Manual

SmartWall & Filterbank

Manual for Smartwall & Filterbank

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Manual for Smartwall & Filterbank

Content

Introduction

Dear technician,

We are confident that you will enjoy working with your new Smartwall or filterbank.

If you have any other types of questions, we refer to our Service & Support platform at www.support.wheelrestore.com. Use your login provided at initial training.

Disclaimer

Safety

General Safety Notes

CAUTION: Only authorized and trained personnel may operate this equipment. You must always act in accordance with the Operators manual, safety decals, safety procedures, and instructions for safe machine operation. Untrained personnel present a hazard to themselves and the machine.

IMPORTANT: Do not operate this machine until you have read all warnings, cautions, and instructions. Due to obtaining safety level, the machine may only be operated by a single user.

It is mandatory that you go through a training course and study this manual thoroughly before you start using equipment.

Decommission, dismantle and disposal

Machine Shipping:
The machine in question is not designed to be disassembled for shipment. It should be transported as a whole unit, using the same method employed during its initial delivery. By following this procedure, the integrity and functionality of the machine can be ensured during transportation.

Machine Disposal:
When the machine reaches the end of its lifecycle, it can be returned to the manufacturer's authorized distributor for proper disposal. The manufacturer willingly accepts all components of the machine for recycling purposes, in accordance with Directive 2002/96/EC. This directive ensures environmentally responsible practices for electronic waste management. By adhering to this directive, both the manufacturer and the owner contribute to the preservation of the environment.

End-of-Life Disposal:
It is essential that the process of end-of-life disposal aligns with the laws and regulations in the region where the machine is located. This phase of disposal is a shared responsibility between the machine owner and the seller. Both parties are obligated to comply with the relevant legal requirements and ensure the proper handling and disposal of the machine. It is important to note that the risk analysis conducted for the machine does not encompass this disposal phase. Therefore, the owner and seller must independently assess and adhere to the appropriate legal procedures to ensure responsible and compliant disposal.

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By following these guidelines, the machine can be shipped and disposed of in a manner that upholds legal requirements, environmental standards, and best practices for responsible waste management.

Commissioning

The operator must pass a training course to be approved for operating the machine. Afterwards this user manual can be used as a guidance for the operations.

General

Introduction

The SmartWall system has been meticulously designed and developed to offer two primary modes of operation, providing maximum versatility and adaptability to suit diverse site requirements. In its first mode, the SmartWall functions as a self-contained unit with integrated filtration and sensors. This intelligent design empowers the SmartWall to effectively respond to specific site needs, including variations in size, such as length and width. Whether a site demands a compact configuration or a more expansive setup, the SmartWall can be adjusted accordingly, ensuring optimal performance and efficiency.

Moreover, the seamless integration between the SmartWall and the SmartBox enhances the system's overall functionality and control capabilities. The SmartBox serves as the central command center, facilitating communication and connectivity between the SmartWall and its associated hardware components. Utilizing a robust local network infrastructure, such as a web-based Human-Machine Interface (HMI) or an App-based HMI, the SmartBox establishes a reliable and efficient interface for monitoring, controlling, and managing the SmartWall's operations.

Through the SmartBox's connectivity features, the hardware components of the SmartWall are effectively interconnected, forming a cohesive network. This network, operating via a Local Area Network (LAN), ensures seamless data exchange, enabling real-time data acquisition, analysis, and feedback. Consequently, operators can leverage the power of the SmartWall system to make informed decisions, implement precise adjustments, and optimize performance based on the specific environmental conditions and requirements of the site.

With its advanced functionality and adaptability, the SmartWall system not only delivers exceptional performance but also offers a streamlined user experience. The comprehensive control capabilities provided by the SmartBox, combined with the flexibility of the SmartWall's design, enable users to tailor the system precisely to their unique needs. Whether it's in industrial settings or commercial spaces applications, the SmartWall system stands as a reliable and innovative solution, revolutionizing the way we approach environmental control and management.

