

Analytical Application Sets

Continuous emission monitoring

Set CEM CERT

Overview



Set CEM CERT is a standardized and certified continuous emission monitoring system. Set CEM CERT is suitable for use in many plants which need to comply with European legislation according to Directive 2010/75/EU, the Industrial Emissions Directive.

The modular CEMS meets the current quality standards of EU directives EN 15267 and EN 14181. The number of components that need to be measured depends on the type of plant as well as the fuel used. The measurement of gas components takes place according to the cold-extractive measuring procedure. A sample flow is constantly being extracted for measurement purposes in the exhaust gas stack by means of a gas sampling probe and transported to the analysis cabinet. The modular system cabinet can be equipped with up to three analyzers and different sample preparation components.

Benefits

- The tested measuring ranges can be selected for a variety of ranges to ensure use in different areas of application for the CEMS (checked for suitability according to EN 15267-3: TÜV and MCERTS).
- The complete modular package allows the certified use of system components from different manufacturers (checked for suitability according to EN 15267-3: TÜV and MCERTS).
- Simple and fast to configure
- Very low costs of procurement and operation

Modular design

- Up to 3 analyzers with different measuring ranges can be configured
- Selection of sample gas cooler and NO_x converter from leading manufacturers
- Electric heaters and air conditioners can be configured to extend the ambient temperature range
- Selection of versions with appropriate sampling probes, heated sample gas lines

Application

- Emission monitoring of power plants fueled with solid, gaseous or liquid fuels
- Emission monitoring of so-called TA air plants
- For plants in which corrosive aerosols (acid mist) may be encountered, suitable measures have to be taken to remove the corrosive aerosols from the gas matrix. To do this, a project-specific technical clarification is required in advance.

Design

Tested component design

The complete system consists of the following tested individual components:

- Sampling probe: M&C, type: SP2000; Bühler/Siemens, type: GAS222/7MB1943-2F
- Heated sample gas line: Winkler/Siemens, type: 7MB1943-2A
- Temperature controller: Siemens, type: SIRIUS
- Two-stage compressor gas cooler: M&C, type: CSS; Bühler, type: EGK 2-19
- Sample gas pump: Bühler/Siemens, type: P2.3/7MB1943-3C
- NO_x converter: M&C, type: CG-2

Design of measuring instruments checked for suitability

The modular measuring system Set CEM CERT can consist of one or up to three of the following analyzers in combination with a system cabinet.

The analyzer checked for suitability is selected separately from the system based on the specific article number.

Analyzer	Article number of the analyzer	Design
ULTRAMAT 23	7MB2358-.....	3 NDIR components on 2 optical benches
ULTRAMAT 23	7MB2357-.....	2 NDIR components on 2 optical benches
ULTRAMAT 23	7MB2355-.....	1 NDIR component on 1 optical bench
SIPROCESS UV600	7MB2621-.....	3 UV components on 1 optical bench
ULTRAMAT 6	7MB2121-..... 7MB2011-.....	1 NDIR component on 1 optical bench
ULTRAMAT 6; two-channel 19" rack unit	7MB2123-..... 7MB2124-.....	2 NDIR components on 2 optical benches
OXYMAT 6	7MB2021-.....	1 paramagnetic O ₂ measuring cell
ULTRAMAT / OXYMAT 6	7MB2023-..... 7MB2024-.....	1 NDIR component on 1 optical bench and 1 paramagnetic O ₂ sample chamber

NDIR = Non-dispersive infrared sensor

Function

The modular measuring system consists of the following components:

- 1 heated sampling probe
- 1 heated sample gas line (length of the heated sample gas line can be selected up to 50 m)
- 1 sample gas cooler
- 1 sample gas pump
- 1 to 3 differently configurable analyzers

Once it has passed through the heated cable, the sample gas flows into a two-stage compressor gas cooler. Between the 1st and 2nd cooler stage there is sample gas pump with integrated gas return for regulating the sample gas flows. Once it has passed through the sample gas cooler, the gas path splits into different partial lines to supply up to three analyzers simultaneously with sample gas. An additional partial flow lets the sample gas excess flow out over a bypass.

