



User manual

SLIDE VALVE – CONTROL UNIT – IVM



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1. INTRODUCTION, GENERAL

This documentation has been drawn up for the system of the quick slide valve supplied by the firm RSBP spol. s r. o. (hereafter RSBP) or its authorised representative. It is handed over to the customer during the installation of the quick slide valve system and gives the customer a basic knowledge of the basic principles and a more detailed description of the individual components used. It also serves as instructions for use and maintenance, and it also contains the basic nomenclature and terminology.

It is essential for the customer to study this documentation and all other documents in detail and to familiarise employees with the relevant qualifications (electrical, mechanical, technology, safety officer) with it. The customer must incorporate passages from the chapters about operation and maintenance into its operating regulations, maintenance plans etc. Should anything be unclear, the customer must contact the firm RSBP or its authorised representative.

The customer should pay particular attention to chapter 10 concerning safety, because the quick slide valve system is equipment which could be dangerous if not correctly operated and maintained, and in addition to technological damage and faults it can cause accidents and injuries with permanent consequences or resulting in death.

The customer must study the safety regulations in detail and familiarise the entrusted employees of its firm with it, and also inform any employees of external firms or other persons who have access to the system as a result of their position of possible risks associated with the quick slide valve system. The customer should incorporate individual passages from the safety chapter into its safety regulations. Should anything be unclear, it should contact the firm RSBP or its authorised representative.

2. NOMENCLATURE, TERMINOLOGY

- a) Quick slide valve system - a technological system that automatically detects the occurrence of an explosion and is capable of preventing its spread through equipment ducting. It consists of detectors, control units and a quick slide valve and potentially other technical equipment. The entire detection of an explosion and prevention of its spread occurs within milliseconds.
- b) Detector - a sensor, detector or switch (pressure, optical) which monitors and detects the occurrence of an explosion and transmits this information to the control unit.
- c) Control unit - device which evaluates information from the detectors monitoring and evaluating the occurrence of an explosion and then sends an impulse to the quick slide valve to prevent the spread of the explosion through the ducting of the equipment. It also controls the entire system, including evaluation of any explosions, and it ensures the interface for the customer or communication as needs be for superior control systems.
- d) Quick slide valve - technological device which prevents spread of an explosion through the equipment ducting on the basis of an electrical impulse from the control unit. It consists of a mechanical part (actual construction of slide valve, fitting flanges, knife gate), pneumatic part (valves, distribution circuits, manometers, silencers) and electrical part (electrical coils, pneumatic valves, end position detectors for the knife gate, pressure detector of pneumatic circuit, cabling).

3. DIAGRAM OF QUICK SLIDE VALVE SYSTEM

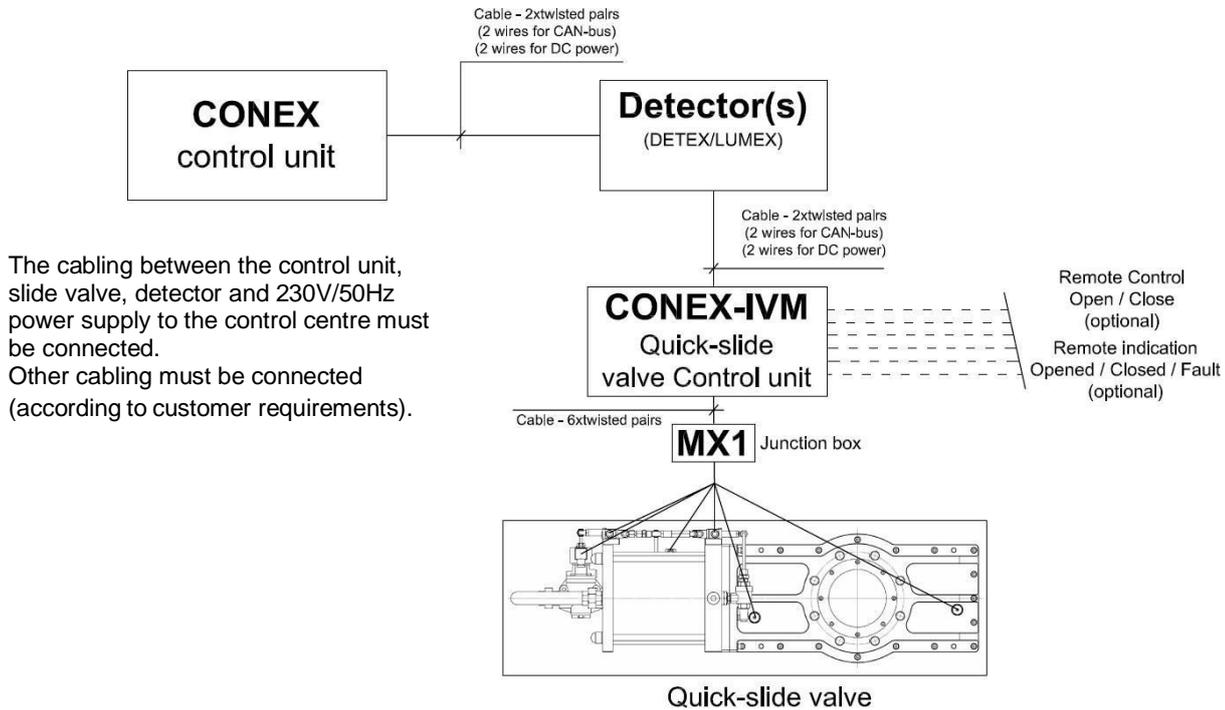


Fig. No 1 - Block diagram of protection of equipment using quick slide valve system

4. OPERATING PRINCIPLE OF QUICK SLIDE VALVE SYSTEM

The quick slide valve system is connected as shown in picture No 1 in chapter 3. In the operating state of pressure level without occurrence of explosion in equipment (silo, conveyor, mill, filter etc.), the quick slide valve system is inactive but ready for the immediate prevention of spread of an explosion (the quick slide valve is in the open position - the knife gate is in the open position - the duct is open).

The detector monitors and detects on an ongoing basis the occurrence of an explosion in the protected equipment and transmits the information to the control unit. Detection of occurrence of an explosion may be based on a pressure or optical measurement, which are attributes accompanying the occurrence of an explosion.

The control unit evaluates on an ongoing basis information from the detector monitoring and detecting the occurrence of an explosion in the protected equipment and then sends an impulse to the quick slide valve. In addition to this function, the control unit is capable of signalling functional states (optically or acoustically), processing input and output signals to/from a superior control system or initiating other blocking and links.

The quick slide valve is connected in a duct using connecting flanges. If there is an explosion in the equipment, the detectors indicate this state and transmit information to the control unit, which then sends an impulse to the CONEX-IVM unit to close the quick slide valve, which prevents the spread of the explosion (the quick slide valve closes - the knife gate moves to the closed position - the duct is closed - the explosion does not spread through the duct).

5. DETECTORS – PRINCIPLE, DESCRIPTION, FUNCTION

The detector is a sensor, detector or switch which monitors and detects on an ongoing basis the occurrence of an explosion in the protected equipment and transmits this information to the control unit. Detection of occurrence of an explosion may be based on a pressure or optical measurement, which are attributes accompanying the occurrence of an explosion.

A detector is installed in protected equipment directly or using a welded on piece or other installation jig. It is connected with the control unit via cabling along which is transmitted information about the state and via which the detector is powered. The specific connection is shown in the documentation supplied to the customer.

