

Planning Manual

1012846 / Index „0“ / en / 12.2012



ODOURTUBE
DER GERUCHS-NEUTRALISATOR

Foreword

Dear customer,

The present planning manual provides you with important information and some examples of how the ODOURTUBE is used.

For the actual implementation on site, the authorised specialist dealer is available to assist you as the direct contact person. The dealer has extensive experience with the implementation of the most diverse, site-related ventilation situations.

In the event of technical malfunctions and for questions concerning spare parts, our customer service department is your direct point of contact.

Of course we are also on hand to answer any queries you may have.

Contact address:

JK-INTERNATIONAL GmbH

Division Global Service

Rottbitzer Straße 69
53604 Bad Honnef (Rottbitze)
Deutschland / Germany

Telephone: +49 (0) 22 24 / 818-875
Fax: +49 (0) 22 24 / 818-205
Email: service@jk-globalservice.de
Internet: www.jk-globalservice.com

Yours sincerely,

JK-INTERNATIONAL GmbH

The right to make technical changes in regard to the figures and information contained in this planning manual is reserved!

Reproduction and duplication of this document or parts thereof are only permitted with our previous written approval and with indication of the source.

Your specialist dealer:

--

Table of contents

Foreword

General

- Meaning of signs and symbols
- Directives
- Proper use
- Export
- Safety
- UV-C radiation
- Ozone
- Climatic requirements
- Supply lines

System description

- Function and use
- System advantages
- Efficiency
- Installation concepts
- Case examples
- Installation instructions
- Mains connection
- Adapter

ODOURTUBE

- Device description
- Connections
- Technical data
- Electrical connection
- Accessories
- Recommended accessories
- UV-C lamps

Accessories

- Manually adjustable damper
- Operation monitor

Appendix

- Electrical connections
- Acoustical terms
- Ventilation terms
- Environmental regulations

General

Table of contents

Meaning of signs and symbols 2
 Hazard warnings 2
 Important information 2

Directives 2

Proper use 2

Export 3

Safety 3

UV-C radiation 3

Ozone 3

Climatic requirements 3

Supply lines 3



Meaning of signs and symbols

Hazard warnings



Danger!

This safety warning – warning triangle with the label "Danger" – indicates that, above all, dangers for persons (danger to life, risk of injury) are to be expected.

For example:



Danger to life! Electric current!

Danger for persons through electric shock and burns.

- Disconnect the voltage supply to the device.



Caution!

This safety warning– warning triangle with the label "Caution" - indicates that, above all, dangers for devices, materials and the environment are to be expected.



Caution, UV-C light!

This symbol indicates that, above all, dangers for persons caused by UV-C light are to be expected.

- Disconnect the device from the supply voltage before undertaking any maintenance work.
- Do not look into the light source.

Important information



Note

This symbol does not constitute a safety warning but provides information for a better understanding of the processes.

Directives

ODOURTUBE devices are constructed according to the following directives:

- EC Directive "Electromagnetic Compatibility" 2004/108/EC (according to the version valid at the time)
- Low Voltage Directives 2006/95/EC (according to the version valid at the time).

ODOURTUBE devices bear the following test symbols:



Proper use

The device is intended for commercial use only, not for domestic use.

This device is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities or lacking sufficient experience and/or knowledge, unless they are supervised by a person responsible for their safety or receive instructions as to how the device is to be used.

The device is equipped with two UV-C lamps and is used to reduce odours. The device may only be operated in the outgoing air line.

Any other use shall be considered improper. The manufacturer cannot be held liable for damage or injuries resulting from improper use. The associated risk shall be borne by the operator alone.

Proper use also includes compliance with the instructions and the conditions of use and maintenance prescribed by the manufacturer. The device may only be serviced and repaired by persons who have been trained and informed of the dangers by the manufacturer or a dealer authorised by the manufacturer.

Export

We emphasize that these devices are intended for the European market only and must not be exported to the USA or Canada and operated in those countries! The manufacturer does not accept any liability in the case of non-compliance with this instruction!

It is expressly pointed out that non-compliance with this instruction may result in high liability risks for the exporter and/or the operator.

Safety

Please note that only specialist personnel who are authorized to provide service and undertake installation work may be tasked with mounting and installing as well as repairing and extending the ODOURTUBE devices.

Electrical connection is to be carried out by a specialist company according to the valid VDE regulations.

Danger warnings and safety instructions attached to the device must not be removed or obscured. The safety instructions must be clearly visible and are to be followed. Safety installations and protective devices (e.g. seals, protective cover and/or other parts / attachments) must not be removed or put out of service. Further information can be found in the instructions for use.

UV-C radiation

UV-C radiation lies on the UV spectrum (100–400 nm). Alongside UV-B (280–320 nm) and UV-A (320–400 nm), UV-C is the radiation type with the shortest wavelength (100–280 nm) and the highest energy content.



Risk of serious damage to eyes and skin!

Even when exposure times are short, UV-C radiation can cause serious damage to the skin and especially to the eyes! Direct irradiation of eyes or skin must be strictly avoided.

- Before undertaking maintenance work and before the device is opened for any reason it must be disconnected from the voltage supply and secured against accidental reconnection.
- Never operate the UV-C lamps outside the device or when the device is open!

Ozone

In the case of wavelengths under 200 nm, ozone (O₃) is generated from the oxygen (O₂) contained in the air. This is achieved with special lamps.

The ozone molecule with its three oxygen atoms is unstable and reacts immediately with organic fragrances in the outgoing air. It breaks them down into the odourless gas carbon dioxide (CO₂) and water (H₂O).



Risks of damage to health!

Ozone is an irritant gas that can lead to breathing difficulties and inflammation of the respiratory tract.

- Before undertaking maintenance work and before the device is opened for any reason it must be disconnected from the voltage supply and secured against accidental reconnection.
- Never operate the UV-C lamps outside the device or when the device is open!

Climatic requirements

ODOURTUBE devices are intended for installation in dry rooms that are not endangered by splashing or dripping water. The maximum relative air humidity in this room must not exceed 60% (for brief periods < 1 h: 85%).

The permitted ambient temperature is between 15 and 39 °C. At intake temperatures below 15 °C a pre-heater is to be used.

Supply lines

The following supply lines are to be taken into account when planning the installation site for an ODOURTUBE device and must be laid before the device is installed.

- Mains connection lead

System description

Table of contents

Function and use	2
Function	2
Use	2
System advantages	2
Efficiency	3
Installation concepts	4
Central injection	4
Decentralised injection	5
Case examples	6
Installation instructions	8
Mains connection	11
Connecting to the mains	11
Adapter	12

System description

Function and use

Function

The core of the ODOURTUBE consists of specially developed lamps that generate UV light with a wavelength of 185 nm. Oxygen molecules that pass through the device are split into highly reactive particles by the light energy and these particles combine with other oxygen molecules in a chain reaction to form ozone (O₃).

Ozone reacts immediately with organic fragrances in the outgoing air and breaks them down into the odourless gas carbon dioxide (CO₂) and water (H₂O). Odours that were previously perceived to be intense and obtrusive are then only weakly present or have vanished completely.

Use

The ODOURTUBE can be used in a variety of ways.

Industry:

Industrial plants often contribute to odour pollution in nearby locations. This is especially true for facilities for the production of plastics, fragrances and aromas.

Foodstuffs:

During the manufacture of foodstuffs odour pollution can often occur within the production process.

Animal husbandry / manufacture of animal feed:

Plans to extend animal fattening farms and animal feed plants often fail owing to the inability to observe the limit values of odour pollution. Traditional meat-cutting plants such as abattoirs are also affected by this problem.

Catering / industrial kitchens

Use of the ODOURTUBE enables the degree of fatty deposits in the exhaust air ducts to be reduced. Besides significantly reducing odours, the ODOURTUBE thus helps to ensure compliance with hygiene and fire prevention regulations.

