

# PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

**ZRE and ZRE/ZFK7 for CO, NO, SO<sub>2</sub> and O<sub>2</sub>**

Manufactured by:

**Fuji Electric Co Ltd**

No 1 Fuji-machi, Hino-City, Tokyo 91-8502  
Japan

has been assessed by CSA Group  
and for the conditions stated on this certificate complies with:

### Environment Agency Guidance

**“MCERTS for stack emissions monitoring equipment at industrial installations”**

- **Continuous emissions monitoring systems (CEMS)**

**Published 20 October 2020**

**EN 15267-1:2009, EN15267-2:2009, EN 15267-3:2007**

**& QAL 1 as defined in EN 14181: 2014**

Certification ranges:

CO	0-125 mg/m <sup>3</sup>	0-1250 mg/m <sup>3</sup>
NO	0-268 mg/m <sup>3</sup>	0-2680 mg/m <sup>3</sup>
SO <sub>2</sub>	0-571 mg/m <sup>3</sup>	0-5710 mg/m <sup>3</sup>
O <sub>2</sub> (PA*)	0-25 Vol.-%	0-10Vol.-%
O <sub>2</sub> (ZI**)	0-25 Vol.-%	0-10 Vol.-%

PA\*- Paramagnetic    ZI\*\* - Zirconium Oxide

Project number: 80152850  
Certificate number: CSA MC 130224/04  
Initial certification: 25 February 2013  
This certificate issued: 06 February 2023  
Renewal date: 24 February 2028



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MCERTS is operated on behalf of the Environment Agency by

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*The MCERTS certificate consists of this document in its entirety.*

*For conditions of use, please consider all the information within.*

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## Approved Site Application

*Any potential user should ensure, in consultation with the manufacturer, that the monitoring system is suitable for the intended application. For general guidance on monitoring techniques refer to the Environment Agency Monitoring Technical Guidance Notes available at [www.mcerts.net](http://www.mcerts.net)*

This instrument is considered suitable for use on waste incineration and large combustion plants. This CEMS has been proven suitable for its measuring task (parameter and composition of the flue gas) by use of the QAL 1 procedure specified in EN14181. The lowest certified range for each determinant shall not be more than 1.5 times the daily average emission limit value (ELV) for incineration plants, and not more than 2.5 times the ELV for other types of applications.

## Basis of Certification

This certification is based on the following test report(s) and on CSA Group's assessment and ongoing surveillance of the product and the manufacturing process:

Report on the suitability test of ZRE and ZRE/ZFK7 measuring system by Fuji Electric Co. Ltd. For the components NO, SO<sub>2</sub>, CO and O<sub>2</sub>.

TÜV Report No.: 936/21210059/A. Köln, October 21, 2009.

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## Product Certified

The ZRE and ZRE/ZFK7 measuring system consists of the following parts:

1. **Sample Probe** – model: TECHNOVA HT PERO-MI AGP04 heated to 180°C
2. **Heated Filter** – integrated with sample probe
3. **Heated Sample Line** – Model: 10m PTFE line heated to 180°C
4. **Gas Conditioning** – model: M&C ECM-2 G/SR 25.2 gas cooler & Premature AS series scrubber
5. **Analyser** – model: ZRE and ZRE/ZFK7 Analyser

Allowable variations could include:

- A different brand or model of sampling system of the same type, provided that there is evidence the alternative system works with similar types of CEM.
- Additional manifolds and heated valves used to allow more than one analyser to share a sampling system.

This certificate applies to all instruments fitted with software version 1.02 (serial number LR0020 for ZRE analysers and LR0023 for ZFK7 analysers onwards).

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## Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: +5°C to +40°C  
Instrument IP rating: IP55

Results are expressed as error % reading, unless otherwise stated.

