

LSM Series

LSM50 RS

User Manual



Revision history

Version	Date	Comments
a	09.04.2025	First Draft

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About this document

- Range of validity** The present manual applies to the **LSM50 RS** electricity meters.
- Purpose** The user manual contains all the information required for metering applications for the intended purpose. This includes:
- Provision of knowledge concerning the characteristics, construction, and function of the meters
 - Information about potential dangers, their consequences, and measures to prevent any danger.
 - Details about the performance of all activities throughout the service life of the meters (parameterisation, installation, commissioning, operation, maintenance, decommissioning and disposal)
- Target group** The content of this user manual is intended for technically qualified personnel of energy supply companies, responsible for system planning, installation and commissioning, operation, maintenance, decommissioning and disposal of meters.
- Typographical conventions** The following typographical conventions are used in this document:
- | Font | Description |
|----------------|---|
| Bold | Font style used for menu items and buttons in the user interface and for keyboard keys. |
| <i>Italics</i> | Font style used for captions and new terminology. |
| Courier | Font for file names, paths, and code examples. |
- Terms and abbreviations** A list of terms and abbreviations used in this document is available at the end of this document.

1 Safety

1.1 Safety Information

The following symbols are used to draw your attention to the relevant danger level, i.e., the severity and probability of any danger, in the individual sections of this document.

**Warning**

Used to indicate a dangerous situation that could cause bodily injury or death.

**Caution**

Used to indicate a situation/ action that could result in material damage or loss of data.

**Note**

Used to indicate general guidelines and other useful information.

In addition to the danger level, safety information also describes the type and source of the danger, its possible consequences, and measures for avoiding the danger.

1.2 Responsibilities

The owner of the meters – usually the utility company – is responsible for assuring that all persons engaged in working with meters:

- Have read and understood the relevant sections of the user manual.
- Are appropriately qualified for the work to be performed.
- Strictly observe the safety regulations (laid down in section 1.3 “Safety Regulations”) and the operating instructions as specified in the individual sections.

In particular, the owner of the meter bears responsibility for the protection of persons, prevention of material damage and the training of personnel.

For this purpose, Luna provides training on a variety of products and solutions. Contact your local Luna representative for more information.

1.3 Safety Regulations

The following safety regulations must be always observed:

- The meter connections must be disconnected from all voltage sources during installation or when opening.
- Contact with live parts can be fatal. The main fuses should, therefore, be removed and kept in a safe place until the work is completed so that other people cannot replace them unnoticed.
- Local safety regulations must be observed. Only technically qualified and appropriately trained personnel are authorized to install the meters.
- Only appropriate tools shall be used for the job. This means, e.g., that the screwdriver must be of the correct size for the screws, and the handle of the screwdriver must be insulated.
- The meters must be held securely during installation. They can cause injuries if dropped.
- Meters that have been dropped must not be installed, even if no damage is apparent, but must be returned to the service and repair department (or the manufacturer) for testing. Internal damage may result in malfunctions or short-circuits.
- The meters must never be cleaned under running water or with compressed air. Water ingress can cause short circuits.

2 Description of Unit

2.1 General View

The LSM50 RS is standalone meter. The meter is suitable for 3-phase 4-wire.

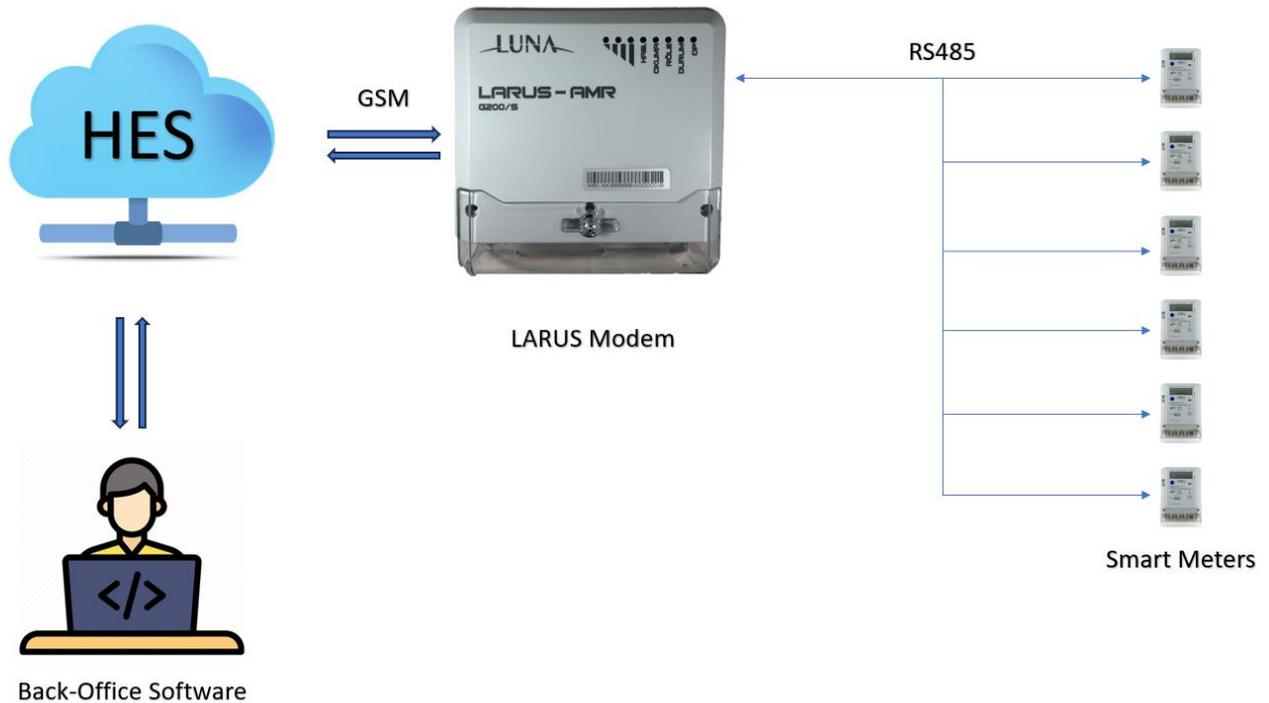


Figure 1. General View of the Device

Integrated features, including Non-volatile memory, multi tariff, phase failure records, changeable load profile period, terminal cover records, main cover records, RTC with battery back-up, 24 previous months records, Anti money laundering (AML) provides extra protection for magnetic tampering. LCD display features are: 9 digits for register value display, 5 digits for obis code display, units of measure on display, configurable LCD screens, configurable digits, previous month data index on display, instant current, voltage, frequency, and power factor on display.

Optional features are:

- LCD backlight,
- Reactive measurement,
- Export measurement,
- Nikel plated coating terminal diameter with 9.5mm,
- Brass terminal diameter with 8.5mm,
- Different free space lengths,
- Billing reset button,
- Communication Type: RS485 (up to 19200 Baud Rate)

2.2 Functional Overview

2.2.1 Meter Characteristics

LSM50 RS meters have the following main characteristics:

- Bi-directional measurements, reactive measurements
- Load Profile options are:
 - 15min/90days
 - 30min/180days
 - 60min/360days
- Tariffication options:
 - Multi-tariff
4 rates & 8 switching times for Weekdays & Saturday & Sunday
 - Single Tariff
 - Advanced Tariff
7-day profile & 4-week profile & 8 season & Holiday profile
- LCD Backlight option
- CT (Current Measurement via Current Transformers),
- Optional battery:
 - CR2032 Type for RTC
 - ER14250C Type for no power read function.
- Terminal cover length options:
 - 19mm
 - 34mm
 - 61mm
- Nominal Voltage U_n :
 - 3x57 | 3x230 V_{AC}
- Operating voltage range:
 - 80% - 115% U_n
- Nominal Frequency f_n : 50Hz ($\pm 2\%$)
- IEC-specific data:
 - Reference Current I_n : 1A
 - Minimum Current I_{min} : 10mA for Class B / C
 - Maximum Current I_{max} : 10A
 - Short-time Overcurrent (10ms): $30 \times I_{max}$
- Active energy measurement accuracy: Class 0.2S (50uA starting current) Class 0.5 or Class 1 (IEC 62053-21) and MID accuracy Class C or Class B (EN 50470-1/50470-3)
- Reactive energy measurement accuracy: Class 2 (IEC 62053-23)
- Starting current $I_{st-active}$: 0.02 % of I_{TR} (=1mA for Class C | =2mA for Class B (0.04 % of I_{TR}))
- Starting current $I_{st-reactive}$: 0.003 % of I_n (=3mA)
- Transitional current I_{tr} : 50mA

