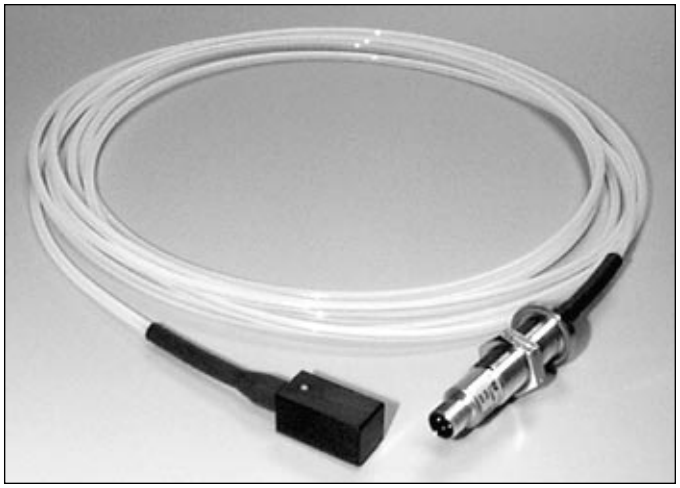
VIBROSYST M



FOA-100

OPTICAL ACCELEROMETER

DESCRIPTION

The FOA-100 Optical Accelerometer◊ is by design nonconductive and immune to electromagnetic interferences. Its optical link ensures an excellent electrical insulation (greater than 27 kVRMS) between the sensor and the instrumentation. Its passive technology makes it ideal for shock and vibration measurements in areas where conventional piezo-electric and piezo-resistive accelerometers may create hazards to machine and personnel, and impair reliable operation.

The optical sensor body is made of ceramic and PPO Noryl with no metallic elements. The optical fibers are embedded and protected by an integral 5 mm thick PTFE tubing with a minimum bending radius of 80 mm. It is available in 6 and 10 m *(19'8" and 32'8")* lengths or other upon request. The sealed feedthrough connector houses the optoelectronic and conditioning circuitry (Mating metallic shielded connector supplied). External power supply is required.

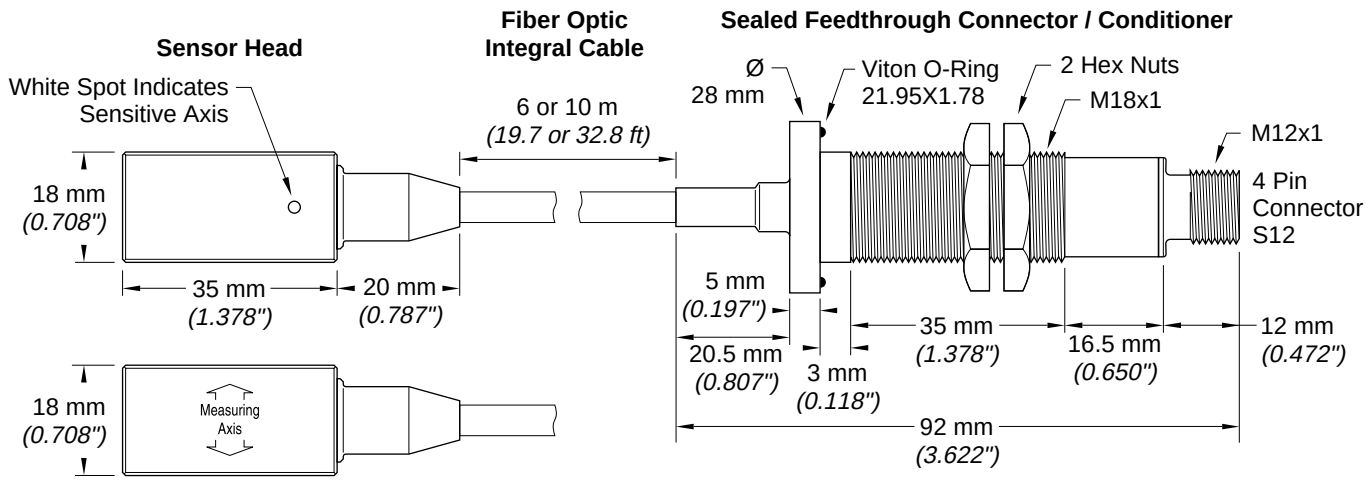
APPLICATIONS

- On-line vibration monitoring in harzardous environments:
  - high voltage,
  - severe electromagnetic interferences, and
  - highly explosive gas.
- Electrical machine applications (turbo and hydro generators, motors):
  - end-windings, windings, and stator teeth,
  - transformers,
  - electrical motor brushes.
  - isolated turbo-generator bearings,
  - high voltage circuit breakers.

