

Switch box type SBU-x(1,2,3)x



Translation of the assembly instructions with operating instructions and technical appendix


In accordance with EU ATEX Directive 2014/32/EU

In accordance with EU Low-voltage Directive 2014/35/EU

In accordance with EU Electromagnetic Compatibility Directive 2014/30/EU

Language version: English

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A) General

A1 Explanation of symbols

In these operating instructions, notes are marked with the following symbols:

 xxxxx	Danger/ Caution/ Warning ... indicates a dangerous situation that could lead to death or severe injury and/or damage to the piping system.
	Note ... indicates an instruction that should be obeyed without fail.
	Information ... indicates useful tips and recommendations.

Ignoring these notes, cautions and warnings could result in danger and the manufacturer's warranty may become void.

A2 Intended use

The SBU switch box is used in conjunction with pneumatic rotary actuators for operating valves. It is used to signal the states "Open/Closed" after having been fitted to a valve. The SBU switch boxes are also suitable for connecting up intrinsically safe circuits. In such cases they are specially marked as such.


The switch box is equipped with proximity switches or mechanical limit switches depending on the specifications of the customer – terminal diagrams for typical position indicators can be found in Appendix D2. EBRO switch boxes can be used in potentially explosive atmospheres of Zone 1 and Zone 2 according to certified explosion subgroups IIA, IIB and IIC and temperature class T5/T6, as well as in Zones 21 and 22 – depending on the certified max. surface temperature. Connection terminals are provided for wiring a solenoid valve coil.


The switch boxes and their components correspond to the relevant standards IEC 60079-0, IEC 60079-1, IEC 60079-7, IEC 60079-11, IEC 60079-31, DIN 60529.

The mechanical adaptation of the pneumatic actuator is to be made directly at the connection point for position controllers and signal devices in accordance with VDI/VDE 3845 using the hole pattern 80 x 30 mm and a 30 mm shaft height (\varnothing_{\max} 30 mm). Attachment sets in accordance with VDI/VDE 3845 with various console dimensions are available for other fitments – see the dimensional data sheet in Appendix D3.

The switch box must not be operated until the following documents have been observed:

- <Manufacturer declaration on EC guidelines>.
- These assembly/operating instructions, which are supplied with the product.


Use of the switch box in a  potentially explosive atmosphere is only permitted if:

- ▶ the customer has explicitly drawn attention to the fact
- ▶ and the switch box is marked with the  symbol and the field of application on the type plate in accordance with Directive 2014/34/EU.

Failure to comply with this <correct use> represents gross negligence and releases the manufacturer, EBRO-Armaturen, from any product liability.

A3 Labelling of the switch box

Every Ex switch box is labelled with the following data on its housing or type plate:

For	Labelling	Remarks
Manufacturer	Exepd	Address see Section 13 <further information>
Valve type	e.g. SBU-I13-211-P02	(labelling on housing) see overview in Section D3
Conformity	CE	Conformity with the Machinery Directive 2006/42/EC
Code	0158	"Notified body" in accordance with EU Directive
EBRO Nr.	e.g. 1234567	7-digit no
SN (serial no.)	e.g. 1234567	Digits 1-7: consecutive no.
Year	e.g. 2017	
Max. perm. U	U_n max (and numerical value)	Numerical values for upper operational limits
Max. perm. I	I_n (and numerical value)	Numerical values for upper operational limits
Test certificate	BVS 12 ATEX E 106	
Additional labelling if required	Explosion protection maximum marking	For example:  II 2 G Ex ia II C T6

*) **Note:** The year of manufacture is encoded in the serial number.

The type plate should not be covered so that the installed valve remains identifiable.

A4 Installed components

The switch box is equipped with position detectors in accordance with the customer's requirements.

When used in potentially explosive atmospheres of Zone 1 and 2, only certified components such as switches and proximity switches must be fitted. When used in Zones 21 and 22, switches and proximity switches of industrial quality may also be fitted inside the dust-tight enclosure provided the manufacturer produces separate evidence of temperature rise. Any customisation of the switch box is only permissible after consultation with the manufacturer. The assembly instructions and safety instructions supplied by the manufacturer of these components are to be observed.

A5 Cable glands

When connecting cables and wires to equipment with the "Increased Safety" degree of protection, it is necessary to use cable glands which are certified as explosion-proof and are suitable for the respective types of cable and wire. They must maintain the "e" degree of protection and contain a suitable sealing component to ensure that the control system is provided with at least protection class IP 54. Metallic cable glands must be earthed.


