AFS Airfilter Systeme GmbH

Translation of the Original Instruction Manual for AFS Air Purification Devices for Removing Oil and Emulsion Mist
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This instruction manual applies to the following AFS air purification devices: AFS 600, AFS 1100, AFS 1600, AFS 3000, AFS 4000, AFS 6000, AFS 8000, AFS 12000, AFS 16000 and the Plus variants.

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1 Explanation of Symbols

Safety instructions, danger point, or important or absolutely mandatory instruction

Electrical connection. Caution: High voltage. Observe safety instructions. Work must only be carried out by a qualified electrician (DIN EN 50 110, IEC 364).

Important additional information or advice for use.

2 General Information

AFS Airfilter Systeme GmbH (AFS) manufactures highly efficient mechanical air purification devices and systems that remove oil, emulsion, and minimal lubricant mist from the air, protecting the workplace environment in metalworking shops. Moreover, as a special construction, AFS also manufactures air purification devices for cleaning air contaminated with solvents in areas that are not at risk of explosion as well as for exhaust air that accrues in dry processing.

AFS devices are not ATEX-certified!

Our AFS devices are state-of-the-art air purification devices both with respect to their safety levels and operating safety. By labeling devices with the CE mark, we are confirming that the risk and hazard assessment meets the standards of the valid EC Machinery Directive 2006/42/EC and valid EMC Directive 2014/30/EU; see the EC Declaration of Conformity in Chapter 12.

The type plate, which lists the device type, serial number, and CE mark, is attached to the device’s door or at the rear of the device.

The relevant standards as well as local, national, and international regulations apply. They are to be observed and obeyed.

2.1 Importance of the Instruction Manual

Read this instruction manual carefully before installation and startup to ensure proper use! Please note that this instruction manual only applies to the particular device and not to the entire system!

The present instruction manual facilitates safe work on and with the device named. It contains safety instructions that must be observed as well as information that is necessary for undisturbed operation of the device.

The instruction manual is to be kept with the device. The instruction manual must be kept available to any person who is to interact with the device at all times. The instruction manual is to be kept for further use and must be passed on to each successive owner, user, or end customer.

2.2 Target Audience for the Instruction Manual

The instruction manual is directed at those who are entrusted with planning, installing, startup, maintaining, or servicing the device and who have the qualifications and knowledge necessary to execute their activities.
2.3 Disclaimer
This instruction manual has been examined to ensure that its contents coincide with the hardware and software of the device described. Nonetheless, there may be discrepancies; no guarantee of complete agreement is given. We reserve the right to make changes in the construction and technical data in the interest of further development. Therefore, no claims may be derived from the information, illustrations or drawings, or descriptions. Errors are excepted. AFS will not be liable for damages due to incorrect use or inappropriate use or for damages that are incurred as a consequence of unauthorized repairs or alterations.

2.4 Appropriate Use
AFS air purification devices are intended exclusively for separating and cleaning exhaust air that contains cooling lubricant from machining tools and centers used in metalworking shops or for the tasks named in the order confirmation. Any other or additional use that is not contractually agreed upon will be considered inappropriate. The manufacturer will not be liable for any resulting damages. The company that uses the device will bear all risk. Intended use also includes reading this instruction manual and adhering to all of the information contained therein – particularly the safety instructions (color code). Instruction manuals for any attached components are also to be observed. The device operator, not the manufacturer, will be responsible for all damages to persons or property that result from inappropriate use.

2.5 Product Safety
The device corresponds to the current state of the art at the time of its delivery and is regarded as fundamentally reliable. The device and its accessories may only be installed and operated in sound condition and with due regard for the assembly and instruction manual. Operation outside of the confines of the device's technical specifications (type plate and addendum/technical data) may damage the device and could cause additional damages!

3 Safety Instructions
3.1 Danger Due to Unloading and/or Transportation
Severe personal injury due to falling loads:
- Secure the AFS device against tipping and falling.
- Avoid standing under floating loads.
- Secure the assembly area.

3.2 Danger from Doors and Maintenance Openings
Low pressure prevails when AFS devices are in operation.

Danger of hand crushing due to pressure from doors and maintenance openings on the suction side:
- Open doors only after the ventilator has stopped.

If AFS air purification devices are operated in conjunction with multiple devices, then all of the devices must be turned off before a door or maintenance opening is opened.
3.3 Danger Due to Electrical Power

Touching live components presents a danger of electric shock, which can be potentially fatal:

- Always ensure that there is no electrical power before working.

Danger of electric shock – potentially fatal. Some electric circuits such as the electronics in the ventilator may be charged for a few minutes after the electrical supply has been interrupted:
- After turning off the electricity, wait at least 5 minutes before beginning to work on or near electrical components.

Danger of electric shock due to static charge in the housing:
- Ground the device (see Chapter 7.6).

Danger of electric shock due to short circuit upon connection of electrical components:
- All cables must be examined for assembly damage or insulation damage before startup.

Danger of electric shock due to wet cleaning the device:
- Always clean without electrical currents.

3.4 Danger Due to Ventilators

After electrical tension has been interrupted, the ventilator can be started up again automatically.

Fatal or severe injury from ventilator rotor:
- Keep persons and objects away from the ventilator rotor.
- For all work on the AFS device, switch off power to the system and wait for the ventilator to stop running.

Fatal or severe injury from the ventilator’s intake effect on clothing and hair:
- Never wear loose clothing and tie up long hair.
- For all work on the AFS device, switch off power to the system and wait for the ventilator to stop running.

Fatal or severe injury from rotor bursting if the maximum permissible operating speed is exceeded:
- Always operate the ventilator within permissible operating speed range.
- For all work on the AFS device, switch off power to the system and wait for the ventilator to stop running.
3.5 Danger from Flaps, Cutoff Devices, or Shutters

Flaps, cutoff devices, or shutters may be built into the pipes or ducts leading to or from the AFS air purification device.

- Danger of finger crushing due to the motion of a shut-off flap:
  - Keep hands away from the flap area.

- Danger of hand injuries due to closing shutter flaps:
  - Keep hands away from the flap area.

3.6 Danger from Hot Gases or Particles

Keep hot gases, particles, aerosols, etc. at temperatures above 60 °C from getting into the AFS air purification devices. No smoldering objects, particles, dusts etc. may get into the device.

3.7 Danger from (Dry) Dusts

AFS air purification devices are not designed to extract (dry) dust. No (dry) dusts may get into the device.

