

## MAS-100®

Microbial Air Monitoring Systems

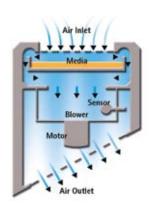
MAS-100 NT® MAS-100 NT® Ex MAS-100 Eco® MAS-100 CG® Ex DA-100® NT



# The most complete and accurate line of microbial air monitoring systems available

### How the MAS-100 Microbial Air Monitoring Systems work

The MAS-100 Microbial Air Monitoring Systems are high-performance instruments which are



based on the principle of the Andersen air sampler. Air is aspirated through a perforated lid, and impacted onto the surface of growth media in a standard 90 mm Petri dish or 60 mm contact plate. Micro organisms impact the culture media and the colonies are counted after proper incubation period. The system measures the inflow of air and regulates the aspirated volume to a constant value of 100 liters/min. All MAS-100 air samplers comply with the guidelines of the ISO 14698 part 1 and part 2.

## Sample collection accuracy

The MAS-100<sup>®</sup> Microbial Air Monitoring Systems provide the most accurate sample

collection available. The MAS-100° systems (except the MAS-100 Eco°) utilize a state-of-the-art mass flow sensor to assure a constant air flow rate of 100 liters/min. The mass flow sensor continuously regulates the air flow rate during sample collection. This allows the MAS-100° system to automatically adjust for differences in fill volume of Petri dishes, changes in air density and differences between

individual perforated lids.

## The MAS-100® product family



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MAS-100® The high-end, high precision airsampler with long-term low operating costs



### page 5

MAS-100 NT® Ex A special version of MAS-100® for use in explosion risk areas



### page 6

MAS-100 Eco® Inexpensive, reproducible, flexible and simple



### page 8

MAS-100 CG® Ex For controlling all types of compressed gases used in industry



### page 10

DA-100 NT® Digital anemometer for the calibration of MAS-100® (NT) systems, not for MAS-100 CG® Ex

## Your advantages

- Perfect in design Precise in its measurements
- Unique Built-in airflow compensation
- Independent Use of standard 90 mm Petri dishes or 60 mm Contact plates

## MAS-100 NT®

### Cat.No. 1.09191.0001

Both the MAS-100 NT® and MAS-100 NT® Ex serves to measure the microorganisms in clean rooms and sterile environments especially in pharmaceutical companies and hygienically critical areas. These compact yet sophisticated devices are the preferred choice for those demanding the highest quality in microbial air monitoring. Both systems utilize either 90 mm Petri dishes or 60 mm contact plates allowing for a low operating cost and greater flexibility. Sampling at 100 liters per minute, these systems have the highest airflow accuracy available at ±2.5%, compared to others that can be as high as  $\pm 10\%$ . The MAS-100 NT™ operates with a highperformance suction device, and the aspirated volume is continuously monitored. The system measures the inflow of air and regulates the aspirated volume to a constant value of 100 liters per minute. The MAS-100 NT™ automatically regulates this volume according to pressure and temperature and thus give all the time comparable results. For measurement in pharmaceutical industry the recommended sampling volume - according to international guidelines - should be 1000 liters.

The MAS-100 NT™ is an improved version of the MAS-100. Improved electronic communication features, validated software, easy and automatic calibration and added safety feature makes this airsampler unique. The impaction speed was also improved and the system is now delivered with a sampling head of 300 x 0.6 mm holes. All parameters are controlled and can changed from the PC software or may be programmed directly on the unit.

The new sampler is very easy to handle. Hard- and software have been developed according to GAMP4. The total system is fully validated. Improved communications RS-232, USB, are available. All functions and parameters as well as the calibration procedure can be done with the new MAS-100 NT™ calibration and communication-software. They can also be programmed directly on the unit. A Large Graphics display on the unit allows the selection of all relevant factors. An alarm- and sample-log records the last 100 events and may be exported or

printed at any time. As in other MAS-Systems the mass flow is measured and guarantees a flow of 100 liters/min. The MAS-100 NT $^{\text{TM}}$  is validated in accordance with the EN ISO 14698 standard.

Unique: The MAS-100 NT® has an integrated automatic calibration function. This guarantees accurate, reliable and independent free from human error calibration results.



It's so easy: just a short turn to open the perforated lid, and the standard petri dish can be removed for incubation.



## MAS-100 NT® Ex

Cat.No. 1.09194.0001

The MAS-100 NT® Ex measures the micro organisms in clean rooms and sterile environments especially in pharmaceutical companies and hygienically critical areas. The use of standard 90 mm Petri dish or 60 mm contact plate, the integrated mass-flow sensor and the portablity of this air sampler are unique on the market. The Ex-Version has been developed especially for the use in explosion-proof areas.





