EBRO ARMATUREN®

BA 4.2 - MRL

Pneumatic cylinder for knife gate valves

Type EC and ECS-O/C

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

Contents

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

www.ebro-armaturen.com

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Gewerbestrasse 5
CH-6330 Cham
☎ (041) 748 5959
Fax (041) 748 5999

A) General

In this instruction a “Pneumatic cylinder for knife gate valves” is denominated shortly “cylinder” or “double acting EC or “single acting ECS-O/C”.
The instruction of a knife gate valve to which this cylinder is installed, applies with priority. Instructions for the accessories, if any, should be observed.

A1 Symbols

In this instruction notes and warnings are written with symbols:

 XXXXX	**Danger / Warning** Points out a dangerous situation which may cause personal injuries or death.
	**Advice** Has to be respected.
	**Information** Information useful to follow.

If these notes and warnings are not respected by the user, dangerous situations may occur and may invalidate the warranty of the manufacturer.

A2 Pneumatic cylinder destination

Pneumatic cylinders double acting **type EC** and single acting type **ECS-O** and **ECS-C** are destined to operate a knife gate valve between its end positions with a signal from the plant control system:

- After connection of the accessory for compressed air supply and exhaust (i.e. solenoid valve or other device), with compressed air, maximum 10 bar, (see cylinder marking) and connection to the plant control system,
- at admissible cylinder temperature limits between -20°C and-+80°C. Other temperature on request.

A (optional) positioner can operate the valve into any intermediate position between OPEN and CLOSED.

The compressed air shall have a dew point equal to –20 °C or, at least, 10 °C below the ambient temperature (ISO 8573 Part 1, Class 3). The air shall be slightly oil misted.

	**Solenoid valves usually need a filter with a mesh width of 40 µm (ISO 8573-1, Class 5).**

Single acting pneumatic cylinders with integrated spring **Type ECS-C/O** additionally have

- a fail safe-function with spring return closing (**ECS-C**) or spring return opening (**ECS-O**) at interruption or fail of the air supply.

Note 1:
*Knife gate valves supplied from EBRO with double acting cylinder (**EC**) including a solenoid valve shall close at electrical signal supply interruption, if the customer has not specified otherwise.*

*Knife gate valves supplied from EBRO with cylinder with fail-safe function (**ECS-C or ECS-C**) including a solenoid valve shall move into the fail safe position at electrical signal supply interruption, if the customer has not specified otherwise.*

Note 2:
The surrounding environment and the system in which the cylinder is installed shall have normal conditions for its specification, to obtain the optimal lifetime of the valve and its pneumatic cylinder.

	EBRO Armaturen does not accept any responsibility for the product, if the cylinder is modified or if wear part not approved by the manufacturer are used on the cylinder.

A3 Related documents

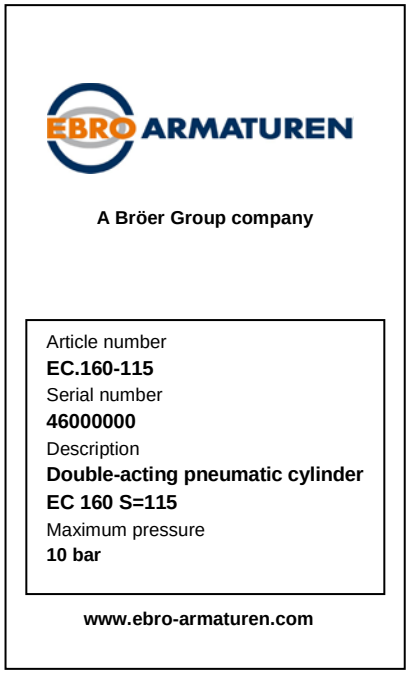
For a cylinder assembled to a knife gate valve:

Further information on Stafsjö-knife gate valves and EBRO-cylinders can be found on www.ebro-Armaturen.com or www.stafsjo.com:

ds+valve type (i.e. ds-BV)	= Valve datasheet with technical information (dimensions, material specification etc.)
mi+valve type (i.e. mi-BV)	= Specific details for maintenance for each valve type.
sp+valve type (i.e. sp-BV)	= Specific details for spare parts for each valve type.
act-cylinder type (i.e. act-EC)	= Datasheet for cylinder with technical information.
sp+cylinder EC-type (i.e sp-EC)	= Specific details for spare parts for each cylinder type.

