VIBROSYSTM MD/®

ISO 9001

PDA-200™ PARTIAL DISCHARGE ANALYZER UNIT

User's Manual

Safety Information

The following manual contains information and warnings. They must be followed in order to keep the instrument in a working condition and ensure safe operation.

Safety and Electrical Symbols

	**Warning - Danger -** Identifies conditions or practices that could cause physical harm or damage the equipment
	**Caution** - Identifies conditions or practices that could result in permanent loss of data.
	**Important Information -** Must be read and followed
	Electronics common - not linked to earth ground
	Shield connection location

Safety Precautions

Warning - Danger **Caution**

- **Although most instruments and accessories are normally used at non-hazardous voltage levels, hazardous conditions may be present in some situations;**
- **This product is intended to be used by qualified operators and maintenance personnel who recognize shock hazards and are familiar with the safety precautions required to avoid possible injury. Carefully read and follow all installation, operation, and maintenance information before using this product;**
- **Install and use this instrument only as specified in this manual or the protection provided by this instrument might be impaired;**
- **Do not use this instrument in wet environments;**
- **When in doubt that safety protection has been impaired, make this instrument inoperative and secure it against any unintended operation;**
- **Have this instrument serviced by qualified service personnel only;**
- **Never remove the cover or open the case without first turning off the main power source;**
- **Never operate this instrument with the cover removed or the case open;**
- **Use caution when working with voltages above 30 VAC RMS or 42 VDC. These voltage levels can cause shock hazards;**
- **Do not operate this instrument around explosive gas, vapor, or dust.**

VibroSystM Inc. 2727 Jacques-Cartier E. Blvd, Longueuil, QC, Canada J4N 1L7 | Phone: 450 646-2157 | U.S. Toll-free Line: 800 663-8379
Email: techsupp@vibrosystm.com | www.vibrosystm.com

TABLE OF CONTENTS

1. GENERAL DESCRIPTION

1.1 Description

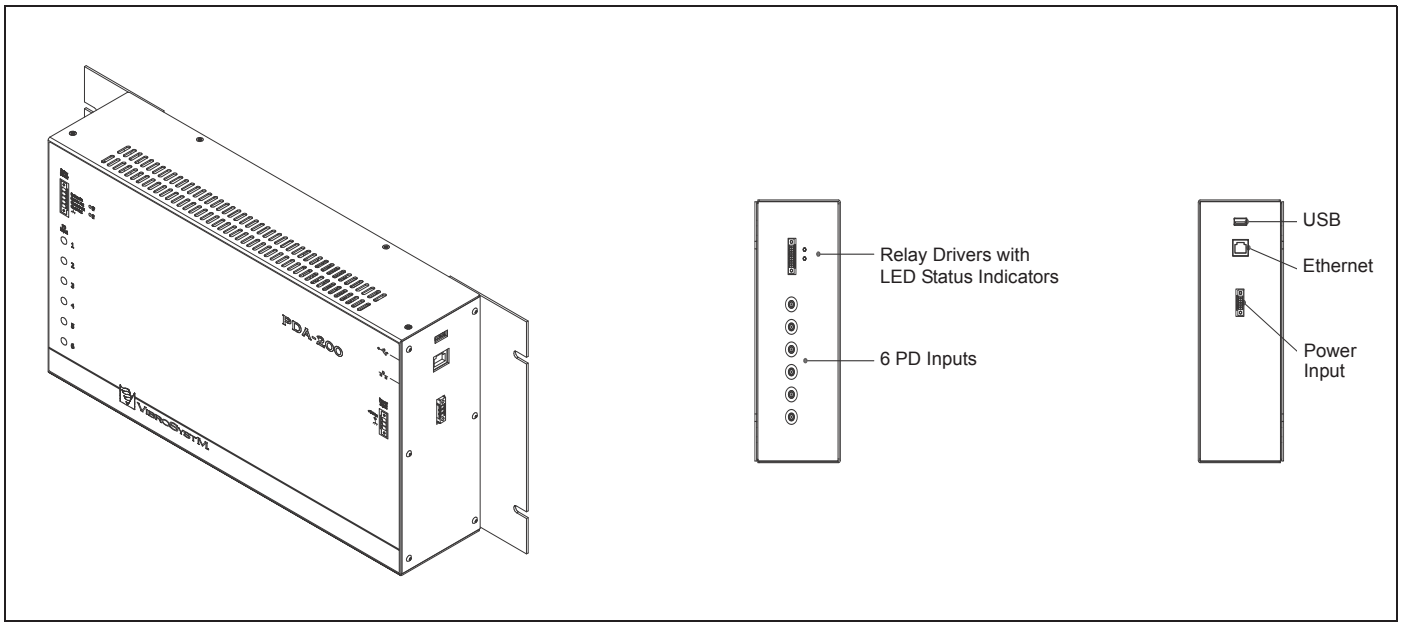
The PDA-200 is a high speed, multi-channel data acquisition unit used for analyzing very high frequency signals from continuous partial discharge measurements. The unit receives the signals from 6 epoxy mica couplers.

