System Monitor
3300/01

Standard System Monitor

The 3300/01 System Monitor allows easy operator/process interaction, ensuring a cost-effective, flexible system. The System Monitor can be ordered as standard or with optional serial interface capabilities.

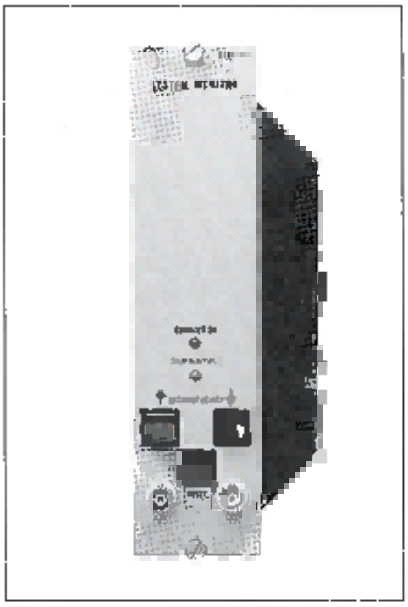
With the System Monitor, the computer interface capabilities of the rack are centralized without the need of extra components. Buffered Keyphasor® signals are also provided on the front panel. These features, together with the buffered transducer signals on the monitor front panels and the monitor indicators that provide continuous readings individually per channel, make extra hardware (such as an external keypad, and/or a special cable connector card) unnecessary.

The System Monitor also accepts contact closure signals for control of functions such as Rack Inhibit, Alarm Reset and Trip Multiply. This greatly enhances the function and reliability of the system.

Reliable system OK monitoring

Each rack contains one System Monitor, installed in the second rack position (next to the Power Supply). While it provides enhanced capabilities to the 3300 monitoring system, the circuitry is not directly in the critical monitoring path, so it does not affect overall monitoring system integrity or reliability. The System Monitor's operation has no effect whatsoever on the normal operation of other monitors in the rack. All basic monitor functions, except for alarm setpoint adjustment, are fully operational, even if the System Monitor is not operational or even not installed in the rack.

The System Monitor controls the system OK function. This OK indicates the correct operation of the system and associated transducers and field wiring. The System Monitor drives the system OK relay, which is located on the Power Input Module (at the rear of the Power Supply). Since the system OK relay is normally energized, it also can be used to annunciate loss of primary power to the 3300 rack. Because of these benefits, we strongly recommend connection of the OK relay contacts to an external annunciator.



3300/01 System Monitor

The System Monitor front panel contains an alarm RESET switch. The monitor also accepts the remote Alarm RESET contact closure signal. These RESET functions are required to reset latching alarms after the monitored values have decreased below the alarm setpoints. Nonlatching alarms reset automatically when the values decrease below the alarm levels.

Advanced, powerful features promote less downtime and higher productivity

Power-up Inhibit — minimizes false alarms due to transient power surge or loss and subsequent (re)application of power. This function inhibits all alarms for approximately 2 seconds after power has stabilized, then restores full alarm capabilities to the system.

Rack Inhibit — performs the same function as Power-up Inhibit but is controlled by an external contact closure.

Trip Multiply — when activated, multiplies the selected monitors' alarm setpoints by 2X or 3X (specified at the time of order). Bently Nevada recommends the use of Trip Multiply only when "normal" vibration levels are expected to increase beyond the alarm setpoints for some (brief) period of time, for example during a machine startup. For this reason, the Trip Multiply function consists of an alarm setpoint multiplier circuit in each monitor, with external contact closure terminals at the rear and an LED on the front panel of the System Monitor. Since the multiplier circuit is individual for each monitor, you can select which monitors in the rack are to operate with the Trip Multiply function. We recommend the Trip Multiply function be activated by a spring loaded switch.

The System Monitor controls alarm setpoint adjustment for all monitors in the rack

The System Monitor enables the user to set or adjust Alert and Danger alarm levels on the various monitors in the rack; hence, a separate programming module is not required. To set alarm levels, simply slide away the desired monitor's front panel so that internal switches are accessible. The function ADJUST ALARM, which is individual for each channel, is enabled by selecting the desired switch position. The LCD bargraph of the selected channel flashes, indicating the ADJUST mode.