Any drill holes not required for cable glands must be closed off with plugs certified as being explosion-proof.

When connecting cables and wires to equipment for use in Zones 21 and 22, the minimum protection class IP 65 must be maintained.




A6 Transport and storage

During storage and transport, the switch box should be kept in the factory packaging and not unpacked until directly before its assembly onto the pneumatic rotary actuator.

B) Assembly and commissioning



	<p><i>These instructions contain safety instructions for foreseeable risks during the assembly/connection of the switch box to a control system.</i></p> <p>It is the user's responsibility to supplement these instructions for other risks specifically linked to the location. It is assumed that all requirements for this system have been complied with.</p>
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B1 *Safety instructions for commissioning*

 	<ul style="list-style-type: none"> • The assembly of the switch box onto the valve and connection to the user's control system must only be carried out by qualified personnel. For the purposes of these instructions, qualified personnel are persons who, on the basis of their training, specialist knowledge and professional experience, can correctly assess and execute the work assigned to them and can identify and avoid potential risks. • The function of a fitted switch box must comply with the <Correct use>, which is described in Section A2. The conditions of use must comply with the specifications labelled on the switch box type plate. • The degree of protection marked on the switch box assumes that the cable glands are sealed accordingly.
 Explosion hazard / Electric shock hazard	

B2 *Prerequisites for assembly/disassembly*

- Ensure that only those switch boxes are installed whose explosion protection class matches the operating conditions. See the corresponding labelling on the type plate (*Section A4*).
- The information on the type plates and on the EC Type Examination Certificate must be observed. Further technical information about the switch boxes can be found in the sources given in Section A6 and on the product.
- Components may only be retrofitted in agreement with the manufacturer taking the EC Type Examination Certificate into consideration. The wire connection is to be completed carefully so that the individual strands are not damaged.
- When connecting multiple or fine gauge wires, the wire ends need to be prepared.

	<p>The attachment of wire-end sleeves must always be carried out with the appropriate crimpers to ensure a consistent quality of compression. All terminal connections, including those that are not in use, are to be firmly tightened.</p>
	<p>The screw connection to the valve must be secured against self-loosening.</p>

- Metal housings in potentially explosive atmospheres must be provided with equipotential bonding that has a cross-section of at least 4 mm².
- Metal housings for **intrinsically safe equipment** do **not** have to be connected to the equipotential bonding system unless it is required by the equipment documentation.

B3 *Installation procedure*

- Inspect the switch box for transport damage. Damaged switch boxes must not be installed.
- For housings set up outdoors, special measures are to be taken, where necessary, to ensure correct operation. This includes, for example, using protective rain covers or, if required, protective housings with a sufficient protection class.
- Connection to the user-side control must be made in accordance with the planner's/ /user's specifications.
Terminal plans are affixed to the cover of the switch box.
- When wiring up an "Increased Safety" solenoid valve in a switch box for "intrinsically safe circuits", minimum distances of 50 mm must be maintained between the circuits.
- Identifiable system malfunctions must be resolved before commissioning. See also Section C3 <Troubleshooting>.

B4 *Initial commissioning*


- Any electrical equipment for use in potentially explosive atmospheres must be selected in accordance with the conditions defined for the individual type of installation. The equipment should only be operated in an undamaged and clean state.
- All electrical connections to user-side control systems should be checked by a qualified electrician before being put into operation.

C) Operating instructions




In accordance with the provisions of Directive 2014/34/EU, the planner of the system must draw up a comprehensive risk analysis.

The manufacturer EBRO Armaturen provides the following documents for this purpose:

- these assembly and operating instructions,
- the declaration on EU Directives included at the beginning.

