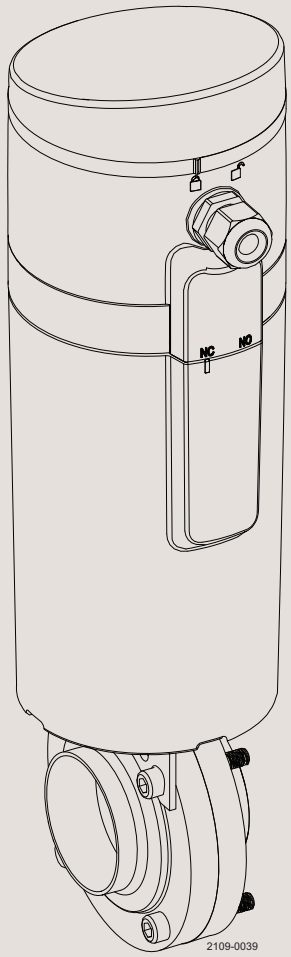
# Instruction Manual

## Unique Control for Butterfly Valves




ESE02126-EN5 2017-03

Original manual

# Table of contents

*The information herein is correct at the time of issue but may be subject to change without prior notice*

# 1 EC Declaration of Conformity

Revision of Declaration of Conformity: 2013-12-03

The Designated Company

Alfa Laval Kolding A/S
Company Name

Albuen 31, DK-6000 Kolding, Denmark
Address

+45 79 32 22 00
Phone No.

hereby declare that

Actuator with integrated control for butterfly valve
Designation

Unique Control
Type

is in conformity with the following directive with amendments:

- Machinery Directive 2006/42/EC
- Regulation (EC) No 1935/2004
- Low Voltage Directive (LVD) 2014/35/EU
- EMC Directive 2014/30/EU
- RoHS2 Directive 2011/65/EU

The person authorised to compile the technical file is the signer of this document

| Global Product Quality Manager<br>Pumps, Valves, Fittings and Tank Equipment | Lars Kruse Andersen |
|---|---|
| Title | Name |
| Kolding | 2017-03-01 |
| Place | Date |

Signature

CE

*Unsafe practices and other important information are emphasised in this manual.*
*Warnings are emphasised by means of special signs. All warnings in the manual are summarised on this page.*
*Pay special attention to the instructions below in order to avoid serious personal injury or damage to the top unit.*

## 2.1 Important information

Always read the manual before using the Unique Control!

WARNING
Indicates that special procedures must be followed to avoid serious personal injury.

CAUTION
Indicates that special procedures must be followed to avoid damage to the Unique Control.

NOTE
Indicates important information to simplify or clarify procedures.

## 2.2 Warning signs

General warning:

Danger of electrical voltage:

Caustic agents:

## 2.3 Safety precautions

### Installation

**Always** read the technical data thoroughly (See chapter 6 Technical data).
**Always** release compressed air after use.
**Never** touch the coupling between the valve body and the actuator if compressed air is supplied to the actuator.
**Always** use a power supply that complies with IEC/EN60950-1 or IEC/EN61010-1 standard and limited-energy circuit requirements.

### Operation

**Always** read the technical data thoroughly (See chapter 6 Technical data).
**Never** touch the valve or the pipelines when processing hot liquids or when sterilising.
**Never** touch the coupling between the valve body and the actuator if compressed air is supplied to the actuator.
**Always** handle lye and acid with great care.

### Transportation

**Always** make sure that compressed air is released.
**Always** make sure that all connections are disconnected before attempting to remove the valve from the installation.
**Always** drain liquid out of valves before transportation.
**Always** used predesignated lifting points if defined.
**Always** ensure adequate fixing of the valve during transportation - if specially designed packaging material is available it must be used.

## 2.4 Loss of air supply

⚠

The Unique Control reacts differently to a loss of air supply compared to a regular spring-return actuator. e.g. the LKLA.

The Unique Control does not have a built-in spring to return the actuator to the de-energised position in cases of air supply failure. Instead, the Unique Control features a built-in check valve that ensures that the actuator remains in the current position if the air supply fails.

In the case of electrical power failure, the Unique Control responds in the same way as regular actuators installed with control heads from the ThinkTop series.

