



# The safe choice for High Purity applications

## Tri-Clover LKB UltraPure automatic or manual butterfly valve

### Application

Tri-Clover LKB UltraPure is an automatic or manual operated butterfly valve for on/off duties. The UltraPure execution is designed and documented to meet the demand in industries like BioPharm and Personal Care.

### Working principles

Tri-Clover LKB UltraPure is either remote controlled by means of an air-actuator or manually by means of a handle.

The actuator is designed so that an axial movement of a piston is transformed into a 90° rotation of a shaft. The torque of the actuator is increased when the valve disc contacts the seal of the valve.

The handle for manual operation mechanically lock the valve in its open or closed position.

### Standard design

Tri-Clover LKB UltraPure consists of two body halves, valve disc, bushings for the disc stem and a seal ring. The valve is assembled by means of screws and nuts.

The air-actuator is made in three standard versions, normally closed (NC), normally open (NO) and air/air activated (A/A).

Two actuator sizes, ø85 mm and ø133 mm, cover all valve sizes and is available in two versions, LKLA and LKLA-T (T for mounting of indication unit on actuator).

The actuator is fitted on to the valve by means of a bracket and screws. The handle for manual operation is fitted on to the valve by means of a cap/block system and a screw.

The handles for the are available in 2 positions, 4 positions, regulating 90° and lockable multi-position.

The valve can be supplied with either welding or clamp connections.

### Control Equipment

Control and indication is possible in connection with the remote controlled valve. See Options.

LKLA-T can be fitted with Topunits

### Documentation

All valves are delivered with Alfa Laval Q-doc including:

- 3.1 certificate in accordance to EN 10204
- FDA compliance and USP Class VI declaration
- TSE statement
- Surface finish declaration (Ra)
- Manufacturing and quality procedures



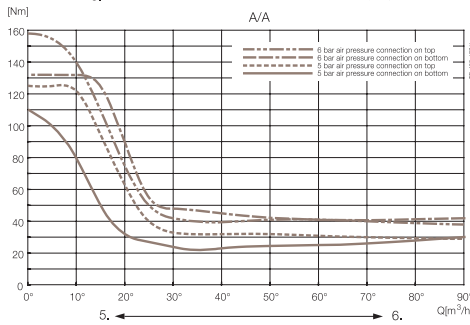
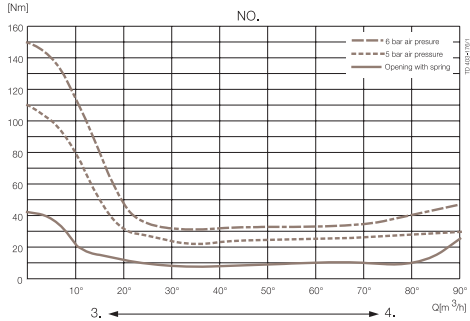
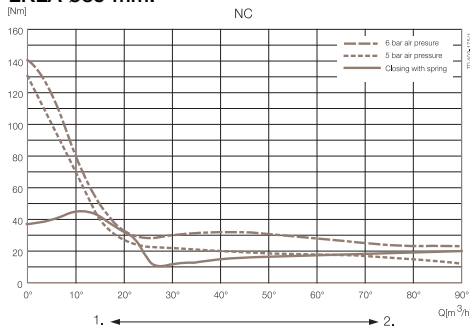
Tri-Clover LKB UltraPure

