



CEMS-2000 B Series

Continuous Emission Monitoring System



System Composition

- **Particulate Concentration Monitoring Subsystem**
– FPI LDM-100 Laser Dust Monitor
- **Gaseous Contaminant Monitoring Subsystem (including SO₂, NO, NO₂, O₂, etc.)**
– FPI OMA-2000 Process Spectrometer
- **Flue Gas Parameter Monitoring Subsystem (Temperature, pressure, flow rate, humidity, etc.)**
– transmitters for temperature, pressure, flow rate and humidity.
- **Data Acquisition and processing subsystem**
– FPI SJWT-0410 data acquisition and process system

System Features

- Comparing to conventional condensation method, CEMS-2000s has no moving parts, featuring compact configuration and long maintenance interval;
- Higher reliability and lower ownership, eliminating the use of costly parts such as peristaltic pump, diaphragm pump and condensation system;
- Higher accuracy, adopting hot-wet process to avoid SO₂ being absorbed by condensed water;
- Gas analysis uses the UV spectroscopy technology, which can deal with the negative effect on measurement from water and dust.
- Analysis system connected to the measurement cell by optical fiber, easing installation and maintenance
- Adopt unique filter to reduce dust more effectively and improve the blowback significantly, in turn obtain a longer maintenance interval;
- Two-step measurement, higher accuracy and better performance;
- Full components measurement, all parameters integrated into to a panel mount OMA-2000.

The CEMS-2000 series Continuous Emission Monitoring System is a high-end environmental protection monitoring equipment developed and produced independently by Focused Photonics Inc. (FPI), which is mainly for the flue gas monitoring at the occasions such as various boilers, industrial kilns and waste incineration. The core products are high quality spectrometer gas analyzer and laser dust detection instrument, of which FPI possesses all the intellectual property rights.

CEMS-2000 B S series measure SO₂, NO_x by thermal wet method and measure O₂ by zirconia method. CEMS-2000 B F series are added by condensation device and CO_x module based on CEMS-2000 B S.

Technical Specifications

- **Gaseous Contaminant Monitoring Subsystem**
Measure range: (0-300-5000) ppm (can be customized)
Components: Up to 5 gases (SO₂, NO_x, O₂, CO, CO₂) + humidity
Linearity: SO₂, NO_x: ≤1%F.S.
O₂ (ZrO): ≤2%F.S. (0-30%)
O₂ (Electrochemistry): ≤2%F.S. (0-30%)
CO: ≤5%F.S. (0-1000ppm)
CO₂: ≤3% readout + 1.5%F.S. (0-25%)
Response Time: ≤30s
I/Os: 8-channel relay output, 4-channel on/off input;
5-channel 4-20mA output, 2-channel 4-20mA input
Communication: RS485, RS232/GPRS
Ambient Temperature: 5°C~40°C

- **Particulate Concentration Monitoring Subsystem**

Items	Specifications
Measurement Range	Transmittance: 0-100%, 80-100%
	Opacity: 100-0%, 20-0%
	Extinction: 0-2.5, 0-0.1
Accuracy	Transmittance/Opacity: ±0.4%
	Extinction: ±0.002
Optical Path	0.5-15m
Response Time	1-600s (adjustable)
Gas Temperature	-20°C~600°C
Gas Pressure	-20KPa~50KPa
Enclosure Protection	IP65
Analogue Output	2-channel 4-20mA (isolated, 750Ω max)
Communication	RS485
Relay Output	3-channel output (relay: 24V, 1A)
Power Supply	Measurement units: 24V DC<20W
	Purge unit: 220V AC<40W
Ambient Temperature	-30°C~60°C

- **Flue Gas Parameter Monitoring Subsystem**

Parameter	Range	Accuracy	Output Signal
Flowrate	0-40m/s	±1%F.S.	4-20mA
Pressure	-10KPa~10KPa	±0.5%F.S.	4-20mA
Temperature	0°C~400°C	±0.5%F.S.	4-20mA
Humidity	0~20%VOL	±2%F.S.	4-20mA

CEMS-2000 I Series

Continuous Emission Monitoring System

The CEMS-2000 I series are a kind of in-situ extraction continuous emission monitoring systems which are developed according to FPI's years of studying and application experience in online industrial gas analysis systems. Combining the advantages of in-situ method and sampling method for continuous emission monitoring systems, it is an innovative solution for the applications in environmental protection. The core components are high quality spectrometer gas analyzer and laser dust detection instrument, of which FPI possesses all the intellectual property rights.

