

# Section 2



## Valves

<b>2.1 Gate valves</b>	113	<b>2.4 In-line valves</b>	164
Introduction	114	DN16 ports	164-165
Options	115	DN40 ports	166-167
Specifications	116-117	DN63 ports	168-169
DN16 16mm ports	118-119	<b>2.5 All-metal valves</b>	170
DN40 38mm ports	120-121	Angle and in-line specifications	170-171
Del-Seal 3½" 50mm ports	122-123	Angle	172
DN63 63.5mm ports	124-125	In-line	173
DN100 102mm ports	126-127	Fine leak	174
DN160 152mm ports	128-129	Precision leak	175
DN200 203mm ports	130-131	<b>Butterfly valves</b>	176
DN250 254mm ports	132-133	19 to 50mm ports	176-177
CF355-304/DN320LF 305mm ports	134-135		
<b>2.2 Rectangular gate valves</b>	136		
SEMI/MESC	136-137		
C-Loc™	138-139		
SEMI/MESC	140-141		
<b>2.3 Angle valves</b>	142		
Introduction	142		
Options	143		
Specifications	144-145		
6.4 and 12.7mm ports	146-147		
DN16CF and DN16KF ports	148-149		
DN25KF ports	150-151		
DN40CF and DN40KF ports	152-153		
DN40KF ports	154-155		
DN63CF and DN63LF ports	156-157		
DN100CF and DN100LF ports	158-159		
DN160CF and DN160LF ports	160-161		
DN200CF and DN200LF ports	162-163		

# Gate valves Million cycle line MC<sup>+</sup>

## Introduction



bonnet flange. The gate closes or opens one of the valves body ports. The valve body is a vacuum tight chamber that is screwed, flanged or welded into a larger vacuum vessel or system.

It is worth noting that reliable vacuum valves were not commercially available until the late 1940s with the advent of O-ring elastomer seals. The elastomer O-ring was developed for use in aircraft hydraulic systems, and was soon thereafter adopted by the vacuum community as the standard means of making vacuum seals. Prior to this it was common practice, even in large research establishments, to upgrade general service valves for vacuum use by winding actuator shaft gaskets from string soaked in an Apiezon grease. Caburn-MDC stainless steel vacuum gate valves incorporate patented C-Loc™ and Uni-Loc™ gate valve locking mechanisms. No contact is made between a valves body and the locking mechanism, a feature which markedly decreases vibration and insures smooth valve operation. Caburn-MDC gate valves require about half the number of moving parts found in comparable competitor valves. This reduction in moving components minimises wear and particulate generation which in turn provides valves of superior performance and reliability. The valves' low outgassing characteristics can be attributed to a fusion welded 300 series stainless steel body, welded AM-350 stainless steel nesting bellows as well as small cross-section O-rings and the elimination of blind internal cavities. Caburn-MDC circular gate valves are offered in various sizes ranging from 16mm to 305mm port diameters. Standard port mounts include: CF metal seal flanges, which are recommended for ultrahigh vacuum service; ISO KF and ISO LF fast make and break elastomer sealed flanges, ideal for high vacuum applications requiring frequent assembly and disassembly. Gate valve actuation is available in both manual and electropneumatic configurations. Custom designed valves are available on request.

In the simplest of terms, vacuum gate valves are devices that regulate the flow of gases, fluids or materials through a structure or aperture by opening, closing or obstructing a port or passageway. Gate valve assemblies consist of three key components: an actuator, a carriage/gate and a valve body. The actuator provides the power to position or transport the valves carriage/gate. The actuator is attached to the valves body via a rectangular

### Standard gate valve features

- UHV and HV series
- Ports with circular or rectangular apertures
- CF, ISO KF or ISO LF port flanges
- Manual and electropneumatic actuators
- Patented C-Loc™ and Uni-Loc™ locking mechanism
- 24V DC air control solenoid valve (Circular and rectangular gate valves)
- OFE copper metal and Viton® elastomer bonnet seals
- Welded bellows actuator seal
- TIG welded internal body joints
- Electropolished interior and exterior surfaces
- Dry film lubricated bearings

### Optional gate valve features

- Modular electromechanical position indicators
- Valve body roughing ports
- High temperature 250°C Kalrez® elastomer gate seal

## Million cycle valves MC<sup>+</sup>

### Features

- Enhanced to withstand 1 million cycles before requiring service.
- Low vibration, quiet operation
- Pneumatically locked in the closed position
- Remains closed in the event of power loss
- Fewer internal parts produce low particle generation

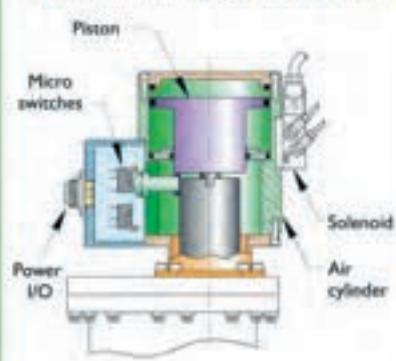
## Mechanical position indicator Option -01



Circular C-Loc™ gate valves can be fitted with optional high precision, modular mechanical position indicators (MPI). This new MPI system consists of two single pole double throw micro switches fitted with integral hinged lever and roller actuators. Each micro switch is wired in a normally open position. Normally closed switches are available on request, and easily modified by reversing standard

factory wiring. Precise positioning of each micro switch is possible by a patented vernier mechanism found only on Caburn-MDC gate valves. MPI connections are made via industry standard seven pin circular threaded connectors supplied with mating female cable connectors. All pneumatic valves include solenoids pre-wired through MPI connector box.

### MPI / Pneumatic actuator detail



# Gate valves Million cycle line MC<sup>+</sup>

## Options



### Air control solenoid valve Option -09 240VAC



Caburn-MDC circular gate valves fitted with standard electropneumatic actuators are equipped with Humphrey 410 series 24V DC air control solenoid valves, optional 240V AC solenoid valves are available on request. All solenoid valves (AC/DC power consumption is 4 watts) are fitted with DIN type connectors that conform to international standards. DIN connectors provide simplicity, convenience and fast, easy electrical installation. Solenoid valves come standard with push button/spring return manual override. Manual override is located at top of solenoid and identified by a prominent red

push button. Solenoid valves are designed for use with compressed air from 0 to 8.6 bar. Air should be clean and uncontaminated. When in doubt, install a filter with filtering capacity of 40 microns. Periodically remove and clean or replace filter elements. All solenoid electrical leads are pre-wired to MPI box connector.

**Caution** Check voltage label on solenoid before connecting power. Do not separate coil portion (black) from body (aluminium).

24V DC solenoid valves are supplied as standard.

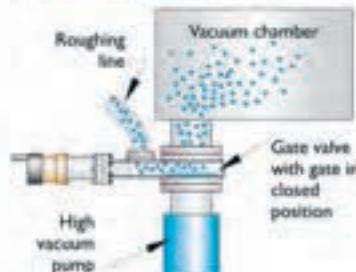
### Roughing port Option -04, -05 and -06

With the exception of the DN16 gate valve, all valves can be fitted with roughing ports. Valves with CF port flanges are supplied with CF roughing port flanges. Flush mounted roughing port flanges have tapped bolt holes, but those with tubular extensions have drilled through bolt holes. Gate valves fitted with ISO KF and ISO LF port flanges are supplied with ISO KF roughing port flanges. Roughing ports will be installed on the side opposite the gate seal (the carriage side of the valve).

Although the location of the roughing port does not affect its function, the positioning of the gate is important.

A roughing port provides a path to a vacuum chamber through the gate valve body. With the gate closed, the valve body and chamber may be evacuated by a vacuum roughing pump.

#### Typical installation



#### Standard gate valve roughing ports include

Option-04	DN40CF to DN63CF valves	DN16CF or DN16KF port
Option-05	DN100CF to DN200CF valves	DN40CF or DN40KF port
Option-06	10 and 12" valves	DN63CF or DN50KF port



### High temperature gate seal Option -11

Gate valves are supplied standard with FKM / FPM fluoroelastomer gate seal. UHV series valves, which have metal sealed bonnet flanges, can be ordered with the high temperature Kalrez® compound 4079 gate seal gasket option. Kalrez® compound 4079 O-rings are suitable for vacuum bakeout to 250°C.

(with gate in an open position). Kalrez® compound 4079 offers excellent chemical resistance and good mechanical properties. When compared to Viton® elastomers, Kalrez® has lower outgassing characteristics for any given temperature from ambient to 250°C.

- When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number.



# Gate valves Million cycle line MC<sup>+</sup>

## Specifications



### Sealing

Valves will seal against 1 bar differential atmospheric pressure in either direction.

### Orientation

Valves can be installed in either a vertical or horizontal orientation.

### Leak tightness

Each valve is tested using a helium mass spectrometer leak detector calibrated for a minimum sensitivity of  $2 \times 10^{-10}$  mbar litre/sec of He. Internal welds are inspected for pits, cracks and other irregularities which may cause virtual leaks.

### Maintenance

Carriage and gate mechanism may be removed through the bonnet flange for seal replacement, cleaning or retrofitting without removing the valve body from the system.

### Manual actuation

Actuators are constructed with non-rising Acme threads for smooth and quick operation. Visual open position indicators are standard on all manual valves.

### Circular gate valves

#### Specifications

##### Material

Body, carriage and gate	300 Series ss
Bellows	AM-350 ss
Air cylinder	Teflon <sup>®</sup> coated aluminium
Bolts	300 Series ss, silver plated

##### Gaskets

Bonnet UHV / HV	OFE Copper / FKM / FPM elastomer
Gate	FKM / FPM or optional Kalrez <sup>®</sup> 4079 elastomer
Piston	FKM / FPM fluoroelastomer elastomer

##### Electropneumatic actuator

Air pressure	5 to 7 bar
Air control valve	410 Series Humphrey solenoid valve
Solenoid power	24V DC, 240V AC-4W
Power loss	Valve closes*
Position indicators	Mechanical, vernier adjustable, hinged-roller type micro switches suitable for 5A, 240V AC

##### Vacuum

Range	$1 \times 10^{-11}$ mbar
Leak test	$2 \times 10^{-10}$ mbar litre/sec of He

**Temperature range** Bakeability under vacuum in open-closed positions, with the following bonnet-gate seal combinations:

Series	Open	Closed	Bonnet	Gate
UHV	200°C	150°C	Copper	FKM/FPM
UHV	250°C	200°C	Copper	Kalrez
HV	150°C	150°C	FKM/FPM	FKM/FPM

##### Weight

See table

##### Dimensions

See table

\* Can be changed to valve open by customer

### Million cycle valves MC<sup>+</sup>

#### Features

- Enhanced to withstand 1 million cycles before requiring service.
- Low vibration, quiet operation
- Pneumatically locked in the closed position
- Remains closed in the event of power loss
- Fewer internal parts produce low particle generation

# Gate valves Million cycle line MC<sup>+</sup>



## Specifications



### Rectangular gate valves

#### Specifications

##### Material

Body, carriage and gate	300 Series ss
Bellows	AM-350 ss
Air cylinder	Teflon <sup>®</sup> coated aluminium
Bolts	300 Series ss, silver plated

##### Gaskets

Bonnet	FKM / FPM fluoroelastomer
Gate	FKM / FPM fluoroelastomer
Piston	FKM / FPM fluoroelastomer

##### Electropneumatic actuator

Air pressure	5 to 7 bar
Air control valve	Herion, double impulse solenoid valve
Solenoid power	24V DC
Power loss	Valve remains in position during air or power failure
Position indicators	Mechanical, vernier adjustable, hinged-roller type micro switches suitable for 5A, 240VAC

##### Vacuum

Range	1x10 <sup>-4</sup> mbar
Leak test	2x10 <sup>-10</sup> mbar litre/sec of He

Temperature range		Bakeability under vacuum in open-closed positions, with the following bonnet-gate seal combination:			
Series	Open	Closed	Bonnet	Gate	
HV	150°C	150°C	Viton <sup>®</sup>	Viton <sup>®</sup>	

##### Weight

Dimensions	See table
------------	-----------

### Million cycle valves MC<sup>+</sup>

#### Features

- Enhanced to withstand 1 million cycles before requiring service.
- Low vibration, quiet operation
- Pneumatically locked in the closed position
- Remains closed in the event of power loss
- Fewer internal parts produce low particle generation

#### Sealing

Valves will seal against 1 bar differential atmospheric pressure in either direction.

#### Orientation

Valves can be installed in either a vertical or horizontal orientation.

#### Leak tightness

Each valve is tested using a helium mass spectrometer leak detector calibrated for a minimum sensitivity of  $2 \times 10^{-10}$  mbar litre/sec of He. Internal welds are inspected for pits, cracks and other irregularities which may cause virtual leaks.

#### Maintenance

Carriage and gate mechanism may be removed through the bonnet flange for seal replacement, cleaning or retrofitting without removing the valve body from the system.

#### Manual actuation

Actuators are constructed with non-rising Acme threads for smooth and quick operation. Visual open position indicators are standard on all manual valves.

# Gate valves Million cycle line MC+

DN16 16mm ports



E-GV-625V

E-GV-625M-P

## UHV Series

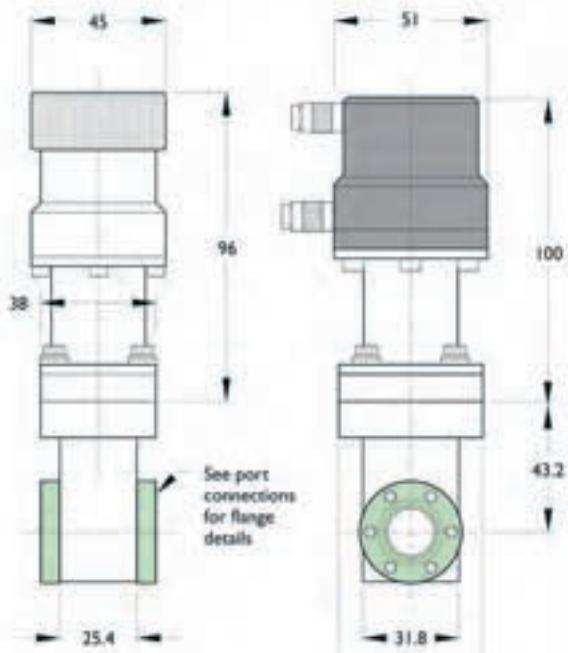
250°C metal sealed bonnets

## HV Series

150°C FKM / FPM O-ring sealed bonnets

### Features

- FKM / FPM O-ring sealed gates
- Stainless steel construction
- Manual or electropneumatic operation



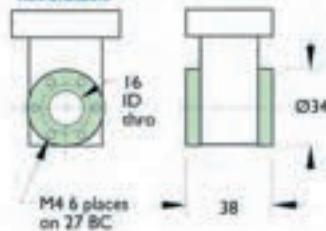
## Port connections

### CF



DN16CF

Roughing ports  
not available

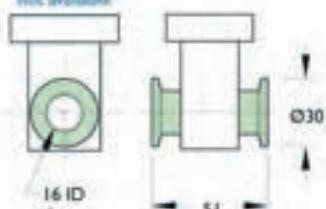


### ISO KF



DN16KF

Roughing ports  
not available



Gate valves Million cycle line MC<sup>+</sup>

DN16 16mm ports

## UHV Series

Metal seal bonnet 250°C

Actuator	Port flange	Flange thread	Bonnet seal	Wt kg	Reference	Part number
Manual	DN16CF	M4	Metal	0.9	E-GV-625M	302011
Pneumatic	DN16CF	M4	Metal	0.9	E-GV-625M-P	303011-03

## HV Series

FKM/FPM seal bonnet 150°C

Actuator	Port flange	Flange thread	Bonnet seal	Wt kg	Reference	Part number
Manual	DN16CF	M4	FKM / FPM	0.9	E-GV-625V	300011
Manual	DN16KF	—	FKM / FPM	0.9	KGV-625V	306000-03
Pneumatic	DN16CF	M4	FKM / FPM	0.9	E-GV-625V-P	301011-03
Pneumatic	DN16KF	—	FKM / FPM	0.9	KGV-625V-P	307000-03

## Valve options

All **pneumatic valves** are supplied with 24V DC air control solenoids as standard.

**Temperature range** Bakeability under vacuum in open-closed positions, with the following bonnet-gate seal combinations:

Series	Open	Closed	Bonnet	Gate
UHV	200°C	150°C	Copper	FKM/FPM
UHV	250°C	200°C	Copper	Kalrez
HV	150°C	150°C	FKM/FPM	FKM/FPM

**Option -09**  
Air control solenoid valves



**Option -11**  
4079 Kalrez® 250°C gate seal



When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example **303016-03-11**

Description	Option Number
240V AC air control solenoid valve <sup>1</sup>	-09
Kalrez high temp O-ring	-11

<sup>1</sup> Supplied as a spare part – not fitted to valve

## Accessories

## Hardware and gaskets



Gasket kit	Material	Quantity per pack	Reference	Part number
Gate and bonnet seal <sup>2</sup>	FKM / FPM	1 <sup>3</sup>	GVG-625	354000
Gate and bonnet seal <sup>2</sup>	FKM / FPM and copper	1 <sup>3</sup>	GVG-625M	355000

Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Metric socket head	M4 x 16mm	DN16CF	25	M4-16	1113000
Clamp	—	DN16KF	1	K16-C	7701000
Centring ring	—	DN16KF	1	K16-CR	7710000

<sup>2</sup> When ordering gasket kits please supply serial number of valve to ensure we supply the correct kit

<sup>3</sup> Each gasket kit contains one bonnet and one gate seal

All dimensions are nominal in millimetres unless specified - Weights given are approximate



## Section 2.1

## Gate valves Million cycle line MC+

DN40 38mm ports

Gate valves



E-GV-1500M

E-GV-1500M-P

## UHV Series

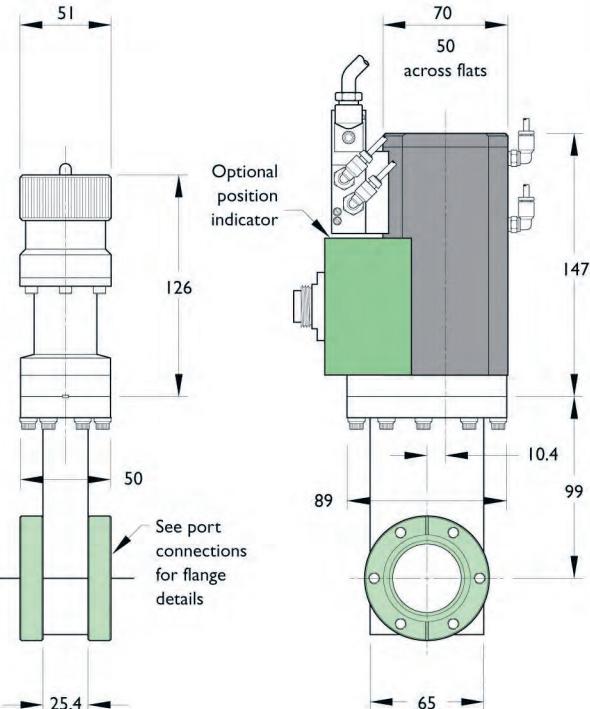
250°C metal sealed bonnets

## HV Series

150°C FKM / FPM O-ring sealed bonnets

## Features

- FKM / FPM O-ring sealed gates
- Stainless steel construction
- Manual or electropneumatic operation

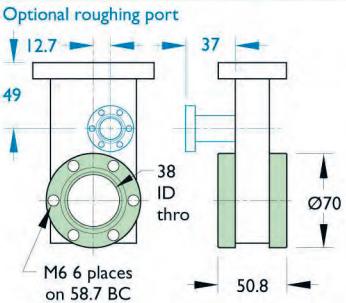


## Port connections

## CF



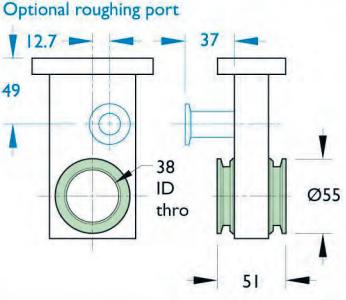
## Optional roughing port



## ISO KF



## Optional roughing port



All dimensions are nominal in millimetres unless specified - Weights given are approximate

## Gate valves Million cycle line MC+

DN40 38mm ports



## UHV Series

Metal seal bonnet 250°C

Actuator	Port range	Flange thread	Bonnet seal	Wt kg	Reference	Part number
Manual	DN40CF	M6	Metal	2.7	E-GV-1500M	302012
Pneumatic	DN40CF	M6	Metal	2.7	E-GV-1500M-P	303012-03

## HV Series

FKM/FPM seal bonnet 150°C

Actuator	Port range	Flange thread	Bonnet seal	Wt kg	Reference	Part number
Manual	DN40CF	M6	FKM / FPM	2.7	E-GV-1500V	300012
Manual	DN40KF	—	FKM / FPM	2.3	KGV-1500V	306001
Pneumatic	DN40CF	M6	FKM / FPM	2.7	E-GV-1500V-P	301012-03
Pneumatic	DN40KF	—	FKM / FPM	2.3	KGV-1500V-P	307001-03

## Valve options

Option -01  
Mechanical position indicatorOption -09  
Air control solenoid valvesOption -04 DN16CF or  
DN16KF roughing portsOption -11  
4079 Kalrez® 150°C gasket**All pneumatic valves** are supplied with 24V DC air control solenoids as standard.

