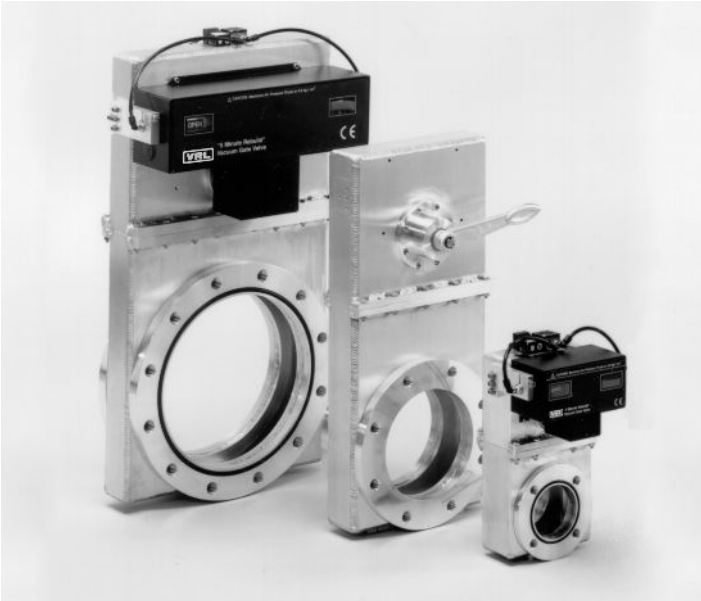
Stainless and Aluminum Gate Valves



Aluminum valves with (left to right): Electro Pneumatic, Manual, and Motor Actuators. Stainless Steel valves also available.

ANSI, ISO, JIS, or Special Flanges
These Vacuum Research 5 minute rebuild valves are available with virtually any flange or combination of flanges at no extra charge. Combinations of ISO on one flange and ANSI on the other are easily accommodated. Even different sizes such as 4 inch on one flange and 6 inch on the other.

Insertable "Flangeless" Valves
It is sometimes helpful to keep the flange-to-flange dimension ("A" dimension on the dimensions pages) as short as possible. In such cases your valves can be provided with no port flanges at all and with either O-Ring grooves machined into the valve body or with a precision machined surface on the body to seal against the O-rings on your pump or chamber. Contact the factory for prices.

Aluminum or Stainless Steel
Vacuum Research Bonnet Style valves are available in stainless steel or 6061 aluminum. Smooth surface finish gives low outgassing and fast pump down.

High Conductance
In addition to the oversize ports used in the LPWA Series for the last 40 years, we now offer the X-LPWA Series where a 4 inch valve has a 6 inch port, an 8 inch valve has a 10 inch port, etc. Conductance values are shown on page 39.

Fail Safe
All Vacuum Research Bonnet Style Valves can be installed for fast close on power failure and air operated valves can be manually positioned without air or electricity.

Long Life
More than 250,000 cycles for aluminum valves. That's one cycle every 2 minutes, 24 hours/day for a year.

SolidWorks *.STEP Files
Contact us to obtain SolidWorks 3D *.STEP format modeling files that plug formatted VRC valve 3-D models into your computer-aided design projects.

Less Outgassing Than Stainless Steel
Dozens of papers show the 6000 Series aluminum used in VRC valves outgasses up to 2 orders of magnitude less than 300 Series stainless steel and of course no hydrogen. A bibliography of 70 peer reviewed papers about out-gassing compiled by Dr. M. Wong at Fermi Labs can be found at http://home.fnal.gov/~mlwong/outgas_rev.htm. See page 40 for more information

Vacuum & Pressure
Vacuum Research valves stay sealed with vacuum or atmosphere on either side.

Satisfaction Guaranteed
Vacuum Research has been building high vacuum valves for almost 50 years and has earned a reputation for world class product quality and customer service. If you are not satisfied with our valve just send it back.

No Leaks
All Vacuum Research valves have total leak rates of less than 5 X 10-10 std cc/sec. By total leak we mean that each completed valve is tested in a He filled bag.

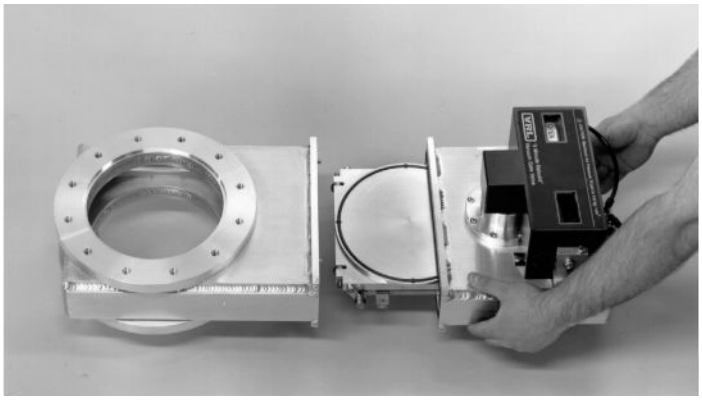
RoHS Compliant
All Valves are (RoHS) 2015/863/EU Compliant and carry the CE mark.

