BARTEC

Manual Ex p Control Unit

APEX^{px}

BARTEC

Operating Instructions - Ex p control unit

APEX^{px}, Version II
Type: 07-37A2-2211/*520

ATEX / IECEx Zone 1 / 21
Document number: 01-37A2-7D0001
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1 General information

1.1 Manufacturer

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1.2 This manual

ATTENTION
Read the enclosed operating instructions carefully before commissioning the APEX^{px} Ex p control unit.

These operating instructions contain information required for the intended use of the APEX^{px} control unit.

The operating instructions are intended for personnel who are qualified to assemble, install, commission and maintain the product.

They are aimed at 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 be accessible to installation, operating and maintenance personnel.

If necessary, the guidelines and standards for areas with gas or dust atmospheres must be observed before starting work, e.g.: Directive 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. Safety instructions and warnings in these operating instructions are of a general nature 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 further information is required, please request it from your local or responsible BARTEC branch. 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 personnel 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 other languages 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 a legal dispute, the "General Terms and Conditions" of the BARTEC Group shall apply in addition.

1.5 Further documents

The latest 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 with standards and directives

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

1.7 Explanation of symbols

1.7.1 Symbols in the operating instructions

DANGER
Indicates a hazard that will result in death or serious injury if it is not avoided.

WARNING
Indicates a hazard that can result in death or serious injury if it is not avoided.

CAUTION
Indicates a hazard that can lead to injuries if it is not avoided.

ATTENTION
Indicates measures to be taken to prevent property damage.

Notice
Important notices and information on effect, economical & environmentally friendly work practices.

1.7.2 Markings on the device

CE 0044	CE mark in accordance with the currently applicable directive.
	Device certified according to marking for potentially explosive atmospheres.
	Marking in accordance with WEEE Directive 2012/19/EU

2 Safety

2.1 Handling the product

The product described in these operating instructions has left the factory in a technically safe and tested condition. To maintain this condition and to ensure that this product operates correctly and safely, it may only be used as described by the manufacturer. In addition, correct and safe operation of this product requires proper transport, correct storage and careful operation.

Safe and correct installation of the APEX^{px} control unit on the pressurised enclosure is a prerequisite for faultless and correct operation.

2.2 Intended use

2.2.1 Exclusive intended use

The Ex p control unit APEX^{px} is used exclusively as a control and monitoring device for pressurised enclosures and is intended for use in explosion group II, category 2GD (EPL Gb and EPL Db) and temperature class T4 or for use in dust atmospheres with a surface temperature of T130°C.

Furthermore, the safety function of the APEX^{px} Ex p control unit fulfils the requirements for SIL 2 in accordance with IEC 61508 and performance level "d" in accordance with EN ISO 13849-1. The permissible operating data of the device used must be observed.

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

2.2.2 Improper use

Any other use is not in accordance with the intended use and can result in damage 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 carried out without the written authorisation of the manufacturer.

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

- Contact the manufacturer and obtain approval before making any changes or modifications.
- Only use original spare and wear parts.

Notice

The manufacturer provides full warranty only and exclusively for spare parts ordered from him.

In principle, our "General Terms and Conditions of Sale and Delivery" apply. These have been available to the operator since the contract was concluded at the latest. Warranty and liability claims for personal injury and damage to property are excluded if they are attributable to one or more of the following causes:

- Improper use of the APEX^{px} control unit.
- Improper installation, commissioning, operation and maintenance of the APEX^{px} control unit.
- Failure to observe the instructions in the manual regarding transport, storage, installation, commissioning, operation and maintenance.
- Unauthorised structural modifications to the APEX^{px} control unit.
- Inadequate monitoring of parts that are subject to wear.
- Improperly carried out repairs.
- Disasters caused by external influences and force majeure.

We grant a warranty period of one year on the APEX^{px} 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 free replacement or repair of defective parts in our Bad Mergentheim factory. For this purpose, any supplied packaging should be kept if possible. If necessary, the goods must be sent to us by written agreement. There is no requirement for subsequent improvement at the installation site.

2.4 Obligations of the operator

The operator undertakes to only allow personnel to work with the APEX^{px} control unit who:

- are familiar with the basic regulations on safety and accident prevention and have been instructed in the use of the APEX^{px} control unit;
- have read and understood the documentation, the chapter on safety and the warnings.
- The operator makes sure that safety and accident prevention regulations applicable to the respective application are complied with.
- who have a level of knowledge of the relevant national standards and regulations.
- Have the entire system 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. the German Ordinance on Industrial Safety and Health (BetrSichV) or the nationally applicable ordinances.
- Wear suitable clothing and footwear with regard to the risk of dangerous electrostatic charges.
- Always carry out any work steps in potentially explosive atmospheres with the utmost care!

2.5.2 Safety instructions for operation

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

Servicing

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

Periodic inspection

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

Repairs

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

Commissioning

- Before commissioning, it must be ensured that all components and documents are available.

2.6 SIL qualification / safety according to IEC 61508

In the following chapters, important notices and information on safe handling of the product are marked as follows:

SIL **ATTENTION**
Important notices and information on safe handling of the product.

2.6.1 SIL qualification

During the development of the Ex p control unit, particular attention is paid to avoidance of systematic faults and detection and control of random faults. Here are the most important properties and requirements from the point of view of functional safety in accordance with IEC 61508:

- Internal monitoring of safety-relevant circuit components
- In case of a fault, transition of safety-related outputs to a defined safe state
- Determination of the probability of failure of the defined safety function
- Safe parameterisation with a non-safe operating environment
- Re-examination

SIL qualification of components is documented within this manual. This chapter summarises all safety-relevant characteristic data required by the end-user and planner for project planning and operation of the safety-instrumented system. Further SIL-relevant information is integrated in this manual.

2.6.2 Safety function

The safety function of the Ex p control unit is to purge with a defined quantity of purge gas, safely monitor the internal overpressure of the protected equipment and release operation. The safe state means that in the event of a pressure drop or malfunction, the Ex p control unit switches to the safe state = deactivation of the protected equipment.

The "safe state" is triggered by:

- Falling below the minimum pressures within the Ex p equipment
- Illogical pressure values within the Ex p equipment
- Failure of the supply voltage

If the Ex p control unit does not deactivate the protected equipment on request or in the event of a fault or does not switch to the safe state, a dangerous failure has occurred.

2.6.3 Safety characteristics

SIL

ATTENTION

The following safety characteristics apply without optional sensors.

The optional sensors must be taken into account when determining the total failure rate!

- The safety characteristics can be found in the documentation for the optional sensors used.

Safety characteristics according to IEC/EN 61508 / DIN EN ISO 13849:

- SIL = 2
- Performance level: = d
- PFHsys = (PFH_S+_PFH_L+PFH_FE+PFH_C) = 1.70E-08
- HFT = 1
- SFFsys = 92.85%
- MTTFd = 76 yr
- DC = 88.78%
- Device type B (complex equipment)
- Interval of re-examinations = 1 year
- Category 3

2.6.4 Response time

The response time of the Ex p control unit to safety-relevant functions, without specific user delay times, is less than 2 seconds.

With the Ex p control unit, it is possible to set a delay time in the event of pressure fluctuations below the minimum pressure.

This results in a delay time of

$T_{reaction}$ = $T_{control} + T_{delay}$

$T_{reaction}$ = Time until Ex p APEX control unit responds to a safety-relevant function

$T_{control}$ = Internal time required by the Ex p control unit to recognise the safety-relevant triggering. < 2 seconds

T_{delay} = Adjustable delay time for safety-relevant triggering added to the response time $T_{control}$.

2.6.5 Residual risk

Residual risks may arise from:

- Errors in project planning
- Errors in operation
- Errors in wiring

3 Product description

3.1 Ignition protection type "Ex p – pressurised enclosure"

The ignition protection type Ex p, referred to as "pressurised enclosure", is based on the measure that explosive gases present in a closed enclosure are purged out followed by the generation and maintaining of overpressure in relation to the surrounding atmosphere. Due to the higher pressure inside the enclosure compared to the atmosphere, explosive gases cannot enter the enclosure at any time. This creates an explosion-resistant space in which electrical devices that are not themselves explosion-proof can be installed and operated in the Zone 1/21.

The APEX^{px} control unit described in these operating instructions uses "pressurised enclosure with leakage compensation" technology. In detail, this refers to maintaining an overpressure inside an enclosure by supplying purge gas to compensate for the leakage losses that occur in the enclosure.

In order to prevent an explosive atmosphere from becoming a hazard during downtimes, the enclosure must be purged with purge gas (compressed air or inert gas) before commissioning. The volume depends on the examination during initial commissioning. The flow rate is measured or determined at the outlet of the pressurised enclosure. As a safe condition in the enclosure is only reached at the start of the operating phase, the APEX^{px} control unit with its components and the purge gas valve must be explosion-proof.

3.2 APEX^{px} control unit, type 07-37A2-2211/*520

The APEX^{px} control unit with its system components is an automatically operating control unit for monitoring, controlling and regulating pressurised enclosures in Zone 1 and Zone 21 potentially explosive atmospheres.

The APEX^{px} control unit is suitable for all common applications.

The electrical installations inside the pressurised enclosure are enabled directly by the APEX^{px} control unit or indirectly by an additional switching device.

Once the APEX^{px} control unit, purge gas valve and pressure switch have been fitted to the pressurised enclosure and the mains voltage and purge gas have been connected, the pressurised system starts automatically.

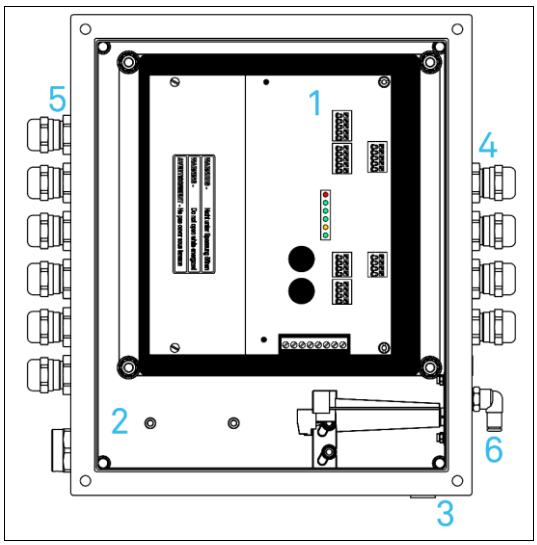
The APEX^{px} control unit regulates the flow of purge gas and the internal pressure of the enclosure during the purging phase. When the operating phase is initiated, the APEX^{px} control unit automatically activates the components mounted in the pressurised enclosure. The internal pressure of the pressurised enclosure is automatically maintained during the operating phase and any leakage losses are compensated.

3.2.1 Design type 07-37A2-2211/*520

The associated pressure measuring card is integrated in this enclosure variant.

Ex p control units of this enclosure variant are mainly mounted externally on the pressurised enclosure, but can also be mounted inside the Ex p equipment.

In terms of explosion protection, the protective enclosure complies with Ex e protection for gas and Ex t protection for dust.



Pos.	Designation
1	Ex p functional unit
2	Ex e protective enclosure
3	External earth connection
4	Cable entry Ex i
5	Cable entry Ex e
6	Pressure measurement connection

3.3 System components of the APEX^{px} Ex p control unit

3.3.1 Purge gas valve, type 05-0056-00**

The purge gas valve switches the purge gas supply. It is a solenoid valve and is used to introduce the purge gas into a pressurised enclosure of Zone 1. Here, the purge gas valve is controlled by the APEX^{px} control unit so that the purge gas valve opens for purging of the pressurised enclosure and closes again once purging is complete.

As purge gas valves, both digital and proportional valves are available.

3.3.2 Pressure monitor, type 17-51P3-1*03

The pressure monitor provides two functions within the Ex p control system. Firstly, it serves as a pressure relief valve, which opens if the internal pressure is too high and relieves the overpressure. Secondly, an orifice is integrated in the pressure monitor via which the flow rate is measured during the purge time.

The pressure monitor must be installed separately from the APEX^{px} control unit in the pressurised enclosure.

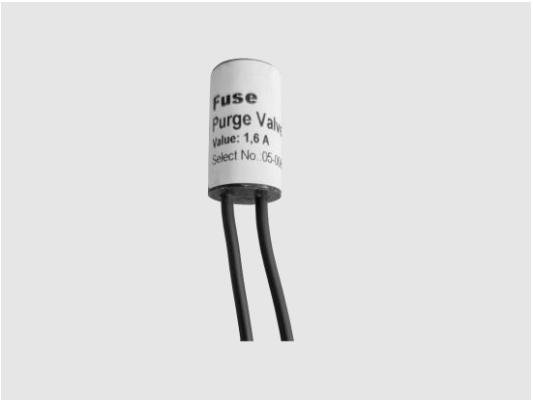
3.3.3 Pressure reducer with pressure gauge, type 05-0056-008*

This upstream pressure reducer is a diaphragm pressure regulator with secondary venting to reduce the pressure of externally supplied purge air. The setting is made using a handwheel. The set reduced pressure can be read off via a pressure gauge.

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

For selection of the pressure reducer, see chapter 5.6 "Purge gas supply".

3.3.4 Valve fuse, type 05-0080-10**



The valve fuse is used to protect the connected purge gas valve and is connected to the Ex e board of the control unit.

3.3.5 p-Operator Panel, type 17-51P5-*111

The p-Operator Panel is a visualisation unit for the APEX^{px} control unit. It can be connected as an option and is used to display the system statuses and parameterise the control units.

It can be connected or disconnected during operation and does not need to be permanently connected to the control unit.

3.3.6 Programming release/switch, type 05-0003-0089

The programming switch must be connected to the control unit and activated to change parameters and switching values.

Values that are changed without a programming jumper connected are not accepted by the APEX control unit.

When the programming switch is activated, the device is in offline mode. If parameters are to be changed, it is necessary to log in to the user login in addition to the active parameter switch.

3.3.7 Interface cable, type 03-9828-0062

The interface cable is used to connect the Ex p control unit to the PC.

It must be connected to the control unit and PC in order to change parameters and switching values.

4 Transport and storage

4.1 Scope of delivery

Notice
Missing parts or damage must be reported immediately in writing to the shipping agent, the insurance company or BARTEC GmbH.

Check the completeness of the scope of delivery using the delivery note

Each Ex p control unit is supplied with the following scope of delivery as standard:

- Ex p control unit
- LAN parameterisation cable, parameterisation switch, operating instructions

4.2 Packaging

The Ex p control unit is delivered packed in film, on pallets and/or in cardboard boxes.

- Dispose of the packaging materials at designated disposal points. Observe the applicable national regulations for disposal

4.3 Transport

WARNING
Risk of death or injury due to falling heavy suspended loads.
- Secure the Ex p control unit with suitable fastening (e.g. straps) before transporting it

ATTENTION
Avoid hard impacts, e.g. by dropping the device or setting it down too hard.
The Ex p control unit may be damaged.
- Only use lifting gear and load suspension equipment with sufficient load-bearing capacity.
- The permissible lifting weight of a lifting device must not be exceeded
- Slowly lower the Ex p control unit.

Take into account the weight of the goods to be transported and select appropriate transport equipment.

4.4 Storage

Store the Ex p control unit in a horizontal position and at temperatures between -20°C and +60°C in its original packaging. The environment must be dry, dust-free and vibration-free.

Store the Ex p control unit for a maximum of 2 years. For storage logistics, we recommend the "first in – first out" principle.

4.5 Disposal

Notice
Observe the applicable national regulations for disposal.

Dispose of the Ex p control unit at the designated disposal points.

5 Installation

Notice

Familiarise yourself with the general safety instructions before starting work (see chapter 2 Safety).

- Observe the chapters "Installation" and "Electrical connections".

Notice

Deviations may apply for installation at customer-specific superstructures.

Notice

Observe the chapters "Installation" and "Electrical connections".

DANGER

Unsuitable positioning of the Ex p control unit on the pressurised enclosure.

This results in unclean purging of the pressurised enclosure. Gas bubbles can form inside the pressurised enclosure and lead to an explosion if the installations are activated.

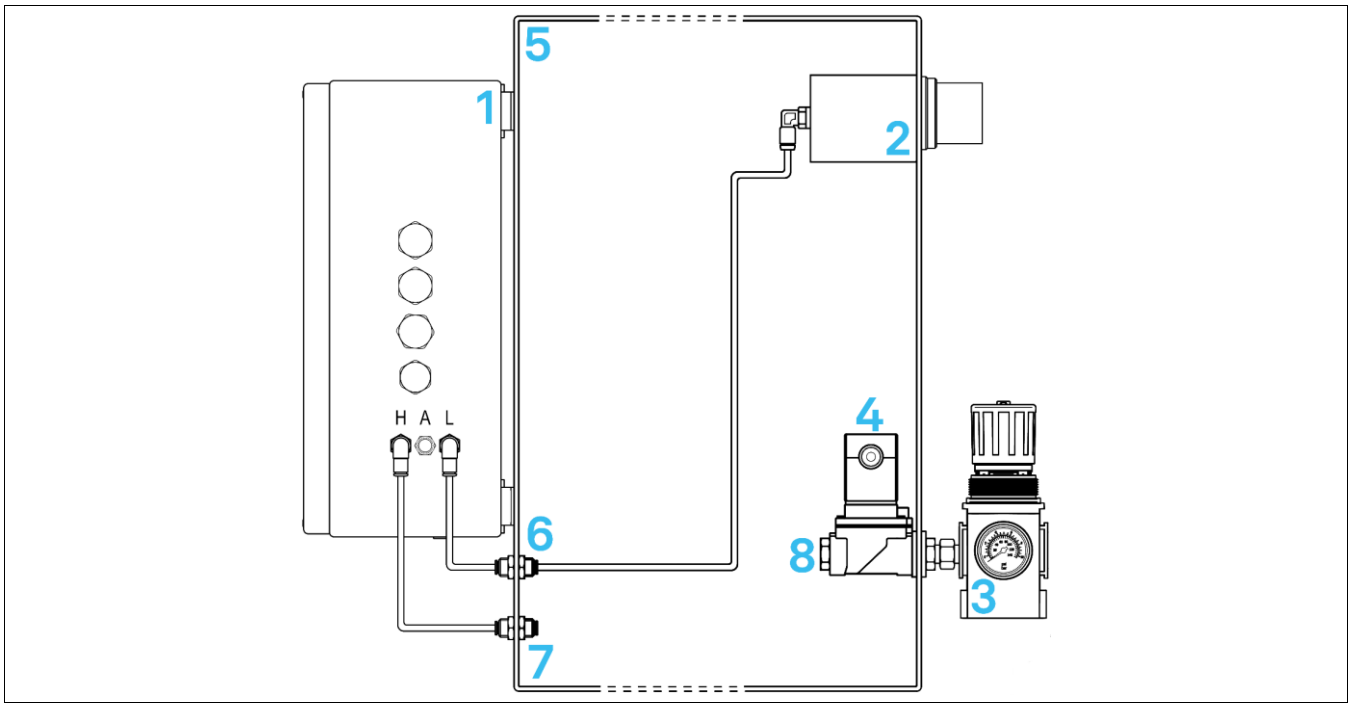
- Exact positioning of the purge gas supply and the pressure switch must be in accordance with EN/IEC 60079-2.
- Ideal purging must be ensured
- Observe light or heavy gases.

Carry out the installation in accordance with the following sections, unless otherwise agreed for customer-specific control units. The APEX^{px} Ex p control unit can be mounted in various positions on the pressurised enclosure.

The following chapters describe installation of the APEX^{px} Ex p control unit on the pressurised enclosure. The APEX^{px} control unit can be installed internally or externally on the pressurised enclosure. The pressure switch and the purge gas valve must be installed separately from the APEX^{px} control unit.

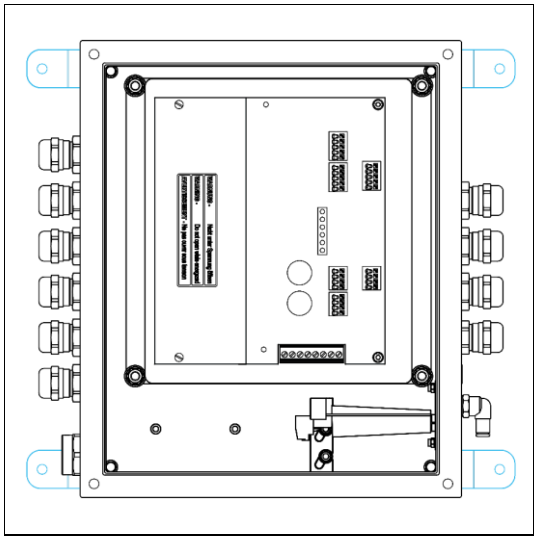
5.1 System structure

5.1.1 General information



Pos.	Designation	Comment
1	APEX^{px} Ex p control unit	Control of explosion protection Ex p
2	Pressure monitor	Purge gas outlet during the purging phase
3	Pressure reducer	Pressure reducing station for purge gas
4	Purge gas valve	Digital or proportional purge gas valve
5	Ex p protected enclosure	
6	Pressure measurement L	Measuring point after orifice
7	Pressure measurement H	Measuring point before orifice
8	Purge gas nozzle	Limitation of maximum purge gas flow

5.2 Installation of APEX^{px} Ex p control unit

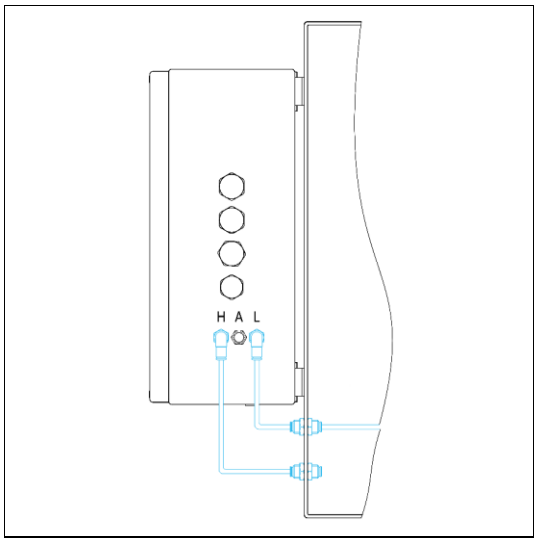


Attach the APEX^{px} Ex p control unit in the intended position using the fastening straps on the enclosure.

M6 screws with corresponding locking elements can be used as fastening material.

The corresponding dimensions can be found in the appendix.

5.3 Installation of APEX^{px} control unit – external attachment



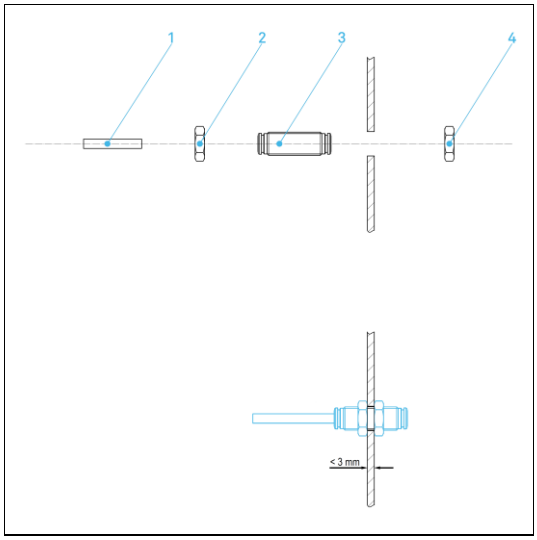
Install the APEX^{px} Ex p control unit in the intended position using the fastening straps on the enclosure.

To enable pressure measurement within the protected Ex p equipment, BARTEC recommends the use of the external installation kit.

The hose connection between the APEX^{px} Ex p control unit and the protected equipment is shown in the following diagram.

5.3.1 External installation kit, type 05-0091-0280

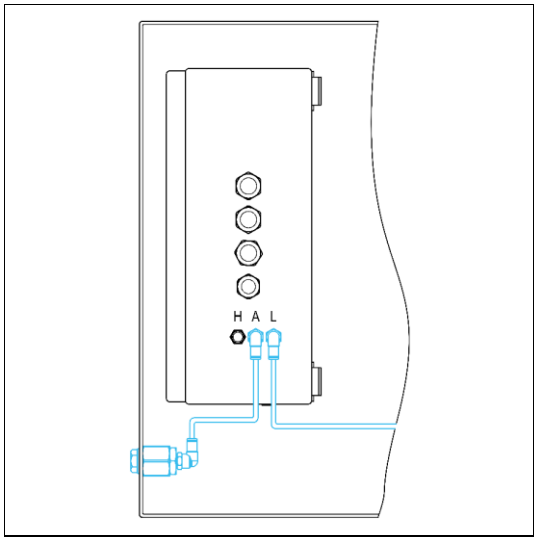
For external installation of the Ex p control unit, two measuring points must be routed into the Ex p switch cabinet using the "External" installation kit.



