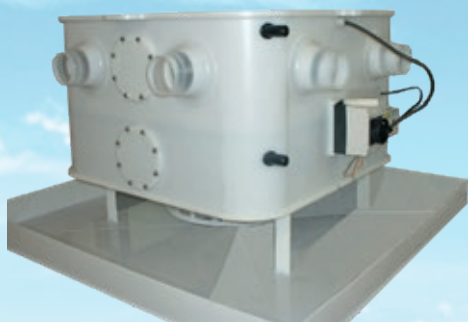


Operating manual



HFS-HACIS[®]



These operating instructions are valid for the standard versions.



These operating instructions are part of the HFS-HACIS[®] and must be available to the operating personnel at all times. The safety information given in these instructions must be followed. In the event of a HFS-HACIS[®] resale, these operating instructions must be included with the equipment supplied.

Translation

In the event of supply or subsequent sale into the countries of the EEA, the operating instructions must be translated into the language of the user country accordingly.

If the translated text contains divergences, always refer to the wording of the original (German) operating instructions, or contact the manufacturer.

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1.2 EC-/EU-Declaration of Conformity

For the purpose of

- EC Machine Directive 2006/42/EC, Annex II A for Machines
- EC Low Voltage Directive 2014/35/EU, Annex III
- EMC Directive 2014/30/EU, Annex I and II

We hereby declare that the construction type of the supplied version of:

HFS-HACIS®

Manufacturer: Hürner Luft- und Umwelttechnik GmbH
Ernst-Hürner-Straße
35325 Mücke-Atzenhain
Germany

Hürner Luft- und Umwelttechnik GmbH
Sälzerstraße 20a
56235 Ransbach-Baumbach
Germany

in the delivered version, as a separate component within an installation, complies with the above regulations and the following standards or normative documents:

Directive / Standard	Title
DIN EN ISO 12100:2011	Safety of machinery - General principles for design – Risk assessment and risk reduction
Reference to the following standards is made additionally in the DIN EN ISO 12100: DIN EN ISO 13857:2008, DIN EN 349:2009, DIN EN ISO 14120:2016, DIN EN ISO 13732-1:2008, DIN EN 60204-1:2014	
DIN ISO 21940-11:2017	Procedures and tolerances for rotors with rigid behaviour
DIN EN 61000-6-4:2011	Electromagnetic compatibility, Generic standards - Immunity for industrial environments
DIN EN 61000-6-2:2011	Electromagnetic compatibility, Generic standards; Emission standard for industrial environments
DIN EN 82079-1:2013	Preparation of instructions - Structuring, content and presentation
VDMA 24167:1994	Fans - Safety requirements

precluding responsibility for components provided or mounted by the customer. If the HFS-HACIS® is modified without prior agreement with HLU, this declaration is void.

Hürner Luft- und Umwelttechnik GmbH



L. Roßkothen (Managing Director)
Mücke-Atzenhain, 08-01-2019

Name and address of the persons, who are authorized, to assort the technical documents:

- Anne-Christin Vögl-Schmitt, Hürner Luft- und Umwelttechnik GmbH, Ernst-Hürner-Straße, 35325 Mücke-Atzenhain, Germany
- Marcel Pfeifer, Hürner Luft- und Umwelttechnik GmbH, Sälzerstraße 20a, 56235 Ransbach-Baumbach, Germany

