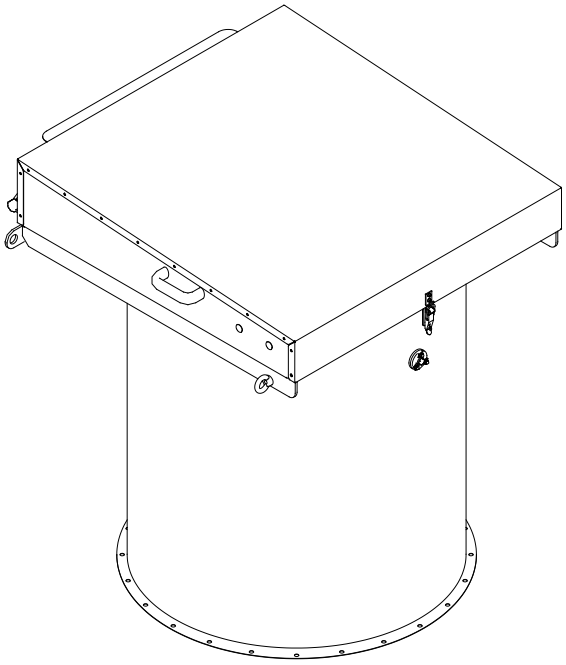
EN

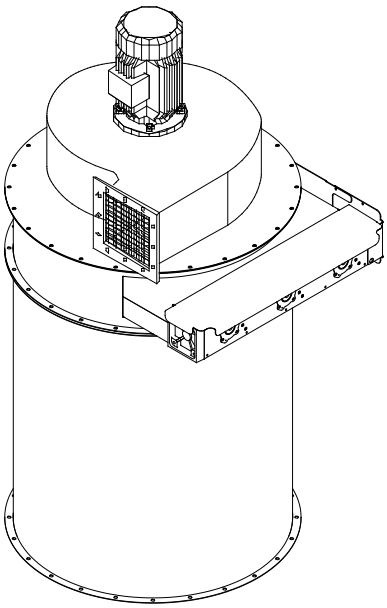
WAMFLO®

ROUND DUST COLLECTORS

2

ASSEMBLY AND MAIN INSTRUCTIONS FOR USE AND MAINTENANCE





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ORIGINAL INSTRUCTIONS IN ENGLISH

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WAMGROUP®

WAM®

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.

This publication cancels and replaces any previous edition and revision.
We reserve the right to implement modifications without notice.
This catalogue cannot be reproduced, even partially, without prior written consent by the Manufacturer.

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 equipment concerned.

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

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

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

The Manual is meant for specialist technical personnel appointed and authorized by the Manufacturer, owner and installer to act on the equipment 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 equipment concerned but do not interfere with the explanation of the operations.
In case of doubt, contact the Manufacturer 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 equipment 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.

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 equipment 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 equipment are exposed. Before opening inspection or maintenance hatches or doors isolate the equipment concerned from the electrical energy sources.
	**Information:** indicates the direction of rotation of the electric motor.
	**Obligation:** indicates the hooking points for lifting each section of the equipment concerned.
	**Forbidden:** indicates it is forbidden to introduce hands into the equipment.

1.3 Glossary and terminology

Operator: person appropriately trained and authorized by the Production Manager for setting up the equipment 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 equipment; 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 equipment concerned, must be familiar with the working of the plant or equipment on which the equipment concerned is installed.

Routine maintenance: includes all the actions necessary to keep the equipment 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 equipment in perfect working order.

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

The precautions are listed below.

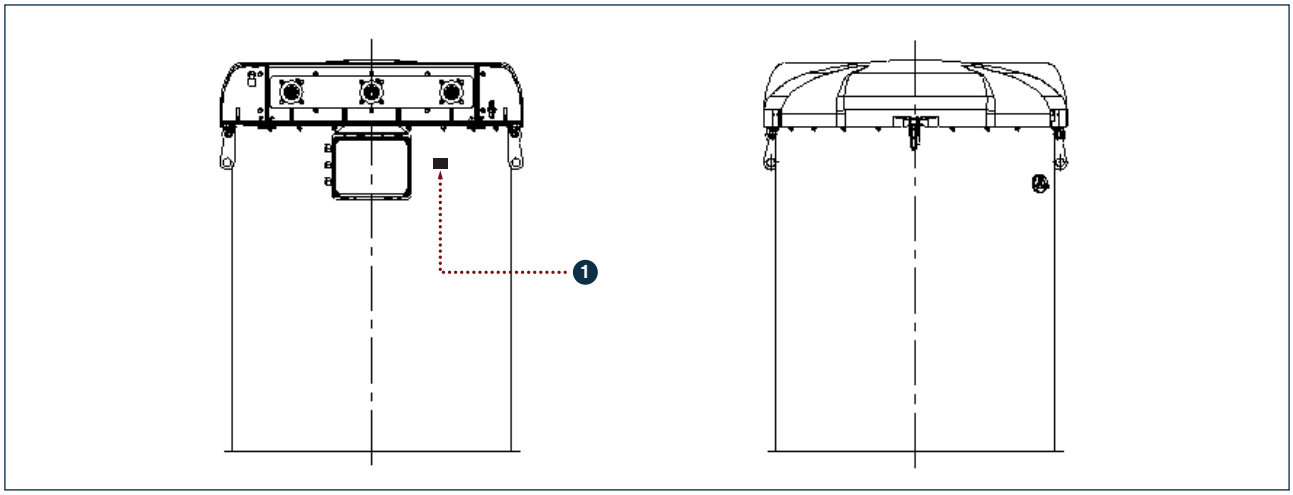
- **Ensure that the equipment concerned is disconnected from all the mains and appropriate devices are used to prevent these from being reconnected accidentally.**
- **Ensure that all the moving parts of the equipment have come to a complete stop.**
- **Ensure the temperature of the equipment concerned 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 equipment or machine concerned to settle down completely.**

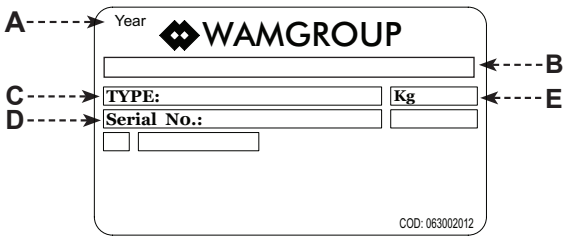
1.4 Manufacturer's data and identification of equipment

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





1 - Identification plate of equipment

A) Year of manufacture
B) Manufacturer's name and address
C) Type of equipment
D) Serial No.
E) Weight of the equipment

1.5 Request for assistance

For all technical assistance, contact the Manufacturer's service network.
For all requests, provide the equipment 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 equipment 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 equipment 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 equipment 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 equipment.

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 equipment, 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 equipment during installation, use and maintenance.

Modifications to the equipment 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 equipment concerned or the sections and the loose components horizontal, 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 equipment 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 equipment.

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 equipment 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 equipment 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 equipment 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 equipment concerned.

2.6 Safety recommendations on biological risks

Danger - Warning

Depending on the type of product processed by the equipment, it is recommended to wear appropriate personal protection equipment against the biological risk which could not be eliminated (residual risk) in case of contact with the equipment or its components.

3.1 General description of the equipment

WAMFLO® is a range of round dust collectors designed both for venting and suction applications.

They consist of:

- round stainless steel body
- vertically mounted filter elements
- air jet or mechanical vibrated cleanig system.

WAMFLO® filters can be used for any kind of application in all industrial sectors.

- The technical features and compressed air cleaning system make it suitable for continuous use.
- For dimensional requirements, it is sometimes necessary to insert the filter elements in the silo/hopper to be dedusted.

For this reason the range of “INSERTABLE” filters does not have a body as to limit the height.

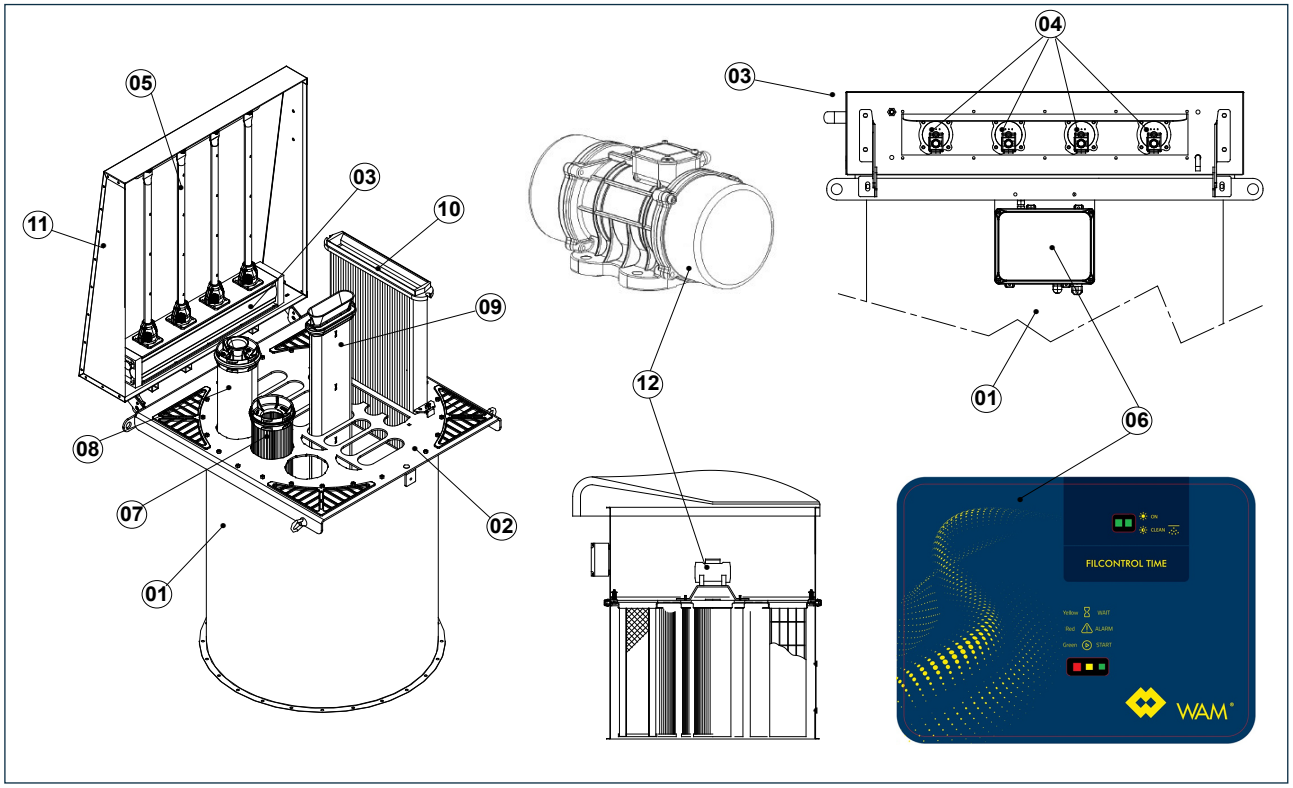
- Unless otherwise specifed, all the dimensions are expressed in millimetres.

The dust separated from the air flow by specific filter elements drops back into the silo, hopper or bin after an integrated automatic pulse-jet cleaning system inside the weather protection cover has removed it from the filter elements.

Important

The terms “equipment”, “dust collector” or “filter” used in this manual refer to the same machine.
As components meant for installation in a plant, the dust collectors - 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 equipment 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	MATERIAL	THICKNESS	FINISH
1	Filter body	SS 304	1 mm	2B
2	Seal frame		6 mm	Powder painted RAL 7001
3	Compressed air tank	Aluminium	3 mm	Light anodized
4	Solenoid valves	Aluminium	-	Matt black cataphoresis
5	Cleaning tubes	SS 304	1 mm	Satin finish 120 - 180 (4/4/IV*)
6	FILCONTROL	-		Time / Connect
7	Cartridge	-		-
8	Bags	-		-
9	Elliptical bags	-		-
10	POLYPLEAT®	-		-
11	Cover	SS 304/plastic	1 mm	2B
12	Vibrator	Cast iron	-	Powder painted

3.3 Operating principle

The dirty air enters the dust collector body (**1**) where dust is separated by the filter elements (**8**).

The dust drops back into the silo, hopper, or bin after an automatic pulse-jet cleaning system (**3+4+5**) has removed it from the flter elements.

3.4 Permitted use

The **WAMFLO®** dust collectors have the function of separating dust particles conveyed by a air flow or gas, using filtering elements made of fabric polyester.

The dusty air flow crosses the filter, which stops the dust particles, allowing the air to flow over it.

The dust collected on the filter elements surface is periodically removed by the cleaning system that can be of the compressed air jet type.

Every other use must be considered as improper and therefore not permitted.

3.5 Improper use not permitted

The dust collector must not be used as an element for discharging overpressure inside closed volumes. One or more safety valves must always be provided in the plant to keep the pressure level within the filter pressure resistance limits.

The air flow handled by the dust collector must never exceed the value defined in the order phase.

Using the dust collector when the components (filter elements, cleaning system, fan, if present, etc) are not in perfect conditions can cause harm to persons and to the environment.

Do not start operating the dust collector until the plant or equipment in which it is to be incorporated has been declared compliant to the relevant national and local legislative provisions in force.

It is forbidden to use the dust collector in potentially inflammable or explosive atmospheres (ATEX).

It is forbidden to use the dust collector for inflammable or explosive products.

It is forbidden to use the dust collector for products that can cause bacteriological contamination.

It is advisable, for safety reasons, not to use clamped filters on the top of silo.

3.6 Noise level

The noise level of the **WAMFLO®** dust collector without fan does not exceed the limit of the directive 86/188/CEE and 89/392/CEE.

The measured equivalent continuous average sound pressure level LAeq is 78.0 dB(A).

All readings were taken at 1 metre distance from the equipment at 1.6 metres from ground, with compressed air shots at 6 bar each 28 seconds, using a precision sound level meter.

Noise measurements of installed equipment may vary due to site conditions.

The noise level of the fans have been measured and they are reported below.

Type	kW	Noise dB (A) max
A	0.75	78
A	1.1	78
B	1.5	75
C	2.2	78
C	3	78
D	4	79
D	5.5	82

All the data indicated in the Table concern the STD. **WAM®** tests:

- filter on DK hopper and Ø 100 mm L = 3000 mm tubes at intake and L = 2000 mm at outlet.

The noise levels of the **WAM®** fans expressed in dB(A) are obtained by readings in the open field, at maximum performance, at the 4 cardinal points at a distance of 1.5 m from the fan which is, in turn, placed 1.5 m off the ground. During the test, the fan is ducted in accordance with Standards UNI 7179-73P.

The user may obtain values different from those indicated, depending on the environment in which the machine is placed.

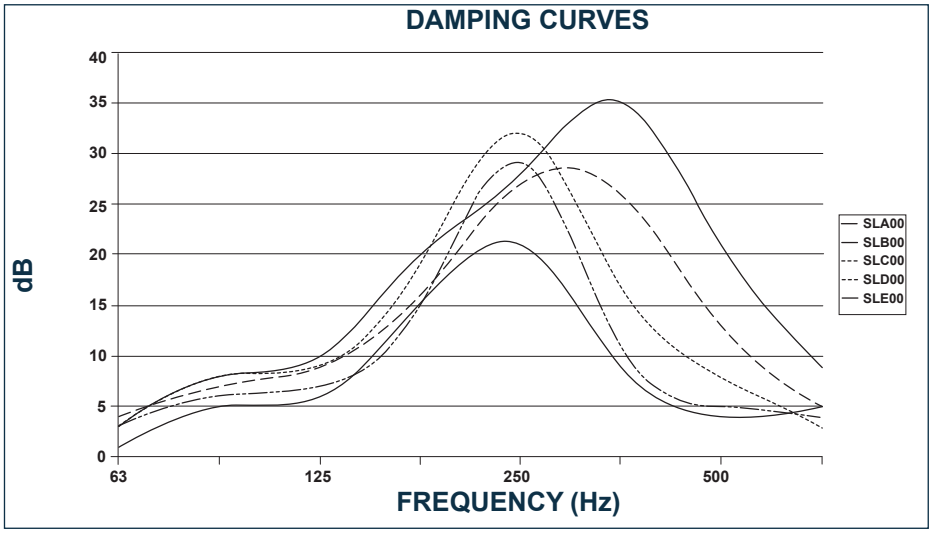
It is always reccomanded to isolate the fan using vibration-damping supports and couplings from the ground and ducting. Avoid placing the fan in corners, near walls or on encased metal structures.

Silencers

A PASSIVE silencer can be coupled at the fan outlet in order to reduce the noise at the outlet. The silencer is always supplied with a adapter stub between the silencer outlet spout (rectangular) and the silencer (round). Moreover, the silencer can be supplied directly coupled with the VPA choke valve. All the dimensions and damping curves for the various models are indicated in Manual.

Important

The silencer is specially designed to reduce the noise at the fan outlet; if an outlet shaft or duct is installed upline of the fan, these components can produce noise which cannot be reduced by the silencer supplied by WAM.



Danger - Warning

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

3.7 Environmental operating limits

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

- Altitude: less than 1,000 m at sea level
- Environmental temperature: between - 20 °C and + 80 °C
- Cold climates: with temperature less than 5 °C use oil and lubricants suitable to the operating temperature.

3.8 Options - Cleaning system

For the **WAMFLO®** filters are available two types of filter elements cleaning system to be selected in order phase. For the **WAMFLO®** filter version with vibrated cleaning system has been defined a finished code range.

- Pulse-jet cleaning system: a reversed air flow is shoot into filter element to remove the powder from the media.
- Vibrated cleaning system: a mechanical vibrator fixed on the seal frame shakes it along with the filter elements to remove the powder from the media.

3.9 Options - Type of filter

In addition to the standard version, depending on the type of application and the dimension requirements, the **WAMFLO®** filters can be manufactured in the following versions:

I - insertable

D - underpressure

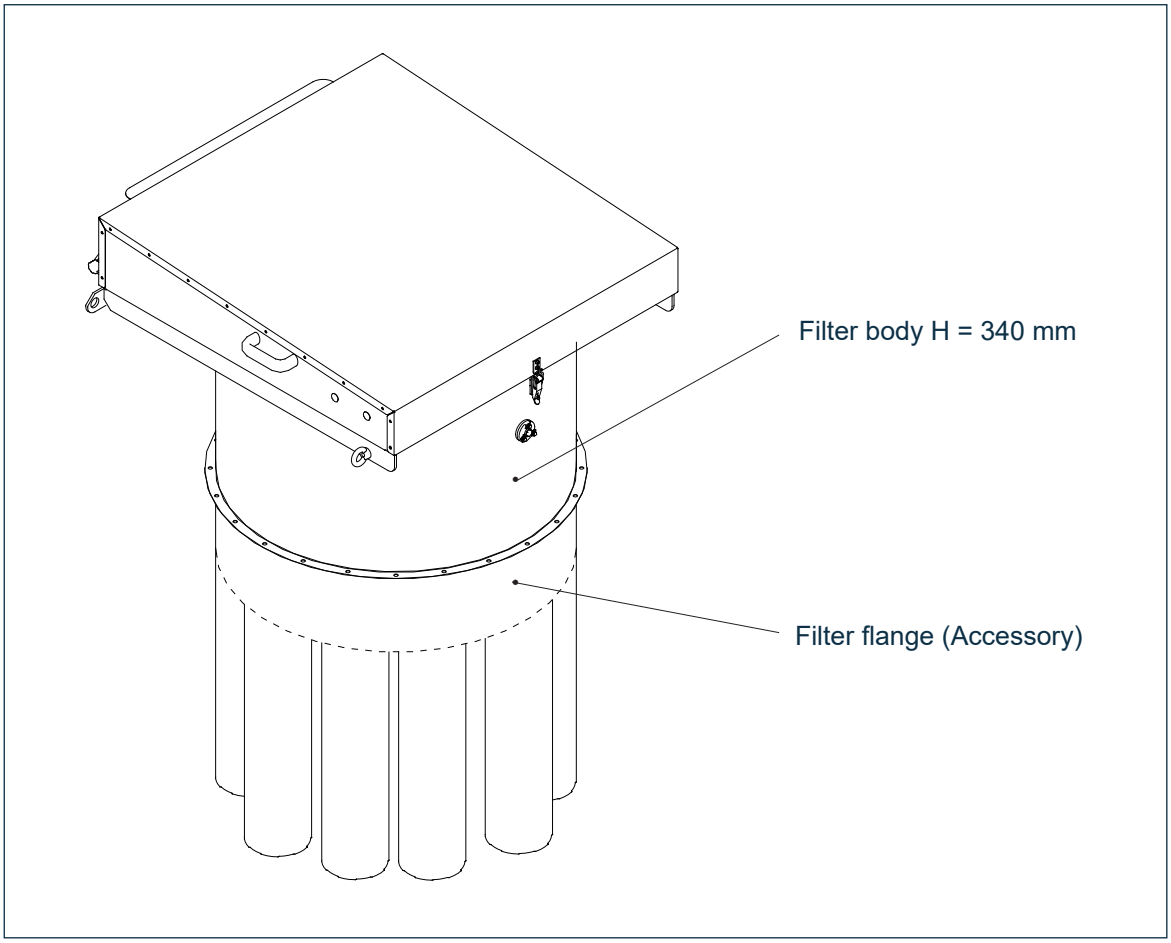
E - insertable underpressure

(see box 5 of modular key)

INSERTABLE FILTERS

For dimensional requirements, it sometimes becomes necessary to insert the filter elements in the silo/hopper to be dedusted.

For this reason the range of “INSERTABLE” filters has a body with H = 340 mm that reduces the height.

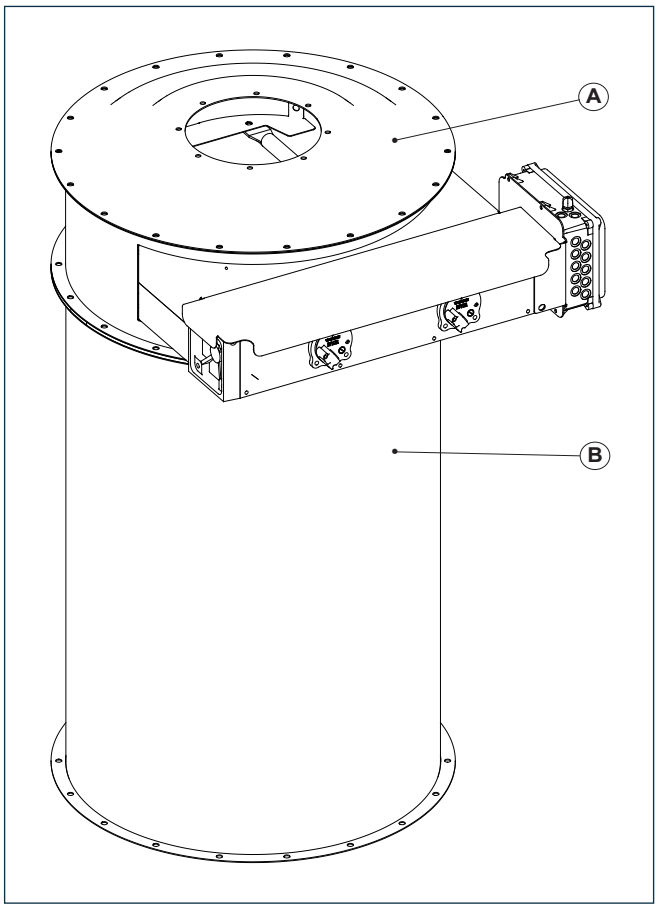


NOTE: The filter flange is supplied separately.

ROUND FILTERS IN UNDERPRESSURE

They are employed in “negative” pneumatic conveying processes: a pump with max -6000 mm H_2O head positioned near the filter sets the entire filter in underpressure.

To avoid damage to the structure, the following modifications are made to the standard model:



A) *FILTER COVER*

It consists of a flat plate with reinforced ribbing and thickened reinforced sheet. A hole is made in the centre through which the customer must connect the pump piping.

B) *FILTER BODY*

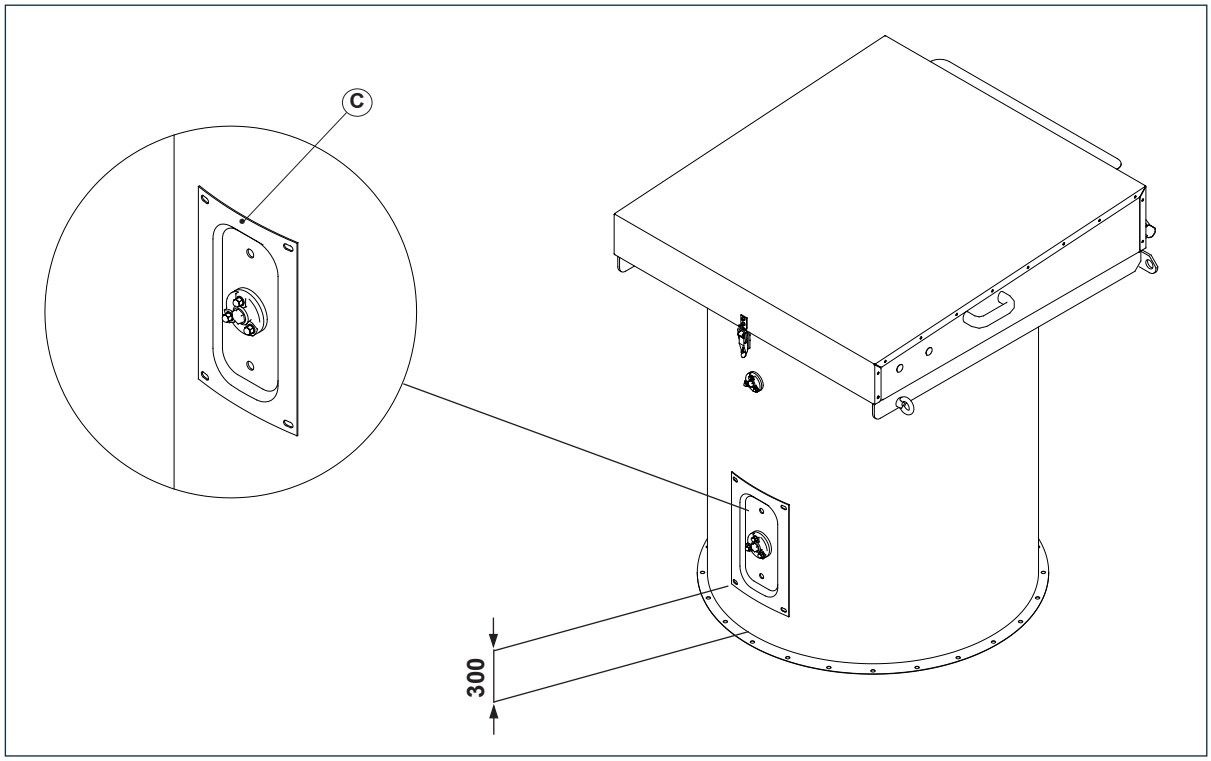
To ensure resistance to under pressures of -0.6 bar (-6000 mm H_2O) the upper flange and the intermediate flange are made of thick sheet metal depending on the diameter as well as on the height of the element.

C) *INSPECTION HATCH*

It is not supplied since it represents the weak point of the structure (see the next page).

3.10 Options: Inspection hatch

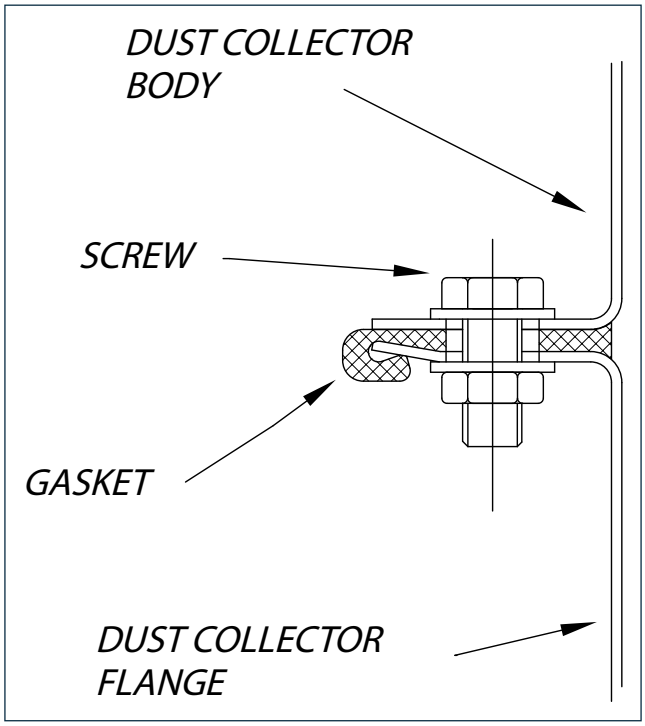
The inspection hatch allows quick access to the dirty part of the filter elements.
It can be requested in the standard version by specifying it in box 7 of the modular key.



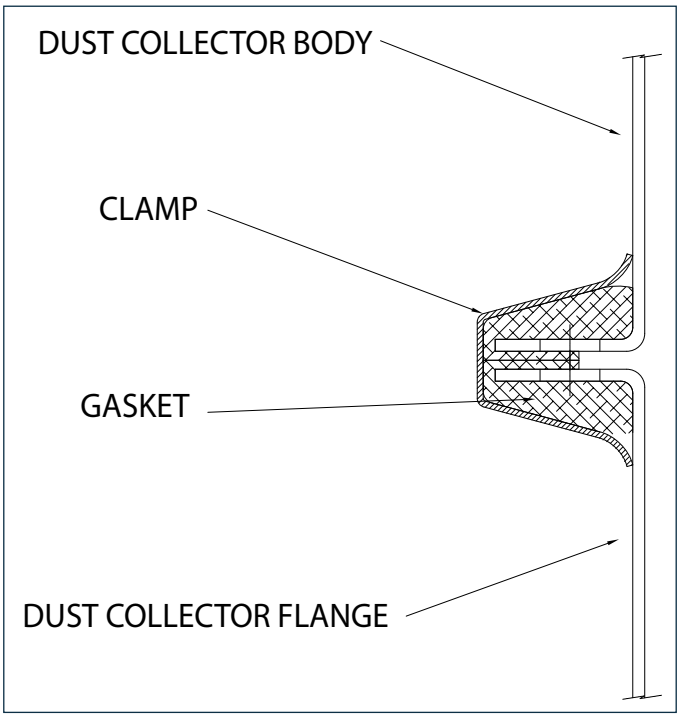
3.11 Options: Connection type

The **WAMFLO®** filter is provided with 2 kind of connection that can be chosen in 8° box of modular key:

- Flanged



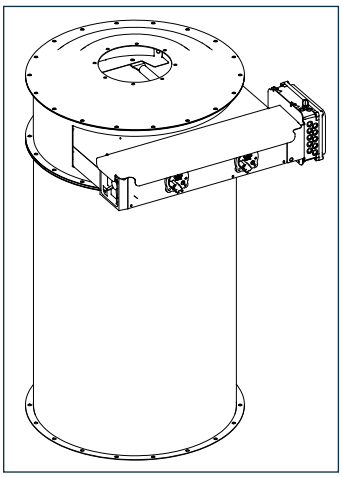
- Clamped



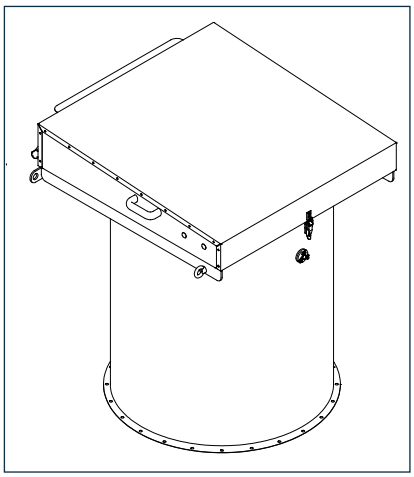
NOTE: It is forbidden to use clamped dust collector on the top of silo.

3.12 Options: Filter outlet supply

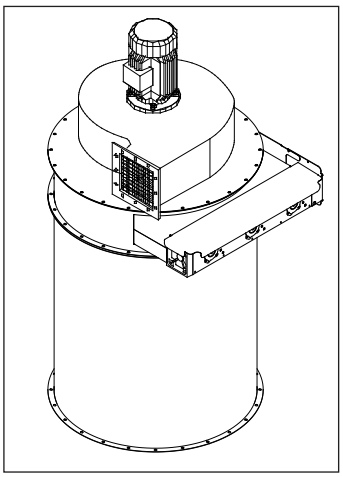
For **WAMFLO®** filters there are a series of options for filter outlet equipment (in the box 18 of the modular key):



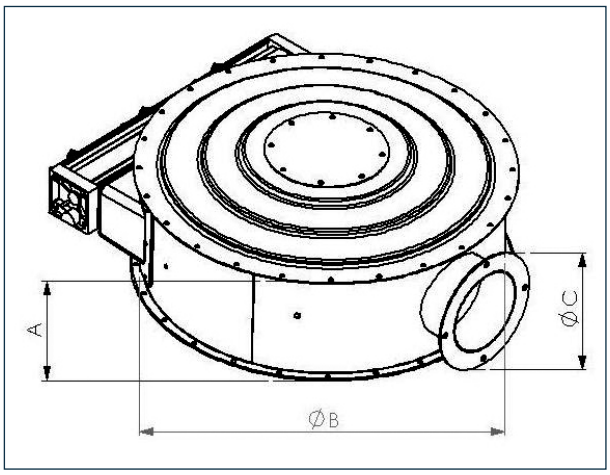
Version with connection for centralized suction



STD version (with rain shield cover)



Version with fan



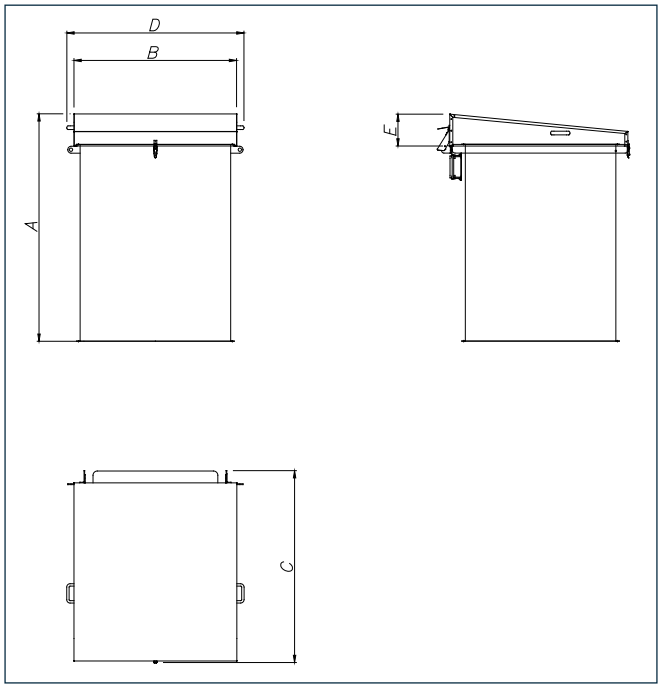
Version with lateral connection

3.13 Options: Weather protection cover

The cover is made of 1mm thick SS 304 with 2B finishing. The locking hook, also made of SS 304, can be padlocked.

