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RACO CENTRAL DATA LOGGING SYSTEM SPECIFICATIONS

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Equipment and Operating Description:

1. The Centralized Data Logging System shall consist of one or more Verbatim RTUs, each configured with an asynchronous communication module and single, centrally-located, auto-answer modem connected to a serial printer.

In operation, each dialer calls the Central Data Logger at programmable intervals to give a routine report. If an alarm condition occurs at any Verbatim RTU, that Verbatim RTU will call the Central Data Logger to report the nature of the alarm and then make calls to personnel, giving the alarm report by digitized voice messages.

The programming operations described below shall be programmable at the unit's keyboard or from a remote Touch Tone phone.

Central Data Logging System Printed Reports:

2. In addition to the normal functions of any Verbatim Dialer, the Verbatim RTU shall, at user-programmable intervals, send a status report to the Central Data Logger. The Central Data Logger will print a completed report of the status of all channels, including any run-time or totalizer values.

Alarm calls cause a printout of the status of all non-normal conditions for each channel, as well as the calling station ID number and time and date of call. The station ID is a number up to 24 digits in length and time is expressed in military time in hours, minutes, and seconds.

Central Data Logger Reports shall include:

- Station identification
- Date and time of report
- Calling status; ie., alarm, polling, self-poll, etc.
- Contact channel alarm status
- Totalizer channel input totals
- Run-time channel input totals
- Analog channel status (if analog option is installed)
- Control output channel status (if remote supervisory control option is installed)

Communications Format - Verbatim RTU / Modem To Serial printer:

3. The Verbatim RTU with the Asynchronous Communications module incorporates an integrated modem using Bell 212A format (1200 Baud) with automatic fallback to Bell 103 (300 Baud). Communications between the Verbatim RTU and the Centralized Data Logger utilizes ASCII data plus printer control information to produce a tabular report of the station status.

Communications Failure Alarm:

4. Calls from Verbatim RTU s to the Central Data Logger failing to establish communications and deliver a complete status message will be retried. Retried calls which successfully connect will log the number of retries on the printer. After a programmable number of unsuccessful retries, the RTU will enter the communications failure alarm state. Subsequent calls to personnel will state that a communications failure exists. A successful connection will clear the communications failure alarm. While a communication alarm persists the RTU will continue to regularly call the Central Data Logger with increased frequency.

Phone Number Dialing:

5. The unit shall be capable of dialing up to 16 phone numbers, each up to 24 digits in length. Dialing shall be programmable as Rotary Pulse, Touch Tone, or High Speed Tone Dialing. Phone numbers and pauses in the dialing string shall be user programmable via the system s keyboard or Touch Tone phone. To accommodate PBX s, cellular phones and pager systems, the length of each pause shall also be programmable.

Solid State Voice Message Recording and Playback:

6. The unit shall have two different categories of speech message capability, both implemented with permanent non-volatile solid state circuitry with no mechanical tape mechanisms. The unit shall allow for message recording from a remote telephone as well as from the front panel, and shall at a minimum incorporate the following seven speech message attributes:
 - A. User Field Recorded Messages: The user may record and re-record his own voice messages, for each input channel and for the Station ID.
 - B. User recorded messages shall be retained intact in permanent, 10-year non-volatile memory in the event of AC or system battery failure or disconnection.
 - C. There shall be no limit on the length of any particular message, within the overall available message recording time, which shall be 40 seconds for 4 channel units; 80 seconds for 8 channel units, and 160 seconds for 16 or more channels.
 - D. The unit shall allow selective recording of both Normal and Alarm advisory messages for each input channel.
 - E. The unit shall provide for automatic setting of the optimum speech memory usage rate for the total set of messages recorded, in order to achieve optimum recording sound quality.
 - F. Circuit board switches or jumper straps shall not be acceptable means of manipulating message length or recording rates.
 - G. Permanent Resident Non-Recorded Messages: Permanent built-in messages shall be included to support user programming operations, to provide supplemental warning messages such as advising that the alarms have been disabled, and to allow the unit to be fully functional even when the installer has not recorded any messages of his own.

Input Monitoring Functions:

7. The unit shall continuously monitor the presence of AC power and the status of four contact closure inputs. Unit shall optionally be field upgradable to incorporate a total of 8, 16, 24, or 32 dry contact inputs. AC power failure, or violation of the alarm criteria at any input, shall cause the unit to go into alarm status and begin dial-outs.

