

COMANCHE[®] COMANCHE[®] CHIEF[®] AND STELETTO[®]

Specification

Remote Monitoring and Control System Software & Hardware Specification

PURPOSE AND SCOPE

The following specification details a **Comanche[®] Remote Monitoring and Control System (RMCS)** tailored for the oil and gas industry which would include production wells, gathering systems, pipelines, tank farms, and petrol-service stations with specific emphasis on corrosion mitigation but not limited to this application.

This **Comanche[®] Remote Monitoring and Control System (RMCS)** specification covers the requirements for *RMCS* web based software, *RMCS* hardware, communication between sites and the web based Data Center and the continuing requirements for technical support and training of **The Company** personnel.

This **RMCS system** shall be used to automatically monitor and control digital and analog functions and processes associated with cathodic protection systems and any other process that **the end user** determines applicable.

As an example for Cathodic Protection, this shall include but not be limited to, the ability to monitor and control cathodic protection rectifiers, monitor reference electrodes, control relays to monitor Off potential and depolarization readings, control relays for synchronized cycling of rectifiers, monitor and/or control anode beds, monitor and/or control resistance bonding points, monitor casing to carrier shorts, et cetera. Also, the monitoring system shall be able to monitor digital functions including but not limited to presence of AC and for all channels send alarms when the parameters are out of the specified value or range.

As an example for other applications, this shall include but not be limited to, the ability to monitor tide levels, monitor and/or control tank levels, monitor and/or control pressure, temperature, flow rates, valves, alarm systems, security systems, lighting systems as well as petroleum viscosity, et cetera.

SOFTWARE FEATURES

OPERATING SYSTEM

The **Comanche® Web-Based Data Center and Software for Remote Monitoring and Control Systems (RMCS)** shall be accessible from any operating system including but not limited to Windows, Apple OS, Android, and IOS that has access to the Internet.

The System shall be used by individuals familiar with the Internet but **shall not require any specialized programming skills.**

For customers that prefer to use a private network, please refer to the Comanche Remote Monitoring and Control System for Private Networks.

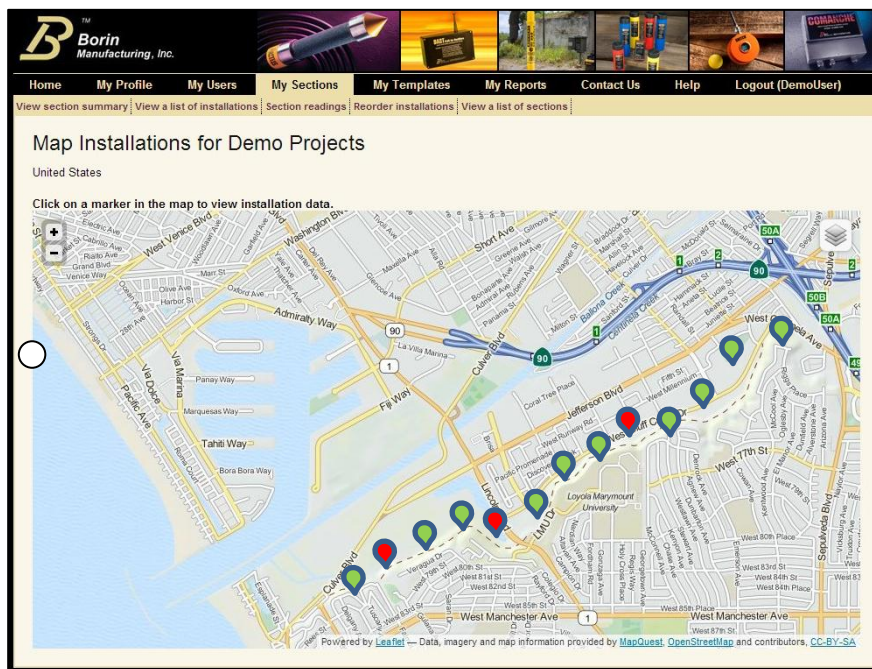
OPERATING METHOD

The System shall work **automatically** without requiring the attention or time of **The Company** personnel. Once set up, the monitoring and alarm functions shall operate automatically without requiring **The Company** personnel to be present. The remote monitoring and control shall automatically notify personnel via text messages or e-mails in a sequence that shall be determined by **the end user**.

