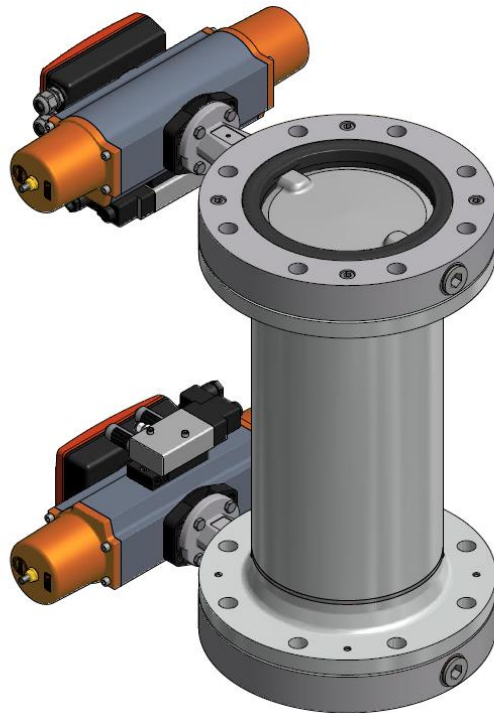


Cycle Lock CL



Example illustrations, all possible model variations are not displayed!

Original - Assembly Manual

with the operating instructions and technical annex

in accordance with EC Machine Directive 2006/42/EC
in accordance with EC Pressure Equipment 97/23/EC

Language version German

Table of Contents

	Page
A) GENERAL INFORMATION	5
A01 DESIGN OF THE HAZARD SYMBOLS	5
A02 DESIGN OF THE NOTE SYMBOLS	6
A03 USED TERMS	7
A04 ABOUT THIS OPERATING MANUAL	8
A05 NOTE ON COPYRIGHT AND TRADEMARK	9
A06 WARRANTY AND LIABILITY	9
A07 LEGAL REGULATIONS	10
A08 NOTES FOR THE OPERATOR	11
A09 QUALIFIED STAFF	12
A10 TRAINING AND EDUCATION	13
A11 IDENTIFICATION OF THE CYCLE LOCK	13
B) SAFETY NOTES	14
B01 GENERAL SAFETY NOTES	14
B02 PROPER USAGE	15
B03 ORGANIZATIONAL MEASURES	17
B04 SAFETY NOTES FOR THE OPERATING STAFF	17
B05 SAFETY NOTES FOR OPERATING THE SYSTEM	19
B06 SAFETY NOTES FOR MAINTENANCE AND UPKEEP	19
B07 SAFETY NOTES FOR WORKING ON THE PNEUMATIC SYSTEM	20
B08 SAFETY NOTES FOR WORKING ON THE ELECTRICAL SYSTEM	21
B09 SAFETY NOTES FOR HANDLING OPERATING SUPPLIES OR MEDIA	22
B10 SAFETY NOTE FOR DEALING WITH HOT SURFACES	23
B11 SAFETY NOTE FOR DEALING WITH COLD SURFACES	24
B12 RESIDUAL HAZARDS	25
C) USAGE CONDITIONS	26
C01 TEMPERATURES - ENVIRONMENT	26
C02 TEMPERATURES - MEDIA	26
C03 SURROUNDING CONDITIONS	26
C04 SETUP CONDITIONS	26
D) STORAGE, PACKAGING AND TRANSPORT	27
D01 STORAGE	27
D02 PACKAGING	27
D03 GENERAL TRANSPORTATION	27
D04 TRANSPORTATION OF THE CYCLE LOCK WITH A FORK LIFT	28
D05 TRANSPORTATION OF THE CYCLE LOCK WITH A CRANE	28
D06 THE LIFTING GEAR HITTING THE CYCLE LOCK	29

E) ASSEMBLY MANUAL	30
E01 ASSEMBLY OF THE CYCLE LOCK IN A TUBING SYSTEM	30
E02 ASSEMBLY OF THE CYCLE LOCK - STEPS DURING INSTALLATION	32
E03 ASSEMBLY OF THE CYCLE LOCK AS THE END FIXTURE OF A TUBING SYSTEM	32
E04 CONNECTION OF THE ELECTRICAL COMPONENTS	34
E05 ELECTRICAL CUSTOMER CONNECTION - NON-OFFSET CONTROL BOX	35
E06 ELECTRICAL CUSTOMER CONNECTION - OFFSET CONTROL BOX	35
E07 CONNECTION FROM THE ELECTRICAL COMPONENTS - STEP CONNECTION SWITCH BOX	36
E08 CONNECTION OF THE PNEUMATIC COMPONENTS	37
E09 CONNECTION OF THE PNEUMATIC COMPONENTS - STEPS CONNECTION DRIVE	39
E10 DISASSEMBLY OF THE CYCLE LOCK	40
F) SAMPLE RUN, FLUSHING AND PRESSURE TEST AFTER INSTALLATION	43
F01 SAMPLE RUN AND FLUSHING	43
F02 PRESSURE CHECK	45
G) PRODUKTBESCHREIBUNG	46
G01 PROPER USAGE	46
G02 SCOPE OF DELIVERY	48
G03 DESCRIPTION OF THE COMPONENTS	49
G04 FUNCTIONAL PROCESS OF THE CYCLE LOCK	51
H) OPERATION AND VISUALIZATION	54
H01 GENERAL NOTE ON OPERATION	54
H02 OPERATING SETUP ON THE TOUCH PANEL	54
H03 MAIN SCREEN	55
H04 SET UP SCREEN	56
H05 MANUAL SCREEN	58
H06 PROCESS TIMES SCREEN	59
H07 MONITORING SCREEN	60
H08 USER SCREEN	61
H09 MAINTENANCE MANAGEMENT SCREEN	62
H10 RUNTIME SCREEN	63
H11 CLOCK COUNTER SCREEN	64
H12 FLUSHING PROCESS SCREEN	65
I) PROGRAMMING SPS	66
I01 PROGRAM ORGANIZATION	66
I02 SOFTWARE TECHNICAL LOCKING	67
I03 ACCESS PROTECTION	67
I04 SAFETY SETTING	67
I05 EXTERNAL CONTROL	67

J) SETTING AND ADJUSTING	68
J01 GENERAL SETTINGS	68
K) MAINTENANCE AND UPKEEP	70
K01 GENERAL MAINTENANCE AND UPKEEP	70
K02 MAINTENANCE INTERVALS	72
K03 CLEANING OF THE CYCLE LOCK BEFORE INSTALLATION	73
K04 GENERAL CLEANING OF THE CYCLE LOCK	73
K05 MAINTENANCE OF THE DRIVES	74
K06 MAINTENANCE OF THE FIXTURE	74
L) DISRUPTIONS, CAUSES AND REPAIR	75
L01 GENERAL DISRUPTIONS	75
L02 ERROR DISPLAY SCREEN	76
L03 ERRORS – CAUSE – REPAIR	76
M) DISPOSAL	80
M01 ENVIRONMENT PROTECTION	80
N) SPARE PARTS	81
N01 GENERAL SPARE PARTS	81
N02 SPARE PARTS ORDER	81
O) TECHNICAL DATA	82
P) INDEX	83

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A) General Information

A01 Design of the Hazard Symbols

The hazard symbols can be found in the safety notes, which point out particular hazards for people or property. They are all designed in a uniform manner in this operating manual and must be observed.



General hazard



Electrical voltage



Hand injuries

Keyword	Meaning
HAZARD	Points out a threatening hazard that will lead to severe injuries or death if the identified instruction is not followed completely.
WARNING	Points out possible hazardous situations that could lead to severe injuries or death if the identified instruction is not followed completely.
CAUTION	Indicates a possible hazardous situation or unsafe, hazardous procedures that could lead to injuries or property damage to the cycle locks or their surrounding area

Structure of the safety notes

Keyword



Hazard symbol

Type and source of hazard

Explanation

Measures to prevent the hazard

Follow the respectively named safety notes and behave with particular caution in these areas! Also share all safety notes with other users!

In addition to the notes in the operating manual, the generally valid safety and accident prevention guidelines must be considered!

A02 Design of the note symbols

The note symbols are located where there are circumstances or activities, which help guarantee a safe, proper and efficient handling with the machine. They are all designed in a uniform manner in this operating manual and must be observed.

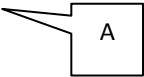


Protective gloves



Eye protection

Symbol	Meaning
	This symbol points out that electrical components and systems must be turned off and secured against being turned on again during all work, before maintenance and repairs.
	This symbol is located where there are circumstances or activities, which help guarantee a safe, proper and efficient handling with the machine. All notes should be fulfilled in the interest of a proper usage of the cycle locks. Share all notes with other users as well!
<ul style="list-style-type: none">•	Work and/or operating steps are marked with the bullet. The steps must be executed from top to bottom!
	Components and their installation spot within the cycle locks are identified with the square and round keys and a letter. Remember that the letters are assigned again for every chapter and always start with A.



Notes and symbols directly installed on the cycle locks, like warning signs, activation signs, rotating direction arrows, component identifications, etc. must be observed.

The notes and symbols attached directly on the cycle locks may not be removed and must be kept in a completely legible condition!

A03 Used terms

cycle lock

For this incomplete machine for batching and dosing products, the term cycle lock, machine or system is used in the following text.

Product

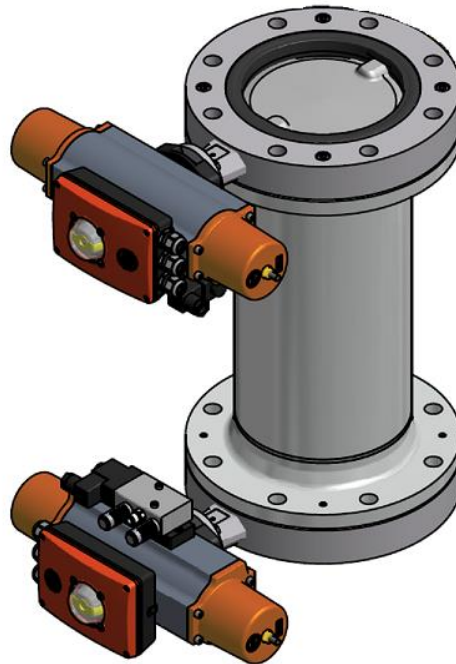
For the products to be delivered, the term medium/media, product or basic material is used in the following text.

Operating personnel

For the operating personnel or the users of the cycle lock, the term operator is used in the following text. This group of people is trained at the machine and informed about the possible hazards.

A04 About this operating manual

This operating manual is valid for the cycle locks in the standard design. The machine serves for delivering and, if applicable, dosing media from silos, containers, hoppers, etc.



The machine in the incomplete machine delivered by EBRO ARMATUREN was designed for the installation in a pipe system or for the attachment to a silo, container or similar system.

When operating the machine, in addition to this operating manual, you must also observe the operating manuals from our suppliers.

This operating manual serves for safe work on and with the machine and represents a significant help for the successful and safe operation of the cycle lock.

It contains important notes on how to operate the machine in a safe, proper and efficient manner and to use the complete scope of functions of the machine. Their observation helps to avoid hazards, lower repair costs and failure times and increase the reliability and lifespan of the machine.

Furthermore, the operating manual should allow the users to execute any maintenance or repair work to the machine independently for daily usage. It contains safety notes that must be observed.

All people who work on and with the machine must have the operating manual accessible and observe the tasks and notes relevant for this.

The operating manual must always be complete and in a completely legible condition.

The EBRO ARMATUREN GmbH put together all specifications of this documentation with the greatest care. Nevertheless, EBRO ARMATUREN cannot rule out deviations and EBRO ARMATUREN reserves the right to technical changes to the machine without prior notice. EBRO ARMATUREN does not take over any legal responsibility or liability for damages that may arise through this. EBRO ARMATUREN will include any necessary changes in the following requirements.

A05 Note on copyright and trademark

Without special consent from the EBRO ARMATUREN GmbH, no part of this documentation may be reproduced or made accessible to third parties. It may only be made accessible to authorized people.

This documentation, including all of its parts, has copyright protection. Reproductions, translations, microfilming and the saving and processing in electronic systems require the written consent from the EBRO ARMATUREN GmbH.

Violations can be penalized and may obligate to compensation.

All rights to exercise commercial protective rights are given to the EBRO ARMATUREN GmbH.

A06 Warranty and liability

The warranty and liability are based on the contractually determined conditions. For warranty conditions, see sales and delivery conditions from the EBRO ARMATUREN GmbH.

Report any guarantee or warranty claims to the EBRO ARMATUREN GmbH immediately after a defect or error is determined. The guarantee or warranty expire in all cases in which no liability claims can be asserted.

In the event of software changes without the knowledge and authorization from the EBRO ARMATUREN GmbH, the liability and warranty claim expires.

Illustrates and drawings serve for general illustration and may deviate from the delivered machine.

The EBRO ARMATUREN GmbH does not take over any guarantee for damages that occur through improper usage, improper storage or improper transportation.

A07 *Legal regulations*

The information, data and notes specified in the operating manual were up to date at the time of printing. No claims for already delivered systems may be asserted from the specifications, figures and descriptions.

The company EBRO ARMATUREN GmbH does not take over any liability for damages and operating disruptions that arise through:

- the assembly.
- the incorrect operation and troubleshooting during operation.
- the repair (maintenance, care, commissioning)
- improper usage.
- independent changes to the machine.
- improper work on and with the machine.
- operating and adjustment errors.
- program errors to the control.
- non-observance of existing standards, directives and accident prevent guidelines.
- non-observance of operating manuals from the supplier.
- non-observance of this operating manual.

A08 Notes for the operator

The operator is any natural or legal person who uses the cycle lock or uses the cycle lock on their behalf.

The operator is the person responsible for safety.

The operator or their representative must make sure that:

- all relevant guidelines, notes and laws for accident prevention and operating safety are complied with;
- after construction and connection of the cycle lock, the complete cycle lock corresponds to the corresponding directives and the system conformity is established for the complex cycle lock.
- the required protective equipment and the EMERGENCY STOP equipment are installed and programmed in connection with the construction-side cycle lock.
- only qualified staff works on and with the cycle lock.
- the staff has the operating manual available during all corresponding work and follows it as well.
- unqualified staff do not work on and with the cycle lock.
- during installation or maintenance work for the cycle lock, the required accident prevention guidelines and safety guidelines are complied with.
- during installation or maintenance work for the cycle lock, the operating manuals and safety notes from the supplier are complied with.

The operating manual must be amended by the operator for operating instructions due to national accident prevent guidelines and environment protection guidelines, including the information about supervisory and reporting obligations for thee consideration of operational particularities, for example, in regards to work organization, work procedures and staff used.

In addition to the operating manual and the accident prevention regulations valid in the user country, as well as at the place of usage, the recognized technical rules or the state of technology must be observed for health and safety protection.

A09 Qualified staff

Qualified staff includes people who can execute the required activities on the cycle lock due to their training, experience, education and knowledge. They possess knowledge about local standards, conditions, accident prevention guidelines and operating circumstances and have been authorized by the responsible individuals for the safety of the cycle lock, who also execute the respectively required work. They must be able to recognize and avoid possible hazards.

The staff who have learned and been trained at EBRO ARMATUREN GmbH may work with the cycle lock. Furthermore, they may also train other people in the usage and functions of the cycle lock.

Otherwise special knowledge is required for certain tasks and activities. This may only be done by trained specialists.

Activities	Trained People	Trained People with technical education	Electricians	Pneumatic specialists
Installation / setup		•	•	•
Commissioning		•	•	•
Operation	•			
Troubleshooting mechanical	•	•		
Troubleshooting electrical			•	
Troubleshooting pneumatic				•
Cleaning	•			
Maintenance		•	•	•
Work on the electrical system			•	
Work on the pneumatic system				•
Packaging and transportation	•			

A10 Training and education

As the operator, you are obligated to inform and instruct the operating and maintenance staff about the existing safety and accident prevention guidelines as well as about existing safety equipment on the machine.

