



## Small, Yet Flexible

### 650/655 Fractional Valves

PD 66370 US1 2002-05

#### Applications

Alfa Laval's Tri-Clover® brand range of fractional valves has been designed for applications requiring a secure, sanitary or sterile environment within the food, beverage, pharmaceutical, cosmetic or biotechnology processing industries. The self-draining ports and ease of operation make the Tri-Clover® brand fractional valves ideal for processes where an uncompromising sanitary environment is demanded. The many design options enable the processor to match the valve to the specific application.

#### Working Principle

The valve is operated by means of a pneumatic actuator or manual hand operator.

#### Standard Design

Alfa Laval's Tri-Clover® brand Fractional Valve is available as a relief, sample, check, air-actuated, manual shut-off or divert valve. Also, they can be ordered with a sterile barrier in the bonnet area if an aseptic design is required. Our fractional valves have a sanitary design which incorporates a polished ID and self-draining ports. This helps to minimize the threat of contamination and avoid product entrapment. Our fractional valves have a unique design that calls for minimal number of components and quick-couple Tri-Clamp® body connections which are easy and fast to take down and reassemble. There is a wide selection of body styles and seat materials. The shut-off and relief are available either as a tee or cross body. Other design features include: corrosion resistant type 316L stainless steel stem, bonnet and valve body construction.



650 and 655 Fractional Valves

Alfa Laval's Tri-Clover® brand Fractional Valves carry U.S. Patent Number 4,570,665

## Series 650/655 Valve Actuators and Manual Operators

### Actuator Air Supply Specifications

- Air pressure range is 50-60 PSI (3.5-4.1 BAR)
- Air-volume required at 50 PSI  
Normally Closed 1¾ cu. in.  
Normally Open 2¾ cu. in.
- Effective operating area is 2.19 sq. inches
- Filtered air and a pressure regulator are required
- Lubricated air is not required

### Type 10 Actuator

(Air to Close - Spring to Open) Used when a “normally open” valve is required.

Tube OD Size	Product Line Pressure (PSI) actuator will close against at ambient temperature	
	½" (12.7 mm)	¾" (19 mm)
50 PSI (3.5 BAR)	195 PSI (13.4 BAR)	195 PSI (13.4 BAR)
60 PSI (4.1 BAR)	230 PSI (15.8 BAR)	230 PSI (15.8 BAR)

### Type 20 Actuator

(Air to Open - Spring to Close) Used when a “normally closed” valve is required for fail-safe operation. In the event of air failure, spring automatically closes the valve.

Tube OD Size	Product Line Pressure (PSI) actuator will close against at ambient temperature
½" (12.7 mm)	150 PSI (10.3 BAR)
¾" (19 mm)	100 PSI (6.9 BAR)

### Type 30 Actuator

(Air to Open - Air to Close)

For applications requiring air both ways. No spring is used in the actuator.

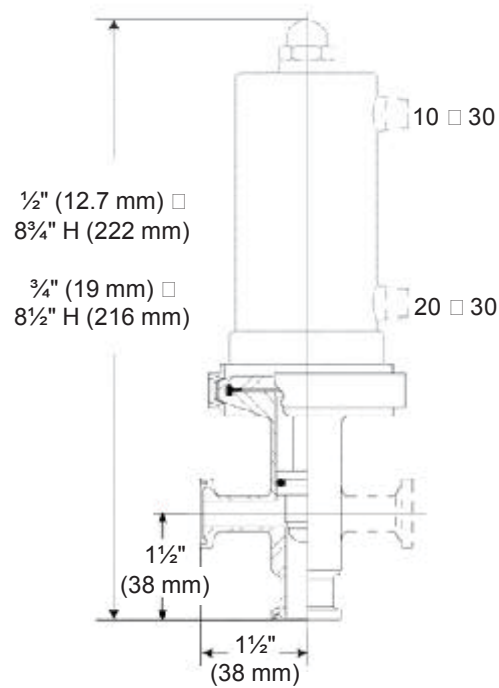
### Type 40 Manual Operator

- Standard handle is a durable UHMW polyethylene handle
- Aluminum bronze handle also available for temperatures above 150°F (66°C) or Pressures above 150 PSI (10 BAR)