System advantages

Modular design

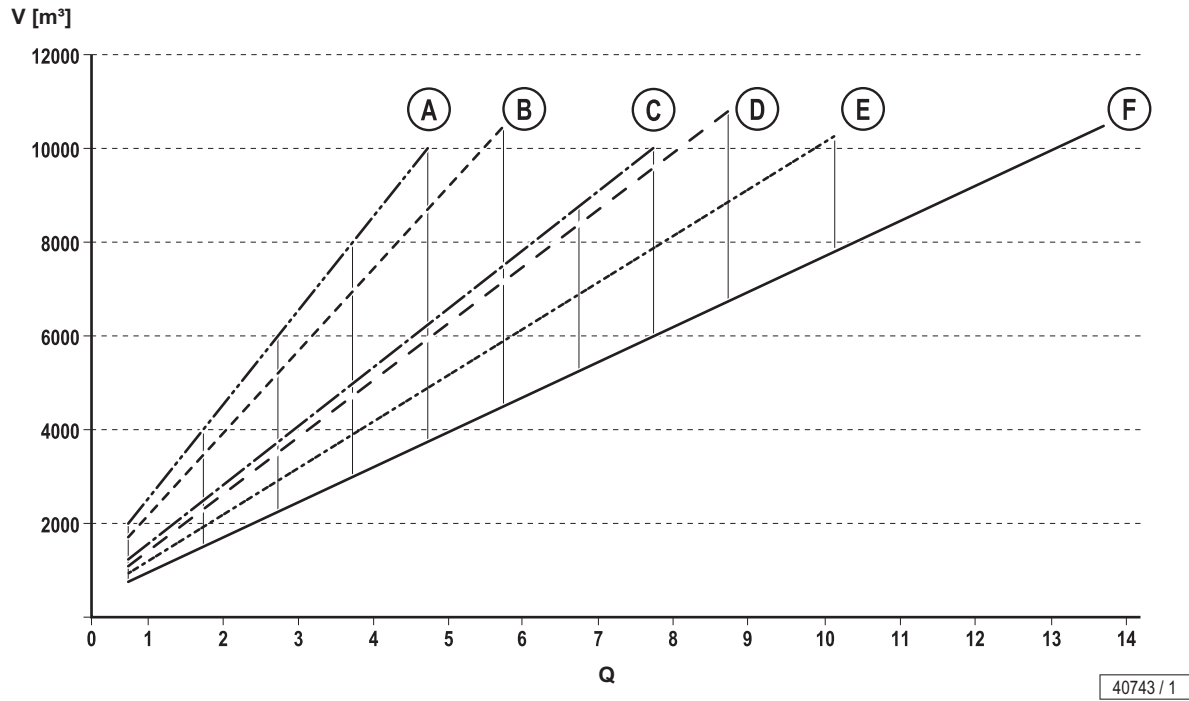
ODOURTUBES have been designed as a modular system. Thanks to fixed installation dimensions and their compact shape, ODOURTUBES can be integrated at almost any location. The bundling of several ODOURTUBES enables a diverse range of exhaust air volume flows to be processed. Larger capacities can also be achieved through simple extension at a later stage.

Easy integration

ODOURTUBES can be integrated in a wide variety of exhaust air installations and systems without pre-engineering. Their use can be planned and implemented at short notice. Their compact design also enables inconspicuous placement.

Efficiency

Number of devices dependent on air volume and source of odour



Legend:

V Air volume

Q Number of ODOURTUBES used

A Catering

B Plastic

C Industrial cooking

D Rape seed oil and methionine

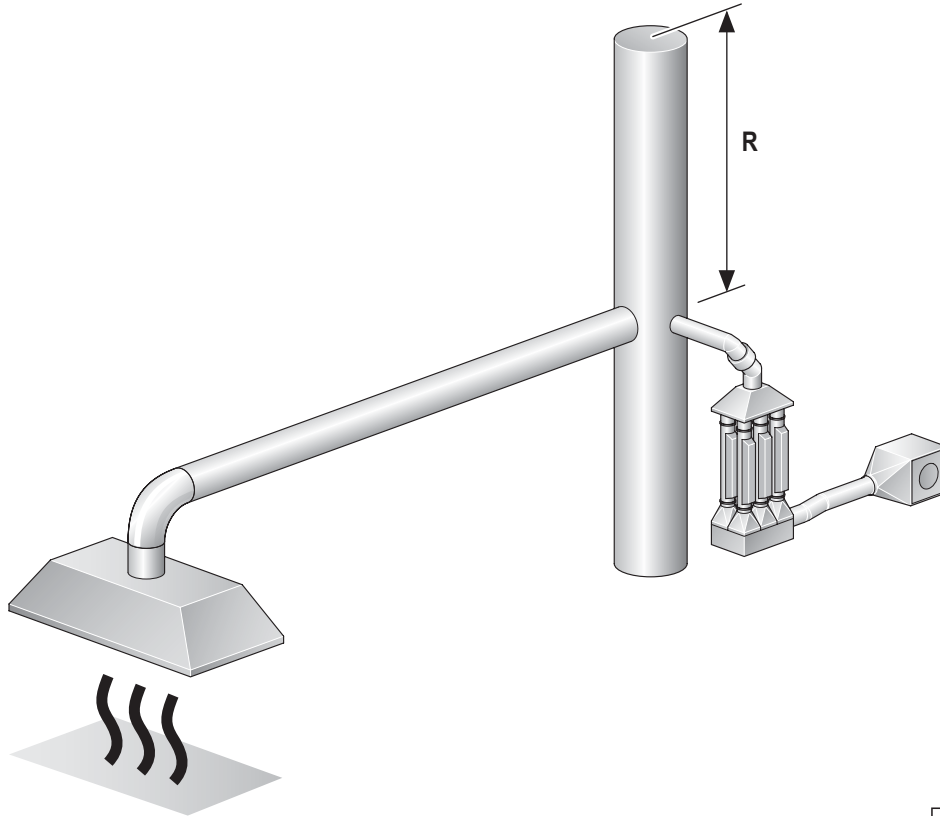
E Waste water

F Coffee aroma

System description

Installation concepts

Central injection



40754 / 0

In the case of a central installation, the individual modules are bundled together to form a so-called battery. Connection to the air duct is made at one point, such that the constructional changes to the system are reduced to a minimum.

Reaction section (R)

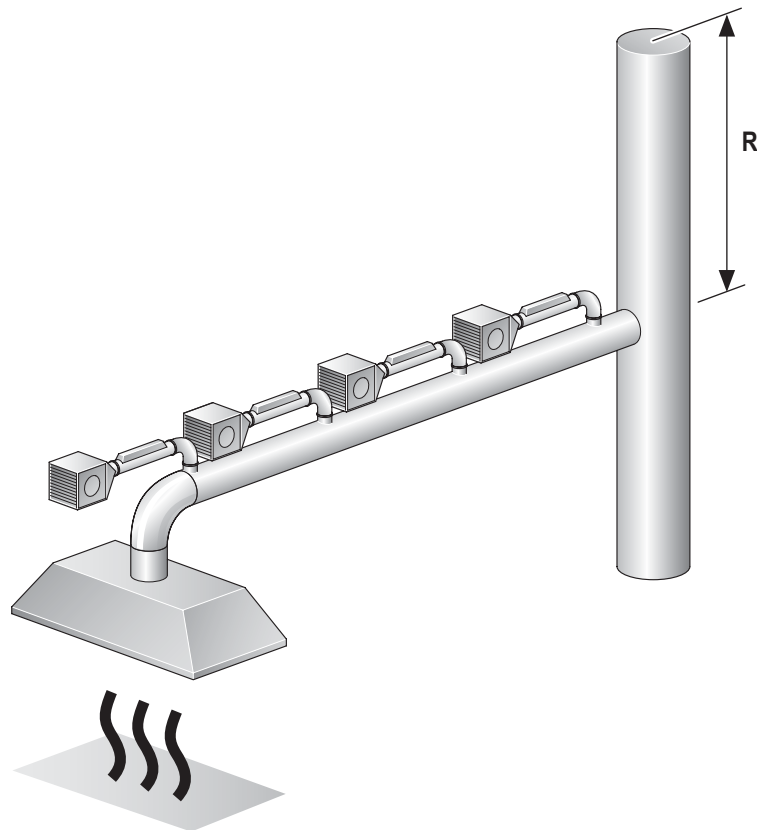
"Reaction section" is the name given to the section of the air duct between the injection point of the ODOURTUBE and the outlet of the outgoing air into the outside air.

