SL7000 RT

Installation Guide

Itron France

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Contents

1. About this guide

1.1. Audience

This guide is intended for use primarily by meter installers, utility testers and specifying engineers.

1.2. Scope

This installation guide provides all information required to:

- understand the principles of operation of the meter
- assess the suitability of the meter for any particular application
- install the meter safely and correctly

Additional information will be provided in the SL7000 User Guide, when referred to.

Abbreviations

AC	Alternating current	**MDI**	Maximum demand indicator
ANSI	American national standards institute	**Min**	Minimum
CE	European conformity (logo)	**mm**	Millimetres
Cosem	Companion specification for energy metering	MV	Medium voltage
DLMS	Device language message specification	**Nom**	Nominal
EMC	Electro-magnetic compatibility	**NVM**	Non-volatile memory
G	Giga (10^9)	**OBIS**	Object identification system
GSM	Global system for mobile communications	**PSU**	Power supply unit
HF	High frequency	**RF**	Radio frequency
Hz	Hertz	**RH**	Relative humidity
I	Current	**RMS**	Root mean square
i.a.w	In accordance with	**Rogowski**	Ironless derivative current sensing technique based on Ampère's law
Ib	Base current	**RTC**	Real-time clock
I/O	Inputs and outputs	**SCADA**	Supervisory control and data acquisition
IR	Infrared	**secs**	Seconds
IEC	International electrotechnical commission	**T**	Tera (10^{12})
k	Kilo (10^3)	**TER**	Total energy register
LAN	Local area network	**THD**	Total harmonic distortion
LCD	Liquid crystal display	**TOU**	Time of use
LED	Light emitting diode	**V**	Volt
LV	Low voltage	**WEEE**	Waste electrical and electronic equipment directive (European Union)
M	Mega (10^6)	**W**	Watt
Max	Maximum		

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2. Certification

2.1. Applicable standards

The SL7000 RT meters comply, where applicable, with the following standards and regulations.

- **IEC 62052-11** Electricity metering equipment (AC) - General requirements, tests and test conditions, part 11: Metering equipment (equivalent to EN 6205-11)
- **IEC 62053-21** Electricity metering equipment (AC) - Particular requirements, part 21: Static meters for active energy (classes 1 and 2), (equivalent to EN 62053-21)
- **IEC 62053-23** Electricity metering equipment (AC) - Particular requirements, part 23: Static meters for reactive energy (classes 2 and 3)
- **IEC 62053-24 (Project)** Electricity metering equipment (AC) - Particular requirements, part 24: Static meters for reactive energy (classes 0,5 S, 0,5, 1S and 1)
- **IEC 62053-31** Electricity metering equipment (AC) - Particular requirements, part 31: Pulse output devices for electro-mechanical and electronic meters (equivalent to EN 62053-31)
- **IEC 62053-52** Electricity metering equipment (AC) - Particular requirements, part 52: Symbols
- **IEC 62053-61** Electricity metering equipment (AC) - Particular requirements, part 61: Power Consumption and Voltage Requirements
- **IEC 62054-21** Electricity metering equipment (AC) - Tariff Load control, part 21: Particular requirements for time switches (equivalent to EN62054-21)
- **IEC 62056-21** Electricity Metering – Data exchange for meter reading, tariff and load control - Direct local data exchange (supersedes IEC61107)
- **IEC 62056-42** Electricity Metering – Data exchange for meter reading, tariff and load control, part 42: Physical layer services and procedures for connection-oriented asynchronous data exchange
- **IEC 62056-46** Electricity Metering – Data exchange for meter reading, tariff and load control, part 46: Data link layer using HDLC protocol
- **IEC 62056-47** Electricity Metering – Data exchange for meter reading, tariff and load control, part 47: COSEM transport layers for IPv4 networks
- **IEC 62056-53** Electricity Metering – Data exchange for meter reading, tariff and load control, part 53: COSEM Application layer
- **IEC 62056-61** Electricity Metering – Data exchange for meter reading, tariff and load control, part 61: Object identification system (OBIS)
- **IEC 62056-62** Electricity Metering – Data exchange for meter reading, tariff and load control, part 62: Interface classes
- **EMC Directive 2004/109/EC** as amended by 92/31/EEC and 93/68/EEC. Compliance has been demonstrated by compliance with EN62052-11 and EN62053-21.

2.2. CE Certificate of conformity

TO BE UPDATED

Déclaration «CE» de conformité
CE Declaration of conformity

Nous,
We,

Itron
ZI de Chasseneuil, avenue des temps modernes
86361 Chasseneuil du Poitou – FRANCE

Entreprise certifiée ISO 9001 par l'AFAQ
ISO 9001 certified by AFAQ

Déclarons que l'(les)appareil(s) : SL761B / SL761E (type)

- compteur statique d'énergie électrique à branchement derrière transformateur :SL761B
- compteur statique d'énergie électrique à branchement direct : SL761E
- Triphasé 4 fils et triphasé 3 fils
- 3x57,7/100…3x240/415 V et 3x57,7/100…3x277/480 V(seulement pour compteur derrière transformateur)
- Courant de référence pour SL761B : 1 ; 1,5 ; 2,5 or 5A avec un courant maximum plus petit ou égale à 10A
- Courant de référence pour SL761E : 5 ; 10 ; 15 or 20A avec un courant maximum plus petit ou égale à 120A
- 50 Hz / 60 Hz

Declare that the product(s) : SL761B / SL761E (type)

- Electrical energy static meter for in-direct connecting : SL761B with maximum current smaller or equal to 10A
- Electrical energy static meter for direct connecting : SL761E with maximum current smaller or equal to 120A
- Three-phase four-wire network and three-phase three-wire network
- 3x57,7/100…3x240/415 V and 3x57,7/100…3x277/480 V(only for indirect connecting meter)
- Reference current for SL761B : 1 ; 1,5 ; 2,5 or 5A
- Reference current for SL761E : 5 ; 10 ; 15 or 20A
- 50 Hz / 60 Hz

Sous réserve qu'il soit installé, maintenu et utilisé pour l'usage auquel il est destiné, dans le respect des règles de l'art de la profession et conformément aux instructions du fabricant, satisfait aux dispositions des directives du Conseil :
Provide that it is installed, maintained and used in the application for which it is made, with respect of the « profession's practices », relevant installation standards and manufacturer's instructions, complies with the provisions of Council Directives :

- **89/336/CEE, 92/31/CEE, 93/68/CEE**
- **2004/22/CE**

et est conforme aux normes ou autre(s) documents normatifs suivants :
and is in conformity with the following harmonised standard(s) or other normative documents :

- **IEC 62052-11** Electricity metering equipment (AC) : General requirements
- **IEC 62053-22** Electricity metering equipment (AC) : Particular requirements-Active energy (class 0.2 S and 0.5 S)
- **IEC 62053-23** Electricity metering equipment (AC) : Particular requirements-Reactive energy (class 2)

- **EN 50470-1** Electricity metering equipment (AC) : Part 1 General requirements
- **EN 50470-3** Electricity metering equipment (AC) : Part 3 Particular requirements

(NMI test report : CVN-705077-01 : ref Actaris D2002169)
(NMI test report : CVN-9200079-01 : ref Actaris D201 3808)

Information complémentaire :
Additional information:
Le dossier technique est consultable en nos locaux de Chasseneuil.
The technical file is available for consultation in Chasseneuil.

