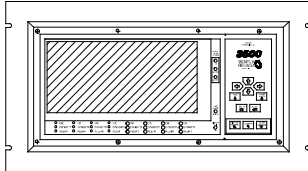


# 3500/93 System Display

## Bently Nevada\* Asset Condition Monitoring

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### Description

The 3500/93 System Display is designed to meet the requirements of American Petroleum Institute (API) Standard 670 and provide local or remote visual indication of all 3500 Machinery Protection System information residing in the rack including:

- System Event List
- Alarm Event Lists
- All Channel, Monitor, Relay Module, Keyphasor\* Module or Tachometer Module data

The 3500/93 System Display is configured using 3500 Rack Configuration Software. The display can be mounted in any of four ways:

1. **Face Mounting** – display installs directly over the front panel of any full size 3500 rack using a special hinged support. This permits access to the rack's buffered output connectors and user-interface buttons and switches without disconnecting or disabling the display.

**Note:** For this mounting option only, the Display Interface Module (DIM) must be installed in slot 15 (right-most slot) of the rack. The Face Mounting option is not compatible with the 3500 Mini-rack.

2. **19-inch EIA Rack Mounting** – display is mounted on 19-inch EIA rails and located up to 100 feet away from the 3500 System. (Up to 4000 feet away from the 3500 System when using the External Power Supply).
3. **Panel Mounting** – display is mounted in a panel cutout located in the same cabinet or up to 100 feet away from the 3500 System. (Up to 4000 feet away from the 3500 System when using the External Power Supply).
4. **Independent Mounting** – display is mounted flush against a wall or panel and located up to 100 feet away from the 3500 System. (Up to 4000 feet away from the 3500 System when using the External Power Supply).



Up to two displays can be connected to each 3500 rack and each display requires one empty 3500 rack slot for insertion of its corresponding DIM. When the display is not face-mounted, the cable connection between the DIM and the Display can be made from the front of the 3500 rack or from the I/O module at the rear of the rack.

Applications that require a cable longer than 100 feet must use the External Power Supply and Cable Adapter. Applications that use the back lighted Display Unit must use the External Power Supply. There are two External Power Supplies: one for connection to 115 Vac and the other for connection to 230 Vac.

The External Power/Terminal Strip Mounting Kit eases installation of External Power Supplies. The External Power/Terminal Strip Mounting Kit is designed to fit in the Independent Mount Housing. The Kit streamlines installation of an External Power Supply in both the Independent Mount Housing or a user supplied housing.

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## Specifications

### Inputs

#### Power

##### Consumption:

15.5 watt maximum (Display Unit & Display Interface Module); 5.6 watt maximum (-01 Display Unit); 12.0 watt maximum (-02 Display Unit).

##### Data Types:

Collects data, such as current values and current alarm status, via a high speed internal network.

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### Outputs

#### Display Interface Module

##### OK LED:

Indicates when the Display Interface Module is operating properly.

##### TX/RX LED:

Indicates when the Display Interface Module is communicating with other modules in the 3500 rack.

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#### Display Unit

##### Unit OK LED:

Indicates when the Display Unit is operating properly.

##### Rack OK LED:

Indicates rack is in OK status, all channels are OK.

##### Rack Alert LED:

Indicates rack is in Alert status, at least one channel is in Alert.

##### Rack Danger LED:

Indicates rack is in Danger status, at least one channel is in Danger.

##### OK LED (8):

Indicates displayed channel(s) above the LED is in OK status.

##### Alert LED (8):

Indicates displayed channel(s) above the LED is in Alert status.

##### Danger LED (8):

Indicates displayed channel(s) above the LED is in Danger status.

##### New Alarm LED:

Indicates new alarm has been detected since the last acknowledgment.

##### Reflective 640 x 200 Dots LCD:

Displays data in graphical and text format. LCD module is reflective FSTN dot matrix type without backlight. Ambient white light is required for acceptable visibility. Best visibility is under indirect sunlight conditions, LCD visibility decreases with corresponding decrease in ambient light level. LCD exhibits acceptable visibility under normal office lighting levels.