A4 Cylinder marking

Each pneumatic cylinder is marked as follows:



The marking shall not be damaged, covered or removed.

	In any contact with EBRO Armaturen or Stafsjö please refer to the **article- and serial number** stated on the label.

A5 Transport, storage and handling

	A cylinder supplied assembled to a knife gate valve: Observe the original installation and service instructions **for the knife gate valve**.

Transport:

	A cylinder delivered separately: An EBRO cylinder is packed according to the conditions of delivery. Damage can occur to the goods due to mishandling at transport. It is important to make a visual inspection of the goods at arrival. If transport damages are detected a report has to be written to the transportation company.

Handling and storage:

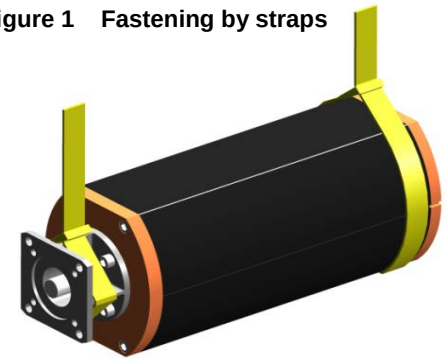
Any lifting and handling shall be carried out with soft straps. The soft straps shall be placed and fastened around the cylinder – see Figure 1.

!	**Never fix a soft strap at an accessory, the cylinder's tie rods or piston rod.**

At lifting and transport respect the weight of the cylinder, which is stated in the datasheet and make sure:

- That the soft straps do not risk to slide along the cylinder.
- That the cylinder and specifically mounted accessory are not exposed to blows or thrusts.
- That the cylinder at dispose is not applied to an accessory.

Figure 1 Fastening by straps



A pneumatic cylinder and its accessories shall be stored in a clean and dry environment, protected against dirt, dust and other pollution. It should not be exposed to direct sunlight.

A6 Air connections

The air connections on the pneumatic cylinder have an interface according <Namur VDI/VDE 3845> and pipe threads according to ISO 228-1:

Cylinder size	Connection	Air pipe dimension *)
EC 100 - EC 125	G ¼"	6 mm
EC 160	G ¼"	10 mm
EC 200	G ½"	12 mm
EC 250-320	G ½"	15 mm

**) This (inside) size shall be larger in case of very long piping*

Table 2 Cylinder air supply dimension

Use proper sealing when the air connections are screwed onto the cylinder.
The air supply pipe connected to the pneumatic cylinder shall have at least the same size as the connection in the cylinder.
If the air supply pipe is too small it will throttle the air flow and may affect the function.

!	Single acting cylinders need one air supply connection only: Spring to open: Air connection at A, see figure 3. Spring to close: Air connection at B, see figure 3. The other cylinder air connection shall be closed by a filter to protect the cylinder inside from contamination at service.
i	At air connection respect the requirements of pneumatic/electric accessories, if any.

B) Installation, functional check and disassembling

!	**This instruction includes safety recommendations for foreseeable risks at installation of the cylinder onto a knife gate valve.** It is the responsibility of the user to complete this instruction for system specific aspects. All requirements of the system shall be observed.

B1 Safety warnings at installation

!	• Installation shall be performed by qualified personal. Qualified are those persons who, due to experience, can judge the risk and execute the work correctly and who are able to detect and to eliminate possible risks. • After installation, the function of the pneumatic cylinder shall be in compliance with the "Pneumatic cylinder Destination", see chapter A2. • For the cylinder the same safety instructions apply as for the air supply system and the control system to which the cylinder is connected. The respect of these requirements shall be followed. • The cylinder should not be exposed to external loads. In case of necessary support see chapter B6. • The cylinder and its accessories shall be protected from any environment that may imply any risks to the function.
Danger	1. Installation of a pneumatic cylinder on knife gate valve is only allowed if: • The knife gate valve is removed from the system or depressurised when installed. 2. A knife gate valve with cylinder shall be operated only if: • All gate guards are installed correctly. **The user's life and health is at stake if this is not followed.** All other handling is the responsibility of the user.
Danger	**All work with single acting cylinder is subject to danger and extreme caution is required during installation.** Make sure that all instructions described are followed and understood before any work with the cylinder begins. **The user's life and health is at stake if this is not followed.**

