

## Operation & Maintenance

Original Operating Instructions



## Drying Systems

**H+HL 5 - 12:** Air Heater AH  
**D 5 - D 12:** Tray Dryer  
**Control:** Filling System  
Kiln  
Rolling Floor  
Box Emptying



## DVGW Certificate

**DVGW-Qualitätszertifikat**  
**DVGW quality certificate**

**QG-3321AQ7116**  
Registrierungsnummer  
registration number

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<b>Anwendungsbereich</b> <small>field of application</small>	Produkte der Gasversorgung <small>products of gas supply</small>
<b>Zertifikatinhaber</b> <small>owner of certificate</small>	WOLF Anlagen-Technik GmbH & Co. KG Münchener Straße 54, D-85290 Geisenfeld
<b>Vertreiber</b> <small>distributor</small>	WOLF Anlagen-Technik GmbH & Co. KG Münchener Straße 54, D-85290 Geisenfeld
<b>Produktart</b> <small>product category</small>	Gaswärmeerzeuger: Wärmelieferer, ortsfest mit Wärmetauscher (3321)
<b>Produktbezeichnung</b> <small>product description</small>	Gasbeheizter, ortsfester Wärmelieferer mit Wärmetauscher für den Anschluss an Luftkanalsysteme oder frei ausblasend
<b>Modell</b> <small>model</small>	WLE-...; WLE-...K

**Prüfberichte**  
test reports

Kontrollprüfung Labor: Ü 2516-01/18 vom 25.05.2018 (TSG)

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Chair, President, Chair, Member of the Certification  
body, issued by, signed, head of certification body

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## EC Declaration of Conformity

**EG-Einbauerklärung**  
Declaration of Incorporation

im Sinne der EG-Richtlinie 2006/42/EG über Maschinen (Anhang II B)  
according to EC-Directive 2006/42/EC on Machines (Annex II B)

**WOLF Anlagen-Technik GmbH & Co. KG**  
Münchener Str. 54  
85290 Geisenfeld, GERMANY

Hiermit erklären wir, dass die nachstehend beschriebene unvollständige Maschine  
We herewith declare that the partly completed machine described below

<b>Bezeichnung der Maschine</b> <small>Denomination of the machine</small>	Ortsfester Wärmelieferer mit Wärmetauscher für den Anschluss an Luftkanalsystemen oder frei ausblasend <i>Fixed Air Heater with heat exchanger for connection to air duct systems or Freeinsufflation</i>
<b>Typenbezeichnung</b> <small>Type Name</small>	WLE-...; H-...
<b>Fabrikatsnummer</b> <small>Serial number</small>	109.4... und darüber 109.4... and higher
<b>Baujahr</b> <small>Year of manufacture</small>	2019 und darüber 2019 and higher

alle grundlegenden Anforderungen der Maschinenrichtlinie 2006/42/EG erfüllt, soweit es im Rahmen des Lieferumfangs  
möglich ist. Ferner erklären wir, dass die speziellen technischen Unterlagen gemäß Anhang VII – Teil B dieser Richtlinie  
erstellt wurden.  
*is complying with all essential requirements of the Machine Directive 2006/42/EC, as far as the scope of delivery allows it. In  
addition we declare that the special technical documentation has been compiled in accordance with part B of Annex VII.*

Die unvollständige Maschine entspricht zusätzlich den Bestimmungen der Richtlinie: <i>In addition the partly completed machine is complying with the regulations of Directives</i>	Maschinenrichtlinie 2006/42/EG <i>Machine Directive 2006/42/EC</i> EMV-Richtlinie 2014/30/EU <i>EMV-Directive 2014/30/EU</i> Gasgeräteverordnung EU/2016/426 <i>Regulation gaseous fuels Directive 2009/142/EC</i>
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Wir verpflichten uns, den Marktaufsichtsbehörden auf begründetes Verlangen die speziellen Unterlagen zu der  
unvollständigen Maschine über unsere Dokumentationsabteilung innerhalb einer angemessenen Zeit zu übermitteln.  
*We undertake to transmit, in response to justified request by the market surveillance authorities, the special documents on the  
partly completed machine by our documentation department within a reasonable time.*

Die unvollständige Maschine darf erst dann in Betrieb genommen werden, wenn gegebenenfalls festgestellt wurde, dass  
die Maschine oder Anlage, in welche die unvollständige Maschine eingebaut werden soll, den Bestimmungen der  
Richtlinie 2006/42/EG über Maschinen entspricht und die EG-Konformitätserklärung gemäß Anhang II A ausgestellt ist.  
*The partly completed machine must not be put into service until the final machine or plant into which it is to be incorporated has  
been declared in conformity with the regulations of Directive 2006/42/EC on Machinery, where appropriate, and until the EC  
Declaration of Conformity etc. to Annex II A is issued.*

Bevollmächtigter der WOLF Anlagen-Technik GmbH & Co. KG für die Zusammenstellung aller technischer Unterlagen ist  
Herr Erich Obster Leitung Technik  
*Person authorized by WOLF Anlagen-Technik GmbH & Co. KG to compile the complete technical documentation is  
Mr. Erich Obster Management Technology*

Geisenfeld, den 01.01. 2019  
Place, Date

ppa.  
Erich Obster, Mitglied der Geschäftsführung  
*Erich Obster, Member of the management*

## EC Declaration of Conformity

**EG-Konformitätserklärung**  
EC-Declaration of Conformity

im Sinne der EG-Richtlinie 2006/42/EG über Maschinen (Anhang II A)  
according to EC-Directive 2006/42/EC on Machines (Annex II A)

**WOLF Anlagen-Technik GmbH & Co. KG**  
Münchener Str. 54  
85290 Geisenfeld, GERMANY

Hiermit erklären wir, dass die nachstehend beschriebene vollständige Maschine  
We herewith declare that the completed machine described below

<b>Produktbezeichnung</b> <small>Product denomination</small>	Ortsfester Wärmelieferer mit Wärmetauscher für den Anschluss an Luftkanalsystemen oder frei ausblasend <i>Fixed Air Heater with heat exchanger for connection to air duct systems or freeinsufflation</i>
<b>Serien- / Typenbezeichnung</b> <small>Model / type</small>	WLE-...; H-...
<b>Fabrikatsnummer</b> <small>Production Number</small>	109.4... und darüber 109.4... and higher
<b>Baujahr</b> <small>Year of manufacture</small>	2019 und darüber 2019 and higher

den wesentlichen Schutzanforderungen im Sinne  
folgender EG-Richtlinien entspricht  
*is complying with the essential protective requirements  
in the sense of following EC-Directives*

Angewandte harmonisierte Normen <small>Harmonized standards used</small>	EN ISO 12100; DIN EN 349 DIN EN 60204-1; DIN EN 61000-6-1/-2/-3/-4
-----------------------------------------------------------------------------	-----------------------------------------------------------------------

Eine technische Dokumentation ist vollständig vorhanden. Eine Betriebsanleitung wird jedem Gerät beigelegt.  
Die Konformitätserklärung bezieht sich nur auf die standardisierte Festlegung der Maschine und erlischt bei der nicht  
bestimmungsgemäßen Benutzung sowie bei konstruktiver Veränderung durch Dritte, die nicht von uns als Hersteller  
schriftlich bestätigt wurde. Adaptionen und Geräte die nicht im Lieferumfang enthalten sind und mit der Maschine  
verbunden oder zu einer Einheit zusammengefügt werden sowie Veränderungen aufgrund örtlicher Gegebenheiten sind  
nicht mit der EG-Konformitätserklärung erfasst. Für diese Teile oder Änderungen ist vom Ersteller der Anlage eine  
Konformitätserklärung zu erwirken. Die Schutzziele der Richtlinie 2006/95/EG über elektrische Betriebsmittel werden  
eingehalten.  
*There is a complete technical documentation. Each plant is accompanied by operating instructions.  
The conformity declaration only refers to the standardized definition of the machine and is no longer valid in case of improper use  
as well as constructional modification by third parties which hasn't been confirmed in writing by us as manufacturer. Adaption parts  
and devices which are not included in the scope of supply and are connected with the machine or combined to a unit as well as  
modifications due to local circumstances are not covered by conformity. For these parts or modifications, a conformity declaration  
has to be obtained by manufacturer. The safety objectives of the Directive 2006/95/EC relating to electric equipment are observed.*

Bevollmächtigter der WOLF Anlagen-Technik GmbH & Co. KG für die Zusammenstellung aller technischer Unterlagen ist  
Herr Erich Obster Leitung Technik  
*Person authorized by WOLF Anlagen-Technik GmbH & Co. KG to compile the complete technical documentation is  
Mr. Erich Obster Management Technology*

Geisenfeld, den 01.01.2019  
Place, Date

ppa.  
Erich Obster, Mitglied der Geschäftsführung  
*Erich Obster, Member of the management*

## Quality Assurance

Verein zur Qualitätssicherung und Zertifizierung  
für den Mittelstand e.V.

**QZV DIN EN ISO 9001:2015**

**ZERTIFIKAT**

Der Verein zur Qualitätssicherung und Zertifizierung für den Mittelstand e.V.  
bescheinigt, dass das Unternehmen  
**WOLF Anlagen-Technik GmbH & Co. KG**  
Heizung-Lüftung-Klimatechnik  
Oberflächen- und Landtechnik  
Münchener Str. 54  
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ein Qualitätsmanagement-System entsprechend der DIN EN ISO 9001:2015 eingerichtet hat und unterhält.  
Der Nachweis wurde in einem Audit erbracht.

Prüf-Bericht Nr.: 25281118

erstellt durch: Prof. Dr.-Ing. Regina Schreiber, Professorin an der Hochschule Kempten

Dieses Zertifikat wurde ausgestellt am: 15.05.2018 und gilt bis zum: 14.05.2021  
Zertifikat-Register Nr.: 2518118

für den QZV  
Prof. Dr.-Ing. K. Köhler, Professor an der Hochschule Kempten

QZV e.V. Schliersee 46, 81538 München  
Registrierungsnummer 33150102 (MfG e.V.)

# Drying Systems

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**H+HL 5 - 12:** Air Heater AH

**D 5 - D 12:** Tray Dryer

**Control:** Filling System

Kiln

Rolling Floor

Box Emptying

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# 1. Intended Use

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This is a Stationary Air Heater AH  
with Heat Exchanger for the Heating of Air For the Purpose of Drying Hops

Stationary Air Heaters AH are suitable for

transporting air, which is

- dust-free
- free of toxic substances
- non-aggressive
- non-corrosive
- incombustible

Preparation of air for

- filtering
- heating

As well as the operating parameters specified in the offer and order and on the type plates, such as

- medium temperature, medium pressure
- humidity

At the time of its development and manufacturing the drying system was built in accordance with applicable engineering practices. They are considered to be operationally safe. However, there are hazards associated with the operation of the drying system if it is not used properly by trained personnel. As a consequence, every person who is assigned to work on or with the drying systems must be properly trained in the state of operation of the equipment and must have read and understood the operator's manual prior to commencing work on or with the drying system.

## **WARNING**

### **Risk resulting from improper use**

Any use deviating from the use described in this operator's manual is considered improper. WOLF cannot be held liable for any resulting damage or injury. The user/operator carries the risk resulting from improper use. Any improper use, misoperation and abuse can cause life-threatening injuries or death.

## **WARNING**

### **Risks due to modifications**

It is strictly prohibited to make any type of modifications to the drying systems. Doing so can lead to serious injury or death. Any variations require prior consultation with and approval from the manufacturer.

Ventilation and air-conditioning systems for the transportation of combustible or explosive gases, vapours, mist or particulate matters, must be designed in a specific manner. Standard AH systems may not be operated in this hazardous area without the respective notation in our technical specifications.



## 2. Safety

This operator's manual describes the safe and efficient handling of the drying systems. A copy of the operator's manual must be stored near the equipment in a way that allows the user/operator to refer to it at any time. Users/operators must carefully read the operator's manual before commencing work and must be capable of following the instructions and heeding the warnings in the manual. All safety notes, warnings and instructions must strictly be complied with. The local accident prevention guidelines and any applicable state and federal safety laws as well as any other pertinent state and federal laws, regulations and guidelines apply.