### Delivery conditions

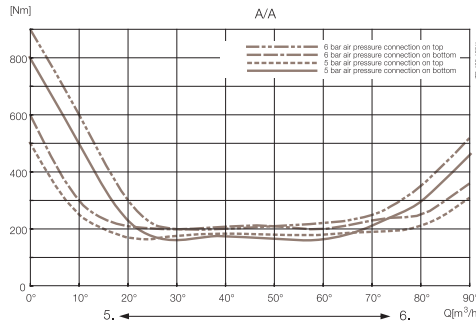
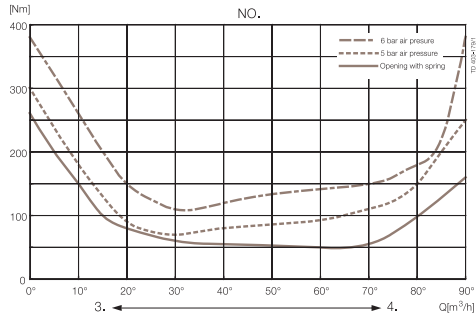
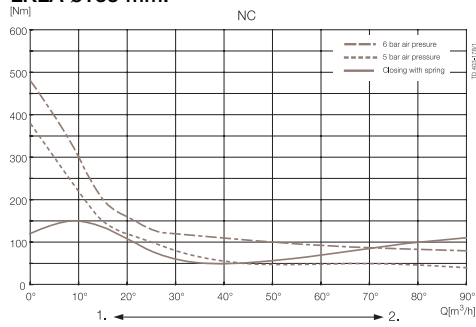
- Individually marked with manufactures logo, ID number, pressure rating, material, standard, dimension and surface finish