The different technical qualifications from the employees must be considered here.

The operating staff must have understood the instructions. Furthermore, it must be guaranteed that the training has been observed. This is the only way you can guarantee the safety and hazard conscious work from your staff. This should be examined regularly. As an operator, therefore, you should have the participation in the training or education confirmed in writing by every employee.

If there is still further need for educating the operating staff after handing over the cycle lock, please contact the EBRO ARMATUREN GmbH for the purpose of agreeing on the conditions.

A11 Identification of the cycle lock

All standard individual components from the cycle lock are equipped corresponding with a label. Additionally, there is a central identification available for the total system with the following data:

	Identification	Comment
Manufacturer	EBRO-ARMATUREN	Address
Code	e.g. CL-011-AAAA-0P02	(casing identification) see overview page 1
Serial-no.:	e.g. 1234567	
Year	MM/YYYY	
Temp.	e.g. 0 – 55°C	Numbers for the upper and lower usage limitations
(Spg.) U=	230 V AC	Numbers for the upper and lower usage limitations
(Electricity) I=	0.6 A	Numbers for the upper and lower usage limitations

The label should not be covered so that the installed cycle lock is always identifiable.

B) Safety notes

B01 General safety notes

There is no guarantee to completeness for these safety notes.

For questions and problems, please contact the company EBRO ARMATUREN GmbH.

At the time of delivery, the cycle lock corresponds to the state of technology and is basically seen as safe for operation.

There are hazards coming from the cycle lock for people, the cycle lock itself and other objects belonging to the operator if:

- unqualified and untrained staff works on and with the cycle lock.
- the cycle lock is used improperly and inappropriately.
- the cycle lock is improperly set, maintained, repaired, programmed or connected.

The cycle lock must be set and equipped so that in the event of proper setting, equipping and usage, it fulfills its functions in problem-free operation and does not represent any hazard for people. Through suitable measures, make sure that no property damage is caused if the cycle lock fails. Operate the cycle lock only in a proper state. Additions, changes or restructuring to the cycle lock are forbidden. They require agreement with the EBRO ARMATUREN GmbH.

B02 Proper usage

This EBRO cycle lock of the CL model, which is installed

- a) as a complete functional unit read to be installed in a total system
 - underneath a storage container (for example, a silo),
 - above the system section "further processing or disposal" with flanges,
- b) should normally receive dust-shaped/grainy solids from the silo up top into the system below and be moved in sequence according to the guidelines from the user through gravity or pneumatic transportation.
- c) It consists of the components:
 - Distance tube with flanges to accept the "sequence volume".
This pipe can optionally be equipped with a level sensor, which sends an electrical signal depending on the filling in the distance pipe.
 - Depending on the block fixture, attached on the top and bottom of the distance pipe:
Normally, this is a block flap in the short construction length with flange eyelets in the casing with an elastomer sleeve for seal-proof closing.
 - Each of the two block flaps is equipped with a pneumatic moving drive - normally with the spring package for the "fail safe setting "CLOSED".
The drives must be connected to the user-side "compressed air" supply network.
 - Each of these drives is activated through an included accessory unit "magnet valve"/setting detector.
 - A "control" component is also delivered, through which the two magnet valves open and close the two block flaps "in sequence",
 - and through which the signals of the two aforementioned position detectors guarantee that the two block flaps are in an alternate "sequence".
This programmable electrical control is installed in a "control box", which uses a touch screen
 - to determine the sequence of the steps against each other,
 - sets every sequence step in its time,
 - can install break times between the individual sequence steps,
for example, in order to control the level in the distance tube,
 - or optionally closes the upper block flap after the signal from the level sensor
and controls the sequence volume in this manner.

- d) This functional unit
- normally fulfill the requirements from the EC Pressure Device Directive (DGRL) 97/23/EC;
 - if it is delivered as a complete functional unit, it is an "incomplete machine" in terms of the EC Machine Directive (MRL) 2004/42/EC.
Only after it has been installed with the two flange ends between the upper silo and lower (pipe) system and screwed in tight, it is completely closed and therefore a "complete machine" in terms of this MRL.
 - The cycle lock can be delivered for media with pressure of up to 10 bar and temperatures up to 160°C - the manufacturer Ebro ARMATUREN and the user/orderer determine which active substances are used for all components depending on this.
 - The user must guarantee that the active substances used for the parts of the cycle lock coming into contact with the media are suitable for fluids.
 - The cycle lock can - but only on special customer request - fulfill the requirements of the directive 94/9EC as a "device" in terms of the ATEX and is optionally equipped in all mechanical and electrical components in a special design so that it is
→ ex-safe **for environment zones**
and does not represent a potential ignition hazard for the following class division according to ATEX directive 1999/92/EC: Zone 0/20, 1/21 or 2/22.
 - Another option is that all internal parts of the cycle lock can be equipped so that they do not possess a potential ignition hazard for
zone inside in the tube system Zone 0/20, 1/21 or 2/22.
 - Independent of this, the cycle lock - but only on special customer request - may be delivered for all of the zones mentioned above in the inner tube system with specially set-up control - **as a "protection system"** in terms of ATEX.
In this special design, the cycle lock is capable of restricting a beginning dust explosion - either above in the silo or below in the tube system - so that this explosion cannot continue in the upper or lower part of the tube system.

B03 Organizational measures

The cycle lock was constructed and built according to the state of technology and the recognized safety-technical rules. In order to avoid hazards for the users and impairments to the cycle lock and other objects, the following organizational measures must be complied with:

- Observation of the proper usage of the system.
- Operation of the cycle lock in a technically proper state.
- Usage of adequately qualified staff.
- Compliance with the maintenance interval.
- Observation and compliance with the hazard signs and signs by the system.
- Observation of this operating manual and the operating manuals from the suppliers of the purchased components.

The operating manual must always be stored on the cycle lock within reach. The staff assigned with activities on the cycle lock must read the operating manual, in particular the safety notes chapter, before beginning the work. This applies in particular for staff that is only occasionally active at the cycle lock.

Spare parts must correspond to the technical requirements while operating the cycle lock. This is guaranteed with original spare parts from EBRO ARMATUREN GmbH.

The area surrounding the cycle lock must be kept in a clean and proper state. Contaminations and impairment of the system functions as well as restrictions in the user's freedom of motion may lead to disruptions and accidents.

The cycle lock may only be operated by staff with the corresponding qualifications.

The operating staff is obligated to examine the cycle lock and their functional groups at least once per shift for external damages and defects. Changes, including the operating behavior, that impair safety must be reported immediately and repaired.

B04 Safety notes for the operating staff

The cycle lock may only be used in a technically proper state as well as properly, safety and hazard conscious under observation of this operating manual! All disruptions and in particular those that can impair safety must be repaired immediately!

Any person who is assigned with the setup, operation, commissioning or maintenance of the cycle lock must have read and understood this operating manual before beginning their work - in particular the *Safety* chapter. This applies in particular for staff who is only occasionally used at the cycle lock.

No liability will be taken over for any damages and accidents that occur through the non-compliance of the operating manual.

The standard accident prevention guidelines as well as the other generally recognized safety and work health rules must be complied with.

The responsibilities for the different activities within the scope of the operation, maintenance and repairing of the cycle lock must be clearly set and complied with.

Only then can incorrect actions - in particular in hazardous situations - be avoided.

The operator must obligate the operating and maintenance staff to wear personal protection equipment. This includes in particular safety shoes, safety gloves, protective goggles, protective clothing, ear protection and tight work clothing.

Do not wear long open hair, loose clothing or jewelry! There is the risk of injury by getting stuck on, suck into or moved by mobile parts!

If there are safety relevant changes to the operating behavior or disruptions to the cycle lock, it must be stopped immediately and the process must be reported to the responsible person!

First aid equipment like bandage sets, eye flushing bottles, fire extinguishers, etc must be stored within reach!

Work on the cycle lock may only be done by reliable, qualified personnel. The legally permissible minimum age must be observed!

Only trained or educated staff may be used!

Staff that must be trained, taught, instructed or are currently in an apprenticeship may only work with the cycle lock under the constant supervision of an experienced, qualified person!

B05 Safety notes for operating the system

For all work that affects the operation, equipping or adjusting of the cycle lock and its safety equipment, the inspection, maintenance and commissioning, the switch on and off processes must be observed in accordance with this operating manual and the notes for maintenance!

The cycle lock may only be operated in a complete and operable state.

The cycle lock is not suitable for operation in an explosive atmosphere!

Before beginning work, the staff must be familiar with the work environment around the cycle lock.

Before turning on the cycle lock, it must be guaranteed that nobody is within the hazard area and can be put into danger through the starting cycle lock!

The cycle lock must be examined for externally recognizable damages at least once a shift. Changes (including those to the operating behavior) must be reported immediately to the responsible technician or works manager

If there are functional disruptions to the cycle lock, stop these immediately and secure. Have disruptions repaired immediately by trained technicians.

B06 Safety notes for maintenance and upkeep

Banking off (for example, gate valves) of upstream and, if applicable, downstream areas before the disassembly of the cycle lock so that no product can slide down during unattended work or escape from the downstream areas.

The operating staff must be informed about the execution of special and maintenance work before it is executed. A supervisor must be named.

The periods for recurring inspections, maintenance or upkeep required or specified in the operating manual must be complied with.

For the execution of maintenance and upkeep measures, factory equipment appropriate for the work is required.

Additionally illuminate maintenance and upkeep areas, if required, with manual or standing lamps.

The upkeep area, if required, must be blocked off generously!

The cycle lock must be completely turned off for maintenance, repair and upkeep work and secured against unexpectedly being turned on again.

In order to avoid electric shocks, do not open any electrical components, casings and covers.

Do not touch damaged, torn parts, in particular those with voltage.

Regularly examine and, if applicable, replace seals from electrical casings.

Always re-tighten any screws that have become loose during maintenance and upkeep work! All screws must be tightened with a torque wrench and the corresponding tightening torque.

If the disassembly of the safety equipment is required during maintenance or upkeep, the assembly and examination of the safety equipment must be carried out immediately after completion of the maintenance and repair work!

Individual parts and larger components must be carefully mounted to lifting equipment when replacing and secured so that the hazard arising from them is kept to a minimum. Only use suitable and technically proper lifting equipment and load handling equipment with adequate carrying capacity!

Do not stand or work under lifted loads.

Only assign experienced people with the lifting of loads and instructing of crane operators! The instructor must be in the operator's field of vision or be in contact with them!

In the event of assembly work over a height of 1.60 m, designated or miscellaneous safety climbing aids and platforms must be used! Do not use machine parts and tubing systems as climbing aids!

For standing places or for work at heights higher than 1.0 m, corresponding fall-safety mechanisms must be provided! All handles, steps, railings, pedestals, platforms, ladders must be free of dirt!

The system, and here in particular the connections and screws, must be freed of all dirt and residues, like oil, operating materials or cleaning agents, at the beginning of the maintenance, upkeep and care.

Do not use any aggressive or solvent-containing cleaning agents. Use fiber-free cleaning cloths.

Only use mild cleaning agents on a water basis. Observe the specifications from the manufacturer. Do not use any organic solvents, because this results in a fire and explosion hazard!

Before cleaning with water, vapor steam (high pressure cleaner) or other cleaning agents, cover or tape up all openings from the cycle lock in which no water, steam or cleaning agent should enter due to safety and functional reasons. Electrical components, control units, switch boxes and clamp casings are particularly in danger. After cleaning, completely remove the covers or tapes.

Make sure the operating and auxiliary materials are disposed of in a safe and environment-friendly manner!

B07 Safety notes for working on the pneumatic system

The pressures required for the cycle lock may lead to injuries.

For repair work done to the compressed air parts, pressure lines to be opened must be made free of pressure before work is started.

The lines to be connected must be clearly and permanently marked, because hazards may arise from mix ups.

Operate the cycle lock only in a secure and functional state. The cycle lock may only be operated without recognizable external damage.

HAZARD



Hazard through uncontrolled starting pneumatic components.

Severe injuries with incorrectly connected pneumatic components or for pneumatic components that start without being controlled.

The pneumatic components may only be connected by a specialist.

All components and connections must be examined before turning on the pneumatic system.

B08 Safety notes for working on the electrical system

The operating voltage required for the system may have fatal consequences if one of the parts under voltage is touched. If there is a short circuit, the hazard of sparks forming and fire exist.

The connection of the system must be adequately dimensioned in order to prevent overload. In the event of disruptions to the electrical energy supply, turn off the cycle lock immediately.

Active parts of the electrical cycle lock under voltage may not be worked on.

Before beginning work with parts of the system that are supplied with electrical energy, turn off the cycle lock on the main switch and secure the cycle lock against being turned on unexpectedly. Otherwise a hazard through electrical voltage exists!

Only use original fuses with the prescribed current strength.

The electrical cycle lock must be in a secure state and maintained in this state. The electrical cycle lock must be examined regularly. Defective and loose connections, etc must be reported and repaired immediately.

The switch cabinet and all clamp and connection boxes must be closed at all times. Only authorized staff is permitted to access the electrical cycle lock for inspection and maintenance.

The active parts of the electrical cycle lock must be protected against direct contact corresponding to their voltage, frequency, usage type and operating location through insulation, location, arrangement or installed equipment.

The electrical cycle lock must be protected against indirect contact corresponding to its voltage, frequency, usage type and operating location so that in the event of an error in the electric cycle lock, protection against hazardous contact voltage is also provided.

HAZARD

Risk of death through electrical voltage.



Severe injuries or death through electric shock.

The connecting of the cycle lock may only be executed by an electrician.

Establish a freedom of voltage and secure the cycle lock against being turned on again.

An electrostatic charge may be created through friction from the media and through the high pressures. This charge may influence and disturb the operation of the cycle lock. That is why there must be sufficient grounding of the cycle lock

WARNING

Disruptions to operation through electrostatic charge.



Disruptions or damage to components.

The connecting of the cycle lock may only be executed by an electrician.

The cycle lock must be grounded.

B09 Safety notes for handling operating supplies or media

When handling raw substances, solvents, oils, greases, media and other chemical substances, the applicable guidelines and safety specifications from the manufacturer of these substances in regards to storage, handling, usage and disposal must be observed and complied with!

When working with certain operating and hazardous substances, protective equipment made of suitable material must be worn (protective goggles, rubber gloves, rubber boots, protective clothing)! Pay attention to the specifications in the safety specifications for the operating or hazardous substance. The safety specifications will be provided to you by the respective manufacturer of the substance.

In the event of eye or skin contact, the affected spot must be immediately cleaned with a lot of water. Suitable facilities (eye flushing bottle, sink, shower) must be available near the workplace!

CAUTION

Hazard through operating or hazardous substances or through media.



Sever injuries or damage to the system.

The safety specifications from the operating and hazardous substances must be present and observed.

Use the personal protection equipment required in the safety specifications when handling the respective hazardous substance.

NOTE

Use personal protection equipment.



When handling hazardous substance, the personal protection equipment specified in the safety specifications must be used.

Use the personal protection equipment.



B10 Safety note for dealing with hot surfaces

During running operation of the cycle lock, very high temperatures may be found at certain spots in the area of certain components. Through radiation heat, it may be that not just the actual component, but rather also the components of the cycle lock or other components nearby may be very hot.

This may cause a burning hazard by coming into contact with hot surfaces or by coming into contact with hot components!

Thus, make sure that adequate contact protection exists between people and hot surfaces and that no fire loads or flammable substances or materials are located near the hot surfaces.

Personal protection equipment (PPE), tight clothing and work safety boots must be used. When handling hot components or hot surfaces, heat resistant gloves should be worn.

Only operate the cycle lock when it is guaranteed that the rising, heated air can be securely and permanently guided out. Make sure that enough fresh air is added!

HAZARD

Hazard through hot surfaces.



