

*Exp Systems*  
**Solutions for Pressurization**

**APEX, SILAS, APC and SPC and Applications**

**Reservation**

Technical data subject to change without notice. Changes, errors and misprints may not be used as a basis for any claim for damages. For safety components and systems, the relevant standards and rules and the respective operating and mounting instructions must be observed.

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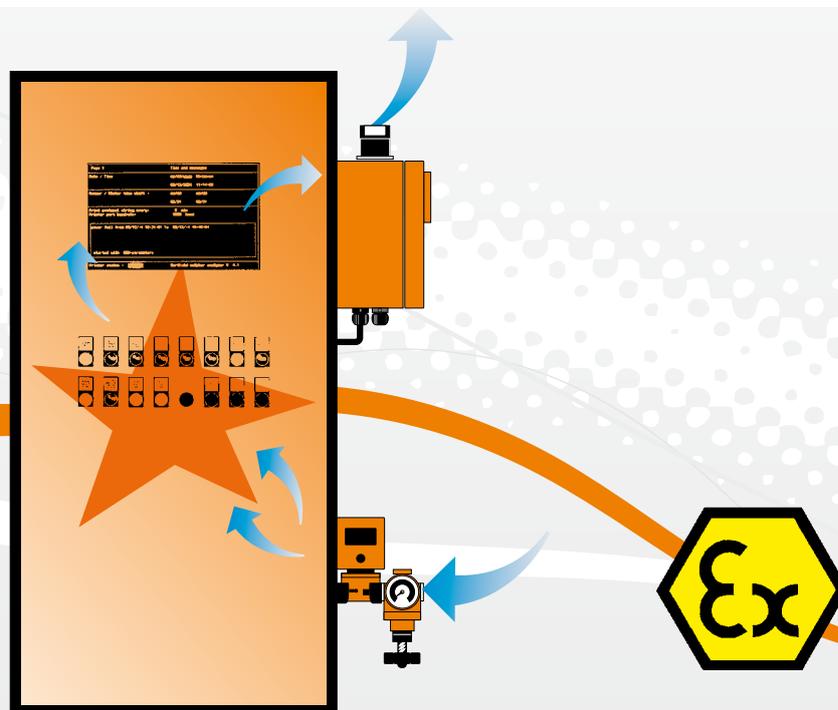
# Ex p Pressurization

# Ex p

There is an ever-increasing demand for complex automation functions for processes in the fields of chemicals, pharmaceuticals, oil and gas. What are needed are flexible, safe and low-maintenance solutions for measuring, controlling, regulating and visualization tasks, particularly in hazardous (potentially explosive) areas.

Control and switchgear systems, motors, drives and pumps, large displays and also industrial monitors are expected to be conveniently, safely and easily equipped for use.

Ex p pressurization is the ideal solution for a lot of applications. This technology allows standard devices to be converted for use in the Ex area, for Zone 1, 2 and 22, with a high degree of flexibility and economic efficiency.



## Principle of Pressurization

A level of pressure higher than atmospheric pressure is generated in a sealed enclosure containing electrical apparatus. The positive pressure inside the enclosure ensures that it is not possible for explosive gases from outside to penetrate the enclosure. This means that a safe area in which non-explosive-proof electrical apparatus can be installed and operated safely is created inside the enclosure. Any losses through leakage are compensated by the supply of more purging gas.

