

## Features

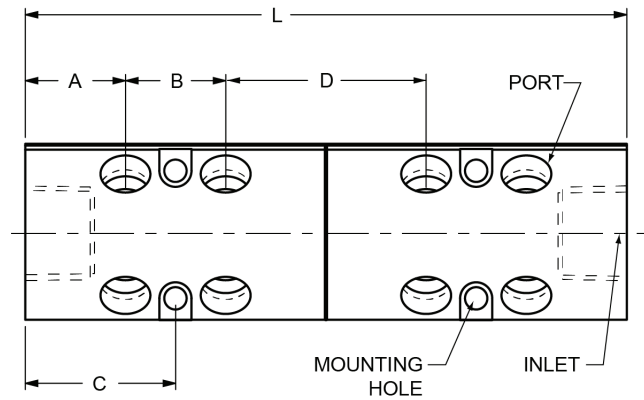
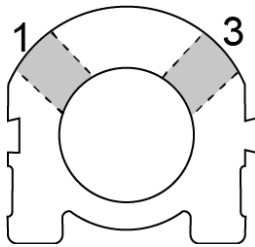
- Water manifolds in anodized aluminum or stainless steel for managing water flow in industrial applications.
- Flow meters are solutions for monitoring water flow when used with control valves for precise results.
- Low Flow Indicators are designed to be used in extremely low-flow applications of critical cooling channels where bubblers and baffles are used.
- Flow Regulators provide unique, single-point flow controls. The Delta-Q® low-cost precision flow regulator module, brass-body and high temperature stainless steel,
- Mold Temperature Regulators are used with existing molds as a non electric alternative to regulate mold temperature up to 120°F.



## Smartflow® Duoflow® Aluminum Manifolds

### Features

- 3/4", 1", and 1-1/2" inlet sizes (NPT)
- 1/4", 3/8" and 1/2" port sizes (NPT)
- Red & Blue Anodized to identify Supply and Return circuits
- Port spacing for quick disconnect and hose barb fittings
- 150 psi - Max operating pressure
- 210°F - Max operating temperature
- Body Material - Anodized Aluminum
- Divider - Stainless Steel
- O-Rings - EPDM
- Port Location - Sides 1 and 3



**U** Inch



Max Operating Temperature: 210°F (99°C)

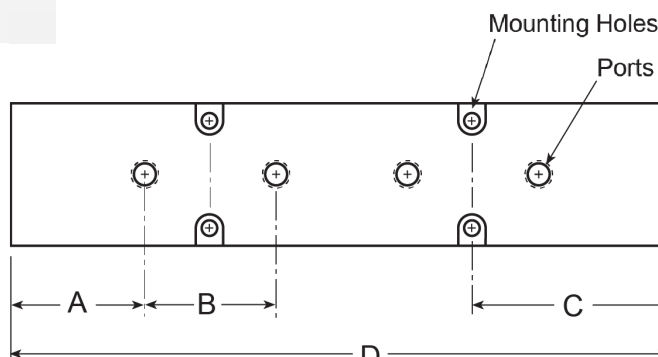
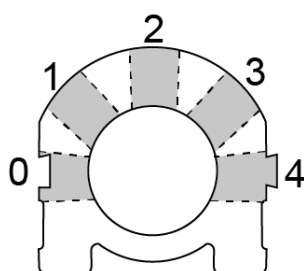
| ITEM NUMBER      | INLET SIZE NPT | TOTAL PORTS | PORT SIZE NPT | PORTS PER END | A     | B     | C      | D     | OVERALL LENGTH L |
|------------------|----------------|-------------|---------------|---------------|-------|-------|--------|-------|------------------|
| 6SDA-8-2-13-YZ   | 3/4"           | 8           | 1/4"          | 4             | 1"    | 1"    | 1.5"   | 2"    | 6"               |
| 6SDA-12-2-13-YZ  | 3/4"           | 12          | 1/4"          | 6             | 1"    | 1"    | 1.5"   | 2"    | 8"               |
| 6SDA-16-2-13-YZ  | 3/4"           | 16          | 1/4"          | 8             | 1"    | 1"    | 1.5"   | 2"    | 10"              |
| 8SDA-8-3-13-YZ   | 1"             | 8           | 3/8"          | 4             | 1.25" | 1.25" | 1.875" | 2.25" | 7.25"            |
| 8SDA-12-3-13-YZ  | 1"             | 12          | 3/8"          | 6             | 1.25" | 1.25" | 1.875" | 2.25" | 9.75"            |
| 8SDA-16-3-13-YZ  | 1"             | 16          | 3/8"          | 8             | 1.25" | 1.25" | 1.875" | 2.25" | 12.25"           |
| 12SDA-8-4-13-YZ  | 1 1/2"         | 8           | 1/2"          | 4             | 1.75" | 1.5"  | 2.5"   | 2.5"  | 9"               |
| 12SDA-12-4-13-YZ | 1 1/2"         | 12          | 1/2"          | 6             | 1.75" | 1.5"  | 2.5"   | 2.5"  | 12"              |
| 12SDA-16-4-13-YZ | 1 1/2"         | 16          | 1/2"          | 8             | 1.75" | 1.5"  | 2.5"   | 2.5"  | 15"              |



## Smartflow® 3/4" Aluminum Water Manifolds

### Features

- 150 psi maximum pressure rating
- One piece / no seams
- Brass end plugs included (NPT only)
- Anodized Red and Blue
- Pre-drilled mounting holes (3/4" Profile - .180" thru hole and all others - .280" thru hole)
- Center Port Location


**U** Inch


Max Operating Temperature: 300°F (149°C)

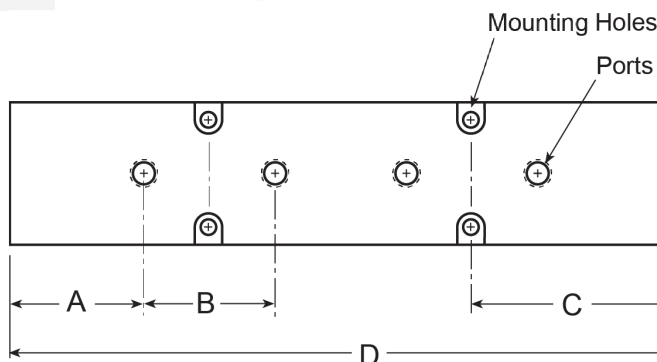
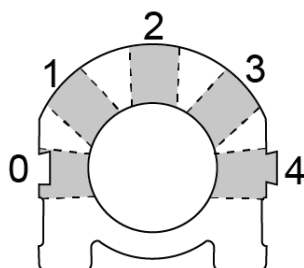
| ITEM NUMBER  | INLET/OUTLET SIZE NPT | NUMBER OF PORTS | PORT SIZE NPT | PORT LOCATION | COLOR | A    | B    | C     | OVERALL LENGTH D |
|--------------|-----------------------|-----------------|---------------|---------------|-------|------|------|-------|------------------|
| 6SA-4-2-2-Y  | 3/4"                  | 4               | 1/4"          | 2             | Red   | 1.5" | 1.5" | 2.25" | 7.5"             |
| 6SA-4-2-2-Z  | 3/4"                  | 4               | 1/4"          | 2             | Blue  | 1.5" | 1.5" | 2.25" | 7.5"             |
| 6SA-6-2-2-Y  | 3/4"                  | 6               | 1/4"          | 2             | Red   | 1.5" | 1.5" | 2.25" | 10.5"            |
| 6SA-6-2-2-Z  | 3/4"                  | 6               | 1/4"          | 2             | Blue  | 1.5" | 1.5" | 2.25" | 10.5"            |
| 6SA-8-2-2-Y  | 3/4"                  | 8               | 1/4"          | 2             | Red   | 1.5" | 1.5" | 2.25" | 13.5"            |
| 6SA-8-2-2-Z  | 3/4"                  | 8               | 1/4"          | 2             | Blue  | 1.5" | 1.5" | 2.25" | 13.5"            |
| 6SA-12-2-2-Y | 3/4"                  | 12              | 1/4"          | 2             | Red   | 1.5" | 1.5" | 2.25" | 19.5"            |
| 6SA-12-2-2-Z | 3/4"                  | 12              | 1/4"          | 2             | Blue  | 1.5" | 1.5" | 2.25" | 19.5"            |
| 6SA-16-2-2-Y | 3/4"                  | 16              | 1/4"          | 2             | Red   | 1.5" | 1.5" | 2.25" | 25.5"            |
| 6SA-16-2-2-Z | 3/4"                  | 16              | 1/4"          | 2             | Blue  | 1.5" | 1.5" | 2.25" | 25.5"            |
| 6SA-4-3-2-Y  | 3/4"                  | 4               | 3/8"          | 2             | Red   | 1.5" | 2.0" | 2.5"  | 9"               |
| 6SA-4-3-2-Z  | 3/4"                  | 4               | 3/8"          | 2             | Blue  | 1.5" | 2.0" | 2.5"  | 9"               |
| 6SA-6-3-2-Y  | 3/4"                  | 6               | 3/8"          | 2             | Red   | 1.5" | 2.0" | 2.5"  | 13"              |
| 6SA-6-3-2-Z  | 3/4"                  | 6               | 3/8"          | 2             | Blue  | 1.5" | 2.0" | 2.5"  | 13"              |
| 6SA-8-3-2-Y  | 3/4"                  | 8               | 3/8"          | 2             | Red   | 1.5" | 2.0" | 2.5"  | 17"              |
| 6SA-8-3-2-Z  | 3/4"                  | 8               | 3/8"          | 2             | Blue  | 1.5" | 2.0" | 2.5"  | 17"              |



## Smartflow® 1" Aluminum Water Manifolds

### Features

- 150 psi maximum pressure rating
- One piece / no seams
- Brass end plugs included (NPT only)
- Anodized Red and Blue
- Pre-drilled mounting holes (3/4" Profile - .180" thru hole and all others - .280" thru hole)
- Center Port Location


**U** Inch


Max Operating Temperature: 300°F (149°C)

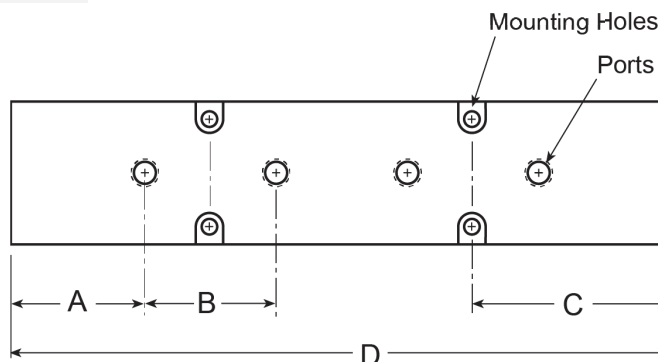
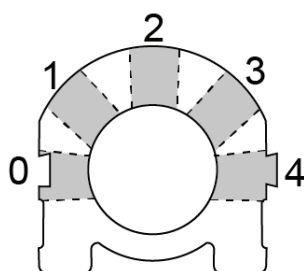
| ITEM NUMBER  | INLET/<br>OUTLET<br>SIZE<br>NPT | NUMBER<br>OF<br>PORTS | PORT<br>SIZE<br>NPT | PORT<br>LOCATION | COLOR | A    | B    | C     | OVERALL<br>LENGTH<br>D |
|--------------|---------------------------------|-----------------------|---------------------|------------------|-------|------|------|-------|------------------------|
| 8SA-4-2-2-Y  | 1"                              | 4                     | 1/4"                | 2                | Red   | 1.5" | 1.5" | 2.25" | 7.5"                   |
| 8SA-4-2-2-Z  | 1"                              | 4                     | 1/4"                | 2                | Blue  | 1.5" | 1.5" | 2.25" | 7.5"                   |
| 8SA-6-2-2-Y  | 1"                              | 6                     | 1/4"                | 2                | Red   | 1.5" | 1.5" | 2.25" | 10.5"                  |
| 8SA-6-2-2-Z  | 1"                              | 6                     | 1/4"                | 2                | Blue  | 1.5" | 1.5" | 2.25" | 10.5"                  |
| 8SA-8-2-2-Y  | 1"                              | 8                     | 1/4"                | 2                | Red   | 1.5" | 1.5" | 2.25" | 13.5"                  |
| 8SA-8-2-2-Z  | 1"                              | 8                     | 1/4"                | 2                | Blue  | 1.5" | 1.5" | 2.25" | 13.5"                  |
| 8SA-10-2-2-Y | 1"                              | 10                    | 1/4"                | 2                | Red   | 1.5" | 1.5" | 2.25" | 16.5"                  |
| 8SA-10-2-2-Z | 1"                              | 10                    | 1/4"                | 2                | Blue  | 1.5" | 1.5" | 2.25" | 16.5"                  |
| 8SA-12-2-2-Y | 1"                              | 12                    | 1/4"                | 2                | Red   | 1.5" | 1.5" | 2.25" | 19.5"                  |
| 8SA-12-2-2-Z | 1"                              | 12                    | 1/4"                | 2                | Blue  | 1.5" | 1.5" | 2.25" | 19.5"                  |
| 8SA-16-2-2-Y | 1"                              | 16                    | 1/4"                | 2                | Red   | 1.5" | 1.5" | 2.25" | 25.5"                  |
| 8SA-16-2-2-Z | 1"                              | 16                    | 1/4"                | 2                | Blue  | 1.5" | 1.5" | 2.25" | 25.5"                  |



## Smartflow® 1" Aluminum Water Manifolds (Cont'd)

### Features

- 150 psi maximum pressure rating
- One piece / no seams
- Brass end plugs included (NPT only)
- Anodized Red and Blue
- Pre-drilled mounting holes (3/4" Profile - .180" thru hole and all others - .280" thru hole)
- Center Port Location


**U** Inch


Max Operating Temperature: 300°F (149°C)

