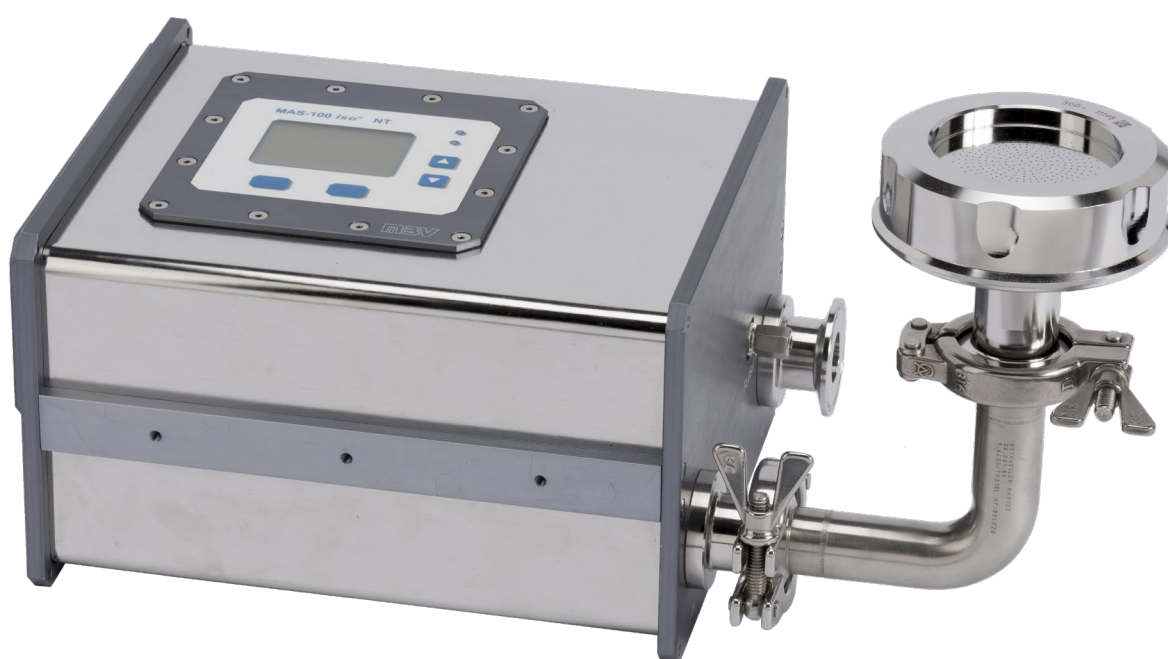


MAS-100 Iso NT® Microbiological Air Sampler

Installation Manual



The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada.

THANK YOU VERY MUCH!

Dear customer

congratulations and thank you very much for choosing a product from MBV AG. We are pleased to make a contribution to your success.



MBV AG develops and produces precision microbial air samplers for more than 20 years. Our uncompromising quest for the best possible quality has convinced globally leading companies to rely on our solutions for their most demanding applications. Our superior product quality is backed by global availability of application and service support.

For best performance of your product please read this instruction manual carefully. The manual will provide you with the necessary information for correct and safe use of your new instrument.

If you need additional technical or application information, do not hesitate to contact us at welcome@mbv.ch or find more information on www.mbv.ch.

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Note

Up-to-date product information – such as Service Information Letters (SIL) – are available in the [expert center](#) section of the MBV AG website www.mbv.ch and [MICROBIAL AIR SAMPLER MAS-100 Iso NT®](http://www.mbv.ch/isont/files) (www.mbv.ch/isont/files).

There, important product after-sales information about changes, issues, instructions and news is provided to customers.

DOCUMENT HISTORY

Revision	Date	History
24.0	2025-03-28	- Chapter Trademarks: Updated - Chapter 1.1.2: Updated - Chapter 1.2.4: Updated - Chapter 1.3.3: Updated - Chapter 1.4: Product labeling removed - Chapter 2: Updated and Installation checklist removed - Chapter 3.4.3: Information about interface flap added - Chapter 7.3: Description for digital output and schematic added - Chapter 7.4.1: Power Consumption added - Footer: Updated - Wording DA-100 & DA-100NT replaced with Anemometer - Reference to USB flash drive removed
23.0	15.08.2022	- Chapter 2.3 Decontamination cycle verification updated - Chapter 4. Piping, Recommendation: decontamination outlet tubing updated - CICD & Trademarks updated
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20.0	15.03.2018	- Page 2: Introduced new «Customer Center» on MBV AG website and removed RSS feed - Chapter 1.4: Removed mention of product CD - Chapter 3.4: Removed $\frac{3}{4}$" and formulated more generally (other dimensions possible) - Chapter 6.3.1: Better picture quality. - Chapter 6.3.2: Too much information, reduced to the strictly necessary. - Included new MBV AG logo - Minor typo and format corrections
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17.0	18.04.2016	Update due to Declaration of Conformity
16.0	11.08.2015	- Reformatted to new layout - Major rework of document structure.
15.0	06.11.2013	Added chapter «Tube length»

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Abbreviations

The microbiological air sampler [MAS-100 Iso NT](#) is designated hereafter as «Instrument».

The [Software MAS-100 Iso NT Air Sampler - C&C](#) (communication and calibration) is designated hereafter as «PC Software».

Applicability

The information in this manual is valid for the following configurations:

Component	Component designation	Revision from
Hardware	Main PCB MAS-100 Iso NT	≥V6
Firmware	Firmware MAS-100 Iso NT	≥V2.8.5
Software	Software MAS-100 Iso NT Air Sampler - C&C	≥V3.1.14

	The PC Software works for these instruments: ▪ MAS-100 Iso MH ▪ MAS-100 Iso NT (Standard and RABS)
	The instrument will communicate its type and firmware version to the PC Software. The PC Software will interact with the instrument accordingly.

Related user manuals

The following user manuals provide additional essential information:

Document designation	Document scope
User Manual MAS-100 Iso NT	Describes hardware related topics
Software Manual MAS-100 Iso NT&MH	Describes the PC Software functions
Communication Manual MAS-100 Iso NT&MH	Describes the communication protocol used to communicate with the instrument via all available interfaces, e.g. Ethernet, Profibus and RS-232
Anemometer User Manual	Describes the adjustment and calibration procedures
Pressure Test Manual MAS-100 Iso NT&MH	Describes how to operate the pressure test kit

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1 General information

This chapter provides information of general interest regarding the instrument.

1.1 Safety information

	IT IS IMPORTANT TO READ THESE INSTRUCTIONS BEFORE USING THIS INSTRUMENT. Please read the safety data sheet and the instrument-specific safety information in this manual carefully before using the instrument and/or any accessory supplied with this product.
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1.1.1 Severity levels

	Warning! Symbols in red boxes indicate hazardous situations which could result in danger to life and/or serious injury and/or irreparable damage to the instrument.
	Attention! Symbols in yellow boxes indicate critical situations which could result in light injuries and/or damage to the equipment and/or unreliable air sampling results.
	Note Symbols in green boxes indicate information which may be of major interest for the user.

1.1.2 Specific safety information for the instrument

	Hazard of dangerous voltage inside the power supply Do not open the power supply. Always keep the areas of electric parts dry (e.g. USB plugs).
	Hazard of injury and/or damage to the instrument Make sure that the equipment does not drop on the floor. Always ensure secure hold and stability.
	Hazard of explosion and/or fire The instrument is not explosion protected; never use it in explosion hazard areas.
	Hazard of serious injury and/or death The used decontamination gas may be toxic, corrosive, flammable or explosive. Ensure the safety according to the safety data sheet of the used decontamination gas.
	Hazard of damage to the instrument Read the instructions in this user manual carefully before any usage of the instrument and pay attention to all warnings.

	Keep this manual in a designated place, accessible for all users for future reference. Ensure that all personnel have read and understood the content of this manual.
	Hazard of damage to the instrument The instrument is designed for IP65. Do not spill liquids into the electric/electronic connections or through the sampling heads.
	Hazard of damage to the instrument Do not perform any intervention inside the instrument. Only trained, qualified and authorized technicians are allowed to perform repair and maintenance activities.
	Hazard of damage to the equipment The system power cord must be easily accessible at all times. Pull the plug rather than the cord to disconnect the system from any electrical outlet. Keep the power cord off the passage; make sure it is not pinched at the plug, electrical outlets, and the point from which it is connected to the system.
	Hazard of damage to the instrument The piping downstream of the decontamination outlet must be unblocked and free of obstructions. Otherwise, an excessive backpressure could build up and release decontamination fluid into the instrument.
	Hazard of damage to the instrument and/or wrong air sampling results The instrument is a precision device for industrial and laboratory use. The instrument shall only be operated by trained, qualified and authorized personnel as stated in chapter 1.2.1.
	Hazard of damage to the equipment and/or wrong air sampling results Any application other than the intended use is not covered by warranty. For additional information, please consult chapter 1.2.2 and chapter 1.3.
	Hazard of wrong air sampling results Using the instrument with the «Easy-Clean» base requires additional considerations during adjustment and calibration: Always perform calibrations and adjustments with the MAS-100 Family Calibration Disk with 85mm diameter or a Petri dish inside the sampling head.
	Hazard of wrong air sampling results An adequate handling of the Petri dish and of the instrument are essential. Always follow good cleanroom practices to make sure that the Petri dish and sampling head do not get contaminated.
	Hazard of wrong air sampling results The manufacturer declines any responsibility for misuse of the PC Software and for entering wrong results. It is the sole responsibility of the user to fill-in the correct values. This system was not developed to meet the technical requirements from 21CFR part 11 and international regulations regarding GxP regulated records.

	If data generated by this system in a GxP regulated environment is needed, ensure to maintain paper recording in accordance with GxP procedures.
	Hazard of cross contamination The FDA considers the separation of penicillin production from other drug products for human use as a GMP requirement (21CFR211.46(d)), therefore we recommend that you take any precaution for installing and handling your MAS system accordingly.

1.2 General provisions

1.2.1 Personnel qualification

The instrument is a precision device for industrial and laboratory use. Its use should be restricted to trained, qualified and authorized personnel.

1.2.2 Intended product use

The instrument is intended solely for the collection of air samples at ambient pressure onto a microbiological culture medium to monitor the microbiological air quality in contamination-controlled areas, such as cleanrooms, isolators, operating theatres, flow hoods, etc.

1.2.3 Operating conditions

The instrument must be calibrated and operated in similar environmental conditions. Please consult the operating conditions in [chapter «Technical specifications»](#) of the respective instruments' [User Manual](#).

1.2.4 «Dual-Use» statement

The MAS-100 Iso NT is an instrument designed solely for civilian purposes and is excluded in the scope of the European «Dual-Use» regulation (EU) 2021/821.

1.3 Warranty

1.3.1 General

This chapter informs about the warranty of the instrument and the procedures to follow if the instrument is not working as described in the user manuals.