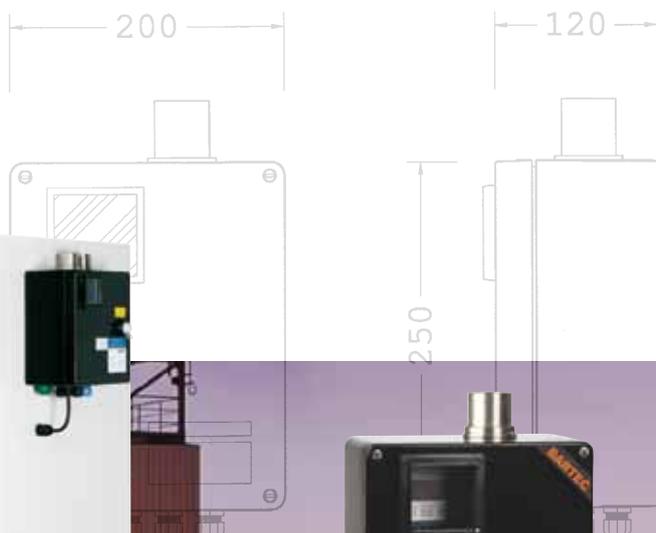
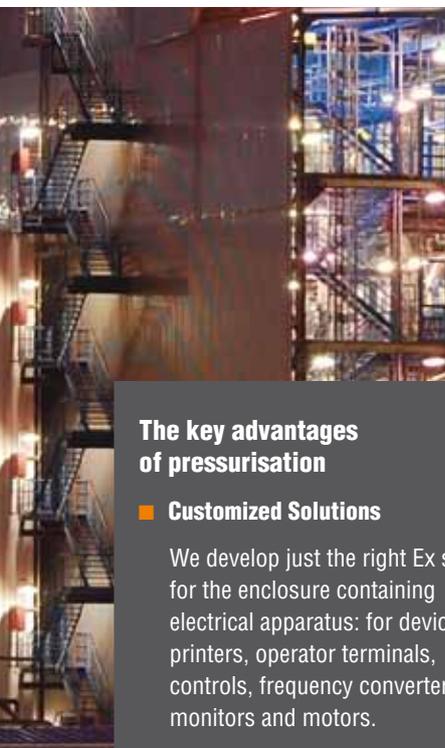
## Types of Protection

The "Pressurized Cabinet" type of protection is divided into three protection levels px, py and pz. The prevailing explosive atmosphere determines a particular equipment protection level (Gb [Zone 1], Gc [Zone 2] or DC [Zone 22]). The type of protection is chosen accordingly.

**Ex px** Non-Ex components can be fitted inside the pressurized enclosure.

**Ex py** Only components which have been tested for Zone 2 at least can be fitted inside the pressurized enclosure.

**Ex pz** Non-Ex components can be fitted inside the pressurized enclosure.



## The key advantages of pressurisation

### ■ Customized Solutions

We develop just the right Ex solution for the enclosure containing electrical apparatus: for devices, printers, operator terminals, controls, frequency converters, monitors and motors.

### ■ Also for XXL cabinets

The pressurization is suitable for cabinets with a capacity of up to 6300 liters.

### ■ Convenient for inspections and maintenance work

There is no problem in accessing fitted components during maintenance work.

A purging process must be run through before the electrical apparatus may be put into operation again.

### ■ Protects the fitted components

The constant supply of more purging gas prevents a build-up of heat and corrosion to the fitted components.

We are specialists in pressurized systems. Bartec's Ex p system offers an innovative Ex solution for controlling and automating devices, machinery and systems in Zone 1, 2 and 22 comfortably and economically.

Non-explosion-proof control units and switchgear as well as complete automation systems are fitted into the cabinets depending on the application. Modern ready-to-operate Ex solutions – approved and certified to Directive 94/9/EC – are created on the basis of the modular ATEX-certified APEX 2003 overpressure control unit.

Over the course of many years, BARTEC experts have gathered substantial experience in the manufacture of complete system automation solutions for use in hazardous areas.

This know-how forms the basis of the development of safe and economically efficient solutions starting with engineering, including production and procurement and extending to commissioning and approval processes.



## APEX Control units for use in Zone 1

The APEX control unit controls and monitors the purging and operating phases in Ex px solutions.

It has proven its worth over many years both in switchgear and also in analysing and operating systems. The control can be mounted either internally or externally. It is also possible to mount the purge gas outlet at a distance.

For special applications BARTEC also offers customised constructions of the modular APEX Control unit. BARTEC supplies both control units and also certified pressurised complete solutions for hazardous areas in Zone 1.