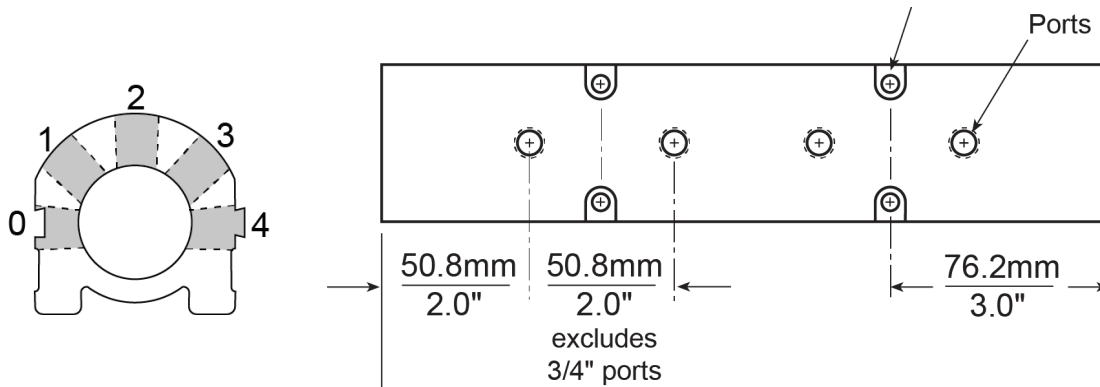
| ITEM NUMBER  | INLET/ OUT-<br>LET SIZE<br>NPT | NUMBER<br>OF<br>PORTS | PORT<br>SIZE<br>NPT | PORT<br>LOCATION | COLOR | A    | B    | C    | OVERALL<br>LENGTH<br>D |
|--------------|--------------------------------|-----------------------|---------------------|------------------|-------|------|------|------|------------------------|
| 8SA-4-3-2-Y  | 1"                             | 4                     | 3/8"                | 2                | Red   | 1.5" | 2.0" | 2.5" | 9.0"                   |
| 8SA-4-3-2-Z  | 1"                             | 4                     | 3/8"                | 2                | Blue  | 1.5" | 2.0" | 2.5" | 9.0"                   |
| 8SA-6-3-2-Y  | 1"                             | 6                     | 3/8"                | 2                | Red   | 1.5" | 2.0" | 2.5" | 13.0"                  |
| 8SA-6-3-2-Z  | 1"                             | 6                     | 3/8"                | 2                | Blue  | 1.5" | 2.0" | 2.5" | 13.0"                  |
| 8SA-8-3-2-Y  | 1"                             | 8                     | 3/8"                | 2                | Red   | 1.5" | 2.0" | 2.5" | 17.0"                  |
| 8SA-8-3-2-Z  | 1"                             | 8                     | 3/8"                | 2                | Blue  | 1.5" | 2.0" | 2.5" | 17.0"                  |
| 8SA-10-3-2-Y | 1"                             | 10                    | 3/8"                | 2                | Red   | 1.5" | 2.0" | 2.5" | 21.0"                  |
| 8SA-10-3-2-Z | 1"                             | 10                    | 3/8"                | 2                | Blue  | 1.5" | 2.0" | 2.5" | 21.0"                  |
| 8SA-12-3-2-Y | 1"                             | 12                    | 3/8"                | 2                | Red   | 1.5" | 2.0" | 2.5" | 25.0"                  |
| 8SA-12-3-2-Z | 1"                             | 12                    | 3/8"                | 2                | Blue  | 1.5" | 2.0" | 2.5" | 25.0"                  |
| 8SA-16-3-2-Y | 1"                             | 16                    | 3/8"                | 2                | Red   | 1.5" | 2.0" | 2.5" | 33.0"                  |
| 8SA-16-3-2-Z | 1"                             | 16                    | 3/8"                | 2                | Blue  | 1.5" | 2.0" | 2.5" | 33.0"                  |



## Smartflow® 1 1/2" Aluminum Water Manifolds

### Features

- 300°F - Maximum operating temperature
- 150 psi maximum pressure rating
- One piece / no seams
- Brass end plugs included (NPT only)
- Anodized Red and Blue
- Pre-drilled mounting holes (3/4" Profile - .180" thru hole and all others - .280" thru hole)
- Center Port Location



**U** Inch



Max Operating Temperature: 300°F (149°C)

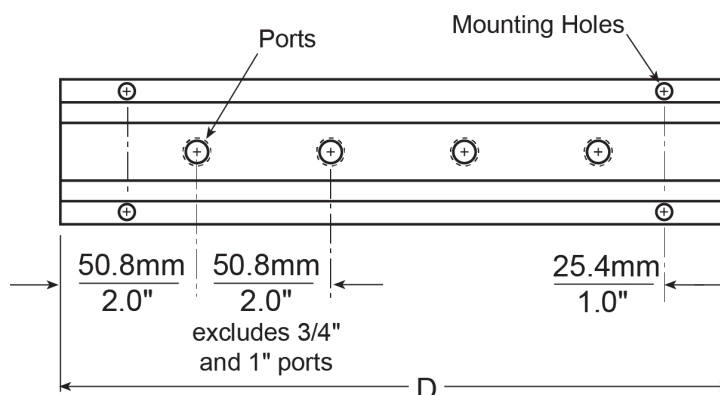
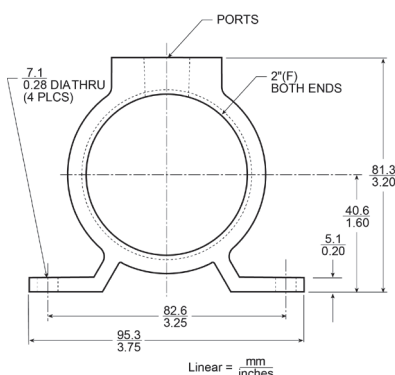
| ITEM NUMBER   | INLET/<br>OUTLET<br>SIZE<br>NPT | NUMBER<br>OF<br>PORTS | PORT<br>SIZE<br>NPT | PORT<br>LOCATION | COLOR | A    | B    | C    | OVERALL<br>LENGTH<br>D |
|---------------|---------------------------------|-----------------------|---------------------|------------------|-------|------|------|------|------------------------|
| 12SA-4-4-2-Y  | 1 1/2"                          | 4                     | 1/2"                | 2                | Red   | 2.0" | 2.0" | 3.0" | 10.0"                  |
| 12SA-4-4-2-Z  | 1 1/2"                          | 4                     | 1/2"                | 2                | Blue  | 2.0" | 2.0" | 3.0" | 10.0"                  |
| 12SA-6-4-2-Y  | 1 1/2"                          | 6                     | 1/2"                | 2                | Red   | 2.0" | 2.0" | 3.0" | 14.0"                  |
| 12SA-6-4-2-Z  | 1 1/2"                          | 6                     | 1/2"                | 2                | Blue  | 2.0" | 2.0" | 3.0" | 14.0"                  |
| 12SA-8-4-2-Y  | 1 1/2"                          | 8                     | 1/2"                | 2                | Red   | 2.0" | 2.0" | 3.0" | 18.0"                  |
| 12SA-8-4-2-Z  | 1 1/2"                          | 8                     | 1/2"                | 2                | Blue  | 2.0" | 2.0" | 3.0" | 18.0"                  |
| 12SA-10-4-2-Y | 1 1/2"                          | 10                    | 1/2"                | 2                | Red   | 2.0" | 2.0" | 3.0" | 22.0"                  |
| 12SA-10-4-2-Z | 1 1/2"                          | 10                    | 1/2"                | 2                | Blue  | 2.0" | 2.0" | 3.0" | 22.0"                  |
| 12SA-12-4-2-Y | 1 1/2"                          | 12                    | 1/2"                | 2                | Red   | 2.0" | 2.0" | 3.0" | 26.0"                  |
| 12SA-12-4-2-Z | 1 1/2"                          | 12                    | 1/2"                | 2                | Blue  | 2.0" | 2.0" | 3.0" | 26.0"                  |
| 12SA-16-4-2-Y | 1 1/2"                          | 16                    | 1/2"                | 2                | Red   | 2.0" | 2.0" | 3.0" | 34.0"                  |
| 12SA-16-4-2-Z | 1 1/2"                          | 16                    | 1/2"                | 2                | Blue  | 2.0" | 2.0" | 3.0" | 34.0"                  |



## Smartflow® 2" Aluminum Water Manifolds

### Features

- 300°F - Maximum operating temperature
- 150 psi maximum pressure rating
- One piece / no seams
- Brass end plugs included (NPT only)
- Anodized Red and Blue
- Pre-drilled mounting holes (3/4" Profile - .180" thru hole and all others - .280" thru hole)
- Center Port Location


**U** Inch


Max Operating Temperature: 300°F (149°C)

| ITEM NUMBER   | INLET/<br>OUTLET<br>SIZE<br>NPT | NUMBER<br>OF<br>PORTS | PORT<br>SIZE<br>NPT | PORT<br>LOCATION | COLOR | A    | B    | C    | OVERALL<br>LENGTH<br>D |
|---------------|---------------------------------|-----------------------|---------------------|------------------|-------|------|------|------|------------------------|
| 16SA-4-4-2-Y  | 2"                              | 4                     | 1/2"                | Center           | Red   | 2.0" | 2.0" | 1.0" | 10.0"                  |
| 16SA-4-4-2-Z  | 2"                              | 4                     | 1/2"                | Center           | Blue  | 2.0" | 2.0" | 1.0" | 10.0"                  |
| 16SA-6-4-2-Y  | 2"                              | 6                     | 1/2"                | Center           | Red   | 2.0" | 2.0" | 1.0" | 14.0"                  |
| 16SA-6-4-2-Z  | 2"                              | 6                     | 1/2"                | Center           | Blue  | 2.0" | 2.0" | 1.0" | 14.0"                  |
| 16SA-8-4-2-Y  | 2"                              | 8                     | 1/2"                | Center           | Red   | 2.0" | 2.0" | 1.0" | 18.0"                  |
| 16SA-8-4-2-Z  | 2"                              | 8                     | 1/2"                | Center           | Blue  | 2.0" | 2.0" | 1.0" | 18.0"                  |
| 16SA-10-4-2-Y | 2"                              | 10                    | 1/2"                | Center           | Red   | 2.0" | 2.0" | 1.0" | 22"                    |
| 16SA-10-4-2-Z | 2"                              | 10                    | 1/2"                | Center           | Blue  | 2.0" | 2.0" | 1.0" | 22"                    |
| 16SA-12-4-2-Y | 2"                              | 12                    | 1/2"                | Center           | Red   | 2.0" | 2.0" | 1.0" | 26.0"                  |
| 16SA-12-4-2-Z | 2"                              | 12                    | 1/2"                | Center           | Blue  | 2.0" | 2.0" | 1.0" | 26.0"                  |
| 16SA-16-4-2-Y | 2"                              | 16                    | 1/2"                | Center           | Red   | 2.0" | 2.0" | 1.0" | 34.0"                  |
| 16SA-16-4-2-Z | 2"                              | 16                    | 1/2"                | Center           | Blue  | 2.0" | 2.0" | 1.0" | 34.0"                  |



Smartflow® Stainless Steel Manifolds with Conventional Ports

Features

- Material: 304 Stainless Steel
  - Temperature Rating: up to 250°F (121°C)
  - Maximum Working Pressure Ratings  
Gas (air,inertgas): 125 psi  
Liquid (oil, water, benign fluids): 250 psi
- Smartflow stainless steel manifolds are formed and welded from 304 stainless steel. The manifolds are 100% leak tested for quality assurance before shipping.
- Smartflow stainless steel manifolds are excellent for highflow applications where chemical compatibility and corrosionresistance are important. Manifold bodies are made from 1-1/2" or 2" square tube to allow maximum flow. Custom modifications are easily handled to provide the exact configuration you need.
- Smartflow stainless steel manifolds are the platform for control of cooling water lines in many types of industrial process cooling. Flowmeters, Flow Regulators, Ball Valves, Quick Disconnect Fittings and more can be added to the manifolds to improve functionality and process control. See page 12 for ordering information.
- Flowmeters and flow regulators are customarily assembled onto one side of parallel manifolds with flow direction into the return side of the manifold.



|                 |                       |    |   |    |   |                           |
|-----------------|-----------------------|----|---|----|---|---------------------------|
| Item Number     | 8 SS - 16 - 2 - 2 - A |    |   |    |   |                           |
| Example         | 8                     | SS | - | 16 | - | 2 - 2 - A                 |
| Supply Threads  |                       |    |   |    |   | Port Sizes                |
| 1"NPT           | 8                     |    |   |    |   | 2 1/4"NPT                 |
| 1"BSPP          | 8B                    |    |   |    |   | 2B 1/4"BSPP               |
| 1-1/2"NPT       | 12                    |    |   |    |   | 3 3/8"NPT                 |
| 1-1/2"BSPP      | 12B                   |    |   |    |   | 3B 3/8"BSPP               |
| Manifold Styles |                       |    |   |    |   | 4 1/2"NPT                 |
| Single          | SS                    |    |   |    |   | 4B 1/2"BSPP               |
| Parallel        | PSS                   |    |   |    |   | 6 *3/4"NPT                |
|                 |                       |    |   |    |   | 6B *3/4"BSPP              |
|                 |                       |    |   |    |   | *76.2mm/3.0" port spacing |
|                 |                       |    |   |    |   | 4 Total Number of Ports   |
|                 |                       |    |   |    |   | to 32                     |



Smartflow® Stainless Steel Manifolds with Low Profile Ports

Features

- Material: 304 Stainless Steel
  - Temperature Rating: up to 250°F (121°C)
  - Maximum Working Pressure Ratings
    - Gas (air,inertgas): 125 psi
    - Liquid (oil, water, benign fluids): 250 psi
- Smartflow stainless steel manifolds are formed and welded from 304 stainless steel. The manifolds are 100% leak tested for quality assurance before shipping.
- Smartflow stainless steel manifolds are excellent for high-flow applications where chemical compatibility and corrosionresistance are important. Manifold bodies are made from 1-1/2" or 2" square tube to allow maximum flow. Custom modifications are easily handled to provide the exact configuration you need.
- Smartflow stainless steel manifolds are the platform for control of cooling water lines in many types of industrial process cooling. Flowmeters, Flow Regulators, Ball Valves, Quick Disconnect Fittings and more can be added to the manifolds to improve functionality and process control. See page 12 for ordering information.
- Flowmeters and flow regulators are customarily assembled onto one side of parallel manifolds with flow direction into the return side of the manifold.