The hinges are provided with a safety system consisting of a hook which automatically locks the cover in the open position.

It must be unlocked manually before closing again.



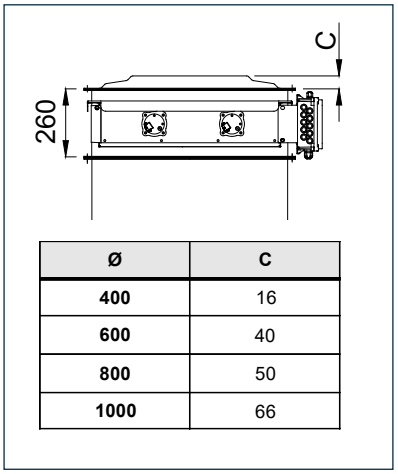
Type	Ø	Length	A	B	C	D	E	Handles N°
FN 1	400	520	710	495	635	545	180	1
		770	900					1
		920	1110					1
		1360	1550					1
		1840	2030					1
FN 2	600	520	710	690	880	740		1
		770	900					1
		920	1110					1
		1360	1550					1
		1840	2030					1
FN 3	800	520	710	875	1005	925		1
		770	900					1
		920	1110					1
		1360	1550					1
		1840	2030					1
FN 4	1000	520	710	1125	1325	1225		2
		770	900					2
		920	1110					2
		1360	1550					2
		1840	2030					2

3.14 Options - Upper connection for standard filters

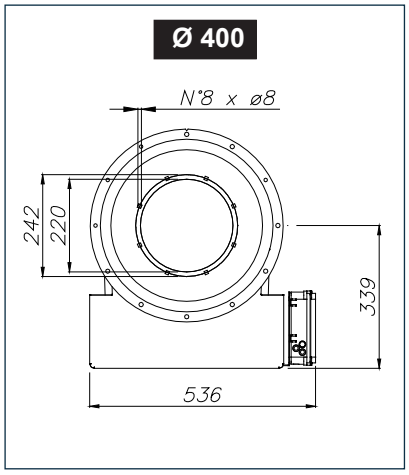
UPPER CONNECTION FOR STANDARD FILTERS

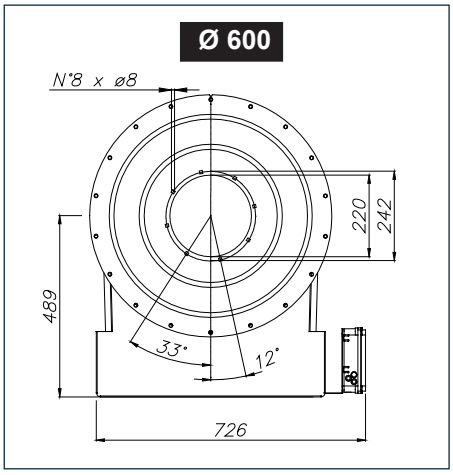
The upper connection for standard filters can be chosen as an option for connecting the **WAM®** filter to a centralized suction system or to a non - **WAM®** fan.

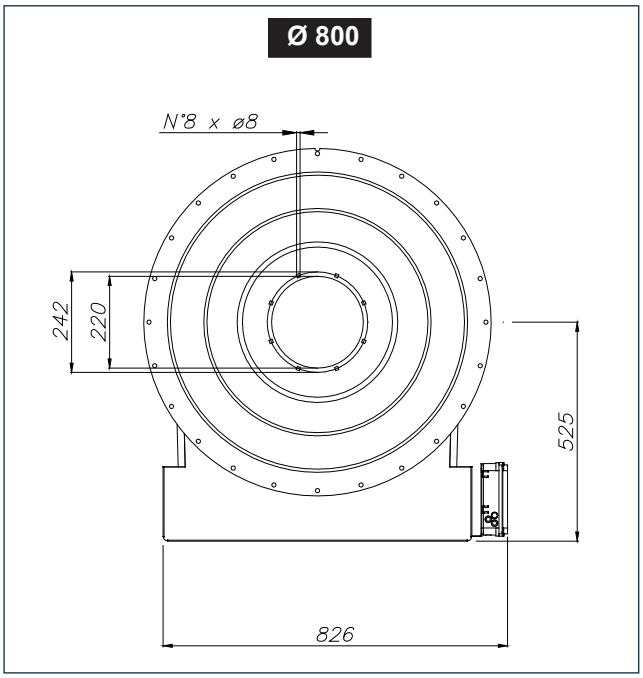
To select the type of cover and the type of material it is made of, enter the correct LETTER/NUMBER in box No. 18 of the modular code (filter outlet supply). The inner diameter of this connection is already suitable at the maximum air flow compatible with the filter. The quotas of the piping fixing part are indicated in the drawings below.

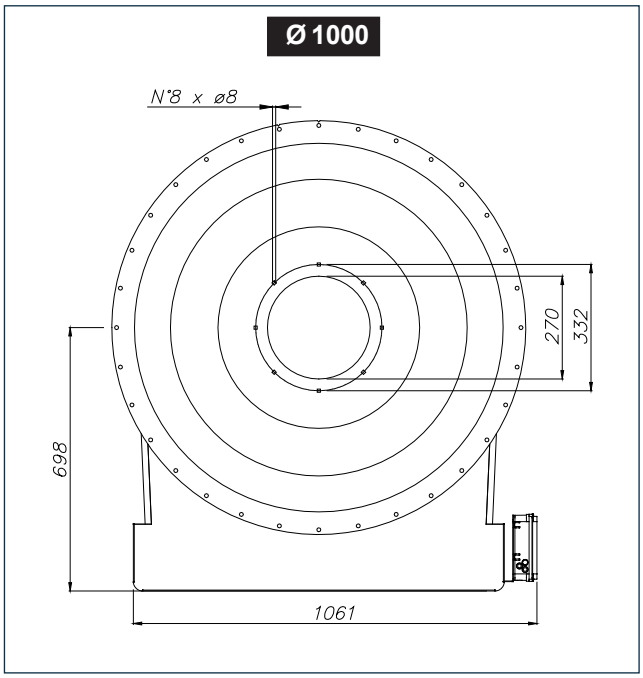


Ø	C
400	16
600	40
800	50
1000	66



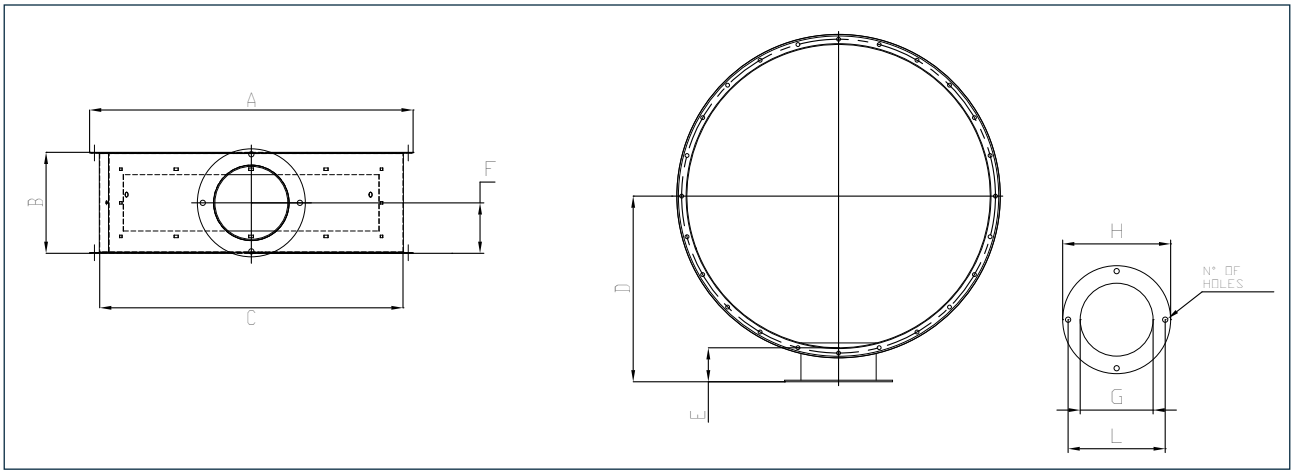






3.15 Options - Lateral connection for standard filters

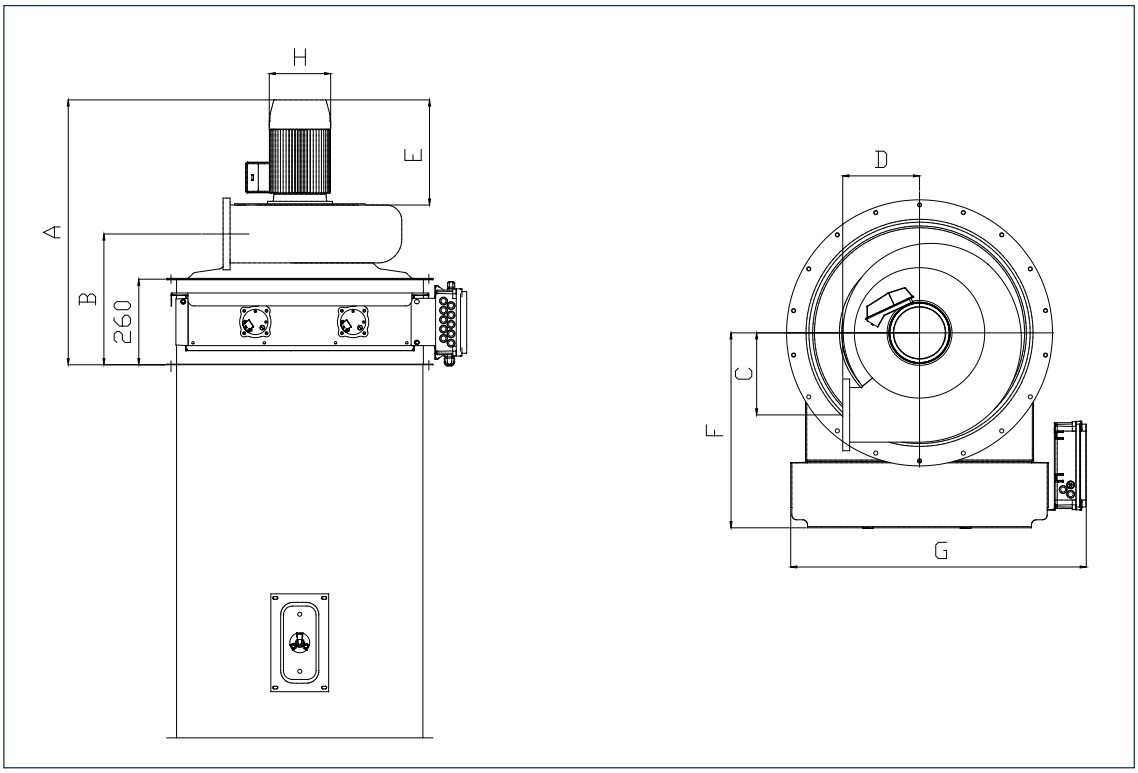
In addition to the upper external connection it is possibile to choose a lateral external connexion which, it is available for air jet cleaning system and vibrated cleaning system.



		A	B	C	D	E	F	G	H	L	HOLES
400	VIBRATED	458	270	438	285	81	135	164	228	200	4 x 13,5
	JET	458	260	458	285	81	130	164	228	200	4 x 13,5
600	VIBRATED	653	270	633	389	88	135	164	228	200	4 x 13,5
	JET	653	260	653	389	88	130	164	228	200	4 x 13,5
800	VIBRATED	833	270	813	479	88	135	190	278	250	4 x 13,5
	JET	833	260	833	479	88	130	190	278	250	4 x 13,5
1000	VIBRATED	1088	270	1068	607	88	135	190	278	250	4 x 13,5
	JET	1088	260	1088	607	88	130	190	278	250	4 x 13,5

3.16 Options - Fans

VERSION WITH FAN

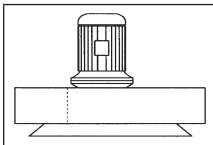


The connection between fan and upper body is always flanged.

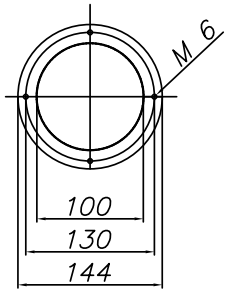
Ø	FAN		A	B	C	D	E	F	G	H
	Type	kw								
400	A	0.75	670	378	201	197	240	390	536	160
	A	1.1	670	378	201	197	240			160
	B	1.1	702	404	238	280	240			160
	B	1.5	727	409	238	280	260			180
600	A	0.75	690	398	201	197	240	478	726	160
	A	1.1	690	398	201	197	240			160
	B	1.1	702	404	238	280	240			160
	B	1.5	747	429	238	280	260			180
	C	2.2	815	443	319	285	280			180
	C	3	855	443	319	285	320			200
800	A	0.75	695	403	201	197	240	573	826	160
	A	1.1	695	403	201	197	240			160
	B	1.1	707	409	238	280	240			160
	B	1.5	727	409	238	280	260			180
	C	2.2	815	443	319	285	280			180
	C	3	855	443	319	285	320			200
	D	4	895	473	357	320	320			210
	D	5.5	960	473	357	385	385			250
1000	A	0.75	720	423	201	197	240	698	1061	160
	A	1.1	720	423	201	197	240			160
	B	1.1	752	429	238	280	240			160
	B	1.5	772	429	238	280	260			180
	C	2.2	860	463	319	285	280			180
	C	3	900	463	319	285	320			200
	D	4	920	493	357	320	320			210
	D	5.5	985	493	357	385	385			250

3.17 Fans - combinations

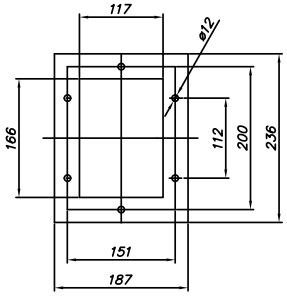
Possible Filter/Fan combinations.

		Ø FILTER			
Type	kW	ø 400	ø 600	ø 800	ø 1000
A	0.75	•	•	•	•
A	1.1	•	•	•	•
B	1.5	•	•	•	•
C	2.2		•	•	•
C	3		•	•	•
D	4			•	•
D	5.5			•	•

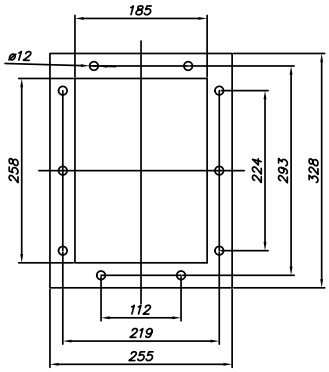
The fans are supplied with outlet spout complete with tamper-proof grille and connector flange.
The dimensions of the outlet spouts are indicated in the Table below.



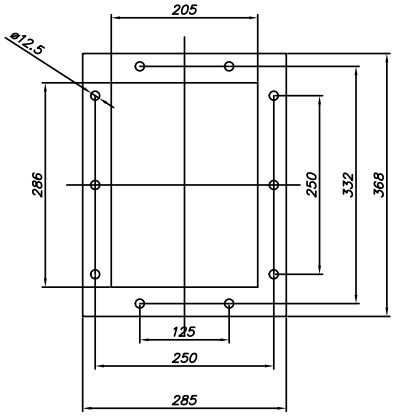
Type A 0.75 - 1.1 kW
With round flange



Type B 1.5 kW

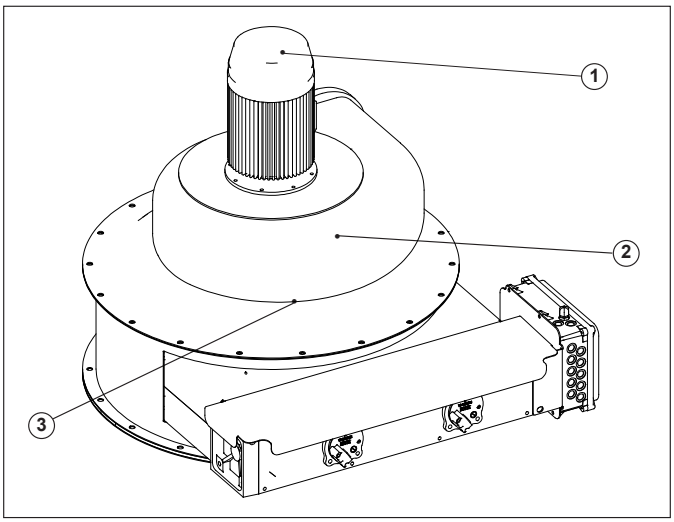


Type C 2.2 - 3 kW



Type D 4 - 5.5 kW

3.18 Options - Fan voltage/frequency



1) ELECTRIC MOTOR

The standard motors are asynchronous, three-phase, with B5 aluminium or cast iron casing, 2 poles, protection degree IP55, isolation class F, with the following voltages and frequencies (see modular key box 19). The motors are constructed according to the **IEC-UNELMEC** standards.

Ref. Modular key	Voltage Frequency
+	Without fan
A	without 50Hz motor
B	without 60Hz motor
D	220-240/380-420V 50Hz IE3
R	440-480V 60Hz IE3
6	210-230/360-400V 60Hz
E	210-230V/360-400V 60Hz IE3

The motors are constructed in compliance with the **IEC-UNELMEC** standards and are **ATEX** certified in accordance with standard 94/9/EC. These motors have holes (for fixing the rotor) at the end of the shaft according to standard DIN332.

2) VOLUTE

The volute is made of sheet metal. The enclosure is perfectly sealed against water seepage. Sealing between the volute and motor is ensured by means of a silicone seal placed between them. A circular or rectangular outlet spout made of sheet metal is provided for connection of the fittings for the air removal pipes. A gate valve can be applied at this outlet to choke the air flow exceeding that required (VPA).

3) ROTOR

The self-cleaning rotor is made up of two disks made of steel plate between which there are welded the steel blades.

3.19 Electric motors electric input

50 Hz - 2 poles standard motors

Frame size	Rated Power (KW)	Freq. (Hz)	VOLTAGE (V)	CURRENT (A) (230V)	CURRENT (A) (400V)	Poles	Speed (rpm)	COS φ	Locked rotor torque / rated torque	Locked rotor current /rated current	Breakdown torque /rated torque	Weight (kg)
80A	0.75	50	230/400	3.29	1.9	2	2850	0.83	2.2	7.0	2.2	16
80B	1.1	50	230/400	4.50	2.6	2	2850	0.84	2.2	7.0	2.2	16
90S	1.5	50	230/400	5.72	3.3	2	2850	0.83	2.2	7.0	2.2	22
90L	2.2	50	230/400	7.79	4.5	2	2850	0.87	2.2	7.0	2.2	27
100L	3.0	50	230/400	10.74	6.2	2	2870	0.87	2.2	7.0	2.3	37
112M	4.0	50	230/400	13.86	8.0	2	2870	0.89	2.3	7.0	2.3	47
132S	5.5	50	230/400	17.67	10.2	2	2870	0.92	2.2	7.0	2.3	68

60 Hz - 2 poles standard motors

Frame size	Rated Power (KW)	Freq. (Hz)	VOLTAGE (V)	CURRENT (A) (230V)	CURRENT (A) (400V)	Poles	Speed (rpm)	COS φ	Locked rotor torque / rated torque	Locked rotor current /rated current	Breakdown torque /rated torque	Weight (kg)
80A	0.75	60	230/400	3.12	1.8	2	3440	0.84	2.0	7.0	2.0	16
80B	1.1	60	230/400	4.33	2.5	2	3440	0.84	2.0	7.0	2.0	16
90S	1.5	60	230/400	5.72	3.3	2	3470	0.83	2.0	7.0	2.0	22
90L	2.2	60	230/400	7.97	4.6	2	3470	0.87	2.0	7.0	2.0	27
100L	3.0	60	230/400	10.05	5.8	2	3450	0.87	2.0	7.0	2.1	37
112M	4.0	60	230/400	12.82	7.4	2	3450	0.89	2.0	7.0	2.1	47
132S	5.5	60	230/400	19.2	11.2	2	3450	0.91	1.9	5.8	2.1	68

For more details see WA.052MT. ELECTRICAL MOTORS Catalogue.

3.20 Cleaning system voltage/cycle

Use the field 14 to selected the standard coil **WAM®** or no coil:

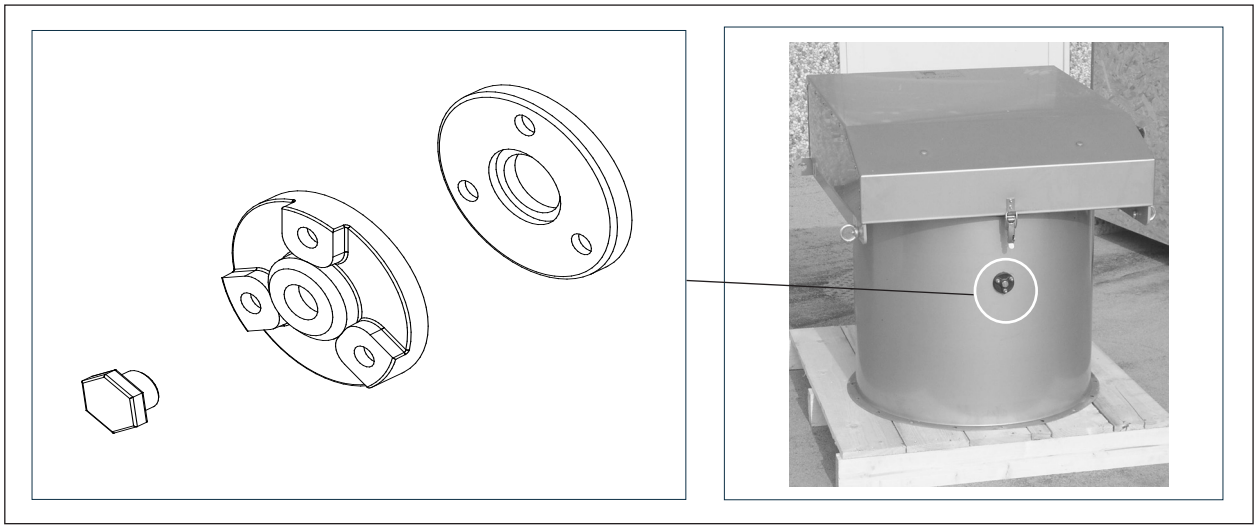
Ref. Modular key	COILS AVAILABLE	COMPATIBLE WITH WAM® PANEL
+	Without Coil	YES
1	24V 50/60 Hz	YES

3.21 Options: Board accessories

The boars can be customised by means of accessories available depending on the board type.

+ = WITHOUT ACCESSORIES

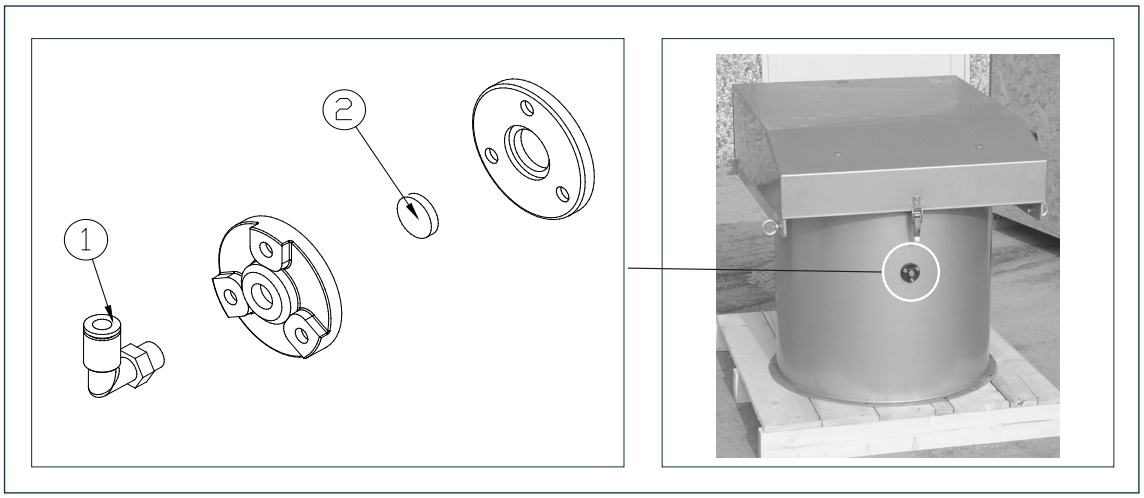
Select this option to have the filter prearranged as indicated in the image below that shows a closure plug.



3.22 Options: Differential pressure meter (MDN)

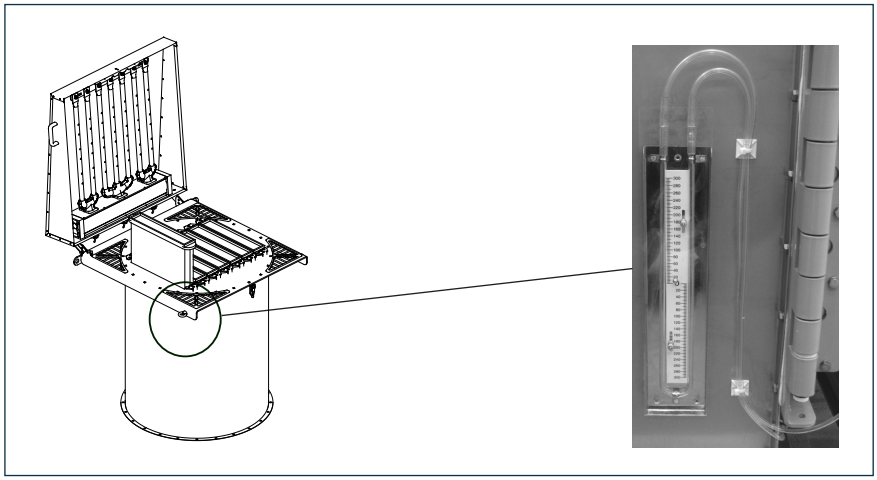
N = PROVISION FOR PRESSURE DIFFERENTIAL MEASUREMENT DEVICE (MDN)

- The filter body is already provided with the holes necessary for connecting the differential pressure meter. A Ø6 mm quick-release coupling (**1**) complete with filter pad (**2**) is inserted in the bore. This option is available only for the FILCONTROL TIME board and makes it possible to add in the future EXCLUSIVELY an analogue pressure meter (MDP, for instance).



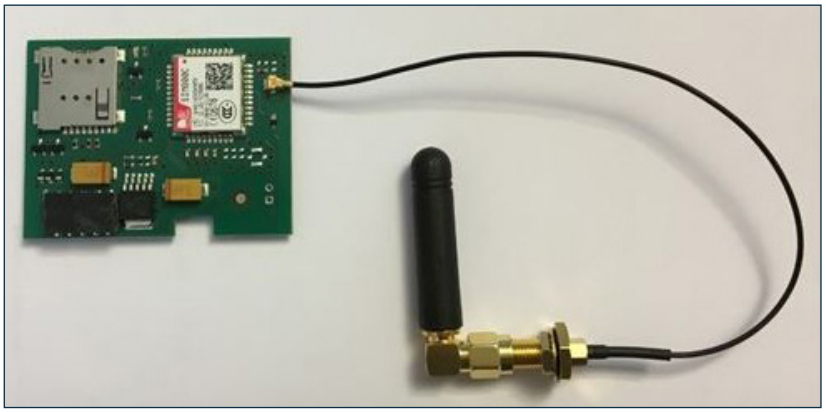
H = WITH DIFFERENTIAL PRESSURE METER MDP

- A transparent “U” shaped tube is installed on the body, connected at one end to the clean part and at the other end to the dirty part of the filter. It must be filled with water and the PD can be read by means of a graduated scale; (available with FILCONTROL TIME only).



G= GPRS MODULE (AVAILABLE ON FILCONTROL CONNECT ONLY)

The GPRS module is an accessory that can send on mobile phones messages on the status of the filter. It is able to send different information on the status of the equipment, such as differential pressure, working hours, and alarms (see the list of available informations on the manual n° 2).



W= WIFI MODULE (AVAILABLE ONLY ON FILCONTROL CONNECT)

With the WIFI module, you can have the same info of GPRS module about the status of the filter, and in addition you can manage in an active way the filter cleaning system thanks to the wireless connection using smartphone, PC or any tablet.

3.23 Overall dimensions and technical features

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

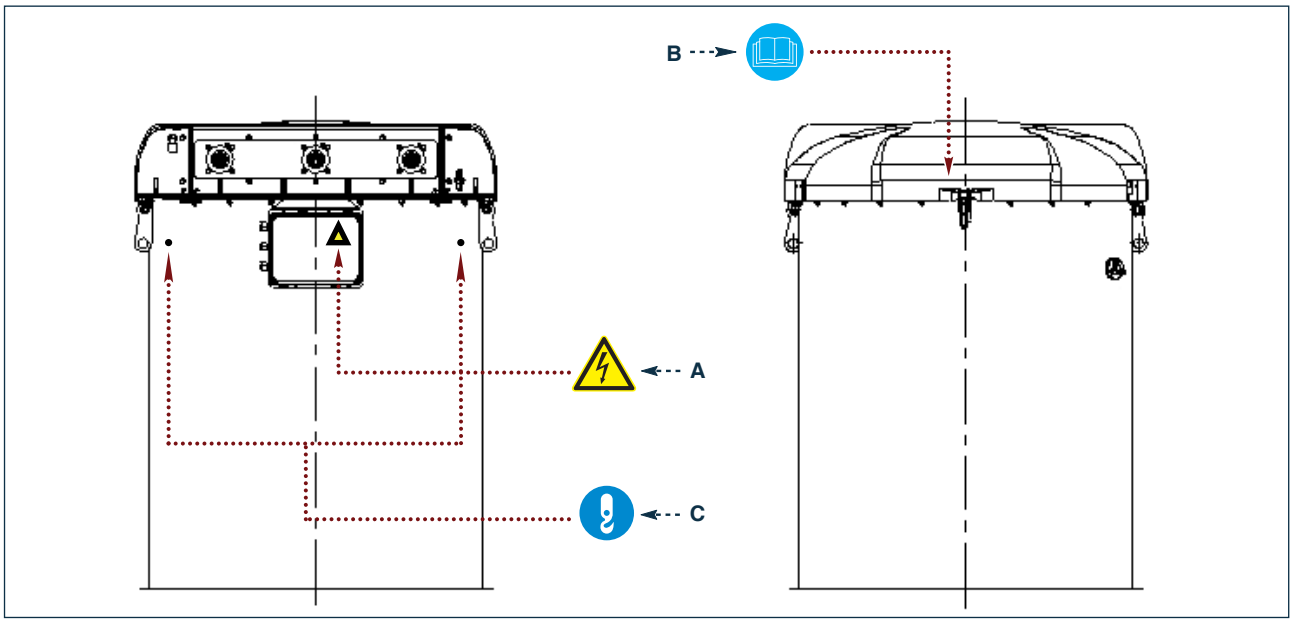
The shipping documents show the Serial number and identification codes.

The information regarding the technical features of the equipment is given in Chapter 10.

3.24 Safety and information signs

Danger - Warning

Follow the signs on the plates.
Ensure that the plates are legible; otherwise clean them and replace the damaged ones, placing them in their original position.



A) Danger sign: indicates danger of electric shock because of powered components present inside the junction box.

B) Obligation: read this Manual before carrying out any action on the equipment concerned.

C) Obligation: indicates the hooking points for lifting each section of the equipment concerned.

3.25 Safety devices

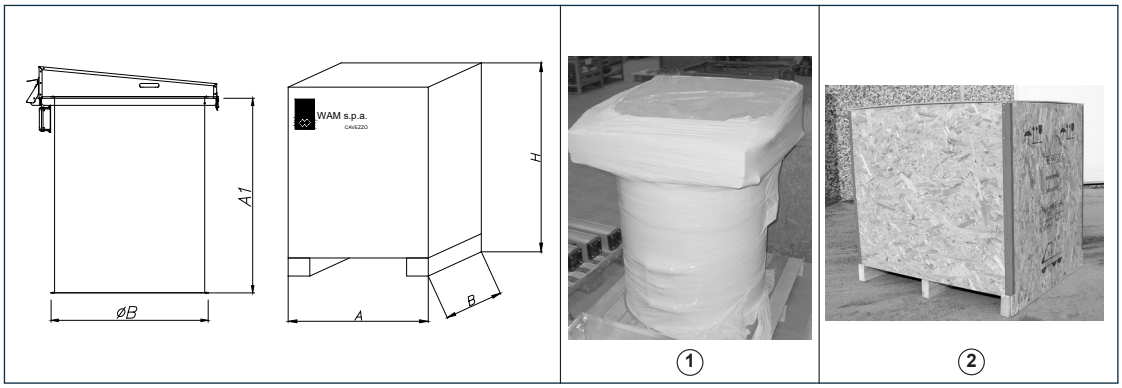
Access to the inspection hatches is not necessary while using the equipment concerned. Their use represents extraordinary use as they were provided for removing foreign bodies and accumulated material from the equipment or for extraordinary maintenance operations.

