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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	Design
ULTRAMAT 23 Art. No. 7MB2358-.....-....	3 NDIR components on 2 optical benches
ULTRAMAT 23 Art. No. 7MB2357-.....-....	2 NDIR components on 2 optical benches
ULTRAMAT 23 Art. No. 7MB2355-.....-....	1 NDIR component on 1 optical bench
SIPROCESS UV600 Art. No. 7MB2621-.....-....	3 UV components on 1 optical bench
ULTRAMAT 6 Art. No. 7MB2121-.....-.... and 7MB2011-.....-....	1 NDIR component on 1 optical bench
ULTRAMAT 6; two-channel 19" rack unit Art. No. 7MB2123-.....-.... and 7MB2124-.....-....	2 NDIR components on 2 optical benches
OXYMAT 6 Art. No. 7MB2021-.....-....	1 paramagnetic O_2 measuring cell
ULTRAMAT / OXYMAT 6 Art. No. 7MB2023-.....-.... and 7MB2024-.....-....	1 NDIR component on 1 optical bench and 1 paramagnetic O_2 sample chamber

NDIR = Non-dispersive infrared sensor

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Function

The modular measuring system consists of the following components:

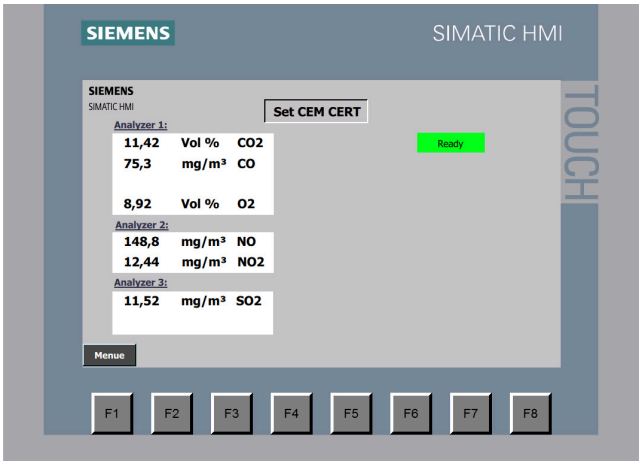
- 1 heated sampling probe
- 1 heated sample gas line (length of the heated sample gas line can be selected up to 50 m)
- 1 sample gas cooler
- 1 sample gas pump
- 1 to 3 differently configurable analyzers

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

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Set CEM CERT

Selection and ordering data

Set CEM CERT Suitability-tested emission measurement system (EN 15267) for continuous emission measurements	Article No. 7MB1957-	●	●	●	●	●	-	●	●	●	0
Click on the Article No. for online configuration in the PIA Life Cycle Portal.											
Unavailable combinations are shown in PIA Life Cycle Portal as "not permitted".											
Rack											
Set CEM CERT, cabinet design (2 100 x 800 x 800 mm), sheet steel, sample gas connection left, with sample preparation, cable inlet above, device design in swing frame, for installation of max. 3 units 19" analyzers, analyzers, with cabinet light, including side panels, front panel and base, door stop on the right		0									
System cabinet 2 (2 100 x 800 x 800 mm) with sample preparation, analyzers in swing frame, for design with up to three 19" analyzers, sample gas connections on the right, cable inlet above, with cabinet light, including side panels and base **Note:** Must be approved by customer with individual acceptance test		1									
GRP cabinet 1 (2 060 x 900 x 800 mm) with sample preparation, analyzers in swing frame, for design with up to three 19" analyzers, sample gas connections on the left, cable inlet above, with cabinet light, base **Note:** Must be approved by customer with individual acceptance test		4									
GRP cabinet 2 (2 060 x 900 x 800 mm) with sample preparation, analyzers in swing frame, for design with up to three 19" analyzers, sample gas connections on the right, cable inlet above, with cabinet light, base **Note:** Must be approved by customer with individual acceptance test		5									
FIDAMAT 6 emission measurement system, sheet-steel cabinet (800 x 700 x 600) with preparation for 1 FIDAMAT 6 analyzer unit. **Note:** FIDAMAT 6 analyzer must be ordered separately		6									
Installation in custom cabinet; is ordered, delivered and invoiced as separate order item		8									
Sampling probe For dust loads up to 2 g/m³, including sampling pipe, length 1 000 mm, for temperatures ≤ 600 °C, with weather protection cover[1], material of filter enclosure: stainless steel											
Without			A								
Type: M&C; Version SP2000			B								
Type: Bühler; GAS 222			C								
Type: M&C; Version SP2000, with connections for 2 heated sample gas lines, without weather protection cover			F								
Type: Bühler; GAS 222, with connections for 2 heated sample gas lines			G								
Ventilation/cooling											
Cabinet fan installed in side panel, with adjustable thermostat **Note:** Must be approved for ULTRAMAT 23 by customer with individual acceptance test.				B							
Energy-efficient cabinet air-conditioning unit installed in side panel, controlled via thermostat				C							
Energy-efficient cabinet air-conditioning unit installed in side panel, controlled via thermostat, for outdoor installation in the GRP cabinet **Note:** Must be approved by customer with individual acceptance test.				D							
Cabinet fan for FIDAMAT 6 emission measurement system installed in side panel, with adjustable thermostat				E							
Energy-efficient cabinet air-conditioning unit for FIDAMAT 6 emission measurement system installed in side panel, controlled via thermostat				F							
Heater											
Without cabinet heating					0						
Electrical frost protection heating installed in the cabinet for expansion of operating range of -5 °C (indoor installation) or -15 °C (outdoor installation)					1						
Grounding of all electrical loads											
1-pole						0					
2-pole						1					
Sample gas cooler Including two heat exchangers arranged in series connection.											
Without								0			
Type: M&C, Version CSS								1			
Type: Bühler, Version EGK-2, for increased cooling capacity								2			
NO_2/NO converter											
Without NO_2/NO converter									A		
With NO_2/NO converter type: Bühler, $BÜNO_x$									B		
With NO_2/NO converter, type: M&C, Version CG, with converter cartridge for conversion of NO_2 into NO									C		
Power supply 50 Hz or 60 Hz, including main switch											
230 V AC, -15%, +10%										B	
400 V AC, -15%, +10%, 3-phase										C	

