User manual
Controller
FP4 V2.00

01/2026

Contents

1 Introduction

This user manual is the original user manual for the Controller FP4 from Spectron Gas Control Systems GmbH, referred to as Spectron.

The Controller FP4 constitutes an incomplete machine in the context of the Low Voltage Directive 2014/35/EU. The Declaration of Conformity is stored in the system documentation.

The user manual is intended to facilitate correct and safe operation for the operating firm, and to warn against misuse. It is intended for the qualified personnel and the operator of the facility.

⚠ WARNING

Incorrect operation

Incorrect operation of the system, e.g. due to instruction errors, can lead to personal injury or damage to the system.

a) Access to the user manual by the operating and maintenance personnel must be absolutely ensured at all times.

b) A copy of the system documentation including the user manual must therefore be kept either on the system or in a suitable and accessible location.

2 Description

2.1 Intended use

The intended use of the Controller FP4 is the control of up to 4 pneumatic valves. These can be configured for an automatic purge process as well as for an additional valve as a cylinder valve, propellant gas valve or line shut-off valve.

The permissible gas types and pressure ranges are each specified on the label (see "Identification / label").

The Controller is not permitted to be used in an explosion hazard zone.

To be able to use the Controllers as intended, all persons working with them must comply with the specifications of the relevant user manual.

The area in which hazards can occur when used as intended is the area around the Controllers. The danger zone changes depending on the system status and use.

2.2 Misuse

Any improper use constitutes misuse. Controllers may only be used for the specified gases and in the specified pressure range. Controllers with electrical components without marking according to EU Directive 2014/34/EU may not be used in an explosion hazard zone.

Furthermore, the following operating conditions are regarded as misuse:

- Use for gases in their liquid phase
- Failure to carry out inspection and maintenance work
- Operation with gases that are not specified on the label
- Operation outside the permissible technical limit values
- Failure to heed and comply with any applicable legal regulations and other provisions
- Non-observance of the user manual
- Failure to heed the information on the label and in the product data sheet

2.3 Identification / label

The label is located on the on the housing of the Controller.

The label provides the following details:

Details	Example
Manufacturer	Spectron Gas Control Systems GmbH
Article designation	FP4
Serial number	2025-0000
Voltage	100 – 240 V AC
Frequency	50 – 60 Hz
Year of manufacture	2025
Pneumatic pressure	6 – 7 bar
Current	0.6 – 1.3 A
Power consumption	max. 136 W

2.4 Environment

2.4.1 Temperatures

Normal temperatures expected in a production area are assumed when operating the system: 0°C to +45°C. On storage, temperatures between -20°C and 60°C are permissible.

The air humidity must be below 60 % rel. humidity to prevent condensation. The operating temperature depends on the gas used.

2.4.2 Degree of cleanliness

Access to the system and to the escape and rescue routes must not be blocked.

The product should be kept clean (dust-free).

For the control air, compressed air must be used of at least class 5 according to ISO 8573-1 or nitrogen (minimum quality 6.0).

2.5 Standards and laws

The design and construction of the controller is subject to the following standards and directives:

2014/35/EU	Low Voltage Directive
2014/30/EU	EMC Directive
DIN EN ISO 12100:2010	Safety of Machinery
DIN EN 60204-1	Safety of Machinery - Electrical equipment of machines – Part 1: General requirements regulates general specifications and recommendations as a sub-standard of EN 60204 Safety of Machinery

Various **additional** laws, regulations and guidelines must be complied with when handling pressurised gases. Find out about the laws, regulations and guidelines that apply in your location.

BetrSichV	Betriebssicherheitsverordnung (Industrial health and safety ordinance)
ProdSG	Produktsicherheitsgesetz (Product Safety Law)
TRBS 1111	Technische Regeln Betriebssicherheit (Technical Regulations on Operational Safety)
DGUV Regulation 1	German Trade Association Principles of Prevention
DGUV Regulation 3	Electrical installations and equipment

3 Safety

3.1 Basic information on the safety instructions

The product complies with the recognised technical regulations. Nevertheless, knowledge of the media used and their dangers as well as basic knowledge of the pressure control panel are prerequisites for safe and accident-free operation.

The user manual must be read and understood by every user. Instruction must be documented in writing.

The safety instructions are to be regarded as a supplement to the applicable accident prevention regulations and laws. Existing accident prevention regulations and laws must be observed in all cases.

NOTICE

Hazards from the operating environment of the system can lead to injuries to persons.

a) No changes may be made to the system which result in a change in function.

b) It is not possible to outline and cover in this manual all hazards arising from the environment or unforeseeable operating conditions of the system.

In the Safety Instructions chapter:

- Users are informed regarding hazards, residual risks and measures for risk reduction.
- The presentation of the safety instructions and the symbols is explained.
- Basic safety instructions to be observed in general are listed. Specific safety instructions are listed in the relevant chapters.

⚠ DANGER

DANGER indicates an imminent danger. If not avoided, death or extremely serious injuries will result.

⚠ WARNING

WARNING indicates a potential imminent danger. If not avoided, death or serious injury could result.

⚠ CAUTION

CAUTION indicates a potentially imminent danger. If not avoided, minor or moderate injury could result.

NOTICE

NOTICE indicates a potentially harmful situation. If not avoided, the system or property in its vicinity could be damaged.

3.2 Safety instructions

⚠ DANGER

Voltage

The components of the control and the connections are under voltage. There is a danger of death on contact.

a) Only allow work in which the control unit must be opened to be carried out by trained specialist personnel (electricians).

b) Only perform work in which the control unit must be opened when the power supply is switched off.

c) The five safety rules according to DIN VDE 0105 are to be observed:

- ⇨ Disconnect from the mains
- ⇨ Secure against reconnection
- ⇨ Verify that the system is dead
- ⇨ Carry out earthing and short circuiting
- ⇨ Provide protection from adjacent live parts

⚠ DANGER

Defective product

A defect on the product can result in unforeseeable operating conditions. Persons may be injured.

a) The product may only be operated in technically perfect condition in compliance with all chapters of the user manual.

b) Environmental protection laws and safety regulations must be observed.

⚠ WARNING

Maintenance

Due to a fault condition, e.g. due to insufficient maintenance, parts of the product can be unexpectedly energised. This may result in electric shocks.

a) The electrical installation is to be tested regularly. Loose connections and defective cables must be rectified immediately.

b) Observe the maintenance intervals and maintenance regulations in this operating manual.

c) Observe the maintenance intervals and maintenance guidelines from the manufacturer and the applicable guidelines.

d) Components may only be replaced by spare parts of the same design. The specifications of the component manufacturers must be complied with during installation.

⚠ WARNING

Noise emission

When working on pressurised pneumatic supply, significant noise emission can occur. Acute and chronic loss of hearing may result.

a) Never perform work on the pressurised pneumatic supply without hearing protection.

b) Only replace the silencers when the supply is unpressurised.

⚠ WARNING

Displacement of atmospheric oxygen

In the event of inert gas leaks, displacement of atmospheric oxygen may occur. Danger of suffocation!

a) The operator must ensure adequate ventilation and airing in all rooms with gas installations and monitor the oxygen content.

⚠ WARNING

Cross-contamination

Cross-contamination of the control air with process gases can result in the control unit being damaged.

a) Ensure that cross-contamination of the control air line is prevented.

⚠ WARNING

Repairs

If the product is not used as intended, unpredictable operating conditions may occur. Serious personal injuries are possible.

a) Repairs may not lead to a change in function. The system may not be tampered with or modified.

b) Before each repair, the system must be depressurised and flushed through.

c) Repairs are only permitted to be carried out by trained persons.

⚠ WARNING

Working on the product

If an accident occurs when working on the product, there is a considerable risk of injury.

a) Never work on the product unattended or unannounced.

b) Observe the site safety rules and permission procedure.

⚠ CAUTION

Injury or damage in the event of incorrect assembly or disassembly

Special steps are required for assembly and disassembly work on the product. Personal injuries and damage to the product are possible.

a) Assembly and disassembly work may only be carried out by the installation engineer or appropriately skilled specialist companies and persons.

b) The product is not permitted to be re-used following disassembly. All components must be disposed correctly.

⚠ CAUTION

Static discharge

Static discharges can occur in the event of contact between the control unit and persons or between parts of the electrical equipment. Injuries, shock responses and damage to the control unit are possible.

a) Before commissioning, the operating firm must ensure that all electrical equipment is provided with equipotential bonding (earthing).

b) The earthing function is to be tested on a regular basis. The intervals are specified by the operating firm in its risk assessment.

NOTICE

Lighting

Incorrect switching actions or confusion can occur due to inadequate lighting.

a) Ensure sufficient lighting in accordance with the statutory regulations.

3.3 Emergencies and safety devices

The operational local safety regulations of the system operator, such as the alarm plan, fire safety regulations and the escape and rescue plans, apply in all cases for the operation of the Controllers .

When handling gases, all specifications from the safety data sheets must be followed. Local emergency services should be informed of the gases used at the site of the system.

In the event of mechanical damage, the product must be put into a safe operating condition.

3.3.1 Emergency stop (emergency shut-off)

When the emergency stop is actuated, all valves are closed and the power supply to the solenoid valves is interrupted.

3.4 Qualification of the operating and maintenance personnel

The intended user group is the system operator (user of the system) and the system maintenance personnel.

Every person working on the system must be familiar with the functions and dangers associated with the overall system. Instruction on the system is to be documented in writing.

Maintenance and repair work should only be carried out by specially trained personnel.

All operators, as well as personnel who regularly enter the area, must be trained on a minimum of the following topics:

- Alarm rules at the site and conduct in the event of malfunctions and leaks
- Basic functions of the product
- User manual
- System documentation incl. manufacturer documentation
- Position of the safety devices

– Safety data sheets on the process gas used
– Personal protective equipment

In addition, operators must have the requisite physical and mental skills to operate and maintain the equipment.

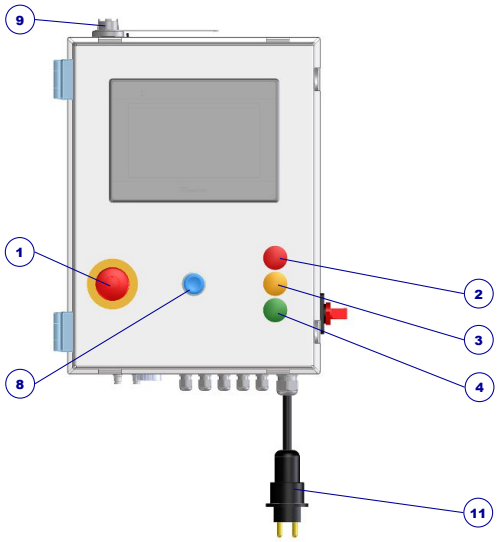
Persons who do not meet this requirement (e.g. visitors), must not remain alone in the overall system.

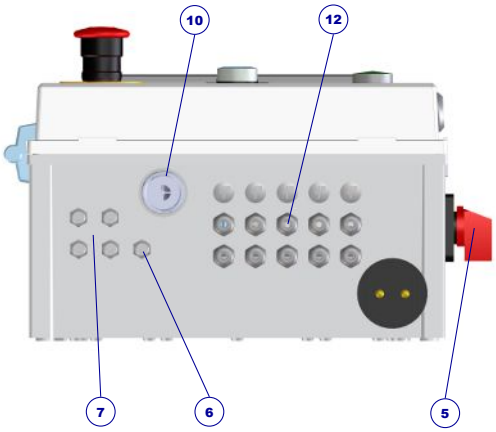
Operating personnel must use appropriate personal protective equipment for the activities to be performed and the associated environmental hazards. The operational instructions and the specifications of the employers' liability insurance associations and the safety data sheets must be complied with.

4 Design and function

4.1 Design

Diagram of the FP4 controller





Position	Description
1	Emergency stop
2	Red LED
3	Yellow LED
4	Green LED
5	Main switch
6	Pneumatic input
7	Pneumatic outputs
8	E-stop reset
9	Ethernet port
10	Signal transmitter (horn)
11	Mains power connection
12	Cable inlets

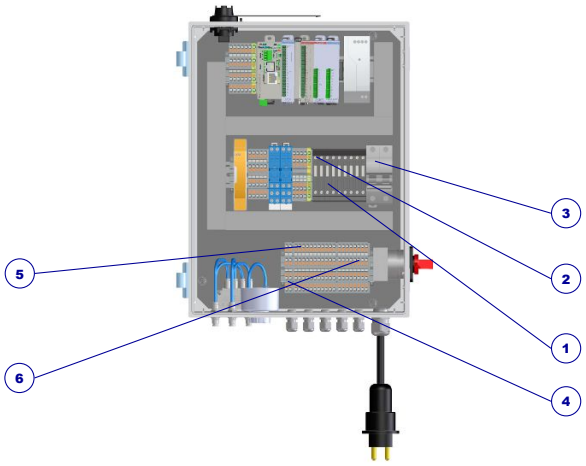
The complete enclosure assembly has an environmental rating of IP65. On the front panel there is an emergency stop button [1] and an E-stop reset button [8]. On the right is the on/off switch [5]. An additional input for an external 2-channel (equivalent) emergency stop is provided internally. This can be deactivated as necessary. When one of the two shutdown options is activated, all valves are closed and the power supply to the solenoid valves is interrupted.
To reset after an emergency stop, the emergency stop switch must be unlocked and then acknowledged with the "E-STOP reset" button.
The error message for the emergency stop must be acknowledged separately on the HMI!

The controller power supply is provided via a three-wire mains cable with connector.

The controller power supply is provided via a 5-m-long, three-wire mains cable. The controller is secured internally with a circuit breaker of characteristic B.

The Ethernet port [9] is located on the top. This allows the device to be integrated into a Modbus system.

Diagram of the FP4 controller



Position	Description
1	8 fuses for analogue inputs
2	Main fuse
3	Circuit breaker
4	External emergency shut-off input
5	Digital inputs
6	Analogue inputs

4.2 Functional description

The intended use of the Controller FP4 is the control of up to 4 pneumatic valves. These can be configured for an automatic purge process as well as for an additional valve as a cylinder valve, propellant gas valve or line shut-off valve.

The controller is designed to control an automatic purge process before and after a gas source change. The number of purge cycles and the duration of the individual steps can be individually set. There is the option of monitoring the purging process by means of a contact pressure gauge or a pressure transmitter.

All controller actions which require an input from an operator are protected by a dual layer password system that allows up to five trained operators to have different operational access via their own personal Identification Number (PIN).

Configuration of the controller type, digital and analogue inputs and alarm settings are all set via the GUI.

4.3 Technical data

NOTICE

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

The maximum input and output pressures and the gas type are given on the identification or label.

4.4 Boundaries and interfaces

The scope of supply includes the product as described in the "Design" chapter. The transfer points to the control air and power supply are the connections on the controller.

The following areas and functions have not been included in the scope of supply from Spectron:

- other systems, lines and installations of the overall system
- Supply of auxiliary media (compressed air or purge gas)
- Power supply
- Lighting

5 Installation

5.1 General information

⚠ CAUTION

Injury or damage in the event of incorrect assembly or disassembly

Special steps are required for assembly and disassembly work on the product. Personal injuries and damage to the product are possible.

a) Assembly and disassembly work may only be carried out by the installation engineer or appropriately skilled specialist companies and persons.

b) The product is not permitted to be re-used following disassembly. All components must be disposed correctly.

The controller is to be mounted to a suitable wall or framework using four fixings with a maximum diameter of 4.8 mm. Once installed, the four red plastic covers should be fitted over the screws to maintain the IP65 rating. The data sheet and the dimensional drawing are stored in the manufacturer's documentation.

5.2 Electrical connection

⚠ DANGER

Voltage

The components of the control and the connections are under voltage. There is a danger of death on contact.

a) Only allow work in which the control unit must be opened to be carried out by trained specialist personnel (electricians).

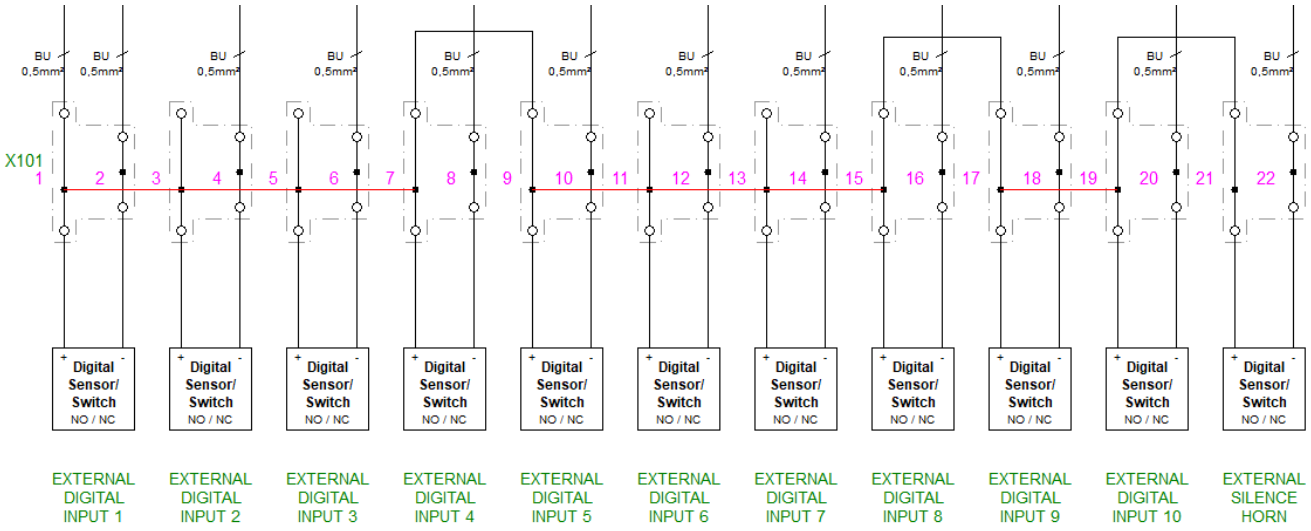
b) Only perform work in which the control unit must be opened when the power supply is switched off.

c) The five safety rules according to DIN VDE 0105 are to be observed:

- ⇨ Disconnect from the mains
- ⇨ Secure against reconnection
- ⇨ Verify that the system is dead
- ⇨ Carry out earthing and short circuiting
- ⇨ Provide protection from adjacent live parts

The controller is shipped with a 5-metre-long cable that can be cut to the required length. The controller is secured internally with a circuit breaker of characteristic B. All earth wires are connected via the power supply to the earth of the distributor immediately downstream.