Date d'apposition du marquage CE : **15 Juin 2009**
Date of affixing « CE » marking: **15th June 2009**

Signature : J.TALBOT
QSE Manager

Title : SL7000-IEC5/VAL/CE_CERTIF			
Type of doc : Product_Qualification_Report Filename : MARQUAGE_CE_SL761B_E.DOC	Project : AMBER	Released	Rev. date : 17/06/2009
Owner : FERTILLET Claude	Itron	Page : 1/1	D2002170-AB

2.3. End-of-life disposal

SL7000 RT meters comply with the requirements of WEEE regulations for recycling or reuse of materials.

At the end of their service life, meters should be uninstalled and then passed to a licenced/certified contractor for

disposal in accordance with these regulations and with all applicable local regulations.

Before passing the meters to the contractor the legal certification stamps or marks must be removed or defaced.

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3. Safety information

Meters must be installed and maintained only by suitably-qualified personnel. Observe the following safety advice when performing installation or service work on meters.

Meter handling

Before installing or removing a meter, or removing the terminal cover for any reason, isolate the meter from the mains supply by removing the supply-side fuses or using alternative local arrangements. Take appropriate measures to ensure that the isolation cannot be overridden by another person. For example, keep physical possession of the supply fuses.

- Adhere strictly to all relevant national regulations for the avoidance of electrical accidents.
- Always disconnect all measurement and auxiliary circuit connections from the meter before attempting to open the meter housing.
- Use only tools that have been approved for electrical installations.
- Clean meters only with a damp cloth or sponge. Do not use excessive or running water.

Installation

Install meters in accordance with the voltage and current specifications printed on the front panel and the wire and environmental specifications given in the installation information.

- The meter measuring and auxiliary circuits must be galvanically isolated.
- All voltage paths (measurement and auxiliary) must be fused.
- The meter voltage connections must be physically separated from the communication lines in accordance with local laws and regulations.
- Do not install meters that are obviously damaged.
- Do not install meters that have been dropped or otherwise subjected to significant impact even if no damage can be seen.
- Do not HIPOT/Dielectric test the auxiliary or communication circuit connections.
- Do not use any meter functions or features for primary protection purposes.
- Do not install meters where failure of the device could cause death, injury or release sufficient energy to start a fire.
- Following installation, ensure that the meter terminal covers are correctly fitted and sealed to prevent user access.

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4. General information

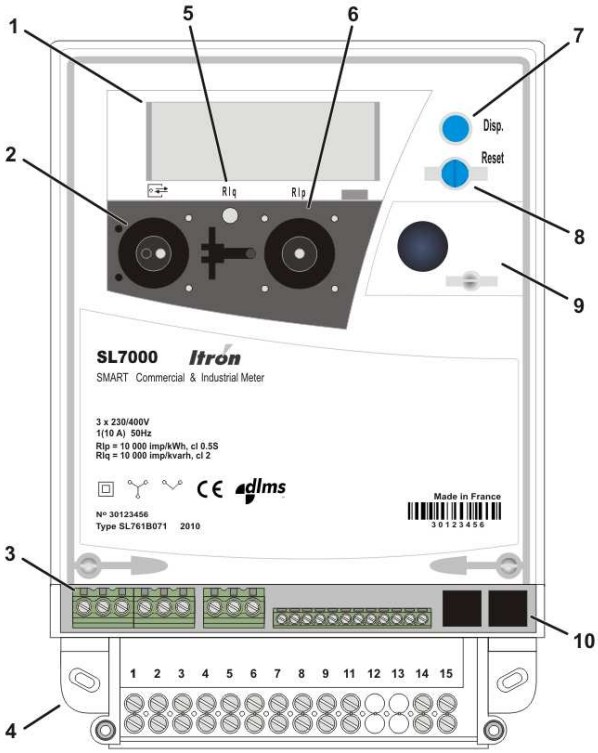
4.1. Meter overview

The SL7000 RT is a static, polyphase, four-quadrant, multi-rate meter. It is intended for monitoring of MV/LV substations on their LV side.

Depending on the factory configuration, the meter provides the following **minimum** features and functions:

Multi-energy registering	Active, Reactive and Apparent energy (import and export) Units - Watt (W), Kilowatt (kW) and Megawatt (MW) Maximum 32 individual energy rate registers for 10 energy channels (incremental or cumulative) Up to 8 energy rates per channel
Multi-rate billing and switching	Billing for both energy and demand Energy rate switching performed by internal clock/calendar • Up to 12 seasons • Up to 24 day profiles • Up to 16 switching times per day profile • Up to 100 special days (repetitive or non-repetitive)
Demand registering	Maximum 24 individual demand rate registers for 10 demand channels Up to 8 energy rates per channel
Load profiling	2 independent sets of 8 recording channels giving up to 16 load profile channels Incremental data
Communication	RS232 + RS232 or RS485 DLMS-Cosem compliant PSTN, LAN (TCP/IP), GSM and GPRS media supported
Network quality monitoring	Voltage cuts, sags and swells Total Harmonic Distortion (THD)

The diagram below shows the main functional elements of the meter:



1 Liquid crystal display (LCD)
2 Infrared communication port
3 Auxiliary I/O terminal blocks
4 Main wiring terminal block
5 Reactive power metrology LED (Rlq)
6 Active power metrology LED (Rlp)
7 Display pushbutton
8 Reset pushbutton
9 Battery holder
10 Serial communication ports

4.2. General specifications

Frequency	50/60 Hz
Connection wiring	4 wires
Connection configuration	Rogowski sensors
Terminal wiring	Current sensors presassembled – Voltages 3Ph+N
Real Time Clock backup	Field-replaceable battery and Internal super-capacitor
Enclosure type	Panel mounting DIN compliant
Environmental protection	IP 51
Operating temperature	Storage : -40°C to +70°C
Relative Humidity	< 75% (maximum 95%)
Net weight	1.9kg
Maximum meter dimensions (W x H x D)	
Meter body	179 x 261 x 83mm
With short terminal cover	179 x 270 x 83mm
With long terminal cover	179 x 359 x 83mm
Standard terminal cover	179 x 324 x 83mm

Connection specifications

Voltage	3 x 127/220V up to 3 x 277/480V auto ranging	
Current	Nominal (Ib)	Ib: 300A
	Maximum (Imax)	Imax : 3000A at 50Hz 2500A at 60Hz
Global accuracy (current sensors included)	Active energy	Class 1
	Reactive energy	Class 1 or 2

Auxiliary power supply specifications (optional)

Auxiliary Power Supply	48V DC to 145V DC 48V AC to 288V AC

4.3. Meter support tools

The SL7000 RT meters have an extensive range of optional facilities and settings, enabling them to be configured to suit individual requirements. In general, a meter is fully configured and programmed for its intended application prior to despatch from the factory.

However, some aspects of the configuration may be changed at any time using dedicated Windows™-based support tools that typically communicate via the optical port on the front of the meter.

Support tool applications provide the following main features:

- metering point management
- configuration creation and editing
- configuration programming and reading
- meter data reading
- meter firmware upgrading

The following support tool is currently available:

ACE Pilot

ACE Pilot is compliant with the following Microsoft Windows™ operating systems:

- XP (SP3)
- 2003 and 2008
- Vista and Seven

4.4. Configuration options

4.4.1. Meter identification

Meter options are specified by a multi-character product code, in which each option is designated by one or more characters. The meter cover is laser-marked with this legally required identification code.

