BA 4.1 Atex

Product:	Actuator
Type:	Pneumatic
Series:	SYS, SYD

Supplementary ATEX Operating Instructions

Any additional information which may be required can be downloaded from our website **www.ebro-armaturen.com** or ordered from the following address:

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1 General information about this manual

1.1 Foreword

The original BA-4.1 EB/MRL assembly instructions and operating instructions including technical appendix apply. These supplementary ATEX operating instructions provide additional information on the use of EBRO actuators in a potentially explosive environment.

1.2 Basic safety instructions

The safety information in these supplementary ATEX operating instructions refers only to the specific actuator. The generally applicable safety regulations and accident prevention regulations must be observed in addition to the information in these supplementary ATEX operating instructions! Work may only be done on the actuator outside the explosion hazard zone after the system has been depressurised and has cooled down. The actuator can be used under the specified operating conditions in explosive gas atmospheres zones 1 and 2 or in explosive dust atmospheres zones 21 and 22. Reference must be made to the specifications on the type plate.

1.3 Explanation of symbols

1.3.1 Hazard symbols

The safety instructions are accompanied by hazard symbols flagging up specific risks for persons or property. They are used consistently throughout these supplementary ATEX operating instructions and must be observed.


General hazard


Hot surfaces


Risk of hand injuries

Explosive atmosphere

1.3.2 Warning notices

Warnings are subdivided as far as possible into the following categories:

⚠ Signal word!
Nature and source of danger, including possible consequences of non-observance
Explanation

- Measures required to avert the danger.

⚠ Danger!
This sign warns of a situation of imminent danger which, if not avoided, will result in death or serious injury.

⚠ Warning!
This symbol warns of a potentially hazardous situation which, if not avoided, will result in death or serious injury.

⚠ Caution!
This sign warns of a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

1.3.3 Information symbols

The information symbols are used to flag up situations or steps where explanation is required to guarantee safe, proper and efficient handling of the actuator.

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Symbol	Meaning
	**Notice**… information to be observed.
	This symbol highlights special circumstances.

All signs and symbols directly attached to the actuator, such as warning signs, operating signs, direction of rotation arrows, component markings, type plate, ATEX markings, etc., must be observed. The attached signs and symbols must not be removed and must be clearly legible at all times.

1.3.4 References and additional information

Cross references to diagrams and positions are shown in the following form in these instructions:

Example: The shaft (Fig. 3-2/1) must...

Explanation: (Fig. 3-2/1) refers to item 1 in diagram 3 in section 2.

1.4 Warranty and liability

The warranty and liability will depend on the contractually agreed terms and conditions. For warranty terms, please see the EBRO ARMATUREN GmbH terms and conditions of sale and delivery.

1.5 Instructions for the owner/operator

The owner/operator is any natural or legal person who uses the actuator or on whose instructions the actuator is used. The owner/operator must ensure that the following requirements are met:

- The assembled and connected actuator complies with the relevant directives.
- Only qualified personnel work on and with the actuator.
- The personnel have access to the supplementary ATEX operating instructions when carrying out the relevant jobs and follow these instructions.
- Non-qualified personnel are prohibited from working on and with the actuator.
- The necessary accident prevention regulations and safety regulations are observed when assembling or servicing the actuator.

	Please read these instructions carefully before use. **Keep this manual for future reference.**

1.6 Personnel requirements

1.6.1 Qualified personnel

Qualified personnel are persons who can carry out the necessary work on the actuator as instructed on the basis of their training, experience and knowledge. They are most notably conversant with the relevant standards, provisions, accident prevention regulations and operating conditions, and have been authorised by the person responsible for safety to carry out the work required in any given case. They must also be able to detect possible hazards and avoid any such risks.

1.6.2 Instructed persons

Instructed persons are persons who have been instructed by the owner / operator regarding the tasks assigned to them and the possible risks of incorrect behaviour.

1.6.3 User groups

Group	Responsibilities

Operating personnel	Operation of actuator.
Qualified personnel	Operation, assembly, installation, start-up, maintenance, troubleshooting / repair, decommissioning and disposal.

