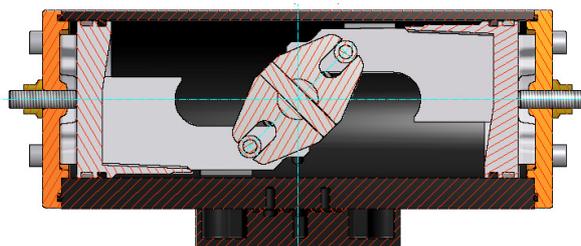
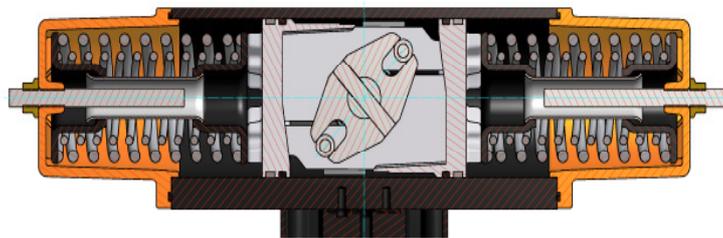


## **Pneumatic Rotary Actuators**

### **Type EB4.1 - EB12.1 SYD double-acting**



### **Type EB5.1 - EB12.1 SYS single-acting**



Example illustration, not all possible type variants are shown!

## **Translation – assembly instructions with operating manual and technical appendix**

**in accordance with EC Machinery Directive  
2006/42/EG**

*Language version: English*

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## OPERATING MANUAL FOR PNEUMATIC ACTUATORS EB4.1 – EB12.1 SYD AND EB5.1 – EB12.1 SYS

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If required, additional information can be downloaded or ordered from the following addresses:

[www.ebro-armaturen.com](http://www.ebro-armaturen.com)

EBRO Armaturen International Est.+ Co.KG  
Gewerbestrasse 5  
CH-6330 Cham  
☎ (041) 748 5959  
Fax (041) 748 5999

## A) General

### A1 Explanation of symbols

In this operating manual, notes are marked with the following symbols:

 xxxxxxxx	<b>Danger/Warning</b> ... indicates a situation of immediate danger that could lead to death or severe injury if not avoided.
	<b>Note</b> ... indicates an instruction that should be obeyed without fail.
	<b>Information</b> ... indicates useful tips and recommendations.

### A2 Correct use

Pneumatic rotary actuators type EBx.1 SYD (double acting) and type EBx.1 SYS (with closing or opening springs) are intended,

- after connection of the solenoid valve to a system-side controller,
- with a gaseous control medium (as a rule compressed air) with control pressure in accordance with the type plate,
- under ambient conditions between -20°C and +80°C (EBRO standard), or between -40°C and +140°C (EBRO special designs)
- spring-opening or spring-closing for type EB SYD with double-action, for type EBx.1 SYS with the “fail safe” function,
- to actuate valves with a 90° rotary motion (e.g. butterfly or ball valves) in response to the electrical signals from the above-mentioned controller and place them in the <OPEN> or <CLOSED> position.
- As a rule, a correctly connected actuator must close in a clockwise direction (looking end-on at the actuator drive shaft) and open in the opposite direction.

The actuator torque and characteristic – see technical appendix – must be matched to the valve and show the valve position correctly with its optical indicator.

To protect the solenoid valve, the compressed air must be filtered with a mesh size of 40µm (ISO 8573-1, class 5). It must be dried and, for switching cycles >4x/min, lightly oiled.

An optionally installed “position detector” module on the actuator signals the actuator position (open/closed) to the system controller.

An optionally installed “position sensor” module on the actuator signals intermediate positions to the system controller so that the valve can be set to intermediate positions between <OPEN> and <CLOSED>.

The actuator be only be operated in accordance with the following documents:

- the <Manufacturer's declaration on EC Directives> included in delivery
- these EBRO mounting instructions **MA4.1 – MRL** (also included in delivery).

The safety instructions in sections B1 and C1 must be observed when installing and operating the drive.

	<p>The connection diagram to be used depends on the correct use of the valve and, in the case of actuators with “fail safe” function, depends on the type of spring(s) with which the actuator is fitted: this must be decided and selected accordingly by the planner/purchaser of the actuator. For connection diagrams for typical applications, see section B4.</p>
---	---

**Note 1:**

*This manual should preferably be used in conjunction with the manual for the valve to which the actuator is fitted – with the manual for the valve **taking precedence**.*

**Note 2:**

**The purchaser is responsible for allocation of an individually supplied actuator to the appropriate valve. Appendix B of the relevant standard, EN15714 - 3, gives detailed indications on this.**

**A3 Divergent use**

In agreement with the manufacturer, EBRO-Armaturen International, the actuator can be used with media other than compressed air.

