1900/65A General Purpose Equipment Monitor

Bently Nevada™ Asset Condition Monitoring

Description

The 1900/65A General Purpose Equipment Monitor is designed to continuously monitor and protect equipment that is used in a variety of applications and industries. The monitor's low cost makes it an ideal solution for general-purpose machines and processes that can benefit from continuous monitoring and protection.

Inputs

The 1900/65A provides four transducer inputs and four temperature inputs. Software can configure each transducer input to support 2- and 3-wire accelerometers, velocity sensors or proximity sensors. Each temperature input supports Type E, J, K, and T thermocouples, and 2- or 3-wire RTDs.

Outputs

The 1900/65A provides six relay outputs, four 4-20 mA recorder outputs, and a dedicated buffered output. The user can use the 1900 Configuration software to configure the relay contacts to open or close according to the OK, Alert and Danger statuses of any channel or combination of channels, and to provide data from any variable from any channel on any recorder output. The dedicated buffer output can provide the signal for each transducer input.

A Modbus® Gateway option allows the monitor to provide static variables, statuses, event list, time and date information directly to any Modbus client, including Distributed Control Systems (DCSs), Supervisory Control and Data Acquisition (SCADA) systems, Programmable Logic Controllers (PLCs), or System 1® software. The monitor uses an internal counter and a Modbus client/master time reference to generate time and date information. Users can upgrade monitors without the Modbus Gateway by ordering the 1900/01 Communications Upgrade (see the Ordering Information section). The 1900/65A supports Modbus communications via Ethernet and a software-configurable RS232/485 serial port.

Configuration

The user defines monitor operation and the Modbus Gateway register map by using software running on a laptop or PC to create a configuration file and download the file to the monitor through the built-in Ethernet connection. The 1900/65A permanently stores configuration information in non-volatile memory, and can upload this information to the PC for changes.

Display Module

The 1900/65A supports an optional display/keypad to view channel information or make minor configuration changes. This allows the 1900/65A to operate as a stand-alone package. If desired, the user can mount the display up to 75 metres (250 feet) from the Monitor Module

imagination at work

Feature List

- Continuous monitoring and protection is suitable for auto-shutdown applications

- Stand-alone operation on general-purpose equipment

- Optional Modbus communications via 10BaseT/100BaseTX Ethernet, or software-configurable 485/232 serial port

- Small package. Monitor Module: 196.9 mm × 149.4 mm × 74.4 mm (7.75" × 5.88" × 2.93"). Monitor Module with attached Display Module: 196.9 mm × 149.4 mm × 97.8 mm (7.75" × 5.88" × 3.85)"

- DIN rail or bulkhead mounting options

- 18 to 36 Vdc power input. (optional 110-220 Vac external supply)

- 24-bit ADC conversion

- Four vibration/position/speed inputs

- Four temperature inputs

- Configurable scale factors and full scale ranges

- Up to four processed variables per channel with independent integration and filter control

- Internal OK checking with status

- Independent Alert and Danger setpoints

- 200-entry event list

- Six relay outputs. Relay operation is programmable

- Buffered outputs for each transducer channel

- Four configurable 4-20 mA recorder outputs

- Optional NEMA 4X/IP66 fiberglass housing with window for display

- Painted or stainless steel weatherproof door for panel-mount display

- Hazardous area approvals

- Maritime Approvals

Specifications

Inputs

Transducer Inputs

Users can configure Channels 1 through 4 to accept input from acceleration, velocity or displacement transducers.

Transducer Channel Types

Channel Types define the functionality for processing that will be applied to an input signal and the kind of variables or measurement values that will be derived from this input. Channel Types also define the kind of sensor that must be used. Transducer Channel Types include:

- Acceleration or Reciprocating Acceleration

- Velocity or Reciprocating Velocity

- Radial Vibration (shaft vibration)

- Thrust (shaft axial displacement)

- Position

- Speed

Acceleration and Reciprocating Acceleration Channel Types

The Acceleration Channel Type and Reciprocating Acceleration Channel Type support two- and three-wire acceleration sensors. The Reciprocating Acceleration channel type has timed OK channel defeat disabled.

Acceleration Variables and Reciprocating Acceleration Variables

Acceleration Variables and Reciprocating Acceleration Variables are filtered and processed measurements from

raw transducer signals. The Acceleration Channel Type and Reciprocating Acceleration Channel Type continuously processes up to four variables per channel.

Vibration:

Up to three bandpass filtered amplitude measurements.

Acceleration Enveloping:

Users can apply the acceleration enveloping algorithm to one Acceleration or Reciprocating Acceleration Variable.

Bias Voltage:

Users may assign the value of the transducer bias voltage to any of the variables.

Configuration Options

Each variable is independently configured with the following options.