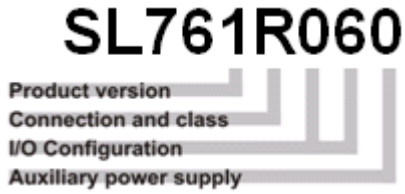
4.4.2. Meter product coding

The meter is equipped with input and output (I/O) ports, as shown:

I/O	Number
Control inputs	2
Pulse inputs	4
Control outputs	4
Pulse inputs	6
1st COM port	RS232 or RS485
2nd COM port	RS232

Product code

The example below illustrates the options and the positions of the associated characters in the product code.



The following tables provide full details of the individual options:

Product version

Code	Option
1	International

Connection and Class

Code	Option
R	Rogowski - Global Class 1

I/O and COM configuration

Code	Option	I/O Level
06	2 x RS232	Full
07	1 x RS232 + 1 x RS485	Full
08	2 x RS485	Full

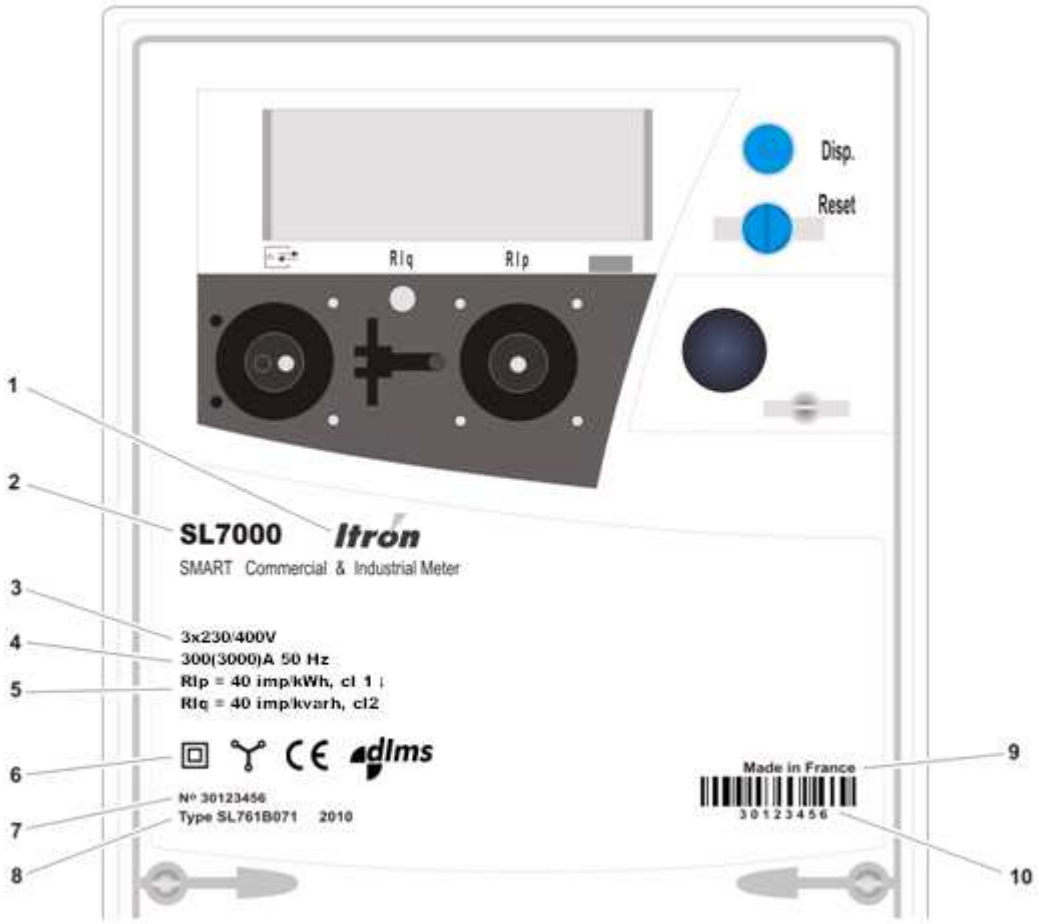
Auxiliary Power Supply (APS)

Code	Option
0	No APS
1	APS fitted

Note: Legal product code is composed of “SL76” + “product version” + “Connection and class”. Following numbers composing the product code are not legal part (for internal and market use only).

4.5. Meter markings

The meter cover is laser-marked with at least the information illustrated below, in accordance with IEC 62053-52. Additional markings may be present, and the layout of the markings will vary, according to the meter configuration and specific customer requirements.



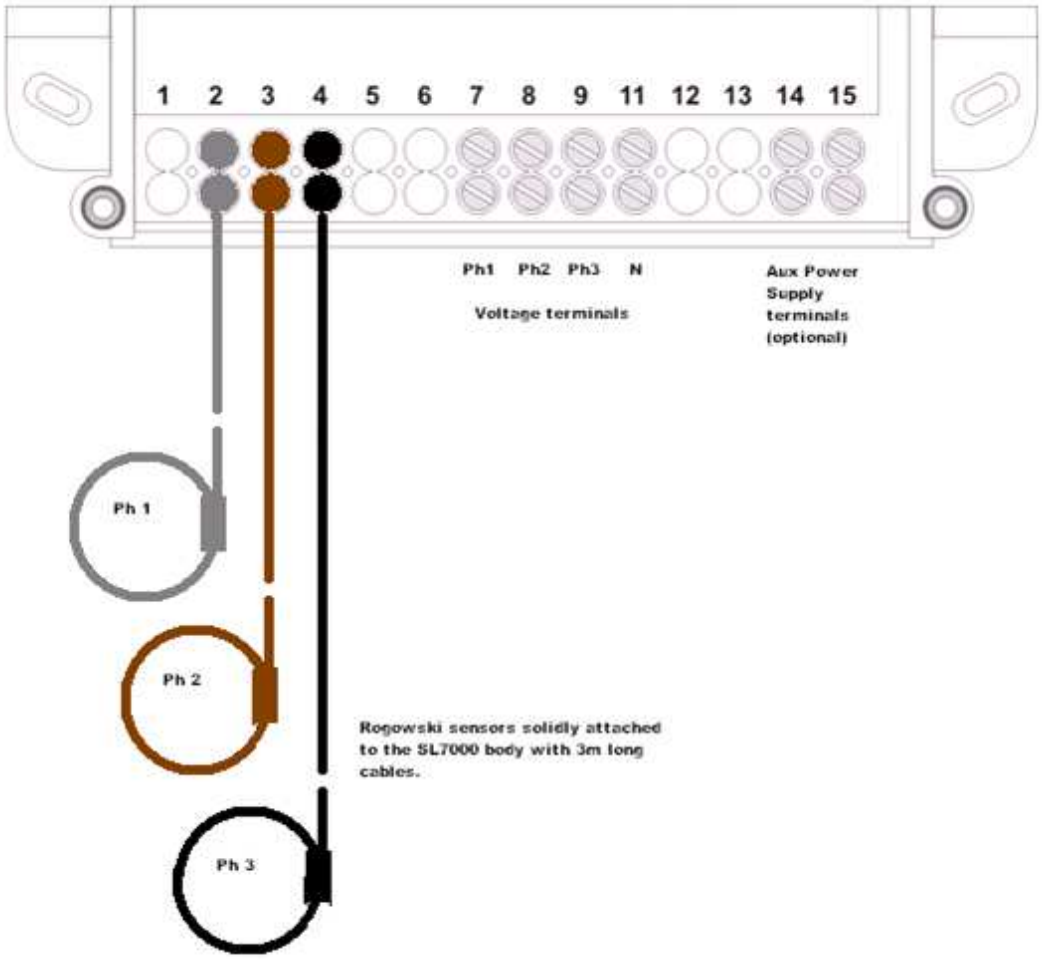
1	Manufacturer name
2	Commercial name
3	Nominal voltage
4	Nominal / maximum current and frequency
5	Metrology constant and accuracy class
6	Appropriate symbols (IEC 62053-52) identifying insulation class, measuring elements, and other relevant characteristics
7	Manufacturers unique serial number
8	Meter legal product code and date of manufacture
9	Place of manufacture
10	Meter serial number - barcode and numerical format This number may be the same as the manufacturers serial number (7) or be a customer-specified identification number

