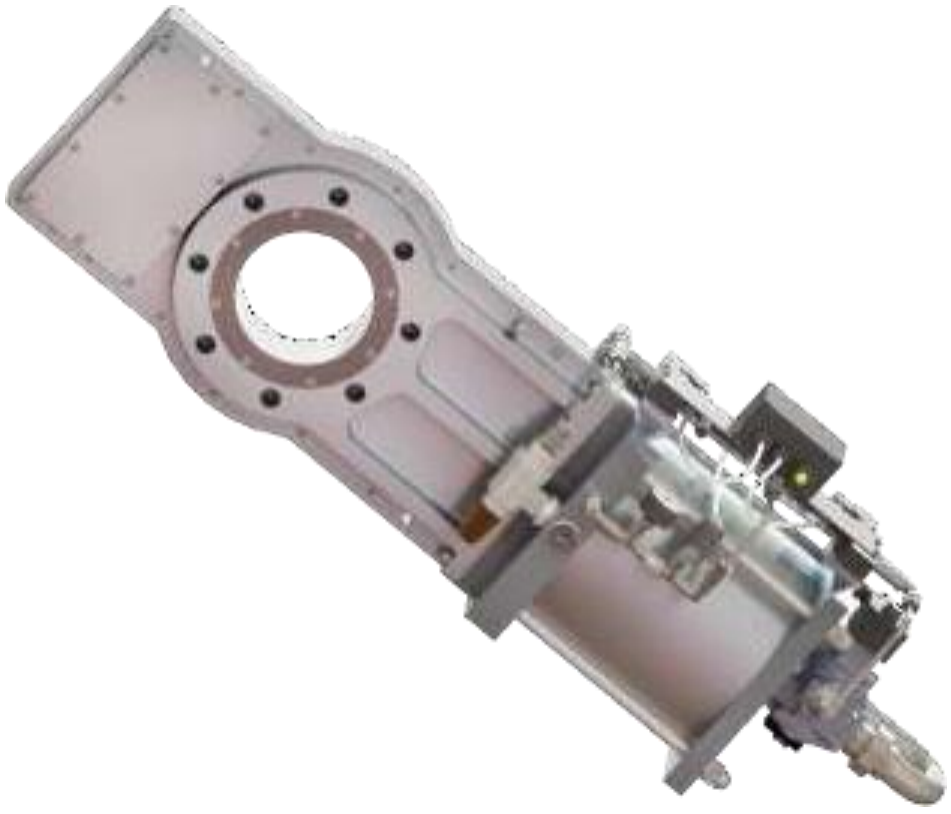
EXPLOSION-PROOF QUICK-ACTING SLIDE VALVE GATEX SYSTEM

DN 50 – DN 200



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1. GENERAL INFORMATION

This user manual (hereinafter UM) has been prepared for the explosion-proof quick-acting slide valve GatEx system of (hereinafter system). The original user manual is available in the Czech language, other language versions are a translation of the original. In case of any ambiguity, the original Czech version shall prevail.

This UM is an integral part of the product and the manufacturer will not accept any damage or injury caused by insufficient knowledge of this UM. It is necessary for the user to study the documentation and all details and other documents with them by suitably qualified employees (electrical, mechanical, technology, safety technicians, etc.).

In case of any ambiguities, the customer should contact manufacturer or its authorized representative.

This user manual must be preserved throughout the lifespan of the system. It must be made readily available to all operator personnel who may encounter the system in and around their work. If it becomes lost, it can be ordered again from the manufacturer or supplier.

The following documents are submitted together with this manual after the installation of the quick-acting slide valve GatEx:

- Completion certificate
- Protocol about installation
- Document about installation
- Certificate of the system functional test
- Training note
- EU Declaration of Conformity acc. to 2014/34/EU
- Checklist of the GatEx explosion-proof quick-acting slide valve GatEx system
- Operational Log
- CONEX control unit user manual
- CONEX-IVM control unit user manual
- DetEx pressure detector user manual

On request can be delivered:

Drawing of Coupling Flanges
Connection Diagram of Solenoid Valves

Increased user attention should be paid in particular to Chapter 4 on proper installation, as the GatEx is a device that can be life-threatening if installed, operated and maintained properly.

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1.1 WARRANTY CONDITIONS

State-of-the-art, high-quality materials were used in the production of the system. A thorough inspection of the GatEx is performed by the factory before sendig it to the customer. If a defect arises in the GatEx during the warranty period for which the manufacturer is liable, and the customer intends to complain about this defect, he is must do so without undue delay. The manufacturer will replace damaged or missing parts of the GatEx as soon as possible.

The manufacturer grants a warranty on the product for a period of two years. This begins at the moment the product is handed over to the operator and, in the absence of such handover, the moment the product was made ready for handover but the transfer did not take place for reasons on the part of the operator.

The warranty cannot be applied in the following cases:

The operator did not become adequately familiar with this UM.
The product was not used in accordance with this UM.
Insufficient or improper maintenance was performed.
The GatEx was not serviced by the manufacturer or by an authorized representative to do so (at least once a year, recommended once a 6 months). There must be a record of this service in the operational log.
Inappropriate spare parts have been used despite the manufacturer pointing out that only original spare parts can be used.
Inappropriate accessories have been used despite the manufacturer pointing out that only original accessories can be used.
Immediately after delivery, the presence of the supplied accessories and the integrity of the original packaging were not checked despite the manufacturer pointing out that, in the event of a breach of this obligation by the operator, late complaints would not be considered.
Damage has been caused by poor or improper handling.
The warranty does not apply in cases where the slide is damaged due to abrasion of the flowing medium.

A complaint about a defect during the warranty period is correctly made by sending the damaged part of the product to the manufacturer, including a written specification of the defect and mention of the product serial number. A complaint which follows this procedure will then be assessed by the manufacturer, and the manufacturer will use this assessment to decide whether the complaint is justified or unjustified.

If any part of this manual is not clearly understood by the operator's employee who comes into contact with the system during his work, the operator is obliged to contact the manufacturer or the authorized representative with appropriate questions. The manufacturer is not liable for any damage or injury caused by a lack of understanding of the contents of this manual.

The explosion-proof quick-acting slide valve GatEx system must be installed and serviced by the manufacturer or its authorized representative. Installation and service must be performed in accordance with this UM. The manufacturer accepts no liability for defects, damage or malfunction of the delivered products in the case of assembly carried out in contravention of the UM or assembly carried out by a professionally non-qualified person.

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1.2. NOMENCLATURE

Explosion-proof quick-acting slide valve GatEx system	a technological system, which detects explosion automatically and then prevents its transfer through pipeline to other parts of the technology. It consists of detectors, control panels and a quick-acting slide valve, or, if appropriate, of other technical accessories. The entire detection of explosion and prevention of its transfer takes milliseconds.
Flow direction	air mass (material) flow direction inside the piping system.
Detector	a sensor or a switch, which monitors and detects the occurrence of explosion and submits this information to the control panel.
Control unit	equipment, which evaluates information from the detectors monitoring and detecting the occurrence of explosion and then gives an impulse to the quick-acting slide valve to prevent the transmission of the explosion through the pipeline of the technology. Furthermore, it controls the entire system and evaluates possible failures. It also provides an interface for the customer or communication for superior control systems.
Quick-acting slide valve	technological equipment, which prevents the transmission of explosion through the pipeline of the technology based on the electrical impulse from the control unit. It consists of a mechanical part (the quick-acting slide valve structure, mounting flanges and a sliding knife), a pneumatic part (valves, ductwork, a manometer, silencers) and an electrical part (electrical coils, pneumatic valves, sensors of the sliding knife limit positions, pneumatic circuit pressure sensors, wiring).
Slow closing	a quick-acting slide valve function, which closes the quick-acting slide valve slowly upon its enabling. Slow closing occurs in the event of a pressure drop in the pneumatic circuit of the quick-acting slide valve below 5 bars or upon manual triggering of this function.
Slow opening	a function of the quick-acting slide valve, which opens the quick-acting slide valve slowly upon its enabling. Slow opening occurs in the event of manual triggering of this function.
Quick closing	a function of the quick-acting slide valve, which closes the quick-acting slide valve quickly upon its enabling. Quick closing occurs in the event of manual triggering of this function or upon the detection of explosion in the protected technology.
Manufacturer	RSBP spol. s r.o.

