

# Technical Information

## **MEAC GHG**

PC Software for Greenhouse Gas Emission Reports

**Described product**

Product name: MEAC GHG

**Manufacturer**

Endress+Hauser SICK GmbH+Co. KG  
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Germany

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**Original document**

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## Glossary

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<b>EPC</b>	Emission PC (system-internal designation for MEAC-PCs)
<b>Ethernet</b>	Cable-based network technology for data networks. Basis for network protocols (e.g., TCP/IP).
<b>Installation</b>	Here: Industrial system with gaseous emissions subject to the laws on emission measurement.
<b>IP</b>	Internet Protocol (standard for computer addressing in data networks)
<b>MEAC</b>	Product series of emission data evaluation systems from Endress+Hauser
<b>MySQL</b>	Software for database management used world-wide
<b>PC</b>	Personal Computer (any make)
<b>PDF</b>	Portable Document Format (platform-independent file format for finished documents).

## Information Symbols

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Important technical information for this product



Nice to know



Supplementary information



Link referring to information at another place

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# MEAC GHG

## 1 Important Information

About this document  
Additional documents

## 1.1 About this document

### Contents

This document describes

- Installation and preparations for using the “MEAC GHG” PC software;
- Program functions only available with advanced access rights.



Product and function description → “MEAC GHG Operating Instructions”.

### Target group

This information is intended for persons skilled in PC-supported emission technology.



- MEAC GHG may be installed by skilled persons only who, based on their training and knowledge can install and configure the software properly.
- Knowledge of the “MEAC GHG Operating Instructions” is presumed.

## 1.2 Additional documents

### MEAC GHG Operating Instructions

The “MEAC GHG Operating Instructions” contain the following information:

- Product description
- Operating functions

### Individual information

- ▶ *When individual information has been provided:* Observe the individual documents provided in addition to these Operating Instructions and Technical Information.



- ▶ Pay primary attention to any individual information on specific product versions.

# MEAC GHG

## 2 Installation

Project planning  
Installation

## 2.1

**Scope of delivery**

- Data medium; contains:
  - Installation program for MEAC GHG
  - Installation program for MySQL
  - Language editor program
- Operating Instructions



*When the data medium is no longer required:*

- ▶ Observe the laws and regulations on disposal of data medium materials.

## 2.2

**System requirements**

PC components	Minimum requirements
PC:	<ul style="list-style-type: none"> <li>● Windows compatible PC</li> <li>● CD-ROM drive [1]</li> </ul>
Operating system:	Windows XP Professional SP3 Windows 7 Professional 32-bit/64-bit
Software:	<ul style="list-style-type: none"> <li>● MySQL [2]</li> <li>● M2kSQLFeeder [2]</li> <li>● Display program for PDF files [3]</li> </ul>
MEAC systems:	<ul style="list-style-type: none"> <li>● MEAC2012 [4] [5]</li> </ul>
PC interface: [6]	<ul style="list-style-type: none"> <li>● Ethernet interface</li> <li>● Ethernet connection cable (LAN)</li> </ul>

[1] For program installation.

[2] In scope of delivery.

[3] Only required when Emission reports are to be displayed in PDF format.

[4] Modifications required → §2.3.

[5] MEAC GHG is not compatible with MEAC2000.

[6] Only required when MEAC GHG is to run on a separate PC or when data from several MEAC PCs are to be processed.

## 2.3

**Modifying the MEAC systems**

*Only applicable for installations where emission data is to be processed with MEAC GHG.*

**Rules for installation configuration**

Configure the installations on the MEAC systems as follows:

- ▶ Stand-alone installation
- ▶ Validity rule: 80% (instead of 2/3)
- ▶ Integration time: 60 minutes
- ▶ Scaling for flow and components identical (either all scaled or all measured under ambient conditions)
- ▶ Physical unit for CO, N<sub>2</sub>O, CH<sub>4</sub>: mg/m<sup>3</sup>
- ▶ Physical unit for CO<sub>2</sub>: g/m<sup>3</sup>

**Procedure for changing the data model****NOTICE: Consequences when changing the data model**

If a component planned for Emission reports in MEAC GHG has been deleted from the MEAC data model, MEAC GHG automatically fills missing emission data with substitute values. The deleted components still appear in the Emission reports.