Vibration Variables:

Peak or RMS

Metric or English units

Filter corner frequencies

Full scale range

Acceleration integrated to velocity

Enveloped Variable:

Filter corner frequencies

Standard or Enhanced demodulation

Filters

Vibration Variable:

0.5 Hz – 25 kHz configurable 4-pole high-pass, 4-pole low-pass

Enveloping High-Pass:

25 Hz to 5 kHz, configurable 4-pole

Enveloping Low-Pass:

125 Hz to 25 kHz, configurable 2-pole

Enveloped Variable High-Pass:

0.1 Hz min., but greater than Enveloped Variable low-pass 2-pole

Enveloped Variable Low-Pass:

Greater than Enveloped Variable high-pass and less than Enveloping high-pass 4-pole

Bias Filter:

0.01 Hz 1-pole low-pass

OK Filter:

2.4 kHz 1-pole low-pass

Full Scale Range

Vibration:

20 to 500 m/s^2 (2 to 50 g) peak and RMS

Enveloped:

20 to 500 m/s^2 (2 to 50 g) peak and RMS

Integrated:

10 to 100 mm/s (0.4 to 4 in/s) peak and RMS

Bias Voltage:

-24 V

Accuracy

Vibration Variables:

±1% of full scale range

Input Impedance

3-wire Voltage Mode:

10 kΩ

Velocity and Reciprocating Velocity Channel Type

The Velocity Channel Type and Reciprocating Velocity Channel Type support two-wire and three-wire piezo-velocity sensors.

Velocity Variables and Reciprocating Velocity Variables

Velocity Variables and Reciprocating Velocity Variables are filtered and processed measurements from raw transducer signals. The Velocity Channel Type and Reciprocating Velocity Channel Type support up to four continuously calculated variables per channel.

Vibration:

Up to three bandpass filtered amplitude measurements.

Bias Voltage:

Users may assign the value of the transducer bias voltage to any of the variables.

Configurable Options

Each variable is independently configured with the following options.

Vibration Variables:

Peak or RMS

Metric or English units

Filter corner frequencies

Full-scale range

Velocity integrated to displacement

Filters

Vibration Variables:

0.5 Hz to 5.5 kHz, configurable 8-pole high-pass, 4-pole low-pass

Bias Filter:

0.09 Hz 1-pole low-pass

OK Filter:

2.4 kHz 1-pole low-pass

Full Scale Range

Vibration:

10 to 50 mm/s (0.5 to 2 in/s) peak and RMS

Integrated:

100 to 500 μm (5 to 20 mils) peak to peak

Bias Voltage:

-24 V

Accuracy

Vibration Variables:

±1% of full scale range

Input Impedance

3-Wire Voltage Mode:

10 kΩ

Radial Vibration Channel Type

The Radial Vibration Channel Type measures radial shaft motion using proximity sensors.

Radial Vibration Variables

Radial Vibration Variables are filtered and processed measurements from raw transducer sensors. The Radial Vibration Channel Type supports up to four continuously calculated variables per channel.

Direct:

Up to three bandpass filtered amplitude measurements

Gap:

Gap voltage

Vibration:

Up to three bandpass filtered amplitude measurements

Configurable Options

Each variable is independently configured with the following options.

Vibration Variables:

Metric or English units

Filter corner frequencies

Number of filter poles

Full-cale range

Filters

Direct Filter 1:

4 to 4000 Hz (240 to 240,000 RPM)

Direct Filter 2:

1 to 600 Hz (60 to 36,000 RPM)

Direct Filter Characteristics:

High-pass set by attack and decay, 1-pole low-pass

Gap Filter:

0.09 Hz 1-pole low-pass

Vibration Variables:

0.5 Hz to 4 kHz, configurable

1-, 2-, or 4-pole high-pass and low-pass, configurable

OK Filter:

2.4 kHz 1-pole low-pass

Full Scale Range

Direct:

100 to 500 μm (3 to 20 mils) peak-to-peak

Gap:

-24 V

Accuracy

Vibration Variables:

±1% of full-scale range

Input Impedance

Non-configurable:

10 kΩ

Thrust Channel Type

The Thrust Channel Type measures axial shaft motion using proximity sensors.

Thrust Variables

Thrust Variables are filtered and processed measurements from raw transducer signals.

Position:

Axial position of shaft

Gap:

Gap, voltage or position

Configurable Options

Each variable is independently configured with the following options.

Position Variables:

Metric or English units

Full-scale range

Filters

Direct Filter:

1.2 Hz 1-pole low-pass

Gap Filter:

0.41 Hz 1-pole low-pass

OK Filter:

2.4 kHz 1-pole low-pass

Full Scale Range

Position:

1 to 4 mm (50 to 150 mils) span with adjustable zero position

Gap:

–24 V

Accuracy

Position Variables:

±1% of full-scale range

Input Impedance

Non-configurable:

10 kΩ

Position Channel Type

The Position Channel Type measures mechanical motion using proximity sensors.

Position Variables

Position Variables are filtered and processed measurements from raw transducer signals.

Position:

Mechanical position

Gap:

Gap, voltage or position

Configurable Options

Each variable is independently configured with the following options.

Position Variables:

Metric or English units

Full scale range

Filters

Direct Filter:

1.2 Hz 1-pole low-pass

Gap Filter:

0.41 Hz 1-pole low-pass

OK Filter:

2.4 kHz 1-pole low-pass

Full Scale Range

Position:

1 to 28 mm (50 to 1100 mils) span with adjustable zero position

Gap:

-24 V

Accuracy

Position Variables:

±1% of full scale range

Input Impedance

Non-configurable:

10 kΩ

Speed Channel Type

The Speed Channel Type measures speed using proximity sensors.

