S.A DE CONSTRUCCIONES INDUSTRIALES

DIRECT CONNECTION SINGLE PHASE ELECTRICITY METER MID CERTIFIED M1DL3 - MID M1DL3T - MID

INSTRUCTION MANUAL

INDEX:

This equipment meets the requirements of the European directive for safety and EMC. It's the responsibility of the installer ensure the continuity of the implementation of these directives in the rest of the installation.

1. INTRODUCTION

M1DL3 – MID is a single-phase electricity meter with a RS485 communication port for DIN rail mounting and indoor usage. This meter complies with the standard EN 50470 – 1/3 for accuracy class B active energy and EN 62053- 23 class 2 for reactive energy. Its size is 18 mm for din rail.

It is intended for Mechanical environment M1 and Electromagnetic environment E2 in accordance with the 2014/32/EU directive.

This meter is also a network analyser, measuring other parameters of a single-phase line.

The measured values can be shown on display or transmitted through the communication port with MODBUS-RTU protocol.

2. WORKING

2.1. Metering and Measurement.

M1DL3 – MID measures positive and negative active energy and reactive energy. It also measures the instantaneous values of the electricity network where it is connected.

M1DL3T – MID version has multi rate function.

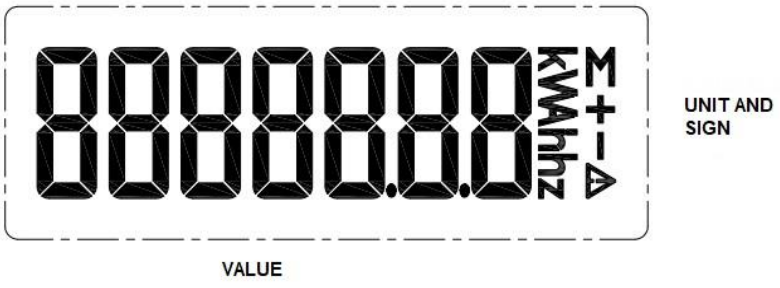
2.2. Display

M1DL3 – MID meter has an LCD display of 25 x 8 mm, with blue backlight, for easy reading in dark places.

Below, there are three tables with the parameters shown in scroll mode, information mode and configuration mode.

M1DL3 – MID has a touch button for display navigation.

Display format.



Parameters shown

SCROLL MODE PARAMETERS			
Measured parameter	**Unit**	**Format**	**Remark**
Forward active energy	kWh	5+2 00000.00	Indication "+"
Reverse active energy	kWh	5+2 00000.00	Indication "-"
Reactive energy	kvarh	5+2 00000.00	
Tariff 1 active energy	kWh	5+2 00000.00	M1DL3T-MID
Tariff 2 active energy	kWh	5+2 00000.00	M1DL3T-MID
Tariff 3 active energy	kWh	5+2 00000.00	M1DL3T-MID
Resettable active accumulator	kWh	5+2 00000.00	
Voltage	V	3+2 000.00	
Current	A	3+2 000.00	
Active power	W	5+0 00000	
Reactive power	Var	5+0 00000	
Apparent power	VA	5+0 00000	
Power factor		1+2 0.00	
Frequency	Hz	5+0 00000	
Forward maximum active power demand	W	5+0 00000	
Reverse maximum active power demand	W	5+0 00000	

Press button for more than tree seconds to enter information display

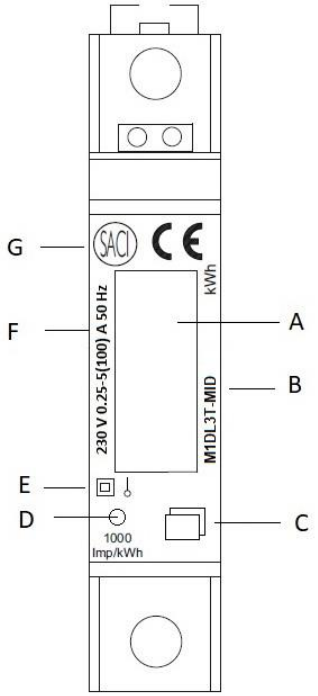
INFORMATION MODE PARAMETERS		
Parameter	**Format**	**Remark**
SETUP		Access to configuration
Serial number	12 000000000000	
MODBUS address	1 a 247	
Baud rate	6: 9600; 7: 19200 8: 38400; 9: 57600 10: 76800; 11:115200	
Parity	0: none; 1: odd; 2: even	
Stop bits	1: 1; 2: 2	
Current tariff		
Date	dd/mm/aa	
Time	hh/mm/ss	