**A4 Identification of the actuator**

Every actuator is identified by a type plate:

The type plate on the actuator housing must not be covered after mounting the actuator on the valve and after installation in the pipe run – this is to ensure that the actuator remains identifiable.

 <b>Danger</b>	<p>Exceeding the maximum pressure indicated on the type plate endangers subsequent operation.</p>
--	---

**A5 Transport and storage**

	<p><i>Actuators with additional electrical modules:</i> To avoid corrosion damage to electrical components during storage, the actuators should be stored at constant room temperature.</p>
	<p>If an actuator is already <u>fitted to a valve</u>: The transport and storage requirements in the valve manual apply. In all cases, the unit is to be stored at constant temperature in an enclosed area.</p>

For the correct transport of an individually supplied actuator, the following applies:

- Always observe the symbols on the packaging when transporting the packages.
- Until the actuator is put to use (fitted to the valve), keep it in the factory packaging.
- Lay the actuator down on its flat side; any mounted accessories (e.g. solenoid valve/limit switches or manual override) must be positioned to the side or on top.
- Protect the actuator from dirt and moisture.
- If required, use securing belts (not chains) as a transport aid.

	<p>When fitting a belt, ensure that it is not fastened to any add-on modules. Protect the actuator from any damage during transport.</p>
	<p>Only for special actuators fitted with (manual) override: since the override is, as a rule, heavier than the actuator, the securing belts can also be attached to the override housing (but not to the handwheel!).</p>

## **B) Mounting the actuator onto the valve and connection of additional modules**

	<p><i>These instructions include safety notices for foreseeable risks when mounting the actuator onto a valve.</i></p> <p>It is the user's responsibility to supplement these instructions for other risks, especially those arising with specific valves. It is assumed that all requirements for this system have been met.</p>
---	---

The connection of any additional electric/electro-pneumatic modules supplied with the actuator is described in the accompanying documentation.  
 These documents apply in addition to these instructions.

### **B1 Safety notices for assembly and connection**

	<ul style="list-style-type: none"> <li>• The assembly and pneumatic/electrical connection of an actuator to the operator's system(s) may only be carried out by trained specialists. For the purposes of this manual, trained specialists are persons who, on the basis of their training, specialist knowledge and professional experience, are familiar with pneumatic components and can correctly assess and execute the work assigned to them and can identify and avoid potential risks.                      A knowledge of the typical properties of rotary valves (butterflies, ball valves) is also required for the assembly; assembly and connection should, where appropriate, be carried out in collaboration with expert colleagues.</li> </ul>
 <b>Risk of crushing!</b>	<ul style="list-style-type: none"> <li>• Actuators are not "stepladders". External loads must not be applied to the valve, actuator or feed lines.</li> <li>• Commissioning of an actuator assembled to a valve is not permitted until the valve is enclosed on both sides by a section of pipe or equipment – any prior actuation implies a risk of crushing and is the sole responsibility of the user.</li> </ul>

### **B2 Interfaces**

The purchaser must ensure the compatibility of the following interfaces:

- a) Actuator/valve flange joint: with dimensions in accordance with ISO 5211 (actuator and/or valve may have multiple bores!),
- b) Valve drive shaft/borehole, square socket/parallel key in actuator:
  - ▶ form (square or with parallel key) must match,
  - ▶ the valve manufacturer must have defined the appropriate actuator shaft dimensions and tolerances
- c) If accessories (e.g. solenoid valve, limit switches) are not supplied by EBRO-Armaturen International, the customer must ensure functional/interface compatibility of actuator and accessories; VDI/VDE 3845 applies here.

**B3 Individually supplied actuator: mounting onto the valve**

- Depending on the valve position, use a provisional compressed air supply to bring the actuator to the <CLOSED> or <OPEN> position, seat and centre the actuator on the valve.  
The positioning of the actuator on the valve is arbitrary and can be determined during assembly.
- The screw connection must be tightened sufficiently for the actuating torque to be transmitted by frictional forces – see table below. The flange size for the actuator is specified on the type plate.  
Tighten screws cross-wise.