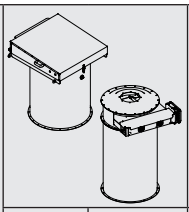
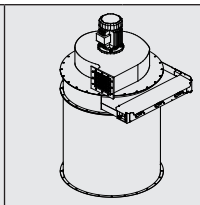
The equipment is shipped with the inspection hatch(es) closed with a bolted device which needs to be unlocked by means of a spanner (wrench) as envisaged by the Standards concerning fixed protections.

4.1 Type of packaging

The standard filter is supplied on a pallet of appropriate dimensions and wrapped in stretch film (1) for protection.

As an option, it can be selected a packaging that consists of wooden panels (2). Depending on the height of the filter, the packing may consist of one or two crates made of folding wooden panels (see Table below).

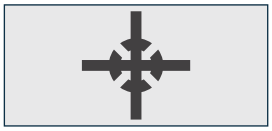


FILTERING SURFACE (m^2)				øB	A1	A	B				
POLY-PLEAT® FN W	Cartridges FN C / FN S	Bags FN M / FN B	Elliptical bags FN E					H	No. of Crates	H	No. of Crates
-	2 - 4	-	-	400	520	685	640	910	1	1300	1
-	3 - 5	-	-	400	770	685	640	1160	1	1545	1
-	6	1	-	400	920	685	640	1300	1	1750	1
-	-	2	-	400	1360	685	640	1750	1	2230	1
-	-	3	-	400	1840	685	640	2230	1	2230+600	2
7	7	-	3	600	520	930	835	910	1	1445	1
11	10	-	-	600	770	930	835	1160	1	1750	1
14	12	3	5	600	920	930	835	1300	1	1845	1
-	-	5	7	600	1360	930	835	1750	1	2230	1
-	-	6	9	600	1840	930	835	2230	1	2230+720	2
13	12	-	4	800	520	1050	1020	910	1	1495	1
20	18	-	-	800	770	1050	1020	1160	1	1750	1
24	22	5	7	800	920	1050	1020	1300	1	1895	1
-	-	8	10	800	1360	1050	1020	1750	1	2230	1
-	-	11	14	800	1840	1050	1020	2230	1	2230+720	2
27	24	-	7	1000	520	1375	1270	910	1	1545	1
40	36	-	-	1000	770	1375	1270	1160	1	1745	1
48	44	11	13	1000	920	1375	1270	1300	1	1945	1
-	-	16	20	1000	1360	1375	1270	1750	1	2295	1
-	-	21	26	1000	1840	1375	1270	2230	1	2295+750	2

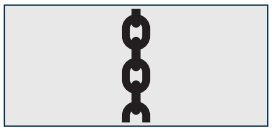
The signs for safe lifting and handling are indicated on all packages.

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

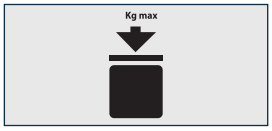
B) Centre of gravity: indicates the position of the gravity centre of the package.



C) Harness: indicates the correct harness position 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.

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 equipment 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 stack the packages as they are not sized for that purpose.
Do not drag or push the entire or sections of the equipment as it will damage them.
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 or harness the sections of the equipment concerned on the basis of their structure.

The illustration shows the equipment lifting points according to the configurations envisaged.

- Slacken the screws on the crate

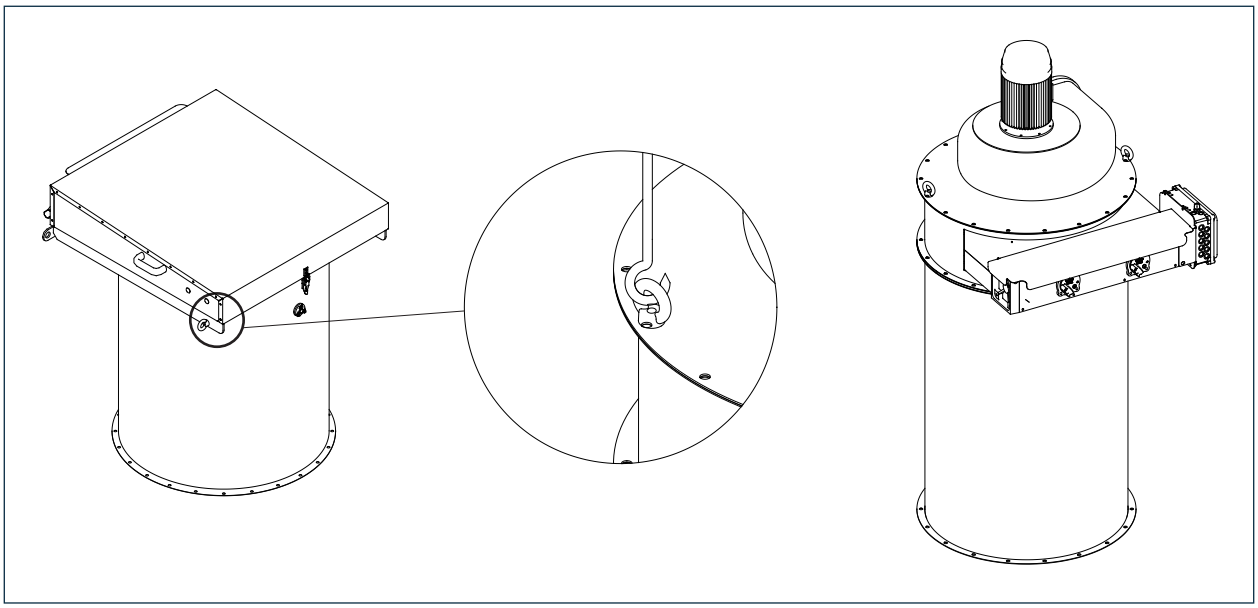
- Remove the crate

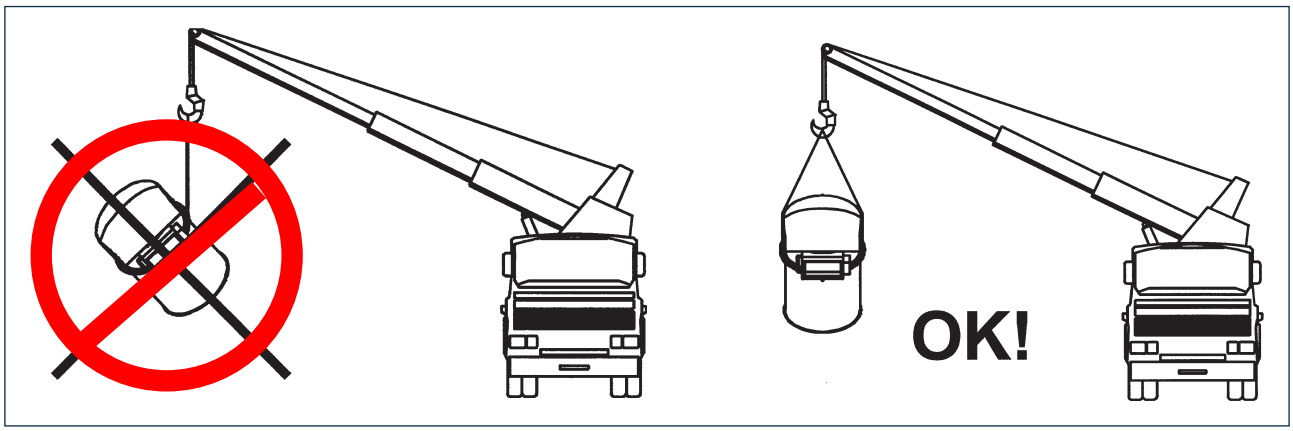
NOTE: The installer is liable for disposal of the packing material in accordance with the legislation in force regarding the matter.

Lifting the dust collector

The dust collector should only be handled and lifted using the eye-bolts provided. Use lifting devices suitable to the weight and dimensions of the dust collector and to the lifting distances concerned. Hook up the dust collector to the lifting device using shackle and safety hooks; do not use clamps, rings, open hooks or any other system that does not ensure the same safety degree as shackles and safety hooks.

Lifting device





Unload the packages from the vehicle and place them on a flat surface which can ensure stability.

5.1 Recommendations for installation

Danger - Warning

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

Before starting installation, define a safety plan compliant with the standards in force regarding workplace safety.

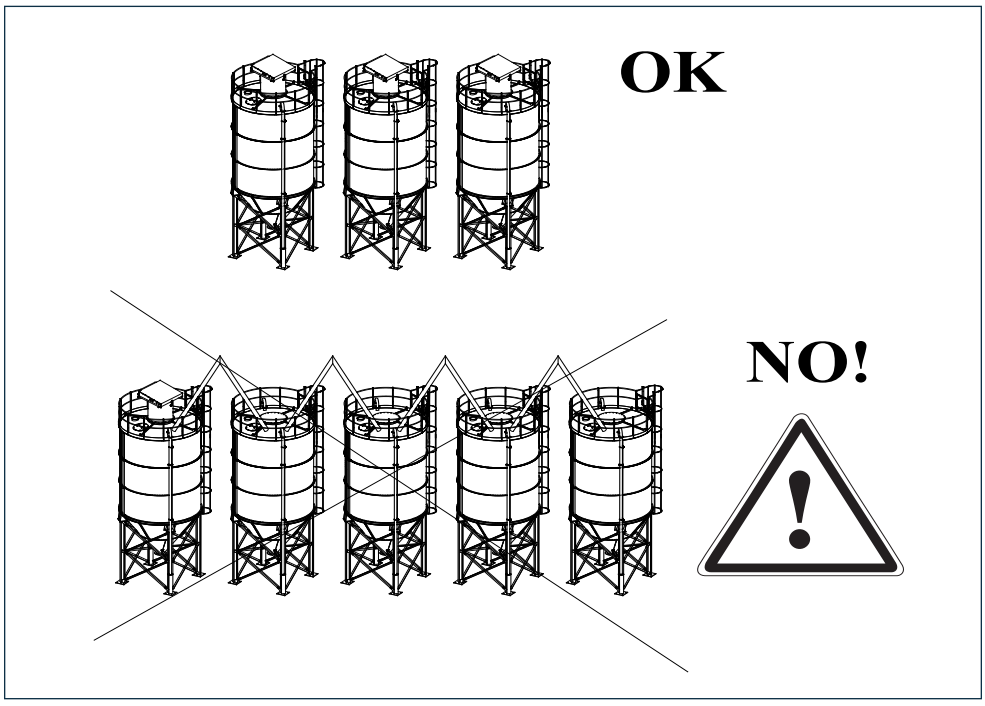
The specialist technician, authorized by the installer or owner, has to evaluate whether the area has been properly prepared and whether the necessary installation equipment is available (crane, etc.).

Define, on the basis of the configuration of the equipment concerned, the assembly method.

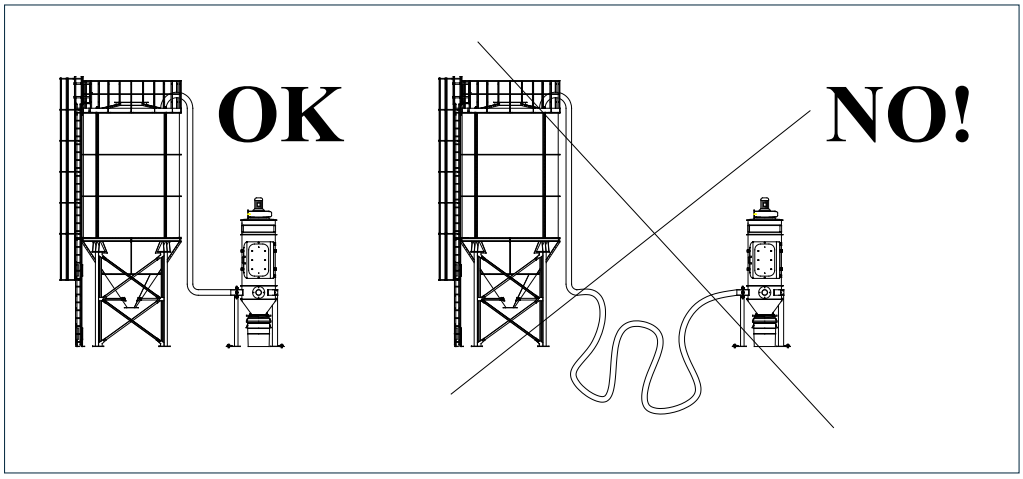
Check, and if damaged, repair the coupling surfaces.

Clean the surfaces thoroughly.

General principles
Assembling on silo



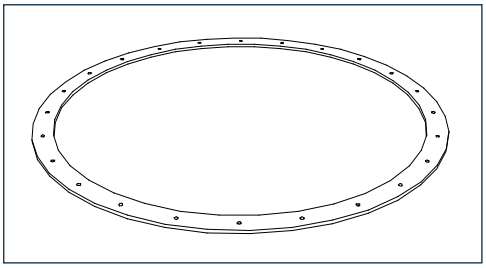
Assembling on dust collection hopper



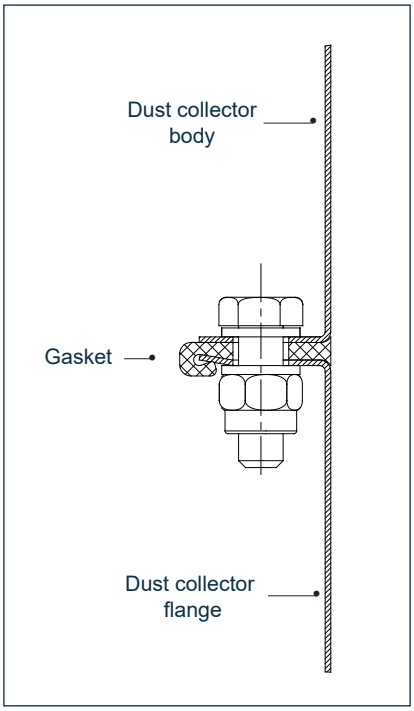
The equipment supplied is provided with perimeter gasket to be inserted between the dust collector and the bottom ring.

Tighten the bolts by applying a tighten torque of 10 Nm.

Gasket

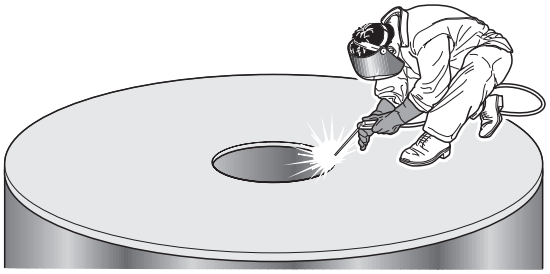


Gasket positioning

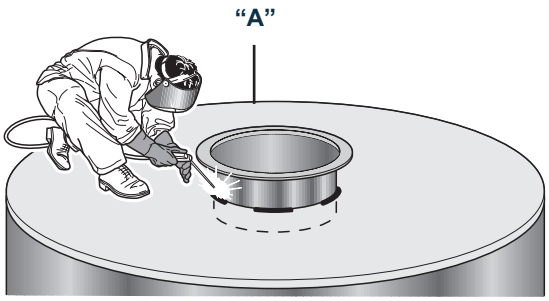


5.2 Positioning the dust collector flange

1



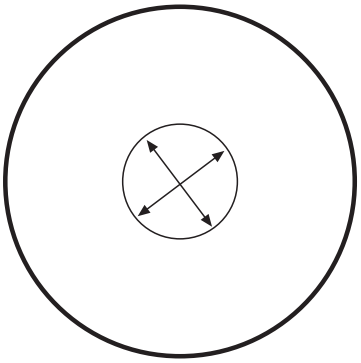
2



- Spot welding

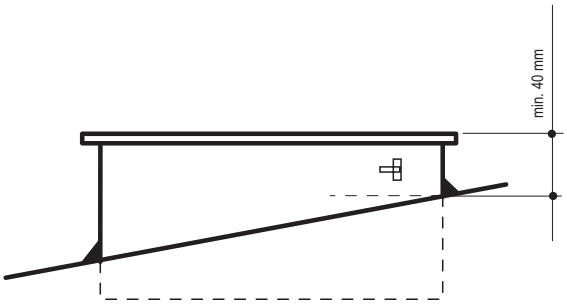
2a

View from “A”

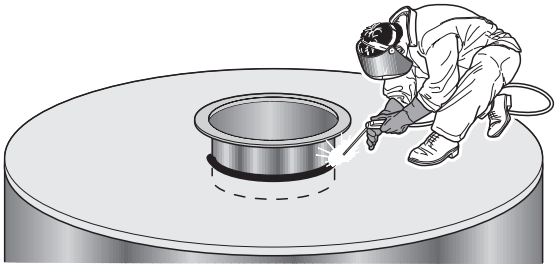


- Checking the circularity

2b

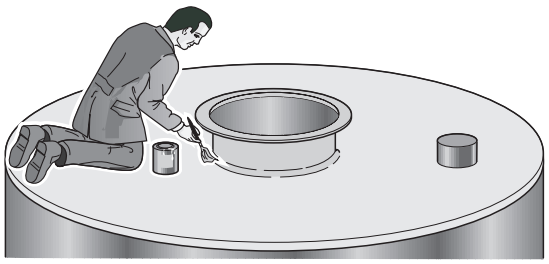


2c



- Complete the welding

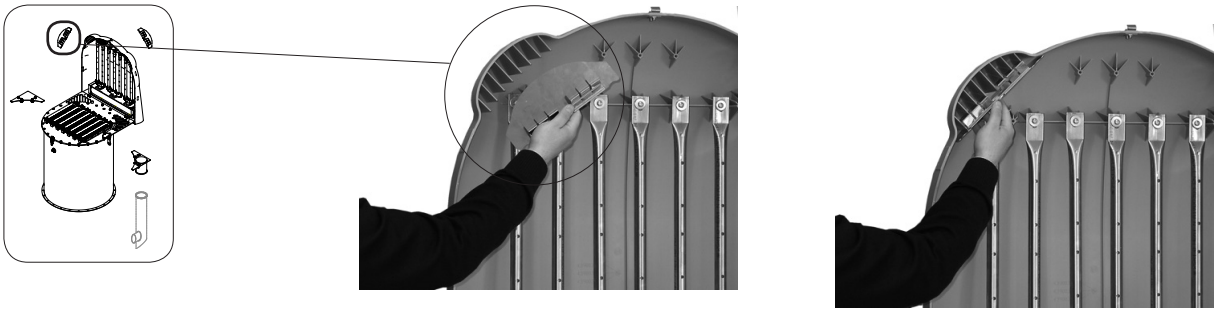
3



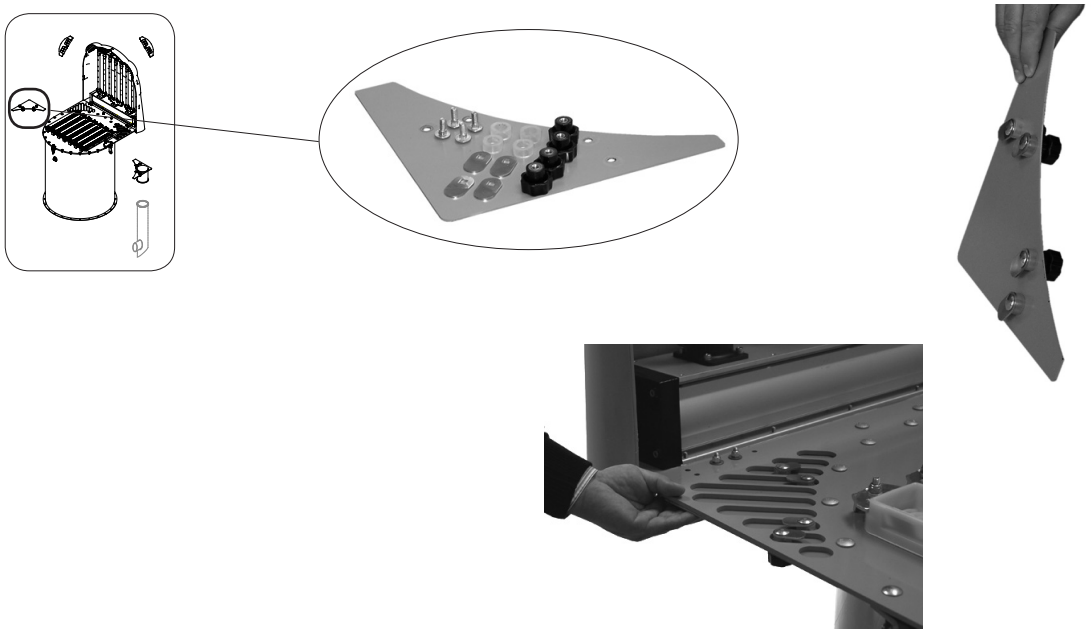
5.3 Emissions sampling kit

VERSION WITH PLASTIC COVER

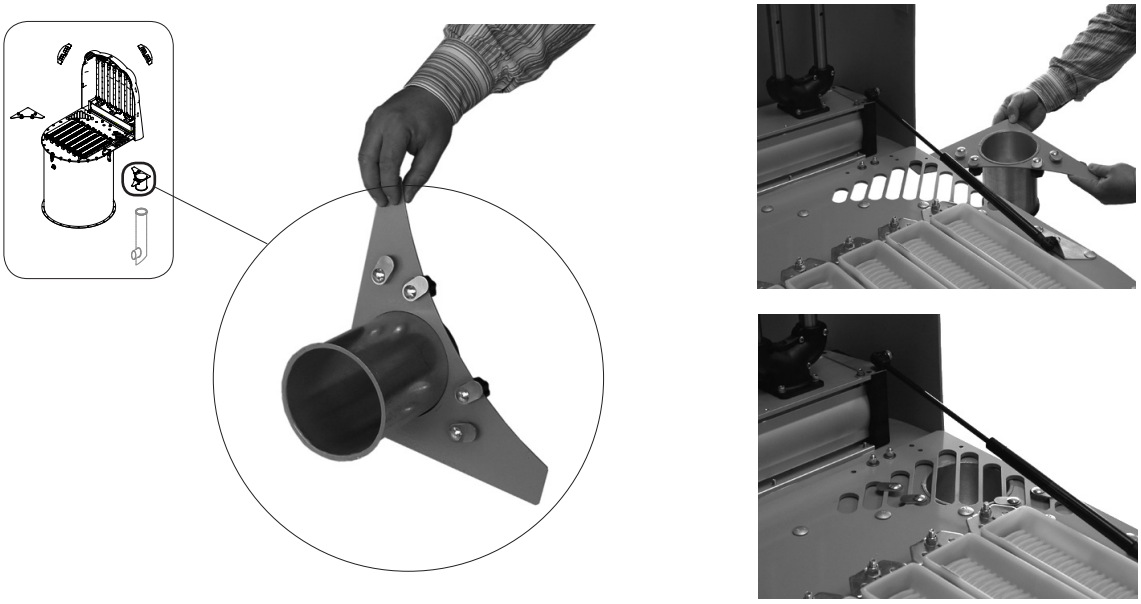
Open the cover



Close the two front openings under the cover using the 2 shaped metal sheets



Fit the blind flange to close one of the rear air outlets



Close the other rear air outlet with the remaining flange with the cylindrical stub pipe

Assemble the vertical tube for fumes extraction
(NOT SUPPLIED BY **WAM**®) by connecting it to the cylindrical stub pipe indicated in the previous Figure

VERSION WITH STAINLESS STEEL COVER

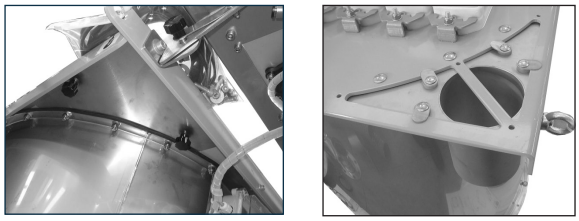


Fig. 1

1) Make sure the Jet cleaning system for the filter is not in operation and open the cover.
2) Fix the blind flanges in the rear slits and the two flanges with tube in the front part of the filter. (See Fig. 1).

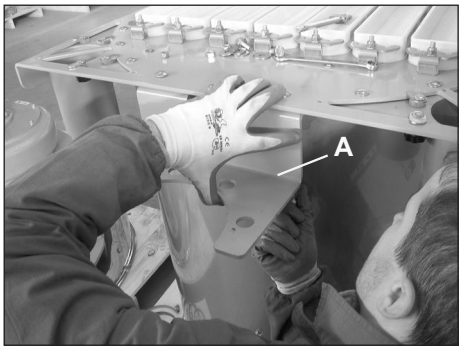


Fig. 2

3) Fix the support A to the elements-holder plate as indicated in Fig.2 removing the 2 screws in the plate.

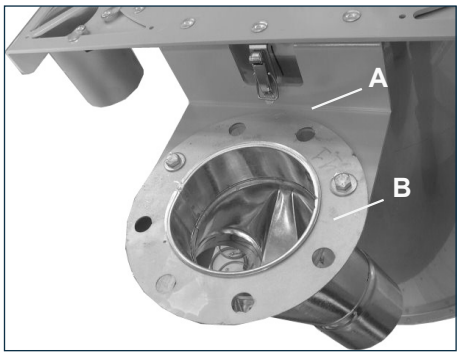


Fig. 3

4) Fix flange B temporarily to the support A as indicated in Fig.3.

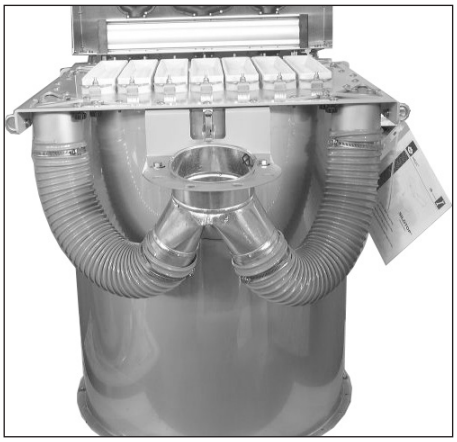


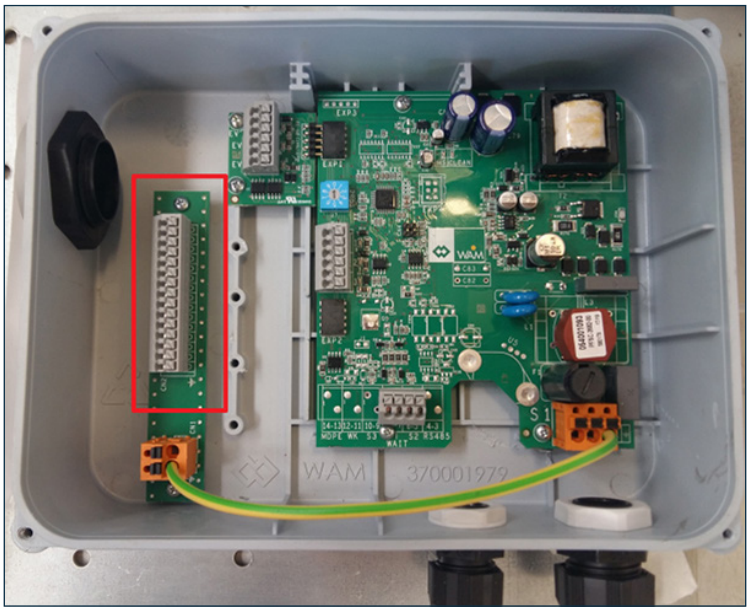
Fig. 4

5) Connect the hose pipes to their respective connections and fix by means of the hose clamps (see Fig.4).
6) Refit the cover.

NOTE: After having sampled the emissions, **WAM®** recommends removing the slits occlusion flanges to allow the filter operating in normal conditions.

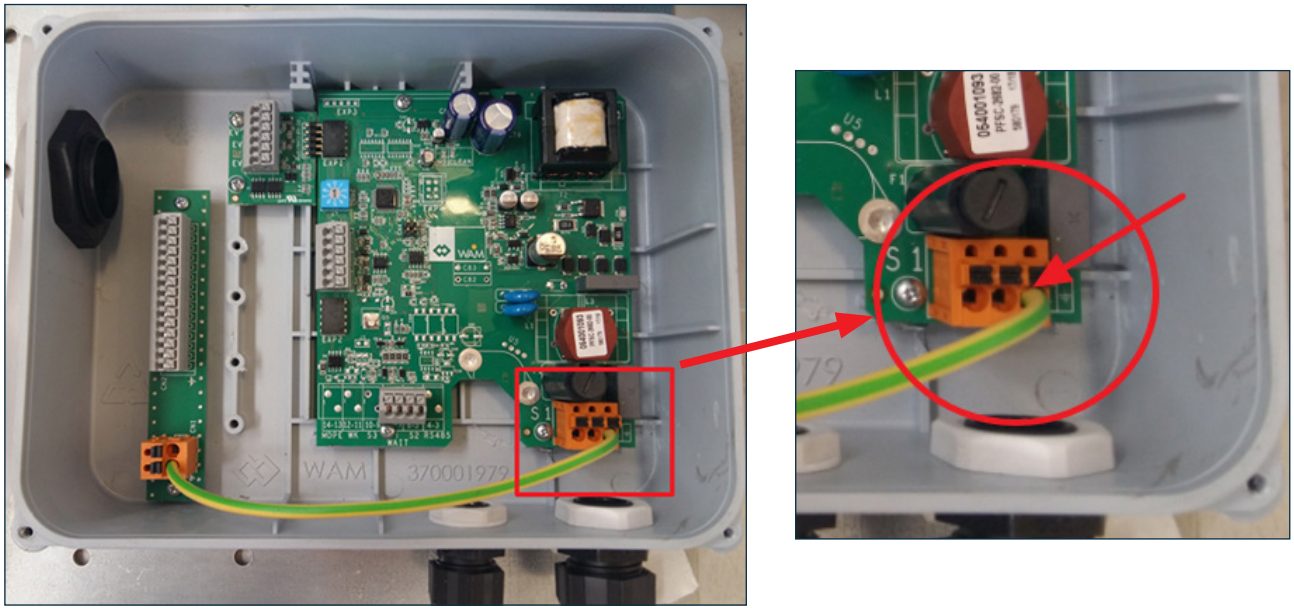
5.4 Earthing connection

If the board is purchased along with the machine, the connection to the bounding of the solenoid valve coils is performed by the construct in the junction box shown below:



If the board is purchased as spare, these connections are in charge of the installer and must be performed by qualified personnel.

The earthing connection of the entire board is positioned inside the junction box as indicated below:

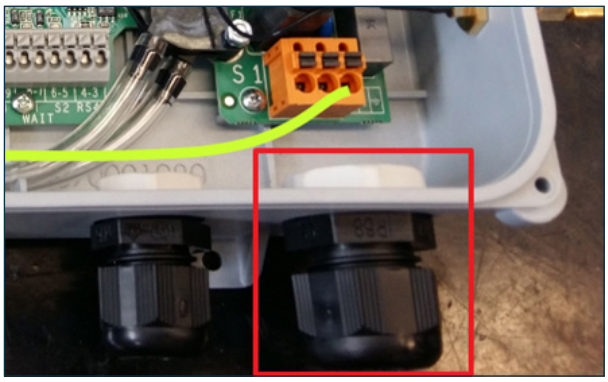


Important

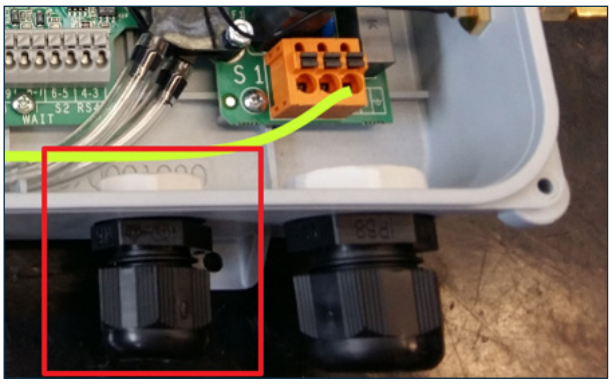
IT is compulsory to always connect the earthing of the board according to the instructions, regardless the supply voltage value.

The card is supplied with cable gland certificated for the connection to the mains and for any other connections (signals or clean contact):

MAIN POWER

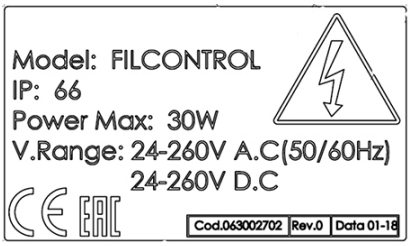


CLEAN CONTACTS



5.5 Marking label

FILCONTROL NON ATEX



FILCONTROL ATEX

CE: CE marking related to the ATEX Directive 2014/34/EU (Dir. 94/9/EC before 19/04/2016)

Ex: Hexagon EX: compliant to the ATEX Directive 2014/34/EU (Dir. 94/9/EC before 19/04/2016)

II: Devices Group (I: electrical equipment for mines, II: electrical appliances for surface installations)

3D: Category 3D, i.e. apparatus suitable for use in ZONE 22

2D Category 2D, i.e. apparatus suitable for use in ZONE 21

IIIB: Powders group (not conductive dust)

T100: Maximum surface temperature

Dc: EPL Dc, i.e. apparatus suitable for use in ZONE 22

Db: EPL DB, i.e. apparatus suitable for use in ZONE 21

Tamb: ambient temperature

5.6 Electrical connection

Danger - Warning

The connection to the mains has to be carried out by an electrician.
Provide mains supply to the equipment concerned according to the compliant current legislation and take into consideration the safety measures required by the installation environment and the expected operating conditions.
Before carrying out the connection ensure that the mains voltage and frequency correspond to those indicated on the electric motor rating plate.
Disconnect from the mains before carrying out any work and use suitable devices so that there cannot be an accidental reconnection.

