X100N

ULTRALARM FAULT RECORDER

Daisy-Chainable Numeric Display Annunciators

RONAN

The Ronan Ultralarm Fault Recorder Series X100N is designed to monitor individual dry or live contacts, or logic level, which are typically wired for single input configuration, or to a series string of contacts in a control or interlock circuit on rotating machinery or process equipment. The X100N features excellent diagnostic capabilities for resolving the cause of fault conditions and prevents unexpected shutdowns of plant equipment.

The Ultralarm units are available in 16 input configurations in panel mount, surface mount, or NEMA enclosures, and portable cases each unique to a specific application.

The X100N features two-digit numeric or window type local annunciation. The numeric digital readout shows process events in consecutive order of occurrence, which allows the absolute chronological order of alarms within a group or number of groups of up to 96-digit inputs. The window annunciator display features dual LED or backlit window annunciation selectively operating in any of the ISA 18.1 sequences.

For requirements with higher than sixteen inputs, multiple units of 16 input capacity may be daisy-chain connected for up to 96 points. In a single or multiple connection, the X100N assigns real time to each event with a 1 millisecond resolution. The events are stored in non-volatile memory and are sent to a locally connected laptop, PC host, and/or to a remote host such as a plant computer, Sequence of Events Recorder, DCS or personal computer. Each unit's integral memory allows storage of up to 3,000 alarm events to be transferred continuously. For systems without host connections, the front panel display is utilized to recall up to eight process shutdown alarm sequence snapshots by pushbutton activation.

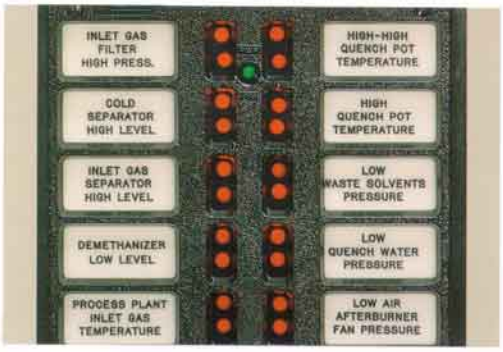
FEATURES

- *Monitors live or dry contacts in shutdown systems and interlock systems*
- *Numeric and/or first-out and subsequent fault indication – 1 through 96*
- *Up to 96 inputs to multiple units, which are daisy-chain connected via RS485*
- *Event history in non-volatile memory, up to 3000 events*
- *Up to 8 incident snapshots of equipment shutdowns*
- *Serial communication to host via RS232 or RS485*
- *Continuous alarm transmission or event history retrieval from remote host or local via laptop or PC*
- *Panel mount, surface mount in NEMA enclosures or carring case*
- *Selection from 16 alarm sequences*
- *Numeric, first-out and sequential resolution, 1 millisecond*
- *Front panel mounted or remote push buttons.*
- *Dual audible interface*
- *Real time synchronization between units*
- *Real time event tagging and display in the host*

LOCAL NUMERIC DISPLAY

The front display panel of each X100N provides dual digit numeric identification of the chronological order of alarms for each input connected to the unit(s). This local numeric readout captures the exact order in which each alarm occurs within each group and retains this information. Up to eight alarm occurrences (snapshots) are retained in memory. Each occurrence is recorded by activating the Silence and then the Reset push button. Activation of the two buttons in sequence protects against accidentally recording by pushing the Reset button only.

To recall the eight snapshots, activating the Test button will display the most recent incident. Push Test again. It will display the next most recent incident snapshot in the circular incident memory with all other subsequent incidents followed by additional activation of Test. To return to the Active mode to acquire events, push the Acknowledge button.



LOCAL ANNUNCIATOR DISPLAY

For applications where no numeric readout is desired, two types of displays are available. The first type provides two redundant high intensity LEDs for alarm display and the larger window for point identification. The second type provides for a backlit larger window with the small window for tag number identification. Point description may be engraved on the large backlit window nameplate.

