



## **SECTION 26 09 13 – WEB-BASED POWER MONITORING COMMUNICATIONS SYSTEM**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. This section describes the metering, communications, and visualization requirements for a modular, scalable Web-based Power Monitoring Communications System. The goal of this system is to provide the user the ability to monitor and manage their power system without the installation of any software other than an internet browser. This system may require the user to store web links in their browser to each of the web enabled devices; however the intent of this approach is to significantly reduce installation, configuration and operational costs of the system.
  - 1. The PMCS shall comply with new construction installations utilizing web-based components to function independently or to co-exist with other Eaton Cutler-Hammer IMPACC system components or other Modbus RTU communicating devices in a heterogeneous environment.
  - 2. For compatibility purposes, all new web based power monitoring systems shall match the installation at Bradley West.
  
- B. This section includes the supply and installation of a complete Power Monitoring Communications System (PMCS) as described in this specification. The PMCS is defined to include, but not to be limited to, remote devices for metering, monitoring, control and protection, a network time server, all Ethernet communications gateways, intercommunication wiring, ancillary equipment, startup and training services, and ongoing technical support.
  
- C. All Tenant power feeders are to be metered by this system.

#### **1.2 SUBMITTALS – FOR REVIEW/APPROVAL**

- A. The following information shall be submitted to the Engineer:
  - 1. System description including an overview of the system provided with detailed description of system architecture. A customized system diagram showing location of computers, repeaters, gateways and assemblies/devices to be connected to the system, as well as types of wiring required (twisted pair, coax, fiber), and a general layout of wiring referencing the specific building/facility layout shall also be part of this description.
  - 2. Bill of material including a complete listing of all hardware, software, training, software configuration, and startup services.
  - 3. Hardware and software description shall be provided in detail for all communications hardware, software, including sensor devices and gathering data to be transmitted over the network, and master display unit. This description will include a list of all the communicating devices to be connected to the network.



4. Typical software screen displays shall be provided in printout form and/or on disk.

### **1.3 SUBMITTALS – FOR INFORMATION**

- A. The Contractor shall provide a submittal for information to include a detailed listing of customer required actions, with timetable, to insure trouble-free startup of the PMCS. This information shall include any equipment access requirement, office requirements and manpower requirements. This submittal shall include the projected system startup time-line, including training dates. In addition, a proposed detailed wiring specification in compliance with these plans and specifications shall be included. The communication wiring specification shall include proposed communication cable, including general cable ratings, communication characteristics, cable routing proposed, termination requirements, and splicing/connections proposed to be made.

### **1.4 SUBMITTALS – FOR CONSTRUCTION**

- A. In addition, the systems operation manual shall include the following information:
  1. A system description overview, descriptive bulletins and/or sales aids covering all components in the system.
  2. A maintenance section including all instruction leaflets and technical data necessary to set up, change setup parameters and maintain the communicating devices and sensors.
- B. A section on communication wiring which includes:
  1. Type of communication wire utilized.
  2. General cable ratings and communications characteristics.
  3. Cable routing diagram including terminations and splicing connections made.
- C. A detailed startup report, including a list of trained customer personnel shall be provided.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. **Cutler-Hammer.**
- B. **Square D.**
- C. **General Electric.**

### **2.2 GENERAL**

- A. The PMCS is defined to include, but not to be limited to, remote devices for metering, monitoring, control and protection, a network time server, all Ethernet communications gateways, intercommunication wiring, printer, ancillary equipment, startup and training services, and ongoing technical support.



## 2.3 WEB-ENABLED POWER MONITORING COMMUNICATION SYSTEM

- A. The web-enabled power monitoring communication system shall use Ethernet as the primary communication backbone between the equipment and the users or legacy systems.
- B. The web-enabled power monitoring communication system shall support multiple protocols over Ethernet to ensure the system can easily be integrated into existing systems. These protocols shall include:
  - 1. HTML web pages to display data to users using a browser.
  - 2. Modbus TCP/IP to support integration into third party systems.
  - 3. BacNet Web Services to support integration into third party systems.
  - 4. SNMP to support integration into Data Center management systems.
- C. The web enabled power monitoring communication system shall provide connectivity to the actual power system in one of two ways:
  - 1. Web enabled meters that measure the critical power system parameters as described herein.
  - 2. Web enabled gateways that communicate to power system devices over device specific communication links as described herein. Web enabled gateways will support the following device communication protocols:
    - a. Eaton's INCOM protocol.
    - b. ModBus RTU over RS-485.
    - c. Eaton's QC Port over RS-485.
  - 3. The web enabled gateway shall support devices as required.
  - 4. The devices connected to the Web enabled gateway shall communicate using the protocols described in Section 2.03 F2 over a local area network Interconnected with #18 gauge twisted pair shielded cable, 600 V Class Belden 9463 family, in properly sized conduit (when run outside of factory assembled equipment for the communication channel).
- D. The web enabled power monitoring communication system shall provide support for configuration of all web enabled meters and gateways directly via the web pages on the device. No additional software shall be required.
  - 1. To support the configuration of legacy devices on the device networks connected to the gateway, the gateway shall support a "pass thru mode" to allow the legacy configuration software to connect from any computer on the users network to the device via the gateway.
- E. All devices in the web enabled power monitoring communication system that are connected directly to Ethernet shall support the ability to synchronize their time clock using NTP. The purpose for this support is to ensure all device clocks are accurate so that event sequences can be adequately analyzed.
  - 1. For devices that support clock synchronization and are on the device networks



