

Operating instructions SILAS Control Unit

Control unit Type: A7-3741-1110/....

Pressure monitor Type: 17-51P3-1604



Operating instructions – SILAS control unit

Ex pzc control unit for pressurized equipment
Type: A7-3741-1110/*00*
with pressure control module, type 17-51P3-1604 and accessories

ATEX / IECEx Zone 2 / 22
Document: A1-3741-7D0001
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1 General information

1.1 Manufacturer

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1.2 Purpose of these operating instructions



ATTENTION

Please read the enclosed operating manual carefully before starting up the SILAS control unit.

These operating instructions contain the required information for the intended use of the SILAS control unit.

The operating instructions are intended for those individuals who are qualified to assemble, install, start up and maintain the product.

They are addressed to technically qualified personnel. The operating instructions are an integral part of the product. They should always be kept in the immediate vicinity of the device and accessible to the installation, operating and maintenance personnel.

If applicable, the guidelines and standards for areas with gas atmospheres must be observed before starting any work, e.g.: RL 2014/34/EU, EN / IEC 60079-17 and EN / IEC 60079-19.

Knowledge and technically correct implementation of the safety instructions and warnings described in these operating instructions are a prerequisite for safe installation and commissioning. The safety instructions and warnings in these operating instructions are kept general and only qualified personnel have the necessary knowledge to interpret and implement them correctly in specific individual cases.

These operating instructions are an integral part of the scope of delivery, even if they can be ordered and delivered separately for logistical reasons.

- If you require any further information, please request it from your local or responsible BARTEC subsidiary. Please read the operating instructions and, in particular, the safety instructions carefully before using the device.
- Keep the operating instructions for the entire service life of the device.
- Make the operating instructions available to all persons entrusted with handling the device.

1.3 Languages

The original user manual is written in German. All other available languages are translations of the original user manual.

The user manual is available in German and English. If there are any other languages which are required, these must be requested from BARTEC or specified when ordering.

1.4 Technical changes

BARTEC reserves the right to change the contents of this document without prior notice. No guarantee is given for the correctness of the information. In case of doubt, the German safety instructions apply, as translation and printing errors cannot be ruled out. In the event of any legal dispute, the “General Terms and Conditions” of the BARTEC Group shall apply in addition.

1.5 Additional documents

The current versions of data sheets, operating instructions, certificates and EC Declarations of Conformity as well as information on accessories can be downloaded from www.bartec.com or requested directly from BARTEC GmbH.

1.6 Conformity to standards and directives

For certificates and EU Declaration of Conformity, please see www.bartec.com.

1.7 Explanation of the individual markings

1.7.1 Markings in the operating instructions



DANGER

This symbol indicates a hazard that will result in death or serious injury if not avoided.



WARNING

This symbol indicates a hazard that can result in death or serious injury if not avoided.



CAUTION

This symbol indicates a hazard that may result in injury if not avoided.



ATTENTION

This symbol indicates measures to avoid damage to property.



Note

This symbol indicates important notes and information on effective, economical and environmentally friendly handling.

1.7.2 Markings on the device



CE marking according to the currently valid directive.



Device certified in accordance with the marking for potentially explosive atmospheres.



Marking according to WEEE directive 2012/19/EU

2 Safety

2.1 Handling the product

The product which is described in these operating instructions has left the factory in a safe and tested condition. In order to maintain this condition and to achieve faultless and safe operation of this product, it may only be used in the manner described by the manufacturer. Furthermore, the proper and safe operation of this product requires proper transport, correct storage and careful operation.

Safe and proper installation of the SILAS control unit with pressure control module as well as the integration is a prerequisite for faultless and correct operation.

2.2 Intended use

2.2.1 Exclusive intended use

The SILAS control unit serves exclusively as a control and monitoring system for pressurized enclosures and is designed for the use in explosion group II, category 3G/D and temperature class T4 or T6.

The permissible operating data of the device used must be observed.

2.2.2 Non-intended use

Any other use is not in accordance with the intended purpose and can lead to damages and accidents. The manufacturer is not liable for any use beyond the exclusive intended use.

2.3 Warranty

WARNING

No modifications or conversions may be made without the written approval of the manufacturer.

Explosion protection is no longer guaranteed if non-specified components are used. In the case of externally supplied parts, there is no guarantee that they have been designed and manufactured to withstand the stresses and to meet the safety requirements.

- Please contact the manufacturer and obtain approval before making any changes or conversions.
- Only use original spare and wear parts.



Note

The manufacturer provides the complete warranty service only and exclusively for the spare parts which have been ordered from him.



In principle, our “General Conditions of Sale and Delivery” apply. These are available to the operator at the latest when concluding the contract. Warranty and liability claims for personal injury and property damage are excluded if they are due to one or more of the following causes:

- Improper use of the SILAS control unit.
- Improper installation, commissioning, operation and maintenance of the SILAS control unit.
- Failure to observe the instructions in the manual regarding transport, storage, assembly, commissioning, operation and maintenance.
- Unauthorised structural modifications to the SILAS control unit.
- Inadequate monitoring of parts which are subject to wear and tear.
- Improperly performed repairs.
- Any catastrophic events which are caused by foreign bodies and force majeure.

We grant a warranty period of one year on the SILAS control unit and its accessories from the date of delivery from the Bad Mergentheim factory. This warranty covers all parts of the delivery and is limited to the replacement or repair of the respective defective parts free of charge at our Bad Mergentheim factory. For this purpose, delivered packaging must be kept as far as possible. If necessary, the goods have to be sent to us after written agreement. There shall be no requirement for any rectification at the place of installation.

2.4 Operator's obligations

The operator is obligated to ensure that only persons work with the SILAS control unit who

- are familiar with the basic regulations on safety and accident prevention and have been instructed in the use of the SILAS control unit;
- have read and understood the documentation, safety chapter and warnings.
- The operator is responsible to ensure that the safety and accident prevention regulations applicable in the respective case of use are observed.
- have a level of knowledge of the relevant national standards and regulations.
- The entire system must be tested and certified in accordance with the requirements of IEC / EN 60079-2.

2.5 Safety instructions

2.5.1 General safety instructions

- General statutory regulations or guidelines on occupational safety, accident prevention regulations and environmental protection laws must be observed, e.g. Ordinance on Industrial Safety and Health (BetrSichV) or the nationally applicable ordinances.
- It is required to wear suitable clothing and footwear with regard to the risk of dangerous electrostatic charges.
- All work steps in potentially explosive atmosphere must always be carried out with the utmost care!

2.5.2 Safety instructions for the operation

When setting up or operating explosion-protected electrical systems, the IEC / EN 60079-14 regulations as well as the relevant installation and operating regulations must be observed.

Maintenance

- The relevant installation and operating regulations must be observed for electrical systems! (e.g. Directive 99/92/EC, Directive 2014/34/EU, Ordinance on Industrial Safety and Health (BetrSichV) or the nationally applicable regulations IEC / EN 60079-14 and DIN VDE 0100 series)!
- The national waste disposal regulations must be observed when disposing of the device.

Periodic inspection

- Pursuant to IEC /EN 60079-19 and IEC / EN 60079-17, the operator of electrical systems in potentially explosive atmospheres is obligated to have them inspected by a qualified electrician in order to ensure that they are in proper condition.
- If the device is operated correctly and the installation instructions and ambient conditions are observed, maintenance service is required at 3-year intervals in accordance with IEC / EN 60079-17. See Section 10 "Maintenance and care".

Repairs

- Any repairs to explosion-protected equipment may only be carried out by authorised persons using original spare parts and in accordance with the state of the art. The applicable regulations must be observed.

Commissioning

- Before commissioning, it must be ensured that all components and documents are available.
- The SILAS control unit must not be installed in any areas where high levels of electromagnetic radiation may occur.

3 Product description

3.1 Type of protection “Ex p – pressurized enclosure”

The type of protection Ex pD, known as “pressurized enclosure”, is based on the measure that explosive gases, which are present in a closed enclosure, are purged out and an overpressure is then generated and maintained relative to the surrounding atmosphere. Due to the higher pressure inside the enclosure compared to the atmosphere, explosive gases cannot enter the interior of the enclosure at any time. This creates an Ex-free space in which electrical equipment can be mounted and operated in Zone 2, which itself is not explosion-proof.

The SILAS control system, which is described in these operating instructions, uses the “pressurized enclosure with leakage compensation” technique. In detail, this means maintaining an overpressure in an enclosure by feeding in purging gas to compensate for the leakage losses which occur in the enclosure.

In order to prevent explosive atmospheres that have penetrated during downtimes from becoming a hazard, the enclosure must be purged with purging gas (compressed air or inert gas) before startup. The quantity depends on the test during the initial startup. The flow is measured or determined at the outlet of the pressurized enclosure. Due to the fact that a safe condition is not reached in the enclosure until the start of the operating phase, the SILAS control system with its components and the purging gas valve must be designed to be explosion-proof.

3.2 SILAS control system

The SILAS control system is an automatically operating control system for pressure monitoring of pressurized enclosures in Zone 2 (Gc) or 22 (Dc) hazardous areas. It consists of the SILAS control unit, the SILAS pressure monitor, a digital purging gas valve and a pressure reducer.

The SILAS control unit is suitable for all common pressurized enclosure applications. The electrical installations inside the pressurized enclosure are enabled by the SILAS control unit directly or by an additional switching device. Once the SILAS control unit with its individual assemblies has been mounted on the pressurized enclosure and the mains voltage and purging gas have been connected, the pressurized system starts automatically. The SILAS control system controls the purging gas flow and the internal enclosure pressure during the pre-purge phase. When the operating phase is initiated, the SILAS control system automatically activates the components which are mounted in the pressurized enclosure.

The internal pressure of the pressurized enclosure is automatically maintained during the operating phase and any leakage losses which occur are compensated.

3.3 System components of the SILAS control unit

3.3.1 SILAS control unit, type A7-3741-1110/*00*



The SILAS control unit can be mounted inside or outside the pressurized enclosure. For internal mounting, e.g. on the mounting plate, the installation kit for internal mounting is also required.

The system pressures and system parameters can be displayed via the integrated display inside the control unit. The values can be changed by means of pushbuttons. Optionally, a version with a display window is available for viewing the internal display.

3.3.2 Purging gas valve, type 05-0056-007*



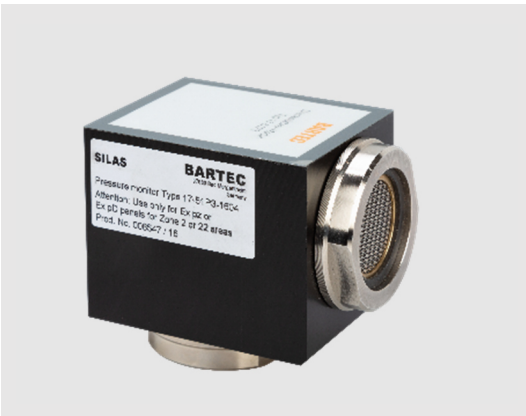
The digital purging gas valve switches the purging gas supply.

It is a pilot-operated solenoid valve that is used to introduce the purging gas into a pressurized enclosure in zone 2.

Here, the digital purging gas valve is controlled by the SILAS control unit in order that the purging gas valve opens to purge the pressurized enclosure and closes again when the purging process has been completed.

Two laterally mounted, adjustable air leakage needle valves compensate for any leakage losses which may occur in the pressurized enclosure.

3.3.3 Pressure monitor, type 17-51P3-1604



The pressure switch provides two functions within the SILAS control system. First, it serves as an overpressure valve which opens when the internal pressure is too high and relieves the overpressure. Secondly, an orifice is integrated in the pressure switch, which defines the flow rate during the purging time.

The pressure monitor must be mounted separately from the SILAS control unit in the pressurized enclosure.

3.3.4 Pressure reducer with pressure gauge, type 05-0056-008*



This upstream pressure reducer is a diaphragm pressure regulator with secondary venting for reducing the pressure of externally supplied purging air.

The setting is made by means of a hand wheel. The set reduced pressure can be read off via a pressure gauge.

Pressure reducers in the sizes G1/4" and G1/2" are available to supply the pressurized enclosure.

The associated technical data can be taken from the data sheet.

For the selection of the pressure reducer, see Section "Purging gas supply".

