Operating Manual

Analytical Computer GC9300

Firmware 2.05
Status: October 15th, 2024
Version: EN16.0

Manufacturer

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Translation of the original document

The **PGC9300_AC_manual_en_16.0** for the gas chromatograph PGC 9300 from October 15th, 2024 is a translation of the original German manual. Anyhow, this document may serve as reference for translations into other languages.

Remark

Please use in case of any uncertainties the German version as main reference

Note

The latest version of this manual (and the one other devices) can be downloaded at your convenience from our Internet page:

www.rmg.com

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Contents

1 About this manual

1.1 Structure of this manual

This manual provides information that is necessary for fault-free and safe operation.

The analytical computer GC 9300 was designed and produced according to the state of the art and generally recognized safety standards and directives. However, its use can entail dangers that are avoidable by complying with this manual. The analytical computer GC 9300 must only be used as intended and in technically sound condition.

⚠ Warning

Unintended use voids all warranty claims and the analytical computer GC 9300 can also lose its approvals.

1.1.1 Abbreviations

The following abbreviations are used:

ca.	circa, about
max.	maximum
min.	minimum
e.g.	for example
MID	Measurement Instruments Directive
PED (DGRL)	Pressure Equipment Directive (Druckgeräterichtlinie)
DSfG	Digitale Schnittstelle für Gasmessgeräte Digital interface for gas flow rate meters, created under the umbrella of the DVGW
DVGW	Deutsche Verein des Gas- und Wasserfaches German Gas and Water Association
MessEG	Measuring and calibration law Law on placing and providing measuring instruments on the market, their use and calibration; valid since 1.1.2015
MessEV	Measuring and calibration regulations Regulation on placing and providing measuring instruments on the market; their use and verification;

	11.12.2014
TCP/IP	Transmission Control Protocol/Internet Protocol
IP (-Adress)	Address assigned to devices based on the Internet Protocol (IP). This makes devices addressable and accessible in the network.
LAN	LAN (Local Area Network) is a local or local network, a computer network.
Eth1 / Eth2	Ethernet interface 1 /2 Ethernet technology enables data to be exchanged in the local network between the connected devices.
SNTP	Simple standard (NTP = Network Time Protocol) to synchronisierung von Uhren in Computersystemen
PTB	Physikalisch-Technische Bundesanstalt German authority for calibration tasks

1.1.2 Symbols

The following symbols are used:

1, 2, …	Identifies steps for work tasks
..	

1.1.3 Structure of notices

The following notices are used:

Danger

This warning notice informs you of imminently threatening dangers that can arise due to misuse/operator error. If these situations are not avoided, death or severe injuries can occur.

Warning

This warning notice informs you of potentially dangerous situations that can arise due to misuse/operator error. If these situations are not avoided, minor injuries can occur.

Caution

This notice informs you of potentially dangerous situations that can arise due to misuse/operator error. If these situations are not avoided, damage to the device or nearby property can occur.

Note

This notice informs you of potentially dangerous situations that can arise due to misuse/operator error. If these situations are not avoided, damage to the device or nearby property can occur.

This notice can provide you with helpful tips to make your work easier. This notice also provides you with further information about the device or the work process in order to prevent operator error.

1.1.4 Working with the device

1.1.4.1 Safety notices Danger, Warning, Caution and Note

Danger

All of the following safety notices must be observed!

Disregard of the safety notices can result in danger to the life and limb or environmental and property damage.

Bear in mind that the safety warnings in this manual and on the device cannot cover all potentially dangerous situations, because the interaction of various conditions can be impossible to foresee. Merely following the instructions may not suffice for correct operation. Always remain attentive and consider potential consequences.

- Read this operating manual and especially the following safety notices carefully before working with the device for the first time.
- Warnings are provided in the operating manual for unavoidable residual risks for users, third parties, equipment or other property. The safety instructions used in this manual do not refer to unavoidable residual risks.
- Only operate the device in fault-free condition and in observance of the operating manual.
- Compliance with local statutory accident prevention, installation and assembly regulations is also mandatory.

Note

All notices in the manual must be observed.

Use of the analytical computer GC 9300 is only permitted in accordance with the specifications in the operating manual.

RMG assumes no liability for damages arising due to disregard of the operating manual.

Danger

Service and maintenance tasks or repairs that are not described in the operating manual must not be carried out without prior consultation with the manufacturer.

Changes to the analytical computer GC 9300 are not permitted.

The technical specifications must be observed and followed for safe operation (*Chapter 6 Technical data*). Performance limits must not be exceeded.

For safe operation, the analytical computer GC 9300 must only be used in the scope of the intended use (*Chapter 1.3 Function* to *1.5 Area of applicability*)

The GC 9300 complies with current standards and regulations. However, danger can arise with misuse and the measuring element of the PGC can be destroyed due to operator error.

1.1.4.2 Dangers during commissioning

Initial commissioning — The initial commissioning must only be carried out by specially trained personnel (training by RMG) or RMG service personnel.

Note

An acceptance test certificate must be created during the commissioning. This, the operating manual and the CE Declaration of Conformity must be stored so that they are always readily available.

All sharp edges on the device were removed, insofar as possible. However, suitable personal protective equipment provided by the operator must be worn during all work.

Danger

This symbol is used in the manual as a warning of the danger of explosion; observe the instructions following the symbol. With the danger of explosion, the following must be observed, in particular:

The analytical computer GC 9300 is not approved or designed for use in explosion-prone areas. Installation must only take place in safe rooms. The analytical computer is intended for installation in a control cabinet in an electronics room.

Install the device as specified in the operating manual. If the device is not installed as specified in the operating manual, there may be a risk that other connected devices have adequate explosion protection.

Inadequately qualified persons working on the equipment are unable to correctly estimate dangers. Explosions can be triggered. Only work on the equipment if you have the appropriate qualifications.

Components can be damaged if you do not use suitable tools and materials. Use tools that are recommended for the respective work in the operating manual.

Mechanical installation	Mechanical installation must only be performed by appropriately qualified technicians.
Electrical installation	Installation on electrical components must only be carried out by qualified electricians.
Mechanical and/or electrical installation	These qualified personnel require training specifically for work in explosion-prone areas. Qualified personnel are persons who have training / education in accordance with **DIN VDE 0105, IEC 364** or **comparable standards**.

Note

- **Before connecting the voltage supply, ensure that all gas lines to the measuring element and the measuring element itself have been flushed. If there is still air in the line system or the measuring element, the measuring element will be destroyed. For this reason, you must also observe the operating manual for the PGC measuring element CP 4900!**

Danger

- **In general, the replacement of an analytical computer GC 9300 must only be carried out by RMG Service.**

1.1.4.3 Dangers during maintenance and repair

Operating personnel	The operating personnel use and operate the device in the scope of the intended use.
Maintenance personnel	Work on the device must only be carried out by qualified personnel who can carry out the respective tasks on the basis of their technical training, experience and familiarity with the applicable standards and requirements. These qualified personnel are familiar with the applicable statutory regulations for accident prevention and can independently recognize and avoid potential dangers.
Maintenance and cleaning	Maintenance and cleaning must only be performed by appropriately qualified technicians.

Danger

Inadequately qualified persons working on the equipment are unable to correctly estimate dangers. Explosions can be triggered.

Danger

The device can be damaged if it is not cleaned as specified in the operating manual. Only clean the device as specified in the operating manual.

Components can be damaged if you do not use suitable tools.

- **Only clean the device with a slightly damp cloth!**

1.1.4.4 Qualification of personnel

Note

In general, the following is recommended for all persons working with or on the analytical computer GC 9300:

- **Training / education for work in explosion-prone areas.**
- **The capacity to be able to correctly estimate dangers and risks when working with the analytical computer GC 9300 and all connected devices.**
- **Training / education by RMG for work with gas measuring devices.**
- **Education / instruction in all national standards and directives to be complied with for the work to be carried out on the GC 9300 analytical computer.**

1.1.5 Risk assessment and minimization

According to assessment by qualified employees of RMG, the analytical computer GC 9300 is subject to risks during its use. Risks can arise, for instance, during use outside of the permissible temperature range. Impermissible current and voltage values can trigger explosions in explosion-prone areas. Naturally, work must only be carried out by trained personnel (see *chapter 1.1.4.4 Qualification of personnel)*, who are also trained to recognize suitable tools and use them exclusively. These risks were summarized alongside development and measures were taken to minimize these risks.

Measures for risk minimization:

- The maximum permissible temperature range is specified on the type plate of the analytical computer GC 9300. Operation of the device is only permitted within these specified ranges.

Danger

- **The wiring from and installation of the analytical computer GC 9300 in explosion-prone areas must only be carried out by trained personnel in accordance with EN60079-14 and in observance of national regulations.**
- **Qualified persons must satisfy the definitions in accordance with DIN EN 0105 or IEC 364 or directly comparable standards.**
- **Only trained and instructed personnel are permitted. Work on the measuring system must only be carried out from qualified persons and inspected by responsible qualified supervisors.**
- **Qualified persons have been authorized by the person responsible for safety of personnel to carrying out such work on the basis of their training, experience or instruction and familiarity with applicable standards, provisions, accident prevention regulations and system conditions. It is essential that these persons are able to recognize and avoid potential dangers in good time.**

1.1.6 Applicability of the manual

This manual describes the analytical computer GC 9300. The analytical computer GC 9300 is only part of a complete system. The manuals of the other components of the system must be observed. If you find contradictory instructions, contact RMG and/or the manufacturers of the other components.

Note

Ensure that the power data of the current connection matches the specifications on the type plate. Observe any applicable national regulations in the country of use. Use cable that is appropriate for the cable fittings.

Danger

Only work on the equipment if you have the appropriate training and qualifications.

1.1.6.1 Danger during operation

Observe the specifications of the system manufacturer and/or system operator.

1.1.6.2 Dangers of operation in EX areas

The analytical computer GC 9300 is not intended for use in explosion-prone areas.

Only operate the analytical computer GC 9300 in fault-free and complete condition.

If you make technical changes to the device, safe operation can no longer be guaranteed.

⚠ Danger

- **Only use the analytical computer GC 9300 in its original condition.**
- **When connecting the measuring element, an external oxygen sensor or additional equipment in explosion-prone areas, ensure that the appropriate explosion protection is provided for these components.**
- **They are intrinsically safe devices for which galvanic isolation must be provided with connection of these devices.**

1.1.6.3 Responsibility of the operator

As the operator, you must ensure that only adequately qualified personnel work on the device. Ensure that all employees who work with the device have read and understood this manual. You are also obligated to train personnel regularly and inform them of the dangers. Ensure that all work on the device is carried out exclusively by qualified persons and inspected by responsible qualified supervisors. The responsibilities for installation, operation, fault rectification, maintenance and cleaning must be clearly regulated. Instruct your personnel with regard to the risks involved with working with the device.

1.1.7 Transport

The device is packaged specific to the transport requirements for each customer. Ensure safe packaging that absorbs light impact and vibrations is used for any further transport. Nevertheless, inform the transport company that all types of impact and vibrations should be avoided during transport.

1.1.8 Scope of delivery

The scope of delivery can differ depending on the optional orders. The following is “normally” included in the scope of delivery:

Part	Quantity
Analytical computer GC 9300	1
Optional: Gateway GC 9310	1
Manual	1
…	…

1.1.9 Disposal of packaging material

Dispose of the material in an environmentally friendly manner in accordance with national standards and directives.

1.1.10 Storage

Avoid extended periods of storage. Inspect the analytical computer GC 9300 for damage and correct function after storage. Contact the RMG service department to arrange for inspection of the device after a storage period of longer than one year. For this purpose, send the device to RMG.

1.2 Structure of the manual

The introduction of this manual comprises two parts. The first part lists general specifications; the symbols used in the manual and the structure of notices are presented and a risk assessment is provided. It also includes specifications for transport and storage of the analytical computer GC 9300. The second part describes how the GC 9300 works and its intended purpose.

The second chapter explains the basic function and operation of the GC 9300 and data storage – taking place in accordance with the DSFG standard, in particular. The electrical connections, inputs, outputs and interfaces are explained in the third section.

The fourth chapter describes the commissioning and how the GC 9300 is connected to a PC. It also explains that the number of DSFG interfaces can be increased using a gateway – the GC 9310. The fifth chapter covers the operation of the GC 9300 and explains the individual menus in detail.

Chapter six summarizes the technical specifications. The Appendix provides an extensive list of parameters and some additional details about the GC 9310.

1.3 Function

The analytical computer GC 9300 is a component of the process gas chromatograph PGC 9300, which analyzes natural gas and biogas and provides the necessary measurement values to determine the energy content and calculate the compressibility factor. As a control computer, it determines the progress of the analysis and delivers measurement results. It stores all operating parameters and is also used for operation.

In addition to analysis control, the GC 9300 provides the following functions:

- Calculation of calorific value, heat value, standard density, and Wobbe index from the percentages of individual gas components in accordance with ISO 6976, and the optional calculation of the methane number.
- Storage of analysis results in archives.
- Comprehensive communication functions.
- Operating mode settings for inspection purposes and analysis of gas samples.

1.4 Mode of operation

The analytical computer GC 9300 is the controller for the process gas chromatograph PGC 9300 and controls the analysis process in the measuring element CP 4900. In normal operation, an analysis begins as soon as the preceding analysis is finished, wherein each analysis lasts about 3-4 minutes, depending on the variant.

The series of analyses proceeds without interruption by automatic calibrations. A calibration, whether it takes place automatically or is started manually, 4 or 5 calibrating gas analyses and takes between 12 and 16 minutes depending on the device type. The calibration interval of 1 day is specified in the PTB approval.

A calibration can also be started manually at any time.

The PGC 9300 can be designed as a **single stream** unit for analysis of the gas from one extraction point or as a **multi-stream** unit for up to 4 extraction points. With multi-stream units, the measured gases changes with each analysis in the standard setting.

The basis of an analysis is the signal curve of the sensor for each column unit, which is called a **chromatogram**. Each peak in this chromatogram marks a gas component. In the evaluation, the area under the peaks are determined, from which polynomials are derived to calculate the proportion of gas components in mol%. The polynomial coefficients are determined in the factory calibration in which a correction factor (**response factor**) is calculated for each component in the automatic and manual calibration.

A **basic calibration** is carried out during commissioning and after various repair and service tasks. The response factors derived from this do not change during running operation and serve for comparison with the current response factors used for the evaluation. As a result, it can enable recognition of a drift of the measuring element due to an enrichment of moisture or heavy carbon dioxide. If the deviation is greater than 10%, an alarm message appears, and the column modules must be heated to gas out. Basic calibration is not permitted during running operation.

In addition to the custody transfer parameters calorific value and standard density, which were already mentioned, the analytical computer calculates the heating value, density ratio and Wobbe index, and, optionally, the methane number as a non-custody-transfer factors from the individual components. The calculation takes place in accordance with ISO 6976 (except for the methane number).

1.5 Area of applicability

The analytical computer GC 9300 is an essential element of the overall measuring unit, which analyzes natural gas and biogas and provides the necessary measurement values to determine the energy content and calculate the compression ability factor. The analytical computer GC 9300 is the controller, or control computer, for the process gas chromatograph PGC 9300 and controls the analysis process in the measuring element CP 4900. It stores all operating parameters and is also used for operation. It records and calculates the measurements, enables display of the measurement results and calculation factors and stores and transmits this data.

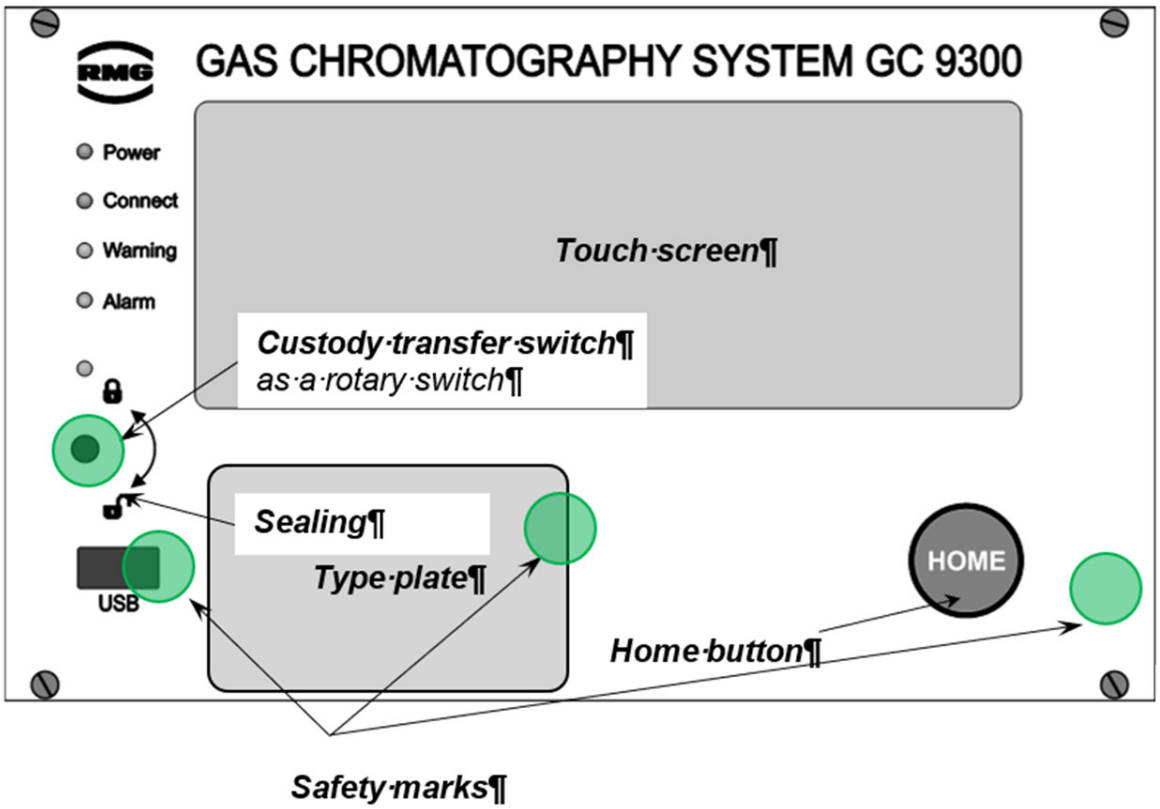
The PGC9300_ME_manual_en_06 (and the English manual) describes the different types that are used in different areas. The PGC 9301 is designed for use in "normal" natural gas. It works with 2 column modules. The PGC 9302 is designed for use in biogas. It works with 2 column modules (A and C). The PGC 9303 allows the determination of further gas components in "normal" natural gas. It works with 3 column modules (A, B and C). The PGC 9304 allows the determination of further gas components in "normal" natural gas. It works with 3 column modules (A, B and C), whereby argon is used as carrier gas in column C. The PGC 9305

complies with the PGC 9301. For this PGC there will be a separate approval according to Russian regulations, the GOST. The differences are described in more detail in the Russian manual.

The permissible environmental temperatures, current and voltage values for safe operation are specified in *chapter 6 Technical data*.

2 Introduction

2.1 Touch screen



The following display and operating elements are located on the front panel:

Green LED (Power)	Continuously illuminated: Voltage indicator. Blinking light: Open custody transfer switch and/or open user lock.
Orange LED (Connect)	Continuously illuminated: The measuring element is connected and active.
Yellow LED (Warning)	Continuously illuminated: A warning has been issued Blinking light: Warning: Current fault of non-custody-transfer function(s)
Red LED (Alarm)	Continuously illuminated: An alarm has been issued Blinking light: Alarm: Current fault of custody transfer function(s)
Custody transfer switch	Sealable rotary switch; the custody transfer lock is opened at the mechanical limit stop (in clockwise direction).
USB interface	For connection of USB components (e.g. a mouse), sealed in custody transfer mode.
HOME button	To switch between the start screen and error screen.
Touch screen	Display and control panel of the analytical computer.

Operation via the touch screen is possible with an easy to understand menu. A PC connected via the network interface enables the following types of operation:

1. Operating software RMGView^{GC}.
2. Any internet browser for viewing and storing of non-custody-transfer archives.

Further operating possibilities are available via DSfG bus with RMG software products such as the PGC revision program AKA-II.

2.2 Operation

Operation takes place on the analytical computer GC 9300 and enables the following actions:

- Reading of analysis results
- Starting of a manual calibration
- Switchover of the analysis from measuring gas to testing gas (reference gas)
- Displaying and changing operating parameters
- Viewing of archives and log books
- Display of chromatograms
- Display of error messages
- Display of the device status
- Baking out

Note

Entry of the code number and/or opening of the custody transfer switch is necessary for nearly all actions other than the display functions.