Speed Variables

Speed Variables are filtered and processed measurements from raw transducer signals.

Speed:

Up to four speed measurements

Gap:

Gap, voltage

Configurable Options

Each variable is independently configured with the following options.

Gap Filter:

0.09 Hz 1-pole low-pass

OK Filter:

2.4 kHz 1-pole low-pass

Full Scale Range

Speed:

100 - 100,000 rpm

Events Per Revolution

EPR:

0.001 to 1000

Accuracy

Speed Variables:

± 0.5 RPM + 0.015% of reading

Input Impedance

Non-configurable:

10 kΩ

Temperature Inputs (Ch. 5 – 8)

Channels 5 through 8 support Type E, J, K, and T thermocouples, and 2- and 3-wire RTDs.

Temperature Variable

Temperature variables are processed measurements from raw transducer signals. The temperature channel type processes one temperature variable per channel.

Configurable Options

Each Variable is independently configured with the following options.

Units:

°C or °F

Filters

Analog Filter:

50 Hz 1-pole, low-pass

Digital Filter:

Notch filter will attenuate the first 5 orders of 50 Hz and 60 Hz (49 Hz to 61 Hz) by a minimum of 100 dB.

Full Scale Range

Type E:

-200 to 1000 °C (-328 to 1832 °F)

Type J:

-210 to 1200 °C (-346 to 2192 °F)

Type K:

-200 to 1370 °C (-328 to 2498 °F)

Type T:

-200 to 400 °C (-328 to 752 °F)

10 Ω Cu α=0.00427:

-200°C to 260 °C (-328 to 500 °F)

120 Ω Ni α=0.00672:

-80°C to 260 °C (-112 to 500 °F)

100 Ω Pt α=0.00385:

-200 to 850 °C (-328 to 1562 °F)

100 Ω Pt α=0.00392:

-200°C to 700 °C (-328 to1292 °F)

Accuracy

All Thermocouple Types:

±1 °C (±1.8 °F) typical @ 25 °C (77 °F)

±2.5 °C (±4.5 °F) maximum for thermocouple measurements over –100 °C (148 °F)

±5 °C (±9 °F) maximum for thermocouple measurements below –100 °C (-148 °F)

3-Wire RTD (except 10 Ω Cu):

±1.5 °C (±2.7 °F) + 0.5 % full scale

3-Wire RTD 10 Ω Cu:

±3 °C (±5.4 °F) + 0.5 % full scale

2-wire RTD Types:

2-wire RTDs have additional errors due to field wire resistance and variations in the field wire resistance due to changes in ambient temperature.

Input Impedance

Thermocouple Inputs:

>1 MΩ

Alarm Status Time Delays

Position / Vibration Inputs

Minimum

0.1 second

Maximum

60 seconds

Adjustment Resolution

0.1 second

Temperature / Speed Inputs

Minimum

1 second

Maximum

60 seconds

Adjustment Resolution

0.1 second

Relays

Relay Logic

The 1900/65A monitor has six relay outputs that users can program to open or close contacts according to user-defined logic statements. Logic statements use the OK, Alert and Danger statuses of any channel, or combination of channels as inputs.

Logical Operators

AND (bypassed channels ignored)

True AND (bypassed channels included)

OR

Logical Operands

Monitor inhibit

Monitor Not OK

Monitor Danger

Monitor Alert

Channel Not OK

Channel Danger

Channel Alert

Variable Danger

Variable Alert

Maximum Operands

50 per relay

Relay Configuration

The following configuration options are independent of the relay logic and can be configured for each relay:

- Latching or non-latching independent of alarm status

- Normally energized or normally de-energized

- Normally open and normally closed via contacts

Relay Specifications

Type

Single pole, double throw (SPDT)

**Maximum
Contact Voltage**

300 Vrms

150 Vdc

**Minimum
Switched
Current**

100 mA @ 12 Vdc

**Maximum
Switched Power**

160 W dc

1500 VA ac

Contact Life

100,000 cycles @ 5 A, 250 Vac

200,000 cycles @ 1 A, 24 Vdc

Sealing

Epoxy

**Insulation
Resistance**

1000 MΩ minimum @ 500 Vdc

Inhibit, Reset, and Trip Multiply Inputs

Inhibit/Trip Multiply

Users can use software to configure the Inhibit/Trip Multiply input as either Inhibit or Trip Multiply.

When configured for Trip Multiply short-circuiting the Inhibit/Trip Multiply contact to RTN will increase Alert and Danger set points.

When configured for Inhibit the Inhibit input will inhibit (bypass or inactivate) Alert and Danger statuses. Short circuiting the INHIBIT contact to INHIBIT RTN will:

- Set all Variable Danger Statuses to logic 0

- Set all Variable Alert Statuses to logic 0

- Set Bypass and Inhibit Statuses to logic 1

Modbus Note: *Monitor Alarm Inhibit switch,* and *Monitor Trip Multiply switch* mapped in the Modbus Gateway will remotely inhibit Alert and Danger statuses or activate Trip Multiply respectfully.