- Calendar Clock accuracy at +23°C deviation value is ± 0.5 seconds ÷ day according to IEC 62054-21:2004.
- Communication Interfaces are:
 - Optical Interface (integrated) is serial and bi-directional according to IEC/EN 62056-21.
 - RS485 is serial and bi-directional according to IEC/EN 62056-21.
- Communication Protocol:
 - IEC/EN 62056-21 (Optical & RS485 interfaces)
- Overvoltage Category: OVC III
- The start and end-time of phase interruptions are stored in the non-volatile memory of the meter.
- The first main cover opening date and time information is stored in the non-volatile memory of the meter. Terminal cover opening date and time of current and previous 24 months are recorded in the non-volatile memory.
- The last 10 intervals when magnetic field is applied, and the number of magnetic interventions is stored in the non-volatile memory of the meter.

2.3 Type Designation:

Brand Name

LSM50 RS electricity meter - LSM50 RS

LSM50 RS - 3 C 10 2 3 10 x12 4 63 1 1 1 1 0 0 0 0

Network Type

3 phase 4 wire - 3

Measured Quantities

Active Energy - A
Active-Reactive (Combi) - C

Active Accuracy Class

Class 1 – 10
Class 0.5 – 5

Reactive Accuracy Class

No Reactive - 0
Class 2 - 2

Measurement Mode

Only +A - 1
Only -A - 2
+A/-A - 3
|-A|+|+A| - 4

Maximum Current

10A – 10

Additional Functions

Billing Reset Button - OXX
Load Profile - X1X
DC Magnet Detection - XX2

Surge Resistance

4kV - 4
6kV - 6

LCD Modes

5+3 - 53
6+3 - 63
7+0 - 70

Battery

No Battery - 0
Internal Battery - 1

Magnetic Sensing

No - 0
Yes - 1

LCD Backlight (Optional)

No - 0
Yes - 1

Reactive (Pulse) LED

No LED - 0
One LED - 1
Two LEDs - 2

Line Current Sensor

Non-Shielded CT - 0

Terminal Screw

Nickel Plated - 0
Brass - 1

Base / Top Cover

Opaque Grey Base & Opaque Grey Top - 0

Connection Sequence

LLLN - 0

2.4 Technical Details

2.4.1 Overview

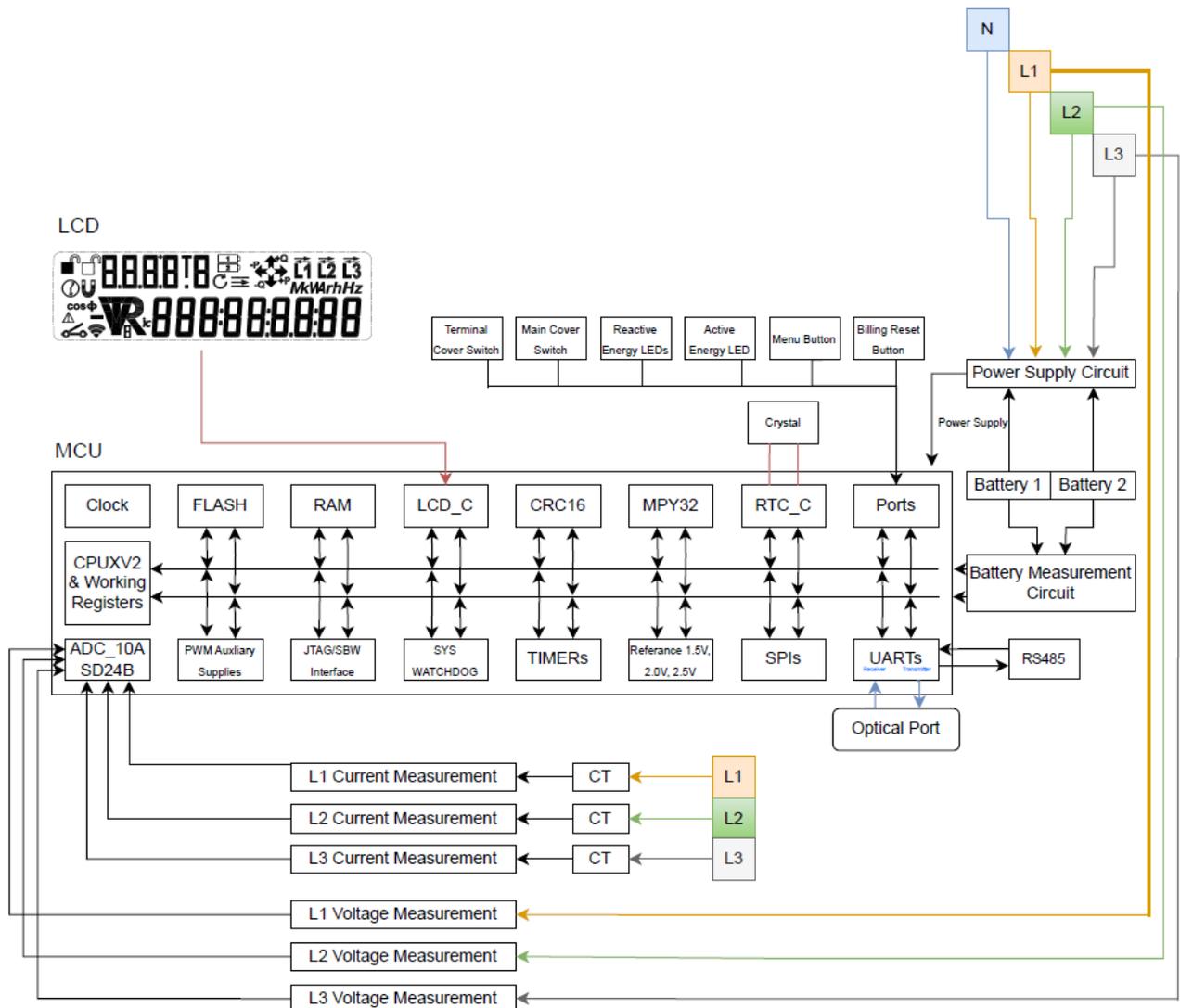


Figure 2: Block Diagram of LSM50 RS

2.4.1.1 Inputs

The main meter inputs are:

- Phases and neutral connections for each phase:
 - Energy measurement
 - Power supply to the meter
- User interface button
- Billing reset button

2.4.1.2 Outputs

The main meter outputs (some of which are also inputs) are:

- LCD to display measured values and the corresponding OBIS code
- Optical test output LED (red, for active and reactive energy)
- Optical interface for data readout on site by means of a suitable PDA (also input)

2.4.1.3 Power supply

The supply voltage for the meter electronics is taken from the single-phase system. It works correctly as soon as phase and neutral are connected to mains voltage. In the event of mains failure, a voltage monitor ensures the safe storage of meter data and manages the restart when mains voltage is restored.

2.4.1.4 Memory

Meter parameters are stored in a non-volatile (flash) memory, which protects the parameters in the event of power failure over the whole lifetime of the meter.

2.4.2 Signal Generation

The measuring element measures the phases current using current transformers, and the phase voltage over a resistor divider. Analogue/digital converters transform both signals into digital voltage and current data. This data is then multiplied by a digital multiplier to produce an energy proportional value. The resulting value is fed into the microprocessor and then transferred into the corresponding (rate-dependent) energy registers.

The microprocessor generates pulses for the optical pulse output LED from the digital sum of the measured phase values according to the meter constant R.

2.4.3 Signal Processing

The output values of the MCU core are used as a basis for further calculations.