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time						
CO					70s	<200s
NO					83s	<200s
SO <sub>2</sub>					99s	<200s
O <sub>2</sub> (Zirconia)					90s	<200s
O <sub>2</sub> (Paramagnetic)					57s	<200s
Repeatability standard deviation at zero point						
CO	0.03					<2.0%
NO	0.06					<2.0%
SO <sub>2</sub>	0.02					<2.0%
O <sub>2</sub> (Zirconia)	0.02					<0.2%
O <sub>2</sub> (Paramagnetic)	0.00					<0.2%
Repeatability standard deviation at reference point						
CO	0.03					<2.0%
NO	0.03					<2.0%
SO <sub>2</sub>	0.11					<2.0%
O <sub>2</sub> (Zirconia)	0.00					<0.2%
O <sub>2</sub> (Paramagnetic)	0.00					<0.2%
Lack-of-fit						
CO	0.40					<2.0%
NO	-0.16					<2.0%
SO <sub>2</sub>	0.19					<2.0%
O <sub>2</sub> (Zirconia)	0.07					<0.2%
O <sub>2</sub> (Paramagnetic)	0.07					<0.2%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Influence of ambient temperature zero point						
CO				-2.90		<5.0%
NO				4.10		<5.0%
SO <sub>2</sub>				3.50		<5.0%
O <sub>2</sub> (Zirconia)	0.06					<0.5%
O <sub>2</sub> (Paramagnetic)	0.10					<0.5%
Influence of ambient temperature reference point						
CO				3.80		<5.0%
NO				4.20		<5.0%
SO <sub>2</sub>				2.90		<5.0%
O <sub>2</sub> (Zirconia)	0.46					<0.5%
O <sub>2</sub> (Paramagnetic)	0.34					<0.5%
Influence of sample gas flow for extractive CEMS						
CO	-0.50					<2.0%
NO	-0.10					<2.0%
SO <sub>2</sub>	-0.50					<2.0%
O <sub>2</sub> (Zirconia)	0.11					<0.2%
O <sub>2</sub> (Paramagnetic)	0.13					<0.2%
Influence of voltage variations 190 to 250V						
CO	-0.50					<2.0%
NO	-0.30					<2.0%
SO <sub>2</sub>	-0.20					<2.0%
O <sub>2</sub> (Zirconia)	-0.05					<0.2%
O <sub>2</sub> (Paramagnetic)	-0.03					<0.2%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Cross-sensitivity at zero with interferents: O <sub>2</sub> , H <sub>2</sub> O, CO, CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, NO, NO <sub>2</sub> , NH <sub>3</sub> , SO <sub>2</sub> , HCl, H <sub>2</sub> S						
CO			1.73			<4.0%
NO			1.34			<4.0%
SO <sub>2</sub>		0.73				<4.0%
O <sub>2</sub> (Zirconia)	0.00					<0.4%
O <sub>2</sub> (Paramagnetic)	0.00					<0.4%
Cross-sensitivity at reference with interferents: O <sub>2</sub> , H <sub>2</sub> O, CO, CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, NO, NO <sub>2</sub> , NH <sub>3</sub> , SO <sub>2</sub> , HCl, H <sub>2</sub> S						
CO				3.09		<4.0%
NO		0.87				<4.0%
SO <sub>2</sub>				3.48		<4.0%
O <sub>2</sub> (Zirconia)	0.25					<4.0%
O <sub>2</sub> (Paramagnetic)	0.14					<4.0%
Converter Efficiency					Not Applicable	>95%
Measurement uncertainty						
CO					12.5%	Guidance - at least 25% below max permissible uncertainty
NO					14.7%	
SO <sub>2</sub>					6.9%	
O <sub>2</sub> (Zirconia)					2.9%	
O <sub>2</sub> (Paramagnetic)					2.6%	