FEATURES

- Excellent electrical insulation (>27 kVRMS) between sensor head and instrumentation
- Light weight sensor head of non-metallic parts; Fiber optic signal channel; Sealed feedthrough connector / conditioner
- Unsensitive to magnetic and electrical fields
- Low transversal sensitivity; Very good thermal stability
- Frequency range: 30–350 Hz, customizable to 950 Hz
- Dynamic range: 0 to 40*g* / 1 mm pk-pk @ 100 Hz
- Bias voltage output: +6 VDC ±4 VAC
- Sensitivity: 100 mV/*g*
- Available optical cable lengths: 6 & 10 m *(19'8" & 32'8")*
- Mating metallic shielded connector supplied

DIMENSIONS



VIBROSYST M

FOA-100
GENERAL SPECIFICATION

Operating

• Measuring Range	0 to 40*g* (1 mm pk-pk at 100 Hz)
• Frequency Range	30 to 350 Hz ± 5% (customizable up to 950 Hz) - 10% at 20 Hz, and + 10% at 400 Hz
• Sensitivity	100 mV/*g* ± 5% at 120 Hz
• Output	Single ended DC coupling, bias voltage + 6 VDC
• Max. Shock Acceleration	600*g* half sine, duration 1 ms
• Resonance Frequency	higher than 500 Hz
• Transverse Sensitivity	< 5% with respect to sensitive axis
• Residual Noise	< 3 mVRMS overall noise between 30 and 350 Hz
• Resolution	< 1 µm peak-peak at 100 Hz
• Insulation Voltage between sensor head and electronics	Greater than 27 kVRMS at 50 Hz
• Operating Pressure	500 kPa hydrogen
• Power Supply	External + 24 VDC non-stabilized ± 20%, approx. 40 mA

Environmental

• Temperature Range	
- Operation	
Sensor	20° to 90°C *(68° to 194°F)*
Electronics	0° to 70°C *(32° to 158°F)*
- Non-destructive	
Sensor	-20° to 100°C *(-4° to 212°F)*
Electronics	-20° to 85°C *(-4° to 185°F)*
• Magnetic Field	max. 1 tesla RMS at 50 Hz
• Electrical Field	max. 1 MV/m at 50 Hz

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◊Patented pending technology

Published: 96.04.16 **Revised:** 99.04.28

Physical Characteristics

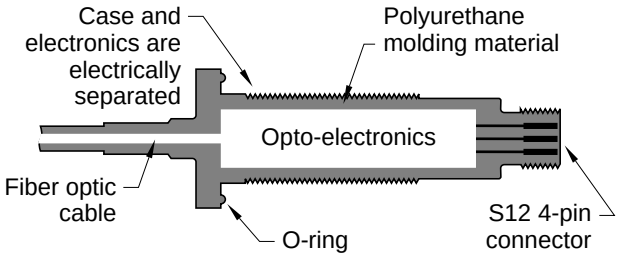
• Sensor Body	PPO Noryl and Ceramic	
- Length	35 mm	*(1.378 in.)*
- Width	18 mm	*(0.708 in.)*
- Thickness	18 mm	*(0.708 in.)*
- Weight	30 g	*(1.06 oz.)*
• Sealed Feedthrough	Chromed Brass alloy, S12 4-Pin connector on outside end with mating metallic shielded connector, Viton O-ring 21.95 x 1.78, 2 hex nuts M18x1	
- Length	92 mm	*(3.62 in.)*
- Max. Diameter	28 mm	*(1.10 in.)*
- Thread Length	35 mm	*(1.38 in.)*
- Thread Diameter	18 mm	*(0.71 in.)*
- Weight	120 g	*(4.23 oz.)*
• Integral Cable	3 fiber glass strands with PTFE protection tubing	
- Lengths	6 m	*(19.68 in.)*
	10 m	*(32.80 in.)*
	other lengths upon request	
- Diameter	5 mm	*(.197 in.)*
- Min. Bending Radius	80 mm	*(3.15 in.)*