Severe injuries or burns when coming into contact with hot surfaces in the area of the components and drives.

Before beginning work, you must allow the components with hot surfaces to cool down.

When turning on the cycle lock, in particular it must be made sure that contact protection is installed on the hot components.

NOTE



Wear heat resistance gloves.

For components with hot surfaces, the operator must provide the employees with heat resistant protective gloves.

Use the personal protection equipment in the form of protective gloves.

B11 Safety note for dealing with cold surfaces

During running operation of the cycle lock, very cold temperatures may be found at certain spots in the area of certain components. Through cold heat, it may be that not just the actual component, but rather also the components of the cycle lock or other components nearby may be very cold.

This may cause a cold burning hazard by coming into contact with very cold surfaces or by coming into contact with cold components!

Make sure that adequate contact protection exists between people and cold surfaces.

Personal protection equipment (PPE), tight clothing and work safety boots must be used. When handling cold components or cold surfaces, cold resistant gloves should be worn.

HAZARD

Hazard through cold surfaces.



Severe injuries or cold burns when coming into contact with cold surfaces in the area of the components and drives.

Before beginning the work, you must heat up the components with cold surfaces in a natural manner.

When turning on the cycle lock, in particular it must be made sure that contact protection is installed on the cold components.

NOTE



Wear cold resistant protective gloves.

For components with cold or cryogenic surfaces, the operator must provide the employees with cold resistant protective gloves.

Use the personal protection equipment in the form of protective gloves.

B12 Residual hazards

The hazards that come from the cycle lock occur during work within the actual limits of the cycle lock if you have to operate the cycle lock for work, for example, during:

- maintenance.
- equipping.
- troubleshooting and repairing.

Make sure to be accompanied by another person for maintenance, equipping or repair work where the cycle lock has to be operated so that they can turn off the complete cycle lock in the event of an emergency.

Work with extreme caution and attention.

Even when all safety guidelines are followed, there remains a residual risk when operating the cycle lock. Anybody who works on and with the cycle lock must know these residual risks and follow the instructions that prevent these residual risks from leading to accidents or damages.

HAZARD



Hazard through missing protection equipment.

Severe injuries through moving components.

If protection equipment must be disassembled or shut down for adjustment and equipping work, all work must be executed in a well thought-out and conscious manner!

Any routine in the operating procedure must be avoided!

C) Usage conditions

C01 Temperatures - environment

Environment temperature Usage area:

- Flaps with direct attachments - 10° C to + 50° C.
- Reduced electrical unit 0°C to 50°C

A proper functionality of the cycle lock is guaranteed in this temperature range.

For temperatures above and below the named temperatures, the functionality can no longer be guaranteed.

C02 Temperatures - Media

Media temperature Usage area: Dependent on the fixture type used

A proper functionality within the cycle lock is guaranteed in this temperature range for the media.

For media temperatures outside of the temperature range, the functionality can no longer be guaranteed.

C03 Surrounding conditions

With the correct composition of the individual components, the cycle lock fulfills a degree of protection according to DIN of IP 67.

Surrounding media, in particular chemically aggressive media, may attack seals, hoses, cables and plastics.

C04 Setup conditions

The cycle lock should only be installed in an area that fulfills the requirements for the temperatures and surrounding conditions. The general directives for workplaces must be complied with as well.

Furthermore, the two fixtures must be screwed into the correct position and tightly with the tubing system.

The entire machine may only be set up and operated in an explosion protected environment.

D) Storage, packaging and transport

D01 Storage

If the cycle lock should not be installed immediately, make sure of suitable storage conditions in a dry, dust-free, frost-free area protected against sunlight. Encase the cycle lock in a plastic or foil packaging and store the cycle locks on pallets.

In order to keep the unused machine operational for a period of up to six months, please observe the following storage conditions:

- the storage room should be dry and free of dust.
- the storage temperature should be between + 5°C to + 40°C.
- the storage should occur on a level ground.
- the cycle lock should be protected against unintentional movements or against tipping over and damages.
- encase the cycle lock in a plastic or foil packaging.

D02 Packaging

The complete cycle lock from the EBRO ARMATUREN GmbH is packaged purposefully and securely depending on the transportation path and destination.

INFO



Note.

Once the delivery has reached its destination, the completeness of the delivery must be examined immediately based on the delivery papers and packaging lists as well as the intactness of the delivery.

In the event of complaints, the EBRO ARMATUREN GmbH must be informed immediately.

D03 General transportation

The cycle lock will be - if nothing different is agreed upon - delivered completely assembled ex works by the EBRO ARMATUREN GmbH.

Please observe the specified weight and dimensions in the delivery papers from the system for transportation.

The cycle lock should be kept in its original packaging until usage or until assembly. The specified storage conditions must be complied with.

HAZARD

Hazard through incorrect transportation or fastening.



Severe damage to the system.

Do not suspend the cycle lock on the drive or moving drive!

Make sure that the folding discs and the flange seal surfaces on the fixtures are not damaged!

D04 Transportation of the cycle lock with a fork lift

Only transport the cycle lock with adequately equipped transportation and lifting equipment! Make sure it is securely mounted and avoid impact!

The cycle lock may be transported internally with a pallet truck or forklift. When transporting or moving the cycle lock, the center of gravity must be considered so that the cycle lock does not tip over or rock.

When moving the cycle lock, the lifting height of the lifting equipment should be kept as low as possible.

Furthermore, the safety guidelines for handling hand pallets or forklifts should be observed.

HAZARD

Death hazard through transportation with forklifts



If the load is improperly fastened or if the forklift is damaged, people may be injured or killed through falling loads.

Do not go in the moving and hazard area of the forklift!

Use permitted and inspected forklifts!

The driver must have a forklift license!

D05 Transportation of the cycle lock with a crane

Only transport the cycle lock with adequately equipped transportation and lifting equipment! Make sure it is securely mounted and avoid impact!

Furthermore, the cycle lock may be lifted and positioned with suitable lifting gear consisting of chains and hooks, or lifting belts, by crane. To do this, fasten your lifting gear sufficiently secure to the cycle lock and lift the cycle lock.

The safety guidelines for dealing with lifting gears (load handling equipment) and cranes should be observed.

HAZARD

Death hazard through lifted loads



If the load is improperly fastened or if the crane or lifting gear is damaged, people may be injured or killed through falling loads.

Do not go under lifted loads!

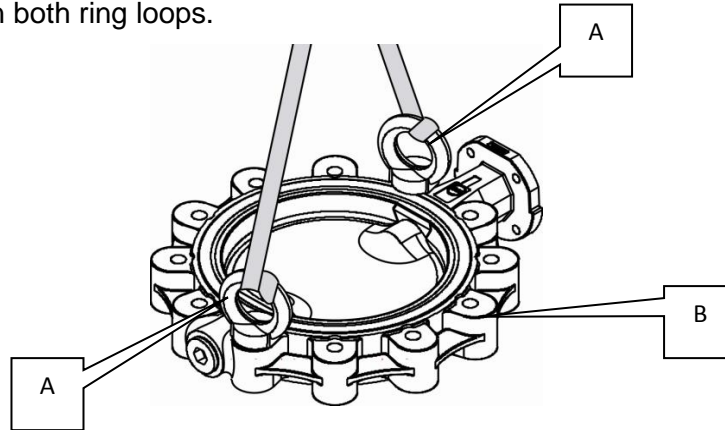
Use permitted and inspected load lifting equipment and cranes!

D06 The lifting gear hitting the cycle lock

Only transport the cycle lock with adequately equipped transportation and lifting equipment!

Screw in at least two sufficiently sized ring loops (pos. A) on a fixture (pos. B) from the cycle lock. Pay attention the weight of the delivered cycle lock.

Fasten your lifting gear on both ring loops.



HAZARD

Hazard through incorrect attachments.



Severe damage to the system.

Use sufficiently dimensioned ring loops and mounts for attaching purposes.

Do not suspend the cycle lock on the drive or moving drive!

Make sure that the folding discs and the flange seal surfaces on the fixtures are not damaged!

E) Assembly manual

E01 Assembly of the cycle lock in a tubing system

During the assembly of the cycle lock, the safety notes from this operating manual and the safety guidelines applicable at the setup location by the operator must be observed. The assembly location or installation location must have sufficient carrying capacity and should be free of vibrations.

The cycle lock should only be installed in an area that fulfills the requirements for the temperatures and surrounding conditions. The general directives for workplaces must also be complied with. Furthermore, observe the setup conditions in this operating manual.

The cycle lock is constructed and adjusted ex works for the purpose you ordered it for. This usage purpose thereby also corresponds to the proper usage of the cycle lock.

Before installation of the cycle lock, the proper usage must be compared again with the installation situation. Then it must be guaranteed that the installed cycle lock corresponds to the present pressures and media to be processed.

Installation in a tubing system must be approved by the operator and may only be executed by qualified staff.

The activation of the cycle lock is only permissible if it has been completely installed on both sides in a tubing system.

HAZARD

Hazard through squeezing upper limbs.



Severe injuries upon activating the cycle lock as long as it is not completely installed in a tubing system.

Before turning on the cycle lock, all components and connections must be completely assembled by qualified staff.

When installing the cycle lock, act with extreme caution and avoid damage to the components of the cycle lock. This applies in particular for the folding panels of the fixtures. Because a damage folding panel may lead to a leak in the fixture.

CAUTION

Leak through damaged folding panel.



The outer edge of the folding panel has a very fine design in order to guarantee that the fixture does not leak when the folding panel is closed.

That is why it must be guaranteed that this area is not damaged while handling during the installation process.

Make sure that the folding discs and the flange seal surfaces on the fixtures are not damaged!

The cycle lock must be installed between flanges according to EN 1092-1 or EN 1759-1. The seal strips according to Form A or Form B must be processed parallel to each other and aligned. This means that the ends of the two tubing sections must be aligned and have parallel connection surfaces. Through this, the usage of additional flange seals is not permissible, because the seal areas on the casing of the fixture are equipped with elastomer or polymer. This guarantees the sealing of the flange connections. A usage of a different flange or a different form of seal strip is not allowed. Should other flanges or forms be desired, these must be agreed upon with the EBRO ARMATUREN GmbH. The installation of these other designs must be confirmed in writing by EBRO ARMATUREN.

The clearance width of the counter-flange to the cycle lock must have adequate space for the opened folding panels so that these are not damaged when they are opened.

INFO



Note.

Observe the width of the counter-flange so that the opened folding panel has sufficient space.

Designs other than those named here must be agreed upon with the EBRO ARMATUREN GmbH.

Minimum required internal diameter D_i of the counter-flange														
DN	50	65	80	100	125	150	200	250	300	350	400	450	500	600
$\varnothing D_i$	51	51	80	103	124	151	196	245	296	334	385	438	484	560

All internal areas of the fixtures must be free of contamination, in particular there may not be any hard or sharp particles here. This also applies to the tube sections to be connected on the construction side. The tube sections and the flanges must be clean and not have any damages.

CAUTION

Leaking through contamination.



Contamination in fixtures, flanges and construction-side tube sections must be removed.

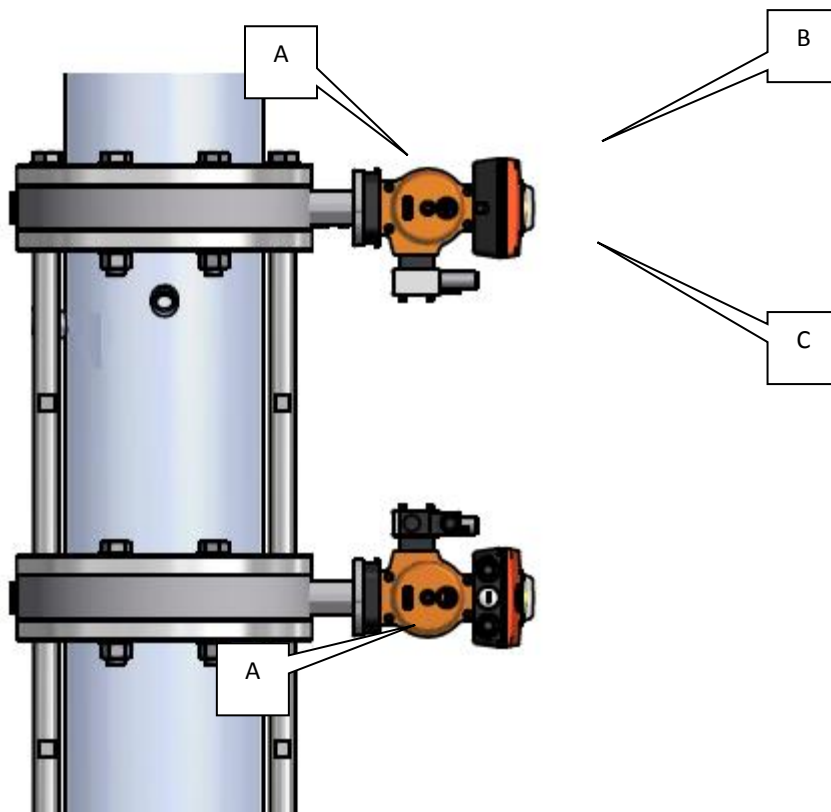
Contamination that is not removed may lead to damage to the seal surfaces, this in turn leads to leaking.

Make sure that the contamination is removed in a proper manner!

E02 Assembly of the cycle lock - steps during installation

The assembly of the cycle lock should be executed as follows:

- Unpacking of the cycle lock from the factory side packaging at the installation site.
- Examination of the cycle lock for transport damage.
- Examination of the cycle lock for damage, here the folding panels and the seal surfaces should be examined.
- Examination of the flanges from the cycle lock and the flange from the construction-side tubing system for dirt.
- Fastening of the cycle lock with corresponding lifting equipment according to this operating manual.
- Insertion of the cycle lock in an aligned manner and vertically in the construction side tubing system.
- Positioning of the cycle lock aligned between the two flanges (pos. A) of the construction side tubing system.
- Usage of all flange connections, make sure that the flange screws (pos. B) and nuts (pos. C) have sufficient dimensions. Only use fitting flange screws.
- Center all flange screws and tighten the flange screws crosswise. Observe the specified torque of the screws.



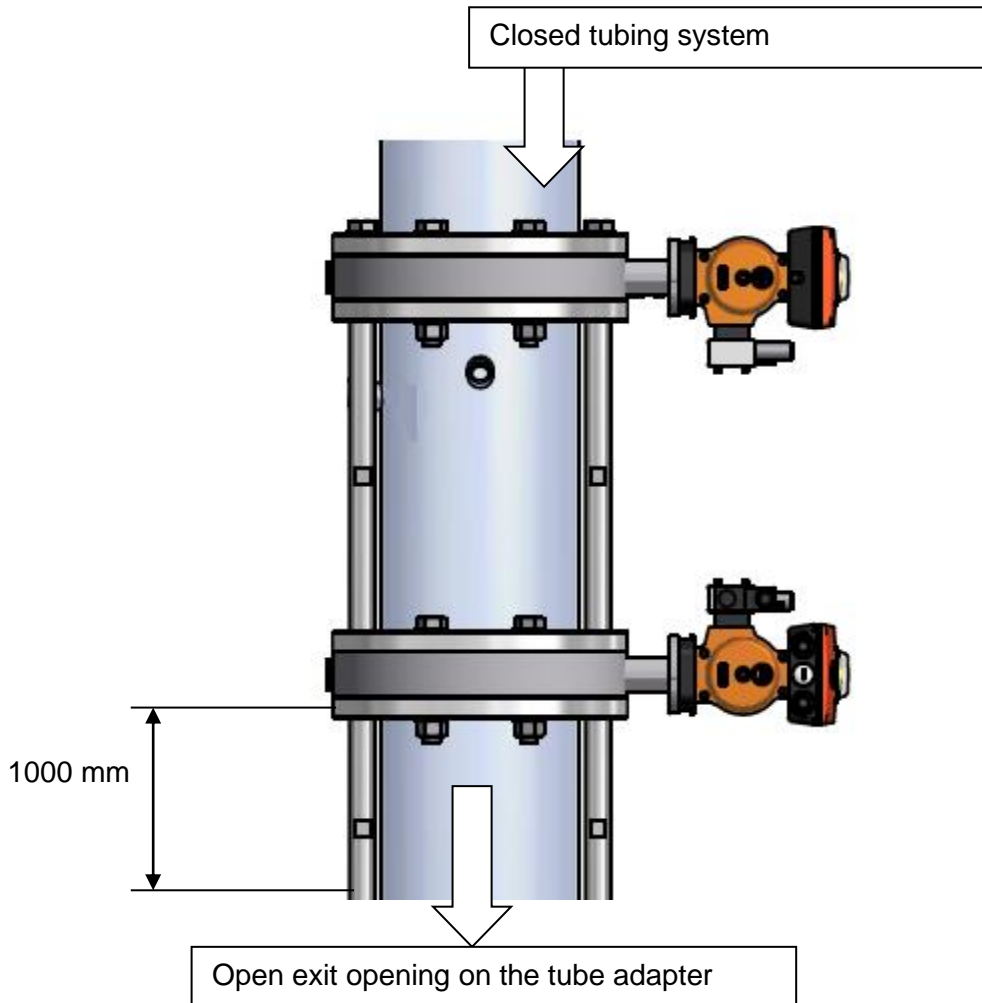
E03 Assembly of the cycle lock as the end fixture of a tubing system

During the assembly of a cycle lock at the end of a tubing system where the one end of the cycle lock is no longer a part of a closed system, the assembly notes from Chapter E01 apply.