ISO flange size	F04	F05	F07	F10	F12	F16
Tightening torque [Nm]	5-6 Nm	8-10 Nm	20-23Nm	44-48 Nm	78-85 Nm	370-390 Nm

- The position indicator must be adjusted to match the valve position:
  - ▶ pointer perpendicular to pipe axis: valve is closed
  - ▶ pointer parallel to pipe axis: valve is open

 <b>Danger</b>	An incorrect position indication presents a danger for subsequent operation.
--	--

**B4 All actuators: connection to the compressed air supply**

	At the start of assembly, you must ensure that the system – data control pressure, control voltage and frequency – for all modules comply with the technical data given on the type plates of the actuator and the additional modules.
---	--

Recommended feed cross-sections (non-binding):

Size	EB4.1	EB5.1	EB6.1	EB8.1	EB10.1	EB12.1
<b>Actuator displacement volume [litres]</b>	0.18	0.46	0.91	1.49	3.25	5.63
<b>Recommended feed line Ø (up to 6 m length)</b>	6 mm	6 mm	6 mm	6 mm	8 mm	8 mm
<b>Shortest possible switching time (approx.) [s]</b>	0.25		0.35	0.45	0.7	1.0

Note:

The shortest possible switching time shown in this table is a guideline value for standard production **double-acting actuators without attached valve** and with optimum supply and disposal of the control medium. After mounting the actuator onto a valve, this limit value will be significantly longer.

The control diagrams for

- ▶ double-acting actuators EBx.1 SYD are shown in Fig. 1
- ▶ single-acting actuators with spring reset EBx.1 SYS are shown in Fig. 2.

For further information, see the instructions for the solenoid valve.

The connection diagrams in accordance with VDI/VDE 3845 (Namur) feature a G ¼" thread