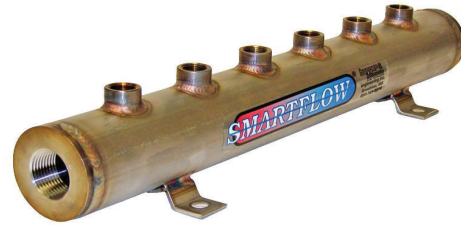
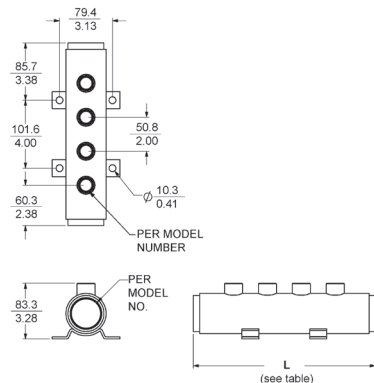
|                 |              |    |   |    |                       |       |
|-----------------|--------------|----|---|----|-----------------------|-------|
| Item Number     | 8SL-16-2-2-A |    |   |    |                       |       |
| Example         | 8            | SL | - | 16 | -                     | 2-2-A |
| Supply Threads  |              |    |   |    | Port Sizes            |       |
| 1"NPT           | 8            |    |   | 3  | 3/8"NPT               |       |
| 1-1/2"NPT       | 12           |    |   | 4  | 1/2"NPT               |       |
| Manifold Styles |              |    | 4 |    | Total Number of Ports |       |
| Single          | SL           | to |   |    |                       |       |
| Parallel        | PSL          | 32 |   |    |                       |       |



## High Pressure and Temperature Stainless Steel Manifolds

## Features

- Available in port quantities of 4, 6, and 8
- Available in 1/4", 3/8" and 1/2" (NPT) Port Sizes
- 3/4, 1" & 1-1/2" (NPT) Supply Threads - one end only
- Optional Flowmeters/Regulator available (1/2" only)
- Stainless Steel
- Optional Temperature Gauge available
- Operating Limits - 450°F (232°C) at 450psi (31bar) and 600°F (315°C) at 100psi (6.9bar)



## Specifications

|                   |                     |
|-------------------|---------------------|
| Manifold Material | Stainless Steel     |
| Material          | Stainless Steel     |
| Viewing Window    | Glass               |
| Vane              | Stainless Steel     |
| Spring            | Stainless Steel     |
| Pin               | Stainless Steel     |
| Gasket            | Non-Asbestos Fiber  |
| Magnet            | Sintered Alnico 8GE |
| Accuracy          | ±10%                |
| Flow Rate         | 6 GPM or 22 LPM     |

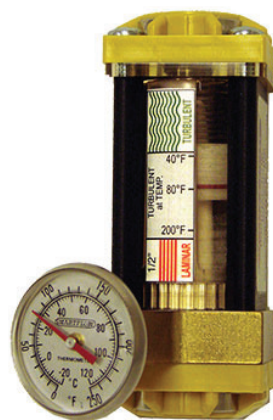
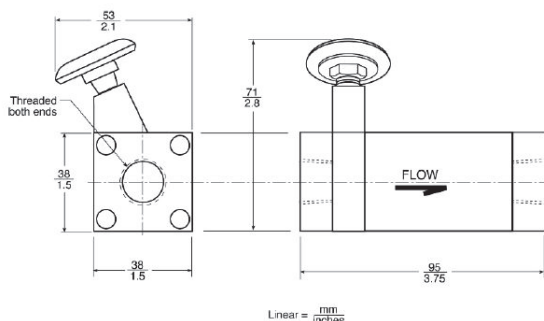
Example Item Number

[illegible]

## Smartflow® Dr. Eddy® Turbulent Flow Indicators

### Features

- Flow Range.....0.25 - 2 gpm or 1 - 8 lpm
- Flow Accuracy.....±10% full scale
- Operating Temperature max. ...210°F (99°C)
- Operating Pressure max...100 psi (6.9 bar)
- Dial Thermometer....0° to 250°F (-20° to 120°C)  
±2% accuracy (full scale)
- Brass or Glass-Filled Nylon End Caps
- Polysulfone Body
- Stainless Steel Spring & Cap Screws
- Brass Gauge Block
- Optional Brass Quick-Connect Fittings
- Made in the U.S.A.



**U** Inch



Max Mold Temperature: 210°F (99°C)

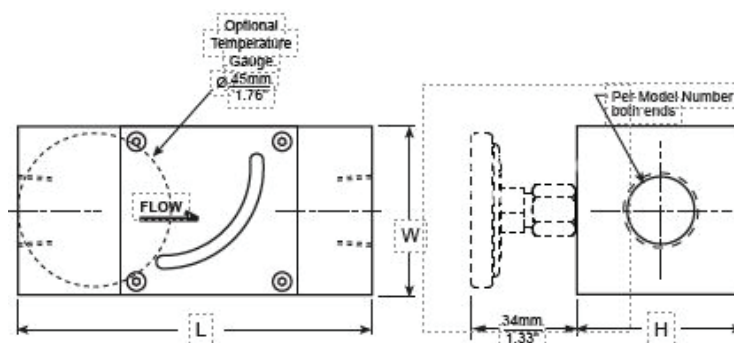
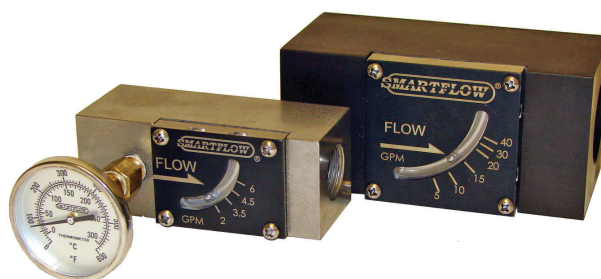
| Item Number  | Inlet Size (NPT) | End Cap | Accessories                                    |
|--------------|------------------|---------|------------------------------------------------|
| FC2-B-E      | 1/4"NPT(F)       | Brass   | Thermometer (standard)                         |
| FC2-B-M      | 1/4"NPT(F)       | Brass   | Thermometer (standard)                         |
| FC2-E-E      | 1/4"NPT(F)       | Brass   | Thermometer with quick-connect socket and plug |
| FC2-E-M      | 1/4"NPT(F)       | Brass   | Thermometer with quick-connect socket and plug |
| FC3-B-E      | 3/8"NPT(F)       | Brass   | Thermometer (standard)                         |
| FC3-B-M      | 3/8"NPT(F)       | Brass   | Thermometer (standard)                         |
| FC3-E-E      | 3/8"NPT(F)       | Brass   | Thermometer with quick-connect socket and plug |
| FC3-E-M      | 3/8"NPT(F)       | Brass   | Thermometer with quick-connect socket and plug |
| FCP2-B-E     | 1/4"NPT(F)       | Nylon   | Thermometer (standard)                         |
| FCP2-B-M     | 1/4"NPT(F)       | Nylon   | Thermometer (standard)                         |
| FCP2-E-E     | 1/4"NPT(F)       | Nylon   | Thermometer with quick-connect socket and plug |
| FCP2-E-M     | 1/4"NPT(F)       | Nylon   | Thermometer with quick-connect socket and plug |
| FCP3-B-E     | 3/8"NPT(F)       | Nylon   | Thermometer (standard)                         |
| FCP3-B-M     | 3/8"NPT(F)       | Nylon   | Thermometer (standard)                         |
| FCP3-E-E     | 3/8"NPT(F)       | Nylon   | Thermometer with quick-connect socket and plug |
| FCP3-E-M     | 3/8"NPT(F)       | Nylon   | Thermometer with quick-connect socket and plug |
| FCP3-E-E-10G | 3/8"NPT(F)       | Nylon   | Thermometer with quick-connect socket and plug |
| FC3-E-E-10G  | 3/8"NPT(F)       | Brass   | Thermometer with quick-connect socket and plug |



## Smartflow® ½" and 1" Hot Oil Flowmeters

### Features

- Stainless steel body with 1/2" NPT and Carbon steel body with 1" NPT
- Compact size works well in restricted-space locations
- Rugged construction provides years of dependable service
- Optional Temperature Gauge provides added function
- 550°F (288°C) Temperature Rating allows installation into high temperature applications
- 150psi (10.3bar) Pressure Rating satisfies most hot oil cooling pressure requirements
- Economical for use in many locations throughout the plant
- Line mounted for easy installation without extra brackets or hardware
- Stainless Steel Vane, Spring & Pin
- Non-Asbestos Fiber Gasket
- Made in the U.S.A.


**U** Inch


Max Mold Temperature: 550°F (288°C)

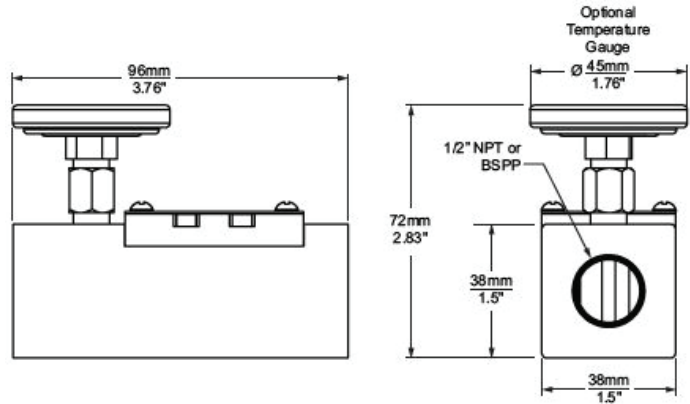
| Item Number | Inlet Size (NPT) | Temp. Gauge | Flow Range | Body Material   | Length          | Width          | Height         |
|-------------|------------------|-------------|------------|-----------------|-----------------|----------------|----------------|
| HF4-A-220   | 1/2"             | No          | 5-22 LPM   | Stainless Steel | 3.75" (95.3mm)  | 1.5" (38.1mm)  | 1.5" (38.1mm)  |
| HF4-A-60    | 1/2"             | No          | 2-6 GPM    | Stainless Steel | 3.75" (95.3mm)  | 1.5" (38.1mm)  | 1.5" (38.1mm)  |
| HF4-B-220   | 1/2"             | Yes         | 5-22 LPM   | Stainless Steel | 3.75" (95.3mm)  | 1.5" (38.1mm)  | 1.5" (38.1mm)  |
| HF4-B-60    | 1/2"             | Yes         | 2-6 GPM    | Stainless Steel | 3.75" (95.3mm)  | 1.5" (38.1mm)  | 1.5" (38.1mm)  |
| HF8-A-1500  | 1"               | No          | 20-150 LPM | Carbon Steel    | 4.75" (120.6mm) | 2.25" (57.2mm) | 2.25" (57.2mm) |
| HF8-A-40    | 1"               | No          | 5-40 GPM   | Carbon Steel    | 4.75" (120.6mm) | 2.25" (57.2mm) | 2.25" (57.2mm) |
| HF8-B-1500  | 1"               | Yes         | 20-150 LPM | Carbon Steel    | 4.75" (120.6mm) | 2.25" (57.2mm) | 2.25" (57.2mm) |
| HF8-B-40    | 1"               | Yes         | 5-40 GPM   | Carbon Steel    | 4.75" (120.6mm) | 2.25" (57.2mm) | 2.25" (57.2mm) |



## Smartflow® 1/2" Pressurized Hot Water Flowmeter

### Features

- Compact size works well in restricted-space locations
- Rugged construction provides years of dependable service.
- Optional Temperature Gauge provides added function
- 400°F (204°C) Temperature Rating allows installation into high temperature applications
- 250psi (17.2bar) Pressure Rating satisfies most pressurized water system requirements
- Economical for use in many locations throughout the plant
- Line mounted for easy installation without extra brackets or hardware
- Stainless Steel Flow Body, Vane, Spring & Pin
- Silicone Gasket
- Made in the U.S.A



**U** Inch



Max Mold Temperature: 400°F (204°C)

| Item Number | Inlet Size (NPT) | Temp Gauge | Flow Range |
|-------------|------------------|------------|------------|
| HWF4-A-60   | 1/2"             | No         | 2-6 GPM    |
| HWF4-B-60   | 1/2"             | Yes        | 2-6 GPM    |
| HWF4-A-220  | 1/2"             | No         | 5-22 LPM   |
| HWF4-B-220  | 1/2"             | Yes        | 5-22 LPM   |



## Smartflow® Mechanical Flowmeters

### Features

- Compact size works well in restricted-space locations.
- Rugged construction gives years of dependable service.
- Variety of inlet sizes provides exactly the right connection.
- 210°F (99°C) Temperature Rating allows installation into a wide range of applications.
- Optional Temperature and Pressure Gauges give instant access to pressure and temperature information in addition to flow in one unit.
- No Mounting Restrictions ease installation in any position without extra brackets or hardware

Smartflow mechanical flowmeters are durable, vane-operated devices that provide visual indication of flow rate in many different styles and sizes. Rugged wetted parts are compatible with many process liquids.

Optional temperature and pressure gauges add functionality and flexibility to Smartflow flowmeters. Brass quick-connect fittings are available on the smaller flowmeters to create an excellent, portable tool for determining flow and locating clogged lines. Galvanic corrosion may occur in anodized aluminum components when installed in electrical connection with more noble metals such as copper. Use appropriate installation practices.

