



Maintenance Logbook

Process Gas Chromatograph PGC 9300

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Manufacturer Our customer service is available for technical queries

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Original Document The logbook **PGC9300_maintenance_manual_en_09** from 2019, July 30th for the gas chromatograph PGC9300 is the document translated first from the German original version. Anyhow, this document may serve as reference for translations into other languages. Please use in case of any uncertainties the German version as main reference.

Note Unfortunately, paper is not updated automatically, whereas technical development continuously advances. Therefore, we reserve the right to make technical changes in regard to the representations and specifications of these operating instructions. The latest version of this manual (and other devices) can be downloaded at your convenience from our Internet home-page

www.rmg.com

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PGC 930 **Maintenance Logbook**
No.

PGC manufacturer number	
PGC year of manufacture	
Meter serial number	

GC 9300 manufacturer number	
GC 9300 year of manufacture	
GC 9300 software version	

Approved for	Calorific value <input type="checkbox"/>	Gas quality <input type="checkbox"/>
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Operator	
Station	
Commissioning	

	Type / carrier gas	Column temperature [°C]	Column pressure [kPa]	Flushing time [s]
Column A				
Column B				
Column C				

Date	
Signature	

Maintenance Logbook PGC 930

Repair / exchange of components

PGC manufacturer number	
PGC year of manufacture	
Meter serial number	

GC 9300 manufacturer number	
GC 9300 year of manufacture	
GC 9300 software version	

Approved for	Calorific value <input type="checkbox"/>	Gas quality <input type="checkbox"/>
---------------------	--	--------------------------------------

Operator	
Station	
Commissioning	

	Type / carrier gas	Column temperature [°C]	Column pressure [kPa]	Flushing time [s]
Column A				
Column B				
Column C				

Date	
Signature	

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1. Instructions for Keeping the Maintenance Logbook

The maintenance logbook is part of the design approval and is used to monitor the operation of the device. It is therefore mandatory that this maintenance logbook should be kept. When a service callout is required, the original maintenance logbook, or a copy, should be sent to the manufacturer.

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The information on the first page and the relevant data in the table are entered by the testing laboratory before the device is delivered. These documents the condition of the device on delivery.

The device is to be inspected by the operator every **8 weeks** until **the first annual routine maintenance check/calibration** (inspections). **After the first annual routine maintenance check/calibration**, it is sufficient for the operator to perform an inspection **every 3 months**. The values listed in Table Section 1 of this maintenance logbook must be documented during every inspection. This applies in particular to the visual inspection of the condition of all filter indicators for PGCs with molsieve cylinders. Routine maintenance must be carried out once a year by qualified personnel in accordance with the manufacturer's instructions and documented in Table 3 of this maintenance book. All PGCs with molsieve cylinders must be baked out once a year as part of routine maintenance. For PGCs of type PGC 9301, it is recommended to bake them out during routine maintenance. Routine maintenance is also a requirement but not a part of the final calibration. The results of the calibration must be documented in table section 4.

1.1. Recommendation for PGCs from RMG

Note

RMG recommends the following table for maintenance work on the PGC 93 X series process gas chromatograph.

Measures and waiting times:

	Filter of the carrier gas		RTS-Filter / U-Filter at the PGC		
	Control	Change	Control	Change	
PGC 9301 Natural gas transport pipeline / compressor stations	n.a.	n.a.	n.a.	n.a.	yearly
PGC 9303, PGC 9304 Natural gas transport pipeline / compressor stations	all 3 months	based on requirement	n.a.	yearly	yearly
PGC 9302 Biogas-plants	monthly	based on requirement	n.a.	yearly	yearly
PGC 9301 Underground storage	n.a.	n.a.	n.a.	n.a.	yearly
PGC 9303, 9304 Underground storage	Monthly	based on requirement	n.a.	yearly	yearly

n.a. – not available (there is no recommendation from RMG)

1.2. Inspection

1.2.1. Operating parameters on the GC 9300

The setpoints for the operating parameters are entered on the first page of this book by the test laboratory during commissioning and shall remain unchanged during operation, unless altered by an RMG service technician.

The actual values of the operating parameters can be checked at any time on the GC 9300 analyser under the *Status -> Meter* tab or using RMGView^{GC}. Because these values are constantly monitored by the controller and because divergences are officially recorded as “faults”, these parameters do not have to be documented in the maintenance logbook. It is therefore necessary to check whether active or inactive faults or warnings are displayed on the GC 9300 at every visit to the station.

1.2.2. Cylinder pressures

The pressure in the gas cylinders is checked directly at the high-pressure gauges of the relevant pressure reducing unit at regular intervals, in other words at every maintenance check, and the information is then documented in the relevant table in Table Section 1 of this logbook. If a cylinder has been changed or switched, this should also be documented in the relevant column. If the PGC is found to be malfunctioning, this fact should also be recorded.