Electric Motor, Air or Manual Actuators
All Vacuum Research gate valves are available with 3 types of actuators. Manual actuators are the least expensive. Electro-pneumatic actuators use 70 psi (4.9 kg/cm) compressed air and include the solenoid (specify the solenoid voltage that is most convenient for you). Electric motor actuators use high torque servo motors and operate from 115V or 230V, 1Ø 50 or 60 Hz. CE Mark included.

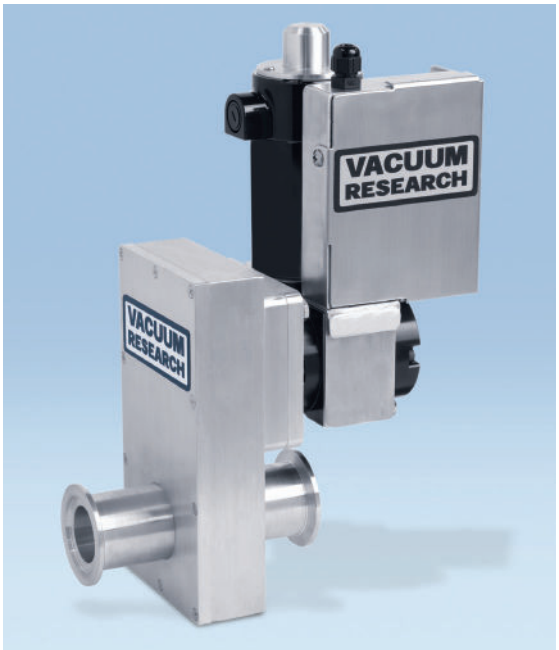
Roughing and Gauge Ports
There are six locations for optional gauge and roughing ports described on page 43.

Position Indicators, Limit Switches
Visual indication of valve position is included on all valves. Limit switches for remote indication are available and are described on the Optional Features pages in the Accessories & Parts section.

Complete Rebuild in 5 Minutes.



With no special tools or training you can replace every moving part in your Vacuum Research Bonnet Style Valve in 5 minutes. (Our best guys can do it in less time, but they practice.)



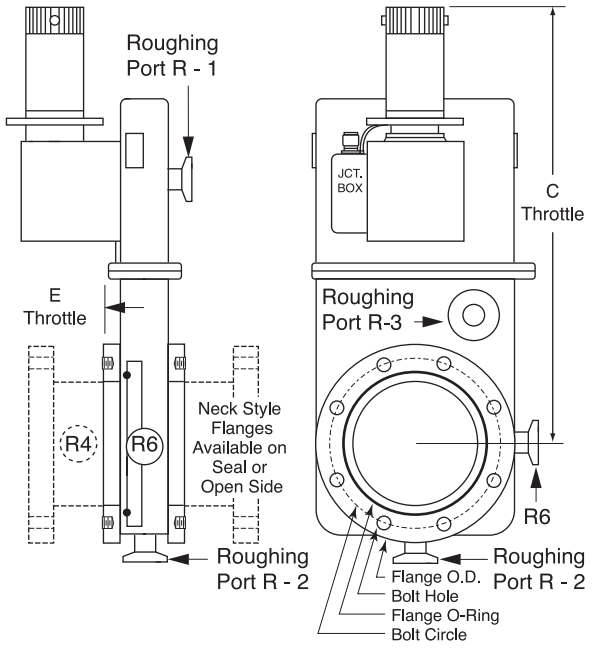
Throttlemaster™ Gate Valve and Motor Positioner Unit. Aluminum has less outgassing than stainless steel. Up to 2 orders of magnitude less, see references on page 39.

- **Aluminum or Stainless Steel Valves**
- **Seals Up To 3 Atmospheres Differential**
- **Vacuum or Atmosphere on Either Side**
- **ANSI Sizes From 2 Inch to 24 Inch**
- **ISO Flanges From 63 to 630 mm**
- **Manual or Closed Loop Operation**
- **All Valves (RoHS) 2015/863/EU Compliant**

The Vacuum Research Throttlemaster™ valve with positioner can be used in either of two control schemes. As a 3 position valve for upstream pressure control with an MFC, or for downstream pressure control with modulating gate position. For 3 position control the basic Throttlemaster™ consists of two components: an aluminum or stainless steel gate valve and a positioner/indicator to drive the fast response servo motor. This is all you need to operate the Throttlemaster™ as a 3 position valve in systems where the mass flow controller is controlling the pressure.

