# Alfa Laval Unique RV-ST

## Regulating valves

### Introduction

The Alfa Laval Unique RV-ST Regulating Valve is the third generation of the Alfa Laval single-seat regulating valve designed to meet the highest process demands of hygiene and safety. Built on a well-proven platform from an installed base of more than a million valves, it is ideal for high-volume, hygienic liquid processing applications that require precision control of flow rate or pressure.

RV-ST has a vast range of Kv-values to fit customers exact needs. 1½"-4" sizes come with a plug seal to also function as a shut-off valve, where 1" sizes do not have a plug seal.

### Application

This pneumatic single-seat regulating valve is ideal for use as a hygienic product valve in the dairy, food, beverage, chemical, pharmaceutical and many other industries.

### Benefits

- Reliable, automated performance
- Versatile, modular design
- Outstanding precision flow
- Easy to maintain
- Large operating range

### Standard design

The Alfa Laval Unique RV-ST Regulating Valve with positioner consists of valve body, valve stem, EPDM plug seal, actuator with advanced electro-pneumatic process controller, and stem bushings threaded to the actuator shaft. The control unit comes in two versions: with or without display.

### Working principle

The Alfa Laval Unique RV-ST Regulating Valve is controlled from a remote location by means of a digital electro-pneumatic process controller. Few straightforward moveable parts ensure reliable operation.

### Certificates

Authorized to carry the 3A symbol

## TECHNICAL DATA

| Pressure | |
|---|---|
| Max. product pressure: | 10 bar (1000 kPa) |
| Min. product pressure: | Full vacuum |
| Air pressure: | 5 - 7 bar (500 to 700 kPa) |

| Temperature | |
|---|---|
| Temperature range: | -10°C to +140°C (EPDM) |

| Positioner data | |
|---|---|
| Supply voltage: | 24 VDC +/- 10% |
| Working temperature: | 0 to 55 °C |
| Push-in fittings: | ø6mm or 1/4" |
| Protection class: | IP65 and IP67 |
| Position detection module: | Contact-free, wear-free |
| Communication: | Analog |

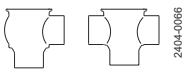
| 8692 Positioner – Top control with display | |
|---|---|
| Setpoint setting: | 0/4 to 20mA and 0 to 5 5/10V |
| Output resistance: | 0/4 to 20 mA: 180Ω<br>0 to 5/10V: 19Ω |
| Power consumption: | < 5W |
| Cable gland: | 2xM16x1,5 (cable-ø10mm) |
| Max. wire diameter: | 1.5 $mm^2$ |

| 8694 Positioner – Basic control without display | |
|---|---|
| Setpoint setting: | 0/4 to 20mA |
| Output resistance: | 180Ω |
| Power consumption: | < 3,5W |
| Cable gland: | 2xM16x1,5 (cable-ø10mm) |
| Max. wire diameter: | 1.5 $mm^2$ |

## PHYSICAL DATA

| Materials | |
|---|---|
| Material: | PPS, stainless steel |
| Cover: | PC |
| Seals: | EPDM |
| Product wetted steel parts: | 1.4404 (316L) |
| External finish: | Semi-bright (blasted) |
| Internal finish: | Bright (polished), internal Ra < 0.8 µm |
| Other steel parts: | 1.4301 (304) |
| Plug seal: | EPDM (optional HNBR or FPM) |
| Other product wetted seals: | EPDM (optional HNBR or FPM) |
| Other seals: | NBR |

### Valve Body Combinations




200 300

### Other valves in the same basic design

- Unique Single Seat
- Standard valve
- Reverse acting valve
- Long stroke valve
- Manually operated valve
- Aseptic valve

### Options

- Male parts or clamp liners in accordance with required standard
- Product wetted seals in HNBR or FPM
- Maintainable actuator

- External surface finish blasted
- Optional plug seal: HNBR or FPM (Not relevant for 1" / DN25 sizes)

**Note!** For further details, see instruction manual.

## Valve Sizing

### Flow Coefficients (Kv)

The following formula and flow coefficient values enable you to select the correct regulating valve for your application.

Formula for water and other products with a specific gravity equal to 1.0:

$$Kvq = \frac{Q}{\sqrt{\Delta P}}$$

Formula for products with a specific gravity other than to 1.0:

$$Kvq = \frac{Q}{\sqrt{\Delta P/SG}}$$

Where:

Q =Product flow rate in $m^3$ per hour

SG =Specific gravity of product

Δ P = Pressure drop across valve in bar

(inlet pressure minus outlet pressure)

### Example of Kv Calculation:

Determine the proper size valve for 60 $m^3$ per hour of water.