The dual LED or the LED backlit window provides typical visual alarm sequence function status such as fast flash, slow flash, intermittent flash, steady on or off.

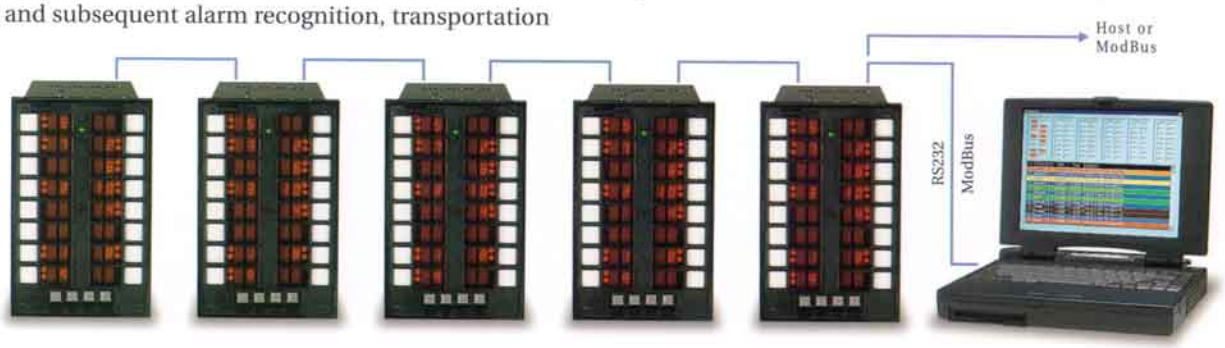
SERIAL COMMUNICATION

The host connection (P1) allows access to all units in a chain via ModBus Slave Mode or Ronan proprietary protocol. The host may continuously receive event information or retrieve event history stored in the X100N's non-volatile memory for display at command. The PLC, DCS, or plant computer typically communicate via ModBus, while personal computers and laptop computers may utilize the Ronan proprietary protocol for event data display. For Sequence of Events Recording displays, the Ronan X1000 software is ideally suited for large event history storage with selective display capabilities such as event history, alarm summary, system access protection, master clock function, etc. The X1000 software may be operated on a customer supplied PC or laptop computer.

SINGLE OR MULTIPLE UNIT CONNECTION

For input requirements higher than the 16 input capacity of a single unit, a number of X100Ns are daisy-chain connected via full duplex RS485 based communication bus. The bus provides for real time synchronization, first out and subsequent alarm recognition, transportation of alarms to host, synchronization of flashing signals, etc.

The connectors P1 and P2 provide for daisy-chain connection of multiple units. Cable assemblies may be provided for ease of unit-to-unit connections.



EVENT DATA TRANSFER

The RS232 or RS485 port (switch selectable) allows connection of a host device such as PLC, PC or laptop computer to the X100N units.

Ronan has two types of software available to retrieve and display the events from X100N; the X1000 (Sequence of Events Recorder) which is a DOS based program, and the X100N-EDR (Event Display and Recorder) which is a Windows NT or Windows 95 based program.

The X1000 software provides 1 millisecond resolution, and communicates with X100N units via Ronan protocol.

The X100N-EDR software communicates with X100N units via ModBus protocol. Other host devices e.g. PLC, PC etc. can retrieve the status of X100N's inputs via the ModBus protocol function 2 on its own time base command.

X100N Event Display and Recorder

X1000 Sequence of Events Recorder

SYSTEM CONFIGURATION

System configuration is selected by the Dip Switch setting on the controller module. Configurable functions are listed below. The forty-eight switches are assigned to each hardware or software function. Detailed instructions are given in the X100N Instruction Manual.