2.4.3.1 Calibration

The measurement system is calibrated during the manufacturing process of the meter. Calibration data is stored in non-volatile memory and cannot be altered.

2.4.3.2 Start Detection

The microprocessor compares the measured power with the minimum starting power. Signals are only passed on if the minimum starting power is exceeded.

2.4.3.3 Type of measurement

The following energy values can be measured and stored in the registers:

- Active energy (A)
- Reactive energy (R)
- Apparent energy (VA)
 - The +A and +R signals are calculated by the summation of imported measured active and reactive energy.
 - The -A and -R signals are calculated by the summation of exported measured active and reactive energy.
 - The combined totals are the sum of the absolute values of +A and -A or +R and -R.
 - Energy type: kWh, kVARh, kVAh
 - Direction: Import, export, ± reactive by quadrant

2.4.3.4 Instantaneous values

Voltage, current, angles, frequency, active power, active power, apparent power, and power factor.

2.4.3.5 Measurement channels

There are 19 independent measurement channels. Each of the measured quantities is assigned to one of these channels.

2.4.3.6 Energy registers

Each of the 13 measurement channels (3 current, 3 voltage, 3 frequency, 3 pf, 1 demand) has a total energy register assigned to it. Also, for LSM50 RS products have many options for tariff (active tariff: can be changed instantly, passive tariff: can be changed after desired date) can be configurable from customer side. The internal register magnitude is expressed in Wh (Watt-hour) Internal registers cannot be reset. When the internal register reaches 4.000.000 kWh, it rolls over to 0. In addition, the LCD has 6+3 digits and configurable.

2.4.3.7 Demand registers

There are 24 demand registers.

2.4.3.8 Demand supervision

The meter monitors power and phase currents.

2.4.3.9 Profiles

The meter supports one load Profiles (Load Profile 1), 1 quality of supply profile and 2 billing data profile.

2.4.3.10 Rates

The meter is designed for up to 4 rates. The assignment of the rate registers is done by means of parameterisation.

2.4.3.11 Rate control

Rate control is performed by the Time-of-Use (TOU) programme.

2.4.3.12 Four-quadrant measurement

The reactive energy ($\pm R_c$, $\pm R_i$) is allocated to the four quadrants as follows:

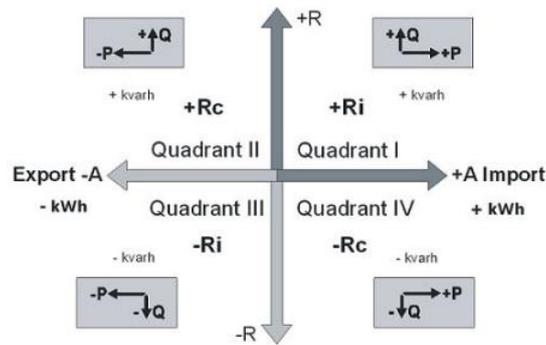


Figure 3: Four-quadrant measurement

2.5 Outputs

Optical Interface, RS485 and test output LED are included in the LSM50 RS.

3 Mechanical Construction

3.1 Case

The meter case is made of Lotte Infino HN3104. The LCD display, the menu button, the optical interface and the pulse output LEDs are always visible.

Mains power and auxiliary terminals are located under the sealable terminal cover. An additional certification seal may be used, if required. The meter cover is sealed for life.



Figure 4: Meter Case

1. LCD Screen
2. Menu Button
3. Optical Port Interface
4. Seal of Distribution Company
5. Billing Reset Button (Optional)
6. LUNA Seal

3.2 Faceplate

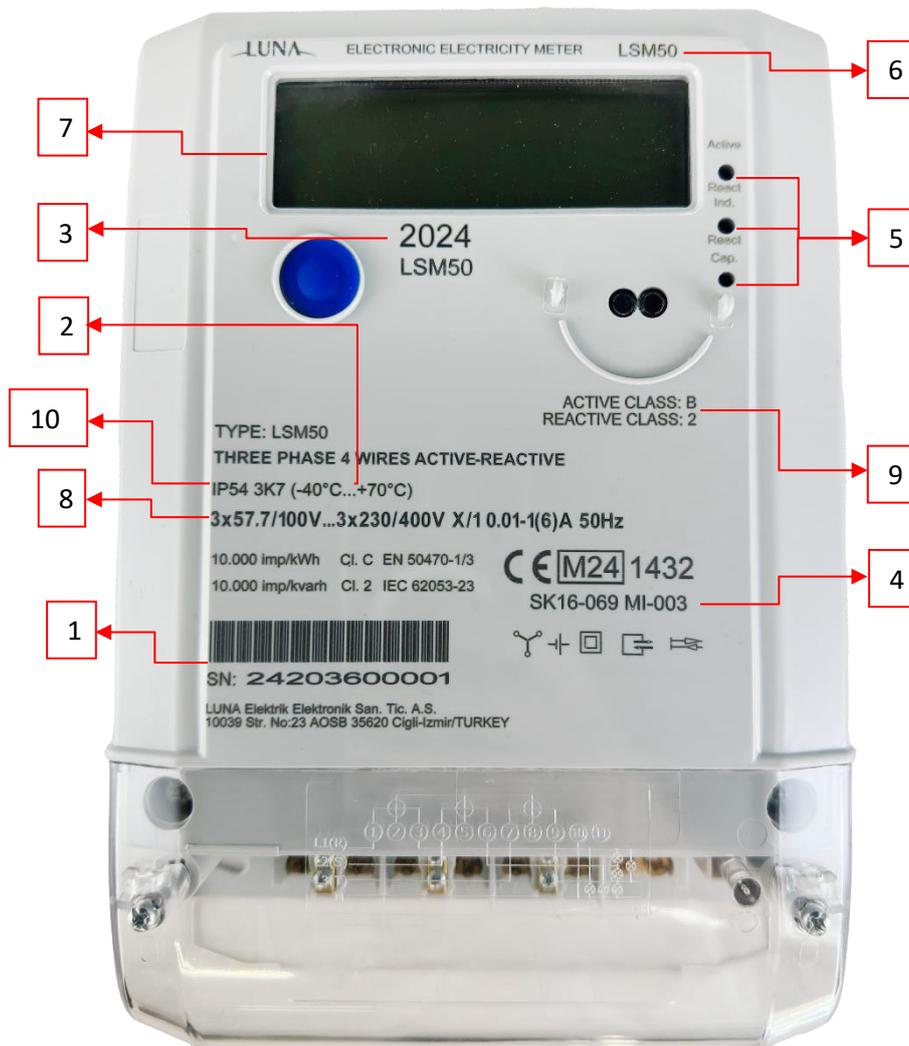


Figure 5: LSM50 RS 3-phase Meter Faceplate

1. Barcode and Customer Property Number
2. Nominal Operating Temperature Range
3. Year of Manufacture
4. Approval Number
5. Active, Capacitive and Inductive Test Output LEDs
6. Product Name
7. Information Blog on the LCD Screen
8. Nominal Connection Values (Current Range, Voltage and Frequency)
9. Accuracy Classes for Active and Reactive Measurement
10. Protection Class: IP54, Mechanical Class: M1, Electromagnetic Class: E2

3.3 Control Elements

The LSM50 RS has two control buttons:

- A user interface button for scrolling through tariffs.