When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example 303016-03-11

**Temperature range** Bakeability under vacuum in open-closed positions, with the following bonnet-gate seal combinations:

Series	Open	Closed	Bonnet	Gate
UHV	200°C	150°C	Copper	FKM/FPM
UHV	250°C	200°C	Copper	Kalrez
HV	150°C	150°C	FKM/FPM	FKM/FPM

## Description

Mechanical position indicator  
DN16CF or DN16KF roughing ports  
240V AC air control solenoid valve  
Kalrez high temperature O-ring

## Option Number

-01  
-04  
-09  
-11

† Supplied as a spare part – not fitted to valve

## Accessories

## Hardware and gaskets



Gasket kit	Material	Quantity per pack	Reference	Part number
Gate and bonnet seal	FKM / FPM	1†	GVG-1500	354001
Gate and bonnet seal	FKM / FPM and copper	1†	GVG-1500M	355001

Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Metric hex head set	M6 x 25mm	DN40CF	25	M6-25	1113006
Clamp	—	DN40KF	1	K40-C	7701002
Centring ring	—	DN40KF	1	K40-CR	7710002

† When ordering gasket kits please supply serial number of valve to ensure we supply the correct kit

† Each gasket kit contains one bonnet and one gate seal

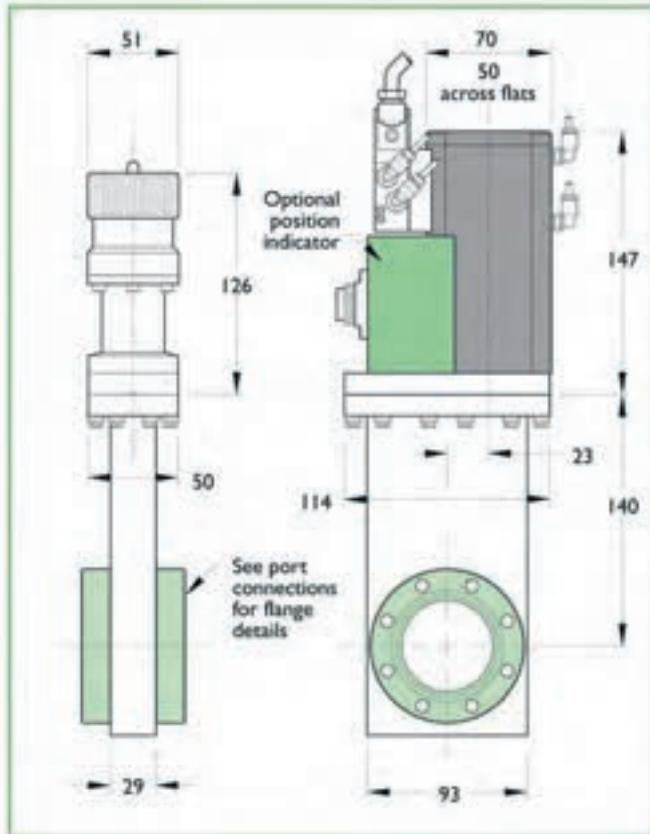
## Gate valves Million cycle line MC+

**Del-Seal® 3 $\frac{3}{8}$ " 50mm ports**



E-GV-2000M

E-GV-2000M-P



## **UHV Series**

250°C metal sealed bonnets

HV Series

#### **150°C FKM / FPM O-ring sealed bonnets**

## Features

- FKM / FPM O-ring sealed gates
  - Stainless steel construction
  - Manual or electropneumatic operation

## Port connections

CF



ISO K



\* 3½" (DN50CF) is not an international ISO size

# Gate valves Million cycle line MC<sup>+</sup>

Del-Seal® 3½" 50mm ports

**UHV Series****Metal seal bonnet 250°C**

Actuator	Port flange	Flange thread	Bonnet seal	Wt kg	Reference	Part number
Manual	DN50CF*	M8	Metal	5.0	E-GV-2000M	302013
Pneumatic	DN50CF*	M8	Metal	5.0	E-GV-2000M-P	303013-03

**HV Series****FKM/FPM seal bonnet 150°C**

Actuator	Port flange	Flange thread	Bonnet seal	Wt kg	Reference	Part number
Manual	DN50CF*	M8	FKM / FPM	5.0	E-GV-2000V	300012
Manual	DN50KF	—	FKM / FPM	3.2	KGV-2000V	306002
Pneumatic	DN50CF*	M8	FKM / FPM	5.0	E-GV-2000V-P	301013-03
Pneumatic	DN50KF	—	FKM / FPM	3.2	KGV-2000V-P	307002-03

\* 3½" (DN50CF) is not an international ISO size

**Valve options**

**All pneumatic valves** are supplied with 24V DC air control solenoids as standard.

When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example **303016-03-11**

**Temperature range** Bakeability under vacuum in open-closed positions, with the following bonnet-gate seal combinations:

Series	Open	Closed	Bonnet	Gate
UHV	200°C	150°C	Copper	FKM / FPM
UHV	250°C	200°C	Copper	Kalrez
HV	150°C	150°C	FKM / FPM	FKM / FPM

**Description**

Mechanical position indicator
DN16CF or DN16KF roughing ports
240V AC air control solenoid valve <sup>1</sup>
Kalrez high temperature O-ring

Option Number
-01
-04
-09
-11

<sup>1</sup> Supplied as a spare part – not fitted to valve

**Accessories****Hardware and gaskets**

Gasket kit	Material	Quantity per pack	Reference	Part number
Gate and bonnet seal <sup>2</sup>	FKM / FPM	1 <sup>3</sup>	GVG-2000	354002
Gate and bonnet seal <sup>2</sup>	FKM / FPM and copper	1 <sup>3</sup>	GVG-2000M	355002

Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Metric hex head set	M8 x 25mm	DN50CF*	25	M8-30	1113007
Clamp	—	DN50KF	1	K50-C	7701003
Centring ring	—	DN50KF	1	K50-CR	7710003

\* 3½" (DN50CF) is not an international ISO size

<sup>2</sup> When ordering gasket kits please supply serial number of valve to ensure we supply the correct kit

<sup>3</sup> Each gasket kit contains one bonnet and one gate seal

All dimensions are nominal in millimetres unless specified - Weights given are approximate

## Section 2.1

## Gate valves

**Gate valves Million cycle line MC<sup>+</sup>**

DN63 63.5mm ports



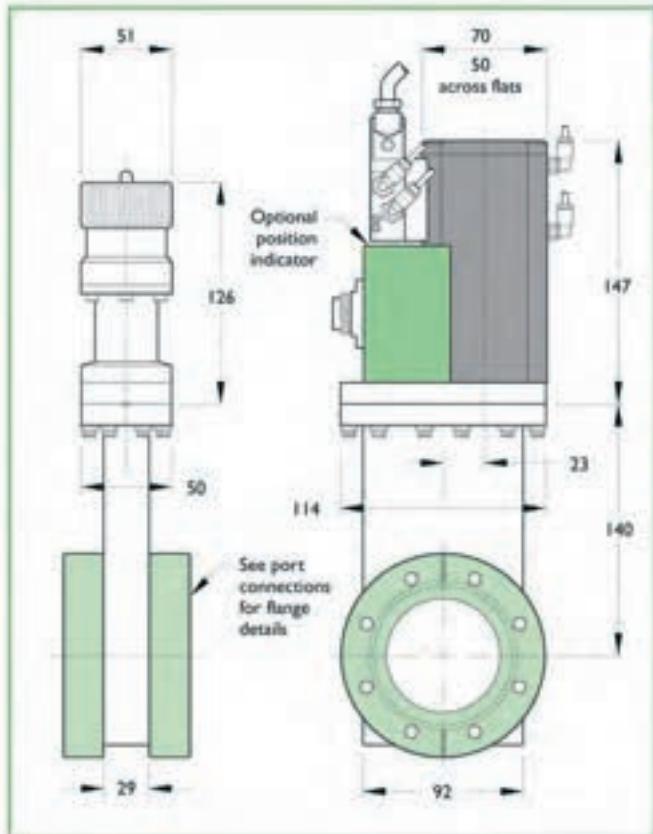
E-GV-2500M



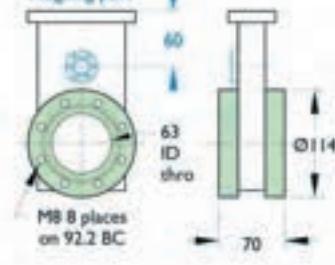
E-GV-2500M-P

**UHV Series****250°C metal sealed bonnets****HV Series****150°C FKM / FPM O-ring sealed bonnets****Features**

- FKM / FPM O-ring sealed gates
- Stainless steel construction
- Manual or electropneumatic operation

**Port connections****CF**

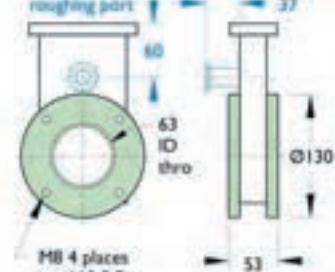
DN63CF

**Optional roughing port**

M8 8 places on 92.2 BC

**ISO LF**

DN63LF

**Optional roughing port**

M8 4 places on 110 BC

All dimensions are nominal in millimetres unless specified - Weights given are approximate

Gate valves Million cycle line MC<sup>+</sup>

DN63 63.5mm ports

## UHV Series

Metal seal bonnet 250°C

Actuator	Port range	Flange thread	Bonnet seal	Wt kg	Reference	Part number
Manual	DN63CF	M8	Metal	5.0	E-GV-2500M	302014
Pneumatic	DN63CF	M8	Metal	5.0	E-GV-2500M-P	303014-03

## HV Series

FKM/FPM seal bonnet 150°C

Actuator	Port range	Flange thread	Bonnet seal	Wt kg	Reference	Part number
Manual	DN63CF	M8	FKM / FPM	5.0	E-GV-2500V	300014
Manual	DN63LF	M8	FKM / FPM	4.5	LGV-2500V	306003
Pneumatic	DN63CF	M8	FKM / FPM	5.0	E-GV-2500V-P	301014-03
Pneumatic	DN63LF	M8	FKM / FPM	4.5	LGV-2500V-P	307003-03

## Valve options

Option -01  
Mechanical position indicatorOption -09  
Air control solenoid valvesOption -04 DN16CF or  
DN16KF roughing portsOption -11  
407F Kalrez® 150°C gasket

All pneumatic valves are supplied with 24V DC air control solenoids as standard.

When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example 303014-03-11

**Temperature range** Bakeability under vacuum in open-closed positions, with the following bonnet-gate seal combinations:

Series	Open	Closed	Bonnet	Gate
UHV	200°C	150°C	Copper	FKM/FPM
UHV	250°C	200°C	Copper	Kalrez
HV	150°C	150°C	FKM/FPM	FKM/FPM

Description	Option Number
Mechanical position indicator	-01
DN16CF or DN16KF roughing ports	-04
240V AC air control solenoid valve <sup>1</sup>	-09
Kalrez high temperature O-ring	-11

<sup>1</sup> Supplied as a spare part – not fitted to valve

## Accessories

## Hardware and gaskets



Gasket kit	Material	Quantity per pack	Reference	Part number
Gate and bonnet seal <sup>2</sup>	FKM/FPM	1 <sup>3</sup>	GVG-2500	354002
Gate and bonnet seal <sup>2</sup>	FKM/FPM and copper	1 <sup>3</sup>	GVG-2500M	355002

Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Metric hex head set	M8 x 30mm	DN63CF	25	M8-30	1113007
Metric hex head set	M8 x 20mm	DN63LF	25	M8-20	1113009
Single claw clamp	—	DN63LF	1 <sup>4</sup>	SCC63/100	1130000
Centring ring	—	DN63LF	1 <sup>5</sup>	L63-CR	7810000

<sup>1</sup> When ordering gasket kits please supply serial number of valve to ensure we supply the correct kit

<sup>2</sup> Each gasket kit contains one bonnet and one gate seal

<sup>3</sup> 3-4 required per flange connection

<sup>4</sup> Includes one elastomer gasket seal

All dimensions are nominal in millimetres unless specified - Weights given are approximate

## Section 2.1

**Gate valves Million cycle line MC<sup>+</sup>**

DN100 102mm ports

Gate valves

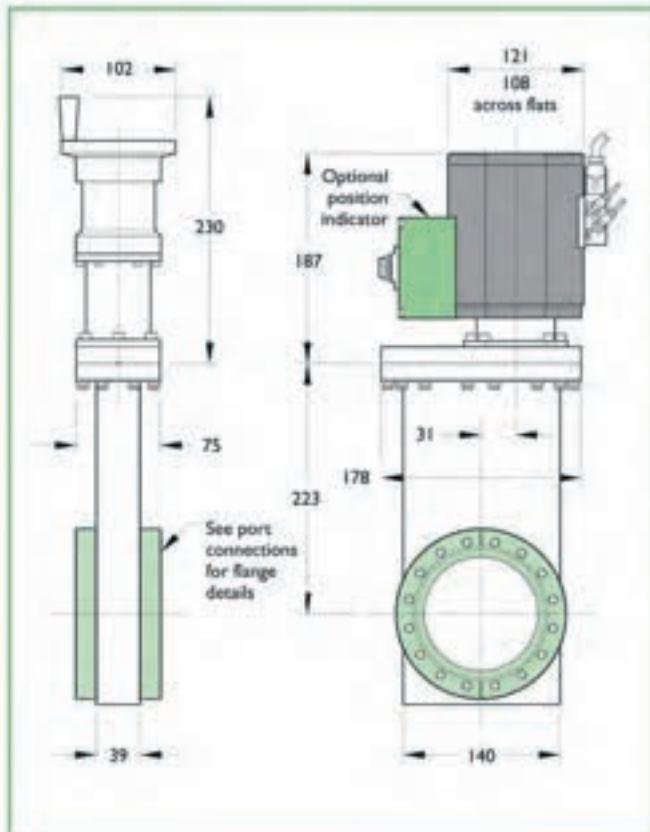
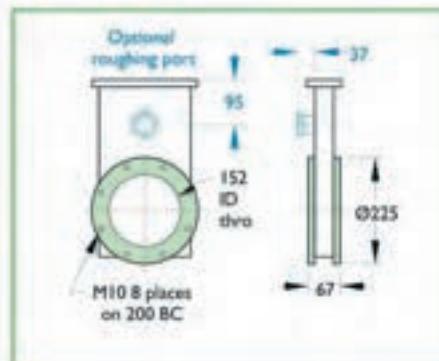
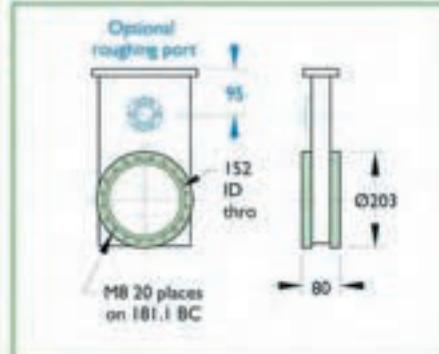


E-GV-4000M-P

E-GV-4000M

**UHV Series****250°C metal sealed bonnets****HV Series****150°C FKM / FPM O-ring sealed bonnets****Features**

- FKM / FPM O-ring sealed gates
- Stainless steel construction
- Manual or electropneumatic operation

**Port connections**

All dimensions are nominal in millimetres unless specified - Weights given are approximate

Gate valves Million cycle line MC<sup>+</sup>

DN100 102mm ports



## UHV Series

Metal seal bonnet 250°C

Actuator	Port range	Flange thread	Bonnet seal	Wt kg	Reference	Part number
Manual	DN100CF	M8	Metal	11.5	E-GV-4000M	302016
Pneumatic	DN100CF	M8	Metal	11.5	E-GV-4000M-P	303016-03

## HV Series

FKM/FPM seal bonnet 150°C

Actuator	Port range	Flange thread	Bonnet seal	Wt kg	Reference	Part number
Manual	DN100CF	M8	FKM / FPM	11.5	E-GV-4000V	300016
Manual	DN100LF	—	FKM / FPM	11.5	LGV-4000V	306005
Pneumatic	DN100CF	M8	FKM / FPM	11.5	E-GV-4000V-P	301016-03
Pneumatic	DN100LF	—	FKM / FPM	11.5	LGV-4000V-P	307005-03

## Valve options

Option -01  
Mechanical position indicatorOption -09  
Air control solenoid valvesOption -04 DN100CF or  
DN100KF roughing portsOption -11  
4079 Kalrez® 250°C gasket

All pneumatic valves are supplied with 24V DC air control solenoids as standard.

When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example 303016-03-11

**Temperature range** Bakeability under vacuum in open-closed positions, with the following bonnet-gate seal combinations:

Series	Open	Closed	Bonnet	Gate
UHV	200°C	150°C	Copper	FKM/FPM
UHV	250°C	200°C	Copper	Kalrez
HV	150°C	150°C	FKM/FPM	FKM/FPM

## Description

Mechanical position indicator  
DN40CF or DN40KF roughing ports  
240V AC air control solenoid valve/  
Kalrez high temperature O-ring

## Option Number

-01  
-05  
-09  
-11

<sup>1</sup> Supplied as a spare part – not fitted to valve

## Accessories

## Hardware and gaskets



Gasket kit	Material	Quantity per pack	Reference	Part number
Gate and bonnet seal <sup>1</sup>	FKM / FPM	1 <sup>2</sup>	GVG4000	354004
Gate and bonnet seal <sup>1</sup>	FKM / FPM and copper	1 <sup>2</sup>	GVG-4000M	355004

Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Metric hex head set	M8 x 35mm	DN100CF	25	M8-35	1113008
Metric hex head set	M8 x 20mm	DN100LF	25	M8-20	1113009
Single claw clamp	—	DN100LF	1 <sup>3</sup>	SCC63/100	1130000
Centring ring	—	DN100LF	1 <sup>3</sup>	L100-CR	7810001

<sup>1</sup> When ordering gasket kits please supply serial number of valve to ensure we supply the correct kit.

<sup>2</sup> Each gasket kit contains one bonnet and one gate seal.

<sup>3</sup> 3-4 required per flange connection

<sup>4</sup> Includes one elastomer gasket seal

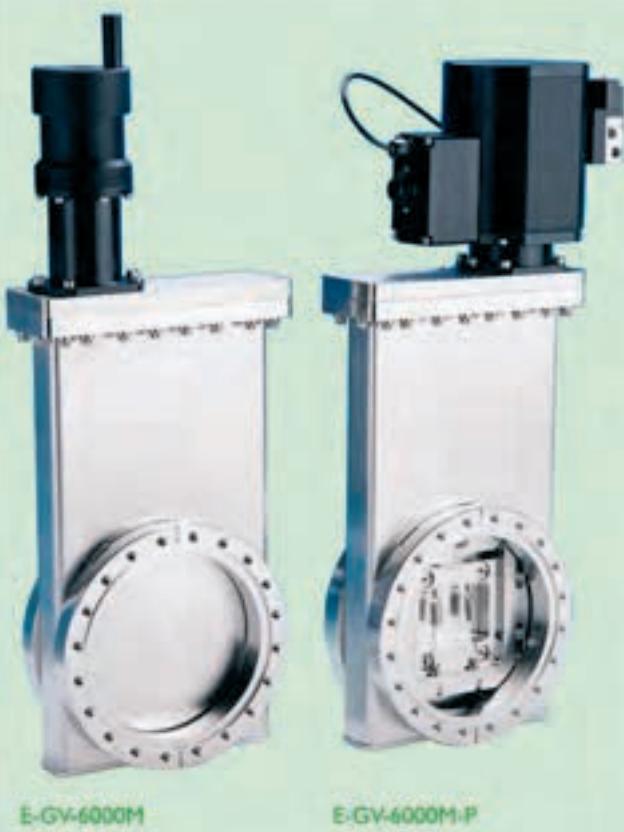
All dimensions are nominal in millimetres unless specified - Weights given are approximate

## Section 2.1

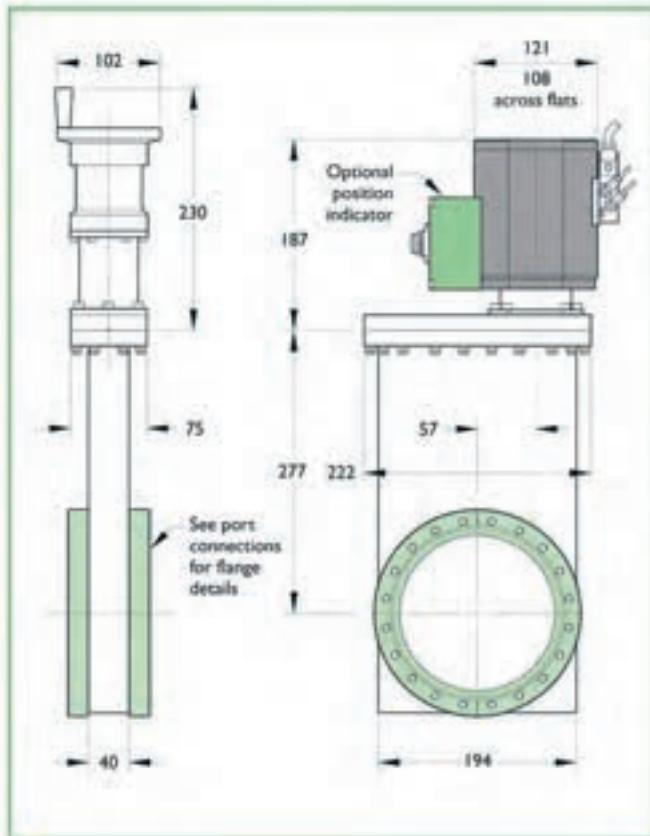
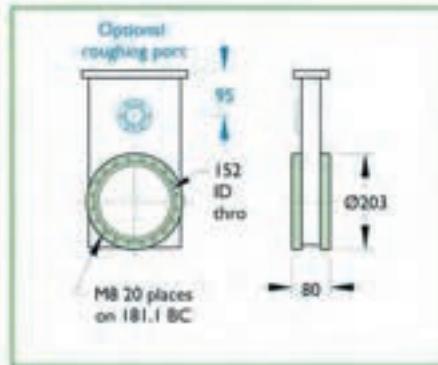
**Gate valves Million cycle line MC<sup>+</sup>**

DN160 152mm ports

Gate valves

**UHV Series****250°C metal sealed bonnets****HV Series****150°C FKM / FPM O-ring sealed bonnets****Features**

- FKM / FPM O-ring sealed gates
- Stainless steel construction
- Manual or electropneumatic operation

**Port connections**

All dimensions are nominal in millimetres unless specified - Weights given are approximate

Gate valves Million cycle line MC<sup>+</sup>

DN160 152mm ports



## UHV Series

Metal seal bonnet 250°C

Actuator	Port range	Flange thread	Bonnet seal	Wt kg	Reference	Part number
Manual	DN160CF	M8	Metal	16.8	E-GV-6000M	302018
Pneumatic	DN160CF	M8	Metal	16.8	E-GV-6000M-P	303018-03

## HV Series

FKM/FPM seal bonnet 150°C

Actuator	Port range	Flange thread	Bonnet seal	Wt kg	Reference	Part number
Manual	DN160CF	M8	FKM / FPM	16.8	E-GV-6000V	300018
Manual	DN160LF	M10	FKM / FPM	15.9	LGV-6000V	306006
Pneumatic	DN160CF	M8	FKM / FPM	16.8	E-GV-6000V-P	301018-03
Pneumatic	DN160LF	M10	FKM / FPM	15.9	LGV-6000V-P	307006-03

## Valve options

Option -01  
Mechanical position indicatorOption -09  
Air control solenoid valvesOption -04 DN160CF or  
DN160KF roughing portsOption -11  
4079 Kalrez® 250°C gasket**All pneumatic valves** are supplied with 24V DC air control solenoids as standard.

When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example 303018-03-11

**Temperature range** Bakeability under vacuum in open-closed positions, with the following bonnet-gate seal combinations:

Series	Open	Closed	Bonnet	Gate
UHV	200°C	150°C	Copper	FKM/FPM
UHV	250°C	200°C	Copper	Kalrez
HV	150°C	150°C	FKM/FPM	FKM/FPM

## Description

Mechanical position indicator  
DN160CF or DN160KF roughing ports  
240V AC air control solenoid valve/  
Kalrez high temperature O-ring

Option Number
-01
-05
-09
-11

Supplied as a spare part – not fitted to valve

## Accessories

## Hardware and gaskets



Gasket kit	Material	Quantity per pack	Reference	Part number
Gage and bonnet seal <sup>1</sup>	FKM / FPM	1 <sup>2</sup>	GVG6000	354006
Gage and bonnet seal <sup>1</sup>	FKM / FPM and copper	1 <sup>2</sup>	GVG-6000M	355006

Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Metric hex head set	M8 x 35mm	DN160CF	25	M8-35	1113008
Metric hex head set	M10 x 30mm	DN160LF	12	M10-30 (12)	1113011
Single claw clamp	—	DN160LF	1 <sup>3</sup>	SCC160/250	1130001
Centring ring	—	DN160LF	1 <sup>4</sup>	L160-CR	7810002

<sup>1</sup> When ordering gasket kits please supply serial number of valve to ensure we supply the correct kit<sup>2</sup> Each gasket kit contains one bonnet and one gate seal<sup>3</sup> 3-4 required per flange connection<sup>4</sup> Includes one elastomer gasket seal

All dimensions are nominal in millimetres unless specified - Weights given are approximate

## Section 2.1

**Gate valves Million cycle line MC<sup>+</sup>**

DN200 203mm ports

Gate valves

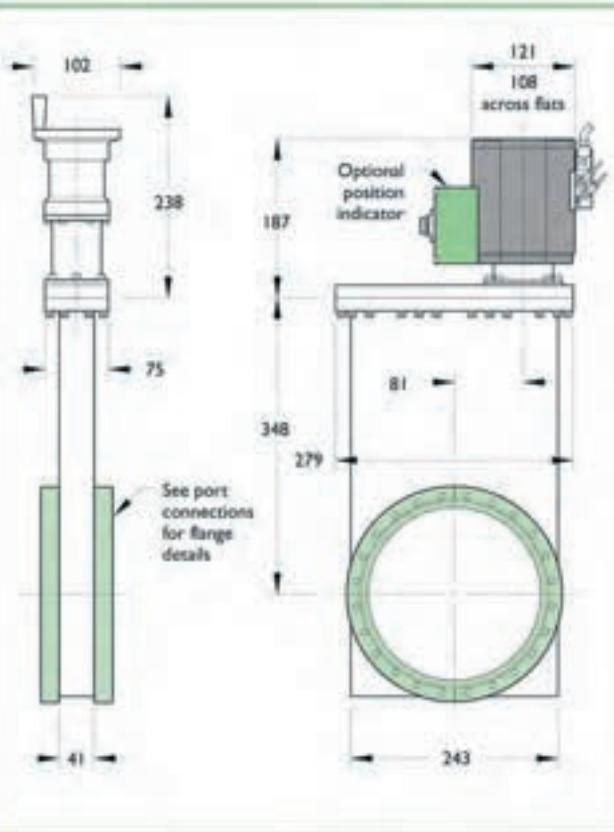


E-GV-6000M

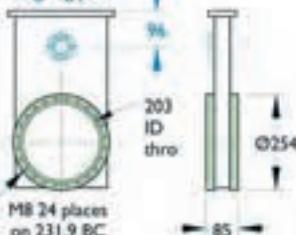
E-GV-6000M-P

**UHV Series****250°C metal sealed bonnets****HV Series****150°C FKM / FPM O-ring sealed bonnets****Features**

- FKM / FPM O-ring sealed gates
- Stainless steel construction
- Manual or electropneumatic operation

**Port connections****CF**

Optional roughing port

**ISO LF**

All dimensions are nominal in millimetres unless specified - Weights given are approximate

Gate valves Million cycle line MC<sup>+</sup>

DN200 203mm ports



## UHV Series

Metal seal bonnet 250°C

Actuator	Port range	Flange thread	Bonnet seal	Wt kg	Reference	Part number
Manual	DN200CF	M8	Metal	25	E-GV-8000M	302019
Pneumatic	DN200CF	M8	Metal	25	E-GV-8000M-P	303019-03

## HV Series

FKM/FPM seal bonnet 150°C

Actuator	Port range	Flange thread	Bonnet seal	Wt kg	Reference	Part number
Manual	DN200CF	M8	FKM / FPM	25	E-GV-8000V	300019
Manual	DN200LF	M10	FKM / FPM	25	LGV-8000V	306007
Pneumatic	DN200CF	M8	FKM / FPM	25	E-GV-8000V-P	301019-03
Pneumatic	DN200LF	M10	FKM / FPM	25	LGV-8000V-P	307007-03

## Valve options

Option -01  
Mechanical position indicatorOption -09  
Air control solenoid valvesOption -04 DN16CF or  
DN16KF roughing portsOption -11  
4079 Kalrez® 250°C gasket

All pneumatic valves are supplied with 24V DC air control solenoids as standard.

