eppendorf

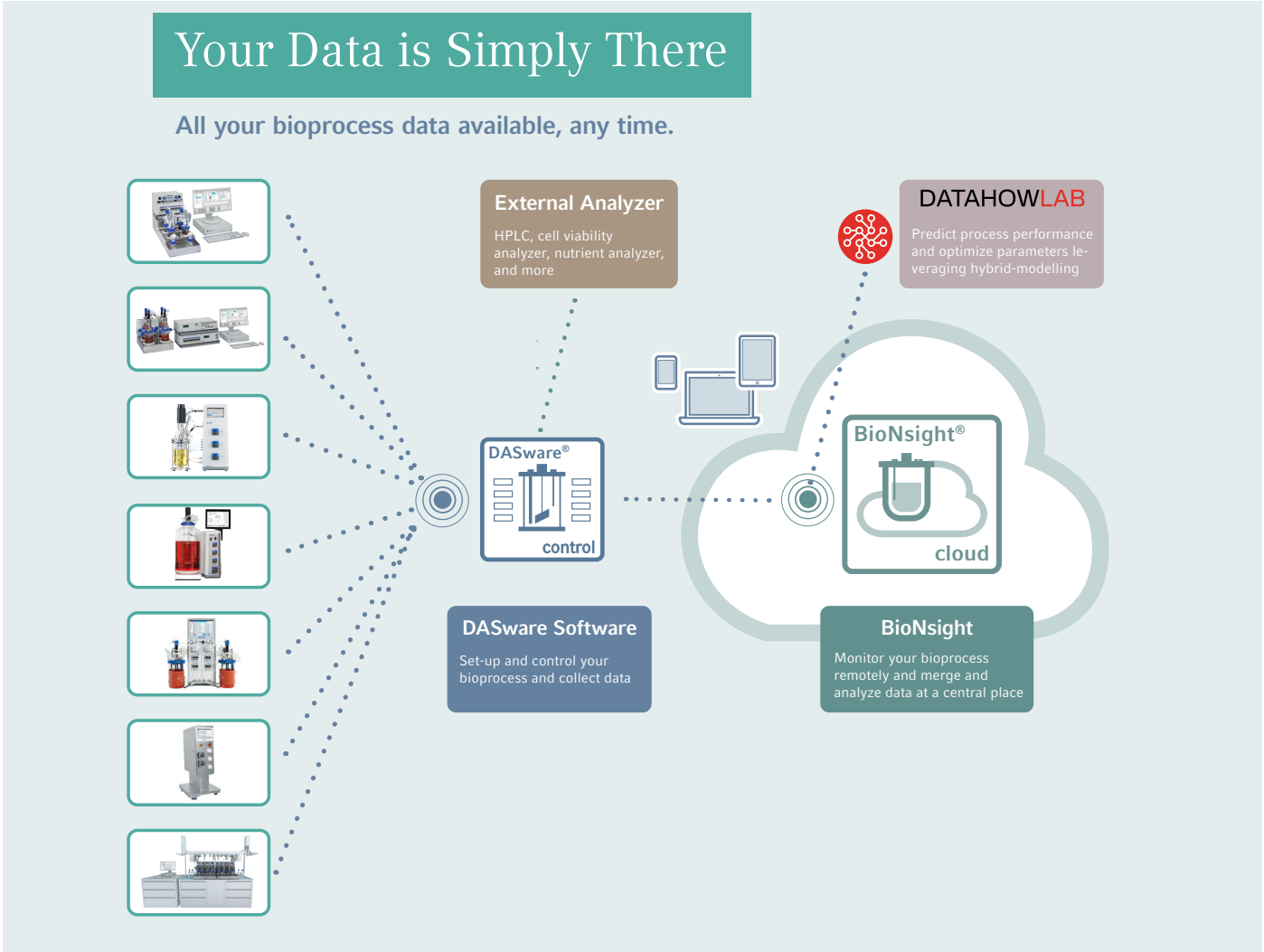
Rock Your Bioprocess

Make every step a hit: bioprocess software from process design to control to analysis

Seamless Software Ecosystem

Set up, control, automate, and analyze your bioprocess with the DASware® suite and BioNsight® cloud

