

# iEM2435 / iEM2455 single phase energy meter

## User manual

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# Safety information

## Important information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that accompany this symbol to avoid possible injury or death.

### **DANGER**

**DANGER** indicates a hazardous situation which, if not avoided, **will result in death or serious injury**.

**Failure to follow these instructions will result in death or serious injury.**

### **WARNING**

**WARNING** indicates a hazardous situation which, if not avoided, **could result in death or serious injury**.

### **CAUTION**

**CAUTION** indicates a hazardous situation which, if not avoided, **could result in minor or moderate injury**.

### **NOTICE**

NOTICE is used to address practices not related to physical injury.

## Please note

Electrical equipment should be installed, operated, serviced and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material. A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

## About this manual

This manual discusses features of the iEM2435 / iEM2455 single phase energy meter and provides installation and configuration instructions.

Throughout the manual, the term “meter” / “device” / “equipment” / “product” refers to iEM2435 / iEM2455 models. The differences between the models, such as a feature specific to one model, are indicated with the appropriate model number or description.

This manual assumes you have an understanding of single phase energy meters and are familiar with the equipment and power system in which your meter is installed.

This manual does not provide configuration information for advanced features where an expert user would perform advanced configuration. It also does not include instructions on how to incorporate meter data or perform meter configuration using energy management systems or software, other than Modbus and M-Bus tool.

Make sure you are using the most up-to-date version of your device's firmware in order to access the latest features.

The most up-to-date documentation about your device is available for download from [www.se.com](http://www.se.com).

### Related documents

Document	Number
iEM2435 / iEM2455 instruction sheet	JYT8368500 / JYT8368600

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# Safety precautions

Installation, wiring, testing and service must be performed in accordance with all local and national electrical codes.

<b>⚠️⚠️ DANGER</b>
<b>HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH</b>
<ul style="list-style-type: none"><li>• This product must be installed inside a suitable fire and electrical enclosure.</li><li>• Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E in the USA, CSA Z462 or applicable local standards.</li><li>• Do not install this product in hazardous or classified locations.</li><li>• Product may use multiple voltage/power sources. Disconnect ALL sources before servicing.</li><li>• Use a properly rated voltage sensing device to confirm that power is off.</li><li>• Products rated only for basic insulation must be installed on insulated conductors.</li><li>• Treat I/O wiring connected to multiple devices as hazardous live until determined otherwise.</li><li>• Do not exceed the product's ratings or maximum limits.</li><li>• Replace the protection covers before powering the equipment.</li><li>• Do not use this device for critical control or protection applications where human or equipment safety relies on the operation of the control circuit.</li><li>• Do not use water or any liquid material to clean the product. Use a cleaning cloth to remove dirt. If dirt cannot be removed, contact local Technical Support representative.</li></ul>
<b>Failure to follow these instructions will result in death or serious injury.</b>

<b>⚠️ WARNING</b>
<b>RISK OF INJURY OR EQUIPMENT DAMAGE</b>
<ul style="list-style-type: none"><li>• Install the external fuse or thermal cut-off, external switch or single-pole circuit breaker on the phase line and not on the neutral line. The protection devices must be installed near to the meter.</li><li>• The wire connecting the meter to the outside circuit, must be sized in accordance with local regulations for the maximum amount of the protection devices used in the circuit.</li></ul>
<b>Failure to follow these instructions can result in death, serious injury, or equipment damage.</b>

<b>⚠️ WARNING</b>
<b>POTENTIAL COMPROMISE OF SYSTEM AVAILABILITY, INTEGRITY, AND CONFIDENTIALITY</b>
<ul style="list-style-type: none"><li>• Change the default password to help prevent unauthorized access to device configuration settings and information.</li></ul>
<b>Failure to follow these instructions can result in death, serious injury, or equipment damage.</b>

# Meter overview

## Overview of meter functions

The iEM2435 / iEM2455 is a single phase meter which measures the forward and reverse energy with a blue backlight LCD display.

The key features of the meters are as follows:

- Current, voltage, and energy measurements
- Total of forward and reverse active energy, total of forward and reverse reactive energy, and active power measurements
- Pulse outputs
- Tariff measurement
- Communication via M-Bus or RS-485 Modbus

For applications, feature details and complete specifications, see the iEM2435 / iEM2455 datasheet at [www.se.com](http://www.se.com).

## Meter models

Model	Commercial reference	Description
iEM2435	A9MEM2435	<ul style="list-style-type: none"> <li>• Communication via M-Bus</li> <li>• Active energy - Class B as per EN 50470-1/3; Class 1 as per IEC 62053-21</li> <li>• Reactive energy - Class 2 as per IEC 62053-23</li> <li>• MID / MIR compliance</li> </ul>
iEM2455	A9MEM2455	<ul style="list-style-type: none"> <li>• Communication via RS-485 Modbus</li> <li>• Active energy - Class B as per EN 50470-1/3; Class 1 as per IEC 62053-21</li> <li>• Reactive energy - Class 2 as per IEC 62053-23</li> <li>• MID / MIR compliance</li> </ul>

## Feature summary

Function	iEM2435	iEM2455
4 quadrant energy measurements, partial and total energy counter	√	√
Total of forward and reverse active energy	√	√
Total of forward and reverse reactive energy	√	√
Power: <ul style="list-style-type: none"> <li>• Active power (kW)</li> <li>• Apparent power (kVA)</li> <li>• Reactive power (kVAR)</li> </ul>	√	√
Voltage, current, frequency and power factor	√	√
2 tariff control through command register	√	√
Pulse outputs	√	√
Communication	M-Bus	RS-485 Modbus
MID / MIR compliant	√	√



## Configuration

The meter configuration can be performed through the HMI display or through communication tool via M-Bus or RS-485 Modbus.

# Commissioning

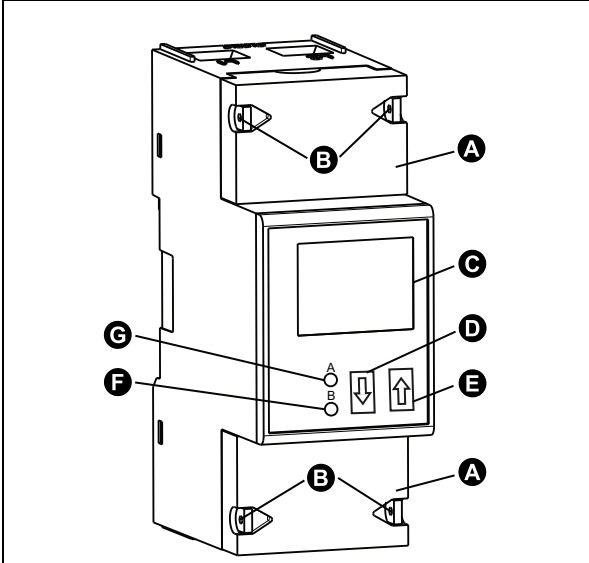
## Supplemental information

This document is intended to be used in conjunction with the instruction sheet that ships in the box with the meter.

See the meter's instruction sheet for information related to installation.

You can download updated documentation from [www.se.com](http://www.se.com) or contact your local Schneider Electric representative for the latest information about your product.

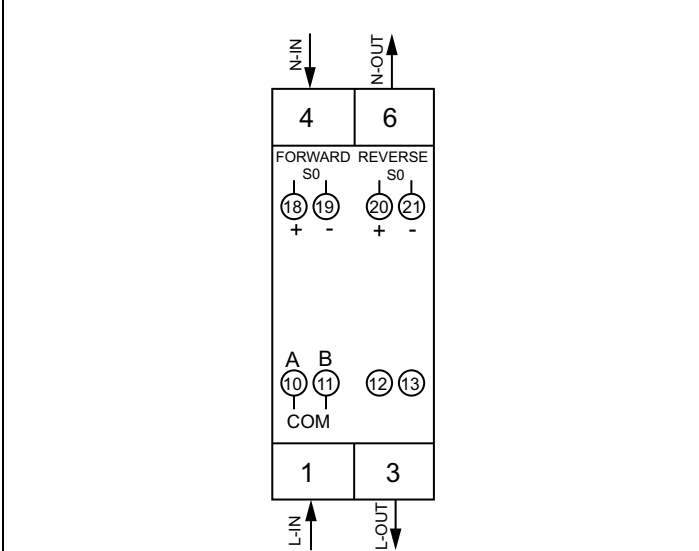
## Meter description



A	Protection covers
B	Sealing points
C	Blue backlight LCD display
D	Down-arrow button (touch sensitive)
E	Up-arrow button (touch sensitive)
F	Active energy consumption LED (B=10000 imp/kWh)
G	Reactive energy consumption LED (A=10000 imp/kVARh)

**NOTE:** The protection covers (A) must be installed and sealed to the sealing points (B) with the steel cable of 1 mm (0.04 in) diameter.

## Wiring



1	Phase line in (L-IN)
3	Phase line out (L-OUT)
4	Neutral line in (N)
6	Neutral line out (N)
10 & 11	M-bus / Modbus communication
12 & 13	Not used
18 (+) & 19 (-)	Pulse output (S0) forward
20 (+) & 21 (-)	Pulse output (S0) reverse

Recommended cable material: Copper wire

## Energy consumption LEDs

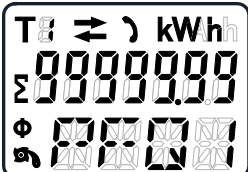
The two red LEDs on the front panel indicates the energy consumption. When power is consumed, the LEDs flash. When more power is consumed, the LEDs flash at a faster rate.