5.2.1 Digital inputs



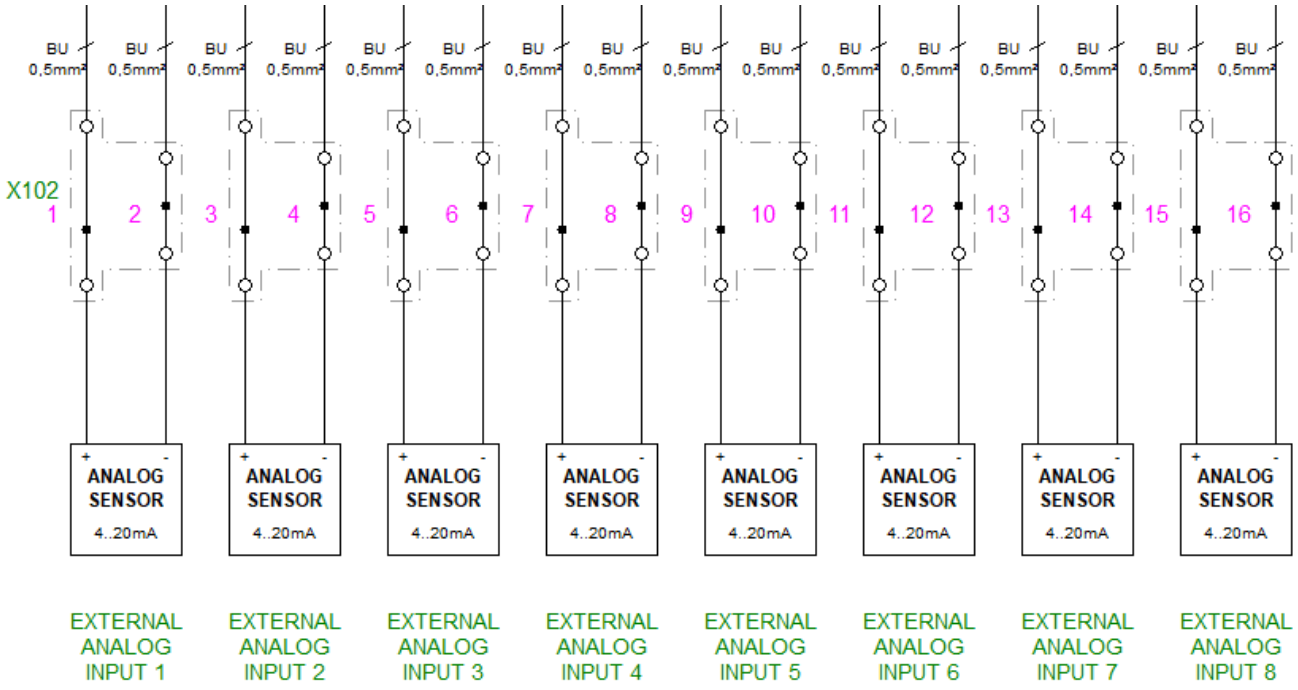
Terminal block X101 provides the connections for the digital sensor inputs. Digital inputs of sensors and switches are directly connected to the terminals of the digital PLC input module.

Terminal 22 on terminal strip X101 is optionally available for remotely switching off the horn. 10 individual digital inputs are available which can be configured as normally open contacts or normally closed contacts. Configuration and use of the digital inputs is described in the corresponding instruction manuals. See also: Digital inputs [▶ 28]

All sensors must be connected with a two-wire cable. This cable (diameter min. 3.5 to max. 7 mm) is passed through one of the cable glands on the base of the unit and connected according to the electrical connection diagrams. The polarity of the sensors must be checked before connection. A short circuit when connecting a sensor will cause the main fuse of the 24V control circuit to blow.

The control wire is connected to the upper connection of the terminal. The lower terminal is the 24V supply (see connection diagram!).

5.2.2 Analogue inputs



The connections for the analogue inputs are connected on terminal block X102. The negative terminal of each analogue signal transmitter is connected to one of the upper terminals. The positive terminal of the signal transmitter is connected to one of the lower terminals. Each terminal is secured with a 32mA glass fuse (20 x 5 mm).

All sensors must be disposed of professionally as hazardous waste. This cable (diameter min. 3.5 to max. 7 mm) is passed through one of the cable glands on the base of the unit and connected according to the electrical connection diagrams.

5.3 Pneumatic connection

⚠ DANGER

Intended use

Operation of the product with gases other than those specified or outside the limits may result in dangerous reactions in the system. Incorrect use poses considerable risks to operating personnel and the environment!

a) Only use the product for gases for which it was designed.

b) Only use the product in the specified limit values for pressure and withdrawal quantity.

c) Usage for another type of gas or outside the limit values is prohibited and constitutes misuse.

⚠ WARNING

Noise emission

When working on pressurised pneumatic supply, significant noise emission can occur. Acute and chronic loss of hearing may result.

a) Never perform work on the pressurised pneumatic supply without hearing protection.

b) Only replace the silencers when the supply is unpressurised.

⚠ WARNING

Displacement of atmospheric oxygen

In the event of inert gas leaks, displacement of atmospheric oxygen may occur. Danger of suffocation!

a) The operator must ensure adequate ventilation and airing in all rooms with gas installations and monitor the oxygen content.

⚠ WARNING

Cross-contamination

Cross-contamination of the control air with process gases can result in the control unit being damaged.

a) Ensure that cross-contamination of the control air line is prevented.

The solenoid valves require a supply of clean dry air or nitrogen filtered to 10 µm, at 6-7 bar. This is connected via a 4mm push-in fitting on the base of the device.

6 Commissioning

6.1 Preparations for commissioning

In addition, follow the user manual for the installed panel.

The controller may only be commissioned following installation at the place of use and connection of the control air and the electrical power supply.

The power supply and the electrical connections inside the housing must be checked before commissioning. The controller must not be operated without a fuse, loose connections must be tightened before commissioning.

Make sure that:

- the assembly has been correctly carried out,
- the controller is connected to the correct control air
- the control air supply is in operation and a pressure test for the control air has been performed
- the circuit breaker is not tripped

6.2 Procedure for commissioning

Switch on the controller by switching the main switch.

7 Operation

7.1 General information on operation

All controller actions that require an input from a user are protected by a three-stage password system that allows up to five trained operators to have different operational access via their own personal Identification Number (PIN).

Configuration of the controller type, digital and analogue inputs and alarm settings are all set via the GUI.

Action	Level 0	Level 1	Level 2	Level 3
Horn shutdown	no	yes	yes	yes
View analogue inputs	no	no	yes	yes
View alarms	yes	yes	yes	yes
Enable manual shutdown	no	yes	yes	yes
Enable service mode	no	yes	yes	yes
Enable manual control	no	no	yes	yes
Acknowledge alarms	no	no	yes	yes
Enter configuration	no	no	no	yes

Table 1: Access data matrix

7.2 Configuration

On power up, the following screen will be displayed:

Pressing the flag sets the system language. Other language libraries available on request.

All system on-screen instructions and alarm messages are displayed in the corresponding language.

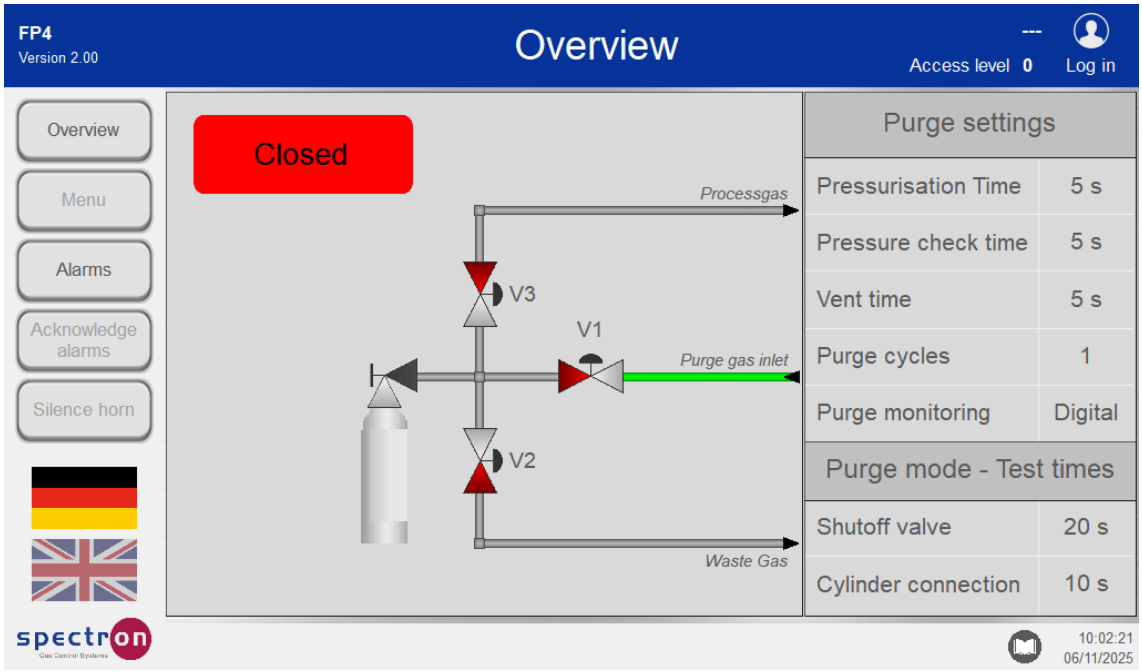
Press "**Start**" to display the system overview.

When the system is first installed, the default values are loaded into all system variables.

After the system has been adapted to the user's requirements, these values are stored in battery-buffered memories.

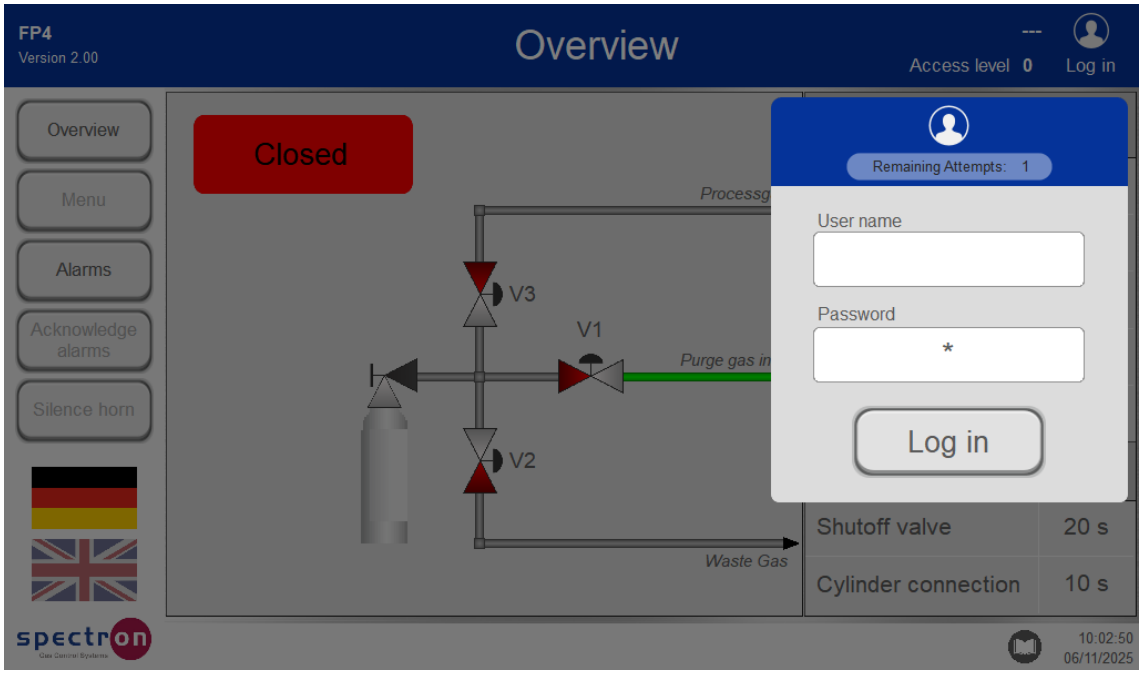
When the device is switched on again, it is restarted with the custom user settings.

Overview Screen when first switched on without adaptation to customer requirements:



To configure the system, first press "**Log in**".

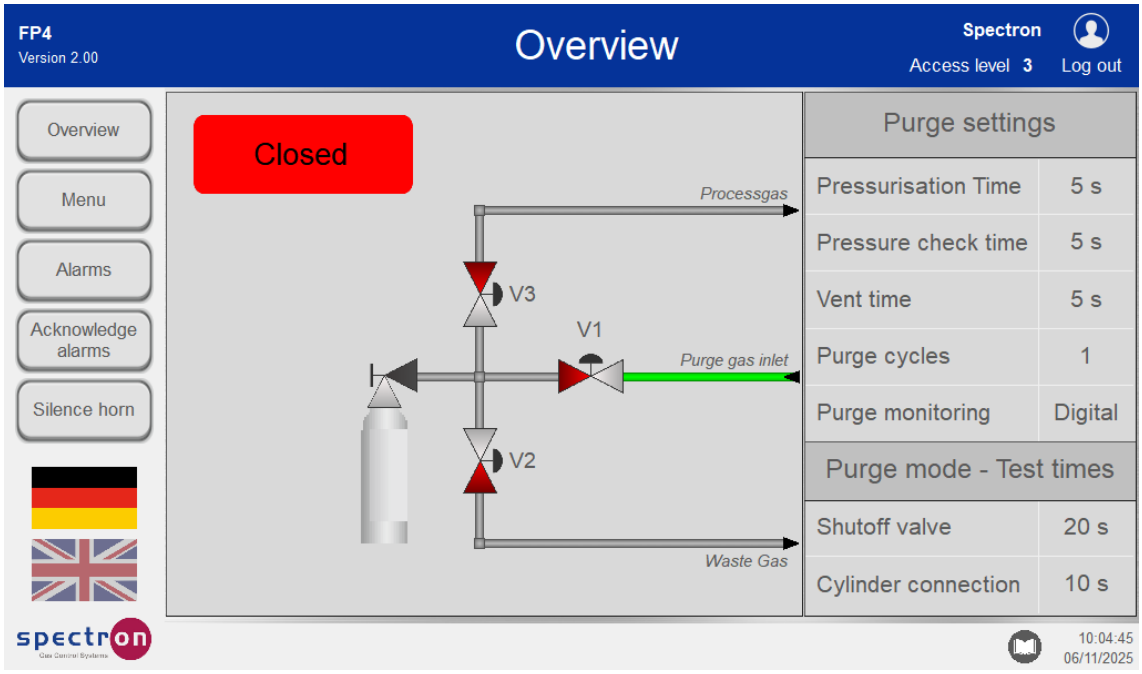
Enter your user name and password in the following window.



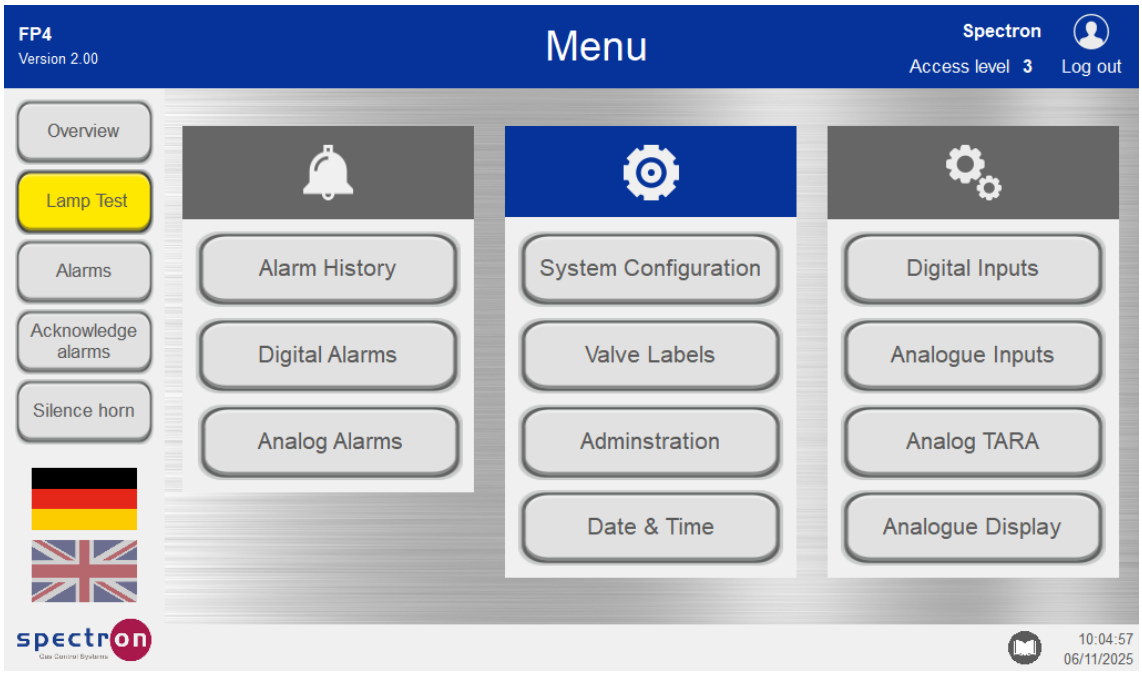
The factory-set user name is User 1.
All entries must be confirmed with Enter.

The factory-set password is 1111. This gives you level 3 system access rights. In the "User management [▶ 23]" menu you can change the user and password settings.

If a valid password has been entered, the login window displays the user name and access level for that password. If the password is entered incorrectly three times, entries will be blocked automatically for one minute. Pressing "Log out" logs out the user and removes the associated system access rights. 10 minutes after logging in, the user will be logged out automatically. This time can be customised in User management [▶ 23].