Connection requirements

- 220v or 110v
- Internet connect via RJ45 cable

The web-based real-time operation of the SmartWall system includes:

- Filterbank status monitoring
- Real-time control of outlet air quality
- Alarm system for timely filter change and monitoring of differential pressure before and after the filter unit
- VOC (Volatile Organic Compounds) real-time sensor alarm system
- Real-time air quality control in different work zones
- Automatic shutdown of spray guns' air supply in the event of VOC overload detection in the work zones
- Workflow and VOC history backup capabilities

With these features, the SmartWall system ensures efficient operation, maintains superior air quality, and enhances safety measures in various work environments. Users can monitor the status of the filterbank, adjust air quality parameters, receive timely alerts for filter replacement, and track differential pressure to

ensure optimal filtration performance. The VOC real-time sensor alarm system provides an additional layer of safety by detecting and responding to VOC overload situations. The system also enables precise control of air quality in different work zones, ensuring a healthy and safe working environment. Lastly, the workflow and VOC history backup capabilities allow users to maintain comprehensive records for analysis, process improvement, and compliance purposes.

Data motoring

Type of data monitoring	Used for
VOC (Volatile Organic Compounds)	Measuring the outlet air quality to ensure clean air.
Air Speed	To ensure the required air speed.
Humidity	To adjust the fan speed pending on humidity based on filter touch time.
Temperature	To adjust the fan speed pending on temperature based on filter touch time.
Differential pressure	To adjust the fan speed pending on the usages of each level of filter.
Fan speed	To validate the optimal fan speed.
Spray gun air feed supply	In event that VOC levels are higher than permitted the VOC source is shut off.
Electronic components	To used within the alarm log of each unit.

Alarms

RPM ALARM

In the event that RPM alarms are triggered due to a motor's rotary fields failing to align with the rotary field in the frequency inverter, the following steps should be taken:

- Verify the condition of the motor: Inspect the motor to ensure it is functioning properly. Look for any signs of damage, overheating, or mechanical issues that may be affecting its performance.
- Examine the acceleration time (ACC) setting: Access the settings on the frequency inverter and specifically review the acceleration time parameter. By default, the ACC setting is typically configured to 1 second. Ensure that this setting is correctly configured and aligned with the requirements of the motor and the specific application.

By following these steps, you can effectively address the RPM alarm issue and diagnose any potential problems with the motor or the settings on the frequency inverter. Proper maintenance and adjustment will help ensure smooth operation and prevent any adverse effects on the system's performance.

VOC ALARM

When VOC (Volatile Organic Compounds) alarms are triggered due to the VOC outlet level being 40% higher than the VOC inlet level for a specific duration, the following actions should be taken:

- Inspect the filter system: Check the condition of the filter system, including the filters themselves, for any signs of clogging, damage, or inefficiency. Ensure that the filters are properly installed and functioning effectively in capturing VOCs. If necessary, replace or clean the filters to restore optimal performance.
- Assess the environment: Evaluate the surrounding environment to identify potential sources of VOC emissions. Look for any open containers, cans, or other items that may be releasing VOCs into the air. Take appropriate measures to eliminate or minimize these sources to maintain a healthier and safer environment.

By conducting these actions, you can effectively address VOC alarms and ensure that the filter system is operating efficiently. Additionally, mitigating potential sources of VOC emissions in the environment will help maintain air quality standards and promote a safer working or living environment.

DIFF. PRESS. ALARM
When differential pressure alarms are triggered due to the pressure being either lower than 20pa or exceeding 200pa for a specific duration, it is important to take the following actions:

- Inspect the filter system: Check the filter system thoroughly to identify any potential issues. Verify if the filter lid is securely closed, ensuring a proper seal. Look for any missing filters or filters that have reached their maximum capacity and require replacement. Addressing these issues will help maintain the integrity and efficiency of the filter system.

By conducting these actions, you can effectively address the differential pressure alarms and ensure that the filter system is functioning optimally. Proper maintenance and timely replacement of filters will help maintain a clean and healthy environment by effectively capturing particles and contaminants.