B2 Conditions for combination valve and cylinder

!	Valve/cylinder interfaces shall have identical dimensions. To assure this the customer must give all necessary information to EBRO at the cylinder order (i.e. valve type, DN etc).
	Due to safety requirements knife gate valve with a cylinder shall have all gate guards installed when it is operated. The user's life and health is at stake if this is not followed. These guards inhibit visual control of gate position. If control of the gate position is necessary**, the beams are prepared for installation of electronic limit switches in both end positions.**
Warning	Do not remove the black caps from the beams **installed without a limit switch**.

B3 Installation on the knife gate valve

- Generally a Stafsjö knife gate valve should be mounted in a horizontal pipe line with the cylinder in a vertical upright position. For any other cylinder position see chapter B6 <Support…>.
- The cylinder is delivered ready for installation on a Stafsjö knife gate valve.
- When mounting a cylinder on a Stafsjö knife gate valve, **the valve cannot remain into the pipe line**, in order to inspect and adjust the valve gate stroke correctly.
- Before installing the cylinder, ensure:
  – That the cylinder has correct –Ø and stroke length and is correctly sized for the valve type.
  – That the valve and cylinder interface is rectangular and correctly centred to the gate connection.
  – That the compressed air quality conforms to chapter A2 <cylinder destination> and the air connection dimensions conform to the cylinder capacity, see table in chapter A6.
- Before mounting make sure that you have prepared (item no. see Fig.3):
  – Clevis pin (20) and split pins (21).
  – Correctly sized gate guards to cover the full gate stroke.
  – Beams with holes for the tie rods to be able to loosen/fasten the cylinder at the knife gate valve.
  – Compressed air characteristics, in order to operate the cylinder.
  – *For single acting, ECS O/C:*
  An air regulator and a ball valve unit – see Fig.2 – that can be closed completely tight.

Mounting of a single acting cylinder (ECS-O/C) to a knife gate valve

Warning	At single acting cylinder installation it is necessary to control the compressed air supply with an air regulator (ball valve/regulating valve unit) – see Fig.2 – to adjust the cylinder rod position gently to the knife valve gate position. This unit shall allow as well to hold the cylinder tie rod in any favoured position to connect the gate/tie-rod coupler.

Before mounting the cylinder onto the valve, the piston rod must be moved to its TOP position. In order to do so follow the steps below:

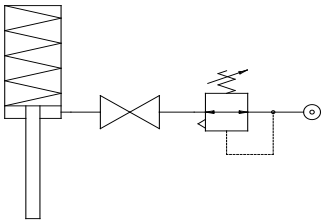


Figure 2
Connection of the air regulator and the ball valve
ECS-O Air connection at A, see figure 3.
ECS-C Air connection at B, see figure 3.

1. Connect the air supply to the air regulator – see Fig. 2.
   Make sure the ball valve is closed.
2. Open the ball valve and operate the actuator ECS-O/C with the air regulator.
3. *For **ECS-C**, spring return for closure only:*
   Move the piston rod (25) to its TOP position and close the ball valve and make sure that there is no leakage.
4. Disconnect the air supply from the air regulator. The air regulator and the ball valve **shall not** be removed.
5. Then follow the following steps for the adjustable gate clevis.

