



VAT Vakuumventile AG
CH-9469 Haag, Schweiz

Product data sheet

Control butterfly with isolation function

Series 616, DN 40 - 100; gear box actuator (1:25)

Ordering No. 616..-....-....

“Pressure control”

1 Description

This product is a Butterfly control valve with extended control range and isolation functionality for downstream pressure control in vacuum systems.

This Product Data Sheet is valid for the valve ordering number(s):

DN		aluminum, hard anodized				stainless steel					
mm	inch	ISO-KF		ISO-F		ISO-KF		ISO-F			
40	1 ½	61632-KH	X	Y			61632-KE	X	Y		
50	2	61634-KH	X	Y			61634-KE	X	Y		
63	2 ½				61636-PH	X	Y		61636-PE	X	Y
80	3				61638-PH	X	Y		61638-PE	X	Y
100	4				61640-PH	X	Y		61640-PE	X	Y

X		Y		Sensor Inputs
Controller configurations		Interface		
G = Basic version		H = RS232 + AO		2
A = With SPS		K = RS485 + AO		2
H = With PFO		E = Logic (A/D)		2
C = With SPS and PFO		Q = DeviceNet®		2
		F = Profibus		2
SPS = Sensor Power Supply		N = CC-Link		2
(+/-15 VDC power for external pressure sensor)		X = EtherCAT		2
PFO = Power Failure Option		Z = Ethernet		2
(Valve opens/closes automatically at power failure)				

Example: 61638-PEGH = stainless steel valve, ISO-F DN80; RS232, 2 sensors



Sample picture only. Specified product may differ in size, flange and options



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2 Technical data

2.1 Valve unit

Pressure range at 20°C (unheated on delivery)						
- Stainless steel	(616 ... E. ...)	1 × 10E-8 mbar to 1.2 bar (abs)				
- Aluminum hard anodized	(616 ... H. ...)	1 × 10E-6 mbar to 1.2 bar (abs)				
Leak valve seat at 20°C (unheated on delivery)						
- Stainless steel	(616 ... E. ...)	1 × 10E-9 mbar ls ⁻¹				
- Aluminum hard anodized	(616 ... H. ...)	1 × 10E-4 mbar ls ⁻¹				
Leak valve body at 20°C (unheated on delivery)						
- Stainless steel	(616 ... E. ...)	1 × 10E-9 mbar ls ⁻¹				
- Aluminum hard anodized	(616 ... H. ...)	1 × 10E-5 mbar ls ⁻¹				
Cycles until first service (unheated and under clean conditions)						
• Pressure control		2'000'000				
• Closing / opening						
○ DN 40...50		250'000				
○ DN 63...100		100'000				
Admissible operating temperature						
• Valve body		10°C to 120°C				
• Ambient		10°C ... ≤ 50°C; (<35 °C recommended)				
Mounting position (valve seat towards chamber) support recommended		any DN40...100 (if actuator is not vertically oriented)				
Process side materials	body / plate	Stainless steel: AISI 316L (1.4404 or 1.4435) Aluminum - EN AW-6082 (3.2315) hard anodized				
	shaft / plate screws / ..	Stainless steel: AISI 316L (1.4404 or 1.4435)				
	shaft bearing	Iglidur® X				
Seals • Standard*)	Plate	FKM (e.g. Viton®)				
	rotary feed through atmosphere side	FKM (e.g. Viton®)				
	rotary feed through vacuum side	FKM (e.g. Viton®)				
DN (nominal I. D.)	[mm] [inch]	40 1½"	50 2"	63 2½"	80 3"	100 4"
Max. differential pressure on plate (close position) [mbar]		1000	1000	1000	1000	1000
Operating time:	Open to close / Close to open [s]	0.6	0.6	0.6	0.6	0.6
	Pressure control (throttling) [s]	0.5	0.5	0.5	0.5	0.5
Min. controllable conductance (N ₂ molecular flow) [ls ⁻¹]		0.05	0.1	0.15	0.2	0.25
Max. conductance (N ₂ molecular flow) [ls ⁻¹]		60	120	220	360	600
Weight (approx.) Aluminum valve	Aluminum [kg]	2.5	2.7	3.8	4.8	5.2
	Aluminum [lbs]	5.5	6	8.4	10.6	11.5
Weight (approx.) Stainless steel valve	Steel [kg]	3.3	3.6	5.9	8.8	9.7
	Steel [lbs]	7.3	7.9	13	19.4	21.4

Behavior in case of power failure:

Depending on configuration
(with or without PFO (Power Fail Option))

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2.2 Control unit

Power supply input	connector	D-Sub, DA-15, male
	supply voltage	+24 VDC ($\pm 10\%$) @ 0.5 V pk-pk max.
Power consumption ¹⁾	(control / drive)	40 W (max.) with optional SPS: +40 W with optional PFO: +10 W +3 W max. (from DeviceNet [®] to DeviceNet [®] Interface board of valve)
Ambient	temperature	10 °C to +50 °C max. (<35 °C recommended)
	humidity	0 to 95% RH, non-condensing
Interface	remote	Refer to chapter 2.3
	service port	USB-B (USB 2.0)
Sensor	connector	D-Sub, DA-15, female
	number of inputs	2
	signal voltage	0 ... 10V DC linear with pressure
	input voltage range	-10 ... +10 V
	input resistance	100 k Ω
	ADC resolution	0.1 mV
	sampling rate	2 ms; moving median (10 mSec)
	power supply (output)	+24 VDC / 1.5 A max. or ± 15 VDC / 1.2 A max. (with SPS option)
Actuator		Motor: Stepper, field oriented control (foc) Encoder: Incremental, 20'000 puls per rotation Gearbox: Ratio 1:25, backlash <0.4°
Movement range	CLOSE - OPEN	158°
Valve mechanics		Deflection lever transfers 158° gearbox output to $\approx 90^\circ$ gate movement; nonlinear transfer
Pressure control performance ²⁾		5 mV or 0.1% of set point, the higher value applies.
Ingress Protection		IP 40

