Operation Manual

BINOS® 100 F

Microprocessor - Controlled
NDIR - / Oxygen - Analyzer
in Field Housing

(Supplement to Operation Manual
BINOS® / OXYNOS® 100)

Process Analytic Division

ROSEMOUNT ANALYTICAL

FISHER-ROSEMOUNT Managing The Process Better

90003786(1) BINOS® 100 F e [4.11] 23.06.98

Fisher-Rosemount GmbH & Co assumes no liability for any omissions or errors in this manual. Any liability for direct or indirect damages, which might occur in connection with the delivery or the use of this manual, is expressly excluded to the extend permitted by applicable law.

This instrument has left the works in good order according to safety regulations.
To maintain this operating condition, the user must strictly follow the instructions and consider the warnings in this manual or provided on the instrument.

Troubleshooting, component replacement and internal adjustments must be made by qualified service personnel only.

Till completion of a separate operation manual of BINOS® 100 F, these supplements to operation manual BINOS® 100 / OXYNOS® 100 are valid !

1. Edition: 06/98

Read this operation manual carefully before attempting to operate the analyzer !
For expedient handling of reports of defects, please include the model and serial number which can be read on the instrument identity plate.

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Safety Summary

Outside and/or inside MLT or at operation manual resp. different symbols gives you a hint to special sources of danger.

Source of danger !
See Operation Manual!

High Voltage !

Electrostatic Discharge (ESD) !

Explosives !

Hot components !

Toxic !

Risk to health !

MLT specific notes for the user !

In operation manual we will give partly additional informations to these symbols.
Strictly follow these instructions please !

1. General

- The following general safety precautions must be observed during all phases of operation, service and repair of this instrument !
  Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture and intended use of this instrument !
  Failure to comply with these precautions may lead to personal injury and damage to this instrument !

- Fisher-Rosemount GmbH & Co. does not take responsibility (liability) for the customer´s failure to comply with these requirements !

- Do not attempt internal service or adjustment unless other person, capable of rendering first aid and resuscitation, is present !

- Because of the danger of introducing additional hazards, do not perform any unauthorized modification to the instrument !
  Return the instrument to a Fisher-Rosemount Sales and Service office for service or repair to ensure that safety features are maintained !

- Instruments which appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.

Operating personnel must not remove instrument covers !
Component replacement and internal adjustments must be made by qualified service personnel only !

Read all operation manuals before attempting to operate with the instrument !
Be sure to observe the additional notes, safety precautions and warnings given in the individual operation manuals !

Do not operate the instrument in the presence of flammable gases or explosive atmosphere without supplementary protective measures !

At photometer or heated components there could be exist hot components !

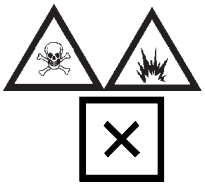
Lift or carry housing with at least 2 persons because of the high weight of field housing BINOS® 100 F (approx. 30 - 35 kg).
For easy transport use a suitable cart.

Guarantee, that the PG fittings together with pass through cables are hermetic to be in agreement with protection class IP 65 (according to DIN standard 40050). The permissible outside diameters of the cables are 7 to 12 mm !

2. Gases and Gas Conditioning (Sample Handling)

Be sure to observe the safety regulations for the respective gases (sample gas and test gases / span gases) and the gas bottles !

Inflammable or explosive gas mixtures must not be purged into the instrument without supplementary protective measures !



To avoid a danger to the operators by explosive, toxic or unhealthy gas components, first purge the gas lines with ambient air or nitrogen (N_2) before cleaning or exchange parts of the gas paths.

3. Supply Voltage

Verify whether the line voltage stated on the instrument ore power supply agrees with that of your mains line!

Be sure to observe the safety precautions and warnings given by manufacturer of power supply !

- BINOS® 100 F is a Safety Class 1 instrument

Tha equipment is provided with a protective earth terminal.
To prevent shock hazard, the instrument chassis and cabinet must be connected to an electrical ground. The instrument must be connected to the AC power supply mains through a three-conductor power cable, with the third wire firmly connected to an electrical ground (safety ground) at the power outlet.
If the instrument is to be energized via an external power supply, that goes for the power supply too.
Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury. Deliberate disconnection is inadmissible / prohibited !

The BINOS® 100 F (field housing) has no switch with disconnect function.
The customer has to provide a switch or circuit breaker into his installation. This switch has to be installed near by analyzer, must be easily attainable for operator and has to be charaterized as disconnector for analyzer.

Cables to external dataprocessing have to be double-isolated against mains voltage for BINOS® 100 F !
If there is no guarantee, install lines internal that they have a distance of at least 5 mm to mains voltage lines.
This distance have to be guarantee permanent (e.g. via cable holder) !

4. Analyzer specific notes for the user

The installation site for the instrument has to be **dry** and remain **above freezing point** at all times.
The instrument must be exposed neither to direct sunlight nor to strong sources of heat. Be sure to observe the permissible ambient temperature !
For outdoor sites, we recommend to install the instrument in a protective cabinet. At least, the instrument has to be protected against rain (e.g., shelter).

For Installation site please take care about safe way to reach the analyzer.

Do not interchange gas inlets and gas outlets !
All gases have to be supplied to the analyzer as conditioned gases !
When the instrument is used with corrosive gases, it is to be verified that there are no gas components which may damage the gas path components.

The exhaust gas lines have to be mounted in a declining, descending, pressureless and frost-free and according to the valid emission legislation !

In case it is necessary to open the gas paths, close the analyzers gas connections with PVC caps immediatly !