Additionally, it must be considered that a tube adapter must be attached at the open end of the cycle lock on the fixture.

This tube adapter must be at least 1000 mm long in order to avoid reaching the folding panel with the upper appendages when reaching into the tube adapter.

The flanging of the tubing system and the tube adapter is carried out as described in chapter E02.



HAZARD

Hazard through squeezing upper limbs



Severe injuries when using the cycle lock as long as this was not equipped with at least a 1000 mm long tube adapter at the exit side during the design as a final fixture.

Before turning on the cycle lock, all components and connections must be completely assembled by qualified staff.

E04 Connection of the electrical components

Stop the system and secure it against turning on again! Clamp the electrical lines in the control box and observe the clamp assignment in the circuit diagram.

Close all connections in accordance with the legal regulations and according to the VDE directives.

Make sure that the wire cross sections, fuses and outlets are sufficiently dimensioned and secured corresponding to the drive output.

Upon connecting cable and wires to the switch boxes, inlets must be used that are suitable for the installed cable and wire types. These must contain a suitable sealing element so that the protection rating IP 67 of the control can be guaranteed. Metallic wire inlets must be connected with a grounding system. Drill holes that are not required for cable routes must also be closed through plugs.

Connecting wire ends must always be done with suitable clamping tools in order to reach consistent quality of the pressing. All clamping positions, also those that are not used, must be tightened.

If applicable, measures must be taken against external influences for systems placed outside. This may be, for example, protective rain roofs or casings. The operator of the system is obligated to the inspection.

The switch box was created for the delivered cycle lock and may not be changed. A usage of other components is not seen as proper. Should other components in the switch box be desired, these must be agreed upon with the EBRO ARMATUREN GmbH. The installation of these other designs must be confirmed in writing by EBRO ARMATUREN.

In order to connect the lines, the switch box is equipped with color coded, double-pole spring connection clamps with a cross section of 2.5 mm². Furthermore, the clamp spots are directly labeled on the circuit board.

The terminal diagram from the switch box is located in the cover of the switch box.

The installation and maintenance may only be executed by an electrician, observe in particular the Safety chapter.

HAZARD

Risk of death through electrical voltage.



Severe injuries or death through electric shock.

The connecting of the cycle lock may only be executed by an electrician.

Establish a freedom of voltage and secure the cycle lock against being turned on again.

An electrostatic charge may be created through friction from the media and through the high pressures. This charge may influence and disturb the operation of the cycle lock. That is why there must be sufficient grounding of the cycle lock.

WARNING

Disruptions to operation through electrostatic charge.



Disruptions or damage to components.

The connecting of the cycle lock may only be executed by an electrician.

The cycle lock must be grounded.

E05 *Electrical customer connection - non-offset control box*

The components are already pre-wired. Only the wires for the voltage supply and the signal wires must be placed on the connection clamps on the construction side.

Observe the attached connection plan.

E06 *Electrical customer connection - offset control box*

The components are pre-wired on one side. The connection wires from the control box to the components are connected in the control box and the wires are wound up on the control box during delivery.

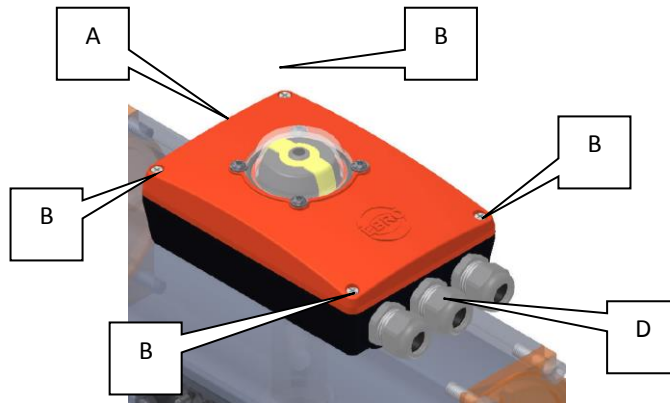
These wires must be connected in the components according to the specifications of the attached connection plan. Only the wires for the voltage supply and the signal wires must be placed on the connection clamps on the construction side.

Observe the attached connection plan.

E07 Connection from the electrical components - step connection switch box

The connection of the switch box should be executed as follows:

- Examination of the switch box for transport damage.
- Examination of the switch box for damage, in particular the casing must be examined here.
- Loosen the four screws (pos. B) on the cover (pos. A) of the switch box.
- Remove the cover from the switch box.



- Screw off the coupling nut (pos. C) from the respective cable guide (pos. D).
- Slide the coupling nut in a correct position on the feed cable so that you can close the cable inlet again correctly.
- Guide the wires through the openings into the inner space of the switch box.
- Clamp the individual wires to the color coded, double pole spring connection clamps (pos. E) with the cross section from 2.5 mm². Observe the clamp plan in the switch box cover and the labels from the clamp positions on the circuit board.



- After connection, check all wires and spring connection clamps.
- Screw tight the coupling nut on the respective cable guide.
- Set the cover in a correct position in the switch box. Pay attention the correct placement of the seal.
- Screw tight the cover with four screws.

E08 Connection of the pneumatic components

Connect the compressed air wire to the hose connection.

The drive must be adjusted to the fixture with its drive torque and characteristic curve and the setting of the fixture must be displayed correctly with its optic displayed. Since the drive from the cycle lock is equipped with a switch box, the display of the position is carried out through the switch box.

The drives were installed for the delivered cycle lock and adjusted to the respective fixture. They may not be changed. A usage of other components is not seen as proper. Should other components of the drive be desired, these must be agreed upon with the EBRO ARMATUREN GmbH. The installation of these other designs must be confirmed in writing by EBRO ARMATUREN.

The drives are normally operated with compressed air or a different control medium in a gas state. Moreover, the control medium must have a dew point that corresponds to -20°C or is at least 10°C below the surrounding temperature.

The compressed air used must be filtered with a filter with a $40\ \mu\text{m}$ mesh size in order to protect the magnet valve. The compressed air must be dried and should be slightly greased with switch cycles of $\geq 4\ \text{x/min}$.

Set the pressure to **6 bar**.

The entire pneumatic system is designed for operation with dry or slightly greased air.

A correctly connected drive normally must be closed clockwise when looking at the drive shaft of the fixture and opened in the opposite direction.

HAZARD



Hazard through uncontrolled starting pneumatic components.

Severe injuries with incorrectly connected pneumatic components or for pneumatic components that start without being controlled.

The pneumatic components may only be connected by a specialist.

All components and connections must be examined before turning on the pneumatic system.

HAZARD



Hazard by exceeding the maximum pressure.

If the maximum pressure specified on the drive is exceeded, this may lead to property damage to the components of the cycle lock.

Check the compliance with the specified pressures.

OPERATING MANUAL CYCLE LOCKS STANDARD DESIGN SERIES

The compressed air supply from the cycle lock must be provided by the construction side.

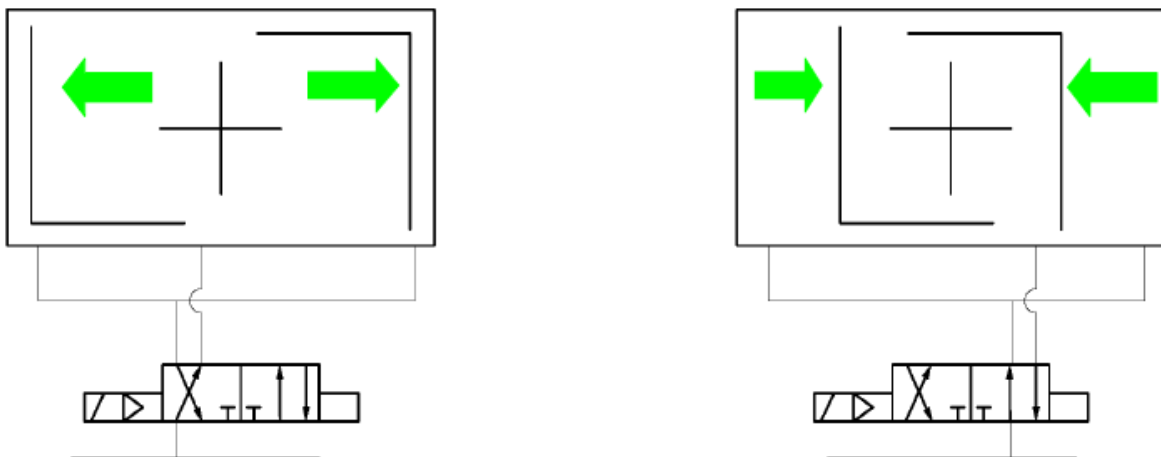
Qualified staff must guarantee that the data from the cycle lock about the control pressure, control voltage and frequency agrees with the technical data notes on the respective signs from the components.

The compressed air line leading to the magnetic valve should be designed as follows as a non-binding recommendation:

Size	EB4.1	EB5.1	EB6.1	EB8.1	EB10.1	EB12.1
Volume / lift of the drive (liter)	0,18	0,46	0,91	1,49	3,25	5,63
Recommended wire - \square (up to 6m long)	6 mm	6 mm	6 mm	6 mm	8 mm	8 mm

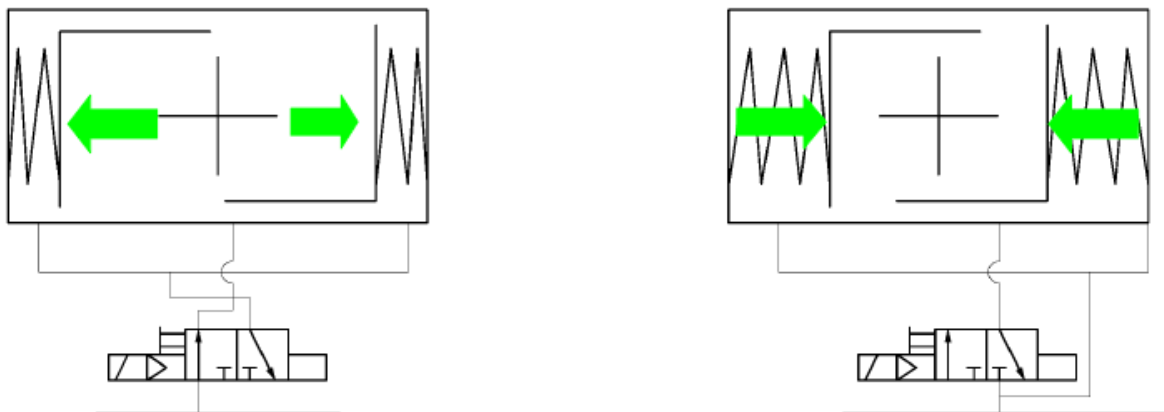
Control diagram for double working drives EBx.1 SYD:

With the double working drive, the addition of the control medium through the connection on the left must cause action counterclockwise and through the addition through the connection on the right in a clockwise manner.



Control diagram for single working drives with spring reset EBx.1 SYS:

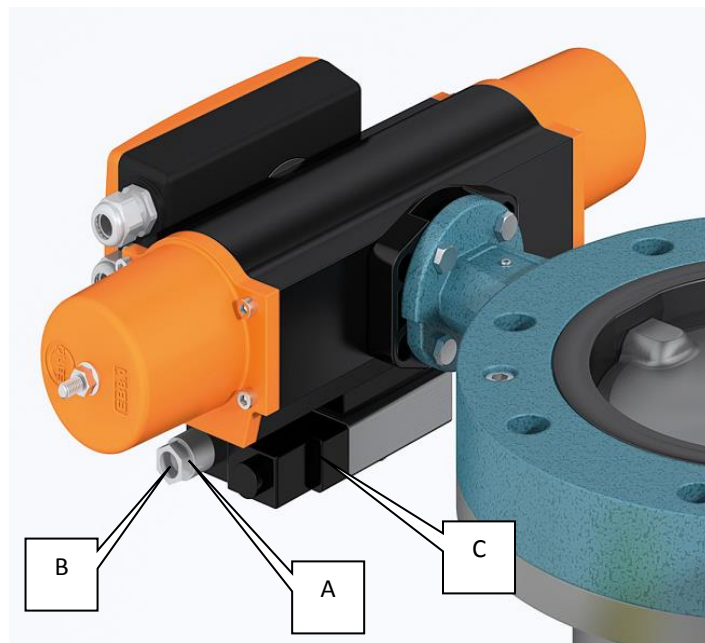
For the single-working, spring resetting drives, the addition of the control medium must be carried out through the connection on the left.



E09 Connection of the pneumatic components - steps connection drive

The connection of the drive should be executed as follows:

- Examination of the drive for transport damage.
- Examination of the drives for damage, in particular the casing must be examined here.
- Screw off the coupling nut (pos. A) from the respective hose guide (pos. B).



- Slide the coupling nut in a correct position on the compressed air wire so that you can connect the hose inlet again at a later point in time.
- Guide the compressed air lines through the feeds into the magnetic valve (pos. C).
- After connection, check all compressed air lines for leaks.
- Screw tight the coupling nut on the respective hose guide.

E10 Disassembly of the cycle lock

During the disassembly of the cycle lock, the safety notes from this operating manual and the safety guidelines applicable at the setup location by the operator must be observed.

Removal from a tubing system must be approved by the operator and may only be executed by qualified staff.

When removing the cycle lock, act with extreme caution and avoid damage to the components of the cycle lock and on the tubing system.

The disassembly of the cycle lock should be executed as follows:

- Stop the system, release it and secure it against turning on again!

NOTE



Release system and secure against turning on again with a lock.

Release electrical components and systems for all work, before maintenance, during adjustment and maintenance and secure against turning on again.

Release the pressure for all work on pneumatic components and systems and secure against pressure.

HAZARD

Risk of death through electrical voltage.



Severe injuries or death through electric shock.

The connecting of the cycle lock may only be executed by an electrician.

Establish a freedom of voltage and secure the cycle lock against being turned on again.

HAZARD

Hazard through uncontrolled starting pneumatic components.



Severe injuries with incorrectly connected pneumatic components or for pneumatic components that start without being controlled.

The pneumatic components may only be connected by a specialist.

All components and connections must be examined before turning on the pneumatic system.