4.5.1. Terminal numbering

A connection diagram is displayed on the inside surface of the terminal cover showing typical main supply connections for the meter configuration and type.

Terminal numbers corresponding to the connection diagram are moulded into the meter case, either above or below the terminal block depending on the meter connection type.

Rogowski terminal block



5. Technical specification

General

Parameter	Description	Data
Meter Commercial Name	SL7000 RT	
Connection wiring	3 or 4 wires	
Connection configuration	Rogowski	
Terminal wiring	Voltage only Rogowski current sensors are irremovable (already attached to the meter body)	
Metrology	Four quadrant	Active and Reactive (import and export)
Metrology sensors	Rogowski derivative ironless sensors (split type flexible loops)	
Registering modes	4 selectable algorithms	Ferraris Static Net result Anti-fraud
Global Accuracy (Rogowski sensors included)	i.a.w. EN/IEC62053-21	Class 1 for active energy

Voltage

Parameter	Details
Reference voltage	3 x 127/220V up to 3 x 277/480V auto ranging
Operating voltage	-20% to + 15% Un
Voltage Interruptions	1 second

Current

Parameter	Details
Nominal current (Ib)	300A
Maximum current (Imax)	3000A at 50Hz 2500A at 60Hz
Starting current	1.2 A (Ib/250) , per phase
Short-time over current	Not limited by the SL7000 RT
Current Circuit Power Consumption	Not applicable

Voltage Circuit Power Consumption

Parameter	Details
Voltage per phase	<2W
Apparent power per phase at Un	<10VA

Display

Parameter	Description	Data
Type	Liquid Crystal Display (LCD)	
Digit height	Main	12mm
Digit height	OBIS code	8mm
Resolution	Number of digits	9

Communications

Parameter	Description	Data
Optical communications	i.a.w IEC62052-21	Mode C
Meter Constant	Rogowski connection type	40 pulses per kWh
Serial Data Communications	RS232, and RS232 or RS485	RJ45 connectors
	Baud rate	9600 up to 19200
Supported protocols	DLMS/Cosem	Y
Communication media types	TCP	With external LAN modem
	GPRS	With external modem
	GSM	With external modem
Real-time operation “Real Time Port”	i.a.w. IEC62056-21	Y
Modem power supply	10V -10/+20%, 100mA, 1W max	on RJ45 connectors. 1W is the maximum shared on the 2 ports

Input and output

Parameter	Description	Data
Control input	Optically-isolated, high-level	Up to 2 inputs + common connection point
	Minimum input voltage	64V (AC/DC)
	Maximum input voltage	288V DC - 300V AC
	Maximum input current	3mA
Control output	Optically-isolated, high-level	Up to 4 outputs + common connection point
	Maximum switching voltage	288V DC - 300V AC
	Maximum switching current	100mA
Pulse input (DIN S0)	Optically-isolated	Up to 6 inputs + common connection point
	Maximum switching voltage	27V DC (provided by the meter)
	Maximum switching current	30mA
	Impedance	1.1kΩ
Pulse output (DIN S0)	Optically-isolated	Up to 4 outputs + common connection point
	Impedance	< 300Ω

Environmental

Parameter	Description	Data
Temperature Range	Operating range	-40°C to +70°C
Humidity range	Maximum operating value	95%
Protection class	According to IEC 60529	IP 51
Isolation Protection	AC voltage at 50Hz for 1 minute	4kV Class 2
Immunity to impulse voltage	According to IEC 62052-11 Waveform of pulse voltage 1.2/50µsecs Source impedance 500ohms, energy 0.5 joules	8kV
Immunity to magnetic fields	Magnetic AC (50Hz) field 0.5mT according to IEC62053 - 21 (400AT coil)	Fully immune
	Magnetic DC field according to IEC 62053-21 (electromagnet with 1000AT)	Fully immune
	Magnetic DC field according to VDEW (perm magnet) field strength 200mT	Fully immune
	1.2 Tesla DC Magnets	Fully immune
Surge immunity main circuits	According to IEC61000-4-5 Source impedance 2 ohms	4kV
Surge immunity auxiliary circuits	According to IEC61000-4-5 Source impedance 42 ohms	1kV
Electrostatic discharge	Electrostatic discharge according to IEC61000-4-2	
	Contact discharge	8kV, 10 cycles
	Air discharge	15kV, 10 cycles
Immunity to RF fields	RF fields i.a.w. IEC61000-4-3	
	With current 80MHz to 2GHz	10V/m
	Without current, 80MHz to 2GHz	30V/m
Fast transient burst	Main circuits : Fast transient burst i.a.w. IEC 61000-4-4	4kV common-mode and pseudo differential
	Auxiliary circuits : Fast transient burst i.a.w. IEC 61000-4-4	2kV common-mode
Radio Interference	RF suppression	CISPR22 Class B

Weight and Dimensions

Parameter	Description	Data
Weight		1.9kg nominal
Dimensions (width x height x depth)	Without terminal cover	179 x 261 x 83mm
	With short terminal cover	179 x 270 x 83mm
	With long terminal cover	179 x 359 x 83mm
	With standard terminal cover	179 x 324 x 83mm
Rogowski sensors	Aperture for the primary conductor	120 mm diameter
	Thickness of the loop	5 mm diameter
	Weight (loop only)	40 g
	Cable length	3 m between the loop itself and the meter body