In the dynamic world of bioprocessing, the integration of Supervisory Control and Data Acquisition (SCADA) and cloud software is crucial for achieving operational excellence. These technologies serve as the foundation for modern bioprocess management, enabling precise control, monitoring, and analysis of complex systems. By leveraging SCADA systems, bioprocess operations attain unmatched efficiency and reliability, while cloud solutions provide scalability and accessibility, empowering global teams to collaborate effectively.
Experience an integrated ecosystem with DASware control and BioNsight cloud. Bioprocesses conducted with all Eppendorf bioprocess controllers can be monitored and controlled through DASware control. BioNsight cloud complements this ecosystem by offering robust data monitoring and analysis capabilities, allowing for holistic insights into bioprocess performance and facilitating strategic optimization. Together, these technologies create a cohesive environment that supports innovation and drives success in bioprocessing.



Powerful Bioprocess Control

DASware control SCADA software: From experimental design through cultivation to data analysis

DASware control is the bioprocess SCADA software at the heart of all Eppendorf small and bench-scale bioreactor systems and our large-scale single-use system. It enables individual monitoring and control of up to 24 bioreactors in parallel, process automation, and advanced data analysis, providing maximum performance from experimental design to result.

Parallel control

> Up to 24* vessel operation: Save time by testing multiple experimental conditions in parallel.
> Monitor and control each bioreactor individually.
> Benefit from parallel design for the implementation of the Design of Experiment concept for efficient process development.

Flexibility

> DASware control ensures smooth integration with existing and new bioprocess controllers, sensors, and cloud systems, adapting to evolving bioprocessing needs.
> Future-proof flexibility with in-field software updates and advanced connectivity options.

Performance

> Utilize powerful charting tools with configurable online trends.
> Advanced data management, including offline, external, and online-calculated values.

Efficiency

> Parallel sensor and pump calibration with intuitive step-by-step guidance.
> Intelligent recipe management: Benefit from predefined and user-editable templates.

Reliability

> Ensure user management and data integrity.
> Benefit from optimized process database storage with quick and easy search and filter functions.
> Event log and alarm functions let you keep track of your process.
> 21 CFR Part 11 compatibility with DASware control plus.

Automation

> Automate your process using enhanced scripting capabilities, profiles and control loops.
> DASware control allows planning of 24/7 sampling and bolus addition to small and bench scale bioprocess systems combined with glass and/or single use bioreactors using the Bioprocess Autosampler.

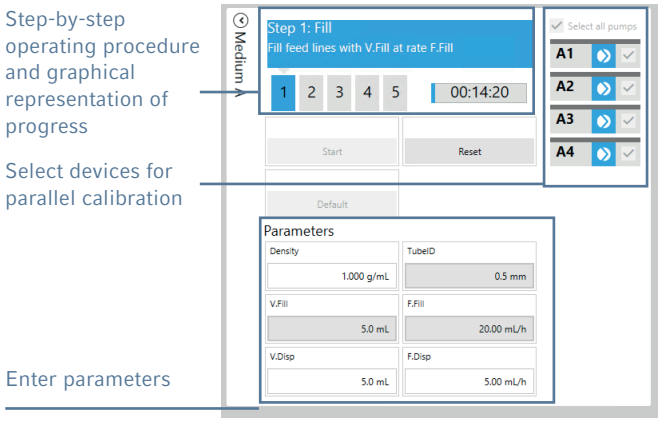
* Depending on the system used

Set Up your Process

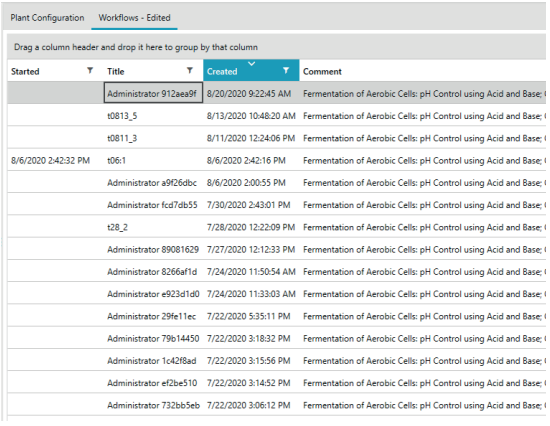
Set up your bioprocess with ease

Bioprocessing starts with experimental design and setting up the process. DASware control supports you in the planning stage and provides all the essential functionalities for process setup, including sensor and pump calibration, setpoint definition, and the configuration of process control strategies. With DASware control, setting up your bioprocess becomes efficient and tailored to your experimental needs.

