TECHNICAL SPECIFICATION

**DIRIS B**

Plug and Play Power Metering and Monitoring Device

for electrical installations

**Purpose of the specification**

This specification describes a multi-function Power Metering and Monitoring Device and its associated current sensors designed for measuring and monitoring electrical installations. It is particularly well suited to isolated measuring points which require RS485 or wireless communication.

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

1. **General characteristics**

The measuring device shall be CE marked, UL listed and shall be a compact modular PMD\* compliant with IEC standard 61557-12.

It shall provide all voltage, current, power, energy and power quality measurements and enable a joint analysis of single-phase and multi-phase loads (even simultaneously).

The PMD shall be based on a Plug & Play concept that provides automatic detection of the network type, loads and current sensor ratings and verification of the current flow direction. In addition, the PMD shall offer:

* 4 independent RJ12 type current inputs allowing simultaneous measurement of up to 4 loads (single-phase, three-phase, with or without neutral…)
* A native RS485 Modbus RTU output
* A remote and optional display for displaying measurement and metering data
* Optional plug-in modules offering additional features (inputs/outputs, additional communication protocols etc.)
* A 0.5 accuracy class for the global measurement chain (PMD + sensors) according to IEC 61557-12

The PMD shall be of modular type to be fitted on a DIN rail or on a back plate.

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

The current sensors shall:

* Form an integral part of the measuring system and therefore, must come from the same supplier as the PMD.
* Have a mV output and have an RJ-type connection to the PMD.
* Enable risk free connection and on-load opening of the sensor’s secondary
* Prevent any installation errors, thanks to the automatic identification of load type, current rating, and current direction by the PMD. If an error is detected, an alarm will be automatically generated.

The PMD shall be suited for any type of new or existing installation using TE solid-core sensors from 5A to 2000A, TR/iTR split-core sensors from 25A to 600A and TF flexible sensors from 100A to 6000A. No additional calibration of the PMD or the previously stated current sensors has to be done to guarantee the proper functioning of the system.

The solid-core and split-core sensors may be fitted aligned or staggered to match the pitch of the corresponding protective devices.

1. **Functions and performance**

The PMD shall meet the following requirements:

* **Accuracy of the measurement chain**

The combination of the measuring devices and sensors allows the following overall accuracy of the measurement chain to be ensured for power (kW) and energy (kWh):

* **Class 0.5 in accordance with IEC 61557-12**:From 2 to 120% of the rated current for the **global measurement chain** (PMD + current sensors)
* Class 0.2 in accordance with IEC 61557-12 and ANSI C12.20 for the measuring device alone

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)
* System (average for three-phase system)
* **General measurements**
* Current, frequency and voltage parameters
* Active, reactive and apparent power, power factor, cos phi and tan phi
* Operation across 4 quadrants (import/export powers)
* Predictive power
* **Metering**
* Active (+/-), reactive (+/-, lagging and leading), apparent energies, partial and total
* Load curves / Demand profiles
* Multi-tariff (8 tariffs maximum)
* **Power quality analysis**
* THD and individual harmonics (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/dips, swells and interruptions) based on a half-cycle sampling rate
* Overcurrents based on a half-cycle sampling rate
* **Alarms**
* 8 time-stamped alarms for the instantaneous or average values for an electrical parameter
* 4 alarms for changes in status of a digital input
* Possibility of Boolean combinations of alarms
* Predictive power smart alarm
* System alarm (sensor disconnection, etc.)
* **Advanced functionalities (up to 600A)**
* Monitoring the status of the upstream protective devices (open/closed position, Trip status, trip and operation counters) without the use of auxiliary contacts. This functionality shall be compatible with all brands and types of protective devices.
* Software correction of wiring errors, even in off-load conditions by pressing a front button on the PMD
* **Data-logging**
* Recording of average electrical values (configurable: U, F, I, P, Q, S, PF, THD, Crest factor, K-Factor) with a variable 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
* **Inputs/Outputs**
* 2 native digital inputs
* **Communication**
* Native Modbus RS485 communication (DIRIS B RS version)
* Native wireless communication, radiofrequency of 868 MHz with a range of 300m (DIRIS B RF version)
* Other protocols are available with optional modules
* The RS485-RF/Ethernet DIRIS G gateway (see separate technical specification document) has an embedded web server for multi-product applications and enables automatic time synchronisation.

1. **Options**

An optional display may be connected to the PMD for local visualization of measurements. It should have the following characteristics:

* High-resolution & graphical views
* 24VDC power supply to prevent dangerous voltage on the door
* IP65 degree of protection for the front panel
* 10 direct access keys to the configuration and measuring information

Optional extension modules may be plugged to the PMD:

* 2 digital inputs / 2 digital outputs
* 2 analog inputs / 2 analog outputs
* Temperature inputs
* Communication protocols (RS485 Modbus RTU, Profibus DP, BACnet IP and BACnet MSTP)
* Up to 4 optional modules per PMD