1.7 Instruction and training

As the owner/operator, you are obliged to inform and brief the operating and maintenance personnel of any applicable safety and accident prevention regulations and about any safety installations relevant to working with the actuator. The different professional qualifications of the employees must be considered here. The operating personnel must have understood the instructions. Measures must also be taken to ensure that the instructions are followed. This is the only way to ensure that your personnel engage in safety-conscious working practices. If further training is required for the operating personnel, please contact EBRO ARMATUREN GmbH to discuss the conditions.

	Please take note of all the information in these supplementary ATEX operating instructions, especially the safety information. The information must have been read and noted before any work is carried out on the actuator. Any use, configuration and variation of the actuator other than set out in these supplementary ATEX operating instructions are considered to be improper and non-intended use!

2 Technical data

2.1 Correct use

Pneumatic rotary actuators type EBx.1 SYD (double acting) and type EBx.1 SYS (with closing or opening springs) are designed for the automatic actuation of industrial valves in the following circumstances:

- after connection of the solenoid valve to a system-side controller,
- with a gaseous control medium*1 (as a rule compressed air in compliance with ISO 8573-1 class 3 and 5) with control pressure as specified on the type plate

.

*1 If fluids other than compressed air are used, please contact our customer service before usage.

Equipment bearing the ATEX marking is approved for use in potentially explosive atmospheres as indicated in accordance with European Directive 2014/34/EU.

2.2 Technical specifications

Additional information is provided in these supplementary ATEX operating instructions on the use of the actuator in potentially explosive atmospheres.
The original BA-4.1 EB assembly instructions and operating instructions including technical appendix apply. They contain important information and safety instructions for the safe handling and operation of the actuator.
Further data sheets relevant to the type of actuator and containing additional information and technical data are available on the EBRO website.
Technical information on the actuator can be found on the type plate and in the delivery note.

The actuator is in ignition protection class “c”.
This protection class includes features designed to guarantee the prevention of such ignition as may be caused by hot surfaces or sparks generated by moving parts of the actuator.

2.2.1 Approval/compliance with standards

Standards: DIN EN ISO 80049-36, DIN EN ISO 80079-37, EN IEC 60079-0
Actuators with any marking listed in section 2.7 are approved for the following areas:

ATEX
For Europe in accordance with Directive 2014/34/EU. The EU Declaration of Conformity serves as proof.

2.3 Manufactured sizes

EB-SYS ⇨ 5.1 to 26.1
EB-SYD ⇨ 4.1 to 26.1

2.4 Interfaces

Valve interface conforming to DIN EN ISO 5211

2.5 Temperature range

The usual ambient conditions apply:

- Temperature range -20°C to +60°C
- Pressure 80 kPa (0.8 bar) to 110 kPa (1.1 bar)
- Air with normal oxygen content

Different ambient conditions are to be assessed by the owner/operator.

Depending on the version, the actuators are designed for the following temperature ranges at variance with the usual ambient conditions:

Design	Temperature range	Max. surface temperature
Standard	-20°C to +80°C	**80°C**
Low temperature	-40°C to +80°C	**80°C**
High temperature	-15°C to +120°C	**120°C**

2.6 Control medium

Filtered compressed air, dry or lubricated.
The pressure dew point (according to ISO 8573-1:2010 class 3) must be ≥ -20°C or min. 10°C below ambient temperature. The maximum particle size (according to ISO 8573-1:2010 class 5) must not exceed 40 µm. For switching cycles ≥ 4 /min: lubricate compressed air. Compressed air for actuation to be supplied from outside potentially explosive areas.

2.7 Marking

In addition to the standard information for the actuators, the type plate bears additional information for the ATEX zone.
Do not cover or paint over the type plate.