For products listed in this publication purchased via Merck KGaA the applicable warranty terms may be found at: www.millipore.com/terms (within the «Terms and Conditions of Sale» applicable to your purchase transaction).

For products listed in this publication purchased directly from MBV AG the applicable warranty terms may be found at: <https://www.mbv.ch/about-us/gtc>.

1.3.2 Quality statement

The instrument has been designed and manufactured to the highest quality levels as described in our ISO 9001 processes.

MBV AG guarantees the instruments performance to specifications for a period of 24 months (starting from shipping date) and for spare and replacement parts for a period of 3 months after repair or service.

1.3.3 Contact

In case of warranty claim please contact your instrument supplier:

MBV AG (manufacturer)	Worldwide	www.mbv.ch/en/services/support/
Merck KGaA, Darmstadt, Germany and/or its affiliates	Worldwide	www.sigmaaldrich.com/support/customer-support

1.3.4 Exclusion clauses

The warranty covers exclusively material and manufacturing defects which occurred during the above described periods of time. The warranty does not cover the natural wear and tear of parts or any damage caused by improper handling, negligence, or non-observance of the user manuals or Service Information Letters. The warranty expires immediately if any of the following conditions are infringed:

- The instrument shall only be serviced or repaired by qualified, trained and authorized technicians
- The instrument shall only be serviced or repaired as described in the service manual
- The instrument shall only be serviced or repaired using original MBV AG spare parts
- The instrument shall only be operated according to the defined intended use
- The instrument shall only be operated and updated with original firmware from MBV AG
- The instrument shall not be modified physically in any way.

	Hazard of damage to the instrument There are no user-serviceable parts inside the instrument.
	Risk of warranty loss Every instrument is secured internally with an anti-tamper seal. Disassembling the instrument will break the seal and render the warranty void.

2 Installation checklist MAS-100 Iso NT/RABS

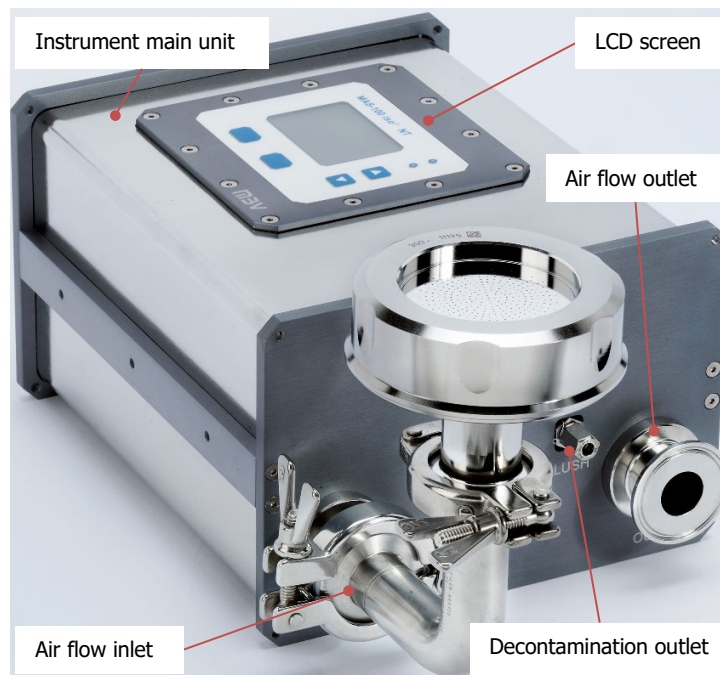
This installation checklist serves as a template to ensure the functionality of the instrument by the integrator. These tests must be carried out prior an IQ/OQ. If one of the tests fail, please contact service@mbv.ch.

For detailed instruction refer to the Installation Checklist MAS-100 Iso NT
https://www.mbv.ch/media/installation_checklist_mas-100_iso_nt_rabs_en.pdf

3 Hardware description

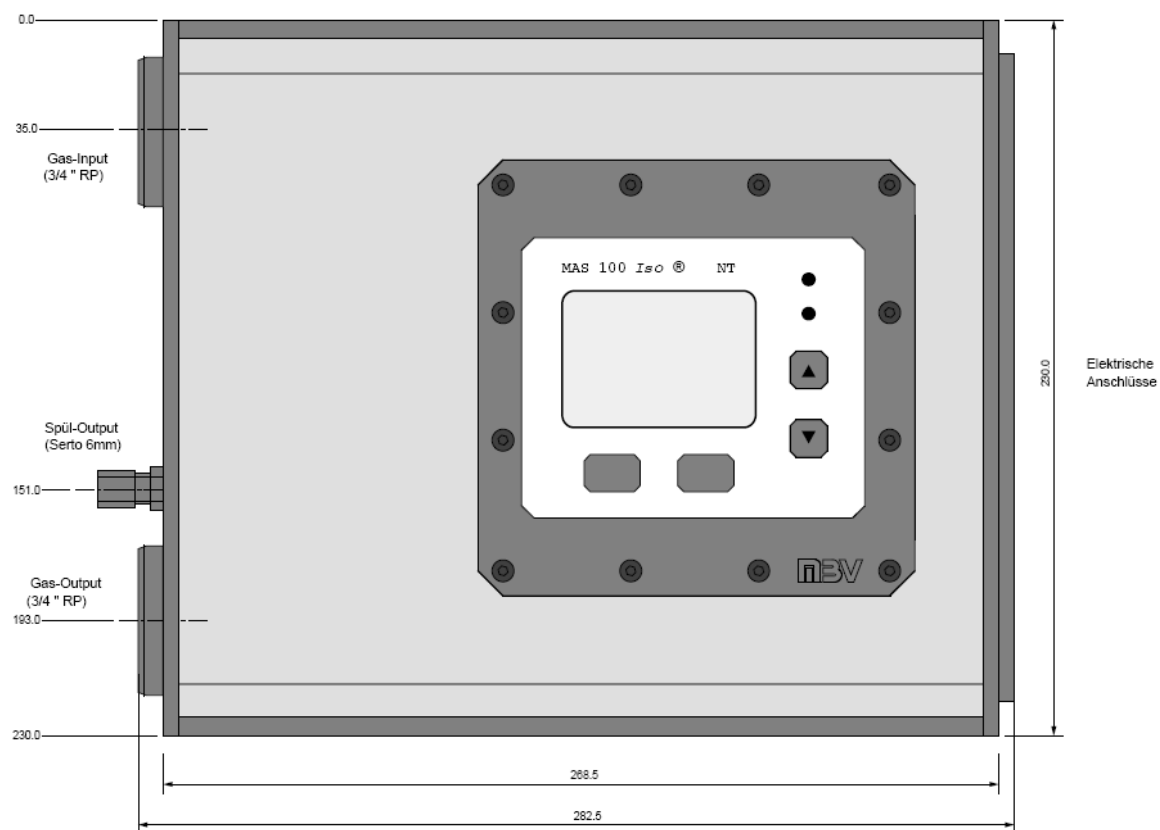
This chapter describes the mechanic layout of the instrument.
All dimensions are in mm if not indicated otherwise.