The pressures should be checked for:

- Carrier gas 1
- Carrier gas 2 (if applicable)
- Internal calibration gas

1.2.3. Carrier gas filter

All PGCs with molsieve cylinders contain carrier gas filters, some of which are provided with indicators. The status of the indicators must be checked and documented at each inspection visit. In the event of partial or complete discoloration of the indicator, the carrier gas cylinder must be changed immediately and all external filters of the PGCs replaced with new filters. It is recommended to have the affected PGC analyzed promptly by the service in order to avoid possible damage. It is also recommended to have the causing carrier gas cylinder checked for moisture.

1.3. Maintenance by service technicians

This section records all changes and measures carried out by service technicians. This encompasses routine maintenance tasks, software updates and service activities in the event of a malfunction. In the event of a malfunction, the operator or service technician should enter a brief description of the problem in the appropriate place.

It should be noted that this maintenance logbook is linked to a meter. In the event of a serious malfunction that requires the meter to be replaced, a new maintenance logbook must be started. This will be supplied with the new meter.

The old maintenance logbook, either a copy or the original, should be sent to the manufacturer for analysis.

2. Manufacturer's requirements

2.1. Annual maintenance of the PGC

The annual inspection of the PGC 930x must be carried out on the basis of the checklist (Table Section 4) by persons who have received appropriate training from RMG to provide such maintenance.

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2.2. Metrological check / calibration

Once the maintenance activities described in Section 2 are complete, the device will subsequently undergo routine calibration. A representative of the responsible calibration authorities must be on hand for this purpose. The design approval and the relevant guidelines and standards it contains are key to the technical calibration of the system.

Calibration entails:

- Checking the area around the existing power outputs
- **Basic calibration** of the PGC's
(device type: **PGC 9301**, **PGC 9302**, **PGC 9303** with internal calibration gas)
- **Normal calibration** of the **PGC 9304** with internal calibration gas
- Verification with external calibration gasses with chromatogram
- Verification of power transmission and/or bus transmission of mandatory calibration values
- Record of all work carried out, entries in the maintenance book

Following the verification of the official parameters to be set in the GC 9300 (tab: *Detail*), metrological check begins with the opening of the calibration lock and the implementation of a basic calibration (select tab: *Detail->01-GC 9300->Mode->Basic Calibration*). Following basic calibration, the new **response factors** (tab: *Detail->09 Calibration Results->RFZ*) and **retention times** (tab: *Detail->09 Calibration Results->RTZ*) are noted down in Table Section 4. If the device is calibrated using the "new mathematics", the **GLKs** (tab: *Detail->11 Component Parameters/ [component]->GLK*) are to be noted down instead of the **RFZs**. In addition, the chromatograms for the calibration gas are compared with the sample chromatograms shown in the design approval. The chromatograms can be analysed using the RMGView^{GC} software or on the basis of the chromatogram displays in GC 9300 (tab: *Graph->Chroms*).

The metrological check of the device takes place subsequently. The test gases defined in the design approval are analysed in succession. At least three analyses are required for each gas. The result of the third analysis is to be used for the verification. The results of these analyses are to be found in the GC 9300 (tab: *Archives*) and **should be fully recorded in the table provided for this purpose**. The key parameters for the official verification (according to the design approval) are indicated in the table. The setpoints can be found in the certificates for the test gasses used and should also be noted. It is recommended that the chromatograms of the test gasses should be checked.

Table Section 1

Cylinder pressures

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Filter of the carrier gas

To be performed at:

- Every inspection
- Every maintenance

Entries made by:

- Operator
- RMG Service

Table section 2

Maintenance measures, general

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To be performed at:

- Annual routine maintenance
- Software update
- Metrological check
- Calibration
- Repair

Entries made by:

- Trained personnel
- RMG Service

Maintenance measure

Measures performed		
Routine maintenance		Table 3
Software update		
Metrological check		Table 4
Calibration		Table 4
Defect		See below

Description of problem	Measure

Performed by	
Performed on	

Signature	
-----------	--

Maintenance measure

Measures performed		
Routine maintenance		Table 3
Software update		
Metrological check		Table 4
Calibration		Table 4
Defect		See below

Description of problem	Measure

Performed by	
Performed on	

Signature	
-----------	--

Maintenance measure

Measures performed	
Routine maintenance	
Software update	
Metrological check	
Calibration	
Defect	

Table 3

Table 4

Table 4

See below

Description of problem	Measure

Performed by	
Performed on	

Signature	
-----------	--

Maintenance measure

Measures performed	
Routine maintenance	
Software update	
Metrological check	
Calibration	
Defect	

