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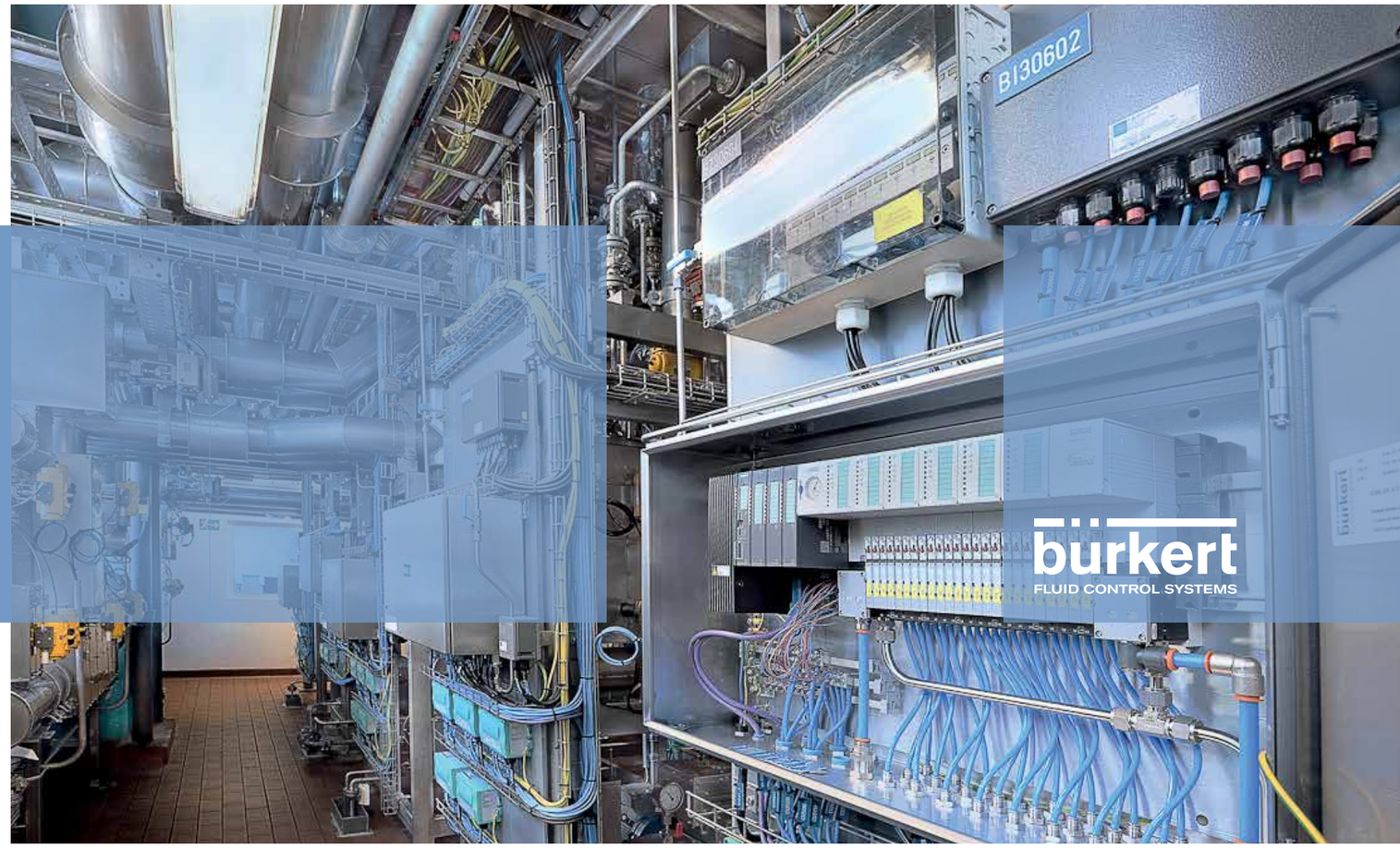
Automation solutions for potentially explosive atmospheres



Proven engineering.

We have been occupied with all aspects of fluid technology for over 70 years now, and have operated in a wide variety of industries with our products.

We place particular focus on the reliability, robustness and safety of our products, which is why we have been in our element in potentially explosive atmospheres for more than 25 years.

We capitalise on our many years of experience and the consistent refinement of our products, and this enables us today to offer a wide range of explosion-proof components.

On this basis, we aim to provide a quality guarantee that promises you maximum safety while also offering the highest efficiency and absolute ease of selection and use.

We look forward to the opportunity as your partner of choice to offer you appropriate solutions for use in potentially explosive atmospheres in the future!

The whole world of automation in potentially explosive atmospheres

Our entire product range related to potentially explosive atmospheres is geared towards modularity, efficiency and safety. Everything from a single source: from the individual components to the fully certified control cabinet.