Please refer to the table below for an overview of the actuator responses in different error scenarios.

| Error Scenario | Unique Control | | Spring-return actuator (LKLA) | | Actuator type |
|---|---|---|---|---|---|
| | De-energised | Energised | De-energised | Energised | Actuator status |
| Air pressure lost | No change | No change | No change | Actuator changes to De-energised position | Actuator response |
| Electrical power lost | No change | Actuator changes to De-energised position | No change | Actuator changes to De-energised position | |

## 3.1 General information

### Concept

Unique Control for butterfly valves is an actuator with integrated automation for LKB butterfly valves. Unique Control is a hygienic, reliable solution with a focus on simplicity.
The Unique Control complements our existing range of actuators and control units and it provides the opportunity to upgrade an existing installation.
Unique Control is compatible with all major PLC systems. It is for use in food, dairy and brewery installations and in biopharmaceutical applications.

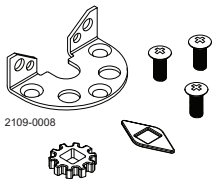
### Working principle

The Unique Control uses an air spring allowing operation at a significantly lower air pressure compared to a conventional mechanical spring. The integrated intelligent automation will self-configure and calibrate with a single press of a button. The actuator is designed for easy onsite configuration as either normally open (NO) or normally closed (NC). The maintenance-free but serviceable actuator design is tested to perform over one million strokes
The Unique Control has a 360 deg. indication light for visual status.
It also provides the opportunity to monitor the status of the operating air pressure, identifying air leakage or failing air pressure.

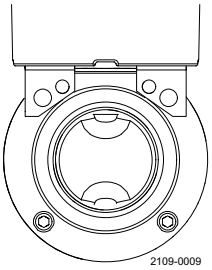
# 4 Installation

## 4.1 Overview of installation instructions

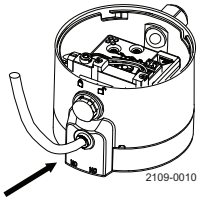
Step 1
Mount bracket kit on actuator.



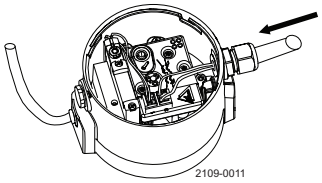

Step 2
Mount actuator on valve head.



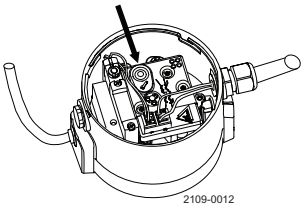

Step 3
Connect air supply.



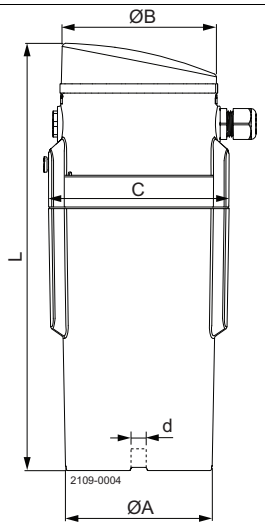

Step 4
Connect communication cable.




Step 5
Calibrate.



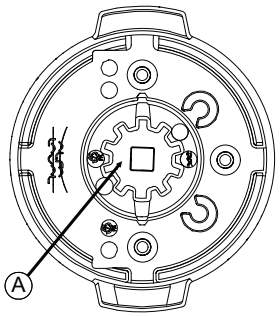
## 4.2 Product dimensions




| Size | 25-63.5 mm<br>DN25-50 | 76.1 mm<br>DN65-80 | 101.6 mm<br>DN100 |
|---|---|---|---|
| øA | 90 | 90 | 90 |
| øB | 97 | 97 | 97 |
| C | 111 | 111 | 111 |
| L | 263 | 263 | 263 |
| d | 8 | 10 | 12 |
| Weight (kg) | 1.6 | 1.6 | 1.6 |

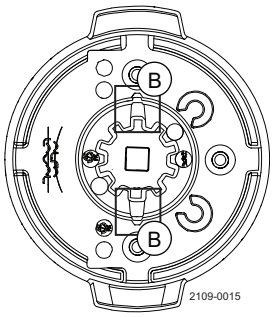
## 4.3 Mounting bracket kit on the actuator - step 1

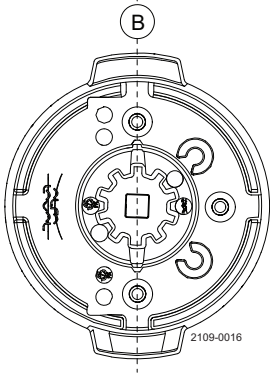
Step 1
Mount the coupler (A) in the slot on the bottom side of the actuator.