Ordering Information

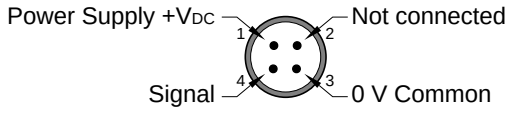
• 6 m cable	P/N 5500-00016
• 10 m cable	P/N 5500-00017

DIAGRAM

Conditioner



Mating S12 Connector Pin Out



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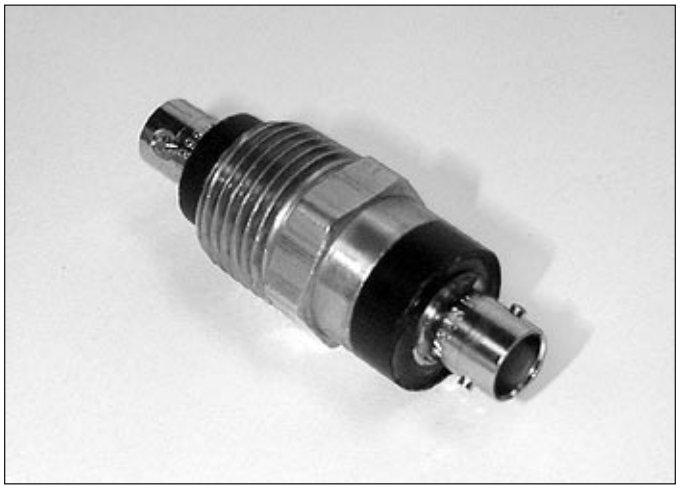


HERMETICALLY SEALED FEEDTHROUGH

SEALED BNC-BNC COAXIAL CONNECTOR

DESCRIPTION

The Hermetically Sealed Feedthrough is used to connect a sensor located inside a sealed environment to its signal conditioner. It is a precision feedthrough connector for a wide range of pressures and temperatures. Designed for use on turbo-generators and synchronous condensers with hydrogen-gas environment.

This feedthrough connector has been tested up to 120 psi. It features BNC coaxial connectors with bayonet type coupling at both ends, an epoxy floating shield, a brass housing, a 1/2" NPT thread coupling, and a temperature rating of up to 100°C *(212°F)*.

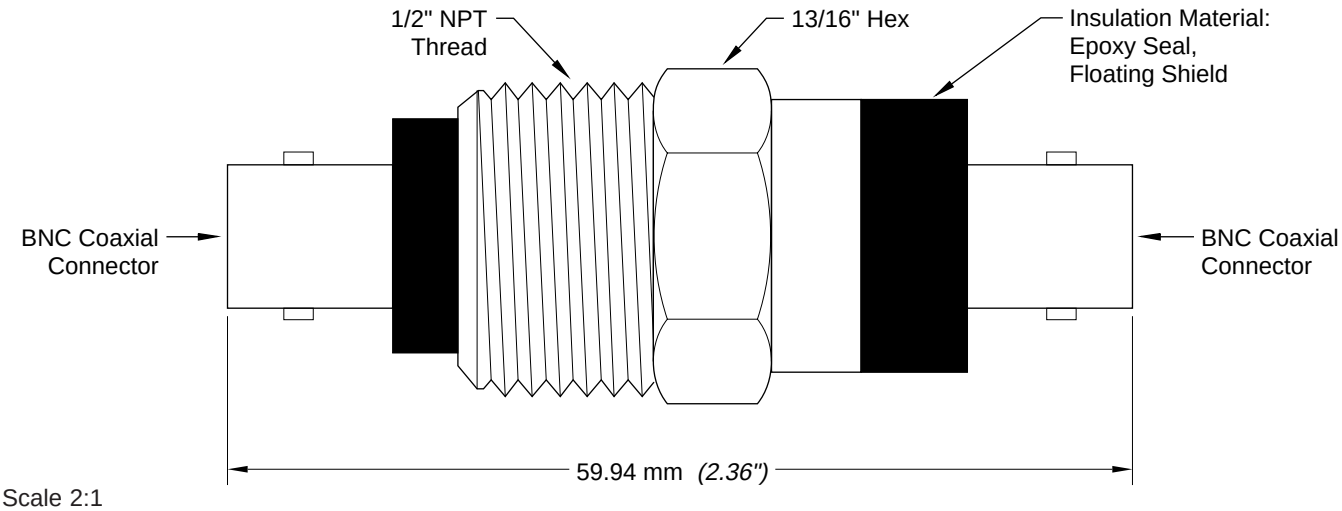
APPLICATIONS

- Sealed electrical signal interface between inside components and outside hardware for hermetic environment machines:
  - turbo-generators
  - synchronous condensers, and
  - any sealed machines
- Connects to AGMS and SBV transmission cables (coaxial, triaxial)