Single valves

Encapsulated, intrinsically safe solenoid valves for fluids and gases as well as NAMUR valves for direct mounting on process actuators

From page 8 onwards

Valve islands

Modular valve islands for use up to zone 1/21

From page 16 onwards

Control cabinet-mounted system solutions

Pre-fitted with installed cables and hoses and tested for use up to zone 1/21: ready-to-install control cabinets adapted to individual requirements

From page 24 onwards

Decentralised automation

Process valves with intrinsically safe position feedback sensors and control heads for decentralised automation concepts

From page 30 onwards

Bürkert system solutions – control cabinets for zone 1

Labelling of explosion-proof components

II 2G	Ex	ia	IIC	T6, T5	Gb	PTB	01	ATEX 2101
II 2D	Ex		IIIC	T80°C	Db	PTB	01	ATEX 2101

Compliant with Directive 94/9/EC

II

Device groups
I = Mining
II = Non-mining

2G

ATEX categories
Bürkert components are to be found in all three categories:

Category 1:
G = Gas (used in zone 0, 1, 2)
D = Dust (used in zone 20, 21, 22)

Category 2:
G = Gas (used in zone 1, 2)
D = Dust (used in zone 21, 22)

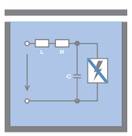
Category 3:
G = Gas (used in zone 2)
D = Dust (used in zone 22)

ia

Ignition protection types

e = Enhanced safety
With a greater degree of safety, excessive temperatures and the production of sparks and arc discharges are prevented within or on external components of electrical equipment.

d = Pressure-resistant encapsulation
Ignition protection type whereby the housing surrounding the ignition source is engineered to withstand an explosion within. The defined clearance measurements (e.g. between the lid and housing) are engineered so that an explosion spreading within cannot spread to the outside.



i = Intrinsic safety
The fundamental principle here is an electrical circuit in which no ignitable sparks or thermal effects can develop that could ignite a potentially explosive atmosphere. The ignition protection type relates to the entire electrical circuit, from the power source to the cables to the end device.

m = Encapsulation
Components that can ignite a potentially explosive atmosphere by means of sparks or hot surfaces are encapsulated in a potting compound.

IIC

Gas groups
Bürkert components are in use in the gas groups IIA, IIB, IIC.

IIIC

Dust groups
Bürkert components are in use in areas with electrically conductive dust (IIIC) and in areas with group IIIA and IIIB dusts.

T6

Temperature classes
The temperature class represents the lowest temperature at which ignition of a gas/air mixture can occur on a hot surface. Bürkert components are available in various different temperature classes:

T4: Max. surface temperature 135°C

T5: Max. surface temperature 100°C

T6: Max. surface temperature 85°C

When used in areas with flammable dust, the maximum surface temperature is specified directly as the value.
T80°C = Max. surface temperature

Gb

Equipment protection level

G or D in capitals represent use in atmospheres that are potentially explosive due to gas (G) or dust (D). The supplementary identifiers a, b or c represent the protection level of the component.

PTB

PTB: Physikalisch-Technische Bundesanstalt (German Federal Metrology Institute). Notified body that issues the type examination certificate.

01

01: Year in which the approval was issued.

2101

2101: Approval number with the notified body.

Other possible labels at Bürkert:

X (at the end of the approval ID):
There are specific conditions that must be heeded when using the device. These are declared in the type examination certificate and operating instructions. (e.g. safety values for coils and similar)

U (at the end of the approval ID):
Incomplete component
Production equipment with component certification

Single valves

30 years safely in operation – conventional solution with single valves

Maximum standards for reliability

Almost all process plants use solenoid valves which are installed within and then do their duty for decades unnoticed. As a result, it is common to find plants even today that are controlled by solenoid valves from the 1980s.
Robustness and reliability are part of our quality philosophy to this day.

Especially in areas where explosion-proofing is required, the correct choice of components and the appropriate ignition protection type are essential for ensuring safe, problem-free operation.

Solenoid valves for all needs

Depending on your requirements, we can offer you solutions tailored to your plant.

- Solutions for zone 2/22 – device category 3
- Solutions for zone 1/21 – device category 2
- Intrinsically safe – approved in accordance with the ATEX and IECEx standards
- NAMUR valves for chemical and process engineering

Solutions for zone 2/22 – device category 3

Connected via cable plug, approved in accordance with ATEX KAT 3 GD EN 60079

The cable plug Type 2513 can be directly connected and screwed into place. With its solid moulded connection cable, it is the only one in its class to comply with all requirements for flexible installation. This eliminates the need for a fixed cable installation with the end device. This cable plug reduces both the installation time and material costs.