For best performance, mechanical flowmeters should be installed in the vertical position with the flow moving upwards.



| Passage Diameter | Nominal Pipe Size | Minimum Flow in GPM by Temperature |       |       |
|------------------|-------------------|------------------------------------|-------|-------|
|                  |                   | 40°F                               | 120°F | 200°F |
| .44"             | 1/4"              | 0.88                               | 0.31  | 0.18  |
| .59"             | 3/8"              | 1.16                               | 0.42  | 0.24  |
| .72"             | 1/2"              | 1.41                               | 0.51  | 0.29  |
| Passage Diameter | Nominal Pipe Size | Minimum Flow in LPM by Temperature |       |       |
|                  |                   | 4°C                                | 49°C  | 93°C  |
| 11mm             | 1/4"              | 3.3                                | 1.2   | 0.7   |
| 15mm             | 3/8"              | 4.4                                | 1.6   | 0.9   |
| 18mm             | 1/2"              | 5.3                                | 1.9   | 1.1   |



# Smartflow® IceCube™ Flowmeters with Brass or Nylon Ends

| Item Number | F3   | - | D3 | - | 25                                                                                    |
|-------------|------|---|----|---|---------------------------------------------------------------------------------------|
| Example     |      |   |    |   |                                                                                       |
| Inlet       |      |   |    |   | Flow Range                                                                            |
| Size        |      |   |    |   | 15 0.2 - 1.5 gpm (gallons/minute)                                                     |
| Brass Ends  |      |   |    |   | 25 0.5 - 2.5 gpm                                                                      |
| 1/4"NPT     | F2   |   |    |   | 80 1.0 - 8.0 gpm                                                                      |
| 1/4"BSPP    | F2B  |   |    |   |                                                                                       |
| 3/8"NPT     | F3   |   |    |   | 100 2 - 10 lpm (liters/wminute)                                                       |
| 3/8"BSPP    | F3B  |   |    |   | 200 5 - 20 lpm                                                                        |
| 1/2"NPT     | F4   |   |    |   | 300 4 - 30 lpm                                                                        |
| 1/2"BSPP    | F4B  |   |    |   |                                                                                       |
| 3/4"NPT     | F6   |   |    |   |                                                                                       |
| 3/4"BSPP    | F6B  |   |    |   |                                                                                       |
| Nylon Ends  |      |   |    |   | Accessories                                                                           |
| 1/4"NPT     | FP2  |   |    |   | A Flowmeter only                                                                      |
| 1/4"BSPP    | FP2B |   |    |   | B Thermometer                                                                         |
| 3/8"NPT     | FP3  |   |    |   | C1 Thermometer and 30 psi Pressure Gauge                                              |
| 3/8"BSPP    | FP3B |   |    |   | C2 Thermometer and 60 psi Pressure Gauge                                              |
| 1/2"NPT     | FP4  |   |    |   | C3 Thermometer and 100 psi Pressure Gauge                                             |
| 1/2"BSPP    | FP4B |   |    |   | CL Thermometer and Liquid-Filled Pressure Gauge (100 psi)                             |
|             |      |   |    |   | D1 *Thermometer, 30 psi Pressure Gauge, Quick Change Socket and Plug                  |
|             |      |   |    |   | D2 *Thermometer, 60 psi Pressure Gauge, Quick Change Socket and Plug                  |
|             |      |   |    |   | D3 *Thermometer, 100 psi Pressure Gauge, Quick Change Socket and Plug                 |
|             |      |   |    |   | DL *Thermometer, Liquid-Filled Pressure Gauge (100 psi), Quick Change Socket and Plug |
|             |      |   |    |   | E *Thermometer, Quick Change Socket and Plug                                          |
|             |      |   |    |   | F1 30 psi Pressure Gauge                                                              |
|             |      |   |    |   | F2 60 psi Pressure Gauge                                                              |
|             |      |   |    |   | F3 100 psi Pressure Gauge                                                             |
|             |      |   |    |   | FL Liquid-Filled Pressure Gauge (100 psi)                                             |

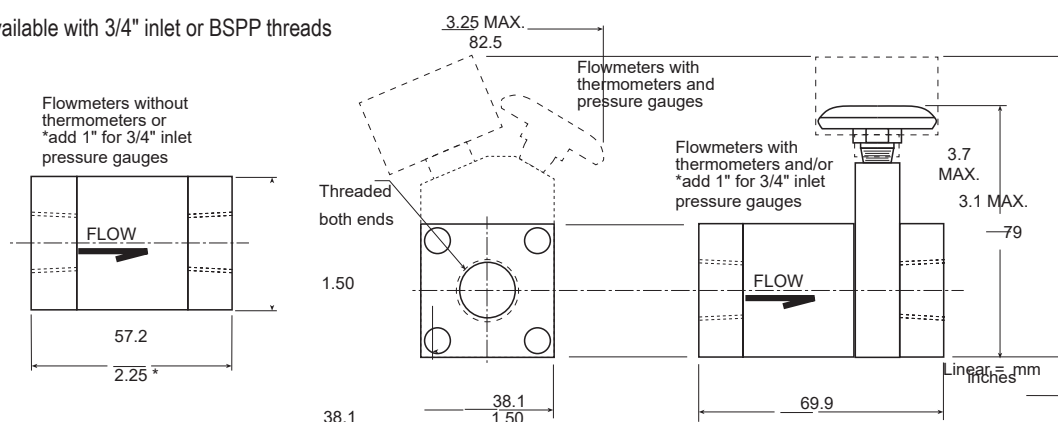
\*Not available with 3/4" inlet or BSPP threads

## Wetted Parts and Materials

|                                      |                             |
|--------------------------------------|-----------------------------|
| End Caps.....                        | Brass or Glass-Filled Nylon |
| Body.....                            | Polysulfone                 |
| Vane.....                            | Glass-Filled Nylon          |
| Spring.....                          | Stainless Steel             |
| O-Rings.....                         | EPDM                        |
| Cap Screws.....                      | Stainless Steel             |
| Optional Gauge Block.....            | Brass                       |
| Optional Quick-Connect Fittings..... | Brass                       |

## Specifications

|                                                     |                            |
|-----------------------------------------------------|----------------------------|
| Flow Accuracy.....                                  | ±10% full scale            |
| Operating Temperature max.....                      | 210°F (99°C)               |
| Operating Pressure max.....                         | 100 psi (6.9 bar)          |
| Optional Thermometer.....                           | 0 to 250°F (-20° to 120°C) |
|                                                     | ±2% accuracy (full scale)  |
| Optional Pressure Gauge...±3% accuracy (full scale) |                            |



# Smartflow® Medium Mechanical Flowmeters

Item Number

Example

F6 - B - 20

Flow Range  
20 2 - 20 gpm, 75 lpm

Inlet Size

3/4"NPT

F6

3/4"BSPP

F6B

1"NPT

F8

1"BSPP

F8B

F8B

## Accessories

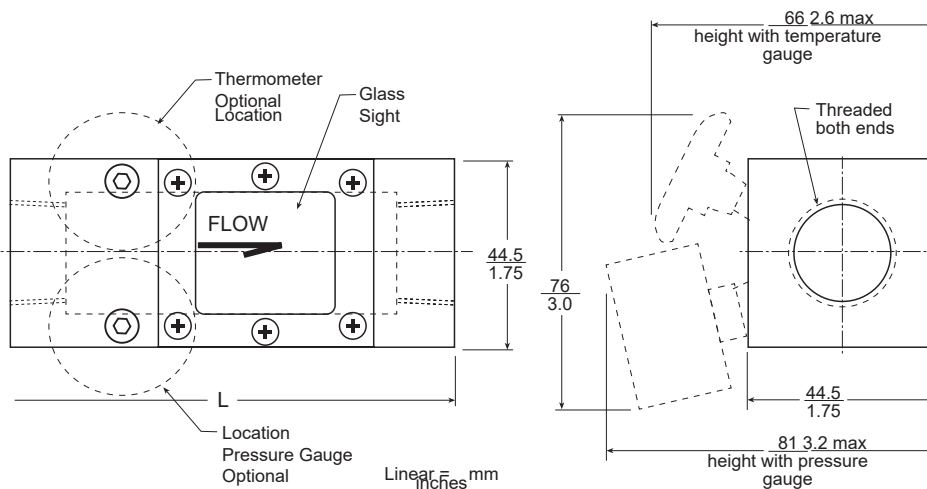
- A Flowmeter only
- B Thermometer
- C1 Thermometer and 30 psi Pressure Gauge
- C2 Thermometer and 60 psi Pressure Gauge
- C3 Thermometer and 100 psi Pressure Gauge
- CL Thermometer and Liquid-Filled Pressure Gauge (100 psi)
- F1 30 psi Pressure Gauge
- F2 60 psi Pressure Gauge
- F3 100 psi Pressure Gauge
- FL Liquid-Filled Pressure Gauge (100 psi)

## Wetted Parts and Materials

|                   |                   |
|-------------------|-------------------|
| Body.....         | Anodized Aluminum |
| Sight Glass ..... | Polysulfone       |
| Vane. ....        | Stainless Steel   |
| Spring .....      | Stainless Steel   |
| Pin .....         | Stainless Steel   |
| Gasket .....      | Neoprene          |

## Specifications

|                                 |                               |
|---------------------------------|-------------------------------|
| Flow Accuracy .....             | ±10% full scale               |
| Operating Temperature max. .... | 210°F (99°C)                  |
| Operating Pressure max. ....    | 100 psi (6.9 bar)             |
| Optional Thermometer .....      | 0 to 250°F<br>(-20° to 120°C) |
|                                 | ±2% accuracy (full scale)     |
| Optional Pressure Gauge .....   | ±3% accuracy<br>(full scale)  |



| Dimension Chart |           |       |
|-----------------|-----------|-------|
| Dim.            | Body Size |       |
|                 | 3/4"      | 1"    |
| L               | 105       | 111   |
|                 | 4.125     | 4.375 |



# Smartflow® Large Mechanical Flowmeters

| Item Number                                            | F8 - | B  | - 40 |
|--------------------------------------------------------|------|----|------|
| Example                                                |      |    |      |
| Inlet Size                                             |      |    | 40   |
| 1"NPT                                                  | F8   |    |      |
| 1"BSPP                                                 | F8B  |    |      |
| 1-1/4"NPT                                              | F10  |    | 100  |
| 1-1/2"NPT                                              | F12  |    |      |
| 1-1/2"BSPP                                             | F12B |    | 150G |
| 2"NPT                                                  | F16  |    |      |
| 2"BSPP                                                 | F16B |    | 150  |
| 3"NPT                                                  | F24  |    | 375  |
| Accessories                                            |      |    |      |
| Flowmeter only                                         |      | A  |      |
| Thermometer                                            |      | B  |      |
| Thermometer and 30 psi Pressure Gauge                  |      | C1 |      |
| Thermometer and 60 psi Pressure Gauge                  |      | C2 |      |
| Thermometer and 100 psi Pressure Gauge                 |      | C3 |      |
| Thermometer and Liquid-Filled Pressure Gauge (100 psi) |      | CL |      |
| 30 psi Pressure Gauge                                  |      | F1 |      |
| 60 psi Pressure Gauge                                  |      | F2 |      |
| 100 psi Pressure Gauge                                 |      | F3 |      |
| Liquid-Filled Pressure Gauge (100 psi)                 |      | FL |      |

Flow Range  
2.5 - 40 gpm (excludes 3" inlet)  
10 - 100 gpm (1-1/2" or 2" inlets only)  
10 - 150 gpm (2" or 3" inlets only)  
19 - 150 lpm (excludes 3" inlet)  
38 - 375 lpm (1-1/2" or 2" inlets only)

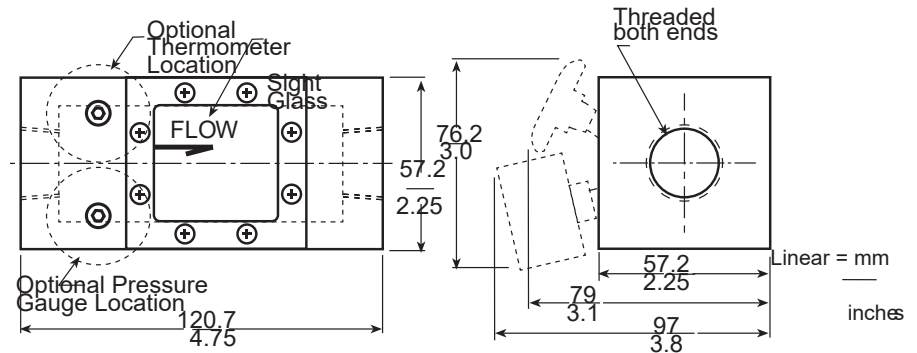
## Wetted Parts and Materials

Body..... Anodized Aluminum  
Sight Glass ..... Polysulfone  
Vane ..... Stainless Steel  
Spring ..... Stainless Steel  
Pin ..... Stainless Steel  
Gasket ..... Neoprene

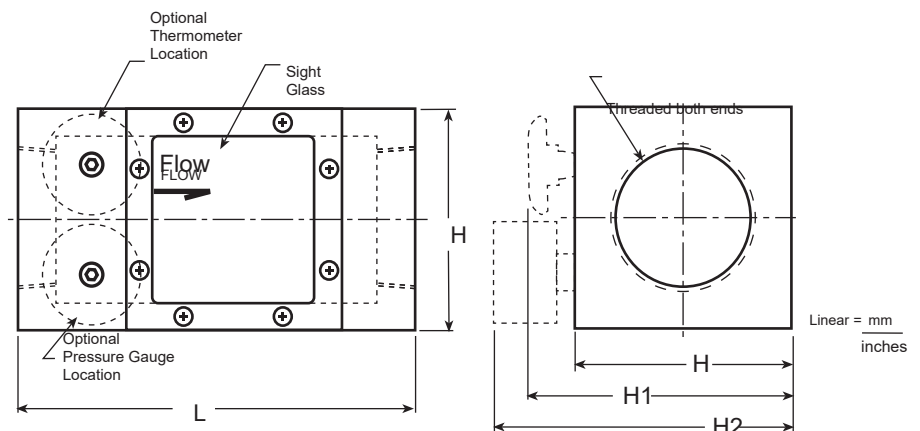
## Specifications

Flow Accuracy ..... ±10% full scale  
Operating Temperature max. .... 210°F (99°C)  
Operating Pressure max..... 100 psi (6.9 bar)  
Optional Thermometer ..... 0 to 250°F (-20° to 120°C)  
Optional Pressure Gauge..... ±2% accuracy (full scale)  
Optional Pressure Gauge..... ±3% accuracy (full scale)