- Supplied with plastic end caps and individually packed together with the documentation

## Torque diagrams - Actuator

### LKLA ø85 mm:



### LKLA ø133 mm:



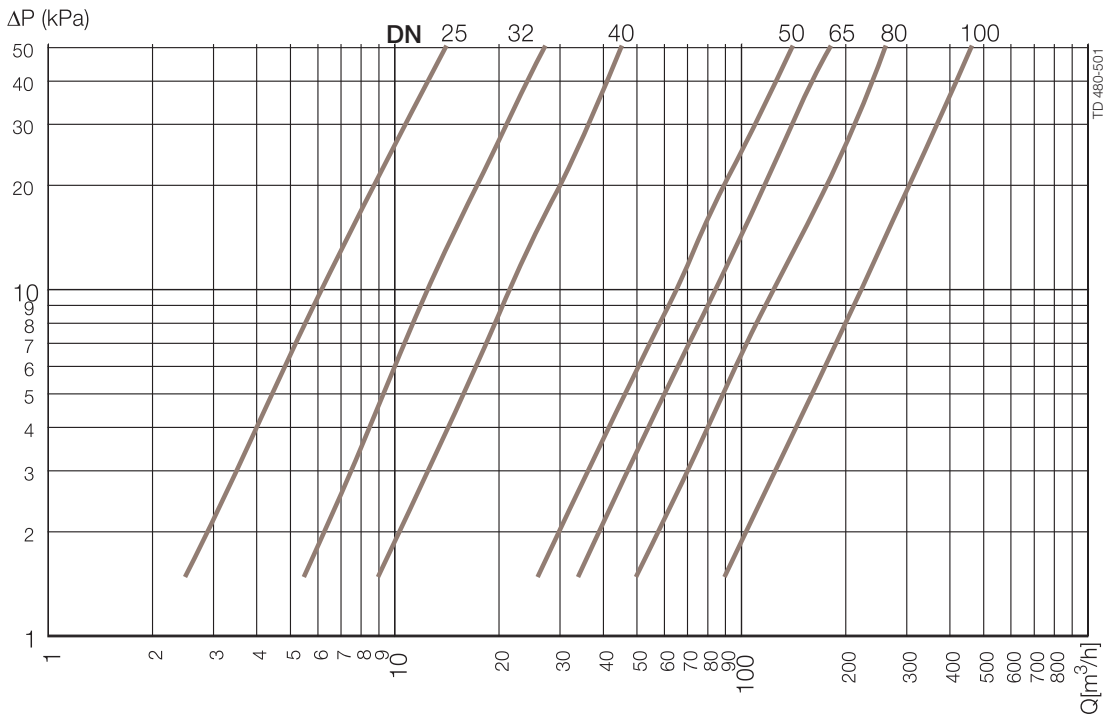
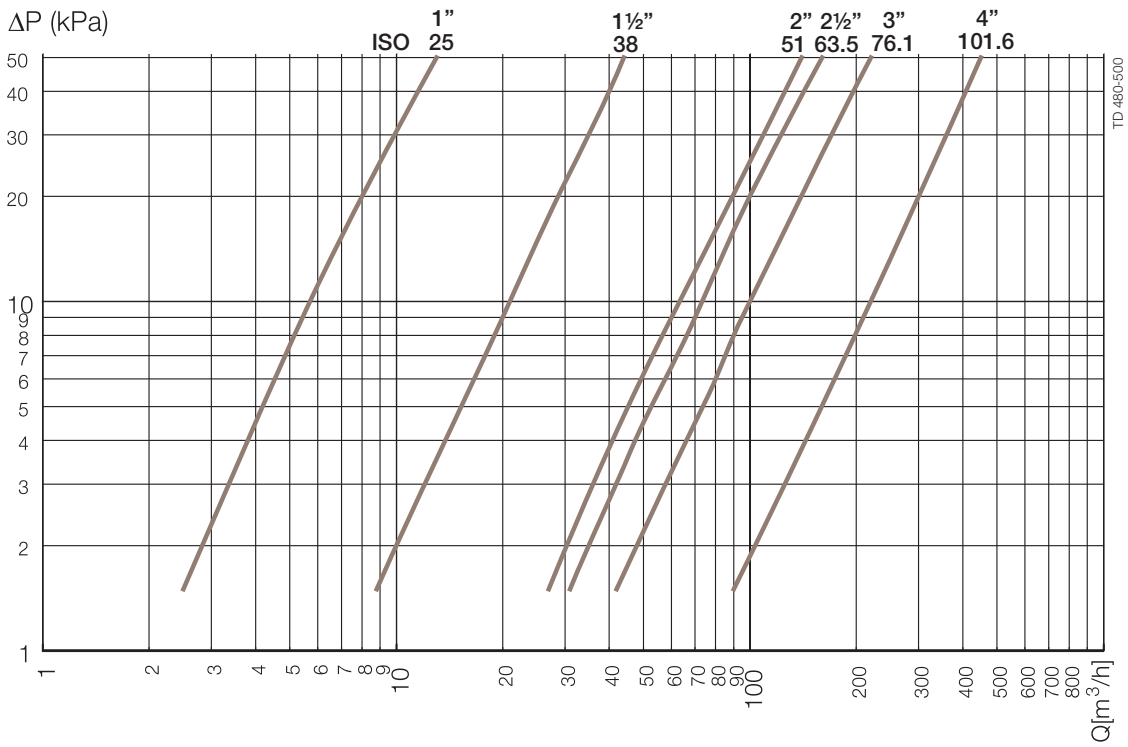
### Torque values (for rotating the valve disc in a dry seal ring)