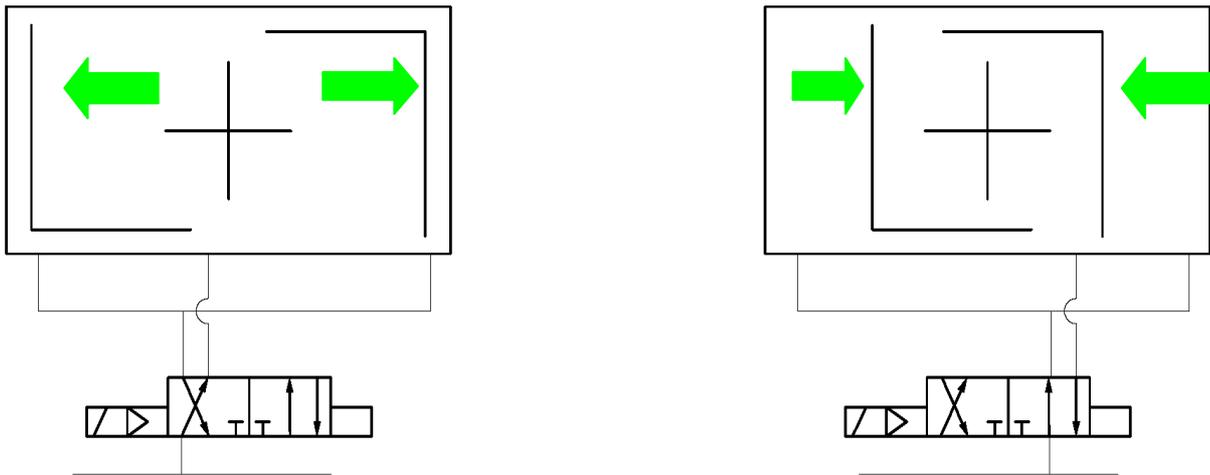


Figure 1: Fig. 1: Schematic diagrams for double-acting actuators EBx.1 SYD

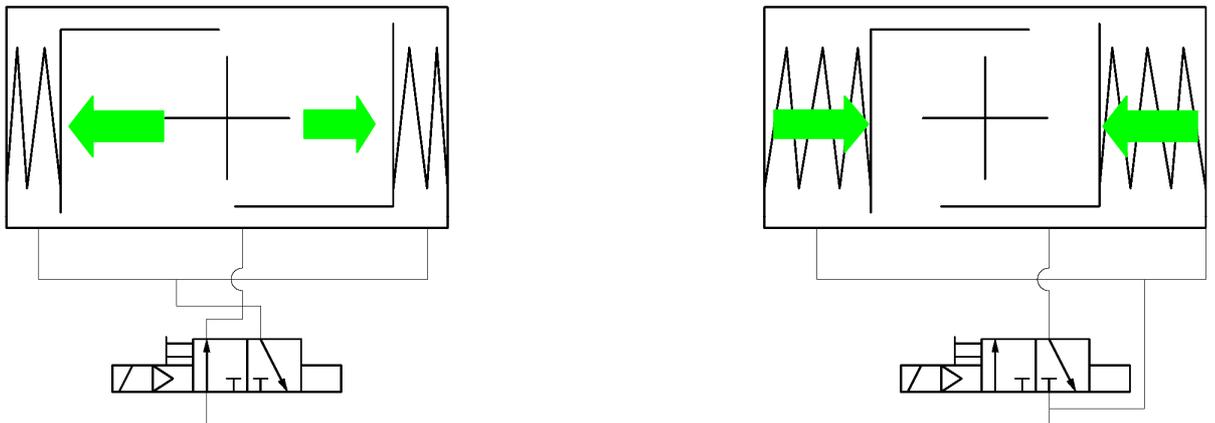


Fig. 2: Schematic diagrams for single-acting actuators EB SYS

	<p>In the standard version of the actuator, feeding control air to the <b>left connection</b> will cause an <b>anticlockwise motion</b>; feeding to the <b>right connection</b> will cause a <b>clockwise motion</b>.  <b>Spring-reset actuators</b> are to be fed only via the <b>left connection</b>; see fig. 2</p>
---	--

**B5 If required: connection of additional electrical/pneumatic modules to the controller**

If such modules are to be connected, the instructions supplied by the component manufacturer must be observed.

**B6 All actuators: adjustment of the base position <CLOSED>**

**This section is only applicable if the valve manufacturer has not already exactly adjusted the <CLOSED> and <OPEN> positions.**

The end stop in the actuator is adjusted for the <CLOSED> position ex works: If required: adjust stop screw.

 <b>Danger</b>	The end positions may only be adjusted when the actuator is depressurised!
--	--

- Loosen both sealing nuts, loosen the end stop screws by a few turns.
- Change the piston position by turning the drive shaft until the groove of the square shaft lies parallel to the longitudinal axis of the cylinder.
- Screw in the end stop screws on both sides until you can feel resistance and tighten the sealing nuts.

**B7 All actuators, trial run: test steps to conclude mounting and connection**

To ensure flawless operation of the actuator during automated operation, the following tests must be carried performed **on each actuator/valve unit** after mounting:

- Does the position indicator on the actuator match the valve position?  
If not, the indicator position must be readjusted.

 <b>Danger</b>	Incorrect position feedback (and incorrect optical display) presents a danger for subsequent operation.
--	---

- Is the control pressure sufficient at the point of use?  
The control pressure directly at the solenoid valve should be at least that shown on the actuator type plate and the smooth operation of a valve under operating conditions ensured.
- Is the solenoid valve correctly connected?  
If control pressure is present but the control signal fails (to test, for example, pull out the plug), the valve must move into the position specified by the purchaser:

Actuator type	Type ID	the valve must
double-acting	EB□.1 SYD	<i>Unless otherwise specified in the order:</i> move into the "CLOSED" position.
spring-closing	EB□.1 SYS	move into the "CLOSED" safety position.
spring-opening		move into the "OPEN" safety position.

If this is not the case, the drive control and/or connection of the solenoid valve must be corrected accordingly. Remedy: see section C3. Troubleshooting

- Actuator/valve connection correctly tightened?  
In functional testing, no relative movement between the valve, mounting bracket (if present) and pneumatic actuator should be detectable. If necessary, re-tighten all screws on the flange joint – see table in section B3.
- Testing actuation function and display:  
when control pressure is applied, the control commands “**CLOSED**” and “**OPEN**” must cause the valve **to move into the corresponding end positions**. The optical display on the actuator (and on the valve, if applicable) must show this correctly.  
If this is not the case, the actuator control and/or the indicator position must be corrected accordingly.
- Check electrical position feedback (if module present)  
the electrical signals “**OPEN**” and “**CLOSED**” (in the system-side control centre) must be compared with the display on the valve. **Signal and display must agree**. If this is not the case, the control and/or the adjustment of the position detector must be checked. The component manufacturer’s installation instructions must also be complied with.

### **B8 Additional information: dismantling the actuator**

The same safety rules are to be observed as for the piping system, the compressed air supply and the (electrical/electro-pneumatic) control system.

Carry out the following steps:

- Mark the alignment between actuator and valve position and record it for reassembly.
- Shut off the compressed air supply safely – if necessary, depressurise the valve.
- Disconnect compressed air supply and control connections.
- Loosen actuator/valve flange joint and lift actuator off the valve.

## C) Operating instructions

In accordance with MRL 2006/42/EC, manufacturers must compile a comprehensive risk analysis. EBRO-Armaturen provides the following documents for this purpose:

- these mounting and operating instructions,
- the declaration on EC Directives included at the beginning.