Functions:

- Annunciator Sequence Selection
- Input Filter Response Time
- Normally Open/Normally Closed Selection by Input
- Automatic Audible Silence Time Delay
- Auto/Manual Silence
- Single or Dual Audible A1/A2
- Reflash/Common Trouble Alarm
- Sequence R Lock/Non-Lock
- Momentary Lock/Non-Lock
- Silence, ACK, Reset Operational
- Serial Ports RS232/RS485

ANNUNCIATOR SEQUENCES

A	Automatic Reset
L	Latched Reset
M	Manual Reset
R	Ringback
R	Ringback (for use with numeric displays)
F1A	First Out (Type 1) Automatic Reset
F1L	First Out (Type 1) Latched Reset
F1M	First Out (Type 1) Manual Reset
F1R	First Out (Type 1) Ringback
F2A	First Out (Type 2) Automatic Reset
F2L	First Out (Type 2) Latched Reset
F2M	First Out (Type 2) Manual Reset
F3A	First Out (Type 3) Automatic Reset
F3A	First Out (Type 3) Automatic Reset (special flashing)
F3L	First Out (Type 3) Latched Reset
F3M	First Out (Type 3) Manual Reset

CONTROLLER MODULES

The Controller Module is the system's CPU and function configurator. The user selectable dip switches provide selection of a wide variety of software performances and hardware functions related to annunciator alarm sequence selection, field contact logic, input and output functions, audibles, etc.

Functions:

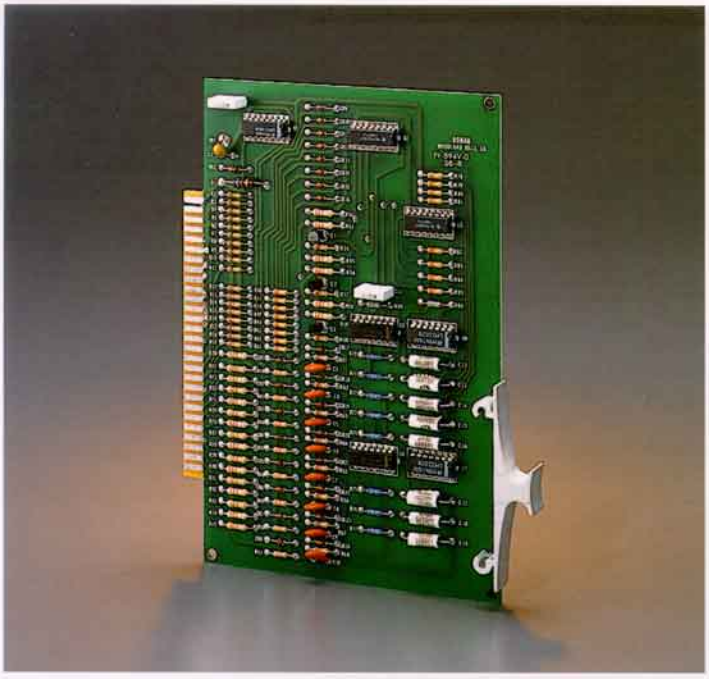
- Scanning of Input and Pushbutton States
- Initiates and Executes Alarm Sequence Action
- Update Status of Display and Audible
- Stores Event History and Shutdown Incident Information
- Transmits Event Data to Host
- Sends Historical Event Data Upon Request from Host
- Time Synchronization with 1 Millisecond Resolution
- Digital Filter 1 to 255 Milliseconds
- Communication with Host
- Services Two Serial Ports

X100N-516-( )-16
- *S = Standard*
- *H = High Resolution*

X100N-651-( )-(voltage)
- *GP = General Purpose*
- *HS = Hermetically Sealed*

POWER SUPPLY MODULES

The Power Supply Module generates the system logic voltages and field contact voltage (24 Vdc). The power supply is available for power sources of 115 Vac or 230 Vac 50/60 Hz or 12, 24, 48, and 125 Vdc. The module provides relay output functions for two audible devices and reflash or common trouble alarms. The relays are available as general purpose or as hermetically sealed for Class I, Division 2 certified units. The contact ratings of the relays are 3 Amps @ 115 Vac or 30 Vdc.