##### Transflective 640x200 Dots LCD:

Displays data in graphical and text format. LCD module is transflective FSTN dot matrix type with white electroluminescent backlight.

Communication between the Display Unit and the Display Interface Module

##### Hardware:

RS422 Interface.

##### Protocol:

Supports GE's Bently Nevada\* proprietary protocol and Modbus\* protocol based on AEG PI-MBUS-300 Rev. E Reference Manual.

##### Channel update rate:

1 second, typical.

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## Environmental Limits

Display  
Interface  
Module & I/O  
Module

### Operating

#### Temperature:

-30°C to +65°C (-22°F to +150°F).

### Storage

#### Temperature:

-40°C to +85°C (-40°F to +185°F).

### Humidity:

95%, noncondensing.

### Display Unit

### Operating

#### Temperature:

-20°C to 65°C (-4°F to 149°F).

### Storage

#### Temperature:

-30° C to 80° C (-22° F to 176° F).

### Humidity:

95%, noncondensing.

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## Compliance and Certifications

### EMC

Standards:

EN 61000-6-2 Immunity for Industrial  
Environments

EN 55011/CISPR 11 ISM Equipment

EN 61000-6-4 Emissions for Industrial  
Environments

European Community Directives:

EMC Directive 2004/108/EC

### Electrical Safety

Standards:

EN 61010-1

European Community Directives:

2006/95/EC Low Voltage

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## Hazardous Area Approvals

CSA/NRTL/C

### Approval Option

(01)

AEx nA IIC: Class I, Zone 2, Div 2

Groups A, B, C, D

T4 @ Ta = -30 °C to +65 °C


(-22 °F to +150 °F)

### ATEX

### Approval Option

(02)

**For Selected Ordering Options  
with ATEX/CSA agency  
approvals:**

 II 3/ (1) G

Ex nC[nL Gc] IIC T4 Gc

T4 @ Ta = -20°C to +65°C

(-4°F to +150°F)

### Brazil

### Approval Option

(02)

**For Selected Ordering Options  
with ATEX/North American  
agency approvals:**

BR-Ex nC [nL] IIC T4

T4 @ Ta = -20 °C to +65 °C

(-4 °F to +150 °F)

### South Africa

### Approval Option

(02)

**For Selected Ordering Options  
with ATEX/North American  
agency approvals:**

Ex nCAL [ia] IIC T4

Ex nCAL [L] IIC T4

T4 @ Ta = -20 °C to +65 °C

(-4 °F to +150 °F)

**Note:** When used with Internal Barrier I/O  
Module, refer to specification sheet  
141495-01 for approvals information.

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Specifications and Ordering Information  
Part Number 141543-01  
Rev. H (07/13)

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## Physical

### Display Interface Module

#### Dimensions (Height x Width x Depth):

241.3 mm x 24.4 mm x 241.8 mm  
(9.50 in x 0.96 in x 9.52 in).

#### Weight:

0.82 kg (1.82 lb.).

### Display Interface I/O Module

#### Dimensions (Height x Width x Depth):

241.3 mm x 24.4 mm x 99.1 mm  
(9.50 in x 0.96 in x 3.90 in).

#### Weight:

0.38 kg (0.84 lb.).

### Display Unit

#### Dimensions (Height x Width x Depth):

203.2 mm x 412.8 mm x 31.2 mm  
(8.00 in x 16.25 in x 1.23 in).

#### Weight:

2.1 kg (4.6 lb.).

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## Rack Space Requirements

### Main Board:

1 full-height front slot.

### I/O Modules:

1 full-height rear slot.