Table 3

Table 4

Table 4

See below

Description of problem	Measure

Performed by	
Performed on	

Signature	
-----------	--

Maintenance measure

Measures performed	
Routine maintenance	
Software update	
Metrological check	
Calibration	
Defect	

Table 3

Table 4

Table 4

See below

Description of problem	Measure

Performed by	
Performed on	

Signature	
-----------	--

Maintenance measure

Measures performed		
Routine maintenance		Table 3
Software update		
Metrological check		Table 4
Calibration		Table 4
Defect		See below

Description of problem	Measure

Performed by	
Performed on	

Signature	
-----------	--

Maintenance measure

Measures performed	
Routine maintenance	
Software update	
Metrological check	
Calibration	
Defect	

Table 3

Table 4

Table 4

See below

Description of problem	Measure

Performed by	
Performed on	

Signature	
-----------	--

Maintenance measure

Measures performed	
Routine maintenance	
Software update	
Metrological check	
Calibration	
Defect	

Table 3

Table 4

Table 4

See below

Description of problem	Measure

Performed by	
Performed on	

Signature	
-----------	--

Maintenance measure

Measures performed	
Routine maintenance	
Software update	
Metrological check	
Calibration	
Defect	

Table 3

Table 4

Table 4

See below

Description of problem	Measure

Performed by	
Performed on	

Signature	
-----------	--

Maintenance measure

Measures performed		
Routine maintenance		Table 3
Software update		
Metrological check		Table 4
Calibration		Table 4
Defect		See below

Description of problem	Measure

Performed by	
Performed on	

Signature	
-----------	--

Table section 3

Annual routine maintenance

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To be performed at:

- Annual routine maintenance

Entries made by:

- Trained personnel
- RMG Service

	Tested:	OK	n. OK	None
Checklist for HP reduction type DRS				
Functional check of regulator				
Leak check				
Functional check of analysis gas heating (if any)				
Functional check of HP reduction heating (if any)				
Checklist for cylinder rack				
Check and documentation of all cylinder pressures				
Functional test of cylinder heating				
Functional check of HP regulator				
Verification of contact gauge				
Functional check of 2 nd press. regulation level (porter regulator, if any)				
Leak check				
Checklist for measuring element and GC 9300				
Verification prefilters on gas connector unit (change of filter as nec.)				
Leak check				
Verification init. press. carrier, measuring, int. a. ext. calibration gas				
Functional check of solenoid valve control				
Functional check of housing heating in measuring element				
Verification relevant operating parameters (Section 1 Op. para.)				
Evaluation of the documented automatic calibrations				
Verification of the "method" by means of special service software				
Verification of retention times				
Evaluation of the chromatograms				
Measures for PGCs with molsieve cylinders				
Bake out overnight (1000 min)				
Exchange filter on PGC				
Exchange of both filters on the bottle rack (if any)				
Date				
Signature				

	Tested:	OK	n. OK	None
Checklist for HP reduction type DRS				
Functional check of regulator				
Leak check				
Functional check of analysis gas heating (if any)				
Functional check of HP reduction heating (if any)				
Checklist for cylinder rack				
Check and documentation of all cylinder pressures				
Functional test of cylinder heating				
Functional check of HP regulator				
Verification of contact gauge				
Functional check of 2 nd press. regulation level (porter regulator, if any)				
Leak check				
Checklist for measuring element and GC 9300				
Verification prefilters on gas connector unit (change of filter as nec.)				
Leak check				
Verification init. press. carrier, measuring, int. a. ext. calibration gas				
Functional check of solenoid valve control				
Functional check of housing heating in measuring element				
Verification relevant operating parameters (Section 1 Op. para.)				
Evaluation of the documented automatic calibrations				
Verification of the "method" by means of special service software				
Verification of retention times				
Evaluation of the chromatograms				
Measures for PGCs with molsieve cylinders				
Bake out overnight (1000 min)				
Exchange filter on PGC				
Exchange of both filters on the bottle rack (if any)				
Date				
Signature				

	Tested:	OK	n. OK	None
Checklist for HP reduction type DRS				
Functional check of regulator				
Leak check				
Functional check of analysis gas heating (if any)				
Functional check of HP reduction heating (if any)				
Checklist for cylinder rack				
Check and documentation of all cylinder pressures				
Functional test of cylinder heating				
Functional check of HP regulator				
Verification of contact gauge				
Functional check of 2 nd press. regulation level (porter regulator, if any)				
Leak check				
Checklist for measuring element and GC 9300				
Verification prefilters on gas connector unit (change of filter as nec.)				
Leak check				
Verification init. press. carrier, measuring, int. a. ext. calibration gas				
Functional check of solenoid valve control				
Functional check of housing heating in measuring element				
Verification relevant operating parameters (Section 1 Op. para.)				
Evaluation of the documented automatic calibrations				
Verification of the "method" by means of special service software				
Verification of retention times				
Evaluation of the chromatograms				
Measures for PGCs with molsieve cylinders				
Bake out overnight (1000 min)				
Exchange filter on PGC				
Exchange of both filters on the bottle rack (if any)				
Date				
Signature				

