
OPERATING INSTRUCTIONS AND SAFETY NOTES

CWD2005 SPC



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1 Technical data

Ex-characteristic acc. to approval

Ex characteristic	Class 1, Division 2, Group D (NEC500)
Ambient temperature:	$5^{\circ}\text{C} \leq T_{\text{amb}} \leq 40^{\circ}\text{C}$

Gas inlets

Number of measuring points:	1
Calibration inlets:	1, internal through gas bottle
Gas connections:	Clamp ring connection 6 mm
Relative gas humidity:	$\leq 95\%$ condensate free
Inlet temperature gas:	max. 45°C

Calibration gas

See operating instructions CWD2005 plus

Power supply

Voltage:	230 VAC/50Hz or 115 VAC/50Hz
Power consumption:	1500 VA max.
Protection class:	I
Degree of protection	IP65 (protective housing)

Compressed air supply

max. input pressure	10 bar
min. input pressure	5 bar
Quantity/power:	20000 l/h

Ambient conditions

Operating temperature:	5 - 40°C
Humidity:	0 - 95 % relative humidity
Ambient pressure:	800 - 1100 hPa (0.8 - 1.1 bar)
Storage temperature:	-15 - 60°C

Interfaces

Relay:	3
Dig. interface:	RS232
Analog interfaces:	0-20 mA



Dimensions

Height:	2453 mm, with exhaust
Width:	1150 mm
Depth:	626 mm

Weight

Weight:	up to 350 kg
---------	--------------

Details – See Overall drawing

	 DANGER
	<p>The system must not be operated outside of the specified ambient temperature, $5^{\circ}\text{C} \leq T_{\text{amb}} \leq 40^{\circ}\text{C}$.</p> <p>Outside of this temperature range, the approval becomes void.</p>

1.1 System limits and overview

The system comprises:

- a protective housing
 - purged with compressed air
 - stainless steel as weather protection
- two terminal boxes
- a venting system of the protective housing
- a compressed air supply with filter, controller and manometer
- a combustion calorimeter

List of the important assembly groups, details according to drawing and parts list, see overall drawing.

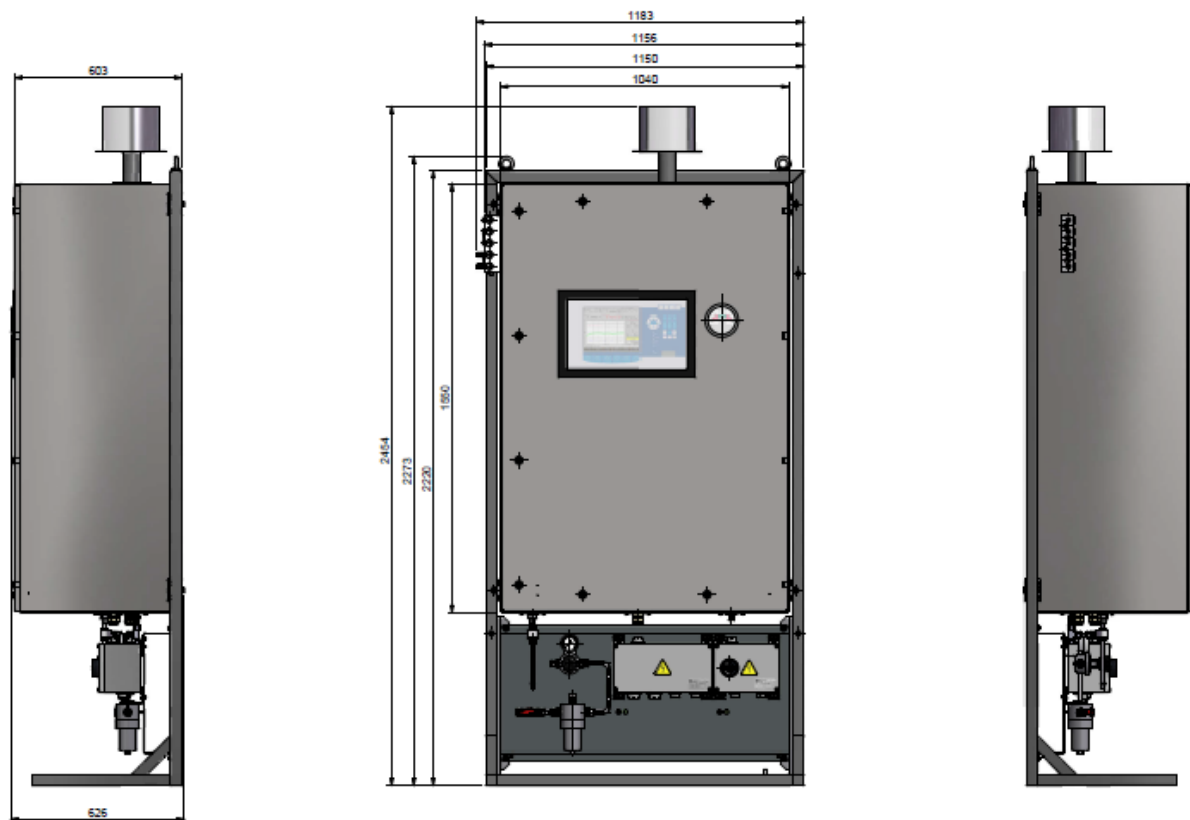


Fig. 1.1: System overview



Fig. 1.2: System overview, protective housing with combustion calorimeter

2 EC declaration of conformity

EC Declaration of Conformity for the combustion calorimeter UNION CWD2005 plus see operating instructions combustion calorimeter CWD2005 Plus.

3 Safety notes

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3.1 Warnings and symbols



In the operating instructions, the following names and symbols are used to denote particularly important information:

	 DANGER
	Immediate danger that can lead to serious physical injury or death.


	 WARNING
	Potentially hazardous situations that can lead to serious injury or death.

	 ATTENTION
	Potentially hazardous situations that can lead to minor physical injury. This can also be used for property damage.

	NOTE
	Denotes information that can make it easier to handle the system or help prevent property damage.

	 DANGER
	The system is approved according to the approval/limited product certification for use in potentially explosive atmospheres. Notices of possibly occurring dangerous situations in potentially explosive atmospheres are marked by this symbol in the operating instructions.