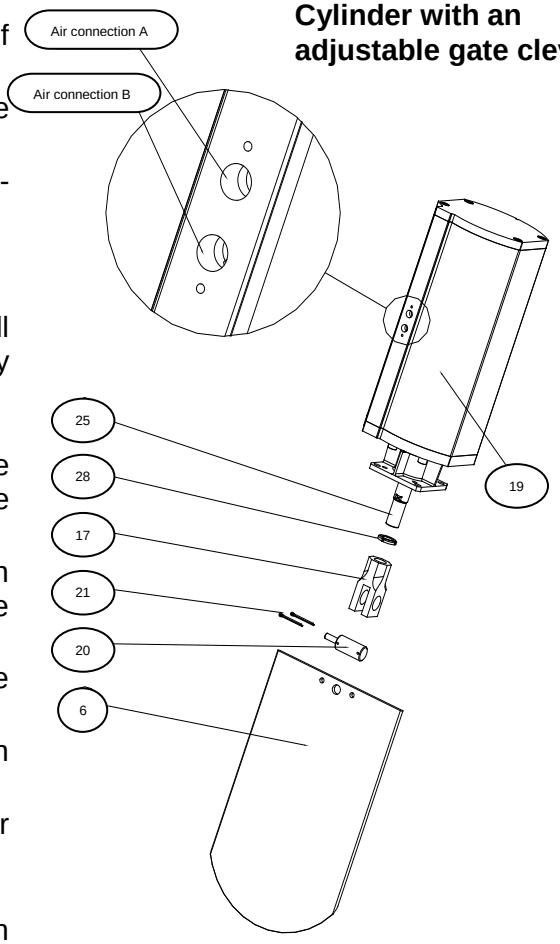
Mounting of a cylinder with adjustable gate clevis onto a knife gate valve

Follow the steps below:

1. Make sure that the knife gate valve is in closed position.
2. Screw the locking nut (28) and gate clevis (17) into the half position of the threaded part of the piston rod (25).
3. Put the cylinder at the valve interface while holding the beams together.
4. Attach the cylinder to the valve interface by manually fastening the four nuts.

   For double acting cylinder EC only: Go to number 6.
5. *For single acting **ECS-C and ECS-C** only:*
   Connect the air supply to the air regulator. Open the ball valve. Move the piston rod (25) to the gate (6) by gently operating the air regulator. Then go to number 7.
6. *For double acting **EC** only:*
   Connect the air supply to the air regulator and move the piston rod (25) toward the gate (6) by gently operating the cylinder up to contact gate clevis (17) / valve gate (6).
7. Make sure that the hole in the gate clevis (17) will align with the hole in the gate and with the hole in the valve beam in order to attach the clevis pin (20).
8. Make sure that the cylinder is aligned parallel to the valve gate and to the valve beams.
9. Connect the gate clevis (17) to the gate with the clevis pin (20) and lock it with the split pins (21).
10. Fasten the cylinder bolting at the interface with the four nuts.
    Fasten evenly and crosswise.
11. Leave an **EC** and **ECS-C** in closed position. Leave an **ECS-O** in opened position by evacuating the air in the air regulator.

Figure 3
Cylinder with an adjustable gate clevis



B4 Adjusting cylinder stroke length

Make sure that the cylinder is correctly mounted on the valve – see chapter B3.

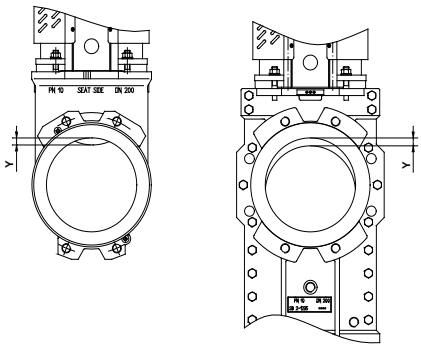
Danger to jam one's fingers	*For single acting cylinder **ECS-C** (spring return to close):* **Under no circumstances is it allowed to put one's fingers or other body parts in valve bore during this operation.**

*For single acting cylinder **ECS,** only:*
Connect the air supply to the air regulator and open the ball valve, see figure 2.

All cylinders:

1. Open the knife gate valve by gently operating the cylinder. The piston rod (25) must be in its TOP position in the cylinder. In this position, the gate (6) should not have left the valve bore completely.
2. Measure the distance “Y” (see Figure 4) between the edges of the retainer ring in the valve body and the lowest part of the gate.
3. If Y ≠ 0 mm, carefully close the knife gate valve.
   If Y = 0 mm, go to step 6.

Figure 4
Adjusting the cylinder stroke length



Danger	*For single acting cylinder **ECS-C** and **ECS-O**:* When adjusting the gate clevis make sure that the ball valve is completely closed and tight (see figures 2 and 4).