3.8 Danger from Noise

The devices may pose a noise hazard, despite being in compliance with the applicable noise regulations. If this is the case, we recommend using sound absorbers and limiting the time you spend in the immediate vicinity of the device.

3.9 Danger from Cooling Lubricant

Due to the substances contained in cooling lubricants, skin irritations, allergic reactions or respiratory irritations may occur on contact with (separated) cooling lubricants.

Personal protective equipment must be worn during maintenance, repair, or other work on the AFS device during which contact with cooling lubricant cannot be ruled out.

4 Transportation and Loading

The devices are delivered on non-returnable pallets and may be recycled by the recipient.

All other components are delivered in recyclable non-returnable packaging to be recycled by the recipient.

The devices can be transported and moved using a forklift (by lifting the entire transport pallet with the device) or, if they are fitted with lifting eyes, lifted off the pallet using transport chains.

AFS devices may only be transported, loaded, or handled by qualified personnel with appropriate professional qualifications.
4.1 Transport Damage and Missing Parts

Please check the delivery for completeness using the delivery documents / part lists as a reference and check the device for transport damage in the presence of the forwarder immediately on receipt. If there are any damaged or missing parts, please take a written note of this, let the forwarder countersign this note, and immediately notify the respective transport company and AFS, in the case of:

Visible damage: Immediately, i.e. without undue delay.
Hidden damage: Within one week.

5 Design and Function of the AFS air Purification Device

The operating principles and basic structure of all AFS air purification devices are the same; they differ only in scale, ventilation system performance, airflow direction, number of filters used per cross-sectional area (depending on device type), color and layout of attachments.

5.1 Operating Principle

Aerosols and particles from the cooling lubricant (A) in the machine exhaust air are separated from/filtered out of the air current in the AFS air purification device.

The separated cooling lubricant accumulates in the bottom area of the air purification device and drains through the two siphons and condensate lines (C).

The extraction output is generated by a motor fan wheel. The motor fan wheel is located in the airflow direction after the post filter and thus on the clean gas side (B).

Figure 1: Exemplary description of material flows as well as separator and filter stages using the AFS 1600 as an example

A Polluted machine exhaust air (raw gas)
B Purified exhaust air (clean gas)
C Separated cooling lubricant/condensate

1 5-stage preliminary separation
2 Follow-up separation or post filter
5.2 Design

5.2.1 Standard Design

All AFS air purification devices are designed according to the same principle. The following description is thus applicable to all series.

Figure 2: Exemplary design and component description using an AFS 1600 with intake left

1. Suction funnel with intake openings or blind cover (suction possible in all directions)
2. Housing
3. Exhaust vent
4. Installation space for motor fan wheel
5. H13 filter or metal mesh follow-up separator
6. Maintenance opening (door)
7. Intake opening with hose or pipe connection

5.2.1.1 Preliminary Separation

Figure 3: Elements of the preliminary separation in AFS air purification devices

1. Metal mesh preliminary separator
2. Filter fleece (depicted without alternate frames)
3. Longlife separator
5.2.1.2 Follow-up Separator or Post Filter

Figure 4: Post filter or follow-up separator in AFS air purification devices

4 Metal mesh of follow-up separator
5 H13 filter

5.2.2 Optional External Air Intake

AFS air purification devices with external air intake are equipped with an additional air cap with rotary plate on the suction funnel.

Figure 5: AFS air purification devices with iris diaphragm for external air intake

The external air intake ensures that dry hall air is aspirated in addition to the humid machine exhaust air. The required volumetric flow rate is adjusted via the rotary plate and the black adjusting screw.

5.3 Optional Sound Absorber

Sound absorbers are optionally available for AFS air purification devices up to the AFS 8000 series. The sound absorber is affixed to the exhaust side of the device.

⚠️ Do not lift or move AFS devices by grabbing onto the installed sound absorber.
6 Installation

6.1 Device Assembly

The device must always be set up horizontally on a rigid and, if possible, vibration-isolated base. The minimum distances between the device and ceilings, walls etc. required to ensure proper operation are:

Top of the device (exhaust air outlet): > 800 mm
Motor side: > 500 mm
Door side: > 800 mm
Bottom of the device (siphon connection): > 500 mm

These minimum distances must be observed to ensure that the device can operate properly.

6.2 Pipe or Hose Connections

Devices for connecting extraction pipes or hoses must be arranged as follows:

- Kink-free
- Large bending radius (radius ≥ diameter)
- About 3° slope toward the air purification device or extraction point
- No water pockets or sagging pipes
- If low points are unavoidable, for instance in passages that run below girders, the lowest point is to be equipped with a condensate drain with a siphon outflow.

6.2.1 Baffle Plate

The extraction opening on the processing machines should be fitted with a baffle plate to prevent droplets of coolant lubricant from entering:

- Distance to wall approx. 50 - 80 mm
- All-around covering of the extraction opening at least 100 mm
- The surface area of the ring crevice (2 * t * a + 2 * t * b) should be at least twice the size of the cross-sectional area of the extraction pipe, see Figure 6.

![Figure 6: Baffle plate, exemplary illustration](image)

6.3 Siphon Connections

Two outlets (three outlets for AFS 12000 and AFS 16000) are located on the bottom of the device for draining the cooling lubricant.

A siphon connection must be installed at each opening and filled with cooling lubricant.

The siphon lines must lead to a collection container or a collecting pipe.
The following points must always be observed. Otherwise the device will no longer function properly.

- Siphon design as a U pipe or loop based on Figure 7
- The distance between the bottom of the device and the top siphon loop:
  - For AFS 600 to AFS 1600 at least 200 mm
  - For AFS 3000 to AFS 16000 at least 250 mm
- Height of the loop or U pipe:
  - For AFS 600 to AFS 1600 at least 200 mm
  - For AFS 3000 to AFS 16000 at least 250 mm.
- The pipe must point downward in the direction of the collection container or collecting pipe
- No low points or water pockets
- Connect each siphon opening individually (see Figure 9 and Figure 8)
- After the device has been installed or after longer periods of disuse, the siphons must be manually filled with cooling lubricant. To make sure: When filling the siphon, there must be fluid coming out of the bottom hose line or pipe!

Figure 7: Siphon installation for AFS air purification devices

Once past the siphons, the drain pipes can be joined into one pipe. See Figure 9 and Figure 8.
7 Electrical Connections

For each series listed, a corresponding backup fuse must be installed on site in the supply line to the AFS air purification device.