The reactive energy consumption LED (A=10000 imp/kVARh) flashes during reactive energy consumption and the active energy consumption LED (B=10000 imp/kWh) flashes during active energy consumption. The LEDs flash at 10000 imp/kWh.

## Button functions

Action	Button function
Hold the up-arrow button (↑) or down-arrow button (↓) for less than 3 seconds	To enable scroll. <b>NOTE:</b> After 30 seconds of no interaction the meter goes back to automatic scroll mode.
Hold the up-arrow button (↑) for 3 seconds	To enter the next menu.
Hold the down-arrow button (↓) for 3 seconds	To go back to previous menu.
Hold both down-arrow button (↓) and up-arrow button (↑) for 3 seconds	To confirm settings.
Hold the up-arrow button (↑) for ≥5 seconds	To enter program mode. To add or remove from the automatic scroll.

## Display screen overview



The blue backlight LCD display as shown in the image has three rows:

- The first row displays tariff indication, energy flow direction, communication status and unit.
- The second row displays the value per unit.
- The last row displays all other metering information or OBIS codes.

Touch the up-arrow or down-arrow button to turn ON the back light. After 30 seconds of inactivity, the backlight switches OFF. On power up, the meter scrolls through the pages in an interval of 10 seconds (default setting).

The meter is equipped with a 7-digit LCD. For the energy consumption the meter displays 99999.99 kWh and automatically changes to 999999.9 kWh when the value exceeds and so on.

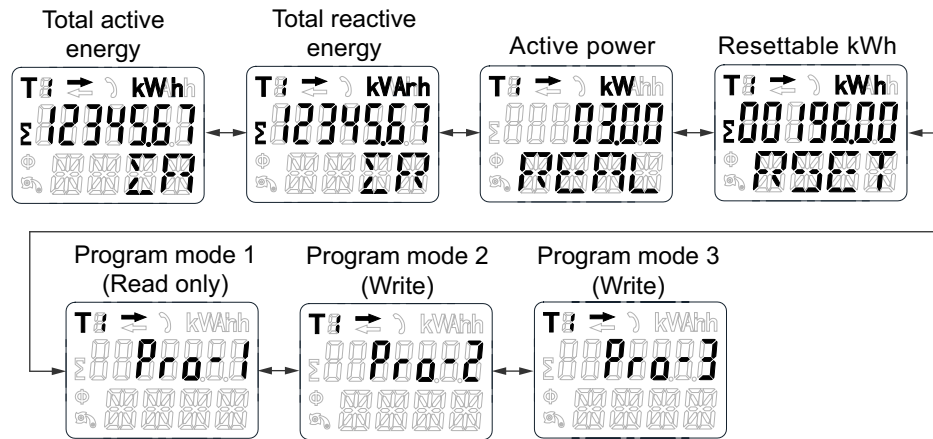
The first display indication of the meter in the scrolling mode is either FW (forward) or RV (reverse).

## Meter screen menus

The meter screens are grouped logically, according to their function. The meter's display screen and the buttons allow you to view the various parameters.

You can access any available meter screen by first selecting the main menu (top level) screen that contains it.

**NOTE: The menu screens shown throughout this user manual depicts when tariff mode is selected for T1 unless otherwise specified.**

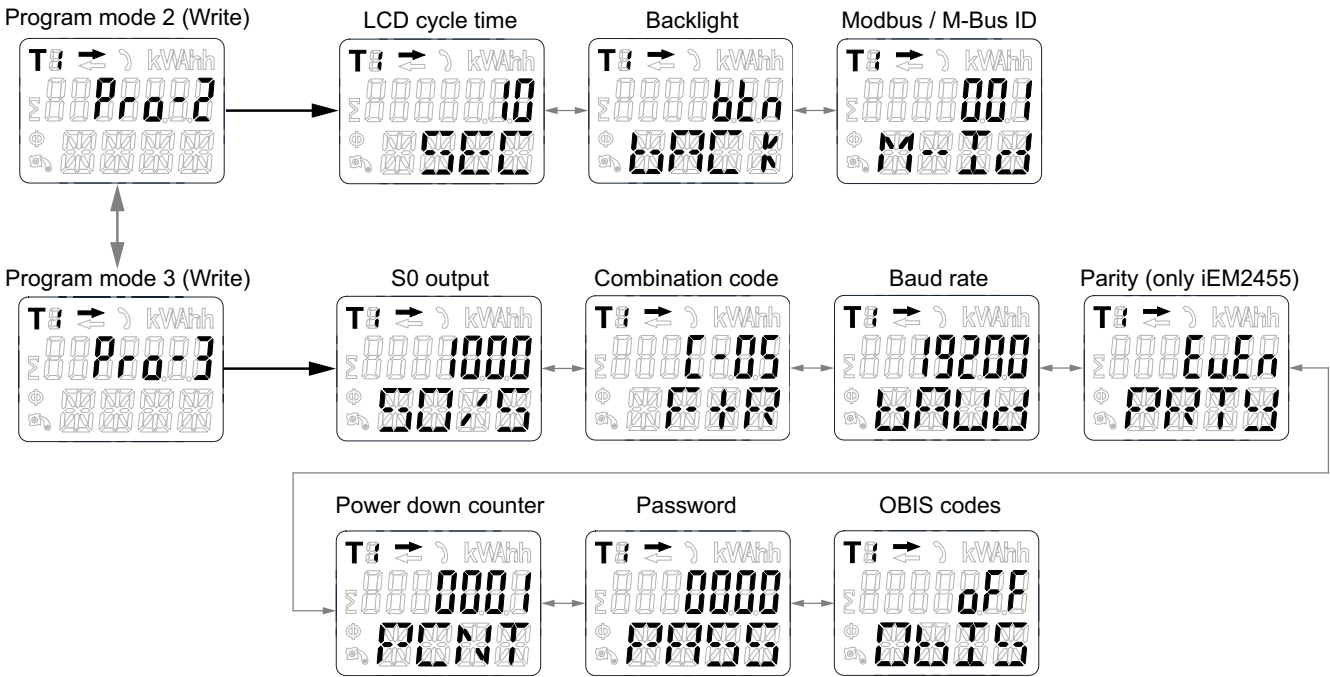


# Configuring

## Configuration mode

The program mode 2 (**Pro-2**) and program mode 3 (**Pro-3**) in the meter HMI allows you to configure various setup parameters.

### Configuration mode menu tree



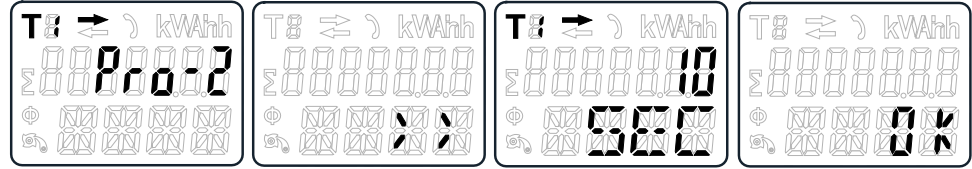
Menu	Parameters	Options	Default values	
Program mode 2 ( <b>Pro-2</b> )	LCD cycle time	1 – 30 seconds	10	
	Backlight	on / off / btn	btn	
	iEM2435	M-Bus ID	000 – 250	000
	iEM2455	Modbus ID	001 – 247	001
Program mode 3 ( <b>Pro-3</b> )	Pulse output (S0) rate	1000 / 100 / 10 / 1 / 0.1 / 0.01 / 2000 / 10000	1000	
	Combination code	C-01 (F) / C-04 (R) / C-05 (F+R) / C-06 (R-F) / C-09 (F-R) / C-10 (F-R)	C-05 (F+R)	
	iEM2435	Baud rate	300 / 600 / 1200 / 2400 / 4800 / 9600	2400
	iEM2455		1200 / 2400 / 4800 / 9600 / 19200 / 38400	19200
	Parity (only iEM2455)	even / none / odd	even	
	Power down counter	–	–	
	Password	0000 - 9999	0000	
	OBIS codes	on / off	off	

## Program mode 2 (Pro-2) configuration

### Setting up scrolling time

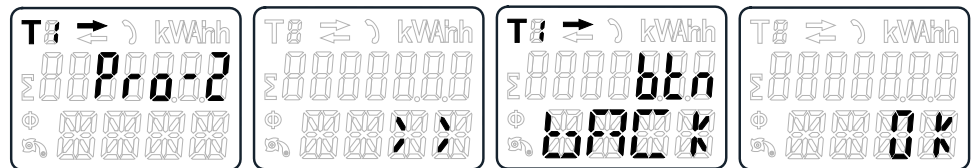
In automatic scroll, for every 10 seconds (default setting) the meter displays the next programmed data page.

To change the scrolling time, follow these steps:



1. Scroll with the buttons to Program mode 2 (**Pro-2**).
2. Hold the up-arrow button for 3 seconds to enter the menu.
3. Scroll to LCD cycle time (**SEC**) page.
4. Hold the up-arrow button for 5 seconds to enter program mode.
5. When the value starts blinking: select the new value between 1 – 30 seconds.
6. Hold both buttons for 3 seconds to confirm the new scrolling time.
7. The LCD displays **OK** when the setting is confirmed.

