LEM022SL DIGITAL DISPLAY KWH METER INDIRECT
230V | 400V | 1(5A) | 50Hz | class 1

DIN rail three phase four wire active energy meter

User manual

1.1 Safety instructions

Information for Your Own Safety
This manual does not contain all of the safety measures for operation of the LEM022SL, because special operating conditions, local code requirements or local, national or international regulations may necessary to take further measures. It does contain information which must be adhered to in the interests of your own personal safety and to avoid material damages.

Warning
Means that failure to observe the instruction can result in death, serious injury or considerable material damage.

Caution
Means hazard of electric shock and failure to take the necessary safety precautions will result in death, serious injury or considerable material damage.

Qualified personnel
Commissioning and operation of SEP LEM022SL described in this manual may only be performed by qualified personnel. Qualified personnel in the sense of the safety information contained in this manual are persons who are authorized to commission, start up, ground and label devices, systems and circuits according to safety and regulatory standards.

Use for the intended purpose
The SEP LEM022SL may only be used for the application cases specified in the catalog and the user manual and only in connection with devices and components recommended and approved by SEP Europe.

Proper handling
The prerequisites for reliable operation of the product are proper transport, proper storage, installation and assembly, as well as proper operation and maintenance. When operating electrical equipment, certain parts of this equipment automatically carry dangerous voltages. Improper handling can therefore result in serious injury or material damage.

- Use only isolated tools.
- Do not connect while circuit is live (hot).
- Place the meter only in dry surroundings.
- Do not mount the meter in an explosive area or exposed to dust, mildew and insects.
- Make sure the used wires are suitable for the maximum current of this meter.
- Make sure the AC wires are connected correctly before activating the current/voltage to the meter.
- Do not touch the meter connecting clamps directly with your bare hands, with metal, blank wire or other material as you will have the chance of an electric shock and a possible chance for health damage.
- Make sure the protection cover is placed after installation.
- Installation, maintenance and repair should only be done by a qualified personnel.

- Never break the seals and open the front cover as this might influence the functionality of the meter, and will be avoid any warranty.
- Do not drop, or allow physical impact to the meter as there are high precision components inside that may break or render the meter measure accurately.

Exclusion of liability
We have checked the contents of this publication and every effort has been made to ensure that the descriptions are as accurate as possible.
However, deviations from the description cannot be completely ruled out, so that no liability can be accepted for any errors or omissions contained in the information given. The data in this manual are checked regularly and the necessary corrections are included in subsequent editions. We are grateful for any improvements that you care to suggest.

1.2 Foreword

Thank you for purchasing the LEM022SL DIN rail three phase four wire energy meter. The LEM022SL energy meter is an advanced type electronic kWh meter available at the market. With the our product range we have introduced a large scale of energy meters on the market suitable for 110VAC to 400VAC (50 or 60Hz).

Although we produce the LEM022SL meter according to IEC 62053-21 and our accurate quality inspection there might always be a possibility that your product shows a fault or failure for which we do apologize. Under normal conditions your product should give you years of benefit and pleasure. In case there is problem with the energy meter you should contact your dealer immediately. All energy meters are sealed with a special seal. Once this seal is broken there is no possibility to claim (for) warranty. Therefore NEVER open an energy meter or break the seal of the energy meter. The warranty time is 12 months, after purchase, and only valid for construction faults.

1.3 Performance criteria:

Operating humidity	≤ 75%
Storage humidity	≤ 95%
Specified operating temperature	-10°C - +40°C (3K5)
Limit operating temperature	-25°C - +55°C (3K6)
Storage temperature	-40°C - +70°C (1K5)
International standard	IEC 62053-21
Accuracy class	Class 1
Protection against penetration of dust and water	IP51
Insulating encased meter of protective class	Ⅱ

1.4 Specifications:

Reference voltage (Un)	230/400V AC (3~)
Operational voltage	161/279 – 300/520V AC (3~)
Insulation capabilities:	
- AC voltage withstand	2KV for 1 minute
- Impulse voltage withstand	6KV – 1.2μS waveform
Minimum current (Imin)	0.25 A
Transitional current (Itr)	0.5 A
Reference current (Iref)	5 A
Maximum current (Imax)	5 A
Operational current range	0.25A - 5A
Over current withstand	3000A for 0.01s
Operational frequency range	50Hz ±10%
Internal power consumption	≤2W / 10VA per phase
Test output flash rate (PULSE LED)	400 pulses per kWh (2.5Wh/imp)
Pulse output rate (pins 26 & 27)	400 pulses per kWh (2.5Wh/imp)
Pulse supply current	Ui max=27V / Ii max 27mA
Power supply indicator (L1, L2 & L3 LED)	Meter is connected and working OK.
Consumption indicator (PULSE LED)	Flashing at load running
Reverse indication (REV. LED)	lighten when load current flow is reverse.
Data display mode	7+1 digits for LCD display
Data save	The data can be stored more than 20 years when power cut.

