

# RS-525SE Remote Data Logger



The ML-525 Standard Edition data logger, housed in a weatherproof RS enclosure, is a compact, low-power, and cost-effective device featuring a built-in LTE-M and NB-IoT cellular modem. It complies with the CE Radio Equipment Directive (RED) 2014/53/EU. It includes an internal temperature and humidity sensor, 112MB SLC flash ring-buffer, a micro SD card holder, eSIM (with 500MB free balance) and nano SIM card slot. The data logger offers various power options, including 3.6V lithium batteries, 8-28V DC input, 12V external solar panel input, or an integrated solar panel with a battery charger.

The device can acquire physical signals through 2 current loop inputs, 2 voltage inputs, 1 potentiometer input, and 3 digital inputs. One analog input can be used for dead-band triggered 100Hz burst recording\* to capture up to 5 seconds of a signal transition in detail. Additional or specialized inputs can be added via internal stackable option boards or converters.

Equipped with three serial ports, the data logger can capture measurements from MODBUS, NMEA, ASCII and SDI-12 compatible sensors. External sensors can be powered by the data logger itself, preventing power consumption while the data logger is in sleep mode. Up to 20 mathematical channels are available to calculate meaningful engineering values from sensor input values (e.g., using a polynomial to calculate flow from a stream level). The logger supports up to 10 aggregation channels (e.g., recording 2- or 10-minute windspeed averages sampled at 1Hz).

The 112MB ring-buffer provides enough capacity to store years of typical log data, and when it becomes full, the oldest data is overwritten to make room for new data. The capacity can be extended up to 4GB with a microSD card.

Logged data can be pushed to up to six different servers of your choosing via HTTP(S), FTP(S), secure TCP, or MQTT(S) at configurable intervals and in various payload formats such as TXT, CSV, JSON, Sparkplug B, or customizable\* formats.

\*Under development



## Features

- LTE-m & NB-IoT Data Logger
- 120MB Internal Data Storage
- Solar, Battery or DC powered
- 3..21V Sensor Excitation
- Serial sensors input
- 1x SDI-12, 1x RS232 and 1x RS485
- MODBUS, NMEA-0183 or ASCII
- Analog & Digital Inputs
- Calculation channels
- Aggregation channels
- TCP, FTP, HTTP, MQTT, e-Mail
- CSV, TXT, JSON or custom payload
- Alarm output & messaging
- IP68/69 Enclosure
- Remote Configuration

## Accessories

- Several option boards
- Camera (JPG)
- GPS Receiver
- TFT Touch Screen

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## Specifications (V5.4B1, updated: 17-June-2026)

### Data Logging

- 1 second to 1 day intervals
- Regular, alarm and independent intervals
- Up to 100 parameter channels
- 112MB ring-buffer extendable to 4GB with microSD card to up to 64GB, 512kB program storage, 160kB SRAM (runtime memory)

### Data push

- 1 minute to 1 day intervals
- Regular and alarm intervals
- Direct push on alarm raise and fall
- Native TXT, JSON, CSV, Sparkplug B payload format
- MQTT, HTTP, FTP<sup>1)</sup>, e-Mail<sup>1)</sup> or proprietary-TCP
- 8k certificate memory (max. 3 different CA certificates)
- Push to up to 6 different servers of your choosing

### Alarming

- Alerts by SMS, e-Mail<sup>1)</sup> and MQTT
- Open collector output (max. 100mA sink current)

### Internal Sensors

- Battery (voltage and rest capacity)
- Temperature and humidity
- GSM signal strength
- GPS with ufl-connector (GPS antenna not included)

### Analog Inputs (12bit resolution and <0.2% FS accuracy)

- 2x current loop inputs (0/4..20mA, 100 Ohm impedance)
- 2x voltage inputs (0..10V)
- 1x potentiometer input (0..2048mV, max. 10M Ohm)

### Digital Inputs (0..5V)

- 3x state, counter (max. 10kHz), on-time meter or trigger

### Serial Input (1x RS232, 1x RS-85 and 1x SDI-12)

- **SDI-12** (up to 15 devices, max 20 channels per device)
- **MODBUS RTU/ASCII** (read registers from up to 15 slaves)
- **NMEA-0183** (standard and custom sentences)
- **ASCII** (sensors outputting readable lines of numeric values)

### Derived Inputs

- **20x calculation channels** (operators, comparisons and functions)

- **10x aggregation channels** (e.g. min/max, avg and percentiles)