7.1 Safety Instructions

Electric motors contain dangerous components that are live and rotate during operation. If operated incorrectly, used improperly or inadequately maintained, these components can cause damage to health and property.

The devices are only to be accessed for work if the system has been disconnected from the power supply. The devices must also be protected from being reconnected.

The device’s electrical components, such as electric motors, servomotors, control and monitoring components, must be connected as specified in the manufacturer’s specifications and the regulations of the relevant utility company.

The regulations of the German Association for Electrical, Electronic & Information Technologies (VDE) must be adhered to. Work on electrical components must be carried out only by qualified electricians.

The drive motors for the ventilator rotors are always fitted with thermostat relays or PTC thermistors for motor protection and must be connected accordingly.

7.2 Motor Protection

Various motor concepts are built in depending on the device type.

Please inform yourself regarding the built-in motor and its protection devices using the supplied motor instruction manual or with AFS directly.

The protection devices and installation guidelines described in the motor instruction manual must be heeded. Make sure that the motor does not restart by itself after a possible fault.

Take damaged or defective motors out of operation and disconnect them from the power supply.

7.2.1 Motor Protection: Acknowledge Faults

Various motor concepts are built in depending on the device type.

Please inform yourself regarding the built-in motor and its protection devices using the supplied motor instruction manual or with AFS directly.

The motor protection is already integrated in EC motors from the manufacturer ebm-papst. In case of fault, the motor automatically turns off. Before the motor can start again, the fault must be acknowledged and the motor reset by momentarily disconnecting the power supply.
7.3 AFS Air Purification Devices with Standard External Rotor Motors

Valid for the AFS 400 C and AFS 600 series.
The accompanying instruction manual for the motor or motor fan wheel must be observed.

The electrical connection is made via the three phases L1, L2, L3 as well as via the thermal contact motor protection switch STDT 16.

The thermal contact of the motor must be connected to the STDT 16.

If the motor switches off due to a malfunction such as overheating, for example, it must be restarted manually via the STDT 16.

Once the ventilator motor has been connected, it is vital to make sure that the radial wheel rotates in the direction indicated by the direction arrow on the front of the device before starting up the air purification device.

If the rotor rotates in the wrong direction, the motor's direction of rotation must be reversed by a qualified electrician by changing the electric poles (reversing the phases).

7.4 AFS Air Purification Devices with EC Motors or PmBlue Controller

Valid for series AFS 1000 C, AFS 1100, AFS 1600, AFS 3000, AFS 4000, AFS 6000, AFS 8000 as well as the Plus device series.
The accompanying instruction manual for the motor or motor fan wheel must be observed.

The electrical connection is made via the three phases L1, L2, L3 as well as PE.

Reversal of the direction of rotation due to swapped phases (see 7.3) is not possible with EC motors.

A lockable main switch must be installed in the electrical supply line between the power supply and the motor of the AFS air purification device. Please check the order confirmation on whether the main switch is attached to the AFS device or supplied separately with the delivery.

In addition to the main switch, an enabling switch (e.g. AFS item no. 70114200) can be installed to switch the AFS air purification device on and off. Please refer to the supplied connection diagram and the separate instruction manual.

7.5 AFS Air Purification Devices with Frequency Converter

Valid for the AFS 12000 and AFS 16000 series.
Frequency converters include the FControl FXDM...AM series (Ziehl-Abegg). Other brands do not conform to the AFS standard.
The instruction manual for the frequency converter that is provided and the installation instructions contained within them must be observed for air purification devices with frequency converters for regulating the flow rate by controlling the rotation speed of the motor fan wheel.
The electrical connection is made via the phases L1, L2, L3 as well as PE.
The PTC thermistor must be connected to the TB/TP terminals.

When AFS air purification devices with frequency converters are operated, a lockable repair switch must be placed inside the feed line before the frequency converter (DON EN 13053-6.3.1).

The AFS device and the frequency converter must not be serviced unless the frequency converter and the AFS device have been shut off using the repair switch. While work is ongoing, the repair switch must be secured with an individualized, lockable closure against unauthorized or accidental restarting.

The repair switch and the frequency converter as well as the frequency converter and the AFS device are to be connected by a qualified and competent specialist and in accordance with all current guidelines and VDE regulations.

The currents in the frequency converter are not shut off when the frequency converter’s motor is turned off.

If "Motor ON" is set on the frequency converter and the frequency converter is disconnected from the mains while it is enabled (e.g. via D1 function), the motor restarts as soon as the mains voltage on the frequency converter is restored.

In addition to the main switch, an enabling switch (10-24 V, potential-free, e.g. AFS item no. 70114200) can be installed to switch the AFS air purification device on and off. Please refer to the supplied connection diagram as well as separate operating instructions of the frequency converter and switch.

7.5.1 Operation

The settings on the frequency converter are made using the arrow keys ▲▼ and the ‘P’ button. The menu items or settings can be selected using the arrow keys ▲▼ and confirmed or saved using the ‘P’ button. Exit the settings or menu level by simultaneously pressing and holding the two arrow keys (ESC).

Before changing the settings, we recommend opening the basic menu or the starting position by pressing ESC.

7.5.2 Operating Modes

Various operating modes and parameters can be (pre-)set on the Ziehl-Abegg FXDM...AM series frequency converters. Please refer to the separate instruction manual for the frequency converter. Parameters that deviate from the standard are provided by AFS in the instruction manual of the frequency converter, see Figure 12.
7.5.3 Settings when Operating without Enabling Switch

- Operating mode 1.01 (standard)
- Language, PIN, min/max frequency settings etc. according to the instruction manual of the frequency converter
- The basic functions are listed below:
  - Switching the motor on:
    - ESC \(\rightarrow\) \(\uparrow\downarrow\) Start \(\rightarrow\) P \(\rightarrow\) \(\uparrow\downarrow\) Motor \(\rightarrow\) P \(\rightarrow\) \(\uparrow\downarrow\) ON \(\rightarrow\) P
  - Switching the motor off:
    - ESC \(\rightarrow\) \(\uparrow\downarrow\) Start \(\rightarrow\) P \(\rightarrow\) \(\uparrow\downarrow\) Motor \(\rightarrow\) P \(\rightarrow\) \(\uparrow\downarrow\) OFF \(\rightarrow\) P
  - Adjusting the frequency:
    - ESC \(\rightarrow\) \(\uparrow\downarrow\) Setting \(\rightarrow\) P \(\rightarrow\) \(\uparrow\downarrow\) Internal preset 1 \(\rightarrow\) P \(\rightarrow\) \(\uparrow\downarrow\) Set the desired frequency \(\rightarrow\) P
  - Operating mode:
    - ESC \(\rightarrow\) \(\uparrow\downarrow\) Basic setting \(\rightarrow\) P \(\rightarrow\) \(\uparrow\downarrow\) Operating mode \(\rightarrow\) P \(\rightarrow\) \(\uparrow\downarrow\) Set the desired operating mode \(\rightarrow\) P