1" and 1-1/4" Flowmeters 40 gpm & 150 lpm



1-1/2", 2" & 3" Flowmeters 40, 100 & 150 gpm, 150 & 375 lpm



| Dimension Chart |              |       |
|-----------------|--------------|-------|
| Dim.            | Body Size    |       |
|                 | 1-1/2" or 2" | 3"    |
| L               | 139.7        | 165.1 |
|                 | 5.5          | 6.5   |
| H               | 76.2         | 101.6 |
|                 | 3.0          | 4.0   |
| H <sub>1</sub>  | 99           | 124.5 |
|                 | 3.9          | 4.9   |
| H <sub>2</sub>  | 114          | 139.7 |
|                 | 4.5          | 5.5   |



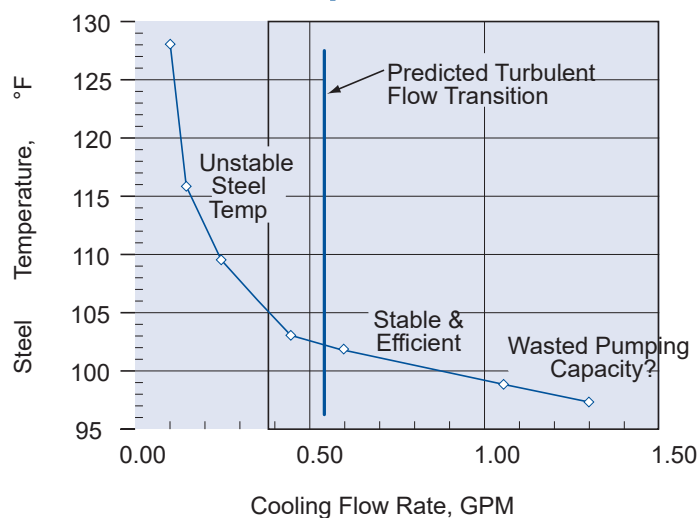
## Smartflow® Flow Regulators

### Features

- **Create Repeatable and Balanced Processes**  
Multiple circuits within an injection mold often have different cooling requirements. Cooling water will normally follow the path of least resistance leaving some circuits starved for water in manifolds without regulators. Individual circuit control allows the operator to direct the process cooling water where needed to produce repeatable finished part quality
- **Optimize Cooling Capacity**  
By applying the principles of Turbulent Flow, cooling circuits can be optimized for efficient cooling, conserving water and electricity. Additional water flow rate beyond turbulent flow condition provides diminishing returns illustrated by the chart below



### Steel Temperature vs. Flow



## Smartflow® Precision Brass Flow Regulators

### Features

- Compact size works well in restricted-space locations.
- Rugged construction provides years of dependable service.
- 210°F (99°C) Temperature Rating allows installation into a wide range of applications.
- Optional Temperature Gauge displays additional process information.
- No Mounting Restrictions ease installation in any position without extra brackets or hardware.

Smartflow® flow regulators provide a unique, leak-free, single-point manual flow control. This regulator incorporates the proven mechanical flowmeter and integral needle valve in a compact design. Very few moving parts improve reliability and leak-free operation.

Used singly or in combination with a water manifold, the flow regulator allows manual control of individual cooling water lines.



| Item Number | FR3  | - B - | 25                                                                                     |
|-------------|------|-------|----------------------------------------------------------------------------------------|
| Example     |      |       |                                                                                        |
| Inlet Size  |      |       | Flow Range 15 0.2 - 1.5 gpm<br>(gallons per minute) 25 0.5 - 2.5 gpm<br>80 1 - 8.0 gpm |
| 1/4"NPT(F)  | FR2  |       |                                                                                        |
| 1/4"BSPP(F) | FR2B |       |                                                                                        |
| 3/8"NPT(F)  | FR3  |       |                                                                                        |
| 3/8"BSPP(F) | FR3B |       | 100 2 - 10 lpm (liters per min.) 200                                                   |
| 1/2"NPT(F)  | FR4  |       | 5 - 20 lpm 300 4 - 30 lpm                                                              |
| 1/2"BSPP(F) | FR4B |       |                                                                                        |

#### Accessories

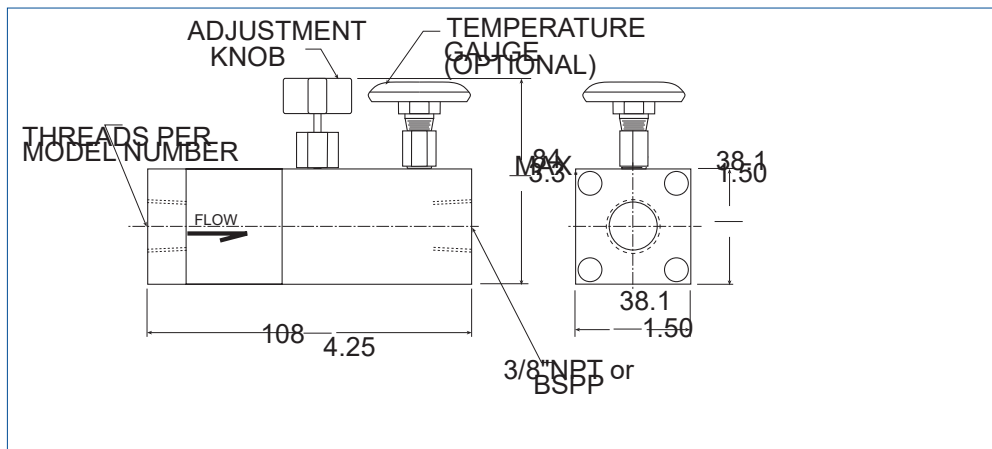
- A Flow regulator only
- B Thermometer
- E Thermometer and Quick Change Socket and Plug (NPT only)

### Wetted Parts and Materials

|                                 |                  |
|---------------------------------|------------------|
| Flow Out Thread Size            | 3/8"NPT or BSPP  |
| End Caps & Regulator Body       | Brass            |
| Valve Stem & Seat               | Brass            |
| Flow Body                       | Polysulfone-Vane |
| Spring                          | Nylon            |
| O-Rings                         | Stainless Steel  |
| Cap Screws                      | EPDM             |
| Optional Quick-Connect Fittings | Stainless Steel  |
|                                 | Brass            |

### Specifications

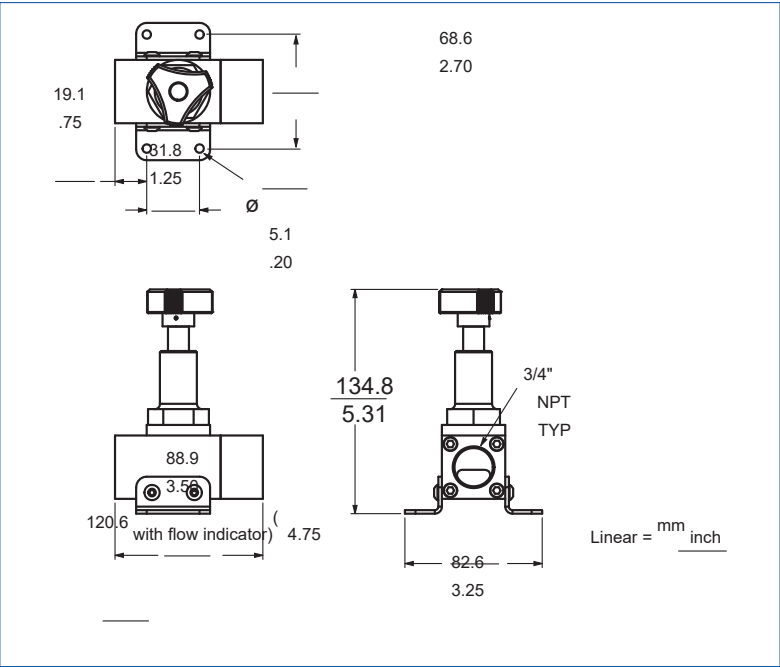
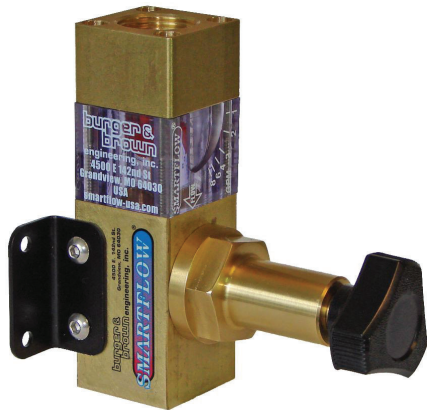
|                            |                             |
|----------------------------|-----------------------------|
| Flow Accuracy              | ±10% full scale             |
| Operating Temperature max. | 210°F (99°C)                |
| Operating Pressure max.    | 100 psi (6.9 bar)           |
| Dial Thermometer           | 0° to 250°F (-20° to 120°C) |
|                            | ±2% accuracy (full scale)   |



# Smartflow® 3/4" Brass Flow Regulators

## Features

The large size of this flow regulator is unique in the industry for precise control of 3/4" cooling water lines. Brass body, valve stem and seat with EPDM o-rings are compatible with most process liquids. The flow regulator can be used in combination with a 3/4" mechanical flow meter to add flow, temperature or pressure indication. IceCube™ flow body with 8 gpm or 30 lpm scale may be added to dis-



- Body .....Brass
- Valve Stem & Seat.....Brass
- O-Rings .....EPDM
- Cap Screws .....Stainless Steel
- Mounting Brackets .....Powder Coated Steel
- Optional Flow Indicator Parts
- Flow Body .....Polysulfone
- Vane .....Nylon
- Spring .....Stainless Steel

## Specifications

- Thread Size .....3/4"NPT(F)
- Operating Temperature max. ....240°F(115°C)
- Operating Pressure max. ....150 psi (10.3 bar)

**U** Inches



Max Mold Temperature: 240°F (115°C)

| Item Number | Inlet Size | Flow Range             |
|-------------|------------|------------------------|
| FR6-A-80    | 3/4" NPT   | 1-8 Gallons Per Minute |
| FR6-A-300   | 3/4" NPT   | 4-30 Liters Per Minute |



Smartflow® 1" Brass Flow Regulators

Features

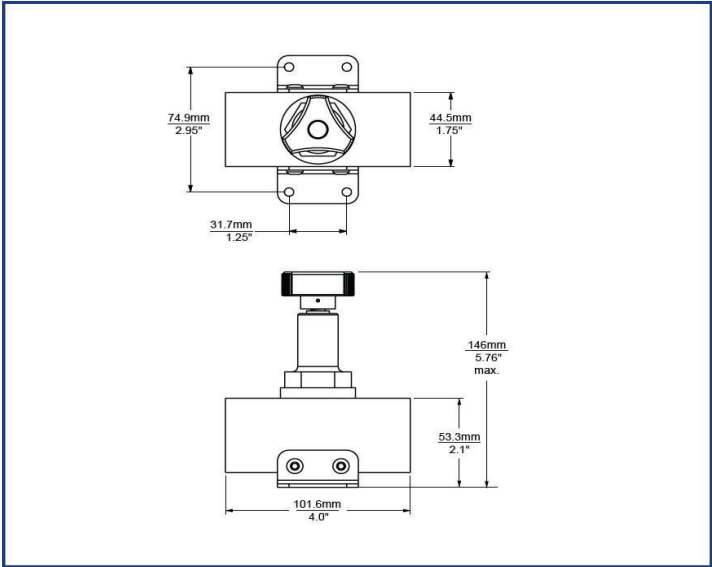
The large size of this manual flow regulator is unique in the industry for precise control of 1" cooling water lines. Brass body, valve stem and seat with EPDM o-rings are compatible with most process liquids. The flow regulator can be used in combination with a 1" electronic or mechanical flow meter to add flow, temperature or pressure indication.

Mounting Brackets are included for mechanical support.

1" Mechanical Flowmeters and Tracer Electronic Flowmeters can be attached to this flow regulator for added functionality.



- Body ..... Brass
- Valve Stem & Seat ..... Brass
- O-Rings..... EPDM
- Mounting Brackets..... Powder-Coated Steel
- Connection Size..... 1"NPT(F)
- Operating Temperature max. .... 240°F(115°C)
- Operating Pressure max. .... 150psi(10.3bar)



**U** Inches



Max Mold Temperature: 240°F (115°C)

| Item Number | Inlet Size |
|-------------|------------|
| FR8-A       | 1" NPT     |



Delta-Q® Precision Flow Regulator Only

Features

The Delta-Q Regulator allows full adjustability of flow volume from unrestricted flow to complete shut off using the manual flow control knob.

The modular design allows users to customize models meeting Scientific Cooling requirements for each application. The glassfilled nylon body is lightweight and durable. Internal stainless steel components are resistant to corrosion.