When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example 303016-03-11

**Temperature range** Bakeability under vacuum in open-closed positions, with the following bonnet-gate seal combinations:

Series	Open	Closed	Bonnet	Gate
UHV	200°C	150°C	Copper	FKM/FPM
UHV	250°C	200°C	Copper	Kalrez
HV	150°C	150°C	FKM/FPM	FKM/FPM

## Description

Mechanical position indicator  
DNH0CF or DN40KF roughing ports  
240V AC air control solenoid valve  
Kalrez high temperature O-ring

## Option Number

-01  
-05  
-09  
-11

\* Supplied as a spare part – not fitted to valve

## Accessories

## Hardware and gaskets



Gasket kit	Material	Quantity per pack	Reference	Part number
Gate and bonnet seal <sup>1</sup>	FKM / FPM	1 <sup>2</sup>	GVG-8000	354007
Gate and bonnet seal <sup>1</sup>	FKM / FPM and copper	1 <sup>2</sup>	GVG-8000M	355007

Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Metric hex head set	M8 x 35mm	DN200CF	25	M8-35	1113008
Metric hex head set	M10 x 30mm	DN200LF	12	M10-30 (12)	1113011
Single claw clamp	—	DN200LF	1 <sup>3</sup>	SCC160/250	1130001
Centring ring	—	DN200LF	1 <sup>3</sup>	L200-CR	7810004

<sup>1</sup> When ordering gasket kits please supply serial number of valve to ensure we supply the correct kit.

<sup>2</sup> Each gasket kit contains one bonnet and one gate seal.

<sup>3</sup> 3-4 required per flange connection

<sup>4</sup> Includes one elastomer gasket seal

All dimensions are nominal in millimetres unless specified - Weights given are approximate

# Gate valves Million cycle line MC<sup>+</sup>

DN250 254mm ports



E-GV-10000M



E-GV-10000M-P

## UHV Series

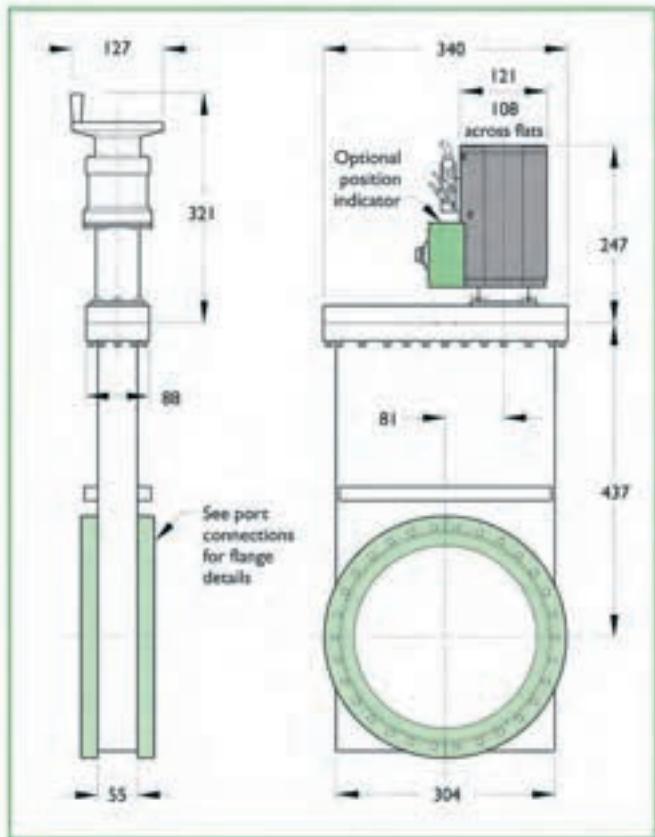
250°C metal sealed bonnets

## HV Series

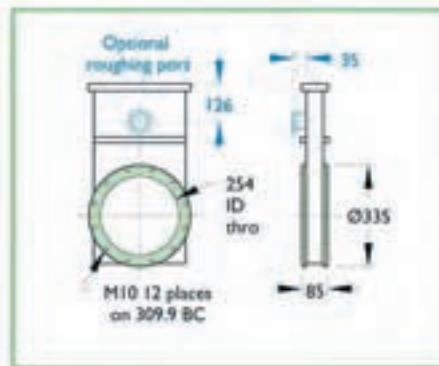
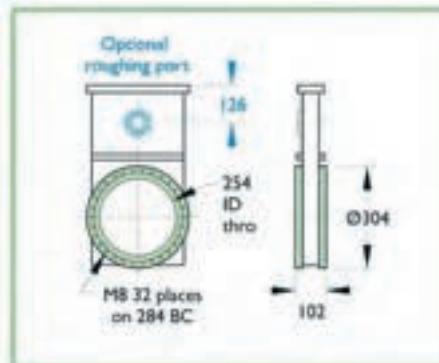
150°C FKM/FPM O-ring sealed bonnets

### Features

- FKM / FPM O-ring sealed gates
- Stainless steel construction
- Manual or electropneumatic operation



## Port connections



All dimensions are nominal in millimetres unless specified - Weights given are approximate

Gate valves Million cycle line MC<sup>+</sup>

DN250 254mm ports



## UHV Series

Metal seal bonnet 250°C

Actuator	Port Range	Flange thread	Bonnet seal	Wt kg	Reference	Part number
Manual	DN250CF	M8	Metal	49.9	E-GV-10000M	302022
Pneumatic	DN250CF	M8	Metal	49.9	E-GV-10000M-P	303022-03

## HV Series

FKM/FPM seal bonnet 150°C

Actuator	Port Range	Flange thread	Bonnet seal	Wt kg	Reference	Part number
Manual	DN250CF	M8	FKM / FPM	49.9	E-GV-10000V	300022
Manual	DN250LF	M10	FKM / FPM	47.7	LGV-10000V	306008
Pneumatic	DN250CF	M8	FKM / FPM	49.9	E-GV-10000V-P	301022-03
Pneumatic	DN250LF	M10	FKM / FPM	47.7	LGV-10000V-P	307008-03

Note E-GV1000M valves have Balzers compatible flanges

## Valve options

Option -01  
Mechanical position indicatorOption -09  
Air control solenoid valvesOption -04 DN16CF or  
DN16LF roughing portsOption -11  
4079 Kalrez® 250°C gate seal**All pneumatic valves** are supplied with 24V DC air control solenoids as standard.

When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example 303016-03-11

**Temperature range** Bakeability under vacuum in open-closed positions, with the following bonnet-gate seal combinations:

Series	Open	Closed	Bonnet	Gate
UHV	200°C	150°C	Copper	FKM/FPM
UHV	250°C	200°C	Copper	Kalrez
HV	150°C	150°C	FKM/FPM	FKM/FPM

## Description

Mechanical position indicator	-01
DN50KF or DN50CF roughing ports <sup>a</sup>	-06
240V AC air control solenoid valve <sup>b</sup>	-09
Kalrez high temperature O-ring	-11
Supplied as a spare part – not fitted to valve	
<sup>a</sup> 3½ (DN50CF) is not an international ISO size	

## Accessories

## Hardware and gaskets



Gasket kit:	Material	Quantity per pack	Reference	Part number
Gate and bonnet seal	FKM / FPM	1 <sup>c</sup>	GVG-10000	354008
Gate and bonnet seal <sup>d</sup>	FKM / FPM and copper	1 <sup>c</sup>	GVG-10000M	355008

Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Metric hex head set	M8 x 50mm	DN250CF	32	M8-50 (32)	1113010
Metric hex head set	M10 x 30mm	DN250LF	12	M10-30 (12)	1113011
Single claw clamp	—	DN250LF	1 <sup>e</sup>	SCC160/250	1130001
Centring ring	—	DN250LF	1 <sup>e</sup>	L200-CR	7810003

<sup>c</sup> When ordering gasket kits please supply serial number of valve to ensure we supply the correct kit<sup>d</sup> Each gasket kit contains one bonnet and one gate seal<sup>e</sup> 3-4 required per flange connection<sup>f</sup> Includes one elastomer gasket seal

All dimensions are nominal in millimetres unless specified - Weights given are approximate

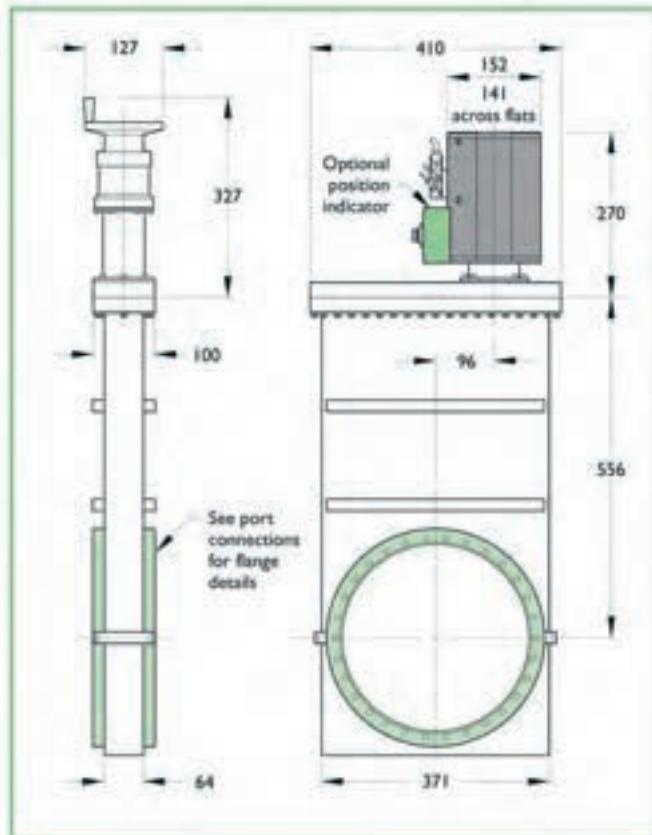
# Gate valves Million cycle line MC+

CF355-304 / DN320LF 305mm ports



E-GV-1200M

E-GV-1200M-P



## UHV Series

250°C metal sealed bonnets

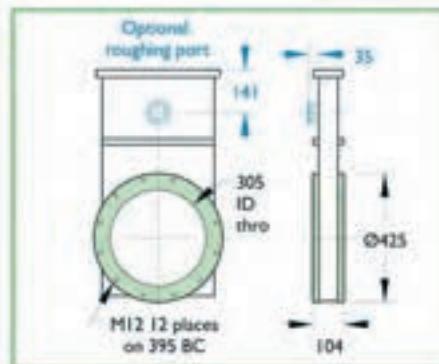
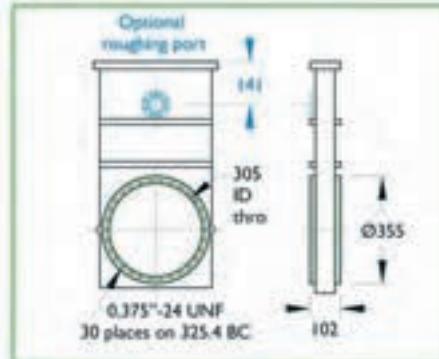
## HV Series

150°C FKM/FPM O-ring sealed bonnets

### Features

- FKM / FPM O-ring sealed gates
- Stainless steel construction
- Manual or electropneumatic operation

## Port connections



# Gate valves Million cycle line MC<sup>+</sup>

CF355-304 / DN320LF 305mm ports



## UHV Series

**Metal seal bonnet 250°C**

Actuator	Port range	Flange thread	Bonnet seal	Wt kg	Reference	Part number
Manual	CF355-304	1/2"-24 UNF	Metal	69.5	GV-I2000M	302009
Pneumatic	CF355-304	1/2"-24 UNF	Metal	69.5	GV-I2000M-P	303009-03

## HV Series

**FKM/FPM seal bonnet 150°C**

Actuator	Port range	Flange thread	Bonnet seal	Wt kg	Reference	Part number
Manual	CF355-304	1/2"-24 UNF	FKM / FPM	69.5	GV-I2000V	300009
Manual	DN320LF	M12	FKM / FPM	67.2	LGV-I2000V	306009
Pneumatic	CF355-304	1/2"-24 UNF	FKM / FPM	69.5	GV-I2000V-P	301009-03
Pneumatic	DN320LF	M12	FKM / FPM	67.2	LGV-I2000V-P	307009-03

## Valve options

**Option -01**  
Mechanical position indicator



**Option -09**  
Air control solenoid valves



**Option -04 DN15CF or DN14KF roughing ports**



**Option -11**  
4079 Kalrez® 250°C gasket



**All pneumatic valves** are supplied with 24V DC air control solenoids as standard.

When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example 303016-03-11

**Temperature range** Bakeability under vacuum in open-closed positions, with the following bonnet-gate seal combinations:

Series	Open	Closed	Bonnet	Gate
UHV	200°C	150°C	Copper	FKM/FPM
UHV	250°C	200°C	Copper	Kalrez
HV	150°C	150°C	FKM/FPM	FKM/FPM

### Description

Mechanical position indicator

DN50KF or DN50CF roughing ports\*

240V AC air control solenoid valve†

Kalrez high temperature O-ring

### Option Number

-01

-06

-09

-11

\* Supplied as a spare part – not fitted to valve

† 3½ (DN50CF) is not an international ISO size

## Accessories

### Hardware and gaskets



Gasket kit	Material	Quantity per pack	Reference	Part number
Gate and bonnet seal <sup>‡</sup>	FKM / FPM	1 <sup>§</sup>	GVG-I2000	354009
Gate and bonnet seal <sup>‡</sup>	FKM / FPM and copper	1 <sup>§</sup>	GVG-I2000M	355009

Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Metric hex head set	1/2"-24 x 2"	CF355-304	30	BA-1001-SP	190065
Metric hex head set	M12 x 40mm	DN320LF	16	M12-40 (16)	1113012
Single claw clamp	—	DN320LF	1 <sup>§</sup>	SCC320/500	1130002
Centring ring	—	DN320LF	1 <sup>§</sup>	L250-CR	7810004

<sup>‡</sup> When ordering gasket kits please supply serial number of valve to ensure we supply the correct kit.

<sup>§</sup> Each gasket kit contains one bonnet and one gate seal.

<sup>†</sup> 3-4 required per flange connection

<sup>‡</sup> Includes one elastomer gasket seal.

All dimensions are nominal in millimetres unless specified - Weights given are approximate

# Gate valves Million cycle line MC<sup>+</sup>

SEMI / MESC



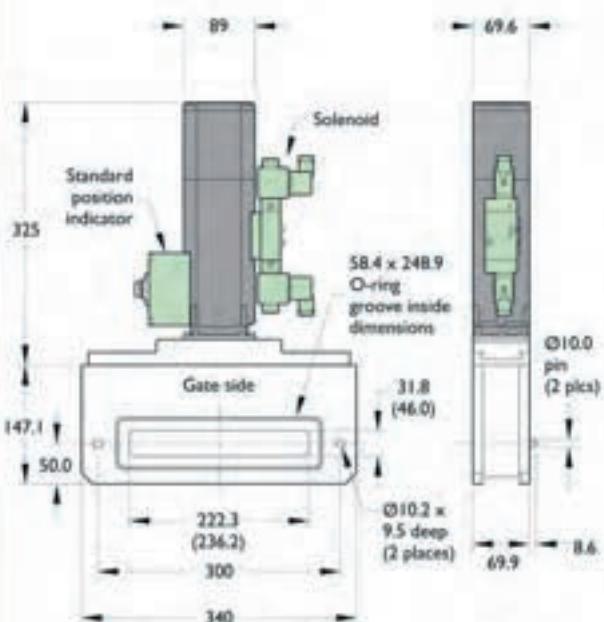
## HV Series

**150°C FKM / FPM O-ring sealed bonnets**

### Features

- FKM / FPM O-ring sealed gates
- Stainless steel construction
- Electropneumatic operation
- Mechanical position indicator
- Patented Uni-Loc™ locking mechanism
- Double impulse 24V DC air control solenoid

### Pneumatic LVHC-18SB



SEMI short for 'Semiconductor Equipment and Materials International' developed the 'Modular Equipment Standards Committee', better known as MESC, to establish global interchangeability and modularity between products from the numerous sources in the semiconductor manufacturing equipment and components industry.

Caburn-MDC LVHC series rectangular gate valves meet or exceed all applicable MESC standards. LVHC valves incorporate a patented one piece gate and carriage design that virtually eliminates vibration and particle generation. O-ring scuffing and wear are non-existent because of a floating driver bar design. The one piece gate and carriage can be removed through the valves bonnet flange for gate seal replacement, cleaning, etc., without disassembling the valve body from the system.

LVHC valves are available in either 70mm (2.75") or 50mm (1.97") flange-to-flange thicknesses, with rectangular ports of 32 x 222mm (1.25" x 8.75") or 46 x 236mm (1.81" x 9.30") dimensions. These valves are designed for use in high vacuum load-lock systems used in semiconductor processing, where low vibration and low particle generation are imperative. The valves' low outgassing characteristics can be attributed to a fusion welded 300 series stainless steel body, welded AM-350 stainless steel nesting bellows as well as small cross section O-rings and the elimination of blind internal cavities. Custom design valves are available on request.

Pneumatic actuators are fitted with mechanical position indicators which indicate fully open and fully closed positions. This MPI system consists of two single pole, double throw micro switches fitted with integral hinged lever and roller actuators. Each micro switch is wired in a normally open position via a seven pin circular threaded connector. Mating female cable connectors are included.

All dimensions are nominal in millimetres unless specified • Weights given are approximate

# Gate valves Million cycle line MC<sup>+</sup>

SEMI / MESC



Normally closed switch wiring is available on request. Precise positioning of micro switches is made possible by a patented vernier adjustment mechanism only available on Caburn-MDC gate valves.

Pneumatic actuators are equipped with dual impulse Herion 24V DC air control solenoid valves.

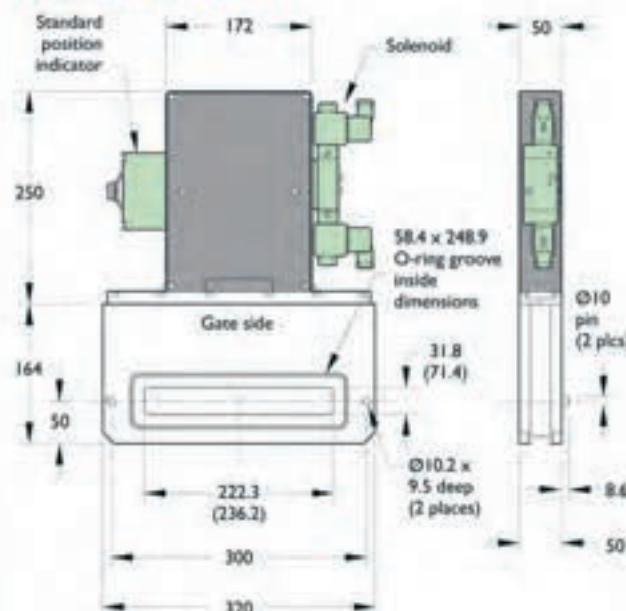
All solenoid valves are fitted with DIN type connectors that conform to international standards. DIN connectors provide simplicity, convenience and fast, easy electrical installation.

Solenoid valves are designed for use with compressed air from 0 to 8.7 bar (working pressure of 4.8 to 6.9 bar). Air should be clean and uncontaminated. When in doubt, install a filter with filtering capacity of 40 microns. Periodically remove and clean or replace filter element.

## Additional features

- SEMI / MESC port flanges for use with claw type fasteners
- 32 x 222mm (1.25" x 8.75") and 46 x 236mm (1.81" x 9.30") rectangular port apertures
- 70mm (2.75") or 50mm (1.97") flange-to-flange body thickness
- FKM / FPM fluoroelastomer bonnet and gate seals
- Welded bellows actuator seal
- TIG welded internal body joints
- Electropolished interior and exterior surfaces
- Low vibration and particle generation
- Dry film lubricated bearings

**Pneumatic LVHC-50SB**



## SEMI / MESC

### HV Series

#### FKM/FPM seal bonnet 150°C

Actuator	Port Range	Bonnet seal	Wt kg	Reference	Part number
Pneumatic	32 x 222	FKM / FPM	18.6	LVHC-18SB	330001
Pneumatic	32 x 236	FKM / FPM	18.6	LVHC-18LB	330004
Pneumatic	46 x 222	FKM / FPM	18.6	LVHC-50SB	330005
Pneumatic	46 x 236	FKM / FPM	18.6	LVHC-50LB	330006

## Accessories

### Hardware and gaskets



Gasket kit	Material	Quantity per pack	Reference	Part number
Gate and bonnet seal	FKM / FPM	1 <sup>†</sup>	LVHCG-18-SB/LB	330101
Gate and bonnet seal	FKM / FPM	1 <sup>†</sup>	LVHCG-50-SB/LB	330102
Body flange seal	FKM / FPM	2	LVHCG-1850B	330103

Hardware	Thread length	For use with	Reference	Part number
Single claw-clamp	M8 x 35mm	MESC	SCC63/100	1130000
Double claw-clamp	M8 x 35mm	MESC	DCC63/100	1130008

<sup>†</sup> Each gasket kit contains one bonnet and one gate seal

<sup>†</sup> Recommended use of 8 to 12 clamps per side

All dimensions are nominal in millimetres unless specified - Weights given are approximate

# Rectangular gate valves Million cycle line MC<sup>+</sup>

C-Loc™



RGV-1B

RGV-1BP

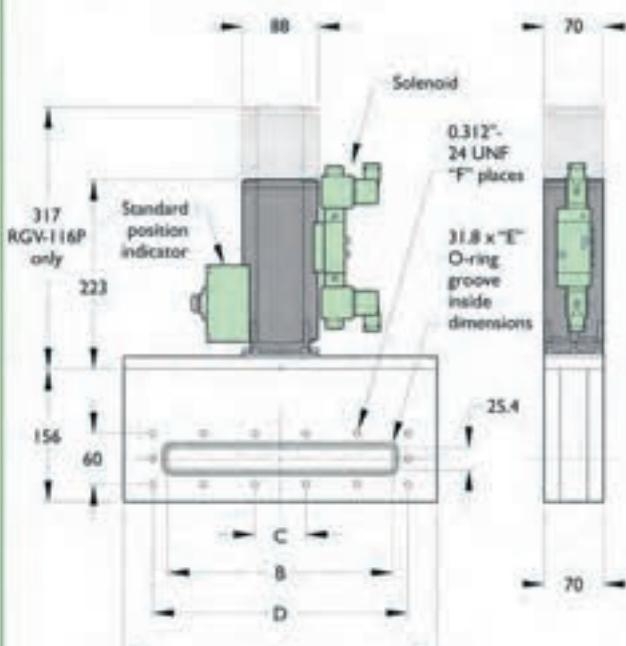
## HV Series

150°C FKM / FPM O-ring sealed bonnets

### Features

- FKM / FPM O-ring sealed gates
- Stainless steel construction
- Electropneumatic operation
- Mechanical position indicator
- Patented Uni-Loc™ locking mechanism
- Double impulse 24V DC air control solenoid

### Pneumatic RGV



RGV stainless steel vacuum gate valves incorporate patented C-Loc™ gate valve locking technology. No contact is made between the valve body and the locking mechanism, a feature which markedly decreases vibration and insures smooth valve operation. RGV valves are designed for use in high vacuum load-lock systems used in semiconductor processing. Low outgassing characteristics can be attributed to fusion welded 300 series stainless steel body and AM-350 stainless steel nesting bellows, small cross-section O-rings and the elimination of blind internal cavities.

