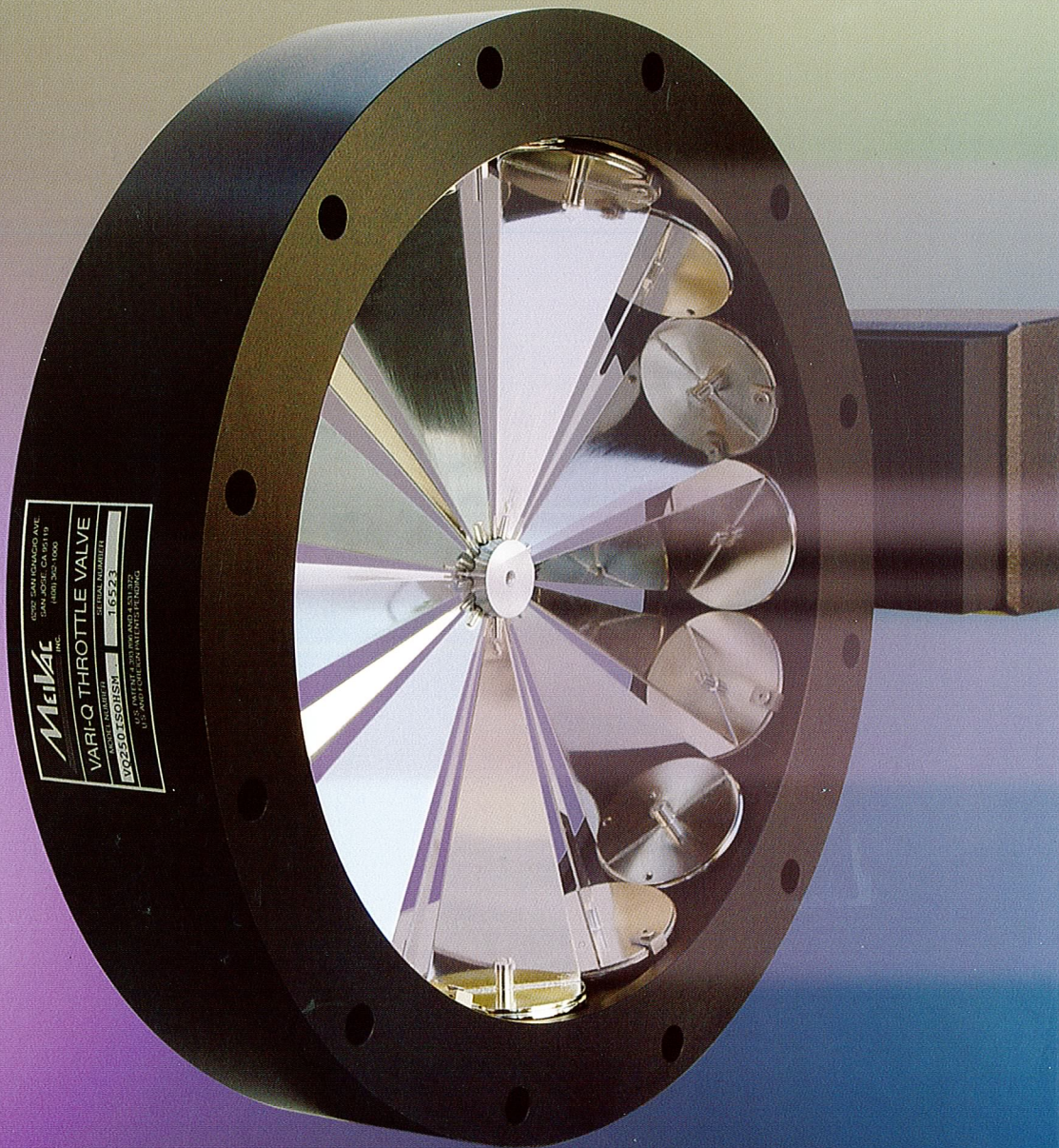
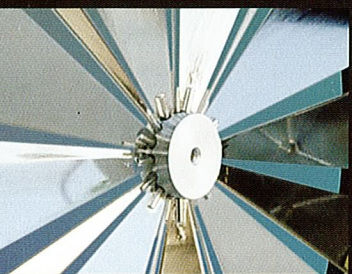
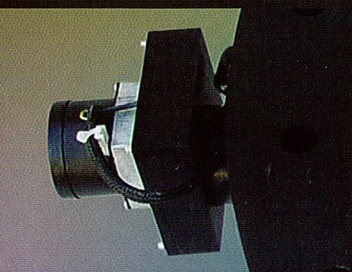
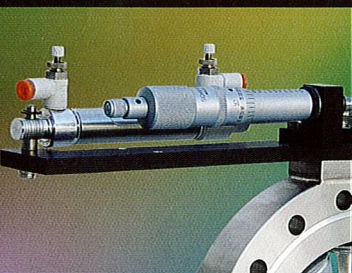


MeiVac
INC.

