

Pneumatic Rotary Actuators

Type EB265 – EB280; EB88 DA double-acting



Type EB265 – EB280; EB88 SR(F) 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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If required, additional information can be downloaded or ordered from the following addresses:




www.ebro-armaturen.com

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A) General

A1 *Explanation of symbols*

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

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

A2 *Correct use*

Pneumatic rotary actuators type EBx DA (double-acting) and type EBx SR(F) (with closing or opening spring) are intended,

- after connection of the solenoid valve to a system-side controller,
- with a gaseous control medium (usually 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 EBx DA with double-action, for type EBx SR(F) 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 put 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 output torque and characteristic – see technical appendix – must be matched to the valve and its optical indicator must show the valve position correctly.

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 lightly oiled for switching cycles >4x/min.


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 must only be operated in accordance with the following documents:

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

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

	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.
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Note 1:

*This manual should be used preferably 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 allocating an individually supplied actuator to the appropriate valve. Appendix B of the relevant standard, EN15714 - 3, gives detailed notes **on this**.


A3 Divergent use

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



A4 Identification of the actuator

Every actuator is identified by a type plate:

To ensure that the actuator remains identifiable, the type plate on the actuator housing must not be covered after the actuator is assembled on the valve and installed in the pipe section.



 Danger	Exceeding the maximum pressure indicated on the type plate presents a danger for subsequent operation.
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A5 Transport and (interim) storage

	Actuators with electrical supplementary modules: To avoid corrosion damage to electrical components during storage, the actuators should be stored at constant room temperature.
	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.

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.

	When fitting a belt, make sure that it is not fastened to any supplementary modules. Protect the actuator from any damage during transport
	Only for special actuators fitted with (manual) override: Since the override is usually heavier than the actuator, the securing belts can also be attached to the override housing (but not to the handwheel!).

B) Mounting the actuator onto the valve and connecting supplementary modules



These instructions include safety notices for foreseeable risks when mounting the actuator onto a valve.

It is the user's responsibility to complete these instructions for other risks, especially those arising with specific valves. It is assumed that all requirements for this system have been met.

The connection of any electric/electro-pneumatic supplementary 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



- The assembly and pneumatic/electrical connection of an actuator to the operator's system(s) may only be carried out by experienced specialists. For the purposes of this manual, experienced persons are people who, on the basis of their training, technical 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.

Knowledge of the typical properties of rotary valves (butterflies, ball valves) is also required for the assembly; assembly and connection should be carried out in collaboration with experienced colleagues, where appropriate.

- Actuators are not "stepladders". External loads must not be applied to the valve, actuator or feed lines.
- 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.



Risk of crushing!

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 boreholes!),
- 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 put the actuator in the <CLOSED> or <OPEN> position, seat the actuator on the valve and centre.
The actuator can be positioned anywhere on the valve; this 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 pipeline axis: valve is closed
 - ▶ pointer parallel to pipeline axis: valve is open

 Danger	An incorrect position indication presents a danger for subsequent operation.
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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 supplementary modules.
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Recommended feed cross-sections (non-binding):

Size	EB265	EB270	EB280	EB88
Actuator displacement volume [litres]	6.45/6.7	8.4/11.8	16.8/17	33.7/34
Recommended feed line Ø (up to 6 m length)	Ø10/8	Ø10/8	Ø10/8	Ø10/8
Shortest possible switching time (approx.) [s]	1.5	5	5	10

Note:

The shortest possible switching time shown in this table is an approximate 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 extended significantly.