Dismount the split pins (21) and the clevis pin (20) to release the gate clevis (17) from the gate (6). Open the cylinder up to the position that the gate clevis (17) comes free. Adjust the gate clevis (17) on the piston rod (25) by screwing-up the gate clevis according the distance “Y”. Then lock it with the locking nut (28).

4. Then put again the gate clevis (17) at the gate (6) and connect it with the clevis pin (20) and the split pins (21), close the valve (100%) smoothly and re-open the cylinder to the full OPEN cylinder position. Check the overlap “Y” (see Figure 4).
5. After this adjusting, the lowest part of the gate should be at minimum edge-to-edge with the retainer ring (Y=0 mm) for a completely open valve – if not repeat the procedure to adjust the clevis setting accordingly:
   At incorrect adjustment the seat might be damaged at closure if the gate moves too far into the knife gate valve seat (the gate must not go off the seat). And if the gate is not fully open but partly in the knife gate valve bore, it would throttle the media flow which might cause erosion and damage the gate seat surface.
6. Install the gate guards and fasten the guard screws for durable protection.
   Observe warnings of chapter B2.

	These gate guards shall cover the full knife gate valve stroke: At any doubt, check the valve serial number (see valve nameplate) and ask Stafsjö or EBRO for support.

7. *For double acting cylinder **EC** only:*
   Disconnect the air supply and go to point 9.
8. *For single acting cylinder **ECS-C and ECS-O** only:*
   - Operate a knife gate valve equipped with ECS-O (fail safe opened) into the full open position before the air supply is disconnected.
     Then disconnect the air supply.
   - Operate a knife gate valve equipped with ECS-C (fail safe closed) into the full closed position before the air supply is disconnected.
   - Then disconnect the air supply.
9. *To install electronic limit switches (if any):*
   Pull out the black caps at the beams. Observe the manufacturer’s instruction for electric connection.

	Due to risk of injuries for the personnel: **If no limit switches are installed: In any case the two black caps shall remain in place to protect the personnel.**

B5 Installation of the cylinder/knife gate valve unit into the pipe system

!	For the knife gate valve installation into the pipe system follow the instructions given in the Original valve installation and service instruction

Connect the cylinder (and accessories, if any) to the air supply and plant control system. For correct air connection observe chapter A6. Follow the relevant accessory instruction, if any.

B6 Support of the cylinder

Fig. 5 Support points at tie rod bolting

Stafsjö's knife gate valve should be installed in a horizontal pipe line with the cylinder vertical in the upright position.
If the knife gate valve is mounted in any other direction, the dead weight of a long gate or a large cylinder may cause tensions/deformation in the valve body and may affect the valve tightness and function.
A valve/cylinder unit that is exposed to vibrations or other mechanical stresses can be subject to similar deformations. Knife gate valve and cylinder should be supported in this case as well.
Support of the cylinder can preferably be done by connecting the supporting device at the tie rod bolting interface, see figure 5.
Ask EBRO or Stafsjö for support if necessary.

B7 Checklist at end of Installation of the cylinder/valve unit into the pipe system

Following should be checked before start up of a of the cylinder/valve unit:

1. Is the air supply pressure sufficient?
   At the cylinder air supply connection, the pressure should conform to the values given in the data sheet. The air supply pressure shall remain in the limit of the cylinder marking.
2. Is the air supply piping sufficient?
   Check that the air supply to the cylinder has the right size and is correctly installed according to chapter A6.

   Note:
   A smooth valve gate operation at service indicates a sufficient air supply.
3. Is the knife gate valve stroke adjusted correctly?
   The valve shall move between into the 100% open or close positions by the relevant signal of the control system.

   Adjusting of cylinder stroke length is described in chapter B4.
4. Is the solenoid valve connected correctly?
   - The knife gate valve shall be completely opened or closed by the relevant signal of the control system.

   - At correct air supply pressure, but at interruption or fail of the electric signal at the solenoid valve *(for a test disconnect the cable!)* the knife gate valve should operate as follows:

Cylinder type	Action
Double acting	*If not otherwise specified by the customer's order:* **The knife gate valve shall close**
Spring to failure close	**The knife gate valve shall close**
Spring to failure open	**The knife gate valve shall open**

5. Is the knife gate valve/cylinder interface bolting correctly fastened?
6. Check if a support according to chapter B6 may be necessary.