	<p><i>These instructions include safety notices for foreseeable risks arising when using the switch boxes in industrial applications.</i></p> <p>It is the planner's/operator's responsibility to supplement these instructions for other risks specifically linked to the system.</p>
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C1 **Safety instructions for operation and maintenance**

  Danger	<ul style="list-style-type: none"> • The function of a switch box must comply with the <Intended use>, which is described in Section A2. • Equipment in an electrical installation in a potentially explosive atmosphere shall be maintained by the operator in a proper condition properly operated, supervised and carried out maintenance and repair work. This includes checking the equipment before commissioning for any transport damage. • Assembly / disassembly, operation and maintenance work may only be carried out by qualified personnel. • For sensors (switches and initiators) with special conditions (see data sheet of the sensor), the corresponding instructions of the manufacturer must be considered. • For cable entries with special mounting conditions (see data sheet of the cable entry), the corresponding notes of the manufacturer must be considered. • All applicable statutory regulations and the other binding directives on occupational safety, accident prevention and environmental protection must be complied with. • Only original parts may be used for maintenance and fault rectification after prior consultation with the manufacturer.
 Electric shock hazard	<p>DO NOT OPEN THE SWITCH BOX IF THE POWER IS SWITCHED ON!</p> <p>Dust deposits > 5 mm must be removed!</p> <p>A defective operating device must not be operated! Danger by electrical charging, only clean the equipment wet!</p> <p>Danger by electrical charging, do not install the equipment in direct dust beam!</p>

C2 Automatic operation

If the switch box is connected to the user's control system as described in Section B, then no further action is required. Section C1 <Safety instructions> is to be observed.

Maintenance: At suitable intervals, check whether the screw connections to the valve are OK.

C3 Troubleshooting

Type of problem	Countermeasure
Malfunction of electrical components and/or (feed) lines	If malfunctions in the electrical connections in/at the terminal box or its components are diagnosed, these are to be corrected – in compliance with the information in Section D <Planning documents> – by qualified personnel.

D) Technical appendix/planning documents

D1 Technical specifications of the switch box

The switch box type EX-SBU-XXXX-XXXX-XXX is a stationary device for use in hazardous areas 1 or 21. The switch box type EX-SBU-XXXX-XXXX-XXX is not suitable for use in zone 0 or 20. It is used for accommodating explosion-proof electrical and / or non-electrical installation appliances, as well as their electrical connection parts with accessories. The assembly is carried out by means of the defined mounting possibilities of the switch box type EX-SBU-XXXX-XXXX-XXX.

The electrical data on the rating plate, as well as the device category for the place of installation, must be observed. Unless stated separately on the rating plate, the operating temperature range of the switch box is -20 ° C to 40 ° C.

D2 Terminal diagram

The relevant terminal diagram is affixed to the cover of every switch box.
The relevant terminal diagram is provided as a separate document.

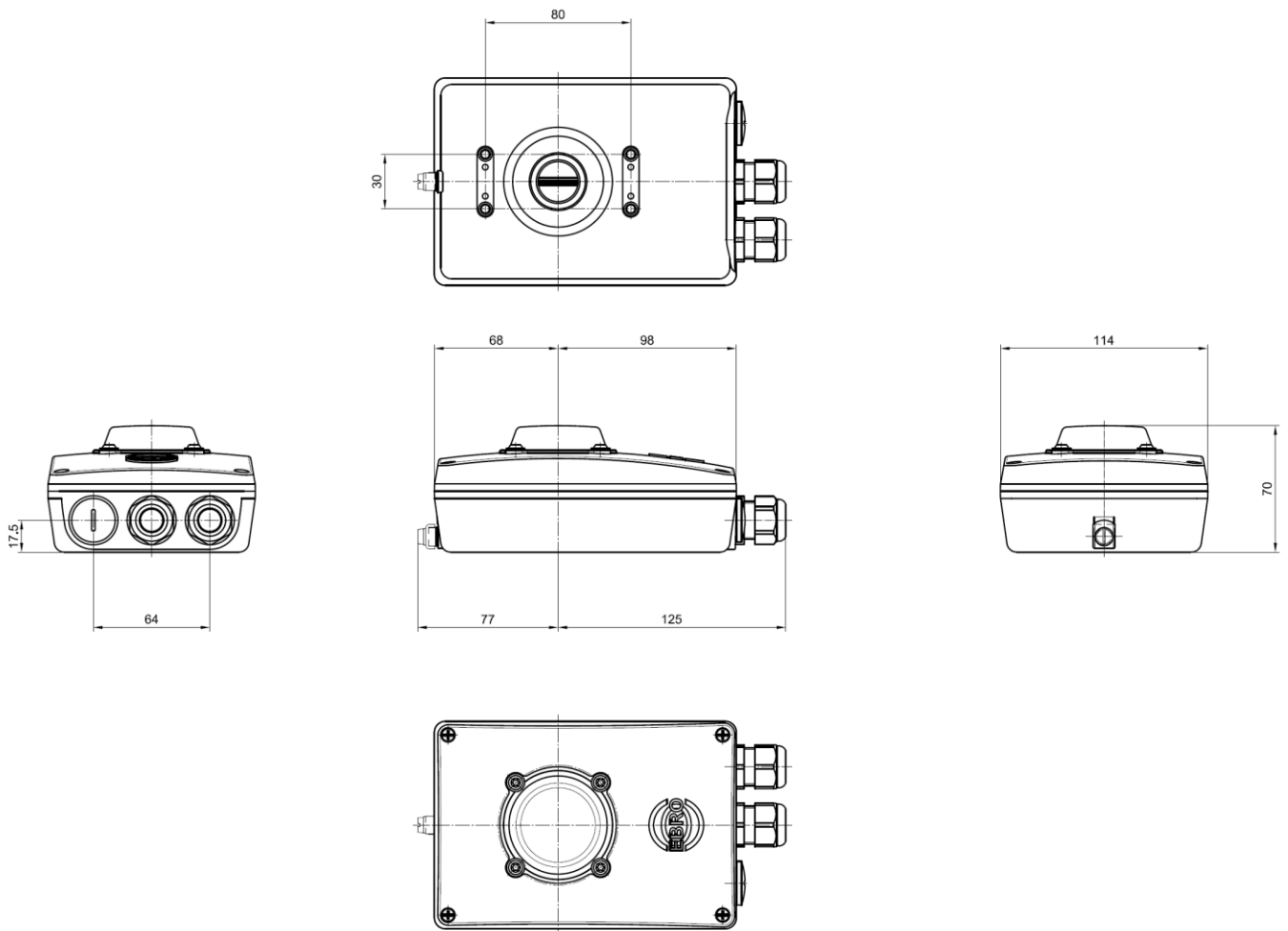
D3 Data sheets for typical position detectors