The qualified personnel instructed to carry out

- assembly
- commissioning
- maintenance
- troubleshooting
- decommissioning

must be instructed to read and follow this operation manual before beginning with work.

### NOTICE

The air heater may only be assembled and operated with CE marked burners, with control units for air heaters. The combustible (**oil**) must comply with the quality heating oil EL (< 6 mm<sup>2</sup>/s at 68 °F) according to DIN 51 603, T1.

When positioning the oil storage tanks, the fire and water protection regulations of the respective state must be observed. The oil storage tanks and oil lines may only be installed, set up, serviced and cleaned by specialists according to any applicable state and federal laws. The regulations regarding the professional laying of the oil line must be observed! The oil storage tanks must be installed so that the heating oil EL is protected against frost and light and a temperature of 104 °F is not exceeded. A specialist must be contacted immediately if even the smallest amount of oil is leaking.

### NOTICE

The air heater as well as the oil burner must be examined several times daily during the drying period. In the process, particular attention must be paid to a free cross-section of the air inlet area. Drawn in pedals on the protective grille or other soiling must be eliminated immediately. The free inlet cross-section for the combustion air and process air may not be reduced. In case of non-compliance, damage to the air heater or a fire hazard can arise. Flammable materials or liquids may not be stored near the air heater or near the flue gas conduit. The heat exchanger should be cleaned at least once annually and residue from combustion should be removed.

### ⚠ WARNING

Work on the stationary air heater may not be started or conducted until the following functions are given:

- Maintenance switches integrated into the system are connected
- Current supply is completely disconnected
- Rotating parts are no longer moving
- System components have cooled off to the normal ambient temperature (room temperature)

### ⚠ WARNING

#### **Risks from moving parts**

Contact with the moving parts of the drying systems can seriously injure persons or cause death.

- Exercise extreme caution when performing tasks involving the moving parts of the drying systems.
- Coordinate work with all persons involved and instruct them accordingly.
- Make sure that nobody comes into contact with the moving parts.
- Every person working with the drying systems must wear the appropriate safety equipment.

After the work is done, restart the system according to the commissioning instructions.

### ⚠ WARNING

#### **Risk due to unqualified personnel (electrical)**

Only trained and qualified expert personnel may be instructed to carry out work on electrical components. The regulations of the local electric supply company and all other applicable guidelines must be strictly observed.

No structural alterations or additions may be carried out on the stationary air heater or on the control unit; otherwise the manufacturer's declaration of conformity will expire!

### ⚠ WARNING

#### **Risk due to unqualified personnel (gas)**

Only trained and qualified expert personnel may be instructed to carry out work on gas-consuming installations (gas burners, gas pressure regulation units and the like). All applicable local and other standards must be strictly observed.

### ⚠ WARNING

#### **Danger if personal protective equipment is not worn**

Persons who monitor, operate, clean, maintain, transport, etc. the conveyor belts/hops silo must always wear the necessary personal protective equipment. Protective equipment guards against physical injury and death in hazardous areas.

### ⚠ WARNING

The system may only be operated by persons who are 18 years and older and who have been familiarised with the system. The accident prevention regulations must be adhered to in all areas. We point out that the system and the components may solely be used to dry hops.

## 02.01 Symbols



### Warnings Insert

This is the safety alert symbol. It is used to alert you to potential death and physical injury hazards. You must strictly obey all safety messages that follow this symbol to avoid injury or death.

**Warnings** in this operator's manual are marked by signal word boxes. The signal words indicate the level of danger. You must always comply with the warnings and act with care in order to avoid fatal accidents, injury and damage to property:



Death or severe injury will result if the corresponding precautionary measures are not taken.



Death or severe injury may result if the corresponding precautionary measures are not taken.



Indicates a potentially dangerous situation that may result in minor to medium-severe injuries if it is not avoided.



Indicates a potentially dangerous situation that may result in property damage if it is not avoided.



You can find the adjacent symbol everywhere in the operation manual, where there is danger due to electrical components.



The adjacent symbol indicates information or application tips in the operation manual.



The adjacent symbol indicates hot surfaces in the operation manual.

## 3. Storage and Transport

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### 03.01 Receipt of Goods, Damages in Transit



**Immediately check delivery** or completeness and possible damages based on **our delivery note** and in the presence of the driver.

Obvious, visible damages – unpack goods in the presence of the driver and check for damages. Immediately write down the facts on the consignment note and have the driver countersign.

**Damages must be reported immediately.**

**Subsequent complaints are rejected by the forwarding agencies' insurances.**

Concealed damages in transit must be reported directly after detection.



## 4. Assembly Air Heaters H 5 (HL 5) - H 12 (HL 12)

### 04.01 General Information



#### Risks due to improper assembly and installation

Assembly, installation and commissioning of the air heater may only be performed by personnel especially trained for this purpose. Improper assembly, installation and commissioning by unqualified personnel may result in accidents causing death, severe injury and/or damage to property.

- Before assembly, installation and commissioning, observe all relevant notes in this owner's manual and comply with them.

Air heaters with a total nominal heat output over 50 kW must be set up in boiler rooms.

The requirements for boiler rooms as well as possible exceptions can be found in the respective state ordinance on firing systems (FeuV).

Air heaters may only be installed on firm and incombustible ground.

The stationary air heaters H 5 - H 12 must be operated so that no condensate can develop in the area of the heat exchanger. The exit flue temperature may not fall below 338 °F – even in the partial load range.

Operating conditions:

<b>maximum air inlet temperature</b>	<b>+ 104 °F</b>
<b>minimum exit flue temperature</b>	<b>338 °F</b>

Observe residual flue gas heat for gas operation mode according to DIN 1020, T3 !



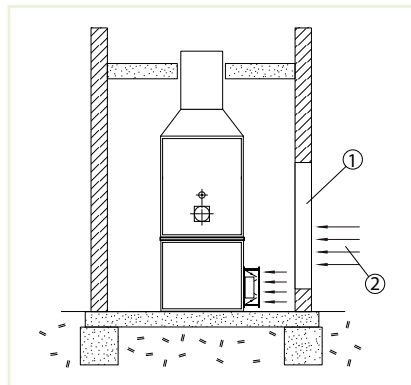
#### Caution danger of combustion

Exhaust gas-carrying surfaces (exhaust gas connection pieces, exhaust pipes, etc.) and housing parts (sight pipe, exhaust hood, cladding plates, burner flange, etc.) may have increased surface temperatures. These can lead to burns if the surface is touched during operation or after the unit has been switched off.

Always wear personal protective equipment (suitable glasses, gloves, etc.).

### 04.02 Supply of Combustion Air – Fan Air Intake

The supply of combustion air for the oil/gas burner as well as the external air taken in by the fan must be carried out via a permanently unrestricted fresh air opening. This requires a free cross-section area (unobstructed, free cross-section of the protective grille).

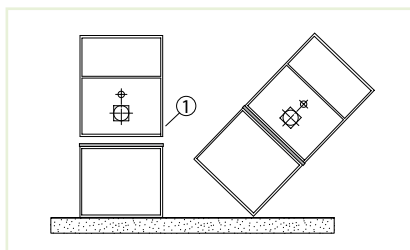


The supply of the total air volume must be carried out directly from outdoors ②. The required free minimum cross-section of the intake port ① may **not** be altered !

Type	Cross-section
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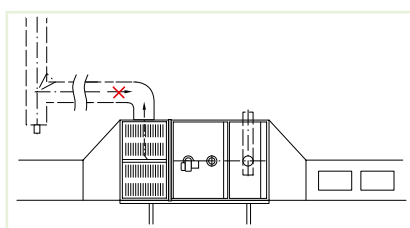
H + HL 5	2.4 m <sup>2</sup>
H + HL 6	2.8 m <sup>2</sup>
H + HL 7	3.7 m <sup>2</sup>
H + HL 8	4.5 m <sup>2</sup>
H + HL 9	5.2 m <sup>2</sup>
H + HL 10	6.5 m <sup>2</sup>
H + HL 11	10.5 m <sup>2</sup>
H + HL 12	10.9 m <sup>2</sup>

## 04.03 Assembly of the Air Heaters H 9 - H 12, Two-Part



1. Install the fan base horizontally
  - clean the ground area
  - provide for a vibration-free support on all sides
  - place sealing tape in the top supporting surface ① of the fan base.
2. Place heat exchanger on the base of the fan and screw in place. Horizontally designed units are equipped with a base frame. The base frame and the AH are screwed together (ex works). The fan element has an individual base frame. Both units, AH and fan element, are screwed together after being correctly positioned.

## 04.04 Horizontal Units (HL)

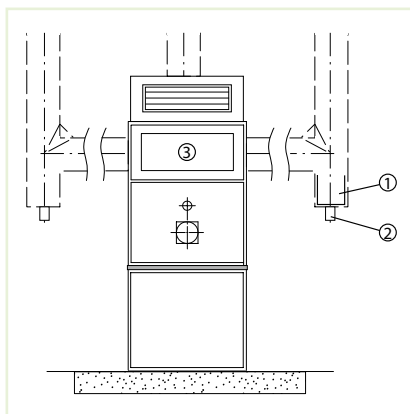


Only the top and rear flue gas connections are to be used for horizontal units.

## 04.05 Flue Gas Connection

As a standard, all air heaters are equipped with a three-sided flue gas connection.

Layout: rear, left and right (fig.). Only use the top or rear flue gas connection for horizontal units! Depending on the case of application, the marked veneers on the cladding panels inside and outside as well as the insulating mat, which, at the same time, becomes visible, must be removed. The blind cover, which is now visible on the heat exchanger, must be unscrewed and replaced with the separately provided flue gas connection.



Local regulations must be observed when connecting the flue pipes!

The chimney cross-section may not be smaller than the cross-section of the connecting pipe!

Lead as directly as possible to the brick chimney or steel chimney with few deflections because these could have a negative effect on the function.

Basically, each steel chimney must be equipped with a flue tube branch with soot receptacle ① and condensate drain ② (fig.) directly on the air heater. Therefore, condensate which develops can be collected in the soot receptacle and does not penetrate the flue gas ducts of the air heater.

### NOTICE

**Condensate from the flue gas duct or the chimney may not flow back into the heat exchanger! The chimney, the dimensioning and the connection to the hot air generator are not included in the delivery and must be provided by the customer.**

The entire flue gas structure ③ and the soot receptacle must be cleaned once a year (chimney sweep).

Only current chimneys approved under building law may be used.

If the calculation of a chimney is required according to DIN EN 13384-1, a draught of "0" Pa must be applied for the air heater.

## 04.06 Safety Thermostat

### WARNING

In addition to a proper, intrinsically safe safety thermostat, a fan thermostat is required. An air heater may not be put into operation **without** these safety devices!

A proper safety thermostat ① ensures operational safety as well as a longer service life.  
Assembly is ex works for completely supplied systems.

### 04.06.01 Settings for the Safety Thermostat

- Safety thermostat ① with restart interlock (delimiter) 302 °F.  
(burner is switched off and locked; manual unlocking required).
- Safety thermostat (controller) **248 °F**. (burner is switched off).
- Fan thermostat approx. **104 °F**. (fan is switched off)

### 04.06.02 To Observe before Commissioning

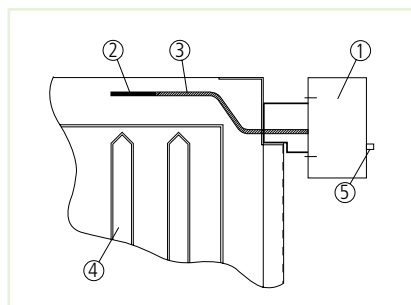
- Triple thermostat may only be inserted on the side at the marked points.
- The sensors ② must be at least 40 mm above the heating pockets in the airstream.
- The sensors ② including the capillary tubes may not encounter any metal contact.
- Pay attention to vibration-free fit so that damage caused by chafing is prevented.
- The bending of the capillary tubes must not be sharp-edged. A minimum bending radius of 5 mm required.  
Carefully bend capillary tubes over tappet!

