

Throttling Butterfly Valves



- Small Footprint/
Compact Design
- Unique Bellows Seal Design
for ultra-clean, high
temperature applications
- Fast Response/
High Resolution
- Power for 2 CDGs embedded
in the Controller Design

**Engineered with
Performance, Reliability
and Value in Mind**

MDC

Engineered Process Solutions

MDC's Throttling Butterfly Valves

Features

Construction:	Stainless Steel body and flanges
Flange type:	ISO KF clamp-style NW25 to NW50 ISO LF bolt-style NW63 to NW250
Seal material:	Viton® or AM-350 stainless steel bellows

Options available upon request

Construction:	Aluminum body and flanges PEEK high temperature isolating thermal block
Flange type:	Metal seal CF-style, ANSI ASA or JIS
Seal material:	Perlast® or Kalrez®
Controller:	Remote/stand alone controller box
Heater jacket:	Custom fit jacket on valve body

Additional details

Contact:	sales@mdcvacuum.com
Download 3D models:	www.mdcvacuum.com

Related valve lines

Sealing throttle valve:	Up to 2-inch size
Gate valve and throttle valve combination:	Up to 6-inch size



ISO LF-100 4-inch
NW100 bolt-style

ISO KF-25 1-inch
NW25 clamp-style

Our new Integrated Throttling Butterfly Valve Line combines high performance analog motion control, a proven high quality valve design and a powerful control algorithm into an excellent cost effective alternative for both OEMs and end users alike. They feature:

- Small footprint/compact design
- Patented bellows seal design option for ultra-clean and high temperature applications
- Fast Response/High Resolution
- Power for 2 CDGs embedded in the Controller Design

The standard configuration provides RS-232 communication, adjustable soft start parameters, 5 non-volatile presets and the ability to utilize two gauges with the onboard $\pm 15V$ power supply. DeviceNet, Profibus and other proprietary communication busses are available as options.

MDC's standard line of Throttling Butterfly Valves are non-sealing and used for downstream pressure control. Standard configurations have a stainless steel body and an elastomer sealed shaft. This is the most economical version. For ultra-clean and/or high temperature applications, a unique bellows sealed version allows for higher operating temperatures and provides virtually particulate-free operation over the life of the valve. MDC's patented bellows sealed TBVs are the only metal sealed vacuum butterfly valves on the market.

Controls are integrated into the unit, with a direct connection to Capacitance Diaphragm Gauges, providing a compact closed-loop pressure control system. The valves can be operated in two modes. The closed loop *pressure control mode* is enabled whenever the valve is directed to change the plate position automatically in order to cause the chamber pressure to match the system pressure set point. Alternatively, the valve can be operated in *valve position control mode* in which the valve is commanded through the software to a series of predetermined angles.

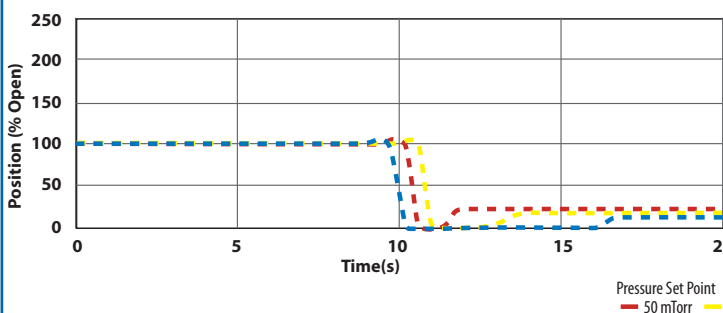
Alternative sealing materials on the standard valve include Perlast® or Kalrez® quadrings for higher temperature applications. The standard aluminum thermal block between the valve and controller is optionally available in PEEK material for greater thermal isolation. A custom heater jacket on the valve body would minimize process gas condensation within the valve.