3.2 Fundamentals of proper use

	 WARNING
	<p>Proper use includes following these operating instructions! In addition to the following safety notes, always follow the safety instructions of the linked system components.</p> <p>Additional equipment or accessories that are not installed, delivered or manufactured by UNION Instruments GmbH require the approval of UNION Instruments GmbH as the manufacturer! Otherwise the guarantee expires.</p>

The system CWD2005 SPC - protective housing and combustion calorimeter CWD2005 Plus - is a sensor system to determine the calorific value of flammable process gases. The system, is designed as a device with overpressure encapsulation and rinsing by compressed air.

The system is intended according to the marking for use in an EX-zone acc. to NEC Class 1, Division 2, Group D.

Determining the calorific value of gas supports process control in industrial systems.


The system is intended for use in weather-proof areas for stationary mounting and installation and for an external power supply with 230V/50Hz and a compressed air supply.



In the case of toxic and explosive gases, observe the safety instructions at the setup site.

Any other use is considered improper. The manufacturer is not liable for the resulting damage; the associated risk is borne by the installer, fitter, operator or user. Only certified professionals may alter the system (calorimeter and protective cabinet) (mechanical, electrical or pneumatic modifications).

3.3 Personnel and qualifications




Establishing gas connections and working on the electric equipment of the system may only be carried out by specialists adhering to the safety regulations, especially those regarding explosive areas.

	NOTE
	Changes to the electric installation, equipment or gas-bearing modules by persons without corresponding authorisation/qualification and without consulting UNION Instruments GmbH cause loss of type test approval.

	 DANGER
	Changes to the installation or modules by persons without corresponding authorisation/qualification cause loss of type test approval.

3.4 Safety notes



3.4.1 General safety notes


 	 WARNING
	<p>The system may only be operated when all of the protective equipment is available and operable.</p> <p>Additional safety notes:</p> <p>☞ <i>before the corresponding chapters!</i></p>

3.4.2 Notes on specific hazards






 	 DANGER
	<ul style="list-style-type: none">• After installation, all gas conducting parts must be checked for leaks according to national/internal regulations!• Observe national regulations for assembly and installation, e.g. IEC/EN 60079-14, NEC500, NFPA 496!• All repairs that require the protective covering to be opened may only be performed by trained personnel.


3.4.3 Electrical connection


	 DANGER
	<p>Danger from electrical shock!</p> <p>Only a trained electrician may modify the electrical equipment of the system in accordance with the relevant guidelines!</p> <p>When the system has been opened, the parts identified by the adjacent symbol may still be live even when the master switch has been turned off. If necessary, disconnect system from the voltage mains!</p>

	NOTE
	<p>Changes to the electric installation by persons without corresponding authorisation/qualification cause loss of type test approval.</p> <p>Only operate relay with functional extra low voltage.</p> <p>Do not connect to the mains power supply.</p>




3.4.4 Process gas

   	<p> WARNING</p> <p>Establishing gas connections and working on the gas-bearing equipment of the system may only be carried out by specialists adhering to the safety regulations, especially those regarding explosive areas.</p> <p>No gas warning system is installed in the system!</p>
--	--






	<p>NOTE</p> <ul style="list-style-type: none">• The connecting parts need to be clean and free of residue. Impurities can enter the calorimeter and cause incorrect measurements and/or damage.• The inlet pressure for the gas connections must not exceed the values specified in the technical data.• Each connection needs to be carefully checked for leaks. If there are any leaks, the system will draw air, and the measurements will be incorrect.• Only use suitable pipes.• Use a separate line to drain off the condensate.
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	<p> ATTENTION</p> <p>The process gas must be free of condensate and dust if the system has no gas preparation system (or gas cooler).</p>
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3.4.5 Compressed air supply





 	 WARNING
	<p>Compressed air generates the protective functions against explosions by purging and creating an overpressure!</p> <p>Establishing compressed air connections and working on the compressed air equipment of the system may only be carried out by specialists adhering to the safety regulations, especially those regarding explosive areas.</p>


3.4.6 Flue gas

   	 WARNING
	<p>Serious risk of injury from escaping flue gas.</p> <ul style="list-style-type: none">• Flue gas must be emitted to the open air!• For flue gases with the components CO, H₂, and H₂S ensure sufficient room ventilation.

	NOTE
	<p>Flue gases / residual heat must be emitted to the open air through a suitable exhaust system.</p>

3.5 Operator safety precautions


  	 WARNING
	<ul style="list-style-type: none">• The operator needs to provide suitable safety equipment for the system to reliably prevent individuals from being injured from gas leaks.• Danger of stumbling over improperly laid supply lines.

Other safety precautions taken by the operator:  *corresponding chapters!*

3.6 Regular operator training

	NOTE
	Country-specific or company-internal regulations about regular user training by the operator must be observed, in particular training on handling explosive areas, gases, and electrical equipment!


3.7 Workplace hazard analysis

	NOTE
	Depending on the national regulations, the operator must perform a workplace risk analysis, if applicable, independent of the CE marking/approval of this combustion calorimeter.

Technical developments can give rise to deviations from these operating instructions. If you require additional information or if particular problems arise that are not fully addressed in this manual, please contact the following address:

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4 Safety device system

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4.1 Main switch

Switches the power supply for the protective cabinets and the process gas analyser in the protective cabinet.

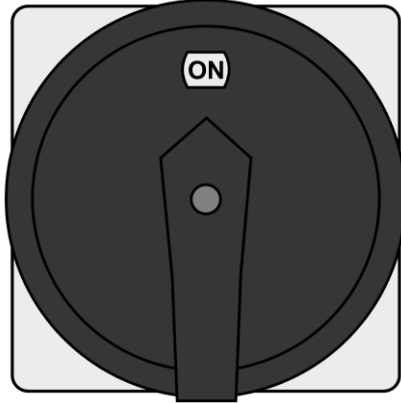


Fig. 4.1: Main switch (example)

4.2 Compressed air purged and pressurised encapsulated housing GFK

Components that can cause ignition are installed in a housing that is purged with compressed air. By the purging with air, the concentration of explosive gases remains below the lower explosibility limit. The resulting overpressure prevents the ingress of explosive gas mixed into the housing. Openings of the housing are designed in such a way that transfer of a potential ignition hazard to the outside is prevented.

4.3 Locks and door of the protective cabinet

The purged housing is closed with a door. The door is locked with 8 locks. Operated by a square box key.