### WARNING

**Check the switching functions of the safety thermostat when commissioning as well as once annually!**

If the reset button of the safety thermostat is located in a traffic route and can be accidentally operated after a fault switch-off, it has to be provided with a suitable cover by the customer which prevents unintentional resetting of the reset button.

When using a power generator, it may not switch off until after the fan thermostat has automatically switched off!



- ① Safety thermostat
- ② Temperature sensor
- ③ Capillary tubes
- ④ Heating pocket
- ⑤ Reset button

## 5. Burner Assembly

### 05.01 General Information

#### WARNING

#### Risks due to improper assembly and installation

Assembly, installation and commissioning of the burner may only be performed by personnel especially trained for this purpose. Improper assembly, installation and commissioning by unqualified personnel may result in accidents causing death, severe injury and/or damage to property.

- Before assembly, installation and commissioning, observe all relevant notes in this owner's manual and comply with them.

All commercial oil burners EN 267 or gas burners EN 676 approved under applicable building law (DIN – DVGW – approval) with automatic firing devices are suitable, which comply with the requirements of DIN 1020 (DIN EN 13842, DIN EN 17082).

The burners must overcome the following specified resistances on the flue gas side:

	H + HL5	H + HL6	H + HL7	H + HL8	H + HL9	H + HL10	H + HL11	H + HL12
Resistance flue gas side Pa	13	13	15	28	15	34	41	36
Starting resistor Pa	150	150	150	200	150	250	250	250

#### WARNING

No waste products **may be burned in the** combustion chamber!

The burner connection is not drilled. It must be equipped with a burner feed opening as well as drill holes for retaining bolts. If a drawing or template is provided, these drill holes can be added in the factory (order no. 02/702). The length of the burner tube must be adapted to the burner tube on the AH.

The burner tube dimensions can be found in the following table "Burner tube length".

Please observe the minimum dimensions for swivel burners!

### 05.02 Operation with Oil Burners

For the operation of the WOLF oil atomisation burner, we recommend the burning of extra light, mineral fuel oil (EL up to 35 °F, E at 68 °F) according to DIN 51603.

The full-cone oil nozzle built into the oil burner must have a scattering angle of 60° resp. as of H9 and HL9 45°.

The oil burner must overcome the resistances on the flue gas side required in the technical specifications.

Oil burners must be equipped with automatic firing devices, which are approved for air heaters (DIN 1020 - DIN EN 13842 und DIN EN 17082).

### 05.03 Operation with Gas Burners

The heating of the air heaters can be carried out with all commercial fuel gases, which are approved for steel boilers. However, according to the DIN - DVGW – approval of the AH, only burners, which were registered with the WOLF AE may be mounted.

The characteristic of the gas flame must comply with the flame of an oil burner with a 60° – full-cone nozzle (for the installation sizes H9 to H12 and HL9 to HL12, 45°).

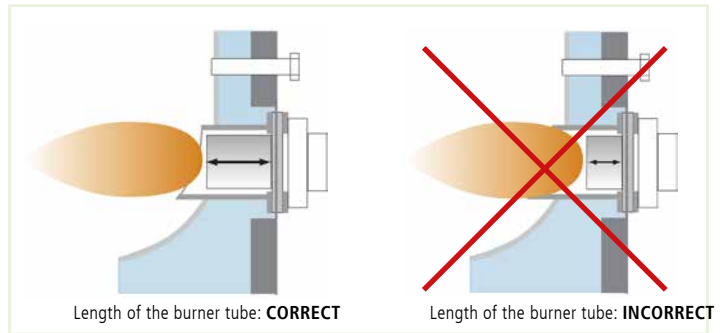
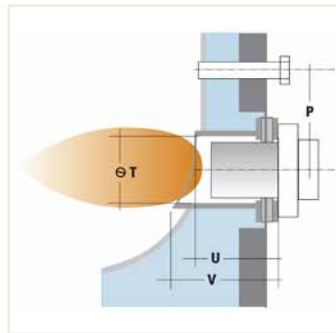
The gas burner must overcome the resistances on the flue gas side required in the technical specifications.

Gas burners must be equipped with automatic firing devices, which are approved for air heaters (DIN 4794 - DIN EN 13842).

Observe residual flue gas heat according to DIN 1020, Part 3!

## 05.04 Burner Tube Length

	H + HL5 H + HL6 H + HL7 H + HL8	H + HL9 H + HL10 H + HL11 H + HL12
Clearance Ø d	250	300
U	215	250
V	320	420
P	500	550



## 05.05 Burner Flame

The burner flame must be directed towards the middle of the burn chamber until right before the rear panel, to achieve an even exposure (fig. 1). The yellow-tip flames may not come in contact with the burn chamber. Pay particular attention to this in the case of multi-stage oil burners and asymmetric flame formation.

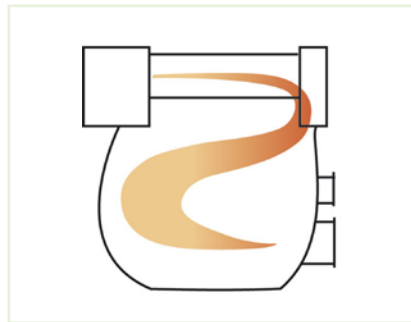


Fig. 1

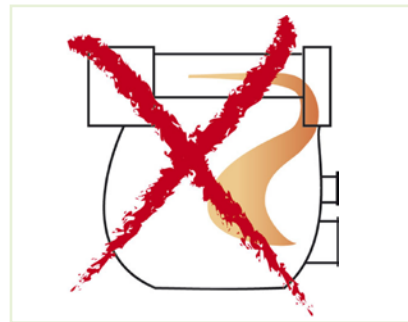


Fig. 2

Flame formation as in (fig. 2) is inefficient and involves overstressing the front half of the burn chamber.

Ideal burning is achieved through the recirculation of the flame over the flame cone, which is proven by the high degree of efficiency.

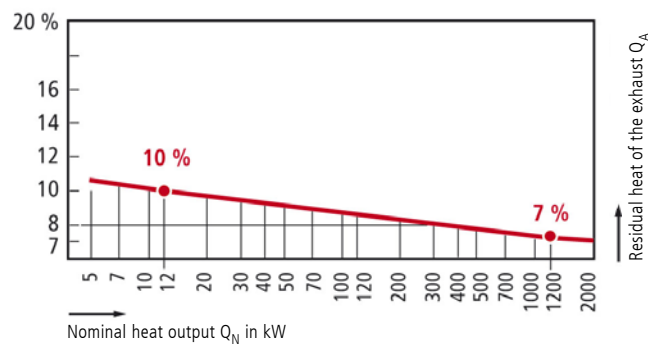
The maximum oil flow capacity specified in our technical list may not be exceeded. In addition to an inefficient operational mode, this would also compromise operational safety.

Conduct function test for the safety thermostat!

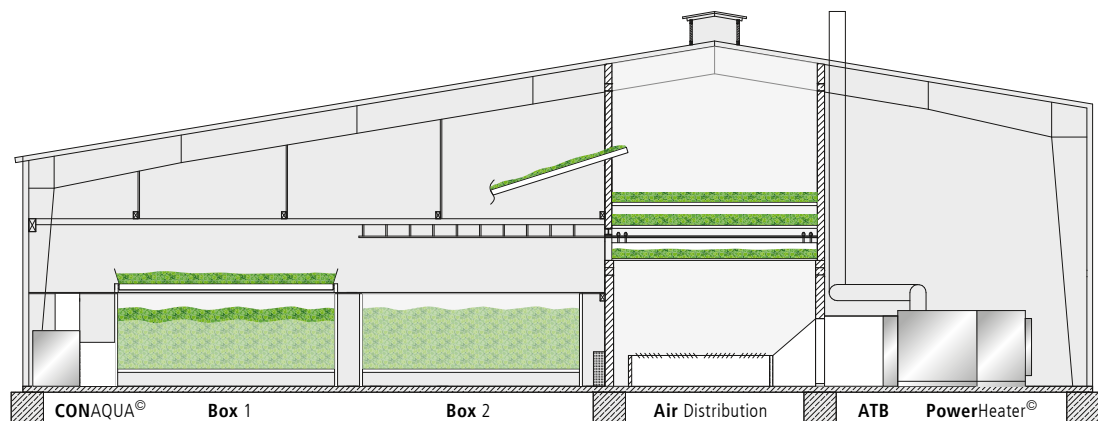
## 05.06 Exit Flue Temperature

According to various regulations, the exit flue temperature must be within the following limits:

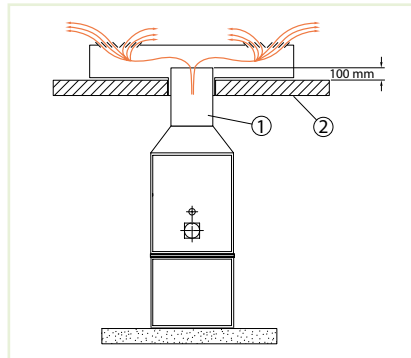
1. The setting of the burner is of prime priority according to:
  - Applicable state and federal emission control laws and regulations - Limitation of the flue gas losses
  - Flue gas losses in systems 25 – 50 kW up to 11%, > 50 kW up to 9% (as of 11/1/2004)
  - Therefore, the exit flue temperature is a parameter subject to the CO<sub>2</sub> content of the flue gases.
2. According to DIN 4755, the exit flue temperature for oil burners may be > 320 °F, < 482 °F.
3. According to DIN 4756, the exit flue temperature for oil burners may be > 320 °F, < 572 °F.  
A minimal residual heat for gas burners is specified according to DIN 1020, Part 3. Falling below this value is impermissible.  
At a nominal heat output, the minimal residual heat amounts to:



## 6. Air Distribution



## 06.01 Air Distribution Cover with Air Supply Pipe



The air supply pipe ① must project 100 mm above the concrete ceiling for all ② systems.

The air distributor cover can be mounted after the assembly of the air supply pipe.

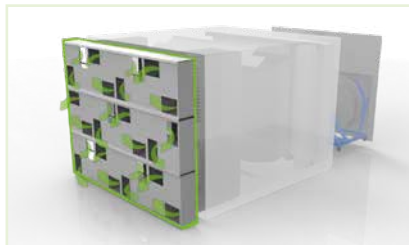
## 06.02 Air Distributor - Covers



The air distributor covers are to equalise the airstreams in the system. The air supply can be influenced using the adjustable knife blades ①.

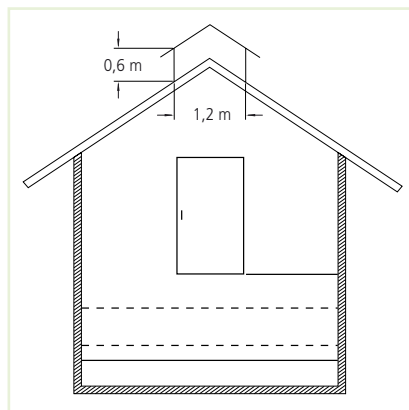
An even distribution of air must be observed during commissioning.

## 06.03 ATB - Air Turbulence Box



- Air turbulence box for even tempering of the air stream to the kiln
- Optimal and even drying results
- Single customizable

## 06.04 Roof Ventilation

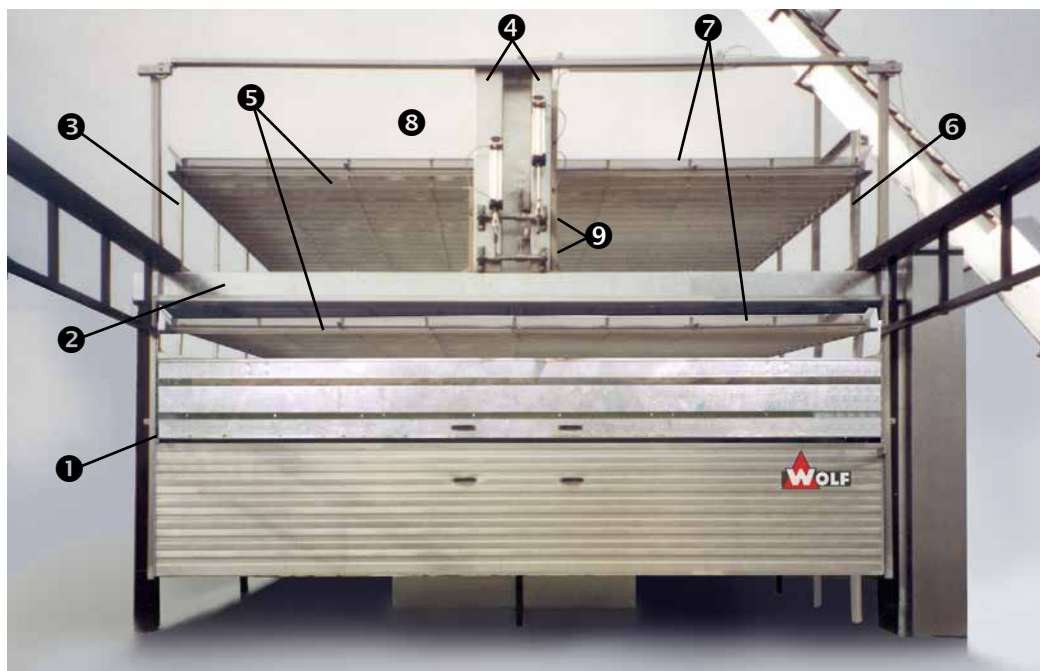


In order to be able to discharge the fully saturated exhaust air in a dust-free manner, a vent is provided, which is always unobstructed.