The length of the reaction section should be at least 2.5 times the value of the air speed present in the air duct.

Example:

If the air speed is 5 m/s, the length of the reaction section should be min. 12.5 m.

Decentralised injection



40755 / 0

System description

In the case of a decentralised installation, it is possible to reduce the odour concentration step by step. The required modules are connected individually and directly to the air duct.

Odour reduction takes place right from the first module. Depending on the odour intensity, further modules can be installed downstream.

Reaction section (R)

"Reaction section" is the name given to the section of the air duct between the injection point of the ODOURTUBE and the outlet of the outgoing air into the outside air.

The length of the reaction section should be at least 2.5 times the value of the air speed present in the air duct.

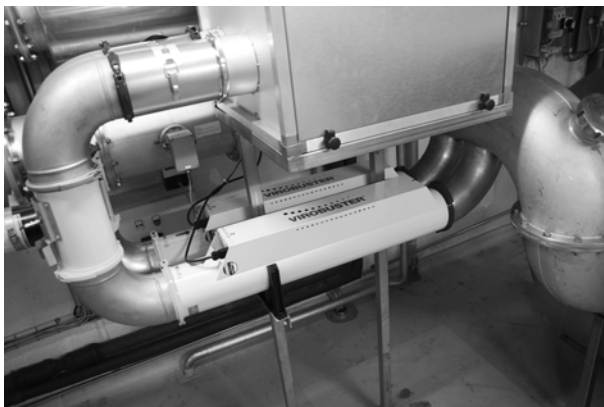
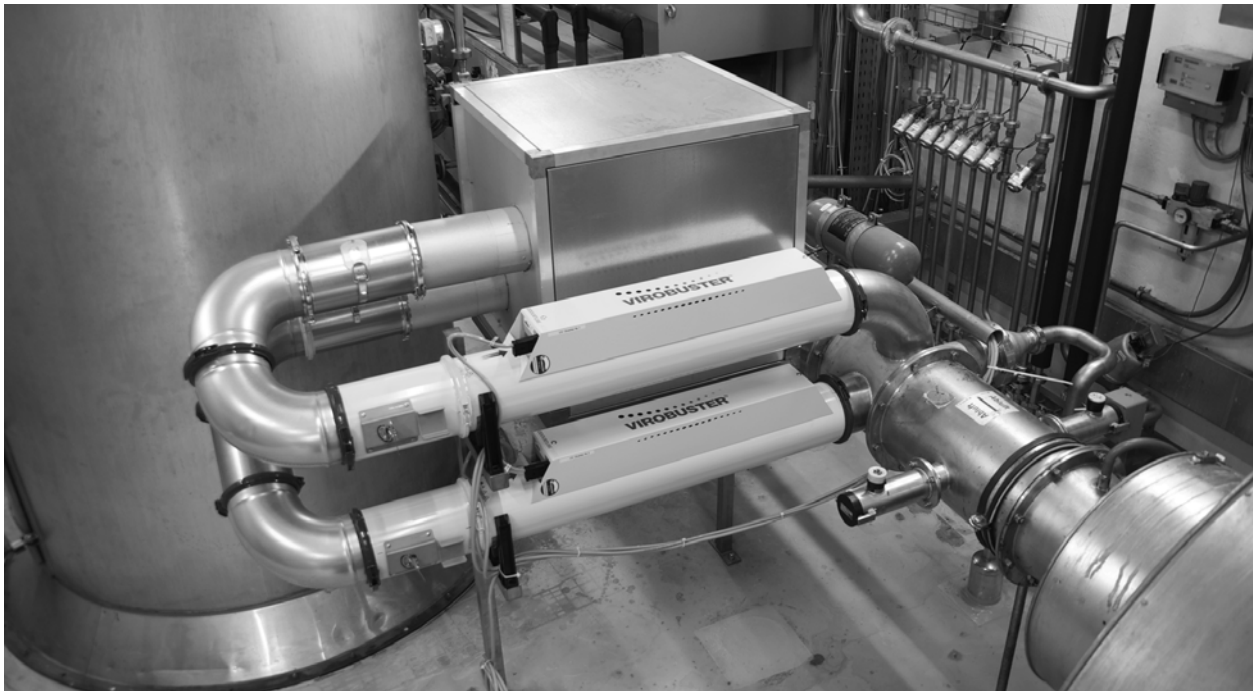
Example:

If the air speed is 5 m/s, the length of the reaction section should be min. 12.5 m.

Case examples



Catering. The exhaust air from various restaurants in a shopping centre with a residential complex was channelled into several exhaust air shafts. In each of the exhaust air shafts two ODOURTUBES were integrated. Air pre-heaters were also installed in order to achieve optimal results in cold weather.



System description

Fragrance and flavour enhancer industry. ODOURTUBES were positioned at the exhaust air lines in a decentralised manner. Three granulators share an exhaust air system. In the case of the two granulators with low capacities, two ODOURTUBES were connected in parallel at one injection point in each case. The installation for the most powerful granulator was attached on the roof. Here four ODOURTUBES were used.

Installation instructions

For safe and efficient operation, a few points should be noted:

Reaction section

"Reaction section" is the name given to the section of the air duct between the injection point of the ODOURTUBE and the outlet of the outgoing air into the outside air.

The length of the reaction section should be at least 2.5 times the value of the air speed present in the air duct.

Example:

If the air speed is 5 m/s, the length of the reaction section should be min. 12.5 m.

Fan

On the intake side a fan with an external motor must be installed. The ODOURTUBE and the fan must be operated simultaneously, i.e. they must be interconnected.

Intake filter

An air filter belonging to filter class F5 must be installed upstream of the Odourtube on the intake side.

Diameter of air duct, air speed

The ratio of air duct diameter to air speed should be such that extremely turbulent air flows result and thus the air is intensively mixed (Reynolds number > 2300).

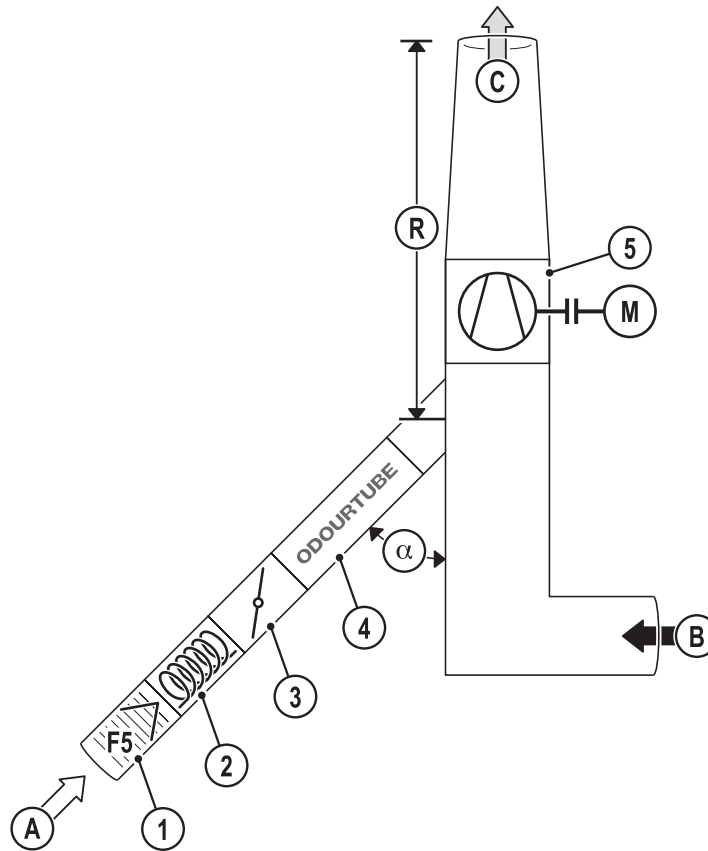
Duct system

The air tightness of the duct system must be ensured. All installed parts that come into contact with the air stream must be ozone-resistant. There should be no plastic or rubber parts in the air stream.