Step 2

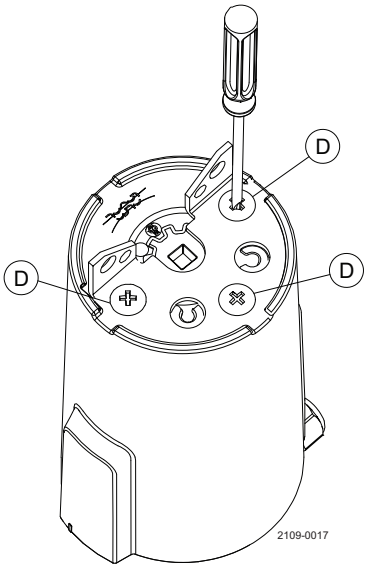
Be aware that the actuator position marking on the bottom of the actuator is aligned as shown on drawing (B).
In cases where the actuator position marking is not aligned, please refer to the troubleshooting section for an instruction on how to re-align it.




Step 3
Mount the bracket using the 3 enclosed screws (D).
The tightening torque is 10 Nm.

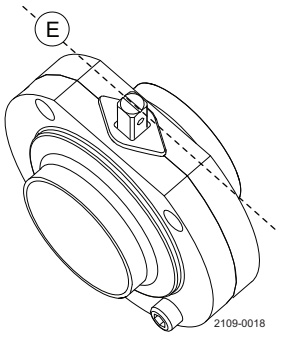
NOTE!
The enclosed screws are applied with a thread-locking adhesive. In the case of dismantling and later reassembly, the screws must be secured with a thread-locking adhesive.



## 4.4 Mounting actuator on the valve head - step 2

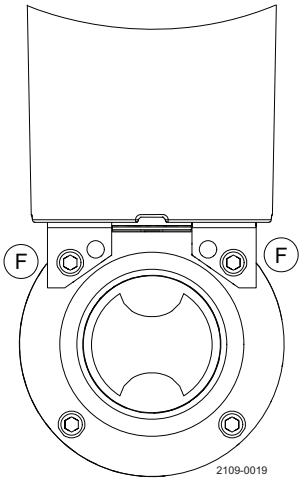
This instruction applies for both NC and NO actuators.

Step 1
Mount the arrow for mechanical open/closed indication of the valve (E).



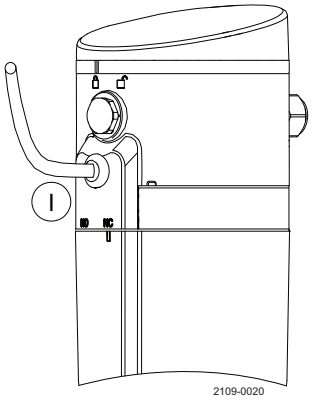

The valve must be closed when the actuator is mounted.
NOTE!
NO/NC functionality of the actuator is changed in the control head.

Step 2
Mount the actuator on the valve head using the enclosed bolts (F).



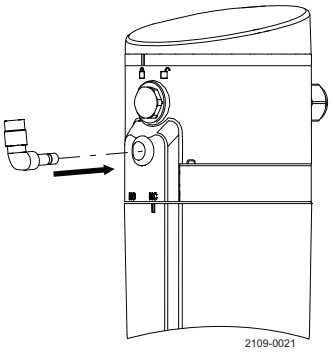
## 4.5 Connecting the air supply- step 3

Step 1
Connect the air supply hose to the ø6 mm air fitting ( I ).



