



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⁾ – 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) – 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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