Reduce repetitive tasks during calibration
When preparing multiple bioreactors at once, DASware control facilitates the parallel calibration of multiple pumps and sensors of a certain type, respectively.



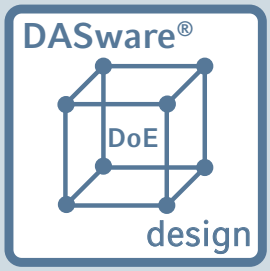
Get started quickly with recipe management
For a quick start, DASware control offers pre-defined cultivation templates, which can be edited and stored for further use.



Design of Experiments

Design of Experiments (DoE) is a structured method to investigate the influence of critical process parameters, interactions, and dependencies in bioprocess development.

DASware design supports the application of the DoE concept. It is an optional addition to the DASware control SCADA software.



DASware design features

> **Full factorial design with integrated DoE builder:** Fills DoE data tables and positions runs on a random basis to eliminate human errors.

> **Recipe generator and automated workflows:** Parallel recipes incorporating factor variation, e.g. for pH, dissolved oxygen, temperature set-points or feed rates, are automatically populated.

> **Third-party software integration:** Alternatively to using the embedded DoE builder, a wide variety of designs for screening, process development and optimization can be automatically imported from the most powerful third-party tools including JMP®, Modde®, and Design-Expert®.

Set Up your Process

Tailor and automate process monitoring and control

Achieve precise control and efficient automation in your bioprocesses with DASware control software. DASware control empowers you to capture and leverage essential process data acquired by integrated sensors, Process Analytical Technology (PAT), and automated sampling. Benefit from preconfigured control loops and the flexibility to design custom feedback systems, ensuring optimal use of sensor information throughout your process. Automate workflows, enabling responsive actions based on real-time sensor data for enhanced reliability and efficiency.

Tailor your feedback control loops

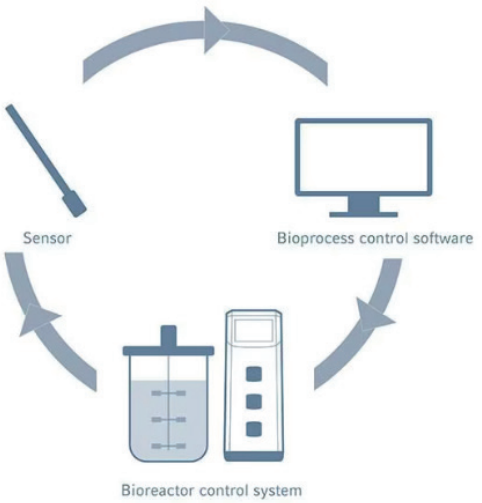
DASware control offers numerous possibilities to automate your process.

> **Reuse and adapt:** The Procedure Editor provides an overview of all units and values; templates are easy to adapt by typing or intuitive copy & paste operation.

> **Parameter control through cascades:** Parameters such as DO can be efficiently controlled by cascading events (for example the adaptation of the agitation speed, gas flow, and mix). Cascades can be entered with values or intuitively by dragging datapoints in the graphical representation.

> **Simplified creation of advanced process control:** This is simplified by DASware control's visual block programming, which makes scripting intuitive and accessible.

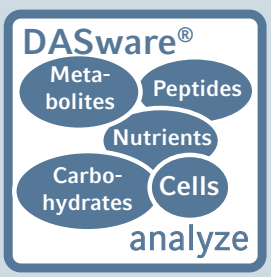
> **For complex automation needs:** DASware control comes with an optimized Script Editor, facilitating scripting through auto completion and error assist. Even offline and open platform communication (OPC) values can be used for scripting.



Device integration

The integration of devices ultimately enables a better process understanding and tailored process control.

DASware analyze enables seamless integration of sampling and analytical devices to the bioreactor system. It is an optional addition to the DASware control SCADA software.



DASware analyze features

> **Connectivity:** Enables bidirectional OPC connectivity.

> **Device integration:** Mass spectrometers, autosamplers, HPLC, Raman spectroscopy, nutrient analyzers, cell counters, biomass monitors, and others can be connected and integrated.

> **Advanced control and insights:** Device integration allows for online calculations and event- or data-driven decisions. It enables feedback control loops and automated sampling.