3.1 Parts designation

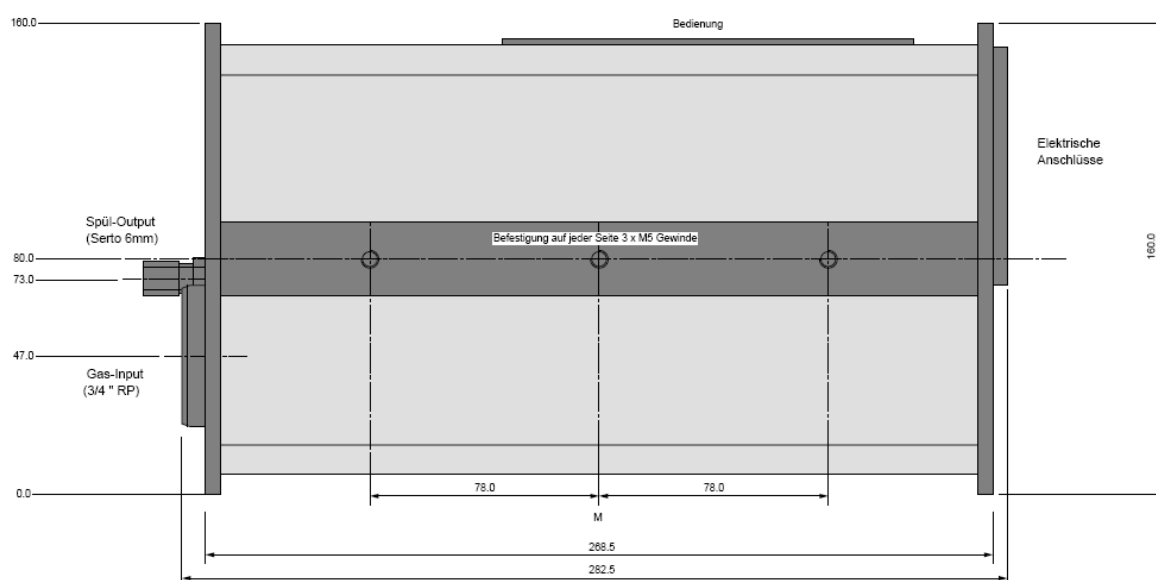


3.2 Views

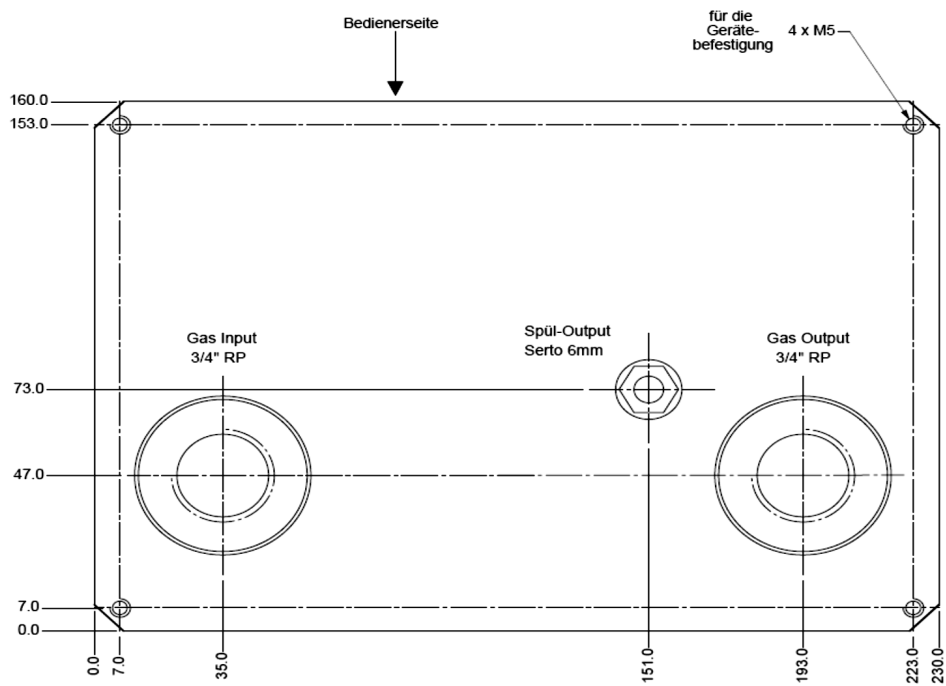
3.2.1 Top view



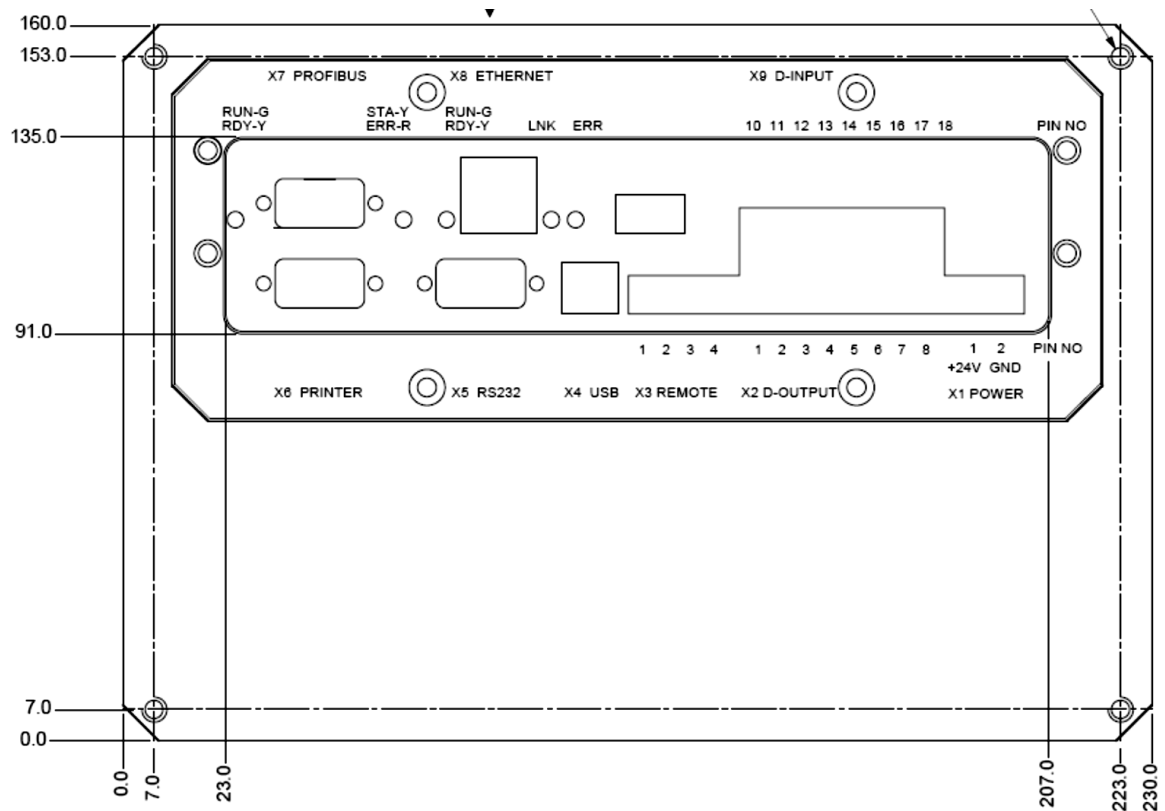
3.2.2 Side view



3.2.3 Gas input / output



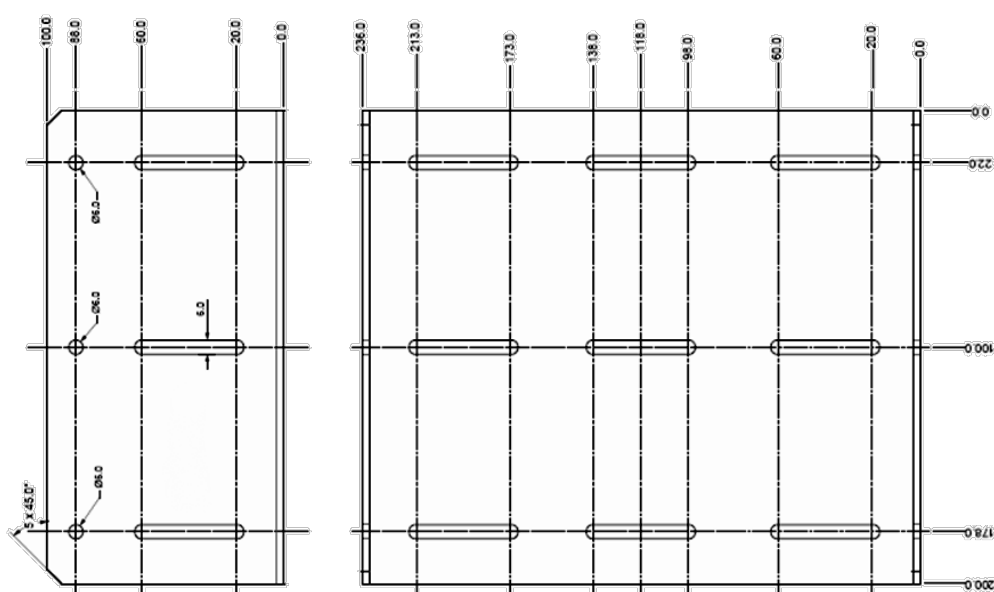
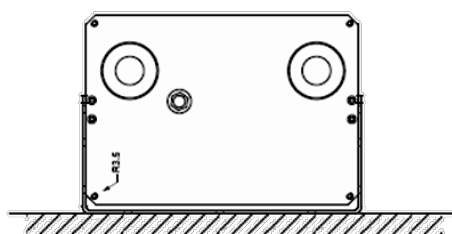
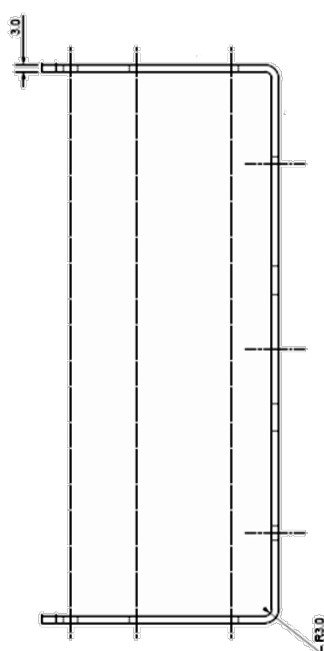
3.2.4 Electrical connection ports



3.2.5 Mounting bracket

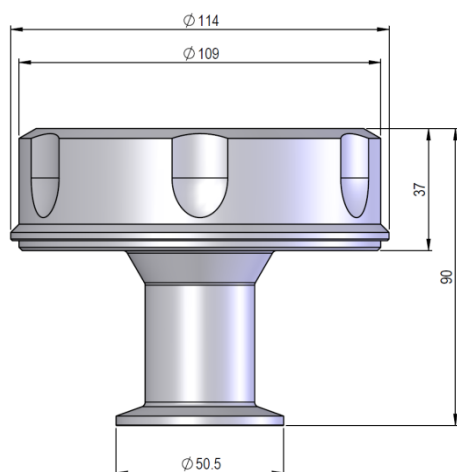
The slots are used to fasten the mounting bracket to a wall or to the ceiling.

	Hazard of falling objects The wall mounting elements must be able to hold a shearing force of up to 294 N.
	Hazard of falling objects The ceiling mounting elements must be able to hold a pulling force of up to 294 N.



3.3 Sampling heads

3.3.1 Maximum outer dimensions



The displayed dimensions are applicable for standard sampling heads with edge protection.

Tri-Clamp connection

Outer diameter: 50.5 mm

Inner diameter: 21.7 mm

3.3.2 Base

Standard base	Easy clean base
	
- For Petri dishes from $\varnothing 90$-100 mm base - Spring-loaded petri dish clamps (adjustable) - Horizontal or vertical mounting - Gas decontamination - Autoclavable	- For Petri dishes from $\varnothing 90$-100 mm base - Passive Petri dish support (no moving parts) - Horizontal mounting only - Gas decontamination or by wiping with a cloth - Autoclavable

3.3.3 Perforated lid

The instruments' standard sampling head configuration includes perforated lids with 300 holes of 0.6 mm diameter (300×0.6). The 400×0.7 lid is mainly used in older products of the MAS-100 product family and is still available as option.



The 400×0.7 perforated lid has a smaller collection efficiency compared to the 300×0.6 perforated lid.



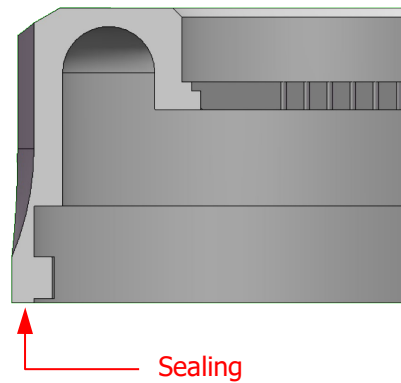
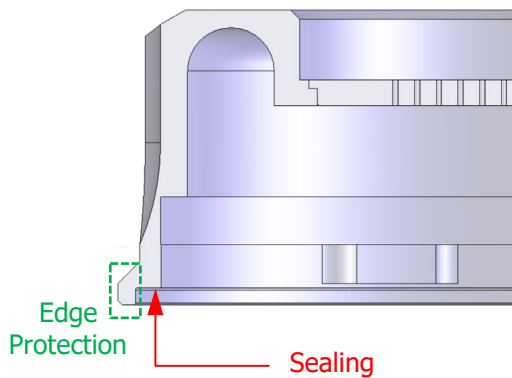
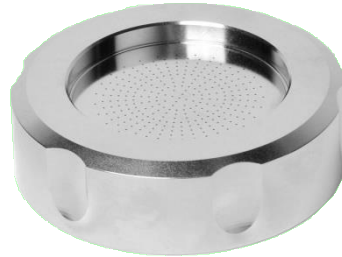
Hazard of damage to the instrument

Since the sealing surface is exposed, it is prone to get damaged if the lid is not handled with care (e.g. by incautious handling when autoclaving).

Perforated lid with edge protection
(Standard)



Perforated lid with free edge (Legacy product)



Materials

Standard: Stainless steel EN 1.4435 (X2CrNiMo18-14-3)
According to BN2 (Electro-polished pharmaceutical quality)

Optional: Anodized aluminum EN AW-6060

3.3.4 Dust cover

Whenever the instrument is not in use, it is recommended to cover the sampling head with the optional stainless-steel cover.