QUALITY VACUUM
COMPONENTS

THROTTLE VALVES & CONTROLLERS



VARI-Q THROTTLE VALVE

Vari-Q Throttle Valve Benefits

- Linear conductance control
- Highly repeatable
- Upstream or Downstream pressure control
- High "Open" conductance
- Low Profile
- Easy Installation and removal
- Corrosion Resistant designs

WHY THROTTLE WITH A VARI-Q?

A high-vacuum pump typically operates at pressures below those used for plasma processing. Throttling the gas in the process chamber causes a differential pressure to be created across the valve, thereby allowing the pump to operate at high-vacuum levels while providing correct process pressures in the chamber. To provide linear control, the vanes on Vari-Q valves are counter-rotated providing optimal pressure control over the range of operation. In the open position the Vari-Q vanes offer little restriction in the pumping path during critical pump down operations. The counter rotated vane designs allow Vari-Q flanges to be low profile, further minimizing conductance losses and pump stack heights.

System Compatability is a prime goal that the Vari-Q valve easily meets. Flange configurations from 100 mm to 35 inches, ASA, JIS, ISO and ConFlat™, in Aluminum and Stainless Steel. Valve vanes and the drive cable are SST. Standard shaft seals are Viton.™ An optional Ferrofluidic seal is available on UHV SST (ConFlat) valves.

ConFlat is a registered trademark of Varian Inc.
Viton is a registered trademark of E.I. DuPont Company

The **MeiVac** team has served the vacuum industry for more than 32 years. Under the name Comptech, the company set a baseline as a multi-faceted vertically integrated vacuum technology supplier.

MeiVac maintains internal design capabilities for mechanical, vacuum, electrical, control, and software disciplines. Government certification standards for fabrication techniques (e.g. SST & Aluminum welding) are universally applied to life critical and High Tech projects alike. Such design and fabrication capabilities permit close control over component quality and delivery.

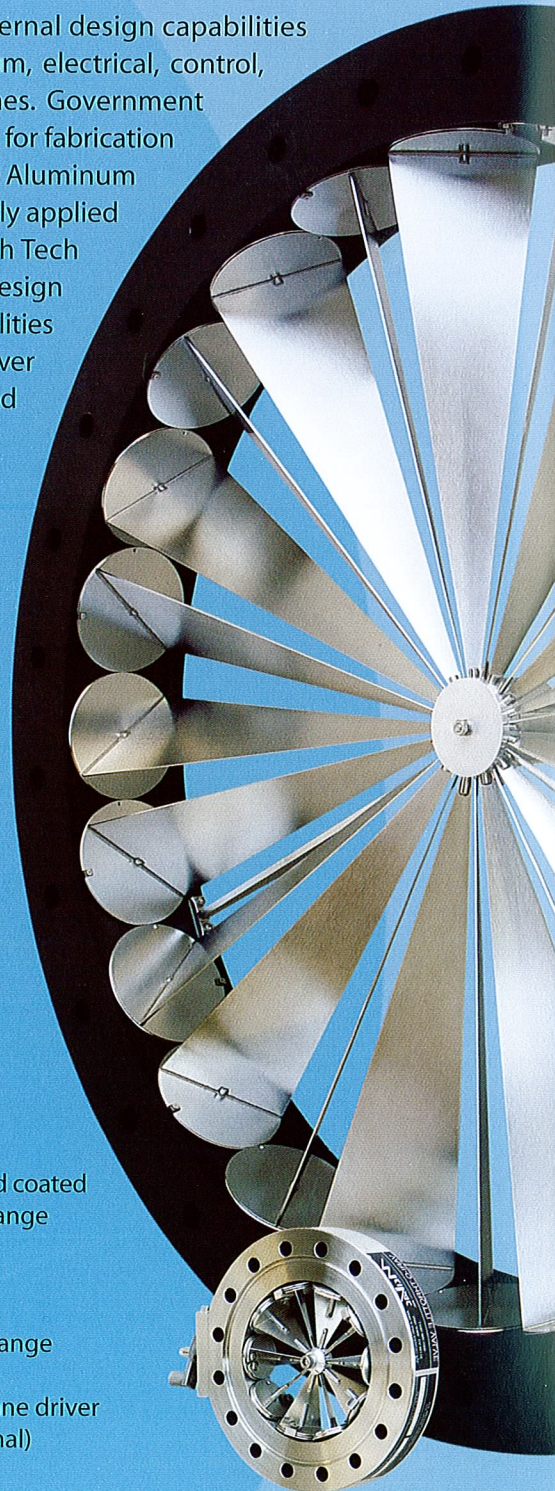
For more than twenty years MeiVac's patented VQ series Throttle Valves have offered linear control and process repeatability from a unique design. The valve utilizes counter-rotating triangular (pie shaped) vanes that are interconnected by a low friction highly reliable cable-driven system.

