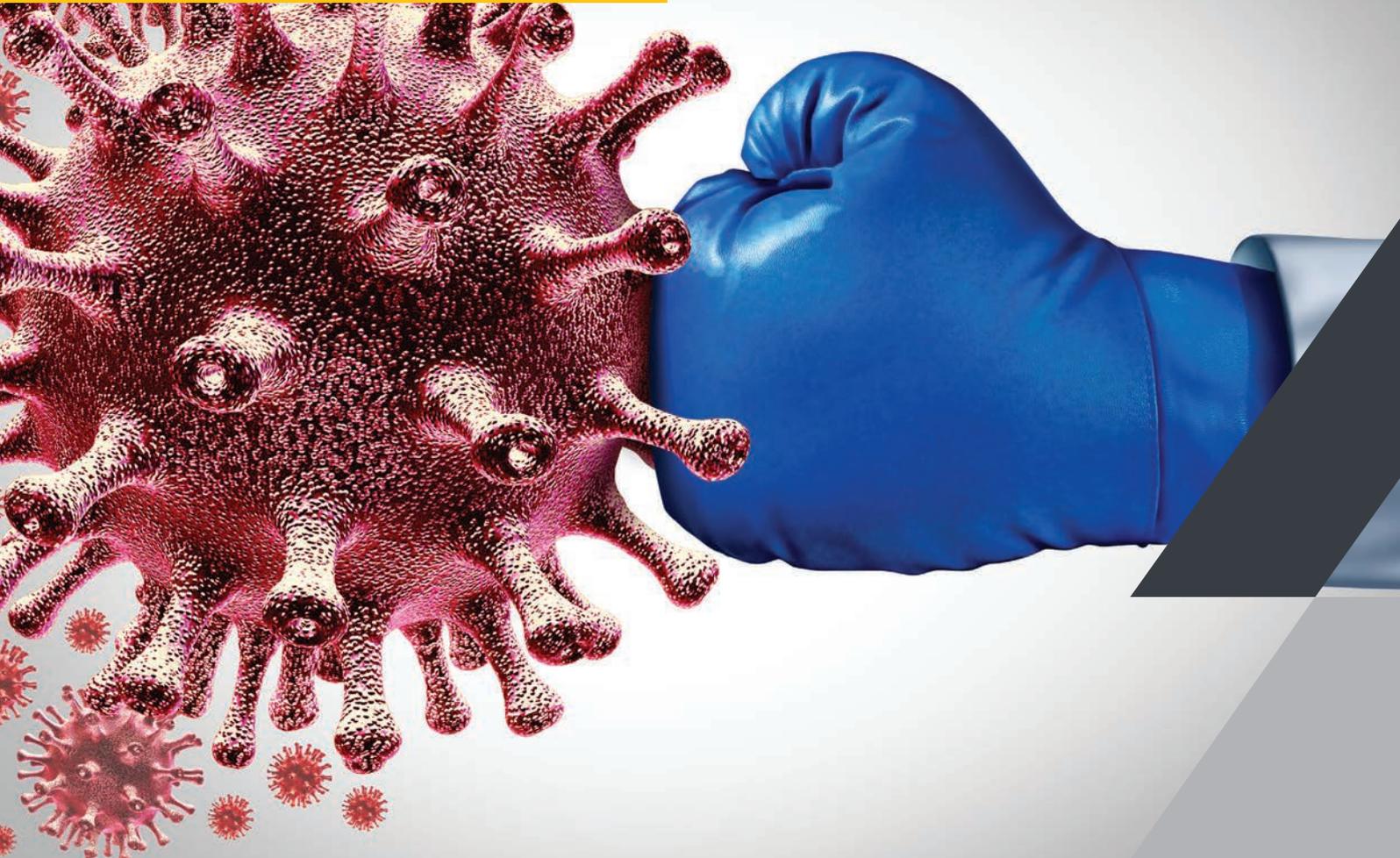


MCS **MASTER**[®]
CLIMATE SOLUTIONS



INTRODUCTORY GUIDE

PREVENTION AND DISINFECTION SOLUTIONS

AGAINST VIRUSES AND BACTERIA

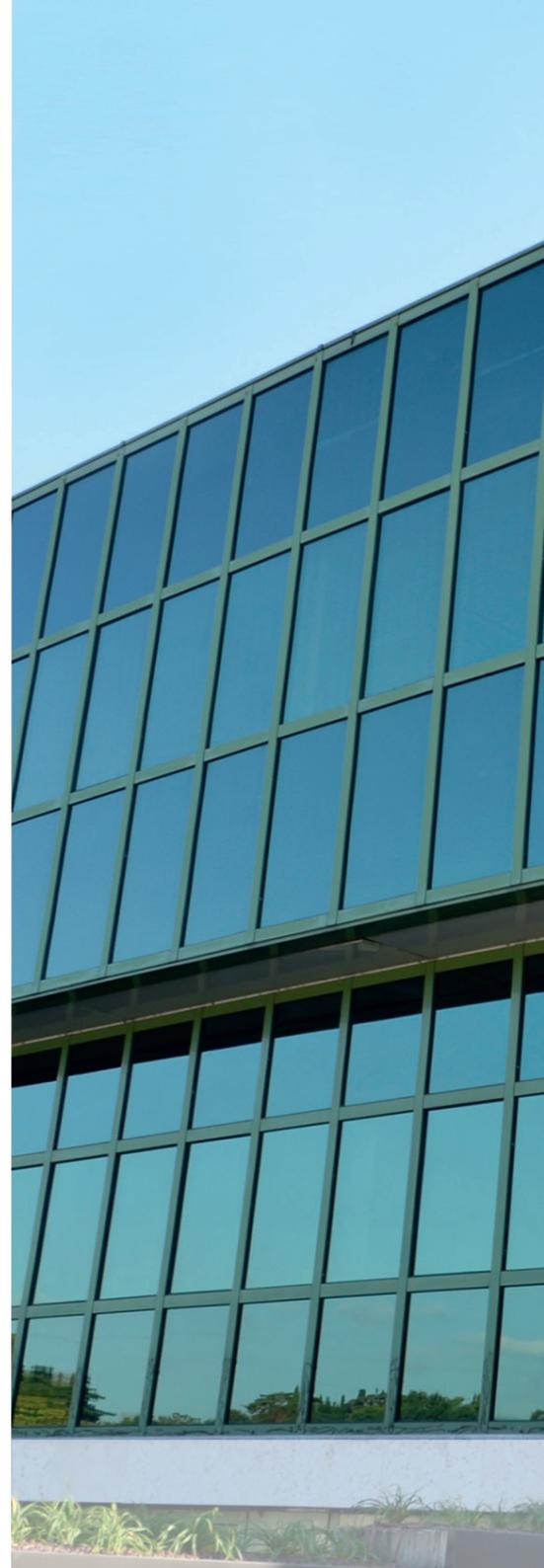
DANTHERMGROUP

About the Dantherm Group

Originally founded in 1954, the Dantherm Group is a European leader in portable and installed climate control solutions for a wide range of industries and uses. Based on the work of more than 500 passionate climate control experts and more than three million installations, our competence centres around Europe design and build exceptional heating, cooling, dehumidification and ventilation units that form the backbone of these climate solutions. In everything they do, they remain focused on creating healthy and comfortable climate surroundings in a sustainable, energy-efficient and cost-effective way.



Five competence centres in Denmark, Germany, Italy, Spain and UK.





Competence centre
for portable heating solutions: Pastrengo, Italy.

Master Climate Solutions

Part of the Dantherm Group since 2017, Master is a world-leading designer and manufacturer of portable and efficient climate control units for heating, air purification, cooling, dehumidification and ventilation. Since the inception in the 1950s in the USA, Master has delivered more than six million units for commercial and private use. Today, Master operates out of Pastrengo near Verona in Italy and it is the Dantherm Group competence centre for heating solutions.





PREVENTION AND DISINFECTION GUIDE INDEX

Introduction

Portable Prevention and Disinfection Solutions for Professionals 6

Protect. Prevent. Disinfect.