7.5.4 Setting when Using an Enabling Switch

See section 7.5.3. In addition:

- ESC \(\rightarrow\) \(\uparrow\downarrow\) Setting \(\rightarrow\) P \(\rightarrow\) \(\uparrow\downarrow\) External preset 1 \(\rightarrow\) P \(\rightarrow\) \(\uparrow\downarrow\) OFF \(\rightarrow\) P
- ESC \(\rightarrow\) \(\uparrow\downarrow\) I/O setup \(\rightarrow\) P \(\rightarrow\) \(\uparrow\downarrow\) D1 Function \(\rightarrow\) P \(\rightarrow\) \(\uparrow\downarrow\) 1D \(\rightarrow\) P
- ESC \(\rightarrow\) \(\uparrow\downarrow\) Start \(\rightarrow\) P \(\rightarrow\) \(\uparrow\downarrow\) Motor \(\rightarrow\) P \(\rightarrow\) \(\uparrow\downarrow\) ON \(\rightarrow\) P

The enabling switch must be connected to terminals D1 D1 of the frequency converter.

The ventilator only starts when the release switch is closed.

7.5.5 Setting Special Functions and Operating Modes

When using special operating modes (e.g., constant volume flow control), please refer to the additional documentation provided.

7.6 Protective Conductor System

AFS devices must be grounded at the ground plate or ground bolt indicated in accordance with EN60204-1.

Before the AFS device is turned on, the protective conductor system of the entire system must be inspected and safe operation ensured.

A ground bolt is mounted ex factory. Depending on the device type, multiple locations have been provided for ground bolts at the base of the device or the carrier.

If necessary, the ground bolts can be mounted elsewhere. The ground bolt is to be connected to the metal housing structure by a professional.
8 Startup Operations

Before the device is turned on, all electrical wires, pipes, ducts, and the AFS device must be examined for proper installation and mechanical damage and leaks.

The operating principles of all AFS air purification devices are the same; they only differ by series in size, ventilation system performance, and number of filters used, depending on the device type.

Perform the following steps to ensure that the device starts up correctly:

1) The following must be ensured:
   - All electrical connections are correctly installed.
   - The device is switched off.
   - All filter elements must be arranged properly; see Figure 14.
   - All filter elements must be as delivered.
   - The AFS device must be securely placed and bolted down at its location.
   - There must be no debris (shavings, screws, assembly materials, etc.) inside the device, the pipes, or the ducts.
   - The intake and exhaust are not clogged or blocked.
2) Fill the siphon lines (see section 6.3).
3) Close and lock the maintenance doors.
4) With optional external air intake, open it completely (see section 5.2.2).
5) Switch on the AFS air purification device (see section 9).
6) Pay attention to unusual noises or vibrations. Immediately turn off the air purification device if they occur in order to avoid damage. Examine the connection and installation and follow the 6 section in this instruction manual.
7) With the optional speed or volume flow setting, set the AFS air purification device to the maximum extraction output and then reduce the capacity until it is appropriate.
8) Check the siphon lines. There must still be liquid in the siphons.

To ensure that the AFS air purification device is fully functional, the volume flow and/or frequency of the motor speed must not fall below 70% of the design value!

With the 3-step switch option (AFS item no. 70114100), stage 1 is only intended for idling or filter drying as long as no manufacturing process is taking place on the tool machine.

For the AFS 12000 series, the maximum frequency is 92 Hz (4-pole motor).

8.1 Initial Phase

Depending on the processing intensity and the volumetric flow, we recommend performing the following actions for newly installed AFS air purification devices (once a week at the start of operation):
   - Visually check the air purification device and filter and/or separator, and clean or replace the filter fleeces if necessary.
   - Check the siphons and condensate lines for tightness and functioning.

After successfully getting through the initial phase, the test interval can be extended; see section 10.
9 Operation

AFS devices are designed for continuous operation.

⚠️ Sequential or stop-and-go operation in which, for example, the air purification device is turned off after each process step or when opening the door of the tool machine, can lead to damage to the AFS air purification device.

To increase the service life of the filter, we recommend a run-on time of 10-15 minutes after the end of a process.

Operating modes are to be separately described and observed by the operator depending on the on-site electrical installation.

9.1 AFS Air Purification Devices with Standard Motors or Standard External Rotor Motors

9.1.1 Turning On

Turn on the air purification device on the main switch, based on the model series.

If a switch type STDT16 (e.g., for AFS 400 C or AFS 600) is installed as the main switch, it will trip in the event of a motor fault (e.g., overheating). When the motor is ready for operation again, the AFS device does not switch on again automatically.

The switch must be actuated again to turn the device on. First, make sure that the AFS air purification device is in perfect working order.

9.1.2 Turning Off

Turn off the air purification device on the main switch.

9.2 AFS Air Purification Devices with EC Motors

9.2.1 Version with Main Switch

9.2.1.1 Turning On

AFS air purification devices with EC motors can be switched on and off via the main switch.

As soon as the motor is supplied with power (main switch ON), the internal motor electronics perform a self-test. The motor fan wheel then starts up.

It may take about 10-15 seconds for the motor fan wheel to start. To get to the maximum speed and full volume flow, it can take approximately 20-30 seconds.

If no additional enable switch is used, motor terminals 0-10 V IN and 10 V OUT must be connected to a wire jumper.

Operation with an enabling switch (see 9.2.2) is preferable to operation with a main switch only.
9.2.1.2 Turning Off

Turn off the air purification device on the main switch.

9.2.2 Variant with Main Switch and Enabling Switch

9.2.2.1 Turning On

1) Set the main switch to ON.
   As soon as the motor is supplied with power (main switch ON), the internal motor electronics perform a self-test.
2) Switch the AFS air purification device on via the enabling switch.