SYSTEM GRAPHICS

The System shall communicate technical processes through visual images, maps, drawings and photographs. The System's visual presentation shall be able to import files in any current graphics format to produce the computer's on-screen graphical interface. Access to the specific processes or values shall be made directly from the image.

The Data Center Software shall have an integrated mapping system that (if enabled by the end user) shall display an icon of each Remote Monitoring Unit in its geographical position as per its GPS coordinates.



DATA STORAGE CAPACITY

The system shall have unlimited data storage capacity and should have automatic back up procedures of historical data.

ALARM MANAGEMENT SYSTEM

The alarm management System shall automatically initiate calls from the remote installations to the Comanche Data Center.

Digital monitoring channels shall have full **alarm** capability.

Analog monitoring channels shall have full **alarm** capabilities.

Alarms detected by the hardware module, at the site, shall generate automatic messages to the Comanche Data Center.

The **Alarm Management System** shall provide **an alarm screen** to document actions taken, and by whom, that shall automatically become part of the permanent record of that event.

AUTOMATIC SURVEILLANCE

The **System** shall initiate, at a user define frequency, the Comanche Data Center to automatically and systematically contact the field hardware modules to monitor the values and control processes and to download data at predetermined intervals.

The user shall be able to at any time as desired to establish connection with the remote unit and get an update of the current readings from the field.

Channel settings updated!

Channels Update for Culver - Del Rey

Demo Projects
United States

Refresh Page Displaying 1-9 of 9 result(s).

Channel	Name	Type	Last Reading	Last Value	Range	Command	Alarm Low	Alarm High	Alarm Triggered	Alarm Value	Clear Alarm	Action Taken
1	Rectifier Voltage Output	Analog Monitor	2013-04-19 12:55:43.253 PDT	30.005 Volt	30 - 35 Volt							
2	Rectifier Current Output	Analog Monitor	2013-04-19 12:55:43.489 PDT	25.033 Amp	25 - 30 Amp							
3	Pipe to Soil Potential RE 1	Analog Monitor	2013-04-19 12:55:43.724 PDT	0.907 Volt	0.9 - 0.95 Volt							
4	Cupon Potential	Analog Monitor	2013-04-19 12:55:43.959 PDT	0.8 Volt	0.8 - 0.85 Volt							
9	Rectifier Output Control	Analog Control	2013-04-19 12:55:44.194 PDT	29 Amp	25 - 30 Amp	Set						
17	AC input alarm	Digital Monitor	2013-04-19 12:55:44.429 PDT	On			Set		2013-04-18 13:37:53.263 PDT	On	<input type="button" value="Clear Alarm"/>	
18	Door open alarm	Digital Monitor	2013-04-19 12:55:44.713 PDT	On								
25	Rectifier Interrupter	Digital Control	2013-04-19 12:55:44.983 PDT	On		Set						
26	Cupon Interrupter	Digital Control	2013-04-19 12:55:40.140 PDT	On		Set						