2. Construction and correct use for the intended application

2.1 Construction of the ventilation system

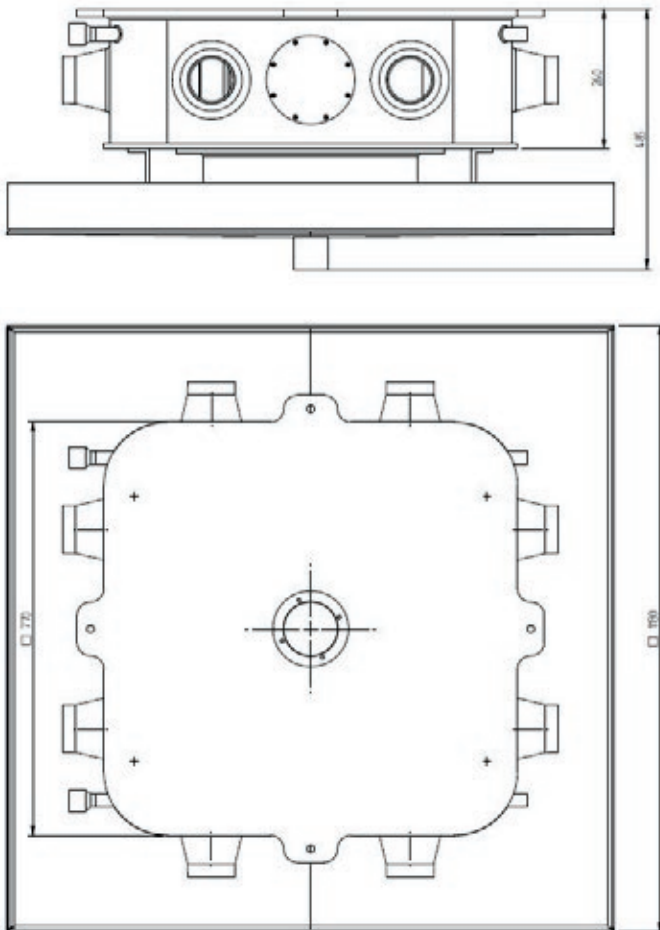


Fig. 1| Overview of the ventilation system

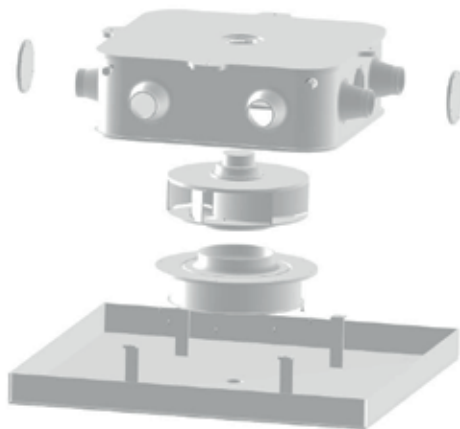


Fig. 2| Construction of the ventilation system

2.2 Correct use for the intended application and field of application

HFS-HACIS[®] are suitable for exhausting aggressive, dust-free, low-aerosol gases and clean air. Explosive atmosphere can be exhausted only using ventilation systems designed specially for this application. The permissible gas temperatures for the most frequently used plastics materials are generally

with PVC: 0 °C bis 50 °C,

with PE, PE-FR (PEs): -20 °C to 60 °C,

with PP, PP-FR (PPs): 0 °C to 70 °C,

and with PVDF: -10 °C to 100 °C.

These temperatures must not be exceeded.

Depending on gas composition and impeller speed, these temperature ranges must be checked and restricted, if necessary. With particularly aggressive media, the reductions must be checked and determined individually in each case. The max. ambient temperature is 40 °C. Sufficient cooling can be ensured regardless of the volume flow, in accordance with the above-mentioned conditions.

The HACIS[®] ventilation system was developed, designed and built exclusively for industrial and commercial use. Using the ventilation system for domestic purposes is excluded.



Residual risks

Although the HFS-HACIS® have been constructed according to the newest technology as well as to the security rules and they are monitored by quality assurance (QA) system, there remains a residual risk due to the possible rupture of the impeller. This happens especially, when the conditions of use have not been complied. Therefore it is necessary to pay attention on technically perfect conditions and on the right case of application. The environment of the ventilation systems has to be secured in such a way, that in case of a damage, neither persons nor objects get harmed.



These assemblies are intended exclusively for the above purpose. Using the assemblies for different purposes than described above, or modifying them without written consent of the manufacturer are considered as non-compliant with the intended application. The manufacturer cannot be held responsible for damage resulting from such use. The risk is borne exclusively by the user. The ventilation system may be started only after checking that all safety devices are operable and that the system in which this ventilation system is installed complies with the EU directives.

