

# ADRE<sup>®</sup> Sxp/408 DSPi

## Bently Nevada<sup>™</sup> Asset Condition Monitoring

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### Description

ADRE Sxp Software and the 408 DSPi (Dynamic Signal Processing Instrument) make up a highly scalable system for multi-channel signal processing and data acquisition.

Unlike other general-purpose computer-based data acquisition systems, ADRE Sxp and the 408 DSPi are specifically designed for real-time highly parallel signal processing and presentation. This extremely versatile system incorporates the functionality of many types of instrumentation, such as oscilloscopes, spectrum analyzers, filters, signal conditioners, and digital recorders into a single platform. The system is designed specifically for corporate network environments, allowing it to operate remotely across a LAN/WAN, or store data in full “stand-alone” mode without an additional/external computer. Additional equipment is seldom, if ever, needed. The system’s real-time display capability permits it to continuously display data independently of data being stored to permanent memory. For established ADRE system users, ADRE Sxp also supports all previous ADRE for Windows databases.

An ADRE Sxp data acquisition system consists of:

- one (up to four)\* 408 Dynamic Signal Processing Instrument(s)
- ADRE Sxp client software, and
- a computer system capable of running ADRE Sxp software.

The 408 DSPi is fully portable or can be rack mounted allowing convenient operation in test stands, on-site, or at remote locations. The 408 DSPi’s highly configurable design supports virtually all standard and non-standard input types including both dynamic transducer signals (such as those from proximity probes, velocity transducers, accelerometers, and dynamic pressure sensors), and static signals (such as process variables from transmitters and distributed control systems. For rotating machinery applications, users can provide a Keyphasor<sup>®</sup> or other speed input signal (such as that from a magnetic or optical transducer) to drive synchronous sampling and order tracking. The system also supports multiple triggering modes for automated data acquisition, allowing you to use the system as a data or event logger without an operator present.

The Client-Server architecture allows multiple software clients to operate and simultaneously view data from single/multiple 408 DSPi systems simultaneously, permitting users to independently view data in the fundamental measurement units of their choice. Software installation and configuration are quick and easy, allowing mass configuration of multiple channels with minimal user intervention. Configuration templates further simplify the process, allowing the user to install the software, produce a configuration, and begin capturing data in minutes.



Notes: (\*) Connecting multiple 408 DSPi systems supported in future. All hardware connectivity is currently in place.

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## 408 DSPi Overview

Each 408 DSPi supports up to 4 sampling cards for up to 32 channels of data acquisition. Up to 4 408 DSPi units can be connected for a total of 128 channels of dynamic data processing and storage. The 408 DSPi base system uses internal clocks and simulated speed/Keyphasor signals to support both asynchronous and synchronous sampling for all channels. Speed Input/Trigger cards support up to 3 independent speed input channels for external speed inputs. Each Speed Input/Trigger card uses 1 available slot, and the 408 DSPi can use a maximum of 2 Speed Input/Trigger cards simultaneously providing up to 6 physical speed inputs and 6 simulated speed inputs. The user can assign any speed input (KPH) to any channel in the system, including channels across multiple 408 DSPi units. Most signal processing and sampling parameters can be changed “on-the-fly” without interrupting data collection.

The 408 DSPi architecture provides flexible hardware configuration. Users can insert sampling cards into the chassis as required. Slots 1 through 4 support all standard sampling cards. Slot 5 is intended specifically for the Digital Replay card as well as future option cards.

The 408 DSPi front panel controls and displays basic functions and data. Users can directly initiate manual samples and triggering from the front panel without using ADRE Sxp software. The front panel LEDs indicates sampling and trigger status and activity. Users can download multiple sampling configurations to the 408 DSPi and later select them for use from the front panel.

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## 8-Channel Dynamic Sampling Card (168905 – AA)

The 8-channel dynamic sampling card is an extremely powerful and flexible signal processing engine. Along with the analog front-end conditioning, the user can configure most transducer inputs, with positive or negative bias, while maintaining maximum signal input range. An array of DSP processors and 24-bit ADCs provide maximum resolution. Input signals can be either AC or DC coupled, and users can independently define upper and lower input voltage levels along with full-scale range and transducer scale factor.

The sampling card can provide a variety of data depending on the configuration and user needs. Each channel can provide multiple “static” variables including:

- direct amplitude,
- bandpass amplitude
- 1X and 2X Amplitude and Phase, and
- up to 4 additional user defined nX vectors including amplitude and phase,
- average & instantaneous gap or bias voltages,
- multiple speed values, and
- a date/time stamp.

In addition to the static data, each channel can provide up to 4 user-defined dynamic waveforms. Users can configure waveforms for simultaneous Synchronous and/or Asynchronous sampling, with different sampling rates and/or frequency spans. The sampling card supports up to 2 different synchronous sampling rates simultaneously. In addition, the card can also sample and store the raw time-continuous data for each channel. All channels within the system are always sampled simultaneously, are synchronized, and are initiated based on a set of user defined “events”.

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## 3-Ch Speed Input/Trigger Card (168906 – AA)

The 3-channel speed input/trigger card supports a variety of transducer inputs and signal conditioning needs including; proximity, magnetic, optical, and laser pickups. Transducer power for both optical pickup and  $\pm 24\text{Vdc}$  proximity is also available if needed. The card integrates a full set of configurable analog signal conditioning tools including; input gain, voltage clamping, inversion, rising or falling edge trigger, auto/manual threshold, and hysteresis. The user can associate a programmable speed input (Keyphasor) multiplier/divider for each channel independently, define discrete values for events per revolution, or, a final ratio, whichever is more convenient. Each channel can have up to three separate “stages” of multiplier/divider ratios. Trigger/speed input channels provide full dynamic sampling, complete with static and waveform data, available for real-time viewing and storage. Each channel also includes a buffered output, allowing the user to select either raw, conditioned analog, or TTL outputs. The buffered outputs are independent of the signal being used for processing.

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### Digital Replay Card (168907 – AA – BB)

The Digital Replay Card provides simultaneous synchronous and asynchronous internal digital reprocessing and playback of all channels in the 408DSPi. The replay card maintains exceptional accuracy and precision in the signal reprocessing that far surpasses the capabilities of other equipment and reprocessing techniques. The digital replay card can play back raw data for *all* channels *simultaneously* including Keyphasor/speed and dynamic sampler inputs. Users can modify all sampling parameters on a KPH channel when replayed, and fully manage and re-conditioned the gain, inversion, clamping, and other characteristics of Keyphasor signals. This provides the ability to control triggering edges and thresholds as reprocessing and analysis requires. On standard dynamic channels, users can modify most sampling parameters. As an example, users may add or modify waveform assignments, variable generation, filtering options, frequency span, and Keyphasor assignments that did not exist in the original configuration reprocessing the data. Additionally, users may add or modify all sampling criteria and triggering parameters. Full scale range, coupling, and transducer type cannot be altered for standard dynamic channels. The Digital Replay card occupies Slot #5 of the 408 DSPi and does not reduce the number of channels available for data collection.

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### Transducer Power Supply Card (168908 – AA – BB)

The transducer power supply card provides power for a wide variety of displacement, velocity, acceleration including ICP accels, and other transducer types used in field and test stand applications. This card can simultaneously power up to 32 transducers in various combinations, and provides direct physical connections for up to 16 transducers, eight  $\pm 24$  Vdc transducer systems and eight constant current transducer systems. Field connection cable and adapter accessories accommodate additional transducer connections. In addition to  $\pm 24$  Vdc selections, the card provides  $\pm$  positive and negative bias selections for constant current applications, all of which can be used simultaneously, to provide a highly flexible power source for most any need. Users can configure transducer power bias in blocks of four (4) directly from the card without the need for special tools, jumpers, or software.

