

PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

Procal 2000 Series Continuous Emission Monitor With ACU Mk3 Control Unit

Manufactured by:

Parker Hannifin Manufacturing Limited (trading as Parker Kittiwake Procal)

5 Maxwell Road
Woodston
Peterborough
PE2 7HU
UK

Has been assessed by Sira Certification Service
And for the conditions stated on this certificate complies with:

**MCERTS Performance Standards for Continuous Emission
Monitoring Systems, Version 3.4 dated July 2012
EN15267-3:2007,
& QAL 1 as defined in EN 14181: 2004**

Certification Ranges :

NO ₂	0 to 200 ppm, 0 to 5000 ppm
N ₂ O	0 to 300 ppm, 0 to 5000 ppm
NO	0 to 240 ppm, 0 to 1500 ppm
SO ₂	0 to 150 ppm, 0 to 1500 ppm
CO	0 to 150 ppm, 0 to 3500 ppm
CO ₂	0 to 15 Vol.%, 0 to 25 Vol.%
H ₂ O	0 to 30 Vol.%

Project No. : 16A0419
Certificate No : Sira MC990006/13
Initial Certification : 21 December 2000
This Certificate issued : 19 December 2015
Renewal Date : 18 December 2020

R Cooper I Eng MInst MC
Technical Director

MCERTS is operated on behalf of the Environment Agency by

Sira Certification Service

Unit 6, Hawarden Industrial Park
Hawarden, Deeside, CH5 3US
Tel: +44 (0)1244 670 900



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Registered Office: Rake Lane, Eccleston, Chester, UK CH4 9JN

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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

On the basis of the assessment and the ranges required for compliance with EU Directives:

This CEM 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, for Industrial Emissions 2010/75/EU, LCPD and WID applications for the ranges specified. The lowest certified range for each determinand shall not be more than 1.5X the daily average emission limit value (ELV) for WID applications, and not more than 2.5X the ELV for LCPD and other types of application.

The field trial was conducted at Aberthaw Power Station in the Vale of Glamorgan for three months.

Basis of Certification

This certification is based on the following Test Report(s) and on Sira's assessment and ongoing surveillance of the product and the manufacturing process:

NPL Report Reference 2009070133/102153/QE2100/MCERTS/ProcalP2000/J1
Dated 9th April 2013

NPL Report Reference 102153/QE2100/Procal 2000 Series MCERTs Field Test
Dated 22nd February 2013

NPL Report Reference 200970133/102153/QE2100/MCERTS/ProcalP2000/J2
Dated 2nd July 2013

NPL Report Reference 105435/QE8400/Procal 2000 Series MCERTs Field Test
Dated 8th May 2013

Sira Test and Certification Report Reference N0328
Environmental (Vibration) Test on a Procal Pulsi Gas Analyser Dated March 2000

Product Certified

The Procal 2000 series measuring system consists of the following parts:

- Procal Model 2000 Analyser
- Analyser control unit model

This certificate applies to all instruments fitted with software version 2.7.2 (serial number 8501226M onwards).

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Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: -20°C to +50°C
Instrument IP rating: IP 65

Results are expressed as error % certification range, unless otherwise stated.

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time						
NO ₂					126s	<200s
N ₂ O					107s	<200s
SO ₂					132s	<200s
NO					136s	<200s
CO					132s	<200s
CO ₂					193s	<200s
H ₂ O					143s	<200s
Repeatability standard deviation at zero point						
NO ₂	0.01					<2.0%
N ₂ O	0.06					<2.0%
SO ₂	0.14					<2.0%
NO	0.16					<2.0%
CO	0.14					<2.0%
CO ₂	0.01					<2.0%
H ₂ O	0.01					<2.0%
Repeatability standard deviation at reference point						
NO ₂	0.20					<2.0%
N ₂ O	0.23					<2.0%
SO ₂	0.13					<2.0%
NO	0.15					<2.0%
CO	0.19					<2.0%
CO ₂	0.08					<2.0%
H ₂ O	0.08					<2.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Lack-of-fit						
NO ₂		0.54				<2.0%
N ₂ O			1.85			<2.0%
SO ₂	-0.27					<2.0%
NO		0.85				<2.0%
CO	0.33					<2.0%
CO ₂		0.63				<2.0%
H ₂ O			1.52			<2.0%
Influence of ambient temperature zero point						
NO ₂	-0.20					<5.0%
N ₂ O	-0.46					<5.0%
SO ₂		0.85				<5.0%
NO				-2.69		<5.0%
CO			1.32			<5.0%
CO ₂	0.15					<5.0%
H ₂ O	-0.32					<5.0%
Influence of ambient temperature reference point						
NO ₂		0.96				<5.0%
N ₂ O				2.41		<5.0%
SO ₂				4.71		<5.0%
NO				-4.65		<5.0%
CO				-4.14		<5.0%
CO ₂				2.41		<5.0%
H ₂ O			1.30			<5.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Influence of sample gas pressure						
NO ₂		0.64				<2.0%
N ₂ O		-0.54				<2.0%
SO ₂	0.42					<2.0%
NO		-0.53				<2.0%
CO	-0.45					<2.0%
CO ₂		-0.80				<2.0%
H ₂ O	-0.46					<2.0%
Influence of voltage variations 190 to 250V						
NO ₂	0.40					<2.0%
N ₂ O	0.14					<2.0%
SO ₂	-0.41					<2.0%
NO	0.25					<2.0%
CO	0.31					<2.0%
CO ₂	0.30					<2.0%
H ₂ O	0.26					<2.0%
Influence of vibration (10 to 60Hz (±0.3mm), 60 to 150Hz at 19.6m/s ²)					No Effect	To be reported
Cross-sensitivity at zero with interferences: O ₂ , H ₂ O, CO, CO ₂ , CH ₄ , N ₂ O, NO, NO ₂ , NH ₃ , SO ₂ , HCl						
NO ₂				3.00		<4.0%
N ₂ O	0.00					<4.0%
SO ₂				-3.33		<4.0%
NO				-2.14		<4.0%
CO				-2.60		<4.0%
CO ₂			1.48			<4.0%
H ₂ O	0.00					<4.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Cross-sensitivity at reference with interferents: O ₂ , H ₂ O, CO, CO ₂ , CH ₄ , N ₂ O, NO, NO ₂ , NH ₃ , SO ₂ , HCl						
NO ₂				3.00		<4.0%
N ₂ O				-2.20		<4.0%
SO ₂				2.11		<4.0%
NO				3.01		<4.0%
CO				2.22		<4.0%
CO ₂				3.57		<4.0%
H ₂ O				-3.48		<4.0%
Measurement uncertainty						
NO ₂					7.9%	Guidance - at least 25% below max permissible uncertainty
N ₂ O					4.3%	
SO ₂					11.7%	
NO					11.6%	
CO					7.5%	
CO ₂					6.0%	
H ₂ O					5.2%	
Calibration function (field)						
NO ₂					0.9343	>0.90
N ₂ O					0.9999	>0.90
SO ₂					0.9971	>0.90
NO					0.9822	>0.90
CO					0.9430	>0.90
CO ₂					0.9841	>0.90
H ₂ O					0.9546	>0.90