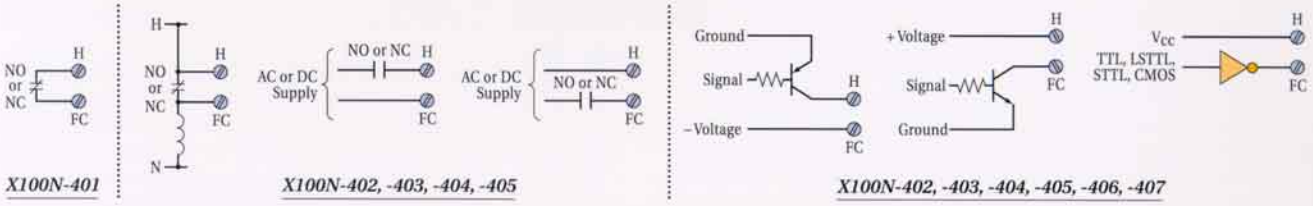


X100N-401, -402, -403, -404, -405, -406, -407

INPUT MODULES

The X100N may be equipped with any of the seven types of input modules available. Each input module provides interface to eight inputs, dry or live contact type, or logic level. The input modules are selected to meet the requirements of the application. They may be intermixed or substituted with other modules if required.

Module Selection Guide



X100N-401

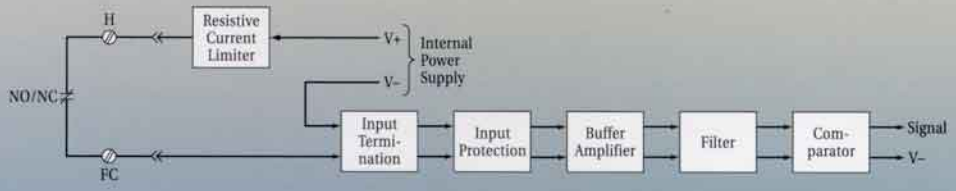
X100N-402, -403, -404, -405

X100N-402, -403, -404, -405, -406, -407

Model X100N-401 Standard Dry Contact Input Modules

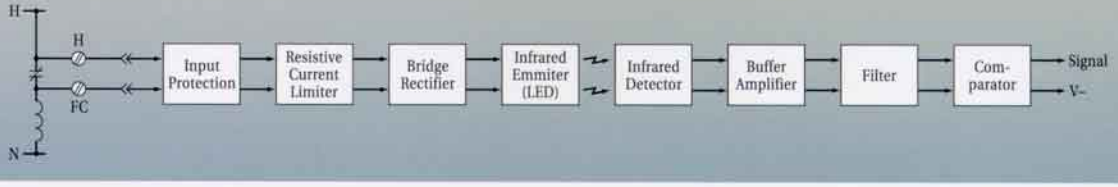
The Model X100N-401 provides for eight dry (isolated) contacts which are powered from the internal 24 Vdc field contact source voltage.

Opto-couplers may be used in place of the dry field contact. Removal of the input module removes power to the field contact.



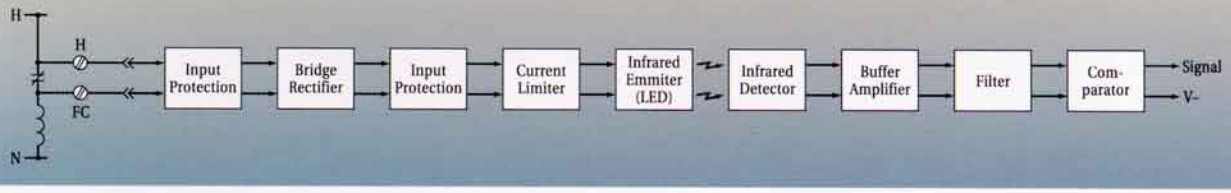
Models X100N-402, -403 Live/Dry Contact Input Modules

These modules are designed primarily to monitor live switch contact voltages ranging from 5 to 280 Vac or Vdc. Model -402 is designed for 5 to 140 Vac or Vdc. Model -403 for 5 to 280 Vac or Vdc provides opto-isolation on each input. These modules are designed to monitor up to 8 series connected live contacts where an external voltage is applied to the contacts. The bridge rectifier in the input circuit allows AC inputs to be monitored and allows DC inputs to be connected without regard to polarity. The input filter minimizes the effect of zero crossing and allows scanning by the controller module.



