# PRODUCT OVERVIEW

## SERVOTOUGH OxyExact 2200

HAZARDOUS AREA

| GAS | MEASURES | APPLICATION |
|---|---|---|
| OXYGEN | PERCENT | PROCESS CONTROL<br>PROCESS SAFETY |

SENSING TECHNOLOGY

PARAMAGNETIC

### KEY APPLICATIONS

- Oxidation control reactions
- Ethylene Oxide (EO), Pure Terephthalic Acid (PTA), and Ethylene Dichloride (EDC) production
- Catalyst regeneration
- Solvent recovery

## HIGH-SPEC PROCESS $O_2$ ANALYZER OFFERS HAZARDOUS AREA CONTROL WITH UP TO SIX MEASUREMENT TRANSMITTERS

### UNRIVALLED PERFORMANCE

- Uses industry-leading patented Paramagnetic technology for stable, non-depleting measurement
- Manufactured by Servomex - over 70 years' experience innovating and pioneering gas analysis, and thousands of units used in the field every year

### FLEXIBLE

- Can be used in hazardous area rated locations including Zone 1 and Division 1
- Samples flammable gas mixtures up to 100% $O_2$
- High pressure variant allows the handling of samples at 45psia (max) (limited to 21% $O_2$ above 18psia)
- High temperature variant allows the handling of high dew point samples
- Digital communication options: Ethernet and RS485 Modbus

### BENCHMARK COMPLIANCE

- ATEX, UKEX, IECEx, CSA (Canada) and FM (USA) for Zone 1 and Division 1 approval

### EASY TO USE

- Six transmitters can be linked to a single control unit, allowing easy device interaction and set-up
- Control unit enclosure allows integration of multiple option cards (four configurable)
- Internal pressure compensation option to monitor vent pressure variations coupled with high sample pressure option for flare stack applications
- Internal flow alarm option

### LOW COST OF OWNERSHIP

- No need for reference/purge gases during measurement in flammable samples
- Simplified transmitter interaction via intuitive control unit hazardous area-model variants
- Rugged, resilient design helps ensure long operational life in harsh conditions
- Auto-validation and calibration

For more information please contact us

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# PRODUCT OVERVIEW

## SERVOTOUGH OxyExact 2200

HAZARDOUS AREA

### UNRIVALLED PERFORMANCE FOR THE MOST DEMANDING $O_2$ PROCESS MONITORING

When you work in hazardous area process monitoring applications, a highly accurate, safe $O_2$ analytical solution that samples any flammable gas mixture up to 100% $O_2$ is crucial. No matter what your monitoring requirement, you need an analytical solution that offers operational flexibility, exceptional safety and the opportunity to reduce costs. We don't believe you should have to compromise.

### A NO COMPROMISE SOLUTION

The OxyExact's sophisticated, flexible design ethos ensures it can be precisely configured to a wide range of application environments. A single intuitive use controller situated in hazardous area, linking to up to six transmitters, permitting simplified set-up and ongoing maintenance through auto-validation and calibration procedures.

The OxyExact also features a three enclosure design that allows the flexibility to measure flammable gases for 0-100% $O_2$, helping to reduce costs by removing the need for purge gases.

### FLEXIBLE PERFORMANCE YOU CAN DEPEND ON

The OxyExact uses patented Paramagnetic sensing technologies to deliver highly stable and accurate $O_2$ measurements. Safety-enhanced design and optional flow alarm and pressure compensation ensures sampling versatility - including flare stack applications - that is demanded by your application needs. In addition, Ethernet or RS485 Modbus protocols deliver enhanced communications capabilities. All these aspects combine to make the OxyExact an industry leading solution for $O_2$ analysis.

### USEFUL LINKS

SERVOMEX SERVICE NETWORK
servomex.com/service

SERVOMEX SYSTEMS INTEGRATED SOLUTIONS
servomex.com/systems

SERVOMEX EXPERT UNRIVALLED KNOWLEDGE AND VISION
servomex.com/expert-guidance


PBTDS OxyExact Rev. 2 Date: 05/24

*These analyzers are not intended for any form of use on humans and are not medical devices as described in the Medical Devices Directive 93/42EEC.*

**Please note:** *Whilst every effort has been made to ensure accuracy, no responsibility can be accepted for errors and omissions. Data may change, as well as legislation, and you are strongly advised to obtain copies of the most recently issued regulations, standards and guidelines. This document is not intended to form the basis of a contract.*



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# TECHNICAL DATA SHEET


## SERVOTOUGH OxyExact 2200 Transmitter

## SPECIFICATIONS

| TRANSMITTER | 2223 | 2222H (high temperature) |
|---|---|---|
| MEASUREMENT COMPARTMENT OPERATING TEMPERATURE | 60°C | 110°C |
| GAS MEASURED | OXYGEN ($O_2$) | |
| TECHNOLOGY | Paramagnetic | |
| **PERFORMANCE** | | |
| Measurement range | 0-100% $O_2$ (0-21% $O_2$ high pressure variant) | 0-100% $O_2$ |
| Minimum recommended range | 0-0.5% | 0-1% |
| Intrinsic error (accuracy) | <0.02% $O_2$ | <0.04% $O_2$ |
| Zero drift per week | <0.02% $O_2$ | <0.08% $O_2$ |
| Span drift per week | <0.05% $O_2$ | <0.10% $O_2$ |
| Linearity error | <0.01% $O_2$ | <0.02% $O_2$ |
| Repeatability | 0.02% $O_2$ | 0.03% $O_2$ |
| Response time ($T_{90}$) | <4 seconds at 250ml/min (standard flow range)<br><4 seconds at 1l/min (bypass option flow range) | |
| Output noise (within any 5 minute period) | <0.01% $O_2$ peak to peak | <0.02% $O_2$ peak to peak |
| Effect of ambient temperature changes | Zero change per 10°C (18°F) ambient change ± 0.02% max<br>Span change per 10°C (18°F) ambient change ± 0.2% max | |
| Sample flow variations | A change in flow from 50-250ml/min (0.2-1.2l/min internal bypass option) will cause a change of 0.1% $O_2$ max | |
| Effect of barometric pressure or sample vent pressure | **Pressure compensation not fitted:** 1% change in pressure corresponds to a 1% change in reading<br>**Internal pressure compensation fitted:** Internal sample pressure compensation option reduces the effect by a factor of 200 or +/-0.02% - which-ever represents the least compensation | **Pressure compensation not fitted:** 1% change in pressure corresponds to a 1% change in reading |
| Effect of supply voltage variation of ±10% | <0.01% $O_2$ or 0.1% of reading, whichever is the greater | 0.02% $O_2$ or 0.2% of reading whichever is the greater |
| Effect of supply interruptions | A single cycle interruption in electrical supply will have no effect on the analyzer | |
| Altitude sensitivity | Less than 0.01% $O_2$ per degree of tilt from altitude at time of calibration | |
| Zero suppression | The Zero may be suppressed in 0.01% steps to a maximum of 99.99% suppression | |
| **SIGNAL OUTPUTS/INPUTS** | | |
| Analog output | Single 'intrinsically safe' 0/4-20mA. Maximum impedance 600 Ω. The output can be made to jam high or low under fault conditions | |
| Alarms & relays | Three 'transmitter signal outputs/inputs' volt free single pole contacts, allocated to NAMUR (fault, maintenance required, in calibration/service mode) | |
| Analog inputs | Two 'intrinsically safe' 0/4-20mA linear inputs designed for external pressure compensation and back-ground gas cross-interference correction. Two 'intrinsically safe' NAMUR flow sensor inputs | |
| Digital inputs | Four 'intrinsically safe' inputs, customer assignable, for example, to manual calibration or validation of 4-20 mA inputs | |
| Control unit connection | Single "intrinsically safe" twisted pair - refer to installation manual for details | |