	<p><i>These instructions include safety notices for foreseeable risks arising when using the actuator in industrial applications..</i></p> <p>It is the user's responsibility to supplement these instructions for other risks, especially those arising with specific valves.</p>
---	--

### C1 **Safety notices for operation**

	<ul style="list-style-type: none"> <li>• The function of a valve-mounted pneumatic actuator must comply with the &lt;correct use&gt; described in section A2.</li> <li>• The conditions of use must comply with the conditions shown on the actuator type plate.</li> </ul> <p>A standard version actuator may only be operated within the temperature limits of -20 °C and +80 °C (EBRO standard).</p> <ul style="list-style-type: none"> <li>• Any work on the actuator may only be carried out by trained personnel. For the purposes of this manual, trained specialists 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.</li> </ul>
 <b>Risk of crushing!</b>	<p>Operation of an actuator mounted on a valve is only permissible if the valve is enclosed on both sides by a section of pipe or equipment – any prior actuation entails a risk of crushing and is the sole responsibility of the user.</p>

### C2 **Automatic operation/ manual operation**

If the actuator is correctly mounted as described in section B, it works automatically and is designed for continuous operation, in accordance with EN15714-3, Table 1.

	<ul style="list-style-type: none"> <li>• When pneumatically powered, the actuator requires a continuous supply of compressed air to ensure stable operation.</li> <li>• If the compressed air supply is interrupted or switched off, &lt;fail safe&gt; actuators move the valve in the predetermined CLOSED or OPEN position.</li> </ul>
---	--

### C3 **Troubleshooting**

Before carrying out troubleshooting procedures, please take note of the safety notices for mounting and repair work. Troubleshooting procedures should only be carried out by trained personnel.

Any tools used must comply with the relevant regulatory requirements and be in perfect condition. Before the rotary actuator is dismantled for troubleshooting, the responsible operations department must give its work clearance. The troubleshooting table below describes a selection of causes of faults that may occur, according to experience, and the corresponding corrective measures:

Fault	Cause	Corrective measure
Rotary actuator does not respond	Power supply to 5/2-way solenoid valve interrupted	(Re-)establish supply; carry out functional test
	Control medium supply interrupted	(Re-)establish control medium supply; carry out functional test
	Actuator control pressure too low	Check control medium supply (adjust if necessary); carry out functional test
	Solenoid valve defective	Disconnect solenoid valve and replace or repair; carry out functional test
	Valve defective (sticks)	See troubleshooting for valves
	Actuator defective (loss of control pressure)	Dismantle actuator and repair; remount actuator; carry out functional test
Rotary actuator cannot be moved to end positions	Stop screws misaligned	Adjust stop screws; carry out functional test
	Valve defective (sticks)	see manufacturer's troubleshooting guide

## **D) Technical appendix/planning documents**

### **Note:**

*Notice: This appendix is not a part of the <Original Mounting Instructions>, it simply provides supplementary information.*

The planner/purchaser must ensure that the actuator is suitable for

- ▶ the valve on which it is mounted,
- ▶ the system-side compressed air supply and the control system.

Important relevant technical information in this respect is listed below.

### **D1 Standard actuator design**

#### **D1-1 Adaption to the valve**

The pneumatic rotary actuators type EB□ SYD (double-acting) and Typ EB□.1 SYS (with opening/closing spring) can be mounted on all rotary action (90°) valves which have an assembly flange complying with EN ISO 5211.

#### **D1-2 Actuator output torques**

The actuator output torques specified in section D5 are nominal torques. They are achieved with a nominal compressed air supply pressure of 5.5 bar.



*The actuator torque varies according to the effective air pressure applied to the actuator.*

- ▶ The actuator is designed to withstand overpressures up to 8 bar,
- ▶ Underpressures must be taken into account by the planner/purchaser when selecting the actuator size – see also D 1.4 below.

#### **D1-3 Rotational direction of the actuator**

Design standard EN 15714-3 specifies that the valve should close in a clockwise direction. This must be ensured during installation by correct connection of the solenoid valve to the power supply and control – see also section B4. The solenoid valve documentation must supply the required information.

#### **D1-4 Valve assignment**

The main factors influencing the required actuation torque are the valve (nominal size), the working pressure and the medium. The required actuation torque for the valve, which is to be provided by the valve manufacturer, derives from these parameters.

It is recommended that a safety margin be added to this value for the configuration of the actuator.

#### **D1-5 Self-locking when not in operation**

The actuation torque – as given in the technical data in section D3 – is achieved by

- ▶ All double-acting rotary actuators, only when control pressure is applied
- ▶ and all <fail safe> actuators with spring returns at the end points.

**As a general rule, the hydraulic torque of the medium cannot influence the position of the shut-off device.**

### D1-6 Durability

Configuring the actuator in accordance with EN 15714-3, Table 1 is the requirement for type testing of the actuator in endurance testing at 30% of nominal power under laboratory conditions. The operating conditions will determine if and when the actuator requires servicing, especially the pressure and purity of the compressed air.