Use in Zone 1

ATEX, INMETRO, GOST-R Certification

SIL 2

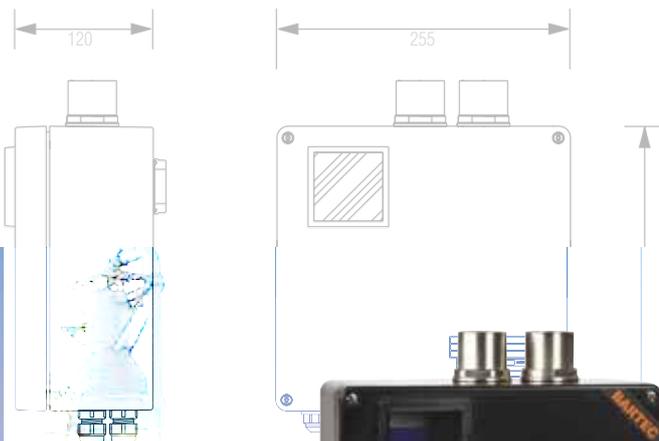
Internal or external mounting

Easy operation

BARTEC offers the APEX control unit in a variety of standard versions to suit the various enclosure capacities:

APEX 2003.MV	remote mounting of the control unit for enclosures with internal capacities of up to 70 litres
APEX 2003.00	for enclosures with internal capacities of up to 700 litres
APEX 2003.002x	for enclosures with internal capacities of over 700 litres

There is a choice of digital or proportional valves to supply purge gas. The purging time is set on the APEX control unit by means of the rotary switch and the pressure switching levels are set by using the menu displayed in the sensor module. The flow is measured at the pressure monitor module by means of a differential pressure measuring procedure.



## Complete Solution

**APC** APEX Pressurized Cabinet

- **Typ Ex px**
- **Approved for Zone 1**
- **National and international approvals** ATEX, GOST-R
- **Easy operation**
- **Automated activation** of the internal fitted components
- **5-times purging**
- **Customized solutions**

### An overview of the advantages of the APEX control unit

#### High level of safety

All APEX control units have a safety integrity level of SIL 2

#### LCD display

Displays the system pressure levels, purging time and settings on the sensor module.

#### Status and system reports

2 freely programmable relays with 2 floating contacts each

#### LED status display

All important pressure switching levels and functions are indicated by LEDs

#### Bypass key switch

for maintenance work

# SILAS Zone 2

## SILAS control unit for use in Zone 2 and 22

The SILAS control unit controls and monitors the purging and operating phases in Ex px solutions.

This control unit has proven its worth over many years in switchgear and operating systems. The control unit can be mounted either inside or outside the apparatus. It is also possible to mount the purge gas outlet at a distance. This makes the SILAS system particularly flexible and versatile.

BARTEC supplies SILAS both as an individual control unit and also as a certified pressurised complete solution for use in hazardous areas in Zone 2 and 22.



Use in Zone 2 and 22

International approvals

ATEX, IECEx, KTL, INMETRO, GOST-R

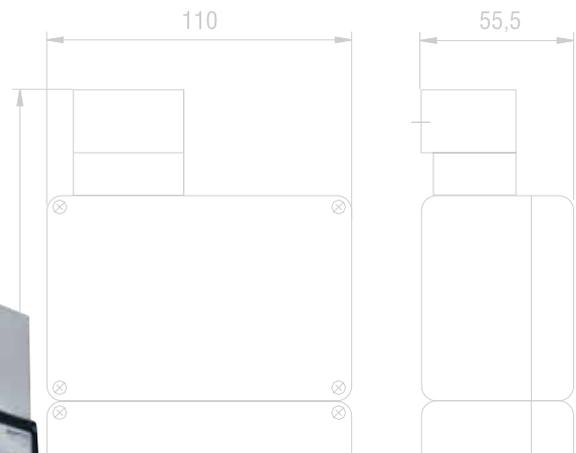
Internal or external mounting

Easy operation



The control is flexible and can also be mounted with 2 purge gas outlets. This makes pressurization solutions possible for quite large control cabinets too.

Digital valves with integrated manual leakage loss compensation are available to supply purging gas. The purging time or pressure switching levels can be set by means of the pushbutton on the SILAS control unit. The values are shown on an integrated LCD display. A pressure sensor, which is fitted inside the SILAS control unit measures and monitors the internal pressure in the pressurized cabinet.