| Size     |       |     | Max. Nm |
|----------|-------|-----|---------|
| 25 mm    | DN25  | 1"  | 15      |
|          | DN32  |     | 15      |
| 38 mm    | DN40  | 1½" | 15      |
| 51 mm    | DN50  | 2"  | 20      |
| 63.5 mm  | DN65  | 2½" | 25      |
| 76 mm    | DN80  | 3"  | 30      |
| 101.6 mm | DN100 | 4"  | 35      |

### Angular motion of actuator:

1. Closing - Spring activated
2. Opening - Air activated
3. Closing - Air activated
4. Opening - Spring activated
5. Closing
6. Opening

Capacity/Pressure drop diagrams



**NOTE!**

For the diagrams the following applies:

Medium: Water (20°C).

Measurement: In accordance with VDI 2173.

## Dimensions

Fig. 1. Dimensions - valve.

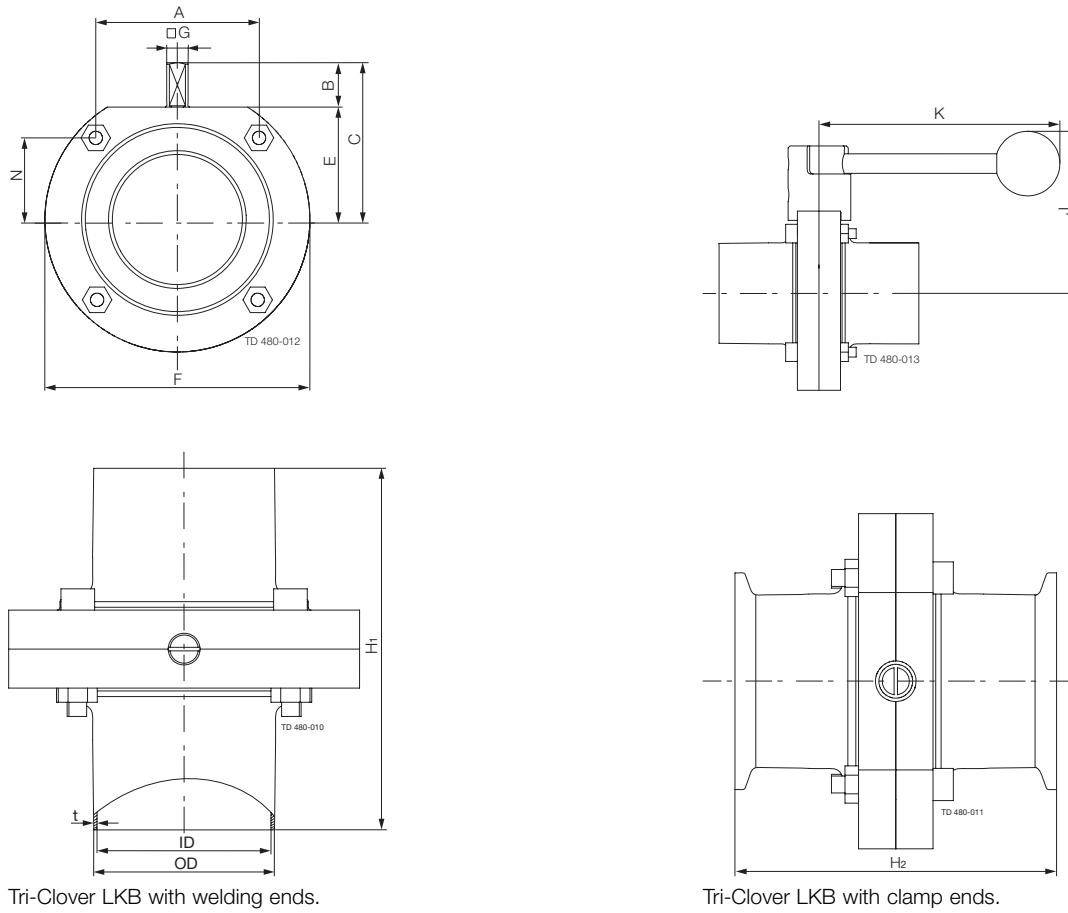
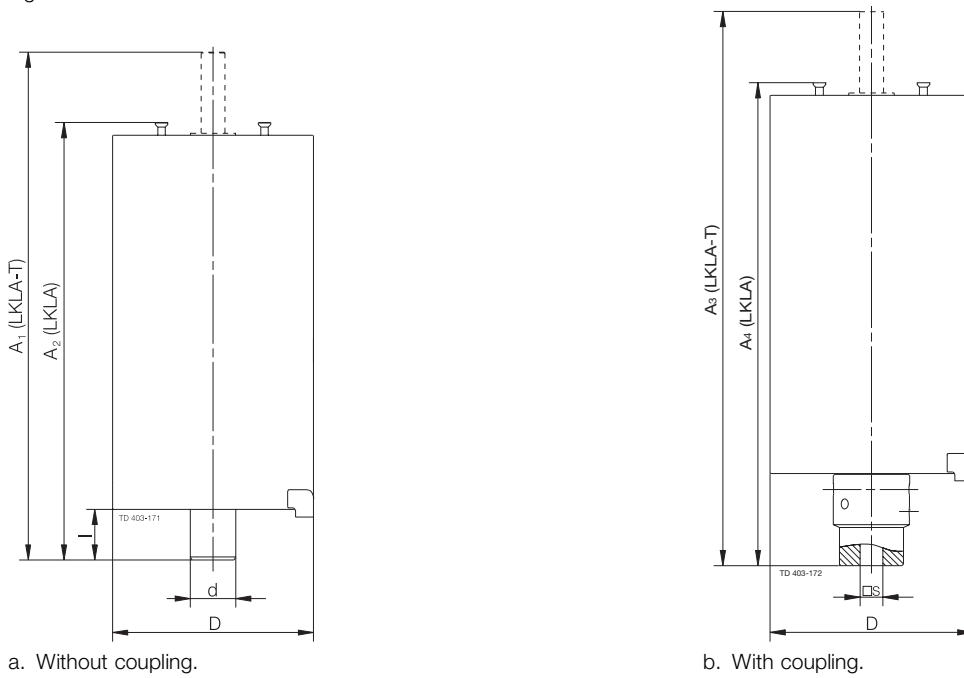


Fig. 2. Dimensions - actuators.