During an explosion in the protected equipment there occur attributes that are detected and measured by the detector in terms of pressure or optically. The detector converts the given physical values into electrical ones, and when the limit of a detected value is exceeded, this state is signalled to the control unit, which is evaluated as an alarm.

There may be various technical versions of the detectors according to the concrete type and modification used. The parameters of some detectors can be set (the limit value and other values configured) via switching elements (switches, reverse switches, potentiometers) implemented directly in the detector or via communication interface using software from a PC or notebook. Some detectors have an internal memory allowing the recording of events over time. Depending on the type of detector used, compressed air blowing of the detection element may also be employed to eliminate fouling.

The pressure detector DetEx and optical infrared detectors LumEx are used in particular in the quick slide valve systems.

6. CONTROL UNIT CONEX – PRINCIPLE, DETECTION, FUNCTION

The control unit is a device which evaluates information from the detectors monitoring and evaluating the occurrence of an explosion and then sends an impulse to the quick slide valve to prevent the spread of the explosion through the ducting of the equipment. The CONEX control unit is used for the quick slide valve system.

The control unit is installed near the protected equipment, within range of the operator and outside the explosion danger zones. Cabling from the detectors and quick slide valve, and the mains power supply cable for the control unit runs to the control unit, and optical or acoustic signalling may also be connected here, as well as the signals to/from the control system and other blocking and links.

The control unit's power supply is 230Vac (-10% to +15%), the power supply cable must be fused using a single pole fuse $I_n=10A$ of characteristic B or C. The supply lead is also protected by overvoltage protection of the third degree in combination with an hf filter against the undesirable effects of atmospheric overvoltage. Third degree overvoltage protection can be installed outside the control unit or can be implemented within it. It is recommended that the customer have first and second degree protection fitted to the power supply lead. If the customer does not have a power supply lead with first

and second degree overvoltage protection, the firm RSBP or its authorised representative cannot guarantee the comprehensive nature of overvoltage protection.

The 230Vac power supply must comply with the conditions of emergency power supply (UPS backup, two independent sources etc.) or its renewal in the case of failure within a maximum of 4 hours must be ensured. The power supply for the control unit must also be ensured in such a way that it is not switched off by this control unit (via contacts of its relays).

Any failure of the 230Vac power supply is dealt with using the internal backup rechargeable batteries (pair of batteries) 24Vdc/2.3Ah with minimum backup operation time of 4 hours. The most adverse possible variant is assumed, but depending on the configuration of the connected appliances, the backup time in individual cases may be longer. In the case of a failure in power supply longer than 4 hours, the internal backup rechargeable battery may be exhausted, and there is no guarantee of the correct function of the control unit.

Only a person demonstrably trained in the operation of the control unit, and physically and mentally competent may perform any operation of the control unit. The operation of the control unit consists in practical terms of visual monitoring of the LED diodes (or display) on the front panel and reaction during individual operational states of the control unit (for description see below).

Increased attention should be paid to chapter 10 concerning safety, because the quick slide valve system is equipment which could be dangerous if not correctly operated and maintained, and in addition to technological damage and faults it can cause accidents and injuries with permanent consequences.

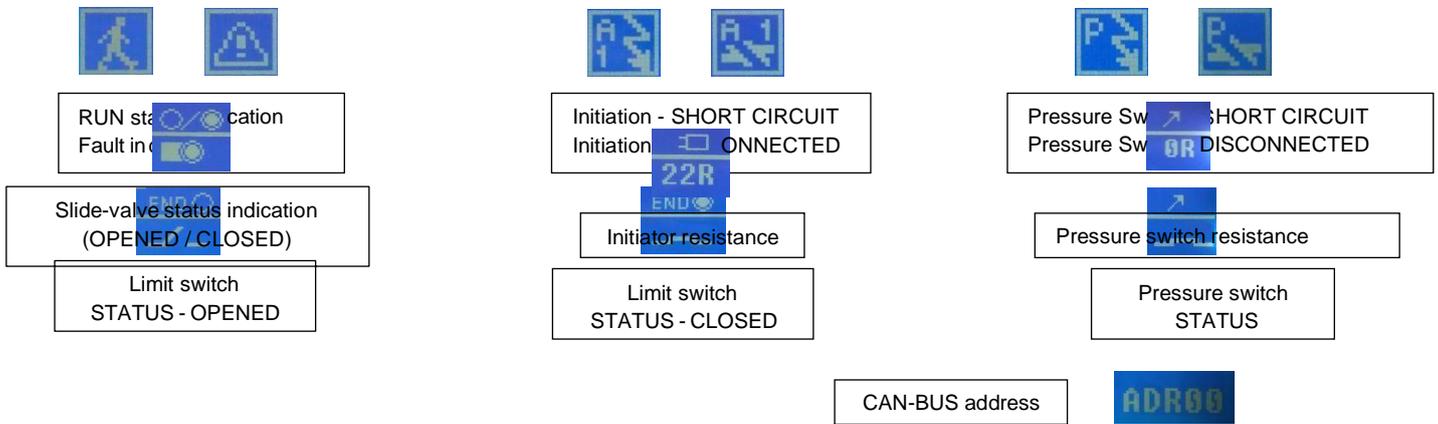
Should anything be unclear, the operator must contact the firm RSBP or its authorised representative.

In the fault-free operational mode of the system the operator at the CONEX control unit merely visually checks that this green LED diode marked "Operation" is lit up. In this mode no other LED may be lit up, neither may the internal buzzer buzz.

Should there be a fault of the system, the yellow LED marked "Fault" comes on, as does the relevant yellow LED on the display with designation of the given identified fault, and at the same time the control unit's internal buzzer starts to buzz with an intermittent tone. In this case the operator may switch off the internal buzzer using the button marked "Warning Signal Reset" located on the front control panel. If there is a "Mains Power Failure", the operator can influence this failure actively by the renewal of the power supply (for example, by switching on the supply circuit breaker). All other faults are of a serious nature, and so the operator must contact the firm RSBP or its authorised representative, who are able to rectify this fault and restore the quick slide valve system to an operational state.

6.1. IVM UNIT STATUS INDICATION TO THE CONTROL UNIT DISPLAY

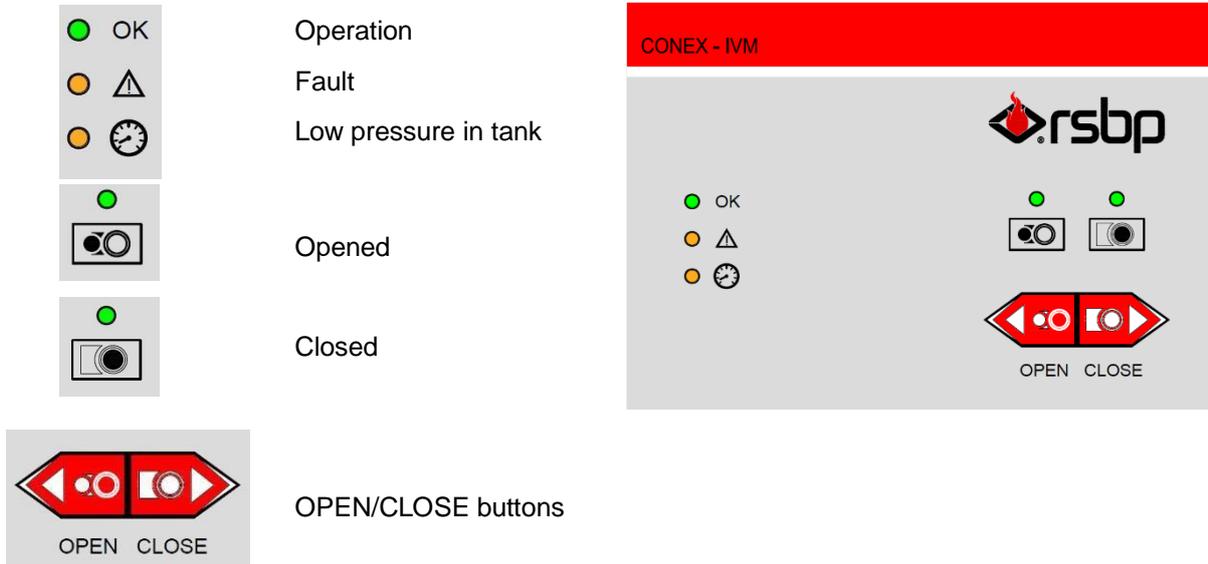
All monitored statuses and slide valve values can be read on the control panel display, in the appropriate sub-screen of the zone, where the slide valve is used.