Discover an application example

Glucose control using Raman spectroscopy in CHO cell culture www.eppendorf.group/AN415

Operate Your Bioprocess

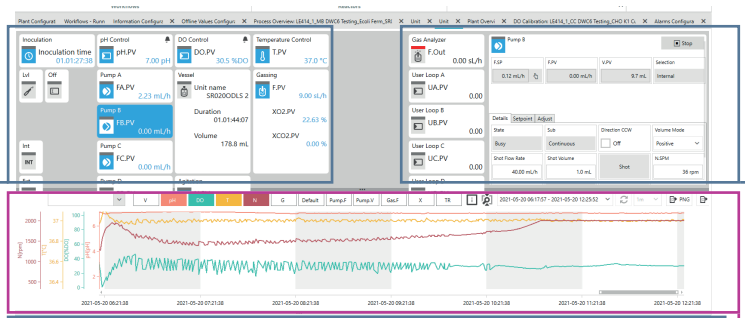
Stay ahead with real-time process insights

Being informed about key bioprocess parameters during your run is essential for maintaining product quality and consistency. With real-time access to critical data, you can make timely adjustments, prevent deviations, and optimize your process performance. Advanced monitoring tools empower you to achieve reliable results and maximize efficiency every step of the way.

Monitor and control your process with DASware control SCADA software

Detailed view on current process values

User-defined functions: Range limits, setpoints and DO cascades can be changed online in case your process requires adjustments



Event window: See events and alarms at a glance

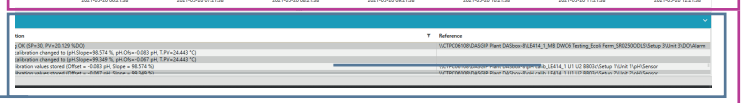
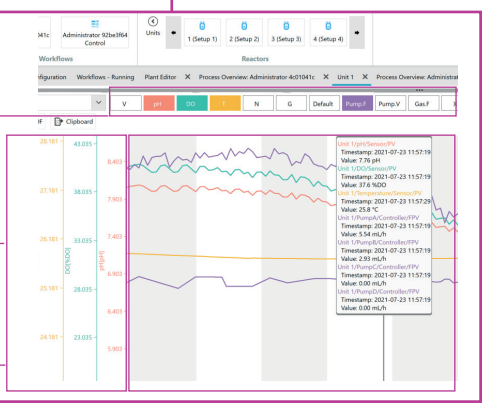


Chart area: Be informed on relevant process parameters: The configurable charting tool allows you to monitor key process parameters, showing a complete graphical overview of the process.

Hide or display parameters; include offine values

Move or zoom scales

See relevant process parameters at a glance



Monitor your process remotely with BioNsight cloud

Process data can be automatically transferred from DASware control to BioNsight cloud, the cloud-based software solution from Eppendorf.

> Remotely monitor your real-time bioprocess data from anywhere and any time.
> View all your running processes at a glance and take the right decisions faster, while your process is still running.

Find out more at **www.eppendorf.group/bioNsight**

Operate Your Bioprocess

Automate bioprocess sampling

You often need to sample your culture during the bioprocess, to monitor growth, product formation, and nutrient consumption. DASware control software seamlessly integrates the Bioprocess Autosampler from Eppendorf for 24/7 automated sampling and bolus additions in cell culture or microbial applications. You can easily define your sampling scheme as well as the bolus addition and sample storage location in DASware control software without the need to familiarize with another software tool.

Automated bioprocess sampling made easy
The Bioprocess Autosampler enables regular and process-triggered 24/7 automated sampling and bolus addition. This can increase process insights while taking manual work off your hands.

> Compatible with a variety of small and bench scale bioprocess systems
> Keeps you flexible, because it is compatible with differently sized single-use and glass bioreactors
> Maximize bench space – no sterile hood required

How the Bioprocess Autosampler works

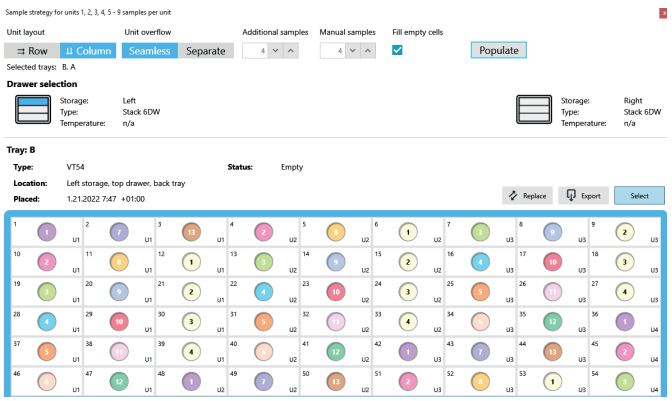
The Bioprocess Autosampler takes samples from multiple bioreactors and stores them tempered for later analysis. The sampling device is automatically cleaned to ensure aseptic operation and prepare the system for the next sampling step.