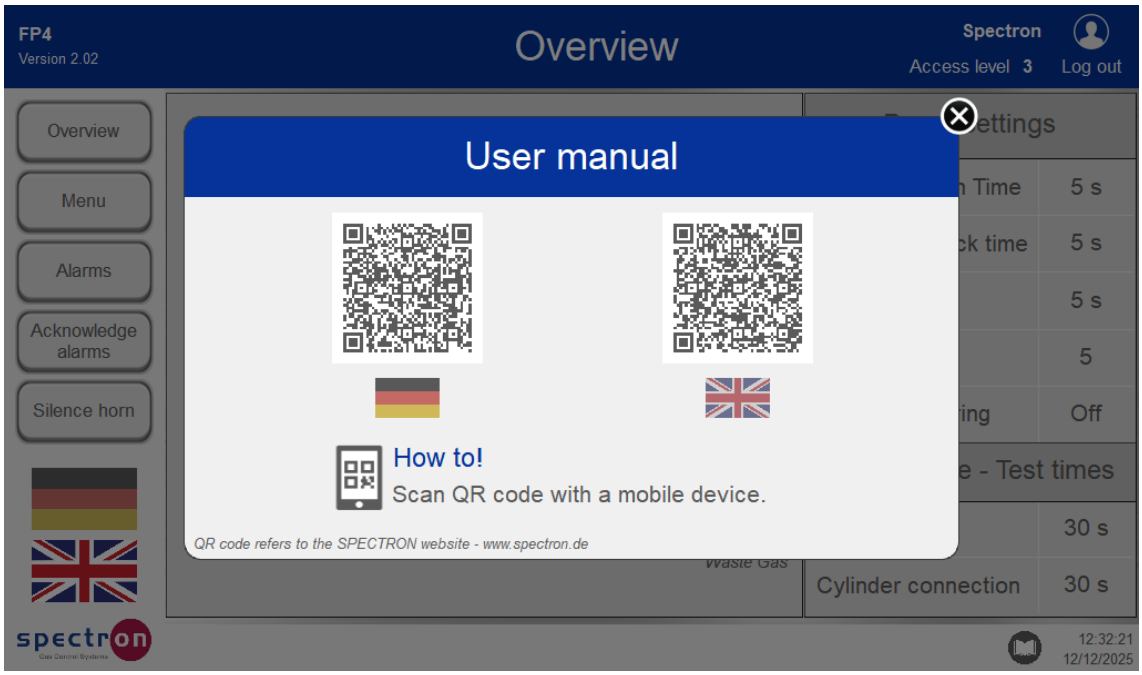


Press "**Menu**" to display the configuration menu.



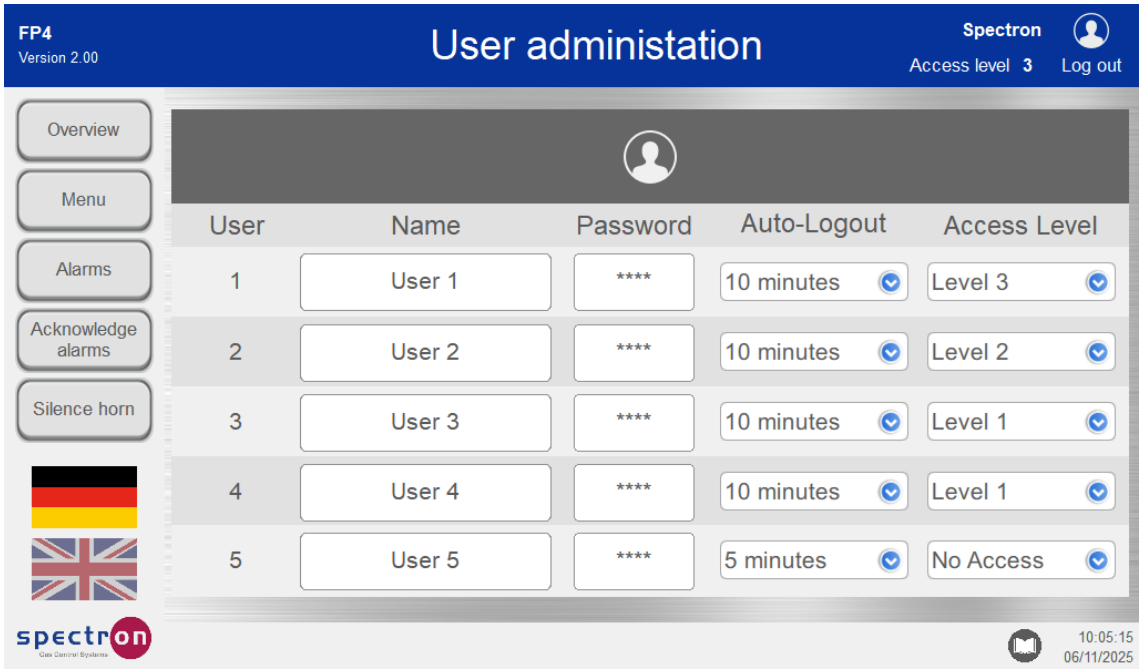
7.2.1 Operating instructions

Pressing the icon (small book at the bottom right) takes you to the selection menu (QR codes) for the operating instructions that are available.



7.2.2 User management

Press "Administration" to manage names, passwords, access levels and login time.



Pressing the name or password displays a keyboard for data entry. A maximum of 16 characters for the long name can be entered for each user. PIN numbers from 0001 to 9999 can be entered as passwords.

7.2.3 System configuration

Press "System Configuration" to configure the system.

The following adjustable parameters are available:

- Number of purge cycles
- Duration of the pressure build-up time (purge gas)
- Duration of the pressure relief time or vacuum time
- Duration of the process gas connection test (leakage test of the connection screw fitting)
- Duration of the process gas source shutdown time (leakage test of the cylinder valve)

When using selected analogue sensor for monitoring:

- The alarm threshold for pressure relief
- The alarm threshold for pressure build-up

When using selected digital sensor for monitoring:

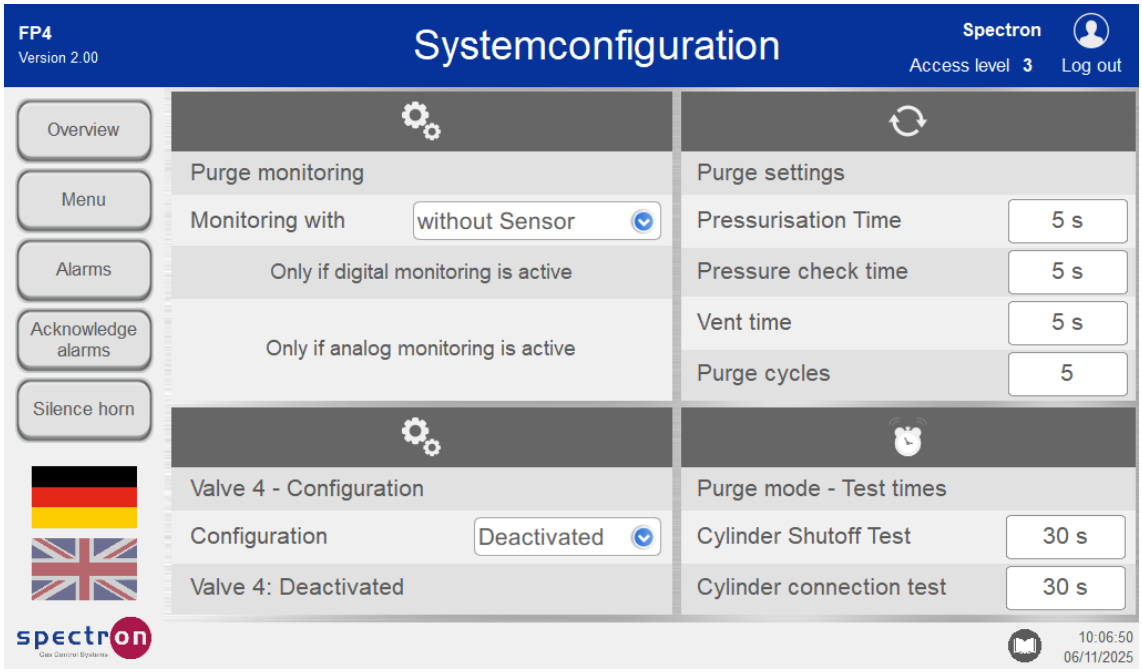
- O/C = low pressure
- O/C = high pressure

The use of the fourth valve outlet:

- ACV= automatic cylinder valve
- VGV = vacuum generator valve
- SOV = outlet shut-off valve

If monitoring is enabled via the system configuration, digital input 1 (if digital monitoring is active) or analogue input 1 (if analogue monitoring is active) is used automatically.

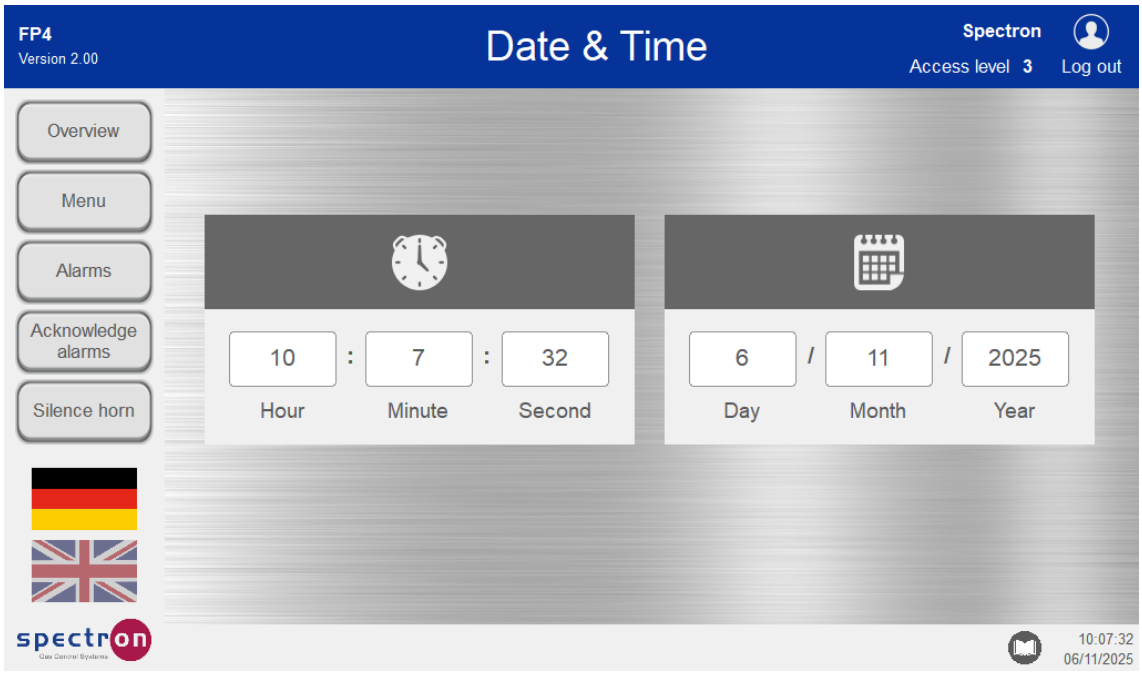
The desired value can be entered by pressing the parameters.



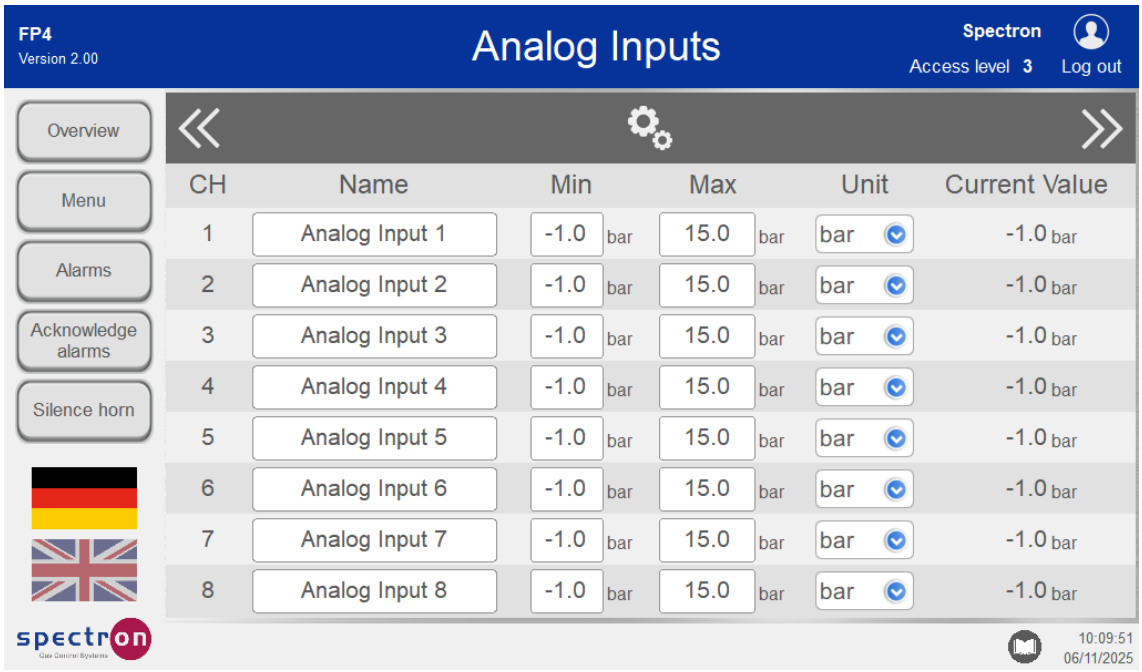
7.2.4 Real Time Clock

The real-time clock can be accessed via the configuration menu.

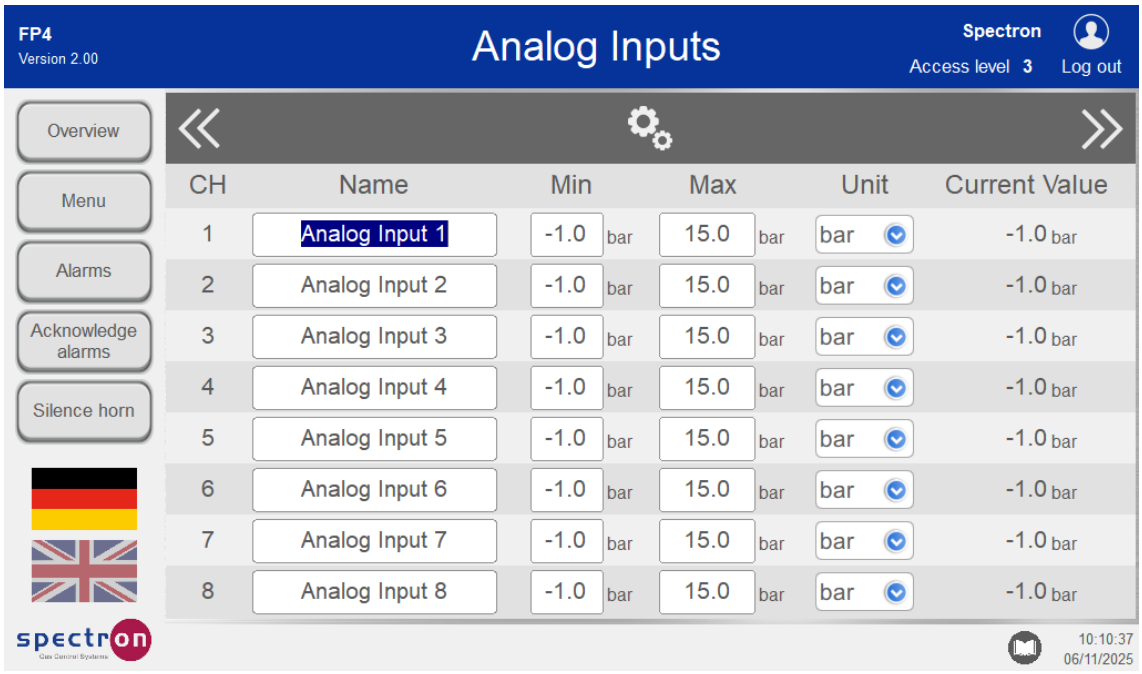
The real-time clock ensures that all displayed error states are marked with the correct date and time. The time is set via this screen:



7.2.5 Analogue inputs



Press the name of an analogue input to change it.



"**min**" is used to select the minimum sensor value.

The respective unit for the system/display can be selected in the "**Unit**" column.

"**max**" is used to select the maximum sensor value.

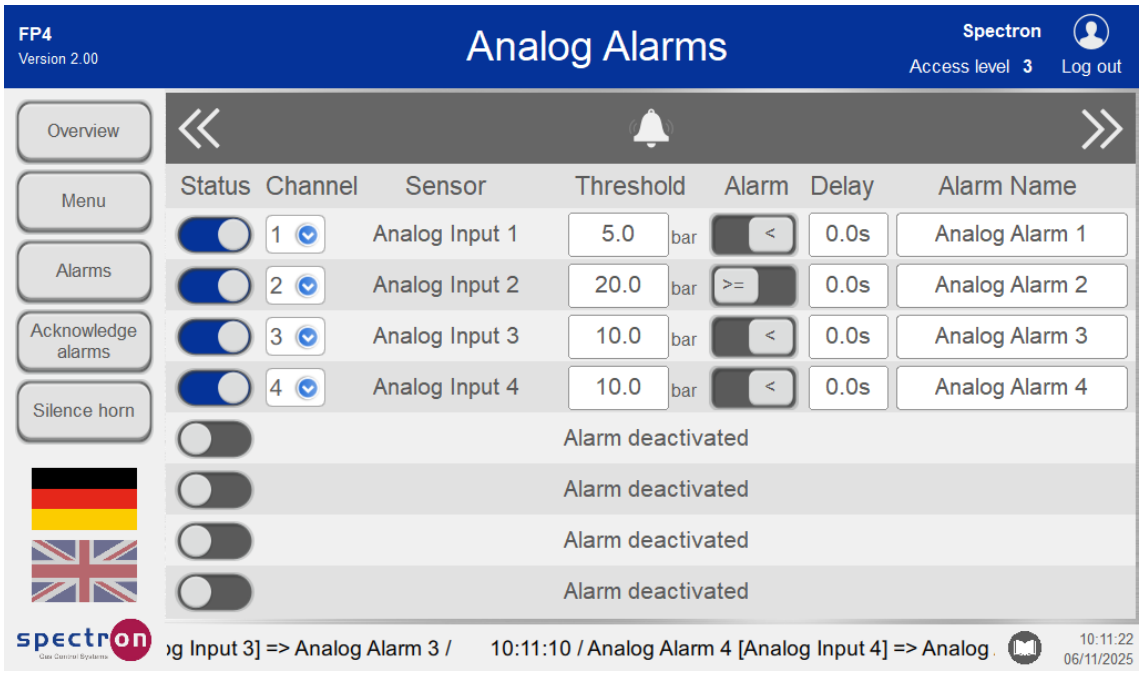
If there are inputs that are configured as weight (kg or lbs), the "Tare setting [▶ 31]" menu is used to automatically add an input field for the tare weight value.

The current values of the analogue inputs are displayed as soon as the unit and the measuring range are entered.