## Complete solution

**SPC** SILAS Pressurized Cabinet

- **Typ Ex pz**
- **Approved for Zone 2 and 22**
- **National and international approvals**  
IECEX, ATEX, GOST-R
- **Easy operation**
- **Automated activation**  
of the internally fitted components
- **5-times purging**
- **Customized solutions**

## Overview of the advantages of the SILAS control units

### LCD display

Displays the system pressure levels, purging time and setpoints on the sensor module.

### Status and system report

1 freely programmable alarm relay

### LED status display

All important pressure switching levels and functions are indicated by LEDs

### Bypass function

for maintenance work

# Ex p Motor Purge Control System

# MPC

## MPC Motor Purge controller, the control unit for motors

The Motor Purge Control system controls and monitors the purging and operating phases of Ex p motors or large Ex p switchgear with a capacity inside the cabinet of more than 3,000 litres.

The control unit is based on the APEX control unit, which has been proven in use.

The MPC is available in a variety of versions to suit our customers' various applications and areas of utilisation.



### MPV Motor Purge Valve

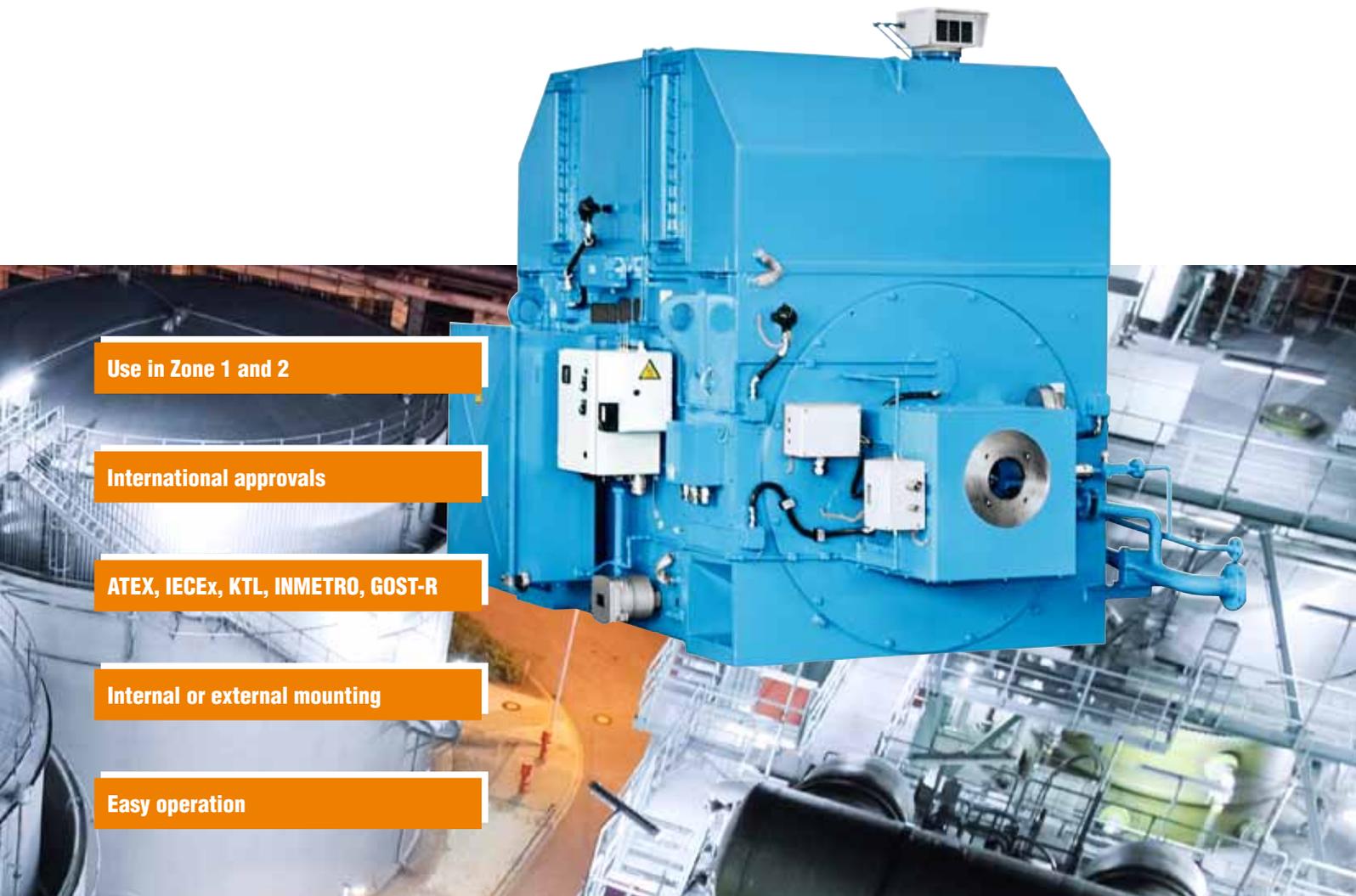
- Horizontal or vertical mounting possible
- Valve-controlled
- Separate outlet for the MPC system