- Make sure that the tubing system is released for removal from the cycle lock by the operator.
- Make sure that the tubing system and the cycle lock are completely emptied.
- Make sure that the tubing system and the cycle lock are completely free of pressure.
- Make sure that the electrical components of the cycle lock are free of electricity.
- Make sure that the pneumatic components of the cycle lock are free of pressure.
- Be informed about the safety guidelines at the place of disassembly. If you have to execute welding or grinding work, you must obtain a welding and grinding permit, a so-called welding permit, from the operator in advance.

- Find out sufficiently about the media used in the tubing system and in the cycle lock. Make sure that you obtain the important information from the operator and from the different safety specifications for hazardous substances. You may not start with the disassembly before you have these specifications.
 - Use the personal protection equipment (PPE) prescribed for the hazardous substance while disassembling the cycle lock.
 - Clean and neutralize all components coming into contact with the media before processing further after disassembly. If necessary, decontaminate these components.
-

CAUTION

Hazard through operating or hazardous substances or through media.



Sever injuries or damage to the system.

The safety specifications from the operating and hazardous substances must be present and observed.

Use the personal protection equipment required in the safety specifications when handling the respective hazardous substance.

- Move the two flaps from the fixtures to the CLOSED position so that both flaps are completely closed.
 - Unscrew the coupling nut on the hose inlet from the compressed air feed.
 - Remove the compressed air wire from the system.
 - Loosen the four screws on the cover of the switch box.
 - Remove the cover from the switch box.
 - Unscrew the coupling nut from the respective cable guide.
 - Remove the clamps from the individual wires on the spring connection clamps in the switch box.
 - Remove the wires from the spring connection clamps.
 - Remove the wires from the switch box.
 - Place the coupling nuts and the cover on the switch box again and screw these tight.
 - Secure the cycle lock from sliding, tipping or falling down with the corresponding lifting equipment. Pay attention to the weight of the cycle lock and in particular the chapter about fastening lifting equipment.
-

HAZARD

Hazard through incorrect attachments.



Severe damage to the system.

Use sufficiently dimensioned ring loops and mounts for attaching purposes.

Do not suspend the cycle lock on the drive or moving drive!

Make sure that the folding discs and the flange seal surfaces on the fixtures are not damaged!

- Unscrew all flange connections and remove the screws and nuts from the system.
 - Force apart the flange from the cycle lock and the tubing system with a corresponding tool.
 - Remove the cycle lock from the tubing system. When removing the cycle lock, you must make sure that the flange seal areas of the cycle lock and the tubing system are not damaged. If necessary, protect the seal areas from damage.
-

CAUTION

Leak through damaged folding panel or seal areas.



The outer edge of the folding panel has a very fine design in order to guarantee that the fixture does not leak when the folding panel is closed.

That is why it must be guaranteed that this area is not damaged while handling during the removal process.

Make sure that the folding discs and the flange seal surfaces on the fixtures and on the tubing system are not damaged!

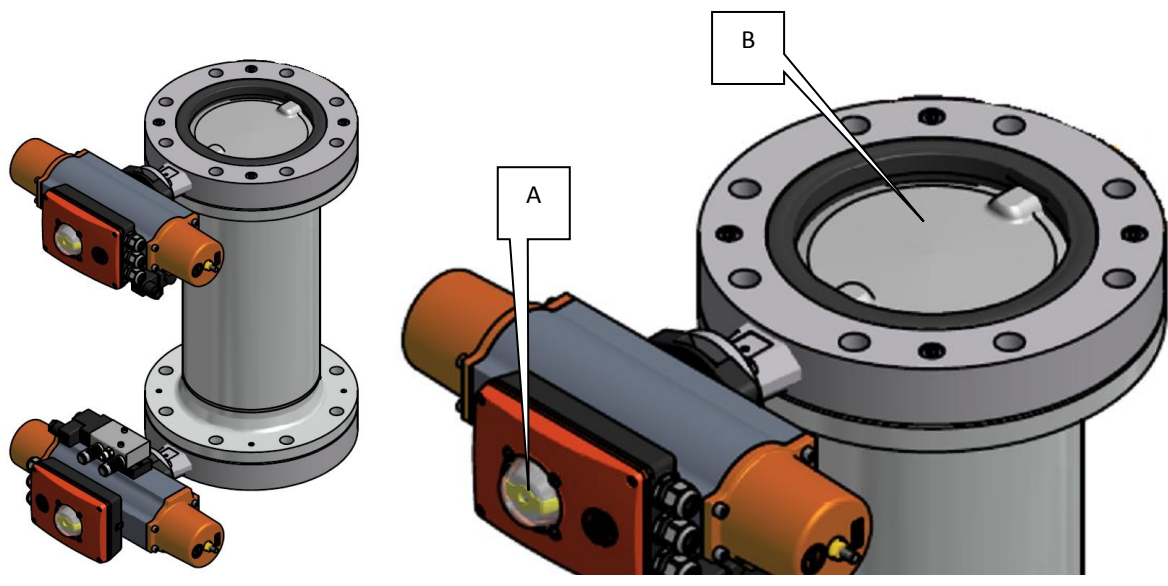
F) Sample run, flushing and pressure test after installation

F01 Sample run and flushing

The delivered cycle lock was manufactured, set and examined ex works for the technical data specified in the order.

Nevertheless, you have to guarantee the proper function for automatic operation after complete installation of the cycle lock. That is why you should execute and document the following steps before commissioning. It is important that you always execute these steps on both drives and fixtures.

- Check if all components and connections were correctly installed.
- Check the correct installation of the cycle lock in the tubing system.
- Check the programming or control of the cycle lock for functionality.



HAZARD



Hazard through incorrect setting or display.

Severe damage to the cycle lock during operation.

An incorrect display or response represent a hazard.

Make sure that the settings OPEN or CLOSED from the fixtures agree with the display on the switch box or the control.

INFO



Note.

Pay attention to the setting and display of the fixture and drive.

A setting of the limit stop CLOSED from a new cycle lock should not be changed as long as the fixture is sealed.

Please observe the notes in this operating manual for adjustment.

- Make sure that the end switches are pressed in the end settings.
- Make sure that the electrical signals for the "OPEN" or "CLOSED" setting, which are displayed on the control, agree with the optical display on the switch box and with the setting of the fixture. If no agreement is determined here, the respective unit must be adjusted again. The cycle lock may first be operated once the agreement is present.
- Check the control pressure immediately on the magnet valve. This must have an adequate size. At least the control pressure must be present here that is marked on the sign from the drive. Only then can a smooth operation of the fixture be guaranteed under operating conditions.
- Check the correct connection of the magnetic valve. With pending control pressure and with a failure of a control signal (to examine, for example, remove the plug), the fixture must be moved to determined setting "CLOSED". If a different setting of the fixture is desired, this must be discussed with the EBRO ARMATUREN GmbH. If the fixture does not move to the "CLOSED" setting, the activation and/or the switching of the magnetic valve must be corrected correspondingly.

Drive type	Type sign	Fixture must
double working	EB□.1 SYD	move to the "CLOSED" setting.
spring closing	EB□.1 SYS	move to the "CLOSED" safety setting.

- Check the screw connections between the drive and fixture with a torque wrench. Observe the corresponding torque for this.
- Check the flange connections between the tubing system and cycle lock with a torque wrench. Observe the corresponding torque for this.
- Turn on the cycle lock and execute a test run. Make sure that with pending control pressure, the respective fixture is moved into the designated final position with the corresponding control commands "OPEN" and "CLOSED". The display of the control and the optical display on the switch box must display these in agreement.
- After a successful test run, move the two fixtures to the "OPEN" setting so that the tubing system can be flushed. If the test run was not completed successfully, the corresponding components must be re-adjusted and another test run executed.
- Flush the entire tubing system and the cycle lock for cleaning. The flushing process must be defined and approved by the operator.

F02 Pressure check

The delivered cycle lock was manufactured, set and examined ex works for the technical data specified in the order.

All delivered cycle locks were subject to a seal and completion inspection from the manufacturer ex works.

For the pressure check of a cycle lock in a tubing system, the testing conditions from the tubing section apply - but with the following restrictions:

- The test pressure from a cycle lock may not exceed the value of 1.5x PS (according to the sign). Both folding panels must be in an opened setting.
- If a closed folding panel is subject to more than 1.1x PS, the risk exists that the inner parts of the fixture are over-stressed. This must definitely be avoided.

HAZARD

Hazard through test pressures being too high during the pressure check.



Severe damage to the system.

Make sure that during the pressure check the two folding panels from the cycle lock are opened.

Make sure that the test pressure does not exceed the value of 1.5 x PS.

G) Produktbeschreibung

G01 Proper usage

The cycle lock from the EBRO ARMATUREN GmbH is only designed to deliver and dose media from silos, containers, hoppers, etc. Pressure differences can be bypassed through optional bypasses.

The cycle lock is delivered corresponding to the order from the operator as a completely inspected unit ready for installation.

The cycle lock normally consists of two fixtures, two flexible drives, two switch boxes, a filling tube and a control from the EBRO standard portfolio.

The cycle lock is an incomplete machine, which is set for the installation in a tubing system or an attachment to a silo, container or similar system.

The manufacturer of complex systems in which the cycle lock is installed is obligated to create a risk assessment for this complex cycle lock. In particular the interfaces to the system components or the cycle lock must be observed here. If due to this observation it is necessary to install further protective equipment for the complex cycle lock, this occurs in the responsibility of the manufacturer of complex systems.

The cycle lock may only be operated with the accessories, which are designated and approved for this by the EBRO ARMATUREN GmbH.

The specifications in the Technical Data sub-chapter as well as in the original documentation from the supplier products in the attachment must be observed and complied with.

Another different or excessive usage is not seen as proper.

Only the operator of the cycle lock is responsible for any damage resulting from this. This also applies to independent changes to the system.

The proper usage includes compliance with the notes on safety, operation and maintenance and repair, which are described in this operating manual and in the documentation from the supplier products.

The following applies to cycle locks:

- the cycle lock is solely used to transport, dose or provide media that corresponds to the technical requirements from this operating manual.
- the cycle lock is only used to operate the media confirmed and approved by the EBRO ARMATUREN GmbH.
- the media must be visible from the order.
- any other usage of the system, for example, the processing of other media and the processing of unapproved media, is seen as improper.
- the usage of the cycle lock in areas with cycle lock hazards is not permissible.
- is only to be used for the purposes confirmed by EBRO ARMATUREN GmbH and operated only under the usage conditions prescribed in this operating manual.
- is only to be operated with the settings and variations prescribed in this operating manual.
- Independent constructional changes, attachments or changes to the cycle lock without written consent from the manufacturer, as well as changes and modifications in the electric system or the control and settings are forbidden or must be agreed upon in advance with the EBRO ARMATUREN GmbH.

HAZARD



Hazard through improper usage of the machine

In the event of improper or illegal usage of the machine, people may be severely injured or killed. Furthermore, the machine may also be damaged.

Only use machines properly!

Do not make any changes to the machine!

Only deliver and dose approved media!

INFO



Observe all notes in this operating manual, in particular the safety notes. They must be read and observed before all activities on the machine.

Any other usage, setting and variation compared to what is described in this operating manual is seen as illegal and as an improper use of the machine!

G02 Scope of delivery

The cycle lock was designed and created at EBRO ARMATUREN and is suitable for delivering and dosing suitable media from silos, containers, hoppers, etc.

The cycle lock we deliver as an incomplete machine is designated for installation in a tubing system.

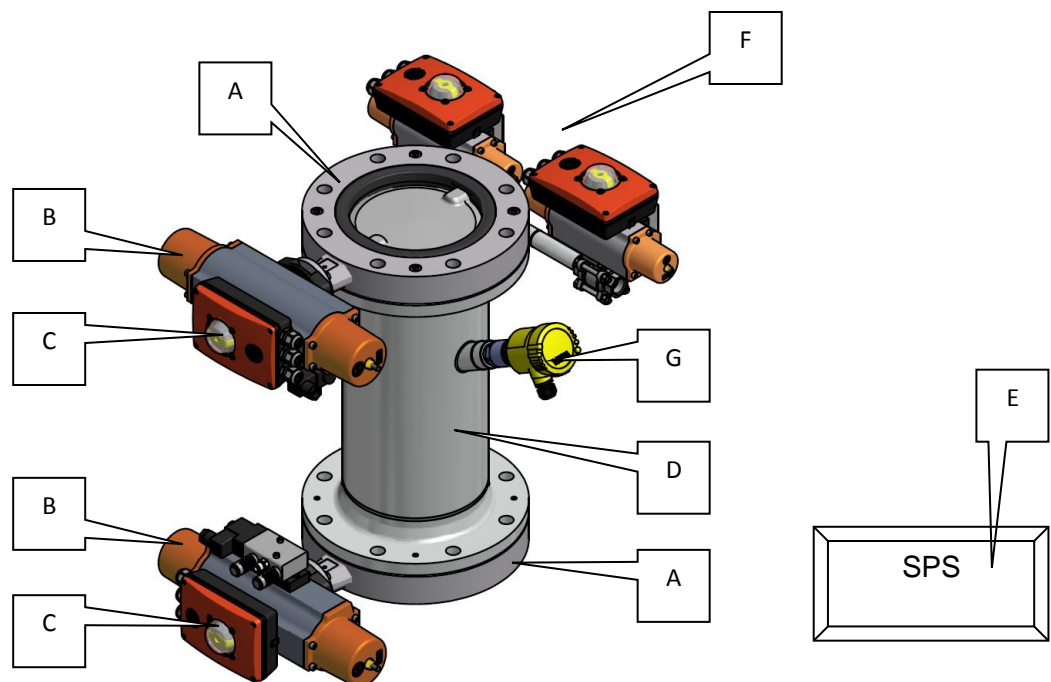
It consists of:

- two fixtures (Pos. A).
- two mobile drivesn (Pos. B).
- two switch boxes (Pos. C).
- a filling tube (Pos. D).
- an SPS control unit (Pos. E).
- optionally up to two bypasses, consisting of two fixtures, two switch boxes and a support on the filling tube (pos. F).
- optionally a fill level sensor (Pos. G).
- Operating and assembly manual.
- Installation explanation.

Immediately after receiving the system, check to see if it agrees with your order and if all components are complete.

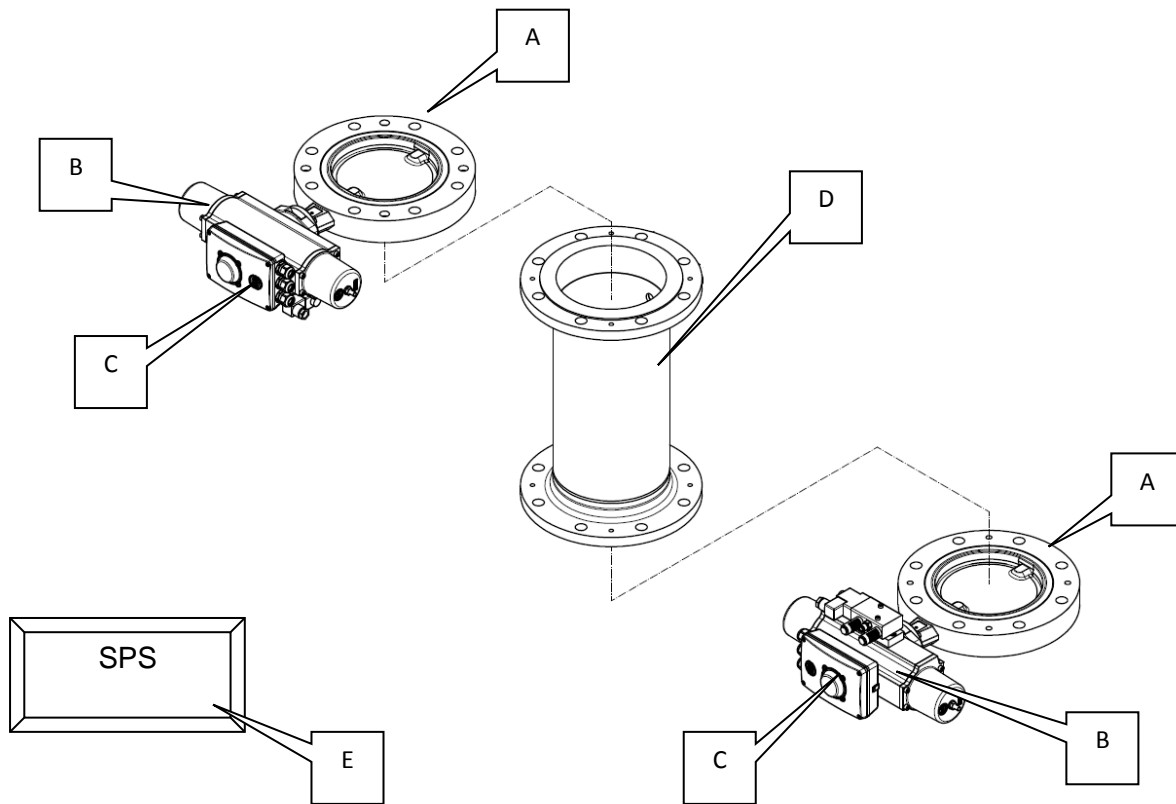
Report:

- Recognizable transportation damages immediately to the deliverer.
- Recognizable defects or incomplete orders immediately to the EBRO ARMATUREN GmbH.



