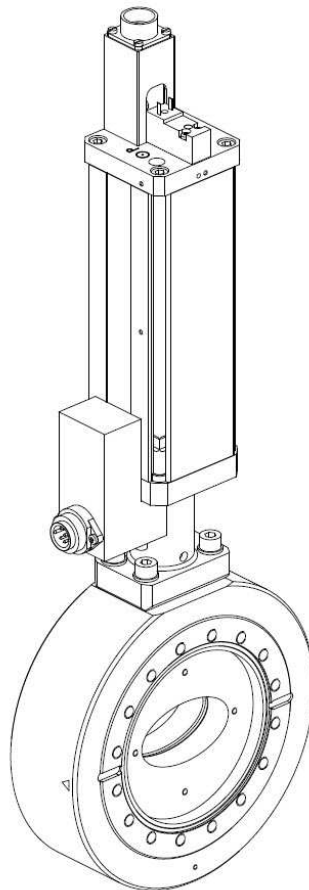


Fast Closing Shutter with double acting pneumatic actuator

Series 773
DN 100 (I. D. 4")

This manual is valid for the following product ordering numbers:

77340-CE44-ABU1
77340- . E44-....



Sample picture

Imprint

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1 Description of product

1.1 Identification of product

The fabrication number and order number are fixed on the product directly or by means of an identification plate.



← Fabrication number

← Order number

1.2 Use of product

Use product for clean and dry vacuum applications only. Other applications are only allowed with the written permission of VAT.

1.3 Related documents

- Product data sheet
- Dimensional drawing

1.4 Important information



This symbol points to a very important statement that requires particular attention.

Example:



VAT disclaims any liability for damages resulting from inappropriate packaging.

1.5 Technical data

Description		
Leak rate	<ul style="list-style-type: none"> – Shutter body – Shutter seat 	$\leq 1 \cdot 10^{-10}$ mbar ls ⁻¹ ≤ 1 mbar ls ⁻¹ (air, 1 bar)
Pressure range		XUHV to 1.2 bar (abs)
Test pressure		1 bar
Differential pressure on the gate		≤ 1.2 bar
Differential pressure at opening		≤ 150 mbar
Cycles until first service		5 000
Bake-out temperature (Maximum values: depending on operating conditions and sealing materials)	<ul style="list-style-type: none"> – Shutter body – Actuator 	≤ 300 °C ≤ 50 °C
Heating and cooling rate		≤ 60 °C h ⁻¹
Material	<ul style="list-style-type: none"> – Shutter body – Mechanism – Flange – Gate – Bellows 	1.4435 ESU, AISI 316L ESR 1.4404, AISI 316L 1.4435 ESU, AISI 316 L ESR 1.4404, AISI 316 L; silver coated AM350, AISI 633
Seal	<ul style="list-style-type: none"> – Bonnet – Gate – Actuator 	metal, silver plated none FKM (Viton®)
Magnetic permeability		$\mu_r \leq 1.05$, except small amounts of material and parts of welding seams, small parts (screws, bolts, ..) are not measured
Mounting position		Any, but shutter side marked with seat side triangle sign in opposite direction of the air inrush

Radiation resistance	<ul style="list-style-type: none"> – Shutter body – Actuator seals – Actuation compl. – Position indicator 	<ul style="list-style-type: none"> 10⁸ Gy (10¹⁰ rad) 10⁵ Gy (10⁷ rad) 10⁴ Gy (10⁶ rad) 10⁶ Gy (10⁸ rad)
Volume of pneumatic actuator		0.36 l / 0.013 ft ³
Compressed air min. – max. overpressure		5 - 6 bar / 73 - 87 psig
Compressed air connections		R 1/8" (USA: 1/8" NPT)
Actuation time (valid for RT, Ø6mm tubing at 4 bar with flow rate of 400 l/min)	<ul style="list-style-type: none"> – Closing – Opening 	<ul style="list-style-type: none"> ≤ 12 ms ≤ 9 s
Weight		13.5 kg / 29.8 lbs
Behavior in case of compressed air pressure drop	<ul style="list-style-type: none"> – Shutter closed – Shutter open 	<ul style="list-style-type: none"> Undefined position Valve remains in open position
Behavior in case of power failure	<ul style="list-style-type: none"> – Shutter closed – Shutter open 	<ul style="list-style-type: none"> Shutter remains in closed position Shutter remains in open position or closes¹

¹⁾ depending on controller settings.