Information on the additional ATEX plate

Directive 2014/34/EU	**ISO 80079-36**
CE Ex	II xxx[1)] Ex h[2)] xxx[3)] xx...xx[4)] xx[5)] X[6]
	II xxx[1)] Ex h[2)] xxx[3)] Tx[4)] X[6)] xx[5)] X[6]

1	*The relevant mark is applied to the shut-off valve with reference to the purchase order, and in accordance with the equipment category (Directive 2014/34/EU).* *Equipment group II - other areas (above ground)* *Equipment category 2 - gases/vapours G, suitable for zone 1 - dusts D, suitable for zone 21* *Equipment category 3 - gases/vapours G, suitable for zone 2 - dusts D, suitable for zone 22*
2)	*Code letter "h" is the symbol for non-electrical equipment*
3)	*Explosion group example: IIB (gas), explosion group IIIC (conductive dusts)*
4)	*Temperature class example: T6 (gas), max. surface temperature T80°C (dust)*

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5)	*Equipment protection level example: Gb (high protection level) (gas), equipment protection level Db (high protection level) (dust)*
6)	"X" special conditions to be noted

2.7.1 Example ATEX markings on type plate:

Standard, low temperature:

II 2G Ex h IIC T6 Gb

II 2D Ex h IIIC T80°C Db

High temperature:

II 2G Ex h IIC T6...T4 Gb

II 2D Ex h IIIC T120°C Db

2.7.2 Markings for ambient temperature limits:

- Standard (-20°C to + 80°C)
- High temperature (-15°C to + 120°C)
- Low temperature (-40°C to + 80°C)

2.7.3 Connection between equipment protection levels (EPL) and equipment category (2014/34/EU)

ISO 80079-36		Directive 2014/34/EU	
EPL	Group	Equipment group	Equipment category
Ga	II	II	1G
Gb			2G
Gc			3G
Da	III		1D
Db			2D
Dc			3D

2.7.1 Reference to sales contract

	Important information on the design of the actuator can be found in the sales contract or on the delivery note. When addressing queries to the EBRO after-sales service department, please state the sales contract number and order item or the serial number, e.g. 123456 (from the standard type plate).

2.8 Earthing

	The actuator must be permanently and securely connected to the on-site equipotential bonding system with a resistance to ground of **< 10^6 Ω**.

2.9 Configuration

2.9.1 Instructions for safe operation

!	The equipment must not be used in hybrid mixtures. A hybrid mixture is a blend of combustible gases or vapours with dust or fluff.

3 Operation

3.1 Use in explosive atmospheres

These instructions contain special safety instructions referring to foreseeable risks during installation, connection, operation and disassembly of the actuator in a potentially explosive atmosphere.
The following points must be noted when operating EBRO actuators in a potentially explosive atmosphere:

- The actuator must be suitable for use in areas subject to explosion hazards, as explained in section 2.
- The safety regulations applicable to drives, control systems and actuators are the same as for the piping system in which they are installed.
- The documentation (operating instructions, declarations) supplied by manufacturers of individual components must be observed in full.
- It is the responsibility of the owner/operator to assess the specific risks on site, to draw up specific instructions relating to such risks and to include them in the documentation.
- The compressed air supply must be drawn from the area outside the explosion hazard zone.

!	**Rotary actuator, single-acting (EB-SYS).** **A solenoid valve must be used to control the compressed air in order to prevent ambient air from entering the cylinder. Ambient air must not penetrate the cylinder.**

3.2 Surface temperature

The surface temperature will depend primarily on the operating conditions (e.g. compressed air, exposure to direct sunlight).

!	The operating temperature limit must not be exceeded.

Special cases where higher temperatures could occur are all related to damage or incorrect assembly or incorrect use:

- Damaged O-rings
- Removal of lubrication
- Heavily contaminated control air

Reference may be made in this regard to the original assembly instructions with operating instructions and technical appendix.

!	The surface temperature limit is specified for the purposes of assessment in the ATEX area in practice. Temperature classes (T1 to T6) and the permissible surface temperature in TXX°C are defined to this end and indicated on the additional ATEX type plate. Internal heating due to switching cycles of approx. 7°C must be taken into account. **It is the responsibility of owner/operator to assess this risk.**

The table below serves as a reference for the calculation of the maximum permissible surface temperature during operation. The safety margin for equipment category 1D is to be decided by the owner/operator.

