


LamaPLC: Eastron SDM 630 Energy Meter with Modbus communication

The Eastron SDM630 is a series of three-phase, multifunctional DIN-rail-mounted energy meters used to measure and monitor electrical parameters in industrial, commercial, and residential applications. It is known for its high accuracy, compact design, and communication interfaces. 

Key Features

- **Multifunctional Measurement:** The meter measures a wide range of parameters, including active energy (kWh), reactive energy (kVARh), active power (W), apparent power (VA), voltage (V), current (A), power factor (PF), frequency (Hz), and total harmonic distortion (THD) for all phases.
- **Direct Connection:** Most models support direct connection for loads up to 100 A, eliminating the need for external current transformers (CTs) for many applications. Other variants, such as the SDM630MCT, are designed to operate with external CTs for higher-current applications.
- **Communication:** It features built-in interfaces, including RS485 Modbus RTU and dual pulse outputs, for remote monitoring and integration into Building Management Systems (BMS), energy management systems, or solar inverters (e.g., Deye, Growatt).
- **Display and Usability:** The meter has a clear, backlit LCD and user-friendly, password-protected menu navigation via touch-sensitive buttons on the front panel.
- **Certification:** Many models, such as the SDM630-Modbus-MID V2, are MID-certified, making them suitable for legally compliant billing.
- **Versatility:** It is compatible with single-phase two-wire, three-phase three-wire, and three-phase four-wire network configurations.

Technical Specifications

According to Eastron Europe datasheets and user manuals, the specifications for the standard SDM630 models are as follows:

Parameter	Specification
Nominal Voltage (Un)	3×230/400 V AC
Maximum Current (Imax)	100 A (direct measurement)
Accuracy Class	Class 1 (IEC 62053-21) / Class B (EN50470-3)
Frequency Range	50 or 60 Hz
Communication	RS485 Modbus RTU, two pulsed outputs
Display	Backlit LCD
Mounting	35mm DIN rail
Protection Degree	IP51 (indoor use)
Operating Temperature	-25°C to +55°C

Eastron SDM630 Version V1, V2, and V3

The primary difference among the Eastron SDM630 V1, V2, and V3 versions lies in the firmware and specific energy calculation methods, particularly how the meters handle imported and exported energy.

Key Differences Summary

- **V1 (Legacy):** The initial version with basic functionality and limited register addresses. It is supported only by certain software configurations at baud rates of 9600 or higher.
- **V2 (Standard/Net-Counting):** Introduced “net-counting” calculation, meaning the total energy measurement combines (Import minus Export) values. It added features such as a second resettable total energy counter and had slightly different default Modbus settings and options in its menus.
- **V3 (Enhanced Functionality/MID):** The latest version is often certified for commercial billing (MID certification). Functionally, it is very similar to V2 but ensures compliance with newer standards, includes updated firmware (typically post-2022 build dates), and may have slightly different default configurations in some supplier-specific models.

Detailed Comparison Points

Feature	SDM630 V1	SDM630 V2	SDM630 V3
Energy Calculation	Basic Import/Export	Net-counting (Total = Import - Export)	Net-counting, often with separate registers
Resettable Energy	Limited options	Includes second resettable total energy counter	Same as V2, possibly enhanced options
Firmware Date	Older builds	Typically prior to 2022	Typically 2022 or later
Modbus Registers	Limited set	More extensive, with added registers	Largely consistent with V2 core registers
Certifications	Standard	Standard, and MID options	Standard and MID options, focus on recent compliance

Modbus Protocol Consistency

Crucially, the core Modbus register addresses for real-time measurements (*voltage, current, power, frequency*) are largely identical across all versions. The main differences users encounter typically relate to the interpretation of the total energy registers and minor menu/configuration variations.

The default Modbus communication settings (Address 1, 9600 baud, 8N1) are generally consistent across all three versions, though supplier customizations exist.

Arduino & Eastron SDM 630

The Eastron SDM630 communicates via Modbus RTU over an RS-485 interface, requiring an RS-485 converter module and a dedicated library to read data on an Arduino. The **SDM_Energy_Meter library** simplifies this process.

Hardware Required

- **Arduino Board:** Any compatible board (Uno, Nano, Mega, ESP32).
- **RS485 to TTL Converter:** A module using chips like [MAX485](#), MAX3485, or SN75176 to convert RS485 signals to Arduino's 5V/3.3V logic levels. These typically have Data Enable (DE) and Receive Enable (RE) pins that need to be controlled by the Arduino.
- **Eastron SDM630:** Configured with default settings: Modbus address 1, baud rate 9600, 8 data bits, no parity, 1 stop bit (8N1).

Wiring Schematic ([MAX485 Module](#))

- MAX485 VCC → Arduino 5V
- MAX485 GND → Arduino GND
- MAX485 DI (Driver Input) → Arduino Pin 4 (TX for SoftwareSerial)
- MAX485 RO (Receiver Output) → Arduino Pin 3 (RX for SoftwareSerial)
- MAX485 DE (Driver Enable) → Arduino Pin 2 (Control pin)
- MAX485 RE (Receiver Enable) → Arduino Pin 2 (Connect DE and RE together as you only need one-way communication at a time)
- MAX485 A (RS485+ / Data+) → SDM630 A terminal
- MAX485 B (RS485- / Data-) → SDM630 B terminal

Arduino Example Code

This example uses the **SDM_Energy_Meter** library by reaper7 and the standard **SoftwareSerial** library.

```
#include <SoftwareSerial.h>
#include <SDM.h>

// Pins for the SoftwareSerial communication
// RX pin: 3, TX pin: 4
SoftwareSerial sdmSerial(3, 4);

// Pin 2 is used to control the DE/RE pins of the MAX485 converter
#define RS485_EN 2

// Create an SDM object (SoftwareSerial instance, Enable Pin)
SDM sdm(&sdmSerial, RS485_EN);

void setup() {
  Serial.begin(115200); // Serial monitor output
  sdmSerial.begin(9600); // SDM630 default baud rate

  Serial.println("\nEastron SDM630 Reader");
}

void loop() {
  // Read Voltage (Register 0x0000)
  float voltage = sdm.readVal(SDM_PHASE_1_VOLTAGE);
  if (!isnan(voltage)) {
    Serial.print("Voltage L1: ");
    Serial.print(voltage);
    Serial.println(" V");
  } else {
    Serial.println("Failed to read Voltage");
  }

  // Read Total System Power (Register 0x0034 or 0x0052 depending on
  // V1/V2/V3 meter version)
  // Check documentation for the specific register address
  float power = sdm.readVal(SDM_TOTAL_SYSTEM_POWER);
```

```
if (!isnan(power)) {
  Serial.print("Total Power: ");
  Serial.print(power);
  Serial.println(" W");
} else {
  Serial.println("Failed to read Power");
}

// Read Total Import Energy (Register 0x0048 or 0x0072 depending on
version)
float energy = sdm.readVal(SDM_TOTAL_IMPORT_ENERGY);
if (!isnan(energy)) {
  Serial.print("Import Energy: ");
  Serial.print(energy);
  Serial.println(" kWh");
} else {
  Serial.println("Failed to read Energy");
}

delay(3000); // Wait 3 seconds before next read
}
```

[modbus](#), [modbus rtu](#), [eastron](#), [modbus map](#), [MID](#), [SDM](#), [SDM 630](#), [Arduino](#), [code](#)

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