SECTION 26 09 13

**ELECTRICAL POWER MONITORING**

**PART 1 – GENERAL**

* 1. **SUMMARY**

1. This specification sheet describes a Power monitoring device with 3 integrated current sensors for the measurement of electrical circuits up to 63A.
2. The technical benchmark reference is SOCOMEC DIRIS Digiware S or a similar solution that has been approved by us.
   1. **SUBMITTALS**
3. Product data: Include rated capacities, weights, operating characteristics, furnished specialties and accessories.
4. Shop drawings: Dimensioned plans, elevations, sections, conductor entry provisions, installed features and devices and material lists for each switch specified.
5. Field quality control test reports.
6. Operation and maintenance data specified by the manufacturer.
7. Product certificates: Signed by manufacturer certifying that products comply with requirements mentioned.
   1. **RELATED STANDARDS**
8. **UL 61010-1:** *Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use*
9. **IEC 61557-12***: Electrical safety in low voltage distribution systems up to 1000 V a.c. and 1500 V d.c. - Equipment for testing, measuring or monitoring of protective measures - Part 12: Power Metering and Monitoring devices (PMD)*
   1. **QUALITY ASSURANCE**
10. The components of the system shall be of the same manufacturer.
11. Comply with requirements of latest revisions of applicable industry standards.

**PART 2 – PRODUCTS**

1. **MANUFACTURERS**
2. Subject to compliance with requirements, provide products by one of the following  :
3. Multi-circuit power metering and monitoring system:
4. SOCOMEC DIRIS Digiware S
5. …
6. **Power Metering & Monitoring Device REQUIREMENTS**
7. **GENERAL:**

The power monitoring device shall be CE marked, cULus listed and shall be PMD compliant according to IEC standard 61557-12.

1. The system altogether shall be a plug & play multi-circuit measuring system providing voltage, current, power, energy and power quality data and enabling a joint analysis of single-phase and multi-phase loads.
2. The power monitoring system comprises:

* One 24VDC Power supply for the whole system
* One system interface centralizing the 24VDC power supply and communication inputs for the entire system and allowing the visualization of all the products connected downstream directly on the display, remotely on its webserver or via multiple communication protocols (Modbus, BACnet, SNMP v1, v2, v3)
* One dedicated voltage measurement module
* Multiple current measurement modules up to 63A. Each module shall be compatible to measure several circuit types (three-phase, single-phase). Its 3 independent current inputs can be used to monitor several circuits simultaneously. The system shall allow up to 32 current modules to be added, for the monitoring of up to 96 circuits
* Optional Input/Output modules
* RJ45 interconnection cables between modules enabling great flexibility and expandability of the system. This bus shall distribute communication, power supply, and synchronize the voltage sampling with the current measurement of all current sensing modules, avoiding to repeat the voltage inputs on all modules.

The current measurement module shall be compatible independently of the brand of the modular protective device and the current inputs shall be spaced at 18 mm (3/4”) center intervals to align appropriately with the pitch of the modular protective device. This allows great compactness inside electrical panelboards.

The same current measurement module shall be mountable either upstream or downstream of the protective device with a self-correction of current input and network line associations.

The device can be mounted on DIN-rail or on a back-plate using a dedicated mounting accessory.

1. **FUNCTIONS AND PERFORMANCE**

In terms of functions, the measuring system must respect the following requirements:

1. **General measurements:**

* Current, frequency, voltage electrical values
* Active (kW), reactive (kVAR) and apparent power (kVA), power factor, cos phi and tan phi
* Operation across 4 quadrants (import/export powers)
* Predictive power
* The measurements will be available with the following values:
* Instantaneous
* max instantaneous (timestamped)
* min instantaneous (timestamped)
* average
* max average (timestamped)
* min average (timestamped)
* system (average between all phases in a multi-phase system)

1. **Metering**

* Active, reactive (lagging and leading), apparent partial and total energies (+/- kWh, +/- kVarh and kVAh)
* Demand profiles
* Multi-tariff (8 tariffs maximum)

1. **Power Quality analysis**

* Total Harmonic Distortion for voltage and current (THD V,U,I)
* Individual Harmonics analysis (up to 63rd) for voltage and current
* Unbalance for voltage and current, symmetrical components (direct, inverse and homopolar)
* Crest factor for voltage and current
* K-factor
* Events in accordance with EN 50160 (voltage sags, voltage swells and voltage interruptions) based on a half-cycle sampling rate

1. **ACCURACY**

The measuring system shall have a minimum **class 0.5 accuracy for active energy (kWh) in accordance with the IEC 61557-12 standard** (accuracy class shall be guaranteed from 0.2A)

1. **DATA LOGGING**

* Recording of average electrical values (configurable: U, F, I, P, Q, S, PF, THD, Crest factor, K-Factor) with a configurable integration period
* Recording and time-stamping of min/max electrical values
* Recording of measurement alarms
* Recording of EN 50160 events and overcurrents
* Recording of system alarms

1. **ALARMS**

* 9 alarms on high or low thresholds of electrical parameters
* Alarms for status changes of a digital input
* Boolean combinations of alarms
* Smart Predictive Power alarm
* Voltage/current phase association alarm

1. **LEDS**

The module shall have at least 3 LEDs (i.e. one per current input) configurable in 2 modes:

* Voltage detection
* Metrology

1. **ADVANCED FUNCTIONALITIES**

* Monitoring the status of the upstream protective devices (open/closed position, Trip status, trip and operation counters) without the use of auxiliary contacts
* Software correction of wiring errors, even in off-load conditions by pressing a front button on the module
* The above functionalities shall be available when the device is positioned downstream any protective device

**PART 3 – EXECUTION**

**3.01 INSTALLATION**

1. Preparation shall be in accordance with reviewed product data, final shop drawing and manufacturer’s recommendations.
2. Installation shall be in accordance with manufacturer’s instructions.
3. Identify components according to Division 26 section “Identification for Electrical Systems”.

**3.02 CONNECTION**

1. Wiring connection shall be in accordance with manufacturer’s instructions.
2. Wiring connection shall be according to Division 26 section “Low-Voltage Electrical Power Conductors and cables”.

**3.03 MAINTENANCE & TRAINING**

1. Operation and Maintenance Instruction: Personnel shall also be formally trained by the manufacturer’s authorized representative as to the proper operation and maintenance of the PMD.
2. The PMD shall not require a new calibration for a period of 10 years minimum if the environment and installation conditions are conform to manufacturer’s instructions.

**3.04 TESTING**

1. The PMD shall be declared conform to the IEC and UL standards by a testing laboratory having the CBTL (Certification Body Testing Laboratory) qualification delivered by a National Certification Body under the IEC Electrotechnical Equipment (IECEE) certification body scheme and/or the NRTL (National Recognized Testing Laboratory) qualification.
2. After installing equipment, execute test reports in accordance with manufacturer’s instructions.

**END OF SECTION 26 09 13**