Description	
Solenoid	
Voltage	24 V DC
Power consumption	≤ 2.5 W
Position indicator	
Type	micro switch
Voltage	≤ 50 V AC / DC
Current max.	≤ 1.2 A
Electric connection	
	common 12-pin plug

2 Safety

2.1 Compulsory reading material

Read this chapter prior to performing any work with or on the product. It contains important information that is significant for your own personal safety. This chapter must have been read and understood by all persons who perform any kind of work with or on the product during any stage of its serviceable life.

	NOTICE
	<p>Lack of knowledge Failing to read this manual may result in property damage. Firstly, read manual.</p>



These Installation, Operating & Maintenance Instructions are an integral part of a comprehensive documentation belonging to a complete technical system. They must be stored together with the other documentation and accessible for anybody who is authorized to work with the system at any time.

2.2 Danger levels



	⚠ DANGER
	<p>High risk Indicates a hazardous situation which, if not avoided, will result in death or serious injury.</p>

	⚠ WARNING
	<p>Medium risk Indicates a hazardous situation which, if not avoided, could result in death or serious injury.</p>

	⚠ CAUTION
	<p>Low risk Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.</p>

	NOTICE
	<p>Command Indicates a hazardous situation which, if not avoided, may result in property damage.</p>

2.3 Personnel qualifications

	 WARNING
	<p>Unqualified personnel Inappropriate handling may cause serious injury or property damage. Only qualified personnel are allowed to carry out the described work.</p>

2.4 Safety labels


Label	Part No.	Location on valve
	T-9001-155	On protective covers of flanges

Table 2-1

3 Design and Function

3.1 Design

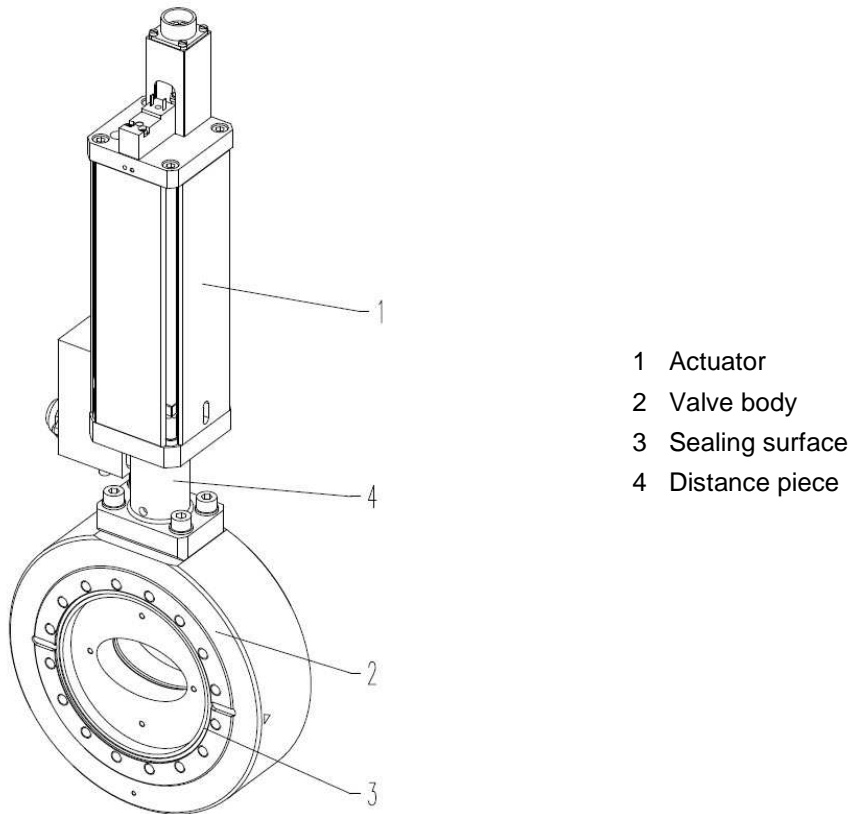


Figure 3-1

3.2 Function

Valve is closed and opened pneumatically.