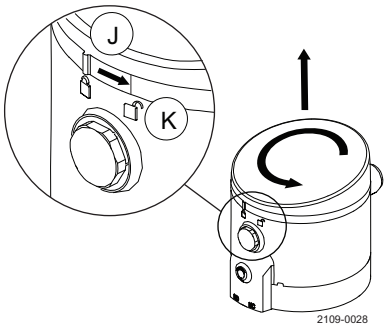

Step 2
NOTE!
For a ¼" air supply hose.

Connect the air supply hose via the ø6 / ¼" angle adaptor.
(Article number: ø6 / ¼" angle adaptor: 9611-99-5679)



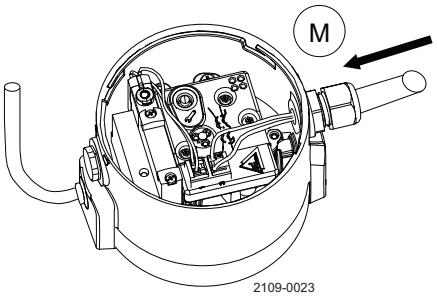
## 4.6 Connecting the communication cable- step 4

Step 1
Remove the prism/top cover by turning the prism/top cover counter-clockwise.
When the mark on the prism (J) is aligned with the open padlock symbol (K), the prism/top cover can be lifted off.




Step 2
Install the cable in the cable gland (M).

NOTE!
Cable connection:
Main cable gland: PG9 (ø4-ø8 mm)
Max. wire diameter: 1.0 $mm^2$ (AWG 18).

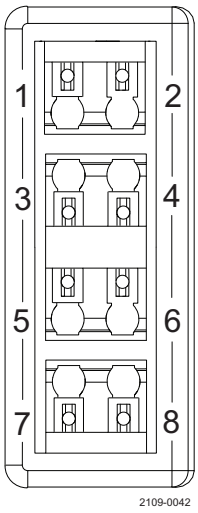



If the cable gland comes loose from the control head during installation, it must be secured with a tightening torque of 4 Nm.

### Digital version – PNP

| | |
|---|---|
| **Supply voltage** | |
| Supply voltage | 24 VDC ± 10% |
| **Max. power consumption of the sensor unit** | |
| Solenoid valve not active | 50mA |
| Solenoid valve active | 65mA |
| **Output signals from the sensor unit to the connected digital interface (PLC)** | |
| Nominal voltage | Same as connected to the Unique Control |
| Load current | 50 mA typical, 100 mA max |
| Voltage drop | Typical 3V @ 50 mA |

### Electrical connection for digital version (PNP)




| | | | |
|---|---|---|---|
| Solenoid | 1 | 2 | Solenoid common (black) |
| Supply 24 VDC | 3 | 4 | Supply 0 VDC |
| De-energised valve | 5 | 6 | Energised valve |
| Pressure alarm | 7 | 8 | Solenoid valve |

Internal connections (1, 2)

Power supply (3, 4)

PLC input signals (5, 6, 7)

PLC output signal (8)

### AS-Interface version

The power supply to the complete unit is taken from the AS-Interface loop. The unit is reverse polarity protected.

| Supply voltage | |
|---|---|
| Supply voltage | 29.5 - 31.6 VDC |
| **AS-Interface profile code** | |
| AS-I v2.11 (31 nodes) | 7.F.F.F |
| AS-I v3.0 (62 nodes) | 7.A.7.7 |
| **Max. power consumption of sensor unit** | |
| Solenoid valve not active | 50mA |
| Solenoid valve active | 65mA |

### AS-Interface bits assignment

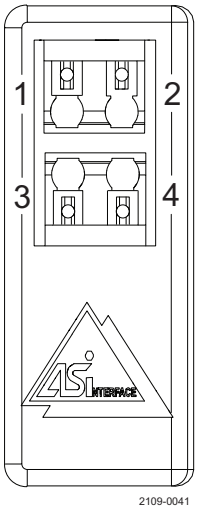
DI0 ..... De-energised valve (feedback #1)
DI1 ..... Energised valve (feedback #2)
DI2 ..... NC
DI3 ..... Pressure alarm (feedback #4)

DO0 ..... NC
DO1 ..... Solenoid valve (output #2)
DO2 ..... NC
DO3 ..... NC

### Electrical connection for AS-i versions

Solenoid

AS-i [ + ]




