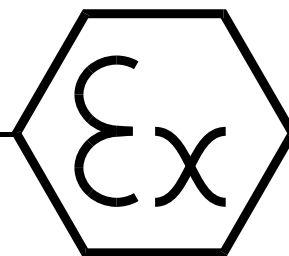


Instruction manual



Pressurized enclosure system **F840**



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The symbols DANGER, WARNING, ATTENTION



DANGER

The signal word calls a danger with a high risk degree which if it is not avoided can cause death or heavy injury.



WARNING

The signal word calls a danger with a middle risk degree which if it is not avoided can cause death or heavy injury.



ATTENTION

The signal word calls a danger with a low risk degree which if it is not avoided can cause slight or moderate injury.



DANGER

This symbol refers to the danger of electric tension which can cause heavy injury or death.

Safety measures: Absolutely read and follow



DANGER

Warning! With the use of this device special care is required. A high electric discharging is possible and can be deadly.

Work at electrical installations and equipment, which are energized are basically forbidden in explosive areas. Work at intrinsically safe circuits (Ex i) are excluded. In special cases work at non intrinsically safe circuits can be carried out if it is ensured that no explosive atmosphere is present during the whole work. The check of the presence of electrical tension should only be done using explosion protected and certified measuring instruments. Grounding and short-circuiting should only be carried out if it is ensured that no hazardous atmosphere is present.

1 Safety indication for explosion-proof devices

Application and Standards

The instructions and warnings given in this instruction manual must be observed in order to ensure safe and proper operation. The equipment should only be used for its intended purpose. The relevant provisions of the standards IEC/EN 60079 particularly IEC/EN 60079-14 "electrical apparatus for potentially explosive atmospheres" apply. The use of the equipment is permitted in potentially explosive atmospheres due to gases or vapours. The data provided at the type plate must be observed. When constructing and operating explosion-proof systems and facilities, the applicable national regulations, provisions and valid standards must be observed.

General Instructions

Work on electrical installations and apparatus in operation is generally forbidden in hazardous locations, with the exception of intrinsically safe circuits. In special cases work can be done on non-intrinsically safe circuits, on the condition that during the duration of such work no explosive atmosphere exists.

Proper and safe operation of this device requires appropriate transport, correct storage and assembly as well as careful service and maintenance. Any work at the device may only be carried out by technically trained personnel.

The electrical characteristics shown at the type plate and within the certificates BVS 15 ATEX E 048 X and IECEx BVS 15.0037 X, and, if applicable, their special conditions, have to be considered.

For outdoor installation it is recommended to protect the explosion protected distribution and control panel against direct climatic influence, e.g. with a protective roof. The maximum ambient temperature is 40°C, if not stipulated otherwise.

Terminal compartment in Increased Safety

When closing, it is to be ensured that the gaskets of the terminal compartment remain effective, thus maintaining degree of protection IP 54. Close unused entries by impact-proof stopping plugs, which are secured against self-loosening and turning.

Maintenance Work

The gaskets of Ex e enclosures are to be checked for damages and replaced, if required. Terminals, especially in the Ex e chamber are to be tightened. Possible changes in colour point to increased temperature. Cable glands, stopping plugs and flanges are to be tested for tightness and secure fitting.

2 General requirements to pressurized enclosure system F830/840

The control unit (FS840) for pressurized enclosure systems can be combined with every Ex pzc- housing that fulfils the following requirements.

2.1 General requirements

- 1 The Ex pzc- system must be inspected by a skilled person of accordance to IEC/EN 60079 –2, IEC/EN 60079 –14 and this manual.
- 2 Mount the solenoid valve (purging medium input) and control unit FS840 to a maximum of distance (optimal arrangement is diagonal).
- 3 The operator must not do any technical changes to the control unit FS840. Any change will invalidate the type examination certificate.
- 4 Only Gönzheimer Elektronik GmbH is allowed to repair the FS840.
- 5 Harmed Ex p-pipes and connections have to be repaired/replaced immediately.
- 6 Discharging of flammable gases into the Ex pzc-housing, e.g. for gas analyser applications is **prohibited**.
- 7 It is necessary to create an instruction manual for the complete system.

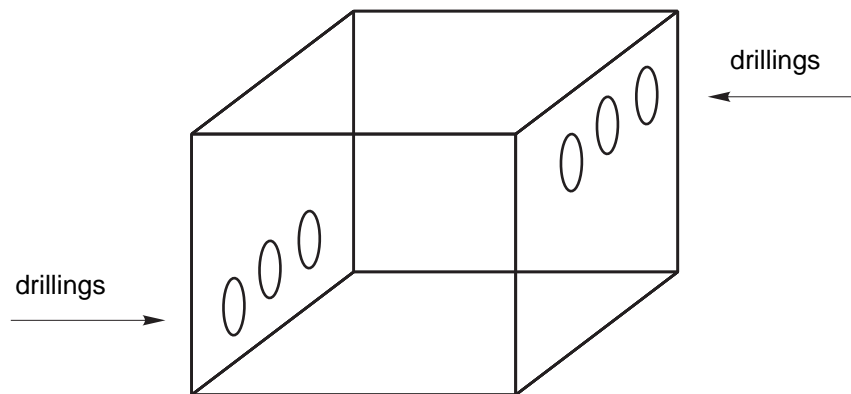
2.2 Mechanical requirements to the Ex pzc- housing

- 1 Regard particularly IEC/EN 60079- 0 + 2.
- 2 The Ex pzc- housing must hold the 1,5 – fold of the maximum pressure, which can be reached inside of the cabinet, 2 mbar at least. The operator has to define the maximum pressure of the housing and has to program this pressure value as monitored max. pressure into the FS840 and has to ensure, that the housing holds this maximum pressure by 1,5 times.
- 3 The Ex pzc- housing must pass an impact test according IEC/EN 60079-0.
- 4 The protection class of the Ex pzc- housing must be greater than IP54.
- 5 Cable glands must have a protection class greater than IP54.
- 6 If the Ex pzc- housing has surfaces made of synthetics (e.g. windows), the maximum limits for area and thickness must be complied with IEC/EN 60079-0.

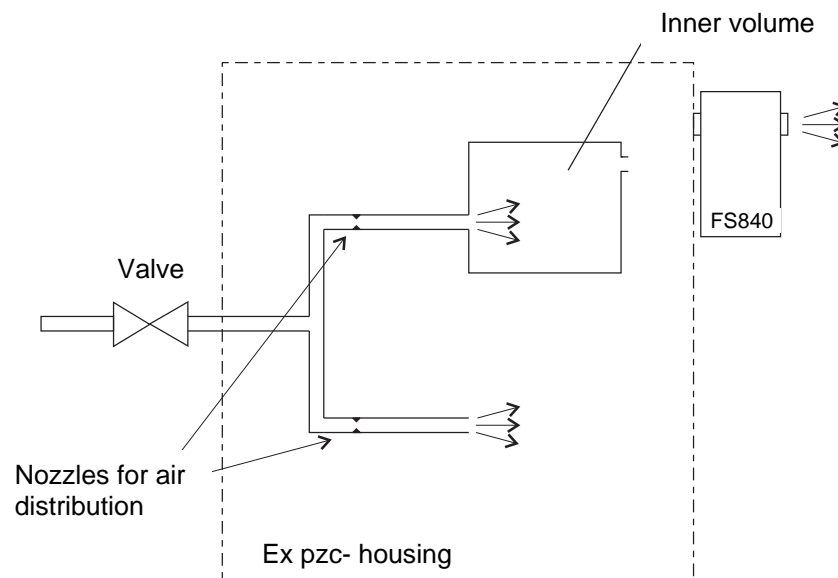
WARNING – DANGER THROUGH ELECTROSTATIC DISCHARGE – SEE INSTRUCTION MANUAL

- 7 There is no danger of static discharge, if the synthetic surface has a thickness of $\leq 0,2$ mm (Group IIC) respectively 2 mm (Group IIB) or less and it is mounted on a metallic ground.

- 8 If the Ex pzc- housing posses internal compartments (closed rooms, compartments that are not purged), the following rules have to be observed:
- Components with a free internal volume less than 20 cm³ are not considered to be internal compartments requiring purging as long as the total volume of all such components is not more than 1% of the free internal volume of the pressurized apparatus.
 - Provide not less than 1 cm² of vent area for each 1000 cm³, (IEC/EN 60079 – 2; Abs. 5.5.2).
 - Place the vents in a diagonal order, as shown on the picture below, with a minimum vent size of 6,3 mm diameter



- Installer can also remove covers or doors of internal housings if they provide adequate vent diameters alternatively.
- If the topics above are not applicable, a separate piping must be added to the internal compartment. The purge medium flow through the compartment must be high enough to make sure that the air in the compartment is exchanged at least 10 times higher. For instance:



2.3 Determination of pre- purging phase

In (Gas-) Ex- Zone 2 it is possible to resign to a purging phase, if the atmosphere in the housing and in the corresponding pipes is much lower than the lower explosive limit (e.g. 25% LEL). Additionally gas detectors can be used to check, if the Gas in the Ex pzc housing is ignitable. (See IEC/EN 60079-14)

2.4 Purge medium requirements

- 1 The purging medium must not be derived from hazardous area, it must be contamination free (dry, free of oil and dust). The air quality must be class 533 according ISO 8573-1, Solids 40µm (Class 5); Dew point -20°C (Class 3); Oil quality 1mg/m³ (Class 3).
- 2 If another purge medium than air is used, it is important to regard the minimum oxygen content of the ambient. Maybe it is necessary to install an exhaust pipe from the outlet of the Ex pzc- housing to out-of-door.
- 3 The inlet of the purging gas into the Ex pzc- housing and the pressurized enclosure control unit FS840 should be located as far away to each other as possible (body diagonal), to achieve a proper purging of the complete housing.
- 4 The pressure loss at the solenoid valve must not be higher than 500 mbar, while pre- purging phase.

2.5 Temperature class of the Ex pzc- housing

The installer has to define the maximum ambient temperature and the resulting maximum temperature class of the Ex pzc- housing.

To determine the temperature class, measure, on worst conditions, the hottest point on the surface of the Ex pzc- housing and recalculate it to the maximum ambient temperature. The minimum temperature class is the one of the FS840 and its surface temperature.

If some parts inside of the housing get hotter than the temperature class, the installer has to determine the time in which the temperature of those parts falls below the temperature class. He has to place a sign on the Ex pzc- housing with the following sentence:

ATTENTION – ALL DOORS AND WINDOWS SHALL NOT BE OPENED UNTIL X MINUTES AFTER DEENERGIZING.