Scrolling time	from 1 to 99 seconds	0 disables scrolling display. Press to turn pages
Combined code	CodE 1	
Demand calculation mode and time	d0 interval. d1 slide From 1 to 30 minutes	Default 0 Default 15 minutes
Firmware version		
CRC code		

From SETUP, a long press access to SETUP page. It is necessary to enter the correct password.
In configuration mode a short press increases the blinking digit, a long press moves to the next digit. After the last digit it pass to the next parameter. For reset use long press.

SETUP DISPLAY		
Parameter	**Format**	**Remark**
MODBUS address	1-247	
Baud rate	6: 9600; 7: 19200 8: 38400; 9: 57600 10: 76800; 11:115200	
Parity	0: none; 1: odd; 2: even	
Stop bits	1: 1; 2: 2	
Reset partial active accumulator		
Reset partial reactive accumulator		
Reset maximum active power demand		
Reset maximum reactive power demand		
Date	dd/mm/aa	
Time	hh/mm/ss	
Scrolling time	From 1 to 99 s	0 disables automatic scrolling. Press to turn pages
Demand calculation mode and time	d0 interval. d1 slide From 1 to 30 minutes	
Code	CodE 1	
Password	0000	

3. FRONT PANEL DESCRIPTION



A Display LCD.
B Model.
C Touch button.
D Led for active energy verification.
E Double insulation and single-phase symbols.
F Reference values.
G SACI logo and CE marking.

4.- CONNECTION DIAGRAM

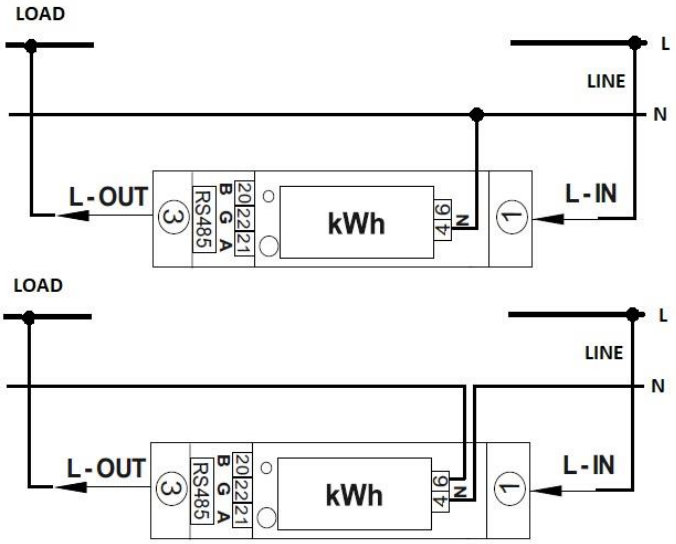


Fig. 3

5. INSTALLATION

5.1 Safety indications ⚠

Before installing the meter read this instruction manual completely.

- Serious injury, or fire hazard could result from improper connection of this instrument. Installation and mounting of this instrument must be performed by qualified personnel only.

- Do not connect the meter without disconnecting mains voltage. Avoid field work unless another person can assist you

- If the equipment is handled in a way not specified by the manufacturer, the equipment protection may be compromised.

- Do not use the meter if its plastic case is damaged and return it to your supplier. The meter must not be opened. No preventive maintenance is required. In case of failure, it must be sent to our facilities for repair and calibration.

