# 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

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### 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 $\alpha$=0.00427:*

-200°C to 260 °C (-328 to 500 °F)

*120 Ω Ni $\alpha$=0.00672:*

-80°C to 260 °C (-112 to 500 °F)

*100 Ω Pt $\alpha$=0.00385:*

-200 to 850 °C (-328 to 1562 °F)

*100 Ω Pt $\alpha$=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 ΩCu:*

±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)

*Max switched Voltage:*

dc: 300V

ac: 400V

*Max switched current:*

dc: 5A

ac: 6A

*Max switched VA:*

dc: 150VA

ac: 1500VA

*Min switched Current:*

dc: 100mA / 12V

**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 × W × 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 × W × 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 × 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<br>330400 Accelerometer<br>330425 Accelerometer |
| Velocity and Reciprocating Velocity | 190501 Velomitor*<br>330500 Velomitor<br>330525 Velomitor<br>330750 Velomitor |
| Radial Vibration, Thrust, and Speed | 3300 5 & 8 mm Proximitor* System<br>3300 XL 8mm Proximitor System<br>3300 XL 11mm Proximitor System<br>3300 XL NSv™ Proximitor System<br>7200 5 & 8mm Proximitor System<br>7200 11mm Proximitor System<br>7200 14 mm Proximitor System |
| Position | 3300 5 & 8 mm Proximitor System<br>3300 XL 8mm Proximitor System<br>3300 XL 11mm Proximitor System<br>3300 XL 25mm Proximitor System<br>3300 XL 50mm Proximitor System<br>3300 XL NSv™ Proximitor System<br>7200 5 & 8mm Proximitor System<br>7200 11mm Proximitor System<br>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-12794

# 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) |
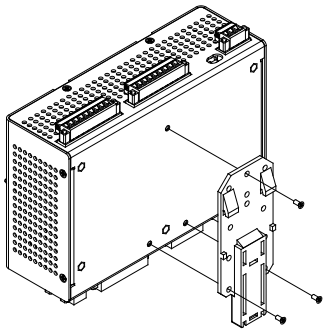


Figure 1: DIN Rail Mount

| | |
|---|---|
| **0 2** | Bulkhead Mount (see Figure 2) |
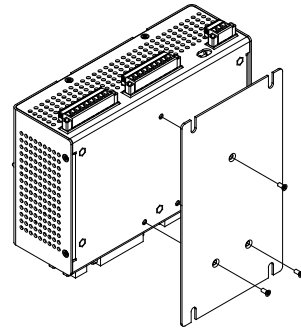


Figure 2: Bulkhead Mount

| | |
|---|---|
| **0 3** | Fiberglass NEMA 4X/IP66 WP housing with window in door (see Figure 3) |
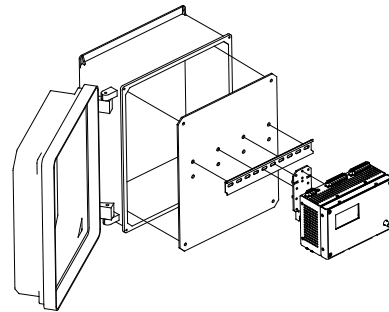


Figure 3: NEMA 4X/IP66 WP Housing

| | |
|---|---|
| **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)
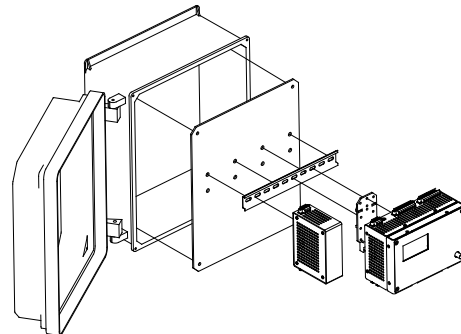


Figure 4: 1900/55 Replacement Kit

| | |
|---|---|
| **07** | ProTIM Housing, Wiring and Mounting Hardware (See Figure on page 21) |

**D:** Approvals Option

|  | | |
|---|---|---|
| | **0 0** | None |
| | **0 1** | Multiple approvals. See Hazardous Area Approvals section for specific certifications. |
| | **0 2** | Maritime Cert (DNV) |