Solenoid common (black)

AS-i [ - ]

Internal connections (1, 2)

AS-i power supply (3, 4)

## 4.7 Calibration- step 5

Step 1

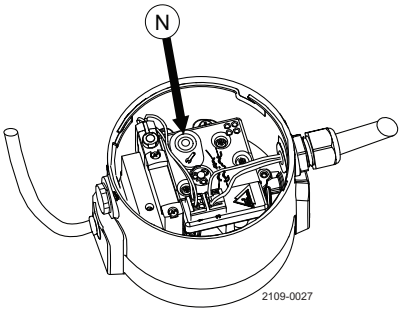
Prerequisite

The Unique Control must be fully installed:
- Mechanically
- Pneumatically
- Electrically

The unit will flash green, when ready to calibrate the first time.

Calibrate

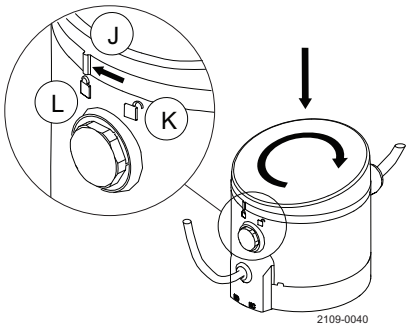
Push the blue button (N) on the sensor unit until you see a yellow flash.
The Unique Control will automatically calibrate.




**The unit is ready to use when the green light comes back on.**

Step 2

Put the prism/top cover back on by pushing it down when the mark on the prism (J) and the open padlock (K) are aligned.
Then turn it clockwise towards the closed padlock (L) to secure the top.




Operating LED feedback

| Actuator status | LED feedback |
|---|---|
| De-energised | Green |
| Energised | Yellow |
| Pressure alarm (De-energised) | Red/green flashing |
| Pressure alarm (Energised) | Red/yellow flashing |

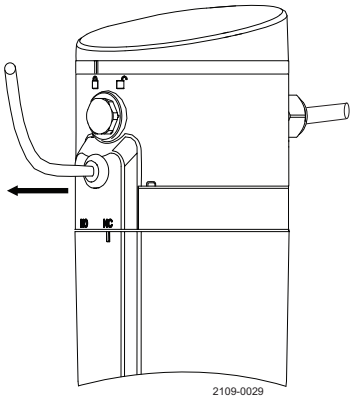
## 4.8 Changing NC/NO functionality

The following instruction shows how to change the Unique Control from “Normally Closed” to “Normally Open” functionality.

Step 1

⚠

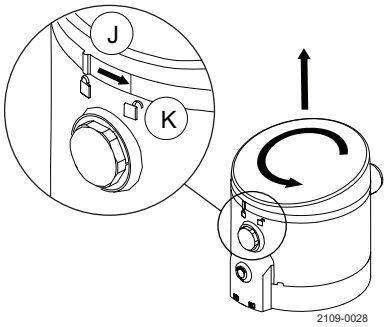
Disconnect the air supply.




Step 2

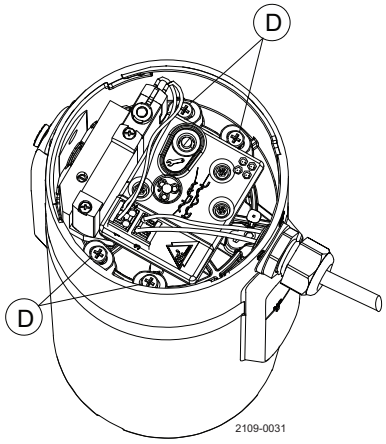
Remove the prism/top cover by turning the prism/top cover counter-clockwise.

When the mark on the prism (J) is aligned with the open padlock symbol (K) the prism/top cover can be lifted off.