Electrical

Activate Inhibit

50 kΩ or less (shorted)

De-activate Inhibit

500 kΩ or greater (open)

Reset

Use the Reset input to reset all latched alarms and latched relays. If the condition driving the status no longer exists, short-circuiting the RESET contact to RESET RTN will:

- Reset all latched Alert statuses

- Reset all latched Danger statuses

- Reset all latched Not OK statuses

- Reset all latched relays

Modbus Note: Writing a non-zero value to the Modbus® register *Reset Latched Statuses* mapped in the Modbus® Gateway will reset the monitor remotely.

Electrical

Activate Reset

50 kΩ or less (shorted)

De-activate Reset

500 kΩ or greater (open)

Transducer Supplies

All outputs are short-circuit protected.

Two-Wire Current Mode

Current Source

3.3 mA ± 5%

Open Circuit Voltage

21 to 24 Vdc

Three-Wire Voltage Mode

Supply Voltage

-24.02 Vdc to –23.47 Vdc

Maximum Rated Current

15 mA

Short Circuit Current

15.1 mA to 23.6 mA

4-20 mA Interface

Number of Outputs

Four outputs, any of which may be configured to provide data from any channel and any variable.

Proportional Value

4 to 20 mA values are proportional to the channel full-scale.

Loop Supply Voltage

18 to 36 Vdc

Loop Resistance

600 Ω maximum

Accuracy

2% over operating temperature range

Update Rate

100 mS

Resolution

10 µA

Clamp Current

2 mA ± 10% (configurable for Not OK and Bypass)

Buffered Outputs

Display Module

A single buffered output on the Display Module provides access to input Channels 1 through 4. The signal does not have gain, and is not scaled. This output is buffered to provide short circuit and EMI protection.

Output Impedance

550 Ω

Bandwidth

40 kHz minimum (Display Module attached directly to Monitor)

8 kHz minimum (75 m (250 ft.) of cable)

Monitor Module

Each input for channels 1 through 4 has a dedicated buffered output. The signal does not have gain, and is not scaled. Each output is buffered to provided short circuit and EMI protection.

Output Impedance

550 Ω

Bandwidth

40 kHz minimum

Indicators

Monitor Module

Status LED

Indicates when the monitor is functioning properly

Display Module

OK LED

Indicates when the monitor is functioning properly

Alert LED

    Indicates an Alert condition

Danger LED

    Indicates a Danger condition

Bypass LED

    Indicates that the monitor is in Bypass mode

Trip Multiply LED

    Indicates that the monitor is in Trip Multiply mode

Channel LED

    Indicates channel is active

Display

    Liquid Crystal Display (LCD) with backlight

    68.6 mm (2.7 in) wide × 35.6 mm (1.4 in) high

Power Requirements

Input Voltage Range

    18 to 36 Vdc

Operating Current

    0.35 A typical, 1.0 A maximum

Operating Power

    8.5 W typical, 14 W maximum

Physical

Monitor Module Dimensions (L x W x H)

    196.9 mm × 149.4 mm × 74.4 mm

    (7.75 in × 5.88 in × 2.93 in)

Weight

    0.77 kg (1.70 lb)

Display Module Dimensions (L x W x H)

    196.9 mm × 149.4 mm × 32.8 mm

    (7.75 in × 5.88 in × 1.29 in)

Weight

    0.40 kg (0.89 lb)

Mounting
DIN Rail Option

    35 mm DIN rail

Bulkhead Option

    Bulkhead mounting plate

Weatherproof Enclosure Option

    NEMA 4X/IP66 Fiberglass Housing with window, 300.2 mm × 249.4 mm × 209.8 mm (11.82 in × 9.82 in × 8.26 in)

    The 1900 Configuration Software package contains everything necessary to install, configure, and maintain the 1900/65A monitor.

- FeaturesTools for installing and troubleshooting
- Simple display to help with configuration
- Ability to browse network for 1900 monitors
- Network configuration
- Configuration for channels, variables, setpoints, tag names, recorders and filters
- Configuration for the optional Modbus Gateway
- Configuration for relays and relay voting logic
- Off-line configuration allowing use of software when hardware is not available

- Firmware upgrade function and diagnostics

- Change bypass modes and setpoints on the fly

- Display component for statuses and variables

- Display Hardware Identification and manufacturing information

- Context-specific help

- System Requirements

- Users may install software on a notebook or desktop computer that meets these minimum requirements:

- Microsoft ® Windows® 2000 or Windows® XP or Windows® Server 2003 Operating System

- 800 MHz Pentium® III class processor

- 256 MB RAM

- 8 MB video card

- 8x or faster CD-ROM drive

- 100 MB available hard drive space

- 10/100BaseT Ethernet interface (10 or 100 Mb/s)

- 1024 x 768 screen resolution recommended

Environmental

Temperature
Operating

-20 to +70 ºC

(-4 to +158 ºF)

Storage

-30 to +90 ºC

(-22 to +194 ºF)