Use only from our factory optional delivered cables or equivalent shielded cables to be in agreement with the CE - conformity.
The customer has to guarantee, that the shield is be connected bothsided.
Shield and connectors housing have to be connected conductive.
Sub.-min.-D-plugs/sockets have to be screwed to the analyzer.

5. Additional notes for service / maintenance

Operating personnel must not remove instrument covers !
Component replacement and internal adjustments must be made by qualified service personnel only !

Always disconnect power, discharge circuits and remove external voltage sources before troubleshooting, repair or replacement of any component !

Any work inside the instrument without switching off the power must be performed by a specialist, who is familiar with the related danger, only !

In case of exchanging fuses the customer has to be certain that fuses of specified type and rated current are used. It is prohibited to use repaired fuses or defective fuse holders or to short-circuit fuse carriers (fire hazard).

At photometer or heated parts there could be exist hot components !

5.1 Electrostatic Discharge

The electronic parts of the analyzer can be irreparably damaged if exposed to **e**lectro**s**tatic **d**ischarge (ESD).

The instrument is ESD protected when the covers have been secured and safety precautions observed. When the housing is open, the internal components are not ESD protected anymore.

Although the electronic parts are reasonable safe to handle, you should be aware of the following considerations:

Best ESD example is when you walked across a carpet and then touched an electrical grounded metal doorknob. The tiny spark which has jumped is the result of electrostatic discharge (ESD).

You prevent ESD by doing the following:

Remove the charge from your body before opening the housing and maintain during work with opened housing, that no electrostatic charge can be built up.

Ideally you are opening the housing and working at an ESD - protecting workstation.
Here you can wear a wrist trap.

However, if you do not have such a workstation, be sure to do the following procedure exactly:

Discharge the electric charge from your body. Do this by touching a device that is grounded electrically (any device that has a three - prong plug is grounded electrically when it is plugged into a power receptacle).
This should be done several times during the operation with opened housing (especially after leaving the service site because the movement on a low conducting floors or in the air might cause additional ESDs).

5. Preparation

Please check the packing and its contents immediately upon arrival.
If any item is damageg or lost you are kindly requested to notify the forwarder to undertake a damage survey and report the loss or damage to us immediately.

5.1 Installation Site

The analyzer must not operate in explosive atmosphere without supplementary protective measures !

The installation site for the analyzer has to be dry and remain above freezing point at all times. The analyzer must be exposed neither to direct sunlight nor to strong sources of heat.
Be sure to observe the permissible ambient temperatures (c.f. Item 20: Technical Data).

For Installation site please take care about safe way to reach the analyzer.

The analyzer has to be installed **as near as possible to the sample point**, in order to avoid low response time caused by long sample gas lines.
In order to decrease the response time, a sample gas pump with a matching high pumping rate may be used. Eventually, the MLT has to be operated in the bypass mode or by an overflow valve to prevent too high flow and too high pressure (Fig. 5-1).

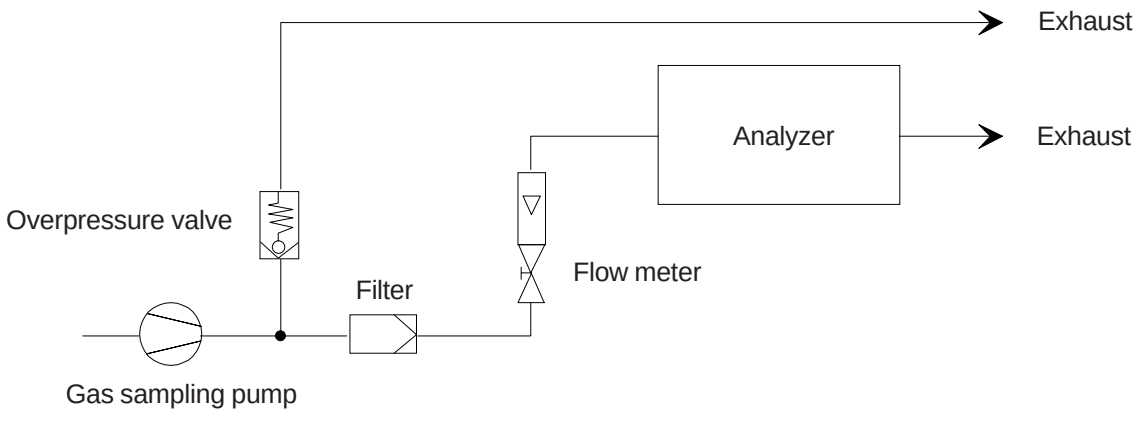


Fig. 5-1: BINOS® 100 F, Bypass installation

5.2 Gas Conditioning (Sample Handling)

The conditioning of the sample gas is of greatest importance for the successful operation of any analyzer according to extractive method.

All gases have to be supplied to the analyzer as conditioned gases !
When the instrument is used with corrosive gases, it is to be verified that there are no gas components which may damage the gas path components.

The gas has to fullfil the following conditions:
It must be

- ❏ free of condensable constituents
- ❏ free of dust
- ❏ free of aggressive constituents which are not compatible with the material of the gas paths.
- ❏ have temperatures and pressures which are within the specifications stated in “Technical Data” of this manual.

Inflammable or explosive gas mixtures may not be introduced into the MLT without supplementary protective measures !

When analysing vapours, the dewpoint of the sample gas has to be at least 10 °C below the ambient temperature in order to avoid the precipitation of condensate in the gas paths.