The correct use for the intended application also implies compliance with the instructions given in the manufacturer operating manual and with the conditions for maintenance and repair. The plastic ventilation systems are not covered by the „Regulation No 327/2011 of the European Commission about the implementation of Directive 2009/125/EC (ErP Directive)“ because they are intended for the extraction of highly corrosive media.

3. Product specific data



The materials/fluids for the correct use of the ventilation system in compliance with the intended application are procured and applied by the manufacturer. The user is responsible exclusively for correct handling of these materials/fluids and the related hazards. Information on hazards and disposal must be provided by the user. Follow the rules given in the manufacturer's safety data sheets for materials and fluids.

3.1 General data

Ambient temperature range

The specifications on the type label are applicable. If they are missing, the temperature range is - 20 °C to + 40 °C.

Noise level

For the value applicable to each ventilation system, see the manufacturer internet site, or contact us via phone

More relevant data are given on the type label.

3.2 Power supply (see motor type label)

Optionally, the electric motors can be controlled continuously by means of a frequency inverter. The maximal rotation speed at the impeller (see HFS-HACIS[®] type label) must not be exceeded. The ICA (instrumentation technology, control technology, automation technology) on site must give protection against overspeed according DIN EN 60204-1.

In case of operation of several motors with a frequency inverter all-pole sinusoidal filters should be used between frequency inverter and motor.



Before connecting the HFS-HACIS[®], check the specifications on the type label and dimension the electrical control system accordingly.

With a motor power ≥ 4 kW for starting up the ventilation system is a star-delta-connection, a soft starter or a FI regulation to use to protect the impeller and the motor bearing against premature damages.

In the case of direct involvement or frequent restart, damage or increased wear may arise by the torque forces on the impeller.

4. Safety

4.1 Signs and explanations



The information given in the operating manual is binding is marked with a „book“.



Warnings are marked with a „STOP“ sign.



Danger warnings
are marked with a warning triangle.



Notes
are marked with a hand symbol.



Hazards due to electric current
are marked with the symbol shown opposite.



Protective earth connection
is marked by these symbols at the connecting points.

4.2 Built-in safety systems (to be implemented by the user)

The built-in safety devices must be checked at regular intervals:

d = daily, **w** = weekly, **m** = monthly, **j** = yearly.

The following methods must be used for checking:

V = visual check, **F** = functional check, **M** = measurement.

Overcurrent protection device

To prevent overheating (fire hazard) in the event of overload (e.g. due to clogging), the ventilation system drive has to be provided with an overcurrent protection device.

Check	
Interval	Method
y	F

Thermal contact (optional)

For temperature monitoring, the ventilation system is equipped with a thermal contact. In the event of a temperature increase, the motor switches off.

Check	
Interval	Method
y	F

PTC resistor (optional)

Don't connect the PTC resistor to the mains voltage. Avoid exceeding a max. PTC resistor test voltage of 2.5 V.

Check	
Interval	Method
y	F

Protective claddings

All mobile ventilation system components driven by the electric motor as well as all other hazardous parts of the ventilation system are covered by fixed, safely fastened protective claddings that can be removed only using tools.

Check	
Interval	Method
m	V

Electrical connection

The electrical connections are made using a 4-wire supply cable system, 3 phases and 1 earth conductor with three-phase motors and using a 3-wire supply cable system, 1 phase, 1 neutral wire and 1 earth conductor with alternating current motors.

Check	
Interval	Method
y	V, F, M



Deactivating the safety devices, or changing their operating principle, is strictly prohibited.

4.3 Interfaces of the HFS-HACIS[®]

The ventilation system has the following interfaces:

- Terminal box or maintenance switch (electric supply)

4.4 Safety measures (to be implemented by the user)

We point out that the user is under the duty to:

- instruct the operating and maintenance personnel on the **protective devices** of the fan,
- and to ensure supervision concerning compliance with the safety measures.

This operating manual must be kept for future use. The specified frequency of inspection and control measures must be met.

- The chapters related to transport, installation and mounting, maintenance, troubles/causes/troubleshooting must be understood by a **qualified person**. Work described in this chapter may be performed only by qualified personnel.