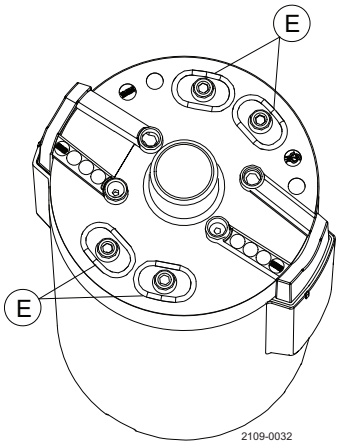



Step 3

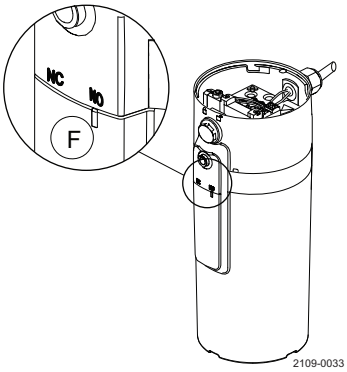
Loosen the 4 screws (D) inside the control head.



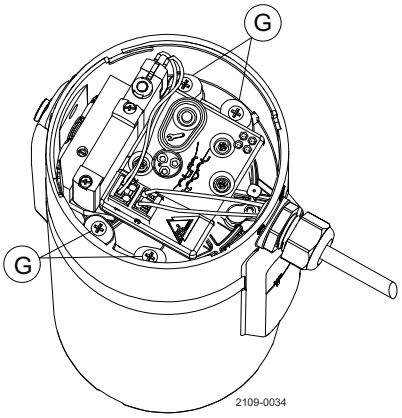
### Step 4
Lift off the control head and be aware that the 4 O-rings (E) remain in the grooves.




### Step 5
Turn the control head 180 degrees and check that the marking (F) is aligned with the NO symbol.

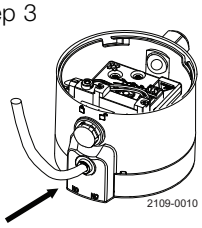



### Step 6
Re-attach the control head to the actuator by tightening the 4 screws (G) with a tightening torque of 2Nm.

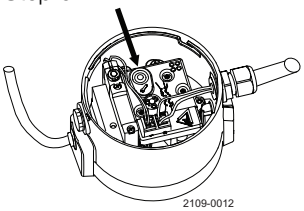



### Step 7
Reconnect the air supply and re-power the Unique Control to complete the change.
See Step 3 and Step 5 in chapter 4 Installation for details.

Step 3




Step 5



## 4.9 Recycling information

• Unpacking

- Packing material consists of wood, plastics, cardboard boxes and in some cases metal straps
- Wood and cardboard boxes can be re-used, recycled or used for energy recovery
- Plastics should be recycled or burnt at a licensed waste incineration plant
- Metal straps should be sent for material recycling

• Maintenance

- During maintenance, oil and wearing parts in the machine are replaced
- All metal parts should be sent for material recycling
- Worn out or defective electronic parts should be sent to a licensed handler for material recycling
- Oil and all non-metal wearing parts must be taken care of in accordance with local regulations

• Scrapping

- At end of life, the equipment must be recycled according to the relevant, local regulations. Besides the equipment itself, any hazardous residues from the process liquid must be taken into consideration and dealt with in a proper manner. When in doubt, or in the absence of local regulations, please contact your local Alfa Laval sales company

# 5 Troubleshooting

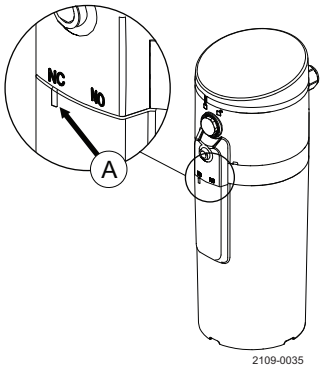
## 5.1 Actuator position marking misaligned

The following instruction will re-align the actuator position marking on the bottom of the actuator in order to continue the general installation.

The instruction depends on the actuator configuration.