VQ-35-ASA-U-O

- Aluminum body hard coated
- 35 inch ASA/ANSI flange
- No actuator shown

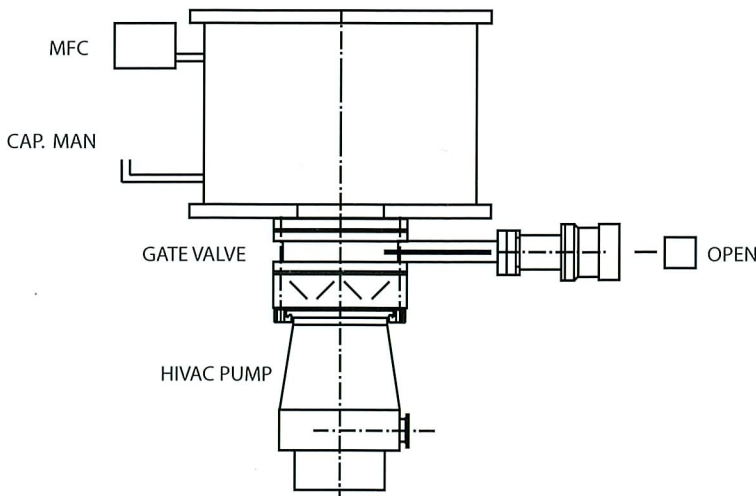
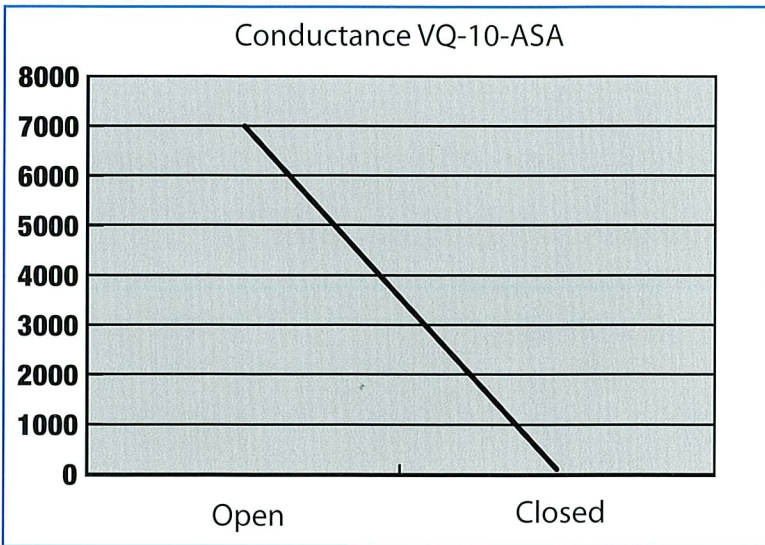
VQ-6-CF-SS-O

- Stainless Steel Body
- 6 inch OD ConFlat flange
- No actuator shown
- Ferro-fluid sealed vane driver feedthrough (optional)



Typical Vari-Q Conductance Performance Characteristics

	Maximum Conductance (l/s)	Minimum Conductance (l/s)
6" ASA	2,450	20
10" ASA	6,900	40
16" ASA	16,200	100
20" ASA	22,000	150
32" ASA	51,200	270
35" ASA	61,700	300



Pressure Control, Two methods of pressure control may be utilized, upstream or downstream.