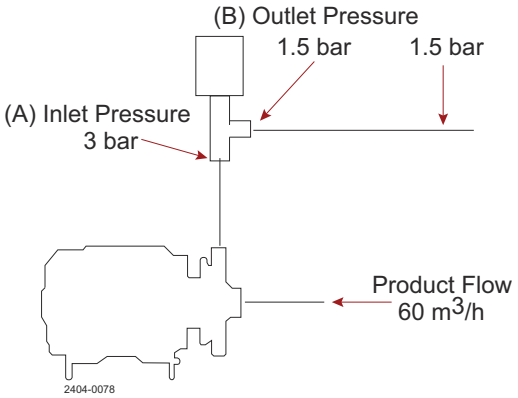
Inlet pressure of 3 bar

Outlet pressure of 1,5 bar

**Solution:** Inlet pressure (A) minus outlet pressure (B):

Δ P = 3 bar - 1,5 bar = 1,5 bar

$$Kvq = \frac{60}{\sqrt{1,5}} = 49$$




## How to Use Data to Select Valve Size

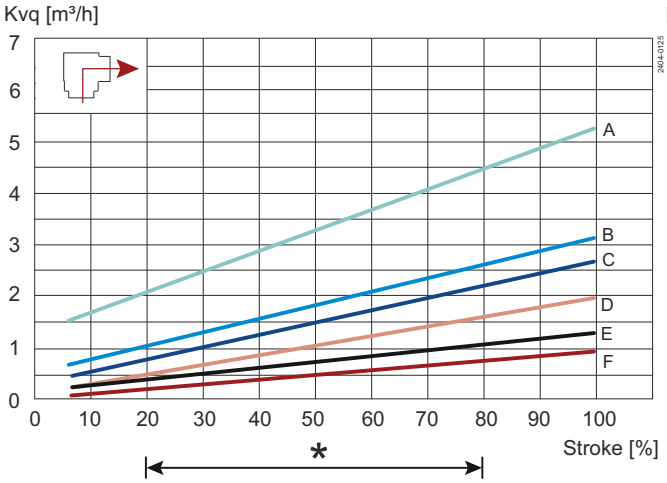
After the Kv factor for a specific application has been calculated, locate the factor on the following diagrams. Choose the curve closest to the 50% stroke.

Using the above example, refer to the chart on the following diagrams you will find that the Kv factor (49) is marked on the chart. You will find that a 2" valve crosses 1 Kv curve, 2½" 1 curve, 3" 3 curves and 4" 3 curves. The correct valve size to use is 2"

because Kv 49 crosses the curve closest to the optimum operating point 50%. Alternatively the 4" valve is also close to the 50%.

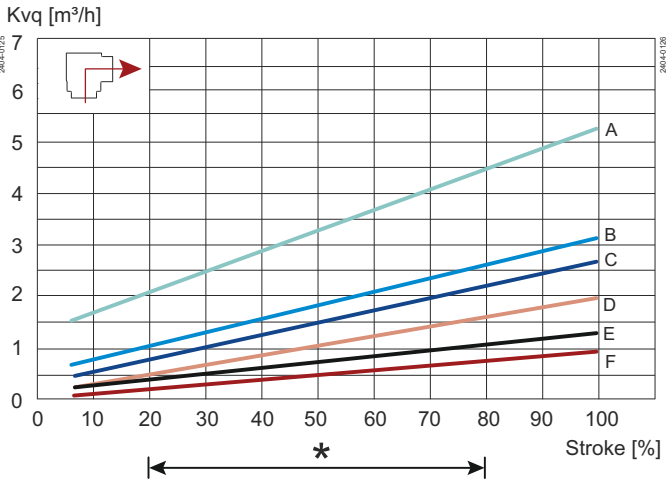
## Pressure drop/capacity diagrams

For Δ P = 100 kPa (1bar)



