**PLEASE NOTE: The following specification contains areas, highlighted in yellow and with the [ ] symbol. In these areas, the engineer must make a selection, add specific, project related information and should delete what is not applicable for the specific project.**

PART 1 GENERAL

* 1. Section includes:
		1. A single or dual channel water quality sensor transmitter with a local user interface AND the ability to access sensor data remotely through a browser enabled device.

[ ] Single channel [ ] Dual channel

* + 1. Scope
			1. Provide labor, material, equipment, related services, and supervision to install and operate the controller to drawings and manufacturer’s specifications.
		2. Alternates
			1. Parameter-specific controllers that do not allow changing parameter configurations in the field are unacceptable.
			2. Controllers or transmitters without the possibility to access data through an internet browser enabled device and cannot present real-time instrument diagnostics are not acceptable.
	1. System Descriptions
		1. Design requirements
			1. Includes capability to actively monitor all internal components and present diagnostics on the overall health of connected sensors and time to next required maintenance, reducing user risk.
				1. Ability to see and be notified of upcoming and past due maintenance.
			2. Includes capability to provide real-time alerts when sensor issues occur with built in workflows with step-by-step guidance to perform calibration and maintenance tasks, reducing user risk.
			3. Includes ability for a cellular network coverage OR Wi-Fi connection OR a LAN connection.
			4. Supports advanced communication protocols, including Profibus DPV1, Modbus TCP/IP, Profinet IO, and Ethernet IP.
			5. Provides capability to view all connected plant measurements, alerts, calibration, and maintenance status in real time on any internet browser capable device.
				1. Connects with overall data system for real time graphic of both online and laboratory data for a full picture of functional plant operational capability.
			6. Controller designed to be used in indoor or outdoor locations.
		2. Performance Requirements
			1. The controller accepts digital sensors in any combination to measure the following water quality parameters:
				1. pH/ORP
				2. Conductivity
				3. Dissolved Oxygen
				4. UV Organics
				5. Sludge level
				6. Ammonium
				7. Ammonia
				8. Nitrate
				9. Combination Ammonium and Nitrate
				10. Total suspended solids
				11. Orthophosphate
				12. Turbidity
				13. Free/total Chlorine
				14. Combination Chlorine HOCl /Chlorine+Acid / Total free chlorine
				15. Ozone in water
				16. Chlorine Dioxide
				17. Oil in Water
				18. Nitrite
		3. Environmental Requirements
			1. Operational Criteria
				1. Operating Temperature:

Ethernet version: –20 to 45 °C (–4 to 113 °F)

Cellular version including Controller and external Cellular USB BOX: -20 to 60

°C (-4 to 140 °F)

Wi-Fi version including Controller and external Wi-Fi USB BOX: -20 to 60 °C (- 4 to 140 °F)

* + - * 1. Storage temperature: –20 to 70 °C (–4 to 158 °F)
				2. Relative humidity: 0 to 95%, non-condensing
				3. Altitude ≤3000m (6,562 ft.)
	1. Certifications
		1. EMC: CE approved (with all sensor types). Listed for use in general locations to UL and CSA safety standards by ETL (with all sensor types).
		2. Safety: General Purpose UL/CSA 61010-1 with cETLus safety mark
		3. Possibility for Hazardous Locations Use: Class 1 Div 2
	2. Warranty
		1. Warranted for 1 year from date of shipment from manufacturer defects.
	3. Unscheduled Maintenance
		1. Clean controller face
		2. Calibrate mA output signals PART 2 PRODUCTS
	4. Manufacturer
		1. Hach Company, Loveland, Colorado and Hach Lange GmbH, Berlin, Germany
			1. SC4500 Controller
	5. Manufactured Unit
		1. Microprocessor-based sensor controller.
		2. Change digital sensors connected to the controller by unplugging and plugging in sensors as necessary.
		3. Modules for connection of Analogue sensors for pH, ORP or Conductivity
		4. The controller is available with the following power requirements:

AC powered: 100–240 VAC ±10%, 50/60 Hz; 1 A (28 W sensor load)

DC powered: 24 VDC +15% –20%; 2.5 A (20 W sensor load)