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## Ordering Information

### System Display

3500/93-AXX-BXX-CXX-DXX

#### A: Mounting Option:

- 01** System Face Mount (DIM must be installed in slot 15, I/O module not included)
- 02** 19-inch EIA Rack Mount (I/O module included)
- 03** Panel Mount (I/O module included)
- 04** Independent Mount (Stainless Steel Housing, I/O module included)
- 05** Back-lighted System Face Mount (DIM must be installed in slot 15, I/O module included, external power supply required)
- 06** Back-lighted 19-inch EIA Rack Mount (I/O module included, external power supply required)
- 07** Back-lighted Panel Mount (I/O module included, external power supply required)
- 08** Back-lighted Independent Mount (Stainless Steel Housing, I/O module included, external power supply required)

#### B: Mounting Distance/Cable Type:

- 00** No Cable Required
- 01** 10 Foot (3 metres) Cable (PVC)
- 02** 50 Foot (15.24 metres) Cable (PVC)
- 03** 50 Foot (15.24 metres) Cable (Teflon®)
- 04** 100 Foot (30.5 metres) Cable (PVC)
- 05** 100 Foot (30.5 metres) Cable (Teflon®)

#### C: External Power Supply:

- 00** None
- 01** 115 Volt AC
- 02** 230 Volt AC
- 03** ATEX External Supply

#### D: Agency Approval Option:

- 00** None
- 01** CSA/NRTL/C
- 02** ATEX/CSA (Class 1, Zone 2)

<b>Accessories and Spares</b>			
<b>135785-01</b>	3500/93 Display Unit, non back-lighted	<b>130121-02-02</b>	500 Foot (152 metres) Extension Cable (Teflon®)
<b>135785-02</b>	3500/93 Display Unit, back-lighted	<b>02200271</b>	External Power Supply for 115 Vac
<b>137412-01</b>	3500/93 Manual	<b>02200272</b>	External Power Supply for 230 Vac
<b>135799-01</b>	3500/93 Display Interface Module	<b>138227-01</b>	Cable Adapter
		<b>146085-01</b>	Power Cable
<b>135799-02</b>	3500/93 Display Interface Module (use with A05 thru A08 options)	<b>137224-01</b>	System Mounting Assembly (sheet metal for A01 & A05 options)
<b>135813-01</b>	3500/93 Display Interface I/O Module	<b>04309007</b>	4-40 X 0.63 Phillips head screw for System Mounting Assembly, 4 are required
<b>175374</b>	ATEX External Power Supply	<b>04344178</b>	10-32 x 0.37 Phillips head screw for System Mounting Assembly, 4 are required
<b>136634-0010-01</b>	10 Foot (3 metres) Cable (PVC)	<b>136978-01</b>	19" EIA Rack Mounting Adaptor (sheet metal for A02 & A06 options)
<b>136634-0050-01</b>	50 Foot (15 metres) Cable (PVC)		
<b>136634-0050-02</b>	50 Foot (15 metres) Cable (Teflon®)	<b>136977-01</b>	Panel Mounting Clamp (sheet metal for A03 & A07 options)
<b>136634-0100-01</b>	100 Foot (30 metres) Cable (PVC)	<b>136976-01</b>	NEMA Gasket
<b>136634-0100-02</b>	100 Foot (30 metres) Cable (Teflon®)	<b>04300148</b>	10-32 x 1.25 Phillips head screw for Panel Mounting Adaptor, 4 are required
<b>130121-02-01</b>	500 Foot (152 metres) Extension Cable (PVC)		

**137835-01**

Independent Mounting Housing  
(sheet metal for A04 & A08 options)

**137833-01**

Mounting Plate

**01660111**

Terminal Strip

**138228-01**

External Power/Terminal Strip  
Mounting Kit includes:

**04310447**

6-32 x 0.37 Phillips head screw for  
Terminal Strip, 2 are required

**138227-01**

Cable Adapter

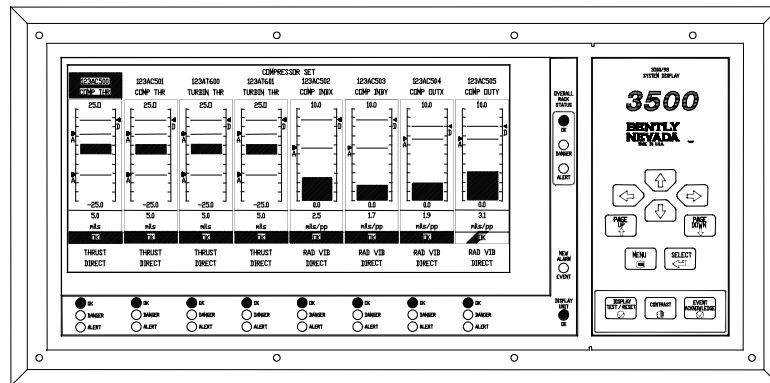
**04330900**

4-40 x 0.18 Phillips pan head  
screw for Power Supply, 4 are  
required.

**04344178**

10-32 x 0.37 Phillips pan head  
screw for Mounting Plate, 4 are  
required.

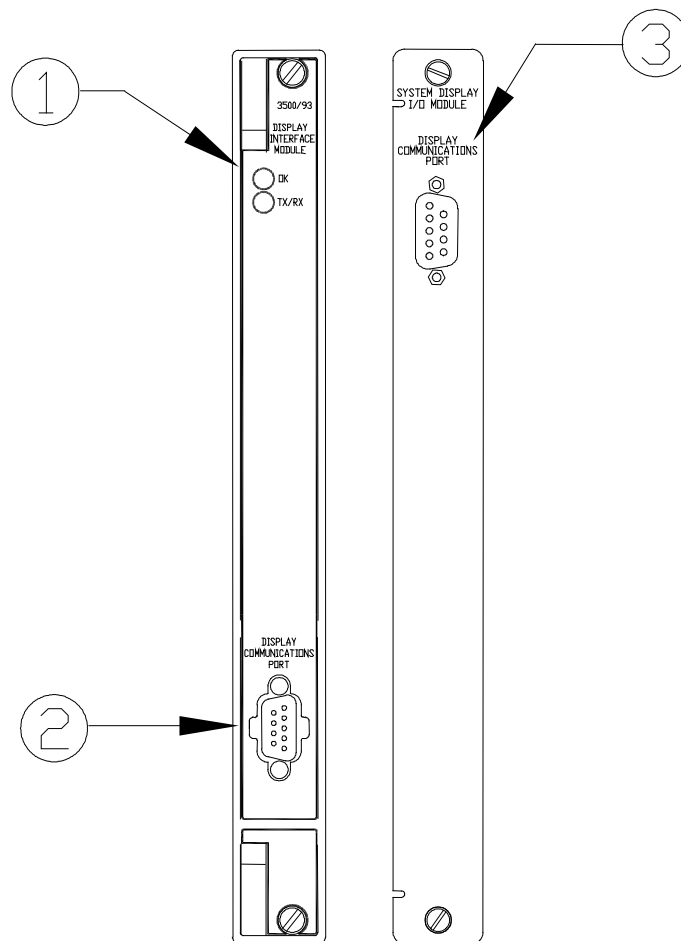
## Graphs and Figures



- 1) LCD
- 2) Channel Status LEDs
- 3) New Alarm Event LED
- 4) Display Unit Status LED
- 5) Keyboard Control Panel
- 6) Rack Status LEDs

