

MarleyGard™ CD

CHEMICAL DELIVERY SYSTEM

engineering data
and specifications



CD CHEMICAL DELIVERY SYSTEM

Maintaining cooling tower water chemistry is important to overall cooling process efficiency and is an essential part of an effective cooling tower water management plan (WMP). The MarleyGard CD Chemical Delivery System helps cooling tower operators take a proactive approach to challenging issues surrounding scale, corrosion, microorganisms and water conservation.

Specifically designed to facilitate delivery of cooling tower water treatment agents, the MarleyGard CD Chemical Delivery System is an organized and robust control panel that also continuously monitors and communicates cooling water conditions.

An array of electronic instrumentation tracks cooling loop water chemistry, including conductivity, oxidation reduction potential (ORP) and pH. The system can also measure concentrations of treatment chemicals and monitor system corrosion using conventional coupons or electronic sensors.

The MarleyGard CD is a recommended option for every factory-assembled cooling tower that can help reduce maintenance costs and extend equipment life.

COMMUNICATION CENTER

The controller interfaces with the facility's computer network and external internet connection for continuous data collection as well as alerts to any user-specified alarm conditions. The controller is accessible remotely from any internet-enabled computer without need of propriety software.

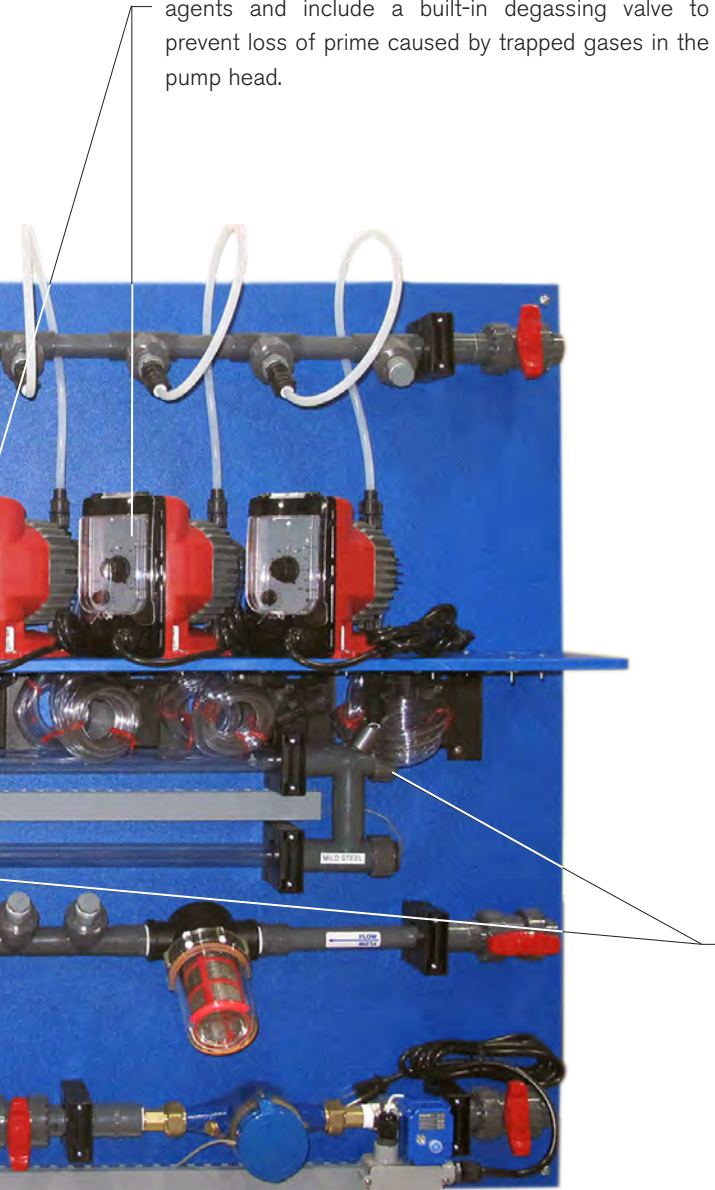
LRP CORROSION MONITORS

The MarleyGard CD panel is available with two linear polarization resistance (LRP) corrosion monitors for mild steel and copper that display mils/year reading and communicate corrosion rate to controller.