When combined with the ZOOM® software suite, the entire system is designed to monitor rotating machines and take measurements at specified intervals or upon defined events. Measurement results can be displayed in real time or on demand for analysis purposes. The ZOOM PDA200 is an optional firmware package that can be added to the ZOOM Platform software to allow partial discharge measurement.

1.2 Main Unit Interventions

- Couplers must be installed on high voltage output circuits at appropriate locations;
- The PDA-200's protection box must be installed within 10m of couplers;
- Coaxial cables must be routed and protected from the couplers to the protection box;
- The Ethernet cable must be routed and protected from the protection box to the VSM Server;
- A main AC power cable is required for a protection box equipped with a VibroSystM power panel.

1.3 Overview of the PDA-200's Main Components



2. INSTALLATION OVERVIEW

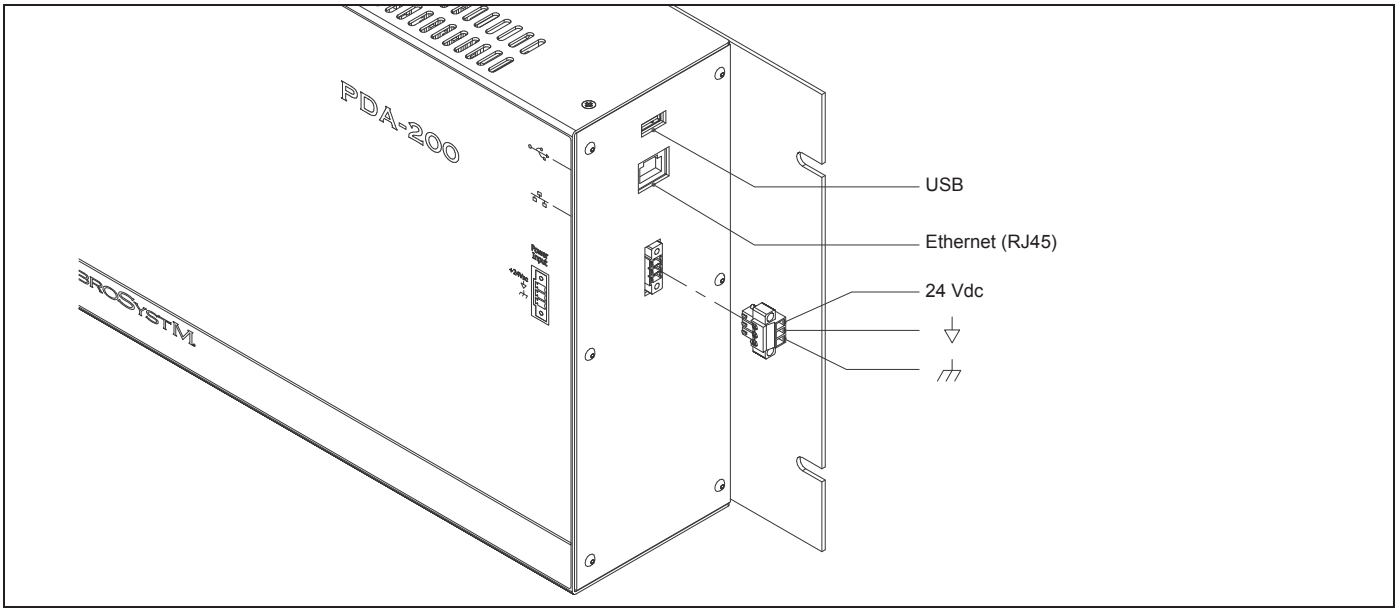
Although it is normally delivered pre-cabled in a 19" rack and part of a complete system, the PDA-200 acquisition unit can also be ordered separately as an addition to an existing installation.

