

# INSTRUCTIONS MANUAL

## VENTURI SUCTION UNIT AV 500

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### Applications

The AV 500 Venturi suction units are particularly suitable in all applications in a hospital environment in which it is necessary to obtain vacuum values up to -800 mbar and where a central vacuum generating system for suction is absent, often as a technical choice. As known, the 'Venturi' physics principle allows depressurising of a pressurised gas to be obtained and, in the case of these devices, this is typically obtained using compressed medical air from a centralised distribution system. These devices are basically formed of a chrome-plated aluminium body, housing the generating unit with Venturi system and also a suction value regulation valve controlled by a knob and a control vacuum gauge with double scale indication (mbar / hPa + mmHg), protected by a silicon shell to avoid damage caused by possible blows during transport or use. The Venturi AV 500

series suction units are also designed, through a threaded connection, for direct or indirect connection to normal collection containers for aspirated liquids, or, through a specific connection, for direct connection to the EASYSAFE or EASYSAFE PLUS safety container, using the special rapid coupling. The extremely rational and simple design, combined with the sophisticated technical execution, allow both operators and patients to appreciate the safety and functionality of this device. Since the functioning principle involves use of pressurised medical air which is dispersed into the environment, the device also has a high-efficiency silencer to guarantee a sufficient level of comfort for patients and operators, and a one-way membrane valve conceived and designed to protect the patient from accidental positive counter-pressures generated by the suction unit.

VENTURI SUCTION UNIT AV 500



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### Important

CAUTION: INDICATION OF DANGER  
Attention: Important indication

#### General information

- Read this manual carefully before using the Venturi suction unit AV 500.
- AFTER UNPACKING AND CONNECTION, CARRY OUT THE FUNCTIONAL TEST AS DESCRIBED IN THE CHAPTERS "INSTALLATION" AND "START-UP PROCEDURE".
- EACH TIME BEFORE USING THE DEVICE CARRY OUT THE OPERATIONS DESCRIBED IN THE CHAPTER "START-UP PROCEDURE".
- INSTALLATIONS THAT ARE NOT ENVISAGED BY THIS MANUAL MAY REDUCE THE SAFETY LEVEL OF THE APPLIANCE.
- EACH TIME BEFORE USE, MAKE SURE THAT THE VENTURI SUCTION UNIT AV 500 IS CONNECTED TO A COLLECTION JAR FITTED WITH AN OVERFLOW VALVE AND AN ANTIBACTERIAL FILTER.
- The company will not accept any responsibility if the instructions in this manual are not observed, if original spare parts and/or authorized technicians are not used.
- The device and its components or accessories do not include parts in natural rubber latex.

#### Operation

- THE VENTURI AV 500 SUCTION UNITS MUST ALWAYS BE USED WITH CARE AND ONLY BY PERSONNEL WHO ARE AWARE OF THE CONSEQUENCES OF THE ONGOING THERAPY.
- Disconnect the gas supply when the unit is not in use.
- The device must be used in a hospital or equivalent structure in the environmental conditions of use indicated here and is not intended for applications in environments where electromagnetic fields, combustion sources, electrical or electrostatic discharge generators, sources of ionising and non-ionising radiation are present.

#### Service

- All modifications and repairs must only be performed by personnel authorized by FLOW METER S.p.A., or by hospital technicians approved by the same company.
- The original spare parts indicated in the service manual must always be used for maintenance operations.
- Check the Venturi AV 500 aspirator every three years in accordance with the chapter "Periodic checks".
- For periodical updating reasons, the device configuration can be subjected to changes. Therefore, FLOW METER guarantees spare parts to be available for at least 5 years from the manufacturing date.
- Any modifications to the appliance must be approved by FLOW METER S.p.A., and carried out in accordance with the procedures prescribed.