¹⁾ Rush in current not considered

²⁾ Documented on model process chamber

Actual dimensions and special configuration: dimensional drawing & optional 3D model

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2.3 Interface

2.3.1 Power Connector – all interfaces

Connector		D-Sub, DA-15, male
Digital inputs	input 1	interlock OPEN (adjustable with CPA 4)
	input 2	interlock CLOSE (adjustable with CPA 4)
	voltage control	12 ... 24V / 4 ... 8 mA
	contact control	24V / 8 mA
Digital outputs	output 1	valve OPEN (adjustable with CPA 4)
	output 2	valve CLOSE (adjustable with CPA 4)
	load	max. 70 V / 0.1 A

2.3.2 Logic

Connector		D-Sub, DB-25, female
Digital inputs	number of inputs	8
	voltage control	5 ... 24V / 2 ... 10 mA
	contact control	3.3V / 2 mA
Digital outputs	number of outputs	4
	load	max. 70 V / 0.1 A
Analog input	number of inputs	2
	voltage range	0 ... 10V
	input resistance	100 kOhm
Analog outputs	number of outputs	2
	voltage range	0 ... 10V
	load	max. 1 mA

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2.3.3 RS232

Connector		D-Sub, DB-25, female
Communication settings	baud rate	1200,2400,4800,9600,19200,38400,57600, 115200 ¹⁾
	data bits	7 or 8 ¹⁾
	stop bits	1 ¹⁾ or 2
	parity bit	even, odd, none ¹⁾
Digital inputs	number of inputs	2
	voltage control	5 ... 24V / 2 ... 10 mA
	contact control	3.3V / 2 mA
Digital outputs	number of outputs	2
	load	max. 70 V / 0.1 A
Analog outputs	number of outputs	2
	voltage range	0 ... 10V
	load	max. 1 mA

¹⁾ Default setting by firmware; Configuration-File (or CPA) can be used to change

2.3.4 RS485

Connector		D-Sub, DB-25, female
Communication settings	baud rate	1200,2400,4800,9600,19200,38400,57600, 115200 ¹⁾
	data bits	7 or 8 ¹⁾
	stop bits	1 ¹⁾ or 2
	parity bit	even, odd, none ¹⁾
	topology	half duplex, full duplex ¹⁾
	network	point to point, multiple devices ¹⁾
	adress range	0 ¹⁾ ... 255
Digital inputs	number of inputs	2
	voltage control	5 ... 24V / 2 ... 10 mA
	contact control	3.3V / 2 mA
Digital outputs	number of outputs	2
	load	max. 70 V / 0.1 A
Analog outputs	number of outputs	2
	voltage range	0 ... 10V
	load	max. 1 mA

¹⁾ Default setting by firmware; Configuration-File (or CPA) can be used to change

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2.3.5 DeviceNet

Connector		microstyle, 5-pin, male
Communication	protocol	DeviceNet, group 2 slave only
	data rate	125, 250, 500 kbaud by switch or network programmable
	MAC ID	address 00 - 63 by switch or network programmable
	profile	Generic “C” ¹⁾ Process Control Device (ODVA)
Supply voltage	transceiver at microstyle connector	24 V _{nom} , 11 ... 25V; max. 0.5 W

¹⁾ Default setting by firmware; Configuration-File can be used to change (or CPA)

2.3.6 Profibus

Connector		D-Sub, DE-9, female
Communication	protocol	Profibus DP-V1, DP-V0
	data rate	9.6, 19.2, 45.45, 93.75, 187.5, 500 kbps, 1.5, 3, 6, 12 Mbps The baud rate is detected automatically ¹⁾ or may be configured
	node address	SW configurable (0, 1 ¹⁾ – 125)

¹⁾ Default setting by firmware; Configuration-File (or CPA) can be used to change

2.3.7 CC-Link

Connector		D-Sub, DE-9, female
Communication	protocol	CC-Link V2
	data rate	156, 625, 500 kbps, 2.5, 5, 10 Mbps ¹⁾ SW configurable
	station number	SW configurable (1 ¹⁾ – 64)

²⁾ Default setting by firmware; Configuration-File can be used to change (or CPA)



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2.3.8 EtherCAT

Connector		2 x RJ45, 8-pin (socket), IN and OUT
Communication	protocol	Protocol specialized for EtherCAT
	node address	Explicit device identification or station alias, set by switches Default: 0-0-0
	physical layer	100BASE-Tx (IEEE 802.3)
Cable		shielded Ethernet CAT5e or higher

2.3.9 Ethernet

Connector		2 x RJ45, 8-pin (socket), IN and OUT
Communication	protocol	Telnet
	node address	IP Address (DHCP or static)
	physical layer	100BASE-Tx (IEEE 802.3)
Cable		shielded Ethernet CAT5e or higher

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2.4 General data

Weight	refer to chapter: 2.1
Dimensional drawing	Refer to dimensional drawing of specific valve ordering number (available on request)

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