X is the determined cooling-time that is needed to cool down hot surfaces lower than the temperature limit for the corresponding temperature class.

2.6 Particular requirements in Zone 22 (Dust - Ex)

2.6.1 Purging-phase / Cleaning of the housing

For the application in the zone 22 the FS840 must not initialize a pre purging phase. Therefore, the automatic purging at the controller FS840 has to be deactivated (Purging = No).

The purging phase before the start-up of the inserted, electrical non-ex equipment, upstream within the gas ex range, is replaced in the zone **22 by inside cleaning the housing**.

2.6.2 Marking in the housing

On the housing has to be the following marking in a well visible place:

WARNING – REMOVE ALL DUST FROM INSIDE OF THE ENCLOSURE BEFORE CONNECTING OR RESTORING THE ELECTRICAL SUPPLY!

2.6.3 Special conditions in the manual of the Ex pzc- system (Zone 22)

In the manual for Ex p- applications for the zone 22 the following items are supplemented:

The use of the Ex p- application within the zone 22 must take place without pre purging phase. The automatic purging at the controller FS840 has to be therefore always deactivated.

The system may be operated not with a single solenoid valve, but only with a leakage balance mechanism without flushing attitude, e.g. SD840 throttle.

Before start-up of the ignition capable apparatus, the inside of the housing has to be cleaned completely.

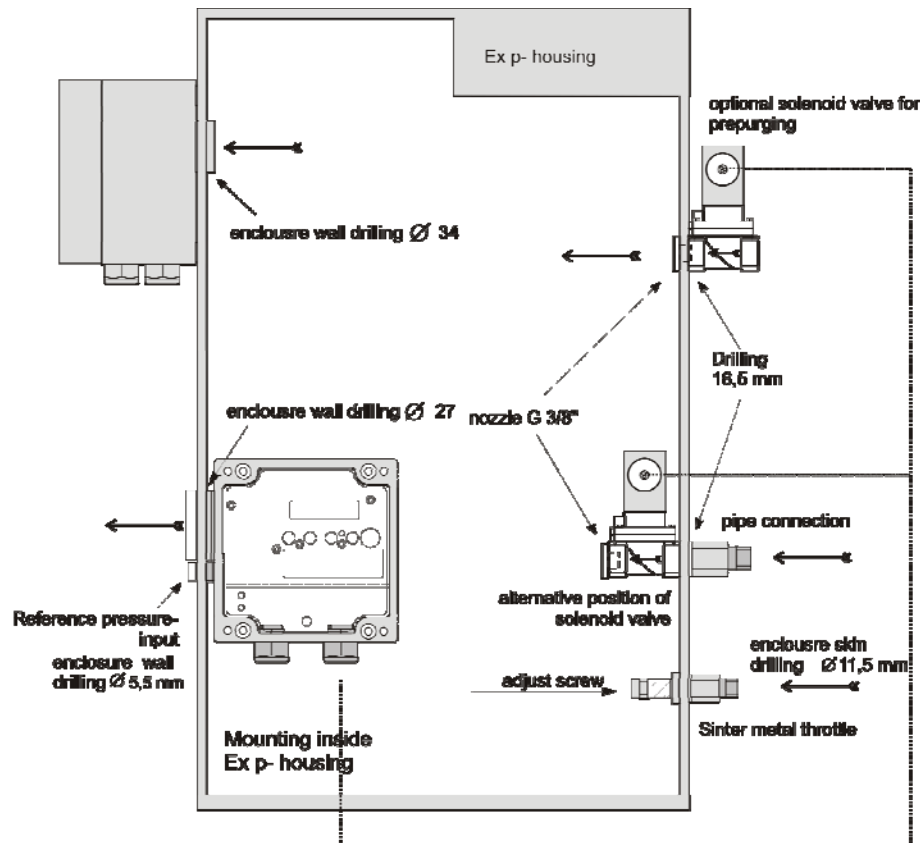
The protective class of the Ex pzc- housing in dust explosive area with not leading-capable dust has to be at least to IP5X, with leading-capable dust at least IP6X.

2.7 Introduction: Pressurized enclosure system F840 with protection pzc

The use of simplified pressurized enclosures allows the operation of 'non explosion protected' devices in hazardous areas inside zones 2 + 22. The protection type 'pressurization' is based on the principle of maintaining a constant pressure using air or a protective gas to prevent an explosive mixture forming near the apparatus inside the pressurized enclosure. This is achieved by operating the unit in a pressurized enclosure (Ex pzc- enclosure) and protecting it from the ingress of explosive gas mixtures by a continuous overpressure with air or an inert gas.

The control unit FS840 provides all necessary functions to install a pressurized enclosure system according IEC/EN 60079-14 and IEC/EN 60079-2 „pzc“: The FS840 measures the internal pressure and alarms or powers off, if the pressure is below the pre- defined minimum pressure.

Optional the FS840 can also pre purge the housing before automatic powering on the housing. In this case connect a digital working 2/2 way solenoid valve to the appropriate terminals. The solenoid must have a separate certification for zone 2.



The purge medium that flows in through the valve is blown through the air outlet in the FS840 into the ambient Ex atmosphere. The air outlet is conform to IEC/EN 60079-2 designed and contains the needed spark barrier.

2.8 Relation between FS830 and FS840

The pressurized enclosure system control units are certified in the same type examination certificate. The special conditions are written in the type examination certificate.

2.9 Purging phase

2.9.1 Pressurized enclosure system without pre- purging

If the operator is sure, that the atmosphere inside of the enclosure and the appropriate pipe infrastructure is below 25% of the lower explosive limit (LEL) at power up, he can abandon the pre- purging of the enclosure in zone 2. In that case the FS840 monitors only the pressure inside of the enclosure of 0.8 mbar at minimum and maximal 22 or 27 mbar at maximum. If any limit is exceeded, the FS840 changes the state on the potential free relay contacts.

The purge medium flows through an adjustable sinter metal throttle into the Ex pzc- housing while reducing its pressure.

The FS840 has a mechanical output valve which opens at approximately 5 mbar to let the purge medium out. Before this valve is a spark barrier located thus the purge medium can be exhausted directly to the hazardous area.

2.9.2 Pressurized enclosure system with pre- purging

To pre- purge the Ex pzc- housing connect a digital working 2/2 way solenoid valve to the control unit that switches between purging and pressure maintenance. In the valve is a nozzle integrated to reduce the pre- pressure and also an adjustable bypass-throttle. For purging, the valve opens and purge air flows through the nozzle into the Ex pzc- housing. After pre- purging the valve closes automatically and the adjustable throttle of the SVD.L lets a small amount of purge medium into the housing to hold the pressure.

The installer can determine the pre- purging time once by doing the attenuation test according IEC/EN 60079-2.

As an alternative he can calculate the purging time without the elaborate attenuation test see below:

The purging time depends on minimum flow (Q_{\min}), free internal volume (V) and the free volume of the connected pipes (V_a). Final the calculated time must be multiplied by 10. The purging time t_{purge} is:

$$t_{\text{purge}} = \frac{10 \times (V + V_a)}{Q_{\min}}$$

The minimum flow (Q_{\min}) depends on the minimum pre pressure (P_{premin}), the pressure lost at the valve (P_{Valve}), internal pressure of the Ex pzc- housing (P_{Int}) and the nozzle diameter (d). The pressure lost at the valve (P_{Valve}) should not exceed 500 mbar. The maximum internal pressure of the housing is defined to be less than 25 mbar. The minimum flow Q_{\min} can be calculated by:

$$Q_{\min} = \sqrt{\frac{2 \times (P_{\text{premin}} - P_{\text{Valve}} - P_{\text{Int}})}{\rho}} \times \frac{d^2 \times \pi}{4}$$

ρ is the density of the purging medium. The density of air is $\rho = 1,293 \text{ kg/m}^3$, the density of nitrogen is $1,25 \text{ kg/m}^3$. We calculate the ρ of air for all gases, because the difference is only 3%.

The installer can calculate the purging time of his own or he can use the automatic calculation in the menu of the FS840 (see 4.7)

Example:

$$Q_{\text{Beispiel}} = \sqrt{\frac{2 \times (2 - 0,5 - 0,025) \times 10^5 \frac{\text{kg} \frac{\text{m}}{\text{s}^2}}{\text{m}^2}}{1,293 \frac{\text{kg}}{\text{m}^3}}} \times \frac{0,002^2 \times \text{m}^2 \times \pi}{4}, \quad \text{mit } 1 \text{ bar} = 10^5 \frac{\text{kg} \frac{\text{m}}{\text{s}^2}}{\text{m}^2}$$

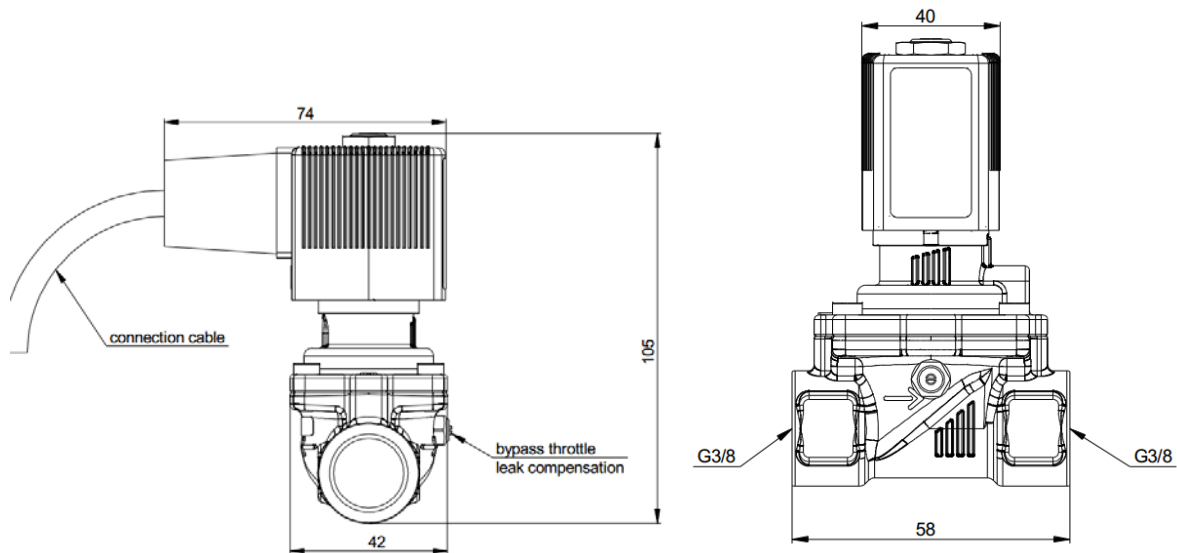
$$Q_{\text{Beispiel}} \approx 0,0015 \frac{\text{m}^3}{\text{s}} \approx 1,5 \frac{\text{l}}{\text{s}}$$

2.10 Operation mode Leakage compensation

The FS840 works after the pre- purging phase or without pre purging phase immediately after the voltage supply in the mode of operation "leakage compensation ".