- ▶ Do not delete components configured for Emission reports in MEAC GHG in the MEAC data model.
- ▶ *If a component must be deleted in the MEAC data model: Delete this component in the MEAC GHG configuration as well (→ p. 16, §3.1.2).*


2.4 **Installation procedure**

2.4.1 **Installing the network (when required)**

*Only applicable when MEAC GHG is to run on a separate PC or when data from several MEAC PCs are to be processed.*

- ▶ Connect the PCs with MEAC data to be processed to the PC on which MEAC GHG is installed using the Ethernet network (LAN).
- ▶ Configure the network and MEAC systems so that the Database server is accessible by all MEAC systems for transferring SQL statements.

 ▶ Protect the network against unauthorized access (passwords, firewall).


 Preparing the MEAC systems → p. 9, §2.3

2.4.2 **Installing the software**

**Prerequisites**

The software of the MEAC system MEAC2012 or MEAC2000 EU must be installed on the PC on which MEAC GHG is installed.

- ▶ *If this is not the case:* First install the MEAC system software.

 The installation programs for the MEAC system and for the MEAC GHG could possibly be on the same data medium.

**Procedure**


- 1 Connect the delivered data medium to the PC.
  - ▶ *If the data medium is a CD-ROM:* Insert the CD-ROM in the CD-ROM drive.
- 2 Run the installation programs on the data medium for the following software (in this sequence):
  - MySQL
  - M2kSQLFeeder
  - MEAC GHG

**Start shortcuts in Windows**

*Only applicable when MEAC GHG is to be started without the MEAC system software.*

- ▶ Create a Windows “shortcut” on the Windows desktop (or somewhere else) to the MEAC-GHG.EXE file. Name the shortcut “MEAC GHG Normal Mode” (example).
- ▶ Create a second “shortcut” to MEACGHG.EXE. Name the shortcut “MEAC GHG Advanced Mode” (example). Extend the function call (shortcut target) with “ReadOnly=0”.

*Example: C:\Programs\SICK\MEACGHG\MEACGHG.EXE ReadOnly=0*

 Normal mode can also be started directly in Windows Explorer (doubleclick MEACGHG.EXE or “Run”).

## 2.4.3

**Transferring the MEAC data model**

Program “M2kSQLFeeder” serves to transfer the data required from the MEAC systems to the database for MEAC GHG:

- The basic parameters are stored in the database Tables “Anlage”, “Komponenten” and “EPC\_Verwaltung”. These data re transferred from the MEAC system when function “Activate data model” is triggered in the MEAC software.
- Data from Table “RWItems” are transferred continually from the MEAC systems.

- 1 Check/ensure the data models of connected MEAC systems are configured correctly (→ MEAC software Operating Instructions).

*When the data model was already set up in the MEAC systems (per “Activate data model”) when MySQL and M2kSQLFeeder were installed:*

- 2 Trigger the function “Activate data model” once in each connected MEAC system (→ MEAC software Operating Instructions).



Database status information → p. 18, Fig. 3.

## 2.4.4

**Making and testing settings**

- 1 Check/modify all settings in program section “Settings” (→ p. 14, §3.1.1).
- 2 Test the program function (→ p. 18, §3.2).



▶ MEAC GHG first functions when all settings are correct.