**E:** Communications Option

|  | | |
|---|---|---|
| | **0 0** | None |
| | **0 1** | Modbus communications |

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**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** | Configuration Software only(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)

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# 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**

**168547-0250-01-02**

75 m (250 ft) PVC cable, assembled

**168547-0250-02-01**

75 m (250 ft) PVC cable, unassembled

**168547-0250-02-02**

75 m (250 ft) TEF cable, assembled

**168628**

75 m (250 ft) TEF cable, unassembled

**168629**

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

**168944**

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

**02295055**

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

**02245002**

MTL 728(-) barrier

**172555**

MTL 796(-) barrier

**169825-01**

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

Training CD

# Dimensions

Note: All dimensions shown in millimeters (inches) except as noted.
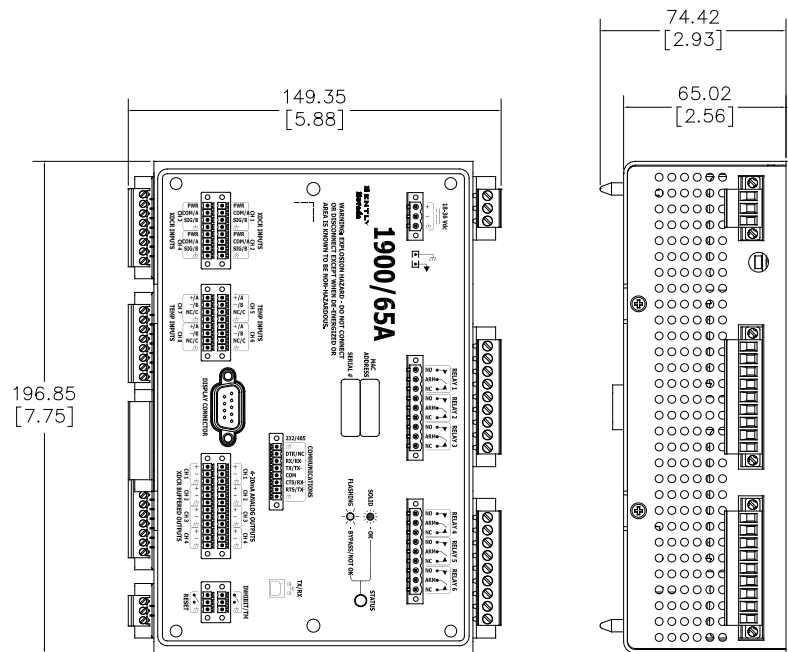