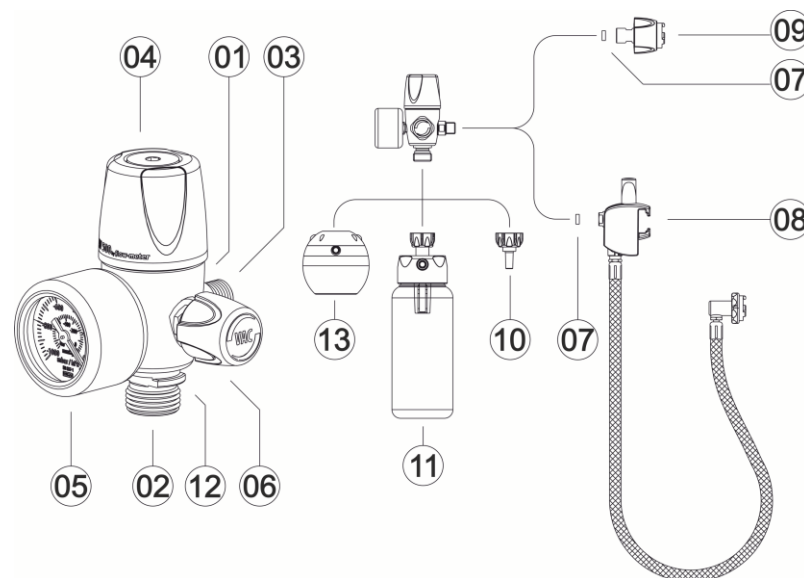
#### Connections

- MAKE THE CONNECTIONS AND CHECK THE SEALS BETWEEN THE COMPONENTS AS DESCRIBED IN THE INSTRUCTIONS FOR USE SECTION. FAILURE TO PERFORM THESE CHECKS MAY COMPROMISE THE SAFETY AND FUNCTIONING OF THE DEVICE.
- THE CONNECTION HOSES MUST COMPLY WITH EN ISO 5359 STANDARD.
- THE DEVICE MUST NOT COME INTO CONTACT WITH OIL OR GREASE.
- The gas connection is indicated with the AIR symbol and/or the relative colour reference.

### Controls and connections

#### LEGEND

- |   |  |
|---|--|
| 01 – Suction unit body with Venturi system              | 08 – Clip for bar with flexible hose and specific gas coupling         |
| 02 – Threaded fitting for use of the regulated vacuum   | 09 – Specific gas rapid coupling                                       |
| 03 – Compressed air supply connection                   | 10 – Hose connection   |
| 04 – Silencer   | 11 – MAK series safety or fluid collection container                   |
| 05 – Control vacuum gauge with silicon protective shell | 12 – Quick coupling system for EasySAFE or EasySAFE PLUS safety vessel |
| 06 – Vacuum adjustment knob                             | 13 – EasySAFE – EasySAFE PLUS safety container                         |
| 07 – Specific gas rapid coupling and clip for wall rail |  |



### Your local dealer and service centre

Your local dealer and service centre for FLOW METER S.p.A. products is:

TO BE FILLED IN BY THE LOCAL DEALER OR AGENT

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The appliance described in this publication is designed and manufactured by:

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### Working principle

The AV 500 Venturi suction unit series is essentially formed of:

- A chrome-plated aluminium body housing an ejector which, through the gas supplied, generates a specific vacuum value proportionate to the flow rate of the gas.
- A threaded supply connection, suitable for connection to the specific gas quick coupling or the clip for fixing to the bar;
- A vacuum outlet coupling integrated into the body, with threaded coupling for connection to the collection device or to the hose connection, and with quick coupling system to allow connection to the EasySAFE - EasySAFE PLUS safety jar.
- A needle regulation tap, controlled by a knob, designed to guarantee precise regulation of the vacuum value needed for treatment;
- A high-efficiency silencer for depleted air, to guarantee a suitable level of comfort for operators and patients.
- A safety device with one-way valve, to protect the patient from accidental counter-pressures generated by the device.
- A control vacuum gauge with a scale of -1000 mbar, with double-scale indication (mbar / hPa + mmHg), protected by a silicon shell to avoid damage caused by possible blows during transport or use.