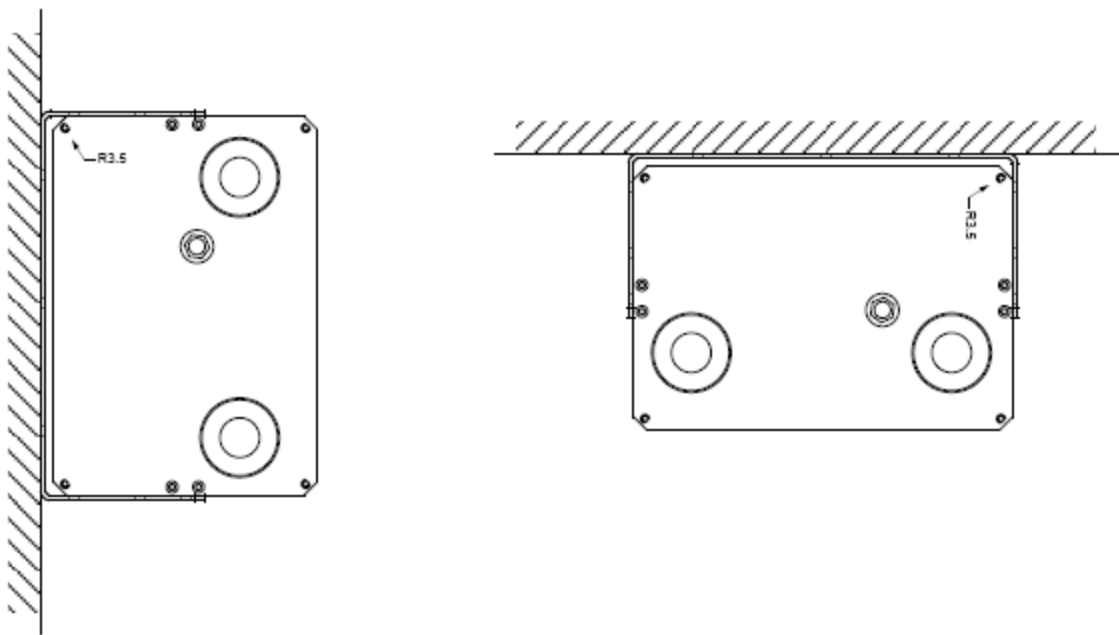
3.4 Installation options

The installation can be done with the delivered mounting bracket.

The screen of the HMI will not be accessible if the instrument is fastened underneath an isolator. In such case the instrument can only be controlled via PC Software. All commands can be initiated by the PC Software, except the address setting (see [chapter 3.4.3](#)).

3.4.1 Instrument orientation

The instrument can be installed in any orientation. Standard Tri-Clamp fittings can be used to facilitate mounting and removing the sampling head. Other fittings may be provided if required.



3.4.2 Screen orientation

The screen of the HMI may be rotated by $4 \times 90^\circ$ for better reading accessibility.



To rotate the screen, proceed as follows:

- Unscrew the twelve screws
- If necessary, disconnect the cable from the display to the PC-board and find the appropriate position
- Reconnect the cable and fasten the display with the screws
- Do not jam the ribbon cable.

3.4.3 Interface flap

To have better access to the instruments interfaces when installed, it is recommended to install a interface flap.

An example of such a flap with USB, LAN and RS232 is shown in the following picture



3.4.4 Address setting

If several instruments are operated in parallel, address numbers from A1 to C3 must be allocated to each unit. Each instrument address must be set once via the HMI in the menu «Config Device» >> «Device Info».

Device Info Name: MAS-100 Iso NT Model: Std / RABS Location: Location 1 Head ID: Head 1 Pos: A1 BackChange	The options «Location and «Head ID » can only be renamed with the PC Software. Address setting - Press «Change» and select «Pos». - Insert the position with the «+» or «-» key - The unit will then display on the LCD screen the corresponding addresses in a grid of «A» to «C» and «1» to «3» <table border="1"><tr><td>A1</td><td>A2</td><td>A3</td></tr><tr><td>B1</td><td>B2</td><td>B3</td></tr><tr><td>C1</td><td>C2</td><td>C3</td></tr></table> - Press «Change» and three times «Back» to return to the main «Menu».	A1	A2	A3	B1	B2	B3	C1	C2	C3
A1	A2	A3								
B1	B2	B3								
C1	C2	C3								

4 Piping

This chapter describes aspects to be considered regarding the piping connected to the instrument.

4.1 Specifications

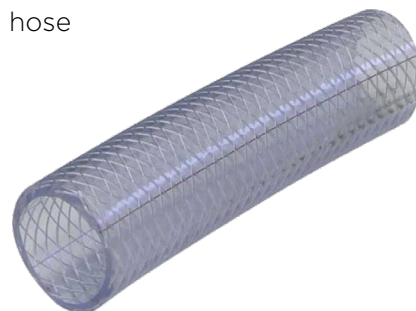
The suction pipe from the sampling head to the instrument should not exceed 10 m in length with a recommended inner diameter of about 22-27 mm.

To ensure a proper function of the suction outlet, pay attention to the following topics:

	Hazard of wrong sampling results Avoid hoses with ribbed inner surfaces, it significantly increases the pneumatic resistance compared to tubes with smooth inner surface.
	Hazard of wrong sampling results Avoid turns and tight bends as much as possible. Flow obstacles increase the pneumatic resistance compared to straight tubes.
	Hazard of wrong sampling results Extreme conditions of the ambient air pressure may affect the system negatively.
	Hazard of damage to the equipment Whatever chosen tubing material must be suitable for the used decontamination gas.

Recommendation:

- NYLFLEX PVC, light, transparent, multi-purpose industrial hose
- Inner Ø25 mm, outer Ø33 mm
- Material inner layer: PVC-P, smooth, transparent
- Material insert: 1 polyester braid
- Material outer layer: PVC-P, smooth, transparent
- Operating temperature: -5 to +60°C



The decontamination outlet tubing from the instrument to the air exit should not exceed 10 m in length with a recommended inner diameter of about 10 mm or 2 m in length when using an inner diameter of about 4 mm.

4.2 Issues with adjustment and calibration

The system must be re-adjusted and calibrated after changing the suction pipe. This can be done automatically with a MBV anemometer and the corresponding PC Software.

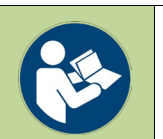


Hazard of wrong sampling results

A proper function of the instrument is only ensured if the system passes the re-adjustment and calibration.

If the automatic adjustment and calibration process is aborted with an error, a performance test is necessary. For this purpose, please follow this procedure:

1. Open the valves 1 and 2 via the PC Software in the «Service» menu
2. Set the blower PWM to the maximum
3. Measure the air flow at the sampling head with an anemometer
4. The anemometer should display at least 107.5 SLPM
5. If a flow of 107.5 SLPM cannot be reached, the air resistance of the suction pipe is too high and must be reduced.



Detailed proceedings regarding the adjustment and the calibration are described in the Anemometer [User Manual](#) and the [Software Manual](#). Further information may be found in the IQ/OQ documentation.

5 IP protection

This chapter provides information about the instruments' protection against external influences.

5.1 Classification

The instrument is optionally available to the level IP54 according to IEC 60529.

This protection level involves:

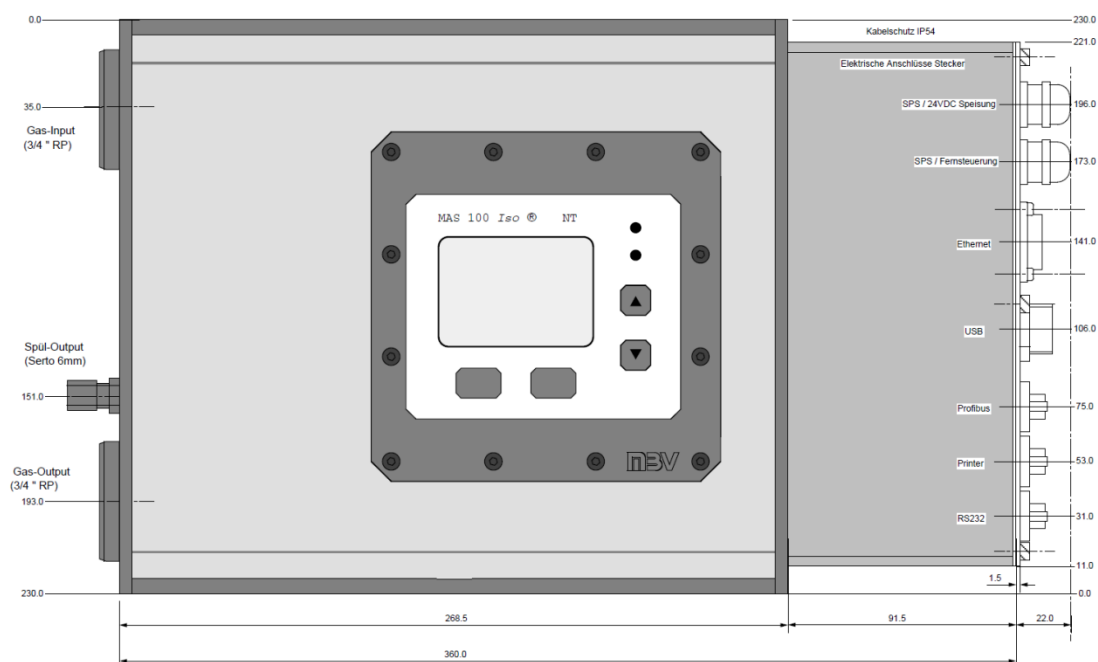
IP	5	Protection against dust
	4	Protection against water sprays



The drawings in the following chapters include the mechanical dimensions to plan the mounting of the instrument with IP54 option in complex systems.

