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ALARMAGENT.COM ® WIRELESS, WEB-BASED MONITORING EQUIPMENT AND SERVICES SPECIFICATION

August 21, 2006

PRODUCT DESCRIPTION

Wireless, web-based alarm detection and notification system from RACO designed specifically for water and wastewater applications. Dependable alarm monitoring and detection. Highly customizable notification preferences. Around-the-clock status access from almost anywhere.

System shall be sufficiently robust to permit direct user on demand management of the following functions via the web; administration and configuration of WRTUs, system preferences, users, reporting parameters, and report generation, requiring no direct participation by the manufacturer.

AlarmAgent.com' s report generation capability is optimized for pump applications. Users can spot clogged or malfunctioning pumps in time to prevent a major disaster. And, for the first time, small pump stations can report flow data without a flow meter.

A service contract with local cellular carriers shall not be required for RTU operation. The WRTU (Wireless Remote Terminal Unit) shall communicate with a dedicated web site via wireless cellular communications.

AlarmAgent.com combines the latest in data communications and wireless technology with the reliability and reputation of RACO's half-century of industry experience.

MANUFACTURER REQUIREMENTS

The Manufacturer of the equipment and provider of related services shall provide evidence of, and warrant compliance with, substantially all below listed requirements.

The Manufacturer/Service Provider shall have been in business providing remote monitoring services to the water distribution / wastewater collection industry or a substantially similar industry for at least five years.

The submitting Company shall have, on staff, engineering and operational personnel with at least twenty years of combined experience in designing, manufacturing and operating wide area monitoring and alarm products for remote facilities in the Water and Wastewater marketplace.

SECTION 1 - WIRELESS RTU (WRTU) FIELD EQUIPMENT REQUIREMENTS

1) The WRTU shall have the following minimum complement of inputs and outputs:

A) 8 Digital Inputs
8 digital inputs monitoring dry (unpowered) contacts. These inputs shall be opto-isolated and surge protected, and shall also be drivable by five volt logic outputs. Open circuit voltage shall be 5 volts; closed circuit current shall be 1.5 milliamperes. All digital inputs shall use a single common return.

B) 2 Universal Analog/Digital Inputs:
2 analog 4-20 ma inputs shall be provided, with 10 bit resolution (0.125%), single ended and surge protected. Absolute accuracy shall be 0.5%. Independent High and Low set points shall be provided for each analog input.

The current loop integrity shall be maintained even when the RTU is turned off. Loop resistance shall be nominally 250 ohms.

The two analog inputs shall be user-configurable to serve as additional digital inputs in lieu of analog, without need for physical settings at the RTU.

C) Relay Contact Outputs
2 Normally Open relays. Contacts shall be rated 1/2 ampere @ 120 VAC. These outputs shall be operable on an occasional basis from the web site, in either momentary or maintained mode.

2) LED Indicators shall include, both performance and diagnostic categories

A) Performance:
RTU on/off
RTU Armed/Disarmed
Battery charge state
Transmitting state
Continuous Signal Strength Indicator: A 10-element bar graph shall provide continuous detailed indication of received radio signal strength without reliance upon counting LED flashes or similar schemes.

B) Diagnostic:
Input state for each digital input
Primary power input present
Output Relay(s) activated
Radio status
Account status
Alarm status
Violation status (an input is in violation but has not yet tripped into Alarm)
Suspended status
Test Button Ready status

3) Serial Port with VT-100 User Interface
The RTU shall include an RS-232 serial port incorporating VT-100 terminal emulation via a standard D-9 connector, providing a convenient user-navigated, menu driven interface as an optional method of user configuration.

4) Test Call Button:
A Test Call Button shall be included on the RTU. When a test call phone number has been entered by the user at the web site, pressing the Test Call Button shall result in a special phone call being placed to that phone number. The call shall include indication of the signal strength as received at the local cellular tower.

5) User Configuration
The basic RTU configuration items shall be performable via local switch settings on the RTU, via the Serial Port on the RTU, or remotely via the web site.

With all digital inputs in their non-alarm state, pressing an "accept" pushbutton on the RTU shall automatically set the open/closed alarm criteria for each input.

The RTU shall at the user's option be configurable from the web site without need to visit the RTU.