Humidity
Operating

95% non-condensing, maximum

Storage

95% non-condensing, maximum

Supported Transducers

Channel Type	Bently Nevada Transducer
Acceleration and Reciprocating Acceleration	200350 Accelerometer 330400 Accelerometer 330425 Accelerometer
Velocity and Reciprocating Velocity	190501 Velomitor® 330500 Velomitor 330525 Velomitor 330750 Velomitor
Radial Vibration, Thrust, and Speed	3300 5 & 8 mm Proximitor® System 3300 XL 8mm Proximitor System 3300 XL 11mm Proximitor System 3300 XL NSv™ Proximitor System 7200 5 & 8mm Proximitor System 7200 11mm Proximitor System 7200 14 mm Proximitor System
Position	3300 5 & 8 mm Proximitor System 3300 XL 8mm Proximitor System 3300 XL 11mm Proximitor System 3300 XL 25mm Proximitor System 3300 XL 50mm Proximitor System 3300 XL NSv™ Proximitor System 7200 5 & 8mm Proximitor System 7200 11mm Proximitor System 7200 14 mm Proximitor System

Note: The 1900/65A provides default configuration settings for Bently Nevada™ transducers. The user can configure the 1900/65A to accept other transducers.

CE Mark Directives

The 1900/65A monitor has the CE mark and is approved for installation within the European Union and European Environmental Agency regions. The monitor has been designed and tested to meet the following directives.

EMC Directives

EN61000-604

Radiated Emissions

EN 55011, Class A

Conducted Emissions

EN 55011, Class A

EN61000-6-2

Electrostatic Discharge

EN 61000-4-2, Criteria B

Radiated Susceptibility

EN61000-4-3, Criteria A

Electrical Fast Transient

EN 61000-4-4, Criteria B

Surge Capability

EN 61000-4-5, Criteria B

Conducted Susceptibility

EN61000-4-6, Criteria A

Low Frequency Conducted Susceptibility

IEC 60945, Criteria A

Low Voltage Directives

The 1900/65A Monitor meets Council Directive 73/23/EEC Low Voltage when the 24 Vdc power source is approved to the Low Voltage Directive. Our power supply P/N 02200794 meets this requirement.

EN 61010-1

Safety Requirements

Safety Requirements for Measurement, Control, and Laboratory Use

EMC Standards

This product is tested to meet Council Directive 89/336/EEC Electromagnetic Compatibility (EMC) and the listed standards, in whole or in part, documented in a technical construction file. EN61000-6-4 Generic emission standard, Part 2, Industrial Environment. EN61000-6-2 EMC Generic Immunity standard, Part 2, Industrial Environment.

Hazardous Area Approvals

This monitor is not certified for installation in Class 1 Div 1 locations, but it will support transducers installed in Div 1 locations via the use of galvanic isolators and barriers. If galvanic isolators are used, no change is necessary to the installation. A removable ground jumper allows the monitor to support zener barrier installations. Removing the jumper will disconnect circuit common from chassis at the monitor so that chassis can be connected at the barrier.

North American

Ex/AEx nA [L] IIC

Class I Division 2 Groups A B C D

T4 @ -20 °C ≤ Ta ≤ 70 °C

Vn = 18 to 36 Vdc @ Imax = 1A per drawing 173089

European

II 3G Ex nA [nL] IIC T4

@-20 °C ≤ Ta ≤ 70 °C

Sira 06 ATEX 4053X

IECEx SIR 06.0012X per drawing 173089

Maritime

DNV Cert A-9974

Ordering Information

1900/65A General Purpose Equipment Monitor

1900/65A-AXX-BXX-CXX-DXX-EXX

A: Power Option

0 0	18 to 36 Vdc
0 1	110 to 220 Vac @ 50 to 60 Hz (external supply)

B: Display Option

0 0	No display
0 1	Attached display (no cable)
0 2	Display with 10' PVC cable
0 3	Display with 10' unassembled PVC cable
0 4	Display with 10' TEF cable
0 5	Display with 10' unassembled TEF cable
0 6	Display with 50' PVC cable
0 7	Display with 50' unassembled PVC cable
0 8	Display with 50' TEF cable
0 9	Display with 50' unassembled TEF cable
1 0	Display with 100' PVC cable
1 1	Display with 100' unassembled PVC cable
1 2	Display with 100' TEF cable
1 3	Display with 100' unassembled TEF cable
1 4	Display with 250' PVC cable
1 5	Display with 250' unassembled PVC cable
1 6	Display with 250' TEF cable
1 7	Display with 250' unassembled TEF cable

C: Mounting Option

0 0	None
0 1	DIN rail mount (see Figure 1)
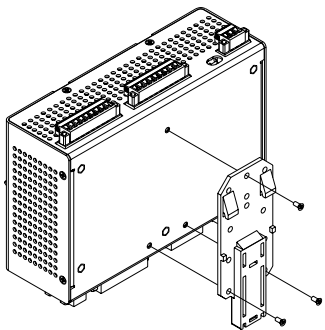
Figure 1: DIN Rail Mount

0 2	Bulkhead Mount (see Figure 2)
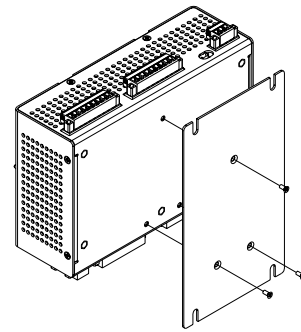
Figure 2: Bulkhead Mount

