



ZPU™-5000 ZOOM® PROCESSING UNIT

Mul ti-channel Processing Instrumentation
& Monitoring/Protection Unit

APPLICATION

Complete on-line monitoring, real time analysis, protection, alarm management and trending of large rotating machines such as:

- Turbogenerators
- Hydrogenerators
- Large electric motors.

DESCRIPTION

The ZOOM® Processing Unit (ZPU™) simultaneously monitors multiple parameters on large rotating machines. It performs various types of measurements in automatic and test modes, processes data, checks alarm conditions and transmits data to the ZOOM® Controller for a quick and efficient data interpretation of machine condition through the ZOOM® software.

The ZPU™-5000 can synchronize acquisition of all parameters with the passing of each rotor pole for salient pole machines or use an external acquisition trigger for non salient pole machines. It tracks up to 16 high speed inputs (a mix of pressure, displacement, vibration, etc.) from standstill to over-speed conditions of the machine under study. Interconnecting additional ZPU™s extends monitoring range and capabilities.

The ZPU™-5000 is rack-mountable and uses a high speed TCP/IP communication with the ZOOM® software located in the system computer in the control room. A communication plug-in is available for easy interface with the Plant Supervisory Control System (SCADA).

MAIN FEATURES

- Up to 16 high speed inputs
Accepts: 4-20mA, 0-5V, 0-10V, +/- 5V, 0/-20V
Also compatible with ICP transmission mode
- Up to 64 analog outputs
 - 32 raw outputs (two per analog input) Voltage and current
 - 32 trending outputs (two per analog input) Voltage and current
 - Note: Trending outputs can also be used for outputting combined values (Smax, ØSmax, X₁-X₂)
- Continuous and independent alarm monitoring of all inputs with four configurable alarm thresholds per input (drivers for external relays included).

In addition:

- System OK (driver for external relay)
- Channels OK (driver for external relay)
- Performs synchronized measurements of connected parameters from standstill to runaway speed in automatic and test modes (*Signature, Pole, Sampling, Trending and Alarm measurements*)
- Vacuum Florescent Display (VFD) for visual interpretation
- 3U Height 19 inches Rack-mount enclosure
- Two communication ports used for easy connection to VibroSystM ThermaWatch® Stator, BTV™ and Modbus products.
- 1 Ethernet port 10/100 Base T
- 2 USB ports



ZPU™-5000 PROCESSING UNIT GENERAL SPECIFICATIONS

The design of the ZPU™-5000 acquisition unit relies on a highly integrated and industry proven processor board combined with plug-in modules. For optimal flexibility and performance, the main acquisition functions of the ZPU™-5000 are thus taken in charge by dedicated modules:

- control (one module per acquisition unit)
- communication (one module per acquisition unit)
- analog inputs/outputs (up to 8 dual-channel modules per acquisition unit)

CONTROL MODULE

This plug-in module supervises control and synchronization signals for ZPU™-5000. Related inputs and outputs include:

- two inputs for synchronization 1/rev. signal on pump storage machines
- one output for treated synchronization 1/rev. signal
- one input for a pulse generator signal (needed for reference when taking signature and pole measurements on machines with non-salient pole rotor, or systems where air gap sensors are not required)
- one input for an acquisition trigger signal (used for trigger acquisition with an external signal)
- one input for an alarm inhibition (used for turning off surveillance and relay actuation)
- one input for a rotation direction signal (pumped-storage applications)
- one output for driving the "System OK" relay
- one output for driving the "Channels OK" relay

COMMUNICATION MODULE

This module enables communications with various instruments:

- One (1) Ethernet 100 Mbps port for communication with ZOOM® Controller
- Two (2) RS-422/RS-485 serial ports for communication with digital measuring chains BTV™-100 and TWS™-100, Modbus RTU, ZOOMLook™ (STATE-100)
- Two (2) USB ports for connection of a portable storage device to copy the configuration or update the firmware

ANALOG I/O MODULES

Analog I/O modules receive and process signals from various sensors and conditioners. Each dual-channel module can receive current or voltage signals from two different sources, to which a digital process is applied. Custom modules are also available for other types of signals.

Each channel also supports 4 analog outputs and 4 open-collector outputs for control of alarm relays.