	Tested:	OK	n. OK	None
Checklist for HP reduction type DRS				
Functional check of regulator				
Leak check				
Functional check of analysis gas heating (if any)				
Functional check of HP reduction heating (if any)				
Checklist for cylinder rack				
Check and documentation of all cylinder pressures				
Functional test of cylinder heating				
Functional check of HP regulator				
Verification of contact gauge				
Functional check of 2 nd press. regulation level (porter regulator, if any)				
Leak check				
Checklist for measuring element and GC 9300				
Verification prefilters on gas connector unit (change of filter as nec.)				
Leak check				
Verification init. press. carrier, measuring, int. a. ext. calibration gas				
Functional check of solenoid valve control				
Functional check of housing heating in measuring element				
Verification relevant operating parameters (Section 1 Op. para.)				
Evaluation of the documented automatic calibrations				
Verification of the "method" by means of special service software				
Verification of retention times				
Evaluation of the chromatograms				
Measures for PGCs with molsieve cylinders				
Bake out overnight (1000 min)				
Exchange filter on PGC				
Exchange of both filters on the bottle rack (if any)				
Date				
Signature				

	Tested:	OK	n. OK	None
Checklist for HP reduction type DRS				
Functional check of regulator				
Leak check				
Functional check of analysis gas heating (if any)				
Functional check of HP reduction heating (if any)				
Checklist for cylinder rack				
Check and documentation of all cylinder pressures				
Functional test of cylinder heating				
Functional check of HP regulator				
Verification of contact gauge				
Functional check of 2 nd press. regulation level (porter regulator, if any)				
Leak check				
Checklist for measuring element and GC 9300				
Verification prefilters on gas connector unit (change of filter as nec.)				
Leak check				
Verification init. press. carrier, measuring, int. a. ext. calibration gas				
Functional check of solenoid valve control				
Functional check of housing heating in measuring element				
Verification relevant operating parameters (Section 1 Op. para.)				
Evaluation of the documented automatic calibrations				
Verification of the "method" by means of special service software				
Verification of retention times				
Evaluation of the chromatograms				
Measures for PGCs with molsieve cylinders				
Bake out overnight (1000 min)				
Exchange filter on PGC				
Exchange of both filters on the bottle rack (if any)				
Date				
Signature				

	Tested:	OK	n. OK	None
Checklist for HP reduction type DRS				
Functional check of regulator				
Leak check				
Functional check of analysis gas heating (if any)				
Functional check of HP reduction heating (if any)				
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Check and documentation of all cylinder pressures				
Functional test of cylinder heating				
Functional check of HP regulator				
Verification of contact gauge				
Functional check of 2 nd press. regulation level (porter regulator, if any)				
Leak check				
Checklist for measuring element and GC 9300				
Verification prefilters on gas connector unit (change of filter as nec.)				
Leak check				
Verification init. press. carrier, measuring, int. a. ext. calibration gas				
Functional check of solenoid valve control				
Functional check of housing heating in measuring element				
Verification relevant operating parameters (Section 1 Op. para.)				
Evaluation of the documented automatic calibrations				
Verification of the "method" by means of special service software				
Verification of retention times				
Evaluation of the chromatograms				
Measures for PGCs with molsieve cylinders				
Bake out overnight (1000 min)				
Exchange filter on PGC				
Exchange of both filters on the bottle rack (if any)				
Date				
Signature				

	Tested:	OK	n. OK	None
Checklist for HP reduction type DRS				
Functional check of regulator				
Leak check				
Functional check of analysis gas heating (if any)				
Functional check of HP reduction heating (if any)				
Checklist for cylinder rack				
Check and documentation of all cylinder pressures				
Functional test of cylinder heating				
Functional check of HP regulator				
Verification of contact gauge				
Functional check of 2 nd press. regulation level (porter regulator, if any)				
Leak check				
Checklist for measuring element and GC 9300				
Verification prefilters on gas connector unit (change of filter as nec.)				
Leak check				
Verification init. press. carrier, measuring, int. a. ext. calibration gas				
Functional check of solenoid valve control				
Functional check of housing heating in measuring element				
Verification relevant operating parameters (Section 1 Op. para.)				
Evaluation of the documented automatic calibrations				
Verification of the "method" by means of special service software				
Verification of retention times				
Evaluation of the chromatograms				
Measures for PGCs with molsieve cylinders				
Bake out overnight (1000 min)				
Exchange filter on PGC				
Exchange of both filters on the bottle rack (if any)				
Date				
Signature				