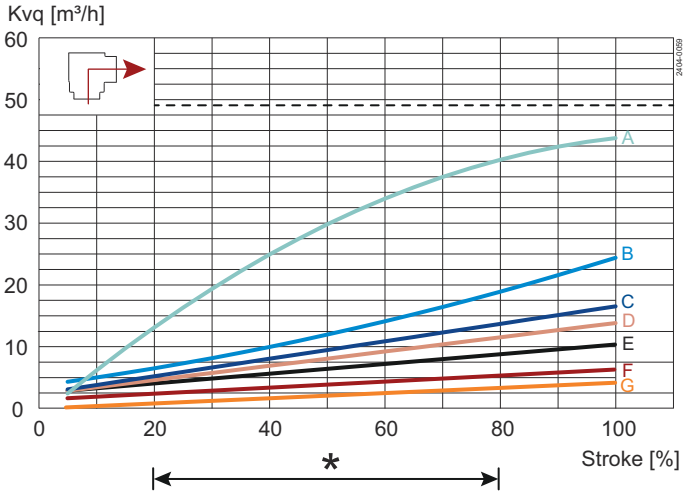

A = Kv 6
B = Kv 3,2
C = Kv 2,7
D = Kv 1,9
E = Kv 1,5
F = Kv 1

**Figure1. Valve size ISO 1”**



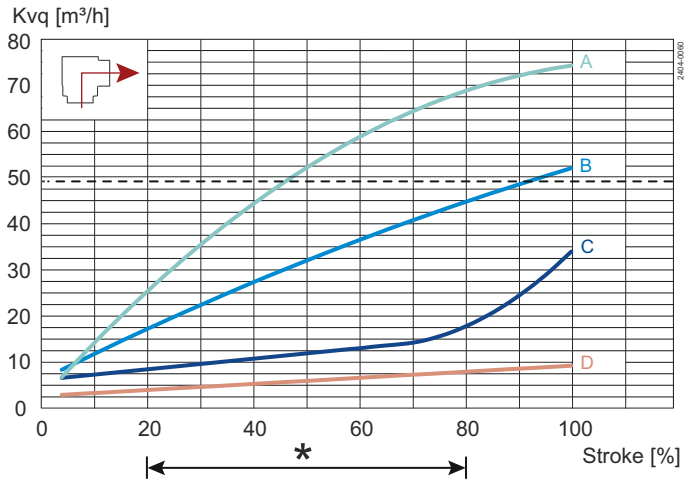

A = Kv 6
B = Kv 3,5
C = Kv 3,1
D = Kv 2,3
E = Kv 1,6
F = Kv 1,2

**Figure2. Valve size DN25**



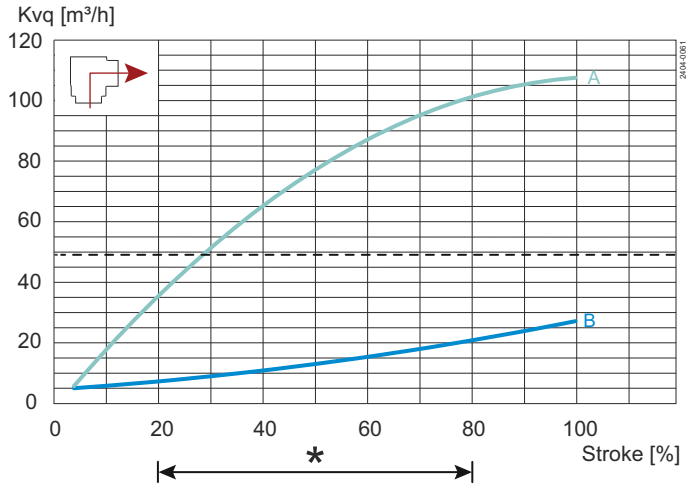

A = Kv 44
B = Kv 25
C = Kv 16
D = Kv 14
E = Kv 10
F = Kv 6
G = Kv 4

**Figure3. Valve size ISO 1.5”/DN40**



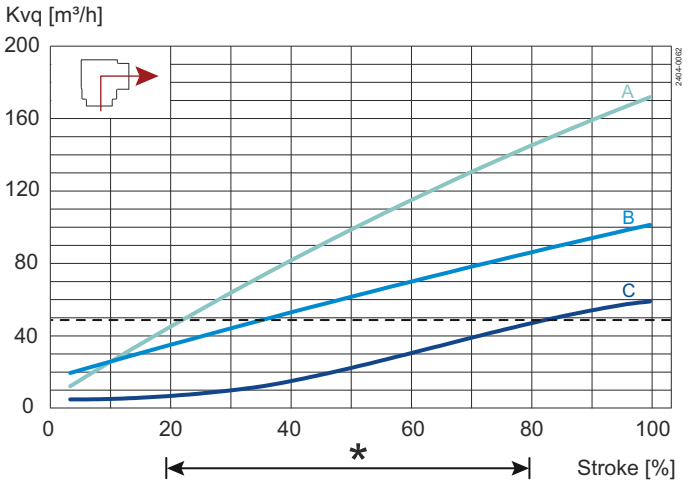

A = Kv 75
B = Kv 52
C = Kv 34
D = Kv 9

**Figure4. Valve size ISO 2”/DN50**



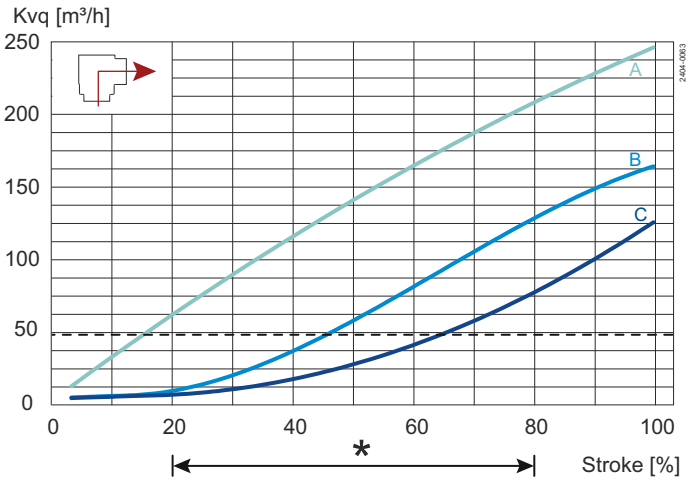

A = Kv 106
B = Kv 27

**Figure5. Valve size ISO 2,5”/DN65**




A = Kv 171
B = Kv 100
C = Kv 59

**Figure6. Valve size ISO 3”/DN80**




A = Kv 250
B = Kv 164
C = Kv 125

**Figure7. Valve size ISO 4”/DN100**

* Recommended working area

**Note!** For the diagrams the following applies

Medium: Water (20° C)

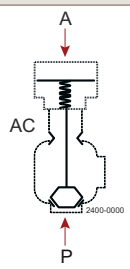
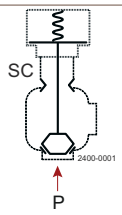
-------- (dotted line) = Kv 49

Alfa Laval recommend max. flow velocity in tubing and valves to be 5 m/sec.

## Pressure data

### Shut-off valves

**Max. pressure in bar without leakage at the valve seat**

| Actuator / Valve body combination and direction of pressure | Air pressure [bar] | Plug position | Valve size [mm] | | | | |
|---|---|---|---|---|---|---|---|
| | | | DN40/38 | DN50/51 | DN65/63.5 | DN80/76.1 | DN100/101.6 |
|  | 6 | NO | 7.60 | 9.60 | 5.60 | 7.20 | 4.80 |
|  | | NC | 6.29 | 7.20 | 4.20 | 6.40 | 4.20 |