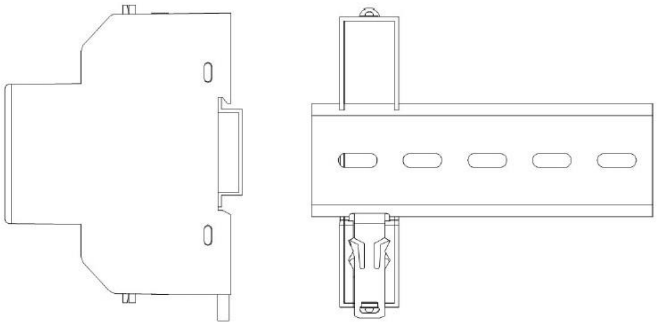
- The device has not a circuit breaker, so this, protection must be provided in the general installation.

- Do not use the meter in explosive atmospheres, or in humid environments with possibility of condensation.

5.2. Mounting instructions.

This unit must be installed inside an electrical cabinet, so that the temperature and humidity do not exceed the working limits.

The plastic case is designed to be mounted in DIN rail of 35 mm x 7.5 mm. To release it from the rail, pull the clip and extract the meter from the rail.

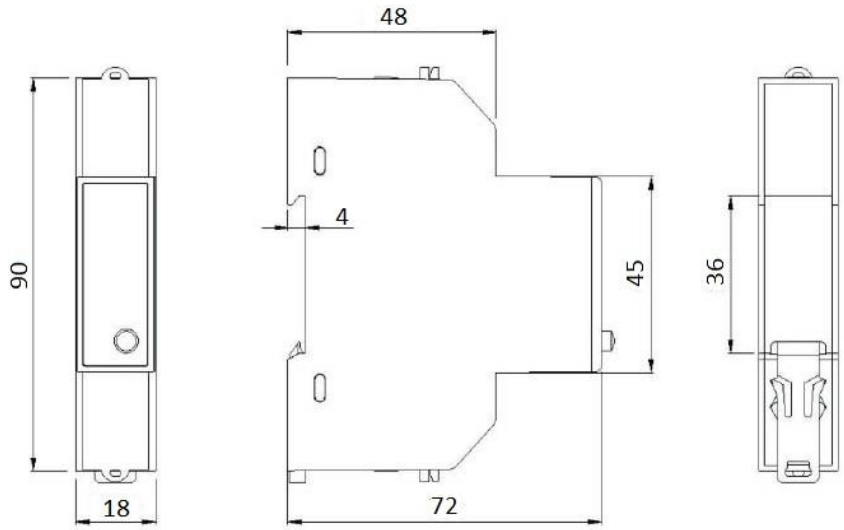


5.3. Connections.

The meter is connected through screw terminals. The connection must be made according to its wiring diagram, indicated on the meter label and in this instruction manual.

6.- DIMENSIONS

High 90 mm
Wide 18 mm
Deep 72 mm
Weight 0.1 Kg



7.- TECHNICAL FEATURES

Voltage:	230 V
Frequency	50 Hz
Burden	<10 VA; 1 W
Current:	0.25 – 5 (100) A
Starting current	20 mA

General:

Class:

Active energy	Class B EN50470 – 1
Reactive energy	2 EN62053 - 23
Instantaneous values	0.5

Constant	1000 Imp / kWh
Temperature range	-25º – 55ºC
Relative humidity. Annual average	≤ 75 %
Maximum humidity without condensation	≤ 95 %
Protection degree	IP51. Indoor usage
Case Materials	PBT, PC
Modular Box. 1 Module	(18 mm)
Terminals	Sealable
Screw terminals	
Maximum wire section:	
Current terminals	25 mm2

More information at "www.saci.es"

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S.A DE CONSTRUCCIONES INDUSTRIALES

DIRECT CONNECTION SINGLE PHASE ELECTRICITY METER

MID CERTIFIED

M1DL3 - MID

M1DL3T - MID

RS485 USER MANUAL

Serial port configuration.
The meter M1DL3 – MID is equipped with an RS485 serial port. The serial port terminals are 20 (B or L-) and 21 (A or L+). Located under the terminal cover of terminal 3, a connection for common is also available on terminal 22.
The baud rate can be set to 9600, 19200, 38400, 57600, 76800 and 115200 baud. Default is 9600.
Parity can be none, even or odd, default none. It can have one or two stop bits, default 1.
Communication through serial port
The protocol used is MODBUS RTU
The reading functions used are 0x03 and 0x04. To record data, 0x06 and 0x10 are used.