Alarm setpoints can now be adjusted by pressing the Alert or Danger switch on the selected monitor and simultaneously pressing the Up or Down arrow switches on the System Monitor. The Up and Down adjustments have two speeds (faster when the switch is held for a few seconds) to enable expedient, convenient adjustments. During alarm level setpoint adjustments, the respective monitor alarms still operate from the previously established setpoints. The monitor will continue to operate from these original setpoints until the ADJUST ALARM switch has been returned to its original position.

Many other types of monitors use potentiometers for alarm setpoint adjustment. With these designs, not only are the potentiometers less reliable, but it is possible to generate a false alarm just by changing the setpoint. If the current monitor reading is just below a

System Monitor
3300/01

setpoint and you decide to increase the setpoint, it is possible to turn the potentiometer the wrong direction. This can lower the alarm setpoint below the current reading and thus generate a false alarm.

Self-testing microprocessor-based technology

The System Monitor checks the voltage supply levels that are vital for proper system operation. Under normal operation, LEDs located behind the System Monitor slide-away front panel will be ON, indicating normal voltage operating levels. If a voltage fault occurs, the appropriate LED(s) turn OFF, the SUPPLIES OK LED on the System Monitor front panel turns OFF and the rack is inhibited from alarming. This minimizes the chance that monitors will generate false alarms.

The System Monitor buffers the two Keyphasor signals which are connected to the unit's rear panel. These short circuit-proof Keyphasor signals are available at individual coaxial connectors on the front panel for easy connection of diagnostic or predictive maintenance equipment without the need for an extra interface card or special cables.

The rear panel of the System Monitor is a double-wide module, which also is common for the Power Supply. It provides the terminals for connecting primary power, Rack Inhibit control, Trip Multiply control, remote Reset control and the connections for two Keyphasor transducers. The rear panel also provides computer-ready connections for a Bently Nevada Communications Processor (TDM or DDM), the terminals for the OK relay contacts and connectors for the Serial Interface.

Computer interface provided as standard

The System Monitor provides a built-in interface between the monitor rack and a Bently Nevada Communications Processor. This provides a computer-ready system; no modifications or additional 3300 System hardware is required to interface to a computer. Consequently, 3300 Systems are easily turned into computerized rotating machinery protection and information systems.

Bently Nevada standard software packages for on-line monitoring include Transient Data Manager® (TDM), Dynamic Data Manager® (DDM), and System 64. Refer to individual Product Data Sheets for more information on these systems.

System Monitor with Serial Interface

Integration of monitored data with Programmable Logic Controllers, Process Control Computers and Distributed Control Systems

The 3300 Serial Interface option gives the 3300 System communication capability over RS-232 or RS-422 physical link connections. The interface option installs in the System Monitor and the original functions of the System Monitor remain unaltered.

The Serial Interface gathers and stores monitor recorder values and status values, placing that data in memory. When data is requested via a protocol message, the message identifies what data is wanted by specifying a data address.

The interface implements two standard protocols, Modicon Modbus® and Allen Bradley DF1, which are switch selectable on the interface assembly. Modicon Modbus allows daisy-chaining of racks; Allen Bradley DF1 does not allow daisy-chaining of racks. Each protocol has its own unique characteristics, but the data which can be transferred over each interface link is similar. *Modbus® is a registered trademark of Modicon Incorporated.*

Applications

Use of the interface by the control computer is for display of direct (current) values, channel status, trending and event logging. Only static data will be transmitted from the 3300 System over the interface; no dynamic data is supplied. At the same time, a TDM or DDM Communications Processor can be connected to the System Monitor. Valuable dynamic data can thereby be input to computers operating Bently Nevada TDM or DDM applications software.

Constantly active scanning process

The Serial Interface uses the Transient Data Manager or Dynamic Data Manager backplane control and multiplexed analog data signal to receive information from the 3300 monitors. If there is no TDM or DDM connected to the 3300 rack, the Serial Interface generates the required backplane control signals to scan the rack. In this case, the Serial Interface will scan a rack assuming the rack is a full 14P rack. If there is a TDM or DDM present, then the Serial Interface detects this and gathers data from the points which are configured in synchronism with the TDM or DDM Communications Processor.

Whichever of the two modes is used for scanning of data, the scanning process is constantly active in the Serial Interface. Data obtained from the scanning process (see Specifications section under Scan Rates) is deposited in a database maintained within the interface. When a request for data is received via a protocol message from an external device, the requested data is taken from the database, formatted and returned to the requested device in a message response.