A = Air
P = Product pressure
AC = Air closes
SC = Spring closes

## Dimensions (mm)

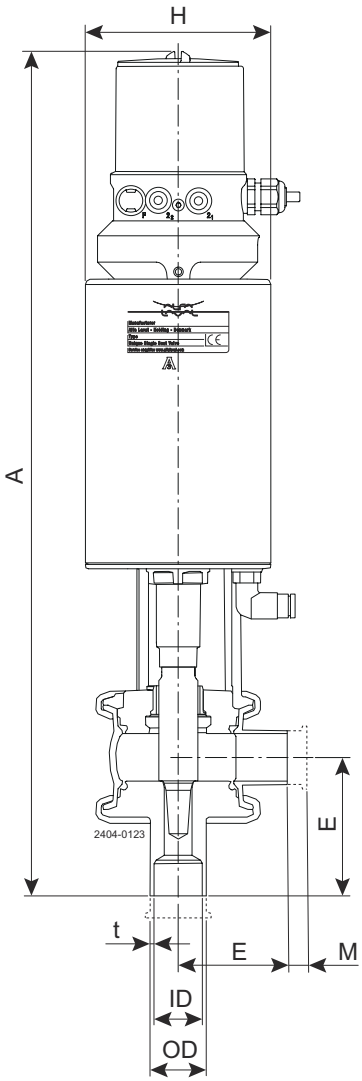



Figure8. Needle valve

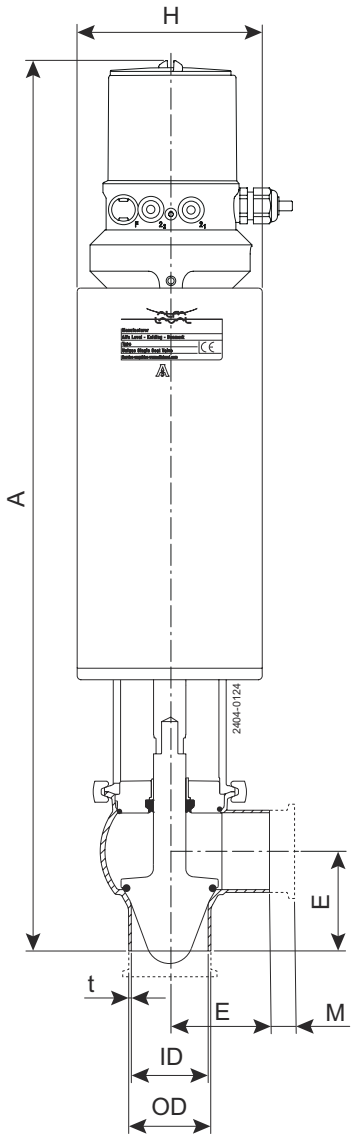



Figure9. RV-ST valve

| Size | 25[1] | 38 | 51 | 63.5 | 76.1 | 101.6 | DN[1] | DN | DN | DN | DN | DN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mm | mm | mm | mm | mm | mm | 25 | 40 | 50 | 65 | 80 | 100 |
| A (with positioner 8694) | 449 | 450 | 499 | 525 | 558 | 603 | 451 | 451 | 500 | 525 | 562 | 606 |
| A (with positioner 8692) | 486 | 487 | 536 | 562 | 595 | 640 | 488 | 488 | 537 | 562 | 599 | 643 |
| OD | 25 | 38 | 51 | 63.5 | 76.1 | 101.6 | 29 | 41 | 53 | 70 | 85 | 104 |
| ID | 21.8 | 34.8 | 47.8 | 60.3 | 72.9 | 97.6 | 26 | 38 | 50 | 66 | 81 | 100 |
| t | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 2 | 2 | 1.5 | 1.5 | 2 | 2 | 2 |
| E | 50 | 49.5 | 61 | 81 | 86 | 119 | 50 | 49,5 | 61 | 78 | 86 | 120 |
| H | 85 | 85 | 115 | 115 | 157.5 | 157.5 | 85 | 85 | 115 | 115 | 157.5 | 157.5 |
| M/ISO clamp | 21 | 21 | 21 | 21 | 21 | 21 | | | | | | |
| M/DIN clamp | | | | | | | 21 | 21 | 21 | 28 | 28 | 28 |
| M/DIN male | | | | | | | 22 | 22 | 23 | 25 | 25 | 30 |
| M/SMS male | 20 | 20 | 20 | 24 | 24 | 35 | | | | | | |
| Weight (kg) | 3.1 | 7.3 | 9.5 | 10.5 | 16.4 | 18.6 | 3.2 | 7.3 | 9.5 | 10.5 | 16.4 | 18.6 |

[1] Dimensions for Needle valve

### Air Connections Compressed air:

R 1/8" (BSP) internal thread for actuator.

## Electrical connections

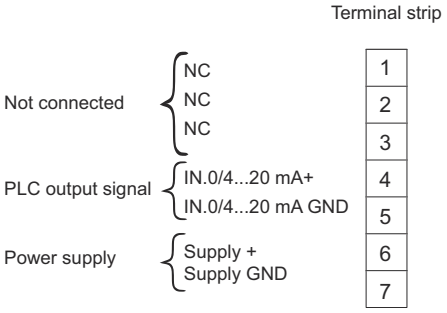



**Figure10. Positioner 8694**
without display

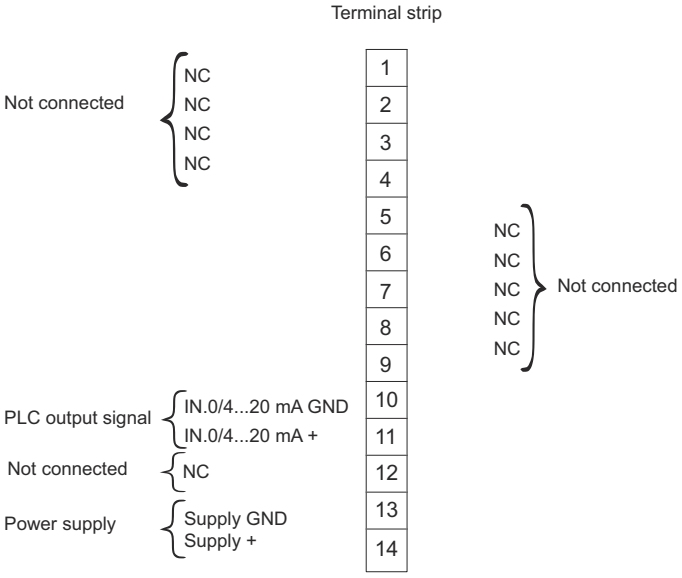



**Figure11. Positioner 8692**
without display






**How to contact Alfa Laval**
Up-to-date Alfa Laval contact details for all countries are always available
on our website at www.alfalaval.com