Filters for SmartWall

Extract 4-Stage Filtration System
Stage-1 Paint Arrestor
(Paper Media) to collect the dissociative particles
Stage-2 Mirco filter
(Synthetic Media) to collect the fine particles & dust
Stage-3 Pleated Box
(Synthetic Media) to pre-filter mirco particles & dust
Stage-4 Carbon Block
(Active Charcoal filter) to reduce fumes & odours

Safety

This section will describe safety including fencing and emergency stops. The system is built with use of both fencing, access doors, light and emergency stops (safety included in PLC). All equipment installed will ensure to follow existing laws and standards.

VOC measurement

VOC is a volatile chemical substance that is formed or released during the spraying of paints and that pollutes the atmosphere. There is no uniform definition for VOC between countries. Accordingly, information on the emission of VOC can only be evaluated if the definition used is also given. VOC is defined within Europe as follows:

“VOC is a chemical compound based on carbon released by natural sources or by human activities such as the use of solvents, paints and varnishes, storage of fuels and their use at petrol stations, exhaust gases from motor vehicles in the air. VOCs are emitted from a variety of anthropogenic and biogenic processes in the environment. The formation can be caused by natural or industrial applications. The industrial use of solvents and transport are among the most important anthropogenic sources.”

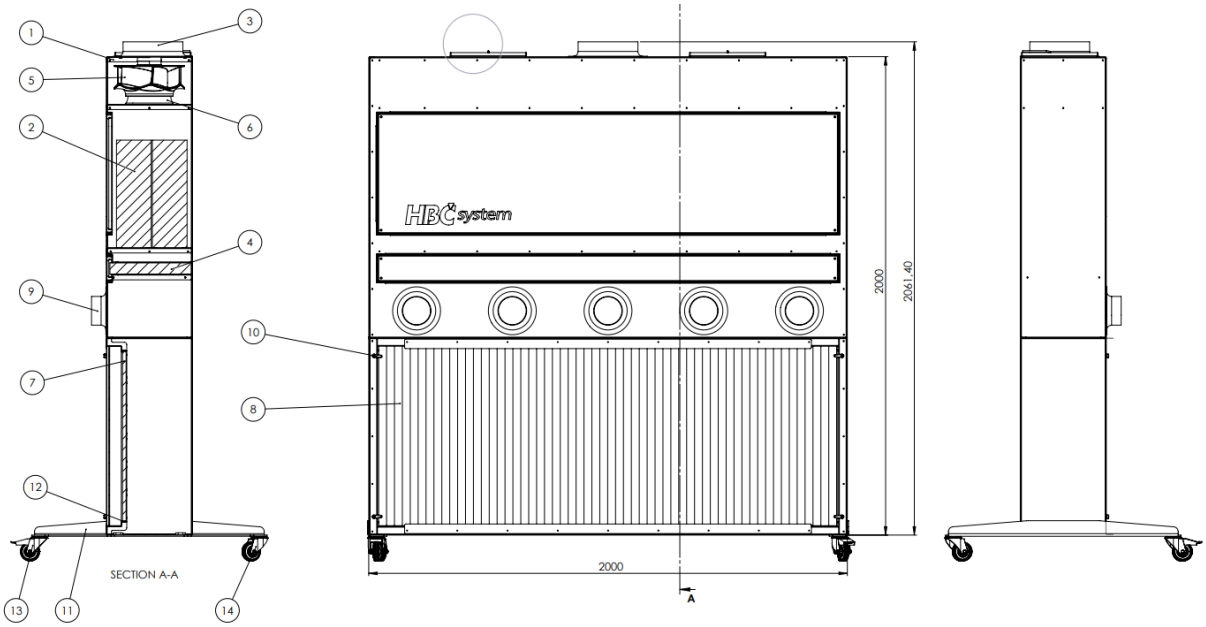
In the SmartWall, the quantitative detection of VOC during spraying is recorded by the VOC sensors positioned in the supply and exhaust air ducts. The sensors are positioned after the ventilation fan and in the exhaust duct in front of the fans.