Each output provides individual short-circuit protection, current regulation, and indicators for power status and voltage/current selection (complete card status is provided within ADRE Sxp client software). Also, this card can occupy a dedicated option slot and leave all transducer input slots available.

Field wiring cable accessories allow the user to conveniently connect of both power and signals to the 408DSPi. These accessories support most voltage and constant current transducer applications without the need for additional bulky equipment. Field wiring accessories and cables must be ordered separately.

The transducer power supply card design incorporates features to support future functionality that will allow users to configure outputs for custom voltage supply requirements via an external breakout panel. This will allow powering older proximity systems that run on  $-18$  Vdc or  $+15$  Vdc, or industrial sensors that use non-standard supply voltages ensuring that the ADRE system is compatible with and capable of powering virtually any transducer type in a single integrated solution.

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### Networking Overview

The 408 DSPi is a secure network appliance that supports DHCP or fixed IP addressing based on your network environment needs. When installed on a LAN/WAN in DHCP mode, the DHCP server or router will assign an IP address to the 408 DSPi. When the user makes a direct connection between the 408 DSPi and client computer in DHCP mode, an IP address will be automatically assigned. The 408 DSPi also supports fixed IP addressing. The user can assign a fixed IP address on one Ethernet port while simultaneously running DHCP on the second Ethernet port. In some instances, primarily when navigating corporate security infrastructures, firewalls, or VPN (Virtual Private Network), specific router configuration may be necessary. Contact your local product support representative for details specific to your needs.

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## Specifications

### 408 DSPi

Typical specifications are provided for a temperature of +25 °C ± 3 °C (+77 °F ± 5.4 °F) except where noted.

#### Data Storage Capacity

Internal - 130GB  
External - Multi Terabyte via external U320 SCSI drive array (requires configuration changes, please contact Bently Nevada technical support for details specific to your needs).

#### Communication:

Dual 1000/100Mb RJ45 Ethernet Ports  
Protocol - TCP/IP  
DHCP or Fixed IP addressing  
LAN/WAN compatible

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## Signal Conditioning - General

### 8 Channel Dynamic Sampling Card

#### Slot Position

Slots 1 through 4

#### 24 Bit A/D converters

#### Input Impedance

*Single Ended*

742kΩ

*Differential*

1.484 MΩ between sig+ and sig-

#### 4-20 mA

511Ω

#### Inputs

##### *Single-ended*

8

##### *Differential*

4

##### *4-20 mA*

8

#### Maximum Signal Input Range :

-25 to 25 V

#### AC Configurable Full Scale Range

0.7 to 10 V

#### DC Configurable Full Scale Range

0.35 to 50 V

#### Status Indication

Boot, Selftest, OK/Not OK, Activity, A/D overrange

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## Direct Measurement Accuracy

Filter values @ 0 db points unless specified otherwise.

#### Non-RMS, Non-Integrated Amplitude

##### *AC Coupled – Hi Mode*

1.6 Hz to 50kHz ( 96 to 3M rpm )  
± 1% of Full Scale Range<sup>1</sup>

##### *AC Coupled - Low Mode*

N/A

##### *DC Coupled – Hi Mode*

1 Hz to 50kHz ( 60 to 3M rpm )  
± 1% of Full Scale Range<sup>1</sup>  
± .011V below 1 V pp

**DC Coupled -  
Low Mode**

0.167 Hz to 20kHz (10 to 1.2M rpm)  
± 1% of Full Scale Range<sup>1</sup>  
± .011V below 1 V pp

**Non-Integrated,  
RMS Amplitude**

**Acceleration  
AC/DC Coupled  
Hi Mode**

10 Hz to 50kHz ( 600 to 3M rpm )  
± 1% of Full Scale Range<sup>1</sup>

**Velocity**

*AC/DC Coupled  
Hi Mode*

10 Hz to 50kHz ( 600 to 3M rpm )  
± 1% of Full Scale Range<sup>1</sup>

*AC Coupled  
Low Mode*

N/A

**Acceleration DC  
Coupled Low  
Mode**

3 Hz to 50kHz ( 180 to 3M rpm )  
± 1% of Full Scale Range<sup>1</sup>

**Velocity DC  
Coupled Low  
Mode**

3 Hz to 50kHz ( 180 to 3M rpm )  
(-3db @ 3Hz)  
± 1% of Full Scale Range<sup>1</sup>

**Non-RMS  
Integrated, RMS  
Integrated  
Amplitude**

**Acceleration AC  
Coupled Hi  
Mode**

10 Hz to 20kHz ( 600 to 1.2M rpm )  
± 1% of Full Scale Range<sup>1</sup>

**Velocity AC  
Coupled Hi  
Mode**

3 Hz to 20kHz ( 180 to 1.2M rpm )  
± 1% of Full Scale Range<sup>1</sup>

**Direct  
Measurement  
Update Rates**

*Valid KPH or  
Simulated KPH  
present*

0 to Peak / Peak to Peak values  
updated every 4 KPH periods.

*Invalid KPH or  
No KPH present*

High Mode – 2 sec sliding window  
Low Mode – 12 sec sliding window  
100ms update rate

*Integrated  
Values*

High Mode – 2 sec sliding window  
Low Mode – 2 sec sliding window  
100ms update rate

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## Bandpass Measurement Accuracy

Specification are exclusive of filter corner settings and transition regions. Filter values specified @ -3 db points.

### Non-RMS, Non-Integrated Amplitude

1 Hz to 50kHz ( 60 to 3M rpm )  
± 1% of Full Scale Input<sup>1</sup>

### Non-RMS Integrated, RMS Integrated Amplitude

1 Hz to 20kHz ( 60 to 1.2M rpm )  
± 1% of Full Scale Input<sup>1</sup>

### Bandpass Filter Selections (Typical)

#### Butterworth

2 Pole ( -40 db/decade )  
4 Pole ( -80 db/decade )  
6 Pole ( -120 db/decade )  
8 Pole ( -160 db/decade )

#### Range

High Pass 1 Hz to 25.5kHz  
Low Pass 10 Hz to 50kHz

Min separation between

#### HPF and LPF

2 Pole - 10.24 x HPF  
4 Pole - 3.24 x HPF  
6 Pole - 2.25 x HPF  
8 Pole - 1.96 x HPF

#### Options

HPF < 10 Hz ( 2 Pole )  
HPF ≥ 10 Hz ( 2, 4, 6, 8 Pole)  
LPF ≥ 10 Hz ( 2, 4, 6, 8 Pole)

## -3db Corner Frequencies

HPF & LPF - 1 Hz Increments,  
-3db ± 5%

## Bandpass Measurement Update Rates

### Valid KPH or Simulated KPH present

0 to Peak / Peak to Peak values updated every 4 KPH periods.