4.5 User's responsibilities



In the European Economic Area, compliance with Council Directive (89/391/EEC) and the related individual directives, especially Council Directive 89/655/EEC Concerning the Minimum Safety and Health Requirements for the Use of Work Equipment by Workers at Work in the relevant national version is mandatory.

The user must obtain the local **operating licence** and follow the relevant rules. Additionally, the user must ensure compliance with the national legal regulations concerning

- the personnel safety (regulations relating to accident prevention)
- the safety of work equipment (protective equipment and maintenance)
- product recycling (Waste Management Law)
- material disposal (Waste Management Law)
- cleaning (cleaning agents and disposal)
- and comply with the requirements for environment protection.



To avoid the occurrence of ignition sources, the operating and maintenance personnel must be equipped properly and receive adequate instructions for realization of cleaning and maintenance work, e.g.

- to avoid the use of tools giving rise to sparking,
- strict observance of the smoking ban,
- to avoid the actuation of ignition sources (e.g. lighters, etc.).

5. General warning symbols

5.1 Hazards

Pay attention to the safety devices described in this manual and follow the safety notes.



During setup, maintenance and repair work, mind the **squeezing hazards**.



During setup, maintenance and repair work, mind the **hazard due to electric current!**



During setup, maintenance and repair work, be aware of the **risk of getting burned** due to hot components. In the event of a failure of the forced ventilation, the drive motor presents a hazard of **getting burned**.

5.2 Operating and hazardous areas on the ventilation system

Hazardous area

During setup, maintenance and repair work, the overall area around the ventilation system is a hazardous area.



During maintenance and repair work, the hazardous area extends 1 m around the ventilation system. The flap pivoting area must be taken into account as well. Keep the area around the ventilation system free from any objects.

5.3 Installation of spare and wear parts

We point out explicitly that spare parts and accessories not supplied by us are not checked and released for use by us either. Installation and/or use of these products can change the design properties of your ventilation system negatively.

The manufacturer cannot be held responsible for damage resulting from the use of other than original components. In connection with the order confirmation, you will receive a data card and a spare parts list for the ventilation system.

If you need spare parts, please, inform our sales partner:

Hürner Luft- und Umwelttechnik GmbH

Sälzerstraße 20a
56235 Ransbach-Baumbach
Germany

Tel. + 49 2623 92 95 9 - 0
Fax + 49 2623 92 95 9 - 99
E-Mail info@hlu.eu
www.hlu.eu

When ordering spare parts, please specify the following data:

- Order no. (see type label)
- Type
- Spare part denomination

6. Installation

6.1 Scope of supplies

The equipment delivered to the user comprises:

- HFS-HACIS®
- Operating manual
- Technical documents

For the detailed scope of equipment supplied, refer to the order confirmation.

6.2 Transport and packing

Although the HFS-HACIS® are checked and packed carefully before shipment, damage during transport cannot be excluded.

6.3 Delivery (also with spare and substitute parts)

Inspection of incoming components:

- Check, if the consignment is complete according to the bill of delivery.

In the event of damage

- Check the consignment for damage (visual inspection).

In the event of complaints

If the consignment was damaged during transport:

- Contact the last forwarder immediately.
- Keep the packaging (for checking by the forwarder or for returning the product).

Packaging for returning the product

- If possible, use the original packaging and the original packaging material. If the original packaging and packaging material haven't been kept, use commercial packaging material. Fasten the fan to a transport pallet (it must be dimensioned appropriately for the weight).
- With any questions relating to packaging and safe transport, please, consult the manufacturer.

6.4 Intermediate storage

The fans should be stored in a room or under a shelter. With outdoor storage, protect the fan from dirt and atmospheric conditions using a canvas cover. Keep the storage temperature between 0 °C and + 40 °C.

To avoid permanent deformation by preventing static load at the contact points between the rolling elements and bearing raceways, the impeller has to be turned for a ¼ turn at regular intervals (at least every 4 weeks).

6.5 Transport to the place of installation (at the customer's site)



Transport must be performed only by qualified personnel in compliance with the local conditions and any warning notes on the packaging material.

HFS-HACIS[®] or fan unit is transported on transport pallets to the site.