2.2.1 Operating modes

The following operating modes are available for the PGC 9300 in the “Details” screen under “GC 9300 mode”:

- **AUTORUN** Normal analysis mode with automatic calibrations
- **STOP** Analysis mode is stopped
- **BASIC CALIB.** Basic calibration (protected against inadvertent triggering)
- **NORMAL CALIB.** Manually started calibration (equivalent to automatic cal.)
- **REF GAS** Test gas analysis (reference gas)

2.3 Data storage

There are **two** archives available for storage of analysis results - a **non-custody-transfer** measurement archive and a **custody transfer** archive according to the DSfG standard. The structure and memory capacity of the two archives are as follows:

Measurement archive

①	Event log book	1,000 entries
②	Parameter log book	1,000 entries
③	Individual analysis archive	351,360 entries
④	Hourly averages archive	17,568 entries
⑤	Daily averages archive	186 entries
⑥	Monthly averages archive	120 entries
⑦	Calibration results archive	14,640 entries

	①	②	③	④	⑤	⑥	⑦
Date, time	●	●	●	●	●	●	●
Event (text)	●						
Parameter – old value		●					
Parameter – new value		●					
Number of analyses per entry			●	●	●	●	
Number of valid analyses			●	●	●	●	
Stream, gas type			●	●	●	●	
Calorific value			●	●	●	●	●
Wobbe index			●	●	●	●	●
Standard density			●	●	●	●	●
Density ratio			●	●	●	●	●
Calorific value			●	●	●	●	●
Real gas factor			●	●	●	●	●
Methane number			●	●	●	●	●
Unnormalized total			●	●	●	●	●
Molar content of individual components (20)			●	●	●	●	●
User values (20)			●	●	●	●	
Peak area (20)							●
Retention times (20)							●
Retention times with the basic calibration							●
Response factors (20)							●
Response factors with the basic calibration (20)							●
Peak start time (20)							●
Peak end time (20)							●
Total area							●

2.3.1 Archive according to the DSfG standard

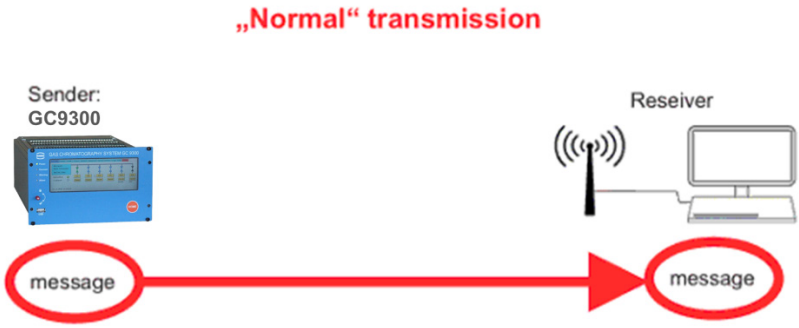
The DSfG archive is divided into archive groups 1 to 23:

AG	Description	Contents	Entries
1	Hourly averages 1	Ho, rhon, Dv, N_2, CO_2, H_2, Hu, Wo, Wu, MZ, Zn, bit string	2280
3	Measurements	Ho, rhon, components, bit string	960
5	Hourly averages 2	Ho, rhon, components, bit string	2280
7	Daily averages	Ho, rhon, components, bit string	95
9	Monthly average	Ho, rhon, components, bit string	24
11	Calibration gas	Calibration results: ΔHo, Δrhon, ΔCO_2, RFs, cal. status	200
13	Reference gas	Ho, rhon, components, bit string, Hu	700
15	Long-term archive	Ho, rhon, CO_2, bit string	70848
17	Analog averages	Analog values 1 to 16, status bit string	2280
19	Extended Hourly averages	Hu, Wo, Wu, MZ, Zn, unnormalized total components	2280
21	Reference gas	Ho, rhon, CO_2, bit string	700
23	Log book	Event, Ho, rhon, components	2280

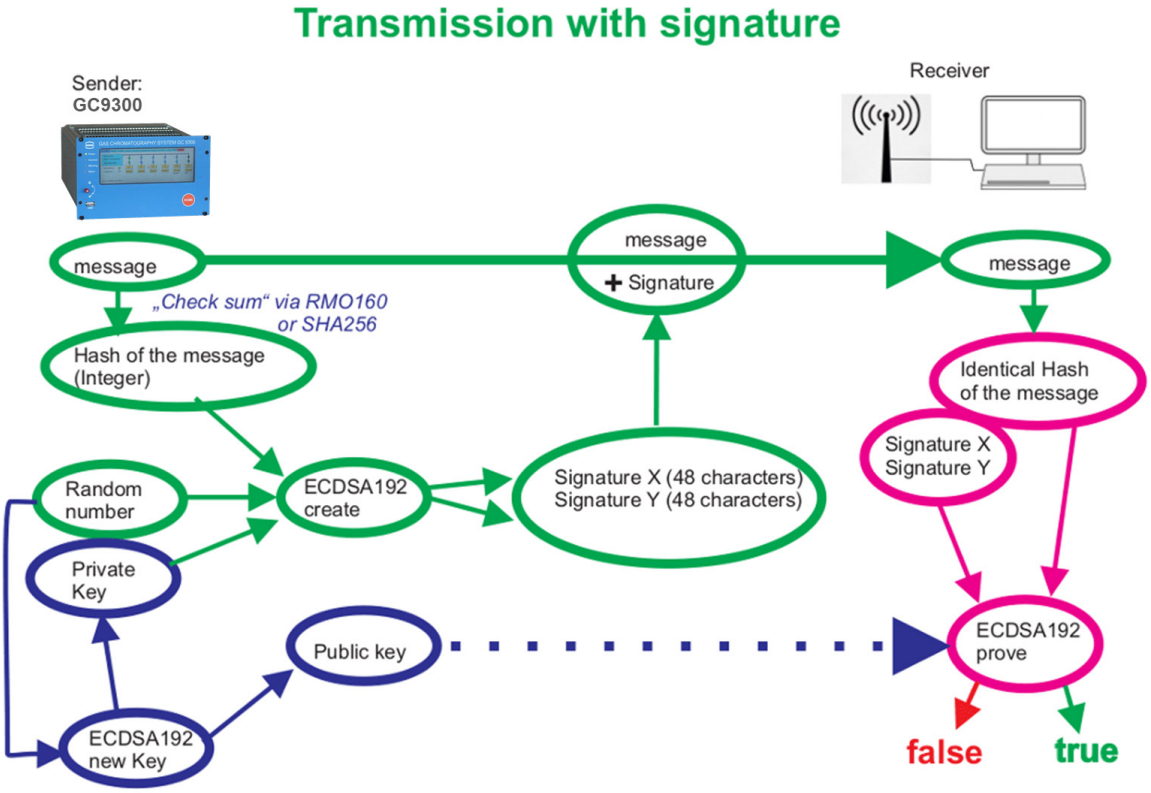
2.4 Signatur

The GC9300 controller offers the option of marking recorded data with an accompanying signature. In the process, the data is not encrypted, but the signature makes it possible to determine whether the data originated from a "secure" source and whether the data quantity was manipulated.

The following figures *"Normal" data transmission* and *Signed data transmission* clarify the process.



"Normal" data transmission



Signed data transmission

With "normal" data transmission, the data is sent by a transmitter to the receiver, which can process said data. In the process, the data must not be considered as trustworthy and any potential data manipulation cannot be checked.

The process for a signed data transmission is somewhat more complicated. There are essentially 3 processes.

1. A program, ECDSA192 (**E**lliptic **C**urve **D**igital **S**ignature **A**lgorithm) in the GC9300 controller generates 2 keys after a random number is loaded: a private key and a public key. These keys consist of 2 parts, signature X and signature Y, wherein each part consists of 48 hexadecimal characters (4 x 48 = 192; thus ECDSA192).

   The private key is stored inaccessibly inside the GC9300 controller.

Note

This key cannot be read or changed in the sealed state of the GC9300 controller.

The public key, for example, can be read in the menu **18. DSfG -> 03 Signature:**

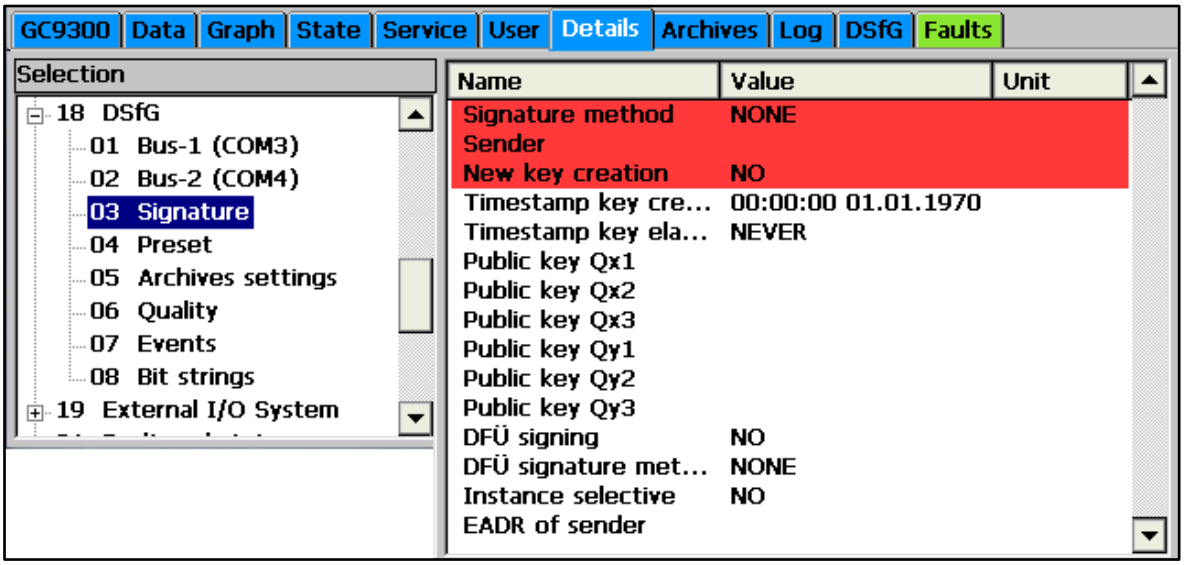
18.03.06 Public Key Qx1 (first 20 characters),
18.03.07 Public Key Qx2 (second 20 characters),
18.03.08 Public Key Qx3 (additional 8 characters), and

18.03.09 Public Key Qy1 (first 20 characters),
18.03.10 Public Key Qy2 (second 20 characters),
18.03.11 Public Key Qy3 (additional 8 characters),

The recipient requires this public key in order to be able to identify the data.

2. A hash is formed from the data of the message (either RMD160 or SHA256; see below, a type of checksum), which is entered as an integer in process 2. The signature (signature X and signature Y), which is attached to the message, is calculated with the private key and a random number.
3. The recipient receives the message and the signature. The hash tag can be calculated from the message. The recipient can verify from the public key and signature whether or not the data is unchanged and originates from a "secure" source, i.e. from a trustworthy sender or whether this is not the case.

The generation of the key is not described in detail here. This signing is initiated in the menu **18.03 DSfG -> Signature**.



Note

Access to the coordinates

18.03.01 Signature method
18.03.02 Sender
18.03.03 New key creation

is under calibration protection and they can only be initiated or changed with an open calibration switch.

The signing method is selected in the coordinate **18.03.01 Signature method**

- „no“
- „RMD160+ECDSA192“
- „SHA256+ECDSA192“

Note

The DVGW (German Association of the Gas and Water Industry) recommends using the RMD160 method for custody transfer applications.

A new key is generated in the coordinate **18.03.03 New key creation**.

Generation of a new key is generally recommended when the GC9300 controller is left unsupervised with an open calibration switch for an extended time, e.g. during repairs.

3 Installation

3.1 Installation

The analytical computer GC 9300 is intended for installation in a control cabinet in a non-Ex area. Installation takes place in a dedicated rack; the device dimensions are:

W x H x D = 213 x 128.4 x 310 mm (42 TE / 3 HE)

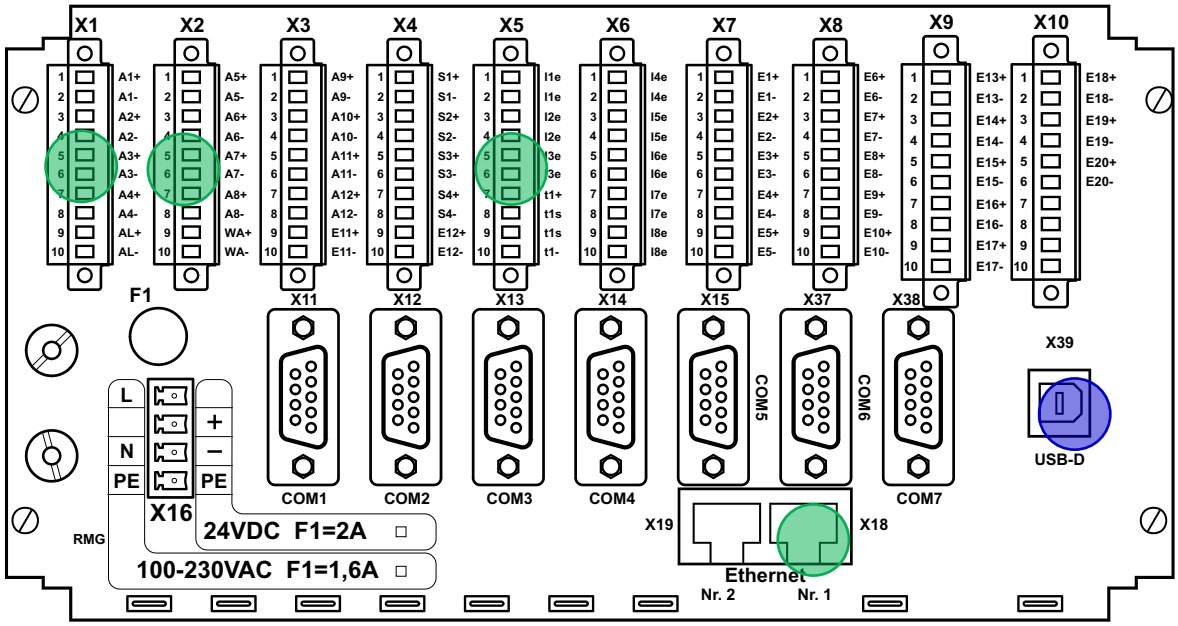
Danger

The GC 9300 is not intended for use in explosion-prone areas.

Installation must only take place in safe rooms!

3.2 Electrical connections

The following figure shows the rear wall of the GC 9300.



Secured connection

Safety mark (interface blocked)

The connections are made on the rear wall. If the number of inputs/outputs is not adequate, an additional module (Wago) with additional digital and analog inputs

and outputs can be connected via an RS 232 interface. The corresponding parameters are displayed in the Details screen under “External I/O system”.

Note

The Wago module can be parameterized without a code word or custody transfer lock.

3.2.1 Connection assignment

Pin assignment

X1				
1	A1+	Digital output 1 +	PGC: Valve stream 1 +	
2	A1-	Digital output 1 -	PGC: Valve stream 1 -	
3	A2+	Digital output 2 +	PGC: Valve stream 2 +	
4	A2-	Digital output 2 -	PGC: Valve stream 2 -	
5	A3+	Digital output 3 +	PGC: Valve stream 3 +	
6	A3-	Digital output 3 -	PGC: Valve stream 3 -	
7	A4+	Digital output 4 +	PGC: Valve stream 4 +	
8	A4-	Digital output 4 -	PGC: Valve stream 4 -	
9	AL+	Alarm contact +	PGC: Alarm +	Contact open in the event of an alarm
10	AL-	Alarm contact -	PGC: Alarm -	

X2				
1	A5+	Digital output 5 +	Calibration gas valve	
2	A5-	Digital output 5 -	Calibration gas valve	
3	A6+	Digital output 6 +	Reference gas valve	
4	A6-	Digital output 6 -	Reference gas valve	
5	A7+	Digital output 7 +	Calibration running	
6	A7-	Digital output 7 -	Calibration running	
7	A8+	Digital output 8 +	Collective message for digital outputs 9 - 12	
8	A8-	Digital output 8 -	Collective message for digital outputs 9 - 12	
9	WA+	Warning contact +	PGC: Warning	Contact open in the event of a warning
10	WA-	Warning contact -	PGC: Warning	

X3			
1	A9+	Digital output 9 +	Limit value exceeded analog value 1*
2	A9-	Digital output 9 -	Limit value exceeded analog value 1*
3	A10+	Digital output 10 +	Limit value exceeded analog value 2*
4	A10-	Digital output 10 -	Limit value exceeded analog value 2*
5	A11+	Digital output 11 +	Limit value exceeded analog value 3*
6	A11-	Digital output 11 -	Limit value exceeded analog value 3*
7	A12+	Digital output 12 +	Limit value exceeded analog value 4*
8	A12-	Digital output 12 -	Limit value exceeded analog value 4*
9	E11+	Input 11 + (Note: passive input, U_{max} = 30 V)	
10	E11-	Input 11 – (Note: passive input, U_{max} = 30 V)	

* The analog values under "Specialties“ can be monitored for limit values. Exceeding these limits leads to a warning or the setting of a signaling contact.

X4		
1	S1+	Current output 1 +
2	S1-	Current output 1 -
3	S2+	Current output 2 +
4	S2-	Current output 2 -
5	S3+	Current output 3 +
6	S3-	Current output 3 -
7	S4+	Current output 4 +
8	S4-	Current output 4 -
9	E12+	Input 12 + (Note: passive input, U_{max} = 30 V)
10	E12-	Input 12 – (Note: passive input, U_{max} = 30 V)

X5		Polarity of current inputs depends on operating mode (active/passive).	
1	I1e	Current input 1	Carrier gas pressure – I (He)
2	I1e	Current input 1	Carrier gas pressure – I (He)
3	I2e	Current input 2	Measuring gas pressure
4	I2e	Current input 2	Measuring gas pressure
5	I3e	Current input 3	(active - / passive +)
6	I3e	Current input 3	(active + / passive -)
7	t1+	Temperature input 1 supply ++	Room temperature
8	t1s	Temperature input 1 sense +	Room temperature
9	t1s	Temperature input 1 sense -	Room temperature
10	t1-	Temperature input 1 supply --	Room temperature

X6		Polarity of current inputs depends on operating mode (active/passive).	
1	I4e	Current input 4	(active - / passive +)
2	I4e	Current input 4	(active + / passive -)
3	I5e	Current input 5	Carrier gas pressure – II (argon)
4	I5e	Current input 5	Carrier gas pressure – II (argon)
5	I6e	Current input 6	(active - / passive +)
6	I6e	Current input 6	(active + / passive -)
7	I7e	Current input 7 / Temperature input 2 supply ++	
8	I7e	Current input 7 / Temperature input 2 sense +	
9	I8e	Current input 8 / Temperature input 2 sense -	
10	I8e	Current input 8 / Temperature input 2 supply --	

X7			
1	E1+	Digital input 1 +	P_{min} helium - 1
2	E1-	Digital input 1 -	P_{min} helium - 1
3	E2+	Digital input 2 +	P_{min} helium - 2
4	E2-	Digital input 2 -	P_{min} helium - 2
5	E3+	Digital input 3 +	P_{min} calibration gas
6	E3-	Digital input 3 -	P_{min} calibration gas
7	E4+	Digital input 4 +	P_{min} test gas
8	E4-	Digital input 4 -	P_{min} test gas
9	E5+	Digital input 5 +	T_{min} calibration gas
10	E5-	Digital input 5 -	T_{min} calibration gas

X8			
1	E6+	Digital input 6 +	T_{min} test gas
2	E6-	Digital input 6 -	T_{min} test gas
3	E7+	Digital input 7 +	P_{max} high-pressure reduction stream - 1
4	E7-	Digital input 7 -	P_{max} high-pressure reduction stream - 1
5	E8+	Digital input 8 +	P_{max} high-pressure reduction stream - 2
6	E8-	Digital input 8 -	P_{max} high-pressure reduction stream - 2
7	E9+	Digital input 9 +	P_{max} high-pressure reduction stream - 3
8	E9-	Digital input 9 -	P_{max} high-pressure reduction stream - 3
9	E10+	Digital input 10 +	P_{max} high-pressure reduction stream - 4
10	E10-	Digital input 10 -	P_{max} high-pressure reduction stream - 4

X9			
1	E13+	Digital input 13 +	Valve control stream – 1
2	E13-	Digital input 13 -	Valve control stream – 1
3	E14+	Digital input 14 +	Valve control stream – 2
4	E14-	Digital input 14 -	Valve control stream – 2
5	E15+	Digital input 15 +	Valve control stream – 3
6	E15-	Digital input 15 -	Valve control stream – 3
7	E16+	Digital input 16 +	Valve control stream – 4
8	E16-	Digital input 16 -	Valve control stream – 4
9	E17+	Digital input 17 +	Alarm input
10	E17-	Digital input 17 -	Alarm input

X10			
1	E13+	Digital input 18 +	P_{min} argon - 1
2	E13-	Digital input 18 -	P_{min} argon – 1
3	E14+	Digital input 19 +	P_{min} argon – 2
4	E14-	Digital input 19 -	P_{min} argon – 2
5	E15+	Digital input 20 +	Warning input
6	E15-	Digital input 20 -	Warning input
7		Not allocated	
8		Not allocated	
9		Not allocated	
10		Not allocated	

3.2.2 Power supply

X16	230 V/AC version		24 V/DC version	
	L	100 – 230 V		Not allocated
		Not allocated	+	+ 24 V
	N	100 – 230 V	-	- 24 V
	PE	Potential equalization	PE	Potential equalization

3.2.3 Interfaces

Network interfaces

X18:	Ethernet interface 1	For connection with the measuring element CP 4900
X19:	Ethernet interface 2	For connection of a PC or to a local network RJ45 socket for LAN/Ethernet (DHCP Client or fixed IP address) Protocols: - Ethernet TCP/IP - Modbus TCP - http - DSfG-B - NTP

Serial interfaces

X11:	COM 1	RS 232 / **RS 485***	Modbus RTU / Modbus ASCII
X12:	COM 2	RS 232	WAGO-IO / GPS 170
X13:	COM 3	RS 232 / **RS 485***	DSfG / Modbus RTU / Modbus ASCII / RMG-Bus
X14:	COM 4	RS 232 / **RS 485***	DSfG / RMG-Bus
X15:	COM 5	RS 232	Modbus RTU / Modbus ASCII
X37:	COM 6	RS 232 / **RS 485***	Modbus RTU / Modbus ASCII / RMG-Bus
X38:	COM 7	**RS 232** / RS 485*	Modbus RTU / Modbus ASCII

* configurable in the device with jumpers, delivery state in bold text.

Pin assignments of the serial interfaces

X11/COM 1		
Pin	RS 232	**RS 485**
1	+U (+5V DC)	+U (+5V DC)
2	RxD	
3	TxD	R/TA A Data
4		
5	GND	SGND Signal Ground
6		
7		
8		R/TN B Data
9		

X12/COM 2	
Pin	RS 232
1	+U (+5V DC)
2	RxD
3	TxD
4	
5	GND
6	
7	
8	
9	

X13/COM 3		
Pin	RS 232	**RS 485**
1		+U (+5V DC)
2	RxD	GND
3	TxD	R/TA A Data
4	DTR	
5	GND	SGND Signal Ground
6		-U
7	RTS	GND
8	CTS	R/TN B Data
9		

X14/COM 4		
Pin	RS 232	**RS 485**
1		+U (+5V DC)
2	RxD	GND
3	TxD	R/TA A Data
4		
5	GND	SGND Signal Ground
6		-U
7		GND
8		R/TN B Data
9		

X15/COM 5	
Pin	RS 232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

X37/COM 6		
Pin	RS 232	**RS 485**
1		+U (+5V DC)
2	RxD	GND
3	TxD	R/TA A Data
4		
5	GND	SGND Signal Ground
6		-U
7		GND
8		R/TN B Data
9		

X37/COM 7		
Pin	**RS 232**	RS 485
1		+U (+5V DC)
2	RxD	GND
3	TxD	R/TA A Data
4		
5	GND	SGND Signal Ground
6		-U
7		GND
8		R/TN B Data
9		

3.2.4 Additional external In- and Outputs

The GC9300 and GC9310 (Gateway) have a maximum of in- and outputs:

- 8 analog inputs
- 4 analog outputs
- 20 digital inputs
- 12 digital outputs

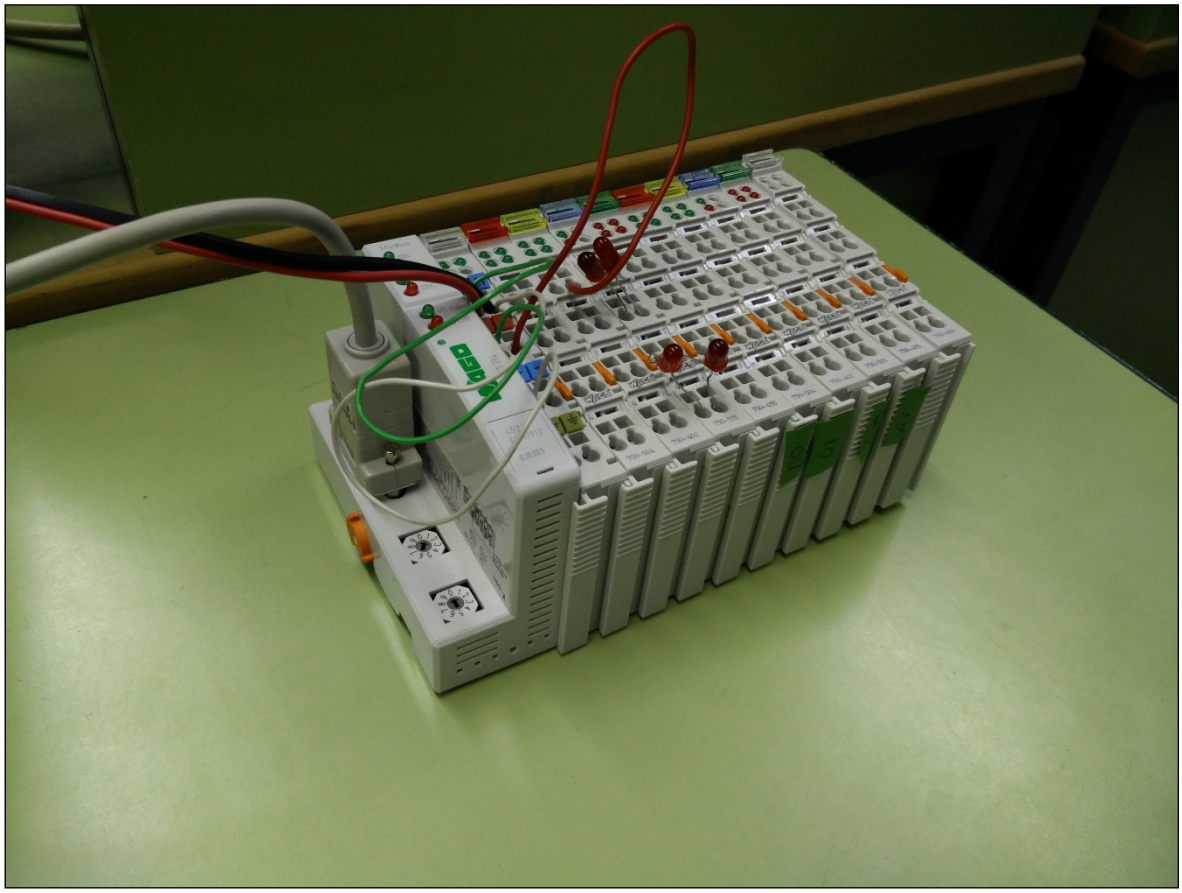
If required, this limitation can be simply extended including external Wago modules:

- Up to 16 additional analog inputs
- Up to 16 additional analog outputs
- Up to 16 additional digital inputs
- Up to 16 additional digital outputs

Note

The extension of the number of external interfaces is also possible for the Gateway GC 9310.