Length of the ridge ventilation = kiln length



## 7. Assembly Tray Dryer D5 - D12



Pull-out rails must be walled up on the building walls up to the bottom edge ①.

- |                   |                                                        |
|-------------------|--------------------------------------------------------|
| ① pull-out rail   | ⑥ side part                                            |
| ② supporting rail | ⑦ reinforcing rod horizontal                           |
| ③ side part       | ⑧ reinforcing rod diagonal on the centre rail (behind) |
| ④ dumping bins    | ⑨ pulling bar                                          |
| ⑤ trays           |                                                        |

### 07.01 Assembly Process

Please observe the markings on the parts during assembly!  
Manually tighten the screws slightly for assembly process 1 - 8!



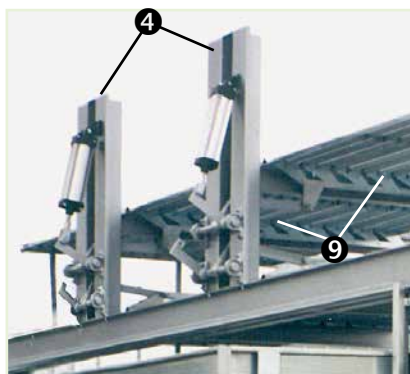
#### Risks due to improper assembly and installation

Assembly, installation and commissioning of the tray dryer may only be performed by personnel especially trained for this purpose. Improper assembly, installation and commissioning by unqualified personnel may result in accidents causing death, severe injury and/or damage to property.

- Before assembly, installation and commissioning, observe all relevant notes in this owner's manual and comply with them.

- Place the supporting rail ② on the wall with supports. Later, the supporting rail must be reinforced indoors according to the supported wall load and filled with concrete.
- Place the side parts ③+⑥ onto the side wall, bolt together with supporting rail ②, provide additional provisional support.
- Place dumping bin ④ with centre rails on supporting rail and rear wall and bolt together with supporting rail.
- Mount horizontal reinforcing rod ⑦ front and back on tray layer level.
- Mount diagonal reinforcing rod on rear side ⑧.
- Align kiln vertically and horizontally and bolt together tightly.
- Insert trays ⑤ into each tray layer according to the number of lateral supports (from front to back) – add a flat washer, diameter 12 mm per tray.
- Erect walling on all sides and wall in tray dryer with attached wall ties.  
Plaster the inside of the kiln from all sides. Use the side moulding as a screed.
- Fully insert the trays.
  - Insert the trays in layers.
  - Observe the installation instructions!
  - Mount cover on centre rail.
  - Mount ⑨ pulling bar.
  - Connect tension rod and pulling bar with bolt M 20 x 70 (lower layer) and M 20 x 130 (top layer).
- Check the mobility of the tray layers with manual dump mechanism.

## 07.02 Pneumatic Mechanism for Tray Dumping and Lift Gate for Pull-Out Opening



The dumping of the dried product as well as the opening and closing of the extraction door is carried out using pneumatic components, without the application of manual force.



### 07.02.01 Assembly Process

1. Attach cylinder base to dump bin ④ using the available screws.
2. Insert cylinder into the cylinder base.
3. Screw the fork head to the transmission lever.
4. Mount control panel for lower layers near the pull-out depending on the prevailing circumstances.
5. A pressure regulator with condensate trap must be mounted next to the control panel.
6. Lay the connecting line from the compressor to the pressure regulator and control panel as well as control panel to the cylinders.

### 07.02.02 Layout of the Connecting Line

- compressor > panel = pressure-resistant hose
- panel > cylinders = pneumatic hose for pressure connection

#### NOTICE

**Observe the length of the connecting line!**

**There must be a pressure of 10 bars on the pressure regulator.**

**All connecting lines must be able to withstand the maximum pressure of the compressor.**

## 07.03 Assembly of the Pneumatic Lift Gate for the Pull-Out Opening

1. Mount the lateral guide rail completely vertically!  
Observe the fastening points on the supporting rail (② from kiln)!
2. Insert the door leaf into the guide rails – the eye bolts must be facing upwards.
3. Mount pneumatic lift cylinders on the structure.
4. Mount pulleys vertically on the structure above the eye bolts.
5. Mount counterweight with pulley on structure.
6. Attach 3 rope clamps to the end of each rope; namely:
  - attach eye bolts from lift gate
  - counterweight
  - cylinder head from lift cylinder (3 ropes)
 The rope lengths must have the same pretension.
7. Carry out fine adjustment of the rope lengths on the lift gate by adjusting the eye bolts.  
Adjust the lift gate **completely horizontally!**
8. Balance the counterweight with the included "punching waste", so that the lift gate slightly closes automatically. A protection must be installed in the area of movement of the counterweight, which prevents anyone from reaching in or climbing underneath.
9. Carry out pneumatic connection as before under item 05.02 "Pneumatic mechanism for dump trays and lift gate for pullout opening".

## 07.04 Extraction Mechanism for Steel Pull-Out (Slider)



A steel pullout serves emptying the dried hops from the kiln. Rail systems for transport outside of the kiln are required for this purpose. Movement on the rails is usually carried out by means of electric powered cable pull. In the case of older systems or breakdowns, movement can be carried out manually. – The extraction slider heats up to the drying temperature (approx. 158 °F). Gloves must be worn to protect hands from being burned. It is also recommended to wear protective goggles.

### **WARNING**

Access to the extraction area must be ensured for systems with Lupus control and the option of automatic slider pullout. Monitoring is conducted with contact switches and acknowledgement keys on the safety doors in the access area to the extraction mechanism. An acknowledgement key is located in the control unit and on the control pulley.

The safety doors, contact switches and acknowledgement keys are not included in delivery and must be installed by the customer. The signals are processed in our control system.



### **Functions of the safeguards for automatic extraction:**

When the safety doors are opened, the automatic slider pullout is stopped. The pullout tray (slider) cannot be put into operation manually or automatically. In order to reactivate the control unit, the safety doors must be closed and activated using an acknowledgement key (after having made sure that there are no other persons in the danger zone). The signal lamp on the acknowledgement key then turns green. The pullout can then be moved forwards or backwards manually (dead man's switch).

### **WARNING**

**In manual operation, the transport area of the slider must be completely visible!**

To start automatic operation, the acknowledgement key must be pressed again. The signal lamp on the acknowledgement key then flashes green. Automatic operation is now active and activates the pullout, when the external signal unit in the slider gives the signal for the slider to move out.

The slider door is automatically opened for extraction. The slider then automatically moves up to the stop point. A visual and acoustic signal is active while the slider door is being opened and the slider is moving.

### **WARNING**

Only persons who are 18 years and older and who are not physically handicapped and have been instructed accordingly may operate the slider pullout.

### 07.04.01 Assembly Process

1. Attach rail system to the structure depending on the model and the prevailing circumstances.
2. Mount electric powered cable pull on the structure.
3. Lay the pulleys and steel rope of the electric powered cable pull to the steel pullout!

### **WARNING**

**Only technically approved fastening material may be used for the attachment of all rails, pulleys as well as electric powered cable pulls!**

## 8. Electrical Connection

### 08.01 Fan Motor

### **DANGER**

#### **Risk of death from electrical current**

Contact with live components and any exposure to electrical currents possesses a risk of death. Electric components that are switched on can move uncontrollably. Serious injury and death are a result.

- Work on the electrical system may only be performed by authorized qualified electricians.
- Before beginning to work on the electrical system, switch off the electrical power supply and secure it against being switched on.
- Cordon off the danger area and mark it with a warning signs.

### **WARNING**

#### **Risk due to deactivation of safety devices**

Do not remove or deactivate safety devices, barriers, limit switches and the like.

### **WARNING**

#### **Risk due to accidental reactivation**

Unauthorized or unintentional reactivation of the drying systems could result in serious injury or death.

- Secure the drying systems against reactivation.
- Cordon off the danger area and mark it with warning signs.



**Services to be provided by operator:**

The electrical supply line must be carried out according to applicable state and federal laws, regulations and guidelines and the regulations of the responsible electric supply company. The connection of the mains cable must be carried out accurately **by a specialist**.

The supply line cross-sections must be adjusted to the nominal current rating.

Provide for strain relief of the connection cables.

It is imperative to connect protective conductors according to DIN 57100 to the marked grounding screw.

Use the original seals when closing the terminal box.

Close inlet openings, which are not required, in a dustproof and waterproof manner.

**NOTICE**

The voltage specified on the fan motor must prevail in the switch cabinet.

Voltage variations larger than  $\pm 10\%$  lead to malfunctions.

The three-phase alternating current motors can be used according to DIN IEC 38 in the range of  $400\text{ V} \pm 10\%$  resp. the single-phase alternating current motors at  $230\text{ V} \pm 10\%$ .

Start-up via star-delta switch with automatic changeover switching from Y to  $\Delta$  required from motors as of 3 kW (enquire at competent electric supply company).



**Carry out proper fuse protection (DIN 57100).**

**NOTICE**

**Motor protection**

According to DIN VDE 0165 (EN 60079), every motor must be protected against improper heating due to overloading using a monitoring device.

If the motor is to be monitored using an overcurrent device with current-dependent delayed triggering according to VDE 0660 (EN 60947) (e.g. circuit breaker), a protection of all electric poles is required.

**NOTICE**

**Adjust thermal overcurrent relay**

It must be set to the measured value. For Y $\Delta$ -switching, setting according to measuring point b). If the amperes drawn by the motor are too high despite proper connection of the motor, the existing circuit compression is lower than was indicated in the order. This can be rectified by artificially increasing the circuit compression (additional installation of a deflector or damper), adjusting the adjustment wedge plate or changing the wedge plate (up to installation size 180 partially possible).

**NOTICE**

Overloaded motors may not be put into operation. No warranty payments can be expected from the manufacturers of the motor.

The motors may only be used for continuous operation and only for normal, not frequently repeated start-ups, in which no significant starting temperature rises occur. The cooling temperature for the motors may not exceed 104°F.

## 08.02 Safety Instructions



Electric motors are equipment with dangerous, live and rotating parts when in operation. Therefore, they can cause severe physical harm, death or material damages in the event of incorrect operation, improper application or insufficient maintenance.

Therefore, only qualified persons may be instructed to work on motors.

Only carry out work on electric motors when they are completely shut off.

Provide safeguards to prevent unintentional restarting.

Observe the safety instructions!