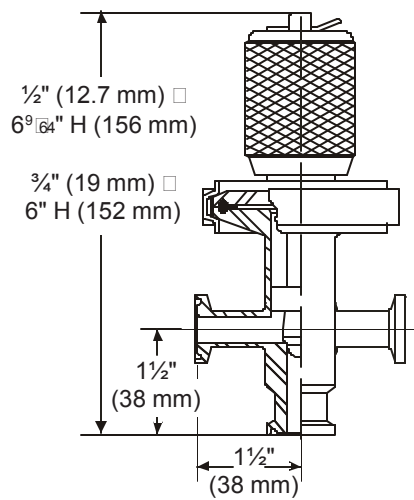
### Type R40 Relief Handle for 650 Valve

- UHMW polyethylene handle with relief spring
- ½" valve - 12-80 PSI
- ¾" valve - 6-60 PSI

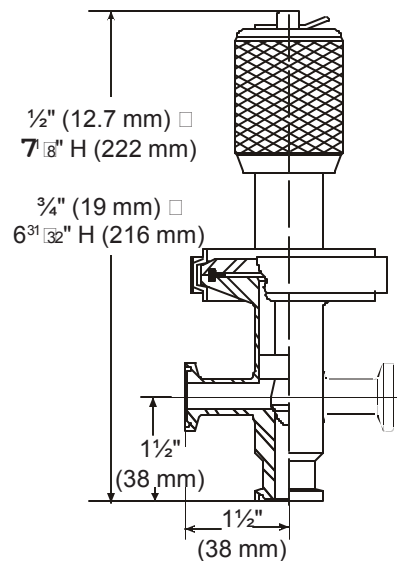
**Series 650/655 Dimensions**



**Air Actuated Valve**  
 650-10M-Actuator (tee body)  
 650-30M-Actuator (cross body)



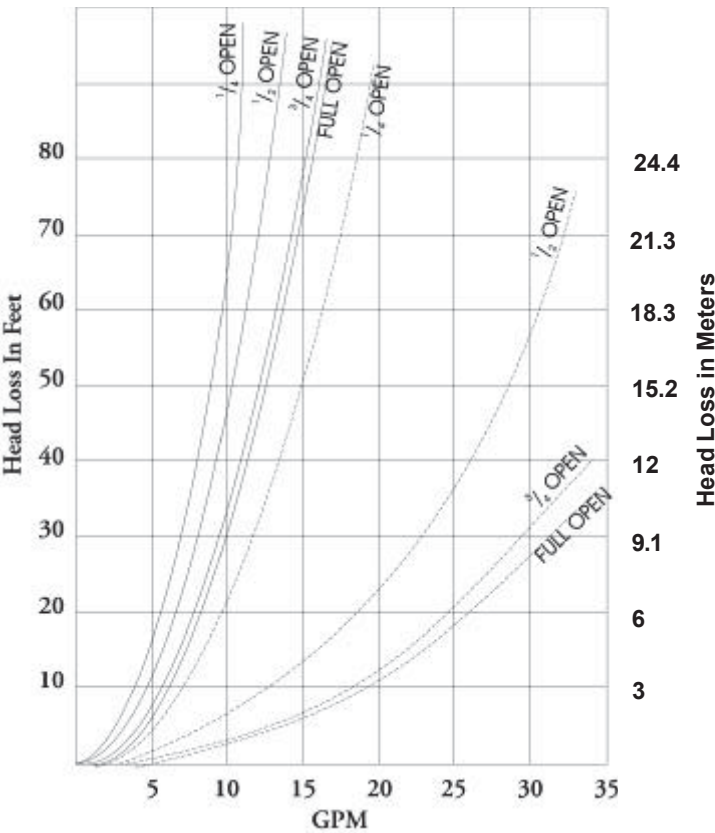
**Manual Shut-Off Valve**  
 650-10M-40 (tee body)  
 650-30M-40 (cross body)  
 (See page 4 □ Cv Factor Chart)



**Relief Valve**  
 650-10M-R40 (tee body)  
 650-30M-R40 (cross body)

## Series 650 Shut-Off

Head Loss Curve



Gal/Min.	5	10	15	20	25	30	35
Ltr/Min.	18.4	37.8	56.8	75.7	94.6	113.6	132.5

Head Loss Curve

Model 650 Manual Shut-Off valve

1/4 inch (19 mm) 1/2 inch (12.7 mm)