FEATURES

- Leak-tight seal for a wide range of pressures and temperatures
  - Tested up to 120 psi on thread side
  - Temperature range: 0° to 100°C *(32° to 212°F)*
- BNC coaxial (bayonet coupling) connectors at both ends isolated to the NPT fitting by an epoxy floating shield
- Brass housing, epoxy floating shield
  1/2" NPT thread coupling, 13/16" Hex nipple size

DIMENSIONS



Scale 2:1

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HERMETICALLY SEALED FEEDTHROUGH GENERAL SPECIFICATIONS

Connection

- Type: BNC coaxial, bayonet coupling

Environment

- Temperature Range: 0° to 100°C *(-32° to 212°F)*
- Seal Leak Test: Up to 120 psi

Physical Characteristics

- Housing Construction: Brass, Epoxy seal, Floating shield
- Pipe Thread
  - Type: 1/2” NPT thread size
  - Instruction: Tighten 2 full turns past finger tight, Seal thread with Teflon tape or other sealant

Dimensions

• Length	59.94 mm	*(2.36 in.)*
• Hex Width	20.637 mm	*(0.812 in.)*

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Published: 99.07.22 **Revised:**

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VIBROSYST M

AGM-P21

SIGNAL CONDITIONING MODULE FOR FOA-100 OPTICAL ACCELEROMETER

DESCRIPTION

The AGM-P21 Input Module is a single input signal conditioner designed to accept the bias voltage output from an FOA-100 Optical Accelerometer. It converts the signal of the FOA-100 to an RMS displacement signal by performing a double integration and an RMS calculation.

The AGM-P21 plugs into a socket on the AGM-P backplane of the ZOOM Extension Unit. It features two analog outputs: the 0–10 V output is used for internal A/D conversion while the auxiliary 4–20 mA output is available from the output screw terminals for other uses.

The module provides input signal protection, amplification, low and high pass filtering. Accuracy is ±1% with low drift of 0.05%/°C. The isolated module provides ±1500 V_{RMS} of isolation (CMV).

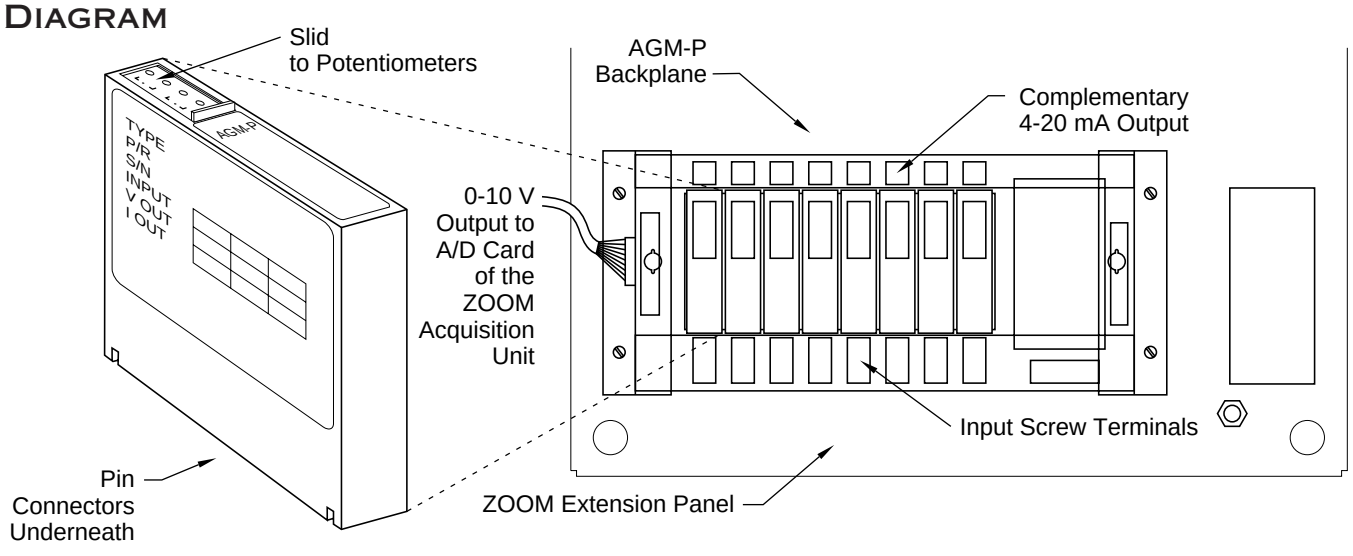
APPLICATIONS

- Interfaces the FOA-100 output signal with the ZOOM® System
- One module per input