**When using a power generator, the function fan overrun as described in "Commissioning" must be ensured.**

## 9. Observe For Oil and Gas Heating

### 09.01 Fully Automatic Oil-Fired Heating system according to DIN 4755

- with air heater DIN 1020 - 1-3, DIN EN 13842 und DIN EN 17082
- with oil atomisation burner EN 267
- with control cabinet

#### 09.01.01 Functionality

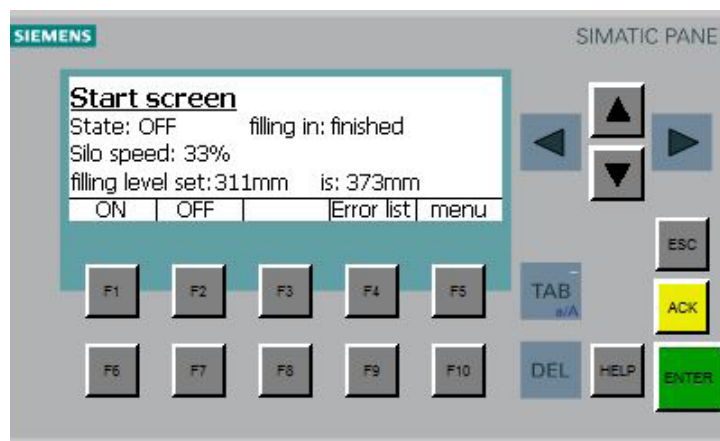
Connection of the fan motor protection (on site) to the WOLF Oil Burner Control Cabinet according to schematic diagram.



The fan may not be switched off while the oil/gas burner is in operation!  
The fan may not be switched off until the AH has cooled off. Unregulated switch offs and voltage interruptions can cause damage to the AH as well as be a fire hazard! Important when using a power generator.

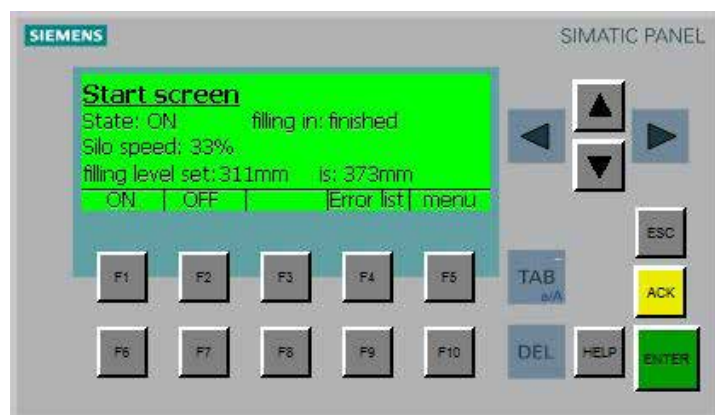
## 10. Control: Filling System

### 10.01 Start Screen of the Filling System - OFF



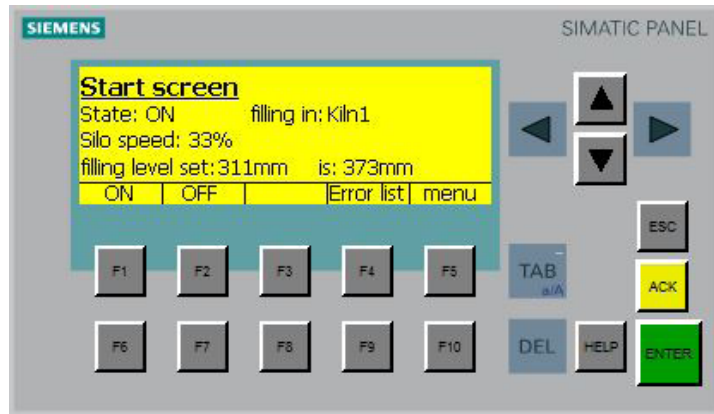
From here all settings can be made.

### 10.02 Start Screen of the Filling System - ON



- F1: Filling system ON
- F2: Filling system OFF
- F3: not used
- F4: Error list
- F5: Menu
- F6: Back to start screen
- F7: Silo Speed faster
- F8: Silo Speed slower
- F9: Setpoint filling level higher
- F10: Setpoint filling level lower

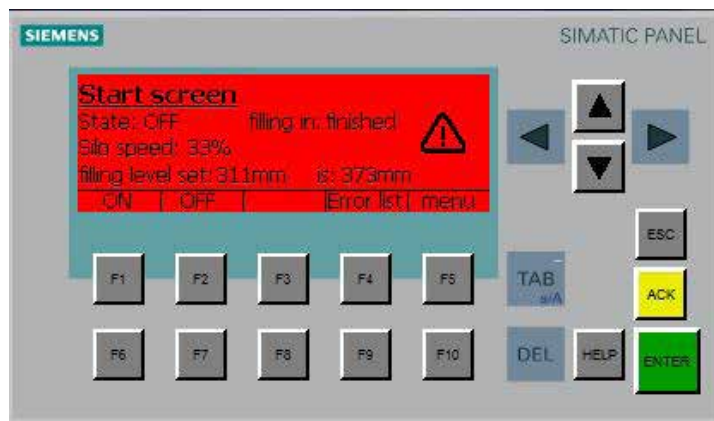
## 10.03 Start Screen of the Filling System - Filling is running



During the filling process only the silo speed can be adjusted.

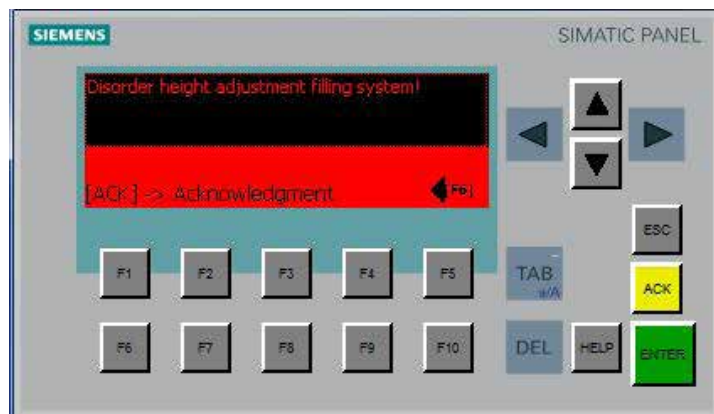
Canceling of the filling process by the „Filling System Off“ switch at the switching cabinet.

## 10.04 Start Screen of the Filling System - Error



A error of the system occurred.

F4: Select error list



The error alerts are listed in particular.

ACK: Acknowledge alert

## 10.05 Control at the switching cabinet



**Filling System Off:**  
stops the filling process

**Filling System 1/2 On:**  
starts the filling process of the respective kiln

**Silo 1/2:**  
Selection of the kiln for the filling process

**Fault Emergency Stop:**  
Display emergency stop switch triggered.

**Silo Speed 1:**  
slow speed of the silo floor

**Silo Speed 2:**  
medium speed of the silo floor

**Silo Speed 3:**  
fast speed of the silo floor

**Elevator Up/Down:**  
setting the position of the elevator

**Acknowledgement:**  
reset the emergency stop switch.



# 11. Control: Kiln

## 11.01 Easy Mode

### 11.01.01 Start Screen



From here all settings can be made.

### 11.01.02 Setting of Values

<b>mobile drawer</b>	<input checked="" type="button" value="Automatic drive with Hop measure device."/>	<input type="button" value="Manual Hop is finish."/>
<b>Setpoint tilt top</b>	<input type="text" value="70%rF"/>	
<b>Correction factor</b> Humidity value capable of air speed in upper hops.	<input type="text" value="1.20"/>	<input checked="" type="button" value="Automatic"/>
<b>Speed of Air flow</b>	<input type="text" value="0.35m/s"/>	<input checked="" type="button" value="Active"/>
<b>max air</b>	<input type="text" value="75%"/>	<input type="button" value="max air"/>
<b>Timer max air</b>	<input type="text" value="30min"/>	
<b>setpoint Temperature</b>	<input type="text" value="68°C"/>	

#### Mobile drawer automatic mode:

The drawer automatically drives out of the kiln, when the hops is dried according to the setting on the external measurement device. (The safety door must be closed and acknowledged.)

#### Mobile drawer manual mode:

When the button is pressed manually, the mobile drawer automatically drives out of the kiln. (The safety door must be closed and acknowledged.)

#### Setpoint tilt top:

If the value in the kiln drops below the set value, the actual value „rel. Humidity“ in the graph starts blinking.

#### Correction factor:

Manual readjustment of the air speed with humidity value in the upper hop shelf. The „Automatic“ button activates the function.

#### Speed of air flow:

Air velocity in m/s, which flows trough the hops shelf. The Button „Active“ activates the function.

#### Max air:

Set fan speed in % manually. The „max air“ button activates the function.

#### Timer max air:

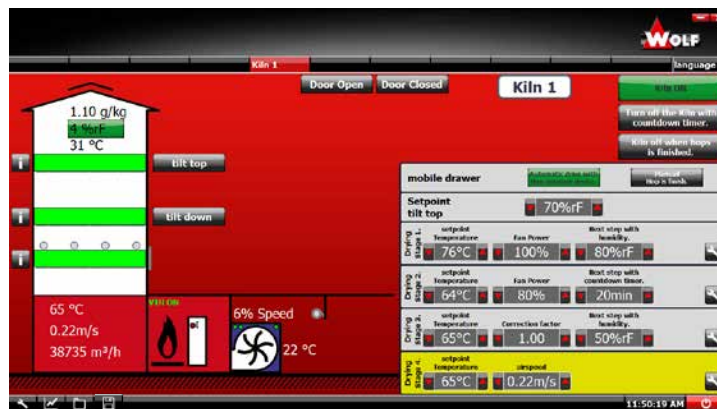
Timer in min. for max air.

#### Setpoint temperature:

Setting the setpoint temperature under the lowest hops shelf.

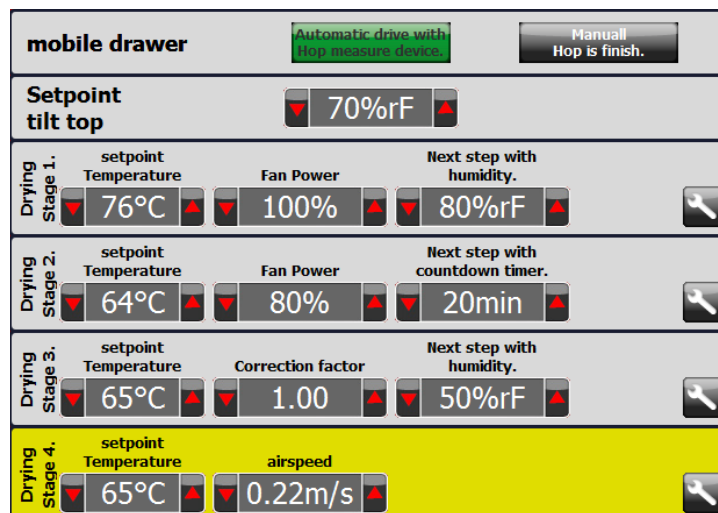
## 11.02 Professional Mode

### 11.02.01 Start Screen



From here all settings can be made.

### 11.02.02 Setting of Values



#### Mobile drawer automatic mode:

The drawer automatically moves out of the kiln, when the hops is dried according to the setting on the external measurement device. (The safety door must be closed and acknowledged.)

#### Mobile drawer manual mode:

When the button is pressed manually, the mobile drawer automatically moves out of the kiln. (The safety door must be closed and acknowledged.)

#### Setpoint tilt top:

If the value in the kiln drops below the set value, the actual value „rel. Humidity“ in the graph starts blinking.

## The 4 Step System

The drying time is divided into 4 stages, which are run through one after the other. The „setpoint temperature“ (temperature below the lowest hops shelf) must be specified for each stage.



Using the „Settings“ button, the following entries can be made individually for each stage:

#### Operation mode

- Fan power: Set fan speed in % manually.
- Correction factor: Manual readjustment of the air speed with humidity value in the upper hop shelf.
- Air speed: Air velocity in m/s, which flows trough the hops shelf.

#### Next step with

- Countdown Timer: The next stage is activated after the set time has elapsed.
- Humidity: The next stage is activated when the humidity falls below the set value.

#### Enable step

- The button can be pressed in any mode and activates the respective stage. For example, if incorrect inputs are made, it is possible to jump between the stages.



## 11.03 Switching On the Kiln



### Kiln ON:

When activated (button is green) the kiln is running in continuous operation.

### Turn off the kiln with countdown timer:

When activated (button is green) the kiln switches off after the set time (see: setting of values)

### Kiln off when hops is finished:

When activated (button is green) the kiln switches off, when the hops is finished according to setting.

