eppendorf

Highest Precision

DASGIP® PHPO, GA and OD4 for monitoring and control of bioprocesses

Versatility in pH, DO, Level, and Redox Monitoring and Control

DASGIP PHPO modules

Eppendorf offers a range of DASGIP PHPO bioprocess analyzers: Choose from a variety of models offering measurement and online control of pH, dissolved oxygen (DO), redox potential and/or level/foam. Each module enables parallel monitoring of four or eight pH sensors. For highest precision, temperature compensation is performed using two Pt100 sensors. Easy-to-use one or two point calibration schemes are integrated. With our control software DASware® control (formerly DASGIP Control) users benefit from parallel cleaning and calibration procedures.

DASGIP PH4PO4L and PH4PO4RD4L feature 4 optional conductivity-based level inputs.

> Four or eight input channels for parallel monitoring and control of bioreactors (depending on model)
> Industry-standard pH, DO, and Pt100 sensor connections
> Optical DO sensors available (Hamilton® VisiFerm® without the need for external power supply)
> Optional level/foam and redox sensors
> Auxiliary ports (0 – 10 V, 4 – 20 mA) for easy third-party sensor integration

Automated Calculation of OTR, CTR and RQ

DASGIP GA modules for exhaust analysis

Eppendorf DASGIP GA4 supports precise online monitoring in four exhaust oxygen and four carbon dioxide analyzer channels. Four integrated mass flow sensors enable automatic calculation of oxygen transfer rate (OTR), carbon dioxide transfer rate (CTR) and respiratory quotient (RQ). In this way, researchers gain valuable insights into critical culture parameters such as biomass development, substrate consumption and product formation. Data can be used for automated process control e.g. agitation, gassing, substrate feed or anti foam addition—boosting accurate individual control and high process automation at the same time.

> No multiplexing: Continuous and accurate data
> Available with two alternative electrochemical O_2 sensors: zirconium dioxide sensor for good long-term stability, and galvanic cell for extended O_2 concentration range and suitable for anaerobic fermentations
> Robust dual-beam infrared CO_2 sensor technology
> rHT option for measurement of relative humidity and temperature—automated humidity compensation in cell culture and other applications

gas sensors by

BlueSens®
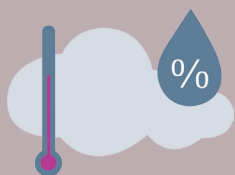
Humidity compensation with the DASGIP rHT option

The humidity concentration of a gas is temperature-dependent. Water vapor in the exhaust leads to a decrease of the relative concentration of the measured gases, the »thinning effect«. If these concentrations are used for online calculations of OTR, CTR and RQ based on a balance of input and output molar flow rates, this effect must be taken into account. Without, OTR calculations would result in misleading readings; e.g. a higher than actual oxygen consumption would be reported. The DASGIP rHT option includes automatic compensation of temperature and humidity effects and provides users with most accurate data.

Online Cell Growth Monitoring

DASGIP OD4 for optical density measurement

DASGIP OD4 offers easy measurement of cell density in up to four vessels. Integrated correlations to offline parameters such as OD_{600} or cell dry weight (CDW) provide online cell growth information.
DASGIP OD Sensors are free of maintenance and available with various path lengths (5, 10, and 20 mm), making them optimal for cell culture and microbial applications.

> Proprietary cancellation technology for bubble-induced noise
> Raw signal (0 – 5 AU) is correlated individually for each channel into OD, CDW, cell wet weight (CWW), total cell density (TCD), and others.

Easy

Access

Stand-alone solutions for monitoring
Seamless integration using the DASGIP EasyAccess software package

DASGIP GA4 and **OD4** modules can not only be used as part of DASGIP Parallel Bioreactor Systems, but also stand-alone or integrated with New Brunswick™ and third-party software. OPC communication allows seamless integration with existing process control systems.

You will find the ordering numbers of our stand-alone modules on the back cover.

Sensors

DO sensors
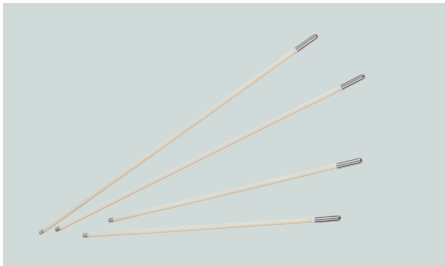Standard Clark electrodes as well as optical sensors

pH sensors
Electrodes and optical sensors for accurate monitoring of pH

Redox sensors
Accurate monitoring of ORP (redox potential)