FEATURES

- Single input: Bias voltage 6 V_{DC}, ±4 V_{AC} (100 mV/g)
- Output sensitivity:
  - 0–10 V 10 $mV/\mu m_{P-P}$
  - 4–20 mA 16 $\mu A/\mu m_{P-P}$
- System OK on 4-20mA output (0mA if not OK)
- High pass filter: 20 Hz (2nd order)
  Low pass filter: 360 Hz (4th order)
- High accuracy: ±1%
- Low drift: 0.05%/°C

DIAGRAM



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AGM-P21 INPUT MODULE GENERAL SPECIFICATIONS

Typical @ +25°C *(77°F)*

Input

• Signal	Bias voltage +6VDC, ±4VAC (100mV/g)
• Input Resistance	300kΩ

Operation

• Output	0–10V for A/D conversion 4–20mA @ RL = 0–850Ω [4] System OK on 4–20mA [1]
• Accuracy [2]	±1% of reading
• Bandwidth	20–360Hz [-3 dB]
• Transfer functions	
- 0-10 V to ZOOM	Displ.(μm_{P-P}) = VOUT x 100
- Compl. 4-20 mA	Displ.(μm_{P-P}) = (IOUT - 4) x 62.5
• Temperature Drift	0.05%/°C
• Output Resistance	4.99kΩ on 0–10V
• Common Mode Voltage [3] Input to Output	±1500VRMS max.
• Voltage Output Protection	Continuous short to ground

Supply

• Power Supply	±15VDC, ±7% (±23mA max.) 12–30VDC (25 mA)
• Consumption	1W

Environmental

• Temperature Range	
- Operating	0° to 55°C *(32° to 130°F)*
- Storage	-25° to 85°C *(-13° to 185°F)*
• Relative Humidity	Up to 95% non-condensing

Physical Characteristics

• Dimensions	80 x 19.7 x 86 mm *(3.150 x 0.775 x 3.395 in.)*

Notes

[1] When system is not OK, the output = 0mA.

[2] Accuracy specifications include the combined effects of repeatability, hysteresis and linearity. Does not include sensor or signal source error.

[3] To ensure isolation, the AGM-P21 module and its associated FOA-100 accelerometer must be powered by separate power supplies.

[4] with +24VDC supply

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Published: 98.08.24 **Revised:**

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VIBROSYST M

PCU-100

PROGRAMMABLE MONITOR FOR WINDING VIBRATION MONITORING

DESCRIPTION

The PCU-100 is a multi-channel, digital processing unit with on-line programmable capability for on-site system configuration.

The innovative modular design allows various mix and match possibilities of input, output and relay modules. It accepts up to 8 signals from FOA-100 accelerometers, LIN-240, -242 or -231 SBV Linearization Modules and matching sensors. Analog output modules inside the PCU-100 can perform various signal processes: peak, peak-peak, rms, gap.

The front-panel keypad and high visibility vacuum fluorescent display (VFD) permit the modification of all settings in minutes without disrupting on-line monitoring. Four BNC connectors and two PCMCIA expansion slots are accessible from the front panel.