The Throttlemaster™ can also be used for downstream pressure control where the gas flow to the chamber is held constant and the Throttlemaster™ gate is moved to control conductance of the pumping system. This requires the use of a PID pressure controller to provide a signal to the valve positioner and a vacuum gauge with a 0 to 10 vdc signal to the PID controller. These may be purchased from Vacuum Research along with your Throttlemaster™ Valve and positioner or you may be able to use your present gauge and controller.

Throttlemaster™ Dimensions

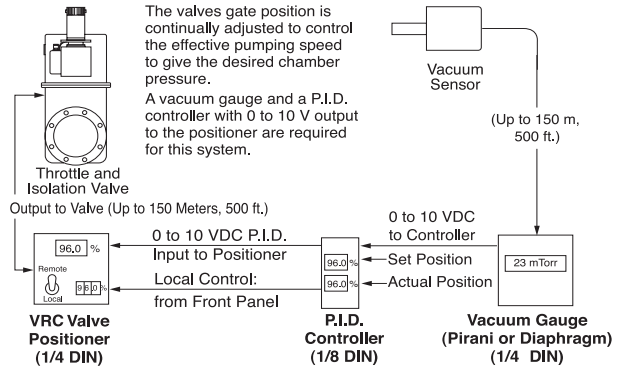


Port dimensions, bolt patterns, and other dimensions are shown on pages 6 and 7 for ANSI and page 13 for ISO valves. A few dimensions unique to the Throttlemaster™ servo actuator are listed here.

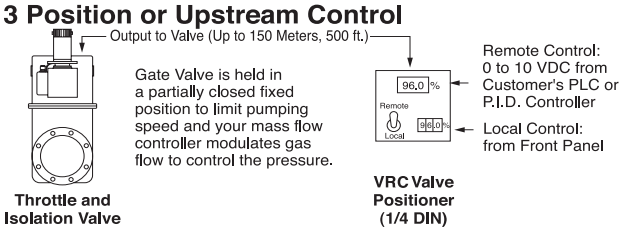
ANSI Flange Port Diameter	2 & 3 in. 4 in. Port	4 in. 6 in.Port	6 in. 8 in.Port	4 in. 6 in.Port	8 in. 10 in.Port	12 in. 12 in.Port
C Throttle	15.90 in.	19.17 in.	22.00 in.	22.00 in.	20.67 in.	22.74 in.
E Throttle	4.34 in.	4.15 in.	4.03 in.	4.03 in.	3.90 in.	3.9o in.

ISO Port Size	63 & 80 mm	100 mm	160 mm	200 mm	250 mm	320 mm
C Throttle	403 mm	403 mm	487 mm	561 mm	525 mm	577 mm
E Throttle	110 mm	110 mm	105 mm	102 mm	99 mm	99 mm

P.I.D. Closed Loop Downstream Pressure Control



3 Position or Upstream Control



Throttlemaster™ Fully Closed
Note that crank arm is vertical and links are near horizontal

Throttlemaster™ 90% Closed
Note that gate has moved only .036 inch (0.9m) from the seal surface

Max Conductance Precision Where it's Most Important

The only Throttle Valve in the world that uses back-to-back sine law relationships to provide maximum conductance precision where you need it most; between 90% to 100% closed!

Why is the Throttlemaster™ conductance precision so good between 90% and 100% closed? There are two design features that allow both leak tight shut off and high resolution in the critical 90% to 100% closed range. The first of these is innovative mechanical design of our actuator, and the second is our high resolution feedback system.

The 180° arc of our actuator arm is double that of butterfly valves. More importantly, the critical 90% to 100% closed position is at bottom dead center where the motion per degree of rotation becomes zero. As this is happening, the gate links are approaching their full extension, which further enhances the resolution of the crank rotation and feed back sensor.

The Vacuum Research feedback element is directly coupled to the motor shaft, and provides stepless resolution of the valve position. The motor itself is a high torque servo that can repeatedly position the gate within a few thousandths of an inch and also lock the gate closed with a full atmosphere differential.

Optional Features

The valves used in the Vacuum Research Throttlemaster™ are the same as the standard open/close valves discussed on pages 4 to 7 of this cata-log. The difference is that the Throttlemaster™ gate position is precisely controlled by the servo motor actuator and the valve positioner to full open, full close, or anywhere in between. A Throttlemaster™ valve can be equipped with roughing and gauge ports and most of the options listed in optional features section.

Valve Motor Voltage

The standard valve motor is 115V, 60 Hz approximately 300 w for 220-240V, 50 Hz. Add suffix 220/50 to P/N.....No extra charge.