### MPV, 3G Motor Purge Controller

- Typ Ex pz
- Approved for Zone 2
- National and international approvals  
ATEX
- Easy operation
- Remote mounting

### MPC, 2G Motor Purge Controller

- Typ Ex px
- Approved for Zone 1
- National and international approvals  
ATEX, INMETRO, GOST-R
- Easy operation
- Remote mounting



Use in Zone 1 and 2

International approvals

ATEX, IECEx, KTL, INMETRO, GOST-R

Internal or external mounting

Easy operation

### **An overview of the advantages of the MPC control units**

#### **LCD display**

Displays the system pressure levels, purging time and setpoints on the sensor module.

#### **Status and system report**

1 freely programmable relay

#### **LED status display**

All important pressure switching levels and functions are indicated by LEDs

#### **Indicator lamps**

Display for purging and operation

# Ex p Examples of Applications

## Ex p PC and Monitor Solutions

Local Ex p PC solutions with the option of an integrated monitor and keyboard. On the front the user has a monitor, which is mounted behind a safety glass pane, and there is the option of a keyboard with an integrated trackball. The Ex p control system can be mounted either internally or externally. Extensions with additional control elements are possible.

To start operation, the customer starts the Ex p control and activates the purge gas supply. Once the purge time for the Ex p solution has expired, the Ex p control automatically activates the Ex p operator terminal. The data connection as well as the internal voltage supply for the monitors and also the internal non-Ex assemblies are started and the customer has the full range of functions at his disposal.



### ➤ Explosion protection

#### Ex protection type

- ⊕ II 2G Ex px IIC T4 Gb resp.
- ⊕ II 3G Ex pz IIC T4 Gc

#### Certification

BVS 11 ATEX E 144 (Zone 1) resp.  
BVS 11 ATEX E 145 (Zone 2)

#### Max. ambient temperature range

$-20\text{ °C} > T_a < +60\text{ °C}$ ,  
depending on the ambient temperatures for  
internal components

#### Approved for Zone

1 or 2

### ➤ Technical data

#### Ex p configuration

Complete system with Ex p control

#### Purge time

Volume-dependent, min. 5-times purging

#### Material

Stainless steel or sheet steel painted

#### ■ Electrical data

##### Supply voltage

AC 230 V, AC 115 or DC 24 V  
Automatic actuation

##### Data line

Automatic actuation

## Ex p Human Machine Interfaces (HMI)

Local operator terminals with the option of additional operating elements.

On the front there is a touchscreen or operator panel such as e.g. SIEMENS MP/TP for the user.

The Ex p control system can be mounted either internally or externally.

To start operation, the customer starts the Ex p control and activates the purge gas supply. Once the purge time for the Ex p operator terminals has expired, the Ex p control automatically activates the HMI and data line.