Figure 6: Control Elements

1. Billing reset button
2. User Interface Button
3. Optical Interface

3.4 Dimensions:

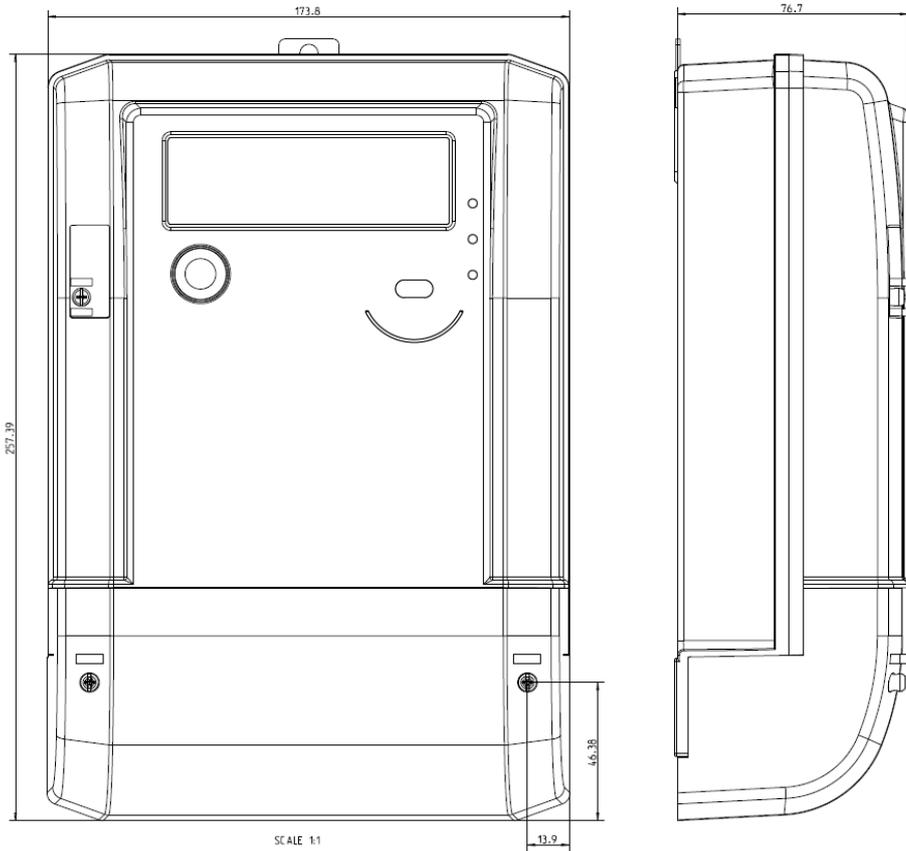


Figure 7: Front & Side Dimensions

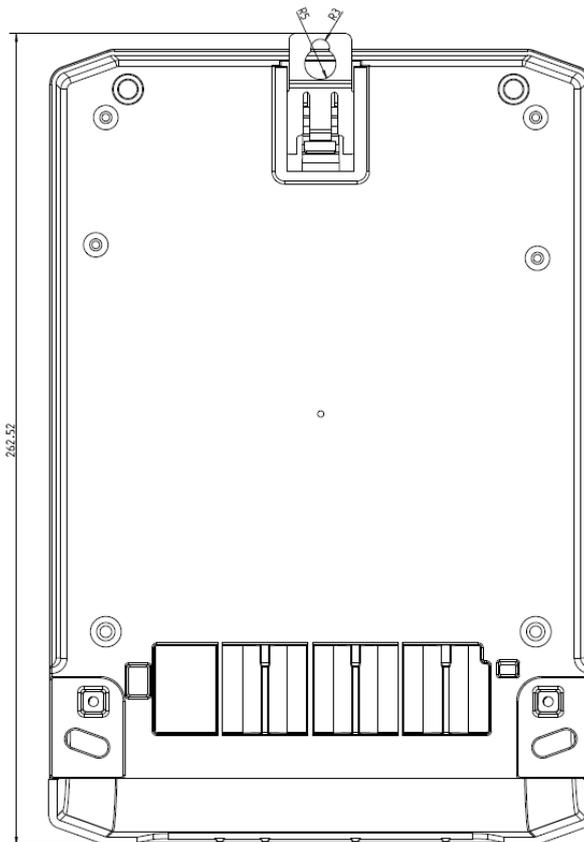


Figure 8: Back Dimension of LSM50 RS (mm)

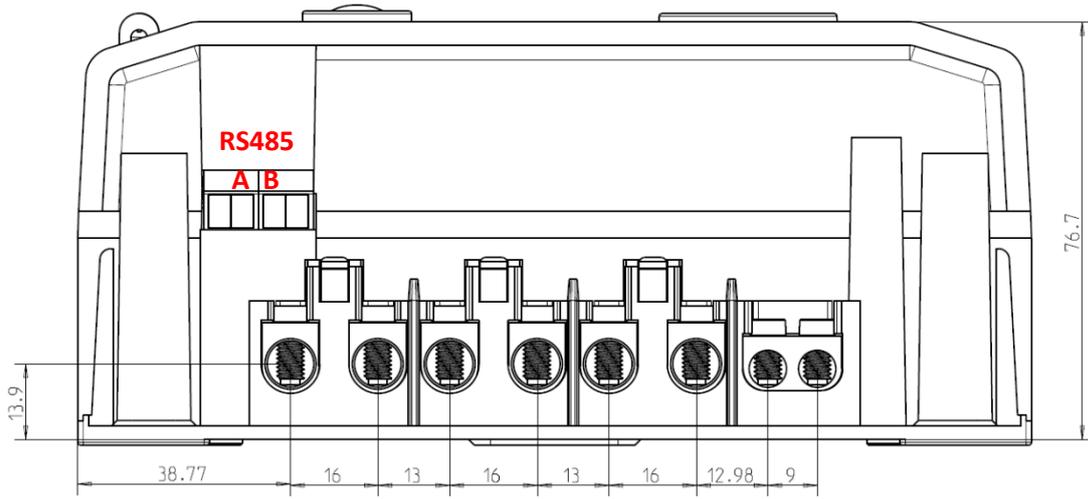


Figure 9: Dimension of Connection Terminal of LSM50 RS (mm)

3.5 Connection Diagram:



Caution

Where to find relevant diagrams.

The diagrams relevant for the installation are shown on the meter's faceplate and/or above the connection terminals.

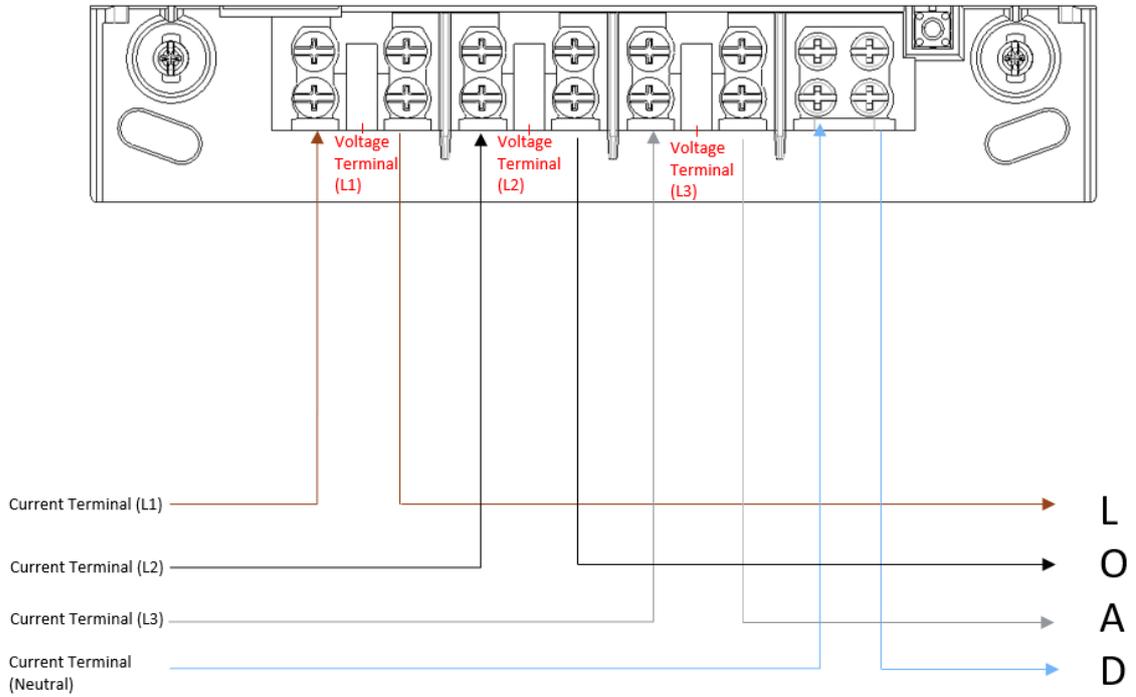


Figure 12: LSM50 RS Connection Diagram

4 Installation

Warning



Don't touch live parts

Dangers can arise from live electrical installations to which the meters are connected.