Suitable gas conditionning hardware may be supplied or recommended for specific analytical problems and operating conditions.

5.2.1 Gas Flow

The gas flow rate should be within the range 0.2 l/min to maxi. 1.5 l/min !

A constant flow rate of about 1 l/min is recommended.

The gas flow rate for analyzer with paramagnetic oxygen sensor is allowed to max. 1.0 l/min !

5.3 Gas Connections

The installed gas connections are specific to the different analyzers. The fittings are located on the left bottom side (viewed from front) and are clearly marked:

IN = Gas inlet OUT = Gas outlet (exhaust)

For one-channel analyzer and dual-channel analyzers tubed in series, only the 2 gas line fittings for channel 1 are present. If the two channels are tube parallel, then all 4 fittings will be present. Zero gas and span gas are introduced directly via the sample gas inlet. The test gas containers have to be set up according to the current legislation.

Do not interchange gas inlets and gas outlets !

The exhaust gas lines have to be mounted in a declining, pressureless and frost-free way and according to the valid emission legislation !

Be sure to observe the safety regulations for the respective gases (sample gas and test gases / span gases) and the gas bottles !

Permissible gas pressure max. 1,500 hPa !

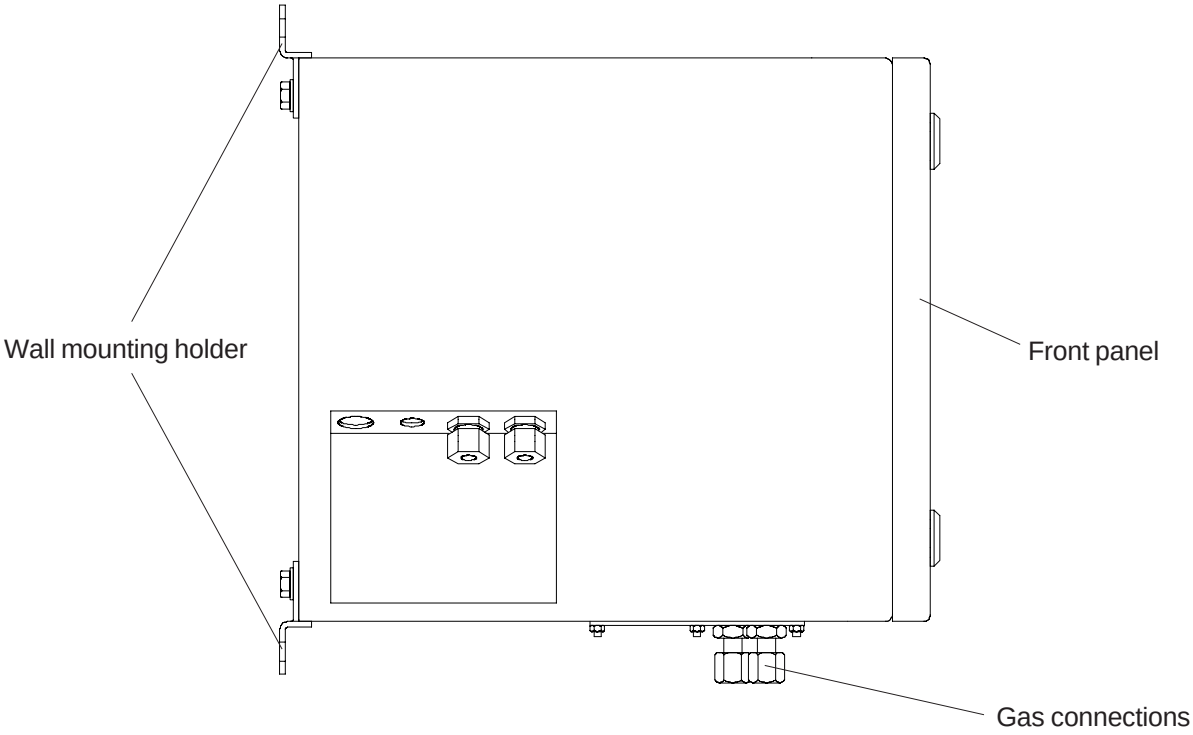


Fig. 5-2: BINOS® 100 F, Gas connections *(viewed from left side)*

5.4 Additional Hints to Field Housing

5.4.1 Wall Mounting

This housing of BINOS® 100 F is designed for wall mounting. For fastening points see Fig. 5-3 please.