The performance specification has been written and verified in accordance with the international standard IEC 61207-1:1994 "Expression of performance of gas analyzers"

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| PHYSICAL | | |
|---|---|---|
| **TRANSMITTER** | **2223** | **2222H (high temperature)** |
| **Ingress protection** | IP66, NEMA Type 4X | |
| **Weight** | 16kg (35.3lbs) | |
| **Dimensions, WxDxH** | 432 (W) x 303 (H) x 210mm (D) | |
| **Mounting** | Wall mount | |

| OPERATING ENVIRONMENT | | |
|---|---|---|
| **Temperature** | Operation: -20°C to +50°C (-4°F to +122°F)<br>Storage: -20°C to +70°C (-4°F to +158°F) | Operation: -10°C to +50°C (+14°F to +122°F)<br>Storage: -20°C to +70°C (-4°F to +158°F) |
| **Atmospheric pressure** | 76 to 112kPaa (11 to 16.2psia) | |
| **Warm up time** | Useable immediately, but typically 2 hours (from 20°C) | Typically 6 hours (from 20°C) |
| **Relative humidity** | 0-95% non-condensing | |
| **Max altitude** | 3,000m (9,842ft) | |

| SAMPLE CONDITION | | | | |
|---|---|---|---|---|
| **TRANSMITTER** | **2223** | **2223 (elevated sample pressure)** | **2222H (high temperature)** | **2222H (high temperature and elevated sample pressure)** |
| **Maximum measurable oxygen concentration** | 100% | 21% | 100% | 21% |
| **Inlet pressure** | Max: 0.3kPa (0.04psig),relative to vent pressure | Max: 0.3kPa (0.04psig),relative to vent pressure | Max: 0.3kPa (0.04psig),relative to vent pressure | Max: 0.3kPa (0.04psig),relative to vent pressure |
| **Sample pressure (maximum)** | <18psia, <1.24bara | >18psia to <45psia, >1.24bara to <3bara | <18psia, <1.24bara | >18psia to <45psia, >1.24bara to <3bara |
| **Inlet flow rate** | 250ml (air)/minute or 1l/min depending upon version | 250ml (air)/minute or 1l/min depending upon version | 250ml (air)/minute or 1l/min depending upon version | 250ml (air)/minute or 1l/min depending upon version |
| **Dew point** | 5°C (9°F) below lowest ambient temp | 5°C (9°F) below lowest ambient temp | 105°C max | 105°C max |
| **Temperature** | -10°C to +50°C (+14°F to +122°F) | -10°C to +50°C (+14°F to +122°F) | -10°C to +105°C (+14°F to +221°F) | -10°C to +105°C (+14°F to +221°F) |
| **Particulates** | maximum 3µm | maximum 3µm | maximum 3µm | maximum 3µm |
| **Inlet connection** | 1/8" NPT Female | 1/8" NPT Female | 1/8" OD Pipe | 1/8" OD Pipe |
| **Outlet connection** | 1/8" NPT Female | 1/8" NPT Female | 1/8" OD Pipe | 1/8" OD Pipe |
| **Condition** | Clean, dry, free from oil and condensates | Clean, dry, free from oil and condensates | Clean, dry, free from oil and condensates | Clean, dry, free from oil and condensates |

| UTILITIES | |
|---|---|
| **Supply voltage** | 100-120V ac, 50/60 Hz or 220-240V ac, 50/60 Hz<br>2223: 100VA<br>2222: 100VA |

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## SAMPLE WETTED MATERIALS

| TRANSMITTER | 2223 (standard Viton) *‡ | 2223/2222H HIGH PRESSURE (solvent resistant) *‡ | HASTELLOY PIPEWORK OPTION (in addition) † | INTERNAL FLOW ALARM (in addition) | INTERNAL PRESSURE COMPENSATION (in addition) |
|---|---|---|---|---|---|
| 316 stainless steel | ● | ● | | | |
| Borosilicate glass | ● | ● | | | |
| Electroless nickel | ● | ● | | | |
| Platinum | ● | ● | | | |
| Platinum/iridium alloy | ● | ● | | | |
| Viton® | ● | | | | |
| Chemraz® 555 | | ● | | | |
| PTFE | | ● | | | |
| Hastelloy C-276 † | | | ● | | ● |
| Aluminia silicate glass | | | | ● | |
| Yttria stabilised zirconia | | | | ● | |

* Special hydrogen resilient transducer option adds EPO-TEK® H72. Available as a special request only.

‡ Special chlorine resilient version replaces Viton®, Chemraz® 555 and PTFE (as appropriate) with Chemraz® 584. Available as a special request only.

† Hastelloy pipework option replaces stainless steel pipework and inlet /outlet connections. Transducer cell, optional flow alarm and pressure transducer remain stainless steel.