### Invalid KPH or No KPH present

100ms update rate

#### Integrated

2 sec sliding window

#### Non-Integrated

2 sec sliding window

## Filtered Measurements

### Filter Bandwidth

Selectable  
1.2 cpm, 12 cpm, 120 cpm  
(0.02 Hz, 0.2 Hz, 2 Hz)

### User enabled Auto-switching tracking filters transition

120 cpm < to > 12 cpm @ 600 rpm  
12 cpm < to > 1.2 cpm @ 60 rpm

### Filter Settling Time to 95 / 99 % of final value

120 cpm < 0.477 / .796 sec  
12 cpm < 4.77 / 7.96 sec  
1.2 cpm < 47.7 / 79.6 sec

**nX Amplitude and Phase Accuracy**

1 to 120k rpm  
± 1% of Full Scale Range<sup>1</sup>  
± 3° of Input (Steady State)

**nX Resolution and Range**

0.01X Increments  
0.01X to ((samp/rev)/2-1)X

**Below Minimum Amplitude**

*DC Coupled*

≤ 0.015 Vpp

*AC Coupled*

≤ 0.5% of full scale

**Gap Voltage Measurements:**

**Measurement Ranges**

0 V to 24 Vdc  
-24 V to 0 Vdc  
-12 to 12 Vdc  
-24 to 24 Vdc  
Upper and Lower voltage range fully programmable between -25 to 25 Vdc

**Amplitude**

± 0.13% of FSR @ -25 to 25 V  
± 0.26% of FSR @ 0 to ± 25 V  
± 0.26% of FSR @ -12.5 to 12.5 V  
(FSR = Full Scale Range)

**Resolution**

Measured 366.2 μV @ 24 V FSR

**Response to 95%/99% of Final Value**

*Instantaneous Gap*

0.95 / 1.59 sec.  
-3db ± 5% @ 0.5 Hz

*Average Gap*

5.3 / 8.84 sec,  
-3db ± 5% @ .09 Hz

**Process Variable Measurements**

**Voltage Inputs**

0 to 10 Vdc (Typical)  
1 to 5 Vdc (Typical)

**Measurement Range**

-25 to 25 Vdc (Upper and Lower voltage range fully programmable)

**Amplitude**

± 0.12% of FSR @ 25V  
± 0.30% of FSR @ 10V  
± 0.75% of FSR @ 1-5V  
(FSR = Full Scale Range)

**Resolution**

152.588 μV (0 to 10 Vdc)  
61.035 μV (1 to 5 Vdc)

**Response to 95%/99% of Final Value**

0.95 / 1.59 sec.

**Low-pass filter**

-3db ± 5% @ 0.5 Hz

**4 – 20 mA Input**

**Input Range**

0 - 41.6 mA max

**Amplitude**

±1% of Full Scale Input

**Resolution**

244 nA / bit

**Response to 95%/99% of Final Value**

5.3 / 8.84 sec

**Low-pass filter**

-3db ± 5% @.09 Hz

**Dynamic Waveform Data**

Filtering associated with asynchronously sampled dynamic waveform data specific to anti-alias filters. Synchronously sampled waveform data is not anti-alias filtered.

**Asynchronous Sampling Rates**

128 to 128kHz ( 2.56 x Frequency Span, 50, 100, 250, 500, 1k, 2.5k, 5k, 10k, 25k, 50k Hz )

**Anti-Alias**

-80 db Minimum

**AC Coupled**

1 Hz to 50kHz ( 60 to 3M rpm )

*Amplitude*±1% of Full Scale Range<sup>1</sup>*Phase*

±3° of Input

**DC Coupled**

DC Hz to 50kHz ( 0 to 3M rpm )

*Amplitude*±1% of Full Scale Range<sup>1</sup>*Phase*

±3° of Input

**Output**

Up to 4 simultaneous asynchronous waveforms per channel

**Synchronous Sampling Rates**

Samples/rev (16, 32, 64, 128, 256, 360, 512, 720,1024)

**DC Frequency Support**

120k rpm (2kHz) @ 16x  
 60k rpm (1kHz) @ 32x  
 30k rpm (500Hz) @ 64x  
 15k rpm (250Hz) @ 128x  
 7.5k rpm (125Hz) @ 256x  
 5.3k rpm (88.8Hz) @ 360x  
 3.75k rpm (62.5Hz) @ 512x  
 2.66k rpm (44.4Hz) @ 720x  
 1.87k rpm (31.25Hz) @ 1024x  
 (AC Frequency support from 1 Hz)

**Output**

Up to 2 simultaneous synchronous waveforms per channel

**Hardware Generated Spectra****Spectral Lines**

6400, 3200, 1600, 800, 400, 200, 100 lines, selectable. One asynchronous spectrum per channel.

Windowing provided on spectrum up to 800 lines, Rectangular, Hanning, Flat-Top

**Free Running Spectrum**

1 per channel

**Zoom Spectrum**

1 asynchronous spectrum per channel.

<b>Center Frequency</b>	Configurable in 1 Hz increments
<b>Zoom Factors</b>	2, 5, 10, 20, 50
<b>Spectral Lines</b>	100, 200, 400, 800
<b><sup>1</sup>Dynamic Sampling Card Amplitude vs. Frequency Cumulative Error</b>	Frequency dependant amplitude and phase errors added to fixed range specifications.
<b>Amplitude error vs. frequency</b>	0 % from 0 to 10kHz (± 4) % from 10kHz to 50kHz
<b>Phase error vs. frequency</b>	(-0.5) to (-2.8) deg from 0 to 5kHz (-2.8) to (-6.6) deg from 5kHz to 10kHz

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**Keyphasor®/Speed Measurements:**

**3 Channel Speed Input (KPH) / Trigger Dynamic Sampling Card**

<b>Slot Position</b>	Slots 1 through 4
<b>Accuracy</b>	1 – 120k rpm, (+/- 0.00915)% of Period Input, (+/- 11) rpm @ 120k rpm Input
<b>Simulated Keyphasor Accuracy</b>	1 – 120k rpm (+/- 0.02) % of Period Input <b>Note:</b> Keyphasor card not required to provide simulated Keyphasor (up to 6 simulated Keyphasors)

<b>Inputs</b>	
<b>Total Inputs</b>	3 speed inputs per card (single ended), maximum 2 cards per system.
<b>Supported Transducers</b>	Proximity, magnetic, or optical transducers. One “powered” optical input (Channel 3 only)
<b>Proximity inputs</b>	
<i>Input Range</i>	-25 to +25 Vdc
<i>Coupling</i>	AC or DC
<b>Input Impedance</b>	128.9 kΩ
<b>Buffered Transducer Outputs</b>	
<b>Number of Outputs</b>	3 channels, user selectable output
<b>Output Types</b>	Raw, Analog Conditioned, TTL ± 22V output maximum 20 μS min duty cycle for TTL output
<b>Output Impedance</b>	330Ω
<b>Output Drive Capacitance</b>	6100 pf (min)
<b>Load Resistance</b>	≥ 10k Ω
<b>Output Protection</b>	Short circuit protected

**Raw Outputs  
Amplitude and  
Delay**

AC Error

-0.91% to 0.42%

DC Error

± 60 mV

Signal Delay

0.6 µS (0.43 deg @ 2kHz)

**Conditioned  
Outputs  
Amplitude and  
Delay**

AC Error

-1.05% to 0.39%

DC Error

- 0.35 V to +60 mV

Signal Delay

2.0 µS ( 4.0 µS Optical ) (1.4/2.8 deg @ 2kHz)

**Transducer  
Power**

-24 Vdc, 57.6 mA max (-22.77 Vdc max, -24.48 Vdc min)  
+24 Vdc, 29 mA max (+24.48Vdc max, +23.13Vdc min)  
+5 Vdc, 250 mA max (+5.2 Vdc max, +4.25 Vdc min, optical transducer power, Channel 3 only)

**Direct  
Measurement  
(KPH) Accuracy**

Filter values specified @ 0 db points

**Non-RMS, Non -  
Integrated  
Amplitude**

AC Coupled - Hi  
Mode

1.6 Hz to 20kHz ( 96 to 1.2M rpm )  
± 1% of Full Scale Range<sup>2</sup>

AC Coupled -  
Low Mode

N/A

DC Coupled - Hi  
Mode

1 Hz to 20kHz ( 60 to 3M rpm )  
± 1% of Full Scale Range<sup>2</sup>  
± .011V below 1 V pp

DC Coupled -  
Low Mode

0.167 Hz to 20kHz ( 10 to 1.2M rpm )  
± 1% of Full Scale Range<sup>2</sup>  
± .011V below 1 V pp

**Bandpass  
Measurement  
(KPH) Accuracy**

Specifications are exclusive of filter corner settings and transition regions. Filter values for bandpass specified @ -3 db points