### Setting up backlight

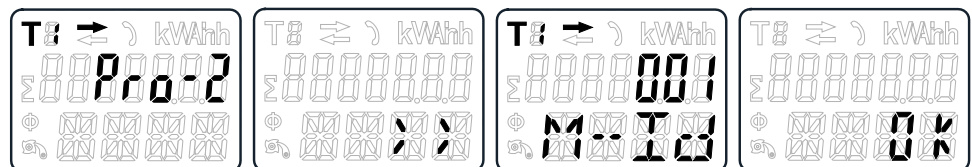


1. Scroll with the buttons to Program mode 2 (**Pro-2**).
2. Hold the up-arrow button for 3 seconds to enter the menu.
3. Scroll to backlight setting (**bACK**) page.
4. Hold the up-arrow button for 5 seconds to enter program mode.
5. When the value starts blinking: select **on** / **oFF** / **btn**.
6. Hold both buttons for 3 seconds to confirm the new setting.
7. The LCD displays **OK** when the setting is confirmed.

### Setting up Modbus ID (iEM2455) / M-Bus ID (iEM2435)

The Modbus ID (iEM2455) can be set from 001 to 247. The M-Bus ID (iEM2435) can be set from 000 to 250.

To change the Modbus ID (iEM2455) / M-Bus ID (iEM2435), follow these steps:

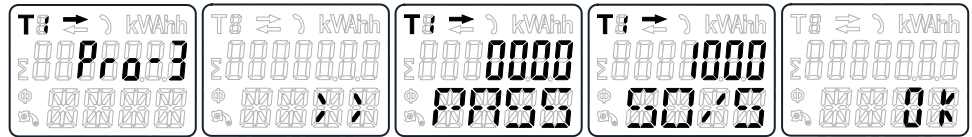


1. Scroll with the buttons to Program mode 2 (**Pro-2**).
2. Hold the up-arrow button for 3 seconds to enter the menu.
3. Scroll to Modbus ID (iEM2455) / M-Bus ID (iEM2435) (**M-Id**) page.
4. Hold the up-arrow button for 5 seconds to enter program mode.
5. When the value starts blinking: select 3 digits (Modbus (iEM2455): **001 – 247** / M-Bus (iEM2435): **000 – 250**).
6. Hold both buttons for 3 seconds to confirm each digit.
7. The LCD displays **OK** when the setting is confirmed.

## Program mode 3 (Pro-3) configuration

### Setting up pulse output rate

The meter is equipped with two pulse outputs (forward and reverse) which are optically isolated from the inside circuit. The meter generates pulses in proportion to the measured consumption for purpose of remote reading or accuracy testing. The pulse output is a polarity dependent, open-collector transistor output which requires an external voltage source for correct operation. For this external voltage source, the voltage ( $U_i$ ) should be less than 27 V DC. The maximum switching current ( $I_{max}$ ) is 100 mA. To connect the impulse output, connect 5 – 27 V DC to connector 18/20 (collector), and the signal wire (S) to connector 19/21 (emitter). To change the pulse output (S0) rate, follow these steps:



1. Scroll with the buttons to Program mode 3 (**Pro-3**).
2. Hold the up-arrow button for 3 seconds to enter the menu.
3. Enter the 4 digit password (default: **0000**): scroll with the buttons and select each digit 0 – 9, hold the up-arrow button for 3 seconds to confirm each digit.
4. Scroll to S0 output (**S0/S**) page.
5. Hold the up-arrow button for 5 seconds to enter program mode.
6. When the value starts blinking: select **10000 / 2000 / 1000 / 100 / 10 / 1 / 0.1 / 0.01**.
7. Hold both buttons for 3 seconds to confirm the new setting.
8. The LCD displays **OK** when the setting is confirmed.

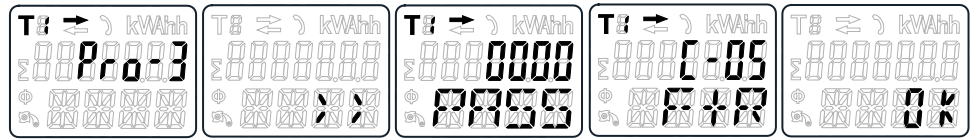
### Setting up combination code

The meter allows you to display the total energy (usage) based on the combination code. The combination code is in accordance with different calculation methods as shown below:

Code	Total (active) energy
C-01	Forward only
C-04	Reverse only
C-05	Forward + Reverse
C-06	Reverse - Forward

Code	Total (active) energy
C-09	Forward - Reverse
C-10	Forward - Reverse

To change the combination code, follow these steps:

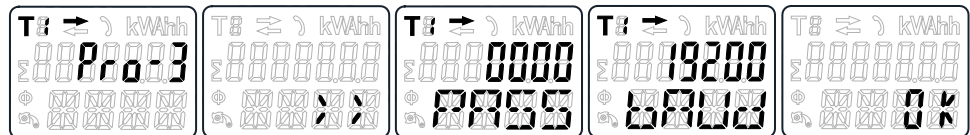


1. Scroll with the buttons to Program mode 3 (**Pro-3**).
2. Hold the up-arrow button for 3 seconds to enter the menu.
3. Enter the 4 digit password (default: **0000**): scroll with the buttons and select each digit 0 – 9, hold the up-arrow button for 3 seconds to confirm each digit.
4. Scroll to combination code (**C-xx**) page.
5. Hold the up-arrow button for 5 seconds to enter program mode.
6. When the value starts blinking: select **01 / 04 / 05 / 06 / 09 / 10**.
7. Hold both buttons for 3 seconds to confirm the new setting.
8. The LCD displays **OK** when the setting is confirmed.

## Setting up baud rate

The Modbus (iEM2455) baud rate can be set from 1200 to 38400. The M-bus (iEM2435) baud rate can be set from 300 to 9600.

To change the baud rate, follow these steps:



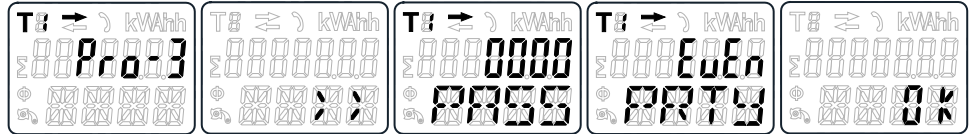
1. Scroll with the buttons to Program mode 3 (**Pro-3**).
2. Hold the up-arrow button for 3 seconds to enter the menu.
3. Enter the 4 digit password (default: **0000**): scroll with the buttons and select each digit 0 – 9, hold the up-arrow button for 3 seconds to confirm each digit.
4. Scroll to baud rate (**bAUd**) page.
5. Hold the up-arrow button for 5 seconds to enter program mode.
6. When the value starts blinking, select:
  - Modbus (iEM2455): 1200 / 2400 / 4800 / 9600 / 19200 / 38400
  - M-Bus (iEM2435): 300 / 600 / 1200 / 2400 / 4800 / 9600
7. Hold both buttons for 3 seconds to confirm the new setting.
8. The LCD displays **OK** when the setting is confirmed.

## Setting up parity (only iEM2455)

The Modbus (iEM2455) parity can be set to **EvEn**, **nonE** or **odd**. The M-bus (iEM2435) parity is always **EvEn**.

To change the parity, follow these steps:



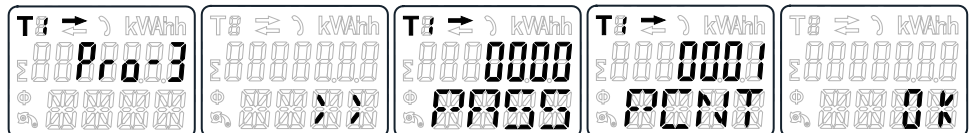


1. Scroll with the buttons to Program mode 3 (**Pro-3**).
2. Hold the up-arrow button for 3 seconds to enter the menu.
3. Enter the 4 digit password (default: **0000**): scroll with the buttons and select each digit 0 – 9, hold the up-arrow button for 3 seconds to confirm each digit.
4. Scroll to parity (**PRTY**) page.
5. Hold the up-arrow button for 5 seconds to enter program mode.
6. When the value starts blinking: select **EvEn / nonE / odd**.
7. Hold both buttons for 3 seconds to confirm the new setting.
8. The LCD displays **OK** when the setting is confirmed.

## Resetting power down counter

The power down counter registers the number of times the meter has been turned off.

To reset the power down counter, follow these steps:

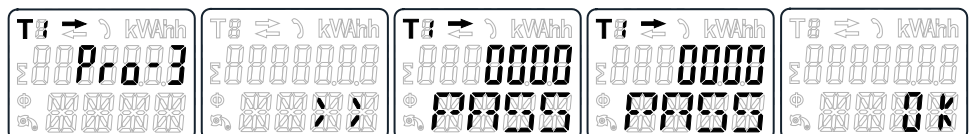


1. Scroll with the buttons to Program mode 3 (**Pro-3**).
2. Hold the up-arrow button for 3 seconds to enter the menu.
3. Enter the 4 digit password (default: **0000**): scroll with the buttons and select each digit 0 – 9, hold the up-arrow button for 3 seconds to confirm each digit.
4. Scroll to power down counter (**PCNT**) page.
5. Hold the up-arrow button for 5 seconds to enter program mode.
6. When the value starts blinking: hold both buttons for 3 seconds to reset.
7. The LCD displays **OK** when the power down counter is reset.

## Setting up password

The Program mode 3 (**Pro-3**) is protected with a password. The default password is **0000**.

To change the password, follow these steps:



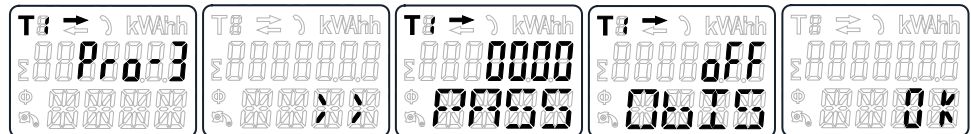
1. Scroll with the buttons to Program mode 3 (**Pro-3**).
2. Hold the up-arrow button for 3 seconds to enter the menu.
3. Enter the 4 digit password (default: **0000**): scroll with the buttons and select each digit 0 – 9, hold the up-arrow button for 3 seconds to confirm each digit.