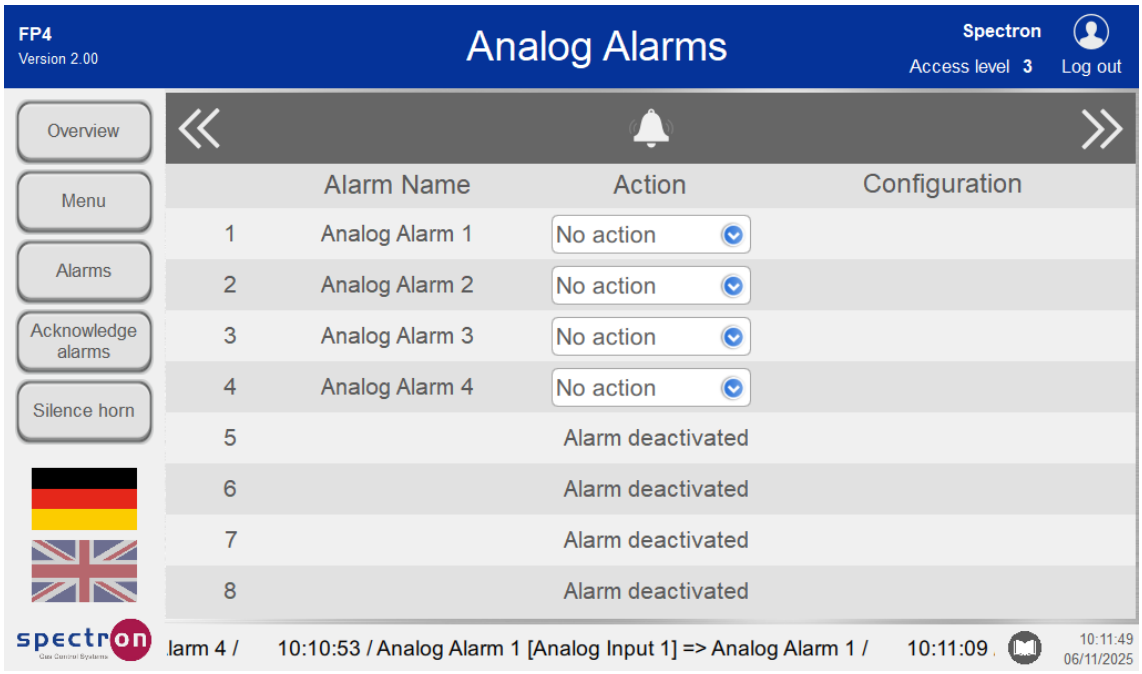
The analogue input 1 can be switched on or off as a purge monitoring sensor by pressing the button under purge monitoring.

Pressing "**Analogue Alarms**" in the main menu will take you to the analogue alarm configuration.

Individual analogue alarms can be activated in the "**Status**" column. The basic value to be monitored is then defined under "**Setpoint**" and the "**Alarm**" column is used to define whether an overrun or underrun should be reported. "**Delay**" allows you to define the time after which an overrun or underrun should be reported. The display name that appears in the alarm history can be entered in the "**Alarm name**" field.



If you press the double arrow to the right, the list of alarm names will open. You can assign different alarm actions to these alarm names.



Press "**No action**" to scroll to the required alarm action.

These are the possible settings for alarm actions:

Action	Description
No action	The alarm is not active
Warning	The alarm is active but does not switch any valves
Shutdown	The alarm is active and closes all corresponding valves

Table 2: Alarm actions

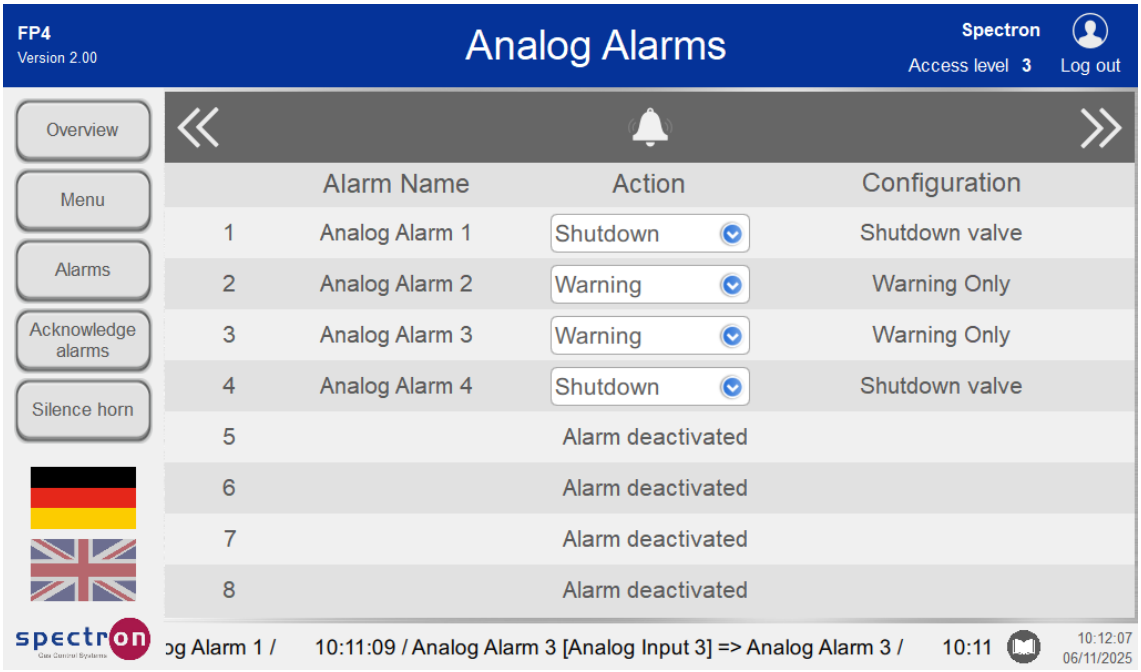
If the pressure (e.g. outlet pressure) drops to 5 bar, the valve is closed.

If the pressure rises (e.g. outlet pressure) to 20 bar, a pre-alarm is issued in the form of a **warning**.

If the pressure drops (e.g. inlet pressure) to 10 bar, a pre-alarm is issued in the form of a **warning**.

If the pressure (e.g. purge gas) drops to 10 bar, the valve is closed.

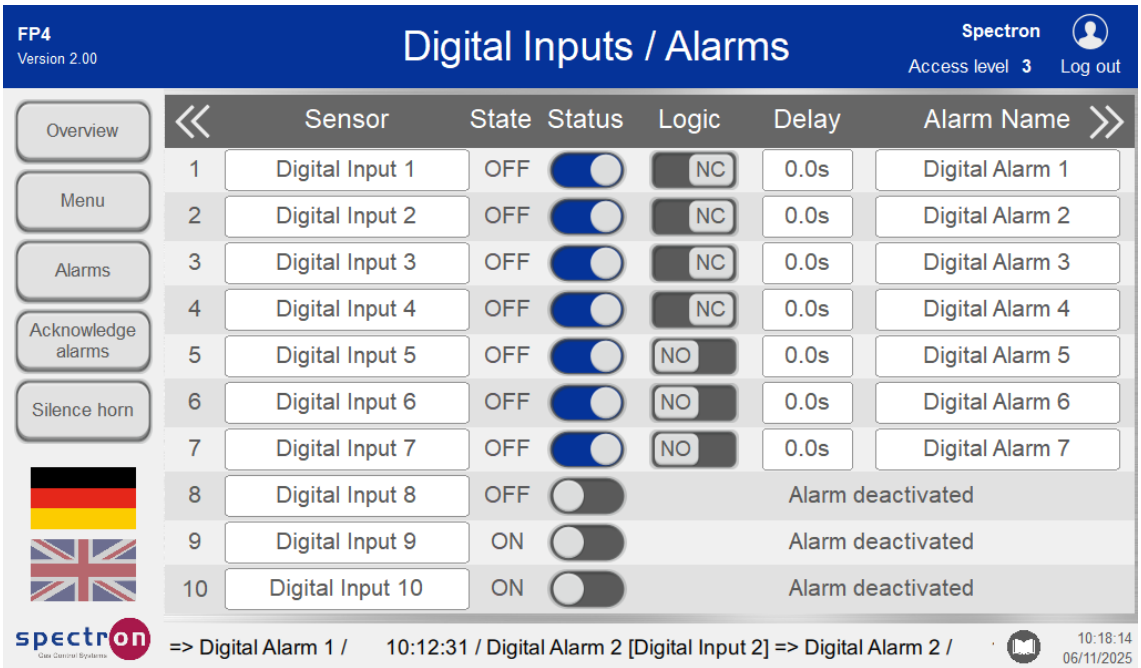
For the **shut-off** of the valves, the **Shutdown** action must be pressed.



7.2.6 Digital inputs

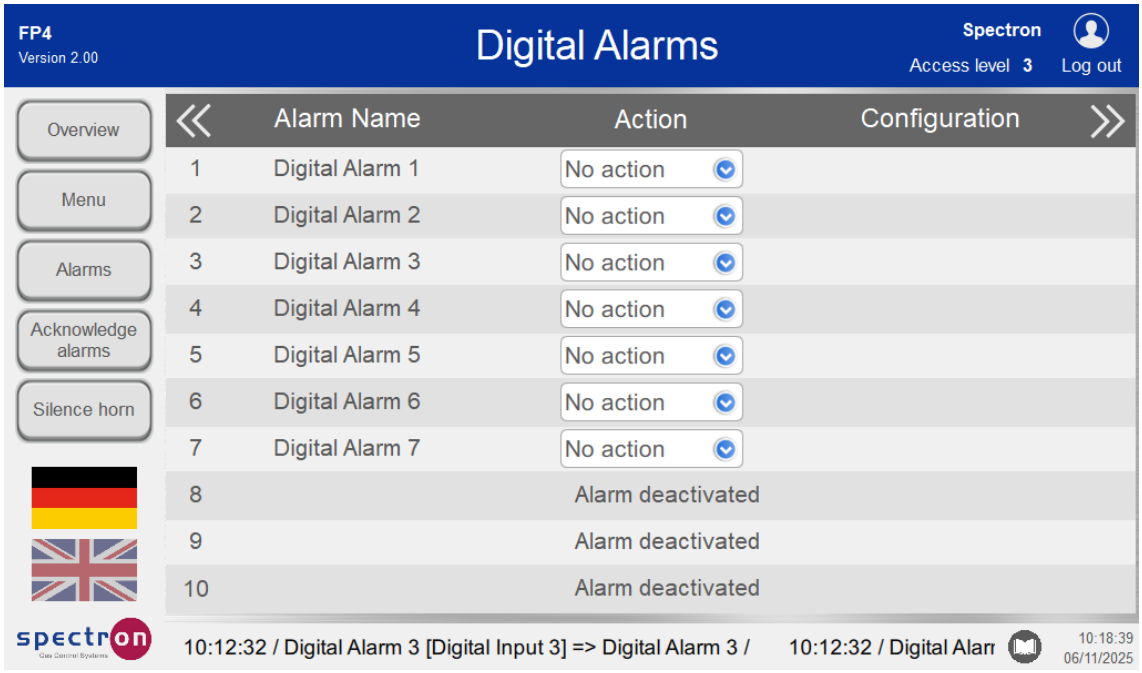
Press the name of a digital input to change it.
Switching in the "**Status**" column activates the input.
The alarm names can be changed by clicking on the respective field.

The status (normally open **NO** or normally closed **NC**), as well as the desired delay can be set.



The analogue input 1 can be switched on or off as a purge monitoring sensor by pressing the button under purge monitoring.

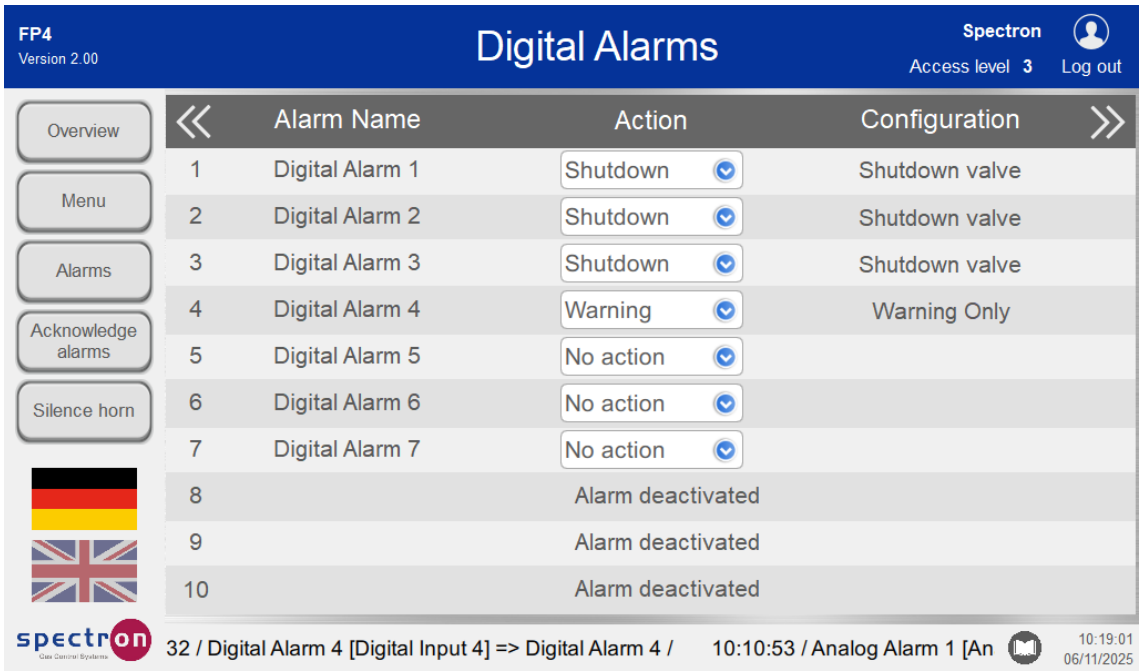
Pressing the double arrow to the right will take you to the digital alarm configuration. Various alarm actions can be assigned to the respective alarms there.



Press "**No action**" to select the desired alarm action from the drop-down menu.

These are the possible settings for alarm actions: see Analogue inputs [▶ 25]

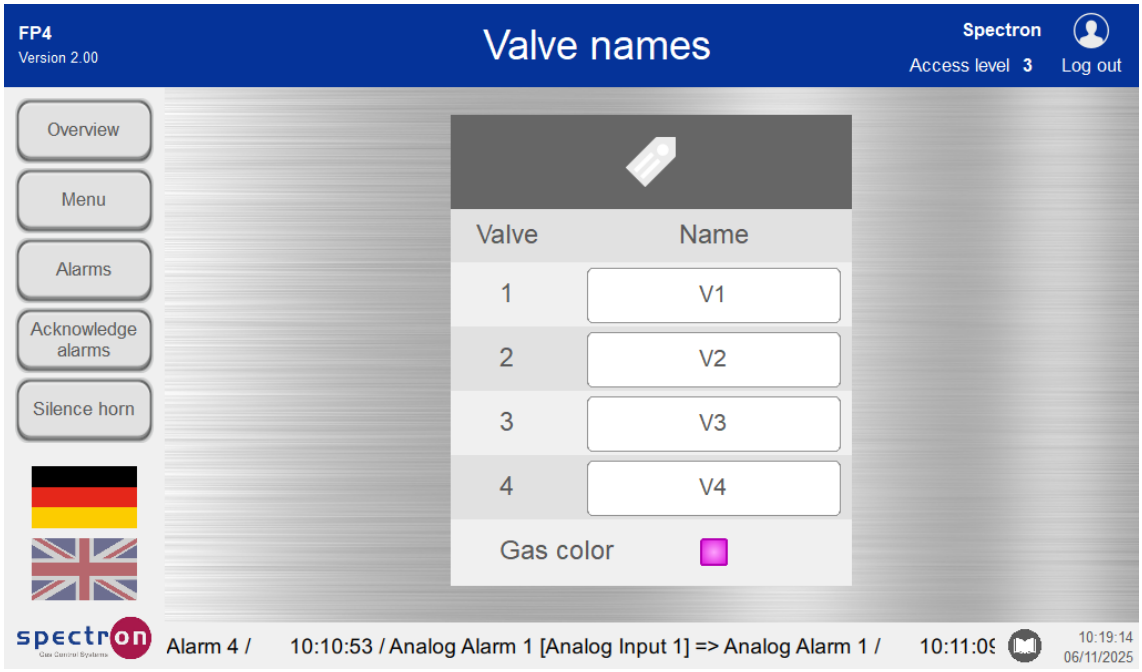
Alarm input 4 is purely a warning alarm.



Pressing **Menu** will take you back to the configuration menu.

7.2.7 Label valves

Pressing "**Label Valves**" in the configuration menu to change the names of the valves in the overview Screen. The colour of the process gas can be selected using the coloured box.

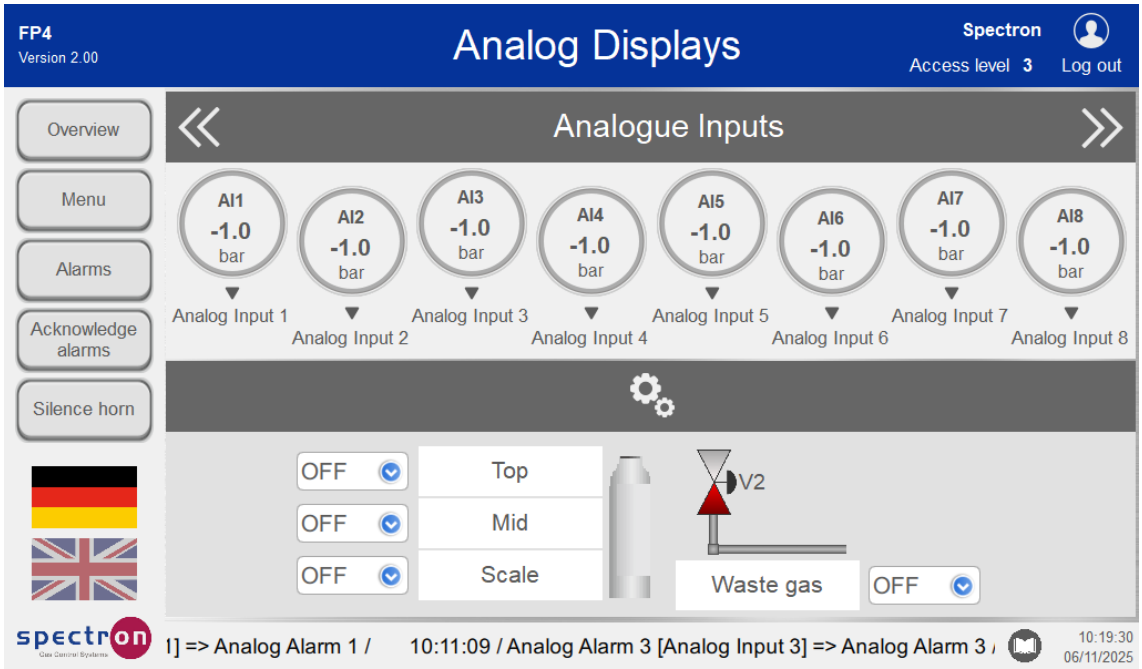


7.2.8 Assignment of the analogue inputs

Analogue values can be displayed in the overview screen.