HFS-HACIS[®] or transport unit **may tip** over during transport. Pay attention to the **focus** (the focus is centred) and **weight** (see technical data). Secure the ventilation system or the transport unit with appropriated resources before the transport.

Transport with forklift

- The forklift has to be adjusted according to the weight of the ventilation system or the transport unit.
- Drive with the forks of the forklift between or under the arbors of the transport pallet of the ventilation system or the transport unit.
- Make sure that the forks of the forklift are completely under the arbor (the forks have to look out at the opposite).
- Lift the ventilation system or transport unit and transport it.

6.6 Installation, mounting, Initial commissioning

Installation, mounting and initial commissioning of the ventilation system are performed by qualified personnel of manufacturer or by qualified customer personnel that must have been trained adequately for this work.

- The constructional arrangement of the ventilation system must ensure that operational underpressure conditions are present at the shaft passage.
- Check on the basis of the static of the building, if it is adjustable for the burden of the ventilation system and if the bottom is flat.
- The installation of the ventilation system and their components are based on the on-site installation plan.
- The ventilation system must not be operated in non-installed condition. The impeller must be free to move without any impediment at all times.
- Mount the (on-site) pipe.

- The ventilation system is equipped with a terminal box (or maintenance switch) for connecting to the mains supply. The motor enclosure must be closed using a sealing joint certified according to the EN IEC 60079-0 and EN IEC 60079-1 standards. Users will have to connect the cable terminals using one of the protection types specified in standard EN 60079-0. The energy supply can be cut off using an onsite maintenance switch (if it is not already installed at the ventilation system).
- Check before the first operation that the turning direction is correct (direction arrow on the ventilation system housing) and that the max. speed is not exceeded (see nameplate).
- If there is danger of foreign parts falling into the ventilation system or being aspirated, the connected pipe upstream and downstream of the ventilation system must be provided with a protective grid (min. IP20 to EN 60529).
- The motors are designed for a maximum ambient temperature of 40 °C.
- The inside of the ventilation system and of upstream and downstream channels and units must be kept free from foreign bodies.
- See point 3.2.
- Ensure that connected lines do not carry loads which lead to a distortion of the HACIS® housing.



The HFS-HACIS® may be connected to the supply voltage and switched on only, when the pipe (on the inlet and outlet side) has been connected completely.

Installation must be performed according to the connecting diagram in the motor operating instructions only by adequately trained and qualified personnel.

The following conditions must be met:

- Compliance with the national regulations relating to the public utilities.
- The supply voltage at the place of installation and the mains frequency must correspond to the values specified on the motor type label.
- The power supply cable must be protected against damage and dimensioned adequately for the power rating.
- Set the thermal overcurrent relay to the nominal current specified on the motor type label and follow the instructions given in the motor operating instructions. We reserve ourselves the right to cancel the motor warranty in the event of failure to comply with this protective measure.



Make sure that the **rotating direction** is correct. To check the rotating direction, switch on the motor shortly and compare the impeller rotating direction with the arrow marked on the housing. If the rotating direction is wrong, change the motor polarity in compliance with the safety regulations. After reaching the operating speed, measure the power consumption immediately and compare it to the motor current specified on the type label.



24 h after initial commissioning: Check the tightness of the housing and the quiet run of the ventilation system and re-tighten the screws.

**Caution**

The ventilation system pipe connections may be performed only using flexible couplings (compensators).

6.7 Operating modes

The ventilation system is switched on and off via an on-site operating unit provided by the user, or operated via an on-site supervisory system. It is designed for continuous operation.

7. Operation



The ventilation system may be operated only by specialized personnel qualified and trained for operation.

8. Maintenance / Cleaning



The chapter on „**Maintenance / Cleaning**“ is intended only for qualified personnel. Maintenance, cleaning and repair work may be performed only by qualified personnel.

Qualified person

A person who is able to assess the work he/she is in charge of and aware of potential hazards due to his/her professional training, skills and experience as well as his/her knowledge of the relevant standards.

Definition according to EN 60204-1.

To ensure smooth operation of the ventilation system, cleaning and maintenance of the ventilation system at regular intervals is required.