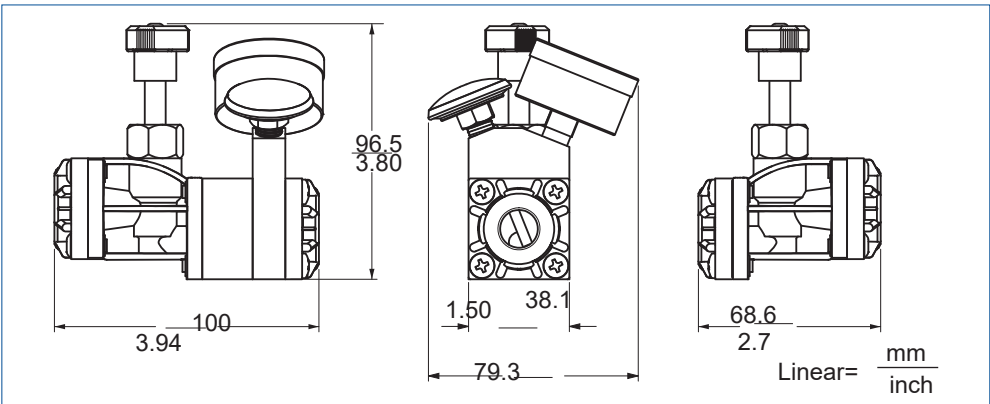
| Item Number    | F3 - A - Q |  |    |                                                        |
|----------------|------------|--|----|--------------------------------------------------------|
| Example        |            |  |    |                                                        |
| Brass End Caps |            |  | A  | Accessories                                            |
| 1/4"NPT(F)     | F2         |  | B  | Regulator only                                         |
| 1/4"BSPP(F)    | F2B        |  | C1 | Thermometer                                            |
| 3/8"NPT(F)     | F3         |  |    | Thermometer and 30 psi Pressure Gauge                  |
| 3/8"BSPP(F)    | F3B        |  | C2 | Thermometer and 60 psi Pressure Gauge                  |
| 1/2"NPT(F)     | F4         |  |    | Thermometer and 100 psi Pressure Gauge                 |
| 1/2"BSPP(F)    | F4B        |  | C3 | Thermometer and liquid-filled Pressure Gauge (100 psi) |
| Nylon End Caps |            |  | CL |                                                        |
| 1/4"NPT(F)     | FP2        |  | F1 | 30 psi Pressure gauge                                  |
| 1/4"BSPP(F)    | FP2B       |  | F2 | 60 psi Pressure gauge                                  |
| 3/8"NPT(F)     | FP3        |  | F3 | 100 psi Pressure gauge                                 |
| 3/8"BSPP(F)    | FP3B       |  | FL | Liquid-filled Pressure Gauge (100 psi)                 |
| 1/2"NPT(F)     | FP4        |  |    |                                                        |
| 1/2"BSPP(F)    | FP4B       |  |    |                                                        |

Wetted Parts and Materials

|                                 |                             |
|---------------------------------|-----------------------------|
| End Caps                        | Brass or Glass-Filled Nylon |
| Body                            | Glass-Filled Nylon          |
| O-Rings                         | EPDM                        |
| Regulator Stem                  | Stainless Steel             |
| Cap Screws                      | Stainless Steel             |
| Optional Gauge Block            | Brass                       |
| Optional Quick-Connect Fittings | Brass                       |

Specifications

|                            |                                                          |
|----------------------------|----------------------------------------------------------|
| Operating Temperature max. | 210°F (99°C)                                             |
| Operating Pressure max.    | 100 psi (6.9 bar)                                        |
| Dial Thermometer           | 0° to 250°F (-20° to 120°C)<br>±2% accuracy (full scale) |
| Pressure Gauge             | 0 to 100 psi (0 to 700 Kpa)<br>±3% accuracy (full scale) |



## Delta-Q® Precision Flow Regulators with 3/8" Tracer® Electronic

## Model Number

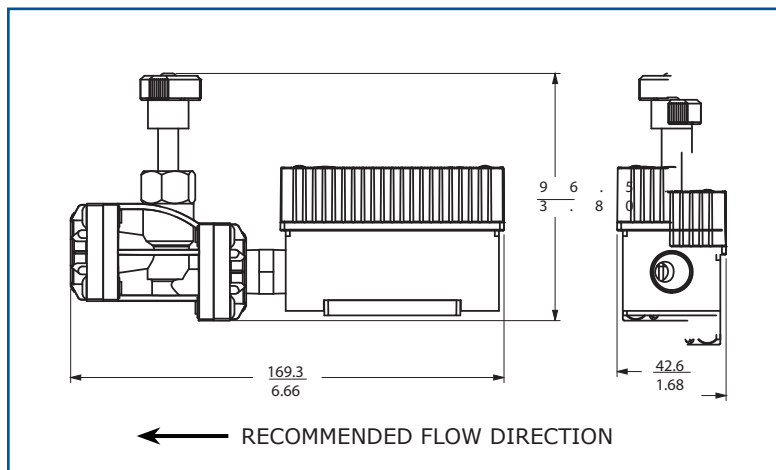
| DD - 3B - Q |      |    |                                |
|-------------|------|----|--------------------------------|
| Thread Size |      |    | Delta-Q<br>End Cap<br>Material |
| 3/8"NPT(F)  | 3B   | Q  | Brass                          |
| 3/8"BSPP(F) | 3B-B | QP | Nylon                          |

Delta-Q Flow Regulator can be used with 3/8" Tracer electronic flowmeters.

- DD- 3.6V Battery-Powered
- Flow Rate Display
  - Temperature Display
  - BTU's/Minute Display
  - Turbulent Flow Condition (with optional glycol % input)



DD-3B-QP



## Wetted Parts and Materials

|                           |                             |
|---------------------------|-----------------------------|
| Flowmeter Body .....      | Nickel-Plated Brass         |
| Impeller .....            | Nylon                       |
| Impeller Shaft .....      | Stainless Steel             |
| Magnet .....              | Neodymium                   |
| Back Cover .....          | Polysulfone                 |
| Flow Regulator Body ..... | Glass-Filled Nylon          |
| Stem & Valve .....        | Stainless Steel             |
| O-Ring .....              | EPDM                        |
| End Cap .....             | Brass or Glass-Filled Nylon |

## Specifications

|                                 |                                     |
|---------------------------------|-------------------------------------|
| Flow Accuracy .....             | ±5% of full scale                   |
| Flow Repeatability .....        | ±3% of full scale                   |
| Temperature Accuracy .....      | ±2% of display                      |
| Temperature Repeatability ..... | ±1% of display                      |
| Operating Temperature .....     | 180°F<br>max.<br>(82°C<br>max.)     |
| Operating Pressure .....        | 150 psi max.<br><br>(10.3 bar max.) |
| Power .....                     | 3.6VDC Battery<br>(included)        |



# Delta-Q® Precision Flow Regulator with IceCube™ Flowmeter

Item Number  
Example

F3 - A - 25 - Q

Brass End  
Caps

1/4"NPT(F)

F2

1/4"BSPP(F)

F2B

3/8"NPT(F)

F3

3/8"BSPP(F)

F3B

1/2"NPT(F)

F4

1/2"BSPP(F)

F4B

Nylon End  
Caps

1/4"NPT(F)

FP2

1/4"BSPP(F)

FP2B

3/8"NPT(F)

FP3

3/8"BSPP(F)

FP3B

1/2"NPT(F)

FP4

1/2"BSPP(F)

FP4B

Accessories

Flow body only

A

Thermometer

B

Thermometer and 30 psi  
Pressure Gauge

C1

Thermometer and 60 psi  
Pressure Gauge

C2

Thermometer and 100 psi  
Pressure Gauge

C3

Liquid-Filled Pressure  
Gauge (100 psi)

CL

Thermometer and  
quick change socket  
and plug

E

30 psi Pressure gauge

F1

60 psi Pressure gauge

F2

100 psi Pressure gauge

F3

Liquid-Filled Pressure  
Gauge (100 psi)

FL

Flow Range

15

0.2 - 1.5 gpm (gallons  
per minute)

25

0.5 - 2.5 gpm

80

1 - 8.0 gpm

100

2 - 10 lpm  
(liters per minute)

200

5 - 20 lpm

300

4 - 30 lpm

## Wetted Parts and Materials

End Caps ..Brass or Glass-Filled Nylon

Flow Body .....Polysulfone

Regulator Body .....Glass-Filled Nylon

Vane .....Glass-Filled Nylon

Spring .....Stainless Steel

O-Rings.....EPDM

Optional Gauge Block .....Brass

Optional Quick-Connect Fittings ..Brass

## Specifications

Flow Accuracy .....±10% full scale

Operating Temperature max. ....210°F

(99°C)

Operating Pressure max. ....100 psi

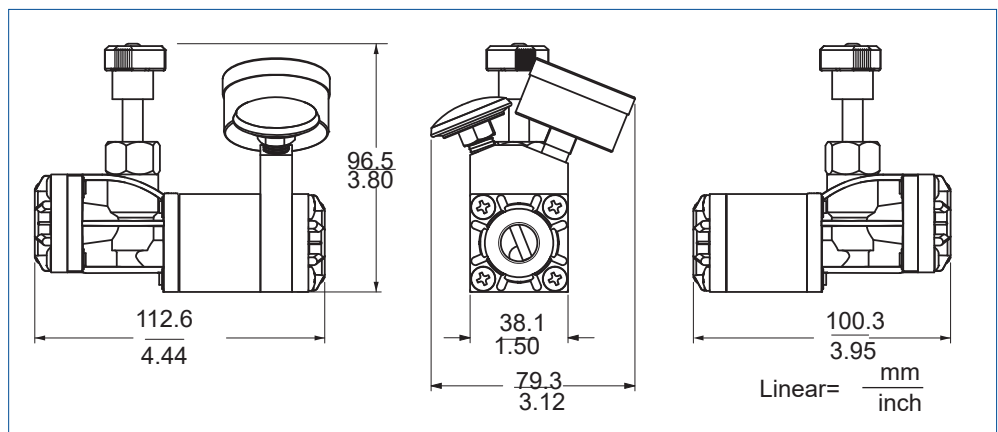
(6.9 bar)

Dial Thermometer .....0° to 250°F

(-20° to 120°C) ±2% accuracy (full scale)

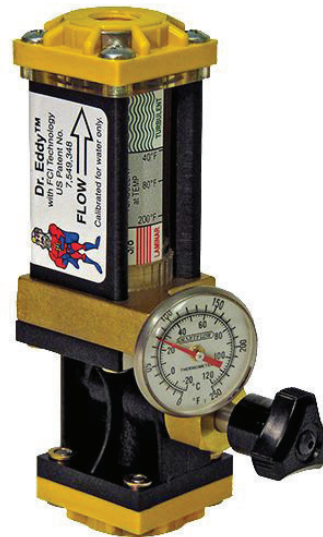
Pressure Gauge .....0 to 100 psi (0  
to 700 Kpa)

±3% accuracy (full scale)



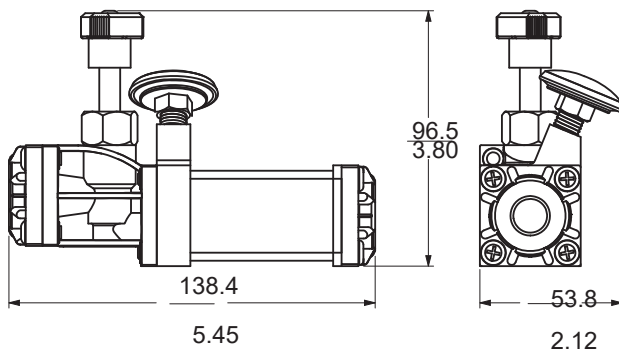
## Delta-Q® Precision Flow Regulator with Dr. Eddy Turbulent Flow Indicator

|                                                |                 |   |   |                                                                                                        |
|------------------------------------------------|-----------------|---|---|--------------------------------------------------------------------------------------------------------|
| Item Number                                    | FC3 - B - E - Q |   |   |                                                                                                        |
| Example                                        |                 |   |   |                                                                                                        |
| Brass End Caps                                 |                 |   |   |                                                                                                        |
| Inlet Size                                     |                 |   |   |                                                                                                        |
| 1/4"NPT(F)                                     | FC2             |   |   |                                                                                                        |
| 1/4"BSPP(F)                                    | FC2B            |   |   |                                                                                                        |
| 3/8"NPT(F)                                     | FC3             |   |   |                                                                                                        |
| 3/8"BSPP(F)                                    | FC3B            |   |   |                                                                                                        |
| Nylon End Caps Inlet Size                      |                 |   |   |                                                                                                        |
| 1/4"NPT(F)                                     | FCP2            |   |   |                                                                                                        |
| 1/4"BSPP(F)                                    | FCP2B           |   | E |                                                                                                        |
| 3/8"NPT(F)                                     | FCP3            |   |   |                                                                                                        |
| 3/8"BSPP(F)                                    | FCP3B           |   | M |                                                                                                        |
| Accessories                                    |                 |   |   |                                                                                                        |
| Thermometer (standard)                         |                 | B |   |                                                                                                        |
| Thermometer with quick-connect socket and plug |                 | E |   |                                                                                                        |
|                                                |                 |   |   | Scale Units<br>English<br>(Temp in °F and<br>Flow in GPM)<br>Metric<br>(Temp in °C and<br>Flow in LPM) |



### Wetted Parts and Materials

|                                 |                             |
|---------------------------------|-----------------------------|
| End Caps                        | Brass or Glass-Filled Nylon |
| Regulator Body                  | Glass-Filled Nylon          |
| Flow Body                       | Polysulfone                 |
| Indicator Ring                  | Silicone Rubber             |
| Piston                          | Acetal                      |
| Spring                          | Stainless Steel             |
| O-Rings                         | EPDM                        |
| Gauge Block                     | Brass                       |
| Optional Quick-Connect Fittings | Brass                       |



1 - 8 lpm

|                            |                                                          |
|----------------------------|----------------------------------------------------------|
| Accuracy                   | ±10% full scale                                          |
| Operating Temperature max. | 210°F (99°C)                                             |
| Operating Pressure max.    | 100 psi (6.9 bar)                                        |
| Dial Thermometer           | 0° to 250°F (-20° to 120°C)<br>±2% accuracy (full scale) |

### Specifications

Flow Range.....0.25 - 2 gpm  
Dr. Eddy is calibrated for use with water only. A 10% glycol scale is available on request.

The addition of glycol to cooling water can have a dramatic effect on Turbulent Flow, increasing the flow rate needed to achieve optimum cooling efficiency.



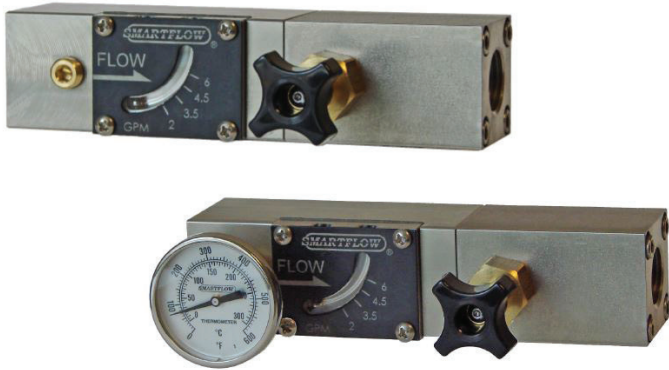
# Smartflow® High Pressure and Temperature Stainless Steel Flow Regulators

**Features**

Smartflow High Pressure and Temperature Stainless Steel Flow Regulators are designed for use in hot water or oil cooling systems up to 400°F (204°C) and 250 psi (17 bar).