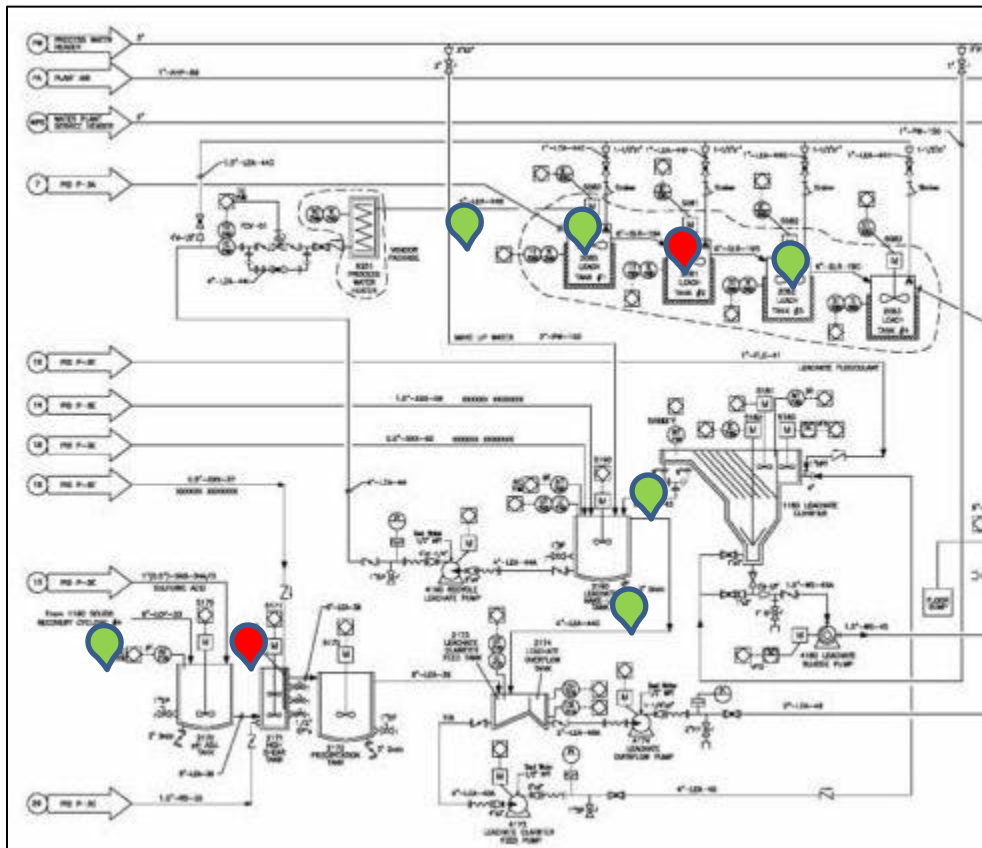
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COLOR CODED STATUS ICONS

The System shall provide a **“Graphical Link”** for all of the incoming messages. This means that status icons will be displayed on the **“Visualizations”** (graphical links) as well as the software input and column screens.

Each message on this incoming screen shall have a direct link to a specific piece of equipment and this link shall be graphically illustrated.

The system shall provide Installation detail records about the equipment which shall include installation notes, current values and diagnostic data relating to performance of the equipment.

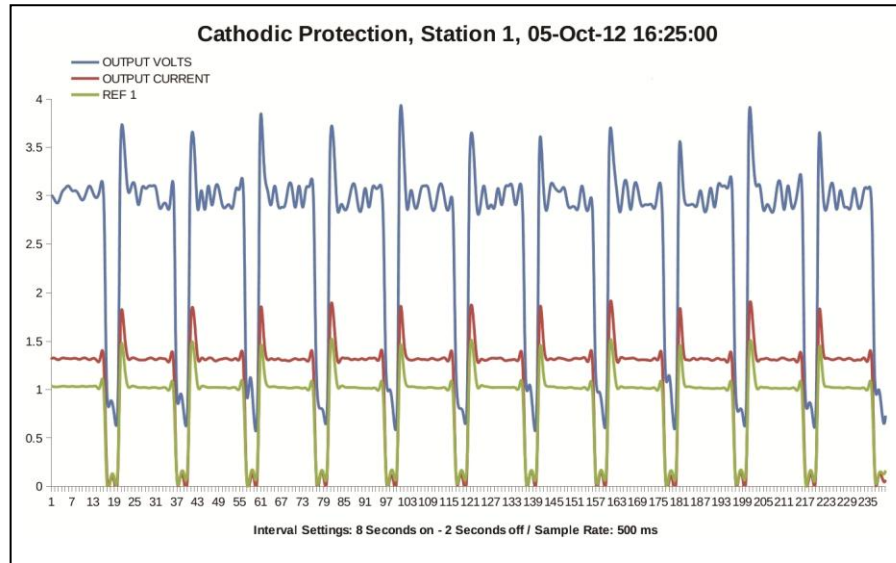


REPORTS

The system shall provide a summary screen to visualize the most critical variables for the entire system including all the installations as grouped by the end user.