0 3	Fiberglass NEMA 4X/IP66 WP housing with window in door (see Figure 3)
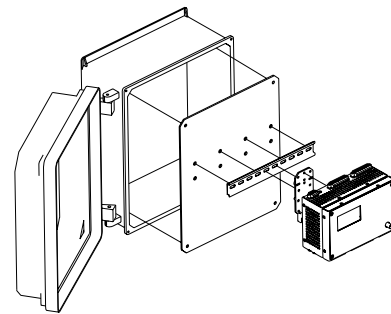
Figure 3: NEMA 4X/IP66 WP Housing

0 4	1900/55 replacement kit (see Figure 4)

Note: Uses existing 1900/55 weather-proof housing and requires power option A01 (110/220 Vac to 24 Vdc external power supply)
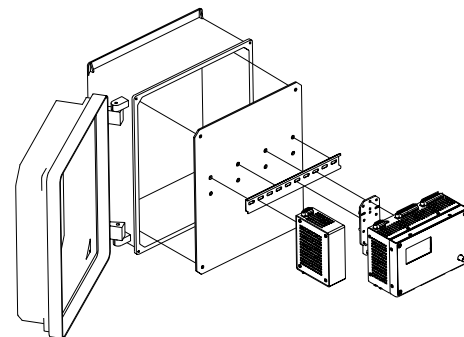

Figure 4: 1900/55 Replacment Kit

D: Approvals Option

0 0	None
0 1	Multiple approvals. See Hazardous Area Approvals section for specific certifications.
02	Maritime Cert (DNV)

E: Communications Option

    0 0   None

    0 1   Modbus communications

1900/01 – 1900/65A General Communications Monitor, Communications Upgrade

1900/01-AXX-BXX-CXX-DXX

A: Order Type Option

    0 1   New order (CD, key, and binder)

    9 8   Replacement licenses (key)

    9 9   Update (CD)

B: Communications Option

    0 1   Modbus communications

C: License Key Type Option

    0 0   None

    0 1   USB license key

    0 2   Floppy disk license key

D: License Quantity Option

X X   Total licenses (1 to 99)