C<sub>v</sub> Factors for manual and shut-off valves

Valve Stroke	1/2" (12.7 mm)	3/4" (19 mm)
10	1.1	1.4
20	1.6	2.6
30	1.9	3.7
40	2.1	4.9
50	2.2	4.9
60	2.2	6
60	2.3	7
70	2.4	7.8
80	2.45	8.8
90	2.5	9.1
100	2.6	9.2

### 650 Series Plug and Seat Design

Series 650 Manual and Air Actuated valves are available in two seat styles

#### The Lip Seal:

Our patented, economical one-piece plug has no o-rings to replace. Available in fluorelastomer for temperatures up to 250°F (121°C), or PTFE for temperatures up to 120°F (49°C), or where fluorelastomer is incompatible with the product.

#### O-Ring Seal:

PTFE Material, with fluorelastomer o-ring, is ideal where application calls for a PTFE plug, and the fluorelastomer o-ring is acceptable. For temperatures up to 250°F (121°C).

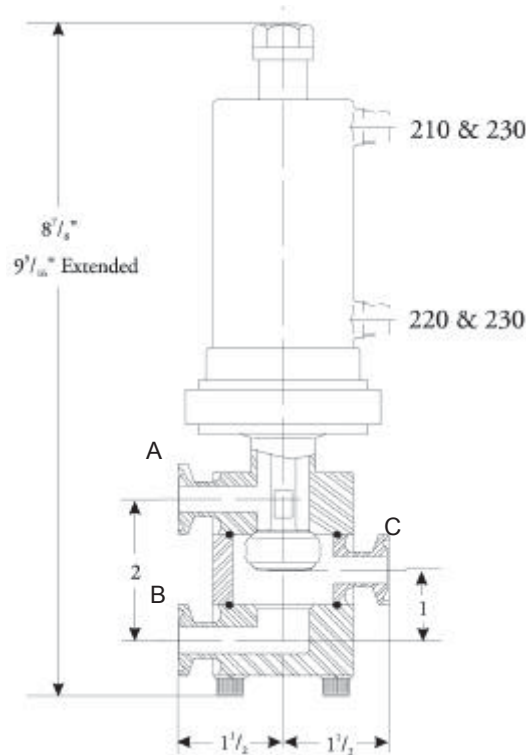
Fluorelastomer and PTFE lip seal not recommended for use in cross body valves (30M). Use only PTFE Plug with O-ring in type 30M valves.

Alfa Laval Fractional valves carry U.S. Patent Number 4,570,665.

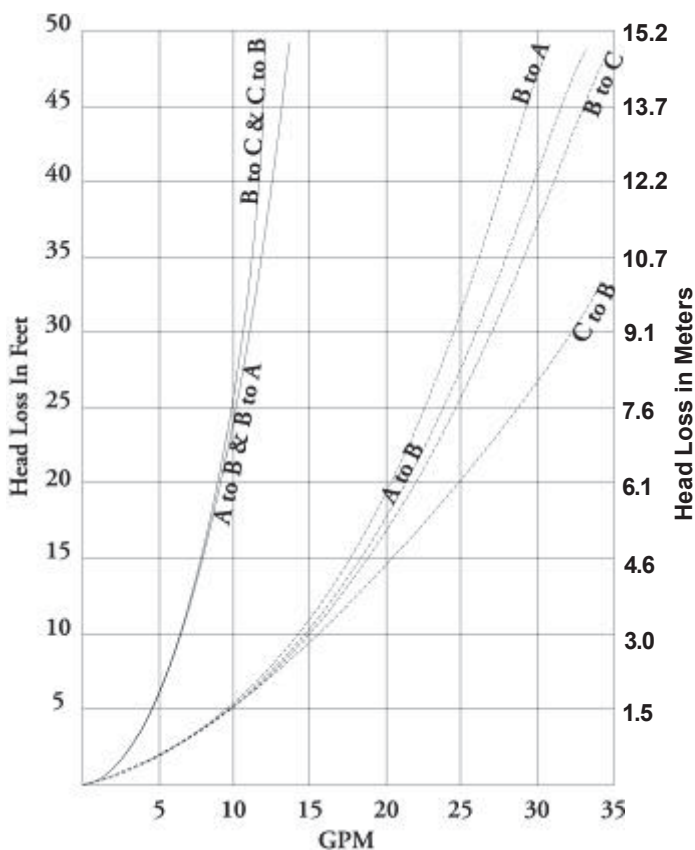


Series 655 Divert Valve

Dimensions



Head Loss Curve



□al Min.	5	10	15	20	25	30	35
Ltr Min.	18.4	37.8	56.8	75.7	94.6	113.6	132.5

Head Loss Curve

Model 655 Air-Actuated □alve

□ □ ¼ inch (19 mm) □ ½ inch (12.7 mm)

655 Series Plug and Seat Design

Series 655 Air-Actuated □alves are available with a bonded elastomer plug.