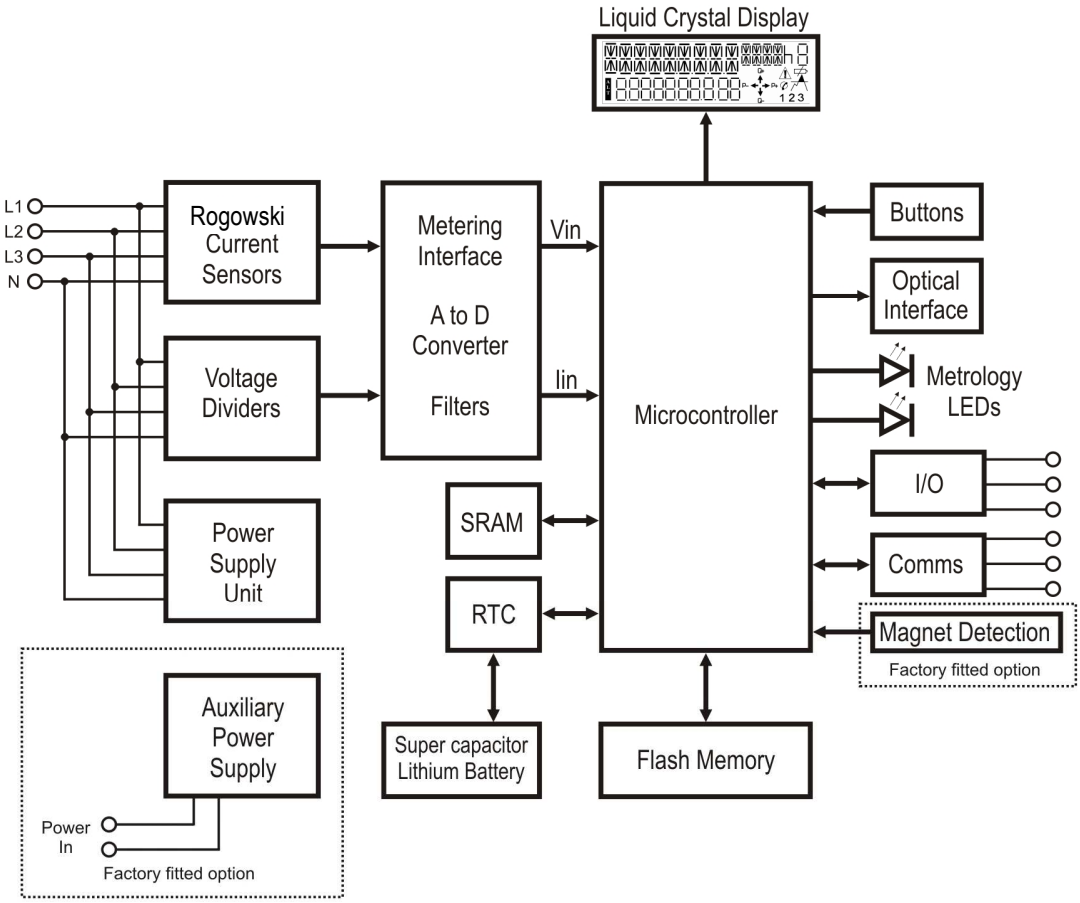
6. Technical description

The main components of the SL7000 meter are assembled onto four printed circuit boards (PCBs):

- metrology voltage divider circuitry and the switched-mode power supply
- microcontroller and memory devices
- I/O circuitry
- LCD display

As a manufacturing option, the meter may be equipped with an additional PCB providing further serial communication ports.

The block diagram below shows the main functional elements of the meter.



6.1. Metrology

The SL7000 RT uses Rogowski loops as current sensors, instead of MCT that are used in the conventional SL7000 CT or DC.
Rogowski loops are based on Ampère's law stating that the integral value of the magnetic field over any closed path surrounding a current conductor is related to the amount of current flowing through this path.
A Rogowski sensor delivers a voltage strictly proportional to the derivative value of the current(s) embraced. So their output is equivalent to the MCT sensors.

The SL7000 RT meters are calibrated in the factory with their Rogowski loops attached, as shipped, so no additional calibration is required in the field.

The Rogowski sensors used by the SL7000 RT can be installed over current cables easily thanks to its quick clip-on system. Their dynamic range allows using a unique model addressing installations rated from 200kVA to 2MVA.

The three current sensors generate a signal per phase that is proportional to the instantaneous current, while voltage signals are derived by dividing the distribution-network line voltages through a resistive divider.

The current and voltage input signals are sampled and digitised 40 times per cycle (50Hz) by an analogue to digital (A-to-D) converter, then processed by a microcontroller to derive various energy values. The microcontroller records these values in a suite of registers that are independent of any meter configuration and are always available.

These registers accumulate their respective energy values in an incremental fashion, until they reach the register limit. At that point they are automatically reset to zero in the same way as roll-over electromechanical meter types.

The contents of these registers can be displayed at any time as instantaneous values on the meter LCD.

The microcontroller also controls the data transfer to the various inputs and outputs, visible metrological LEDs and infrared port.

Refer to the SL7000 User Guide for more technical description.

7. Communications

Refer to the SL7000 User Guide

8. Meter displays

Refer to the SL7000 User Guide.

9. Installation

9.1. Warnings

DANGER OF ELECTRIC SHOCK

Before and during installation of a meter, observe all requirements given in the Safety information.

In particular:

- Meters must be installed only by suitably-qualified personnel.
- Ensure that the meter supply cabling is isolated from the mains supply, and that the isolation cannot be overridden by another person.
- Following installation, ensure that the meter covers are correctly fitted and sealed to prevent user access.

DANGER OF ELECTRIC SHOCK

The SL7000 RT meter is designed for live installation on isolated primary conductors or cables in low voltage (not exceeding 500V).

In case of installation on bare conductors or bars systems, an additional isolation of the conductors or bars must be recovered at the location intended for the Rogowski loops prior of their installation.