CHEMICAL METERING PUMPS

Pumps provide automatic injection of water treatment agents and include a built-in degassing valve to prevent loss of prime caused by trapped gases in the pump head.



CONTROL SYSTEM DESIGNED FOR COOLING TOWER OPERATION

Key indicators are pre-programmed, simplifying setup and eliminating guesswork. The controller offers multilevel security and accountability by providing a continuous record of system operation and performance. Five assignable relays support easy addition of data inputs to expand controller function.

Microprocessor controls and features:

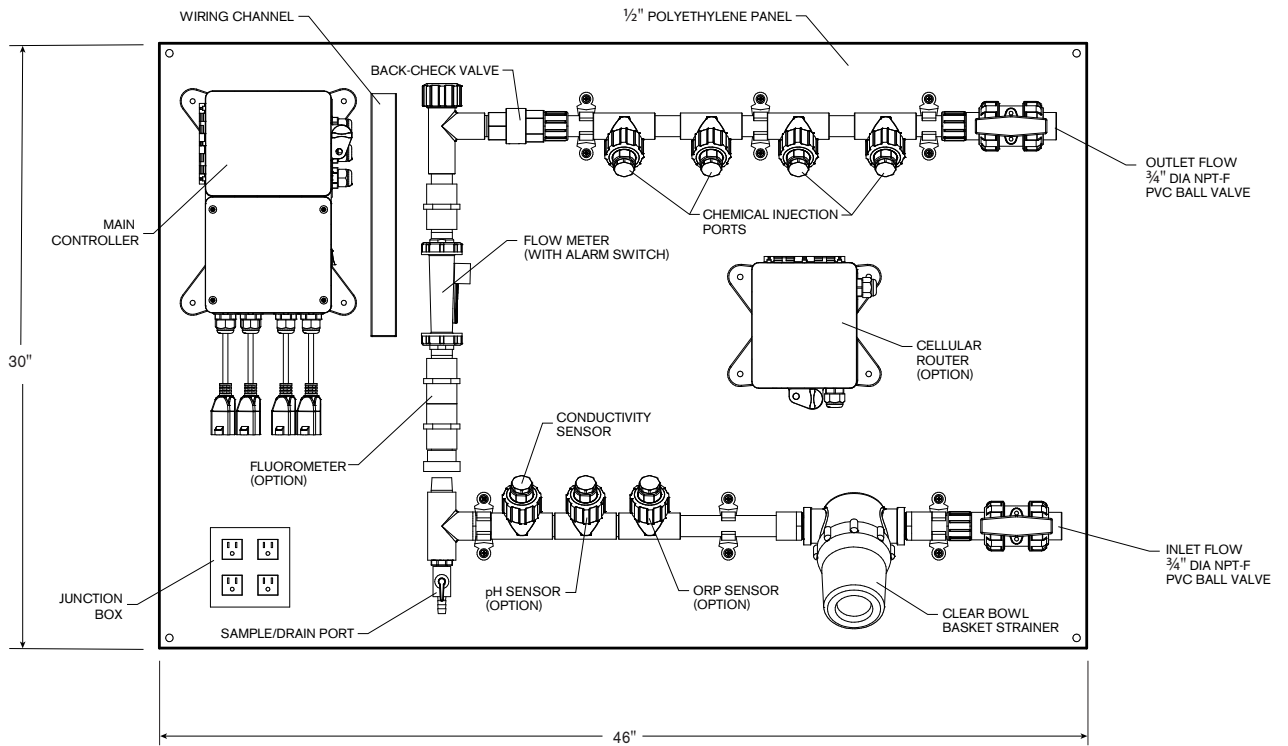
- Conductivity
- ORP
- pH – Langelier (LSI) or Ryznar (RSI) Index
- Biocide Feed
- Inhibitor Feed
- Four 4-20mA Inputs
- USB to Access Data
- Internet communications option