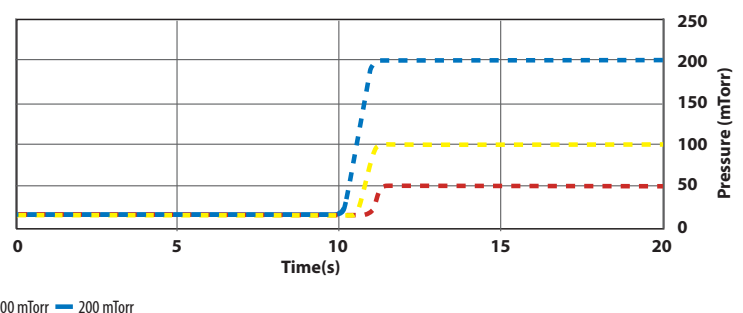
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For more information, please contact:
Phone: 800 443-8817 email: sales@mdcvacuum.com

Position Transition using MDC's 160mm Butterfly Valves



Pressure Transition using MDC's 160mm Butterfly Valves



The above graphs depicts MDC's BV position and chamber pressure following a command to close the loop on 50, 100 or 200 mtorr. The valve responds from fully open to fully closed in less than 1 second. The time to achieve the desired pressure is a function of chamber volume, gas feed rate and pumping speed.

BELLOWS SEALED SHAFT

Mechanical Specifications

Min. Close Time (ms)	100
	For Smallest Valve
Angular Resolution (arc-sec)	6.3
Leak Rate (atm- <i>scc</i> /sec He)	1.0 e -9
Valve Max Operating Temp	50° C
	200° C with temperature isolating block

Power Requirements

Input Power	24 VDC < 100W
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Gauge Power

Auxiliary Power	±15 VDC 1500 mA total
	Power for 2 CDGs available on board

Control

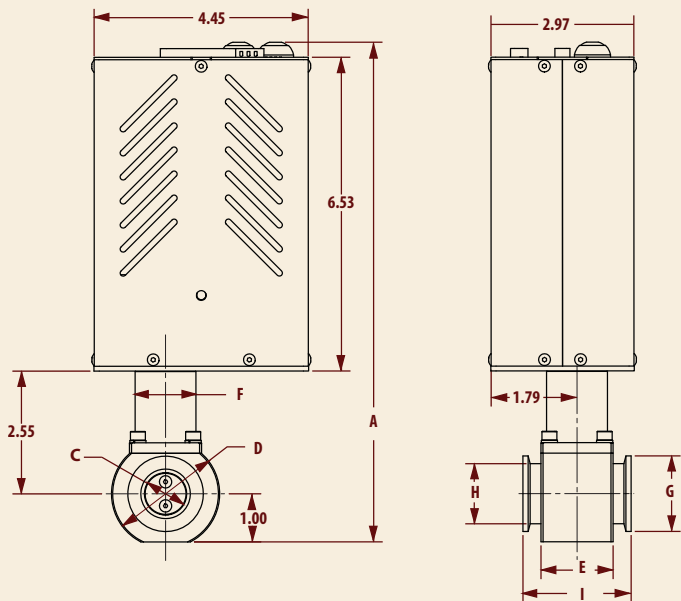
Digital I/O	
Inputs	9
	Valve open, close and stop. Select analog set point. Select set points A-E
Outputs	2
	Valve open, closed
Analog I/O	
Inputs	2
	Analog control signal and range
Outputs	1
	Pressure/position output
Serial Com.	RS-232
	Supports the MKS command set. RS-485 and Ethernet optional
Proprietary Busses	None Standard
	DeviceNet, ProfiBus, EtherNet/IP optional

Pressure Control Specifications

Accuracy (% of gauge reading)	± 0.25
Repeatability (% of gauge reading)	± 0.12
Range (% of gauge range)	0.5 to 100

Lifetime

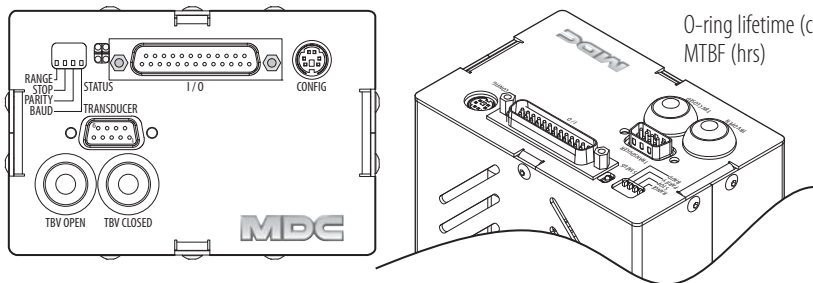
O-ring lifetime (cycles)	>3M
MTBF (hrs)	>10000



The integrated controller is the same size on all Throttling Butterfly Valves. The valve body shown above has ISO KF-25 damp-style flanges.