APPLICATIONS

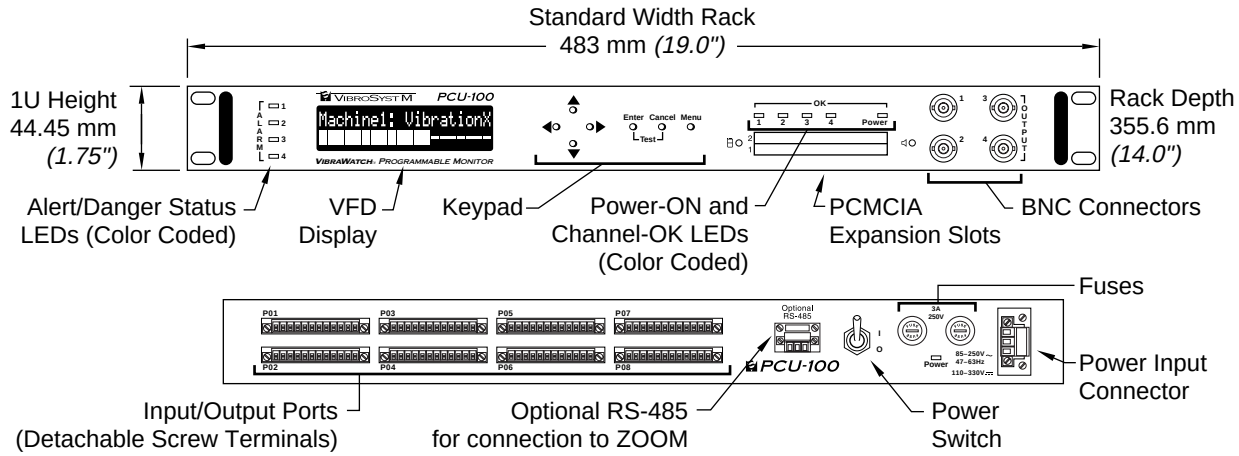
- On-line monitoring of end-winding and in-slot bar vibration on hydro and turbo generators
- Collect data for trend analysis of vibration levels and condition-based (predictive) maintenance

MAIN FEATURES

- Multi-tasking, multi-channel, modular design, digital processing instrumentation
- Fully on-line configurable
- Accepts up to 8 inputs from FOA or SBV measuring chains (FOA-100, DCS-400 + LIN-240, DCS-420 + LIN-242, SBV-3.14 + LIN-231)
- Alarm monitoring on single-channel or dual-channel input (voting logic)
- Choice of on-site selectable outputs: raw, processed (peak, pk-pk, rms, gap), alarm relays
- RS-485 and 4-20 mA outputs to ZOOM or third-party instrumentation
- Bar graph displays for visual vibration interpretation
- Digital inputs and outputs for remote control
- Rear-panel I/O ports with detachable screw terminals

OVERVIEW

Front Panel



Rear Panel

DESIGN

The PCU-100 is built with a space saving design. The front-panel hosts a vacuum fluorescent display (VFD), a keypad, status LEDs, BNC connectors and PCMCIA expansion slots. The back-panel features I/O ports with detachable screw terminals, fuseholders, power input connector and switch.

The unit features 8 internal expansion slots for task modules which provide configuration flexibility for various usages. The universal power supply makes the PCU-100 readily compatible with virtually all AC and DC power inputs.

PROGRAMMING

The PCU-100 is fully on-line configurable using the front-panel keypad and display to change any setting in minutes without disrupting the monitoring operation. Settings can be backed-up on a PCMCIA flash memory card. The setting menus are password protected to prevent unauthorized access.

Menus are used to enter information, select among preset features, and enable/disable various parameters.

The user can choose to enable or disable modules, channels, inputs, outputs, or relays, and to enter different values such as low and high limits, hysterisis, filters, time constants and delays. He can also select amongst types of signal processing (peak, pk-pk, rms, average, AC, DC, AC+DC, maximum value), active relay level (energized/deenergized), channels to be displayed on bar graphs and system units.

Two sets of Alert and Danger thresholds are supported and can be switched remotely for alarm monitoring of specific transitory operating conditions.

DISPLAY

The VFD screen is used for bar graph display and unit configuration.

In monitoring mode, the screen displays the vibration of one channel at a time in sequence. The lower line displays the vibration bar graph with indicators for peak, alert and danger levels. The upper line shows information such as machine or channel ID and status, numerical vibration value, percentage of full scale, Alert and Danger thresholds.

The Right and Left arrow buttons enable to select and change the channel to be displayed as a bar graph. The Up and Down arrow buttons are used to select the type of information to be showed on the upper line.

TASK MODULES

The universal design of the **Vibration Input Module** readily accepts two probe input channels with complementary high-speed raw outputs (-20 to +10 V) and supplies two virtual inner channels to the unit for processing

The **Analog Output Module** supports up to four virtual inner channels and directly provides RS-485, 4 to 20 mA or 0 to 10 V processed outputs to the ZOOM® system or to third-party instrumentation. It performs the signal processing for either direct output or virtual inner channel for alarm monitoring. Each module can process several signals: peak, pk-pk, rms, average, raw (with passband filtering), AC+DC, AC, DC, maximum value, or none.