ACCESSORY STAND AND CABINET

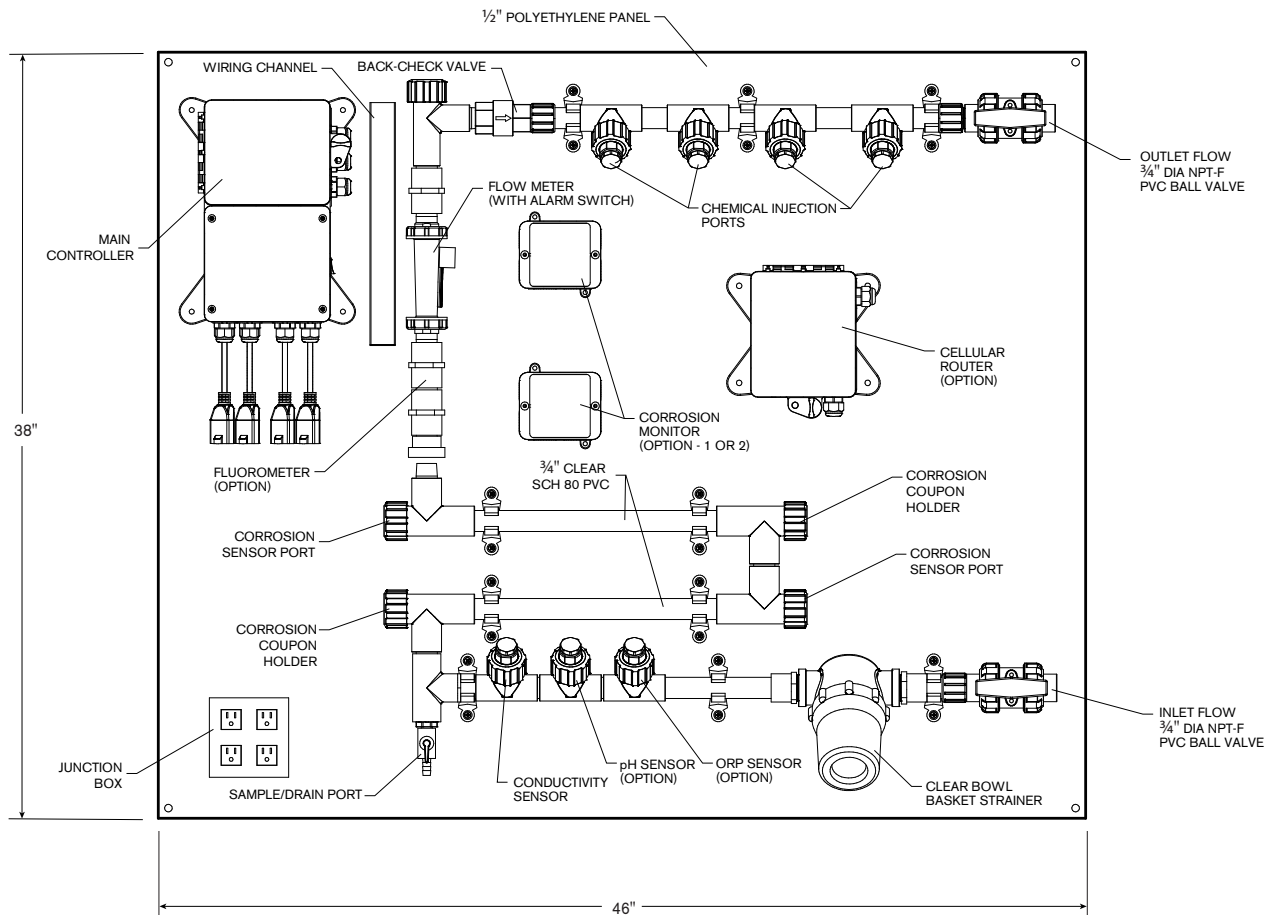
The MarleyGard CD Chemical Delivery System can be mounted to a vertical surface or to an accessory epoxy-coated tubular steel stand which is secured to the floor to create a freestanding system. A cabinet to house and protect panel components from the elements is also available.