Use electric cables having cross section appropriate to the power absorption of the equipment concerned.

The installer will have to provide to interfacing the equipment with the necessary controls: start/stop, emergency stop, reset after an emergency stop, in compliance with the regulatory standards in force.

Disconnect the mains before each intervention and use suitable devices to prevent an accidental reconnection of the equipment.

Ensure that the protection devices are present and working each time the equipment is started up.

The installer must connect the equipment to the earthing system of the plant.

For **WAM®** dust collectors, the control panel is located inside a box with IP66 protection in accordance with Standard CEI EN 60529. The panel is supplied prewired: the connections to the coils are made and tested by **WAM®**. The standard supply includes the rotative microswitch for adjustment of proper cleaning programmes previously charged; the adjustable programmes are indicated in the related section.

All the control panels are provided with a presetted cleaning programme used for the end of cleaning cycle. It is known that the most effective cleaning of every dust removal system is the one carried out with no air at the filter inlet. In absence of an asceding air flow, the dust detaches from the elements more easily, leaving the fabric cleaner.

Operating temperature.....-20°C to 80°C (normal operation); 100°C (maximum temperature)
Voltage..... 24 ± 15% V (AC-DC) => 260 ± 15% V (AC-DC)
Frequency.....0 Hz (DC) => 60Hz
Output voltage and frequency.....24±10% (DC) controlled by µP for operation of the coils at 24V AC or DC
Max. power AC .....30 VA
Max. power DC .....30 W

Electronic control panel connection

1) POWER SUPPLY VOLTAGE - It works with all the supply voltages from 24V to 260V either in AC or in DC.

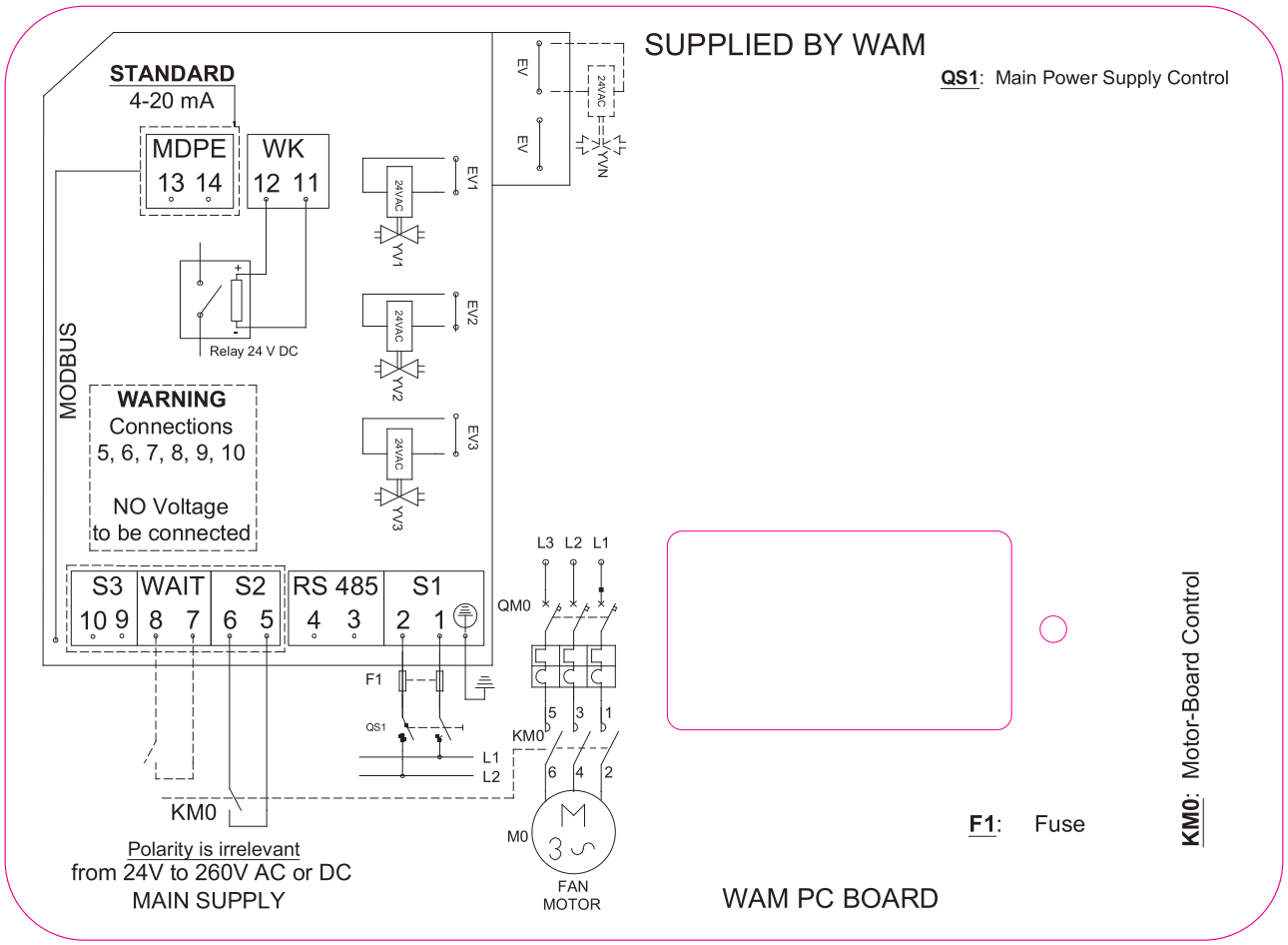
2) SUPPLY VOLTAGE AUTO-RECOGNITION - The electronic panel automatically recognises the voltage applied, therefore no settings are necessary for normal operation.

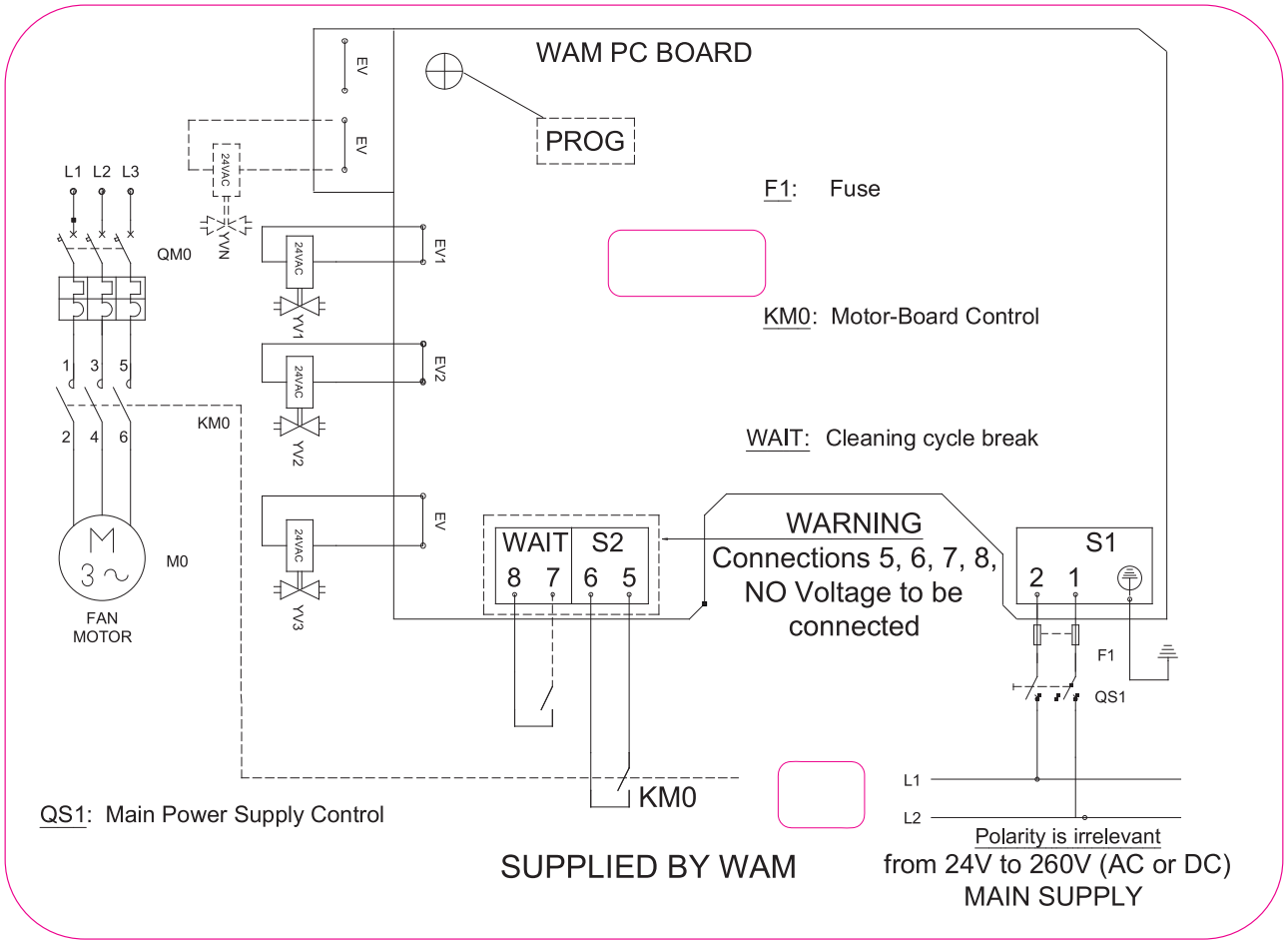
3) CONNECTIONS TO JUNCTION BOX - The electronic panel is powered by means of terminal (S1) and accepts all the voltages mentioned at point 1) above. To switch on the control panel a clean contact (voltage free) must be connected to the terminal strip S2. When the contact (S2) opens, the end of cycle cleaning starts, and continues for a period defined by the cleaning program set on the board.

4) WAIT SAFETY BLOCK - Activation of the WAIT input (closure of contact) suspends the cleaning cycle and saves the position of the last output activated. The block persists as long as WAIT is active (contact closed). When WAIT is deactivated (contact open), the cleaning cycle is resumed from the next output to the last output energized if S2 is still active. Otherwise, the program returns to STANDBY without carrying out the end of cycle cleaning system. The WAIT contact can be used as safety/alarm switch or to reduce the end of cycle cleaning system duration. In fact, if WAIT is activated during the end of cycle cleaning system, the cleaning stops completely; if WAIT is deactivated, the program returns to STANDBY.

In the back side of the graphic applied on the box cover, there are all technical indication how to be connected the FILCONTROL board.

There are 2 electrical schemes, ones for TIME and another ones for CONNECT model. See following schemes.





Control panel power consumption

The Table of the panel power inputs in various operating conditions, i.e. according to the supply voltage, is indicated below.

POWER SUPPLY VOLTAGE (VAC)	POWER INPUT (A)	POWER (W)
24	0.220	5.3
115	0.090	10.4
230	0.050	11.5
260	0.045	11.7

Important

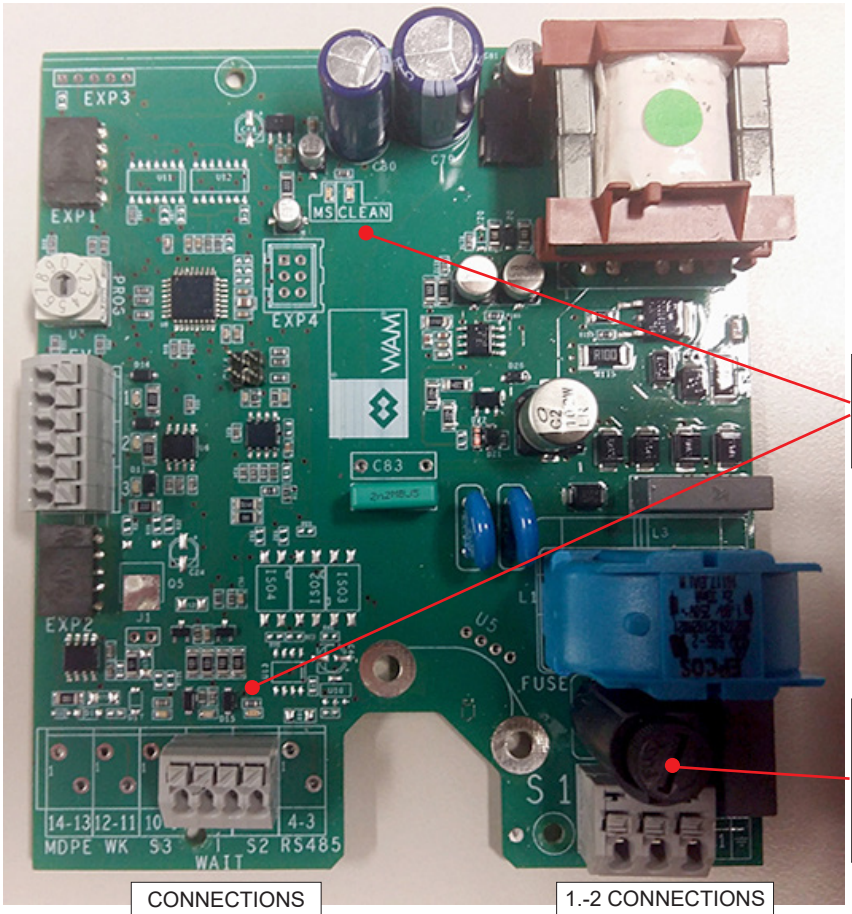
The main power supply (S1) must always be present on the panel (deactivate only for maintenance).

The filter is supplied with a pre-set program depending on the configuration of the filter.

The following pages provide information on how to edit the programs for both FILCONTROL TIME e FILCONTROL CONNECT boards.

5.7 FILCONTROL TIME: Description and connection

FILCONTROL TIME ELECTRONIC BOARD



EXP1 EXPANSION CONNECTION

NO. 3 AND 6 EV 24VAC 50-60HZ

SET THE CLEANING PROGRAMS 1-9

OUTPUT NO. 3 EV 24VAC 50-60HZ

EXP2 EXPANSION CONNECTION

NO. 3 AND 6 EV 24VAC 50-60HZ

OPERATION LEDS INDICATORS

FUSE HOLDER

T1.6AH250V

FOR BOARD PROTECTION

CONNECTIONS 5-6-7-8

DO NOT CONNECT THE MAINS

1.-2 CONNECTIONS - GROUNDING

CONNECT TO POWER SUPPLY 24VDC 260 VAC 50/60hZ

5.8 FILCONTROL TIME: Cleaning cycle programs available

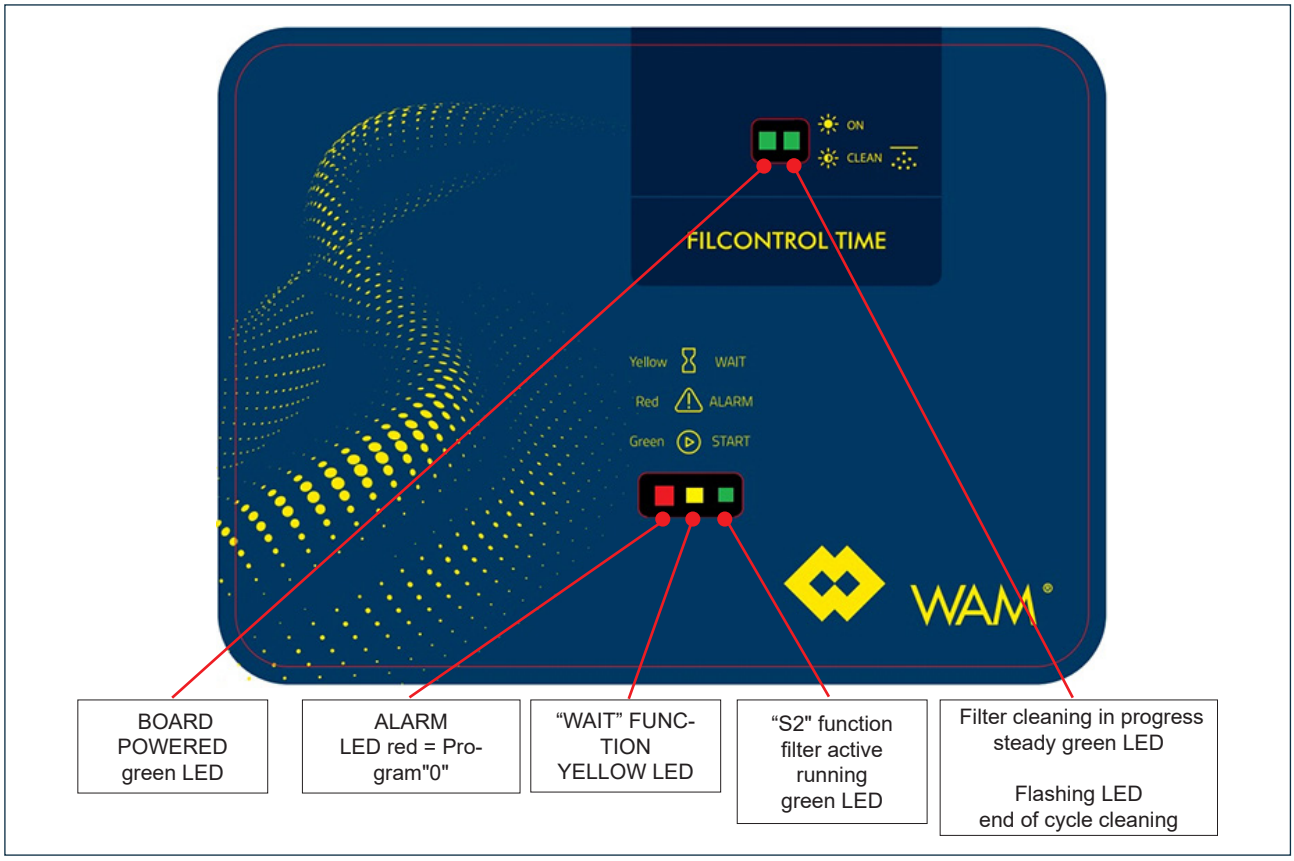
The programs can be changed by acting on the rotary DIP switches positioned on the electronic board left side
The board goes into alarm status if operated on the zero program.

Prog. (D)	Description	Number [E/V]	Tp [sec] PAUSE	Ts [msec] VALVE	Number of End Cleaning cycle
0	AUTOTEST-TEST	-	3	100	1
1	SILAB14	-	56	100	7
2	SILAB24	-	39	100	7
3	PLEATED_28	-	28	100	7
4	PLEATED_5	-	5	100	7
5	PLEATED_15	-	15	100	7
6	BAG/POCKET_5	-	5	210	7
7	BAG/POCKET_15	-	15	210	7
8	BAG/POCKET_28	-	28	210	7
9	BAG/POCKET_56	-	56	210	7

5.8.1 Default presetting programs:

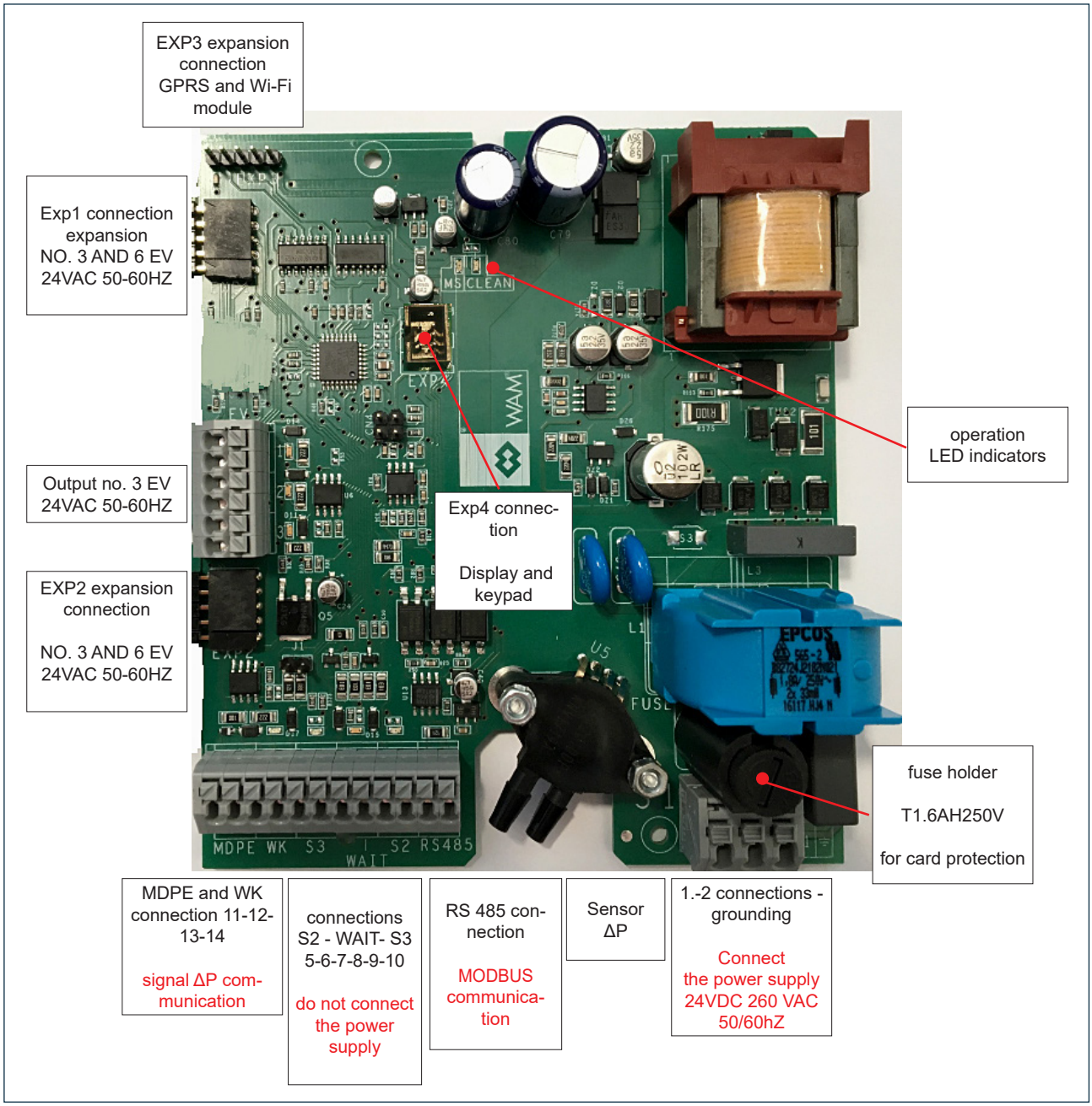
- filter with cartridges or polipleat : program n° 3
- filter with BAG or POCKET: program n° 8
- negative pressure filter with BAGS or POCKETS: program n°9

5.9 FILCONTROL TIME: User interface



5.10 FILCONTROL CONNECT: Description and connections

FILCONTROL CONNECT ELECTRONIC BOARD



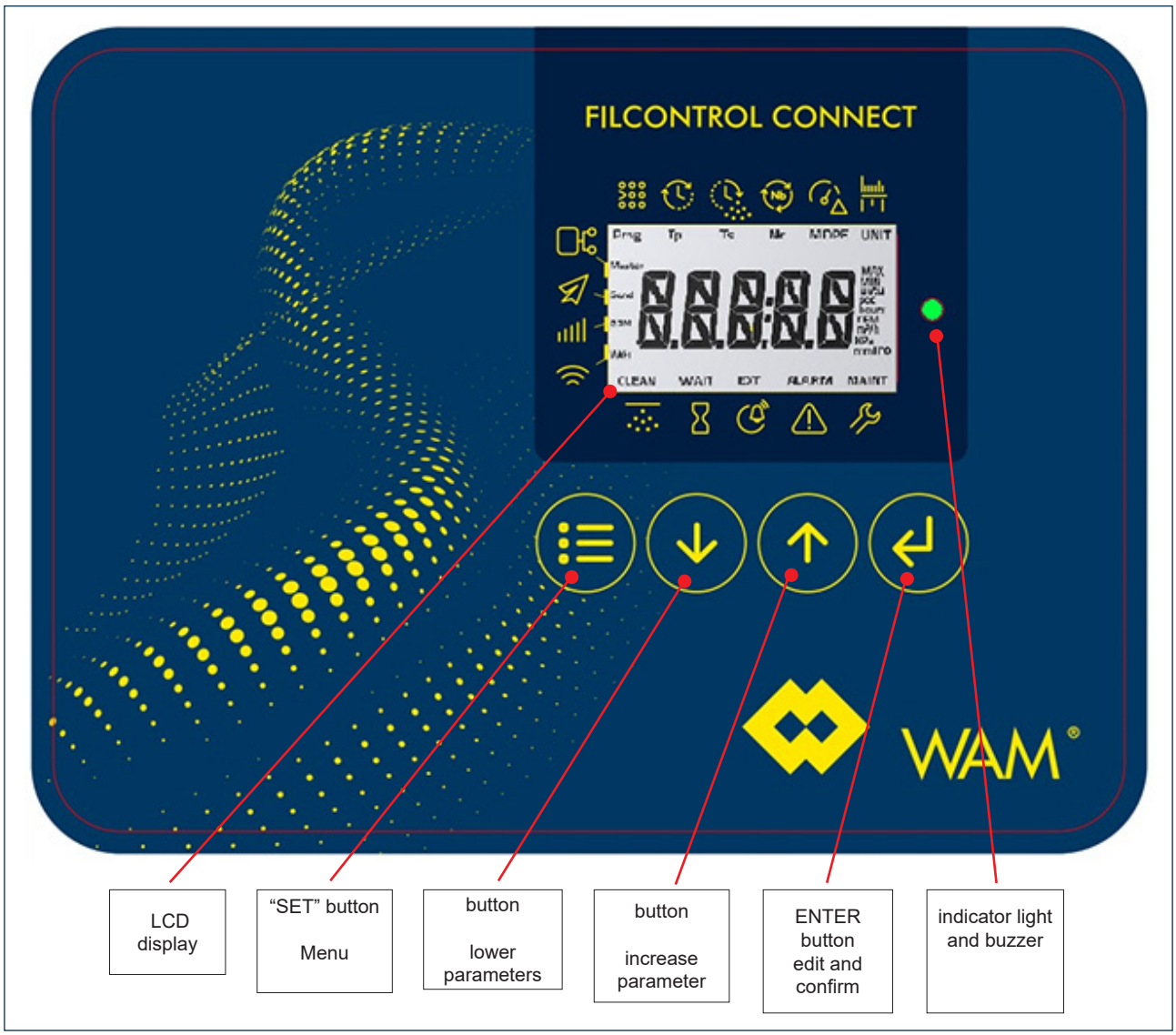
5.11 FILCONTROL CONNECT: Keypad and LCD display kit

The touch keypad + LCD display kit integrated into the box cover is connected through a flat cable to the EXP4 connector provided on the FILCONTROL CONNECT board.

The FILCONTROL CONNECT comes always with the keypad kit for the programming of the cleaning cycles.

The user interface keypad must be powered by the FILCONTROL CONNECT board.

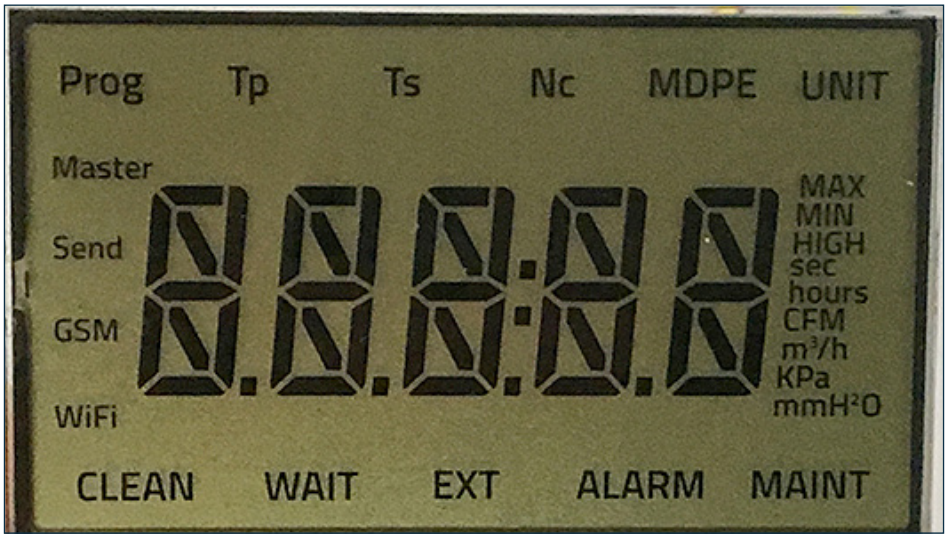
KEYPAD WITH LCD DISPLAY KIT



Through the user interface, the operator can check the status of the filter functions and modify them, if necessary, upon installation.

NOTE: Light indicator if red it means that operator is activating /pressing multiple buttons.

5.12 FILCONTROL CONNECT: Reading the parameters on the LCD display



The symbols used have been designed for an intuitive reading of the board parameters.
Check the table below.

KEYPAD ICON	REFERENCE ON THE DISPLAY	DESCRIPTION
FILTER STATUS INFORMATION BAR		
	CLEAN	The filter is running the cleaning cycle. The display shows the solenoid valve "ev:01" active
	WAIT	The filter is in standby, contact WAIT active, cleaning cycle in standby
	EXT	External error, S3 contact active, filter in alarm and cleaning cycle stopped
	ALARM	Alarm status
	MAINT	Maintenance status, ON during board programming

KEYPAD ICON	REFERENCE ON THE DISPLAY	DESCRIPTION
CLEANING PROGRAMMING BAR		
	Prog	The display shows the Program ID as "p" followed by a number
	Tp	Pause Time - the display shows, in seconds, the pause time between a blow and the next
	Ts	Blow time - solenoid valve opening time
	Nc	Number of cleaning cycles performed with the S2 disabled
	MDPE	ΔP Value
	UNIT	Active in programming, switches the units of measure from the metric system (mmH_2O m^3/h) to the American system (KPa - CFM)
INTERCONNECTIVITY BAR		
	Master	Active when the network RS485 is connected
	Send	Active when message is sent
	GSM	Active when the module GPRS is connected
	WiFi	Active when the Wi-Fi module is connected

5.13 FILCONTROL CONNECT: Programming the board using the keypad

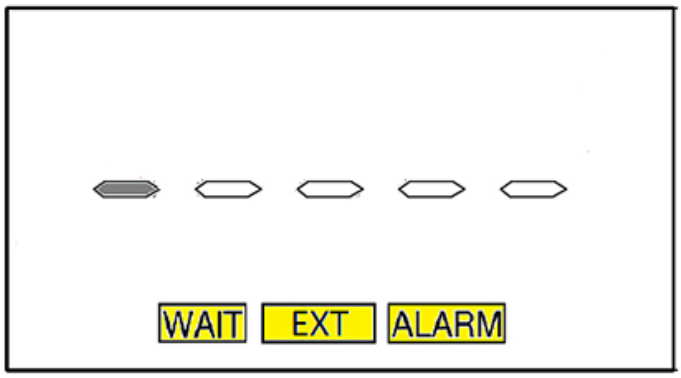
Danger - Warning

Note: make sure the board is powered prior to starting programming it.
The solenoid valve cables must be connected and the S2 input of the board must be disabled.
The programming must be performed by an operator previously trained and specialized, with the cover closed.

5.13.1 Filter power supply

When the filter is supplied the suitable voltage, according to the specifications:

- the power LED comes on (CLEAN LED);
- all solenoid valves are enabled for a very short time to run the connection test (each LED flashes during tests);
- the dotted line slides from the first to the fifth digit;



- The "FILCONTROL CONNECT" displays first the window shown below, then the map with the selected program and indicates:

  INF00 → if the preloaded program is correct

  Or

  ERR01 → if the number of solenoid valves connected / acknowledged does not match the number reported by the preloaded program.

  If the corresponding input is active, the board displays the message WAIT.
  The S3 external alarm input is active and the message EXT is displayed.
  At the end of the initial operation, the filter runs normally despite alarms are tripped.

NOTE: The display shows the errors in sequence, if any.

When FILCONTROL is working with programme “0” (test program), led RED on the board will be lighted.

Check Cleaning programme loaded and set proper programme following instruction reported in the paragraph **5.13.2** and **5.13.3**.

5.13.2 SET-UP - Programming

NOTE: The SET-UP mode (available only in the FILCONTROL CONNECT version).

To access this menu, press for 5 seconds the ENTER key 

5.13.3 Selecting the cleaning system program

The programs from 0 to 63 contain information on the number of solenoid valves, on the solenoid valves management type, and the differential pressure values (max., min., high). See the available programs list.

a) Tap ENTER to change the program. 

b) Tap the arrow keys  to set the suitable program.

c) Tap ENTER  while the number is blinking to apply the change; all related program values will be copied in the set-up; they can be subsequently changed by the operator.