Two types of protection relay modules are available:

- **Internal Relay Module** features three DPST relays used for Alert, Danger or System-OK outputs.
- **External 9-Relays & Driver Module** activates up to 9 DPDT relays mounted external to the PCU-100 unit. Each relay can be readily used for Alert, Danger or System-OK outputs.

The **Digital I/O Module** is used for digital inputs and outputs. Digital inputs are used for remote switching controls such as Rack Inhibit, Alarm Reset, Danger Bypass, Power-up Inhibit, and Alarm Threshold select. Digital outputs are used to transmit unit status information such as Power-ON, Power Failure, and Rack Bypass while alarm is inhibited.

TASK MODULES
MAIN SPECIFICATIONS

Vibration Input Module

- Input
  - Number (up to): 2-channel
  - Signal: 4 to 20 mA, from SBV linearization modules and matching sensors (LIN-240+DCS-400, LIN-242+DCS-420, LIN-231+SBV-3.14)
    Bias voltage from FOA-100
- Signal Processing (DSP): Analog-to-Digital and Digital-to-Analog
- Output (from DSP)
  - Number (up to): 2 internal channels (virtual), 2 external channels (signal)
  - Signals
    - Internal: Digital
    - External: Analog, high-speed raw, -20 to +10 V
- Probe Supply
  - Voltage: +24 VDC to LIN Module
  - To FOA-100: Extrenal power supply panel required

Analog Output Module

- Signal Processing
  - Number (up to): 4-channel processing
  - Types Available: peak, peak-peak, rms, average AC+DC, AC, DC, maximum value, raw (with passband filtering), none
- Output
  - Number (up to): 4 channels
  - Ranges: 4 to 20 mA and 0 to 10 V

Internal Relay Module

- Number of contacts: 3 relays
- Type: DPDT contacts
- UL/CSA Rating: 0.6 A @ 110 VDC, 0.6 A @ 125 VAC (50/60 Hz)

External Relays & Driver Module

- Number: 9 external relays and drivers
- Type: To drive external DPDT contacts
- UL/CSA Rating: 0.6 A @ 110 VDC, 0.6 A @ 125 VAC (50/60 Hz)

Digital I/O Module

- Input Number: 4 channels
  Rack Inhibit, Alarm Reset, Danger Bypass, Power-Up Inhibit
- Input Type: TTL level detection
- Output Number: 3 channels
  Power-ON, Power-Low, Rack Bypass
- Output Type: Normally opened NPN transistors

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PCU-100 FOR SBV™
GENERAL SPECIFICATION

Operating

• Inputs	FOA-100 Measuring Chains SBV Measuring Chains DCS-400 + LIN-240, DCS-420 + LIN-242, or SBV-3.14 + LIN-231
• Digital Inputs	Rack Inhibit, Alarm Reset, Danger Bypass, Power-Up Inhibit, Alarm Threshold Select
• Analog Outputs	High-speed raw (linearized), peak, peak-peak, rms, average AC+DC, AC value, DC value, maximum value, raw, none
• Digital Outputs	Power-ON, Power-Low, Rack Bypass
• Processing Rate	4065 samples/sec. per input channel
• Display	2x20 characters Vacuum Fluorescent Display

Power Supply

• Voltage Input	Universal, 85 to 265 VAC (47 to 63 Hz) or 110 to 330 VDC
• Consumption	20 W max.
• Fuse	Two 3AG (250V, 0.75A slow-blow)
• Connector	1 removable mini connector (screw terminal)

Connection

• External I/O Ports on Rear-panel	8 removable mini connectors (screw terminals) 1 removable mini connector (screw terminal) for optional RS-485 communication with AGMS or ZOOM systems
• Auxiliary Outputs on Front-panel	Four BNC type Two PCMCIA slots

Environmental

• Temperature Drift	±500 ppm/°C
• Temperature Range	
- Operating	0° to 50°C *(32° to 122°F)*
- Storage	-40° to 80°C *(-40° to 176°F)*
• Humidity	Up to 95%, noncondensing

Physical Characteristics

• Casing	Closed anodised aluminum shell with two handles
• Width	483 mm (*19 in.)*
• Heigth	1 U 44.5 mm (*1.75 in.)*
• Depth	355.5 mm (*14 in.)*
• Weight	

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† Patented measuring technology

Published: 98.03.05 **Revised:** 03.01.29

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VIBROSYST M

XPSP

EXTERNAL POWER SUPPLY PANEL FOR PES-100 AND SPES-100 PROBE SERIES, AND FOA-100 ACCELEROMETERS

APPLICATIONS

- +24 VDC power supply to PES-100 and SPES-100 Probe series and FOA-100 accelerometers when interfaced with PCU-100 Programmable monitor.