   It may take about 10-15 seconds for the motor fan wheel to start. To get to the maximum speed and full volume flow, it can take approximately 20-30 seconds.

   If no additional enable switch is used, motor terminals 0-10 V IN and 10 V OUT must be connected to a wire jumper.

   In normal operation, the main switch can always remain in the ON position.

9.2.2.2 Turning Off

Turn off the air purification device with the enabling switch.
For longer periods of inactivity, also switch off the main switch.

9.3 AFS Air Purification Devices with Frequency Converter

An AFS air purification device that has a frequency converter is operated and controlled by means of that frequency converter.

⚠ The frequency converter instruction manual must be observed.

9.3.1 Operation

For operation and setting of the frequency converter, see Chapter 7.5.

9.3.2 Turning the System On

1) Set the main switch to ON
2) Switch the motor on via the ESC menu → Start → P → Motor → P → ON → P.

9.3.2.1 With Enabling Switch

The connections and settings according to section 7.5.4 must be made.

1) Set the main switch to ON
2) Set the enabling switch to ON (1).
9.3.3 Turn the System Off

9.3.3.1 Without Enabling Switch
Switch the motor off via the ESC menu → Start → P → Motor → P → OFF → P.

9.3.3.2 With Enabling Switch
Set the enabling switch to OFF (0). The AFS air purification device switches off.

9.3.4 Additional Information:
We recommend installing an enabling switch using it to turn the AFS air purification device on and off. The operating modes and the extraction output are to be adjusted accordingly with the frequency converter.

The frequency converter can be continuously operated by means of the power supply. The frequency converter should only be disconnected from the power supply during longer downtimes, in the event of a fault or, for example, during maintenance work.

If the frequency converter is parameterized ex factory, then the corresponding parameters will be noted in the instruction manual that is delivered with the frequency converter, see Chapter 7.

The operating modes and settings can be found in the frequency converter's instruction manual.

The currents in the frequency converter are not shut off when the frequency converter's motor is turned off.

If the frequency converter is set to "Motor ON" and the frequency converter is cut off from the mains voltage, the frequency converter will start again at the last selected setting immediately upon the power turning back on. The motor can start.

To ensure safe extraction output, the frequency converter is not to be operated below its minimum frequency of 70% of the maximum frequency.

9.4 Follow-up Time

The AFS air purification device should continue to run for approximately 10-15 minutes once the process has ended.

10 Maintenance

Failure to maintain the device as specified in the AFS instruction manual will void the warranty / guarantee.

Only original AFS parts may be used. Only then is the functionality of the AFS device ensured!
10.1 Replacing Filters and Separators

10.1.1 Preliminary Separation
The filters and separators of the preliminary separation are not locked and can be pushed into or pulled out of the air purification device via the insertion rails.

Always push the filters and separators all the way into the air purification device, until they go no further.

10.1.2 Post Filter or Follow-up Separator
Proceed as follows to replace the post filters or follow-up separator:

1) Remove the filter and separator from the preliminary separation
2) Loosen the screws on the Z-rails
3) Pull the filter out
4) Caution: The filter may be oily
5) Push the new filter into the Z-rails as far as it will go
6) Fasten the M6 screws
7) Ensure that the filter is in the correct and fixed position
8) Reinstall the filters and separators of the preliminary separator

For follow-up filtering, the filter pockets must be vertical. Please observe the “top” marking on the filter.

Figure 13: Replacement of post filter or follow-up separator

10.2 Maintenance Work and Cycles
All maintenance work on a device must be performed exclusively after the device has been turned off and by trained personnel familiar with the device.

If multiple AFS air purification devices are operating in conjunction with one another, ALL the devices must be turned off or the shut-off devices (if present) must be closed for maintenance to be performed.

Maintenance cycles are to be set in accordance with the type of process and degree of contamination of the extracted air. The degree of contamination in the device as well as the separator elements must be examined and then cleaned or replaced as needed.
Figure 14: Filter arrangement within AFS air purification devices

1 Preliminary separator metal mesh
2 Preliminary filter fleeces
3 Longlife separator
4 Post filter
5 Metal mesh follow-up separator

Never change the order, number or installation position of the separation and filter elements as this will render the device inoperable.

The device must only be operated with AFS-approved separation and filter elements.

The separation and filter elements may be laterally removed from the device for cleaning or replacement.

10.2.1 Metal Mesh Preliminary Separator (pos. 1)

Figure 15: Metal mesh preliminary separator

The preliminary separator is made of a corrosion-resistant metal mesh, is non-wearing and can be cleaned and rinsed.

Cleaning interval: In case of visually recognizable contamination, i.e. deposit of shavings, hardened oil, abraded material, grease residues.
And at least every 4 weeks.

Directions: Use hot water and grease-removing cleaning agents with a high-pressure cleaner or in a component washing system.

Component will have oil and cooling lubricant residue. Wastewater must be disposed of properly and in an ecologically responsible manner.
10.2.2 Preliminary Filter Fleeces (pos. 2)

Figure 16: Fleece preliminary filter. Depicted without alternate frames

The preliminary filters used are filter fleeces, which must be replaced when they become contaminated.

Replacement interval: In case of visually recognizable contamination, i.e. deposit of shavings, hardened oil, abraded material, grease residues.

And at least every 4 weeks.

⚠️ Component will have oil and cooling lubricant residue. Proper and ecologically responsible disposal is absolutely necessary.

ℹ️ The preliminary filter fleeces are also available with an alternate frame.

10.2.3 Longlife Separator (pos. 3)

Figure 17: Longlife separator: arrow must point in the direction of flow

⚠️ The Longlife separator may not be exposed to temperatures exceeding 60 °C.

⚠️ The Longlife separator distinguishes itself through its high-performance self-cleaning action and must therefore only be cleaned when visibly and seriously clogged or contaminated.

Cleaning: self-cleaning.

If, despite its self-cleaning action, the Longlife separator should nonetheless become extremely contaminated, i.e. with oil and emulsion residues, hardened oil, the entire separator can be cleaned using warm water and a grease-removing cleaning agent.

⚠️ The Longlife separator must not be opened or disassembled.

⚠️ It is vital that the separator be installed in accordance with the air flow direction arrows on the separator’s frame. Otherwise the device will no longer function properly.
If necessary, the writing on the Longlife separator can be arranged upside down relative to the airflow direction and the installation position.

Damaged Longlife separators must be replaced immediately.