6) In-Field Firmware Upgrade Feature
Future firmware enhancements of the operating features of the RTU shall at user's option be implemented by temporarily plugging in a disposable upgrade module provided by the RTU manufacturer.

7) Wiring Connections
All wiring connections shall be via unpluggable screw-clamp terminal blocks, which accommodate 16 to 26 AWG wire.

8) Power Requirements

A) The RTU shall operate on 12 to 24 VDC power input.
With 12 VDC input, current shall be 1 ampere peak 200 ma. average. With 24 VDC input, current shall be 0.5 ampere peak, 100 ma average. Surge protection shall be 1,500 watts peak. The fuse shall reset automatically.

B) The RTU shall be operable in a reduced solar power mode. Average current in this mode shall be 60 ma or less. The RTU shall not power down in the solar power mode, allowing it to be contacted by the web site at all times.

C) The RTU shall incorporate a sealed lead-acid backup battery contained within the enclosure. The battery shall be automatically charged, providing 24 hours nominal backup time. All enclosure options shall accommodate the battery internally.

Upon power failure, the battery shall maintain RTU operation continuously until it reaches a fixed discharge level or until power is restored. The RTU shall not power down during power failure, allowing it to be contacted via the web site at any time, even during power failures.

9) Environmental
The operating temperature range shall be -30 to + 70 ^{o}C (-22 to +158 ^{o}F)
The storage temperature range shall be -40 to + 85 ^{o}C (-40 to +185 ^{o}F)
Allowable humidity shall be 0 to 95% non condensing.

10) Physical

The RTU shall be available in the following form factors:

A) Durable Indoor enclosure version 9.6"H x 4.35" W x 2.75" D
B) Open chassis (no enclosure) version 9.6"H x 4.0" W x 2.44" D
C) NEMA4X enclosure version 8.1"H x 4.33" W x 5.5" D

All three enclosure options shall incorporate all electronics plus the backup battery.

A DIN rail mounting kit shall be available for vertical mounting of the Open Chassis and Indoor Enclosure versions.

For pump station monitoring, the primary signal wiring connections shall be dry contact inputs reflecting the on/off state of each pump. No other input connections shall be required to provide all the pump monitoring functions described below.

11) Alarm and Return To Normal Reporting
The RTU shall transmit both alarms and returns to normal to the web site. Web site settings shall determine whether actual notifications are delivered to users upon return to normal.

12) Alarm Suspension:
The RTU shall incorporate means to suppress alarm reports arising from any given input going in and out of alarm repeatedly. Such suspensions shall apply only to the input involved. Notification shall be provided when such suspensions occur. Such suspensions will automatically clear upon receipt of template reports or when manually cleared at the RTU.

13) Pumping Station Performance Reports:
The RTU shall automatically generate daily reports of the following pumping station performance parameters, presented at the web site, in both tabular and visual/graphic formats:

● Run time for each pump, both daily and cumulative
● Run time ratio between pumps
●Number of starts for each pump
●Starts Ratio between pumps
●GPM output for each pump
●Total station flow without need for flowmeters.
●Hours with two pumps running simultaneously (2-pump stations only)
●Hours to Maintenance based upon cumulative run times (two tracks per pump)

14) Pump Performance Alarm
Independent of the daily reports, the RTU shall promptly and automatically generate Alarm Notifications upon sudden sustained drop in GPM performance of any pump. The sensitivity of this alarm function shall be user configurable to allow for variation in conditions between pumping stations.

15) Pump Performance Application Templates
To simplify configuration, the RTU shall provide the following Application Template settings according to the pumping station setup:

Template #	# of pumps monitored	Reports Pulse flowmeter* Totals	Reports Hours with 2 pumps running	Additional digital inputs available	Analog/ digital inputs available
1	2	No	Yes	6	2
2	2	Yes	Yes	5	2
3	3	No	No	5	2
4	3	Yes	No	4	2

*Alternatively, rain gauge pulses may be reported. The maximum pulse input rate shall be 10 Hz at 50% duty cycle. The minimum pulse closure time shall be 50 milliseconds.

16) Other General Purpose Application Templates
Other Application Templates shall also be selectable for General Purpose monitoring applications, incorporating various configurations of pulse-counting, time accumulation, digital and analog inputs.

Limited Warranty
The Manufacturer shall provide a three year limited warranty on all equipment provided.