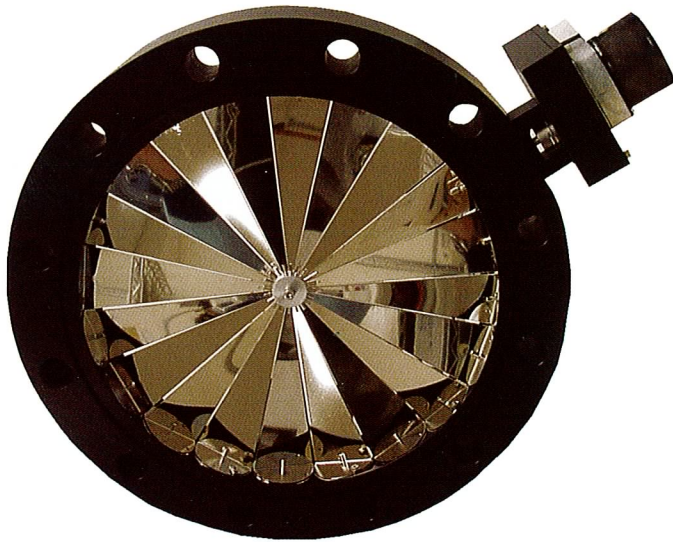
Upstream pressure control is achieved by varying the process gas flow against a fixed conductance such as a pneumatically actuated (PA) throttle valve. Gas flow is varied, (e.g. Mass Flow Controller) to achieve a specific pressure. Process gas flow must be corrected (reduced) to accommodate variations in pressure caused by leaks, gas bursts, or out-gassing from chamber, tooling and substrates.

Downstream pressure control provides a constant process gas flow with pressure control provided by variable conductance Servo Motor driven, Vari-Q model throttle valves. Feedback from a chamber pressure transducer (e.g. capacitance manometer) is compared against a process set-point resulting in a signal to the throttle valve actuator that adjusts the throttle valve position and thereby pumping speed to maintain process gas pressure.

Downstream pressure control has the distinct benefit of improved process residual gas quality. If/when gas load varies, Upstream control reduces process gas flow exacerbating the potentially severe imbalance between pure process gas flow and outgas contamination. This is of particular concern when depositing the first few monolayers of a material. Coincidentally this is a time when plasma energy increases out-gassing. Downstream control on the other hand, does not reduce process gas flow while maintaining process pressure by varying pump stack conductance. In addition, this affords the quick removal of contamination from the process environment. Not only is the contamination ratio minimized, the corrective response of the valve increases pump speed, significantly reducing the period of the event.

Servomotor Driven SM Throttle Valves

For automated closed loop pressure control, a Servomotor (SM) driven throttle valve can provide positional and downstream or upstream pressure control. Pressure reference is accomplished with an external set-point from either a pressure controller or the process system controller. That signal is compared against a pressure measurement transducer, such as a capacitance manometer that is monitoring process chamber pressure. The pressure controller may be rack mounted or, in applications where a dedicated system process controller provides the set-point, a valve mounted pressure controller may be utilized eliminating the need for a rack mounted external control.



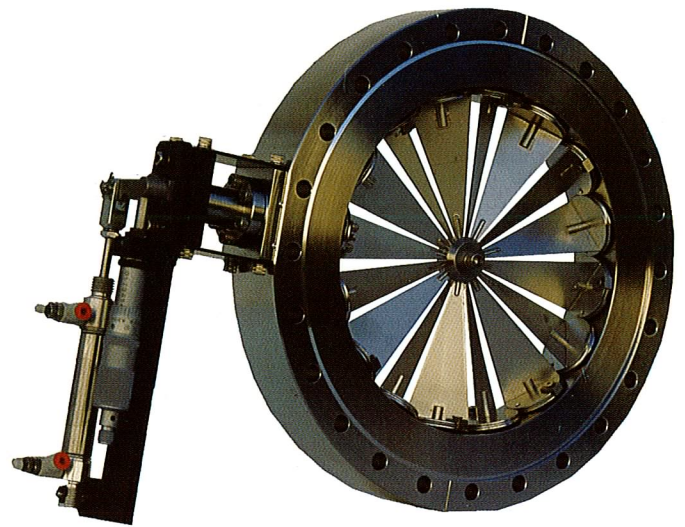
VQ-10-ASA-H-SM

- Aluminum Hard Coated Body
- 10" flange ASA/ANSI Flange
- Servo motor drive (SM)

The need for accurate multi set-point process vacuum pressure control is growing as production sophistication increases. MeiVac's Vari-Q Throttle valves, with precision motor drives, provide equipment suppliers with reliable capability for addressing these needs. Vacuum process systems manufacturers integrate MeiVac Throttle Valves in the equipment to economically maximize process control while minimizing space.