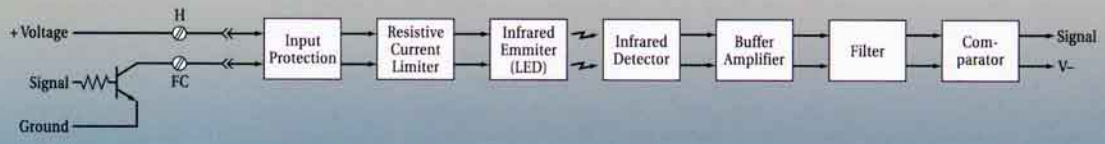
Models X100N-404, -405 High Sensitivity Live/Dry Contact Input Modules

The -404 and -405 modules are similar to the -402, -403 modules, but feature constant current limiting to 3 milliamperes over the operating range. This allows monitoring of up to 16 series wired live contacts, typical for compressor and boiler control systems monitoring.



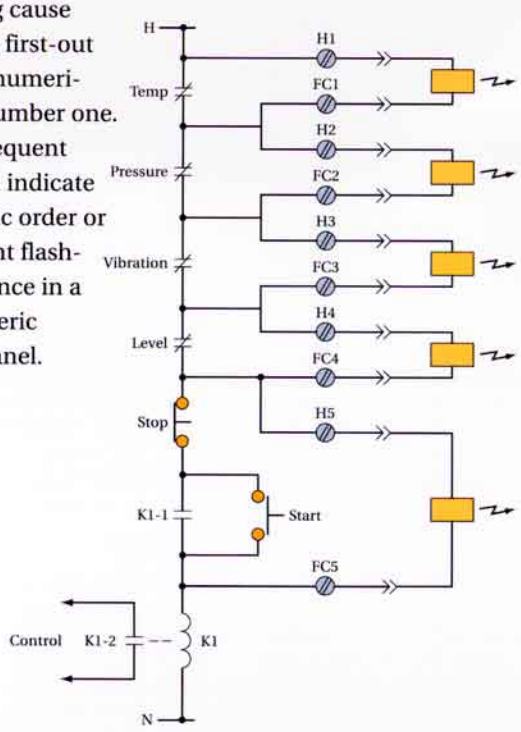
Models X100N-406, -407 Logic Level Input Modules

The -406 and -407 modules are designed for interface with logic level inputs providing opto-isolation at voltage levels 4.5 volts to 16.5 volts. Transistors, TTL, LSTTL, and STTL inputs, and 4.5 volts to 30.0 volts transistor CMOS inputs respectively.