Air Purifiers 7

Spray – Water With Sanitizers 7

Mist and Fog – Water With Ozone 7

Clean the Air 8

Heat 9

Our Products

Purify the Air: Air Purifier AMH 100 10

Spray Sanitizers: Spray Fogger SF 3 11

Mist and Fog of Water With Ozone and Sanitizers: Disinfection ARK 3 12

Clean the Air: Bio Cooler BC 341 14

Clean the Air: Fixed Bio Coolers BCM 15

Disinfection With Heat: EKO 9 Electric Heater 16

Disinfection With Heat: EKO 9 Electric Heater 17

Disinfection With Heat: EKO 150 Diesel Heater 18

Intelligent Monitoring Control System 19

INTRODUCTION

PORTABLE PREVENTION AND DISINFECTION SOLUTIONS FOR PROFESSIONALS

The outbursts of pandemic viruses such as SARS, MERS and COVID 19 over the past couple of decades have illustrated the need for mankind to build and maintain an emergency equipment capacity that allows us to instantly apply disinfection solutions everywhere in society, right from private homes to your workplace. This also helps us ensure we can continuously work to prevent or minimise the spread of viruses altogether.

Efficient and flawless virus disinfection and prevention can be obtained using different methods, each of which offer their own distinct advantages. At Master, we have developed a range of professional devices that enable professionals to rapidly carry out procedures that work for different types of environments.

Being all portable, our solutions can be applied anywhere. They help you avoid, reduce and combat virus and bacteria infections.



PROTECT. PREVENT. DISINFECT.

AIR PURIFIERS

Air purifiers are a great way to ensure clean indoor air. In addition to removing unpleasant odours, dust, allergens and more, they have proven to also help fight off and keep away airborne bacteria and viruses, effectively reducing the risk of virus and bacterial infections. To that end, Master air purifiers use highly efficient HEPA 14 filters that remove up to 99.995% of airborne particles measuring 0.3 microns or more.

Air purification is an ideal solution for purifying closed rooms.

SPRAY – WATER WITH SANITIZERS

Some chemicals and sanitizers quickly kill bacteria and deactivate virus on surfaces. One of the most efficient ways of distributing these chemicals or sanitizers over large areas is to mix them with water and then disperse the mixture using either a handheld spray gun or a sanitation tunnel to create a very fine fog. This enables you to quickly spray and disinfect a large number of people, pallets, vehicles or large surfaces.

Spray guns are ideal for large spaces or for outdoor areas.

MIST AND FOG – WATER WITH OZONE

The antipathogenic effects of ozone have been known for decades. The capability of ozone to kill bacteria, viruses, fungi and more, is the reason for its increased use for disinfection of municipal water supply around the world. Viruses are small, independent particles that, unlike bacteria, multiply only within the host cell. Ozone destroys them by diffusing through the protein coat into the nucleic acid core, thereby damaging the genetic material.

Pure ozone, dispersed in the air is powerful but also harmful for humans when inhaled. In addition, ozone is highly corrosive. For this reason, we prefer to generate a safe mix of ozone and water.

Ozone is also a very powerful disinfectant that can be created locally by means of a water ozone generator. Similar to chemicals, the ozone mix created by our solutions can then be sprayed on people, pallets, vehicles or large surfaces for preventive reasons or to remove known infections.

Created 100% naturally by means of an electronic plate, ozone is dispersed into the air where it quickly disinfects it along with the surfaces in the treated room. The main advantage is that the ozone can be created locally – no supply, transportation or storage is required.

Ozone is the ideal solution for purifying people and machines, for instance amusement parks, ships, public spaces, shopping malls, hospitals and much more.

CLEAN THE AIR

Evaporative bio coolers equipped with UV lamps can clean the air and help reduce the risk of infections. Fitted with filters they can also remove dust and dirt residues.

The UV light from UV lamps is known to purify water by entirely deactivating and killing any virus or bacteria it may contain. When combined with the bio coolers, air humidity will be kept at a level that further reduces the risk of transmission.