Marking on the actuator	Temperature class	Maximum surface temperature (explosive gases)		Marking on the actuator	Maximum surface temperature (explosive dusts)
		Equipment category 2G	Equipment category 3G		Equipment category 2D-3D
T6	T6	80°C	80°C	**T80°C**	80°C
T6…T4	T6	80°C	80°C	**T120°C**	120°C
	T5	95°C	95°C		
	T4	120°C	120°C		

Danger!

Risk of fatal injury due to increased surface temperature of actuator in a potentially explosive atmosphere.

Impact of heat through compressed air or from outside, e.g. direct sunlight, must not lead to an increase in the surface temperature.

- Do not exceed the operating temperature limit.
- Protect the actuator from strong sunlight and hot compressed air.

3.3 Electrostatic charge

3.3.1 Compressed air

Solid or liquid suspended particles in the compressed air can lead to electrostatic charges. The compressed air specifications in section 2.6 must be met.

3.3.2 Coatings

Actuators may be coated as standard at the factory or at the request of the purchaser. The coating for an explosive atmosphere must be specified when placing the purchase order.
Actuators with an ATEX type plate are safe to use as indicated on the plate.

!	**The application of additional coats of paint or varnish is prohibited. Propagating brush discharges must not occur in the case of gases and vapours.**

3.4 Dust deposits

Layers of dust on the actuator can impair the dissipation of heat from the actuator to the ambient air. This can result in a heat build-up. Any deposits or layers of dust which may be present must be removed in order to ensure that the surface temperature does not rise above the permissible limit.

!	**Any blasting of compressed air or escaping compressed air must be avoided on the actuator as it could lead to the build-up of an explosive atmosphere through swirling dust.**

If large amounts of dust are present, the valve must be cleaned more frequently.

!	**The dust layer must not be more than 1 mm thick. Processes which generate strong charges are not permitted in outdoor areas.**

Danger!

Risk of fatal injury from the ignition of dust in a potentially explosive atmosphere.

In case of deposits (dust) on the actuator surface, it is imperative that heat from external sources, e.g. direct sunlight or hot compressed air, does not lead to a critical increase in the surface temperature.

- ➢ Remove dust deposits from the actuator regularly.

3.5 Transport, handling and storage

Leave the actuator in its original protective packaging. Padding provides protection during transport. Use suitable transport / lifting equipment. Leave protective caps on the actuator until just before installation. Packaging must be disposed of properly.
Recommended storage conditions:

- Room temperature > 5°C, < 25°C
- Relative air humidity 50 to 60 %
- Darkened room (protection from direct sunlight)
- Room free of explosive atmosphere

3.6 Assembly, installation and start of operation

3.6.1 Required tools

Suitable tools will be required for installation and assembly (not supplied with the product).

3.6.2 Assembly

Refer to the original assembly instructions with operating instructions and technical appendix.

3.6.3 Safety instructions for installation

!	The installation may be carried out by qualified personnel only. **Installation in an explosion-proof atmosphere.** Inspect the actuator before installation, making sure that it is clean and has not been damaged in transit. Do not install the actuator if it is damaged or dirty.

3.6.4 Information on the electrical installation

Actuators do not contain any electrical components. Electrical components may be supplied for installation with the product (e.g. control unit, sensors). The owner/operator is required to check the markings on the components before start of operation in order to ensure that they are designed for potentially explosive atmospheres. Reference must be made to the documents provided by the suppliers of electrical components.
Always comply with the applicable statutory regulations for electrical installations.

Danger!

Risk of fatal or serious injury to operating personnel or passers-by from electrostatic charge/electric shock.

Electrical equipment and components may only be connected by a qualified electrician.
There is a risk of electric shock from electrical installations and exposed terminals if these are not connected correctly.

- ➢ Earth the actuator.
- ➢ Work on electrical connections may only be carried out by qualified specialists with the supply voltage switched off and with measures in place to prevent it from being switched back on.

Danger!