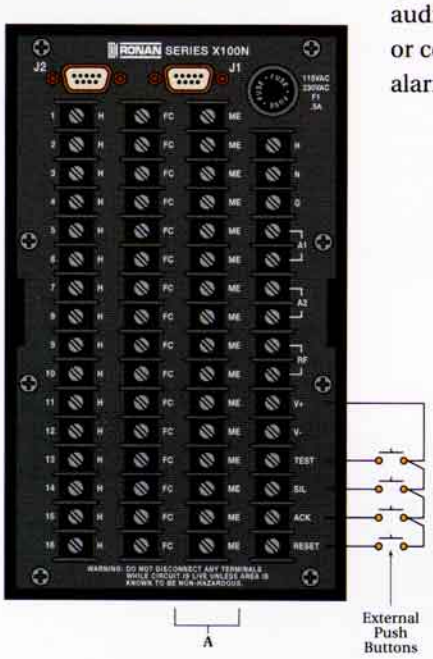
FAULT FINDER APPLICATION

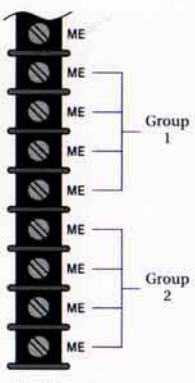
The X100N is ideally suited to monitor live contacts in serial string connection typical in rotating machinery, compressors, and boiler control systems. The process or machine monitoring contacts are connected to the X100N rear terminals. The opening of the first contact in the string will drop out the control relay of the process or machine, indicating cause of fault as first-out alarm or numerically as number one. Any subsequent alarm will indicate in numeric order or as different flashing sequence in a non-numeric display panel.



TERMINATION

The termination facilities for the 16 channel unit provide for external pushbutton interface, two terminals for each field contact termination, dry or live contact, two audible, and reflash or common trouble alarm contact outputs.