Procedure:

- Drill the installation holes at the intended locations Drill d=10.5 mm
- Guide the hose partition fittings pos. 3 into the holes.
- Use the nuts pos. 2 and 4 to fasten the partition fittings in the centre of the holes.
- Insert the hose pos. 1 into the hose partition fitting. The other end is plugged into the hose connection provided on the Ex p control unit.

5.4 Installation of APEX^{px} control unit – internal installation

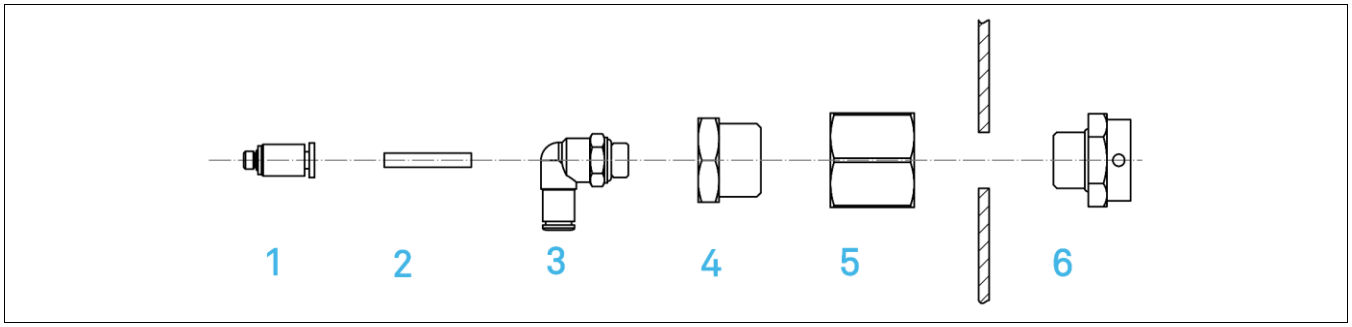


Install the APEX^{px} Ex p control unit in the intended position using the fastening straps on the enclosure. BARTEC recommends using the internal installation kit so that the pressure measurement can be carried out inside the protected Ex p equipment.

In order for the APEX^{px} Ex p control unit to be able to measure the atmospheric pressure, it is important to connect the hose connection with the installation kit.

5.4.1 Internal mounting kit, type 05-0091-0275

- Drill an installation hole d=16.5 mm at the intended location on the pressurised equipment
- Screw the venting screw (6) with the sleeve (5) into the provided hole
- Screw the reducer (4) into the socket (5)
- Screw the quick connector (3) into the reducer (4).
- Slide the hose (2) into the quick connector (4) and guide it to the internally mounted Ex p control unit
- Insert the hose into the atmosphere measuring point (1), which is screwed into the APEX.



5.5 Installation of pressure monitor

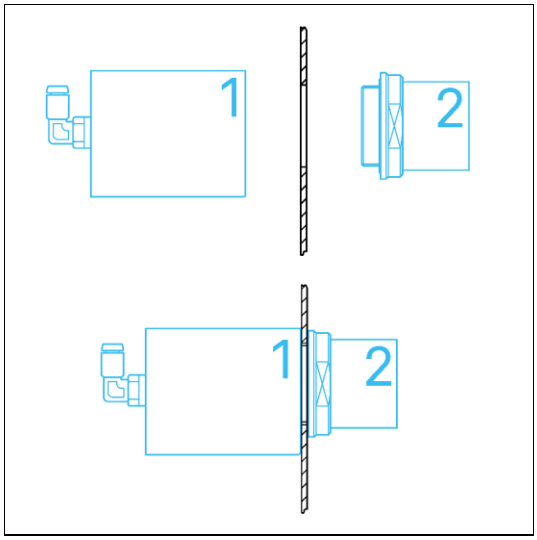
CAUTION

Incorrect installation or contamination of the pressure monitor!

Incorrect installation or heavy contamination prevents the overpressure from escaping and leads to a sharp rise in pressure.

- Check that the pressure monitor has a flow direction from the inside to the outside and is free from contamination.

A through-hole of 37 mm is required in the enclosure wall of the pressurised enclosure for installation of the pressure monitor. The outlet fitting is used for attachment.

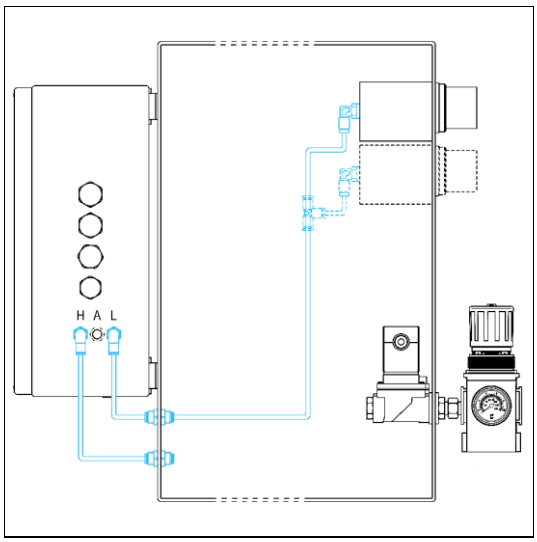


- Drill a Ø 37 mm hole at the intended installation position of the pressurised enclosure.
- Unscrew the outlet fitting (2) from the pressure monitor enclosure (1).
- Position the pressure switch enclosure (2) so that the air in the pressurised enclosure can flow outwards.
- Screw together the pressure monitor enclosure (2) and the outlet fitting (1).
- Tighten the outlet fitting (1) and pressure monitor enclosure (2) until the pressure monitor is firmly secured.

5.5.1 Pressure monitor hose connection

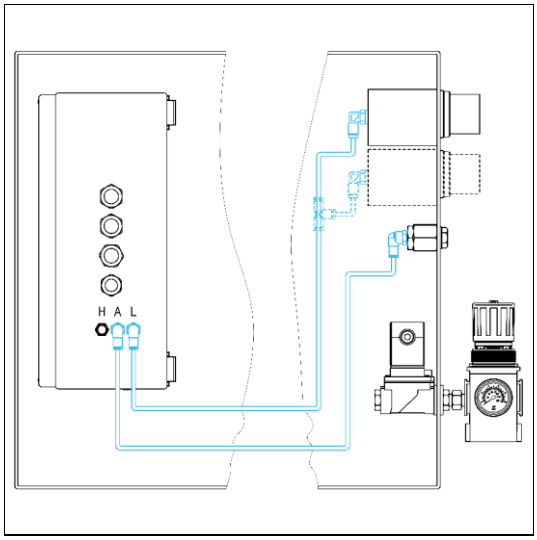
To ensure that the differential pressure measurement of the APEX^{px} Ex p control unit measures correctly, it is important that the hose connection inside the Ex p control unit is clean.

Hose connection of the APEX^{px} for external installation



- Connect the hose connection "L" on the APEX^{px} Ex p control unit to the hose connection on the pressure monitor.
- When using two pressure monitors, the second connection on the pressure monitor must be integrated into the hose connection of the first pressure monitor using a T-connection.
- The entry into the enclosure can be realized using the external installation kit

Hose connection of the APEX^{px} for internal installation



- Connect the hose connection "L" on the APEX^{px} Ex p control unit to the hose connection on the pressure monitor.
- When using two pressure monitors, the second connection on the pressure monitor must be integrated into the hose connection of the first pressure monitor using a T-connection.
- Connect the "A" connection to the atmosphere measuring point integrated in the enclosure

5.6 Purge gas supply

ATTENTION

Material damage due to missing purge gas nozzle!

Due to the internal pressures generated, there is a risk that the pressurised enclosure will be overloaded.

- Check that the purge gas nozzle has the correct hole.

Notice

Insufficient purge gas due to insufficiently dimensioned purge gas supply line.

Pressurised enclosure does not go into operation due to insufficient flow rate.

- Check the inside diameter of the purge gas supply.

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

The purge gas supply must be selected according to the following table.

Volume	Pressure	Pressure reducer	Pressure monitor	Purge gas nozzle	Supply
< 50 litres	2 bar	1/4"	12 mm	2.8 mm	10 mm
50 to 300 litres	2 bar	1/4"	15 mm	3.9 mm	10 mm
300 to 700 litres	2 bar	1/2"	18 mm	4.5 mm	15 mm
700 to 1,000 litres	3 bar	1/2"	2x 18 mm	4.5 mm	15 mm
from 1,000 litres	3 bar	1/2"	2x 18 mm	5.5 mm	20 mm

(The values given in the table are guidelines and may vary)

The pressure reducer for reducing the supplied purge gas pressure is mounted on the outside of the pressurised enclosure. The purge gas valve, which releases the purge gas, is mounted inside the pressurised enclosure. The purge gas nozzle limits the maximum flow rate of the purge gas and prevents the maximum pressure increase within the pressurised enclosure in case of defect in the purge gas valve.

Installation of the purge gas supply is illustrated below. The required installation material is included in the scope of delivery.

5.6.1 Version G1/4", gas

Notice

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

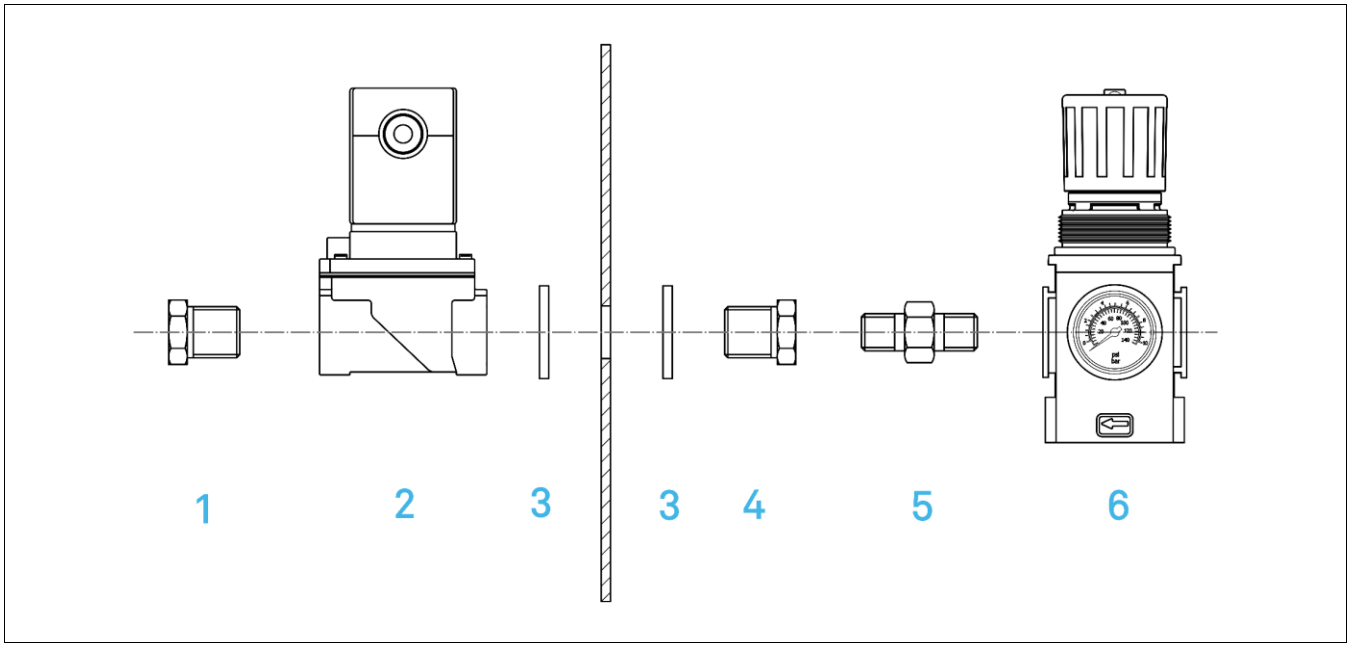
Installation of the purge gas supply must be carried out carefully. To ensure that the screwed parts are tight, they can be sealed using a PTFE sealing tape.

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

Procedure

- Drill a Ø 17 mm hole at the intended installation position of the pressurised enclosure.
- Use the reducing sleeve (4) and the sealing discs (3) to fit the purge gas valve (2) to the pressurised enclosure.
- Screw the drilled purge gas nozzle (1) into the outlet of the purge gas valve (2).
- Screw the detachable double nipple (5) into the reducing sleeve (4).
- Screw the pressure reducer G ¼" (6) onto the detachable double threaded nipple (5).

Pos.	Designation	Comment
1	Purge gas nozzle, drilled	In scope of delivery (2)
2	Purge gas valve	In digital or proportional version
3	Sealing disc	In scope of delivery (6)
4	Reducing sleeve G 1/4"i / G3/8"a	In scope of delivery (6)
5	Detachable double nipple G1/4"	In scope of delivery (6)
6	Pressure reducer G1/4"	For enclosures with a volume of up to 300 litres



5.6.2 Version G1/2", gas

Notice

The purge gas supply version in G1/2" can be used as of a protected volume of > 300 litres.

Installation of the purge gas supply must be carried out carefully.

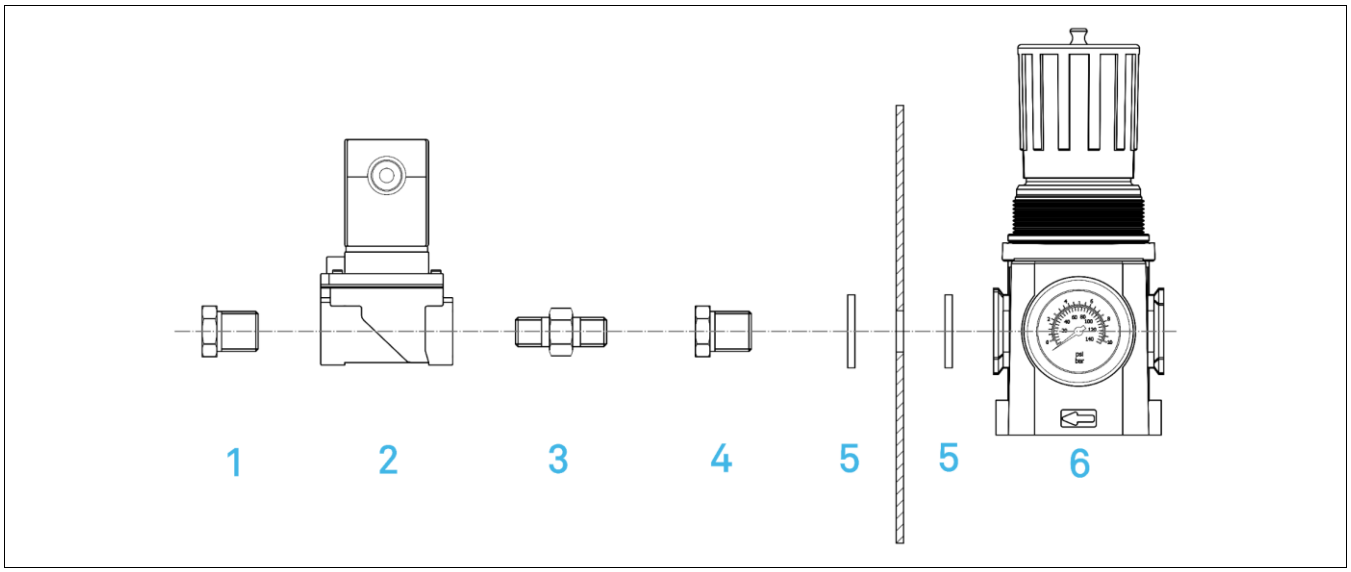
To ensure that the screwed parts are tight, they can be sealed using a PTFE sealing tape.

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

Procedure

- Drill a Ø 21 mm hole at the intended installation position of the pressurised enclosure.
- Use the reducing sleeve (4) and the sealing discs (5) to install the G1/2" pressure reducer (6) on the pressurised enclosure (6).
- Screw the detachable double nipple (3) into the reducing sleeve (4).
- Screw the purge gas valve (2) onto the detachable double nipple (3).
- Screw the purge gas nozzle (1) into the outlet of the purge gas valve (2).

Pos.	Designation	Comment
1	Purge gas nozzle, drilled	In scope of delivery (2)
2	Purge gas valve	In digital or proportional version
3	Detachable double nipple G3/8"	In scope of delivery (7)
4	Reducing sleeve G3/8"i / G1/2"a	In scope of delivery (7)
5	Sealing disc	In scope of delivery (7)
6	Pressure reducer G1/2"	For enclosures with a volume of more than 300 litres



5.6.3 Version G1/4", dust

Ex	For dust applications, a pressurised enclosure has no purging phase and is only pressurised with a positive overpressure. Therefore, there is no purge gas valve.

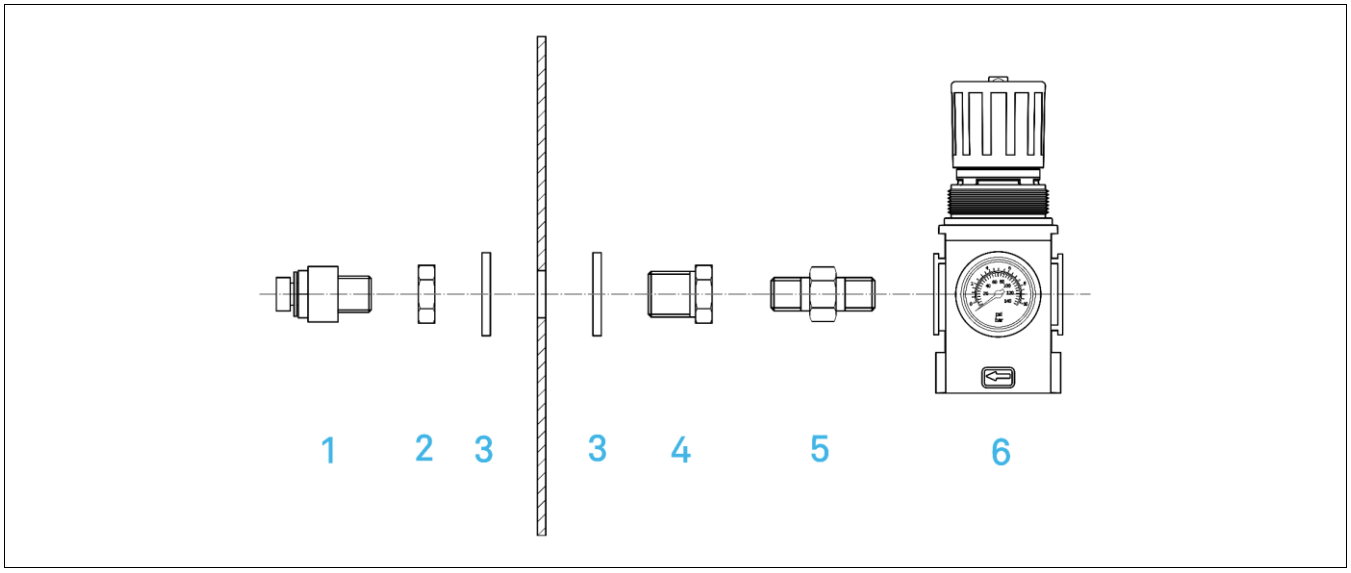
For dust applications, a pressurised enclosure has no purging phase and is only pressurised with a positive overpressure. Therefore, there is no purge gas valve. To ensure that the screwed parts are tight, they can be sealed using a PTFE sealing tape.

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

Procedure

- Drill a Ø 17 mm hole at the intended installation position of the pressurised enclosure.
- Install the reducing sleeve (4) with sealing discs (3) in the pressurised enclosure using the G3/8" nut (2).
- Screw the adjustable purge gas nozzle (1) into the reducing sleeve (4) inside the pressurised enclosure.
- Screw the detachable double nipple (5) into the reducing sleeve (5).
- Screw the pressure reducer G ¼" (6) onto the detachable double threaded nipple (5).

Pos.	Designation	Comment
1	Adjustable purge gas nozzle	
2	Nut G3/8"	
3	Sealing disc	In scope of delivery (6)
4	Reducing sleeve G 1/4"i / G3/8"a	In scope of delivery (6)
5	Detachable double nipple G1/4"	In scope of delivery (6)
6	Pressure reducer G1/4"	



6 Electrical connections

DANGER

Risk of death or serious injury due to working on live parts!

Risk of death due to electric current.

- Observe the 5 safety rules for working on electrical systems: Disconnect; secure against restarting; ensure that there is no voltage; earthing and short-circuiting; cover or isolate neighbouring live parts.

6.1 Wiring instructions

DANGER

Risk of death or serious injury when opening the cover of the APEX control unit in an explosive atmosphere!

Explosion hazard.

- Before opening enclosure covers, check the atmosphere for the presence of explosive gases.
- Only open for maintenance and servicing.

DANGER

Risk of death or serious injury due to improper closures!

Explosion hazard.

- Seal unused cable fittings with suitable and approved seals.

DANGER

Risk of death or serious injury due to improper installation!

Explosion hazard.

- Tighten cable fittings with 3.0 Nm
- Tighten the cover with 1.4 Nm

WARNING

Short-circuits due to loose or protruding lines in the APEX control unit!

An explosion may be triggered.

- Connect all wire lines, even those not required, to terminals.
- Check that no lines are loose or protruding.

WARNING

Avoid damaging the seals

Compromising of the explosion protection concept.

- Visual inspection of the seal when closing the APEX control unit (intact, clean and secured).

6.1.1 Inserting and laying of connection lines

The procedure for inserting and laying of connection lines to the APEX^{px} control unit is described below:

- Guide the supply, data and release line through the cable fittings into the connection compartment and connect or disconnect the conductors by pressing the actuator.
- Connect the shields and earth connections to the earthing terminal.
- Tighten cable fittings with 3.0 Nm.

6.1.2 EMC-compliant connection

Notice

Electromagnetic compatibility of an overall system in accordance with the EMC Directive must be ensured by the manufacturer (EMC-compliant design of a system) and the end-user (interference-free design of an overall system).

BARTEC Ex p control units can only operate safely and faultless with EMC-compliant wiring. This chapter supports you in the EMC-compliant design of your system.

During operation of an electronic or electrical device, interactions with other neighbouring devices occur. The neighbouring devices act as a source of interference, which affects the other device as an interference sink.

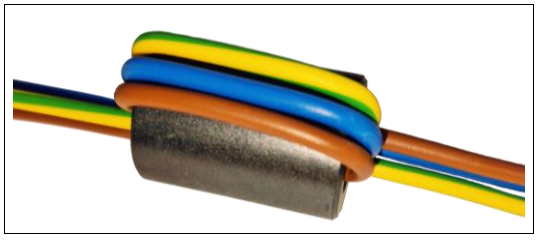
BARTEC Ex p control units are considered electromagnetically compatible and have been developed in compliance with applicable EMC standards and limit values.

For safe operation of the Ex p control units under EMC influences, professionally clean line connection makes a major contribution.

Lines and connections

Please observe the following points:

- Divide the lines into groups.
  Power cables / signal cables / data cables
- Ensure that the wiring is routed correctly. Ensure that cross-coupling between signal/data lines and power cables is avoided.
- Signal lines and power cables may only cross at right angles
- Route signal and data lines as close as possible to earth surfaces
- If possible, lay short cables. This means that coupling capacitances and inductances can be avoided.
- Use the supplied ferrite core for the power supply.
  Here, the individual conductors must be routed in a loop through the ferrite core.



Earthing cables

Earthing of a system fulfils protective and functional measures.

Please observe the following points:

- Earthing cables should be as short as possible.
- Avoid earth loops.
- Use earth straps with a width of at least 10 mm.

Shielding

To ensure faultless operation of a system, cables with the largest possible surface area (not cross-section) are important. High-frequency currents do not flow through the entire conductor cross-section, but predominantly on the outer skin of a conductor.

Please observe the following points:

- Always connect the shield over a large area using metal cable clamps.
- Avoid connecting the shield with long wires on both sides

6.1.3 Back-up fuse

ATTENTION

Observe the rated current of the release circuit (K1) and add this to the following information. The following values only apply for the Ex p control unit!

If the dimensions are too small, the Ex p control unit may be destroyed.

