants can corrode and ruin gaskets inside the fittings. Do not use detergents or disinfectants for cleaning!

Heavy soiling can lead to malfunctions. If it becomes necessary to clean the pressure control panel, use only a damp, lint-free cloth.

6.3 Repair information

Caution!

Repairs may only be carried out by specialist personnel in authorised repair workshops. After repairs, the entire pressure control panel 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 carried out by the user or third parties without the express written approval of the manufacturer.

7. Transport and storage

7.1 General conditions for transport and storage

- Transport and storage: -30 °C to +60 °C
- Atmospheric conditions: 50% relative humidity at 40 °C
  90% relative humidity at 20 °C

Note!

The ambient air must be free from unusually high quantities of dust, acids, corrosive gases or substances such as smoke, steam, oil vapour etc.

Operation of the pressure control panel under extreme weather conditions, vibrations and shocks all impair functional safety and must be avoided.

Warning!

When storing acetylene cylinders, make sure that

- there are no heat or ignition sources in the vicinity
- no flammable or explosive substances are stored in this area
- the absolute ban on smoking is complied with
- suitable and functioning fire extinguishers are available
- all stipulations of Directives 2009/104/EC and 98/24/EC and their transposed versions in national law (in the Federal Republic of Germany: Betriebssicherheitsverordnung and Gefahrstoffverordnung) and the associated technical rules (in the Federal Republic of Germany: TRGS and TRBS) are complied with.

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