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**AlarmAgent.com Preliminary Product Specification**

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The Alarm Agent wireless remote monitoring system shall comprise two distinct elements:

- One or more wireless RTU's to be located at monitored sites. RTU's shall utilize "Cellular Control Channel" (CCC) wireless carrier services which operate without requiring the user to make arrangements with local cellular carriers.
- A secure central Web Site, which shall be provided via two redundant, separately located servers. Users access their own dedicated area of this Web Site via their own passwords, to view and download reports of alarms, data and activity. This Web Site shall also manage the generation, delivery, escalation and acknowledgement of alarm messages, as well as scheduling of personnel on-duty shifts. Alarm messages shall be provided in various user selectable delivery formats, which shall include email, text messaging and conventional voice alarm phone calls.

**SECTION 1: RTU SPECIFICATIONS**

**Enclosure Options:**

RTU shall be available in three enclosure options:

- 1) NEMA 3R raintight, gasketed galvanized steel enclosure 6"H x 6" W x 4" D
- 2) Compact non-metallic enclosure for indoor applications, (direct panel or optional DIN rail mount) 7.4" H x 4.3" W x 2.5" D
- 3) "Open Frame" without enclosure (direct panel or optional DIN rail mount) 6.5" H x 4" w x 2.5" D

**Power:**

RTU shall operate on user's choice of:

- 1) Optional 18 VAC power at 1.2 amperes, from a 120 VAC UL approved Class II wall transformer, or

2) 24 VDC @ 500 ma

The RTU shall include a 12 volt 1.2 AH rechargeable sealed lead acid battery. All circuitry for precision charging of the battery shall be included in the RTU.

RTU shall also be capable of operation directly from solar arrays, requiring only the addition of a larger capacity sealed lead acid battery.

**Battery Backup:**

RTU's standard sealed lead acid battery shall maintain RTU operation for a period of at least 24 hours from the time of interruption of primary power, without rendering the wireless transceiver inoperative at any time during this period. The battery shall be contained within each of the three enclosure options.

**Temperature operating range:**

RTU shall operate in an environmental temperature range of -30 to + 160 degrees F.

**Inputs:**

RTU shall incorporate 8 digital and 2 analog inputs.

Digital inputs shall be opto-isolated to 4,000 volts for protection against high voltage transients, shall accept dry contact or logic level inputs, and as an available option shall accept 120 VAC inputs directly.

Selected digital inputs configured as non-alarming shall be capable of reporting the triple combination of status, "on" time, and pulse count, without requiring separate inputs for each.

Each digital input configured as alarmable shall report both alarm events and return to normal events. The RTU shall automatically filter out back-and-forth "dithering", to prevent needless redundant transmissions.

Analog inputs shall be configurable for 4-20 ma at 10 bit resolution, or as additional digital inputs. Each analog input shall have two high-level and two low-level alarm trip points.

RTU shall incorporate pluggable terminal blocks for ease of wiring connection.

In addition to the external inputs, RTU shall provide internal power failure and low battery alarm functions.

**Outputs:**

RTU shall incorporate two relay outputs, which can be controlled via the Web Site for occasional special-purpose remote control operations.

#### **Selectable Reporting Modes**

RTU shall be capable of 8 possible reporting modes, to match the application. These shall include among others:

- “Pump Station Monitoring” for two or three pumps, providing daily reports of number of starts, run time and total flow for each pump, total flow for the station, plus measured efficiency (actual gpm output rate) of each pump, without requiring flowmeters. Four additional digital inputs and two analog inputs shall be available to report other data or alarms such as intrusion, rainfall, flowmeter totals, etc.
- “Generic” monitoring for a wide variety of other monitoring applications, with various combinations of digital input functions, (alarm, status, “on” time and pulse counting.), plus two analog inputs.

The default reporting interval shall be 24 hours, at a time of day selected by the user. Other intervals shall be configurable.

#### **Selectable Arm/Disarm reporting modes:**

RTU shall allow selection among three modes of reporting Arm and Disarm (maintenance mode) change events, with time/date stamping:

- “Real time” reporting of Arm/Disarm events as they occur.
- “Daily Summary” of Arm/Disarm events, reported at a user-defined time of day each 24 hours.
- “Accumulated Summary” of Arm/Disarm events, with reporting deferred until 6 events have been accumulated.

RTU shall be capable of being Armed or Disarmed remotely via the Web Site without requiring a visit to the RTU.

#### **Remote Arm/Disarm Module**

An optional Arm/Disarm module shall be available to allow local Arming and Disarming without directly physically accessing the RTU. This module shall be mountable to a back surface and shall be connectable to the RTU via 2-wire cable, and shall provide a pushbutton and 2-color LED to indicate current Armed/Disarmed status.

#### **i-Button Personnel Access Module**

An optional I-Button module, shall be available. This module shall be locatable separate from the RTU via up to 50 feet of 4-conductor cable, and shall provide a log report of access and arm/disarm (maintenance mode) settings, uniquely identifying the specific person and time/date for each such operation. A 2-color LED on the module shall indicate the current Armed/Disarmed state.

**RTU Configuration:**

Configuration of the RTU shall be performable by the user via the Web Site without need to visit the RTU, with the exception of detailed analog alarm set points.