During operation, the ventilation system is subject to vibration susceptible of releasing screwed and clamping connections. To prevent damage, check the ventilation system for loosened connections at regular intervals (recommended interval with single-shift operation: 3 months).



For information on maintenance/cleaning of individual components purchased from other manufacturers (e.g. electric motor), refer to the corresponding manufacturer operating instructions.



When switching off the supply voltage because of cleaning, maintenance and repair work, measures to prevent the supply voltage from being switched on accidentally must be taken by the user (locking the main or maintenance switch using a padlock).



During maintenance and repair work, mind all rotating and mobile parts. **Risk of entanglement!** Tight clothing must be worn in the danger area.



During maintenance and repair work, mind the **squeezing hazards**.



When doing maintenance and repair work, mind the **hazards due to electric current**.



Cleaning, maintenance and repair work may be done only at non-explosive atmosphere.
For reasons of safety, only tools made of **non-sparking material** may be used when doing this work.



The work intervals specified below are intended for single-shift operation (8 hours a day; 22 days a month; 12 months a year).

d = daily	y = yearly
w = weekly	R = cleaning required when opening
m = monthly	LT = lifetime
½ y = half-yearly	MO = manufacturer operating manual

8.1 Cleaning



Cleaning may only be carried out by qualified personnel.


Caution

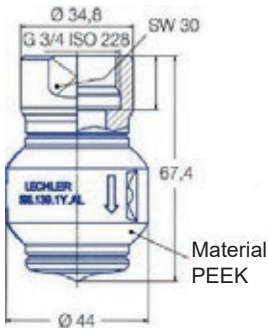
During cleaning work, wear personal safety equipment in accordance with company safety regulations (e.g. safety gloves).

Cleaning systems

HACIS[®] ventilation systems with integrated cleaning are equipped with integrated cleaning nozzles type Hygienic Whirly 594.049.1Y.AF.00.1 by Lechler or type Tanko S20 by AWH. The number of nozzles and the requirements they have to meet are optimised for the uniform application of cleaning foam or water to the entire interior of the unit. Fig. 2 and Fig. 3 show the cleaning nozzles by AWH. The required volume flow is listed in the table below together with the cleaning nozzles installed.



The recommended operating pressure of the cleaning nozzles is **3 bar**. **The maximum permitted pressure is 5 bar.**



Standard version
 Female thread
 595.139.1Y.AL



Standard version
 Female thread
 594.XX9.1Y.AF



Fig. 4| Hygienic Whirly
 cleaning nozzle

Fig. 3| Section of cleaning nozzle



Fig. 5| Tanko S cleaning nozzle by AWH

Overview of the cleaning nozzles and the required volume flow:

Room	Nozzle type	Number of nozzles	Volume flow per nozzle	Total volume flow
Drying room	Tanko S20	3	22 l per min	66 l per min
Ripening room 3	Tanko S20	4	22 l per min	88 l per min
Ripening room 4	Tanko S20	5	22 l per min	110 l per min
Ripening room 5	Tanko S20	5	22 l per min	110 l per min
Ripening room 6	Tanko S20	5	22 l per min	110 l per min

Cleaning interval

The cleaning interval of the HACIS® ventilation system depends on the contamination of the conveyed air, the hygienic requirements in the installation area of the unit or on internal cleaning regulations. Cleaning also serves to avoid imbalances caused by dirt accumulation.



Unless there are internal regulations concerning the cleaning of the HACIS® unit, cleaning must be carried out once a week.

The recommended cleaning agents are listed in this chapter. If a different cleaner is to be used, its suitability must be agreed in advance with the manufacturer of the HACIS® ventilation system or of the foam cleaner.



Only use cleaning agents that are listed below!

Cleaning procedure

Before cleaning begins, the HACIS[®] ventilation system is switched to cleaning mode. Draining of the cleaning foam or rinsing water through the drip pan must be ensured before cleaning starts, since liquid can already drain off through the drip pan during foam cleaning.

1. Initial foaming

This wets the entire surface of the interior compartment with cleaning foam. The employee responsible for cleaning must ensure that cleaning foam emerges from the designated gaps in the device.