# MEAC GHG

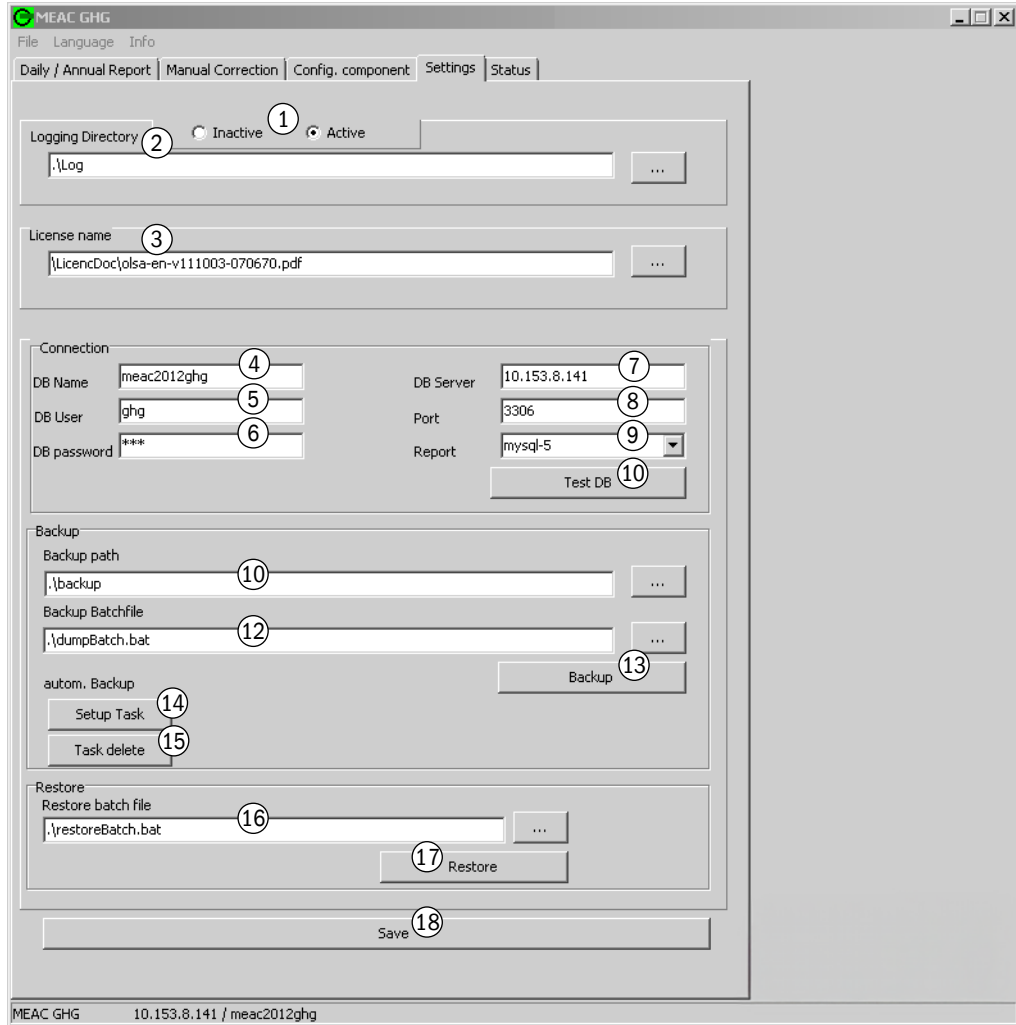
## 3 Configuration

Configuring the database  
Configuring greenhouse gas components

3.1 **Settings required in MEAC GHG**

3.1.1 **Configuring settings**

Fig. 1 Program section for settings (example)



- 1 Call up the program section for settings (→ p. 14, Fig. 1).
- 2 Check/make the required settings (→ Table 1).
- 3 Click “Save” to store the settings.