In this mode of operation will maintain after an overpressure (at least 0.8 mbar) within the Ex pzc- cabinet. This cabinet minimum pressure as well as also a cabinet maximum pressure are programmable and are monitored constantly.

Leakage losses are compensated by a small bypass. This bypass is integrated in the valve and mechanically adjustable (diameter 0,3 ... 1 mm).



2.11 Conformity with Standards

The Ex certified control unit FS840 fulfills the requirements of listed standards in the attachment (Declaration of conformity). It is developed, manufactured and tested in accordance with state-of-the-art engineering practice and ISO9001:2015.

3 Mounting and connection

3.1 Mounting

3.1.1 Control unit FS840

The control unit FS840 is suitable for mounting in hazardous area zones 2 / 22. The installer can place it at the outside of the Ex pzc- housing, the position is arbitrary.

The installer can mount the control unit using the 4 mounting holes in the housing rear, but the fixing on the air in- or outlet is sufficient.



CAUTION!

While mounting, observe local safety guidelines and the regulative: IEC/EN 60079-14.



CAUTION!

The reference output (=M5 internal thread at the left side of the control unit) must have contact to the ambient pressure.

If the control unit is placed into the Ex pzc- housing, the reference output must be connected to the ambient with a pipe or tube.

Additional see general requirements to pressurized enclosure system F830/840 (Chapter 2).

Additional regulations for mounting in Gas- Ex- Zone



CAUTION!

When the FS840 is used as a device of Gas Ex Group **IIC**, the pressurized enclosure must have at least degree of **protection IP54**.

Additional regulations for mounting in Dust- Ex- Zone



CAUTION!

When the FS840 is used as a device of Dust Ex Group **IIIB**, the pressurized enclosure must have at least degree of **protection IP5X**.



CAUTION!

When the FS840 is used as a device of Dust Ex Group **IIIC**, the pressurized enclosure must have at least degree of **protection IP6X**.

3.1.2 Sinter metal throttle SD840

While operation mode "leakage compensation" a small amount of purging gas enters through the sinter metal throttle SD840 into the Ex pzc- housing to provide the desired overpressure. Dispensable purge gas will be exhausted at an overpressure of about 5 mbar through the integrated outlet valve of the control unit FS840.

3.1.3 Optional solenoid valve for purging

The installer can mount the solenoid valve SVD.L.x-Alxx in or outside of the Ex pzc- housing, see details from manufacturer documentation.

3.2 Connection and Startup

3.2.1 Connection details

When connecting the Ex e terminals, the following limits must be observed

| | |
|----------------------------------|---|
| Min. and Max. clamping torque | Min. 0,4 Nm Max. 0,5 Nm |
| Min. and Max. wire cross-section | Stiff: 0,2 – 2,5 mm ² Flexible: 0,2 – 2,5 mm ² |

When connecting and commissioning, the following points should be observed



CAUTION!

Mains VOLTAGE! Extreme caution is advised when handling this device. High electrical discharge is possible and can be fatal.

See installation regulative and the conformity statements BVS 15 ATEX E 048 X and IECEx BVS 15.0037 X.

Do not exceed terminal safety limits of each terminal.

See limits in technical details or conformity statements.

The internal valve fuse must be adapted to the solenoid valve that is used.

3.2.2 Terminals of the FS840

| Terminal | Description |
|----------|--|
| 1,2 | Power off relay 1 / Signal contact 1 |
| 3,4 | Power off relay 2 / Signal contact 2 |
| 5,6 | Contact for the flush medium valve, 5 = L+, 6 = N- |
| 7,8 N - | Supply, depending on version, N or Minus at DC |
| 9,10 L + | Supply, depending on version, L or Plus at DC |
| 11,12 | I/O Switch input for passive contacts |

3.2.3 Place and exchange of valve fuse

The fuse for the solenoid valve SVD.L.x-Alxx is located on the right side of the buttons. If the solenoid valve does not work anymore, the fuse should be checked.



3.2.4 Power off relays

The control unit FS840 switches off the line voltage of the target device via the clamps 1,2 and 3,4. The switching power is 250V / 5A.



WARNING!

The maximum current limit of 5 A on the terminals 1,2 and 3,4 should not be exceeded at any time!

E.G. By an application of switched power supply a multiple higher current as the nominal max. current may occur. In this case a switching on current limitation (e.g. NTC) must be added to avoid the off-limits high current.

If this is missed the risk of „jammed relay contacts“ and within the loss of the explosion protection exists!

3.2.5 Switch input for passive contacts

The FS840 comes with a switch input at terminals 11 and 12 for the connection of simple apparatus like a passive switching contact, a liquid level switch or a temperature switch. This switch input is just active after the pre- purging phase in normal operation mode. The logic of the switch input is configurable (Input positive logic: yes or no). Following functions are available:

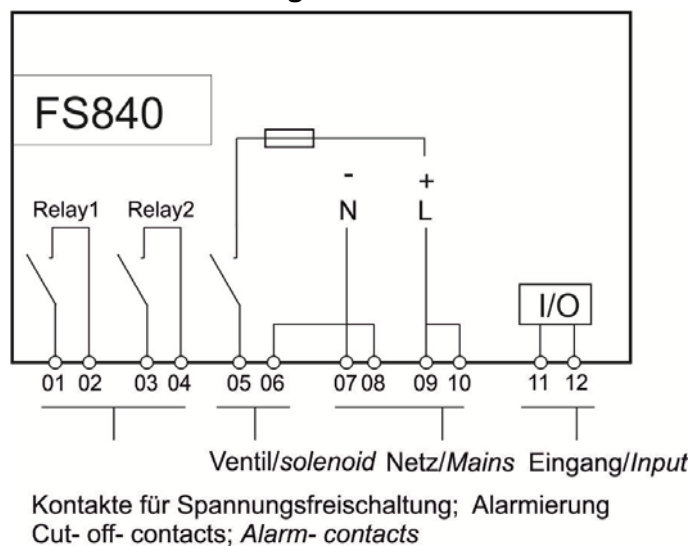
None: The switch input is deactivated.

Bypass: E.g. via a key switch the bypass mode could be activated.

External alert: E.g. a liquid level switch could activate the external alert and the system will open the power off relays.

External thermostat: A temperature switch, that changes its switching status at a certain temperature value could be used, to realize a cooling possibility for the housing. If the temperature switch changes its switching status, the control unit FS840 opens the solenoid valve and a high air flow will generate a smart cooling power.

3.2.6 Electrical diagram of the FS840



4 Operation

To operate the FS840 use the built-in buttons and display.

4.1 Display

The operation modes, the actual data of pressure or purge time and also error messages as well as menu point are shown in clear text on the display.






4.2 Alarm- signal- lamp

Additionally to the display a multicolour LED shows the status of the control unit.

| Colour | Mode | Meaning | Relay |
|--------|--------------|--------------------------------------|--------|
| Green | constant | Normal operation mode | closed |
| Green | flashing | e.g. cooling | closed |
| Yellow | constant | Purging | open |
| Red | constant | Error | open |
| Red | flashing 1Hz | Pressure higher than "Max. pressure" | open |
| Blue | constant | Menu | open |
| Purple | constant | Bypass | closed |

4.3 Buttons

The four multi-function-buttons have different meanings respectively functions, depending on the display and operation mode.

| Button | Operation-mode | Function |
|---|----------------|--|
|  „to the right“-button | Operation | none |
| | in Menu | Shift cursor one position to the right |
| BYPASS  „up“-button | Operation | Activates Bypass; i.e. enable toggle ignition-capable device on or off independently of the purging status. |
| | in Menu |  (Fire certificate required) Get next menu item |
| INFO  „down“-button | Operation | Changes indication of display: present pressure, remaining purge time and present state of Ex pzc-system |
| | in Menu | Get previous menu item |
| MENU  „Enter“-button | Operation | Enters main menu |
| | in Menu | Initiates and confirms parameter input |

4.4 Indication modes during normal operation

The actual status of the Ex pzc- System is generally shown on the info display. Using the “Down”- button the user can toggle to the present pressure and remaining purge time indication.




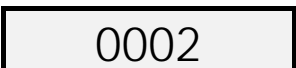

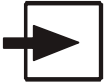

4.5 Bypass, activate and deactivate



CAUTION!

**The activation of the Bypass is just allowed, if it is sure, that no explosive atmosphere is in the environment of the Ex p system.
(Fire certificate required)**

Starting situation to activate the Bypass is the operation, that means that the Ex pzc- housing is purged, not purged or in purging phase

| | |
|---|--|
|  | (1) press  button |
|  | (2) The Bypass code is needed |
|  | The ex works Bypass code is '0002'. If the code was changed, enter the correct code. |
|  | (3) Enter the correct code using the arrow keys |
|  | and confirm the code with the “ENTER”- button |
|  | (4) The Bypass is now activated. The Ex protection Ex p is bypassed. The control unit shows the indication “Ex OK”. |



Note

A maximum Bypass-time for the Software activated Bypass is programmable in the menu. After that time, the control unit switches automatically back to the previous state.

The Bypass will be deactivated in the same way.

With a certified key switch connected to the switch input and the activated bypass mode in the switch input menu, the Bypass could also be activated and deactivated.

4.6 Configuration

The possible operation modes according to chapter 2 will be programmed in the menu by the user. The following passage shows the menu, where the structure and the parameters of the Ex pzc- system will be set.

The Master Code (M-Code) ex works is: 0001

4.7 Menu structure

In this chapter the menu structure is shown. Some operation modes depend on each other, so there is no structure where all menu items are visible.

