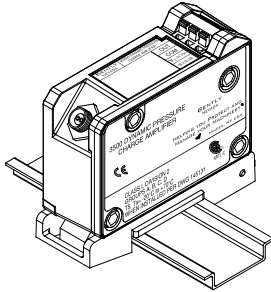


# 350500 Dynamic Pressure Charge Amplifier

Bently Nevada\* Asset Condition Monitoring

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## Description

The 350500 Dynamic Pressure Charge Amplifier (DPCA) is a component in a dynamic pressure sensing system. This sensing system, which monitors pressure pulsations that result from combustion instability in gas turbine engines, consists of a charge-coupled piezoelectric pressure sensor, low noise interconnect cable, 350500 charge amplifier, and monitoring device.

The dynamic pressure sensor should be a high temperature piezoelectric type that converts dynamic pressure to an output signal scaled in pico-coulombs per unit of pressure. The 350500 charge amplifier design allows its use with a number of sensors designed to monitor combustion instability.

The interconnect cable, which connects the sensor with the charge amplifier, is a specially designed low-noise, environmentally robust cable. The 350500 DPCA offers two interconnect cable options.

The 350500 charge amplifier converts the sensor charge signal to a low impedance voltage output signal. This signal is suitable for Bently Nevada monitors such as the 3500/64 Dynamic Pressure Monitor. The electrical interface from the monitor to the charge amplifier, which consists of -24 Vdc power, common, and signal, is the same as that for a Bently Nevada Proximator\*. Appropriate safety barriers can be used between the charge amplifier and the monitoring device.



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## Specifications

All Specifications are at 23 °C ± 2 °C, (73.4 °F ± 3.6 °F)

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### Installation

Install per Installation Drawing 145131 in a safe area or CSA\NRTL\C Class I Division 2, Group A, B, C, or D hazardous area or Class 1 Zone 2 IIC.

Install per Drawing 146821 for Intrinsically Safe Division 1 or Class 1 Zone 0 IIC applications.

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### 350500 Electrical Specifications

#### Power:

#### Supply Voltage (at the module)

- 19.60 Vdc to - 26 Vdc when no safety barriers are used

-17.75 Vdc to - 26 Vdc when safety barriers are used.

#### Supply Current

14.68 mA maximum with no load  
11.69 mA typical with no load

#### Signal:

#### Input Sensitivity

Ordered option:

13.8 pC/psi (200 pC/bar)

16 pC/psi (232 pC/bar)

1200 pC/psi (17,404 pC/bar)

12 pC/psi (174 pC/bar)

60 pC/psi (870 pC/bar)

Expected Sensor Pole-to-Pole Capacitance for different Input Sensitivities	Input Sensitivity Option in pC/psi:	Nominal Pole-Pole Capacitance in picofarads:
	13.8	320
	16	60 to 90
	1200	6,300
	12	100
	60	300

#### Output Sensitivity

Ordered option:  
100 millivolt/psi ( 1.45 Volt/bar)±  
2% @ 150 Hz

#### Dynamic Range

±50 psi pk

#### Common Mode Rejection

-40 dB or better in the passband.

#### Output Resistance Frequency Response

50 ohm typical

Ordered option: High Low  
(See Figure 1)

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### Physical

#### Dimensions:

See figures 3 and 4

#### Weight:

246 grams (8.7 oz)

#### Mounting:

Panel mount and 35 mm DIN rail mount options. (See Figures 3 and 4)

#### Power/Signal Connector and Wiring:

Three-conductor SpringLoc terminal strip for power, instrument common, and signal output. Accepts wire sizes of: 0.2 mm<sup>2</sup> to 1.5 mm<sup>2</sup> (16 to 24 AWG) without ferrules, and 0.25 mm<sup>2</sup> to 0.75 mm<sup>2</sup> (18 to 23 AWG) with ferrules. Recommended field wiring is a three-conductor shielded triad. Maximum length of 305 metre (1000 feet) between the charge amplifier and the monitor.