1.5 Intrinsic errors:

With balanced loads

Imin ≤ I < Itr	Cosφ = 1	±1.5%
Itr ≤ I ≤ Imax	Cosφ = 1	±1.0%
	Cosφ = 0.5L	±1.0%
	Cosφ = 0.8C	±1.0%

With single phase load

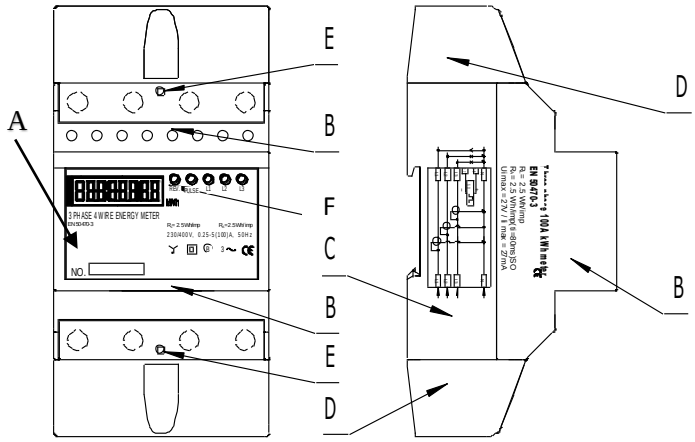
Itr ≤ I ≤ Imax	Cosφ = 1	±2.0%
	Cosφ = 0.5L	±2.0%

1.6 Description

A	Front panel
B	Cover
C	Base
D	Protection cover
E	Security hasp
F	Indicator LED

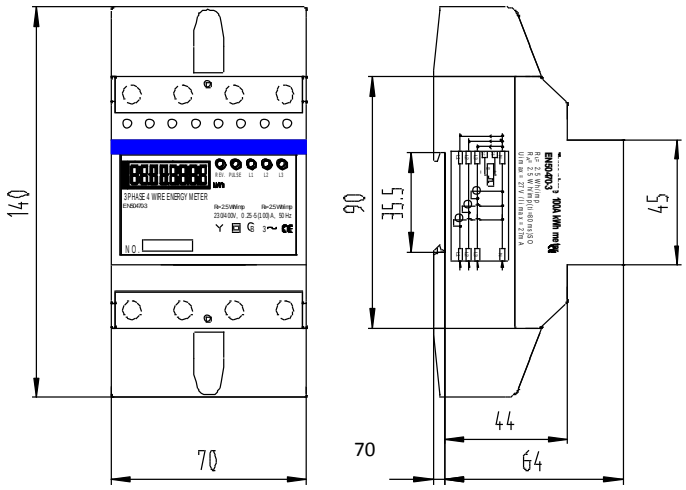
Material

Front plate	Transparent inflaming retarding polycarbonate
Cover	Fiber-glass reinforced inflaming retarding polycarbonate
Base	Fiber-glass reinforced inflaming retarding polycarbonate
Protection cover	Fiber-glass reinforced inflaming retarding polycarbonate



1.7 Dimensions

Height	140 mm
Width	70 mm
Depth	64 mm
Weight	0.53 Kg (net)



1.8 Installation

CAUTION

- Turn off and lock out all power supplying the energy meter and the equipment to which it is installed before working on it.
- Always use a properly rated voltage sensing device to confirm that power is off.

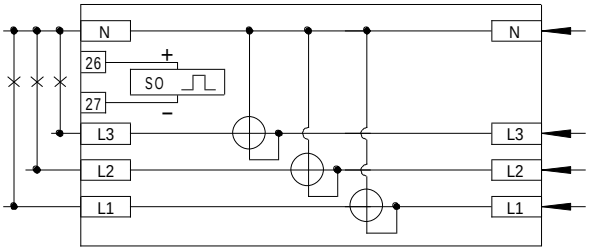
WARNING

- Installation should be performed by qualified personnel familiar with applicable codes and regulations.
- Use isolated tools to install the meter.
- Fuse or thermal cut-off or single-pole circuit breaker can't be fitted on the supply line and not the neutral line.
- Case is sealed, failure to observe this instruction can result in damage for meter.
- No warranty if case is opened or removed seal or damage.

