iEM2100 series

Energy meters

User manual

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Schneider Electric

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 bulletin 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 follow 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.

⚠ 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.

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

Additional information

Title of documentation	Reference number
Installation sheet	NHA4935401-00

You can download these technical publications and other technical information from www.schneider-electric.com.

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Chapter 1 Safety precautions

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

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E in the USA, CSA Z462 or applicable local standards.
- Turn off all power supplying this device and the equipment in which it is installed before working on the device or equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Do not exceed the device's ratings for maximum limits.
- Replace all devices, doors and covers before turning on power to this equipment.

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

⚠ WARNING

UNINTENDED OPERATION

Do not use the meter for critical control or protection applications where human or equipment safety relies on the operation of the control circuit.

Failure to follow these instructions can result in death, serious injury or equipment damage.

⚠ WARNING

INACCURATE DATA RESULTS

- Do not rely solely on data displayed on the front panel or in software to determine if the device is functioning correctly or compliant with all applicable standards.
- Do not use data displayed on the front panel or in software as a substitute for proper workplace practices or equipment maintenance.

Failure to follow these instructions can result in death, serious injury or equipment damage.

Chapter 2 Meter overview

Overview of meter functions

The meters provide the essential measurement capabilities (for example, current, voltage, and energy) required to monitor a single-phase electrical installation.

The key features of the meters are:

- measurement of active and reactive energy
  - Active measurement accuracy: Class 1 (IEC 62053-21) and Class B (EN50470)
  - Reactive measurement accuracy: Class 2 (IEC 62053-23)
- 2 tariffs controlled by digital inputs on select models,
- MID compliance with select models,
- pulse outputs on select models,
- LCD display (current, voltage, power and energy measurements and basic configuration),
- communications via Modbus or M-Bus protocols on select models.

Main characteristics

Function		iEM2110	iEM2135	iEM2150	iEM2155
Direct measurement (up to 63 A)		√	√	√	√
Four Quadrant Energy measurements		√	√	√	√
Electrical measurements (I, V, P, PF, F, P, Q)		√	√	√	√
2 tariffs (Controlled by digital inputs)		2	2	–	2
Pulse outputs		2	–	–	–
Communications	**Modbus**	–	–	√	√
	M-Bus	–	√	–	–
MID compliant		√	√	–	√
Width (18 mm module in DIN rail mounting)		2	2	2	2

Chapter 3 Communications via Modbus

Modbus communication overview

Modbus RTU protocol is available on the iEM2150 and iEM2155 models.

The information in this section assumes that you have an advanced understanding of Modbus communications, your communications network and the power system that your meter is connected to.

There are three different ways of using Modbus communication:

- by sending commands using the command interface (see “Command interface overview” on page 12)
- by reading the Modbus registers (see “Modbus register list” on page 14)
- by reading Device Identification (see “Read Device Identification” on page 16)

Modbus communications settings

Before communicating with the device using Modbus protocol, use the display to configure the following settings:

Settings	Possible values
Baud rate	9600 Baud 19 200 Baud 38 400 Baud
Parity	Odd Even None
Address	1–247

NOTE: The number of stop bits is fixed at 1.

Communications indicator

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

Related topics

- For more information on the Modbus protocol, see the Modbus organization website at www.modbus.org.
- See “Communications troubleshooting” on page 29 for more information on troubleshooting communications issues.

Modbus functions

Function list

The table below lists the supported Modbus functions:

Function code		Function name
Decimal	Hexadecimal	
3	0x03	Read Holding Registers
16	0x10	Write Multiple Registers

Function code		Function name
Decimal	Hexadecimal	
43/14	0x2B/0x0E	Read Device Identification

For example:

- To read different parameters from the meter, use function 3 (Read).
- To change a communication setting, use function 16 (Write) to send a command to the meter.