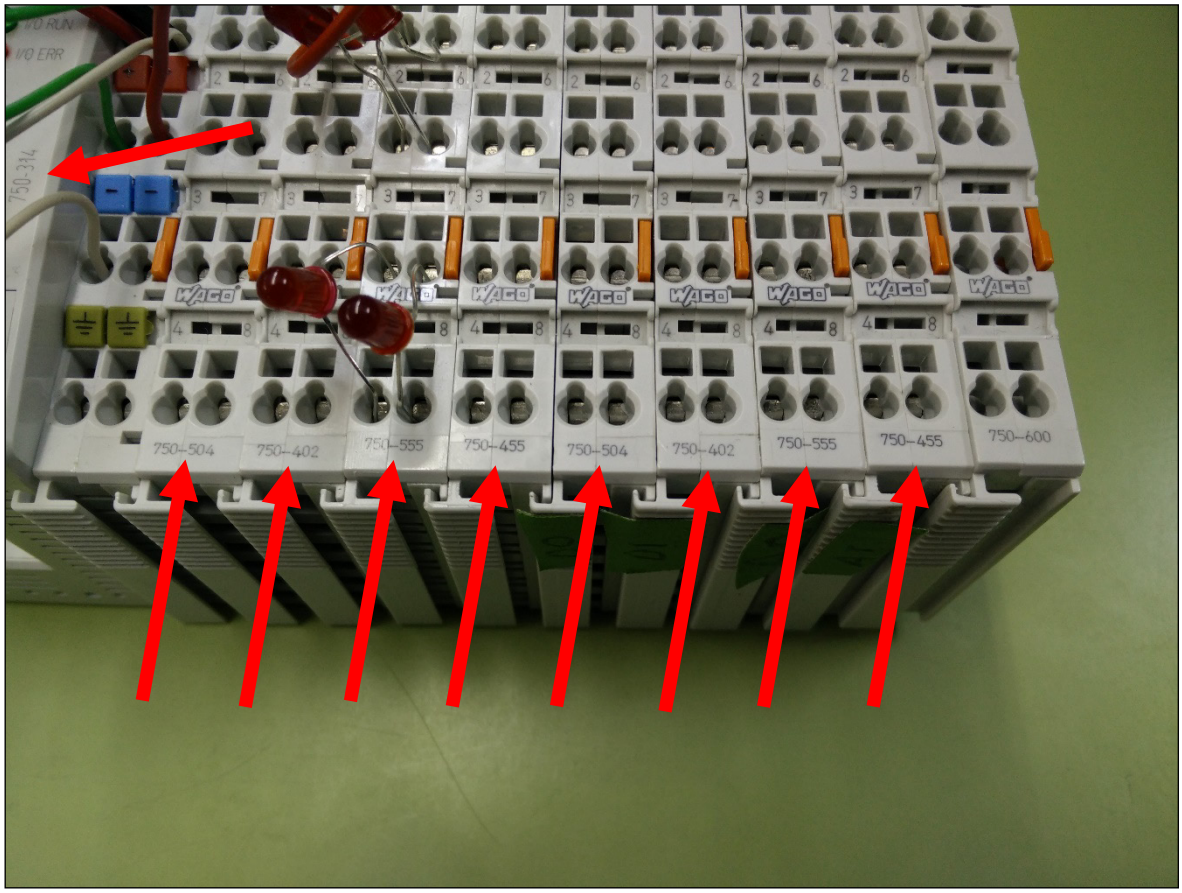
The next figure shows such a setup:



The connection module, the fieldbus coupler as Wago 750-314 or Wago 750-316, as well as the end module, the bus terminal Wago 750-600 are fixed. Between the connection module and the end module you may choose the modules:

- 750-402 4-channel digital inputs
- 750-455 4-channel analog inputs
- 750-504 4-channel digital outputs
- 750-554 2-channel analog outputs
- 750-555 4-channel analog outputs
- 750-602 24 V DC power supply (galvanically isolated potential feed)

The next figure shows the above setup in an enlargement of the previous setup; the numbers of the Wago modules can be read.

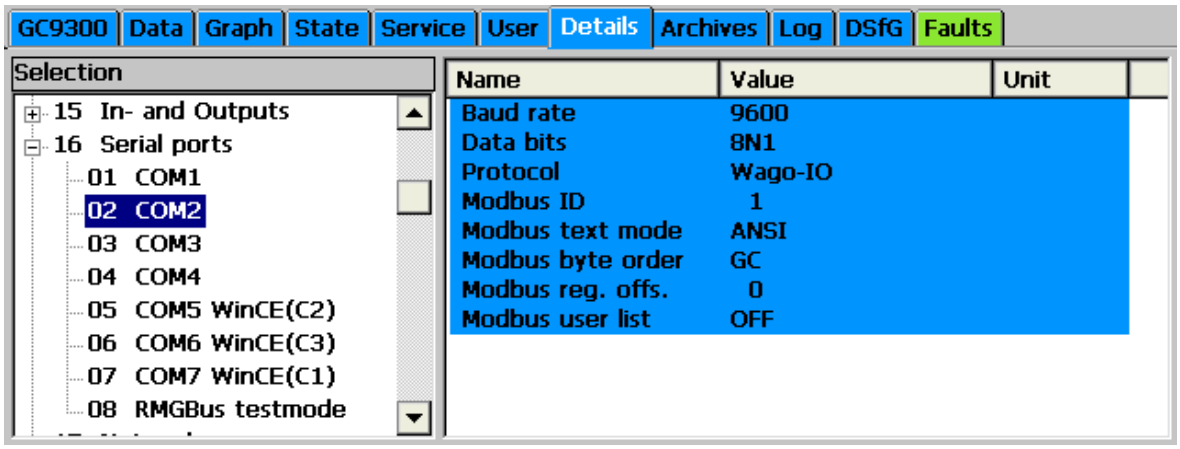


With the above modules, the following inputs and outputs can be realized, for example:

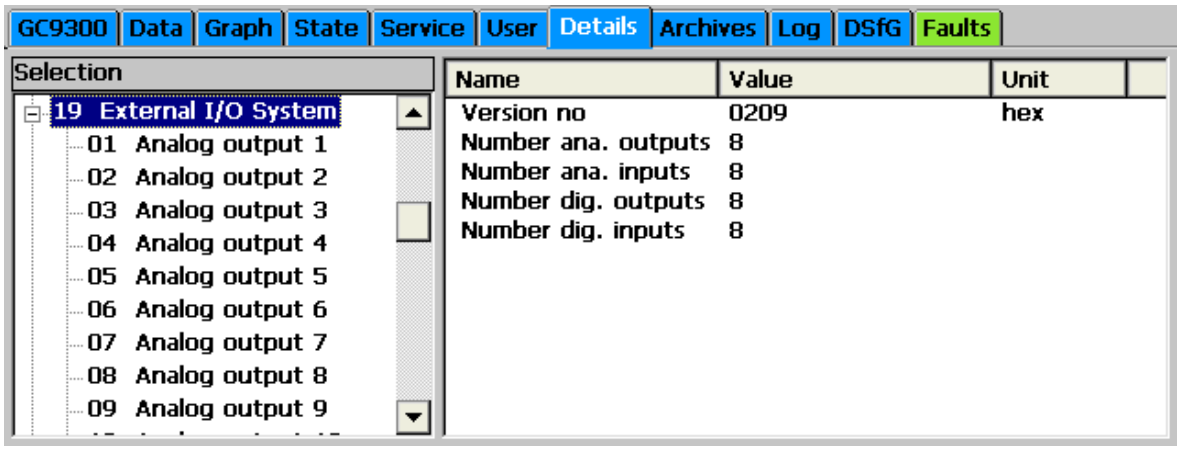
- 16 digital inputs — 4 x 750-402 4-channel digital inputs
- 16 analog inputs — 4 x 750-455 4-channel analog inputs
- 16 digital outputs — 4 x 750-504 4-channel digital outputs
- 16 analog outputs — 8 x 750-554 2-channel analog outputs or the 4 x 750-555 4-channel analog outputs *1

*1 or any number of both modules with up to 16 analog outputs.

The extension of the inputs and outputs can be implemented via a serial ports of the Wago modules to the **02 COM 2 interface** of the GC9300 family. To use the Wago modules, the following parameters on the GC93XX have to be set in the menu item **16 serial ports, 02 COM 2** as shown in the next figure.



In menu item **19 External I/O System** (see next figure) you may read the additional available number of additional in- and outputs. In addition, the settings and status of the individual inputs and outputs can be parameterized and read here.



Note

The sequence of the digital inputs has been adapted to firmware version 2.003 and higher. It may therefore no longer match that of existing installations. Therefore, firmware updates should be avoided or should be realized from the RMG's service.

4 Commissioning

4.1 Establishing connection to the PC

A crossover network cable is necessary for direct connection between the analytical computer and a PC; a standard network cable is required for connection to a hub.

4.2 Switching on the device

⚠ Caution

- **Before connecting the voltage supply for the measuring element, ensure that all gas lines to the measuring element and the measuring element itself have been flushed!**
- **If there is still air in the supply lines or the measuring element, the column modules can be destroyed.**
- **Proceed as described in the manual for the measuring element CP 4900 for ventilation.**

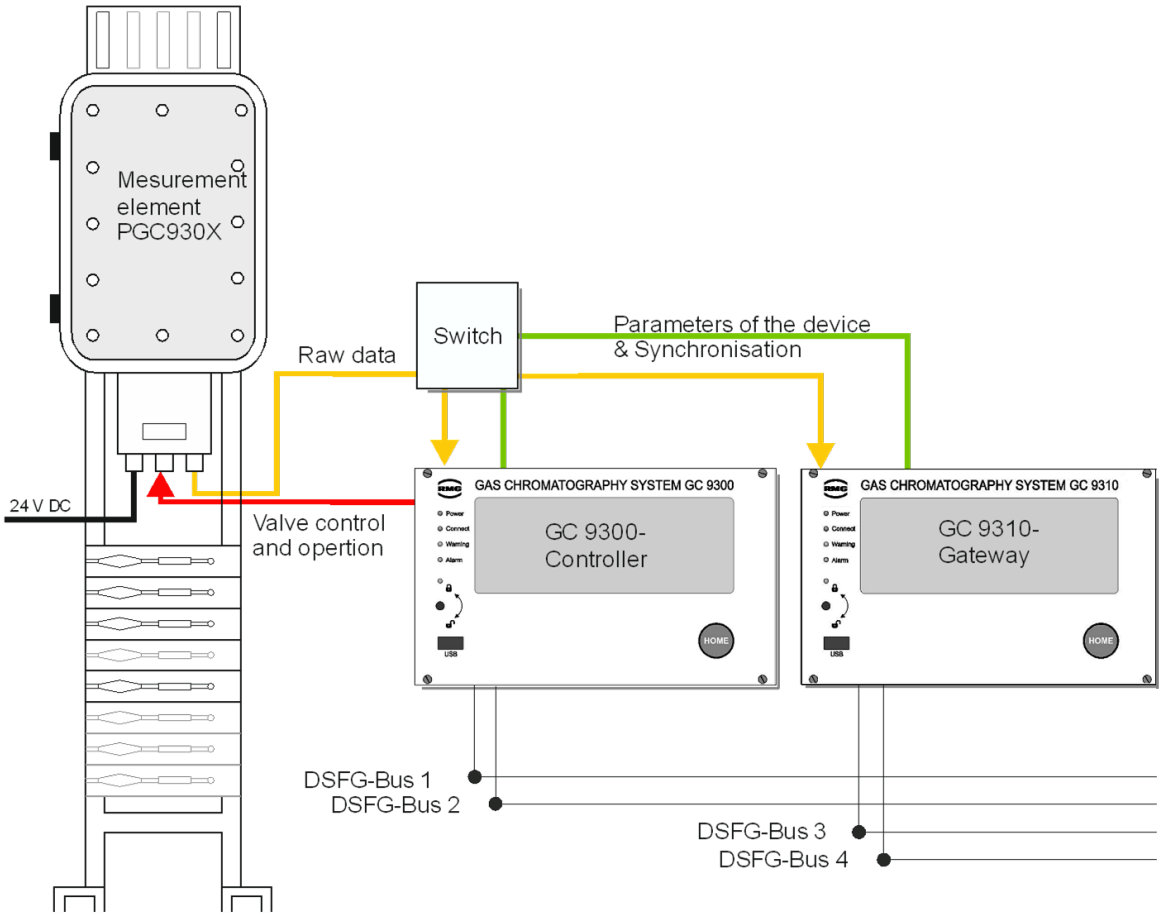
Before switching on, please check whether the correct carrier gas pressure is set to 5.5 bar ± 10 % in the status field. This adjustment is made via an external regulator on the bottle rack.

If this initial calibration is not successful, a second calibration must be performed immediately thereafter. If this calibration is also unsuccessful, operation is stopped automatically.

4.3 Gateway GC 9310

As a control computer, the GC 9300 determines the progression of the analyses of the process gas chromatograph PGC 9300 and delivers measurement results. Operation takes place via the analytical computer GC 9300, where all operating parameters are stored. The gateway GC 9310 is **optional** and designed to extend the **2 DSFG interfaces of the GC 9300** to **4 DSFG interfaces (GC 9300 + GC 9310)**; if more than two additional DSfG buses are required, additional GC 9310 units can be connected. In this case, please contact the RMG service department.

The GC 9310 delivers the same measurement results as the GC 9300. Although the GC 9300 transmits the operating parameters to the GC 9310, the GC 9310 does not assume any tasks for control of the measuring element. The figure below shows the configuration.



Like the GC 9300, the operation, display and storage of data take place via touch screen, an internet browser or the operating software RMGView^{GC}.

Configuring GC 9300 for operation with GC 9310

In order to ensure that the GC 9300 Controller can work in combination with one or several GC 9310 gateways, the following settings must be made:

- LAN-1 must be set in *chapter 3.2 Electrical connections*.
- The gateways are connected via a hub to LAN-1 of the GC 9300.
- Then the menu entry “LAN-1” must be selected under Details “Network service” for the menu “DSfG extension”.
- “Send params to GW” must be selected, then the parameters from the GC 9300 are transmitted to the GC 9310.

4.3.1 GC 9310 commissioning

- The GC 9300 controller is started up and completely configured (as described above)
- The GC 9300 is set to STOP
- The GC 9310 gateway is started up and configured (as described above)
- The GC log status LED on the start screen of the GC 9310 is now illuminated green
- Operating parameters of the GC 9300 are transmitted to the GC 9310
- The received parameters can be checked on the start screen of the GC 9310

Note

- **In order for the GC 9310 to calculate in the same manner as the GC 9300, a manual calibration must be carried out!**
- **This calibration is necessary because the GC 9310 performs calculations automatically!**
- **When the GC 9300 continues running in AUTORUN, the two devices run in synchronized operation.**

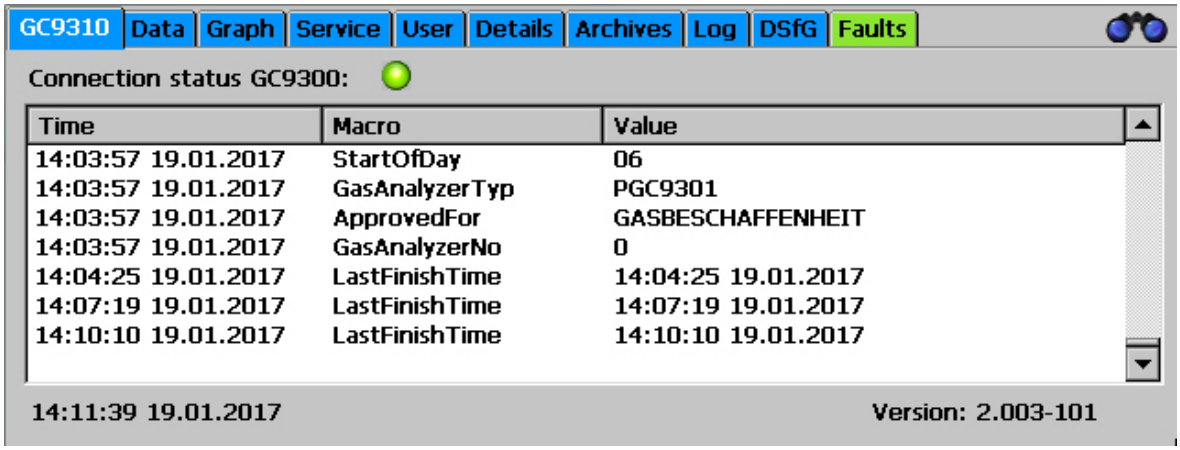
Note

- **It must be ensured that the GC 9300 controller and GC 9310 gateway have the same time and date.**
  For this purpose, use of the same time sync source is recommended for the two devices.

Like the GC 9300, the gateway GC 9310 is intended for installation in a control cabinet in the electronics room. Installation takes place in a dedicated rack; the device dimensions are:

W x H x D = 213 x 128.4 x 310 mm (42 DU / 3 HU)

The start screen shows the current status of the GC log. The GC log is used for communication between the GC 9300 and GC 9310.



The LED shows the status of the GC log:

- Gray: No telegram received from the GC 9300.
- Green: Everything OK. Telegrams are being received regularly from the GC 9300.
- Red: Timeout. No telegrams have been received from the GC 9300 for an extended time. In this case an alarm is issued simultaneously.

Like the GC 9300, the individual screens are arranged like tabs:

The values that the GC 9310 has received from the GC 9300 are shown in the table. All operating parameters, the number of the measuring element and the time stamp of the analyses are shown. The date and time of the device and the software version are displayed at the bottom edge.

GC9310-GW	Start screen with status of the GC log
Data	Results of the last analysis
Graphs	Chromatograms and trends
Service	Service functions
User	User-specific display
Detail	List of all measurements and parameters of the GC 9310
Archive	Display of the GC archive
Log	Display of the log books
DSfG	Display of the DSfG archive
Errors	Display of error messages with date and time

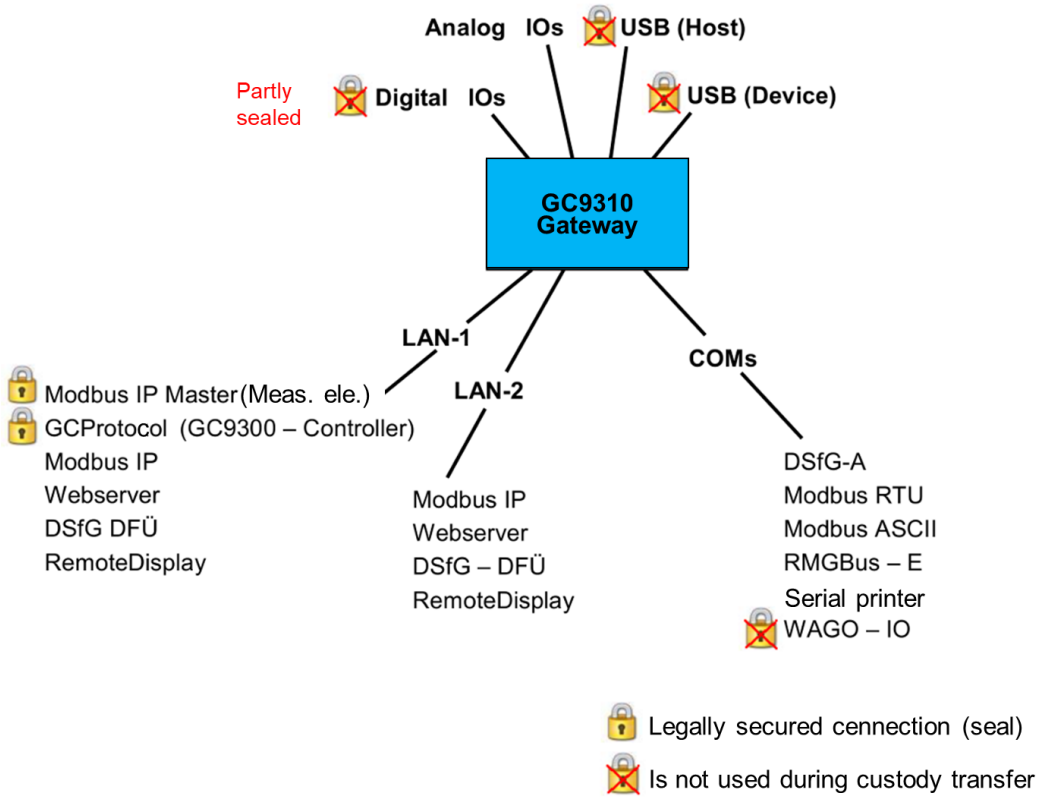
The gateway GC 9310 enables:

- Reading of analysis results
- Displaying and changing operating parameters
- Displaying and saving of analysis results in archives and log books
- Display of chromatograms
- Display of trends
- Display of error messages
- Display of the device status
- Display of the GC log status
- Comprehensive communication functions.
- Calculation (or adoption from the GC 9300) of calorific value, heat value, standard density, and Wobbe index from the percentages of individual gas components in accordance with ISO 6976, and the optional calculation of the methane number.

Like the GC 9300, entry of the code number and/or opening of the custody transfer switch is normally necessary for nearly all actions other than the display functions.

4.3.2 Interfaces and logs

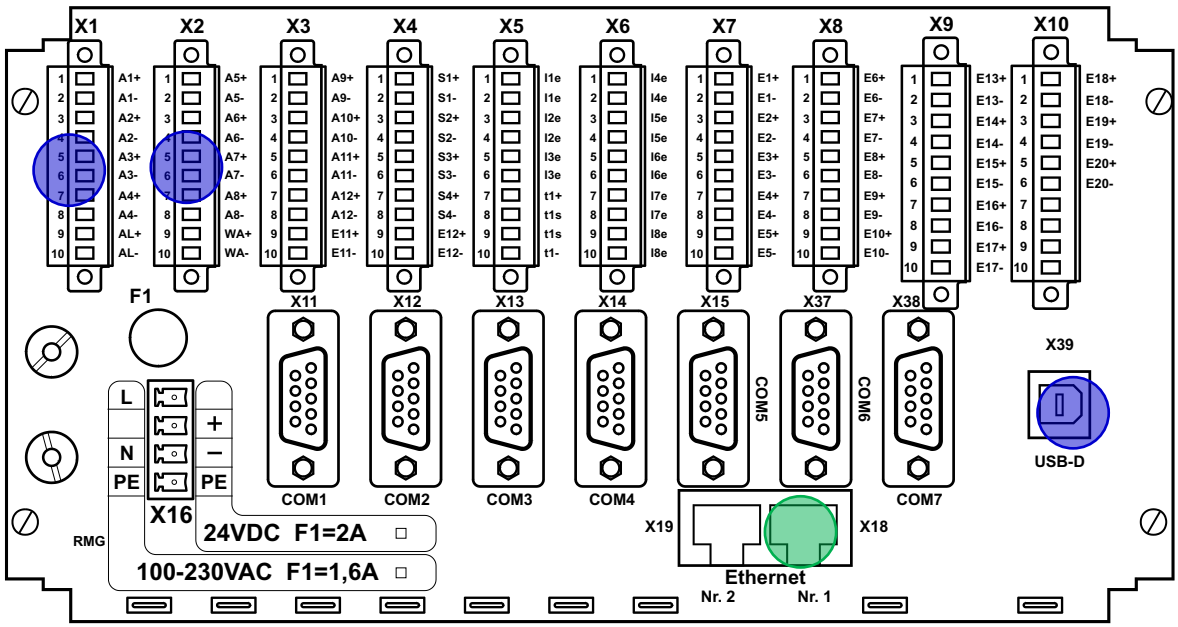
The gateway GC 9310 basically offers the same interfaces and logs as the GC 9300. The **GC log** for communication between the GC 9300 and GC 9310 has been **recently added**. **Digital outputs 1-7** (valve control and calibration running) are **omitted**. The following figure shows an overview of the interfaces and logs.



