

CERTIFICATE

of Product Conformity (QAL1)

Certificate No.: 0000036414_02

AMS designation: SERVOFLEX MiniMP 5200 for O₂

Manufacturer: Servomex Group Ltd.
Jarvis Brook
Crowborough / East Sussex, TN6 3FB
United Kingdom

Test Laboratory: TÜV Rheinland Energy GmbH

**This is to certify that the AMS has been tested
and found to comply with the standards
EN 15267-1 (2009), EN 15267-2 (2009), EN 15267-3 (2007)
and EN 14181 (2014).**

Certification is awarded in respect of the conditions stated in this certificate
(this certificate contains 6 pages).
The present certificate replaces certificate 0000036414_01 of 28 February 2017.



Suitability Tested
EN 15267
QAL1 Certified
Regular
Surveillance

www.tuv.com
ID 0000036414

Publication in the German Federal Gazette
(BAnz) of 02 March 2012

German Federal Environment Agency
Dessau, 16 February 2022

This certificate will expire on:
01 March 2027

TÜV Rheinland Energy GmbH
Cologne, 15 February 2022

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51105 Köln

Test institute accredited to EN ISO/IEC 17025 by DAkkS (German Accreditation Body).
This accreditation is limited to the accreditation scope defined in the enclosure to certificate D-PL-11120-02-00.

Test report:	936/21216148/B of 06 September 2011
Initial certification:	20 August 2012
Expiry date:	01 March 2027
Certificate	Renewal (of previous certificate 0000036414_01 of 28 February 2017 valid until 01 March 2022)
Publication:	BAnz. 02.03.2012, no. 36, p. 920, chapter II number 1.2

Approved application

The tested AMS is suitable for use at combustion plants according to Directive 2010/75/EU, chapter III (13th BImSchV), chapter IV (17th BImSchV), 30th BImSchV, plants in compliance with TA Luft, plants according to the 27th BImSchV and other plants requiring official approval. The measured ranges have been selected so as to ensure as broad a field of application as possible.

The suitability of the AMS for this application was assessed on the basis of a laboratory test and a three-month field test at a municipal waste incinerator.

The AMS is approved for an ambient temperature range of +5 °C to +40 °C.

The notification of suitability of the AMS, performance testing and the uncertainty calculation have been effected on the basis of the regulations applicable at the time of testing. As changes in legal provisions are possible, any potential user should ensure that this AMS is suitable for monitoring the limit values and oxygen concentrations relevant to the application.

Any potential user should ensure, in consultation with the manufacturer, that this AMS is suitable for the intended purpose.

Basis of the certification

This certification is based on:

- Test report 936/21216148/B of 06 September 2011
- by TÜV Rheinland Energie und Umwelt GmbH
- Suitability announced by the German Federal Environment Agency (UBA)
- as the relevant body
- The ongoing surveillance of the product and the manufacturing process

Publication in the German Federal Gazette: BAnz. 02 March 2012, no. 36, p. 920, chapter II number 1.2, UBA announcement dated 23 February 2012:

AMS designation:

SERVOFLEX MiniMP 5200 for O₂

Manufacturer:

Servomex Group Ltd., East Sussex, England

Field of application:

For plants requiring official approval and for plants according to the 27th BImSchV

Measuring range during performance testing:

Component	Certification range	Unit
O ₂	0 - 25	Vol.-%

Software version:

05000-cu0-18

Restrictions:

None

Test Report:

TÜV Rheinland Energy GmbH, Cologne
Report no.: 936/21216148/B of 06 September 2011

Certified product

This certification applies to automated measurement systems conforming to the following description:

The measuring system works with a paramagnetic oxygen sensor. This physical measurement method is based on the very high magnetic susceptibility of oxygen.

The measuring cell consists of two hollow spheres filled with nitrogen, which are formed into a dumbbell by a bar. There is a small mirror at the rotation point of the dumbbell. A wire loop is attached around the dumbbell, which is needed for the compensation procedure. This system is then fixed rotationally symmetrically in a glass tube with a platinum clamping band and screwed with two pole pieces so that the measuring cell can be dismantled for cleaning.

If the measuring cell is in an inhomogeneous magnetic field generated by two permanent magnets and oxygen-containing gas flows into the measuring cell, the oxygen molecules are drawn into the magnetic field and a field line compression occurs at the wedge-shaped poles. This effect acts on the diamagnetic hollow spheres and forces them out of the magnetic field. This rotation of the dumbbell is registered by an optical system consisting of a light-emitting diode, the mirror on the dumbbell and a differential photocell.

If the dumbbell is forced out of the magnetic field by the presence of oxygen molecules, the voltage of the photocell changes immediately, which generates a corresponding current via a measuring amplifier, which produces an electromagnetic counter-torque through the wire loop on the dumbbell and thus returns the dumbbell to its zero position. This compensation current is proportional to the oxygen content in the measuring cell and absolutely linear, so that the value can be displayed directly in vol.-% O₂.