3.3.5 Purging gas nozzle



The purging gas nozzle is used to mechanically limit the maximum flow rate.

It limits the maximum flow in the event of a defective purging gas valve.

The purging gas nozzle for dust applications is adjustable and is used in order to limit the pressure inside the pressurized enclosure for zone 22, as no purge gas valve is applied here.

3.3.6 Mounting kit for internal installation



The mounting kit for internal installation is required if the SILAS control unit is mounted inside a pressurized enclosure.

In this case, the reference measuring connection for atmospheric pressure is led to the outside by means of a hose line.

4 Installation

Note

Before starting any work, please read the general safety instructions (see Section 2 “Safety”).

- Please observe the sections “Installation” and “Electrical Connections”.

DANGER

Unsuitable positioning of the Ex p control on the pressurized enclosure

This results in unclean purging of the pressurized enclosure. Gas bubbles can form inside the pressurized enclosure and cause an explosion when the internals are activated.

- The exact positioning of the purging gas supply and the pressure switch must be carried out in accordance with EN/IEC 60079-2.
- Ideal purging must be ensured.
- Light or heavy gases must be observed.

The SILAS control unit can be mounted in various positions on the pressurized enclosure.

The following chapters describe the arrangement of the SILAS control unit on the pressurized enclosure. The SILAS control unit can be mounted either internally or externally on the pressurized enclosure. The pressure monitor and the purging gas valve must be mounted separately from the SILAS control unit.

4.1 Typical arrangements

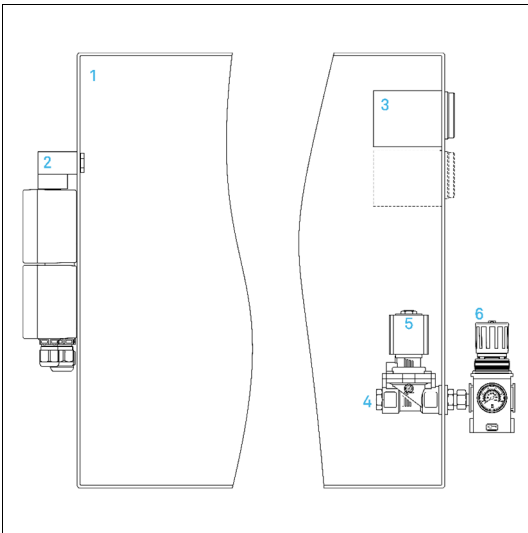
ATTENTION

The following figures serve only as a schematic representation and do not show the correct positioning on the pressurized enclosure.

Check the arrangement in accordance with IEC / EN 60079-2

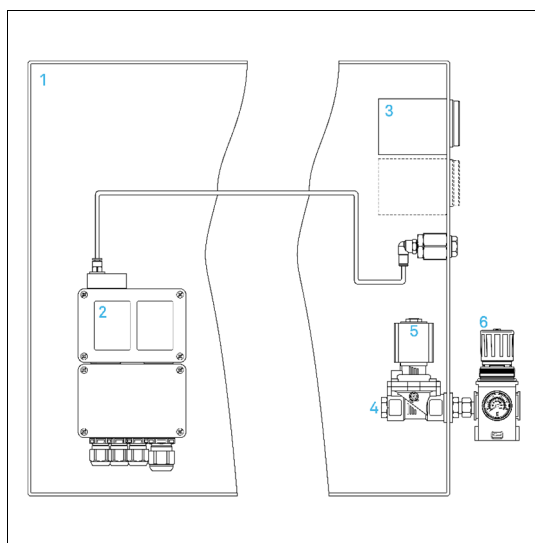
- For instance, an arrangement of the components pressure monitor at the bottom and purging gas supply at the top may be advantageous for heavy gases.

4.1.1 External mounting – Gas application



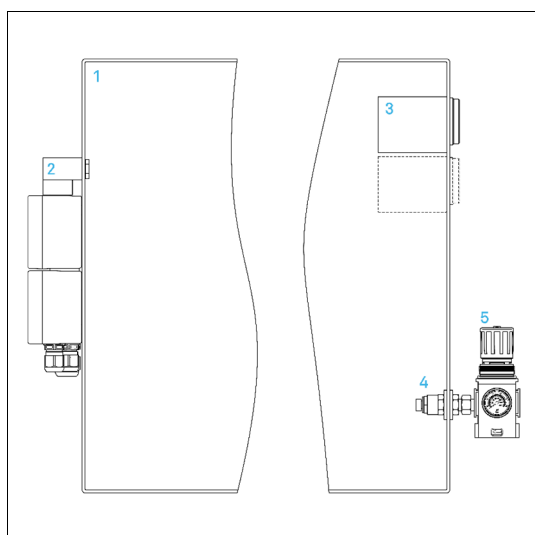
Pos.	Designation
1	Ex pzc enclosure
2	SILAS control unit
3	Pressure monitor
4	Purging gas nozzle
5	Purging gas valve
6	Pressure reducer

4.1.2 Internal mounting – Gas application



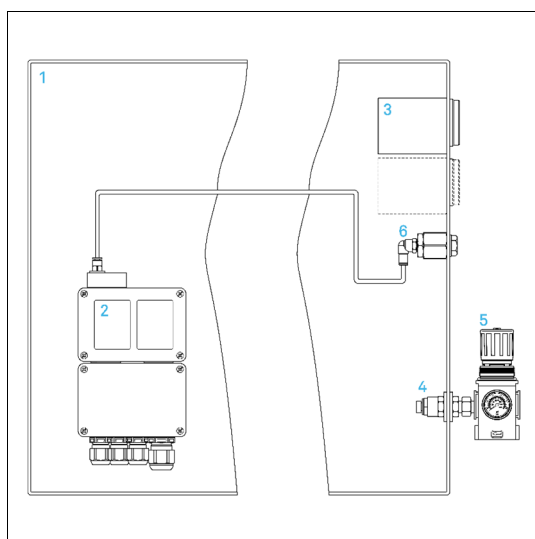
Pos.	Designation
1	Ex pzc enclosure
2	SILAS control unit
3	Pressure monitor
4	Purging gas nozzle
5	Purging gas valve
6	Pressure reducer
7	Atmospheric measuring point

4.1.3 External mounting – Dust application



Pos.	Designation
1	Ex pzc enclosure
2	SILAS control unit
3	Pressure monitor
4	Purging gas nozzle
5	Pressure reducer

4.1.4 Internal mounting – Dust application



Pos.	Designation
1	Ex pzc enclosure
2	SILAS control unit
3	Pressure monitor
4	Purging gas nozzle
5	Pressure reducer
6	Atmospheric measuring point

4.2 Mounting of the SILAS control unit – External mounting

ATTENTION

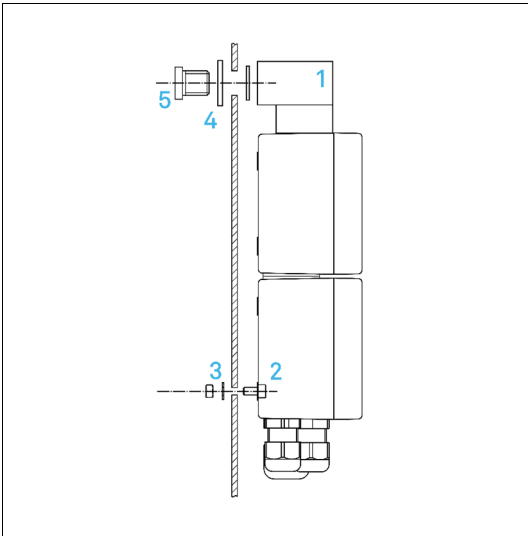


Remove the fuse plugs after the installation has been completed!

Incorrect measurement due to yellow protective cap at the measuring point
 - Remove the yellow protective cap at the pressure measurement before commissioning.

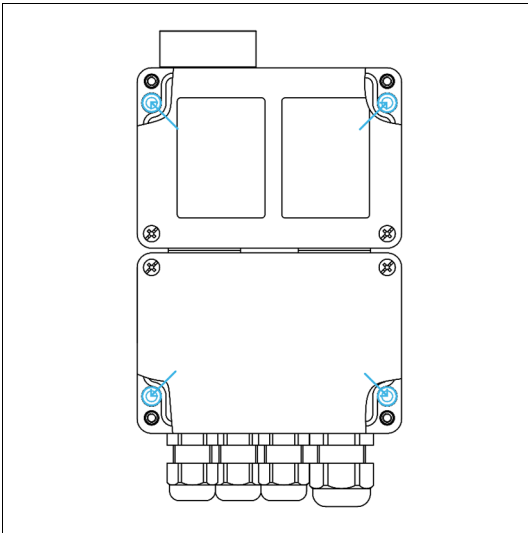
In order to mount the SILAS control unit, the boreholes must be drilled at the desired location on the pressurized enclosure as it is shown in the drilling pattern in the Appendix.

In order to mount the SILAS control unit, the lower cover must be removed. The SILAS control unit can be screwed onto the pressurized enclosure by using the provided mounting holes provided.



Pos.	Designation
1	SILAS control unit
2	M4 x 20 screw
3	M4 nut with M4 locking ring
4	Inner and outer seal
5	Bulkhead fitting

4.3 Mounting of the SILAS control unit – Internal mounting



For the internal mounting of the control unit, SILAS can be fixed by means of the mounting holes which are integrated in the enclosure.

In order to install the SILAS control unit, the lower and upper lids must be removed. The SILAS control unit can be screwed to the mounting plate with M4 screws, for instance, by using the provided mounting holes.

4.4 Mounting of the atmosphere measuring point

ATTENTION



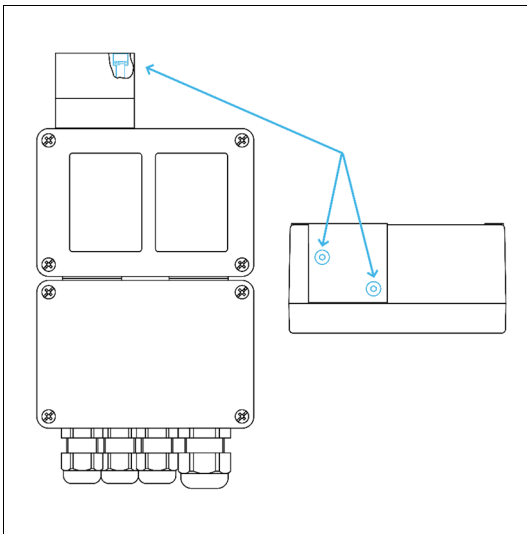
Faulty measurements due to contamination!

A contaminated atmosphere measuring point leads to faulty measurements of the operating pressures. The faulty measurement deactivates the pressurized enclosure and therefore, it cannot be operated.

- Check the atmosphere measuring point for any contamination at regular intervals.

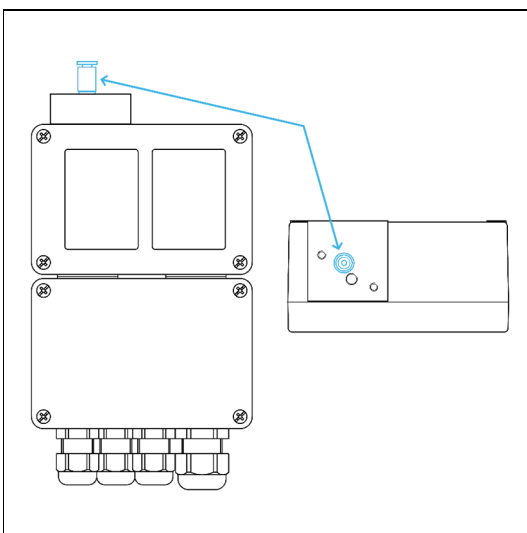
In order to enable that the SILAS control unit is able to measure the operating pressures correctly, an atmospheric measuring point must be set for the “internal installation” variant. All parts which are required for this procedure are included in the scope of delivery of the “internal mounting” kit.

The following section shows the conversion to internal mounting of the SILAS control unit.



Remove the upper part (1) of the pressure measuring head by unscrewing the two Allen screws (2).

In order to do this, loosen the screws by using a size 3 Allen screwdriver.