## COMPLIANCE

| HAZARDOUS AREA APPROVALS | | |
|---|---|---|
| **TRANSMITTER** | **2223** | **2222H (high temperature)** |
| ATEX (Europe) | Ⓔx II 2(I)GD Ex db ia [ia Ga] IIC T4 Gb<br>Ⓔx tb IIIC T70°C Db<br>IP66 (-20°C < Ta < +50°C) | Ⓔx II 2(I)GD Ex db ia [ia Ga] IIC T3 Gb<br>Ⓔx tb IIIC T80°C Db<br>IP66 (-10°C < Ta < +50°C) |
| UKEX (Great Britain) | Ⓔx II 2(I)GD Ex db ia [ia Ga] IIC T4 Gb<br>Ⓔx tb IIIC T70°C Db<br>IP66 (-20°C < Ta < +50°C) | Ⓔx II 2(I)GD Ex db ia [ia Ga] IIC T3 Gb<br>Ⓔx tb IIIC T80°C Db<br>IP66 (-10°C < Ta < +50°C) |
| FM (USA) | Class I, Division 1, Groups A,B,C and D<br>Class II, Division 1, Groups E, F and G<br>Class III, Division 1<br>T4, ambient temperature 50°C maximum | Class I, Division 1, Groups A,B,C and D<br>Class II, Division 1, Groups E,F and G<br>Class III, Division 1<br>T3, ambient temperature 50°C maximum |
| FM Zones (USA) | Class I, Zone 1 approval, AEx d ia IIC T4 (Ta = 50°C) | Class I, Zone 1 approval, AEx d ia IIC T3 (Ta = 50°C) |
| CSA (Canada) | Class I, Division 1, Groups A,B,C and D<br>Class II, Division 1, Groups E,F and G<br>Class III<br>Type 4X, T4, ambient temperature 50°C maximum | Class I, Division 1, Groups A,B,C and D<br>Class II, Division 1, Groups E,F and G<br>Class III<br>Type 4X, T3, ambient temperature 50°C maximum |
| CSA Zones (Canada) | Class I, Zone 1 approval, Ex d ia [ia] IIC T4 (Ta = 50°C) | Class I, Zone 1 approval, Ex d ia [ia] IIC T3 (Ta = 50°C) |
| IECEx (International) | Ex db ia [ia Ga] IIC T4 Gb<br>Ex tb IIIC T70°C Db<br>IP66 (-20°C ≤ Ta ≤ +50°C) | IEC Ex db ia [ia Ga] IIC T3 Gb<br>Ex tb IIIC T80°C Db<br>IP66 (-10°C ≤ Ta ≤ +50°C) |
| CML (Japan) | Ex db ia [ia Ga] IIC T4 Gb<br>Ex tb IIIC T70°C Db<br>IP66 (-20°C ≤ Ta ≤ +50°C) | Certification not available |
| **EC DIRECTIVES** | 2223 & 2222 Transmitters comply with the EMC Directive, RoHS, and all other applicable directives. | |
| **ELECTRICAL SAFETY** | Electrical safety to IEC 61010-1 | |

| TRANSMITTER CONFIGURATION | |
|---|---|
| **Transmitter versions** | There are two versions of the OxyExact 2200. The 2223 measurement compartment is controlled at 60°C, whilst the 2222H measurement compartment operates at 110°C. The higher sample compartment temperature of the 2222H results in some options not being available for this transmitter unit. |
| **Transmitter certification** | Six certified versions of the OxyExact analyzer are available for the 2233 transmitter version: European ATEX, Great Britain UKEX, International IECEx, American FM, Canadian CSA and Japanese CML. Japanese certification is not available for the 2222H. Refer to certification section for full details. |
| **Supply voltage** | Two versions of supply voltage are available: 100-120 and 220-240V ac. |
| **User manual** | An Installation manual that contains all of the information needed to install and safely set up the transmitter. |
| **Service manual** | A Service manual contains technical descriptions, fault diagnosis, parts removal, refitting and test instructions, tool and test equipment lists and electrical drawings. It is intended for use by Servomex trained service personnel. The Service manual covers both the OxyExact 2200 control unit and transmitters. |
| **Electrical entry option** | As standard the transmitter unit is supplied with 5 gland entries, 3 x ½" NPT female and 2 x ¾" NPT. |
| **Sample pipework materials** | As standard the transmitter sample pipework is stainless steel. Optionally for the 2223 version the internal pipework can be configured to be of Hastelloy construction for improved resistance to acidic or highly corrosive sample gases. |
| **Sample cell type** | The standard sample cell contains Viton® o-rings and is suitable for sample pressures up to 18psia (1.24bara) and oxygen concentrations up to 100%. The 'High pressure' solvent resistant cell utilises Chemraz® and PFTE o-rings and is suitable for sample gas pressures up to 45psia (3bara) with non-enriched oxygen samples (<21%) and 100% oxygen with sample gas pressures up to 18psia (1.24bara). The 2222H is only supplied with the High Pressure Solvent Resistant cell option. |
| **Sample flow** | Standard flow option of 250ml/min (100 to 250ml/min).<br>An internal bypass option allows sample gas inlet flows of up to 1l/min (0.8 to 1.2l/min). |
| **Internal sample filter** | Option to fit an internal 20micron filter within the sample gas inlet port to add additional protection to fine dust particles entering the precision paramagnetic cell. Use of the internal filter is always recommended. The inlet filter is not designed to be the primary protection of particulates in any associated sample system. |
| **Flow alarm** | The measurement of the analyzer is highly reliable and has internal diagnostics to ensure correct operation, yet in low flow conditions the measurement performance may be affected and this cannot be diagnosed by the instrument without a flow sensor. Our Flowcube technology offers an internal solid state flow sensor fitted directly to the outlet of the measurement transducer, ensuring that the measurement gas is flowing through the transducer at all times for maximum reliability and safety.<br>*(Note: the flow sensor is currently not suitable for gas mixtures that differ significantly in thermal conductivity from that of Nitrogen. Sample gases containing hydrogen and/or helium at concentrations over 10% of the total mixture are no suitable).* |
| **Pressure compensation** | Effect of barometric pressure or sample vent pressure:<br><br>The analysers measure the partial pressure of $O_2$ in the sample gas, therefore the reading (at constant pressure or $O_2$ content) is proportional to the ratio of cell pressure at the time of the analysis to that at the time of calibration unless the pressure compensation option is fitted and calibrated.<br><br>The uncorrected gas measurement is directly affected by changes in atmospheric pressure and any sample vent back pressures on the sample outlet. A 1% change in pressure will directly affect the measurement by 1% of reading.<br><br>This needs to be considered when looking at the measurement performance required.<br>Internal pressure compensation reduces the effect due to vent pressure changes by a factor of 200, or ±0.02% $O_2$ whichever is the greater.<br><br>Internal pressure compensation is not available as an option in the 2222H transmitter. Instead, if sample pressure compensation is required, a 4-20mA input is available for connection to a customer supplied sample external pressure signal (i.s barrier required) and external compensation parameters can be configured via the control unit menu system. This customer supplied external pressure compensation functionality can also be used on the 2223 transmitter if required. |
| **Sample inlet adaptors** | Allows the connection of 1/8" NPT male fittings directly to the analyzer as standard. Optionally, for the 2223 version only, adaptors can be configured to adapt the sample entries to:-<br>1/4" OD tube directly to the analyzer<br>6mm OD tube directly to the analyzer |
| **Corrosive sample purge** | A 1/4"OD inlet & outlet fitting allows inert gas to be supplied to the analyzer to prevent the build- up of any corrosive gases within the sample compartment. Purge gas should be clean dry air or an inert gas controlled to a flowrate no higher than 50ml/min. This will extend the operational life of the analyzer in such environments. |
| **Functional safety SIL (Route 1H) requirement** | This manual provides detailed information and instructions that will be needed in order to use the SERVOTOUGH OxyExact in safety instrumented systems, in respect of hardware safety integrity only (route 1H), according to IEC 61508 Edition 2.0 2010-04.<br>It is aimed at those responsible for planning, designing, installing, commissioning, operating and maintaining safety instrumented systems using the SERVOTOUGH OxyExact. |