- Rated current (controller) + rated current release circuit (K1).

Variant	APEX^{px}, DC	APEX^{px}, AC
Rated current, control unit	>= 3.15	>= 2
Rated voltage, control unit	>= 63 V D	>= 277 V AC
Response time	Slow	Slow
Switch-off current	>= 1.5 kA	>= 1.5 kA
Melting integral	12... 34 A²s	9.7... 14.7 A²s

6.1.4 Inductive loads

ATTENTION

Interference caused by inductive loads can destroy the Ex p control unit!

Overvoltages occur when switching off inductive loads (e.g. contactor coils). Voltage peaks of up to 4 kV can occur with a voltage gradient of 1 kV / microsecond.

- Inductive loads must be suppressed by suitable measures.

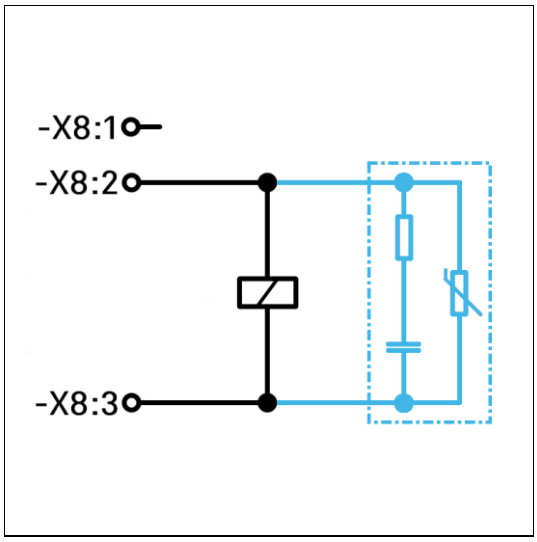
For inductive loads, protective circuits are to be used to limit the voltage peaks that occur when switching off.

The consequences of this can be:

- Coupling of interference signals that generate false signals
- Destruction of the Ex p control unit.

Protective circuits protect the Ex p control unit from early failure due to overvoltage that occurs when the current flowing through an inductive load is interrupted. In addition, protective circuits limit the electrical interference that occurs when switching inductive loads.

Protective circuit for AC-fed inductive loads



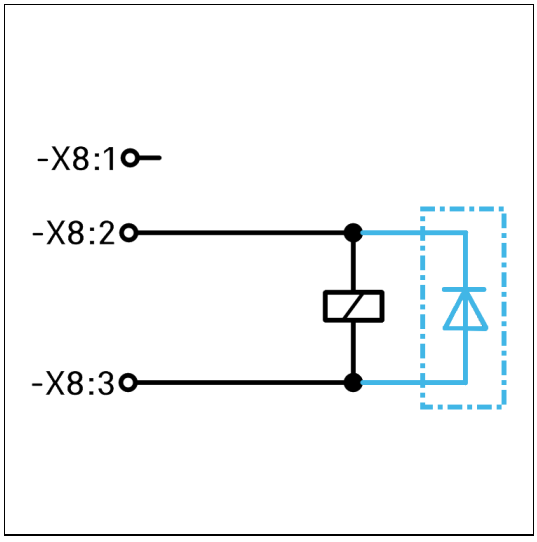
This circuit variant is used for inductive loads AC-fed relays / contactors.

This circuit variant utilises the property of the VDR resistor of low impedance above a certain threshold voltage. This short-circuits the self-induction voltage.

Any resulting vibrations are minimised by the RC snubber.

Interference suppression measure, e.g. BARTEC 07-7311-93GU/K000
RC snubber and varistor

Protective circuit for DC-fed inductive loads



This circuit variant is used for DC-fed relays / contactors. A diode is connected in parallel to the coil in the reverse direction.

Interference suppression measure, e.g. BARTEC 07-7311-61GF/5400
Freewheeling diode

6.2 Electrical wiring

WARNING

Explosion protection not guaranteed by connecting intrinsically safe (Ex i) signals to relay outputs!

Relay outputs are not suitable for intrinsically safe (Ex i) signals.

- Use suitable isolating relays between Ex e relay outputs and Ex i signals!

ATTENTION

Material damage due to incorrect supply voltage!

Internal electronics of the Ex p control unit can be destroyed.

- Before activating the supply voltage, compare the value of the supply voltage with the value printed on the control unit.

ATTENTION

Active protective measure!

- As an active protective measure, the supply voltage must be protected by a fuse (min. 1500 A breaking capacity).

ATTENTION

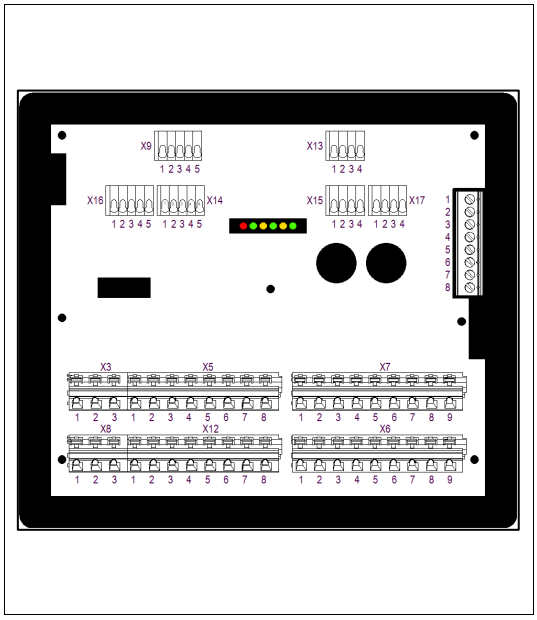
EMC-compliant wiring!

Internal electronics can be disturbed by a lack of EMC measures and cause unforeseen shutdowns.

- Loop the supplied ferrite sleeve into the power supply.
- See EMC-compliant wiring

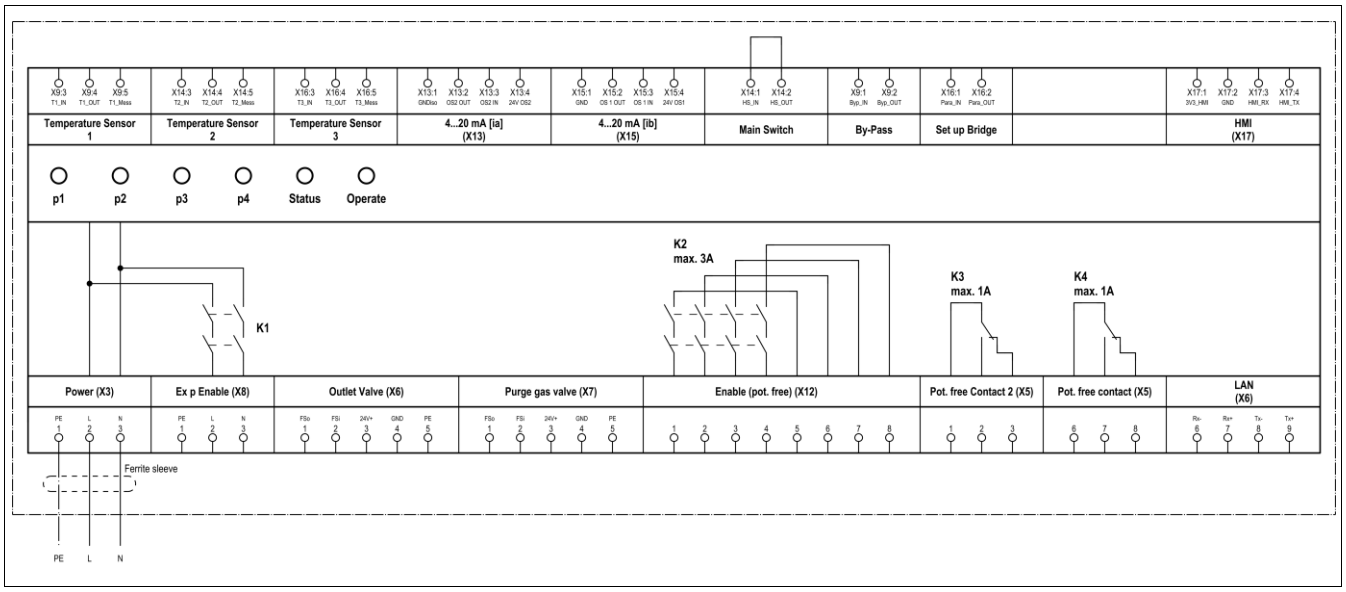
6.2.1 Terminal block overview

On the connection board of the Ex p functional unit are the connection terminals with ignition protection type "Ex e" (X3, X5, X8, X12, X7 and X8) or "Ex i" (X9, X16, X14, X17 and pressure measuring card).

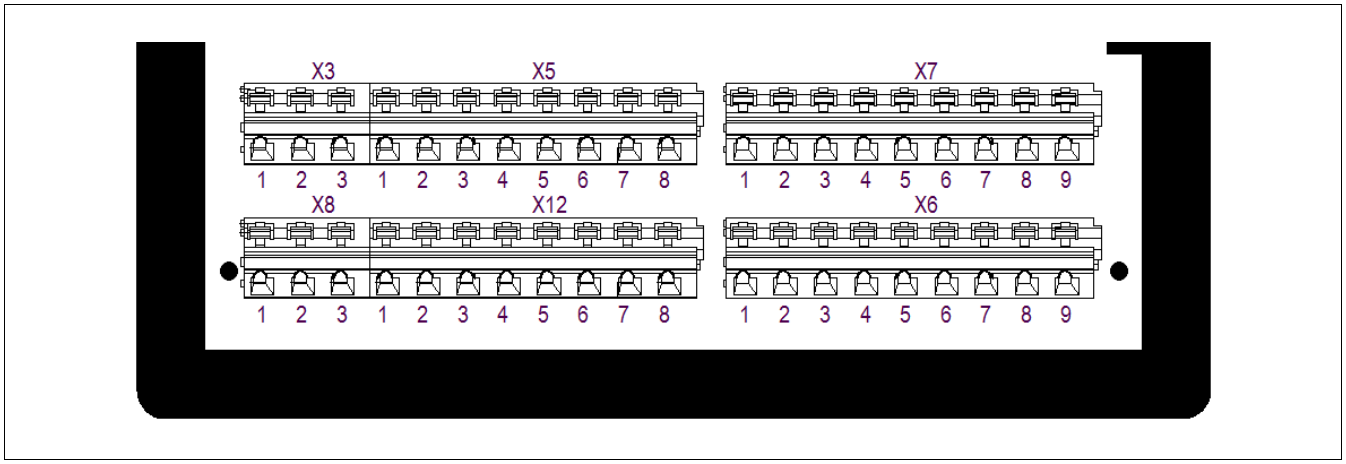


Terminal	Ex	Connection
X3	Ex e	Power supply
X5	Ex e	2x signal relays, 1x CO
X8	Ex e	Release, energised
X12	Ex e	Signal relay, 4x NO
X7	Ex e	Purge gas valve, empty contacts
X8	Ex e	Valve, LAN
X9	Ex i	Bypass, T-sensor 1
X13	Ex i	Optional sensor [ia]
X14	Ex i	Main switch, T-sensor 3
X15	Ex i	Optional sensor [ib]
X16	Ex i	Parameter release, T-sensor 2
X17	Ex i	p-Operator Panel
	Ex i	Pressure measuring card

6.2.2 Connection diagram



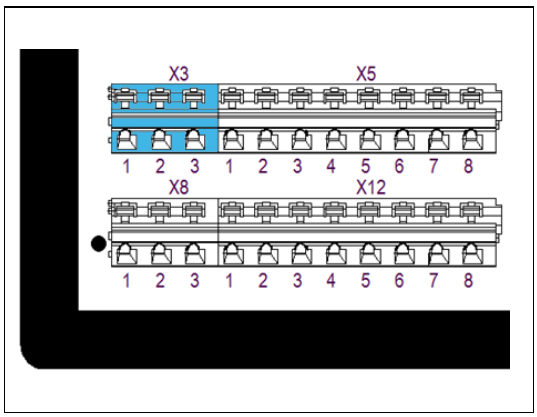
6.2.3 Ex e connection terminals



6.2.3.1 Terminal block "X3"

The supply voltage is connected to terminal block X3.

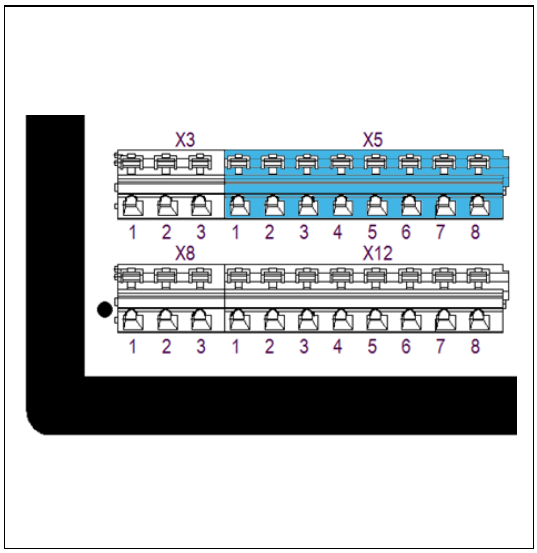
⚠ **Installation of ferrite sleeve!** → See section EMC-compliant connection



Terminal	Connection
1	PE
2	Phase (+conductor) power supply
3	Neutral (GND) power supply

6.2.3.2 Terminal block "X5"

One potential-free changeover contact each, K3 and K4 are available on the Ex p functional unit for messages and processing signals. The associated switching function can be set in the Ex p control unit via the WEB interface and is freely programmable.
The maximum switching current is 1 A.



Terminal	Connection
1	K3 – COM (foot contact)
2	K3 – NO (normally open contact)
3	K3 – NC (normally closed contact)
4 / 5	PE
6	K4 – COM (foot contact)
7	K4 – NO (normally open contact)
8	K4 – NC (normally closed contact)

6.2.3.3 Terminal block "X8"

ATTENTION

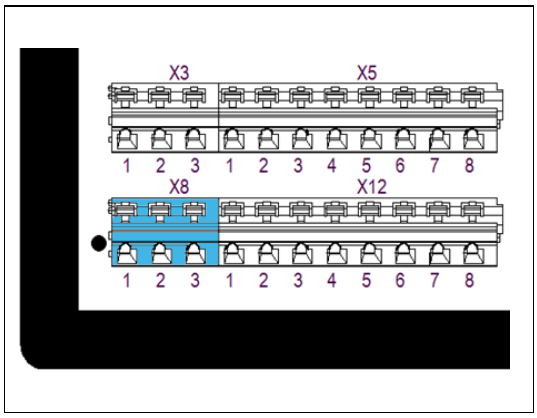
Material damage due to overcurrent on control electronics!

Welding of the release relays or destruction of the Ex p functional unit by inductive loads.

- The Ex p release (relay K1, X8 terminals 2 and 3) may only be operated in combination with a mains fuse (max. 5 A, 1,500 A switching capacity, fast-acting).
- Supplement inductive loads with suitable interference suppression measures. See chapter 6.1.4.
- Maximum start-up current 15 A for 20 ms

The application inside the pressurised enclosure is released by the Ex p control unit using the release contact on terminal block X8.

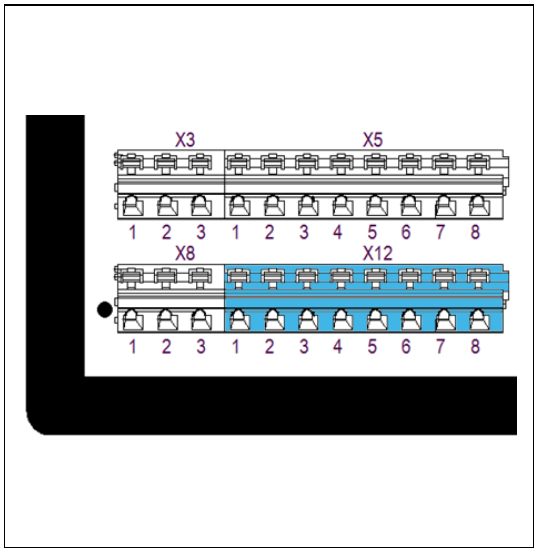
⚠ **No voltage may be present in the pressurised enclosure when the Ex p control unit is deactivated**



Terminal	Connection
1	PE
2	Phase (+conductor) power supply
3	Neutral (GND) power supply

6.2.3.4 Terminal block "X12"

A potential-free signal (4x NO) is available on the Ex p functional unit. This signal can either be used as a release, which is also safety-related. Or it can be used as a potential-free signal.



Terminal	Connection
1	K2_1 - NO (normally open contact)
2	K2_2 - NO (normally open contact)
3	K2_3 - NO (normally open contact)
4	K2_4 - NO (normally open contact)
5	K2_1' - NO (normally open contact)
6	K2_2' - NO (normally open contact)
7	K2_3' - NO (normally open contact)
8	K2_4' - NO (normally open contact)

6.2.3.5 Terminal block "X7"

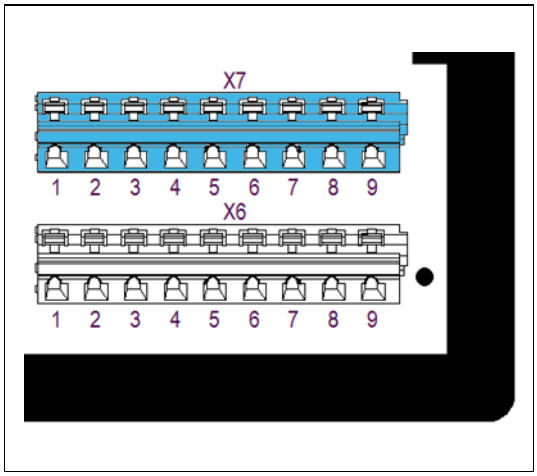
ATTENTION

Damage due to incorrect back-up fuse!

Valve or Ex p control unit may be damaged.

- Only operate the digital purge gas valve with a 1.0 A back-up fuse and the proportional purge gas valve with a 1.6 A back-up fuse.

Terminal block X7 is used to connect the purge gas valve with associated valve fuses. In addition, terminal points 6 – 9 are intended to accommodate the unused wires of the LAN connection cable.



Terminal	Connection
1	Back-up fuse
2	Back-up fuse
3	Valve +
4	Valve -
5	Valve PE
6	Connection of unused wire LAN cable
7	Connection of unused wire LAN cable
8	Connection of unused wire LAN cable
9	Connection of unused wire LAN cable

6.2.3.6 Terminal block "X6"

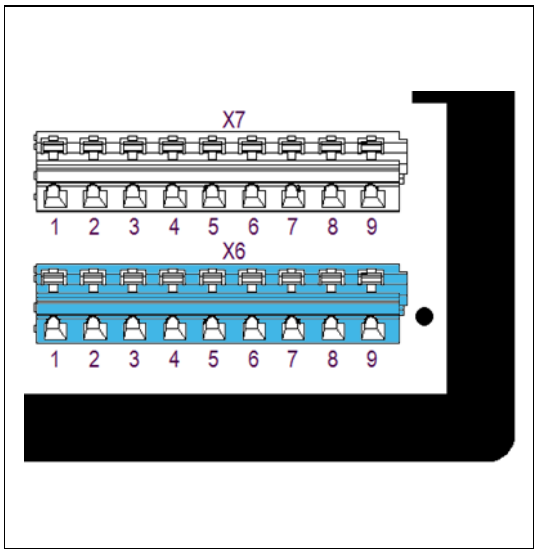
DANGER

Risk of death or serious injury due to connected programming cable!

Explosion hazard.

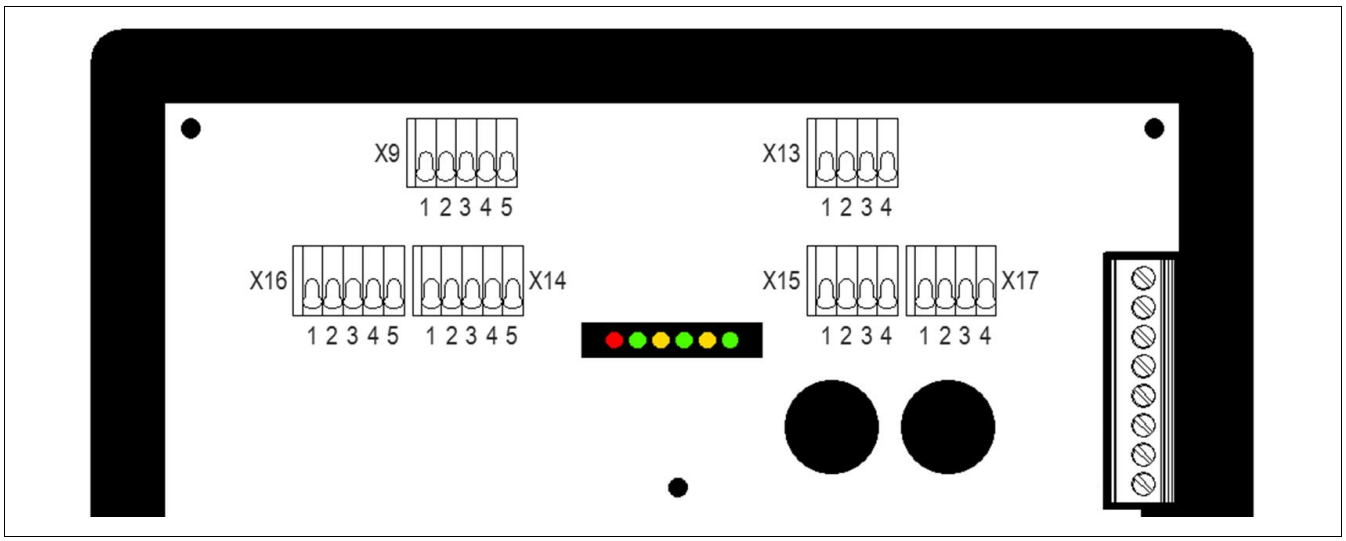
- Disconnect the programming cable after completing maintenance and programming work.

Terminal block X6 is used to connect valve-controlled outlets with associated valve fuses. In addition, terminal points 6 – 9 are intended to accommodate the wires of the LAN connection cable.



Terminal	Connection
1	Back-up fuse
2	Back-up fuse
3	Valve +
4	Valve -
5	Valve PE
6	GN - Send, negative
7	GNWH - Send, positive
8	OG - Receive, negative
9	OGWH - Receive, positive

6.2.4 Ex i connection terminals



6.2.4.1 Terminal block "X13"

SIL

ATTENTION

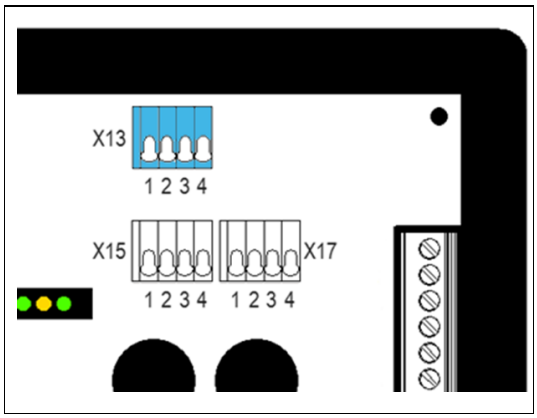
Attention when connecting external sensors to the Ex p control unit.

When connecting external sensors to the Ex p control unit, attention must be paid to functional safety!

- The external sensors must fulfil the requirements of SIL 2.

An additional pressure sensor with a 4...20 mA output can be connected to the optional current input OS 2 [Ex ia] or purging can be triggered without deactivation using a current signal.

The signal is processed depending on the function settings.



Terminal	Connection
1	GNDiso
2	OS2 Out
3	OS2 IN
4	24V OS2

6.2.4.2 Terminal block "X15"

SIL

ATTENTION

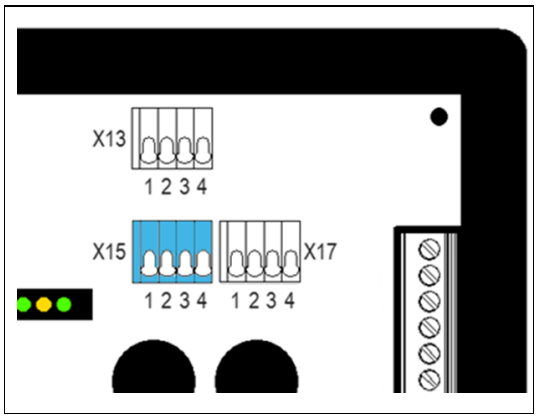
Attention when connecting external sensors to the Ex p control unit.