Touching live parts is dangerous to life. All safety information should therefore be strictly observed.

Note

Intended environmental conditions for meter installations:

- The meter is intended to be installed in an "M1" mechanical environment, with vibration and shocks of low significance as per directive 2014/32/EU.
 - The meter is intended to be installed in an "E2" electromagnetic environment as per directive 2014/32/EU.
 - The meter is intended to be installed indoors.
 - The meter is intended to be installed in non-condensing humidity conditions.
 - The meter should be installed with copper conductors. The use of aluminium conductors may result in corrosion. Seek advice from Luna before using this meter with aluminium conductors.
 - The installation site must meet the requirements of the device's ingress protection class (IP54) and the operating temperature range (-40 ... +70 °C).
 - Ingress protection class IP54 can only be ensured, if all connected cables are routed away from the meter without opening any breakouts in the terminal cover.
 - Avoid installing the device on south-facing walls and direct sunlight. If necessary, use an additional shield or visor to protect the installation from direct sunlight (shield not provided by LUNA).
-



Caution

This meter is intended for indoor use only

In cases where an outdoor installation is unavoidable, care must be taken to ensure the meter is installed within a suitable enclosure to maintain the operating environment in accordance with the meter specification. Such enclosures must be securely sealed to avoid the risk of meter damage because of exposure to the external environment including, but not limited to, extreme temperatures, humidity, and insect ingress.



4.1 Introduction:

The following conditions must be met for the installation and commissioning of the meter:

- The work described below must only be conducted by technically qualified and suitably trained persons.
- These persons must be familiar with and observe local safety regulations.
- Rules and regulations contained in section Safety on page 6, the safety regulations, as well as guidelines for safe operation, must be strictly observed.
- All the materials and tools required must be present before starting work.

4.2 Before Installation:

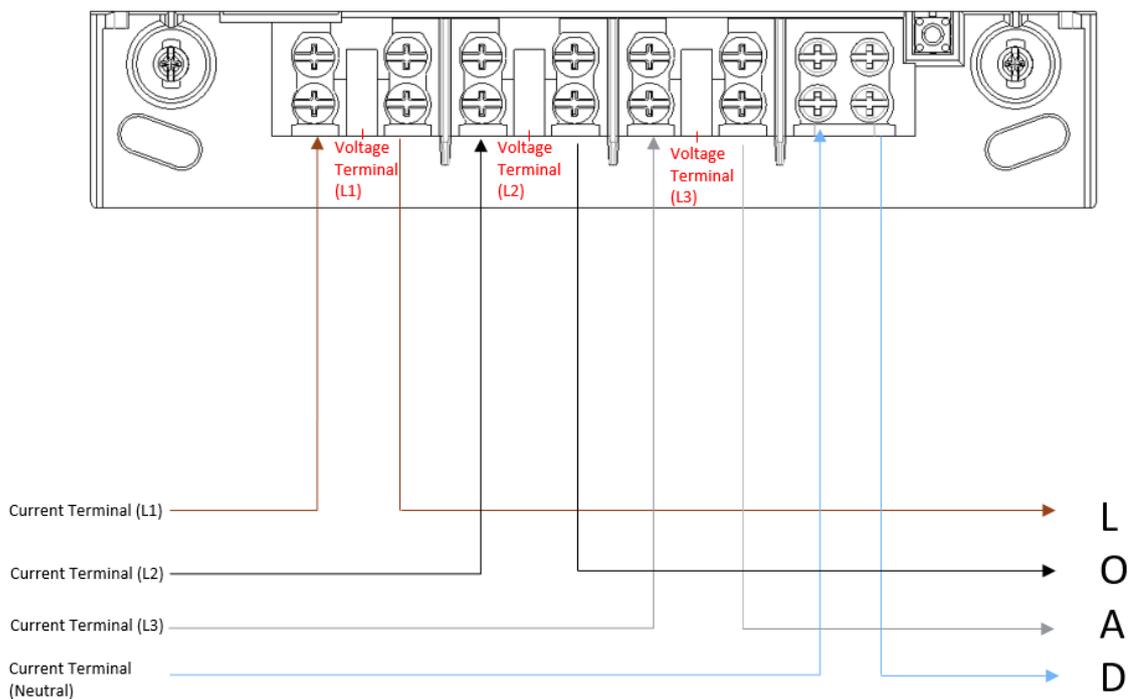


Figure 13: Connection of Phase and Neutral Terminals

Warning



Dangerous voltage on conductors

The connecting wires at the place of installation must not be live when mounting the meter. Touching live parts is dangerous to life. The main fuse should be removed and kept in a safe place until work is completed, so that it cannot be replaced by anyone unnoticed.

Caution



No overcurrent protection and automatic disconnection

The meter has no internal overcurrent protection and no method of disconnection from the mains. Overcurrent protection must be provided by the end installation.

4.3 Wall Board Mounting Screw Positions

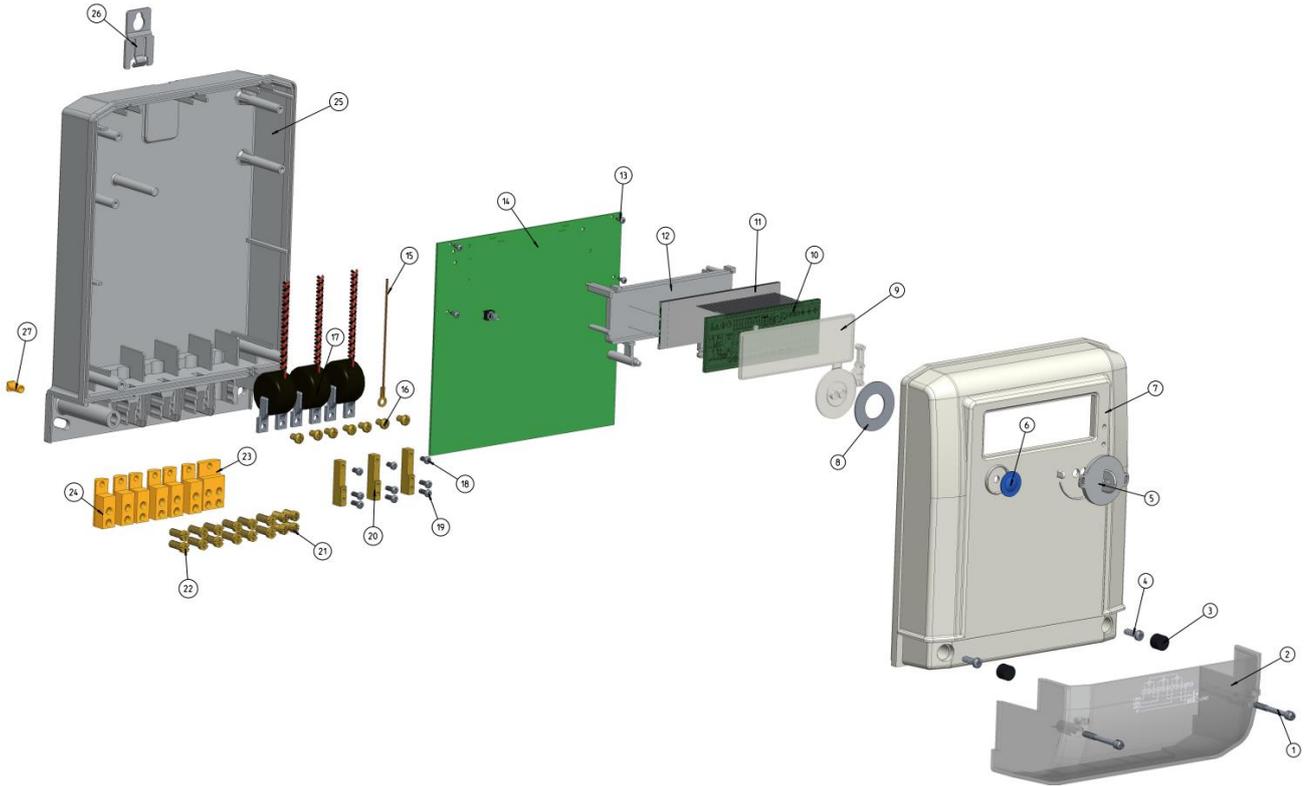


Figure 14: Exploded BoM & Wall Board Mounting Screw Positions

4.4 Connecting:

4.4.1 Connecting Phase & Neutral Terminals:

Note



Observe safety precautions.