Table 1

## Settings

[1]	Pos.[2]	Setting/parameter
<input type="radio"/>	1	Option for automatic storage of function calls and function return values in a text file (logging.txt).
<input checked="" type="radio"/>	2	Path of folder in which MEAC GHG stores the Log files.
<input checked="" type="radio"/>	3	Path of file containing the individual usage license.[3]
<input checked="" type="radio"/>	4	Name of database used by MEAC GHG for MySQL.
<input checked="" type="radio"/>	5	Login data for MySQL.[3]
<input checked="" type="radio"/>	6	
<input checked="" type="radio"/>	7	IP address of the PC on which the database is installed.[4]
<input checked="" type="radio"/>	8	Port number for Pos. 7.[4]
<input checked="" type="radio"/>	9	Specifies the connection protocol of the database management program used.
<input type="radio"/>	10	Button to test the database with the parameters currently set.
<input checked="" type="radio"/>	11	Path of folder in which MEAC GHG stores the Backup files.[5]
<input checked="" type="radio"/>	12	Path of the file controlling the backup process (→ Pos. 13).
<input type="radio"/>	13	Button to start a database backup.[6]
<input type="radio"/>	14	Button to create a task in the Windows Task Scheduler for backup control.[7] <i>Serves to create automatic regular backups:</i> ▶ Start the Windows Task Scheduler and make the appropriate time settings for this task.
<input type="radio"/>	15	Button to delete the task created in Pos. 14.
<input checked="" type="radio"/>	16	Path of the file controlling the restore process (→ Pos. 17).
<input type="radio"/>	17	Button to replace the current database data with backup data (Restore)[8]; opens a menu displaying the backup data available. ▶ Select the desired backup data in the menu displayed.
<input checked="" type="radio"/>	18	Button to store the settings displayed.

[1] ● = setting required. ○ = option.

[2] → p. 14, Fig. 1.

[3] Installed by the Installation program.

[4] Determined by the individual network connection.

[5] *Recommendation:* Use a directory on a data medium that can be disconnected from the PC and kept in a different location.

[6] Backup files receive an automatic time specification (timestamp).

[7] Requires Administrator rights in Windows.

[8] *Recommendation:* First make a backup of the current data.

3.1.2 **Configuring components**

**Menu contents**

Fig. 2 Program section to configure the components (example)