When connecting external sensors to the Ex p control unit, attention must be paid to functional safety!

- The external sensors must fulfil the requirements of SIL 2.

An additional pressure sensor with a 4...20 mA output can be connected to the optional current input OS 1 [Ex ib] or purging can be triggered without deactivation using a current signal.

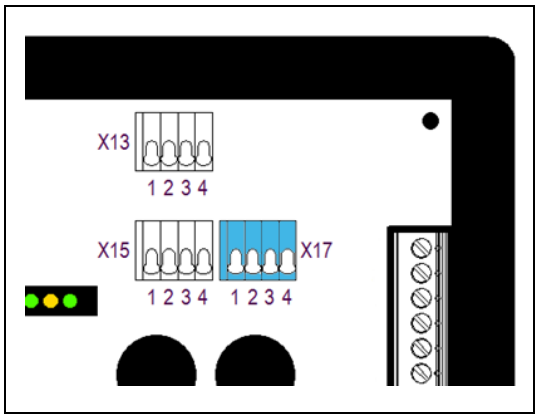
The signal is processed depending on the function settings.



Terminal	Connection
1	GND
2	OS1 Out
3	OS1 IN
4	24V OS1

6.2.4.3 Terminal block "X17"

The optionally available p-Operator Panel can be connected to terminal block "X17".



Terminal	Connection	Cable colour
1	3V3_HMI	Black
2	GND	White
3	HMI_RX	Red
4	HMI_TX	Yellow

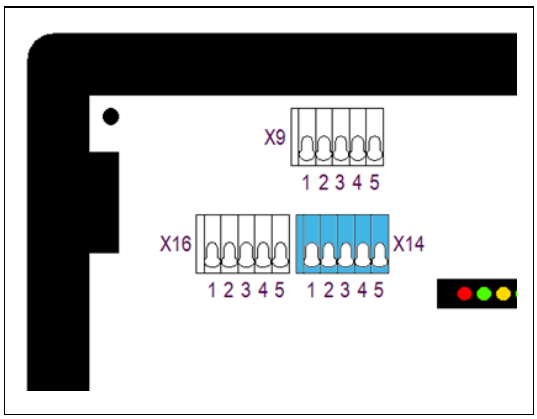
6.2.4.4 Terminal block "X14"

Notice

The main switch IN // main switch OUT contact is fitted with a jumper as standard. This jumper ensures that the system is automatically released after the purging process.

This "Main switch" function releases operation when the control unit is released and the switch is activated. The switch does not require a resistor combination.

The temperature sensor can be PT 100 or 1000. Settings for the sensor are made in the device.



Terminal	Connection
1	Main switch IN
2	Main switch OUT
3	Temperature sensor 2 IN
4	Temperature sensor 2 OUT
5	Temperature sensor 2 MEAS

6.2.4.5 Terminal block "X16"

WARNING

Risk of death or serious injury due to unintentional alteration of Ex-relevant parameters.

Explosion protection is no longer guaranteed.

- Remove the programming release after deliberately changing parameters.
- After changing or adjusting parameters, a subsequent function check must be carried out.

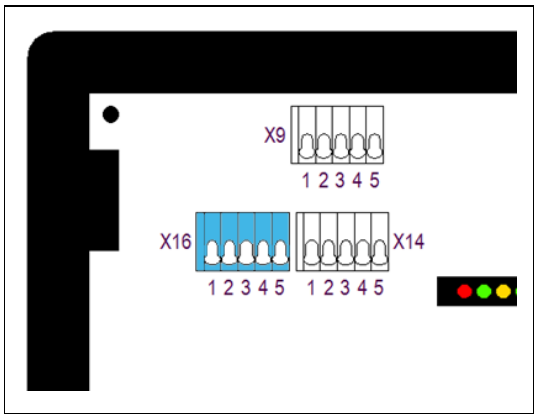
Notice

In normal operation, the parameter switch should not be connected in order to avoid unintentional parameter changes.

To change settings and setpoints on the device, the programming release must be connected and activated. It should only be connected during deliberate changing of parameters. After changing or adjusting parameters, a subsequent function check must be carried out.

This must not be connected during normal operation of the Ex p system.

The temperature sensor can be PT 100 or 1000. Settings for the sensor are made in the device. Two or three wire sensors can be used.



Terminal	Connection
1	Para_IN
2	Para_OUT
3	Temperature sensor 3 IN
4	Temperature sensor 3 OUT
5	Temperature sensor 3 MEAS

6.2.4.6 Terminal block "X9"

DANGER

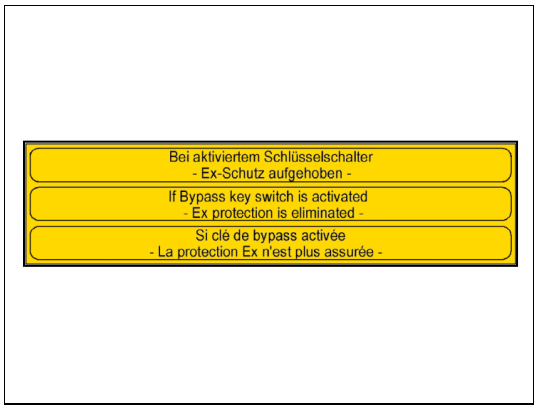
Risk of death or serious injury due to commissioning with bypass key switch in potentially explosive atmosphere!

Explosion hazard.

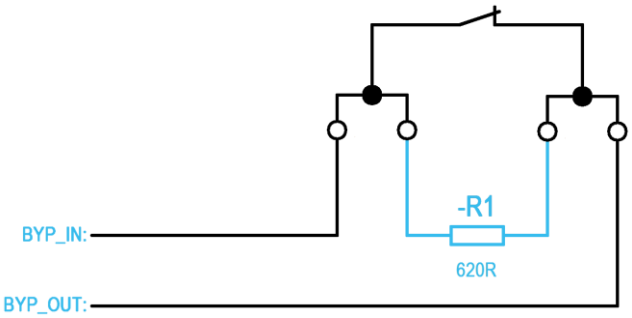
- Commissioning with bypass key switch must be authorised by the operations manager or their representative. Authorisation may only be granted if it is ensured that no explosive atmosphere is present for the period of commissioning or if the necessary protective measures against the risk of explosion have been taken (fire permit).
- The bypass key switch must be marked in the immediate vicinity of the key switch to indicate that the explosion protection is deactivated when the key switch is activated.

A bypass key switch can be connected for examinations that have to be carried out on the protected application under voltage.

The bypass key switch must be labelled with an identification plate attached in the immediate vicinity of the bypass key switch.

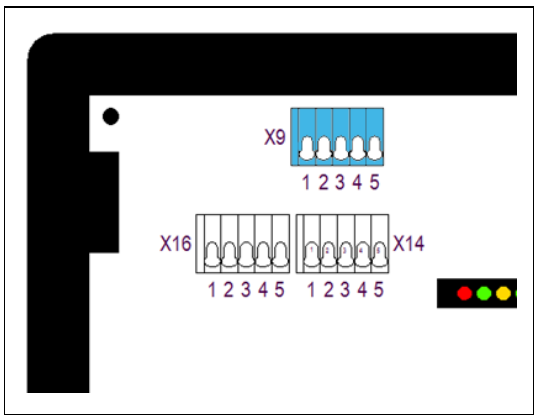


Wiring example:



The setting of the bypass key switch is queried by the control electronics in an intrinsically safe manner. In order for the bypass switch to be recognised and the function to be executed, a 620R resistor must be recognised by the Ex p control unit via the terminal.

The temperature sensor can be PT 100 or 1000. Settings for the sensor are made in the device. Two or three wire sensors can be used.



Terminal	Connection
1	Byp_IN
2	Byp_OUT
3	Temperature sensor 1 IN
4	Temperature sensor 1 OUT
5	Temperature sensor 1 MEAS

7 Operation

The following chapters describe operation and use of the Ex p control unit by the end-user. The configuration and setting description can be found in separate operating instructions.

The complete solution is self-starting once the purge gas supply and supply voltage have been connected. System statuses can be queried via the WEB operating system.

7.1 Configuration of the LAN interface

The Ex p control unit is supplied with a fixed IP address as standard.

Standard IP address (delivery status): 192.168.11.101

7.1.1 Setting the LAN connection

The settings of the LAN interface on the PC (or converter/managed switch) must be parameterised so that it can communicate with the Ex p control unit.

Settings:

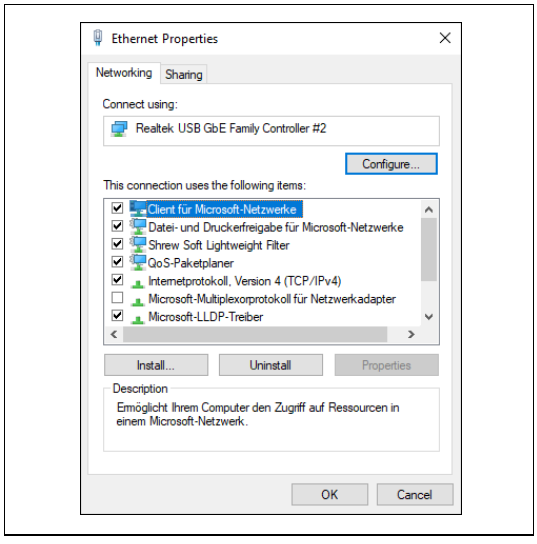
LAN interface configuration:

- Advanced / Speed: 100 Mbps Full Duplex

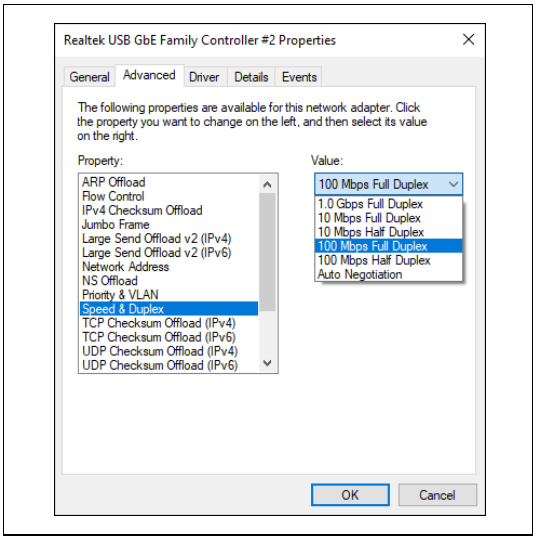
Internet Protocol Ver. 4 (TCP/IPv4) properties:

- Activation of fixed IP address
- IP address: 192.168.11.99
- Subnet mask: 255.255.0.0

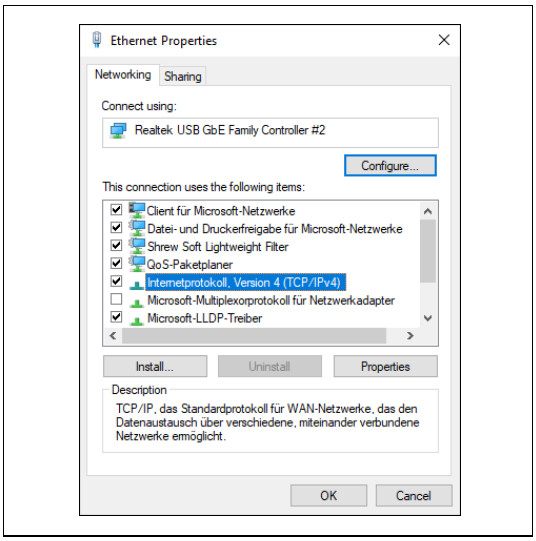
Procedure



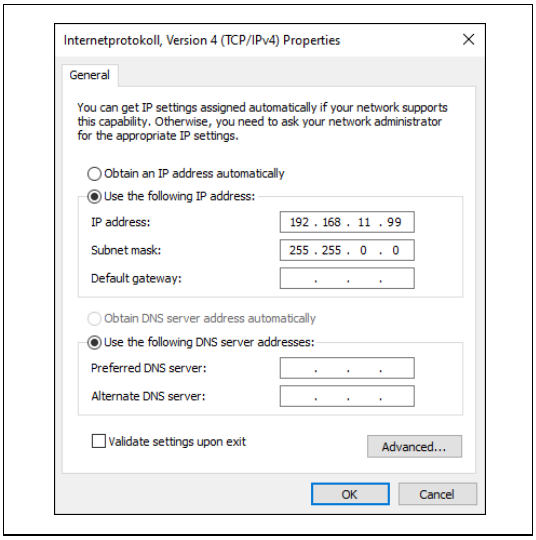
- Open the network settings of the LAN interface on the PC/laptop.
- Select the "Properties" button to call up the properties of the LAN connection.



- Press the "Configure..." button to open the settings for the network adapter and select the Advanced tab.
- Select the "Speed & Duplex" function in the "Property" field on the left by clicking on it.
- Set the "Value" field on the right to "100 Mb Full Duplex" by clicking and selecting from the drop-down menu.
- Confirm changes with "OK".



- Double-click to call up Internet Protocol Version 4 (TCP/IP4).



Properties of Internet Protocol Version 4 (TCP/IPv4):

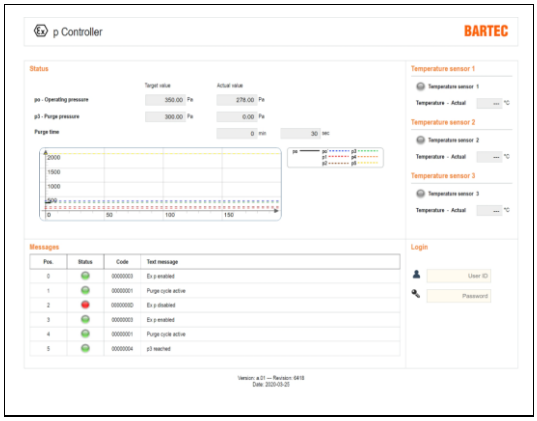
- Switch "Obtain IP address automatically" to "Use the following IP address" by clicking on it.
- Enter IP address 192.168.11.99 under "IP address"
- Enter subnet mask 255.255.0.0.
- Confirm inputs with OK.

7.2 Operation of the WEB operating system

The WEB operating system (WEB-OS) is operated via the PC's input devices.

7.3 Login at WEB operating systems

Two levels are available for logging in to the WEB interface



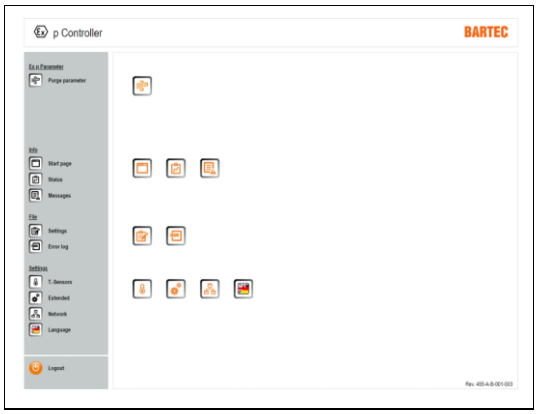
Level 1	=	**Guest access**
User ID	=	guest
Password	=	guest

Notice: Settings cannot be changed. Language change and status query and messages possible.

Level 2	=	**User access**
User ID	=	user
Password	=	0000

Notice: Settings can only be changed when the programming switch is set.

7.4 Navigation in WEB operating system



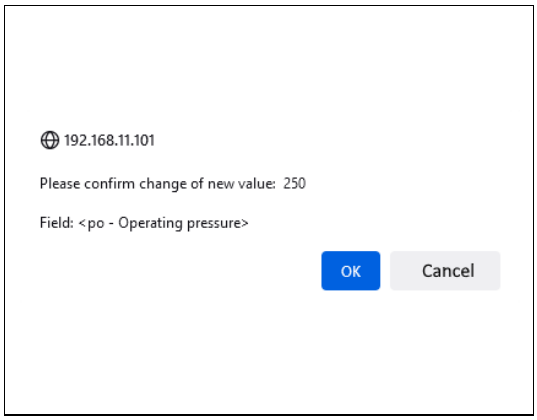
By clicking on the grey navigation bar on the left, you can jump directly to the specific submenus.

The corresponding icons for the submenus are arranged to the left of this.

The icon for logging out is located at the bottom left. By pressing the button, the WEB operating system logs out and switches to the start screen.

7.5 Input of parameters

Changing parameters in the web interface must be carried out in a specific order.

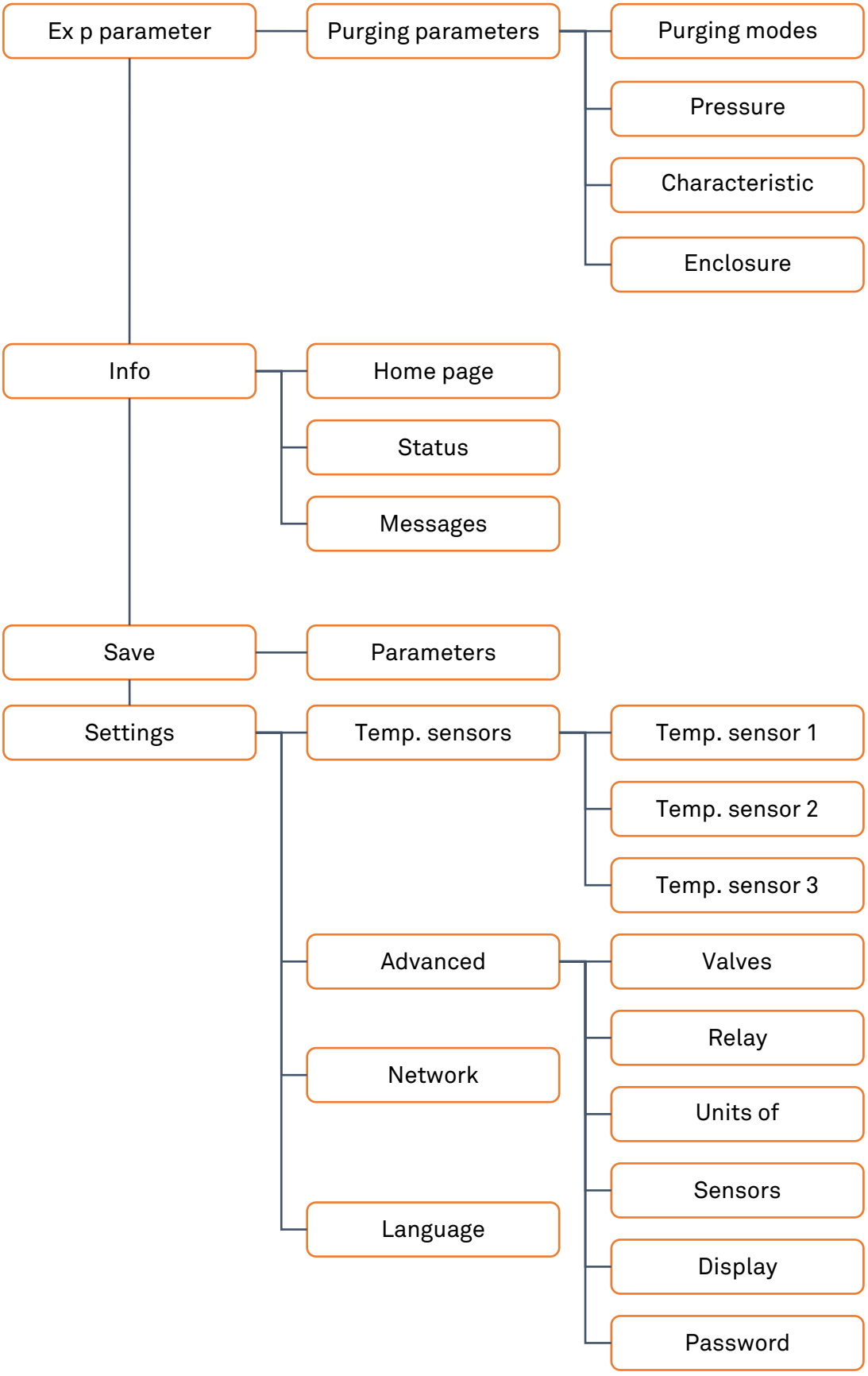


Procedure

- Activate parameter switch.
- Logging into the WEB operating system
- Select the desired parameter e.g. po
- Enter pressure value - e.g. enter value 250
- Confirm by pressing "Enter"
- The following window opens. This is to confirm and check the changed parameter value.

7.6 Menu structure of the WEB operating system

The WEB interface integrated in the Ex p control unit shows the following menu structure.



7.7 LED indicators on the Ex p functional unit

LED	Colour	Function
p1	Green	**Minimum pressure** – Lights up when the minimum pressure is exceeded
p2	Yellow	**Pre-alarm** – Lights up when the value falls below the set value
p3	Green	**Purge pressure** – Lights up during the purging phase and when the setpoint is exceeded
p4	Red	**Maximum pressure** – Lights up when the maximum pressure p4 or p5 is exceeded
Operate	Green	**Release / purging process** – Flashing during purging and illuminated when released after purging
Status	Green	**Supply / bypass** – Lights up when the supply voltage is applied and flashing when the bypass is activated

7.8 Operating menu in WEB operating system

7.8.1 Ex p parameters / purging parameters

The purging parameters are summarised in the "Ex p parameters / Purging parameters" menu. This includes the purging modes, pressure parameters, characteristic curve and enclosure parameters submenus.

7.8.1.1 Purging modes

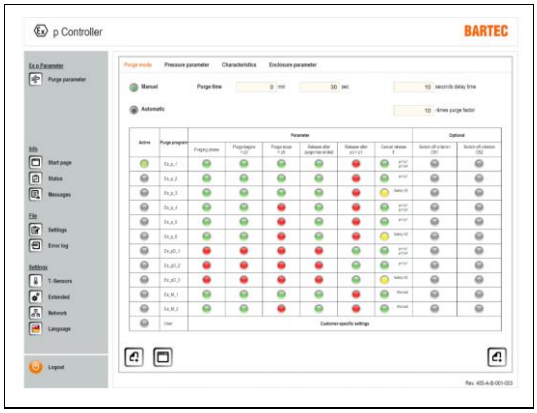
DANGER

Risk of death or serious injury due to use of an unsuitable purging modes!

Explosion hazard.

- Only activate purging programs suitable for the application.
- Purging programs Ex_p_3, Ex_p_6, Ex_M_1 and Ex_M_2 are special purging modes which must not be used for standard applications.

Ex p sequence control is defined in the "Purging modes" submenu.



Purge time = Fixed purge time of the Ex p device

Delay time = Defines the delay time for switching off the Ex p equipment in the event of pressure fluctuations.

Purging factor = Parameter for the number of purging operations of the Ex p volume for automatic averaging of the purge time.

Automatic purging automatically calculates the corresponding purge time during the initial phase of purging based on the parameters stored in the Ex p control unit for the enclosure size and applied purge gas outlet.

Manual purging is based on the values for purge time and pressures being permanently stored in the device during initial commissioning. The purge time is calculated and programmed by the commissioning technician based on the determined flow rate and enclosure volume.

Gas application purging programs:

Program	Application	Function				
		Purging phase	Purge time starts when P3 is reached	Purge time stops when reaching of p5	Ex p active at	Ex p inactive at
Ex_p_1	Gas	Yes	Yes	Yes	Purge time expiration	po < p1 po > p4
Ex_p_2	Gas	Yes	Yes	Yes	Purge time expiration	po < p1
Ex_p_4	Gas	Yes	Yes	No	Purge time expiration	po < p1 po > p4
Ex_p_5	Gas	Yes	Yes	No	Purge time expiration	po < p1

Ex p programs dust application:

Program	Application	Function				
		Purging phase	Purge time starts when P3 is reached	Purge time stops when reaching of p5	Ex p active at	Ex p inactive at
Ex_pD_1	Dust	No	No	No	po >= p1	po < p1 po > p4
Ex_pD_2	Dust	No	No	No	po >= p1	po < p1

7.8.1.2 Pressure parameters

The system pressures of the Ex p equipment are defined in the "Pressure parameters" submenu.

Value	Description
po	**Operating pressure.** Regulating pressure value during the operating phase.
p1	**Minimum pressure.** Switch-off value, if undershot, the release is cancelled.
p2	**Pre-alarm.** Value at which an alarm can be triggered before switch-off.
p3	**Purge pressure.** Purge time starts when the set value is exceeded.
p4	**Maximum pressure, operation.** The release switches off depending on the mode used.
p5	**Maximum pressure, purge.** The release switches off depending on the mode used.