### ➤ Explosion protection

#### Ex protection type

- ⊕ II 2G Ex px IIC T4 Gb resp.
- ⊕ II 3G Ex pz IIC T4 Gc

#### Certification

- BVS 11 ATEX E 144 (Zone 1) resp.
- BVS 11 ATEX E 145 (Zone 2)

#### Max. ambient temperature range

- 20 °C > T<sub>a</sub> < +60 °C,
- depending on the ambient temperatures for internal components

#### Approved for Zone

- 1 or 2

### ➤ Technical data

#### Ex p construction

- Complete system with Ex p control

#### Purge time

- Volume-dependent, min. 5-times purging

#### Material

- Stainless steel or sheet steel painted

#### Version

- Optional stand
- Optional operating
- Elements operating panels

#### ■ Electrical data

##### Supply voltage

- AC 230 V, AC 115 or DC 24 V
- Automatic actuation

##### Data line

- Automatic actuation

# Ex p Examples of Applications

## Ex p Printer

Printing in a hazardous environment. With the aid of a pressurized enclosure, it is possible to modify a standard office printer for use in an explosive atmosphere.

The enclosures are adapted specially to suit the printers that are used. They have a reduced-sized door to facilitate the removal of printouts. This door can be opened for 15 seconds in order to remove the printout. The advantage of this solution is that it prevents leakages through slits.

To put into operation, the customer starts the Ex p control and activates the purge gas supply. Once the purge time for the Ex p printer has expired, the Ex p control activates the printer and the data line automatically.



### ➤ Explosion protection

#### Ex protection type

- ⊕ II 2G Ex px IIC T4 Gb resp.
- ⊕ II 3G Ex pz IIC T4 Gc

#### Certification

BVS 11 ATEX E 144 (Zone 1) resp.  
BVS 11 ATEX E 145 (Zone 2)

#### Max. ambient temperature range

$-20\text{ °C} > T_a < +60\text{ °C}$ ,  
depending on the ambient temperatures for  
internal components

#### Approved for Zone

1 or 2

### ➤ Technical data

#### Ex p construction

Complete system with Ex p control

#### Purge time

Volume-dependent, min. 5-times purging

#### Material

Stainless steel or sheet steel painted

#### Fitted components

- Laser printer
- Thermal transfer printer
- Customized printer

#### ■ Electrical data

##### Supply voltage

AC 230 V, AC 115 or DC 24 V  
Automatic actuation

##### Data line

Automatic actuation

## Ex p Control and Switchgear Cabinets

A pressurized enclosure allows customized control units which are used as standard in non-hazardous areas to be used easily and safely in hazardous areas.

Special customized components fitted in the front panel can be adapted for use in the hazardous area. Operating elements such as buttons or indicator lamps are replaced by tested and approved versions. The customized non-Ex control is inside. Sensor inputs and outputs can be made safe by means of Ex i barriers. It is also possible to mount operating panels, monitors, keyboards, horns or flashing lamps.

To put into operation, the customer starts the Ex p control and activates the purge gas supply. Once the purge time for the Ex p printer has expired, the Ex p control automatically activates the printer and the data line.



### Optional accessories

- Protective hoods
- Support arm systems
- Ex d contactor in div. switching capacities

### ➤ Explosion protection

#### Ex protection type

- ⊕ II 2G Ex px IIC T4 Gb resp.
- ⊕ II 3G Ex pz IIC T4 Gc

#### Certification

- BVS 11 ATEX E 144 (Zone 1) resp.
- BVS 11 ATEX E 145 (Zone 2)

#### Max. ambient temperature range

- 20 °C > T<sub>a</sub> < +60 °C,
- depending on the ambient temperatures for internal components

#### Approved for Zone

- 1 or 2

### ➤ Technical data

#### Ex p construction

- Complete system with Ex p control

#### Purge time

- Volume-dependent, min. 5-times purging

#### Material

- Stainless steel or sheet steel painted

#### Installations

- Laser printer
- Thermal transfer printer

#### ■ Electrical data

##### Supply voltage

- AC 230 V, AC 115, or DC 24 V
- Automatic actuation

##### Data line

- Automatic actuation

# Ex p Examples of Applications

## Ex p Customized Solutions

We test and evaluate special customer systems for the possibility of modifying them for use in hazardous environments.

- Evaluation of mechanical protection against explosions
- Designing the customer's system
- Certification to ATEX
- Documentation

On behalf of our customers, we plan, develop and produce tailor-made solutions for use in hazardous areas.