- Degree of protection IP65
- Impact and pull-resistant cable in accordance with EN60079
- Installation saves time and cost

Solutions for zone 1/21 – device category 2

Coil with fixed connection cable, approved in accordance with the standards ATEX, IECEx, KOSHA, NEPSI

The connection cable that is cast together with the coil as a single element and the epoxy resin encapsulation meet standard requirements and can withstand rough operating conditions. Both the cable and the casting mass for the coil are chemically and thermally highly durable. The materials involved are subject to particularly stringent requirements in machine rooms, at petrol stations and in other outdoor locations.

Encapsulation II 2 GD Ex mb

- Degree of protection IP65
- Flexible and halogen-free cable
- Chemically highly-resistant polyolefin cable

Terminal box, approved in accordance with the standards ATEX, IECEx (KOSHA and NESPI pending)

The terminal box features a robust metal connection housing and easy-to-handle connection technology. In addition to a large clamping space, the lid is fixed in the open position for easy connection of the cables. The valve is opened and connected with the aid of just one tool. The unique, rotatable housing provides additional flexibility for dealing with local space problems individually and quickly – saving valuable time and storage costs.

Degree of protection IP65

- Easy, time-saving installation, maintenance and service:
  Just one tool for establishing electrical connection
  Lid locking mechanism
  Rotatable housing (in 90° steps)
- Enhanced protection
  Robust connection housing made of metal
  Leaded lid
  Earthing screw for external potential equalisation (included in scope of supply)

Intrinsically safe – approved in accordance with the ATEX and IECEx standards

The considerable variety of intrinsically safe coils enables us to offer a wide range of valve functions. In order to offer the highest compatibility possible with isolation barriers and outputs on remote I/O systems available on the market, there are various coils with different pull-in currents.

- Coils Ex ia-certified
- Time-saving connection thanks to standardised type A cable head
- Degree of protection IP65
- Different coils for different pull-in currents
- High compatibility with commonly-used barriers