The unit shall, upon a single program entry, automatically accept all the existing input states as the normal non-alarm state, eliminating possible confusion about Normally Open versus Normally Closed inputs. Further, as a diagnostic aid, unit shall have the capability of directly announcing the state of any given input as currently Open Circuit or Closed Circuit , without disturbing any message programming. Each input channel shall also be independently programmable, without need to manipulate circuit board switches or jumpers, as Normally Open or Normally Closed, or for No Alarm (Status Only), or for Pulse Totalizing, or for Run Time Metering, or completely disabled (omitted from all reports).

Run Time Meter Function:

8. Dry contact inputs (up to a total of 8 of the inputs) shall be programmable to accumulate and report the number of hours their respective input circuits have been closed. Any such inputs shall never cause an alarm, but on inquiry shall recite the channels message according to the status of the input and then report the accumulated closed circuit time to the tenth of an hour. The input shall report up to a total accumulated running time of 99,999.9 hours before rolling over to zero. The initial value of the Run Time Meter shall be programmable to match existing instrumentation. Message recording shall allow customized voice messages of the general form
The lag pump is on. Run time is XXXXX.X hours .

Pulse Totalizer Function:

9. Dry contact inputs (up to a total of 8 of the inputs) shall be programmable to accumulate the number of pulses (momentary contact closures) occurring at the input. An alarm setpoint shall be programmable to create an alarm call upon reaching a particular total value. The input shall accept a pulse rate of up to 100 pulses per second. If the pulse rate exceeds 50 pulses per second, the pulses must have a 50% duty cycle. The Totalizer shall accumulate no less than 4,000,000,000 pulses before rolling over to zero. The initial value of the Pulse Totalizer count shall be programmable to match existing instrumentation. A programmable scale translation factor and voice message recording shall allow completely tailored voice reports in translated spoken units, of the general form
The total main valve water flow is XXXX.X million gallons .

Voice Reports During Inquiry Calls:

10. When personnel call the unit for voice reports, the station ID message plus the messages indicating the status of all input channels shall be spoken by the unit. The word alert shall be appended to the message for any channel detecting a violation which has not yet satisfied the Alarm Trip Delay for that channel. If no channels have any alarm status, the preamble All channels normal shall be spoken, to avoid the necessity of listening to all the channel reports. The unit shall also on command give a report of only those channels with some alarm status.

Voice Reports During Alarm Calls:

11. When the unit calls personnel with voice reports, it shall provide the Station ID message plus, the system will report all four classes of active alarm inputs.
 - A. Unacknowledged Alarm; Input Signal In Alarm Condition - All inputs that have had their alarm criteria met and are actively in alarm status and have not been acknowledged.
 - B. Unacknowledged Alarm; Input Signal In Normal Condition - All inputs who have had their alarm criteria met and have not been acknowledged, but their input signal has returned to normal prior to acknowledgement.
 - C. Inputs in Alert; Input Signal In Alarm Condition - All inputs that currently have their alarm criteria violated but not long enough to have met the criteria established and have caused an alarm call.
 - D. Acknowledged Alarms Inputs; Input Signal Ignored - All inputs that have been in alarm, have been acknowledged; and have not been automatically or manually reset since acknowledgement.

Regular Interval Autocall Function:

12. Unit shall allow user to optionally program the unit to place regular interval status calls to the centrally-located auto-answer modem and cause a status report to be printed on the serial printer. The interval shall be programmable from 0.1 to 99.9 hours.

Acknowledgement and Alarm Reset Timers:

13. The unit shall place voice calls to personnel, who may then acknowledge the alarm by entering a Touch Tone 9 , or by calling the unit back. Dialing shall rotate indefinitely through the programmed phone number list until acknowledgement, even if the alarm condition has returned to normal. Once acknowledged, dialing shall be suspended for that particular input channel for the duration of the programmed Alarm Reset Time. At the end of the Alarm Reset Time, the Acknowledged Alarm status for that channel shall be cleared, making that channel again ready for new alarms. Meanwhile, emerging alarm conditions on other channels shall cause dialing to resume immediately, with Alarm Reset Timers maintained independently for each input.

Security Access Code:

14. Unit shall allow a security access code up to 8 digits long to be optionally entered at the front panel keyboard only. If such an access code has been programmed, then the unit shall solicit and require the user to enter that code in order for any programming operations to be performed.

Overall Local & Remote Programming Capabilities:

15. All system functions shall be programmable without need to manipulate circuit board switches or jumpers to alter system functions or programming. All programming shall be accomplished via the front panel keyboard or (except for the Security Access Code) remotely from any Touch Tone phone.