Prog. (D)	Description	Number [E/V]	Tp [sec]	Ts [msec]	Number of End Cleaning cycle	"Ts" End cycle [sec]	MDPE Max [mmH_2o]	MDPE Min [mmH_2o]	MDPE HIGH [mmH_2o]	MDPE HIGH DEFAULT [mmH_2o]
0	AUTOTEST	-	5	100	1	5	000	000	000	000
1	SILAB14	2	56	100	7	5	90	20	400	500
2	SILAB24	3	39	100	7	5	90	20	400	500
3	SILOTOPR03	3	28	100	7	5	90	20	400	500
4	ROUND FILTER FN/FNX (W) POLYPLEAT - 2 E/V	2	28	100	7	5	90	20	200	500
5	ROUND FILTER FN/FNX (W) POLYPLEAT - 3 E/V	3	28	100	7	5	90	20	200	500
6	ROUND FILTER FN/FNX (W) POLYPLEAT - 4 E/V	4	28	100	7	5	90	20	200	500
7	ROUND FILTER FN/FNX (W) POLYPLEAT - 5 E/V	5	28	100	7	5	90	20	200	500
8	ROUND FILTER FN/FNX (W) POLYPLEAT - 6 E/V	6	28	100	7	5	90	20	200	500
9	ROUND FILTER FN/FNX (S/C) CARTRIDGES - 1 E/V	1	28	100	7	5	90	20	200	500
10	ROUND FILTER FN/FNX (S/C) CARTRIDGES - 2 E/V	2	28	100	7	5	90	20	200	500
11	ROUND FILTER FN/FNX (S/C) CARTRIDGES - 3 E/V	3	28	100	7	5	90	20	200	500
12	ROUND FILTER FN/FNX (S/C) CARTRIDGES - 4 E/V	4	28	100	7	5	90	20	200	500
13	ROUND FILTER FN/FNX (S/C) CARTRIDGES - 5 E/V	5	28	100	7	5	90	20	200	500
14	ROUND FILTER FN/FNX (S/C) CARTRIDGES - 6 E/V	6	28	100	7	5	90	20	200	500
15	ROUND FILTER FN/FNX BAG - 1 E/V	1	28	210	5	5	90	20	200	500
16	ROUND FILTER FN/FNX BAG- 2 E/V	2	28	210	5	5	90	20	200	500
17	ROUND FILTER FN/FNX BAG- 3 E/V	3	28	210	5	5	90	20	200	500
18	ROUND FILTER FN/FNX BAG - 4 E/V	4	28	210	5	5	90	20	200	500
19	ROUND FILTER FN/FNX BAG - 5 E/V	5	28	210	5	5	90	20	200	500
20	ROUND FILTER FN/FNX BAG - 6 E/V	6	28	210	5	5	90	20	200	500
21	ROUND FILTER FN/FNX (E) ELLIPTICAL BAG - 2 E/V	2	28	210	5	5	90	20	200	500

Prog. (D)	Description	Num-ber [E/V]	Tp [sec]	Ts [msec]	Number of End Cleaning cycle	"Ts" End cycle [sec]	MDPE Max [mmH_2o]	MDPE Min [mmH_2o]	MDPE HIGH [mmH_2o]	MDPE HIGH DEFAULT [mmH_2o]
22	ROUND FILTER FN/FNX (E) ELLIPTICAL BAG - 3 E/V	3	28	210	5	5	90	20	200	500
23	ROUND FILTER FN/FNX (E) ELLIPTICAL BAG - 4 E/V	4	28	210	5	5	90	20	200	500
24	POLYGONAL FILTER FP/FPX (W) POPLYPLEAT -3 E/V	3	28	100	7	5	90	20	200	500
25	POLYGONAL FILTER FP/FPX (W) POPLYPLEAT - 4 E/V	4	28	100	7	5	90	20	200	500
26	POLYGONAL FILTER FP/FPX (W) POPLYPLEAT - 5 E/V	5	28	100	7	5	90	20	200	500
27	POLYGONAL FILTER FP/FPX (W) POPLYPLEAT - 6 E/V	6	28	100	7	5	90	20	200	500
28	POLYGONAL FILTER FP/FPX (W) POPLYPLEAT - 7 E/V	7	28	100	7	5	90	20	200	500
29	POLYGONAL FILTER FP/FPX (W) POPLYPLEAT - 8 E/V	8	28	100	7	5	90	20	200	500
30	POLYGONAL FILTER FP/FPX (W) POPLYPLEAT - 10 E/V	10	28	100	7	5	90	20	200	500
31	POLYGONAL FILTER FP/FPX (T) POCKET - 3 E/V	3	28	210	5	5	90	20	200	500
32	POLYGONAL FILTER FP/FPX (T) POCKET - 4 E/V	4	28	210	5	5	90	20	200	500
33	POLYGONAL FILTER FP/FPX (T) POCKET - 5 E/V	5	28	210	5	5	90	20	200	500
34	POLYGONAL FILTER FP/FPX (T) POCKET - 6 E/V	6	28	210	5	5	90	20	200	500
35	POLYGONAL FILTER FP/FPX (T) POCKET - 7 E/V	7	28	210	5	5	90	20	200	500
36	POLYGONAL FILTER FP/FPX (T) POCKET - 9 E/V	9	28	210	5	5	90	20	200	500
37	POLYGONAL FILTER FP/FPX (T) POCKET - 10 E/V	10	28	210	5	5	90	20	200	500
38	POLYGONAL FILTER FP/FPX (T) POCKET - 12 E/V	12	28	210	5	5	90	20	200	500
39	HOPPERTOP - 1 E/V	1	28	100	7	5	90	40	400	500
40	FLT04	4	10	100	7	5	60	20	150	500
41	FLT06	6	10	100	7	5	60	20	150	500
42	FLT08	8	10	100	7	5	60	20	150	500
43	FLT12	12	10	100	7	5	60	20	150	500
44	FLT24	24	10	100	7	5	60	20	150	500
45	HOPPERJET (W) - POLYPLEAT - 1 E/V	1	28	100	7	5	90	40	400	500
46	HOPPERJET (W) - POLYPLEAT - 2 E/V	2	28	100	7	5	90	40	400	500
47	HOPPERJET (T) - POCKET - 1 E/V	1	28	210	7	5	90	40	400	500
48	HOPPPERJET (T) - POCKET - 2 E/V	2	28	210	7	5	90	40	400	500
49	INSERTABLE VACUUM FPN/FPNX (T) POCKET - 6 E/V	6	56	210	7	5	90	20	300	500
50	INSERTABLE VACUUM FPN/FPNX (T) POCKET - 9 E/V	9	56	210	7	5	90	20	300	500
51	INSERTABLE VACUUM FPN/FPNX (T) POCKET - 12 E/V	12	56	210	7	5	90	20	300	500

5.13.4 Customising the program

Use the SEL  key to go to the next fields, which allow modifying the parameters of the selected program.

- Tp: change the pause time;
- Ts: change the blows timing;
- Nc: change the number of end of cycles cleaning;
- MDPE R/A: R = read only, A = alarm tripped, C = Calibrate and go back to read only;
- MDPE-MIN: change the minimum value;
- MDPE-MAX: change the maximum value;
- MDPE-HIGH: change the ALARM threshold.

To apply the change, tap ENTER  while the parameter is displayed; use the arrow keys  to increase or decrease the preloaded values.

To confirm the changes and go to the next parameter, tap ENTER  .

5.13.5 Customising the application

Use the SEL  key to go to the next fields and change the configurations of the parameters listed.

To save the changes made to the parameters, tap ENTER  while the parameter to be modified is shown on the display.

Increase or decrease the preloaded values by tapping the arrow keys  .

To confirm the changes and go to the next parameter, tap ENTER  .

Editable parameters

- **UNIT**: indicates the unit of measure:
  - **KPa and CFM** (imperial units). When WIFI is conencted and ACTIVE this parameter cannot be changed by touch screen User's Interface;
  - **Nm^3/h and mmH_2or** (metric - **default**).
- **NOd33 (default):** indicates the RS485 MODBUS node:
  - parameters 0; 1; 2; 3 are only for manufacturer use.
  - from 4 to 99 slaves for communication only
- **PR:** indicates the protocol:
  - 0 RS485 (**default**);
  - 1 Wi-Fi (Hot-Spot 192.168.2.1);
  - 2 Wi-Fi (DHCP client! configure your network, first.);
  - 3 GPRS.

- **bdR:** (BAUDRATE) indicates the communication speed RS485:
  0…9 between 1200 and 38400 (**default 9600 firmware rev.01**)
- **S3:** indicates the external alarm input S3:
  - "0" the system ignores S3;
  - "1" the system uses S3 normally open sensor (Jumper = ALARM);
  - "2" the system uses S3 normally closed sensor (Jumper = OK).

Danger - Warning

To apply the changes made on the parameters listed above, when the LCD screen displays "AbORt", tap the arrow keys  to move to "SaVe", then tap  ENTER to confirm the changes. It is very important that any changes in the setting must be confirmed at with SAVE function.

5.13.6 Accessing the info mode (available on FILCONTROL CONNECT only)

Tap the SEL  key to scroll through all information menu items and freeze the information for about 20 seconds or until the SEL  key is tapped again.

Information available on the LCD screen:

- operation hours (hours);
- alarms;
- pressure (mmH2O - KPa);
- theoretical air litres (m3/h - CFM);
- program (1,2,3,4 ...);
- Tp → pause time (sec.);
- Ts → blows timing (msec);
- Nc → number of regenerating cleaning cycles (1,2,3,4,…);
- MDPE REAd / ACTI → Pressure sensor Δ function mode
  Or ACTI → active: smart cleaning enabled;
  Or read → reading: smart cleaning disabled.
- MDPE MIN → minimum pressure value Δ smart cleaning deactivation;
- MDPE MAX → maximum pressure value Δ smart cleaning activation;
- MDPE HIGH → maximum working pressure threshold Δ permitted by the filter.

MDPE sensor Calibration

MDPE sensor can be calibrated using function "CALIB".

To perform proper MDPE Calibration (5.13.2), MDPE air tubes must be disconnected and S2 signal must be OFF.

Enter in Programme setting and press MENU button until appear “CALib” on the display then press button UP to reset MDPE sensor.

After the calibration pressure value will be “0”.

NOTE: MDPE sensor calibration must be done when filter is in standby, no air no cleaning cycle active.

5.13.7 Managing the error messages (available on FILCONTROL CONNECT only)

The system goes into self-acknowledgement and uses always the solenoid valves connected; when the number of solenoid valves does not match the number in the selected program, it reports an error message. “**ERR01**”

The error messages are displayed:

- on the LCD display of the filters electronic board;
- on the PC via RS485 communication (MODBUS);
- as SMS messages via GPRS module (option);
- on the WEB and mobile interface via Wi-Fi module (option).

The table listing the errors / information messages sent by the FILCONTROL CONNECT board is given below.

NOTE:

- The errors / information have codes from 0 to 15
- To better diagnose the events and be able to determine the malfunction cause, each error is stored on the board along with the event time.

FILCONTROL CONNECT Error / Information Messages Table

Code	Definition	Description	Troubleshooting	Notes
00	Power On	Sent upon each start up		
01	EV-Match	The solenoid valves match the selected program		The board operates correctly.
11	EV-No Match	The solenoid valves do not match the selected program	Check if all coils are properly connected correctly; if the coils are OK, change the cleaning program.	The message ERR01 is displayed on the LCD until the correct program is selected and after having reset the board.
02	S2-Enable	The S2 input has changed status (Enable Filter)	S2 Contact: check the wiring of the signal sent by the fan and/or make sure the sensors are working properly.	The verification is made starting the 10th second after start up
12	S2-Disable	The S2 input has changed status Filter (Disabled)		The check is performed after the shut down
13	S3-Alarm	The input S3 has changed status (External Alarm)	Contact S3: check to make sure the wiring of the connected sensors signal works properly. If S3 is physically connected, but no status is reported, check if the S3 function has been correctly configured (see the Programming section).	The verification is made starting the 10th second after start up
03	S3-OK	The input S3 has changed status (External Alarm)		The check is performed after the shut down.
04	MDPE OK	MDPE reading function OK.		
14	MDPE-ZERO	MDPE reading value "000" when S2 is active.	Check if the air hoses are connected. heck if the filtering tab is clogged (replace). Check the sensor function by blowing into the tube.	If S2 is active, the MPDE value should always vary, although slightly

Code	Definition	Description	Troubleshooting	Notes
24	MDPE HIGH	The pre-set high pressure value has been exceeded	If the MDPE value stays too high, change the cleaning cycle.	MDPE value too high, elements tend to get clogged.
34	MDPE FAULT	Reading of the pre-set maximum pressure value reached	Check the status of the filtering elements, replace if necessary. Check the parameter set.	High MDPE value out off the scale.
05	Display-OK Display-Fault	User interface OK		
15	Display-Fault	Panel Interface problems	Check if the keypad connecting cable is properly inserted into the exp4 connector	
06	WK-OFF	Filter in "WK" output not active alarm		
16	WK-ON	Filter in "WK" output active alarm		
07	Set-Up	The operator has changed the SET-UP	Operator has intervened on the default SET UP	Message via GSM and Wi-Fi
18 **28** **38**	GPRS-User1 GPRS-User2 GPRS-User3	Someone has modified the GPRS Set-Up of a user (1,2 or 3)	Check with operators authorized USERS	Edit USERS using the GPRS Module
09	GPRS-OK	Indicates on the display that someone wants to use the GPRS, module active.		GPRS module connected
19	GPRS-Fault	Indicates on display that someone wants to use the GPRS, but the module cannot be reached.	Check the GPRS module connection. Check if the board has been configured for the GPRS option. Check if the SIM card is inserted Check for GSM signal.	The Error cannot be sent to the GPRS module due to missing connection.

5.13.8 WK programmable output errors *(available on FILCONTROL CONNECT only)*

The WK output is a general alarm which trips when at least one of the alarms in the following table is active. (for wiring connection see page 45).

Error	SET	RESET key	Functions in alarm status	Description
ERR1	ERR01	INF00 INF01	If possible, allow cleaning to continue	Solenoid Valves number not consistent with the program.
ERR3	ERR03	INF03	Cleaning cycle blocked	External alarm
ERR4	HIG04 ERR04	INF04	Allow cleaning to continue	High Pressure No pressure with S2 active

5.14 FILCONTROL CONNECT: Accessory modules

The FILCONTROL CONNECT electronics requires to fit 2 accessories for remote connection:

a) GPRS MODULE;

b) Wi Fi MODULE.

If an "INF00" message is sent whenever the board is switched on, the GPRS or Wi-Fi module is running and has been correctly configured by the operator.

If the above message has not been sent, the connection to the GPRS or Wi-Fi module has not been properly performed and, as a result, the board does not acknowledges the modules.

5.14.1 GPRS Module

The GPRS module can be supplied as option at the time of the order and as accessory kit to be installed on filters that uses the FILCONTROL CONNECT electronic board.

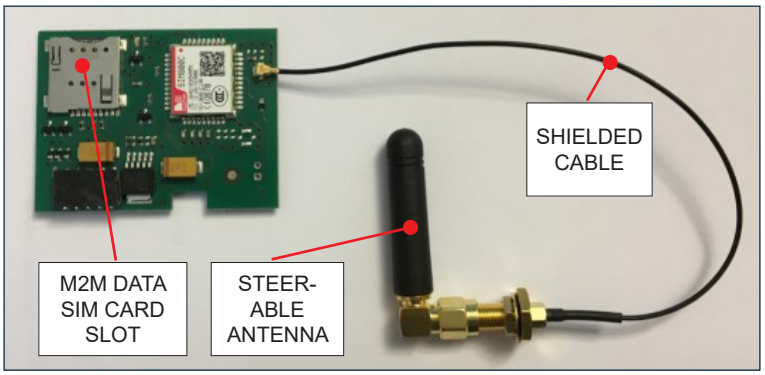
The GPRS module kit consists of:

- electronic board;
- shielded cable for wall connection;
- steerable antenna.

The kit does not include the SIM card for M2M connectivity.

The customer can purchase the M2M SIM card from a local dealer and fit it into the appropriate slot on the GPRS module.

N.B.: Disable the PIN code before inserting the SIM card.



Installation and activation

The indications on the installation and activation of the GPRS module are given below.

Installing the GPRS Module

1) Disconnect the board from the main power supply.

2) Open the cover by unscrewing the 4 screws.

3) Disconnect the flat cable that connects the master card / touch keypad.

4) Check if the body is provided with the bore for the fastening of the antenna, otherwise perform a hole having d=6.25 mm.

5) Install the antenna shielded cable and secure with the fastening nut, checking to make sure the sealing is tight.

6) Insert the GPRS module in the vertical guide and centre the pin for EXP3 connection.

7) Fasten the steerable antenna by tightening the nut.

8) Insert the M type SIM CARD (the SIM card pin code has to be disabled).

9) Close the cover, connect the keypad flat power and communication cable.

10) Power the electronic board.

11) Enter the Programming page and configure the parameter pr (protocol) on "3" → GPRS (see 5.13.5)

12) Check if the LCD displays shows the message "GSM".

NOTE: a) The boards envisages maximum 3 users.
b) Replacing the GPRS module does not require changing the set-up.
c) Replacing the MASTER board requires to repeat the module set-up through SMS.

Activating the SMS functions on your phone

1) STORE ON THE CONTACT LIST OF YOUR PHONE THE SIM CARD NUMBER!

2) Add (or change) the associated phone numbers (maximum 3 users):

The to assign a phone number send SMS to GPRS module number use the following command:

TEn.PW+country code cell phone number

- **N** → 1,2 or 3 (user)
- **PW** → User password

  The default password upon first installation is:

  User 1 → “1111”

  User 2 → “2222”

  User 3 → “3333”
- **Mobile Phone Number + country code.**

Example:
Phone.TE1.1111+39347123456789

- TE1 “User1”
- Password "1111"
- Italy country code +39
- Personal number 347123456789

NOTE: Used as standard E.164 that envisages maximum 14 digits.

Changing the password

After the first user registration, it is recommender to change the default user password.

To change your password send the following message:

PWn.oldPW.newPW.newPW where:

- **n** → 1,2 o 3 (user)
- **oldPW** → the old password
  User 1 → “1111”
  User 2 → “2222”
  User 3 → “3333”
- **newPW** → New Password

Example:
PW1.1111.Abs8.Abs8

GPRS status request

To require the status of your filter, send a request via SMS using the command:

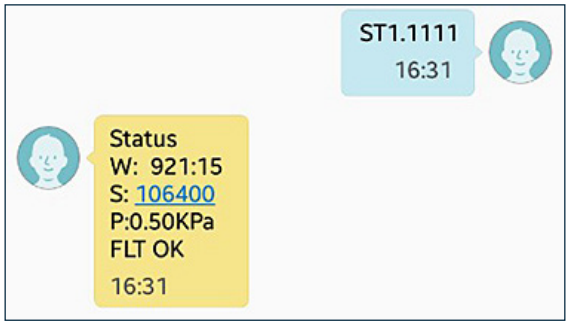
STn.PW

- **n** → 1,2 o 3 (user)
- **PW** → User Password

After the command is sent, the filter replays with a message:

Status
W:nnnnnh → number of operation hours up to the time the message has been sent
Sh:nnnnn → number of blows performed
P:ppp → delta P pressure expressed in mmH2O / KPa
FLT_OK or ALARM

Example:



Report request (recent events)

You can request the last events report via SMS using the command:

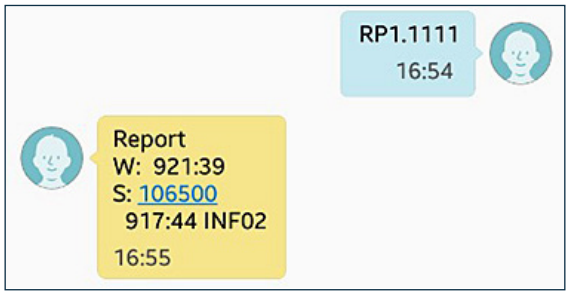
RPn.PW

- **n** → 1,2 or 3 (user)
- **PW** → User Password

After this command is sent, the filter replays with a message:

Report
W: nnnnnh → operation hours up to the time the message has been sent
Sh: nnnnn → number of blows performed
Hours: min → most recent event
Hours: min → oldest event

The filter does not repeat the events; if the same event repeats several times, it always displays the most recent one.



Managing the notifications

To automatically receive reports or notifications on the events, assign to the user a notification mode.

The command that allows you to manage the notifications is:

MDn.PWt

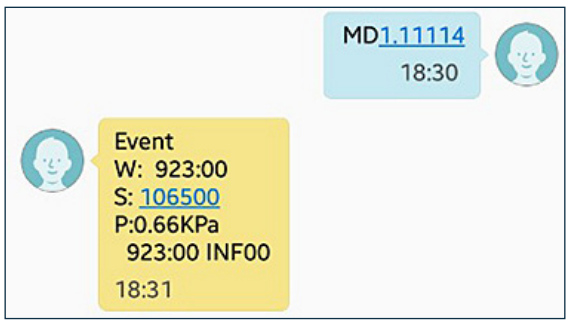
- **n** → 1, 2 or 3 (user)
- **PW** → User Password
- **t** → type of notification (must be a number between 0 and 7)

Notification ID	Description
0	No Notification
1	Status every 40 operation hours
2	Status every 160 operation hours
3	Status every 320 operation hours
4	Events notification
5	Events and status every 40 operation hours
6	Events and status every 160 operation hours
7	Events and status every 320 operation hours

Example:

MD1.11114

Notification in case of a status chang. [4]



Alarms communicated through SMS messages

CODE	DEFINITION	MESSAGE RECEIVED THROUGH SMS
00	Power On	**HH:MM Pwr Up**
01 **11**	EV-Match EV-NoMatch	**HH:MM ELV OK** **HH:MM ELV Err**
02 **12**	S2-Enable S2-Disable	**HH:MM S2 ON** **HH:MM S2 OFF**
03 **13**	S3-OK S3-Alarm	HH:MM EXT OFF HH:MM EXT ON
04 **14** **24** **34**	MDPE OK MDPE-ZERO MDPE HIGH MDPE-FAULT	**HH:MM MDPE OK** **HH:MM MDPE LOW** **HH:MM MDPE HIGH** **HH:MM MDPE ALARM**
05 **15**	Display-OK Display-Fault	**HH:MM DSY OK** **HH:MM DSY ALARM**
07	Set-Up	**HH:MM CHG SetUp**
18 **28** **38**	GPRS-User1 GPRS-User2 GPRS-User3	**HH:MM CHG USER**
09 **19**	GPRS-OK GPRS-Fault	**HH:MM GPRS OK** **HH:MM GPRS ERR**
Other	UNDEF	**HH:MM ???**

* HH:MM = ONLY HOURS ACTUALLY WORKED

5.14.2 Wi-Fi MODULE (option available only on FILCONTROL CONNECT)

Select the protocol 1 or 2 in the set-up (see paragraph 5.13.5) to use the Wi-Fi module.

When a power board is connected to an optional Wi-Fi board, the power board sends at regular intervals the status or other information to the Wi-Fi module so as to refresh the Web-Server.

If the operator has not set the correct protocol, the web pages will be empty.

N.B.: It is not possible to fit an Wi-Fi module if a GPRS module has been installed on the FILCONTROL CONNECT board.

HOT-SPOT (default)

The module allows Wi-Fi communication between a smartphone, tablet or PC and the electronic board of the filter and makes it possible to:

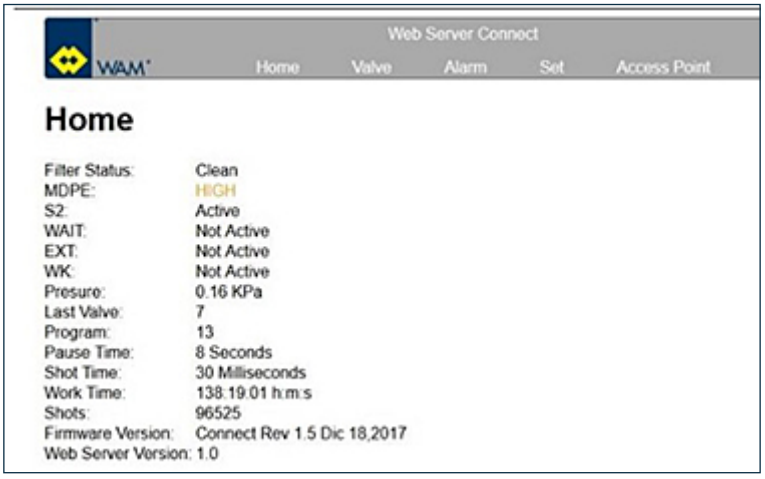
- **check the filter status;**
- **edit the operating parameters;**
- **check the events log.**

The module creates a network named 'WAM_CONNECT_######"; the "#" stand for the MAC ADDRESS.

In case multiple filters are installed, this allows interrogating each filter independently.

To get connected to the module using your smartphone, tablet or PC, access the set-up of the Wi-Fi and get connected to the network of the filter of interest.

Then open any Internet browser, type the IP address **192.168.2.1** and access the home page of the **web-server**.



"HOME" page fields description

The "Filter Status" field displays:

-"Clean" during cleaning;

-"Stand-by" and "Alarm" when the filter operation has been blocked and it is not performing the cleaning.

The "MDPE" field shows respectively the pressure in the format set by the user and the current status (low, normal, high, alarm).

The fields "S2", "WAIT", "EXT" can be "Active" or "Not Active", depending on the physical status of the related inputs.

The "WK" field is "Active" if the filter is in alarm, otherwise it stays "Not Active".

The "Pressure" field displays the differential pressure value measured between the dirty and the clean area of the filter.

The "Last Valve" field indicates the ID of the last solenoid valve which has performed a blow, if the status of the filter is "clean". Under normal conditions, is displayed in sequence the number of the solenoid valves active among the solenoid valves installed.

The "Program", "Pause Time" and "Blow Time" fields show the selected program, with pause and blowing timing.

The "Work Time" fields represent the operation hours counters and indicate, respectively, for how many hours and minutes the input "S2" and the filter cleaning have been active, and how many blows have been actually performed.

The "Firmware Version" field indicates the firmware version installed on the power board.

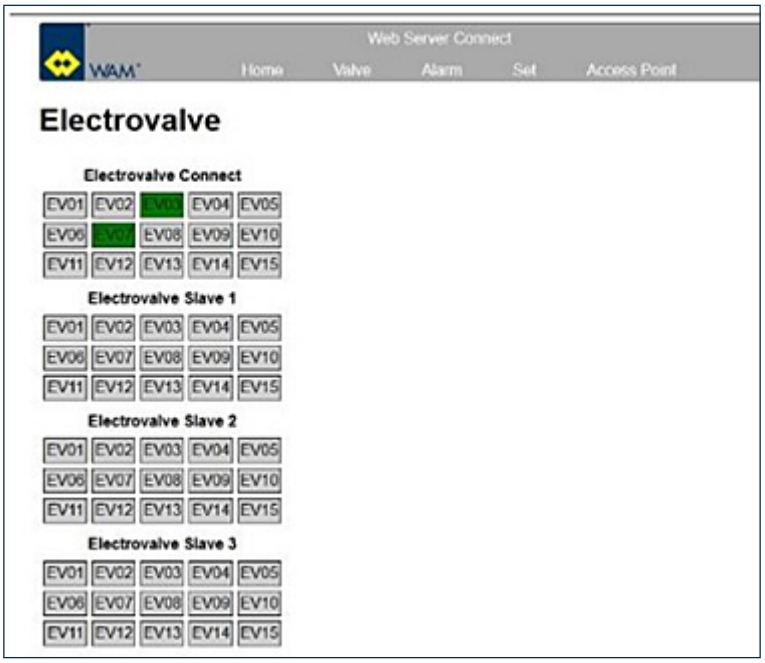
The "Web Server Version" field indicates the firmware version installed on the Wi-Fi module.

"VALVE" web page

This window shows (green coloured) the solenoid valves that have been identified by the board and grey coloured, those not connected. This map is used to identify the physical address of the solenoid valves in the system.

- EV01 to EV03 they are connected on the master card;
- EV04 to EV09 they are connected on the first expansion (option);
- from EV10 to EV15 they are connected on the second expansion (option).

Moreover, if the master board controls the connected boards, the status shown is "Slave"

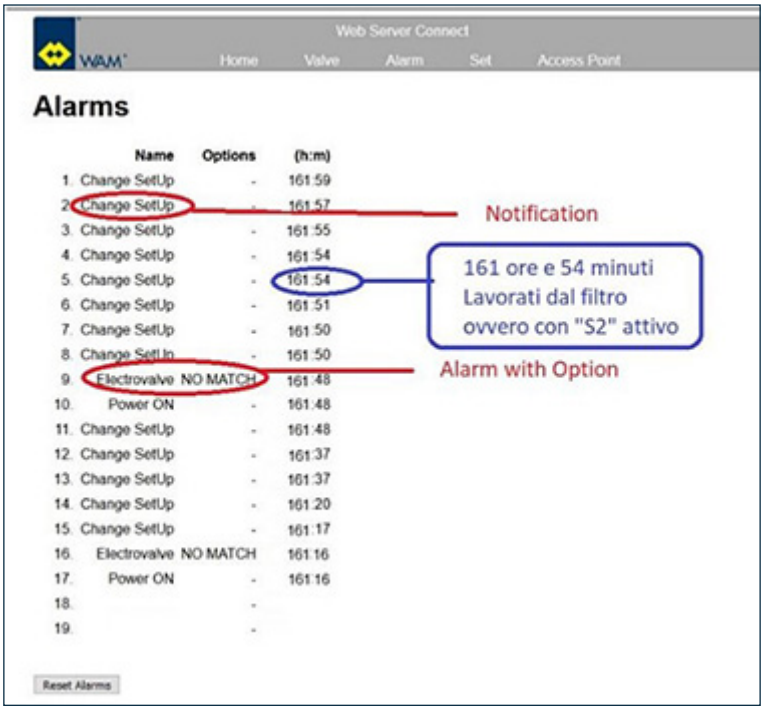


“ALARM” web page

This window displays the last 20 events recorded:

- Power-on → whenever the filter is powered it is recorded a change of status;
- Solenoid Valve NO-MATCH → in case the filter setting does not match the number of solenoid valves identified;
- Inputs S2, S3 → any status change is recorded;
- WK Alarm Output → any status change is recorded;
- MDPE Sensor → any of the 4 available statuses (low, norm., high, alarm) change is recorded;
- Change SET-UP → if modified by an operator:

N.B.: Use the "Reset alarm" key to clear the events log.



“SET-UP” web page

This window allows displaying the filter set-up and permits the operator to modify the cleaning and operation parameters.

The first column represents the parameter name.

The second column represents the validity fields.

The third column lists the current value.

The column with the boxes allows inserting the new values.

These parameters are extensively described in the previous paragraph.

SET-UP Mode

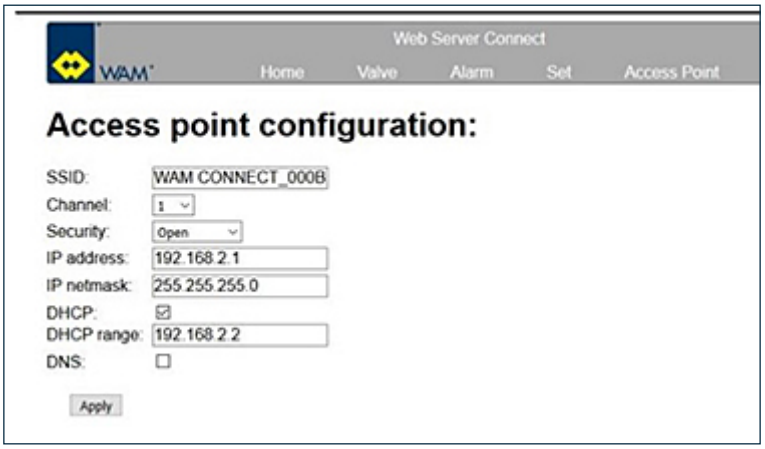
Use the key "Apply" to send the updated values to the FILCONTROL CONNECT board with Wi-Fi Module.

“ACCESS POINT” web page

This window displays the Wi-Fi configuration.

The SSID is the network name created by the filter; other fields contain the configuration of the ACCESS POINT:

- default Web-Server 192.168.2.1
- default MASK 255.255.255.0
- default 1 channel with DHCP 192.168.2.2



For Android

1. Access the "Settings";
2. Select "Wi-Fi".
3. If not active → enable the Wi-Fi function.
4. Wait for the device to show all available networks.
5. Select "**WAM_CONNECT**_0123456789AB"
6. Wait for the message "Connected without the Internet" to be displayed.
7. Close the settings page.
8. To edit go to "Google" or open in any browser **192.168.2.1**
9. Wait for the browser to open the "HOME" page of the filter.

5.15 FILCONTROL CONNECT: MODBUS board communication

The MODBUS communication function of the FILCONTROL CONNECT (not on time) allows the electronic board to get interfaced with the PLC control systems through an universal protocol.

Communication protocol: RS485, MODBUS 9600,8,N,1

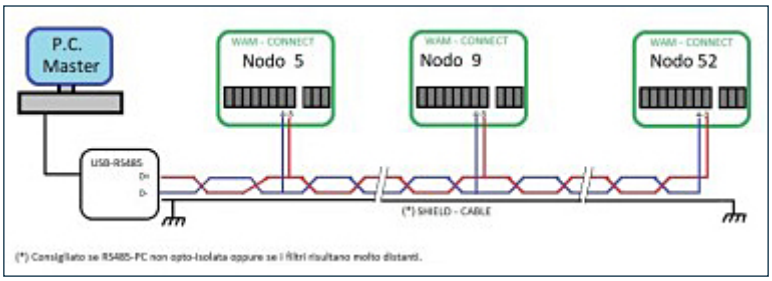
Connection

The boards must be connected through the terminals 3 and 4 with twisted pair.

The interface on the filters is opto-insulated with insulation capacity of about 4KV.

Since it does not envisage repeaters management (only connection D+ and D-), the filters number and the distances are limited to one way only according to the MODBUS standard.

Example of connection:



Set-up - Conflicts with other options

The priority of the Wi-Fi and GPRS can generate corrupted MODBUS due to the physical switching of the communication.

N.B.: As a consequence, if two protocols are used simultaneously, corrupted frames detecting algorithms must be provided.

- SetUp → **PR=0**

The filter only communicates in MODBUS mode (recommended).

- SetUp → **PR=1.2**

The filter communicates every 1 second with the Wi-Fi module, the MODBUS communication is still possible in the remaining time. Provision should be made in the network management for logics meant to recover lost messages sent by the filter due to the temporary management of the Wi-Fi module.

