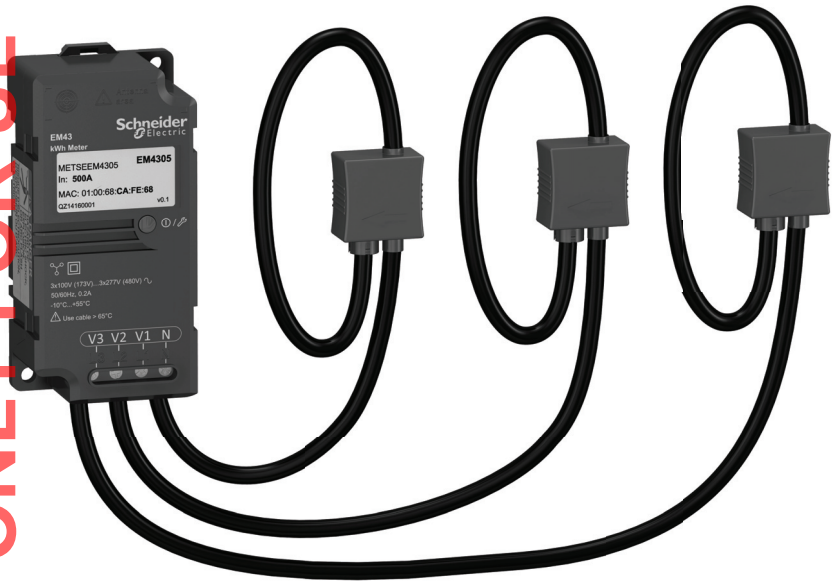
EM4300 series wireless energy meter

User manual

7EN02-0356-00
10/2014



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 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 follow this symbol to avoid possible injury or death.

This is the CE marking. It consists of the CE mark as an attestation of compliance with the R&TTE Directive, and the “information sign” or “alert sign” to inform the user that restrictions on the use of the apparatus may apply in some countries or geographic areas.

This symbol means the product is intended for use on 3-phase electrical systems.

This symbol means the product is double-insulated.

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

NOTICE is used to address practices not related to physical injury. The safety alert symbol shall not be used with this signal word.

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.

Notices

Class B FCC Part 15

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This Class B digital apparatus complies with Canadian ICES-003.

R&TTE

This equipment is in accordance with the requirements of the R&TTE (Radio equipment and telecommunications terminal equipment) directive for the following authorized countries:

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MT NL PL PT RO SE SI SK TR BA GE HR MD ME MK RS.

The R&TTE declaration of conformity is available at www.schneider-electric.com.

Reasonable use and responsibility

This product must be installed, connected and used in compliance with prevailing standards and/or installation regulations.

If this product is used in a manner not specified by the manufacturer, the protection provided by the product may be impaired.

The safety of any system incorporating this product is the responsibility of the assembler/installer of the system.

Updates

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

Trademarks

Modbus, PowerLogic and Schneider Electric are trademarks or registered trademarks of Schneider Electric in France, the USA and other countries.

Chapter 1 Introduction

Marketing content needed.
We typically repurpose content from the technical datasheets, and sometimes the brochure as well. It would be good to highlight the benefits here, like excellent ROI based on much lower installation cost (hence lower TCO). It would also be good to list (and prioritize) applications, number one being Brownfield sites (but use terms the customers are familiar with).

The PowerLogic™ EM4300 series wireless energy meters offer good value and scalability for the demanding needs of your energy monitoring and cost management applications. All meters in the EM4300 series range comply to Class 1 accuracy standards for energy and feature a compact format and built-in current sensors for quick and easy installation.

The meters are ideal for both new or existing buildings with 3-phase with neutral electrical service.

Some of the many features supported by the meter include:

- Three permanently attached and factory calibrated flexible current sensors.
- 200 A, 500 A, 1000 A or 2000 A rated current, depending on meter model.
- 3-phase voltage connections rated for 100 V L-N (173 V L-L) to 277 V L-N (480 V L-L) electrical systems.
- No separate power supply required; meter is powered from the L1 to N voltage input connections.
- Can be mounted on a DIN rail or on a flat surface.
- Equipped with Zigbee Pro wireless communications.
- Compatible with Com'X and MPM series wireless gateways/collectors.

For applications, feature details and the most current and complete specifications of the EM4300 series meters, see the EM4300 series technical datasheet at www.schneider-electric.com.

EM4300 series meter models

The EM4300 series is available in the following models:

Model	Commercial reference	Description
EM4302	METSEEM4302	200 A rated current, 55 mm (2.17 in) coil diameter
EM4305	METSEEM4305	500 A rated current, 55 mm (2.17 in) coil diameter
EM4310	METSEEM4310	1000 A rated current, 125 mm (4.92 in) coil diameter
EM4320	METSEEM4320	2000 A rated current, 125 mm (4.92 in) coil diameter

Measured parameters

The meter provides Class 1 accurate energy measurements. This section lists some of the parameters measured by the meter.

- Per phase accumulated active, reactive and apparent energy
- Total accumulated active, reactive and apparent energy
- Line frequency
- Maximum current
- Minimum voltage

Gateway and data collectors

Meter data is collected and passed through wireless gateway devices available from Schneider Electric™ such as PowerLogic™ Com'X series or PowerLogic™ MPM series gateways.

Related topics

- See the Com'X series and MPM series product pages at www.schneider-electric.com for more information.

Data display and analysis tools

The meter integrates seamlessly with display and analysis software available from Schneider Electric™ such as StruxureWare™ Facility Insight or StruxureWare™ Building Expert.

Facility Insight and Building Expert software let you analyze and monitor your system and produce reports for any department in an organization.