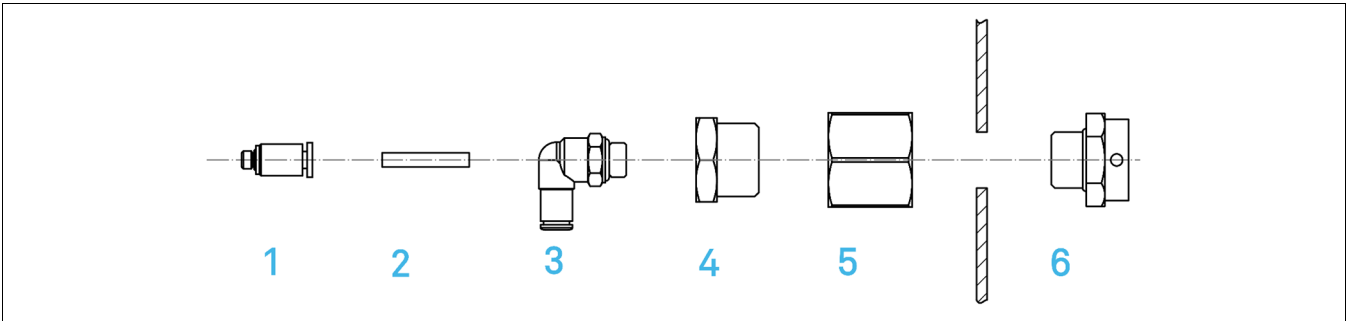


Screw the M5 hose quick connector (3) from the atmospheric connection set into the provided threaded hole.

4.4.1 Internal Mounting Kit, Type 05-0091-0275



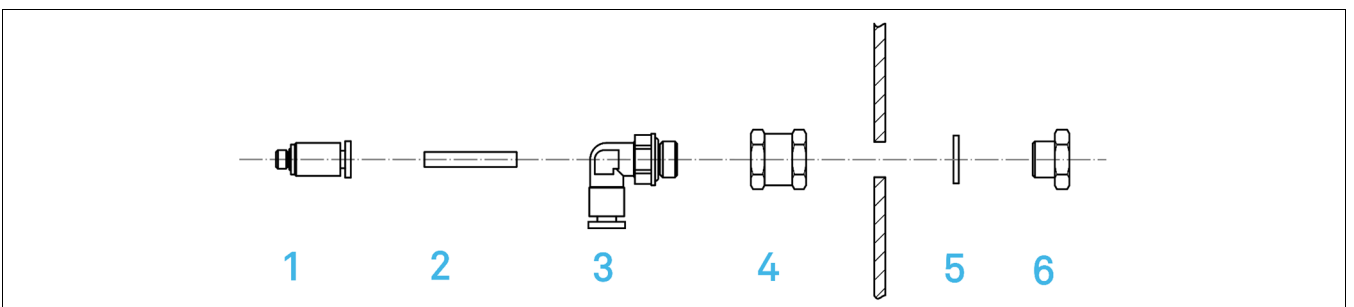
- Drill a mounting hole with a diameter of 16.5 mm at the intended location on the pressurized equipment
- Screw the venting screw (6) with sleeve (5) into the drilled hole.
- Screw the reducer (4) into the sleeve (5).
- Screw the quick connector (3) into the reducer (4).
- Insert the hose (2) into the quick connector (4) and pull it to the internally mounted Ex p control unit.
- Insert the hose into atmosphere measuring point (1), which is screwed into the SILAS.



4.4.2 Internal Mounting Kit, Type 05-0091-0275



- Drill a hole with a diameter of 9.6 mm at the intended mounting position of the pressurized enclosure.
- Insert the screw plug (6) and the sealing ring (5) through the hole.
- Screw the sleeve (4) onto the thread.
- Screw the quick connector (3) into the sleeve (4).
- Insert the hose (2) into the quick connector (3) and pull it to the internally mounted Ex p control unit.
- Insert the hose into atmosphere measuring point (1), which is screwed into the SILAS.



4.5 Mounting the pressure monitor

CAUTION

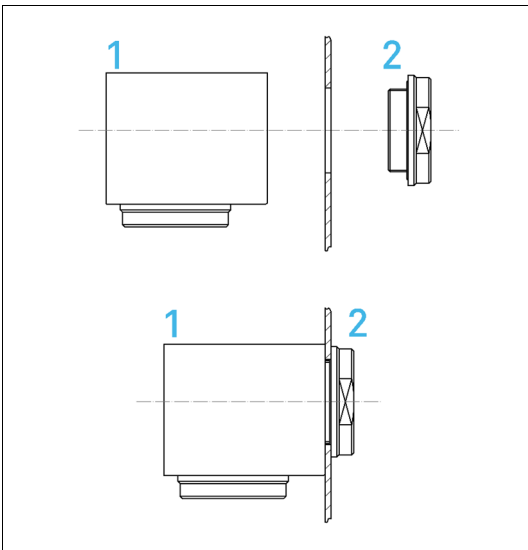


Incorrect installation or contamination of the pressure monitor!

Incorrect installation or heavy contamination will prevent the excess pressure from escaping and lead to a sharp rise in pressure.

- Check and ensure that the outlet screw connection is not covered from the outside.
- Check and ensure that the pressure switch has a flow direction from the inside to the outside.

A through bore with a diameter of 37 mm in the wall of the pressurized enclosure is required for mounting the pressure monitor. The outlet fitting is used for the mounting.



- Drill a hole with a diameter of 37 mm at the intended mounting position of the pressurized enclosure.
- Unscrew the outlet fitting (2) from the pressure monitor enclosure.
- Place the pressure monitor enclosure (2) in such a way that the air in the pressurized enclosure can flow to the outside.
- Screw the pressure monitor enclosure (2) together with the outlet fitting (1).
- Tighten the outlet fitting (1) and the pressure monitor enclosure (2) until the pressure monitor module has a firm hold.

4.6 Purging gas supply

ATTENTION



Material damage due to a missing purging gas nozzle!

There is a risk that the pressurized enclosure will be overstressed due to the resulting internal pressures.

- Check whether a purging gas nozzle with the correct bore is present.

Note



Too little purging gas due to insufficiently dimensioned purging gas supply line.

- Pressurized enclosure does not start up due to insufficient flow.
- Check the inner diameter of the purging gas supply.

The purging gas supply consists of a pressure reducer, a purging gas valve and a purging gas nozzle. Depending on the volume of the pressurized enclosure, a purging gas supply is available in the sizes G1/4" or G1/2".

The purging gas supply must be selected in accordance with the following table.

Volume	Pressure	Pressure reducer	Pressure monitor	Purging gas nozzle	Supply line
< 50 litre	2 bar	1/4"	1x	2.8 mm	10 mm
50 to 300 litres	2 bar	1/4"	1x	3.9 mm	10 mm
300 to 700 litres	2 bar	1/2"	1x	4.5 mm	15 mm
700 to 1,000 litres	3 bar	1/2"	1x or 2x	4.5 mm	15 mm
> 1,000 litres	3 bar	1/2"	2x	5.5 mm	20 mm

(The values included in the table are only indicative and may vary).

The pressure reducer for reducing the supplied purging gas pressure is mounted on the outside of the pressurized enclosure. The purging gas valve, which releases the purging gas, is mounted inside the pressurized enclosure. The purging gas nozzle limits the maximum flow of the purging gas and thus prevents the maximum pressure increase inside the pressurized enclosure in case of any defect of the purging gas valve.

The assembly of the purging gas supply is shown below. The required mounting material is included in the scope of delivery.

4.6.1 Version G1/4", gas



Note

The G1/4" purging gas supply version can be used up to a protected volume of 300 litres.

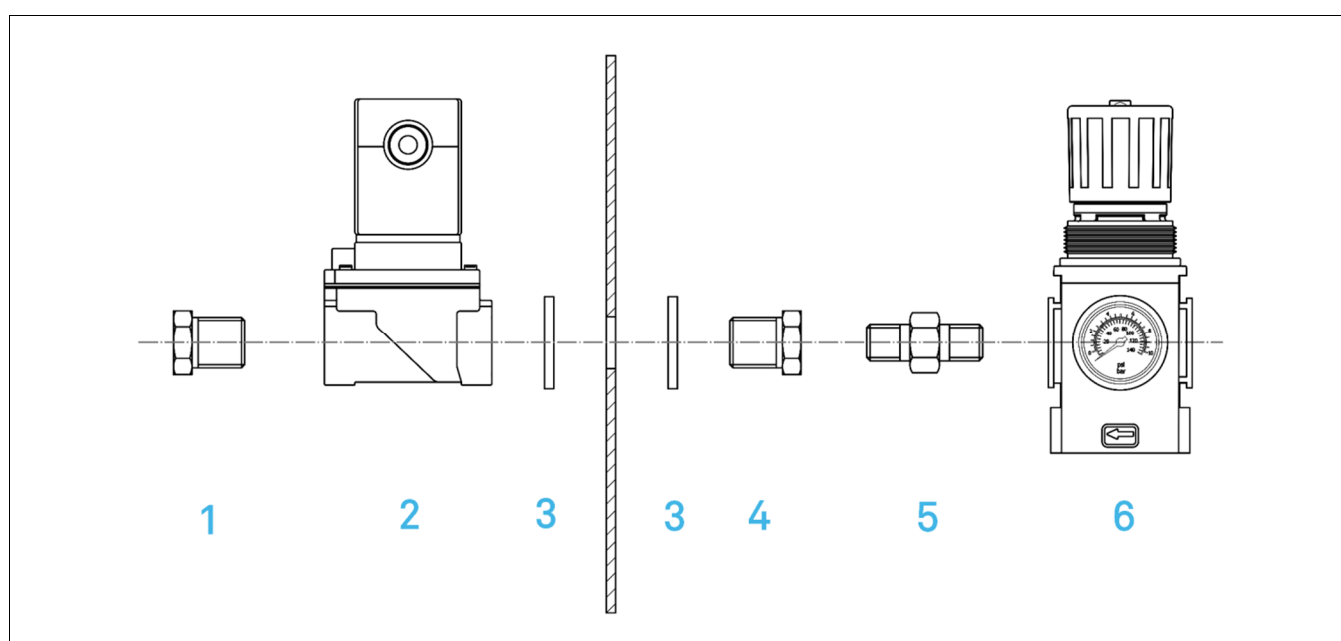
The assembly of the purging gas supply must be carried out carefully. In order to ensure that the screwed parts are tight, they can be sealed by means of a PTFE sealing tape.

When assembling, make sure that no foreign particles are introduced.

Procedure

- Drill a hole with a diameter of 17 mm at the intended mounting position of the pressurized enclosure (4).
- Mount the purging gas valve (2) onto the pressurized enclosure (4) by using the reducing sleeve (5) and the sealing washers (3).
- Screw in the purging gas nozzle (1) at the outlet of the purging gas valve (2).
- Screw the detachable double nipple (6) into the reducing sleeve (5).
- Screw the G 1/4" pressure reducer (7) onto the detachable double threaded nipple (6).

Item	Designation	Remark
1	Purging gas nozzle	Included in the scope of delivery (2)
2	Purging gas valve	
3	Sealing washer	Included in the scope of delivery (6)
4	Reducing sleeve G 1/4"i / G3/8"a	Included in the scope of delivery (6)
5	Detachable double nipple G1/4"	Included in the scope of delivery (6)
6	Pressure reducer G1/4"	Included in the scope of delivery (6)



4.6.2 Version G1/2", gas



Note

The G1/2" purging gas supply version is applicable from a protected volume of > 300 litres.