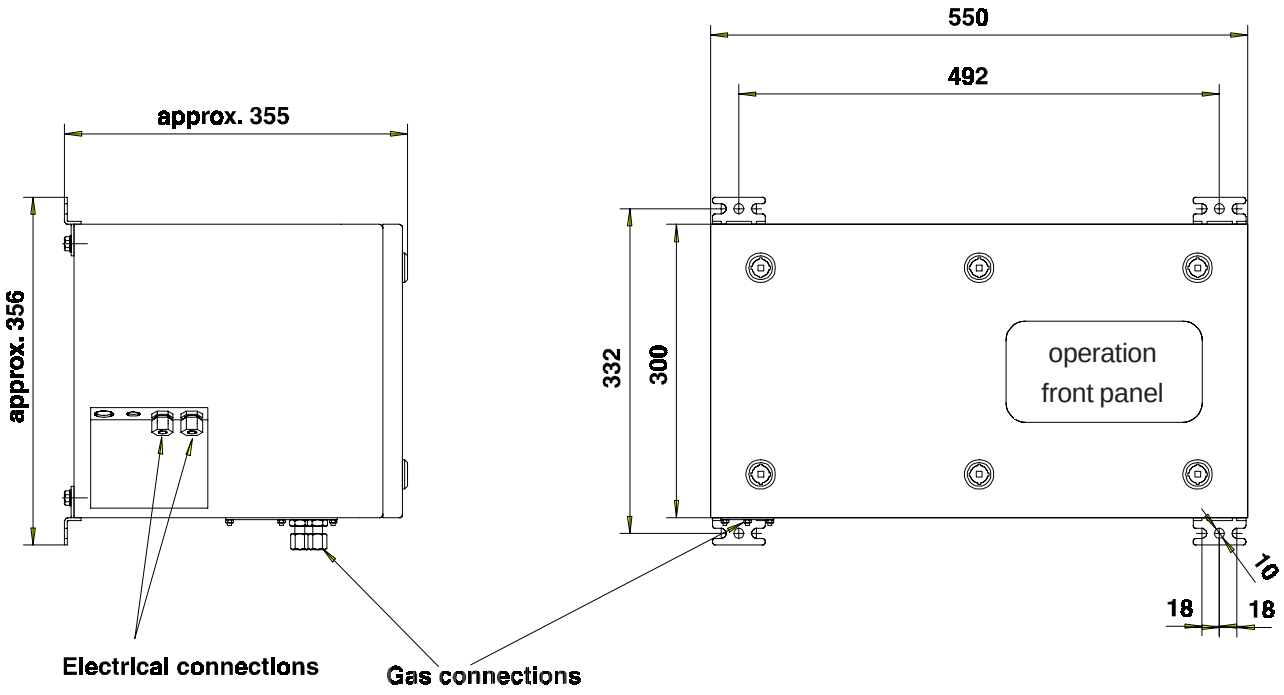


Fig. 5-3: Dimensional sketch / Drill drawing BINOS® 100 F *[all dimensions in mm]*
(optional electronics and photometer/sensors can be mounted into two separately housings)

Lift or carry housing with at least 2 persons because of the high weight of field housing BINOS® 100 F (approx. 30 - 35 kg).
For easy transport use a suitable cart.

5.4.2 Electrical Connections

Be sure to observe the safety precautions and warnings !

Garantuee, that the PG fittings together with pass through cables are hermetic to be in agreement with protection class IP 65 (according to DIN standard 40050). The permissible outside diameters of the cables are 7 to 12 mm !

a) Mains Supply

The analyzer is specified for an operating voltage of 230 Vac or 120 Vac resp., 47-63 Hz..
Built-in power supply (manual switch between 230/120 Vac) is one power supply of type SL5.

❍ Opening of housing (front panel) (see Item 21.).

❍ Take mains line via PG fitting (Fig. 5-4) inside the housing.
Connect L and N to powerline filter (Fig. 5-6) via plug jacket (6,3x0,8 mm).
Connect PE via ring cable system to left ground conductor pin (Fig. 5-6).

Verify beforehand that the line voltage stated on the identification plate (front door inside) agrees with that of your power supply line !
Verify that the position of input voltage switch of the power supply(s) agrees with that of your power supply line (Fig. 24-2 and 5-5) !

The BINOS® 100 F (field housing) has no switch with disconnect function.
The customer has to provide a switch or circuit breaker into his installation. This switch has to be installed near by analyzer, must be easily attainable for operator and hase to be charaterized as disconnector for analyzer.

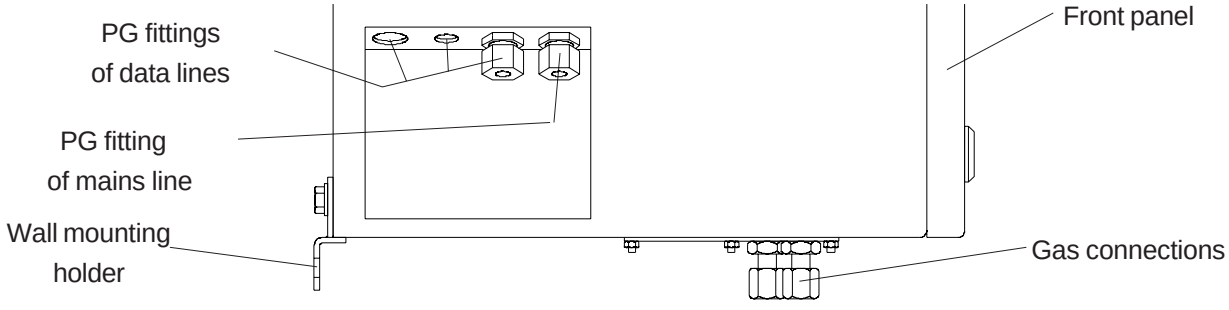


Fig. 5-4: BINOS® 100 F, PG fitting for lines *(side view from left)*

b) optional Data Lines

This are analog outputs, digital outputs, status output relays and serial interfaces.

❍ Opening of housing (front panel) (see Item 21.).

❍ Take lines via PG fittings (Fig. 5-4) inside the housing.
Connection is to be done to the respective terminal strips (Fig. 5-5 and 5-6).
Assignements of terminal strips is identically to assignment of connectors shown on page 26-1 of operation manual BINOS® / OXYNOS® 100 !

⚠ Cables to external dataprocessing have to be double-isolated against mains voltage for analyzer !
If there is no garantuee, install lines internal that they have a distance of at least 5 mm to mains voltage lines.
This distance have to be garantuee permanent (e.g. via cable holder) !