2.1 Preliminary Considerations Before Installing the PDA-200 in a Rack or Enclosure

The following guidelines will help you plan your equipment rack configuration:

- Allow sufficient clearance around the rack or enclosure for maintenance;
- Make sure the internal temperature inside the enclosure does not exceed 60°C *[140°F]*;
- Cables must be kept away from an electrical noise source, power lines and fluorescent lighting fixtures;
- Keep signal cables separated from power cables;
- The unit must be kept away from electrically conductive dust, water or moisture;
- The PDA-200's design conforms to the requirements of various 19-inch rack standards.
- Do not install on a structure which is subjected to vibrations. If vibrations cannot be avoided, anti-vibration mounts are mandatory.

2.2 Cabling the PDA-200



2.2.1 Power Input

Mechanical characteristics

Panel header with threaded flange	Phoenix Contact MCV 1.5/3-GF-3.81 (male)
Mating plug with screw flange	Phoenix Contact MC 1.5/3-STF-3.81 (female)
Recommended wire size	1.5 - 0.5 mm^2 *[16 - 20 AWG]*

Electrical characteristics

Input voltage range	24 V_{DC} ± 15%
Power consumption	35 W

⚠ Caution

- The grounding terminal is essential to provide better efficiency against ESD and EMI perturbations;
- To ensure protection, the chassis grounding wire must be of a heavier or equal gauge than the grounding wire associated with the AC input.