7. CONEX-IVM CONTROL UNIT

The CONEX-IVM unit "hereafter IVM" is an individual component of the system looking after the actual control of the slide valve, checking the state of the individual functions and transfer of this information to/from the CONEX control unit. It also serves as an "interface" between the control system of the protected technology and slide valve (remote control, state signalling etc.).

There are control and signalling elements for the operator on the front panel of the IVM.



Operation - Signalling of operational state (solid, the slide valve may be open or closed)

Fault - Fault state of some monitored function. This state is signalled in several cases (see: table)

Fault	Possible cause
Broken, shorted or earthed activation circuit (circuit of quick-acting valve)	Mechanical damage to cabling or disconnected valve coil.
Broken, shorted pressure measurement circuit. (along with low pressure indication)	Mechanical damage to cabling or pressure detector.
Logic error of knife position. (jointly with indication of both end positions)	Knife outside of end position: not completely open or closed.
	if the slide valve does not react to close and open commands, contact the Service

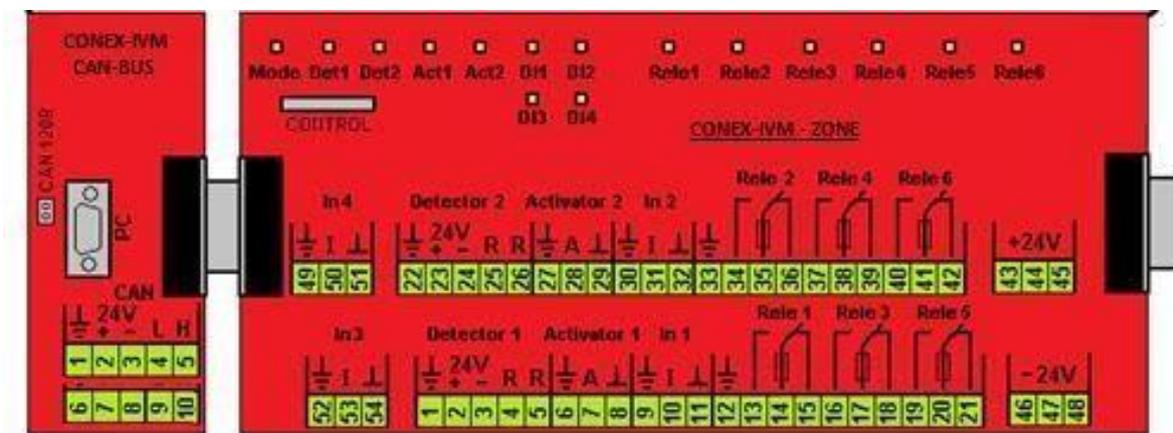
Low pressure The pressure of the input working air is too low. Permanently illuminated if there has been a drop in the air pressure needed for operation of the slide valve and it shuts immediately. If the working pressure is alright, the pressure sensor could have been damaged, and it is necessary to contact the firm RSBP or its authorised representative and request a check on or repair of the quick slide valve system

Open/close Buttons for manual control of slide valve.

The control panel has a transparent cover which must always be shut properly after the end of activity on the panel so that contamination from the environment does not enter it.

If a reaction of the quick slide valve system is signalled, it is necessary to adhere to the instructions for control of the control unit (*see manual of CONEX control unit*) and also to proceed according to the technological or safety plan of the customer. This may also determine other procedures for the operator when a fault is reported or the system run.