Dimensions (mm)

Tri-Clover LKB UltraPure

| Size        | 25 mm  | 38 mm  | 51 mm  | 63.5 mm | 76.1 mm | 101.6 mm | DN 25  | DN 32  | DN 40  | DN 50  | DN 65  | DN 80  | DN 100 |
|-------------|--------|--------|--------|---------|---------|----------|--------|--------|--------|--------|--------|--------|--------|
| A           | 42.00  | 42.00  | 61.00  | 61.00   | 79.50   | 106.00   | 42.00  | 42.00  | 42.00  | 61.00  | 61.00  | 79.00  | 106.00 |
| B           | 15.50  | 16.70  | 16.60  | 17.50   | 16.60   | 16.00    | 14.70  | 15.90  | 16.70  | 16.60  | 17.50  | 16.00  | 160.00 |
| C           | 49.00  | 49.00  | 58.50  | 69.50   | 73.50   | 93.00    | 48.00  | 49.00  | 54.00  | 63.00  | 75.00  | 79.00  | 93.00  |
| OD          | 25.00  | 38.00  | 51.00  | 63.50   | 76.10   | 101.60   | 29.00  | 35.00  | 41.00  | 53.00  | 70.00  | 85.00  | 104.00 |
| ID          | 22.60  | 35.60  | 48.60  | 60.30   | 72.90   | 97.60    | 26.00  | 32.00  | 38.00  | 50.00  | 66.00  | 81.00  | 100.00 |
| t           | 1.20   | 1.20   | 1.20   | 1.60    | 1.60    | 2.00     | 1.50   | 1.50   | 1.50   | 1.50   | 2.00   | 2.00   | 2.00   |
| E           | 32.50  | 32.50  | 42.00  | 52.00   | 57.00   | 77.00    | 33.30  | 33.30  | 37.70  | 46.60  | 57.30  | 63.00  | 77.00  |
| F           | 78.00  | 78.00  | 99.00  | 117.00  | 132.00  | 169.00   | 79.00  | 79.00  | 86.50  | 105.70 | 125.00 | 143.00 | 169.00 |
| □G          | 8      | 8      | 8      | 8       | 10      | 12       | 8      | 8      | 8      | 8      | 10     | 10     | 12     |
| H1          | 127.00 | 127.00 | 132.00 | 134.00  | 162.00  | 180.00   | 127.00 | 127.00 | 127.00 | 132.00 | 142.00 | 164.00 | 180.00 |
| H2          | 104.20 | 104.20 | 109.20 | 111.20  | 176.40  | 194.40   | 90.00  | 90.00  | 90.00  | 95.00  | 118.00 | 120.00 | 136.00 |
| J           | 82.00  | 82.00  | 92.00  | 102.00  | 107.00  | 127.00   | 74.00  | 74.00  | 78.00  | 88.00  | 98.00  | 104.00 | 118.00 |
| K           | 120.00 | 120.00 | 120.00 | 120.00  | 162.00  | 162.00   | 120.00 | 120.00 | 120.00 | 120.00 | 162.00 | 162.00 | 162.00 |
| N           | 26.50  | 26.50  | 30.50  | 40.50   | 43.50   | 53.00    | 27.30  | 27.30  | 31.70  | 35.10  | 45.80  | 49.50  | 53.00  |
| Weight (kg) | 1.2    | 1.0    | 1.5    | 2.1     | 3.0     | 4.7      | 1.2    | 1.1    | 1.3    | 1.8    | 3.1    | 3.5    | 5.1    |

NOTE! Weights are for valves with welding ends and handles.