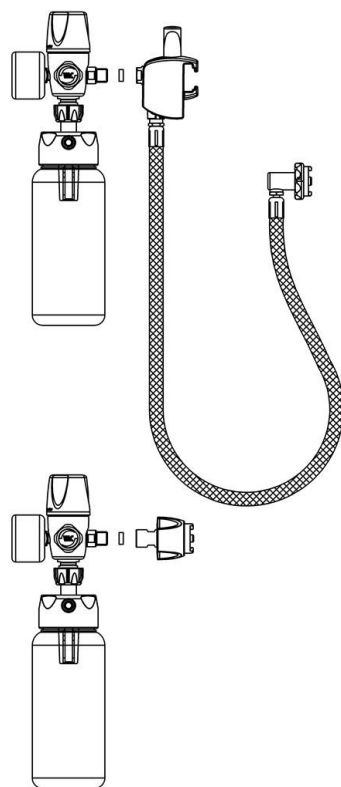


Venturi AV 500 suction unit with EasySAFE PLUS safety vessel (optional) (example of application)

#### CAUTION

THE VENTURI AV 500 SUCTION UNIT MAY OPERATE CORRECTLY WHEN SUPPLIED WITH COMPRESSED AIR AT THE PLATE SUPPLY PRESSURE ± 10% (STANDARD VERSION 400 kPa (4.0 bar)). IN THIS PRESSURE RANGE, THE SYSTEM CAN GUARANTEE MAXIMUM EFFICIENCY IN TERMS OF SUCTION, SILENT OPERATION AND CONSUMPTION.

## Installation



Check the functioning of the unit every day or in accordance with the hospital routine. A description is given below of some of the most commonly used methods for connecting the Venturi suction unit.

### Alternative 1: fixing to rail and compressed air supplied with flexible hose from distribution outlet

This alternative makes it possible to fix the Venturi suction unit AV 500 to a wall rail with a bracket.

- Connect the Venturi system suction unit to a suitable clip for the wall rail (e.g. for a 30x10 bar), with threaded inlet ISO G 1/4" F., placing a suitable washer between the couplings and tightening it properly;
- Connect a suitable flexible hose to the inlet hose connector on the rail bracket and secure it with an appropriate hose clamp;
- Connect the other end of the flexible hose to a compressed air quick-coupling (e.g. AFNOR NF-S 90-116 type), securing it with an appropriate clamp;
- Fasten a safety vessel (i.e. MAK/500) or a hose connection with a coupling of suitable dimension to the suction fitting of the Venturi device;
- Connect the compressed air intake to the wall outlet on the hospital central system.

### Alternative 2: direct connection to compressed air distribution outlet

This alternative makes it possible to connect the Venturi suction unit AV 500 directly to the hospital distribution system outlets.

- Connect the Venturi system suction unit to a compressed air coupling suitable for the hospital's centralised system (e.g. AFNOR NF-S 90-116 type), with threaded inlet coupling ISO G 1/4" F., placing a suitable washer between the couplings and tightening it properly;
- Fasten a safety vessel (i.e. MAK/500) or a hose connection with a coupling of suitable dimension to the suction fitting of the Venturi device;
- Connect the compressed air intake to the wall outlet on the hospital central system.

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## Cleaning and disposal

- CLEAN THE EQUIPMENT EVERY DAY OR IN ACCORDANCE WITH THE HOSPITAL ROUTINE.
- CAREFULLY CLEAN ALL THE SURFACES OF THE EQUIPMENT USING A SOFT DAMP COTTON CLOTH RINSED IN NEUTRAL DETERGENT DILUTED 10% IN WATER.

### CAUTION

**DO NOT USE SOLVENTS OR ABRASIVE PRODUCTS FOR CLEANING: THEY CAN SERIOUSLY DAMAGE THE SURFACES OF THE EQUIPMENT AND THE PLASTIC PARTS.**

- DO NOT IMMERSE THE UNIT IN DISINFECTANT;
- DO NOT PLACE THE UNIT IN AN AUTOCLAVE;
- DO NOT USE INFLAMMABLE PRODUCTS.

