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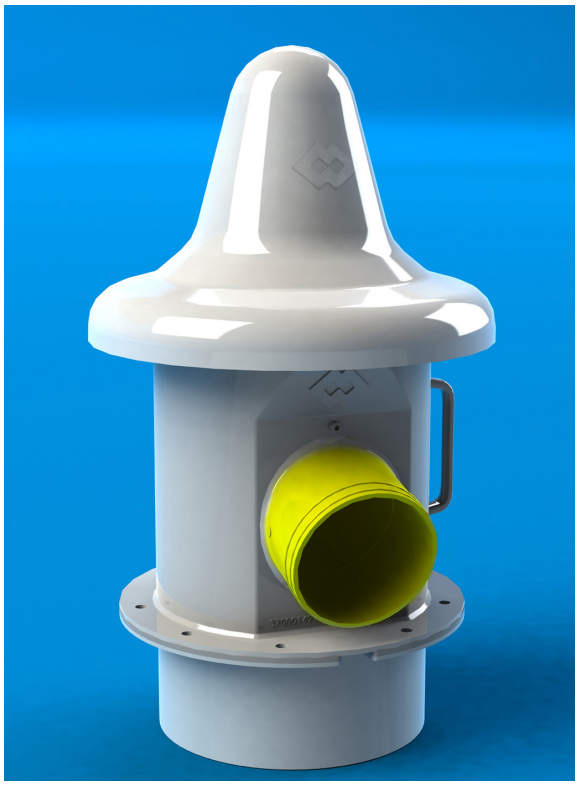
EN

VHS-C

MEMBRANE PRESSURE RELIEF VALVE

ASSEMBLY AND MAIN INSTRUCTIONS FOR USE AND MAINTENANCE



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ORIGINAL INSTRUCTIONS IN ENGLISH

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All the products described in this catalogue are manufactured according to **WAMGROUP S.p.A. Quality System procedures**. The Company's Quality System, certified in July 1994 according to International Standards **UNI EN ISO 9002** and extended to the latest release of **UNI EN ISO 9001**, ensures that the entire production process, starting from the processing of the order to the technical service after delivery, is carried out in a controlled manner that guarantees the quality standard of the product.

SUMMARY

1.1 Scope of the Manual

This Manual has been prepared by the Manufacturer to provide the operating technical information for installation, operation and maintenance of the valve concerned.

The Manual, which is an integral part of the valve concerned, must be preserved throughout the life of the valve in a known easily accessible place, available for consultation whenever required.

If the Manual is lost, damaged or becomes illegible, contact AIRMATIC for a copy specifying the serial number of the valve.

If the valve concerned changes ownership, the Manual has to be handed over to the new owner as part of the valve supply.

The Manual is meant for specialist technical personnel appointed and authorized by the Manufacturer, owner and installer to act on the valve concerned for which specific technical skills in the sector concerned are necessary (electrical, mechanical, etc.).

The illustrations may differ from the actual structure of the valve concerned but do not interfere with the explanation of the operations.
In case of doubt, contact AIRMATIC for explanations.

The Manufacturer reserves the right to make changes to the Manual without the obligation to provide prior notification, except in case of modifications concerning the safety level.

The technical information included in this Instruction Manual is the property of the Manufacturer and therefore has to be considered as confidential.

It is forbidden to use the Manual for purposes other than those strictly linked to the operation and maintenance of the valve concerned.

This information is provided by the Manufacturer in the original language (English) and can be translated into other languages to satisfy legislative and/or commercial requirements.

1.2 Symbols

To highlight certain parts of the text, for purposes of safety, or to indicate important information, certain symbols are used, the meaning of which is described below.

It is important to comply with and scrupulously follow the information highlighted by the symbols.

Danger - Warning

Indicates situations of serious danger which, if ignored, can be risky for the health and safety of persons.

Caution

Indicates that appropriate behaviour must be adopted to avoid posing risk for the health and safety of persons and avoid causing economic damage.

Important

Indicates particularly important technical information which must not be ignored.

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List of safety and information symbols

Symbol representation	Symbol description
	**Danger sign:** indicates danger of electric shock caused by the presence of powered components inside the junction box or control panel.
	**Obligation:** read this Manual before carrying out any action on the valve concerned.
	**Forbidden:** indicates that it is forbidden to lubricate or adjust moving parts.
	**Danger:** indicates danger of serious injury to limbs if the internal moving parts of the valve are exposed. Before carrying out inspection operations, isolate the valve concerned from the electrical energy sources.
	**Information:** indicates the direction of rotation of the electric motor.
	**Obligation:** indicates the hooking points for lifting of the valve concerned.
	**Forbidden:** indicates it is forbidden to introduce hands into the valve.

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1.3 Glossary and terminology

Operator: person appropriately trained and authorized by the Production Manager for setting up the valve concerned and carrying out routine maintenance.

Installer: organization with specialized technicians and appropriate equipment for carrying out risk-free installation and extraordinary maintenance.

Specialist technician: person responsible for and authorized by the Manufacturer, owner or installer to act on the valve; must have specific technical skills depending on the sector concerned (electrical, mechanical etc.). The specialist technician, in addition to being familiar with the working of the valve concerned, must be familiar with the working of the plant or equipment on which the valve concerned is installed.

Routine maintenance: includes all the actions necessary to keep the valve in good working conditions, to ensure greater operating durability and to keep the safety requisites constant.

Extraordinary maintenance: all the actions meant to keep the valve in perfect working order.

Setting in safety conditions: all the precautions the authorized personnel must adopt before acting on the valve concerned.

The precautions are listed below.

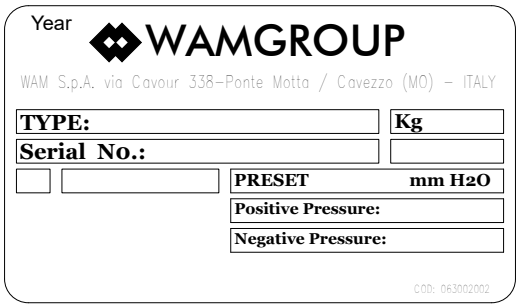
- **Ensure that the valve concerned is disconnected from all the mains and appropriate devices are used to prevent these from being reconnected accidentally.**
- **Ensure that all the moving parts of the valve have come to a complete stop.**
- **Ensure the temperature of the valve concerned is such that it does not burn.**
- **Provide appropriate lighting in the area around the operations.**
- **Wait for the material to be handled inside the valve concerned to settle down completely.**

1.4 Manufacturer's data and identification of the valve

Important

Do not change the data on the identification plate.
Keep the ID plates clean, intact and legible as regards the data they contain.
If the ID plate is damaged or is no longer legible (even just one informative element on it) contact the Manufacturer for a new ID plate and replace it.

The ID plates shown identify the equipment concerned and its main components.
The plates show the reference necessary for operating safety.



1) Type of valve
2) Serial No.
3) Label code
4) Manufacturer's logo
5) Manufacturer's name and address
6) Weight
7) Setting

The plate is placed on the valve body.

1.5 Request for assistance

For all technical assistance, contact AIRMATIC's service network.
For all requests, provide the valve identification data, the type of problem encountered and all other information which could be useful for identifying the problem.

1.6 Warranty

The conditions for validity and applicability of the warranty are specified in the sales contract.

1.7 Exclusion of responsibility

The valve is delivered according to the specifications indicated by the Buyer in the order and the conditions valid at the time of purchase.

The Manufacturer shall not accept responsibility for safety of persons or objects and operation failure of the valve if the loading/unloading operations from trucks, transport, positioning at the site, use, repairs, maintenance etc. have not been carried out in compliance with the warnings described in this Manual, and in accordance with the national legislation in force.

Likewise, the Manufacturer shall not accept any responsibility if the valve concerned is used:

- improperly;
- by unauthorized persons and/or persons not sufficiently trained for installation, operation and maintenance;
- with modifications made to the original configuration without the Manufacturer's permission;
- with spare parts that are not original or are not specific for the model;
- without maintenance;
- non-pursuant to the regulatory standards and national or local legislation on the matter of occupational safety;
- non-pursuant to the recommendations in this Manual or on the warning and danger plates applied on the valve.

2.1 General safety prescriptions

Read the Instruction Manual carefully and strictly follow the instructions it includes, especially those regarding safety.

Most accidents at the workplace are caused by negligence, failure to follow the most elementary safety regulations and incorrect or improper use of tools and equipment.