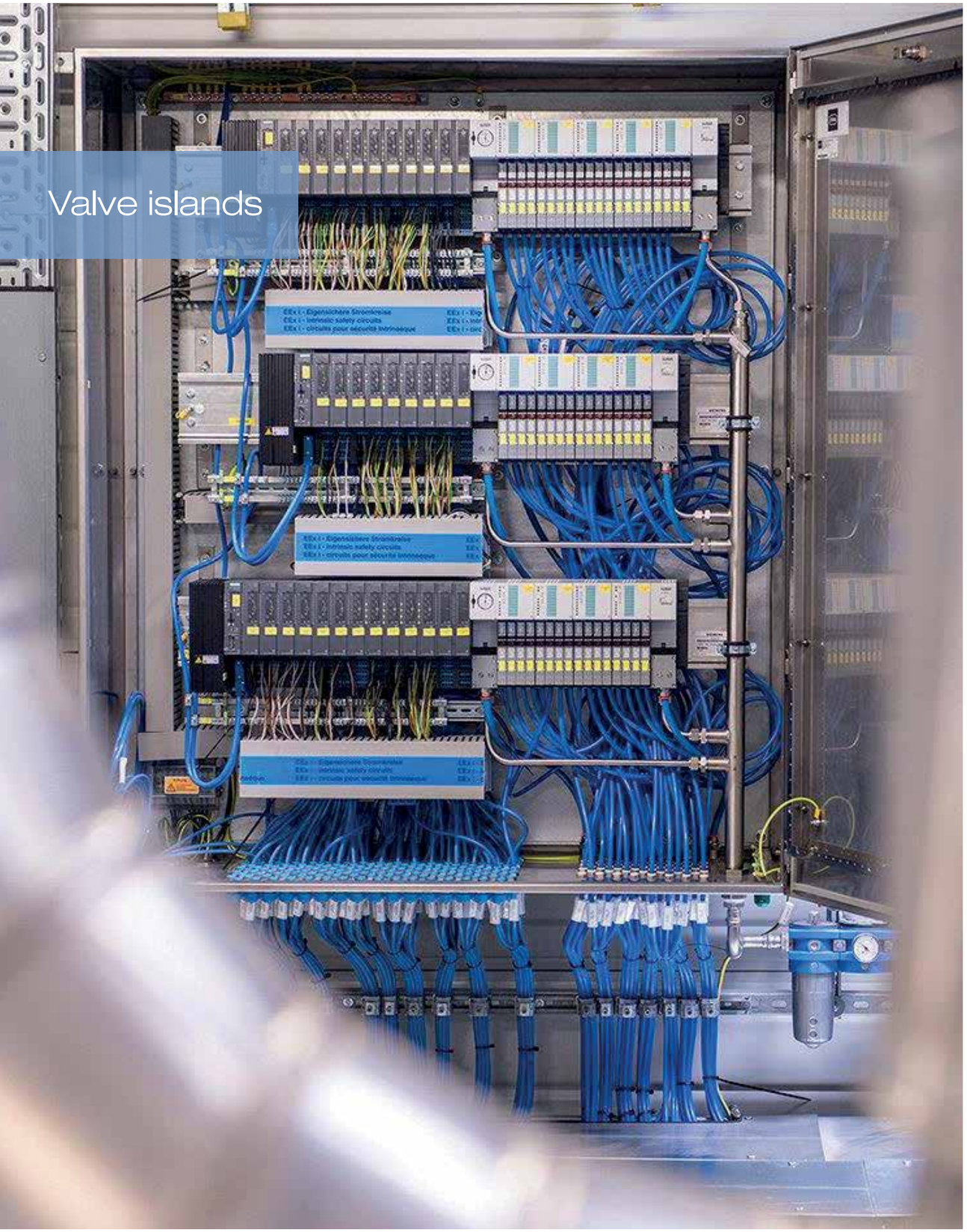
Plunger valve Type 6014

NAMUR valves for chemical and process engineering

Our proven NAMUR valves have remained unchanged for many years now. As a manufacturer of traditional NAMUR valves, we are familiar with the properties that offer our customers benefits:

- Robustness
- High cost efficiency (no constant air usage)
- Reliability – SIL evaluation
- Outstanding value for money
- Broad temperature range (-40°C…70°C)
- High-quality versions made of Ematal-coated aluminium and stainless steel
- A wide variety of ignition protection types for use in areas subject to explosion protection
- A variety of operating voltages
- High air flow rate

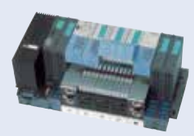
NAMUR pilot valve Type 6519



Valve islands

How our valve islands are used

Valve islands are an essential element of efficient automation. The selection and configuration of the appropriate devices is therefore critical in determining the plant's later availability. Our range of valve islands offers flexible solutions for a variety of requirements. We would be pleased to provide you with a proposal for the optimum combination for your plant.

	Zone 2/22	Zone 1/21
Type 8640		
Type 8644		
Type 8647		
Type 8650		
Types 8652, 8653		

8644

Smartly utilised – signal processing up to zone 0/20

In many plants, automation technology components can be installed in zone 2/22 and therefore do not necessarily need to have an EU type examination certificate issued.
Many of our valve islands can be used in zone 2/22. They must be installed in an appropriate housing that is compliant with the requirements of IEC 60079-0.

Compatible with established I/O systems from commonly-used manufacturers

The seamless integration of the existing Type 8644 AirLINE generation of valve islands into the I/O systems Siemens ET200S, WAGO I/O System 750, Phoenix InLINE System and Rockwell Point I/O provides a combination that enables users to combine a broad spectrum of digital, analogue and pneumatic signals cost-efficiently in a single control cabinet.
Control cabinets are frequently installed in plants in zone 2/22 for cost reasons. In this case, this should also enable intrinsically safe signals from areas with strict requirements such as zone 1/21 to be processed in these control cabinets.

Combined with WAGO I/O system up to zone 0/20

The combination of the valve island AirLINE Type 8644 and the intrinsically safe input and output modules of the WAGO I/O System 750 provides cost-efficient actuation of pneumatic actuators and intrinsically safe signals in such cases:
Installed in zone 2/22 – pneumatic and electrical signal processing from up to zone 0/20!

Valve island AirLINE Type 8644

8647

Bürkert and Siemens – a smart combination

Valve island AirLINE SP Type 8647, compatible with Siemens ET200SP

Working closely with Siemens, Bürkert now also enables the user to integrate valves into the decentralised remote I/O system ET200SP from Siemens. The complete software and hardware integration into Siemens automation technology enables the user to maintain an overview of all key process parameters at all times. The versatile diagnostic functionality allows these parameters to be read directly from the LCD display of the valve island or forwarded to a global control system.

For the first time, it is also possible to display the switching position of the downstream process valves directly on the pilot valve, which facilitates start-ups and troubleshooting significantly, saving the user valuable time. Thanks to the integration of an additional deactivation terminal on each valve module, it is also possible to easily and cheaply integrate a variety of emergency-off circuits.

Thanks to a conformity state and EU Declaration of Conformity, the system can also be used in potentially explosive atmospheres up to zone 2.

Valve island AirLINE SP Type 8647

8652

Unambiguous diagnostics in plain text and symbol form

Compact design

Robustness is an important topic, and the engineering design of the AirLINE Type 8652 valve island places particular value in this regard. The construction on an aluminium base unit enables it to be installed as usual on a top hat rail in the control cabinet or integrated directly into the floor of the control cabinet, providing the user with innovative flexibility when it comes to installation.