## 11.04 Switching Off the Kiln



The kiln is switched off with the „ ON/OFF“ button in the lower menu bar.

## 11.05 Control of the Shelves / Tilt Function



### Door open/ door closed:

When activated (button is green) the drawer gate opens/ closes.

### Mobile drawer backward / forward driving:

When activated (button is green) the drawer drives forwards/ backwards as long as the button is pressed.

### Mobile drawer auto. back to the kiln:

When activated (button is green), the drawer door opens automatically, the drawer drives back into the kiln and the drawer door closes again.

### Tilt mobile drawer:

When activated (button is green) the drawer is tilted. Press the button at least 5 times for a complete tilting of the shelf.

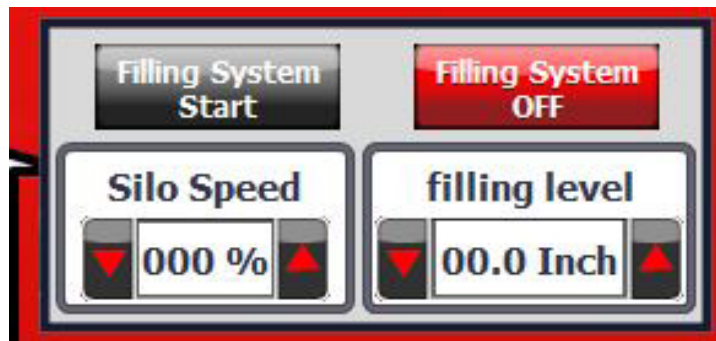
### Tilt shelves:

Clicking once reduces the air flow to the set value. Press and hold (button is green) to tilt. Press the button at least 5 times to completely tilt the shelf.

### Minimize air:

Reducing the air flow and set the value to open the mobile drawer door. The button flashes green when ready to open.

## 11.06 Control Filling (optional)



### Silo speed:

Speed in % of the silo floor.

### Filling level:

Height of the hops filling in the upper shelf.

### Filling system start:

When activated (button is green) the filling operation is started.

### Filling system OFF:

When activated (button is green) the filling operation is stopped.

## 11.07 Control Rolling Floor (optional)



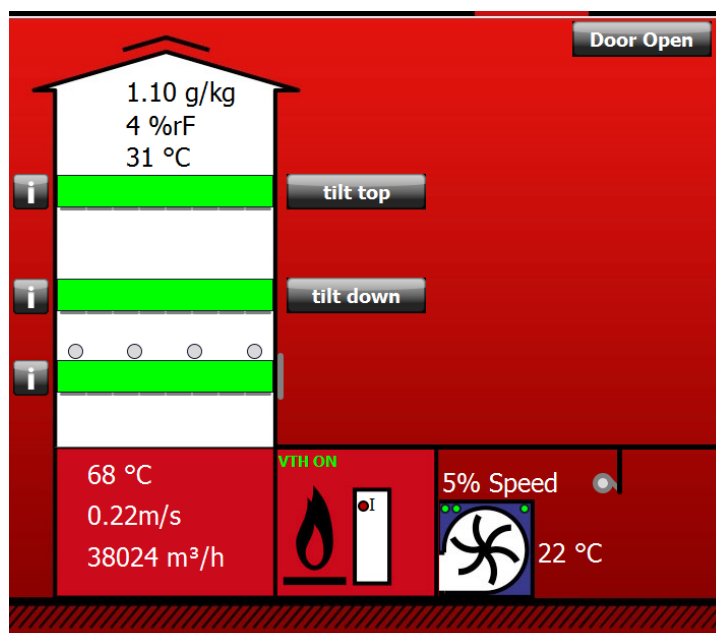
### Rolling floor is not filled with hops:

When no hops is on the rolling floor, the actual program is cancelled and the rolling floor can do new jobs.

### Rolling floor is filled with hops:

When hops is on the rolling floor, the rolling floor is started and the selected box is filled.

## 11.08 Graphical View



### Display of:

Actual values of absolute humidity (g/kg), temperature (F), relative humidity (% r.F.)

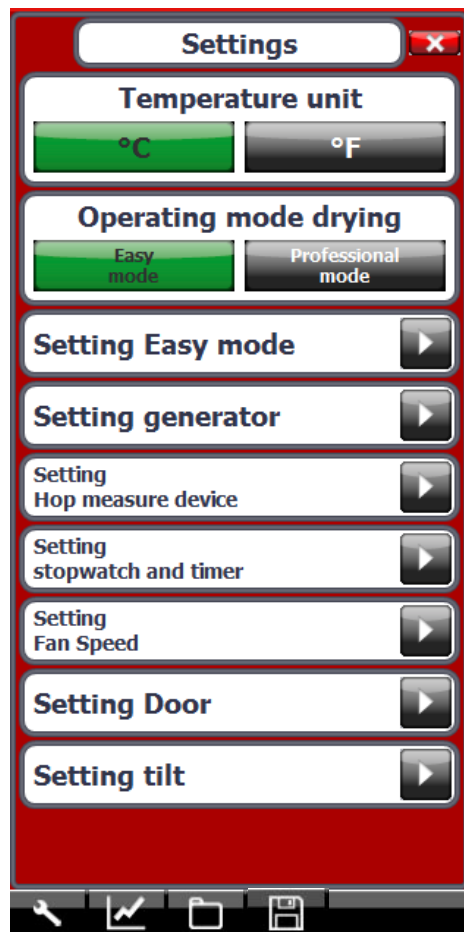
Burner on/off

Supply air open/closed

## 11.09 Settings



Using the „Settings“ button in the lower menu bar, the following entries can be made:



### Temperature unit:

Setting the temperature unit between °C and °F

### Operation mode drying:

Changing between Easy Mode and Professional Mode

### Setting Easy Mode:

- Turn on „Max air“ after filling
- Switch to „Air speed“ after „Max air“.
- Switch to „Correction factor“ after „Max air“
- Use the last setting after „Max air“.

### Setting Professional Mode:

- Turn on „Drying stage 1“ after filling

**Setting generator (optional):**  
Setting for an external electric generator.

- Switch off the generator only once with the kiln.
- Always switch off the generator with the kiln
- Setting generator overrun time

### Setting hop measure device:

- Switch off the measurement device after the mobile drawer is driven out automatically
- Honk when the hops are ready
- Honk when the hops in the middle shelf are ready
- Honk when the hops in the mobile drawer are ready

### Setting stopwatch and timer:

- Show the stopwatch in the display
- Show the shelf timer in the display

### Setting fan speed:

Individual adjustment of the fan speed

### Setting door (optional):

Individual setting of the pneumatic or manual door.

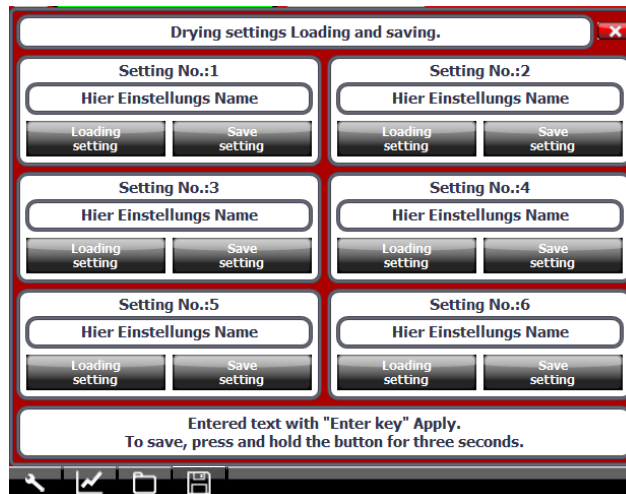
### Setting tilt (optional):

Individual adjustment of shelf and mobile drawer tilting

## 11.10 Drying Settings Loading and Saving



Using the „Loading/Saving“ button in the lower menu bar, the following entries can be made:



In Professional Mode as well as in Easy Mode, several memory slots are provided for this purpose.

### Save setting:

The current values in the display are saved as presettings. Press and hold the button to save (button is green).

### Load setting:

A previously saved setting is loaded. The current values in the display are replaced. Press and hold the button to load (button is green).

### Here settings name

To enter the individual file name, confirm with „Enter“ on the keyboard.

## 11.11 Curve Plotter



Using the „Curve Plotter“ button in the lower menu bar, you get to the diagram:



Here the drying process is shown graphically.

## 11.12 Data Recording

### 11.12.01 Setting Data Recording



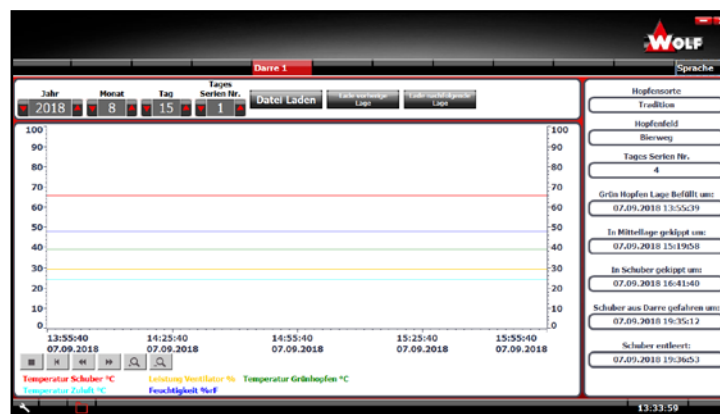
After filling, the hop layer is marked with the variety and the hop field.

File names are accepted with „Enter“ on the keyboard.

### 11.12.02 Archives Data Recording



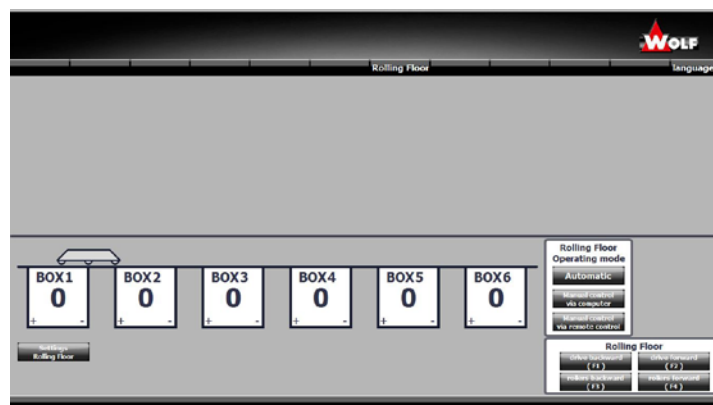
Using the „Archives“ button in the lower menu bar, you get to the diagram:



Marked hop shelves can be loaded here.

## 12. Control: Rolling Floor

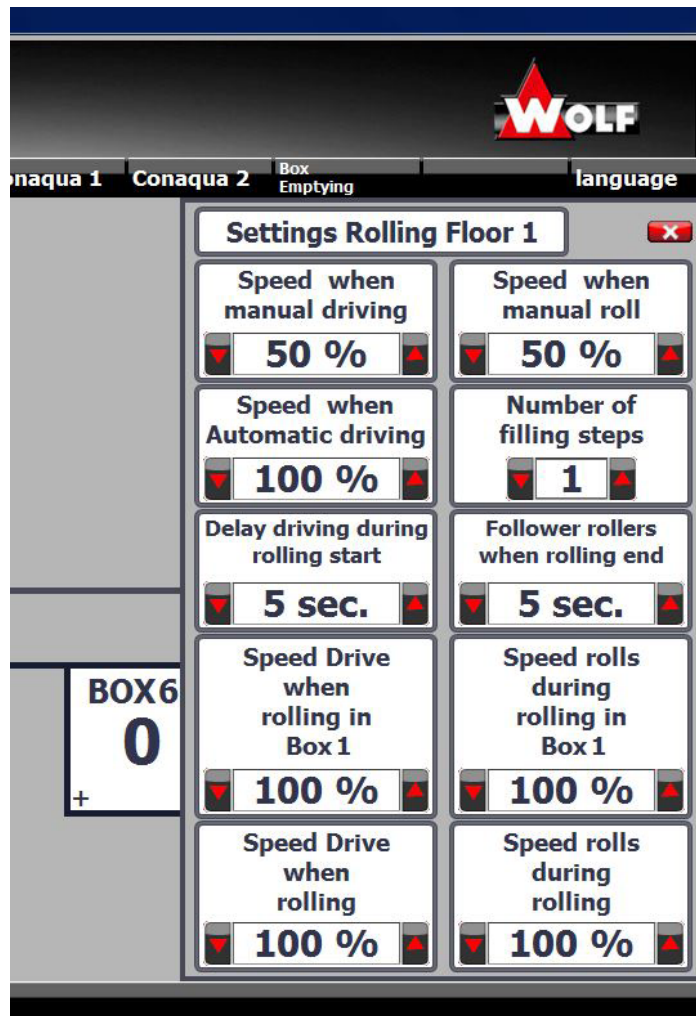
### 12.01 Start Screen of the Rolling Floor



From here all the settings can be made.