4.4 Flame arresters

Flame arresters prevent the propagation of a potential ignition hazard to other system parts.

4.5 Cable / line glands

Cables and lines connected to the housing must ensure tightness in order to enable overpressure by the compressed air purging.

4.6 Pressure switch, pressure too low

De-energises the system as soon as the pressure value falls below 0.8 inWC. Gas inlets are closed.

4.7 Markings and warning system

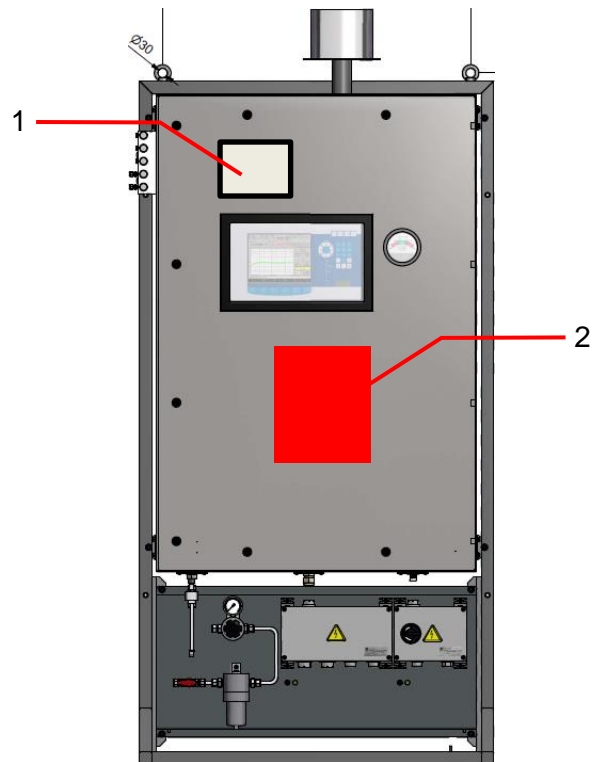


Fig. 4.2: Markings and warnings

1. Type plate
2. Warnings, purge duration, switching on

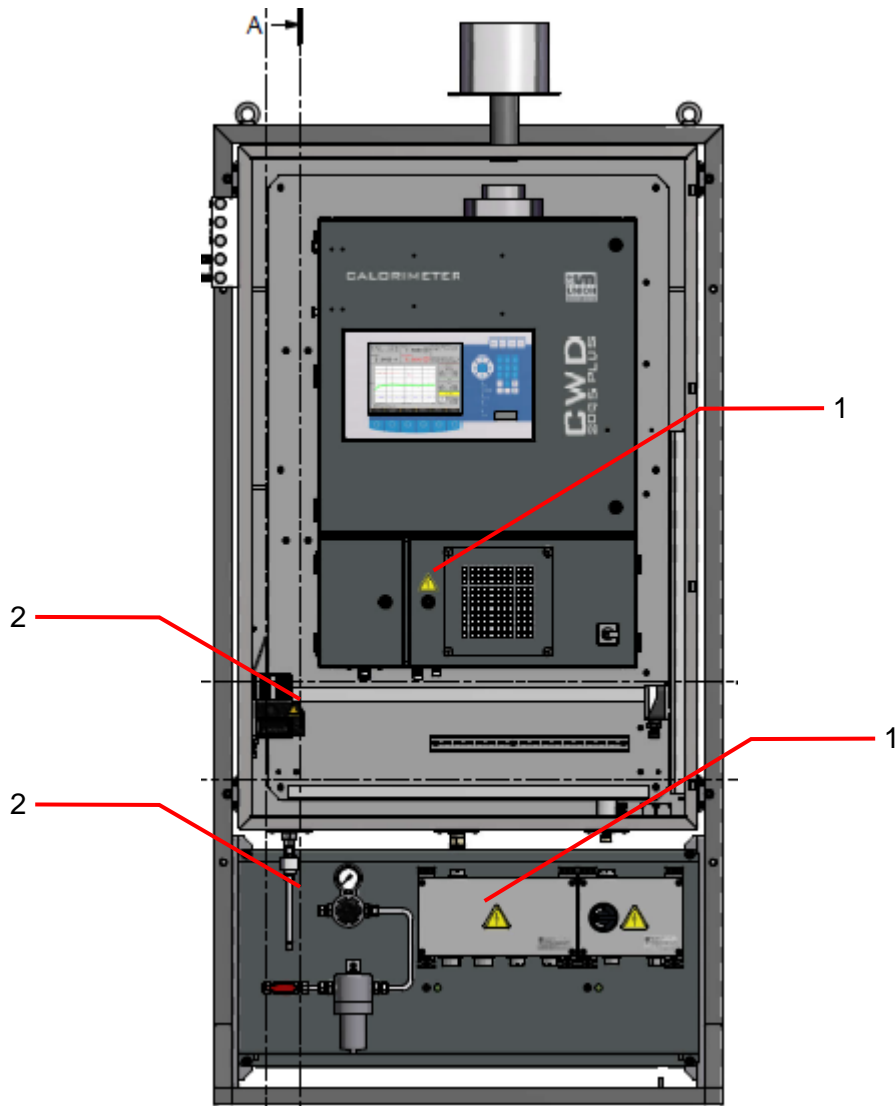



Fig. 4.3: Markings and warnings, terminal boxes

- 1. Warning note electricity
- 2. Warning note hot surface

5 Connections, transport, setting up

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	NOTE
	<p>Generally, the system is started up by Union Instruments GmbH or service technicians.</p> <p>If it is not transported, set up and started up by Union Instruments GmbH (for example in-house transportation and resale), coordinate the appropriate procedure with Union Instruments GmbH (☞ <i>Chapter 12 Service</i>).</p>