For sophisticated installations like plants, tank farms, airports, military bases, etc. that have a high density of variables with one same communication device, the system shall provide a summary screen to include all of these variables simultaneously or as defined by the end user.

The system shall provide multiple screens to view the data with filter and sort features to generate reports right from the Data Center.



SUMMARY REPORT EMAIL

The system shall automatically send by e-mail a summary report of the whole system as a PDF attachment on a periodic basis, the frequency shall be user defined.

REMOTE UNIT FUNCTIONALITY

The management of the field hardware through the software shall consist of the following three elements:

Monitoring – The system shall have the full capability of monitoring Automatically and/or Manually both digital and analog functions of any field equipment that provides an electrical interface. This would include but not be limited to: rectifiers voltage output, rectifier current output, rectifier AC input, current density, temperature, pressure, smoke alarms, burglar alarms, lighting systems, on-off valves, control valves, flow, density, humidity, gates, doors, soil resistance, soil pH, structure to soil potentials, strain gauges, tank levels, boiler pressure, water & hydrocarbon leak detectors, et cetera.

Control – The system shall have the full capability of controlling Automatically and/or Manually both digital and analog functions of any field equipment that provides an electrical interface. This would include but not be limited to: rectifier current output, rectifier voltage output, current density, temperature, pressure, smoke alarms, burglar alarms, lighting systems, on-off valves, control valves, flow, density, humidity, gates, doors, structure to soil potentials, tank levels, boiler pressure, regulators, et cetera.

Counting – The system shall have full capability of counting operating time of a rectifier or any other equipment, and to graphically represent uptime and downtime of the rectifier.

DIAGNOSTICS TOOL

Diagnostics – The system shall have the full capability of performing diagnostics on remote field equipment **Automatically and/or Manually** to determine their operational status. This would include but not be limited to: a cathodic protection rectifier's **power in**, the status of the **circuit breaker**, the status of the **fuse**, the operability of the **rectifier stacks**, the **DC current** out of the stacks, condition of the **output shunt** and the status of the **ground bed** and if required the **output and status of each anode in the ground bed**.

The System shall have the capacity to zoom into unscheduled past events/alarms for analysis and graph high frequency readings (up to 40ms) for a defined period of time to facilitate assessment and troubleshooting of several variables simultaneously.

INSTANT OFF AND DEPOLARIZATION FUNCTION

The System shall take Off Potential readings with time parameters configurable in milliseconds.

The System shall compare the Off Potential reading to a user predefined Off Potential Standard. If the Off Potential is lower than the standard, the system shall take a second Off Potential reading (depolarization) after a user defined wait time.

The screenshot displays the 'Off Potential Details for Culver - Del Rey' configuration page. The page features a navigation menu at the top with options like Home, My Profile, My Users, My Sections, My Templates, My Reports, Contact Us, Help, and Logout (DemoUser). Below the menu is a breadcrumb trail: Details | Channels update | Readings archive | Graph readings | Advanced logging | Device settings | Channel settings | Alarms | History | Cyclic Interruption | Section summary.

The main content area is titled 'Off Potential Details for Culver - Del Rey' and includes a note: 'Fields with * are required.' The configuration fields are as follows:

- Start Frequency *: Daily
- Start Time *: 08:00 (8 AM) (in installation's time zone)
- Off Channel *: Rectifier Interrupter
- Off Potential Wait Time *: 50 ms
- Reference Channels *: Rectifier Voltage Output, Rectifier Current Output, Pipe to Soil Potential RE 1, Cupon Potential
- Threshold Channel: Pipe to Soil Potential RE 1
- Threshold: 9 Volt (Valid range: 0.9 .. 0.95 Volt)
- Depolarization Wait Time: 5 s

On the right side, there is a 'Off Potential' section with links: Edit Off Potential Settings, Remove Potential Settings, View Off Potential Readings, and Graph Off Potential Readings.