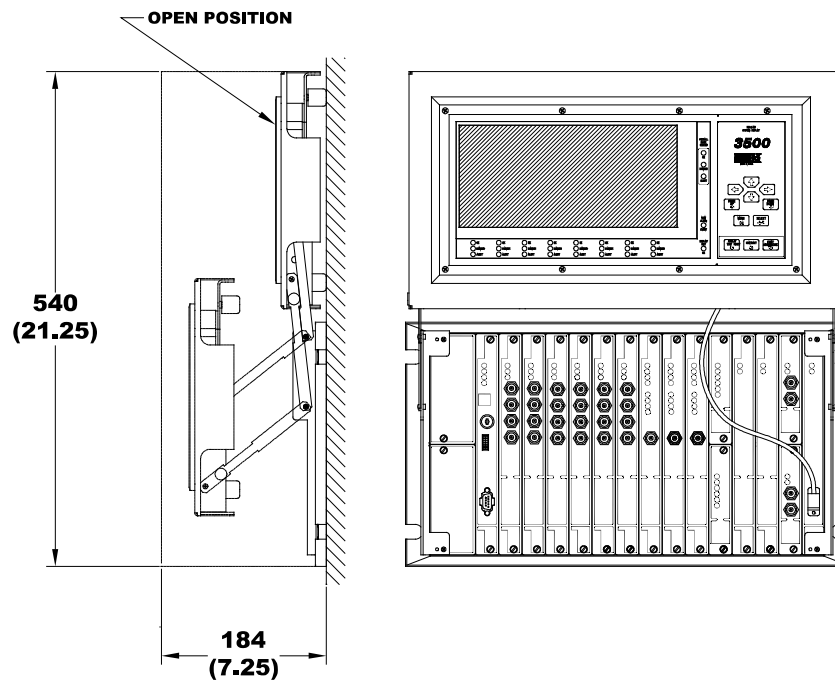
Figure 1





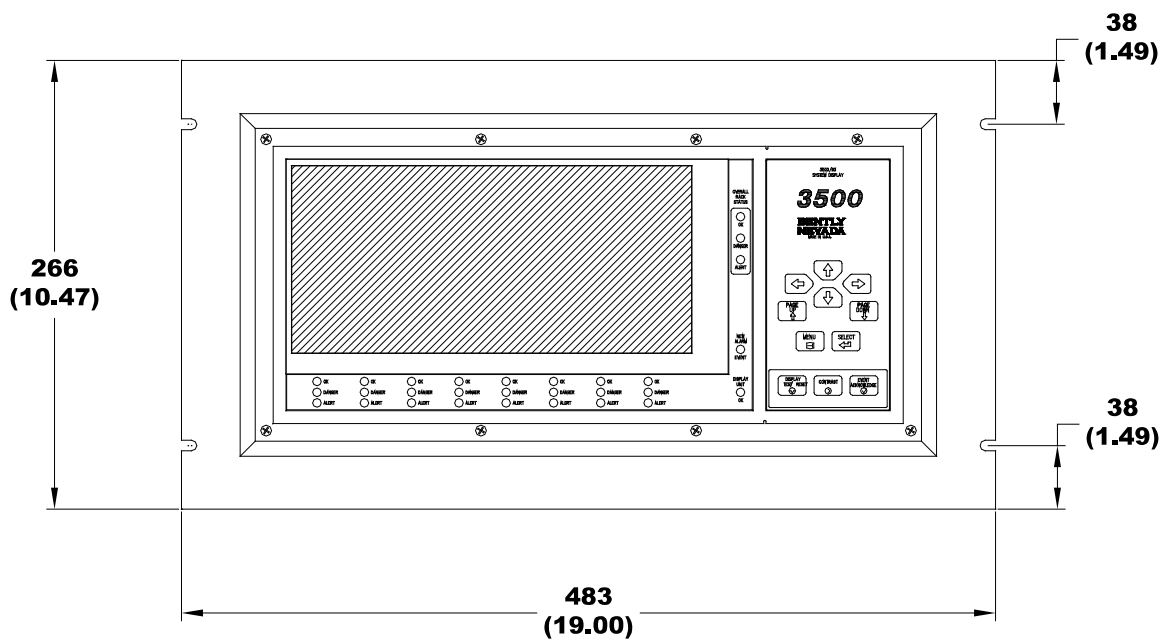
- 1) Display Interface I/O Module
- 2) Display Communications Port
- 3) Display Interface I/O Module