The bio coolers are specifically designed to ventilate well-ventilated rooms and buildings by 'flushing' them with fresh air. In relation to infection risks, this is better than closed-loop AC systems that recirculate.

Moreover, the units have been designed with easy cleaning and maintenance in mind – doing so at regular intervals will minimise risks associated with viruses and extend the lifetime of the units.

HEAT

All of the beforementioned preventative and disinfection treatments work mainly on the air and surfaces in direct contact with the cleaning agent applied. For severe infections that require documented disinfection effect, we recommend applying heat, if possible, in your specific application. Most bacteria will die from being exposed to temperatures of 55°C or more.

Heat has been known to kill pathogens for centuries. In the course of history, scientists have been able to demonstrate how temperature exposure kills or disactivates a wide variety of bacteria and viruses. This is substantiated by the below table:

Species	Temperature	Duration	Author/Scientist
Bacillus coli (E. coli)	60°C	10 minutes	Loeffler (1886)
Bacillus typhosus	56°C	10 minutes	Sternburg (1887)
Dysentery bacilli	60°C	10 minutes	Runge & O'Brien (1924)
Vibrio cholerae	55°C	15 minutes	Kitasato (1889)
Mycobacterium tuberculosis	63°C	3 minutes	North & Park (1925)
Bacillus pestis (Yersinia)	60°C	2 minutes	Gladin (1898)
Staphylococci	62°C	10 minutes	Sternburg (1887)
Streptococci	60°C	30 minutes	Ayers & Johnson (1918)

Source: Hampil, B. (1932): "The Influence of Temperature on the Life Processes and Death of Bacteria", *The Quarterly Review of Biology*, 7(2):172-196

CORONAVIRUS CAN BE DEACTIVATED WITH HEAT

THIS TABLE SHOWS THAT CORONAVIRUS IS VERY STABLE AT LOW TEMPERATURES, BUT CAN BE QUICKLY DEACTIVATED AT TEMPERATURES ABOVE 56°C.

	4°C		20°C		37°C		56°C		67°C		75°C	
15 min	+++	+++	+++	+++	+++	+++	+++	+++	++	++	+	+
30 min	+++	+++	+++	+++	+++	+++	+++	+++	+	+	-	-
60 min	+++	+++	+++	+++	+++	+++	++	++	-	-	-	-
90 min	+++	+++	+++	+++	+++	+++	-	-	-	-	-	-
120 min	+++	+++	+++	+++	+++	+++	-	-	-	-	-	-
Cell control	-	-	-	-	-	-	-	-	-	-	-	-
Virus control	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++

Note: CPE of infected cells was determined 48 h postinfection.

+: less than 25% cells with CPE, ++: 26%-50% cells with CPE, +++: 75% cells with CPE, ±: only few cells with CPE, -: without detectable CPE.

Source: "Stability of SARS Coronavirus in Human Specimens and Environment and Its Sensitivity to Heating and UV Irradiation", *Biomedical and environmental sciences* 16, 246-255 (October 2003)

PURIFY THE AIR: AIR PURIFIER AMH 100



FEATURES

- Air cleaning by circulation of air with different filters
- Case made of steel sheet, powder coated
- Service-friendly housing construction
- Quick fasteners for tool-free filter change
- Rubber feet for installation on the floor or other flat surfaces
- Easy to carry by handle
- Powerful and energy saving radial fan
- Hose connector for hose ø 200mm at air inlet and air outlet
- On/Off-switch
- MID counter (optional), operating hour counter (standard)
- Applications: water damage restoration, with pollutants and/or mould contaminated areas, disinfection

AMH 100 dissected



HEPA-filter H14 effectively filters viruses and bacteria.