Accidents can be prevented and avoided by taking due care, using suitable equipment and adopting adequate preventive measures.

Apply and comply with the standards in force regarding workplace hygiene and safety.

The personnel trained for and authorized for the operations has to have the psychological/physical requisites, experience in the sector concerned and the necessary technical skills for carrying out the operations assigned to them.

All workers involved in any kind of operation must be prepared, trained and informed as regards the risks and the behaviour to be adopted.

Pay attention to the meaning of the notices applied on the valve, keep these legible and respect the information indicated.

Use instruments, equipment and tools that have been approved and are intrinsically safe, and cannot alter the safety level of the operations or damage the valve during installation, use and maintenance.

Modifications to the valve components should not be made for any reason whatsoever, without the Manufacturer's permission.

2.2 Safety prescriptions for transport and handling

Carry out all the handling and transport operations in accordance with the procedures and instructions shown on the packaging and in the Manual supplied.

All the operations must be performed by qualified authorized personnel.

Those authorized to carry out the handling operations must have the capabilities and experience required to adopt all the necessary measures to guarantee one's safety and the safety of persons directly involved in the operations.

The chosen features of the lifting and handling means (crane, bridge crane, forklift truck etc.) must take into account the weight to be handled, the dimensions and the gripping points.

During lifting use only accessories such as eyebolts, hooks, shackles, spring hooks, belts, slings, chains, ropes etc., that have been certified and are suitable for the weight to be lifted.

During handling respect the prescriptions applicable for handling loads.

Keep the position of the valve concerned and the loose components vertical, keep the load low and make all the necessary movements gently.

Avoid sudden manoeuvres, dangerous oscillations and rotations, accompanying the movements manually and place the load gently on the ground.

2.3 Safety prescriptions for installation

Before starting with installation, a "Safety Plan" must be implemented to safeguard the personnel directly involved and those who carry out operations in the surrounding area.

All the laws must be strictly applied, especially those concerning workplace safety.

Before proceeding with installation operations, mark off the work area to prevent access by unauthorized persons.

The electrical connections must be made in compliance with the standards and laws in force.

The person in charge of making the electrical connections has to ensure that the required standards and laws are respected before testing.

2.4 Safety prescriptions for use and operation

Do not tamper with the valve concerned by using any kind of device to obtain performances different from those designed.
All unauthorized changes can affect the health of people and the integrity of the valve.

The operators have to exclusively wear protective clothing and have to be equipped with appropriate individual protection devices for carrying out the operations and as required by the safety and work accident prevention standards.

Before use, ensure that all the safety devices are installed and that they are working properly.

During operations, prevent access to the work area by unauthorized persons.

Remove all obstacles or sources of danger from the work area.

It is strictly forbidden to walk or placing any improper load on the equipment.

2.5 Safety prescriptions for maintenance and replacement of components

Danger - Warning

Before carrying out any operation on the valve concerned, ensure it is switched off and disconnected from all mains and use suitable devices to prevent the possibility of the power sources being activated accidentally.

Maintain the valve concerned in the conditions of utmost efficiency compliant with the maintenance plan provided by the Manufacturer.

Good maintenance apart from preserving the functional features and essential safety features over time, will also allow extending the working life of the valve concerned and achieving the best possible performance.

Strictly follow the procedures indicated in the Manual, especially those concerning safety.

Ensure that all the safety devices are active and working properly.
Mark off the work area in such a manner as to prevent the access of unauthorized persons.

Replace the worn and damaged components exclusively with original spare parts, whose safety, reliability and interchangeability have been undoubtedly established.

Apart from invalidation of the warranty, the Manufacturer declines all responsibility for damage to objects and harm to persons deriving from the use of non-original spare parts or due to modifications made during repairs without express written authorization.

Use the oil and lubricants recommended by the Manufacturer.

Do not dump polluting material (oil, grease, paint, plastic etc.) in the environment, but carry out waste separation disposal depending on the chemical composition of the various products in compliance with the legislation in force.

On completion of maintenance or replacement operations, before resuming production, check that no foreign bodies (rags, tools etc.) have been left inside the valve concerned.

3.1 General description of the equipment

Pressure control valve used in all plants where it is required to control excess pressures or negative pressures, if any, that may be created inside the containers, thereby preventing their breakage or deformation.

"**VHS**" Pressure Relief Valves are the last safety net when abnormal pressure conditions endanger the silo structure. This is why sudden excess or suction pressure inside the silo must be dealt with instantly.

Even though ideally a "**VHS**" Pressure Relief Valve should never have to go into action, it must be efficient and reliable if needed.

"**VHS**" Pressure Relief Valves consist of a cylindrically shaped metal body with flanged connection spigot to the silo, an exhaust outlet spout for duct connection, an elastic diaphragm able to re-establish pressure balance instantaneously, a counterweight kit to keep the valve closed under normal conditions, and a weather protection cover.

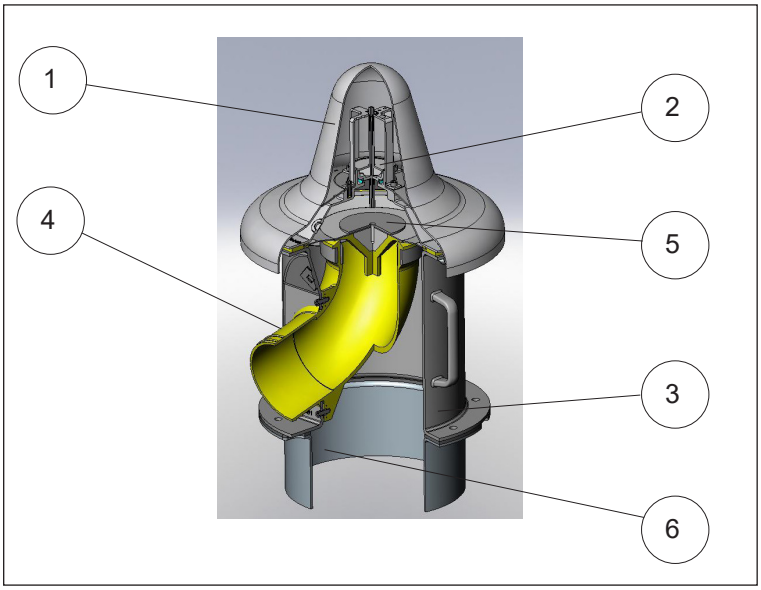
The working principle of the "**VHS**" Pressure Relief Valve is innovative. The special double-effect breathable membrane allows re-establishing pressure balance, under negative or positive pressure conditions.

The special properties of the diaphragm avoid blockage, as well as the formation of material crusts.

Important

The terms "equipment" and "valve" used in this manual refer to the same machine.
As components meant for installation in a plant, the valves - not fully provided with safety means - have to be considered "partly completed machinery". Therefore, they do not bear an EC marking.
It is forbidden to start the valve unless the machine/plant in which it is to be installed has been declared compliant with the Directive 2006/42/EC and further modifications.

3.2 Main components



POS.	DESCRIPTION
1	Weather protection cover
2	Pilot
3	Casing
4	Elbow
5	Diaphragm
6	Weld-on spigot

3.3 Operating principle

The "**VHS**" operates in real time. Through an interplay of pressure on different surface areas on both sides of a diaphragm fitted inside the valve housing, perfect pressure balance is achieved. In the event of excess pressure this interaction enables air from inside the silo to flow back into the atmosphere; in case of suction pressure the air penetrates from the atmosphere into the silo.

The "**VHS**" valve is not controlled by an external device.It starts working automatically whenever there is a pressure imbalance within the silo due to filling or emptying of the silo by means of any system. (UNI ISO 8456 5.1.1.4.2 and 5.1.1.4.2. and 5.1.1.4.3).

Size 375 suits the HSE (0- 9540853-0-2).

NOTE: Appropriate maintenance as described in the relevant section of this Manual will considerably increase the life span of the valve. This is particularly important for materials that tend to get hardened or compacted if not handled for a certain period of time.

Due to the design and operation type of the VHS valve, whenever the overpressure calibration value is exceeded, the valve opens and releases a mixture of dust and air (a dust-cloud). The air-dust mixture is released only under overpressure conditions; in case of suction pressure the air penetrates from the atmosphere into the silo.

The "**VHS**" valve is suitable for pressurized or vacuum containers not subjected to special testing or legislation.