CORROSION COUPON RACK

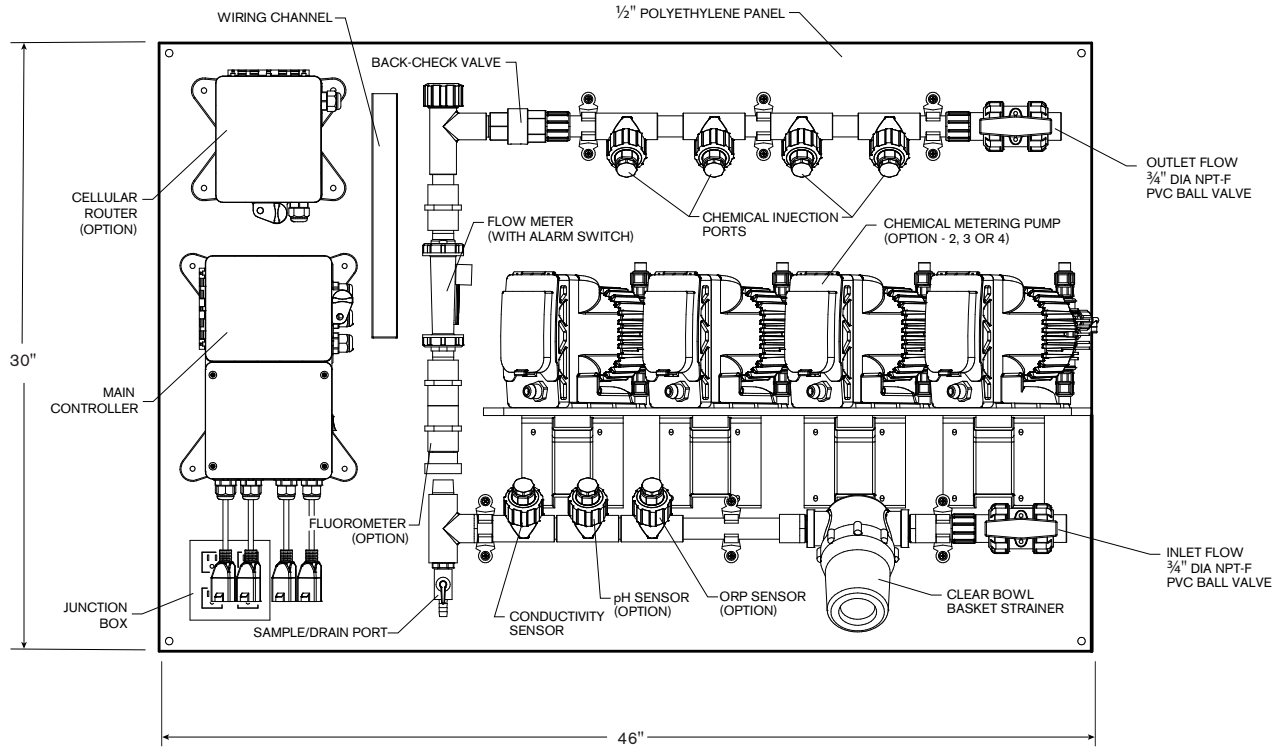
To effectively monitor corrosion, the MarleyGard CD panel is available with a two-station corrosion coupon rack with quick-disconnect coupon holders for mounting specimens. A variety of metal coupon materials are available. Control of corrosion and scale helps lower operational equipment costs and extend cooling tower life.