Different filters available:

- Pre-filter G4
- Fine dust filter F9
- HEPA-filter H13
- HEPA-filter H14
- Active carbon filter

Optional accessories

G4 filter - Art.-Nr.: 5107-0060

H13 filter - Art.-Nr.: 5107-0059

Active carbon filter - Art.-Nr.: 6005-0006

H14 filter - Art.-Nr.: 5107-0053

Specifications	Units	AMH 100
Air flow	m ³ /h	1600
Operating temperature range	°C	1-34
Power consumption	W	280
Power supply	V/Hz	230/1ph/50
Fan type		1x Radial
Noise level	dB(A)	63
Protection class		IP24
Product size (h x d x w)	mm	420 x 390 x 580
Weight	kg	19



SPRAY SANITIZERS: SPRAY FOGGER SF 3



FEATURES

- Spray disinfection and sterilization of surfaces
- Easy to use, portable
- Large spray range and exact orientation
- High efficiency
- Rapid diffusion
- Easy to adjust: spray volume and particle size
- Droplets of disinfectant are suspended in the air for longer, ensuring an even distribution and effective clean
- Suitable for public spaces, offices, hospitals, vehicles, hotels, restaurants, schools

Product images



Specifications	Units	SF 3
Tank capacity	l	4.5
Spray volume – adjustable	ml/min	150-260
Particle size – adjustable	micron	10-150
Rated power	W	1400
Spraying range	m	8-10
Power cord length	m	5
Product size (l x w x h)	mm	495 x 260 x 425
Box size (l x w x h)	mm	540 x 215 x 380
Net/gross weight	kg	3.5/4
Pallet	pcs.	40

MIST AND FOG OF WATER WITH OZONE AND SANITIZERS: DISINFECTION ARK 3



ARK 3 OZO – spray of water with ozone generation

ARK 3 SAN – spray of water for sanitizer product*

*automatic dosage optional
**sanitizer product not included

Disinfection with mist and fog



FEATURES

- ARK 3 system pulverizes and projects small micro drops of water in the environment
- Automatic disinfection for people and machines
- Allows to deactivate virus and kills bacteria
- Water UV treatment included
- Automatic activation by presence detector and manual push-button
- GATE in strong stainless steel INOX 304
- High quality components
- Protective box for housing pumping, filtering and disinfection systems
- Optional temperature sensor
- Easy and quick installation
- Easy to adapt to different applications – modular system
- Suitable for amusement parks, ships, campings, swimming pools, beaches, public spaces, industry, warehouses, shopping malls and restaurants, sport and leisure centres, entrance zones to hospitals and other public and private buildings, disinfection of people and vehicles



Specifications	Units	ARK 3
Power supply	V/Hz	220/50
Power consumption	kW	1.5
Flow rate	l/m	2 lpm - 25 nozzles
Working pressure	Bar	80
Max. temperature	°C	60
Water ozone generator		Included on ARK 3 OZO model
Automatic dosage		Optional on ARK 3 SAN model
Low pressure inlet		½" quick connector
High pressure outlet		Connector included
Electrical connection		Type C connector included

Specifications	Units	ARK 3
GATE		
Box size (l x w x h)	mm	2600 x 350 x 150
Weight	kg	20
TANK		
Box size (l x w x h)	mm	1050 x 290 x 390
Weight (empty)	kg	8
INOX BOX		
Box size (l x w x h)	mm	960 x 600 x 400
Weight	kg	70

MIST AND FOG OF WATER WITH OZONE AND SANITIZERS: DISINFECTION ARK 3

KIT INCLUDES

① GATE

- INOX 304 arch – 2.6 x 1.6m
- Micro-drop high pressure nebulization nozzles
- Safety anchor to the ground
- Automatic presence detector