[1] Exception: Option F is without weather protection cover.

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Selection and ordering data (continued)

Options	Order code
Add "**-Z**" to article number and specify order code	
Accessories	
Condensation trap made of plastic with level monitoring	**A03**
Acidification module for measuring SO_2 concentrations < 50 mg/m³; to prevent washout effects by the condensate. **Note:** Must be approved by customer with individual acceptance test.	**A04**
PROFIBUS DP interface for querying status and measured signals. **Note:** Must be approved by customer with individual acceptance test.	**A13**
Air Treater for FIDAMAT 6, for removing residual traces of hydrocarbons in the combustion gas of the FID; supplied unassembled, for wall mounting, incl. 2 m hose line	**A14**
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 ULTRAMAT 6 (7MB2121-.....-....)	**C12**
• Preparation for the installation of OXYMAT 6 (7MB2021-.....-....)	**C14**
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 OXYMAT 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 OXYMAT 6 (7MB2021-.....-....)	**C34**
• Preparation for the installation of ULTRAMAT/OXYMAT 6 (7MB2023-.....-....)	**C35**
Analyzers mounting position 4	
• Preparation for installation of an additional LDS6 central unit (7MB6121-...0.-0...). The LDS 6 central unit must be ordered separately with a CD6 sensor pair	**C40**
Heated line must be ordered as option D27 and 7MB1943-2AA31	
Fuse protection (25A) and regulator for heated sample gas line up to 50 m, the heated line must be ordered or provided under MLFB 7MB1943-2AA31	**D27**
Zero gas and calibration gas infeed	
Semi-automatic zero gas infeed for ULTRAMAT 23; max. number: 1	**F01**
Fully automatic zero gas infeed for a zero gas cylinder[1)]	**F02**
Fully automatic calibration gas infeed for the first calibration gas cylinder[1)]	**F03**
Fully automatic calibration gas infeed for the second calibration gas cylinder[1)]	**F04**
Fully automatic calibration gas infeed for the third calibration gas cylinder[1)]	**F05**
Signal processing	
Analog signal processing 1 duplicated, electrically isolated, max. load 600 Ω, 1x/analog signal	**M01**
Analog signal processing 2 duplicated, electrically isolated, max. load 600 Ω, 1x/analog signal	**M02**
Analog signal processing 3 duplicated, electrically isolated, max. load 600 Ω, 1x/analog signal	**M03**
Analog signal processing 4 duplicated, electrically isolated, max. load 600 Ω, 1x/analog signal	**M04**
Analog signal processing 5 duplicated, electrically isolated, max. load 600 Ω, 1x/analog signal	**M05**
Analog signal processing 6 duplicated, electrically isolated, max. load 600 Ω, 1x/analog signal	**M06**
Documentation Technical documentation of the Set CEM CERT and the configured analyzers	
German	**N01**
English	**N02**
French	**N03**
Hardware and software configurations corresponding to QAL1 according to EN 15267	**Y27**

