



VAT Vakuumventile AG
CH-9469 Haag, Schweiz

Product data sheet
Series 653, DN 100 - 350 mm (I.D. 4" - 12")
Ordering No. 653...-.....-.....

1 Description

This product is a throttling pendulum valve with isolation functionality. It is intended to use for downstream pressure control applications.

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

| DN | | Ordering numbers | | | | | | | | | | | |
|-----|------|------------------|---|-----|----------|------------------------|---|----------|---|---|----------|---|---|
| mm | inch | blank aluminum | | | | hard anodized aluminum | | | | | | | |
| | | ISO-F | | JIS | | ISO-F | | JIS | | | | | |
| 100 | 4 | 65340-PA | x | y | 65340-JA | x | y | 65340-PH | x | y | 65340-JH | x | y |
| 160 | 6 | 65344-PA | x | y | 65344-JA | x | y | 65344-PH | x | y | 65344-JH | x | y |
| 200 | 8 | 65346-PA | x | y | 65346-JA | x | y | 65346-PH | x | y | 65346-JH | x | y |
| 250 | 10 | 65348-PA | x | y | 65348-JA | x | y | 65348-PH | x | y | 65348-JH | x | y |
| 320 | 12 | 65350-PA | x | y | 65350-JA | x | y | 65350-PH | x | y | 65350-JH | x | y |
| 350 | 14 | -- | | | 65351-JA | x | y | -- | | | 65351-JH | x | y |



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

Controller configurations:

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|---|---|---|-------|-------|--|--|-----------|---------------|---------------|--|-------------------|-----------|---|--------------|-----------------|---|--------------|----------------|---|----------------------|----------------|---|------------------------------------|-----------|---|------------------------------|---------------|---|------------------------------|--------------|---|-----------------------------------|------------------------------------|--|
| <table border="0"> <tr> <td style="border: none;"> <table border="0"> <tr> <td style="border: none;">x</td> <td style="border: none;"> </td> <td style="border: none;"> </td> <td style="border: none;">y</td> </tr> <tr> <td colspan="4" style="border: none;">-----</td> </tr> </table> </td> <td style="border: none;">Interface</td> <td style="border: none;">Sensor inputs</td> </tr> </table> | <table border="0"> <tr> <td style="border: none;">x</td> <td style="border: none;"> </td> <td style="border: none;"> </td> <td style="border: none;">y</td> </tr> <tr> <td colspan="4" style="border: none;">-----</td> </tr> </table> | x | | | y | ----- | | | | Interface | Sensor inputs | <table border="0"> <tr> <td style="border: none;">G = basic version</td> <td style="border: none;">H = RS232</td> <td style="border: none;">2</td> </tr> <tr> <td style="border: none;">A = with SPS</td> <td style="border: none;">E = Logic (A/D)</td> <td style="border: none;">2</td> </tr> <tr> <td style="border: none;">H = with PFO</td> <td style="border: none;">Q = DeviceNet®</td> <td style="border: none;">2</td> </tr> <tr> <td style="border: none;">C = with SPS and PFO</td> <td style="border: none;">F = Profibus *</td> <td style="border: none;">2</td> </tr> <tr> <td style="border: none;">T = basic version with VC master *</td> <td style="border: none;">K = RS485</td> <td style="border: none;">2</td> </tr> <tr> <td style="border: none;">V = with SPS and VC master *</td> <td style="border: none;">N = CC-Link *</td> <td style="border: none;">2</td> </tr> <tr> <td style="border: none;">U = with PFO and VC master *</td> <td style="border: none;">X = EtherCAT</td> <td style="border: none;">2</td> </tr> <tr> <td style="border: none;">W = with SPS, PFO and VC master *</td> <td style="border: none;">S = VC slave (without interface) *</td> <td></td> </tr> </table> | G = basic version | H = RS232 | 2 | A = with SPS | E = Logic (A/D) | 2 | H = with PFO | Q = DeviceNet® | 2 | C = with SPS and PFO | F = Profibus * | 2 | T = basic version with VC master * | K = RS485 | 2 | V = with SPS and VC master * | N = CC-Link * | 2 | U = with PFO and VC master * | X = EtherCAT | 2 | W = with SPS, PFO and VC master * | S = VC slave (without interface) * | |
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| x | | | y | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ----- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| G = basic version | H = RS232 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A = with SPS | E = Logic (A/D) | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H = with PFO | Q = DeviceNet® | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C = with SPS and PFO | F = Profibus * | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| T = basic version with VC master * | K = RS485 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| V = with SPS and VC master * | N = CC-Link * | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| U = with PFO and VC master * | X = EtherCAT | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| W = with SPS, PFO and VC master * | S = VC slave (without interface) * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| |
|---|
| SPS = Sensor Power Supply (±15VDC power supply for sensor) |
| PFO = Power Failure Option (valve closes / opens automatically at power failure) |
| VC = Valve Cluster (for operating several valves synchronously) |