② TANK

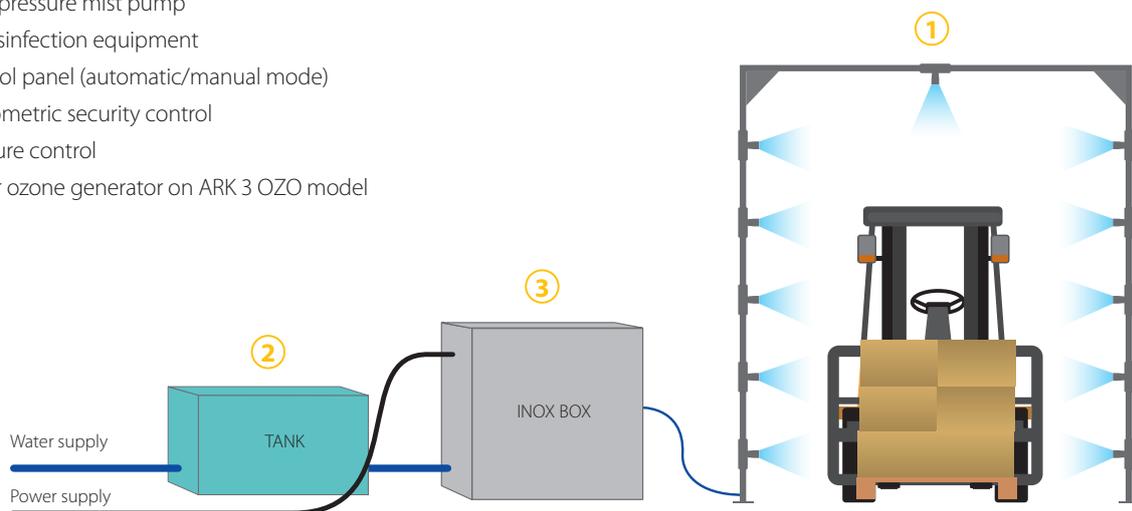
- Capacity of 107 l
- Water pump 12 V with safety pressure switch
- Low pressure connection
- Anti-overflow security system

③ INOX BOX

- Storage drawer with lifting legs
- High pressure mist pump
- UV disinfection equipment
- Control panel (automatic/manual mode)
- Manometric security control
- Pressure control
- Water ozone generator on ARK 3 OZO model



Installation example



High pressure pump



High pressure tubing



Nozzles



Nozzle connectors



Slip-lok connectors

CLEAN THE AIR: BC 341 WITH UV LAMP



To counter the spread of virus and bacteria, a range of evaporative coolers from Master are now fitted with UV lamps.

FEATURES

- Powerful air volume 30,000 m³/h to cool large working areas
- No installation, no duct work required
- Low running costs
- Easy to maintain
- Evaporative filter pads, blocking dirt
- UV lamp, disinfecting the water
- Low energy consumption – 1.3 kW
- Applications: Workshops and warehouses, plastic, glass, assembly and painting plants, agriculture and greenhouses



Specifications	Units	BC 341
Cooling pad	dm ³	340
Air flow	m ³ /h	30,000
Maximum area	m ²	400
Power consumption	W	1300
Power supply	V/Hz	220-240/1ph/50
Rated current	A	4.5
Water consumption	l/h	15-20
Tank capacity	l	200
Direct water connection	inch	½
Tank level control		Yes
Product size (l x w x h)	mm	1690 x 920 x 1910
Weight	kg	120



Note:

The UV lamp kit is available as an accessory for the Master BC 60, BC 80, BC 180 and BC 340 models.

CLEAN THE AIR: BCM FIXED COOLERS



FEATURES

- Powerful cooling method available in 19,000m³/h, 31,000m³/h, 50,000m³/h
- Control temperature and humidity through App
- Low running costs
- Easy to maintain
- Evaporative filter pads, blocking dirt
- Dust filter, blocking dust
- UV lamp option, disinfecting the water
- Low energy consumption, 10% compared to traditional AC
- Fresh, cool and healthy air to guarantee cool and clean environment
- Full technical and commercial support available for dimensioning and project support
- Applications: Workshops and warehouses, plastic, glass, assembly and painting plants, agriculture and greenhouses

Installation example



Specifications	Units	BCM 19	BCM 31	BCM 50
Cooling pad	dm ³	255	306	420
Cooling pad	cm	75 x 85 x 10	87 x 88 x 10	100 x 105 x 10
Air flow	m ³ /h	19,000	31,000	50,000
Fan type		Axial	Axial	Axial
Fan speed		12	12	12
Power consumption	kW	1.1	3.0	4.0
Power supply	V/Hz	230/1ph/50	230/1ph/50	230/1ph/50
Air exit	mm	Down or top lateral	Down or top	Down or top
Tank capacity	l	30	50	60
Water consumption	l/h	20-40	30-50	40-70
Remote control integration	SM 4.0	Yes	Yes	Yes
Product size (l x w x h)	mm	1100 x 1100 x 960	1280 x 1280 x 1170	1500 x 1500 x 1450
Weight	kg	55	86	112