These regulators are ideal for connection to temperature control units in an injection molding environment. 1/2"NPT(F) threaded ends are standard. Temperature Gauge is optional.

Stainless steel valve seat and high temperature seals provide long, trouble-free service.



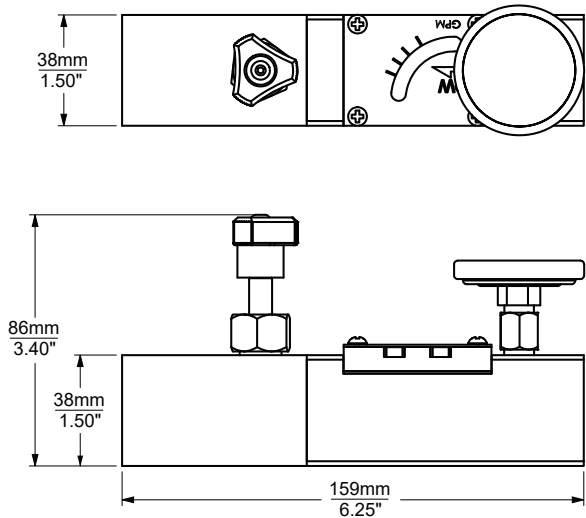
|                        |               |    |                                               |
|------------------------|---------------|----|-----------------------------------------------|
| Item Number            | HFR4 - A - 60 |    |                                               |
| Example                |               |    |                                               |
| Temperature Gauge      |               |    | Flow Range                                    |
| No Temperature Gauge   | A             | 60 | 2 - 6 gpm (gallons per minute) 220 5 - 22 lpm |
| With Temperature Gauge | B             |    | (liters per minute)                           |

Wetted Parts and Materials

|                |                     |
|----------------|---------------------|
| Body           | Stainless Steel     |
| Viewing Window | Glass               |
| Vane           | Stainless Steel     |
| Spring         | Stainless Steel     |
| Hinge Pin      | Stainless Steel     |
| Gasket         | Non-Asbestos Fiber  |
| Magnet         | Sintered Alnico 8GE |
| O-Rings        | Viton               |

Specifications

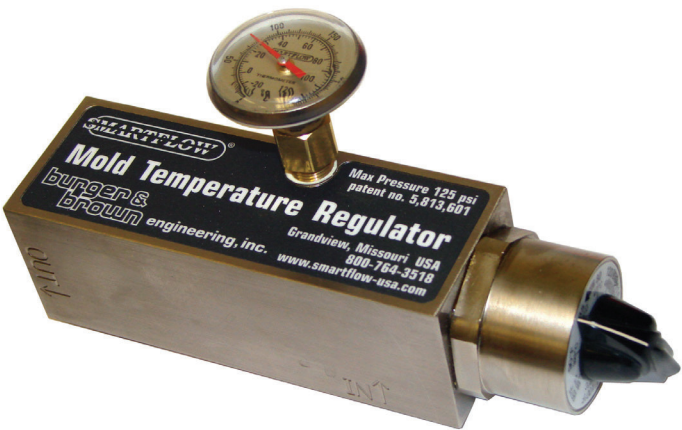
|                             |                            |
|-----------------------------|----------------------------|
| Accuracy.....               | ±10% full scale            |
| Operating Temperature max.  | .....400°F (204°C)         |
| Operating Pressure max..... | 250 psi (17.2 bar)         |
| Dial Thermometer            | 0 to 600°F (-20° to 300°C) |



Smartflow® Mold Temperature Regulators

Features

- Multiple zone control - using several regulators or an optional inlet manifold facilitates effective zone control
- Unaffected by pressure changes - the Mold Temperature Regulator uses the thermal expansion principle for operation.
- Handles tower water temperature changes - modulates flow to control cooling water temperature.
- In-Line mounting - installs easily without additional hardware.
- Cost of ownership - typically 1/6 the cost of a conventional electric mold heater.
- Maintenance free - few internal parts for trouble-free operation.
- Energy saving - it uses no electricity, conserving precious energy dollars.
- Small size - cleans up shop floor clutter: no hoses or power cords to trip over.
- Integral dial thermometer - verifies Set Point temperature.
- Optional inlet manifold - provides temperature control for multiple zones with one regulator.



Specifications

Physical

Material.....All wetted parts are  
Electroless Nickel-Plated Brass &  
Stainless Steel

O-Rings .....Buna-N

Inlet Size .....1/4" NPT(F)

Outlet Size.....1/2" NPT(F)

Maximum Pressure .....125 psi (8.6 bar)

Weight .....3 lbs (1.5 kg)

Operating

Regulator

Cooling water set point range .....80° to 120°F (27° to 49°C)

Accuracy .....±1°F Full Scale

Flow capacity .....5 to 25 gallons (19 to 95 liters) per hour Regulator operation is more accurate than dial thermometer.

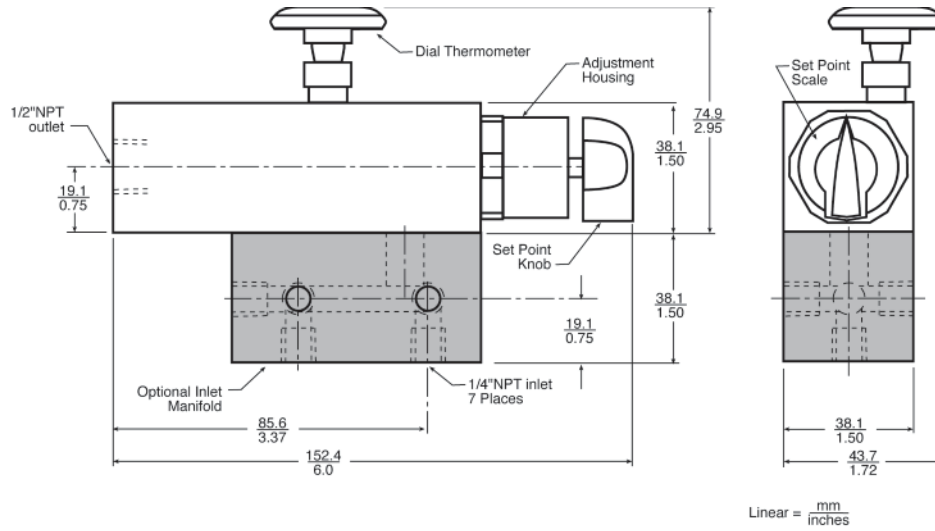
Dial Thermometer

Range.....0 to 250°F (-18 to 121°C)

Accuracy .....±1°F Mid Scale ±2°F Full Scale



# Smartflow® Mold Temperature Regulators (Cont'd)



**U** Inch



Max Mold Temperature: 120°F (49°C)

| Item Number              | Inlet                      | Outlet                  |
|--------------------------|----------------------------|-------------------------|
| WDT2-N2-N4               | 1/4"NPT(F)                 | 1/2"NPT(F)              |
| WDT2-S2-P2               | 1/4" Quick Connect Socket  | 1/4" Quick Connect Plug |
| WDT2-S3-P3               | 3/8" Quick Connect Socket  | 3/8" Quick Connect Plug |
| WDT2-N2-N4-M             | 1/4"NPT(F) 7 port Manifold | 1/2"NPT(F)              |
| WDMF-100 (manifold only) | 1/4"NPT(F) 7 port          |                         |



## High Temperature Low Flow Indicator

### Features

Bi-Directional - flow indicator works with flow from either direction simplifying installation.

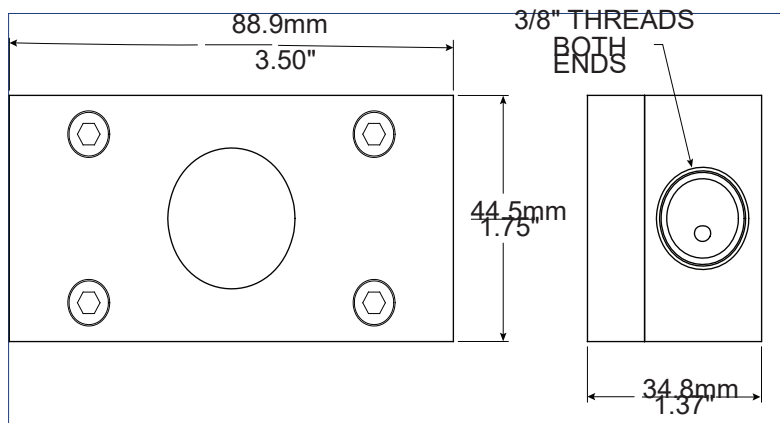
204°C (400°F) Temperature Rating allows installation into high temperature applications.

17.2bar (250psi) Pressure Rating satisfies most pressurized water system requirements.

Economical for use in many locations throughout the plant.

Smartflow High Temperature Flow Indicators are designed to show the presence of flow in very low flow applications. This high temperature indicator comprises high-visibility impeller and robust flow body designed for punishing duty.

High Temperature, Low Flow Indicators are ideal for use in critical injection mold cooling circuits such as bubblers or baffles where flow is restricted and effective cooling is essential.



**U** Inch Max Mold Temperature: 400°F (204°C)

| Item Number | Inlet Size |
|-------------|------------|
| HLFI3-A-40  | 3/8"NPT    |
| HLFI3B-A-40 | 3/8"BSPP   |

Flow Body - Stainless Steel  
Viewing Window - High Temperature Glass  
Impeller - High Temperature Polymer  
Shaft - Stainless Steel  
Pin - Stainless Steel  
O-Ring - PTFE  
Threaded Connections - 3/8"NPT or BSPP  
Operating Temperature max. - 204°C (400°F)  
Operating Pressure max. - 17.2bar (250psi)  
Flow Range - 0.3 - 4 LPM (0.08 - 1 GPM)



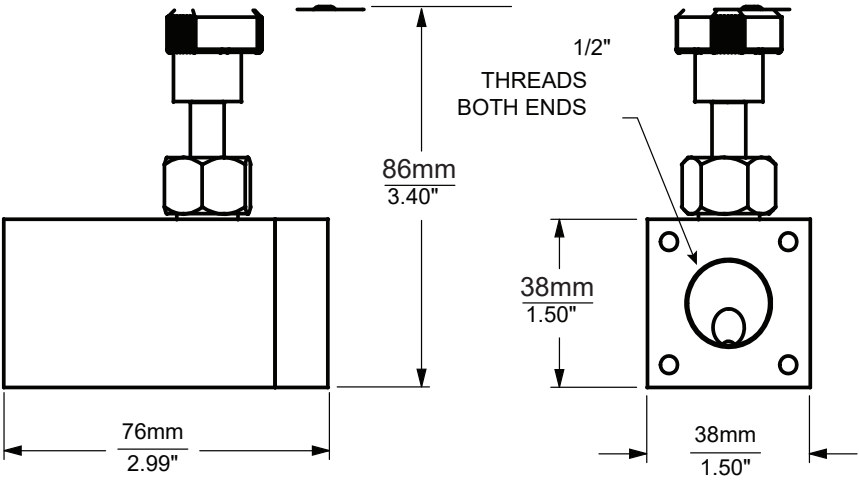
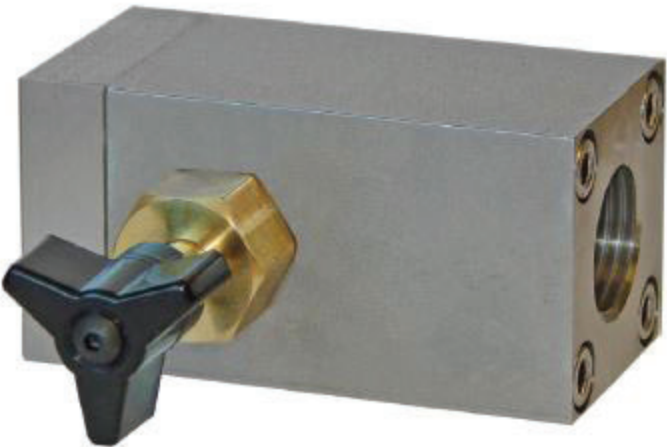
High Temperature Flow Regulator

Features

- Flow Body: Stainless Steel
- Valve Stem: Brass
- Valve Seat: Stainless Steel
- O-Ring: Viton
- Threaded Connections: 1/2" NPT
- Operationing Temperature max.: 204°C (400°F)
- Operating Pressure max.: 17.2bar (250psi)

High Temperature Flow Regulator is a manual needle valve specifically designed for high temperature cooling applications. Maximum pressure rating of 17.2bar (250psi) allows installation into many different cooling applications.

Fine manual control regulates the flow opening from wide open to fully closed. Flow body is comprised of corrosion-resistant stainless steel and brass components in addition to high temperature o-ring seals.



**U** Inch



Max Mold Temperature: 400°F (204°C)

| Item Number | Thread Size |
|-------------|-------------|
| HWFR4-A-NA  | 1/2" NPT    |



## Low Flow Indicator/Regulator with Brass or Nylon Ends

### Features

- End Caps: Brass or Glass-Filled Nylon
- Body: Polysulfone
- Rotor: Nylon
- O-Rings: EPDM
- Cap Screws: Stainless Steel
- Optional Gauge Block: Brass
- Optional Quick Change Socket and Plug: Brass
- Flow Range: 0.3 to 4LPM (0.08 to 1GPM)
- Operating Temperature max.: 99°C (210°F)
- Operating Pressure max.: 6.9bar (100psi)
- Optional Thermometer: -20° to 120°C (0 to 250°F)  
±2% accuracy (full scale)
- Optional Pressure Gauge: 0 to 700Kpa (0 to 100psi)  
±3% accuracy (full scale)



Item Number

LFI3 - A - 40

Example

Brass End

Caps

1/4"NPT

LFI2

1/4"BSPP

LFI2B

3/8"NPT

LFI3

3/8"BSPP

LFI3B

1/2"NPT

LFI4

1/2"BSPP

LFI4B

Accessories

A Indicator only (no accessories)

B Thermometer

C1 Thermometer and 30psi Press. Ga.

C2 Thermometer and 60psi Press. Ga.

C3 Thermometer and 100psi Press. Ga.

