Email: info@capred.org



DEMONSTRATION OF SCADA IN CLEAN WATER SUPPLY

Core Components of SCADA

This document provides detailed technical specifications for the core components required for the SCADA system integration in the water production facility. The specifications ensure that bidders have a clear understanding of the quality, performance, and compatibility requirements for each component. These technical guidelines are designed to maintain consistent performance, reliability, and operational efficiency across different installations while allowing bidders the flexibility to propose suitable solutions.

Depending on the nature of components, technical specifications may focus on different parameters and performance. If not explicitly stated, bidders are free to select components as long as they align with the overall project goals and contribute to the successful implementation.

The core components are listed below:

- PLC (If not used, no need to follow):
 - o Power Input: 12-24 VDC
 - Digital Input: Isolated, 0-24 VDC input range
 - o Digital Output: Isolated, 0-24 VDC output range, Dry Switch or Open Collector
 - o Analog Input (Voltage): 0-10 VDC input range, 10-bit resolution or higher
 - o Analog Input (Current): 4-20 mA input range, 10-bit resolution or higher
 - o Analog Output (Voltage): 0-10 VDC output range, 10-bit resolution or higher
 - o Analog Output (Current): 4-20 mA output range, 10-bit resolution or higher
 - o Support I/O Extension: At least 64 I/O points or 8 Extension Modules
 - o Support Network: RS485, LAN (10/100/1000 Mbps)
 - Network Protocol: Modbus RTU, Modbus TCP, MQTT
 - Warranty: 2 Years.
- Input/Output Extension (If not used, no need to follow):
 - o Power Input: 12-24 VDC
 - o Digital Input: Isolated, 0-24 VDC input range
 - Digital Output: Isolated, 0-24 VDC output range, Dry Switch or Open Collector
 - o Analog Input Voltage: 0-10 VDC input range, 10-bit resolution or higher
 - o Analog Input Current: 4-20 mA input range, 10-bit resolution or higher
 - Analog Output Voltage: 0-10 VDC output range, 10-bit resolution or higher
 - Analog Output Current: 4-20 mA output range, 10-bit resolution or higher
 - Support Network: RS485 or LAN
 - o Network Protocol: Modbus RTU or Modbus TCP or MQTT
 - Warranty: 2 Years.
- Digital Flow Meter:
 - Liquid Type: Water, Sewage
 - o Fluid Velocity: 0-7 m/s
 - o Turbidity: 0-1000 NTU with little bubble
 - o Fluid Temperature: 0-100 °C
 - o Pipe Material: Steel, Stainless, Cast iron, Copper, Cement, PVC, HDPE
 - o Pipe Diameter: 100-1000 mm





- o Transducer Type: Clamp-on or Insertion Ultrasonic Transducers
- Communication: RS485, Modbus-RTU
- Baud Rate: 1200-38400 bps Accuracy: 1% (Standard)
- Working Temperature: 0-60 °C (Controller), 0-100 °C (Transducer)
- o Working Under Water: 2 m (After completely sealing) for both Controller and
 - Transducer
- Warranty: 2 Years.
- Digital Power Meter:
 - o Phase: 3 Phase
 - o Rating Voltage: 220/380 VAC
 - Rating Current: Depending on the Load
 - o Frequency: 45-65 Hz
 - Withstand Voltage: > 2 kV/1 min
 - o Insulation between Terminal and Chassis: > 100 $M\Omega$
 - Accuracy: 1% (Standard) Display Type: Digital Display
 - o Communication: RS485, Modbus-RTU
 - o Baud Rate: 1200-38400 bps
 - Warranty: 2 Years.
- Water Pressure Sensor for Booster Pump System:
 - o Power Supply: 24 VDC
 - Measurement Range: 0-10 Bar
 - Measuring Media: Gaseous, Liquid, Water
 - Medium Temperature: -40 to 80 °C
 - Environment Temperature: -40 to 85 °C
 - Compensation Temperature: At least -10 to 70 °C (Standard)
 - o Pressure Type: Gauge Pressure, Absolute Pressure
 - Accuracy: 1% Full Scale (FS)
 - o Overload: 200%
 - Temperature Drift: ≤ 0.03 % FS/°C Long-term Stability: ≤ 0.2 % FS/Year
 - Display Type: Digital
 - o Communication: RS485, Modbus-RTU
 - Baud Rate: 1200-38400 bps o Protection Grade: IP65
 - Warranty: 2 Years.
- Water Pressure Switch for Booster Pump System:
 - Rating Power: 250 W o Rating Current: 0.5 A
 - Rating Voltage: 220 VAC, 24 VDC
 - Measurement Range: 0.1-7 Bar (Adjustable)
 - o Maximum Endurance: 10 Bar
 - Measuring Media: Compressed Air, Water
 - o Medium Temperature: -5 to 60 °C
 - o Environment Temperature: -5 to 60 °C
 - Switch Type: Normally Close (NC)