The main function of the valve is to safeguard containers, filter and other equipment from overpressures or negative pressure over the tolerance limits.

For the safeguard of the operator and of the envinronment there are required special type of valves.

3.4 Permitted use

These valves have been specially designed for handling of powder and granular materials.

The "**VHS**" valves can be used in discontinuous operation in case of exceeding or suction pressure value conditions in a silo or tank for handling powders or granular material.

The "**VHS**" valve is designed to prevent damages to the silo, or other type of containers, and filter or for pneumatically conveyed material systems.

The "**VHS**" valves can be only used with maximum internal pressure or negative pressure according to technical specification.

The "**VHS**" type valves made from plastic and metal are not designed to bear the weight of the equipment installed near of the weight of persons.

Every other use must be considered as improper and therefore not permitted. The Manufacturer shall not accept responsibility for any other use.

3.5 Improper use not permitted

Do not start operating the pressure relief valve until the plant or equipment in which it is to be incorporated has been declared complying to the relevant national and local legislative provisions in force.

It is forbidden to use the valve in potentially inflammable or explosive atmospheres (ATEX). It is forbidden to use the valve for granular materials such as stones, sand, gravel, etc..

It is forbidden to use the valve unless the membranes are intact.

It is forbidden to use the valve as a support even if it is not working. Apart from falling, there is risk of damage to the machine.

It is forbidden to use the valve for inflammable (magnesium powder, etc.) or explosive materials.

It is forbidden to use the valve for materials which can cause radioactive contamination.

It is forbidden to use the valve with SINT® elbows for hot materials with temperatures exceeding 80°C and cold materials with temperatures below - 20°C.

3.6 Noise level

The only source of noise on the valve is due to the air that flows through it during operation.

The "**VHS**" valve is usually installed on the top of silos, i.e. in places where exposure of operators is limited. During maintenance, the plant must remain stationary, so there is no noise generated by the valve.

Because of the limited frequency (occasional) of valve operation and the distance of the operators, risks due to noise are excluded.

The no-load noise level of the "**VHS**" valve does not exceed 50 dB(A), the value measured at a distance of 1 m, in the most unfavorable position.

This may vary according to the type of material handled and the type of accessories applied.

Danger - Warning

Depending on the installation site, the installer must adopt suitable systems (barriers, etc.), if necessary, to maintain the noise levels within the legally permitted limits.

3.7 Environmental operating limits

Unless otherwise specified, the valve concerned may be used only within the limits indicated.

- Altitude: less than 1,000 m at sea level
- Environmental temperature: between - 20 °C and + 40 °C

3.8 Overall dimensions and technical features

For the exact identification of the equipment concerned, see the identification plate.

The shipping document shows the diameter of the valve in addition to the serial number and identification codes.

Information regarding the technical features of the "**VHS**" valves, depending on their diameter and characteristics is given in Chapter 10.

The "**VHS**" valve has the following features:

- The valve body can withstand an overpressure P=1bar (10000 mm H_20, 100Kpa)
- The paint coating of the valve base (if present) is < 200 micron thick.
- The valve body is provided with a flange and it can be connected directly to the using an under valve stub pipe.
- However, a ring is provided to be welded to the silo, where the valve will then be bolted.

Once assembled, the machine ensures sealing against to the intervention value.

The user is liable for use of the valve in presence of dust with harsher features than the ones indicated above or in areas having different classification.

Under normal operation conditions, the HS valve does not imply the risk of hot surfaces. However, in certain applications, due to the type of material handled, there can be generated very hot surfaces on the valve. In such conditions, the user/installer must apply warning signs that indicate the hazard or install barriers that prevent the operator from reaching the hot parts.

NOTE: In order to avoid or diminish unnecessary activation of the valve, please follow the indication given below:

- The permitted pressures must be followed during the silos loading phase. It is reccomended a pressure value lower than 1.5 bar and in any case the values must be compliant with the standards in force.
- Follow the indications regarding maintenance frequency present in this Manual.
- Install only filters properly sized.
- The filters maintenance frequency must be followed.
- The "**VHS**" valve must be installed at the top of the silo.
- Valve position: far from filter and loading pipe and from the filter.

3.9 Calibration

Incorrect selection of the valve is not possible, since the valve is only available with the factory setting (over-pressure 500 mm H_2O, negative pressure – 50 mm H_2O / VDI 3673 - DIN 4119).

In any case, the user must ensure that the pressure setting made by the "**VHS**" valve Manufacturer suits the maximum pressure tolerated by the silo.

Otherwise, the user will have to modify the setting and adjust the value on the basis of the maximum tolerable pressure for the case concerned, using the suitable weight washer kits according to the Tables and the procedures given below. In any case, the Manufacturer shall not be responsible for any faults or damage that may result from incorrect use or incorrect choice of the valve.

Installation of the weight washer kit allows bringing the pressure limit value of the valve within the activation range, i.e. between 300 mm H_2O and 900 mm H_2O for overpressure and -50 mm H_2O for negative pressure.

In order to preserve the container (silo, hopper, etc..) the Manufacturer recommends operation within the maximum setting threshold of 500 mm H_2O in overpressure and -50 mm H_2O in negative pressure.

NOTE: The overpressure or negative pressure values indicated on the rating plate are subjected to the construction tolerance; it can therefore be expected a tolerance value up to a maximum percentage of 5% of the values given.

If necessary, the Manufacturer can supply a certificate on "**VHS"** setting.

SETTING TABLE	
PRESSURE	
No. of counterweigts	mm H_2O
7 (= 0.4 kg)	300
11 (= 0.5 kg)	400
15 (= 0.7 kg)	500
17 (= 0.8 kg)	600
19 (= 0.9 kg)	700
23 (= 1.1 kg)	800
26 (= 1.2 kg)	900

To change standard setting, follow the instruction given below:

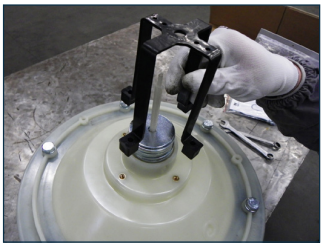

1


2


3


4


5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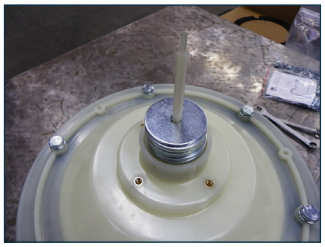
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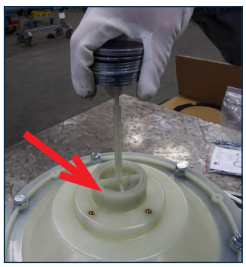
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1) Place the valve on a flat surface and make sure there are no hazards conditions.
2) Unscrew the 3 M6 fixing screws of the cover using an Allen Key.
3) Pay attention to the reference notch on the cover place at the handle.
4) Remove completely the cover.
5) Unscrew the 4 M6 fixing screw of the pilot guide using an Allen Key.
6) Remove the pilot guide.
7) Modify the overpressure settings by varying the number of washers, according to the indications on the settings table above.
8) Ensure the pilot base (see the arrow in picture no.8) stays in the correct operation position (perfectly orthogonal).

To reset the normal operation of the valve, follow the steps indicated above in reversed order from 6 to 1.

3.10 Safety and information signs

Danger - Warning

Follow the signs on the plates.
The plates have to be readable; if they are not, clean them, replace the damaged ones and place them in their original position.

NB: See page 2, **1.2 Symbols**

3.11 Safety devices

The access to the internal parts of the valve is not necessary during operation.

Extraordinary access is provided for removing foreign bodies and accumulated material inside the valve or for extraordinary maintenance.

For accident prevention it is essential to keep the valve out of reach of personnel during operation. To this purpose, the customer has to provide suitable safety devices such as grilles, as well as protective inlet and outlet joints (either robust flexible sleeves or rigid pipe unions). However, the installer has to avoid that, even accidentally, a person gets harmed (by employing suitable hopper, safety grilles,...).

When using movable safety devices, provide protection limit switches, which stop the valve instantaneously if the protection is opened or removed. Restarting of the valve operation must only be possible when the protection is effective again (according to EN 1088).

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4.1 Type of packaging

The type of packaging is selected according to the type of equipment supplied, the transport means used, the quantity of goods shipped and the destination.

To facilitate shipment, the valves may be divided into separate packages that are suitably protected. Nuts and bolts and gaskets necessary for the correct assembly are not included and supplied together with the valves.