4. Scroll to password (**PASS**) page.
5. Hold the up-arrow button for 5 seconds to enter program mode.
6. When the value starts blinking: select each digit 0 - 9, hold both buttons for 3 seconds to confirm each digit.
7. The LCD displays **OK** when the setting is confirmed.

## Setting up OBIS code

You can set the OBIS code to **on** in Program mode 3 (**Pro-3**). The default setting for OBIS code is **off**.

To set the OBIS code, follow these steps:

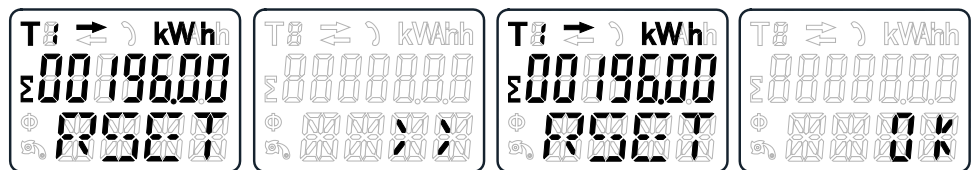


1. Scroll with the buttons to Program mode 3 (**Pro-3**).
2. Hold the up-arrow button for 3 seconds to enter the menu.
3. Enter the 4 digit password (default: **0000**): scroll with the buttons and select each digit 0 – 9, hold the up-arrow button for 3 seconds to confirm each digit.
4. Scroll to OBIS (**Obis**) page.
5. Hold the up-arrow button for 5 seconds to enter program mode.
6. When the value starts blinking: select **on** or **off**.
7. Hold both buttons for 3 seconds to confirm new setting.
8. The LCD displays **OK** when the setting is confirmed.

## Resetting day counter

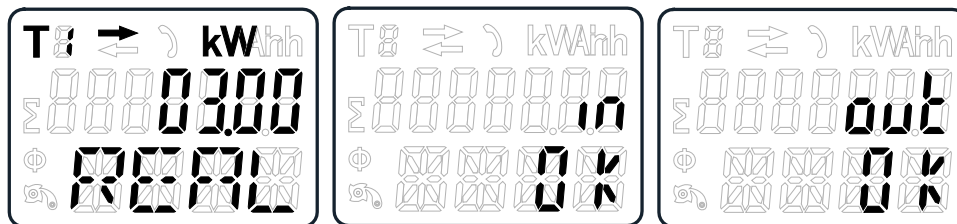
The meter is equipped with a day counter for consumed energy. The consumed energy is the energy forward calculated and can be reset to zero (0).

To reset the day counter to zero (0), follow these steps:



1. Scroll with the buttons to resettable kWh (**RSET**) page in the main menu.
2. Hold the up-arrow button for 3 seconds to enter the menu.
3. When the value starts blinking: hold the up-arrow button for 5 seconds to reset.
4. The LCD displays **OK** when the day counter is reset.

## Adding / removing registers to / from automatic scroll



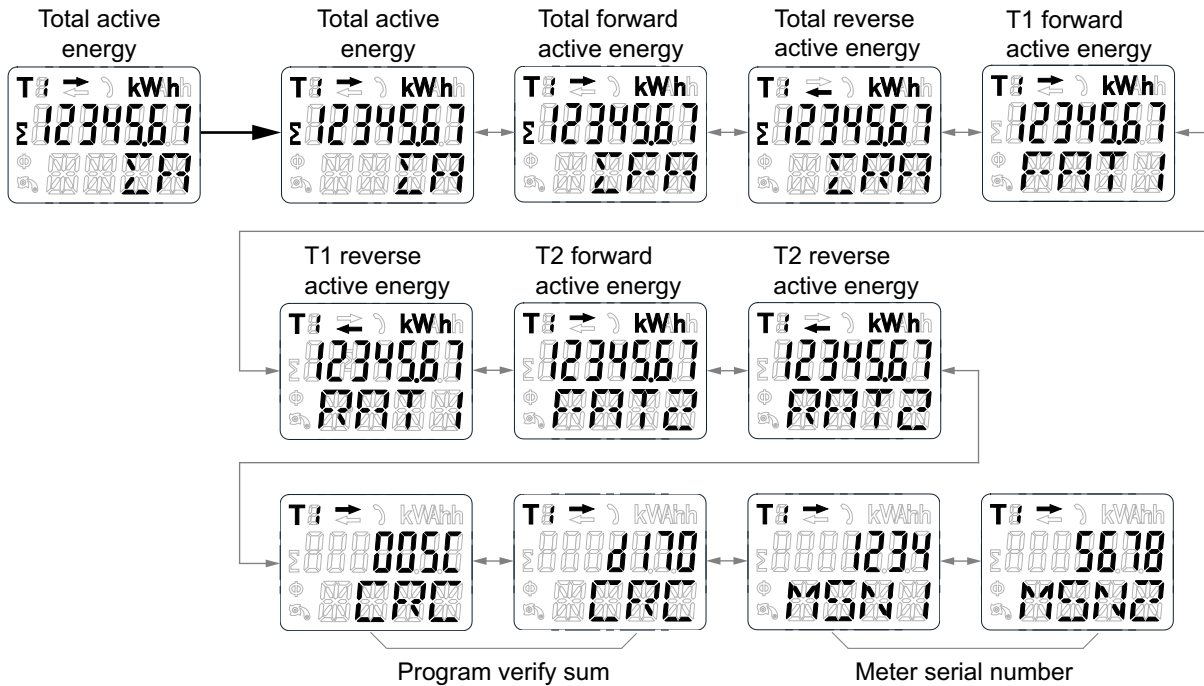
1. Scroll to the register that you need to add or remove.

**NOTE:** Only the registers in the sub-menu after the total active energy, total reactive energy, active power and Program mode 1 can be added or removed to / from the automatic scroll. Total active energy cannot be removed.

2. Hold the up-arrow button for 5 seconds to add or remove the register.
3. The LCD displays in **OK** or **out OK**.

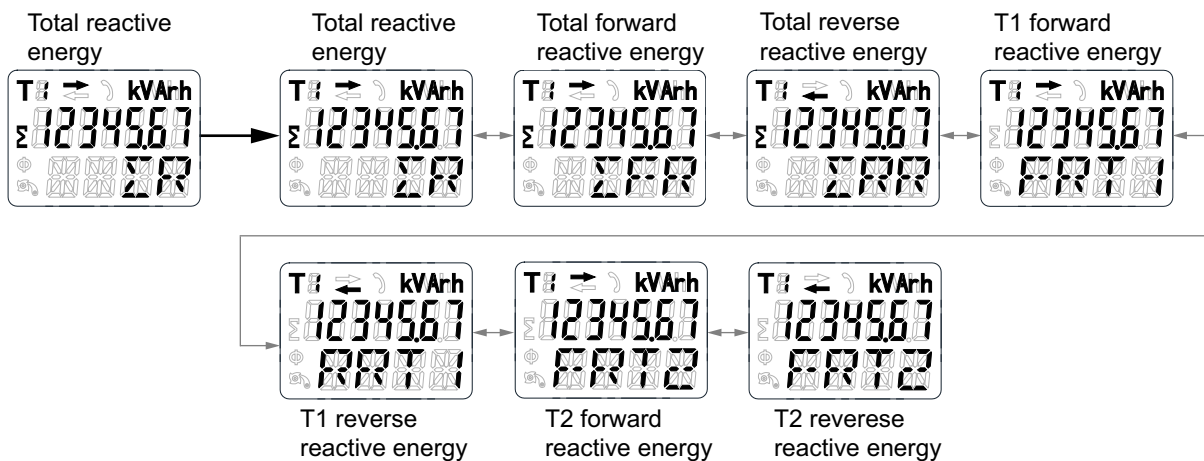
# Operating

## Viewing active energy parameters



1. Scroll with the buttons to total active energy (**ΣA**) register in the main menu.
2. Hold the up-arrow button for 3 seconds to enter the next menu.  
The display shows >>.
3. Hold the down-arrow or up-arrow button to scroll through various active energy parameter pages.
4. Hold the down-arrow button for 3 seconds to go back to main menu.  
The display shows <<.

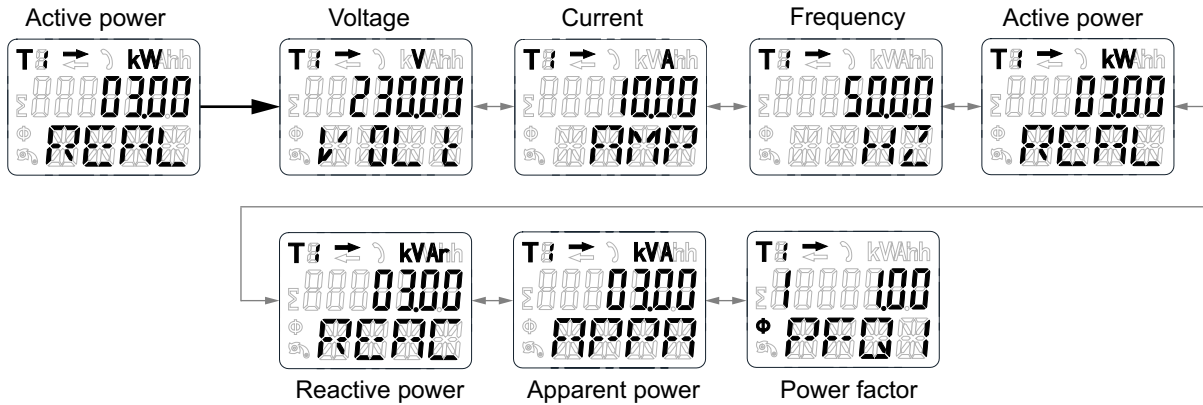
## Viewing reactive energy parameters



1. Scroll with the buttons to total reactive energy (**ΣR**) register in the main menu.
2. Hold the up-arrow button for 3 seconds to enter the next menu.  
The display shows >>.