The following list explains the single menu items and helps to understand correct the system settings. The condition on what the menu item is visible is not explained.

| Hierarchy | | | Description, Explanation |
|-----------|------------------|-----------------|---|
| 1.Level | 2.Level | 3.Level | |
| Language | | | Define the language shown on the display of the Ex pzc- system in this menu item. Available languages are: German, English, French, Dutch, Spanish |
| Structure | Purging | Yes | Purging Yes means that the Ex pzc- housing will be pre purged before "Ex Ok" Message is shown. |
| | | No | Purging No means that the housing will not be pre- purged. The "Ex Ok" Message is directly shown and the min. pressure is monitored. |
| | Purge time auto. | Yes | Purge time auto, Yes: The purge time will be automatically calculated out of cabinet volume, pre-pressure and nozzle diameter. (Acc. chapter 2.9.2; factor 10) |
| | | No | Purge time auto, No: Enter purge time directly. |
| | Input function | None | Input is deactivated. |
| | | Bypass | Bypass could be activated with a certified key switch. |
| | | External alert | If the external alert will be activated, the signal contacts will power off/open. |
| | | Ext. thermostat | An additional cooling possibility for the inner of the housing could be realized with the used solenoid valve. |
| | | | Output 1 function: |
| | Output 1 func. | Ex Ok | Explosion protection is ok: The output is set, if the pressure is higher than minimum pressure. |
| | | None | Output 1 is deactivated. |
| | | Fault | Fault-function: An internal Error will be shown on the display. |
| | | Max. pressure | Maximum pressure: The output is set if the actual pressure inside the housing is higher than the maximum pressure level. |

| | | |
|----------------|------------------|--|
| | P<P-Alarm | Alarm pressure: The output is set if the actual pressure inside the housing is lower than the signal pressure. |
| | Purging | Purging: The output is set during purging phase. |
| | Bypass active | Bypass: The output is set if the bypass is active. |
| Output 1 | NO / NC | Circuit opening principle 1 (1/2) NO = Normally open NC = Normally closed Output 2 function: See Output 1 func. |
| Output 2 func. | | |
| Output 2 | NO / NC | Circuit opening principle 2 (3/4) NO = Normally open NC = Normally closed |
| Parameters | Purge time | Purge time [h/min/sec]: Enter the purge time directly. This parameter only appears if "Purge time auto" = "No". [Ex works: 10 min] If "Purge time auto" = "Yes", the following items are shown: <ul style="list-style-type: none"> • Cabinet volume [dm³]: If "Purge time auto" = "Yes" [Ex works: 500 ltr] • Input pressure [bar]: Pre pressure of the purge medium, that is connected to the solenoid valve or inlet throttle [Ex works: 2 bar] • Nozzle diameter [mm]: Diameter of the nozzle that is mounted at the input of the Ex pzc- housing [Ex works: 3mm] • Minimum pressure while purging [mbar]: During pre- purging phase the FS840 monitors an increased pressure inside of the Ex pzc- housing to achieve the defined flow on the output valve. This increased pressure is monitored with this parameter [Ex works:7.0 mbar] |
| | Cabinet volume | |
| | Input pressure | |
| | Nozzle diameter | |
| | Min. P purge | |
| | Min. P operation | Minimum pressure at normal operation [mbar]: Monitored minimum pressure in the Ex pzc- housing [Ex works:0,8 mbar] |
| | Signal pressure | Signal pressure [mbar]: Monitored signal pressure in the Ex pzc- housing [Ex works:1,5 mbar] |
| | Max. pressure | Maximum pressure [mbar]: Monitored maximum pressure in the Ex pzc- housing [Ex works:18 mbar] |

Max. bypass
time

Codes

Menu code

Bypass
code

Maximum bypass time [min]:

Maximum Bypass-time for the Software activated Bypass. After that time, the control unit switches automatically back to the previous state.
[Ex works: off]

Menu code: Code to enter the main menu [Ex works: 0001]

It is **not** possible to set this value to „0000“.

Bypass code: Code to enter the bypass mode.

The code can be disabled with „0000“. The code “9999” disables the bypass in general
[Ex works:0002]

5 Annex

5.1 Terminals and terminals Ex- limits

| Terminal | Voltage | Current | Power | Remark |
|-----------|--|--|--|------------------------------------|
| 1, 2 | U _m = 250VAC U _m = 250VAC U _m = 30VDC | I _m = 5A bei AC1 I _m = 1,2A bei AC15 I _m = 5A bei DC1 | P _m = 1500VA P _m = 300VA P _m = 150W | Signal contact 1 |
| 3, 4 | U _m = 250VAC U _m = 250VAC U _m = 30VDC | I _m = 5A bei AC1 I _m = 1,2A bei AC15 I _m = 5A bei DC1 | P _m = 1500VA P _m = 300VA P _m = 150W | Signal contact 2 |
| 5, 6 | | | | Contact for the flush medium valve |
| 7/8, 9/10 | U _n = 90VAC - 230VAC U _n = 24VDC | | P _n < 1,5W P _n < 1,5W | Supply |
| 11/12 | For connection of passive contacts inside of Ex p enclosure | | | Switch input |

5.2 Technical details

| | | Ex pzc- control unit FS840 |
|---------------------------|---|--|
| General | Mounting | inside hazardous area |
| | Ex protection class | II 3 G - Ex ec nC ic [pzc] IIC T6 Gc II 3 G - Ex ec nC ic [pzc] IIC T5 Gc II 3 D - Ex tc ic [pzc] IIIB T85°C Dc II 3 D - Ex tc ic [pzc] IIIC T85°C Dc |
| | Certificates | BVS 15 ATEX E 048 X, IECEX BVS 15.0037 X |
| | Ambient temperature | -20°C ...+40°C at T6 -20°C ...+60°C at T5 |
| Housing | Dimensions | H x B x T: 120 x 122 x 90 mm |
| | Protection | IP65 (without considering outlet valve) |
| | Material | FS840.x.x.0: Aluminium, powder-coated, RAL 7035 FS840.x.x.1: Polyester |
| | Tightening torque for cable glands and cap nut (plastic, black) | M16x1,5 (5-10 mm) – 3 Nm |
| Electrical specifications | Supply voltage [V] | AC: 100 – 230V; 48 ..62 Hz +/- 10% DC: 24V +/- 10% |
| | Power consumption | approx. 2 VA, without solenoid valve |
| Ex e terminals | Signal contacts terminals 1-4 (potential free) | U _m = 250V AC, I _m = 5 A bei AC1, P _m = 1500VA U _m = 250V AC, I _m = 1,2 A bei AC15, P _m = 300VA U _m = 30V DC; I _m = 4 A bei DC1, P _m = 150W |
| | Solenoid valve connection terminals 5/6 | Output voltage is equal to supply voltage, protected by internal fuse |
| | Min. and Max. clamping torque | Min. 0,4 Nm Max. 0,5 Nm |
| | Min. and Max. wire cross-section | Stiff: 0,2 – 2,5 mm ² Flexible: 0,2 – 2,5 mm ² |

For more details see type examination certificate, certificates

5.3 Air pressure values

| | |
|---|-------------------------------------|
| Tolerance | +/- 5% of measure point |
| Maximum pressure (P max.) | Adjustable: 0 mbar ... 22/27 mbar |
| Minimum pressure purge (P min. (purging)) | Adjustable: 7 mbar ... 22/27 mbar |
| Minimum pressure operation (P min. (operation)) | Adjustable: 0,8 mbar ... 22/27 mbar |
| Signal pressure (P signal) | Adjustable: 0 mbar ... 22/27 mbar |