The packages can be loaded separately on the vehicle or fixed to a pallet, protected properly, or inside a container for shipment to a far destination or for sea or air transportation.

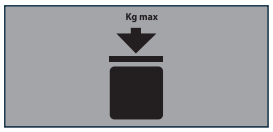
The signs for safe lifting and handling are shown on all the packages. The list bellow provides the description and symbols envisaged on the packaging.

A) Fragile: indicates that the package must be handled and lifted carefully to avoid damage.

B) Centre of gravity: indicates the position of the centre of gravity of the package.

C) Harness: indicates the correct position of the harness for lifting the package.

D) Stacking limit: indicates the maximum stacking load of the packages.



E) Weight: indicates the maximum weight of the package.

The packaging material has to be disposed off or recycled in compliance with the standards in force.

The data given below do not include any additional packaging (such as pallets or similar).

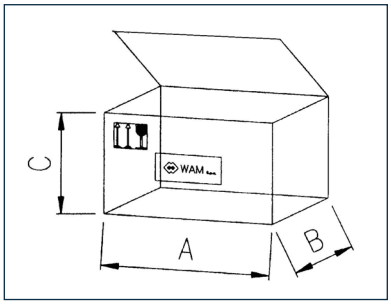
Valve	Weight (kg)
VHS273.C	8
VHS375.C	14

The illustration shows the type and dimensions of the packaging mostly used for shipping by truck, sea or air.

Do not burn possible plastic parts of the packaging as they are polluting.

The pallet, as all wooden parts, can be reused, but cannot be returned.

NOTE: The installer is liable for disposing of the packaging material in accordance with the legislation in force regarding the matter.



Valve	Diameter		
	A	**B**	**C**
VHS273.C	420	420	580
VHS375.C	550	570	650

Connecting ring included.

Dimension in mm

4.2 Reception of goods

On receiving the goods, ensure that the type and quantity correspond to the data present on the acknowledgement of order.

Possible damage has to be immediately communicated in writing in the space provided to this purpose in the waybill.

The carrier is obliged to accept the complaint and leave the Customer a copy of the waybill.

If the supply is “free destination” a copy of the waybill and of the complaint shall be sent to the Manufacturer or to the forwarder.

If the damages are not claimed immediately on receipt of the goods, your request for compensation may not be accepted.

4.3 Lifting and unloading methods

Danger - Warning

Carry out the lifting and handling operations according to the information indicated on the valve and in the Manufacturer's Operation Manual.
The person authorized for unloading operations has to make sure all the necessary measures are adopted to ensure his or her safety and the safety of other persons directly involved.
Use means and accessories (ropes, hooks, shackles etc.) suitable for the load to be lifted.
Pay attention in the lifting phase to balance the load to avoid uncontrolled movements which could cause work injuries to persons.
Do not place other weights on the packagings.
Do not drag or push the valve as this will damage it.
Before lifting and handling the load, read the relevant information indicated in the "Information regarding safety" Chapter.

Harness the packages according to the indications and symbols applied on them and on the basis of their structure.

Unload the packages from the means of transport and place them on a flat surface which ensures the stability.

Avoid damaging the goods during unloading and handling. Always handle goods with care.

Caution

Keep the valve in vertical position according to the arrow on the packaging.
Do not turn the valve upside down as it could suffer structural damages.

5.1 Recommendations for installation

Danger - Warning

The installation operations have to be carried out by a technician specialised in such activities.
Provide appropriate safety measures and use suitable equipment to prevent risk of work accident to the persons involved in the operations and to those nearby.
Harness and handle the sections of the equipment concerned as described and shown in the "Unloading and lifting method" paragraph.

Before starting installation, define a safety plan which complies with the laws in force regarding workplace safety.

The specialist technician, authorized by the installer or owner, has to evaluate whether the area has been prepared properly and whether the necessary installation equipment is available (crane, etc.).

Define, on the basis of the configuration of the equipment concerned, the assembly method, if the inductive limit switch or other accessories require preassembly.

Clean the coupling surfaces thoroughly.

5.2 Storage or Shutdowns

Prior to installation

Avoid damp and salty atmospheres as far as possible. Place the equipment on wooden platforms or protected from unfavourable weather conditions. Keep the valve in vertical position.

Do not store the equipment in the open or in areas where there are vapours or substances not compatible with the material used for construction of the machine (even substances slightly corrosive).

Avoid storage below -20°C to maintain the features of the membrane.

Long machine shutdowns after assembly

Set the machine in safety condition before starting operation and make sure the machine is completely emptied.

Before starting the machine, check the electrical connections (if present), pneumatic system and all parts whose operation may be affected by long shutdowns.

Possible reuse after long shutdowns

Avoid damp, salty atmospheres during machine shutdowns.

Place the equipment on wooden platforms, or protected from unfavourable weather conditions.

Set the machine in safety conditions before starting operation and make sure the machine is completely emptied.

Before starting the machine, check the electrical connections (if present), pneumatic system and all parts whose operation may be affected by long shutdowns.

Before starting up the machine, clean it thoroughly by following the instructions given on the product safety chart.

If the machine operates in different conditions, or uses materials different from the previous application, ensure that the use complies to the INDICATIONS FOR USE section.

5.3 Supply

All valves have been preassembled and tested at the factory.

Basic supply provides also welding spigot.

Mounting bolts and nuts are not included.

5.4 Preparation

Remove packaging.

Mount the accessories (grille, inductive prossimity switch, or others).

WAMGROUP® supplies some of the above mentioned accessories which have to be bolted or clamped on by the customer.

The customer is responsible for the installation of any other type of actuator different than those mentioned above. He will perform the mechanical analysis necessary to ensure the effective possible use.

Do not hang any heavy devices directly on the valves and do not use the machine as a support.

5.5 Installation and fixing of the equipment

- Lifting the valve

Danger - Warning

Carry out the lifting and handling operations according to the information shown on the equipment and in the Manufacturer's Operation Manual.
The specialist technician authorized for carrying out the installation must make sure all the necessary measures are adopted to ensure his own safety and that of other persons directly involved.
The laws regarding workplace safety must be strictly followed.
Use means and accessories (ropes, hooks, shackles, etc.) suitable for the load to be lifted.
Pay attention in the lifting phase to balance the load so as to avoid uncontrolled movements, which could cause an accident.

Use lifting systems suitable to the weight and dimensions of the load to be lifted and the lifting distances concerned.

Otherwise use the handle available on the body (see pictures below).

- Fixing the valve

Carry out pneumatic and electrical connections in compliance with the standards in force.

Installing the valve directly on the silo

1) Ensure the surface on which the valve is to be fixed (container cover) is horizontal.

2) Unpack the valve.

3) Check the tightening torque of the fixing nuts present on the valve cover to make sure it is 19÷24 Nm.

4) Trace a hole equal to the inner diameter of the valve housing, at the top of the silo.

5) After drilling the hole, use the valve housing to trace the holes of the flange on the top of the silo.

6) Carry out the holes for the flanging.

N.B. The cutting and welding operations must be carried out by qualified personnel. Suitable Hot-Works procedures (such as cutting, welding…) and LOTO – lockout/tagout: machine disconnection procedure (electrical and mechanical segregation), must be applied for safe installation of the valve. Authorization for operations using heat MUST be given by specialist technical personnel trained as regards the risk of dust explosions (able to check the residual risk, the suitability of the tools and understanding of the procedures).

7) Apply a thin layer of sealant liquid between the surface of the silo and the valve flange.

8) Fix the valve body to the top of the silo using bolts and tighten the nuts by applying a torque of 36 - 46 Nm.

Installing of the valve on the silo using bottom ring under the valve.

1) Unpack the valve.

2) Check the tightening torque of the cap nuts present on the valve cover to make sure it is 19÷24 Nm.