Equipment Designation:
The RTU shall be an AlarmAgent WRTU as provided by RACO Manufacturing and Engineering, Emeryville, CA 94608 (510) 658 6713.

SECTION 2 – ALARMAGENT.COM WEB SITE, SERVER AND NOTIFICATION REQUIREMENTS

The Web Site associated with the RTU shall be implemented on a quintuple-redundant multiple server system with immediate failover, load leveling and hot standby firewall. Servers shall be located in a highly secure facility, which includes a seamless Uninterruptible Power Supply (UPS).

Private information is protected over the internet. All pages are encrypted with 128-bit encryption utilizing SSL (Secure Sockets Layer) with an SSL Certificate from a major Certificate Authority (CA). Additionally, RACO will not sell any information collected by the web site to any third parties.

1) Access to the Web Site shall be secured by individual user logon names and passwords. The user may optionally establish individual user PINs which, if implemented, will be required to acknowledge alarm notifications and to access the AlarmAgent system by call-in to a toll free telephone number.

The Web Site shall allow two access levels: Users and Customer System Administrators (CSAs).

2) The Web Site shall allow all users to do the following:

A. View a “System Dashboard” which provides an overview of any alarms, acknowledged alarms and other special status conditions of all RTUs in the system. This shall include a list of any RTUs, which are Off Line or Disarmed.

B. Generate and view reports for each RTU in the system. Available reports for all users shall include Pump Performance, Analog Reading, Status History and Arm/Disarm reports.

C) Pump Performance Reports shall present critical pump performance data for each selected RTU over a selected span of time in both tabular and graphic form. The data presented shall include:

Daily and cumulative Run Time for each pump
Ratios of daily run times
Daily number of starts for each pump
Ratios of number of starts
Calculated GPM performance of each pump
Calculated Station Flow without need for flowmeters at the pump station
Time Until Maintenance Due (based upon cumulative run times, two tracks)
Daily Hours with 2 pumps running (two pump stations only)

The graphs shall be designed such that any significant emerging anomalies in pump operation (gpm, starts, etc.) shall stand out visually at a glance.

The Web site shall provide “Next RTU” functionality so that the user can view these key graphs in immediate succession for all RTUs in the system.

D) RTU Status Reports shall present all relevant status details for each selected RTU, including but not limited to the state of each channel. Indications shall be color-coded for rapid review.

E) Event Logs shall include all events related to the Web Site and each RTU, including a time and date stamped log of user Web Site call-ins and logins, alarm events, notifications, acknowledgements, configuration changes by user.

3) Advanced CSA functions:
Users designated as CSAs may perform the following advanced functions:

A) Establish, edit and maintain a list of system users who will be eligible to access the Web Site and receive alarm notifications.

B) Establish and edit notification data (Phone numbers, email, etc) and optional PINs for each user.

C) Assign selected users into Notification Groups, which can then be linked to specific selected alarm channels on specific selected RTUs.

D) Establish a Notification Sequence for each Notification Group, designating which group members are to be notified in which order, when a linked alarm event occurs. This shall include the ability to configure the time interval between each successive notification in the sequence.

E) Configure alarm trip delays, relay output states and the time of day for daily scheduled reports from the RTU.

F) Configure whether returns to normal will cause notifications to users, and whether returns to normal shall clear the status of the related alarm

G) Configure whether Snooze Alarms will be enabled and the number of hours for the alarm to be re-notified if the alarm condition still exists. If enabled, recipients of voice notifications may choose between regular acknowledgement or acknowledgement with Snooze.

H) Configure alarm criteria, notification and report messages and Notification Group linkages for each input channel on the RTU, as well as analog alarm set points for analog channels.

I) Configure the report scaling for analog inputs using any of five different methods:
Percentage (0-100%)
Raw converter counts (0-1023)
Milliampere reading (4-20 ma)
Custom scaling by entry of gain and offset values
Custom scaling by entry of two known pairs of signal level and reading values

J) Notifications:
Notifications shall be selectable by the CSA in any combination of voice phone calls, SMS Text Messages, pagers, or email.

K) Voice notifications shall use a high-quality text-to-voice functionality so that the name of each RTU station and specific messages entered for each input channel for each RTU shall be included in voice notification calls.

L) Notifications shall continue indefinitely until acknowledged, and shall be re-initiated if so configured per the Snooze Alarm feature described above.

Equipment Designation:
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