Risk of fatal or serious injury to operating personnel or passers-by from ignition of an explosive atmosphere by electrostatic charge.

When assembling and operating the actuator, make sure that the actuator and any attached components are earthed.

- The actuator must be permanently earthed through the on-site equipotential bonding system.

3.7 Start of operation

Ensure that the actuator is operated in conditions where it is not subject to vibrations.
The EBx.1-SYS actuator (with spring reset) is to be fitted with a solenoid valve with spring chamber ventilation.
Whether the piping of the actuator could be an ignition risk for the compressed air supply with plastic hoses must be determined by the user.
The function of a pneumatic actuator assembled onto a valve must comply with the <Intended use>.
The operating conditions must be compatible with the conditions indicated on the actuator type plate.

Warning!

Operating the actuator if it is mounted on a fitting and is not enclosed on both sides by a section of pipe or equipment is a potentially dangerous situation which, if not avoided, will result in death or serious injury. There is a risk of crushing. The safety rules set out by the owner/operator for the piping system must be followed.

- The danger must be assessed by the owner/operator.
- The operation of actuators on valves is only permitted if the valve is installed in a pipeline system in accordance with its intended use.
-

Depending on the frequency of operation, the following checks should be carried out at least every 2 - 4 weeks
:

- the actuator is not heating up to more than 60°C (= on the actuator housing) through heat transmission in a pipe section with a medium >60°C: if necessary, appropriate shielding must be provided
- all the screw connections between the valve and actuator are properly tightened
- the actuator is pressing the valve evenly to both end positions at the control pressure marked
- no control medium is escaping to the outside

3.7.1 Earth connection testing

The actuator must be included in the equipotential bonding system. Check the contact resistance at the following point:

- between the actuator (e.g. cover screws) and the earth connection of the system.

The leakage resistance must have a value of < $10^6\Omega$.

4 Maintenance

Read the original assembly instructions and operating instructions BA-4.1 EB/MRL carefully and follow the instructions.

Pneumatic actuators of type EBx.1-SYD require the following maintenance checks if operated in potentially explosive atmospheres:

- Checks at least twice a year to ensure that the actuator is still permanently earthed
- Checks to verify that the position indicator and the actuator are not covered by dust

Pneumatic actuators of type EBx1-SYS require the following additional maintenance:

- Any exhaust units which may be fitted ensure that the actuator functions correctly and could get blocked with dust or dirt.
- Filter equipment must be cleaned or replaced at suitable intervals depending on the local ambient conditions.

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- A functional "OPEN CLOSED" test must also ensure that the spring set moves the actuator to the safety end position.

	Actuators must not be repaired in potentially explosive environments as it is possible/inevitable that sparks will be unintentionally generated by tools on impact. It is therefore imperative to remove the actuator and repair it in a safe environment. Users must take measures to ensure that there is no possibility of potentially explosive air escaping during disassembly.

4.1 Safety information relating to maintenance

	Maintenance work to be done by qualified personnel only. Shut down the actuator, cut off the compressed air supply and take measures to prevent it from being switched on again. Wait until the pressure has been discharged from the actuator. The actuator must be free of compressed air and may need to be bled manually through the solenoid valve. The owner/operator is responsible in case of improper maintenance.

4.2 General information

	The owner/operator will be responsible for any damage caused to the actuator through the use of non-original spare parts.

	Please contact the after-sales service department at EBRO ARMATUREN GmbH if you have any questions regarding maintenance, especially about disassembly, assembly, drawings, data sheets, spare parts and replacement actuators.

5 Troubleshooting and repair

Refer to the original assembly instructions with operating instructions and technical appendix.

6 Removal from service, scrap disposal and return

The precautions outlined in section 4 also apply when taking the valve out of operation. The actuator can be completely dismantled and the materials sorted according to type ready for disposal in line with the relevant disposal regulations/environmental protection regulations.

Clean the actuator if returning it to the EBRO after-sales service department.

Please ask for the **return form** and fill in the form. Returns must be accompanied by the completed return form.

7 Index, glossary and appendices

Appendix: EU Declaration of Conformity

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