MDC offers a unique valve construction that includes an AM-350 stainless steel bellows sealed shaft. This is the only throttling butterfly valve on the market with a metal shaft seal. Additionally, a PEEK material thermal block separates the valve body from the controller. The design allows for higher operating temperatures and eliminates any elastomer-to-shaft contact. The metal shaft sealing method provides a pressure control system for high temperature, ultra-clean applications where particulates must be kept to a minimum.

All electronics for operation are included in the integrated controller, providing compact installation with a small footprint. A variety of inputs may be accessed through a standard RS-232 connection to an external computer. Up to five pressure set points or plate positions may be programmed for precise control of process pressure levels. A stepper motor drive provides precision and speed to maintain the pressure set point selected. Power for two Capacitance Diaphragm Gauges is accessible through a connection to the controller.



Part Number	Part Description	Overall Height A	Overall Width B	Valve I.D. C	Body O.D. D	Body Thickness E	Drive Housing Diameter F	Flange O.D. G	Flange Neck O.D. H	Face-to-Face Dim I
371001	TBV Bellows KF-25	10.39"	4.45"	0.88"	2.25"	1.50"	1.27"	1.57"	1.25"	2.25"
371002	TBV Bellows KF-40	10.98"	4.45"	1.39"	2.75"	1.50"	1.27"	2.16"	1.75"	2.25"
371003	TBV Bellows KF-50	11.69"	4.65"	1.87"	3.38"	1.00"	1.27"	2.95"	2.20"	2.50"
371004	TBV Bellows ISO-63	12.49"	5.05"	2.37"	4.17"	1.00"	1.27"	3.74"	3.00"	2.50"
371005	TBV Bellows ISO-80	13.37"	5.47"	2.88"	5.00"	1.00"	1.27"	4.33"	3.50"	2.50"
371006	TBV Bellows ISO-100	14.86"	6.50"	3.87"	6.50"	1.00"	1.27"	N/A	N/A	1.50"
371007	TBV Bellows ISO-160	18.08"	8.86"	5.87"	8.86"	2.00"	1.61"	N/A	N/A	2.00"
371008	TBV Bellows ISO-200	20.58"	11.22"	7.87"	11.22"	2.00"	1.67"	N/A	N/A	2.00"
371009	TBV Bellows ISO-250	22.54"	13.19"	9.76"	13.19"	2.00"	1.67"	N/A	N/A	2.00"

ELASTOMER SEALED SHAFT

Mechanical Specifications

Min. Close Time (ms)	100
	For Smallest Valve
Angular Resolution (arc-sec)	6.3
Leak Rate (atm-scc/sec He)	1.0 e -9
Valve Max Operating Temp	50° C
	150° C with optional seal material

Power Requirements

Input Power	24 VDC < 100W
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Gauge Power

Auxiliary Power	±15 VDC 1500 mA total Power for 2 CDGs available on board
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Control

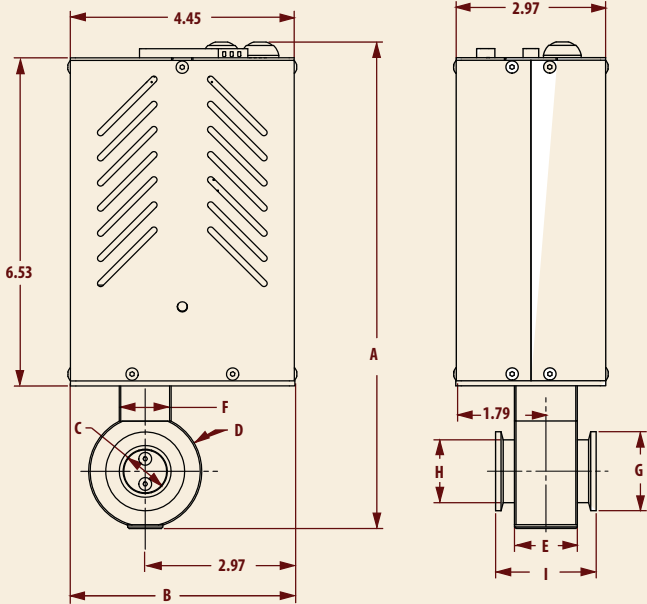
Digital I/O	
Inputs	9
Outputs	Valve open, close and stop. Select analog set point. Select set points A-E 2 Valve open, closed
Analog I/O	
Inputs	2 Analog control signal and range
Outputs	1 Pressure/position output
Serial Com.	RS-232 Supports the MKS command set. RS-485 and Ethernet optional
Proprietary Busses	None Standard DeviceNet, ProfiBus, EtherNet/IP optional