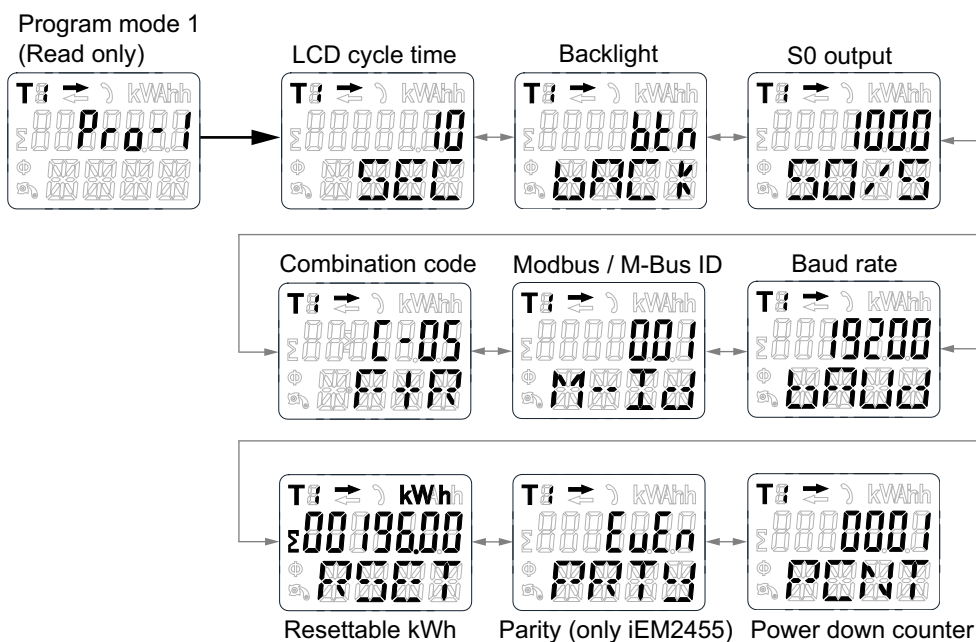
3. Hold the down-arrow or up-arrow button to scroll through various reactive energy parameter pages.
4. Hold the down-arrow button for 3 seconds to go back to main menu.  
The display shows <<.

## Viewing instantaneous (RMS) measurements



1. Scroll with the buttons to active power (**REAL**) register in the main menu.
2. Hold the up-arrow button for 3 seconds to enter the next menu.  
The display shows >>.
3. Hold the down-arrow or up-arrow button to scroll through various instantaneous (RMS) measurement pages.
4. Hold the down-arrow button for 3 seconds to go back to main menu.  
The display shows <<.

## Viewing Program mode 1 (Pro-1) parameters



1. Scroll with the buttons to Program mode 1 (**Pro-1**) register in the main menu.

2. Hold the up-arrow button for 3 seconds to enter the next menu.  
The display shows >>.
3. Hold the down-arrow or up-arrow button to scroll through various Program mode 1 (**Pro-1**) parameter pages.
4. Hold the down-arrow button for 3 seconds to go back to main menu.  
The display shows <<.

# Maintenance and troubleshooting

## Maintenance overview

The meter does not contain any user-serviceable parts. If the meter requires service, contact your local Schneider Electric Technical Support representative.

<b>NOTICE</b>
<p><b>EQUIPMENT DAMAGE</b></p> <ul style="list-style-type: none"> <li>• Do not open the device case.</li> <li>• Do not attempt to repair any components of the device.</li> </ul> <p><b>Failure to follow these instructions can result in equipment damage.</b></p>

Do not open the meter. Opening the meter voids the warranty.

## Troubleshooting

Problem	Probable cause	Possible solution
The red consumption LED is not flashing (Pulse LED).	There is no load connected to the meter.	Connect load to the meter.
	The load on the line is very low.	Check with multimeter, if the load value is very low.
The register does not count.	There is almost no load connected to the meter.	Check if the red consumption LED is flashing.
No pulse output.	The pulse output is not supplied with DC power. The pulse output is not connected correctly.	Check the external voltage source (U <sub>i</sub> ) is 5 – 27 V DC with a voltmeter. Check if the connection is correct: the 5 – 27 V DC should be connected to the collector connection (pin 18/20+) and the signal wire (S) to the emitter connection (pin 19/21-).
The pulse output rate is wrong.	Is the correct pulse rate set via the Modbus tool or in Program mode 3?	Use the Modbus tool which can be bought separately.

If the problem is not fixed after troubleshooting, contact Technical Support for help.

## Display errors

Display shows	Kind of errors	Solution
Err 01	Memory error	Please contact your local Schneider Electric representative for meter replacement
Err 02	Program code checksum error	

# References

## Communication via Modbus (iEM2455)

### Overview

The meter can communicate with your PC. In order to read out the meter registers, install and configure the PC software. Use an RS-485 converter to connect the PC and the meter.

The cable should be connected to terminals 10 and 11. The default communication address of the meter is 01.

The Modbus implementation used is Modbus basic (standard) with the following settings:

- Baud rate 19200
- 8 data bits
- Even parity
- 1 stop bit

The baud rate values can be changed to 1200, 2400, 4800, 9600, 38400. The parity can be set to none or odd. Data and stop bit cannot be changed.

**NOTE:**

When connecting the meter through a serial converter (RS-485) for testing, position an additional resistor (120  $\Omega$ / 0.25 W) across the terminals (10 and 11) on the meter side.

### Register list column description

<b>Address</b>	A 16-bit register address in hexadecimal. The address is the data used in the Modbus frame.
<b>Register</b>	A 16-bit register number in decimal (register = address + 1)
<b>Action</b>	R = Read only register W = Write only register RW = Read Write register RWC = Read register, write through Command register
<b>Size</b>	Data size in number of registers
<b>Type</b>	Data type
<b>Units</b>	Unit of the register value
<b>Description</b>	Information about the register and the range and values that apply

The Modbus register list data types are as follows:

Type	Description	Range
UInt16	16 bit unsigned integer	0 to 65535
UInt32	32 bit unsigned integer	0 to 4294967295
Int64	64 bit signed integer	-9223372036854775808 to +9223372036854775807
UTF8	8 bit field	Multibyte character encoding for Unicode
Float32	IEEE 754-1985 single precision floating-point value	-3.4E38 to +3.4E38
4Q FP PF	Four quadrant floating point power factor	-2 to +2
Bitmap	—	—



## Register list

### System

Address	Register	Action	Size	Type	Units	Description
0x001E	31	R	20	UTF8	-	Meter name Default: Power Meter
0x0032	51	R	20	UTF8	-	Meter model Default: iEM2455
0x0046	71	R	20	UTF8	-	Manufacturer Default: Schneider Electric
0x005A	91	R	1	UInt16	-	Meter code
0x0082	131	R	2	UInt32	-	Serial number
0x0088	137	R	5	UTF8	-	Hardware revision in x.x.x format Default: 1.0.0 <b>NOTE:</b> The first number is the major version, the second number is the minor version, and the third number is normally not used.
0x0665	1638	R	1	UInt16	-	Present firmware version

### Meter setup and status

Address	Register	Action	Size	Type	Units	Description
0x0725	1830	R	1	UInt16	-	Power on off counter Default: 1
0x07DE	2015	R	1	UInt16	-	Number of phases (Always 1)
0x07DF	2016	R	1	UInt16	-	Number of wires (Always 2)
0x07E0	2017	R	1	UInt16	-	Power system (Always 0 = 1PH2W L-N)
0x07E1	2018	R	1	UInt16	Hz	Nominal frequency Default: 50
0x07E4	2021	R	2	Float32	A	Meter amps Default: 100

### Command interface

Address	Register	Action	Size	Type	Units	Description
0x1482	5251	W	1	UInt16	-	Requested command
0x1483	5252	W	1	UInt16	-	Reserved for future use
0x1484 - 0x148D	5253 - 5262	W	1	UInt16	-	Command parameter 001 -010

Address	Register	Action	Size	Type	Units	Description
0x14FF	5376	R/W	1	UInt16	-	Command status
0x1500	5377	R/W	1	UInt16	-	Command result codes: <ul style="list-style-type: none"> <li>• 0 = Valid and successful command</li> <li>• 3000 = Invalid command</li> <li>• 3001 = Invalid parameter</li> <li>• 3002 = Invalid number of parameters</li> <li>• 3007 = Command is valid but the operation was not performed</li> </ul>

## Display

Address	Register	Action	Size	Type	Units	Description
0x17D4	6101	R/WC	1	UInt16	-	LCD cycle time Default: 10

## Communication

Address	Register	Action	Size	Type	Units	Description
0x1965	6502	R/WC	1	UInt16	-	RS-485 communication port address 1 – 247 Default: 1
0x1966	6503	R/WC	1	UInt16	-	RS-485 communication baud rate <ul style="list-style-type: none"> <li>• 0 = 9600</li> <li>• 1 = 19200 (default)</li> <li>• 2 = 38400</li> <li>• 3 = 4800</li> <li>• 4 = 2400</li> <li>• 5 = 1200</li> </ul>
0x1967	6504	R/WC	1	UInt16	-	RS-485 communication parity <ul style="list-style-type: none"> <li>• 0 = Even (default)</li> <li>• 1 = Odd</li> <li>• 2 = None</li> </ul>