The relevant data sheet for the position detector is available as a separate document in the appendix.

D4 Sensors with special conditions

The relevant data sheet for the sensor is available as a separate document in the appendix

D5 Dimensional drawings





Translation

EC-Type Examination Certificate

- (1) **EC-Type Examination Certificate**
- (2) Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC
- (3) No. of EC-Type Examination Certificate: **BVS 12 ATEX E 106**
- (4) Equipment: **terminal box type EX-SBU-****_****_*****
- (5) Manufacturer: **Exepd GmbH**
- (6) Address: **i-Park Tauberfranken 23, 97922 Lauda-Königshofen, Germany**
- (7) The design and construction of this equipment and any acceptable variation thereto are specified in the appendix to this type examination certificate.
- (8) The certification body of DEKRA EXAM GmbH, notified body no. 0158 in accordance with Article 9 of the Directive 94/9/EC of the European Parliament and the Council of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive. The examination and test results are recorded in the test and assessment report BVS PP 13.2082 EG.
- (9) The Essential Health and Safety Requirements are assured by compliance with:
 - EN 60079-0:2009 **General requirements**
 - EN 60079-1:2007 **Flameproof Enclosure 'd'**
 - EN 60079-7:2007 **Increased Safety 'e'**
 - EN 60079-11:2007 **Intrinsic Safety 'i'**
 - EN 60079-31:2009 **Protection by Enclosures 't'**
- (10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the appendix to this certificate.
- (11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.
- (12) The marking of the equipment shall include the following:

II 2G Ex de IIC T6 Gb or
II 2G Ex e ia IIC T6 Gb or
II 2G Ex ia IIC T6 Gb
II 2D Ex tb IIIC T85°C Db

DEKRA EXAM GmbH
Bochum, dated 19th April 2013

Signed: Hans-Christian Simanski

Signed: Dr. Franz Eickhoff

Certification body

Special services unit



(13) Appendix to

(14) **EC-Type Examination Certificate**
BVS 12 ATEX E 106

(15) 15.1 Subject and type

Terminal box type EX-SBU-^{*1)*2)*3)*4)_*5)**6)_***7)}

- | | |
|---|---|
| 1 ⁾ Type of sensors | M = microswitches
I = initiators/ voltage not bridged (standard)
V = initiators / voltage bridged |
| 2 ⁾ Number of sensors | 0 = none (distributor)
1 = 1
2 = 2
3 = 3 (Ex ia / Ex tb only) |
| 3 ⁾ Type of ignition protection | 1 = Ex de
2 = Ex ia
3 = Ex e ia
4 = Ex tb |
| 4 ⁾ Terminal clamps for connecting solenoids | 3 = 3 terminals (one coil)
5 = 5 terminals (two coils –Ex ia / Ex tb only) |
| 5 ⁾ Type of screw connection | X = plastic
Y = metal |
| 6 ⁾ Not relevant | |
| 7 ⁾ Not relevant | |

15.2 Description

The terminal box of type EX SBU-****-****-**** is used in conjunction with pneumatic drives for valves. To visually indicate the position of the drive, the enclosure is equipped with a plastic cap.