To clean the HACIS[®] ventilation system, foam must be sprayed from the integrated cleaning nozzles for at least 15 minutes. This specified time applies for each cleaning nozzle or pipe. During commissioning, check how much foam can be removed through the drip water pipe. If necessary, **pauses must be observed during initial foaming.**

After initial foaming, the cleaning agent must be given sufficient time to take effect.



The exposure time of the cleaning foam is at least 5 minutes; if the manufacturer specifies different times, these must be observed.

2. Rinsing with water

Following the initial foaming of the HACIS[®] ventilation system, the interior of the unit is rinsed with water during the rinsing phase to remove the cleaning foam. The cleaning foam and the drip water are collected in the drip pan and discharged through the drainage system. The duration of the rinsing phase can be found in the manufacturer's instructions for the cleaning agent.



Irrespective of the manufacturer's instructions for the cleaning foam, a minimum rinsing phase of 10 minutes per nozzle is recommended. The individual pipes must be supplied with water one after the other.

After the cleaning foam has been removed, the HACIS[®] unit remains in cleaning mode to allow the remaining water in the unit to drain off.



The HACIS[®] ventilation system must remain in cleaning mode for at least 5 minutes after rinsing.

After the draining process, the units are returned to their normal operating modes. To do this, either the switch in question is flipped, or the mode is defined directly in the controller.

If cleaning mode has been selected by means of the switch, the normal operating mode cannot be set in the control unit. In this case, the switch must be reset to the normal operating mode.

Cleaning agents

The following cleaning agents, which are recommended by the respective manufacturers, can be used for the HFS-HACIS®.



The cleaning agents may only be used in the concentration specified by the cleaning agent manufacturer. The specified exposure times must be observed.

The instructions for use and safety data sheets of the cleaning agent manufacturers must be observed!

Overview of cleaning agents:

Manufacturer	Designation of cleaning agent	Type of cleaning agent
Calvatis GmbH	calgonit AF 108	Mildly alkaline
Calvatis GmbH	calgonit DS 683	Disinfection
Calvatis GmbH	calgonit SF 504	Acidic

8.2 Lubrication

The bearings of the built-in electric motors are provided with a grease filling calculated for a service life of 10 000 – 20 000 operating hours.

8.3 Inspection interval / Function checking

	Interval with single-shift operation					
	d	w	m	½ y	1 y	MO
Superordinate facility for connecting the supply voltage				x		
Settings of the on-site protective devices						x
HACIS®-motor function checking						x

8.4 Vibrations

International standards for the balancing quality and vibration values for industrial fans are defined in the standard ISO 14694:2003. The vibrations are measured radially on the shaft bearing of the drive motor. If a measurement is not possible directly on the motor, it is measured radially at the next point that has a mechanical connection to the motor. The following table shows the fan application categories for maximum permissible vibration.

Vibration values according to ISO 14694						
Standard group ISO 14694	Motor power [kW]	Min. balancing quality	Limit values			
			At manufacturer Average values; maximum values in brackets		In operation Average values; maximum values in brackets	
			Fixed mounted [mm/s]	Flexibly mounted [mm/s]	Fixed mounted [mm/s]	Flexibly mounted [mm/s]
BV-2	>0.15<3.7	G16	3.5 (5.1)	5.6 (7.6)	Start-up 5.6 (7.6) Alarm 9.0 (12.2) Slow-down 10 (14)	Start-up 9.0 (12.7) Alarm 14.0 (19.1) Slow-down 16 (21)
BV-3	>=3.7<37	G6.3	2.8 (3.8)	3.5 (5.1)	Start-up 4.5 (6.4) Alarm 7.1 (10.2) Slow-down 9.0 (12.7)	Start-up 6.3 (8.8) Alarm 11.8 (16.5) Slow-down 12.5 (17.8)
BV-4	>=37<300	G2.5	1.8 (2.5)	2.8 (3.8)	Start-up 2.8 (4.1) Alarm 4.5 (6.4) Slow-down 7.1 (10.2)	Start-up 4.5 (6.4) Alarm 7.1 (10.2) Slow-down 11.2 (15.2)