[1)] Applies to ULTRAMAT 6, ULTRAMAT/OXYMAT 6, OXYMAT 6, SIPROCESS UV600. Max. quantity 3; 1x/used calibration gas cylinder. Option must be selected if the option C11 ... C15 was selected at least once.

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Technical specifications

Set CEM SERT	
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)]	• 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	• 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	• 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 hazardous zone
Degree of protection	IP54
Calibration	Semi-automatic or fully automatic; AUTOCAL on ULTRAMAT 23 freely adjustable up to max. 24-hour interval
Dimensions*	
Sheet-steel cabinet (with base) for indoor installation	2 100 × 800 × 800 mm (H × B × T)

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

1) With NO and SO_2 concentration > 500 mg/m³, the glass heat exchanger must be used.

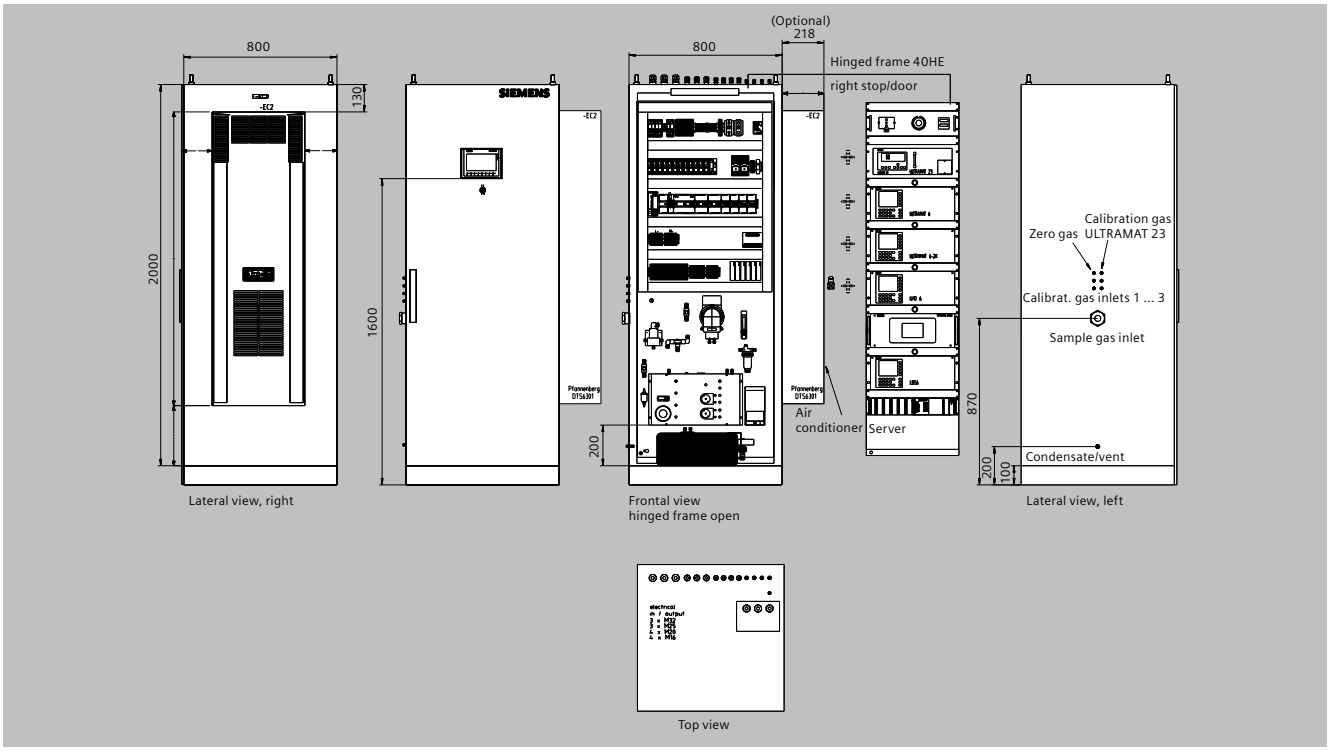
2) When the SIPROCESS UV600 analyzer is selected, the cooler type EGK 2-19 must be used due to the greater cooling capacity.