## 12.02 Setting of Values



### Speed when manual driving:

Setting the driving speed in manual mode in %.

### Speed when manual roll:

Setting the rolling speed in manual mode in %

### Speed when automatic driving:

Setting the driving speed in automatic mode in %.

### Number of filling steps:

Setting the number of steps to empty a fill in the relevant box.

### Delay driving during rolling start:

Setting the time until the rolling floor starts driving when unloading.

### Follower rollers when rolling end:

Setting the time the rolling floor keeps rolling to empty remaining hops into the box.

### Speed drive when rolling in box 1:

Setting the driving speed when rolling in the first box.

### Speed rolls during rolling in box 1:

Setting the rolling speed when rolling in the first box.

### Speed drive when rolling:

Setting the driving speed when rolling in all other boxes.

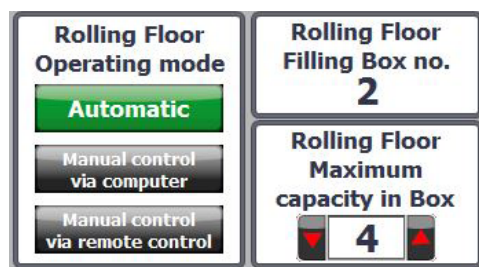
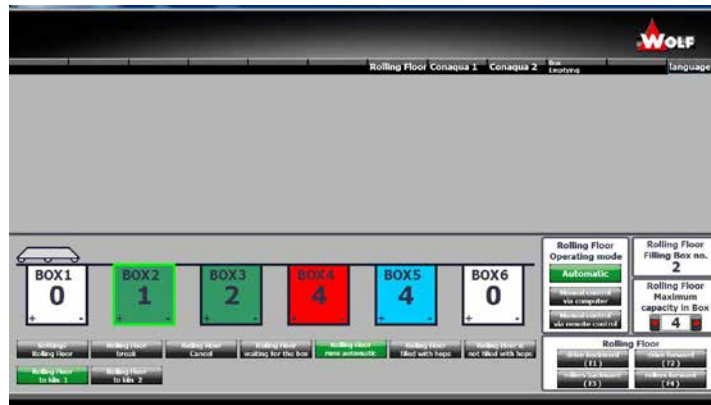
### Speed rolls during rolling:

Setting the driving speed when rolling in all other boxes.

## 12.03 Switching on the Rolling Floor / Rolling Floor Operating Mode

Hint: Activating / changing the operating modes is only possible, when no operatin mode is activated.  
(Switching off by pressing on the activated mode again)

## 12.04 Automatic Mode



### Automatic:

When activated (button is green) the rolling floor waits, until a kiln is ready to empty (standby mode). If a kiln is ready, the rolling floor drives to the kiln, gets filled and empties the hops in the selected box. If the rolling floor is not filled, it goes back in standby mode.

### Rolling floor filling box no.:

Selection of the box to be filled.

**Rolling floor maximum capacity in box:** Setting the maximum number of filling operations.

### Box color white:

box is empty

### Box color green:

box is filled with hops (number = number of filling operations)

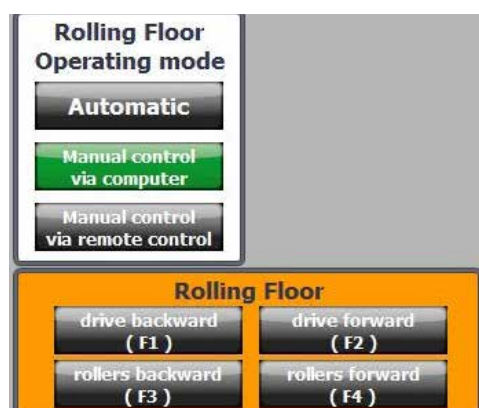
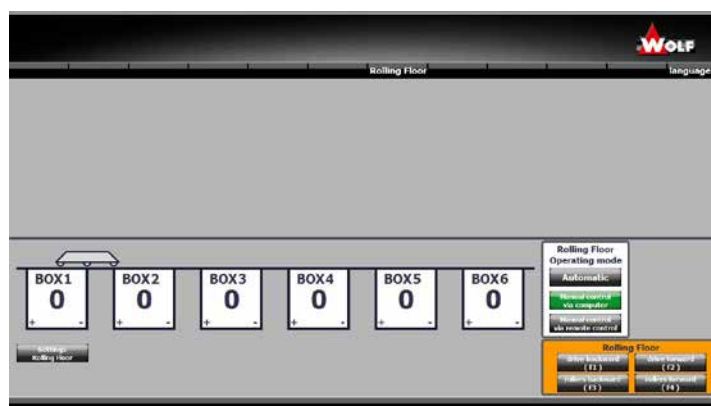
### Box color red:

box has reached the maximum filling capacity.

### Box color blue:

box is conditioned with CONAQUA Unit.

## 12.05 Manual Control via Computer



### Manual control via computer:

When activated (button is green) the rolling floor can be controlled manually, either by mouse click on the buttons or by the F keys on the keyboard.

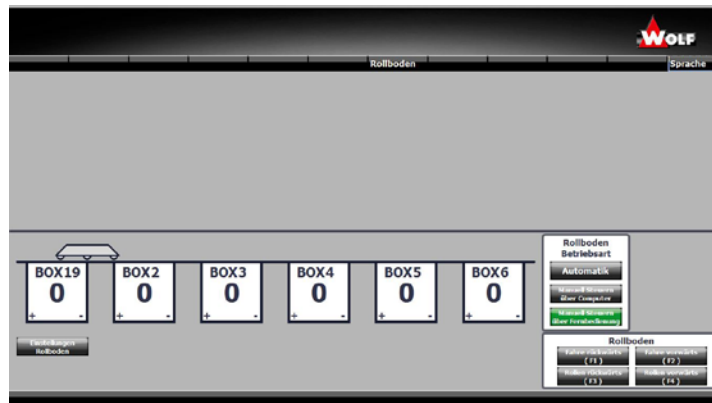
### Drive backwards / drive forwards:

The rolling floor drives backwards / forwards.

### Roll backwards / roll forwards:

The rolling floor rolls backwards / forwards.

## 12.06 Manual Control via Remote Control



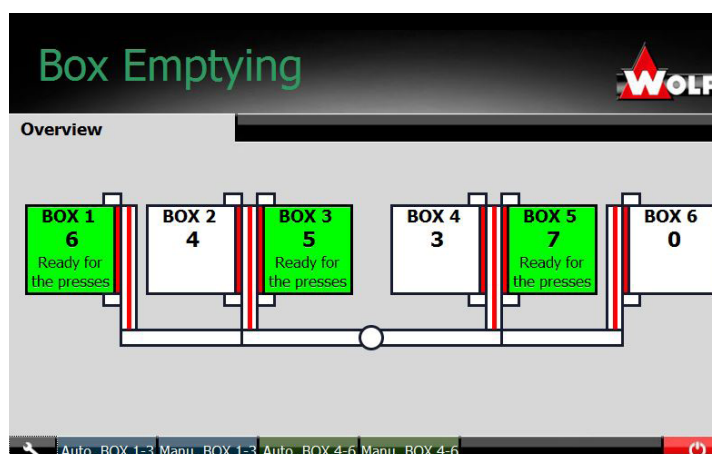
### Manual control via remote control:

When activated (button is green) the rolling floor can be controlled manually with the remote control at the plant.



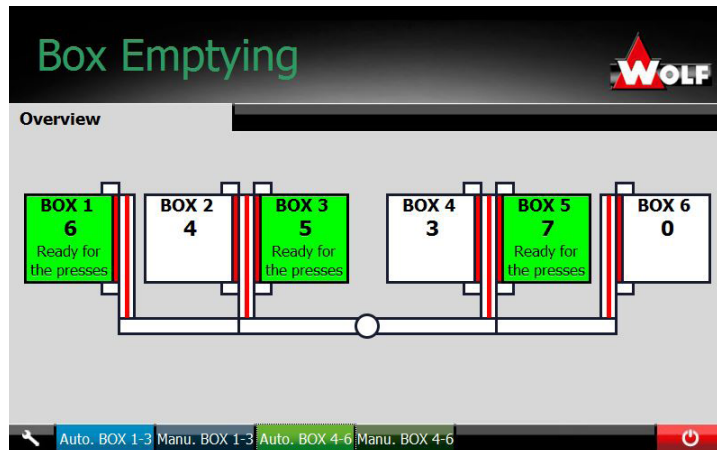
## 13. Control: Box Emptying (Touch Panel)

### 13.01 Start Screen of Box Emptying



From here all the settings can be made.

## 13.02 Auto. BOX - Automatic Mode



### Starting:

Press **Auto. BOX** at the bottom of the display in the touch panel.

### Box color green:

the relevant box is ready for the presses.

### Gate color red:

the relevant gate is closed

### Gate color green:

the relevant gate is open.

### Belt color green:

the relevant conveyor belt/ motor is running.

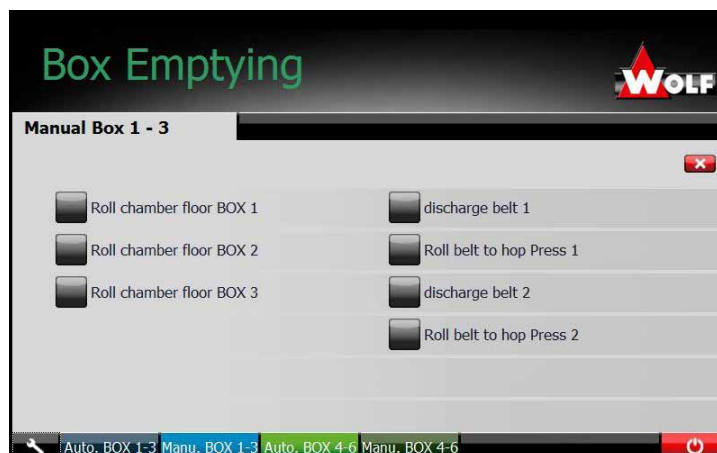
### Light barrier:

If the light barrier is not interrupted (no hops on the conveyor belt), it is indicated as a red line

### Pressing process:

1. Open the gate at the box
2. Acknowledge emergency stop switch
3. Switch box in Automatic Mode
4. Press is filled automatically
5. If the box is empty, deactivate Automatic Mode
6. Close the gate

## 13.03 Manu. BOX - Manueller Modus



### Starting:

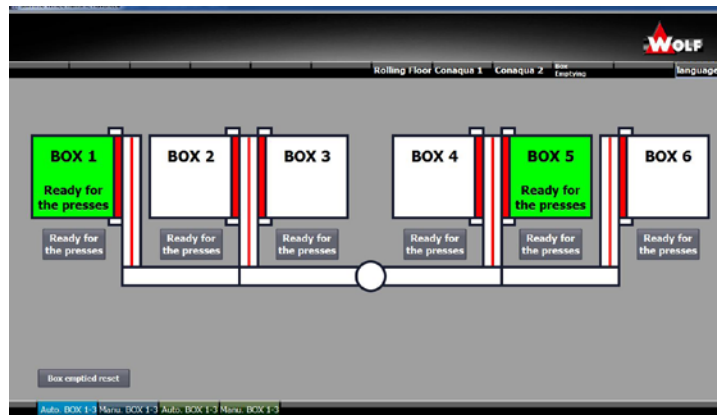
Press **Manu. BOX** at the bottom of the display in the touch panel.