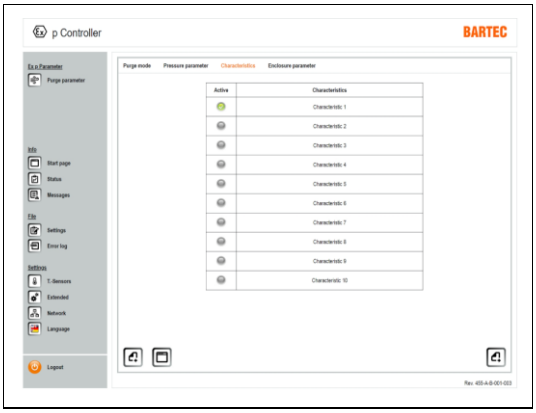
7.8.1.3 Characteristic curve

DANGER

Incorrect parameterisation of the parameters in the Ex p control unit!

The purging process takes place with insufficient flow of purge gas and there is a risk of residual explosive gases inside the Ex p equipment.

- Check type and set characteristic.



For automatic purge time determination, the characteristic of the pressure switch in the system must be set in the Ex p control unit.

Value	Function	Type pressure monitor	Orifice size
Characteristic 1	1x pressure outlet	1x 17-51P3-1203	5 mm
Characteristic 2	1x pressure outlet	1x 17-51P3-1303	8 mm
Characteristic 3	1x pressure outlet	1x 17-51P3-1403	12 mm
Characteristic 4	1x pressure outlet	1x 17-51P3-1503	15 mm
Characteristic 5	1x pressure outlet	1x 17-51P3-1603	18 mm
Characteristic 6	2x pressure outlet	2x 17-51P3-1603	18 mm

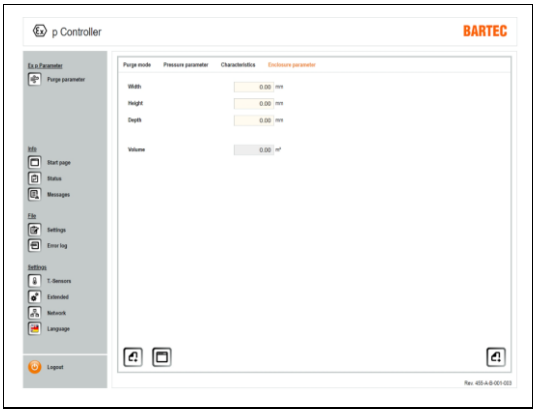
7.8.1.4 Enclosure parameters

DANGER

Incorrect parameterisation of the parameters in the Ex p control unit!

The purging process takes place with insufficient flow of purge gas and there is a risk of residual explosive gases inside the Ex p equipment.

- Check enclosure size and enclosure volume.

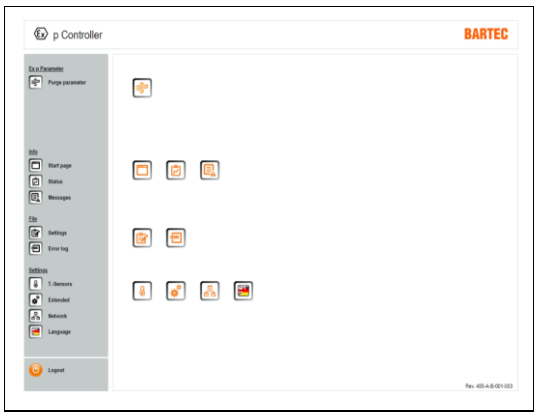


For automatic purge time determination, the size of the protected volume must be set in the Ex p control unit.

This is done by entering the length, width and height in mm.

7.8.2 Info

7.8.2.1 Home page

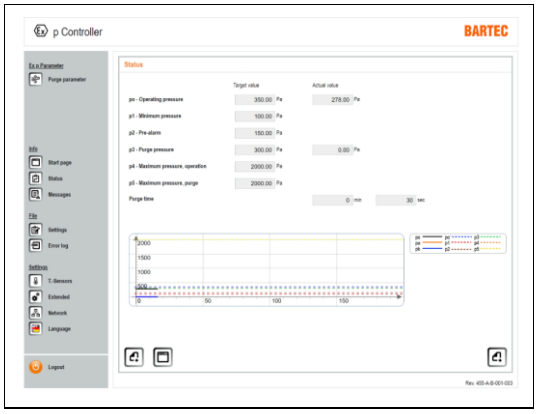


By clicking on the grey navigation bar on the left, you can jump directly to the specific submenus.

The corresponding icons for the submenus are arranged to the left of this.

The icon for logging out is located at the bottom left. By pressing the button, the WEB operating system logs out and switches to the start screen.

7.8.2.2 Status



The "Info / Status" menu provides an overview of the setpoint and measured values.

There is also an internal pressure diagram at the bottom.

7.8.2.3 Messages

The current system status is displayed as a plain text message in the "Info / Messages" menu.

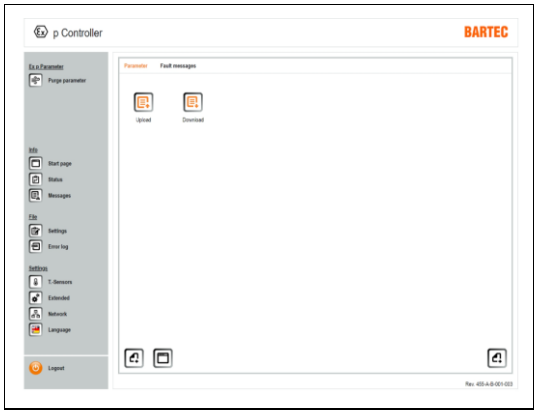
Green messages = Positive

Yellow messages = Warning

Red messages = Error messages

7.8.3 File

7.8.3.1 Settings

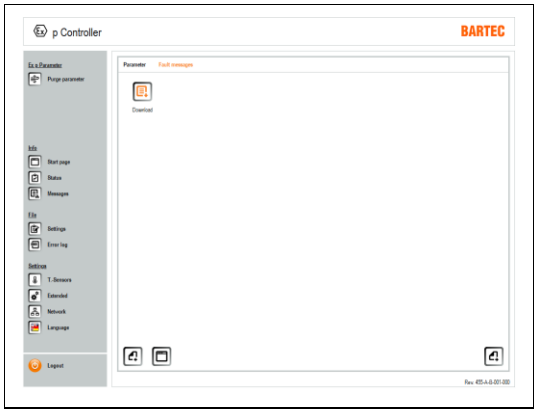


In the "Save / Parameters" menu, parameters of the Ex p control unit can be saved to a local computer or transferred from the local computer to the Ex p control unit.

Load = Transfer local parameter set to the Ex p control unit.

Save = Save parameter set from Ex p control unit to local computer.

7.8.3.2 Fault messages



Furthermore, there is the option of reading out the error memory in the "Save / Error memory" menu.

Download = Local loading of the error memory.

The file is transferred to the local computer as a *.csv file. This can be opened using Microsoft Excel.

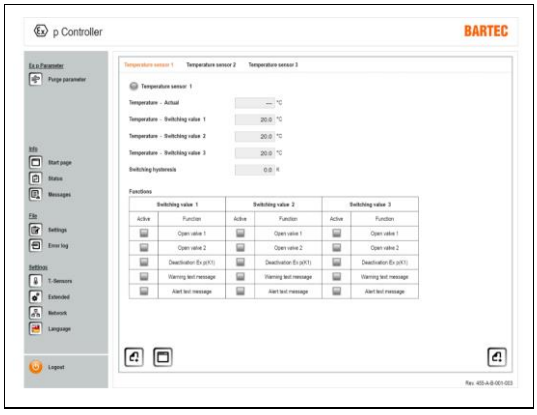
7.8.4 Settings / Advanced

7.8.4.1 Temperature sensors

Notice

The temperature sensors are not designed with safety in mind!

- This means that if the "Deactivation Ex p" function is activated, the protected equipment is deactivated when the temperature is exceeded and reactivated when the temperature drops!



Up to three connected PT100/1000 sensors can be configured in the "T. sensors" menu.

Various functions can be executed in the control sequence for the recorded temperature.

This function can be used, for example, to monitor and cool frequency converters.

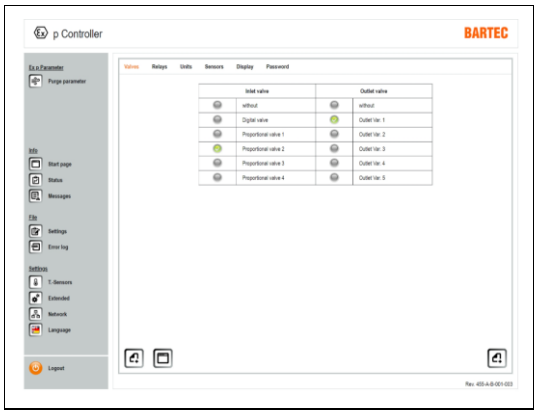
Temperature sensor	Function
Temperature – Actual	Display of the measured temperature
Temperature switching value 1	If the switching value is exceeded, the assigned function is executed
Temperature switching value 2	
Temperature switching value 3	
Switching hysteresis	Switching hysteresis between activation and deactivation

Switching value	Function
Open valve 1	Cooling via purge air
Open valve 2	Function is not available for APEX^{px}
Deactivation Ex p (K1)	Release Ex p drops
Warning message plain text	Plain text messages issued as warning
Alarm message in plain text	Plain text message issued as alarm

Procedure for "Temperature sensors" settings

- Connect computer to Ex p control unit
- Activate the programming switch
- Log in to the WEB-OS with the user level
- Call up the Advanced / Sensors menu
- Activate the corresponding button for the required temperature sensor e.g. temperature sensor 1 by clicking on PT100 or 1000
- Associated button changes to
- Confirm pop-up window with changed value
- Select the display unit in °C or °F by clicking the Activate button. Display changes to
- Confirm pop-up window with changed value
- Call up the T. sensors / Temperature sensor 1 menu
- Signalling for active sensor is indicated by the green indicator
- Store switching value 1
  e.g. 25°C
- Confirm pop-up window with changed value
- For switching value 2 and switching value 3, proceed in the same way as for switching value 1
- Store switching hysteresis
  e.g. 5 K, functions are activated or deactivated with a hysteresis of 5K
- Select function for switching value 1
  e.g. open valve 1 "Cooling via purge air" function
- Confirm pop-up window with changed value
- Function to switching value 2 and switching value equal to switching value 1.

7.8.4.2 Valves



The purge gas valve connected to the Ex p control unit can be set in the "Valves" menu.

The delivery status is in the digital valve setting.

The activated purge gas valve is marked with the following symbol:

Purge gas valve		Outlet valve	
Default	Valve	Default	Outlet
	Without	activated	Without
activated	Digital valve Type 05-0056-0073		Outlet Var. 1
	Proportional valve 1		Outlet Var. 2
	Proportional valve 2 Type 05-0056-0081		Outlet Var. 3
	Proportional valve 3 and 4		Outlet Var. 4
			Outlet Var. 5

7.8.4.3 Units of measurement

The display units for pressure, length, volume and dilution can be selected in the "Units of measurement" menu.

7.8.4.4 Relay

Notice

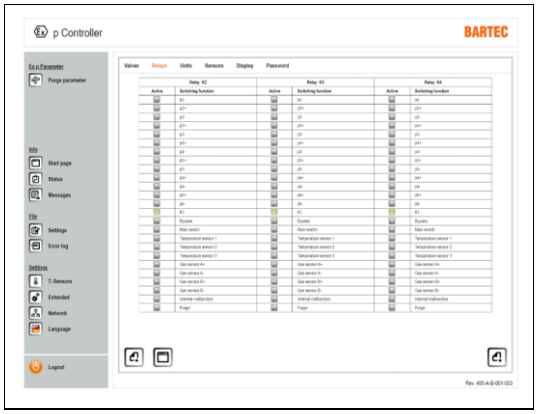
Attention: Switch relay K2 simultaneously with K1!

When switching parameter K1 is activated, the relay functions as a release relay. Other activated switching parameters are ignored.

- Programming additional switching parameters on relays K3 or K4

Messages with a "minus sign" indicate that the relay is activated if the value falls below the threshold.

Messages with a "plus sign" indicate that the relay is activated if the value is exceeded.



In the "Relay" menu, the relays K2, K3 and K4 can be assigned the corresponding switching functions. One or more switching functions can be assigned to each relay.

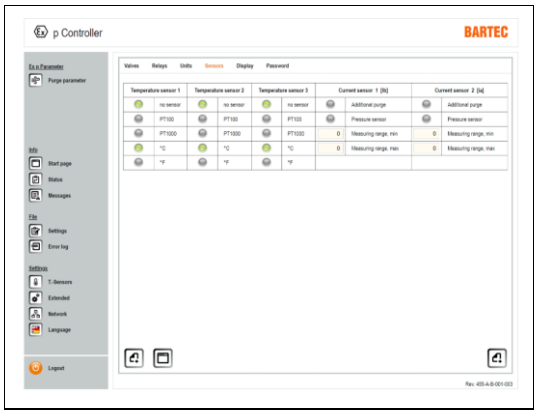
The factory setting is switch with K1.

The activated switching function is marked with the following symbol:

Procedure

- Connect computer to Ex p control unit
- Activate the programming switch
- Log in to the WEB interface with the user level
- Call up the Advanced / Relay menu
- Activate the specific message(s) in the "of respective relay" column by clicking on the corresponding button.
  e.g. click on "K1"; the button changes from to
- Confirm pop-up window with changed value
- Deactivate the programming switch

7.8.4.5 Sensors



The three additional temperature sensors can be activated in the "Sensors" menu.

In addition, the OS1 and OS 2 current sensors can be activated.

In the standard version, the sensor inputs OS1 and OS2 can be provided with an "additional pressure monitoring" or with an "additional purging" function.

Application as “additional pressure monitoring“

The APEX Ex p control unit with additional pressure monitoring is based on the standard version. Purging and the operating phase takes place in the same way.

The difference to the standard version is seen during the operating phase; the control unit uses two optionally connected pressure sensors to additionally monitor the equipment in terms of minimum pressure during the operating phase.

Procedure:

- Log into the WEB interface at the user level
  Select the “Extended / sensors” menu
  In the table shown you can activate the “Pressure sensor” function
  under Current sensor 1 or Current sensor 2.
  The minimum and maximum measurement range of the sensor must also be entered.
- Confirm the pop-up window with changed value(s)
- Select the “Pressure parameters” menu and enter the desired set points for the optional pressure sensors “pa and pb“
  e.g. pa – specify a trigger value of 2.00 mbar for pressure sensor A.
  The corresponding Ex p equipment will be deactivated when falling below 2.00 mbar at the measurement point.
- Confirm the pop-up window with changed value(s)
- Active pressure sensors are marked as active for the corresponding purge program in the “Purge parameters/purge modes” menu.

“Additional purging” function

The current inputs can also be used to activate additional purging on the Ex p control unit. The Ex p equipment remains in the operating phase and purging can also be repeated.

In order to use this function, the additional purging function must be activated for the corresponding current input in the “Extended / sensors” parameters menu.

4 mA = purging with active operating phase, 7 mA = normal operating phase

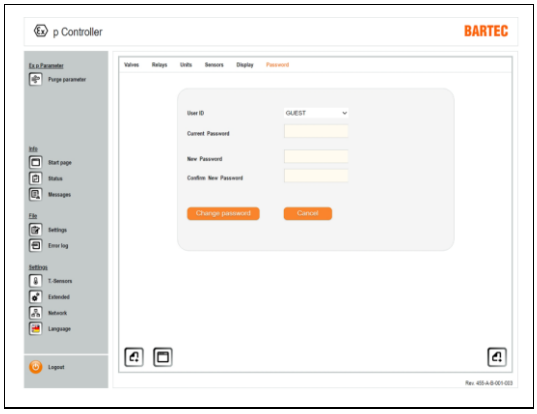
Procedure:

- Log into the WEB interface at the user level
  Select the “Extended / sensors” menu
  In the table displayed, you can activate the "Additional purge" function under Current sensor 1 or Current sensor 2
- Confirm the pop-up window with changed value
- Deactivate the programming switch
- Activate additional purge (Active useable during operation phase)
  normal operation = 7 mA to current sensor input.
  additional purge = 4 mA to current sensor input

7.8.4.6 Display

The contrast and brightness of the LCD display on the p-Operator Panel can be set in the "Display" menu.

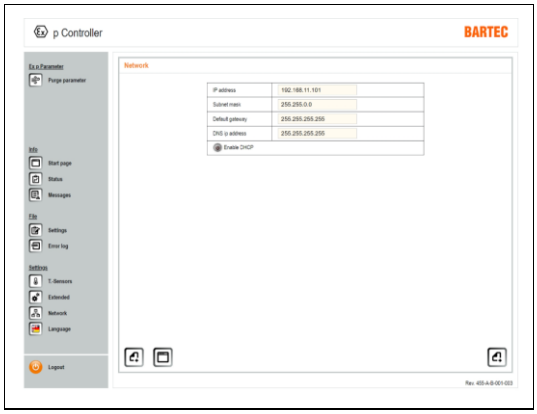
7.8.4.7 Password



A new password can be entered for the guest and user in the "Password" menu.

The password should consist of a four-digit numerical sequence.

7.8.4.8 Network



All network-specific settings are made in the "Network" menu.

By default, the Ex p control unit is set to a static IP address. It is also possible to activate a DHCP mode.

7.8.4.9 Language

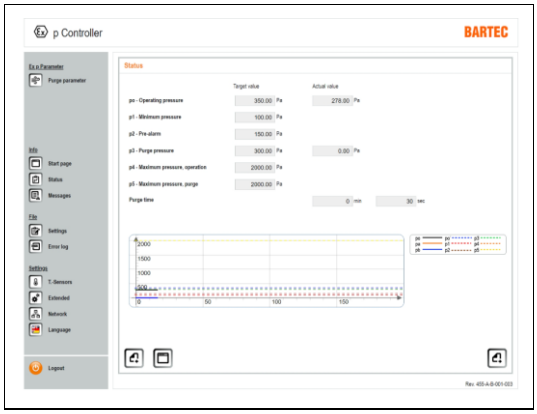
The system language can be selected between German and English in the "Language" menu.

7.9 System status

By connecting the laptop to the Ex p control unit, initial information about the system status can be called up on the start screen.

Procedure

- Log in to the WEB interface by opening the browser and entering the IP address 192.168.11.101



The start screen provides an initial overview of the status of the Ex p system.

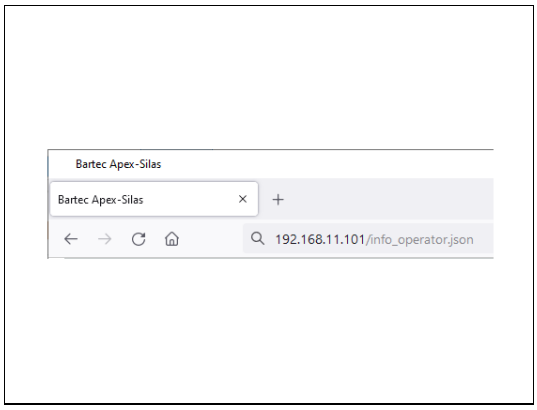
The setpoint for po and p3 and the corresponding measured values are displayed in the top left-hand area. Furthermore, plain text messages, pressure diagram and, in the case of optionally connected temperature sensors, values are displayed.

7.10 Reading out data containers

The data for the control room is requested via a web browser or using a corresponding software tool to be provided by the customer, which is able to send an HTML GET message equivalent to a browser request to the APEX Ex p control unit via the network.

The data format returned by the device is JSON
(see https://de.wikipedia.org/wiki/JavaScript_Object_Notation)

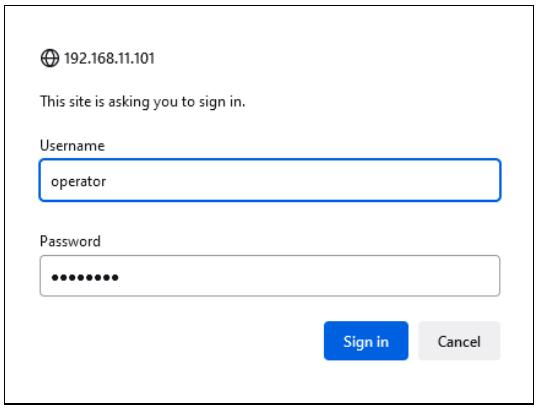
Query



The data for the control centre can be queried via the URL:

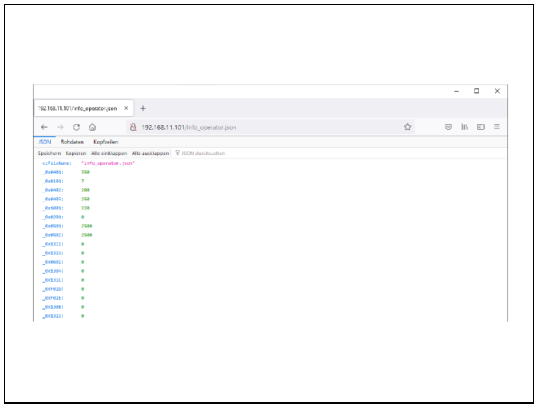
- http://<ip-addr>/info_operator.json.

- e.g. http://192.169.1.101/info_operator.json



The user name/password must be entered.

User name: "operator"
Password: "operator"



Response from the Ex p control unit.

KEY/ID	Parameters	Unit
_0x0401	Operating pressure po (setpoint)	Pa
_0x0101	Operating pressure po (actual value)	Pa
_0x0402	Minimum pressure (switch-off value)	Pa
_0x0403	Pre-alarm (switching value)	Pa
_0x1001	Purge pressure p3 (setpoint)	Pa
_0x0201	Purge pressure p3 (actual value)	Pa
_0x0501	Maximum pressure, operation p4 (switching value)	Pa
_0x0502	Maximum pressure, purging p5 (switching value)	Pa
_0x1312	Pressure sensor A pa (actual value)	Pa
_0x132A	Pressure sensor B pb (actual value)	Pa
_0x0602	Purge time	Seconds

8 Commissioning

DANGER

Explosion hazard due to incorrect parameters!

Incorrect parameters and settings cancels the explosion protection class.

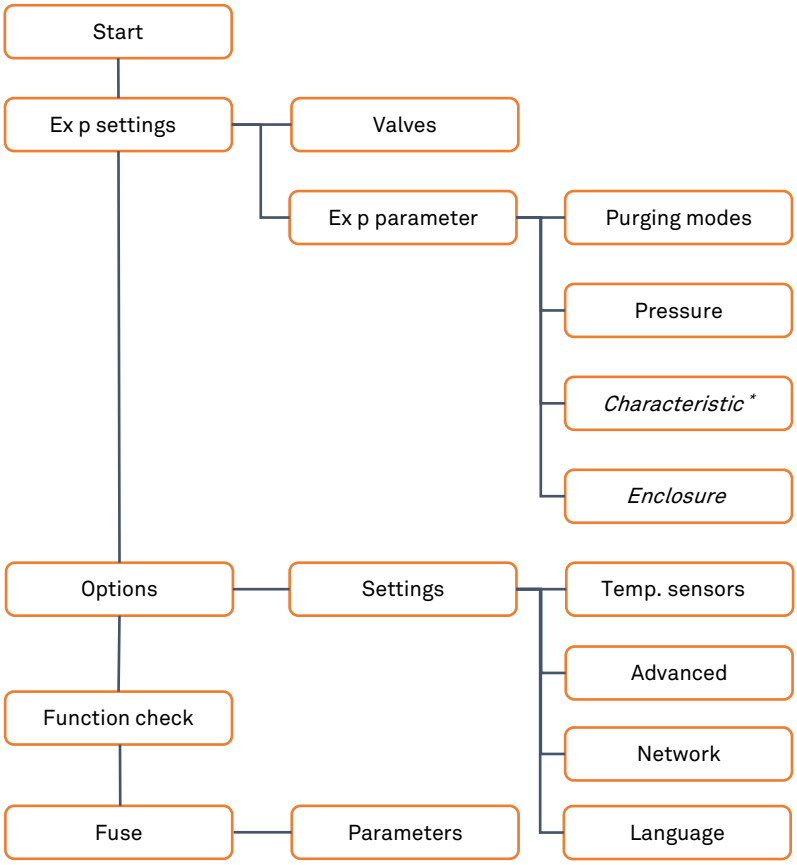
- Check the settings and parameters using the four-eye-principle

8.1 General information

The following sections describe the initial commissioning of the Ex p control unit. This means that it is described in detail how the Ex p control unit is configured for the produced Ex p equipment.