Detailed information on the analyzers

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

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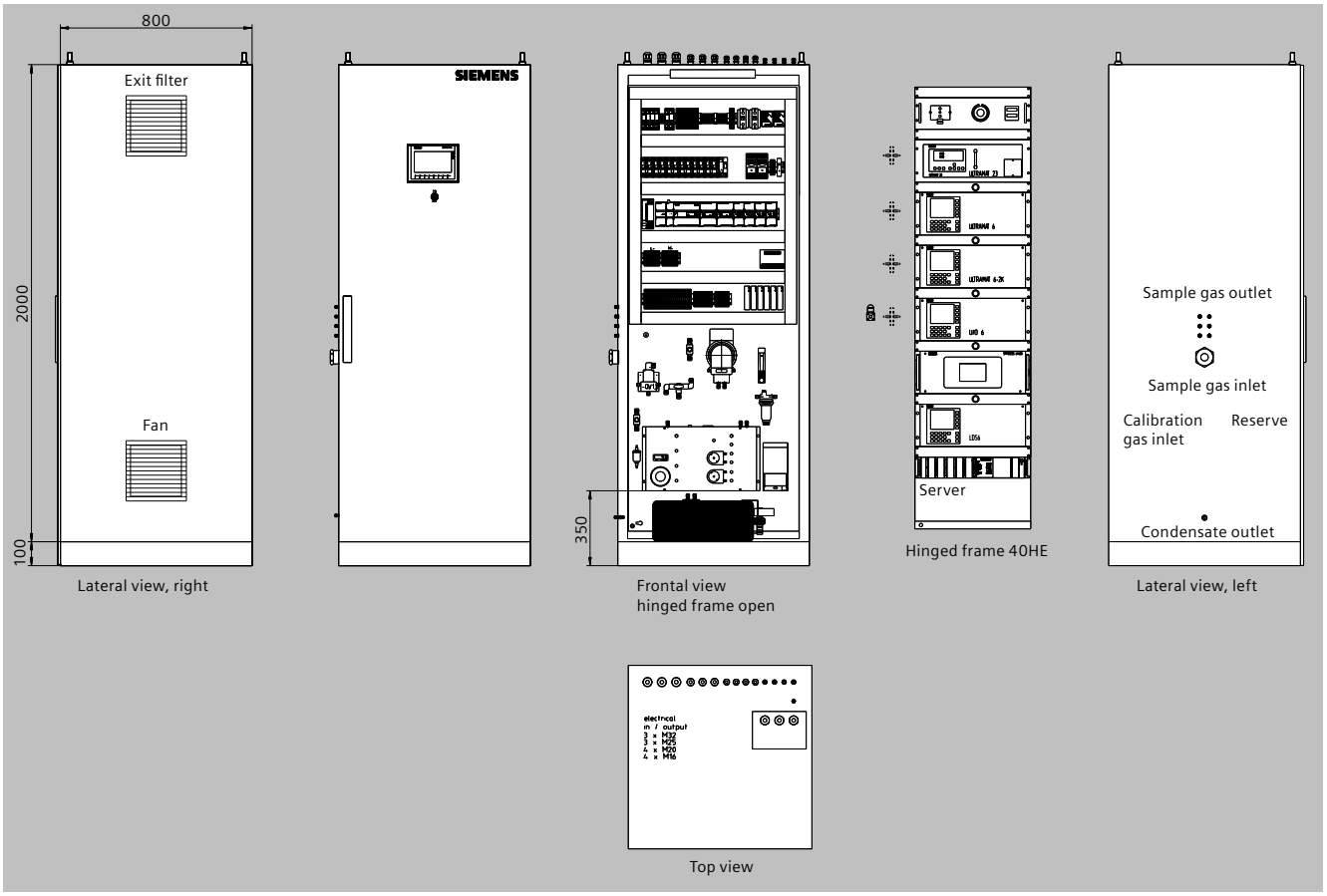
Dimensional drawings



Set CEM CERT, version with refrigerator, dimensions in millimeter

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Dimensional drawings (continued)



Set CEM CERT, version with fan, dimensions in millimeter