connected to the gateways, they shall support the ability to sync their clock to the clock in the gateway.

- F. A User Guide shall be provided with the web enabled equipment to describe the commissioning process for setting the equipment's Ethernet address, and ensuring trouble-free data access from any computer on the network, using a standard Internet browser.
- G. In all web enable devices, a common user interface shall be implemented across all types of power equipment, from Medium-Voltage Switchgear to Low-Voltage Switchgear, Switchboards, Motor Control Centers (MCCs), Power Distribution Units (PDUs) and Uninterruptible Power Supplies (UPSs). The purpose of this is to reduce end user training time and improve system usability.

## **2.4 ETHERNET SWITCHES**

- A. A single web access point: 4 or 6 port Ethernet switch shall be provided in the equipment to allow a single access point for the user and the ability to connect more than one network device directly on the customer's Ethernet Local Area Network (LAN).
- B. Ethernet switch shall support standard copper RJ45 connectors and/or 100BaseFX Fiber-Optic via ST connectors.
- C. All switches are subject to the approval of the LAWA IMTG.

## **PART 3 - EXECUTION**

### **3.1 WARRANTY**

- A. The manufacturer shall warrant the equipment supplied hereunder. The warranty shall include:
  - 1. Two (2) year free telephone technical support.
  - 2. Warranty on all hardware supplied under this system shall be for two (2) years.

### **3.2 FACTORY TESTING**

- A. The following standard factory tests shall be performed on the equipment provided under this section:
  - 1. Configure and load all software.
  - 2. Test and operate computer and software in a simulated system mode for minimum of 24 hours.
  - 3. Demonstrate full system functionality

### **3.3 INSTALLATION**



- A. The Contractor shall furnish, install and terminate all communication conductors and associated conduits external to any factory supplied equipment.
- B. All communication conductor wiring and routing shall be per the manufacturer's recommendations.

### **3.4 FIELD QUALITY CONTROL**

- A. The contractor shall furnish the services of a manufacturer's representative to assist LAWA in starting up and programming the system. The manufacturer's representative shall be factory-trained and shall have a thorough knowledge of the software, hardware, and system programming. The manufacturer's representative shall provide the following services:
  - 1. Setting all the addresses of all devices in the equipment.
  - 2. Verifying and troubleshooting the integrity of the data line (run by others).
  - 3. Assisting LAWA in correcting any data line problems.
  - 4. Coordinating any possible warranty problems with the PMCS.
  - 5. Configure the PMCS software to match the field devices.

### **3.5 FIELD TESTING**

- A. Verify complete system operation including all hardware, software and communication devices.
- B. Verify networking performance with all interfacing systems by other manufacturers.

### **3.6 MANUFACTURER'S CERTIFICATION**

- A. A qualified factory-trained manufacturer's representative shall certify in writing that the equipment has been installed, adjusted and tested in accordance with the manufacturer's recommendations.
- B. The Contractor shall provide five (5) copies of the manufacturer's representative's certification.

### **3.7 TRAINING**

- A. The Contractor shall furnish the services of a manufacturer's representative for a period of one (1) 8-hour days to train the LAWA's personnel in operation and programming of the system. The manufacturer's representative shall be factory-trained and shall have a thorough knowledge of the software, hardware and system programming. The training session shall include:
  - 1. Hands-on training of site personnel.
  - 2. Explanation of system operation.
  - 3. Explanation of devices.



4. Explanation of LAWA's system.

### **3.8 AFTER STARTUP SUPPORT**

- A. The PMCS manufacturer shall provide a 24-hour 800 telephone number manned with Engineers/Technicians expert in PMCS devices, software and communication system troubleshooting or capable of providing technical information.
- B. The PMCS Manufacturer shall provide a 1 year service contract to maintain the software and system devices. The contract shall be renewable on an annual basis at a fixed charge and shall include a minimum of 2 site visits yearly to perform system maintenance. The service contract shall include as a minimum:
  1. Installation of Software patches and Upgrades to System Operating Software as required.
  2. Anti-Virus Software upgrades as required.
  3. PMCS Software upgrades as required.
  4. Database maintenance and archiving of data.

END OF SECTION 26 09 13