5.4 Dimensions

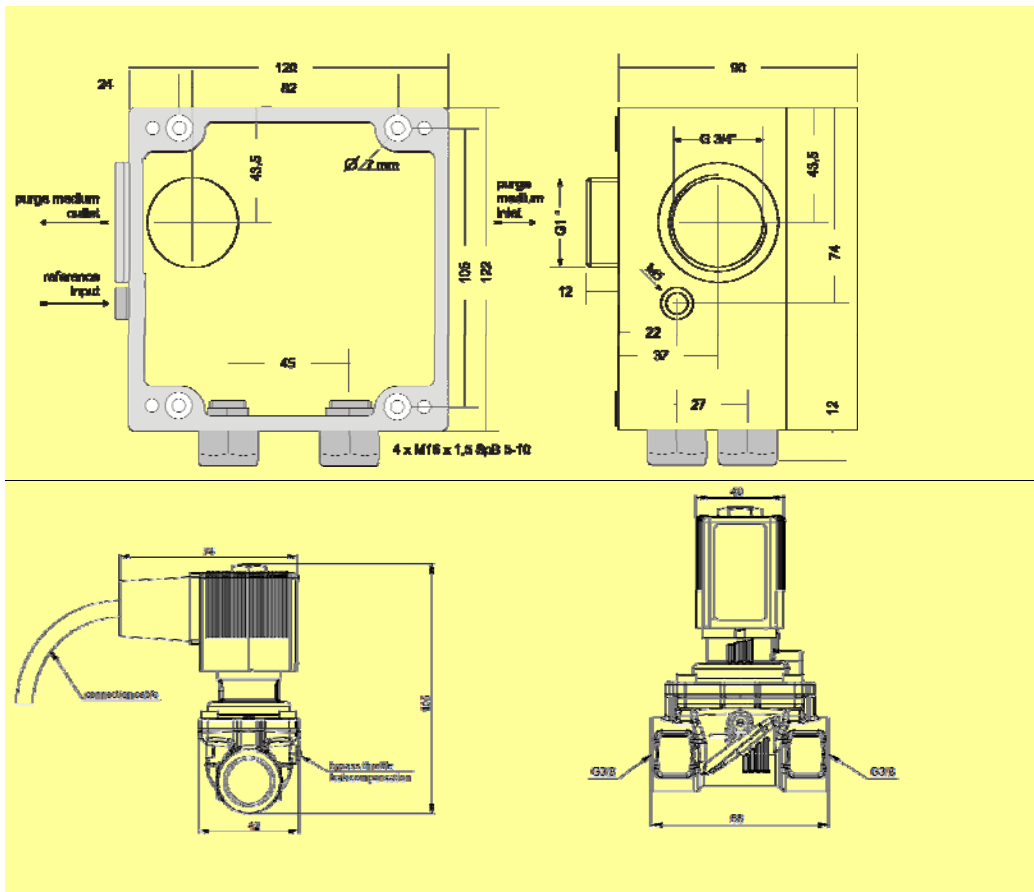


Figure 1:
Dimension
FS840



Figure 2: sole-
noid valve
SVD.L.x-Alxx

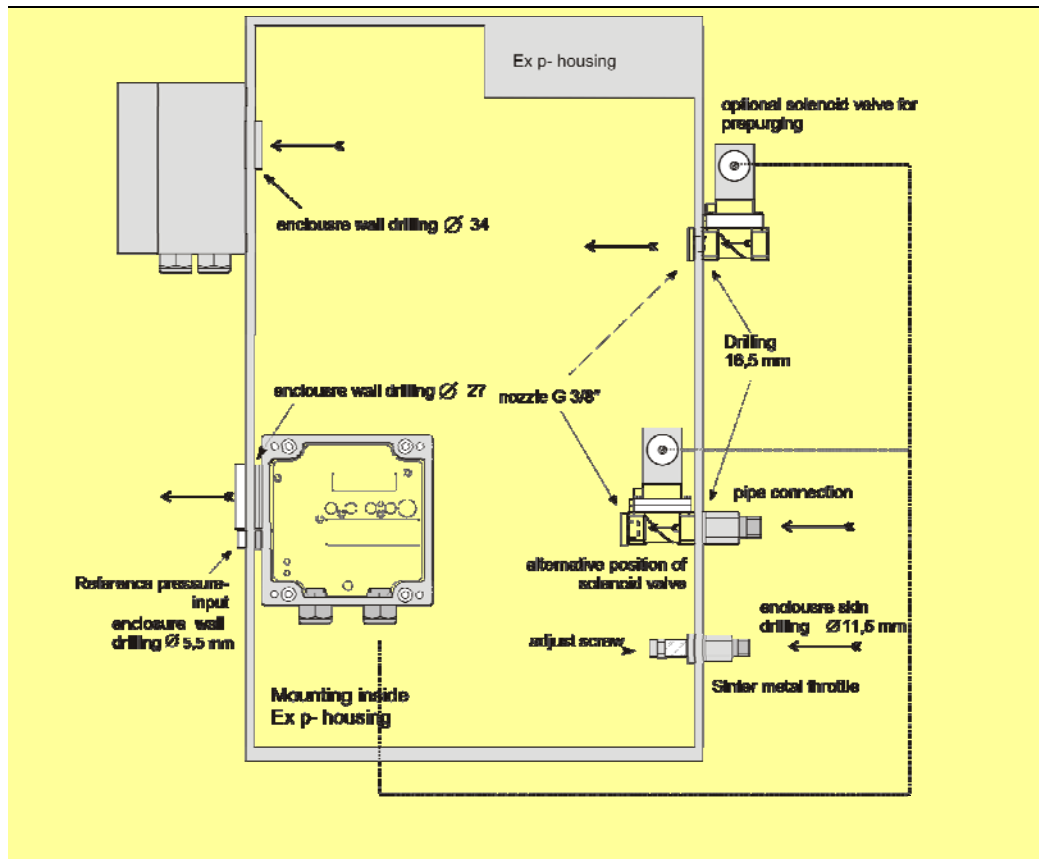


Figure 3:
Mounting
examples

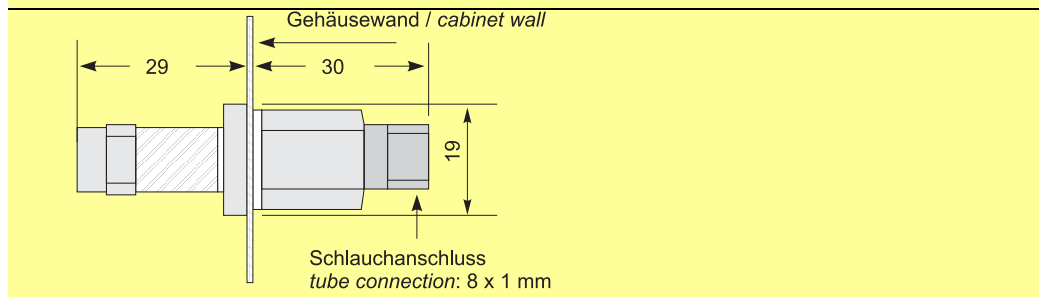
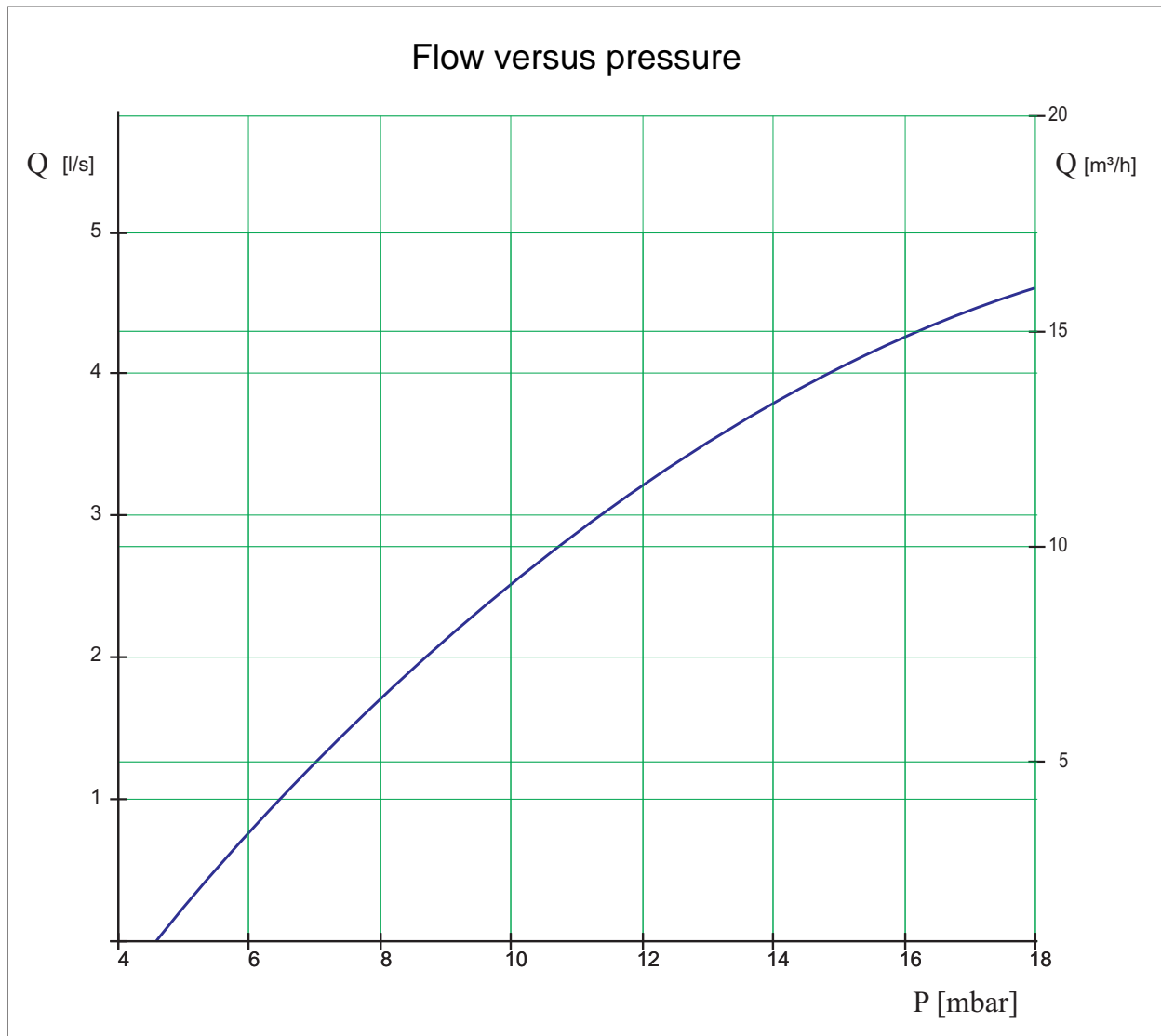


Figure 4:
Sinter metal
throttle SD840



5.5 Flow chart

The diagram shows the relationship between pressure inside of enclosure and the output flow. The diagram is only valid, without reducing input or output diameters as well as flow reducing pipes.



5.6 Flow rate table

The table below shows the flow rate depending on pre- pressure and nozzle diameter

| Pre pressure [bar] [105Pa] | Flow [l/s] ρ air = 1,293 kg/m ³ | | | | | | | | | |
|----------------------------------|---|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| | Nozzle diameter [mm] | | | | | | | | | |
| | 0,3 | 0,5 | 0,7 | 1 | 1,5 | 2 | 3 | 4 | 5 | 6 |
| 1,5 | 0,027 | 0,076 | 0,149 | 0,305 | 0,686 | 1,220 | 2,745 | 4,880 | 7,625 | 10,98 |
| 2 | 0,034 | 0,094 | 0,184 | 0,375 | 0,844 | 1,501 | 3,376 | 6,002 | 9,378 | 13,50 |
| 2,5 | 0,039 | 0,109 | 0,213 | 0,434 | 0,977 | 1,736 | 3,907 | 6,945 | 10,85 | 15,62 |
| 3 | 0,044 | 0,121 | 0,238 | 0,486 | 1,093 | 1,944 | 4,373 | 7,775 | 12,14 | 17,49 |
| 3,5 | 0,048 | 0,133 | 0,261 | 0,533 | 1,199 | 2,131 | 4,795 | 8,524 | 13,31 | 19,18 |
| 4 | 0,052 | 0,144 | 0,282 | 0,576 | 1,296 | 2,303 | 5,182 | 9,213 | 14,3 | 20,72 |
| 4,5 | 0,055 | 0,154 | 0,302 | 0,616 | 1,386 | 2,463 | 5,542 | 9,853 | 15,396 | 22,17 |

5.7 Type designation

Control unit FS840

| | | | | |
|-----------------------------|--------------|---|---|---|
| Control unit | FS840 | . | . | . |
| Mains voltage: | | | | |
| 24 V DC | .6 | | | |
| 100-230V AC | .8 | | | |
| Pressure measurement range: | | | | |
| Standard 0 - 22 mbar | .0 | | | |
| Extended 0 - 27 mbar | .1 | | | |
| Housing material: | | | | |
| Aluminium | .0 | | | |
| Polyester | .1 | | | |

Further pressure ranges on demand

Solenoid valve SVD.L.x

| | | | | |
|--------------------------|--------------|---|----|---|
| Solenoid valve: | SVD.L | . | AI | 0 |
| Inner diameter / nozzle: | | | | |
| 2 mm | .2 | | | |
| 3 mm | .3 | | | |
| 4 mm | .4 | | | |
| n mm | .n | | | |
| Scope | | | | |
| ATEX / IECEX | -AI | | | |
| Mains voltage: | | | | |
| 230 V AC | 0 | | | |
| 110-120 V AC | 3 | | | |
| 24 V DC | 6 | | | |

Adjustable sinter metal throttle SD840.0


5.8 Problems and solutions

| | |
|----------------|---|
| Code forgotten | <ul style="list-style-type: none"> • turn the device off (e.g. disconnect from power supply) • press the very right (red) key, turn the device on • hold the key, until "RESET" appears • all data is set to ex work defaults |
|----------------|---|

5.9 Transport, Storing, Disposal and Repairs

| | |
|------------------|--|
| Transport | Vibration-free in origin package, do not pitch, handle carefully |
| Storing | Store the device dry, inside of the origin package |
| Disposal | When the explosion proof multipurpose distribution, switching and control units are eventually disposed of, the national regulations governing the disposal of waste materials in the country concerned must be rigorously observed. |
| Repairs | Defective parts may only be replaced by the Manufacturer or by personnel specially trained and supervised by the Manufacturer. Only genuine spare parts from the Manufacturer may be fitted. |