5.1 Connections of the system

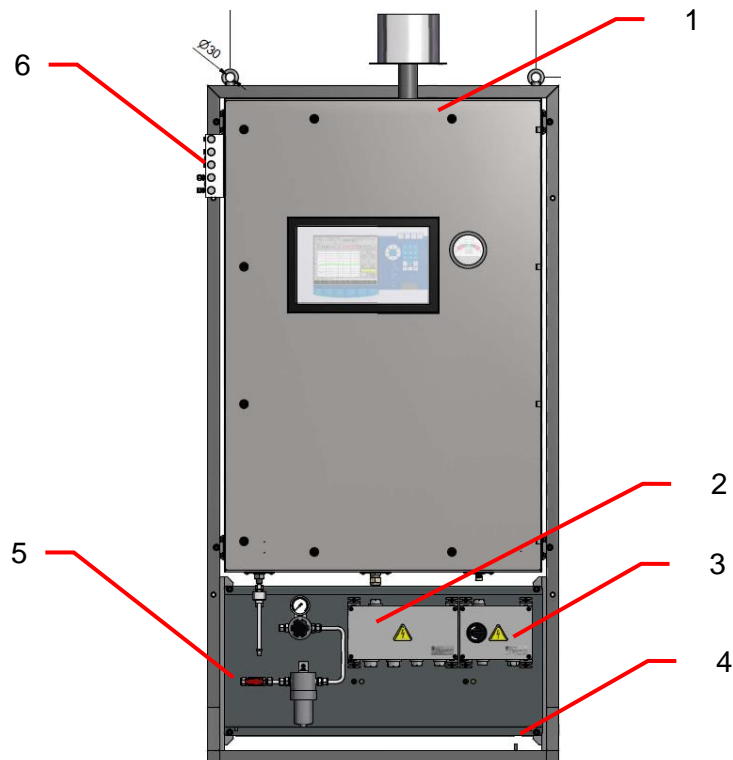





Fig. 5.1: Connections of the system




1. Outlet flue gas, compressed air
2. Connection of signal lines
3. Connection of power supply
4. Protective ground connection, multiple points
5. Compressed Air Inlet
6. Gas inlet, process, calibration, test gas

5.1.1 Accessories

 	 WARNING
	<p>Risk of injury/defective!</p> <p>Use of non-approved accessories can cause defects and be hazardous. This will render the warranty null and void. The operator is liable for incurring damage! Observe the Ex approval!</p> <p>Only use original accessories or accessories that have been approved by Union Instruments GmbH.</p>

5.2 Transport

	 WARNING
	<p>Risk of injury/defective!</p> <p>Transport damage can impede the protective function of the protective housing. In case of damage to the transport packaging or indications for improper transport, check the housing thoroughly!</p>

 	 WARNING
	<p>Possible injury from the system tipping over or falling from pallets and load carrying equipment.</p> <ul style="list-style-type: none">• Use suitable hoisting equipment for unpacking and transport!• Check the load bearing capacity and condition of the slinging equipment and carefully attach it.• Never stand under suspended loads.



NOTE



Shocks during transport can impair the protective housing. Therefore, check system/protective housing after transport for damage!

In case of damage during transport from improper handling, the carrier should perform a damage report within seven days (railway, post office, freight forwarder).

5.3 Ambient conditions



	 ATTENTION
	<p>Ambient conditions during storage and set up.</p> <p>Observe the ambient conditions! Contact Union Instruments GmbH if the system has been stored for more than three months or needs to be operated or stored under ambient conditions other than those specified!</p>

5.3.1 Storage conditions of the system

Freezing condensate water in the system can cause defects. Make sure that the system is free from gas / humidity residue.

Storage temperature: -15 - 60°C
Humidity: 0 - 95% relative humidity
Ambient pressure: 700 - 1400 hPa (0.7 - 1.4 bar)

5.4 Installing and connecting


	 DANGER
	<p>Risk of explosion!</p> <p>Danger due to invalid cable glands!</p> <p>If improper cable glands are used, the explosion protection cannot be ensured anymore!</p> <ul style="list-style-type: none">• Only use cable glands approved for the required ignition protection type!• Observe the technical data when selecting/using cable and line glands! <p>Danger due to open drilled holes or unused cable glands!</p> <p>If drilled holes are open or cable glands unused, the explosion protection cannot be ensured anymore!</p> <ul style="list-style-type: none">• Always close open drilled holes and unused cable glands with approved sealing plugs!• Sealing plugs must be inserted with a tool!• Observe the technical data when selecting/replacing suitable sealing plugs!

5.4.1 Setup site

The installation location of the system must meet the following requirements:

- Observe the requirements acc. to the technical data, especially the ambient conditions and the IP protection type.
- clean room
- protected from direct weather impact and direct sunlight
- Insure a clean, sufficient amount of compressed/ambient air for undistorted measurements
- Ensure that the load-bearing capacity of the environment is sufficient
- Design sufficient space on the sides for mounting and connecting lines
- install according to the requirements of explosion protection marking

	 WARNING
	Leaking process gas needs to be discharged by the operator into a safe environment!



	NOTE
	The compressed air must be dry and free from dust and oil! Humid, dirty air will distort the measurement results of the analyser.

5.4.2 Attachment



The system is designed for fixed installation on the ground. Provide suitable means of attachment.

Ensure sufficient space for operating, maintenance the system.

Ensure sufficient load-bearing capacity of the environment and the means of attachment.

	 WARNING
	<p>Danger of injury due to the weight of the system!</p> <p>Weight see technical data!</p> <p>Use measures against falling and suitable hoisting tools!</p>

5.4.3 Opening and closing the housing lids/doors

	 DANGER
	<p>Risk of explosion!</p> <p>Terminal boxes</p> <p>See operating instructions of the terminal boxes</p> <ul style="list-style-type: none">• Danger due to damaged seals and sealing surfaces, danger due to improper screw connections! <p>Protective housing of combustion calorimeter</p> <p>See operating instructions protective housing</p> <ul style="list-style-type: none">• Danger due to damaged seals and sealing surfaces!• If seals are damaged seals and the doors closed improperly, the explosion protection cannot be ensured any more!• If the doors are improperly locked, the explosion protection cannot be ensured any more! <p>A repair must only be done according to the design specifications of the manufacturer.</p>

Terminal boxes

Loosen screws at the housing lid and remove lid carefully. Make sure not to remove/lose the spacer sleeves!



Protective housing


Observe notes to open the doors - see notes on the housing!

Protective housing is under pressure – Do not open doors before overpressure is relieved!

Observe door locks!