7.1. IVM UNIT STATUS INDICATION TO THE CONTROL UNIT DISPLAY

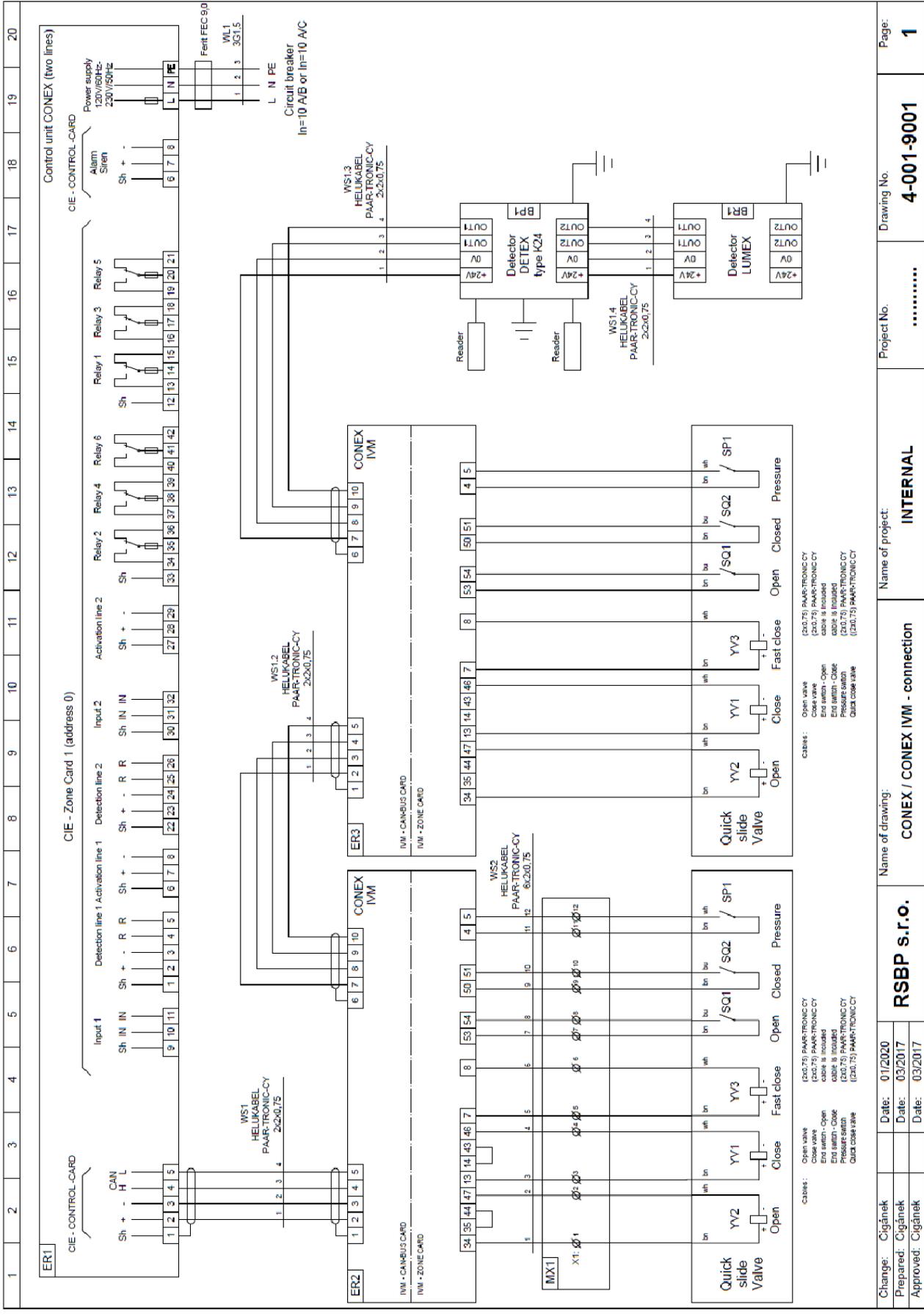


RELAY 1 - HOLD	- Valve relay HOLD - holding the slide-valve opened
RELAY 2 - OPEN	- Valve relay OPEN - relay for slide-valve opening
RELAY 3 - OPENED	- Relay for indicating the position: Slide-valve opened
RELAY 4 - CLOSED	- Relay for indicating the position: Slide-valve closed
RELAY 5 - ALARM	- Relay for indicating the status ALARM
RELAY 6 - FAULT	- Relay for indicating the status FAULT

IN 1 - OPEN	- Input for remote opening 24V
IN 2 - CLOSE	- Input for remote closing 24V
IN 3 - OPENED	- Limit switch input 8.2V opened
IN 4 - CLOSED	- Limit switch input 8.2V closed

DET 1 - PRESS	- Pressure detection - pressure sensor
DET 2	- unplugged

ACT 1 - ALARM	- Valve coil for quick closing
ACT 2	- unplugged

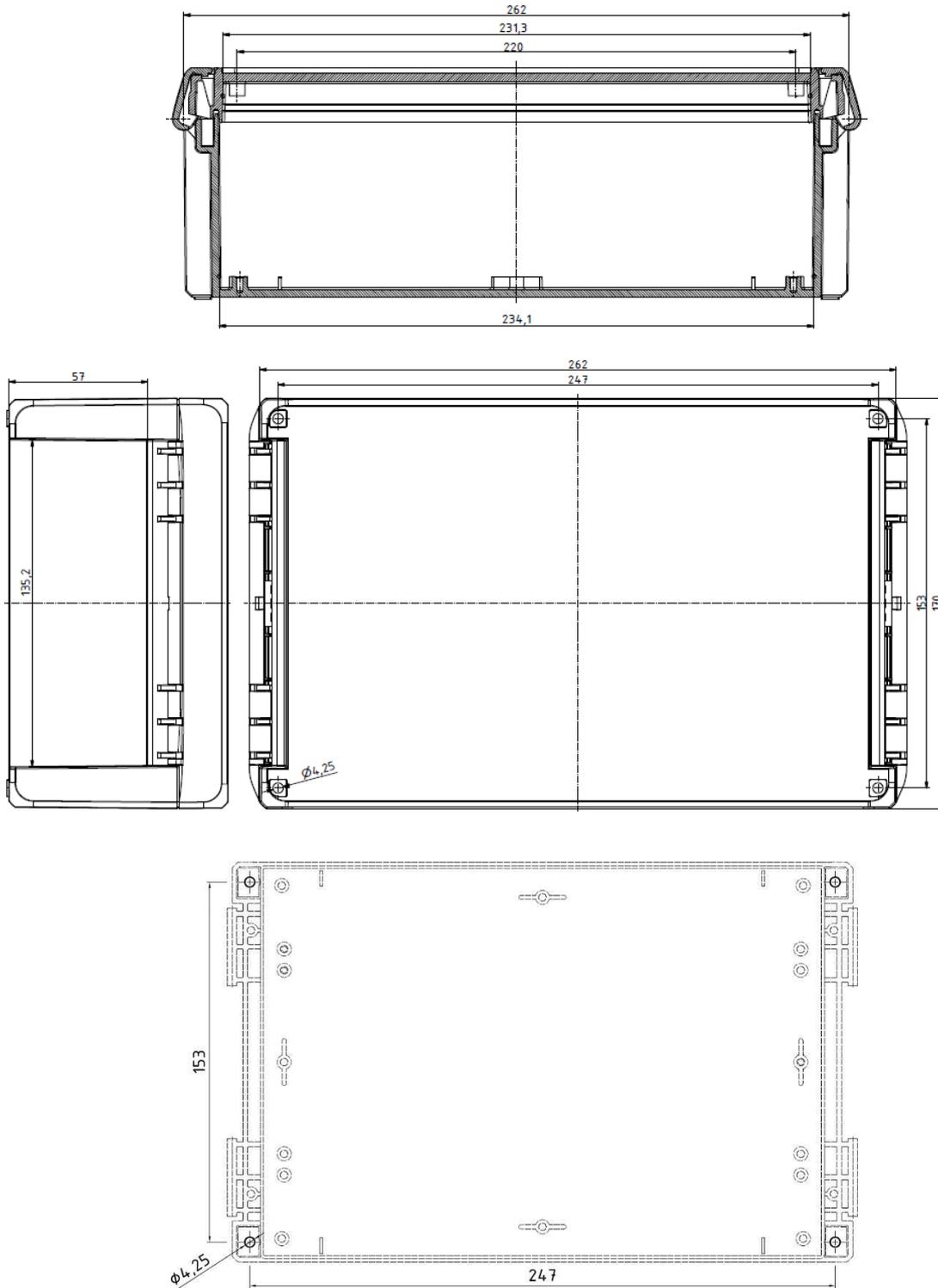


Change: Cigánek	Date: 01/2020	Name of drawing: CONEX / CONEX IVM - connection	Name of project: INTERNAL	Project No.	Drawing No. 4-001-9001	Page: 1
Prepared: Cigánek	Date: 03/2017	RSBP s.r.o.				
Approved: Cigánek	Date: 03/2017					

7.2. BASIC TECHNICAL DATA OF CONEX CONTROL UNIT WITH SLIDE VALVE UNIT CONEX-IVM

Supply voltage	100 to 240 V ac
Supply voltage frequency	50 to 60 Hz
Power supply circuit breaker	In = 10 A (characteristics B or C)
Power supply cable	3C x 1.5 mm ²
Current consumption of control unit	100 mA to 2.5 A (depending on load, mode etc.)
Cover	IP65
Reaction time (response time) – maximum	3 ms (< 50ms to complete closure)
Reaction time (response time) – configurable SW	1 to 240 s
Operational ambient temperature	-10 to 50°C (limited by rechargeable battery)
Relay outputs (one NO/NC contact for one relay)	30 V dc/10 A
Number of relays – two-zone version	6 items
Bus	CAN (250 kbps)
Recording of events	in internal memory (10000 events)
Signalling	colour LEDs on front panel
Visualisation	LCD display (160 x 128 pixels)
Control	buttons and controllers on front panel
Parametrisation, configuration	via specialised 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
Weight – CONEX-IVM	1 600g