* + 1. The controller uses a menu-driven operation system.
		2. The controller is equipped with a real-time clock.
		3. The controller is equipped with two security levels.
		4. The controller shall have worded operation menus in 24 languages.
		5. The controller is equipped with an USB reader for data download and controller software upload.
		6. High voltage:

Two relays (SPDT);

Wire gauge: 0.75 to 1.5 mm2 (18 to 16 AWG)

**AC controller**

Maximum switching voltage: 100–240 VAC

Maximum switching current: 5 A Resistive/1 A Pilot Duty Maximum switching power: 1200 VA Resistive/360 VA Pilot Duty **DC controller**

Maximum switching voltage: 30 VAC or 42 VDC Maximum switching current: 4 A Resistive/1 A Pilot Duty

Maximum switching power: 125 W Resistive/28 W Pilot Duty

* + 1. Five analogs 0/4-20 mA outputs are provided with a maximum impedance of 500 ohms.
			1. The controller can be equipped with five 4-20 mA outputs with a maximum impedance of 500 ohms.
			2. The following can be programmed:
				1. Alarms:

High and Low alarm point

High and Low alarm point deadband

On and Off delay

* + - * 1. Controls

Linear

PID

* + 1. The controller can be equipped with the following forms of communication:
			1. Profibus DP
			2. Modbus TCP/IP
			3. Profinet (ODVA certified)
			4. Ethernet IP (ODVA certified)
		2. The controller can host one of the compatible RTC modules
		3. All user settings of the controller are retained for 10 years in flash memory.
		4. The controller is equipped with a system check for:
			1. Motherboard temperature
			2. Field auto-test
	1. Equipment
		1. Materials
			1. Housing: polycarbonate, aluminum (powder coated), and stainless steel Metal enclosure with a corrosion-resistant finish
			2. Rating: UL50E type 4X, IEC/EN 60529–IP 66, NEMA 250 type 4X
		2. Conduit openings: 0.5 in. NPT
	2. Components
		1. To deliver:
			1. Controller as described in section 1.1.A
			2. Mounting hardware for wall, pipe, and panel mounting
			3. User manual and installation documentation
		2. Dimensions: Refer to controller drawings
		3. Weight: 1.7 kg (3.7 lbs.)
	3. Instrument Options & Accessories

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 Must be added to instrument at time of order.

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 [ ] Power cord (specify geography)

[ ] Hazardous location rating (C1D2)

[ ] Internet Connection (via LAN, Cellular, or Wi-Fi)

[ ] Modbus TCP/IP

[ ] 4-20mA input module

[ ] 4-20mA output module, 5 outputs

[ ] Profibus DP network module [ ] Profinet IO (ODVA certified)

[ ] Ethernet IP (ODVA certified)

[ ] M12/RJ45 connector kit (Ethernet cable) [ ] M12/M12 connector kit (Ethernet cable) [ ] LZY472-01 USB adapter

[ ] Ethernet cable M12 to M12, 10 m [ ] Ethernet cable M12 to RJ45, 5 m

[ ] Mobile holder

[ ] Memory-Stick (USB)

[ ] UV protection screen

[ ] UV protection screen with sun roof [ ] Cellular USB Box

[ ] Wi-Fi USB Box

[ ] RTC Module

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PART 3 EXECUTION

* 1. Preparation
		1. Mounting
			1. Mount the controller as shown on the drawings
	2. Installation
		1. Install controller following transmittal drawings and instrument user manual.
	3. Manufacturer’s Service and Start-Up
		1. Contractor will include manufacturer’s services to perform commissioning of the system to include device provisioning to communicate via local protocols and initiate initial product configuration
		2. Contractor will include the manufacturer’s services to perform start-up on instrument to include basic operational training and certification of performance of the instrument.
		3. Contractor will include a manufacturer’s Service Agreement that covers all the manufacturer’s recommended preventative maintenance, regularly scheduled calibration and any necessary repairs beginning from the time of equipment startup through to end user acceptance / plant turnover and the first 12 months of end-user operation post turnover.
		4. Items A and B are to be performed by manufacturer’s factory-trained service personnel. Field service and factory repair by personnel not employed by the manufacturer is not allowed.
		5. Use of manufacturer’s service parts and reagents is required. Third-party parts and reagents are not approved for use.

END OF SECTION