Caburn-MDC RGV gate valves are offered in four standard sizes ranging from 25 x 160mm (1" x 6.3") to 25 x 420mm (1" x 16.5") rectangular port dimensions. Flange-to-flange body thickness is 70mm (2.75"). Gate valve actuators are available in both manual and electropneumatic configurations. The gate and carriage can be removed through the valves bonnet flange for gate seal replacement, cleaning, etc., without disassembling the valve body from the system. Custom design valves are available on request.

Pneumatic actuators are fitted with mechanical position indicators which indicate fully open and fully closed positions. This MPI system consists of two single pole, double throw micro switches fitted with integral hinged lever and roller actuators.

# Rectangular gate valves Million cycle line MC<sup>+</sup>

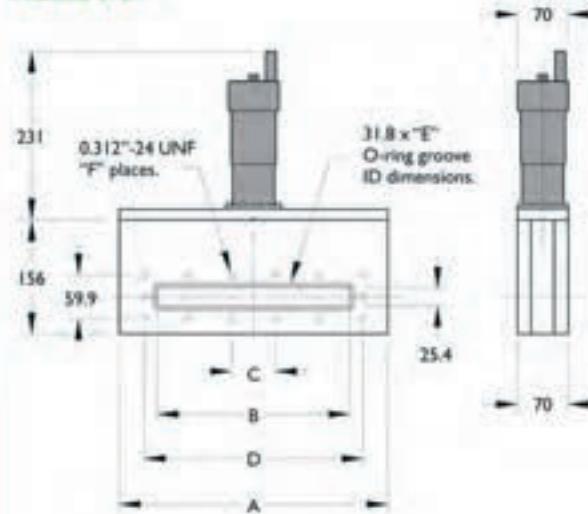
C-Loc™



Each micro switch is wired in a normally open position via a seven pin circular threaded connector. Mating female cable connectors are included. Normally closed switch wiring is available on request. Precise positioning of micro switches is made possible by a patented vernier adjustment mechanism only available on Caburn-MDC gate valves.

Pneumatic actuators are equipped with dual impulse Herion 24V DC air control solenoid valves. All solenoid valves are fitted with DIN type connectors that conform to international standards. DIN connectors provide simplicity, convenience and fast, easy electrical installation. Solenoid valves are designed for use with compressed air from 0 to 8.7 bar (working pressure of 4.8 to 6.9 bar). Air should be clean and uncontaminated. When in doubt, install a filter with filtering capacity of 40 microns. Periodically remove and clean or replace filter element.

## Manual RGV



\* Flange detail is typical both sides

## HV Series 150°C

Actuator	A	B	C	D	E	F	Port flange	Bonnet seal	Wt kg	Reference	Part number
Manual	267	160.0	69.9	209.5	171.5	10	25 x 160	FKM / FPM	27	RGV-16	331000
Manual	317	210.8	59.9	240.0	222.3	12	25 x 211	FKM / FPM	28	RGV-18	331002
Manual	368	264.2	59.9	299.7	270.5	14	25 x 264	FKM / FPM	30	RGV-110	331004
Manual	508	419.1	64.8	453.4	425.5	18	25 x 419	FKM / FPM	34	RGV-116	331013
Pneumatic	267	160.0	69.9	209.5	171.5	10	25 x 160	FKM / FPM	30	RGV-16P	331001
Pneumatic	317	210.8	59.9	240.0	222.3	12	25 x 211	FKM / FPM	31	RGV-18P	331003
Pneumatic	368	264.2	59.9	299.7	270.5	14	25 x 264	FKM / FPM	32	RGV-110P	331005
Pneumatic	508	419.1	64.8	453.4	425.5	18	25 x 419	FKM / FPM	36	RGV-116P	331014

## Accessories

### Hardware and gaskets



Gasket kit:	Material	Quantity per pack	Reference	Part number
25 x 160 Gate and bonnet seal	FKM / FPM	1	RGVG-16	331101
25 x 210 Gate and bonnet seal	FKM / FPM	1	RGVG-18	331102
25 x 264 Gate and bonnet seal	FKM / FPM	1	RGVG-110	331103
25 x 419 Gate and bonnet seal	FKM / FPM	1	RGVG-116	331104
25 x 160 Gate and bonnet seal	FKM / FPM	2	RGVG-16B	331105
25 x 210 Gate and bonnet seal	FKM / FPM	2	RGVG-18B	331106
25 x 264 Gate and bonnet seal	FKM / FPM	2	RGVG-110B	331107
25 x 419 Gate and bonnet seal	FKM / FPM	2	RGVG-116B	331108

Hardware	For use with	Quantity per pack	Reference	Part number
Socket head screw	5/16"-24 x 1"	24	BA-RGV-18	331012

Each gasket kit contains one bonnet and one gate seal.

All dimensions are nominal in millimetres unless specified - Weights given are approximate

# Rectangular gate valves Million cycle line MC+

SEMI / MESC 300mm



LVHC-300MM

## Specifications

### Material

Body and gate	300 Series ss
Bellows	AM-350 ss
Air cylinder	Anodised aluminium
Bolts	300 Series ss

### Gaskets

Bonnet	FKM / FPM fluoroelastomer
Gate	FKM / FPM fluoroelastomer
Piston	FKM / FPM fluoroelastomer

### Electropneumatic actuator

Air pressure	4.8 to 6.9 bar
Air control valve	Herion, double impulse solenoid valve
Solenoid power	24V DC
Power loss	Valve remains in position during air or power failure
Position indicators	Mechanical, vernier adjustable, hinged-roller type micro switches suitable for 5A, 120/240V AC

### Vacuum

Range	$1 \times 10^{-6}$ mbar
Leak test	$2 \times 10^{-6}$ cc/sec of He
Temperature range	150°C Open / 150°C Closed
Weight	34 kg
Dimensions	See drawing

## HV Series

### Features

- FKM / FPM O-ring sealed gate
- Stainless steel construction
- Electropneumatic operation
- Mechanical position indicators
- Patented Uni-Loc™ locking mechanism
- Double impulse 24V DC air control solenoid

### Description

Caburn-MDC LVHC series rectangular gate valves meet or exceed all applicable MESC standards. LVHC valves incorporate a patented one piece gate design that virtually eliminates vibration and particle generation. O-ring scuffing and wear are non-existent because of a floating driver bar design. The one piece gate can be removed through the valves bonnet flange for gate seal replacement, cleaning, etc., without disassembling the valve body from the system.

SEMI short for 'Semiconductor Equipment & Materials International' developed the 'Modular Equipment Standards Committee', better known as MESC, to establish global interchangeability and modularity between products from the numerous sources in the semiconductor manufacturing equipment and components industry.

The 300mm valve is the latest addition to the LVHC series. These valves are designed for use in high vacuum load-lock systems used in semiconductor processing, where low vibration and low particle generation are imperative. The valves low outgassing characteristics can be attributed to a fusion welded stainless steel body, welded AM-350 stainless steel nesting bellows as well as small cross section O-rings.

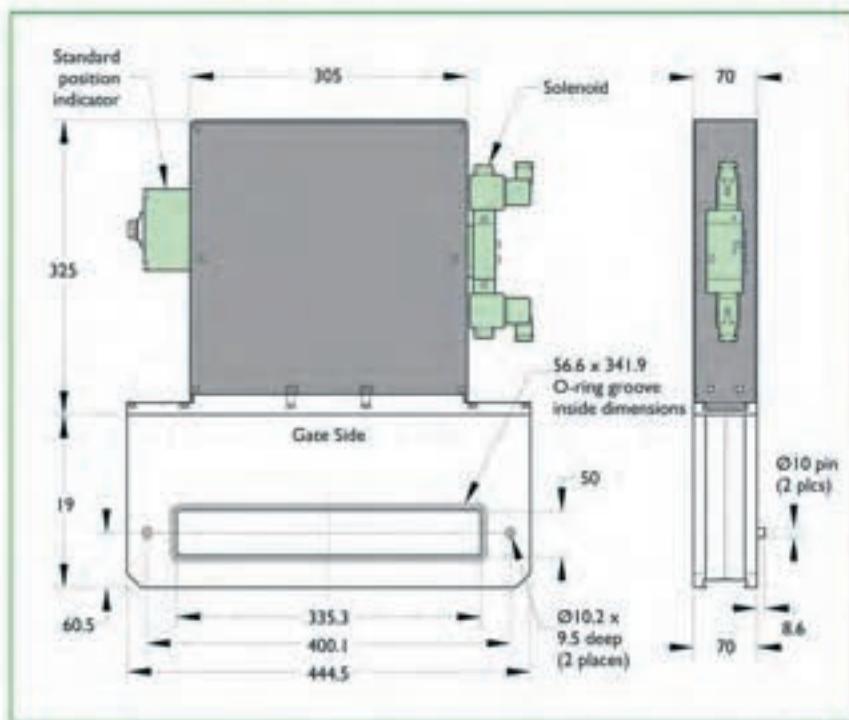
This LVHC valve has a 50 x 335mm rectangular opening to accommodate the next generation of wafer processing. Other standard LVHC valves are available with rectangular ports from 32 x 222mm to 46 x 236mm. The SEMI / MESC port flanges are joined using claw-clamp type fasteners.

Pneumatic actuators are fitted with vernier adjustable mechanical position indicators (MPI) which indicate fully open and fully closed positions. The MPI system consists of two single pole, double throw microswitches fitted with integral hinged lever and roller actuators. Precise positioning of microswitches is made possible by a patented vernier adjustment mechanism only available on Caburn-MDC gate valves. The position indicator is wired via a seven pin circular threaded connector - mating female cable connectors are included.

Pneumatic actuators are equipped with dual impulse Herion 24V DC air control solenoid valves. Solenoid valves are fitted with DIN type connectors, which conform to international standards and provide simplicity, convenience and fast, easy electrical installation. Solenoid valves are designed for use with compressed air from 0-8.6 bar, and are well suited for use with the 4.8 to 6.9 bar pneumatic actuator. Air should be clean and uncontaminated. When in doubt, install a filter with filtering capacity of 40 microns. Periodically remove and clean or replace filter element.

# Rectangular gate valves Million cycle line MC<sup>+</sup>

SEMI / MESC 300mm



## Features

- SEMI / MESC port flanges for use with claw type fasteners
- Welded bellows actuator seal
- Electropolished interior and exterior surfaces
- Low vibration and particle generation

## General guidelines

### Sealing

Valves will seal against 1 bar differential atmospheric pressure in either direction.

### Orientation

Valves can be installed in either a vertical or horizontal orientation.

### Leak tightness

Each valve is tested using a helium mass spectrometer leak detector calibrated for a minimum sensitivity of  $2 \times 10^{-10}$  mbar litre/sec of He.

### Maintenance

Gate mechanism may be removed with the bonnet flange for seal replacement, cleaning or retrofitting without removing the valve body from the system.

### Electropneumatic actuation

Actuation is accomplished by dual air cylinders for uniform sealing pressure. Actuation is directed by a Herion 24V DC double impulse solenoid valve. The solenoid requires an electrical signal to redirect air flow and therefore remains in a static position upon either air or power loss.

## SEMI / MESC

### HV Series

FKM/FPM seal bonnet | 50°C

Actuator	Port range	Bonnet seal	Wt kg	Reference	Part number
Pneumatic	50 x 35	FKM / FPM	18.6	LVHCG-300MM	330007

## Accessories



Gasket kit	Material	Quantity per pack	Reference	Part number
Gate and bonnet seal	FKM / FPM	1	LVHCG-300MH	330104
Body flange seal	FKM / FPM	2	LVHCG-300B	330105
Hardware	Thread length	For use with	Reference	Part number
Single claw-clamp	M8 x 35mm	MESC	SCC63/100	1130000
Double claw-clamp	M8 x 35mm	MESC	DCC63/100	1130008

Each gasket kit contains one bonnet and one gate seal.

All dimensions are nominal in millimetres unless specified - Weights given are approximate



# Angle valves Million cycle line MC<sup>+</sup>

## Introduction

### Angle and In-line valves

Vacuum angle valves are devices that regulate the flow of gases, fluids or materials through a structure or aperture by opening, closing or obstructing a port or passageway. Valve assemblies consist of an actuator, a poppet and a valve body. The actuator provides the power to position or transport the valves poppet which is attached to the valves body via a circular bonnet flange. The poppet closes or opens one of the valves body ports. The valve body is a vacuum tight chamber.



Reliable vacuum valves were not commercially available until the late 1940s with the advent of O-ring elastomer seals. The elastomer O-ring was developed for use in aircraft hydraulic systems, and was soon thereafter adopted by the vacuum community as the standard means of making vacuum seals. Prior to this it was common practice, even in large research establishments, to upgrade general service valves for vacuum use by winding actuator shaft gaskets from string soaked in an Apiezon grease.

Caburn-MDC stainless steel vacuum angle valves have been designed for maximum conductance and minimum size for easy installation. These valves are ideally suited for systems requiring high reliability and low outgassing. The valves' low outgassing characteristics can be attributed to a fusion welded 304 stainless steel body, welded AM-350 stainless steel nesting bellows as well as small cross-section elastomers and the elimination of blind internal cavities.

Caburn-MDC angle valves are offered in various sizes ranging from 6.4 to 254mm port diameters. Standard port mounts include: CF metal seal flanges, recommended for ultrahigh vacuum service; ISO KF and ISO LF fast-make and fast-break elastomer seal flanges, ideal for high vacuum applications requiring frequent assembly and disassembly.

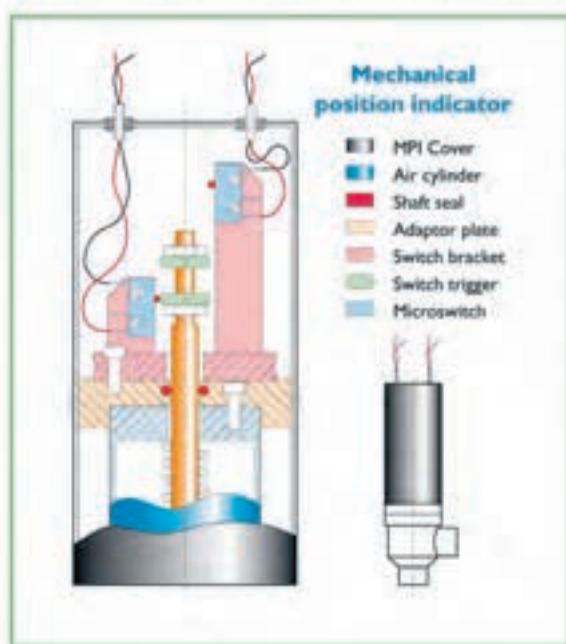
### Standard features

- Enhanced to withstand 1 million cycles before requiring service
- UHV and HV series
- CF, ISO KF and ISO LF port connections
- Manual and electropneumatic actuators
- 24V DC air control solenoid valve
- OFE copper metal and FKM/FPM fluoroelastomer bonnet seals
- Welded bellows actuator seal
- TIG welded internal body joints
- Electropolished interior and exterior surfaces

### Optional features

- Electromechanical position indicator
- Magnetic reed switch position indicators
- Air control solenoid valves for 240VAC
- High temperature 250°C Kalrez® elastomer poppet seal

### Mechanical position indicator Option -01



Caburn-MDC angle valves are available with precision mechanical position indicator (MPI) option. The MPI system consists of two single pole, double-throw micro switches mounted on top of the pneumatic actuator air cylinder. Each micro switch is wired in the normally open position. Wiring in a normally closed position is available on request, and easily modified by reversing standard factory wiring. Precise actuation of each micro switch is factory adjusted by positioning individual switch triggers mounted on the actuator shaft.



# Angle valves Million cycle line MC<sup>+</sup>



## Options

## Magnetic reed-switch position indicator Option -02

Caburn-MDC magnetic reed switches consist of four basic components: a glass capsule, a gas filler (the atmosphere inside the glass capsule), electrical contacts and two ferromagnetic reeds.

The reeds are hermetically sealed into the glass capsule in a cantilever fashion so that the ends align and overlap, while maintaining a small gap between them. The floating end of each reed will assume opposite magnetic polarity when brought into the proximity of a magnetic field. When the magnetic flux density is sufficient, the attraction force of the opposing magnetic poles will overcome the reed stiffness causing them to flex

towards each other and make electrical contact. Since these switches have no mechanical parts to wear out this operation can be repeated millions of times.

The characteristic life expectancy of these switches is rated at 100 million cycles, provided electrical ratings are not exceeded.

Contacts normally open, Caburn-MDC reed switch position indicators will operate at temperatures ranging from -40°C to +125°C.



## Air control solenoid valve Option -09 240V AC

Angle valves fitted with standard electropneumatic actuators are equipped with Humphrey 310 or 410 series 24V DC standard and 240VAC 50/60Hz optional air control solenoid valves. Air-open/spring-close angle and in-line valves use the 310 series solenoids, while the 410 series solenoid is used with the air-open/air-close angle and in-line valves. AC/DC power consumption for this solenoid valve is 4 watts.

All solenoid valves are fitted with DIN type connectors that conform to international standards. DIN connectors provide simplicity, convenience and fast, easy

electrical installation. Solenoid valves come standard with push button/spring return manual override. The manual override is located at the top of the solenoid and identified by a prominent red push button.

Air control solenoid valves are designed for use with compressed air from 0 to 8.6 bar (gauge working pressure of 4.8 to 6.9 bar). Air should be clean and uncontaminated. When in doubt, install a filter with a 40 micron filtering capacity. Periodically remove and clean or replace the filter element.



## High temperature poppet seal Option -11

Angle valves are supplied standard with FKM/FPM fluoroelastomer poppet seals. UHV series valves, which have metal sealed bonnet flanges, can be ordered with the high temperature Kalrez® compound 4079 poppet seal gasket option. Kalrez® compound 4079 elastomers are suitable for vacuum bakeout to 250°C (with poppet in an open position). Kalrez® compound 4079 offers excellent chemical resistance and good mechanical properties. When compared to FKM/FPM fluoroelastomer, Kalrez® has lower outgassing characteristics for any given temperature from ambient to 250°C.

As with standard poppet seals, Kalrez® elastomer seals have a small amount of

Krytox® LVP vacuum grease applied at the time of installation. Vacuum grease should be applied to elastomer gaskets in order to maximise its sealing properties and extend its cycle life.

Installation of a poppet seal is accomplished by pressing an O-ring into the poppet groove first at the 12 and 6 o'clock positions then at the 3 and 9 o'clock positions, etc. Pressing the O-ring into the groove in this manner avoids twisting the O-ring.

**Note** Kalrez® has a much faster permeation rate for helium than does FKM / FPM fluoroelastomer.



# Angle valves Million cycle line MC<sup>+</sup>

## Specifications

### General guidelines

Installation and orientation – Angle valves can be installed using one of various port connections as summarised on page 149. Valves up to and including 100mm ports can be installed in either a vertical or horizontal orientation. Valves with 150mm and larger ports must be installed in a vertical orientation, as shown in the figure below. The bottom port is usually oriented towards the vacuum environment. Mounting in this fashion minimises the in-vacuum volume and also aids poppet sealing when the side port is vented to air.

Sealing – Angle valves can be sealed via manual or electropneumatic actuation. All valves up to 75mm ports will seal against 1 bar differential atmospheric pressure in either a bottom or side port direction. Those with 100mm and larger ports should be installed with vacuum at the valve seat port only, shown as bottom port.



Electropneumatic angle valves with 6.4 to 38mm diameter ports are fitted with air-open/spring-close actuators. Valves with 50mm or larger diameter ports employ air-open/air-close pneumatic actuators. Custom actuator designs are available on request. The solenoid valve temperature should not exceed 50°C. Pneumatically actuated air cylinder seals are FKM / FPM fluoroelastomer O-rings and therefore have a temperature limit of 150°C.

### Maintenance

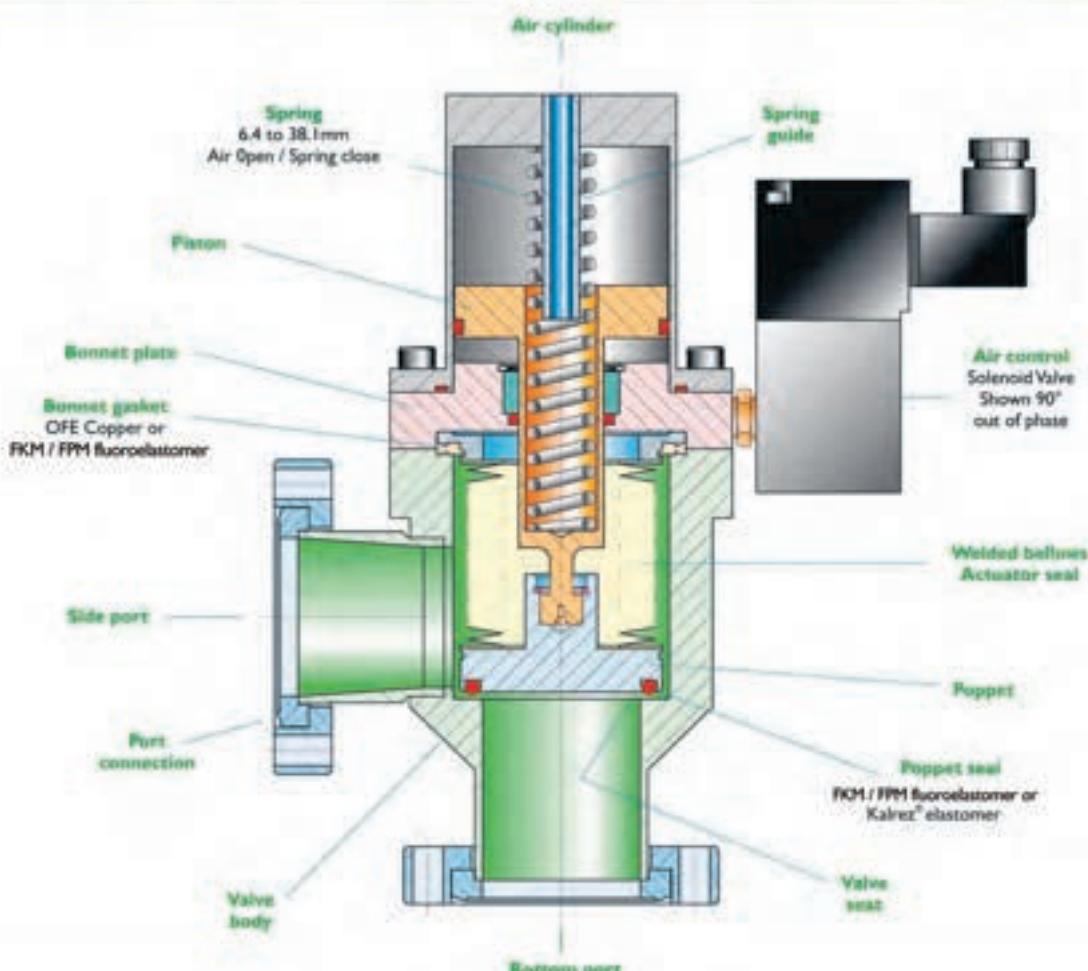
Actuator and poppet mechanism may be removed through the bonnet flange for seal replacement, cleaning or retrofitting without removing the valve body from the system. Refer to instruction manual for details.