Versatile diagnostic functionality

The valve island also offers the possibility of displaying and processing feedback from the field directly. The switching positions of the process valves can then be read directly from the LCD display of the valve island, helping the user to speed up start-up processes and simplify maintenance.

Higher plant availability thanks to network redundancy

When integrating the valve island into a PROFINET environment, the integrated MRP functionality guarantees safe operation and prevents complete failures within the network.
This new valve island represents Bürkert's ongoing expansion of the new Efficient Device Integration Platform (EDIP), with which Bürkert is opening the door to Industry 4.0 for its products. The device platform EDIP encompasses a wide range of functions and coordinated HMI devices in order to facilitate the system integration of new devices. Bürkert's free software, the Communicator, provides diagnostic functions such as monitoring of operating data and alarms for customer-specific parameters.

Valve island AirLINE Type 8652

8650

Compact, modular and intrinsically safe

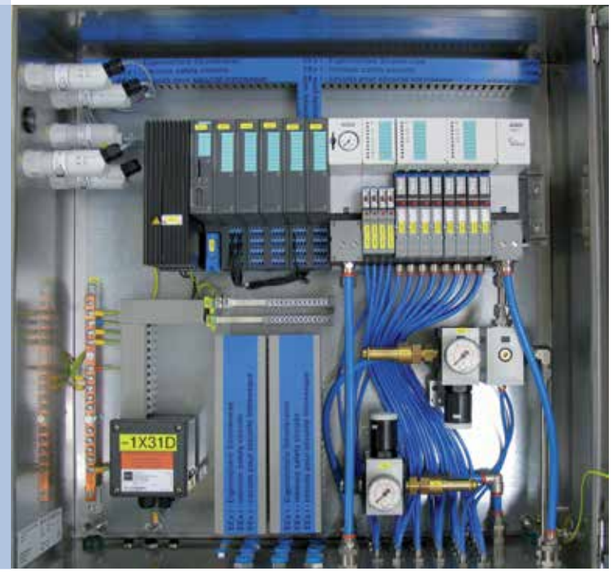
Less wiring, easy planning and reduced documentation

Decentralisation is a key factor in implementing low-cost solutions in process automation. Connecting sensors and actuators to fieldbus systems reduces the cable connection workload significantly. Modular peripheral systems enable greater efficiency and flexibility on-site. These benefits can now be realised in potentially explosive atmospheres with the AirLINE Ex Type 8650 valve island.

Compatible with Siemens I/O system

Thanks to complete integration with the Siemens system SIMATIC ET 200iSP, all options for decentralised combination of electric and pneumatic functions in ex zone 1 can be realised, including extensive maintenance and diagnostic functions.

The intrinsically safe peripheral system SIMATIC ET 200iSP from Siemens communicates via DP-IS couplers using the highly widespread fieldbus PROFIBUS DP. This solution thus offers maximum openness and flexibility when planning new plants or for integration into existing ones.



Tidy, well-conceived and space-saving - individuality made by Bürkert

Technical data AirLINE Ex Type 8650

Pressure range	2.5 ... 7 bar (expanded pressure range with auxiliary pilot air version) 0 ... 8 bar (expanded pressure range with auxiliary pilot air version)
Temperature range	0° ... 55°C (horizontal installation position, 100% duty cycle) 0° ... 50°C (all other installation positions, 100% duty cycle)
Valves	3/2-way valves Type 6524 (11 mm valve width, Q = 300 l/min) 5/2-way valves Type 6525 (11 mm valve width, Q = 300 l/min) 2 x 3/2-way valves Type 6524 (11 mm valve width, Q = 300 l/min) 3/2-way valves Type 6526 (16.5 mm valve width, Q = 700 l/min) 5/2-way valves Type 6527 (16.5 mm valve width, Q = 700 l/min)
Valve slots	Max. 48 valves Type 6524 / 6525 (11 mm valve width) Max. 32 valves Type 6526 / 6527 (16.5 mm valve width) Max. 44 valves Type 6524 as double valve 2x3/2-way
Valve modules	4-channel module plate for 4 x 11 mm valves 4-channel module plate for 4 x 16.5 mm valves 8-channel module plate for 4 x 11 mm valves as double valves
Number of modules	Max. 32 electronic modules Power supply and interface module from Siemens
Supply	24 V DC or 230 V AC (via Siemens power supply)
Communication	PROFIBUS DP IS (via Siemens interface module IM 152-1) Software integration by means of GSD, EDD, HSP and SUP
Diagnostics	Coil short circuit Open output Switching cycle counter
Installation	On Siemens S7 profile rail Installation in Ex-e housing
Degree of protection	IP 30
Explosion protection / approval	Valves with ignition protection type “intrinsically safe” Ex ia Valve modules with ignition protection type “intrinsically safe” Ex ib Terminal modules with ignition protection type “intrinsically safe” Ex ib and “enhanced safety” Ex e Approved in accordance with ATEX and IEC
Pneumatic feature	P channel shut-off for pneumatic hot-swap function Non-return valve in R and S channel
Dimensions	Width: Valve disc with 4 x 11-mm valves: 44 mm Valve disc with 4 x 16.5-mm valves: 66 mm Connection discs / intermediate feeds: 44 mm Siemens terminal modules: 60 mm Depth: 168 mm (from S7 profile rail) Height: 190 mm Maximum expansion width: approx. 1085 mm
Installation in ...	Zone 1 / 21
Signals from ...	Zone 0 / 20