The control diagrams for

- ▶ double-acting actuators EBx DA are shown in Fig. 1
- ▶ single-acting actuators with spring reset EBx SR (F) are shown in Fig. 2

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

The connection diagrams as per VDI/VDE 3845 (Namur) feature a G ¼" thread

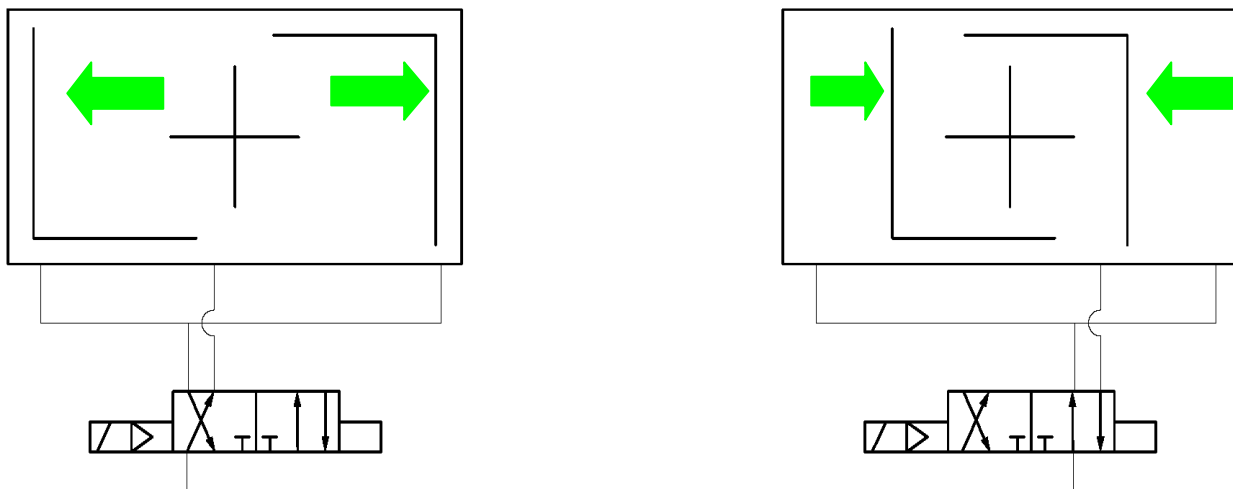


Fig. 1: Schematic diagrams for double-acting actuators EBx.1 SYD

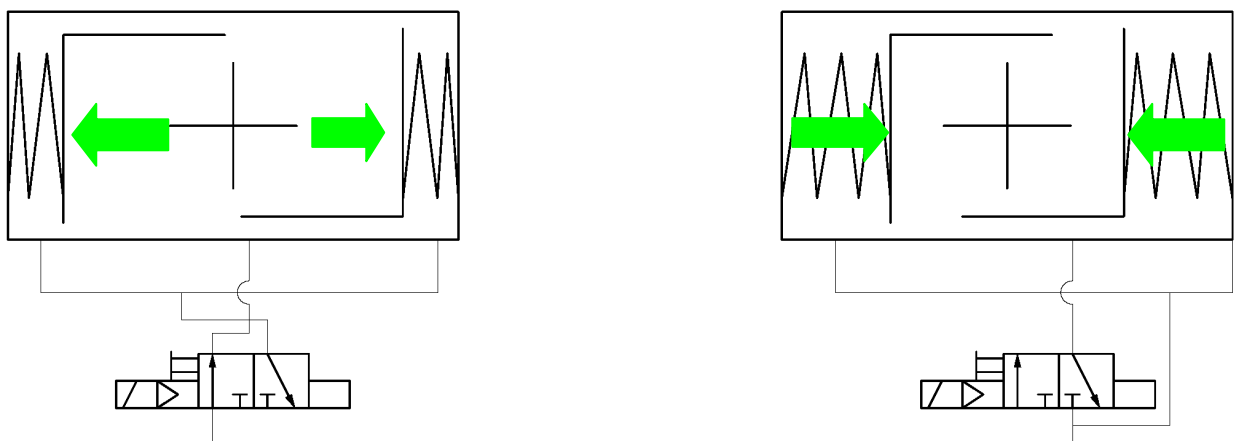


Fig. 2: Schematic diagrams for single-acting actuators EB DA

!	<p>In the standard version of the actuator, feeding control air to the left connection must cause an anticlockwise motion; feeding to the right connection must cause a clockwise motion.</p> <p>Spring-reset actuators are to be fed only via the right connection; see fig. 2</p>
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B5 If required: connection of electrical/pneumatic supplementary 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 basic position <CLOSED>