Table format

Register tables have the following columns:

Register Address	Action (R/W/WC)	Size	Type	Units	Range	Description

- *Register Address*: Modbus address of register encoded in the Modbus frame, in decimal (dec)
- *Action*: The read/write/write by command property of the register
- *Size*: The data size in Int16
- *Type*: The encoding data type
- *Units*: The unit of the register value
- *Range*: The permitted values for this variable, usually a subset of what the format allows
- *Description*: Provides information about the register and the values that apply

Unit table

The following data types appear in the Modbus register list:

Type	Description	Range
UInt16	16 bit unsigned integer	0 – 65535
Int16	16 bit signed integer	-32768 to +32767
UInt32	32 bit unsigned integer	0 – 4 294 967 295
UInt64	64 bit unsigned integer	0 – 18 446 744 073 709 551 615
UTF8	8 bit field	multibyte character encoding for Unicode
Float32	IEEE 754-1985 single-precision floating-point value	-3.4E38 to +3.4E38
Bitmap	—	—

Command interface

Command interface overview

The command interface allows you to configure the meter by sending specific command requests using Modbus function 16.

Command request

The following table describes a Modbus command request:

Slave Number	Function Code	Command block	CRC
1–247	16	The command block is made of a command number and a set of parameters, as described in the table below. **NOTE:** All reserved parameters can be considered as any value, for example 0.	Checksum

The following table describes the command block:

Register Address	Content	Size (Int16)	Data (example)
5250	Command number	1	5000 (Set communications)
5251	Parameter	1	0 (Reserved)
5252	Parameter	1	0 (Reserved)
5253	Parameter	1	0 (Reserved)
5254	Parameter	1	2 (Address = 2)
5255	Parameter	1	1 (Baud rate = 19200)
5256	Parameter	1	2 (Parity = None)
5257	Parameter	1	0 (Reserved)

Related topics

- See “Command list” on page 13 for details on the command numbers.

Command result

The command result can be obtained by reading registers 5375 and 5376.

The following table describes the command result:

Register address	Content	Size (Int16)	Data (example)
5375	Requested command number	1	2020 (Reset partial energy values command)
5376	Result Command result codes: – 0 = Valid and successful command – 3000 = Invalid command – 3001 = Invalid parameter – 3002 = Invalid number of parameters – 3007 = Command is valid but the operation was not performed	1	0 (Valid and successful command)

Command list

Communications Setup

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	Address
	W	1	UInt16	–	0, 1, 2	Baud Rate 0 = 9600 1 = 19200 2 = 38400
	W	1	UInt16	–	0, 1, 2	Parity 0 = Even 1 = Odd 2 = None
	W	1	UInt16	–	–	(Reserved)

Reset Partial Energy Counters

Command Number	Action (R/W)	Size	Type	Unit	Range	Description
2020	W	1	UInt16	–	–	Partial energy values are reset (imported / exported active and reactive energy)

Modbus register list

System

Register Address	Action (R/W/WC)	Size	Type	Units	Description
30	R	20	UTF8	–	Meter Name
50	R	20	UTF8	–	Meter Model
70	R	20	UTF8	–	Manufacturer
130	R	2	UInt32	–	Serial Number
132, 133	R	4	DATETIME	–	Date of Manufacture Register 132, bits 6-0: Year from 2000 (0–99) Register 133, bits 11-0: Month (1-12) Register 133, bits 7-5: day of week (Sunday-Saturday) Register 133, bits 4-0: day of month (1-31)
136	R	5	UTF8	–	Hardware Revision in x.x.x format (for example, 1.0.0) **NOTE:** The first number is the major version, the second number is the minor version, and the third number is normally not used.
1637	R	1	UInt16	–	Present firmware version, multiplied by 10000 (for example, if the current firmware version is 2.1, the value of this register is 21000).