4.3.3 Data storage

The data storage of analysis results is possible in non-custody-transfer measurement archives and in custody transfer archives in accordance with the DSFG standard; storage is no different than in the GC 9300 (*chapter 2.3 Data storage*)

4.3.4 Electrical connections of the GC 9310



The connections are made on the **rear wall**.

Connection assignment

Pin assignment

X1				
1	A1+	Not available		
2	A1-	Not available		
3	A2+	Not available		
4	A2-	Not available		
5	A3+	Not available		
6	A3-	Not available		
7	A4+	Not available		
8	A4-	Not available		
9	AL+	Alarm contact +	PGC: Alarm +	Contact open in the event of an alarm
10	AL-	Alarm contact -	PGC: Alarm -	

X2				
1	A5+	Not available		
2	A5-	Not available		
3	A6+	Not available		
4	A6-	Not available		
5	A7+	Not available		
6	A7-	Not available		
7	A8+	Digital output 8 +	Collective message for digital outputs 9 - 12	
8	A8-	Digital output 8 -	Collective message for digital outputs 9 - 12	
9	WA+	Warning contact +	PGC: Warning	Contact open in the event of a warning
10	WA-	Warning contact -	PGC: Warning	

X3			
1	A9+	Digital output 9 +	Limit value exceeded analog value 1*
2	A9-	Digital output 9 -	Limit value exceeded analog value 1*
3	A10+	Digital output 10 +	Limit value exceeded analog value 2*
4	A10-	Digital output 10 -	Limit value exceeded analog value 2*
5	A11+	Digital output 11 +	Limit value exceeded analog value 3*
6	A11-	Digital output 11 -	Limit value exceeded analog value 3*
7	A12+	Digital output 12 +	Limit value exceeded analog value 4*
8	A12-	Digital output 12 -	Limit value exceeded analog value 4*
9	E11+	Input 11 + (Note: passive input, U_{max} = 30 V)	
10	E11-	Input 11 – (Note: passive input, U_{max} = 30 V)	

* The analog values under "Specialties“ can be monitored for limit values. Exceeding these limits leads to a warning or the setting of a signaling contact.

X4		
1	S1+	Current output 1 +
2	S1-	Current output 1 -
3	S2+	Current output 2 +
4	S2-	Current output 2 -
5	S3+	Current output 3 +
6	S3-	Current output 3 -
7	S4+	Current output 4 +
8	S4-	Current output 4 -
9	E12+	Input 12 + (Note: passive input, U_{max} = 30 V)
10	E12-	Input 12 – (Note: passive input, U_{max} = 30 V)

X5		Polarity of current inputs depends on operating mode (active/passive).	
1	I1e	Current input 1	freely selectable
2	I1e	Current input 1	freely selectable
3	I2e	Current input 2	freely selectable
4	I2e	Current input 2	freely selectable
5	I3e	Current input 3	(active - / passive +)
6	I3e	Current input 3	(active + / passive -)
7	t1+	Temperature input 1 supply ++	Room temperature
8	t1s	Temperature input 1 sense +	Room temperature
9	t1s	Temperature input 1 sense -	Room temperature
10	t1-	Temperature input 1 supply --	Room temperature

X6		Polarity of current inputs depends on operating mode (active/passive).	
1	I4e	Current input 4	(active - / passive +)
2	I4e	Current input 4	(active + / passive -)
3	I5e	Current input 5	freely selectable
4	I5e	Current input 5	freely selectable
5	I6e	Current input 6	(active - / passive +)
6	I6e	Current input 6	(active + / passive -)
7	I7e	Current input 7 / Temperature input 2 supply ++	
8	I7e	Current input 7 / Temperature input 2 sense +	
9	I8e	Current input 8 / Temperature input 2 sense -	
10	I8e	Current input 8 / Temperature input 2 supply --	

X7			
1	E1+	Digital input 1 +	freely selectable
2	E1-	Digital input 1 -	freely selectable
3	E2+	Digital input 2 +	freely selectable
4	E2-	Digital input 2 -	freely selectable
5	E3+	Digital input 3 +	freely selectable
6	E3-	Digital input 3 -	freely selectable
7	E4+	Digital input 4 +	freely selectable
8	E4-	Digital input 4 -	freely selectable
9	E5+	Digital input 5 +	freely selectable
10	E5-	Digital input 5 -	freely selectable

X8			
1	E6+	Digital input 6 +	freely selectable
2	E6-	Digital input 6 -	freely selectable
3	E7+	Digital input 7 +	freely selectable
4	E7-	Digital input 7 -	freely selectable
5	E8+	Digital input 8 +	freely selectable
6	E8-	Digital input 8 -	freely selectable
7	E9+	Digital input 9 +	freely selectable
8	E9-	Digital input 9 -	freely selectable
9	E10+	Digital input 10 +	freely selectable
10	E10-	Digital input 10 -	freely selectable

X9			
1	E13+	Digital input 13 +	freely selectable
2	E13-	Digital input 13 -	freely selectable
3	E14+	Digital input 14 +	freely selectable
4	E14-	Digital input 14 -	freely selectable
5	E15+	Digital input 15 +	freely selectable
6	E15-	Digital input 15 -	freely selectable
7	E16+	Digital input 16 +	freely selectable
8	E16-	Digital input 16 -	freely selectable
9	E17+	Digital input 17 +	freely selectable
10	E17-	Digital input 17 -	freely selectable

X10			
1	E13+	Digital input 18 +	freely selectable
2	E13-	Digital input 18 -	freely selectable
3	E14+	Digital input 19 +	freely selectable
4	E14-	Digital input 19 -	freely selectable
5	E15+	Digital input 20 +	freely selectable
6	E15-	Digital input 20 -	freely selectable
7		Not allocated	
8		Not allocated	
9		Not allocated	
10		Not allocated	

Power supply

X16	230 V/AC version		24 V/DC version	
	L	100 – 230 V		Not allocated
		Not allocated	+	+ 24 V
	N	Neutral	-	- 24 V
	PE	Potential equalization	PE	Potential equalization

Network interfaces

X18:	Ethernet interface 1	For connection with the measuring element CP 4900
X19:	Ethernet interface 2	For connection of a PC or to a local network

Serial interfaces

X11:	COM 1	RS 232 / **RS 485***	Modbus RTU / Modbus ASCII
X12:	COM 2	RS 232	WAGO-IO / GPS 170
X13:	COM 3	RS 232 / **RS 485***	DSfG / Modbus RTU / Modbus ASCII / RMG-Bus
X14:	COM 4	RS 232 / **RS 485***	DSfG / RMG-Bus
X15:	COM 5	RS 232	Modbus RTU / Modbus ASCII
X37:	COM 6	RS 232 / **RS 485***	Modbus RTU / Modbus ASCII / RMG-Bus
X38:	COM 7	**RS 232** / RS 485*	Modbus RTU / Modbus ASCII

* configurable in the device with jumpers, delivery state in bold text.

Pin assignments of the serial interfaces

X11/COM 1		
Pin	RS 232	**RS 485**
1	+U (+5V DC)	+U (+5V DC)
2	RxD	
3	TxD	R/TA A Data
4		
5	GND	SGND Signal Ground
6		
7		
8		R/TN B Data
9		

X12/COM 2	
Pin	RS 232
1	+U (+5V DC)
2	RxD
3	TxD
4	
5	GND
6	
7	
8	
9	

X13/COM 3		
Pin	RS 232	**RS 485**
1		+U (+5V DC)
2	RxD	GND
3	TxD	R/TA A Data
4	DTR	
5	GND	SGND Signal Ground
6		-U
7	RTS	GND
8	CTS	R/TN B Data
9		

X14/COM 4		
Pin	RS 232	**RS 485**
1		+U (+5V DC)
2	RxD	GND
3	TxD	R/TA A Data
4		
5	GND	SGND Signal Ground
6		-U
7		GND
8		R/TN B Data
9		

X15/COM 5	
Pin	RS 232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

X37/COM 6		
Pin	RS 232	**RS 485**
1		+U (+5V DC)
2	RxD	GND
3	TxD	R/TA A Data
4		
5	GND	SGND Signal Ground
6		-U
7		GND
8		R/TN B Data
9		

X37/COM 7		
Pin	**RS 232**	RS 485
1		+U (+5V DC)
2	RxD	GND
3	TxD	R/TA A Data
4		
5	GND	SGND Signal Ground
6		-U
7		GND
8		R/TN B Data
9		

4.4 Compatible mode GC9390

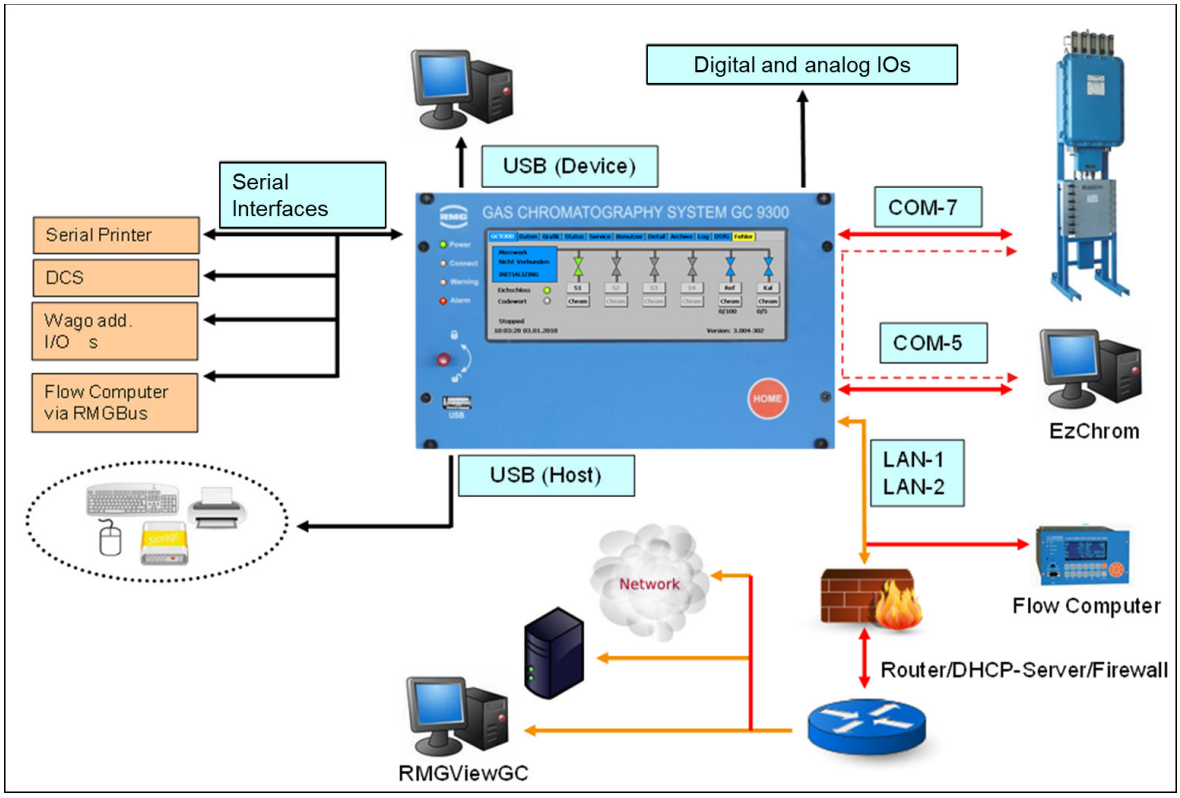
The compatible mode is an update for the existing PGC9000VCs with a new, own approval. This update is also possible for older PGC versions, please contact RMG if necessary. With the update there is generally no increase from e.g. the version PGC9000VC to PGC9300 connected, but this update contains essentially the following characteristics:

- Better operating comfort due to the touch screen
- A larger number of inputs and outputs:
  - 20 digital Inputs
  - 12 digital Outputs
  - 8 analog Inputs
  - 4 analog Outputs
- Extended communication possibilities:
  - 7 serial interfaces
    (Modbus Master – RTU, Modbus Master -ASCII, RMG -Bus, DSfG)
  - 2 ethernet interfaces
    (Web browser, RMGView^{GC} [including remote control], DSfG -IP)
  - 2 USB for service and development
- Internal achieving of the data (no MRG necessary):
  - GC – archives and DSfG – archives
  - Parameter log and event log
- Graphical functions:
  - Chromatograms
  - Trends

Note

When updating, check whether the type plate needs to be changed. Please contact the RMG service department.

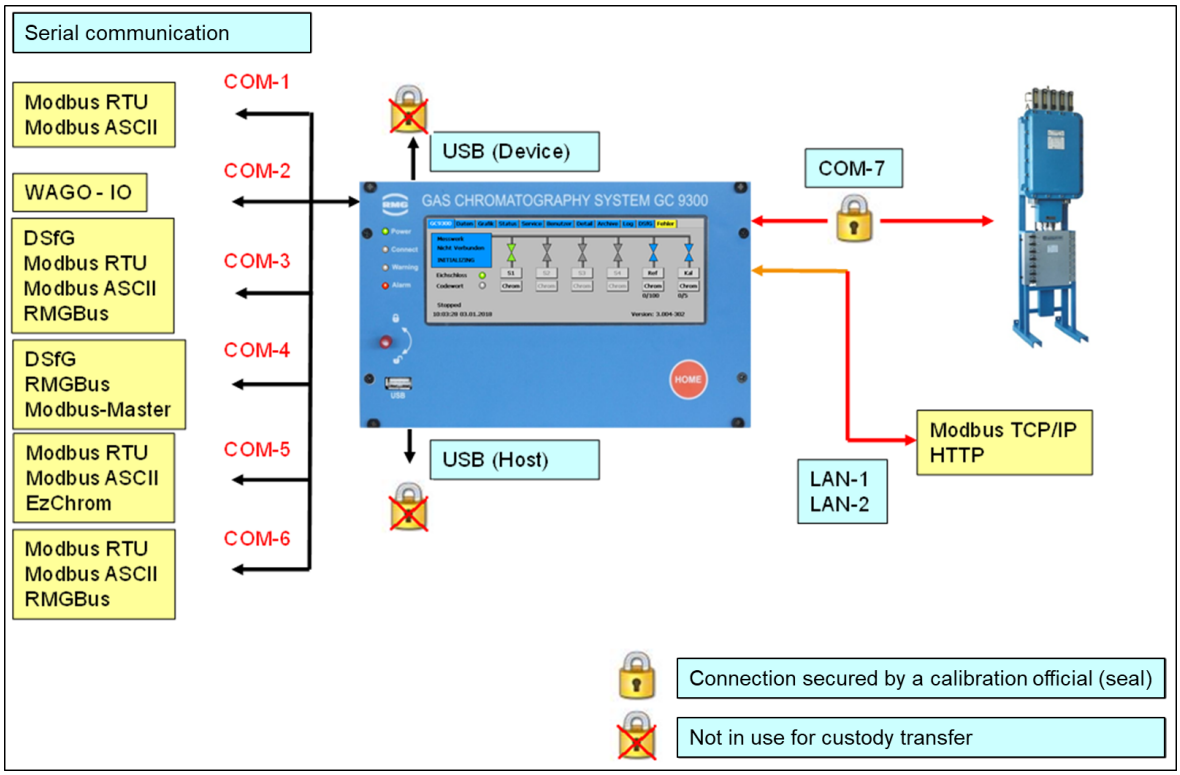
The next figure shows the various connection options to the GC9390 and communications with the GC9390.



The PGC measurement element is connected via COM 7 and a PC can be connected via COM 5. The LAN 1 and LAN 2 connections allow the connection of an ERZ2000 (ERZ2000-NG or ERZ2000-DI) and the integration into a PC network. Additionally, the RMGView^{GC} software can also be activated here, which allows convenient operation of the GC9390. These operating options are described in the corresponding manual of the RMGView^{GC} software.

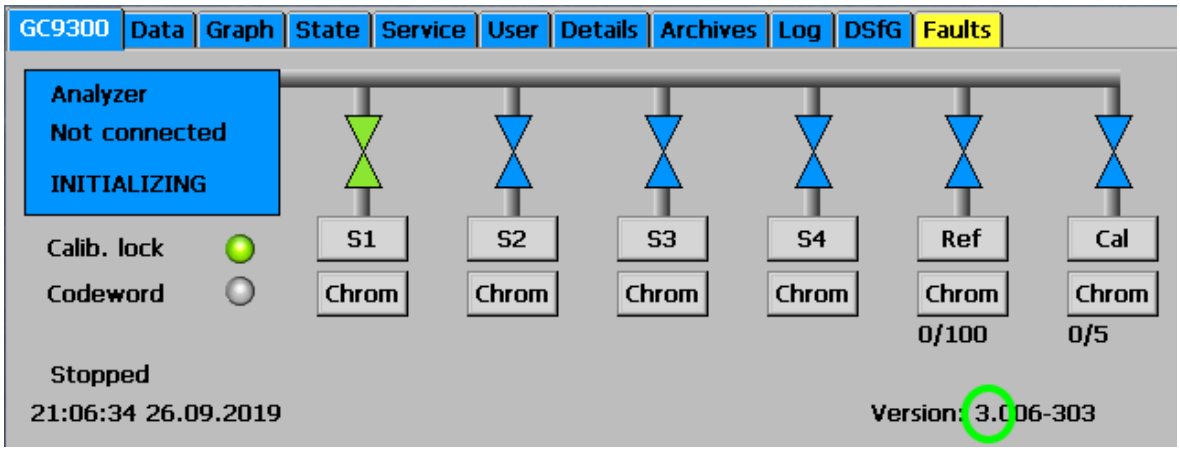
Further connection possibilities can be seen in the illustration.

The next figure shows the various communication protocols. In particular, the figure shows whether there is a custody transfer connection secured by a seal or whether the connection is not possible in custody transfer mode, such as the USB port at the bottom left of the front panel, which is blocked by a seal sticker.

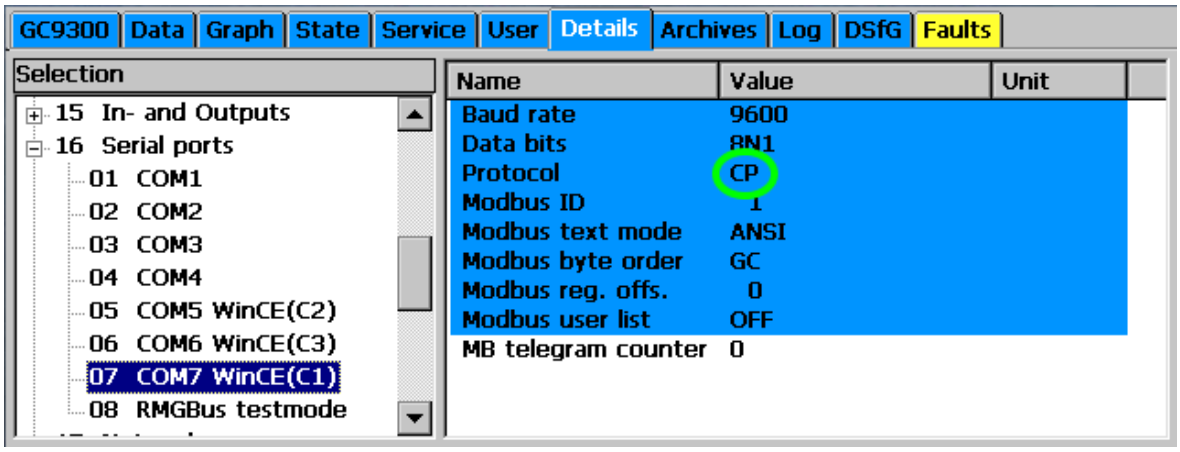


Furthermore, the different protocols are listed, which can be operated at the COM interfaces.

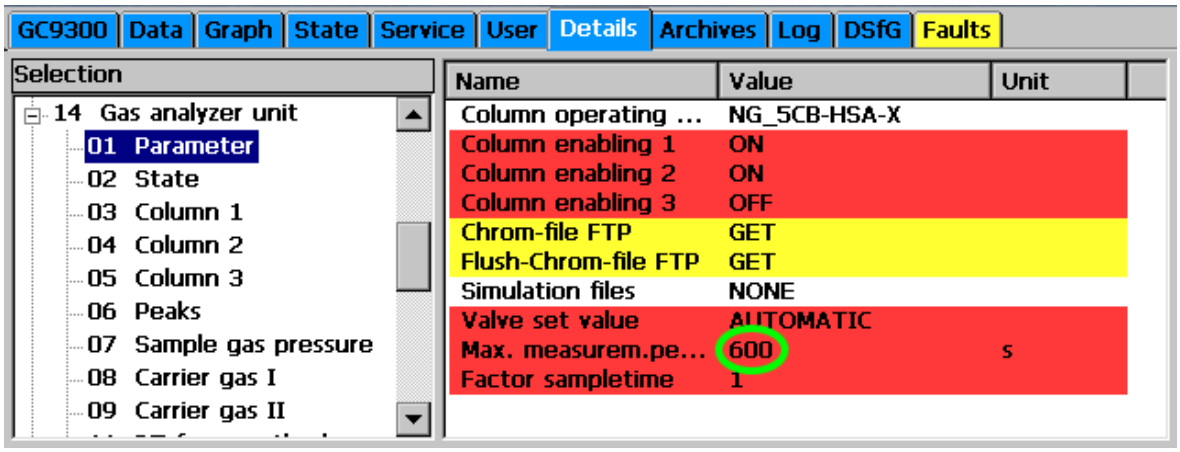
For the compatible mode a firmware version of the GC9390 of at least 3.xxx-3xx is necessary. You can read this status on the touch screen in the next figure in the lower left corner of the green circle.



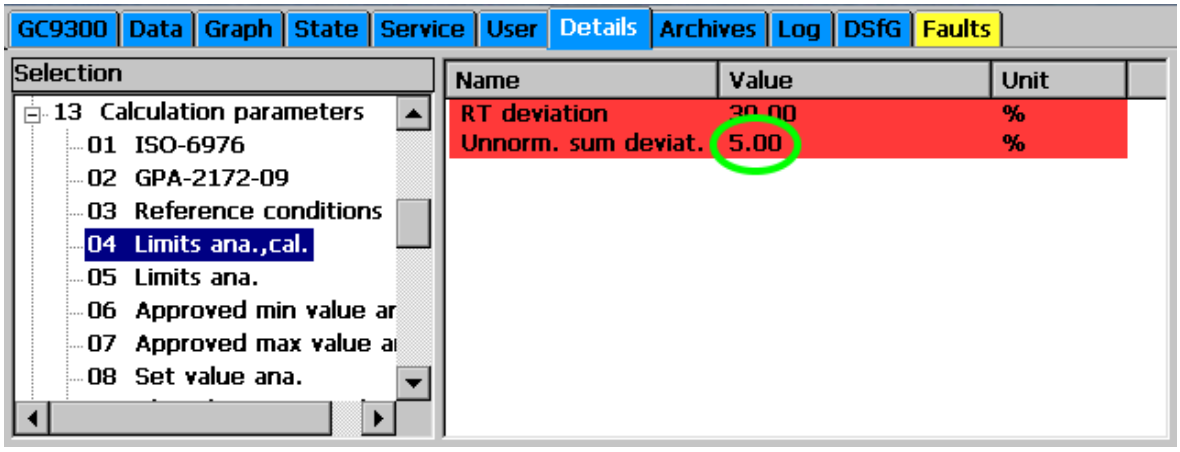
Some further settings are required. In the **menu "Detail"** the COM 7 protocol must be set to CP for the measuring unit (see next figure in the green circle).