5.4.4 Process gas

	 DANGER
	<p>Risk of explosion!</p> <p>Danger due to invalid line glands!</p> <p>If improper line glands are used, the explosion protection cannot be ensured anymore!</p> <ul style="list-style-type: none">• Only use line glands approved for the required ignition protection type!• Observe the technical data when selecting/using cable and line glands! <p>Danger due to open drilled holes or unused line glands!</p> <p>If drilled holes are open or cable glands unused, the explosion protection cannot be ensured anymore!</p> <ul style="list-style-type: none">• Always close open drilled holes and unused line glands with approved sealing plugs!• Observe the technical data when selecting/replacing suitable sealing plugs!

	NOTE
	<ul style="list-style-type: none">• The connecting parts need to be clean and free of residue. Impurities can enter the calorimeter and cause incorrect measurements and/or damage.• The inlet pressure for the gas connections must not exceed the values specified in the technical data of the calorimeter.• Each connection needs to be carefully checked for leaks. If there are any leaks, the system will draw air, and the measurements will be incorrect.• Only use suitable pipes.

	 ATTENTION
	<p>The process gas must be free of condensate and dust if the system has no gas preparation system!</p>

5.4.5 Connection of process and calibration gas

Maximum gas inlet pressure see technical data.

Then connect the process gas inlet with the screw connection and to the housing of the system, see Fig. 5.1.

Screw connections see provided operating instructions.

The inlet for process and calibration gas to the protective housing and combustion calorimeter is already connected.

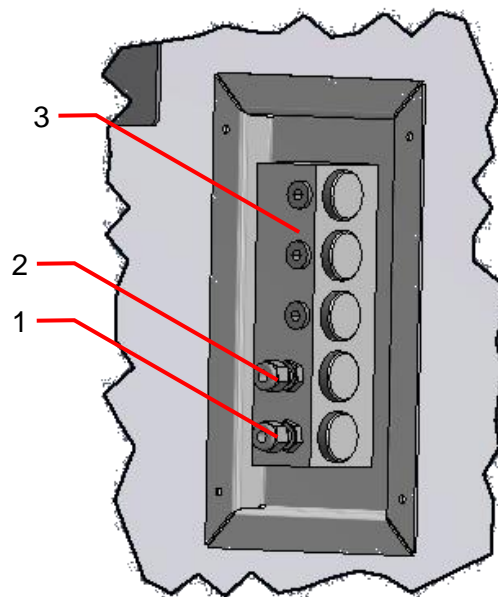


Fig. 5.2: Terminal block, inlet process and calibration gas

1. Calibration gas inlet
2. Process gas inlet
3. Nozzle block inlet gas

Recommended material for connecting lines is stainless steel, outer diameter \varnothing 6mm.

5.4.6 Compressed air connection

Maximum inlet pressure of compressed air see technical data.

Then connect the process gas inlet with the screw connection and to the housing of the system, see Fig. 5.1.

The inlet for compressed air to the protective housing and combustion calorimeter is already connected.

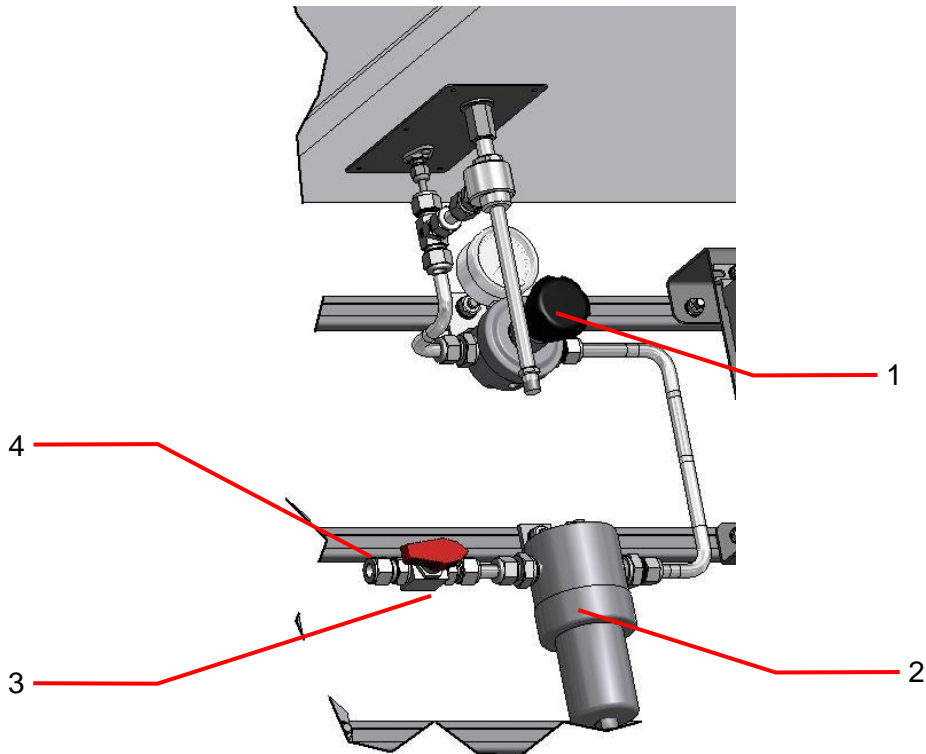




Fig. 5.3: Purge air, supply and distribution

1. Pressure controller, overpressure in protective housing, PCV 1-Air
2. Air filter with indicator
3. Shut-off valve for compressed air
4. Compressed air inlet

5.4.7 Electrical connection

	 DANGER
	<p>Danger from electrical shock!</p> <p>Only a trained electrician may modify the electrical equipment of the system in accordance with the relevant guidelines!</p> <p>When the system has been opened, the parts identified by the adjacent symbol may still be live even when the master switch has been turned off. If necessary, disconnect system from the voltage mains!</p>



The electric line to the power supply must meet the requirements for operation in potentially explosive atmospheres, e.g. IEC/EN 60079-14, as well as national regulations.

The cable gland must meet the requirements of EX zones and be matched to the cable and the threaded hole in the housing. Observe the operating instructions of the cable glands!

Integrate all blank, not energized metal parts independent of the operating voltage into the protective ground system.

The outer protective ground connection at the system is designed for cable lugs. Avoid loosening of the cable, lay the cable close to the housing.