5.10 Marking

| | |
|---|--|
|  | II 3 G - Ex ec nC ic [pzc] IIC T6 Gc; Ta = 40°C |
| | II 3 G - Ex ec nC ic [pzc] IIC T5 Gc; Ta = 60°C |
| | II 3 D - Ex tc ic [pzc] IIIB T85°C Dc; Ta = 60°C |
| | II 3 D - Ex tc ic [pzc] IIIC T85°C Dc; Ta = 60°C |

5.11 List of parameters

| | | | |
|------------------------------|-------------|--------------------|-------|
| System-identification | System-No.: | Remark: | Date: |
| FS840. | Serial-No.: | Solenoid valve: SV | |

| <i>Inputs</i> | <i>Description</i> | <i>Display</i> | <i>Value / State</i> | |
|------------------------------------|--------------------------------------|------------------|---|--|
| Language | | Language | | |
| Structure | | | | |
| Purging | Should the housing be pre purged | Purging | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| Purge method | Automatic or manual purge time input | Purge time auto. | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| Input function | | Input function | <input type="checkbox"/> None <input type="checkbox"/> External alert | <input type="checkbox"/> Bypass <input type="checkbox"/> Ext. thermostat |
| Output 1 function | | Output 1 func. | <input type="checkbox"/> None <input type="checkbox"/> Ex Ok <input type="checkbox"/> Fault <input type="checkbox"/> Bypass active | <input type="checkbox"/> Max. pressure <input type="checkbox"/> P<P-Alarm <input type="checkbox"/> Purging |
| Output 2 function | | Output 2 func. | <input type="checkbox"/> None <input type="checkbox"/> Ex Ok <input type="checkbox"/> Fault <input type="checkbox"/> Bypass active | <input type="checkbox"/> Max. pressure <input type="checkbox"/> P<P-Alarm <input type="checkbox"/> Purging |
| Circuit opening principle output 1 | | Output 1 NO/NC | Normally open <input type="checkbox"/> | Normally closed <input type="checkbox"/> |
| Circuit opening principle output 2 | | Output 2 NO/NC | Normally open <input type="checkbox"/> | Normally closed <input type="checkbox"/> |
| Parameters | Purge time | Purge time | | |
| | Housing volume | Cabinet volume | | |
| | Input Pressure | Input pressure | | |
| | Nozzle diameter | Nozzle diameter | | |
| | Minimum pressure while purging | Min. P purge | | |

| | | | |
|-------|--------------------------------------|---------------------|--|
| | Minimum pressure at normal operation | Min. P operation | |
| | Signal pressure | Signal pressure | |
| | Maximum pressure | Max. pressure | |
| | Maximum bypass time | Max. bypass time | |
| Codes | Code for main menu | Menu code | |
| | Code for bypass | Bypass code | |

Translation

(1) Type Examination Certificate

- (2) Equipment and protective systems intended for use in potentially explosive atmospheres – Directive 94/9/EC
- (3) No. of Type Examination Certificate: **BVS 15 ATEX E 048 X**
- (4) Equipment: **Control unit for pressurised enclosure systems types FS830/FS840**
- (5) Manufacturer: **Gönnheimer Elektronik GmbH**
- (6) Address: **Dr.-Julius-Leber-Str. 2, 67433 Neustadt/W, Germany**
- (7) The design and construction of this equipment and any acceptable variation thereto are specified in the appendix to this type examination certificate.
- (8) The certification body of DEKRA EXAM GmbH certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment of category 3 intended for use in potentially explosive atmospheres, given in Annex II to the Directive. The examination and test results are recorded in the test and assessment report BVS PP 15.2073 EG.
- (9) The Essential Health and Safety Requirements are assured by compliance with

| | |
|--------------------------|-----------------------------|
| EN 60079-0:2012+A11:2013 | General requirements |
| EN 60079-2:2014 | Pressurised Enclosure "p" |
| EN 60079-11:2012 | Intrinsic Safety "i" |
| EN 60079-15:2010 | Type of Protection "n" |
| EN 60079-31:2014 | Protection by Enclosure "t" |

- (10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the appendix to this certificate.
- (11) This Type Examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.
- (12) The marking of the equipment shall include the following:



II 3G Ex nA nC ic [pzc] IIC T6 Gc; T_a = 40°C
II 3G Ex nA nC ic [pzc] IIC T5 Gc; T_a = 60°C

II 3D Ex tc ic [pzc] IIIB T85°C Dc; T_a = 60°C
II 3D Ex tc ic [pzc] IIIC T85°C Dc; T_a = 60°C

DEKRA EXAM GmbH
Bochum, dated 2015-06-09

Signed: Christian Simanski

Certification body

Signed: Ute Hauke

Special services unit

- (13) Appendix to
- (14) **Type Examination Certificate**
BVS 15 ATEX E 048 X
- (15) 15.1 Subject and type

Control unit for pressurised enclosure system types FS830 / FS840

15.2 Description

The pressurised enclosure system of types FS830 and FS840 are used to construct explosion-protected equipment for the type of protection Pressurised Enclosure according to EN/IEC 60079-2 and EN/IEC 60079-31. The control unit FS840.*.* is fitted with an enclosure and an integrated outlet valve; the control unit FS830.*.* is open at the rear and intended for installation at a front plate.

Type code

Control unit FS840.*.*

| | | | |
|---------------------------------|--|----|----|
| Mains voltage: | | .* | .* |
| 230 V AC..... | | .0 | |
| 115 V AC..... | | .2 | |
| 24 V DC..... | | .6 | |
| Pressure measuring range: | | | |
| standard 0-18mbar..... | | | .0 |
| extended 0-27mbar..... | | | .1 |

Steuergerät FS830.*.*

| | | | |
|---------------------------------|--|----|----|
| Mains voltage: | | .* | .* |
| 230 V AC..... | | .0 | |
| 115 V AC..... | | .2 | |
| 24 V DC..... | | .6 | |
| Pressure measuring range: | | | |
| standard 0-18mbar..... | | | .0 |
| extended 0-27mbar..... | | | .1 |

Air outlet LA830

| | | | |
|---------------------|--|----|----|
| Type: | | .* | .* |
| diameter 40 mm..... | | .0 | |
| diameter 16 mm..... | | .1 | |

15.3 Parameters

FS840.*.* and FS830.*.*

| Terminal | Voltage | Current | Power | Comment |
|-----------|--|--|---|------------------------|
| 1, 2 | U _m = 250 VAC U _m = 250 VAC U _m = 30 V DC | I _m = 5 A at AC1 I _m = 1.2 A at AC15 I _m = 5 A at DC1 | P _m = 1500 VA P _m = 300 VA P _m = 150 W | Signal contact 1 |
| 3, 4 | U _m = 250 VAC U _m = 250 VAC U _m = 30 V DC | I _m = 5 A at AC1 I _m = 1.2 A at AC15 I _m = 5 A at DC1 | P _m = 1500 VA P _m = 300 VA P _m = 150 W | Signal contact 1 |
| 5, 6 | | | | Purge valve connection |
| 7/8, 9/10 | U _n = 230 VAC U _n = 115 VAC U _n = 24 V DC | | | Power supply |

(16) Test and assessment report

BVS PP 15.2073 EG, as of 2015-06-09

(17) Special conditions for safe use

The examination of the pressurised enclosure defining the pneumatic parameters and the temperature class requires a separate certification.

The bypass shall only be actuated if there is no risk that explosive atmosphere will occur.

All cables have to be installed as permanent cables.

The purge valve has to be suitable for use in explosive atmospheres in which category 3 equipment is operated and for the conditions applicable at the place of use. A fuse that is suitable for use together with the purge valve can be installed upstream in the control unit of types FS840.*.* or FS830.*.*.

Where FS830.*.* is installed, the following degrees of ingress protection are required:

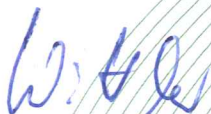
IP54 at applications for II 3G;

IP6X at applications for II 3D for equipment group IIIC, and

IP5X at applications for II 3D for equipment group IIIB.

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

DEKRA EXAM GmbH
44809 Bochum, 2017-09-11
BVS-Alh/Ar E 7206/17



Certification body



Special services unit

Translation

Type Examination Certificate Supplement 1

Change to Directive 2014/34/EU

Equipment intended for use in potentially explosive atmospheres
Directive 2014/34/EU

EU-Type Examination Certificate Number: **BVS 15 ATEX E 048 X**

Product: **Control unit for pressurised enclosure systems types FS830 / FS840**

Manufacturer: **Gönnheimer Elektronik GmbH**

Address: **Dr.-Julius-Leber-Str. 2, 67433 Neustadt an der Weinstraße, Germany**

This supplementary certificate extends Type Examination Certificate No. BVS 15 ATEX E 048 X to apply to products designed and constructed in accordance with the specification set out in the appendix of the said certificate but having any acceptable variations specified in the appendix to this certificate and the documents referred to therein.

DEKRA EXAM GmbH certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.
The examination and test results are recorded in the confidential Report No. BVS PP 15.2073 EU.

The Essential Health and Safety Requirements are assured in consideration of:

| | |
|--------------------------|-----------------------------|
| EN 60079-0:2012+A11:2013 | General requirements |
| EN 60079-2:2014 | Pressurised Enclosure "p" |
| EN 60079-11:2012 | Intrinsic Safety "i" |
| EN 60079-15:2010 | Type of Protection "n" |
| EN 60079-31:2014 | Protection by Enclosure "t" |

If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Special Conditions for Use specified in the appendix to this certificate.

This Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

The marking of the product shall include the following:

 II 3G Ex nA nC ic [pzc] IIC T6 Gc; T_a = 40°C
II 3G Ex nA nC ic [pzc] IIC T5 Gc; T_a = 60°C
II 3D Ex tc ic [pzc] IIIB T85°C Dc; T_a = 60°C
II 3D Ex tc ic [pzc] IIIC T85°C Dc; T_a = 60°C

DEKRA EXAM GmbH
Bochum, 2018-09-04

Signed: Jörg Koch

Certifier

Signed: Dr Michael Wittler

Approver

13 **Appendix**

14 **Type Examination Certificate**

**BVS 15 ATEX E 048 X
Supplement 1**

15 **Product description**

15.1 **Subject and type**

Control unit for pressurised enclosure system types FS830 / FS840

15.2 **Description**

With this supplement the certificate is changed to Directive 2014/34/EU.
(Annotation: In accordance with Article 41 of Directive 2014/34/EU, EC-Type Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Supplementary Certificates to such EC-Type Examination Certificates, and new issues of such certificates, may continue to bear the original certificate number issued prior to 20 April 2016.)