**Figure 2**



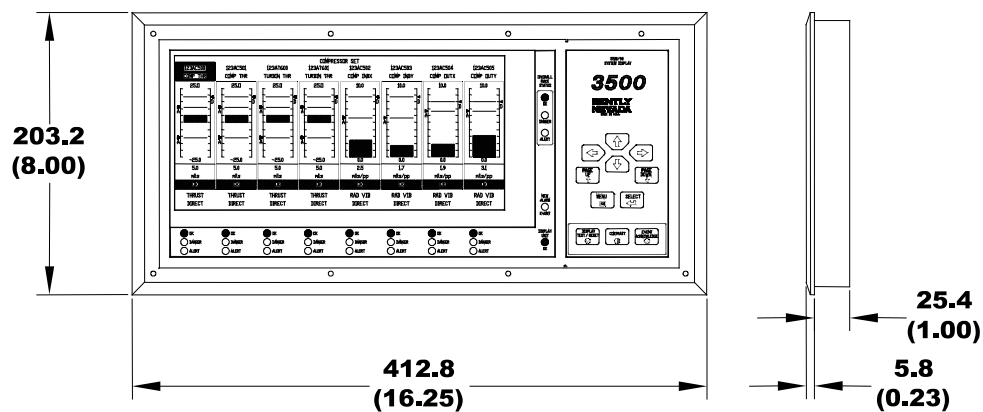
Dimensions are in millimeters (inches)

**Figure 3: System Face Mount Option**



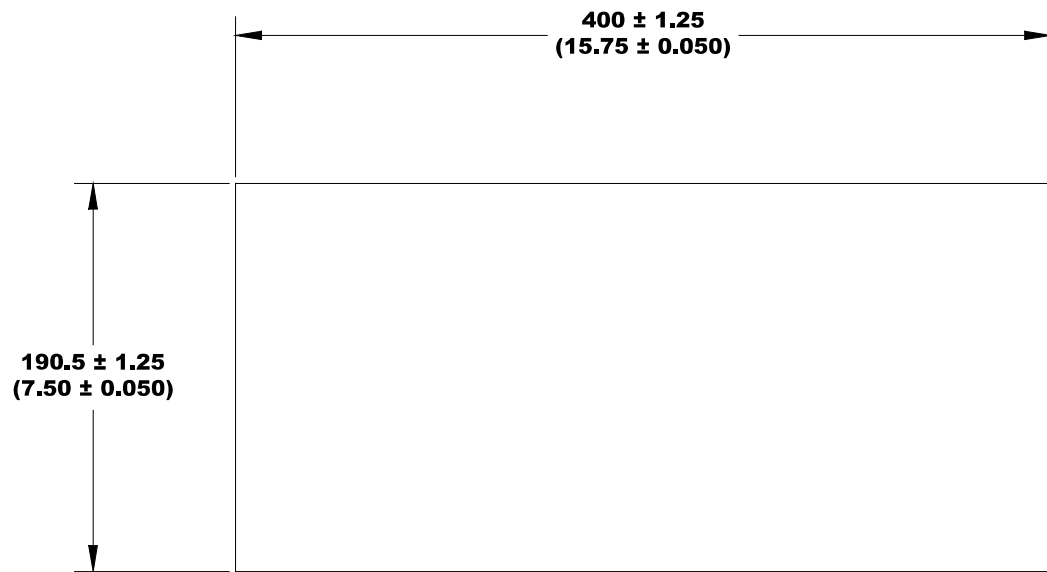
Dimensions are in millimeters (inches)