Level sensors
Level control by foam-induced anti-foam addition

OD sensors
Optical absorbance measurement with different optical path lengths
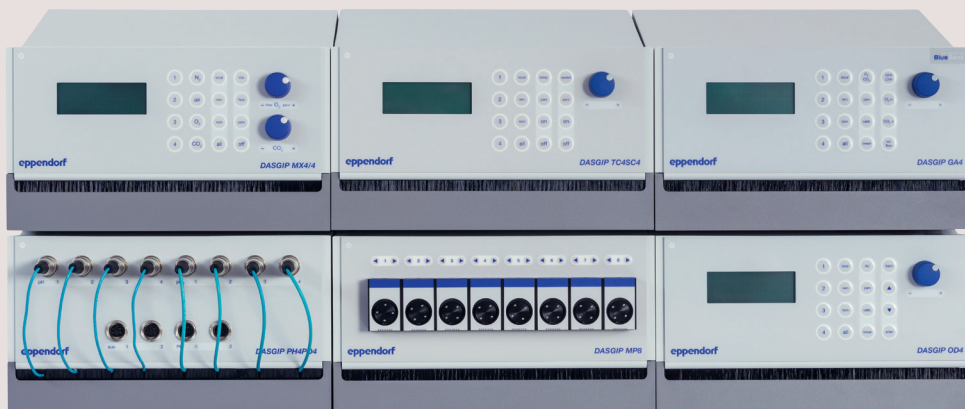

Temperature sensors
Platinum RTD temperature sensors (Pt100)

For sensor details and ordering information please visit your local eShop going to www.eppendorf.com.

»As easy as stacking blocks.«

The flexible Eppendorf DASGIP modules for monitoring and control meet the highest demands in research and process development labs or as a part of quality assurance. The parallel nature of the DASGIP modules and their compact, stackable design enable individual operation of up to 16 bioreactors while making optimal use of lab space.

For more information please also refer to our brochures on DASGIP solutions for temperature/agitation control, feeding, and gassing.

Technical data* and ordering information

	PH4PO4	PH4PO4L	PH4RD4	PH8PO8	PH4PO4RD4L
pH measurement					
Channels	4	4	4	8	4
Measurement range (depending on sensor)	0 – 14	0 – 14	0 – 14	0 – 14	0 – 14
DO measurement					
Channels	4	4	–	8	4
Measurement range (depending on sensor)	0 – 500 % DO	0 – 500 % DO	–	0 – 500 % DO	0 – 500 % DO
Temperature compensation					
Pt100-type temperature sensor inputs	2	2	2	2	2
NTC-type temperature sensor inputs	4	4	4	8	4
ORP (redox) measurement					
Channels	–	–	4	–	4
Measurement range (depending on sensor)	–	–	-2,000 – 2,000 mV	–	-2,000 – 2,000 mV
Level measurement					
Channels	–	4	–	–	4
Order number	**76DGPH4PO4**	**76DGPH4PO4L**	**76DGPH4RD4**	**76DGPH8PO8**	**76DGPH4PO4RDL**

	OD4
OD measurement	
Channels	4
Measurement range (depending on sensor)	0 – 5 AU
Order number	**76DGOD4**
Order number stand-alone*	**76DMOD4**

	DASGIP® GA4	DASGIP® GA4E	DASGIP® GA1	DASGIP® GA1E	DASGIP® GA2	DASGIP® GA2E
Measurement channels (O_2, CO_2, mass flow each)	4	4	1	1	2	2
Pressure range	0.8 – 1.2 bar	0.8 – 1.2 bar	0.8 – 1.2 bar	0.8 – 1.2 bar	0.8 – 1.2 bar	0.8 – 1.2 bar
Exhaust oxygen measurement						
Measuring principle	Zirconium dioxide	Galvanic cell	Zirconium dioxide	Galvanic cell	Zirconium dioxide	Galvanic cell
Measurement range	1 – 50 %	0 – 100 %	1 – 50 %	0 – 100 %	1 – 50 %	0 – 100 %
Exhaust carbon dioxide measurement						
Measurement principle	Infrared	Infrared	Infrared	Infrared	Infrared	Infrared
Measurement range	0 – 25 %	0 – 25 %	0 – 25 %	0 – 25 %	0 – 25 %	0 – 25 %
Mass flow measurement						
Measurement range	0 – 300 sL/h	0 – 300 sL/h	0 – 300 sL/h	0 – 300 sL/h	0 – 300 sL/h	0 – 300 sL/h
Order number	**76DGGA4X**	**76DGGA4EX**	**76DGGA1X**	**76DGGA1EX**	**76DGGA2X**	**76DGGA2EX**
Order number stand-alone*	**76DMGA4X**	**76DMGA4EX**	**76DMGA1X**	**76DMGA1EX**	**76DMGA2X**	**76DMGA2EX**

Accessories

Description	Order no.
DASGIP® Relative Humidity and Temperature Sensors, incl. accessories for DASGIP® GA4 Exhaust Analyzing Module for 4 vessels	76DGGA4RHT

* Technical specifications are subject to change without notice. ** Stand-alone modules incl. OPC server software (requires separate PC)

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