350500 Dynamic Pressure Charge Amplifier

Datasheet

Cordant™

145828 Rev. W



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 Bently Nevada™ 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 Proximitor. Appropriate safety barriers can be used between the charge amplifier and the monitoring device.

Baker Hughes

Specifications

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

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.

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	Sensitivity
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)
05	6.22 pC/psi (90 Pc/bar)

Expected Sensor Pole-to-Pole Capacitance for Different Input Sensitivities

Ordered Option	Input Sensitivity	Nominal Pole-to-Pole Capacitance
00	16 pC/psi	60 to 90 pF
01	1,200 pC/psi	6,300 pF
02	13.8 pC/psi	320 pF
03	12 pC/psi	100 pF
04	60 pC/psi	300 pF
05	6.22 pC/psi	122 pF

Sensitivity	100 mV/psi (1.45 V/bar) ±2% @ 150 Hz
Dynamic Range	±50 psi pk
Common Mode Rejection	-40 dB or better in the passband
Output Resistance Frequency Response	50 Ω typical Ordered option: High or Low (see Figures 1 and 2)

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^2 to 1.5 mm^2 (16 to 24 AWG) without ferrules, and 0.25 mm^2 to 0.75 mm^2 (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)

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

145536 Interconnect Cable Specifications

Unless noted otherwise all Specifications are at 23°C±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°C maximum (302°F)
Conductor to Conductor Capacitance	30 pF/ft nominal

145693 Interconnect Cable Specifications

Unless noted otherwise all Specifications are at 23°C±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 Datasheet (document 141195) 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) DPCAs can be mounted in panel mount configuration and up to eight (8) in DIN mount configuration.

Ordering Information

Dynamic Pressure Charge Amplifier

350500-AA-BB-CC-DD-EE

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)
05	6.22 pC/psi (90 pC/bar)
B: Low Pass Frequency Option (See Figures 1 and 2)	
00	High
01	Low
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
E: Approvals	
00	No Approvals
01	CSA/NRT/L Class 1 Div 2, Groups A,B,C,D
05	Multi Agency Approvals

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 **(AA order options 01 to 15)**

Graphs and Figures

Dimensions in inches unless otherwise noted.