At the bottom right, a graph shows the potential (V) over time (t) during a 'Rectifier Off' event. The potential starts at a steady level, then drops sharply at the 'Rectifier Off' point. The 'Off Potential Wait Time' is the interval from the drop to the first measurement point. The 'Depolarization Wait Time' is the interval from the first measurement point to the second measurement point, where the potential has partially recovered.

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PERSONNEL MANAGEMENT SYSTEM

The **Comanche® Remote Monitoring and Control System (RMCS)** shall provide for the ability to organize **company** personnel, that are required to participate in this program, at all levels of the company, in a manner that shall allow alarm messages to be sent **Automatically** to the responsible person, or persons, in the correct geographical locations of the country.

The **Personnel Management Software Module** shall maintain a data bank of personnel, and be able to send text messages or e-mails to a person as predetermined by **the end user**. The messages sent shall include information regarding the cause of the alarm.

User Records History.

The system shall keep record of all changes on alarms clearing and changes to settings for installations and channels made by each user. The system shall allow to filter and sort historic user records for analysis or report generation as determined by the end user.

These messages shall become **permanent records**.

The screenshot displays the Borin Manufacturing, Inc. web interface. The top navigation bar includes links for Home, My Profile, My Users, My Sections, My Templates, My Reports, Contact Us, Help, and Logout (DemoUser). Below the navigation bar, a breadcrumb trail shows: Details | Channels update | Readings archive | Graph readings | Advanced logging | Device settings | Channel settings | Alarms | Cyclic Interruption | Off Potential | Section summary. The main content area is titled "View History for Culver - Del Rey" and shows "Demo Projects United States". A message indicates "Displaying 211-220 of 262 result(s)".

Date	Type	Name	Action	Original Value	New Value	Action By
2012-12-11 19:11:49	Channel	Cupon Interrupter	Set control to Off			DemoUser
2012-12-11 19:11:38	Channel	Rectifier Interrupter	Set control to Off			DemoUser
2012-12-11 19:11:24	Channel	Digital Control (27)	Set control to On			DemoUser
2012-12-11 19:11:10	Channel	Cupon Interrupter	Set control to On			DemoUser
2012-12-11 19:10:56	Channel	Rectifier Interrupter	Set control to On			DemoUser
2012-12-11 19:03:43	Installation	Culver - Del Rey	Added to project Demo Project 10.64.0.22			DemoUser
2012-12-11 19:01:43	Installation	Culver - Del Rey	change longitude	0.000000		DemoUser
2012-12-11 19:01:43	Installation	Culver - Del Rey	change latitude	0.000000		DemoUser
2012-12-11 18:56:42	Channel	Rectifier Interrupter	Create		Digital Control (25)	DemoUser
2012-12-11 18:56:42	Channel	Digital Monitor (19)	Create		Digital Monitor (19)	DemoUser

At the bottom of the table, there is a pagination control: "Go to page: < Previous 17 18 19 20 21 22 23 24 25 26 Next >".

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SECURITY

The system shall have a **security system** working continuously on **three levels**.

The **FIRST** level shall be **software driven** and have a multiple level password structure which shall enable personnel to have differing levels of system access and control.

The **SECOND** level shall be **software driven** requiring a high level data encryption system to ensure the integrity of the information.

The **THIRD** level shall be **communications directed** through the software preventing a third party computer access via any communications system.

DATA COMPATIBILITY

The system's data shall be compatible with major data base and spreadsheet programs. Data shall be able to be downloaded, graphed and manipulated for analysis into programs such as databases and spreadsheets software as well as custom programs.

TECHNICAL SUPPORT & TRAINING

Technical Support shall be provided on a continuing basis to ***the end user*** at **NO CHARGE**.