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Supplier	the natural or legal person who supplied the GatEx.
Authorized representative	a natural or legal person who has been authorized in writing by the manufacturer to act on his behalf in the performance of specific tasks.
Operator	the natural or legal person who operates the GatEx.
Trained person	a person who is thoroughly familiar with this manual.
Operational log	a document supplied with the GatEx, or other suitable operator document used to record operations carried out on the GatEx. date and time of the action • what caused the action (regular service, failure…) • how the action was handled • name and signature of the employee who performed the action
Pull system	the fan is located behind the source of the explosion (from the point of view of the direction of airflow).
Push system	the fan is located in front of the source of the explosion (from the point of view of the direction of airflow).

1.3 CLASSIFICATION OF GATEX

The explosion-proof quick-acting slide valve GatEx system is designed in accordance with the European Directive 2014/34/EU, based on the standard EN 15089 and EN ISO 80079-36.

Certification	FTZÚ 17 ATEX 0113X
Equipment group	II
Explosive atmosphere	D
Equipment category, indoor/outdoor	20, 0 (Ga, Da) / 22, 2 (Gc, Dc)

Tab. 1 – Explosion-proof quick-acting slide valve GatEx system classification

The electrical components installed on the external side of the quick-acting slide valve must be certified for the respective zone or category.

1.4. STORAGE

Prior to the installation on the protected technology, the components of the explosion-proof quick-acting slide valve GatEx system must all be stored in a clean, dry place and they must not be exposed to adverse weather conditions. All components shall be stored in the original packaging at a temperature from +10 °C to +40 °C.

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2. GENERAL SAFETY INSTRUCTIONS

The operator is obliged to ensure that the quick-acting slide valve system is used and operated only in technically perfect condition. The required intervals of inspections and maintenance must be observed. Provide for required service or repair performed by service staff of the manufacturer or an authorized representative.

The activities performed on any part of the system GatEx must all be recorded in the operational log, so that the history of these activities can be checked at any time.

By closing the slide valve GatEx, only the explosion spreading through the pipeline can be stopped. It cannot be used for controlling or closing the flowing material in the pipeline.

2.1. PARAMETERS ENSURING THE SAFE USE OF GATEX ACCORDING TO THE ATEX CERTIFICATE

Name of the protective equipment	GatEx	
Purpose of GatEx	Equipment preventing the transmission of explosion	
Dust used	St1, St2, St3	
Parameters of dust	Detection DetEx	non-metal dust KSt,max ≤ 300 bar.m.s-1 MESG ≥ 1,27mm metal dust KSt,max ≤ 350 bar.m.s-1 MESG ≥ 2,12mm
	Detection LumEx	non-metal dust KSt,max ≤ 200 bar.m.s-1 MESG ≥ 1,70mm
Zone inside the pipeline	20, 0	
Maximum air speed in the duct	35 m.s-1	
Max. pred in the vessel pred,max	7 bar	
Maintenance	To ensure the operability of GatEx, the operator must provide for cleaning (if this is appropriate with respect to the operation) to the extent necessary for ensuring the purity needed for the required functions.	
Ambient temperature	-5 °C to +50 °C (with a heated bag from -40 °C, with other special components to +70 °C)	
Operating temperature (flowing medium maximum temperature)	-10 °C to +80 °C	
Storage temperature	+10 °C to +40 °C	
Highest surface temperature	130 °C	
Maximum dust concentration in the pipeline	Unlimited	
Coupling flanges	EN 1092-1	

Tab. 2 – GatEx technical parameters

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DN 50 – DN 80		DN 100 – DN 150	DN 200	DN 200*	DN 200**
Max. pred in the vessel pred,max [bar]	7	7	8	2	1,2
GatEx pressure resistance pmax [bar]	21	21	21	21	21
Minimum installation distance [m]	4	6	7	6	10
Maximum installation distance [m]	20	11	12	12	12

* explosion detection using explosion venting device (RSBP manufacturer)
** explosion detection using LumEx optical detector (RSBP manufacturer)
Tab. 3 – Proper installation technical specification

2.2 TYPES OF EXPLOSION DETECTION

The explosion can be detected in the following ways:

- DetEx pressure detector installed on the protected equipment.
- Flame and spark detector LumEx 1 or LumEx 4 installed on the protected equipment.
- Explosion venting device, installed on a protected device, equipped with an opening indicator complying with standard EN 60079-25.

In the event of an explosion, the quick-acting slide valve GatEx must be inspected by the manufacturer or an authorized representative to ensure its proper function for further safe use.

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3 SYSTEM DESCRIPTION

If there is an explosive atmosphere in the form of a whirled cloud of dust in the technology and if this atmosphere comes in contact with an initiation source, an immediate explosion can occur. The explosion-proof quick-acting slide valve GatEx system protects the technology, operators and the environment from destructive effects of such explosions.

3.1 PRINCIPLE OF FUNCTION

The system of the quick-acting slide valve is intended to prevent the transmission of the explosion from one part of the technology to another part. The system works on the principle of continuous monitoring of pressure in the protected part. Upon exceeding the preset limit pressure value, the quick-acting slide valve GatEx closes. This quick- acting slide valve is installed on the pipeline connecting the protected part of the technology with other parts of the technology. Upon closing the quick-acting slide valve GatEx, a barrier occurs in the pipeline route; the barrier prevents the transmission of flame, pressure, dust and other accompanying phenomena of explosion farther through the pipeline to other parts of the technology. The quick-acting slide valve GatEx system consists of:

- Quick-acting slide valve (or quick-acting slide valves) GatEx sized from DN 50 to DN 200
- CONEX control unit (each CONEX control unit can be connected to multiple quick-acting slide valves GatEx. The maximum quantity depends on the type of the control unit used and the total consumption of the system. The specific minimum quantity shall be specified by the manufacturer, depending on the specific application.)
- CONEX-IVM control unit (one piece for each GatEx)
- Detector (based on the topology and dimensions of the protected technology, there can be more than one detector)

The quick-acting slide valve GatEx system is a pneumatic equipment controlled by three solenoid valves. First valve is responsible for the function of slow opening, the second one for slow closing and the third valve is responsible for quick closing in the event of explosion.

In addition to the actual quick-acting slide valve GatEx, the CONEX control unit evaluating the information from detectors, monitoring fault conditions and sending the impulse to quick closing of the quick-acting slide valve to its CONEX-IVM control unit, is an integral part of the system.

CONEX-IVM control unit is another integral part of the system, which shall be installed in the vicinity of the quick- acting slide valve. It indicates the basic fault conditions, the status of the quick-acting slide valve (open/closed), and the quick-acting slide valve can be opened or closed slowly with it. It also receives the signal from CONEX control unit and triggers the function of quick closing of the quick-acting slide valve in the event of explosion. Furthermore, it sends the signal to the quick-valve of the quick-acting slide valve, which ensures the actual quick closing. Each electrical component on the quick-acting slide valve (valves, sensors, detectors and others) is also connected to CONEX-IVM control unit. The last integral part of the system of the quick-acting slide valve includes detectors (the pressure detectors DetEx are used).