ELECTRICAL CHARACTERISTICS

CONTROL MODULE

Inputs:

- Type Pull-up connected to 24 V
- Trigger level 3.8 V
- Hysteresis ±250 mV
- Pulse length 10 µsec. minimum

Outputs:

- Type NPN Open-Collector (35V max./50mA max.)

Note: a +24V (100mA) power supply output is available from this module, which may be used as a power source for the synchronization sensors (1/rev.).

COMMUNICATION MODULE

Ethernet port

- Protocol TCP/IP
- Speed Up to 100Mbps

RS-422/RS485 ports

- Electrical Specifications 4 wires full duplex or 2 wires half duplex
- Speed 115200 bps

USB ports (1.1, 2.0 compatible)

- Connection Type A, female

ANALOG I/O MODULES

Types available

- 0 /10V input 0 to +10 Volts (DC @ 1 KHz)
- 0 /5V input 0 to +5 Volts (DC @ 1 KHz)
- +/-5V input -5 to +5 Volts (DC @ 1 KHz)
- 0 /-20V input 0 to -20 Volts (DC @ 1 KHz)
- 4/20mA input 4 to 20 mA (DC @ 1 KHz)
- ICP® transmission mode *Different modules are available for accelerometers and velocimeters using ICP*

Processing

- DSP 150 MIPS
- A/D resolution 16 bits
- Sampling rate 8000 samples/sec (per channel)

Relay driver outputs (4 per channel)

- LO "alert" NPN open-collector (35Vmax./50mA max.)
- HI "alert" NPN open-collector (35Vmax./50mA max.)
- LOLO "danger" NPN open-collector (35Vmax./50mA max.)
- HIHI "danger" NPN open-collector (35Vmax./50mA max.)

Analog outputs (4 per channel)

- Raw current output: 4 to 20 mA
- Raw voltage output: 0 to +10 V
- Trending voltage output: 0 to +10 V
- Trending current output: 4 to 20 mA

Available processes: (each channel is individually programmable)

- Raw output:

- Simple integration
- Double integration
- No processing

- Trending output:

- Air Gap Value
- Peak to peak value of raw output signal
- Peak value of raw output signal
- RMS value of raw output signal
- Minimum value of raw output signal
- Maximum value of raw output signal
- No processing of raw output signal
- Vectorial value (S) from raw values (X-Y) received from two channels of the same module
- Maximum vectorial value (Smax) from raw values (X-Y) received from two channels of the same module
- Angle value (\emptyset) of S vector

PROCESSOR BOARD

- Type EBX, 800MHz
- Memory buffer capacity 50000 samples (per channel)

POWER SUPPLY

- Input Voltage 100-240 VAC, 105-330 Vdc
- Input Frequency 50-60 Hz
- Power Consumption 65 W
- Fuse Two 250 V / 3.15 A slow-blow one on Line, one on Neutral

ENVIRONMENTAL

- Temperature Range
 - Operation 0°C to 50°C (32°F to 120°F)
 - Storage -40°C to 80°C (-40°F to 175°F)
- Humidity 95% non-condensing max.
- Max. Altitude 2000 m

PHYSICAL CHARACTERISTICS (OVERALL)

- Casing 3U high 19" rack-mount
NEMA1 / IP20
- Height 13.34 cm (5.25 in.)
- Width – Front 48.26 cm (19.00 in.)
- Width – Back 44.25 cm (17.42 in.)
- Depth 45.72 cm (18.00 in.)



View of ZPU-5000 plug-in modules.



Display panel showing real-time information

COMPLEMENTARY PRODUCTS

- STATE Extension Unit: monitors slow evolving parameters.
 - Accepts up to 16 inputs
- XPSP External Power Supply Panel: provides +24 Vdc power for measuring chains.
 - Accepts up to 16 measuring chains
 - Up to 4A
- BNC Extension Panel
 - Up to 16 signals and one 1/rev. signal.
- External Panel Relays
 - Includes 24 Vdc power supply to drive coils
 - Up to 34 relays can be installed

For more information about these components, ask for their individual data sheets.

VibroSystM reserves the right to change specifications to improve products without notification.

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ANNEXE 1