The installation of the purging gas supply must be carried out carefully

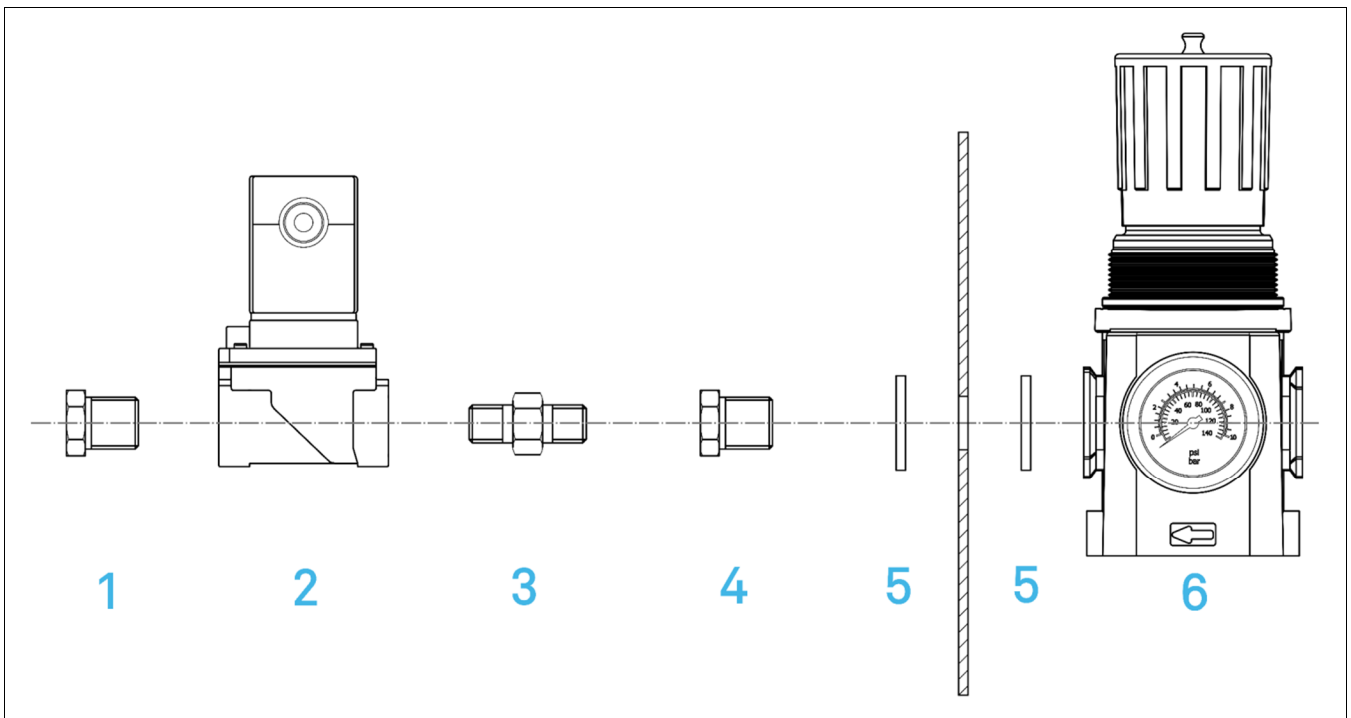
In order to ensure that the screwed parts are tight, they can be sealed by means of a PTFE sealing tape.

During assembly, it must be observed taken that no foreign particles are introduced.


Procedure

- Drill a hole with a diameter of 21 mm at the intended mounting position of the pressurized enclosure (6).
- Mount the pressure reducer G1/2" (7) on the pressurized enclosure (6) by using the reducing sleeve (4) and the sealing washers (5).
- Screw the detachable double nipple (3) into the reducing sleeve (4).
- Screw the purging gas valve (2) onto the detachable double nipple (3).
- Screw in the purging gas nozzle (1) at the outlet of the purging gas valve (2).

Item	Designation	Remark
1	Purging gas nozzle	Included in the scope of delivery (2)
2	Purging gas valve	
3	Detachable double nipple G3/8"	Included in the scope of delivery (6)
4	Reducing sleeve G3/8"i / G1/2"a	Included in the scope of delivery (6)
5	Sealing washer	Included in the scope of delivery (6)
6	Pressure reducer G1/2"	



4.6.3 Version G1/4", dust

	<p>There is no purging phase in a pressurized enclosure for dust applications and therefore, only positive overpressure is applied. Thus, there is also no purging gas valve.</p>
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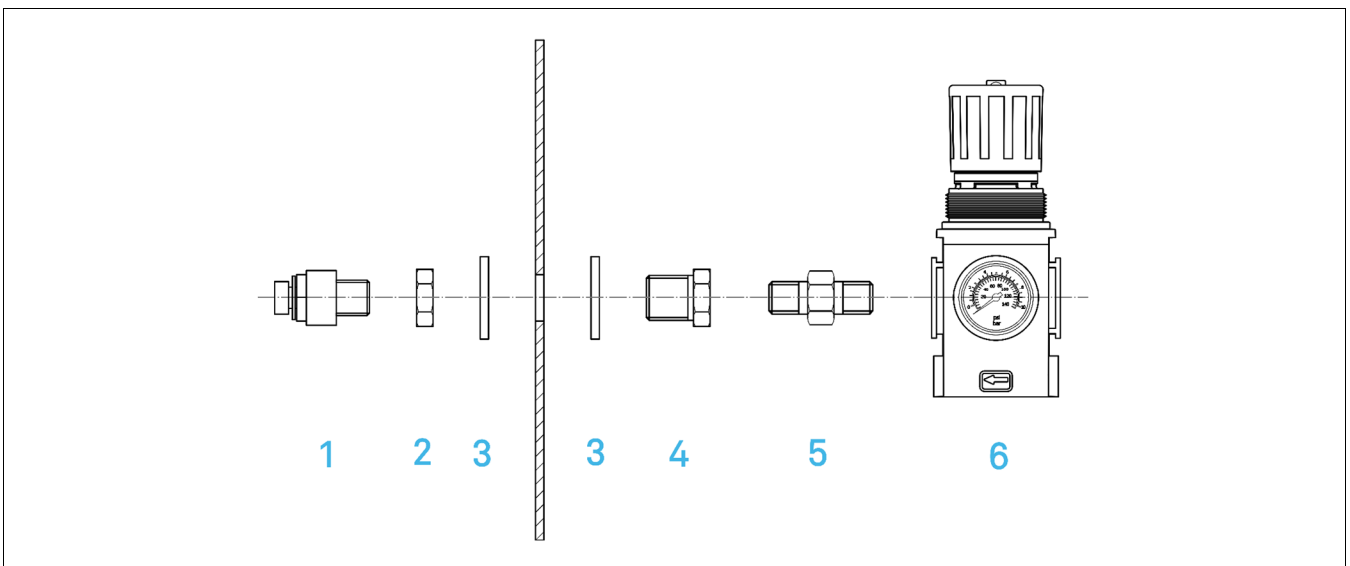
For dust applications, there is no purging phase in a pressurized enclosure and thus, only positive overpressure is applied. Therefore, there is also no purging gas valve. In order to ensure that the screwed parts are tight, they can be sealed by using a PTFE sealing tape.

During assembly, it must be observed taken that no foreign particles are introduced.

Procedure

- Drill a hole with a diameter of 17 mm at the intended mounting position of the pressurized enclosure (4).
- Mount the reducing sleeve (5) with sealing washers (3) in the pressurized enclosure by using the G3/8" nut (2).
- Inside the pressurized enclosure, screw the adjustable purging gas nozzle (1) into the reducing sleeve (5).
- Screw the detachable double nipple (6) into the reducing sleeve (5).
- Screw the G 1/4" pressure reducer (7) onto the detachable double threaded nipple (6).

Item	Designation	Remark
1	Adjustable purging gas nozzle	
2	Nut G3/8"	
3	Sealing washer	Included in the scope of delivery (6)
4	Reducing sleeve G 1/4"i / G3/8"a	Included in the scope of delivery (6)
5	Detachable double nipple G1/4"	Included in the scope of delivery (6)
6	Pressure reducer G1/4"	



5 Electrical connections

DANGER

Death or serious physical injury from working on live parts!



Danger to life due to electric current.

- The 5 safety rules for working on electrical systems must be observed: Disconnect; secure against reconnection; determine absence of voltage; ground and short-circuit; cover or block off any adjacent live parts.

5.1 Wiring instructions

DANGER

Death or serious physical injury due to opening the cover of the Ex p control unit in an explosive atmosphere!



Explosion hazard.

- Before opening the housing cover, the atmosphere must be checked for the presence of any explosive gases.
- Open only for any maintenance and servicing work.

DANGER

Death or serious physical injury due to improper closures!



Explosion hazard.

- Unused cable glands must be closed with suitable and approved closures.

DANGER

Death or serious injury due to improper installation!



Explosion hazard.

- Tighten cable glands with 3.0 Nm
- Tighten the lid with 1.4 Nm

WARNING

Short circuits due to loose or protruding cables in the SILAS control unit!



An explosion may be triggered.

- Connect all single core cables to the terminal, including those which are not required.
- Check that no lines are loose or protruding.

WARNING

Any damages to the seals must be avoided



The explosion protection concept must be observed.

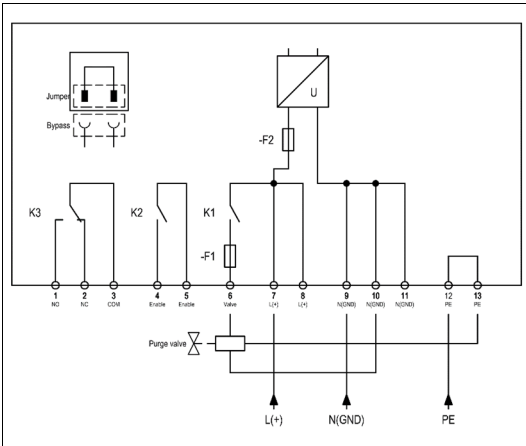
- A visual inspection of the seal must be carried out when closing (good condition, clean and tightly fit).

5.1.1 Inserting and fitting of connection cables

The following describes the procedure for inserting and fitting of connection cables on the SILAS control unit:

- Insert the supply and data line through the cable glands into the terminal compartment and connect or disconnect the conductors by pressing the actuator.
- Place shields and ground connections on the ground terminal.
- Tighten the cable glands with 3.0 Nm.

5.1.2 Wiring



Terminal	Connection
1 – 3	Relay K3
4 – 5	Relay K2
6	Purging gas valve
7 – 8	L+
9 – 11	L-
12 - 13	PE

5.2 Valve fuse

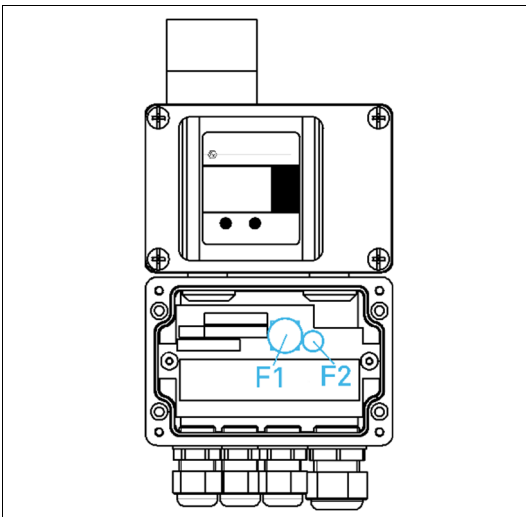
WARNING

The digital purging gas valve is only permitted for the operation with a SILAS control unit with a matched valve fuse!

If the valve is over dimensioned, there is a risk of excessive heating!

- The compatibility of the purging gas valve and the SILAS control unit has to be checked.

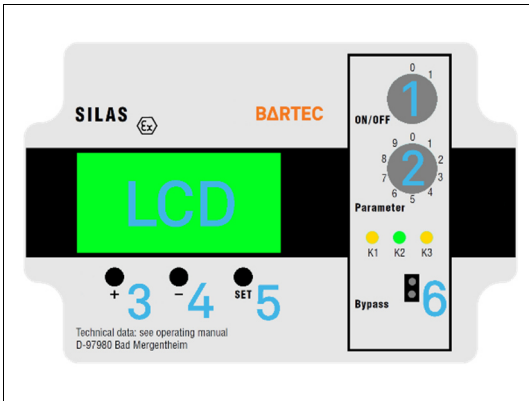
The terminal board located in the connection enclosure of the SILAS Ex p control unit has two fuses F1 (purging valve) and F2 (main fuse). Fuse F1 is designed for the BARTEC standard purging valves. If any other flush valves are used, it must be ensured that the fuse corresponds to the required value of the purging valve. Fuse F2 (main fuse) may only be replaced by the manufacturer.



F1	Valve voltage	Purging valve
T 80 mA	AC 230 V	05-0056-0071
T 160 mA	AC 115 V	05-0056-0072
T 500 mA	DC 24 V	05-0056-0073

6 Operation

6.1 Setting the parameters



The parameters are set via the SILAS operating menu. For this purpose, the SILAS control unit is equipped with a rotary switch and 3 buttons.

The individual functions of the rotary switch and the buttons are explained in the following sections.