8.2 Sequence for initial commissioning

The following procedure is recommended for setting the function parameters:



8.3 Parameterisation of purge gas valve

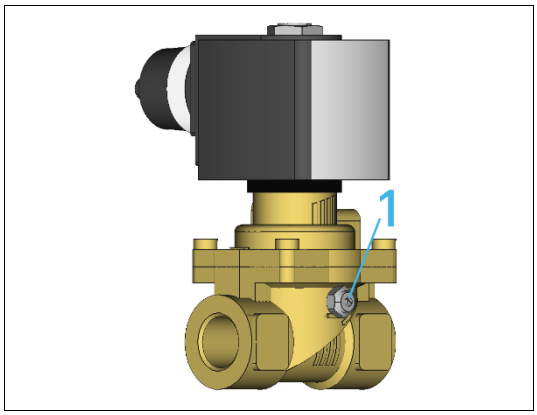
For the APEX^{px} Ex p control unit, purge gas valves are available in "Proportional" or "Digital" versions. The difference between the two types of purge gas valve is how they work:

Digital purge gas valve = On/off valve. Air leakage is compensated by setting the manually adjustable leakage air needle valve.

Proportional purge gas valve = Regulating valve. During the purging phase, the internal pressure po setpoint is regulated to 87.5% of p5 and during the operating phase to po setpoint.

The purge gas valve used must be set in WEB-OS in the Advanced / Valves menu.

8.3.1 Digital purge gas valve "Leakage air compensation" setting



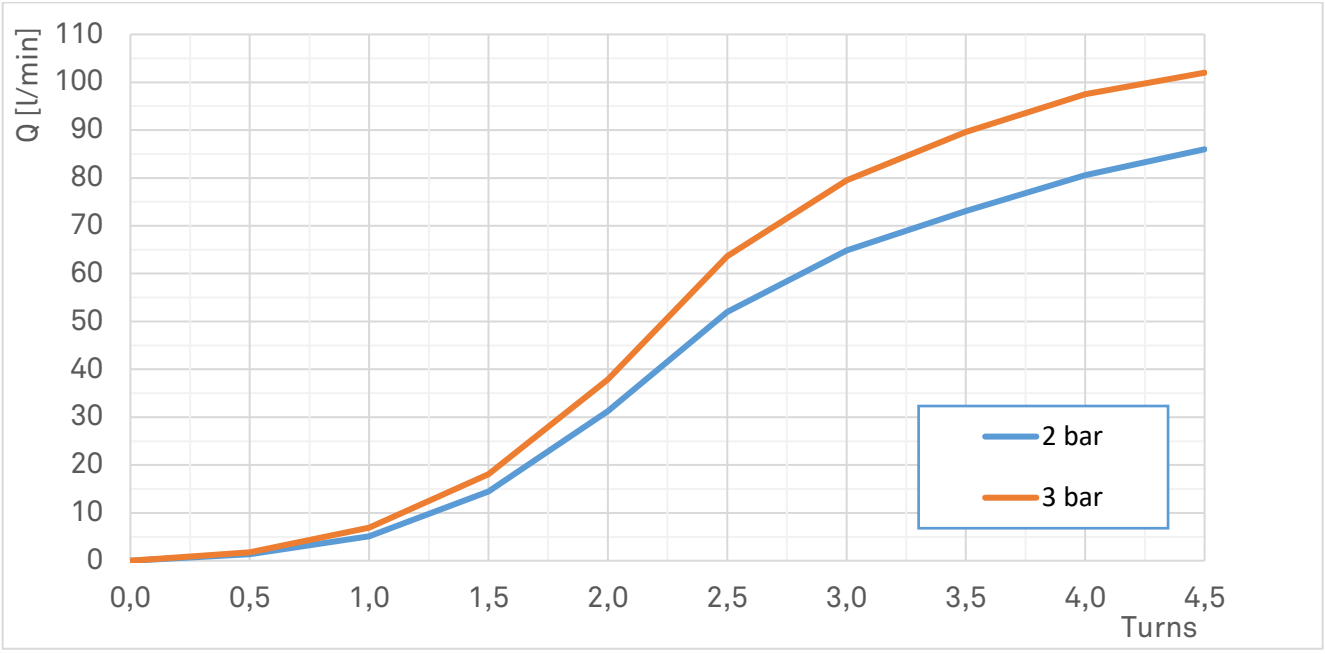
The leakage air needle (1) is used to determine the internal pressure during operation of the Ex p equipment. In order for the APEX^{px} Ex p control unit to switch to the "Purge" function, correct setting of the leakage air needle is important.

Procedure

- Set up the pressurised equipment ready for operation
- Measure the internal pressure using a pressure gauge or use the Ex p control unit for pressure recording
- Close the pressurised equipment
- Activate the purge gas supply
- Read the resulting internal pressure on the measuring device
- Measured internal pressure should correspond to the desired operating pressure

- If the internal pressure is too low, increase the volume of purge gas at the leakage air needle valve. This is done by turning anti-clockwise
- If the internal pressure is too high, the volume of purge gas at the leakage air needle must be reduced. This is done by turning the leakage air needle clockwise.

Diagram for leakage compensation



8.4 Commissioning the APEX^{px} [Gb] control unit

Notice

Ensure that the electrical wiring is as described in the relevant operating instructions and that the purge gas supply is connected.

If the Ex p control unit is in programming mode (parameter switch activated and password entered), the pressure values are displayed in Pa. Settings are made in the unit Pa.

To carry out the configuration, log into the WEB-OS at user level.

8.4.1 Procedure for Ex p settings – Manual purging

After the purge gas valve used has been set, the Ex p specific parameters are set in the following sections.

Follow the individual chapters for the correct procedure for the parameters.

8.4.1.1 Settings "Purging program / Purging mode"

DANGER

Risk of death or serious injury due to use of an unsuitable purging modes!

Explosion hazard.

- Only activate purging programs suitable for the application.
- Purging programs Ex_p_3, Ex_p_6, Ex_M_1 and Ex_M_2 are special purging modes which must not be used for standard applications.

The purging mode and sequence control can be customised in the "Purging parameters / Purging modes" web interface.

Notice

The precondition for all purging programs to ensure that the other process phases are initiated is **po > p1**.

Procedure

- Connect PC to Ex p control unit, activate programming switch
- Log in to the WEB interface with the user level
- Call up the "Purging parameters / Purging modes" menu
- Select the applied purging program by clicking the left button
  Purging program Ex_p_1 by clicking on the button
  Button changes from ⏻ to ●
- Confirm pop-up window with changed value
- Purging mode should be set to "● Manual" for the purging described here.

8.4.1.2 Determination of purge time

Notice

The procedure described here for determination of the purge time is based on the principle of manual purge time calculation.

Assumptions for determination of the purge time:
- All relevant parameters are assumed values -

Ex control unit with digital purge gas valve application

When using a digital purge gas valve, the purge pressure p3 is set by means of mechanical limitation by the purge gas nozzle. The table in chapter 5.6 provides guide values for the drill diameters based on the protected enclosure volume.

Deviating from this table, the purge gas nozzle can also be drilled out step by step to achieve the desired purge pressure p3. The larger the hole of the purge gas nozzle, the higher the volume of purge gas supplied and therefore the higher the purge pressure p3 achieved.

Ex p control with proportional purge gas valve application

When using a proportional purge gas valve, the purge pressure p3 is achieved by adjusting the internal pressure to the value 87.5% of p5. This means that the internal pressure can be finely adjusted during purging with the aid of the proportional valve, which can be useful for pressure-sensitive assemblies in the front of the pressurised enclosure.

Procedure

- Connect the PC to the Ex p control unit, activate the programming switch and log in at USER level.
- Call up the "Purging parameters / Pressure parameters" menu
- Set the pressure parameter p3 purge pressure to 2000 Pa (20 mbar)
  Pop-up window with display of changed value opens, confirm
- Set pressure parameter p5 – maximum pressure, purging to the maximum value permitted by the pressurised equipment during purging, e.g. set 2000 Pa (20 mbar). Pop-up window with display of changed value opens, confirm
- Deactivate the programming switch
- Ex p control unit switches from programming mode to control/monitoring mode.
- Note the reached p3 purge pressure (actual value), e.g. 12 mbar
  The hole of the purge gas nozzle may need to be adjusted
  Open operating instructions chapter "Purge air diagram"
  Note the corresponding flow rate Q as a function of the determined p3 from the diagram.
- Calculate the purge time using the formula below
- Activate the programming switch and log into the WEB-OS with the USER level
- Call up the "Purging parameters / Pressure parameters" menu
- Set the pressure parameter p3 purge pressure to the determined value
  Pop-up window with display of changed value opens, confirm
- Call up the "Purging parameters / Purging modes" menu
- Set the purge time to the calculated purge time
  Pop-up window with display of changed value opens, confirm

8.4.1.3 Calculation of purge time

The purge time is calculated using the following formula:

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

The flow rate must be determined using the reached purge pressure p3 and the related flow diagram (see appendix, chapter 13).

Example 1:

Cabinet volume = 140 litres; purging = 5-fold; 1 pressure switch

Setting the switching value "P3" = 12.0 mbar,

as described in chapter 8.4.1.2 "Determining the purge pressure".

Flow rate according to 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 litres; purging = 5-fold; 2 pressure switches

Setting the switching value "P3" = 12.0 mbar,

as described in chapter 8.4.1.2"Determining the purge pressure".

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

$$\frac{720 \text{ litres} \times 5}{24{,}000 \text{ l/h}} \times 60 = 9 \text{ minutes}$$

8.4.1.4 Setting of "Ex p parameters / pressure parameters"

Notice

The pressure parameters to be complied with are part of IEC / EN 60079-2.

Furthermore, the pressure parameters depend on the application and must be checked during initial commissioning.

The following values can be used as basic settings:

po = 2.5 mbar (250 Pa)

p1 = 1.0 mbar (100 Pa)

p2 = 1.5 mbar (150 Pa)

p3 = Determination by chapter 8.4.1.2

p4 = Application-dependent, e.g. pressure-sensitive components?

P5 = Application-dependent, e.g. pressure-sensitive components?

Procedure

- Connect PC to Ex p control unit, activate programming switch
- Log in to the WEB-OS with the user level
- Call up the "Purging parameters / Pressure parameters" menu
- Enter and confirm the "po – operating overpressure" parameter
  e.g. 250 Pa (2.5 mbar)

  The value "po" is the internal operating overpressure of the pressurised enclosure. This value is monitored by the Ex p control unit and compensated if necessary.
- Pop-up window with display of changed value opens, confirm
- Enter and confirm pressure parameter "p1 - minimum pressure"
  e.g. 100 Pa (1.0 mbar)

  The value "p1" is the permitted minimum pressure of the pressurised enclosure. This value is monitored by the Ex p control unit and, if necessary, shutdown is triggered if the value is fallen below.
- Pop-up window with display of changed value opens, confirm
- Enter and confirm pressure parameter "p2 – pre-alarm"
  e.g. 150 Pa (1.5 mbar)

  The value "p2" is a pre-alarm. The pre-alarm can be used to output a pre-alarm before shutdown by falling below p1.
- Pop-up window with display of changed value opens, confirm
- Follow the same procedure for the other pressure parameters

8.4.2 Procedure for Ex p settings – Automatic purging

8.4.2.1 Settings "Purging program / Purging mode"

DANGER

Risk of death or serious injury due to use of an unsuitable purging modes!

Explosion hazard.

- Only activate purging programs suitable for the application.
- Purging programs Ex_p_3, Ex_p_6, Ex_M_1 and Ex_M_2 are special purging modes which must not be used for standard applications.

The purging mode and sequence control can be customised in the "Purging parameters / Purging modes" web interface.

Notice

The precondition for all purging programs to ensure that the other process phases are initiated is **po > p1**.

Procedure

- Connect PC to Ex p control unit, activate programming switch
- Log in to the WEB-OS with the user level
- Call up the "Purging parameters / Purging modes" menu
- Select the applied purging program by clicking the left button
  Purging program Ex_p_1 by clicking on the button
  Button changes from to
- Confirm pop-up window with changed value
- Set the purging mode to " Automatic" by clicking the button.
  Click on the button
  Button changes from to
- Confirm pop-up window with changed value
- Enter the desired purging factor

  ⚠ The purging factor specifies how often the protected volume should be purged.
  E.g. 5-fold purging means that a protected volume of 100 litres is purged with at least 500 litres of purge gas.

  Enter the value "5" and confirm with "Enter"
- Confirm the confirmation window

8.4.2.2 Setting of "Ex p parameters / pressure parameters"

Notice

The pressure parameters to be complied with are part of IEC / EN 60079-2.

Furthermore, the pressure parameters depend on the application and must be checked during initial commissioning.

The following values can be used as basic settings:

po = 2.5 mbar (250 Pa)

p1 = 1.0 mbar (100 Pa)

p2 = 1.5 mbar (150 Pa)

p3 = Automatic determination by Ex p control unit

p4 = Application-dependent, e.g. pressure-sensitive components?

P5 = Application-dependent, e.g. pressure-sensitive components?

Procedure

- Connect PC to Ex p control unit, activate programming switch
- Log in to the WEB-OS with the user level
- Call up the "Purging parameters / Pressure parameters" menu
- Enter and confirm the "po – operating overpressure" parameter
  e.g. 250 Pa (2.5 mbar)
- The value "po" is the internal operating overpressure of the pressurised enclosure. This value is monitored by the Ex p control unit and compensated if necessary.
  Pop-up window with display of changed value opens, confirm
- Enter and confirm pressure parameter "p1 - minimum pressure"
  e.g. 100 Pa (1.0 mbar)
- The value "p1" is the permitted minimum pressure of the pressurised enclosure. This value is monitored by the Ex p control unit and, if necessary, shutdown is triggered if the value is fallen below.
  Pop-up window with display of changed value opens, confirm
- Enter and confirm pressure parameter "p2 – pre-alarm"
  e.g. 150 Pa (1.5 mbar)
- The value "p2" is a pre-alarm. The pre-alarm can be used to output a pre-alarm before shutdown by falling below p1.
  Pop-up window with display of changed value opens, confirm
- Follow the same procedure for the other pressure parameters

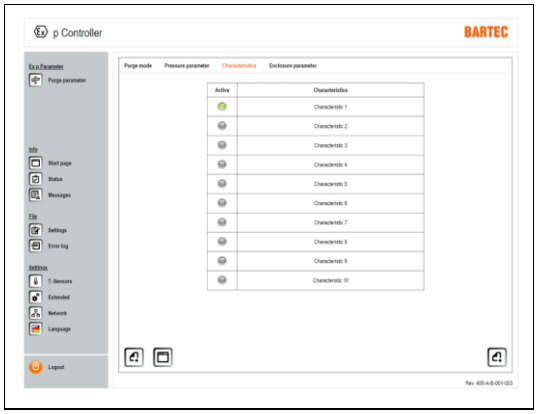
8.4.2.3 Setting of "Ex p parameter / characteristic curve"

WARNING

Risk of death or injury due to incorrect setting of the characteristic curve.

Explosion protection is no longer guaranteed

- Check the type number and associated characteristic curve of the pressure switch.



The device-specific mounted pressure switch is defined in the "Characteristic curve" tab.

This must be set correctly for the correct automatic purge time calculation.

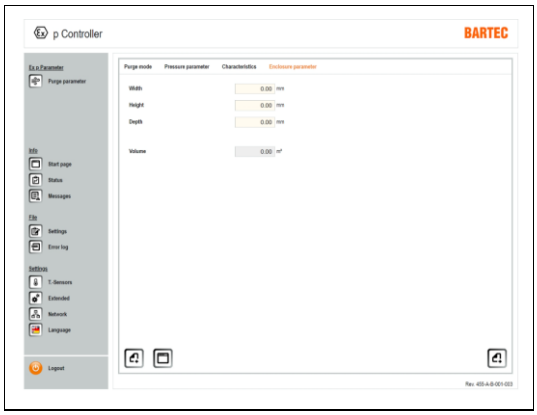
The pressure switch used can be selected by "clicking" on the button ( ).

The selection table can be found in chapter 7.8.1.3

8.4.2.4 Setting of "Ex p parameters / Enclosure parameters"

Notice

If the Ex p control unit is in programming mode (parameter switch activated and password entered), the units of measurement are displayed in mm.



The internal volume of the pressurised enclosure is defined in the "Enclosure parameters" tab.

8.4.3 Function check Ex p

Notice

Safe operation in case of pressure fluctuations

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

When commissioning the pressurised enclosure, it is necessary to check the individual operating phases. All previous work steps must be completed for this. Operating pressure, leakage compensation and purge time must be set.

8.4.3.1 Checking the pre-purging phase

Procedure

- Set up the pressurised enclosure ready for operation.
- Activate the APEX^{px} control unit.
- Activate the purge gas supply;
  LED "Status" active
  LED "p1" active LED "p2" off
  LED "p3" active LED "Operate" flashes
- Reduce the purge gas supply by lowering the pressure at the pressure reducer; the purge time stops;
  LED "Status" active
  LED "p3" off LED "Operate" off
- Reset the purge gas supply to the initial value by increasing the pressure at the pressure reducer; allow the purge time to expire;
  LED "Status" active
  LED "p1" active LED "p2" off
  LED "p3" off LED "Operate" active

8.4.3.2 Checking the operating phase

Procedure

- Set up the pressurised enclosure ready for operation.
- Activate the APEX control unit.
- Activate the purge gas supply.
- Allow purge time to expire; LED "K2" lights up, relay "K2" activates installations inside the pressurised enclosure.
- Reduce the purge gas supply by lowering the pressure at the pressure reducer; LED "K2" goes out, relay "K2" deactivates installations inside the pressurised equipment.

8.5 Commissioning the APEX^{px} [Db] control unit

Notice

Ensure that the electrical wiring is as described in the relevant operating instructions and that the purge gas supply is connected.

If the Ex p control unit is in programming mode (parameter switch activated and password entered), the pressure values are displayed in Pa. Settings are made in the unit Pa.

To carry out the configuration, log into the WEB-OS at user level.

8.5.1 Procedure for Ex p settings

Follow the individual chapters for the correct procedure for the parameters.

8.5.1.1 Settings "Purging program / Purging mode"

DANGER

Risk of death or serious injury due to use of an unsuitable purging modes!

Explosion hazard.

- Only activate purging programs suitable for the application.
- Purging programs Ex_p_3, Ex_p_6, Ex_M_1 and Ex_M_2 are special purging modes which must not be used for standard applications.

The purging mode and sequence control can be customised in the "Purging parameters / Purging modes" web interface.

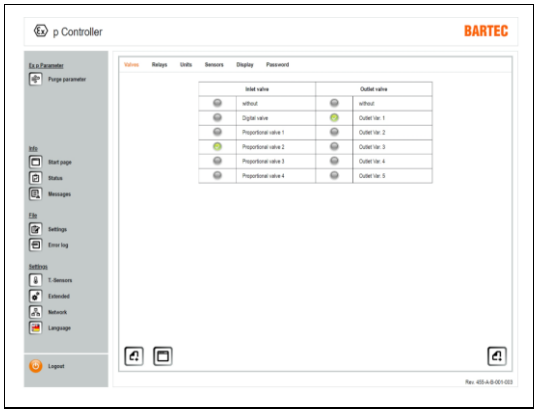
Notice

The precondition for all purging programs to ensure that the other process phases are initiated is **po > p1**.

Procedure

- Connect PC to Ex p control unit, activate programming switch
- Log in to the WEB-OS with the user level
- Call up the "Purging parameters / Purging modes" menu
- Select the applied purging program by clicking the left button
  Purging program Ex_pD_1 by clicking on the button
  Button changes from to
- Confirm pop-up window with changed value
- Purging mode should be set to " Manual" for the purging described here.

8.5.1.2 "Purge gas valve" settings



As purging does not take place in Ex pD (dust) applications, the purge gas valve is replaced by an adjustable purge gas nozzle.

To ensure that the control unit does not control a valve, the setting "None" must be applied in the corresponding WEB interface menu "Advanced / Valves".

Inlet and outlet valves are set to "without".

8.5.1.3 Setting of "Ex p parameters / pressure parameters"

Notice

The pressure parameters to be complied with are part of IEC / EN 60079-2.

Furthermore, the pressure parameters depend on the application and must be checked during initial commissioning.

The following values can be used as basic settings:

po = 1.5 mbar (150 Pa)

p1 = 1.0 mbar (100 Pa)

p2 = 1.2 mbar (120 Pa)

p3 = not applied for dust applications

p4 = 5.0 mbar (500 Pa)

P5 = 5.0 mbar (500 Pa)

Procedure

- Connect PC to Ex p control unit, activate programming switch
- Log in to the WEB-OS with the user level
- Call up the "Purging parameters / Pressure parameters" menu
- Enter and confirm the "po – operating overpressure" parameter
  e.g. 150 Pa (1.5 mbar)

  The value "po" is the internal operating overpressure of the pressurised enclosure. This value is monitored by the Ex p control unit and compensated if necessary.
- Pop-up window with display of changed value opens, confirm
- Enter and confirm pressure parameter "p1 - minimum pressure"
  e.g. 100 Pa (1.0 mbar)

  The value "p1" is the permitted minimum pressure of the pressurised enclosure. This value is monitored by the Ex p control unit and, if necessary, shutdown is triggered if the value is fallen below.
- Pop-up window with display of changed value opens, confirm
- Enter and confirm pressure parameter "p2 – pre-alarm"
  e.g. 120 Pa (1.2 mbar)

  The value "p2" is a pre-alarm. The pre-alarm can be used to output a pre-alarm before shutdown by falling below p1.
- Pop-up window with display of changed value opens, confirm

8.5.2 Follow the same procedure for the other pressure parameters – Function check Ex p

Notice

Safe operation in case of pressure fluctuations

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

When commissioning the pressurised enclosure, it is necessary to check the individual operating phases. All previous work steps must be completed for this. Operating pressure, leakage compensation and purge time must be set.

8.5.2.1 Checking the operating phase

Procedure

- Set up the pressurised enclosure ready for operation.
- Activate the APEX^{px} control unit.
- Activate the purge gas supply.
- Ex pD application is activated after a positive pressure has been established;
  LED "Status" active LED "Operate" active
  LED "p1" active LED "p2" off LED "p3" off
- Reduce the purge gas supply by lowering the pressure at the pressure reducer;
  LED "Status" active LED "Operate" off
  LED "p1" off LED "p2" off LED "p3" off

9 Operation

9.1 Safety during operation

DANGER

Risk of death or serious injury due to damaged explosion protection measures!

Safe operation is no longer possible.

- Take the APEX^{px} control unit out of operation and secure it against being switched on again.

9.2 Operating phases of the APEX^{px} Ex p control unit

Operation of a pressurised enclosure, protected by an APEX^{px} Ex p control unit, which is designed for use in potentially explosive gas atmospheres, can be divided into three phases. The three phases are divided into preparation, pre-purging and operating phases.

9.2.1 Flowchart

Operating phase	Requirement	Impact
Preparation phase Chapter 9.2.2	Mains voltage connected	Initiation of purging phase
	Internal pressure < p4 and > p1	
	Purge time not yet expired	
	Purge valve opens	
Purging phase Chapter 9.2.3	Internal pressure > p3	Purge time running
	Internal pressure < p5	
	Purge time counts down	
Operating phase Chapter 9.2.4	Pre-purge time expired	Release of pressurised equipment
	Internal pressure > p1	
	Internal pressure < p4	

9.2.2 Preparation phase

The preparation phase begins with switching on the supply voltage for the APEX^{px} control unit and the supply of purge gas. The purge gas flows into the pressurised enclosure via the purge gas valve.

- APEX^{px} active due to supply voltage
- The internal pressure of the pressurised enclosure is increased by the incoming purge gas.
- The minimum pressure "p1" of the enclosure is exceeded. The LED "p1" lights up
- The purge gas valve is opened via the APEX^{px} control unit.
- Transition to purging phase.

9.2.3 Purging phase

The pressurised enclosure is purged with purge gas to remove any explosive gas-air mixture that may be present or to dilute it to a harmless concentration before any potential ignition sources in the pressurised enclosure are switched on.

This process prepares the pressurised enclosure for the operating phase. The volume of purge gas required depends on the free volume and the protected application within the pressurised enclosure. The pre-purging process is constantly monitored by the sensor of the APEX^{px} Ex p control unit.