**IF THE EQUIPMENT IS ACCIDENTALLY CONTAMINATED BY SUCTIONED LIQUIDS, IT MUST BE ISOLATED AND NECESSARY CLEANING OPERATIONS MUST BE CARRIED OUT BY QUALIFIED PERSONNEL.**

**IF NECESSARY, STERILISE THE VENTURI SUCTION UNIT AV 500 WITH AN ETHYLENE OXIDE CYCLE (e.g. 14% EO - 12 h. - 50 kPa - 37 °C).**

**THE DEVICES DESCRIBED IN THIS DOCUMENT ARE REUSABLE. THEIR SHELF LIFE RELIES ON THE PERFORMANCE OF A REGULAR PREVENTIVE AND PERIODIC MAINTENANCE PLAN. DISPOSAL OF REPLACED COMPONENTS AND/OR OF THE WHOLE DEVICE MUST COMPLY WITH THE LOCAL CURRENT REGULATIONS FOR POTENTIALLY CONTAMINATED HOSPITAL WASTE.**

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## Start-up procedure

To start-up the device, proceed as follows:

- Make sure that the collection jar is connected to the device suction connector and that the overflow valve float moves freely in its container;
- Connect the suction hose to the PATIENT hose connector on the collection jar;
- Check that the suction adjusting valve is closed (turned in a clockwise direction);
- Connect the compressed air supply to the wall outlet on the hospital central system;
- Set the required degree of suction, closing the outlet coupling (or the hose connection outlet to the patient of the collection container) and checking it on the control vacuum gauge, using the adjustment knob (rotating counter-clockwise to increase suction and clockwise to reduce or stop it). The system is now ready for use.

After using the device, it is essential to proceed as follows:

- Close the suction adjusting valve by turning it in a clockwise direction;
- Disconnect the vacuum supply from the rapid supply outlet of the centralised hospital system;
- At this point the collection jar must be removed after disconnecting it from the suction unit and from the PATIENT circuit.

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### CAUTION

- BEFORE USING, MAKE SURE THAT THE VENTURI SUCTION UNIT AV 500 IS CONNECTED TO A COLLECTION JAR WITH AN OVERFLOW VALVE.
- THE USE OF A COLLECTION JAR WITH AN ANTIBACTERIAL FILTER IS RECOMMENDED TO PROTECT THE SUCTION DEVICE AND THE ENVIRONMENT FROM ACCIDENTAL CONTAMINATION.
- BEFORE USE, MAKE SURE THAT THE SUCTION UNIT IS SECURELY FIXED AND IN A VERTICAL POSITION (THIS IS FUNDAMENTAL FOR THE CORRECT FUNCTIONING OF THE OVERFLOW VALVE).
- THE LIQUIDS COLLECTED MUST ONLY BE DRAINED OUT IN AREAS ASSIGNED TO THE DISPOSAL OF HOSPITAL WASTE AND/OR STRICTLY FOLLOWING THE INSTRUCTIONS OF THE AUTHORITIES FOR THE TREATMENT OF THESE PRODUCTS.
- CLEAN THE COLLECTION SYSTEM BEFORE USING IT AGAIN, FOLLOWING THE INSTRUCTIONS IN THE CHAPTER "CLEANING AND DISPOSAL".
- DO NOT USE OXYGEN TO SUPPLY THE VENTURI SUCTION UNIT: THE EXHAUSTED GAS SATURATING THE ENVIRONMENT COULD CREATE DANGEROUS CONDITIONS IN THE VICINITY OF NAKED FLAMES, SOURCES OF COMBUSTION OR HIGHLY INFLAMMABLE MATERIALS.

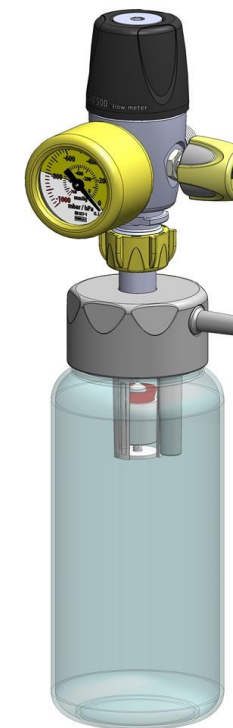


**NO PART OF THE SUCTION UNIT SHOULD BE LUBRICATED; LUBRICANTS CAN LEAD TO COMBUSTION AND EXPLOSIONS WHEN THEY COME INTO CONTACT WITH OXYGEN UNDER PRESSURE.**



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## Maintenance



Venturi AV 500 suction unit with MAK/500 safety vessel (optional) (example of application)

### Maintenance operations

The AV 500 vacuum generating unit is designed and manufactured with materials that ensure a long working period without requiring maintenance. However, when the periodic controls made by the user indicate the need for repairs (e.g. replacement of components), this must be done by authorized technicians and following the instructions given in the Service Manual MS002.