8.5 Tightening torques for bolt connections

On the basis of VDI 2230 the following tightening torques are recommended for bolts of strength class 8.8:

Nominal diameter [mm]	Tightening torques [Nm]
M4	3,3
M5	6,5
M6	11,3
M8	27,3
M10	54

Nominal diameter [mm]	Tightening torques [Nm]
M12	93
M16	230
M20	464
M24	798

8.6 General hints for maintenance

Correct maintenance is decisive for the fan safety of operation and lifetime. Operational disorders due to insufficient or improper maintenance can cause high repair costs and long downtimes. For this reason, regular maintenance is indispensable.



Before starting maintenance and repair work (especially when the fan must be opened), compliance with the switch-off procedures is essential.

Checks	Interval
The inspection intervals must be shortened at strong degree of pollution, high ambient temperatures and frequent start / many load changes.	
Check, if the fan is installed correctly and safely and pay attention to possible vibrations during operation. If necessary, re-tighten the screw connections.	m
Check the connections of the pipe on the inlet and outlet side, housing cover and shaft seal (if installed) for tightness.	m
Check the housing for stress cracks, quiet run and storage temperature. Check the impeller for deformations, wear and cakings.	y

8.7 Checks

After completing work, please, check:

- The completeness of performed work,
- Unless there is reason to complain, the ventilation system can be taken into operation



After checking and replacing the wear parts, please check, if all safety devices are fully operable.

9. Troubles, causes and measures



The facts and information relating to „Troubles, cause and measures“ described in this operating manual are formulated in a way that they are understood by persons with a professional training in the fields of

- electrics / electronics
- mechanics / maintenance.

Appropriate tools and test equipment must be made available to this personnel. Before any maintenance and repair work, the fan must be de-energized and protected against re-activation. Unless the specified measures are successful, please, contact the manufacturer.

Trouble	Possible cause	Remedial action
HFS-HACIS [®] unquiet run (heavy vibration)	Impeller unbalance	Balancing required, consult manufacturer
	Deposits on the impeller	Clean the impeller
	Damage on impeller	Consult manufacturer
Motor bearing noise	Motor bearing damaged	Replace bearing or motor, Consult manufacturer or motor supplier
HFS-HACIS [®] power output too low	Wrong impeller rotating direction	Reverse the rotating direction
	Output reduction facilities are not opened, or opened only partly	Check the output power reduction facilities
	Pipe resistances on inlet or outlet side too high	Reduce resistances, increase the HFS-HACIS [®] power, consult manufacturer
Motor power consumption to high	Defective motor winding	Change motor, consult manufacturer or motor supplier
	Wrong impeller rotating direction	Reverse the rotating direction
	Motor protective switch is not adjusted correctly	Adjust motor protective switch correctly
Motor is switched off by the motor protection switch	Motor protective switch is not adjusted correctly	Adjust motor protective switch correctly
	Motor winding defective	Change motor, consult manufacturer or motor supplier
	Impeller blocked	Check impeller
Sliding noises	Motor winding defective	Consult manufacturer
	Impeller unbalance	Balancing required, consult manufacturer
	Foreign body between impeller and housing	Remove the foreign body
Sudden power decrease	Inlet or outlet pipe untight	Check the pipes
	Connecting collar defective	Replace the collar

10. Emergency

In case of emergency, switch off the main switch or withdraw the power supply connector.

11. Dismantling / Disposal

Dismounting

Dismounting may be done only by qualified personnel.

Before starting dismantling work, make sure that the switch-off procedures are followed.

Disposal

The ventilation system is made mainly of steel and plastics (except the electrical equipment) and must be discarded in compliance with the applicable local environmental regulations.



For discarding the cleaning agents, follow the local regulations and the information given in the manufacturer safety data sheets.

Contaminated cleaning tools (brushes, clothes, etc.) must be discarded in compliance with the manufacturer specifications as well.

Depending on the HACIS® application, the housing and the impeller must be considered as special waste and discarded accordingly.

Injection moulded or sintered housings are provided with recycling signs indicating which type of plastic material was used.

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