The pressurised enclosure system of types FS830 and FS840 are used to construct explosion-protected equipment for the type of protection Pressurised Enclosure according to EN/IEC 60079-2 and EN/IEC 60079-31. The control unit FS840.*.* is fitted with an enclosure and an integrated outlet valve; the control unit FS830.*.* is open at the rear and intended for installation at a front plate.

Reason for the supplement:

The type designation was changed. For the AC model there is only one design with AC/DC module-type power supply and 90 V to 230 V power supply range.

The DC/DC converter for the 24 V_{DC} model was changed.

Digital inputs are added.

Change of components and layout.

15.3

Type designation

Control unit FS840.*.*

| | | | |
|-----------------------------------|----|---|---|
| Mains voltage: | | * | * |
| 24 V _{DC} | .6 | | |
| 90 V to 230 V _{AC} | .8 | | |
| Pressure measurement range: | | | |
| Standard 0 - 18 mbar..... | .0 | | |
| Extended 0 - 27 mbar..... | .1 | | |

Control unit FS830.*.*

| | | | |
|-----------------------------------|----|---|---|
| Mains voltage: | | * | * |
| 24 V _{DC} | .6 | | |
| 90 V to 230 V _{AC} | .8 | | |
| Pressure measurement range: | | | |
| Standard 0 - 18 mbar..... | .0 | | |
| Extended 0 - 27 mbar..... | .1 | | |

Air exhaust LA830

| | | | |
|---------------------|----|---|---|
| Design: | | * | * |
| Diameter 40 mm..... | .0 | | |
| Diameter 16 mm..... | .1 | | |

15.4

Parameters

FS840.*.*

| Terminal | Voltage | Current | Power | Remark |
|-----------|---|---|---|------------------------------------|
| 1, 2 | U _m = 250 V _{AC} U _m = 250 V _{AC} U _m = 30 V _{DC} | I _m = 5 A for AC1 I _m = 1.2 A for AC15 I _m = 5 A for DC1 | P _m = 1500 VA P _m = 300 VA P _m = 150 W | Signal contact 1 |
| 3, 4 | U _m = 250 V _{AC} U _m = 250 V _{AC} U _m = 30 V _{DC} | I _m = 5 A for AC1 I _m = 1.2 A for AC15 I _m = 5 A for DC1 | P _m = 1500 VA P _m = 300 VA P _m = 150 W | Signal contact 1 |
| 5, 6 | | | | Contact for the flush medium valve |
| 7/8, 9/10 | U _n = 90 V to 230 V _{AC} U _n = 115 V _{AC} U _n = 24 V _{DC} | | P _n < 1.5 W | Supply |
| 11/12 | For connection of passive contacts inside of Ex p enclosure | | | Switch input |

FS830.**

| Terminal | Voltage | Current | Power | Remark |
|-----------|---|---|---|------------------------------------|
| 1, 2 | U _m = 250 V _{AC} U _m = 250 V _{AC} U _m = 30 V _{DC} | I _m = 5 A for AC1 I _m = 1.2 A for AC15 I _m = 5 A for DC1 | P _m = 1500 VA P _m = 300 VA P _m = 150 W | Signal contact 1 |
| 3, 4 | U _m = 250 V _{AC} U _m = 250 V _{AC} U _m = 30 V _{DC} | I _m = 5 A for AC1 I _m = 1.2 A for AC15 I _m = 5 A for DC1 | P _m = 1500 VA P _m = 300 VA P _m = 150 W | Signal contact 1 |
| 5, 6 | | | | Contact for the flush medium valve |
| 7/8, 9/10 | U _n = 90 V to 230 V _{AC} U _n = 115 V _{AC} U _n = 24 V _{DC} | | P _n < 1.5 W | Supply |
| 11/12/13 | | | | PE |
| 14/15 | For connection of passive contacts inside of Ex p enclosure | | | Switch input |

16 Report Number

BVS PP 15.2073 EU, as of 2018-09-04

17 Special Conditions for Use

The examination of the pressurised enclosure defining the pneumatic parameters and the temperature class requires a separate certification.

The bypass shall only be actuated if there is no risk that explosive atmosphere will occur.

All cables have to be installed as permanent cables.

The purge valve has to be suitable for use in explosive atmospheres in which Category 3 equipment is operated and for the conditions applicable at the place of use. A fuse that is suitable for use together with the purge valve can be installed upstream in the control unit of types FS840.** or FS830.**.

Where FS830.** is installed, the following degrees of ingress protection are required:

IP54 at applications for II 3G;

IP6X at applications for II 3D for equipment Group IIIC, and

IP5X at applications for II 3D for equipment Group IIIB.

18 Essential Health and Safety Requirements

The Essential Health and Safety Requirements are covered by the standards listed under item 9.

19 Drawings and Documents

Drawings and documents are listed in the confidential report.

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

DEKRA EXAM GmbH
Bochum, dated 2018-09-04
BVS-AIh/Mu A20170853

Certifier

Approver



Translation

Type Examination Certificate Supplement 2

Equipment intended for use in potentially explosive atmospheres
Directive 2014/34/EU

Type Examination Certificate Number: **BVS 15 ATEX E 048 X**

Product: **Control unit for pressurised enclosure systems types FS830 / FS840**

Manufacturer: **Gönnheimer Elektronik GmbH**

Address: **Dr.-Julius-Leber-Str. 2, 67433 Neustadt an der Weinstraße, Germany**

This supplementary certificate extends Type Examination Certificate No. BVS 15 ATEX E 048 X to apply to products designed and constructed in accordance with the specification set out in the appendix of the said certificate but having any variations specified in the appendix attached to this certificate and the documents referred to therein.

DEKRA Testing and Certification GmbH certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.
The examination and test results are recorded in the confidential Report No. PP 15.2073 EU.

The Essential Health and Safety Requirements are assured in consideration of:

| | |
|-------------------------------|-----------------------------|
| EN 60079-0:2012 + A11:2013 | General requirements |
| EN 60079-2:2014 | Pressurised Enclosure "p" |
| EN IEC 60079-7:2015 + A1:2018 | Increased Safety "e" |
| EN 60079-11:2012 | Intrinsic Safety "i" |
| IEC 60079-15:2017 | Type of Protection "n" |
| EN 60079-31:2014 | Protection by Enclosure "t" |

Except in respect of those requirements listed under item 18 of the appendix.

If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Special Conditions for Use specified in the appendix to this certificate.

This Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

The marking of the product shall include the following:

 II 3G Ex ec nC ic [pzc] IIC T6 Gc; T_a = 40°C
II 3G Ex ec nC ic [pzc] IIC T5 Gc; T_a = 60°C

 II 3D Ex tc ic [pzc] IIIB T85°C Dc; T_a = 60°C
II 3D Ex tc ic [pzc] IIC T85°C Dc; T_a = 60°C

DEKRA Testing and Certification GmbH
Bochum, 2019-07-29

Signed: Jörg-Timm Kilisch

Managing Director

13 **Appendix**14 **Type Examination Certificate****BVS 15 ATEX E 048 X
Supplement 2**15 **Product description**15.1 **Subject and type**

Control unit for pressurised enclosure systems type FS830 / FS840

15.2 **Description**

The pressurised enclosure system of types FS830 and FS840 are used to construct explosion-protected equipment for the type of protection Pressurised Enclosure according to EN/IEC 60079-2 and EN/IEC 60079-31. The control unit FS840.*.* is fitted with an enclosure and an integrated outlet valve; the control unit FS830.*.* is open at the rear and intended for installation at a front plate.

Reason for the supplement:

The model type with polyester housing was added. The type key was extended.
The device was tested in accordance to the standards listed on page 1. The marking was modified in accordance to the standards.

15.3 **Type designation**

| | | | |
|-----------------------------|----|----|----|
| Control unit FS840 | * | * | * |
| Mains voltage: | | | |
| 24 V DC..... | .6 | | |
| 90 V to 230 V AC..... | .8 | | |
| Pressure measurement range: | | | |
| Standard 0 - 18 mbar..... | | .0 | |
| Extended 0 - 27 mbar..... | | .1 | |
| Housing material: | | | |
| Aluminium..... | | | .0 |
| Polyester..... | | | .1 |
| Control unit FS830 | * | * | |
| Mains voltage: | | | |
| 24 V DC..... | .6 | | |
| 90 V bis 230 V AC..... | .8 | | |
| Pressure measurement range: | | | |
| Standard 0 - 18 mbar..... | | .0 | |
| Extended 0 - 27 mbar..... | | .1 | |
| Air exhaust LA830 | * | | |
| Design: | | | |
| Diameter 40 mm..... | | .0 | |
| Diameter 16 mm..... | | .1 | |

15.4 Parameters

FS840.*.*

| Terminal | Voltage | Current | Power | Remark |
|-----------|---|---|---|------------------------------------|
| 1, 2 | U _m = 250 V _{AC} U _m = 250 V _{AC} U _m = 30 V _{DC} | I _m = 5 A for AC1 I _m = 1.2 A for AC15 I _m = 5 A for DC1 | P _m = 1500 VA P _m = 300 VA P _m = 150 W | Signal contact 1 |
| 3, 4 | U _m = 250 V _{AC} U _m = 250 V _{AC} U _m = 30 V _{DC} | I _m = 5 A for AC1 I _m = 1.2 A for AC15 I _m = 5 A for DC1 | P _m = 1500 VA P _m = 300 VA P _m = 150 W | Signal contact 1 |
| 5, 6 | | | | Contact for the flush medium valve |
| 7/8, 9/10 | U _n = 90 V to 230 V _{AC} U _n = 115 V _{AC} U _n = 24 V _{DC} | | P _n < 1.5 W | Supply |
| 11/12 | For connection of passive contacts inside of Ex p enclosure | | | Switch input |

FS830.*.*

| Terminal | Voltage | Current | Power | Remark |
|-----------|---|---|---|------------------------------------|
| 1, 2 | U _m = 250 V _{AC} U _m = 250 V _{AC} U _m = 30 V _{DC} | I _m = 5 A for AC1 I _m = 1.2 A for AC15 I _m = 5 A for DC1 | P _m = 1500 VA P _m = 300 VA P _m = 150 W | Signal contact 1 |
| 3, 4 | U _m = 250 V _{AC} U _m = 250 V _{AC} U _m = 30 V _{DC} | I _m = 5 A for AC1 I _m = 1.2 A for AC15 I _m = 5 A for DC1 | P _m = 1500 VA P _m = 300 VA P _m = 150 W | Signal contact 1 |
| 5, 6 | | | | Contact for the flush medium valve |
| 7/8, 9/10 | U _n = 90 V to 230 V _{AC} U _n = 115 V _{AC} U _n = 24 V _{DC} | | P _n < 1.5 W | Supply |
| 11/12/13 | | | | PE |
| 14/15 | For connection of passive contacts inside of Ex p enclosure | | | Switch input |

16 Report Number

BVS PP 15.2073 EU, as of 2019-07-29

17 Special Conditions for Use

The examination of the pressurised enclosure defining the pneumatic parameters and the temperature class requires a separate certification.