6.2 “ON/OFF” rotary switch

The “ON/OFF” rotary switch (1) activates or deactivates the SILAS control unit.

6.3 “Parameter” rotary switch

The “Parameter” rotary switch (2) is used to show the various parameters in the SILAS control unit display.

Pos.	Parameter	Function
1	Operating position	Displays the purging time or the current pressure value.
2	Purging function	Setting the purging function.
3	Purging time (PT)	Setting the purging time
4	P1	Minimum overpressure (MIN)
5	P2	Pre-alarm
6	P3	Purging pressure
7	P4	Maximum pressure
8	Relay function	This defines the function of relay K3.
9	Time delay (DLY)	Switch-off delay if the pressure falls below the MIN pressure

6.4 “+”, “-” and “SET” pushbuttons

The pushbuttons “+” (3), “-” (4) and “SET” (5) are used in order to change and store the switching values which may be selected by rotary switch “Parameter” (2).

By pressing the “+” or “-” pushbutton once, the value will change by 0.1 mbar. The stored value is marked with an “*”.

Procedure

- Turn the “Parameter” switch (2) to the position for those parameters which have to be set.
- Set each parameter to be set by using the “-” (4) or “+” (3) buttons.
- Save each set value with the “SET” button (5).
- Turn the “Parameter” switch to the “0” position upon completion of all parameters.

6.5 Bypass operation

DANGER

Danger of explosion when bypass operation is active!

The activation of the bypass operation can cause explosive gas to enter the pressurized enclosure.



- Determine the gas concentration in the surrounding atmosphere.
- Release of the activation of the bypass operation by the operation manager or his representative (fire permit).
- Limit the time of activation of the bypass operation.

During the operating phase, it may be necessary to change the settings on internally mounted components. For this purpose, the SILAS control unit provides the bypass function. If the bypass operation is activated, it must be ensured that no explosive gas is present in the atmosphere. The gas concentration in the surrounding atmosphere must be determined by using a gas measuring device.

After activating the bypass operation, the door of the pressurized enclosure can be opened without interrupting the operation of the internal components. The necessary adjustments can be made and, upon completion, the pressurized enclosure must be closed again. During this period of time, the operation of the pressurized enclosure is not interrupted.

Procedure

- Remove the top cover of the SILAS control unit.
- Set “Parameter” rotary switch to position 9 and insert the “Bypass” jumper (6).
The indication in the display changes from “NORMAL” to “BYPASS”.
- The door of the pressurized enclosure can be opened.
The release by relay “K2” is not reset.
- Carry out the necessary work inside the pressurized enclosure. Subsequently, close the door of the pressurized enclosure.
- Allow the renewed purging time to elapse.
- Remove the “Bypass” jumper.
The indication in the display changes from “BYPASS” to “NORMAL”.
- Set “Parameter” rotary switch to position 0.
- Mount the upper cover of the SILAS control unit.

7 Commissioning



DANGER

Risk of explosion if parameters are incorrect!

Incorrect parameters and settings cancel the explosion protection.

- Check the settings and parameters by using the “four eyes principle”.

7.1 General settings for the commissioning process

7.1.1 Purging function

Dependent on the application, various purging functions can be assigned to the SILAS control unit. Upon selection of the individual purging function, the behaviour of the SILAS control unit changes.

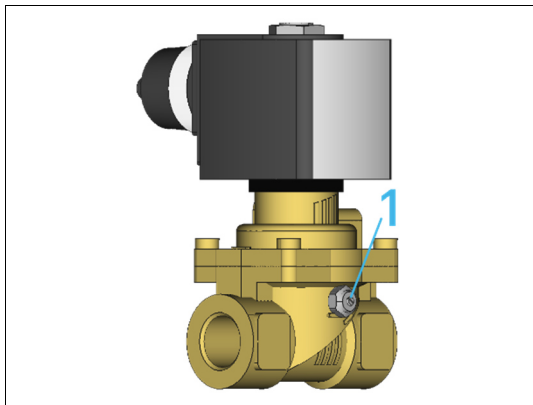
Programme	Function			
	Purging time required?	Purging time starts when P1 is exceeded	Purging time stops when P4 is reached	K2 switches off when the internal pressure falls below the value of P1
PRG YES	Yes	No	No	No
PRG YP1	Yes	Yes	No	No
PRG YP2	Yes	Yes	No	Yes
PRG YP3	Yes	Yes	Yes	No
PRG NO	No	No	No	No

7.1.2 Relay K3

Various functions can be assigned to the potential-free relay K3 (changeover contact).

Value	Function	
K2+	Release	Switches simultaneously with K2
P1+	MIN alarm	Active when exceeding P1
P1-	MIN alarm	Active when underrun P1
P2+	Pre-alarm	Active when exceeding P2
P2-	Pre-alarm	Active when underrun P2
P3+	Purging pressure	Active when exceeding P3
P4+	Max alarm	Active when exceeding P4
PT+	Purging time	Active when purging time counts down
BYP	Bypass	Active when bypass is switched on
ALR	Function alarm	Active in case of internal fault

7.1.3 Adjusting the leakage air needle valve



The leakage air needle (1) is used to determine the internal pressure during the operation of the Ex p equipment. In order to enable that the SILAS Ex p control unit switches to the “Purging function”, it is important to adjust the leakage air needle correctly.

Procedure

- Set the “ON/OFF” rotary switch to position “1”.
- Set the “Parameter” rotary switch to position “0”.
- Set the required inlet pressure on the pressure reducer.
- Allow the SILAS control unit purging time to elapse.
- Do not change the leakage air needle “1” on the purging gas valve.
- The display shows the current internal pressure.

If the pressure drops, increase the flow rate at the leakage air needle.

If the pressure increases, the flow rate at the leakage air needle must be reduced.

Increase the flow rate at the leakage air needle “1”:

- by using a small screwdriver in order to turn the screw of the leakage air needle “1” counter-clockwise in $\frac{1}{4}$ turns.
- by checking the internal pressure once again in order to determine whether the value is stable, rising or falling.
- If the internal pressure is stable, the leakage air needle is adjusted.

Reduce the flow rate of the leakage air needle “1”:

- by using a small screwdriver in order to turn the screw of the leakage air needle “1” clockwise in $\frac{1}{4}$ turns.
- by checking the internal pressure once again in order to determine whether the value is stable, rising or falling.
- If the internal pressure is stable, the leakage air needle is adjusted.

7.2 Commissioning the SILAS control unit [Gc]

The initial commissioning of the SILAS control for the gas explosion hazardous area is shown in the following sections.

In order to ensure that the SILAS control unit is parameterised and set safely, BARTEC recommends the following routine procedure:

- Before commissioning, check the electrical equipment which is mounted inside the pressurized enclosure.
- Check the pressurized enclosure in order to ensure sufficient purging.
- Observe the relevant safety regulations, standards and rules.
- Select and set the purging function, see Section 7.1.1.
- Determine the operating pressure, see Section 7.2.1.
- Determine the purging pressure, see Section 7.2.2.
- Perform the purging time calculation, see Section 7.2.3.
- Check the pre-purge phase, see Section 7.2.4.
- Check the operating phase, see Section 7.2.5.

7.2.1 Determination of the operating pressure

In order to maintain the minimum internal pressure, the air leakage rate of the valve must be adjusted due to the fact that every pressurized enclosure may have leakage losses.

Procedure

- Set the required inlet pressure on the pressure reducer; e.g. 2 bar.
- Leave the leakage air needle on the purging gas valve at the preset value.
- Close the pressurized enclosure.
- Connect the mains voltage and set the “ON/OFF” rotary switch on the SILAS control unit to position 1.
- Reduce the P3 value until the purging phase has elapsed, e.g. 1.0 mbar.
- Wait for the purging phase and set the “Parameter” rotary switch to position 0.
- The operating pressure is set. The operating pressure is indicated on the SILAS control unit display. This should be kept constant at the desired value, e.g. 2.0 mbar.
- If the desired value is not reached, increase the flow rate at the leakage air needle. See Section 7.1.3.
- If the desired value is exceeded, the flow rate at the leakage air needle must be reduced. See Section 7.1.3.

7.2.2 Determination of the purging pressure p3

In order to determine the purging pressure, close the pressurized enclosure and start up the SILAS control unit.

Procedure

- Set the “ON/OFF” rotary switch to position 1.
- Set the “Parameter” rotary switch to position 5.
- Use the “Plus (+)” button on the SILAS control unit in order to increase the setpoint P3 and confirm with the “SET” button; e.g. 15 mbar
- Set the “Parameter” rotary switch to position 0.
- Establish the purging gas connection and set the required inlet pressure at the pressure reducer; e.g. 2 bar
- Record and note the maximum internal pressure; e.g. displayed value of 12.5 mbar.
- Set the “Parameter” rotary switch to position 5.
- Using the Plus (+) or Minus (-) button on the SILAS control unit will set the setpoint P3 to the recorded value -0.5 mbar and it must be confirmed with the “SET” button, e.g. in this example it is 12.0 mbar
- Set the “Parameter” rotary switch to position 2.
- Calculate the purging time according to Section “6.3 Purging time calculation”.
- Use the plus (+) and minus (-) buttons on the SILAS control unit in order to set the purging time and confirm with the "SET" button; e.g. 3 minutes in this example
- Set the “ON/OFF” rotary switch to position 0.
- Set the “Parameter” rotary switch to position 0.
- Set the “ON/OFF” rotary switch to position 1.
- The SILAS control unit starts and the purging time begins to run automatically.

7.2.3 Calculating the purging time

The purging time is calculated in accordance with the following formula:

$$\frac{\text{Cabinet volume [litre]} \times \text{Purging factor}}{\text{Flow rate [l/h]}} \times 60 = \text{Purging time [minutes]}$$

The flow rate has to be determined on the basis of the achieved flushing pressure P3 and the associated flow diagram (see Appendix, Section 13).

Example 1:

Cabinet volume = 140 l; Purging = 5-fold; 1 pressure monitor

Adjusting the switching value “P3” = 12.0 mbar,

as described in Section 7.2.2 “Determination of the purging pressure”

Flow rate according to the diagram = 14,000 l/h

$$\frac{140 \text{ litres} \times 5}{14.000 \text{ l/h}} \times 60 = 3 \text{ minutes}$$

Example 2:

Cabinet volume = 720 l; Purging = 5-fold; 2 pressure monitors

Adjusting the switching value “P3” = 12.0 mbar

as described in Section 7.2.2 “Determination of the purging pressure”

Flow rate according to the diagram = 24,000 l/h

$$\frac{720 \text{ litres}}{24.000 \text{ l/h}} \times 5 \times 60 = 9 \text{ minutes}$$

7.2.4 Checking the pre-purge phase**Note****Safe operation during pressure fluctuations**

- For safe operation (pressure fluctuations), the set inlet pressure of the pressure reducer must be increased by the value of 0.5 bar.

When commissioning the pressurized enclosure, it is necessary to check the individual operating phases. For this purpose, all the previous operations must be completed. The operating pressure, the compensation of leakage losses and the purging time must be set.

Procedure

- Set up the pressurized enclosure ready for operation.
- Activate the SILAS control unit.
- Activate the purging gas supply; The LED K1 lights up and the purging time in the display starts to count down.
- Reduce the purging gas supply by reducing the pressure at the pressure reducer; the purging time in the display is halted.
- Reset the purging gas supply by increasing the pressure at the pressure reducer to the initial value. The purging time in the display counts down. After the purging time has elapsed, the LED “K2” lights up and the relay “K2” is activated.

7.2.5 Verifying the operating phase

When commissioning the pressurized enclosure, it is necessary to verify the individual operating phases. For this purpose, all previous work steps must be completed. The operating pressure, the compensation of leakage losses and the purging time must be set.

Procedure

- Set up the pressurized enclosure ready for operation.
- Activate the SILAS control unit.
- Activate the purging gas supply.
- Allow the purging time to elapse. The LED “K2” lights up. The relay “K2” activates the internals inside the pressurized equipment.
- Reduce the purging gas supply by reducing the pressure at the pressure reducer. The LED “K2” goes out. The relay “K2” deactivates the internals inside the pressurized equipment.

7.3 Commissioning the SILAS control unit [Dc]

7.3.1 Determination of the operating pressure

In order to ensure that the minimum internal pressure is maintained, the leakage air rate of the enclosure must be adjusted at the adjustable purging gas nozzle, since each pressurized enclosure has individual leakage losses.