* not yet available

Example: 65340-PAGH

Aluminium valve with ISO-F DN100 flanges, RS232 interface, with 2 sensor inputs

| | | |
|-----------------|--------------------------|-----------------|
| Created by: NAS | Release date: 17.03.2021 | 1/7 |
| Modified by: | Release date: | 938344ED |



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Ordering No. 653...-.....-.....

2 Technical data

2.1 Valve unit

| | | |
|---|--|---|
| Pressure range (unheated on delivery) | | |
| <ul style="list-style-type: none"> Aluminum Aluminum, hardanodized | | 1 × 10E-8 mbar to 1.2 bar (abs) 1 × 10E-6 mbar to 1.2 bar (abs) |
| Leak rate valve seat (unheated on delivery) | | |
| <ul style="list-style-type: none"> Aluminum Aluminum, hardanodized | | 1 × 10E-9 mbar ls ⁻¹ 1 × 10E-4 mbar ls ⁻¹ |
| Leak rate valve body (unheated on delivery) | | |
| <ul style="list-style-type: none"> Aluminum Aluminum, hardanodized | | 1 × 10E-9 mbar ls ⁻¹ 1 × 10E-5 mbar ls ⁻¹ |
| Cycles until first service (unheated and under clean conditions) | | |
| <ul style="list-style-type: none"> Pressure control Closing / opening | | 1'000'000 200'000 |
| Admissible operating temperature | | |
| <ul style="list-style-type: none"> Valve body Ambient | | ≤ 120°C ≤ 50°C |
| Mounting position (valve seat on chamber side recommended) | | |
| <ul style="list-style-type: none"> DN100...250 DN320...350 | | Any Horizontally and vertically restricted as shown below* |
| Process side materials | valve body / plate | EN AW-6061 (3.3211) |
| | sealing ring | EN AW-6061 (3.3211), AISI 305 (1.4303), AISI 420C (1.3541), AISI 631 (1.4568) |
| | other parts | AISI 316L (1.4404, 1.4435), AISI 440 (1.4122), AISI 301 (1.4310), AISI 316 Ti (1.4571), AISI 304 (1.4301) |
| Seals | plate, body, bonnet, rotary feedthrough, shaft feedthrough | FKM (e.g. Viton®) FFKM optional |