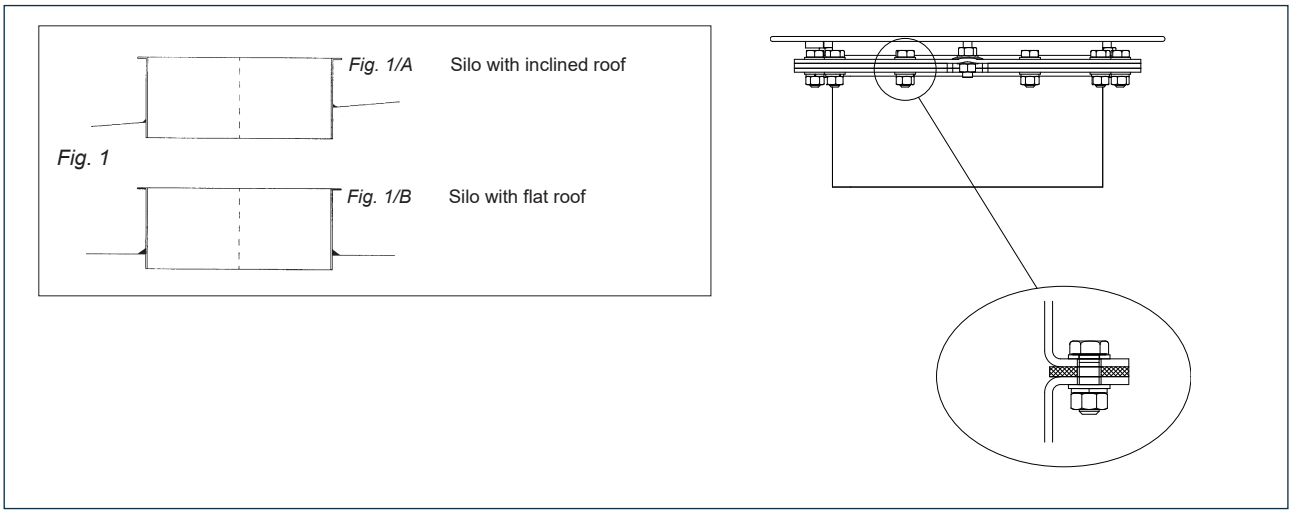
3) Use the ring under the valve to trace the hole to be drilled at the top of the silo.

4) After the hole is drilled, weld the ring under the valve in such a way that it is perfectly horizontal.

N.B.: The cutting and welding operations must be carried out by qualified persons according to the note given previously.

5) Place the elastomeric gasket supplied inside the **"VHS"** package between the flange of the bottom ring and the flange valve.

6) Fix the valve housing on the ring under the valve by means of the bolts supplied and tighten the nuts by applying a torque of 36÷46 Nm.



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Important

For accident prevention it is essential to keep the valve out of reach of personnel during operation. To this purpose the customer has to provide suitable safety devices such as grilles, as well as protective inlet and outlet joints (either robust flexible socks or rigid pipe unions). However, the installer has to avoid that, even accidentally , a person remains harmed (by using suitable hopper, safety grilles, etc.).

When employing movable safety devices, provide protection limit switches that stop the valve instantaneously if the protection is opened or removed. Restarting of the valve operation must only be possible when the protection is effective again (according to EN 1088).

Check and remove any possible vibrations of the plant, which could affect the safe and proper working of the machine.

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Apply a thin layer of liquid seal before fitting the valve to the connecting flange.

Clean the valve regularly with either air or water. This is particularly important if the material handled tends to compact or to solidify due to longer shutdown periods.

It is the responsibility of the installer, and of any person using the equipment, to:
- not to start it unless it has been fixed to the parts of the plant provided to that purpose;
- not to start if the system in which is fitted has not been certified in accordance with the laws in force;
- to install a system that prevents harm to persons or damage to property.

After fixing, carefully check the perfect alignment of the counter-weight piloting system (washers). The possible misalignment entails malfunctioning of the machine.

Fig.1

Correct system positioning.

Fig.2

Fig.3

Wrong system positioning.

Important

After carrying out the installation, check if there are any misalignments and deviations to be corrected.

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5.6 Assembly instruction

Inductive Proximity Switch

The "**VHS**" valve in all its size can be provided with an inductive signaling system.

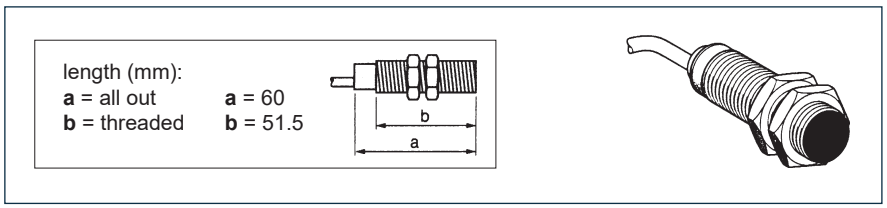
This device is used for signaling the intervention of the valve in overpressure or negative pressure conditions compared to the calibration value. **WAM**® supplies the KXS12 inductive proximity switch (that can operate with a 24 voltageat 220V) (- see attached technical sheet -).

In the valve activation phase, the inductive switch generates an instantaneous signal indipendently of the valve operation. The signal ceases when the valve returns to the home position after the action. In order to manage this signal it is recommended to use suitable contro device supplied by WAM.

In order to detect the opening of the valve, the KXS12 sensor has to be installed at a distance from the metallic surface of 0 < H < 4 mm by acting on the two nuts.

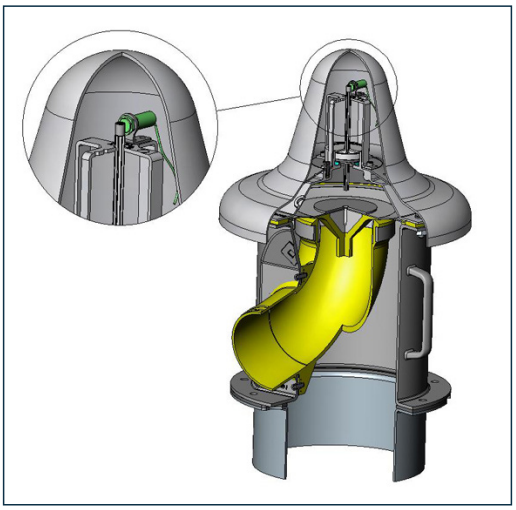
Inductive limit switch characteristics:

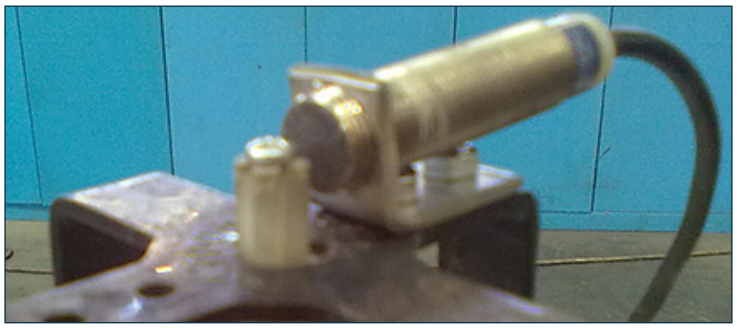
- M12 x 1 threaded cylinders;
- Standard brass metal casing;
- AC or DC power supply;
- NC contacts.



Inductive limit switch can be placed in the below position:

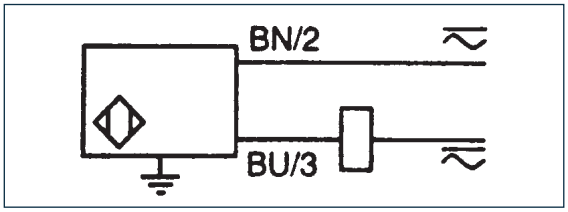
- Applied in the pilot section: fix the switch on the cross using present holes. Tighten the zinc-plated self-locking screw on the pilot rod. See image below. In this case sensor picks the signal from the pilot bar.