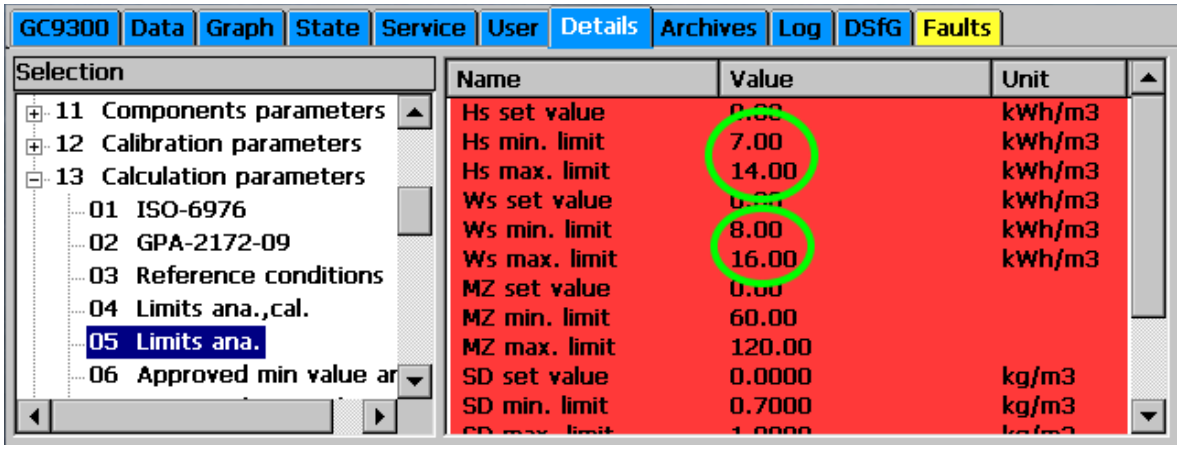
Next, enter the maximum measuring period of 600 seconds for the parameters.



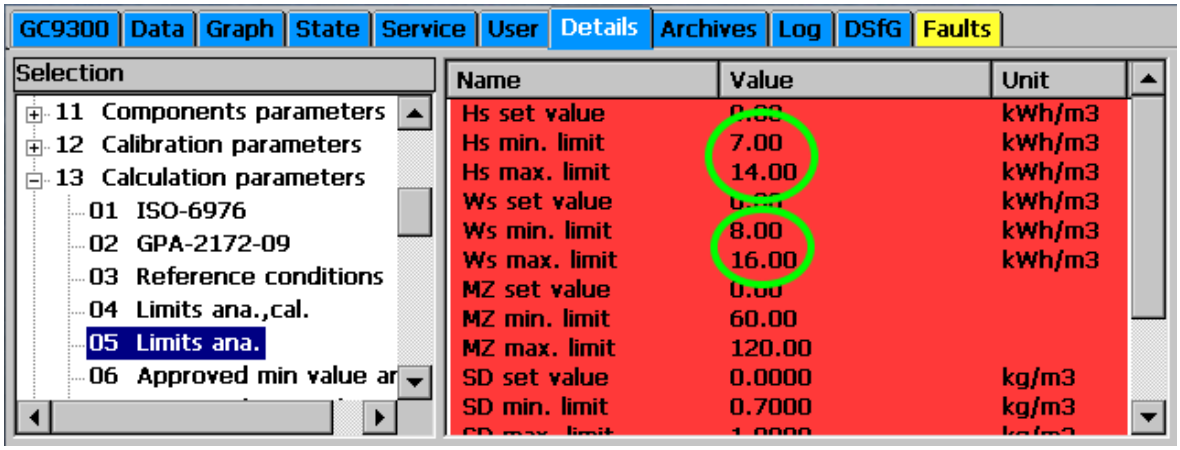
The next step is to set the limit value for the deviation of the unnormalized sum to 5 %.



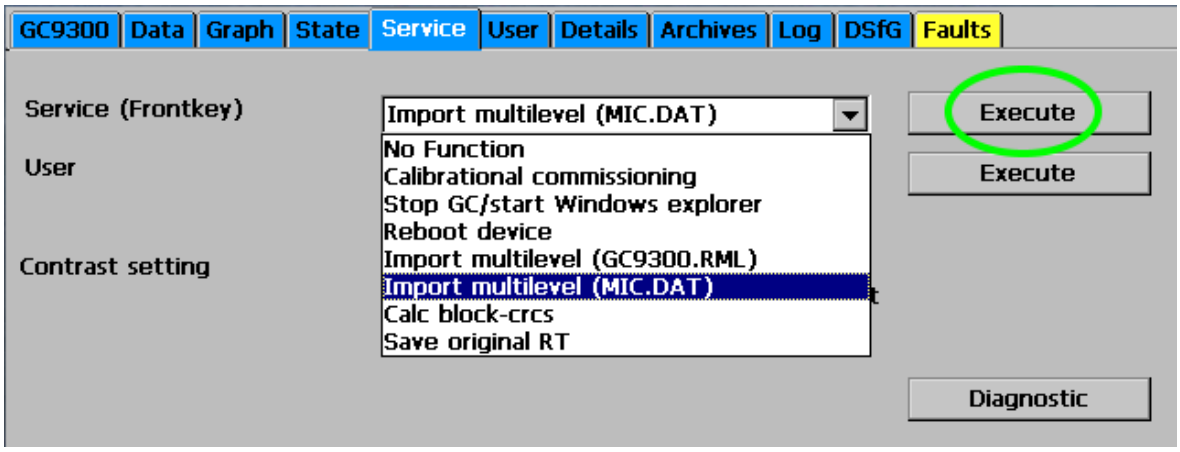
The lower and upper limit values for the calorific values Ho and Wobbe index Wo must be specified, too.



For the gas components nitrogen, carbon dioxide, propane, iso-butane, n-butane, neo-pentane, iso-pentane, n-pentane and the higher hydrocarbon compounds, that are summarized in C6+, the maximum possible concentrations are to be recorded.



The next step is to import the configuration of the measurement element. To do this, select "Import Multilevel (MIC.DAT)" in the "Service" menu and activate it with Execute (green circle).



Note

With the use of the compatible mode some functions are no longer supported:

- **Use of oxygen sensor (Oxos), relevant in general for biogas applications**
- **Protocol RMG Bus - E (RMG Bus Coupler)**
- **Protocol for the data memory DS 900**
- **Quantity Recorder MRG**
- **Special Gateways**
- **HP printer (direct connection)**
- **GC9310 gateway**
- **Automatic baking out**

5 Operation

5.1 Operation on the touch screen

The touch screen enables simple operation via a graphic and largely self-explanatory user interface. You can jump from any place in the menu to the start screen with the “HOME” button and then switch back and forth between the start screen and error screen.

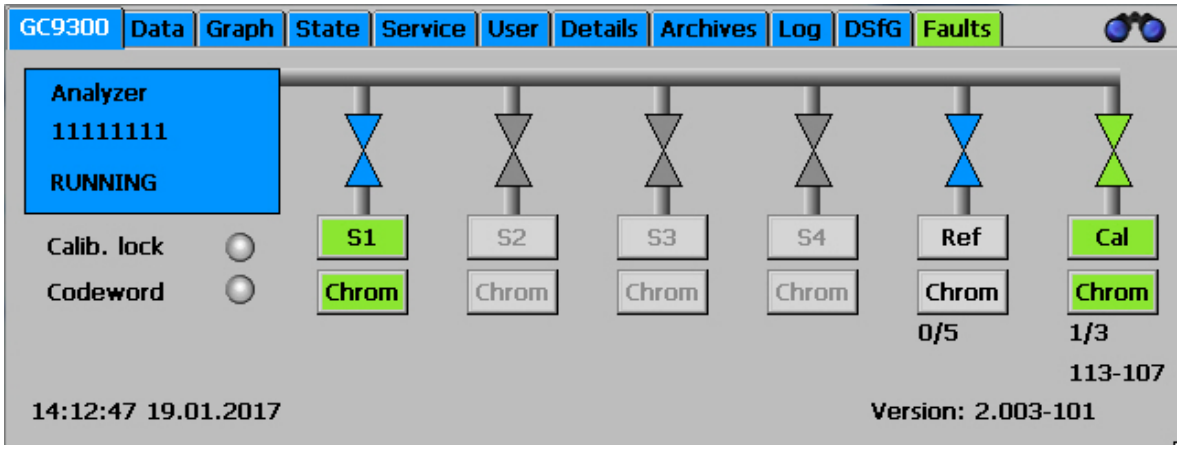
Note

Operate the touch screen directly with your finger or use the supplied plastic stylus.

Never use hard or sharp objects such as screwdrivers or pens!

There is a risk of scratching or tearing the film of the touch screen.

5.1.1 Start screen



The start screen shows an overview of the current status of the PGC. The following are displayed:

- Error status with color-coding of the “Error” tab
- Ready indicator
  - “READY” for “Measuring element is ready”

  - “NOT READY” for “Measuring element is not ready”
  - “INITIALIZING” for “Measuring element starting up”
  - “FLUSHING” for “Measuring element flushing in progress”
  - “Running” the Measurement element is running
- Analysis status for gas streams S1 to S4, as well as reference gas and calibrating gas.
- Indication of whether the user lock or custody transfer switch is open.
- Date and time of the device
- Software version
- Analysis time: total time [minutes]
- Analysis time: sample time [minutes]

The symbols for the analysis status have the following meanings:

Green: Gas stream is active and switched on
Blue: Gas stream is active and not switched on
Gray: Gas stream is inactive
Black: valves fixed

Green color: The last analysis of this gas flow was error-free.
Grey color and black text:
There is still no measurement result for this gas stream.
Red color: The last analysis of this gas stream was faulty.

Grey color of the gas stream symbol and gray text mean that the gas stream is not available for the present version.

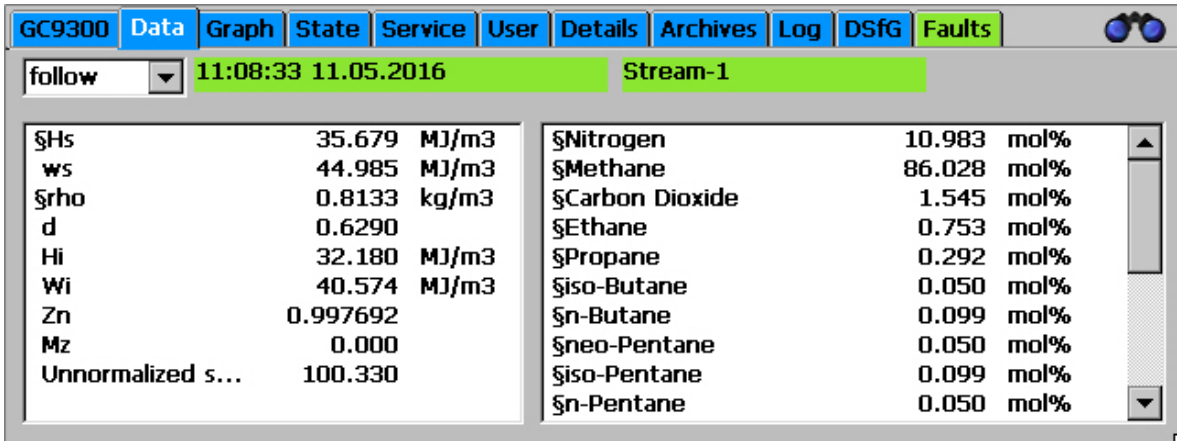
S1, Ref and Cal. are always available.

The individual screens are arranged like tabs. They represent the top level of the operating menu and are accessible via the buttons on the upper edge. The following screens are available:

GC 9300	Start screen
Data	Results of the last analysis
Graphs	Chromatograms and trends
Status	Status displays, measuring element and digital IOs

Service	Service functions
User	User-specific display
Detail	List of all measurements and parameters of the GC 9300
Archive	Display of the GC archive
Log	Display of the log books
DSfG	Display of the DSfG archive
Errors	Display of error messages with date and time

5.1.2 Data: Results of the last analysis



This screen displays the results of the last analysis, the molar content of the gas components in the right window and values such as calorific value, standard density and Wobbe index that calculated from the molar content in the left window. The methane number is also shown if its calculation is activated.

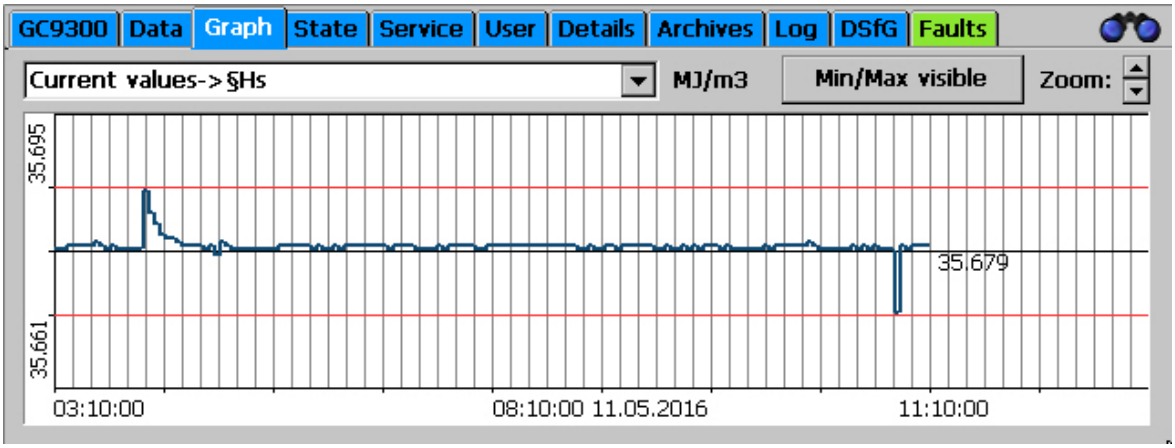
The setting for which analysis result is displayed is changed in the selection field at the top left.

successive	Result of the last analysis, regardless of gas stream or gas type.
Stream-1	Measuring gas from Gas Stream 1
Stream-2	Measuring gas from Gas Stream 2
Stream-3	Measuring gas from Gas Stream 3
Stream-4	Measuring gas from Gas Stream 4
REF gas	Last reference gas analysis
Cal. gas	Last calibration gas analysis

Note

The same result is obtained by activating (touching) the corresponding valve symbol in the "Home" screen.

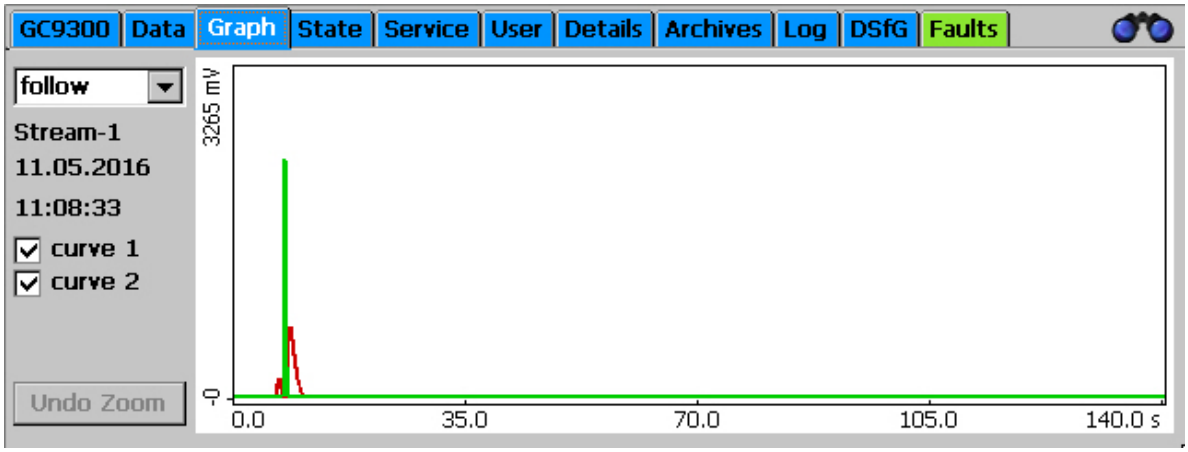
5.1.3 Graph - Trends: Trend display of arbitrary values



The trends of arbitrary values are displayed the “Graph - Trends” screen. Recording takes place for 60 hours (2.5 days). An interval of 10 hours is always displayed.

Specification of which values are recorded should take place under “Archive and buffer - Trend”. The Modbus address of the value to be recorded must be entered here.

5.1.4 Graph - Chroms: Chromatogram of the last analysis



The chromatograms (signal curves) of the last analysis are displayed in the “Graph - Chroms” screen. As described under “Data”, the gas stream and/or gas type is selected in the left selection field. There is a “Reject” selection point here for SKIP analyses for the purpose the flushing and the corresponding results were not assigned to a gas stream.

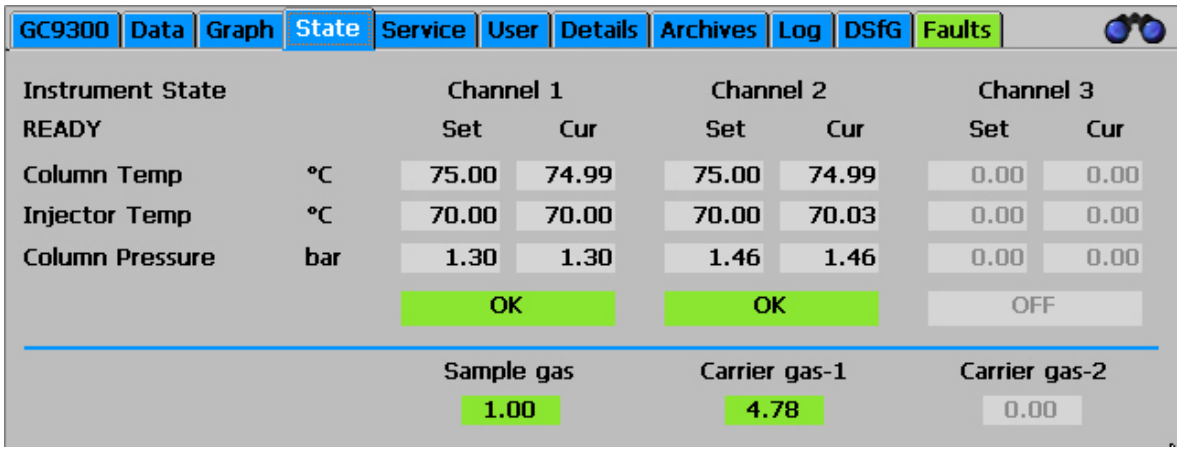
The measuring element may have 2 or 3 column modules. There is a curve for each of these modules and they can be displayed individually or together.

Zoom: The scale of the graph can be changed. Press the stylus on the light blue graphic field and draw a rectangle by moving the stylus. The area within the rectangle is then enlarged. To return to the original standard scale, click on “Undo zoom”.

Note

For correct display, the "zoom" must first be reset after the measuring stream selection. Only then will the stream be displayed.

5.1.5 Status - Measuring element: Status displays, e.g. column temperature

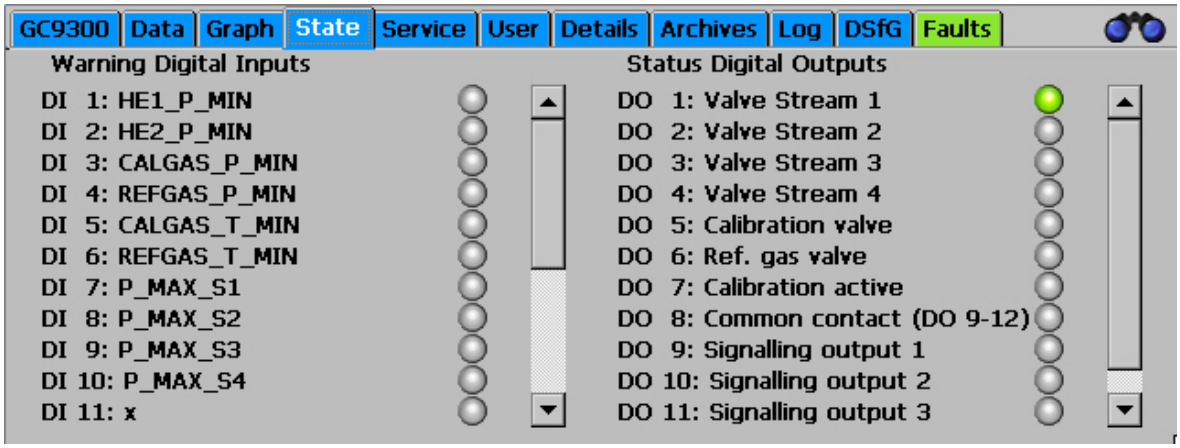


Variables such as pressure and temperature for Columns 1 to 3 and inlet pressures for measuring gas and carrier gas can be found here for the entries in the maintenance log. An additional, second carrier gas is used for some applications.

Note

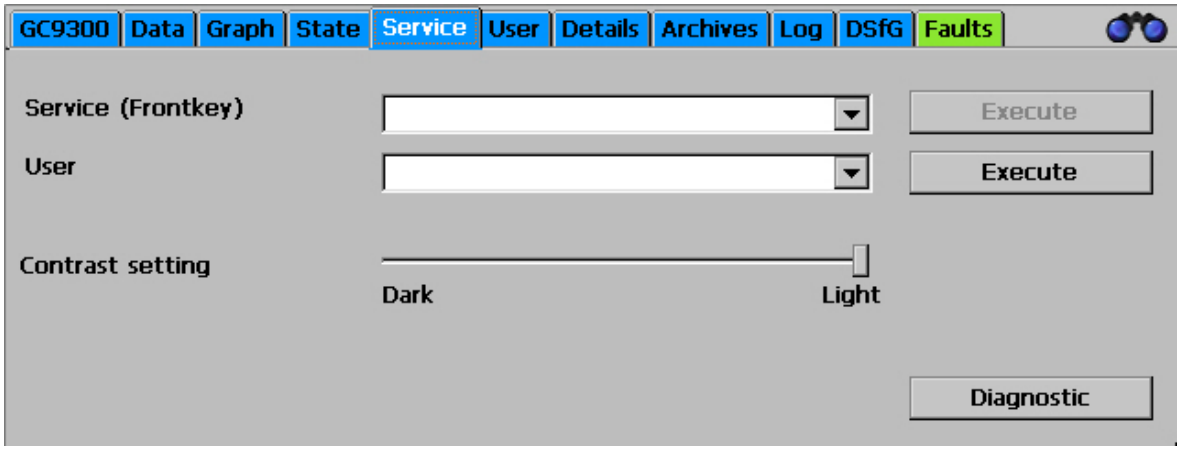
The status menu is also displayed when the yellow field (measurement element status field) in the "Home" screen is touched.

5.1.6 Status – Dig. I/O: Status display of digital inputs and outputs



The statuses of digital inputs and outputs can be viewed here.