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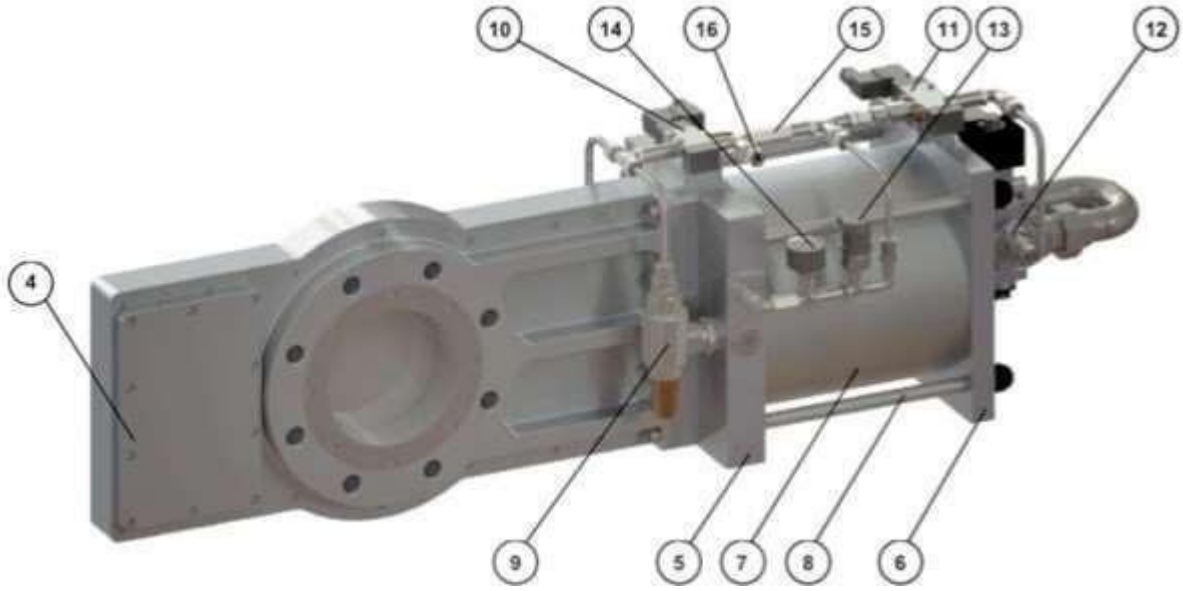
1. quick-acting slide valve body (aluminum alloy)
2. sliding knife (stainless steel)
3. bore liner (stainless steel)



4. cover plate (aluminium alloy)
5. top flange (aluminium alloy)
6. bottom flange (aluminium alloy)
7. air tank (aluminium alloy)
8. bolt (stainless steel)
9. rapid escape valve with silencer
10. 3/2 solenoid valve for slow opening
11. 5/2 solenoid valve for slow closing
12. 3/2 solenoid valve for quick closing
13. pressure switch
14. manometer
15. non-return valve
16. air supply (fitting for compressed-air supply through a stainless steel pipe 8x1)

Fig. 1 – Quick-acting slide valve GatEx basic parts

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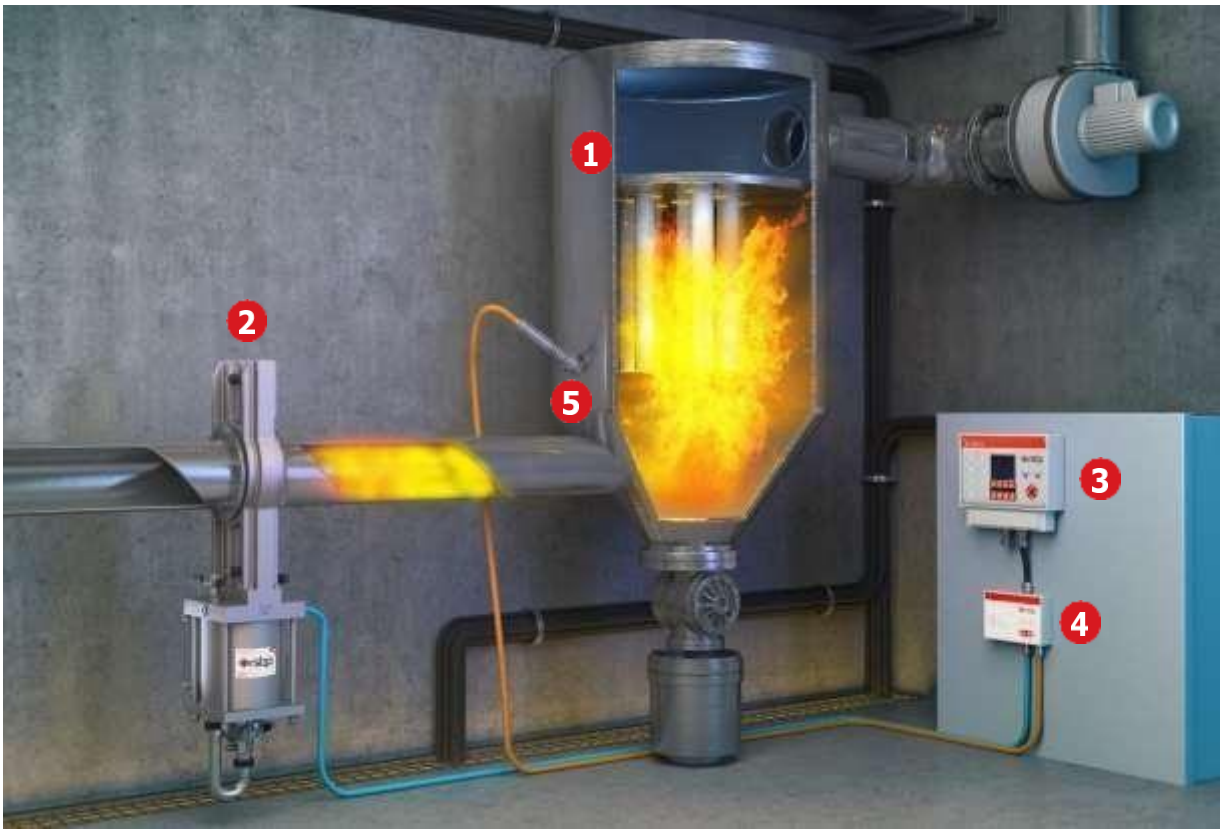
The quick-acting slide valve GatEx shall be installed into the pipelines of protected technological units (e.g. filter separators, cyclones and others). GatEx can be installed into the flammable dust flow and pull system. In this pipeline, no particles or objects different from combustible dust can flow, since the system is designed for the explosion parameters of the combustible dust.

Upon an explosion, the explosion is detected by a detector, whose status is continuously evaluated by the CONEX control unit. After the increased sensed value (pressure) has been recorded, the CONEX control unit sends the signal to the CONEX-IVM control unit, which subsequently sends the signal to the valve responsible for its quick closing. This prevents the transmission of the explosion to other parts of equipment or production technology. The quick-acting quick-acting slide valve shall be installed into the pipeline at the required installation distance, as specified in this UM.
Upon power outage, the energy is supplied from the battery sets in the CONEX control unit. Power from the battery sets can supply the entire system (CONEX, CONEX-IVM, one or more detectors and the quick-acting slide valve GatEx) for a limited period of time, which depends on the number of detectors connected, the length of wiring and other effects. After the back-up source has been discharged, the quick-acting slide valve is closed slowly.



1. filter
2. quick-acting slide valve GatEx
3. CONEX control unit
4. CONEX-IVM control unit
5. DetEx – pressure detector