To do this, select "**Analogue Displays**" in the configuration menu.

To assign these values to the display, press the respective drop-down menu to select the desired analogue input.

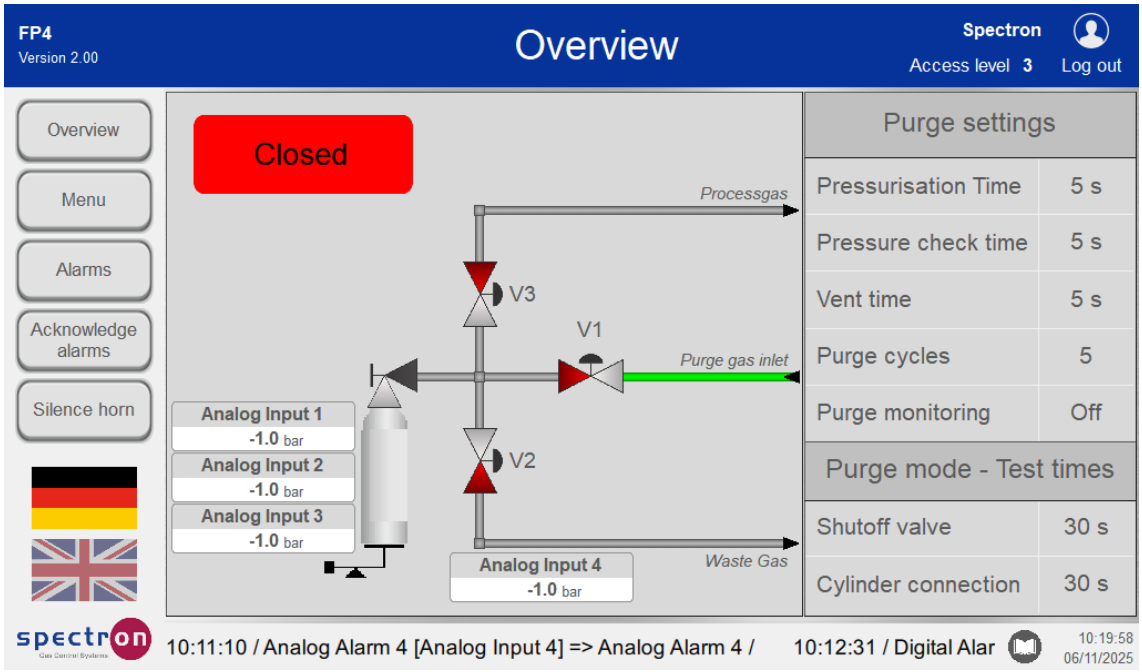


The **display** "**Scale**" automatically adds a cylinder scale icon in the standard overview if an analogue value is assigned to it. For this reason, this value should also come from a scale.

If an assignment is "**OFF**", the corresponding area in the overview screen remains empty.

Pressing "**Menu**" will take you back to the configuration menu.

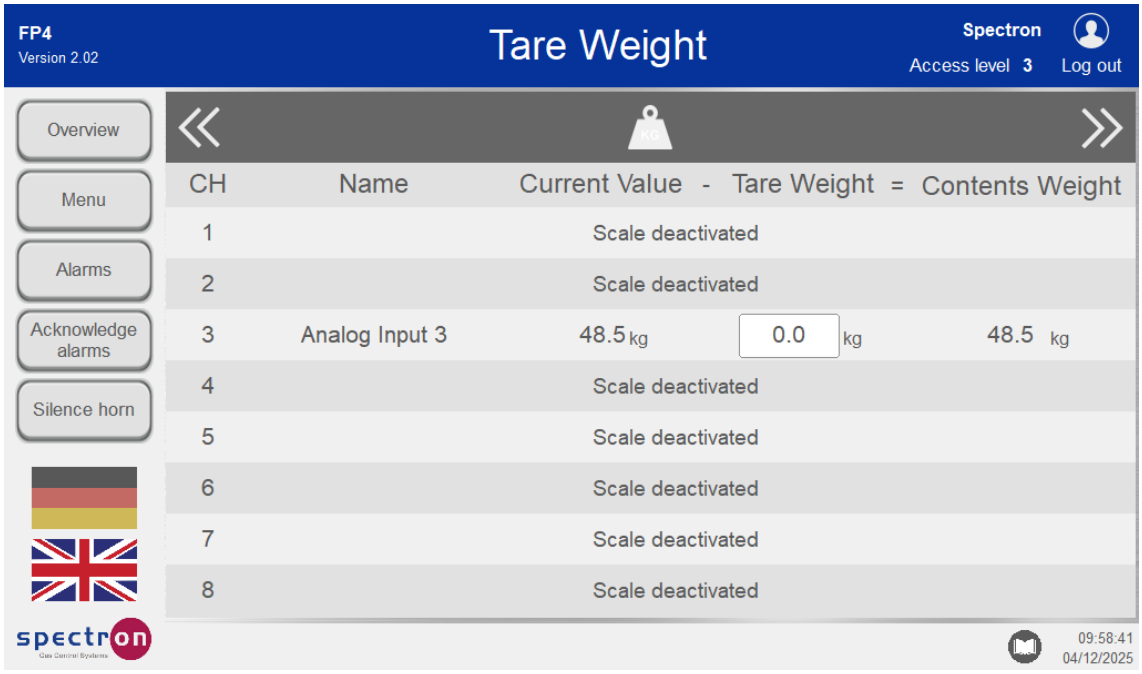
Press "**Overview**" in the configuration menu to see the assigned displays.



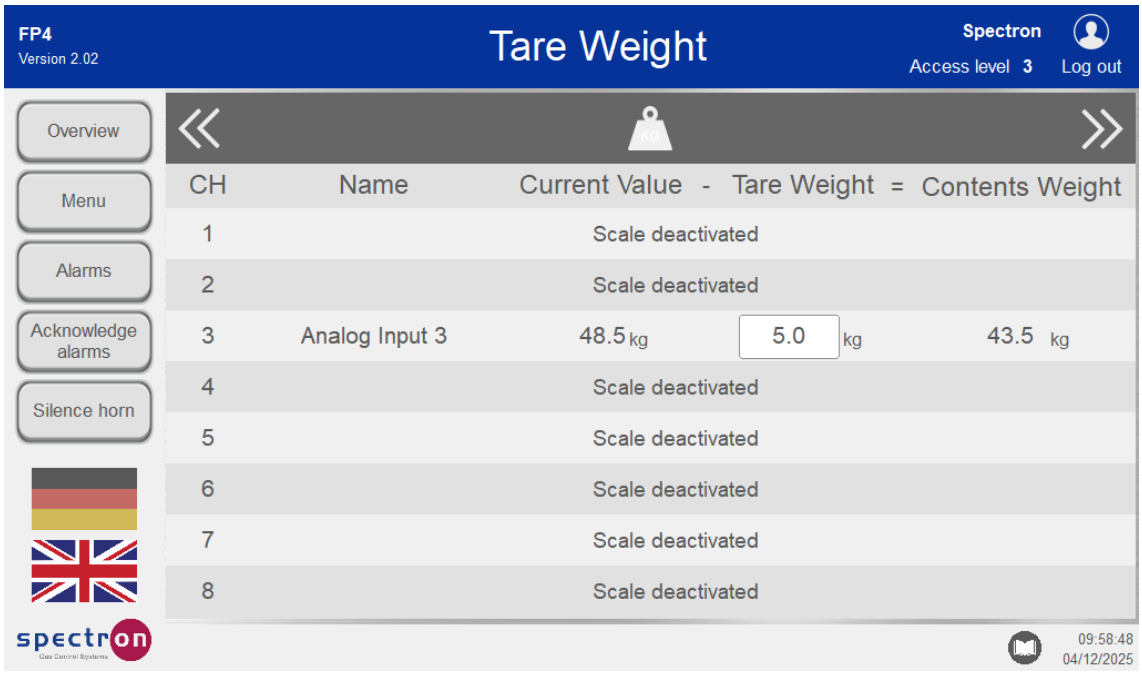
7.2.9 Tare setting

In the configuration menu, press "**Set Tare Weight**" to enter the tare weight.

On this screen you can enter the tare weight of the cylinder.

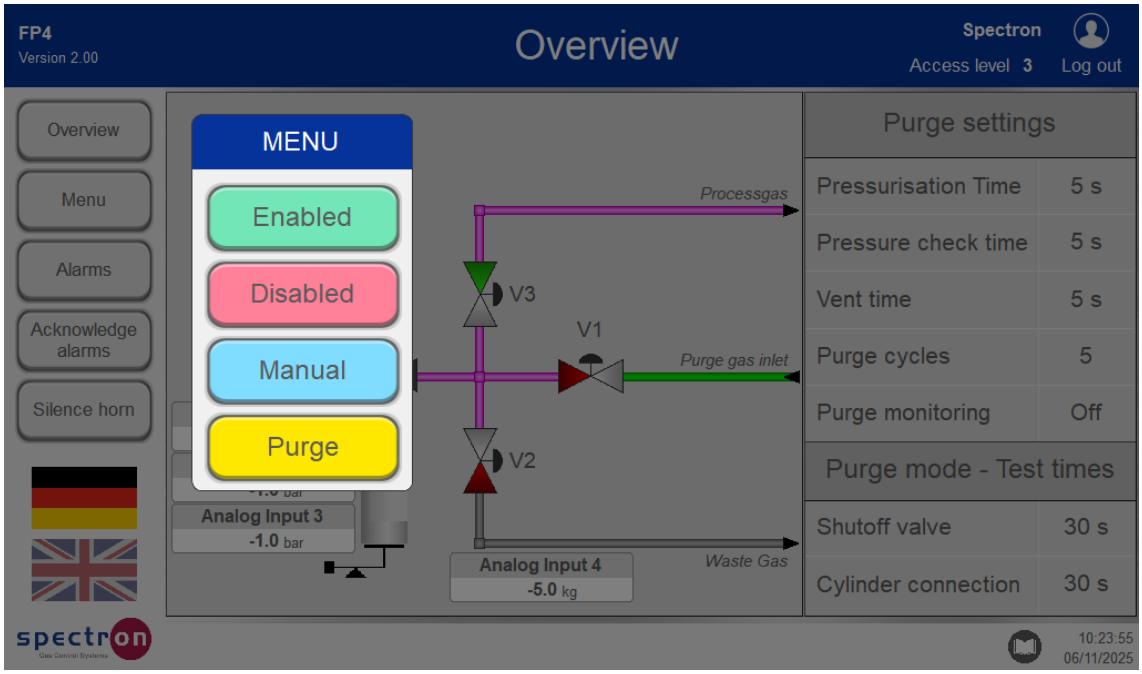


If you have entered a tare weight, the weight of the cylinder content is output as a display value. This value is used to trigger alarm actions.

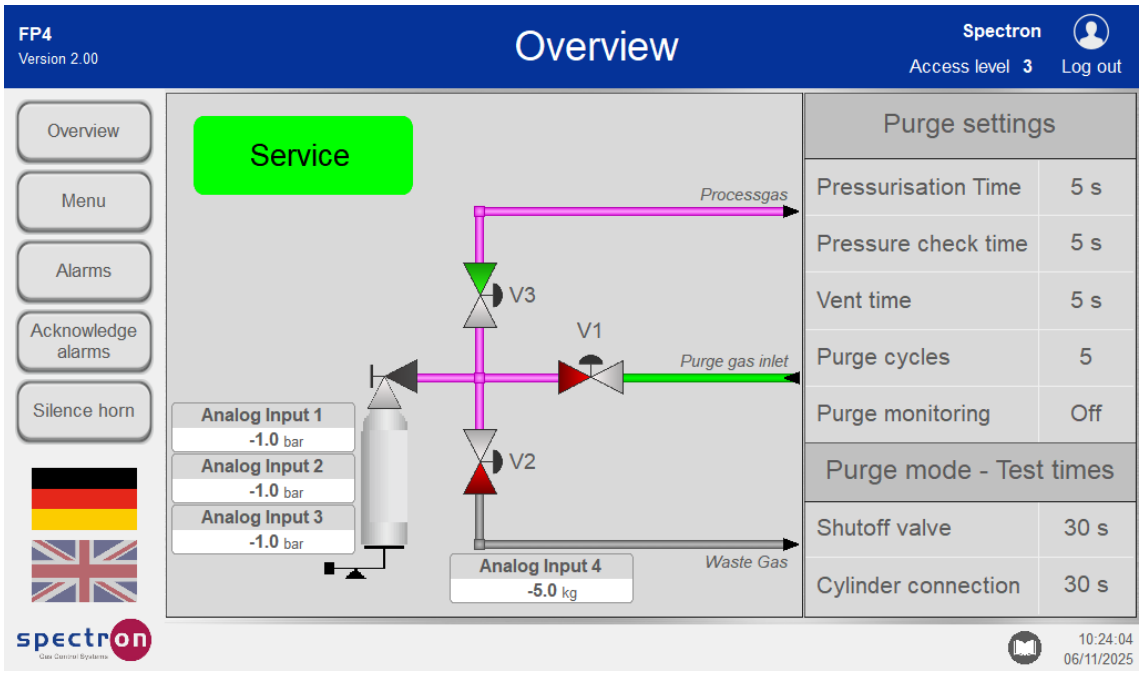


7.3 Commissioning a valve

If all valves are closed and there are no active errors, the valve status is displayed as "**Closed**". Pressing the "**Closed**" status display or the valve icon will open a selection window.



Press the " **Activate**" button to put the valve into operation.

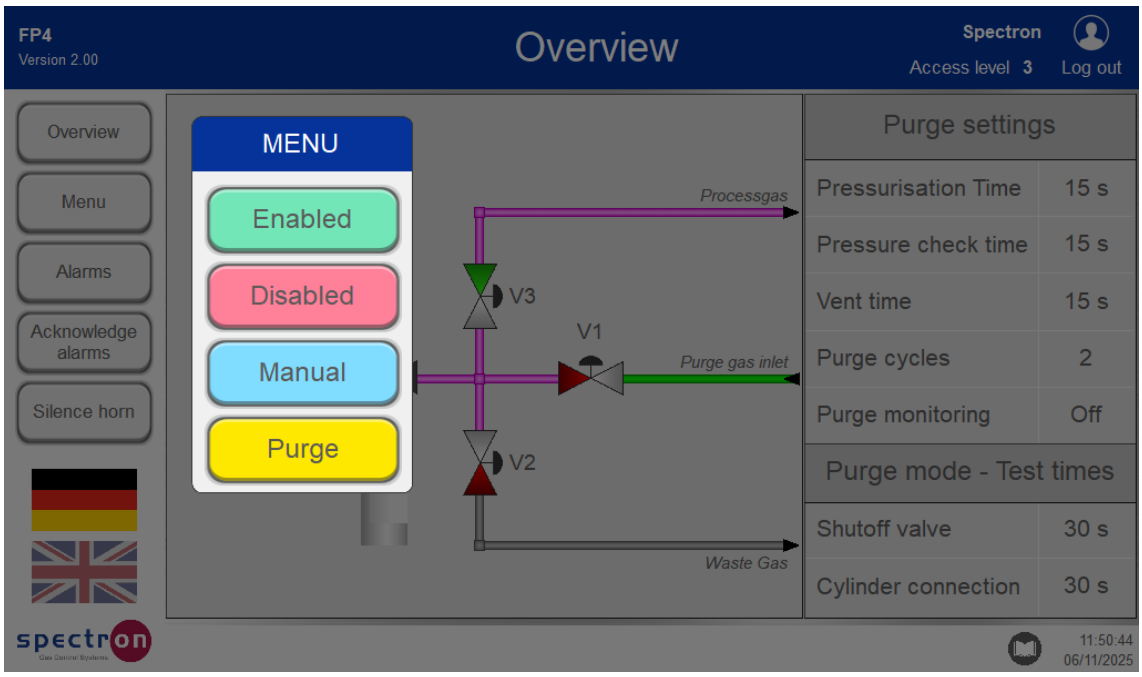


7.4 Automatic purge process

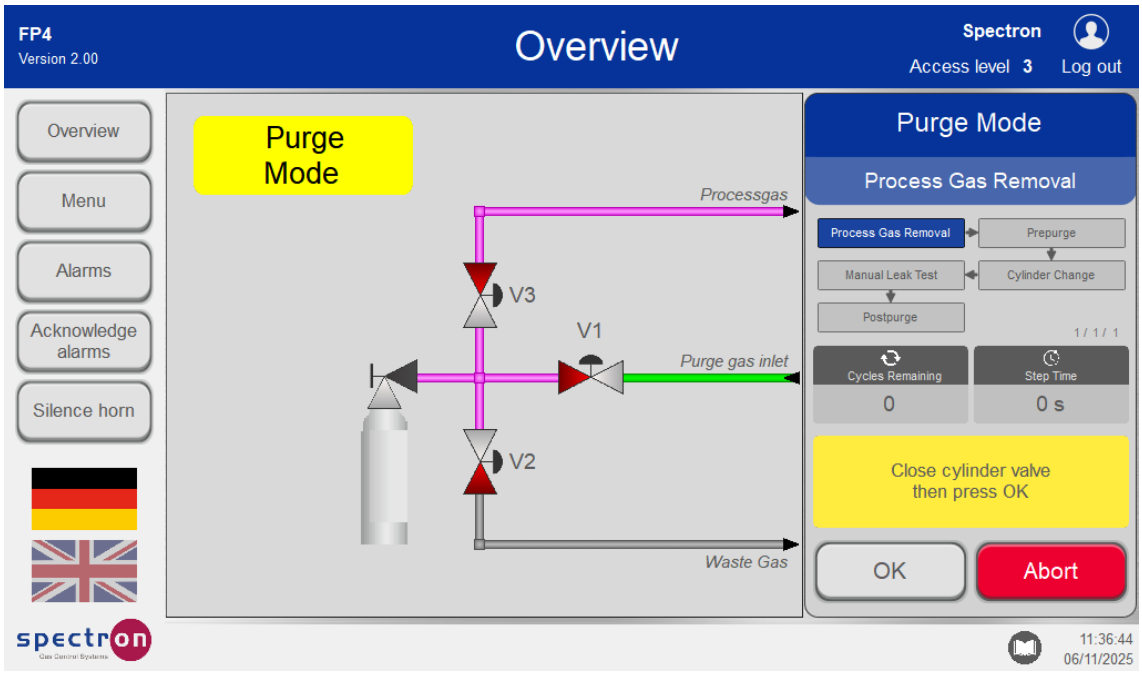
7.4.1 Purge cycle

Pressing the "Out of service" status display for a valve will open a selection window.