Address Map:
Registers related to tariff are only valid for M1DL3T-MID
Instantaneous values:

address	**R/W**	**Register length**		**Format**
0x0100	R	2	Voltage	long 0.001 V
0x0102	R	2	Current	long 0.001 A (1)
0x0104	R	2	Active power	long 1 W
0x0106	R	2	Apparent power	long va
0x0108	R	2	Reactive power	long var
0x010A	R	1	Frequency	integer 0.1 Hz
0x010B	R	1	Power factor	integer 0.001

(1) Signed, the same sign as active power.
Negative values are expressed in 2`s complement.

Energy accumulators:

Address	**R/W**	**Register length**		**Format**
0x010E	R	2	Total import active energy	long 0.01 kWh
0x0110	R	2	Import active energy tariff T1	long 0.01 kWh
0x0112	R	2	Import active energy tariff T2	long 0.01 kWh
0x0114	R	2	Import active energy tariff T3	long 0.01 kWh
0x0116	R	2	Import active energy tariff T4	long 0.01 kWh
0x0118	R	2	Total export active energy	long 0.01 kWh
0x011A	R	2	Export active energy tariff T1	long 0.01 kWh
0x011C	R	2	Export active energy tariff T2	long 0.01 kWh
0x011E	R	2	Export active energy tariff T3	long 0.01 kWh
0x0120	R	2	Export active energy tariff T4	long 0.01 kWh
0x012C	R	2	Total import reactive energy	long 0.01 kvarh
0x012E	R	2	Import reactive energy tariff T1	long 0.01 kvarh
0x0130	R	2	Import reactive energy tariff T2	long 0.01 kvarh
0x0132	R	2	Import reactive energy tariff T3	long 0.01 kvarh
0x0134	R	2	Import reactive energy tariff T4	long 0.01 kvarh
0x0136	R	2	Total export reactive energy	long 0.01 kvarh
0x0138	R	2	Export reactive energy tariff T1	long 0.01 kvarh
0x013A	R	2	Export reactive energy tariff T2	long 0.01 kvarh
0x013C	R	2	Export reactive energy tariff T3	long 0.01 kvarh
0x013E	R	2	Export reactive energy tariff T4	long 0.01 kvarh
0x014A	R	2	Reactive energy Quadrant 1 total	long 0.01 kvarh
0x014C	R	2	Reactive energy Q1 tariff 1	long 0.01 kvarh
0x014E	R	2	Reactive energy Q1 tariff 2	long 0.01 kvarh
0x0150	R	2	Reactive energy Q1 tariff 3	long 0.01 kvarh