Fig. 2 – Function diagram of the quick-acting slide valve GatEx system

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3.2. TECHNICAL DATA

3.2.1. BASIC DIMENSIONS

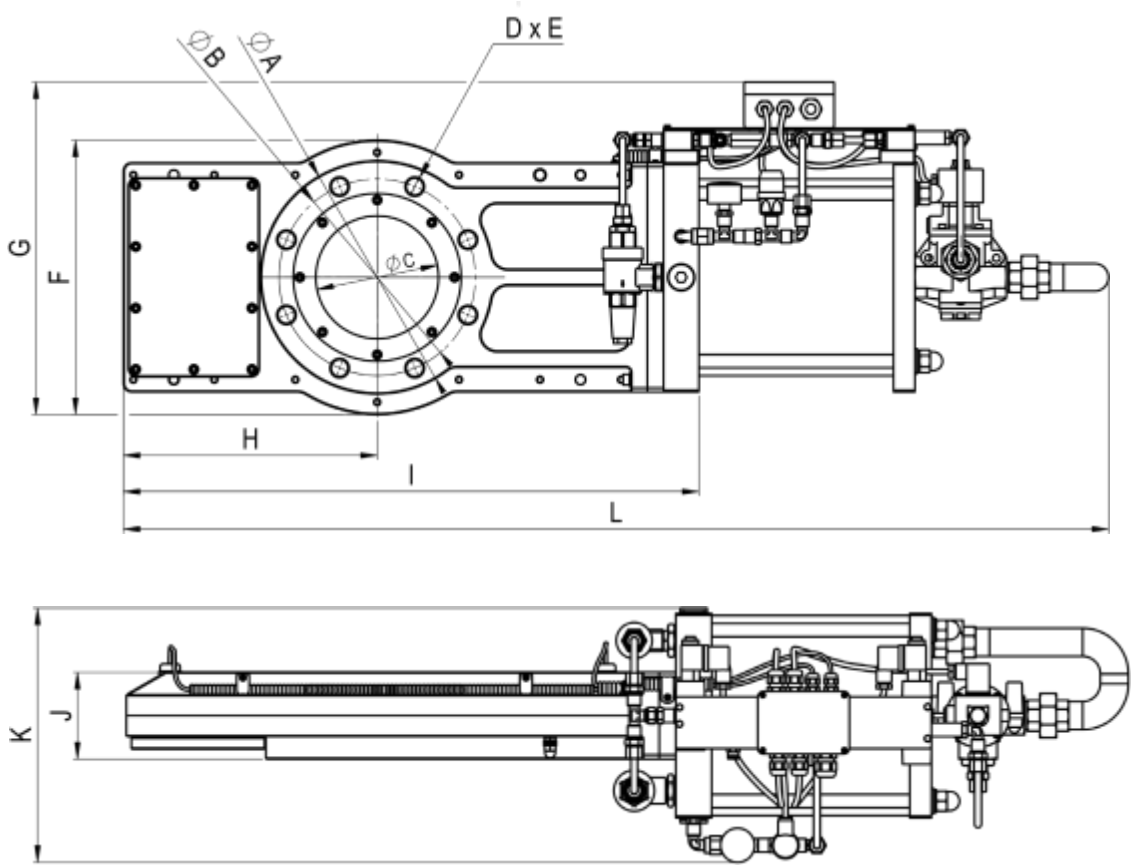

Fig. 3 - Diagram of basic dimensions of the product line

DN (mm)	A (mm)	B (mm)	C (mm)	D	E	F (mm)	G (mm)	H (mm)	I (mm)	J (mm)	K (mm)	L (mm)	Weight (kg)
50	165	125	50	4	M16	230	336	193	436	104	299	837	44
65	185	145	65	8	M16	245	344	202,5	468	104	299	884	48
80	200	160	80	8	M16	260	351	205	493	104	299	924	51
100	220	180	100	8	M16	280	379	235	553	104	305	1004	58
125	250	210	125	8	M16	305	391	273	628	104	305	1104	64
150	285	240	150	8	M20	335	406	310	703	104	305	1204	73
200	340	295	200	12	M20	390	458,5	385	853	124	305	1404	100

Tab. 4 – Basic dimensions of the product line

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3.2.2 MATERIAL DESIGN

The main components of the GatEx (body, the entire pneumatic part) are made of aluminum alloy. Other parts, for example the sliding knife, body insert of the entire ductwork of compressed air, are made of stainless steel.

3.2.3. SPECIAL FLANGE SEAL

In addition to the standard flange sealing made of EPDM, the packing can be supplied made of special materials according to customer's requirements.

3.2.4. COMPRESSED AIR REQUIREMENTS

Air at a pressure of 5 to 6 bar must be supplied to the quick-acting slide valve GatEx. If the pressure in the customer's pneumatic circuit is higher, it is necessary to place a pressure reducing valve in front of the pneumatic circuit of the slide and reduce the pressure to the required range. The pressure in the pneumatic circuit of the slide is continuously monitored by a pressure switch. If the pressure drops below 5 bar, the CONEX control unit evaluates this drop as an error and quick-acting slide valve closes slowly. The air quality for the installation of the slide is governed by the ISO 8573-1 1: 2010 standard. In this case, the compressed air must be in quality class 1.1.2.

If air quality other than that specified is used, the manufacturer is not responsible for flawless operation of the GatEx.

3.3. OTHER COMPONENTS OF THE PROTECTIVE SYSTEM

The quick-acting slide valve GatEx system is an active system for the separation/prevention of the explosion transmission. This means that other components are integral parts ensuring its correct operation. They include the CONEX control unit, CONEX-IVM control unit and the pressure detector (detectors) DetEx.

3.3.1. CONEX CONTROL UNIT

The control panel CONEX is used for the system of the quick-acting slide valve. The CONEX control unit is a device, which evaluates the information from the detectors monitoring and detecting the occurrence of the explosion, and then it sends the impulse to the CONEX-IVM control unit of the quick-acting slide valve to close, thus preventing the transmission of the explosion.

The control unit is installed near the protected equipment, within the reach of operators, outside the explosive- atmosphere zones. The wiring from the detectors and the quick-acting slide valve is connected to the control unit. The control unit is supplied with mains voltage, and optical or acoustic alarms as well as signals from/to the control system and other blocking and bonds can be connected to it.

The control unit is supplied with a voltage of 230 V AC (-10 % to +15 %). The supply must be protected with a single-pole circuit breaker In=10A of the characteristics B or C. Furthermore, the supply is protected with a surge protection of the third grade together with a VF filter against adverse effects of atmospheric and operating over voltage. The surge protection of the third grade can be installed outside the control unit or installed into the control unit. Customers are advised to provide the supply with a first and the second grades of the surge protection. If the customer does not provide the supply with the first and the second grades of the surge protection, the manufacturer or its authorized

representative shall not be held liable for the comprehensiveness of the surge protection and for the

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flawless operation of the system.

The supply voltage source 230 V AC must meet the conditions of the emergency power supply (back-up with a UPS, a pair of independent sources, etc.) or power restoration within 4 hours must be ensured in the event of power outage.

The control unit supply must also be designed in such a way that it cannot be cut off by this control unit (by the relay contacts). The possible supply voltage outage 230 V AC is covered by using the internal back-up battery set (a pair of batteries) 24 V DC/2.3 Ah with a back-up time of at least 4 hours of operation. The worst possible situation is considered: depending on the configuration of the connected appliances, the back-up time can be longer in specific situations. In the event of supply voltage outage longer than 4 hours, the back-up battery source can be discharged and the proper operation of the control unit cannot be guaranteed.
The operation of the control unit can be performed only by a person who has been trained in this task and who is physically and mentally fit.

Under the flawless operation mode of the system, the operator of the CONEX control unit checks only if the green LED, the one marked “Provoz” (Operation), is on. In this mode, no other LED can be lit or the built-in buzzer cannot sound.

In the event of a system failure, the yellow LED, the one marked “Porucha” (Failure), and the corresponding LED on the display with the identification of the detected failure are on. At the same time, the built-in buzzer of the control panel sounds intermittently. Should this be the case, the operator can switch off the built-in buzzer with a push- button marked “Reset výstražné signalizace” (Warning Alarm Reset) located on the front control panel. If the failure is “Porucha napájecí sítě” (Supply network failure), the operator can actively influence the failure by restoring supply voltage (e.g. by switching the supply circuit breaker on). The other failures are all more serious in their nature. Therefore, the operator must contact manufacturer or its authorized representative, who are able to remove the failure and to restore the working order of the quick-acting slide valve GatEx system.
For more information, instructions for use and connection and for dimensional drawings, see the user manual concerning the CONEX control unit.

The possible supply voltage outage 230 V AC is covered by using the internal back-up battery set (a pair of batteries) 24 V DC/2.3 Ah with a back-up time of at least 4 hours of operation. The worst possible situation is considered: depending on the configuration of the connected appliances, the back-up time can be longer in specific situations. In the event of supply voltage outage longer than 4 hours, the back-up battery source can be discharged and the proper operation of the control panel cannot be guaranteed.

If in doubt, the operator shall contact the manufacturer or its authorized representative.

Fig. 4 – CONEX control unit

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3.3.2. CONEX-IVM CONTROL UNIT

CONEX-IVM control unit (hereinafter referred to as IVM) is a sub-component of the system, which actually controls the quick-acting slide valve GatEx, checks the statuses of individual functions and transmits the information from/to the CONEX control unit. Furthermore, it works as an “interface” between the control system of the protected technology and the slide valve (remote control, status indication, etc.).