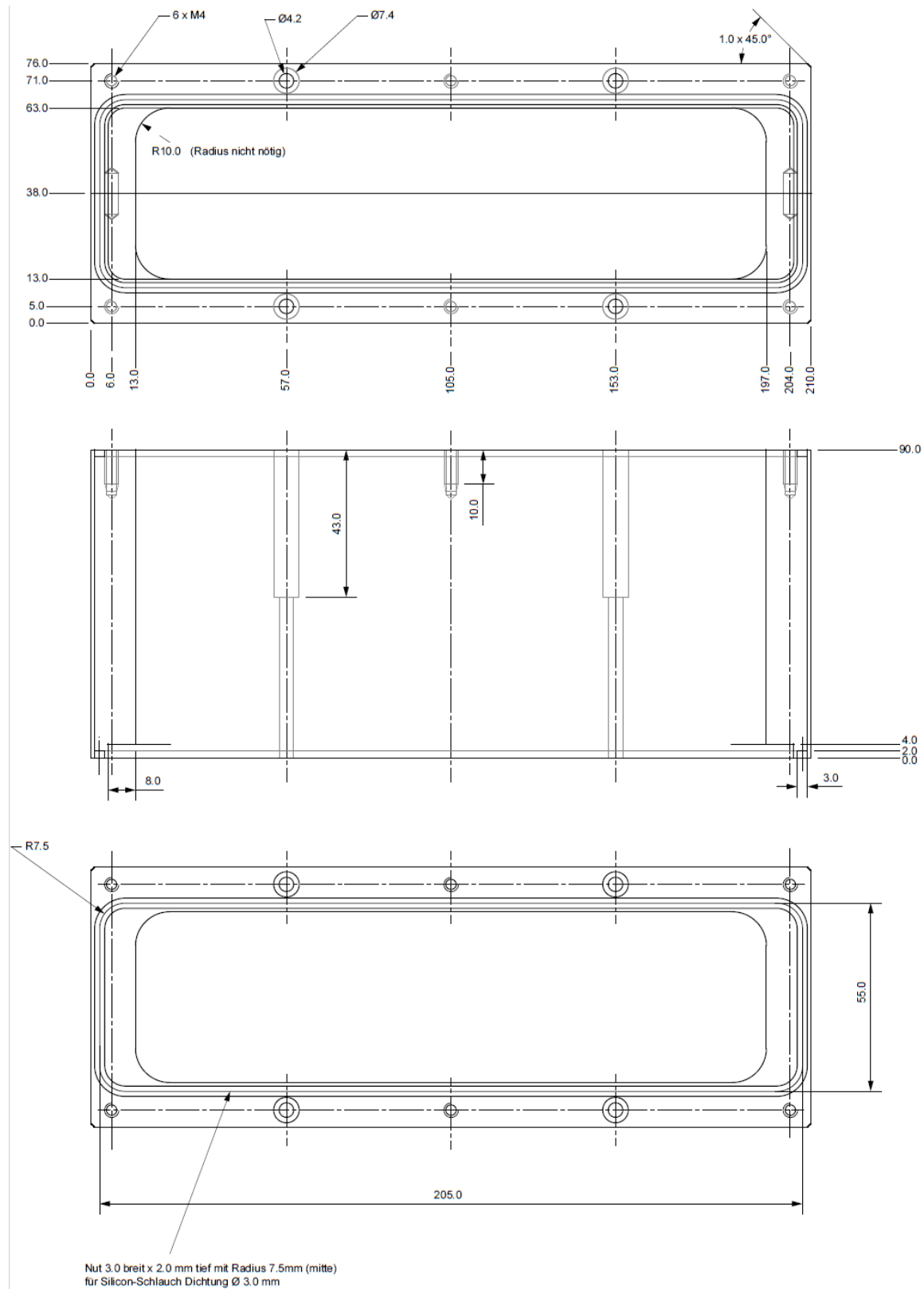
5.2 Views

Top view

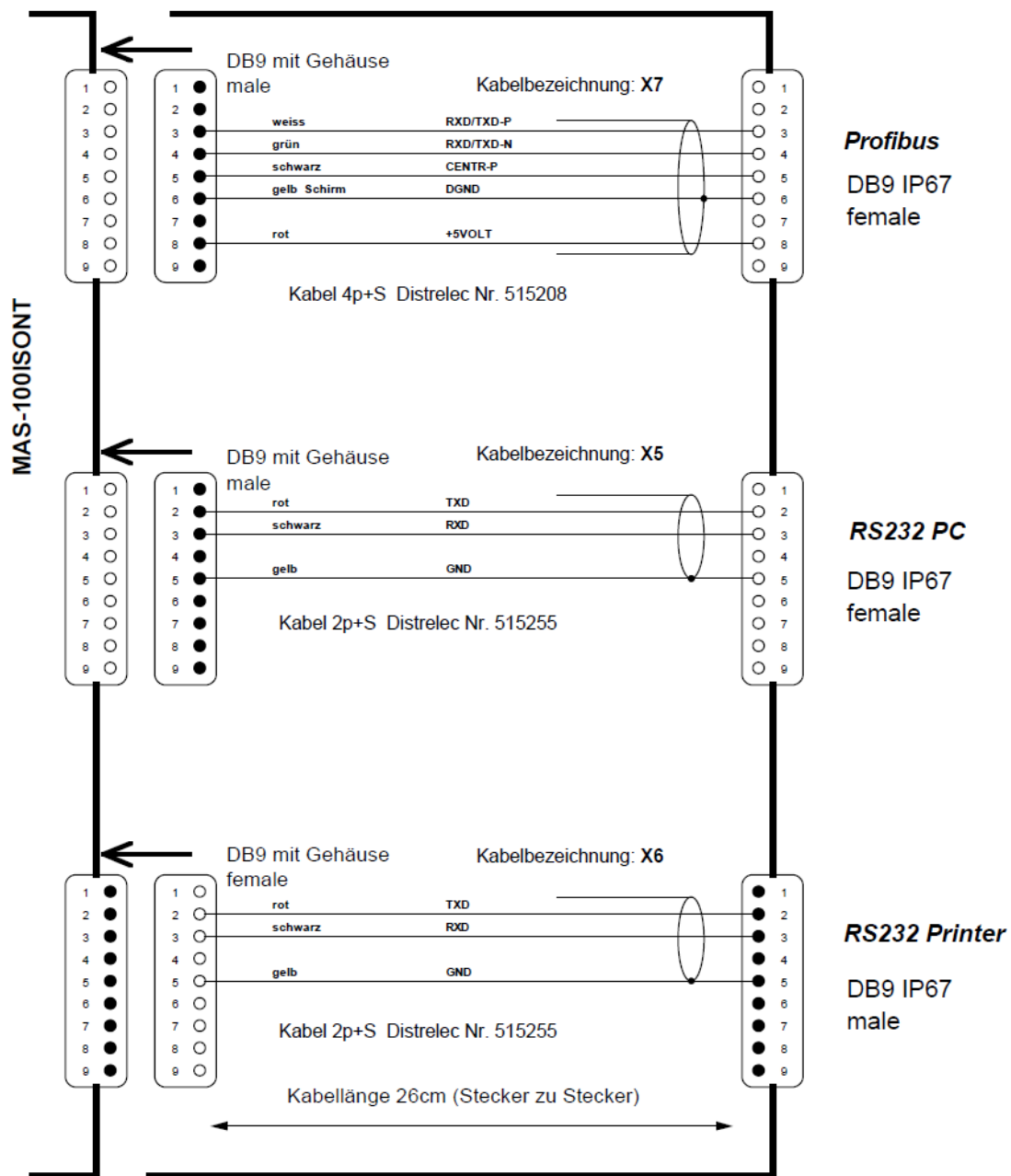


Technical drawing of a rectangular plate with dimensions and features. The drawing includes a top view and a side view. The top view shows a rectangular plate with a width of 100 mm and a length of 160 mm. The plate has a central circular hole with a diameter of $\varnothing 20.5$ mm. There are four rectangular slots, each with a width of 10 mm and a height of 18 mm, spaced evenly along the length. There are also four circular holes, each with a diameter of $\varnothing 16.0$ mm, spaced evenly along the length. The side view shows the plate's thickness of 6 mm and the circular hole's diameter of $\varnothing 20.5$ mm. The drawing includes a 1:1 scale bar and a 45-degree angle indicator.

Connector housing IP54



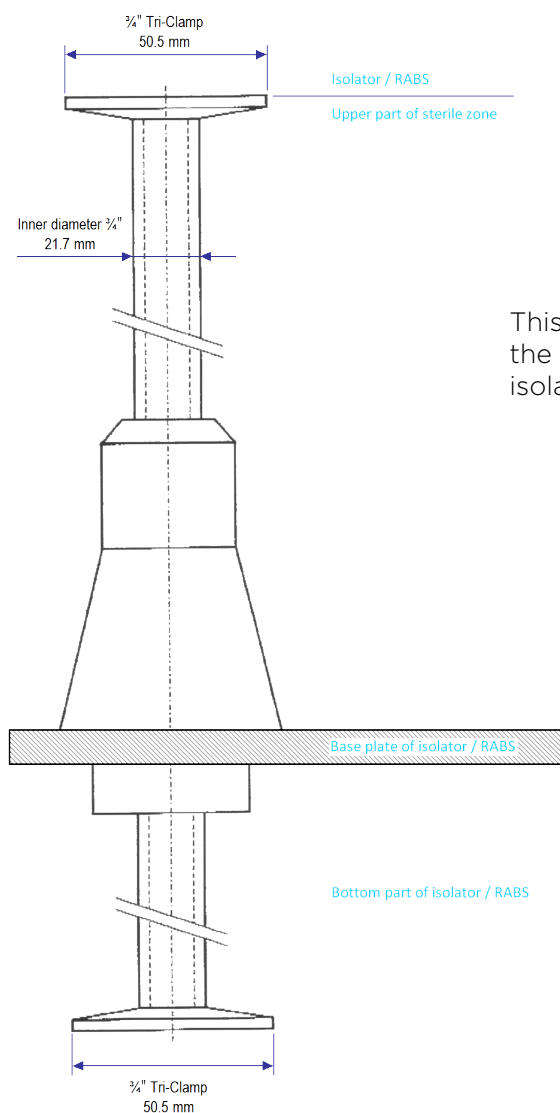
Cables for extension



6 Mechanical and pneumatic connections

This chapter describes the mechanic/pneumatic interfaces of the instrument.

6.1 Sampling head adapter



This picture shows a possible setup to connect the sampling head through the base plate of an isolator / RABS

6.2 Hose nozzle

The hose nozzle is an output connector. It is used to evacuate the decontamination gas used for the decontamination process. Rubber hoses and plastic hoses made of PTFE, soft PVC, and polyamide can be connected directly to the nozzle.