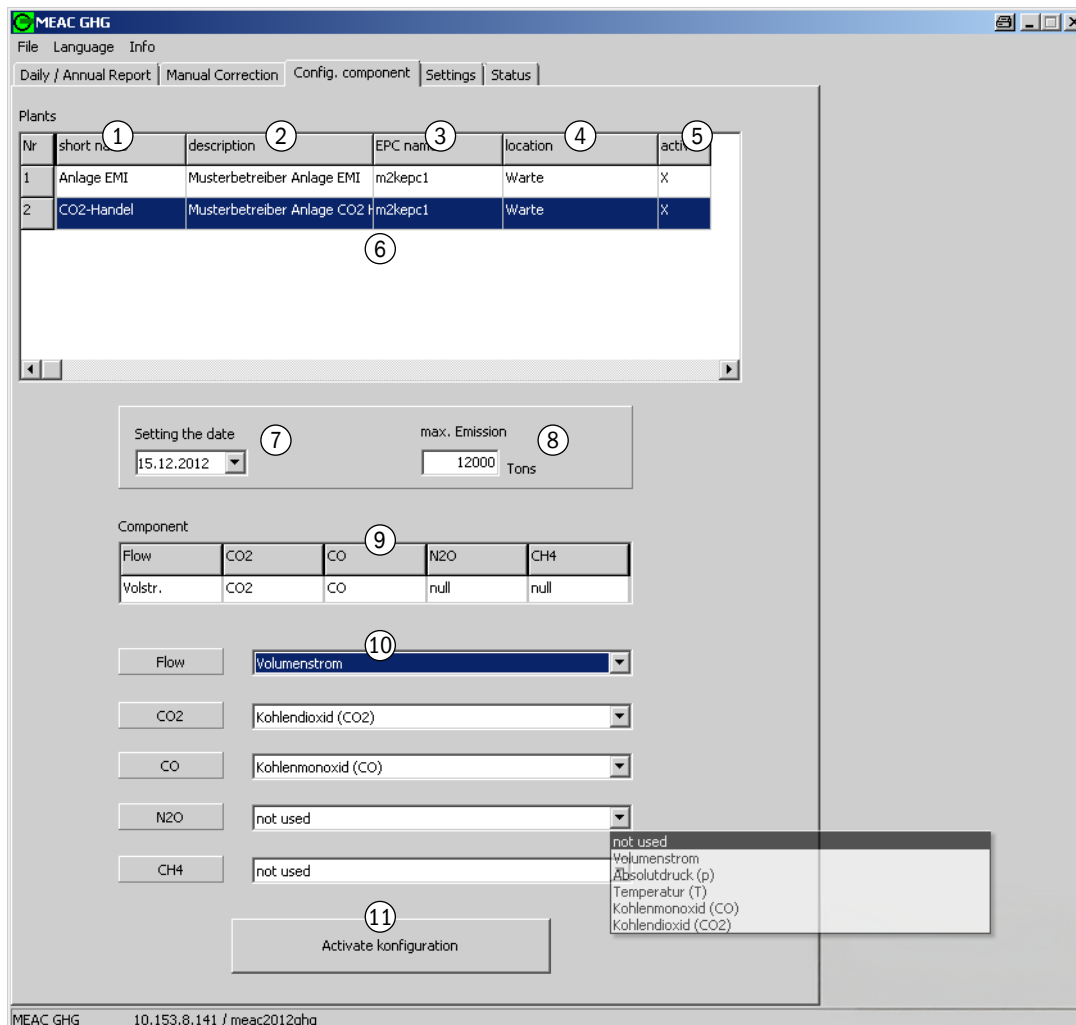


Table 2 Component configuration

Pos.[1]	Setting/parameter
1	Installation short name.[2]
2	Installation description.
3	Name of the relevant MEAC PC (Emission PC).
4	Installation location.
5	X = the installation is configured completely for MEAC GHG.
6	Installation list: All installations of connected MEAC systems.[3]
7	Start-up date → Emission data before this date are not considered in the Emission reports.
8	Maximum emission amount for which the user has purchased Emission rights (tons) → shown in the Emission reports.
9	Status area: The current assigned (measured) components used by the MEAC GHG to calculate the greenhouse gas amount of the relevant installation. [4]
10	Selection area: Selectable measured components of the relevant installation.[5]
11	Button to store the settings displayed.

- [1] → Fig. 2.
- [2] Specifications originate from the MEAC system.
- [3] Installations not used for Emission reports can also be included.
- [4] "Null" is displayed for components not configured.
- [5] From the data model of the relevant MEAC system. "Not used" is displayed for components not configured.

### Aim

The components to be used for the greenhouse gas amounts are selected for each installation of a MEAC system for which the Emission reports are to be generated.

When an Emission report is created, all installations correctly configured and with measured values in the database appear under "All sources".



Existing configurations can be changed.

### Procedure

- 1 Call up the program section to configure the components (→ p. 16, Fig. 2).
- 2 In the All Sources list: Use the cursor buttons to highlight the installation to be edited.
- »» The components assigned for the installation are shown in the Status area.



- The first installation still not completely configured is highlighted automatically when the menu starts.
- Installations completely configured are marked "Active" (X).
- Components "Null" and selection area "Not used" are displayed for installations still not configured for the MEAC GHG.

- 3 In the selection area: Select the measured components to be used for calculating Emission reports for each of the greenhouse gas components (Flow, CO<sub>2</sub>, CO, N<sub>2</sub>O, CH<sub>4</sub>).
- »» The selection is displayed immediately in the status area.



- One measured component must be assigned for "Flow".
- At least one measured component must be assigned for "CO<sub>2</sub>" or for "CO".

- 4 *When the configuration is complete:* Click "Save" to store the configuration.

3.2

**Testing the program function**

- 1 Check the database connection (use the relevant button → p. 14, Fig. 1, Pos. 10).
- 2 Check the prerequisites for Emission reports:
  - Component configuration (→ p. 16, §3.1.2).
  - The MEAC GHG database contains data from the MEAC systems (Tables “Installations”, “Components”, “EPC management” and “RWItems”; see also the status display → Fig. 3).
    - »» *If this is not the case:* Check the data transfer (→ p. 11, §2.4.3).
- 3 Create and check an Emission report (→ MEAC GHG Operating Instructions).