| Size        | 1"     | 1½"    | 2"     | 2½"    | 3"     | 4"     |
|-------------|--------|--------|--------|--------|--------|--------|
| A           | 42.00  | 42.00  | 61.00  | 61.00  | 79.50  | 106.00 |
| B           | 15.50  | 16.70  | 16.60  | 17.50  | 16.60  | 16.00  |
| C           | 49.00  | 49.00  | 58.50  | 69.50  | 73.50  | 93.00  |
| OD          | 25.40  | 38.10  | 50.80  | 63.50  | 76.20  | 101.60 |
| ID          | 22.1   | 34.8   | 47.5   | 60.2   | 72.9   | 97.38  |
| t           | 1.65   | 1.65   | 1.65   | 1.65   | 1.65   | 2.11   |
| E           | 32.50  | 32.50  | 42.00  | 52.00  | 57.00  | 77.00  |
| F           | 78.00  | 78.00  | 99.00  | 117.00 | 132.00 | 169.00 |
| □G          | 8      | 8      | 8      | 8      | 10     | 12     |
| H1          | 127.00 | 127    | 132.00 | 134.00 | 162.00 | 180.00 |
| H2          | 104.20 | 104.20 | 109.20 | 111.20 | 176.40 | 194.40 |
| J           | 82.0   | 82.0   | 92.00  | 102.00 | 107.00 | 127.00 |
| K           | 120.00 | 120.00 | 120.00 | 120.00 | 162.00 | 162.00 |
| N           | 26.50  | 26.50  | 30.50  | 40.50  | 43.50  | 53.00  |
| Weight (kg) | 1.2    | 1.0    | 1.5    | 2.1    | 3.0    | 4.7    |

NOTE! Weights are for valves with welding ends and handles.

Dimensions (mm) - Actuator

LKLA and LKLA-T:

| Valve size     | 25-63.5 mm<br>DN25-50 | 76.1 mm<br>DN65-80 | 101.6 mm<br>DN100 | 101.6 mm<br>DN100 |
|----------------|-----------------------|--------------------|-------------------|-------------------|
| A <sub>1</sub> | 244                   | 242                | 242               | 363               |
| A <sub>2</sub> | 193                   | 191                | 191               | 316               |
| A <sub>3</sub> | 244                   | 244                | 244               | 337               |
| A <sub>4</sub> | 173                   | 173                | 173               | 290               |
| D              | 85                    | 85                 | 85                | 133               |
| d              | 17                    | 17                 | 17                | 30                |
| l              | 16.5                  | 16.5               | 16.5              | 34                |
| □s             | 8                     | 10                 | 12                | 12                |
| Function       | NC, NO, A/A           | NC, NO, A/A        | NC, NO, A/A       | NC, NO, A/A       |

900593

Connections

Compressed air

R<sup>1</sup>/<sub>8</sub>" (BSP), internal thread.

## Technical Data

### Valve:

Max. product pressure: . . . . . 1000 kPa (10 bar).

Min. product pressure: . . . . . Full vacuum.

Temperature range: . . . . . -10°C to +95°C\*

\*) SIP (steam in place) up to 140°C is possible with the following actions:

1.

- Open valve
- SIP
- Cool down the valve before operating

2.

- Close valve
- SIP
- Cool down the valve before operating

### Actuator:

Max. air pressure: . . . . . 700 kPa (7 bar).

Min. air pressure, NC and NO: . . . . . 400 kPa (4 bar).

Temperature range: . . . . . -25°C to +90°C.

Air consumption (litres free air) - ø85 mm: . . . . . 0.24 x p (bar).

Air consumption (litres free air) - ø133 mm: . . . . . 0.95 x p (bar).

Weight: . . . . .  
 - ø85 mm: 3 kg.  
 - ø133 mm: 12 kg.