Prior to connecting the meter, read and strictly observe the general safety instructions given in section Before Installation. The meter must be mounted as described in section Mounting before it is connected.

Caution



Do not withdraw connecting wires with closed terminals.

Never pull-on connecting wires when the terminals are closed, as this can damage the terminals.

Caution



If the meter is used with pins, pin adapters or cables with a lower maximum current than the maximum current of the meter (as indicated on the faceplate of the meter), the maximum current of the meter does not apply, and it is the responsibility of the installer to fuse the meter appropriately

**Caution**

If the meter was delivered with pins, the torque of the phase terminal screws must be checked after installation.

**Caution**

Use ferrules with multi-stranded wires.

When using multi-stranded wires, the use of ferrules is required.

**Caution**

Use appropriate screwdrivers.

Always use properly maintained torque-controlled screwdrivers. Torque must be regularly re-calibrated according to the instructions of the screwdriver manufacturer.

Inspect the screwdriver tip on a regular basis as worn out tools can damage screws and incorrect torque might be applied.

Under no circumstances a slotted/pozidriv combi bit screwdriver shall be used without torque control.

Meters are provided with a double-screw crimp type terminal. The terminals meet the requirements of the rotation test IEC 60999-1 clause 9.4 and pull test IEC 60999-1 clause 9.5.

When using an electric screwdriver, set the screwdriver to the correct torque and use it with great care and at the right angle. It is also important to use low speed and exert the required pressure against the screw head.

1. Cut the phase and neutral conductors to the required length and strip their ends. The insulation of the conductor must extend as far as the terminal indentation i.e., there must be no bare wire visible outside the terminal edge. The stripped part of the conductor should be shortened, if necessary.

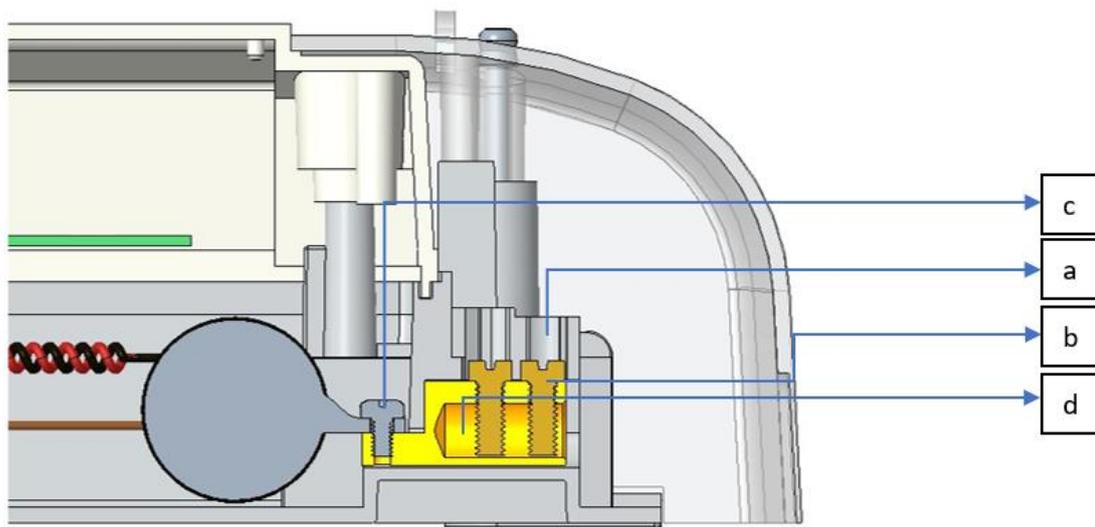


Figure 15: Double Screw Crimp Type Terminal

- a. Terminal Block
- b. Terminal Screw
- c. CT Screw (Inner one)
- d. Terminal

2. The meter can relate to solid (single wire), stranded or multi-stranded conductors. Ferrules must be used when multi-stranded (very finely stranded and flexible) conductors, e.g., RK (IEC 60228-5), are used.
3. Insert the phase and neutral conductors to the relevant terminals (the terminals are numbered as shown in the connection diagram) and tighten the terminal screws firmly (recommended torque 2.5 Nm and maximum torque 2.7 Nm). Use a slotted/pozidriv combi bit #2 screwdriver.
4. The conductor must always be carefully placed in the middle of the terminal in such a way that it cannot move sideways when tightening the terminal screws. When tightening ensure that the conductor remains in the brass terminals. The smaller the diameter of the cable, the more care is required.
5. The beginning and end of the relevant conductors should be identified using a suitable test unit (e.g., buzzer) to ensure that the right consumer is connected to the meter output.

4.5 Commissioning and Functional Check

The installed meter should be checked and put into service as follows:

1. Insert the main fuses removed before installation. The meter turns itself on.
2. Check the display for error message and check, if no load is connected, that the test output LED glows red.
3. Connect a load and check that the pulse output LED starts blinking.
4. Check that the meter is measuring correctly. Display indicators and their functions are described in section Display.
5. Check the meter display (go to Figure 10) once more to make sure that the display state corresponds with the physical state of the installation:

The installer should observe the following:

- Correct connection to mains network
 - Phase voltages
- Energy flow direction and pulse output LED
- Any error codes.
- General purpose arrows (configurable)
 - Energy rates
 - Internal errors in the meter

4.6 Billing Reset Button Usage

For using this button, you need to follow these steps (pictures):

1. Remove the seal (if exists) from screw (M4, star).



Figure 16

2. Turn the screw CCW (counter-clockwise) with 1.12Nm screwdriver #2.

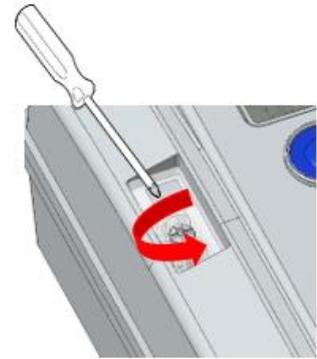


Figure 17

3. Set aside the mini cover.

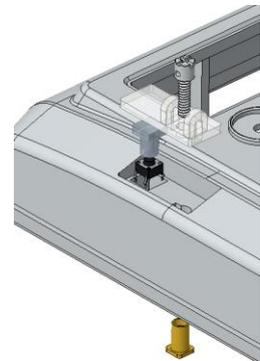


Figure 18

4. Push the button that in the red circle. When you would like to close you can follow inverse of these directions.



Figure 19

4.7 Uninstalling the Meter

Warning



Remove main fuse before disconnecting

The connection wires at the place of installation must not be live when removing the meter. Touching live parts is dangerous to life. The corresponding main fuse should be removed and kept in a safe place until work is completed, so that it cannot be replaced by anyone unnoticed.

1. Switch off the voltage. The display goes off.
2. Release and remove the terminal cover.
3. Ensure with a phase checker that the connection wires have no voltage. If there is voltage, remove the main fuses.
4. Remove the connection wires of RS485 (if included).
5. Loosen the terminal screws of the phases and neutral connection wires with a suitable screwdriver and withdraw the wires from the terminals.
6. Remove the mounting screws and dismount the meter.
7. Mount a substitute meter with the three fixing screws on the mounting surface.
8. Connect the substitute meter as described in Connecting section and the following section.

5 Operation

5.1 Display

5.1.1 Basic Layout and Display Symbols

By the definition of MID regulation, on the LCD screen of LSM55 meters, there is 6 integers and 3 decimals. The information displayed on LCD can vary.