The SERVOFLEX MiniMP 5200 measuring system consists of the following components:

1. Sampling probe type M&C PS4000-H
2. Heated sample gas line up to 10 m in length, Material: PTFE, Inner diameter 4 mm.
3. Test gas cooler M&C PSS5
4. SERVOFLEX MiniMP 5200 O₂-Analyser (mains operation)

General remarks

This certificate is based upon the equipment tested. The manufacturer is responsible for ensuring that on-going production complies with the requirements of the EN 15267. The manufacturer is required to maintain an approved quality management system controlling the manufacturing process for the certified product. Both the product and the quality management systems shall be subject to regular surveillance.

If a product of the current production does not conform to the certified product, TÜV Rheinland Energy GmbH must be notified at the address given on page 1.

A certification mark with an ID-Number that is specific to the certified product is presented on page 1 of this certificate.

This document as well as the certification mark remains property of TÜV Rheinland Energy GmbH. Upon revocation of the publication the certificate loses its validity. After the expiration of the certificate and on request of TÜV Rheinland Energy GmbH this document shall be returned and the certificate mark must no longer be used.

The relevant version of this certificate and its expiration date are also accessible on the internet at qal1.de.

Document history

Certification of the SERVOFLEX MiniMP 5200 measuring system is based on the documents listed below and the regular, continuous surveillance of the manufacturer's quality management system:

Initial certification according to EN 15267

Certificate no. 0000036414_00: 20 August 2012
Expiry date of the certificate: 01 March 2017
Test report: 936/21216148/B of 26 September 2011
TÜV Rheinland Energie und Umwelt GmbH
Publication: BAnz. 02 March 2012, no. 36, p. 920, chapter II number 1.2
UBA announcement dated 23 February 2012

Renewal of the certificate

Certificate no. 0000036414_01: 28 February 2017
Expiry date of the certificate: 01 March 2022

Certificate no. 0000036414_02: 16 February 2022
Expiry date of the certificate: 01 March 2027

Calculation of overall uncertainty according to EN 14181 and EN 15267-3

Measuring system

Manufacturer	Servomex
Name of measuring system	SERVOFLEX MiniMP 5200
Serial number of the candidates	11691 / 11692
Measuring principle	paramagnetic

Test report

Test laboratory	TÜV Rheinland
Date of report	2011-09-26

Measured component

Certification range	O ₂	0 - 25 Vol.-%
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Evaluation of the cross sensitivity (CS)

(system with largest CS)

Sum of positive CS at zero point	0,00	Vol.-%
Sum of negative CS at zero point	-0,22	Vol.-%
Sum of positive CS at reference point	0,18	Vol.-%
Sum of negative CS at reference point	0,00	Vol.-%
Maximum sum of cross sensitivities	-0,22	Vol.-%
Uncertainty of cross sensitivity	-0,127	Vol.-%

Calculation of the combined standard uncertainty

Tested parameter

	u		u ²	
Standard deviation from paired measurements under field conditions *	u _D 0,031	Vol.-%	0,001	(Vol.-%) ²
Lack of fit	u _{lof} -0,046	Vol.-%	0,002	(Vol.-%) ²
Zero drift from field test	u _{d,z} 0,007	Vol.-%	0,000	(Vol.-%) ²
Span drift from field test	u _{d,s} -0,017	Vol.-%	0,000	(Vol.-%) ²
Influence of ambient temperature at span	u _t 0,095	Vol.-%	0,009	(Vol.-%) ²
Influence of supply voltage	u _v 0,009	Vol.-%	0,000	(Vol.-%) ²
Cross sensitivity (interference)	u _i -0,127	Vol.-%	0,016	(Vol.-%) ²
Influence of sample gas flow	u _p -0,024	Vol.-%	0,001	(Vol.-%) ²
Uncertainty of reference material at 70% of certification range	u _{rm} 0,202	Vol.-%	0,041	(Vol.-%) ²

* The larger value is used :
"Repeatability standard deviation at span" or
"Standard deviation from paired measurements under field conditions"

Combined standard uncertainty (u _c)	$u_c = \sqrt{\sum (u_{max,j})^2}$	0,26	Vol.-%
Total expanded uncertainty	$U = u_c * k = u_c * 1.96$	0,52	Vol.-%

Relative total expanded uncertainty

Requirement of 2000/76/EC and 2001/80/EC	U in % of the range 25 Vol.-%	2.1
Requirement of EN 15267-3	U in % of the range 25 Vol.-%	10.0 **
Requirement of EN 15267-3	U in % of the range 25 Vol.-%	7.5
Requirement for standard reference methods	U in % of the range 25 Vol.-%	6.0

** For this component no requirements in the EC-directives 2001/80/EG and 2000/76/EG are given.
A value of 10.0 % was used for this.