Accessories

167699-02

    1900/65A Display Module

173400-01

    1900/65A Product Manual

172250-01

    1900/65 Modbus Gateway Users Guide

173089-01

    1900/65A Field Wiring Diagrams

02200794

    Power supply, 110/220 Vac to 24 Vdc 2.5 A DIN rail mount

02200121

    DIN rail end bracket

168374

    35mm DIN rail mounting clip for 1900/65A Monitor Module

168495

    Bulkhead mounting plate

168547-0010-01-01

    3 m (10 ft) PVC cable, assembled

168547-0010-01-02

    3 m (10 ft) PVC cable, unassembled

168547-0010-02-01

    3 m (10 ft) TEF cable, assembled

168547-0010-02-02

    3 m (10 ft) TEF cable, unassembled

168547-0050-01-01

    15 m (50 ft) PVC cable, assembled

168547-0050-01-02

    15 m (50 ft) PVC cable, unassembled

168547-0050-02-01

    15 m (50 ft) TEF cable, assembled

168547-0050-02-02

    15 m (50 ft) TEF cable, unassembled

168547-0100-01-01

    30 m (100 ft) PVC cable, assembled

168547-0100-01-02

    30 m (100 ft) PVC cable, unassembled

168547-0100-02-01

    30 m (100 ft) TEF cable, assembled

168547-0100-02-02

    30 m (100 ft) TEF cable, unassembled

168547-0250-01-01