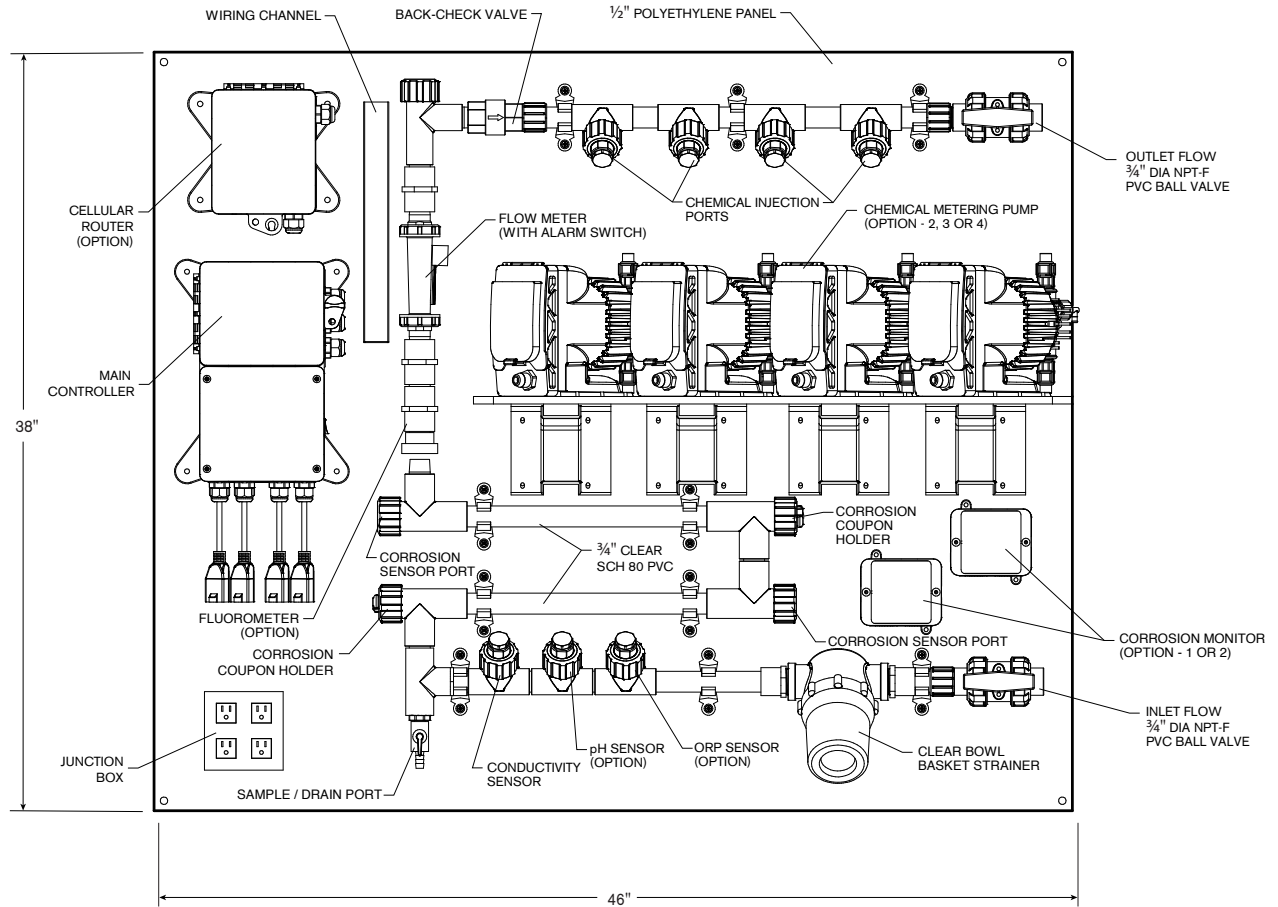
MARLEYGARD CD 1000-001



MARLEYGARD CD 1000-002



MARLEYGARD CD 1000-003



MARLEYGARD CD 1000-004

Specifications

Specification Value

- 1.0 Chemical Delivery System:**
Complete chemical delivery system or water treatment equipment shall consist of the following components:
- 1.1 Controller**
Furnish a cooling tower conductivity, make-up conductivity, pH and ORP controller with three taggable feed timers, 5 control relays, flow switch assembly, two contacting head water meter inputs, four 4-20mA inputs, detailed on-board history, and Internet-based remote communications. Controller shall accept an input line voltage of 95-240 VAC (50/60 Hz) and produce an output relay voltage of 115VAC (3-amp, individually-fused relays). Manual activation of relay outputs shall be accomplished through the use of H-O-A keys with user-defined timeouts. Controller shall feature an on/off switch and come pre-wired with an 8'-0" male power cord and five 7" female output receptacles. Controller shall be programmable via a tactile-feedback ATM-style keypad and shall feature a 16-line full graphic LCD display. Controller shall come with a front panel accessible USB port for downloading locally stored history, unit configuration and uploading of configuration files and firmware. Controller shall be housed in a NEMA 4X type housing with a padlockable, gasketed clear viewing door. Controller shall come stamped with an approved safety listing (UL, ETL, or CSA). Controller shall include a 3/4" schedule 80 PVC bypass assembly containing a conductivity, pH and ORP probe tee assembly, flow switch tee, and sample port with shut-off valve rated to 120 psi and 14°F.
- 1.1a Conductivity Control Circuit:**
Conductivity control circuit shall be capable of measuring from 0-10,000 μ S in one-microsiemen increments. Controller shall feature an adjustable set point, differential, high alarm, low alarm, and bleed limit timer. Controller shall also be able to control the bleed based on cycles of concentration method by measuring both tower and make-up conductivity. Cycles control will utilize a simple proportional logic based on
- A complete chemical delivery system helps ensure that the cooling tower owner and the selected water treatment provider have all the tools needed to automate the treatment program. An automated program helps the owner and water treatment provider protect the equipment, maintain proper treatment cycles and monitor the treatment process between regularly scheduled system inspections.
 - A range of built-in options provides the tower owner and water treatment provider with added flexibility to choose the specific parameters to monitor and control. The panel also facilitates the addition of alternate treatment mechanisms to address future water chemistry changes.