**Non-RMS, Non -  
Integrated  
Amplitude**

1 Hz to 20kHz ( 60 to 1.2M rpm )  
± 1% of Full Scale Range<sup>2</sup>

**Gap Voltage  
(KPH)  
Measurements**

**Measurement  
Range**

0 to 25 Vdc  
-25 to 0 Vdc  
-12.5 to 12.5 Vdc  
-25 to 25 Vdc

**Amplitude**

± 0.14% of FSR @ -25 to 25 V  
± 0.28 of FSR @ 0 to ± 25 V  
± 0.28% of FSR @ -12.5 to 12.5 V  
(FSR = Full Scale Range)

**Resolution**

Measured 381.47 µV @ 25 V range

**Response to  
95%/99% of  
Final Value**

*Instantaneous  
Gap*

0.95 / 1.59 sec.  
-3db  $\pm$  5% @ 0.5 Hz

*Average Gap*

5.3 / 8.84 sec,  
-3db  $\pm$  5% @ .09 Hz

**Status**

**Types**

Boot Status  
Self-test  
Over/Under Speed  
Activity  
Edge Pulse

**Detection**

Error detection indicated if change in rotative speed between consecutive Keyphasor pulses is greater than 25%, or shaft rotative speed is less than 1 rpm, or greater than 120k rpm

**Keyphasor  
Index**

Used to assist with positioning a shaft relative to a reference position while the shaft is stopped. Manual threshold must be selected for speeds below 1 rpm.

**Triggering**

Automatic or Manual Mode  
Positive or negative edge of signal input, selectable.

**Speed/Dynamic  
Frequency  
Range**

DC Coupled: DC to 20kHz  
AC Coupled: 1Hz to 20kHz

**Auto  
Threshold**

1 rpm – 120k rpm (0.0167 Hz – 2kHz), min voltage required at low freq

**Manual  
Threshold**

1 rpm to 120k rpm (0.0167 Hz to 2kHz) -25 Vdc to 25 Vdc, 0.10 Vdc increments

**Input Clamping**

-25 to 25 Vdc, 0.01 V increments, positive and negative

**Waveform  
Transformation**

Inverting or non-inverting

**Hysteresis**

0.2 to 2.0 V, 0.2 V increments  
0.2 to 1.0 V, 0.2 V increments (Optical )

**AC Gain**

1, 2, 5, 10

**Minimum Input  
Duty Cycle**

1.0  $\mu$ S pulse

**Maximum  
Trigger Error  
With Sine Wave  
Input**

Input  $\leq$  1kHz: < 0.5 deg,  
1kHz – 20 kHz: < 1 deg

**Input Multiplier  
/ Divider**

3 stages per input channel,  
8 digits pre decimal, 12 digits post decimal per stage, configurable ratio or real number in software.

**Speed Input KPH Card Amplitude vs. Frequency Cumulative Error:**

Frequency dependent amplitude and phase errors added to fixed range specifications.

**Amplitude error vs. frequency**

+ 1% to (-1.5) % from 0.1Hz to 20kHz

**Phase error vs. frequency**

(-1.5) to (-2.5) deg from 0 to 2kHz  
 (-2.5) to (-12) deg from 2kHz to 10kHz

**Data Collection Trigger/Event**

**Triggers**

*Amplitude*

Any variable, "or", per channel. (amplitude, phase, nX, Direct, Bandpass, Gap, Process Variable)

*Rpm*

Upper and lower level, per speed input

*Time*

User-programmable, recurring, scheduled

*External Contact*

High or low voltage input, "normally open", "normally closed" logic selectable in software

**High Voltage**

90 V to 240 V (AC or DC)  
 4 mA Maximum current  
 62 kΩ ± 2 %  
 (High voltage input to return)

**Low Voltage**

5 V to 30 V (AC or DC)  
 15 mA Maximum current  
 2.15 kΩ ± 2 %  
 (Low voltage input to return)

**Sampling Events**

*Δrpm*

1 rpm to 120k rpm, min 1 rpm increments

*ΔTime*

0.1 s to 999 hours, 0.1 s increments.

16 ms minimum event period for all sampling events.

*ΔAmplitude*

Programmable, absolute or % change ( not in first release )

**Digital Replay KPH/Speed Input Measurements**

Speed Input/KPH cards (168906-02) delivered prior to November 2006 require an update to work properly with the Digital Replay Card.

When in replay mode, there is no alteration to dynamic sampler data. The following apply to KPH measurements, in addition to standard operational KPH specifications except where noted:

Event Rate = Shaft rpm x Events/rev:

Event Rate	Rpm Error	Phase Error
1 to 6k	+/- < 1 rpm	+/- < 1 deg
6k to 30k	+/- 4 rpm	+/- < 1 deg
30k to 60k	+/- 7 rpm	+/- 1 deg
60k to 90k	+/- 20 rpm	+/- 1 deg
90k to 120k	+/- 40 rpm	+/- 2 deg
120k to 300k	N/A	+/- 3 deg (typ)
300k to 600k	N/A	+/- 6 deg (typ)
600k to 900k	N/A	+/- 8 deg (typ)
900k to 1200k	N/A	+/- 9 deg (typ)

**Amplitude**

Sine wave input up to 8 Vpp any full scale range.

**Raw Outputs<sup>3</sup>***AC Error*

-1.31% to 0.82%

*DC Error*

± 60 mV

**Conditioned Outputs<sup>3</sup>***AC Error*

-1.45% to 0.79%

*DC Error*

- 0.35 V to +60 mV

**<sup>3</sup>Speed Input/KPH Card amplitude cumulative (total) error**

AC Accuracy Speed Input/KPH signal processing is independent from dynamic data produced by the standard dynamic sampling card. Reprocessing of data from the standard sampling card is therefore not subject to any additional signal processing errors.

**Current When Shorted**

52 mA ± 5mA per output, 4 outputs maximum

**Current Outputs****(+) Bias**

3.36 mA ± 0.3mA @ Load: 10 Ω to 6.5 kΩ per output, 4 outputs max

**(-) Bias**

3.30 mA ± 0.36mA @ Load: 10 Ω to 6.5 kΩ per output, 8 outputs max

**Aux Output**

For future accessories and programmable voltage supply.

**Status Indication**

Boot Status  
OK Detection  
Current Limit  
Current Source - Bias (+/-)  
Voltage Source - Bias (+/-)

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**Transducer Power Supply Card****Slot Positions**

Slots 1 through 5

**Voltage Outputs**

-24Vdc (-23.35Vdc to -24.48 Vdc)

**Max Current**

84.5 mA ± 4.5 mA

**Short Circuit**

55 mA ± 5mA per output, 8 outputs maximum  
+24Vdc (+24.48Vdc to +23.34 Vdc)

**Max Current**

84.5 mA ± 4.5 mA

---

**Physical****Dimensions****408 DSPi (L x W x H)**

36.1 × 41 × 10 cm (14.25 × 16 × 3.8 in)

**Power Supply (L x W x H)**

18.3 × 13.7 × 9.1 cm (7.2 × 5.4 × 3.6 in)

**Weight****408 DSPi**

9.5 kg (21 lbs) @ 32 channels

**Power Supply**

1.3 kg (3 lbs)

## Construction

### 408 DSPi

- Aluminum Chassis
- Cast aluminum front and rear panels.
- Black Powder Coating – textured finish, indoor/outdoor use.
- Environmentally sealed momentary tactile switches.
- Bayonet locking external power connector

## Environmental

### Operating Temperature (408 DSPi and External Power Supply)

0° C to +50° C (+32° F to +122° F)

**Note:** Rated specifications at fan inlets. Do not block fans during operation, un-obstructed airflow is required.

### Storage Temperature

-30° C to +80° C (-22° F to +176° F)

### Relative Humidity

0% to 95% non-condensing

## Vibration

### Operational

0.25G @ 5-100Hz

### Non-operational

3G @ 5-100Hz

## Shock

10G @ 2mS operational & non-operational

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## Environmental Considerations

The 408 DSPi is designed to meet a broad range of use cases and environments. Significant design measures have been implemented to provide a robust electrical and mechanical package. Shock isolation mounts are used internally on critical components and careful attention focused on reliability of the system including extensive shock, vibration, and temperature exposure. The robust shipping case is designed for transportation and shipment in the most rigorous environments.

