





VAT Vakuumventile AG  
CH-9469 Haag, Schweiz

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

## 2 Technical data

### 2.1 Valve unit

Pressure range (unheated on delivery)		
<ul style="list-style-type: none"> <li>Aluminum</li> <li>Aluminum, hardanodized</li> </ul>		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"> <li>Aluminum</li> <li>Aluminum, hardanodized</li> </ul>		1 × 10E-9 mbar ls <sup>-1</sup> 1 × 10E-4 mbar ls <sup>-1</sup>
Leak rate valve body (unheated on delivery)		
<ul style="list-style-type: none"> <li>Aluminum</li> <li>Aluminum, hardanodized</li> </ul>		1 × 10E-9 mbar ls <sup>-1</sup> 1 × 10E-5 mbar ls <sup>-1</sup>
Cycles until first service (unheated and under clean conditions)		
<ul style="list-style-type: none"> <li>Pressure control</li> <li>Closing / opening</li> </ul>		1'000'000 200'000
Admissible operating temperature		
<ul style="list-style-type: none"> <li>Valve body</li> <li>Ambient</li> </ul>		≤ 120°C ≤ 50°C
Mounting position (valve seat on chamber side recommended)		
<ul style="list-style-type: none"> <li>DN100...250</li> <li>DN320...350</li> </ul>		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 <sub>2</sub> molecular flow) <sup>1)</sup>	[ls <sup>-1</sup> ]	<3	<5	<10	<15	<22	<25
Max. Conductance (N <sub>2</sub> molecular flow) <sup>1)</sup>	[ls <sup>-1</sup> ]	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 $\Omega$
	ADC resolution	0.1 mV
	sampling rate	2 ms
	power supply (output)	+24 VDC / 1.5 A max. or $\pm 15$ 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	0 ... 10V
	load	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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