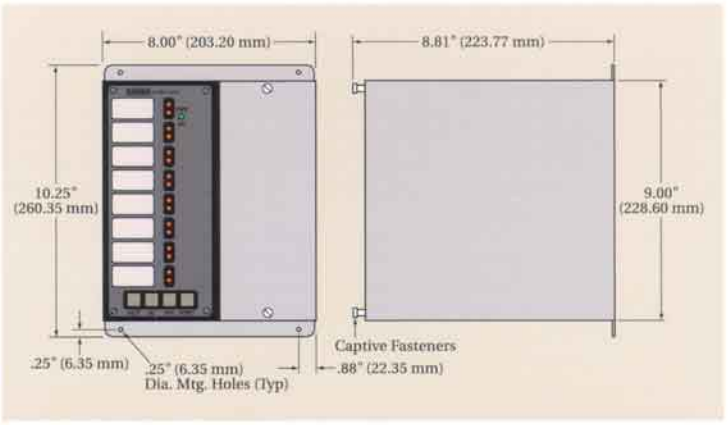




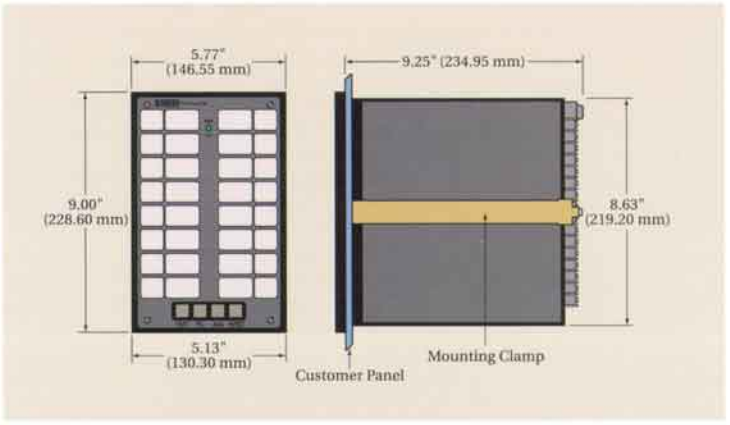
Detail A

DIMENSIONS

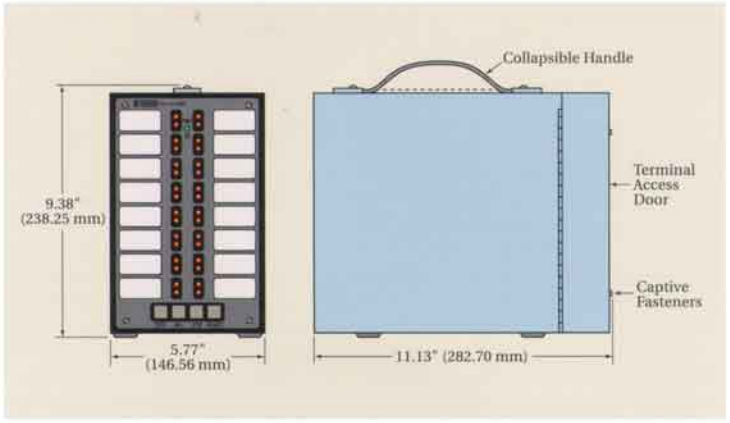
Surface Mounting Chassis



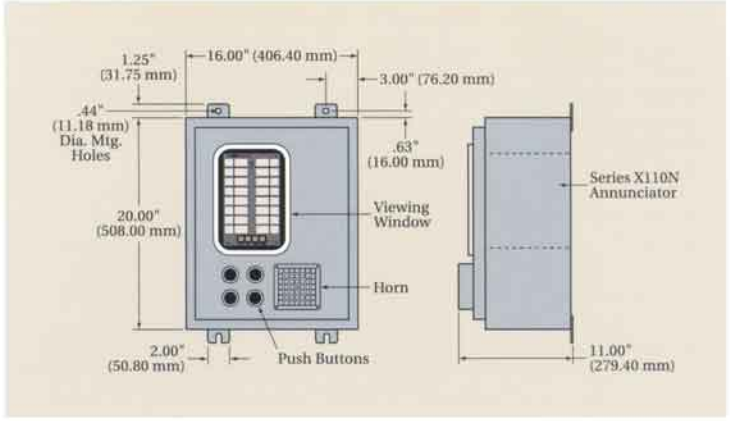
Panel Mounting Chassis



Portable Cases



NEMA Enclosures



SPECIFICATIONS

Power Source: 115 Vac, 220 Vac, 12, 24, 48 and 125 Vdc

Power On: Green Indicator Light on Front Panel

Power Fuse: 1/2 Ampere

Operating Temperature: 0° to 50° C (32° to 122° F)

Number of Channels: 16 Dry or Live Inputs per Unit; 16 to 96 Inputs to Daisy-Chain Connected Units

Field Contact Voltage: 4.5 Vdc/Vac to 280 Vdc/Vac

Field Contact Current: 1 to 10 mA AC/DC Normally Open/Normally Closed; Dip Switch Selectable

Alarm Response Time: 1 to 255 Milliseconds; Selection Applies to All Inputs

First-Out Alarm Resolution: 0.65 Milliseconds for DC; 1.5 to 2.0 Milliseconds for AC

Alarm Sequences: Selection from 16 Standard ISA S18.1; Sequences Selectable for Each Input

Display: Window Type LED Backlit; Dual LED Indicators Only; Dual LED with Numeric

Nameplates: Specific Engraving and Color with Order

Output Contact: Common Trouble or Reflash Alarm; Normally Open/Normally Closed Selectable; Audible 1; Audible 2 (selectable for ringback)

Contact Rating: 3 Amps @ 115 Vac or 30 Vdc

Serial Communication: Electrical Connection; Unit to Unit – RS485 Multidrop, Daisy-Chain Connected; Unit to Host – RS232 or RS422

Protocol: ModBus, RTU

Event Time Assignment: Month/Day/Year; Hours/Minutes/Seconds/Milliseconds

Incident Snapshots: Eight Held in Non-Volatile Memory; Reset for Next Snapshot – Integral or External Push Button

Event History: Last In/First Out (LIFO)

Retrieval: Via Laptop Computer or PC

Number of Inputs in a Group: 96 Maximum; From 1 to 6 Point Units, Daisy-Chain Connected

Surge Withstand Test: ANSI/IEEE c37.90.1.1989

EMI Immunity: CE Compliant

Electrical Classification: General Purpose or Class 1, Division 2, Groups A, B, C, D Using Hermetically Sealed Relays

Digital Filter: Common for All Inputs 1 to 255 Milliseconds

Relay Output: Selectable for Common Trouble Alarm or Reflash, Normally Open/Normally Closed

Push Button: Interlock for Silence, ACK, Reset

Audible: Automatic Momentary Ringback; Auto Silence; Priority Horn Assignable by Input

Host Interface: ModBus, RTU Protocol (for other interfaces contact factory)

RONAN

RONAN ENGINEERING COMPANY

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