7.3. DIMENSIONS



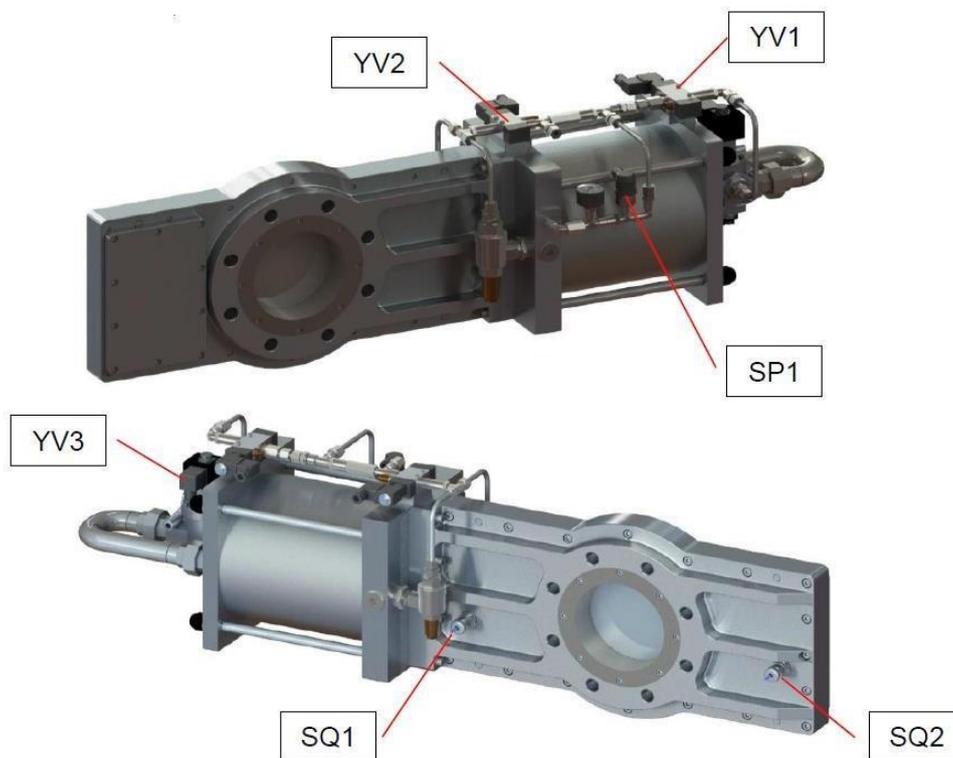
8. QUICK SLIDE VALVE – PRINCIPLE, DESCRIPTION, FUNCTION

Quick slide valve - technological device which prevents spread of an explosion through the equipment ducting on the basis of an electrical impulse from the control unit. It consists of a mechanical part, pneumatic part and electrical part.

The mechanical part consists of the actual steel structure of the slide valve, the fitting flanges, knife gate and other structures and fitting elements.

The pneumatic part consists of three pneumatic valves (one of them is in a special instant version for quick reaction during the closing of the slide valve, the other two serve for "slow" closing and opening of the slide valve and are used during servicing or during the re-opening of the slide valve after it has been closed), compressed air hoses, manometer showing the air pressure, silencers and other structures and fitting elements

The electrical part consists of electrically controlled coils of three pneumatic valves, a pair of induction sensors for the end positions of knife gate "Open" and "Closed", pneumatic circuit pressure sensor, cabling for these components and cabling connecting the slide valve with the CONEX-IVM control unit.



- SQ2 – induction sensor of the position "Closed"
- SQ1 – induction sensor of the position "Opened"
- SP1 – pressure sensor
- MX1 – terminal box* (to be installed in the event of installation of CONEX-IVM at a distance greater than the cable length of position sensors)
- YV3 – quick-acting electric valve
- YV1 – electric valve for closing
- YV2 – electric valve for opening

Fig. No 2 - Wiring diagram of the slide valve electric part

9. INSTALLATION ON PROTECTED EQUIPMENT

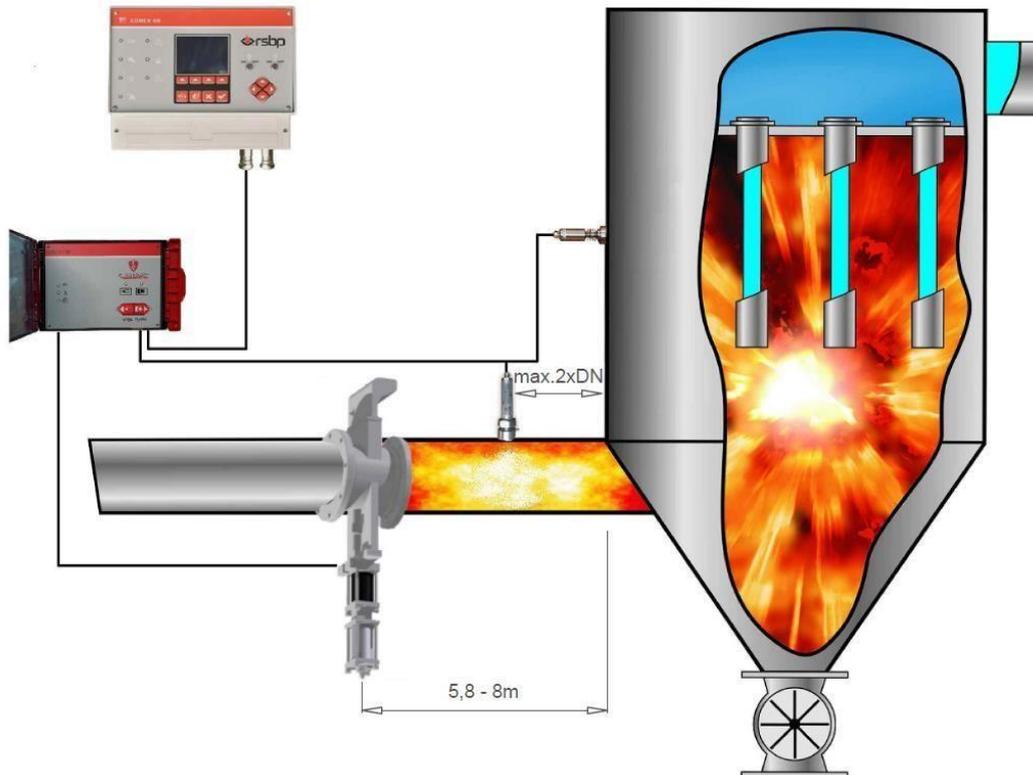
The relevant detectors (pressure, optical), including additional equipment, are installed mechanically on the equipment considered to be a source of occurrence of an explosion. Installation is performed on welded on fittings, reservoirs, holders, flanges etc.

The quick slide valve is installed mechanically in a duct via a fitting flange.

The CONEX-IVM control unit is installed near the protected equipment within range of the operator and outside the explosion danger zones according to customer requirements. It must be connected with a CONEX control unit.

9.1. INSTALLATION DISTANCES

The proper functions of the slide valve are subject to its installation at the proper distance from the device, from which possible spread of the “explosion” flame front is expected. The slide valve is tested and certified for the installation in the range from 5.8 to 8 m from this device. Also when used with the optical detector LUMEX I, the detector must be installed at a distance of max. 2DN from the device, which is insulated, unlike the pressure detector DETEX, which can be fitted anywhere on the device. **(The detectors must always be installed in the way that their proper functions are not infringed.)**



10. ELECTRICAL CABLING

Electrical cabling means cables and wires connecting the control panel with individual components of the quick slide valve system. The control panel, detectors, quick slide valve and power supply of the control panel 120V/60Hz - 230V/50Hz must be bonded electrically. The connection from the control panel CONEX to the optical or acoustic signalling, the signals from and to the control system and other blockings and connections can be bonded electrically. Some components of the slide valve system are grounded separately to the grounding system of the building. For all these connections, typical metallic cables or wires (shielded or unshielded) are used.