Procedure

- Set the required inlet pressure at the pressure reducer; e.g. 2 bar.
- Open the purging gas nozzle with approx. 2 turns and close the pressurized enclosure.
- Connect the mains voltage and set the “ON/OFF” rotary switch on the SILAS control unit to position 1.
- The operating pressure is set. The operating pressure is shown on the SILAS control unit display. This should be kept constant at a value of approx. 1.5 mbar.
- If the minimum pressure drops, increase the flow rate at the purging gas nozzle.
- If the minimum pressure increases, the flow rate at the purging gas nozzle must be reduced.

7.3.2 Verifying the operating phase

When commissioning the pressurized enclosure, it is necessary to verify the individual operating phases. For this purpose, all previous work steps must be completed. The operating pressure and the compensation of leakage losses must be set.

Procedure

- Set up the pressurized enclosure ready for operation.
- Activate the SILAS control unit.
- Activate the purging gas supply.
- After the internal overpressure has been built up, the pressurized enclosure is ready for operation;
The LED “K2” lights up. Relay K2 is active.
- Reduce the purging gas supply by reducing the pressure at the pressure reducer. The LED “K2” goes out. The relay “K2” deactivates the internals inside the pressurized equipment.

8 Operation

8.1 Operating phases of the SILAS control unit [Gc]

The operation of a pressurized enclosure built for the gas explosion hazardous area can be divided into three phases. The three phases are divided into the preparation, pre-purge and operating phase.

8.1.1 Flow diagram

Operating phase	Requirement	Impact
Preparation phase Section 8.1.2	Mains voltage connected	Initiation of the purging phase
	Internal pressure < p4 and > p1	
	Purging time has not yet elapsed	
Purging phase Section 8.1.3	Purging valve opens	Purging time is running
	Internal pressure > p3	
	Internal pressure < p4	
Operating phase Section 8.1.4	Purging time counts down	Release pressurized equipment
	Pre-purge time has elapsed	
	Internal pressure > p1	
	Internal pressure < p4	

8.1.2 Preparation phase

The preparation phase begins when the supply voltage for the SILAS control unit is switched on and the purging gas is supplied. The purging gas flows into the pressurized enclosure via the purging gas valve.

- SILAS activated due to supply voltage
- The incoming purging gas increases the internal pressure of the pressurized enclosure.
- The minimum pressure “P1” of the housing is exceeded.
- The purging gas valve is opened via the SILAS control unit.
- Transfer to the purging phase

8.1.3 Purging phase

The pressurized enclosure is purged with the purging gas in order to remove any explosive gas/air mixture which is present in it or to dilute it to a non-hazardous concentration before the possible ignition sources in the pressurized enclosure are switched on.

This process prepares the pressurized enclosure for the operating phase. The amount of purging required depends on the free volume of the pressurized enclosure.

The purging process is constantly monitored by the sensors in the sensor module and the pressure switch.

- Opening the purge gas valve increases the flow with purging gas.
- The disc, which is integrated in the pressure switch, is lifted.
- The switching values of minimum pressure “P1” and purging pressure “P3” are exceeded.
- The purging time in the display counts down.
- After the purging time has elapsed, the purging gas valve is closed.
- Transfer to the operating phase

8.1.4 Operating phase

The operating phase begins with the closing of the purging gas valve.

The operating pressure must be maintained during the entire operation of the pressurized enclosure in order to prevent the ingress of flammable substances. The release of the pressurized enclosure is signalled via relay “K2” of the SILAS control unit.

If the enclosure pressure falls below the set minimum values during the operating phase, all electrical installations in the pressurized enclosure which are not explosion-proof themselves are switched off. A new purging process is initiated.

- The purging valve closes and the leakage losses are compensated by the integrated leakage air valve.
- The residual purging display goes out and the existing internal enclosure pressure is indicated on the display.
- The LED “K2” lights up.
- The relay “K2” activates the mains voltage or releases it.
- The relay “K3” switches in accordance with the configuration.

8.2 Operating phases of the SILAS control unit [Dc]

The operation of a pressurized enclosure designed for a potentially explosive dust atmosphere can be divided into two phases: Preparation phase and operating phase. These two phases are explained in detail below.

8.2.1 Flow diagram

Operating phase	Requirement	Impact
Preparation phase Section 8.2.2	Mains voltage must be connected	Initiation of the purging phase
	Internal pressure < p4 and > p1	
Operating phase Section 8.2.4	Internal pressure > p1	Release of pressurized equipment
	Internal pressure < p4	

8.2.2 Preparation phase

During the preparation phase, all internal dust deposits must be removed before the pressurized enclosure is activated. After cleaning the pressurized enclosure, the door is closed, the SILAS control unit is put into operation and the purging gas supply is activated.

The activation of the purging gas supply causes purging gas to flow into the pressurized enclosure via the adjustable leakage air needle, resulting in an overpressure relative to the surrounding atmosphere.

- The inflowing purging gas increases the internal pressure of the pressurized purging gas.
- The minimum pressure “P1” of the enclosure is exceeded.
- The next phase “Operating phase” is initiated.

8.2.3 Operating phase

The operating phase begins with the incoming purging gas. This builds up an overpressure in the pressurized enclosure compared to the atmosphere. The internal pressure of the pressurized enclosure is measured at the SILAS control unit and compared with the set limits. After the internal overpressure has developed and the minimum switching value has been exceeded, the release of the pressurized enclosure is signalled via relay “K2” of the SILAS control unit.


During the operating phase, the ingress of dust is prevented by a constant overpressure relative to the surrounding atmosphere. The internal pressure is monitored by the pressure monitoring system of the SILAS control unit. In case that an internal pressure occurs during the operating phase, which falls below the switching value of “P1”, for instance, by opening the door, it is possible to send a message via the alarm indication system.

- Existence of the internal overpressure.
- LED “K2” lights up.
- The relay “K2” activates the mains voltage or releases it.
- The relay “K3” switches in accordance with the configuration.

9 Maintenance and care

WARNING

Maintenance intervals




If it is used correctly and in accordance with the installation instructions and ambient conditions, the maintenance interval must be observed pursuant to EN 60079-17.

- Maintenance interval max. 3 years
- Maintenance by qualified personnel

WARNING

Dust deposits due to environmental influences




Dust deposits can accumulate in the pressure monitor when used in dust Ex applications.

- If there are heavy dust deposits, the pressure monitor must be cleaned every six months.

Note

Maintenance and care



- Observe the currently valid provisions and the national regulations regarding the maintenance, servicing and testing of the operating equipment!
- Any operating and maintenance work may only be performed by trained specialist personnel. The legal regulations and other binding guidelines for occupational safety, accident prevention and environmental protection must be observed.
- When opening any covers or removing parts, live parts may be exposed, unless this is possible by hand. Connecting parts may also be under voltage.

The table in Section 10.1 serves as a minimum requirement for maintenance or commissioning for a pressurized enclosure.

Pos.	Inspection point	Commissioning	Maintenance
1	Visual inspection for any enclosure damage		
2	Mounting of the SILAS control unit according to the instruction manual		n/a
3	A diagonal pre-purge of the enclosure must be ensured		n/a
4	Ensuring that the installed devices are securely fastened		
5	Sufficient flushing of built-in devices		n/a
6	Attention to devices with integrated capacitors (attach a label, if necessary)		n/a
7	Observation of devices with hot surfaces (attach a label, if necessary)		
8	Establishment of equipotential bonding of the pressurized enclosure		
9	Checking the wiring		n/a

Pos.	Inspection point	Commissioning	Maintenance
10	Testing of the wiring in accordance with the relevant guidelines		n/a
11	If applicable, checking whether there are viewing panels made of laminated safety glass or plastic (with a sign “avoid electrostatic charge, wipe with a damp cloth”)		n/a
12	General condition of the attachments of the pressurized enclosure (support feet, rain canopy and cable glands)		
13	Supply voltage of the individual devices corresponds to the mains voltage		n/a
14	Total power consumption of the devices below the maximum switching capacity of the control unit		n/a
15	Checking whether there are any possible data lines disconnected		n/a
16	Checking the maximum surface temperature		n/a
17	Pressure test has been passed with 1.5 x Pmax; no permanent deformations of the enclosure		n/a
18	Determination of the enclosure volume		n/a
19	Checking the pre-purge phase		
20	Checking the switching values of the SILAS control system		
21	Performing a functional test of the SILAS control system		
22	Checking potential bypass operation for proper function		

10 Malfunctions and troubleshooting

It is assumed that the connection of all external electrical and mechanical devices has been carried out properly. Therefore, the proper setup and connection of the electrical devices should be checked first.

10.1 Fault table






Fault	Possible cause	Remedy
The device does not operate. The display does not indicate anything.	Mains voltage is not present	Check the mains voltage supply cable.
	The device is defect.	Return to manufacturer
The electrical equipment is switched on without pre-purging phase	Bypass plug and rotary switch S2 are in Pos. 9	Remove the bypass plug and turn the rotary switch S2 to Pos. 0
	Incorrect programming of the purging function in the SILAS control unit	Check programming of the purging function.
The purging time does not count down.	No purging gas available	Connect the purging gas
	The purging gas valve does not open.	Check the purging gas valve for the presence of supply voltage (terminals 6 and 9)
		Check the purging gas valve for any foreign particles in the mechanical part
		Increase the inlet pressure to the setpoint value.
	Purging gas does not flow through the pressurized enclosure in sufficient quantity	Increase the diameter of the purging gas nozzle.
		Check the purging gas pressure "P3".
		Increase the cross-section of the purging gas inlet line
Increase the cross-section of the supply line.		
The set pressure of the pressure reducer is not reached.	Increase the cross-section of the supply line.	
The enclosure leaks during the pre-purging phase due to increased internal pressure.	Seal the enclosure with suitable measures or reinforce the enclosure walls	

Fault	Possible cause	Remedy
The digital purging gas valve switches off briefly during the purging process.	Purging gas is fed into the pressurized enclosure in too large quantity.	Reduce the diameter of purging gas nozzle.
The digital purging gas valve does not close after the pre-purging phase.	The internal pressure drops below P2. The leakage losses are too high.	Eliminate the leaks.
The control unit switches off the electrical devices after the purging time with a 5 sec. time delay.	The leakage air needle of the digital valve is too small.	Increase the leakage air compensation.
The digital purging gas valve closes briefly during the operating phase.	The internal pressure drops below P2	Increase the air leakage compensation.
The electrical devices do not switch off when the pressure drops.	Bypass is activated	Deactivate the bypass.