- Opening the purge gas valve increases the flow of purge gas.
- The disc integrated in the pressure switch is lifted.
- Switching values of minimum pressure "p1", purge pressure "p3" are exceeded. This is indicated by the corresponding LEDs on the Ex p control unit. The LED "Operate" flashes during the purging process.
- The purge time is counted down.
- After the purge time has expired, the purge gas valve is closed.
- Transition to operating phase

9.2.4 Operating phase

The operating phase begins when the purge gas valve is closed.

The operating pressure must be maintained during the entire operation of the pressurised enclosure in order to prevent the ingress of flammable substances. Release of the pressurised enclosure is signalled via relay "K1" of the APEX^{px} Ex p control unit.

If the enclosure pressure falls below the set minimum values during the operating phase, all electrical installations in the pressurised enclosure that are not themselves explosion-proof are switched off. New purging is initiated as soon as the purge pressure "p3" is reached again.

- The purge valve closes and leakage losses are compensated via the integrated leakage air valve.
- The LED "Operate" changes from flashing to steady light. The LED "p3" LED goes out.
- Relay "K1" switches the mains voltage on or releases it.
- All other relays switch depending on the configuration.

9.3 Operating phases of the APEX [Db] control unit

Operation of pressurised equipment protected by an APEX^{px} Ex p control unit, which is designed for use in potentially explosive dust atmospheres, can be divided into two phases: Preparation and operating phase. The two phases are explained below.

9.3.1 Flowchart

Operating phase	Requirement	Impact
Preparation phase Chapter 9.3.2	Mains voltage connected	Initiation of purging phase
	Internal pressure < p4 and > p1	
Operating phase Chapter 9.3.4	Internal pressure > p1	Release of pressurised equipment
	Internal pressure < p4	

9.3.2 Preparation phase

During the preparation phase, all internal dust deposits must be removed before activating the pressurised enclosure. After cleaning the pressurised enclosure, the door is closed, the APEX^{px} Ex p control unit is put into operation and the purge gas supply is activated.

By activating the purge gas supply, purge gas is fed into the pressurised enclosure via the adjustable leakage air needle, thus achieving an overpressure compared to the surrounding atmosphere.

- The internal pressure of the pressurised enclosure is increased by the incoming purge gas.
- The minimum pressure "p1" of the enclosure is exceeded.
- The LED "p1" lights up
- The next phase, the "Operating phase", is initiated.

9.3.3 Operating phase

The operating phase begins with the incoming purge gas. This builds up an overpressure in the pressurised enclosure compared to the atmosphere. The internal pressure of the pressurised enclosure is measured on the APEX^{px} control unit and compared with the limit value setpoints. Once the internal overpressure exists and the minimum switching value has been exceeded, the release of the pressurised enclosure is signalled via relay "K1" of the APEX^{px} Ex p control unit.

If the enclosure pressure falls below the set minimum values during the operating phase, all electrical installations in the pressurised enclosure that are not themselves explosion-proof are switched off. New purging is switched on as soon as the internal pressure "p1" is reached again.

- Existence of internal overpressure.
- The LEDs "Operate" and "p1" light up.
- Relay "K1" switches the mains voltage on or releases it.
- All other relays switch depending on the configuration.

10 Maintenance and care

WARNING

Dust deposits due to environmental influences.

Dust deposits can accumulate in the pressure switch when used in applications in explosive dust atmospheres.

- In case of heavy dust deposits, clean the pressure switch every six months.

Notice

Maintenance and care

- Observe the currently valid regulations and national regulations for maintenance, servicing and testing of the equipment!
- Operating and maintenance work may only be carried out by trained and qualified personnel. Statutory regulations and other binding guidelines on occupational safety, accident prevention and environmental protection must be complied with.
- When opening any covers or removing parts, unless this can be done by hand, live parts may be exposed. Connection components may also be under voltage.

10.1 Maintenance

10.1.1 Maintenance intervals

WARNING

Maintenance intervals

If used correctly and in compliance with installation instructions and ambient conditions, maintenance intervals in accordance with EN 60079-17 must be observed

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

Maintenance interval	Work to be carried out
Monthly	Visual inspection according to chapter 10.1.2
Semi-annual	Cleaning according to chapter 10.1.3
Annually	Regular maintenance according to chapter 10.1.4

10.1.2 Visual inspection

Carry out a monthly visual inspection.

Procedure

- Check the enclosure, cable entries and cables for damage.
- Check screw connections for tightness.
- Check the error memory for contents.
- Check seals and sash locks.

10.1.3 Cleaning

Solvents should not be used to clean the control unit, as contact with seals may compromise their function.

10.1.4 Regular maintenance

Depending on the purity of the purge air used, inlet and outlet of the control unit must be checked regularly for contamination (e.g. oil, dust, etc.) or corrosion.

In case of irregularities, the operator should consider the possibility of timely and proper cleaning at BARTEC GmbH to prevent spontaneous failure of the control unit

Furthermore, the function of the overall system should be checked. The correct sequence of the purging phase and operating phase should be checked.

The following table serves as minimum maintenance requirements for a pressurised enclosure.

Pos.	To be checked	Maintenance
1	Visual inspection for damage to the enclosure	
2	Check of installed devices for secure attachment	
3	Pay attention to devices with hot surfaces (attach warning sign if necessary)	
4	Establishing equipotential bonding of the pressurised enclosure	
5	General condition of the attachments of the pressurised enclosure (device feet, rain cover, cable fittings)	
6	Pre-purging phase checked	
7	Switching values of the APEX^{px} Ex p control unit checked	
8	Function check of the APEX^{px} control unit carried out	
9	Possible bypass operation checked for proper function	

11 Fault and troubleshooting

ATTENTION

Changes in operating behaviour may be an indication of existing damage to the Ex p control unit!

The Ex p control unit may be damaged.

- Do not put the Ex p control unit back into operation until the cause of the error has been rectified.

It is assumed that all external electrical and mechanical devices have been connected correctly. Therefore, proper installation and connection of the electrical devices should be checked first.

11.1 Fault table

Fault	Possible cause	Troubleshooting
Sporadic failure	Cable breakage	Check connections
	Pressure drop / leakage	Check for tightness and leakage compensation
	EMC influences	Check wiring according to EMC specifications
Control unit without function (All LEDs off)	Mains voltage not available	Check supply voltage
	Device defective	Return to manufacturer
The protected devices are switched on without pre-purging	Bypass activated	Deactivate bypass
	Incorrect purging program activated	Check the purging program
During pre-purging, the purge gas valve switches off briefly	Excessive purge gas is introduced into the pressurised enclosure	Reduce the size of the purge gas nozzle
Digital purge gas valve does not switch to the small nozzle after the pre-purging phase	Temperature sensor is connected, internal temperature is too high	Check purge gas valve for foreign particles in the mechanical part
		Wait until the internal temperature has dropped due to the increased flow rate, or check the set temperature switching value
	Main switch or jumper not connected to terminals Hs_In / Hs_Out	Switch on main switch or connect jumper to terminals Hs_In / Hs_Out
	Purge gas valve does not close	Check purge gas valve for switched off supply voltage
The control unit switches off the electrical devices with a time delay after the purge time	Leakage air needle of digital valve too small	Increase the air flow rate of the leakage air needle
	Switching value "p3" too high	Check switching value "p3"
Relays K4 or K5 do not switch	Switching parameters incorrectly selected	Check switching parameters.

Fault	Possible cause	Troubleshooting
LED "Operate" does not flash during the purge time	Purge gas not available	Check that the supply voltage is connected to the purge gas valve
	Purge gas valve does not open or only opens partially	Check purge gas valve for foreign particles in the mechanical part
		Increase inlet pressure to setpoint
	Insufficient purge gas flow through Ex p enclosure	Check the purge gas nozzle for correct value
		Check setpoints "p3" and "p1" of the control unit
		Increase the cross-section of the purge gas supply line
		Purge gas supply too low. Increase the cross-section of the supply line
	Set pressure of the pressure reducer is not reached	Remove the closure or eliminate the reduction by taking suitable measures
	Pressure switch of the control unit is impermissibly closed or fitted with a reducer	Seal the enclosure using suitable measures
	Enclosure leaks during the pre-purging phase due to increased internal pressure	Check that the supply voltage is connected to the purge gas valve
Digital purge gas valve switches on briefly during the operating phase	Value "po" too high	Reduce "po" value
	Pressurised enclosure leaking, switching value "p1" fallen below.	Seal the pressurised enclosure
	Pressurised enclosure leaking, switching value "p1" fallen below.	Adjust the leakage compensation.
The electrical devices do not switch off if the pressure drops	Bypass activated	Bypass activated
	Incorrect purging program selected	Correct the purging program

11.1.1 Error messages

The control units provide plain text messages, which are divided into 3 categories.

- Positive messages are notifications that do not affect the readiness of the system.
- Warning messages are notifications that affect parts of the system.
- Alarm messages are notifications that lead to shutdown of the protected equipment.

11.1.1.1 Positive messages

Status	Code	Plain text
	00000001	Purging process
		The control unit has started the purging process.
	00000002	Ex p ready
		The control unit has successfully completed the purging process. The main switch or jumper HS_IN / HS_OUT is not closed.
	00000003	Ex p active
		The control unit has successfully completed the purging process. The main switch or HS_IN / HS_OUT jumper is closed and the release is given.
	00000004	p3 reached
		The setpoint "p3" purge flow is reached and the purge time counts down.

11.1.1.2 Warning messages

Status	Code	Plain text
	00000005	Bypass active
		The bypass is activated on the control unit.
	00000006	Door contact / main switch open
		The main switch or HS_IN / HS_OUT jumper is not closed.
	00000007	p2 fallen below
		Setpoint p2 "Pre-alarm" is fallen below
	00000008	p4 exceeded
		Setpoint p4 "Maximum pressure – operation" exceeded
	00000009	p5 exceeded
		Setpoint p5 "Maximum pressure – purging" exceeded
	0000000A	Sensor 1 temperature exceeded
		Setpoint temperature at sensor 1 exceeded
	0000000B	Sensor 2 temperature exceeded
		Setpoint temperature at sensor 2 exceeded
	0000000C	Sensor 3 temperature exceeded
		Setpoint temperature at sensor 3 exceeded

11.1.1.3 Alarm messages

Status	Code	Plain text
	0000000D	Ex p inactive
		The protected equipment is deactivated.
	0000000E	Device fault 1
		HW test error (processors)
	0000000F	Device fault 2
		HW test error (barriers)
	00000010	Device fault 3
		HW test error (internal temperature monitoring)
	00000011	Device fault 4
		HW test error (fatal error)
	00000012	Sensor error 1
		HW test error (pressure sensor / sensor board status)
	00000013	Sensor error 2
		HW test error (opt. current sensors)
	00000014	Sensor error 3
		HW test error (ext. temperature sensors)
	00000015	p1 fallen below
		Setpoint p1 "Min. pressure" is fallen below.
	00000016	p3 fallen below
		Setpoint p3 "Purge pressure" is fallen below.
	00000017	p4 exceeded
		Setpoint p4 "Maximum pressure – operation" exceeded.
	00000018	p5 exceeded
		Setpoint p5 "Maximum pressure – purging" exceeded.
	00000019	Sensor 1 temperature exceeded
		Setpoint temperature at sensor 1 exceeded.
	0000001A	Sensor 2 temperature exceeded
		Setpoint temperature at sensor 2 exceeded.
	0000001B	Sensor 3 temperature exceeded
		Setpoint temperature at sensor 3 exceeded.

12 Technical data

12.1 APEX^{px} Ex px control unit

12.1.1 Explosion protection

Type	07-37A2-2211/.520
Certifications	ATEX, IECEx, EAC, CCC
Use in	Zone 1, Zone 21
ATEX	
Certificate	BVS 19 ATEX E 015 X
Labelling	Ex II 2(1)G Ex eb mb ib [ib pxb] [ia Ga] IIC T4 Gb
	Ex II 2(1)D Ex tb [ib pxb] [ia Da] IIIC T130 °C Db
IECEx	
Certificate	IECEx BVS 19.0038X
Labelling	Ex eb mb ib [ib pxb] [ia Ga] IIC T4 Gb
	Ex tb [ib pxb] [ia Da] IIIC T130 °C Db
EAC Eurasian Economic Union	
Certificate	EAЭC RU C-DE.AЖ58.B.01809/21
Labelling	1Ex e mb ib [ib px][ia Ga] IIC T4 Gb X
	Ex tb [ib px][ia Da] IIIC T130 Db X

12.1.2 Electrical data

Type	07-37A2-2211/.520
Rated operating voltage DC	24 Vdc to 44 Vdc, +/- 10% for type 07-37A2-2211/1521
Rated operating voltage AC	100 Vac to 230 Vac, +/- 10% for type 07-37A2-2211/2521
Rated current	0.5 A to 1.5 A
Tolerance range	+/- 10%
Overvoltage category	II
Max. power consumption	17 Watts
Relay K1	2 potential-related NO contacts,
- Release relay -	230 Vac at 5 A (AC1) or 24 Vdc at 5 A (DC1)
	Max. start-up current 15 A for 20 ms
Relay K2	4 potential-free NO contacts,
- Release or signal relay -	230 Vac at 3 A (AC1) or 24 Vdc at 3 A (DC1)
	Max. start-up current 15 A for 20 ms
Relay K3 / K4	Potential-free CO contact
- Signal relay -	230 Vac at 1 A (AC1) or 24 Vdc at 1 A (DC1)
	Max. start-up current 15 A for 20 ms

Type	07-37A2-2211/.520
Connection terminal "Ex e"	0.08 ... 2.5 mm² (28 ...12 AWG)
With wire end ferrule	0.25 ... 1.5 mm²
Connection terminal "Ex i"	0.20 ... 2.0 mm² (20 ...14 AWG)
With wire end ferrule	0.25 ... 0.75 mm²

12.1.3 Ex p specific data

Type	07-37A2-2211/.520
Pressure measuring range	0 to 25 mbar
Tolerance range	±0.5 mbar
Purge gas valve	Digital or proportional
Purge time	0 to 120 minutes (adjustable)

12.1.4 Mechanical data

Type	07-37A2-2211/.520
Protection type	IP 64 according to IEC/EN 60079-0
	IP 66 according to IEC/EN 60529
Dimensions	250 (W) x 300 (H) x 130 (D) mm
Enclosure material	Stainless steel V4A
Weight	10.5 kg
Cable fittings	6x M20, nickel-plated brass (clamping range: 4 – 12 mm)
	1x M16, clamping range 3 - 9 mm

12.1.5 Ambient conditions

Type	07-37A2-2211/.520
Storage and transport	-25°C to +60°C
Operating temperature at T4	-25°C to +60°C
Operating temperature at T5	-25°C to +50°C
Relative humidity	< 95% (without condensation)
Permissible altitude	< 2000 m

12.2 Pressure switch

Type	17-51P3-1.03
Dimensions	55 x 70 x 57 mm (WxHxD)
Material	POM
Protection type	IP 65
Opening pressure	Approx.. 3 mbar
Orifice	8 mm, 12 mm, 15 mm or 18 mm
Installation hole	37 mm
Weight	Approx. 0.2 kg
Transport temperature Storage temperature	-20°C to + 80°C
Operating temperature	-20°C to + 80°C

12.3 Purge gas valve

12.3.1 Digital purge gas valve

Type	05-0056-0073
Rated operating voltage	DC 24 V
Pressure	Max. 16 bar
Weight	Approx. 1.2 kg
Nominal diameter	13 mm
Connection	G 3/8"

12.3.2 Proportional purge gas valve

Type	05-0056-0081
Rated operating voltage	DC 24 V
Pressure	Max. 3.5 bar
Weight	Approx. 1.2 kg
Nominal diameter	6 mm
Connection	G 3/8"

12.4 Purge gas

Residual dust	< 40 µm
Residual water	Dew point +3°C
Residual oil content	1 mg/m³
Temperature	Maximum + 40°C

13 Ordering information

13.1 APEX^{px} Ex px control unit

Designation	Order number
APEX^{px} control unit, DC	07-37A2-2211/1520
APEX^{px} control unit, AC	07-37A2-2211/2520

13.2 Pressure switch

Designation	Order number
Pressure switch module, in Ex p enclosure, 8 mm orifice	17-51P3-1303
Pressure switch module, in Ex p enclosure, 12 mm orifice	17-51P3-1403
Pressure switch module, in Ex p enclosure, 15 mm orifice	17-51P3-1503
Pressure switch module, in Ex p enclosure, 18 mm orifice	17-51P3-1603

13.3 Purge gas valve

Designation	Order number
Digital valve with leakage air needle valve; G3/8", ATEX / IECEx, 2x purge gas nozzle undrilled, DC 24 V, NC	05-0056-0073
Proportional valve with leakage air needle valve; G3/8", ATEX / IECEx, 2x purge gas nozzle undrilled, DC 24 V, NC	05-0056-0081

13.4 Purge gas valve fuse

Designation	Order number
Valve fuse 1.0 A (digital purge gas valve application)	05-0080-1016
Valve fuse 1.6 A (proportional purge gas valve application)	05-0080-1017

13.5 Purge gas nozzle zone 22

Designation	Order number
Purge gas nozzle 1/4", with attachments	05-0056-0062

13.6 Pressure reducer

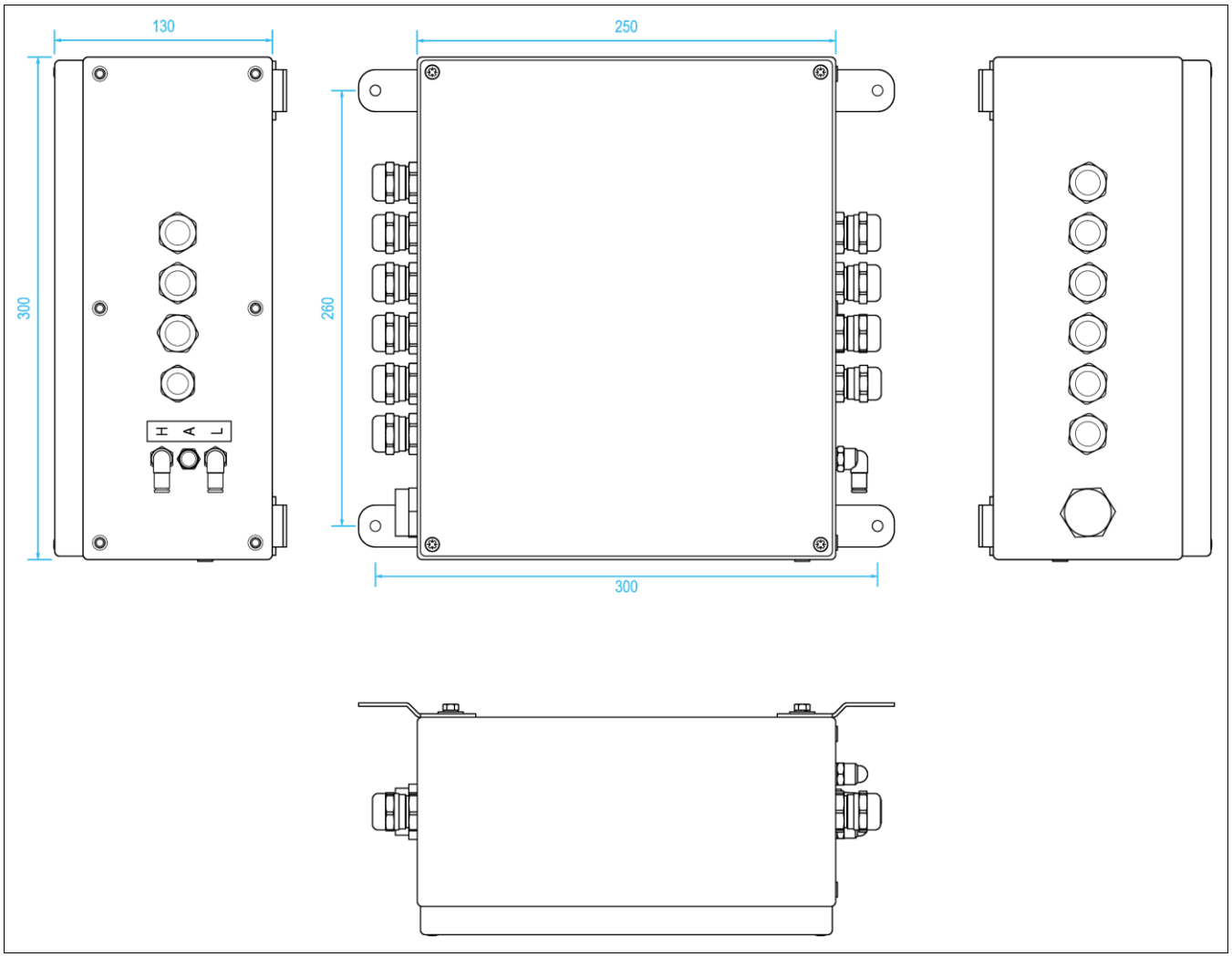
Designation	Order number
Pressure reducer 1/4", 0.5-6 bar, max. 110 m³/h, attachments	05-0056-0083
Pressure reducer 1/2", 0.5-6 bar, max. 450 m³/h, attachments	05-0056-0084

13.7 Installation kit

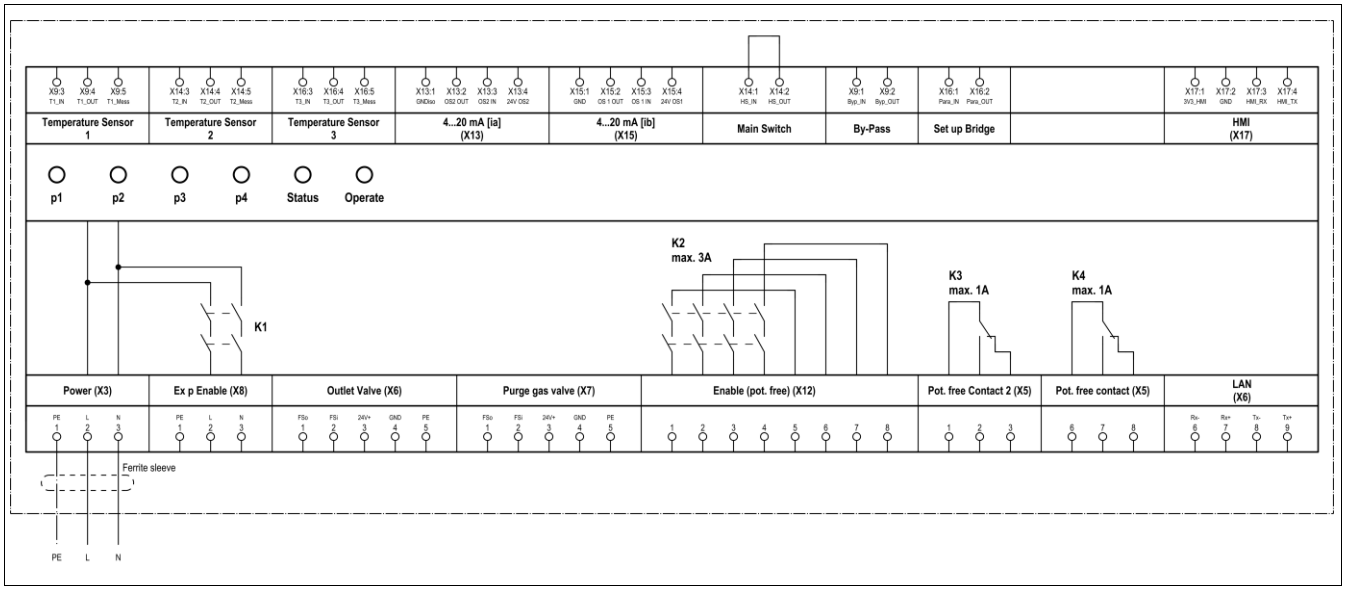
Designation	Order number
Installation kit for installation of the APEX control unit inside the pressurised enclosure, IP 66	05-0091-0275
Installation kit for installation of the APEX control unit outside the pressurised enclosure	05-0091-0280