Selection switches on the Serial Interface allow the setting of the device address and baud rate. In addition, such selections as message checking mode, parity and stop bit selection, modem controls enable, and protocol mode can be set.

Specifications

INPUTS

Power: Accepts regulated dc voltages from rack Power Supply.

Nominal Consumption: 2 watts; 3.6 watts with interface option

System Monitor
3300/01

Signal: Accepts up to two proximity probe Keyphasor® signals. Buffered Keyphasor signals are available on the front panel via coaxial connectors for diagnostic or predictive maintenance instruments.

Input Impedance: 10 kΩ.

OUTPUTS

Buffered Keyphasor Outputs: Two coaxial connectors on front panel.

Output Impedance: 100 Ω.

Keyphasor Transducer Power Supply: User-programmable for –24 Vdc or –18 Vdc. Voltages are short circuit protected.

Indicators: Two LEDs on front panel indicate:

Supplies OK — ON when all system supply voltages are within tolerance.

Trip Multiply — ON when Trip Multiply function is active.

LEDs behind the slide-away front panel indicate the condition of the various monitored supply voltages. The appropriate Supply voltage LED and the SUPPLIES OK LED on the front panel turn OFF if a voltage is out of tolerance.

CONTROLS

Front Panel: Two switches control the Up or Down adjustment of monitor alarm setpoints. A third switch controls the alarm RESET function.

Rear Panel: Terminals provide connections for Rack Inhibit, Trip Multiply and Alarm Reset. Two receptacles provide connection for a Communications Processor and there are two receptacles for the Serial Interface.

ENVIRONMENTAL LIMITS

Temperature Range:

Operation: +32°F to +149°F (0°C to +65°C).

Storage: –40°F to +185°F (–40°C to +85°C).

Relative Humidity: To 95% noncondensing.

PHYSICAL

Space requirements: One rack position, installs only in position two (next to the Power Supply).

Weight: 2 lbs. (1 kg).

Serial Interface

Address Setting: Eight switches on the Serial Interface allow setting of up to 256 different addresses.

Baud Rate: Three switches are used to set the desired baud rate for serial communications. A maximum rate of 9600 baud is possible.

Message Checking: One switch selects between Cyclic Redundancy Check (CRC) and Block Character Checking (BCC) for message validation. Allen Bradley protocol can use CRC or BCC checking; Modicon Modbus® uses only CRC checking.

Parity and Stop Bit Selection: Two switches allow selection of parity and stop bit modes.

Protocol Selection: If the switch labeled AB is ON, Allen Bradley protocol is selected; if the switch is OFF, Modicon Modbus® protocol is selected.

BCD Switch: If set, the data returned in Allen Bradley protocol is formatted in Binary Coded Decimal.

Data Format: The monitor's static data is converted to a binary value by an internal A/D converter. The 8-bit value is right shifted and stored internally as a 12-bit value. If BCD format is selected the 12-bit value is converted to BCD.

Data Accuracy: Data accuracy is dependent on the accuracy of the 0 to –10 V output of each monitor. The overall accuracy is equal to the monitor's Data Manager output accuracy plus 0.30%.

Scan Rates:

Active Mode: When there is no Data Manager connected, the Serial Interface data base is completely updated for an entire rack in 120 ms.

Passive Mode: Only those monitors that are configured in the Data Manager are scanned. The scan rate is controlled by the Data Manager.

TDM: For a full rack of 12 dual channel monitors, the scan rate for the status values (Alert, Danger and NOT OK) is 83 ms. TDM scans direct values once every four seconds.

DDM: For a full rack of 12 dual channel monitors, the scan rate for both status and direct values is a minimum of 120 ms.

Note: With both TDM and DDM, static data collection has a lower priority than other more important tasks such as servicing of alarms and receiving communications messages. Scan rates may be lengthened under circumstances in which these tasks are very active, though such instances should be rare.