Whatever the circumstances, to ensure a prolonged efficiency of the system described in this publication it is necessary to:

- Clean the surfaces regularly and accurately as described in the chapter "Cleaning and disposal".
- Replace any damaged or faulty parts using original spare parts only and following the instructions provided by the manufacturer.
- Always use the AV 500 suction unit with Venturi system in combination with a safety container, in order to protect the device from accidental contamination.
- Perform the checks described in the chapter "Periodic controls".

### CAUTION

- THE USE OF FLOW METER NON-ORIGINAL SPARE PARTS MAY INTERFERE WITH THE FUNCTIONING AND SAFETY OF THE DEVICE, REPRESENTING A HAZARD FOR THE USER AND THE PATIENT. THE REPLACEMENT PART CODES ARE INDICATED IN THE PRODUCT SERVICE MANUAL.

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## Periodic controls

Check the device every three years or in accordance with hospital procedures to guarantee functionality and perfect efficiency of the aspirator with Venturi system AV 500.

### 1. Functioning control

Check functioning following the instructions in the chapter "Start-up procedure".

### 2. Control of the maximum depression value

- Connect a suitable size hose fitting to the suction supply connector;
- Connect a controlling vacuum gauge with an end of scale value of 1000 mbar / hPa (or -1 bar) to the hose fitting described above;
- Connect the compressed air supply to the wall outlet of the central hospital system;
- Fully open the suction adjusting valve by turning the knob anticlockwise and check that the maximum vacuum value reached corresponds to the one indicated in the chapter "Technical features". Moreover, make sure that the controlling vacuum gauge shows the same value as the one indicated on the appliance.

### 3. Control of the maximum suction rate

- Connect a suitable size hose fitting to the suction supply connector;
- Connect the above hose fitting to the outlet of a control AIR flowmeter with a calibration of 30 L/min. at 1013 mbar / 23 °C;
- Connect the compressed air supply to the hospital central system wall outlet;
- Fully open the suction adjusting valve by turning the knob anticlockwise and check that the maximum flow value reached corresponds to the one indicated in the chapter "Technical features".

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## Technical features

Commercial description .....	VENTURI SUCTION UNIT AV 500
Dimensions .....	Height: 100 mm Width: 72 mm Depth: 92 mm
Weight.....	Kg. 0.50
Vacuum gauge with indication of the suction.....	0 ÷ -1000 mbar with double scale indication (mbar / hPa + mmHg) – Accuracy class 2.5 (2.5% V.L.)
Adjustable maximum vacuum pressure (with ±10% plate supply pressure).....	-800 mbar / hPa -50 mbar / hPa
Maximum suction rate.....	40 L/min. + 5 L/min.
Gas and supply pressure (standard version).....	Compressed air 400 kPa (4.0 bar) ± 10%
Suction adjusting system .....	Needle valve
Air consumption with maximum suction.....	74 L/min. ± 2 L/min.
Standard supply connections.....	ISO G 1/4" M. - 1/4" NPT M.
Regulated vacuum connection .....	ISO G. 1/2" M. + quick coupling system for EasySAFE - EasySAFE PLUS safety container
Valve protecting the suction circuit against positive pressures .....	Membrane
Storage conditions .....	-40 °C ± 2 °C / +60 °C ± 5 °C and 40%÷70% relative humidity
Working conditions .....	+5 °C ± 2 °C / +35 °C ± 5 °C

Check the device every three years following the instructions in the section "Periodic controls".

Lifetime upon first installation: 10 years.

Warranty: The manufacturer provides a two-year warranty for concealed defects which are not caused by wear and tear of materials, starting from the date when the device is first placed on the market.

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