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| CONFIGURATION | |
|---|---|
| OxyExact 2223 VARIANTS: | We have three pre configured 2223 OxyExact builds (SV01, SV02 and SV03) to cover the most common chosen option configurations to enable a quick turnaround from specification to delivery. |
| Standard Variant 1 (SV01) | The pre-configured standard variant 1 base level configuration, including the high pressure solvent resistant transducer, for general oxygen measurement requirements. |
| Standard Variant 2 (SV02) | The pre-configured standard variant 2 mid level configuration, adding internal flow alarm to the SV01 build, covering mid level process measurement needs. |
| Standard Variant 3 (SV03) | The pre-configured standard variant 3 full configuration, adding pressure compensation to the SV02 mid level build, covering all your process measurement needs. |
| User Configured (UC) | Other analyzer configurations not covered by one of the above standard variant configurations, including Hastelloy sample pipework and corrosive purge options. |

| OxyExact 2223 VARIANT | | SV01 | SV02 | SV03 | UC |
|---|---|---|---|---|---|
| Transmitter certication | ATEX/UKEX Cat 2GD Z1-Z21 (Europe and Great Britain) | ☐ | ☐ | ☐ | ☐ |
| | FM Class 1 Div 1 Zone 1 (USA) | ☐ | ☐ | ☐ | ☐ |
| | CSA Class 1 Div 1 Zone 1 (Canada) | ☐ | ☐ | ☐ | ☐ |
| | IEC Ex Zone 1 - Zone 21 (International) | ☐ | ☐ | ☐ | ☐ |
| | CML Z1-Z21 (Japan) | ☐ | ☐ | ☐ | ☐ |
| Supply voltage | 100 - 120Vac | ☐ | ☐ | ☐ | ☐ |
| | 220 - 240Vac | ☐ | ☐ | ☐ | ☐ |
| Operator manual | English | ☑ | ☑ | ☑ | ☑ |
| Service manual | Not required | ☐ | ☐ | ☐ | ☐ |
| | Required - English | ☐ | ☐ | ☐ | ☐ |
| Electrical entry option | 3/4" & 1/2" NPT (Standard option) | ☐ | ☐ | ☐ | ☐ |
| | M20 adaptor kit | ☐ | ☐ | ☐ | ☐ |
| | PG13.5 adaptor kit | ☐ | ☐ | ☐ | ☐ |
| Sample pipework material | Stainless Steel | ☑ | ☑ | ☑ | ☐ |
| | Hastelloy | ■ | ■ | ■ | ☐ |
| Sample cell type | Standard (Viton o-rings) | ☐ | ☐ | ☐ | ☐ |
| | High pressure solvent resistant (Chemraz and PTFE o-rings) | ☑ | ☑ | ☑ | ☐ |
| Sample flow | 250ml/min (100 minimum to 250ml/min maximum) | ☑ | ☑ | ☑ | ☐ |
| | 1l/min (0.8 minimum to 1.2l/min maximum). | ■ | ■ | ■ | ☐ |
| Internal sample inlet filter | Not required | ■ | ■ | ■ | ☐ |
| | Fitted | ☑ | ☑ | ☑ | ☐ |
| Flow alarm | Not required | ☑ | ■ | ■ | ☐ |
| | Fitted, internal | ■ | ☑ | ☑ | ☐ |
| Pressure compensation | Not required | ☑ | ☑ | ■ | ☐ |
| | Fitted, internal | ■ | ■ | ☑ | ☐ |
| Sample inlet adaptor | Standard (1/8" NPT (F)) | ☐ | ☐ | ☐ | ☐ |
| | 1/4" OD adaptor | ☐ | ☐ | ☐ | ☐ |
| | 6mm OD adaptor | ☐ | ☐ | ☐ | ☐ |
| Corrosive sample purge | Not required | ☑ | ☑ | ☑ | ☐ |
| | Fitted | ■ | ■ | ■ | ☐ |
| Functional safety/SIL2 (Route 1H) requirement | Not required | ☐ | ☐ | ☐ | ☐ |
| | Required - English safety manual | ☐ | ☐ | ☐ | ☐ |
| Label tag no. | Not required | ☐ | ☐ | ☐ | ☐ |
| | Required | ☐ | ☐ | ☐ | ☐ |
| Label tag characters | Customer transmitter tag number up to 16 characters | | | | |