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

The end stop in the actuator is adjusted for the <CLOSED> position ex works: If required: adjust stop screw (1 for DA) or (26 for SR(F)). (See illustration on page 14)

 Danger	The end positions may only be adjusted when the actuator is depressurised!
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- Loosen both nuts (2 for DA) or (29 for SR(F)), unscrew the end stop screws (1 for DA) or (26 for SR) by a few turns.
- Change the piston position by turning the drive shaft (15) until the groove of the square shaft lies parallel to the longitudinal axis of the cylinder.
- Screw in the end stop screws (1 or 6) on both sides until you feel resistance and then tighten the nuts (2 or 29).

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 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.

 Danger	Incorrect position feedback (and incorrect optical display) presents a danger for sequent operation.
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- **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 which ensures the smooth operation of a valve under operating conditions.
- **Is the solenoid valve connected correctly?**
If control pressure is present but the control signal fails (to test, for example, pull out the plug), the valve must move to the position specified by the purchaser:

Actuator type	Type ID	the valve must
double-acting	EB□ DA	<i>Unless otherwise specified in the order:</i> move to the “CLOSED” position.
spring-closing	EB□ SR(F)	move to the “CLOSED” safety position.
spring-opening		move to 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 tightened correctly?
In functional testing, relative movement between the valve, mounting bracket (if present) and pneumatic actuator should not be detectable. If necessary, re-tighten all screws on the flange joint – see table in section B3.
- Testing the 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**” display (in the system-side control centre) must be compared with the optical 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 installation instructions of the component manufacturer must be complied with.

B8 Additional information: dismantling the actuator

Observe the same safety rules as for the piping system, the compressed air supply and the (electrical/electro-pneumatic) control system.


Then carry out the following steps:

- Mark the alignment between actuator and valve position and record it for reassembly.
- Safely shut off the compressed air supply – if necessary, depressurise the valve.
- Disconnect the compressed air supply and control connections.
- Loosen the actuator/valve flange joint and lift the 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 complete these instructions for other risks, especially those arising with specific valves.</p>
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C1 **Safety notices for operation**

	<ul style="list-style-type: none"> • The function of a valve-mounted pneumatic actuator must comply with the <Correct Use> described in section A2. • The conditions of use must comply with the identification shown on the actuator type plate. <p>A standard version actuator may only be operated within the approved temperature limits of -20 °C and +80 °C (EBRO standard).</p> <ul style="list-style-type: none"> • Any work on the actuator may only be carried out by experienced personnel. For the purposes of this manual, experienced persons are people who, on the basis of their training, technical knowledge and professional experience, can correctly assess and execute the work assigned to them and can identify and avoid potential risks.
 Risk of crushing!	<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"> • When pneumatically powered, the actuator requires a continuous supply of compressed air to ensure stable operation. • If the compressed air supply is interrupted or switched off, <fail safe> actuators move the valve to the predetermined CLOSED or OPEN position.
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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 must be in perfect condition. Before the rotary actuator is dismantled for troubleshooting, the responsible operations department must issue its release (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 of fault	Corrective measure
Rotary actuator does not respond	Power supply to 5/2-way solenoid valve interrupted	(Re-)establish power 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:

This appendix is not part of the <Original Mounting Instructions>, it simply provides additional 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 Adaptation to the valve

The pneumatic rotary actuators type EB□ DA (double-acting) and type EB□ SR(F) (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 output torques of the rotary actuators specified in section D5 are nominal torques. They are achieved with a nominal compressed air supply pressure of 5.5 bar.



The output 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 D1.4 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 specified by the valve manufacturer, is derived from these parameters.