!	**Never operate a knife gate valve with actuator without the gate guards securely fastened!**

At any trouble follow chapter C4.

B8 Installation in an ATEX-classified area ⟨Ex⟩

***Note**:*
Additional requirements may be found in the knife gate valve's installation and service instruction.

!	In ATEX-classified zones, in accordance with ATEX Directive 94/9/EC, only knife gate valves with ATEX- classification and relevant valve marking shall be installed.

Additional to the requirements above make sure that:

- The cylinder is part of the plant earthed system.
- The user has performed a risk analysis of the pipe line and knife gate valve/cylinder unit in accordance with the guidelines of ATEX Directives.

B9 Disassembling

For the cylinder the same safety instructions apply as for the air supply system and for the control system to which the cylinder is connected. The following requirements shall be observed.

⚠ **Danger**	1. Dismounting of a cylinder from a knife gate valve is only allowed if: • The knife gate valve is depressurised, • The cylinder is disconnected from the air supply 2. Disassembling of the cylinder itself is only allowed if: • The cylinder is disconnected from the air supply and from the knife gate valve. • **NO disassembling of a single acting cylinder shall be made by the user.** **The user's life and health is at stake if this is not followed.** All other handling is the responsibility of the user.

Disassembling the cylinder from the knife gate valve

See item-no. at Fig. 3:

All cylinders:

1. Depressurise the pipe line.

!	**If the complete unit cylinder/knife gate valve shall be dismounted from the pipe line follow the valve instruction.**
⚠	**The valve shall not be pressurised as long as the valve is not equipped with an actuator.**

Double acting cylinder EC:

2. Operate the valve into the completely closed position. Make sure that the clevis pin is centred in the lower hole of the beam. If the valve is equipped with limit switches, these shall be removed first.
3. Depressurise and disconnect the air supply from the cylinder.
4. Disconnect all electric connections.

5. Disconnect gate clevis (17) from the valve gate by removing the split pins (21) and clevis pin (20).
6. Remove the cylinder from the valve interface by loosening the four nuts at the valve interface. Use soft straps if necessary, see chapter A5. Make sure not to damage any accessory.
7. At storage, observe chapter A5.

Single acting ECS-O (fail safe opened) and ECS-C (fail safe closed):

1. Connect the air supply to the air regulator ball valve unit (see figure 2).
2. Operate the knife gate valve into complete closed position. Make sure that the clevis pin (20) is centred in the lowest hole of the valve beam. If the valve is equipped with switches of any kind, these have to be removed first.
3. Close the ball valve.
4. Disconnect all electric connections.
5. Disconnect the piston rod from the gate (6) by removing the split pins (21) and clevis pin (20).
6. Move the piston to the OPEN position in the cylinder by gently operating the air regulator.
7. Remove the cylinder from the valve interface by loosening the four nuts at the valve interface. Use soft straps if necessary, see chapter A5. Make sure not to damage any accessory.
8. Depressurise the cylinder by gently operating the air regulator to zero to bring it into its “fail-safe” position.

Danger	**The piston rod for ECS-C (fail safe closed) will move to its unpressurised position (piston rod out).** **Make sure no hand or fingers are in the way of the piston rod movement.**

9. Disconnect the air regulator and ball valve unit.
10. At storage, observe chapter A5.

Disassembling of the cylinder

For disassembling of the cylinder see the maintenance instructions for the cylinder **<act-EC>** on the document www.stafsjo.com (chapter A3).

Danger	**No disassembling shall be made of a single acting cylinder by the user.** **The user’s life and health is at stake if this is not followed!**

C) Service and maintenance

The user shall make a risk analysis as per Directive 2006/42/EC for the knife gate valve/cylinder system. For this analyse EBRO or Stafsjö supplies the following documents:

- This Original installation and service instruction for the pneumatic cylinder,
- The Original installation and service instruction for the knife gate valve,
- The manufacturer's declaration to EC Directives.