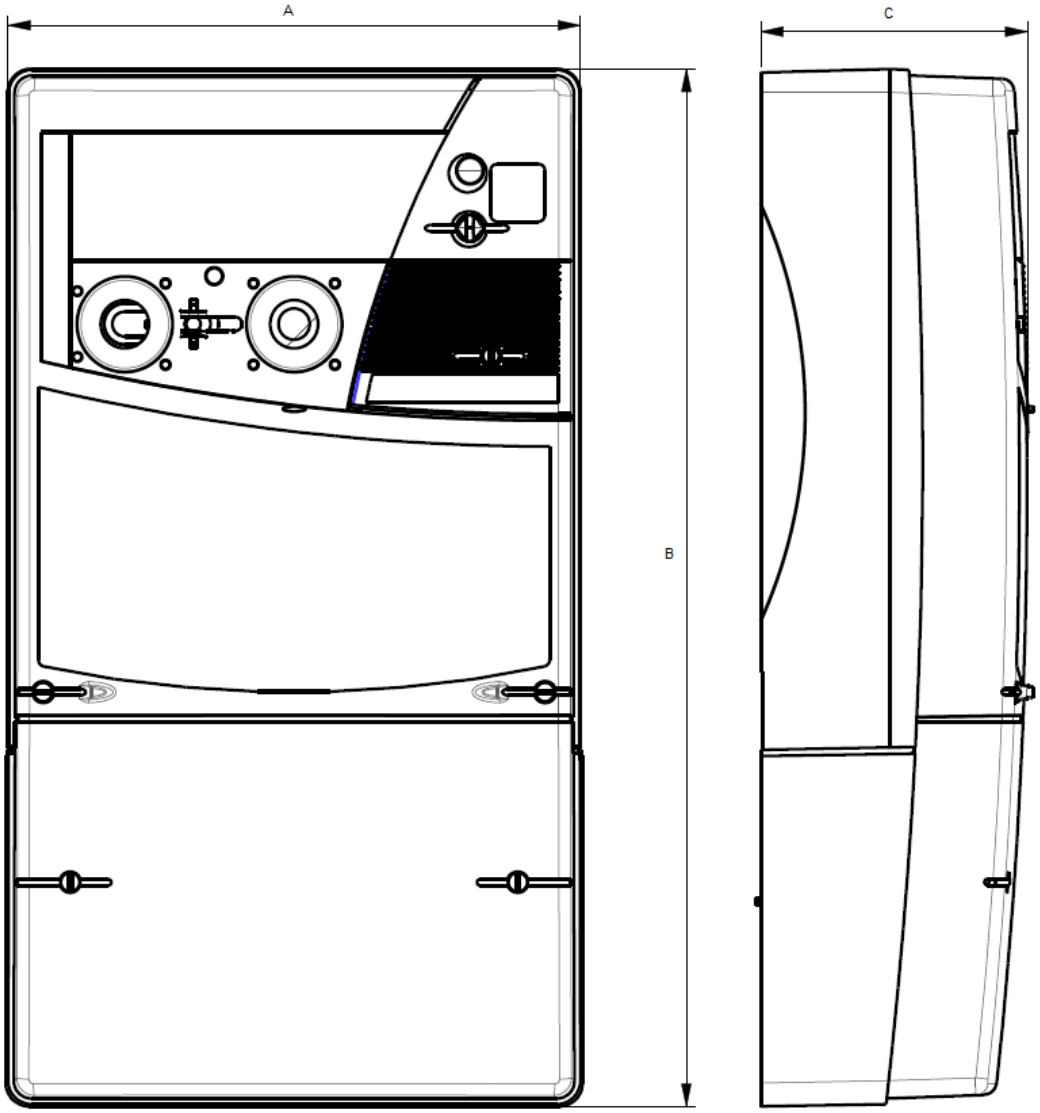
9.2. Environmental

SL7000 RT meters are certified for indoor use only. Do not install meters outdoors unless they are housed in an enclosure which can maintain the specified environmental requirements.

Parameter	Range
Temperature	-40° to +70°
Humidity	Up to 95% RH
Environmental protection	IP 51

9.3. Dimensions

The meter can be factory-fitted with either a short, standard or long terminal cover.



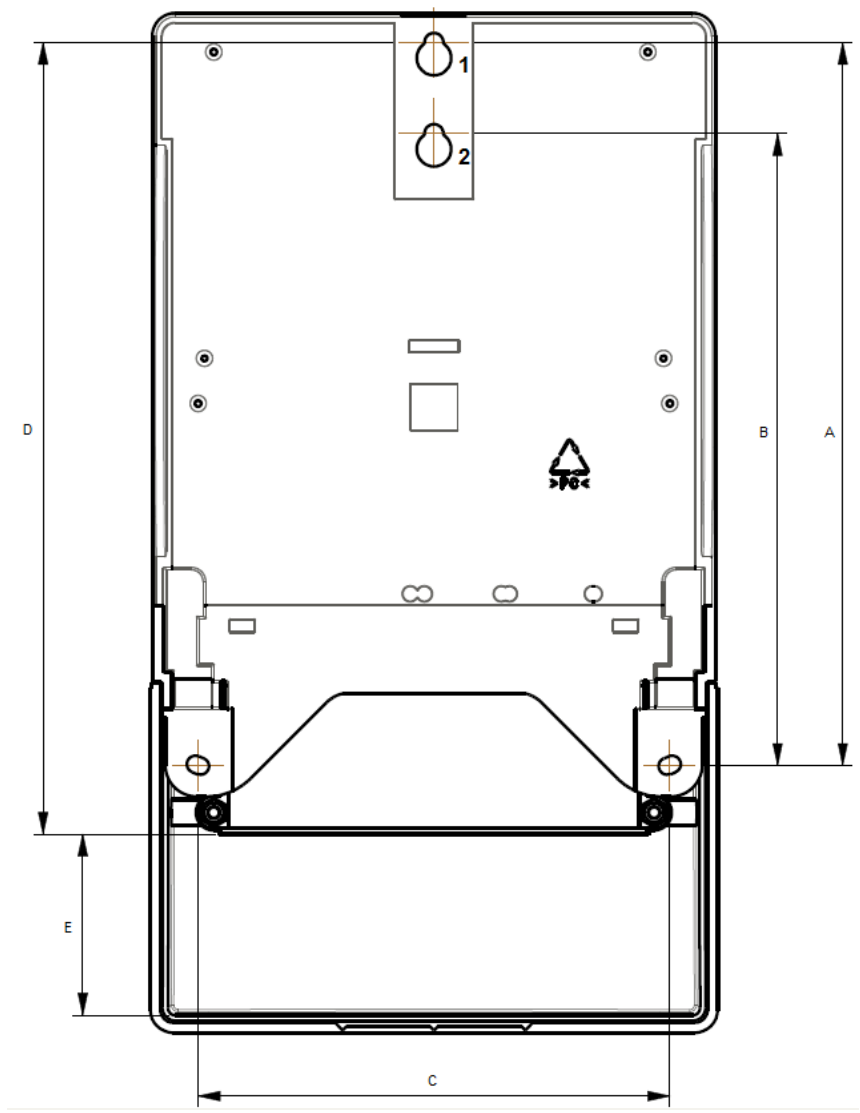
Item	Dimension	Description
A	179	Meter body width
B	270	Meter length - with short terminal cover
	324	Meter length - with standard terminal cover
	359	Meter length - with long terminal cover
C	83	Meter body depth

All dimensions are in millimetres.

9.4. Fixings

The meter is provided with two upper fixing points (1) and (2), select the appropriate one to use, as required. A hanging bracket is also provided with the meter.

Two further lower fixing points are located within the terminal area; these can be accessed only by removing the terminal cover.

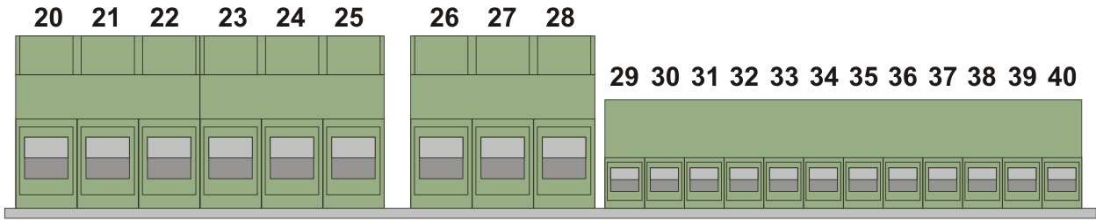


Item	Dimension	Description
A	230	Upper fixing point (1) to lower fixing points (centre to centre)
B	201	Upper fixing point (2) to lower fixing points (centre to centre)
C	150	Left to right lower fixing points (centre to centre)
D	252	Upper fixing point (1) centre to lower edge of meter body
E	4	Lower edge of meter body to lower edge of short terminal cover
E	58	Lower edge of meter body to lower edge of standard terminal cover
E	93	Lower edge of meter body to lower edge of long terminal cover

All dimensions are in millimetres.

9.5. Auxiliary and communication wiring

Auxiliary wiring



Terminal	Function	Terminal	Function	Terminal	Function
20	Control output 1	**29**	Pulse output 1	**36**	Pulse input 1
21	Control output 2	**30**	Pulse output 2	**37**	Pulse input 2
22	Control output 3	**31**	Pulse output 3	**38**	Pulse input 3
23	Control output 4	**32**	Pulse output 4	**39**	Pulse input 4
24	No connection	**33**	Pulse output 5	**40**	PI Common
25	CO Common	**34**	Pulse output 6		
26	Control input 1	**35**	PO Common		
27	Control input 2				
28	CI Common				

The control output and input terminal blocks accept cables up to 2.5mm².