The aspirated air must not be process air.

If the temperature of the aspirated air is below 15 °C, an air pre-heater must be installed.

Installation diagram "negative pressure"



- A Supply air (inside or outside air)
- B Exhaust air
- C Outgoing air
- R Reaction section

The length of the reaction section should be at least 2.5 times the value of the air speed present in the air duct.

Example:

If the air speed is 5 m/s, the length of the reaction section should be min. 12.5 m.

In this installation solution, the supply air meets the exhaust air to be treated upstream of the fan. For the supply air line a separate fan is not required. The supply air is aspirated by the negative pressure existing in the chimney.

The fan must be dimensioned so that ,besides the exhaust air, it also covers the air requirement of the ODOURTUBE.

- α Connection angle (< 45°)

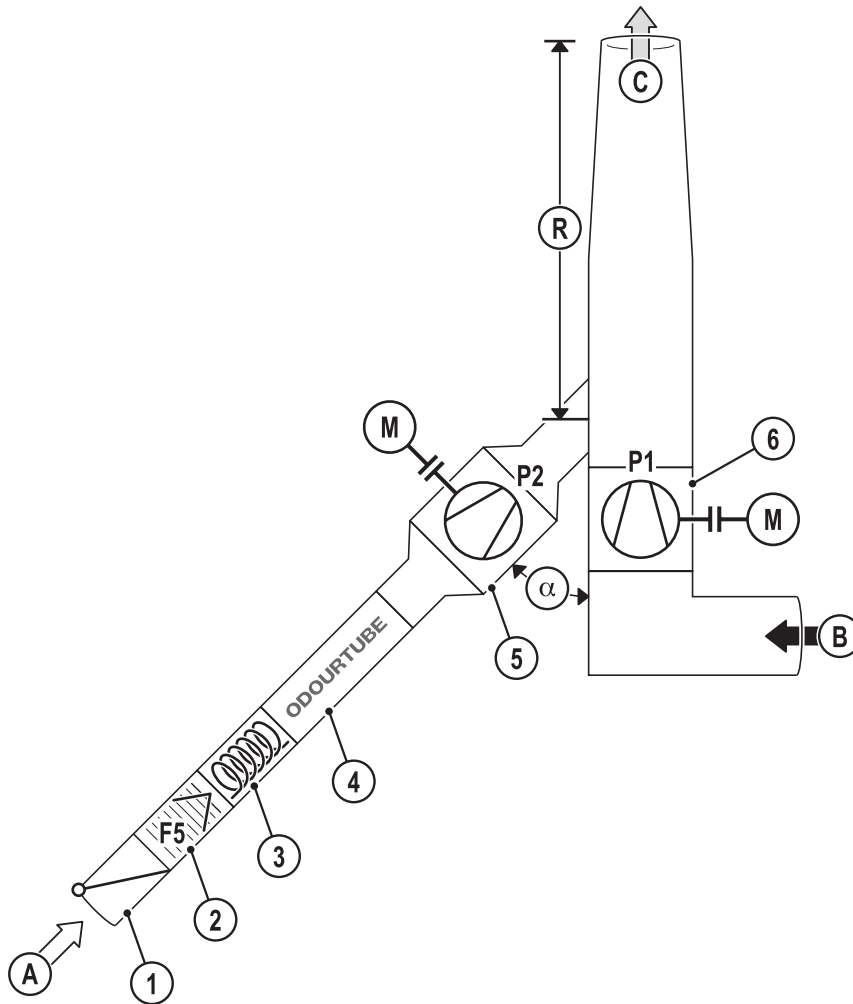
1. Pre-filter (filter class F5)
2. Air pre-heater (if supply air temperatures < 15 °C)
3. Volumetric flow controller
4. ODOURTUBE
5. Fan with exterior motor

Example:

If the exhaust air volume is 2000 m³/h and the air requirement of the ODOURTUBE is 300 m³/h, the fan must present a delivery volume of 2300 m³/h.

40756 / 0

Installation diagram "pressure side"



40757 / 0

A Supply air (inside or outside air)

B Exhaust air

C Outgoing air

R Reaction section

The length of the reaction section should be at least 2.5 times the value of the air speed present in the air duct.

Example:

If the air speed is 5 m/s, the length of the reaction section should be min. 12.5 m.

α Connection angle ($< 45^\circ$)

1. Check valve (optional)

2. Pre-filter (filter class F5)

3. Air pre-heater (if supply air temperatures $< 15^\circ\text{C}$)

4. ODOURTUBE

5. Fan with exterior motor (supply air line)

6. Fan (exhaust air)

P₁ Pressure (exhaust air)

P₂ Pressure (supply air line)

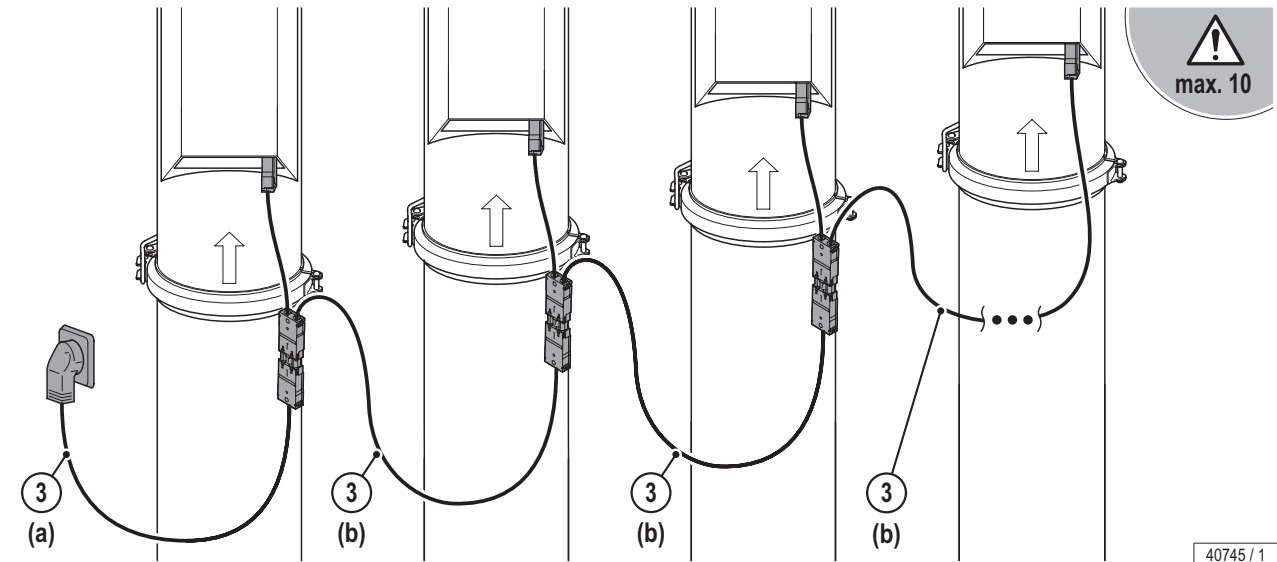
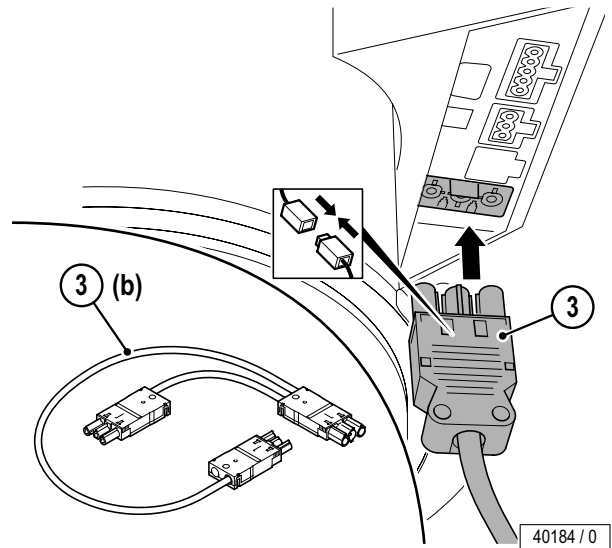
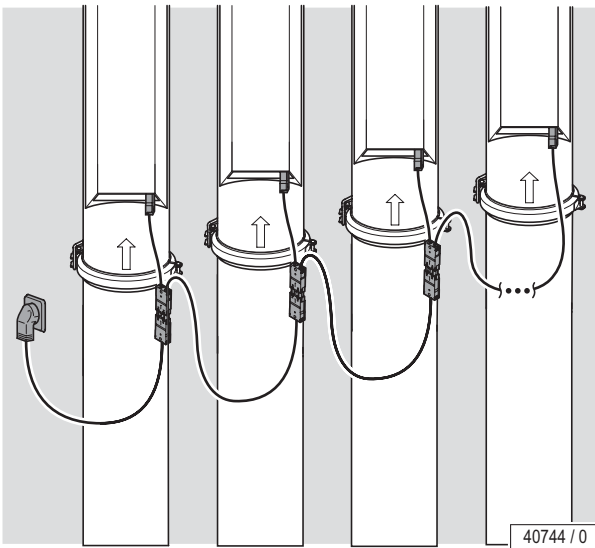
In this installation solution the supply air is injected into the exhaust air to be treated downstream of the fan. For this purpose the supply air line must be equipped with a separate fan. This fan (5) must build up a significantly higher pressure than the fan (6), that is $P_2 \gg P_1$.