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time (field)						
NO ₂					85s	<200s
N ₂ O					82s	<200s
SO ₂					80s	<200s
NO					78s	<200s
CO					81s	<200s
CO ₂					61s	<200s
H ₂ O					90s	<200s
Lack of fit (field)						
NO ₂			-1.47			<2.0%
N ₂ O		-0.95				<2.0%
SO ₂		-0.87				<2.0%
NO			1.71			<2.0%
CO			1.60			<2.0%
CO ₂			1.86			<2.0%
H ₂ O			-1.57			<2.0%
Maintenance interval					Note 1 1 Month	>8 days
Zero and Span drift requirement	<p>The CEMs have check facilities that can be operated manually or be programmed to be carried out at different time intervals.</p> <p>The automatic zero facility was operating successfully at the specified times. The span test facility gave satisfactory results (and these were also within specification throughout the field test with no adjustment). The status signals operated correctly.</p>					<p>Clause 6.13 & 10.13</p> <p>Manufacturer shall provide a description of the technique to determine and compensate for zero and span drift.</p>

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Change in zero point over maintenance interval						
NO ₂		0.80				<3.0%
N ₂ O		0.80				<3.0%
SO ₂				-2.50		<3.0%
NO				-2.30		<3.0%
CO				2.30		<3.0%
CO ₂	0.00					<3.0%
H ₂ O	0.30					<3.0%
Change in reference point over maintenance interval						
NO ₂			1.30			<3.0%
N ₂ O			1.80			<3.0%
SO ₂				-2.90		<3.0%
NO				2.90		<3.0%
CO				2.10		<3.0%
CO ₂				2.90		<3.0%
H ₂ O				2.30		<3.0%
Availability						
SO ₂ , NO, CO, CO ₂ , H ₂ O					95.4%	>95%
NO ₂ N ₂ O					99.2%	>95%
Reproducibility						
NO ₂			1.60			<3.3%
N ₂ O		0.80				<3.3%
SO ₂				2.60		<3.3%
NO				2.60		<3.3%
CO				2.40		<3.3%
CO ₂				2.40		<3.3%
H ₂ O		0.60				<3.3%

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Note 1: The P2000 has a maintenance interval of 1 month. The work details below has to be carried out at regular intervals, depending on local conditions:

Check that the analyser(s) and associated units are functioning correctly by logging and comparing the “test screen” readings with those previously logged.

Select zero gas purge and verify the P2000 indicates zero within 2% of span, then select span gas and verify it is within 2% FSD of the cylinders' certified concentrations.

If the system outputs are connected to a plant DCS verify that the current readings are displayed correctly on the DCS display.

Before leaving site ensure that the system is left in its normal operational mode.

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Description

The Procal 2000 analyser comprises a stack mounted probe and a separate control unit. The analyser performs measurements of the components of stack gases and operates by using the infrared absorption of the gases being measured.

Selected infrared wavelengths signals are sequentially measured by the analyser, seven times per second, each corresponding to an absorption feature of the individual gas.

Both measurement and reference wavelength filters are used together with gas filter correlation cells to determine changes in absorption. These changes are mapped to concentration using a mathematical algorithm, which also corrects for the influence of pressure, temperature and interfering gases. Sample pressure change compensation must be enabled.

The output of the separate analyser control unit can be configured by the user to display transmitted and concentration in various units.

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 Sira Certificates'. The design of the product certified is defined in the Sira Design Schedule for certificate No. Sira MC990006/13
2. If certified product is found not to comply, Sira Certification Service should be notified immediately at the address shown on this certificate.
3. The Certification Marks that can be applied to the product or used in publicity material are defined in 'Regulations Applicable to the Holders of Sira Certificates'.
4. This document remains the property of Sira and shall be returned when requested by the company.

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