**Tick a single box for each selectable option**

☐ Option selectable

■ Option not available in that variant

☑ Pre-selected option

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## CONFIGURATION

| | |
|---|---|
| **OxyExact 2222H VARIANTS:** | We have two pre-configured 2222H OxyExact builds (SV01 &SV02) to cover the most common chosen option configurations to enable a quick turnaround from specification to delivery. |
| **Standard Variant 1 (SV01)** | The pre-configured standard variant 1 base level configuration, including the high-pressure solvent resistant transducer, for general oxygen measurement requirements. |
| **Standard Variant 2 (SV02)** | The pre-configured standard variant 2 mid-level configuration, adding internal flow alarm to the SV01 build, covering mid to high level process measurement needs. |
| **User Configured (UC)** | Other analyzer configurations not covered by one of the above standard variant configurations, including corrosive purge options. |

| **OxyExact 2222H VARIANT** | | **SV01** | **SV02** | **UC** |
|---|---|---|---|---|
| **Transmitter certication** | ATEX/UKEX Cat 2GD Z1-Z21 (Europe and Great Britain) | ☐ | ☐ | ☐ |
| | FM Class 1 Div 1 Zone 1 (USA) | ☐ | ☐ | ☐ |
| | CSA Class 1 Div 1 Zone 1 (Canada) | ☐ | ☐ | ☐ |
| | IEC Ex Zone 1 - Zone 21 (International) | ☐ | ☐ | ☐ |
| **Sample temperature** | 110°C set point (T3 rating) | ☑ | ☑ | ☑ |
| **Supply voltage** | 100 - 120Vac | ☐ | ☐ | ☐ |
| | 220 - 240Vac | ☐ | ☐ | ☐ |
| **Operator manual** | English | ☑ | ☑ | ☑ |
| **Service manual** | Not required | ☐ | ☐ | ☐ |
| | Required - English | ☐ | ☐ | ☐ |
| **Electrical entry option** | 3/4" & 1/2" NPT (Standard option) | ☐ | ☐ | ☐ |
| | M20 adaptor kit | ☐ | ☐ | ☐ |
| | PG13.5 adaptor kit | ☐ | ☐ | ☐ |
| **Sample pipework material** | Stainless Steel | ☑ | ☑ | ☑ |
| **Sample cell type** | High pressure solvent resistant (Chemraz and PTFE o-rings) | ☑ | ☑ | ☑ |
| **Sample flow** | 250ml/min (100 minimum to 250ml/min maximum) | ☑ | ☑ | ☐ |
| | 1l/min (0.8 minimum to 1.2l/min maximum) | ■ | ■ | ☐ |
| **Internal sample inlet filter** | Not required | ■ | ■ | ☐ |
| | Fitted | ☑ | ☑ | ☐ |
| **Flow alarm** | Not required | ■ | ■ | ☐ |
| | Fitted, internal | ■ | ☑ | ☐ |
| **Sample inlet adaptor** | 1/8" OD tubes | ☑ | ☑ | ☑ |
| **Corrosive sample purge** | Not required | ☑ | ☑ | ☐ |
| | Fitted | ■ | ■ | ☐ |
| **Functional safety/SIL2 (Route 1H) requirement** | Not required | ☐ | ☐ | ☐ |
| | Required - English safety manual | ☐ | ☐ | ☐ |
| **Label tag no.** | Not required | ☐ | ☐ | ☐ |
| | Required | ☐ | ☐ | ☐ |
| **Label tag characters** | Customer transmitter tag number up to 16 characters | | | |

**Tick a single box for each selectable option**

☐ Option selectable

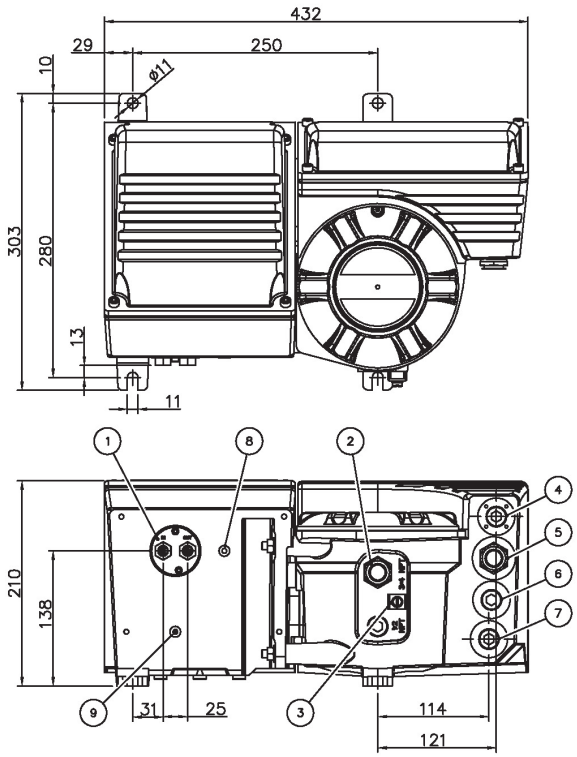
■ Option not available in that variant

☑ Pre-selected option

# DIMENSIONAL DRAWINGS

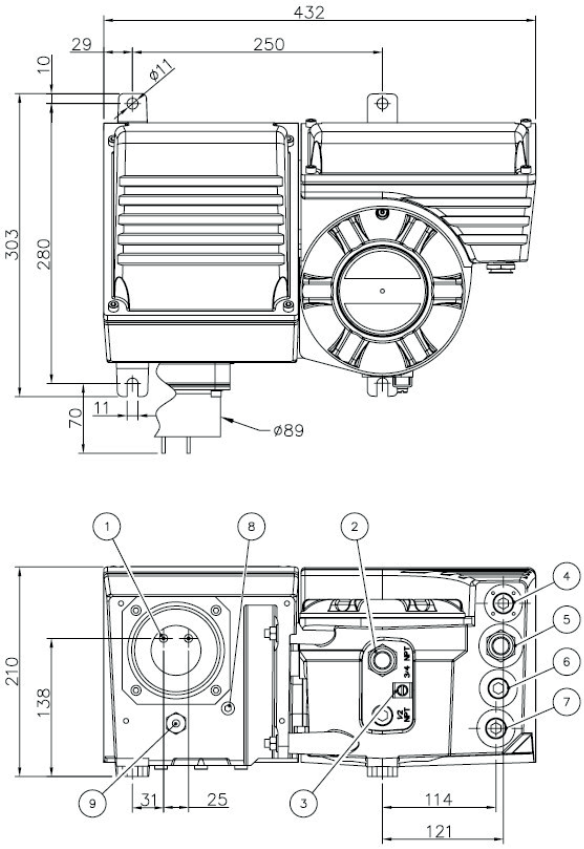
## TRANSMITTER UNIT

### SERVOTOUGH OxyExact 2223 Transmitter




1. Sample gas connections
2. Power cable entry
3. Functional (EMC) earth/ground terminal
4. Signal cable entry
5. Signal cable entry
6. Signal cable entry
7. Signal cable entry
8. Corrosive purge gas outlet*
9. Corrosive purge gas inlet*