14 Appendix

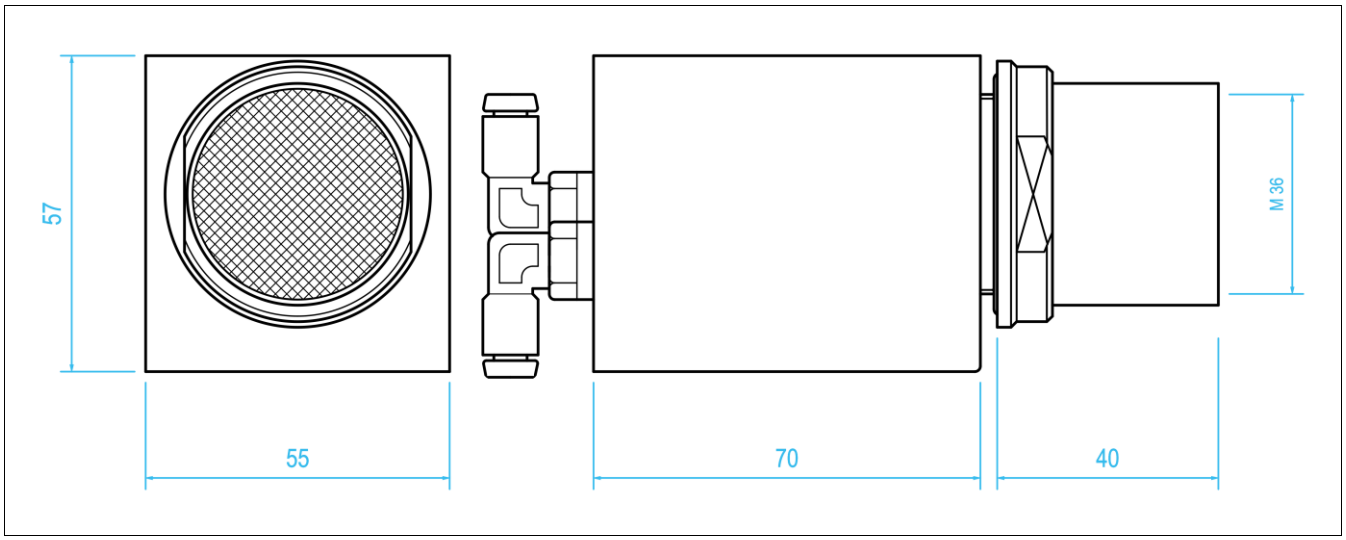
14.1 Dimensions of APEX^{px} Ex px control unit



14.1.1 Block diagram

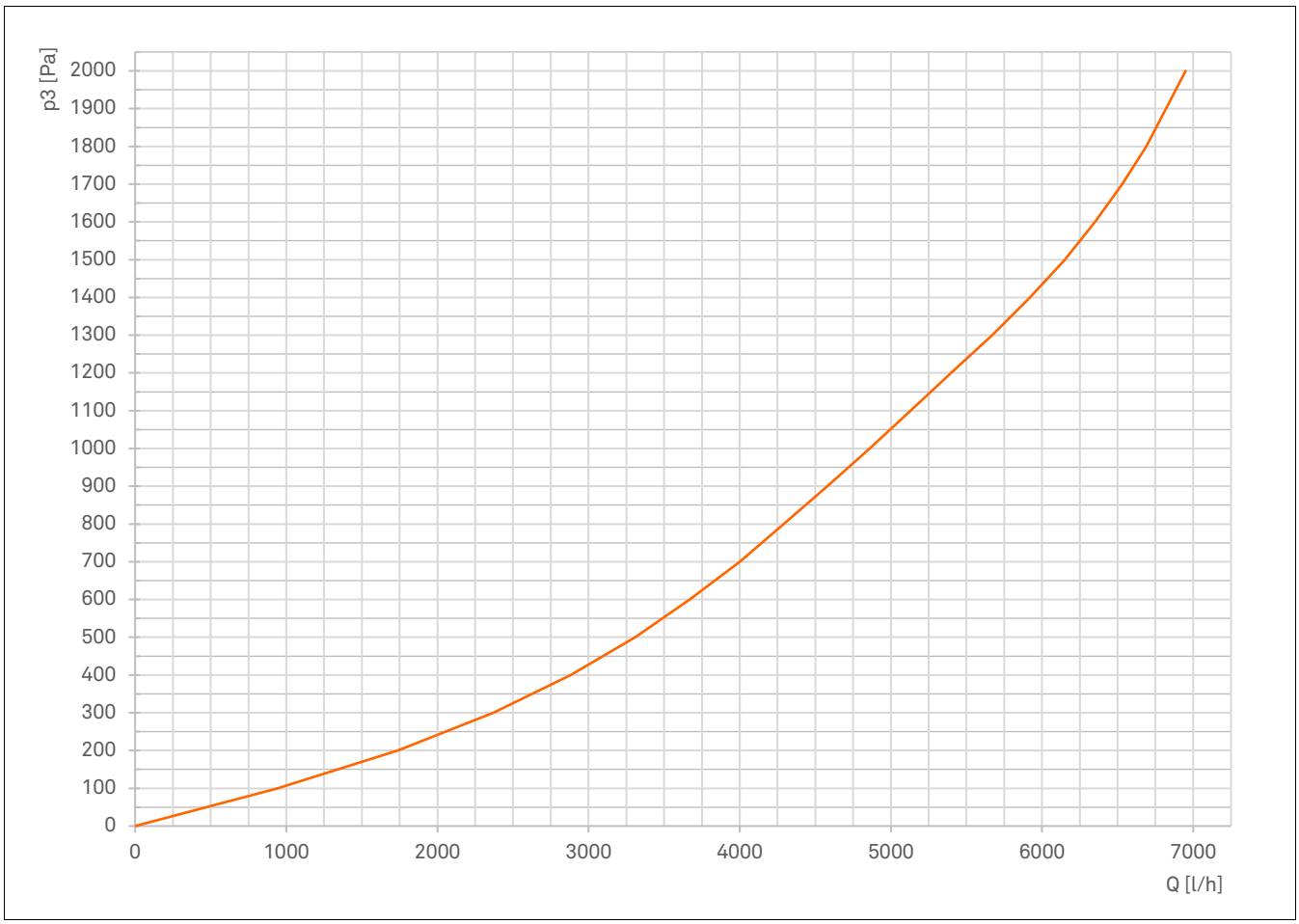


14.2 Pressure switch dimensions

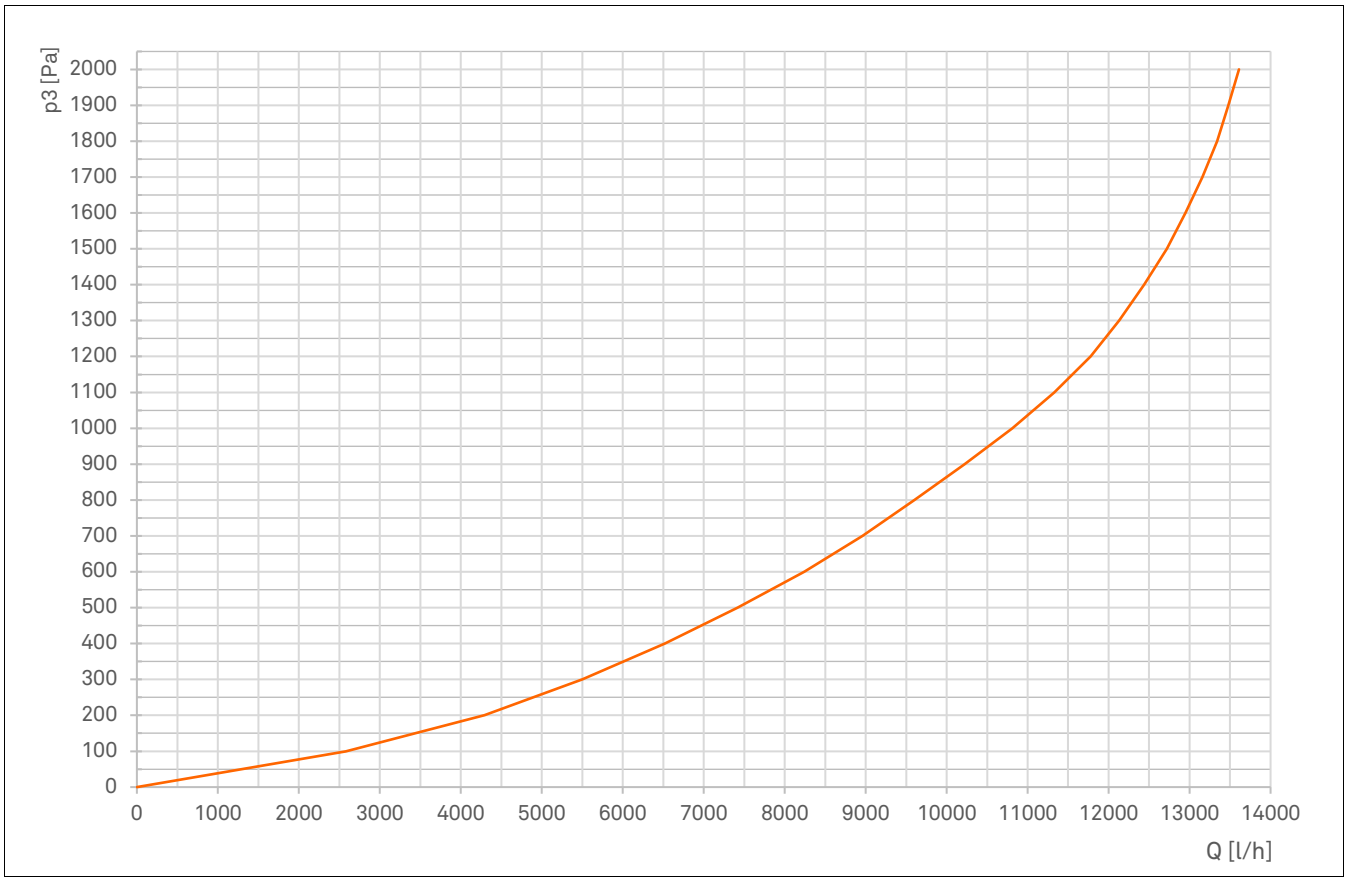


14.3 Purge gas diagram

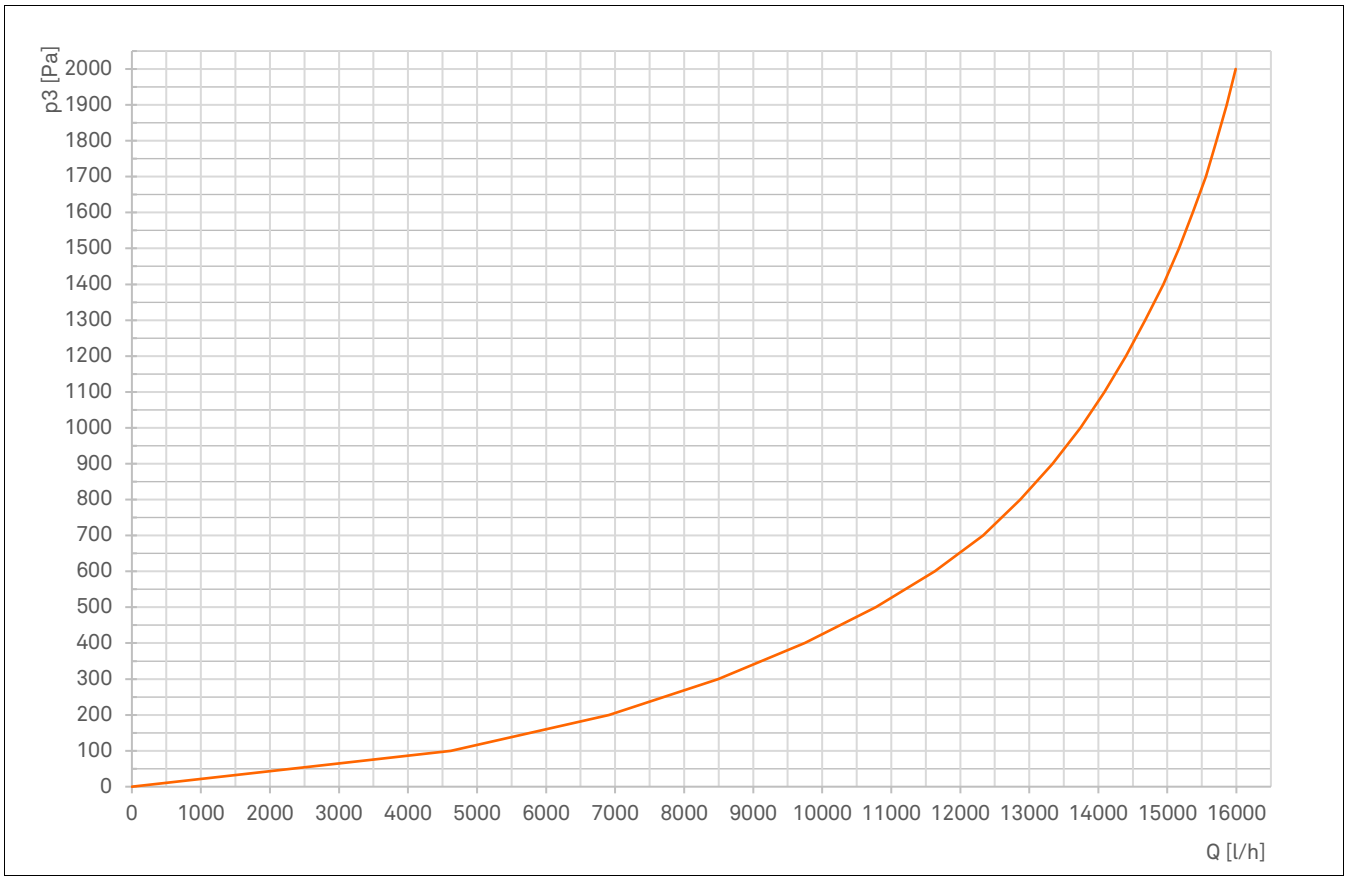
14.3.1 Purge gas diagram 8 mm, type 17-51P3-1203



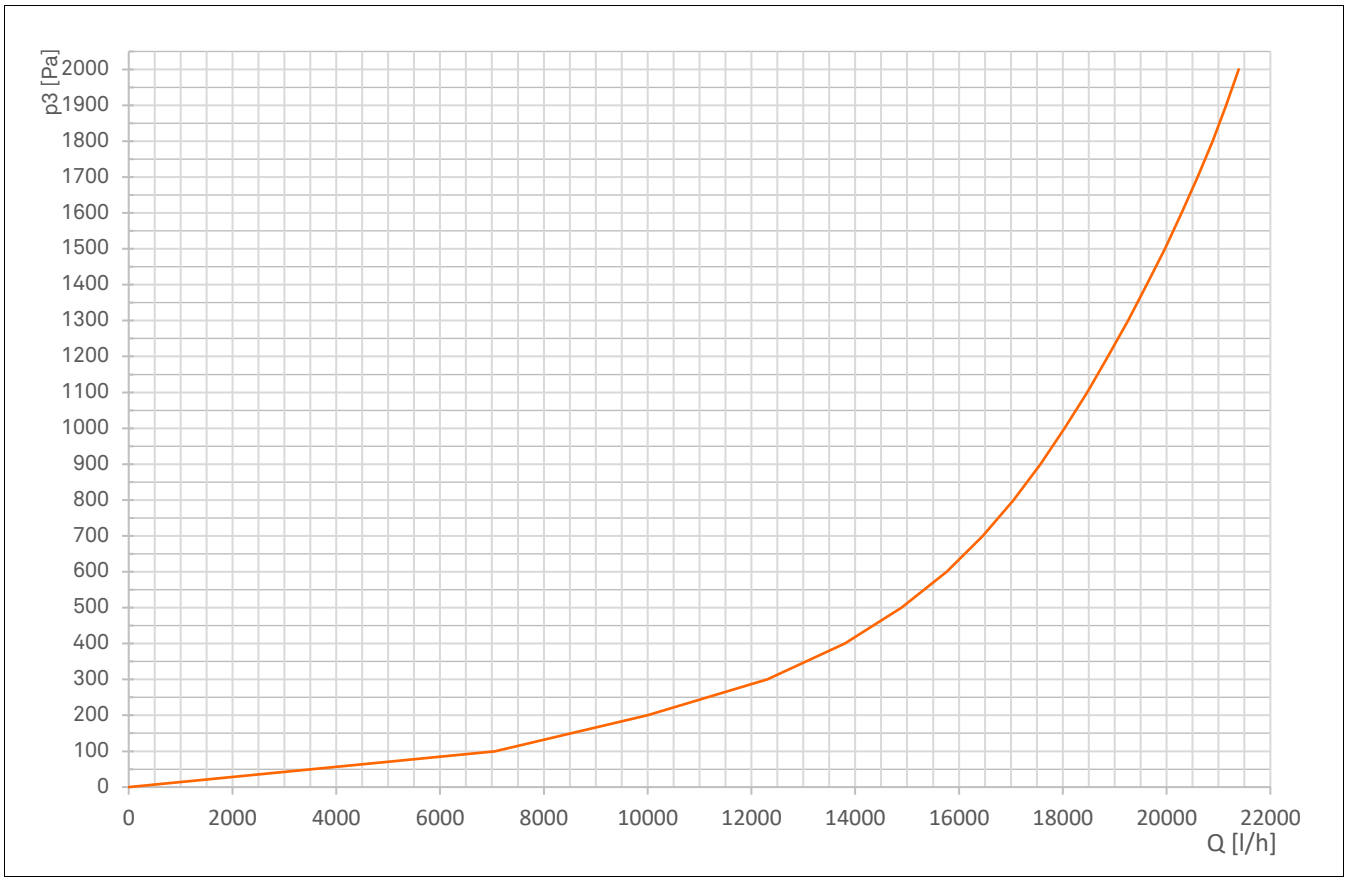
14.3.2 Purge gas diagram 12 mm, type 17-51P3-1403



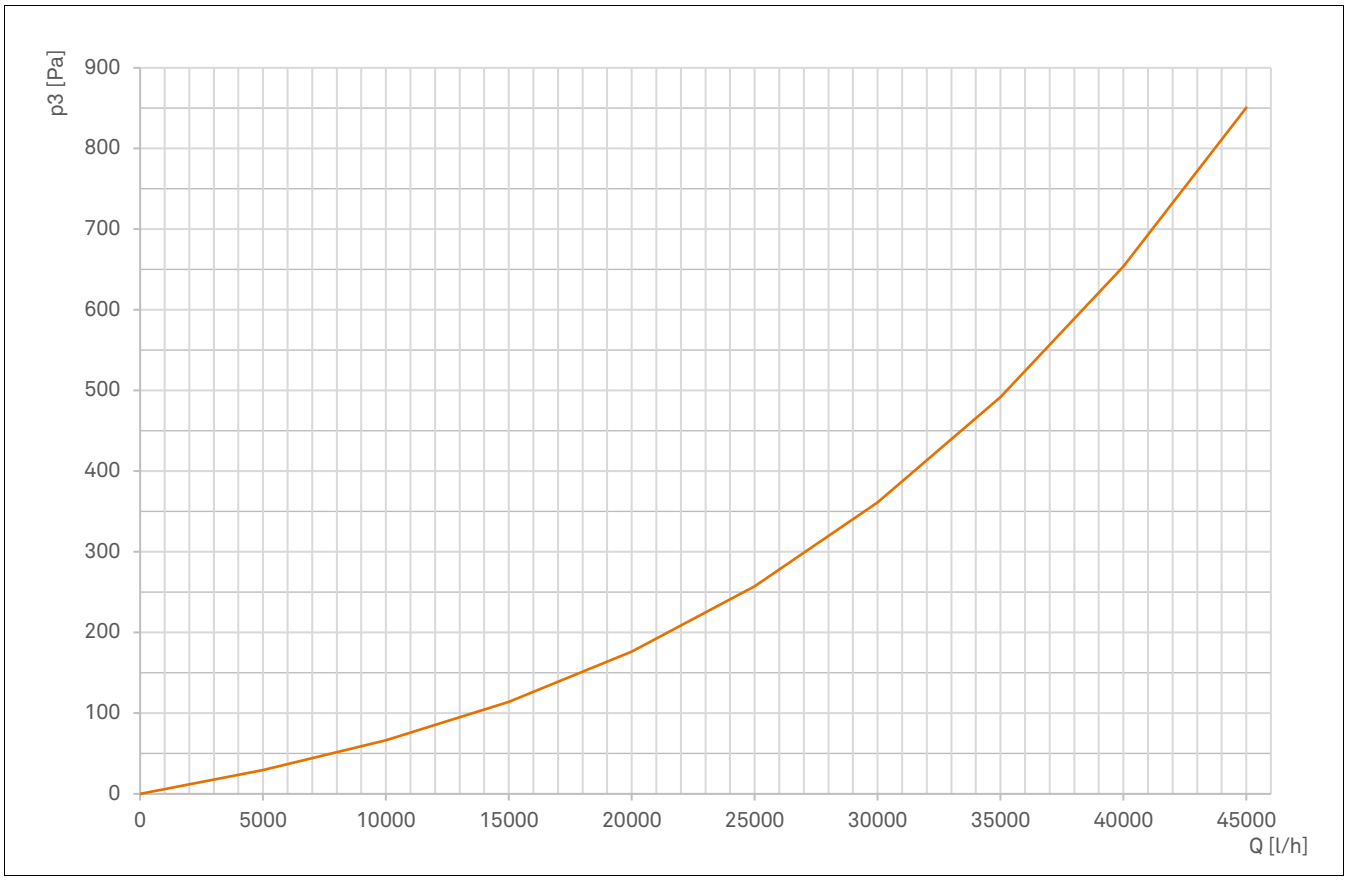
14.3.3 Purge gas diagram 15 mm, type 17-51P3-1503



14.3.4 Purge gas diagram 18 mm, type 17-51P3-1603



14.3.5 Purge gas diagram 2x 18 mm, 2x type 17-51P3-1603



14.4 Applied software packages

For servicing of the hardware/software of the APEX control unit, the freeware freeRTOS is used

15 Declaration of conformity

EU Konformitätserklärung
EU Declaration of Conformity
Déclaration UE de conformité
№ 01-37A2-7C0001-B

BARTEC

Wir	We	Nous
	BARTEC GmbH Max-Eyth-Straße 16 97980 Bad Mergentheim Germany	
erklären in alleiniger Verantwortung, dass das Produkt	declare under our sole responsibility that the product	attestons sous notre seule responsabilité que le produit
Ex p Kontrolleinheit	**Ex p control unit**	**Unité de contrôle Ex p**

Typ 07-37A2-*1*1/** APEX^{py} und 07-37A2-*2*1/**** APEX^{px}**
Type 07-37A2-*1*1/** APEX^{py} and 07-37A2-*2*1/**** APEX^{px}**

auf das sich diese Erklärung bezieht den Anforderungen der folgenden **Richtlinien (RL)** entspricht	to which this declaration relates is in accordance with the provision of the following **directives (D)**	se référant à cette attestation correspond aux dispositions des **directives (D)** suivantes
ATEX-Richtlinie 2014/34/EU	**ATEX-Directive 2014/34/EU**	**Directive ATEX 2014/34/UE**
EMV-Richtlinie 2014/30/EU	**EMC-Directive 2014/30/EU**	**Directive CEM 2014/30/UE**
RoHS-Richtlinie 2011/65/EU	**RoHS-Directive 2011/65/EU**	**Directive RoHS 2011/65/UE**
WEEE-Richtlinie 2012/19/EU	**WEEE-Directive 2012/19/EU**	**Directive WEEE 2012/19/UE**
und mit folgenden Normen oder normativen Dokumenten übereinstimmt	and is in conformity with the following standards or other normative documents	et est conforme aux normes ou documents normatifs ci-dessous

EN IEC 60079-0:2018/AC:2020
EN 60079-2:2014
EN IEC 60079-7:2015/A1:2018
EN 60079-11:2012
EN 60079-18:2015/A1:2017
EN 60079-31:2014
EN 61010-1:2010 / A1:2019/AC:2019
EN 61000-6-4:2007 +A1:2011
EN 61000-3-2:2014
EN 61000-3-3:2013
EN 61326-1:2013
EN 62061:2021
EN ISO 13849-1:2015
EN ISO 13849-2:2012
EN 60529:1991/A2:2013/AC:2019

Verfahren der EU-Baumusterprüfung / Benannte Stelle	Procedure of EU-Type Examination / Notified Body	Procédure d'examen UE de type / Organisme Notifié
	BVS 19 ATEX E 015 X Rev. - **0158, DEKRA Testing and Certification GmbH, 44809 Bochum**	

CE 0044

Bad Mergentheim, 01.02.2024

i.V. Jens Schurwanz
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16 Notes

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