Mains connection

Connecting to the mains

Connecting ODOURTUBE devices to the mains power supply can be carried out individually or in series. Using the Y cable (3b), up to 10 devices can be connected to a socket.

Connection to the mains power supply can be carried out before as well as after installation. It is imperative that the mains voltage be switched off during installation so that the device cannot be switched on accidentally.



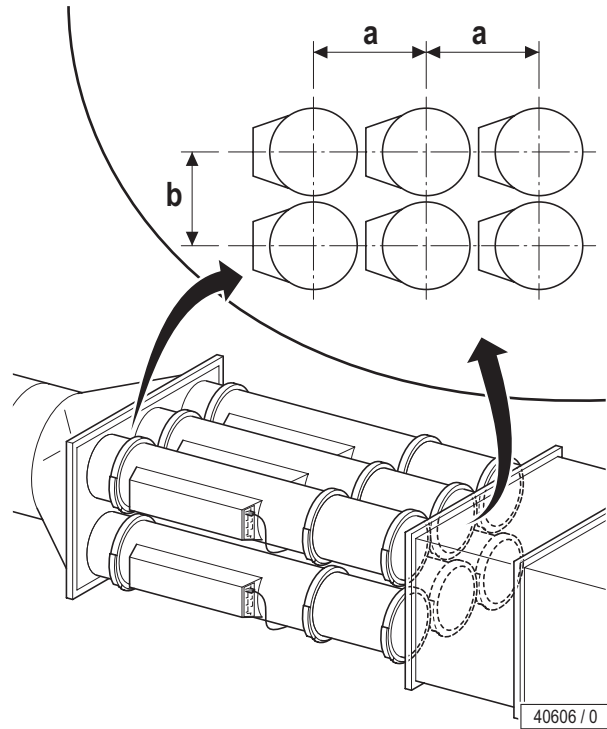
System description

Adapter

ODOURTUBES can be adapted to almost any installation situation with the help of adapter pieces. For the manufacture of adapter pieces only a small number of dimensions need to be observed.

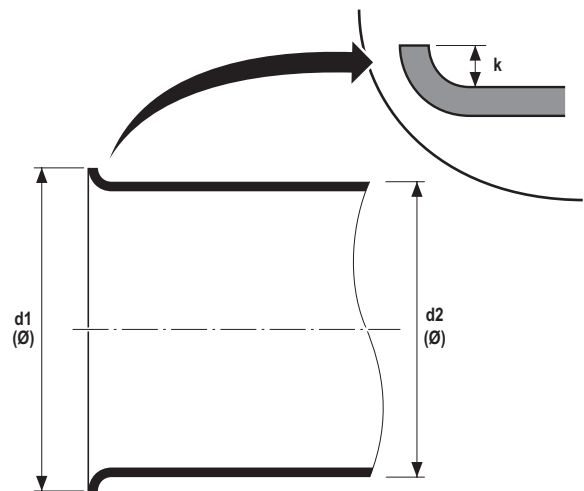
Minimum distances between the individual ODOURTUBES:

a:	230 mm
b:	200 mm

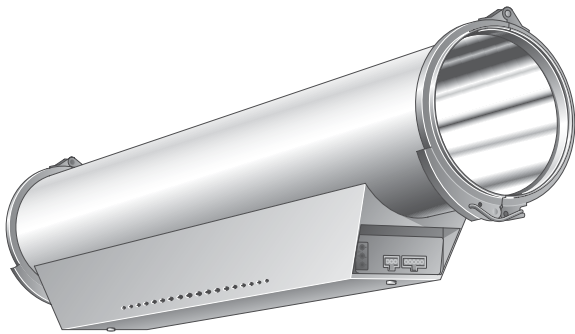


Pipe connection dimensions:

Diameter d1:	174 mm
Diameter d2:	160 mm
Flange edge k:	min. 5 mm max. 7 mm



40758 / 0



- The ideal solution for the efficient reduction of odour emissions as an alternative to traditional filter technologies.
- Easy integration in existing extractor systems
- Easy installation and quick commissioning
- All capacities possible

500000740

ODOURTUBE

Table of contents

Device description 2

Connections 2

Technical data 3

 Dimensions and weights 3

 Performance data 3

 Environmental conditions 3

Electrical connection 3

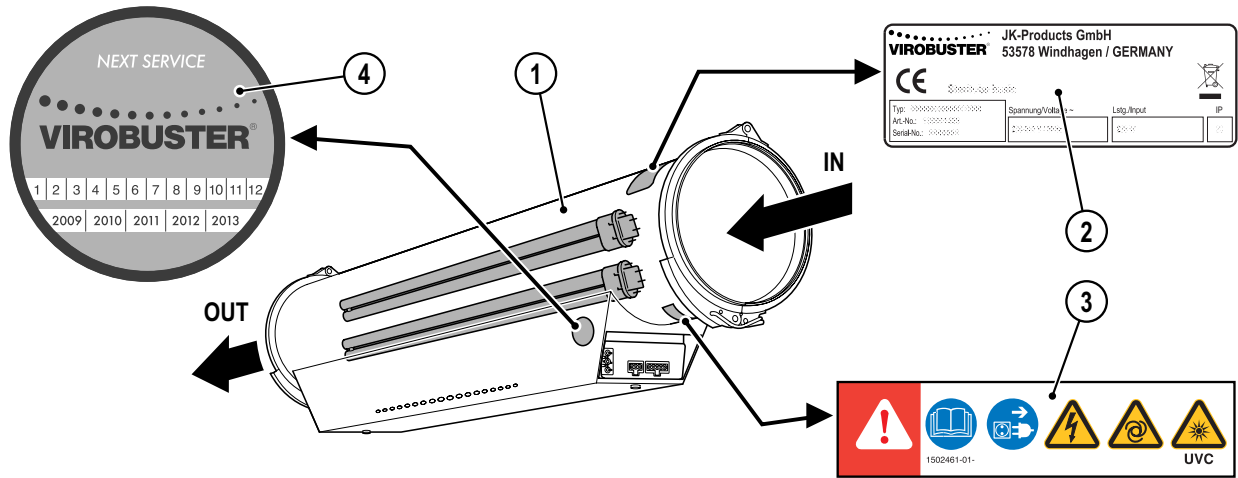
Accessories 4

Recommended accessories 4

UV-C lamps 5

ODOURTUBE

Device description

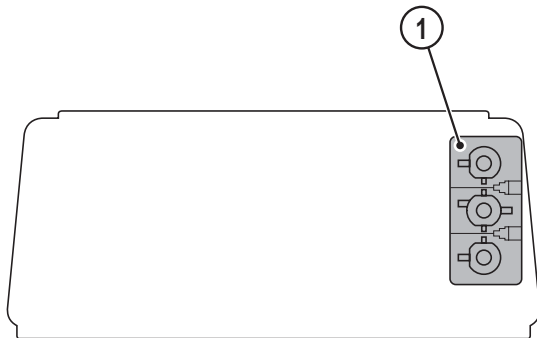


40470 / 0

- 1. ODOURTUBE with 2 UV-C lamps
 - 2. Nameplate
 - 3. Warning label
 - 4. Maintenance sticker
- IN Air intake side
OUT Air outlet side