### SERVOTOUGH OxyExact 2222H Transmitter




1. Sample gas connections
2. Power cable entry
3. Functional (EMC) earth/ground terminal
4. Signal cable entry
5. Signal cable entry
6. Signal cable entry
7. Signal cable entry
8. Corrosive purge gas outlet*
9. Corrosive purge gas inlet*

* If option fitted

Dimensions shown in millimetres

# TECHNICAL DATA SHEET

## SERVOTOUGH OxyExact 2200 Control Unit

## SPECIFICATIONS

| | |
|---|---|
| **PERFORMANCE** | |
| Display resolution | User configurable with maximum 4 decimal places |
| Control Unit mA output resolution | Whichever is the greater: 0.001% oxygen or 0.002% of mA output span |
| **DIGITAL COMMUNICATIONS** | |
| Modbus communications protocol | Modbus RTU (RS485) provided as standard or optionally Ethernet Modbus TCPIP (standard RJ45 connection) |
| **SIGNAL INTERFACE CARDS OPTIONS** | *A maximum of four signal interface cards may be installed in any combination* |
| Milliamp Output Card | Two mA outputs and two 'low power' relays per card<br><br>Two isolated 0-20mA/4-20mA outputs with full configuration of zero and span. The user may define a second range and invoke it by means of an external output contact closure. Maximum impedance for each output is 1KΩ.<br><br>All outputs may be configured in 'reverse' and the maximum current for all outputs is 21.5mA.<br><br>Two 'low power' relays rated 30V ac/dc @ 1Amp, customer assignable to 'NAMUR' status alarms, alarm, auto-calibration or remote range change functions.<br><br>The mA output can be made to 'Jam' high or low on a fault condition in accordance with NAMUR 43. |
| Relay Output Card | Four 'high power' relays per card<br><br>Four 'high power' relays per relay option card rated at 240V ac/30V dc @ 1.0Amp, customer assignable to NAMUR status alarms, measurement alarm, fault or auto-calibration functions. |
| Digital Input Card | Eight digital inputs per card<br><br>Eight digital inputs per option card, customer assignable<br>Potential use:<br>• Autocalibration initiation<br>• Remote range change<br>• Validity of mA inputs<br>• Digital flow sensors |
| **FEATURES** | |
| Display | Graphics LCD display with LED backlight and integral keypad (seven button) |
| User Interface | Software has multi-language menu capability (English, French and German languages) with standard status pane icons<br><br>User interface is has six user configurable measurement display pages with up to six measurements displayed on each page |
| Security | Four level user configurable password protection as standard |
| Transmitter Connection | Up to six transmitters can be connected to a single control unit |
| Transmitter Separation | Maximum permissible separation between a single transmitter and control unit is 1,000m. Please consult Servomex for the maximum separation between multiple transmitters and a single control unit |

| OPERATING ENVIRONMENT | |
|---|---|
| Temperature | Operation: -10 to +50°C (+14°F to +122°F) in sheltered location<br>Storage: -20°C to +70°C (-4°F to +158°F) |
| Atmospheric pressure | 76 to 112 kPaa (11 to 16.2psia) |
| Warm up time | Useable immediately, but typically 2 hours from cold start at 20°C |
| Relative humidity | 0-95% non-condensing |
| Max altitude | 3,000m (9,842ft) |

| PHYSICAL | | |
|---|---|---|
| CONTROL UNIT | 2210 | 2213 |
| Ingress protection | IP66, NEMA Type 4X | |
| Weight | 10kg (22 lbs) | 25kg (55.1 lbs) |
| Dimensions, WxDxH | 280 (W) x 300 (H) x 250mm (D) | 505 (W) x 325 (H) x 255mm (D) |
| Mounting | Wall mount | |

| UTILITIES | |
|---|---|
| Supply voltage | 100-120V ac, 50/60 Hz or 220-240V ac, 50/60 Hz<br>2210: 30VA<br>2213: 50VA |

# COMPLIANCE

| HAZARDOUS AREA APPROVALS | | |
|---|---|---|
| CONTROL UNIT | 2210 | 2213 |
| ATEX (Europe)<br>UKEX (Great Britain) | Ⓔx II 3(1)GD Ex ic ec nC [ia Ga] IIC T4 Gc<br>Ⓔx tc IIIC T70°C Dc<br>IP66 (-20°C < Ta < +50°C) | Ⓔx II 2(I)GD Ex db ia [ia Ga] IIC T4 Gb<br>Ⓔx tb IIIC T70°C Db<br>IP66 (-20°C < Ta < +50°C) |
| FM (USA) | Class I, Division 2, Groups A,B,C,and D<br>Class II, Division 2, Groups F and G<br>Class III, Division 2<br>T4, ambient temperature 50°C maximum | Class I, Division 1, Groups B,C and D<br>Class II, Division 1, Groups E, F and G<br>Class III, Division 1<br>T4, ambient temperature 50°C maximum |
| FM Zones (USA) | Class I, Zone 2 approval, IIC T4<br>(Ta = 50°C) with IS outputs | Class I, Zone 1 approval<br>AEx d ia [ia IIC] IIB + H2<br>T4 (Ta = 50°C) |
| CSA (Canada) | Class I, Division 2, Groups A,B,C and D<br>Class II, Division 2, Groups E,F and G<br>Class III<br>Type 4X, T4, ambient temperature<br>50°C maximum | Class I, Division 1,Groups B,C and D<br>Class II, Division 1,Groups E,F and G<br>Class III<br>Type 4X, T4, ambient temperature<br>50°C maximum |
| CSA Zones (Canada) | Class I, Zone 2 approval, Ex nA nL nC ia [ia]<br>IIC:T4 | Class I, Zone 1 approval, Ex d ia [ia]<br>IIB + H2, T4 (Ta = 50°C) |
| IECEx (International) | Ex ic nA ec [ia Ga] IIC T4 Gc<br>Ex tc IIIC T70°C Dc<br>IP66 (-20°C ≤ Ta ≤ +50°C) | Ex db ia [ia Ga] IIC T4 Gb<br>Ex tb IIIC T70°C Db<br>IP66 (-20°C ≤ Ta ≤ +50°C) |
| CML (Japan) | Certification not available | Ex db ia [ia Ga] IIC T4 Gb<br>Ex tb IIIC T70°C Db<br>IP66 (-20°C ≤ Ta ≤ +50°C) |