Ordering Information

System Monitor with Serial Interface

A
3300/01 - □□

Option Description

A □□ **Type**
- 01 Standard
- 02 Serial Interface

ACCESSORIES

Rack/Cable Assemblies

RS-422 Rack-to-Rack Cable
(25-pin Male to 25-pin Female)

A B
84915 - □□□□ **-** □□

Option Descriptions

A □□□□ **Cable Length**
- 0010 10 feet (3 metres)
- 0025 25 feet (7.5 metres)
- 0050 50 feet (15 metres)
- 0100 100 feet (30 metres)
- 0250 250 feet (75 metres)
- 0500 500 feet (150 metres)

B □□ **Assembled**
- 01 No
- 02 Yes

System Monitor
3300/01

RS-232 Rack-to-Host Cable
(25-pin Female to 25-pin Female)

A B
84916 - □□□□ - □□

A □□□□ **Cable Length**
- 0010 10 feet (3 metres)
- 0025 25 feet (7.5 metres)
- 0050 50 feet (15 metres)
- 0100 100 feet (30 metres)

B □□ **Assembled**
- 01 No
- 02 Yes

RS-232 Rack-to-Host Cable
(15-pin Male to 25-pin Female)

A B
85343 - □□□□ - □□

A □□□□ **Cable Length**
- 0010 10 feet (3 metres)
- 0025 25 feet (7.5 metres)
- 0050 50 feet (15 metres)
- 0100 100 feet (30 metres)
- 0250 250 feet (75 metres)
- 0500 500 feet (150 metres)

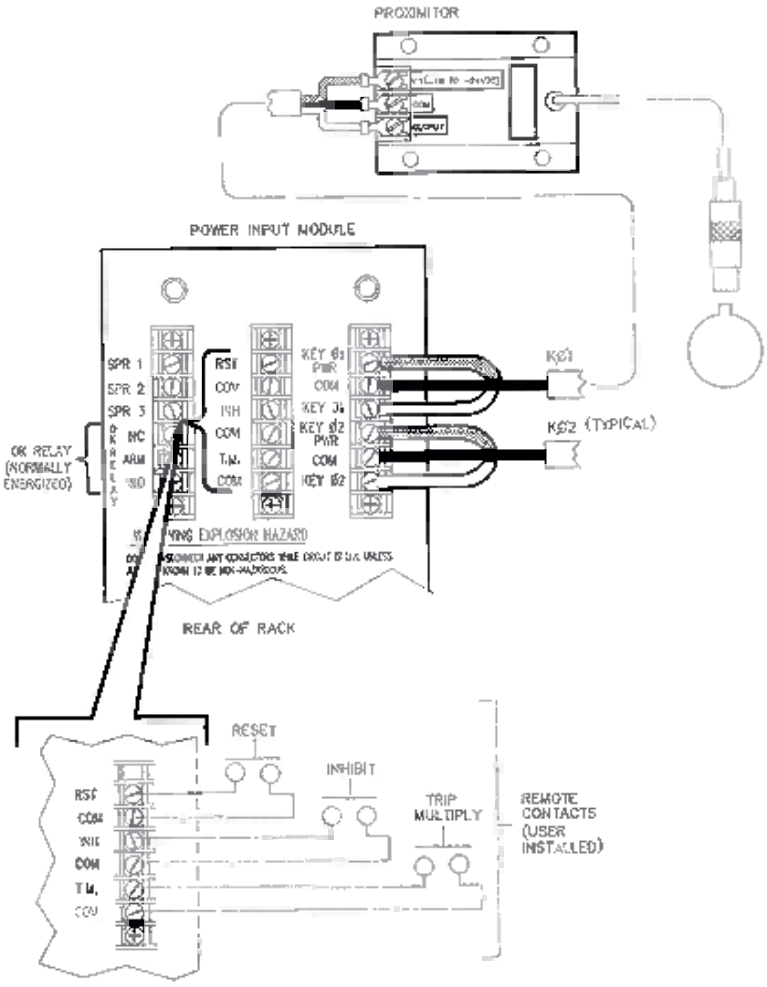
B □□ **Assembled**
- 01 No
- 02 Yes

RS-422 Rack-to-Host Cable
(25-pin Female to 25-pin Female)

A B
84917 - □□□□ - □□

A □□□□ **Cable Length**
- 0010 10 feet (3 metres)
- 0025 25 feet (7.5 metres)
- 0050 50 feet (15 metres)
- 0100 100 feet (30 metres)
- 0250 250 feet (75 metres)
- 0500 500 feet (150 metres)

B □□ **Assembled**
- 01 No
- 02 Yes



Field wiring diagram for 3300/01 standard System Monitor