Fig. 5 – CONEX-IVM control unit

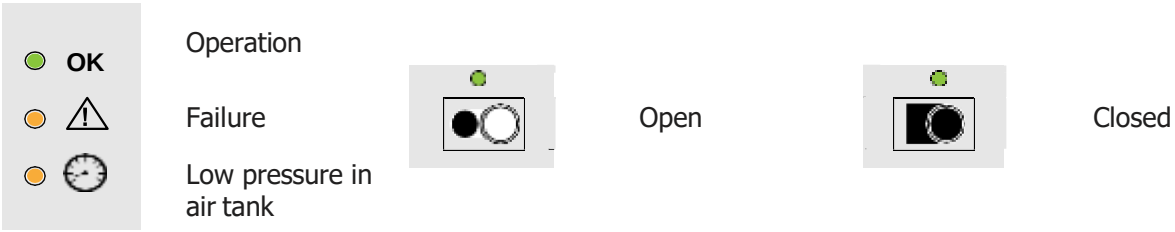

Fig. 6 – CONEX-IVM control unit signalization

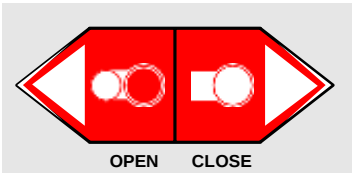

Fig. 7 – CONEX-IVM control unit push-buttons open/close

Operation
Indication of the operation status (permanently lit, the quick-acting slide valve can be opened and closed)

Failure A fault condition of a monitored function. This status is indicated in more situations (see Tab. 5)

Failure	Possible cause
Broken, short-circuited or grounded circuit ofactivation (valve circuit for quick closing)	Mechanical damage to the cabling or a disconnectedvalve coil.
Broken, short-circuited pressure measurement circuit (together	Mechanical damage to wiring or a pressure sensor.

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with the low-pressure indication)	
Knife position logic error (together with the indication of both limit positions)	The knife outside the limit positions: partially opened or Closed If the GatEx does not respond to the commands "close"and "open", contact the manufacturer or authorized representative.

Tab. 5 – Failures and possible causes

Low pressure	The working air supply pressure is too low. It is lit permanently if the compressed air pressurerequired for the operation of the quick-acting slide valve has dropped; the quick-acting slide valve is closed immediately. If the working pressure is all right, the pressure sensor might havebeen damaged. It is necessary to contact manufacturer or its authorized representative and to require an inspection or repair to the system of the quick-acting slide valve.
Open/Close	The push-buttons to control the quick-acting slide valve manually.

The control unit is equipped with a transparent cover, which must be closed properly; this is the prevention of impurity ingress from the surroundings.

In the event of alarms of the system, observe the operation instructions of the control unit (see the UM for the CONEX control unit) and follow the technological or safety plan of the customer. The customer can set down further possible procedures for operators in the event of failure reporting or system startup.

Supply voltage	100 to 240 V AC
Supply voltage frequency	50 to 60 Hz
Power supply circuit breaker	In = 10 A (characteristic B or C)
Supply cord (cable)	3C x 1,5 mm^2
Control unit current consumption	100 mA to 2,5 A (depending on the load, mode...)
IP code	IP65
Response time - maximum	3 ms (<50ms until fully closed)
Response time - adjustable by SW	1 to 240 s
Ambient operating temperature	-10 °C to +50 °C (limited by the battery set)
Relay outputs (one contact NO/NC per each relay)	30 V dc/10 A
Number of relays - two-	6 pcs

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zones design	
Bus	CAN (250 kbps)
Event log	into the internal memory (10 000 events)
Indication	color LEDs on the front panel
Visualization	LCD display (160 x 128 pixels)
Control	push-buttons and controls on the front panel
Parametrization, settings	using special software
Dimensions – CONEX (H x W x D)	316 x 355 x 167 mm
Dimensions – CONEX-IVM (H x W x D)	270 x 170 x 90 mm

Tab. 6 – Technical data for CONEX control unit with the CONEX-IVM control unit

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3.3.3PRESSURE DETECTOR DETEX

It is a detector working on the principle of measurement and evaluation of static and dynamic pressures. It is equipped with its own logics allowing for automatic corrections and verification of the actual operating statuses, so that maximum accuracy, reliability and, in particular, safety are ensured. It consists of a sensing head for sensing pressure, an evaluation unit and a connecting cable. The sensing head also contains a temperature sensor, which allows accurate pressure sensing and its correction in the entire range of the operating temperature. The settings and the parametrization of the detector shall be performed through a communication converter using special software. The detector also has its own internal memory, which allows logging the events depending on the real time, its possible processing, filing etc. The settings and parametrization of the detector can be performed only by the manufacturer or its authorized representative.
The detectors are designed with one sensing head (the cable length between the sensing head and the evaluation unit is 2 meters) and with two sensing heads (the cable length between the sensing head and the evaluation unit is 4 meters - for each sensing head).

Fig. 8 – Pressure detector DetEx
in angle adapter (left) and vertical adapter (right)

3.4 OPTIONAL ACCESSORIES

3.4.1. HEATED BAG WITH THERMAL INSULATION

The GatEx heating is realized by a self-regulating heating cable, the temperature is controlled by a capillary thermostat.

Fig. 9 – Heated bag

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4. INSTALLATION ON THE PROTECTED EQUIPMENT----------

The quick-acting slide valve GatEx is supplied assembled. The installation shall be performed according to the documents for the specific use, supplied by the manufacturer. The detectors, the CONEX control unit and the CONEX-IVM control unit are integral parts of the GatEx. The location of other components and their descriptions are included in the previous chapters.

The installation of the quick-acting slide valve GatEx as well as the installation of its components must always be provided by the manufacturer or its authorized representative. In the event of unprofessional installation, service or any other interventions in the installed system, neither the manufacturer, nor the supplier shall be held liable for its functions. Should this be the case, the user shall forfeit the right to claim if any defects of the quick-acting slide valve GatEx system are detected.

The user must not change the settings or location of the detectors or interfere with the connection of the inductive sensors.

4.1. PRE-INSTALLATION CHECK

Immediately after the delivery and then before the actual commencement of the installation of the quick-acting slide valve GatEx system, perform the following basic checks:

- Check the integrity of the original packaging of the quick-acting slide valve GatEx and other components.
- Check the integrity and intactness of the surface treatment of all components.
- Check the integrity of flange packing.

After the successful checks, the components are ready to be installed. If you detect defects or deficiencies, contact the manufacturer or the dealer immediately.

4.2. INSTALLATION OF THE GATEX ON THE PROTECTED EQUIPMENT

4.2.1. INSTALLATION IN THE ENVIRONMENT

If the GatEx is placed outdoors, quick-acting slide valve must be protected from weather and climatic influences (rain, snow, frost, ice, etc.).

For this case, we recommend using a heated bag (see chapter Optional accessories). At the same time, the heated bag expands the temperature characteristics of the GatEx.

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4.2.2. INSTALLATION ON THE PIPELINE

The quick-acting slide valve GatEx shall be screwed on the pipeline equipment within the range of the installation distance.

Fig. 10 – GatEx nameplate and its placing on GatEx

The GatEx shall be installed in the position indicated in the Fig. 11. This means with the pneumatic part downwards or horizontally. For handling the DN 200, eye bolts (DIN 580, M8 - C15E) can be used, which are screwed in 2 pieces in the full length of the threads in the holes corresponding to the basic mounting (transport) position. Another 4 pcs. M8 threaded holes are located on the body of the DN 200, which are covered with plastic plugs. After removing the appropriate plugs, these holes are used to place the hanging screws (2 pcs.) For handling the slide for other permissible mounting positions of the GatEx.