## Materials

|                           | Material               | According to                  |
|---------------------------|------------------------|-------------------------------|
| Product wetted steel part | 1.4404 or equal (316L) | EN 10088 or equal (AISI 316L) |
| Other steel parts         | 1.4301 or equal (304)  | EN 10088 or equal (AISI 304)  |
| Bushings for valve disc   | PVDF                   | -                             |

## Elastomers

|                          | Material | According to         | Min. Temp. | Max. Temp. |
|--------------------------|----------|----------------------|------------|------------|
| Product wetted elastomer | EPDM     | FDA and USP Class VI | -10° C     | 140° C     |
|                          | FPM      | FDA and USP Class VI | -10° C     | 180° C     |

## Surface specification (Product wetted steel parts)

| Standard       | Internal              | ASME BPE designation | External    |
|----------------|-----------------------|----------------------|-------------|
| ISO 2037 / DIN | 0.5 µm                | SF1                  | Semi-bright |
| ASME BPE*      | 0.5 µm                | SF1                  | Semi-bright |
| ASME BPE*      | 0.4 µm electro polish | SF4                  | Semi-bright |

\* According to ASME BPE 2009 table SF-3

## Connections

| Type       | Matching tubes and fittings | According to         |
|------------|-----------------------------|----------------------|
| Weld ends* | ISO 2037 / DIN / ASME BPE   | ISO, DIN or ASME BPE |
| Clamp ends | ISO 2037 / DIN / ASME BPE   | ISO, DIN or ASME BPE |

\* Weld ends on ASME BPE valves are according to ASME BPE 2009 316L Table DT-3 with low sulfur and suitable for orbital welding

## Actuator:

Actuator body: . . . . . Stainless steel 1.4307 (304L).

Piston: . . . . . Light alloy

Air/air version (for ø85 mm: Bronze).

Seals: . . . . . Nitrile (NBR).

Housing for switches: . . . . . Noryl (PPO).

## Seal qualities

### EPDM:

The EPDM seal is mechanically strong and normally resistant to ozone and other strong oxidizers, animal and vegetable fats, polar solvents, acids and bases, water and aqueous solutions.

The seal is available in all sizes.

### FPM:

Normally resistant to ozone and other oxidizers, hydrocarbons in general, oils, lubricants and greases.

The seal is available in all sizes.

## Options

- A. ThinkTop® for control and indication.\*
- B. Indication unit with micro switches.\*
- C. Indication unit with inductive proximity switches.\*
- D. Indication unit with Hall proximity switches.\*
- E. Explosion proof indication unit with inductive proximity switches.\*
- F. Bracket for actuator.
- G. Handle with two or four positions.
- H. Handle for electrical position indication.
- I. Handle with infinite intermediate positions.
- J. Multipositioning handle\*\*.
- K. Lockable Multiposition Handle. Padlock can be mounted as shown in fig. 5.  
**Note!** Padlock is not delivered.
- L. Special cap for 90° turned handle position.
- M. Service tool for actuator.
- N. Service tool for fitting 25-38 mm (DN25 - DN40) valve discs.

\* For further information see Product Catalogue chapter "Control & Indication".

\*\* A padlock can be mounted on the Lockable Multiposition Handle as shown in the opposite figure.

**Note!** Padlock is not delivered.

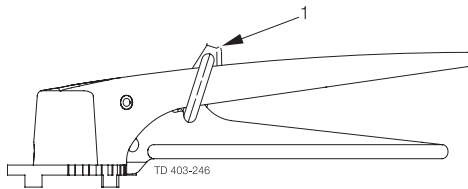


Fig. 3. Lockable Multiposition Handle with padlock.

1. Padlock

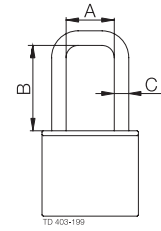


Fig. 4. Dimensions - padlock.

A. Min. 20 mm

B. Min. 35 mm

C.  $\varnothing 6$  mm

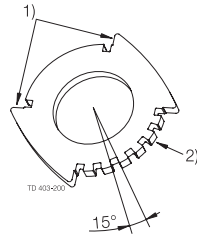


Fig. 5. Positioning cap.

1. On/Off
2. Multi positioning

## Ordering

Please state the following when ordering:

- Valve type: Tri-Clover LKB UltraPure
- Valve size
- Connections
- Surface finish
- Rubber grade: EPDM or FPM
- Type of handle, if required

### If ordering with actuator:

- Type: LKLA or LKLA-T
- Size:  $\varnothing 85$ mm or  $\varnothing 133$  mm.
- Function: NC, NO or Air/Air
- Other options

## Note!

For further details, see also ESE01699.

ESE01697EN 1007

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

### How to contact Alfa Laval

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