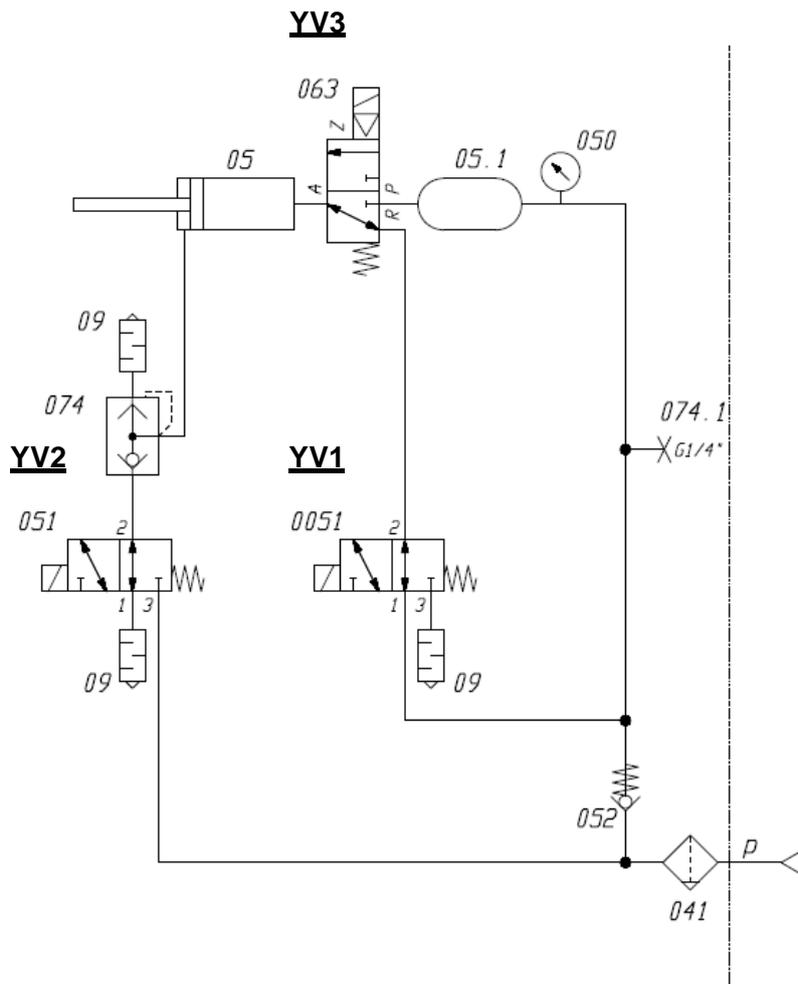
The wiring must conform to the applicable wiring regulations and standards. In particular, the distance of control cables of the quick slide valve system from heavy current and high voltage cabling must be adhered to in the event of ties and crossings. Any interventions in electric wiring carried out by the customer are prohibited.

Recommended conductors		
Length	Conductor	Ferrite
to 50 m (CONEX => CAN-BUS DEVICE)	PAAR-TRONIC-CY* 2 x 2 x 0.75*	FEC 9,0
to 150 m (CONEX => CAN-BUS DEVICE)	PAAR-TRONIC-CY 2 x 2 x 1.5*	FEC 9,0
to 20 m (CONEX-IVM => MX1)	PAAR-TRONIC-CY 6 x 2 x 0.75*	FEC 13,0

* is a recommended shielded conductor with twisted pairs

11. PNEUMATIC PART

The actual movement of the slide-valve thin gate is performed by a pneumatic drive. The slide valve, therefore, requires a continuous supply of compressed air (during still-stand "opened closed", the air is not being consumed). The device includes a compressed air reservoir; the reservoir accumulates a supply for 1 closing of the slide valve. The working pressure is continuously monitored by the pressure switch and in the event of a drop under the minimum limit (6 bar) or in the event of a fault (disconnection) of the pressure switch, it is closed immediately. Closing in the shortest possible time is of high importance for this device; therefore, the quality of the compressed air supply must be considered.



11.1. COMPRESSED AIR QUALITY

The supplied compressed air (*pressure 6-10 bar*) must be free from any mechanical impurities. The slide valve can be supplied only with dry compressed air with a dew point of at least 5K under the limit of the lowest ambient temperature, where the slide valve is to be used. Compressed air may be greased (**do not use any sticky oils**). Only silicone-based oils featuring low viscosity can be used (*low viscosity at a minimum working temperature of the slide valve*).

12. SAFETY, MAINTENANCE, OPERATION

The quick slide valve system is equipment which could be dangerous if not correctly operated and maintained, and in addition to technological damage and faults it can cause accidents and injuries with permanent consequences or resulting in death. There is a risk in particular of electric shock injury, occurrence of explosion and its associated influences (increased pressure, increased temperature) and its consequences (potentially ejected parts of protected equipment or quick slide valve system). This danger must be reduced to zero level of risk.

Simple maintenance of the quick slide valve system performed by the customer consists only of checking for mechanical damage and cleanliness of the individual components of the system, power and control cabling, ensuring compressed air and reading the pressure from the slide valve manometer. There is a zero chance of the specified risks occurring during this activity. All other maintenance except the aforementioned activities is performed exclusively by workers for the firm RSBP or its authorised representative, who are trained for all of these activities and have sufficient know-how and skills to prevent the aforementioned risks.

Operation of the quick slide valve system performed by the customer consists only of operation of the CONEX control unit and CONEX-IVM unit, and this is a visual monitoring of the LEDs (or display) on the front panel and reaction to the individual operational states (described in chapter 6). Only a person demonstrably trained in this activity may perform any operation of the control unit.

There is a definition of so-called forbidden and mandatory activities which the customer must not or must perform in the context of the quick-acting system.

In the case of their performance or in contrast non-performance, the firm RSBP or its authorised representative will not provide the customer with a guarantee, nor will the firm RSBP or its authorised representative bear any material or legal liability.

The forbidden activities include:

- If the control unit is in the servicing mode (indicated by the yellow LED being on), and an "Alarm" or "Prealarm" is indicated (indicated by the relevant red LEDs being on), it is forbidden to put the control unit into the operational state (by turning the key of the relevant zone to the "ON" position). The quick slide valve system may be activated. In such a case it is necessary to restart (renew) the control unit function by pressing the button "Reset". If even after pressing the "Reset" button the red LED diodes "Alarm" or "Prealarm" do not go off, it is necessary to contact the firm RSBP or its authorised representative and ask for a check on the quick slide valve system to prevent unintended activation of the system.
- It is forbidden to put objects, a hand, foot etc. near the slide valve knife.
- If detectors operating on the pressure detection principle are used, it is necessary to prevent the detectors from being exposed to mechanical shocks of a constant (operational) or incidental (for example during cleaning, maintenance, removal of build-ups of adhered material with a hammer etc.) nature. These shocks may cause false positive detections of explosions and the reaction of the quick slide valve system.
- If detectors working on the light sensing principle are used, it is necessary to prevent the detectors from being exposed to light effects other than those arising during an explosion (for example during welding, ingress of artificial or natural light).

- Any unauthorised interventions in the quick slide valve system (its mechanical, pneumatic and electrical part) are forbidden.
- It is forbidden to breach or otherwise damage the quick slide valve system (its mechanical, pneumatic and electrical part)
- It is forbidden to breach the seals, change the configurations and parameters of the quick slide valve system.
- It is forbidden to operate an incomplete or damaged quick slide valve system.
- It is forbidden to remove without justification safety covers, guards etc.