Figure 5: Monitor Module Dimensions
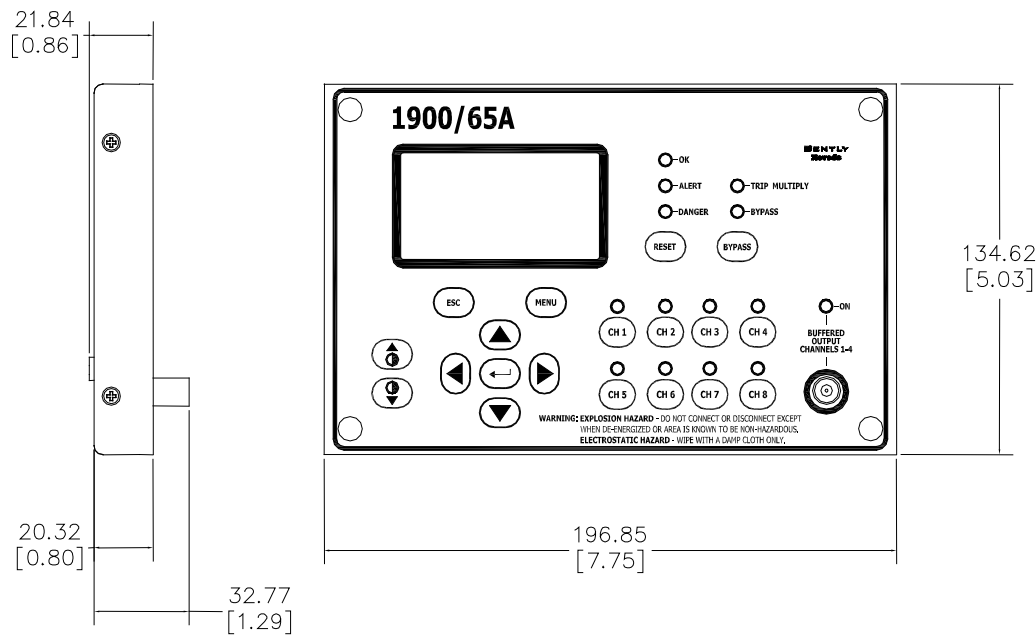


Figure 6: Display Module Dimensions
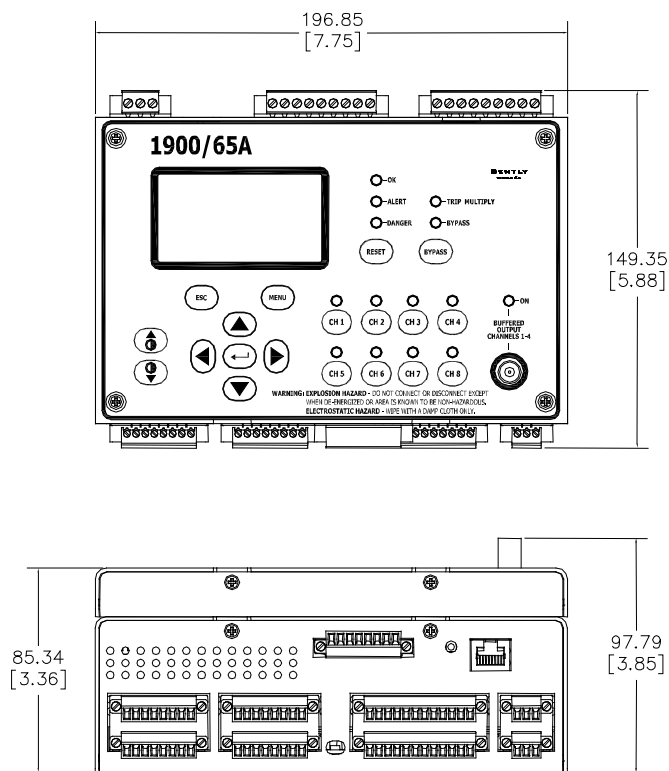
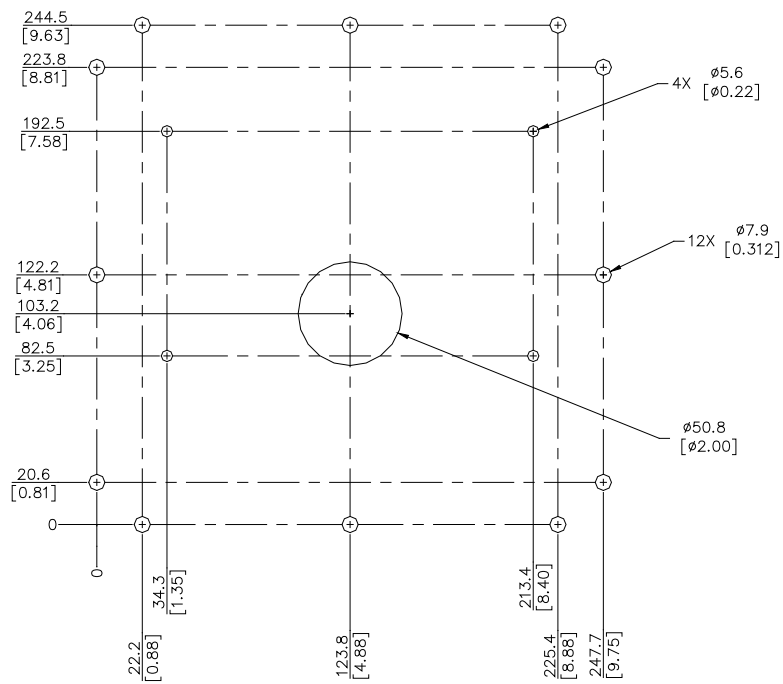Figure 7: Combined Dimensions