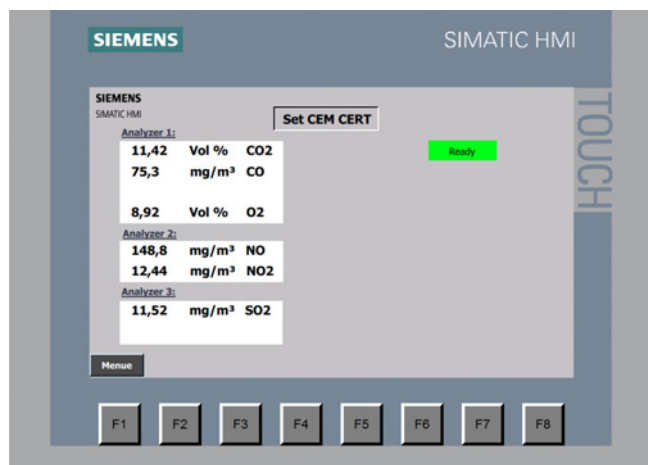
To protect the analyzers, a condensate blocker is located directly upstream from the analyzers; it closes off the gas path when condensate enters the path.

A three-way valve is installed upstream from the pump to supply the zero gas for automatic zero-point calibration.

A second three-way valve is installed downstream from the pump to supply zero gas and calibration gases from the pressurized gas cylinders. This three-way valve can offer calibration gases time-controlled from compressed gas cylinders for automatic calibration of zero point or reference point. Alternatively, calibration gases can be supplied manually by means of a three-way ball valve.

By default, the Set CEM CERT is operated by means of a touch screen panel (SIMATIC HMI, KTP700 BASIC) on the front of the measuring cabinet.

Alternatively, the measuring device can also be operated by means of the individual analyzers.



Start menu on the SIMATIC HMI touch screen panel

Technical specifications

Climatic conditions	
Ambient temperature	+5° ... +40 °C (standard)
• With heating	Min.-5 °C
Relative humidity	75% (annual average), non-condensing
Sample gas conditions	
	Sample gas must not be flammable or explosive.
Max. sample gas pressure at inlet to sample preparation system	500 hPa (mbar)
Max. moisture content in sample gas ¹⁾²⁾	<ul style="list-style-type: none"> • 17 vol % (cooler type: CSS), with PVDF heat exchanger • 25 vol % (cooler type: EGK 2-19), with glass heat exchanger.
Sample gas temperature	Max. 200 °C at cabinet entry
Sample gas flow	Approx. 60 l/h per analyzer
Sampling probe	<ul style="list-style-type: none"> • Dust load: < 2 g/m³ • Mounting flange: DN 65, PN 6, form B • Including temperature controller with Pt100 • With internal sampling tube, stainless steel, length: 1 m (can be shortened) • With filter in probe, to 600 °C
Sample gas line, electrically heated	Max. 50 m
Power supply	
Supply 1	230 V AC, 50 ... 60 Hz (-15%, +10%); on request
Supply 2	400 V AC, 50 ... 60 Hz (-15%, +10%)
Power	Max. 4 000 VA; without heated sample gas line
System design	
Fusing of electronic consumers	1-pole or 2-pole (selectable)
Sample gas cooler	2-stage
Output signals	<ul style="list-style-type: none"> • 4 ... 20 mA; corresponding to the analyzer information or via PROFIBUS DP • Additional digital inputs and outputs via PLC (SIMATIC S7-1200)
Color	RAL 7035
Weight	Approx. 160 kg
Sheet-steel cabinet/frame	Indoor installation
Explosion protection classification	Installation outside the Ex zone
Degree of protection	IP54
Calibration	Semi-automatic for fully automatic; AUTO-CAL on ULTRAMAT 23 freely adjustable up to max. 24-hour interval
Dimensions	
Sheet-steel cabinet (with base) for indoor installation	2 100 x 800 x 800 mm (H x W x D)

500 mm spacing on the right or left must be provided for the cable inlet and connection of the heated sample gas line.