### Leak testing

Each valve is tested using a helium mass spectrometer leak detector calibrated for a minimum sensitivity of  $2 \times 10^{-10}$  mbar litre/sec of Helium. Internal welds are inspected for pits, cracks, and other irregularities which may cause virtual leaks.

### Customer note

Bakeout – Air control solenoid valves must be removed or remotely mounted for valve maximum bakeout conditions.



All dimensions are nominal in millimetres unless specified - Weights given are approximate

Angle valves Million cycle line MC<sup>+</sup>

## Specifications



## Specifications

## Material

Flanges	304SS
Valve body	304SS
Air cylinder	Teflon <sup>®</sup> coated aluminium
Actuator seal	AM-350 welded bellows
Gaskets, bonnet	OFE Copper or FKM / FPM fluoroelastomer
Gaskets, poppet	FKM / FPM or Kalrez <sup>®</sup> 4079 elastomer
Gaskets, pneumatic actuator	FKM / FPM fluoroelastomer
Bolts	300 Series Stainless Steel

## Electropneumatic actuator

Air pressure	4.8 to 6.9 bar
Air control valve 6.4 to 38.1	310 Series Humphrey solenoid valve
Air control valve 50.8 to 254	410 Series Humphrey solenoid valve
Solenoid power	24V DC/240V AC 50/60Hz, 4Watts
Power loss	Valve closes
Position indicators, magnetic	0.5A, 240V AC, 10W maximum
Position indicators, mechanical	5A, 240V AC micro switch

## Port fastening

Bolt type	Hex head bolts
Nut type	Hexagonal nuts

## Fastening torque for CF port flanges

M4	10 Nm
M6	16 Nm
M8	20 Nm

## Vacuum

Range	To $1 \times 10^{-3}$ mbar
Leak test	$2 \times 10^{-3}$ mbar litre/sec of He

Temperature range	Bakeability; under vacuum in open/closed positions with the following bonnet/poppet seal combinations
-------------------	-------------------------------------------------------------------------------------------------------

UHV Series with Copper/FKM / FPM 200°C open / 150°C closed

UHV Series with Copper/Kalrez<sup>®</sup> 250°C open / 200°C closed

HV Series with FKM / FPM 150°C open / 150°C closed

## Weight and Dimensions

See tables

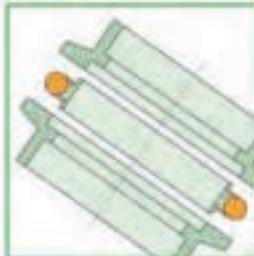
## Port connection guide

Caburn-MDC offers four industry standard port connections. The port connections available for each valve size are depicted in the specific two page valve spread. Port connections not shown, are either not available for that specific valve size or only available on request.

The following port connection guide summarises the four standard connection solutions available. For a detailed discussion of these connections reference Section 1.

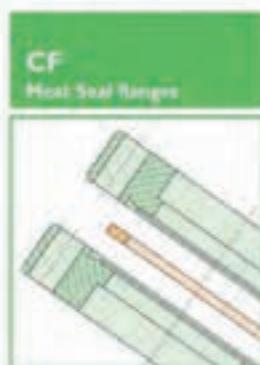
## UHV Flange

CF flanges employ a Conflat<sup>®</sup> compatible knife-edge sealing mechanism which produces a cold-flow deformation of a metal copper gasket. Flanges are available for tube sizes from 6.4 to 355.6mm diameters. They are used in UHV environments where high temperature bake-outs are a must. Both port flanges are rotatable.

ISO KF  
ISO Elastomer seal flanges

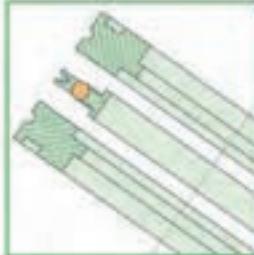
## HV Flange

KF flanges are ideal for vacuum systems requiring frequent assembly and disassembly. Fastening and sealing is achieved by a hinged radial clamp which provides compression of an elastomer gasket. KF flanges comply with all ISO specifications for vacuum hardware and are available for tube sizes up to 50.8mm in diameter.



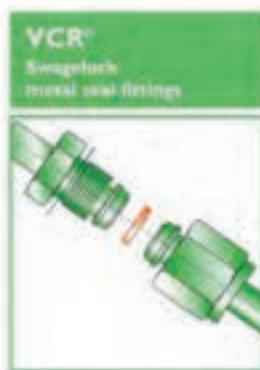
## UHV Tube fitting

Swagelok VCR<sup>®</sup> tube fittings are designed for rapid make-up in tube, pipe and welded systems. They are zero clearance fittings, ideal for installation in limited space. Sealing is accomplished with the compression of a copper metal gasket. They are typically used for gas admission into UHV systems. VCR in  $\frac{1}{4}$ " (6.4mm) tube only.

ISO LF  
ISO Elastomer seal flanges

## HV Flange

LF flanges cover the range from 63.5 to 508mm tube diameters. The main difference between LF and KF flanges is their method of fastening. LF flanges use multiple claw-clamps versus a single hinged radial clamp in KF flanges. They also meet all ISO specifications for vacuum hardware.



**Customer note:** VCR<sup>®</sup> fittings are imperial sizes only

All dimensions are nominal in millimetres unless specified - Weights given are approximate



## Section 2.3

## Gate valves

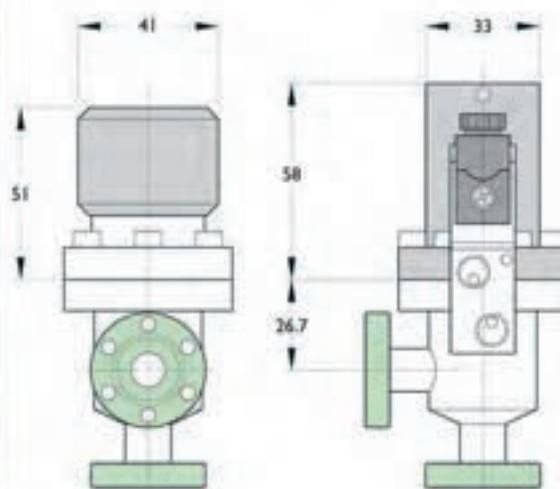
Angle valves Million cycle line MC<sup>+</sup>

6.4 and 12.7mm ports



AV-050

VAV-025-P

See port connections  
for flange details.Position indicators  
are not a standard option  
for 6.4 and 12.7mm valves.  
Contact sales office for  
additional information.

## UHV and HV series

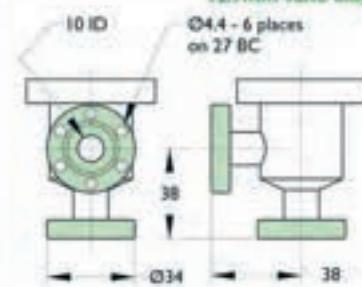
## Metal and elastomer seal bonnets

## Features

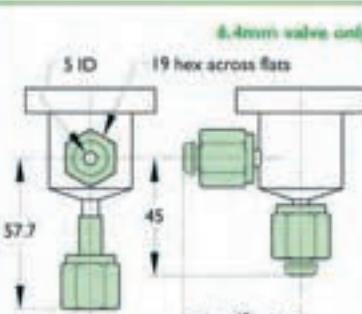
- Stainless steel construction
- Manual or electropneumatic operation
- Air-open / spring-close air cylinder

## Port connections

## CF

DN16CF  
Metal seal flange12.7mm valve only:  
Ø4.4 - 6 places  
on 27 BC

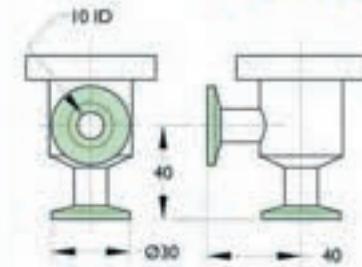
## Female VCR

1/2" (6.4mm)  
Swagelok® VCR fitting6.4mm valve only:  
19 hex across flats

## ISO KF

DN16KF  
Elastomer seal flange

12.7mm valve only:



All dimensions are nominal in millimetres unless specified • Weights given are approximate

Angle valves Million cycle line MC<sup>+</sup>

6.4 and 12.7mm ports

## UHV Series

## Metal seal bonnet 250°C

Valve size	Actuator	Port range	Bonnet seal	Wt kg	Reference	Part number
6.4	Manual	Female VCR	Metal	0.5	VAV-025M	301053
6.4	Pneumatic	Female VCR	Metal	0.5	VAV-025M-P	313070-03
12.7	Manual	DN16CF	Metal	0.5	AV-050M	312055
12.7	Pneumatic	DN16CF	Metal	0.5	AV-050M-P	313072-03

## HV Series

## FKM/FPM seal bonnet 150°C

Valve size	Actuator	Port range	Bonnet seal	Wt kg	Reference	Part number
6.4	Manual	Female VCR	Metal	0.5	VAV-025	310080
6.4	Pneumatic	Female VCR	Metal	0.5	VAV-025-P	311087-03
12.7	Manual	DN16CF	FKM / FPM	0.5	AV-050	310082
12.7	Manual	DN16KF	FKM / FPM	0.5	KAV-050	310083
12.7	Pneumatic	DN16CF	FKM / FPM	0.5	AV-050-P	311089-03
12.7	Pneumatic	DN16KF	FKM / FPM	0.5	KAV-050-P	311090-03

## Valve options

All pneumatic valves are supplied with 24V DC air control solenoids as standard.

**Temperature range** Bakeability under vacuum in open/closed positions with the following bonnet/poppet seal combinations

UHV Series with Copper / FKM / FPM 200°C open / 150°C closed  
UHV Series with Copper / Kalrez® 250°C open / 200°C closed  
HV Series with FKM / FPM fluoroelastomer 150°C open / 150°C closed

Option -09  
Air control solenoid valves



Option -11  
4079 Kalrez® 250°C poppet seal



When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example 313072-03-11

Description	Option Number
240VAC air control solenoid valve*	-09
High temperature poppet seal	-11

\* Supplied as a spare part – not fitted to valve

## Accessories

## Hardware and gaskets



Gasket kit	Material	Quantity per pack	Reference	Part number
Poppet and bonnet seal	FKM/FPM and copper	1^	AVG-050M	351016
Poppet and bonnet seal	FKM / FPM fluoroelastomer	1^	AVG-050	350013

Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Socket cap head bolts	M4 x 20mm	DN16CF	25	M4-20	1113014
Clamp	—	DN16KF	1	K16-C	7701000
Centring ring	—	DN16KF	1	K16-CR	7710000

<sup>1</sup> Each gasket kit contains one bonnet and one gasket seal

All dimensions are nominal in millimetres unless specified - Weights given are approximate

# Angle valves Million cycle line MC<sup>+</sup>

DN16CF and DN16KF ports



## UHV Series

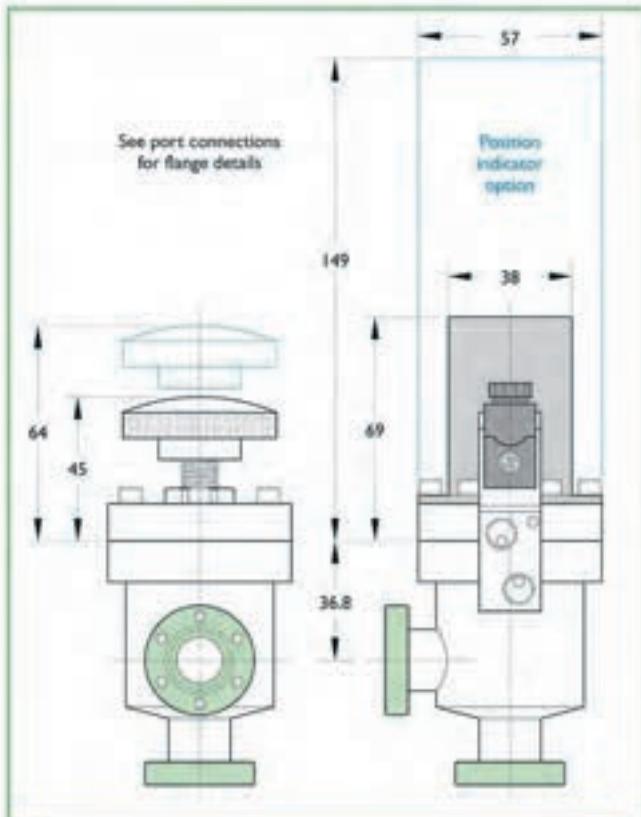
250°C Metal seal bonnets

## HV Series

150° Elastomer sealed bonnets

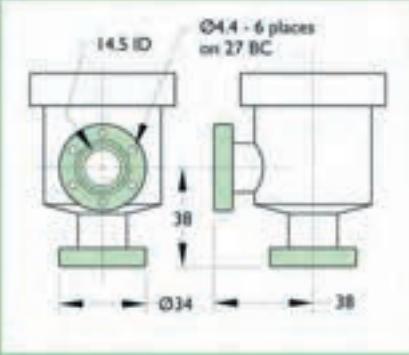
### Features

- Poppet elastomer seals made from FKM / FPM fluoroelastomer
- Stainless steel construction
- Manual or electropneumatic operation
- Air-open / spring-close air cylinder

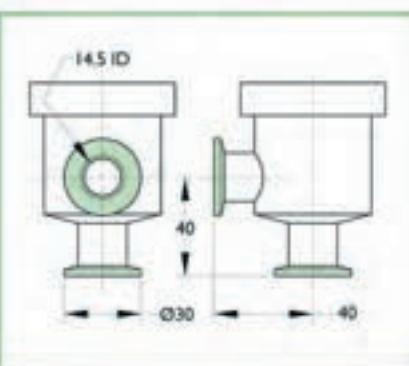


## Port connections

### CF



### ISO KF



All dimensions are nominal in millimetres unless specified - Weights given are approximate

Angle valves Million cycle line MC<sup>+</sup>

DN16CF and DN16KF ports



## UHV Series

Metal seal bonnet 250°C

Valve Nominal ID	Actuator	Port flange	Bonnet seal	Wt kg	Reference	Part number
16	Manual	DN16CF	Metal	0.5	AV-075M	312015
16	Pneumatic	DN16CF	Metal	0.9	AV-075M-P	313015-03

## HV Series

FKM/FPM seal bonnet 150°C

Valve Nominal ID	Actuator	Port flange	Bonnet seal	Wt kg	Reference	Part number
16	Manual	DN16CF	FKM / FPM	0.5	AV-075	310015
16	Manual	DN16KF	FKM / FPM	0.5	KAV-075	310072
16	Pneumatic	DN16CF	FKM / FPM	0.9	AV-075-P	311015-03
16	Pneumatic	DN16KF	FKM / FPM	0.5	KAV-075-P	311072-03

## Valve options

Option -01  
Mechanical position indicatorOption -02  
Magnetic position indicatorOption -09  
Air control solenoid valvesOption -11  
K079 Kalrez® 250°C poppet seal

All pneumatic valves are supplied with 24V DC air control solenoids as standard.

When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example 313015-03-01-11

**Temperature range** Bakeability under vacuum in open/closed positions with the following bonnet/poppet seal combinations

UHV Series with Copper/FKM/FPM 200°C open/150°C closed

UHV Series with Copper/Kalrez® 250°C open/200°C closed

HV Series with FKM/FPM fluoroelastomer 150°C open/150°C closed

## Description

Option Number
-01
-02
-09
-11

Mechanical position indicator

Magnetic position indicators

240VAC Air control solenoid valve

High temperature Kalrez® poppet seal

Supplied as a spare part – not fitted to valve

## Accessories

## Hardware and gaskets



Gasket kit	For use with	Material	Quantity per pack	Reference	Part number
Poppet and bonnet seal	UHV	FKM / FPM and copper	1 <sup>†</sup>	AVG-075M	351004
Poppet and bonnet seal	HV	FKM / FPM fluoroelastomer	1 <sup>†</sup>	AVG-075	350004

Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Socket cap head bolts	M4 x 20mm	DN16CF	25	M4-20	1113014
Clamp	—	DN16KF	1	K16-C	7701000
Centring ring	—	DN16KF	1 <sup>†</sup>	K16-CR	7710000

<sup>†</sup> Each gasket kit contains one bonnet and one gate seal<sup>†</sup> Includes one elastomer seal

All dimensions are nominal in millimetres unless specified - Weights given are approximate



# Angle valves

DN25KF ports

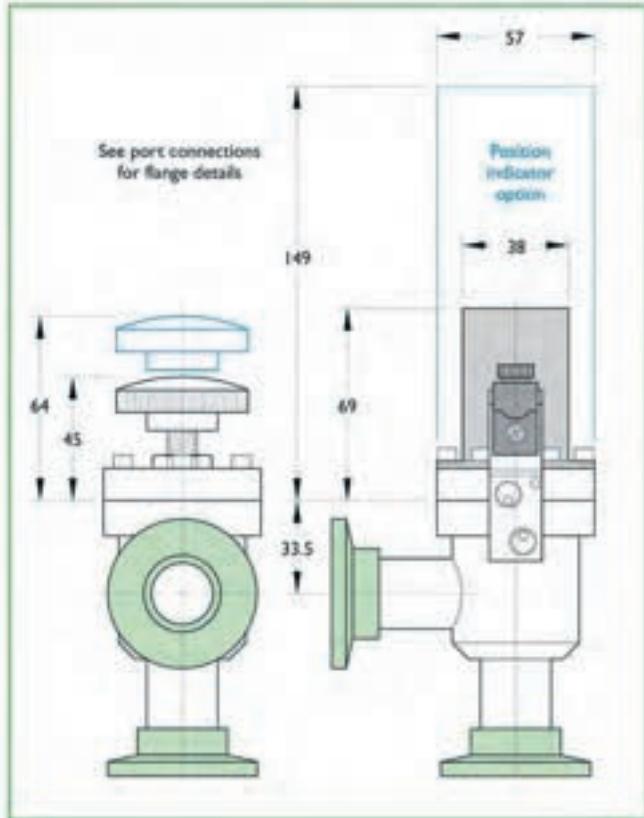


## HV Series

### 150° Elastomer sealed bonnets

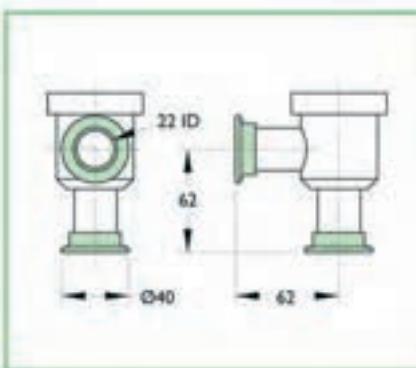
#### Features

- Poppet elastomer seals made from FKM / FPM fluoroelastomer
- Stainless steel construction
- Manual or electropneumatic operation
- Air-open / spring-close air cylinder



## Port connections

### CF



## Angle valves



DN25KF ports

## HV Series

Elastomer seal bonnet 150°C

Valve size	Actuator	Port range	Bonnet seal	Wt kg	Reference	Part number
25	Manual	DN25KF	FKM / FPM	0.5	KAV-100	310073
25	Pneumatic	DN25KF	FKM / FPM	0.9	KAV-100-P	311073-03

## Valve options

Option -01  
Mechanical position indicatorOption -02  
Magnetic position indicatorOption -09  
Air control solenoid valvesOption -11  
4029 Kalrez® 250°C poppet seal

All pneumatic valves are supplied with 24V DC air control solenoids as standard.

When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example 313022-03-02-11

**Temperature range** Bakeability under vacuum in open/closed positions with the following bonnet/poppet seal combinations

UHV Series with Copper/FKM/FPM 200°C open/150°C closed

UHV Series with Copper/Kalrez® 250°C open/200°C closed

HV Series with FKM/FPM fluoroelastomer 150°C open/150°C closed

## Description

## Option Number

Mechanical position indicator

-01

Magnetic position indicators

-02

240V AC Air control solenoid valve<sup>1</sup>

-09

High temperature Kalrez® poppet seal

-11

Supplied as a spare part – not fitted to valve

## Accessories

## Hardware and gaskets



Gasket kit	For use with	Material	Quantity per pack	Reference	Part number
Poppet and bonnet seal	HV	FKM / FPM fluoroelastomer	1 <sup>1</sup>	AVG-100	350004
Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Clamp	-	DN25KF	1	K25-C	7701001
Centring ring	-	DN25KF	1 <sup>1</sup>	K25-CR	7710001

<sup>1</sup> Each gasket kit contains one bonnet and one gate seal

<sup>1</sup> Includes one elastomer seal

All dimensions are nominal in millimetres unless specified - Weights given are approximate



## Angle valves

DN40CF and DN40KF ports



AV-150

AV-150-P

### UHV Series

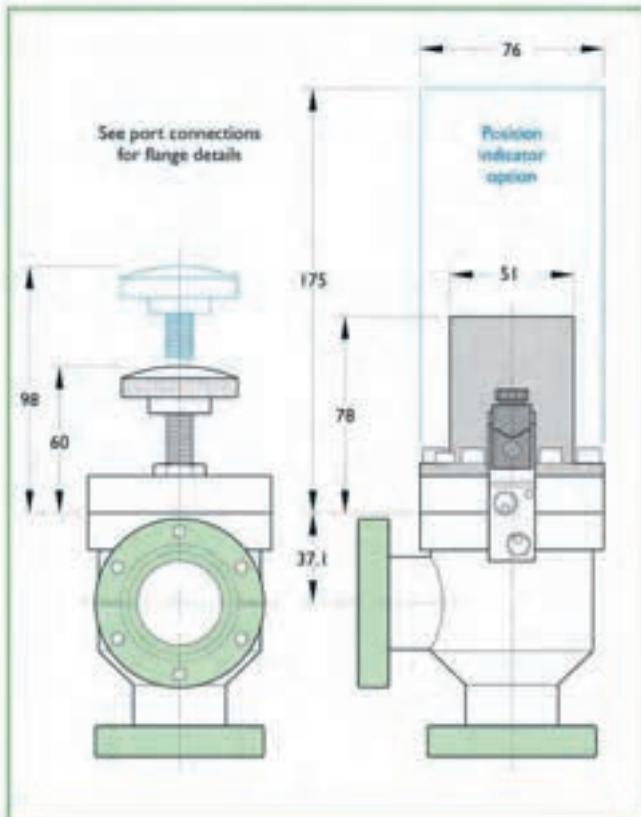
#### 250°C Metal seal bonnets

### HV Series

#### 150° Elastomer sealed bonnets

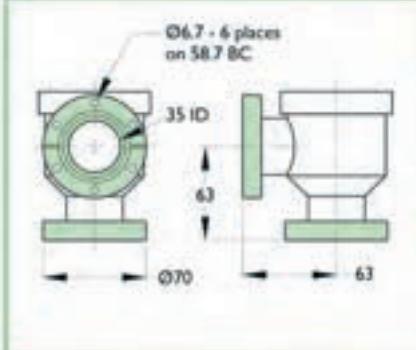
### Features

- Poppet elastomer seals made from FKM / FPM fluoroelastomer
- Stainless steel construction
- Manual or electropneumatic operation
- Air-open / spring-close air cylinder

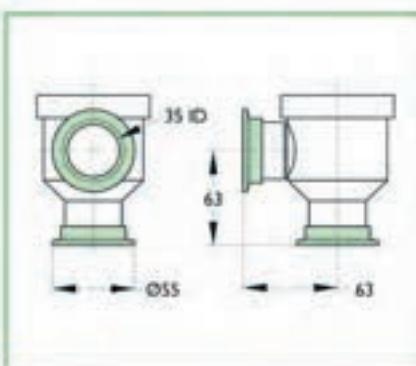


### Port connections

#### CF

DN40CF  
Metal seal flange

#### ISO KF

ISO DN40KF  
Elastomer seal flange

All dimensions are nominal in millimetres unless specified - Weights given are approximate

## Angle valves



DN40CF and DN40KF ports

## UHV Series

Metal seal bonnet

250°C

Valve size	Actuator	Port range	Bonnet seal	Wt kg	Reference	Part number
38	Manual	DN40CF	Metal	2.7	AV-150M	312029
38	Pneumatic	DN40CF	Metal	2.3	AV-150M-P	313029-03

## HV Series

Elastomer seal bonnet

150°C

Valve size	Actuator	Port range	Bonnet seal	Wt kg	Reference	Part number
38	Manual	DN40CF	FKM / FPM	1.8	AV-150	310029
38	Manual	DN40KF	FKM / FPM	1.8	KAV-150	310074
38	Pneumatic	DN40CF	FKM / FPM	2.7	AV-150-P	311029-03
38	Pneumatic	DN40KF	FKM / FPM	2.3	KAV-150-P	311074-03

## Valve options

Option -01  
Mechanical position indicatorOption -02  
Magnetic position indicatorOption -09  
Air control solenoid valvesOption -11  
407Y Kalrez® 250°C poppet seal

All pneumatic valves are supplied with 24V DC air control solenoids as standard.