DISINFECTION WITH HEAT: EKO 3 ELECTRIC HEATER

30 minutes at temperature above 56°C or 5 minutes at temperature above 70°C is enough to deactivate Coronavirus SARS-CoV-2 causing COVID-19.

An effective disinfection requires high temperatures. But to avoid thermal shock to the room and the objects in it, the temperature needs to be increased smoothly.



FEATURES

- Compact and lightweight
- EKO 3 delivers 800 m³/h of hot air using only 2.8 kW at 240 V (single phase)
- Connection to the external digital remote thermostat THK, specific for this application, included in the package
- Overheat thermostat
- Motor with thermal protection and intervention
- The Master EKO is placed inside the room and recirculates the air increasing the temperature by 15°C at a time
- Compatible with Master IMCS remote monitoring and documentation device

Included in the box



Remote thermostat THK with probe 4150.137



Master IMCS



Specifications	Units	EKO 3
Heating power	kW	2.8
	Btu/h	11260
	kcal/h	2866
Air flow	m ³ /h	800
Power supply	V/Hz	230/1ph/50
Rated current	A	12.4
Remote thermostat		Digital
Product size (l x w x h)	mm	455 x 440 x 600
Weight	kg	19

Note:

EKO 3 has a power limited to 2.8 kW.
EKO 3 alone will not be able to heat a standard room.
EKO 3 is designed to be used in very small spaces or as a support to an EKO 9.

SMOOTH TEMPERATURE INCREASE

The temperature of the air flowing through is increased in amounts of 15°C each time. 20°C->35°C ->50°C- 70°C. The big air flow allows a fast increase and an even temperature distribution. This solution avoids temperature shocks, which would let insects run away.

HIGH AIR FLOW

The high air flow quickly mixes the air in the room allowing to heat everywhere.

DISINFECTION WITH HEAT: EKO 9 ELECTRIC HEATER

30 minutes at temperature above 56°C or 5 minutes at temperature above 70°C is enough to deactivate Coronavirus SARS-CoV-2 causing COVID-19.

An effective disinfection requires high temperatures. But to avoid thermal shock to the room and the objects in it, the temperature needs to be increased smoothly.



FEATURES

- EKO 9 delivers 1400 m³/h of hot air using only 9 kW at 380 V (three phase)
- Connection to an external digital remote thermostat THK, specific for this application, included in the package
- Overheat thermostat
- Motor with thermal protection and intervention
- The Master EKO is placed inside the room and recirculates the air increasing the temperature by 15°C at a time
- Compatible with Master IMCS remote monitoring and documentation device

Included in the box



Remote thermostat THK with probe 4150.137



Master IMCS



Optional accessories



Extension cord
16A, 5m
16A, 10m

SMOOTH TEMPERATURE INCREASE

The temperature of the air flowing through is increased in amounts of 15°C each time. 20°C->35°C ->50°C- 70°C. The big air flow allows a fast increase and an even temperature distribution. This solution avoids temperature shocks, which would let insects run away.

HIGH AIR FLOW

The high air flow quickly mixes the air in the room allowing to heat everywhere.

Specifications	Units	EKO 9
Heating power	kW	9
	Btu/h	30709
	kcal/h	7740
Air flow	m ³ /h	1400
Power supply	V/Hz	400/3ph/50
Rated current	A	13.8
Remote thermostat		Digital
Product size (l x w x h)	mm	550 x 606 x 921
Weight	kg	35

DISINFECTION WITH HEAT: EKO 150 DIESEL HEATER

An effective disinfection requires high temperatures. But to avoid thermal shock to the room and the objects in it, the temperature needs to be increased smoothly. Master's purpose-built EKO heaters do just that.