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Calibration function (field)						
CO					0.99	>0.90
NO					0.99	>0.90
SO <sub>2</sub>					0.99	>0.90
O <sub>2</sub> (Zirconia)					0.99	>0.90
O <sub>2</sub> (Paramagnetic)					0.99	>0.90
Response time (field)						
CO					93s	<200s
NO					96s	<200s
SO <sub>2</sub>					98s	<200s
O <sub>2</sub> (Zirconia)					98s	<200s
O <sub>2</sub> (Paramagnetic)					68s	<200s
Lack of fit (field)						
CO		0.88				<2.0%
NO		-0.63				<2.0%
SO <sub>2</sub>		0.93				<2.0%
O <sub>2</sub> (Zirconia)	-0.15					<0.2%
O <sub>2</sub> (Paramagnetic)	-0.09					<0.2%
Maintenance interval					4 weeks Note 1	>8 days

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Zero and Span drift requirement	<p>The AMS is able to perform automated calibrations. The automated adjustment of zero point was carried out during the field test. No problems occurred throughout the field test period. A status signal is set, if the automated calibration should not work.</p>					<p>Clause 6.13 &amp; 10.13</p> <p>Manufacturer shall provide a description of the technique to determine and compensate for zero and span drift.</p>
Change in zero point over maintenance interval						
CO	-0.38					<3.0%
NO		0.69				<3.0%
SO <sub>2</sub>		0.81				<3.0%
O <sub>2</sub> (Zirconia)	-0.09					<0.2%
O <sub>2</sub> (Paramagnetic)	-0.11					<0.2%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Change in reference point over maintenance interval						
CO				-2.31		<3.0%
NO				2.81		<3.0%
SO <sub>2</sub>				-2.37		<3.0%
O <sub>2</sub> (Zirconia)	-0.17					<0.2%
O <sub>2</sub> (Paramagnetic)	0.19					<0.2%
Availability All Components					98.4%	>95% (>98% for O <sub>2</sub> )
Reproducibility						
CO				2.50		<3.3%
NO			1.00			<3.3%
SO <sub>2</sub>		0.70				<3.3%
O <sub>2</sub> (Zirconia)	0.10					<0.2%
O <sub>2</sub> (Paramagnetic)	0.11					<0.2%

Note 1: The ZRE / ZFK7 has a maintenance interval of 4 weeks. The work detailed below has to be carried out at regular intervals, depending on local conditions:

Check of zero and span point with the help of test gasses and visual inspection of the system including tubings, flow meter, temperature controller and pumps.

Annual Maintenance works: Replacement of the filter element within the heated probe.

Test gasses shall be fed via the dynamic injector at least once every three months.

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## Description

The FUJI ZRE & ZRE/ZFK7 gas analyser is a multi-component analyser based on the absorption of non-dispersive infrared radiation (NDIR). The attenuation in the radiation that depends on the wavelength is a measure of the respective concentration of the gas. The analyser measures O<sub>2</sub> with a paramagnetic sensor or alternatively, a zirconia cell.

The FUJI ZRE & ZRE/ZFK7 can measure up to 4 gas components simultaneously and continuously, 3 being infrared sensitive gases such as CO, NO, or SO<sub>2</sub> and the other O<sub>2</sub>.

The FUJI ZRE & ZRE/ZFK7 is a 19-inch rack mounted analyser for use in process monitoring applications or continuous emissions monitoring.

## General Notes

1. This certificate is based upon the equipment tested. The Manufacturer is responsible for ensuring that on-going production complies with the standard(s) and performance criteria defined in this certificate. The manufacturer is required to maintain an approved quality management system controlling the manufacture of the certified product. Both the product and the quality management system shall be subject to regular surveillance according to 'Regulations Applicable to the Holders of CSA Group Testing UK Ltd Certificates'.
2. The design of the product certified is held and maintained by TÜV Rheinland for certificate No. Sira MC130224.
3. If a certified product is found not to comply, CSA Group should be notified immediately at the address shown on this certificate.
4. The certification marks that can be applied to the product or used in publicity material are defined in 'Regulations Applicable to the Holders of CSA Group Testing UK Ltd Certificates'.
5. This document remains the property of CSA Group and shall be returned when requested by CSA Group.

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