



## 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.

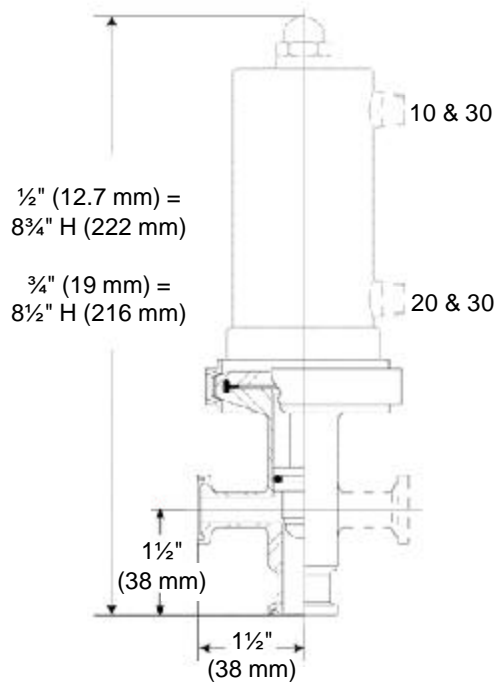
### Type 40 Manual Operator

- 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)

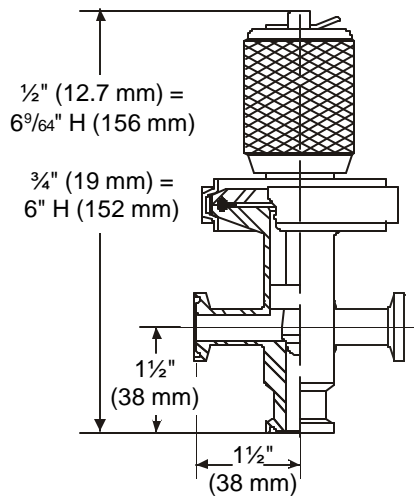
### Type R40 Relief Handle for 650 Valve

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

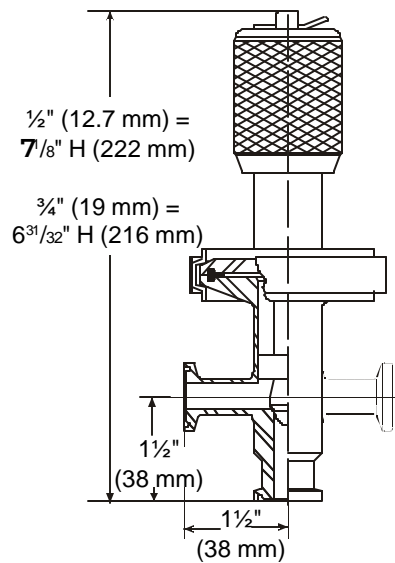
**Series 650/655 Dimensions**



**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)

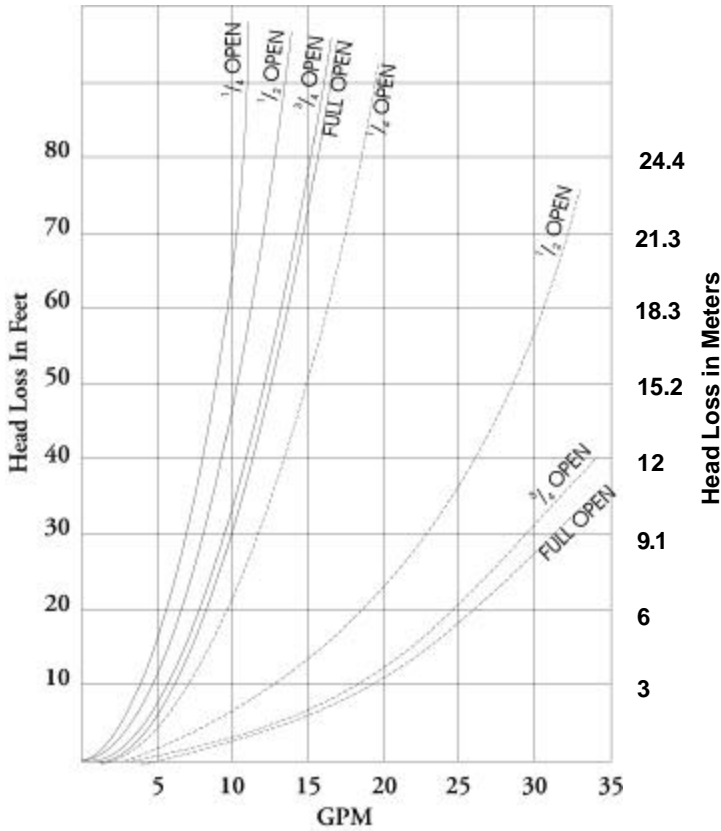


**Relief Valve**  
 650-10M-R40 (tee body)  
 650-30M-R40 (cross body)



**Series 650 Shut-Off**

**Head Loss Curve**



**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

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/Shutdown Valve

— — 3/4 inch (19 mm)    — — 1/2 inch (12.7 mm)