	Tested:	OK	n. OK	None
Checklist for HP reduction type DRS				
Functional check of regulator				
Leak check				
Functional check of analysis gas heating (if any)				
Functional check of HP reduction heating (if any)				
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Check and documentation of all cylinder pressures				
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Checklist for measuring element and GC 9300				
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Leak check				
Verification init. press. carrier, measuring, int. a. ext. calibration gas				
Functional check of solenoid valve control				
Functional check of housing heating in measuring element				
Verification relevant operating parameters (Section 1 Op. para.)				
Evaluation of the documented automatic calibrations				
Verification of the "method" by means of special service software				
Verification of retention times				
Evaluation of the chromatograms				
Measures for PGCs with molsieve cylinders				
Bake out overnight (1000 min)				
Exchange filter on PGC				
Exchange of both filters on the bottle rack (if any)				
Date				
Signature				

	Tested:	OK	n. OK	None
Checklist for HP reduction type DRS				
Functional check of regulator				
Leak check				
Functional check of analysis gas heating (if any)				
Functional check of HP reduction heating (if any)				
Checklist for cylinder rack				
Check and documentation of all cylinder pressures				
Functional test of cylinder heating				
Functional check of HP regulator				
Verification of contact gauge				
Functional check of 2 nd press. regulation level (porter regulator, if any)				
Leak check				
Checklist for measuring element and GC 9300				
Verification prefilters on gas connector unit (change of filter as nec.)				
Leak check				
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Functional check of housing heating in measuring element				
Verification relevant operating parameters (Section 1 Op. para.)				
Evaluation of the documented automatic calibrations				
Verification of the "method" by means of special service software				
Verification of retention times				
Evaluation of the chromatograms				
Measures for PGCs with molsieve cylinders				
Bake out overnight (1000 min)				
Exchange filter on PGC				
Exchange of both filters on the bottle rack (if any)				
Date				
Signature				

	Tested:	OK	n. OK	None
Checklist for HP reduction type DRS				
Functional check of regulator				
Leak check				
Functional check of analysis gas heating (if any)				
Functional check of HP reduction heating (if any)				
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Functional check of housing heating in measuring element				
Verification relevant operating parameters (Section 1 Op. para.)				
Evaluation of the documented automatic calibrations				
Verification of the "method" by means of special service software				
Verification of retention times				
Evaluation of the chromatograms				
Measures for PGCs with molsieve cylinders				
Bake out overnight (1000 min)				
Exchange filter on PGC				
Exchange of both filters on the bottle rack (if any)				
Date				
Signature				

Table section 4

Test gas analyses

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To be performed at:

- Metrological check
- Calibration

Entries made by:

- Trained personnel
- RMG Service

Note:

Handwritten entry is not required if a clearly labelled printout of the values is archived in the maintenance logbook.

Procedure for metrological check / calibration

1. Performance of basic calibration (PGC 9301, PGC 9302, PGC 9303) respectively normal calibration (PGC 9304) with logging of the
 - retention times (RTZ, resp. RT)
 - response factors (RFZ / GLK, resp. RF)
2. Analysis of the test gases
3. Verification of the chromatograms / data transmission
Current outputs only need to be checked if they are used for official transmission of fiscal metering readings.
4. Verification of software CRC
5. Entry of notes, as necessary

	Basic calibration		Normal calibration	
	RTZ / s	RFZ / GLK	RT / s	RF
Nitrogen				
Methane				
Carbon dioxide				
Ethane				
Propane				
Isobutane				
N-butane				
Neopentane				
Isopentane				
N-pentane				
Hexane (C6+)				
Heptane				
Octane				
Nonane				
Oxygen				
Helium				
Hydrogen				

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

	OK?
Verification of the chromatogram of the internal calibration gas	
Verification of the chromatogram of test gas 1	
Verification of the chromatogram of test gas 2	
Verification of the chromatogram of test gas 3	
Verification of the chromatogram of test gas 4	
Verification of the chromatogram of test gas 5	
Verification of the chromatogram of test gas 6	
Checking the range of the current outputs	
Verification of the fiscal metering values transmitted at the outputs	
Verification of the software and kernel CRCs	
Are all results correctly logged?	

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Remarks

Signatures	
Service	
Authority	

The signatures relate to the entire metrological check / calibration, i.e. including the entries on pages 34 to 38.