Pneumatic Actuated PA Throttle Valves

For Upstream Pressure control, a throttle valve with precision mechanical reproducibility is required. The PA series throttle valves provide two-position operation, full open, or a preset manually adjusted (throttled) position. A built-in precision micrometer allows mechanical repeatability settings to 0.001 inches. Pneumatic valve actuation from the full open position to throttled position requires 40-55 (maximum) psi compressed air. A four-way 115 VAC solenoid valve, ten feet of 1/8" O.D. tubing and all required fittings are provided.



VQ-6-CF-SS-PA-F

- Stainless Steel body
- Six inch ConFlat, metal sealed flange
- Pneumatic Actuator
- Ferro-fluid sealed vane driver feedthrough (optional)

NOTE: To develop a throttling curve, vacuum chamber pressure is monitored while varying the micrometer stop position or servo motor set-point and gas flow. In this way, calibration curves of chamber pressure, versus gas inlet flow and throttle valve position, may be generated providing useful data for R&D studies and production run specifications.

Rack Mounted Pressure Controller

Precision downstream pressure control on the SM model valves is provided by a rack mounted Self Tuning Digital PID Valve Controller with display. Its self-tuning algorithm brings the system to set point faster than conventional controllers and ensures repeatable process recipes without operator intervention. The self-tuning function determines optimal control parameters for any set-point in the range of the valve by learning time-constants, transfer functions of the valve, characteristics of the pumping system, valve gain, and other important parameters.

This controller includes adjustable soft-start functions for each set-point, open and close functions to minimize turbulence in the chamber, local / remote transducer zeroing capability, and two relays to activate the system functions or to indicate if the pressure deviates from the desired set-point. All controls are easily accessed via a simple to use front panel, or remotely through RS-232, TTL, or analog voltage. LCD readout shows valve position and displays pressure in a wide range of engineering units. Five reprogrammable set-points are provided for pressure or position control.

Standard Features

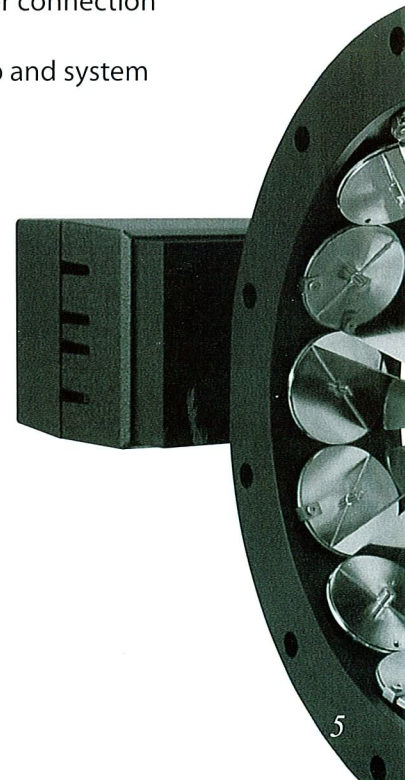
- Multi set-point (Five programmable from front panel or external)
- RS-232 Interface
- Soft-Start
- Self-tuning Control
- PID Control
- Remote Zero
- Remote Control Override: open, close, hold
- Relay outputs, two

On Valve Pressure Controller

MeiVac valves can be supplied with optional on-valve pressure controllers specifically designed for process computers or PLC controls. These controllers offer either digital or analog modes integrated into the process control system. The valve mounted pressure controller integrates control, communications, and driver circuits in a compact module with the valve driver. The mounting configuration for this on-valve module is the same as that used for the Pneumatic (PA) or Servomotor (SM) drivers for ease of interchange. For flexibility of function the valve may be operated in upstream or downstream control configurations. Operationally the on-valve module receives pressure input from a user supplied pressure transducer and compares it to the set-point input from the system controller in an internal PID loop. This input can be received as RS-232 digital or 0-10V DC analog signal.