Figure 4: : 19-Inch EIA Rack Mount Option



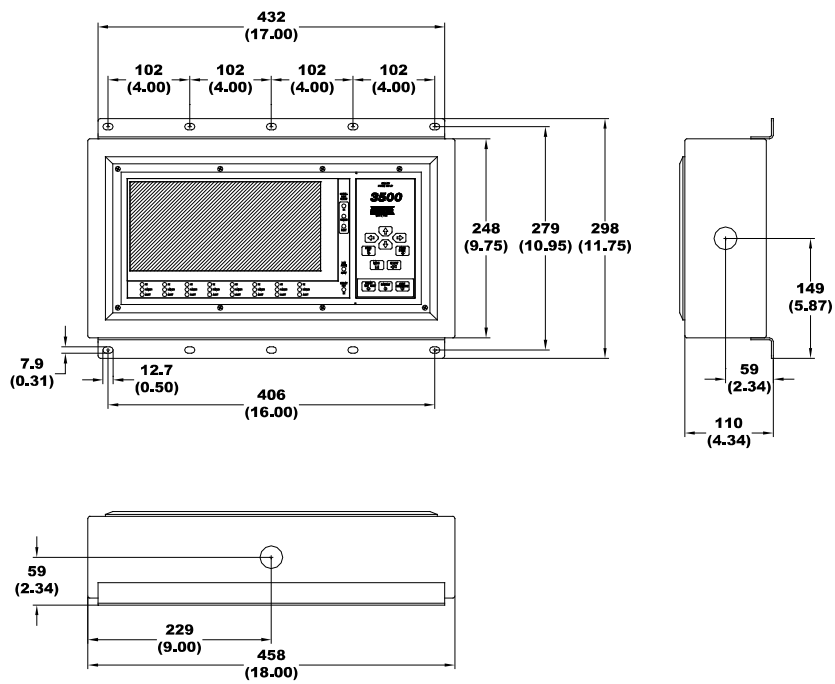
Dimensions are in millimeters (inches)

Figure 5: Display Unit Outline Dimensions



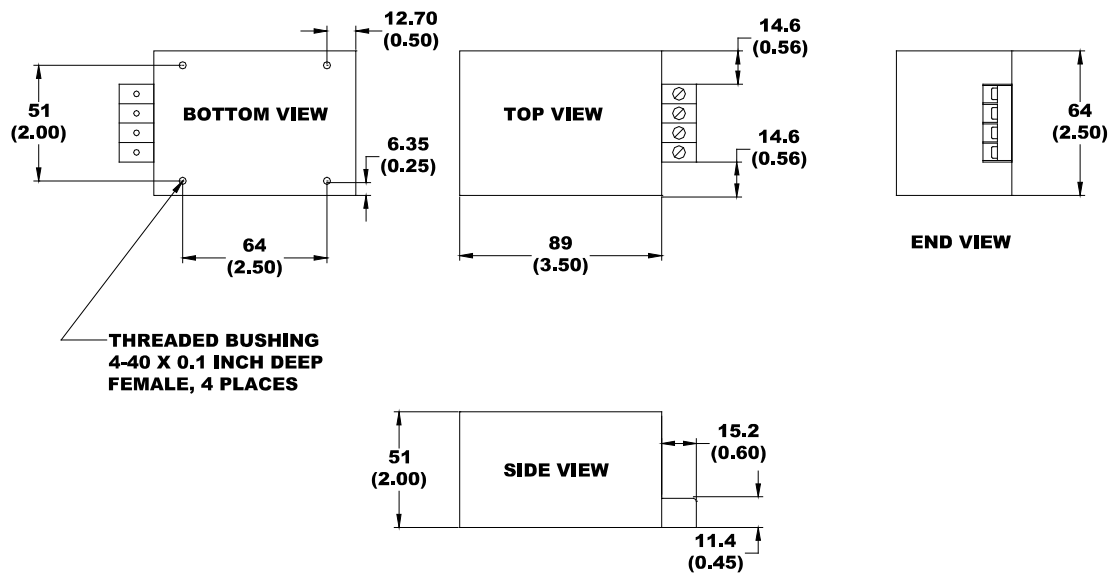
Dimensions are in millimeters (inches)

Figure 6: Panel Cutout Dimensions For Panel Mount Option



Dimensions are in millimeters (inches)

Figure 7: Independent Mount Option



Dimensions are in millimeters (inches)

**Figure 8:** External Power Supply

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