edibon

Technical Teaching Equipment

NEW

GENERAL DESCRIPTION

The ERP-CBM Cybersecurity module has been designed by edibon to allow the student to understand how substations are protected against cyber attacks.

Power engineers demand the most reliable services for their control and protection systems. Settings cannot be disturbed, cables cannot be switched, and significant latency cannot be tolerated. Engineers must have full control of their critical systems and maintain full access to control their equipment 24 hours a day, 365 days a year. Cybersecurity must protect these assets and enable power engineers to accomplish their work efficiently.

The ERP-CBM secures all Ethernet communications between your private networks and interoperates with existing business IT and control systems over an Internet Protocol Security (IPsec) virtual private network (VPN). The ERP-CBM has been designed to protect power protection relays network from malicious traffic with an integrated firewall and strong access authentication control.

Protective meters, protective relays, programmable logic controllers (PLC), remote terminals unit (RTUs), and computers, are communicated through EIA-232, also known as RS-232 (standard for serial communication transmission of data).

The ERP-CBM allows the students to study how prevent unauthorized access, control, monitoring, and malicious attacks by authenticating and optionally encrypting all data along the communications path.

This module has been designed as complement of ERP-UB. Protection Relays Test Unit, AEL-MPSS. Modular Smart Grid Power Systems Simulators and APS12. Advanced Mechanical, Electrical and Smart Grid Power Systems.

In order to see these units, click in the following links:

• ERP-UB: http://www.edibon.com/en/files/equipment/AEL-5/catalog

• AEL-MPSS: http://www.edibon.com/en/files/equipment/AEL-MPSS/catalog

• APS12: http://www.edibon.com/en/files/equipment/APS12/catalog

The module includes:

Virtual Private Networks:

Maximum Throughput: 87 Mbps.

Maximum Concurrent Sessions: 16.

Protection Protocols: IPsec.

Key Exchange: IKEv1, IKEv2.

Authentication: Passphrase, X.509, OCSP.

Advanced Encryption Standard: AES.

Nonaccelerated Encryption Algorithms: 3DES, Blowfish.

Encryption Key Strength: 128-bit, 256-bit.

Routing Functions:

Static Routing.

Network Address Translation: Port Forwarding (DNAT).

Network Address Translation: Outbound NAT (SNAT).

Ethernet Protocols:

Address Resolution Protocol (ARP).

Dynamic Host Configuration Protocol (DHCP) Client.

Encapsulating Security Payload (ESP).

File Transfer Protocol (FTP).

Hypertext Transfer Protocol Secure (HTTPS).

Internet Control Message Protocol (ICMP).

Internet Key Exchange (IKEv1/v2).

Internet Protocol Security (IPsec) Protocol Suite.

Internet Secure Association and Key Management Protocol (ISAKMP).

Lightweight Directory Access Protocol (LDAP) Client.

Modbus TCP/IP.

Network Time Protocol (NTP) Client/Server.

Online Certificate Status Protocol (OCSP).

Remote Authentication Dial-In User Service (RADIUS).

Secure Shell (SSH) Client/Server.

Simple Network Management Protocol (SNMP).

Spanning Tree Protocol (STP).

Syslog.

Telnet.

Transmission Control Protocol (TCP).

Transport Layer Security (TLS).

User Datagram Protocol (UDP).

VLANS:

As many as 4 VLANs per network interface.

Security.

User-Based Accounts.

Maximum Local Accounts: 256.

Password Length: 8–128 characters.

Password Set: All printable ASCII characters.

Communications Ports:

Ethernet Ports.

Ports: 2 rear, 1 front.

Data Rate: 10 or 100 Mbps.

Front Connector: RJ45 Female.

Rear Connectors: RJ45 Female or LC Fiber (single-mode or multimode, 100 Mbps only).

Specifications

Fiber Optic:

 100BASE-FX Multimode Option (to 2 km).

 Maximum TX Power: −14 dBm.

 Minimum TX Power: −19 dBm.

 RX Sensitivity: −30 dBm.

 System Gain: 11 dB.

 Source: LED.

 Wavelength: 1300 nm.

 Connector Type: LC (IEC 61754-20). 100BASE-LX10 Single-Mode Option (to 15 km):

 Maximum TX Power: −8 dBm.

 Minimum TX Power: −15 dBm.

 RX Sensitivity: −25 dBm.

 System Gain: 10 dB.

 Source: Laser.

 Wavelength: 1300 nm.

 Connector Type: LC (IEC 61754-20).

Serial Ports:

 Type: EIA-232/EIA-422/EIA-485 (software selectable).

 Data Rate: 1200 to 115200 bps.

 Connectors: DB-9 Female (Ports 1–16), Isolated 8 pin (Port 17).

 Power: +5 Vdc power on Pin 1 (500 mA maximum cumulative for 16 ports).

USB Ports:

 1 Host Port: Type A (nonfunctional, for future use).

 1 Device Port: Type B (nonfunctional, for future use).

Power Supply:

 Rated Supply Voltage:

  125–250 Vdc.

  110–240 Vac, 50/60 Hz.

  48–125 Vdc.

  120 Vac, 50/60 Hz.

  24–48 Vdc.

 Input Voltage Range:

  85–300 Vdc or 85–264 Vac.

  38.4–137.5 Vdc or 88–132 Vac.

  18–60 Vdc polarity dependent.

Power Consumption:

 AC: <40 VA.

 DC: <30 Watts.

Input Voltage Interruptions.

 20 ms @ 24 Vdc.

 20 ms @ 48 Vdc.

 50 ms @ 125 Vac/Vdc.

 100 ms @ 250 Vac/Vdc.

 Cables and Accessories, for normal operation.

Manuals:

This unit is supplied with the following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.

EXERCISES AND PRACTICAL POSSIBILITIES

1.- Study of the Cybersecurity devices connection.

2.- Step by step Software installation.

3.- User accounts management.

4.- Study the cybersecurity Virtual Private Network (VPN).

5.- Study of Password management.

6.- Analysis and study of Firewall configuration.

7.- Getting results.

REQUIRED SERVICES

-Electrical supply: single-phase, 220 V/50 Hz. or 110 V/60 Hz.

DIMENSIONS & WEIGHT

ERP-CBM:

-Dimensions: 490 x 330 x 310 mm. approx.
(19.29 x 12.99 x 12.20 inches approx.).

-Weight: 10 Kg. approx.
(22 pounds approx.).

✱Specifications subject to change without previous notice, due to the convenience of improvements of the product.

REPRESENTATIVE: