

Translation of the original installation instructions

Oil mist separator

LGAir O 600 Basic/Advanced

Mat. No. of original installation instructions
72502448



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2 General safety instructions

2.1 Safety instructions for installation and operating personnel

This translation of the original installation instructions contains important safety information which must be heeded at all times during installation, normal operation and maintenance.

Non-observance can result in the following risks to persons and the environment as well as in damage to the machine or system:

- ⇒ Failure of critical functions of the machine or plant or of its component parts.
- ⇒ Danger to persons from electrical or mechanical effects as well as from chemical reactions.
- ⇒ Danger to the environment owing to the leakage of hazardous substances.

Before installation / start-up:

- Read this translation of the original installation instructions carefully.
- Make sure that installation and operating personnel are adequately trained.
- Make sure the contents of the original installation instructions are fully understood by the responsible persons.
- Define areas of responsibility and competence.
- Prepare a maintenance schedule.

During operation of the system:

- Keep this translation of the original installation instructions handy at the place of use.
- Heed the safety instructions. Always operate the machine or system in accordance with its ratings.

If in doubt:

- Consult the manufacturer.

2.2 Warning structure

Where possible, warnings are structured according to the following system:

Signal word	
Possibly with symbol	Nature and source of the danger ⇒ Potential consequences of non-observance • Action to avert the danger.

2.3 Warning symbols used

 DANGER!
Immediate danger! ⇒ Non-observance will result in serious or fatal injury.
 WARNING
Potentially dangerous situation! ⇒ Non-observance can result in serious or fatal injury.
 CAUTION!
Potentially dangerous situation! ⇒ Non-observance can result in minor or moderate injuries.
CAUTION! (without a symbol)
Potentially dangerous situation! ⇒ Non-observance can result in property damage.

2.4 Other symbols used

	Danger: High voltage!
	Danger information about explosion protection
	Information about environmental protection
	Protective clothing must be worn!
	Eye protection must be worn!
	Hand symbol: Indicates general information and recommendations
	Bullet: Indicates the order in which actions are to be carried out
⇒	Arrow: Indicates responses to actions

3 Glossary

Initial differential pressure:

Differential pressure at the start of the filtration process (when the oil separator elements are “new”).

Differential pressure (Δp):

Pressure difference between the dirty air side and the clean air side.

Oil mist:

Minute oil droplets distributed in air.

Oil separator element:

Filter element with star-pleated coalescer material. The medium flows from the inside to the outside. Oil droplets “coalesce” to form larger drops.

Volume flow:

Airflow conveyed by the unit in m³/h.

Preseparating element

Filter element with special fibre fleece.

4 General information

4.1 Manufacturer

Filtration Group GmbH
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D-74613 Öhringen
Phone +49 7941 6466-0
Fax +49 7941 6466-429
industrial.sales@filtrationgroup.com
industrial.filtrationgroup.com
shopindustrial.filtrationgroup.com

4.2 Information about the original installation instructions

FG Mat. No. 72502448
Date: 22.06.23
Version..... 04

5 Intended use

 DANGER!	
	Danger of explosion! ⇒ Risk of injury to persons or damage to property. • The oil mist separator must not be installed in potentially explosive atmosphere. • The unit must not be used to extract explosive aerosols. • Provide suitable fire protection devices.
	CAUTION!
This FG oil mist separator is only allowed to be used in accordance with the operating conditions specified in the contract documentation and in the original installation instructions. All forms of use which deviate from or exceed the limits of use described above are considered to be contrary to the intended purpose. The manufacturer is not liable for any damage resulting from such use.	

The FG LGAIR O 600 oil mist separator is used for decentralized extraction oil mist locally from machine tools.

The oil mist separator LGAir O 600 is suitable for oil-water emulsions.

6 Product description

6.1 General

This translation of the original installation instructions applies to the LGAir O 600 Basic and LGAir O 600 Advanced.

6.2 Principle of the process

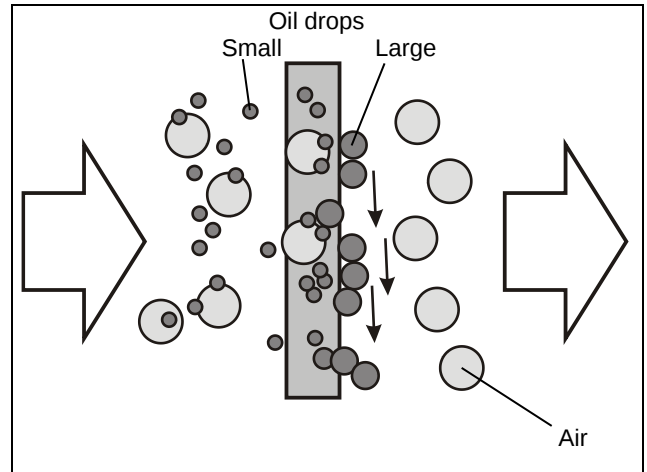


Fig. 1: Operating principle

6.2.1 General functional description

Oil mist is extracted from the work area of machine tools. The oil-laden air flows through the oil separator element from the inside to the outside. The oil attaches itself to the fibre fleece as it passes through the filter. Minute oil droplets coalesce to form larger drops. These large oil drops migrate downwards on the oil separator element due to gravity. The oil accumulates at the bottom of the housing and is returned to the storage tank of the machine tool via the oil drain hose and the membrane valve. The vacuum in the filter housing causes external air to be sealed off by the membrane valve. The valve opens automatically when the oil in the drain hose reaches a level of at least 200 mm. The cleaned airflow is extracted by means of a high-pressure fan and blown out at the top through a silencer.

6.2.2 LGAIR O 600

The LGAir O 600 is a filtering separator with two ENA/OENA stage 1 elements connected in parallel and a downstream OENA stage 2 fine filter. The raw gas enters the filter housing from the side and flows through the ENA/OENA Stage 1 filter elements and the OENA stage 2 fine filter from the inside to the outside. The ENA/OENA stage 1 filter elements separate any solid particles that may be entrained. After saturation of the elements of the respective stage, the oil is separated, oil emulsion is separated. The discharged oil is gravity fed to the bottom of the respective stage of the filter housing and led out of the separator via the drain hoses.

6.3 Operating principle

6.3.1 LGAir O 600 Basic

The LGAir O 600 Basic is driven by an EC motor. The fan is operated at a constant speed, the delivered volume flow adjusts itself according to the differential pressure at the ENA/OENA stage1 and OENA stage 2 elements.

6.3.2 LGAir O 600 Advanced

The LGAir O 600 Advanced is driven by an EC motor and controlled to a constant negative pressure in the intake area by means of a differential pressure sensor. Ex works, the vacuum is set so that a constant volume flow of approx. 600 m³/h is pumped.

At a vacuum of approx. 400 Pa downstream of the ENA/OENA stage1 elements, an electrical signal is emitted. In addition, the OENA stage 2 fine filter generates an electrical signal at a differential pressure of approx. 200 Pa output.

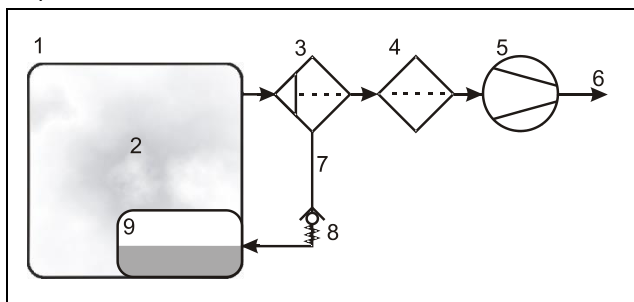


Fig. 2: Operating principle of the LGAir O 600

1	Machine tool
2	Oil mist
3	ENA/OENA stufe1 filter elements
4	OENA stufe 2 fine filter
5	Fan
6	Clean air
7	Oil drain hose
8	Membrane valve
9	Oil storage tank

6.3.3 Protection against fire and explosion

During machining operations where oil is used, air generally has to be extracted from the work area to prevent the atomised oil from dispersing.

The concentrations that often occur in the oil jet itself could result in ignition in case of tool breakage, for example.

If the machining operation involves flammable oils or flammable materials, safe operation must therefore be ensured by providing suitable fire and explosion protection devices in conformity with statutory regulations.

Main components

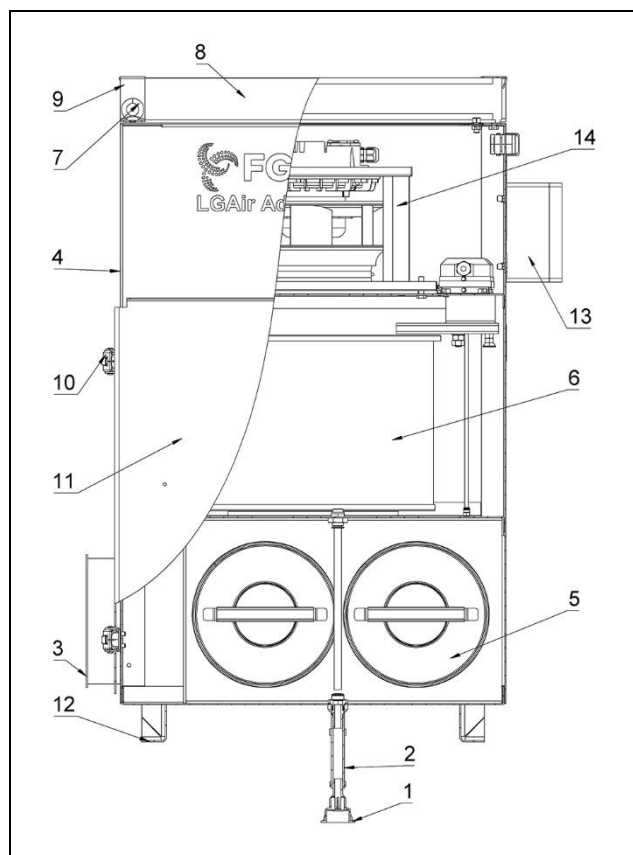


Fig. 3: Diagram of the main components

1	Membrane valve (3x)
2	Oil drain hose 15x2 mm (5.5 m)
3	Dirty air connection Ø 200 mm
4	Filter housing
5	ENA/OENA stage 1 (2x)
6	OENA stage 2 (1x)
7	Eyebolt for transport
8	HEPA filter (optional)
9	Support for HEPA filter
10	Snap lock
11	Access door
12	Mounting profile
13	Control cabinet
14	Fan



For dimensions, refer to section 15.

7 Technical data

FGC.com

TYP
TYPE

MATERIALNUMMER
PART NO.

AUFTRAGS NRUMMER
JOB NO.

BAUJAHR
YEAR

VOLUMENSTROM
VOLUME FLOW

MEDIEN TEMPERATUR
MEDIUM TEMPERATURE

BETRIEBSTEMPERATUR
OPERATING TEMPERATURE

FILTERSTUFE1/VORABSCHIEDER
FILTERSTAGE1/PRESEP. ELEMENT

FILTERELEMENT
FILTER

MOTORLEISTUNG
MOTOR OUTPUT

The order-specific data can be taken from the name-plate.

(Space for name-plate)

7.1 Technical data

Product version	LGAir O 600
Volume flow	Approx. 600 m³/h
Fluid temperature	+10°C to +80°C
Operating temperature	+10°C to +50 °C
Filter	ENA/OENA stage 1 filter elements
	OENA stage 2 fine filter
	HEPA H13 filter (optional)
Motor output	0.8 kW
Power supply	3 AC 380 ... 480 V/PE +/- 10 %, 50 to 60 Hz
Motor speed	max. 3977 rpm
Rated current consumption	1.85 A
Motor protection class	IP54
Sound level L _{eq}	71 dB(A)
Clean air connection	200 mm
Dimensions LxWxH	836x709x1075 mm
Weight	105 kg
Oil drain hose	3x 15x2 mm PVC transparent (5.5 m)

7.2 Using motor protection switches

The use of motor protection switches in the mains supply circuit of the EC fan is not permitted. We recommend the installation of C10A 3-pole automatic circuit breakers.

8 Transport and storage

Transport

- Always transport upright in the original packaging.
- Avoid vibration.

Storage

- Always store upright in the original packaging.
- Always store in a dry, frost-free room.



Seaworthy packaging is specified in the contract documentation as an option.

8.1 Delivery and acceptance

The oil mist separator is normally delivered by truck completely assembled.

- Please check it for damage in transit as soon as it arrives.
- Check all parts in the consignment against the packing list.

If any parts are missing or damaged:

- Notify the forwarding agent immediately.
- Notify your local FG field service representative immediately.

9 Installation

DANGER!



Danger of explosion!

- ⇒ Risk of injury to persons or damage to property.
- The oil mist separator must not be installed in potentially explosive atmosphere.

WARNING

If the system is installed by unauthorised persons:

- ⇒ Risk of injury.
- ⇒ All warranty claims are rendered invalid.
- The system must be installed by a suitably trained person!

9.1 Installing the oil mist separator

- Attach ropes with clevis pins to the lifting eyebolts.
- Make sure the load is evenly distributed.
- Use spacers if necessary.



For dimensions, refer to section 15.

If a fork-lift truck is used:

- Fasten the oil mist separator to the fork-lift truck with a sling.
- Place the oil mist separator in an upright position. Maximum inclination 5° in all directions.
- Install the oil mist separator so that the clean air connection is at least 700 mm higher than the storage tank of the machine tool.
- Install the oil mist separator so that it is protected from the elements.

9.2 Installation

CAUTION!

Avoid oil spillage:

- All tubing and seals must be oil-tight.

WARNING

Avoid danger due to overvoltage and lightning strikes by observing guidelines and standards.

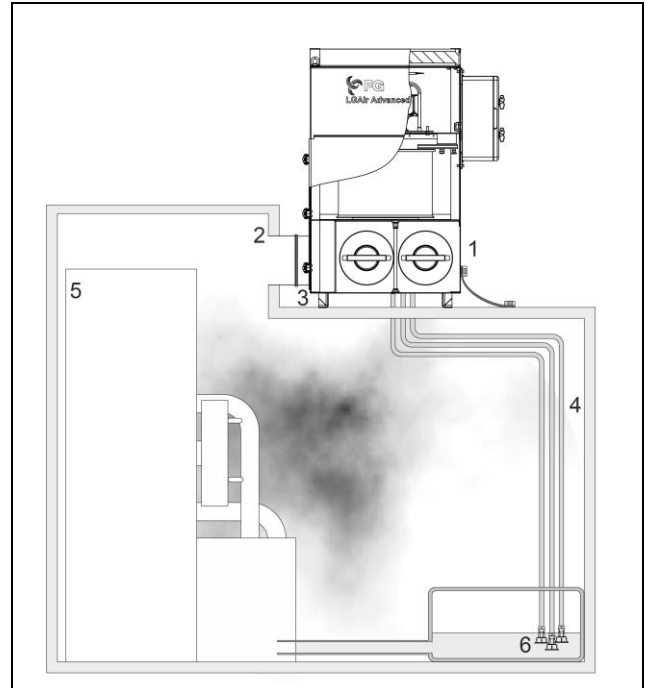


Fig. 4: Installing the oil mist separator

- Bolt the housing of the LGAir O 600 oil mist separator so that it is rigid.
- Provide equipotential bonding between the machine tool and the grounding lug (1) on the LGAir O 600 oil mist separator.
- Connect the extraction point to the dirty air connection (3) of the oil mist separator using a tube section (2) that is as short as possible.
- Lay the oil drain hoses (4) into the storage tank of the machine tool (5).
- ⇒ The oil drain hoses (4) can be shortened to a length of 200 mm; they must not be joined together.



A minimum height difference of 200 mm must be observed to ensure proper working.

- Additional airflow devices can be provided if required owing to the tube length or arrangement.

9.3 Signal meanings (LGAir O 600 Advanced)

- ⇒ COM1NC1 signal: Unit is ready for operation
- ⇒ COM2NC2 signal: Negative pressure ≥ 400 Pa on ENA/OENA stage 1 filter elements (element change recommended)
- ⇒ COM3NC3 signal: Negative pressure ≥ 200 Pa at OENA stage 2 fine filter (element change recommended)

(see circuit diagram in section 17)

10 Start-up

CAUTION!

- Only aerosols from approved oil should be extracted (refer to section 5).
- Observe the specific safety precautions (fire hazard!) when working with hazardous materials (e.g. Mg).
- The system should only be connected to the designated mains voltage.
- The oil mist separator must not be started up if damaged.

- Either switch on the oil mist separator using an electrical switching device to be provided by the customer or start it up via the machine controller.
- Refer to the circuit diagram in section 17 for the terminal assignment.

10.1 Control options

10.1.1 Control via the main circuit

If you only want to control the LGAir via the power supply, you must insert a jumper between plug contacts 7 and 8 (release signal). In this case, the unit is switched on and off by means of the power supply at contacts 1 to 3.

10.1.2 Control via the control circuit

The unit is connected to the power supply and activated when there is a switch connection between plug contacts 7 and 8 (release signal).

In an emergency (emergency stop, fire), the power supply must be switched off by means of an external device.

10.1.3 Signal „Motor is activated“

A "motor is activated" signal can be picked up at contact 6 of the connector if contact 5 is supplied with an external voltage (max. 30 V DC).

10.1.4 Alternative control option (LGAir O 600 Advanced)

If contact 9 and/or contact 10 is connected to contact 11 in the connector, different SET values of the reference variable can be controlled.

11 Normal operation

WARNING

The membrane valve opens automatically!

⇒ Risk of injury.

- Never operate the oil mist separator unattended.

CAUTION!

- Make sure the membrane valve for the oil drain hose is working correctly at all times.
- The oil drain hose must not be kinked.
- No hearing protection is required if the system is installed as a standalone unit. It may be necessary to wear ear protectors if several different noise sources are present simultaneously at the place of use.

The extraction volume flow is approximately 600 m³/h in normal operation.

The oil mist which has been separated is drained via the transparent oil drain hose and can be returned to the oil storage tank.

12 Removal from service

- Either switch off the oil mist separator using an electrical switching device or shut it down via the machine controller.



- Dispose of all components in an environmentally responsible way.

Emergency shut-down

- Interrupt the electrical power supply.

13 Troubleshooting

Fault	Possible cause	Remedy
Oil mist separator cannot be switched on	System not connected to power supply	Connect the system to the power supply
	Fault in frequency inverter	Ask an electrician to test the frequency inverter and repair it if necessary
	Motor temperature too high	
Oil mist separator switches off suddenly	Fault in electrical system	Ask an electrician to test the system and repair it if necessary
Extraction capacity too low	Oil separator elements are dirty	Replace the oil separator elements. Recommended order: 1. ENA/OENA stage 1 elements 2. OENA stage 2 fine filter 3. HEPA H13 filter (if installed)
	Leak in tubing on suction side	Repair the leak
	Incorrect design	Check the design and consult the manufacturer if necessary
Oil exits on clean air side	Membrane valves for oil drain hoses are missing, faulty or incorrectly attached	Attach the membrane valves correctly and replace them if necessary (refer to section 14.4)

14 Maintenance

WARNING

If the system is maintained by unauthorised persons:

- ⇒ Risk of injury.
- ⇒ All warranty claims are rendered invalid.
- The system must be maintained by a suitably trained person!

Before all maintenance work:

- Take steps to prevent the oil mist separator from being switched on by unauthorised persons.
- Disconnect the oil mist separator from the power supply.
- Take steps to prevent the oil mist separator from being switched on again by unauthorised persons.



- Take any necessary safety precautions (protective clothing, eye protection, etc.).



- Carry out the maintenance work.
- Start up the oil mist separator again.
- Observe the oil mist separator.
Does it operate normally (refer to section 11)?

14.1 Inspection and maintenance schedule

Interval	Component	Activity
Daily	Oil mist separator	Check for leakage. The transparent oil drain hose must not be completely filled with oil
		Check the volume flow through the oil separator elements
Monthly	Oil mist separator	Check for damage to mechanical components. Check the electrical devices, and in particular the protective devices, of the oil mist separator for visible damage and perform a functional test
	Membrane valves	Check for damage, perform a functional test and if necessary replace
Yearly	Oil mist separator	Clean the housing. Replace the elements: Oil separator element, HEPA after-filter (optional). Replace the membrane valves
	The necessary inspection and maintenance work is dependent on the particular application. Please consult the manufacturer if necessary. All maintenance work can also be carried out by the manufacturer on request.	

Customer Service contact:
 Filtration Group GmbH
 Schleifbachweg 45
 D-74613 Öhringen
 Phone: +49 7941 6466-388
 industrial.service@filtrationgroup.com

14.2 Information on the fan

	All repairs to the fan must be carried out by the manufacturer. No liability will be accepted by Filtration Group GmbH for repairs by third parties.
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All wearing parts must be replaced in accordance with the maintenance intervals recommended by the manufacturer. Such parts do **not** provide grounds for warranty claims. The service life of wearing parts depends on the runtime, the operational load and various other influences such as temperature, etc.

14.3 Replacing the oil separator elements

	WARNING
Element replacement ⇒ Danger of overturning Ensure that the unit is sufficiently stable prior to replacing the elements!	
	CAUTION!
- Do not use damaged filter elements. - Make sure the seals are correctly fitted to the filter element and the cover.	

14.3.1 Removing the oil separator elements

	- Provide a suitable vessel for the dirty oil separator elements. - Provide wipes to mop up leaked oil. - Use only original FG oil separator elements. - Dispose of all dirty oil separator elements and wipes in accordance with the applicable statutory requirements and regulations.
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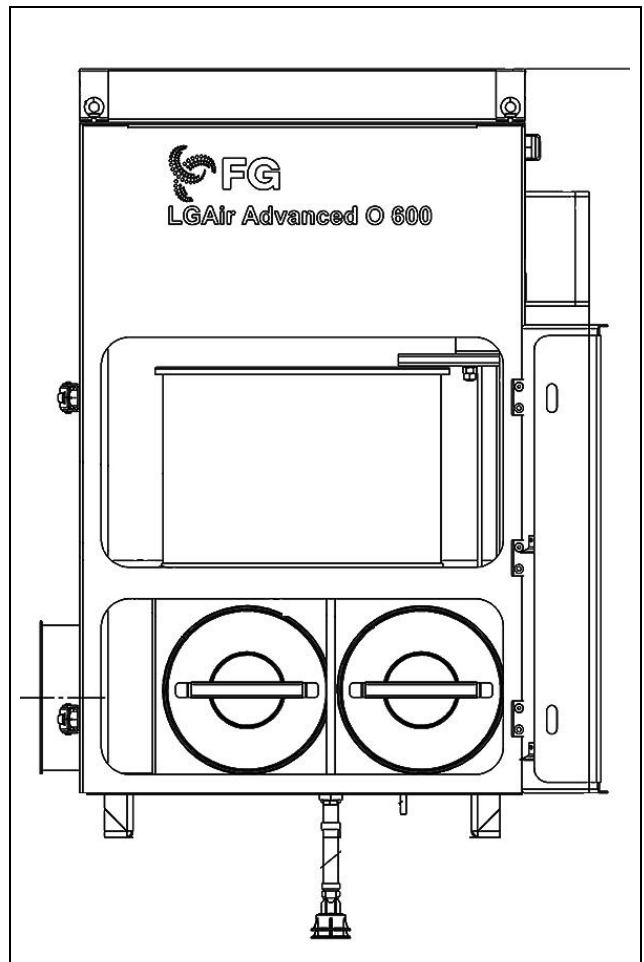


Fig. 5: Loosening the snap locks and opening the maintenance door

14.3.2 Replacing the HEPA H13 filter (optional)

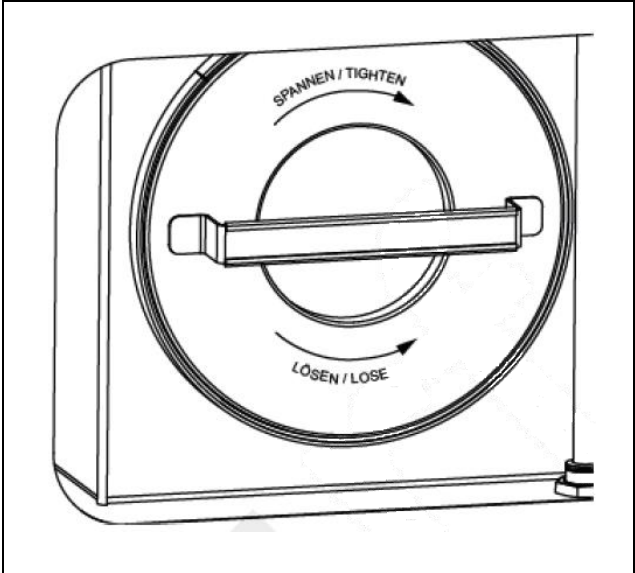


Fig. 6: Unscrew ENA/OENA stage 1 elements and replace with new original elements. Tighten elements hand tight

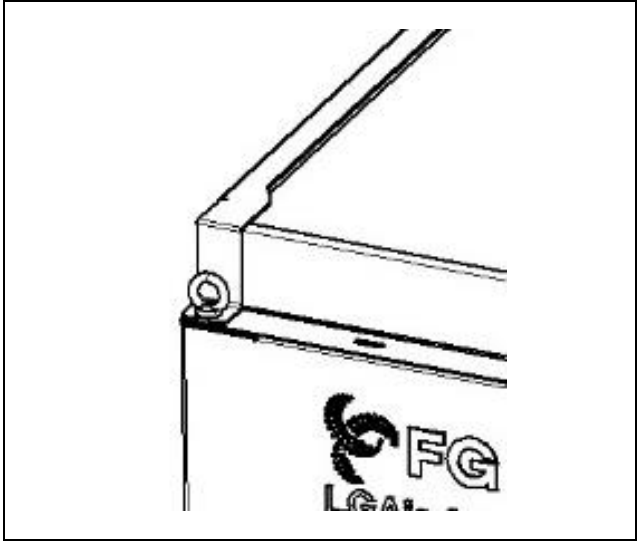


Fig. 8: Loosening the eyebolts

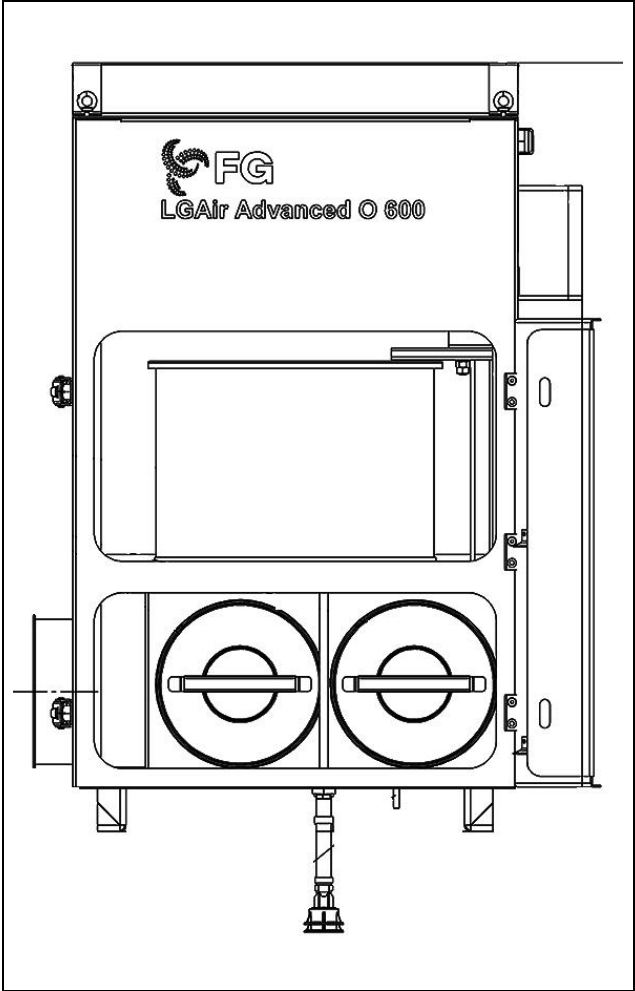


Fig. 7: Closing maintenance door and securing snap locks

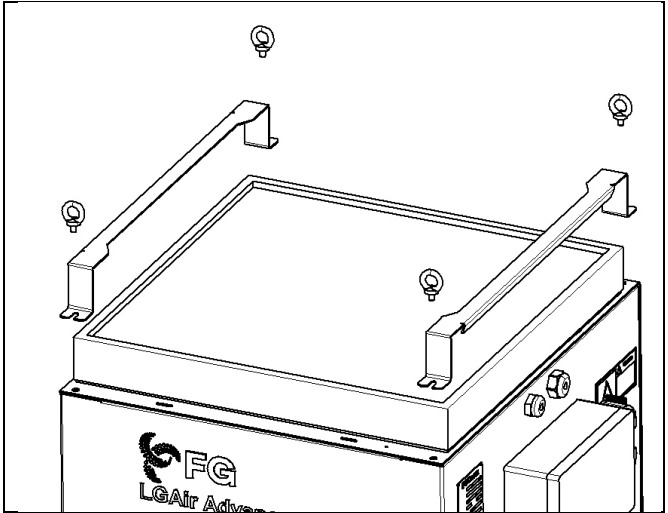


Fig. 9: Removing retaining bracket

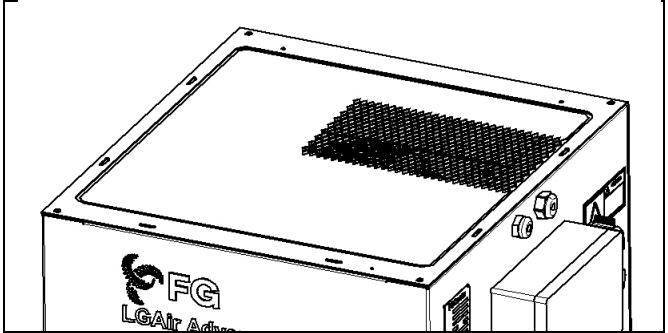


Fig. 10: Removing the HEPA filter and replacing it with a new original element

Reattaching the retaining bracket and eyebolts

14.4 Replacing the membrane

14.4.1 Removing the membrane

- Insert a blunt object into the narrow orifice of the valve (1).
- Press the membrane (2) out carefully through one of the valve orifices (1).

⇒ The membrane has now been removed from the valve.

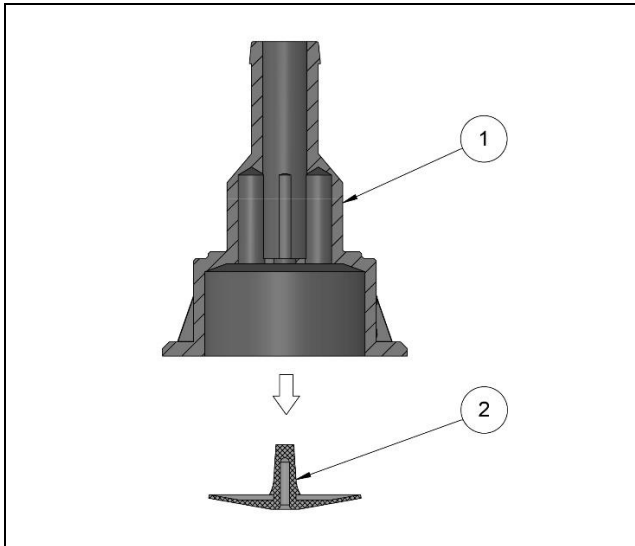


Fig. 11: Removing the membrane

14.4.2 Inserting the membrane

- Insert the membrane (2) into the valve (1) centrally with the nipple (3) first.
 - Insert the nipple (3) into the middle orifice of the valve (2).
 - A thin, blunt object (such as a 2 mm Allen key) can be inserted into the orifice on the underside of the membrane as an aid.
 - Press the membrane (2) into the valve (1) as far as it will go.
- ⇒ The membrane (2) has now been inserted into the valve (1).

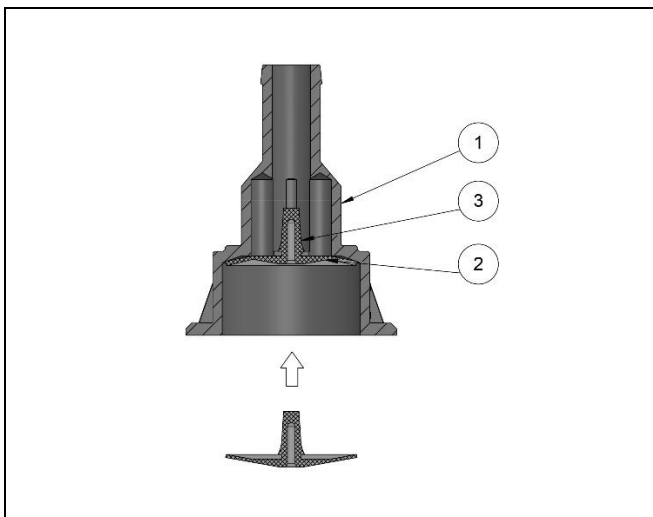


Fig. 12: Inserting the membrane

15 Dimension drawing

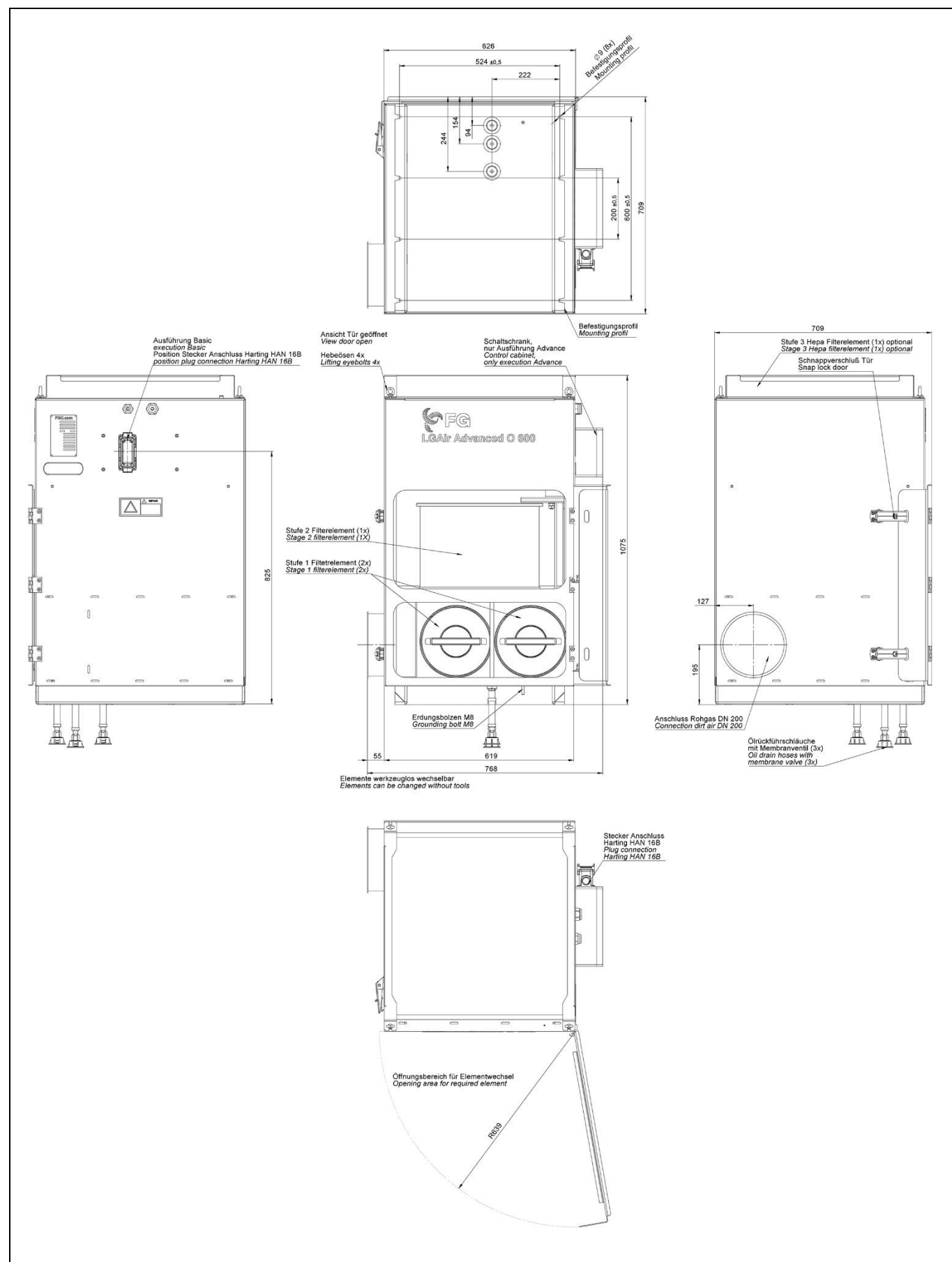
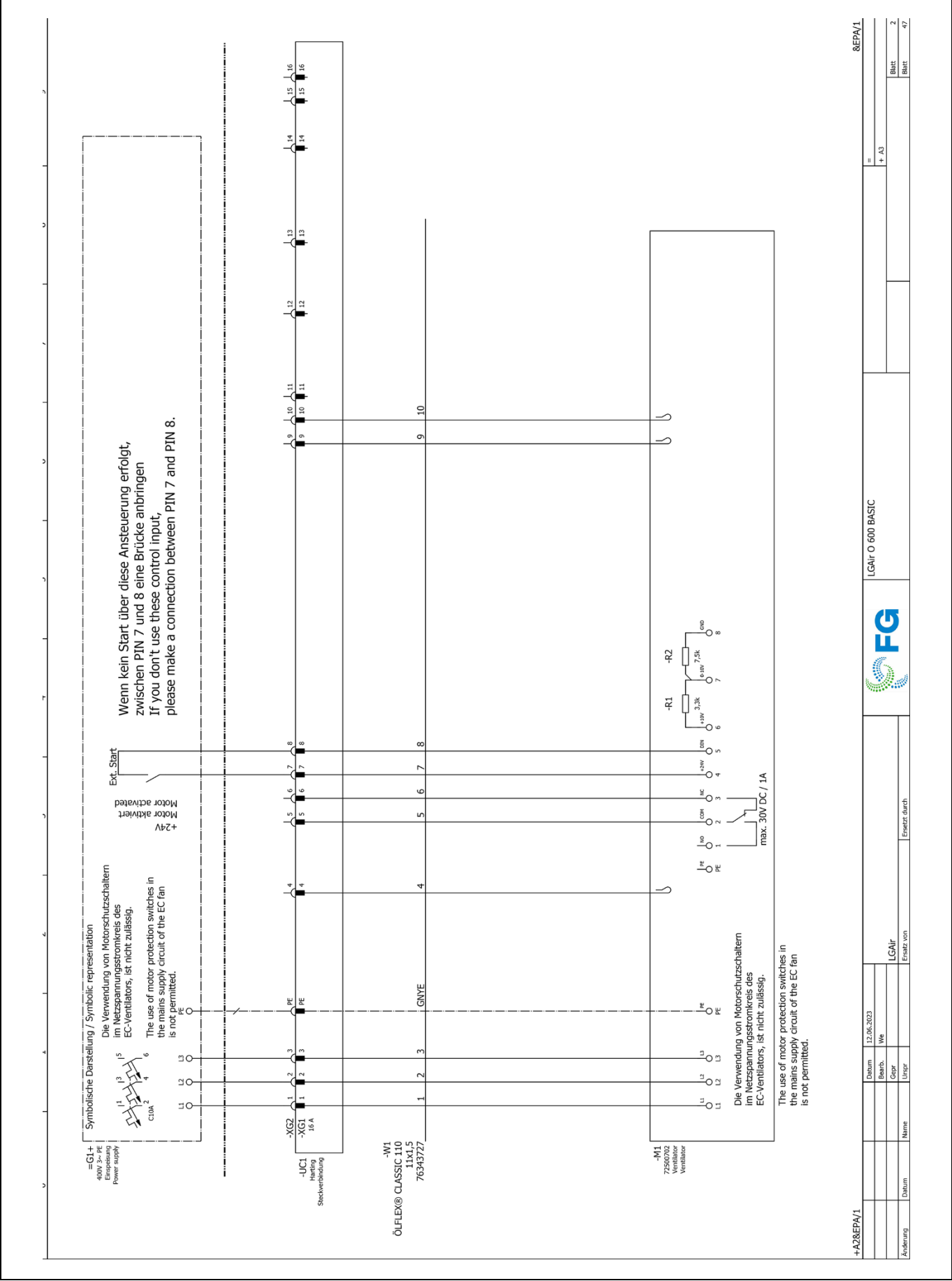


Fig. 13: Dimension drawing of the LGAir O 600

16 List of spare parts

No.	Designation	Order no.
1	ENA/OENA stage 1 filter element	72497165
2	OENA stage 2 fine filter	72497060
3	HEPA H13 filter 610x610x68 (optional)	72497002
4	Drain assembly group LGA/LGAir (1x NBR membrane valve, 1x membrane valve housing, 5.5 m hose)	72405215
5	Membrane valve NBR	72429488
6	Fan with EC drive	72500702

17 Circuit diagram



18 Accessories and optional equipment

18.1 HEPA H13 filter

An FG HEPA after-filter can be additionally installed in order to meet particularly high air purity requirements in recirculating systems.

HEPA after-filters have a very long service life owing to the excellent filtration efficiency of the LGAir unit. FG HEPA filters (class H13) are supplied with a filter surface of 11 m² as standard.

Material no. 72497002

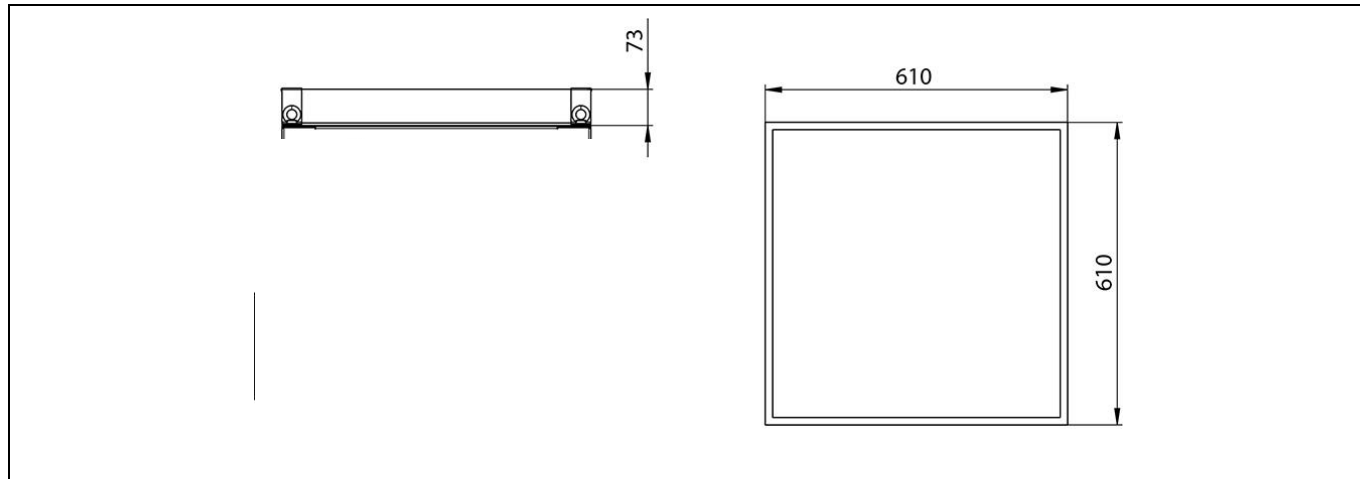


Fig. 14: HEPA H13 after filter

18.2 Frame

For installing the LGAir unit next to a machine tool.

Material no. 70539323

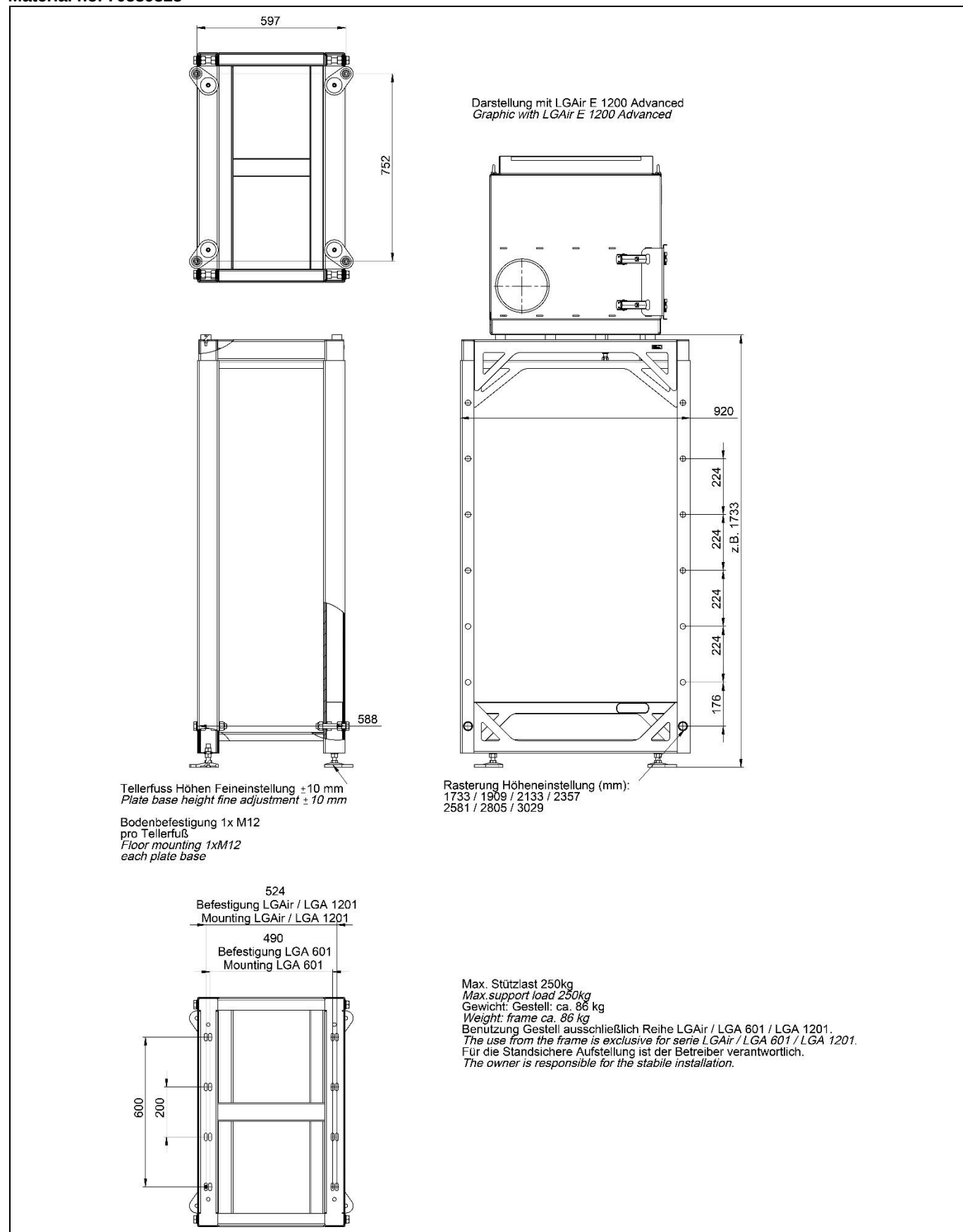


Fig. 15: Schematic diagram of the frame

18.4 External preseparation with an impact separator (Miofilter panel)

Protects the prefilter and main filter installed in the unit from impurities such as entrained metal parts, dust particles or macro emulsions.

Miofilter panels are cleanable coarse filters which can achieve class G4 (EN 779) depending on the inflow velocity.

18.4.1 Installation in the machine tool

The Miofilter panel (material no. 70569965) can be installed in the machine tool directly in front of the dirty air connection of the LGAir O 600 using the fixing set (material no. 70571759).

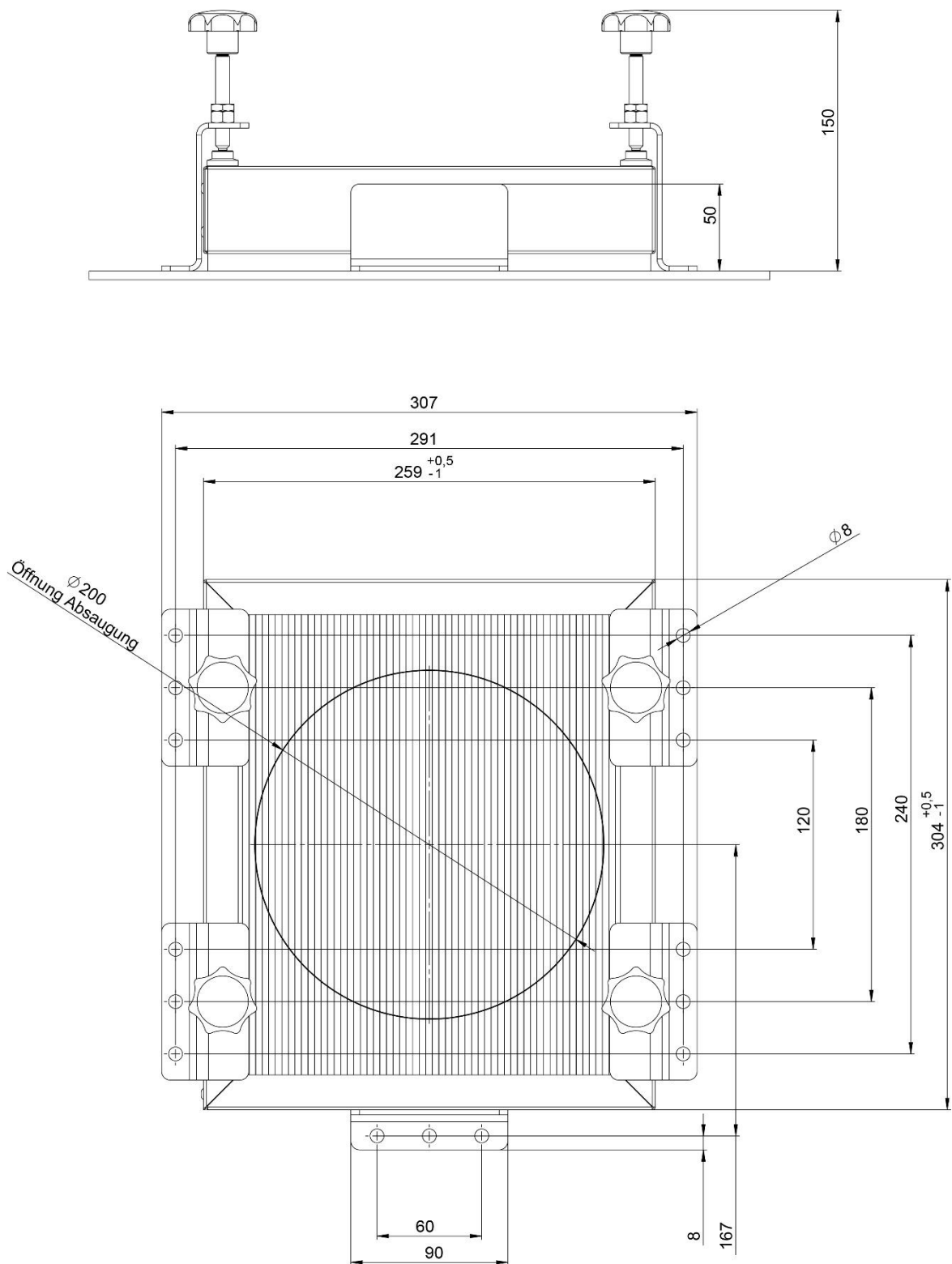


Fig. 16: Installing a Miofilter panel in the machine tool

18.4.3 Installation outside the machine tool

The Miofilter panel (material no. 70569965) can be installed outside the machine tool in the sheet metal housing (material no. 70579167) in front of the oil mist separator.

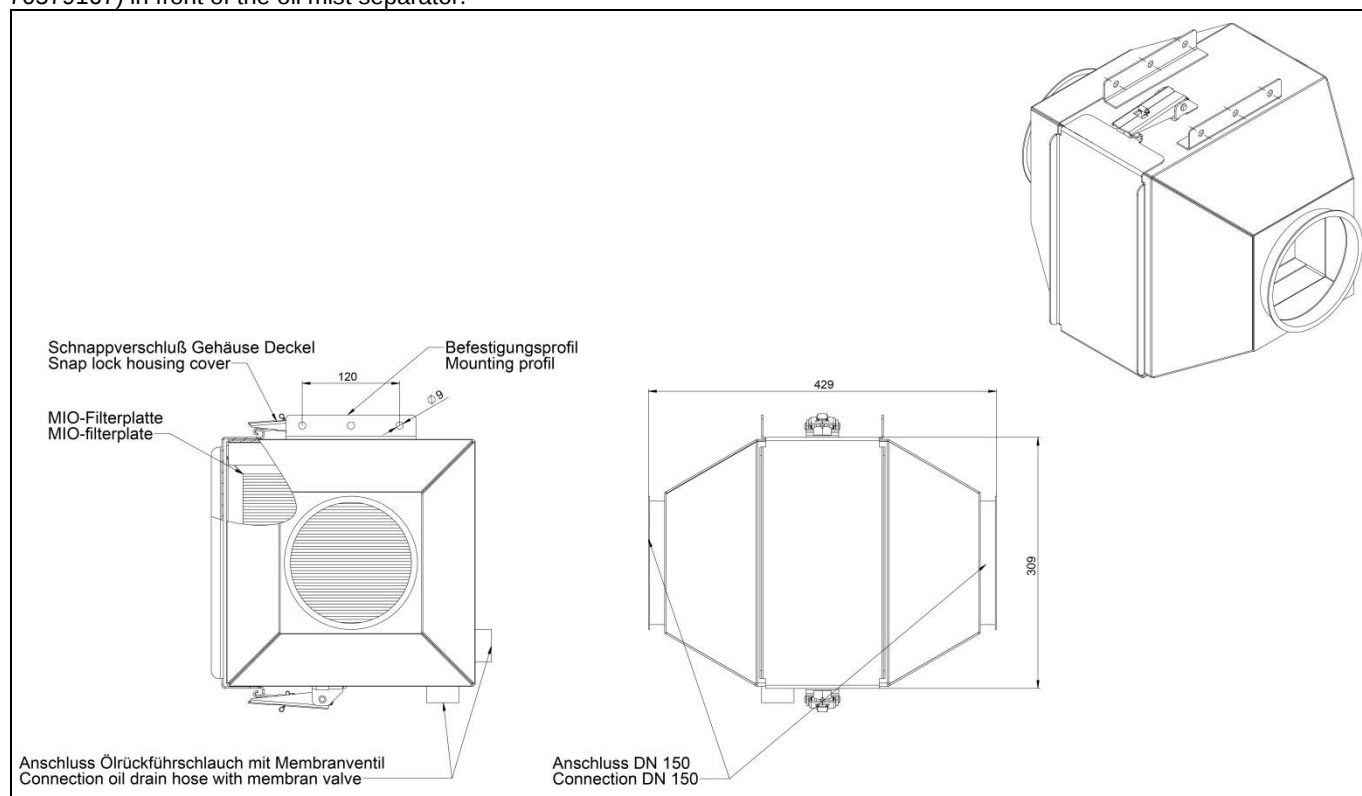


Fig. 17: Installing a Miofilter panel outside the machine tool

19 Declaration of incorporation

EC Declaration of incorporation



The manufacturer

Filtration Group GmbH
Schleibachweg 45
74613 Öhringen
Tel.: +49 7941 6466-0
Industrial.filtrationgroup.com

hereby declares that the following product

Product designation: Oil aerosol separator unit
Type designation: LGAIR Basic O 600, LGAIR Basic E 1200,
LGAIR Advanced O 600, LGAIR Advanced E 1200
Machine description: Separation of cooling lubricant aerosols

conforms to the essential requirements of the following directive:

2006/42/EC Directive 2006/42/EC of the European parliament and of the council of 1 May 2006 on machinery and amending Directive 95/16/EC (recast) (1) official journal of the EU: L157/24 of 9 June 2006
2014/35/EU Directive 2014/35/EC of the European parliament and of the council of 26 February 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility (recast) official journal of the EU: L96/79 of 29 March 2014.

The partly completed machinery must not be put into service until the relevant machinery into which this partly completed machinery is to be incorporated has been declared in conformity with the Machinery Directive 2006/42/EC.

Following harmonised standards have been applied:

EN ISO 12100:2011-03 Safety of machinery - General principles for design – Risk assessment and risk reduction
EN ISO 13857:2020 Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs
EN 60204-1:2018 Safety of machinery - Electrical equipment of machines
EN ISO 20607:2019 Safety of machinery - Instruction handbook - General drafting principles

The manufacturer undertakes to transmit any specific documentation on the partly completed machinery to the appropriate national authorities in writing on request. All specific technical documentation belonging to the machinery has been compiled pursuant to annex VII section B.

Documentation representative/department:

Filtration Group GmbH
Abteilung Konstruktion
Schleibachweg 45
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CE representative:

Michael Bordt

Signatory:

Wolfram Zuck
Managing Director

Öhringen, 06.10.2022
Date

Signature

Annex: 1 page

Annex to the Declaration of Incorporation pursuant to the Machinery Directive 2006/42/EC for oil mist separation
List of the essential health and safety requirements (where applicable) pursuant to 2006/42/EC, Annex 1, applied and fulfilled.



Essential requirements	Fulfilled
Principles of safety integration	yes
Materials and products	yes
Design of machinery to facilitate its handling	yes
Control systems	no
Risk of loss of stability	yes
Risk of break-up during operation	yes
Risks due to falling or ejected objects	yes
Risks due to surfaces, edges or angles	yes
Risks related to variations in operating conditions	yes
Risks related to moving parts	yes
Choice of protection against risks arising from moving parts	yes
Required characteristics of guards and protective devices	yes
Electricity supply	yes
Static electricity	yes
Errors of fitting	yes
Extreme temperatures	yes
Fire	yes
Explosion	yes
Noise	yes
Vibrations	yes
Radiation	yes
External radiation	yes
Emissions of hazardous materials and substances	yes
Lightning	no
Machinery maintenance	yes
Access to operating positions and servicing points	no
Isolation of energy sources	yes
Operator intervention	yes
Cleaning of internal parts	yes
Information and warnings on the machinery	no
Warning of residual risks	yes
Marking of machinery	yes
Instructions	yes

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