*

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| DN (nominal I. D.) | [mm] | 100 | 160 | 200 | 250 | 320 | 350 |
|---|---------------------|----------|----------|----------|----------|----------|----------|
| | [Inch] | 4" | 6" | 8" | 10" | 12" | 14" |
| Operating time (s): | | | | | | | |
| Open to close / Close to open | [s] | 3 / 4 | 3 / 4 | 3 / 4 | 3 / 4 | 5 / 6 | 5 / 6 |
| Pressure control (throttling) Default Speed | [s] | 0.7 | 0.8 | 0.9 | 0.9 | 1.1 | 1.3 |
| Pressure control (throttling) Fast speed | [s] | 0.4 | 0.4 | 0.5 | 0.5 | 0.6 | 0.7 |
| Min. controllable conductance (N ₂ molecular flow) ¹⁾ | [ls ⁻¹] | <3 | <5 | <10 | <15 | <22 | <25 |
| Max. Conductance (N ₂ molecular flow) ¹⁾ | [ls ⁻¹] | 1'700 | 5'000 | 12'000 | 22'000 | 30'000 | 43'000 |
| Max. differential pressure on the plate in closed position [mbar] | | 1'200 | 1'200 | 1'200 | 1'200 | 1'200 | 1'200 |
| Max. differential pressure during operation [mbar] | | 30 | 10 | 5 | 5 | 5 | 5 |
| Compressed air min. – max. overpressure | [bar] | 4...7 | 4...7 | 4...7 | 4...7 | 4...7 | 4...7 |
| | [psi] | 58...102 | 58...102 | 58...102 | 58...102 | 58...102 | 58...102 |

| DN (nominal I. D.) | [mm] | 100 | 160 | 200 | 250 | 320 | 350 |
|--------------------|--------|-----|-----|-----|-----|-----|-----|
| | [Inch] | 4" | 6" | 8" | 10" | 12" | 14" |
| Weight (approx.) | [kg] | 12 | 18 | 22 | 29 | 48 | 59 |
| | [lbs] | 27 | 40 | 49 | 64 | 106 | 130 |



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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 | (control / drive) | 70 W (max.) with optional SPS + 40 W with optional PFO + 10 W |
| Ambient | temperature | 0 °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 | -10 ... +10 V |
| | input resistance | 100 k Ω |
| | ADC resolution | 0.1 mV |
| | sampling rate | 2 ms |
| | power supply (output) | +24 VDC / 1.5 A max. or ± 15 VDC / 1.2 A max. (with SPS option) |
| Position resolution | | 58'000 (full stroke) |
| Actuator type | | Stepper motor with servo control |
| Pressure control accuracy | | 5 mV or 0.1% of setpoint, the higher value applies |
| Ingress Protection | | IP 30 |

| | | |
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2.3 Interface

Power Connector

| | | |
|-----------------|------------------------------------|---|
| Connector | | D-Sub, DA-15, male |
| Digital inputs | input 1 | interlock open (adjustable with CPA 4.0) |
| | input 2 | interlock close (adjustable with CPA 4.0) |
| | voltage control contact control | 12 ... 24V / 4 ... 8 mA 24V / 8 mA |
| Digital outputs | output 1 | valve opened (adjustable with CPA 4.0) |
| | output 2 | valve closed (adjustable with CPA 4.0) |
| | load | max. 70 V / 0.1 A |

Logic

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

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 |
| | physical layer | 100BASE-Tx (IEEE 802.3) |
| Cable | | shielded Ethernet CAT5e or higher |



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CC-Link

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

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 "B" for valves with cluster option Generic "C" |
| Supply voltage | transceiver at microstyle connector | 24 Vnom, 11 ... 25V; max. 0.5 W |

RS485

| | | |
|------------------------|-------------------|--|
| Connector | | D-Sub, DB-25, female |
| Communication settings | baud rate | 1200,2400,4800,9600,19200,38400,57600,115200 |
| | data bits | 7 or 8 |
| | stop bits | 1 or 2 |
| | parity bit | even, odd, none |
| | topology | half duplex, full duplex |
| | network | point to point, multiple devices |
| | adress range | 0 ... 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 |



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RS232

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

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 or may be configured |
| | node address | SW configurable (0 – 125) |

Valve Cluster

| | | |
|--------------|---------------|---|
| Cluster link | Connector | 2 x RJ45 |
| | Communication | RS485 |
| | Adress range | 0 = master 1 ... 79 = slave address set by switches |

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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