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260913-H: ELECTRICAL POWER MONITORING

Scope

Electrical Power Monitoring requirements. Includes direction which devices to include Power monitoring, how to populate points, define trending and alarms, what the name the points, and Desigo descriptors to include for developing graphics within Desigo.

Related Sections

Basis Guideline:

- 230905-H: Mechanical Systems Controls
- 230924-H Systems Integration
- 260500-H Supplemental Common Work Results for Electrical
- 260510-H Electrical General Requirements
- 260553-H Supplemental Electrical Equipment Identification
- 260800-H Supplemental Electrical Acceptance Test
- 261100-H Supplemental Unit Substations
- 263000-H Supplemental Engine-Generator Systems
- 263010-H Supplemental Paralleling Gear
- 263353-H Supplemental Central UPS Systems
- 263500-H Supplemental Power Conditioners
- 272000-H Supplemental Voice and Data Communications

For an explanation of the use of these guidelines, see “Design Guidelines for UMHHC Facilities”.

U-M Standard Details:
D260000 Series – Electrical Standard Details
D260913H-1 – “Monitoring Points, Alarm & Trend Requirements (Power Monitoring)”
D272000H-1 - Data Connection to Equipment Panels up to 120V
D272000H-2 - Data Connection to Equipment Panels above 120V up to 480V

General

University of Michigan Hospitals (UMH) owns and maintains a unified Electrical Monitoring System (EMS) frontend using Siemens Desigo CC. Data is to be gathered from various electrical devices by Loytec gateways. The Loytec gateway will deliver the data, alarms, and trended data to the Siemens Desigo headend via IP over the HITS network. Siemens Desigo will display each electrical device on its own dedicated graphic interface. The alarms of the electrical devices will follow the priority that is defined on the Standard Detail D260913H-1 – “Monitoring Points, Alarm & Trend Requirements (Power Monitoring)”. Electrical devices are not to be connected directly to the MM HITS Network. The various data points to be collected from the field components are defined in Standard Detail 9.3 Electrical D260913H-1.

Electrical Devices that are added to MM electrical distribution are to follow the guideline 260553-H “Supplemental Electrical Equipment Identification” for naming conventions. All electrical devices identified on electrical detail D260913H-1 are to have the ability to export the data points identified.

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The design A/E shall utilize UMH's master spec MS230924- "Systems Integration (Hospital Projects)" for all work on hospital funded projects that are to be maintained by UMH and/ or monitored by the UMH BMS. AE shall be responsible for editing this master spec so that it is job specific.

Contractual documentation should identify the electrical contractor to install a Field Level Network (FLN) that exports the said data from the electrical devices to a Loytec gateway. The Electrical Systems Control Contractor (ESCC) is responsible for configuring the Loytec gateway of all the points, alarms, and trending information identified within the electrical detail D260913H-1. The drawings shall identify the FLN devices, locations, power sources, and UPS power are applicable to maintain data monitoring during a power outage. Drawings shall also identify all necessary raceways and conductors for FLN and where it is to establish connection with HITS network including data closet.

The complete power monitoring system work shall be split between the Electrical Systems Controls Contractor (ESCC), the Systems integrator (SI) and UMH's HITS department. The ESSC shall be responsible for providing the Secondary Field Level Network (FLN), providing and configuring the gateway and providing the raceway to the nearest HITS Telecomm room. The SI shall be responsible for integrating the points, alarms & trends served up by the gateway into the Desigo frontend. The UMH's Health Information Technology & Services (HITS) department shall be responsible for providing IP Layer 3 networking of all peer-to-peer communication of gateways.

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Basic System Requirements

EMS shall integrate with the power monitoring capabilities of the electrical equipment selected for a project. Electrical equipment shall be fully factory assembled complete with its associated monitoring devices installed, wired, tested, configured and commissioned accordingly. All devices shall be addressed by the ESCC using BMS addressing provided by UMH and subsequently tested to verify reliable communication.

Power Meters

EMS shall interface directly with basic power meters and power quality meters to monitor the required points through BacNet/IP orModBus/IP. Meters shall not be integrated using RTU or MS/TP.