It is recommended to add a safety margin 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

The configuration of the actuator as per EN 15714-3, Table 1 is the specification for type testing the actuator during endurance testing at 30% of nominal power under laboratory conditions.

The operating conditions - and the pressure and purity of the compressed air in particular - will determine if and when the actuator requires servicing.



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 Emergency manual override

Emergency manual override 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 for an actuator is 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 pipework, and whether this requires additional support.

D1-9 Corrosion protection

This unit corresponds to corrosion category C4, as per 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)

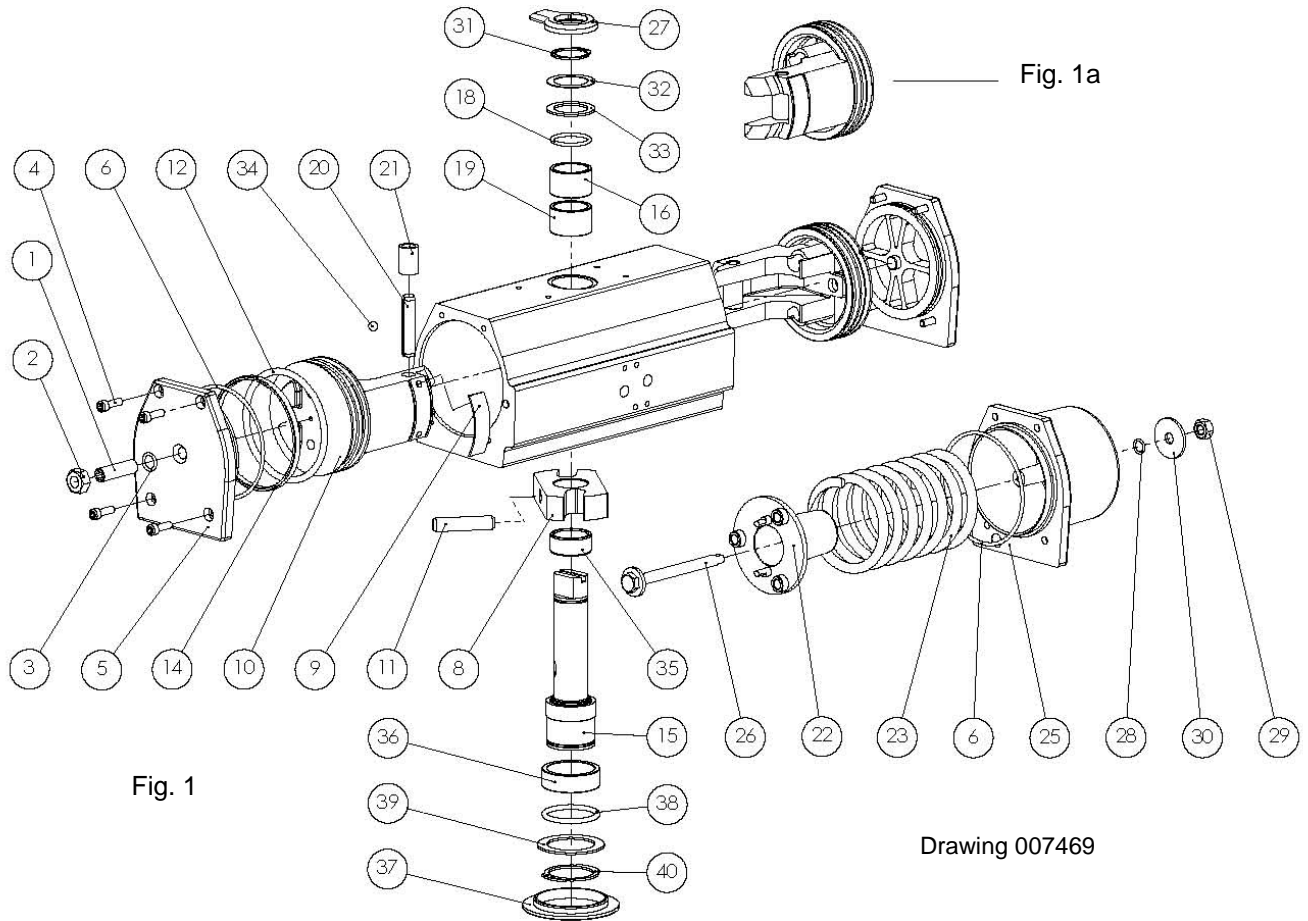
At the customer's request, the actuator can be supplied fitted with 2 (or more) limit switches to signal "OPEN" and "CLOSED" – the manufacturer, voltage and current type (DC or AC) must be specified for the magnet.