The current and historical progress of VOC development can be read graphically at the measuring points via a webpage. The standard measuring period of 10 minutes is pre-programmed. Alternatively, further time periods can also be selected. In the data logbook memory, the data are stored in the form of totals and current measured values during the program run. Material consumption values can be displayed.

The PLC controller monitors the VOC difference. If the difference between input and output is greater than 40 points, there is an alarm in the form of a flashing light. If the operator does not react, the air supply for the magnet valve will close.

Filter bank & Smart Wall Picture

Technical drawing of Smartwall (SM3000)



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Local / Remote operations

All operations are executed either through the LED button located on the technical drawing at the front, or via our Service and Support System (SAS). The LED button provides status indications for the SmartWall or FilterBank.

LED Light indicator	State	Message
White	Sleep mode is selected	Sleep is used outside operation
Yellow	Prep mode is selected	Prep is used doing sanding
Green	Paint mode is selected	Paint is used when painting
Blue	Dry mode is selected	Dry mode is automatically switched off after X seconds. This can be configured in SAS.
Purple	Internet error	Internet connection missing.
Red	Fault (Reset error with a push on the led button)	Device is in fault; no operations are allowed until the fault has been reset. See SAS for specific error messages.

To comply with regulations concerning the monitoring and documentation of VOC levels (volatile organic compounds), the use of internet connectivity is necessary to switch operations. However, offline operations are permitted in regions where these regulations do not apply. For more detailed information, please reach out to HBC System / WheelRestore.

Default settings

The device comes preconfigured with default settings.

	Fan speed	LED light	Remote monitoring		
Sleep	0%	OFF	ON		
Prep	60%	ON	ON		
Spray	80%	ON	ON		
Drying	40%	ON	ON		
Fault	0%	OFF	ON		

Daisy chaining / Mirrored operations

The configuration of mirroring multiple devices to ensure seamless operation synchronization is handled by our dedicated support team. It is crucial to maintain an active internet connection on all mirrored devices as operations are transmitted over-the-air (OTA). Additionally, it is essential to ensure that all devices have the same firmware installed, which can be verified within our Service and Support System (SAS).

Update firmware

Requirements for updating includes
- A PC / Mac
- SD Card (max size 32. Gb)

Step 1. Format the SD Card with the filesystem **FAT32** and name it **CLONE**
Step 2. Extract the firmware files from the ZIP file and copy them to the SD Card.
Step 3. Please pull the automatic fuse to turn off the machine.
Step 4. Insert the SD Card into the PLC with the **machine turned off.**
Step 5. Turn on the machine with the automatic fuse.
Step 6. Wait for the first diodes to light constant.
Step 7. Remove the SD Card.
Step 8. Successfully update.

Configuring internet

An ethernet cable is plugged in Ethernet 2 – CH2 from a switch or router connected to internet.
**Cellular options is also available.*

Technical specifications

Fan information

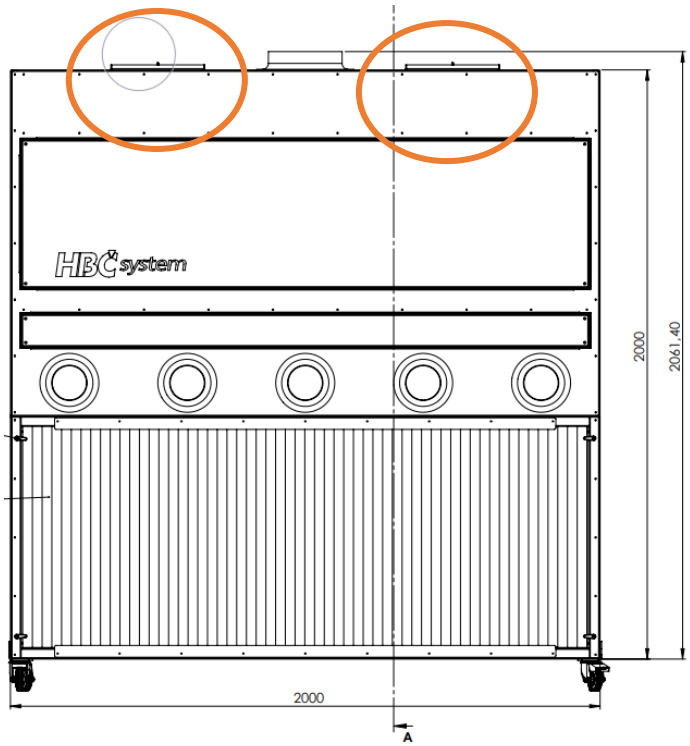
Products name: Filterbank & SmartWall Technical data sheet for Fans
Item no.: SM2000 + SM3000