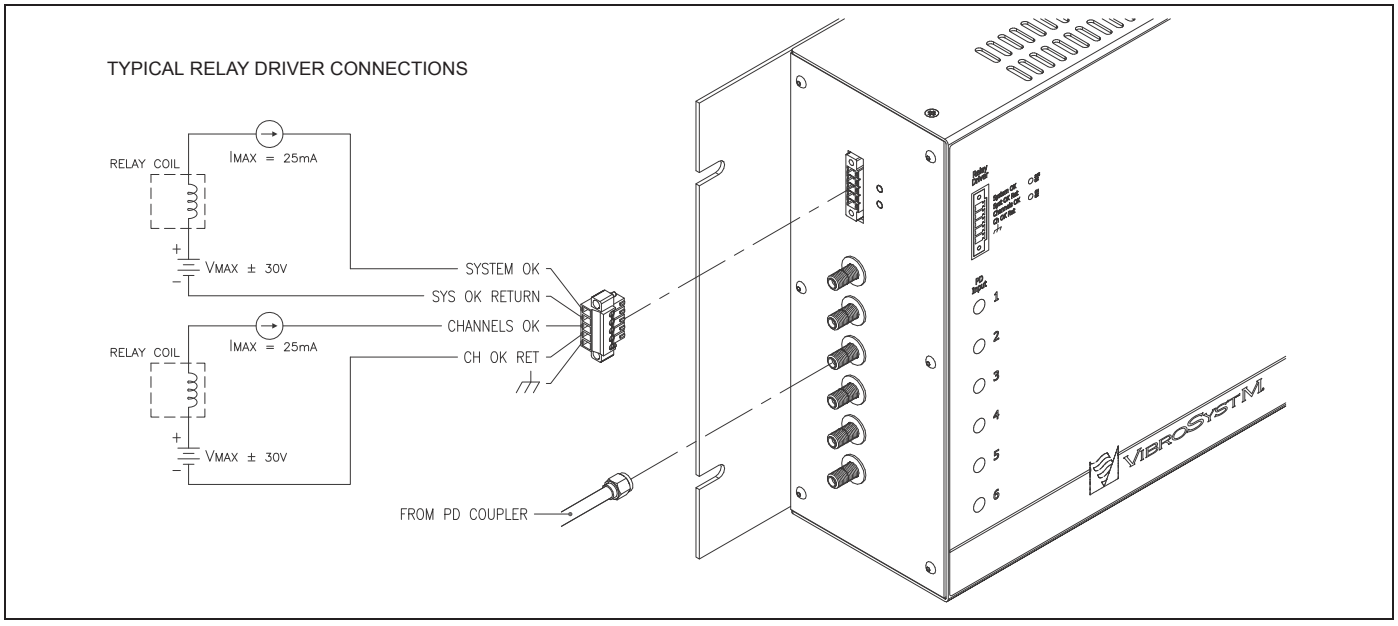
2.2.2 Ethernet Port

Mechanical characteristics

Receptacle	RJ-45
Cable type	CAT6-E

Electrical characteristics

Protocol	TCP/IP
Communication speed	100/1000 Base-T



2.2.3 Relay drivers

Mechanical characteristics

Vertical header with threaded flange	Phoenix Contact MCV 1.5/5-GF-3.81 (male)
Mating plug with screw flange	Phoenix Contact MC 1.5/5-STF-3.81 (female)
Recommended wire size	0.5 - 0.35 mm^2 *[20-22 AWG]*

Electrical characteristics

Input Voltage	≤ ±30 V
Input Current	≤ 25 mA
System OK	Driver is closed when the system is operating properly. Driver is opened when a malfunction occurs.
Channels OK	Driver is opened when all channels are functional. Driver is closed when at least one channel is found defective.

2.2.4 PD Inputs (Channels 1 to 6)

Mechanical characteristics

Receptacle	SMA connector (female)

Electrical characteristics

Voltage input range	± 10 V
Bandwidth	150 kHz to 270 MHz
Input impedance	10 kΩ typical

Recommended coupler type

Epoxy mica	80 pF

3. USING THE PDA-200

3.1 LED Indicators

Upon each startup, LED indicators light up in the following colors:

- SYSTEM OK **Yellow**
- CHANNELS OK **Yellow**

After the startup sequence, the LED indicators change color as follow:

- SYSTEM OK
  Turns **Green** when the system is powered up and operating properly.
  Turns **Orange** when a system component malfunction occurs, such as a firmware malfunction or a network connection error.
  Flashes **Yellow** when files are copied from a USB key, and turns **Yellow** once the operation is completed.
- CHANNELS OK
  Turns **Green** after firmware has completed booting and all measuring chains are confirmed as functional. Remains **Green** as long as all measuring chains are functional.
  Turns **Orange** when at least one measuring chain looses the carrying signal.

3.2 USB Port

The USB port allows connection of a portable storage device to update a firmware. Refer to the ZOOM Installation Guide for details on the update procedure.

Important Information

- U3 USB smart drives are not compatible with the PDA-200's operating system;
- Apart from this restriction, any portable USB flash drive formatted to FAT32 may be used.

3.3 Maintenance

3.3.1 Cleaning

Clean the exterior of the PDA-200 only. Do not apply cleaner directly on the unit or allow liquids to spill or enter the unit.

4. GENERAL SPECIFICATIONS

PD Inputs

• Number of Inputs	6
• Input Impedance	10 kΩ
• Recommended Coupler Type	Epoxy Mica 80 pF

Acquisition Specifications

• Line Frequency	50 to 60 Hz
• Voltage Range	±2.5 mV to ±10 V Max ± 200 V (Spike < 200 µsec)
• Dynamic Range	70 dB
• Frequency Range	
Band 1	150 kHz to 1.04 MHz
Band 2	1.04 MHz to 3.15 MHz
Band 3	3.15 MHz to 7.38 MHz
Band 4	7.38 MHz to 16.83 MHz
Band 5	16.83 MHz to 33.16 MHz
Band 6	33.16 MHz to 66.83 MHz
Band 7	66.83 MHz to 133.2 MHz
Band 8	133.2 MHz to 266.8 MHz
Overall	150 kHz to 266.8 MHz

Measurement Types with ZOOM

• Partial Discharge Detection	Scatter Plots and Trending
• Fault Matching Diagnostic	Pattern Categorization
• EMI Detection	Continuous

Status Indicators and Outputs

• SYSTEM OK	
Indicator	Green/Orange LED
Relay Driver	Bipolar FET* (±30 V max. / 25 mA max.)
• CHANNEL OK	
Indicator	Green/Orange LED
Relay Driver	Bipolar FET* (±30 V max. / 25 mA max.)