## Energy pulse output

Address	Register	Action	Size	Type	Units	Description
0x1968	6505	R/WC	2	Float32	-	S0 output rate Default: 1000

## Energy settings

Address	Register	Action	Size	Type	Units	Description
0x196A	6507	R/WC	1	UInt16	-	Combined Code 01 (F) 04 (R) 05 (F+R) (default) 06 (R-F) 09 (F-R) 10 (F-R)

## Current, voltage, power, power factor, and frequency

Address	Register	Action	Size	Type	Units	Description
<b>Current</b>						
0x0BB8	3001	R	2	Float32	A	Current
<b>Voltage</b>						
0x0BD4	3029	R	2	Float32	V	Voltage
<b>Power</b>						
0x0BEE	3055	R	2	Float32	kW	Active power
0x0BFC	3069	R	2	Float32	kVAR	Reactive power
0x0C04	3077	R	2	Float32	kVA	Apparent power
<b>Power factor</b>						
0x0C0C	3085	R	2	4Q_FP_ PF	-	Power factor: <ul style="list-style-type: none"> <li>-2 &lt; PF &lt; -1 = Quad 2, active power negative, capacitive</li> <li>-1 &lt; PF &lt; 0 = Quad 3, active power negative, inductive</li> <li>0 &lt; PF &lt; 1 = Quad 1, active power positive, inductive</li> <li>1 &lt; PF &lt; 2 = Quad 4, active power positive, capacitive</li> </ul>
<b>Frequency</b>						
0x0C26	3111	R	2	Float32	Hz	Frequency <ul style="list-style-type: none"> <li>Range : 40 to 70</li> </ul>

## Energy and energy by tariff

### Energy values - 64-bit integer

Address	Register	Action	Size	Type	Units	Description
<b>Total energy (cannot be rest)</b>						
0x0C84	3205	R	4	Int64	Wh	Forward active energy
0x0C88	3209	R	4	Int64	Wh	Reverse active energy
0x0C8C	3213	R	4	Int64	Wh	Total active energy
0x0C94	3221	R	4	Int64	VARh	Forward reactive energy
0x0C98	3225	R	4	Int64	VARh	Reverse reactive energy
0x0C9C	3229	R	4	Int64	VARh	Total reactive energy
<b>Partial energy</b>						
0x0CB8	3257	R	4	Int64	Wh	Forward partial active energy

**Energy values - 64-bit integer (Continued)**

Address	Register	Action	Size	Type	Units	Description
<b>Energy by tariff</b>						
0x105F	4192	R/WC	1	UInt16	-	Tariff 01: T1 (default) 02: T2
0x1064	4197	R	4	Int64	Wh	T1 Forward active energy
0x1068	4201	R	4	Int64	Wh	T2 Forward active energy
0x106C	4205	R	4	Int64	Wh	T1 Reverse active energy
0x1070	4209	R	4	Int64	Wh	T2 Reverse active energy
0x1074	4213	R	4	Int64	Wh	T1 Total active energy
0x1078	4217	R	4	Int64	Wh	T2 Total active energy
0x107C	4221	R	4	Int64	VARh	T1 Forward reactive energy
0x1080	4225	R	4	Int64	VARh	T2 Forward reactive energy
0x1084	4229	R	4	Int64	VARh	T1 Reverse reactive energy
0x1088	4233	R	4	Int64	VARh	T2 Reverse reactive energy
0x108C	4237	R	4	Int64	VARh	T1 Total reactive energy
0x1090	4241	R	4	Int64	VARh	T2 Total reactive energy

**Energy values - 32-bit floating point**

Address	Register	Action	Size	Type	Units	Description
<b>Total energy (cannot be rest)</b>						
0xB02C	45101	R	2	Float32	Wh	Forward active energy
0xB02E	45103	R	2	Float32	Wh	Reverse active energy
0xB030	45105	R	2	Float32	VARh	Forward reactive energy
0xB032	45107	R	2	Float32	VARh	Reverse reactive energy
0xB038	45113	R	2	Float32	Wh	Total active energy
0xB03A	45115	R	2	Float32	VARh	Total reactive energy
<b>Partial energy</b>						
0xB034	45109	R	2	Float32	Wh	Forward partial active energy
<b>Energy by tariff</b>						
0xB040	45121	R	2	Float32	Wh	T1 Forward active energy
0xB042	45123	R	2	Float32	Wh	T2 Forward active energy
0xB044	45125	R	2	Float32	Wh	T1 Reverse active energy
0xB046	45127	R	2	Float32	Wh	T2 Reverse active energy
0xB048	45129	R	2	Float32	Wh	T1 Total active energy
0xB04A	45131	R	2	Float32	Wh	T2 Total active energy
0xB04C	45133	R	2	Float32	VARh	T1 Forward reactive energy
0xB04E	45135	R	2	Float32	VARh	T2 Forward reactive energy
0xB050	45137	R	2	Float32	VARh	T1 Reverse reactive energy
0xB052	45139	R	2	Float32	VARh	T2 Reverse reactive energy
0xB054	45141	R	2	Float32	VARh	T1 Total reactive energy
0xB056	45143	R	2	Float32	VARh	T2 Total reactive energy

## Diagnostics

Address	Register	Action	Size	Type	Units	Description
0x4E23	20004	R	5	Bitmap	-	Err-02 <ul style="list-style-type: none"> <li>• 0 = No error (default)</li> <li>• 3 = Software error</li> <li>• 5 = Memory error</li> </ul>

## Command list

### Tariff

Command Number	Action (R/W)	Size	Type	Unit	Range	Description
2008	W	1	UInt16	—	—	(Reserved)
	W	1	UInt16	—	1, 2	Tariff: 1 = T1 2 = T2

### Pulse output

Command Number	Action (R/W)	Size	Type	Unit	Range	Description
2003	W	1	UInt16	—	—	(Reserved)
	W	2	Float32	kW/pulse	10000, 2000, 1000, 100, 10, 1, 0.1, 0.01	Pulse constant

### Reset partial energy counters

Command Number	Action (R/W)	Size	Type	Unit	Range	Description
2020	W	1	UInt16	—	—	(Reserved)

### Combined code

Command Number	Action (R/W)	Size	Type	Unit	Range	Description
2958	W	1	UInt16	—	—	(Reserved)
	W	1	UInt16	—	01, 04, 05, 06, 09 and 10	Combined code

### LCD cycle time

Command Number	Action (R/W)	Size	Type	Unit	Range	Description
4001	W	1	UInt16	—	—	(Reserved)
	W	1	UInt16	—	1 - 30 seconds	LCD cycle time

## Communication

Command Number	Action (R/W)	Size	Type	Unit	Range	Description
5000	W	1	UInt16	—	—	(Reserved)
	W	1	UInt16	—	—	(Reserved)
	W	1	UInt16	—	—	(Reserved)
	W	1	UInt16	—	1 – 247	Modbus ID
	W	1	UInt16	—	1 – 4	Baud Rate 0 = 9600 1 = 19200 2 = 38400 3 = 4800 4 = 2400 5 = 1200
	W	1	UInt16	—	1 – 3	Parity 0 = Even 1 = Odd 2 = None
	W	1	UInt16	—	—	(Reserved)

## Read device identification

Object ID	Name / Description	Size	Type	Value	Notes
0x00	Vendor name	18	UTF8	Schneider Electric	—
0x01	Product Code	9	UTF8	A9MEM2455	The Product code value is identical to the catalog number of each device
0x02	Firmware revision	4	UTF8	X.Y	Equivalent to register 1638

The read device ID codes 01 and 04 are supported:

- 01 = request to get basic device identification (stream access)
- 04 = request to get one specific identification object (individual access)

## Communication via M-Bus (iEM2435)

### Overview

M-Bus is a master / slave communication protocol (EN13757-3) where the master initiates transactions and the slave(s) respond with the requested information or action. Data is transferred using hexadecimal telegrams.

The meter can communicate with your PC. In order to read out the meter registers first install and configure the PC software. Use an M-bus level converter to connect the PC and the meter.

The cable should be connected to terminals 10 and 11. The default communication address of the meter is 00.

The default M-Bus communication settings are as follows:

- Baud rate 2400
- 8 data bits
- Even parity

- 1 stop bit

The baud rate can be changed to values 9600, 4800, 1200, 600 and 300 baud. Data, parity and stop bit cannot be changed.

## Key terms

Term	Definition
C-Field	The control or function field of the telegram. It provides information about the telegram, such as the direction of data flow (master to slave or slave to master), the status of the data flow and the function of the message.
CI-Field	The control information field of the telegram. It defines the type and sequence of data to be transmitted.
Fixed data header	Contains device and manufacturer identification information.
DIF	Data information field. The DIF contains information about the function of the data (for example, instantaneous versus maximum) and the data format (for example, 16-bit integer).
DIFE	Data information field extension. A DIFE contain additional information about the data, such as tariff and subunit.
Master	A device that issues commands and receives responses from slave devices. There can be only one master per serial network.
Slave	A device that provides information or performs actions in response to requests from the master.
VIF / VIFE	Value information field and value information field extension. The VIF and VIFE contain information about the value (for example, whether it is an energy or power value).  The meter uses both primary VIFE (as detailed in the M-Bus protocol documentation) and manufacturer-specific VIFE.