**Sensor  
Connector:**

Two-pin LEMO EXG.0B.302.HLN  
(mates to LEMO FGG.0B.302 or  
equivalent)  
or  
Three-pin MIL Connector  
MS31128-3P  
(mates to MS3116F8-3S or  
equivalent)

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**Environmental Limits**

**Operating  
Temperature:**

-20 °C to +70 °C (-4 °F to +158 °F)

**Storage  
Temperature:**

-40 °C to + 85 °C (-40 °F to +185  
°F)

**Operating and  
Storage  
Humidity:**

0% to 95% relative non-  
condensing

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**Hazardous Area Approvals**

**North America:**

Class I Division 2, Groups A, B, C, D  
Class I Division 1, Groups A, B, C, D  
CSA Class I Zone 0 Ex ia IIC T4  
(-20°C ≤ Ta ≤ +70°C)  
Class I Zone 2 Ex nA IIC T5  
(-20°C ≤ Ta ≤ +70°C)

**Europe:**

Ex ia IIC T5 Ga  
(-20°C ≤ Ta ≤ +70°C)  
Ex nA IIC T5 Gc  
(-20°C ≤ Ta ≤ +70°C)

**International:**

Ex ia IIC T5 Ga  
(-20°C ≤ Ta ≤ +70°C)  
Ex nA IIC Gc  
(-20°C ≤ Ta ≤ +70°C)

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**Compliance and Certifications**

**EMC:**

European Community Directives:  
EMC Directive 2004/108/EC  
Standards:  
EN 61000-6-2:2005  
EN 61000-6-4:2007

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**145536 Interconnect Cable Specifications**

Unless noted otherwise all Specifications are at 23°  
±2°C, (73.4°F ±3.6° F)

The 145536 Interconnect Cable is a double shielded,  
double jacketed, low noise treated, twisted pair cable  
designed specifically for use with the 350500 DPCA.

**Sensor**

**Connector:**

MS3106F-10SL-4S  
(Mil spec two pin connector)  
or  
MS31128-3P  
(Mil spec three pin connector)

**Charge Amp**

**Connector:**

LEMO FGG.0B.302.CLAD.56  
or  
Three-pin MIL Connector  
MS31128-3P

**Cable Operating  
Temperature:**

150° Celsius maximum (302° F)

**Conductor to  
conductor  
capacitance:**

30 pF/ft nominal

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**145693 Interconnect Cable Specifications**

Unless noted otherwise all Specifications are at 23°  
±2 °C, (73.4 °F ±3.6 °F)

The 145693 Interconnect Cable is a double shielded,  
double jacketed, low noise treated, twisted pair cable  
designed specifically for use with the 350500 DPCA.  
It can be ordered in lengths from 1 to 15 metres in 1-  
metre increments.

**Sensor  
Connector:**

M83723/95G10207  
(Mil spec two pin connector)  
or  
MS3116F8-3S  
(Mil spec three pin connector)

**Charge Amp  
Connector:**

LEMO FGG.0B.302.CLAD.56  
or  
Three-pin MIL Connector  
MS31128-3P

**Cable Operating  
Temperature:**

200 °C maximum (392° F)

**Conductor to  
conductor  
capacitance:**

70 pF/ft nominal

**Housing Specifications**

330181 Housing.  
See Data Sheet 141195-01 for  
Specifications and Ordering  
Information. This housing is used  
with 3300 XL Proximitor and can  
also be used for the 350500.  
Up to six (6) DPCA's can be  
mounted in panel mount  
configuration and up to eight (8)  
in DIN mount configuration.

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## Ordering Information

**Dynamic Pressure Charge Amplifier**

**350500-AA-BB-CC-DD-EE-FF**

**A: Input Sensitivity Option**

**00** 16 pC/psi (232 pC/bar)  
**01** 1200 pC/psi (17,404 pC/bar)

**02** 13.8 pC/psi (200 pC/bar)  
**03** 12 pC/psi (174 pC/bar)  
**04** 60 pC/psi (870 pC/bar)

**B: Low Pass Frequency Option**

**00** High  
**01** Low  
(See Figure 1)

**C: Output Sensitivity Option**

**00** 100 mV/psi (1.45 V/bar)

**D: Mounting Option**

**00** Panel Mount, LEMO Connector  
**01** 35 mm DIN Mount, LEMO  
Connector  
**02** No Mounting Hardware, LEMO  
connector  
**\*10** Panel Mount, MIL Connector  
**\*11** Din Mount, MIL Connector  
**\*12** No Mounting Hardware, MIL  
Connector

\*Ordering options 10, 11 or 12 for D  
limits the input sensitivity option  
(ordering option A) to be either 00 (16  
pC/psi (232 pC/bar) or 04 (60 pC/psi (870  
pC/bar)).