0x0152	R	2	Reactive energy Q1 tariff 4	long 0.01 kvarh
0x0154	R	2	Reactive energy Quadrant 2 total	long 0.01 kvarh
0x0156	R	2	Reactive energy Q2 tariff 1	long 0.01 kvarh
0x0158	R	2	Reactive energy Q2 tariff 2	long 0.01 kvarh
0x015A	R	2	Reactive energy Q2 tariff 3	long 0.01 kvarh
0x015C	R	2	Reactive energy Q2 tariff 4	long 0.01 kvarh
0x015E	R	2	Reactive energy Quadrant 3 total	long 0.01 kvarh
0x0160	R	2	Reactive energy Q3 tariff 1	long 0.01 kvarh
0x0162	R	2	Reactive energy Q3 tariff 2	long 0.01 kvarh
0x0164	R	2	Reactive energy Q3 tariff 3	long 0.01 kvarh
0x0166	R	2	Reactive energy Q3 tariff 4	long 0.01 kvarh
0x0168	R	2	Reactive energy Quadrant 4 total	long 0.01 kvarh
0x016A	R	2	Reactive energy Q4 tariff 1	long 0.01 kvarh
0x016C	R	2	Reactive energy Q4 tariff 2	long 0.01 kvarh
0x016E	R	2	Reactive energy Q4 tariff 3	long 0.01 kvarh
0x0170	R	2	Reactive energy Q4 tariff 4	long 0.01 kvarh
0x0172	R	2	Resettable active energy	long 0.01 kWh
0x0174	R	2	Resettable reactive energy	long 0.01 kvarh
0x0176	R	2	Forward active demand	long 0.1 W
0x0178	R	2	Maximum forward active demand	long 0.1 W
0x017A	R	2	Reverse active demand	long 0.1 W
0x017C	R	2	Maximum reverse active demand	long 0.1 W
0x017E	R	2	Forward reactive demand	long 0.1 var
0x0180	R	2	Maximum forward reactive demand	long 0.1 var
0x0182	R	2	Reverse reactive demand	long 0.1 var
0x0184	R	2	Maximum reverse reactive demand	long 0.1 var

Meter parameters

0x1000	R	3	Serial number	12 digits ½ byte
0x1003	R/W	1	MODBUS ID	1 to 247
0x1004	R	1	Firmware version	101
0x1005	R	1	Hardware version	101
0x1006	R	1	Checksum	
0x1007	R/W	4	Time	00, year, month, day weekday, hour, minute, second
0x100B	R/W	1	Scrolling time	1 to 99 s. 0 disables.
0x100C	R/W	1	Baud rate	6: 9600; 7: 19200; 8: 38400; 9: 115200
0x100D	R/W	1	Parity	0 none; 1 odd; 2 even
0x100E	R/W	1	Stop bits	1: 1 bit; 2: 2 bits.
0x100F	R/W	1	Combined code	
0x1010	R/W	1	Demand mode	0: interval. 1 slide
0x1011	R/W	1	Demand cycle	1 to 30 minutes
0x1012	R/W	4	Display contents	Bitwise (2)
0x1016	R/W	1	Password	
0x1018	R/W	2	meter running time	Seconds with I > Istart. 0 Reset.
0x101A	R/W	2	Unit mA	Istart mA
0x2001	W	1	Clear resettable energy registers	bit 12 active, 13 reactive
0x2002	W	1	Clear demand	0xA5yy bit 0 A+; bit 1 A-; Bit 2 R+; bit 3 R-

Tariff parameters:

0x1700	R/W	12	Daily profile 1	8*hhmmtt	hour, minute and tariff
0x170C	R/W	12	Daily profile 2	"	
0x1718	R/W	12	Daily profile 3	"	
0x1724	R/W	12	Daily profile 4	"	
0x1730	R/W	12	Daily profile 5	"	
0x173C	R/W	12	Daily profile 6	"	
0x1748	R/W	12	Daily profile 7	"	
0x1754	R/W	12	Daily profile 8	"	
0x1760	R/W	12	Season table	8*mmddpf	start date: month, day and daily profile
0x176C	R/W	21	Holydays table	14*mmddpf	month, day and profile

(2) Bit = 1 selected. Bit = 0 Not selected

0	Import + export active energy.
1	Import active energy
2	Export active energy
3	Reactive energy
4	Active energy T1
5	Reactive energy T1
6	Active energy T2
7	Reactive energy T2
8	Active energy T3
9	Reactive energy T3
10	Active energy T4
11	Reactive energy T4
12	Resettable active energy
13	Resettable reactive energy
14	Voltage
15	Current
16	Active power
17	Reactive power
18	Apparent power
19	Power factor
20	Frequency
21	Import active power demand
22	Maximum import active power demand
23	Export active power demand
24	Maximum export active power demand
25	Import reactive power demand
26	Maximum import reactive power demand
27	Export reactive power demand
28	Maximum export reactive power demand

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