Case comes standar



Contact plate holder 1.09214.0001

## Technical specifications

x
25 cm
11 cm
2.38 kg
Anodized aluminum
10 cm
100 liters / min. + 2.5%
50, 100, 250, 500, 1000 liters
1 to 2000 liters
Li-lon, rechargeable battery, 7.4 V / 6.9 Ah
Full recharge time approx. 3.5 hours
Total running time approx. 7 hours
approx. 42000 litres
6 V
Alphanumeric liquid crystal display, 32 characters
RTC (Real Time Clock) battery; good for approx. 10 years
PWM frequency for driving motor
Type 80C552
Hot-wire anemometer, numerical control, Temperature and Presure sensors
Emission: EN 61326-1:2006, EN 55011:1998+A1:99 Immunity: EN 61326-1:2006, EN 61000-4-2:1995 + A1:98 +A2:01 EN 61000-4-3:2002, EN 61000-4-4:1995 + A1:01 +A2:01 EN 61000-4-5:1995 + A1:01, EN 61000-4-6:1996 + A1:01 EN 61000-4-8:1993 + A1:0
110-240 Volt, 50-60 KHz

Note: Specifications for the MAS-100 Ex® are the same as above

## MAS-100 Eco® Cat.No. 1.09227.0001

unit is ideal for applications in or

minute uses standard 90 mm Petri dishes,

controlled using single touch "yes" or "no"

MAS-100 Eco®	
Height (without handle)	14 cm
Diameter	11 cm
Height (with handle)	18 cm
Weight	1.4 kg
Material	Anodized aluminum
Diameter of Sampling head	10 cm
Nominal Airflow	100 liters/min +4.0%
Standard Sampling Volumes	10, 20, 50, 100, 200 & 500 liters
Freely Definable Sampling Volumes	0 -1,000 liters
Rechargeable Batteries	2 NiMH rechargeable batteries, 1.2 V
Motor	6 V
Display characters	Alphanumeric liquid crystal display, 2 x 8
Lifetime RTC Battery	RTC (Real Time Clock) battery; good for about 10 years
CE Approval	EN 50081-1:1992 + EN 50082-1:1997
	EN 50081-2:1993 + EN 50082-2:1995 + prEN 50082-2:1996
Power Unit / Battery Charger	110-240 Volt, 50-60 KHz
Output	5V DC/500mA

MAS-100

ECO

run stop

## MAS-100 CG Ex<sup>®</sup> Cat.No. 1.09327.0001

The MAS-100 CG Ex® system is for use when there is a need to test compressed gases for microbial contamination. Utilizing two sensors, one to measure mass flow and the other for pressure, the unit collects samples under the pressure of the gas supply. The MAS-100 CG Ex® system samples at two constant flow rates, 100 L/min and 50 L/min for low flow applications. The system will sample gas at a pressure range between 1.5 bar to 10 bar. Compressed gas is directed through a perforated plate onto the 90 mm Standard Petri dish.

After sampling of the required volume of gas, a gradual decompression occurs automatically, preventing any sudden pressure change, avoiding possible damage to the microorganisms and improving recovery. After decompression, the Petri dish is removed and incubated.

The MAS-100 CG Ex® system is the only compressed gas microbial air sampler approved for use in Zone 2 explosion hazard areas. The MAS-100 CG Ex® is calibrated with compressed air. Due to our unique mass flow sensor technology, only a mathematical correction factor is required to sample other gases. There is no need to calibrate for specific gases. The unit is pre-programmed for compressed air, nitrogen, carbon dioxide, argon and oxygen. No calculations are

needed for correction of density etc., and a total of 10 gas protocols can be programmed and stored in the unit. The MAS-100 CG Ex® sampler makes compressed gas sampling easy and accurate. The automated collection process saves time and eliminates the awkward manipulations required with manual methods.





As with all our other MAS-100® air samplers, this unit uses the impaction method and standard 90mm Petri dishes.

## Technical specifications

		Fx®

Height32.5 cmLength37.0 cmWidth11.0 cmWeight (without Sampling Head)10 kg

Material Box Coated aluminum

Nominal Flow Rates 100 liter/min. ±5.0% (over the pressure

50 liter/min. ±5.0% over the pressure range of 1.5 bar to 10 bar (absolute)

Standard Sampling Volumes 50, 100, 250, 500, 1000 liter
Freely definable sampling volumes 1 to 2000 liter, volumes individually

selectable between 0 and 2000 liters.

O volumes are not displayed

Pre-programmed gas types Air, nitrogen, carbon dioxide, argon

Battery Pack 20 cells NiMH, 3800mAh, voltage 24 V

Battery Charger 110–240 Volt, 50–60 Hz

Charger Input 36 V DC, 1.5 A

Display Alphanumeric liquid crystal display,

32 characters

Lifetime RTC Battery Approx. 10 years
Flow Valve Proportional, 24 Volt

Processor: Type: 80C552

0-10 har and proportional valve

2001, EN61000-6-4; 2001; EN61326-1 + A1; 1998

x-Proof SNCH 02 ATEX 3418

EN1127: 1997. EN 50021: 1999

Sampling Head

Head without Clamps, Height 16.0 cm
Diameter 10.0 cm

Material Anodized aluminum, clamps of stainless stee

Autoclavable 20 minutes at 121°C

Tuhing Length 1.5 m ID=10 mm OD=19 mm

sterilize for 20 min at 121°C

Rapid Connectors Chromium-plated brass



## DA-100® NT Calibration System Cat.No. 1.09192.0001

The DA-100® NT is a digital anemometer for the calibration of MAS-100® (NT) systems (not MAS-100 CG® EX). It measures the airflow of the MAS-100® systems with a very high degree of accuracy this is completed very quickly. The new DA-100® NT displays the volume or the mass flow. In addition, the pressure and the temperature can be displayed. With the DA-100® NT all MAS-Instruments with the addition notation "NT" may be calibrated automatically. It is delivered with a certificate from an official and accredited calibration laboratory or on demand with a factory certificate.