Fig. 3

Installation status (example)

The screenshot shows the MEAC GHG software interface. The title bar reads 'MEAC GHG'. The menu bar includes 'File', 'Language', and 'Info'. The main menu contains 'Daily and Annual report', 'Manual Cancellation', 'Component Config.', 'Settings', and 'Status'. The 'Status' tab is active, showing sub-tabs for 'Sources' and 'Logging'. Below the sub-tabs, the section 'All Sources' is displayed with a table containing the following data:

Source		Date From	Date To
m2kepc1	1	13.12.2012	20.08.2013
m2kepc1	2	13.12.2012	20.08.2013

### 3.3 Using the Language editor (as required)

#### 3.3.1 Language editor function

Existing menu texts can be changed using the additional program “SILEditor”, e.g., to adapt individual menu texts. This also allows creating individual language versions (→ p. 20, §3.3.4).

#### 3.3.2 Installing the Language editor

- ▶ Copy file “SILEditor.exe” from the CD to a PC folder.



##### Recommendations:

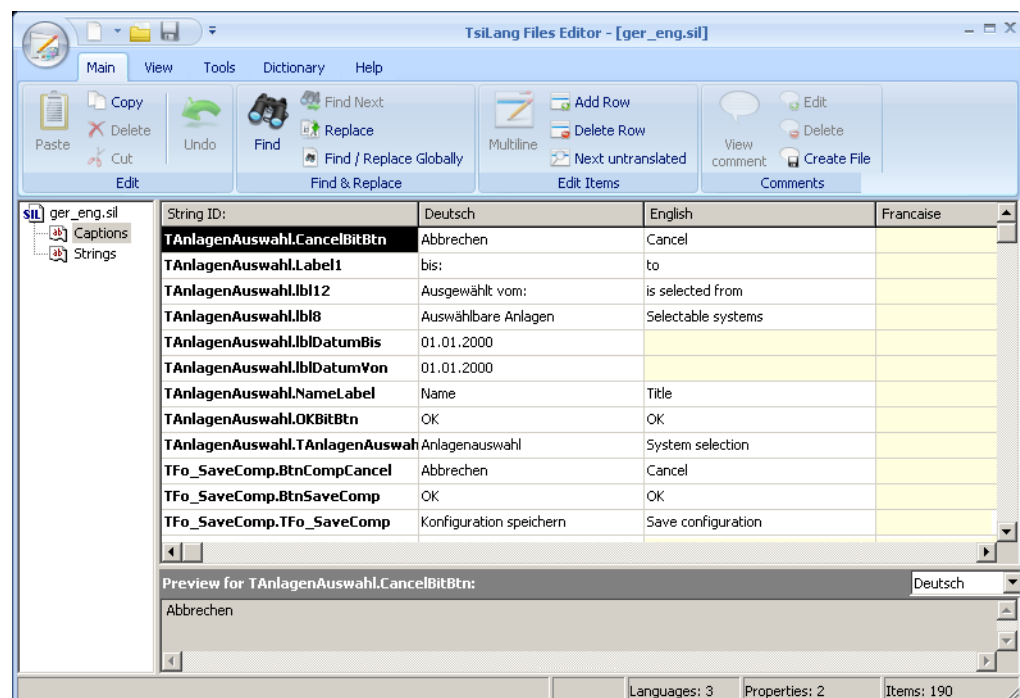
- ▶ Use the folder in which MEAC GHG is installed.
- ▶ Create a “shortcut” to “SILEditor.exe” (e.g., on the Windows Desktop), with which the “SILEditor” can be started.

#### 3.3.3 Using the Language editor

- 1 Start “SILEditor.exe”.
  - 2 Open file “ger\_eng.sil” in the SILEditor.
  - 3 Change texts as desired.
  - 4 Save “ger\_eng.sil”.
- »» Changes are immediately effective in MEAC GHG.

Fig. 4

SILEditor



- “Captions” = texts for operating elements (menus, buttons, labels).
- “Strings” = message texts.

### 3.3.4 Information for translation work

#### Files required

File	Function	Storage location
SILEditor.exe	Editor program	Data medium delivered.
ger_eng.sil	Language file	Folder in which MEAC GHG is installed.

#### Procedure

- The language file contains three languages.
- Only existing texts can be changed.