## M-Bus protocol support

The meter supports the M-Bus protocol as follows:

- Mode 1 communications (least significant bit first).
- Telegram formats:
  - Single character
  - Short frame
  - Long frame
- Function codes (C-field bits 3-0):
  - SND\_NKE: Initiates of communications between the master and slave.
  - SND\_UD: The master sends user data to the slave.
  - REQ\_UD2: The master requests Class 2 user data from the slave.
  - RSP\_UD: The slave sends requested data to the master.
- Secondary addressing in accordance with the M-Bus standard.
- Broadcast telegrams.

## M-Bus protocol implementation

### M-Bus tool for viewing data and configuring the meter

The M-Bus tool provides a graphical user interface where you can view meter data and configure meter settings. To obtain the tool, go to [www.se.com](http://www.se.com) and search for

your meter model then select Downloads or contact your local Schneider Electric representative.

## Communications indicator

A symbol appears on the display when the meter is communicating. You can use this indicator to assist in communications troubleshooting.

## Variable data structure telegram information

### Fixed data header

Byte 1 – 4 Identification No.	Byte 5 – 6 Manufacturer	Byte 7 Version	Byte 8 Medium	Byte 9 Access No.	Byte 8 Status	Byte 11 – 12 Signature
Serial number of the meter in an 8-digit, BCD coded format  The serial number can also be found on the meter front panel	4CA3 hex = Schneider Electric	Firmware version of the communications board  10 = version 1.0	02 hex (electricity)	Counter of successful access attempts	Indicates M-Bus application errors	Not used

## Data record header information

### Data formats used by the meter (DIF bits 3 – 0)

**NOTE:** x in the hex value is determined by bits 7 – 4 of the DIF.

Format	bin	hex
No data	0000	x0
8-bit integer	0001	x1
16-bit integer	0010	x2
24-bit integer	0011	x3
32-bit integer	0100	x4
32-bit real	0101	x5
48-bit integer	0110	x6
64-bit integer	0111	x7
Variable length	1101	xD

### Data function types used by the meter (DIF bits 5 - 4)

Function type	bin
Instantaneous	00

### Primary VIF used by the meter

**NOTE:** E denotes the extension bit; x in the hex value is determined by bits 7 – 4 of the VIF.



Primary VIF	bin	hex	Description
Energy	E000 0011	x3	Wh with a resolution of 10 <sup>0</sup>
Power	E000 1110	xE	kW with a resolution of 10 <sup>3</sup>
Bus address	E111 1010	xD	Data type C (unsigned integer), as detailed in the M-Bus protocol documentation
Primary VIFE	1111 1101	FD	Indicates that the first VIFE is a primary VIF extension
Manufacturer-specific VIFE	1111 1111	FF	Indicates that the next VIFE is manufacturer specific

## Primary VIFE codes used by the meter

The primary VIFE codes in the table below are used by the meter when the VIF equals FD hex (1111 1101 bin).

**NOTE:** E denotes the extension bit; x in the hex value is determined by bits 7-4 of the VIFE.

Primary VIFE codes	bin	hex	Additional information
Manufacturer	E000 1010	xA	–
Model	E000 1100	xC	–
Voltage	E100 1001	x9	Volts with a resolution of 10 <sup>0</sup>
Current	E101 1100	xC	Amps with a resolution of 10 <sup>0</sup>
Error flag	E001 0111	x7	—

## Manufacturer-specific VIFE codes

The manufacturer-specific VIFE codes in the table below are used by the meter when the VIF equals FF hex (1111 1111 bin).

**NOTE:** E denotes the extension bit; the hex value assumes E = 0.

Description	bin	hex
Export energy value	E000 1001	09
Partial energy value	E000 1101	0D
Current	E000 0000	00
Voltage L-N	E000 0100	04
Power Factor	E000 1010	0A
Frequency	E000 1011	0B
Active tariff	E001 0000	10
Tariff control mode	E001 0001	11
Number of phases	E010 0001	21
Number of wires	E010 0010	22
Power system configuration	E010 0011	23

## Telegram information for data records

The following sections outline the telegram information used in data records. The tables contain the following information (if applicable):

- Data format in hex (for example, 16-bit integer)
- Primary VIF in hex
- Primary VIFE codes in bin and hex

- Manufacturer-specific VIFE codes in bin and hex

## Meter information

**NOTE:** E denotes the extension bit; the hex value assumes E = 0.

Data format	Primary VIF Extension		Description
	bin	hex	
0D	E000 1010	0A	Manufacturer "Schneider Electric" in 18-byte ASCII format
0D	E000 1100	0C	Model in ASCII format
03	E0001 0111	17	Meter error codes: 0 = Code 101: error in executable firmware code 1 = Code 102: calibration data is missing or has errors

## Energy and energy by tariff measurements

The energy and energy by tariff measurements listed below are preserved through power failures.

**NOTE:** E denotes the extension bit; the hex value assumes E = 0.

Data format	DIFE	Primary VIF	Primary VIFE		Manufacturer-specific VIFE		Description
			bin	hex	bin	hex	
07	—	03	—	—	—	—	Total active energy import
07	—	83	—	—	E000 1001	09	Total active energy export
87	40	03	—	—	—	—	Total reactive energy import
87	40	83	—	—	E000 1001	09	Total reactive energy export
07	—	83	—	—	E000 1101	0D	Partial active energy import
87	40	83	—	—	E000 1101	0D	Partial reactive energy import
03	—	—	—	—	E001 0000	10	Active tariff 1 = rate A (tariff 1) active 2 = rate B (tariff 2) active
87	10	03	—	—	—	—	Rate A (tariff 1) active energy import
87	20	03	—	—	—	—	Rate B (tariff 2) active energy import

## Instantaneous measurements

**NOTE:** E denotes the extension bit; the hex value assumes E = 0.

Data format	DIFE	Primary VIF	Primary VIFE		Manufacturer-specific VIFE		Description
			bin	hex	bin	hex	
05	—	2E	—	—	—	—	Active power
85	40	2E	—	—	—	—	Reactive power
85	80 40	2E	—	—	—	—	Apparent power
05	—	—	E100 1001	C9	E000 0100	04	Voltage L-N
05	—	—	E101 1100	DC	E000 0000	00	Current
05	—	—	—	—	E000 1010	0A	Power factor
05	—	—	—	—	E000 1011	0B	Frequency

## Meter status information

Use the following information to read system and status information from the meter. See the section regarding telegram information for meter configuration for more information on writing to the meter.

## Power system configuration information

**NOTE:** E denotes the extension bit; the hex value assumes E = 0.

Data format	Manufacturer specific VIFE		Description
	bin	hex	
03	E010 0011	23	Power system configuration (always 0 = 1PH2W L-N)
03	E010 0010	22	Number of wires (always 2)
03	E010 0001	21	Number of phases (always 1)
03	E010 0100	24	Nominal frequency (always 50)

## Telegram information for meter configuration

You can use the information provided in this section to write to the meter using a SND\_UD function.

You can also configure the meter using the M-Bus tool available from [www.se.com](http://www.se.com).

## Supported VIFE codes for meter configuration

**NOTE:** E denotes the extension bit; the hex value assumes E = 0.

VIFE code		Action	Description
bin	hex		
E000 0000	00	Write and replace	Replaces the old value with the new value
E000 0111	07	Clear	Resets an accumulated value to 0 (zero)

## Example configuration telegram

This example shows the telegram for a command to reset partial energy on a slave with the primary address of 4

hex	Description
68	Start character
07	L-field
07	L-field repetition
68	Start character
53	C-field (control field) SND_UD = Send user data to slave
04	A-field (address field) Slave address of the meter you want to reset
51	CI-field (control information field) Data send to slave

00	Indicates no data is sent (because this is a reset)
FF	VIF indicating the next field is manufacturer specific
8D	Manufacturer-specific VIFE: Reset partial energy
07	Action = Reset
xx	Automatically generated Checksum
16	Stop character

## Communications setup

### Setting the primary address

SND_UD code	Data format	Primary VIF	Range/Options	Description
00	01	7A	0 – 250	Primary address

### Setting the baud rate

To change the baud rate via communications, send a telegram to the meter with the appropriate value in the CI-field:

Baud rate	Hex value for CI-field
300	B8
600	B9
1200	BA
2400	BB
4800	BC
9600	BD

## Resets

**NOTE:** E denotes the extension bit; the hex value assumes E = 1.

SND_UD code	Data format	Primary VIF		Manufacturer specific VIFE		Description
		bin	hex	bin	hex	
07	00	—	—	E000 1101	8D	Resets partial energy accumulation to 0 (imported / exported active and reactive energy)

## M-Bus tool for data display and meter configuration

The M-Bus tool provides a graphical user interface where you can view meter data and configure meter settings. To obtain the tool, go to [www.se.com](http://www.se.com) and search for your meter model then select Downloads or contact your local Schneider Electric representative.

If you access a different meter without closing and re-opening the M-Bus tool, the fields displayed in the tool may not match the device you are accessing. The M-Bus tool may indicate a setting was changed without the setting on the meter actually changing.

## NOTICE

### INACCURATE DEVICE SETTINGS

Do not rely on the configuration information displayed in the M-Bus tool to determine if the associated device is correctly configured.

**Failure to follow these instructions can result in inaccurate device settings and data results.**

## Installing the M-Bus tool

Before you install the tool, you need to download it from [www.se.com](http://www.se.com) or obtain it from your sales representative.

