TENDER SPECIFICATION

**DIRIS Digiware DC**

Multi-circuit Plug and Play measuring and monitoring system

for DC electrical installations

**Purpose of the specification**

This specification describes a multi-function, multi-circuit power monitoring system and its associated current sensors designed for measuring, monitoring and managing DC electrical installations.

The technical benchmark reference is SOCOMEC DIRIS Digiware DC or a similar solution that has been approved by us.

1. **General characteristics**

The measuring system shall be CE marked, cULus listed and shall be a multi-circuit modular PMD\* compliant with the IEC 61557-12 standard.

It shall provide all voltage, current, power, energy and power quality measurements of multiple DC loads simultaneously.

The Plug & Play system will be based on modules that can be interconnected (without tools) and will provide auto-addressing of the devices connected to the communication bus. In addition, the system shall comprise the following:

* A control and power supply interface (24 VDC) allowing the visualisation of all the products connected downstream directly on the display, remotely on its webserver or through communication with multiple communication protocols.
* One dedicated voltage measurement module. The voltage measurement shall be with a direct connection up to 180 VDC or via the addition of voltage adaptors up to 1650 VDC.
* Multiple current measurement modules connected to DC sensors using RJ12/terminal cables provided by the manufacturer of the measurement system. The current measurement module shall have at least 3 inputs enabling the measurement of up to 3 DC loads per module. The system will accept up to 6 DC current modules to monitor up to 18 DC loads. Repeaters can be used in order to add additional current measurement modules.
* Input-Output modules
* The modules will be interconnected by an RJ45 bus. This bus will distribute power supply & communication to all the modules and will synchronise the single voltage measurement with the current measurements for all the loads with the same voltage reference, avoiding repeating the voltage connection for each load.

Measurement modules can be fitted on a DIN rail or on a back-plate.

The measurement system shall have a minimum class 1 accuracy for power and energy according to IEC 61557-12 for direct connection up to 180 VDC.

*\*PMD: Power Metering and Monitoring Device in accordance with IEC 61557-12.*

The measuring system should accept any type of current sensors complying with the following characteristics:

* Open-loop Hall-effect sensors
* Power supply voltage: +/- 15V SELV (Safety Extra Low Voltage)
* Power Supply current: +/- 25mA depending on the sensor
* Output voltage: +/- 4V SELV
* Molex 4-point male terminal
* Measurement range: 16 to 6000 A
* Enable a risk free connection and on-load opening of the sensor’s secondary

The measuring system should be suited for any type of new or existing installation using solid-core sensors from 50A to 5000A, or split-core sensors from 50A to 2000A.

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1. **Configuration**

The measurement system can be configured from the remote display or using a free dedicated configuration software installed on a PC connected to the measurement system via a USB connection or via the communication network (RS485/Ethernet).

In addition, the system shall allow:

* **Automatic detection and addressing**

An auto-addressing function automatically allocates Modbus addresses to the modules connected via a remote display or Ethernet gateway (see separate technical specification document).

1. **Functions and performance**

The measurement system shall meet the following requirements:

* **Accuracy of measurements:**
* **A minimum class 0.5 accuracy for current in accordance with IEC 61557-12**: from 10% to 120% of the rated current
* **At minimum class 1 accuracy for power and energy in accordance with IEC 61557-12**:from 2 to 120% of the rated current for direct measurement up to 180 VDC

The measurements will be available with the following values:

* instantaneous
* max instantaneous (time-stamped)
* min instantaneous (time-stamped)
* averages
* max averages (time-stamped)
* min averages (time-stamped)
* **General measurements**
* DC Voltage from 19.2 VDC up to 1650 VDC
* DC Current
* DC Power (import/export powers)
* DC Predictive power
* **Metering**
* Energies (bidirectional)
* Load curves / Demand profiles
* **Power quality analysis**
* RMS voltage and current
* Ripple voltage and current
* **Inputs/Outputs**

Digital input/output modules can be added to the system. Each module shall have at least 4 inputs and 2 outputs enabling the following:

* Pulse centralization from multi-fluid meters
* Monitoring of the status of protection devices or withdrawable drawers (ON/OFF, Trip counter)
* Command of the protection relays

Analog input modules can be added to the system. Each module shall have at least 2 inputs, 0/4 – 20mA type, enabling the following:

* Data collection from analog sensors (pressure, temperature or humidity sensors)
* **Alarms**
* Time-stamped alarms for the instantaneous or average values for an electrical parameter
* Alarms for status changes of a digital input
* Possibility of Boolean combinations of alarms
* System alarm
* **Data-logging**
* Recording of average electrical values (configurable with a variable integration period)
* Recording and time-stamping of min/max electrical values
* Recording of measurement alarms
* Recording of system alarms
* **Display**

The remote display shall have the following characteristics:

* 24 VDC power supply to prevent dangerous voltage on the door
* High-resolution & graphical views
* 10 direct access keys to the configuration and measuring information
* IP65 degree of protection for the front panel
* Embedded web server for remote visualization of measurements on a web browser
* Communication via multiple protocols (Modbus TCP; Modbus RTU; BACnet IP; SNMP v1, v2 & v3)
* SNTP synchronisation of downstream products
* SMTP e-mail transmission in case of alarms
* **Webserver**

All data from the measuring system shall be visualized in a web interface embedded either in a dedicated Ethernet gateway or in the remote Display. This webserver shall allow:

* Display of real-time and historical measurements
* Display of on-going alarms and a log of finished alarms
* Manual or automatic FTPS data export