AC/DC

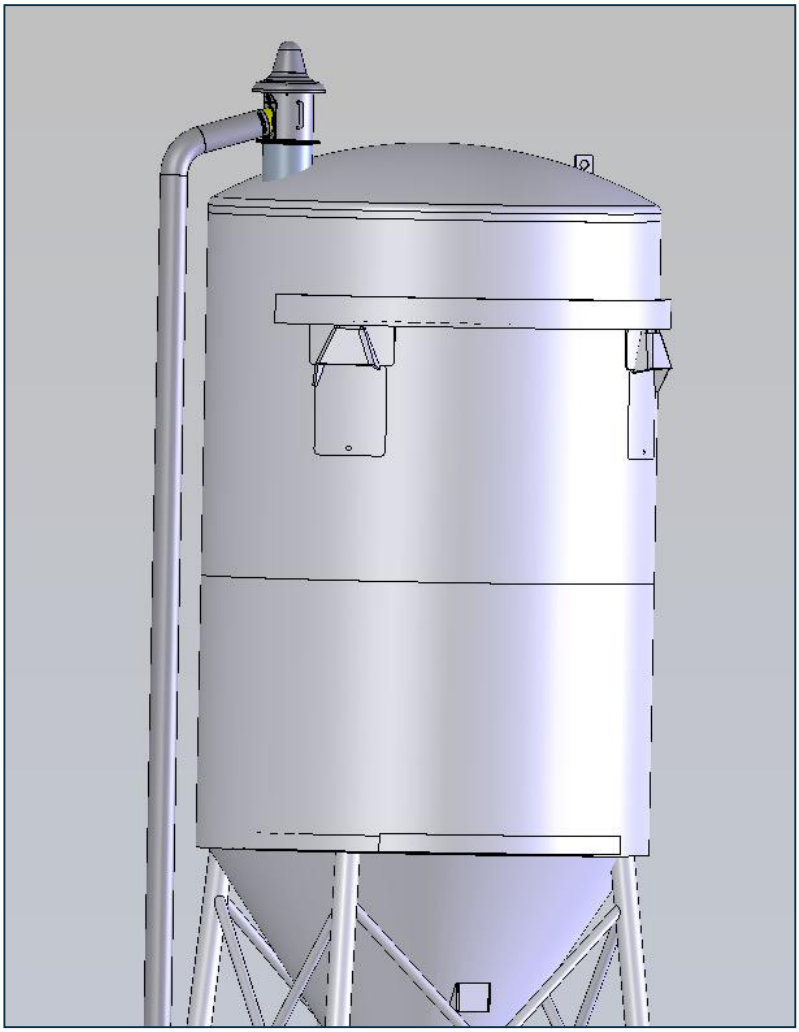
Description	Type
Nominal capacity	5 mm
2-wire type NC (protected against short circuits)	XS1-M12MB250
Weight (kg)	0.120
Features	
Type of connection	cable 2x0.5 mm2, length 2.0 m (1)
Protection degree	IP 68
Operating range	0...4 mm
Repeatibility precision	3% of Sr
Operating temperature	-25... + 80°C
Indicating output status protected model	1 red LED outlet state, 1 green LED presence of feeding
Nominal feed voltage	~ 24...240V (50/60 Hz) o 24...210V
Voltage limits (including wavering)	~ o 20...264V
Commutated current	(~)5...300mA o ( ) 5...200mA (3)
Voltage drop, passing status	5.5 V
Residual current, non-passing status protected model	1.5 mA
Current absorbed without load	-
Maximum inversion frequency	(~) 25 Hz o ( ) 200Hz
Delays	On availability: 40 o 70ms (models protected against short circuit) On activation: 2ms: on release: 4ms



N.B.: For switches with different cable lengths, contact Télémécanique machine suppliers directly.

Connection between valve and the conveying pipe

The valve can convey toward the ground, through an appropriate connecting pipe which is not supplied by **WAM**® as an option or separately, the possible emissions generated in overpressure condition.



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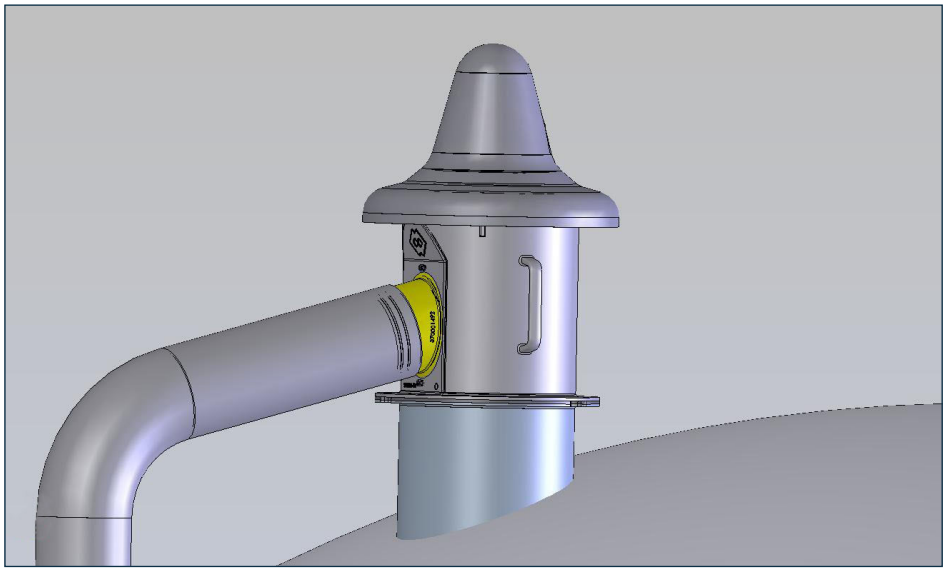
- Remove the safety grid if provided;
- Check beneath the weld-on spigot on the elbow if the grid is fitted;
- Fit the plastic elbow inside the emission pipe having the proper diameter;
- Using a clamp or a similar system, fix sturdily the connection between the two components. To ensure it is well fixed, check that the end of the tube andheres perfectly to end of the elbow.
- Avoid or reduce to the minimum the fixing of the pipe in horizontal segments. Avoid elbows or inclinations that might cause the clogging of the valve elbow;
- It is recommanded to install the pipe near the external edge of the silo;
- The emission pipe has to be installed so as the air flow and incoherent material flow doesn't get blocked;
- Fix the vertical segment of the pipe to the silo wall on the basis of the silo features, the pipe type and the plant location.



5.7 Electrical connection

Danger - Warning

The equipment is not provided with an electrical system. Connection to the mains must be carried out by an electrician.
Provide a connection line for powering the equipment in accordance with the provisions of the related laws and taking into consideration the environmental safety requisites for installation and the envisaged operating conditions.

None of the basic utilities require electrical connection.

5.8 Compressed air connection

None of the basic utilities require the use of compressed air.

5.9 Inspection

Important

When installation is complete, authorized personnel must carry out a general test to make sure the safety conditions have been completely satisfied.

The authorized personnel must also check:
- That no tools or other material have been left inside the valve;
- That the fixing screws have been tightened using the prescribed torque.

Before starting to operate the valve:
- Ensure that the plant in which the valve is installed complies to the Directive 2006/42/EC and the relevant directives, the safety standards in force and those specifically applicable;
- Make sure the exhaust inlet and outlet spouts of the valve are connected to the final equipment or plant in order to prevent access to hazardous areas;
- Ensure that the operating conditions are complied with.

Start up the equipment on empty to ensure that operation of the valve is correct and easy.

Operate the valve for about 1 to 3 minutes to ensure it is working correctly.

In the presence of:
- unusual noise;
- overheating of the body;
- lower pressure than setting point to open and close the valve.

Stop the valve and remove the cause of the malfunctioning.

Danger - Warning

When sizing the valve, check for any chemical incompatibility between the material and the components of the valve.

NOTE: Remember that, to avoid or reduce futile activation of the valve:

- The permitted pressures must be respected during the silos loading phase. Pressure values lower than 1.5 bar are recommended, and in any case the values must be compliant with the standards in force.
- The valve maintenance frequency must be followed according to the indications in the User Manual;
- Properly sized filters must be installed;
- The filters maintenance frequency must be followed;
- The "**VHS**" valve must be installed at the top of the silo far from inlet pipe and filter.

6.1 Production Start-up

Before starting up the valve the operator in charge and authorized for the production must ensure the safety devices installed are present, in working order and that the operating conditions are respected (exhaust inlet and outlet spouts connected correctly or protected,etc.).

Especially with materials that tend to harden or become sticky after longer periods of storage ensure no material or liquid remained on the exhaust elbow passages. In such case clean the area thoroughly.

Start the operation of the valve on empty. If the valve works properly, add material and proceed with regular operation.

At the first start up, check that the operation of the valve is suitable to the intended use. (UNSUITABLE PRESSURE SETTINGS can cause excessive pressure imbalance with consequent implosion or explosion of the silo, leakage of dust from the valve, possible crust formation on the valve and pollution of surrounding environment).

Important

In case of excessive noise, strong vibrations, etc. stop the valve and report the problem to the person in charge authorized to restore the proper working.
Do not use the equipment if demaged.

Operation

Regular cleaning increases the life of the equipment. This applies in particular to those application in which the materials handled either tend to harden or become sticky when stored for a longer period.