The 408 DSPi is a measurement “instrument” and should be treated with the appropriate consideration. Exposure to “extreme” environments will have constraints. Direct exposure to condensing liquids, rain, sand, or other particulates that could impair ventilation are however, not appropriate. In scenarios that may exceed environmental specifications custom solutions can be created to meet specific needs. If you have any questions regarding an application please contact your local Bently Nevada representative.

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## Input Power

### External Power Supply

#### Input

90/264 Vac, 47/63 Hz auto sensing

#### Output

+32 Vdc ± 5% @ 10 A Max  
+5 Vdc ± 3% @ 600 mA Max

#### Surge Protection

Up to 2kV Max

### **LED Indicators**

AC Power ready  
DC Output enabled  
Fault Latch Detection

### **Faults**

AC supply fault  
Over/Under output voltage error  
Over current detection  
Thermal protection  
(Faults are latching and require AC power cycle to reset)

### **Approvals**

#### **System**

CE Mark

#### **External Power Supply Only**

CSA (NRLT/C) Certification (CSA, and UL by CSA, KEMA (Europe) and CB).

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### **CE Mark Directives**

EMC Directives 89/336/EEC – with amendments  
Declaration of Conformity available online -  
[http://www.ge-energy.com/prod\\_serv/products/oc/en/hazardous\\_areas\\_certifications.htm](http://www.ge-energy.com/prod_serv/products/oc/en/hazardous_areas_certifications.htm)

#### **IEC / EN61000-3-2**

##### **Harmonics**

IEC / EN 61000-3-2/A14: 2000

##### **Flicker**

IEC / EN 61000-3-3: 1995

#### **IEC / EN61000-6-2**

##### **Electrostatic Discharge**

EN 61000-4-2: 1995 Criteria B

### **Electro-Magnetic Field**

EN 61000-4-3: 1995 Criteria A

### **Electrical Fast Transient**

EN 61000-4-4: 1995  
AC Power, Criteria B  
Signal Ports, Criteria B

### **Surge Capability**

EN 61000-4-5: 1995  
AC Power, Criteria B  
Signal Ports, Criteria B

### **RF Conducted**

EN 61000-4-6: 1996  
AC Power, Criteria B  
Signal Ports, Criteria A

### **Voltage Dips/Interrupt**

EN 61000-4-11: 1994  
30% 0.5 Periods, Criteria B  
60% 5 Periods, Criteria C  
60% 50 Periods, Criteria C

### **IEC / EN61000-6-4**

#### **Radiated Emissions**

EN 55011: 1998

#### **Conducted Emissions**

EN55011: 1998

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### **Low Voltage Directives**

#### **IEC / EN 60950: 2001**

#### **IEC / EN 61010-1: 2001**

USA EMC  
CFR 47 FCC

**Radiated Emissions**

FCC 15

**Conducted Emissions**

FCC 15

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**Ordering Information**

**408 DSPi**

**168679-AXX-BXX-CXX-DXX-EXX-FXX-GXX-HXX-IXX**

(All accessories are ordered as separate line items - \* not currently available)

**A: Slot # 1 Option**

- 00 Empty Slot
- 01 8 Ch Dynamic Sampler Card
- 02 3 Ch Speed Input (KPH) / Trigger Card
- 03 Transducer Power Supply Card

**B: Slot # 2 Option**

- 00 Empty Slot
- 01 8 Ch Dynamic Sampler Card
- 02 3 Ch Speed Input (KPH) / Trigger Card
- 03 Transducer Power Supply Card

**C: Slot # 3 Option**

- 00 Empty Slot
- 01 8 Ch Dynamic Sampler Card
- 02 3 Ch Speed Input (KPH) / Trigger Card
- 03 Transducer Power Supply Card

**D: Slot # 4 Option**

- 00 Empty Slot
- 01 8 Ch Dynamic Sampler Card
- 02 3 Ch Speed Input (KPH) / Trigger Card
- 03 Transducer Power Supply Card

**E: Slot # 5 Option**

- 00 Empty Slot
- 01 Digital Replay Card w/o analog outputs
- 03 Transducer Power Supply Card

**F: Power Supply Option**

- 00 None
- 01 90/264 Vac 47/63 Hz
- 02 90/264 Vac 47/63 Hz w/dc backup, auto-switching\*

**G: Carry Case Option**

- 00 None
- 01 Hard Shipping Case
- 02 Soft Carry Case\*

**H: Metrology Certification Option**

- 00 None
- 01 All Cards

**I: Rack Mount Kit Option**

- 00 None
- 01 with 19 in Rack Mount Kit

**Note:** Options marked with an asterisk (\*) are not currently available

**What is included when ordering the 408 DSPi (168679):**

3 AC power cords (1 USA, 1 European, and 1 UK standards) included with the FF Power Supply option  
1 Ethernet Cable – Cat5e with ferrite, 3 m (10 ft), required to meet CE certification.

Each Dynamic Sampler or Speed Input (KPH) card includes signal input cables (172068). You need not order additional signal input cables accessories unless you require more for your application. You may order signal input cables separately.

Optical/Laser KPH transducer input adapter cables (172262 - 01 and 169714 - 01) and Transducer Power Supply cables and accessories must be ordered separately.

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**ADRE Sxp Software**

**4080/01-AXX-BXX-CXX-DXX-EXX-FXX-GXX**

**A: Version**

- 01 Initial Order
- 98 Update

**B: Full Function Client - License Qty**

- 00 None
- 01 One (1) Client License
- 02 Two (2) Client Licenses
-

- - 10** Ten (10) Client Licenses
- C:** Network Viewer Edition - License Qty
- 00** None
  - 01** One (1) Client License
  - 02** Two (2) Client Licenses
  - 
  - 
  - 10** Ten (10) Client Licenses

- D:** Archive Viewer Edition - License Qty
- 00** None
  - 01** One (1) Client License
  - 02** Two (2) Client Licenses
  - 
  - 
  - 10** Ten (10) Client Licenses

- E:** Full Client - Media Qty\*\*
- 00** None
  - 01** One (1) CD-ROM
  - 02** Two (2) CD-ROMs
  - 
  - 
  - 10** Ten (10) CD-ROMs

- F:** Network Viewer Edition - Media Qty\*\*
- 00** None
  - 01** One (1) CD-ROM
  - 02** Two (2) CD-ROMs
  - 
  - 
  - 10** Ten (10) CD-ROMs

- G:** Archive Viewer Edition - Media Qty\*\*
- 00** None
  - 01** One (1) CD-ROM
  - 02** Two (2) CD-ROMs
  - 
  - 
  - 10** Ten (10) CD-ROMs

\*\* (Media qty must be either (1) or equal to license qty)

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**ADRE Sxp Technical Support Plan  
4080/20-AXX**

- A:** Number of Years
- 01** One (1) Year - Single License
  - 02** Two (2) Years - Single License
  - 03** Three (3) Years - Single License
  - 04** Four (4) Years - Single License
  - 05** Five (5) Years - Single License

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**Bently BALANCE™ Software**

**3030/01-AXX** Multi-Plane Balancing Software  
(For use with ADRE Sxp. Requires Bently Balance™ Version 3.1 or later. Please contact your local sales representative for additional ordering information)

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**408 DSPi Accessories (Accessories are ordered as separate line items.)**

**8-Channel Dynamic Sampler Card  
168905-AXX**

- A:** Approvals
- 02** option only (CE approved)

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**3-Channel Speed Input/KPH Trigger Card  
168906-AXX**

- A:** Approvals
- 02** option only (CE approved)

Requires appropriate adapter cable to connect optical transducer inputs.

**Note:** Speed Input/KPH cards (168906-02) delivered prior to November 2006 require an update to work properly with the Digital Replay Card.

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**Digital Replay Card****168907-AXX-BXX****A:** Approvals**0 2** option only (CE approved)**B:** Output Option**0 0** No output**0 1** With analog output (not currently available)

Note: Speed Input/KPH cards (168906-02) delivered prior to November 2006 require an update to work properly with the Digital Replay Card.

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**Transducer Power Supply Card****168908-AXX-BXX****A:** Approvals**0 2** option only (CE approved)**B:** Output Accessory Option**0 0** None**0 1** Option not currently available

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**Additional Accessories (Accessories are ordered as separate line items)**

**172068** Signal Input Cable - SMA to BNC, 3 m (10 ft) required for 168905 - 02 (or /01), and 168906 - 02 (or /01). (Included with each Dynamic Sampler - qty 8, and Speed Input (KPH) card - qty 6)

**173887** SMA Push-On Adapter, for SMA to BNC cable 172068. Allows SMA cable connector to be pushed onto signal input connector for convenience.

**174466** Ethernet Cable - Cat5e with ferrite, 3 m (10 ft). Required to meet CE certification. (qty 1 included with 408DSPi)

**169633** 408 DSPi Hard Shipping Case

**169337** 408 DSPi External Power Supply  
90/264 Vac 47/63 Hz

**169347 - 01** External Power Supply to 408DSPi Extension Cable, 1.8 m (6 ft). For use with 169337. Using this cable provides additional cable length for a total of ~ 3 m (10 ft). Convenient for rack mount applications.

**169234 - 01** 408 DSPi 19 in Rack Mount Kit

**123135** Velomitor Power Module Kit - Provides power and connects up to four Velomitor transducers.

**169714 - 01** Keyphasor input adapter cable (0.5m). Connects *laser transducer* kits to KPH card 168906 - 02 (or /01). See Figure 3.

**166812 - 01** Laser transducer kit with 2m cable. Includes transducer and extension cable. Requires adapter cable 169714 - 01 to connect to KPH card 168906 - 02 (or /01). See Figure 3.

**166813 - 01** Laser transducer kit with 5m cable. Includes transducer and extension cable. Requires adapter cable 169714 - 01 to connect to KPH card 168906 - 02 (or /01). See Figure 3.

**172262 - 01** Optical Keyphasor adapter cable (0.5m). Connects *optical pickup* 10798 - 03 (early style) to KPH card 168906 - 02 (or /01). See Figure 3.

**10798 - 03** Optical pickup sensor (early style) with integral cable 3m (10ft). See Figure 3.

**20545 - 25** Optical pickup 7.6m (25 ft) extension cable (early style). Can be ordered in lengths up to 30 m (99 ft). See Figure 3.

**20211 - 05** Optical pickup mounting package. Includes mounting pliers, magnetic base, and gooseneck transducer holder.

**02290050** Reflective tape roll

<b>02290002</b>	PCMCIA Enhanced Parallel Port card to support 208 DAIU on computers without external EPP port. (required if using ADRE Sxp Notebook Computer 169849)
<b>174968</b>	Fan vent cover update/replacement kit
<b>176472</b>	European AC Power Cord 250V 2.5m
<b>178775 - 01</b>	408DSPi Transducer Power Supply Card Standard Field Wiring Harness. See Figure 4 and Figure 5.
<b>178762 - 01</b>	408DSPi Transducer Power Supply Card Modular Field Wiring Harness (requires 178763-01) See Figure 4 and Figure 6.
<b>178763 - 01</b>	408DSPi Transducer Power Supply Card Modular Wiring Adapter. See Figure 4.
<b>178897 - 01</b>	408DSPi Transducer Power Supply Card Field Wiring Terminal Kit. See Figure 4.

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#### Minimum Computer Requirements

ADRE Sxp software will run on most computer systems, desktop or notebook, providing that the systems meet minimum specifications This datasheet provides minimum computer requirements but minimum specifications will impact software operation and system performance and the ability for the system to achieve maximum specifications You must follow the "recommended computer specifications" below to realize the full potential of the system.

- 1Ghz Processor
- 512MB RAM
- 40 GB HDD (100MB Free Space)
- CD-ROM
- 100 Mb Ethernet
- 800x600 SVGA

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#### Recommended Computer Specifications

- 2.4Ghz or faster, Xeon
- 1.8Ghz or faster, Dual Core (notebooks)
- 2 GB RAM

- 60-80 GB HDD
- DVD±RW
- 1000/100 Mb Ethernet
- SXGA 64MB VRAM

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#### ADRE Sxp Notebook Computer

##### 169849 High Performance Notebook Computer

You can also use this computer with ADRE for Windows software and the 208DAIU. The SPP-100 PCMCIA card (02290002) supports connection to the 208DAIU. This computer does not have an external parallel port.

- 2.2Ghz (or higher) Processor
- 2 GB RAM (or higher)
- 160 GB (or higher) HDD
- DVD±RW
- 1000/100 Mb Ethernet
- 802.11 a/b/g draft-n WLAN w/Bluetooth®
- USB 2.0 (or higher)
- WXGA 128MB VRAM
- 56K Fax/Modem
- Windows XP Pro\*
- \*Windows® Vista available by request
- Soft Carry Case

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#### Computer Peripherals

Users should evaluate the selection of additional external peripherals on a case-by-case basis. User needs can be very different and therefore we do not recommend generic solutions. We can provide peripherals such as printers, external hard drives, monitors, or other devices that best meet your needs. Please provide your sales representative with specific requirements.

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#### Operating System Requirements & Support

ADRE Sxp software is designed to run and fully tested on Microsoft® Windows XP (Service Pack 2). ADRE Sxp software can be installed on Microsoft Windows Vista & 2000. ADRE Sxp software cannot be installed on earlier versions of Microsoft Windows operating systems such as Windows 95/98/NT.

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## Networking Requirements

ADRE Sxp software requires an available Ethernet port with TCP/IP protocol support to communicate with the 408 DSPi. A 1000 Mb (GB) Ethernet port is required for the 408 DSPi to meet full performance specifications. Under typical conditions with only one or two clients accessing the 408 DSPi, 100MB Ethernet will provide excellent performance.

Bandwidth sharing on any network, depending on traffic, is always a consideration and will affect network performance. Ensure that all networking hardware is installed and configured according to your network administrator's specifications.

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## Database Access and Storage

The 408 DSPi can store up to 130 GB of data internally. For applications that may need significantly more storage capacity, an external rack mounted drive array can also be added. Permanent installations, test stands, or very long term storage of raw streamed data can easily be supported with an external drive array.