Pressure Control Specifications

Accuracy (% of gauge reading)	± 0.25
Repeatability (% of gauge reading)	± 0.12
Range (% of gauge range)	0.5 to 100

Lifetime

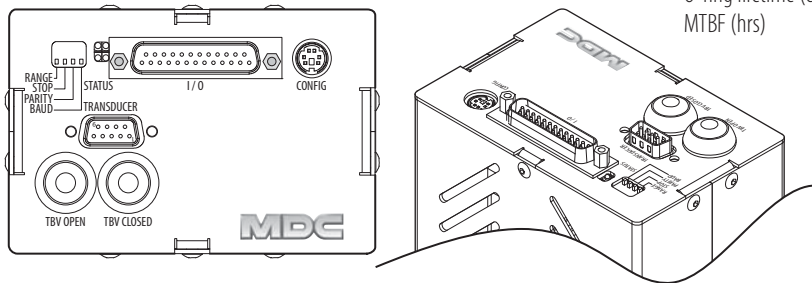
O-ring lifetime (cycles)	>3M
MTBF (hrs)	>10000



The integrated controller is the same size on all Throttling Butterfly Valves. The valve body shown above has ISO KF-25 clamp-style flanges.

The standard configuration includes a Viton® elastomer sealed shaft for economy and where high temperature and ultra-clean requirements are not top priority. Two quad-rings provide a low leak rate for over 3 million cycles. Alternative sealing materials of Perlast® or Kalrez® are available for higher temperature applications or where chemical resistance to process gases is required. For continuous high temperature operation, a PEEK material thermal block separates the valve body from the controller.

All electronics for operation are included in the integrated controller, providing compact installation with a small footprint. A variety of inputs may be accessed through a standard RS-232 connection to an external computer. Up to five pressure set points or plate positions may be programmed for precise control of process pressure levels. A stepper motor drive provides precision and speed to maintain the pressure set point selected. Power for two Capacitance Diaphragm Gauges is accessible through a connection to the controller.



Part Number	Part Description	Overall Height A	Overall Width B	Valve I.D. C	Body O.D. D	Body Thickness E	Thermal Block F	Flange O.D. G	Flange Neck O.D. H	Face-to-Face Dim I
361007	TBV KF-25	9.68"	4.45"	0.88"	2.25"	1.25"	2.00"	1.57"	1.25"	2.00"
361000	TBV KF-40	10.29"	4.45"	1.39"	2.75"	1.50"	1.15"	2.16"	1.75"	2.25"
361001	TBV KF-50	10.79"	4.64"	1.87"	3.38"	1.00"	2.00"	2.95"	2.20"	2.00"
361008	TBV ISO-63	11.61"	5.04"	2.37"	4.17"	1.00"	1.54"	3.74"	3.00"	2.00"
361009	TBV ISO-80	12.45"	5.47"	2.88"	5.00"	1.00"	1.54"	4.33"	3.50"	2.00"
361002	TBV ISO-100	13.70"	6.50"	3.87"	6.50"	1.00"	2.15"	N/A	N/A	1.00"
361003	TBV ISO-160	16.48"	8.86"	5.87"	8.86"	1.25"	2.70"	N/A	N/A	1.25"
361004	TBV ISO-200	18.96"	11.22"	7.87"	11.22"	1.25"	2.70"	N/A	N/A	1.25"
361005	TBV ISO-250	20.92"	13.19"	9.76"	13.19"	1.25"	2.70"	N/A	N/A	1.25"