Most other heaters on the market are incapable of reaching these high temperatures smoothly and are therefore unfit for thermal disinfection.



BIG POWER FOR BIG ROOMS!

FEATURES

- The MASTER EKO 150 is an extremely powerful heater which is able to treat large spaces, ie. chicken farms, pig farms
- It delivers 12,800 m³/h of hot air
- It uses only 2.8kW of electric power at 220-240V
- Connection to an external digital remote thermostat THK, specific for this application, included in the package
- Connection to flexible tubes to disperse heat in critical points
- High air pressure, allowing the use of long flex tubes
- Air recirculation, allowing the heater to be placed outside the room being treated
- Compatible with Master IMCS remote monitoring and documentation device

Included in the box



Remote thermostat THK with probe 4150.137



Master IMCS

SMOOTH TEMPERATURE INCREASE

The temperature of the air flowing through is increased in amounts of 15°C each time. 20°C->35°C->55°C- 70°C. The big air flow allows a fast increase and an even temperature distribution. This solution avoids temperature shocks, which would let insects run away.

HIGH AIR FLOW

The high air flow quickly mixes the air in the room allowing to heat everywhere.



Specifications	Units	EKO 150
Heating power	kW	150
	Btu/h	512,000
	kcal/h	129,000
Total air pressure	Pa	250
Air flow	m ³ /h	12,800
Flex tube	cm	1 tube Ø 70cm,
		2 tubes Ø 51cm or
		4 tubes Ø 34cm
Power supply	V/Hz	220-240/1ph/50
Rated current	A	12.6
Remote thermostat		Digital
Summer ventilation		Yes
Fan		Axial
Flue tube	mm	200
Electronic box protection		IP 55
Product size (l x w x h)	mm	2200 x 985 x 1620
Weight	kg	380

INTELLIGENT MONITORING CONTROL SYSTEM

With IMCS for EKO heaters you can add multiple wireless temperature sensors into the room and control the temperature using GSM.

It allows:

MONITORING: Remotely control the temperature of each sensor

RECORDING: Record the temperatures in the room, giving a secure documentation about the disinfection job done.

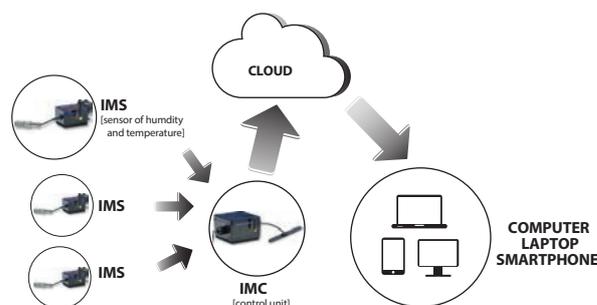


FEATURES

With the computer or a tablet you can access to the cloud and read in a **DASHBOARD** the following information:

- Temperature
- Humidity
- Running time

How IMCS works



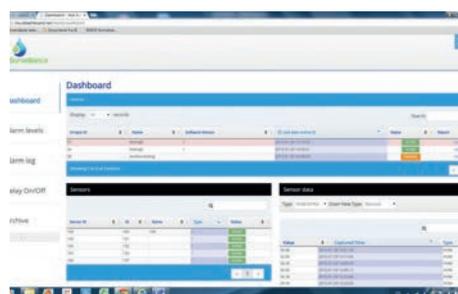
The **IMS** SENSORS measure the temperature and the humidity in the room and send the information to the **IMC**, the GSM COMMUNICATION UNIT.

The **IMC** sends the information to the Cloud.

IMCS consists of:

IMS: The wireless climate sensor IMS measures temperature and humidity in the room and communicates with the IMC unit.

IMC: This unit collects the data from several IMS units (up to 32 sensors) and sends data via GSM to the cloud.



IMCS components:

- Administration of any number of disinfection job
- QR codes to scan IMC and get information or scan more sensors
- Alarm administration and Alarm receivers
- All data in close to real time
- All cases saved in Dashboard Archive

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