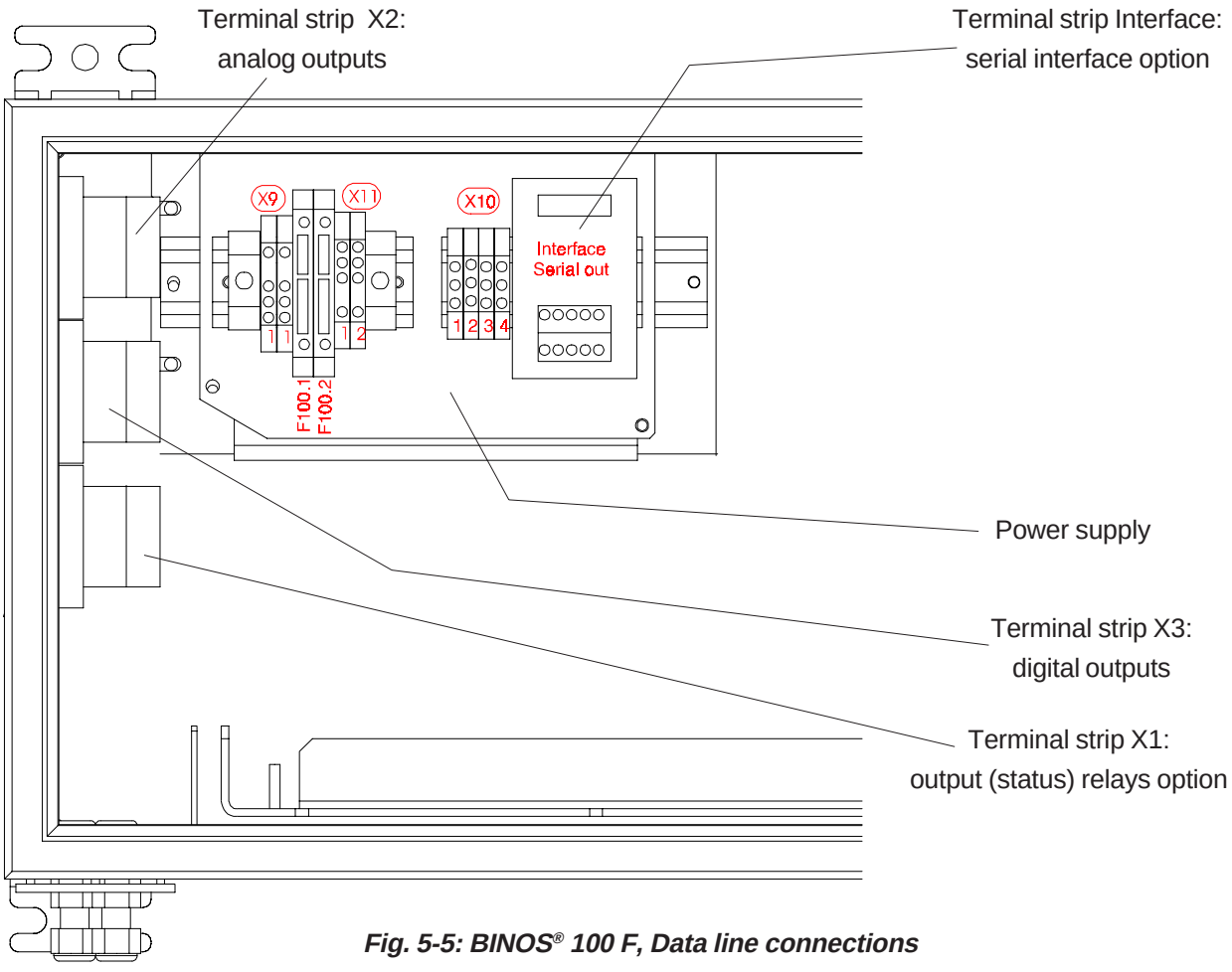


Fig. 5-5: BINOS® 100 F, Data line connections
Inside view from front (without front door)