This technical support shall be available 24 hours a day and feature "**Remote Diagnostic Access**". This **RDA** feature shall allow (only if authorized by the end user) a technical support engineer to access the master station from a remote location while at the same time providing instructions to the ***end user*** personnel via telephone.

Training Support shall be provided on a continuing basis to ***the end user*** at **NO CHARGE**.

HELP SYSTEM

The System Web Based Software shall have **on line help files** at all levels of the program. Instructions for all the basic and advanced functions of the software and hardware shall be included.

SOFTWARE UPGRADES

Software has more than **50 man-years of software development time** and is always being expanded to stay at the cutting-edge of the state of the art in features and processing efficiency.

HARDWARE FEATURES

HARDWARE QUALITY

All remote module hardware shall be manufactured with **military grade components**. No exceptions will be allowed. All plug and play cards shall have gold plated pins and sockets. No exceptions will be allowed.

PRIMARY ENCLOSURE

The primary enclosure shall be high impact plastic colored black or dark gray through the use of carbon black colorant to provide the first level of ultraviolet protection. Additionally, ultraviolet inhibitors shall be used in the manufacture of the primary enclosure. The primary enclosure shall be water, moisture and dust proof to an IP65 rating (Nema 4x). The primary enclosure shall contain only the principal electronics which would include the motherboard, channel cards, communication cards, data-logging card and their connectors.

SECONDARY ENCLOSURE

The secondary enclosure shall be either plastic, made to the same design criteria as the primary enclosure (above), or it can be either stainless steel or anodized aluminum but shall have the same IP65 rating.

The secondary enclosure shall contain all other devices necessary for the operation of the system such as power supplies, special sensing devices, controllers, communication devices, et cetera.

CHANNELS

The remote modules shall be capable of remote monitoring of both analog and digital functions.

The remote modules shall have a range of from two (2) channels to an unlimited number of channels while utilizing the same software for all possible channel configurations.

All modules can be linked together to work in concert with each other in any combination and in any quantity. This shall allow multiple devices to be monitored and controlled utilizing a single communication source for each remote installation.

Configuration of all hardware functions shall be done from the master station (no configuring in the **field** shall be required as part of the setup or continued operation of the system).

All channels shall be capable of continuous two way communication with any other channel in **any** combination.

CHANNEL SPECIFICATIONS

All channels sets shall have their own **“Microprocessor”**.

All channels sets shall have **“Master Surge Protection”** (MSP) surge protection.

All channels sets shall be capable of **“Plug And Play”** installation. Applies only to Comanche Chief modules which have removable channel set cards; the Steletto Module has a fix number of channels (7-8) for rectifier applications.

All channels sets featuring Plug & Play cards shall have **“Gold Plated Pins & Sockets”**.

All channels shall be **“Electrically Isolated”** from each other.

All channels shall have **“Electro Static Discharge”** (ESD) surge protection.

All channels shall have **“Electro Magnetic Protection”** (ESD) surge protection.

All channels shall have **“Full Memory Retention”** capability when power is terminated.

All channel sets featuring plug and play cards shall be capable of taking readings up to **40** times per second. The results shall be able to be displayed on the computer monitor in the form of a sign-wave similar to that of an oscilloscope.

All channels shall maintain their established settings and protocols in the advent of a power failure or any other high surge electrical condition and **there absolutely shall be no requirement to re-enter any information** as a result of these surges or power failures.

All analog channels, using integrated hardware circuitry, shall have the capability of displaying a minimum of ten (10) reference electrode readings, through which, the software can select the appropriated reference reading to manage an auto-potential rectifier. Applies only to Comanche Chief module.

All analog channels, using integrated hardware circuitry, shall have the capability of displaying a minimum of twenty (20) DIN standard IR-Free reference electrodes and showing both their **ON** and **OFF** potential readings. Applies only to Comanche Chief module.