Meter Setup and Status

Register Address	Action (R/W/WC)	Size	Type	Units	Description
2014	R	1	UInt16	–	Number of Phases (always 1)
2015	R	1	UInt16	–	Number of Wires (always 2)
2016	R/WC	1	UInt16	–	Power System (always 0 = 1PH2W L–N)
2017	R/WC	1	UInt16	Hz	Nominal Frequency (always 50 Hz)

Command Interface

Register Address	Action (R/W/WC)	Size	Type	Units	Description
5250	R/W	1	UInt16	–	Requested Command
5252 – 5374	R/W	1	UInt16	–	Command Parameter 001 – 123
5375	R	1	UInt16	–	Command Status
5376	R	1	UInt16	–	Command result codes: – 0 = Valid and successful command – 3000 = Invalid command – 3001 = Invalid parameter – 3002 = Invalid number of parameters – 3007 = Command is valid but the operation was not performed
5377 – 5499	R/W	1	UInt16	–	Command Data 001 – 123

Communication

Register Address	Action (R/W/WC)	Size	Type	Units	Description
6500	R	1	UInt16	–	Protocol 0 = Modbus
6501	R/WC	1	UInt16	–	Address
6502	R/WC	1	UInt16	–	Baud Rate: 0 = 9600 1 = 19 200 2 = 38 400
6503	R/WC	1	UInt16	–	Parity: 0 = Even 1 = Odd 2 = None

Tariff Input (iEM2155)

Register Address	Action (R/W/WC)	Size	Type	Units	Description
7274	R	1	UInt16	–	Digital Input Control Mode (always set to 2 = Multi Tariff Control)
8905	R	2	UInt16	–	Digital Input Status: 0 = relay open 1 = relay closed

Meter Data

Current, voltage, power, power factor and frequency

Register Address	Action (R/W/WC)	Size	Type	Units	Description
Current					
3000	R	2	Float32	A	Current
Voltage					
3028	R	2	Float32	V	Voltage
Power					
3054	R	2	Float32	kW	Active Power
3068	R	2	Float32	kVAR	Reactive Power
3076	R	2	Float32	kVA	Apparent Power
Power Factor					
3084	R	2	Float32	–	Total Power Factor: -2 < PF < -1 = Quad 2, active power negative, capacitive -1 < PF < 0 = Quad 3, active power negative, inductive 0 < PF < 1 = Quad 1, active power positive, inductive 1 < PF < 2 = Quad 4, active power positive, capacitive
Frequency					
3110	R	2	Float32	Hz	Frequency

Energy and energy by tariff

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

Most energy values are available in both unsigned 64-bit integer and 32-bit floating point format.

Energy values – 64-bit integer					
Register Address	**Action (R/W/WC)**	**Size**	**Type**	**Units**	**Description**
Total Energy (cannot be reset)					
3204	R	4	UInt64	Wh	Total Active Energy Import
3208	R	4	UInt64	Wh	Total Active Energy Export
3220	R	4	UInt64	VARh	Total Reactive Energy Import
3224	R	4	UInt64	VARh	Total Reactive Energy Export
Partial Energy					
3256	R	4	UInt64	Wh	Partial Active Energy Import
3272	R	4	UInt64	VARh	Partial Reactive Energy Import
Energy by Tariff (iEM2155)					
4191	R	1	UInt16	Wh	Tariff active rate: 1: tariff A 2: tariff B **NOTE:** This register value is always 0 on the iEM2150 to indicate that the tariff feature is not available.
4196	R	4	UInt64	Wh	Tariff A Active Energy Import
4200	R	4	UInt64	Wh	Tariff B Active Energy Import

Energy values – 32-bit floating point					
Register Address	**Action (R/W/WC)**	**Size**	**Type**	**Units**	**Description**
Total Energy (cannot be reset)					
45100	R	2	Float32	Wh	Total Active Energy Import
45102	R	2	Float32	Wh	Total Active Energy Export
45104	R	2	Float32	VARh	Total Reactive Energy Import
45106	R	2	Float32	VARh	Total Reactive Energy Export
Partial Energy					
45108	R	2	Float32	Wh	Partial Active Energy Import
45110	R	2	Float32	VARh	Partial Reactive Energy Import
Energy by Tariff (iEM2155)					
45120	R	2	Float32	Wh	Tariff A Active Energy Import
45122	R	2	Float32	Wh	Tariff B Active Energy Import

Read Device Identification

The meters supports the Read Device Identification function with the mandatory objects VendorName, ProductCode and Revision Number.