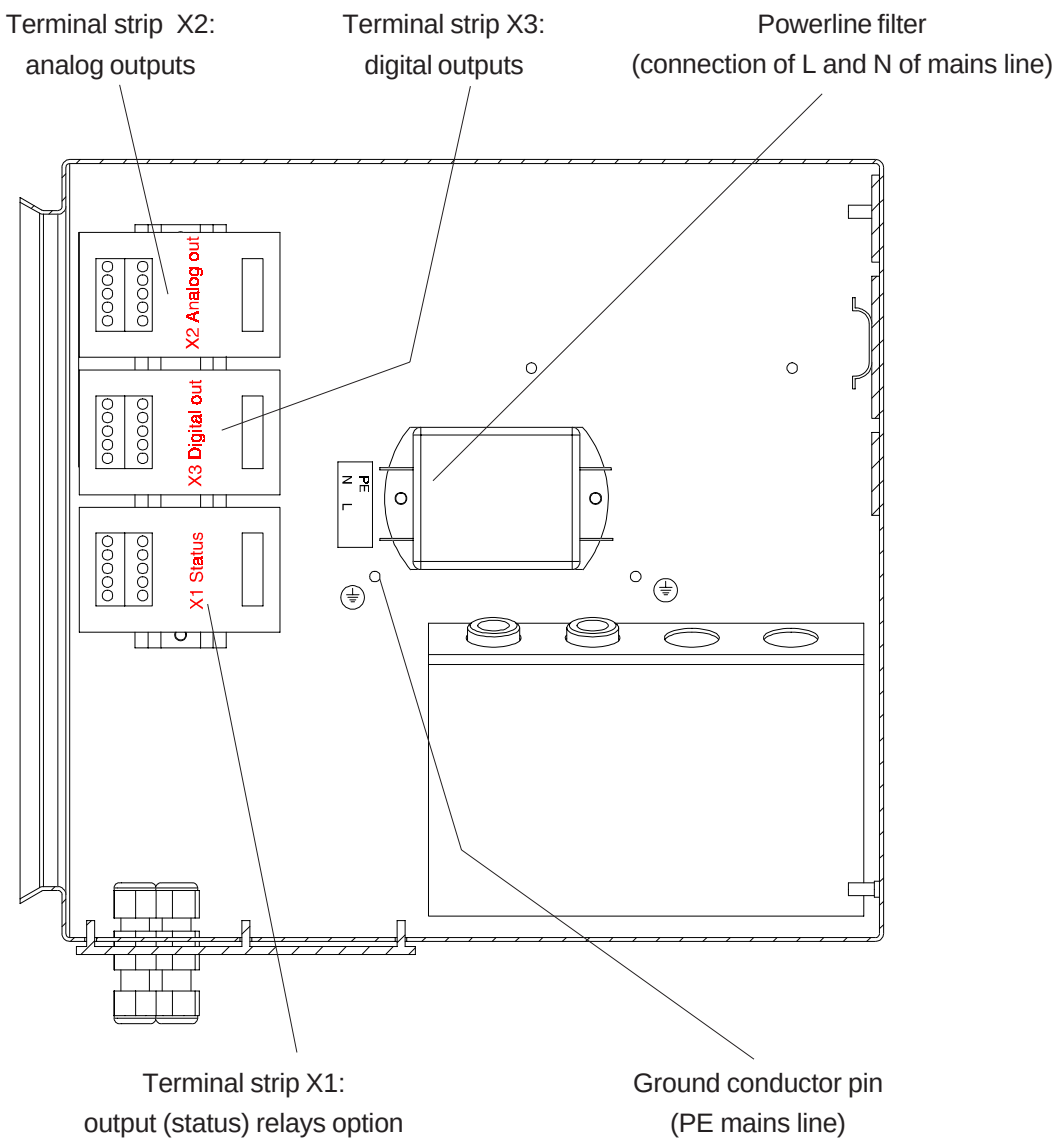


Fig. 5-6: BINOS® 100 F, Connection data lines / mains line
(inside view, left side panel)

21. Opening the Housing

The housing must be opened for checking the electrical connections and for replacement or cleaning of any of the components of the analyzer.

Be sure to observe Item 5. of the safety measures !

- ❍ Disconnect all voltage supplies.
- ❍ Open all 6 fasteners with a square key (Fig. 21-1)
- ❍ Lift left side of front panel slightly and swing out front panel to the right side carefully. Withdraw the photometer sliding carriage to the front carefully.

At photometer or heated parts there could be exist hot components !

Closing of the housing is performed in reverse order.

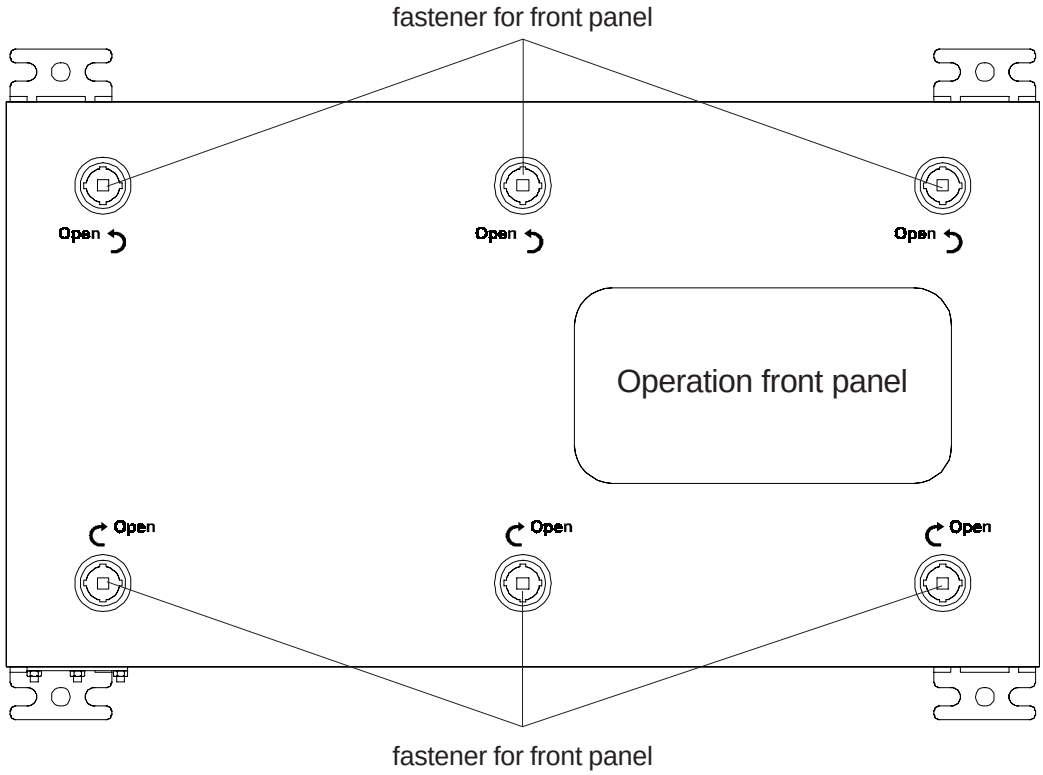


Fig. 21-1: BINOS® 100 F (Field housing) *(fastener for front panel)*

24. Technical Data

Certifications	CE EN 50081-1, EN 50082-2, EN 61010-1
in preparation	NAMUR, CSA NRTL/C, C-Tick, IS
Measuring ranges	see order confirmation
Measuring components	see order confirmation