- Utilizing dual conductivity options, exact bleed-off requirements can be set even if the quality of make-up water changes. This can occur when the source water supplied to the cooling tower varies, such as between well water and surface water sources. Conventional single conductivity probe monitors only allow for tower conductivity readings. If bleed-off set point for tower water conductivity is constant and make-up water source changes, upsets can cause scaling, corrosion, loss of bacterial control and poor water conservation.

Specifications	Specification Value
<p>defined best and worst make-up water conductivity values with corresponding cycles values. Conductivity control circuit shall energize a 115VAC, 3-amp, individually-fused relay tied to a bleed valve when the system conductivity exceeds the set point and shall remain energized until the system conductivity falls below the differential level. All set points and alarm levels shall be adjustable over the full conductivity measurement range and the limit timer shall be adjustable from 0-1439 minutes.</p>	
<p>1.1b pH Control Circuit: pH control circuit shall be capable of measuring from 0-14 pH in 0.01 increments. Controller shall feature an adjustable set point, differential, high alarm, low alarm, feed interrupt for bleed or other chemical feed and feed limit timer.</p>	<ul style="list-style-type: none"> ■ Controlled pH can help increase the cycles of concentration. This in turn can help reduce water usage in some systems. The water treatment provider can advise when pH control can provide the desired benefit.
<p>1.1c Oxidation Reduction Potential (ORP) Control Circuit: ORP control circuit shall be capable of measuring 0-1000 mV in 1 mV increments. Controller shall feature an adjustable set point, differential, high alarm, low alarm and feed limit timer. ORP control shall be interlockable with a taggable timer that has been configured as a 28-day timer. If interlocked the ORP set point will switch to a second set point level during the 28-day timer's run period.</p>	<ul style="list-style-type: none"> ■ Oxidizing biocides are products such as ozone, bromine, chlorine, and chloramine. When feeding oxidizing biocides for microbial control, the ORP monitor will register the oxidizing potential of the water. While ORP does not indicate how much oxidizing product is added to the water, it can indicate that enough has been added to satisfy the system's demand. When the oxidizing potential is high enough for a pre-set period of time, the biocide can effectively kill bacteria and control algae.
<p>1.1d Taggable Timers: Controller shall feature three taggable feed timers which shall be selectable between five different activation modes (pulse, recycle, limit, post bleed, and 28-day clock). Timers shall each activate a 115VAC, 3-amp, individually-fused relay tied to a chemical feed pump based on the user-defined feed method.</p>	
<p>1.1e Water Meter Inputs: Controller shall include two digital inputs for contacting head water meter inputs and provide hourly and daily water meter usage history and be able to calculate evaporation if one water meter input is supplied in the make-up and bleed-off line.</p>	<ul style="list-style-type: none"> ■ Water meters can serve as a double check to measure bleed-off control. For water conservation reporting, it is important to have an accurate record of water used against water sent to sewer discharge. The difference in these is evaporation. In some water districts businesses or industry can receive evaporation credits on water not returned to the sewer. <p>Chemical additions also can be accurately calculated for proper dosing considerations when make-up, evaporation, and bleed-off rates are known.</p>