Procedure for metrological check / calibration

1. Performance of basic calibration (PGC 9301, PGC 9302, PGC 9303) respectively normal calibration (PGC 9304) with logging of the
 - retention times (RTZ, resp. RT)
 - response factors (RFZ / GLK, resp. RF)
2. Analysis of the test gases
3. Verification of the chromatograms / data transmission
Current outputs only need to be checked if they are used for official transmission of fiscal metering readings.
4. Verification of software CRC
5. Entry of notes, as necessary

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	Basic calibration		Normal calibration	
	RTZ / s	RFZ / GLK	RT / s	RF
Nitrogen				
Methane				
Carbon dioxide				
Ethane				
Propane				
Isobutane				
N-butane				
Neopentane				
Isopentane				
N-pentane				
Hexane (C6+)				
Heptane				
Octane				
Nonane				
Oxygen				
Helium				
Hydrogen				

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

	OK?
Verification of the chromatogram of the internal calibration gas	
Verification of the chromatogram of test gas 1	
Verification of the chromatogram of test gas 2	
Verification of the chromatogram of test gas 3	
Verification of the chromatogram of test gas 4	
Verification of the chromatogram of test gas 5	
Verification of the chromatogram of test gas 6	
Checking the range of the current outputs	
Verification of the fiscal metering values transmitted at the outputs	
Verification of the software and kernel CRCs	
Are all results correctly logged?	

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Remarks

Signatures	
Service	
Authority	

The signatures relate to the entire metrological check / calibration, i.e. including the entries on pages 39 to 43.

Procedure for metrological check / calibration

1. Performance of basic calibration (PGC 9301, PGC 9302, PGC 9303) respectively normal calibration (PGC 9304) with logging of the
 - retention times (RTZ, resp. RT)
 - response factors (RFZ / GLK, resp. RF)
2. Analysis of the test gases
3. Verification of the chromatograms / data transmission
Current outputs only need to be checked if they are used for official transmission of fiscal metering readings.
4. Verification of software CRC
5. Entry of notes, as necessary

	Basic calibration		Normal calibration	
	RTZ / s	RFZ / GLK	RT / s	RF
Nitrogen				
Methane				
Carbon dioxide				
Ethane				
Propane				
Isobutane				
N-butane				
Neopentane				
Isopentane				
N-pentane				
Hexane (C6+)				
Heptane				
Octane				
Nonane				
Oxygen				
Helium				
Hydrogen				

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

	OK?
Verification of the chromatogram of the internal calibration gas	
Verification of the chromatogram of test gas 1	
Verification of the chromatogram of test gas 2	
Verification of the chromatogram of test gas 3	
Verification of the chromatogram of test gas 4	
Verification of the chromatogram of test gas 5	
Verification of the chromatogram of test gas 6	
Checking the range of the current outputs	
Verification of the fiscal metering values transmitted at the outputs	
Verification of the software and kernel CRCs	
Are all results correctly logged?	

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Remarks

Signatures	
Service	
Authority	

The signatures relate to the entire metrological check / calibration, i.e. including the entries on pages 44 to 48.

Procedure for metrological check / calibration

1. Performance of basic calibration (PGC 9301, PGC 9302, PGC 9303) respectively normal calibration (PGC 9304) with logging of the
 - retention times (RTZ, resp. RT)
 - response factors (RFZ / GLK, resp. RF)
2. Analysis of the test gases
3. Verification of the chromatograms / data transmission
Current outputs only need to be checked if they are used for official transmission of fiscal metering readings.
4. Verification of software CRC
5. Entry of notes, as necessary

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	Basic calibration		Normal calibration	
	RTZ / s	RFZ / GLK	RT / s	RF
Nitrogen				
Methane				
Carbon dioxide				
Ethane				
Propane				
Isobutane				
N-butane				
Neopentane				
Isopentane				
N-pentane				
Hexane (C6+)				
Heptane				
Octane				
Nonane				
Oxygen				
Helium				
Hydrogen				

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

	OK?
Verification of the chromatogram of the internal calibration gas	
Verification of the chromatogram of test gas 1	
Verification of the chromatogram of test gas 2	
Verification of the chromatogram of test gas 3	
Verification of the chromatogram of test gas 4	
Verification of the chromatogram of test gas 5	
Verification of the chromatogram of test gas 6	
Checking the range of the current outputs	
Verification of the fiscal metering values transmitted at the outputs	
Verification of the software and kernel CRCs	
Are all results correctly logged?	

Remarks

Signatures	
Service	
Authority	

The signatures relate to the entire metrological check / calibration, i.e. including the entries on pages 49 to 53.