Object ID	Name/Description	Length	Value	Note
0x00	VendorName	16	SchneiderElectric	–
0x01	ProductCode	09	A9MEM2150 A9MEM2155	The ProductCode value is identical to the catalog number of each device.
0x02	MajorMinorRevision	04	V1.0	Equivalent to X.Y in register 1637

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)

The Modbus request and response are compliant with the Modbus Application Protocol Specification.

Chapter 4 Communications via M-Bus

M-Bus communications overview

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

Communications via M-Bus protocol is available on the iEM2135.

The information in this section is intended for users with an advanced understanding of M-Bus protocol, their communications network and their power system.

Configuring basic communications settings

Before communicating with the meter via M-Bus protocol, use the display to configure the following settings:

Setting	Possible values
Baud rate	300 600 1200 2400 4800 9600
Primary address	1–250

NOTE: The meter is shipped as an unconfigured M-Bus slave with the address 0. You must change the address to a number in the 1–250 range, using the display or communications. If you need to set the address back to 0, you must use the display.

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) 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.

Related topics

- See the M-Bus organization website at www.m-bus.com for more information on the M-bus protocol.
- See “Communications setup” on page 25 for information on setting the baud rate using a telegram.

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.

Related topics

- See the M-Bus organization website at www.m-bus.com for more information on the M-Bus protocol, including secondary addressing procedures.
- See “Fixed data header” on page 21 for the meter-specific information required for secondary addressing (for example, identification number, manufacturer and medium).

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.schneider-electric.com and search for your meter model to find the downloads available for the meter, 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.

Related topics

- See “M-Bus tool for data display and meter configuration” on page 25 for information on obtaining and using the M-Bus tool.
- See “Communications troubleshooting” on page 29 for more information on troubleshooting communications issues.

Variable data structure telegram information

Fixed data header

Secondary address information						
Byte 1-4 Identification No.	**Byte 5-6 Manufacturer**	**Byte 7 Version**	**Byte 8 Medium**	**Byte 9 Access No.**	**Byte 10 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 For example, 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 10^0
Power	E000 1110	xE	kW with a resolution of 10^3
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 10^0
Current	E101 1100	xC	Amps with a resolution of 10^0
Digital Input	E001 1011	xB	Tariff input information
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
Digital input (tariff) association	E011 0000	30

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

Data format	Primary VIF Extension		Description
	bin	hex	
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 “Telegram information for meter configuration” on page 24 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)

Digital input (tariff) status information

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

Data format	Primary VIFE		Manufacturer-specific VIFE		Description
	bin	hex	bin	hex	
03	E001 1011	1B	—	—	Digital input control mode (always 2 = Multi Tariff control)
02	—	—	E011 0010	32	Digital input status: 0 = relay open 1 = relay closed
03	—	—	E011 0000	30	Digital input association with partial energy data reset (always 0 = Digital input is not associated with the partial energy reset)

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.schneider-electric.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

hex	Description
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

Related topics

- See “M-Bus tool for data display and meter configuration” on page 25 for information on the M-Bus tool.

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 VIFE		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.schneider-electric.com and search for your meter model to find the downloads available for the meter, 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

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 iEM2135 config tool** (or navigate to the location where you installed the program) and click **Mbus iEM2135 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.