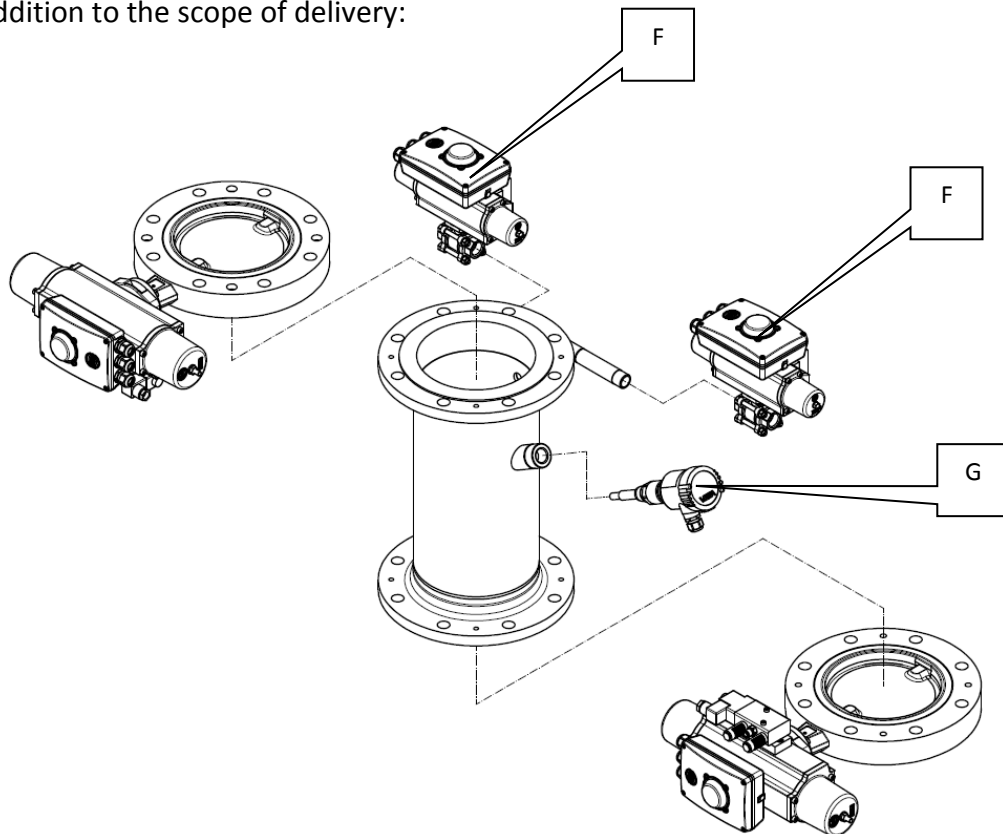
G03 Description of the components

The cycle lock in the standard design consists of two fixtures (pos. A), two mobile drives (pos. B), two switch boxes (pos. C), a filling tube (pos. D) and a control (pos. E) from the EBRO standard portfolio.



- Pos. A) Block fixture - any fixture from the EBRO portfolio can be used here. The fixture can, for example, be a block flap, a spacer, a squeeze valve or a ball valve. The block fixture is screwed with the filling tube.
- Pos. B) Mobile drive - any pneumatic mobile drive from the EBRO portfolio can be used here. The mobile drive is mounted on the block fixture.
- Pos. C) Switch box - a switch box from the EBRO portfolio is used here. The SBU switch box with mechanical end switch serves for the end position monitoring of the respective mobile drive.
- Pos. D) Filling tube - a standard filling tube or a filling tube according to the customer's request is used here. The filling tube may also, for example, have a conical shape. The volume of the filling tube is dependent on the height and diameter of the filling tube.
- Pos. E) SPS – consists of a control unit with the visualization through a touch panel. The operation and visualization are carried out through the control of the SPS. Here all process values and times can be set as desired. The SPS has a web visualization, which provides the entire scope of function of the touch panel, for example, in the customer network.

Optional in addition to the scope of delivery:

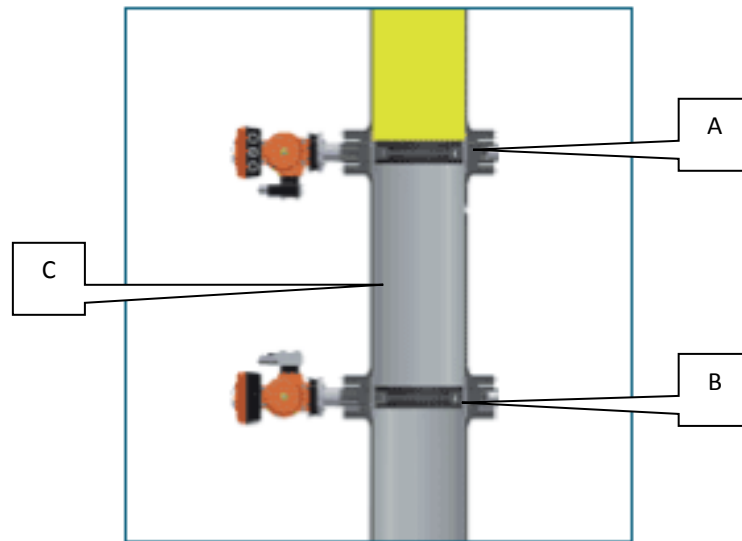


- Pos. F) Bypass fixture - with the help of the bypass fixture, different pressure levels can be bypassed. Through this, for example, a pressure equalization can be established for a silo before filling the filling tube in order to prevent a strong discharge of pressure difference in the silo and lower the sleeve wear.
- Pos. G) Fill level sensor - instead of using permanently set filling and emptying times, demand oriented quantities can be added through the fill level sensor. The partially isolated measuring sensor is optimized for measuring bulk goods.

G04 Functional process of the cycle lock

For the cycle lock in the standard design without optional additions, the steps occur as follows:

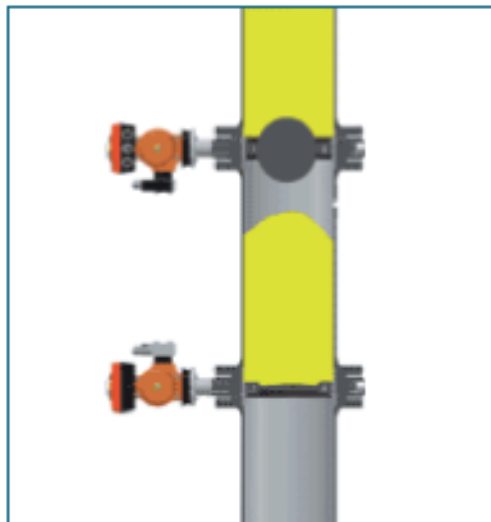
1. Basic setting from the cycle lock



- Blocking of the medium in the tubing system through the incoming fixture (pos. A).
- Opening of the outgoing fixture (pos. B). This process is executed before every single sequence and makes sure that any remaining medium in the filling tube (pos. C) is delivered out of the filling tube.
- Close the outgoing fixture.

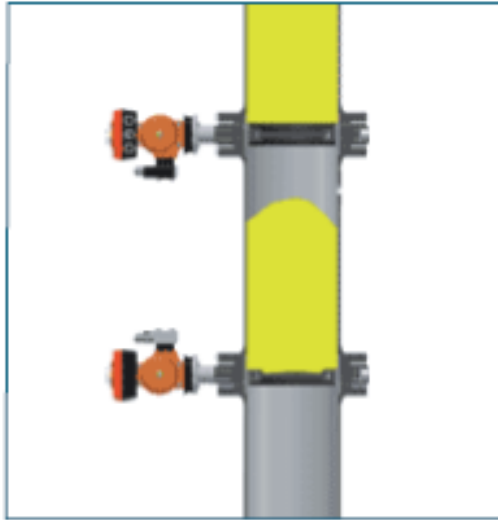
2. Filling the filling tube

Open the incoming fixture. Through this, the medium moves into the filling tube and is kept in the filling tube through the closed outgoing fixture. The filling time can be adjusted as desired. The fill quantity depends on the set time for filling, the form and size of the filling tube, the pressure and the medium.



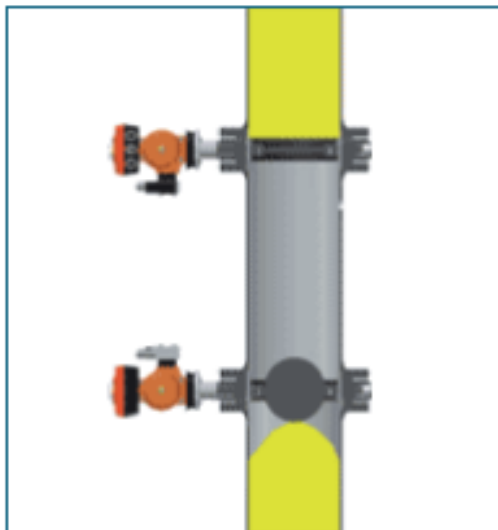
3. Intermediate position

- Close the incoming fixture after reaching the set time. The medium is kept in the filling tube until the outgoing fixture opens or the waiting time has expired.



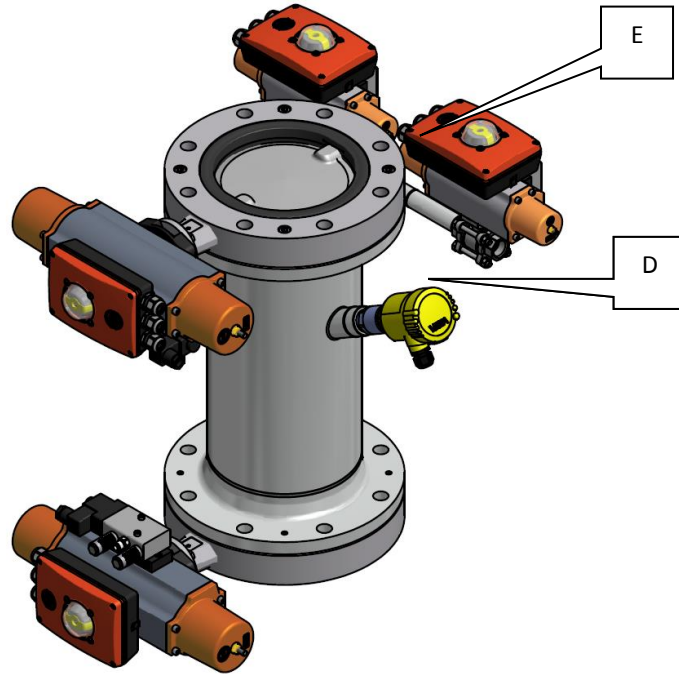
4. Emptying

- Open the outgoing fixture to empty the filling tube. Through this, the medium is transported from the filling tube to the continued process.
- Close the outgoing fixture. After this, the next sequence can be executed.



Optional filling with fill level sensor

- Open the ingoing fixture. Through this, the medium moves into the filling tube and is kept in the filling tube through the closed outgoing fixture. The fill quantity can be dosed exactly the same through the fill level sensor (pos. D), through which the required quantity can be added. The partially isolated measuring sensor is optimized for measuring bulk goods.



Optional ventilating of the filling tube with a bypass fixture in the basic setting

- Opening of the bypass fixture. With the help of the bypass fixture (pos. E), different pressure levels can be bypassed. Through this, for example, a pressure equalization can be established for a silo before filling the filling tube in order to prevent a strong discharge of pressure difference in the silo and lower the sleeve wear.

H) Operation and visualization

H01 *General note on operation*

Before beginning operation, read the chapter *Safety Notes*. The listed safety notes must be followed and are valid for all sub-chapters. Also observe the information from the connected processing machine, the tubing system and that of the programming.

HAZARD

Risk of death through electrical voltage.



Severe injuries or death through electric shock.

The connecting of the cycle lock may only be executed by an electrician.

Establish a freedom of voltage and secure the cycle lock against being turned on again.

HAZARD

Hazard through uncontrolled starting pneumatic components.



Severe injuries with incorrectly connected pneumatic components or for pneumatic components that start without being controlled.

The pneumatic components may only be connected by a specialist.

All components and connections must be examined before turning on the pneumatic system.

H02 *Operating setup on the touch panel*

The cycle lock is equipped with a main operating console, which is located in a separate control box. This can be installed directly near the cycle lock or also at a short distance from the cycle lock. Furthermore, the control in a customer-side SPS can be integrated through binary signals or field buses.

The operating console serves for the operation and setting of the parameters from the system. It is equipped with a touch panel. Through this, commands can be entered directly through the screen. Use the included stylus or your finger to touch the screen.

In order to be able to understand the operation of the cycle lock on the interface - operator and cycle lock - as easily as possible, the control is divided by a functional menu structure. Here you can change from the main view of the screen to the different menu levels by clicking on the desired menu points through the buttons. The selection options and assignments are displayed on the screen for you.

H03 Main screen

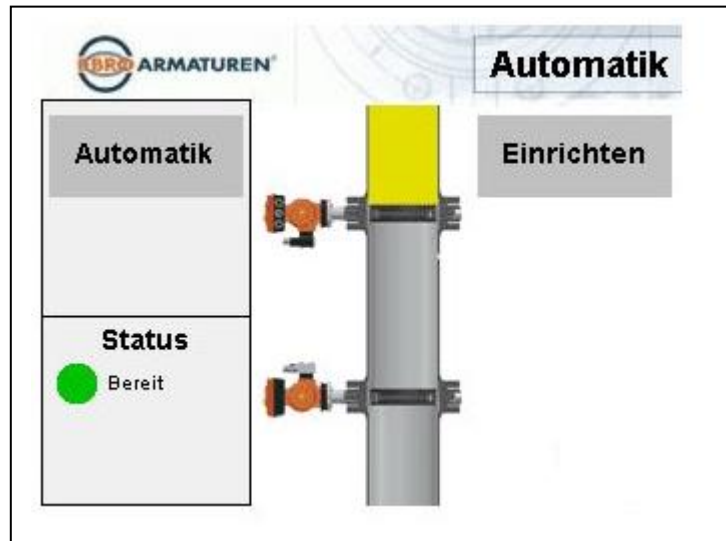
In the upper left frame, you will find the operating mode selection.

If the cycle lock is in automatic mode, it can be remotely controlled through external commands. If "automatic" is deselected, it will be in manual mode.

The current status is displayed in the lower left frame.

The status is either green or red. Green means that the cycle lock is ready for operation or in operation. In clear text, "Ready" (ready for operation) or "In Progress" (the cycle lock is currently running either in manual or automatic mode) is found next to this.