Find more information at
www.eppendorf.group/bpautosampler

Download our appliation notes for some application examples:

Automated sampling for the analysis of a parallel CHO culture www.eppendorf.group/AN492

Automated sampling for E. coli feeding strategy monitoring www.eppendorf.group/AN507



Use DASware control to predefine the storage location of your samples in the sample storage.

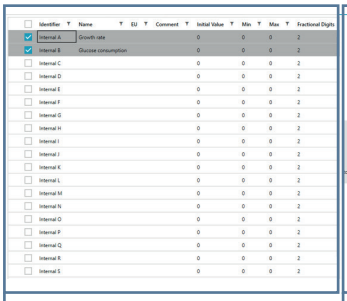
Autosampling and process control combined
The Bioprocess Autosampler seamlessly integrates with DASware control software:

> Plan and execute sampling protocols
> Ensure tracebility by tracking samples from initial planning through the sampling process to storage
> Schedule precise bolus additions for each of your bioreactors individually
> Use the scripting capabilities of DASware control to initiate smart sampling and bolus additions based on real-time process parameters, so no critical data is missed, enhancing process insights

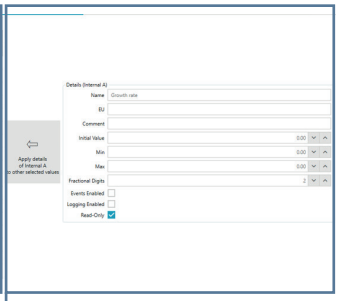
Integrate your Data

Consolidate your bioprocess data in one central location

DASware control is your central tool to consolidate your bioprocess data in one central location, to make it accessible and use them for process control and process analysis.



Overview of all offline values
Values measured offline or generated using integrated analyzers can be entered into DASware control



Editor for offline values
to include information such as name and engineering unit

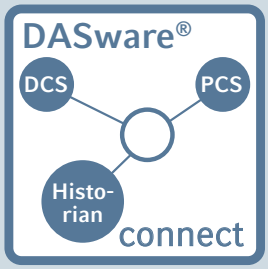
Easy use of data from external devices
With DASware control, easily enter up to 26 offline value tracks manually and up to 26 values from integrated external devices and analyze them just like any other parameter. Another 26 online calculated values can be integrated. Define control loops with configurable input and output process parameters.

Export your data
Export bioprocess data, as well as procedures, plant information, setups, and event log. An integrated report generator with Microsoft® Excel®–based export tools does the first step of your data analysis for you.

Easy communication and data transfer

DASware connect makes bioprocess data available for scientific analysis and modelling, centralized process control, and data storage.

DASware connect integrates Eppendorf bioreactors into third-party process control systems and legacy corporate historians. It is an optional addition to the DASware control SCADA software.



DASware connect features

> **Data exchange:** Facilitates company-wide access to bioprocess data, like setpoints, process values, feed profiles, calibration and controller parameters, events, and alarms.

> **Interfacing:** Interfacing with scientific software packages like LabVIEW® and MATLAB®

> **Integration:** Enables, among others, the integration into: Emerson® DeltaV®, Siemens® SIMATIC PCS 7 TeleControl®, ABB® 800xA, OSISOFT® PI System, Matrikon® OPC Historian.

Integrate Your Data

Contextualize data across devices, runs, and sites - To optimize, transfer, scale-up

BioNsight cloud is fully integrated into the Eppendorf bioprocess control software DASware control and enables you to consolidate your bioprocess data in one central location with a few simple clicks. Easily compare data from different batches and collaborate with colleagues, regardless of their location.

Integrate your data

> Transfer data from internal sensors, offline data from external analyzers, historic runs, and integrate process data from non-Eppendorf bioprocess controllers.
> Contextualize data across devices, runs and sites for easy and meaningful comparisons.