Improperly installed or damaged Longlife separators will cause diminished or unsatisfactory separation performance. Under those conditions, the device will no longer function properly.

Component will have oil and cooling lubricant residue. Wastewater or the separator must be disposed of properly and in an ecologically responsible manner.

10.2.4 Post Filter (Item 4)

Figure 18: Post filter (e.g., HEPA filter H13)

The following are installed as post filters:
- HEPA filter H13
- Please note the order confirmation for filters of identical design and their filter class, if applicable.

The separation performance of the H13 post filter is higher than that of the metal mesh follow-up separator (see section 10.2.5) The metal mesh follow-up separator is not recommended for processing installations which produce smoke and vapor.

The H13 post filter will become clogged in the course of its operation, diminishing the AFS air purification device’s extraction output.
If the H13 post filter is clogged or if the air current is significantly reduced due to a saturated filter, then the H13 post filter must be replaced.

The H13 post filter cannot be cleaned.

Replacement interval: Replace when there is a noticeable reduction in the device’s extraction output due to oil and emulsion residue deposits, or hardened oil.

To replace the contaminated post filter, undo the M6 screws on the terminal strips so as to allow the suspended particle filter to be pulled out. When fitting a new post filter, the filter’s rubber sealing strips must be on the intake side (in the terminal area).

The filter bags must be vertical.
If the H13 post filter is not promptly replaced, it may tear. There will therefore be no filtration effect and the AFS air purification device will be inoperative. The AFS air purification device must be turned off immediately and a new H13 post filter must be installed.

Component will have oil and cooling lubricant residue. Proper and ecologically responsible disposal is absolutely necessary.

10.2.5 Metal Mesh Follow-up Separator (pos. 5)

Figure 19: Metal mesh follow-up separator

The following are used as follow-up separator:
- Metal mesh follow-up separator
- Please note the order confirmation for separators of identical design, if applicable.

The alternative to an H 13 post filter, a non-wearing, corrosion-resistant metal mesh follow-up separator, can be cleaned or washed like the metal mesh preliminary separator.

Cleaning interval: In case of visually recognizable contamination, i.e. deposit of shavings, hardened oil, abraded material, or grease residues.
And at least every 4 weeks.
Cleaning: Use hot water and grease-removing cleaning agents with a high-pressure cleaner or in a component washing system.

To clean a contaminated post filter, undo the M6 screws on the terminal strips so as to allow the follow-up separator to be pulled out.

Components will have oil and cooling lubricant residue. Wastewater must be disposed of properly and in an ecologically responsible manner.

The separation performance of the H13 post filter (see Chapter 7.1.4) is higher than that of the metal mesh follow-up separator. The metal mesh follow-up separator is not recommended for processing installations which produce smoke and vapor.

For clean air recirculation (circulating air), a metal mesh follow-up separator is not recommended as the last filter stage.
10.2.6 Ventilator (pos. ⑤)

The ventilator motor and rotor are largely maintenance-free. If the separation and filter elements are not maintained or not properly maintained, there is a risk of the ventilator motor overheating or of an unbalanced mass.

⚠️ In the event of a malfunction, please contact AFS. The ventilator rotor in any AFS air purification device must not be disassembled under any circumstances.

10.2.7 Siphon (pos. ⑦)

Siphons and drain pipes must be inspected and cleaned regularly. When separating sludge-forming products, the siphons and drain pipes might become clogged.

Inspection interval: Inspect when there is visually recognizable clogging caused by oil and emulsion residue deposits, hardened oil, fine dusts, etc.

And at least every 4 weeks.

Directions: Clean with hot water and grease-removing cleaning agents.

⚠️ After cleaning the siphons, they must be filled again with cooling lubricant. If this is not done, then the AFS device will not be operational. It is therefore absolutely vital to ensure that the siphons are always full of fluid. See Chapter 6.3.

⚠️ Component will have oil and cooling lubricant residue. Wastewater must be disposed of properly and in an ecologically responsible manner.
10.3 Overview of Maintenance Intervals

The filter elements must be **inspected** every week or inspected immediately if the device’s extraction output diminishes.

The AFS device must always be disconnected from its power supply before before it is maintained!

<table>
<thead>
<tr>
<th>Type of contamination</th>
<th>Inspection interval</th>
<th>Cleaning interval</th>
<th>Directions for cleaning/replacements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preliminary separator metal mesh</td>
<td>Weekly</td>
<td>At least every 4 weeks</td>
<td>Clean with hot water and grease-removing cleaning agents with a high-pressure cleaner or in a component washer system.</td>
</tr>
<tr>
<td>Preliminary filter Fleeces</td>
<td>Weekly</td>
<td>At least every 4 weeks</td>
<td>Replace with a conventional grade G3 filter fleece with a fleece thickness of 20 mm.</td>
</tr>
<tr>
<td>Longlife separator</td>
<td>Weekly</td>
<td>As needed</td>
<td>Please refer to section 10.2.3 in case of contamination.</td>
</tr>
<tr>
<td>H13 post filter</td>
<td>Weekly</td>
<td>Cannot be cleaned</td>
<td>Replace filter. Undo M6 screws on terminal strips. When fitting the new filter, the rubber sealing strip must be on the intake side (in the terminal area) and the filter bags vertical.</td>
</tr>
<tr>
<td>Follow-up separator metal mesh (alternative to ④)</td>
<td>Weekly</td>
<td>At least every 4 weeks</td>
<td>Clean the filter. To do so, open the clamping rails via the M6 screws. Clean with hot water and grease-removing cleaning agents with a high-pressure cleaner or in a component washer system.</td>
</tr>
<tr>
<td>Ventilator</td>
<td>Maintenance-free.</td>
<td>-</td>
<td>In the event of a malfunction, please contact AFS.</td>
</tr>
<tr>
<td>Siphon</td>
<td>Weekly</td>
<td>At least every 4 weeks</td>
<td>Clean with hot water and grease-removing cleaning agents. Once clean, the siphons have to be filled with cooling lubricant again; see section 10.2.7.</td>
</tr>
</tbody>
</table>

We recommend that a set of replacement filters and/or separators be kept on hand so that old ones may be replaced quickly when necessary and so that the system can be put back into operation immediately.