24.1 Signal Outputs, Interfaces

analog [(optically isolated), Offset and final concentration are free programmable]	0 - 10 V and 0 - 20 mA ($R_B \leq 500\ \Omega$) or 2 - 10 Vand 4 - 20 mA ($R_B \leq 500\ \Omega$), adjustable via keyboard
Option:	0 (0,2) - 1 V and 0 (4) - 20 mA ($R_B \leq 500\ \Omega$)
digital, parallel (optically isolated)	2 threshold contacts per channel Sample gas valve, Zero gas valve, Span gas valve 1, Span gas valve 2 “Open Collector”, max. 30 V DC / 30 mA
digital, serial (Option)	RS 232 C or RS 485
Output Relays (Option)	“Measure/Calibration” and “Failure Analyzer” “non-voltage carrying contacts” max. 30 V/ 1 A / 30 W

24.2 Housing

Gas connections	Standard 6/4 mm PVDF additional fittings on request
Dimensions	see dimensional sketch (Fig. 24-1)
Weight (depending on configuration)	approx. 30 - 35 kg
Protection class	IP 65 (according to DIN standard 40050)
Permissible ambient temperature	+ 5 to + 40 °C (higher ambient temperatures (45 °C) on request)
Humidity (non condensing)	< 90 % rel. humidity at + 20 °C < 70 % rel. humidity at + 40 °C
Explosive atmosphere	The analyzer must not be operated in explosive atmosphere without supplementary protective measures
Altitude	0-2000 m (above sea level)

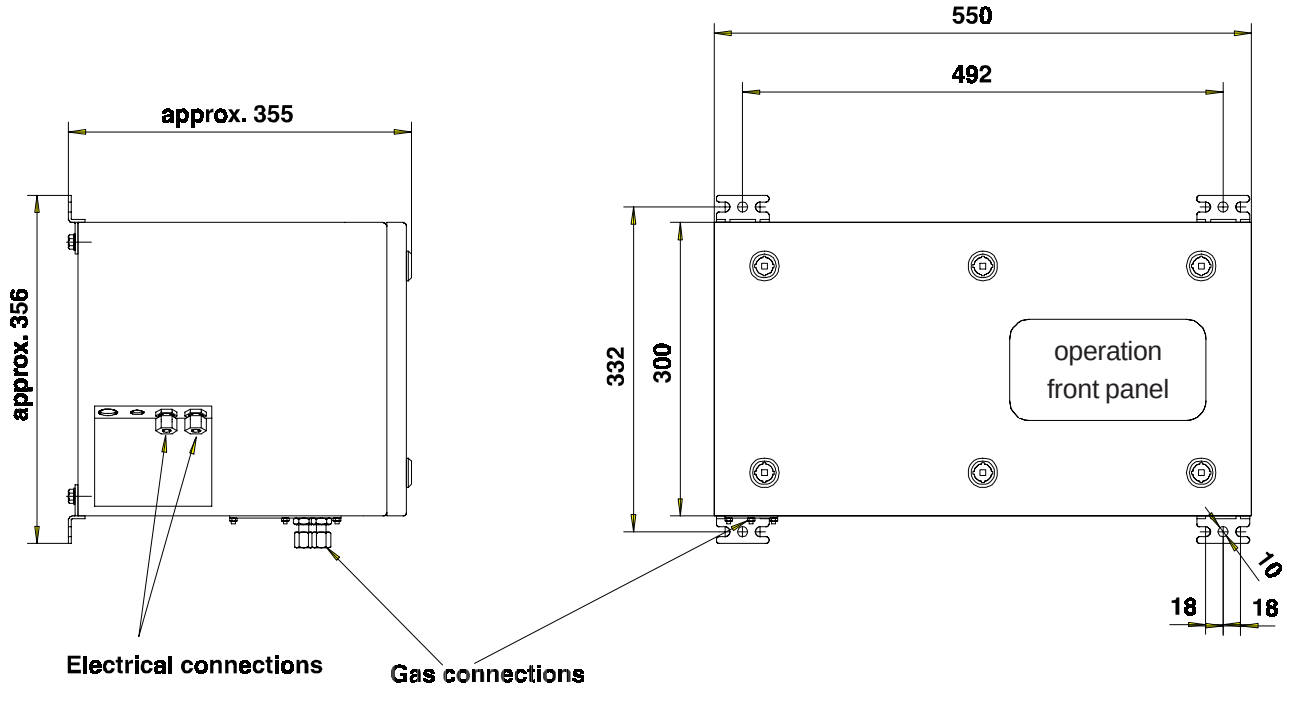


Fig. 24-1: Dimensional sketch/ Drill drawing BINOS® 100 F *(dimensions in mm)*

24.3 Voltage Supply

Input	plug jacket
Internal power supply	SL5
Power consumption	max. 100 VA
Fuses (internal)	T2,5A/250V (2 pieces)