- Set-up → **PR=3,4**

Every 5 seconds the filter queries the GPRS module, then manages and/or sends messages to the phones; however, MODBUS communication is still possible in the remaining time. Provision should be made in the network management for logics meant to recover lost messages sent by the filter due to the temporary management of the GPRS module.

MODBUS protocol data reading

Function 3 MODBUS protocol:

1 Byte	Default “33” (See Set-up)
1 Byte	3
2 Byte (High, Low)	0x0000 … 0xFFFF
2 Byte (High, Low)	0 … 125

Example of logs 1000 and 1001 request:

1 Byte	Default “33” (See Set-up)
1 Byte	0x03
1 Byte	2 * log
2 Byte * log	Value Array

Example of logs 1000 and 1001 request:

0x11	0x03	0x03	0xE8	0x00	0x02	Chk-H	Chk-H

Response		
Slave Adress	1 Byte	Default “33” (See Set-up)
Function Code	1 Byte	0x03
Byte Count	1 Byte	2 * log
Log Value	2 Byte * log	Value Array

As a response to the logs 1000 and 1001request:

0x11	0x03	0x04	0x12	0x34	0x56	0x78	Chk-H	Chk-H

List of readable logs

Address	Log	Meaning
1000	Filter status	Bit groups, see the following description
1001	MDPE Reading	0…50 0,0KPa…5,0KPa
1002	Solenoid Valves Window	Bit 0….14 => EV1…EV15; 1=None
1003	Program set	0…63 Program number
1004	Pause Time	Each unit equals 1 Sec.
1005	Blowing time	Each unit equals 10 mSec.
1006	WORK-TIME minutes	Working timer, minutes with S2 active
1007	WORK-TIME hours	Working timer, hours with S2 active
1008	SHOOT - LOW	Number of blows performed 0….65536
1009	SHOOT - HIGH	Number of blows, each unit equals 65536 shots

Filter status log

			Ev	Ev	Ev	Ev	-	WK	EX	W	S2	M	M	F	F

FF=00	Filter in "Stand-By"
FF=01	Filter in "Clean"
FF=10	Filter in "End of Clean"
FF=11	Filter in Alarm

M=00	MDPE value lower than the minimum
M=01	MDPE normal value
M=10	MDPE high value
M=11	MDPE in alarm value

S2=0,1	Input S2, 1=active, 0=Not Active
W=0,1	Input WAIT, 1=active, 0=Not Active
EX=0,1	Input Ext (S3 or alarm), 1=active, 0=Not Active
WK=0,1	Output WK, 1=active, 0=Not Active
Ev=0....15	Last solenoid valve that has blown, 0=StandBy, n=EVn

Danger - Warning

If several filters are monitored by one PC, the nodes 0, 1, 2, 3 and 33 are reserved for specific functions, therefore they cannot be used.
Configure them on the other nodes; the node 33 can be configured on one filter only.
From the front panel of the FILCONTROL CONNECT select nodes between 4 and 99 (except for 33, already configured).

5.16 Solenoid valves heater

SOLENOID VALVES HEATER CONNECTIONS

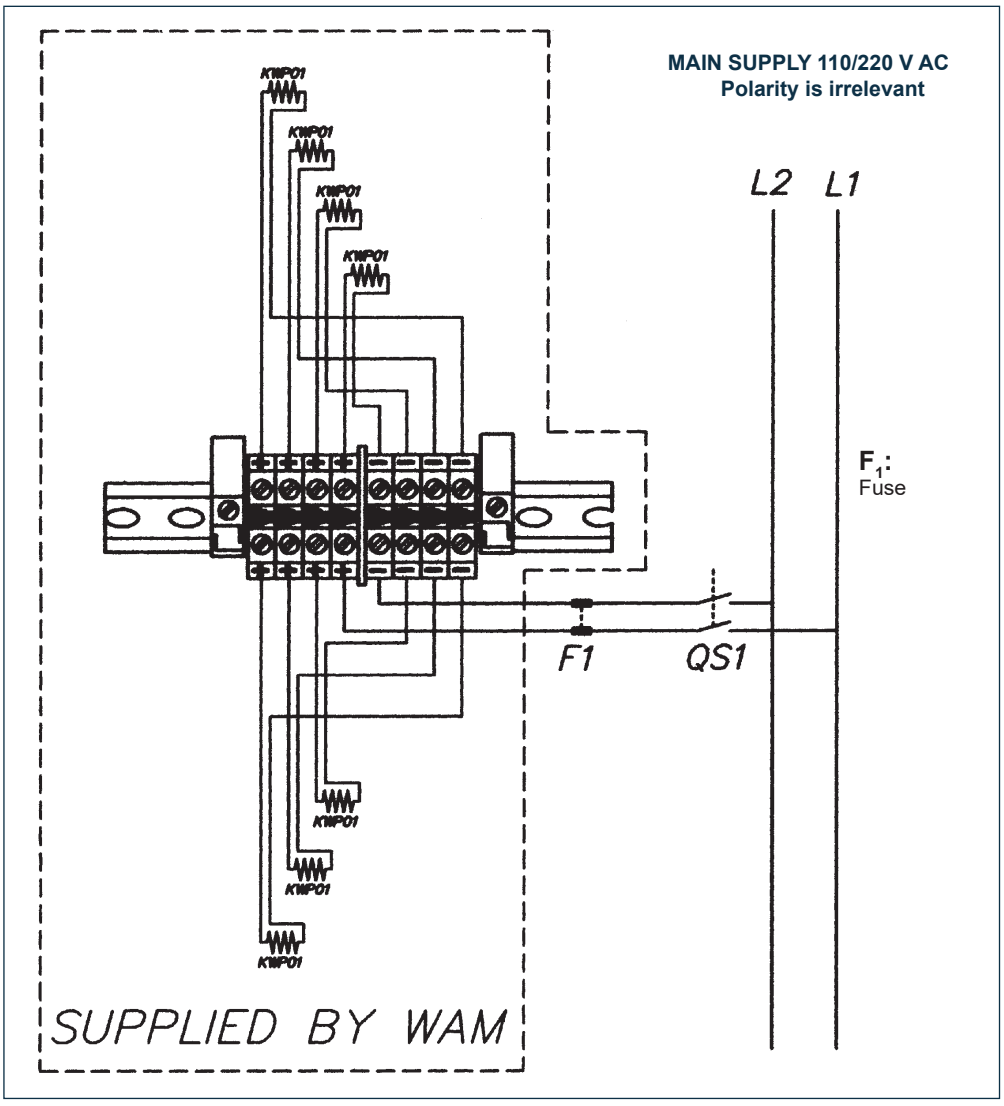
The junction box of the heater is positioned inside an IP66 housing according to the Standard CEI EN 60529.

- The panel is supplied prewired;
- Connections to the heating elements are made by the Manufacturer.

POWER SUPPLY

The junction box of the solenoid valves heater must be fed 110/220 VAC.

- For powering the junction box, use the terminals marked blue (+) and red (-).
- The polarity is irrelevant.
- The terminals marked white (+ and -) regards the KWP01 heating elements connections (already carried out by the Manufacturer).



5.17 Pneumatic connections

Compressed air requirements

The operation of the filter requires permanent connection to a compressed air circuit. The compressed air must be:

1) Clean - Free of residues which could damage the filter solenoid valves.

2) De-moist - The filter tank is provided with a condensation drainage cap. It is, however, reccomended to provide for a condensation separator.

3) Oil-free - The presence of oily substances in the air could cause premature and irreversibile clogging.

Use filters which always keep the air clean and oil-free.

Danger - Warning

Discharge the piping before connecting the compressed air supply to the filter.

Tank inlet pressure

- Minimum 5 bar
- Maximum 6 bar

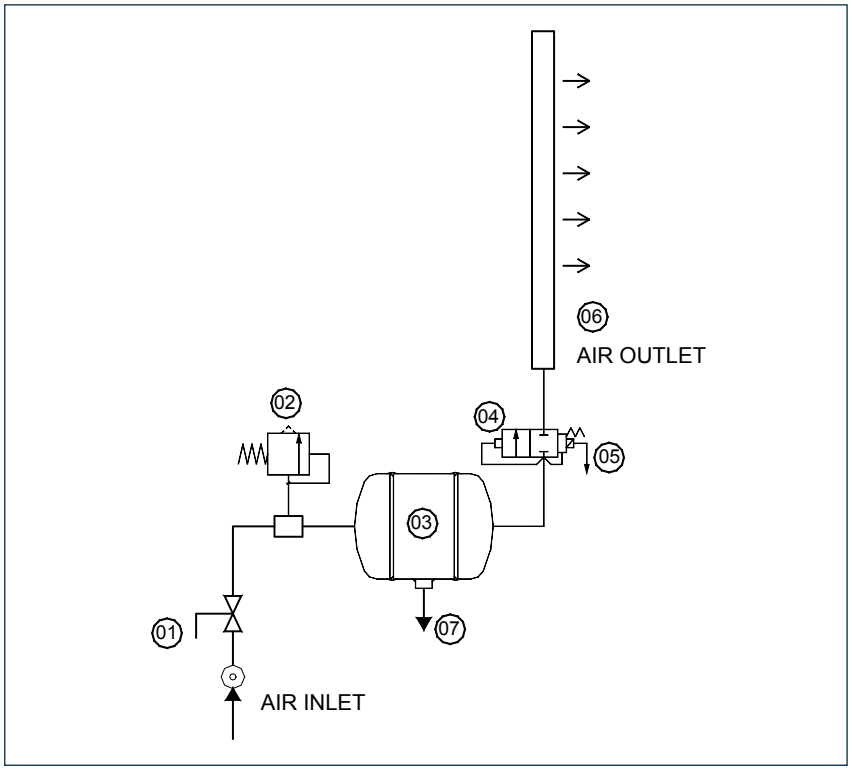
Variations of the usage conditions may require:

- Modifications of inlet pressure to the tank.
- Modifications to the control panel settings, that requires changing the compressed air consumptions.

It is recommended to install a Kit (pressure gauge, relief valve) near the filter. A manual cut-off device (ball valve or similar device) must be inserted on the line to facilitate subsequent maintenance operations.

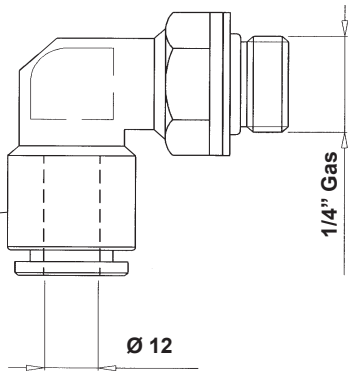
Important

The filter must be supplied with a separate branch that can be disconnected independently.



CODE	DESCRIPTION
01	MANUAL BALL VALVE (NOT SUPPLIED BY **WAM®**)
02	RELIEF VALVE (NOT SUPPLIED BY **WAM®**)
03	TANK
04	1” RAPID DISCHARGE VALVE
05	DRIVE
06	AIR OUTLET
07	CONDENSATION DRAINAGE CAP

The compressed air coupling on the filter is achieved by means of a push-in fitting (for 12 mm pipe). The installer must fix the compressed air hose pipes correctly and provide the due protections against sudden detachment of the pipes.



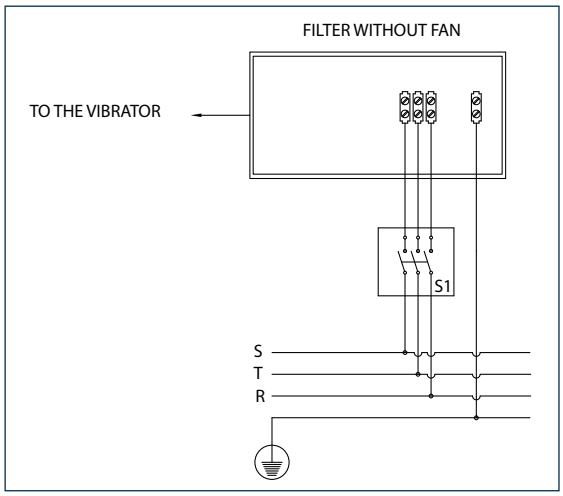
COMPRESSED AIR CONSUMPTION

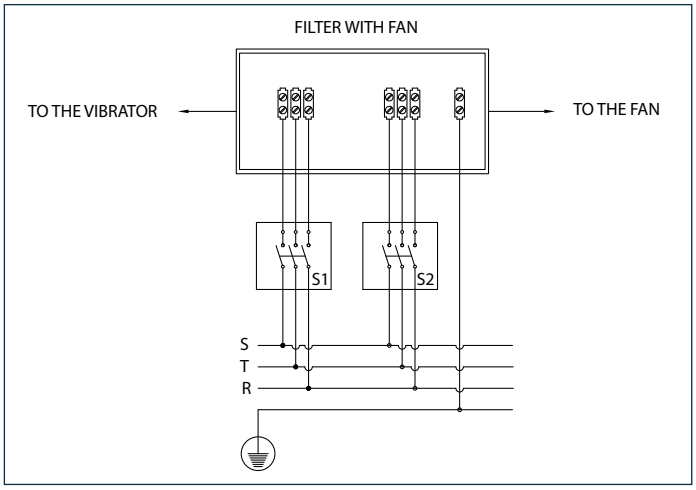
Ø	Air tank volume	P max. (bar)	Cleaning interval*	Pulse duration	Nm³/h
800	5.1	6	28 s	100 ms	4.5

Input voltage (Vac)	Electrical Input (A)	Power (W)
24	0.220	5.3
115	0.090	10.4
230	0.050	11.5
260	0.045	11.7

5.18 Filters with vibrated cleaning system

In vibrated **WAMFLO®**, the electronic board is installed in a switch box and consists of a terminal board. ON/OFF switches are not included in the supply.





Important

Use of vibrated cleaning system limit application to discontinuos service only.

There can be two different types of installation:

- filter on the receiver of a batch pneumatic conveyor (e.g. silo filled by a tank) in this case, the filter must be started only after the pneumatic conveying phase is finished. The vibration phase has to last maximum 60 seconds.
- filter on a hopper with fan (e.g. manual bag empty): in this installation the vibrator must operate only when the fan has been stopped. Be reminded that that once the motor has been disconnected from the electric supply, the fan operation ends within 30-40 seconds.

It is used an automatic cleaning system, make sure that this does not operate immediately after the fan motor has stopped.

Once again, vibration must only last 60 seconds at most.

5.19 Inspection

Important

When installation is complete, authorized personnel must carry out a general test to ensure that the safety conditions have been completely met.

The authorized personnel must also check:
- that no tools or other material have been forgotten inside the filter;
- that the fixing screws have been tightened using the prescribed torque;

Before starting to operate the filter:
- Ensure that the plant in which the filter is installed is compliant to the Directive 2006/42/EC and to the relevant general directives and safety standards in force and those specifically applicable.
- Ensure that the inspection hatches are locked with the bolts supplied inserted in their original position.
- Ensure that the operating conditions are met.

5.20 Commissioning

Preliminary checks

After completing the electrical and compressed air connections, carry out the following checks:
- Check to ensure the control panel is powered and set correctly.
- Ensure that the pressure of the filter reservoir is 6 bar.
- Check all nuts, bolts and locking devices to ensure they are perfectly tightened.
- Check all elements to ensure they are fixed properly to the seal frame.
- Check the seals to ensure they are not damaged and the inspection hatch is closed.
- Ensure that the warning and instruction signs are present.
- Check piping connections to the filter (if these are present) to ensure they are secured and assembled carefully.
- Check the direction of rotation of the fan (if present).

6.1 Production start-up

Before starting up the filter, the operator in charge and authorized for the production must ensure that the safety devices installed are present, in working conditions and that the operating conditions are followed (doors closed, inlet and outlet).

Start-up procedure

Proceed as follows (after preliminary checks):

1) Start up the dust discharger (if present)

2) Start up the air compressor.

3) Start up the control panel (MS LED ON).

4) Start up the cleaning cycle (clean LED ON)

5) Check all solenoid valves to ensure they work correctly (the yellow LED turnes on when the panel sends the impulse to the solenoid valve)

6) Check the cleaning cycle duration and the pause time.

N.B.: If the filter features a FILCONTROL CONNECT electronic board, in case the solenoid valves are not acknowledged, the board displays the message ERR01.

Danger - Warning

When a fan is installed, in the initial phase of filter use, the air capacity must be adjusted to the designed value.
When the pressure losses are balanced, the air flow value has to be adjusted again. Then ensure the power input does not exceed the value onthe rating plate.

Frequent checks of the filter operation **particulary during the first few weeks** are essential.

Only through these checks it will be possible to determine whether the preset pause duration is the proper one as regards the cleaning of the filter cartridges.

- After a few hours of operation, ensure the vibrations have not slackened the nuts and bolts.
- Avoid consecutive startups of the motor as this involves continuous overloads leading to overheating of the electrical parts. Before restarting leave it to cool sufficiently.
- Remember that **WAM®** “fans” are fitted with their own sealed single-block bearings unless otherwise specified by the Customer and therefore do not need any checking of the lubrication.
- Once the filter is installed, it is necessary to check the cleaning cycle especially in the first few weeks of operation. This has to be done to ensure that the pause time setting is sufficient for correct cleaning according to the Customer’s requirements.

Important

In case of excessive noise, strong vibrations, etc. stop the filter cleaning system and report the problem to the person in charge authorized to restore the correct working.
Do not use the equipment if damaged.

6.2 Equipment shutdown at the end of the work cycle

1) Shut down the filter without disconnecting it from the power supply (according to the settings of the board, the end of cycle cleaning gets automatically enabled on the basis of the number of cycles pre-configured on the electronic board.

2) At the end of the cycle, disconnect the control panel from the power supply.

3) Switch off the compressor.

4) Switch off the dust discharger valve or screw conveyor (if present).

6.3 Long shutdown of the equipment

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

1) Avoid damp and salty enviroments during equipment shutdowns.

2) Place the equipment on wooden pallets and store it protected from harsh weather conditions.

3) Set the equipment in safety condition before operating it.

4) Before using the equipment, check the condition of the electrical and pneumatic systems and all the parts the working of which may be affected by prolonged shutdowns.

5) Run a complete cleaning cycle before activating the filter.

6.4 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 filter after a long shutdown, proceed as described below.

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

2) Check all oil levels.

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

Danger - Warning

Before carrying out any maintenance activity, enable all the safety devices to ensure the safety of the persons involved in the operations and those near by.
Set the equipment concerned in safety condition (see 2.0 Information regarding safety).
Wear suitable personal protection equipment; in this regard, consult the person in charge of production activites safety.

- Scheduled maintenance Table

Component	Operation to be carried out	Daily	Every month	Every six months	Every two years	Manual reference
Safety devices	Performance check	•				
Inspection hatches	Checking the condition	•				
Flanged assembly	Checking the seal	•				
Air tank	Checking the pressure and condensation		•			
Filter elements	Checking the conditions of the filter media and differential pressure		•			
Compressed air	Checking value and presence		•			
Control panel	Checking the condition			•		
Solenoid valve	Checking the functioning and condition			•		
Blowing pipes	Checking the condition				•	

Danger - Warning

- Special applications of the fans sometimes require special maintenance, especially when very dusty air flows through the fan or when it is used for pneumatic conveying of various type of materials.
- The rotor may get jammed progressively, affecting the balancing effectiveness. It is therefore re comended to check its condition periodically by opening the filter hatch. If the rotor needs to be removed, slacken the clamp fixing nuts to the side of the fan and remove it. Remove the screw and washer which secure the rotor to the shaft, fit a safety washer to the tip of the shaft, then remove the rotor from the shaft by using an extractor. Pay attention to the movement of large rotors. To assemble, repeat the procedure in reverse order.
- Check the fan periodically, by rotating it manually on a weekly basis to prevent damage to the rings.

7.1 Cleaning the equipment (the machine)

Clean the outside part of the equipment (the machine) 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 equipment (the machine), after vacuuming the dust, with a low-pressure water jet.

7.2 Cleaning the filter elements

THE CARTRIDGES AND THE POLYPLEAT®

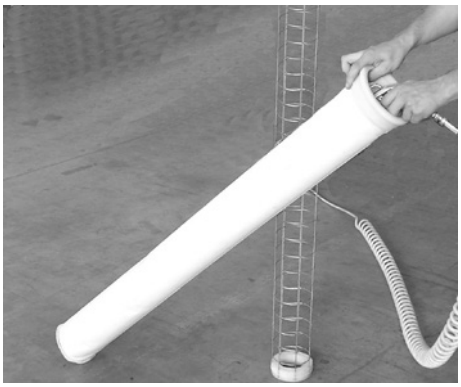
The filter elements are made from polyester-based NON-WOVEN FABRICS coated through special surface treatment.

During the maintenance phases the filter elements can be cleaned thoroughly to increase their durability.

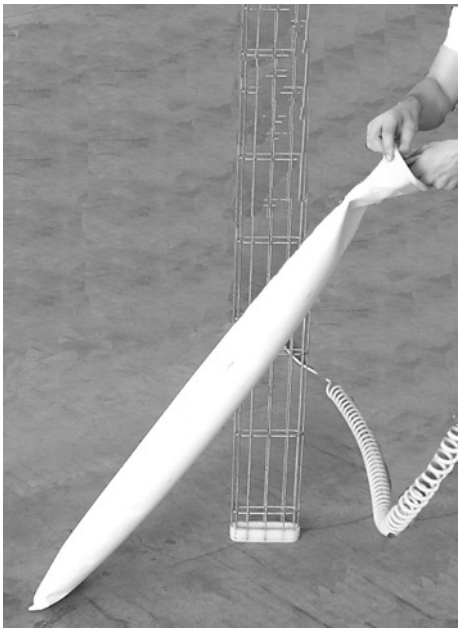
The cleaning can be performed simply by mechanical shaking or using compressed air; make sure not to release the dust thus generated into the atmosphere.

BAGS - ELLIPTICAL BAGS - POCKETS

These elements MUST be dry-cleaned, or brushed using a non-abrasive brush and then "blow" with compressed air (max. 6 bar) from the inside outwards.



Bags



Elliptical bags

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 Replacing the filter elements

Replace the filter elements with new ones having the same structural and functional features.
Always ask for original spare parts to ensure the safety and functionality of the equipment.

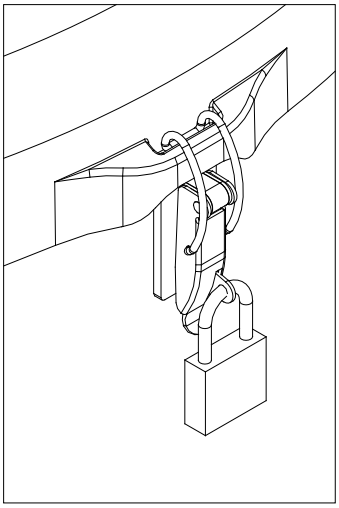
Danger - Warning

Set the filter in safety condition (see Glossary and terminology).
Do not drop the filter elements.

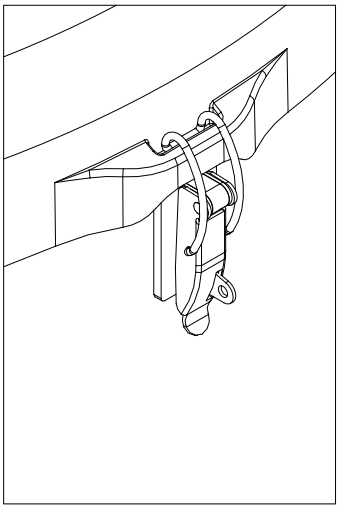
OPEN THE FILTER COVER

FILTERS WITH PLASTIC COVER

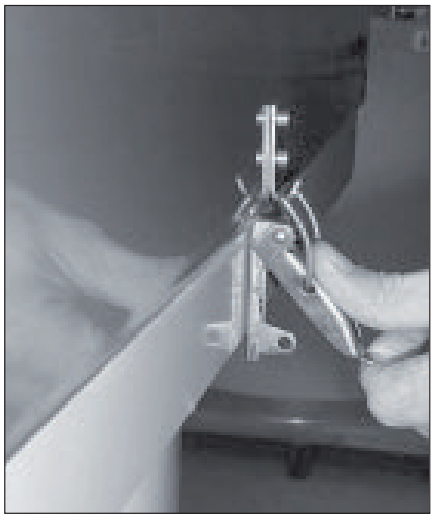
FILTERS WITH METAL COVER



Remove the padlock



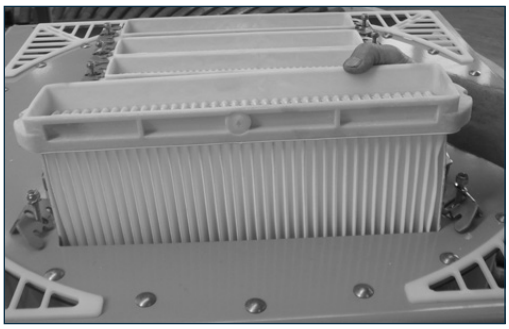
Open the snap lock



Open completely the cover using the handle.

Slacken the nuts of the clamps.

Shift the clamps to release the filter elements.



Pull out the filter element without damaging it.

For reassembly, repeat the above operations in reverse.

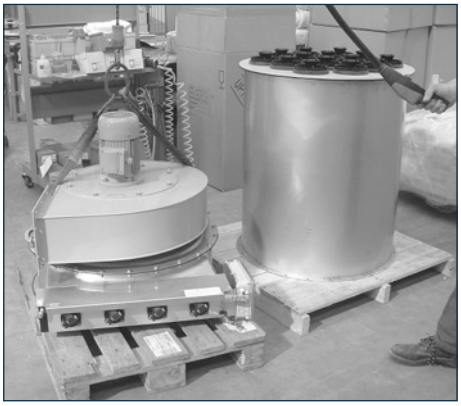
8.3 Removing the fan

Filters with fan or connection for top suction.

Remove the upper body fastening screws.

Lift the fan-upper body unit by means of the lifting grips meant for the purpose.

Disconnect the earth wire.



Place the fan gently on its side.

Fix the end plate inserting only two screws and then proceed with removal of the filter elements.

For assembly carry out the removal operations in reverse order.

8.4 Removing and refitting filter elements

Remove the Venturi tubes (if provided).

Grip the tool and hook the filter elements. Pull it towards you by levering on the plate, then remove all the elements to be replaced.

Remove the respective frame to be reused.

For assembly carry out the removal operations in reverse order.

Remove the Venturi tubes (if provided).

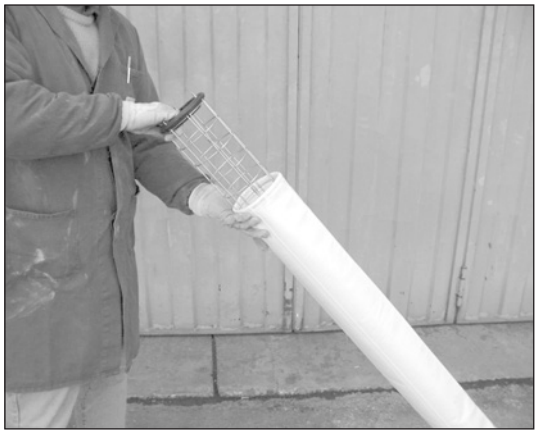
Unscrew the bags (anticlockwise - seen from the top).

Remove the worn elements completely and place them carefully outside the filter taking care to prevent them from falling accidentally.

Remove the 3 M6 nuts.

Remove the top part of the filter element.

Remove the bag.



For assembly carry out the removal operations in reverse order.

Remove the Venturi tubes (if provided).

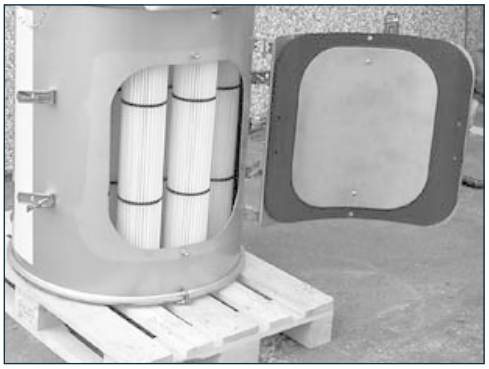
Unscrew the cartridges (anticlockwise - seen from the top).

Remove the worn elements completely and place them carefully outside the filter taking care to prevent them from falling accidentally.

For assembly carry out the removal operations in reverse order.

Open the four snap hooks starting with the one on the top RH (front view), then proceed cross-wise.

Open inspection hatch, pulling from LH to RH, by means of the handle provided. If the operation is found to be difficult, hold both edges of the door with both hands and pull simultaneously.



Open inspection hatch wide.

Unscrew the cartridges (anticlockwise - seen from the top).

Lower them enough to remove from the front by pulling upwards. Carry out cleaning operations as described in the catalogue (see bag or cartridge depending on whether the filter is a FB or FS).

For assembly, repeat the removal operations, but in reverse.

8.5 Replacing solenoid valve

Danger - Warning

Set the filter in safety condition (see Glossary and terminology).

1) Remove the coil (**6**) and the connector (**7**) after having removed the relative ring nut

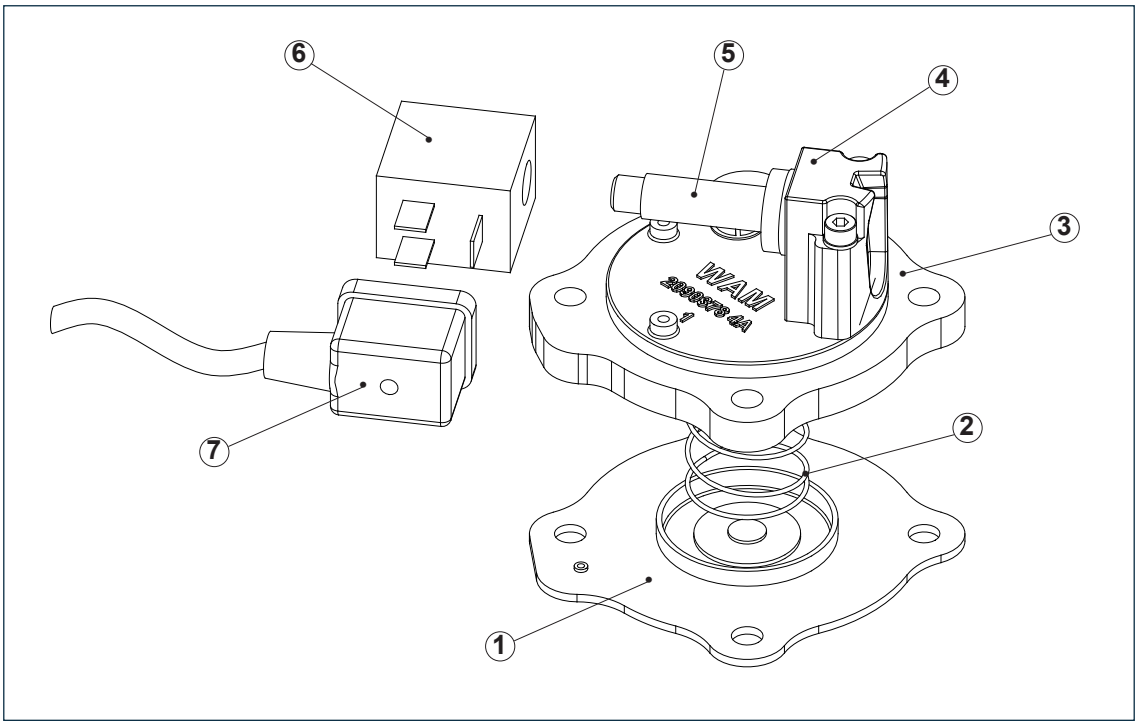
2) Remove the hexagonal screws and washers that secure the valve cover (**3**)

3) Replace the diaphragm (**1**) and the spring (**2**)

4) Verify that the diaphragm (**1**) is positioned above the drain hole

5) Insert the spring (**2**)

6) Fit the new cover by checking that the spring is over the shoulder of the disc diaphragm and the cover is positioned over the vent hole



8.6 Returning the equipment (the machine)

When returning the equipment (machine) 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 equipment (machine).

8.7 Dismantling and disposal

Dismantling of the equipment (machine) must be entrusted to personnel specialized in these activities and equipped with adequate skills.

Dismantle the components of the equipment (machine) concerned; if necessary contact the Manufacturer 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 the Manufacturer's Customer Service Department.

Danger - Warning

Before carrying out any operation "set the equipment (machine) 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.

