TECHNICAL SPECIFICATION OF ELECTRICAL METERING FOR CONNECTED LINE SOLUTION

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PART 1 - GENERAL

1.1 SCOPE OF SUPPLY

This specification describes the energy metering solution for connected line for tracking the energy consumption of manufacturing site with reduced operating cost. Also, it describes the architecture of design, requirements and installation of Energy metering with different applications.

1.2 RELATED STANDARDS

The product supplied must be designed, manufactured, and tested in compliance with IEC (International Electrical Commission) standards currently as follows:

IEC 60364-8-1	Common Requirements for Low voltage Electrical Installations
IEC 61557-12	Common Requirements for Power metering and Monitoring Devices
IEC 62053-22	Common Requirements for Electricity Metering
IEC 61010-1	Safety Requirements for Measuring, control and laboratory equipments.
2011/65/EU	Requirement for following Rohs in electrical and electronic substance.

1.3 SUBMITTAL DOCUMENTS

Catalog cut sheets with performance specifications demonstrating compliance with specified requirements.

1.4 QUALITY ASSURANCE

A. Applies only to newly manufactured static watt-hour meters of accuracy classes 0.2 to 0.5 S, for the measurement of alternating current electrical active energy in 50 Hz or 60 Hz networks and it applies to their type tests only.

B. The Accuracy classes with Branch circuit monitoring of 1%, which ensures precise and reliable measurements at different loads.

C. The components used in the metering follows RoHS Directive, which aims to prevent the risks posed to human health and the environment related to the management of electronic and electrical waste.

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1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the Project site in supplier's or manufacturer's original wrappings and containers, labeled with supplier's or manufacturer's name, material or product brand name, etc...

B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.6 WARRANTY

A. The Standard warranty for the product is 12 and 18 months from start-up and from readiness of delivery respectively.

PART 2 – PRODUCT

S NO	Features	Scenario 1(Retrofit)	Scenario 2(Green field Applications)
1	Device Integration	Easy Integration with Existing Circuit via ethernet	Integration with Existing Circuit via PLC/ Ethernet
2	Mounting	Direct, DIN and Cable tie Mounting	Direct, DIN and Cable tie Mounting
3	Product Architecture	Circuit Monitoring System, Network Analyzers, Control Unit	Circuit Monitoring System, Network Analyzers, Circuit Breakers, Control Unit.

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2.1 MANUFACTURERS:

A. Approved Manufacturers: Subject to compliance with requirements.

B. Shall be engaged in the manufacture of electrical products of types and size required and have been in satisfactory use in similar service for a minimum of years.

2.2 TECHNICAL DATA REQUIREMENT:

A. Easy Installation with existing circuit via ethernet and PLC.

B. Integration with certified Edge gateway at 0 downtime with open-core sensors that directly fit any MCB and Rogowski coils for any cable.

C. According to IEC 61557-12 and IEC 62053-22, There is an MID approval for billing process and ensuring precise and reliable measurement of different loads with branch circuit monitoring and Network.

D. According to IEC 62053-22, They contain particular requirements and tests for the metrology, specifying error limits under reference conditions and the permissible effect of disturbances and influence quantities.

E. AC and DC multichannel branch monitoring with minimum space requirement upto 160A current and higher limit.

F. Circuit Monitoring System which is an ultra-compact and high-performance multichannel measurement system for AC and DC monitoring with supply voltage of 80 – 277 VAC (L1-N, +5%), 50 / 60 Hz working under operating and storage temperature of − 25 ... +70 / − 40 ... + 85 °C. It has more accuracy for AC and DC with ≤ ± 1% and ≤ ± 1.2%, ≤ ± 1.4%, ≤ ± 1.8% respectively.

G. Network analyzer with 2 digital outputs, aux supply 48-240 V AC/DC and Bluetooth with rated current of 5A which has operating temperature of − 25 ... +70°C. It follows EU directive 2011/65/EU. It is protected against contamination from limited amounts of dust and other particles with IP54 rating.

H. Low Voltage Digital Unit with spread range of low voltage digital of operating voltage up-to 1150v and current from 100 to 6300A with 50 to 60Hz which has operating temperature of -25… +70°C. It follows IP40 rating with reverse feed capabilities.

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2.3 PRODUCT FEATURES:

2.3.1 Circuit Monitoring System:

a. Extremely accurate and efficient measurements of AC, DC or mixed currents up to 160 A (TRMS) thanks to sensors with a width of 18-25 mm.
b. The parameters are processed via the control unit which manages up to 96 sensors (up to 96 single-phase lines, or 32 three-phase lines or a mix of up to 96 sensors).
c. Support of several communication protocols: Modbus RTU, Modbus TCP/IP, SNMP v1/v2 and v3 encrypted.
d. Easy access for data collection (online and historical values) and quick data export provided by the integrated web server.
e. Notification of alarms via e-mail and FTP server.

2.3.2 Network Analyzers:

a. High-accuracy monitoring class 0,5S compliant to main metering standards (IEC 62053-22 and IEC 61557-12)
b. Intuitive configuration and visualization thanks to easy-to-use HMI
c. All-removable terminals, Rogowski compliance and 57mm depth in the panel for easy installation and wiring
d. It is often natively integrated with energy and asset manager cloud-solution.

2.3.3 Control Unit

a. Collects measurement data from up to 16 energy and power meters, in addition to 96 current sensors and digital sensors, simultaneously.
b. Remote monitoring of the system thanks to a digital communication that supports different protocols (Modbus RTU, TCP or SNMP v1, v2 and encrypted v3)
c. Interfaces guarantee straightforward integration into any IT infrastructure: LAN (TCP/IP or Modbus TCP) and RS485 (Modbus RTU)

2.3.4 Low Voltage Digital Unit:

a. Digital Unit is the multi-purpose multi-meter for energy measurement with embedded network analyser, data loggers, advanced connectivity and gateway for cloud communication.

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b. It is Compatible with all switching devices with 100% applicable for every low/voltage scenario.
c. Cost/effective solution compared with traditional retrofitting approach with 30% operational cost saving via the energy management system.
d. It Maximizes UP-time with 50% time saving when retrofitting, with reduced impact on switchboard design.

PART 3 – EXECUTION

3.1 INSTALLATIONS

3.1.1 Connections and Assemblies:

3.1.1.1 Scenario 1 – Retrofit

a. Circuit Monitoring System current sensors fitting directly MCBs for measurement of loads up to 160A, compatible with MCBs from any brand. Open-core shape allowing retrofit without any downtime up to 80A. Communication towards Circuit Monitoring System control unit is through wired Circuit Monitoring System bus.
b. Circuit Monitoring System control unit collecting data from Circuit Monitoring System sensors via Circuit Monitoring System bus and allowing to send out the information to existing PLC via Ethernet/IP communication.
c. Network analyzers compatible with Rogowski coils allowing retrofit without any downtime of loads higher than 160A and up to 10kA. Communication towards control unit is through Modbus.

3.1.1.2 Scenario 2 – Greenfield Applications:

a. Circuit Monitoring System current sensors fitting directly MCBs for measurement of loads up to 160A, compatible with MCBs from any brand. Communication towards control unit is through wired bus.
b. Network analyzers compatible with 1A or 5A current transformers for measurement of loads higher than 160A. Communication towards control unit is through Modbus.
c. Control Unit collects data from existing devices via Modbus (meters, breakers…), new field devices (Network Analyzers via Modbus, Circuit monitoring system

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sensors via bus) and allowing to send out the information to existing edge gateway via rest API.

3.2 TRAINING

a. Contractor, on request, shall be able to provide a quotation for proper training for the product to the End-User/Client.

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