5.4.8 Electrical interfaces

	 WARNING
	<p>Untrained personnel starting the system may endanger people and equipment.</p> <p>Only trained service technicians may start up the analyser.</p>

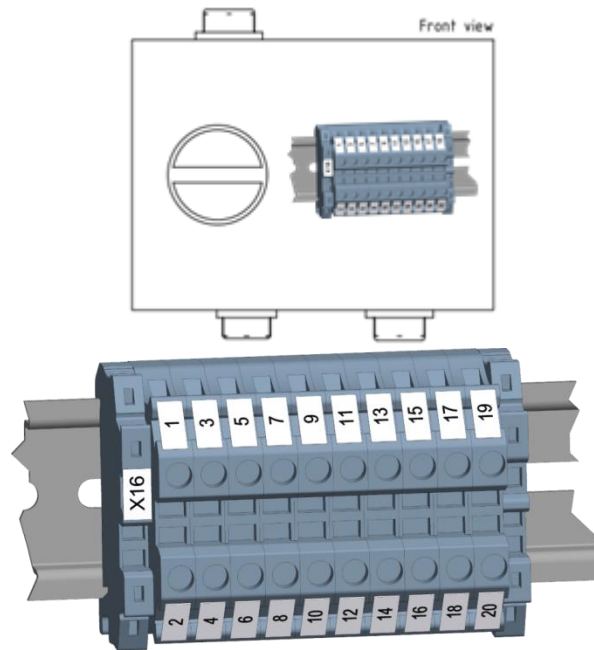


Fig. 5.4: Electric connection system – power supply X16

Assignment see provided wiring diagram! Connect the system via terminals L1, N, PE to the voltage supply according to national/internal regulations.

- | | |
|---------|---------------|
| X16.16. | Connection L1 |
| X16.18. | Connection N1 |
| X16.20. | Connection PE |

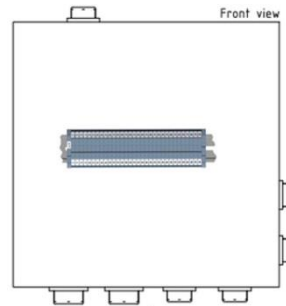


Fig. 5.5: Electric connection system – signal lines X17



	<i>Customer</i>	<i>Union Instr.</i>	<i>Cable</i>	<i>Union Instr.</i>				
Relay	X17.2 Relay K1	COM	X17.1	nnG1.1	X14.1	lower row	Process	
		NO	X17.3	nnG1.2	X14.2			
		NC	X17.5	nnG1.3	X14.3			
	X17.8 Relay K2	COM	X17.7	nnG1.4	X14.4	lower row	Service request	
		NO	X17.9	nnG1.5	X14.5			
		NC	X17.11	nnG1.6	X14.6			
	X17.14 Relay K3	COM	X17.13	nnG1.7	X14.7	lower row	Error	
		NO	X17.15	nnG1.8	X14.8			
		NC	X17.17	nnG1.9	X14.9			
4..20mA outputs	X17.20 IOut1	+	X17.19	nnG1.10	X5.1	lower row	Wobbe index	
		-	X17.21	nnG1.11	X5.2			
	X17.24 IOut2	+	X17.23	nnG1.12	X5.3		lower row	Calorific value
		-	X17.25	nnG1.13	X5.4			
	X17.28 IOut3	+	X17.27	nnG1.14	X5.5		lower row	Specific gravity
		-	X17.29	nnG1.15	X5.6			
	X17.32 IOut4	+	X17.31	nnG1.16	X5.7		lower row	not installed
		-	X17.33	nnG1.17	X5.8			

Fig. 5.6: Electric connection X17 – Relay K1 – K3, analogue output

	<i>Customer</i>	<i>Union Instr.</i>	<i>Cable</i>	<i>Union Instr.</i>				
4..20mA outputs	X17.36 IOut5	+	X17.35		X5.9	upper row	not installed	
		-	X17.37		X5.10			
	X17.40 IOut6	+	X17.39		X5.11		upper row	not installed
		-	X17.41		X5.12			
Digital Inputs	X17.46 Dig.In 1	DGNDE	X17.43		X3.1	lower row	customer specific use	
		E-DI1	X17.45		X3.2			
	[...]	[...]		[...]				
	[...]	[...]		[...]				





Fig. 5.7: Electric connection X17 – analogue and digital output, digital input

Assignment ask for wiring diagram. Values and ranges such like Wobbe index, Calorific value are exemplary, real values are customer specific.

	 WARNING Outputs (relay, analog, digital) and inputs must only be operated with safety extra-low voltage! Do not connect to mains / supply voltage!
---	--


Maximum load of the relay connections 30VDC / 1A.



5.4.9 Operator safety precautions

  	 WARNING
	<ul style="list-style-type: none">• Operate the system according to the requirements for potentially explosive atmospheres.
	<ul style="list-style-type: none">• The operator needs to provide suitable safety equipment for the system to reliably prevent individuals from being injured from gas leaks.
	<ul style="list-style-type: none">• Any leaking process gas needs to be diverted into a safe environment.• Identify the exit point of the diverted gas with a warning.• Danger of stumbling over improperly laid supply lines.


Install the supply lines in a suitable manner.

5.5 Startup after setup

	NOTE
	<p>Before commissioning/transport of the combustion calorimeter, make sure that all transport safeguards are removed/attached.</p> <p>See separate operating instructions for combustion calorimeter!</p>

	 WARNING
	<p>Untrained personnel starting the system may endanger people and equipment.</p> <p>Only trained service technicians may start up the analyser.</p>



5.6 Documentation


 A simple line drawing of a hand with the index finger pointing to the right.	<p>NOTE</p> <p>Union Instruments GmbH recommends keeping a maintenance manual and documenting all jobs and tests.</p>
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6 Commissioning, operation, removing from service

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6.2.1	Workplaces.....	6—4
6.3	Operation	6—4
6.4	Decommissioning / switching off.....	6—6


6.1 Commissioning/start-up

	 <h1 style="margin: 0;">ATTENTION</h1>
	<p>To establish operational readiness, including of the linked system components, according to the corresponding operating instructions.</p>

	<h1 style="margin: 0;">NOTE</h1>
	<p>The following table includes abridged instructions for commissioning the system after a longer standstill.</p> <p>To turn on the system after a short downtime, a few steps can be omitted: ☞ <i>right column!</i></p>

Steps	Startup	Turning on
Check whether the ambient conditions (☞ <i>Technical Data</i>) and the EX marking meet the requirements.	X	X
Check if the system is attached safely.	X	
Check that the gas analysis device is suitable for the process gas.	X	
Check that the process gas is correct.	X	
Check that the calibration gas is correct.	X	
Check that the gas connections are correct and tight.	X	X
Check the filters (water / fine filter), – check for condensate/dirt.	X	X
Establish/switch on the operator energy and media supply.	X	X
Switch on / open compressed air, see Fig. 6.1	X	X
Purge for 30 minutes	X	X
Check overpressure in protective housing, min. 1.0 inWC, see Fig. 6.1.	X	X
Turn on the main switch, see Fig. 6.1.	X	X
Make sure the linked system components are ready to start.	X	X
 If the system was only switched off temporarily, production can be resumed!		