24.3.1 Electrical Safety

Over-voltage category	II
Pollution degree	2
Safety Class	1

24.3.2 Power supply SL5

Input	terminal strips
Nominal voltage	230 / 120 Vac, 50 / 60 Hz
Input voltage	176–264 Vac und 85–132 Vac, 47-63 Hz manual switch
Input power	max. 300 VA
Output	terminal strips
Output voltage	24 Vdc, +5% -1%
Output power	max. 120 VA
Dimensions	65 x 125 x 103 mm (WxHxD)
Installation	Mountable on DIN supporting rails TS35

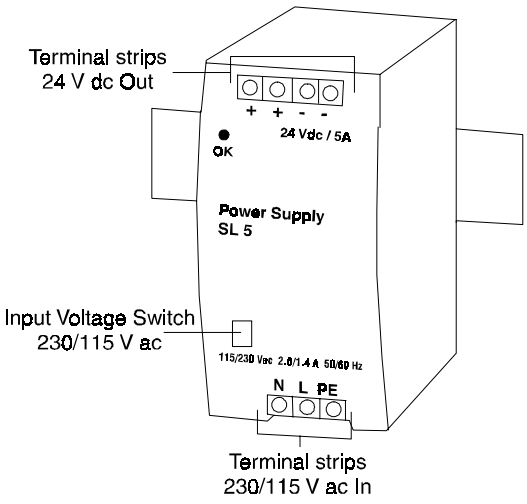


Fig. 24-2: Sketch SL 5

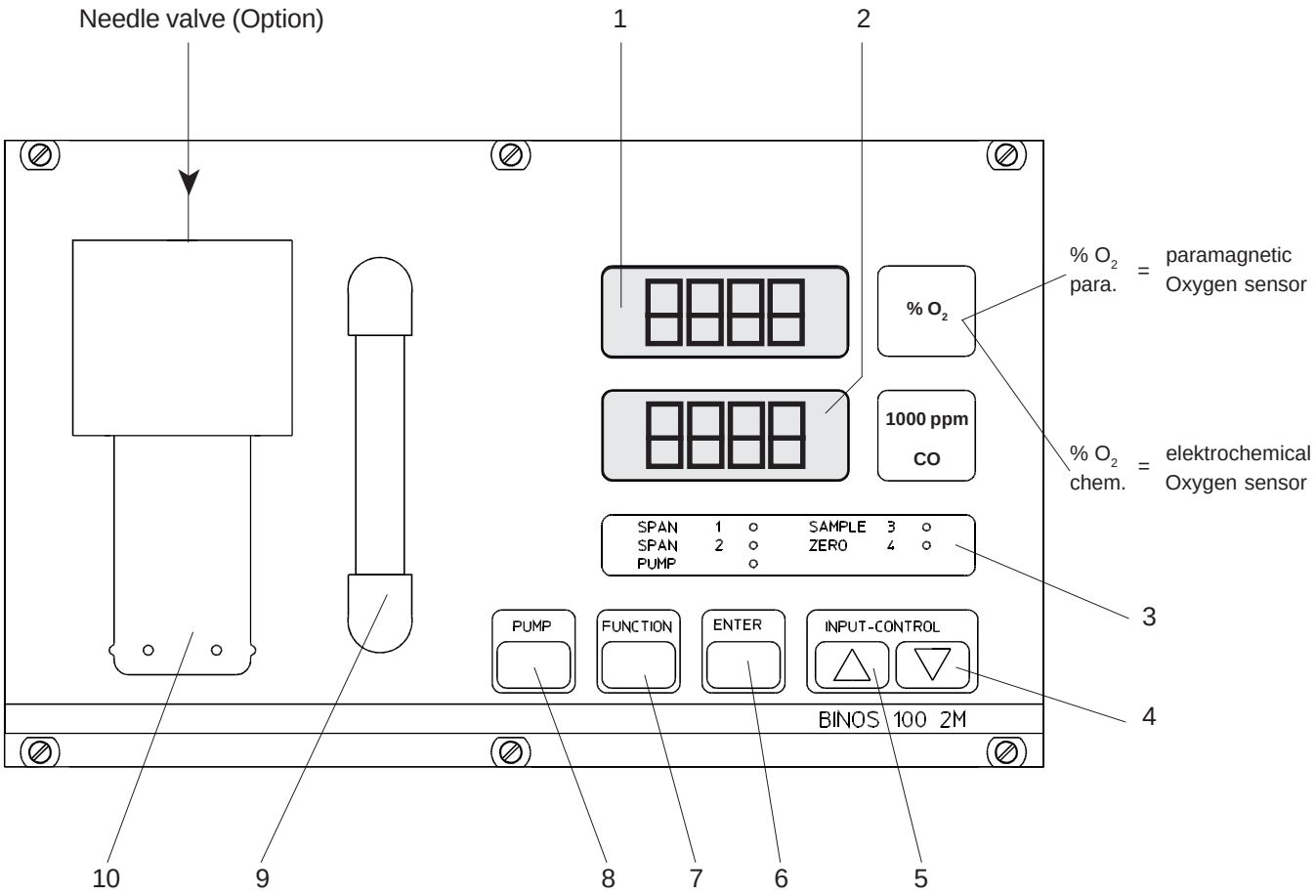


Fig. A-1: BINOS® 100 F, Operation Front Panel

1 LED - Display (Channel 1)
2 LED - Display (Channel 2)
3 Function - LED for Options "Solenoid Valves / Gas Sampling Pump"
4 Input setting control key **DOWN**
5 Input setting control key **UP**
6 **ENTER** key
7 **FUNCTION** key
8 Key for Option "Gas Sampling Pump"
9 Flow Meter (Option)
10 Fine Dust View Filter with Needle Valve (Option)