Connections

Air intake side



40576 / 1

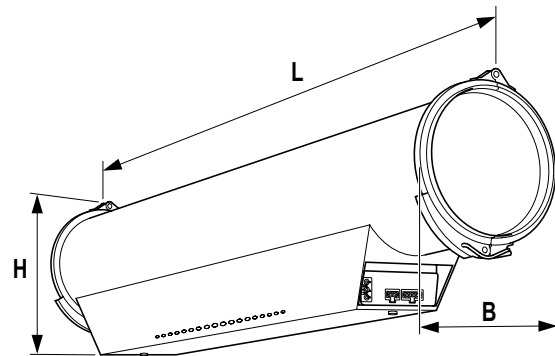
- 1. Power supply
Connecting cable plug system (supplied loose)

ODOURTUBE

Technical data

Dimensions and weights

Length L:	1000 mm
Height H:	220 mm
Width B:	Pipe connection DN160 (without quick clamp)
Weight (including UV-C lamps):	approx. 10 kg



40209 / 0

Performance data

Electrical data	
Power consumption rating:	190 W
Rated voltage:	230 – 240 V
Rated frequency:	50 Hz
Rated fuses:	1 × 16 A
Microfuse	6.3 A (time delay)
Ventilation data	
Ozone production	7.5 ppm at 150 m ³ /h 5.0 ppm at 300 m ³ /h
for exhaust air volume flows	750 m ³ /h – 3000 m ³ /h

Environmental conditions

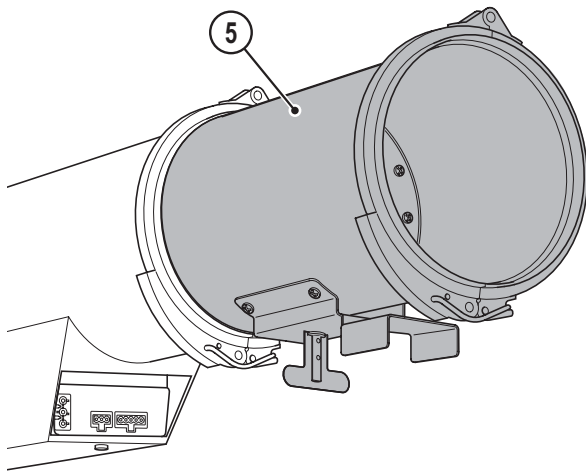
Operation in Indoor Areas (normal operation):	
Air humidity:	< 60% (< 1 h: 85%)
Ambient temperature:	15 – 39 °C
At intake temperatures below 15 °C a pre-heater must be used.	

ODOURTUBE

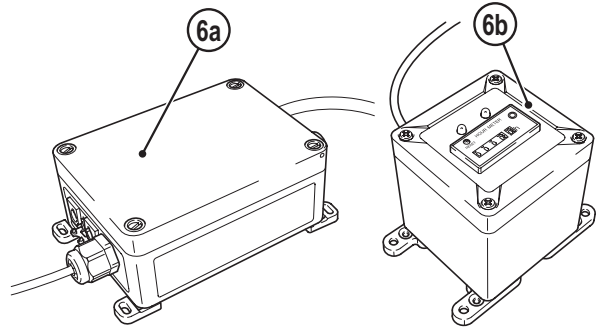
Electrical connection

Description	Article no.	Remarks
Connecting lead	1503304	supplied loose
Y cable	1503305	supplied loose

Accessories



40605 / 0



40742 / 0

Item	Description	Article no.	Remarks
5	Manually adjustable damper	100002500	for shutting off the air duct during maintenance work on the Odourtube unit
6	Operation monitor, consisting of a) Electronic module b) Display module	100003062	for lamp function monitoring and counting of operating hours

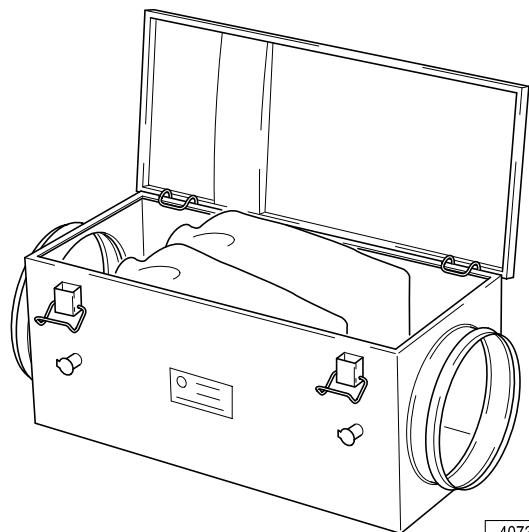
Recommended accessories

The accessories presented below are not a part of the Virobust-er delivery program and can be purchased from a specialist dealer.

The types listed serve as examples. Types from other manufacturers and with different designations etc. may also be used.

Filter box F5/F7

Type designation:	Manufacturer:
FFR 160/1770	Systemair
Filter box 160	Stiebel
External filter box	Vortice

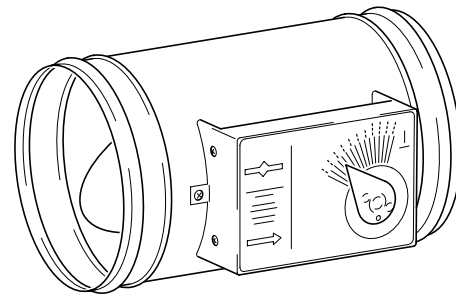


40739 / 0

ODOURTUBE

Volumetric flow controller

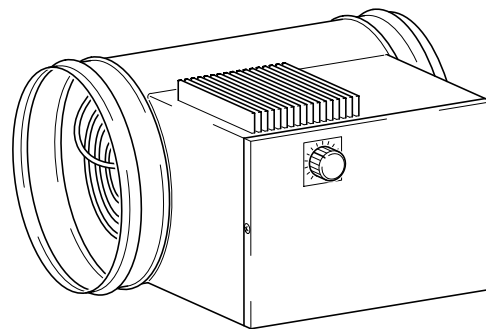
Type designation:	Manufacturer
VR1	Wildeboer
R series	Trox
VRA	Schako