If the status is red, a disruption is present. In this case, a switch button to get to the error message window will show up under the status message.



H04 Set up screen

The access is password protected and the "automatic" operating mode must be disabled.

By entering the correct password and selecting the "login" button, you can get to the overview by pressing "Next".

The following actions can be executed in the "Setup" program area:

- Manual operation (on site operation).
- Parameter settings (for example, activation times for all fixtures in the automatic mode).
- Observation of the process values.



The screenshot shows the 'Benutzer' (User) login screen. At the top left is the 'EBRO ARMATUREN' logo. The title 'Benutzer' is in a blue box at the top right. Below the logo is a 'Passwort:' label and a text input field containing six asterisks. To the right of the input field is the instruction: 'Zum Einrichten Automatik deaktivieren, Passwort eingeben und anmelden.' Below the input field are three buttons: 'Anmelden', 'Weiter', and 'Zurück'.



The screenshot shows the 'Benutzer' (User) login screen. At the top left is the 'EBRO ARMATUREN' logo. The title 'Benutzer' is in a blue box at the top right. Below the logo is a 'Passwort:' label and a text input field containing the password 'ebro'. To the right of the input field is the instruction: 'Zum Einrichten Automatik deaktivieren, Passwort eingeben und anmelden.' Below the input field are three buttons: 'Anmelden', 'Weiter', and 'Zurück'.



Benutzer

Passwort:

Abmelden

Weiter

Zurück

Zum Einrichten Automatik deaktivieren, Passwort eingeben und anmelden.

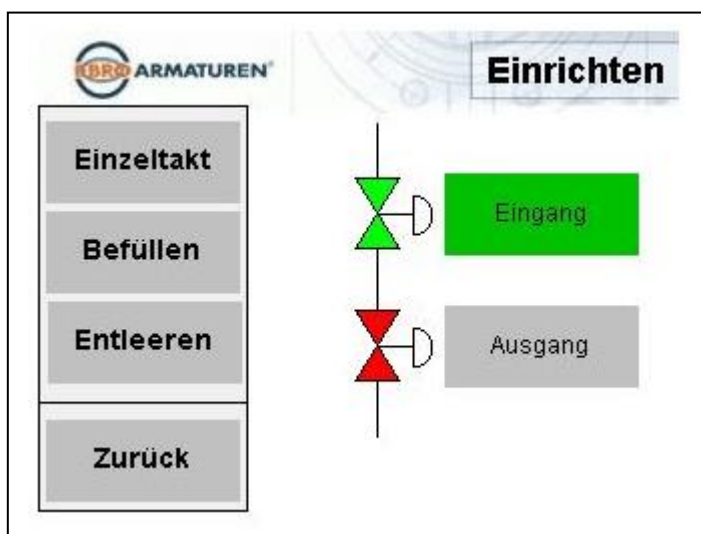
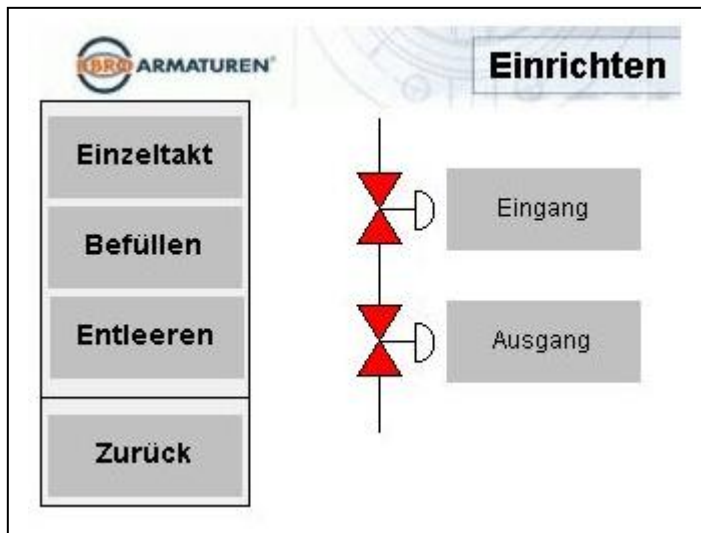


Einrichten

Bedienen	Paramter	Prozesswerte
Manuell	Prozesszeiten	Laufzeiten
Spülvorgang	Überwachung	Taktzähler
	Benutzer	
Zurück	Wartungsmanagement	

H05 Manual screen

In manual mode (on site operation), individual sequences can be executed or the cycle lock can be filled or emptied separately. In addition to this is a completely manual operation of the individual fixtures by making the selection in the image representation. The respective fixture is opened by clicking on it once. If the button is deselected, the fixture will close.



H06 Process times screen

Explanation:

Parameter	Description	Unit	Default
<i>Ventilation duration</i>	Time for how long before the filling the bypass fixture from the input is opened.	0 ... 100,000 ms	2,000 ms
<i>Filling duration</i>	Time of how long the input fixture is opened to fill the intermediate tube piece.	1,000 ... 100,000 ms	2,000 ms
<i>Wait time</i>	Wait time for the material in the intermediate tube piece before delivery.	0 ... 100,000 ms	2,000 ms
<i>Ventilation duration</i>	Time for long the bypass fixture from the output is opened before emptying.	0 ... 100,000 ms	2,000 ms
<i>Emptying duration</i>	Time of how long the input fixture is opened to empty the intermediate tube piece.	1,000 ... 100,000 ms	2,000 ms
<i>Total run time</i>	Sum of all process times listed above, including internal delay times.	ms	-

EBRO ARMATUREN®

Prozesszeiten

Belüftungsdauer s

Dauer befüllen: s

Wartezeit s

Entlüftungsdauer s

Dauer entleeren: s

Takt ausführen alle Min

Zurück

Laufzeit gesamt: s

H07 Monitoring screen

Explanation:

Parameter	Description	Unit	Default
<i>Delay error message</i>	Delay time between the "normal" operating states and the classification of faulty states as an error.	0 ... 100,000 ms	2,000 ms
<i>Mutual locking</i>	Dead time between two activations of different fixtures.	1,000 ... 100,000 ms	2,000 ms
<i>Max. permissible run time</i>	Upper limit for the duration of the individual cycles. This value is defined by the total process of the cycle lock and must be entered by the customer.	ms	-
<i>Run time of the last cycle</i>	The duration of each cycle is measured in the control and results from the sum of all set process times (filling duration, waiting intermediate setting, etc.) and all other process values (activation duration of the drives, delays, etc.). If this measures value exceeds the "max. permissible runtime", the error "runtime exceeded" will appear.	ms	-

The screenshot shows the 'Überwachung' (Monitoring) screen of the EBRO ARMATUREN control system. It features four adjustable parameters, each with a numeric input field and a unit indicator:

- Verzögerung Störmeldung: 5 s
- Gegenseitige Verriegelung: 400 ms
- Max. zulässige Laufzeit: 30 s
- Laufzeit letzter Zyklus: 20 s

At the bottom of the screen, there are two buttons: 'Zurück' (Back) and 'Info'.

H08 User screen

Explanation:

Parameter	Description	Unit	Default
<i>Autom. user log off</i>	Once the set time has been reached, the user will be logged off automatically. "Set up" can first be selected after logging in again.	0 ... ? ms	600,000 ms
<i>New password</i>	The current password is displayed in this field and cannot be changed.	text	ebro



H09 Maintenance management screen

Explanation:

Parameter	Description	Unit	Default
<i>Maximum switch cycles from the fixtures</i>	Due to wear to the sleeves, the maximum switch cycles of the fixtures are limited. This value is strongly dependent on the process (medium, pressure, etc.) and should be observed by the manufacturer as a recommendation.	number	Dependent on the fixture type
<i>Maximum runtime deviation</i>	The activation times (opening and closing times) are monitored from the switching of the signal output up to reaching the final position. Since two fixtures are available as a reference for each other, differences are evaluated in the activation times and a notification is emitted if the set "maximum runtime deviation" is exceeded. These runtimes can be found under "Process Values" → "Runtimes".	0 ... 100,000 ms	1,000 ms



H10 Runtime screen

In the "Runtime" screen, the last times from the activation of the individual fixtures can be found. This time is the value between the SPS command and the ultimate reaching of the final position.

The opening and closing times for the two fixtures should be approximately similar with the same construction size and type.

The "Maximum runtime deviation" parameter processes these values for a prediction of the maintenance state.

Laufzeiten	
Öffnungszeit Eingangsarmatur:	4445 ms
Schließzeit Eingangsarmatur:	2605 ms
Öffnungszeit Ausgangsarmatur:	4825 ms
Schließzeit Ausgangsarmatur:	2475 ms

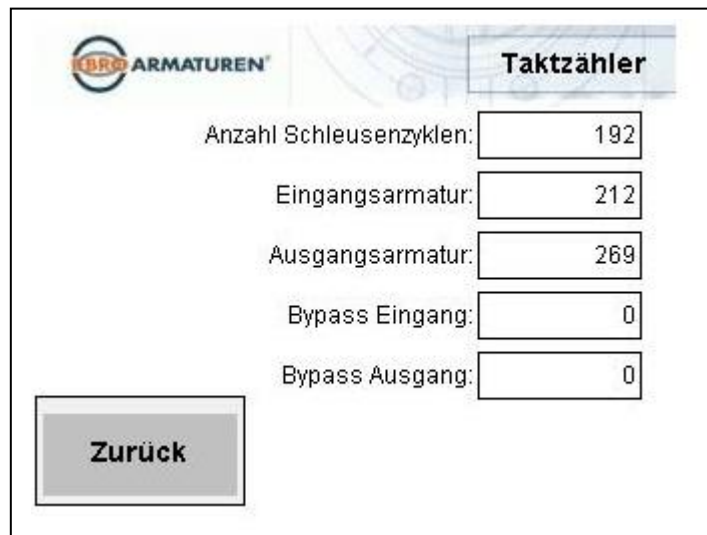
Zurück

H11 Clock counter screen

Explanation:

The clock counters are remanent and cannot be influenced by the user. The overview serves for the inspection of the operating history from the cycle lock.

Parameter	Description	Unit	Default
Number of lock cycles	Clock counter from completely executed lock runs	number	-
Incoming fixture	Clock counter from the incoming fixture		
Outgoing fixture	Clock counter from the outgoing fixture		
Bypass entrance	Clock counter from the bypass fixture entrance		
Bypass exit	Clock counter from the bypass fixture exit		



H12 Flushing process screen

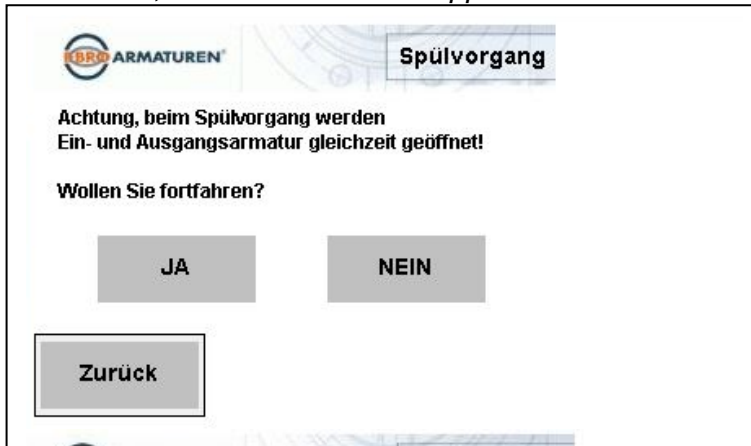
An additional selection in the Setup sub-menu exists for the flushing process.

When the button is pressed, the following safety note will appear on the screen:

"Caution, both inlet and outlet fixtures are opened simultaneously during the flushing process!"

"Do you want to continue?"

If you select the "Yes" button, another window will appear with a final selection of the flushing process.



Once the "flushing
If the button is disa



I) Programming SPS

101 Program organization

There are two operating modes - automatic and manual.

A single sequence or permanent run can be selected in the automatic mode.

The program is organized as follows:

Templates	Description
Main	In Main, the operating mode selection and the error and notification handling are located.
Lock cycle	Main template for automatic mode. The individual steps worked through sequentially here.
Inputs_outputs	Assignment of the inputs and outputs as well as locking of the signals among each other. With a possible connection to a superior control unit, these commands (binary inputs or signals through a field bus) are executed in a self-retaining manner. The command signals from the visualization are also designed in a self-retaining manner.
Manual	All actions that are possible in the manual operation are organized here. This includes the execution of individual sequences (complete cycle), filling, emptying and the separate, time-independent controlling of all drives.
Organization	General program parts like time, creation of the sequence signal and user log in
Sequence counter	The lock cycles and any activation of the fixtures are counted here.
Runtime	The activation times are dependent on different factors of influence. The runtime from the last sequence cycle is measured in order to compare the runtime monitoring with the process data after every cycle. Additionally, the activation times from the drives (signal output until the final position is reached) are measured, which are also included in the runtime monitoring. A maximum runtime deviation can be set. This cannot be mixed up with the runtime monitoring. During the runtime monitoring for the max. permissible cycle time up to the output of an error, for example, in the event of a blockade, the runtime deviation measures the difference of the activation times from the input and output fixture in order to determine wear and stiffness early enough.
Fixture control	Function template for controlling and monitoring the drives.

I02 Software technical locking

Independent of the operating mode and the external signal states, all fixtures are locked with each other through locking components. Plus there is a dead time that delays the opening of a fixture after it has been successfully closed.

I03 Access protection

The automatic mode is freely accessible. The automatic operating mode must be disabled and a password correctly entered to select "Set up".

I04 Safety setting

There is an emergency off command input. This signal is used internally to immediately stop all processes and shutting down of all outputs.

I05 External control

External overview of control functions (binary inputs or different field buses).

Identification	Explanation
Automatic	<i>The cycle lock can only be operated by external commands in automatic mode. If the cycle lock is not in the automatic mode, it is in the manual operating status.</i>
Individual sequence	<i>With an increasing flank in the automatic mode, an individual sequence is executed. After this the cycle lock is back in the basic setting.</i>
Permanent run	<i>With an increasing flank in the automatic mode, a permanent run is executed. Initially, it is first emptied, then the lock process is executed in a cyclical manner until another signal flank ends the permanent run. The current cycle is executed until the end.</i>
Safety position (emergency off)	<i>Is handled internally like an emergency off signal. If the signal comes, the automatic mode is ended immediately, all outputs are turned off.</i>

J) Setting and adjusting

J01 General settings

The cycle lock must be set up for the media to be processed for operation.

However, maintenance and upkeep work may lead to the settings having to be reset.

Before beginning the setting work, read the *Safety* chapter.

The listed safety notes must be followed and are valid for all sub-chapters. Moreover, observe the operating instructions for the purchased parts.

You should empty the complete cycle lock for setting and maintenance work and remove all media from the connected tubing system.

The setting or adjusting must be approved by the operator and may only be executed by qualified staff.

HAZARD

Risk of death through electrical voltage.



Severe injuries or death through electric shock.

The connecting of the cycle lock may only be executed by an electrician.

Establish a freedom of voltage and secure the cycle lock against being turned on again.

HAZARD

Hazard through uncontrolled starting pneumatic components.



Severe injuries with incorrectly connected pneumatic components or for pneumatic components that start without being controlled.

The pneumatic components may only be connected by a specialist.

All components and connections must be examined before turning on the pneumatic system.

CAUTION

Hazard through operating or hazardous substances or through media.



Sever injuries or damage to the system.

The safety specifications from the operating and hazardous substances must be present and observed.

Use the personal protection equipment required in the safety specifications when handling the respective hazardous substance.

CAUTION

Damage and disruptions on the machine due to incorrect settings.



Property damage to the machine and, if applicable, low lifespan.

Execute setting work on the machine properly!

Check settings

NOTE



Release system and secure against turning on again with a lock.

Release electrical components and systems during all work, before maintenance, setting and upkeep and secure against turning back on.