The mandatory duties include:

- The operator must not be in areas equipped with the quick slide valve system (in particular its knife gate) in the operational mode. It is only possible to be in these areas in its servicing mode. Servicing mode means putting the control unit in the "Servicing" mode, which is performed by turning the key of the relevant zone to the "OFF" position. Signalling of this mode is indicated by the yellow LED diode marked with the relevant pictogram being on (see Instructions of CONEX control unit). In the servicing mode the output circuits are disconnected in the control unit, so the system cannot be electrically activated and the slide valve cannot shut (when putting the control units into the servicing mode, it is recommended that the worker or workers implementing the given activity remove the key from the front panel of the control unit in order to prevent the accidental, unintentional or unauthorised start of the control unit's operational mode). A zero risk of system activation is achieved by the physical disconnection of the electrical cabling between the CONEX-IVM Unit and slide valve, and by disconnecting the compressed air source - this work must not be performed by the customer but only the workers of the firm RSBP or its authorised representative. Only workers of the firm RSBP or its authorised representative are capable and authorised to disconnect the cabling, disconnect the compressed air source and then restore the system to the operational mode.
- Electrical fitting work must be performed, must correspond to and must be maintained in the context of valid electrical fitting regulations and standards.
- Electrical fitting must be inspected according to the standard, and this includes an initial inspection and regular inspections.
- In the case of disposal of the quick slide valve system, it is necessary to proceed in compliance with the Electrical Waste Disposal Act and Waste Disposal Act.

Should there be any unclear points regarding forbidden and mandatory activities, it is necessary to contact the firm RSBP or its authorised representative.

13. INSPECTION OF ELECTRICAL FITTING AND SERVICING OF QUICK SLIDE VALVE SYSTEM

The firm RSBP or its authorised representative ensures initial servicing of electrical fitting. The firm RSBP or its authorised representative or the customer itself is capable of ensuring the subsequent regular periodic inspection of electrical fitting in intervals of one year from the initial inspection.

If the inspection of electrical fitting is ensured by the customer, this work may only be performed by a person with the relevant electrical fitting qualifications, and it is absolutely essential that during each inspection (initial and periodic) a worker from the firm RSBP or its authorised representative be present as an expert assistant and guarantor for the correct functioning of the quick slide valve system.

Only workers of the firms RSBP or its authorised representative perform regular servicing of the quick slide valve system, and they do so once every six months.

14. COMMISSIONING, FITTING, DISMANTLING, INSTALLATION, SETTING

All work associated with commissioning, installation and dismantling work, setting and installation of the quick slide valve system must be performed only by a worker of RSBP or its authorised representative.

14.1. INSTALLATION AND LOCATION OF THE UNIT CONEX IVM

The control unit should always be installed in the vicinity of the slide valve in such a way that it is always accessible to operators. The selected place of installation of CONEX-IVM must be exposed to harmful influences as little as possible; such influences include vibrations, excessive changes in ambient temperature or radiant heat. Do not place it on any exposed locations where there is a high probability of accidental damage (e.g. along material transport routes). In the cabinet of the unit IVM, there are 4 prepared openings for bolt connections (in the space under hinges). The installation must always be carried out with all four bolts, on a flat surface, so as to avoid cabinet deformation after bolt tightening, which could result in a decrease in IP protection.

In the events, when the unit IVM cannot be installed in the vicinity of the slide valve (within 2 m), a terminal box can be installed near the slide valve, and IVM can be installed at a distance not exceeding 20 m (the maximum length of cables between the terminal box and IVM).

14.2. CONNECTIONS

It is necessary to draw up project documentation, including circuit diagrams, for each installation in advance.

The unit CONEX-IVM shall be connected with the slide valve (standard scheme shown in chapter 7.1). Furthermore, IVM shall be connected to the control panel CONEX (cable specifications detailed in chapter 10). Depending on the scope of the respective installation, detectors and power supply of the control panel shall be connected. Additionally, as appropriate, input and output signals to control the system and the status indication shall be connected.

14.3. COMMISSIONING

14.3.1. CONTROL PANEL START-UP

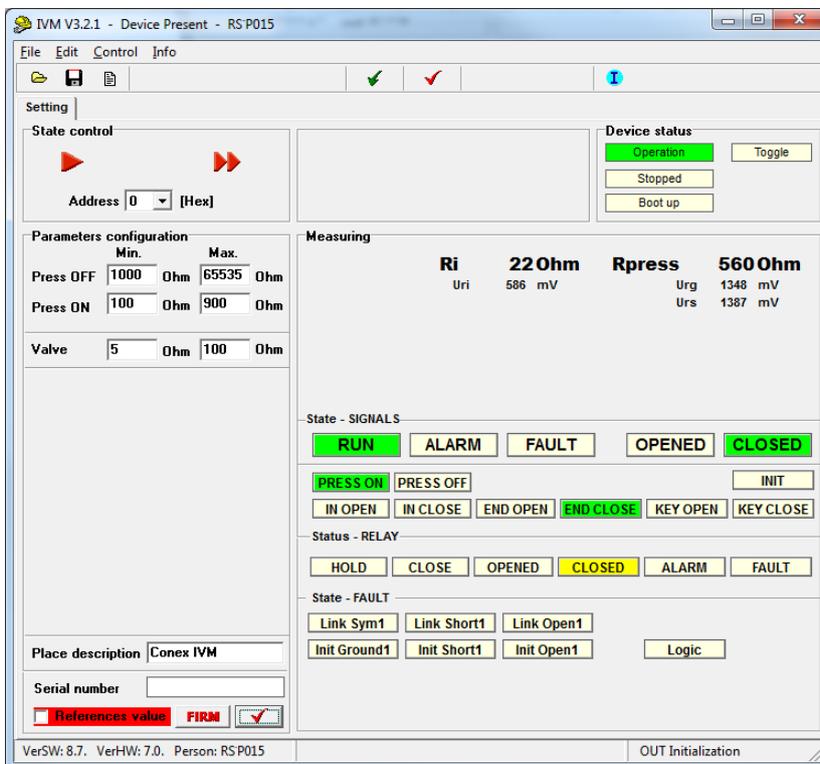
Prior to commissioning, first check connection of each cable and the compressed air supply. Then switch the control panel CONEX on (feed the supply voltage).

14.3.2. SETTING THE CONTROL PANEL CONEX

Set the control panel according to the installation parameters (setting of detection, activation, zone logic etc., see: User's Manual for the Control Panel CONEX)

14.3.3. SETTING THE UNIT CONEX-IVM

For the actual settings of the unit IVM, you need PC software and a unique hardware USB key.

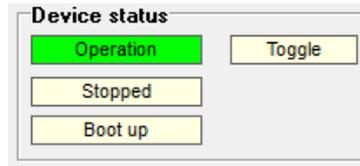


Read/Write

The green button is used to retrieve the actual settings of the unit IVM.
 The red button is used to upload the set parameters to the unit IVM.



Control field It is used to select the address, start and reset the software of the unit IVM. The selected address must correspond to the position of the switch for selecting the address, which is located on the CAN BUS card of the corresponding unit.