40740 / 0

Pre-heater

Type designation:	Manufacturer
CB	Systemair
EHR-R	Helios



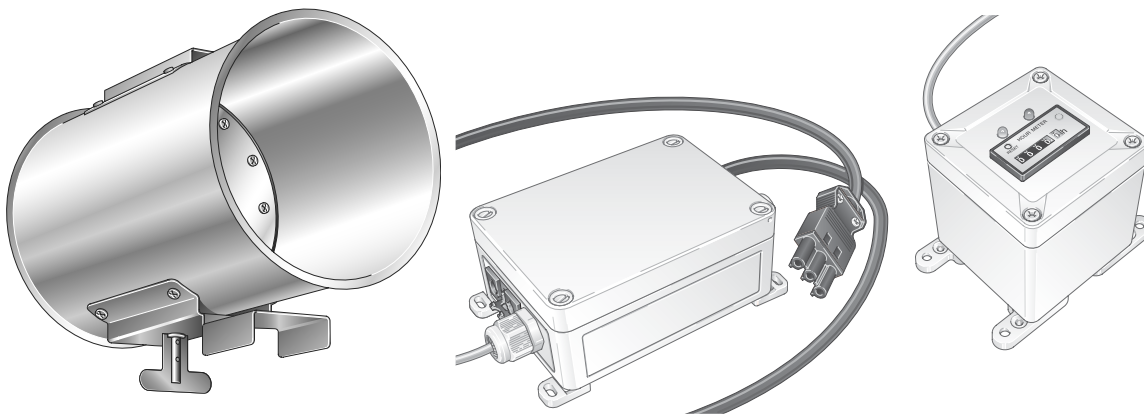
40741 / 0

UV-C lamps

Designation	Article no.	Remarks
UV-C lamps B ¹⁶ Oz	1006661	2 lamps

ODOURTUBE





Accessories

Table of contents

Manually adjustable damper 2

 Description 2

 Connection 2

 Technical data 2

Operation monitor 3

 Description 3

 Connection 3

 Function 3

 Technical data 4

Accessories

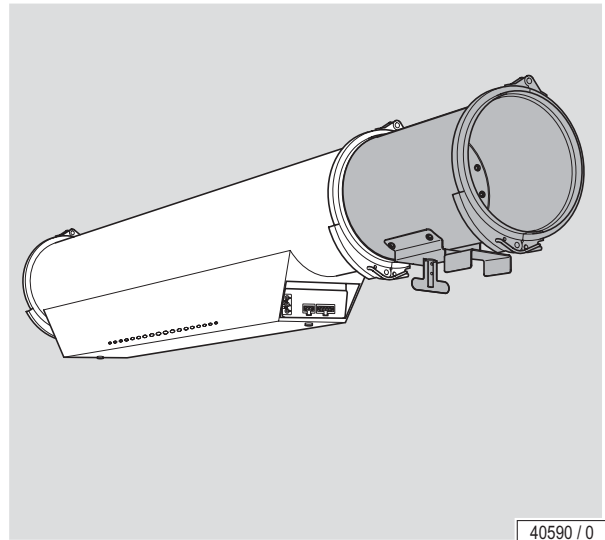
Manually adjustable damper

Description

The manually adjustable damper is an accessory for the ODOURTUBE.
 The manual adjustable damper is used to shut off the air duct during maintenance work on the Virobuster unit.

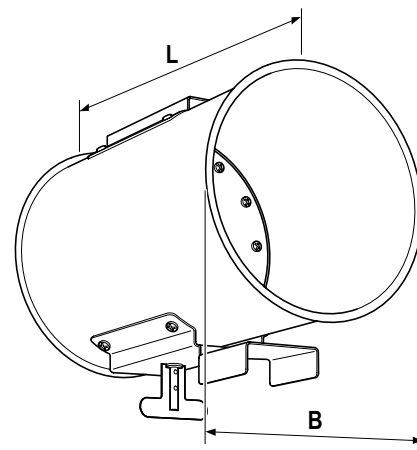
Connection

The manually adjustable damper is installed on the air intake side of the Virobuster unit.



Technical data

Dimensions and weight	
Length L:	250 mm
Width B:	Pipe connection DN160 (without quick clamp)



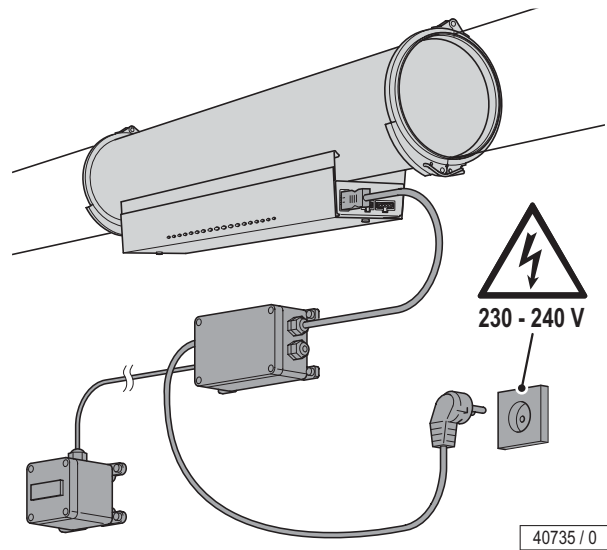
Operation monitor

Description

The operation monitor is an accessory for the ODOURTUBE. It is used to monitor the functioning of the lamps and the counting of operating hours.

Connection

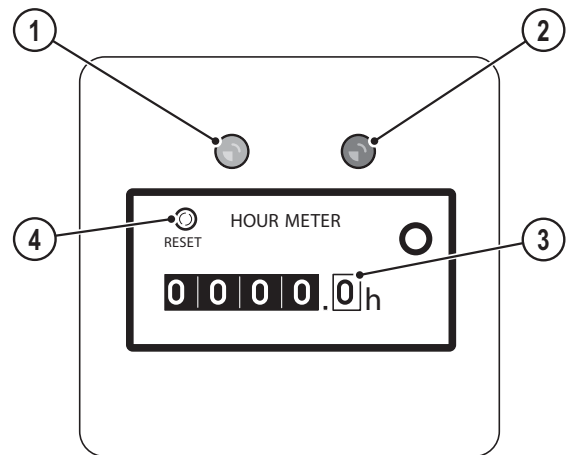
The operation monitor is installed upstream of the voltage supply of the ODOURTUBE.



Function

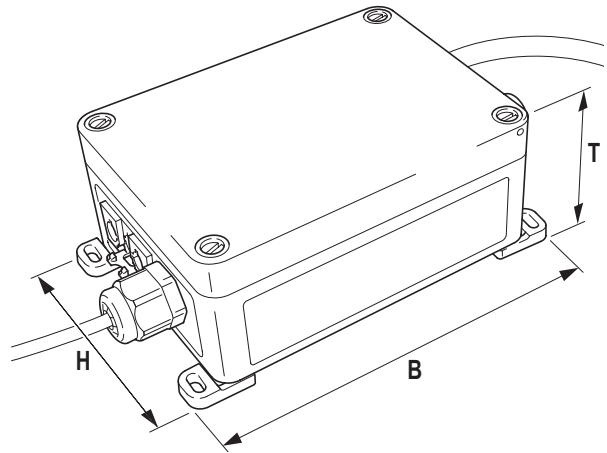
The indicator lamps (1) and (2) indicate whether the lamps of the ODOURTUBE are working. If indicator lamp (1) (green) is illuminated, both lamps are operating. If indicator lamp (2) (red) is illuminated, one or both lamps are faulty. The lamps of the ODOURTUBE must be always changed in pairs.

The operating hours counter (3) can be reset via the reset button (4).



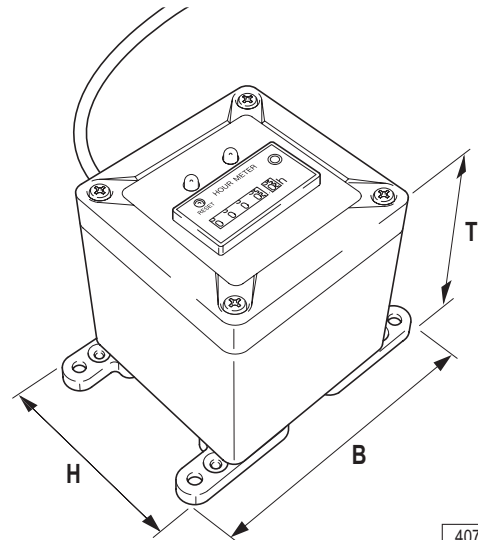
Technical data

Dimensions - electronic module	
Height H:	95 mm
Width B:	150 mm
Depth T:	60 mm



40733 / 0

Dimensions - display module	
Height H:	80 mm
Width B:	120 mm
Depth T:	90 mm



40734 / 0

Appendix

Table of contents

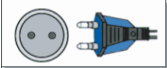

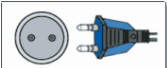
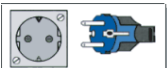
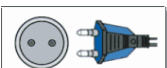
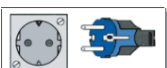
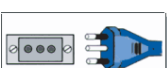
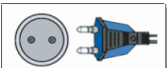
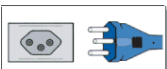
Electrical connections	2
Mains voltage and electrical plug standards in European countries.	2
Mains voltage and plug standards in selected countries around the world.	3
Acoustical terms	4
Ventilation terms	4
Environmental regulations	5
Lamp disposal	5
Packaging	5
Disposal of old devices	5
Registration numbers	5

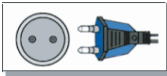
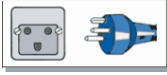

Appendix

Electrical connections


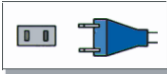
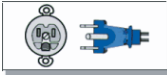
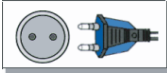

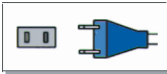
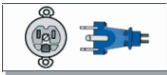
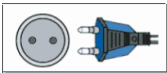
Please note that electrical connection may only be carried out by a specialist electrical company. Here the protective measures according to VDE 0100 § 49 (old) or 0100 Part 701-703 are to be observed.