Address:17th, GIA Tower, Sopheak Mongkol Rd, Koh Pich, Phnom Penh, Cambodia.

Protection Grade: IP54







- Warranty: 2 Years
- Water Pressure Sensor for Water Tank (Water Level Sensor):
 - o Power Supply: 24 VDC
 - o Measurement Range: 0-10 m
 - o Measuring Media: Liquid, Water
 - o Medium Temperature: -20 to 85 °C
 - o Working Temperature: -40 to 80 °C
 - Accuracy: 1% Full Scale (FS)
 - o Overload: 200%
 - o Sensitivity Drift: ≤ 2 % FS
 - o Zero Drift: ≤ 2 % FS
 - Long-term Stability: ≤ 2 % FS/Year
 - o Communication: RS485, Modbus-RTU
 - o Baud Rate: 1200-38400 bps
 - Protection Grade: At least IP68
 - Warranty: 2 Years.
- Float Switch (Water Level Sensor) for Intake:
 - Use Media: Water, Oil
 - Max Contact Rating: 10 W
 - Max Switching Voltage: 220 VDC
 - o Max Switching Current: 1.5 A
 - o Max Breakdown Voltage: 300 VDC
 - o Max Carry Current: 3.0 A
 - \circ Max Contact Resistance: 100 M Ω
 - o Temperature Rating: -30 to 125 °C
 - o Material: Stainless Steel
 - o Length: 150 mm (Recommended)
 - o Type: Double Balls Float Switch, Straight
 - Warranty: 2 Years.
- Float Switch (Water Level Sensor) for Water Tank:
 - o Use Media: Water, Oil
 - Max Contact Rating: 10 W
 - Max Switching Voltage: 220 VDC
 - o Max Switching Current: 1.5 A
 - Max Breakdown Voltage: 300 VDC
 - Max Carry Current: 3.0 A
 - Max Contact Resistance: 100 MΩ
 - o Temperature Rating: -30 to 125 °C
 - o Material: Stainless Steel
 - o Length: 100 mm (Recommended)
 - Type: Single Balls Float Switch, L Type
 - Warranty: 2 Years.
- Non-Contact Level Switch (Liquid Level Sensor) for PAC or CL Container:
 - o Voltage Range: 5-24 VDC
 - Use Media: Water (cold, hot, boiling), Liquid
 - Use Container/Tube/Pipe: Mon-Metallic (Plastic, Glass, Ceramic)
 - o Sensing Distance: Max 20 mm
- Sensing Type: Capacitance Sensor
 Address:17th, GIA Tower, Sopheak Mongkol Rd, Koh Pich, Phnom Penh, Cambodia.