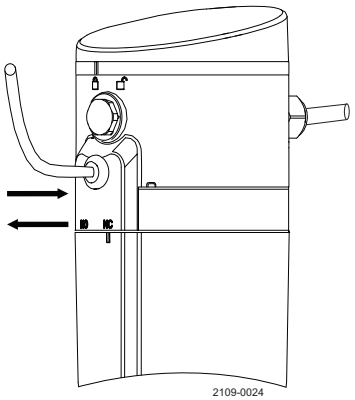
### NC actuator

**Step 1**
The actuator configuration can be verified on the marking on the outside of the control head (A).

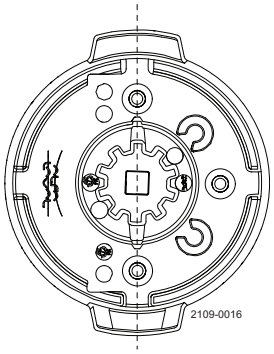



**Step 2**
1. Connect air supply to the actuator.
2. Disconnect air supply to the actuator

⚠
Beware of the movement of the coupler.



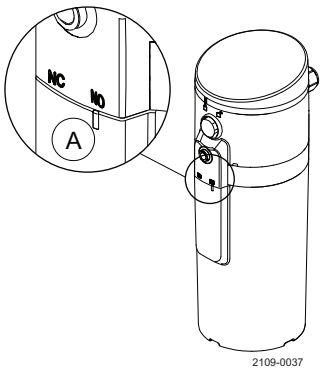

**Step 3**
**Verification**
Check that the actuator position marking is aligned.



NO actuator

Step 1

The actuator configuration can be verified on the marking on the outside of the control head (A).

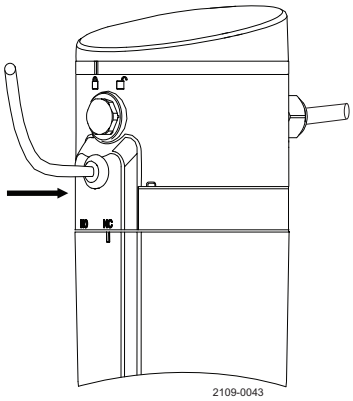



Step 2

1. Connect air supply to the actuator.

⚠

Beware of the movement of the coupler.

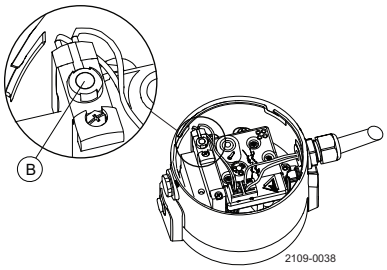



Step 3

1. Activate the manual override (B) on the solenoid valve.
2. Disconnect air supply to the actuator.

⚠

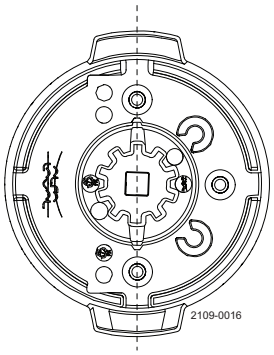
Beware of the movement of the coupler.




Step 4

Verification

Check that the actuator position marking is aligned.



# 6 Technical data

## 6.1 Technical data

Principle The Unique Control uses an air spring allowing operation at a significantly lower air pressure compared to a conventional mechanical spring.

The integrated intelligent automation will by a one bottom push perform a self configuration involving valve size recognition as well as calibration to the provided operating air pressure.

The actuator is designed for easy onsite configuration as either normally open (NO) or normally closed (NC).