All analog channels, which are intended to monitor reference electrodes, shall have a minimum of twenty (20) meg-Ohms of internal impedance. **There will be no exceptions to this feature.**

DATA-LOGGING

All of the remote module channel configurations shall have a full featured data-logging capability.

All data accumulated shall be saved in the advent of a power failure or if the remote module is disconnected or shut off.

The data-logging card shall record the activity of a **minimum** of thirty-two (32) channels that are working simultaneously.

The data-logging plug and play card shall have USB expandable capacity.

SYNCHRONIZED INTERRUPTION

The **Comanche® Remote Monitoring and Control System (RMCS)** shall be capable of synchronized interruption by two methods.

First: Each remote module's internal clock shall synchronize with a time server. This shall be done continually even when the synchronizing function is not operating.

Second: All of the remote modules shall be synchronized by the “**Global Positioning System**” (**GPS**) method and will synchronize to external GPS interrupters.

The **Comanche® Remote Monitoring and Control System (RMCS)** shall be capable of synchronized interruption by taking complete control of any interrupters, auto-potential or auto-current rectifiers, et cetera.

This synchronization shall be done through, either the “**Internal Clock**” or through the “**Global Positioning System**” (**GPS**) method. Either method shall be available at the discretion of *the end user*.

The screenshot displays the web interface for the Comanche Remote Monitoring and Control System. The page title is "Cyclic Interruption Details for Culver - Del Rey". The interface includes a navigation menu with options like Home, My Profile, My Users, My Sections, My Templates, My Reports, Contact Us, Help, and Logout (DemoUser). Below the menu is a breadcrumb trail: Details | Channels update | Readings archive | Graph readings | Advanced logging | Device settings | Channel settings | Alarms | History | Off Potential | Section summary |. The main content area contains a form for configuring cyclic interruptions. The form includes a dropdown menu for "Channel" set to "Rectifier Interrupter", input fields for "On Cycles" (8) and "Off Cycles" (2) in seconds, and date-time pickers for "Start Time" (2013-01-09 07:00:00) and "Stop Time" (2013-01-19 17:00:00). Below the form are "Save" and "Cancel" buttons. The footer of the page indicates "Copyright © 2013 by BORIN".

SYSTEM POWER

Hardware shall be capable of using power sources that would include commercial power. AC or DC power supplies are available to meet the customer's specification.

The system shall have a non-interruptible power source available, including but not limited to batteries, solar panels, thermoelectric generators, etc.

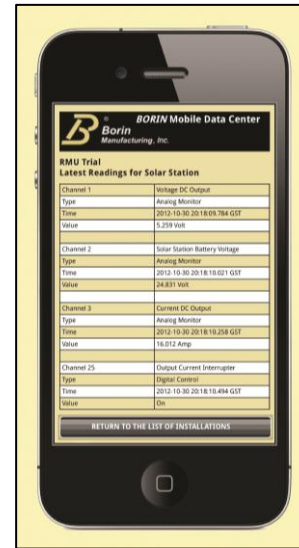
INSTALLATION FEATURES

The field installed equipment, remote modules shall have color coded analog & digital connectors and color coded function connectors.

The system shall allow access to the unit in the field through a **Smart phone** optimized web access.

OPERATING TEMPERATURE

The remote modules (modules located in the field) shall have a continuous operating temperature range, even in a secondary enclosure, of **-40 Celsius to +85 Celsius** (-40 Fahrenheit to + 185 Fahrenheit), and to withstand humidity levels in the range of 0 to 95% without condensation.



COMMUNICATIONS

COMMUNICATIONS FORMATS

The system shall work with a broad range of communication formats which all shall work together seamlessly in any combination and will include the following systems:

- TCP/IP network (Ethernet)
- GSM Cellular Network
- Radio
- Satellite
- Fiber Optic
- Microwave
- SCADA
- MODBUS
- Et cetera

INSTALLATION

Installation of the entire system, software and hardware, shall be performed by a factory trained employee with at least 5 years of experience in remote monitoring and control equipment installations.