Communication

• Ethernet	
Protocol	TCP/IP
Speed	100/1000 Base-T

Power Requirements

• Voltage	24 Vdc ±15%
• Consumption	35 W

Connection

• Power Input	3-Pos. Removable Terminal Block
• Ethernet	RJ-45
• PD Inputs	SMA Connector (Female)
• USB Port	Type A, Female
• Relay Drivers	5-Pos. Removable Terminal Block

Environment

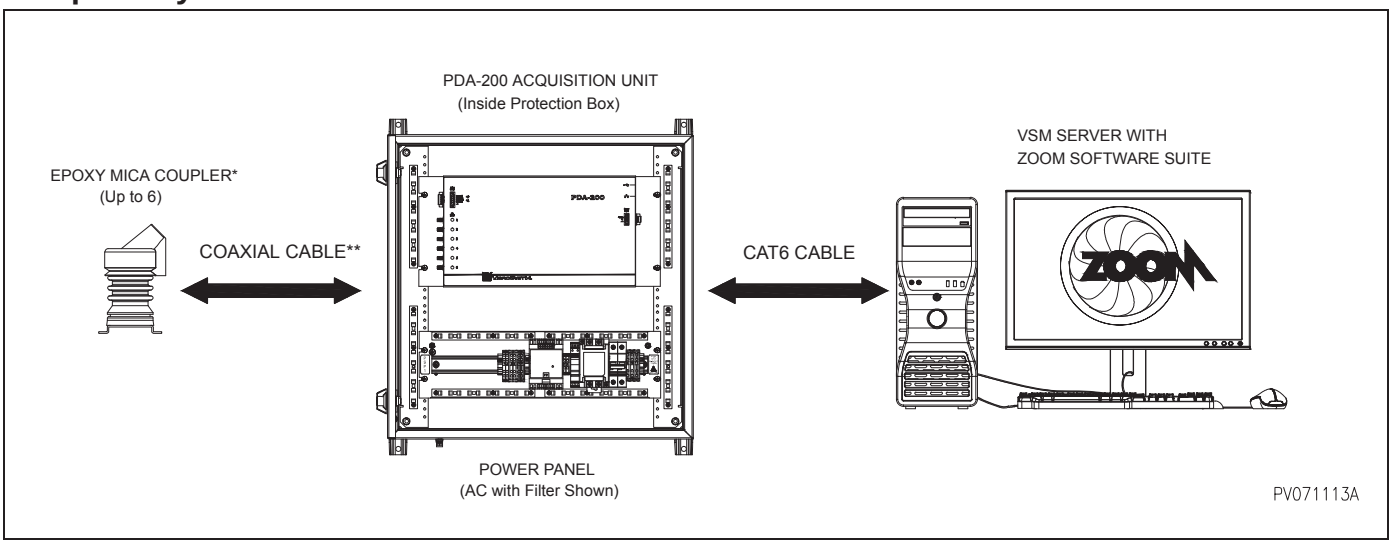
• Temperature Range	
Operation	0 to 60°C *[32 to 140°F]*
Storage	-20 to 80°C *[-4 to 176°F]*
• Humidity	Up to 95%, Non-Condensing
• Protection Rating	IP20

Physical Characteristics

• Casing	5U High, 19“ Rack-Mount, NEMA 1
Material	Steel, Zinc-plated

**FET: Field Effect Transistor*

Complete System Overview



*Coupler positioning is in accordance with commonly accepted installation practices.
**For maximum system performance, the protection box must be installed within 10 m *[33 ft]* of the couplers.

Optional Power Panels

- AC with filter to 24 Vdc, 4 A (100-240 Vac, 50-60 Hz);
- Universal to 24 Vdc, 4A (100-240 Vac, 50-60 Hz, 105-250 Vdc).

Dimensions