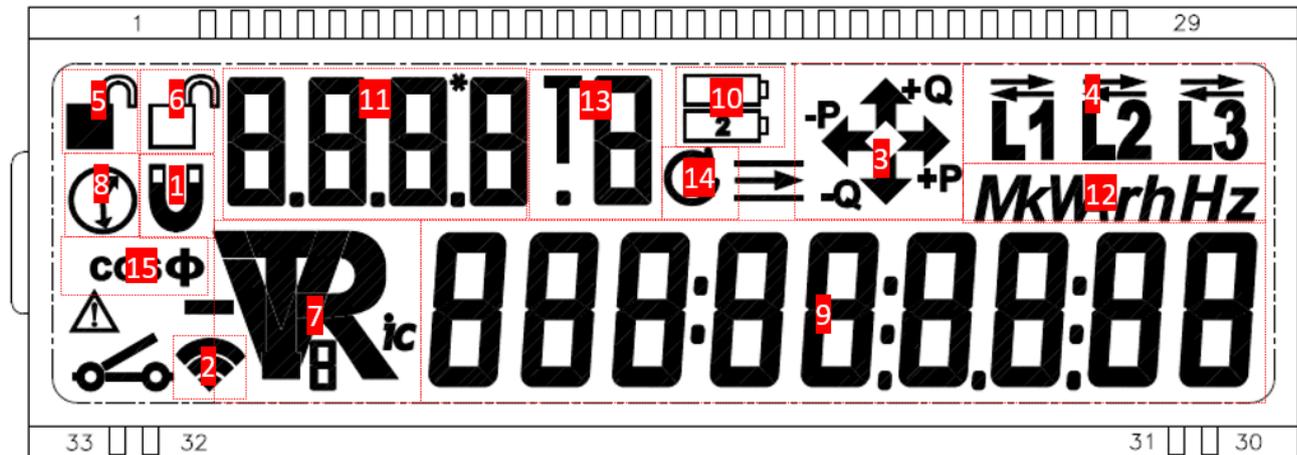


Figure 21: LCD Screen

1. This sign means there is a magnetic intervention to the meter. (MAGNETIC INTERVENTION NOTIFICATION),
2. If the meter is able to communicate the icon is displayed on the screen. (COMMUNICATION NOTIFICATION),
3. Energy direction and no-load indication (segments for showing the energy direction, quadrants and Active & Reactive energy no-load symbols),
 - a. Import energy notification $\rightarrow +P$
 - b. Export energy notification $\leftarrow -P$
 - c. Reactive inductive energy notification $\uparrow +Q$
 - d. Reactive capacitive energy notification $\downarrow -Q$
4. Phase directions,
5. It indicates that main cover is opened. In case of unauthorized execution of this process, warranty will be void and penalty fees may be incurred. (MAIN COVER REMOVAL NOTIFICATION),
6. The visual on this notice on the screen indicates that terminal cover previously opened. In case of unauthorized execution of this process, warranty will be invalid and penalty fees may be incurred. (TERMINAL COVER REMOVAL NOTIFICATION),
7. General purpose symbol (factory configurable), energy rates and base units ($V_1, V_2, V_3, I_1, I_2, I_3, I_{1,2,3}, F_1, F_2, F_3, T, -T, R_i, R_c, -R_i, -R_c, P, -P$),
8. This sign means Real-time clock is disrupted for any reason. In this case, the meters write the values at the "Tariff T1". (REAL TIME CLOCK FAILURE NOTIFICATION),
9. Value Field (9 digits for showing values),
10. This notice appears on the screen when the battery level is lower than a certain voltage level.. When you see this sign, please inform authorized personnel and/or organization. (LOW BATTERY NOTIFICATION),
11. Code field (4 digits for showing OBIS codes),
12. Electricity measurement units (V, A, kW, kW -, kWh+, kWh-, kvarh+, kvarh-, kvarh, Hz, MWh),
13. Tariffication count,
14. Reset icon,
15. Power factor icon.

5.2 Operation Elements

5.2.1 LCD

The meter displays energy data and other parameters on its 5-integer (optionally 6 integer), 3-decimal digit LCD screen. It also displays symbols for the notifications described above. Detailed information about LCD can be found in the LCD Screen Information section.

5.2.2 User Interface Button

The LCD menus can be scrolled by pressing the menu button.

5.2.3 Active Power Consumption LED

Each light pulse indicates 1 Wh active power consumption.

5.2.4 Reactive Power Consumption LED (On Active-Reactive Model)

Each light pulse indicates 1 VARh reactive power consumption.

5.2.5 Optical Port

Optical port feature enables data transfer and programming in compliance with EN 61107 communication protocol.

A receiver and a transmitter diode are used for optical communication. Communication interface provides all index info, index, and demand data from past months, and enables officials to make authorized changes.

5.2.6 Sealing Spots

Embedded spots are found on the meter case to prevent intervention to the meter.

5.2.7 RS485 Communication

Support up to 19200 Baud Rate via RS485 port.

5.3 Menus:

LSM50 RS electricity meter has two types of menus.

1. Sub Menu
2. Main Menu

And LSM50 RS firmware can configure all OBIS codes for menu types.

For default LSM50 RS menus include OBIS Codes which are include under tables:

1. Sub Menu:

To display "Sub Menu" on the screen, press and hold the menu button of the meter for 4 seconds. In the sub-menu, Voltage, Current, Power Factor, Frequency information and previous month information of T, -T, Reactive inductive, Reactive Capacitive, Demand will appear on the screen respectively and scroll automatically. To quit "Sub Menu", press and hold the menu button of the meter for 4 seconds.

OBIS Code	Description	Meter Types	Menu
0.0.0	Serial Number	1ph - 3ph - Combi	Sub Menu
96.70	Top Cover Tampering Date/Hour	1ph - 3ph - Combi	Sub Menu
96.71	Terminal Cover Tampering Date/Hour	1ph - 3ph - Combi	Sub Menu
0.2.0	Program Version	1ph - 3ph - Combi	Sub Menu
32.7.0	Vrms L1	1ph - 3ph - Combi	Sub Menu
52.7.0	Vrms L2	3ph - Combi	Sub Menu
72.7.0	Vrms L3	3ph - Combi	Sub Menu
31.7.0	Irms L1	1ph - 3ph - Combi	Sub Menu
51.7.0	Irms L2	3ph - Combi	Sub Menu
71.7.0	Irms L3	3ph - Combi	Sub Menu
14.7.0	Frequency	1ph - 3ph - Combi	Sub Menu
33.7.0	Cosfi L1	1ph - 3ph - Combi	Sub Menu
53.7.0	Cosfi L2	3ph - Combi	Sub Menu
73.7.0	Cosfi L3	3ph - Combi	Sub Menu

Table 1

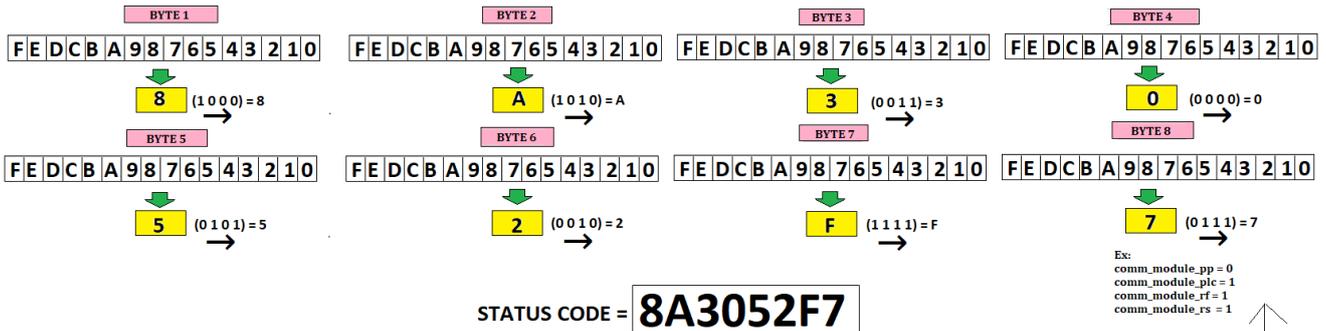
2. Main Menu:

OBIS Code	Description	Meter Types	Menu
0.9.2	Date	1ph - 3ph - Combi	Main Menu
0.9.1	Hour	1ph - 3ph - Combi	Main Menu
1.8.0	T Total Active Energy	1ph - 3ph - Combi	Main Menu
1.8.1	T1 Tariff Active Energy	1ph - 3ph - Combi	Main Menu
1.8.2	T2 Tariff Active Energy	1ph - 3ph - Combi	Main Menu
1.8.3	T3 Tariff Active Energy	1ph - 3ph - Combi	Main Menu
1.8.4	T4 Tariff Active Energy	1ph - 3ph - Combi	Main Menu
2.8.0	T Total Active Energy Export	1ph - 3ph - Combi	Main Menu
2.8.1	T1 Tariff Active Energy Export	1ph - 3ph - Combi	Main Menu
2.8.2	T2 Tariff Active Energy Export	1ph - 3ph - Combi	Main Menu
2.8.3	T3 Tariff Active Energy Export	1ph - 3ph - Combi	Main Menu
2.8.4	T4 Tariff Active Energy Export	1ph - 3ph - Combi	Main Menu
5.8.0	Ri Inductive Reactive Energy (+)	Combi	Main Menu
6.8.0	Rc Capacitive Reactive Energy (+)	Combi	Main Menu
7.8.0	Ri Inductive Reactive Energy (-)	Combi	Main Menu
8.8.0	Rc Capacitive Reactive Energy (-)	Combi	Main Menu

1.6.0	Pmax Active Power - Demand Import	1ph - 3ph - Combi	Main Menu
1.6.0	Pmax Demand Date/Hour	1ph - 3ph - Combi	Main Menu
2.6.0	Pmax Active Power - Demand Export	1ph - 3ph - Combi	Main Menu
2.6.0	Pmax Demand Date/Hour	1ph - 3ph - Combi	Main Menu
-	Test Screen	1ph - 3ph - Combi	Main Menu

Table 2

5.4 Status Codes:



	F.F.0	F.F.1	F.F.2	F.F.3
BYTE 1 ↓	Reserved bit (all time 0) Reserved bit (all time 0) Reserved bit (all time 0) general_system_error1	Reserved bit (all time 0) Reserved bit (all time 0) shock_tamper diode_tamper	Reserved bit (all time 0) Reserved bit (all time 0) Reserved bit (all time 0) Reserved bit (all time 0) Reserved bit (all time 0)	Reserved bit (all time 0) Reserved bit (all time 0) Reserved bit (all time 0) Reserved bit (all time 0)
BYTE 2 ↓	Reserved bit (all time 0) Reserved bit (all time 0) extrem_high_consumption_error extrem_high_demand_error	Reserved bit (all time 0) parameter_write_occured rtc_write_occured tariff_write_occured	Reserved bit (all time 0) Reserved bit (all time 0) Reserved bit (all time 0) battery_removed	feature_dst feature_magnetic_tamper_detection feature_over_current feature_over_under_voltage
BYTE 3 ↓	meas_ic_fatal_error meter_locked2 meter_locked rs485_port_fatal_error	Reserved bit (all time 0) neutral_current_error reactive_limit_excess maximum_demand_excess	Reserved bit (all time 0) Reserved bit (all time 0) Reserved bit (all time 0) Reserved bit (all time 0)	Reserved bit (all time 0) Reserved bit (all time 0) Reserved bit (all time 0) Reserved bit (all time 0)
BYTE 4 ↓	rf_module_fatal_error plc_module_fatal_error magn_ic_error memory_bus_error other_fatal_errors	batt2_warning0 (11 full, 10 decreased, 01 weak, 00 empty) batt1_warning0 (11 full, 10 decreased, 01 weak, 00 empty)	Reserved bit (all time 0) Reserved bit (all time 0) rf module connected plc module connected	Reserved bit (all time 0) option_imp_10000 option_dlms_comm Reserved bit (all time 0)
BYTE 5 ↓	fatal_flash_memory_write_error fatal_checksum_error_within_billing_data checksum_error_within_billing_data	voltage_unbalanced_warning current_unbalanced_warning startup_reactive_energy startup_active_energy	Reserved bit (all time 0) latching_relay_error_occured latching_relay_status_changed latching_relay_connected	option_lcd_sub_menu option_tatil_gunleri option_phase_interruptions_advanced option_lcd_backlight
BYTE 6 ↓	metrology_fatal_error metrology_ic_communication_error metrology_voltage_path_error metrology_current_path_error	phase3_interruption_occured phase2_interruption_occured phase1_interruption_occured phase123_interruption_occured	Reserved bit (all time 0) Reserved bit (all time 0) strong_magnetic_fields_occured strong_magnetic_fields_status	Reserved bit (all time 0) option_load_profile option_reactive_measurement option_export
BYTE 7 ↓	meter_supply_failure Reserved bit (all time 0) cold_reset_occured warm_reset_occured	phase3_on phase2_on phase1_on phase_sequence_correct	terminal_cover_opened terminal_cover_status front_cover_opened front_cover_status	bsl_sw_yok option_memory_spi_flash option_memory_eeprom option_latching_relay
BYTE 8 ↓	energy_measured_or_imminent not_calibrated rtc_error clock_invalid	reversed_phase over_current_error under_voltage_error over_voltage_error	remote_date_time_synchronisation local_date_time_synchronisation remote_meter_parameterisation local_meter_parameterisation	comm_module_pp comm_module_plc comm_module_rf comm module_rs

Figure 21: Status Codes

6 Service

The device has no user-serviceable parts.

Device service is available through your local LUNA representative.

6.1 Troubleshooting

If the meter is not operating correctly, check the display for error messages (see section Display for instructions on how to use the display). If there are problems with the meter the following items should be checked first.

1. Is mains voltage present (check display of meter)?
2. Has the maximum ambient temperature been exceeded?
3. Is the meter visibly damaged?
4. Is there any error code displayed (code F.F)? The error codes are described in section Status Codes on page 37.

6.2 Cleaning

To remove normal dirt such as dust, use a soft, damp cloth. Do not use any solvents or cleaning agents. If the device is heavily soiled, e.g., the display is no longer readable, it should be uninstalled and sent to an authorised service centre.



Warning

Danger of short-circuits.

Never clean soiled devices under running water or with high pressure equipment. Water ingress can cause short-circuits and damage the device.

6.3 Error Messages

The meter performs regular internal self-tests. If a critical error is detected during self-test, an error is displayed. If only one error has occurred, a textual description of that error is displayed. If more than one error has occurred, a hexadecimal error code indicating several errors is shown.

If an error appears while the display is in a sub-menu (not in operating display), the display is not interrupted. Only the operating display can be interrupted by an error. The error is displayed as soon as the device goes back to operating display.

6.3.1 Critical Errors

Critical errors indicate severe problems, but the device can still operate. However, the data measured and stored in the meter may be corrupted and it is recommended that meters showing critical errors are returned to the LUNA service centre.

7 Terms and abbreviations

The following terms and abbreviations are used in this document.

Term	Description
COSEM	Companion Specification for Energy Metering. COSEM is an interface model of communicating energy metering equipment, providing a view of the functionality available through the communication interfaces.
MID	Directive 2004/22/EC of the European Parliament and the Council of 31 March 2004 on measuring instruments.
OBIS	Object Identification System. OBIS provides standard identifiers for all data within the metering equipment, both measurement values and abstract values.
RTC	Real Time Clock
AML	Anti Money Laundering
CT	Current Transformer
LCD	Liquid-Crystal Display
IEC	International Electrotechnical Commission
EN	European Standards
LED	Light-Emitting Diode
AC	Alternative Current
SMPS	Switching-Mode Power Supply
MCU	Microcontroller Unit

Table 4

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Contact:

Luna Elektrik Elektronik SAN. TIC.LTD STI

10039 Street No:23

Atatürk O.S.B.

İzmir - TURKEY

Phone: +90 232 472 15 45

www.lunatr.com