Setting of detailed analog alarm set points, as well as (optionally) all other RTU-level configuration, shall also be performable via local serial port connection to a portable computer running Windows Terminal.

Optional local initial configuration, adequate to facilitate RTU setup and initial testing, without requiring connection to a portable computer, shall be performable via local DIP switch setting at the RTU, in cases where no configuration has yet been done at the Web Site. However this local configuration step shall not be required for proper system operation when configuration data has been entered by the user at the Web Site.

**Signal Strength Meter**

An LED “bar graph” display shall provide convenient, continuous clearly visible detailed indication of the wireless connection signal strength to the local cell tower, assisting in verification of suitability of the placement of the antenna, as well as diagnosing any future wireless link problems.

**SECTION 2: WEB SITE SPECIFICATIONS****Secure Network Operation Centers**

The internet Web Site to which the RTUs report shall be implemented redundantly at two geographically separate, secure Network Operation Centers (NOCs).

**Passwords and PINs**

Users may access only their own dedicated data areas on this Web Site, using a password which they have established. At the option of the user, separate PINs shall also be assignable to individual personnel to provide an audit trail of acknowledgements and other operations performed by each individual person.

**Schedules and Personnel Rosters**

The Web Site shall allow the user, if desired, to define the working schedules or shifts of the customer’s organization in terms of working hours and days of the week, including identifying holidays. Rosters of personnel eligible to receive notifications shall be configurable by shift schedule. Personnel shall be further assignable into groups based upon alarm channel types (e.g. inputs indicating electrical problems versus mechanical problems), to assist in defining alarm notification lists.

**“Watchdog” non-responsive RTU alarm notification:**

When any RTU fails to report in at the expected time, the Web Site shall generate “communication failure” alarm messages according to configurations established by the user.

**Disarmed RTU notification:**

If the Armed/Disarmed reporting mode has been set to either “Real Time” or Daily reporting, and if the user has so configured at the Web Site, then the Web Site shall generate notification messages if the RTU remains disarmed at a time of day established by the user.

**Configurable parameters** shall include (but not be limited to):

- Reporting modes for daily reports and for Arm/Disarm events
- Input Channel alarm criteria (open circuit is alarm, closed circuit is alarm, status only.) Status only inputs can also provide run times and pulse counting.
- Scaling factors for variables such as analog and pulse counting data
- Recipient calling lists and duty roster, including day/night/weekend scheduling and holiday exceptions. Web shall allow recipients to be “grouped”, facilitating entries, revisions and personnel vacation schedules, as well as allowing optional separate assignments by input channel.
- Multi-Tier alarm escalation sequences (follow-up alarm notifications to be generated if no acknowledgement is received)
- Messages for email and pager/digital cell and voice phone call notifications (entered in text form)
- PINs and passwords

**Utilities to speed the configuration process**

The Web Site shall provide convenient “copy to/copy from” utilities to speed the configuration process for systems with multiple RTUs.

**Event logs**

The Web Site shall provide easily accessible, detailed Alarm and Dispatch logs (logs of all alarm, notification attempt and acknowledgement events), as well as for events such as receipt of reports, configuration changes, etc.

**Data Review and Analysis**

Means shall be provided for the user to review relevant report data, as well as the history of alarm and Arm/Disarm events online in organized and sorted tabular formats. All such data shall also be downloadable for more detailed analysis and charting, using Microsoft Excel with application macros which are also downloadable from the Web Site at no cost.

## **Additional Configuration items and Data Analysis for Pump Monitoring Special Pump Station Application Features:**

For Pump Station Monitoring applications, user shall enter the “cycle excursion volume displacement” for each pumping station, which is the increment of volume between the low (pump turn on) and high (pump turn off) levels in the well or other container at the station. The Web Site shall use this parameter to perform the calculations of individual pump and station total flow, and measured individual pump efficiency (gpm output rate), without reliance on flowmeters.

For Pump Station Monitoring applications, the Web Site shall also provide three separate “Maintenance Tracks” for each pump, allowing the user to enter various scheduled maintenance data (run time hours or calendar days between lubrications, bearing replacements, etc.). The Web Site shall display the remaining time until each maintenance item is due, and provide special indication when each such time has elapsed.

**Messaging methods** shall be selectable in any combination and shall include:

- Alphanumeric & Numeric paging to pagers and cellular phones
- SMS Text Messaging to Digital Cellular Phones
- FAX
- Email to computers, PDAs, etc.
- Voice dial-out (conventional voice alarm telephone calls) which include requiring PIN entry (if so configured) to allow acknowledgement during the call, without need to call back or take other action to acknowledge the alarm. Note that this is not to be confused with “Cell Phone” messaging which is just text messaging to digital cell phones without voice.

### **Toll-Free Call-in Number**

A voice mode toll-free call-in telephone number shall be provided as an alternative means of acknowledging alarms and obtaining basic status reports.

### **Alarm Acknowledgement**

Users may acknowledge alarms during voice alarm telephone calls, by 2-way Text Messaging devices, by accessing the Web Site, or by calling the toll free telephone number. PINs shall be required for acknowledgement if they have been configured by the user.