Mains voltage and electrical plug standards in European countries

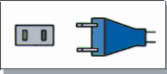


Type of plug: Illustration and description	Country	Recommendation
C  Plug with 2 round contacts, no ground contact (Euro plug).	Belgium, France, Poland, Slovakia, Czech Republic	An adapter is required for devices with a Schuko plug (type F).
E  Round plug with 2 round contacts and a socket for grounding. It also often features 2 contact plates on the sides so that it can also be used in a socket for Schuko plugs. The grounding contact is a round contact which protrudes from the socket. Therefore a normal Schuko plug cannot be inserted.		
C  Plug with 2 round contacts, no grounding contact (Euro plug).	Bulgaria, Germany, Estonia, Finland, Greece, Iceland, Croatia, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Austria, Portugal, Romania, Sweden, Slovenia, Spain, Hungary	No adapter required
F  Round plug with 2 round contacts and 2 contact plates on the side for grounding (Schuko plug). Sometimes also equipped with a socket which matches a grounding contact on the socket.		
C  Plug with 2 round contacts, no grounding contact (Euro plug).	Italy	An adapter is required for type L sockets; the Italian L socket is being increasingly replaced by the Schuko socket type F in new installations.
F  Round plug with 2 round contacts and 2 contact plates on the side for grounding (Schuko plug). Sometimes also equipped with a socket which matches a grounding contact on the socket.		
L  Plug with 3 round contacts (ground is in the centre). The sockets can also accept two-pole Euro plugs.		
C  Plug with 2 round contacts, no grounding contact (Euro plug).	Liechtenstein, Switzerland	An adapter is required for type J
J  Hexagonal plug with 3 round contacts arranged in a triangular pattern. The sockets can also accept two-pole Euro plugs.		

Type of plug: Illustration and description	Country	Recommendation
C  Plug with 2 round contacts, no grounding contact (Euro plug).	Denmark	An adapter is required for devices with a Schuko plug (type F).
K  Plug with 2 round contacts and a parabolic grounding contact, arranged in a triangular pattern. The sockets can also accept two-pole Euro plugs.		
G  Plug with 2 flat parallel contacts and one rectangular contact, arranged in a triangular pattern.	Great Britain, Ireland, Malta, Cyprus	An adapter is required for type G sockets

Mains voltage and plug standards in selected countries around the world

Type of plug: Illustration and description	Country	Nominal voltage and nominal frequency	Recommendation
I  Plug with 2 flat contacts which protrude from the plug housing in a V shape.	Australia	230 - 240 V 50 Hz	Adapter required
A  Plug with 2 flat parallel contacts, no grounding contact.	Japan, North America (Canada / USA)	Japan: 100 V, 60 Hz / 50 Hz North America: 120 V, 60 Hz	Adapter required
B  Plug with 2 flat parallel contacts plus a round grounding contact.			
C  Plug with 2 round contacts, no grounding contact (Euro plug).	Russia, Turkey	220 V / 230 V 50 Hz	No adapter required
F  Round plug with 2 round contacts and 2 contact plates on the side for grounding (Schuko plug). Sometimes also equipped with a socket which matches a grounding contact on the socket.			
A  Plug with 2 flat parallel contacts, no grounding contact.	Brazil	Voltage varies depending on the location 110 V, 60 Hz (Rio / Sao Paolo) 127 V, 60 Hz (Salvador / Bahia) 220 V, 60 Hz (Brazilia)	An adapter is required for type A; Type C Euro plug fits without problems
B:  Plug with 2 flat parallel contacts plus a round grounding contact.			
C  Plug with 2 round contacts, no grounding contact (Euro plug).			

Appendix

Type of plug: Illustration and description	Country	Nominal voltage and nominal frequency	Recommendation
A  Plug with 2 flat parallel contacts, no grounding contact.	China	220 V 50 Hz	Adapter required
G  Plug with 2 flat parallel contacts and one rectangular contact, arranged in a triangular pattern.			
I  Plug with 2 flat contacts which protrude from the plug housing in a V shape.			

Acoustical terms

Terms	Explanations
Sound	Sound is produced by mechanical vibrations. It propagates through a medium (gas, liquid or solid).
Frequency	Number of vibrations per second. Unit: 1 Hertz = 1 Hz = 1/s. The tone pitch increases with the frequency. Frequency range of the human ear: 16 Hz ... 20,000 Hz.
Sound level (sound pressure level)	A measure for the intensity of sound (acoustic energy).
Sound power level	A measure for the acoustic energy emitted from a sound source per unit of time.
Decibel (db)	Standard unit for the sound level represented on a logarithmic scale.
dB (A)	Since the human ear hears high tones (frequencies) of the same sound level with different degrees of intensity, the noise must be dampened accordingly with filters at certain frequencies. The frequency evaluation curve with filter A takes this into account and indicates the subjective auditory impression. The difference of 10 db (A) corresponds approximately to a doubling (or halving) of the perceived volume.

Ventilation terms

Terms	Explanations
Room ventilation system	Ventilator-supported, mechanically controlled devices for covering the ventilation requirements in all rooms of a building.
Volume flow	A measure for the volume flowing per unit of time, mostly stated in [m ³ /h]
Circulating air	Exhaust air that is re-used in the same system as supply air.
Orifice plate	Plate for constricting the air flow. By measuring the pressure difference (in pascals) between a point upstream of the orifice plate and one in the orifice plate, the volume flow can be determined.
Pascal (Pa)	Physical unit (SI unit) for pressure. Indicates the amount of force (Newton [N]) acting on a square metre [m ²].

Environmental regulations

Lamp disposal

According to the national waste disposal laws¹⁾ and in accordance with the communal waste statutes, proof must be provided of the proper disposal of UV lamps.

Since servicing is carried out through replacement of the parts by our customer service team, the old lamps and batteries will be disposed of by the customer service team during servicing.

Packaging

All packaging consists of 100 % recyclable materials. Packaging brought into circulation by the JK Corporate Group and no longer required can be returned to the JK Corporate Group. Your customer service centre or dealer will be happy to advise you.

Disposal of old devices

The device has been manufactured using recyclable materials. When subsequently scrapped, the device must be disposed of properly. The JK Corporate Group will provide you with information on the content or potential hazards of the materials used.

On request, this device can be disposed of properly by the JK Corporate Group. This service is available free of charge²⁾. Your customer service centre or dealer will be happy to advise you.

Registration numbers

Companies within the JK Corporate Group are registered as manufacturers in Germany and assume all obligations in respect of the German Electrical and Electronic Equipment Act.

Registry number JK-Licht GmbH (lamps):
WEEE-DE 61515020

Registry number JK-Products GmbH (devices):
WEEE-DE 62655951

The components and devices are labelled with the following symbol:



1) Germany: 1) Recycling Economy and Waste Disposal Act (KrWAbfG)
2) Outside Germany, the respective national legislation applies. Please contact your local dealer.

Appendix