

Adjustable Port Loading Ring

All regulators use a loading device to draw gas out from the lower diaphragm chamber. The objective is to lower pressure under the diaphragm as the spring loses tension. The loss in spring tension occurs as the diaphragm drops to open the valve.

The ROOTS B34, B38, B838, CL231, CL34, CL38, & CL838 regulators use a ported metal loading ring.



Dual ported loading ring

The loading ring is a heat-treated spring steel stamping with two beads that fits into a groove on the orifice. The orifice also has a radial notched shoulder into which a tip on the ring rests. The notched shoulder locks the ring from turning after it is positioned. The B34, B38, and CL231 series regulators use a dual ported loading ring while the B38 and B838 series use a single port style.

A perfect flow pattern is one that reduces pressure under the diaphragm at a rate equaling the loss of spring tension. As the diaphragm moves down, pressure increases at a rate that equals the increase in spring tension as the diaphragm moves up. This results in a perfectly controlled outlet pressure with no pressure change above or below the desired set pressure, regardless of volume change, except at zero flow.

With a change of inlet pressure, there is no perfect loading ring setting that provides a constant outlet pressure. Therefore, the loading ring is set to a position that provides the best outlet pressure control over the given inlet pressure range and corresponding orifice size. The loading ring position and selected orifice size for the ROOTS regulators catalog data limit the maximum loading pressure to 2-inch w.c. above set point at the highest inlet pressure shown per orifice size for pounds to inches regulation. For pounds to pounds regulation, the maximum loading is .2 PSIG for spring loaded regulators and 1% of absolute outlet pressure for constant loaded regulators.

Loading Ring Positions

Loading Ring Positions For B34 Regulators Except IM Models

- For M and D models
Set at 0 degrees

- For R and N models with outlet pressure of 1PSIG or less
If inlet pressure is 50 PSIG or less set at 15 degrees off
center If inlet pressure is 50 PSIG or more set at 21
degrees
- For R and N models with outlet pressure more than 1
PSIG Set at 0 degrees
If inlet pressure varies from below 50 PSIG to 60 PSIG max, Set at 18
degrees If inlet pressure is never above 10 PSIG, set at 12.5 degrees

Loading Ring Positions for B34IM Regulators

- For outlet pressure less than 1 PSIG
If inlet pressure is 50 PSIG or less set at 18 degrees
If inlet pressure is more than 50 PSIG set at 21 degrees
- For outlet pressure of 1 to 2
PSIG Set at 12.5
degrees
- For outlet pressure more than 2
PSIG Set at 0 degrees

Loading Ring Positions for B38 and B838 Regulators

- M and D models.
Set at 0 degrees
All other B38 and B838 models
Use the setting shown in the catalog capacity table for that model.

Loading Ring Positions For CL231, 34, 38, & 838**Loading Ring Positions for CL231 Regulators**

- For inlet pressure 15 PSIG and
below Set at 12 degrees
- For inlet pressure greater than 15
PSIG Set at 15 degrees

Loading Ring Positions for CL34 Regulators

- For M and D models
Set at 0 degrees
- For all remaining CL34 models
For inlet pressure 50 PSIG and
below Set at 15 degrees
For inlet pressure greater than 50

PSIG Set at 21 degrees

Loading Ring position for CL38 and CL838 Regulators

- For M and D models
Set at 0 degrees
 - For all remaining CL38 and CL838 models For outlet pressure less than 1 PSIG Set at 25 degrees
For outlet pressure greater than 1 PSIG Set at 0 degrees

Adjusting The Loading Ring Position

To adjust the loading ring position

1. Remove the diaphragm case from the valve body.
2. Remove the loading ring from the orifice by spreading the loading ring slightly with both thumbs and pulling it off the orifice.
3. Consider the casting seam opposite the outlet as the centerline of the valve body. Use a pencil or fine line marker to mark the radial notch on the orifice that lines up with the seam. Use the radial notch mark for 0 degrees.
4. In a clockwise direction, count the number of notches required to give the desired position and again mark the orifice.

Note Each notch on a 34 orifice is 2.5 degrees. Each notch on a 38 or 838 orifice is 1.9 degrees.

5. Divide the specified degree setting by 2.5 for the 34 series or by 1.9 for the 38 series to determine the number of notches to count for the second mark.

For example:

B34 set at 15 degrees

15 divided by 2.5 = 6 notches

B38 set at 40 degrees

40 divided by 1.9 = 21 notches

6. With the desired position marked, reinstall the loading ring. Place both thumbs inside the loading ring, spread outward and push down onto orifice so the small indentation on the inside of the loading ring engages the desired notch and the two beads on each side lock into the orifice groove.

Note Loading ring positioning tool 799081 is available from the factory for use with the B34 and CL34 series regulators. An instruction sheet is available to explain usage. There is no tool currently available for the 38 and 838 series.

Troubleshooting

While the catalog data is based on regulators with the positions listed, performance can sometimes be enhanced by custom settings.

- The B838 series of regulators perform best when one loading ring is turned clockwise and one is turned counterclockwise.
- When the regulator is used close to a rotary meter and pressure surges occur in reaction, the pressure can sometimes be stabilized by rotating the loading ring a few degrees from zero. This rotation causes a decrease in the listed catalog capacity at the stated droop point and should be done only if the flow requirement is not 100% of the orifice capacity for the application.
- *Hunting* in the B38 and 838 series regulators can often be stopped by turning the loading ring counterclockwise the same number of degrees from zero as the clockwise setting.

Due to the harmonics set up by various meter set piping arrangements, any design regulator can experience instability on a given meter set. The loading ring allows for fine-tuning to correct for problems unique to a given set.

ROOTS Regulators

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