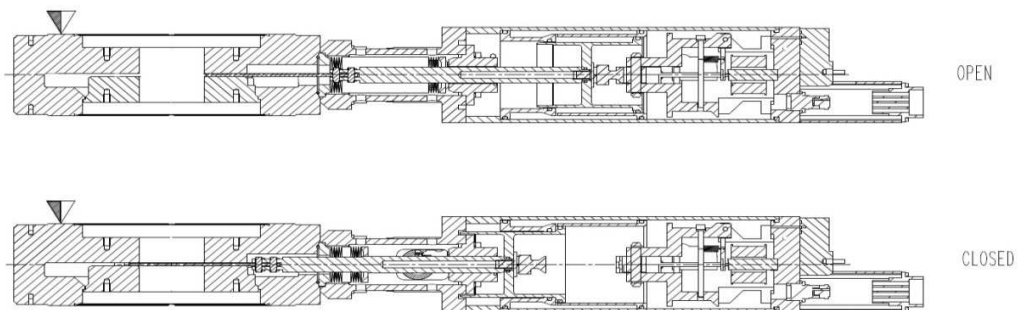





Figure 3-2 ▼ Valve seat side

4 Installation

	⚠ WARNING
	Unqualified personnel Inappropriate handling may cause serious injury or property damage. Only qualified personnel are allowed to carry out the described work.

4.1 Unpacking

	NOTICE
	Physical overstraining at controller Inappropriate handling with the valve may cause in damage of controller. Do not place the valve on the controller.

	NOTICE
	Physical overstraining at pedestal Inappropriate handling with the valve may cause in damage of pedestal. Lift valve at valve body out of transport case.



- Make sure that the supplied products are in accordance with your order.
- Inspect the quality of the supplied products visually. If it does not meet your requirements, please contact VAT immediately.
- Store the original packaging material. It may be useful if products must be returned to VAT.

1. Open the transport case and remove inside packing material as far as necessary.
2. Lift the valve carefully and place it on a clean place.



Do not remove protective foils from valve opening

4.2 Installation into the system

	WARNING
	<p>Movable parts Human body parts may get jammed and severely injured. Do not connect or supply electrical power and compressed air before the product is completely mounted in the system.</p>

	NOTICE
	<p>Sealing surfaces Sealing surfaces of valve and vacuum system could be damage in case of incorrect handling. Only qualified personal are allowed to install the valve into the vacuum system.</p>


	NOTICE
	<p>Wrong connection Wrong connection may result in damage of controller or power supply. Connect all cables exactly as shown in the following descriptions and schematics.</p>


	NOTICE
	<p>Burned connector pins (spark) Connector pins or electronic parts could damage, if plugged and unplugged under power. Do not plug or unplug connectors under power.</p>

	NOTICE
	<p>Contamination Gate and other parts of the valve must be protected from contamination. Always wear clean room gloves when handling the valve.</p>

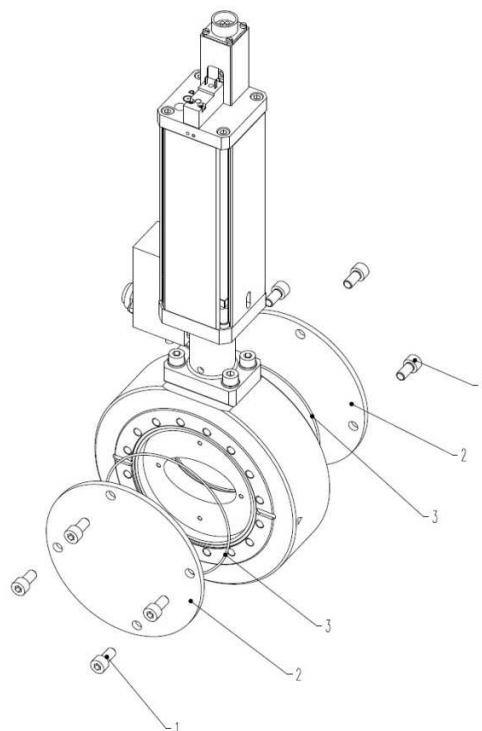
Mount valve to a clean system only.