All benefits concentrated: Intrinsically safe valve technology

Fast replacement during operation thanks to hot-swap function

The pneumatic hot-swap function enables easy replacement of valves and electronic modules during operation. The other valves can continue working normally – while electrically live and pressurised. The integrated P channel shut-off closes the pressure channel automatically below the valve and opens it again as soon as the new valve is screwed on.

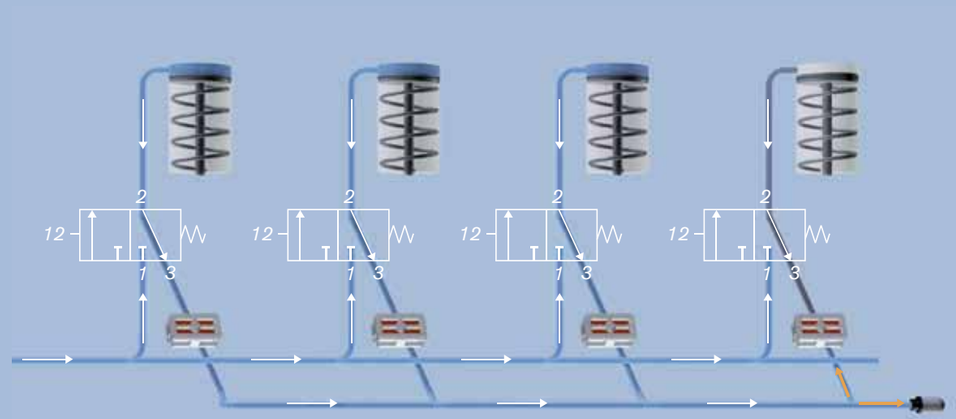
Even more safety: Non-return valves prevent unintended valve switching

Optional non-return valves provide greater safety in the process. In the event of a plant malfunction, all actuators shut down simultaneously, forcing the exhaust air to be vented from all of the actuators into the environment. This can lead to the formation of back pressure in the valve block if venting is not completed quickly enough. This back pressure can cause a valve to switch unintentionally, which can have severe repercussions for a process. If non-return valves are integrated into the base modules, such a problem does not even arise at all in the process.