According to the different connection between the sampling probe and the probe box, this series includes two types: CEMS-2000 I I and CEMS-2000 I T, both of which can be upgraded to explosion-proof series. CEMS-2000 I I adopts an integrated connection between the probe and the probe box while CEMS-2000 I T uses heat-tracing pipeline between the probe and the probe box, which is adaptable to the installation in different external conditions.

System Composition

- **Particulate Concentration Monitoring Subsystem**
– FPI LDM-100 Laser Dust Monitor
- **Gaseous Contaminant Monitoring Subsystem (including SO₂, NO, NO₂, O₂, etc.)**
– FPI OMA-3000 Process Spectrometer
- **Flue Gas Parameter Monitoring Subsystem (Temperature, pressure, flow rate, humidity, etc.)**
– transmitters for temperature, pressure, flow rate and humidity.
- **Data Acquisition and processing subsystem**
– FPI SJWT-0410 data acquisition and process system

- **Flue Gas Parameter Monitoring Subsystem**

Parameter	Range	Accuracy	Output Signal
Flowrate	0-40m/s	±1%F.S.	4-20mA
Pressure	-10KPa~10KPa	±0.5%F.S.	4-20mA
Temperature	0°C~400°C	±0.5%F.S.	4-20mA
Humidity	0~20%VOL	±2%F.S.	4-20mA

System Features

- Comparing to conventional condensation method, CEMS-2000s has no moving parts, featuring compact configuration and long maintenance interval;
- Higher reliability and lower ownership, eliminating the use of costly parts such as peristaltic pump, diaphragm pump and condensation system;
- Higher accuracy, adopting hot-wet process to avoid SO₂ being absorbed by condensed water;
- Gas analysis uses the UV spectroscopy technology, which can deal with the negative effect on measurement from water and dust.
- Analysis system connected to the measurement cell by optical fiber, easing installation and maintenance
- An analysis house is not needed, compact structure which can be upgraded to explosion-proof version



Technical Specifications

- **Gaseous Contaminant Monitoring Subsystem**
Measure range: (0-300-5000) ppm (can be customized)
Components: Up to 5 gases (SO₂, NO_x, O₂, CO, CO₂) + humidity
Linearity: SO₂, NO_x: ≤1%F.S.
O₂ (ZrO): ≤2%F.S. (0-30%)
O₂ (Electrochemistry): ≤2%F.S. (0-30%)
CO: ≤5%F.S. (0-1000ppm)
CO₂: ≤3% readout + 1.5%F.S. (0-25%)
Response Time: ≤30s
I/Os: 8-channel relay output, 4-channel on/off input;
5-channel 4-20mA output, 2-channel 4-20mA input
Communication: RS485, RS232/GPRS
Ambient Temperature: 5°C~40°C

- **Particulate Concentration Monitoring Subsystem**

Items	Specifications
Measurement Range	Transmittance: 0-100%, 80-100%
	Opacity: 100-0%, 20-0%
	Extinction: 0-2.5, 0-0.1
Accuracy	Transmittance/Opacity: ±0.4%
	Extinction: ±0.002
Optical Path	0.5-15m
Response Time	1-600s (adjustable)
Gas Temperature	-20°C~600°C
Gas Pressure	-20KPa~50KPa
Enclosure Protection	IP65
Analogue Output	2-channel 4-20mA (isolated, 750Ω max)
Communication	RS485
Relay Output	3-channel output (relay: 24V, 1A)
Power Supply	Measurement units: 24V DC<20W
	Purge unit: 220V AC<40W
Ambient Temperature	-30°C~60°C