Problem	Probable cause	Possible remedy
Excessive differential pressure	1) Compressed air supply failure	1) Check the functioning of the compressor Check the condensation filters Check the presence of water and/or oil in the air tank of the filter
	2) Lack of air from the shooting tubes	2) Check the proper working of the electronic panel. Check the proper working of the solenoid valve. Check the proper working of the solenoid valve membrane
	3) Filter elements clogged	3) Operate the unit on empty and then remove all filter elements and replace damaged one
Dust in the clean area	1) Check for possibly damaged flter elements	1) Replace if damaged
	2) Check the seals	2) Replace if damaged
	3) Check if the flter elements are housed correctly in their seat	3) Install again in case
Solenoid valve continuous blowing	1) Check the correct working of the coil (for assembly details see the page 85)	1) Switch on and off the compressed air supply to the filter 3-4 times. 2) Remove the component no. 6 after removing the relative ring nut. Unscrew the component 5 ensuring that the pin and spring inside does not fall and that the former slides perfectly in. 3) Inspect pin coupling area of components 4 to compoment 5 ensuring there are no impurities.
Low suction	Check for possible obstructions along the ducting system Check the filter elements Check the fan rotation direction	Remove the obstructions Replace the dirty elements Adjust to the correct rotation direction
Fan not working	Check power supply Check power input Check rotation direction	Connect the correct power supply Adjust rotation direction or motor

Fan

Problem	Probable cause	Possible remedy
No throughput (with power reduction at normal rotation speed). (1)	Tubes clogged and/or suction points clogged.	Clean tubes and hoods, check position of gates.
	Rotation speed insufficient	Check the supply voltage and the motor terminals connection; check the transmission ratio, make sure the belts do not slip.
	Direction of rotation inverted.	Check connection of windings inside motors junction box
	Filter overload.	Increase activation frequency of automatic cleaning device (where envisaged) or intervene manually.
	Changes in cross-section, sudden and close bends.	Check aeraulic circuit layout.
	Unexpected widening or bends which do not allow normal recovery of dynamic pressure in delivery.	Check aeraulic circuit layout.
Excessive air flow (if the rotation speed is correct, high power draws for radial fans with forward-curved blades).	Rotation speed.	Check the direction of rotation, check for particular turbulence conditions at the suction, check rotation speed in motor at supply voltage, check for winding defects.
	Air passing through inspection hatch, badly constructed tubes or badly installed components, or valve not adjusted correctly.	Check the system and reposition the components correctly.
	Excessive power loss.	Adjust the air inlet valve.
	Fuses not suitable.	Replace.
	Hard fan rotation.	Clean suction area and replace motor, if necessary.
Pressure insufficient.	Rotation speeds too low.	See (1)
	Throughput higher than the values envisaged due to incorrect sizing of circuits or air temperature considerably different from the reference value which is 15 C°.	Modify the transmission ratio and/or replace fan, resize the circuit.
	Rotor partially blocked and/or damaged.	Check the assembly position and condition of rotor.
	Direction of rotation inverted.	See (1)
Difficulty in start-up.	Excessive power input.	See (2)
	Reduced supply voltage.	Check the data on the motor plate.
	Fuses not suitable for the requirements.	Replace.

Problem	Probable cause	Possible remedy
Power input higher than rating plate data. (2)	Rotation speed to high, it requires more power than the one installed.	Replacement of motor and pulleys and/or redefinition of system.
	Air density greater than the one envisaged.	See above.
	Higher throughputs at the values envisaged for pressure lower than the values envisaged.	See above.
Air pulsation.	Fan operates in the initial area of the throughput curve.	Redefine the installation or change the fan.
	Centrifugal fans which operate in null throughput conditions.	See above.
	Suction not constant, with vortices present.	Insert flow rectifiers.
Excessive noise.	Higher rpm to obtain the required performances.	Use of soundproofed enclosures and/or silencers; choose a machine with larger dimensions and the same performance or a machine with lower peripheral speed.
	Faulty bearings.	Check the bearings for wear (especially the sealed ones) and the lubrication.
	Rotor not balanced or sliding on housing.	Check fixing of rotor and tubes.
	Eccentricity between rotor and stator.	Check coaxiality.
	Vibrations in winding.	Can be reduced by using better quality motors.
Vibrations.	Imbalance of rotating parts.	Check balance again.
	Supporting structure unsuitable (natural frequency approaching corresponding to the fan rotation speed).	Change the natural frequency of the support by adding weights.

Electronic control panel

Problem	Solution
Not working	If the MS green LED does not flash 1) Check the power supply on terminal S1 2) Check the performance of the fuse (for replacement, use a fuse of the same type and having the same value)
	If the MS green LED flashes 1) Check if there is any enabling signal (verify if the contact S2 is closed) (CLEAN red LED On) 2) The control panel works properly when there is a power supply of 24 VAC on each pair of EV terminals (See-wiring diagram)

9.2 Check-list in case of fault

If you have been unable to solve the problem on the equipment (machine) even after having carried out the operations suggested in paragraph “Trouble-shooting” please contact the plant technician/installer/or the Manufacturer.

If technical assistance is required, in addition to the equipment data, the plant technician/installer or Manufacturer will also need information concerning the plant in which the equipment (machine) 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 equipment (machine) concerned.

Danger - Warning

Before carrying out any operation “set the equipment (machine) 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) Description of problem.

b) Photo showing the whole filter and how it is installed.

c) Dusty air volume that flows in the filter.

d) Does the filter start up without problems after long shutdowns?

e) Is the outlet unblocked? Are there shut off valves that might prevent the evacuation?

f) What is the duration of the operating cycle?

2) Checking the electrical part

a) Are voltage variations possible due to simultaneous start-up of various equipments?

b) Is the plant equipped with a current generator?

c) Measure the differential pressure of the filter.

d) Check the electronic panel configuration and connection.

e) What is the value of the voltage supply?

f) What are the pause and working time of the cleaning system?

3) Checking the filter

a) Has the filter been assembled correctly?
Are all the inspection hatches in closed position?

b) Has the filter been fixed correctly?

4) Checking the dust

a) Material description?

b) Bulk density? (kg/dm^3)

c) Particle size? (µm/mm)

d) Moisture? (%)

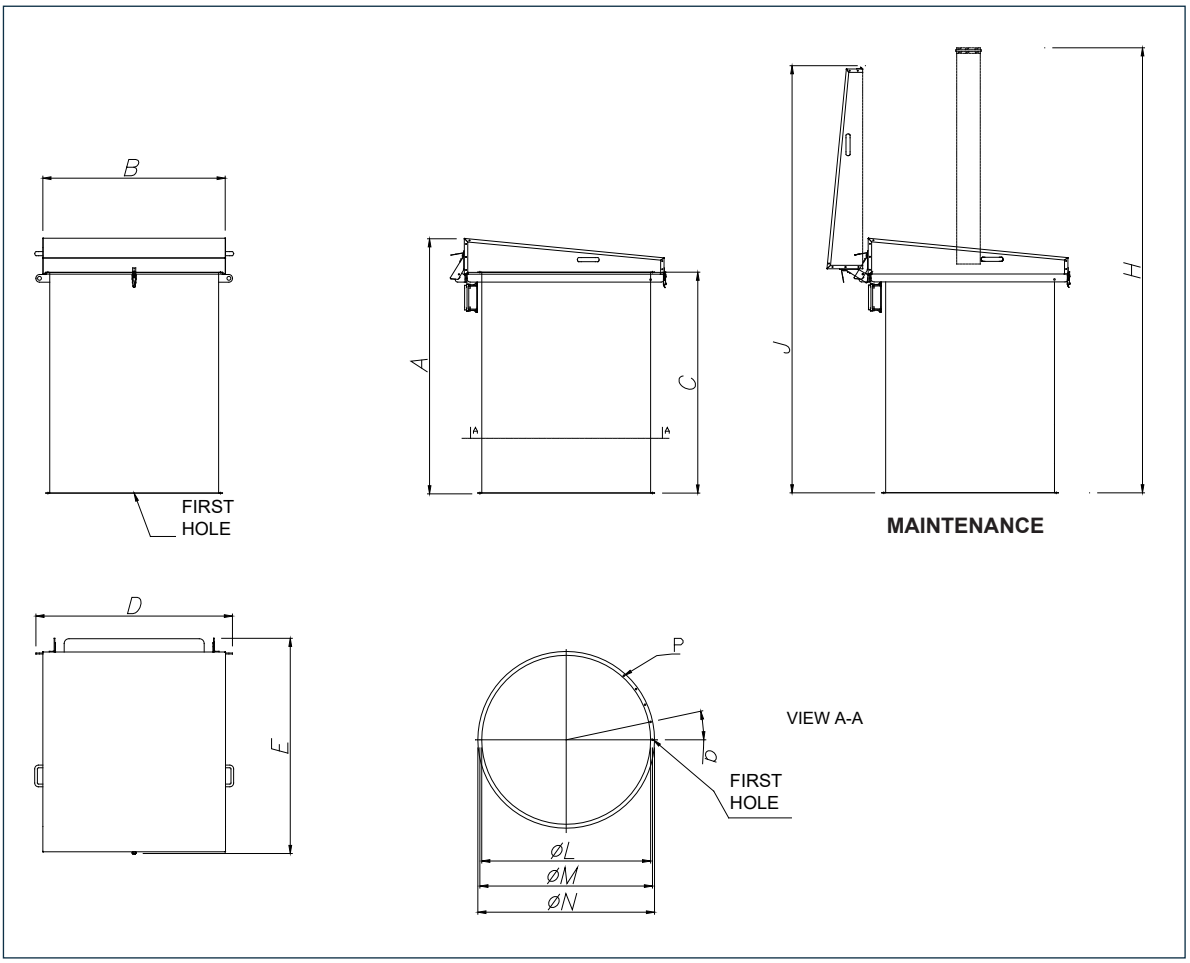
e) Flowability?

f) Compressibility?

g) Abrasiveness?

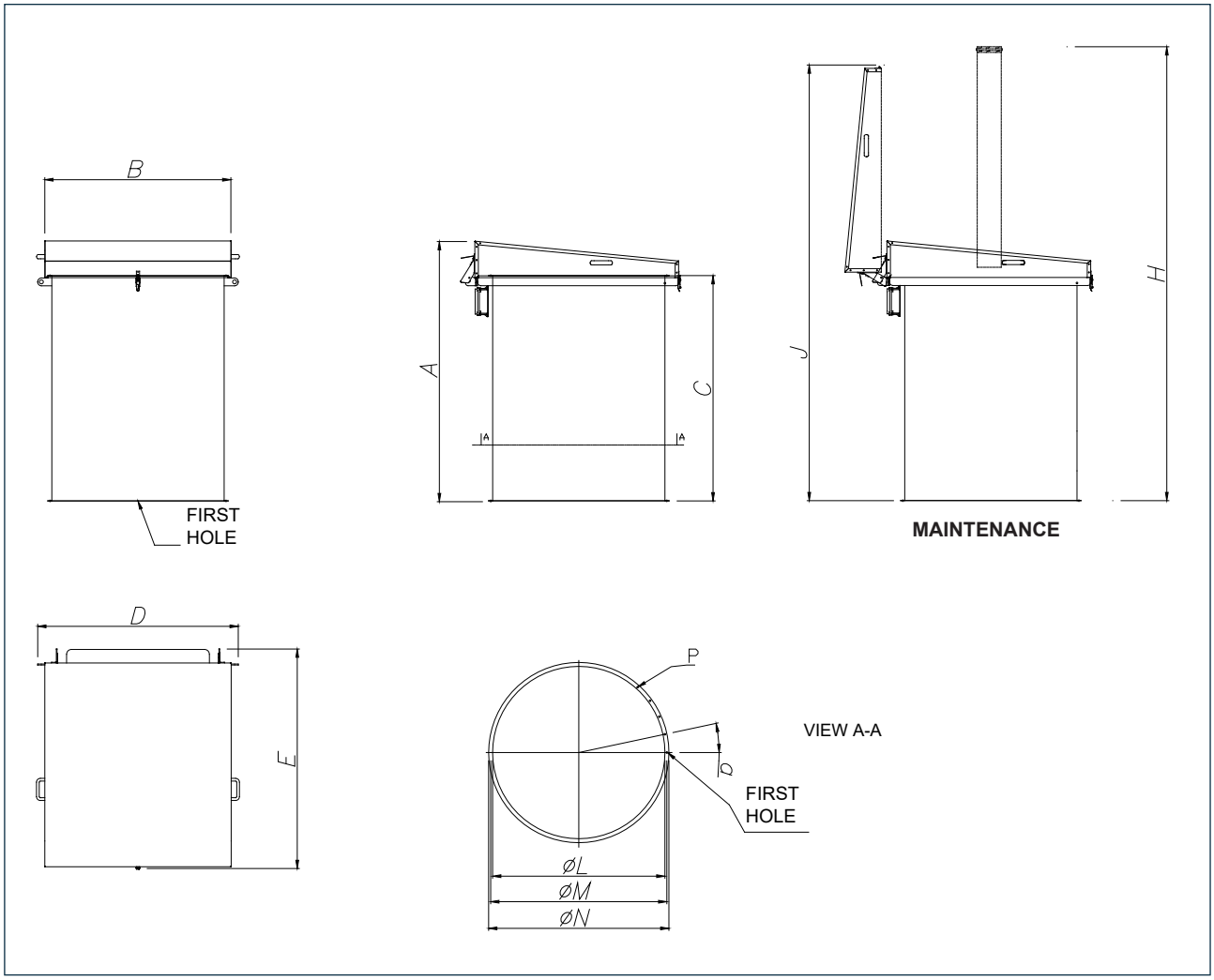
10.1 Dimensions and weights of the standard filter

Cartridges



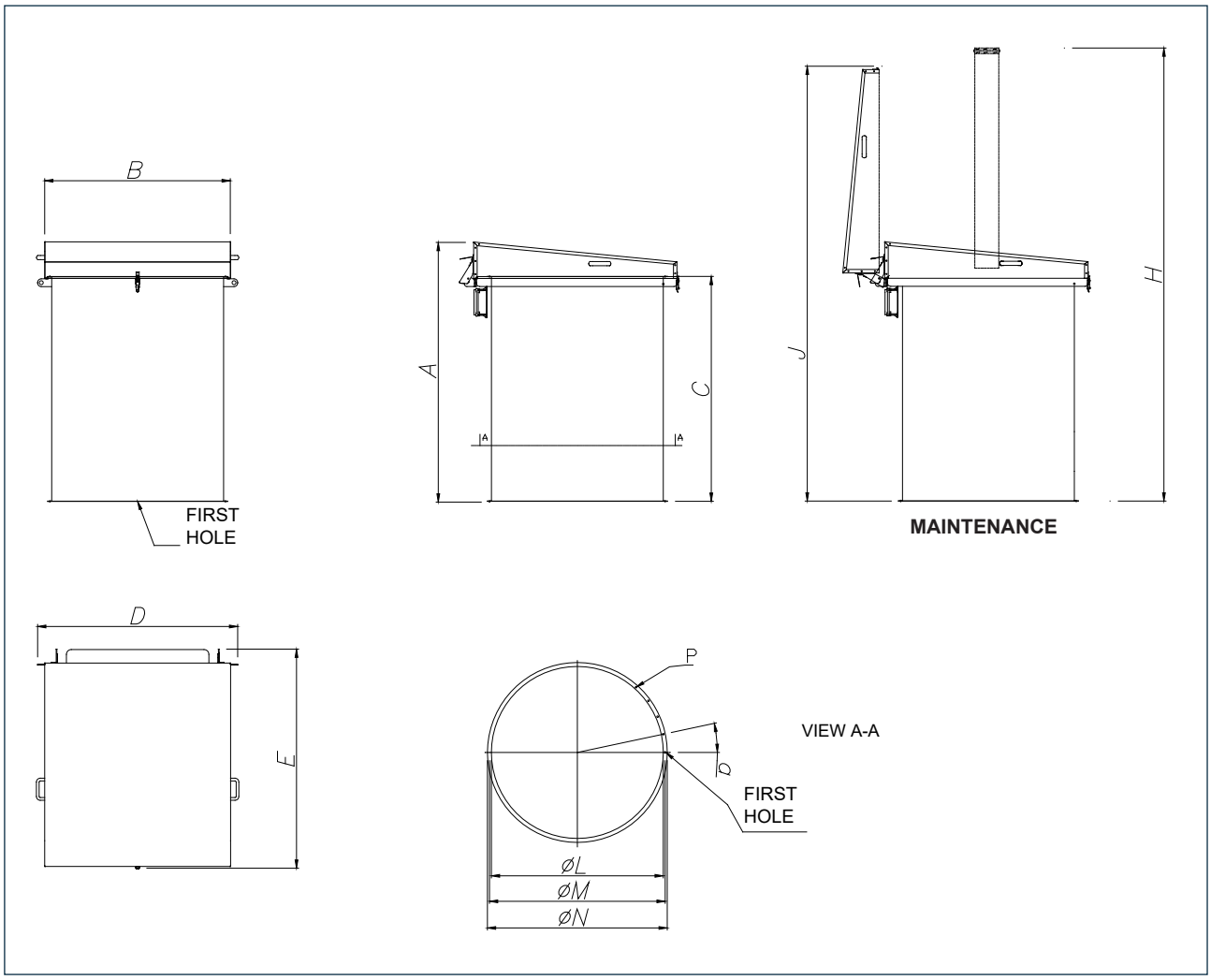
CODE	Filtering surface (m²)	Filter elements		A	B	C	D	E	H	J	K	ØL	ØM	ØN	α	P		Weight (kg)
		No.	Length													No.	Ø	
FNC1J02	1.7	2	520	710	495	526	551	626	1060	1100	754	408	433	458	30	12	10	43
FNC1J03	2.5	2	770	960	495	776	551	626	1560	1350	754	408	433	458	30	12	10	46
FNC1J04	3.3	4	520	710	495	526	551	626	1060	1100	754	408	433	458	30	12	10	38
FNC1J05	5.1	4	770	960	495	776	551	626	1560	1350	754	408	433	458	30	12	10	47
FNC1J06	6.2	4	920	1110	495	926	551	626	1860	1500	754	408	433	458	30	12	10	50
FNC2J07	6.7	8	520	710	690	526	746	871	1060	1100	999	603	628	653	20	18	10	65
FNC2J10	10.2	8	770	960	690	776	746	871	1560	1350	999	603	628	653	20	18	10	71
FNC2J12	12.3	8	920	1110	690	926	746	871	1860	1500	999	603	628	653	20	18	10	75
FNC3J12	11.7	14	520	710	875	526	928	996	1060	1100	1124	783	808	833	15	24	10	89
FNC3J18	18	14	770	960	875	776	928	996	1560	1350	1124	783	808	833	15	24	10	97
FNC3J22	22	14	920	1110	875	926	928	996	1860	1500	1124	783	808	833	15	24	10	103
FNC4J24	23	28	520	710	1125	526	1231	1317	1060	1100	1445	1038	1063	1088	12	30	10	132
FNC4J36	36	28	770	960	1125	776	1231	1317	1560	1350	1445	1038	1063	1088	12	30	10	136
FNC4J44	44	28	920	1110	1125	926	1231	1317	1860	1500	1445	1038	1063	1088	12	30	10	145

POLYPLEAT®



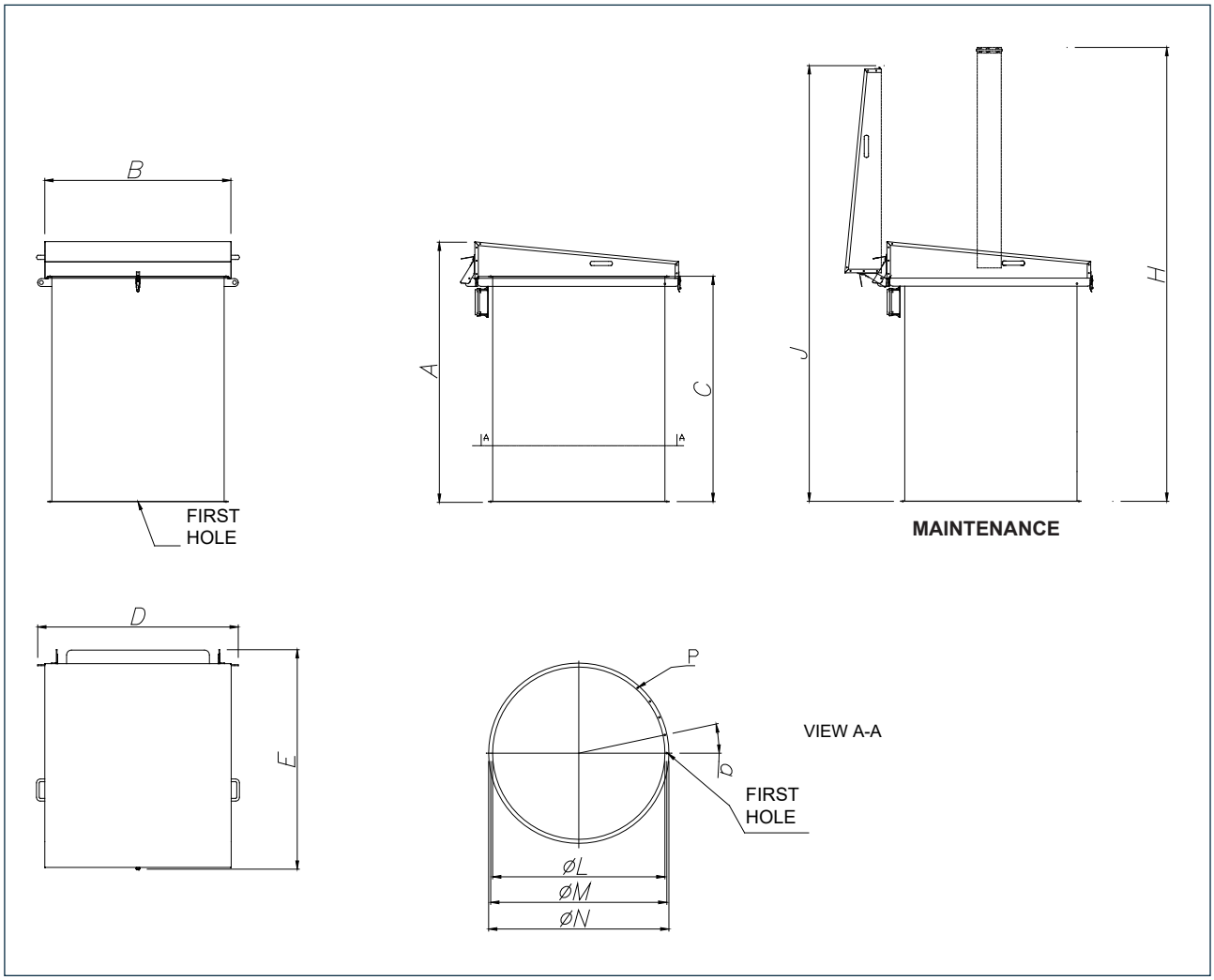
CODE	Filtering surface (m²)	Filter elements		A	B	C	D	E	H	J	K	ØL	ØM	ØN	α	P		Weight (kg)
		No.	Length													No.	Ø	
FNW2J07	7.5	4	520	710	690	526	746	871	1060	1100	999	603	628	653	20	18	10	70
FNW2J11	11.4	4	770	960	690	776	746	871	1560	1350	999	603	628	653	20	18	10	76
FNW2J14	13.7	4	920	1110	690	926	746	871	1860	1100	999	603	628	653	20	18	10	80
FNW3J13	13.1	7	520	710	875	526	928	996	1060	1350	1124	783	808	833	15	24	10	98
FNW3J20	19.9	7	770	960	875	776	928	996	1560	1500	1124	783	808	833	15	24	10	106
FNW3J24	24	7	920	1110	875	926	928	996	1860	1100	1124	783	808	833	15	24	10	112
FNW4J27	27	14	520	710	1125	526	1231	1317	1060	1350	1445	1038	1063	1088	12	30	10	140
FNW4J40	40	14	770	960	1125	776	1231	1317	1560	1500	1445	1038	1063	1088	12	30	10	152
FNW4J48	48	14	920	1110	1125	926	1231	1317	1860	1100	1445	1038	1063	1088	12	30	10	163

Bags



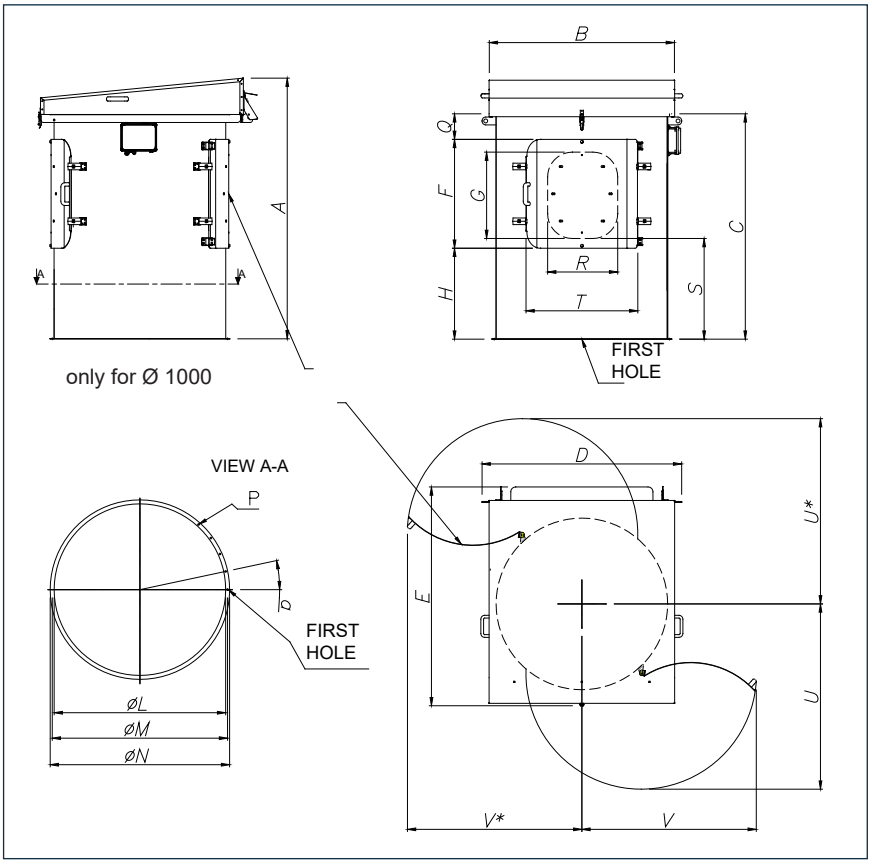
CODE	Filtering surface (m²)	Filter elements		Modules		A	B	C	D	E	H	J	K	ØL	ØM	ØN	α	P		Weight (kg)
		No.	Length	No.	Length													No.	Ø	
FNM1J01	1.5	4	920	1	920	1110	495	926	551	626	1860	1500	754	408	433	458	30	12	10	52
FNM1J02	2.3	4	1360	1	1360	1550	495	1366	551	626	2740	1940	754	408	433	458	30	12	10	58
FNM1J03	3.0	4	1840	2	920	2030	495	1846	551	626	3700	2420	754	408	433	458	30	12	10	65
FNM2J03	3.1	8	920	1	920	1110	690	926	746	871	1860	1500	999	603	628	653	20	18	10	78
FNM2J05	4.5	8	1360	1	1360	1550	690	1366	746	871	2740	1940	999	603	628	653	20	18	10	88
FNM2J06	6.0	8	1840	2	920	2030	690	1846	746	871	3700	2420	999	603	628	653	20	18	10	100
FNM3J05	5.4	14	920	1	920	1110	875	926	928	996	1860	1500	1124	783	808	833	15	24	10	110
FNM3J08	8.0	14	1360	1	1360	1550	875	1366	928	996	2740	1940	1124	783	808	833	15	24	10	124
FNM3J11	10.5	14	1840	2	920	2030	875	1846	928	996	3700	2420	1124	783	808	833	15	24	10	142
FNM4J11	10.8	28	920	1	920	1110	1125	926	1231	1317	1860	1500	1445	1038	1063	1088	12	30	10	158
FNM4J16	16	28	1360	1	1360	1550	1125	1366	1231	1317	2740	1940	1445	1038	1063	1088	12	30	10	181
FNM4J21	21	28	1840	2	920	2030	1125	1846	1231	1317	3700	2420	1445	1038	1063	1088	12	30	10	210

Elliptical bags



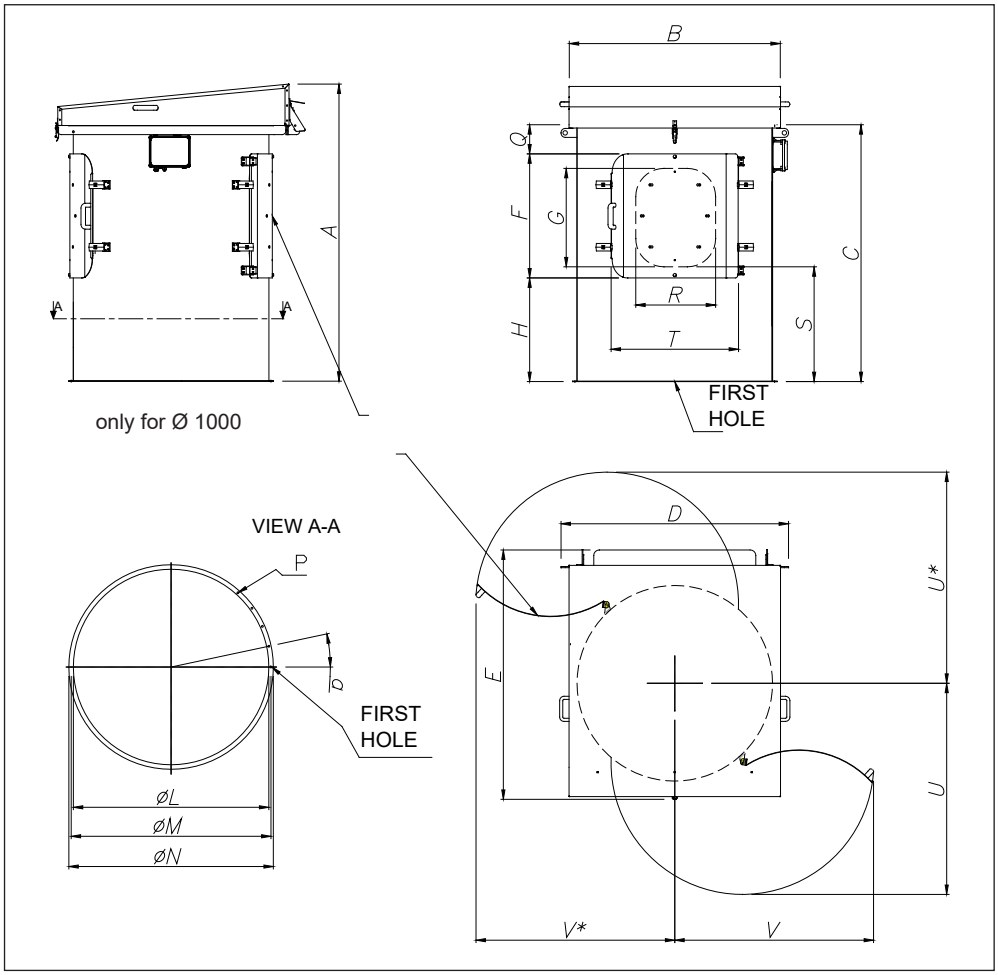
CODE	Filtering surface (m²)	Filter elements		Modules		A	B	C	D	E	H	J	K	ØL	ØM	ØN	α	P		Weight (kg)
		No.	Length	No.	Length													No.	Ø	
FNE2J03	2.4	12	520	1	520	710	690	526	746	871	1060	1345	999	603	628	653	20	18	10	76
FNE2J05	4.4	12	920	1	920	1110	690	926	746	871	1860	1500	999	603	628	653	20	18	10	93
FNE2J07	6.6	12	1360	1	1360	1550	690	1366	746	871	2740	1940	999	603	628	653	20	18	10	110
FNE2J09	8.9	12	1840	2	920	2030	690	1846	746	871	3700	2420	999	603	628	653	20	18	10	127
FNE3J04	3.5	18	520	1	520	710	875	526	928	996	1060	1345	1124	783	808	833	15	24	10	104
FNE3J07	6.6	18	920	1	920	1110	875	926	928	996	1860	1500	1124	783	808	833	15	24	10	128
FNE3J10	9.9	18	1360	1	1360	1550	875	1366	928	996	2740	1940	1124	783	808	833	15	24	10	153
FNE3J14	13.3	18	1840	2	920	2030	875	1846	928	996	3700	2420	1124	783	808	833	15	24	10	177
FNE4J07	6.7	34	520	1	520	710	1125	526	1231	1317	1060	1345	1445	1038	1063	1088	12	30	10	149
FNE4J13	12.4	34	920	1	920	1110	1125	926	1231	1317	1860	1500	1445	1038	1063	1088	12	30	10	189
FNE4J20	20	34	1360	1	1360	1550	1125	1366	1231	1317	2740	1940	1445	1038	1063	1088	12	30	10	233
FNE4J26	26	34	1840	2	920	2030	1125	1846	1231	1317	3700	2420	1445	1038	1063	1088	12	30	10	271

Cartridges removable from the front

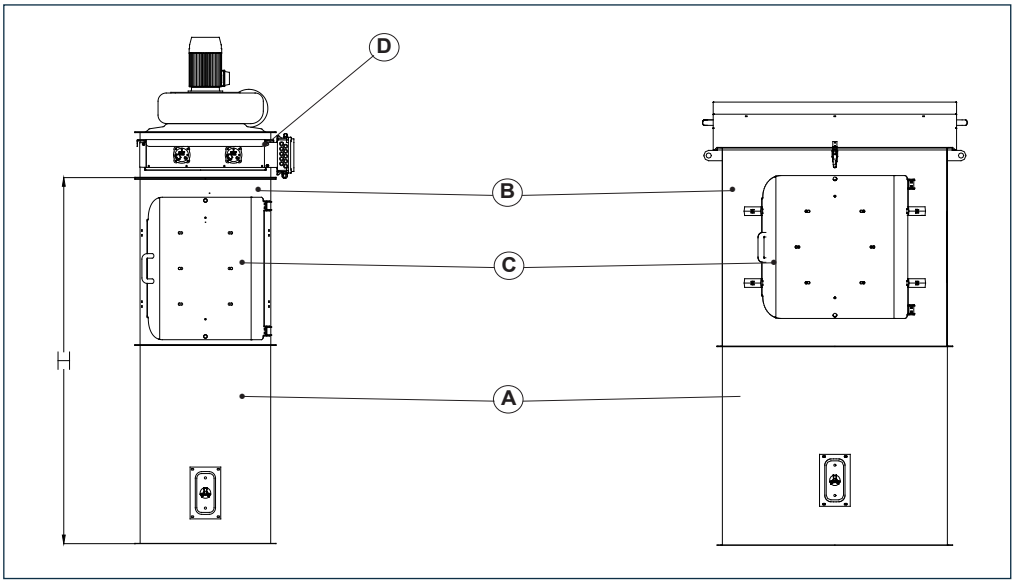


CODE	Filtering surface (m²)	Filter elements																				P		Weight (kg)
		No.	Length	A	B	C	D	E	F	G	H	Q	R	S	T	U	V	ØL	ØM	ØN	α	N°	Ø	
FNS1J02	1.7	2	520	710	495	526	551	626	400	330	30	96	280	255	430	496	370	408	433	458	30	12	10	50
FNS1J03	2.5	2	770	960	495	776	551	626	660	580	25	91	280	255	430	496	370	408	433	458	30	12	10	57
FNS1J04	3.3	4	520	710	495	526	551	626	400	330	30	96	280	255	430	496	370	408	433	458	30	12	10	51
FNS1J05	5.1	4	770	960	495	776	551	626	660	580	25	91	280	255	430	496	370	408	433	458	30	12	10	59
FNS1J06	6.2	4	920	1110	495	926	551	626	660	580	130	136	280	255	430	496	370	408	433	458	30	12	10	62
FNS2J07	6.7	8	520	710	690	526	746	871	400	330	30	96	390	360	550	740	440	603	628	653	20	18	10	77
FNS2J10	10.2	8	770	960	690	776	746	871	660	580	25	91	390	360	550	740	440	603	628	653	20	18	10	89
FNS2J12	12.3	8	920	1110	690	926	746	871	660	580	130	136	390	360	550	740	440	603	628	653	20	18	10	94
FNS3J12	11.7	14	520	710	875	526	928	996	400	330	30	96	499	465	650	940	543	783	808	833	15	24	10	104
FNS3J18	18	14	770	960	875	776	928	996	660	580	25	91	499	465	650	940	543	783	808	833	15	24	10	119
FNS3J22	22	14	920	1110	875	926	928	996	660	580	130	136	499	465	650	940	543	783	808	833	15	24	10	126
FNS4J24	24	28	520	710	1125	526	1231	1317	400	330	30	96	499	475	680	1150	460	1038	1063	1088	12	30	10	143
FNS4J36	36	28	770	960	1125	776	1231	1317	660	580	25	91	499	475	680	1150	460	1038	1063	1088	12	30	10	160
FNS4J44	44	28	920	1110	1125	926	1231	1317	660	580	130	136	499	475	680	1150	460	1038	1063	1088	12	30	10	172

