

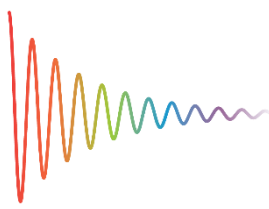
Symphony®

## Control System Programs

Operations Module & Management Module

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Operating Management System  
For Biological Processes



## SymphonyControl System Customer

Thank you for purchasing a Symphony Control System.

The control system that you selected is unlike any other control system in the market. Right out of the box, you'll get unprecedented automation precision, accuracy, and operating efficiency; all with no retuning requirement.

The Symphony Control Solution features next-generation control logic. This technology advancement is your passkey to the 4<sup>th</sup> Industrial Revolution and all of the benefits that are envisioned in this future state.

The Symphony Team and the programs available to Symphony customers are designed to help you get the 'most' from the Symphony control system.

Symphony is your Utility's partner for the life. Together, we can transform your plant from a 'Wastewater Treatment Facility' to a 'Water Resource Management Enterprise' that your rate-payers and community are proud of and are pleased to support.

*Let's dream together!*

**Your Symphony Team**

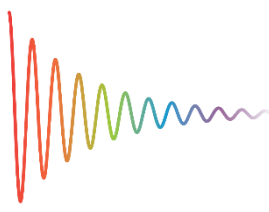
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Operations Management System  
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## Symphony Operations Module

Symphony **Operations Module** features two primary control systems that are installed individually or combined. Expanded control functionality is available upon request. All control systems are configured specific to your plant. The control systems feature an auto-tuning function so once the system is operating, the control system becomes your in-house resident operations expert. Since the systems are customized to your plant, changes to the physical structure or equipment require adjustments to the control system. These can be easily accommodated with simple reprogramming on the control system.

### **PAL™ – Aeration Process Optimization Control System** *Predictive Aeration Logic System*

PAL features process-based control algorithms to determine the individual airflow requirement for each control zone, total airflow to pace the blowers, and dynamic most-open-valve positioning for each control valve. With auto-tuning, the resulting residual dissolved oxygen (DO) levels are maintained to tight tolerances of DO setpoint for each control zone.

Be sure to carefully select the operating DO setpoint as aeration is the largest power use in the entire plant. An overly conservative setpoint will cost you money. For example, each additional 1mg/L in residual DO increases the aeration requirement by approximately 20%.

The same logic that is used to evaluate control actions also reduces the wear and tear on the control elements. While the control system is constantly monitoring the performance of the system in real-time, control adjustments may only be required periodically. This operating strategy and operational efficiency is normal and the eliminate of target seeking directly extends the service life of these mechanical components.

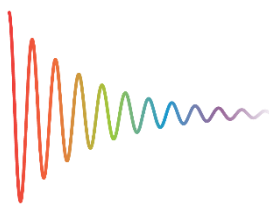
### **BIOS™ – Biological Process Optimization Control System** *Bioprocess Intelligent Optimization System*

BIOS features process-based control algorithms to determine the required residual DO level for desired process performance. This eliminates excess aeration, improves process performance, and ensures lowest possible aeration energy use.

Chemical feed and recycle flow streams can also be controlled and paced to process requirements. For BNR processes, internal mixed liquor recycle streams beneficially capture chemically bound oxygen and are regulated in concert with direct aeration for best process performance.

**Both PAL and BIOS controls are custom site-specific solutions; and can be applied individually or combined. The best outcome is achieved when these complementary control systems are applied in tandem. Symphony control systems are open architecture and seamlessly integrate with legacy control systems, instruments, and equipment.**

*BioChem Techonology Inc. provides the technology for Symphony Controls through an exclusive partnership with EDI.*



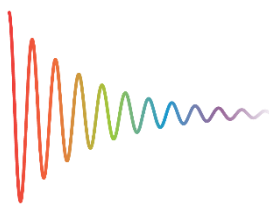
## Symphony Controls Membership

The purchase of a **PAL** or **BIOS** control system includes a Symphony '**Controls Membership**'. Symphony Control Members are 'knowledge partners' and the service component of the program is structured to ensure that every installed control system is delivering 100% of its potential value.

**Control Members** receive;

- Application updates and success stories
- The latest Symphony development information
- Direct input into product enhancement and expansion efforts
- User support from **Operations Control Specialists**. Specialist are available to assist in diagnosing and resolving control system operational issues, and other related questions or concerns.

Control Members are eligible for a Symphony **Management Membership** upgrade.



## Symphony® Management Module

Symphony **Management Module** entails data, system, and process analytics for strategic operations management at the plant level. The **Management Module** leverages the ‘learned-knowledge’ captured in the control system and uses this information to drive host of management-based decisions and actions. The ‘*Service Features*’ of Symphony® **Management Module** membership include:

**Annual Site Visit** – *Your Symphony Management Team will conduct the following;*

- Plant inspection and assessment of all associated components
- New Operator Training and Existing Operator Retraining
- Operator Feedback Session
- Management Objectives Discussion
- Core function software and control logic updates

**Annual Improvements Report** – *The main components of the report will include:*

- Statement of Health for the overall system and biological process units
- Feasibility Assessment for outcomes uncovered and discussed during the onsite visit
- Feasibility Level Investment Portfolio including costs and return on investments (ROI) expectations for areas of improvement
- Implementation Plan for select high ROI investment opportunities

**On-Going Control System Helpdesk** – Control specialist are available to assist in diagnosing and resolving control system operational issues, and other related questions or concerns.

**On Call Process Troubleshooting Assistance**<sup>1</sup> – Process engineers and operations specialists are available to assist with diagnosing and resolving operator observed problems without additional procurement requirements.

The Symphony **Management Module** is a collaborative management program focused on improving Utility value and the pursuit of broader initiatives including many of the initiatives outlined in the Effective Utility Management (EUM) Primer<sup>2</sup>. The **Management Module** is available to any plant; however, for complete benefits and best possible outcomes the full suite of Symphony controls is required.

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<sup>1</sup>20 hours per year allocation included in base Management Membership

<sup>2</sup>EUM Primer – management guidance program developed by USEPA and Industry Associations



## Symphony Management Membership

Only Symphony **Controls Members** can avail the service features of Symphony **Management Membership** by upgrading to a subscription based renewable three-year membership contract. Symphony **Management Members** enjoy Controls Member benefits, plus direct, onsite support and consultation services.






### Benefits for Controls Members

### Additional Benefits for Management Members



**Utility Management**

-  Achieve Business Objectives
-  Better Staff Utilization

- Improved Capital Utilization 
- Insight for Future Planning 
- Support Utility and Regulatory Objectives 
- Demand Side Power Management 
- Improve Sustainability: GHG and Nutrient Trading 






**Plant Operations**

-  Peace of Mind
-  Transformative Productivity Growth

- Seamless User Experience 
- RCM: Reliability Centered Maintenance 
- FDIR: Fault Detection, Isolation & Recovery
- Asset Management 



**Planning & Designing**

-  Real Time Process Optimization
-  Lowest Total Aeration Cost
-  System Compatibility

- High Economic Value & Capital Utilization 
- Equipment Optimization 
- Design Optimization 