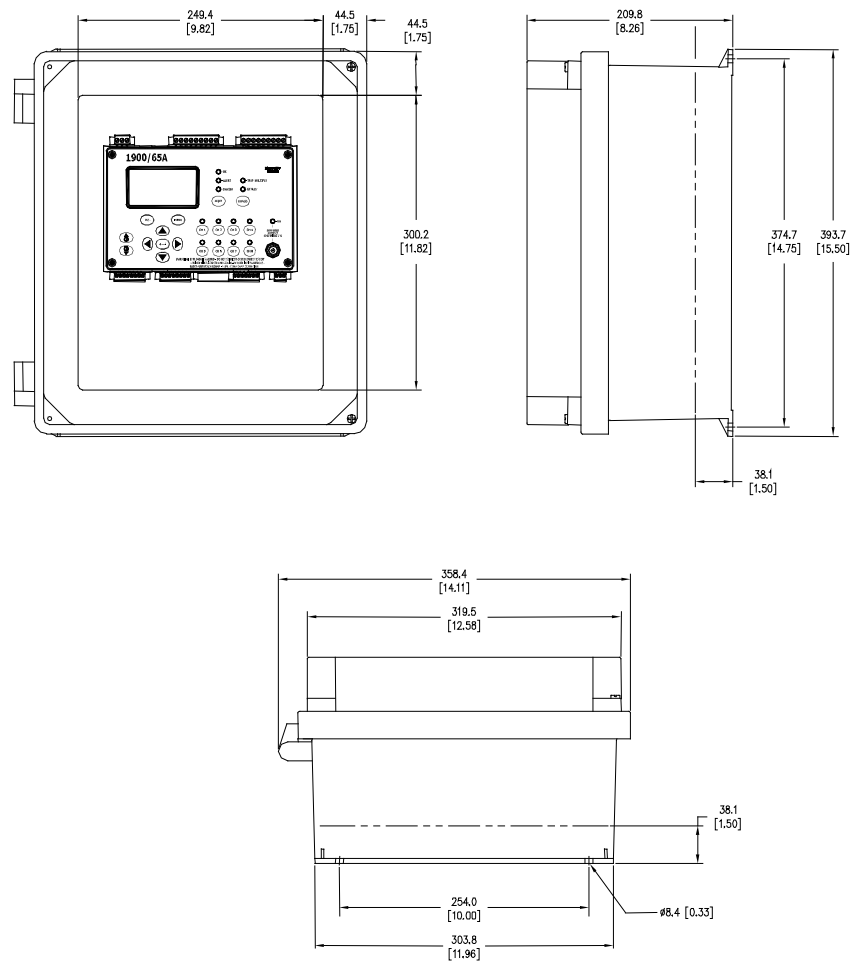
Figure 8: Weatherproof Housing Dimensions
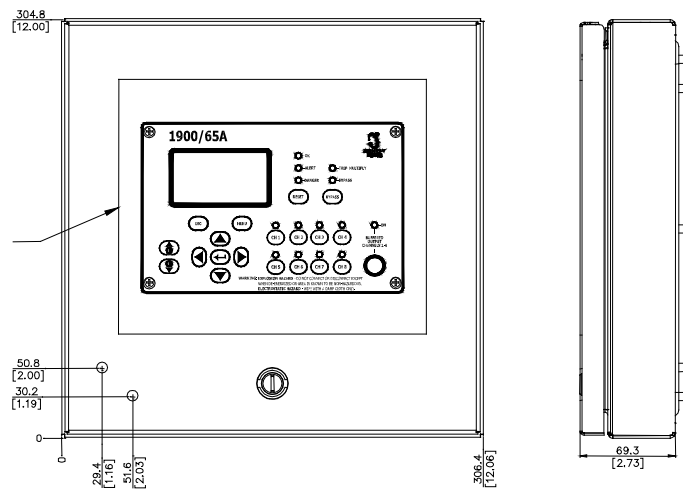
Figure 9: Weatherproof Door Drill Pattern