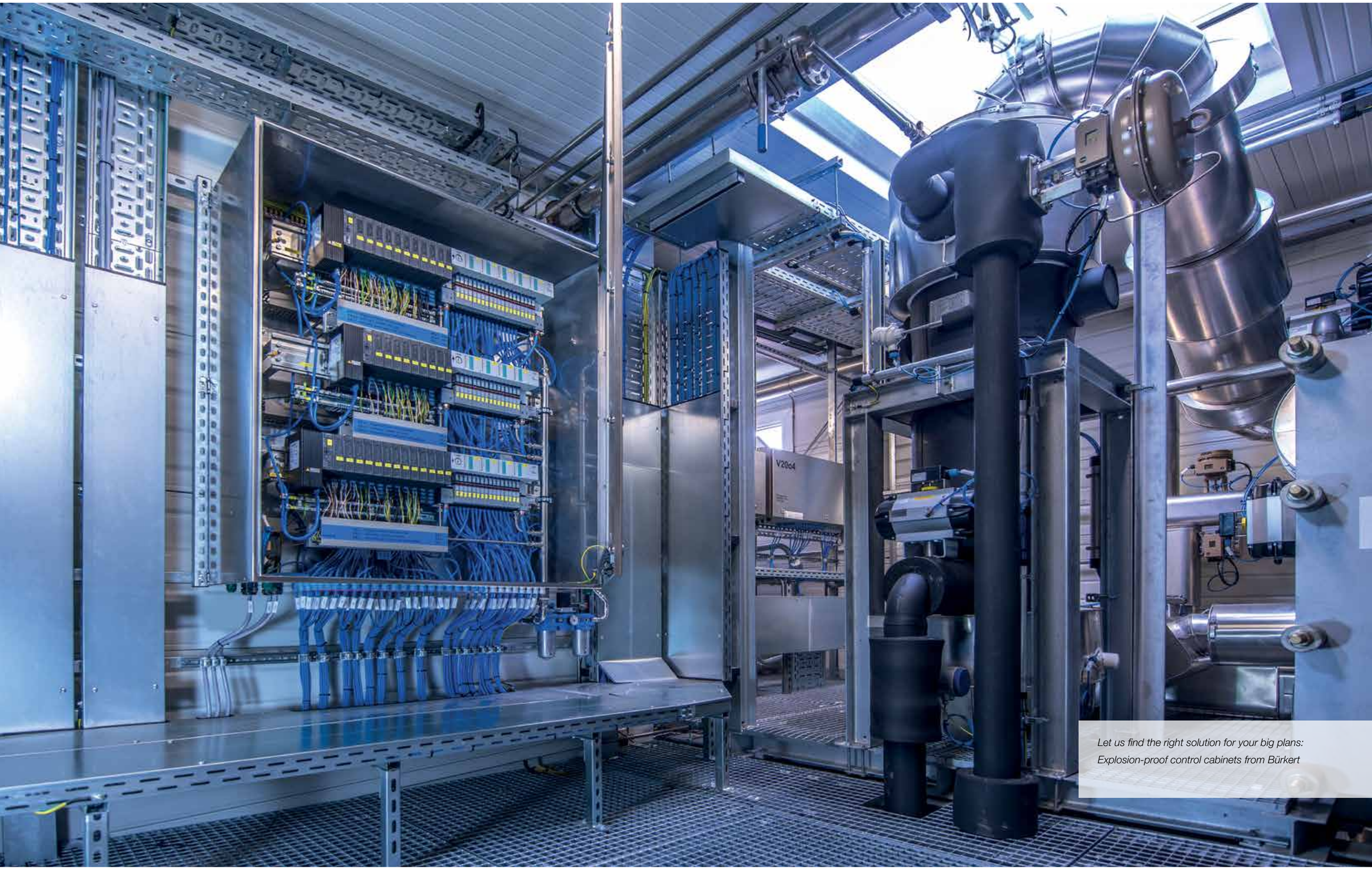
Process reliability and a lack of necessity for maintenance in perfect harmony – AirLINE Ex from Bürkert and ET200iSP from Siemens

Pneumatic hot-swap function (P channel shut-off)

Non-return valves in the exhaust air ducts



Greater process reliability thanks to non-return valves



Let us find the right solution for your big plans:
Explosion-proof control cabinets from Bürkert

Control cabinet-mounted system solutions

Individual solutions for electropneumatic automation

Compact plants in potentially explosive atmospheres such as those found in the pharmaceutical industry can be automated in a cost-efficient manner using decentralised control cabinets. Intrinsically safe valve islands from Bürkert can be installed directly in plants in ATEX-certified control cabinets in combination with powerful I/O systems, allowing them to be installed close to the process. This enables high-density pneumatic, electrical and also failsafe signals to be unified centrally in a single control cabinet and processed directly in the field using an integrated I/O system.

Individual connections or integrated valve island solution?

For such automation requirements, Bürkert offers a variety of solution concepts. Thanks to our large range of intrinsically safe valve systems, we are able to find the right combination for our customers for almost any electropneumatic requirement. From classic individual valve connection concepts to high-integration valve island solutions, both concepts are modular and can be tailored to the customer's needs.

Modern automation concepts must be simple and safe

Many plants still in operation today work according to the traditional principle of individually connecting valves. These are frequently encapsulated valves with Ex m protection with the electrical connection implemented as Ex e ("enhanced safety"). While these concepts still work, they are not particularly maintenance-friendly, because everything needs to be de-energised in the event of a fault. Modern solutions on the other hand can be designed on the basis of intrinsic safety, providing the user with greater flexibility and greater ease of maintenance.

Durable reliability –
safely in operation for over 20 years

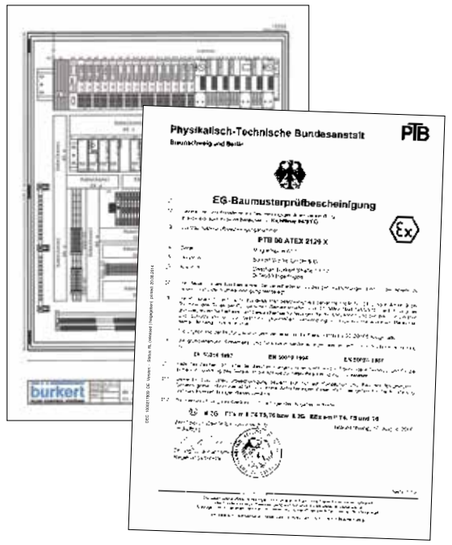
Safe for operation over the next 20 years – switching to a modern PLS system requires new concepts.