- We recommend that the connecting wire which is used to connect the meter to the outside circuit should be sized according to local codes and regulations for the ampacity of the circuit breaker or over current device used in the circuit.
- An external switch or a circuit-breaker should be installed on the inlet wire, which will be used as a disconnection device for the meter. And it is recommended that the switch or circuit-breaker is near the meter. convenience for the operator. The location of the switch or circuit-breaker should comply with the specifications of the building electrical design and all local regulations.
- An external fuse or thermal cut-off which is used as a overcurrent protection

device for the meter must be installed on the supply side, and it is recommended that the overcurrent protection device be near the meter so that it is convenience for the operator. The overcurrent protection device should comply with the specifications of the building electrical design and all local regulations.

- This meter can be installed indoor directly, or in a meter box which is waterproof outdoor, in compliance with local codes and regulations.
- The meter has to be installed in a good ventilated and dry place.
- The meter has to be installed in a protection box in dangerous or dusty environment.
- The meter can be installed and used after being tested in concord with specifications.
- The meter can be installed on a 35mm DIN rail.
- The best way to install the meter is in an available height so that it is easy to read.
- When the meter is installed in an area with frequent surges due to e.q. thunderstorms, welding machines, inverters etc., protect the meter with applicable Surge Protection Devices.
- After finishing installation, the meter must be sealed to prevent tampering.
- Connection of the wires should be done in accordance with the underneath connection diagram.



L1	L1 phase wire
L2	L2 phase wire
L3	L3 phase wire
N	Neutral wire
26 and 27	Pulse output contact

1.9 Operating

Working indication

On the LEM022SL front panel, there are three power indicating LED which have different color from each other. The yellow LED represent L1 phase; the green LED represent L2 phase; the red LED represent L3 phase. When any phases work normally, the LED representation will be on. When any phases have failure or no power, the LED will turn off.

Consumption indication

There is a PULSE LED which is used as indicating power consumption in the front panel of LEM022SL. When consumption happens, the LED will flash. The more quickly LED flash, the more consumption there is. For this LED, the flash rate is 400 impulses per kWh (2.5Wh/imp).

Reverse indication

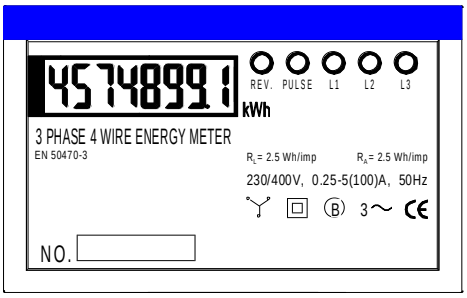
There is REV. LED on LEM022SL front plate. When meter load current flow is reverse, the LED lighten. What does the indication do count down or still stay the same.

Reading the meter

LEM022SL is equipped with a white backlight LCD display. During the normal working hours, the backlight will be on all the time. LCD display will show the following energy data and indication message.

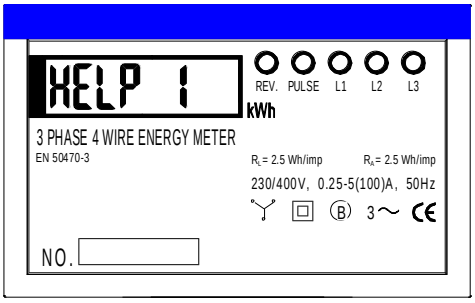
a) Current total energy

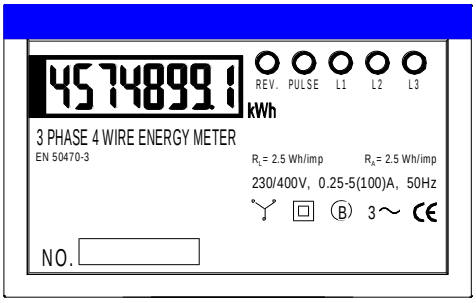
When the meter is in normal working, it will display only 7 +1 energy data with. The unit is kWh. These data cannot be reset to zero by the user. Example: Total energy is 4574899.1 kWh.



b) Indication for reverse use

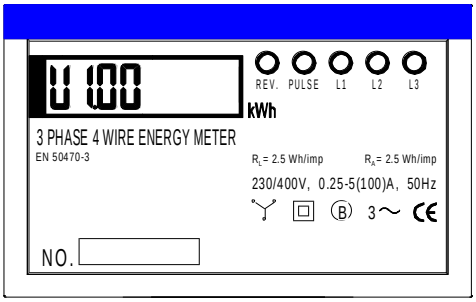
When the meter is connected with the incoming line and the outgoing line reversed. The LCD display, will show every 3 seconds. HELP 1.





c) Meter version

When the meter is turned on, it will display the meter version for 3 seconds.