D2-3 Emergency 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□ DA - double-acting and EB□ SR(F) – single-acting



Drawing 007469

Material table for EB 200					
Part No.	Description	Number of DA	Number of SR	Material	Surface treatment
1	Adjusting screw	1	-	Sizes 210-260: Non-corroding steel Other: Steel	- / galvanized
2	Locking nut	1	-	Sizes 210-260: Non-corroding steel Other: Steel	- / galvanized
3	O-ring	1	-	Nitrile	-
4	Screw	8-16	8-16	Sizes 210-260: Non-corroding steel Other: Steel	- / galvanized
5	End plate with borehole	1	-	Aluminium	powder coated
6	O-ring	2	2	Nitrile	-
7	Cylinder	1	1	Aluminium	anodisiert
8	Scotch Yoke	1	1	Steel	-
9	Guide element	1	1	POM/PTE	-
10	Piston	1	1	Aluminium	-
11	Tubular pin, double	1	1	Spring steel	-
12	O-ring	1	1	Nitrile	-
14	Guide tape	1	1	PTFE, filled	-
15	Rotating shaft	1	1	Sizes 210-260: Non-corroding steel Other: Steel	- / Galvanized and yellow chromated
16	Bearing, top	1	1	Polymer material	-
17	End plate without borehole	1	1	Aluminium	anodisiert
18	O-ring top	1	1	Nitrile	-
19	Sliding ring, top	1	1	Polymer material	-
20	Piston pin	1	1	Steel	-
21	Piston roller	1	1	Steel	-
22	Spring guide	-	1	Aluminium	-
23	Outer spring	-	1	Alloyed spring steel	corrosion protection
24	Inner spring	-	1	Alloyed spring steel	corrosion protection
25	Spring casing	-	1	Aluminium	powder coated
26	Clamping screw	-	1	Sizes 210-260: Non-corroding steel Other: Steel	- / galvanized
27	Indicator	1	1	Polymer material	-
28	O-ring	-	1	Nitrile	-
29	Locking nut	-	1	Sizes 210-260: Non-corroding steel Other: Steel	- / galvanized
30	Marking screw	-	1	Aluminium	anodisiert
31	Locking ring, top	1	1	Spring steel	corrosion protection
32	Intermediate disk	1	1	Non-corroding steel	-
33	Sliding disk, top	1	1	Polymer material, chemically stable	-
34	Seal	1	1	Sizes 210-240: Non-corroding steel Other: Nitrile	-
35	Sliding ring, bottom	1	1	Polymer material	-
36	Bearing, bottom	1	1	Polymer material	-
37	Sliding ring	1	1	Polymer material	-
38	O-ring, bottom	1	1	Nitrile	-
39	Sliding disk, bottom	1	1	Polymer material, chemically stable	-
40	Locking ring, bottom	1	1	Spring steel	corrosion protection

- 1) For actuators size 265 and 280: twice the number of parts 3) EB 270-280 have steel slotted pins
4) Not pictured! Does not apply to sizes 265 and 280 5) For sizes 270 and 280 only, not pictured 6) Included in the seal kit