| EC DIRECTIVES | 2210 & 2213 Control Units comply with the EMC Directive, RoHS, and all other applicable directives |
|---|---|
| ELECTRICAL SAFETY | Electrical safety to IEC 61010-1 |

| CONTROL UNIT CONFIGURATION | |
|---|---|
| Control unit versions | There are two versions of the OxyExact 2200 control unit. The 2210 is a single compartment build and is certified for Zone 2 / Class 1 Div 2 installations whilst the 2213 uses an Exd compartment with separate intrinsically safe section for the screen and keypad to raise the certification to Zone 1 / Class 1 Div 1. |
| Controller certification | Six certified versions of the OxyExact analyzer are available for the 2213 controller version: European ATEX, Great Britain UKEX, International IECEx, American FM, Canadian CSA and Japanese CML. Japanese certification is not available for the 2210. Refer to certification section for full details. |
| Supply voltage | Two versions of supply voltage are available: 100-120 and 220-240V ac. |
| User manual | An Installation and Operator manual that contains all of the information needed to install and safely set up the analyzer. |
| Service manual | A Service manual contains technical descriptions, fault diagnosis, parts removal, refitting and test instructions, tool and test equipment lists and electrical drawings. It is intended for use by Servomex trained service personnel. The Service manual covers both the OxyExact 2200 control unit and transmitters. |
| Electrical entry option | As standard the controller unit is supplied with:<br><br>2210 controller - 7 gland entries, 2 x ½" NPT female and 5 x ¾" NPT<br>2213 controller - 8 gland entries, 3 x ½" NPT female and 5 x ¾" NPT<br><br>Adaptors to M20 gland entries supplied (optional)<br>Adaptors to Pg13.5 gland entries supplied (optional) |
| Slot module option 1<br>Slot module option 2<br>Slot module option 3<br>Slot module option 4 | Four option slots exist that can be configured with any combination of boards from the list below. All outputs and inputs are software configurable via the control unit user interface.<br>• mA output card – two 4-20mA outputs and two low voltage relays with changeover contacts.<br>• Relay output card – four relays with changeover contacts<br>• Digital input card – eight channels |
| Data communication | This allows for the analyzer to be fully maintained and configured remotely. It also allows for a greater level of remote diagnostics to be carried out above that supplied by the relay contacts. As standard the controller is configured with RS485 Modbus protocol output. Optionally the control unit can be configured with Modbus Ethernet TCPIP protocol. |
| Enclosure options | As standard the enclosure is fitted with a breather vent. Optionally a blanked vent can be configured to allow the complete enclosure in the case of the 2210 controller, or the intrinsically safe section. The breather vent allows the complete enclosure to vent to atmosphere in the case of the 2210 controller , or the intrinsically safe section, for the 2213 controller. Servomex only recommend the use of the blanked vent vent option in indoor, temperature controlled installations. |
| Controller mounting | The OxyExact 2200 controller is available in a wall mount option only. |

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| CONFIGURATION | |
|---|---|
| OxyExact 2210 VARIANTS: | We have one pre-configured 2210 OxyExact build (SV01) to cover the most common chosen option configurations to enable a quick turnaround from specification to delivery. |
| Standard Variant 1 (SV01) | The pre-configured standard variant 1 base level configuration, including the mA output and relay option card, for general controller requirements. |
| User Configured (UC) | Other analyzer configurations not covered by one of the above standard variant configurations, including corrosive purge options. |

| OxyExact 2210 VARIANT | | SV01 | UC |
|---|---|---|---|
| Controller certication | ATEX/UKEX Cat 2GD Z2-Z22 (Europe and Great Britain) | ☐ | ☐ |
| | FM Class 1 Div 2 Zone 2 (USA) | ☐ | ☐ |
| | CSA Class 1 Div 2 Zone 2 (Canada) | ☐ | ☐ |
| | IEC Ex Zone 2 - Zone 22 (International) | ☐ | ☐ |
| Supply voltage | 100 - 120Vac | ☐ | ☐ |
| | 220 - 240Vac | ☐ | ☐ |
| Operator manual | English | ☑ | ☑ |
| Service manual | Not required | ☐ | ☐ |
| | Required - English | ☐ | ☐ |
| Electrical entry option | 3/4" & 1/2" NPT (Standard option) | ☐ | ☐ |
| | M20 adaptor kit | ☐ | ☐ |
| | PG13.5 adaptor kit | ☐ | ☐ |
| Slot 1 Module Option | Not required | ■ | ☐ |
| | mA output board | ☑ | ☐ |
| | Relay board | ■ | ☐ |
| | Digital input board | ■ | ☐ |
| Slot 2 Module Option | Not required | ■ | ☐ |
| | mA output board | ■ | ☐ |
| | Relay board | ☑ | ☐ |
| | Digital input board | ■ | ☐ |
| Slot 3 Module Option | Not required | ■ | ☐ |
| | mA output board | ■ | ☐ |
| | Relay board | ■ | ☐ |
| | Digital input board | ■ | ☐ |
| Slot 4 Module Option | Not required | ■ | ☐ |
| | mA output board | ■ | ☐ |
| | Relay board | ■ | ☐ |
| | Digital input board | ■ | ☐ |
| Data communication | Modbus protocol (RS485) | ☑ | ☐ |
| | Modbus protocol Ethernet | ■ | ☐ |
| Enclosure Option | Blanked | ■ | ☐ |
| | Breather | ☑ | ☐ |
| Controller Mounting | Wall | ☑ | ☑ |
| Label tag no. | Not required | ☐ | ☐ |
| | Required | ☐ | ☐ |
| Label tag characters | Customer transmitter tag number up to 16 characters | | |