Press the "Purge" button to switch the system over to purge mode.

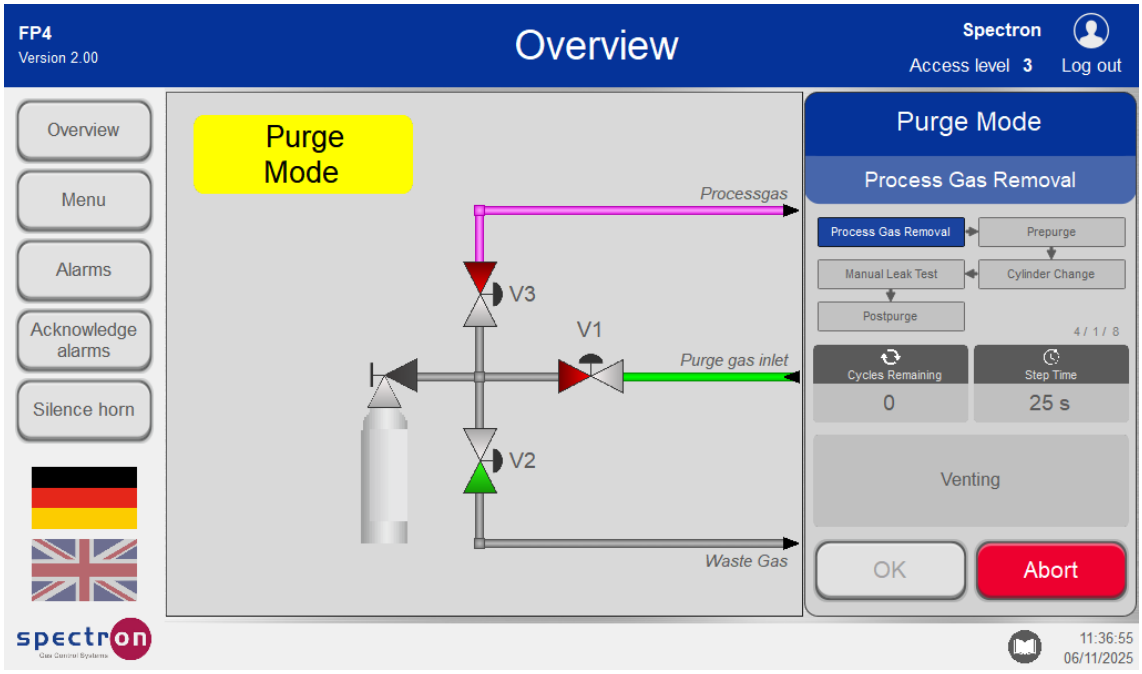


A window appears on the display, which describes each step in purging mode.
In the first step, the process gas source valve must be closed.

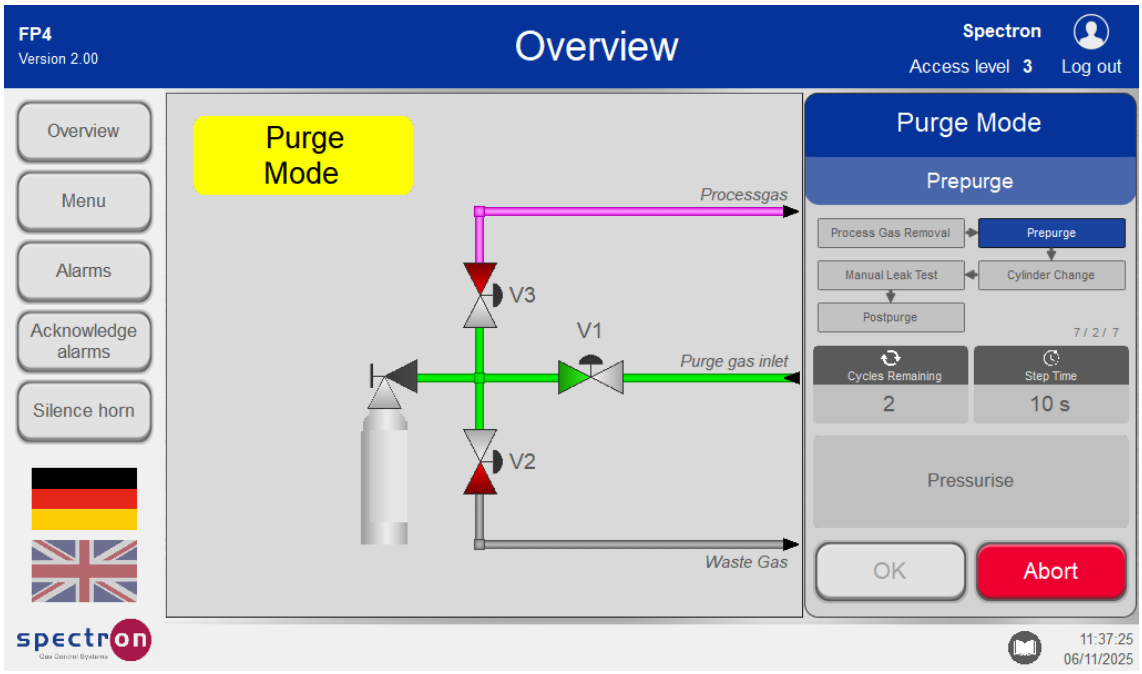


On confirmation, the pre-purge program is run before the cylinder change, which completely flushes out the remaining process gas in the lines before removing all traces of the process gas source.

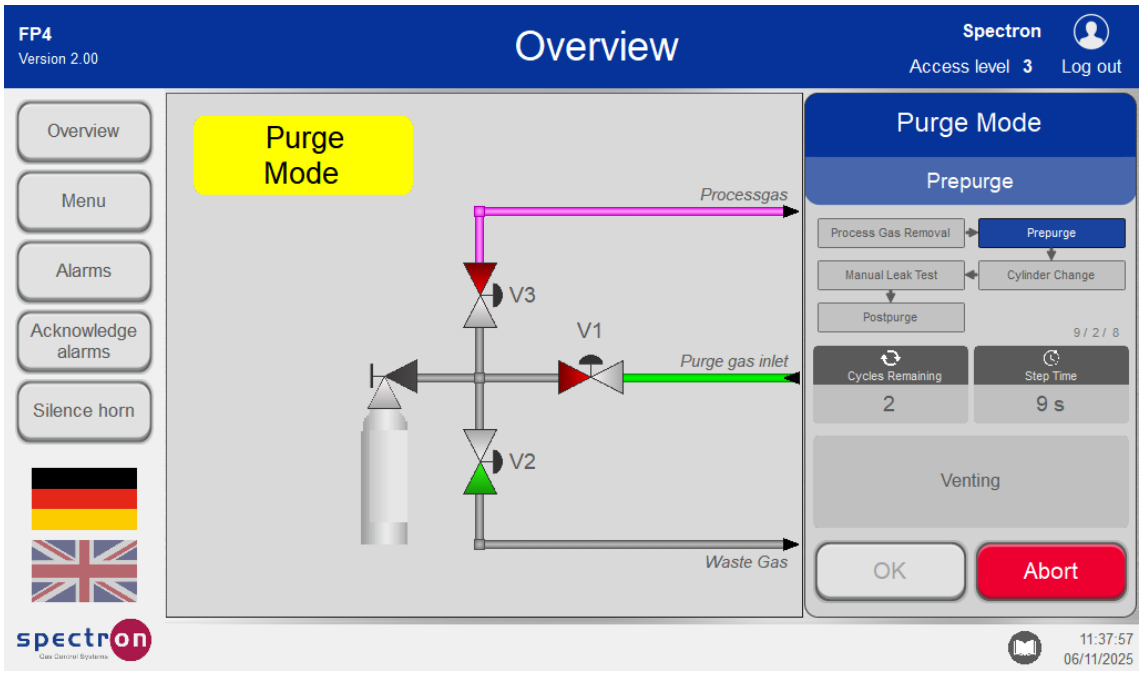
After confirmation, the process gas is removed either by relieving the pressure or using a vacuum generator, which was previously configured in the system configuration. The process gas removal has a fixed time value of 30 seconds.



The next step is the first purge cycle. In this process, pressure is first built up in the system with the aid of the purge gas.

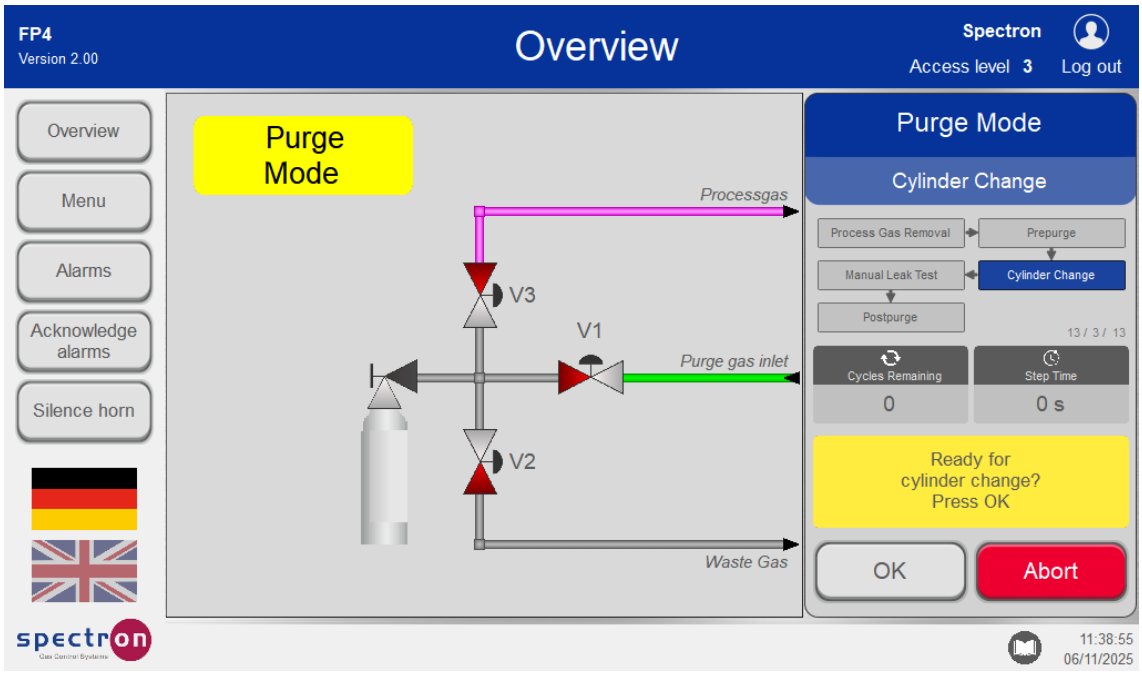


The purge gas is then removed either by relieving the pressure or with the aid of a vacuum generator.

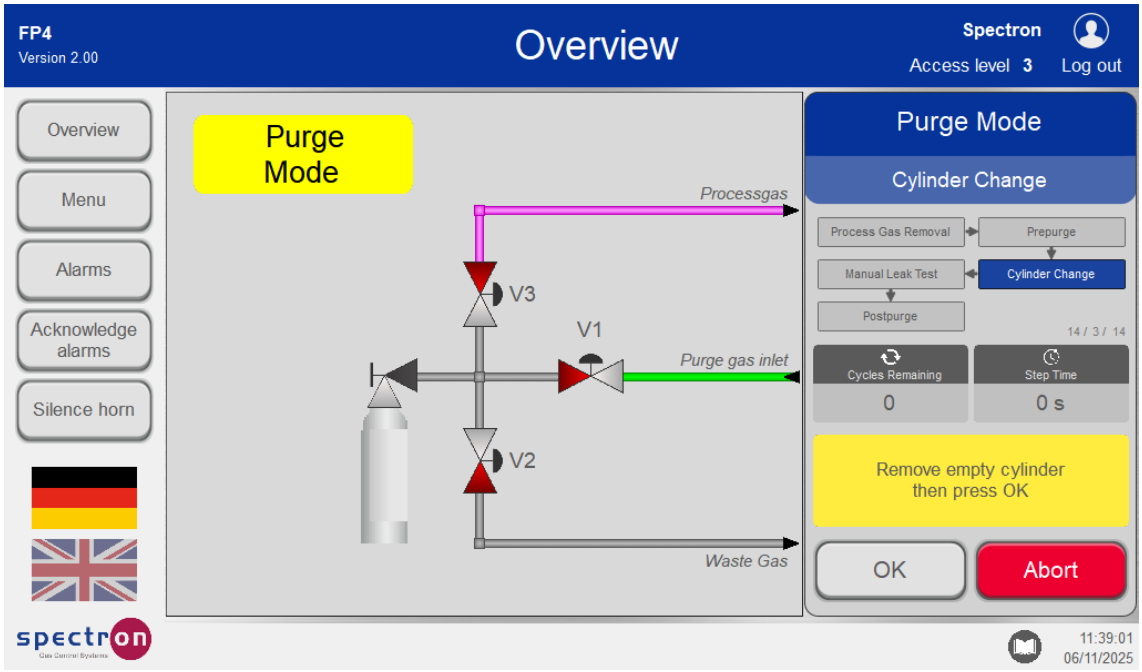


These steps are repeated according to the number set in the system configuration for the purge cycle.

After the purge run-throughs, it must be confirmed whether you are ready for the cylinder change. In the event of an unconfigured purge monitoring system, the purge sequence is to be monitored manually. In the event of malfunctions in the purge sequence, the process must not be continued.

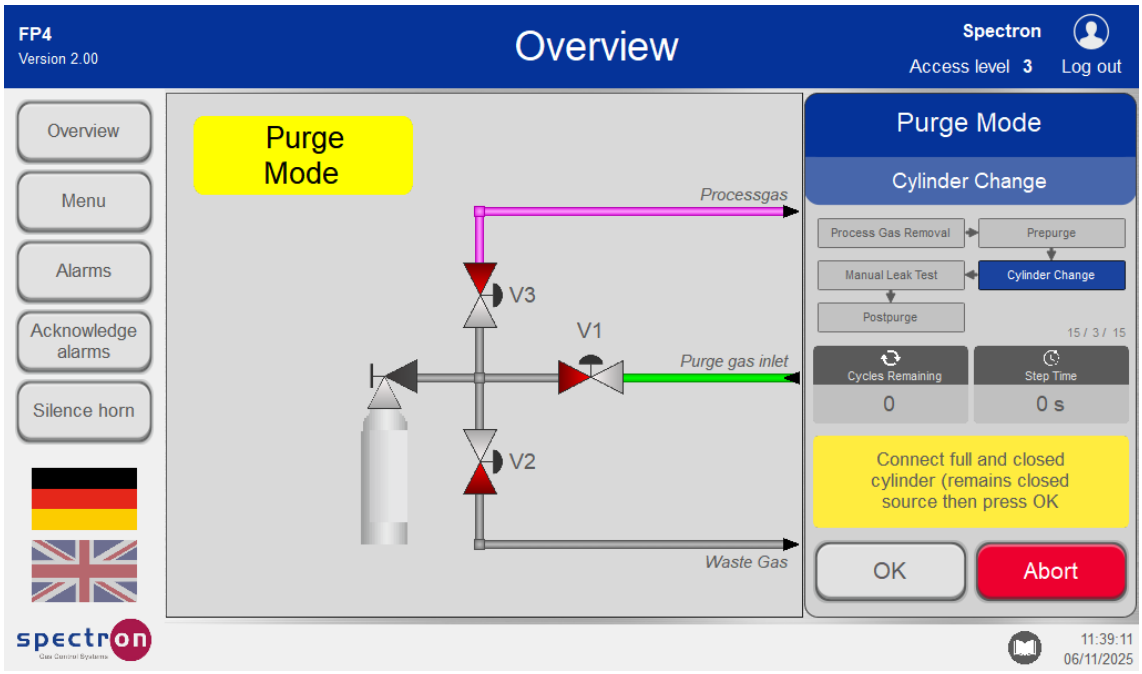


After confirmation, the instruction is given to remove the connected process gas source.

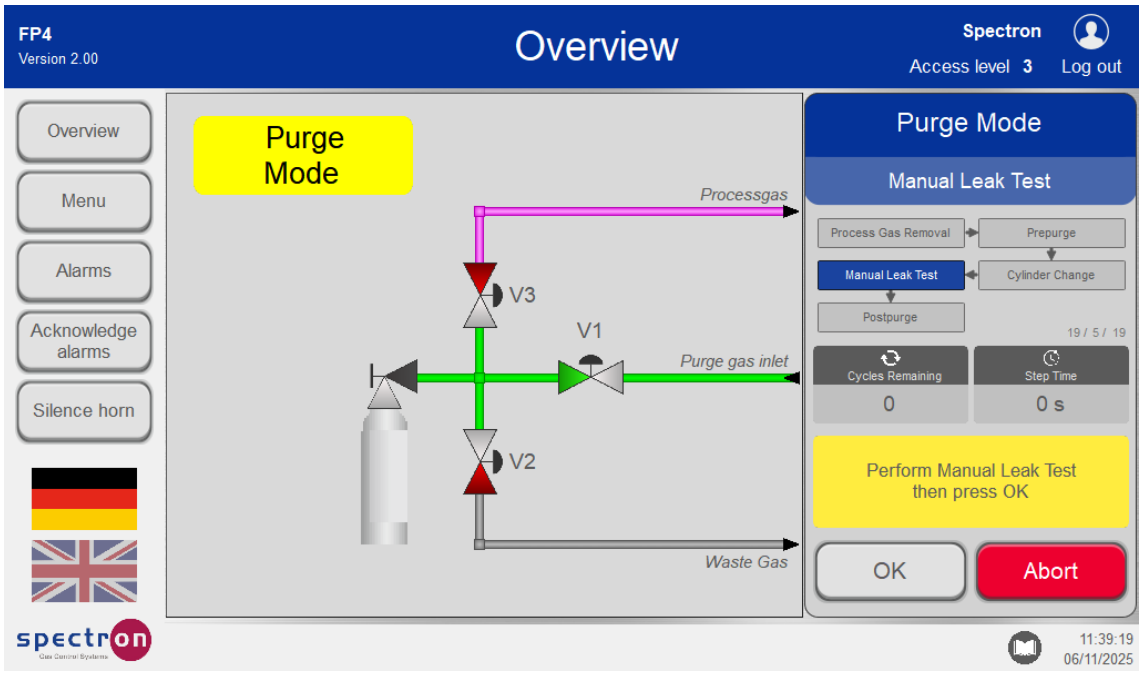


Once the process gas source has been removed, it can be confirmed with OK. The instruction is given to connect the full process gas source.