Specifications	Specification Value
<p>1.1f Control Relays: Controller shall feature five 115VAC, 2.5-amp, individually-fused control relays which shall be activated or disabled by multiple user-defined alarms or events and include a use-defined daily maximum "on" setting, activation delay and programmable single "on" event timer that when complete reverts back to normal operation.</p>	<ul style="list-style-type: none"> ■ Control relays are used to actuate a pump to operate, or a solenoid to open. The flow switch serves as a "safety" to insure that the system does not operate normally when, in fact, nothing normal is occurring.
<p>1.1g Flow Switch: Controller shall include a flow switch to prevent activation of relays in the event of "no flow" through the flow assembly.</p>	
<p>1.1h On-board History Collection: Controller shall automatically gather operating data such as conductivity, temperature, makeup water volume, bleed-off water volume, calculated evaporation volume and other specified digital and analog inputs at user-adjustable intervals. Controller shall include a built-in "service report" tool for the manual entry of up to ten user-defined test parameters (i.e., alkalinity, hardness, etc.). Controller shall retain all history in its onboard memory for a period of no less than one calendar year. Controller shall be able to present all data in both graphical and tabular format on the controller display without the need to export the data to another source.</p>	<ul style="list-style-type: none"> ■ When you want to know, "What Happened?" the onboard history allows users to access events for a full year. Alarms, changes in settings, variations in conductivity or chemical feed rates all can be accessed from the HMI interface on the controller screen. The user does not need separate computer access to make these checks.
<p>1.1i Digital Inputs: Controller shall include five digital inputs that can be identified as low drum level alarms or any other digital input and programmed for sensing an alarm when seeing an open or closed contact.</p>	<ul style="list-style-type: none"> ■ The user has the option to increase the controller's capacity by applying additional inputs. Even items not related to water chemistry, such as vibration alarms or fluid levels, can provide information to the control system.
<p>1.1j 4-20mA Inputs: Controller shall include four passive and isolated 4-20mA inputs that can each feature an adjustable set point, differential, high alarm, low alarm and limit timer. The name, units of measure and displayed scale of the 4-20mA shall be definable by the operator.</p>	<ul style="list-style-type: none"> ■ The control unit's four, 4-20mA inputs expand the capability of the panel to take in variable readings. The appropriate value can be assigned from 4-20 and recorded for future use on the control system.
<p>1.1k Auxiliary Flowmeter Inputs: Controller shall include one digital input for contacting head or pulse flow meter inputs and provide hourly and daily meter usage history. These inputs can be linked to a control relay for alarming when flow</p>	<ul style="list-style-type: none"> ■ When water flow stops and the electric contact head water meter fails to record flow or no flow, a serious situation can be averted. The auxiliary flowmeter can alert the user to an upset condition in operation. It works as a "safety" on water use and consumption.

Specifications	Specification Value
<p>is not occurring when expected and have minimum and maximum volume alarms for specified time intervals.</p> <p>1.11 Remote Communications:</p> <p>Network: Controller shall include a Category-5 network cable and plug for interfacing with the facility's computer network and external internet connection. Controller shall use DHCP network protocol for "plug-and-play" compatibility with modern computer networks. Controller shall not rely on phone line based dial-up connections. Controller shall be remotely accessible from any internet-enabled computer using any common web browser and shall not require that any proprietary software be installed on the remote computer(s). Controller shall maintain a persistent internet connection with its host server for continuous data collection, and all data shall be continually backed up on dual servers for historical archiving. Remote communications shall rely on encryption technology for the highest communications security level. Communications network shall allow users to receive immediate notification of any user-specified alarm conditions via e-mail (or e-mail enabled cell phones or pagers).</p> <p>Interface: Remote interface shall allow a user to view and change all of the controller's operating parameters. Remote interface shall allow viewing, graphing, and exporting all historical data including conductivity, temperature, water usage (makeup, bleed-off evaporation), and all user-defined service report fields.</p> <p>1.2 Chemical Metering Pumps: Three chemical metering pumps shall be furnished for automatic injection of water treatment chemicals. Pumps shall be rated from 0-30 gpd at a maximum injection pressure of 110 psi. Pumps shall feature a built-in degassing valve to prevent loss of prime caused by trapped gases in the pump head. Pumps materials of construction shall be suitable for the chemicals being used. Pumps shall include a foot valve, injection valve, and all required 3/8"</p>	<p>■ When upset conditions occur the MarleyGard controller can alert personnel working in a control room as well as remotely via any internet-linked phone or tablet. Remote access allows immediate evaluation and appropriate on-line changes.</p> <p>■ The three chemical metering pumps are standard to provide the basics for most conventional chemical water treatment programs, typically a corrosion/scale inhibitor and two biocides which can be alternated.</p> <p>The MarleyGard pumps are a diaphragm type pump and are fully adjustable for speed and stroke. The adjustability makes them ideal for either dilute or concentrated products.</p>