When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example 312029-03-02-11

## Temperature range

Bakeability under vacuum in open/closed positions with the following bonnet/poppet seal combinations

UHV Series with Copper/FKM/FPM	200°C open/150°C closed
UHV Series with Copper/Kalrez®	250°C open/200°C closed
HV Series with FKM/FPM fluoroelastomer	150°C open/150°C closed

## Description

## Option Number

Mechanical position indicator

-01

Magnetic position indicators

-02

240V AC Air control solenoid valve<sup>1</sup>

-09

High temperature Kalrez® poppet seal

-11

<sup>1</sup> Supplied as a spare part – not fitted to valve

## Accessories

## Hardware and gaskets



## Gasket kit

Poppet and bonnet seal UHV FKM / FPM and copper

Quantity per pack

## Reference

## Part number

351005

Poppet and bonnet seal HV FKM / FPM fluoroelastomer

1<sup>2</sup>

## Reference

## Part number

350004

## Hardware

## Thread length

## For use with

Quantity per pack

## Reference

## Part number

1113021

Hex head bolt set M6 x 35mm DN40CF

25

## Reference

## Part number

7701002

Clamp DN40KF

1

## Reference

## Part number

7710002

Centring ring DN40KF

1<sup>2</sup>

## Reference

## Part number

<sup>1</sup> Each gasket kit contains one bonnet and one gate seal<sup>2</sup> Includes one elastomer seal



# Angle valves Million cycle line MC+

DN50KF ports



KAV-200

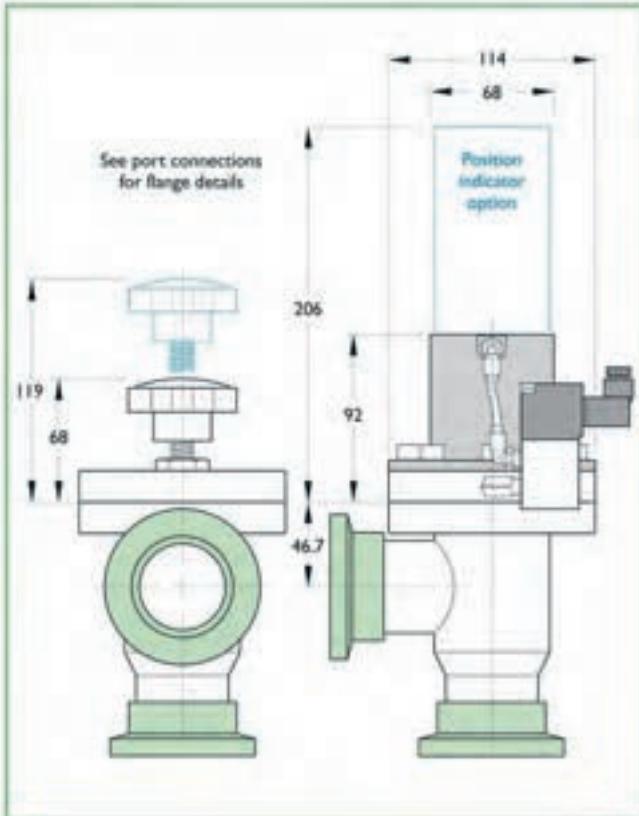
KAV-200-PAA

## HV Series

### 150° Elastomer sealed bonnets

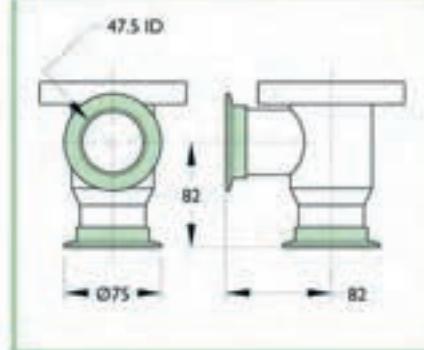
#### Features

- Poppet elastomer seals made from FKM / FPM fluoroelastomer
- Stainless steel construction
- Manual or electropneumatic operation
- Air-open / spring-close air cylinder



#### Port connections

##### CF

ISO DN50KF  
Elastomer seal flange

Angle valves Million cycle line MC<sup>+</sup>

DN50KF ports



## HV Series

Elastomer seal bonnet 150°C

Valve size	Actuator	Port range	Bonnet seal	Wt kg	Reference	Part number
50	Manual	DN50KF	FKM / FPM	4.5	KAV-200	310075
50	Pneumatic	DN50KF	FKM / FPM	4.9	KAV-200-PAA	311075-03

## Valve options

Option -01  
Mechanical position indicatorOption -02  
Magnetic position indicatorOption -09  
Air control solenoid valvesOption -11  
4029 Kalrez® 250°C poppet seal**All pneumatic valves** are supplied with 24V DC air control solenoids as standard.

When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example 313033-03-02-11

**Temperature range** Bakeability under vacuum in open/closed positions with the following bonnet/poppet seal combinations

UHV Series with Copper/ FKM/FPM 200°C open/ 150°C closed

UHV Series with Copper/Kalrez® 250°C open/ 200°C closed

HV Series with FKM/FPM fluoroelastomer 150°C open/ 150°C closed

Description	Option Number
Mechanical position indicator	-01
Magnetic position indicators	-02
240V AC Air control solenoid valve <sup>†</sup>	-09
High temperature Kalrez® poppet seal	-11

<sup>†</sup> Supplied as a spare part – not fitted to valve

## Accessories

## Hardware and gaskets



Gasket kit	For use with	Material	Quantity per pack	Reference	Part number
Poppet and bonnet seal	HV	FKM / FPM fluoroelastomer	1 <sup>‡</sup>	AVG-200	350006
Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Clamp	—	DN50KF	1	K50-C	7701003
Centring ring	—	DN50KF	1 <sup>‡</sup>	K50-CR	7710003

<sup>†</sup> Each gasket kit contains one bonnet and one gate seal<sup>‡</sup> Includes one elastomer seal



# Angle valves Million cycle line MC<sup>+</sup>

DN63CF and DN63LF ports



## UHV Series

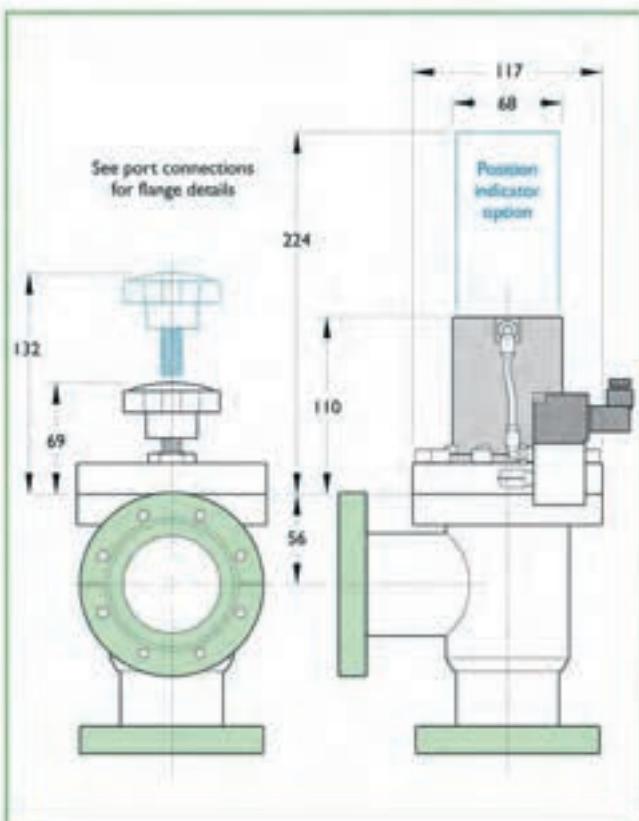
250°C Metal seal bonnets

## HV Series

150° Elastomer sealed bonnets

### Features

- Poppet elastomer seals made from FKM / FPM fluoroelastomer
- Stainless steel construction
- Manual or electropneumatic operation
- Air-open / spring-close air cylinder

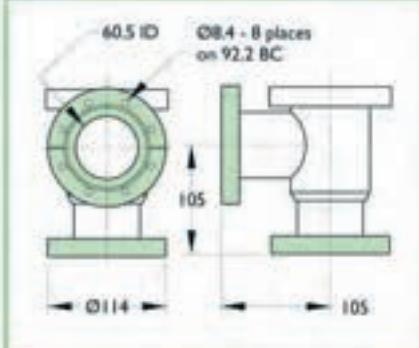


## Port connections

### CF



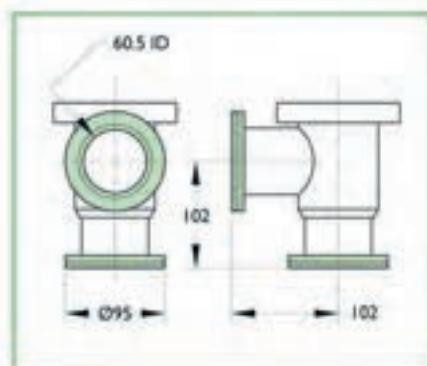
DN63CF  
Metal seal flange



### ISO LF



ISO DN63LF  
Elastomer seal flange



All dimensions are nominal in millimetres unless specified • Weights given are approximate

Angle valves Million cycle line MC<sup>+</sup>

DN63CF and DN63LF ports

## UHV Series

Metal seal bonnet

250°C

Valve size	Actuator	Port Range	Bonnet seal	Wt kg	Reference	Part number
63	Manual	DN63CF	Metal	5.4	AV-250H	312037
63	Pneumatic	DN63CF	Metal	5.4	AV-250M-PAA	313037-03

## HV Series

Elastomer seal bonnet

150°C

Valve size	Actuator	Port Range	Bonnet seal	Wt kg	Reference	Part number
63	Manual	DN63CF	FKM / FPM	5.4	AV-250	310037
63	Manual	DN63LF	FKM / FPM	5.4	KAV-250	310076
63	Pneumatic	DN63CF	FKM / FPM	5.4	AV-250-P	311037-03
63	Pneumatic	DN63LF	FKM / FPM	5.4	KAV-250-P	311076-03

## Valve options

Option -01  
Mechanical position indicatorOption -02  
Magnetic position indicatorOption -09  
Air control solenoid valvesOption -11  
407Y Kalrez® 250°C poppet seal

All pneumatic valves are supplied with 24V DC air control solenoids as standard.

When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example 310076-03-02-11

**Temperature range** Bakeability under vacuum in open/closed positions with the following bonnet/poppet seal combinations

UHV Series with Copper/FKM/FPM 200°C open/150°C closed

UHV Series with Copper/Kalrez® 250°C open/200°C closed

HV Series with FKM/FPM fluoroelastomer 150°C open/150°C closed

## Description

## Option Number

Mechanical position indicator

-01

Magnetic position indicators

-02

240V AC Air control solenoid valve

-09

High temperature Kalrez® poppet seal

-11

Supplied as a spare part – not fitted to valve

## Accessories

## Hardware and gaskets



Gasket kit	For use with	Material	Quantity per pack	Reference	Part number
Poppet and bonnet seal	UHV	FKM / FPM and copper	1 <sup>a</sup>	AVG-250M	351007
Poppet and bonnet seal	HV	FKM / FPM fluoroelastomer	1 <sup>b</sup>	AVG-250	350007

Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Hex head bolt set	M8 x 50mm	DN63CF	25	M8-50	1113026
Double claw-clamp	—	DN63LF	1	DCC63/100	1130008
Centring ring	—	DN63LF	1 <sup>c</sup>	L63-CR	7810000

<sup>a</sup> Each gasket kit contains one bonnet and one gate seal

<sup>b</sup> Includes one elastomer seal

All dimensions are nominal in millimetres unless specified - Weights given are approximate



## Section 2.3

## Gate valves

Angle valves Million cycle line MC<sup>+</sup>

DN100CF and DN100LF ports



AV-400

AV-400-PAA

## UHV Series

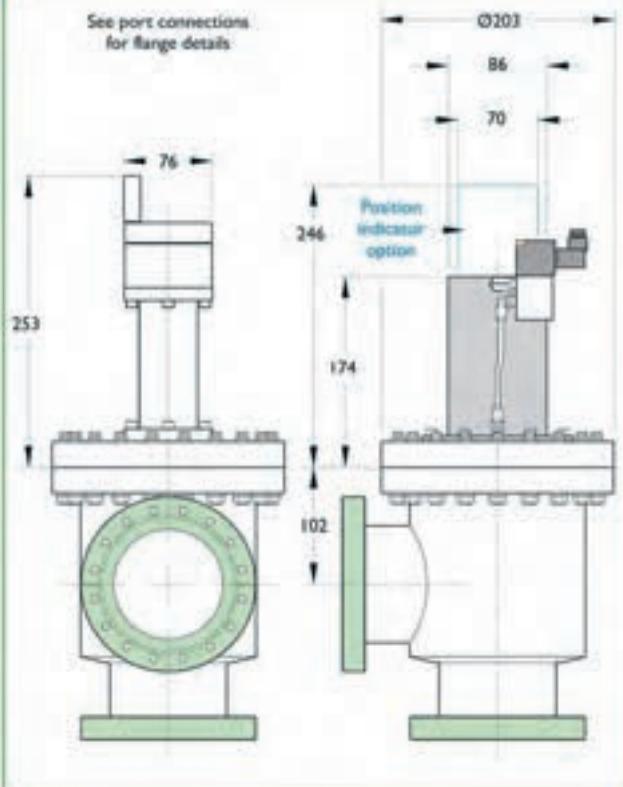
## 250°C Metal seal bonnets

## HV Series

## 150° Elastomer sealed bonnets

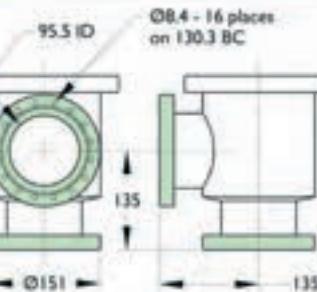
## Features

- Poppet elastomer seals made from FKM / FPM fluoroelastomer
- Stainless steel construction
- Manual or electropneumatic operation
- Air-open / spring-close air cylinder

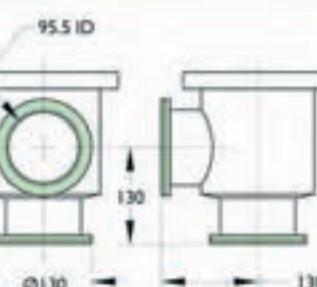
See port connections  
for flange details:

## Port connections

## CF

DN100CF  
Metal seal flange

## ISO LF

ISO DN100LF  
Elastomer seal flange

All dimensions are nominal in millimetres unless specified - Weights given are approximate

Angle valves Million cycle line MC<sup>+</sup>

DN100CF and DN100LF ports

## UHV Series

Metal seal bonnet

250°C

Valve size	Actuator	Port Range	Bonnet seal	Wt kg	Reference	Part number
100	Manual	DN100CF	Metal	16.8	AV-400H	312045
100	Pneumatic	DN100CF	Metal	16.8	AV-400M-PAA	313045-03

## HV Series

Elastomer seal bonnet

150°C

Valve size	Actuator	Port Range	Bonnet seal	Wt kg	Reference	Part number
100	Manual	DN100CF	FKM / FPM	16.8	AV-400	310045
100	Manual	DN100LF	FKM / FPM	16.8	LAV-400	310078
100	Pneumatic	DN100CF	FKM / FPM	16.8	AV-400-PAA	311045-03
100	Pneumatic	DN100LF	FKM / FPM	16.8	LAV-400-PAA	311080-03

## Valve options

Option -01  
Mechanical position indicatorOption -02  
Magnetic position indicatorOption -09  
Air control solenoid valvesOption -11  
4079 Kalrez® 250°C poppet seal

All pneumatic valves are supplied with 24V DC air control solenoids as standard.

When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example 313045-03-02-11

**Temperature range** Bakeability under vacuum in open/closed positions with the following bonnet/poppet seal combinations

UHV Series with Copper/FKM/FPM 200°C open/150°C closed  
 UHV Series with Copper/Kalrez® 250°C open/200°C closed  
 HV Series with FKM/FPM fluoroelastomer 150°C open/150°C closed

## Description

## Option Number

Mechanical position indicator

-01

Magnetic position indicators

-02

240V AC Air control solenoid valve<sup>a</sup>

-09

High temperature Kalrez® poppet seal

-11

Supplied as a spare part – not fitted to valve

## Accessories

## Hardware and gaskets



Gasket kit	For use with	Material	Quantity per pack	Reference	Part number
Poppet and bonnet seal	UHV	FKM / FPM and copper	1 <sup>b</sup>	AVG-400M	351009
Poppet and bonnet seal	HV	FKM / FPM fluoroelastomer	1 <sup>b</sup>	AVG-400	350009

Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Hex head bolt set	M8 x 50mm	DN100CF	25	M8-50	1113026
Double claw-clamp	—	DN100LF	1 <sup>c</sup>	DCC63/100	1130008
Centring ring	—	DN100LF	1 <sup>c</sup>	L100-CR	7810001

<sup>a</sup> Each gasket kit contains one bonnet and one gate seal

<sup>b</sup> 4-8 required per flange connection

<sup>c</sup> Includes one elastomer seal

All dimensions are nominal in millimetres unless specified - Weights given are approximate



# Angle valves Million cycle line MC<sup>+</sup>

DN160CF and DN160LF ports



AV-600

AV-600-PAA

## UHV Series

250°C Metal seal bonnets

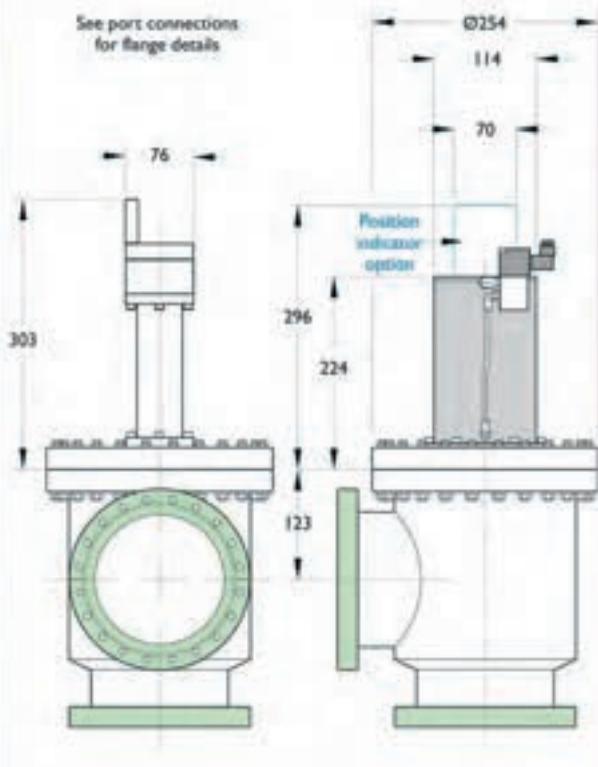
## HV Series

150° Elastomer sealed bonnets

### Features

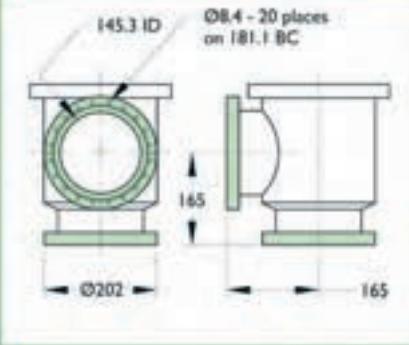
- Poppet elastomer seals made from FKM / FPM fluoroelastomer
- Stainless steel construction
- Manual or electropneumatic operation
- Air-open / spring-close air cylinder

See port connections  
for flange details

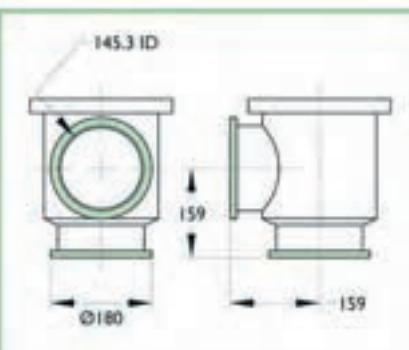


## Port connections

### CF

DN160CF  
Metal seal flange

### ISO LF

ISO DN160LF  
Elastomer seal flange

All dimensions are nominal in millimetres unless specified - Weights given are approximate

Angle valves Million cycle line MC<sup>+</sup>

DN160CF and DN160LF ports

## UHV Series

Metal seal bonnet

250°C

Valve size	Actuator	Port range	Bonnet seal	Wt kg	Reference	Part number
150	Manual	DN160CF	Metal	28.6	AV-600H	312049
150	Pneumatic	DN160CF	Metal	28.6	AV-600M-PAA	313049-03

## HV Series

Elastomer seal bonnet

150°C

Valve size	Actuator	Port range	Bonnet seal	Wt kg	Reference	Part number
150	Manual	DN160CF	FKM / FPM	28.6	AV-600	310049
150	Manual	DN160LF	FKM / FPM	28.6	LAV-600	310079
150	Pneumatic	DN160CF	FKM / FPM	28.6	AV-600-PAA	311049-03
150	Pneumatic	DN160LF	FKM / FPM	28.6	LAV-600-PAA	311081-03

## Valve options

Option -01  
Mechanical position indicatorOption -02  
Magnetic position indicatorOption -09  
Air control solenoid valvesOption -11  
407F Kalrez® 250°C poppet seal

All pneumatic valves are supplied with 24V DC air control solenoids as standard.