EB200-DA - Double Acting			Torque Mn							
Type	Function	Position 0° = closed 90° = open	Air pressure supply							
			2,1 bar 30 psi	2,8 bar 40 psi	3,5 bar 50 psi	4,2 bar 60 psi	4,5 bar 65 psi	5,5 bar 80 psi	6,0 bar 87 psi	7,0 bar 100 psi
EB 265-DA	Air opens	0°	432	576	720	864	926	1188	1296	1512
	Air closes	60°	203	271	338	406	435	556	606	711
		90°	307	409	512	614	658	844	921	1075
EB 270-DA	Air opens	0°	630	840	1050	1260	1350	1733	1890	2200
	Air closes	60°	315	420	525	630	675	862	940	1100
		90°	455	607	758	910	975	1247	1360	1590
EB 280-DA	Air opens	0°	1270	1693	2117	2540	2721	3483	3800	4450
	Air closes	60°	635	847	1058	1270	1361	1742	1900	2220
		90°	915	1220	1525	1830	1961	2512	2740	3190
EB 88-DA	Air opens	0°	2413	3217	4022	4826	5170	6618	7220	8455
	Air closes	60°	1207	1609	2010	2413	2586	3310	3610	4218
		90°	1739	2318	2898	3477	3726	4773	5206	6061

EB200-SR - Single Acting - spring-closing			Adapted springs at respective air supply pressure							
Type	Function	Position 0° = closed 90° = open	Adapted springs at respective air supply pressure							
			2,1 bar 30 psi	2,8 bar 40 psi	3,5 bar 50 psi	4,2 bar 60 psi	4,5 bar 65 psi	5,5 bar 80 psi	6,0 bar 87 psi	7,0 bar 100 psi
EB 265-SR	Air opens	0°	280	373	467	560	607	671	730	935
		60°	113	150	187	225	244	280	305	360
		90°	125	167	208	250	271	303	330	425
	Spring closes	90°	210	280	350	420	455	560	730	695
		30°	103	137	171	205	222	273	305	355
		0°	153	203	254	305	330	407	330	525
EB 270-SR	Air opens	0°	355	473	592	710	769	947	1030	1210
		60°	155	207	258	310	336	413	440	520
		90°	190	253	317	380	412	507	550	640
	Spring closes	90°	315	420	525	630	682	840	910	1060
		30°	155	207	258	310	336	413	440	520
		0°	215	287	358	430	466	573	620	720
EB 280-SR	Air opens	0°	715	953	1192	1430	1549	1907	2080	2430
		60°	310	413	517	620	672	827	900	1050
		90°	380	507	633	760	823	1013	1110	1290
	Spring closes	90°	635	847	1058	1270	1376	1693	1840	2150
		30°	310	413	517	620	672	827	900	1050
		0°	435	580	725	870	942	1160	1260	1470
EB 88-SR	Air opens	0°	1359	1811	2265	2717	2943	3623	3952	4085
		60°	589	785	982	1178	1277	1571	1710	1995
		90°	722	963	1203	1444	1564	1925	2109	2451
	Spring closes	90°	1207	1609	2010	2413	2614	3217	3496	4085
		30°	589	785	982	1178	1277	1571	1710	1995
		0°	827	1102	1378	1653	1790	2204	2394	2793



Pneumatic actuator EB200-SR spring-opening Adapted springs to air supply pressure Torque Mn