11 Technical data

11.1 Ex pz SILAS control unit

11.1.1 Explosion protection

Type	A7-3741-1110/.00.
Certifications	ATEX, IECEx, EAC, KCs, INMETRO, US/CA (NEC505), UKCA
Area of use	Zone 2, Zone 22
ATEX / UKCA	
Certification	TÜV 09 ATEX 553359 X / CML 21UKEX1862X
Marking	 II 3G Ex ec nC [pzc] IIC T4 Gc
	 II 3G Ex ec nC [pzc] IIC T6 Gc
	 II 3D Ex tc [pzc] IIIB T135 °C Dc
	 II 3D Ex tc [pzc] IIIB T85 °C Dc
IECEX	
Certification	IECEX TUN 10.0030X
Marking	Ex ec nC [pzc] IIC T4 Gc
	Ex ec nC [pzc] IIC T6 Gc
	Ex tc [pzc] IIIB T135 °C Dc
	Ex tc [pzc] IIIB T85 °C Dc
Eurasian Economic Union (EEU)	
Certification	 E0000 RU 0-DE.0058.0.01809/21
Marking	2Ex nA nC [pz] IIC T4 Gc X 0000
	2Ex nA nC [pz] IIC T6 Gc X
	Ex tc [pz] IIIB T85°C Dc X
KCs - Korea	
KCs Certification	Type A7-3741-1110/.000: 13-KB4BO-0313
Marking	Ex nA nC [pZ] IIC T4/T6
Certification - Gas	Type A7-3741-1110/.002: 17-KA4BO-0245X
Marking	Ex nA nC [pzc] IIC T6/T4
Certification - Dust	Type A7-3741-1110/.000: 13-KB4BO-0635X
Marking	Ex tc [p] IIB T85°C
Certification - Dust	Type A7-3741-1110/.002: 17-KA4BO-0245X
Marking	Ex nA nC [pzc] IIC T6/T4
INMETRO – Brazil	
Certification	UL-BR 17.0568X
Marking	Ex nA nC [pzc] IIC T4/T6 Gc
	Ex tc [pzc] IIIB T85 °C Dc

Type	A7-3741-1110/.00.
NEC 505/CEC505, US/CA	
Certification	CSA 13.2654547
Marking (US)	Class I, Zone 2: AEx nA nC [pz] IIC T4/T6 Gc
Marking (CA)	Class I, Zone 2: Ex nA nC [pz] IIC T4/T6 Gc
Marking (US)	Class I, Zone 22: AEx tc [p] IIC T85 °C Dc
Marking (CA)	Class I, Zone 22: Ex tc [p] IIC T85 °C Dc

11.1.2 Electrical data

Type	A7-3741-1110/.00.
Nominal operating voltage	AC 230 V, AC 115 V or DC 24 V
Tolerance range	+/- 10 %
Overvoltage category	II
Max. power consumption	8 Watt
Relay K2	Max. AC 253V; 5 A; cos φ 0.7 @ T4 Max. AC 253V; 0.5 A; cos φ 0.7 @ T6
Relay K3	Max. AC 253V; 5 A; cos φ 0.7 @ T4 Max. AC 253V; 0.5 A; cos φ 0.7 @ T6
Connection terminals	Max. 2.5 mm ²

11.1.3 Ex p specific data

Type	A7-3741-1110/.00.
Pressure measuring range	0 to 25 mbar
Tolerance range	± 0.5 to 1.0 over the entire measuring range
Purging time	0 to 60 minutes (adjustable)

11.1.4 Mechanical data

Type	A7-3741-1110/.00.
Protection class	IP 54
Dimensions	110 x 191 x 55 mm (WxHxD)
Enclosure material	Glass fibre reinforced polyester, black
Weight	1.2 kg
Cable glands	3x M16, clamping range 4.5 - 9 mm 1x M20, clamping range 7 - 13 mm

11.1.5 Environmental conditions

Type	A7-3741-1110/.00.
Transport and storage temperature	-20 °C to +60 °C
Operating temperature @ T4	-20 °C to +60 °C
Operating temperature @ T6	-20 °C to + 40 °C
Relative humidity	< 95 % (no condensation)
Use at altitudes from	< 2000 m

11.2 Pressure monitor

Type	17-51P3-1604
Dimensions	55 x 70 x 57 mm (W x H x D)
Material	POM
Opening pressure	3 mbar
Mounting hole	37 mm
Weight	Ca. 0,2 kg
Transport and storage temperature	-20 °C to + 80 °C
Operating temperature	-20 °C to + 80 °C

11.3 Purging gas valve

Type	05-0056-007.
Nominal operating voltage	AC 230 V, AC 110 V or DC 24 V
Pressure	Max. 16 bar
Weight	Approx. 1.2 kg
Nominal diameter	13 mm
Connection	G 3/8"

11.4 Purging gas

Residual dust	< 40 µm
Residual water	Dew point +3 °C
Residual oil content	1 mg/m ³
Temperature	Maximum + 40 °C

12 Ordering information

12.1 SILAS control unit

Designation	Order number
SILAS control unit, AC 230 V	A7-3741-1110/1000
SILAS control unit, AC 115 V	A7-3741-1110/2000
SILAS control unit, DC 24 V	A7-3741-1110/4000
SILAS control unit with window, AC 230 V	A7-3741-1110/1002
SILAS control unit with window, AC 115 V	A7-3741-1110/2002
SILAS control unit with window, DC 24 V	A7-3741-1110/4002

12.2 Pressure monitor

Designation	Order number
Pressure control module, 18-mm-orifice	17-51P3-1604

12.3 Purging gas valve

Designation	Order number
Digital valve with air leak needle valve; G3/8", ATEX / IECEx, 2x purging gas nozzle undrilled, AC 230 V, NC	05-0056-0071
Digital valve with air leak needle valve; G3/8", ATEX / IECEx, 2x purging gas nozzle undrilled, AC 110 V, NC	05-0056-0072
Digital valve with air leak needle valve; G3/8", ATEX / IECEx, 2x purging gas nozzle undrilled, DC 24 V, NC	05-0056-0073

12.4 Purging gas nozzle, Zone 22

Designation	Order number
Purging gas nozzle 1/4", with mounting parts	05-0056-0062

12.5 Pressure reducer

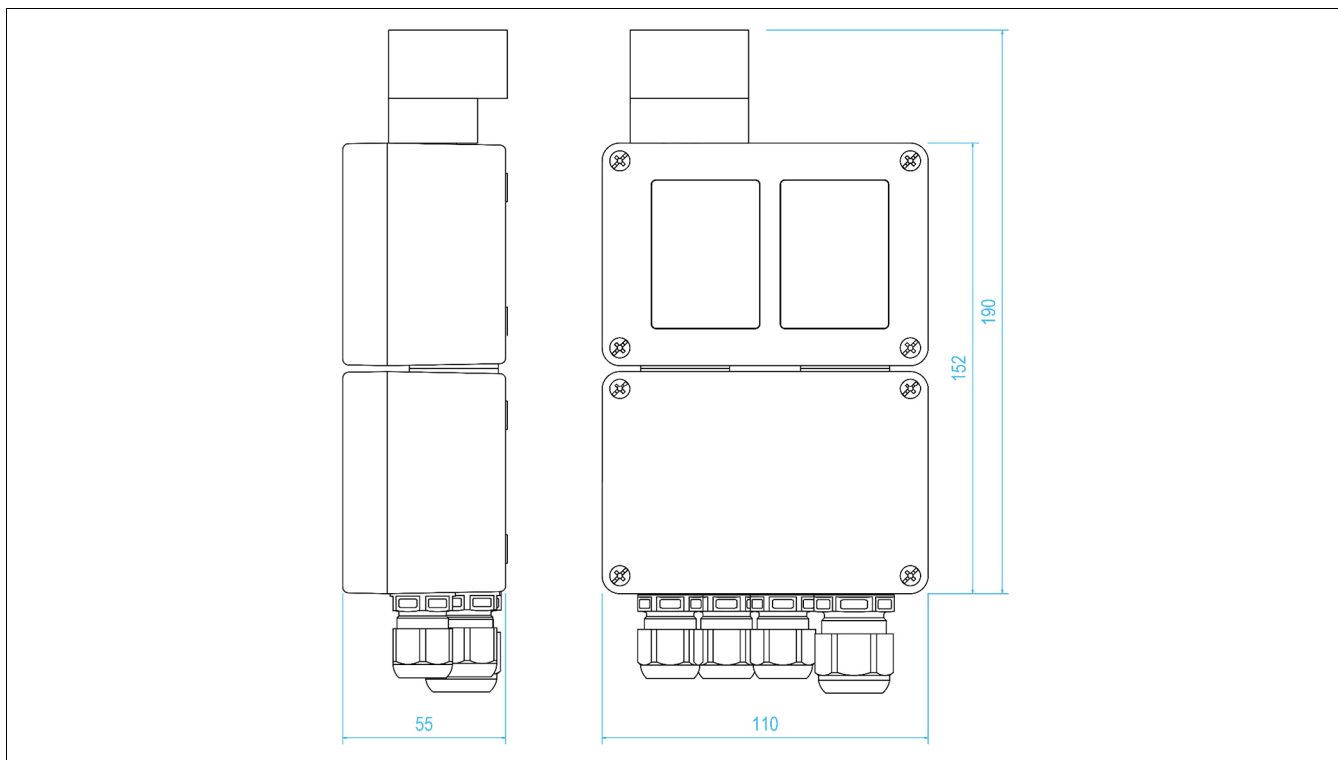
Designation	Order number
Pressure reducer 1/4", 0.5-6 bar, max. 110 m ³ /h, mounting parts	05-0056-0083
Pressure reducer 1/2", 0.5-6 bar, max. 450 m ³ /h, mounting parts	05-0056-0084

12.6 Mounting set

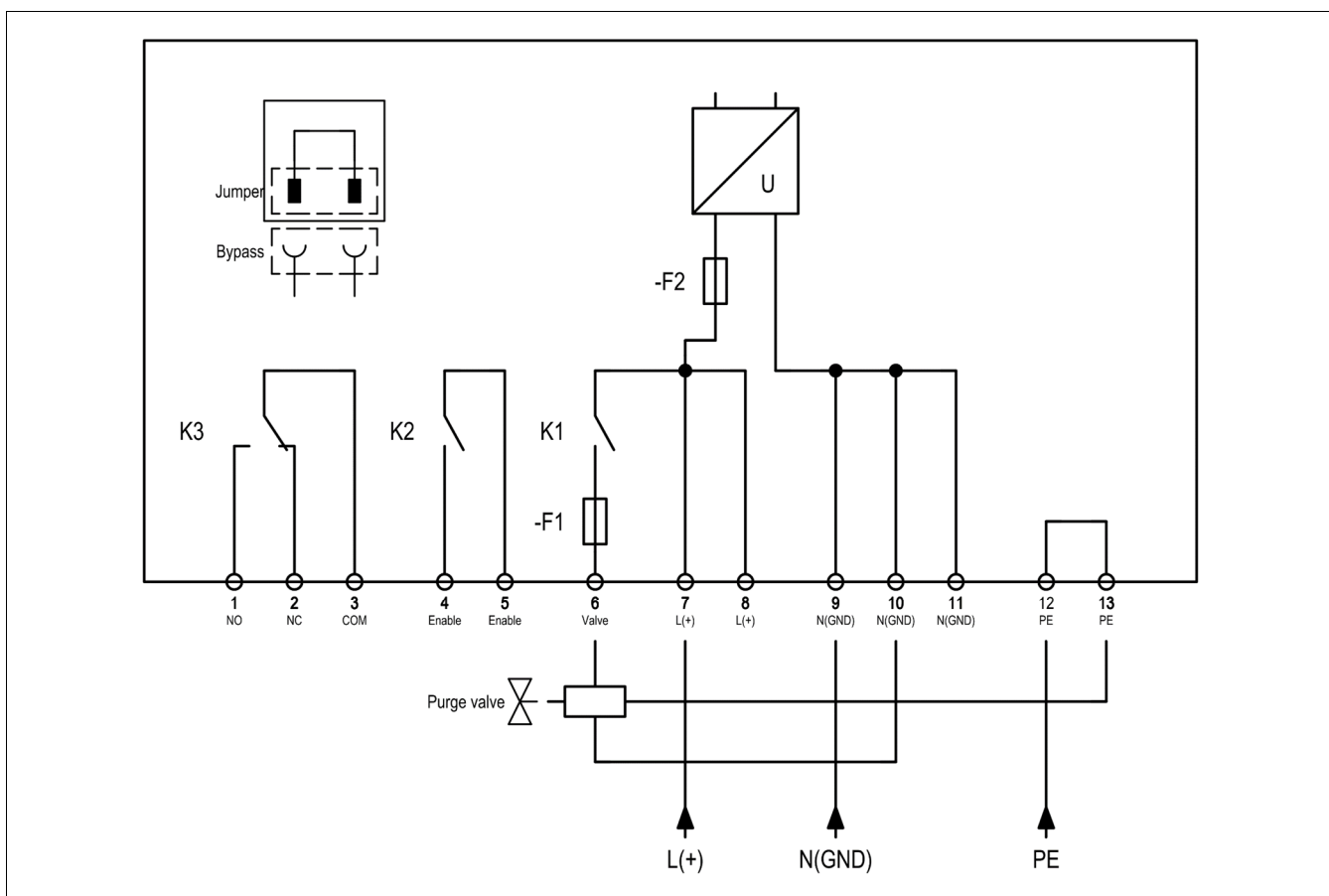
Designation	Order number
Mounting set for mounting the SILAS control unit inside the pressurized enclosure, IP 54	05-0091-0117
Mounting set for mounting the SILAS control unit inside the pressurized enclosure, IP 66	05-0091-0275