4.2.1 Preparation for installation

	⚠ WARNING
	<p>Danger of injury in case of insufficient skills Inappropriate handling may cause serious injury or property damage. Make sure that the valve does not topple or fall down while removing the protective covers from the flanges.</p>

	NOTICE
	<p>Sensitive product Valve parts may get damaged. When removing the protective covers from the flanges, be careful to avoid damage to the valve.</p>

3. Remove outer plastic bag.
4. Remove inner plastic bag in cleanroom environment only
5. Remove screws (1) and protective covers (2); see «Figure 4-1».
6. Remove O-rings (3).



- 1 Screws (quantity depends on valve size)
- 2 Protective covers
- 3 O-ring

Figure 4-1



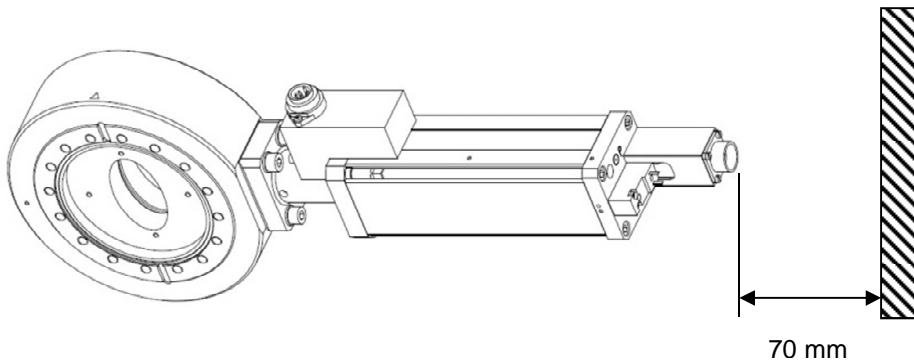
Store screws, protective covers and O-ring. They may be useful when valve needs to be repacked.

7. Clean sealing surfaces; with a cleanroom wiper soaked with pure alcohol (Isopropanol).
8. Clean surface with clean, oil free compressed air.


4.2.2 Installation space condition



Install the valve with integrated controller with space for dismantling and air circulation as shown in figure below.

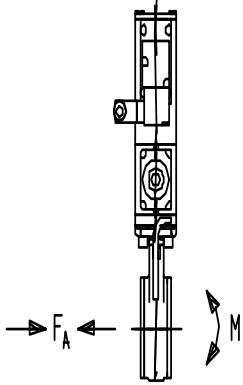


4.3 Admissible forces



NOTICE	
	<p>Force at valve body</p> <p>Forces from the weight of other components can lead to deformation of the valve body and to malfunction of the valve.</p> <p>Do not higher force the valve body as specified.</p>







The following forces are admissible.

Axial tensile or compressive force « F_A »		Bending moment « M »		
N	lb.	Nm	lbf.	
500	112	30	22	

4.4 Compressed air connection

	 WARNING
	<p>Valve in open or closed position</p> <p>Risk of injury when compressed air is connected to the valve.</p> <p>Connect compressed air only when:</p> <ul style="list-style-type: none"> - valve is installed in the vacuum system - moving parts cannot be touched

	NOTICE
	<p>Wrong sequence of connections</p> <p>Valve mechanism may get damaged when electrical power is being connected before compressed air is connected.</p> <p>Always connect compressed air before connecting electrical power.</p>


-  Use clean, dry or slightly oiled air only.
-  Admissible air pressure range, see product data sheet.
-  Supply compressed air pressure only after the supply line is properly mounted to the actuator.


Connect compressed air supply line according the specification on the product data sheet and; see «Table 4-1».