Standard Features

- Digital or analog pressure or position control
 - RS-232
 - Analog 0-10VDC
- On-valve control integration
 - No rack mount required
 - Communications and drive circuits included
- Direct pressure transducer connection
- Built-in diagnostics
- Manual override for setup and system maintenance



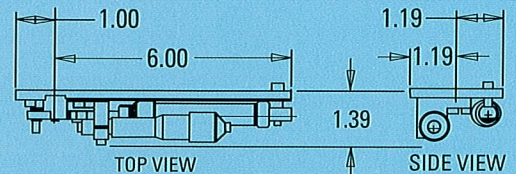
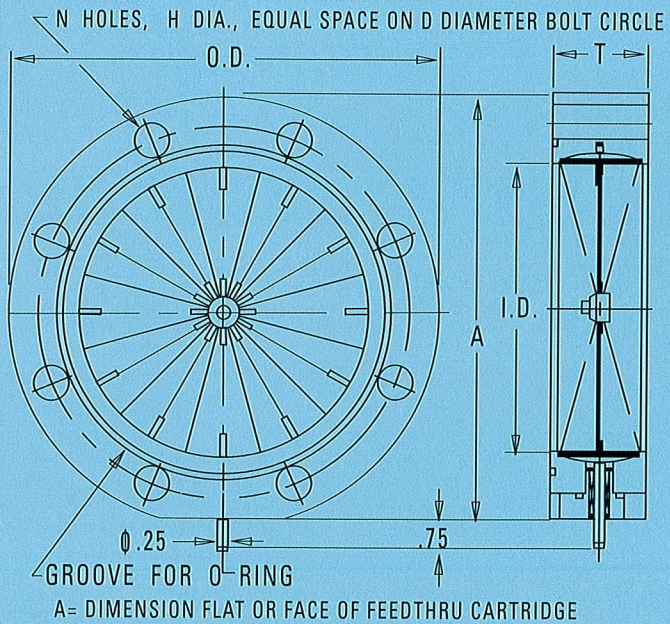
DIMENSIONAL TABLE OF VQ THROTTLE VALVES

O.D.	Flange Outside Diameter
I.D.	Flange Inside Diameter
T	Flange Thickness
A	Assembly width at actuator Flange
N	Number of mounting bolt holes
H	Diameter of mounting bolt holes
D	Mounting bolt circle diameter
O-ring	Nomenclature or dimensions

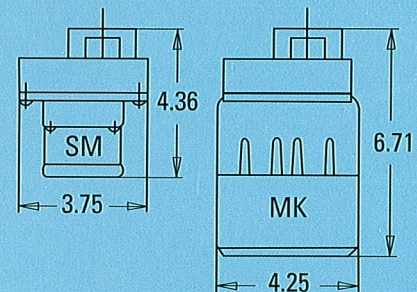
Table refers to schematic callouts on page 7

Model	O.D.	I.D.	T	A	N	H	D	O-Ring
Dimensions in mm								
VQ-100-JIS-x-0	185	102	44	194	8	12	160	120mm ID x 4.7mm C/S
VQ-200-JIS-x-0	300	187	60	287	8	15	269	255mm ID x 6mm C/S
VQ-250-JIS-x-0	350	251	64	364	12	15	320	275mm ID x 6mm C/S
VQ-300-JIS-x-0	400	302	60	398	12	15	370	325mm ID x 6mm C/S
VQ-400-JIS-x-0	520	406	70	522	12	19	480	430mm ID x 6mm C/S
VQ-100-ISO-x-0	165	102	44	174	8	9	145	NA
VQ-160-ISO-x-0	225	153	57	237	8	11	200	NA
VQ-200-ISO-x-0	285	187	60	279	12	11	260	NA
VQ-250-ISO-x-0	335	261	70	348	12	11	310	NA
VQ-400-ISO-x-0	510	400	70	518	16	14	480	NA
Dimensions in inches								
VQ-6-CF-SS-0	5.97	3.688	1.000	6.16	16	0.330	5.130	Cu Gasket
VQ-8-CF-SS-0	7.97	5.702	0.870	8.30	22	0.332	7.128	Cu Gasket
VQ-10-CF-SS-0	9.97	6.438	0.970	10.35	24	0.332	9.128	Cu Gasket
VQ-12-CF-SS-0	12.000	9.868	2.500	12.51	32	0.344	11.181	Cu Gasket
VQ-6-ASA-x-0	11.000	7.376	2.375	10.89	8	0.875	9.500	#2-267
VQ-8-ASA-x-0	13.500	7.376	2.375	13.00	8	1.062	11.750	#2-272
VQ-10-ASA-x-0	16.000	11.875	2.375	15.89	12	0.937	14.250	#5-905
VQ-16-ASA-x-0	23.500	18.000	2.750	23.68	16	1.125	21.250	#2-466
VQ-20-ASA-x-0	27.500	21.000	3.250	27.62	20	1.250	25.000	#2-471
VQ-32-ASA-x-0	38.000	32.120	5.250	38.19	16	0.880	36.250	32.75 ID x 0.275 C/S
VQ-35-ASA-x-0	41.750	35.000	5.250	41.68	14	1.625	38.500	35 ID x 0.275 C/S