*As a general rule, the service interval of an actuator is significantly longer than that of the valve.*  
▶ When the valve is serviced, the actuator should at least be checked to ensure it is functioning correctly.

### D1-7 Manual operation

Manual operation using an auxiliary gearbox with a free-wheel is not standard for pneumatic actuators.

### D1-8 Installation position

The valve/actuator unit may be installed in any position.

- ▶ The usual position is with the actuator above the valve
- ▶ The valve type may restrict the possible installation positions
- ▶ If the valve shaft of a unit with additional manual operation gearbox is mounted horizontally, the system designer or valve manufacturer must decide whether the actuator exerts an unacceptable torsional stress on the valve and/or the piping, and whether this requires additional support.

### D1-9 Corrosion protection

This unit corresponds to corrosion category C4, as set out in the EN 15714-3 standard for pneumatic actuators.

## D2 *Optional additional equipment*

### D2-1 Solenoid valve

At the customer's request, the actuator can be supplied fitted with a solenoid valve – the valve manufacturer, voltage and current type (DC or AC) must be specified.

### D2-2 Limit switches (for position detection)

At the customer's request, the actuator can be supplied fitted with 2 (or more) limit switches to signal "OPEN" and "CLOSED" – the manufacturer, voltage and current type (DC or AC) must be specified for the magnet.

### D2-3 Manual override (with auxiliary gearbox)

At the customer's request, the actuator can be supplied fitted with a worm gearbox with a manually operated clutch.

**D3 Technical characteristics of the actuator**

**Type EB□.1 SYD – double-acting and EB□.1 SYS – single-acting**

**Drive torque, double-acting in Nm**

Control pressure											
Actuator	2.5 bar	3.0 bar	3.5 bar	4.0 bar	4.5 bar	5.0 bar	5.5 bar	6.0 bar	7.0 bar	8.0 bar	Actuator
EB 4.1	11	13	16	18	20	22	25	27	31	36	EB 4.1
EB 5.1	36	38	44	51	57	63	70	76	89	101	EB 5.1
EB 6.1	65	78	91	104	117	130	143	156	182	208	EB 6.1
EB 8.1	104	125	146	166	187	208	229	250	292	333	EB 8.1
EB 10.1	220	265	309	353	397	441	485	530	618	706	EB 10.1
EB 12.1	381	457	534	610	686	762	839	915	1067	1220	EB 12.1

**Drive torque, single-acting in Nm**

Antriebs- größe	Feder- variante	Anzahl Federn	Federmoment		Effektives Luftmoment in Nm bei Steuerdruck											
			in Nm		2,5 bar		3,0 bar		4,0 bar		5,0 bar		5,5 bar		6,0 bar	
			0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
EB 5.1 SYS25	VI	2	12,0	20,0	19,7	11,7	26,0	18,0	38,7	30,7	51,3	43,3	57,7	49,7	64,0	56,0
EB 5.1 SYS30	V	2	17,0	27,0			21,0	11,0	33,7	23,7	46,3	36,3	52,7	42,7	59,0	49,0
EB 5.1 SYS40	IV	2	22,0	35,0					28,7	15,7	41,3	28,3	47,7	34,7	54,0	41,0
EB 5.1 SYS50	III	3	27,0	44,0							36,3	19,3	42,7	25,7	49,0	32,0
EB 5.1 SYS55	II	3	30,0	49,0									39,7	20,7	46,0	27,0
EB 5.1 SYS60	I	4	35,0	58,0											41,0	18,0
EB 6.1 SYS25	VI	2	27,0	44,8	38,0	20,2	51,0	33,2	77,0	59,2	103,0	85,2	116,0	98,2	129,0	111,2
EB 6.1 SYS30	V	2	35,0	57,0			43,0	21,0	69,0	47,0	95,0	73,0	108,0	86,0	121,0	99,0
EB 6.1 SYS40	IV	2	45,0	74,0					59,0	30,0	85,0	56,0	98,0	69,0	111,0	82,0
EB 6.1 SYS50	III	3	55,0	90,0							75,0	40,0	88,0	53,0	101,0	66,0
EB 6.1 SYS55	II	3	63,0	102,0									80,0	41,0	93,0	54,0
EB 6.1 SYS60	I	4	73,0	119,0											83,0	37,0
EB 8.1 SYS25	VI	2	40,0	67,0	64,2	37,2	85,0	58,0	126,7	99,7	168,3	141,3	189,2	162,2	210,0	183,0
EB 8.1 SYS30	V	2	48,0	82,0			77,0	43,0	118,7	84,7	160,3	126,3	181,2	147,2	202,0	168,0
EB 8.1 SYS40	IV	2	65,0	111,0					101,7	55,7	143,3	97,3	164,2	118,2	185,0	139,0
EB 8.1 SYS50	III	3	82,0	140,0							126,3	68,3	147,2	89,2	168,0	110,0
EB 8.1 SYS55	II	3	90,0	152,0									139,2	77,2	160,0	98,0
EB 8.1 SYS60	I	4	107,0	181,0											143,0	69,0
EB10.1 SYS25	VI	2	89,0	151,0	131,8	69,8	176,0	114,0	264,3	202,3	352,7	290,7	396,8	334,8	441,0	379,0
EB10.1 SYS30	V	2	107,0	182,0			158,0	83,0	246,3	171,3	334,7	259,7	378,8	303,8	423,0	348,0
EB10.1 SYS40	IV	2	145,0	231,0					208,3	122,3	296,7	210,7	340,8	254,8	385,0	299,0
EB10.1 SYS50	III	3	182,0	279,0							259,7	162,7	303,8	206,8	348,0	251,0
EB10.1 SYS55	II	3	198,0	322,0									257,8	163,8	332,0	208,0
EB10.1 SYS60	I	4	236,0	370,0											294,0	160,0
EB12.1 SYS25	VI	2	155,0	224,0	226,0	138,5	302,0	233,0	455,0	386,0	607,0	538,0	684,0	615,0	760,0	691,0
EB12.1 SYS30	V	2	185,0	309,0			272,0	148,0	425,0	301,0	577,0	453,0	654,0	530,0	730,0	606,0
EB12.1 SYS40	IV	2	241,0	392,0					369,0	218,0	521,0	370,0	598,0	447,0	674,0	523,0
EB12.1 SYS50	III	3	296,0	475,0							466,0	287,0	543,0	364,0	619,0	440,0
EB12.1 SYS55	II	3	333,0	546,0									506,0	293,0	582,0	369,0
EB12.1 SYS60	I	4	389,0	630,0											526,0	285,0