If the new process gas source has been connected, this must be confirmed with OK.

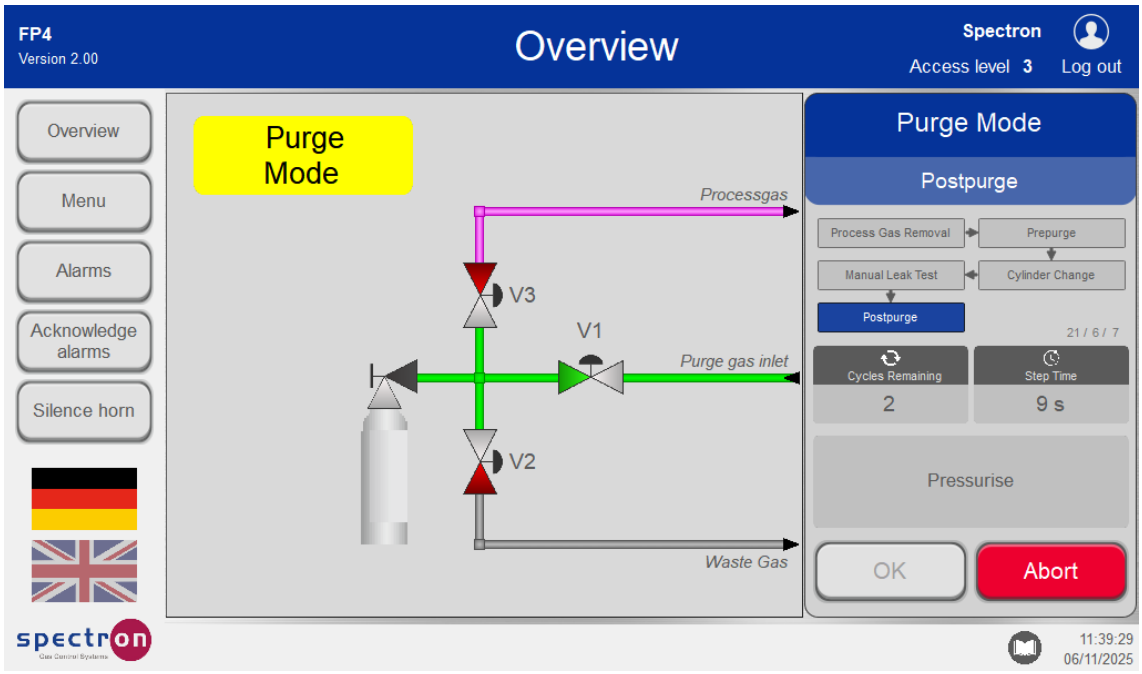


The next step is the leak test. The purge gas is thereby admitted into the lines and allows a manual leak test of the connections.

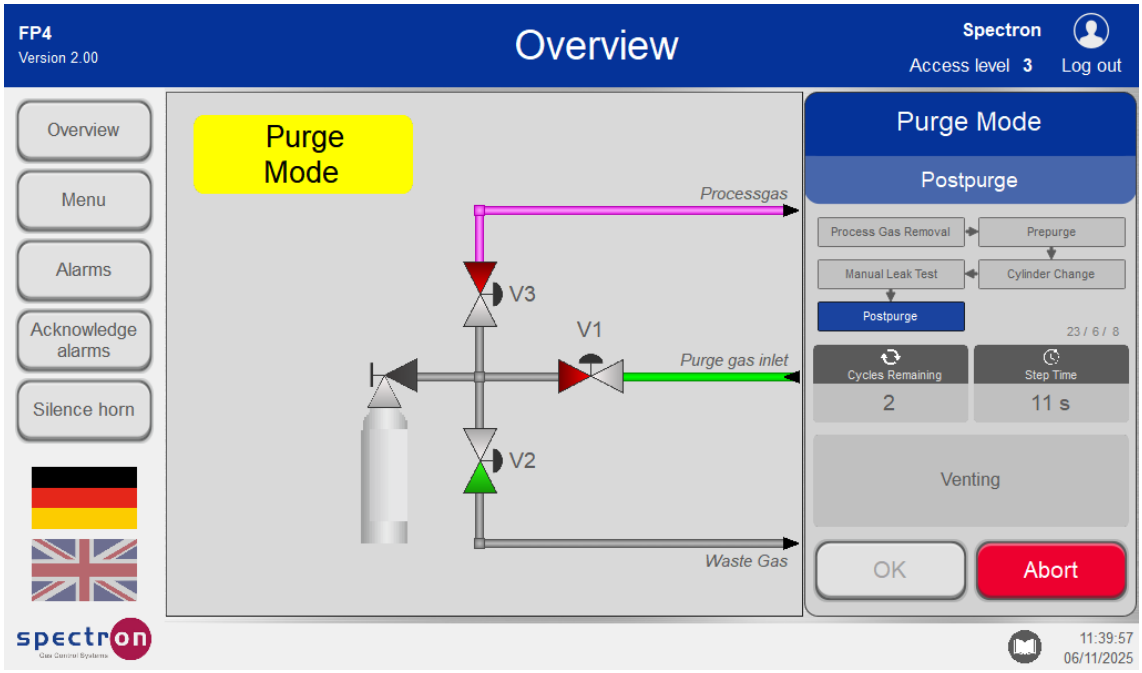


With confirmation, the post-purge program takes place after the cylinder change, which flushes impurities and atmospheric air from the line before the process gas source valve is opened.

The next step is the first purge cycle. In this process, pressure is first built up in the system with the aid of the purge gas.



The purge gas is then removed either by relieving the pressure or with the aid of a vacuum generator.

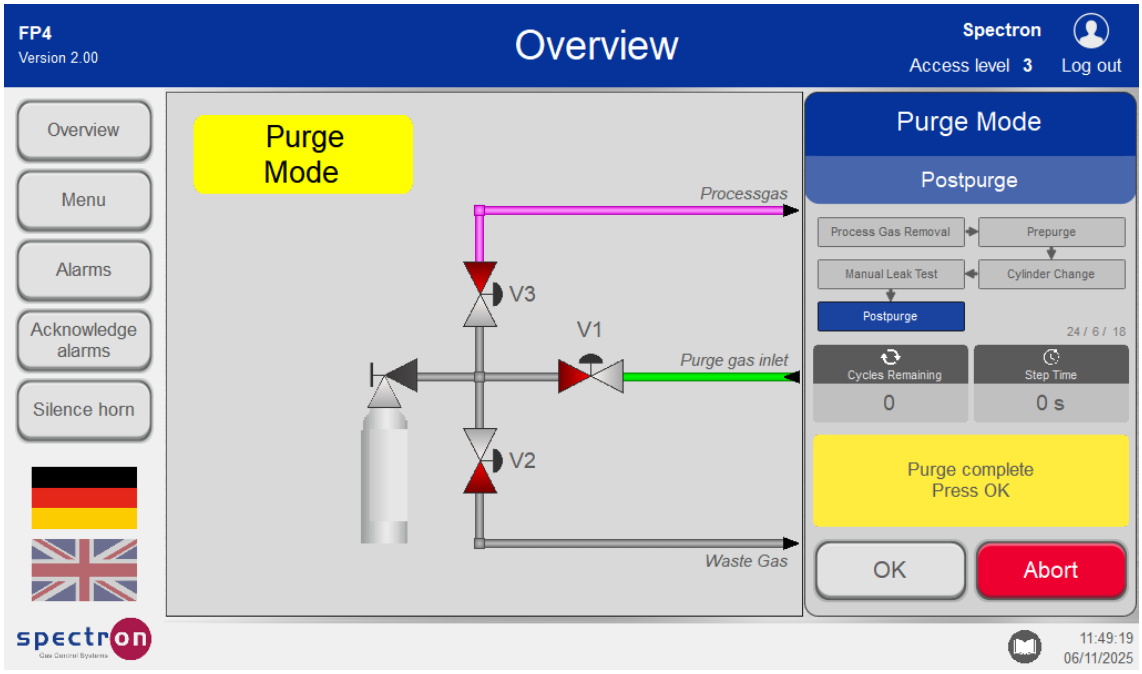


These steps are repeated according to the number set in the system configuration for the purge cycle.

After the purge passes, confirm that the purge cycle is completed and the process gas source can be opened.

Note: If pressure monitoring and at the same time an alarm (empty message) is configured on digital input 1 or analogue input 1 and the process gas source valve is not open, then this alarm is activated as soon as it is confirmed with OK.

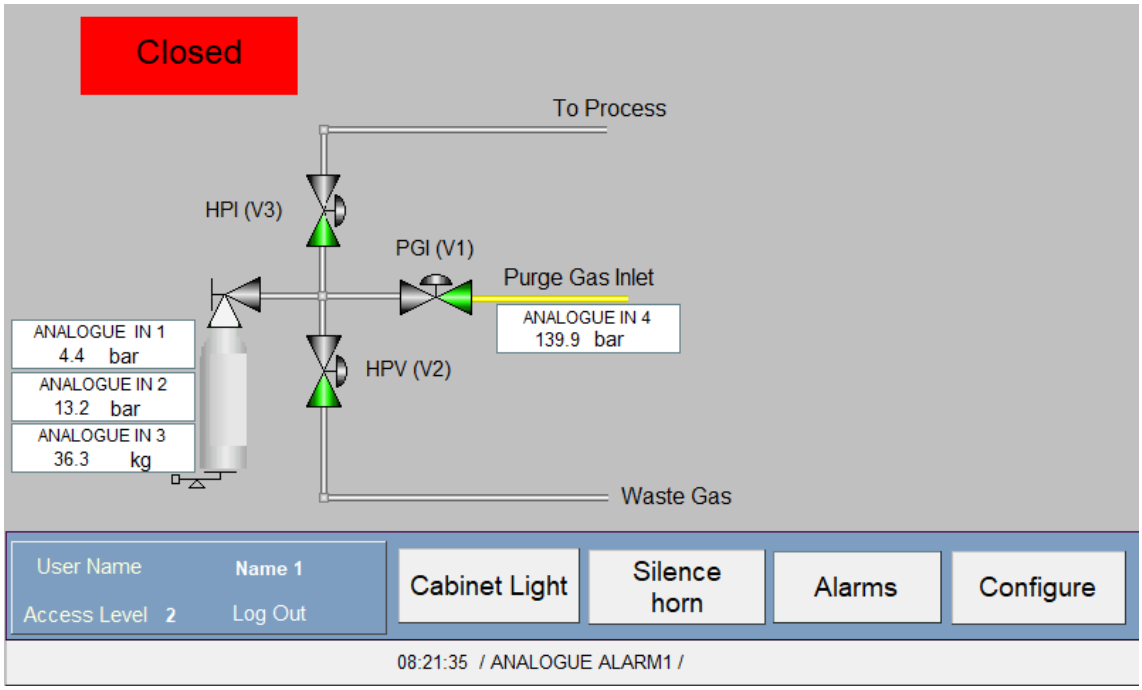
After confirmation, the system can be put back into operation.



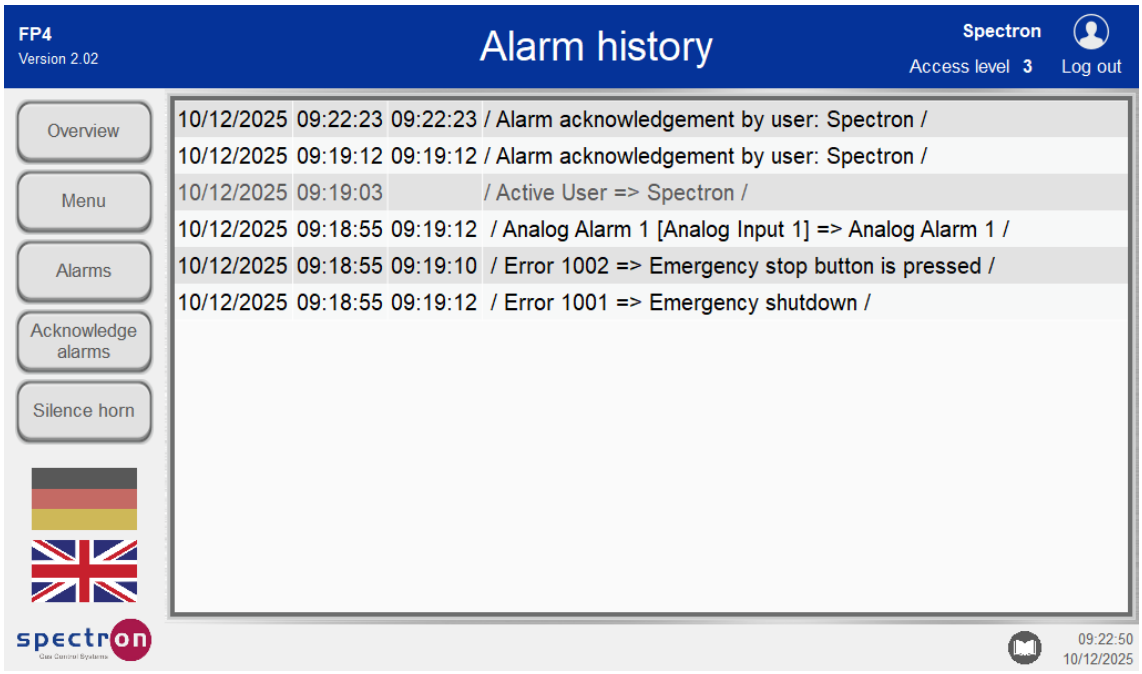
7.5 Triggering an emergency shut-off

On the following screen, analogue input 1 has triggered an alarm because the set cylinder pressure has not reached the setpoint value.

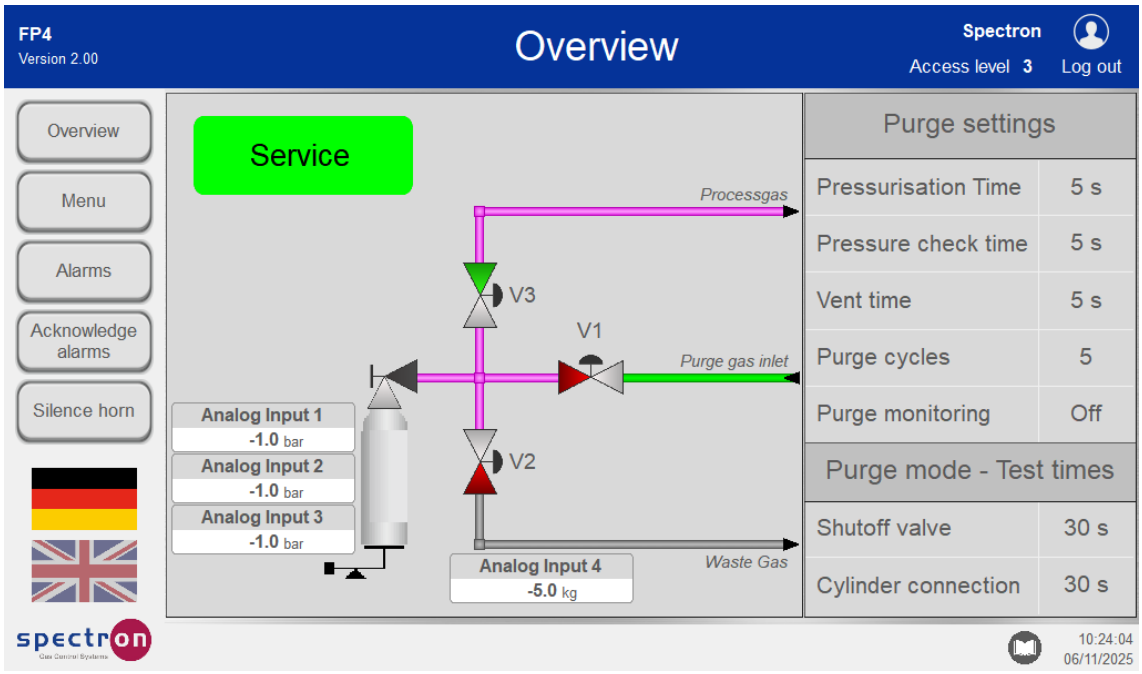
As a result, the gas supply system has been interrupted.



When an alarm is triggered, the date and time as well as the name of the alarm are recorded. The entries of the resolved alarms must be cancelled to be able to resume operation. They can only be **cancelled** if access is enabled with a level **1 or 2** password.



After the error has been rectified and the alarm has been cleared, the system can be re-commissioned.



All alarms are stored in the alarm history and can be retrieved via the configuration menu. Each alarm is automatically cleared from the history after 3 months.

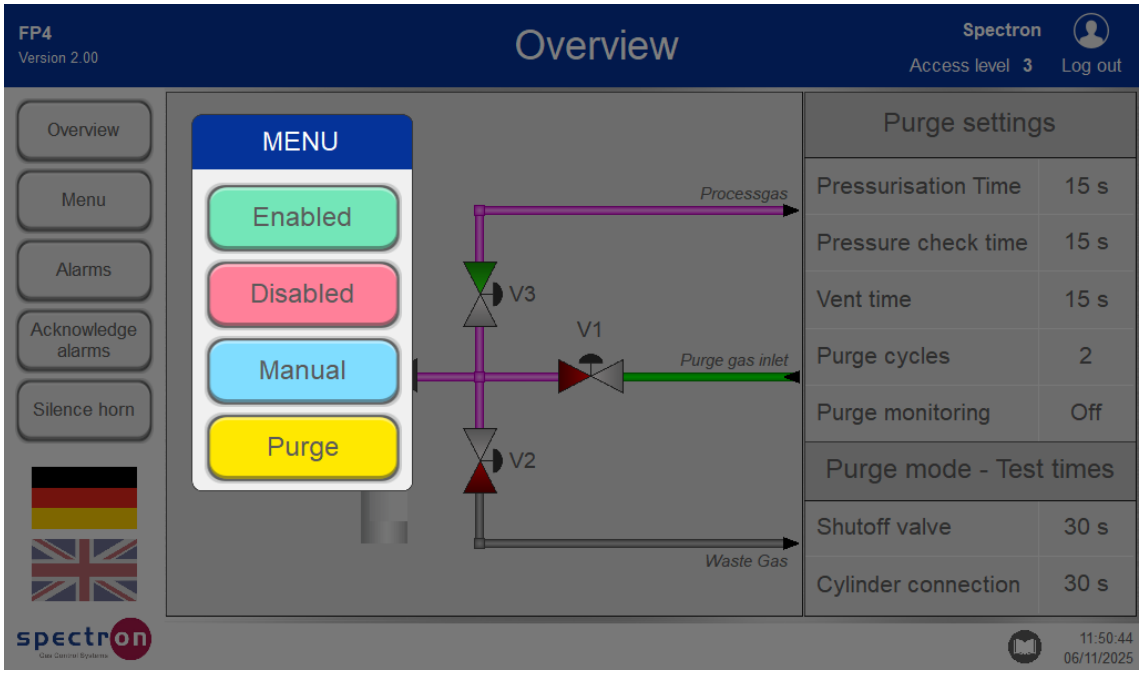
7.6 Manual mode

With level 2 or 3 system access rights, valves can be operated manually.