The terminal box can be manufactured for different types of ignition protection, i.e. Increased Safety 'e', Intrinsic Safety 'i' or Protection by Enclosure 't'; this depends on the requirements for the respective zone in which the terminal box will be used. The terminal box will also be equipped with separately certified and suitable end-of-line switches and initiators.



15.3 Parameters

Electrical data

Rated voltage	AC 230 V ± 10 % max. DC 30 V ± 10 % max.
Rated current	3 A max.
Max. power dissipation (Ta: +40 °C)	20 W
Max. power dissipation (Ta: +60 °C)	8 W

Thermal data

max. ambient temperature range permitted (Ex e / Ex t)	-40 °C up to +60 °C
max. ambient temperature range permitted (Ex i)	-40 °C up to +70 °C

(16) Test and assessment report

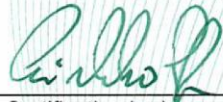
BVS PP 13.2082 EG, as of 19.04.2013

(17) Special conditions for safe use

None

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

DEKRA EXAM GmbH
44809 Bochum, 30.09.2013
BVS-Yil/Ar E 3024/13



Certification body



Special services unit

Declaration in accordance with EC Directives

KE_Ex-SBU01

Rev01/2017-02/AF

The manufacturer

EBRO Armaturen

Gebr. Bröer GmbH
Karlstrasse 8
58135 Hagen
Deutschland



Declares that the switchbox unit
series Ex SBU-XXXX-XXXX-XX

are manufactured in accordance with the requirements of the following standards:

EN 60079-0 :2014-06	Explosive atmospheres - Part 0: Equipment - General requirements (IEC 60079-0:2011, modified + Cor.:2012 + Cor.:2013)
EN 60079-1 :2015-04	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d" (IEC 60079-1:2014)
EN 60079-7 :2016-08	Explosive atmospheres - Part 7: Equipment protection by increased safety "e" (IEC 60079-7:2015)
EN 60079-11 :2012-06	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i" (IEC 60079-11:2011 + Cor.:2012)
EN 60079-31 :2014-12	Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t" (IEC 60079-31:2013)
EN 60947-5-2 :2014-01	Low-voltage switchgear and controlgear - Part 5-2: Control circuit devices and switching elements - Proximity switches (IEC 60947-5-2:2007 + A1:2012)
EN 60947-5-6 :2000-12	Low-voltage switchgear and controlgear - Part 5-6: Control circuit devices and switching elements, DC interface for proximity sensors and switching amplifiers (NAMUR) (IEC 60947-5-6:1999)

The following product documents are available:

Planning documents, technical data sheets, catalogue pages

These products conform to the following directives:

ATEX directive 2014/32/EU

Low-voltage directive 2014/35/EU

Electromagnetic compatibility 2014/30/EU (EMC)



II 2G Ex ia IIC T6 Gb or II 2G Ex e ia IIC T6 Gb or II 2G Ex de IIC T6 Gb




II 2D Ex tb IIIC T85°C Db

1. The products are an "incomplete machine" in the sense of article 2 g) of this directive
2. The table overleaf lists whether and how the requirements of this directive are fulfilled
3. This declaration is the mounting declaration in the sense of this directive

For conformity with the above- named directives, the following apply:

1. The user must comply with the <correct use> as defined in the "Original mounting and operating instructions" (BA Ex-SBU) included in the delivery and must follow all notices in these instructions.
Failure to comply with these instructions can – in serious cases – release the manufacturer from product liability.
2. Commissioning of the Limit Switches Box is not permitted until conformity of the system in which the Limit Switches Box is installed with all the above- mentioned EC directives is declared by the person responsible. A specific declaration is included in delivery for the above - named actuator.

Hagen, February 2017


Lydia Bröer
CEO

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