When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example 313049-03-02-11

**Temperature range** Bakeability under vacuum in open/closed positions with the following bonnet/poppet seal combinations

Description	Option Number
Mechanical position indicator	-01
Magnetic position indicators	-02
240V AC Air control solenoid valve	-09
High temperature Kalrez® poppet seal	-11

<sup>1</sup> Supplied as a spare part – not fitted to valve

UHV Series with Copper/FKM/FPM 200°C open/150°C closed  
 UHV Series with Copper/Kalrez® 250°C open/200°C closed  
 HV Series with FKM/FPM fluoroelastomer 150°C open/150°C closed

## Accessories

## Hardware and gaskets



Gasket kit	For use with	Material	Quantity per pack	Reference	Part number
Poppet and bonnet seal	UHV	FKM / FPM and copper	1 <sup>1</sup>	AVG-600M	351010
Poppet and bonnet seal	HV	FKM / FPM fluoroelastomer	1 <sup>1</sup>	AVG-600	350010

Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Hex head bolt set	M8 x 60mm	DN160CF	25	M8-60	1113027
Double claw-clamp	—	DN160LF	1 <sup>1</sup>	DCC160/250	1130009
Centring ring	—	DN160LF	1 <sup>1</sup>	L160-CR	7810002

<sup>1</sup> Each gasket kit contains one bonnet and one gate seal

<sup>1</sup> 4-8 required per flange connection

<sup>1</sup> Includes one elastomer seal

All dimensions are nominal in millimetres unless specified - Weights given are approximate



## Angle valves Million cycle line MC<sup>+</sup>

DN200CF and DN200LF ports



AV-800-PAA

### UHV Series

250°C Metal seal bonnets

### HV Series

150° Elastomer sealed bonnets

#### Features

- Poppet elastomer seals made from FKM / FPM fluoroelastomer
- Stainless steel construction
- Manual or electropneumatic operation
- Air-open / spring-close air cylinder

See port connections  
for flange details

Position  
indicator  
option

Ø356

70

140

364

292

160.8

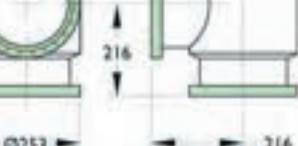
### Port connections

CF



DN200CF  
Metal seal flange

197.4 ID  
Ø8.4 - 24 places  
on 231.9 BC

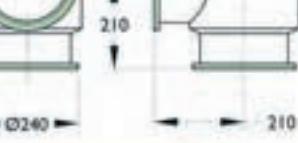


ISO LF



ISO DN200LF  
Elastomer seal flange

197.4 ID



All dimensions are nominal in millimetres unless specified • Weights given are approximate

# Angle valves Million cycle line MC<sup>+</sup>

DN200CF and DN200LF ports

**UHV Series****Metal seal bonnet****250°C**

Valve size	Actuator	Port Range	Bonnet seal	Wt kg	Reference	Part number
200	Pneumatic	DN200CF	Metal	36.3	AV-800M-PAA	313053-03

**HV Series****Elastomer seal bonnet****150°C**

Valve size	Actuator	Port Range	Bonnet seal	Wt kg	Reference	Part number
200	Pneumatic	DN200CF	FKM / FPM	36.3	AV-800-PAA	311053-03
200	Pneumatic	DN200LF	FKM / FPM	36.3	LAV-800-PAA	311082-03

**Valve options****Option -01**  
Mechanical position indicator**Option -02**  
Magnetic position indicator**Option -09**  
Air control solenoid valves**Option -11**  
4079 Kalrez® 250°C poppet seal

**All pneumatic valves** are supplied with 24V DC air control solenoids as standard.

When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example 313053-03-03-11

**Description:**

Mechanical position indicator

**Option Number:****-01**

Magnetic position indicators

**-02**240V AC Air control solenoid valve<sup>†</sup>**-09**

High temperature Kalrez® poppet seal

**-11**

<sup>†</sup> Supplied as a spare part – not fitted to valve.

**Accessories****Hardware and gaskets**

Gasket kit	For use with	Material	Quantity per pack	Reference	Part number
Poppet and bonnet seal	UHV	FKM / FPM and copper	1 <sup>‡</sup>	AVG-800M	351011
Poppet and bonnet seal	HV	FKM / FPM fluoroelastomer	1 <sup>‡</sup>	AVG-800	350011

Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Hex head bolt set	M8 x 60mm	DN200CF	25	M8-60	1113027
Double claw-clamp	–	DN200LF	1 <sup>‡</sup>	DCC160/250	1130009
Centring ring	–	DN200LF	1 <sup>‡</sup>	L200-CR	7810003

<sup>‡</sup> Each gasket kit contains one bonnet and one gate seal

<sup>†</sup> 4-8 required per flange connection

<sup>‡</sup> Includes one elastomer seal



## In-line valves Million cycle line MC+

DN16 ports



IV.075

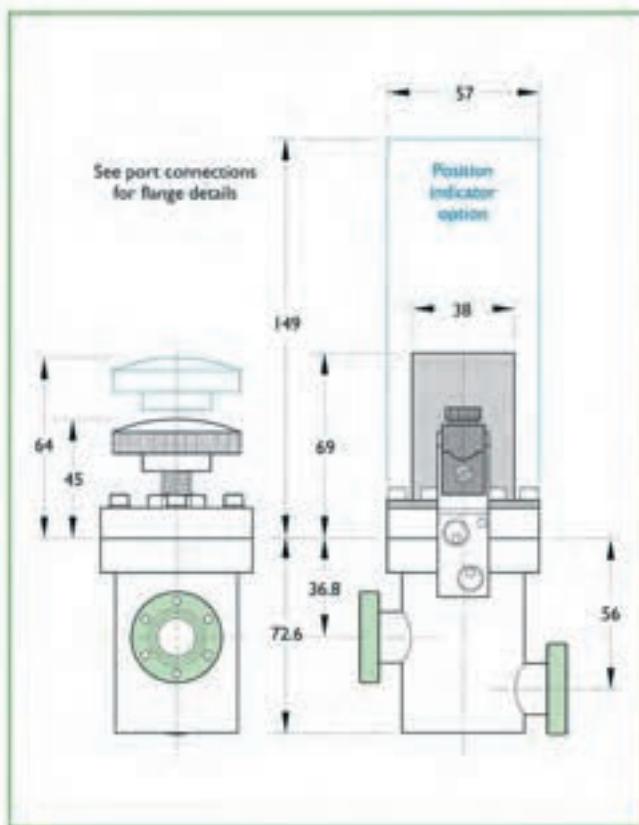
IV.075-P

## HV Series

## 150° Elastomer sealed bonnets

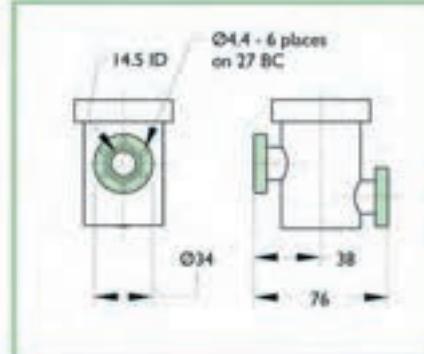
## Features

- Poppet elastomer seals made from FKM / FPM fluoroelastomer
- Stainless steel construction
- Manual or electropneumatic operation
- Air-open / spring-close air cylinder

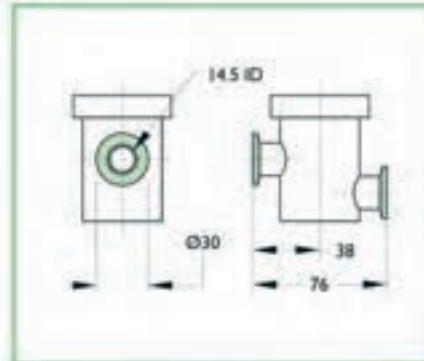


## Port connections

## CF

DN16CF  
Metal seal flange

## ISO KF

ISO DN16KF  
Elastomer seal flange

## In-line valves Million cycle line MC+



DN16 ports

## HV Series

Elastomer seal bonnet 150°C

Valve size	Actuator	Port range	Bonnet seal	Wt kg	Reference	Part number
19	Manual	DN16CF	FKM / FPM	0.9	IV-075	320004
19	Manual	DN16KF	FKM / FPM	0.5	KIV-075	320052
19	Pneumatic	DN16CF	FKM / FPM	0.9	IV-075-P	321004-03
19	Pneumatic	DN16KF	FKM / FPM	0.5	KIV-075-P	321052-03

## Valve options

Option -01  
Mechanical position indicatorOption -02  
Magnetic position indicatorOption -09  
Air control solenoid valvesOption -11  
4079 Kalinex® 250°C poppet seal

All pneumatic valves are supplied with 24V DC air control solenoids as standard.

When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example 323004-03-93-11

## Description

Mechanical position indicator

Option Number

-01

Magnetic position indicators

-02

240V AC Air control solenoid valve<sup>†</sup>

-09

Supplied as a spare part – not fixed to valve

## Accessories

## Hardware and gaskets



Gasket kit	For use with	Material	Quantity per pack	Reference	Part number
Poppet and bonnet seal	HV	FKM / FPM fluorocarbon elastomer	1 <sup>‡</sup>	IVG-075	350004
Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Socket cap head bolts	M4 x 20mm	DN16CF	25	M4-20	1113014
Clamp	—	DN16KF	1 <sup>‡</sup>	K16-C	7701000
Centring ring	—	DN16KF	1 <sup>‡</sup>	K16-CR	7710000

<sup>†</sup> Each gasket kit contains one bonnet and one gate seal.<sup>‡</sup> 3-4 required per flange connection

\* Includes one elastomer seal



# In-line valves Million cycle line MC<sup>+</sup>

DN40 ports



IV-150

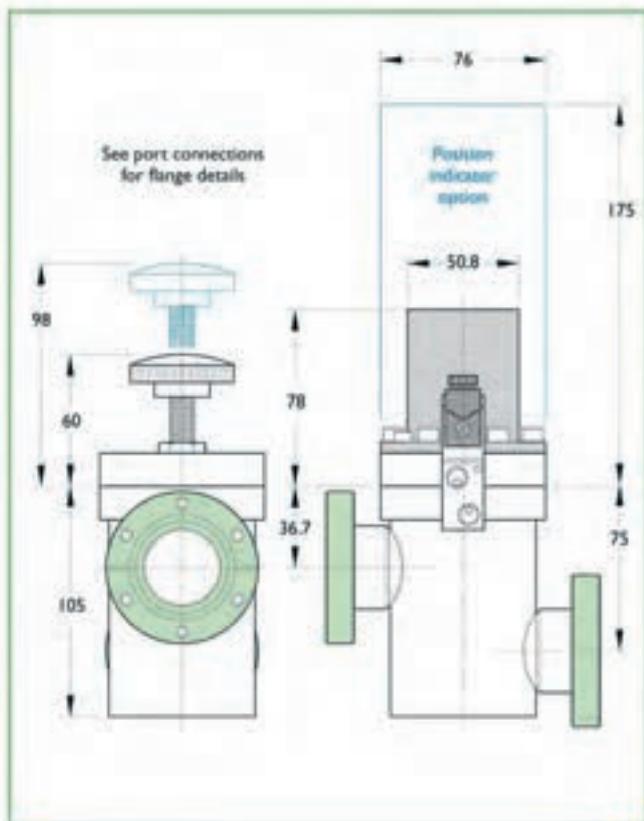
IV-150-P

## HV Series

### 150° Elastomer sealed bonnets

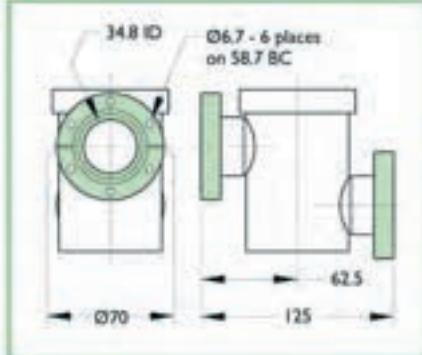
#### Features

- Poppet elastomer seals made from FKM / FPM fluoroelastomer
- Stainless steel construction
- Manual or electropneumatic operation
- Air-open / spring-close air cylinder

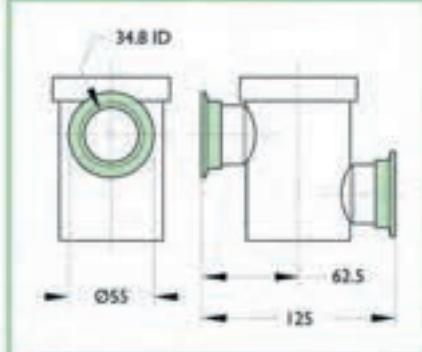


#### Port connections

##### CF

DN40CF  
Metal seal flange

##### ISO KF

ISO DN40KF  
Elastomer seal flange

## In-line valves Million cycle line MC+

DN63 ports



## HV Series

Elastomer seal bonnet 150°C

Valve size	Actuator	Port range	Bonnet seal	Wt kg	Reference	Part number
38	Manual	DN40CF	FKM / FPM	2.3	IV-150	320018
38	Manual	DN40KF	FKM / FPM	1.8	KIV-150	320054
38	Pneumatic	DN40CF	FKM / FPM	2.3	IV-150-P	321018-03
38	Pneumatic	DN40KF	FKM / FPM	1.8	KIV-150-P	321054-03

## Valve options

Option -01  
Mechanical position indicatorOption -02  
Magnetic position indicatorOption -09  
Air control solenoid valvesOption -11  
4079 Kalmer® 150°C copper seal

All pneumatic valves are supplied with 24V DC air control solenoids as standard.

When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example 323004-03-93-11

## Description

Mechanical position indicator

## Option Number

-01

Magnetic position indicators

-02

240V AC Air control solenoid valve<sup>†</sup>

-09

Supplied as a spare part – not fixed to valve

## Accessories

## Hardware and gaskets



Gasket kit	For use with	Material	Quantity per pack	Reference	Part number
Poppet and bonnet seal	HV	FKM / FPM fluorocarbon	1 <sup>‡</sup>	IVG-150	350005
Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Hex head bolt set	M6 x 35mm	DN40CF	25	M6-35	113021
Clamp	—	DN40KF	1 <sup>‡</sup>	K40-C	7701002
Centring ring	—	DN40KF	1 <sup>‡</sup>	K40-CR	7710002

<sup>†</sup> Each gasket kit contains one bonnet and one gate seal<sup>‡</sup> 3-4 required per flange connection<sup>‡</sup> Includes one elastomer seal



## In-line valves Million cycle line MC+

DN63 ports



M250

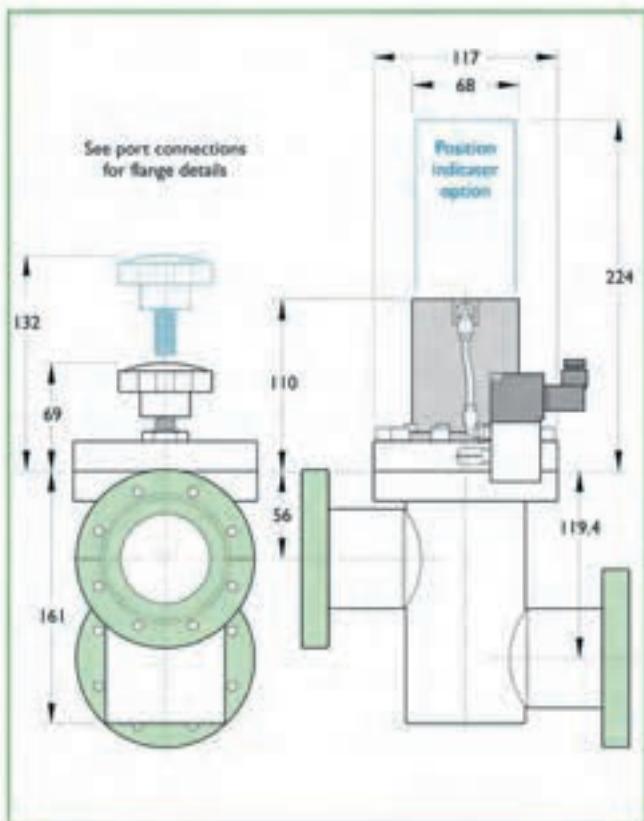
TM-250-P

HV Series

#### 150° Elastomer sealed bonnets

## Features

- Poppet elastomer seals made from FKM / FPM fluoroelastomer
  - Stainless steel construction
  - Manual or electropneumatic operation
  - Air-open / spring-close air cylinder

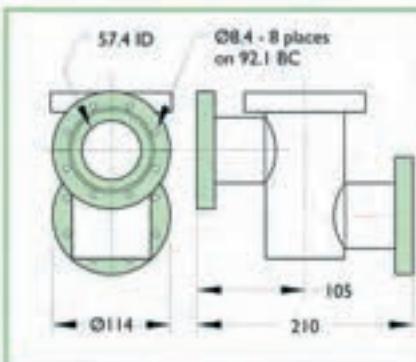


## Port connections

CF



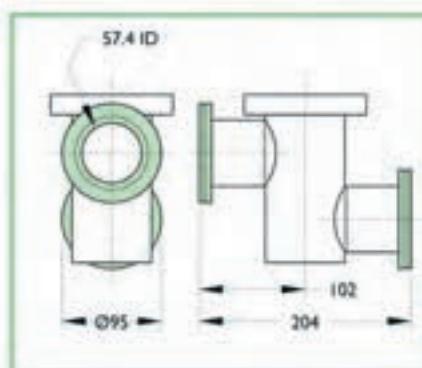
DNASTR<sup>®</sup>  
Phylogenetic tree



ISO KF



ISO DRAFT  
Blauwe en Rode



All dimensions are nominal in millimetres unless specified - Weights given are approximate

## In-line valves Million cycle line MC+

DN63 ports



## HV Series

Elastomer seal bonnet 150°C

Valve size	Actuator	Port Range	Bonnet seal	Wt kg	Reference	Part number
63.5	Manual	DN63CF	FKM / FPM	5.5	IV-250	320026
63.5	Manual	DN63LF	FKM / FPM	5.5	LIV-250	320056
63.5	Pneumatic	DN63CF	FKM / FPM	5.5	IV-250-PAA	321026-03
63.5	Pneumatic	DN63LF	FKM / FPM	5.5	LIV-250-PAA	321056-03

## Valve options

Option -01  
Mechanical position indicatorOption -02  
Magnetic position indicatorOption -09  
Air control solenoid valvesOption -11  
4079 Kalrez® 250°C poppet seal

All pneumatic valves are supplied with 24V DC air control solenoids as standard.

When ordering gate valve options, please add the option number(s) to the end of the desired UHV or HV series gate valve part number listed above.

For example 323004-03-92-11

**Temperature range** Bakeability under vacuum in open/closed positions with the following bonnet/poppet seal combinations

UHV Series with Copper / FKM/FPM 200°C open / 150°C closed

UHV Series with Copper/Kalrez® 250°C open/200°C closed

HV Series with FKM/FPM fluoroelastomer 150°C open/150°C closed

## Description

Mechanical position indicator

Option Number

-01

Magnetic position indicators

-02

240VAC Air control solenoid valve<sup>1</sup>

-09

Supplied as a spare part – not fixed to valve

## Accessories

## Hardware and gaskets



Gasket kit	For use with	Material	Quantity per pack	Reference	Part number
Poppet and bonnet seal	HV	FKM / FPM fluoroelastomer	1 <sup>2</sup>	IVG-250	350007
Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Hex head bolt set	M8 x 50mm	DIN40CF	25	M8-50	1113026
Clamp	-	DIN40KF	1 <sup>3</sup>	DCC63/100	1130008
Centring ring	-	DIN40KF	1 <sup>4</sup>	L63-CR	7810000

<sup>1</sup> Each gasket kit contains one bonnet and one gate seal

<sup>2</sup> 3-4 required per flange connection

<sup>3</sup> Includes one elastomer seal

All dimensions are nominal in millimetres unless specified - Weights given are approximate

# All-metal valves

## Angle and in-line specifications



MAV-150

MIV-150

### Specifications

#### Material

Flanges	304ss
Valve body	304ss
Bolts	300ss
Gaskets, poppet and bonnet	OFE Copper

#### Port fastening

Bolt type	Socket head bolts
Nut type	Hexagonal nuts

#### Vacuum

Range	$1 \times 10^{-11}$ mbar
Leak test	$2 \times 10^{-6}$ mbar litre/sec of He

#### Poppet sealing torque

19 Valve, first/subsequent seals	10-14/8-10 Nm
38 Valve, first/subsequent seals	5-11/5-10 Nm
63 Valve, first/subsequent seals	10-14/8-10 Nm

#### Temperature range

Closed/open	300°C/450°C
-------------	-------------

#### Weight and dimensions

See tables

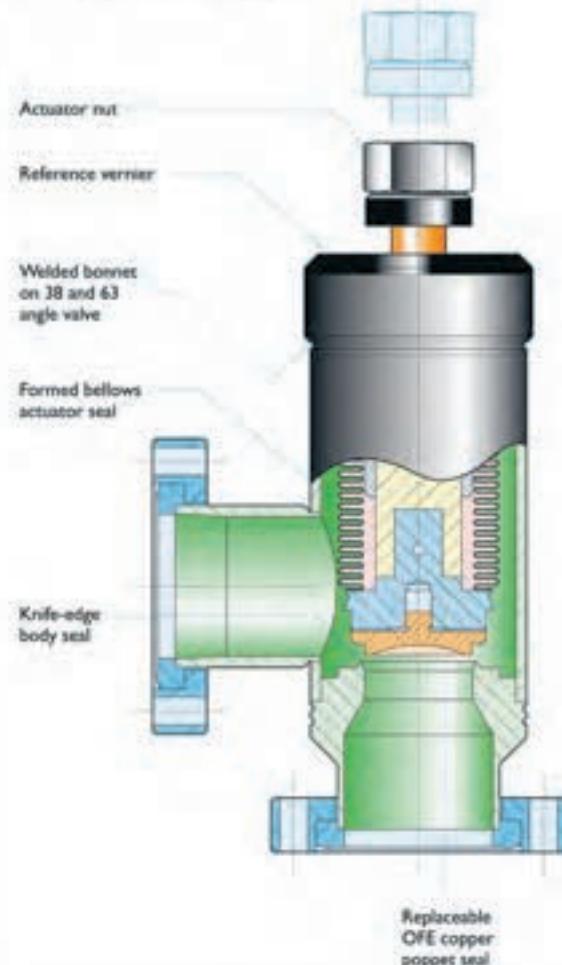
### UHV Series

#### 450°C Metal seal bonnet and poppet

##### Features

- UHV-compatible to  $1 \times 10^{-11}$  mbar
- Manual actuation
- Hundreds of seal cycles per gasket
- Replaceable OFE copper poppet gasket
- High temperature service to 450°C
- 300 Series stainless steel construction
- Stainless steel bellows sealed actuator
- High conductance design

#### 38mm All-metal angle valve cross section





Caburn-MDC bakeable all-metal angle and in-line valves are designed for use in ultrahigh vacuum environments where elevated temperatures preclude the use of elastomers and low temperature gasket metals. These valves provide reliable high temperature seals from atmospheric pressures to below  $10^{-11}$  mbar.

Wherever possible, bonnet gasket seals have been eliminated in an effort to minimise the number of potential leak paths. Valves fitted with bonnet seals have been so designed to facilitate gasket replacement. The size and orientation of the valve body ports on bonnet fitted valves precludes gasket removal through its ports.

When operated at ambient temperatures, all-metal valves provide hundreds of leak free cycles between routine poppet gasket replacements. In high temperature applications, life cycles are inversely proportional to the bakeout temperatures. When operated at the maximum bakeout temperature of  $450^{\circ}\text{C}$ , the poppet seal gasket life is reduced to approximately 50 open/close cycles.

### Seal design

A vacuum seal is made by pressing the poppet OFE copper gasket onto a conical stainless steel knife edge seat as depicted in the diagram at top-right. The sealing pressure deforms the copper gasket, which conforms to the conical knife-edge seat. During thermal cycling the valves loading mechanism counteracts component differential expansion to maintain a uniform pressure necessary for seal integrity.

