

# Symbio® Chiller Control Comparison



MCS control architecture is similar to pre-2002 Trane UCP2 controls. In comparison, Symbio uses more advanced technology in the form of networked digital sensors controlled by a central processor. This allows for numerous advantages: quicker processing time allows for new control schemes, faster diagnostics, and faster installation of repair components. This enhances productivity both during use and when troubleshooting issues.



Micro Control Systems

Features	MCS Control Panel	Symbio® Controller	Symbio® Benefits
Base Technology	Two board control system; a master control board and a monochrome operator interface, with expansion boards as needed. All sensors are homerun wired.	Networked digital sensors and display controlled by Symbio digital controller and AdaptiView™ color graphic display.	Advanced technology provides faster chiller response time.
Diagnostic and Reporting Capabilities	Diagnostics are coded and only available on monochrome display. Optional color display shows standard graphs and service setpoints.	Diagnostics are displayed in full text on the AdaptiView color graphic display, as are customizable graphs and service reports. Recorded data logs include ASHRAE 3 report, Custom report, Graphical custom historical data log, purge report, and 50 alarm log.	Easy to use, easier and quicker to diagnose potential problems, customizable reports allow you to see only what you need in one place.
Primary Repair Components	Proprietary 30 point I/O master control board runs the entire unit. Similar to Trane technology of 1985 UCP1 controls. Repair parts available only through MCS.	Modular digital component design that minimizes cost of individual service parts and all components are used in Trane present production equipment.	Repair components are affordable, readily available, and stocked globally through Trane parts outlets.
Remote Monitoring	No remote monitoring capability.	Enables remote connectivity to monitor, analyze and maximize your building's performance.	Symbio 800 unit controllers integrate seamlessly and securely with Symbio or non-Trane building automation systems for simplified equipment monitoring and management.
Chiller Protective Control Strategy	Magnum controller is a general purpose compressor controller used in the air and water cooled refrigeration markets. It allows users to set unsafe limits outside of what Trane will allow for its chillers. This can result in damage to the chiller motor and other critical components.	OEM developed, UL tested adaptive chiller protection strategies that have been used on 10,000 + chillers. The Symbio controller monitors chiller refrigerant temperatures, refrigerant pressures and electrical phase imbalances and adjusts chiller operation when conditions approach alarm limits. An example of such a condition is when there is a partial failure of a cooling tower, limiting total capacity.	Provides the best in chiller protection strategies, keeping the chiller online as much as possible without risking equipment damage.

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Motor/Power Protective Control Strategy	Motor protection limits not indicated in current literature.	Advanced motor/power protection - Trane uses a dedicated motor starter protection module that has been UL tested and certified for centrifugal chiller protections.	This module protects the motor and its starter system from damage caused by phase loss, phase reversal, and under and over voltage, even in cases where the master Symbio controller has failed. It also has a self diagnosing starter "dry run" feature.
Unit Startup Strategy	Soft start not included.	The chiller controller uses soft loading except during manual operation. Large adjustments due to load or setpoint changes are made gradually.	Less stress on the chiller helps maintain chiller longevity.
Power Failure Recovery Strategy	Restart times set by operator.	Fast Restart - The controller allows the CenTraVac chiller to restart during the postlube process. If the chiller shuts down on a nonlatching diagnostic, the diagnostic has 30–60 seconds to clear itself and initiate a fast restart. This includes momentary power losses.	Fast Restart controls allow the chiller to restart quickly without excess wear and tear and keeps the safety features of the controls intact.
Performance Monitoring Capability	Not indicated in current literature.	Symbio measures heat exchanger approach, tons, power consumption, power factor (uncorrected), compressor phase amps, and compressor phase voltage.	Monitoring chiller performance allows for preventative maintenance and can keep the chiller running at optimal performance.
Temperature Control Strategy	Reactive controls strategy consistent with Trane 1985 UCP1 controls.	Feedforward Adaptive Control uses an open-loop, PID predictive control strategy designed to anticipate and compensate for load changes. It uses evaporator entering-water temperature as an indication of load change.	Responds faster and maintains stable leavingwater temperatures. It also eliminates the inherent proportional error seen with deadband controls.
Inlet Guide Vane Control	Re-use of existing guide vane controls	New stepper actuator provided.	Allows precise and reliable inlet guide vane control.
Trane Intelligent Services (TIS)	Not available	A standard capability of Symbio controls is to interface with TIS. TIS allows the user to monitor, analyze and improve their building's performance; the data from your building systems is translated into actionable, outcome-oriented recommendations.	Maintain your building's optimum performance by pairing Symbio controls with TIS.
Facility Communications Capability	BACnet™, Modbus™, and Johnson N2 communications capability available as an option.	Native BACnet and Modbus® communications capability. LonTalk™ communications capability available as an option.	Communications capability is included.
Logging and Reporting	Not compatible with Tracer Summit building automation system.	Compatible with Tracer building automation system.	Communicates with Tracer systems which allows advanced energy savings strategies such as our patented Tracer chiller plant optimization.
Variable Primary Control	Not indicated in current literature.	Symbio uses a patented, variable, water-flow compensation algorithm to maintain stable, precise capacity control. This optional control feature includes water differential-pressure-sensor transducers and improves the ability of the chiller to accommodate variable flow.	When combined with variable flow pumping, varying the water flow reduces the energy consumed by pumps, which can be a significant source of energy savings.
Adaptive Frequency Drive Control Capabilities	Not indicated in current literature.	Symbio provides the most advanced generation of control for Trane AFD chillers. AFD control is integrated into Trane's adaptive logic, allowing the controls to optimize the AFD operation while avoiding surge conditions.	An Adaptive Frequency Drive can be added without additional controls requirements when used with a Symbio.
Integrated Purge Control	Not capable of integration with Trane EarthWise™ purge	The Symbio is capable of controlling the Trane EarthWise purge. The EarthWise purge control function provides all the inputs and outputs to control the purge, uploading setpoints and downloading data and diagnostics.	Communication between chiller controls and purge allows for optimization of both purge and chiller efficiency. It also allows purge diagnostics to be seen in the building automation system.



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