Further information on the pneumatic cylinder **types EC** and **ECS** can be found on www.stafsjo.com – see chapter A3.

	This instruction includes safety notes for industrial application for any foreseeable risk at use of the cylinder only. It is the responsibility of the user/plant designer to complete these instructions, consider specific risks from the plant.

C1 Safety warnings at service and maintenance

	• At service, the function of the cylinder shall be in compliance with the cylinder destination, see chapter A2. • The use of the cylinder shall be in compliance with the cylinder markings in chapter A4. • Service and maintenance shall be performed by qualified personal. Qualified are those persons who, due to experience, can judge the risk and execute the work correctly and who are able to detect and to eliminate possible risks. • At maintenance of the cylinder it should be disassembled as described in chapter B9. • No repair or maintenance shall be done on the cylinder when: – The pipe system is pressurised and/or – the air supply from the system is pressurised. • At any start up, air supply and electric connections should be visually inspected to be OK.
Danger	A valve with cylinder shall be operated only if: • All gate guards are installed correctly, so that the moving gate(s) is completely encapsulated. **If a fault or defect is detected at a single acting pneumatic cylinder ECS-O** and **ECS-C:** • No repair shall be made by the user himself. **The cylinder contains a compressed spring.** Repair on cylinder type **ECS-O/C** shall always be made by EBRO or Stafsjö's personnel or by EBRO or Stafsjö appointed personnel. **The user's life and health is at stake if this is not followed.**

C2 Service

Note:
For a cylinder assembled at a knife gate valve: Additional requirements may be found in the Knife gate valve installation and service instruction.

The start up can be made, if the cylinder has passed all checks according to chapter B7 <Checklist> without fail, the cylinder shall operate by the signals of the plant control system.

The cylinder should be visually inspected on regularly basis for leakage and other external effects that might involve risks for the user's personnel, the valve and/or its accessories.

A full operational test shall be performed once a month to verify that the cylinder/knife gate valve unit operates correctly. If a fault or problem is detected at an inspection or operational test, a more thoroughly check and repair should be made as soon as possible. Further information on spare parts and/or instructions for maintenance is available on www.stafsjo.com.

C3 Maintenance

As long as the cylinder is tight and passes the operational test the only maintenance is a visual control.

The lifetime of the wear parts in the cylinder depends on the frequency of the cylinder operation, the quality of the air supply (i.e. pressure, temperature and cleanliness) and of the surrounding environment.

Wear and spare parts can be identified by the documents listed in chapter A3: For a cylinder see the EBRO-document ***<sp-EC)>*** – to be downloaded by www.stafsjo.com

C4 Troubleshooting

Note 1:
For a cylinder mounted on a knife gate valve additional requirements may be found in the valve instruction.
Note 2:
Wear parts can be identified by the documents listed in chapter A3: For a cylinder see the EBRO-document <sp-EC)> – to be downloaded by www.stafsjo.com.

Problem	**Reason**	**Measure**
Leakage in rod sealing	Worn-out rod sealing	See chapter C3 <Maintenance>
Leakage in cylinder end cup	Insufficient seal between cylinder tube and cylinder end cups	See chapter C3 <Maintenance>
Gate does not open/close completely	Insufficient air supply to cylinder	See note in chapter A6 <Connection>
	Wrongly adjusted cylinder stroke	See note in chapter B4 <Adjusting>
	Fault in limit switches Clogged valve	See note in chapter B7 <Checklist> See knife gate valve instruction
	Damaged seat/gate Worn out piston sealing	See knife gate valve instruction See chapter C3 <Maintenance>
Gate does not open/close in a smooth movement	Insufficient air supply to cylinder Clogged valve	See note in chapter B7 <Checklist> See knife gate valve instruction
	Damaged seat/gate	See knife gate valve instruction
	Worn out piston sealing	See chapter C3 <Maintenance>

EBRO or Stafsjö can offer maintenance of the cylinder.
Please contact EBRO or Stafsjö or your local representative for further information – addresses see page 1.

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 EBRO pneumatic cylinders

type double-acting (EC) and single-acting with spring return to open (ECS-O) or to close (ECS-C)

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

ISO 228-1:2000	Pipe threads where pressure-tight joints are not made on the threads – Part 1: Dimensions, tolerances and designation.