### Poppet gasket replacement

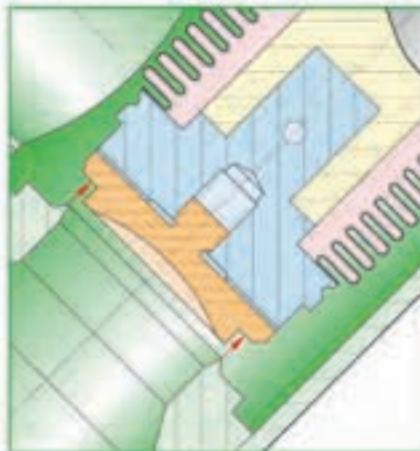
Poppet gasket replacement for the DN40 and DN63 all-metal angle valves must be done by removing the valve from the system, as these two valves have welded bonnets. Once detached from the system, gasket replacement is easily accomplished by inserting a standard blade screw driver into the bottom port and unscrewing the copper gasket, which is then extracted through the side port of the valve. The DN16 angle valve and all in-line valves are fitted with bonnet seals and do not require complete removal from the system for gasket replacement. Gasket removal and replacement is performed by detaching the bonnet flange from the valve body. Once the bonnet has been opened the gasket is easily detached by unscrewing with a standard blade screw driver.

### Seal torque

The first seal or closure in an all-metal valve causes plastic deformation of a virgin copper gasket leaving a permanent impression. This first closure is made at the factory and shipped to the customer in a ready to install sealed condition. Upon breaking this seal, resealing can be accomplished by torquing the valve according to the "Poppet Sealing Torque" data found in the specifications chart shown on page 172. To aid in the process of subsequent seal cycles the top of each valve body is fitted with a radially graduated vernier plate. The vernier plate provides a visual cue for previous and subsequent cycle or torque positions.

### Valve compatibility

Caburn-MDC offers Varian and Vacuum Generators (VG) compatible all-metal angle and in-line valves. The Varian compatible valves have been labelled as "V" in the valve type column found in each product table. Vacuum Generators compatible valves are identified by a "VG" designation in the valve type column. Compatibility is defined herein as the ability to replace or interchange Varian and/or Vacuum Generators valves with Caburn-MDC all-metal valves. Compatibility is limited



to valves fitted with CF port flanges and exclusively to the port to port dimensional characteristics. In other words, the dimensions from any valves' flanged port centreline to the opposite ports' flange face are direct equivalents to Varian and VG valves. Other Caburn-MDC all-metal valve dimensions may vary from those found on Varian and Vacuum Generators products. The "T" designation in the valve type column pertains to valves designed for either tube weld installation or custom flange attachment.



**Caburn-MDC,  
Varian and  
Vacuum  
Generators  
port  
dimensions**

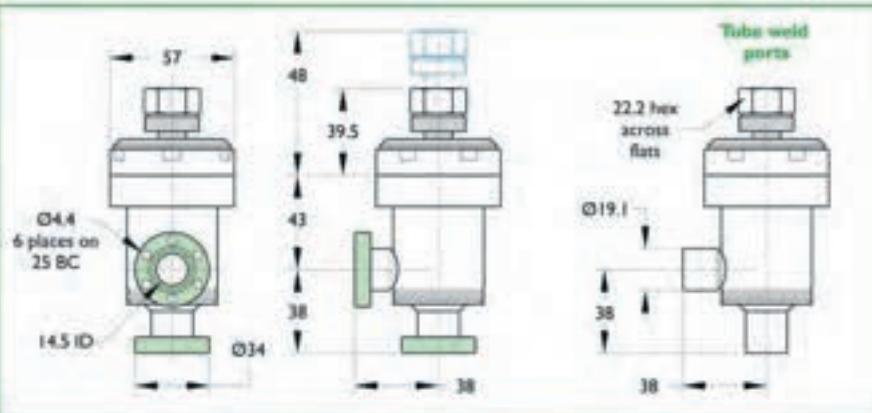




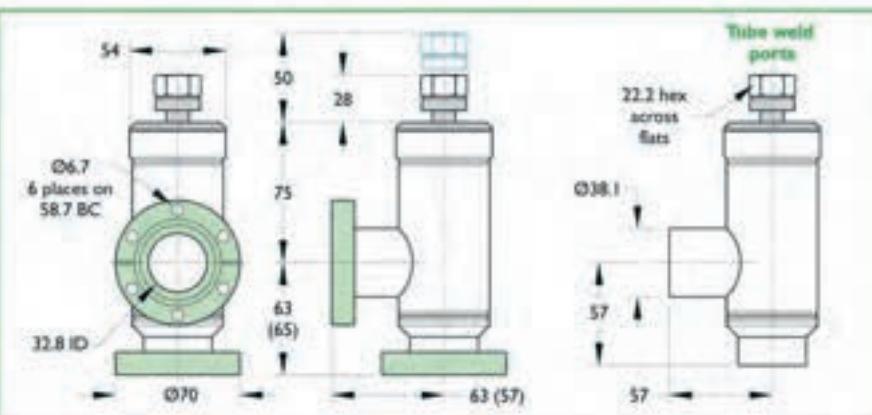
## All-metal valves

### Angle

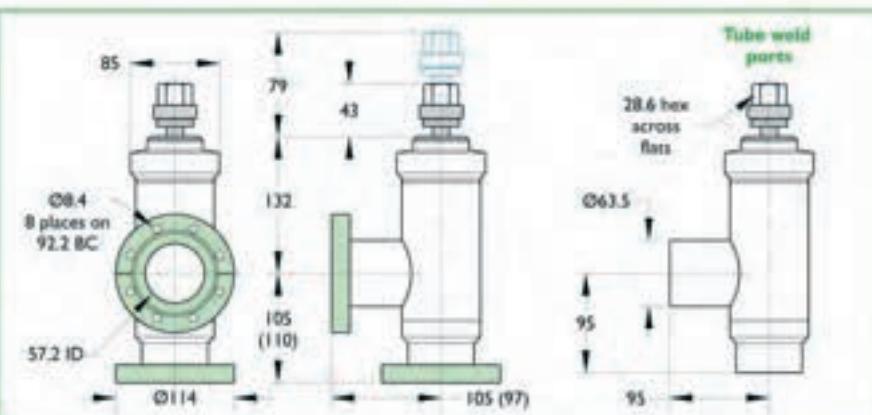
#### DN16 Angle valve



#### DN40 Angle valve



#### DN63 Angle valve



#### Angle valves UHV

##### All-metal series 450°C

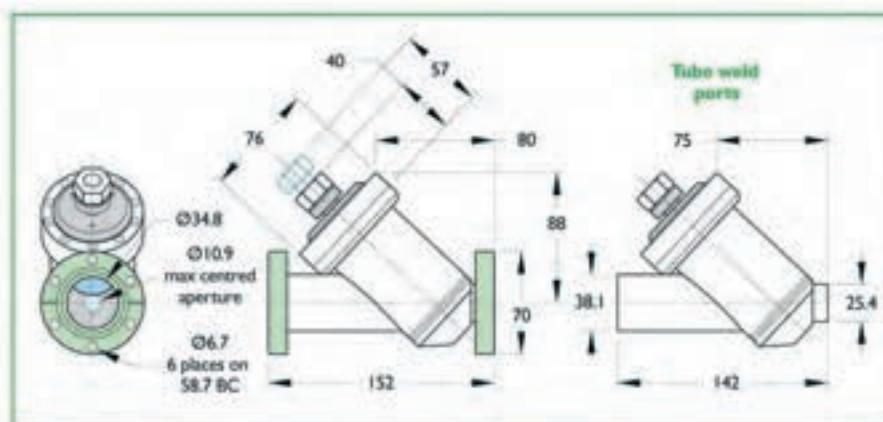
Caburn-MDC all-metal angle valves designated as type "V" will interface in systems currently fitted with Varian all-metal angle valves. They have port to port dimensions which are compatible with Varian products. All-metal angle valves designated as type "VG" will interface in systems currently fitted with Vacuum Generators all-metal angle valves. They have port to port dimensions which are compatible with Vacuum Generators products. All metal angle valves designated as type "T" will interface with a tube weld installation or custom flange attachment.

Valve size	Valve type	Port Range	Bonnet seal	Wt kg	Reference	Part number
DN16	T	Tube weld	Metal	0.5	MAV-075-T	314000
DN16	V	DN16CF	Metal	0.9	MAV-075-V	314001
DN40	T	Tube weld	Welded	1.4	MAV-150-T	314002
DN40	V	DN40CF	Welded	1.8	MAV-150-V	314003
DN40	VG	DN40CF	Welded	1.8	MAV-150-VG	314004
DN63	T	Tube weld	Welded	6.8	MAV-250-T	314005
DN63	V	DN63CF	Welded	7.3	MAV-250-V	314006
DN63	VG	DN63CF	Welded	7.3	MAV-250-VG	314007

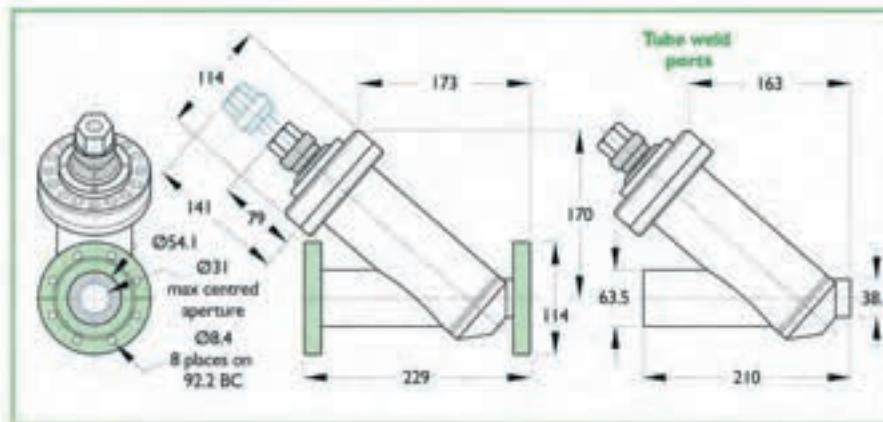
All dimensions are nominal in millimetres unless specified - Weights given are approximate



## DN40 In-line valve



## DN63 In-line valve



## In-line valves UHV

## All-metal series 450°C

Caburn-MDC all-metal in-line valves designated as type "V" will interface in systems currently fitted with Varian all-metal in-line valves. They have port to port dimensions which are compatible with Varian products. All metal angle valves designated as type "T" will interface with a tube weld installation or custom flange attachment.

## Accessories

## Gaskets



Gasket used with	Gasket total	Poppet	Bonnet	Port	Material	Reference	Part number
16 Angle	2	1	1	—	OFE Copper	MAVG-075	351013
40 Angle	4	1	12	2	OFE Copper	MAVG-150	351014
63 Angle	3	1	—	2	OFE Copper	MAVG-250	351015
40 In-line	4	1	1	2	OFE Copper	MIVG-150	351014
63 In-line	3	1	2	—	OFE Copper	MIVG-250	351015

<sup>†</sup> Used with In-line valve only

Hardware	Thread length	For use with	Quantity per pack	Reference	Part number
Socket cap head bolts	M4 x 20mm	DN16CF	25	M4-20	1113014
Head head bolt set	M6 x 35mm	DN40CF	25	M6-35	1113021
Head head bolt set	M8 x 50mm	DN63CF/DN100CF	25	M8-50	1113026
Head head bolt set	M8 x 60mm	DN160CF/DN200CF	25	M8-60	1113027
Head head bolt set	M8 x 60mm	DN250CF	25	M8-60(32)	1113033

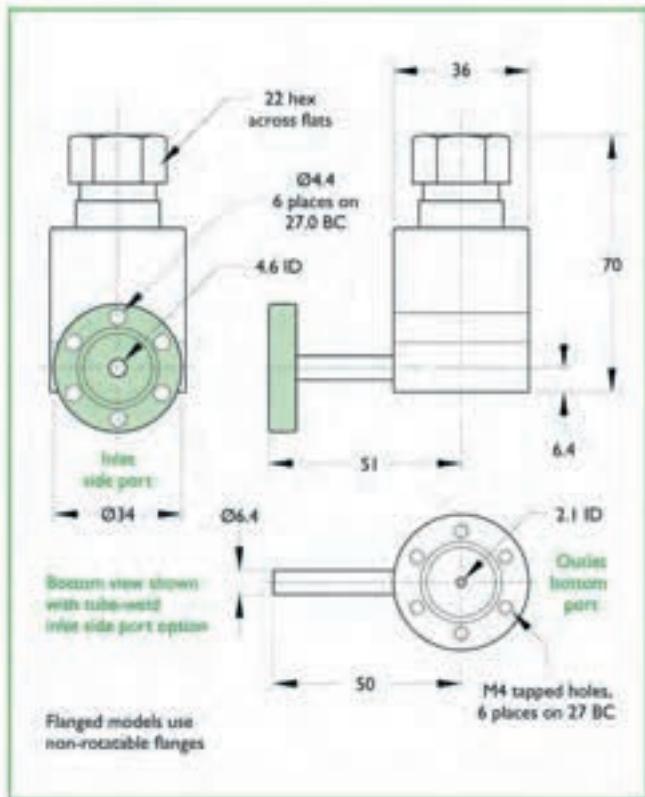
All dimensions are nominal in millimetres unless specified - Weights given are approximate

# All-metal valves

## Fine leak



E-MLV-22



### UHV Series

#### 450°C Metal seal bonnets

##### Features

- Adjustable leaks to  $1 \times 10^{-7}$  mbar l/sec
- High-temperature service to 450°C
- Durable stellite superalloy seat
- Replaceable nickel diaphragm seal
- Manual actuator
- Stainless steel construction
- Dry film lubricated actuator
- CF ports

##### Specifications

###### Material

Flanges	304ss
Valve body/seat	304ss/Stellite
Bolts	300ss
Gaskets, poppet and bonnet	Nickel

###### Port fastening

Bolt type	Socket head
Nut type	Hexagonal
Leak rate	$1 \times 10^{-7}$ to $1 \times 10^{-5}$ mbar l/sec
Inlet pressure	$\leq 1$ bar maximum
Temperature rating	450°C
Weight	0.5 kg

All-metal MLV series leak valves are specifically designed to control gas admission into ultrahigh vacuum systems. They are manually actuated and ideally suited for handling hot or corrosive gases commonly used in demanding research environments. The valve body is constructed of type 304 stainless steel and fitted with a knife-edge seat made of a durable stellite superalloy.

Caburn-MDC ultrahigh vacuum leak valves are shipped in a leak-tight condition. Valve leak rates can be adjusted down to a minimum leak of  $1 \times 10^{-7}$  mbar l/sec. Leak rate is controlled by relieving the pressure applied to a replaceable nickel diaphragm. Although these valves can be fully closed and rendered leak tight, doing so repeatedly will reduce the life of the nickel diaphragm and require periodic replacement.

###### Description

Valve, DN16CF

Valve, tube weld

Nickel diaphragm

Wt. kg	Reference	Part number
0.5	E-MLV-22	315000
0.5	E-MLV-21	315001
0.5	MLV-N0	931585

###### Bolt set

Socket cap head bolts

###### Thread length

M4 x 20mm

###### For use with

DN16CF

###### Quantity per pack

25

###### Reference

M4-20

###### Part number

1113014

All dimensions are nominal in millimetres unless specified - Weights given are approximate

## All-metal valves

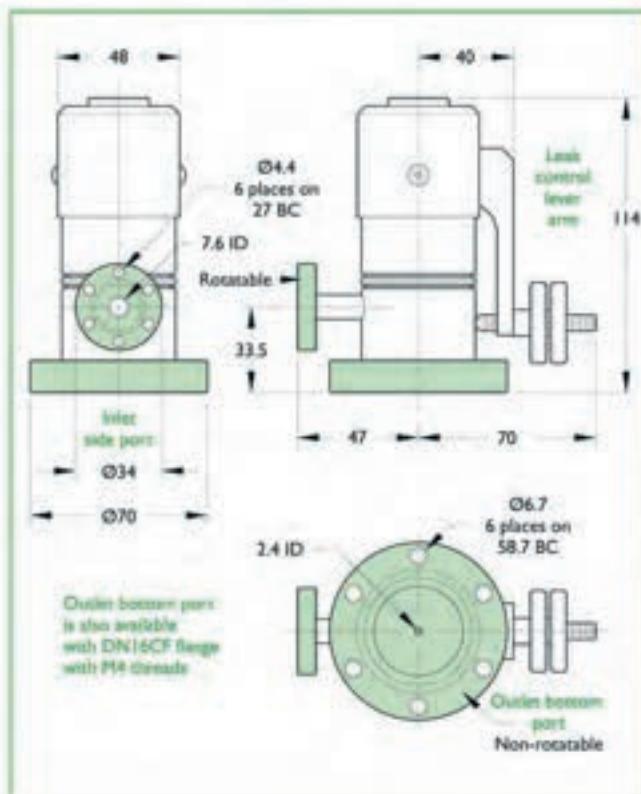


Precision leak



ULV-150

ULV-075



## UHV Series

## 450°C Welded bonnets

## Features

- Adjustable leaks to  $1.3 \times 10^{-10}$  mbar l/sec
- High-temperature service to 450°C
- Replaceable sapphire poppet
- Replaceable OFE copper seat
- Manual cantilever actuator
- Stainless steel construction
- Dry film lubricated actuator
- CF ports

## Specifications

## Material

Flanges	304ss
---------	-------

Valve body/seat	304ss/OFE Copper
-----------------	------------------

Poppets	Sapphire
---------	----------

Bolts	300ss
-------	-------

## Port fastening

Bolt type	Socket head
-----------	-------------

Nut type	Hexagonal
----------	-----------

Leak rate	$1.3 \times 10^{-10}$ mbar l/sec
-----------	----------------------------------

Inlet pressure	$\leq 1$ bar maximum
----------------	----------------------

Temperature rating	450°C
--------------------	-------

Weight	0.5 kg
--------	--------

All-metal ULV series precision ultrahigh vacuum leak valves are designed to control gas admission into high and ultrahigh vacuum systems. They are manually actuated via a cantilever arm fitted with extra-fine pitch threads for precise adjustment. They are ideally suited for handling hot and corrosive gases commonly used in demanding research environments. The valve body is constructed of type 304 stainless steel and a replaceable OFE copper seat. The valve poppet is made of high purity sapphire and is also replaceable. ULV series precision leak valves are shipped in a leak-tight condition. Leak rates are controlled by relieving the pressure applied to the replaceable copper seat. Leak rates are adjustable down to a minimum of  $1.3 \times 10^{-10}$  mbar l/sec.

Description	Wt. kg	Reference	Part number
Valve, DN16CF	1.4	E-ULV-075	315013
Valve, DN40CF	1.8	ULV-150	315010
Sapphire spare kit	0.5	ULVSA	315011
Bolt set:	Thread length	For use with:	Quantity per pack
Socket cap head bolts	M6 x 35mm	DN40CF	25
			Reference: M6-35
			Part number: 1113021

All dimensions are nominal in millimetres unless specified - Weights given are approximate



### Features

- Quick open/quick close with positive locks
- Positive FKM / FPM fluoroelastomer O-ring vacuum seal
- Type 304 stainless steel valve body
- High conductance
- Choice of CF or KF Flange

### Description

Caburn-MDC butterfly valves require only one-quarter turn rotation of the handle to go from fully open to the fully closed position. In the DN16CF and DN16KF flange series, a spring loaded ball bearing becomes seated in an indent providing a positive mechanical stop. All other size valves employ a roll pin stop method.

These quick-acting butterfly valves feature an improved sealing action. The opening in the body of the valve has been machined at a slight angle to the plane of the flapper. The flapper is set to rotate slightly off-centre. On closure, this causes the sealing pressure to be applied more uniformly all around the O-ring. A reliable, positive seal is made and the tendency of previous designs to roughen the surface of the O-ring and eject it from its groove is eliminated.

Caburn-MDC butterfly valves are low outgassing. All internal surfaces are machined from solid stainless steel bar stock. The handle is made of aluminium. A small O-ring on the stem prevents shaft leakage.

The valves are offered with a choice of CF ultrahigh vacuum metal-seal flanges or ISO KF O-ring seal flanges.

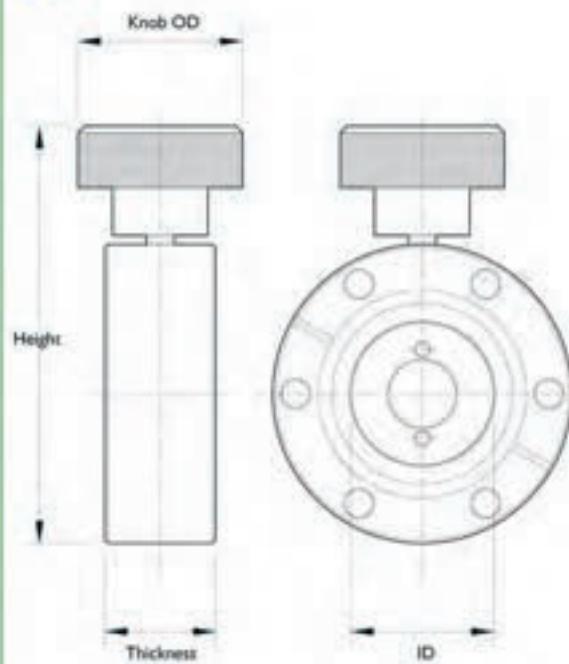
### Specifications

#### Material

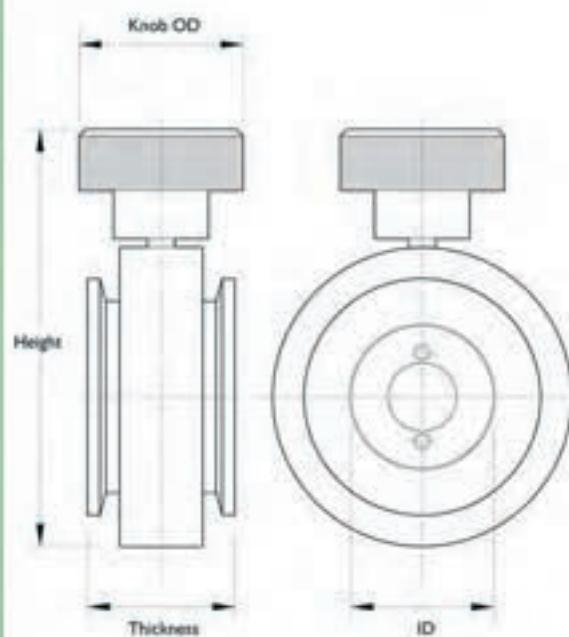
Flanges and body	304ss
Knob	Aluminium
O-rings	FKM / FPM fluoroelastomer
Vacuum range	$1.3 \times 10^{-6}$ mbar
Temperature rating	150°C open / 125°C closed
Weight and dimensions	See table

### UHV and HV series

#### CF



#### ISO KF



\* All valves have identical flanges both sides

## Butterfly valves

19 to 50mm ports



## CF



Nominal size	Type range	Flange OD	Through height	ID	Thickness	Knob dia	Wt kg	Reference	Part number
19	DIN16CF	34	50	15.2	19.1	19	0.5	BFV-075	360000
38	DIN40CF	70	97	33.8	25.4	38	0.5	BFV-150	360001

## ISO KF



Nominal size	Type range	Flange OD	Through height	ID	Thickness	Knob dia	Wt kg	Reference	Part number
19	DIN16KF	30	46	15.2	37.8	19	0.5	KBFV-075	360010
25	DIN25KF	40	59	22.1	31.8	19	0.5	KBFV-100	360011
38	DIN40KF	55	97	33.3	34.0	38	0.5	KBFV-150	360012
50	DIN50KF	75	113	47.5	42.7	38	1.2	KBFV-200	360013

## Accessories



Description	Nominal size	Wt kg	Reference	Part number
Seal kit	19	0.1	BFVG-075	360500
Seal kit	25	0.1	BFVG-100	360501
Seal kit	38	0.1	BFVG-150	360502
Seal kit	50	0.1	BFVG-200	360503

Includes one stem seal and one flapper seal