**E: Approvals**

**00** No Approvals  
**01** CSA/NRT/L Class 1 Div 2,  
Groups A,B,C,D  
**05** Multi Agency Approvals

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## Interconnect Cables

**145536 -01**

This cable is 15.24 metres long (50  
feet) and has a MS3106F-10SL-4S  
sensor connector.

**145536 -02**

Identical to -01 with overmold on  
the sensor side connector.

**145693 - AA**

This cable has a  
M83723/95G10207 sensor side  
connector and can be ordered in  
lengths from 1 metre to 15 metre  
in 1-metre increments

**A: Length option**

01 to 15 metres in 1-metre increments

## Frequency Response Plots

### Typical Low Frequency Corner vs. External Capacitance (Low Pass filter option set to 'High')

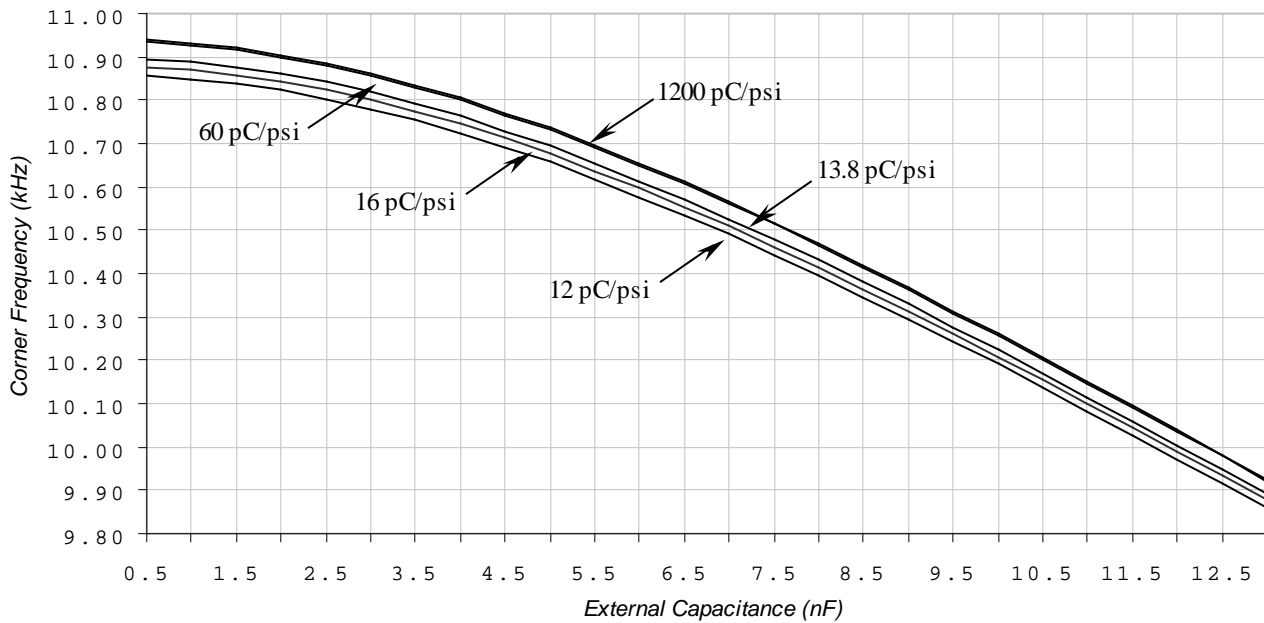


Figure 1: Low-Pass Filter option set to 'High'. 'External Capacitance' is the pole-to-pole cable capacitance plus the capacitance of the sensor