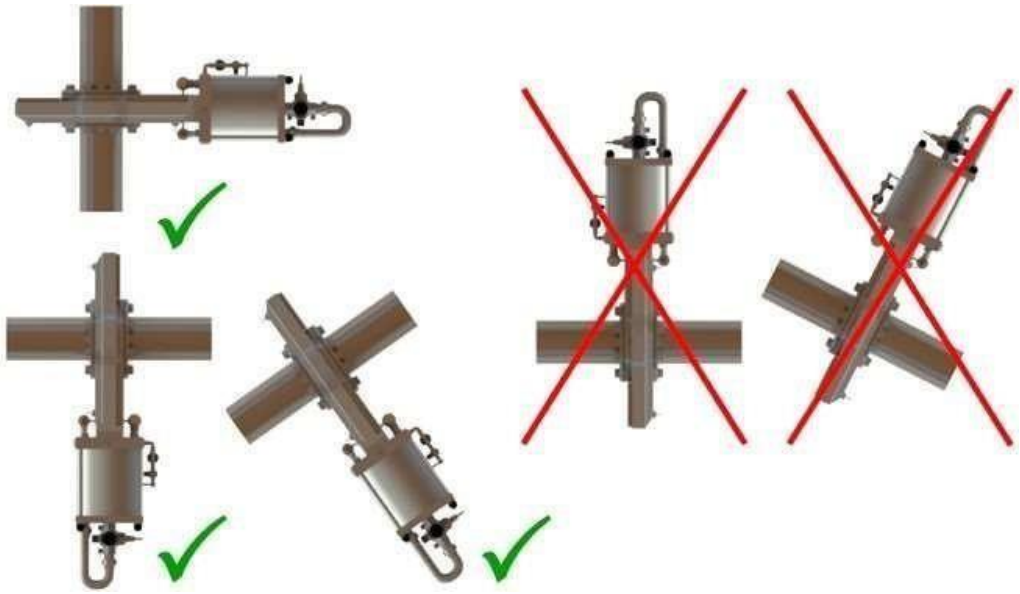

Fig. 11 – Correct position of the GatEx on the pipeline

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4.2.3. INSTALLATION DISTANCE

The installation distance of the slide is given in the table – “Proper installation technical specification”, located in chapter „Parameters ensuring the safe use of GatEx according to the ATEX certificate“.

If the installation distance is too short, the quick-acting slide valve may not be able to close in time and the explosion may pass through the pipeline. If the installation distance is too long, the slide valve can be damaged due to the very strong explosion.

4.2.4. FLANGE SEALING

In places of contact of the pipeline with the quick-acting slide valve, the appropriate sealing must be applied. In addition to flange thickness, you must consider also a pair of sealing 2x4 mm (t) to the total width of the quick-acting slide valve (J) for the proper section of the pipeline.

Fig. 12 – Pipeline length with considering the thickness of sealing

4.2.5. INSTALLATION ON THE PIPELINE

The manufacturer assumes and recommends the use of welding-neck flanges according to the standard EN 1092-1 PN 16. When using other flanges with a different width, use the bolts of a different length than supplied by the manufacturer together with the GatEx. This standard solution is intended only for the installation, when the pressure over 16 bars in the entire technology system affected by the explosion pressure is not expected. When pressure higher than 16 bars (pressure resistance of the quick-acting slide valve pmax) may occur, the connection of the quick-acting slide valve GatEx must be designed for this specific application. The design shall be made by the manufacturer or the supplier of the quick-acting slide valve GatEx.

For easier manipulation with the quick-acting slide valve GatEx, use suspension straps with textile loops of appropriate length and load capacity. The flanges on the pipeline must be welded in such a position and turning that the requirement stipulated in chapter 4.2.2. considering the turning of the quick-acting slide valve GatEx with its pneumatic part downwards is met. The actual quick-acting slide valve GatEx cannot transfer any forces from the actual weight of the pipeline or any other external loads (except for the effect from the prevention of pressure and flame transmission in the explosion).

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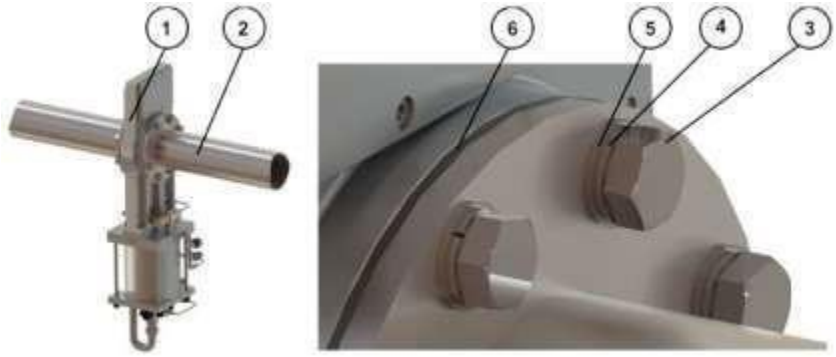

Fig. 13 – Fitting the GatEx on the pipeline

1	GatEx	4.	spring washer (DIN128)
2	pipeline	5.	flat washer (DIN125/ISO 7089)
3	bolt (DIN 933/ISO 4017)	6.	flange sealing

Connect the GatEx body with pipeline flanges with supplied jointing material (or your own jointing material provided that it meets the condition set out below). Remember to use the flange sealing. The depth of screw is all right provided that the appropriate supplied bolts and the above-mentioned flanges EN 1092 -1 PN 16 are used. Should this be the case, the depth of screw shall mean the distance of the bolt end from the contact face of the quick-acting slide valve surface. In other situations, ensure that the depth of screw, considering all washers used, falls within the range specified in the table below. In the table, tightening torques for tightening the screws are also listed.

Bolt	**Min. screw [mm]**	**Max. screw [mm]**	**Tightening torque [Nm]**
M16 (DN 50 to DN 125)	23	30	90
M20 (DN 150, DN 200)	23	35	120

Tab. 7 – Fasteners specification

fasteners	**DN 50**	**DN 65 to DN 125**	**DN 150**	**DN 200**
Flange bolt	DIN 933 / ISO 4017 M16x55 – 8.8, galvanized8 pcs.	DIN 933 / ISO 4017 M16x55 – 8.8, galvanized16 pcs.	DIN 933 / ISO 4017 M20x60 – 8.8, galvanized16 pcs.	DIN 933 / ISO 4017 M20x60 – 8.8, galvanized24 pcs.
Flat washer underthe flange bolt	DIN 125 / ISO 7089 M16, galvanized 8 pcs.	DIN 125 / ISO 7089 M16, galvanized 16 pcs.	DIN 125 / ISO 7089 M20, galvanized 16 pcs.	DIN 125 / ISO 7089 M20, galvanized24 pcs.
Spring washer under the flangebolt	DIN 128 M16, galvanized 8 pcs.	DIN 128 M16, galvanized 16 pcs.	DIN 128 M20, galvanized 16 pcs.	DIN 128 M20, galvanized24 pcs.
Serrated Washer for conductive connection	DIN 6798 M16, galvanized 4 pcs.	DIN 6798 M16, galvanized4 pcs.	DIN 6798 M20, galvanized4 pcs.	DIN 6798 M20, galvanized4 pcs.

Tab. 8 – Supplied fasteners

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GatEx must be conductively connected to the pipeline. The recommended method of connection with the supplied ground cable and the supplied jointing material is shown in Fig. 14. The grounding consists in connection the ground screw on the body of the quick-acting slide valve GatEx with both the pipeline flanges. The composition of the jointing

material is shown in Fig.12, 13 and 14. This method of electrical connection is just a recommendation. In any case, it must comply with the applicable legislation for grounding valid in the place of the installation of the GatEx.