¹⁾ With NO and SO₂ concentration > 500 mg/m³, the glass heat exchanger must be used.

²⁾ When the SIPROCESS UV600 analyzer is selected, the cooler type EGK 2-19 must be used due to the greater cooling capacity.

Detailed information on the analyzers

You can find detailed information on the analyzers under "Extractive continuous process gas analysis".

Additional versions	Order code
Extractive process gas analyzers	
A total of up to 3 analyzers in combination can be selected. Each of the analyzers must be ordered separately.	
Analyzers mounting position 1	
• Preparation for the installation of ULTRAMAT 23 (7MB2358-...../7MB2357-...../7MB2355-.....)	C10
• Preparation for the installation of a SIPROCESS UV600 (7MB2621-.....)	C11
• Preparation for the installation of ULTRAMAT 6 (7MB2121-.....)	C12
• Preparation for the installation of ULTRAMAT 6/2 channels (7MB2123-.....)	C13
• Preparation for the installation of ULTRAMAT 6 (7MB2021-.....)	C14
• Preparation for the installation of ULTRAMAT/OXYMAT 6 (7MB2023-.....)	C15
Analyzers mounting position 2	
• Preparation for the installation of ULTRAMAT 23 (7MB2358-...../7MB2357-...../7MB2355-.....)	C20
• Preparation for the installation of a SIPROCESS UV600 (7MB2621-.....)	C21
• Preparation for the installation of ULTRAMAT 6 (7MB2121-.....)	C22
• Preparation for the installation of ULTRAMAT 6/2 channels (7MB2123-.....)	C23
• Preparation for the installation of ULTRAMAT 6 (7MB2021-.....)	C24
• Preparation for the installation of ULTRAMAT/OXYMAT 6 (7MB2023-.....)	C25
Analyzers mounting position 3	
• Preparation for the installation of ULTRAMAT 23 (7MB2358-...../7MB2357-...../7MB2355-.....)	C30
• Preparation for the installation of a SIPROCESS UV600 (7MB2621-.....)	C31
• Preparation for the installation of ULTRAMAT 6 (7MB2121-.....)	C32
• Preparation for the installation of ULTRAMAT 6/2 channels (7MB2123-.....)	C33
• Preparation for the installation of ULTRAMAT 6 (7MB2021-.....)	C34
• Preparation for the installation of ULTRAMAT/OXYMAT 6 (7MB2023-.....)	C35
Sample gas line, electrically heated	
Highly flexible, electrically heated sample gas line; can be regulated up to max. 200 °C, including temperature controller integrated in system cabinet	
Length: 5 m	D01
Length: 10 m	D02
Length: 15 m	D03
Length: 20 m	D04
Length: 25 m	D05
Length: 30 m	D06
Length: 35 m	D07
Length: 40 m	D08
Length: 45 m	D09
Length: 50 m	D10
Electronic overcurrent protection for heated sample gas line	
Grounding and temperature controller for heated sample gas line. The heated sample gas line must be ordered separately: see catalog AP 11 "Components for emission analysis".	
Length up to 5 m	D21
Length up to 10 m	D22
Length up to 15 m	D23
Length up to 20 m	D24
Length from 21 m to 30 m	D25
Length from 31 m to 40 m	D26

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Additional versions

Zero gas and span gas infeed

Semi-automatic zero gas infeed for ULTRAMAT 23; max. number: 1

Fully automatic zero gas infeed for a zero gas cylinder¹⁾

Fully automatic calibration gas infeed for the first calibration gas cylinder¹⁾

Fully automatic calibration gas infeed for the second calibration gas cylinder¹⁾

Fully automatic calibration gas infeed for the third calibration gas cylinder¹⁾

¹⁾ Applies to:

- ULTRAMAT 6
- ULTRAMAT/OXYMAT 6
- OXYMAT 6
- SIPROCESS UV600

Maximum number: 3; 1x/used calibration gas cylinder

Option must be selected if the option C11 ... C15 was selected at least once.