Procedure for metrological check / calibration

1. Performance of basic calibration (PGC 9301, PGC 9302, PGC 9303) respectively normal calibration (PGC 9304) with logging of the
 - retention times (RTZ, resp. RT)
 - response factors (RFZ / GLK, resp. RF)
2. Analysis of the test gases
3. Verification of the chromatograms / data transmission
Current outputs only need to be checked if they are used for official transmission of fiscal metering readings.
4. Verification of software CRC
5. Entry of notes, as necessary

54

	Basic calibration		Normal calibration	
	RTZ / s	RFZ / GLK	RT / s	RF
Nitrogen				
Methane				
Carbon dioxide				
Ethane				
Propane				
Isobutane				
N-butane				
Neopentane				
Isopentane				
N-pentane				
Hexane (C6+)				
Heptane				
Octane				
Nonane				
Oxygen				
Helium				
Hydrogen				

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

	OK?
Verification of the chromatogram of the internal calibration gas	
Verification of the chromatogram of test gas 1	
Verification of the chromatogram of test gas 2	
Verification of the chromatogram of test gas 3	
Verification of the chromatogram of test gas 4	
Verification of the chromatogram of test gas 5	
Verification of the chromatogram of test gas 6	
Checking the range of the current outputs	
Verification of the fiscal metering values transmitted at the outputs	
Verification of the software and kernel CRCs	
Are all results correctly logged?	

58

Remarks

Signatures	
Service	
Authority	

The signatures relate to the entire metrological check / calibration, i.e. including the entries on pages 54 to 58.

Procedure for metrological check / calibration

1. Performance of basic calibration (PGC 9301, PGC 9302, PGC 9303) respectively normal calibration (PGC 9304) with logging of the
 - retention times (RTZ, resp. RT)
 - response factors (RFZ / GLK, resp. RF)
2. Analysis of the test gases
3. Verification of the chromatograms / data transmission
Current outputs only need to be checked if they are used for official transmission of fiscal metering readings.
4. Verification of software CRC
5. Entry of notes, as necessary

59

	Basic calibration		Normal calibration	
	RTZ / s	RFZ / GLK	RT / s	RF
Nitrogen				
Methane				
Carbon dioxide				
Ethane				
Propane				
Isobutane				
N-butane				
Neopentane				
Isopentane				
N-pentane				
Hexane (C6+)				
Heptane				
Octane				
Nonane				
Oxygen				
Helium				
Hydrogen				

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

	OK?
Verification of the chromatogram of the internal calibration gas	
Verification of the chromatogram of test gas 1	
Verification of the chromatogram of test gas 2	
Verification of the chromatogram of test gas 3	
Verification of the chromatogram of test gas 4	
Verification of the chromatogram of test gas 5	
Verification of the chromatogram of test gas 6	
Checking the range of the current outputs	
Verification of the fiscal metering values transmitted at the outputs	
Verification of the software and kernel CRCs	
Are all results correctly logged?	

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Remarks

Signatures	
Service	
Authority	

The signatures relate to the entire metrological check / calibration, i.e. including the entries on pages 59 to 63.

Procedure for metrological check / calibration

1. Performance of basic calibration (PGC 9301, PGC 9302, PGC 9303) respectively normal calibration (PGC 9304) with logging of the
 - retention times (RTZ, resp. RT)
 - response factors (RFZ / GLK, resp. RF)
2. Analysis of the test gases
3. Verification of the chromatograms / data transmission
Current outputs only need to be checked if they are used for official transmission of fiscal metering readings.
4. Verification of software CRC
5. Entry of notes, as necessary

64

	Basic calibration		Normal calibration	
	RTZ / s	RFZ / GLK	RT / s	RF
Nitrogen				
Methane				
Carbon dioxide				
Ethane				
Propane				
Isobutane				
N-butane				
Neopentane				
Isopentane				
N-pentane				
Hexane (C6+)				
Heptane				
Octane				
Nonane				
Oxygen				
Helium				
Hydrogen				

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

	OK?
Verification of the chromatogram of the internal calibration gas	
Verification of the chromatogram of test gas 1	
Verification of the chromatogram of test gas 2	
Verification of the chromatogram of test gas 3	
Verification of the chromatogram of test gas 4	
Verification of the chromatogram of test gas 5	
Verification of the chromatogram of test gas 6	
Checking the range of the current outputs	
Verification of the fiscal metering values transmitted at the outputs	
Verification of the software and kernel CRCs	
Are all results correctly logged?	

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Remarks

Signatures	
Service	
Authority	

The signatures relate to the entire metrological check / calibration, i.e. including the entries on pages 64 to 68.