Open calibration gas supply when combustion calorimeter is configured with automatic calibration.

 A simple line drawing of a hand with the index finger pointing to the right.	<p>NOTE</p> <p>For first starting or starting up after a long downtime, back up the configuration of the system / gas analysis device.</p> <p>Let a service technician do the backup or ask Service for special instructions.</p>
--	--

6.2 Description of the workplaces / operating elements

NOTE

This chapter only discusses the elements normal operators use to operate the system to establish the protective function by purging and overpressure.

6.2.1 Workplaces

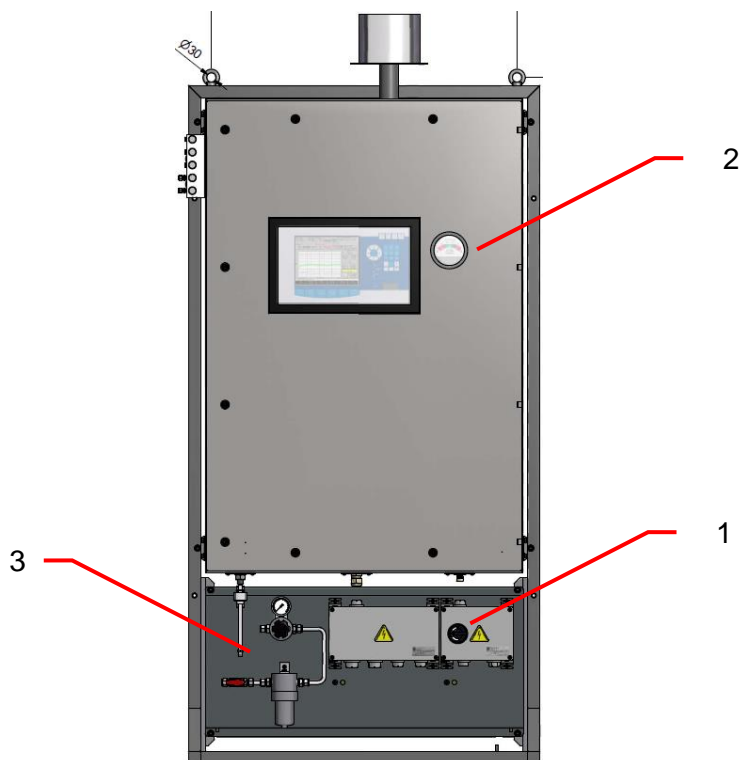





Fig. 6.1: Workplaces

Item No.	Designation	Function / activity
1	Main switch	Switch on/off, de-energises the system
2	Pressure display, manometer	Displays overpressure in protective housing, displays status
3	Compressed air inlet	opens/closes the compressed air supply, displays pre-pressure, displays the status of the compressed air filter

6.3 Operation



 	 WARNING
	<p>Danger of injury!</p> <p>Only operate combustion calorimeter</p> <ul style="list-style-type: none">• if all lines have been installed and checked for leaks according to national regulations.• if an overpressure of 1.0 inWC is displayed!


In order to ensure the protection function and automatic analysis operation,


- check the pressure indicator – display in the safety range (green range) – 1.0 inWC
- check the indicator at the compressed air filter
- adjust the overpressure in the housing using the controller PCV 1-Air

Operation of the combustion calorimeter is described in the provided operating instructions.

6.4 Decommissioning / switching off

	 <h1 style="margin: 0;">ATTENTION</h1>
	<p>To remove the system from service, the linked system components must also be removed from service according to their operating instructions.</p>

	<h1 style="margin: 0;">NOTE</h1>
	<p>The following table contains the steps for decommissioning the analyser for a long period.</p> <p>If the system shall only be switched off for a short time, some of the steps are not necessary: ☞ <i>column <u>Turn off!</u></i></p> <p>At first start-up or before longer downtime, back up the configuration of the system / gas analysis device.</p> <p>Let a service technician do the backup or ask Service for special instructions.</p>

Steps	Turn off	Decommissioning
Turn off the main switch.	X	X
Rinse system for 30 minutes – let compressed air be switched on until device has cooled down and no voltage is applied any more	X	X
Shut compressed air supply	X	X
Disconnect the device from the process, close the line professionally.		X
Shut down the linked system components.	X	X
 If the system is only to be taken out of service for a short time, the sequence stops here!		
If required, disconnect / switch off the operator's energy and media supply and the signal transmission professionally.		X
If feasible, pack the system in a suitable way.		X

7 Maintenance and service

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7.1 Service



When working in the potentially explosive areas, observe the pertinent safety precautions.

The measuring quality of the gas analyser can only be ensured if the service intervals are maintained.

The explosion protection function of the protective housing and the flame arresters can only be ensured if the service intervals are maintained.

7.1.1 Preparations

The feed lines to linked system components can be closed for servicing purposes. Once operation has been resumed, they need to be reopened.

	 DANGER
	<p>Serious risk of injury from electricity.</p> <ul style="list-style-type: none">• The parts of the combustion calorimeter identified by the adjacent symbol may still be live even when the main switch has been turned off. If necessary, disconnect combustion calorimeter from the voltage mains!• Turn off main switch, disconnect from power supply if necessary and secure against connecting/turning on again!• Only a trained electrician may work on the electrical equipment of the combustion calorimeter!

DANGER

Risk of explosion!

If the pressure monitoring system is bridged for maintenance/service work, the device can be operated permanently without compressed air purging and overpressure.

There is no protection against explosions!

- Bridging only for service and maintenance work!
- Bridging only by authorised trained staff!
- Use suitable measures /warnings to prevent permanent operation!