### Accessory Port (1x RS232 with 5V switched excitation)

### Built-in cellular modem

- LTE-M (M2), NB-IoT (NB2), 3GPP release 14 compliant
- IPv4, IPv6, NTP, TLS (1.1, 1.2, or 1.3) and SN1
- Max transmission power: LTE 21dBm
- LTE bands: 1,2,3,4,5,8,12,13,18,19,20,25,26,27,28,66,71 & 85
- TAC: 35681210, FCC ID: RI7ME910G1W1
- eSIM, data only with about 500MB for 5 years at least<sup>2)</sup>
- Nano SIM-CARD slot
- Integrated LTE antenna, external antenna optional

### Configuration by:

- USB-C (local) or secure TCP tunnel (remote)

### Power consumption

- 30mA@3.6V average operating<sup>3)</sup> current during a duty cycle of less than 1 sec<sup>4)</sup> per log interval.
- 250mA@3.6V average operating current during 20 to 60 seconds cellular communication.
- <30uA@3.6V sleep current
- 1mA@3.6V sleep current when burst recording enabled
- 3..21V excitation to power external sensors (max. 200mA@12V)
- Configurable daily operation time bracket to limit power consumption (e.g. from 07:00AM to 20:00PM)

### Power supply (mounted in several different covers)

- **LI**: 3.6V Lithium battery holder(s)<sup>5)</sup>
- **PV**: 1Wp Integrated solar panel and LiFePO4<sup>5)</sup> charger
- **SLA/LFP**: 12V solar panel input and SLA or LiFePO4<sup>5)</sup> charger
- **DC/LFP**: 8..28V DC input with or without LiFePO4<sup>4)</sup> charger

**1) FTPS with TLS-Explicit, SMTP with TLS-Implicit.**

**2) The eSIM remains the property of the manufacturer and is provided for convenience only. If it does not operate as expected, no claims for compensation can be made. In such cases, a physical SIM can be used as an alternative.**

**3) 30mA if no external sensors need to be powered.**

**4) <1 sec. if external sensors don't require time to "warm up".**

**5) LiFePO4 battery not included.**

**Data acquisition systems to monitor off-grid or hard to reach locations.  
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## Editions

### Enclosure specifications:

- IP68/69 (24h@3m without cable entries)
- UV stabilized polycarbonate.
- Wide temperature operating range  $-30^{\circ}\text{C}$  to  $+75^{\circ}\text{C}$
- 150x121x92mm, ~420g (RS-525SE-LI/3Li/DC/DC-LI/LFP/SLA)
- 150x121x131mm, 450g (RS-525SE-PV)
- 150x120x85mm, 620g (TS-525SE-LI/DC/DC-LI/LFP/SLA)



## Stock Keeping Unit Table

SKU format: RS-525SE-z (z=Power Supply)

Power Supply (z) Description

|              |                                                                                               |
|--------------|-----------------------------------------------------------------------------------------------|
| RS-525SE-LI  | 3.6V Lithium battery powered (SAFT LSH20), 1x D-Size holder.                                  |
| RS-525SE-3LI | 3.6V Lithium battery powered (SAFT LSH20), 3x D-Size holder with safety electronics.          |
| RS-525SE-DC  | Integrated 8..28V DC adapter.                                                                 |
| RS-525SE-PV  | Integrated 1Wp solar panel and 3.2V LiFePO4 cell charger, 1x 26650 holder.                    |
| RS-525SE-LFP | Integrated 3.2V LiFePO4 cell charger for external 12V (21Voc) solar panel, 4x 18650 holder.   |
| RS-525SE-SLA | Integrated 12V Sealed Lead Acid/LiFePO4 battery charger for external 12V (21Voc) solar panel. |
| ML-525SE-PCB | The main PCB without enclosure and power supply board.                                        |
| Touch Screen | 3.5" 320x240 TFT touch screen (IP54 protection instead of IP68)                               |
| TS-525SE-LI  | 3.6V Lithium battery powered (SAFT LSH20), 1x D-Size holder.                                  |
| TS-525SE-DC  | Integrated 8..28V DC adapter.                                                                 |
| TS-525SE-LFP | Integrated 3.2V LiFePO4 cell charger for external 12V (21Voc) solar panel, 4x 18650 holder.   |
| TS-525SE-SLA | Integrated 12V Sealed Lead Acid/LiFePO4 battery charger for external 12V (21Voc) solar panel. |

### Remarks:

The data logger will be supplied with 3 unmounted PG7 cable glands for cables with 3.5-7mm diameter, giving the user the freedom to choose the positions, number, size and type of glands/connectors best matching his applications.

To keep IP68 rating drill accurate cable entry/connector cut-outs and ensure the gland matches the cable diameter to achieve a proper seal.

We recommend removing the PCB before drilling and to use a wood drill. We can also offer laser cutting services to make connector/gland cut-outs.

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