The pulse output and input terminal blocks accept cables up to 1.5mm².

Note: Depending on meter factory configuration, some of the inputs and outputs shown above may not be available.

Communication wiring

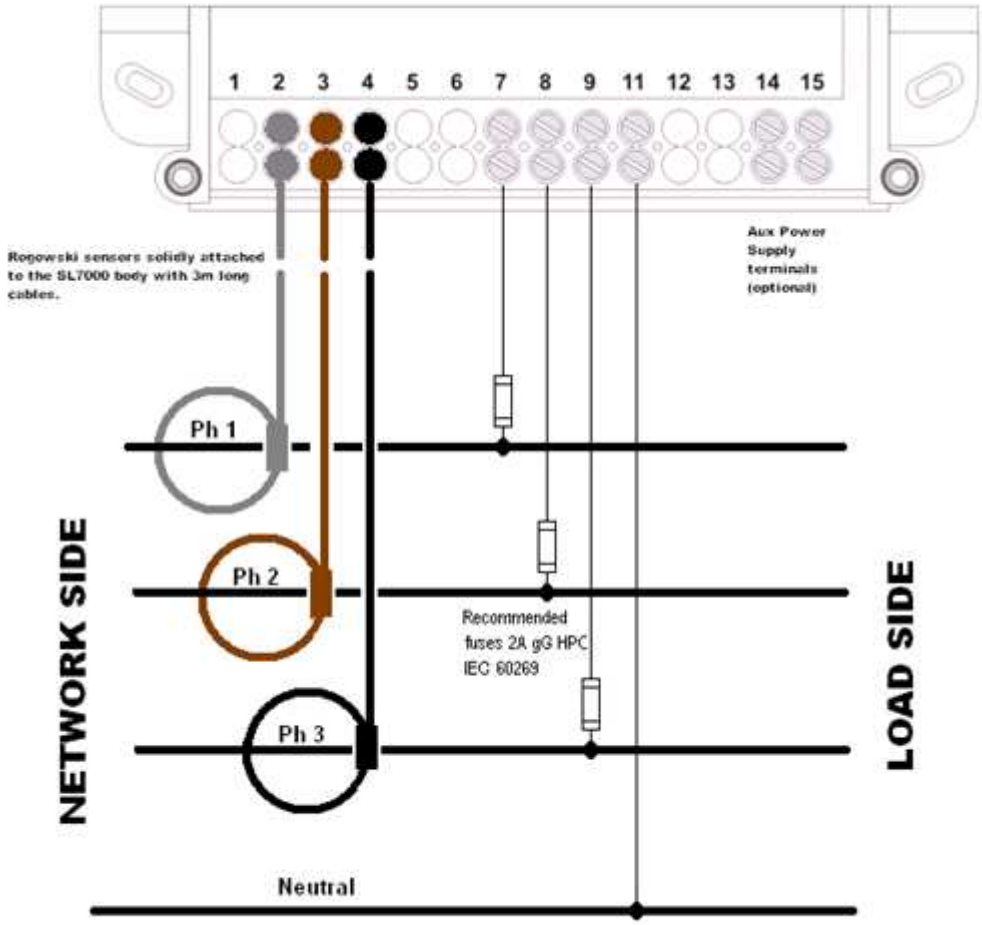
Both RS232 and RS485 type communication ports use RJ45 connectors:

It is recommended that twisted and shielded cables are used for communication line wiring and that one end of the cable shield should be connected to ground.

Pin	RS232 Function	RS485 Function
1	VMDM Approx +10V DC at 100mA (0.9W max)	VMDM Approx +10V DC at 100mA (0.9W max)
2	No connection	RX -
3	No connection	No connection
4	RX	RX +
5	TX	TX +
6	0V - Ground	0V - Ground
7	DTR	TX -
8	No connection	No connection

9.6. Cabling

Main terminal wiring - voltage connection



Terminal	Function	Terminal	Function	Terminal	Function	Terminal	Function
1	Not used	**4**	I3 sensor	**7**	U1	**11**	Neutral
2	I1 sensor	**5**	Not used	**8**	U2	**14**	APS
3	I2 sensor	**6**	Not used	**9**	U3	**15**	APS

Main terminal specification

Terminal type	Clamp screws	Cable diameter
Voltage	2 x M4	5mm (max)
Current sensors	Factory set – No need to manipulate	

Installation of the Rogowski loops over the main power cable(s)

1. The 3 Rogowski loops are marked by a colored sleeve close to their junction block.
    - Grey for phase 1 sensor
    - Brown for phase 2 sensor
    - Black for phase 3 sensor

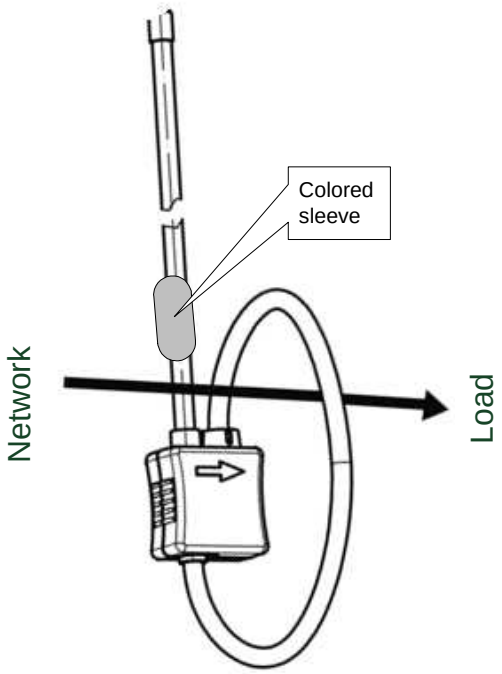
It is key that the Rogowski sensors are installed accordingly their corresponding phase otherwise the measurement will be mixed up.

2. The junction block of the Rogowski loop bears a direction arrow.

Make sure that the loop is installed in such a way that :

- The arrow is located at the inner side of the loop (do not force thenatural curvature of the lop in the opposite way)
- The arrow points towards the LOAD side

It is key that the direction of the Rogowski sensors is correct, otherwise the measurement will be reversed (import for export and vice-versa).