Molded Seat:

Standard material is fluorelastomer for temperatures up to 250°F (121°C). Other materials available.

**Note:** All elastomers used in Alfa Laval Fractional □alves are compounded to FDA standards.



**Body Styles Available:**

Shut-off  
Divert  
Relief  
Sample  
Check

**Port Connection Sizes:**

½" (12.7 mm) tube OD  
¾" (19 mm) tube OD

**Connection Type:**

Tri-Clamp

**Materials of Construction:**

Valve body	stainless steel 316L	Standard
Bonnet	stainless steel 316L	Standard
Stem	stainless steel 316L	Standard

**General Service Ranges:**

Fractional sizes valves are nominally rated up to 100 PSI (6.9 BAR) at 250°F (121°C) or 230 PSI (15.8 BAR) at 72°F (22°C). Refer to section on Plug and Seat Design for further detail. Contact Alfa Laval if higher pressure or temperature ratings are called for.

**Optional Microswitch or Proximity Switch**

All Series 650 and 655 Air-Actuated valves can be furnished with optional microswitch or proximity switch-equipped actuators at an additional cost. Switches are designed to deliver a signal to indicate both the open and closed positions, via lights or panel readouts, to monitor valves or to act as a safety interlock in a total system.

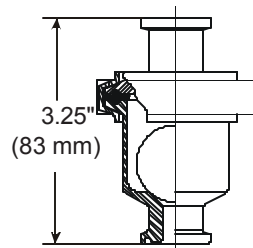
Microswitch units contain two SPDT switches, UL & CSA listings 15 A 125 or 250 VAC, ½ A, 125 VAC, 1 A, 250 VAC. Low voltage, intrinsically safe microswitch units are also available.


Proximity switches have no moving parts to be replaced, hence longer life. Rate Range 20-140 Volt AC, 50-60 Hz, 10-140 Volt DC, Maximum Load 200 mA, .8mA leakage current.

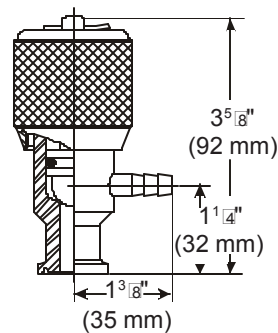
Contact Alfa Laval for additional details.



## Dimensions for 660 and C45 Valves



**Check Valve**  
C45MP (Ball Chec□)  
C45MPS (Plug Spring Chec□) 



**Sample Valve**  
660-10-40 

### C45 Check Valve:

- 1/2" (12.7 mm) or 3/4" (19 mm) sizes with Tri-Clamp□ end connections
- Available with a 316 stainless steel ball (vertical installation only) or with PTFE plug and spring.
- Relief pressure□  
3/4" size ..... 1.5 PSI (0.1 BAR)  
1/2" size ..... 3 PSI (0.2 BAR)

### 660 Sample Valve:

- Manual valves furnished with durable UHMW polyethylene handle.
- Optional bronze handle available for pressures above 150 PSI (10 BAR) or temperatures 150°F (66°C).
- 660-10 has 1/2" Tri-Clamp□ by □" hose barb (pictured above). or 660-10M has 1/2" Tri-Clamp□ by 1/2" Tri-Clamp□ connections (not pictured).

## Options

### **Equipment**

- Microswitch
- Proximity switch
- Handle style/material
- Actuator style

### **Ordering**

Please state the following when ordering:

- Valve size and style
- Actuator or manual operator type
- Seat Type: Fluorelastomer, EPDM, Buna or PTFE; Lip Seal or O-Ring
- Switch options
- Ball or plug/spring (check valve)



PD 66370 US1 2002-05

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  
Contact details for all countries  
are continually updated on our website.  
Please visit [www.alfalaval.com](http://www.alfalaval.com) to  
access the information direct.