### Typical Low Frequency Corner vs. External Capacitance (Low Pass filter option set to 'Low')

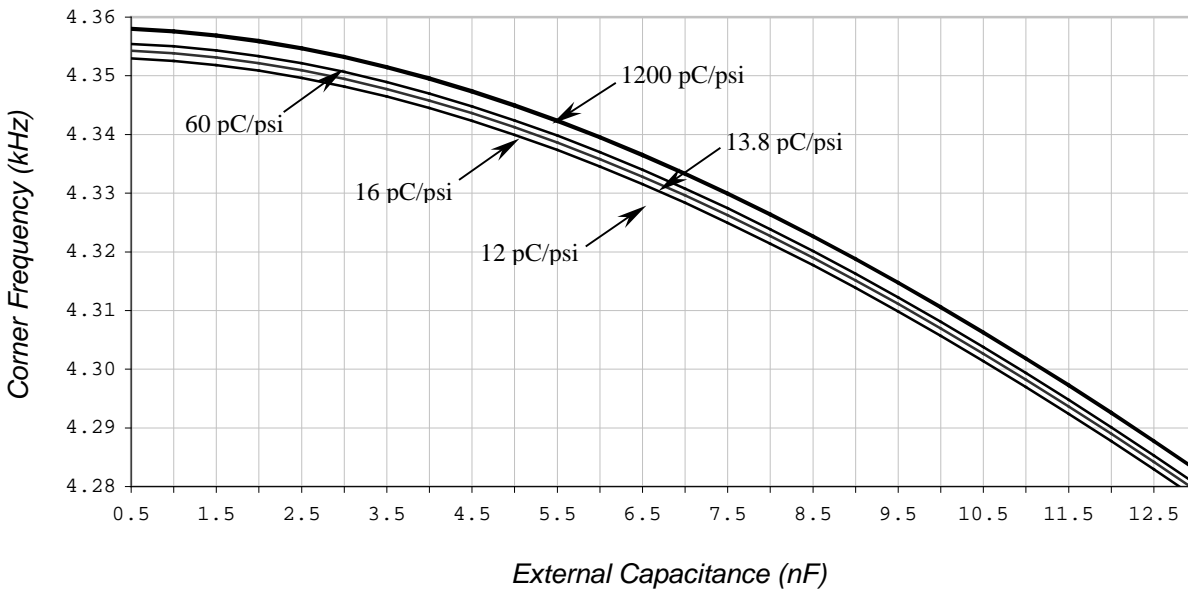
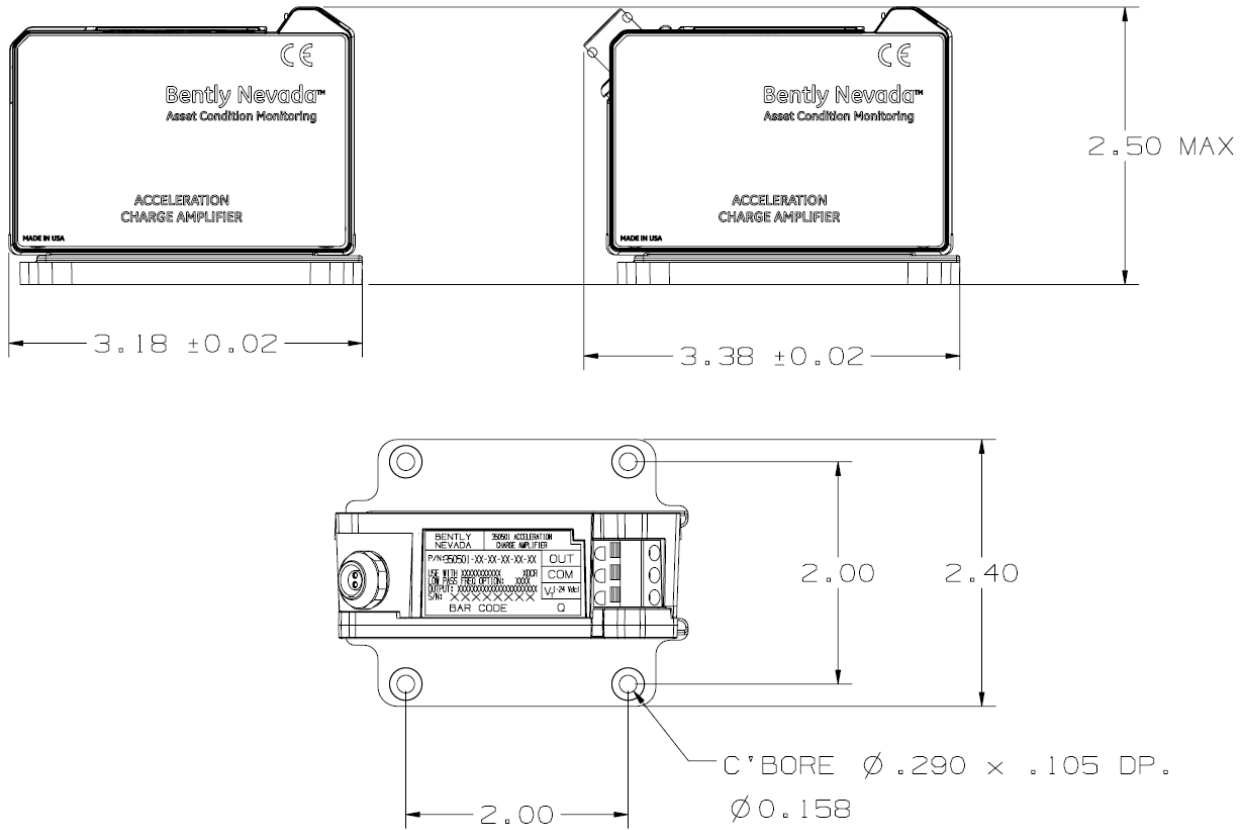