Release the pressure for all work on pneumatic components and systems and secure against pressure.

K) Maintenance and upkeep

K01 General maintenance and upkeep

Before beginning all maintenance and upkeep work, read through the *Safety* chapter. When purchasing spare parts and wear parts, original parts from the EBRO ARMATUREN GmbH and the purchase parts from the manufacturer must be used. It is pointed out that spare parts not delivered from the corresponding manufacturer are not inspected and approved. The installation or usage of such parts may under circumstances cause negative constructional changes to the defined properties of the cycle lock and thereby impair the active or passive operating safety.

For damages that are created through the usage of non-original parts and accessories, the manufacturer has no liability.

Before beginning every shift, the cycle lock must be subject to a short inspection in order to recognize possible damages early on and be able to take required measures for disruption free production processes.

The work and activities on the cycle lock may only be executed by qualified staff, please also observe the *Qualified Staff* chapter for this.

The listed safety notes must be followed and are valid for all sub-chapters. Also observe the operating manual from the connected processing machine, the tubing system and that of the programming.

You should empty the complete cycle lock for setting and maintenance work and remove all media from the connected tubing system.

The maintenance must be approved by the operator and may only be executed by qualified staff.

CAUTION

Damage and disruptions on the machine due to incorrect maintenance.



Property damage to the machine and, if applicable, low lifespan.

Maintain and repair the machine according to the defined interval!
Observe shift operation!

HAZARD

Risk of death through electrical voltage.



Severe injuries or death through electric shock.

The connecting of the cycle lock may only be executed by an electrician.

Establish a freedom of voltage and secure the cycle lock against being turned on again.

HAZARD



Hazard through uncontrolled starting pneumatic components.

Severe injuries with incorrectly connected pneumatic components or for pneumatic components that start without being controlled.

The pneumatic components may only be connected by a specialist.

All components and connections must be examined before turning on the pneumatic system.

CAUTION



Hazard through operating or hazardous substances or through media.

Sever injuries or damage to the system.

The safety specifications from the operating and hazardous substances must be present and observed.

Use the personal protection equipment required in the safety specifications when handling the respective hazardous substance.

NOTE



Release system and secure against turning on again with a lock.

Release electrical components and systems for all work, before maintenance, during adjustment and maintenance and secure against turning on again.

Release the pressure for all work on pneumatic components and systems and secure against pressure.

K02 Maintenance intervals

Element	Maintenance activity	Maintenance intervals			Information
		Before every shift	Daily	Semi-annually	
Total cycle lock		●			Changes in the operating behavior, in particular those that impair the safety, must be reported immediately and repaired!
Seal from the cycle lock and the flange connections			●		Immediately report and repair leaks!
Total cycle lock	Cleaning			●	All contaminations must be removed at least every 6 months!
Drives	Control			●	All drives must be subject to a visual inspection at least every 6 months!
Fixtures	Control			●	All drives must be subject to a visual inspection at least every 6 months!

K03 Cleaning of the cycle lock before installation

All internal areas of the fixtures must be free of contamination, in particular there may not be any hard or sharp particles here. This also applies to the tube sections to be connected on the construction side. The tube sections and the flanges must be clean and not have any damages.

In particular, remember that the cover in the casing from the fixture may not come into contact with lubricants, cleaning materials or other substances that do not have proven suitability or are approved by the EBRO ARMATUREN GmbH.

Unsuitable cleaning agents or substances may lead to contamination, swelling or damage to the fixture.

CAUTION

Leaking through contamination.



Contamination in fixtures, flanges and construction-side tube sections must be removed.

Contamination that is not removed may lead to damage to the seal surfaces, this in turn leads to leaking.

Make sure that the contamination is removed in a proper manner!

K04 General cleaning of the cycle lock

When operating the cycle lock, a mixture of oil, dust and other foreign objects is occasionally created. The operation and functionality of the cycle lock may be disrupted by these deposits.

In order to avoid these disruptions, you must comply with the maintenance intervals and the cycle lock must be cleaned externally at least every 6 months.

HAZARD

Hazard through uncontrollably moving components.



Severe injuries or death when working on running systems.

Before all cleaning work, the cycle lock must be released of all pressure and secured against being turned on again unexpectedly.

Do not execute cleaning work during running operation.

CAUTION

Hazard through incorrect or aggressive cleaning agent.



Injuries or damages to the system.

The safety specifications for the cleaning agent must be present and observed.

Only use a dry cloth and, if applicable, conventional cleaners.

K05 Maintenance of the drives

The drives are free of maintenance, because the cylinders are equipped with lifespan lubrication. Nevertheless, the drives should be subject to a visual inspection semi-annually and, if applicable, cleaned with a towel.

Pay attention to the maintenance specifications from the construction side compressed air supply.

The compressed air used must be filtered with a filter with a 40 µm mesh size in order to protect the magnet valve. The compressed air must be dried and should be slightly greased with switch cycles of ≥ 4 x/min.

In order to avoid these disruptions, you must comply with the maintenance intervals and the drives must be cleaned externally at least every 6 months.

K06 Maintenance of the fixture

The fixtures themselves are maintenance free. Nevertheless, the fixtures should be subject to a visual inspection semi-annually and, if applicable, cleaned with a towel.

During the visual inspection, please also pay attention to the flange connections and screws for the construction side tubing system. If applicable, leaks may be created here, which must be immediately reported and repaired.

In order to avoid these disruptions, you must comply with the maintenance intervals and the fixture must be cleaned externally at least every 6 months.

Furthermore, the flange connections should be inspected manually at least once a year and tightened with a torque wrench. Observe the specified torque of the screws.

L) Disruptions, causes and repair

L01 General disruptions

Before beginning the troubleshooting, read the chapter *Safety Notes*. The listed safety notes must be followed and are valid for all sub-chapters. Also observe the information from the connected processing machine, the tubing system and that of the programming.

HAZARD



Risk of death through electrical voltage.

Severe injuries or death through electric shock.

The connecting of the cycle lock may only be executed by an electrician.

Establish a freedom of voltage and secure the cycle lock against being turned on again.

HAZARD



Hazard through uncontrolled starting pneumatic components.

Severe injuries with incorrectly connected pneumatic components or for pneumatic components that start without being controlled.

The pneumatic components may only be connected by a specialist.

All components and connections must be examined before turning on the pneumatic system.

CAUTION



Hazard through operating or hazardous substances or through media.

Sever injuries or damage to the system.

The safety specifications from the operating and hazardous substances must be present and observed.

Use the personal protection equipment required in the safety specifications when handling the respective hazardous substance.

NOTE



Release system and secure against turning on again with a lock.

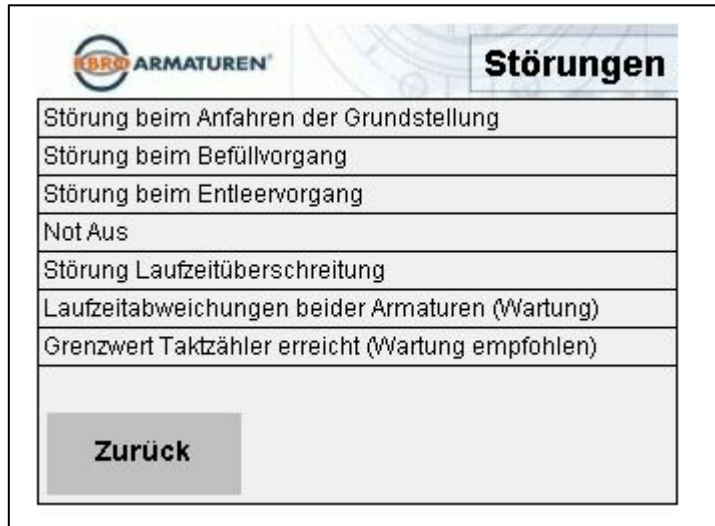
Release electrical components and systems for all work, before maintenance, during adjustment and maintenance and secure against turning on again.

Release the pressure for all work on pneumatic components and systems and secure against pressure.

L02 Error display screen

Errors are signaled through a blinking of the current status in red. By selecting the "notifications" field, you can end up in the overview of the error notifications.

All error notifications result in the current program being stopped and a moving to the safety positions. Once the cause of the error has been repaired, the cycle lock can be reset through the "ACK" button.



L03 Errors – Cause – Repair

Error	Cause	Repair
<i>Leak on the flange connection to the tubing</i>		
	In the area of the flange connections due to an incorrectly mounted connecting screw or due to damages to the seal areas, media escapes between the fixtures of the cycle lock and the tubing system.	Seal flange connection between casing and tubing. Observe the instructions in the operating manual for the tubing and installation note for the corresponding fixture. If the leak cannot be repaired by tightening the flange, it must be guaranteed that the tubing flanges are aligned and parallel to each other. And/or replace the cover from the casing.
<i>Leak on the shaft seal</i>		
	Leaking of the shaft seal.	If the shaft seal is leaking, a repair is necessary. The shaft seal must be replaced.

Error	Cause	Repair
<i>Leak in the passage seal (disc / sleeve sealing)</i>		
	Leaking in the passage seal.	<p>Check if the fixture is 100% closed with complete actuating torque.</p> <p>If the fixture is still leaking in a closed position, open and close the fixture multiple times under pressure.</p> <p>If the fixture is still leaking, a repair is necessary. The casing covering (sleeve) must be replaced.</p>
<i>A drive from the cycle lock does not work</i>		
	The voltage supply to the magnetic valve is disrupted.	Establish the voltage supply again for the magnetic valve.
	No supply of the drive with a control medium. Supply is disrupted.	Restore supply with control medium.
	Control pressure on the drive is too low.	Set control pressure.
	Magnetic valve is defective.	Maintain or replace magnetic valve.
	Drive is completely defective and no longer works correctly.	Maintain or replace drive.
<i>Drive can no longer be moved to the final position</i>		
	Settings on the drive no longer fit or were changed.	Reset or renew drive.
<i>Fixture can no longer be moved to the final position</i>		
	Settings on the drive no longer fit or were changed.	<p>Reset or renew drive.</p> <p>Renew fixture.</p>
<i>Emergency off</i>		
	An external emergency off command is signaled.	<p>Check emergency off button.</p> <p>Once the operating state has been renewed, the control can be reset through the "ACK" button.</p>

Error	Cause	Repair
<i>Disruption while starting the basic setting</i>		
	<p>The fixture settings are examined at the beginning of every new lock cycle. If a fixture is not in the closed position, the cycle lock will try to close this. If the final position notification is not active within the time frame of the error message (parameter "delay error message"), the cycle will be canceled, the error message emitted, automatic mode</p>	<p>Examination of the fixture settings, function of the end switch, signal wire and the SPS inputs. In manual mode, the fixtures may be opened and closed for testing purposes.</p>
<i>Error during filling process</i>		
	<p>In automatic mode, an error occurred while filling the cycle lock. The final position switches are not in the correct logical order, depending on the defined time frames (parameter "fill permanently" and "delay error message")</p>	<p>Examination of the fixture settings, function of the end switch, signal wire and the SPS inputs. In manual mode, the fixtures may be opened and closed for testing purposes.</p>
<i>Error during emptying process</i>		
	<p>In automatic mode, an error occurred while emptying the cycle lock. The final position switches are not in the correct logical order, depending on the defined time frames (parameter "empty permanently" and "delay error message")</p>	<p>Examination of the fixture settings, function of the end switch, signal wire and the SPS inputs. In manual mode, the fixtures may be opened and closed for testing purposes.</p>
<i>Error runtime exceeded</i>		
	<p>Through the "max. permissible runtime" parameter, an upper limit can be set for the duration of the individual lock cycles. This is normally defined through the entire process of the cycle lock. The duration is measured in the control and results from the sum of all set process times (filling duration, waiting intermediate setting, etc.) and all other process values (activation duration of the drives, delays, etc.). If this measures value exceeds the "max. permissible runtime", the error "runtime exceeded" will appear.</p>	<p>If this message appears with a change to the process parameters, there is most likely stiffness in the fixtures or an error in the sensors (end switch, wire, SPS). The error can be reset by acknowledging it. If the cause is not repaired, the cycle lock will report this error message again during the next cycle.</p>

Error	Cause	Repair
<i>Runtime deviation (maintenance recommended)</i>		
	<p>Message - no error</p> <p>The activation times (opening and closing times) are monitored from the switching of the signal output up to reaching the final position.</p> <p>Since two fixtures are available as a reference for each other, differences are evaluated in the activation times and a notification is emitted if the set "maximum runtime deviation" is exceeded.</p>	<p>The fixture sleeve could be worn.</p>

M) Disposal

M01 Environment protection

Contribute to environment protection by recycling valuable raw materials and thereby protecting resources.

We also point out the respective disposal guidelines for the countries.

What must be disposed of?	Material	How should it be disposed?
Transportation material Packaging	Pallets Paper and cartons Plastics	Return to the manufacturer or courier For recyclable paper Plastic recycling
Cleaning rags Oil and grease	Fabric, oil and grease	Oil and waste containing grease
Components	Control Electronic devices and components Metal Plastics	Add to electronic garbage Add to electronic garbage Metal recycling Add to plastic recycling

CAUTION

Hazard through operating or hazardous substances.



Severe injuries or severe environmental damage.

The safety specifications from the operating and hazardous substances must be present and observed.

Use the personal protection equipment required in the safety specifications when handling the respective hazardous substance.

For all work on and with the machine, the legal obligations to avoid waste and for the proper usage and disposal must be complied with according to the safety specifications!

In particular during installation, repair and maintenance work, substances that pose water hazards, like lubricants and oils, may not be exposed to the ground or end up in the sewage system! These substances must be stored, transported, collected and disposed of in suitable containers!

N) Spare parts

N01 General spare parts

When purchasing spare parts and wear parts, original parts from the EBRO ARMATUREN GmbH and the purchase parts from the manufacturer must be used. It is pointed out that spare parts not delivered from the corresponding manufacturer are not inspected and approved. The installation or usage of such parts may under circumstances cause negative constructional changes to the defined properties of the cycle lock and thereby impair the active or passive operating safety.

For damages that are created through the usage of non-original parts and accessories, the manufacturer has no liability.

The replacement and worn parts lists can be found in the attachment to this operating manual.

N02 Spare parts order

The following information must be provided for every spare parts order:

- Type.
- Order number.
- Part no. (parts catalog).
- Identification no. or drawing no. (parts catalog).

If these 4 parts are not complied with, a quick processing of the ordered spare part cannot be guaranteed.

O) Technical data

P) Index

Accident prevention guidelines	17	Medium	7
Additions	14	Mobile drives	48
Assembly	30	Note symbols	6
Assembly work	20	Operating personnel	7
Burning hazard	23	Operating voltage	21
Bypasses	48	Operation	54
Cleaning agents	20	Operator	11
Cold burns	24	Original fuses	21
Compressed air components	20	Pipe system	8
Compressed air wire	37	Products	7
Control diagram	38	Protective rights	9
Control medium	37	Qualified staff	12
Control unit	48	Restructuring	14
Counter-flange	31	Ring loops	29
Crane	28	Safety notes	14
Current strength	21	Safety specifications	22
cycle lock	7	Scope of delivery	48
Degree of protection	26	Screw connections	19
Disassembly	40	Screws	19
Environment temperature	26	Setting work	68
Factory equipment	19	Spare parts	70, 81
Fall safety mechanisms	20	Standing spaces	20
Fill level sensor	48	Step	51
Filling tube	48	Storage	27
Fixtures	48	Switch box	36, 48
Flange	31	Switch cabinet	21
Folding panel	31	System	7
Forklift	28	Temperatures	26
Frequency	21	Tightening torque	19
Functional disruptions	19	Transportation	27
Hazard symbols	5	Troubleshooting	75
Liability	9	Tube adapter	33
Lifting equipment	28	Usage area	26
Machine	7	Voltage	21
Maintenance	70	Weight	27
Media	7	Workplaces	30
Media temperature	26		