5.1.7 Service: Service functions



Very special settings can be made with the service functions or functions can be started:

Service (front switch)
The following functions can be selected and started by clicking on the “Execute” button when the custody transfer switch is open:

a. Custody transfer commissioning
b. Close GC / start Windows Explorer (Close the GC program)
c. Restarting the device
d. Download ERRORLOG.TXT from the measuring element.
e. Multilevel import (Import column-specific parameters from the factory calibration)
f. Calculate block CRCs
(A test total for the custody transfer parameters is calculated for each menu item under “Details”)
g. Bake out the measuring element

Note

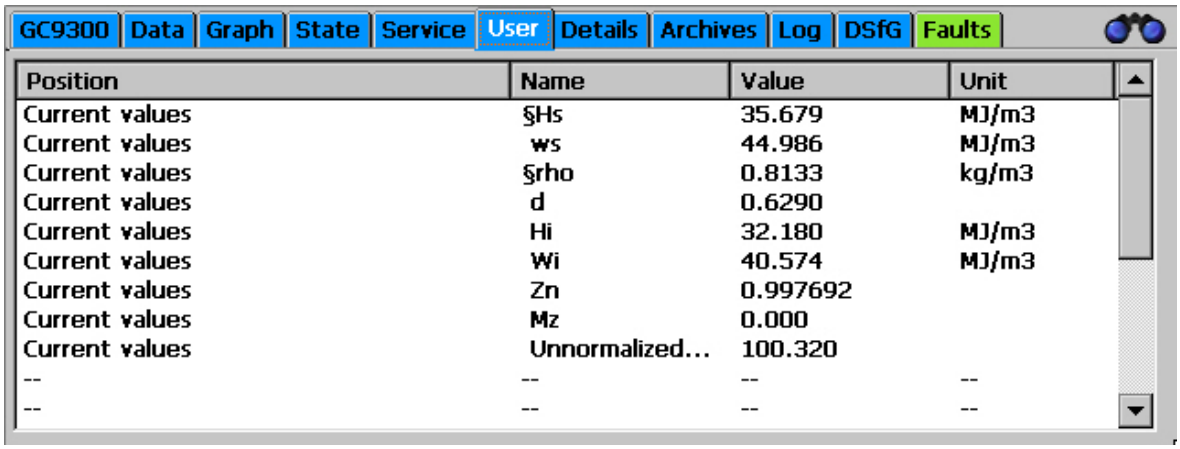
These functions a. to g. have major effects on the functionality and are thus reserved for RMG Service!

Under the supervision of a custodian, however, work such as baking out may be carried out.

The following functions can be selected by the “normal” user and started by clicking on the “Execute” button.

- Calibrate touch screen:
  (Calibration takes place according to the instructions of the operating system and is intended for the correct assignment of contact points for the graphic elements.)
- Contrast settings
  (Slide for adjustment of the screen contrast)

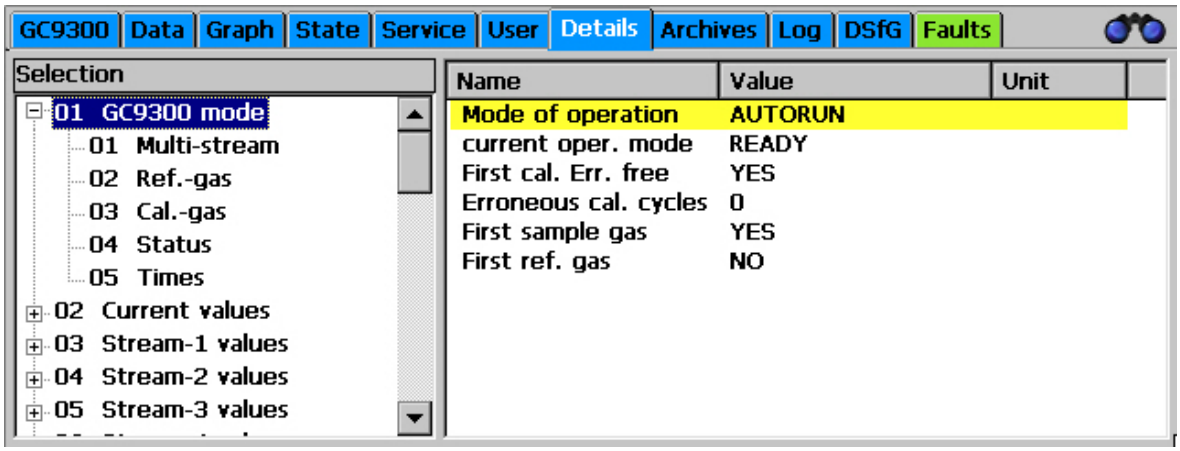
5.1.8 User: User-specific display



The user screen offers the possibility of summarizing 20 arbitrary, frequently needed measurements for quick display.

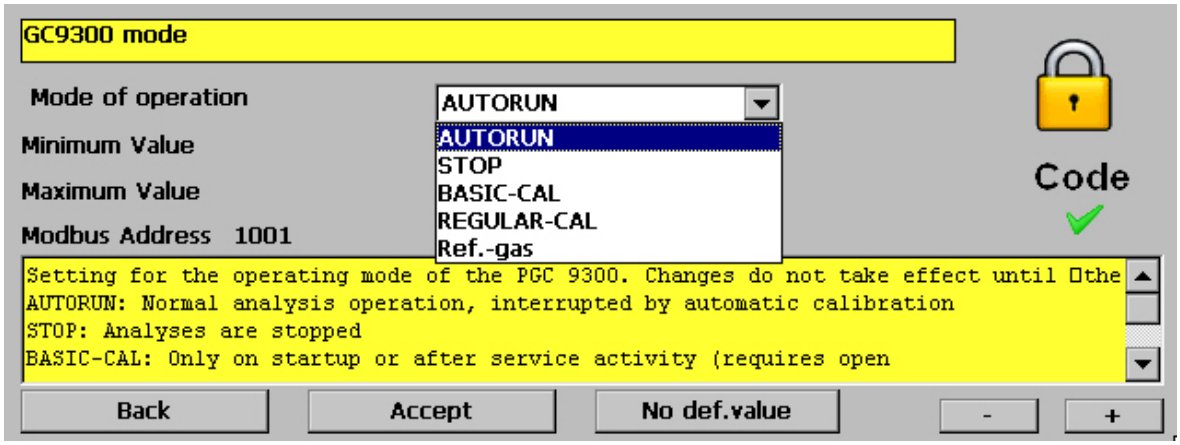
Selection takes place in the “Detail” screen under “User - Screen”. Then the corresponding Modbus addresses must be specified for each display value. These can be found by navigating in the “Detail” screen to the respective variable and clicking on it.

5.1.9 Detail: List of all measurements and parameters of the GC 9300



A list of all measurements, parameters and operating modes is provided here. The values are structured in 3 levels and can also be changed with this menu. Navigation to the two upper levels takes place in the left window, then the respective parameters and measurements are displayed in the right window.

When a parameter in the right window is clicked on, a window for changing the parameter appears:

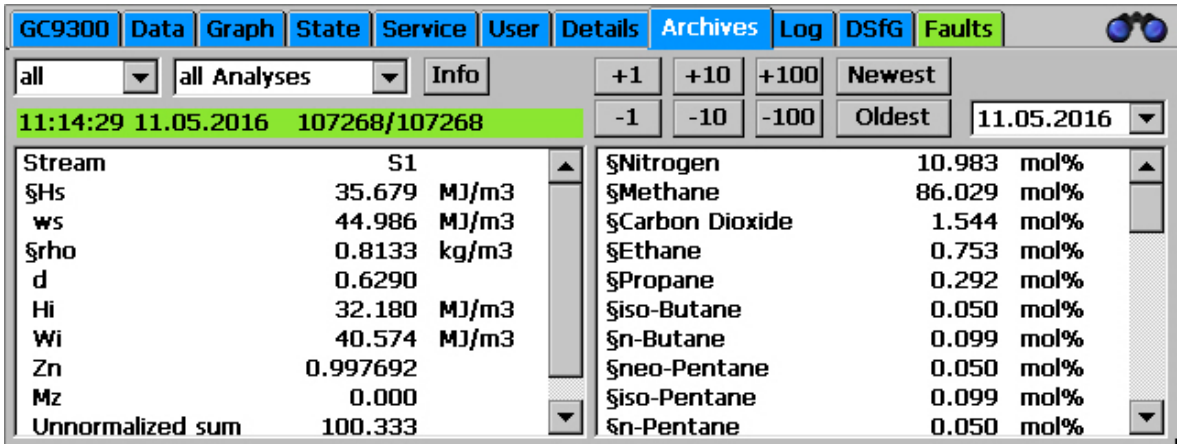


This window contains fields for entry of variable values or selection fields to change modes, depending on the type of parameter. In the example above, it is the operating mode that can be adjusted in this manner. In the yellow field below it, there is a brief description of the parameter, possible with additional information.

The “-” and “+” buttons are used to switch to the previous or next parameter in the current level.

If a variable value or text should be entered, a keyboard appears once the user clicks on the corresponding entry field:

5.1.10 Archive: Display of archive entries



All archive entries can be viewed on this screen. A data record with gas components and calculated variables can be displayed on this screen. The desired data can be filtered as follows with the selection fields:

Left selection field:

- **All** All conducted analyses, including calibrating and reference gas
- **S1** Gas Stream 1
- **S2** Gas Stream 2
- **S3** Gas Stream 3
- **S4** Gas Stream 4
- **Ref** Reference gas
- **Cal** Calibrating gas
- **Skip** Analyses that are not used

Middle selection field:

- **Each analysis** Display of individual analyses
- **Hour** Display of the hourly averages
- **Day** Display of the daily averages
- **Month** Display of the monthly averages

Right selection field:

A calendar field appears in which the day of the archived data can be selected.

Then you can jump back one, 10 or 100 entries with the **buttons -100, -10, -1, +1, +10** and **+100**.

5.1.11 Log: Display of the log books

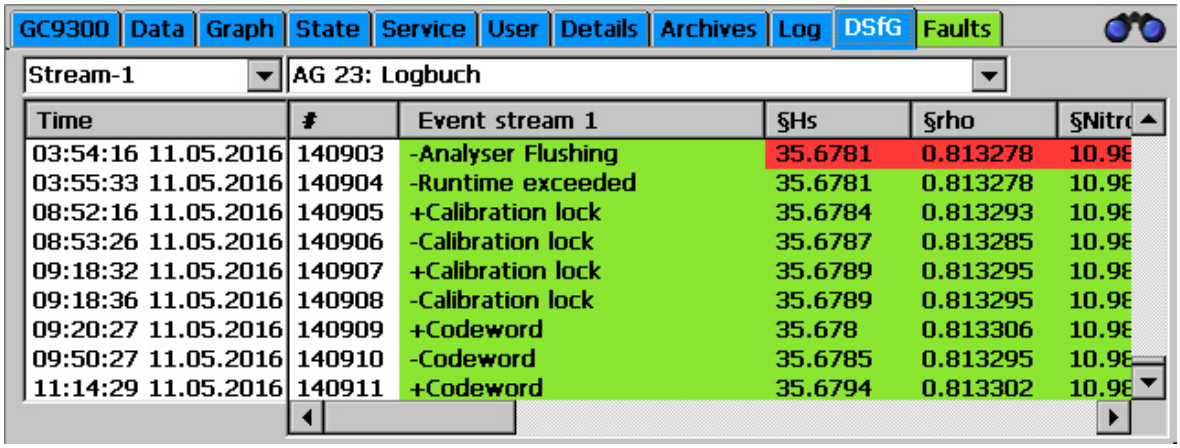
The log books for the PGC are displayed on this screen. With the right selection field you can switch to:

Events: All events, such as incoming or outgoing alarms with date and time
Parameters: All parameter changes with date and time

Note

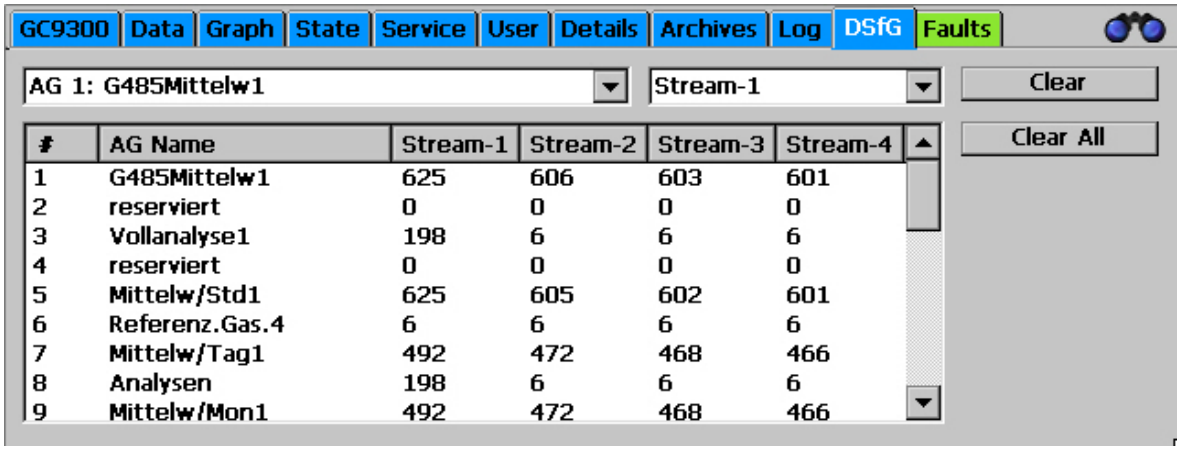
Only parameters that are under the code word or the custody transfer switch are logged.

5.1.12 DSfG - Archive: Display of the DSfG archive



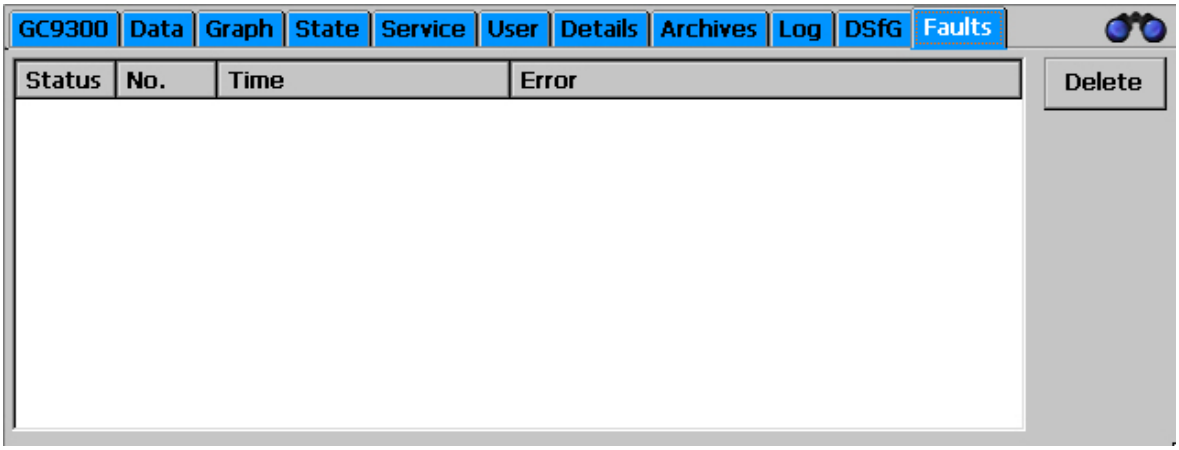
The individual DSfG archive groups can be viewed on the “DSfG - Archive” screen. The archive groups exist from Stream1 – Stream4.

5.1.13 DSfG - Delete: Deletion of the DSfG archive



The individual DSfG archives can be deleted stream-by-stream on the “DSfG - Delete” screen. Therefore, the calibration switch must be opened and the calibration protection extinguishes. It must be reestablished by a calibration officer.

5.1.14 Errors: Display of error messages with date and time



All recently occurring and unacknowledged errors are displayed. Error messages that are no longer present (green) can be deleted here. Errors with a red background are alarms (A), which means the custody transfer measurement is faulty; errors with a yellow background are warnings (W), which means the custody transfer measurement has not been affected; notices (N) with a violet background are information that is unrelated to errors.

The tab is displayed in the color of the error with the highest priority with the display of a different screen:

- Green: no
- Yellow: warning
- Red: alarm

5.2 Operation examples

5.2.1 Enter code number

When changing a large number of parameters, you must first enter the user code. The default setting is 99999999. Proceed as follows:

I. Open the "Details" screen and scroll down in the window on the left until "User" appears.
II. Click on the word "User", then on "Codeword" in the window on the right.
III. Enter the user code using the displayed keyboard.
IV. Confirm your input by clicking the "OK" button.
V. Click the "Apply" button.
VI. Click the "Back" button to exit the parameterization window.

5.2.2 Change operating mode

To change the operating mode, you must first enter the user code. Stay on the "Details" screen and proceed as follows:

I. Scroll up to the top of the window on the left.
II. Click on "GC9300 Mode".
III. Click on "Operating Mode" in the window on the right.
IV. Select the desired operating mode in the selection field.
V. Click the "Apply" button.
VI. Click the "Back" button to exit the parameterization window.

The following operating modes are available:

AUTORUN	Normal analysis operation. One analysis is performed after another, interrupted by automatic calibration.
STOP	Measurement and calibration operation are disabled.
BASIC-CAL	Basic calibration for startup and for RMG service. Basic calibration may not be carried out during normal analysis operation.
NORM-CAL	Manual calibration, which can be started at any time and has the same effect as automatic calibration and also takes 30 minutes. AUTORUN is activated automatically after calibration.
REF-GAS	Reference gas analysis, i.e. the reference input for the analysis of test gas or a gas sample is connected. The PGC remains in this mode until it is changed again or the maximum number of reference gas analysis are done.

After the operating mode is changed, the analysis or calibration currently being performed is ended and switchover takes place directly afterwards.

5.2.3 Program current output

To program a current output, the user code must be entered first. Remain in the "Detail" screen and proceed as follows:

I. To change the operating mode, you must first enter the user code. Stay on the "Details" screen and proceed as follows:

II. On the "Details" screen, navigate to the measured value that you wish to output via the current output.

III. In the window on the right, click on the name of the measured value to read the Modbus address on the parameterization screen. Click "Back" to exit the parameterization screen.

IV. In the window on the left, scroll to "Inputs and Outputs" and click on it.

V. Scroll down and select one of the four current outputs.

VI. In the window on the right, click on "Operating Mode" and select the desired operating mode of the current output, e.g. 4-20 mA.

VII. In the window on the right, click on "Select" and enter the Modbus address of the measured value to be output under "Select" on the parameterization screen.

VIII. Finally, enter the limits. "Phys. Min. Value" is the measured value for which the minimum current (0 or 4 mA) is to be output, while "Phys. Max. Value" is the measured value for the maximum current (20 mA).

IX. The limit value violation should be set to "WARNING" provided the current output is not being used for custody transfer.

5.2.4 Read values for maintenance log entry

The following values must be read out for the entry in the Maintenance Book:

I. Carrier gas pressure

II. Measuring gas pressure

III. Column temperature

IV. Column pressure

These values can be found on the "Details" screen:

I. Select in the left window "Measuring Element/Pressure of Gas for Analysis". The measuring gas pressure is displayed on the right in the first line.

II. In the window on the left, select "Measuring Element/Carrier Gas-I". The carrier gas pressure is displayed on the right in the first line.

III. In the window on the left, select "Measuring Element/Channel-I". The pressure and temperature for column 1 are displayed in the window on the right.

IV. In "Measuring Element/Channel-2" and "Measuring Element/Channel-3" you can find the values for other columns.

It is easier to read these values if the yellow field (movement status field) in the "Home" screen is touched.

5.3 Bake-out

After a longer service interval or if there is a possibility that impurities from undefined gas mixtures may have entered the measuring element, it is recommended that the measuring element is baked-out in order to remove these impurities.

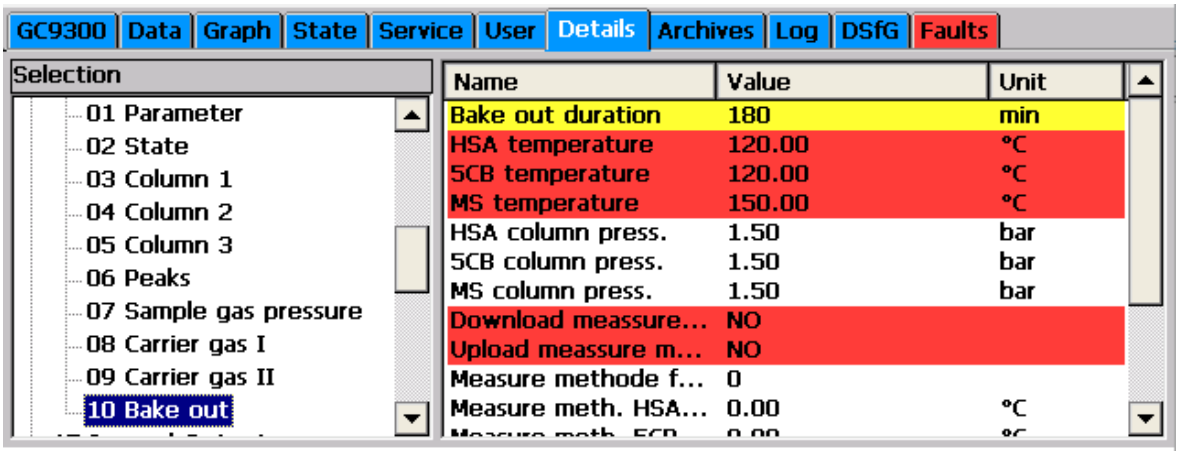
Note

If necessary, consult RMG's service department before starting a heating process.

5.3.1 Bake-out process

As of version V1.610-081, there is a new *chapter 14.10 Bake-out* under the *chapter 14 measurement element*.

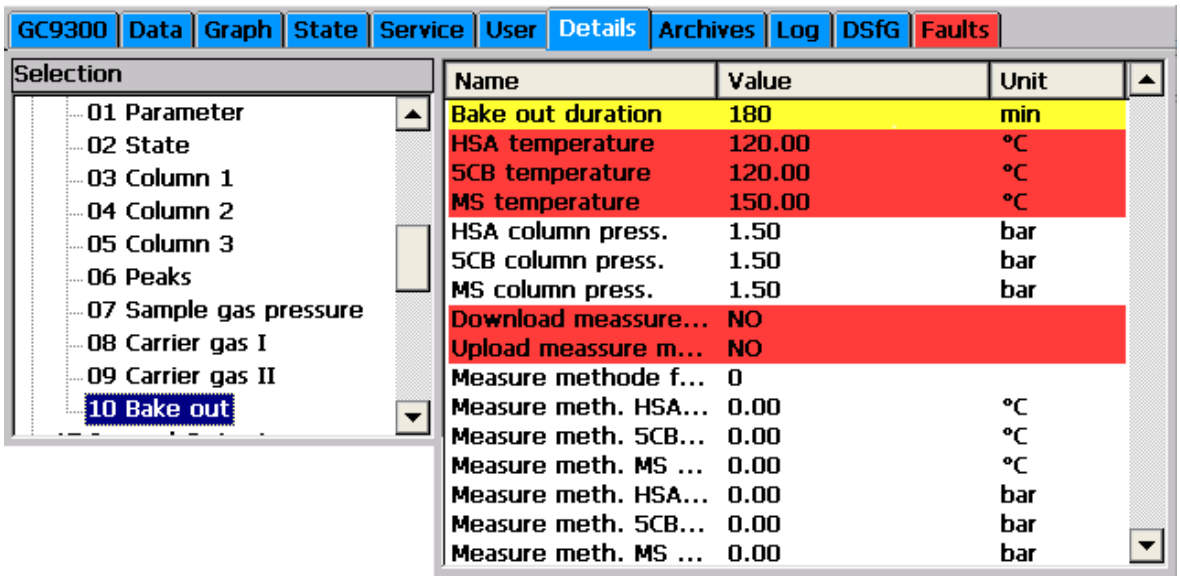
The duration of the heating process can be entered here. This value is below the user code word and can be between 180 minutes and 1080 minutes. By default, this value is set to 180 minutes. The following figure shows the matrix from the user's point of view.