Procedure for metrological check / calibration

1. Performance of basic calibration (PGC 9301, PGC 9302, PGC 9303) respectively normal calibration (PGC 9304) with logging of the
 - retention times (RTZ, resp. RT)
 - response factors (RFZ / GLK, resp. RF)
2. Analysis of the test gases
3. Verification of the chromatograms / data transmission
Current outputs only need to be checked if they are used for official transmission of fiscal metering readings.
4. Verification of software CRC
5. Entry of notes, as necessary

69

	Basic calibration		Normal calibration	
	RTZ / s	RFZ / GLK	RT / s	RF
Nitrogen				
Methane				
Carbon dioxide				
Ethane				
Propane				
Isobutane				
N-butane				
Neopentane				
Isopentane				
N-pentane				
Hexane (C6+)				
Heptane				
Octane				
Nonane				
Oxygen				
Helium				
Hydrogen				

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	set	actual	absolute	set	actual	absolute
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

	OK?
Verification of the chromatogram of the internal calibration gas	
Verification of the chromatogram of test gas 1	
Verification of the chromatogram of test gas 2	
Verification of the chromatogram of test gas 3	
Verification of the chromatogram of test gas 4	
Verification of the chromatogram of test gas 5	
Verification of the chromatogram of test gas 6	
Checking the range of the current outputs	
Verification of the fiscal metering values transmitted at the outputs	
Verification of the software and kernel CRCs	
Are all results correctly logged?	

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Remarks

Signatures	
Service	
Authority	

The signatures relate to the entire metrological check / calibration, i.e. including the entries on pages 69 to 73.

Procedure for metrological check / calibration

1. Performance of basic calibration (PGC 9301, PGC 9302, PGC 9303) respectively normal calibration (PGC 9304) with logging of the
 - retention times (RTZ, resp. RT)
 - response factors (RFZ / GLK, resp. RF)
2. Analysis of the test gases
3. Verification of the chromatograms / data transmission
Current outputs only need to be checked if they are used for official transmission of fiscal metering readings.
4. Verification of software CRC
5. Entry of notes, as necessary

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	Basic calibration		Normal calibration	
	RTZ / s	RFZ / GLK	RT / s	RF
Nitrogen				
Methane				
Carbon dioxide				
Ethane				
Propane				
Isobutane				
N-butane				
Neopentane				
Isopentane				
N-pentane				
Hexane (C6+)				
Heptane				
Octane				
Nonane				
Oxygen				
Helium				
Hydrogen				

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

	OK?
Verification of the chromatogram of the internal calibration gas	
Verification of the chromatogram of test gas 1	
Verification of the chromatogram of test gas 2	
Verification of the chromatogram of test gas 3	
Verification of the chromatogram of test gas 4	
Verification of the chromatogram of test gas 5	
Verification of the chromatogram of test gas 6	
Checking the range of the current outputs	
Verification of the fiscal metering values transmitted at the outputs	
Verification of the software and kernel CRCs	
Are all results correctly logged?	

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Remarks

Signatures	
Service	
Authority	

The signatures relate to the entire metrological check / calibration, i.e. including the entries on pages 74 to 78.

Procedure for metrological check / calibration

1. Performance of basic calibration (PGC 9301, PGC 9302, PGC 9303) respectively normal calibration (PGC 9304) with logging of the
 - retention times (RTZ, resp. RT)
 - response factors (RFZ / GLK, resp. RF)
2. Analysis of the test gases
3. Verification of the chromatograms / data transmission
Current outputs only need to be checked if they are used for official transmission of fiscal metering readings.
4. Verification of software CRC
5. Entry of notes, as necessary

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	Basic calibration		Normal calibration	
	RTZ / s	RFZ / GLK	RT / s	RF
Nitrogen				
Methane				
Carbon dioxide				
Ethane				
Propane				
Isobutane				
N-butane				
Neopentane				
Isopentane				
N-pentane				
Hexane (C6+)				
Heptane				
Octane				
Nonane				
Oxygen				
Helium				
Hydrogen				

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

Relevant for calibration?	Test gas 1			Test gas 2		
	Type		Error	Type		Error
	↓	set	actual	absolute	set	actual
Calorific value						
Standard density						
Nitrogen						
Methane						
Carbon dioxide						
Ethane						
Propane						
Isobutane						
N-butane						
Neopentane						
Isopentane						
N-pentane						
Hexane (C6+)						
Heptane						
Octane						
Nonane						
Oxygen						
Helium						
Hydrogen						

	OK?
Verification of the chromatogram of the internal calibration gas	
Verification of the chromatogram of test gas 1	
Verification of the chromatogram of test gas 2	
Verification of the chromatogram of test gas 3	
Verification of the chromatogram of test gas 4	
Verification of the chromatogram of test gas 5	
Verification of the chromatogram of test gas 6	
Checking the range of the current outputs	
Verification of the fiscal metering values transmitted at the outputs	
Verification of the software and kernel CRCs	
Are all results correctly logged?	

Remarks

Signatures	
Service	
Authority	

The signatures relate to the entire metrological check / calibration, i.e. including the entries on pages 79 to 83.

Subject to technical modification

For further information
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