**D4 Notes on risks arising from continuous operation**

- The actuator is designed for continuous operation, in accordance with EN15714-3, Table 1.
- The actuator is screwed to the valve at the interface as per ISO5211. The necessary tightening torques for the fastening screws can be found in Section B2.  
Actuators with higher actuation frequencies should be visually inspected at suitable intervals (no later than when the valve is serviced) to check that this screw fastening remains tight – it should be tightened if required.
- The actuator is designed for operation with clean and dry compressed air in accordance with section 1 <Correct use>.

	The material selection and manufacturing tolerances of the valve drive shaft interface must be matched to the frequency of the switching operations <u>by the valve manufacturer</u> – in accordance with the requirements of EN 5211:
	As a rule, the <CLOSED> position of the valve is adjusted when the actuator is mounted onto the valve. As long as the valve does not leak, this setting should not be changed. If adjustment is necessary, the EBRO assembly instructions, <b>MA4.1-MRL section B6</b> , and/or the relevant valve manual provide more precise information.

**D5 Notes on other risks**

- *Securing the pretensioned springs:*  
The spring sets of type EB□ SYS are pretensioned and appropriately secured. The protective sleeve must not be altered by the user. Springs must not be exposed to corrosive control media.
- *Replacing spring sets:*  
If required, the spring sets of type EB□.1 SYS can be changed to meet the torque requirement of the valve.
- *Mechanical loads:*
  - ▶ Actuators are not “stepladders”. External loads must not be applied to the valve, actuator or feed lines.
  - ▶ The actuator is designed for static loading within the piping system. Risks arising from loading caused by vibrations in the system are not covered: in such cases, the long-term securing of the screw fastenings on the actuator, at the least, must be agreed with the manufacturer, EBRO-Armaturen.

## Declaration in accordance with EC Directives

The manufacturer **EBRO Armaturen International Est. Co.KG**  
Eschen, Branch Office Cham  
Gewerbstrasse 5  
CH-6330 Cham, Switzerland

declares that the pneumatic rotary actuators

**Type EB4.1 - EB12.1 SYD double-acting**  
**Type EB5.1 - EB12.1 SYS single-acting**

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

<b>DIN EN ISO 5211</b>	<b>Industrial valves – Part-turn actuator attachments</b>
<b>DIN EN 15081</b>	<b>Industrial valves. Mounting kits for part-turn valve actuator attachments</b>
<b>VDI / VDE 3845</b>	<b>Positioning drive connection</b>
<b>EN 12100</b>	<b>Safety of machines</b>
<b>ISO 8573-1 cl. 3 and 5</b>	<b>Compressed air quality</b>

The following product documents are available:

**Technical data sheets, EB-SYD - 4.1, EB-SYS - 4.2**

These products conform to the following directives:

### **Machinery Directive 2006/42 EC (MRL)** [applies only in combination with a valve]

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 4.1-MRL Rev. 0/2009) 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 valve (and, where applicable, the mounted actuator) is not permitted until conformity of the system in which the valve 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.
3. The manufacturer, EBRO-Armaturen, has carried out and documented the required risk analyses. The employee charged with making this documentation available is Mr Kliemisch of EBRO-Armaturen.