6.2 Clearing the valve following a blockage

If, during normal operation, the valve does not releases any emissions and then comes to a complete stop, it is highly probable that the problem is caused by a blockage.

Danger - Warning

The authorized operator must strictly apply all laws regarding workplace safety and adopt appropriate safety measures against work accidents. Specifically, do not insert the hands into the inlet/outlet next to the valve if the disc has not been blocked safely using external means.

Danger - Warning

Disconnect the equipment from all mains and use the appropriate means to prevent it from being re-connected accidentally.

Proceed as described:

- Cut off the inductive limit switch power supply to the valve if present;
- Remove the outlet sleeve or grill and ensure the outlet spout is not obstructed by material or deposits and clean it using a tool, if necessary.

Danger - Warning

Never insert the hands inside the valve.

6.3 Machine shutdown at the end of the work cycle

There is no special switch-off procedure.

The stop of the machine is made by stopping of loading activity. It is recommended to check the valve every time it is started-up and air-dust mixture is released. This is particularly important when the material transported tends to harden or get compacted when not handled for a certain period of time.

6.4 Long shutdowns of the equipment

When the valve remains unused for long periods, proceed as described below.

1) Empty the valve of the product it contains to prevent it from hardening.

2) Clean the valve (see “Cleaning the equipment”).

3) Repair the damaged or worn mechanical parts, if necessary.

6.5 Reuse

Important

If the equipment is to be used in different conditions and with materials other than the previous application, ensure the “Permitted use” indications are complied with.

Before reusing the valve after a prolonged shutdown, proceed as described below.

1) Check the main nuts and bolts to make sure they are tightened properly.

2) Set the machine in safety before starting operation making sure the machine is completely empty.

3) Check the supply system and all parts the working of which may be affected by long shutdowns.

4) Clean the equipment thoroughly by following the instructions given on the product safety chart.

5) If the machine operates in different conditions, or using materials different from the previous application, ensure this use complies the INDICATIONS FOR USE section.

6) Start up the equipment (see “Production Start-up”).

Danger - Warning

Before carrying out any maintenance operation, activate all the safety devices for the safety of the persons involved in the operations and those nearby.
Set the equipment concerned in safety condition.
Wear suitable personal protection equipment; in this regard, consult the person in charge of safety of production activities.

Important

Failure to strictly follow the instructions can cause problems and cancel the warrantee of the machines supplied.

To carry out maintenance operations on the valve up the silo, first clean the inside of the valve and then the surrounding area, taking care to avoid dust dispersion.

The following indications must be strictly followed:

Scheduled maintenance Table

Component	Operation to be carried out	After every action	Week-ly	Every month	Every six months	Every years	Every two years
Safety devices	Performance check			•			
Valve	Remove dust residue or de-posit from the outside surface	•	•				
Valve outlet	Check if the outlet is free of material residue. Otherwise clean it thoroughly to remove all obstruction to the flow of material	•	•				
Earth connection	Integrity of electrical connec-tion			•			
Seal	Wear checking			•			
Membrane	Wear checking				•		
Flanges	Fix checking				•		
Plate	Checking the condition and legibility				•		
Seal, elbow and mem-branous	Replace all parts subjected to fatigue stress or wear						•
Elbow	Wear checking				•		
Safety and information signs	Check the condition and leg-ibility				•		
Valve	Setting checking				•		
Valve	Completely overhaul					•	

Important

Part replacement depends on the use of the valve and type of material handled.

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7.1 Cleaning the valve

Clean the outside part of the valve using a vacuum cleaner to prevent dispersal of dust in the environment and in the surrounding area; or use a moist cloth.

Do not use compressed air.

Wash the valve, after vacuuming the dust, with a low-pressure water jet.

7.2 Lubrication

No lubrification required.

8.1 Safety recommendations for replacement

Danger - Warning

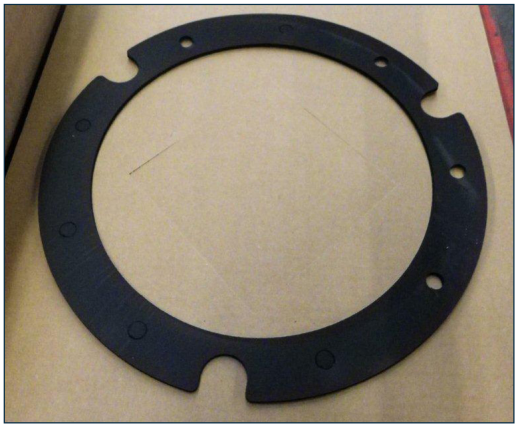
The replacement operations must be carried out by a specialist authorized technician with specific skills in the sector concerned (mechanical, electrical etc).
Before carrying out any operation, provide suitable safety measures and use the appropriate equipment to prevent risk of work injuries to persons involved in the operations and those nearby.
Activate all the safety devices envisaged and prevent access to controls which, if activated, could cause work injuries to the persons involved in the operations.

8.2 Assembly and disassembly valve operation

Disassembly

1) Remove the flange fixing nuts (M10) between the valve and the under valve stub pipe flanges;

2) Remove the sel between valve body and stub pipe;



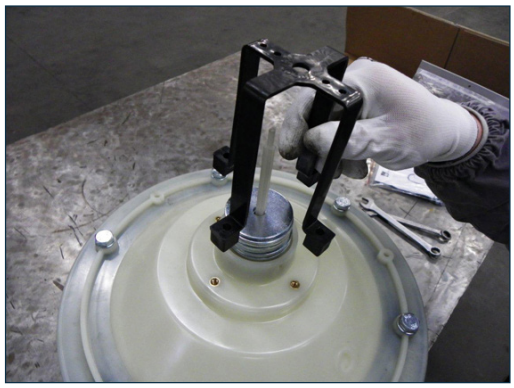
3) Unscrew the n.3 cover fixing screw. They are positioned under the cover and they are at a 120° inclination;

(use as a reference the small arrow on the cover aligned to the handle of the valve)

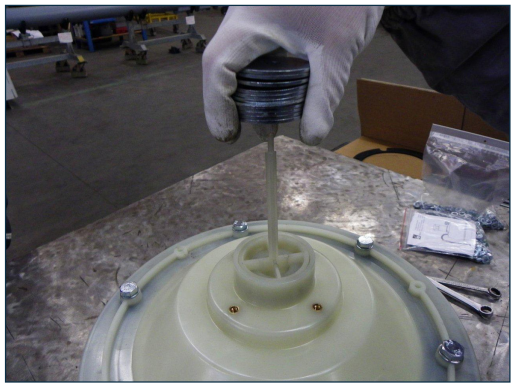
4) Remove the protection cover

5) Remove the pilot system;

6) Unscrew n.4 M6 screws and take off the plastic cross;



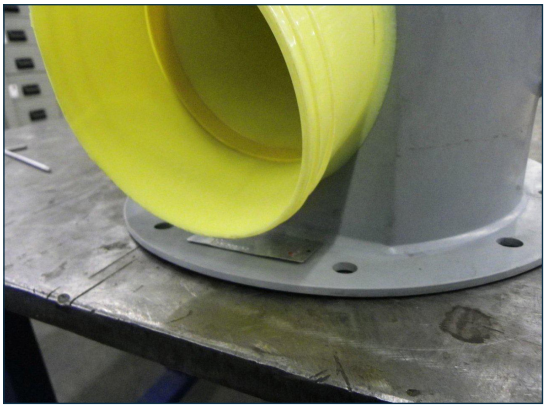
7) Remove the weight washer and check the integrity of the system;



8) Unscrew M10 the nuts and remove the bolts and washer; remove the cover.

9) Remove the membrane and clean it;

10) Remove the rigid ring at inlet and outlet of the elbow;



11) Remove the elbow blocked to the body and clean it.

Assembly

Follow in reversed order the disassembly instructions.

Depending on the type of action carry out the operations described earlier in reverse order by paying special attention to:

1) Position the diaphragm correctly ensuring that their gaskets adhere to the related supporting surface;

2) Place weight washers at the centre of the sliding rods;

3) Tighten the nuts on the cover applying a torque of 36 Nm;

4) Fit the cover after placing the fixing screw the correct position to prevent water infiltration. Use handle and mark on cover as a reference on aligning and tightening;

5) Tighten the screw applying a torque of 36 Nm.

8.3 Replacement of wear parts

The membrane and elbow, which are the only wear parts in the "**VHS**" valves, must be replaced after a while on the basis of the material and application.