Unit shall at a minimum allow programming of the following items. However, default values shall be provided so that most of these items do not actually require user programming:

Phone numbers, dialing delays and pulse/tone dialing mode	Alarm reset time
Special number callback/call forward	Ring answer delay
Station ID message	Number of repeats of voice alarm message
Input channel Alarm messages	Autocall on/off and interval
Input channel Normal messages	Security access code
Message recording rate	Arm/disarm alarms
Alarm Criteria for all channels, together or independently	Exit delay before alarms are armed
Channel Run Time Meter, Pulse Totalizer, and disable	Local listening microphone on/off
Alarm trip delays, all channels together or independently	Speaker on/off
Time between alarm calls	Time and Date

Nonvolatile Program Memory Retention:

16. User-entered programming and voice messages shall be kept intact even during power failures or when all power is removed for up to ten years.

Diagnostics:

17. The unit shall provide a complete voice report of all programmable functions and their programmed values on command from any remote Touch Tone phone. A concise summary report listing only the user-entered, non-default programming shall also be available. The accumulated number of inquiry calls, alarm calls, acknowledged alarms and power failure alarms shall also be available from the unit.

Local Microphone, Speakerphone, Dialout on Command:

18. The unit shall allow a remote caller to activate a built-in microphone in order to hear local sounds. At the front panel, a built-in speaker shall operate with the microphone to achieve speakerphone operation, with synthesized voice and data transmissions suspended. Unit shall also allow the user to dial any arbitrary phone number as commanded, digit by digit, and establish speakerphone connection, without need to reprogram any regular dialout phone numbers. A redial function shall be included. The built-in speaker shall be programmable to be off for all reports except for front panel programming operations.

Call Forward/Call Back Function:

19. To allow callback testing or call forwarding, a special phone number shall be programmable. Upon command the unit shall dial this number and provide a regular voice status report.

Public Address Broadcast:

20. The standard dialer shall provide a mini phone jack for optional connection to a local public address system. If connected to the PA system the dialer shall broadcast all alarm messages over the PA system and the telephone simultaneously.

Battery Backup During AC Power Failures:

21. The unit shall provide at least 16 hours of continuous operation from its automatically recharged gel-cell battery, in the event of AC power failure. The charger shall be a precision controlled-voltage type for maximum battery life and efficiency.

Optional DC Power:

22. The user shall be able to optionally configure the dialer for DC power operation. The standard dialer shall provide a mini phone jack for optional connection to a DC power source.

Phone Line:

23. The dialer is to use a standard pulse or Touch Tone dial-up phone line and is to be F.C.C. Part 68 approved for such connection. Units requiring direct leased lines shall not be accepted.

Integral Surge Protection:

24. All power, phone line, dry contact, and analog signal inputs shall be protected at the circuit board to IEEE Standard 587, category B (6,000 volts open circuit / 3,000 amps closed circuit). Gas tubes followed by solid state protectors shall be integral to the circuit board for each such line. Protectors mounted external to the main circuit board shall not be an acceptable substitute. The installer shall provide a good electrical ground connection point near the unit to maximize the effectiveness of the surge protection.

Additional Features: Sealed switches, LED Indicator, Alarm Disable Warning, Talk Through:

25. All keyboard and front panel switches shall be sealed to prevent contamination. Front panel LED s shall indicate: Normal Operation, Program Mode, Phone Call in Progress, Status for each channel, AC Power Present, AC Power Failure, and Low, Discharging or Recharging Battery. On any Inquiry telephone call or On Site status check, the voice shall provide specific warning if no dialout phone numbers are entered, or if the unit is in the alarm disable mode, or if AC power is off or has been off since last reset. A built-in microphone shall allow anyone at a remote phone to listen to local sounds and have a two-way conversation with personnel at the dialer.

Ambient Temperature and Humidity :

26. Unit shall operate over the ambient temperature range of 32 to 110 degrees F, and 0 to 95% relative humidity (non-condensing).

Warranty:

27. The manufacturer shall repair any defective autodialer units returned to the factory at no charge for parts and labor, for a period of three years from the date of shipment, provided that the unit has not been subjected to abuse.

Modular Upgrades:

28. The following options may be ordered with the unit, and may also be modularly added in the field:
Additional contact input channels, up to 32 total
Analog Signal Input Option (1, 4, 8, 16 inputs)
Remote Supervisory Control, 4 or 8 outputs
Additional speech recording memory

Special order Items:

29. The following optional items shall be available on units from the factory:
NEMA 4X Fiberglass Enclosure
Internal Heater/thermostat (for ambient temperatures below 32 degrees F or for condensation control)
Local Alarm Relay output (activates during unacknowledged alarms).