**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).

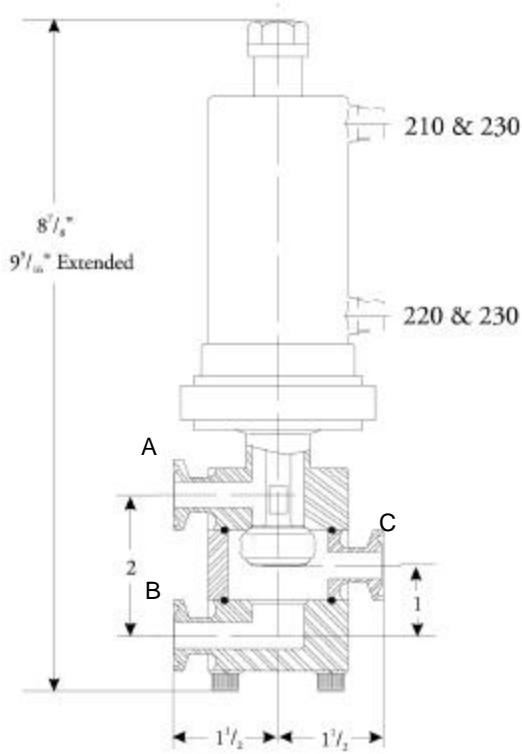
\*Fluorelastomer and PTFE lip seal not recommended for use in cross body valves (30M). Use only PTFE Plug with O-ring in type 30M valves.



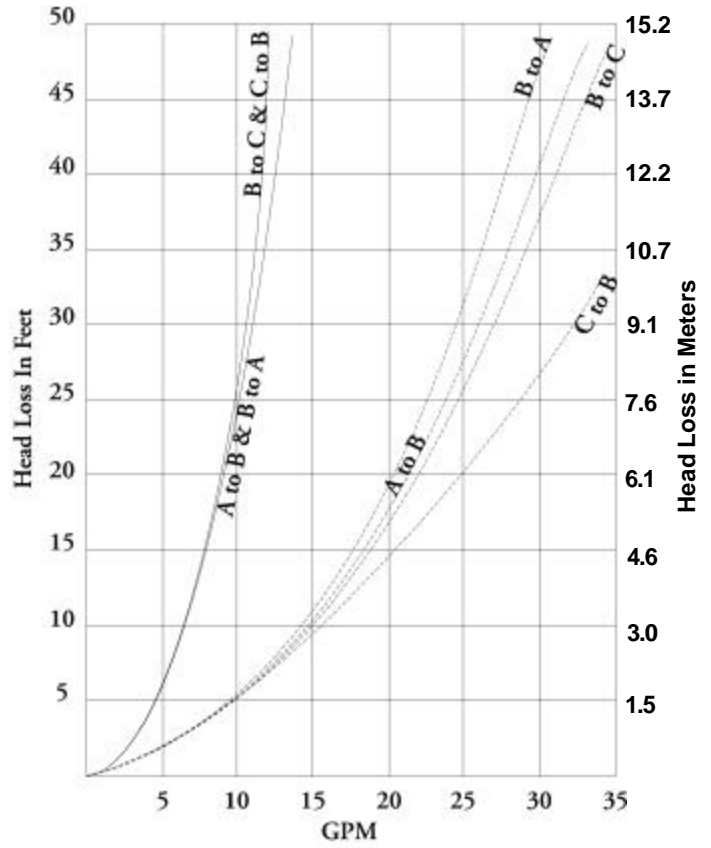
Alfa Laval Fractional Valves carry U.S. Patent Number 4,570,665.

**Series 655 Divert Valve**

**Dimensions**



**Head Loss Curve**



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 655 Air-Actuated Valve

— — ¼ inch (19 mm)    — ½ inch (12.7 mm)

**655 Series Plug and Seat Design**

Series 655 Air-Actuated Valves 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 Valves 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.

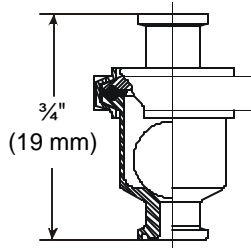
Microswitch units contain two SPDT switches, UL & CSA listings: 15 A/125 or 250 VAC, ½ A, 125 VAC, ¼ A, 250 VAC. Low voltage, intrinsically safe microswitch units are also available.


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.

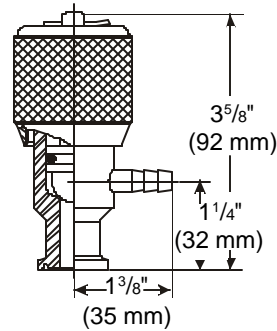
Contact Alfa Laval for additional details.




**Dimensions for 660 and C45 Valves**



**Check Valve**  
 C45MP (Ball Check)   
 C45MPS (Plug/Spring Check)



**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 1/4" 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)