Hagen, 21.12.2009

  
Olaf Kliemisch, Product Manager Actuator Technology

**OPERATING MANUAL FOR PNEUMATIC ACTUATORS EB4.1 – EB12.1 SYD AND EB5.1 – EB12.1 SYS**

<b>The manufacturer</b>	<b>EBRO ARMATUREN Gebr. Bröer GmbH, D58135 Hagen</b>
<b>declares that the EBRO pneumatic actuators EBx.1 SYD/SYS meet the following requirements:</b>	
<b>Requirements according to appendix I, Machinery Directive 2006/42/EC</b>	
1.1.1., g) Correct use	See operating manual
1.1.2., c) Incorrect use warnings	See operating manual
1.1.2., c) Required protective equipment	Exactly as for the pipe section in which the valve is installed
1.1.2., e) Accessories	No special tool is required for changing wearing parts
1.1.3 Components in contact with media	The materials of the parts in contact with media are determined before delivery and are specified both in the type data sheet and the EBRO confirmation of order. The user is required to carry out an appropriate risk analysis for resistance to the operating medium.
1.1.5 Handling	Fulfilled by the notices in the installation instructions
1.2 and 6.2.11 Control	The user's responsibility, and in accordance with the installation instructions for the actuator
1.3.2 Prevention of breakage risks	For functional components: assured if actuator correctly used
1.3.4 Sharp corners and edges	Requirement fulfilled
1.3.7/8 Injury caused by moving parts	Requirement fulfilled if correctly used. Service and repair are only permissible with actuator deactivated and power supply switched off.
1.5.1–1.5.3 Power supply	The responsibility of the user. See also installation instructions for the actuator
1.5.5. Operating temperature	Warning notice against unacceptable temperatures: see Operating Manual, section <correct use>
1.5.7 Explosion	⊕ protection required. Must be expressly agreed in purchase order. In this case: use only as marked on the actuator.
1.5.13 Emission of hazardous substances	Not applicable
1.6.1 Servicing	See operating manual Holding of spare part stock to be agreed with with EBRO Armaturen International Est. + Co.KG.
1.7.3 Identification	Valve: in accordance with assembly instructions. Actuator: see actuator manufacturer's documentation.
1.7.4 Operating instructions	These installation instructions also contain instructions for the use of the actuator. Additional information required for the operation of the <complete machine> is the responsibility of the planner/user.
<b>Appendix III</b>	The actuator is not a <complete machine>: therefore it has no CE marking for conformity with the Machinery Directive
<b>Appendices IV, VIII-XI in accordance with EN 12100</b>	Not applicable
1. Area of application	The basis for this is decades of experience of use of the actuator types named on page 1. <i>Note: it is essential that the user carries out a risk analysis of the pipe run and the valves installed therein that is specially adapted to the operating conditions in accordance with sections 4 to 6 of EN 12100 – such an analysis is not possible for the manufacturer, EBRO Armaturen International Est. + Co.KG. in respect of standard valves.</i>
3.20.6.1 Inherently safe design	The actuators are manufactured according to <inherently safe design> principles.
Analysis according to sections 4, 5 and 6	Experience of faulty operation and misuse documented by the manufacturer in the context of cases of damage (documentation in accordance with ISO9001) was used as the basis.
5.3 Limits of the machine	Limiting of the <incomplete machine> was carried out in accordance with the <correct use> of the actuator.
5.4 Decommissioning, disposal	Not within the responsibility of the manufacturer, EBRO Armaturen International Est. + Co.KG.
6.2.2 Geometric factors	Since the valve and actuator comprise the functional parts, when correctly used, this section does not apply.
6.3 Technical protective devices	Where applicable, only required for accessories – see confirmation of order.
6.4.5 Operating instructions	Since valves with actuators work automatically, following the command signals from the controller, the operating manual describes those aspects that are <typical of the actuator> and must be provided to the manufacturer of the piping system.
Risk analysis	The risk analysis was carried out in accordance with MRL appendix VII, B) by the manufacturer, EBRO Armaturen International Est. + Co.KG and is documented in accordance with MRL appendix VII B).