Components will have oil or cooling lubricant residue. Wastewater or components must be disposed of properly and in an ecologically responsible manner.
10.4 Volumetric Flow Rate Monitoring (optional)

AFS air purification devices can be equipped with volume flow monitoring. As soon as a predefined minimum volume flow rate is undershot, a potential-free contact is opened or closed via a differential pressure switch (MPR). This signal can then, for example, be evaluated via the machine control or connected to a signal lamp.

There can be several reasons for falling below the minimum volumetric flow rate, e.g.,

- Contaminated/clogged filters or separators
- Clogged intake
- Blocked exhaust
- Motor speed too low

After switching on the air purification system, it sometimes takes up to 30 seconds for the full volume flow to get established. During this time, the signal or the contact “Volume flow too low” may be displayed.

The MPR is to be set to 100 Pa (preset ex factory).

The MPR differential pressure switch is only installed in the original equipment when post filters are used (see section 10.2.4). As soon as the MPR signal activates, the post filter is most likely saturated and needs to be replaced.

When using a metal mesh follow-up separator (see section 10.2.5), the MPR may be exposed to an increased cooling lubricant load, which may destroy the MPR. If an MPR is installed and the post filter is replaced with a metal mesh follow-up separator, contact AFS.

Technical details as well as connection and signal processing of the MPR can be found in the instruction manual of the MPR or in the interface description or circuit diagram of the AFS air purification device.

Figure 20: Factory setting and installation location of the MPR (example)
10.4.1 MPR Connections

10.4.1.1 Pneumatic

The MPR is to be connected as shown in Figure 21:
- P1, red, +
- P2, blue, -

The hoses must not be buckled.

Figure 21: Connection of MPR P1+ and P2-

10.4.1.2 Electric

⚠️ The VDE regulations must be adhered to. Work on electrical components must be carried out only by qualified electricians.

The electrical connections are located below the transparent front cover. To open the cover, slightly loosen the clip on the side and carefully lift off the cover.

⚠️ The supplied circuit diagrams and interface descriptions must be observed.

10.4.2 Functional Principle of Volume Flow Monitoring

The flow speed and therefore the volumetric flow rate within the device are indicated by the differential pressure determined by the differential pressure measurements before and after the Longlife separator.

⚠️ The MPR will only operate error-free if the Longlife separator is not contaminated or damaged. When the Longlife separator is removed, the MPR and thus the volumetric flow monitoring have no function.

The signal “Volume flow too low” can be output as normally closed or normally open depending on the model and electrical connection (for example)
- as red-green display
- via a signal lamp
- via the machine control system
- as potential-free contact.
10.4.2.1 Procedure for “Volume flow too low” Signal

When the “Volume flow too low” signal is present, it means that the current volume flow is below the set minimum. This can have various reasons, e.g.,

- Blocked intake port or induction pipe
- Blocked exhaust vent or exhaust air pipe
- Ventilator speed too low or wrong direction of rotation
- Clogged pressure transducer
- Kinked pressure transducer pipes
- Overall pressure loss through the entire system (from intake to exhaust) too great
- Ventilator does not work in the desired area of operation
- MPR connected incorrectly
- etc.

The following steps must be taken in this case:

1) Check the intake and exhaust for clogging and clean or remove the obstruction, if applicable.
2) Check ventilator speed and direction of rotation. For the model with adjustable ventilator speed, adjust the maximum speed.
3) Check the filter and separator of preliminary separation and clean or exchange, if necessary (see section 10.2).
4) Replacing the post filter (see section 10.2.4).

It is recommended to check after each working step whether the signal “Volume flow too low” is still present. Then continue with the next step.

Do not confuse the “Volume flow too low” signal with the “Filter clogged” signal.

10.4.3 Volumetric Flow Monitoring Troubleshooting

If the “Volume flow too low” signal is still present despite installing new filters or performing maintenance work according to section 10 or 10.4.2.1, the following steps must be carried out:

1) Check the MPR settings: Must be set to 100 Pa
2) Remove all filters except the Longlife separator
3) Close the device again and turn back on
4) Wait until the volume flow has fully formed.

If the signal “Volume flow too low” is no longer present, the differential pressure switch and display system are fully functional. The insufficient volume flow can then be caused by, for example, clogged filters or a blocked extraction system.

If the signal “Volume flow too low” is still present, it may be due to one of the following reasons:

- Clogged pressure transducer
- Kinked pressure transducer pipes
- Overall pressure loss through the entire system (from intake to exhaust) too great
- Ventilator does not work in the desired area of operation
- MPR incorrectly connected or defective

Please contact AFS if this is the case.
11 Troubleshooting

Several causes of a malfunction or non-function can also occur simultaneously. Please always check if there are multiple causes. Then carry out the necessary measures according to the corresponding chapters of this instruction manual. Safety instructions must be observed.