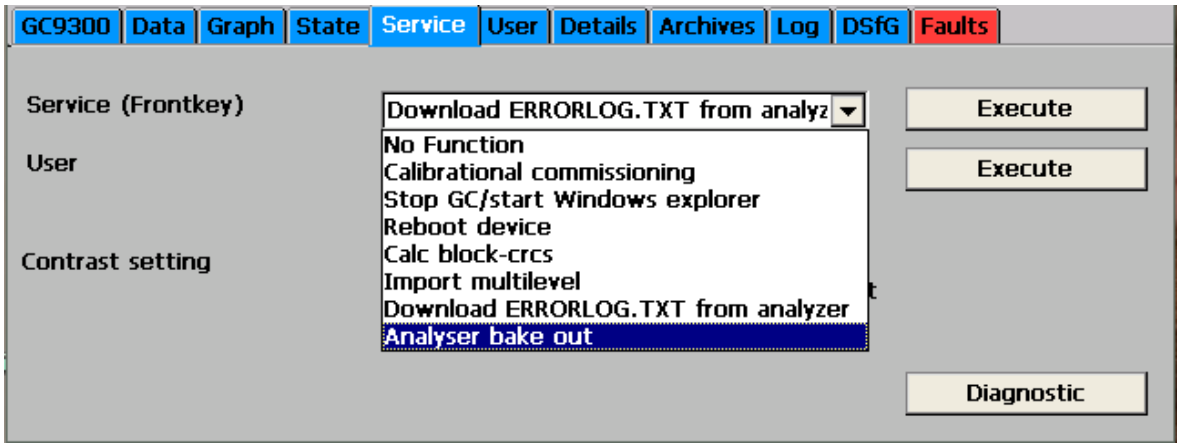
In the *chapter 14.10 Bake-out* there are further matrix elements which are not visible in the user profile *USER*. These additional matrix elements are only visible to the service.

Before a heating process can be started, the current measuring method from the measuring element must be saved in the GC9300 controller. This can be done using the matrix element *Upload measurement method* in *chapter 14.10 Bake-out*.

The following figure shows the matrix from a developer's point of view.



The service functions Bake-out the measuring element can be started in the service dialog. The calibration switch must be open in order to perform a service function.

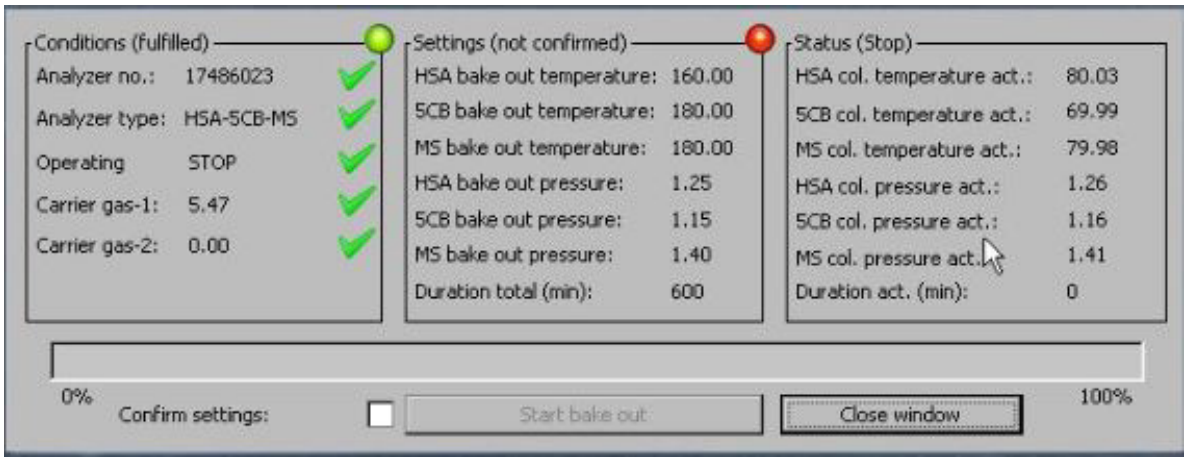


To start the bake-out process, a number of prerequisites must be met:

- The parameters of the measurement method for the connected measuring element must be stored in the GC9300 controller. (Matrix element: Upload measurement method)
- The measuring element must be equipped with the column arrangement HSA - 5CB - MS.
- The operating mode must be set to STOP.
- The carrier gas pressure must be correct.
  (For PGC9304 carrier gas 1 and -2.)
- The calibration switch must be open in order to start the service function.

In addition, the settings of the heating procedure must be confirmed:

- column temperatures
- column pressures
- Total duration of the bake-out process



Note

After the bake-out process has been started, the dialog can no longer be exited.

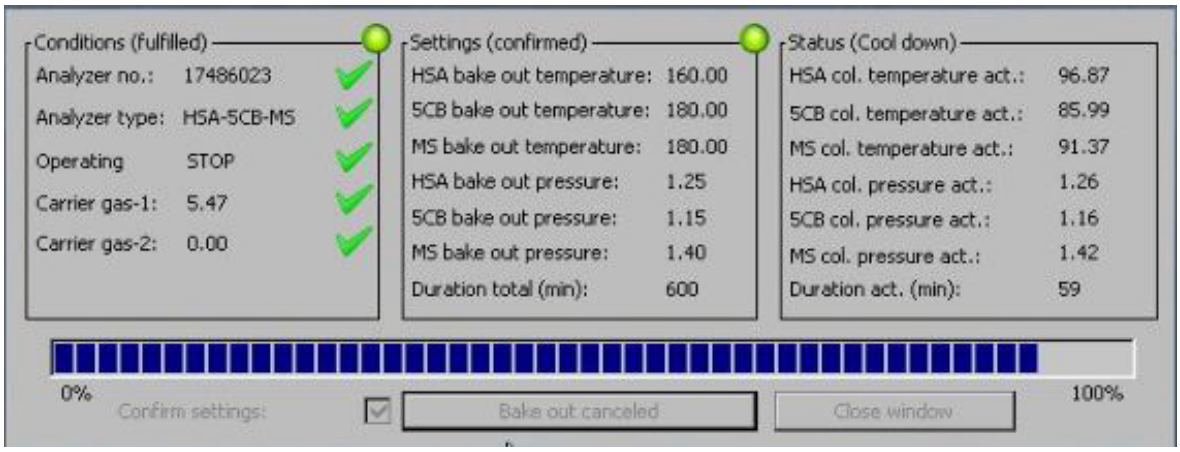
During the bake-out process, this dialog box contains status indicators that allow for proper monitoring of the process:

- Current column temperatures
- Current column pressures
- Remaining time of the heating process
- Progress bar
- Status display ("Bake out", "Cool down" and "Equilibrate")

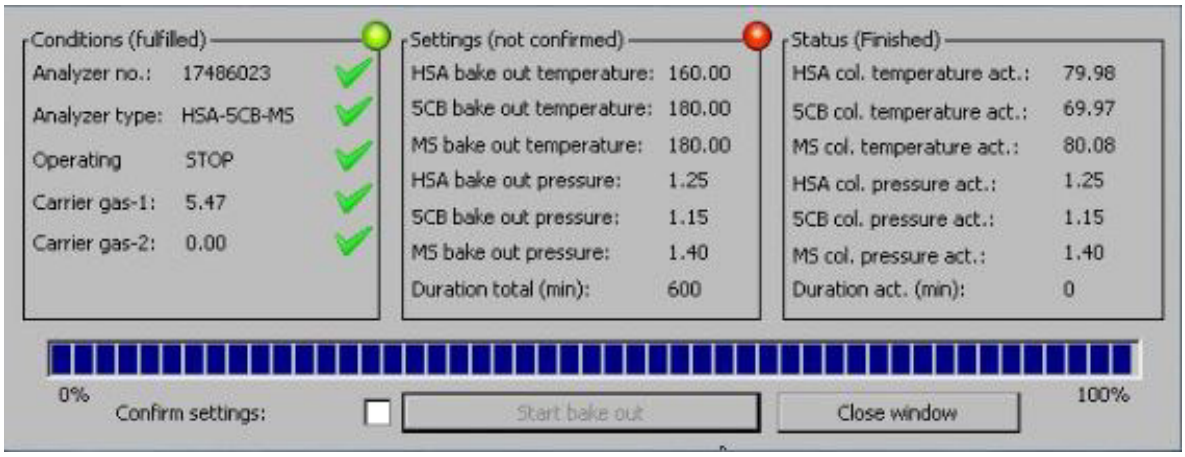
The heating process starts as soon as "Start bake-out process" has been confirmed twice.

The orange button can be used to stop the heating process. To abort the bake-out process, "Abort Bake-out" must be confirmed twice.

After termination of the heating process, cooling is started immediately. Now no more actions and interventions in the cooling process are possible and the cooling time (always 1 hour) has to be waited.



After cooling has been completed, the dialog box can be left again, regardless of whether the heating process was interrupted early or whether the heating process was successfully completed.



All actions of the heating process were logged into the event log (the timestamps do not correspond to a real process).


GC9300
Data
Graph
State
Service
User
Details
Archives
Log
DSfG
Faults
Time
Event
00:34:23 18.05.2018 +H "MW Setzen Messmeth. OK"
00:34:23 18.05.2018 - H "Abkühlen"
00:34:23 18.05.2018 +H "Equilibrieren"
01:04:24 18.05.2018 - H "Equilibrieren"
09:51:17 18.05.2018 +H "Bake out"
09:52:24 18.05.2018 - H "Bake out"
09:52:24 18.05.2018 +H "Cool down"
10:22:27 18.05.2018 - H "Cool down"
10:22:27 18.05.2018 +H "Equilibrieren"
10:52:29 18.05.2018 - H "Equilibrieren"
Events
Top
Bottom

5.4 Retention time monitoring

The GC9300 controller offers the monitoring of the retention time of nitrogen and generates a warning if a change is too large.

The check takes place backdated to the time of the **10.15.02 Startup Delay** (60 days in the example below). The time of the **10.15.03 Period for summation** (10 days) before the Startup Delay and the same period before are compared to each other.

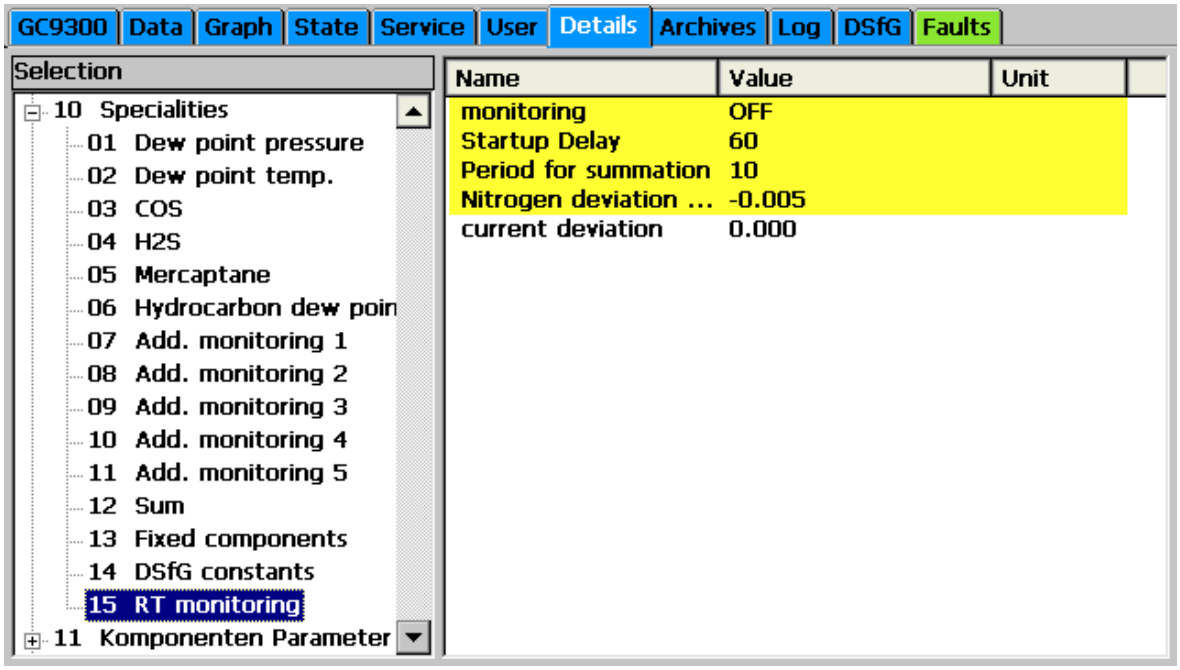
Based on the times selected in the example here, the average retention times for the period from day 41 to 50 is compared with the average retention time for the period from day 51 to 60. These times may differ only very slightly from one another.

Note

Empirical investigations have shown that the relative shift for the retention times should be less then approximately -0.005. This value is stored in coordinate 10.15.04 Nitrogen deviation.

If the shift is higher, a warning is generated.

Please contact the RMG service department.



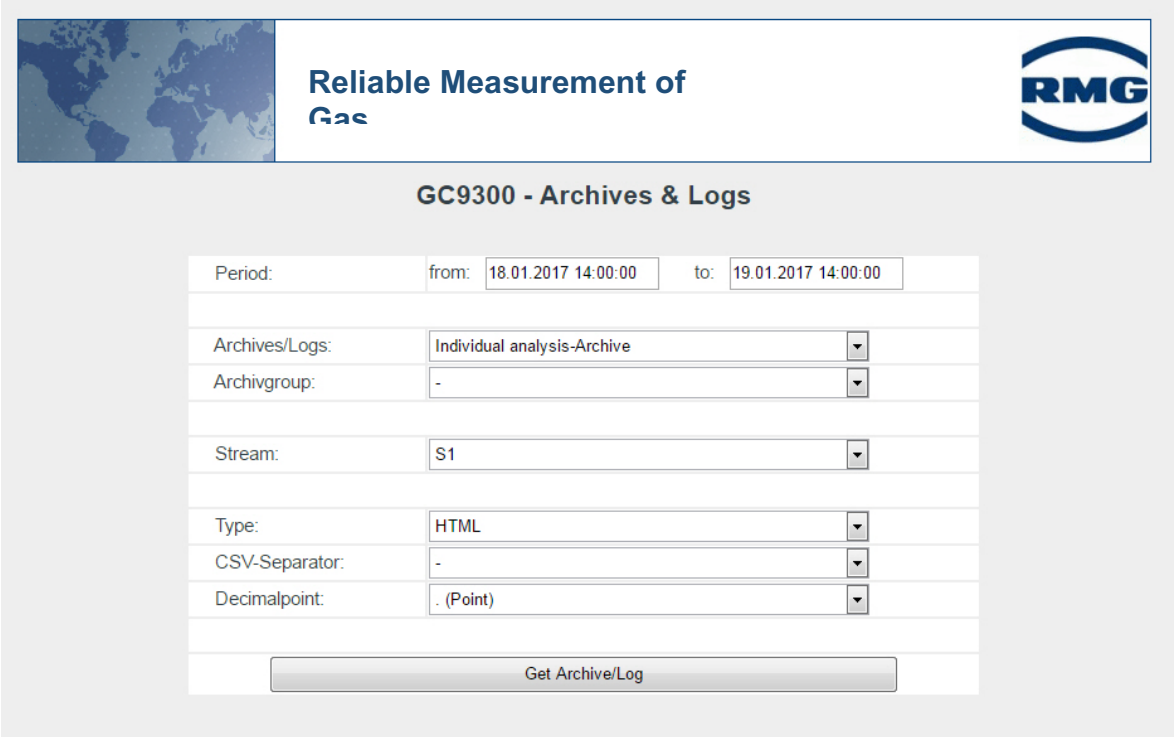
1. Monitoring is activated in coordinate **10.15.01 Monitoring**.
2. In coordinate **10.15.02 Startup Delay**, the time [in days] is set in which the monitoring does not issue a warning.
3. Coordinate **10.15.03 Period for summation** gives the time [in days] during which the measured retention times of the calibration runs are summed up.
4. The coordinate **10.15.04 Nitrogen deviation** shows the value against which the calculated deviation is checked.
5. Coordinate **10.15.05 actual deviation** shows the current deviation.

5.5 View and read archive via internet browser

If there is a TCP/IP connection between a PC and the analytical computer, the archives can be read out with any Internet Browser and the archive content displayed. The archive content can be saved in the file formats html and csv. The abbreviation "csv" stands for "character-separated values", a format that can be read by MS Excel.

To get access to the archive data you have to enter a username and a password. The username is always “gcuser” and the password can be set under “22: Archives, Storage/Web Archive Password”.

Data is read out and viewed from the following window:



5.6 Operation with RMGView^{GC}

You may find all required information in the manual of RMGView^{GC}. This manual can be downloaded from the RMG internet homepage:

www.rmg.com

5.7 Error messages

Error messages are categorized as follows:

A	Alarms	Custody transfer measurement faults
W	Warnings	Non-custody transfer function faults
H	Hints	Messages without faults

Alarm numbers

Inter-nal	DSfG	Type	English	Description
1	7001	E	Read / write config	Conflict in assignment of parameters / software
2	7002	E	Load signature key	Signature key is loaded
3	424	E	ADC out of Range	Collective fault signal AD converter for current inputs 1 to 8
8	407	E	Reboot GC9300	Intermittent power failure
9	407	E	Reboot GC9300 (BIOS)	Bios triggered an automatic restart
10	7010	E	T1 open circuit	Line break Room temperature measurement
11	7011	E	T2 open circuit	Line break 2nd temperature measurement
12	7012	E	Temp.-1 alarm limits	Error during room temperature measurement
13	7013	E	Temp.-2 alarm limits	Error in 2nd temperature measurement
14	621	E	Outp current-1 alarm limits	Current output 1: Measured value outside the limit values
15	622	E	Outp current-2 alarm limits	Current output 2: Measured value outside the limit values
16	623	E	Outp current-3 alarm limits	Current output 3: Measured value outside the limit values
17	624	E	Outp current-4 alarm limits	Current output 4: Measured value outside the limit values
20	7020	E	ISO conditions	Input variables for ISO 6976 outside permissible limits
21	7021	E	GPA conditions	Input size for GPA 2172-96 except permissible limits
30	7030	E	Nitrogen Min/Max	Ana. & Cal: Nitrogen outside user limits
31	7031	E	Methane Min/Max	Ana. & Cal: Methane outside user limits
32	7032	E	Carbon Dioxide Min/Max	Ana. & Cal: Carbon dioxide outside user limits
33	7033	E	Ethane Min/Max	Ana. & Cal: Ethan outside user limits
34	7034	E	Propane Min/Max	Ana. & Cal: Propane outside user limits
35	7035	E	iso-Butane Min/Max	Ana. & Cal: iso-butane outside user limits
36	7036	E	n-Butane Min/Max	Ana. & Cal: n-butane outside user limits
37	7037	E	neo-Pentane Min/Max	Ana. & Cal: neo-pentane outside user limits
38	7038	E	iso-Pentane Min/Max	Ana. & Cal: iso-pentane outside user limits
39	7039	E	n-Pentane Min/Max	Ana. & Cal: n-pentane outside user limits
40	7040	E	C6+ Min/Max	Ana. & Cal: C6+ outside user limits
41	7041	E	n-Hexane Min/Max	Ana. & Cal: n-Hexan outside user limits
42	7042	E	n-Heptane Min/Max	Ana. & Cal: n-heptane outside user limits
43	7043	E	n-Octane Min/Max	Ana. & Cal: n-octane outside user limits
44	7044	E	n-Nonane Min/Max	Ana. & Cal: n-Nonan outside user limits
45	7045	E	Oxygen Min/Max	Ana. & Cal: Oxygen outside user limits
46	7046	E	Helium Min/Max	Ana. & Cal: Helium outside user limits
47	7047	E	Hydrogen Min/Max	Ana. & Cal: Hydrogen outside user limits
48	7048	E	Argon Min/Max	Ana. & Cal: Argon outside user limits
49	7049	E	Reserve Min/Max	(Reserve for future functions)
50	7050	E	Gas analyzer timeout	Connection to measuring unit interrupted
51	7051	E	MAC LAN2 is default	MAC address of the LAN2 interface not set
52	7052	E	Runtime exceeded	Default maximum analysis duration exceeded
53	7053	E	Wrong analyzer unit	Incorrect movement connected
54	7054	E	empty analysis	Archive entry without values, for general error display
60	7060	E	Wago AO1 alarm limits	Alarm limit values for Wago analog output 1 violated

Inter-nal	DSfG	Type	English	Description
61	7061	E	Wago AO2 alarm limits	Alarm limit values for Wago analog output 2 violated
62	7062	E	Wago AO3 alarm limits	Alarm limit values for Wago analog output 3 violated
63	7063	E	Wago AO4 alarm limits	Alarm limit values for Wago analog output 4 violated
64	7064	E	Wago AO5 alarm limits	Alarm limit values for Wago analog output 5 violated
65	7065	E	Wago AO6 alarm limits	Alarm limit values for Wago analog output 6 violated
66	7066	E	Wago AO7 alarm limits	Alarm limit values for Wago analog output 7 violated
67	7067	E	Wago AO8 alarm limits	Alarm limit values for Wago analog output 8 violated
68	7068	E	Wago AO9 alarm limits	Alarm limit values for Wago analog output 9 violated
69	7069	E	Wago AO10 alarm limits	Alarm limit values for Wago analog output 10 violated
70	7070	E	Wago AO11 alarm limits	Alarm limit values for Wago analog output 11 violated
71	7071	E	Wago AO12 alarm limits	Alarm limit values for Wago analog output 12 violated
72	7072	E	Wago AO13 alarm limits	Alarm limit values for Wago analog output 13 violated
73	7073	E	Wago AO14 alarm limits	Alarm limit values for Wago analog output 14 violated
74	7074	E	Wago AO15 alarm limits	Alarm limit values for Wago analog output 15 violated
75	7075	E	Wago AO16 alarm limits	Alarm limit values for Wago analog output 16 violated
80	7080	E	Nitrogen §Min/Max	Analysis: Nitrogen content outside permissible limits
81	7081	E	Methane §Min/Max	Analysis: Methane content outside permissible limits
82	7082	E	Carbon Dioxide §Min/Max	Analysis: CO2 content outside permissible limits
83	7083	E	Ethane §Min/Max	Analysis: Ethane content outside permissible limits
84	7084	E	Propane §Min/Max	Analysis: Propane content outside permissible limits
85	7085	E	iso-Butane §Min/Max	Analysis: i-butane content outside permissible limits
86	7086	E	n-Butane §Min/Max	Analysis: n-butane content outside permissible limits
87	7087	E	neo-Pentane §Min/Max	Analysis: Neopentane content outside permissible limits
88	7088	E	iso-Pentane §Min/Max	Analysis: i-pentane content outside permissible limits
89	7089	E	n-Pentane §Min/Max	Analysis: n-pentane content outside permissible limits
90	7090	E	C6+ §Min/Max	Analysis: C6+ fraction outside permissible limits
91	7091	E	n-Hexane §Min/Max	Analysis: n-hexane content outside permissible limits
92	7092	E	n-Heptane §Min/Max	Analysis: n-heptane content outside permissible limits
93	7093	E	n-Octane §Min/Max	Analysis: n-octane content outside permissible limits
94	7094	E	n-Nonane §Min/Max	Analysis: n-Nonan content outside permissible limits
95	7095	E	Oxygen §Min/Max	Analysis: Oxygen content outside permissible limits
96	7096	E	Helium §Min/Max	Analysis: Helium content outside permissible limits
97	7097	E	Hydrogen §Min/Max	Analysis: Hydrogen content outside permissible limits
98	7098	E	Argon §Min/Max	Analysis: Argon content outside permissible limits
99	7099	E	Reserve §Min/Max	(Reserve for future functions)
100	609	E	Cal: retentions time	Calibration: at least one retention time outside permissible limits
101	610	E	Response factor	Calibration: at least one response factor outside permissible limits
102	608	E	Cal: unnorm. Sum	Calibration: unnormalized sum outside permissible limits
103	7103	E	Cal: total area	Calibration: Total area outside permissible limits
104	7104	E	Cal: Concentration	Calibration: Collective signal for limit value violation of components
105	7105	E	Cal: Hs limit	Calibration: Calorific value outside permissible limits
106	7106	E	Cal: rho limit	Calibration: Standard density outside permissible limits
107	7107	E	Cal: CO2 limit	Calibration: CO2 content outside permissible limits
120	7120	E	Ana: retentions time	Analysis: at least one retention time outside permissible limits
121	7121	E	Ana: unnorm. Sum	Analysis: unnormalized sum of permissible limits other than permissible limits
122	7122	E	Ana: Concentration	Analysis: Collective message for limit value violation of components
123	7123	E	Ana: Hs min/max	Analysis: Calorific value outside permissible limits
124	7124	E	Ana: Ws min/max	Analysis: Wobbe index outside permissible limits
125	7125	E	Ana: Mz min/max	Analysis: Methane number outside permissible limits
126	7126	E	Ana: d min/max	Analysis: Density ratio outside permissible limits
127	7127	E	Ana: rho min/max	Analysis: standard density outside permissible limits