Device status Operation and Stopped indicates the operation of the unit
 Boot up indicates starting the unit
 Toggle up indicates running of the unit software



Measuring field This field shows the current measured values Ri (valve coil resistance for quick closing of the slide valve) and Rpress (pressure switch link resistance). (The values Uri, Urg, Urs are indicative only. These are the values of internal variables necessary for the calculation of resistance values)

Parameters configuration					
	Min.		Max.		
Press OFF	1000	Ohm	65535	Ohm	
Press ON	100	Ohm	900	Ohm	
Valve	5	Ohm	100	Ohm	

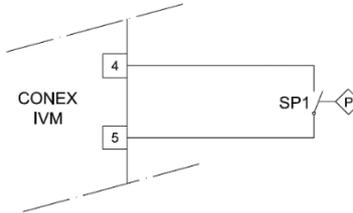
Parameter configuration field The field is used to set the limit values of resistances for the valve line of quick closing and the pressure switch link. (the maximum measured values are 860 Ω for the valve and 65535 Ω for the pressure switch)

Press OFF the resistance value of the pressure switch after the indication of pressure drop.

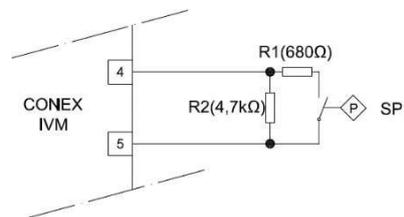
Press ON the resistance value of the pressure switch after the indication of sufficient pressure.

The input for the pressure switch is equipped with an analogue measuring of resistance for possible short circuit monitoring and disconnection.

When you use a separate pressure switch without the requirement for monitoring short circuit and disconnection (set Press OFF = 1000-65535 Ω / Press ON 0-100 Ω “see reference values”).



When you request to monitor short circuit and pressure switch line interruption, terminators shall be installed on the line (“on the switch side” set Press OFF = 1000-10000 Ω / Press ON 100-900 Ω).



Valve - resistance value of the valve coil for quick closing.

Setting the resistance values must correspond to the actual value of the valve coil for quick closing +/- 50% (minimum = coil resistance - 50%, but at least 5 Ω and maximum = coil resistance + 50 %, but not more than 800 Ω).

Example: the valve coil features the resistance of 30Ω, minimum shall be set to 30 Ω -50%=15 Ω, maximum shall be set to 30 Ω +50%=45 Ω.

With these settings, the resistance lower than 30 Ω (Min.) will be evaluated as a short circuit in the wiring and the resistance over 45Ω (Max.).



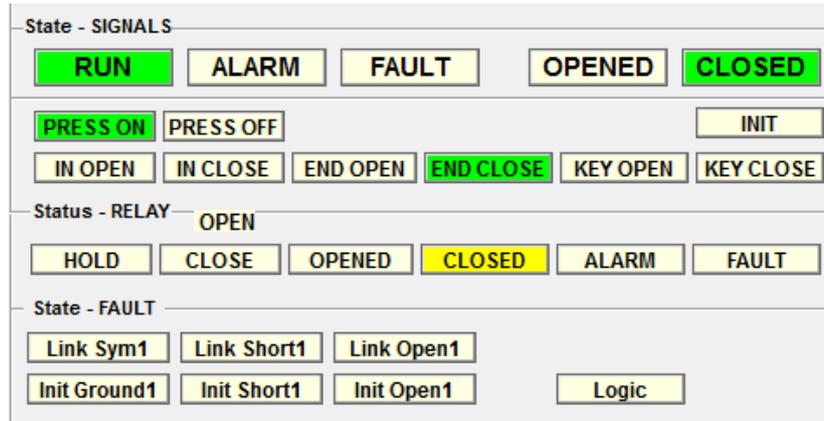
The screenshot shows a configuration window for 'Place description' with the value 'Conex IVM'. Below it is a 'Serial number' field. At the bottom, there is a checkbox labeled 'References value' which is currently unchecked, followed by a 'FIRM' button and a checkmark icon.

Location description field: (optional description)

Serial number field: retrieves the serial number automatically (cannot be changed)

Reference values: by checking this field, the resistance values for the pressure line and the line of the quick closing valve coil will be filled in automatically.

Press OFF	=1000 Ω -65535 Ω
Press ON	=0 Ω -100 Ω
Valve	=5 Ω -100 Ω



Status indication of each signal, relays and faults

Signals	RUN	-	Signal OPERATION	„active“
	ALARM		Signal ALARM	„active“
	FAULT		Signal Fault	„active“
	PRESS ON	-	Signal sufficient pressure	„active“
	PRESS OFF	-	Signal insufficient pressure	„active“
	IN CLOSE	-	Signal close input	„active“
	IN OPEN	-	Signal open input	„active“
	END CLOSE	-	Signal limit switch closed	„active“
	END OPEN	-	Signal limit switch opened	„active“
	KEY CLOSE	-	Signal close keys	„active“
KEY OPEN	-	Signal open keys	„active“	
Relays	HOLD	-	Relay of the automatic closing valve	„active“
	OPEN	-	Relay of the opening valve	„active“
	OPENED	-	Indication relay open	„active“
	CLOSED	-	Indication relay closed	„active“
	ALARM	-	Indication relay closed	„active“
	FAULT	-	Indication relay fault	„active“
Faults	Link Sym1	-	Ground connection:	pressure switch line
	Link Short1	-	Short circuit:	pressure switch line
	Link Open1	-	Interruption:	pressure switch line
	Init Ground1	-	Ground connection:	quick closing valve
	Init Short1	-	Short circuit:	quick closing valve
	Init Open1	-	Interruption:	quick closing valve
Logic			Function logic fault (<u><i>e.g.: sensors opened and closed active at the same time, etc.</i></u>)	

14.3.4. FUNCTIONAL TEST

During functional tests, ensure that the space of the slide valve knife is free from any obstacles, objects or body parts. This could result in damage to health and property.

Before the start of the test, ensure that the compressed air supply is closed and the slide valve reservoir is free from pressure. Check whether the control unit interprets this condition as a fault and that signals both on the control panel CONEX and as “insufficient pressure” on the unit panel IVM. Upon opening the compressed air supply, this fault shall disappear.

If the operating conditions are all met, the control panel CONEX will not indicate any other faults. On the panel of the slide-valve control unit, only the operation (solid green LED) and the slide-valve position (LED indicating the position opened or closed) are indicated.

Now, it is the time we tested the operability of slow opening and closing. By pressing the key “OPEN”, the slide valve opens. It starts to open immediately (the opening speed may be different depending on the working air pressure). As soon as the knife is adjusted to the position open, the condition is indicated by the corresponding LED. After about 2 seconds following the complete opening, discharge of the air used for opening should be clearly audible and the slide valve shall remain opened. By pressing the key “CLOSE”, close the slide valve.

Quick closing shall be tested by opening the slide valve. Simulate the explosion on the explosion detector connected and set for the activation of the corresponding zone with the slide valve (for the detectors DETEX using the pressure simulator, for the detectors LUMEX by exposing them to light). Immediate closing of the slide valve knife occurs.

Another step consists in testing the automatic safety closing. Open the slide valve and disconnect the connector head from the coil for the quick closing valve. The slide valve must be closed immediately. Repeat the test with a small change for the pressure switch circuit (instead of the valve coil, disconnect the pressure switch). Again, immediate closing must occur. In the both cases, the control panel and the IVM unit panel must indicate the corresponding fault.

15. TECHNICAL PARAMETERS OF QUICK SLIDE VALVE

Control voltage of electric valves	24Vdc
Parameters of compressed air (operational pressure)	5 to 6bar
Placement in zone	20,0 inside / 22,2 outside
Nominal duct diameter	DN 50/65/80/100/125/150
Distance on ducting from protected volume for DN50/65/80	4m – 20m
Distance on ducting from protected volume for DN100/150	6m – 11m
Maximum reduced explosion pressure	<u>DN50-80</u> 0.1Bar <u>DN100-150</u> 0.1Bar
Closing time of slide valve	less than 50ms