<table>
<thead>
<tr>
<th>Error</th>
<th>Series</th>
<th>Cause</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ventilator is not working.</td>
<td>All devices</td>
<td>Power supply not connected correctly.</td>
<td>Check the electrical connection and connect the AFS device according to the connection diagram. Check power supply. See chapter 7.</td>
</tr>
<tr>
<td></td>
<td>All with main switch</td>
<td>The main switch is in the OFF position.</td>
<td>Set the main switch to ON.</td>
</tr>
<tr>
<td></td>
<td>AFS 600, AFS 400C</td>
<td>The STDT16 switch is in the OFF position.</td>
<td>Set the STDT16 switch to ON.</td>
</tr>
<tr>
<td></td>
<td>AFS 600, AFS 400C</td>
<td>Thermal contact has tripped (e.g., due to a motor fault, overheating etc.).</td>
<td>Check why overheating occurred and eliminate the cause. Wait for the motor to cool down. Then manually start the device again on the STDT16.</td>
</tr>
<tr>
<td></td>
<td>All devices</td>
<td>With optional enabling switch: Enabling switch not connected and/or in OFF position.</td>
<td>Connect the enabling switch according to the wiring diagram or/and set the enabling switch to ON.</td>
</tr>
<tr>
<td></td>
<td>All devices with EC motor</td>
<td>Fault on motor. The internal electronics have shut off the motor for protection.</td>
<td>Check why the fault occurred and eliminate the cause. Acknowledge the motor fault by de-energizing the motor, wait approx. 20 seconds and switch on the device again.</td>
</tr>
<tr>
<td></td>
<td>All devices</td>
<td>PTC thermistor not connected.</td>
<td>Connect the PTC thermistor of the motor according to the connection diagram.</td>
</tr>
<tr>
<td></td>
<td>All devices with a frequency converter</td>
<td>With optional enabling switch: Enabling switch not connected and/or in OFF position.</td>
<td>Connect the enabling switch according to the connection diagram, parameterize the frequency converter accordingly and/or set the enabling switch to ON.</td>
</tr>
<tr>
<td></td>
<td>All devices with EC motor</td>
<td>The internal electronics carry out a self-check.</td>
<td>Wait approx. 20-30 seconds for the ventilator to start and reach its target speed.</td>
</tr>
<tr>
<td></td>
<td>All devices with a frequency converter</td>
<td>The internal electronics carry out a self-check. A start-up ramp is set.</td>
<td>Wait approx. 20-30 seconds for the ventilator to start and reach its target speed.</td>
</tr>
<tr>
<td></td>
<td>All devices</td>
<td>Wrong direction of rotation of the ventilator.</td>
<td>Check the direction of rotation of the ventilator and change it by swapping the phase, if necessary. Observe the direction of rotation arrow on the motor side of the AFS device.</td>
</tr>
<tr>
<td></td>
<td>All devices</td>
<td>The airflow is blocked.</td>
<td>Check whether the intake point or the exhaust is free, clean if necessary.</td>
</tr>
<tr>
<td></td>
<td>All devices</td>
<td>The filter and/or separator of the preliminary separator are clogged.</td>
<td>Clean or replace the filter and/or separator of the preliminary separator. See chapter 10.</td>
</tr>
<tr>
<td></td>
<td>All devices</td>
<td>Post filter is clogged.</td>
<td>Replace the post filter. See chapter 10.</td>
</tr>
<tr>
<td></td>
<td>All devices with external air intake</td>
<td>External air intake is open too wide.</td>
<td>Close the additional air cap more.</td>
</tr>
<tr>
<td>Fault</td>
<td>Series</td>
<td>Cause</td>
<td>Measure</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>-------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Separated cooling lubricant does not run off</td>
<td>All devices</td>
<td>The drain line is not designed as a siphon.</td>
<td>Check the drain line and install it according to the instructions. Implemented as siphon. See chapter 6.3.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Siphon is not filled.</td>
<td>Fill the siphon in the drain line with clean cooling lubricant. See chapter 6.3.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drain line clogged.</td>
<td>Flush or replace the drain line, then refill with clean cooling lubricant.</td>
</tr>
<tr>
<td>Separation efficiency is not satisfactory</td>
<td>All devices</td>
<td>Longlife separator flowed through incorrectly.</td>
<td>Check the air direction arrow on the Longlife separator. Install the Longlife separator so that the arrow points in the direction of flow.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Longlife separator damaged.</td>
<td>Replace the Longlife separator.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Longlife separator incorrectly assembled (only in series before 2012)</td>
<td>Longlife separator correctly assembled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flow rate through the air purifier is too low.</td>
<td>With optional volumetric flow rate adjustment: increase the volumetric flow rate (e.g., set 3-step switch higher).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>With optional frequency converter, increase the frequency. Note: For the AFS 12000, the maximum frequency is 92 Hz.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Filters are clogged: Replace the filter.</td>
<td>See chapter 10.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Separators are clogged: Clean the separators.</td>
<td>See chapter 10.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Extraction line is clogged: remove obstruction (e.g., shavings).</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exhaust is blocked: free the exhaust.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wrong direction of rotation of the ventilator:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Check the direction of rotation of the ventilator and change it by swapping the phase, if necessary. Observe the direction of rotation arrow on the motor side of the AFS device.</td>
</tr>
<tr>
<td>The “Volume flow too low” message is displayed</td>
<td>All devices with optional volumetric flow monitoring</td>
<td>The volumetric flow rate is too low.</td>
<td>Check and clear the extraction line and exhaust, check and clean the separator, check and replace the filter, check and increase the motor speed, if necessary. See Chapter 10.4.2.1</td>
</tr>
<tr>
<td>The message “Volume flow too low” persists, even though the measures have been implemented according to Chapter 10.4.2.1</td>
<td>All devices with optional volumetric flow monitoring</td>
<td>Error in display or monitoring system</td>
<td>Carry out measures according to Chapter 10.4.3.</td>
</tr>
</tbody>
</table>

⚠️ If the error still persists or if you have further questions, please contact AFS.
12 EC Declaration of Conformity

im Sinne der Maschinenrichtlinie 2006/42/EG, Anh. II 1.A
EC Declaration of Conformity
according to the Machinery Directive 2006/42 / EC, Annex II 1.A

Hersteller: AFS Airfilter Systeme GmbH
Manufacturer: Am Richtbach 14
74547 Untermünkheim-Übrigshausen, Germany

Die Bauart der Maschine: Luftreinigungsgerät für den betrieblichen Umweltschutz.
The type of machinery: Air purifying unit for environmental protection in factories.

Typenbezeichnung: AFS 600, -1100, -1600, -3000, -4000, -6000, -8000, -12000, -16000
Type number:

Fabrikationsnummer: 9300 und folgende
Fabrication number: 9300 and following

ist entwickelt, konstruiert und gefertigt in Übereinstimmung mit der EG-Richtlinie:
is developed, designed and manufactured in accordance with the EC Directive:


The person authorized to compile the technical documents in the sense of the Machinery Directive is Mr. Uwe Burkhardt.

EN 60204-1 Sicherheit von Maschinen - Elektrische Ausrüstung von Maschinen – Teil 1 Allgemeine Anforderungen
Safety of machinery - electrical equipment of machines – part 1 general requirements
EN 13857:2008 Sicherheit von Maschinen - Sicherheitsabstände gegen das Erreichen von Gefährdungsbereichen mit den oberen und unteren Gliedmaßen
Safety of machinery - Safety distances to prevent danger zones being reached by the upper and lower limbs
EN 12100:2010 Sicherheit von Maschinen – Allgemeine Gestaltungsleitsätze
Safety of machinery – general principles for design

Eine technische Dokumentation ist vollständig vorhanden. Eine Betriebsanleitung wird jedem Gerät beigefügt.
The complete technical documentation is available. An operator´s manual is component of each machinery supply.

Übrigshausen, January 1, 2019 – Dipl.-Ing. Kai Kuppinger -
(Managing Director / Manager)
# 13 Wear parts

<table>
<thead>
<tr>
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Only original AFS parts may be used. Only then is the functionality of the AFS device ensured!
14 Notes