Replacement item no.: SM2019 - Centrifugal fan – 1 pcs
Each Filterbank or SmartWall has two fans in each.

Technical fan specifications (Per fan)

V	220
Hz	50
m^3/H	4000
RPM	2600
W	800
A	2.30
dB/A	85
Fans size (mm)	Ø315 - Impeller diameter
Weight	9,5 kg / 20,95 lb

Location of fans:



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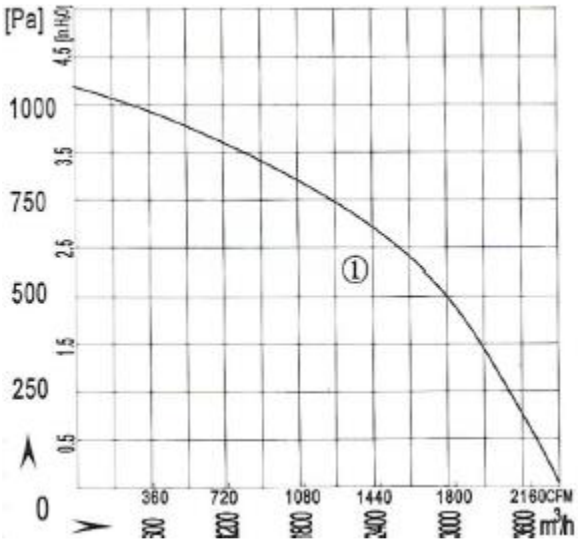
Centrifugal fan Curved:



The product safety requirements:

GB12350	《Safety requirements of small power motors》
GB/T13275	《General technical requirement for general centrifugal fan》
EN60335-1	《Household and similar electrical appliances-safety》

Operating environment requirements:

Operate temperatures from -30℃, to +70℃, Operate humidity from 0% to 95% RH
Storage temperatures from -20℃, to +60℃,; Storage humidity from 5% to 95% RH

Type of protection:	IP54
Insulation class:	F
Bearing:	Ball bearing
Approvals:	ISO9001:2000,CE,CCC, all the materials accord with ROHS
Heat Protection:	This external rotor motor with heat protection, cutting off temperature: 150—160℃,replacement temperature 100—110℃

Balancing, Vibration, Runout of the fan:

The residual unbalance of the fan is not less than G6.3 (balancing precision grade) in each plane, according with JB/T910; Vibration speed virtual value of fans ≤0.15 mm/s, test method accords with JB/T 8689. Runout of impeller in axial and radial direction ≤0.15mm

Filter information

Innovative 4-Stage Filtration System

Differential pressure switches monitor airflow pressure and indicate when filters need replacing.
Stage-1
Paint Arrestor
(Paper Media) to collect the dissociative particles.
Stage-2
Micro-filter
(Synthetic Media) to collect fine particles and dust.
Stage-3
Pleated Box
(Synthetic Media) to pre-filter micro particles & dust.
Stage-4
Carbon Block
(Active Charcoal filter) to reduce fumes and odours.