- o Compatible Tube/Pipe Diameter: Min 12 mm
- Output Type: 5-24 VDCDisplay Status: LED
- Warranty: 2 Years.
- Turbidity Sensor (Water Quality Monitoring) with Controller:
 - o Power Supply: 220 VAC, 50-60 Hz
 - o Measurement Range: 0-1000 NTU (Intake), 0-50 NTU (Clean Water)
 - o Resolution: 0.1 NTU (Intake), 0.01 NTU (Clean Water)
 - o Accuracy: 5% FS
 - Use Medium: Sewage, Tap Water, Water
 - Working Temperature: 0 to 40 °CDisplay Mode: Digital (Optional)
 - Communication: RS485, Modbus-RTU
 - Baud Rate: 1200-38400 bps
 Protection Grade: IP68
 Warranty: 2 Years.
- Residual Chlorine Sensor (Water Quality Monitoring) with Controller:
 - Power Supply: 220 VAC, 50-60 Hz
 Measurement Range: 0-20 mg/L
 - o Resolution: 0.01 mg/L
 - Use Medium: Sewage, Tap Water, Water
 - o Working Temperature: 0 to 50 °C
 - o Pressure Resistance: 6 Bar
 - Display Mode: Digital (Optional)
 - o Communication: RS485, Modbus-RTU
 - o Baud Rate: 1200-38400 bps
 - o Protection Grade: IP65
 - Warranty: 1 Years.
- PH Sensor (Water Quality Monitoring) with Controller:
 - o Power Supply: 220 VAC, 50-60 Hz
 - o Measurement Range: 0-14 pH
 - o Resolution: 0.01 pH
 - Use Medium: Sewage, Tap Water, Water
 - Working Temperature: 0 to 80 °C
 - o Pressure Resistance: 6 Bar
 - Display Mode: Digital (Optional)
 - o Communication: RS485, Modbus-RTU
 - o Baud Rate: 1200-38400 bps
 - o Protection Grade: IP65
 - Warranty: 1 Years.
- Total Dissolved Solids (TDS) and EC Sensor (Water Quality Monitoring) with Controller:
 - o Power Supply: 220 VAC, 50-60 Hz
 - O Measurement Range: 0-1100ppm (TDS), 0-2000 μS/cm (EC)
 - o Resolution: 0.1 μS/cm
 - o Accuracy: 1% FS
 - Use Medium: Sewage, Tap Water, Water
 - Working Temperature: 0 to 80 °C

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Pressure Resistance: 6 Bar





Display Mode: Digital (Optional)

Communication: RS485, Modbus-RTU

Baud Rate: 1200-38400 bpsProtection Grade: IP68

Warranty: 1 Years.

• Sludge Detector with Controller:

Voltage Range: 5-24 VDC

o Use Medium: Water

Working Temperature: 0 to 60 °C

Sensing Type: Capacitance/Conductivity Sensor (Depending on Bidder)

o Communication: RS485, Modbus-RTU

Display Mode: Digital (Optional)

Baud Rate: 1200-38400 bps

o Protection Grade: IP65

Warranty: 1 Years.

Dosing Pump:

Operating Voltage: 220/380 VAC (Depending on Bidder)

Operating Frequency: 50 HzFlow Rate: Depending on Bidder

o Pressure: Depending on Bidder

 Liquid Type: Poly Aluminum Chloride (PAC), Chlorine (CL), Acid, Medicine, Chemical...

o Suction: 2 m

Display Type: Digital (Optional)

Control Mode: External Signal Controlled (Stroke Frequency or Stroke Length)

Signal Control Type: 0-20 mA (Depending on Bidder)

Warranty: 1 Years.

Network Switch:

o Power Supply: 12-24 VDC

o Mount: DIN Rail or Wall Mounted

Working temperature: -40 to 75 °C

Working humidity: 10 to 90% RH, Non-Condensing

o Device Type: Ethernet Switch

Number of Port: 5 or 8 RJ45 Port

 Support Network Protocol: IEEE 802.3, 802.3i, 802.3u, 802.3x, compatible with Modbus

• TCP, Ethernet/IP, Profinet

Transmission Rate: 10/100 Mbps

Communication Mode: Full-Duplex & Half-Duplex

Warranty: 2 Years.

Network MoDem:

o Power Supply: 12-24 VDC

Rating Current: Max 3A

Network Technology: GSM/CDMA/HSPA/LTE
 2G Band: Band 8 (900 MHz), Band 3 (1800 MHz)

o 3G Band: Band 1 (2100 MHz)





- 4G Band: Band 5 (850 MHz), Band 8 (900 MHz), Band 3 (1800 MHz), Band 1 (2100 MHz), Band 7 (2600 MHz)
- Communication: RS232, RS485Baud Rate: At least 1200-38400 bps
- Warranty: 2 Years.
- IoT Gateway:
 - o Power Supply: 12-24 VDC
 - Rating Current: Max 3A
 - Network Technology: GSM/CDMA/HSPA/LTE
 2G Band: Band 8 (900 MHz), Band 3 (1800 MHz)
 - o 3G Band: Band 1 (2100 MHz)
 - 4G Band: Band 5 (850 MHz), Band 8 (900 MHz), Band 3 (1800 MHz), Band 1 (2100 MHz), Band 7 (2600 MHz)
 - o Communication: LAN, Wi-Fi (Optional)
 - Network Protocol: MQTT
 - Warranty: 2 Years.