Execution	Procedure
<p>Standard solenoid valve</p> <p>77 ... - -</p>	<p>Connect relevant compressed air supply line to connection ⊕</p> <p>Supply admissible compressed air to connection.</p>

Table 4-1

4.5 Electrical connection

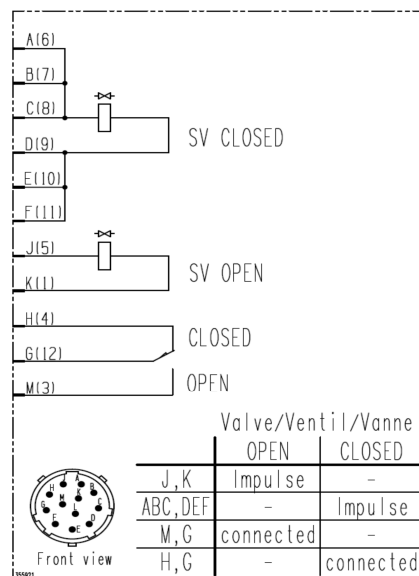
	⚠ DANGER
	<p>Electric shock</p> <p>Parts being under voltage will result in serious injury or death. Do not touch parts being under voltage.</p>

	NOTICE
	<p>Wrong sequence of connections</p> <p>Valve mechanism may get damaged when electrical power is being connected before compressed air is connected. Always connect compressed air before connecting electrical power.</p>



	NOTICE
	<p>Wrong voltage</p> <p>Electrical components may get damaged. Supply electrical components with the correct voltage.</p>


Connect electrical component according to the wiring diagram on the product data sheet.

4.5.1 Connection overview



5 Operation

	 WARNING
	<p>Unqualified personnel Inappropriate handling may cause serious injury or property damage. Only qualified personnel are allowed to carry out the described work.</p>

	 WARNING
	<p>Movable parts Human body parts may get jammed and severely injured. Do not operate before product is installed completely into the vacuum system.</p>

5.1 Normal operation

Valve is closed and opened pneumatically.

- The valve is closed and opened by compressed air pressure. The cylinder is permanently maintained under compressed air pressure
- Closing is initiated by a solenoid, which releases a latch. The result is an extremely short closing time. The final stage of closing is pneumatically dampened.



For technical details, see product data sheet.



Make sure that compressed air is supplied at the specified pressure; see also chapter «4.4 Compressed air connection».



Make sure that the connect voltage is supplied. See also chapter «4.5 Electrical connection».

Action	Execution	Procedure
To open the valve	Standard solenoid valve 77 ... - -	Supply specified voltage to the magnetic coil.


Table 5-1

Action	Execution	Procedure
To close the valve	Standard solenoid valve 77 ... - -	Cut voltage supply to the magnetic coil.

Table 5-2

5.2 Operation under increased temperature

Maximum allowed temperature, see product data sheet.

NOTICE	
	<p>Inconstant temperatures</p> <p>Performance of the valve may deteriorate.</p> <ul style="list-style-type: none">– Actuate valve only after the bake-out temperature has been stable for two hours.– If valve must be actuated during bake-out, make sure that the heating or cooling rate does not exceed 10 °C per hour in the temperature range from 100 °C to 300 °C.– Make sure that the temperature differences over the whole body do not exceed 30 °C.

5.3 Bake-out

See product data sheet.

5.4 Behavior in case of compressed air pressure drop

See product data sheet.

5.5 Behavior in case of power failure

See product data sheet.


5.6 Trouble shooting

Failure	Check	Action	See
Valve mechanism does not move	Air pressure	Connect compressed air	«4.4 Compressed air connection»
	Electrical power	Connect electrical power	«4.5 Electrical connection»
	Operating pressure	Adjust operating pressure	«4.4 Compressed air connection»
Leak at gate	Condition of gate seal	Please contact VAT	www.vatvalve.com
	Condition of valve gate	Please contact VAT	www.vatvalve.com
	Operating pressure	Adjust operating pressure	«4.4 Compressed air connection»
Leak at body	Condition of bonnet seal and sealing surface	Please contact VAT	www.vatvalve.com
	Condition of bellows	Please contact VAT	www.vatvalve.com
Whistling sound during opening or closing	–	No action required when valve is actuated at atmosphere	–
	–	No action required when valve is actuated in vacuum as long as the sound is not excessive	–

Table 5-3

If you need any further information, please contact one of our service centers. You will find the addresses on our website www.vatvalve.com.

6 Maintenance

	⚠ WARNING
	Unqualified personnel Inappropriate handling may cause serious injury or property damage. Only qualified personnel are allowed to carry out the described work.

6.1 Maintenance intervals

Under clean operating conditions the valve does not require any maintenance during the specified cycles.