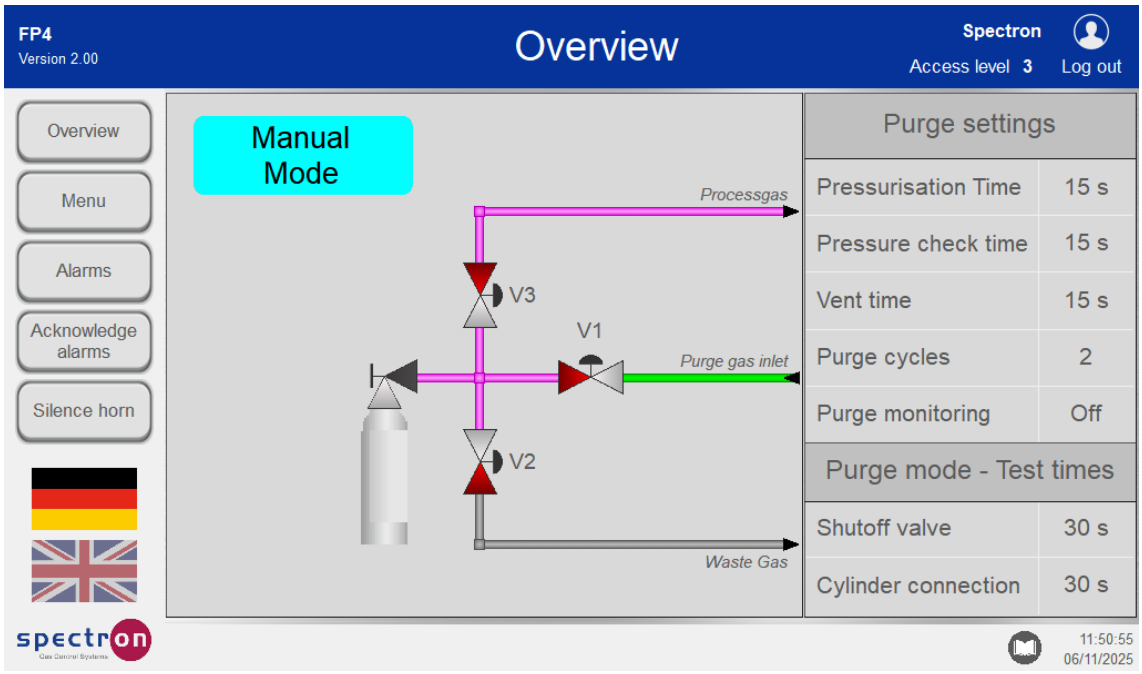
This state differs from the operating mode in that the valves can also be opened in the event of an alarm.

Only the signals for emergency shutdown and remote shutdown have priority over manual operation.

Pressing the "**Closed**" status display for a valve will open a selection window.

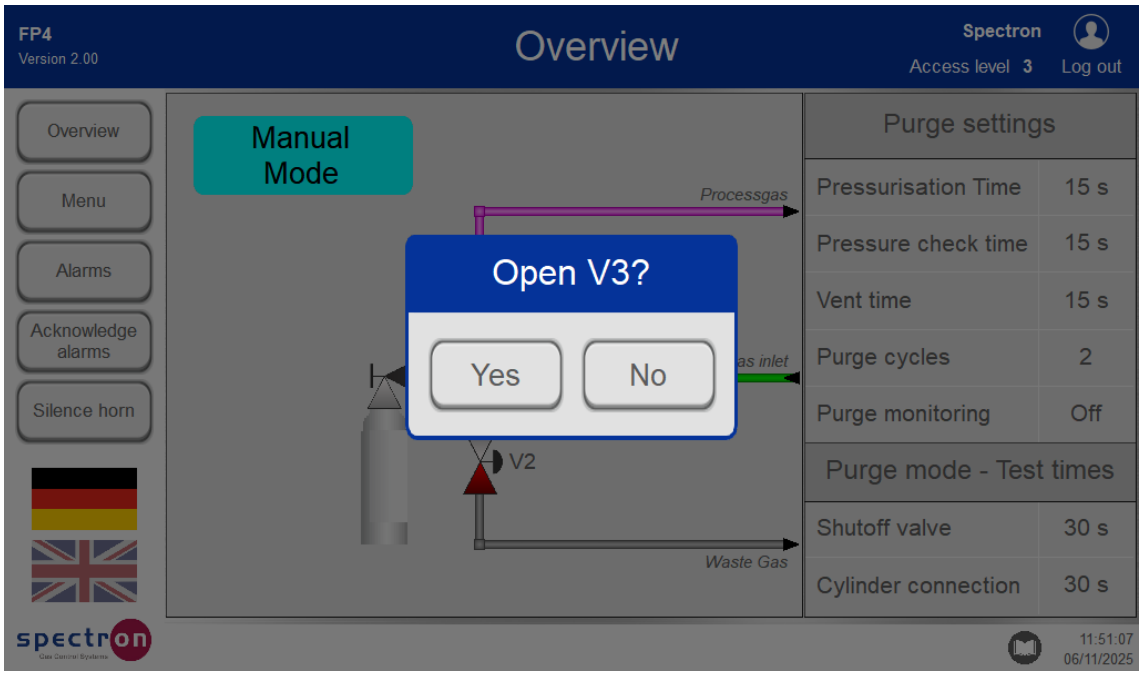


Press the "**Manual**" button to put the valve in manual mode.

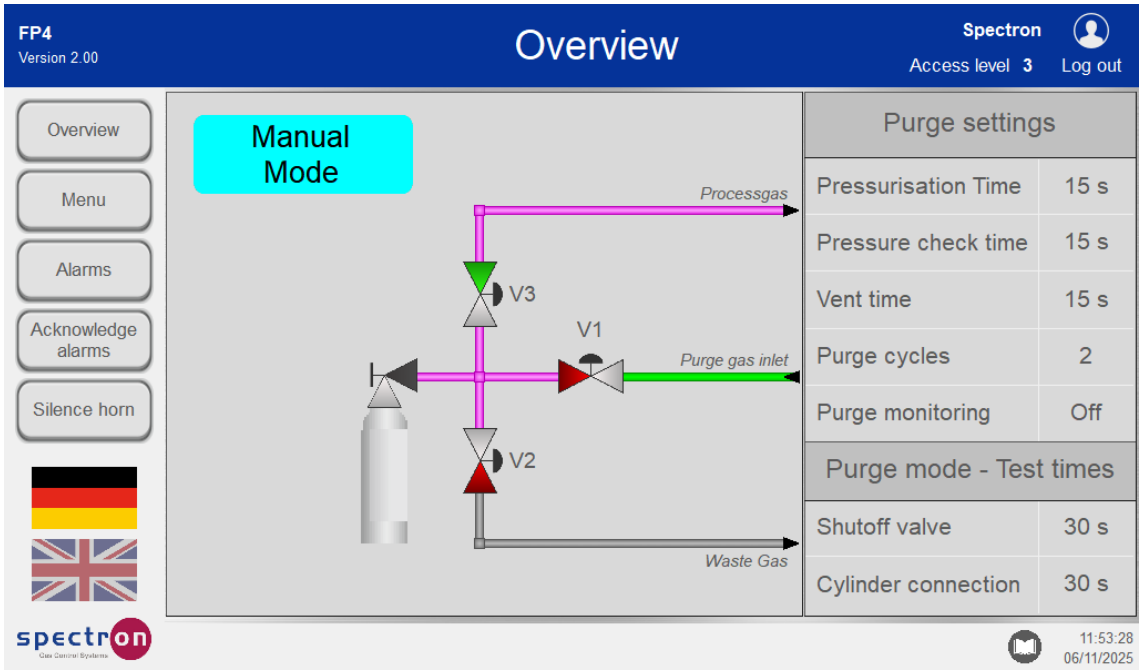


This mode is exited after 15 minutes when the user logs off. All valves that were in manual mode are automatically closed.

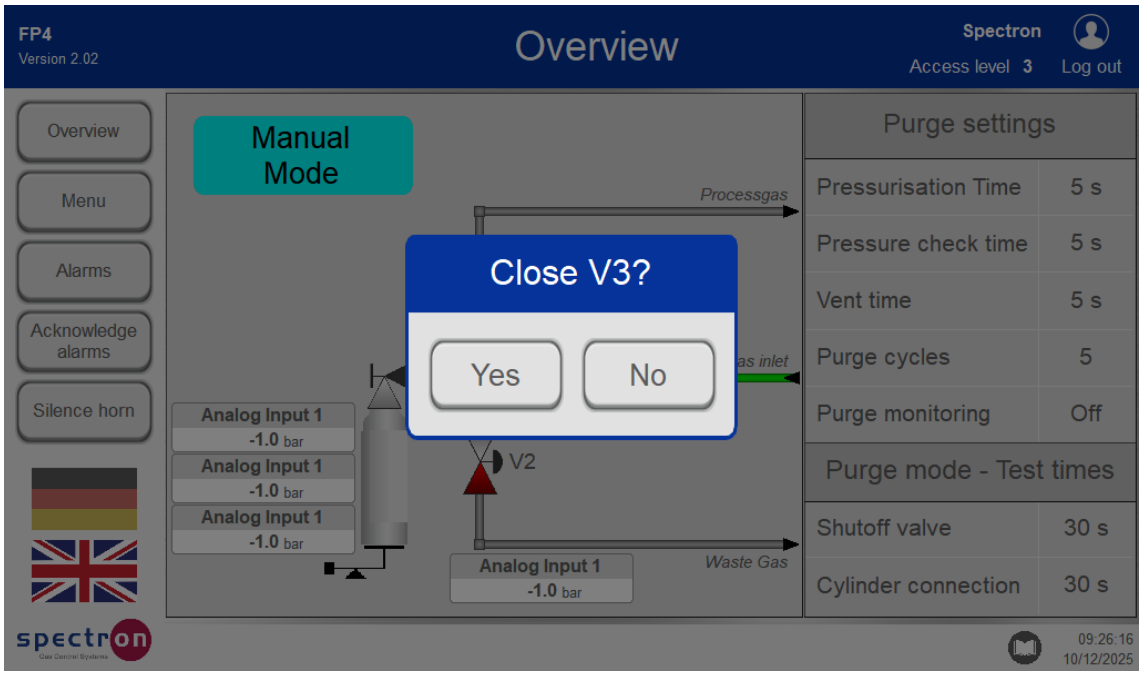
If you press the valve that is in manual mode, you will be able to open it.



Selecting "**YES**" will open the valve.



If you touch the opened valve, then you can close it again.



7.7 Alarm history

The configuration menu is used to access the "Alarm history". All generated alarms are displayed there together with the date and time. Be mindful of the configuration of the Real Time Clock [▶ 24].

Each alarm is stored for 180 days, then deleted automatically.

7.8 Decommissioning

Switch off the controller by switching the main switch.

8 Maintenance, cleaning and repairs

8.1 General information on maintenance

⚠ DANGER

Voltage

The components of the control and the connections are under voltage. There is a danger of death on contact.

a) Only allow work in which the control unit must be opened to be carried out by trained specialist personnel (electricians).

b) Only perform work in which the control unit must be opened when the power supply is switched off.

c) The five safety rules according to DIN VDE 0105 are to be observed:

- ⇨ Disconnect from the mains
- ⇨ Secure against reconnection
- ⇨ Verify that the system is dead
- ⇨ Carry out earthing and short circuiting
- ⇨ Provide protection from adjacent live parts

⚠ WARNING

Noise emission

When working on pressurised pneumatic supply, significant noise emission can occur. Acute and chronic loss of hearing may result.

a) Never perform work on the pressurised pneumatic supply without hearing protection.

b) Only replace the silencers when the supply is unpressurised.

⚠ WARNING

Displacement of atmospheric oxygen

In the event of inert gas leaks, displacement of atmospheric oxygen may occur. Danger of suffocation!

a) The operator must ensure adequate ventilation and airing in all rooms with gas installations and monitor the oxygen content.

Correctly performed and timely maintenance increases the service life, ensures availability and helps to avoid undesirable downtimes.

Servicing and maintenance measures are only permitted to be carried out by competent specialist companies and persons (electrical engineers).

Maintenance work should be documented by the operator. The documentation should indicate who carried out which work and when (proof of maintenance).

It is only permitted to use original spare parts or equivalent spare parts as well as suitable tools:

– The recommended maintenance and test intervals are to be observed! (Also observe the manufacturer's documents)

– The causes of possible defects are to be investigated, e.g. damage, unusual noises, overheating, etc.

Before beginning maintenance work, the controller must be enabled and secured against reconnection. Observe the five safety rules according to DIN VDE 0105:

- Disconnect from the mains
- Secure against reconnection
- Verify that the system is dead
- Carry out earthing and short circuiting
- Provide protection from adjacent live parts

After completing the works, a re-commissioning process must be carried out (see "Commissioning [▶ 19]").

8.2 Regular maintenance work and cleaning

For components in which the tests reveal wear or even malfunctions, repairs or component replacement must be carried out by competent specialist companies and persons (electrical engineers).

Components	Test	Interval
Pneumatic components	Visual inspection for corrosion, damage and correct fastening	At least annually and before each commissioning process
	Pressure and leakage test	
Electrical components	Visual inspection for corrosion, damage and correct fastening	At least annually and before each commissioning process
	Functional test	
Earthing	Visual inspection for damage and correct fastening	At least annually
	Continuity test with grounding resistance report (VDE 701)	
Emergency stop	Functional test	At least annually

The controller should be cleaned on a regular basis. Heavy soiling can lead to malfunctions.

9 Repair

9.1 General information on repair work

⚠ DANGER

Voltage

The components of the control and the connections are under voltage. There is a danger of death on contact.

a) Only allow work in which the control unit must be opened to be carried out by trained specialist personnel (electricians).

b) Only perform work in which the control unit must be opened when the power supply is switched off.

c) The five safety rules according to DIN VDE 0105 are to be observed:

- ⇨ Disconnect from the mains
- ⇨ Secure against reconnection
- ⇨ Verify that the system is dead
- ⇨ Carry out earthing and short circuiting
- ⇨ Provide protection from adjacent live parts

⚠ WARNING

Noise emission

When working on pressurised pneumatic supply, significant noise emission can occur. Acute and chronic loss of hearing may result.

a) Never perform work on the pressurised pneumatic supply without hearing protection.

b) Only replace the silencers when the supply is unpressurised.

⚠ WARNING

Displacement of atmospheric oxygen

In the event of inert gas leaks, displacement of atmospheric oxygen may occur. Danger of suffocation!

a) The operator must ensure adequate ventilation and airing in all rooms with gas installations and monitor the oxygen content.

The objectives of the repair are:

- Detect and assess causes of malfunction
- Rectify faults and restore operational readiness

Repairs to the controller may only be performed by the manufacturer or specialist personnel (electrical engineers) instructed on the system.

Before beginning maintenance work, the controller must be enabled and secured against reconnection. Observe the five safety rules according to DIN VDE 0105:

- Disconnect from the mains
- Secure against reconnection
- Verify that the system is dead

– Carry out earthing and short circuiting
– Provide protection from adjacent live parts.

After completing the works, a re-commissioning process must be carried out (see "Commissioning [▶ 19]").

9.2 Troubleshooting and fault rectification

Fault	Possible cause	Remedy
Controller not functioning	Fuse faulty	Replace fuse
	Power supply unit faulty	Replace power supply unit
	Mains power supply interrupted	Check and ensure power supply
No analogue signal	Fuse faulty	Replace fuse
	Loose contact on terminal	Check terminal assembly
Pneumatic valve not switching	Loose contact on terminal	Check terminal assembly
	Pneumatic valve faulty	Replace pneumatic valve
Pneumatic valve leaking	Line faulty	Replace line
	Valve seal faulty	Replace valve
	Seal leaking on screw connection	Replace seal
Display not functioning	Fuse faulty	Replace fuse
	Supply voltage to the display interrupted	Check electrical connection of the display
	Display faulty	Replace display
Communication fault on display	Loose contact on data cable	Check data cable connections
	Controller fixed	Switch the controller off and back on, replace if necessary

10 Dismantling and disposal

10.1 General information on dismantling

⚠ DANGER

Voltage

The components of the control and the connections are under voltage. There is a danger of death on contact.

a) Only allow work in which the control unit must be opened to be carried out by trained specialist personnel (electricians).

b) Only perform work in which the control unit must be opened when the power supply is switched off.

c) The five safety rules according to DIN VDE 0105 are to be observed:

- ⇨ Disconnect from the mains
- ⇨ Secure against reconnection
- ⇨ Verify that the system is dead
- ⇨ Carry out earthing and short circuiting
- ⇨ Provide protection from adjacent live parts

⚠ WARNING

Noise emission

When working on pressurised pneumatic supply, significant noise emission can occur. Acute and chronic loss of hearing may result.

a) Never perform work on the pressurised pneumatic supply without hearing protection.

b) Only replace the silencers when the supply is unpressurised.

⚠ WARNING

Displacement of atmospheric oxygen

In the event of inert gas leaks, displacement of atmospheric oxygen may occur. Danger of suffocation!

a) The operator must ensure adequate ventilation and airing in all rooms with gas installations and monitor the oxygen content.

⚠ CAUTION

Injury or damage in the event of incorrect assembly or disassembly

Special steps are required for assembly and disassembly work on the product. Personal injuries and damage to the product are possible.

a) Assembly and disassembly work may only be carried out by the installation engineer or appropriately skilled specialist companies and persons.

b) The product is not permitted to be re-used following disassembly. All components must be disposed correctly.

Before dismantling and disposal of the controller, it must be taken out of operation.

The dismantling process is to be carried out in the following order:

1. Decommissioning the controller
2. Disconnect the controller from the power supply
3. Disconnect the controller from all connected cables
4. Remove the controller from the mounting medium
5. Pack the controller

10.2 Disposal

Dismantling and disposal must be carried out in accordance with the official and legal requirements at the site of the system. The operator must produce a risk assessment and work instructions before dismantling. A piece of equipment may only be disposed of when the decontamination declaration has been provided, completed in full.

Spectron Gas Control Systems GmbH
Monzastr. 2c
D-63225 Langen
Tel: +49 (0)6103 9424-050
Fax: +49 (0)6103 9424-072
info@spectron.de
www.spectron.de