ATEX-certified control cabinets

Effective complete systems for potentially explosive atmospheres

At Bürkert, we develop control cabinet solutions that are conceived down to the smallest detail and are safe and simple to use. The control cabinets are developed and designed in Bürkert's own "Systemhaus" engineering facilities, resulting in control cabinets of especially high quality and pronounced functionality, boasting electrofluidic or electropneumatic combinations in particular.

The overall control cabinet package is completed by extensive documentation in ePLAN P8, heat generation measurements, evidence of intrinsic safety and complete electrical and pneumatic function tests.



Intrinsically safe and failsafe

The integration of failsafe modules on the ET200iSP system from Siemens provides new opportunities to implement safety-centric processes in a decentralised fashion in the control cabinet directly in potentially explosive atmospheres.

Thanks to the smart coordinated switching of pneumatic components in the control cabinet, this enables safety-centric armatures and process actuators to be pneumatically controlled directly from the control cabinet. As a result, failsafe functions can be relocated to the field without the need for additional hardware, and plants can be decentralised more consistently as a result.

Thanks to tried, tested and robust valve technology – as well as any necessary redundancies – SIL applications can be unified more easily and more cost-effectively where they are needed – in the field, in the process.
To ensure maximum safety in the explosion-proof control cabinet, all supply air lines are implemented as stainless steel pipes. This underlines the high level of safety and prevents malfunctions.

3/2-way valve Type 6518 as a pilot valve in the control cabinet - safety thanks to proven technology and robust installation

Safe & tidy – adapter plates for the control cabinet wall

Easy to install and use thanks to pre-assembly

Thanks to the compact, intrinsically safe 2 x 3/2-way valves with an air flow rate of up to 300 l/min and an installation width of just 11 mm, the user can accommodate a high density of pneumatic signals in the control cabinet wall, thus saving space. The valves are pre-mounted on a shared connection block, enabling them for instance to be electrically controlled using intrinsically safe signals from a remote I/O station. This saves time, requires less installation work and incurs fewer costs due to the more compact, easier-to-use control cabinets.

Process reliability features such as P channel shut-off and non-return valves can be optionally integrated, providing a uniquely compact and easy-to-maintain solution, especially in potentially explosive atmospheres. The main advantages of intrinsic safety are further highlighted by the possibility of replacing valves while the system is electrically live and pressurised (hot-swap function).

The fewer the number of pneumatic hoses, the greater the process reliability

AirLINE Quick allows the use of components in the control cabinet to be reduced significantly. Direct installation in the control cabinet wall or floor eliminates the need for pneumatic hoses in the control cabinet. This allows control cabinets to be constructed even more compactly and enables all actuators, supply air and exhaust air to be mounted directly externally on the control cabinet using the adapter plate. The omission of hoses in the cabinet minimises the potential for errors when connecting actuators.

The optional ATEX approval of the adapter plate in accordance with EN 60079-7 "enhanced safety" enables the user to perform installations in housings with Ex e protection or in control cabinets or intrinsically safe valve boxes on-site in potentially explosive atmospheres.

AirLINE Quick adapter plate

Decentralised automation

A question of environment

Depending on the plant concept, a variety of automation solutions are necessary. For decentralised process automation, Bürkert also offers not only automation with control cabinets and valve islands but also a broad range of process and control valve products to solve complex automation problems.

A variety of control concepts

When combined with the large selection of different process valves, our integrated feedback and control units provide a good basis for reliable automation. Thanks to the wide variety of communication protocols, these can be integrated into a broad range of automation networks.

As robust and safe as a control cabinet

The valve systems are compliant with the high IP degree of protection that is required for the practical application and are only manufactured from materials that react well to cleaning agents. Accordingly, the IP degree of protection is not attacked when used for long periods of time in highly humid environments or cleaned with aggressive chemicals.

Ease of integration, including in the existing plant

The decentralised approach also offers benefits even before start-up, because the process and automation level simplifies project planning thanks to the simplified integration and enables more flexible solutions. This also applies to later installations, start-ups and maintenance work.

Smart process valves and intrinsically safe position feedback sensors

Pneumatically actuated process valves can be fitted with all necessary automation components, e.g. with manual pilot valves, electrical feedback units and optical status indicators, fieldbus interfaces and even position feedback sensors and process controllers.

ATEX-certified control heads

Universally adaptable and combinable with all valve forms, our control heads handle the entire pneumatic control, feedback, diagnostics and even bus communication.