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

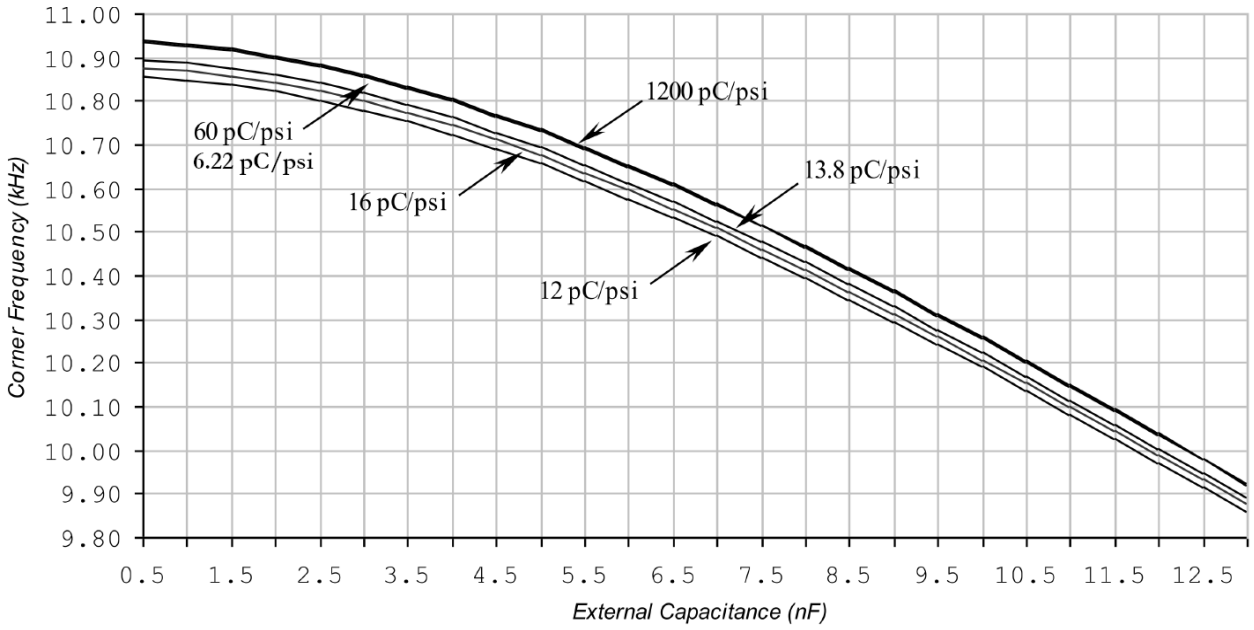


Figure 1: Low-Pass Filter option set to High. External Capacitance is the pole-to-pole cable capacitance plus the capacitance of the sensor.

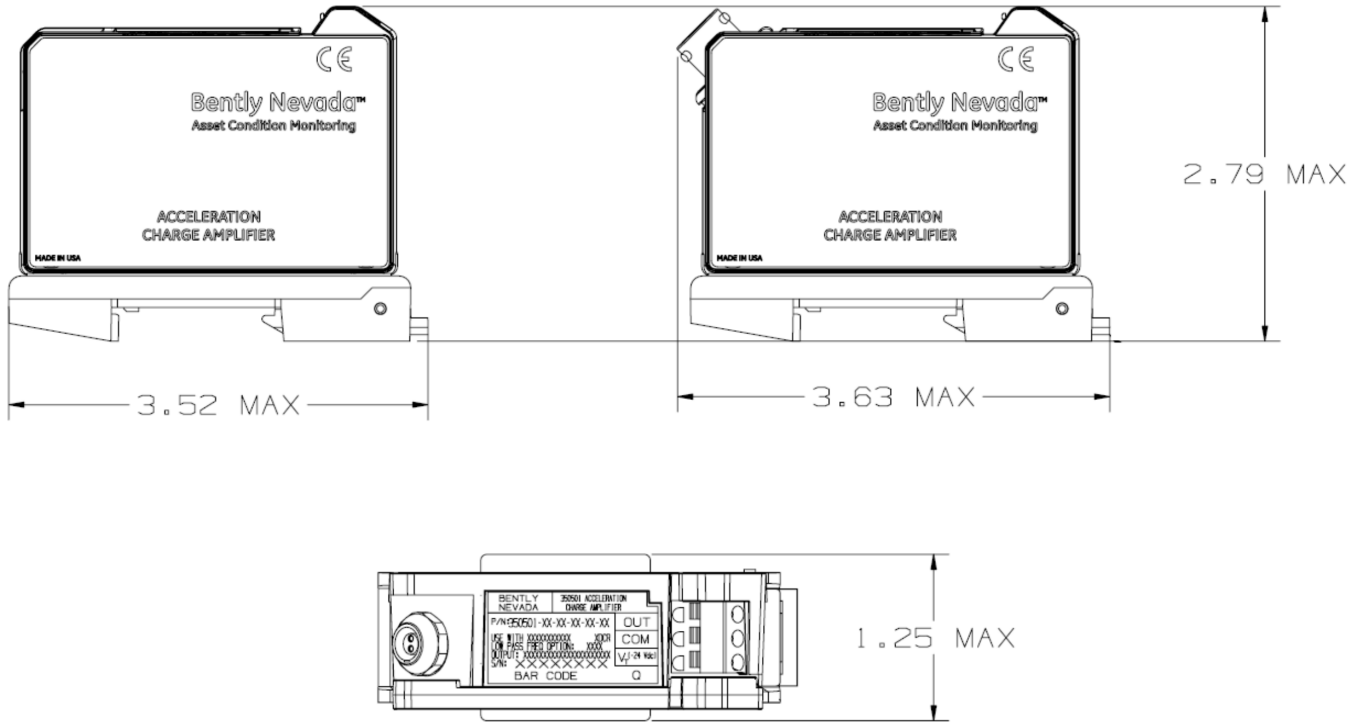


Figure 4: 350500 DIN Mount Option