Fig. 14 – Conductive connection of the GatEx to the pipeline

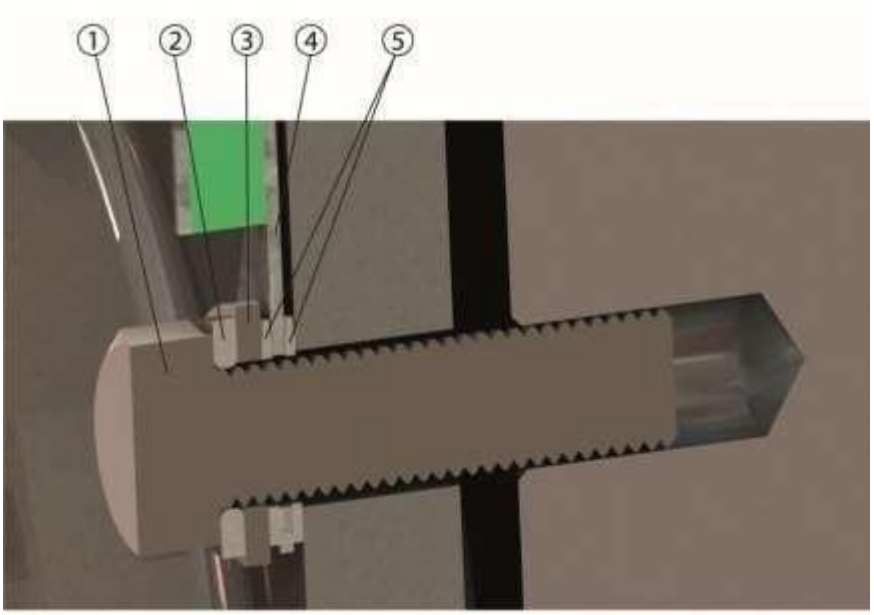

Fig. 15 – Composition of the fasteners - flange screw - conductively connected

1.	bolt (DIN 933/ISO 4017)	4.	ground cable eye
2.	spring washer (DIN 128)	5.	serrated washer (ISO 6798)
3.	flat washer (DIN 125/ISO 7089)		

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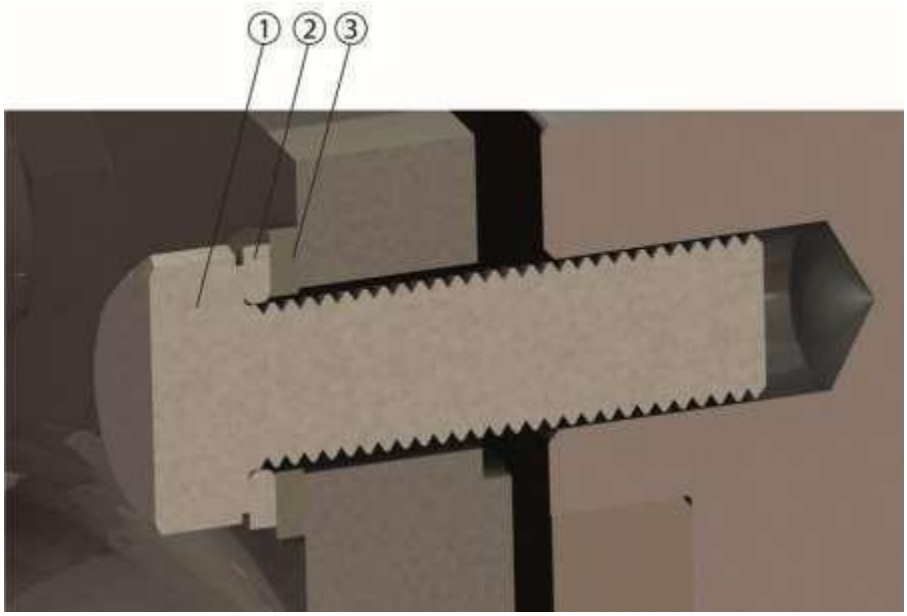

Fig. 16 – Composition of fasteners - flange screw - not conductively connected

1. bolt (DIN 933/ISO 4017)
2. spring washer (DIN 128)
3. flat washer (DIN 125/ISO 7089)

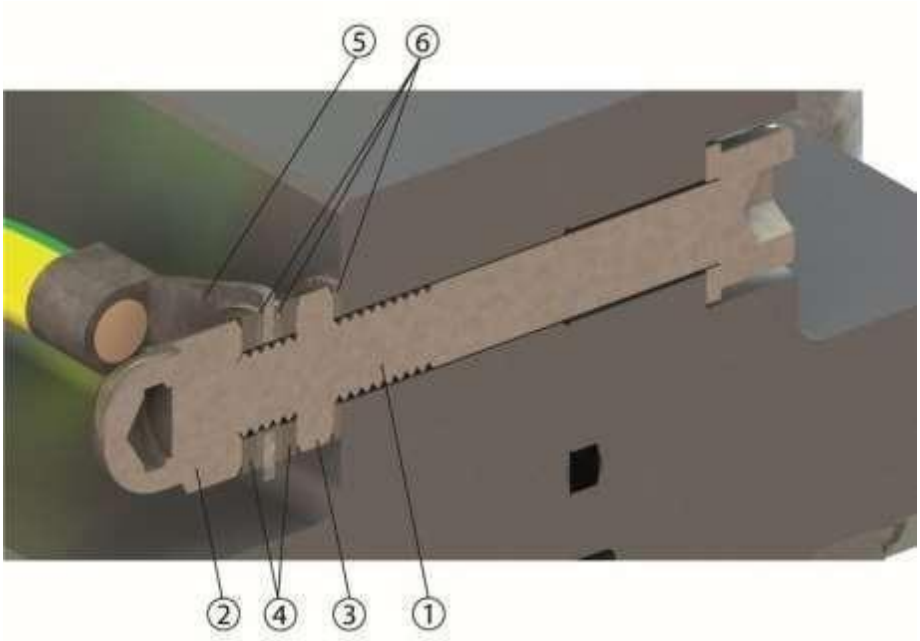

Fig. 17 – Composition of the fasteners - body screw - conductively connected

1. bolt (DIN 933/ISO 4017)
2. hexagon domed cap nut DIN 1587
3. thin nut ISO 4035
4. flat washer (DIN 125/ISO 7089)
5. ground cable eye
6. serrated washer (ISO 6798)

All fasteners in the figure is installed on the quick-acting slide valve GatEx already.

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5. GATEX ELECTRICAL COMPONENTS

5.1. INDUCTIVE SENSORS

The quick-acting slide valve inductive sensors are electrical components sensing the position of the quick-acting slide valve sliding knife. The information about the closed or the opened positions of the knife is sent to the CONEX-IVM control unit and then to the CONEX control unit. The information about the status of the quick-acting slide valve can also be introduced to the customer's system for further processing, visualization, etc.

The quick-acting slide valve GatEx inductive sensors are two inductive sensors (designed for the explosive atmospheres) with a connection cable with a length of about 1.5 m. These sensors then monitor the open/closed positions.

Any settings and parametrization of the quick-acting slide valve inductive sensor can be performed only by the manufacturer or its authorized representative.

Ambient temperature	-20 °C to +70 °C
IP code	IP67
Installation method	in to the GatEx body
Fixation	using two adjusting nuts
Certification	II 1D Ex ia IIIC T 95 °C Da IP67
	II 1G Ex ia IIC T6 6a

Tab. 9 – Inductive sensor technical specification and classification

5.2. PRESSURE SWITCH

The pressure switch is used for continuous monitoring the pressure in the pneumatic circuit of the quick-acting slide valve GatEx. If the pressure drops below 5 bars, the control unit evaluates this condition as a fault and the quick-acting slide valve is closed slowly.

IP code	IP65 (with fitted connector)
Temperature resistance	-30 °C to +100 °C

Tab. 10 – Pressure switch technical parameters

5.3. SLOW-CLOSING AND OPENING PNEUMATIC VALVES

They are solenoid valves 3/2 or 5/2. Each of them has one function; either slow opening, or slow closing of the quick-acting slide valve. The valves are equipped with electromagnetic coils.

Solenoid valve classification for Ex atmosphere	**Electromagnetic coil classification for Ex atmosphere**
CE Ex II2GDcIIBT5	II3GD Ex nA IIC T4 Gc
T100°C -5°C≤Ta≤50°C	Ex tc IIIC T117°C Dc IP65
	-20°C<Ta<+50°C

Tab. 11 – Slow-closing and opening pneumatic valve technical specification and classification

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5.4. QUICK-CLOSING PNEUMATIC VALVE

In the event of explosion, this valve opens based on the signal from the control unit, which has evaluated increased pressure on the detector. After opening, compressed air is blasted quickly from the air tank to the pneumatic cylinder of the quick-acting slide valve, thus closing the quick-acting slide valve. The valve is equipped with an electromagnetic coil.