The bypass shall only be actuated if there is no risk that explosive atmosphere will occur.

All cables have to be installed as permanent cables.

The purge valve has to be suitable for use in explosive atmospheres in which Category 3 equipment is operated and for the conditions applicable at the place of use. A fuse that is suitable for use together with the purge valve can be installed upstream in the control unit of types FS840.*.* or FS830.*.*.

Where FS830.* is installed, the following degrees of ingress protection are required:
IP54 at applications for II 3G;
IP6X at applications for II 3D for equipment Group IIIC, and
IP5X at applications for II 3D for equipment Group IIIB.

18 Essential Health and Safety Requirements

The Essential Health and Safety Requirements are covered by the standards listed under item 9.

For this product the standard IEC 60079-0:2017 Ed. 7.0 is equivalent to the harmonized standard EN 60079-0:2012 + A11:2013 in terms of safety.

For this product the standard IEC 60079-15:2017 is equivalent to the harmonized standard EN 60079-15:2010 in terms of safety.

19 Drawings and Documents

Drawings and documents are listed in the confidential report.

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

DEKRA Testing and Certification GmbH
Bochum, 2019-07-29
BVS-Alh/Mu A 20190390



Managing Director



IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: IECEx BVS 15.0037X

Issue No: 2

Certificate history:

Status: **Current**

[Issue No. 2 \(2019-08-07\)](#)

[Issue No. 1 \(2018-09-04\)](#)

Date of Issue: **2019-08-07**

Page 1 of 4

[Issue No. 0 \(2015-04-27\)](#)

Applicant: **Gönnheimer Elektronik GmbH**
Dr.-Julius-Leber-Str. 2
67433 Neustadt an der Weinstraße
Germany

Equipment: **Pressurization system type FS830 / FS840**
Optional accessory:

Type of Protection: **Intrinsic Safety "i", Type of Protection "n", Pressurized Enclosure "p", Protection by Enclosure "t", Increased Safety "e"**

Marking:
See Annex

Approved for issue on behalf of the IECEx
Certification Body:

Jörg Koch

Position:

Head of Certification Body

Signature:
(for printed version)

Date:


7.8.19

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the [Official IECEx Website](http://www.iecex.com).

Certificate issued by:

DEKRA Testing and Certification GmbH
Certification Body
Dinnendahlstrasse 9
44809 Bochum
Germany

 **DEKRA**
On the safe side.



IECEx Certificate of Conformity

Certificate No: IECEx BVS 15.0037X Issue No: 2
Date of Issue: **2019-08-07** Page 2 of 4
Manufacturer: **Gönnheimer Elektronik GmbH**
Dr.-Julius-Leber-Str. 2
67433 Neustadt an der Weinstraße
Germany

Additional Manufacturing location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:

The apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

| | |
|---|--|
| IEC 60079-0 : 2017 Edition:7.0 | Explosive atmospheres - Part 0: Equipment - General requirements |
| IEC 60079-11 : 2011 Edition:6.0 | Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i" |
| IEC 60079-15 : 2017 Edition:5.0 | Explosive atmospheres - Part 15: Equipment protection by type of protection "n" |
| IEC 60079-2 : 2014-07 Edition:6 | Explosive atmospheres - Part 2: Equipment protection by pressurized enclosure "p" |
| IEC 60079-31 : 2013 Edition:2 | Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t" |
| IEC 60079-7 : 2017 Edition:5.1 | Explosive atmospheres - Part 7: Equipment protection by increased safety "e" |

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:

[DE/BVS/ExTR15.0034/02](#)

Quality Assessment Report:

[DE/TUN/QAR10.0006/08](#)



IECEx Certificate of Conformity

Certificate No: IECEx BVS 15.0037X

Issue No: 2

Date of Issue: 2019-08-07

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Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

General product information:

The pressurization systems type FS840.*.* and FS830.*.* are used for construction of electrical apparatus type of protection Pressurized Enclosure in acc. with IEC 60079-2 resp. IEC 60079-31. The control unit of the FS840.*.* is erected with a housing and an exhaust valve. For panel-mounting the housing of the FS830.x.x is open at the rear side.

Type designation:

See Annex

Parameters

See Annex

SPECIFIC CONDITIONS OF USE: YES as shown below:

- The pressurized enclosure with determination of the pneumatic parameters has to be tested and certified separately.
- The activation of the bypass must be prevented in occurrence of explosive atmosphere.
- All pipes and wires have to be installed fix.
- The purge valve must be suitable for EPL Gc and Dc. An appropriate fuse can be connected in the control unit FS840.*.* or FS830.*.*.
- FS830.*.*: Protection of IP54 for applications II 3G and IP6X for Group IIIC, IP5X for Group IIIB for applications II 3D essential



IECEx Certificate of Conformity

Certificate No: IECEx BVS 15.0037X

Issue No: 2

Date of Issue: **2019-08-07**

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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

The model type with polyester housing was added. The type key was extended. The device was tested in accordance to the standards listed on page 1. The marking was modified in accordance to the standards.

Annex:

[BVS_15_0037x_Gönnheimer_Annex_issue2.pdf](#)



IECEx Certificate of Conformity



Certificate No.:

IECEx BVS 15.0037X issue No.: 2

Annex

Page 1 of 2

The system consists of:

the Control unit
type FS840.*.* or FS830.*.*
(instead of * in the complete denomination letters
and numerals will be inserted which characterize
modifications)

Type of protection
Ex ec nC ic [pzc] IIC T6 Gc
for $-20^{\circ}\text{C} \leq T_a \leq +40^{\circ}\text{C}$
Ex ec nC ic [pzc] IIC T5 Gc
for $-20^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$
resp.
Ex tc ic [pzc] IIIB T85°C Dc
for $-20^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$
Ex tc ic [pzc] IIIC T85°C Dc
for $-20^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$

Type designation

| | | | |
|-----------------------------|----|----|---|
| Control unit FS840 | * | * | * |
| Mains voltage: | | | |
| 24 V DC..... | .6 | | |
| 90 V to 230 V | .8 | | |
| AC | | | |
| Pressure measurement range: | | | |
| Standard 0 - 18 mbar | .0 | | |
| Extended 0 - 27 mbar..... | .1 | | |
| Housing material: | | | |
| Aluminium..... | | .0 | |
| Polyester..... | | .1 | |
| Control unit FS830 | * | * | |
| Mains voltage: | | | |
| 24 V DC..... | .6 | | |
| 90 V bis 230 V AC..... | .8 | | |
| Pressure measurement range: | | | |
| Standard 0 - 18 mbar | .0 | | |
| Extended 0 - 27 mbar..... | .1 | | |
| Air exhaust LA830 | * | | |
| Design: | | | |
| Diameter 40 mm..... | | .0 | |
| Diameter 16 mm..... | | .1 | |



IECEx Certificate of Conformity



Certificate No.:

IECEx BVS 15.0037X issue No.: 2

Annex

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Parameters

FS840.*.*

| Terminal | Voltage | Current | Power | Remark |
|-----------|---|--|--|------------------------------------|
| 1, 2 | $U_m = 250 \text{ V}_{AC}$ $U_m = 250 \text{ V}_{AC}$ $U_m = 30 \text{ V}_{DC}$ | $I_m = 5 \text{ A}$ for AC1 $I_m = 1.2 \text{ A}$ for AC15 $I_m = 5 \text{ A}$ for DC1 | $P_m = 1500 \text{ VA}$ $P_m = 300 \text{ VA}$ $P_m = 150 \text{ W}$ | Signal contact 1 |
| 3, 4 | $U_m = 250 \text{ V}_{AC}$ $U_m = 250 \text{ V}_{AC}$ $U_m = 30 \text{ V}_{DC}$ | $I_m = 5 \text{ A}$ for AC1 $I_m = 1.2 \text{ A}$ for AC15 $I_m = 5 \text{ A}$ for DC1 | $P_m = 1500 \text{ VA}$ $P_m = 300 \text{ VA}$ $P_m = 150 \text{ W}$ | Signal contact 1 |
| 5, 6 | | | | Contact for the flush medium valve |
| 7/8, 9/10 | $U_n = 90 \text{ V}$ to 230 V_{AC} $U_n = 115 \text{ V}_{AC}$ $U_n = 24 \text{ V}_{DC}$ | | $P_n < 1.5 \text{ W}$ | Supply |
| 11/12 | For connection of passive contacts inside of Ex p enclosure | | | Switch input |

FS830.*.*

| Terminal | Voltage | Current | Power | Remark |
|-----------|---|--|--|------------------------------------|
| 1, 2 | $U_m = 250 \text{ V}_{AC}$ $U_m = 250 \text{ V}_{AC}$ $U_m = 30 \text{ V}_{DC}$ | $I_m = 5 \text{ A}$ for AC1 $I_m = 1.2 \text{ A}$ for AC15 $I_m = 5 \text{ A}$ for DC1 | $P_m = 1500 \text{ VA}$ $P_m = 300 \text{ VA}$ $P_m = 150 \text{ W}$ | Signal contact 1 |
| 3, 4 | $U_m = 250 \text{ V}_{AC}$ $U_m = 250 \text{ V}_{AC}$ $U_m = 30 \text{ V}_{DC}$ | $I_m = 5 \text{ A}$ for AC1 $I_m = 1.2 \text{ A}$ for AC15 $I_m = 5 \text{ A}$ for DC1 | $P_m = 1500 \text{ VA}$ $P_m = 300 \text{ VA}$ $P_m = 150 \text{ W}$ | Signal contact 1 |
| 5, 6 | | | | Contact for the flush medium valve |
| 7/8, 9/10 | $U_n = 90 \text{ V}$ to 230 V_{AC} $U_n = 115 \text{ V}_{AC}$ $U_n = 24 \text{ V}_{DC}$ | | $P_n < 1.5 \text{ W}$ | Supply |
| 11/12/13 | | | | PE |
| 14/15 | For connection of passive contacts inside of Ex p enclosure | | | Switch input |