Viton® and Kalrez® O-Rings

Throttlemaster™ valves are shipped with Buna-N O-Rings except for the gate seal which is Viton®. For valves with all Viton® or Kalrez® see page 5 for prices on these special O-Rings.

Spare Valve Positioner

Remote mini Valve Positioner: P/N X801403.....$1,5

Model Numbering System

VRC Valves are Manufactured in the USA.

Vacuum Research valves are available with dozens of options to allow you to select exactly the features you need for your vacuum system. The model number system illustrated below will accurately describe most valves, but if you have any questions about the best way to specify what you need, just call or fax our customer service department and we will be happy to help you. All Valves are (RoHS) 2015/863/EU Compliant.

Basic Valve Style

LPWA..... Bonnet Style, Large Port Aluminum
TBWA ..... Thick Body Valves for Dirty Environments
X-LPWA..... Bonnet Style, Extra Large Port Aluminum
LPSS..... Bonnet Style, Large Port Stainless Steel
X-LPSS..... Bonnet Style, Extra Large Port Stainless Steel
BEL ..... Bellows Seal, Welded Aluminum
END STD..... Standard Port Aluminum Gate Valves
END LP..... Oversize Large Port Aluminum Gate Valves
AVAL..... Aluminum Poppet Style Valves
AVMS..... Mild Steel Poppet Valves
REB..... Rectangular Port, Bellows Seal
REQ ..... Rectangular Port, Quad Ring Seal

Roughing & Gauge Ports

Specify location (R-1, R-2, etc.) and size of port (NW-16, NW-25, etc.) Refer to page 42 in this catalog: Roughing and Gauge Ports, for the range of port sizes available in each location for your basic valve style.

Limit Switches (Position Indicators)

Visual Position Indicators are included on All Bonnet Gate Valves. Limit switches are described in the "Optional Features and Accessories" section on page 41. (Sold by the pair, 1 for open, 1 for closed)

LSS ..... Enclosed Limit Switch (SPDT)
LSD..... Enclosed Limit Switch (DPDT)
LSO..... Open Type Limit Switch (SPDT)
LSE ..... Electronic Type Limit Switch (SPDT)
LSX-C... Explosion Proof, Grps. C, D (SPDT)
LSX-B ... Explosion Proof, Grp. B (SPDT)

Flange Bolt Pattern

ASA.....ANSI Bolt Pattern
CF .....Conflat® Flanges
CF-MET....Metric Conflat®
JIS.....Japan Industrial Std.
DEP.....Dependex Flanges
ISO.....ISO Bolt Pattern
SPEC .....Customer Special Flange
BLANK .....No Holes or O-Ring

Flange O-Rings

2O O-Rings both flanges
NO No flange O-Rings
1O O-Ring Open Side
1S O-Ring Seal Side

LPWA - 12 - ASA - N8 - 2O - B - R2 - NW-16 - EP - 115 - LSS

Port Flange Neck Style

N1.....Tapped Holes Both Sides
N5.....Neck Flange on Both Sides
N6 .....Neck Flange on Seal Side
N8.....Neck Flange on Open Side
TAP ....Tapped Holes on Neck Flanges

Our standard neck style valves (N5, N6, N8) have slots rather than holes for bolts. For tapped holes instead of slots add "TAP" to Model number. No extra charge.

Type of Operator

EP.....Electro-Pneumatic
A.....Air Pilot
3 POS ....3 Position Electro-Pneumatic
P.....Pneumatic only (no solenoid)
M.....Manual Lever
T.....Manual Throttle
MO.....Motor Actuator

Normal Valve Port Size

Inches: 2, 3, 4, 6, 8, 10, 12, 16, 20, 24, 32
ISO: 63 mm to 630 mm
JIS: 63 mm to 630 mm
Conflat®: 2.75, 4.5, 6, 8, 10, 12 inch OD

O-Ring Material

B Buna-N
V Viton®
S Silicone
K Kalrez®
C Chemraz®

Solenoid Voltage (Only Used with EP Operator)

115.....115V, 50/60 Hz
220.....220-240 V, 50 Hz
24D .....24 VDC
115 EX.....Expl. Proof 115V, 50/60 Hz
220 EX.....Expl. Proof 220V, 50 Hz
24 EX.....Expl. Proof 24 VDC

Call our toll free number (800) 426-9340, or (412) 261-7630 to place orders or for customer service. Our FAX number is (412) 261-7220. Address orders by mail to Vacuum Research Corporation, 100 Chapel Harbor Drive, #4, Pittsburgh, PA 15238 USA. Prices in this catalog are FOB factory. CIF or C&F prices available. Contact factory for pro forma invoice or price quotation. Terms are Net 30 days.