Part number information:

Part no.	Product
SM2001	Carbon Block - filter (26 pcs. required)
SM2003	Pleated Box filter (3 pcs. required)
SM2004	Paint Arrestor (1 pcs. required)
SM2002	Micro-filter (2 pcs. required)

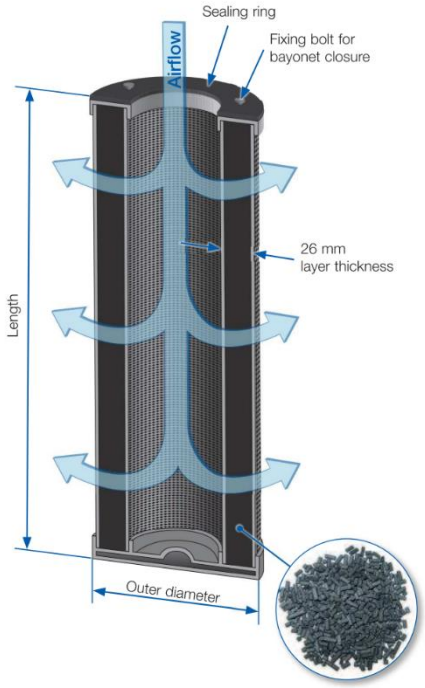
Carbon Block filter

Technical Data Sheet

Part no.	**Product description**
SM2001	Carbon Block filter

Required units for SM2000 & SM3000 = 26 pcs
Activated coal filters / Carbon blocks.
Easy to install, just by placing the filter in the holes and turning the filter.

Flow diagram of filter:



Material characteristic

Humidity resistant up to 70% r.h
Temperature resistant up to max. 70 degrease

Pleated box filter

Technical Data Sheet

Part no.	**Product description**
SM2003	Pleated Box filter

Required units for SM2000 & SM3000 = 3 pcs

The pleated box filter area extends the time between replacements, leading to lower operational expenses. The use of durable synthetic fibers ensures resistance to breakage. Consistent and stable fold connections are achieved through spacers composed of hotmelt adhesive. The compact design not only saves on storage, transportation, handling, and assembly costs but also enhances overall efficiency

Material characteristic

Fire behaviour	DIN 53438- 3 (F1)
Max. temperature [°C]	70
Max. humidity resistance [%]	100
Filter class acc. to EN 779:2012	F7

Mirco **filter**

Technical Data Sheet

Part no.	**Product description**
SM2002	Mirco filter

Required units for SM2000 & SM3000 = 2 pcs

- Durable synthetic fibers - 100% polyester, resistant to breakage
- The filter media is compressed towards the clean air side, enabling full-depth dust absorption
- Thermally bonded for enhanced structural integrity
- Progressive density structure provides a high dust holding capacity
- Fraunhofer IPA-tested for paint compatibility
- Ideal for coarse dust filtration with requirements for higher air flows and substantial dust holding capacity

Material characteristic

Fire behaviour	DIN 53438 - 3 (F1)
Max. temperature [°C]	80
Max. humidity resistance [%]	100
Filter class acc. to ISO 16890	ISO Coarse 45%
Filter class acc. to EN 779:2012	G2

Store in a dry and clean place, protect from moisture and sunlight. Ensure sufficient air supply. Store the rolls vertically. Storage temperature between 0°C and 40°C.
Storage time max. 2 years from the delivery date.
Storage and transport in the original packaging.

Paint Arrestor

Technical Data Sheet

Part no.	**Product description**
SM2004	Paint Arrestor

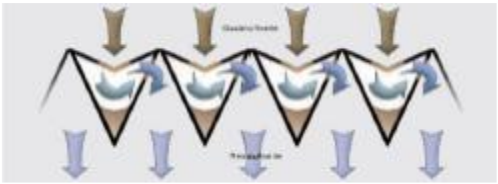
Required units for SM2000 & SM3000 = 1 pcs

- Designed for the effective separation of ink mist in paint bootls
- Functions as a prefiltration layer for "Paint-Stop" filter mats, enhancing overall durability.

Material characteristic

Number of pleats	350
Average arrestance [%] (depending on the used paint)	98
Remarks	water-repellent, flame-retardant

Particle - loaded air flow must change its direction several times due to filter construction. Particles heavier than air stick to the walls of Paint Arrestor filter due to centrifugal forces, while cleaned air flow moves through outlets. Pleated construction offers minimum air resistance with a maximum capacity to store overspray.



Disposal

If the machine is bought: The machine is separated and sorted according to local environmental requirements.

If the machine is rented: Return machine to FSG.