Paralleling Gear

EMS shall interface with the PLC of paralleling gear to monitor the required equipment via BacNet/IP or ModBus/IP through the HITS network. However, if feasible direct IP communication to devices is preferred.

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Substation Gear

EMS shall interface with an IP gateway to monitor the required equipment via BacNet/IP or ModBus/IP through the HITS network. However, if feasible direct IP communication to devices is preferred.

Automatic Transfer Switch (ATS)

The ATS shall be equipped with a power meter that is installed downstream of the switch, so that the unit can maintain power in the event of an emergency switchover. The ATS shall provide monitoring electrical branch circuits, position, and start generator command. The ATS is to communicate via RS-232, RS-485, and Ethernet simultaneously.

Uninterrupted Power Supply (UPS)

EMS shall interface directly with UPSs via BacNet/IP through the HITS network. UPSs shall not be connected using RTU or MS/TP.

Power for Gateways

Power to gateways shall be provided by the ESCC through a fused disconnect located in the low voltage cabinet. The gateways shall be powered by the same type of power, or greater priority, which is being monitored. When monitoring paralleling gear include a UPS and power it from the load side. See Masterspec 230905 for UPS specification.

Secondary Field Level Network (FLN)

- The ESCC shall provide a fully integrated BACnet EMS incorporating electric and communication components for the monitoring of main electrical distribution equipment. The ESCC shall not exercise control over the equipment. Points are read only by SI.
- BACnet components shall natively use the most current ANSI/ASHRAE Standard 135 for communications and shall be BTL certified with BTL published PIC statements.
- Modbus/IP components may be integrated through a Loytek BACnet/IP gateway
- Gateways to be configured with only the points and point types as identified within Electrical Standard Details D260913H-1.
- The ESCC is responsible for providing the pathway for the network cables according to standard details “Data Connection to Equip Panels 120V” and “Data Connection to Equip Panels 480V”.
- Network cables will be pulled by hospital HITS. Network patch cables shall be provided by HITS.
- The ESCC is responsible for configuring the devices, enabling network communication, and confirming point communication with Systems Monitoring.
- The ESCC will provide Desigo Systems Integrator with a list of points and Desigo descriptors. ESCC to submit points and descriptors for approval of MM.
- BMS addresses will be requested by the ESCC by submitting the BMS Address Request form.
- Hospital IT will scan the device for cyber-attack vulnerabilities. The ESC will be responsible for remediation of found vulnerabilities.

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- The ESCC shall provide a Loytec gateway in the same room as the equipment it serves. Gateways are to be mounted in a panel and backed up with an approved local or central UPS. Local UPS to be monitored for trouble alarms.

Electrical Monitoring System Drawings

The required scope of a project's EMS shall be indicated by the use of system drawings. All equipment/ systems that are monitored or alarmed by the BMS shall be identified with a system diagram.

EMS drawings shall utilize U-M's standard symbols. Normally, U-M will provide sample drawings in electronic format for A/E use. Revise these drawings to make them project specific. Include all project specific points and alarm values. Provide similar EMS drawings for systems not available from U-M's samples.

Wiring diagrams shall be provided on the EMS drawings that indicate the interface to manufacturer's provided components, etc. These diagrams may be schematic in nature but shall indicate fundamentally how electrical monitoring is accomplished.

System Integration

- The SI shall be responsible for BACnet and Modbus device and object discovery, point instantiation, displaying of alarms, and creating all front end graphics.
- SI to configure Desigo points as point type, parameters, and alarms as identified within D260000 Series – Electrical Standard Details.
- The AE shall discuss with the FPD electrical engineer the approved manufacturers to list in the project specifications. The desire is to competitively bid all power monitoring projects to the approved manufacturers listed in specification 260913. In general, all standard power meters shall be competitively bid. However, UMH wishes to standardize with Eaton PowerXpert meters for power quality and harmonics monitoring when wave capture meters are required.

Commissioning

- EMCC, SI, Commissioning Agent, and UM Systems Monitoring representative to confirm all points from FLN, points entering Desigo. Verification of trending and alarming at FLN, as well display of points and alarms by SI.