You can use the ADRE Sxp software to view all data on the 408 DSPi, thereby minimizing the need to move large datasets over the network. Users can move entire databases or just the portion they need to a client computer. Because moving large databases over a network can consume significant bandwidth and affect network performance we recommend that you use a dedicated or high bandwidth network or a local (direct) connection between the 408 DSPi and the ADRE® Sxp client computer.

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## Network and Archive Viewer Edition Software

There are two "Viewer Edition" options for ADRE Sxp that are specifically designed to meet use case scenarios that do not require active control or configuration of a 408 DSPi. All versions of ADRE Sxp can read all ADRE for Windows databases.

**Network Viewer Edition** - The Network Viewer allows a user to "connect to a 408" and view **live data** or any archived data on the 408. Users need this if they wish to view live data, participate in a live test, etc. The network viewer can also display all archived data, either locally, or on the 408. This option is intended for applications that require remote participation in data collection or viewing of live data, as well as local viewing of archive data.

**Archive Viewer Edition** - The Archive Viewer software is intended for situations when a user requires support from other personnel, typically from a corporate support team or consultant. In such cases, support personnel will not actually be configuring or collecting live data from the 408. Once a user has archived and moved data from the 408, the Archive Viewer provides all viewing features and data manipulation capability. The Archive Viewer allows users to open databases only after they have been archived and moved to another computer or placed on storage media. The Archive Viewer is not able to connect to a 408 at all.

## Display Plot / Formats

The following plots can be selected from stored data. Users can configure the display to show only the applicable plots for any given application package.

- Current Values
- Tabular List
- Orbit / Timebase (w/ superposition of overlay)
- Orbit (w/ superposition of overlay)
- Timebase (w/ superposition of overlay)
- Continuous Raw Timebase (w/multi decimation)
- Bode (w/ *Forward & Reverse Vector transforms*, coming soon)
- Polar (w/ *Forward & Reverse Vector transforms*)
- Shaft Centerline (*Average and Instantaneous position & Orbit Overlay*)
- X vs. Y
- Trend / Multivariable Trend
- Spectrum / Full Spectrum
- Waterfall / Full Waterfall (w/ Campbell format)
- Cascade / Full Cascade (w/ Campbell format)
- System Event List

## ADRE for Windows / 208 DAIU support

ADRE Sxp software provides complete support for existing ADRE for Windows databases. This allows users to continue using existing ADRE for Windows systems as needed while sharing data with those running ADRE Sxp software. Although ADRE Sxp does not communicate directly with the 208 DAIU, ADRE for Windows software can run on the same computer as ADRE Sxp. Many notebook computer systems no longer have an EPP port (Enhanced Parallel Port) necessary to communicate with the 208 DAIU. For many notebook computers, the PCMCIA EPP card (02290002) can provide the required interface. In some instances, a port replicator or docking station may provide such connectivity. Contact your local technical support representative for details specific to your needs.

	<i>Full Function</i>	<i>Network Viewer</i>	<i>Archive Viewer</i>
<b>ADRE Sxp Client Versions</b>			
<b>Functionality</b>			
View historical data on local computer	✓	✓	✓
View historical data stored on network server/drive	✓	✓	✓
Import and view ADRE for Windows data	✓	✓	✓
Configure, save, and view plots and plot sessions	✓	✓	✓
Build 408 Configurations	✓	✓	✓
View Configurations	✓	✓	✓
Connect to 408	✓	✓	
View Real-time Data on 408	✓	✓	
Upload Configurations to 408	✓	✓	
Download data from 408 to local computer	✓	✓	
View Network Settings on 408	✓	✓	
<b>408DSPi Control &amp; Operation</b>	✓		
Enter & Exit Store Enable	✓		
Manual Sample	✓		
Control Triggering	✓		
On-the-fly Configuration Changes	✓		
Set Active Database/Configuration	✓		
Modify System Properties	✓		
Update/Service 408	✓		
408 Diagnostics	✓		
Configure Network Settings	✓		

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### Multi-Plane Balancing Software

Bently BALANCE™ software (3030/01) is designed specifically to integrate with your ADRE system. ADRE Sxp databases can be imported directly into Bently BALANCE V3.1 (and later) providing analysis and a comprehensive solution for your most challenging balancing needs. You can also import/export data directly from/to spreadsheets into Bently BALANCE, adding great flexibility to your balancing program. Bently BALANCE includes powerful optimization tools, multiple sets of influence vectors, and multiple “what-if” solutions, all while viewing graphical results on plots and weight maps. Bently BALANCE is a powerful part of your total diagnostic and maintenance program. Contact your local sales representative for more details.

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### Software Licensing

ADRE Sxp software is available as a single “computer” license. A separate license is required for each installation of this product on a different computer. Contact your local sales or service representative to purchase or discuss “site” or “enterprise” licensing requirements.

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### Software Technical Support Agreement

The Software Technical Support Agreement (TSA) allows you to contact our Product Service department for assistance at any time during the selected period of coverage. The support agreement period begins with your initial request for assistance, first software update, or three months after your order, whichever comes first. In addition to e-mail, fax, and telephone support, the Support Agreement provides free software updates as well as updates via the Internet. Your Technical Support Agreement insures that you have access to the most current version of software with all the latest enhancements. Technical support plans are available for single and enterprise wide installation of our software products. Contact your local sales representative for details specific to your needs.

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### Registration for ADRE Sxp Technical Support

Registration of the ADRE Sxp software product is the only way to activate your Technical Support Agreement. Please contact your local Technical Support representative or visit us on-line for details specific to product registration.

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### Training Programs

Training is essential to insure users are able to realize full value from their tools in the most efficient manner. Our technical training group can provide training to meet your needs. Training specific to ADRE Sxp and the 408 DSPi can be provided at your facility or at one of many Training Centers located around the world. Contact your local sales representative for details specific to your needs.

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### Documentation (can be ordered separately)

<b>176559-01</b>	ADRE Quick Start Guide
<b>172179-01</b>	ADRE Sxp / 408 DSPi Datasheet
<b>172937-01</b>	ADRE Sxp Training Course Manual