#### After translation

- 1 Exit MEAC GHG.
- 2 Copy the changed Language file to the folder in which MEAC GHG is installed (replace the existing "ger\_eng.sil").
- 3 Start MEAC GHG.

## MEAC GHG

# 4 Correcting Emission Data

Purpose  
Procedure

#### 4.1 Purpose of corrections

Each entry of the MEAC Daily protocol can be set to status “Substitute value” per menu function in MEAC GHG. This allows marking emission values as “not measured real” afterwards (marked with “MC” in the Emission report) which thus corrects the Emission report. The assignment can also be reset again.

#### 4.2 Making corrections

- 1 Call up the program section for manual correction (→ p. 23, Fig. 5).
- 2 Select the installation in the Installation list for which the values are to be edited.
- 3 Set the timeframe from which the emission data are to originate (date and time of the emission data).

*Note:* The dates must be in the same calendar year. If this is not the case, the second date is set automatically to the last calendar day (31.12.) of the year of the first date.



This function is useful in editing the data when the timeframe in which the emission data originated is known.

- 4 Click the line in the data list to change the status.
  - »» The data line selected is highlighted.
  - »» The relevant emission data are displayed in the display area.
- 5 *To set the status for these data to “substitute value”:* Click on the button.



The button is labeled differently when the status is already “substitute value”.  
► *To delete the “substitute value”:* Click on the button.