CL Thermometer and Liquid-Filled Press. Ga. (100psi)

D1 Thermometer, 30psi Press. Ga., Quick Change Socket and Plug\*

D2 Thermometer, 60psi Press. Ga., Quick Change Socket and Plug\*

D3 Thermometer, 100psi Press. Ga., Quick Change Socket and Plug\*

DL Thermometer, Liquid-Filled Press. Ga. (100psi), Quick Change Socket and Plug\*

E Thermometer, Quick Change Socket and Plug\*

F1 30psi Pressure Gauge

F2 60psi Pressure Gauge

F3 100psi Pressure Gauge

FL Liquid-Filled Pressure Gauge (100psi)

Nylon End Caps

1/4"NPT

LFIP2

1/4"BSPP

LFIP2B

3/8"NPT

LFIP3

3/8"BSPP

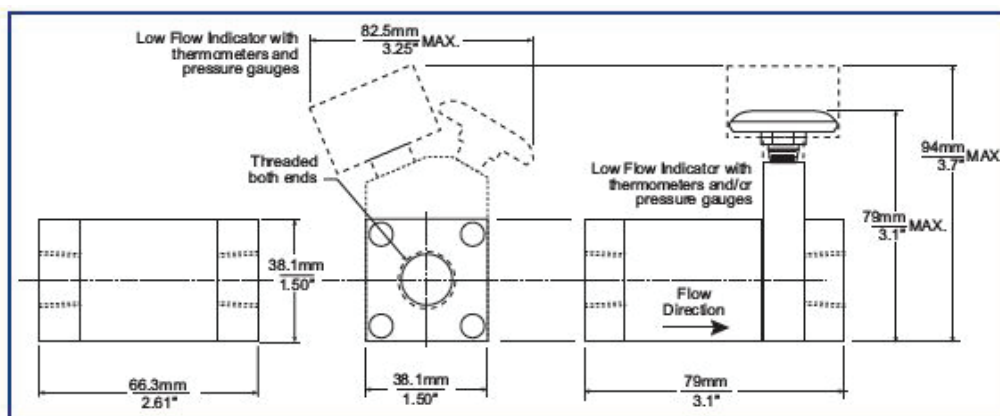
LFIP3B

1/2"NPT

LFIP4

1/2"BSPP

LFIP4B



# Delta-Q® Precision Flow Regulator with Low Flow Indicator

## Features

- Flow Range: 0.3 to 4LPM (0.08 to 1GPM)
- Operating Temperature max: 99°C (210°F)
- Operating Pressure max: 6.9bar (100psi)
- Dial Thermometer: -20° to 120°C (0 to 250°F) ±2% accuracy (full scale)
- Pressure Gauge: 0 to 700Kpa (0 to 100psi) ±3% accuracy (full scale)

## Example Item Number

Model      LFI3      -      A - 40 - Q

### Brass End

Caps

|          |       |
|----------|-------|
| 1/4"NPT  | LFI2  |
| 1/4"BSPP | LFI2B |
| 3/8"NPT  | LFI3  |
| 3/8"BSPP | LFI3B |
| 1/2"NPT  | LFI4  |
| 1/2"BSPP | LFI4B |

### Nylon End

Caps

|          |        |
|----------|--------|
| 1/4"NPT  | LFIP2  |
| 1/4"BSPP | LFIP2B |
| 3/8"NPT  | LFIP3  |
| 3/8"BSPP | LFIP3B |
| 1/2"NPT  | LFIP4  |
| 1/2"BSPP | LFIP4B |

### Accessories

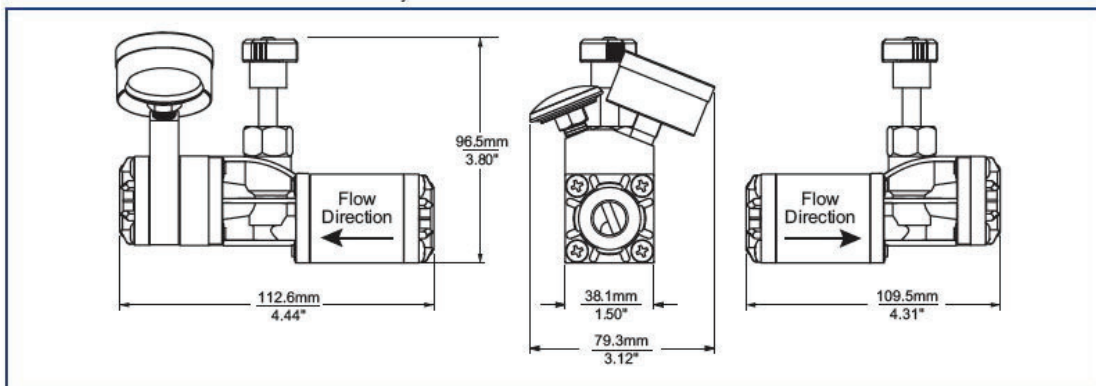
|    |                                                                               |
|----|-------------------------------------------------------------------------------|
| A  | Indicator only (no accessories)                                               |
| B  | Thermometer                                                                   |
| C1 | Thermometer and 30psi Press. Ga.                                              |
| C2 | Thermometer and 60psi Press. Ga.                                              |
| C3 | Thermometer and 100psi Press. Ga.                                             |
| CL | Thermometer and Liquid-Filled Press. Ga. (100psi)                             |
| D1 | Thermometer, 30psi Press. Ga., Quick Change Socket and Plug*                  |
| D2 | Thermometer, 60psi Press. Ga., Quick Change Socket and Plug*                  |
| D3 | Thermometer, 100psi Press. Ga., Quick Change Socket and Plug*                 |
| DL | Thermometer, Liquid-Filled Press. Ga. (100psi), Quick Change Socket and Plug* |
| E  | Thermometer, Quick Change Socket and Plug*                                    |
| F1 | 30psi Press. Ga.                                                              |
| F2 | 60psi Press. Ga.                                                              |
| F3 | 100psi Press. Ga.                                                             |
| FL | Liquid-Filled Press. Ga. (100psi)                                             |

\* NPT only



## Wetted Parts and Materials

- End Caps: Brass or Glass-Filled Nylon
- Flow Body: Polysulfone
- Regulator Body: Glass-Filled Nylon
- Rotor: Glass-Filled Nylon
- Stem and Valve Seat: Stainless Steel
- O-Rings: EPDM
- Optional Gauge Block: Brass
- Optional QC Socket and Plug: Brass



# TRACER<sup>®</sup> VM Base Flowmeters

## Features

- Operating Temperature: 0°C to 120°C (32°F to 248°F)
- Operating Pressure: 10.3 bar max. (150 psi max.)
- No moving parts for reliable operation
- Flow and Temperature Sensors in one unit for compact installation
- Quick temperature response from direct media contact
- Economical and versatile construction with corrosion-resistant materials
- Installs easily onto Smartflow Aluminum Manifolds to interface with Smartlink™ for total injection mold cooling water process control
- 3/8" & 1/2" Body Size - Glass-Filled Nylon Flow Body with Brass or Nylon End Caps
- 3/4" thru 1-1/2" Body Size - Anodized Aluminum or Stainless Steel Flow Body



## Example Item Number

| VM 3 - B - 18H - B - P1Q                    |     |          |      |                   |     |                                                                              |  |
|---------------------------------------------|-----|----------|------|-------------------|-----|------------------------------------------------------------------------------|--|
| Body Size                                   |     |          |      | Flow Range        |     | Options                                                                      |  |
| 3/8"NPT                                     | 3   | B or N   | 18H  | 1 to 18 LPM       | P 1 | 30 psi Pressure Gauge                                                        |  |
| 3/8"BSPP                                    | 3B  |          |      | (.3 to 4.8 GPM)   | P 2 | 60 psi Pressure Gauge                                                        |  |
| 1/2"NPT                                     | 4   |          | 40H  | 2 to 40 LPM       | P 3 | 100 psi Pressure Gauge                                                       |  |
| 1/2"BSPP                                    | 4B  |          |      | (.5 to 10.6 GPM)  | P 4 | 160 psi Pressure Gauge (Pressure gauges not available with AL body material) |  |
| 3/4"NPT                                     | 6   | AL or SS | 100H | 5 to 100 LPM      | Q   | Delta-Q® Precision Flow Regulator (use with VM3 or VM4 only)                 |  |
| 3/4"BSPP                                    | 6B  |          |      | (1.3 to 26.4 GPM) |     |                                                                              |  |
| 1"NPT                                       | 8   | AL or SS | 100H | 5 to 100 LPM      |     |                                                                              |  |
| 1"BSPP                                      | 8B  |          | 200H | 10 to 200 LPM     |     |                                                                              |  |
| 1-1/2"NPT                                   | 12  | AL or SS | 200H | 10 to 200 LPM     |     |                                                                              |  |
| 1-1/2"BSPP                                  | 12B |          |      | (2.6 to 52.8 GPM) |     |                                                                              |  |
| Body Material                               |     |          |      |                   |     |                                                                              |  |
| Glass-Filled Nylon with Brass End Caps      |     | B        |      |                   |     |                                                                              |  |
| Nylon End Caps (3/8" and 1/2" only)         |     | N        |      |                   |     |                                                                              |  |
| Anodized Aluminum Body                      |     | AL       |      |                   |     |                                                                              |  |
| Stainless Steel Body (3/4" and larger only) |     | SS       |      |                   |     |                                                                              |  |



SMARTLINK® Tracer®<sub>VM</sub> Interface

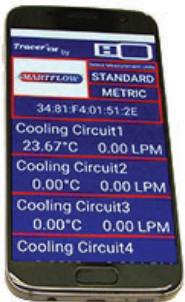
Features

- Ethernet port connects the Interface to a local network for communication with Data Logger PC Software.
- Dry contact switch signals out of limit temperature and flow rate conditions when using the Data Logger PC Software.
- Provides power, ground and signal terminations near the process to simplify connections to TracerVM Base units.
- Transmits temperature and flow conditions in real time to mobile devices for process monitoring up to 20 meters away.
- USB port provides mobile device charging plus flash drive connection.
- Gasketed, water-resistant plastic enclosure provides secure mounting in locations where occasional water spray is present.
- Smartflow Data Logger PC Software

Tracer<sub>VM</sub> Mobile App is available for free download from iTunes or the Google Play store. Search for “Tracer<sub>VM</sub>”. The mobile app displays temperature and flow rate data from one Interface module with up to 8 flowmeters at one time.

Specifications

- Housing: NEMA4X compliant
- Operating Temperature: 0°C to 52°C (32°F to 125°F)
- Maximum Wireless Range: 20 meters (65.6ft)  
Maximum TracerVM Base Flowmeter
- Distance to Smartlink TracerVM Interface: 3 meters (10ft)
- Power Required: 8 to 28VDC with earth ground (external) required to maintain signal integrity
- Relay Switch Rating: 2A, 250VAC/220VDC



**U** Inch



Max Mold Temperature: 125°F (52°C)

| Item Number | Description                              |
|-------------|------------------------------------------|
| VMBTI-102   | Smartlink® Tracer®VM Bluetooth Interface |



# TRACER<sup>®</sup> VM Flowmeter with User Interface

## Features

- TracerVM Flowmeter with User Interface measures liquid flow rate and temperature while providing a selectable analog voltage and programmable switch.
- Separate analog outputs facilitate data collection of temperature and flow rates.
- FCI helps optimize systemic water usage.
- SPDT switch is programmable for one to four set points.
- Totalizer function provides volume display from a user-selected start point.
- New Reynolds Number Display provides instant Turbulent Flow information based on water temperature, flow rate, cooling line diameter and glycol content.
- 8 to 28VDC Power Source is required to supply the flowmeter



### Example Item Number

VM 3 - B - 18H - L - P1Q

| Body Size                              |     |          |              |                                    |   | Options                                                                              |
|----------------------------------------|-----|----------|--------------|------------------------------------|---|--------------------------------------------------------------------------------------|
| 3/8"NPT                                | 3   | B or N   | 18H<br>40H   |                                    |   | P1 30 psi Pressure Gauge                                                             |
| 3/8"BSPP                               | 3B  |          |              |                                    |   | P2 60 psi Pressure Gauge                                                             |
| 1/2"NPT                                | 4   |          |              |                                    |   | P3 100 psi Pressure Gauge                                                            |
| 1/2"BSPP                               | 4B  |          |              |                                    |   | P4 160 psi Pressure Gauge                                                            |
| 3/4"NPT                                | 6   | AL or SS | 100H         |                                    |   | (Pressure gauges not available with AL body material)                                |
| 3/4"BSPP                               | 6B  |          |              |                                    |   | Q Delta-Q® Precision Flow Regulator (use with VM3 or VM4 only)                       |
| 1"NPT                                  | 8   | AL or SS | 100H<br>200H |                                    |   |                                                                                      |
| 1"BSPP                                 | 8B  |          |              |                                    |   |                                                                                      |
| 1-1/2"NPT                              | 12  | AL or SS | 200H         |                                    |   |                                                                                      |
| 1-1/2"BSPP                             | 12B |          |              |                                    |   |                                                                                      |
|                                        |     |          |              |                                    |   | User Interface                                                                       |
|                                        |     |          |              |                                    | L | Local (display housing attached to flow body, standard)                              |
|                                        |     |          |              |                                    | R | Remote (display housing on mounting plate with 2.9(M) cable connection to flow body) |
| Body Material                          |     |          |              | Flow Range                         |   |                                                                                      |
| Glass-Filled Nylon with Brass End Caps |     | B<br>N   | 18H          | 1 to 18 LPM<br>(.3 to 4.8 GPM)     |   |                                                                                      |
| Nylon End Caps (3/8" and 1/2" only)    |     |          | 40H          | 2 to 40 LPM (.5 to 10.6 GPM)       |   |                                                                                      |
| Anodized Aluminum                      |     | AL<br>SS | 100H         | 5 to 100 LPM<br>(1.3 to 26.4 GPM)  |   |                                                                                      |
| Stainless Steel                        |     |          | 200H         | 10 to 200 LPM<br>(2.6 to 52.8 GPM) |   |                                                                                      |