EB200-SRF - Single Acting - spring-opening

Type	Function	Position 0° = closed 90° = open	Adapted springs at respective air supply pressure							
			2,1 bar 30 psi	2,8 bar 40 psi	3,5 bar 50 psi	4,2 bar 60 psi	4,5 bar 65 psi	5,5 bar 80 psi	6,0 bar 87 psi	7,0 bar 100 psi
EB 265-SRF	Spring opens	0°	280	373	467	560	607	671	730	935
		60°	113	150	187	225	244	280	305	360
		90°	125	167	208	250	271	303	330	425
	Air closes	90°	210	280	350	420	455	560	730	695
		30°	103	137	171	205	222	273	305	355
		0°	153	203	254	305	330	407	330	525
EB 270-SRF	Spring opens	0°	355	473	592	710	769	947	1030	1210
		60°	155	207	258	310	336	413	440	520
		90°	190	253	317	380	412	507	550	640
	Air closes	90°	315	420	525	630	682	840	910	1060
		30°	155	207	258	310	336	413	440	520
		0°	215	287	358	430	466	573	620	720
EB 280-SRF	Spring opens	0°	715	953	1192	1430	1549	1907	2080	2430
		60°	310	413	517	620	672	827	900	1050
		90°	380	507	633	760	823	1013	1110	1290
	Air closes	90°	635	847	1058	1270	1376	1693	1840	2150
		30°	310	413	517	620	672	827	900	1050
		0°	435	580	725	870	942	1160	1260	1470
EB 88-SRF	Spring opens	0°	1359	1811	2265	2717	2943	3623	3952	4085
		60°	589	785	982	1178	1277	1571	1710	1995
		90°	722	963	1203	1444	1564	1925	2109	2451
	Air closes	90°	1207	1609	2010	2413	2614	3217	3496	4085
		30°	589	785	982	1178	1277	1571	1710	1995
		0°	827	1102	1378	1653	1790	2204	2394	2793

D4 Notes on risks arising from continuous operation

- The actuator is designed for continuous operation, following EN15714-3, Table 1.
- The actuator is screwed to the valve at the interface as per ISO5211. Section B2 contains the necessary tightening torques for the screw connection.
Actuators with higher actuation frequencies should be visually inspected at suitable intervals (no later than when the valve is serviced) to check the secure fit of this screw connection – it should be tightened as necessary.
- 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 specifications of EN 5211:
	The <CLOSED> position of the valve is usually 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, MA4.0.1-MRL section B6, 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□ SR(F) are pretensioned and appropriately secured. The protective sleeve must not be altered by the user. It is assumed that the springs will not be exposed to corrosive control media.
- *Replacing spring sets:*
If required, the spring sets of type EB□ SR(F) can be replaced 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 accessories.
▶ The actuator is designed for static loading within the piping system. Risks arising from loads caused by vibrations in the system are not covered: As a minimum in such cases, the long-term securing of the screw connections on the actuator 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
Gewerbestrasse 5
CH-6330 Cham, Switzerland

declares that the pneumatic rotary actuators

Type EB265 – EB280; EB88 DA double-acting
Type EB265 – EB280; EB88 SR(F) single-acting

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

DIN EN ISO 5211	Industrial valves – Rotary actuator attachments
DIN EN 15081	Mounting kits for rotary valve actuator attachments
VDI / VDE 3845	Positioning element joint
EN 12100	Safety of machines
ISO 8573-1 cl. 3 and 5	Compressed air quality

The following product documents are available:

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

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 4.0.1-MRL Rev. 0/2009) included in the delivery and must observe 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 the person responsible has declared that the system in which the valve is installed conforms with all the above-mentioned EC directives. 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 available documentation is Mr Kliemisch of EBRO-Armaturen.

Hagen, 21.12.2009


Olaf Kliemisch, Product Manager Actuator Technology

OPERATING MANUAL FOR PNEUMATIC ACTUATORS
EB265 – EB280; EB88 DA AND EB265 – EB280; EB88 SR(F)

The manufacturer	EBRO ARMATUREN Gebr. Bröer GmbH, D58135 Hagen
declares that the EBRO pneumatic actuators EBx.1 SYD/SYS meet the following requirements:	
Requirements according to appendix I, Machinery Directive 2006/42/EC	
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 is used correctly
1.3.4 Sharp corners and edges	Requirement fulfilled
1.3.7/8 Injury caused by moving parts	Requirement fulfilled if used correctly. 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 Stock-keeping of wearing parts to be agreed 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
Appendix III	The actuator is not a <complete machine>: therefore it has no CE marking for conformity with the Machinery Directive
Appendices IV, VIII-XI	Not applicable
in accordance with EN 12100	
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 pipeline section 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. regarding 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 used correctly, 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)