Inter-nal	DSfG	Type	English	Description
130	7130	E	Pres. meas. gas at injection	Sample gas pressure outside permissible limits
131	7131	E	Pres. carrier gas I	Carrier gas pressure 1 (helium) outside permissible limits
132	7132	E	Pres. carrier gas II	Carrier gas pressure 2 (argon) outside permissible limits
133	7133	E	No ana. start bec. of pres. meas. gas	Analysis not started due to measuring gas pressure error
134	7134	E	max pres. carrier gas I	Pressure of the 1st carrier gas too high
135	7135	E	max pres. carrier gas II	Pressure of the 2nd carrier gas too high
149	7149	E	Method not found	Method file could not be opened (GC9390 only)
150	7150	W	Cal: Concentration	Calibration: Collective signal for limit value violation of components
151	7151	W	Ana: Concentration	Analysis: Collective Notification
152	7152	W	Temp.-1 warning limits	Error during room temperature measurement
153	7153	W	Temp.-2 warning limits	(Reserve for future functions)
154	7154	W	outp current-1 warning limits	Current output 1: Measured value outside the limit values
155	7155	W	outp current-2 warning limits	Current output 2: Measured value outside the limit values
156	7156	W	outp current-3 warning limits	Current output 3: Measured value outside the limit values
157	7157	W	outp current-4 warning limits	Current output 4: Measured value outside the limit values
158	7158	W	#DiWarnText_0	Warning message for digital input. 1, text programmable
159	7159	W	#DiWarnText_1	Warning message for digital input. 2, text programmable
160	7160	W	#DiWarnText_2	Warning message for digital input. 3, text programmable
161	7161	W	#DiWarnText_3	Warning message for digital input. 4, text programmable
162	7162	W	#DiWarnText_4	Warning message for digital input. 5, text programmable
163	7163	W	#DiWarnText_5	Warning message for digital input. 6, text programmable
164	7164	W	#DiWarnText_6	Warning message for digital input. 7, text programmable
165	7165	W	#DiWarnText_7	Warning message for digital input. 8, text programmable
166	7166	W	#DiWarnText_8	Warning message for digital input. 9, text programmable
167	7167	W	#DiWarnText_9	Warning message for digital input. 10, text programmable
168	7168	W	#DiWarnText_10	Warning message for digital input. 11, text programmable
169	7169	W	#DiWarnText_11	Warning message for digital input. 12, text programmable
170	7170	W	#DiWarnText_12	Warning message for digital input. 13, text programmable
171	7171	W	#DiWarnText_13	Warning message for digital input. 14, text programmable
172	7172	W	#DiWarnText_14	Warning message for digital input. 15, text programmable
173	7173	W	#DiWarnText_15	Warning message for digital input. 16, text programmable
174	7174	W	#DiWarnText_16	Warning message for digital input. 17, text programmable
175	7175	W	#DiWarnText_17	Warning message for digital input. 18, text programmable
176	7176	W	#DiWarnText_18	Warning message for digital input. 19, text programmable
177	7177	W	#DiWarnText_19	Warning message for digital input. 20, text programmable
179	-	W	Limit H2S-Sum	Hydrogen sulphide value (AI) above permissible limit
180	7180	W	Nitrogen §Min/Max	Analysis: Nitrogen content outside permissible limits
181	7181	W	Methane §Min/Max	Analysis: Methane content outside permissible limits
182	7182	W	Carbon Dioxide §Min/Max	Analysis: CO2 content outside permissible limits
183	7183	W	Ethane §Min/Max	Analysis: Ethane content outside permissible limits
184	7184	W	Propane §Min/Max	Analysis: Propane content outside permissible limits
185	7185	W	iso-Butane §Min/Max	Analysis: i-butane content outside permissible limits
186	7186	W	n-Butane §Min/Max	Analysis: n-butane content outside permissible limits
187	7187	W	neo-Pentane §Min/Max	Analysis: Neopentane content outside permissible limits
188	7188	W	iso-Pentane §Min/Max	Analysis: i-pentane content outside permissible limits
189	7189	W	n-Pentane §Min/Max	Analysis: n-pentane content outside permissible limits
190	7190	W	C6+ §Min/Max	Analysis: C6+ fraction outside permissible limits
191	7191	W	n-Hexane §Min/Max	Analysis: n-hexane content outside permissible limits
192	7192	W	n-Heptane §Min/Max	Analysis: n-heptane content outside permissible limits
193	7193	W	n-Octane §Min/Max	Analysis: n-octane content outside permissible limits
194	7194	W	n-Nonane §Min/Max	Analysis: n-Nonan content outside permissible limits
195	7195	W	Oxygen §Min/Max	Analysis: Oxygen content outside permissible limits
196	7196	W	Helium §Min/Max	Analysis: Helium content outside permissible limits
197	7197	W	Hydrogen §Min/Max	Analysis: Hydrogen content outside permissible limits
198	7198	W	Argon §Min/Max	Analysis: Argon content outside permissible limits

Inter-nal	DSfG	Type	English	Description
199	7199	W	Reserve §Min/Max	(Reserve for future functions)
200	7200	W	Pres. meas. gas	Sample gas pressure outside permissible limits
201	7201	W	Gas analyzer TO	Movement does not respond
203	7203	W	Too many peaks	Chromatogram contains too many peaks
204	7204	W	Wago AO1 warning limits	Warning limit values for Wago analog output 1 violated
205	7205	W	Wago AO2 warning limits	Warning limit values for Wago analog output 2 violated
206	7206	W	Wago AO3 warning limits	Warning limit values for Wago analog output 3 violated
207	7207	W	Wago AO4 warning limits	Warning limit values for Wago analog output 4 violated
208	7208	W	Wago AO5 warning limits	Warning limit values for Wago analog output 5 violated
209	7209	W	Wago AO6 warning limits	Warning limit values for Wago analog output 6 violated
210	7210	W	Wago AO7 warning limits	Warning limit values for Wago analog output 7 violated
211	7211	W	Wago AO8 warning limits	Warning limit values for Wago analog output 8 violated
212	7212	W	Wago AO9 warning limits	Warning limit values for Wago analog output 9 violated
213	7213	W	Wago AO10 warning limits	Warning limit values for Wago analog output 10 violated
214	7214	W	Wago AO11 warning limits	Warning limit values for Wago analog output 11 violated
215	7215	W	Wago AO12 warning limits	Warning limit values for Wago analog output 12 violated
216	7216	W	Wago AO13 warning limits	Warning limit values for Wago analog output 13 violated
217	7217	W	Wago AO14 warning limits	Warning limit values for Wago analog output 14 violated
218	7218	W	Wago AO15 warning limits	Warning limit values for Wago analog output 15 violated
219	7219	W	Wago AO16 warning limits	Warning limit values for Wago analog output 16 violated
220	7220	H	MZ Input values	Incorrect input values for methane number calculation
221	7221	H	Valve fixed	Mode with fixed valves (service only) is set
222	-	H	Test mode	PGC runs in test mode! No custody transfer operation!
223	7223	H	Cal: Set values	Sum of components in calibration gas not 100%.
224	7224	H	Printer not ready	Printer is not ready
225	7225	H	EVars CRC	New checksum (CRC) for custody transfer parameters
227	7227	H	Testmode digital outputs	Test mode for digital outputs is active
228	7228	H	Calib. val. ferroram(CRC)	Monitoring of calibration values for inputs and outputs
229	7229	H	Calib. val. ferroram(version)	Monitoring of the version number for the structure of the inputs and outputs
230	800	H	Calibration lock	Calibration switch open
231	801	H	Codeword	Password entered
232	810	H	Old Date & Time	Last DSfG time before change
233	811	H	New Date & Time	First DSfG time after change
234	802	H	Revision	Calibration or reference gas is measured
235	7235	H	Write Simufile	Simulation files are written to SD card
236	7236	H	Calibrational commissioning	A custody transfer commissioning is in progress.
237	7237	H	Ext. test gas	Gas composition measurement external test gas
238	7238	H	Waiting time until start	Waiting time until the measurement starts
240	7240	H	Multilevel import ok	Import of multilevel coefficients successful
241	7241	H	Multilevel import not ok	Import of multilevel coefficients not successful
242	7242	H	Analyzer Initializing	Measuring unit initialized
243	7243	H	Analyzer Flushing	Measuring element is flushed
247	760	H	Analyzer calibrating	Measuring mechanism is calibrated
250	7250	H	Chromatogram (FTP)	Note/error when fetching the chromatogram from the measuring mechanism
251	7251	H	FlushChromatogram (FTP)	Note/error when fetching the first chromatogram after rinsing
252	7252	H	Write chromatogram	Note/error when writing the chromatogram to the SD card
253	7253	H	Write flushchrom	Note/Error with write. 1. chromatogram after rinsing on the SD card
260	7260	H	Bake out	Bakeout process running
261	7261	H	Cool down	Cooling after baking out
262	7262	H	Equilibrate	Time after baking out until measuring unit is stable again
263	7263	H	Set meas. methode nok	Set measuring method parameter in measuring mechanism failed after heating out

Inter-nal	DSfG	Type	English	Description
264	7264	H	Set meas. methode ok	Set measuring method para. in measuring mechanism successful after heating out
270	7270	H	Parameterlog disabled	No recording of parameter changes
271	-	H	Old time	Old time (after changing the time)
272	-	H	New time	New time (after changing the time)
300	7300	W	Curr. input-1 warning limits	Warning limit values for current input 1 violated
301	7301	W	Curr. input-2 warning limits	Warning limit values for current input 2 violated
302	7302	W	Curr. input-3 warning limits	Warning limit values for current input 3 violated
303	7303	W	Curr. input-4 warning limits	Warning limit values for current input 4 violated
304	7304	W	Curr. input-5 warning limits	Warning limit values for current input 5 violated
305	7305	W	Curr. input-6 warning limits	Warning limit values for current input 6 violated
306	7306	W	Curr. input-7 warning limits	Warning limit values for current input 7 violated
307	7307	W	Curr. input-8 warning limits	Warning limit values for current input 8 violated
308	7308	W	Abort bake out -> set meas. method	Heating of the columns is aborted and the measuring method is loaded.
310	7310	W	Wago AI1 warning limits	Warning limit values for Wago analog input 1 violated
311	7311	W	Wago AI2 warning limits	Warning limit values for Wago analog input 2 violated
312	7312	W	Wago AI3 warning limits	Warning limit values for Wago analog input 3 violated
313	7313	W	Wago AI4 warning limits	Warning limit values for Wago analog input 4 violated
314	7314	W	Wago AI5 warning limits	Warning limit values for Wago analog input 5 violated
315	7315	W	Wago AI6 warning limits	Warning limit values for Wago analog input 6 violated
316	7316	W	Wago AI7 warning limits	Warning limit values for Wago analog input 7 violated
317	7317	W	Wago AI8 warning limits	Warning limits for Wago analog input 8 violated
318	7318	W	Wago AI9 warning limits	Warning limits for Wago analog input 9 violated
319	7319	W	Wago AI10 warning limits	Warning limit values for Wago analog input 10 violated
320	7320	W	Wago AI11 warning limits	Warning limit values for Wago analog input 11 violated
321	7321	W	Wago AI12 warning limits	Warning limits for Wago analog input 12 violated
322	7322	W	Wago AI13 warning limits	Warning limits for Wago analog input 13 violated
323	7323	W	Wago AI14 warning limits	Warning limits for Wago analog input 14 violated
324	7324	W	Wago AI15 warning limits	Warning limits for Wago analog input 15 violated
325	7325	W	Wago AI16 warning limits	Warning limits for Wago analog input 16 violated
330	7330	W	Multistream parameter	Error during multistream parameterization
331	7331	W	Can't read Dil-Switch	Readout of Dil switch positions failed
332	7332	W	Explorer running!	Windows Explorer is active
333	7333	W	Saving display calibration	Touch screen calibration has not been saved
334	7334	W	Software-reboot analyzer	Restart of the measuring mechanism by analysis computer
335	7335	W	CP-Data	No measurement data received from measuring mecha-nism
340	7340	W	Nitrogen Min/Max	Ana. & Cal: Nitrogen outside user limits
341	7341	W	Methane Min/Max	Ana. & Cal: Methane outside user limits
342	7342	W	Carbon Dioxide Min/Max	Ana. & Cal: Carbon dioxide outside user limits
343	7343	W	Ethane Min/Max	Ana. & Cal: Ethan outside user limits
344	7344	W	Propane Min/Max	Ana. & Cal: Propane outside user limits
345	7345	W	iso-Butane Min/Max	Ana. & Cal: iso-butane outside user limits
346	7346	W	n-Butane Min/Max	Ana. & Cal: n-butane outside user limits
347	7347	W	neo-Pentane Min/Max	Ana. & Cal: neo-pentane outside user limits
348	7348	W	iso-Pentane Min/Max	Ana. & Cal: iso-pentane outside user limits
349	7349	W	n-Pentane Min/Max	Ana. & Cal: n-pentane outside user limits
350	7350	W	C6+ Min/Max	Ana. & Cal: C6+ outside user limits
351	7351	W	n-Hexane Min/Max	Ana. & Cal: n-Hexan outside user limits
352	7352	W	n-Heptane Min/Max	Ana. & Cal: n-heptane outside user limits
353	7353	W	n-Octane Min/Max	Ana. & Cal: n-octane outside user limits
354	7354	W	n-Nonane Min/Max	Ana. & Cal: n-Nonan outside user limits
355	7355	W	Oxygen Min/Max	Ana. & Cal: Oxygen outside user limits
356	7356	W	Helium Min/Max	Ana. & Cal: Helium outside user limits
357	7357	W	Hydrogen Min/Max	Ana. & Cal: Hydrogen outside user limits
358	7358	W	Argon Min/Max	Ana. & Cal: Argon outside user limits

Inter-nal	DSfG	Type	English	Description
359	7359	W	Reserve Min/Max	(Reserve for future functions)
368	7368	W	Wago DI1 active	Wago digital output 1 active
369	7369	W	Wago DI2 active	Wago digital output 2 active
370	7370	W	Wago DI3 active	Wago digital output 3 active
371	7371	W	Wago DI4 active	Wago digital output 4 active
372	7372	W	Wago DI5 active	Wago digital output 5 active
373	7373	W	Wago DI6 active	Wago digital output 6 active
374	7374	W	Wago DI7 active	Wago digital output 7 active
375	7375	W	Wago DI8 active	Wago digital output 8 active
376	7376	W	Wago DI9 active	Wago digital output 9 active
377	7377	W	Wago DI10 active	Wago digital output 10 active
378	7378	W	Wago DI11 active	Wago digital output 11 active
379	7379	W	Wago DI12 active	Wago digital output 12 active
380	7380	W	Wago DI13 active	Wago digital output 13 active
381	7381	W	Wago DI14 active	Wago digital output 14 active
382	7382	W	Wago DI15 active	Wago digital output 15 active
383	7383	W	Wago DI16 active	Wago digital output 16 active
384	7384	W	Cal: retentions timewarning limits	Cal: retention time outside the border
496	7496	E	Invalid methode	Invalid method
497	7497	E	Too litte data from CP	Too little data received from the movement (GC9390 only)
498	7498	E	Too much data from CP	Too much data received from the movement (GC9390 only)
528	7528	W	Too litte data from CP	Too little data received from the movement (GC9390 only)
529	7529	W	Too many data from CP	Too much data received from the movement (GC9390 only)
576	7576	H	Application change	application change
577	7577	H	Device reboot required! (Registry)	Device must be restarted
578	7578	H	EZChrom active	Connection with EZChrom-PC activated
624	7624	E	GCProt timeout	GC <-> Gateway Communication timeout
625	7625	E	GCProt send failed	Send data to gateway failed (GC9300 only)
626	7626	E	GCProt receive failed	Failed data transfer from controller (only GC9310)
627	7627	E	GCProt telegram content incorrect	Data telegram from controller faulty (only GC9310)
672	7672	W	GCProt missed telegram	Data telegram lost from controller (GC9310 only)
721	7720	H	Params are sent to GC9310	Parameters are sent to the gateway (GC9300 only)
722	7721	H	Params are received from GC9300	Parameters are received by the controller (GC9310 only)
723	7723	H	Params have to be sent to GC9310	new parameters must be sent to the gateway (GC9300 only)

Some messages are listed as both alarms and warnings.

- For the current outputs, you can specify whether they are to be used for custody transfer (alarm) or not (warning).
- For the limit values there are both warning limits (can be set freely via user code) and alarm limits (can only be set via calibration switch).

As the error list can vary depending on the device variant and software version, we recommend reading out the current list for your device via the GC web server.

6 Technical data

Housing

19“ slot	
Dimensions	W x H x D = 213 x 128.4 x 310 mm (42 DU / 3 HU)
Ambient temperature	-20 to 55 °C

Power

Power supply	24 V/DC -10%/+15%
Power requirement	25 W

Control panel

Control buttons	1 button (HOME)
Display	LCD touchscreen
	640 x 240 dots
	256 colors

Hardware

Embedded PC	CPU ARM1176
Display	533 MHz
	128 MB RAM
	64 MB Flash

Memory

SD card	4 GB

Operating system

Windows CE 6.0

Digital inputs

Number	20
U_{max}	5 V
I_{max}	13 mA
f_{max}	10 Hz
Surge protection	6.8 V

Digital outputs

Number	12
U_{max}	24 V
I_{max}	100 mA
P_{max}	100 mW
Surge protection	33 V

Current inputs

Number	8
Resolution	20-bit
U_{max}	2.5 V
R_i	250 ohms
Surge protection	6.8 V

Current outputs

Number	4
Resolution	12-bit
Load	700 ohms
Surge protection	33 V

Data interfaces

Ethernet (2x)	
LAN 1	RMG network, measuring element connection DHCP server, DHCP client or fixed IP address
LAN 2	Operator network DHCP client or fixed IP address
USB (2x)	
Front	For mouse, ext. hard disk or keyboard
Rear panel	For connection of a PC
Serial (7x)	
COM 1	RS 232 / RS 485, configurable by jumpers
COM 2	RS 232
COM 3	RS 232 / RS 485, configurable by jumpers
COM 4	RS 232 / RS 485, configurable by jumpers
COM 5	RS 232
COM 6	RS 232 / RS 485, configurable by jumpers
COM 7	RS 232 / RS 485, configurable by jumpers

Appendix

Appendix A: List of parameters

The "Parameter list" is in a separate part of the manual called:

PGC9300_AC_Parameter_en_15

This section of the manual can be accessed and downloaded – if required – from the homepage:

www.rmg.com

Appendix B: Certificates

EU-Konformitätserklärung
EU-Declaration of Conformity

90

Baumusterbescheinigung PGC 9304
Type – examination Certificate PGC 9304

Baumusterbescheinigung PGC 9303
Type – examination Certificate PGC 9303

Baumusterbescheinigung PGC 9302
Type – examination Certificate PGC 9302

Baumusterbescheinigung PGC 9301
Type – examination Certificate PGC 9301

Baumusterbescheinigung PGC 9090 / CP 4002 VC
Type – examination Certificate PGC 9090 / CP 4002 VC

Note

EU declaration of conformity

The declaration of conformity presented reflects the situation on the data when the operating manual was issued. The latest version of the EU declaration of conformity is available from our website www.rmg.com.

EU-Declaration of Conformity
EU-Konformitätserklärung

CE

We **RMG Messtechnik GmbH**
Wir Otto – Hahn – Straße 5
35510 Butzbach
Germany

Declare under our sole responsibility that the product is in conformity with the directives. Product is labeled according to the listed directives and standards and in accordance with the Type-Examination.
Erklären in alleiniger Verantwortung, dass das Produkt konform ist mit den Anforderungen der Richtlinien. Das entsprechend gekennzeichnete Produkt ist nach den aufgeführten Richtlinien und Normen hergestellt und stimmt mit dem Baumuster überein.

Product **Process Gas Chromatograph**
Type PGC 9301, PGC 9302, PGC 9303, PGC 9304 and GC 9310

Produkt ***Prozess-Gaschromatograph***
Typ PGC 9301, PGC 9302, PGC 9303, PGC 9304 und GC 9310

Harmonisation Legislations *Harmonisierungsrechtsvorschriften*	**EMV**	**ATEX**
EU- Directives *EU-Richtlinie*	2014/30/EU	2014/34/EU
Marking *Kennzeichen*	---	Ex II 2G Ex db e IIB+H_2 T5/T4 Gb
Normative Documents *Normative Dokumente*	EN 61326-1:2006 IEC 61000-4-2: 1995 IEC 61000-4-3: 2002 IEC 61000-4-4: 2004 IEC 61000-4-5: 1995 IEC 61000-4-6: 2003 IEC 61000-4-8: 1993	EN IEC 60079-0: 2018 EN 60079-1: 2014 EN IEC 60079-7: 2015 + A1: 2018
EC Type-Examination issued by *EG-Baumusterprüfung ausgestellt durch*	Prüfbericht / Test Report: FS-1104-173643-001 (Nemko GmbH)	Modul B DMT 00 ATEX E 001
Approval of a Quality System by *Anerkennung eines Qualitätssicherungs-systems durch*	---	Modul D BVS 23 ATEX ZQS/E139 Notified Body: 0158 DEKRA Testing and Certification GmbH

RoHS 2011/65/EU

The object of the declaration described above is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
Der oben beschriebene Gegenstand der Erklärung erfüllt die Vorschriften der Richtlinie 2011/65/EU des Europäischen Parlaments und des Rates vom 8. Juni 2011 zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten.

RMG Messtechnik GmbH
Butzbach, den 30.09.2024

Thorsten Dietz
(CEO)

i.V.
Sascha Körner
(Technical Manager)

Sitz der Gesellschaft Butzbach • **Registergericht Friedberg** HRB 2535
Geschäftsführung Thorsten Dietz
Qualitätsmanagement DIN EN ISO 9001:2015

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Geräteart: *Type of instrument:*	Gasbeschaffenheitsmessgerät *Device to determine the gas quality* Prozessgaschromatograph (PGC)
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Zertifizierung:
Certification:
Im Auftrag
On behalf of PTB
Dr. Bert Anders

Braunschweig, 23.09.2024
Siegel
Seal

Bewertung:
Evaluation:
Im Auftrag
On behalf of PTB
Helga Bettin

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