VQ AMBIENT TEMPERATURE THROTTLE VALVES



PNEUMATIC ACTUATOR



SERVOMOTOR DRIVES

Dimensions of VQ Throttle Valves

VQ-6-ASA-U-SM

MODEL NUMBER CODE FOR VQ THROTTLE VALVES

ACTUATOR

SM

Servomotor for MeiVac or commercially available rack mounted pressure controllers (e.g. MKS)

MK

Integrated Servomotor and valve mounted computer interfaced controller

PA

Pneumatic actuator

O

No actuator

COATING

U

Clear Alodine Aluminum Flange with SST vanes

H

Hard Coat Black Anodized Aluminum flange with SST vanes

SS

Stainless Steel flange and vanes

FLANGE

ASA, ISO

Flange type

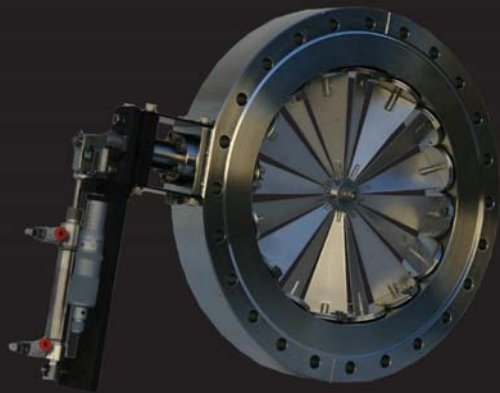
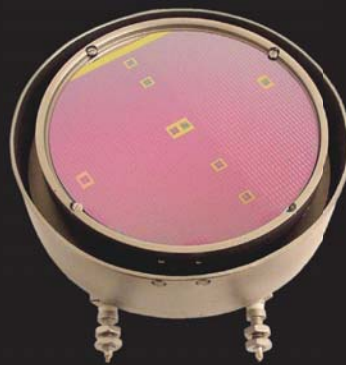
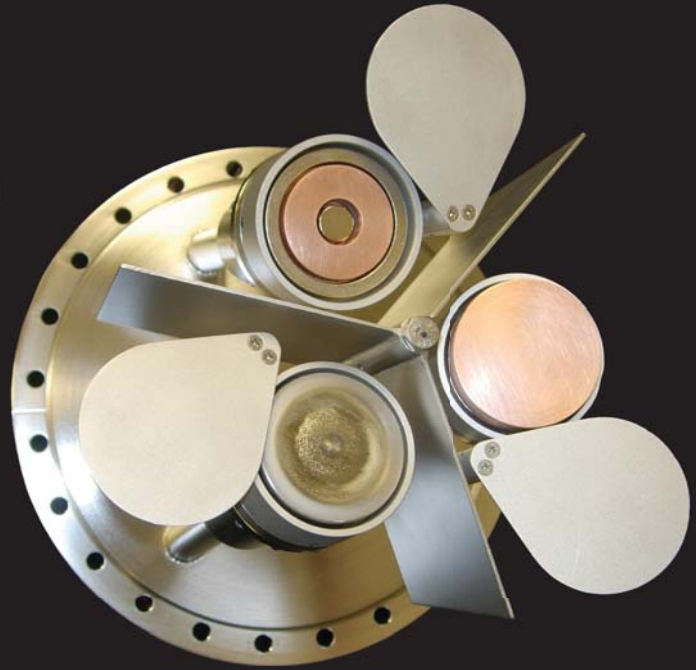
JIS, CF

SIZE

Inches for ASA or CF

Dimension

mm for ISO or JIS



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