**Tick a single box for each selectable option**

☐ Option selectable

■ Option not available in that variant

☑ Pre-selected option

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| CONFIGURATION | |
|---|---|
| OxyExact 2213 VARIANTS: | We have one pre-configured 2213 OxyExact build (SV01) to cover the most common chosen option configurations to enable a quick turnaround from specification to delivery. |
| Standard Variant 1 (SV01) | The pre-configured standard variant 1 base level configuration, including the mA output and relay option card, for general controller requirements. |
| User Configured (UC) | Other controller configurations not covered by one of the above standard variant configuration, including digital input option card and ethernet communications option. |

| OxyExact 2213 VARIANT | | SV01 | UC |
|---|---|---|---|
| Controller certication | ATEX/UKEX Cat 2GD Z2-Z22 (Europe and Great Britain) | ☐ | ☐ |
| | FM Class 1 Div 2 Zone 2 (USA) | ☐ | ☐ |
| | CSA Class 1 Div 2 Zone 1 (Canada) | ☐ | ☐ |
| | IEC Ex Zone 2 - Zone 22 (International) | ☐ | ☐ |
| | CML Z1 – Z21 (Japan) | ☐ | ☐ |
| Supply voltage | 100 - 120Vac | ☐ | ☐ |
| | 220 - 240Vac | ☐ | ☐ |
| Operator manual | English | ☑ | ☑ |
| Service manual | Not required | ☐ | ☐ |
| | Required - English | ☐ | ☐ |
| Electrical entry option | 3/4" & 1/2" NPT (Standard option) | ☐ | ☐ |
| | M20 adaptor kit | ☐ | ☐ |
| | PG13.5 adaptor kit | ☐ | ☐ |
| Slot 1 Module Option | Not required | ■ | ☐ |
| | mA output board | ☑ | ☐ |
| | Relay board | ■ | ☐ |
| | Digital input board | ■ | ☐ |
| Slot 2 Module Option | Not required | ■ | ☐ |
| | mA output board | ■ | ☐ |
| | Relay board | ☑ | ☐ |
| | Digital input board | ■ | ☐ |
| Slot 3 Module Option | Not required | ■ | ☐ |
| | mA output board | ■ | ☐ |
| | Relay board | ■ | ☐ |
| | Digital input board | ■ | ☐ |
| Slot 4 Module Option | Not required | ■ | ☐ |
| | mA output board | ■ | ☐ |
| | Relay board | ■ | ☐ |
| | Digital input board | ■ | ☐ |
| Data communication | Modbus protocol (RS485) | ☑ | ☐ |
| | Modbus protocol Ethernet | ■ | ☐ |
| Enclosure Option | Blanked | ■ | ☐ |
| | Breather | ☑ | ☐ |
| Label tag no. | Not required | ☐ | ☐ |
| | Required | ☐ | ☐ |
| Label tag characters | Customer transmitter tag number up to 16 characters | | |

**Tick a single box for each selectable option**

☐ Option selectable

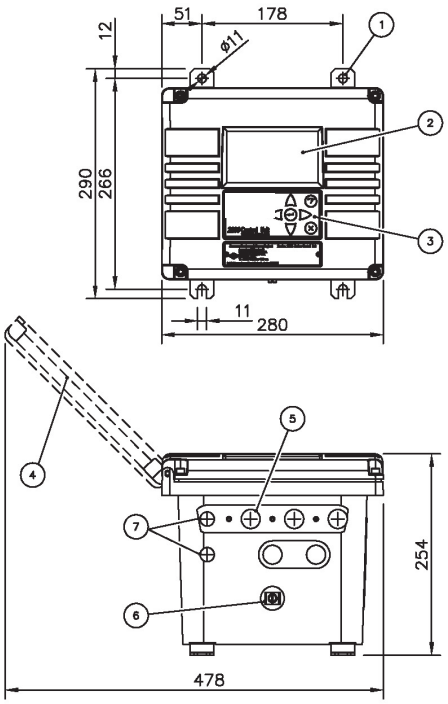
■ Option not available in that variant

☑ Pre-selected option

# DIMENSIONAL DRAWINGS

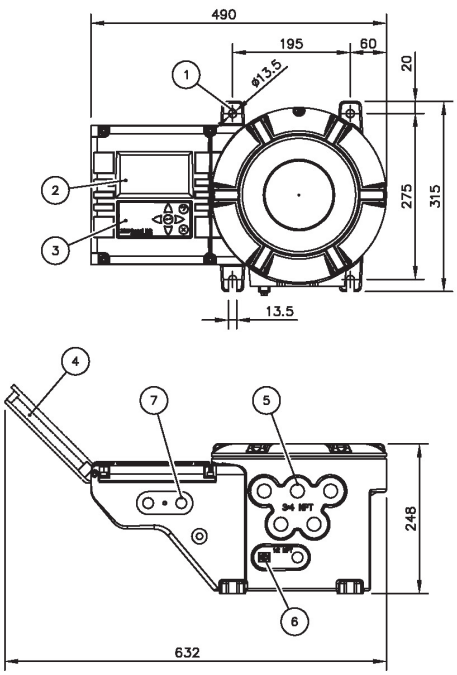
## CONTROL UNIT

### SERVOTOUGH OxyExact 2210 Control Unit




1. Surface mount fixing hole
2. Display window
3. Keypad
4. Door, in open position
5. Power and signal cable entries
6. Functional (EMC) earth/ground terminal
7. Transmitter connection cable entries

### SERVOTOUGH OxyExact 2213 Control Unit




1. Surface mount fixing hole
2. Display window
3. Keypad
4. Door, in open position
5. Power and signal cable entries
6. Functional (EMC) earth/ground terminal
7. Transmitter connection cable entries

Dimensions shown in millimetres

# WE'RE READY TO HELP

WHATEVER YOUR GAS ANALYSIS REQUIREMENTS, WHEREVER YOU ARE

PBTDS OxyExact Rev. 2 Date: 05/24

*These analyzers are not intended for any form of use on humans and are not medical devices as described in the Medical Devices Directive 93/42EEC.*

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