Source: Serto

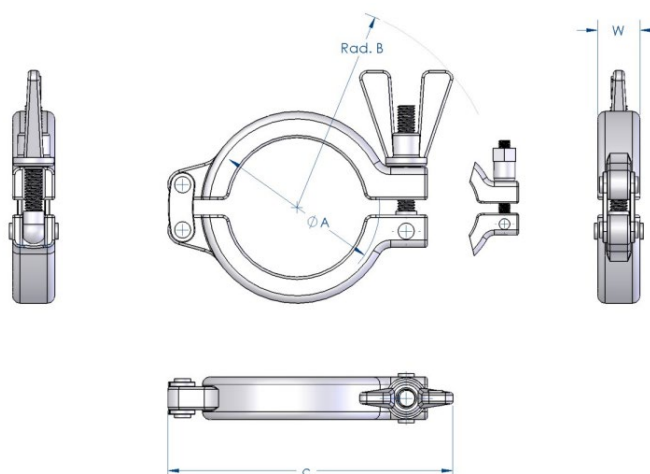
Edelstahl	Acier inoxydable	Stainless steel										
Gerade Schottverschraubung Durchführungsänge max. 5 mm Union double pour passage de cloison pour cloison max. 5 mm Panel mount union max. panel thickness 5 mm												
SO 51521												
Type-d	Mat.-Nr.	bar	M	SW1	SW2	L1	L2	B	z	z1	e	kg/100
Für metrische Rohre	Pour tubes métriques											
For metric tubes												
SO 51521-2	058.1500.020	250	6x0.75	8	10	14.0	19.0	6.5	10.5	15.5	2.2	1.190
SO 51521-3	058.1500.030	250	6x0.75	8	10	16.0	21.0	6.5	10.5	15.5	2.2	1.270
SO 51521-4	058.1500.040	250	8x1	10	12	20.0	24.0	8.5	13.5	17.5	3.5	2.240
SO 51521-5	058.1500.050	250	8x1	10	12	20.0	24.0	8.5	13.5	17.5	3.5	2.200
SO 51521-6	058.1500.060	200	10x1	12	14	22.0	27.5	10.5	13.5	19.0	4.5	3.610
SO 51521-8	058.1500.080	200	12x1	14	17	24.0	30.0	12.5	15.0	21.0	6.5	5.210
SO 51521-10	058.1500.100	160	14x1	17	19	27.5	33.0	14.5	15.5	21.0	8.5	7.330
SO 51521-12	058.1500.120	160	16x1	19	22	28.5	33.5	16.5	16.0	21.0	10.5	9.400

6.3 7.3 Tri-Clamp connection

6.3.1 Tri-clamp

On the instrument, standard Tri-Clamp fittings are used to connect the tubing with the head base and the instrument. The corresponding clamp shall be chosen considering the used fitting and following the corresponding standard:

- ISO 2852: DN8 / 10 / 15 / 20 / 25
- DIN 32676: DIN 25 / 32 / 40
- BS 4825: 1" to 1 1/2"



Tri-clamps from different manufacturers are available on the market. The interchangeability must be previously ascertained.

Suggestion

Title:	SH Safety Clamp®
Standards:	ISO 2852, DIN 32676, BS 4825 (ASME BPE) / *non standard
Material:	Tri-Clamp Coupling, Wingnuts und Eye-Bolt Screw from AISI 316 (1.4401)
Sterilization temperature:	150°C
Type of construction / Surface quality:	Closure Clamp with V-Profile, for equal pressure overall the hole diameter. Surface: bright finish
Options:	The Wing-Nuts can be exchanged by special Hexagon-Nuts: Item-No. for clamps 1/2" to 5" = 200.000.001 Item-No. for clamps from 5 1/2" = 200.000.002 Technical contents are subject to change
Remarks:	Data to the maximum operating pressure became in dependingness with the assigned seals (elastomers). Clamp with Wing-Nut SH Type: Torque rating 5 Nm Clamp with Hexagon-Nut SHX Type: Torque rating 20 Nm

Technical Datas to SH Safety Clamp®										
Drawing to table below; see previous page										
ISO 2852 DIN 32676 Row B	DIN 32676 Row A	BS 4825 DIN 32676 Row C	A TC-Size	B Rad.	C Length	W Thick- ness	max. Workpressure by 150° C	max. Testpressure	Weight in Gramm	Item-Number
DN 6 / 8 / 10	DIN 4 / 6 / 8 / *10	1/2" - *3/4"	25.0	63.0	75.0	17.0	50 bar	100 bar	160 g	200.105.028
	DIN 10 / 15 / 20		34.0	67.0	85.0	17.0	50 bar	100 bar	180 g	200.110.037
DN 8" / 10" 15 / 20 / 25	DIN 25 / 32 40	1" - 1 1/2"	50.5	77.0	102.0	17.0	50 bar	100 bar	260 g	200.125.053
DN 32 / 40	DIN 50	2"	64.0	93.0	123.0	17.0	50 bar	100 bar	340 g	200.150.067
DN 50		2 1/2"	77.5	100.0	140.0	17.0	50 bar	100 bar	390 g	200.165.080
DN 65	DIN 65	3"	91.0	105.0	150.0	17.0	40 bar	80 bar	450 g	200.180.094
DN 80	DIN 80	3 1/2"	106.0	110.0	165.0	17.0	40 bar	80 bar	450 g	200.190.108
	DIN 100	4"	119.0	119.0	185.0	17.0	35 bar	70 bar	580 g	200.200.122

Source: Connectors 2017

6.3.2 Inlet/Outlet Tri-Clamp connectors

The inlet and outlet ports feature custom made Tri-clamp connectors:

	Outer diameter AD [mm]	Inner diameter ID [mm]
Inlet	50.5 mm	21.7 mm
Outlet	50.5 mm	21.7 mm



Hazard of injury and/or damage to the instrument

The Tri-Clamp connectors are custom made and shall not be replaced by third-party products as stipulated in the warranty [chapter 1.3.4](#)

Counterpart connector

Suitable Tri-Clamp connectors according to ISO 2852, ISO 32676 or BS 4825 from different manufacturers are available on the market. The interchangeability must be previously ascertained.

For minimum flow resistance, the counterpart fittings at the inlet or outlet shall have ID $\geq$ 21.7 mm.

6.4 Sealings

6.4.1 Silicone screen gasket

This silicone gasket is used to seal Tri-Clamp connections on instruments of the MAS-100 Iso product family.
For purchase information please refer to the [User Manual MAS-100 Iso NT](#) , chapter “Part list”.



Technical specifications

Standards:	BS 4825, DIN 32676 row C, ISO 2852, ASME BPE
Material:	Platinum cured silicone, transparent
Decontamination temperature:	Max. 150°C
Certificates:	Certificate of Conformity FDA-21 CFR 177.2600
Surface quality:	Smooth and nonporous, free of laminar recesses and increases, edges without tears and notches

Certificate of Conformity

The manufacturer certifies that the elastomer compounds of the silicone used in the manufacture of the hygienic sealing gaskets comply with the Food and Drug Association (FDA) Code of Federal Regulations for rubber and rubber-like materials. This under Title 21, paragraph 177.2600 and meets the criteria of the Class I materials classification of the 3-A Sanitary Standards, U.S.D.A. and standard 51 of the N.S.F.

6.4.2 Silicone screen gasket

This silicone screen gasket is used to seal Tri-Clamp connections on instruments of the MAS-100 Iso product family. In the event of a breaking Petri dish the mesh avoids the ingress of shards into the instrument. Therefore, its' use is highly recommended for the first sealing below the sampling head, especially when using easy clean bases.



For purchase information please refer to the [User Manual MAS-100 Iso NT](#), chapter “Part list”.

Technical specifications

Standards:	BS 4825, DIN 32676 row C, ISO 2852, ASME BPE
Material:	Platinum cured silicone, transparent
Decontamination temperature:	Max. 150°C
Certificates:	Certificate of Conformity FDA-21 CFR 177.2600
Surface quality:	Smooth and nonporous, free of laminar recesses and increases, edges without tears and notches.

Certificate of Conformity

The manufacturer certifies that the material supplied is in accordance with the requirements of the order and has been manufactured in accordance with the guidelines listed below:

- Meets or exceeds FDA regulations CFR 177.2600 for contact with food
- Meets or exceeds usp class VI-121C requirements
- Meets or exceeds cytotoxicity tests
- Meets or exceeds 3A & USDA standards
- Animal derived ingredient free (adif).

7 Connection ports

This chapter describes the electric/electronic interfaces of the instrument.

7.1 Connection options



X1	Power	X6	Printer or Anemometer
X2	Digital output	X7	Profibus
X3	Remote	X8	Ethernet
X4	USB	X9	Digital input
X5	RS-232		

7.2 (X1) - Power connector

This is the power supply connection of the instrument. It also functions as the main power switch if the power cord is disconnected.

Electrical specifications

- Supply voltage: 24 V DC $\pm 5\%$
- Reverse polarity protection (internal lead fuse)
- Overvoltage protection (internal lead fuse)
- Nominal current: 2.5 A
- Inrush current: 17 A during 0.5 ms
- Connector: MC 1,5/2-STF-3,5 Mini-Combicon, Phoenix Contact.

Pin assignment

Pin number	Function	Symbol
1	Positive input voltage	+24 V DC
2	Ground	GND

7.3 (X2) - Digital outputs

Electrical specifications

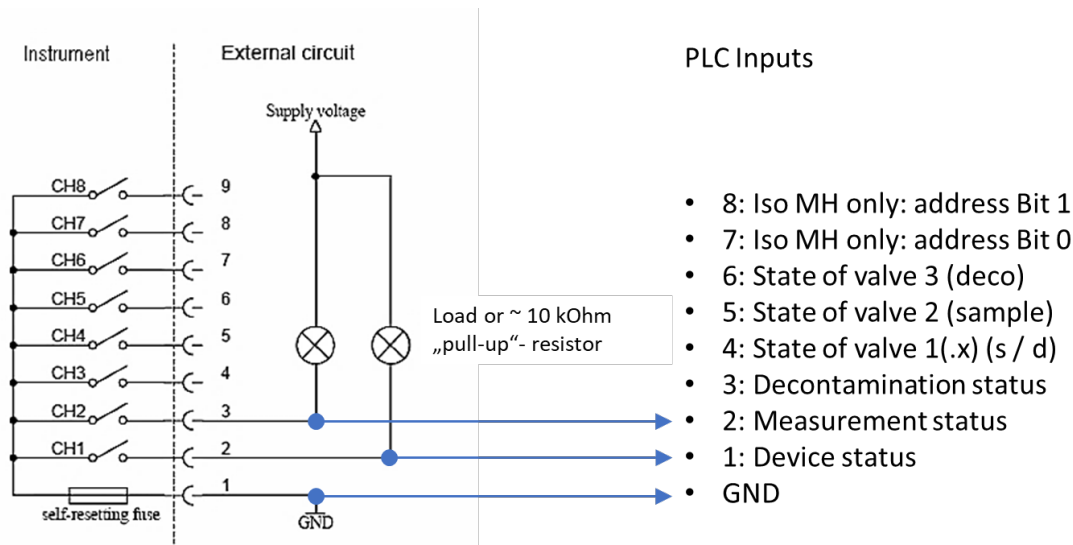
- Nominal external supply voltage: 24 V DC
- Maximum input voltage: 40 V (overvoltage protection)
- Maximum output current for all channels: 1 A
- Maximum output current per channel: 1 A
- Reverse polarity protection
- Short-circuit protection
- Overload protection (internal self-resetting fuse) ⇨ To reset fuse, disconnect the voltage
- Functional insulation between I/O and main circuit
- Connector: MC 1,5/9-STF-3,5 Mini-Combicon, Phoenix Contact.

Pin assignment

Pin №	Channel	Function	Description
1	-	Common ground	-
2	1	Device status	Failure = high, normal operation = low
3	2	Measurement status	Running = high, stopped = low
4	3	Decontamination flow status	Running = high, stopped = low
5	4	State of valve 1	Open = high, closed = low
6	5	State of valve 2	Sampling: open = high, closed = low
7	6	State of valve 3	Decontamination: open = high, closed = low
8	7	N/A	N/A
9	8	N/A	N/A

Schematic and explanation

In this schematic illustration, on the instrument side, a switch is drawn for simplicity reason for each channel, which is not fully correct.