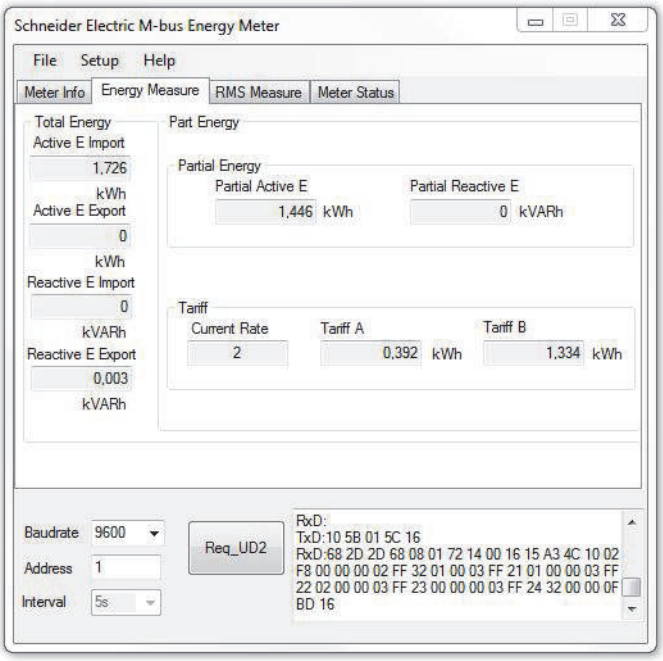
   You can change the mode from within the tool, if needed.
6. Click **OK** to start the M-Bus tool and access the meter.

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** dropdown list.
- Manual mode: Press **Req_UD2** to request data from the meter.

To switch modes, select **Setup > Monitor** then select the mode you want to use.



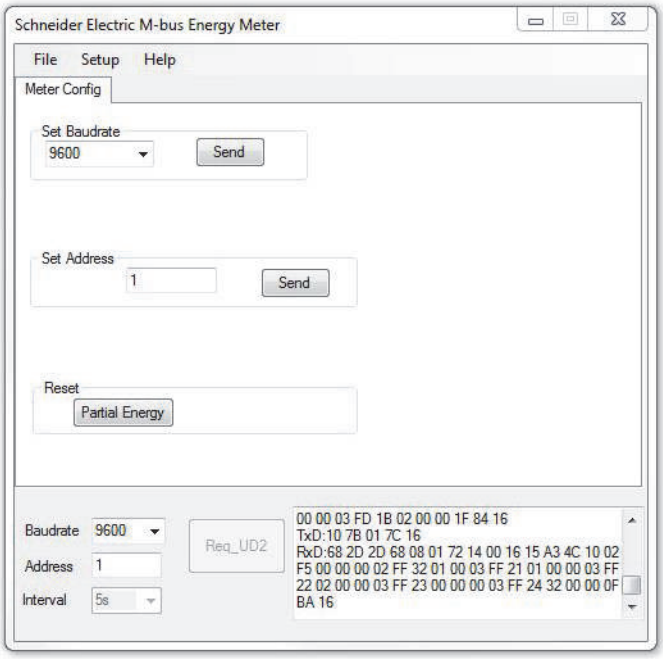
The tool has the following tabs for viewing meter information:

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 **Clear** to remove the error codes from the display. This does not resolve the errors.
Energy Measure	This 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.

Chapter 5 Troubleshooting

The meter does not contain any user-serviceable parts.

NOTICE
RISK OF DAMAGE TO THE METER • Do not open the meter case. • Do not attempt to repair any components of the meter. **Failure to follow these instructions can result in equipment damage.**

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

Diagnostics error codes

If the meter displays error codes 2 or 3, there is an internal malfunction and the meter must be replaced. Contact your local Schneider Electric representative.

Communications troubleshooting

If the meter does not respond to a request from the master, the communications symbol ( ) does not appear on the display when a request is sent from the master, or there are significant errors in the responses (> 1%), check the following:

- the meter is on and the LCD is functioning correctly
- the meter is wired to the communications network correctly, as shown in the installation sheet
- the address of the meter (either the Modbus address or the M-Bus primary address) is correct and unique on the loop
- For Modbus meters:
  - the cable length is < 1200 meters and there are no more than 32 devices connected to the RS-485 loop
  - the parity, baud rate and number of stop bits are the same for all devices on the RS-485 loop, and the master is using the correct values
- For M-Bus meters:
  - the master device has enough power to supply all devices connected to the loop
  - the baud rate is the same for all devices on the loop, and the master is using the correct values

If you still experience communications issues after following the instructions above, please contact Technical Support.

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