DESCRIPTION

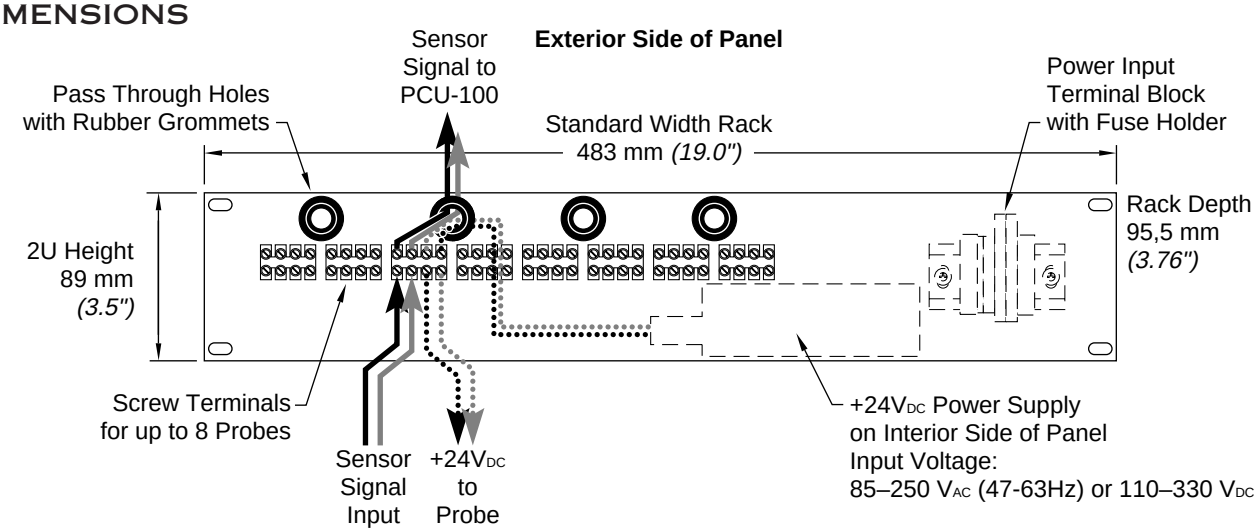
The XPSP External Power Supply Panel is designed to provides +24 VDC power for up to 8 measuring chains of PES-100 and SPES-100 series probes or FOA-100 optical accelerometers when used with the PCU-100 Programmable Monitor. The maximum load of all measuring chains combined is 1 Amp.

The panel mounts at the back of a rack near its realted PCU-100 unit. Screw terminals interface between the field wiring of the measuring chain, the signal link to the PCU-100, and the universal power supply of the panel. The main power input terminal block is fuse protected.

FEATURES

- Provides +24 VDC power supply for up to 8 measuring chains
- Independant screw terminals per measuring chain
- Maximum load: 1 Amp total
- Universal power supply input: 85–250VAC (47–63 Hz) or 110–330 VDC
- Input terminal block with fuse protection
- 2U high (89 mm / *3.5 in.*) panel, standard width rack (483 mm / *19 in.*)

DIMENSIONS



VIBROSYSTM

XPSP
General Specification

Operating

• Matching Devices	PES-100 series Proximity Probes SPES-100 series Underwater Proximity Probes, FOA-100 Optical Accelerometers
• Number	Up to 8 measuring chains

Power Supply

• Input	Universal, 85–250 VAC, 47–63 Hz 110–330 VDC
• Output	+24 VDC
• Max. Load	1 Amp

Connection

• Measuring Chains	Screw terminals
• Power Input	Fuse protected terminal blocks

Environmental

• Temperature Range	
- Operating	0° to 50°C *(32° to 122°F)*
- Storage	-40° to 80°C *(-40° to 176°F)*

Physical Characteristics

• Width	483 mm *(19 in.)*
• Height	2U 89 mm *(3.5 in.)*
• Depth	95.5 mm *(3.76 in.)*

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Published: 02.03.14 **Revised:**

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