The DA-100® was especially designed to calibrate all MAS-100 (NT) air samplers with the exception of the compressed-gas sampler MAS-100 CG Ex®. Fully automated calibration for all NT air sampler, standard calibration procedure for all MAS air samplers (Cannot be used for MAS-100 CG Ex)

The DA-100® NT is a vane-bearing and highly precise anemometer. It measures the volume or mass flow and displays the result on the display. The mass flow is calculated on the basis of the integrated pressure and temperature sensor.

### Advantages

- High accuracy of ± 1%
- Very fast: update every three seconds
- Easy to use
- Displays temperature and velocity of the air
- · Battery operated
- Calibration certificate





Stand the DA-100 NT on the perforated lid of the MAS-100 NT and connect the cable between the two instruments.

## Technical specifications

DA-100 <sup>®</sup>			
Accuracy at 100 liters/min.	+ 1.0%		
Height	8.5 cm		
Diameter	11 cm		
Weight	0.8 kg		
Vane Bearing	Magnetic (patent pe	ending)	
Material	Anodized aluminum		
Battery Pack	9 V Battery		
Display	Alphanumeric LCD d	lisplay, 2 x 8 characte	rs
Temperature Display Resolution	increments		
Ambient Conditions	Temperature sensor:	Accuracy ± 0.3°C	Resolution ± 0.1 °C
	Pressure sensor:	Accuracy ± 1.5mbar	Resolution ± 0.1mbar
	Ambient conditions:	: Temperature 0 to 40	°C
	Humidity:	0 to 80% r.h.	
CE Tested	•	, CISPR 11, Class B 61000-4-3, IEC 6100 61000-4-8, IEC 6100	

## Ordering informations

### The instruments

Description	Cat. No.
MAS-100 NT® Air Sampler	1.09191.0001
MAS-100 Eco® Air Sampler	1.09227.0001
MAS-100 NT® Ex Air Sampler, Explosion Proof	1.09194.0001
MAS-100 CG Ex®	1.09327.0001
DA-100® NT Digital Anemometer	1.09192.0001

### Spare parts and accessories

Description	Cat. No.
MAS-100® Extra Dust Cover*	1.09084.0001
MAS-100® Mains Charger	1.09085.0001
MAS-100® NiMH Battery Pack	1.09229.0001
MAS-100® NiCd Battery Pack (For Version 2.62 or lower)	1.09087.0001
MAS-100® Extra Perforated Lid, Aluminum*	1.09088.0001
MAS-100® Extra Perforated Lid, Stainless Steel, 400 x 0.7 mm	1.09821.0001
MAS-100® Tripod	1.09326.0001
MAS-100® Tripod Adapter - Quick Connect	1.09223.0001
MAS-100® Tube Adapter	1.09224.0001
MAS-100® PC Interface Cable for Nova-LIMS®	1.09226.0001
MAS-100® Contact Plate Holder	1.09214.0001
MAS-100® Perforated Lid for Contact Plates	1.09213.0001
MAS-100 CG Ex® Extra Sampling Head, Low Flow 50 L/min and 100 L/min	1.09237.0001
MAS-100 Eco® Mains Charger	1.09128.0001
MAS-100 Eco® Tripod Adapter	1.09127.0001
MAS-100 Ex® NiCd Battery Pack	1.09087.0001
MAS-100 Ex® Extra Dust Cover*	1.09123.0001
MAS-100 Ex® Extra Perforated Lid, Aluminum*	1.09124.0001
Perforated lid for MAS-100 NT® (300 x 0.6 mm)**	1.09195.0001
Main charger for MAS-100 NT® **	1.09200.0001
Battery pack Li-Ion for MAS-100 NT®**	1.09208.0001

## References

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"New Sampler for the collection, sizing and enumeration of viable airborne particles."
Journal of Bacteriology,
Vol 76, pp. 471-484.

Meier, R., Zingre, H. (2000) "Qualification of air sampler systems: The MAS-100®" Swiss Pharma 22, No. 1-2, pp. 15-21

Feller, W. "An Introduction to Probability Theory and its applications", John Wiley and Sons Inc., New York, 1950

"Microbial Evaluation of Cleanroom Environments", U.S. Pharmocopiea 27 NF 23, General Chapters <1116>, 2004



<sup>\*</sup> Lids and Dust Covers are all interchangeable among MAS-100® MAS-100 Fco® MAS-100 Fx®

<sup>\*\*</sup> products are also suitable for MAS-100 NT® Ex.



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