Signal processing

Analog signal processing duplicated, electrically isolated, max. load 600 Ω, 1x/analog signal

Documentation

Technical documentation of the des Set CEM CERT and the configured analyzers

German

English

French

Order code

F01

F02

F03

F04

F05

M01

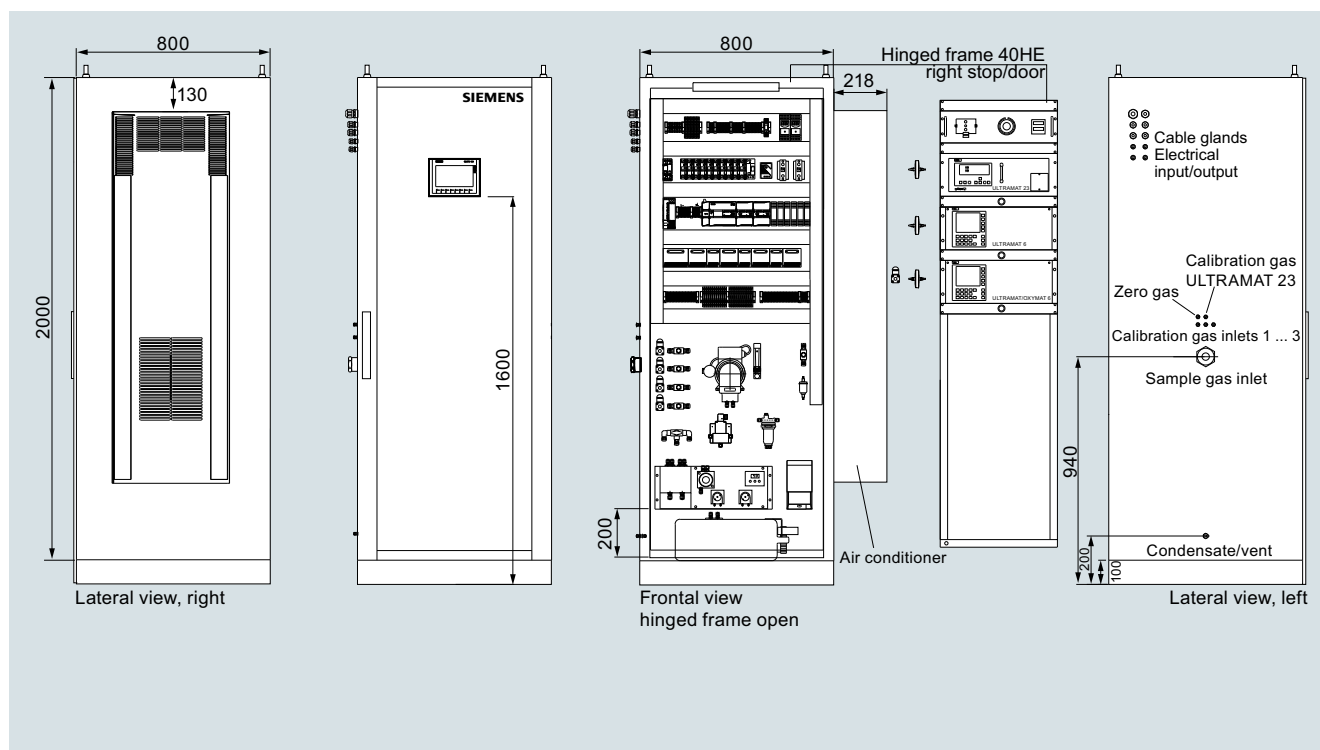
N01

N02

N03

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Dimensional drawings



Set CEM CERT, dimensions in mm