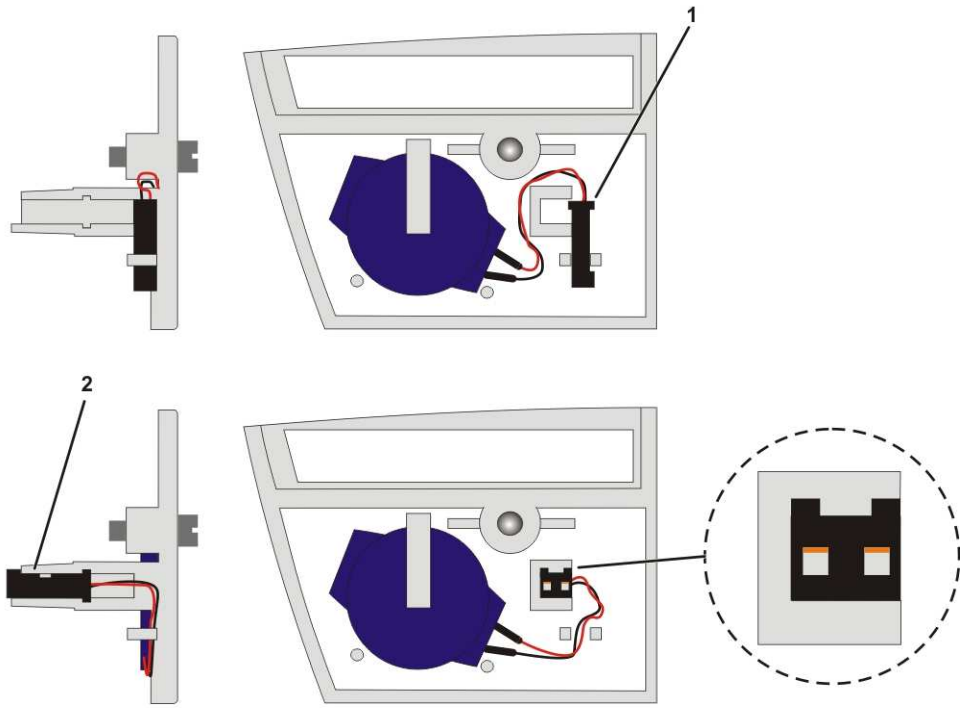
3. General recommendations
    - When securing the loop part against the main conductor or cable, a moderate pressure is sufficient thanks to the light weight of the sensor, do not flatten the loop part
    - As far as possible, keep the loop part away from adjacent conductors (the other phases for instance)

9.7. Battery

The meter is designed so the lithium battery can be safely installed or replaced while the meter is operating, as follows:

1. If fitted, remove the seal from the battery holder securing screw.
2. Undo the securing screw and carefully extract the battery holder from the meter housing.
3. The meter may be initially shipped with the battery cable in the disconnected position (1). If this is the case, move and fit the cable connector into the moulded pillar, as shown (2).

   The illustrations show a rear view of the battery holder.



4. If the battery is being replaced, slide the old one out from under the securing tab and exchange.
5. Ensure the battery connector is the correct way round, as shown above.
6. Replace the battery holder into the meter, ensuring the moulded plastic connector pillar is inserted into the lower aperture.
7. Tighten front securing screw.
8. Using the meter support tool, clear any battery error indications/alarms and reset the battery expected life time value.
9. Seal the meter, as necessary.

9.8. Installation checks

Before connecting the mains supply to the installed meter, carefully check that:

- the correct meter type with the right identification number has been installed for this client at this metering point.
- all mains supply and auxiliary cables are connected to the correct terminals.
- all cable clamp screws are securely tightened.
- the battery has been correctly installed.

9.9. Start-up and functional checks

Take the following steps to check that the meter is functioning.

1. Connect the mains supply to the meter.
2. Check that the LCD display turns on and shows coherent displays.

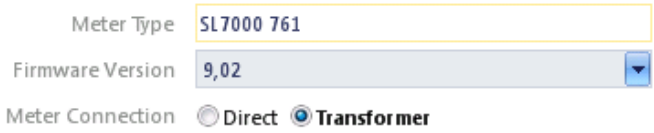
   Depending on the meter configuration, the LCD may move automatically through a sequence of displays, or it may be necessary to use the meter display pushbutton to move through the sequence.
3. Check that the meter is in the start mode (STOP is not displayed).
4. Check the phase sequence is correct; the quadrant indicator icons in the LCD should not be flashing.
5. Apply a load to the meter and check that the metrology LED (active - kWh) starts to flash.

   The flash rate is proportional to the load.
6. Using the IR port, connect a support tool enabled PC to the meter and:
   - read the Total Energy Registers (TER) values
   - read all instantaneous values
   - read the meter status values and its configuration
   - erase any non-fatal alarms
7. Carry out the LCD test and confirm all the display segments and annunciator icons are lit.
8. Wait for approx 15 minutes while the meter operates.
9. Check the TER values have incremented from their initial values.
10. Check the maximum demand value is consistent with the applied load.
11. Re-check meter status.

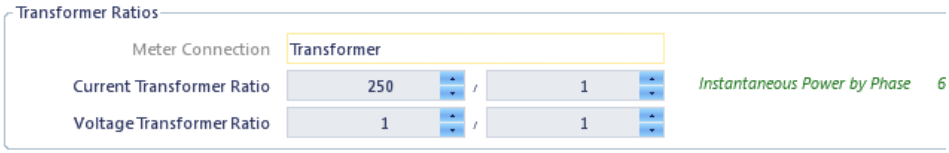
9.10. Metrology parameters settings

With the ACE Pilot support tool, open the meter configuration

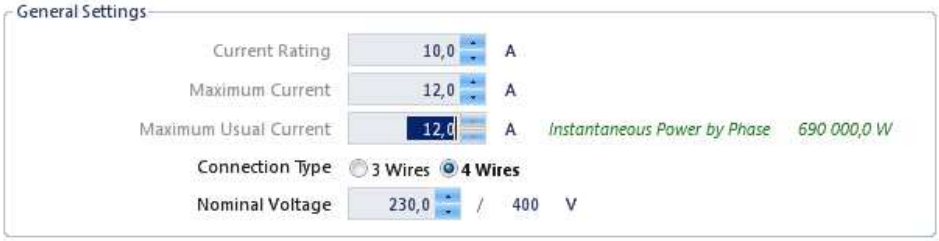
1. Make surre that the General Ressources are set for a SL7000 with: Meter Type SL761, FW Version 9.xx and Meter connection Transformer



2. Make sure that the Metrology Connection parameters are set to a CT ratio 250/1 and a VT ratio 1/1



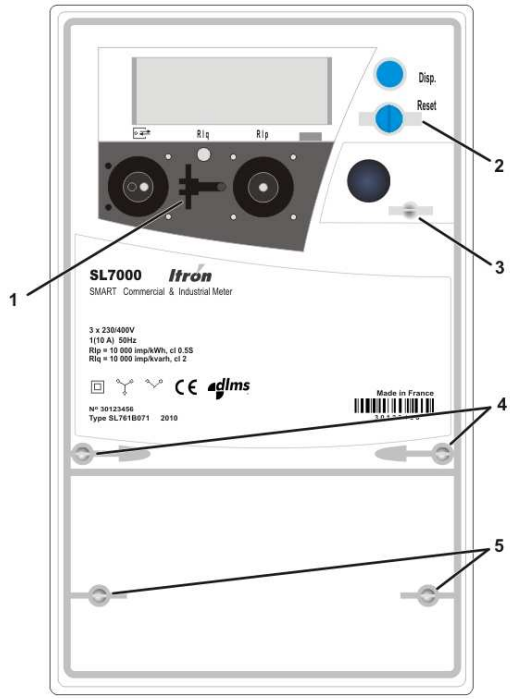
3. Make sure that the Metrology/Network parameters are set to 12 A Max Current



   The Maximum Usual current may be set to a lower value depending on the application.
4. Use the Toolbox functions to verify all aspects of meter operation.
5. Save and print the results as evidence of correct operation.

9.11. Sealing the meter

Before leaving the installation site, fit the terminal cover, and seal the meter against unauthorised access or tampering by fitting wire or plastic seals, as required, in the following locations:



1 IR Port

2 Reset pushbutton

3 Battery holder

4 Main cover

5 Terminal cover

9.12. Current conductors environment recommendations

TO BE DEVELOPPED

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10. Technical appendix

Refer to SL7000 User Guide