Figure 2: Low-Pass Filter option set to 'Low'. 'External Capacitance' is the pole-to-pole cable capacitance plus the capacitance of the sensor

# Dimensional Drawings

(Dimensions in inches)



**Figure 3: 350500 Panel Mount Option**

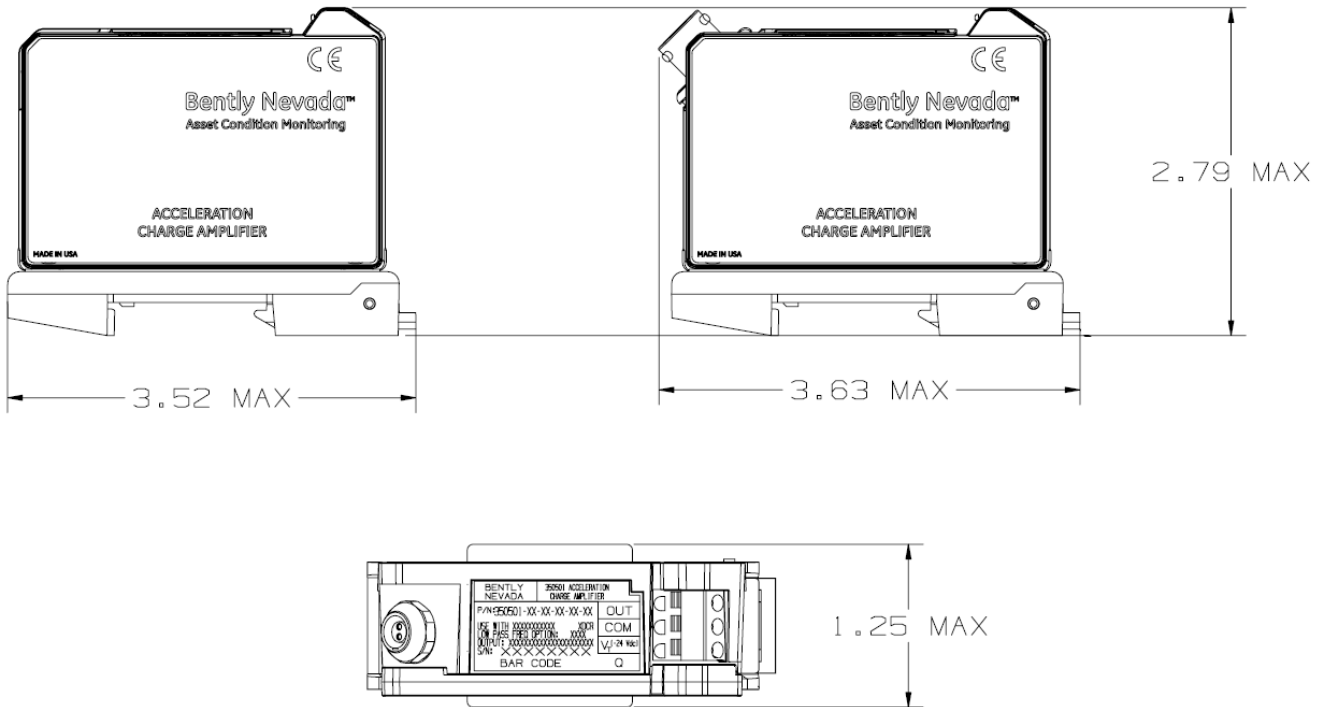


Figure 4: 350500 DIN Mount Option

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