Fig. 5 Program section for manual correction of emission data

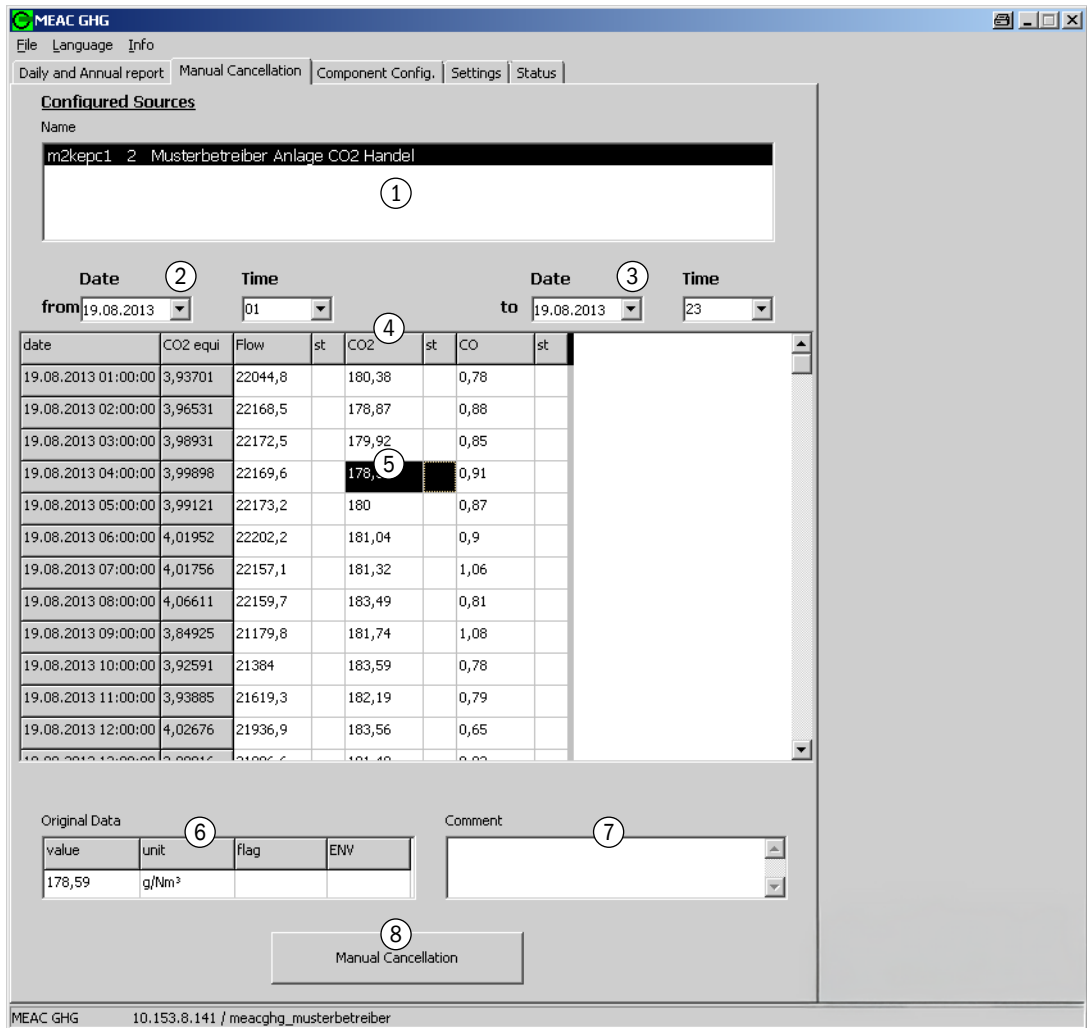


Table 3 Component configuration

Pos.[1]	Setting/parameter
1	Installation list: All installations for which at least one Emission report has already been created.
2	Desired start of the data list
3	Desired end of the data list
4	Data list: List of emission data of the relevant MEAC Daily protocol
5	Selected data
6	Display area: Information on the selected data – measured value, unit, measured value status (key to symbols → “MEAC GHG Operating Instructions”), status of option “Reprocessed” [2]
7	Entry field for text [3]
8	Button to save

[1] → Fig. 5.

[2] Original data of MEAC system

[3] Always refers to the timestamp of the data, not to the measured values.



The entry field for text serves to enter the reason for correction.



# MEAC GHG

## 5 Annex

Calculation variables

Calculation formulas

## 5.1 Calculating substitute values

### Calculation variables

SMW:	Valid average hourly value of the concentration/volume flow in operation (at least a value over 5 seconds in operation + at least 80% of the hour without malfunction/maintenance/calibration)
ANZ:	Number of SMWs from the start of the year to the current day
JMW:	Current average annual value of all SMWs from the start of the year to the current day
SAW:	Standard JMW deviation
SEW:	Substitute value for SMW in operation with 80% criterion not satisfied

### Calculation formulas

JMW	= Total: (SMW)/ANZ
SAW	= Root: [Total: (SMW-JMW) <sup>2</sup> /ANZ]
SEW	= JMW + 2 · SAW

## 5.2 Calculating the annual emission

### Calculation variables

CO <sub>2</sub> :	SMW of the CO <sub>2</sub> concentration [g/m <sup>3</sup> ]
CO:	SMW of the CO concentration [mg/m <sup>3</sup> ]
N <sub>2</sub> O:	SMW of the N <sub>2</sub> O concentration [mg/m <sup>3</sup> ]
CH <sub>4</sub> :	SMW of the CH <sub>4</sub> concentration [mg/m <sup>3</sup> ]
FLOW:	SMW of the volume flow [m <sup>3</sup> /h]
SEM:	Hourly emission amount (CO <sub>2</sub> -equiv. [t])
JEM:	Annual emission amount (CO <sub>2</sub> -equiv. [t]) cumulated to the date of the Emission report

### Calculation formulas

SEM	= FLOW · (CO <sub>2</sub> + CO · 1.571/1000 + N <sub>2</sub> O · 310/1000 + CH <sub>4</sub> · 25/1000)/1000000
JEM	= Total: (SEM)

## 5.3 Calculating the trends

### Calculation variables

JMK:	Cumulated annual amount
JSB:	Previous annual hours without “not in operation”
JSR:	Annual hours remaining to end of year
SEW:	Number of hours with substitute values
JMP:	Projected annual amount (trend) [t]
VPP:	Projected annual availability (trend) [t]

### Calculation formula

JMP	= JMK + (JMK / JSB · JSR)
VPP	= (JSB + JSR - SEW) / (JSB + JSR) · 100 %

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[www.addresses.endress.com](http://www.addresses.endress.com)

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