Bags removable from the front



CODE	Filtering surface (m²)	Filter elements		Modules																				P		Weight (kg)
		No.	Length	No.	Length	A	B	C	D	E	F	G	H	P	Q	R	S	T	U	V	ØL	ØM	ØN	α	No.	Ø	
FNB1J01	1.5	4	920	1	920	1110	495	926	551	626	660	580	130	176	136	280	255	434	496	370	408	433	458	30	12	10	64
FNB1J02	2.3	4	1360	1	1360	1550	495	1366	551	626	660	580	570	176	136	280	255	434	496	370	408	433	458	30	12	10	75
FNB1J03	3.0	4	1840	2	920	2030	495	1846	551	626	660	580	1050	176	136	280	255	434	496	370	408	433	458	30	12	10	77
FNB2J03	3.1	8	920	1	920	1110	690	926	746	871	660	580	130	176	136	390	360	552	740	440	603	628	653	20	18	10	97
FNB2J05	4.5	8	1360	1	1360	1550	690	1366	746	871	660	580	570	176	136	390	360	552	740	440	603	628	653	20	18	10	111
FNB2J06	6.0	8	1840	2	920	2030	690	1846	746	871	660	580	1050	176	136	390	360	552	740	440	603	628	653	20	18	10	119
FNB3J05	5.4	14	920	1	920	1110	875	926	928	996	660	580	130	176	136	499	465	648	940	543	783	808	833	15	24	10	132
FNB3J08	8.0	14	1360	1	1360	1550	875	1366	928	996	660	580	570	176	136	499	465	648	940	543	783	808	833	15	24	10	152
FNB3J11	10.5	14	1840	2	920	2030	875	1846	928	996	660	580	1050	176	136	499	465	648	940	543	783	808	833	15	24	10	165
FNB4J11	10.8	28	920	1	920	1110	1125	926	1231	1317	660	580	130	176	136	499	475	678	1150	460	1038	1063	1088	12	30	10	184
FNB4J16	16	28	1360	1	1360	1550	1125	1366	1231	1317	660	580	570	176	136	499	475	678	1150	460	1038	1063	1088	12	30	10	213
FNB4J21	21	28	1840	2	920	2030	1125	1846	1231	1317	660	580	1050	176	136	499	475	678	1150	460	1038	1063	1088	12	30	10	236



STANDARD								
H	LOWER BODY		INTERMEDIATE BODY		HATCH		UPPER BODY	
	Thickness	Finishing	Thickness	Finishing	Thickness	Finishing	Thickness	Finishing
520 770 920 1360	Absent		1.5 mm	2 B	2 mm	Satin finish 120-180 (4/4/IV*)	1	2 B
1840	1 mm	2 B						

STANDARD								
H	LOWER BODY		INTERMEDIATE BODY		HATCH		UPPER BODY	
	Thickness	Finishing	Thickness	Finishing	Thickness	Finishing	Thickness	Finishing
520 770 920 1360	Absent		1.5 mm	2 B	2 mm	Satin finish 120-180 (4/4/IV*)	2	2 B
1840	2 mm	2 B						

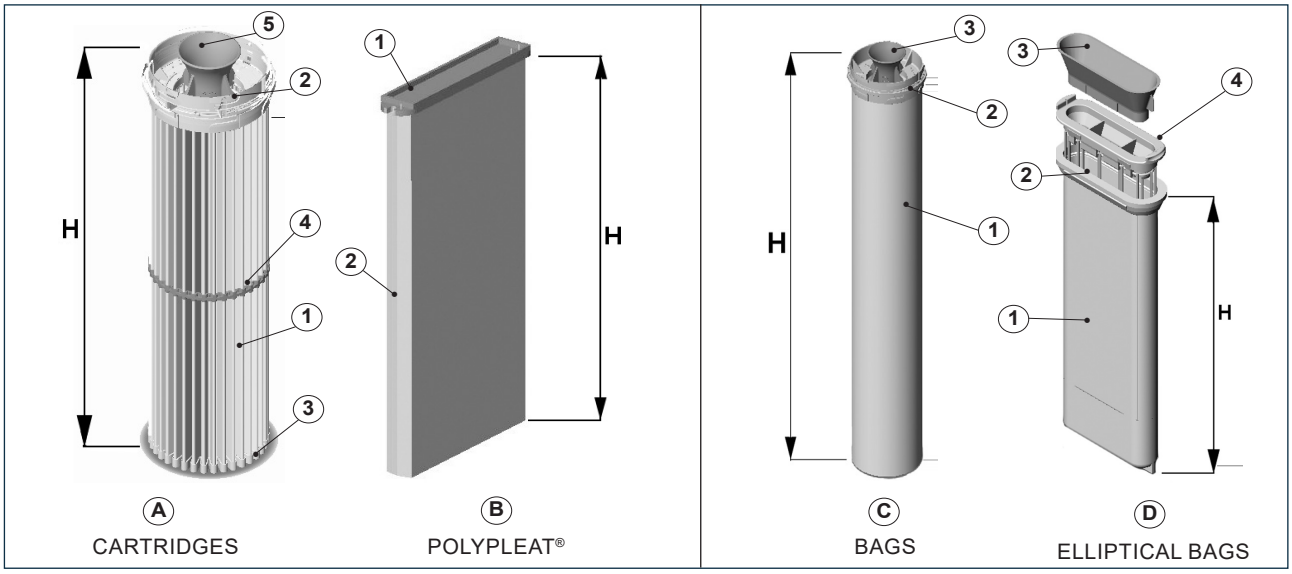
STANDARD								
H	LOWER BODY		INTERMEDIATE BODY		HATCH		UPPER BODY	
	Thickness	Finishing	Thickness	Finishing	Thickness	Finishing	Thickness	Finishing
520 770 920 1360	Absent		400 - 1.5 mm 600 - 1.5 mm 800 - 2 mm 1000 - 2 mm	2 B	2.5 mm	Satin finish 120-180 (4/4/IV*)	400 - 1.5 mm 600 - 1.5 mm 800 - 2 mm 1000 - 2 mm	2.5 mm
1840	400 - 1.5 mm 600 - 1.5 mm 800 - 2 mm 1000 - 2 mm	2 B						

10.2 Filter elements

Circular or elliptical filter elements can be installed in **WAMFLO®** filters. The filter medium may be smooth (bags or elliptical bags) or pleated (cartridge and **POLYPLEAT®**). The latter solution ensures optimum use of the space available, but is incompatible with certain types of applications. For more details consult the **WAM®** technical-sales department.

The Venturi system, applied in **WAMFLO®** filters, is specially designed by **WAM®** to make the compressed air cleaning system more efficient.

PLEATED **SMOOTH**



TYPE	ITEM POS.	DESCRIPTION	MATERIAL	H
CARTRIDGE (A)	1	Filter medium	Non-woven-fabric polyester	520 770 920
	2	Head	Thermoplastic material	
	3	Base plate		
	4	Strip		
	5	Venturi		
POLYPLEAT® (B)	1	Head	Thermoplastic material	
	2	Filter medium	Non-woven-fabric polyester	
BAG (C)	1	Filter medium	Polyester felt	920 1360 1840
	2	Head	Thermoplastic material	
	3	Venturi		
ELLIPTICAL BAG (D)	1	Filter medium	Polyester felt	520 920 1360 1840
	2	Head	Technopolymer (SINT®ER)	
	3	Venturi	Thermoplastic material	
	4	Frame head		

10.3 Filter media

For all filter elements there can be used different types of media, to satisfy the requirements of all the applications in the various industrial sectors. The **WAM®** filter media are rigorously certified by the **"BIA" Professional Institute for Workplace Safety** (Germany).

WAM® Code	MATERIAL	g/m²	FIELDS OF APPLICATION	Class BIA
SMOOTH				
FM	Smooth polyester felt	350	Very simple filtration	L
FP	Smooth polyester felt	500	Filtration of std.materials (more than 70µm)	L
FA	Smooth polyester felt	550	Filtrations of electrostatically charged materials	L
FF	Smooth polyester felt	350	Filtration of flour and bran (flour mills industry)	
FV	Smooth polyester felt	550	Filtration of materials containing moisture and/or oils	L
FB	Smooth polyester felt	550	Filtrations of electrostatically charged materials and those which contain moisture or oils	L
FU	Smooth polyester felt	470	Average difficult filtrations	M
MT	Smooth polyester felt	550	Extreme filtrations	M
FZ	Smooth polyester felt	485	Extreme filtrations of electrostatically charged materials	M

WAM® Code	MATERIAL	g/m²	FIELDS OF APPLICATION	Class BIA
PLEATED				
PH	Pleated polyester with nanofiber	265	Filtration of std.materials	M
PX	Pleated polyester anti-static with nanofiber	265	Filtrations of electrostatically charged materials	M
PV	Pleated polyester idro-oleophobic	265	Filtration of materials containing moisture and/or oils	M
PB	Pleated polyester anti-static idro-oleophobic	265	Filtrations of electrostatically charged materials and those which contain moisture or oils	M
PT	Pleated polyester with ePTFE membrane	280	Extreme filtrations	M
PZ	Pleated polyester antistatic with ePTFE membrane	290	Extreme filtrations of electrostatically charged materials	M

NOTE: For more information see "Filter Media" and "Selection Criteria" Catalogues.

10.4 Timers

The timer has the function of controlling the filter elements cleaning cycle with compressed air sequentially, with the possibility of changing the cleaning time and pause time between one cleaning operation and the next.

Fig. 1

Electronic timer (Fig.1)

The **WAM®** electronic control panel can be powered with a 24V - 260V AC/DC, 50/60 Hz supply and installed inside a container which ensures a protection degree IP66.

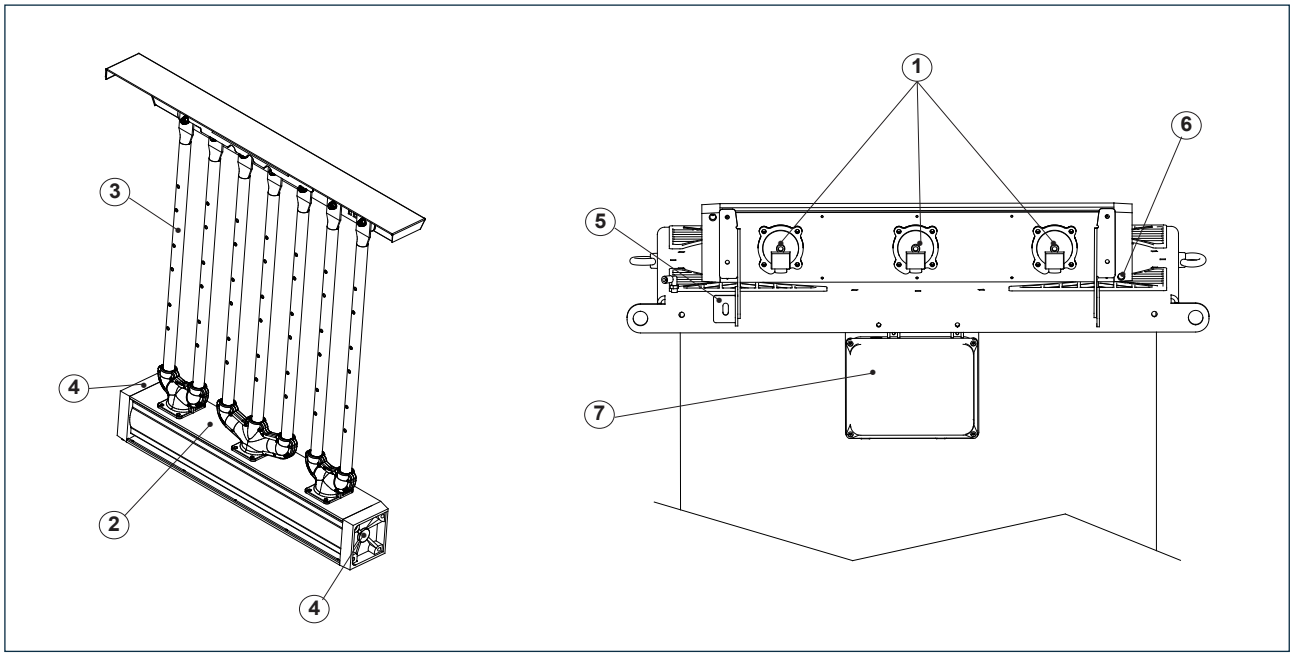
The board comes with 1-9 cleaning programs for the TIME version and 64 cleaning programs for the CONNECT version. Each program envisages the cleaning at the end of the cycle.

10.5 Cleaning system

For the **WAMFLO®** filters the filter elements cleaning system can be selected in the order phase (box 3 of modular key):

J - reverse compressed air jet.

Cleaning with reverse compressed air jet



Cleaning unit

It consists of:

- Solenoid valves (**1**) mounted directly inside the compressed air tank (**2**) so as to reduce load losses to the minimum;
- SS 304 Cleaning tubes (**3**);
- Externally anodized aluminium tank with two heads (**4**) also made of aluminium with black matt cataphoresis treatment;
- Air inlet valve (**5**)
- Valve for condensate drainage (**6**).

Timer (**7**) which controls compressed air supply to the cleaning pipes in a sequential manner. The filter requires a connection with a compressed air pipe at constant 6 bar. The air must be cleaned, de-moist and de-oiled.

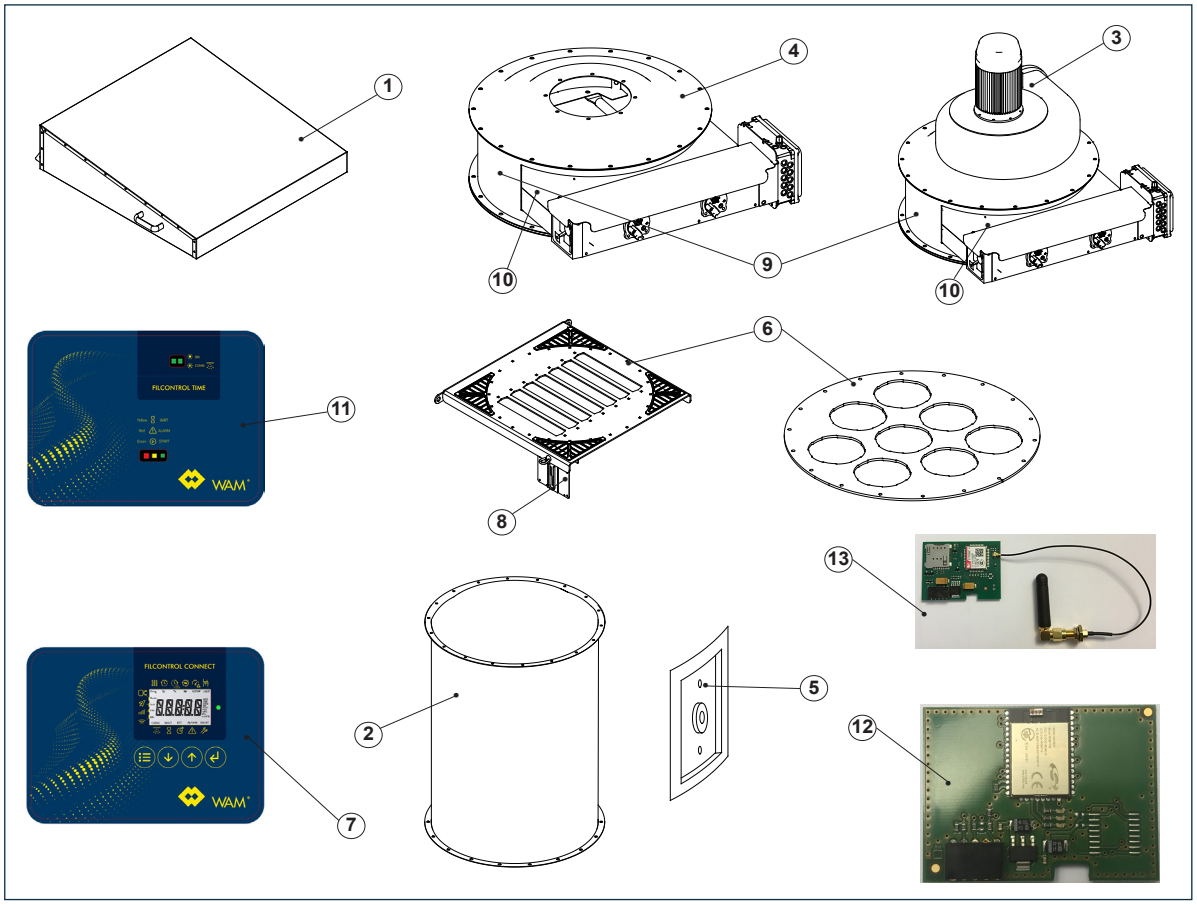
Cleaning with mechanical vibrated system

Cleaning unit

It consists of:

- Three-phase asynchronous electric vibrator;
- The terminal box is provided with strip connectors for the fitting of the vibrator and of the exhaust fan (if installed).

10.6 Options: materials and finishes

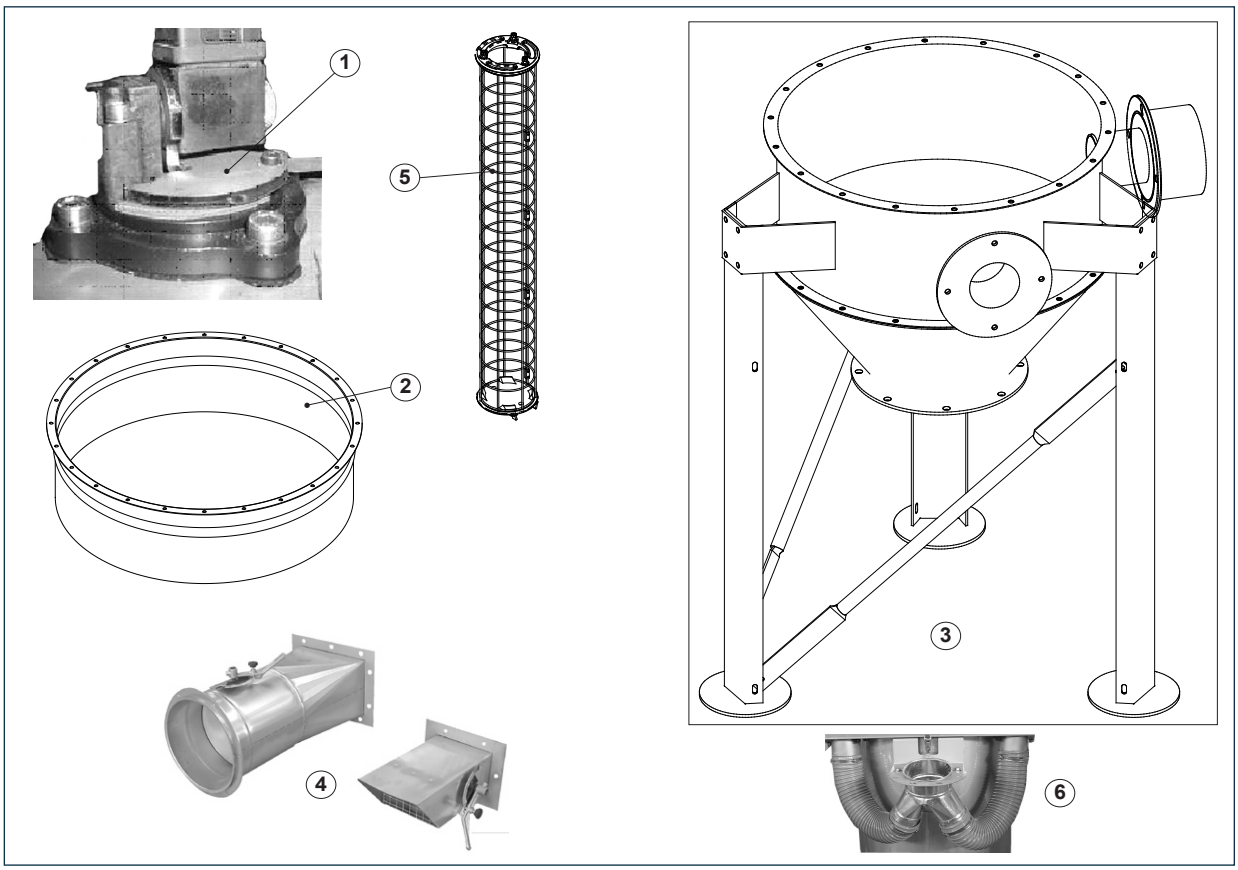


ITEM POS.	DESCRIPTION	MATERIAL	THICKNESS	FINISH
1	Cover	SS 316	1 mm	2B (UNI EN 10088-2/4 1997
2	Filter body	SS 304	2 mm	
		SS 316	1 mm	
		SS 316	2 mm	
3	Fan	See pages 29-30		
4	Upper suction connection	CARBON steel	2 mm	Powder painted RAL 7001
		SS 304	2 mm	2B (UNI EN 10088-2/4 1997)
		SS 316	2 mm	2B (UNI EN 10088-2/4 1997)
5	Inspection hatch	SS 304	--	2B (UNI EN 10088-2/4 1997)
6	Elements-holder plate	SS 304	6 mm	Satin finish 120 - 180 (4/4/IV*)
		SS 316		
7	FILCONTROL CONNECT	--	--	--
8	MDP	--	--	--
9	Upper body	SS 304	1 mm	2B (UNI EN 10088-2/4 1997)
		SS 316	2 mm	
10	Panel			
11	FILCONTROL TIME	--	--	--
12	WI FI MODULE	--	--	--
13	MODULE GPRS	--	--	--

*In accordance with UNI-EN 10088 (1997) / AISI (1974) / DIN 17440 (1985)

10.7 Accessories

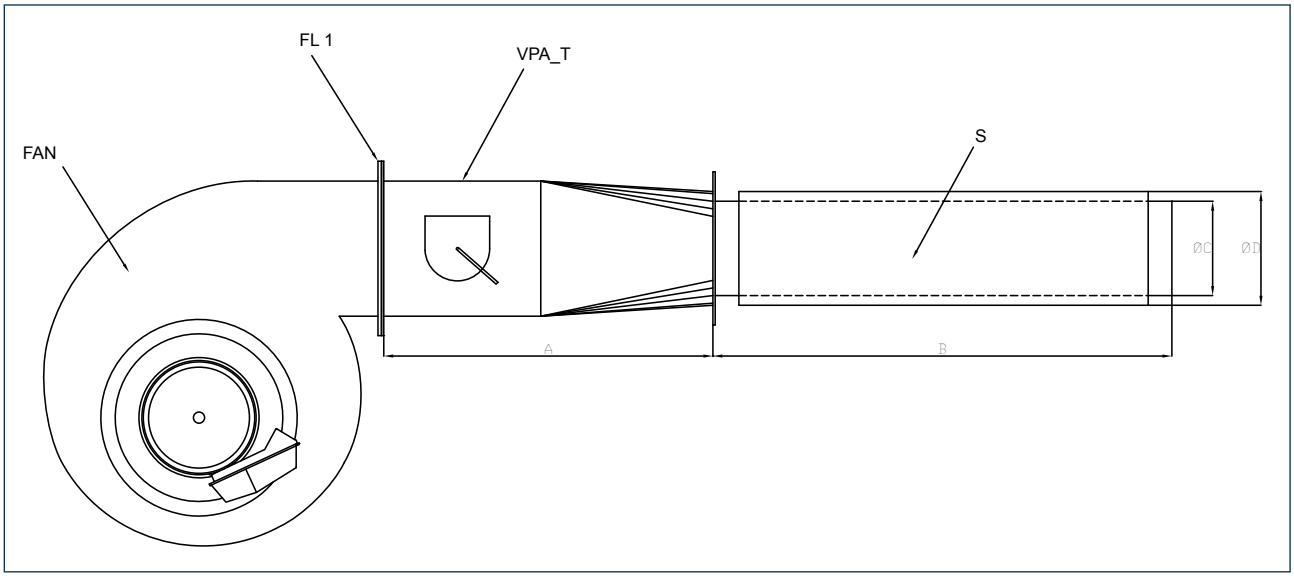
Materials and finishings



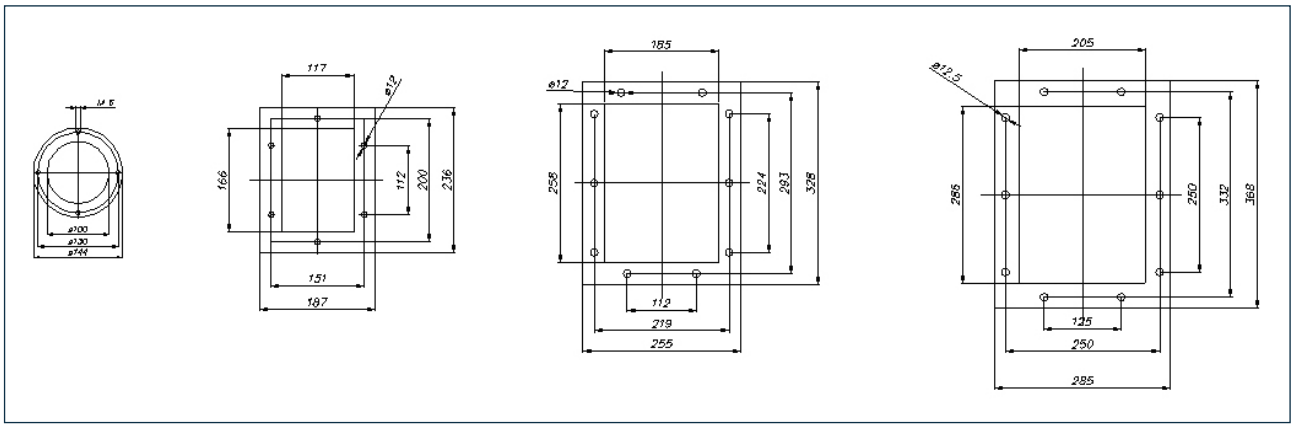
POS.	DESCRIPTION	MATERIAL	THICKNESS	FINISH
1	KWP01	Winter protection		----
2	Filter flange	CARBON steel	2 mm	Powder painted RAL7001
		SS 304	2 mm	2B (UNI EN 10088-2/4 1997
		SS 316	2 mm	2B (UNI EN 10088-2/4 1997
3	Dust collection hopper	See DK Hoppers Catalogue		
4	Choke valve for fan	CARBON steel	2 mm	Galvanized
5	Plasticized frames	CARBON steel	--	Plasticized powder paint RAL 9001
6	Emissions sampling connection	--	--	--

*In accordance with UNI-EN 10088 (1997) / AISI (1974) / DIN 17440 (1985)

Choke valve with silencer

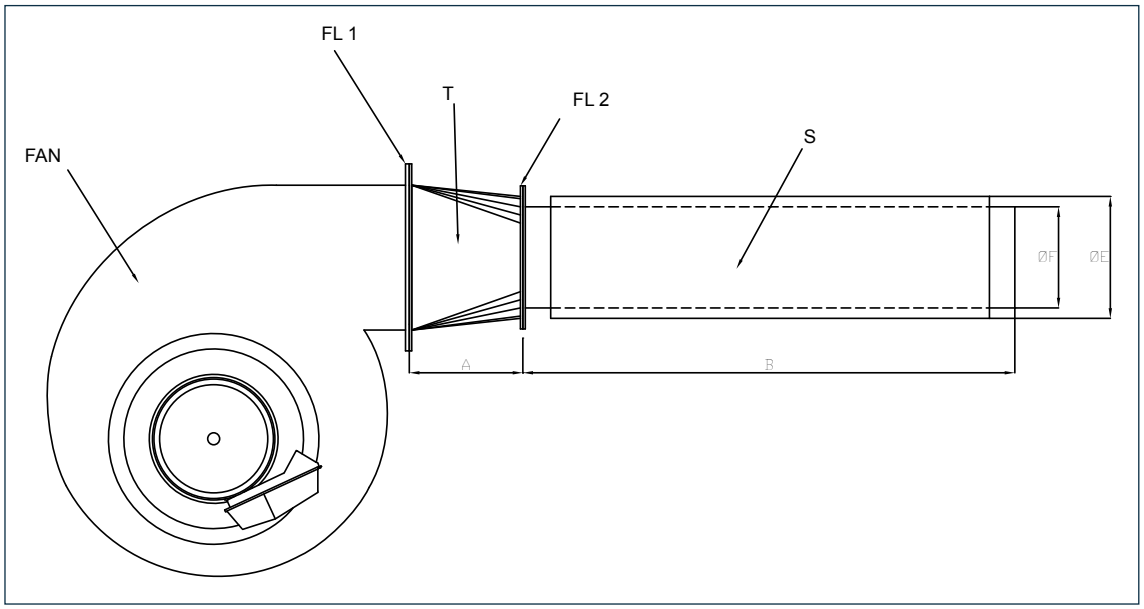


Fan	VPA + Silencer	A [mm]	B [mm]	Diameter C [mm] (Interno)	Diameter D [mm] (Esterno)	Weight S [kg]
A	VPAAS	180	650	100	200	7,5
B	VPABS	440	700	160	260	11,5
C	VPACS	585	700	250	350	18
D	VPADS	630	700	315	415	24

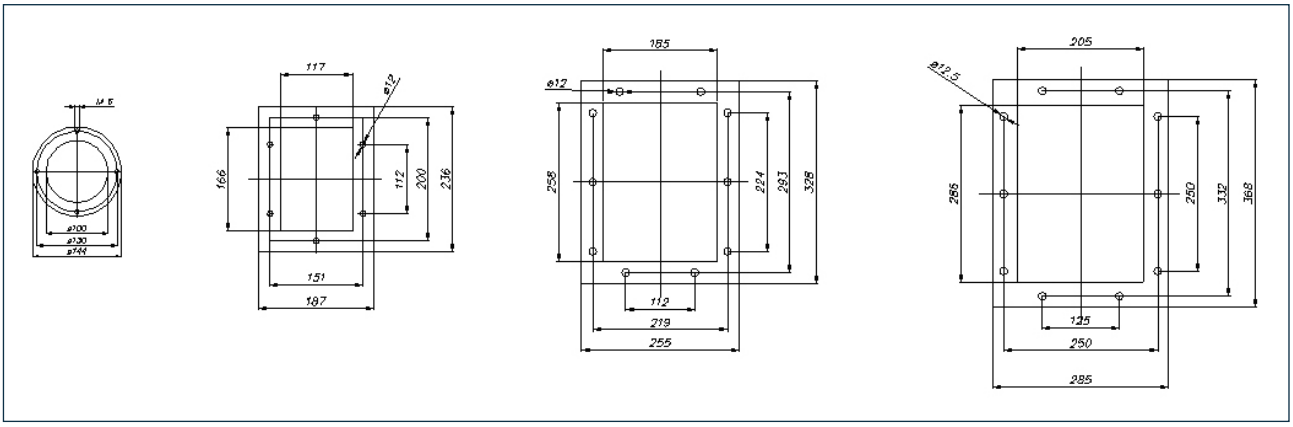


FAN TYPE	FAN FLANGE									
	A	B	C	D	E	F	G	H	I	N° ø
B (1.5)	187	236	165	117	-	1	112	151	200	6
C (2.2-3)	255	328	258	185	112	2	112	219	292	10
D (4-5.5)	285	368	288	205	125	2	125	249	332	10

Silencer



Fan	T	Silencer	A [mm]	B [mm]	Diameter F [mm] (Interno)	Diameter F [mm] (Esterno)	Weight S [kg]
A	X	SLA00	180	650	100	200	6
B	X	SLB00	180	700	160	260	11
C	X	SLC00	180	700	200	300	13
D	X	SLD00	200	700	250	350	15,5



FAN TYPE	FAN FLANGE									
	A	B	C	D	E	F	G	H	I	N° ø
B (1.5)	187	236	165	117	-	1	112	151	200	6
C (2.2-3)	255	328	258	185	112	2	112	219	292	10
D (4-5.5)	285	368	288	205	125	2	125	249	332	10