By pressing and holding of the button the relevant conveyor belts are switched on.

The Roll Chamber Floor only can be switched on, if the relevant gate is opened.

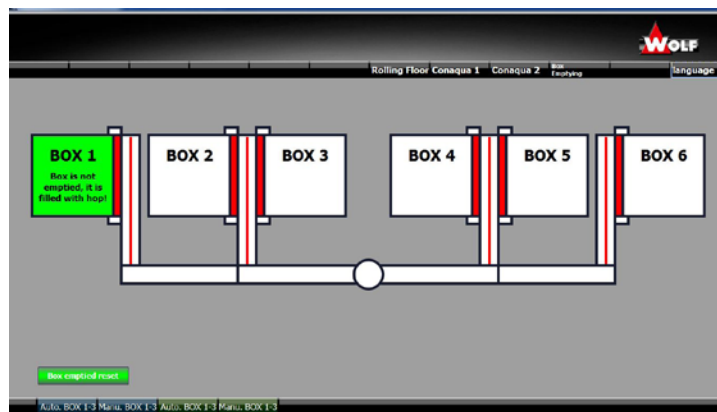
## 14. Control: Box Emptying (Personal Computer)

### 14.01 Additional Functions



#### Ready for the presses:

Selection of the box to be pressed.



#### Box Emptied Reset (optional):

If the gate of the box was accidentally opened and started to empty, usually all the data of the box will be deleted. By pressing the button and clicking on the relevant box (box color green) the data is retained.

## 15. Maintenance, Warranty

### 15.01 Hop Drying System

#### NOTICE

Our warranty expires if damages occur due to improper handling or maintenance. Furthermore, experience shows that more severe damages occur with increasing age of the products if maintenance is insufficient.

Obey all applicable laws and regulations regarding maintenance intervals for safety equipment.

#### WARNING

Only competent resp. specialised personnel may conduct the inspection of safety guidelines!!!

#### NOTICE

The hot air generator and the oil burner have to be inspected several times a day during the drying period. Special attention has to be paid to the free cross-section of the air intake surface. If cone leaves or other containments are sucked to the protective grid, they have to be removed immediately. The free intake cross-section for the combustion air and process air may not be reduced. Failure to observe this may result in damage to the hot air heater or fire hazard can occur. Flammable substances or liquids must not be stored in the area of the hot air generator and in the area of the exhaust pipe. The heat exchanger should be cleaned at least once a year and combustion residues removed.

### 15.02 Motor / Fan

#### WARNING

#### Risk due to accidental reactivation

The system must be shut off before maintenance work is carried out and assured against unintentional reactivation after the cooling off process. You must observe standard operation procedures at all times. Unauthorized or unintentional reactivation of the drying systems could result in serious injury or death.

- Secure the drying systems against reactivation.
- Cordon off the danger area and mark it with warning signs.



#### Caution danger of combustion

Exhaust gas-carrying surfaces (exhaust gas connection pieces, exhaust pipes, etc.) and housing parts (sight pipe, exhaust hood, cladding plates, burner flange, etc.) may have increased surface temperatures. These can lead to burns if the surface is touched during operation or after the unit has been switched off. Always wear personal protective equipment (suitable glasses, gloves, etc.).

#### 15.02.01 Maintenance Intervals for System Components

The system should be serviced before every hops harvest!



Contact our service department if you are interested in a maintenance agreement:  
**telephone: 08452 99-220, fax: 08452 99-502, Email: [service@wolf-geisenfeld.de](mailto:service@wolf-geisenfeld.de)**

#### 15.02.02 Motor / Fan

Motor	The fan motor does not require any maintenance. Accumulated dust should be removed on regularly dry.
Fan wheel	Remove dust and other deposits regularly, to prevent imbalance.
Fan bearings	The groove ball bearings built into the bearing cross-sections as well as the pedestal bearings without lubricating nipples are maintenance-free. The spherical bearings built into the pedestal bearing housings with lubricating nipples should be regreased with lithium soap based grease. Used grease must be removed – please pay attention to the unobstructed discharge of used grease! The first relubrication should be carried out after 30 operating hours.
Fresh air intake grating	(fan intake air) Remove soiling regularly.

#### 15.02.03 PowerHeater with Free-Wheeling Fan

Access to the fan is via a large-scale inspection hatch, which is equipped with locks. The inspection hatch is additionally secured with two clamps, which can only be opened with the help of tools.

There is a contact protection screen between the inspection hatch and the fan. It may not be removed except for maintenance or inspection purposes. **The system must be shut off and assured against unintentional restarting before conducting maintenance work and before opening the inspection hatch.**

The fan is directly connected to the drive motor in the high-performance PowerHeater. Therefore, there is no loss of drive. Servicing of V-belts is not required. The entire fan unit is on a vibration frame for shock absorption, which is equipped with spring vibration dampers. The fan must be checked for mechanical vibrations before being put into operation. An inspection of the mechanical vibration must be conducted according to applicable state and federal laws, regulations, rules and ordinances. The maximum vibration severity (measured in the bearing bracket of the

engine bearer on the wheel side) is 2.8 mm/s.  
The wheel and the drive motor must be cleaned annually. Deposits on the wheel lead to imbalance and therefore, to damages (breakage).

**⚠ WARNING**

The wheel and the drive motor must be cleaned annually. Deposits on the wheel lead to imbalance and therefore, to damages (breakage). Non-compliance can lead to the wheel bursting which may result in death or severe physical injury.

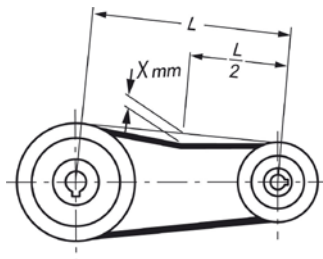
- Wet cleaning may not be conducted (only dry)
- The wheel may only be replaced by a specialist, who has substantiated knowledge of this fan technology.
- After replacing the wheel and restarting, it is imperative to rebalance the entire rotating unit according to DIN ISO 9040, T1.

**⚠ WARNING**

**After maintenance work is done, the contact protection screen must be reattached and the inspection hatch must be locked and secured against unauthorised opening using the clamps!**

### 15.02.04 V-Belt

#### V-Belt – tension and alignment



To prevent unnecessary strains on V-pulleys, bearings and an overheating of the V-belts, an accurate alignment as well as tensioning of the V-belts must be observed!

Adjustment is carried out by changing the position of the drive motor. After loosening the mounting bolt on the motor tensioning device, it can be moved in longitudinal and lateral axis.

**The following must be observed:**

#### V-belt tension

Only provide enough tension so there is no slipping when starting up. The V-belt must still be able to be pressed down on. A specialist should check and set the belt tension. To do so, a pretension measuring device (Optibelt) is to be used.

$$\text{Rule of thumb: } x = \frac{2.5 \times \text{centre distance (mm)}}{100}$$

**NOTICE**

V-belts must be checked for the following items after the **first 5** and **after 50 operating hours**.  
Before commissioning, please make sure that all screws are tightened.

**NOTICE**

#### Changing the V-belt

Only use packaged V-belts from one manufacturer for drives with multiple V-belts. Never mix old and new V-belts!  
If necessary, always change a complete set!



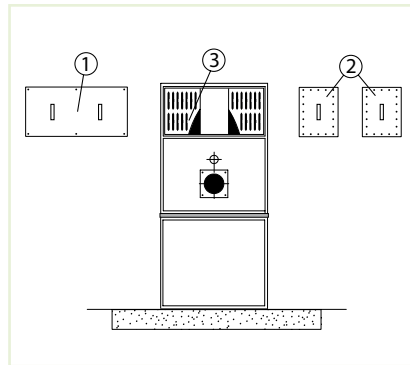
### 15.02.05 Air heaters

**Cleaning the heat exchanger** - before each heating period



As in the case of oil burners, possible deposits should also be removed from heat exchangers at specific intervals. All air heaters have special cleaning ports for this purpose, which are accessible from the burner side.

**Cleaning ports for heating pockets**



for ③: flue gas turbulators

- The top cladding panel must be removed ① for cleaning.
- Rectangular inspection caps ② become visible.
- After removing these caps as well as the flue gas turbulators ③ from the heating pockets, dust off deposits using a cleaning brush and remove using a soot suction device.
- Assembly in the reverse order.



Make sure the inspection caps are tight and leak-proof.  
Insert a new sealing cord (e. g. isoKERAM cord 25 x 5 ): Old sealing cord is defective!  
Unscrew all nuts, to seal the inspection caps so that flue gas emission is prevented.



**Tighten the nuts 2 x. Cleaning port for combustion chamber**

After removing the oil burner, the combustion chamber can be cleaned via the burner tube using a soot suction device (special chimney sweep tool or from a heating contractor).

### 15.02.05 Flow Sensor

Dust must be removed from the flow sensor:

- Take the flow sensor out of the mounting
- Dip a soft brush in ethyl alcohol and carefully clean the sensor.
- When the ethyl alcohol has dried, reinsert the sensor into the mounting.



**Please observe direction of arrows = direction of the airstream!**

### 15.02.06 Pneumatics

#### NOTICE

The existing condensate must be completely emptied from the condensate trap however, particularly after each hops harvest ---> **risk of freezing.**

## 16. Decommissioning, Disassembly

### 16.01 Decommissioning

#### **Decommissioning**

Stopping the system via control unit

- Close external air intake port, to avoid risk of freezing
- Switch off main switch and terminate system
- Fan element - release tension from V-belt resp. remove, to prevent damage to bearings
- Shut off fuel supply

#### **Recommissioning**

Conduct visual inspection whether or not visible damages can be determined. Then, carry out commissioning of the AH device, as described under Commissioning.

- Fan element
  - Apply V-belt – tension.
  - Remove old grease from fans with regreasable bearings, which can be relubricated, with new lithium soap based grease.
- Open fuel feed line
- Activate main switch
- Switch on control unit

### 16.02 Disassembly and Disposal



#### **Disassembly**

Before disassembly, the stationary air heater resp. the ultimate consumer built into it must be switched off. A competent electrician must remove all live connecting cables.

Furthermore, all components leading to combustibles must be completely removed. This must be carried out by a qualified contractor, who conducts a professional disposal of oil and gas lines.



#### **Risk of death from electrical current**

Contact with live components and any exposure to electrical currents possesses a risk of death. Electric components that are switched on can move uncontrollably. Serious injury and death are a result.

- Work on the electrical system may only be performed by authorized qualified electricians.
- Before beginning to work on the electrical system, switch off the electrical power supply and secure it against being switched on.
- Cordon off the danger area and mark it with a warning signs.

Then, the stationary air heater can be stripped down on location into its individual units or individual parts. This should also be carried out by a qualified contractor, who has knowledge of the environmentally-friendly disposal of the individual components.

**WARNING**

Suitable breathing masks should be worn when handling dusty components (filters) as well as mineral wool products.

**Disposal**

The following materials are used in our AH devices

Housing – frame profile, cladding profile and components made of

- hot-dip galvanised steel sheet
- stainless steel 1.4301
- aluminium Al Mg

All metals can be recycled into the circle of resources via special waste.

Sealing compounds from

- polyurethane– waste code no. 55908, 080404,

All sealing materials can be supplied to hazardous waste or controlled combustion.

Insulation material

- mineral wool - waste code no. 31416
- sound proofing mats

All insulation materials can be disposed of via normal rubbish dumps.

## 17. Emergency

---

### 17.01 Fire Fighting

**WARNING**

When operated correctly and routinely serviced there is no direct fire hazard from the stationary air heater.

In the case of fire, only the small amount of integrated sealing can burn away.

A direct fire hazard emanates from the (installed by a qualified contractor) oil / gas burner.

**WARNING**

In case of fire, a protective mask, independent of air circulation, must be worn for fire fighting.

The device must be shut off. Suitable fire extinguishing media are

- water spray jets
- fire extinguishing foam
- fire extinguishing powder

### 17.02 Emission of Hazardous Substances

**WARNING**

Given that only small amounts of combustible sealants are included, only small amounts of harmful substances can develop in case of fire. Based on the applied materials, these are – nitric oxides, carbon dioxide, carbon monoxide, hydrogen chloride.

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