13 Appendix

13.1 Dimensions of the Ex pz SILAS control unit

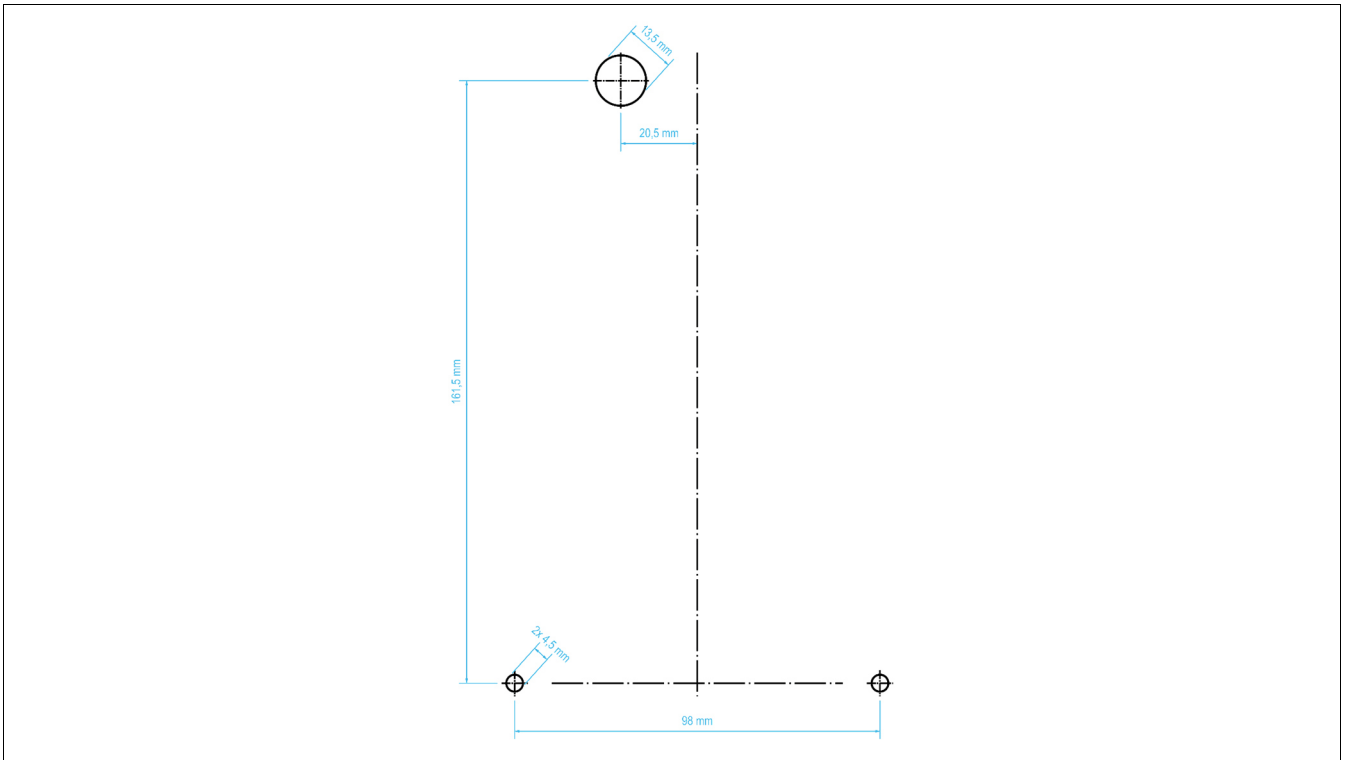


13.1.1 Block diagram

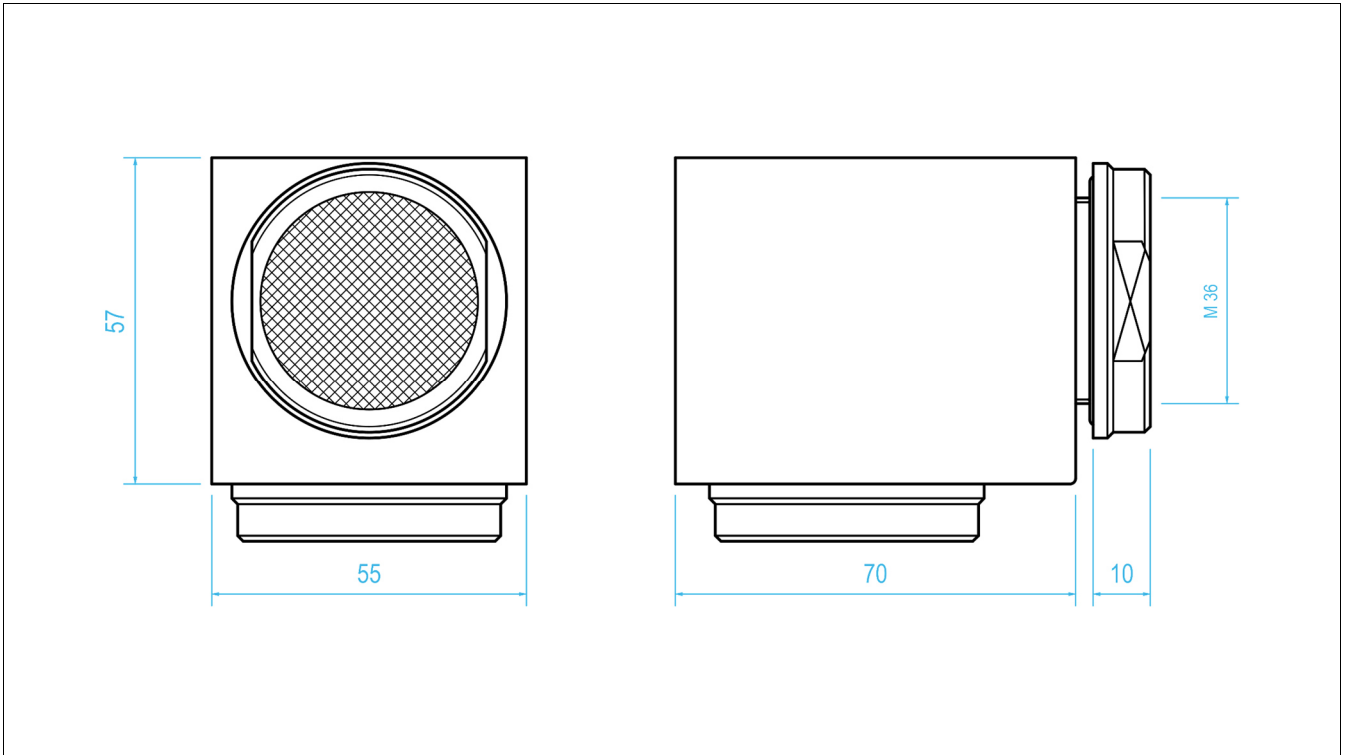


13.2 Dimensions of the pressure monitor

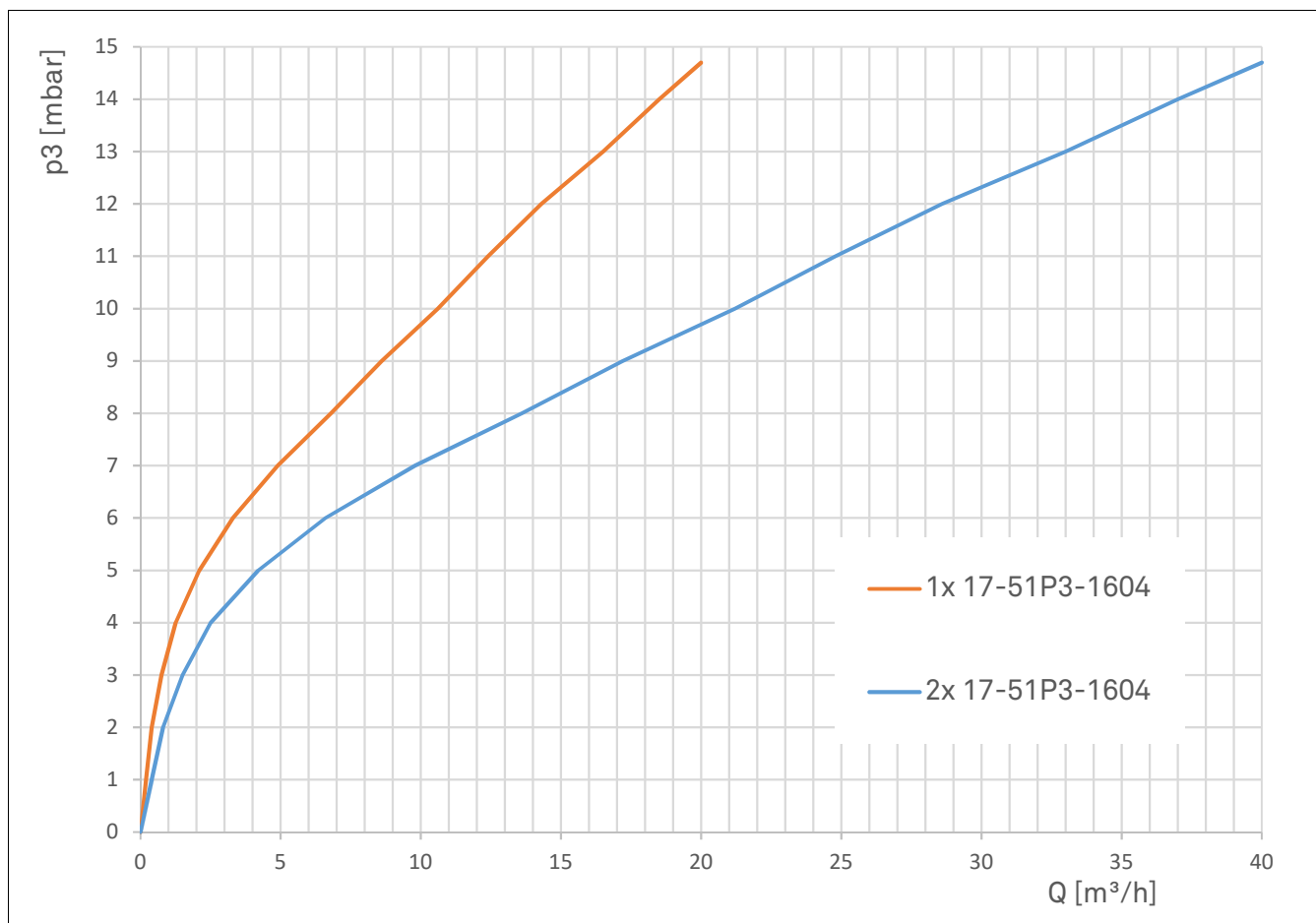
13.2.1 Drilling pattern



13.3 Dimensions of the pressure monitor



13.4 Purging gas diagram



14 Declaration of Conformity

EU Konformitätserklärung
EU Declaration of Conformity
Déclaration UE de conformité

BARTEC

Nº A1-3741-7C0001-F

Wir	We	Nous
BARTEC GmbH Max-Eyth-Straße 16 97980 Bad Mergentheim Germany		
erklären in alleiniger Verantwortung, dass das Produkt Steuerung SILAS	declare under our sole responsibility that the product Control System SILAS	attestons sous notre seule responsabilité que le produit Contrôleur SILAS
Type A7-3741-1110/****		
auf das sich diese Erklärung bezieht den Anforderungen der folgenden Richtlinien (RL) entspricht ATEX-Richtlinie 2014/34/EU EMV-Richtlinie 2014/30/EU RoHS-Richtlinie 2011/65/EU und mit folgenden Normen oder normativen Dokumenten übereinstimmt	to which this declaration relates is in accordance with the provision of the following directives (D) ATEX-Directive 2014/34/EU EMC-Directive 2014/30/EU RoHS-Directive 2011/65/EU and is in conformity with the following standards or other normative documents	se référant à cette attestation correspond aux dispositions des directives (D) suivantes Directive ATEX 2014/34/UE Directive CEM 2014/30/UE Directive RoHS 2011/65/UE et est conforme aux normes ou documents normatifs ci-dessous
EN IEC 60079-0:2018/AC:2020 EN 60079-2:2014/AC:2015 EN IEC 60079-7:2015/A1:2018 EN 60079-15:2019 EN 60079-31:2014		EN 60529:1991/A2:2013/AC:2019 EN IEC 61000-6-2:2019 EN 61000-6-3:2007+A1:2011 EN 61010-1:2010+A1:2019
Verfahren der internen Fertigungskontrolle	Procedure of internal control of production	Procédure de contrôle interne de fabrication

TÜV 09 ATEX 553359 X Issue 1

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