We have already very successfully adapted the following installations and systems for suitability for use in hazardous areas:

- Measurement systems
- Indicator panels
- Water analysing systems
- Painting robots
- Camera systems
- Refrigerating machines
- Servo motors



### ➤ Explosion protection

#### Ex protection type

- ⊕ II 2G Ex px IIC T4 Gb resp.
- ⊕ II 3G Ex pz IIC T4 Gc

#### Certification

- BVS 11 ATEX E 144 (Zone 1) resp.
- BVS 11 ATEX E 145 (Zone 2)

#### Max. ambient temperature range

- 20 °C > T<sub>a</sub> < +60 °C,
- depending on the ambient temperatures for internal components

#### Approved for Zone

- 1 or 2

### ➤ Technical data

#### Ex p construction

- Complete system with Ex p control

#### Purge time

- Volume-dependent, min. 5-times purging

#### Material

- Stainless steel or sheet steel, painted

#### Fitted components

- Laser printer
- Thermal transfer printer

#### ■ Electrical data

#### Supply voltage

- AC 230 V, AC 115 or DC 24 V
- Automatic actuation

#### Data line

- Automatic actuation

**Customer**

Company \_\_\_\_\_

Street \_\_\_\_\_

Postcode/City \_\_\_\_\_

Country person \_\_\_\_\_

Contact \_\_\_\_\_

E-mail \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_

**BARTEC**

Sales employee \_\_\_\_\_

**Offer**

**Order**

Project name \_\_\_\_\_

Enquiry number \_\_\_\_\_

**Deadline**

Offer of quotation \_\_\_\_\_ Delivery \_\_\_\_\_

**Documents provided**

ePLAN documentation

Control cabinet drawing

Other points

Parts list

Data sheets

Drawing numbers \_\_\_\_\_

**Order quantity**

**Area of use**

Zone 1 (2G)  Outdoor

Zone 2 (3G)  Indoor

Zone 22 (3D)  Clean room

ATEX certified  Offshore

IECEx certified

**Temperatures**

Ambient temperature \_\_\_\_\_ to \_\_\_\_\_ °C

**Temperature class**

T3  T5

T4  T6

**Material and construction "Pressurized cabinet"**

Enclosure size (mm): Width \_\_\_\_\_ x Height \_\_\_\_\_ x Depth \_\_\_\_\_

Stainless steel V2A (1.4301, AISI 304)

Stainless steel V4A (1.4401, AISI 316L)

Sheet steel, painted

Plastic (separately certified)

1-door, stop on the right

2-door

multi-door

Painted in conformance to RAL:

Plinth, height: \_\_\_\_\_

Seawater-resistant paint

Special paint (include specification sheet)

Steering castors

Sun roof

Feet

Crane eyelets

Lock double-bit, standard

Lock, lockable

**Inspection window/fitted window**

Inspection window

Size (mm): Width \_\_\_\_\_ x Height \_\_\_\_\_

Fitted window  lockable

Size (mm): Width \_\_\_\_\_ x Height \_\_\_\_\_

**Operating voltage**

AC 230 V (L/N/PE)  AC 115 V (L/N/PE)

AC 400 V (3L/N/PE)  DC 24 V (L+/GND)

Power consumption: \_\_\_\_\_ A

others: \_\_\_\_\_

**Safe activation**

Direct activation (through Ex p control)

Indirect activation (through Ex d contactor)

Activation from the non-hazardous zone

**Cable entries**

Quantity	Size	Ex i	Ex i circuits effective in Zone

**Interface(s)**

RS \_\_\_\_\_  LAN

PROFIBUS  other: \_\_\_\_\_

**Air conditioning/cooling/heating**

Compressed-air cooling (VORTEX)

Water/air cooling

Air conditioning

Anti-freeze heating

Internal power dissipation \_\_\_\_\_ W

Max. internal temperature \_\_\_\_\_ °C

Min. internal temperature \_\_\_\_\_ °C

Max. external temperature \_\_\_\_\_ °C

Min. external temperature \_\_\_\_\_ °C

Water temperature \_\_\_\_\_ °C

**Purge gas medium**

cleaned compressed air

inert gas

Quantity	Size	Ex i	Ex i circuits effective in Zone

**Fitted components**

Quantity	Product designation	Type

BARTEC protects  
people and  
the environment  
by the safety

of components,  
systems  
and plants.