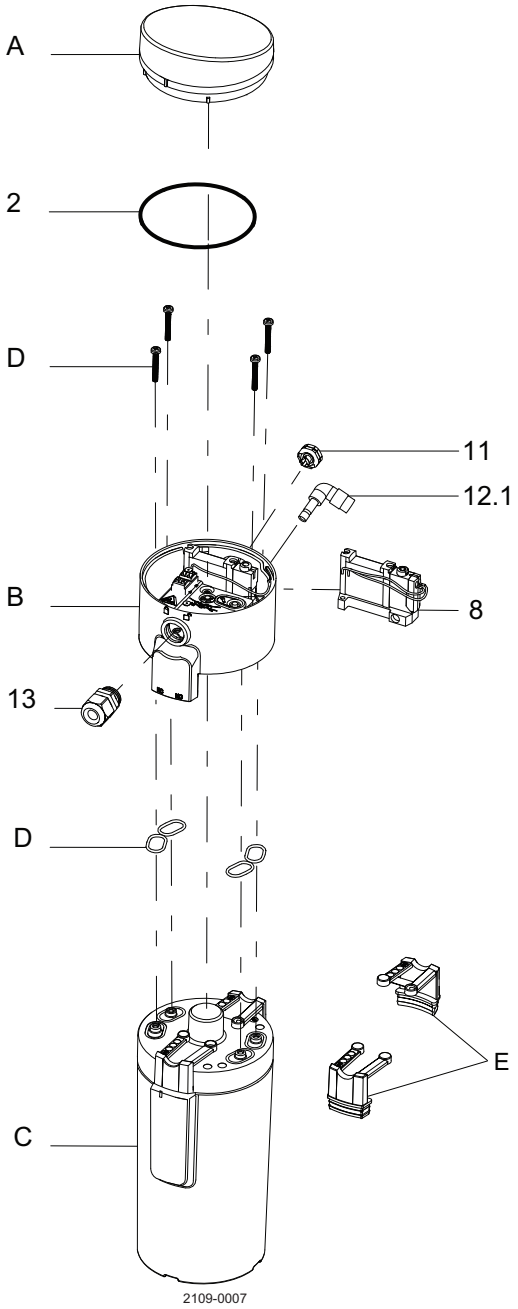
| | |
|---|---|
| **Actuator** | |
| Max. air pressure | 800 kPa (8 bar) |
| Min. air pressure | 300 kPa (3 bar) |
| Working temperature | -5°C to +60°C |
| Protection class | IP66 and IP67 |
| Air consumption (on each stroke) | 0.8 x p (volume x pressure) |
| Push-in fittings | 6 mm |
| **Communication** | |
| **Option 1** | |
| Interface | Digital |
| Supply voltage | 24 VDC ± 10% |
| **Option 2** | |
| Interface | AS-Interface v2.1, 31 node |
| Supply voltage | 29.5V - 31.6 VDC |
| Slave profile | 7.F.F.F |
| Default slave address | 0 |
| **Option 3** | |
| Interface | AS-Interface v3.0, 62 node |
| Supply voltage | 29.5V - 31.6 VDC |
| Slave profile | 7.A.7.7 |
| Default slave address | 0 |
| **Sensor board** | |
| Power supply | 24 VDC, 1 W |
| Feedback signal #1 | De-energised valve |
| Feedback signal #2 | Energised valve |
| Feedback signal #3 | Pressure alarm |
| Valve tolerance band | Auto setup |
| Short circuit and brownout protection | EN 61131-2 |
| Surges immunity (digital interface only) | EN 61000-4-5 |
| **Solenoid valve** | |
| Supply voltage | 24 VDC ± 10%, 1 W |
| Air supply | 300-800 kPa (3-8 bar) |
| Type of solenoid | 4/2-way |
| Number of solenoids | 1 |
| Manual hold override | Yes |
| **Physical data** | |
| **Materials** | |
| Actuator body | Black nylon PA 12 (reinforced) |
| Steel parts | 1.4301 (304) and 1.4404 (316) |
| Seals | NBR |
| **Compatible valves** | |
| LKB ISO | 25, 38, 51, 63.5, 76.1 and 101.6 mm |
| LKB-2 | DN 25, 32, 40, 50, 65, 80 and 100 |
| **Cable connection** | |
| Main cable gland | PG9 (ø4 - ø8 mm) |
| Max. wire diameter | 1.0 $mm^2$ (AWG 18) |

**Weight** (kg)

| Size | 25-63.5mm<br>DN25-50 | 76.mm<br>DN65-80 | 101.6mm<br>DN100 |
|---|---|---|---|
| Weight (kg) | 1.6 | 1.6 | 1.6 |

# 7 Parts list

## 7.1 Parts list



## Parts list

| Pos. | Qty | Denomination |
|---|---|---|
| A | | Top incl. prism and O-rings |
| B | | Base, cpl. |
| C | | Cylinder, cpl. |
| D | | Screws and O-rings |
| E | | Rubber plugs with instruction |
| 2 | 1 | O-ring |
| 8 | 1 | Solenoid valve, cpl. |
| 11 | 1 | Gore Vent |
| 12.1 | 1 | Air-fitting |
| 13 | 1 | Cable gland PG9 |

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