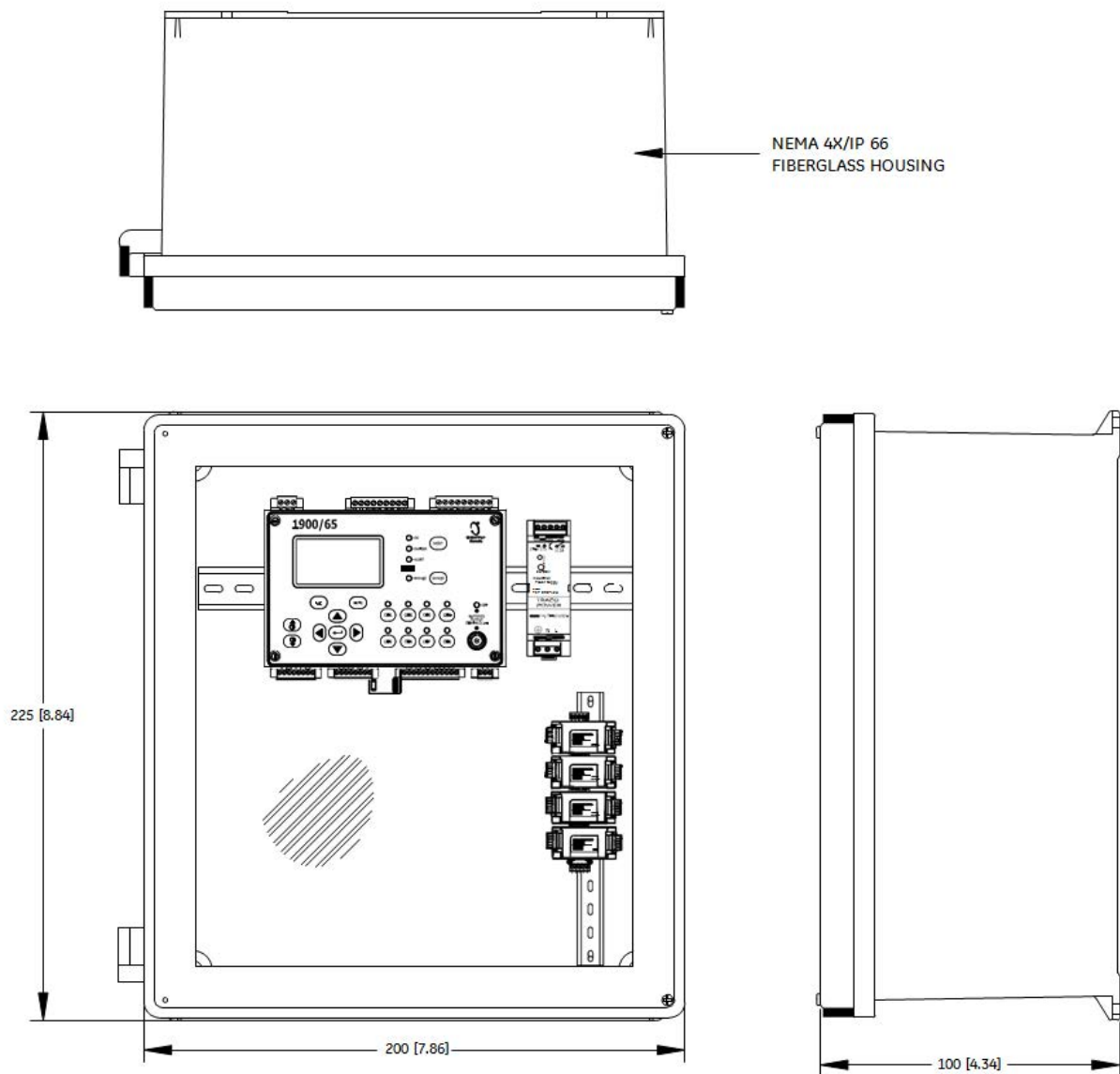


Figure 10: Weatherproof Door Dimensions

NEMA 4X/IP 66
FIBERGLASS HOUSING

1900/65

225 [8.84]

200 [7.86]

100 [4.34]

Figure 11: ProTIM Housing Dimensions