It is recommended replacing the seals and membrane every 2 years, as you can see in the Maintenance Schedule table.

For spare part codes refer to Spare Parts section.

Proceed as described:

1) Ensure the container below the valve is empty;

2) Disconnect the mains and compressed air supply.

3) Follow the assembly/disassembly steps indicated above.

8.4 Returning the valve

When returning the valve use the original packaging if it has been preserved, otherwise fix the it on a pallet and cover it with nylon shrink-wrap, to protect it as best as possible from impact during transport. In any event, make sure there is no residue material inside the valve.

8.5 Dismantling and disposal

Dismantling of the valve must be entrusted to personnel specialized in these activities and equipped with adequate skills.

Dismantle the components of the valve concerned; if necessary contact AIRMATIC for further information.

The components dismantled have to be separated on the basis of the nature of the materials of which they consist, in compliance with the laws on the matter of "differential collection and disposal of wastes".

With reference to the WEEE Directives, electrical and electronic components, marked with a special symbol, have to be disposed off in authorized collection centres meant for the purpose.

Unauthorized disposal of "Waste Electrical and Electronic Equipment" (WEEE) is punishable with fines governed by the laws concerning the matter.

9.1 Trouble-shooting

Minor problems can be solved without consulting a specialist.

The following Table contains a list of the most common problems, the possible causes and possible remedies.

For particularly difficult actions which are not mentioned in the Table, contact AIRMATIC's Customer Service Department.

Danger - Warning

Before carrying out any operation "set the valve concerned in safety" (see "Glossary and terminology"), operate according to the indications on the "Operation and Maintenance Manual" and in accordance with and in compliance with the standards in force as regards health and safety.

FAULT	POSSIBLE REASON	SOLUTION
A) Pressure inside the silo remains higher than overpressure setting of valve during and after loading.	1) Membrane encrusted.	1) Take off cover and remove crusts.
	2) Output elbow clogged	2) Remove material in the elbow.
	3) Pilot is non damage	3) Remove the cover and repositioning the pilot.
B) Pressure inside the silo remains lower than negative pressure setting of valve after emptying	1) Valve does not close completely.	1) Take off cover and remove crust.

9.2 Check-list in case of fault

If you have been unable to solve the problem on the valve even after having carried out the operations suggested in paragraph "Trouble-shooting" please contact the plant technician/installer/or AIRMATIC.

If technical assistance is required, in addition to the valve data, the plant technician/installer or AIRMATIC will also need information concerning the plant in which the valve is installed, its installation and its working, for better identification of the problem that has occurred.

Obviously many of the checking operations which are requested have already been performed in the various steps during installation, testing and start-up of the valve concerned.

Danger - Warning

Before carrying out any operation "set the valve concerned in safety" (see "Glossary and terminology"), operate according to the indications on the "Operation and Maintenance Manual" and in accordance with and in compliance with the standards in force as regards health and safety.

1) Information necessary

a) Does valve open and close after long shutdown periods without problems?

b) Do weather conditions influence negatively the loading/unloading operations?

c) Do you notice continuous dust leakage from the valve?

d) Is there a layer of dust on the valve or around it?

e) Check if the valve releases dust during the last 10 minutes of the loading operations.

f) Ensure the silo has no deformation, or other characteristic signs of implosion.

g) Check that the silo has no signs of bulging due internal overpressure.

2) Checking the silo

a) Is silo pneumatically fed with pressure > 1.5 bar?

The loading pressure value has to always be lower than 1.5 bar.

b) With more silos, are all of them equipped each with a separate pressure relief valve?

Each silos has to be provided with a pressure relief valve.

c) Are silos connected between each other?

Avoid connecting the silos to each other.

d) Does each silo have its own dust filter?

In case the silos are connected, ensure no obstruction is present.

e) Is each silo provided with a dust collector?

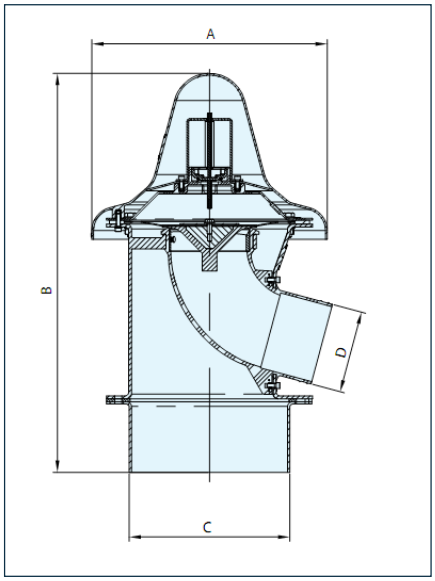
f) Ensure the filter air flow and filter media suits the application.

g) Ensure the filter is not damaged and it operates properly.

h) Ensure the filter routine maintenance has been carried out.

i) Ensure the level indicators are present and working properly.

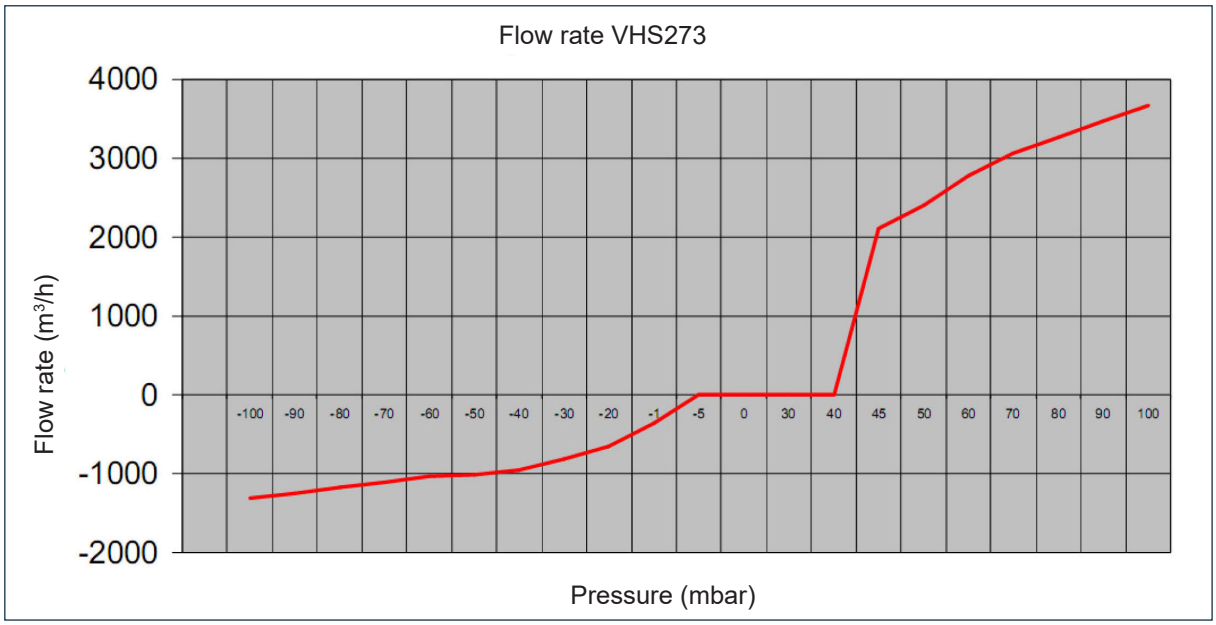
10.1 Dimensions



VHS273	Excess Pressure	Negative Pressure	kg
Standard-type	500 mm H_2O	-50 mm H_2O*	8
Option	300 ~ 800 mm H_2O*	-50 mm H_2O*	

A	B	C	D
Φ 366 mm	557 mm	Φ 273 mm	Φ 140 mm

10.2 Flow rate



A1 Nuts and bolts tightening torque Table

Thread diameter	Tightening torque [Nm]		
	Resistance Class **8.8**	Resistance Class **10.9**	Resistance Class **12.9**
M6	9.5	13.0	16.0
M8	23.0	32.0	39.0
M10	46.0	64.0	77.0
M12	80.0	110.0	135.0
M14	125.0	180.0	215.0
M16	195.0	275.0	330.0
M18	270.0	390.0	455.0
M20	385.0	540.0	650.0
M22	510.0	720.0	670.0
M24	660.0	930.0	1100.0
M27	980.0	1400.0	1650.0
M30	1350.0	1850.0	2250.0