    75 m (250 ft) PVC cable, assembled

168547-0250-01-02

    75 m (250 ft) PVC cable, unassembled

168547-0250-02-01

75 m (250 ft) TEF cable, assembled

168547-0250-02-02

75 m (250 ft) TEF cable, unassembled

168628

Stainless steel NEMA 4X weatherproof door for panel-mount display assembly

168629

Painted steel NEMA 4 weatherproof door for panel-mount display assembly

168944

Fiberglass NEMA 4X/IP66 weatherproof housing with window in door

02295055

MTL 728(-) barrier

02245002

MTL 796(-) barrier

172555

Modbus/TCP (Ethernet) to Modbus/RTU (Serial) Converter

169825-01

Training CD

Dimensions

Note: All dimensions shown in millimeters (inches) except as noted.
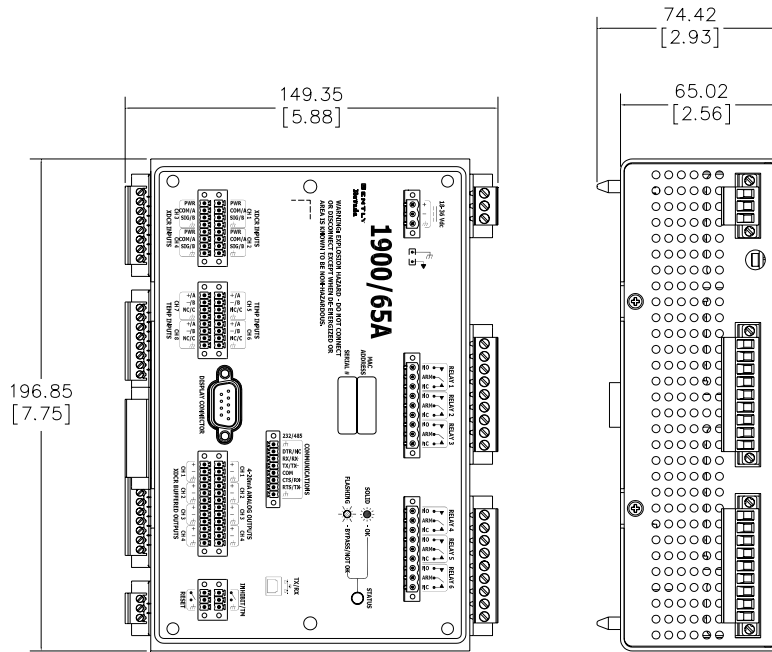
Figure 5: Monitor Module Dimensions
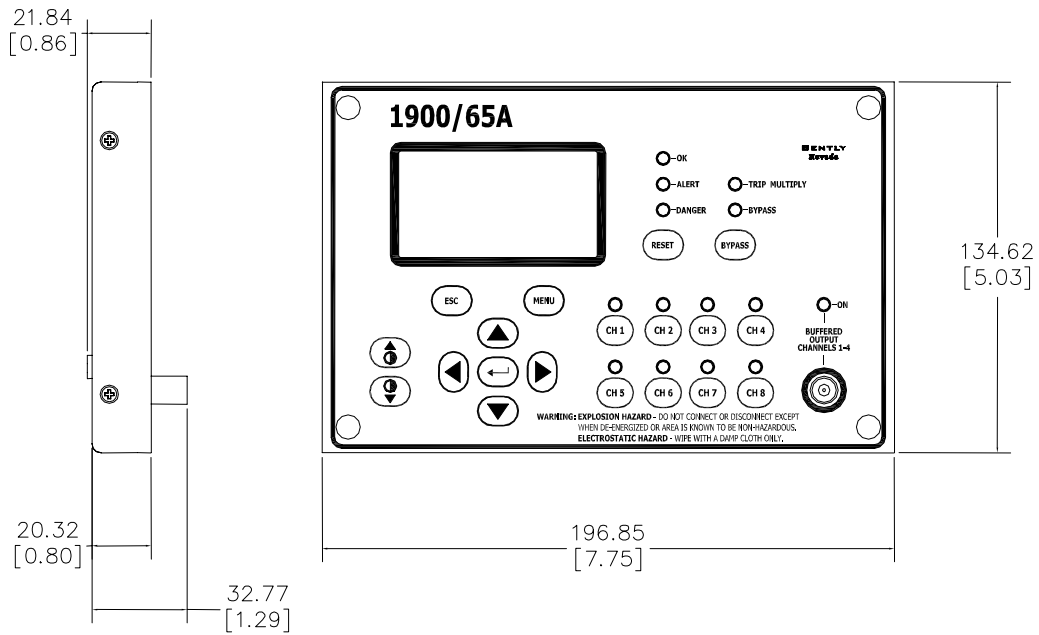
Figure 6: Display Module Dimensions
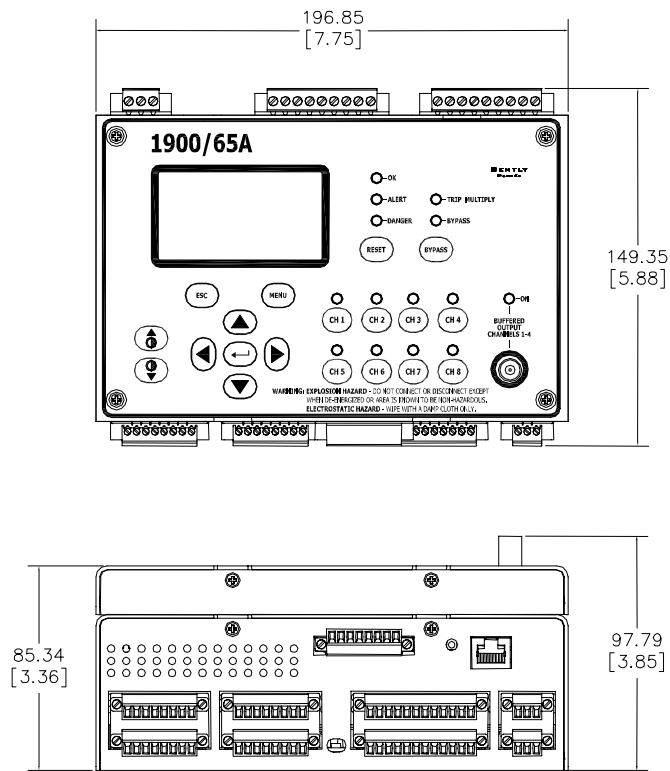
Figure 7: Combined Dimensions
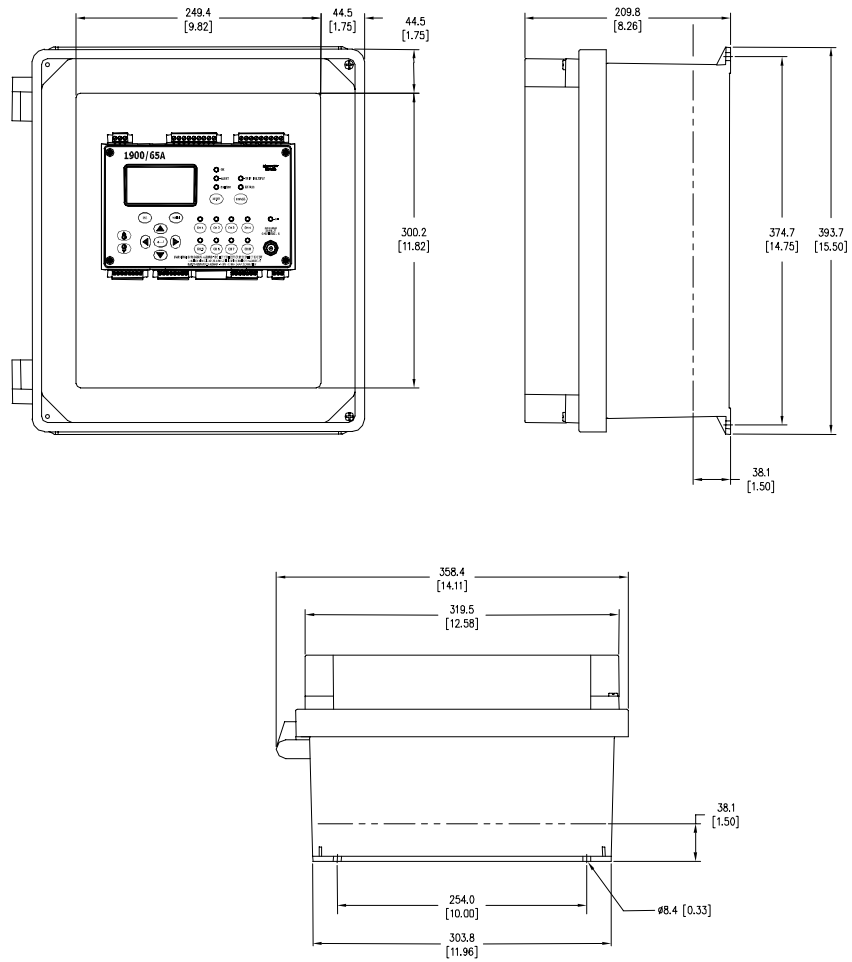
Figure 8: Weatherproof Housing Dimensions
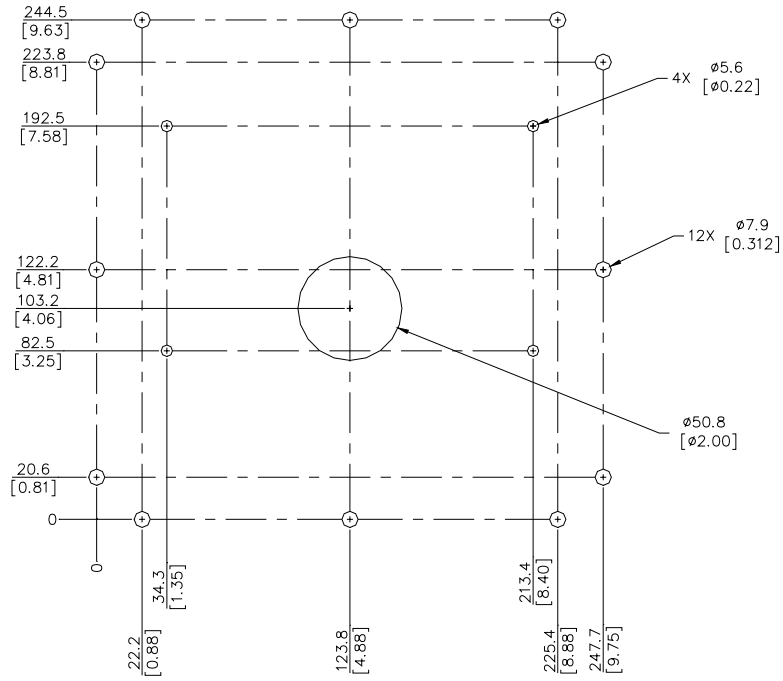
Figure 9: Weatherproof Door Drill Pattern
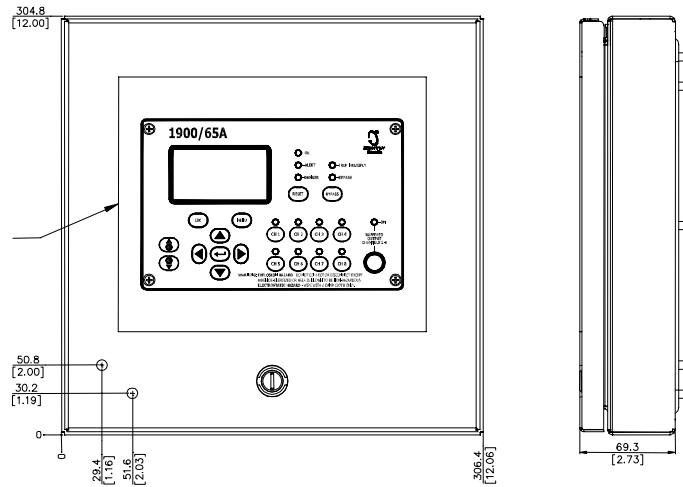
Figure 10: Weatherproof Door Dimensions