Specifications	Specification Value
<p>tubing for the suction, discharge, and priming return lines. Pumps shall be rated to accept a 115VAC input and feature a 3-amp, quick-blow fuse.</p>	<p>The additional degassing valve prevents loss of prime if air enters the pump head. All valves and tubing to complete connections are supplied.</p>
<p>1.3 Water Meters: Two 3/4", 1" or 2" bronze-body multi-jet contacting-head water meter with totalizer shall be furnished for the makeup water line and the bleed-off water line. Water meters shall feature a 10 gpc electrical dry contact output for transmitting both makeup and bleed-off volume to the cooling tower controller.</p>	
<p>1.4 Bleed-off Assembly: A 3/4" brass shutoff valve shall be furnished with a zero-psi differential brass-body motor open spring return ball valve. Ball valve shall accept a 115VAC input.</p>	<p>■ Concentrated water must be discharged from the system once maximum operating cycles of concentration are reached. A bleed-off assembly is provided to insure that the water discharge is controlled properly. The second contact water meter will "check" the flow to be certain debris or other mechanical failure does not prevent the bleed-off assembly from performing its task.</p> 
<p>1.5 Corrosion Coupon Rack: A two-station corrosion coupon rack constructed of 3/4" schedule 80 PVC with clear PVC piping over the coupons shall be furnished. Coupon rack shall be mounted on a high density 1/2" thick blue polyethylene panel and shall include inlet and outlet shutoff valves and flow indicator. Coupon rack shall feature four O-ring sealed quick-disconnect coupon holders with nylon hardware for mounting each coupon specimen.</p>	<p>■ Because corrosion is detrimental to the system, the corrosion rack provides a way to monitor the corrosive effect of the system water on the metals in the cooling tower. Corrosion coupons of various types of metals provide the owner and water treatment provider with valuable information about the performance of the water treatment program to prevent corrosion.</p>
<p>1.6 Display Panel: A prefabricated panel with the controller, chemical metering pumps and sample stream assembly shall be furnished complete with quick release injection tees, a clear plastic bowl strainer, back check, flow indicator, two quick release corrosion monitor probe tees and isolation valves pre-mounted on a high density 1/2" thick blue polyethylene panel to insure correct installation of water treatment equipment.</p>	<p>■ All components are mounted on one panel which provides easy access to actuated controls and monitors associated with the system.</p>

Specifications

Specification Value

- 1.7 **Corrosion Monitors:**
Two stand-alone LPR corrosion rate monitors shall be furnished with a displayed mils/year reading and mA output of corrosion rate to main controller.
- 1.8 **Fluorometer Monitor:**
Furnish an online fluorometer sensor for continuous monitoring and control of PTSA traced inhibitor chemicals. Sensor is to be factory installed, plumbed into the sample loop and factory prewired to controller's mA input card and tested.
- 1.9 **Cellular Communication:**
A cellular router with 12 or 24 months of pre-paid data service shall be provided for connecting the controller and cloud-based monitoring program.
- As an option, electronic corrosion monitors can be added to verify and record system corrosion rates in real time.
 - For clients who prefer adding traceable products to their process systems, fluorometers can detect, monitor and record precise treatment dosages. Traced chemical products can reduce the normal testing required from traditional treatment programs. This allows plant operators to spend time on other projects.
 - In locations where a communication line to the controller cannot be established, a cellular router can be installed to provide remote access and communication (third party user fees and rates apply).



SPX Cooling Technologies designs and manufactures cooling towers and other specialized heat exchangers, and provides water management products to support the execution of an effective water management plan(WMP) as outlined in ANSI/ASHRAE Standard 188-2015. Water treatment professionals should be consulted to perform chemical delivery services.

SPX COOLING TECHNOLOGIES, INC.

7401 WEST 129 STREET
OVERLAND PARK, KS 66213 USA
913 664 7400 | spxcooling@spx.com
spxcooling.com

MGCD-TS-18 | ISSUED 3/2018

© 2018 SPX COOLING TECHNOLOGIES, INC | ALL RIGHTS RESERVED
In the interest of technological progress, all products are subject to design and/or material change without notice.