Pulse output

The pulse led on the front of the meter is pulsing when the meter is in use (2,5Wh/inp.). The LEM022SL DIN rail energy meter is equipped with an pulse output which is fully separated from the inside circuit. It generates pulses in proportion to the measured energy for remote reading purposes and accuracy testing. The pulse output is a polarity dependant, passive transistor output requiring an external voltage source for correct operation. For this external voltage source, the voltage (Ui) should is 5-27V DC, and the maximum input current (Iimax) is 27mA DC. To connect the impulse output, connect 5-27V DC to connector 26 (anode), and the signal wire (S) to connector 27 (cathode). The meter pulses 400 per kWh (2.5Wh/imp).

1.10 Troubleshooting

CAUTION
• During repair and maintenance, do not touch the meter connecting clamps directly with your bare hands, with metal, blank wire or other material as you will have the chance of an electric shock and a possible chance for health damage. • Turn off and lock out all power supplying the energy meter and the equipment to which it is installed before opening the protection cover to prevent the hazard of electric shock.

WARNING

- Maintenance or repair should be performed by qualified personnel familiar with applicable codes and regulations.
- Use insulated tools to maintain or repair the meter.
- Make sure the protection cover is in place after maintenance or repair.
- Case is sealed, failure to observe this instruction can result in damage for meter.

Problem	**Check**	**Solution**
No light for the Power supply indicator (L1, L2 & L3 LED).	Is AC power supply connected to the meter?	Check switch or circuit-breaker and fuse or thermal cut-off.
	Is the L1, L2, L3 and N connecting correct?	Reinstall terminal screws on the L1, L2, L3 and N. Make sure all screws are fixed. Than there should be a 230V 50Hz AC voltage between the terminal screws on the N and L1 or L2 or L3, when power supply is input.
	Is the terminals 25, 24, 23, 22, 21 and 20 connecting correct?	Reinstall terminal screws on the 25, 24, 23, 22, 21 and 20. Make sure all screws are fixed. Than there should be a 230V 50Hz AC voltage between the terminal screws on the N and 24 or 22 or 20, when power supply is input.
	Maybe there is a fault in the inside circuit.	Contact a qualified technician. When necessary replace the meter.

Problem	Check	Solution
No light for the consumption indicator (PULSE LED).	Is the load running?	Only when load is running, this LED will flash.
	Is the operating power too low?	If the operating power is too low, the spacing interval of flashing will be prolonged so that people is under the delusion that LED isn't burning.
	Maybe there is a fault in the inside circuit.	Contact a qualified technician. When necessary replace the meter
The register can't run.	Is there power supplied to the meter?	Check that the power supply indicator (L1, L2 & L3 LED) is burning.
	Is the operating power too low?	If the operating power is too low, the spacing interval of running will be prolonged so that people is under the delusion that register can't run.
	Maybe there is a fault in the inside circuit.	Contact a qualified technician. When necessary replace the meter
LCD backlight can't lit.	Is there a power supply inside the meter?	Check that the power supply indicator is burning.
	Maybe there is a fault in the inside circuit.	Contact a qualified technician. When necessary replace the meter
No pulse output.	Is DC power supply connected to the meter?	Check the external voltage source (Ui) is 5-27V DC.
	Is the connecting correct?	Check correct connecting: connect 5-27V DC to connector 26 (anode), and the signal wire (S) to connector 27 (cathode).
	Maybe there is a fault in the inside circuit.	Please connect with technical support to replace this meter.
Pulse output rate wrong.	Maybe there is a fault in the inside circuit.	Contact a qualified technician. When necessary replace the meter

1.11 Technical support

For questions about our products please contact:

- SEP Europe dealer in your in your region
- Your local SEP Europe distributor
- Email: mail@sep-europe.nl

www.sep-europe.nl

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