1. Navigate to the location where you saved the installation files.
2. Double-click **setup.exe**. A welcome screen appears. Click **Next**.
3. Confirm the installation location for the tool. Click **Browse** if you want to select a different location. Click **Next**. A confirmation screen appears.
4. Click **Next** to begin the installation. A screen appears when the installation is complete.
5. Click **Close**.

## Accessing the meter using the tool

Before you access the meter using the M-Bus tool, make sure that you:

- Connect the meter to a level converter (for a direct serial connection) or a level converter and gateway (for connection via a serial or Ethernet network).
- Set the address of the device to a value other than 0 (zero) using the HMI.
- Install the M-Bus tool on your computer.

1. Select **Start > Programs > Schneider Electric > Mbus config tool** (or navigate to the location where you installed the program) and click **Mbus config tool** to open the tool. The login screen appears.
2. Select the port on your computer that you are using to connect to the meter and select the baud rate that matches the meter's configuration.
3. Click **Test Com** to open the communications port.
4. Type the device address in the **Address** field.
5. Select the communications mode that you want the tool to start in:
  - **Monitor(Automatic)**: The tool automatically sends read requests to and receives data from the meter. You can set the interval at which these read requests are sent.
  - **Monitor(Manual)**: You must manually send a read request to get data from the meter.
  - **Config**: The tool opens in configuration mode.

You can change the mode from within the tool, if needed.

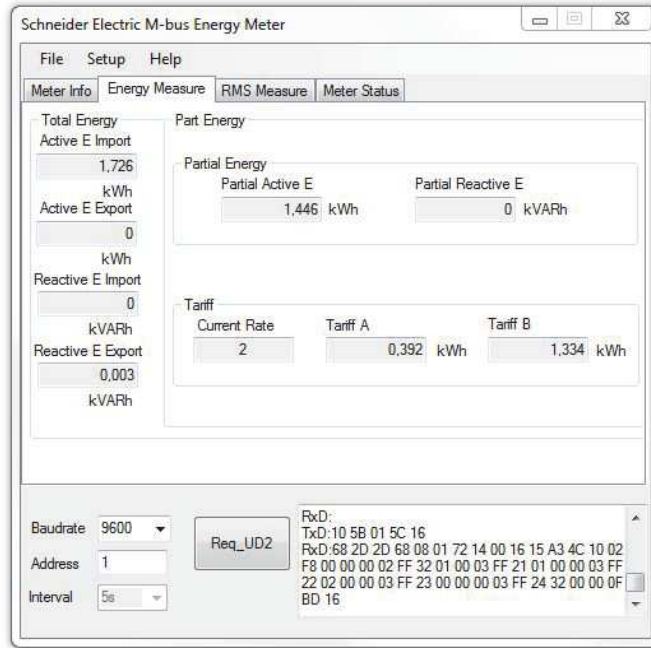
6. Click **OK** to start the M-Bus tool and access the meter.

## Viewing meter data using the M-Bus tool

You can use two modes to view data from the device: automatic or manual.

- Automatic mode: Select the update interval from the **Interval** drop-down list.

- Manual mode: Select **Req\_UD2** to request data from the meter.
- To switch modes, select **Setup > Monitor** then select the mode you want to use.



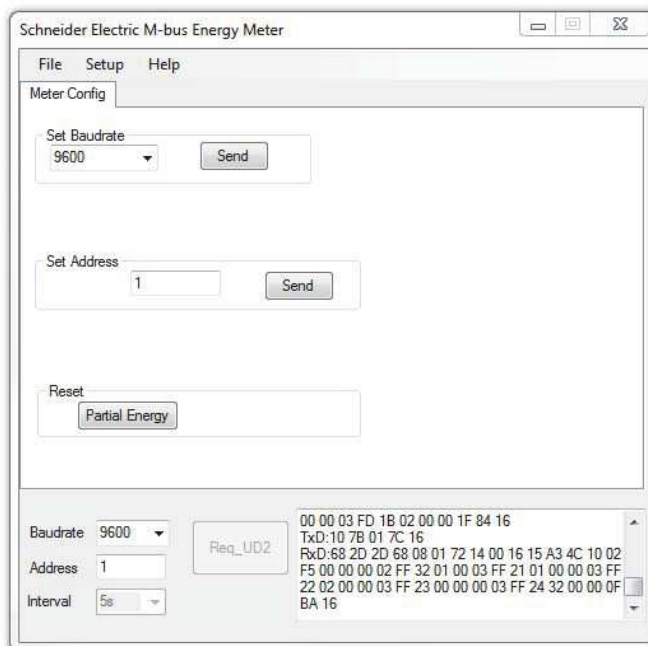
The tool has the following tabs for viewing meter information:

Tab name	Description
Meter Info	This tab provides basic information about the meter (for example, model and serial number) and any active error codes. Click <b>Clear</b> to remove the error codes from the display. This does not resolve the errors.
Energy Measure	tab provides total and partial energy and energy by tariff information.
RMS Measure	This tab provides power, current, and voltage values as well as frequency and power factor information.
Meter Status	This tab provides information on the status of the tariff inputs and existing power system settings.

## Configuring the meter using the M-Bus tool

You can use the M-Bus tool to configure basic meter settings.

1. Select **Setup > Config** to switch to configuration mode.



2. Set the values that you want to change, then click **Send** for that value or section.

Some values may be unavailable based on existing settings.

The configuration screen has the following sections:

Section	Description
Set Baudrate	Set the baud rate.
Set Address	Set the meter address.
Reset	Reset partial energy and input metering accumulations.

## Specifications

The specifications contained in this section are subject to change without notice.

## Mechanical characteristics

IP degree of protection (IEC 60529-1)	Front display: IP51
Mounting position	Vertical
Display type	Blue backlight with 7-digit LCD
Keypad	Down-arrow and up-arrow buttons
Front panel LED indicators	Reactive energy consumption LED (A=10000 imp/kVARh) Active energy consumption LED (B=10000 imp/kWh)
Dimensions W x H x D	35.8 x 96.7 x 63 mm (1.41 x 3.81 x 2.48 in)

## Electrical characteristics

### Measurement accuracy

Measurement type	Class of accuracy as per standard	% Error of reading
Active energy	Class B as per EN 50470-1/3 Class 1 as per IEC 62053-21	±1%
Reactive energy	Class 2 as per IEC 62053-23	±2%
Active power	–	±1%
Apparent power	–	±1%
Reactive power	–	±2%
Current	–	±0.5%
Voltage	–	±0.5%
Frequency	–	±0.05%
Power factor	–	±0.01 count

### Voltage inputs

Nominal voltage (U)	230 V L-N AC
Operational voltage	195 to 253 V L-N AC
Insulation capabilities	AC voltage withstand: 4 kV for 1 minute Impulse voltage withstand: 6 kV for 1.2 μs waveform (UC2, IEC 62052-31)
Operational frequency	50 Hz ± 10%

### Current inputs

Basic current ( $I_b$ )	5 A
Maximum rated current ( $I_{max}$ )	100 A
Operational current	$0.4\%I_b - I_{max}$
Over current withstand	$30 I_{max}$ for 0.01 s
Operational frequency	50 Hz ± 10%

### Power consumption

Internal power consumption	≤1 W/Phase - ≤1 VA/Phase
----------------------------	--------------------------

### Pulse characteristics

Pulse output rate	10000 / 2000 / 1000 / 100 / 10 / 1 / 0.1 / 0.01 imp/kWh
Pulse width	1000 / 100 / 10 / 1 / 0.1 / 0.01 imp/kWh: 31 ms 2000 imp/kWh < 30 kW: 31 ms 2000 imp/kWh > 30 kW: 15 ms 10000 imp/kWh < 6 kW: 31 ms 10000 imp/kWh > 6 kW: 15 ms 10000 imp/kWh > 12 kW: 5 ms

## Environmental characteristics

Operating temperature	-25 °C to +55 °C (-13 °F to +131 °F)
Storage temperature	-40 °C to +70 °C (-40 °F to +158 °F)



Operating humidity	≤75%
Storage humidity	≤95%
Altitude	≤ 2000 m (6561 ft) above sea level
Electromagnetic environmental class	E2
Mechanical environmental class	M1
Mounting location	For indoor use only

## Safety

Insulated encased meter of protective class II

Double insulation

## Basic errors

0.05I <sub>b</sub>	Cosφ = 1 ±1.5%
0.1I <sub>b</sub>	Cosφ = 0.5Lag ±1.5% Cosφ = 0.8Lead ±1.5%
0.1I <sub>b</sub> – I <sub>max</sub>	Cosφ = 1 ±1%
0.2I <sub>b</sub> – I <sub>max</sub>	Cosφ = 0.5Lag ±1% Cosφ = 0.8Lead ±1%

## M-Bus communication (iEM2435 only)

Bus type	M-bus
Baud rate	300, 600, 1200, 2400 (default), 4800 and 9600
Address range	0 – 250 user configurable
Range	≤1000 m
Protocol	EN13757-3
Unit loads	±2
Maximum number of meters	64 <sup>1</sup>

## RS-485 Modbus communication (iEM2455 only)

Bus type	RS-485
Protocol	Modbus RTU with 16 bit CRC
Baud rate	1200, 2400, 4800, 9600, 19200 (default) and 38400
Address range	1 – 247 user configurable
Maximum bus load	60 meters per bus
Range	1000 m

1. The maximum number of meters is dependent on the converter, baud rate (the higher the baud rate, less number of meters which can be used) and the circumstances under which the meters are installed.

## Data retention

>10 years without power



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As standards, specifications, and design change from time to time,  
please ask for confirmation of the information given in this publication.

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