Product documents are available on the following:

Design documentation, technical data sheets, catalogue pages

These products comply with the following directives:

Pressure Equipment Directive 97/23 EC (PED).
Art. 3, paragraph 3 applies.

Machinery Directive 2006/42 EC (MD). This Directive does not apply:
The cylinder is no <machine> and no <incomplete machine> but only a <component> in the sense of the <Guide to the Machinery Directive 2006/42 EC, rev.04/2010>, §34, it is destined to be installed onto a Stafsjö knife gate valve.

This instruction is the “Installation Instruction” in the sense of the Machinery Directive together with the table below – it lists up some compliance of the cylinder design with the Directive above.

The manufacturer	**EBRO Armaturen International Est. Co.KG Eschen, Zweigniederlassung Cham Gewerbestrasse 5 CH-6330 Cham, Swizerland**
declares that an **EBRO –pneumatic cylinder for a knife gate valve** complies with EC- Directives as follows:	
Directive 2006/42/EC § of Annex 1	**Declared conformance to the requirements as per Annex 1 of the Directive 2006/42/EC**
1.1.1, g) Cylinder destination	See installation and service instruction
1.1.2.,c) foreseeable misuse	See installation and service instruction
1.1.2.,d) protecting measures personnel	Same as the pipe section into which the valve/cylinder unit is installed.
1.1.2.,e) accessories for maintenance	No special tools are necessary.
1.1.3 material in contact with compressed air	All cylinder material in contact with compressed air is chosen for air taken from clean and not corrosive environment. The relevant risk analysis is the responsibility of the user.
1.1.5 handling	See installation and service instruction.
1.2 and 6.2.11 control system	Is the responsibility of the user in combination with the instruction of the cylinder.
1.3.2 withstand to stresses	For parts under pressure: See declaration of conformity to the PED 97/23/EC. For functional parts: Ensured at contractual use of the cylinder.
1.3.4 sharp edges or angles	Requirements fulfilled at use as specified in the <cylinder destination>.
1.3.7/.8 risks related to moving parts	Requirements are fulfilled at use as per <valve destination> and <cylinder destination> of the valve/cylinder unit, defined in the relevant instructions. Delivered gate guards must be installed on the valve. No maintenance or service is allowed when the pipe line is pressurized and /or the cylinder is under pressure from air supply. If the valve is modified by the customer (new cylinder): Necessary protective devices shall be installed. Ask Stafsjö for support.
1.5.1 – 1.5.3 energy supply	In the responsibility of the user in combination with the instruction of the cylinder.
1.5.5 contact to surface with high/low temp.	In the responsibility of the user.
1.5.7 explosion	Ex-protection may be necessary. This shall be confirmed in the EBRO or Stafsjö order acknowledgement. Pay attention to the cylinder marking and relevant instruction from EBRO.
1.5.13 emission of dangerous substances	Not applicable at not dangerous fluids (compressed air).
1.6.1 maintenance	See chapters C1 und C3 of the Original cylinder service instruction and the relevant valve instruction.
1.7.3 marking	Cylinder: see Original installation and service instruction Knife gate valve: see Original installation and service instruction knife gate valve
1.7.4 service instruction	See cylinder installation and service instruction and valve instruction.
Requirements from Annex III	The cylinder is no complete machine and no incomplete machine. No CE marking for conformity with the directive 2006/42/EC.
Requirements from Annexes IV,VIII to XI	Not applicable.

The following shall be observed by the user:

1. The use of the cylinder shall comply with the <Pneumatic cylinder destination>, defined in the “Original Installation and service instructions“ supplied with the cylinder. The user shall observe the warnings in this manual.
2. The valve/cylinder unit shall not be put into operation until the conformity to all applicable EU directives into which the unit is installed has been declared by the person responsible.
3. EBRO has made and documented the required risk analysis. The EBRO employee responsible for this documentation is Dirk Schröder, E. A. Antriebstechnologie & Services GmbH, Karlstr.8, at 58135 Hagen Germany.

29.11.2011

H. Hager / EBRO International General Manager