The instrument has galvanically isolated opto-switches which drive power FET's as switches.

This schematic aside shows the instruments digital output with the N-MOSFET as switch as applied in our instrument.

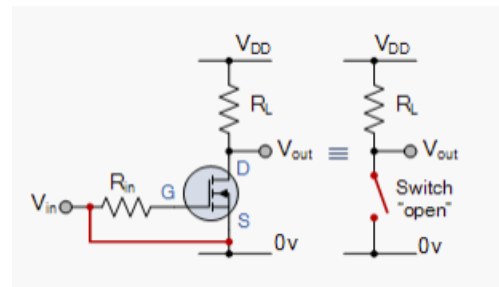
An additional power supply is needed (e.g. from the PLC module or its power supply).

For direct visibility, a signal lamp can be connected between the supply voltage ($V_{DD}/+$) and to one of the Digital output connections ($V_{out}/-$) on the instrument as 'load' (R_L).

If a PLC digital input module is used for signal detection, a 10 kOhm resistor used as 'load' (R_L) is needed for each channel. V_{out} is connected to the digital input of the PLC module.

The outputs are configured as NC ('normally closed'), so that the normal state of the outputs is always 0 (low).

Example: In the event of an alarm, the FET on CH1 is switched open so that the load is no longer drawn to GND, but to the supply voltage level, and therefore becomes 1 (high).



7.4 (X3) - Remote control

The remote-control connector is used to connect the optional remote cable or a switch for remotely starting and stopping a measurement cycle.

7.4.1 Interface

Electrical specifications

- Output voltage: 5 V (only to supply the button)
- Cut-off frequency of low-pass input filter: 160 Hz
- Debouncing
- Connector: MC1,5/4 STF 3,5 Mini-Combicon, Phoenix Contact.



Hazard of damage to the instrument

This interface is not protected against overload, short-circuit and overvoltage.

A wrong external circuit can result in severe damage to the instrument.

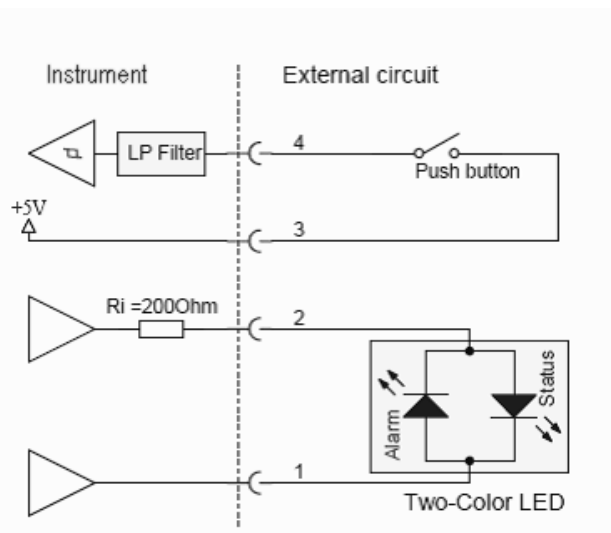
Power consumption

In Standby the power consumption is 10 W. For a measurement or decontamination with low pneumatic pressure conditions (without filters, short hose lengths, etc.), 30 W must be expected. Under the highest pneumatic pressure conditions the power consumption can rise up to a maximum of 60 W.

Pin assignment

Pin №	Function	Description
1	Cathode status LED	Shows status ready and sampling (flash)
2	Cathode alarm LED	Shows status when stopped or alarm
3	Push button, +5V Output	Power supply for push button
4	Push button, Input	Start/abort measurement cycle

Schematic

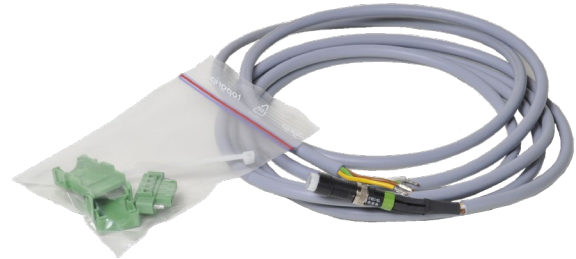


7.4.2 Remote cable

For purchase information please refer to the [User Manual MAS-100 Iso NT](#), chapter "Part list".

Technical specifications

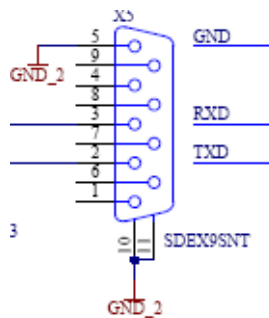
- PVC cable 4x0.5 mm², length: 2.50 m, Diameter for mounting is 5.7 mm
- Phoenix contact MC1,5/4-STF-3,5 Mini-Combicon
- Push button with 2-coloured LED (red/green), diameter for mounting is 8.0 mm.



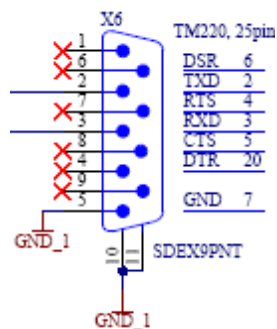
7.5 (X4) - USB type B

The USB connector on the instrument is a standard USB type B connector. It can be connected to a windows computer. Use the PC Software to access and configure the instrument.

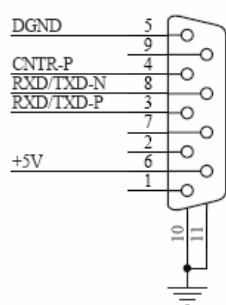
7.6 (X5) - RS-232 PLC pin out



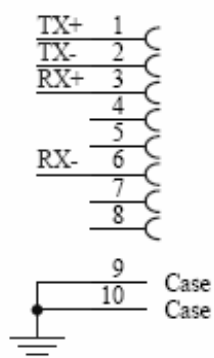
7.7 (X6) - RS-232 printer / Digital Anemometer pin out



7.8 (X7) - Profibus pin out



7.9 (X8) - Ethernet pin out



7.10 (X9) - Digital inputs

Electrical specifications

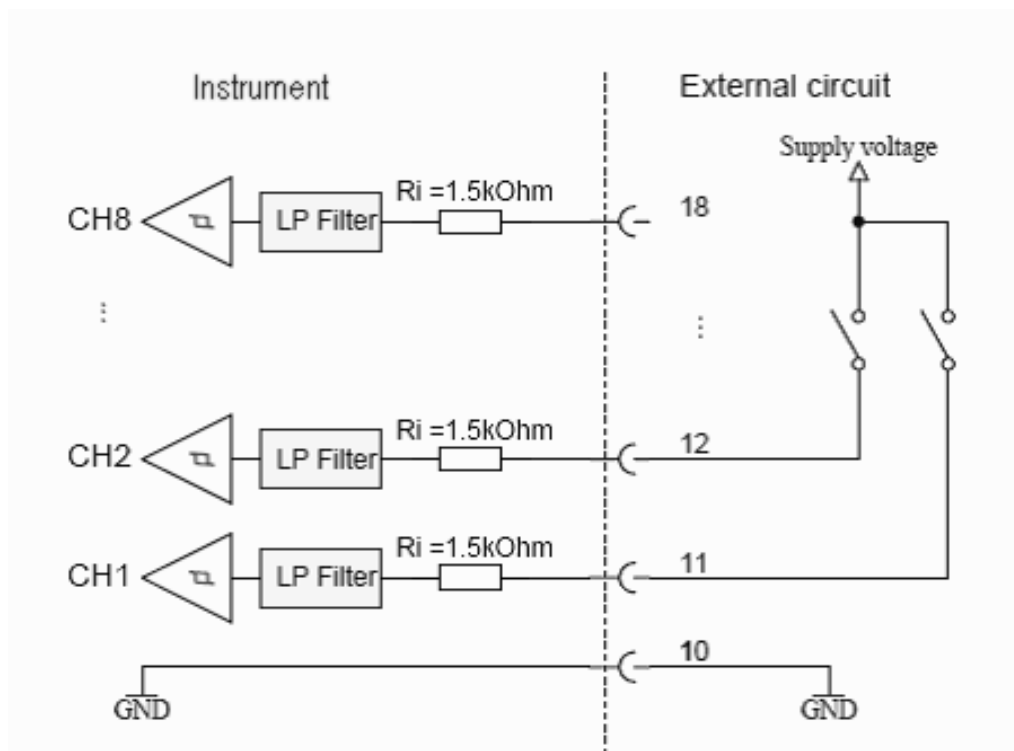
- Nominal voltage: 5 to 24 V DC
- Maximum input voltage: 50 V (overvoltage protection)
- Threshold voltage: TTL-level (working up to nominal voltage)
- Input resistance: 1.5 kOhms
- Cut-off frequency of low-pass input filter: 100 Hz
- Debouncing
- Functional insulation between I/O and main circuit
- Reverse polarity protection
- Connector: MC 1,5/9-STF-3,5 Mini-Combicon, Phoenix Contact.

Pin assignment

Pin №	Channel	Function	Description
10	-	Common ground	-
11	1	Start measurement	Triggered on positive edge
12	2	Abort measurement	Triggered on positive edge
13	3	Start decontamination flow	Triggered on positive edge
14	4	Abort decontamination flow	Triggered on positive edge
15	5	Alarm acknowledge	Triggered on positive edge
16	6	Reserve	-

17	7	Reserve	-
18	8	Reserve	-

Schematic



8 Ethernet interface installation and configuration

This chapter describes how to establish an Ethernet connection to the instrument.

The desired communication interface must be specified explicitly when ordering an instrument.

The instrument will be factory-installed to work with the ordered interface immediately.



Hazard of damage to the instrument
Retrofitting an Ethernet/Profibus communication interface may only be done by an MBV AG-certified technician.

8.1 Interface configuration via PC Software

Step 1 Startup the PC Software

1. Connect USB
2. Start PC Software
3. Login as «Service» user, password «mbvservice»

Step 2 Select «Ethernet»

Step 3 Edit the Ethernet configuration with «IP Address», «Netmask», «Def. gateway» and the «Duplex mode»

Step 4 Press the button «Save settings to device»

Step 5 Power reset the instrument.