	Electromagnetic coil classification for atmosphere:
	II 3G Ex ec IIC T4 Gc
	II 3D Ex tc IIIC T130°C Dc
IP code	IP65 (with plug-in connector)

Tab. 12 – Quick-closing pneumatic valve technical specification and classification

6. OPERATING, MAINTENANCE AND TRAINING

The explosion-suppression system of the quick-acting slide valve can be operated only by a person who is physically and mentally fit and who has been trained in these activities demonstrably. Under normal operation, no electric-shock or heat dangers threaten to operators.

Maintenance intervals shall be set down on the basis of the operating conditions in the given technology. The following procedure is recommended:

1. maintenance	2 weeks after commissioning
2. maintenance	6 weeks after commissioning
3. maintenance	8 weeks after commissioning

Based on the detected operational facts (speed of clogging the area), the customer shall determine the quick-acting slide valve GatEx maintenance interval (for instance once a month). The lowest permitted maintenance frequency is once a year. Each maintenance work must be recorded in the operational log, clearly indicating the information about the date and time of the task. Furthermore, it must be stated, whether it was an inspection, maintenance, modification or repair, and what had been done with the quick-acting slide valve and the reason for this task. Finally, the name of who has carried out the operation and his signature must be included.

The maintenance of the quick-acting slide valve GatEx consists in regular checks of the mechanical damage or strong contamination of the cleaning pocket of the quick-acting slide valve GatEx. This task can be carried out only by a trained person.

The quick-acting slide valve GatEx cover plate must not be removed if the device is in operation and air mass is flowing in the pipeline, on which the quick-acting slide valve GatEx has been installed.

Before starting maintenance, put the control panel into the service mode, so that injuries to the operators

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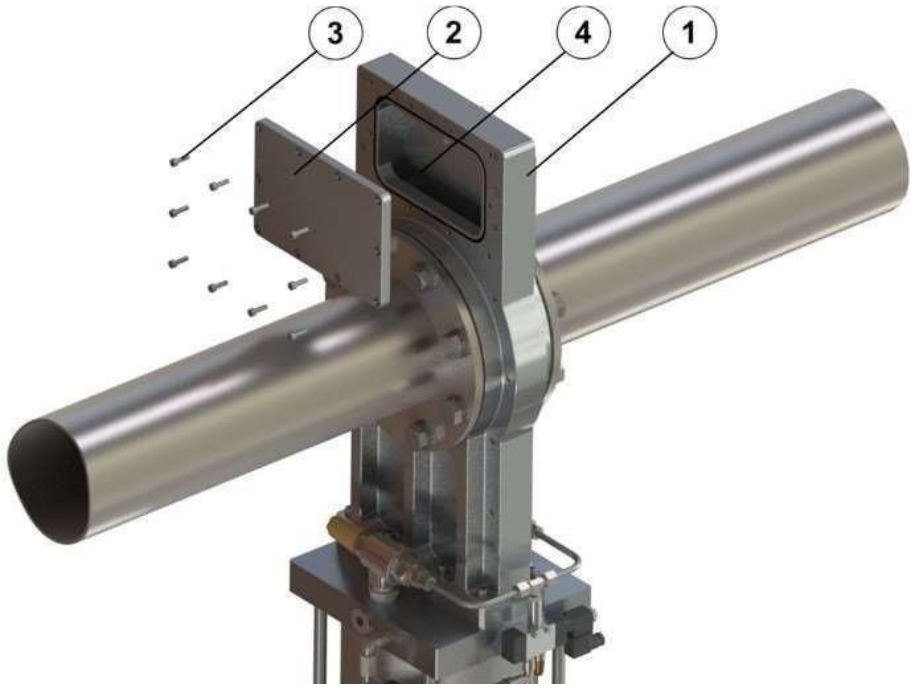
performing maintenance of the quick-acting slide valve GatEx are prevented.

6.1. MAINTENANCE PROCEDURE

- Clean the outer surface of the quick-acting slide valve.
- Check whether no visible mechanical damage to any part of the quick-acting slide valve has occurred.
- Open the quick-acting slide valve cover plate see Fig. 18.
- Visually inspect the interior space.
- Clean the interior space of the quick-acting slide valve. In the event of strong contamination, clean either with mechanical cleaning tools, or with an industrial vacuum cleaner.
- Close the quick-acting slide valve cover plate. Use the original fasteners.
- Also check other parts of the pneumatic circuit (empty condensation water from the sediment separator, check the operability of the pressure-reducing valve and other possible pneumatic components).



1.	quick-acting slide valve body	3.	fasteners
2.	cover plate	4.	quick-acting slide valve internal space

Fig. 18 – Opening cover plate of the quick-acting slide valve

The periodic training of the staff shall mean their warning against dangers during accidental or prescribed movement in the area of the quick-acting slide valve and instruction against this threat (about protection). The training shall be held once a year, including new ones.

The instructions listed in this chapter must be transferred by the user operational and safety rules.

Any tasks carried out with the product must be recorded in the operational log, so that the history of these works can be checked at any time.

The operational log must be properly maintained by the specific responsible person. This person must be mentioned in the operational log.

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7. SERVICE

For the flawless function of the quick-acting slide valve, the service interval of once in six months is recommended.

The scope of service procedure and activities as on the entire explosion-proof quick-acting slide valve GatEx system is governed by the installation and service manual - GatEx MIS-402.

The inspection and the service of the quick-acting slide valve can be carried out only by the manufacturer or its authorized representative

In the event of explosion, the quick-acting slide valve must be inspected by the manufacturer or the authorized representative, so that its proper function for further safe use is ensured.

Each task must be recorded in writing by an authorized representative into the operational log. The record shall include the assessment of the condition of the protective system. In the event of defects, proposals for their removal and the actual removal shall be done only by the manufacturer or the authorized representative.

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8. SPARE PARTS

There is the list of spare parts, which can be ordered if necessary. The list shows only the most common spare parts. If a different part of the quick-acting slide valve GatEx has been damaged or lost the part can be ordered from the manufacturer or the supplier after prior consultation.

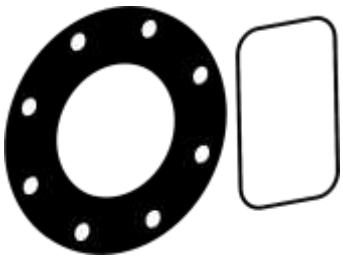
Inductive sensor

An inductive sensor for the indication of the open/closed status of the quick-acting slide valve GatEx. Each GatEx is equipped with two sensors monitoring the limit positions of the sliding knife.

Pressure switch

The pressure switch is used for continuous monitoring the pressure in the pneumatic circuit of the quick-acting slide valve GatEx. If the pressure drops below 5 bars, the CONEX control unit evaluates this condition as a fault and the quick-acting slide valve is closed slowly.

Gasket set



A set of gasket enabling resealing of flange joints and GatEx quick- acting slide valve cover. For each dimension the special set must be ordered.

3/2 Solenoid valve for slow opening

The valve is intended for slow opening of the quick-acting slide valve GatEx. Its replacement is desirable in particular if it has been damaged mechanically or if it has suffered other defects.

5/2 Solenoid valve for slow closing

The valve is intended for slow closing of the quick-acting slide valve GatEx. Its replacement is desirable in particular if it has been damaged mechanically or if it has suffered other defects.

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3/2 Solenoid vale for quick closing

This valve is intended for quick closing of the quick-acting slide valve GatEx in the event of explosion. Its replacement is desirable mainly if it has been damaged mechanically or if it has lost its function for another reason.

Non-return valve

This valve is used to prevent leak of compressed air from the air tank. Its replacement is required if it has been damaged mechanically.

A escape valves with silencers

This valve is intended to vent the pneumatic piston chamber during the movement of the piston. Its replacement is necessary in the event of mechanical damage or a loss of function.

A compressed-air treatment unit

This is a spare part which is supplied as an accessory. It is used to be installed upwards the pneumatic circuit, before the quick-acting slide valve GatEx, where it filters impurities from compressed air.

Manometer

The manometer is used to check the pressure in the pneumatic circuit of the quick-acting slide valve. Its replacement is necessary if it has been damaged or if it has suffered a failure.

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