- Impacts from the process may require more frequent maintenance.
- When the valve has reached the specified cycles; see product data sheet, we recommend to have it serviced by VAT. Please contact your nearest VAT service center to get recommendations and an offer. You will find the addresses on our website www.vatvalve.com.

7 Repairs


Repairs may only be carried out by the VAT service staff. In exceptional cases, the customer is allowed to carry out the repairs, but only with the prior consent of VAT.

Please contact one of our service centers. You will find the addresses on our website www.vatvalve.com.

8 Dismounting and Storage

	<p style="text-align: center;">⚠ WARNING</p> <p>Unqualified personnel Inappropriate handling may cause serious injury or property damage. Only qualified personnel are allowed to carry out the described work.</p>
	<p style="text-align: center;">⚠ WARNING</p> <p>Hazardous components Human body parts may get jammed and severely injured. Before dismantling the product: – disconnect compressed air supply – disconnect electrical power supply</p>
	<p style="text-align: center;">⚠ WARNING</p> <p>Movable parts Human body parts may get jammed and severely injured. Keep human body parts away from movable parts.</p>
	<p style="text-align: center;">NOTICE</p> <p>Contamination Product may get contaminated. Always wear cleanroom gloves when handling the product.</p>

8.1 Dismounting

NOTICE	
	Valve in open position Valve mechanism may get damaged if valve is in open position. Close valve before dismounting the valve from the system.

1. Close valve.

1. Disconnect compressed air supply.



After disconnecting the compressed air, make sure that the actuator is depressurized!


2. Disconnect electrical power supply.


3. Dismount valve according chapter «4 Installation», however in reverse order.



Observe safety instruction of chapter «4 Installation».

8.2 Storage

NOTICE	
	Wrong storage Inappropriate temperatures and humidity may cause damage to the product. Valve must be stored at: – relative humidity between 10% and 70% – temperature between +10 °C and +50 °C – non-condensing environment


NOTICE	
	Inappropriate packaging Product may get damaged if inappropriate packaging material is used. Always use the original packaging material and handle product with care.


1. Clean / decontaminate valve.


2. Mount protective covers on flanges; see chapter «4.2.1 Preparation for installation».

3. Pack valve appropriately, by using the original packaging material.

9 Packaging and Transport

	⚠ WARNING
	Unqualified personnel Inappropriate handling may cause serious injury or property damage. Only qualified personnel are allowed to carry out the described work.


	⚠ WARNING
	Harmful substances Risk of injury in case of contact with harmful substances. Remove harmful substances (e. g. toxic, caustic or microbiological ones) from valve before you return the valve to VAT.

	NOTICE
	Inappropriate packaging Product may get damaged if inappropriate packaging material is used. Always use the original packaging material and handle product with care.



- When returning products to VAT, please fill out the VAT form «Declaration of Chemical Contamination» and send it to VAT in advance. The form can be downloaded from our website www.vatvalve.com.
- If products are radioactively contaminated, the VAT form «Contamination and Radiation Report» must be filled out. Please contact VAT in advance.
- If products are sent to VAT in contaminated condition, VAT will carry out the decontamination procedure at the customer's expense.

9.1 Packaging


NOTICE	
	<p>Valve in open position Valve mechanism may get damaged if valve is in open position. Make sure that the valve is closed.</p>

1. Mount protective covers on flanges; see chapter «4.2.1 Preparation for installation».
2. Pack valve appropriately, by using the original packaging material.



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9.2 Transport

NOTICE	
	<p>Inappropriate packaging Product may get damaged if inappropriate packaging material is used. Always use the original packaging material and handle product with care.</p>



VAT disclaims any liability for damages resulting from inappropriate packaging.

10 Disposal

	 WARNING	
	Harmful substances Environmental pollution. Discard products and parts according to the local regulations.	

11 Spare parts



NOTICE

Non-original spare parts

Non-original spare parts may cause damage to the product.
Use original spare parts from VAT only.



- Parts may only be replaced by the VAT service staff.
- Please contact one of our service centers and specify the fabrication number of the product; see chapter «1.1 Identification of product». You will find the addresses on our website www.vatvalve.com.



12 Appendix