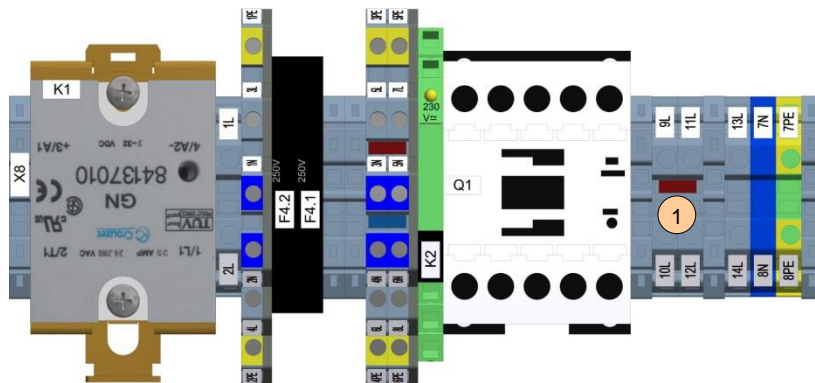
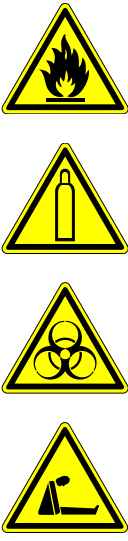






Fig. 7.1: Top hat rail X8, Service bridge

Item No.	Designation	Function / activity
1	Service bridge	bridge pressure monitoring system, combustion calorimeter can be used without protection system

	 WARNING
	Serious risk of injury from exiting gas.
	<ul style="list-style-type: none">• Before maintenance works, shut down the combustion calorimeter and, if necessary, any connected system components!• The gas connections may only be established by trained personnel. Follow the applicable guidelines at the installation site.

7.1.2 Maintenance work/Inspection

	NOTE
	<p>The maintenance work must be carried out in accordance with the inspection and maintenance schedule! The type and extent of the wear depends on the individual application and operating conditions. Thus, all maintenance intervals specified are guide values only.</p> <p>Maintenance work at the gas analysing device and components of the system are described in the provided documentation – observe intervals and work processes!</p>

	 DANGER
	<p>Loss of protective function!</p> <p>The type and degree of wear and tear highly depends on the individual conditions of usage and operation. Thus, all maintenance intervals specified are guide values only.</p>

The following overview only describes the checks/work in regard to the protective housing and the functions for explosion protection.

Inspection	Interval (recommended)
------------	---------------------------

Weekly inspection



Compressed air inlet free	weekly, or when required
Filter for compressed air free	weekly, or when required
Pressure indicator at protective cabinet readable and plausible	weekly, or when required
Flame arrester consistent and not soiled	weekly, or when required
Exhaust system free	weekly, or when required

Quarterly inspection

Process gas analyser calibrated according to manufacturer's specifications	every 3 months, latest annually or when required
--	--

Observe related operating instructions of the combustion calorimeter and other components!

7.2 Troubleshooting

	 DANGER
	<p>Loss of protective function!</p> <ul style="list-style-type: none"> • After several short-circuits/ignitions in the protective cabinet, the protective function cannot be ensured anymore! • After resetting/replacing the thermal fuse in the process gas analyser, check the device for proper function! • In case of housing damage (protective housing, terminal boxes), check their protective functions and replace! <p>Replace the flame arresters!</p> <ul style="list-style-type: none"> • After fire or explosion at the flame arrester. • Visible mechanical damage at housing, lid or retaining ring of flame arrester. • Strong soiling or corrosion of the fire protection.

NOTE



Troubleshooting in the system is divided into the following categories:

- insufficient pressure of compressed air

For other faults, observe related operating instructions of the process gas analyser and other components!

7.2.1 Preparations

The feed lines to linked system components can be closed for servicing purposes. Once operation has been resumed, they need to be reopened.



WARNING



Serious risk of injury from electricity and exiting gas.

- Observe the safety precautions of the corresponding EX area!
- Before maintenance works, shut down the combustion calorimeter and, if necessary, any connected system components!
- Turn off main switch, disconnect from power supply if necessary and secure against connecting/turning on again!
- After turning off the main switch, purge for at least 30 minutes with compressed air!
- Only a trained electrician may work on the electrical equipment of the process gas analyser.
- Parts of the process gas analyser labelled with this symbol may still be live even when the main switch has been switched off.
- If necessary, disconnect combustion calorimeter from the voltage mains!

7.2.2 Changing/replacing fuses

Fuses may only be exchanged by an electrician or service professional. Choose the type approved by UNION.
Specification of the fuses, refer to UNION.


7.2.3 Messages/malfunctions

Display of messages/malfunctions

Pressure switch triggers, required overpressure not reached

- Check filter of compressed air supply for free flow / dirt
- Check inlet pressure of compressed air supply, see technical data
- Check function of the pressure switch
- Check function of the faceplate in the exhaust air duct system
- Check free flow of compressed air in all concerned lines/connections

7.3 Service

	NOTE
	<p>If you have any questions Union Instruments GmbH will be happy to assist. In case of orders or technical questions, please have the customer number, telephone number for return calls, the type and number of the process gas analyser (see the type plate) and the required spare parts and parts list numbers to hand.</p>

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8 Disposal

Following decommissioning, the analyser can be returned to Union Instruments GmbH.

Suggestion: Let Union Instruments GmbH dispose of the combustion calorimeter.





	 WARNING Risk of injury from electricity and exiting gases in the combustion calorimeter, if applicable.
---	---

If necessary, purge the gases. E.g. by running a calibration with ambient air.

Before disassembly, separate combustion calorimeter from energy supplies!

 Umweltgefährlich	NOTE Observe the national regulations on disposing machines and operating materials! Sort the parts according to group and recycle properly.
---	---

9 Spare parts

  	 WARNING
	<p>Use of non-approved spare parts causes loss of the EX approval! This will render the warranty null and void! The operator is liable for incurring damage!</p> <p>The use of non-approved spare parts (such as parts from other manufacturers, parts with different specifications, replicas of used and wear parts) can cause defects and be hazardous. This will render the warranty null and void. The operator is liable for incurring damage!</p> <p>When replacing standard components, only use identical components by the original manufacturer. If components are discontinued or components by different manufacturers are used, request the manufacturer approval by Union Instruments GmbH.</p>

Spare parts can be ordered from Union Instruments GmbH:

Identify and write down type, number and designation of the part, order part.

10 Annex

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