Analyze

> Quickly identify deviations or expected behaviors by analyzing data from various runs and scales.
> Benefit from better decision-making based on meaningful comparisons.
> Add external data from offline devices for deeper insights into your cultivation.

Align, compare, and analyze your bioprocess runs

BioNsight cloud lets you easily synchronize and compare all relevant bioprocess data tracks, both from internal sensors and external analyzers. It therefore helps identifying patterns and discovering interdependencies.

Align data
Align all process records to inoculation time

Select runs for analysis
Bioprocess runs of interest, easily selected from a drop-down list of all your historic runs

Expand your data sets
Upload and display data generated with external analyzers, for example cell density, viability, and nutrient concentrations

Zoom in
Dive deeper in your data and focus on specific areas of interest for detailed information

Display your parameters of interest
Change your selection anytime

Advance your Process Insights

Develop better processes faster

BioNsight cloud provides a seamless journey from data to insight through its integration with DataHowLab. DataHowLab is a unique bioprocess data analytics and modelling solution that empowers scientists to generate powerful AI-enabled process insights with their process data. Advanced technologies are embedded in a user-friendly environment developed for non-data-science experts.

Key capabilities of DataHowLab include:

Data analytics and visualizations
Effortlessly generate insights with DataHowLab's visualization boards. A wide variety of analyses and plots can be generated and customized in just a few clicks.

Model-based process development
More than just data insight, models can be used for key development tasks such as process optimization, robustness analysis, optimal experimental design, and more.

Access to advanced process models
Access a library of advanced process models, including DataHow's transformative AI-enabled hybrid models.

Advanced analytics with ease
DataHowLab has been developed for process scientists, providing guidance with workflows and automations to make even the most advanced analysis possible.

The partnership of Eppendorf and DataHow® offers a transformative path to data-driven, digital process development, which enables scientists to remove analytical constraints and unlock the value of their data.

Native integration of BioNsight® cloud and DataHowLab	
Use data efficiently: Easily send all your data from DASware control to DataHowLab via BioNsight cloud	✓
Save time: Data from BioNsight cloud is pre-formatted. No need for manual processing for use with DataHowLab	✓
Gain convenience: Single sign-on (SSO) to log in to DataHowLab with your BioNsight cloud user data	✓

DATAHOWLAB

Find out more about DataHowLab
www.datahow.ch/products/datahowlab/

Navigate Clinical Production

Software compatible with 21 CFR Part 11 and EudraLex Volume 4 Annex 11

DASware control plus shares features and functionalities for process monitoring and control with DASware control. It is compatible with 21 CFR Part 11 and EudraLex Volume 4 Annex 11 for use in clinical and commercial manufacturing.

The intricate regulatory framework 21 CFR Part 11 defines the prerequisites for electronic records and electronic signatures, signalling an era characterized by paperless production procedures and electronic signatures seamlessly mirroring their handwritten counterparts. The software is purpose-built with a focus on compatibility to 21 CFR Part 11 and EU GMP Annex 11, supporting users to achieve regulatory compliance with criteria set forth by those standards.

Benefits at a glance:

> **User authentication and access control:** aligning with the GMP requirements to prevent unauthorized access and maintain data integrity.
> **Electronic records:** track and document critical actions in an audit trail, gaining a comprehensive view of data integrity and compliance history.
> **Electronic signatures with confidence:** ensure the authenticity and reliability of critical documentation in your bioprocessing operations.
> **Efficient data management:** retrieval and storage of human and electronic system readable data whilst adhering to rigorous data integrity standards.

DASware® control plus

Interested in **DASware control plus**?
For optimal integration and compatibility of our soft- and hardware, we recommend consulting with our expert sales team to tailor solutions that best fit your unique needs with our system configuration.

Translate seamlessly from R&D to clinical and commercial manufacturing

Translate your R&D upstream bioprocess achievements into clinical and commercial manufacturing success with our integrated solutions. Our streamlined package includes bioprocess controllers, bioreactors, bioprocess SCADA software, and services, allowing you to conduct both R&D and manufacturing processes on a unified platform while supporting compliance with GMP requirements.

Find out more at
www.eppendorf.group/commercial-bioprocessing

Get in Touch

Would you like to get more information about our software solutions or discuss your individual requirements? Get in touch, we are all ears!

Visit our eshop to find more detailed product information or inquire a product:
www.eppendorf.group/bioprocess-software

Or simply mail to **bioprocess-info@eppendorf.com** with any question.

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