# Graphs and Figures



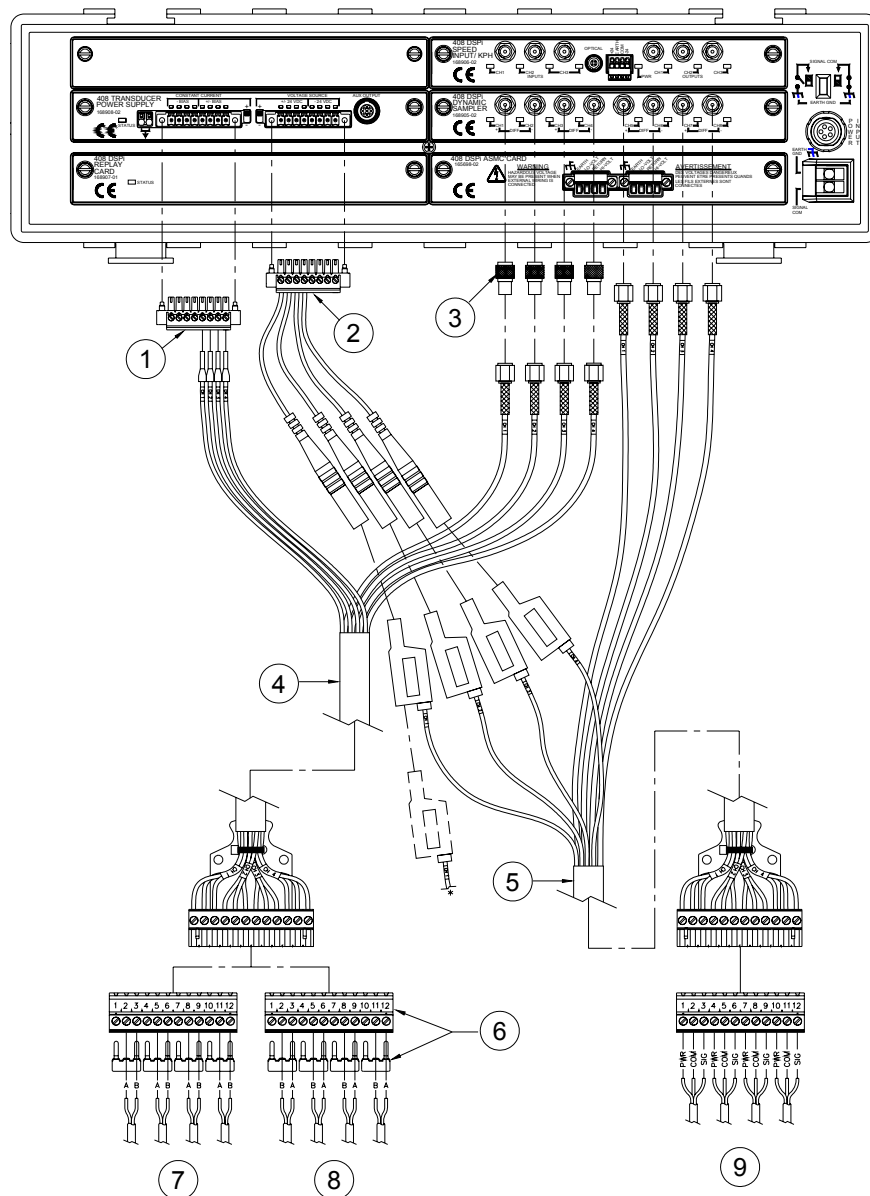
Figure 1: ADRE Sxp/408 DSPi Front View



Figure 2: ADRE Sxp/408 DSPi Rear View

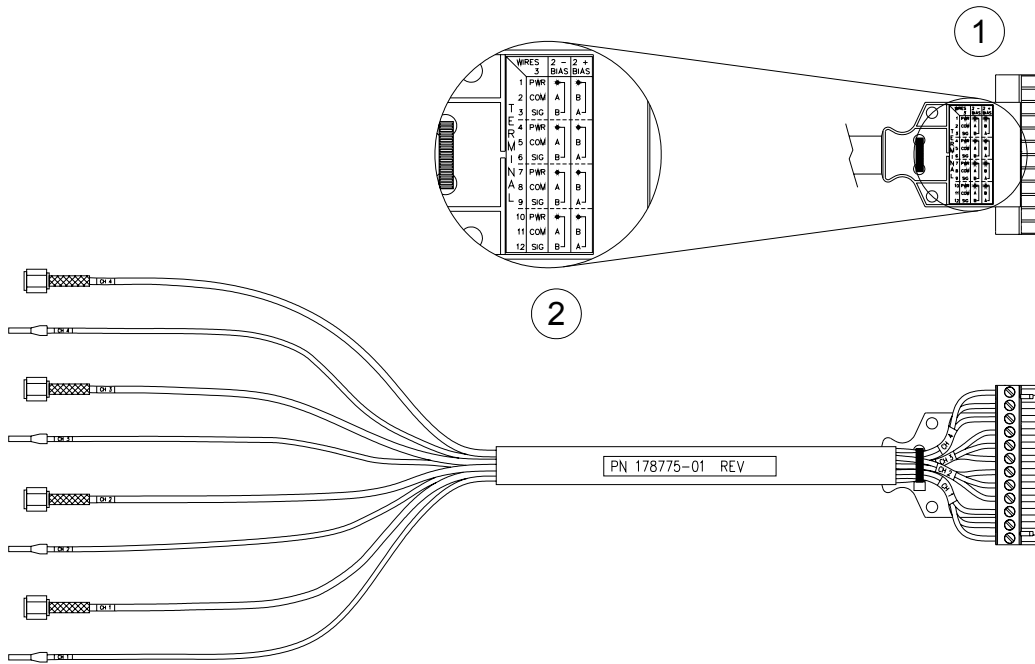


Figure 3: 408 DSPi with Optical KPH and Laser Tachometer speed input transducers.



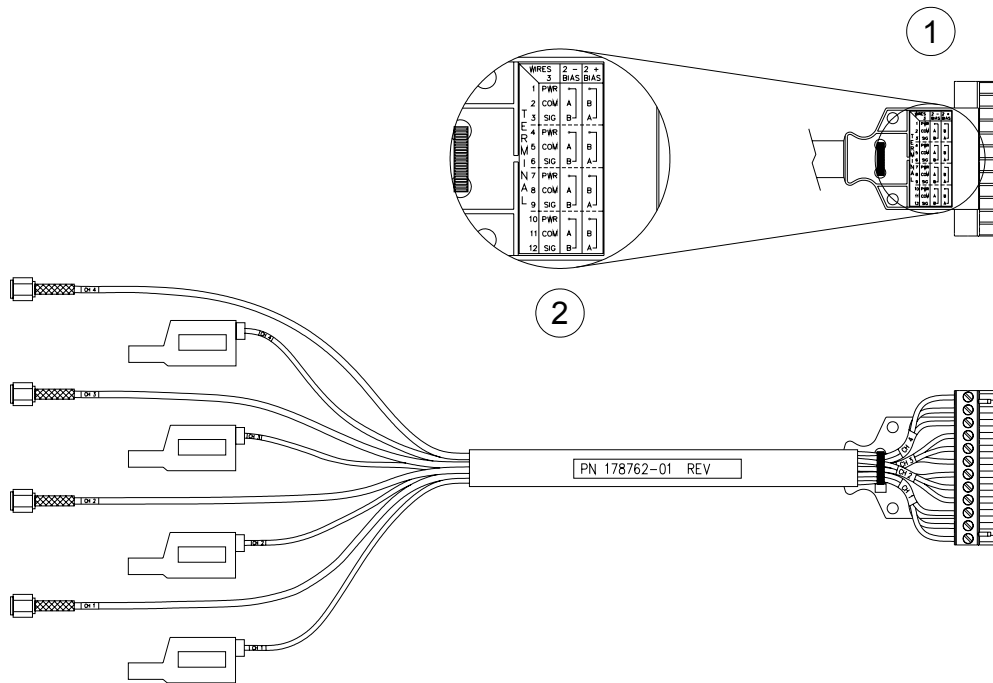
1. Standard terminal plug (included with 168908)
2. Modular wiring adapter (P/N 178763-01). Required for 178762-01.
3. SMA push-on quick-connect adapter (P/N 173887).
4. 4-connection standard wiring harness for 2- or 3-wire transducers (P/N 178775-01). See Figure 5 for detail.
5. 4-connection modular wiring harness for 2- or 3-wire transducers (P/N 178762-01). See Figure 6 for detail. **Note:** Modular wiring harness can be stacked only with 3-wire voltage powered connections (will not work with constant current transducers).
6. Field wiring terminal kit (one 12-position terminal and jumpers P/N 178897-01).
7. Field wiring for 2-wire constant current transducers with negative bias.
8. Field wiring for 2-wire constant current transducers with positive bias.
9. Field wiring for 3-wire positive or negative voltage powered transducers.

**Figure 4: Field Wiring Cables for Transducer Power and Signal Input**



1. Reverse side of connector.
2. Detail of wiring legend label.

**Figure 5: Detail of Standard Wiring Harness 178775-01**



1. Reverse side of connector.
2. Detail of wiring legend label.

**Figure 6: Detail of Modular Wiring Harness 178762-01**

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