Parameter	Range	Default settings	Description
Fieldbus type	None, Ethernet, Profibus	Ethernet	Select Ethernet/Profibus fieldbus type
IP Address	0.0.0.0 ... 255.255.255.255	192.168.109.30	IP address of instrument
Netmask	0.0.0.0 ... 255.255.255.255	255.255.255.0	Netmask
Def. Gateway	0.0.0.0 ... 255.255.255.255	0.0.0.0	Default gateway
Duplex mode	Half-duplex/full-duplex	Half-duplex	Duplex selection of Ethernet connection
Speed	10 Mbit/s	NA	Communication speed, cannot be modified

8.2 Configuring Ethernet via HMI on instrument

Proceed as follows:

1. Power up the instrument
2. HMI screen should display the main menu
3. Start the «Service» menu
4. Go to option «Interfaces»
5. Go to option «Ethernet»

The following screen is displayed:

Ethernet	
Enable:	On
IPA: 255,255,255,255	▲▼
NMK: 255,255,255,255	▲▼
DGW:255,255,255,255	
Auto-Neg.	On
Back	Change

Ethernet	
DGW:255,255,255,255	
Auto-Neg.	On
Duplex:	FullDupl. ▲▼
Speed:	100MBit/s
Interface	Auto-Det.
Back	Change

The following parameters can be modified:

Parameter	Range	Description
Enable	On, Off	Enable/disable Ethernet protocol
IPA	0.0.0.0 ... 255.255.255.255	IP Address of device
NMK	0.0.0.0 ... 255.255.255.255	Netmask
DGW	0.0.0.0 ... 255.255.255.255	Default Gateway
Auto-Neg.	On/Off	Auto-negotiation, cannot be modified
Duplex	Half-duplex/full-duplex	Duplex selection of Ethernet connection
Speed	10 Mbit/s	Communication speed cannot be modified
Interface	Auto/Twisted Pair /AUI	Interface selection

The settings will only take effect when the screen is left by pressing the «Back» button.

8.3 Establishing connection to instrument

This chapter describes the options and how to connect to the instrument via Ethernet.

8.3.1 General

1. Disconnect the USB cable between the instrument and the computer.
2. Connect the instrument via Ethernet cable to your network.
3. Make sure that your computer is connected to your network also via Ethernet cable/wireless.
4. After configuration of the instrument, power reset the instrument.
5. IP Address: IP Address of the instrument as configured in [chapter 8.1](#) and/or [chapter 8.2](#)
6. Port Number: 6666

Once the connection is established, the communication with the instrument can be done using the common protocol described in the [Communication Manual MAS-100 Iso NT&MH](#).



It is always recommended to check this connection option.

1. Open the PC Software
2. Choose «New connection»
3. Select «Ethernet connection»
4. Enter the «IP» your instrument is configured with
5. Activate the «Save connection » to remember this IP configuration
6. Press «OK» to establish connection to your instrument.

The PC Software shows your instrument in the same way as it was connected via USB. All functions are accessible as in case of a USB connection.

Troubleshooting

If the connection to the instrument cannot be established, check the following:

- Check cable suitability (category, length...)
- IP address, netmask and default gateway are set correctly
- Instrument is connected to the Ethernet
- Do the LEDs next to the Ethernet connector (X8) flash green
- Check the state of the Ethernet connector:
 - Go to menu «Interfaces»
 - Go to option «Fieldbus Info», the state should be «Active»

Fieldbus Info	
Type:	Ethernet
State:	active
SW Version:	V02.030
Back	

9 Profibus interface installation and configuration

This chapter describes how to establish a Profibus connection to the instrument.

The desired communication interface must be specified explicitly when ordering an instrument.

The instrument will be factory-installed to work with the ordered interface immediately.



Hazard of damage to the instrument
Retrofitting an Ethernet/Profibus communication interface may only be done by an MBV AG-certified technician.

9.1 Interface configuration via PC Software

Step 1 Startup the PC Software

1. Connect USB
2. Start PC Software
3. Login as «Service» user, password «mbvservice»

Step 2 Select «Profibus»

Step 3 Edit the «Profibus (Slave) address» and the «Protocol»

Step 4 Press the button «Save settings to device»

Step 5 Power reset the instrument.

The following parameters can be modified:

Parameter	Range	Default settings	Description
Fieldbus type	None, Ethernet, Profibus	Profibus	Select Ethernet/Profibus fieldbus type
Profibus address	0...126	1	Profibus slave address of the instrument
Protocol	Standard / SPS	Standard	Depending on the desired protocol

9.2 Establishing connection to the instrument

Connectivity options:

- a. Profibus master (configuration file «MBV_06C3.gsd» helps to establish connection to the instrument)

b. Profibus master hardware / software interface

9.2.1 Procedure

1. Disconnect the USB cable between the instrument and the computer
2. Connect the instrument via Profibus cable to the network
3. Make sure that the PC is connected to the same network
4. After configuration of the instrument, power reset the instrument
5. Start your Profibus master device or software
6. Establish a connection with the configuration file «MBV_06C3.gsd»
7. Check the LEDs next to the Profibus connector X7, see [chapter 9.2.2](#)

Once the connection is established, the communication with the device can be done using the common protocol described in the [Communication Manual MAS-100 Iso NT&MH](#).

Command examples:

(CR) means Carriage Return / enter in HEX format = 0D 0A

Command	Code	Code in HEX format	Answer from instrument
Start measurement cycle	%CM#1(CR)	25 43 4D 23 31 0D 0A	%CM#1
Stop measurement or decontamination cycle	%CM#3(CR)	25 43 4D 23 33 0D 0A	%CM#3
Clear pending alarms:	%CM#4(CR)	25 43 4D 23 34 0D 0A	%CM#4

9.2.2 Troubleshooting

If the connection to the instrument cannot be established, check the following:

1. Check cable suitability (category, length...)
2. Slave address and protocol are set correctly
3. Instrument and Profibus master are connected to the same network
4. Do the LEDs next to the Profibus connector X7 flash as shown in the following table
5. After a restart and when the connection with the slave is made, the LEDs can indicate the following states:

State	Description
Two green LEDs are on	Connection between master and slave is ok, ready for communication
Only green LED is flashing	Slave correctly initialized but no connection to master
Green LED is flashing irregularly	Boot error of slave, restart instrument again

10 Printer installation

10.1 Supported devices

Two commercially available printers (Epson TM U220 and Samsung Bixolon Type SRP 275) are pre-programmed and may be selected. The printers will be factory preconfigured to display special characters like à, é, è, ä, ö, ü, etc.

10.2 Configuration



The printer is preconfigured when ordered from MBV AG directly and will be ready to use.

General procedure for the printer configuration:

1. Disconnect the power cord of the printer.
2. Remove the cover at the bottom of the printer to gain access to the DIP switches to adjust the printing parameters.
3. Adjust with a small flat head screw driver the two DIP switch banks according to the tables below
4. Reassemble the cover
5. Reconnect the power cord
6. Keep pressing the line feed key while switching on the printer, it'll print the printer settings
7. Once everything is set correctly, connect the serial cable from the air sampler.

Printer Epson TM-U220D:

Dip SW1 (upper bank)								Dip SW2 (lower bank)									
	1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8
ON			X		X	X			ON								
OFF	X	X		X			X	X	OFF	X	X	X	X	X	X	X	X

Samsung Bixolon-275AG:

Dip SW1 (upper bank)								Dip SW2 (lower bank)									
	1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8
ON			○		○				ON			×		×	×		
OFF	×	×		×		×	×	×	OFF	×	×		×			×	×

O = optional

Other printers:

Although not supported by MBV AG, other printers may work. Printer communication settings:

- 9600 Baud
- 8 data bits
- Parity even
- 1 stop bit
- Handshaking XON/XOFF

If an emulator / interpreter setting can be selected, please choose «Epson»

11 Power supply unit

11.1 MBV AG product

For purchase information please refer to the [User Manual MAS-100 Iso NT](#), chapter «Part list».



- Cable length: ~ 1'800 mm (AC side), ~ 1'500 mm (DC side)
- Cable conductor cross-chapter: 18AWG
- Input voltage: 100 to 240 V AC (47 to 63 Hz, 1.5 to 0.7 A)
- Output voltage: 24 V DC $\pm 5\%$ (2.7 A)



Hazard of damage to the instrument or wrong sampling results
The power supply must be secured against a maximum current of 2.7 A.

11.2 Alternative power supplies

Some operators may choose to use a power supply unit of their own choice. In such cases, special attention must be given to the following aspects:

1. The alternative PSU must at least match or excel the performance of the MBV AG product
2. The customer must include an EMC-protection-ferrite core on the power cable, close to the connector to the instrument. MBV AG recommends the ferrite core WE 742 715 3 from Würth Elektronik.

12 Alarm test procedure

In the event of the instrument not working properly, the system will automatically trigger an alarm and emit a high-pitched acoustic signal. The alarm event is stored in the alarm log of the instrument, which the user can visualize with the PC Software. The user has several options to stop the alarm sound:

- a. Via PC Software, press «Acknowledge Alarm»
- b. Via the digital inputs
- c. Via the remote switch connection

	For commissioning and testing purposes it is possible to provoke harmless alarms. Always check the alarm log for the presence of any provoked alarm. Missing alarms can be a sign of malfunction.
	During the factory acceptance test of the instrument some alarms will be provoked for quality assurance purposes. These alarms will still be visible in the alarm log after delivery.
	Hazard of damage to the instrument or wrong sampling results Critical alarms shall not be provoked by the operator, as this kind of interventions in the instrument is not allowed. These alarms are marked in red, as shown in the following table.

Alarm ID	Description	How to provoke
91	Blower does not start!	No description; the intervention in the instrument needed for this is not allowed.
92	Min. flow not reached!	Put dust cover on sampling head before starting a measurement.
93	Sample valves do not close	No description; the intervention in the instrument needed for this is not allowed.
94	Target flow not reached!	Put dust cover on sampling head a few seconds after having started a measurement.
95	Decontamination flow too low!	Close decontamination outlet before starting decontamination.
96	Decontamination valves do not close	No description; the intervention in the instrument needed for this is not allowed.
97	Device temperature too high	No description; the intervention in the instrument needed for this is not allowed.
98	Measurement/decontamination interrupted!	Start measurement, during measurement, disconnect or switch off power supply. After a few seconds, reconnect or switch on power supply, after startup of instrument, the error is shown.
99	Sample duration too low!	Set process settings to SQS, change volume to 1000 liters and duration to 1 minute, start measurement.

100	Invalid Calibration or Calibration Not Activated!	Before adjusting and calibrating the instrument, a measurement can be started. OR: Make a Flow calibration, create calibration certificate, question «Activate calibration validity immediately»= No (Don't save or printout the certificate!), start measurement.
101	Recalibration needed!	Change date on instrument + 1 year (so that the calibration validity has expired) and save date, in the SW service menu «Other settings» activate “block measurements if calibration validity expired”, start measurement.
102	Target volume is 0!	Set process settings to SQS, change volume to 100 liter and duration to 4 hours, start measurement.
103	Flow sensor defect!	No description; the intervention in the instrument needed for this is not allowed.
104	Measurement stopped!	Start measurement and abort measurement during running.
105	24 Volt supply too low!	No description; the intervention in the instrument needed for this is not allowed.
106	24 Volt supply too high!	No description; the intervention in the instrument needed for this is not allowed.



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