Related topics

- See the Facility Insight and Building Expert product pages at www.schneider-electric.com for more information.

Firmware

This user manual is written to be used with meter firmware 1.01 or later. See "Firmware upgrades" on page 18 to view your meter's firmware version.

Chapter 2 Hardware reference

This section supplements the meter's installation sheet and provides additional information about the meter's physical characteristics and capabilities.

Related topics

- See the installation sheet that came with your product for detailed mounting and wiring instructions (or download a copy at www.schneider-electric.com).
- See your product's technical datasheet at www.schneider-electric.com for the most current and complete specifications.

EM43xx meter details

COPY FROM THE INSTALL SHEET THE DESCRIPTION SECTION, INCLUDING GRAPHICS

=> describe the Rogowski coil - how to install and notes like "install on insulated cable only", "keep coil perpendicular (90 degrees) to the current carrying conductor", "do not bend or pinch", "when securing the current sensor, make sure it clicks into the locking clasp".

=> describe the voltage connections, describing the tool needed, torque

=> call out the antenna location and add note not to block it

=> identify the reed switch in the drawing, then cross-reference it to the "Resetting the meter" chapter.

LED indicator

The LED indicator alerts or informs you of metering and communications activity. It blinks red and/or green depending on the status of the device.

***add callout pointing to the LED location

Specifications

The information contained in this section is subject to change without notice.

Current inputs

- Rated current
  - EM4302: 200 A
  - EM4305: 500 A
  - EM4310: 1000 A
  - EM4320: 2000 A
- Active energy accuracy: 1%
- Measured current: 2 to 120% of rated current
- Current sensor maximum temperature: 65 °C (149 °F)

Voltage inputs

- Rated voltage: 100 VAC L-N (173 VAC L-L) to 277 VAC L-N (480 VAC L-L)
- Minimum: 90 VAC L-N
- Maximum: 300 VAC L-N
- Frequency: 50 / 60 Hz
- Measurement category III

Protection

- Fuses / circuit breakers must be UL listed for North America installations

Control power

- Powered from voltage inputs L1-N
- Maximum supply current: 0.2 A
- Burden: 2 W maximum power consumption

Wireless communications

- RF band: 2.4 GHz
- Protocol: Zigbee Pro
- RF maximum power: 10 mW (10 dBm)
- Maximum operating range: 10 m (33 ft)

Environment

- Operating temperature: -10 to 55 °C (14 to 131 °F)
- 90% RH non-condensing
  Maximum dewpoint 37 °C (99 °F)
- Protection degree: IP20
- Pollution degree: 2
- Altitude: < 2000 m (6562 ft) above sea level
- Isolation: Class II (IEC 61010-1 CAT III 300 V)
- For indoor use only
- Not suitable for wet locations

Safety

- IEC 61010-1 (3rd edition) - CB Scheme
- UL 61010-1 (3rd edition)
- CSA 61010-1 (3rd edition)
- LVD (Low Voltage Directive) 2006/95/EC

EMC

- EMC Directive 2004/108/EC
- IEC 61326-1:2005
- FCC 15 Subpart B
- NMB 003

Radio

- R&TTE Directive 1999/5/EC
- IEC 61326-1:2013
- EN 300 328 v1.8.1, v1.71
- EN 300 440-2 v1.4.1
- EN 301-489-1 v1.9.2
- EN 301-489-17 v2.2.1
- FCC 15 Subpart C
- RSS 210

Related topics

- See your product's technical datasheet at www.schneider-electric.com for the most current and complete specifications.
- See your product's installation sheet for installation and wiring information.

Chapter 3 Commissioning

This section explains how install the meter and commission the energy management system.

Before you begin

Plan and schedule the work involved before starting the installation and commissioning. Electricity meters are often installed inside the main electrical switchboard in the technical room. Wireless signals can pass through the metal door of an electrical panel. Other material, such as concrete can adversely affect the wireless signal transmission.

- Carefully read and follow the safety precautions before working with the meter.
- Make sure you completely understand how the wireless gateways work.
- Make sure you understand the capabilities and limitations of wireless communications.

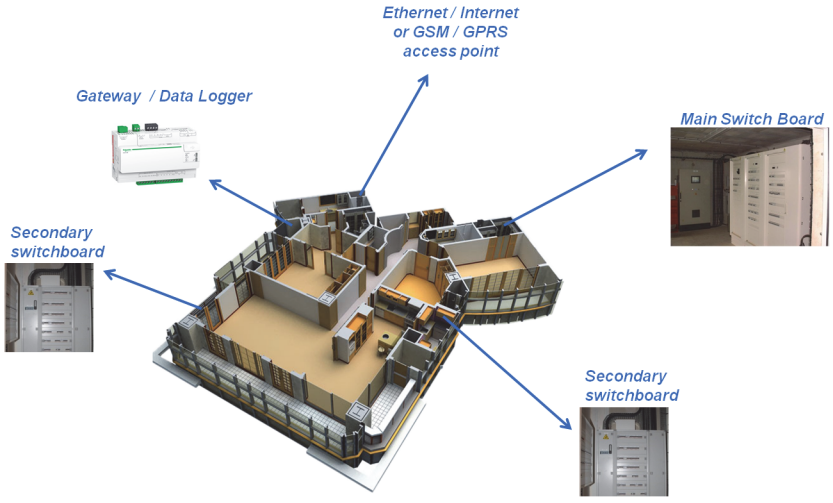
Wireless networks

This section provides guidance on wireless communication.

The meter uses the Zigbee Pro wireless networking technology to communicate with the Com'X series or MPM series wireless gateway/data collector. The meter transmits the wireless signal, and the gateway receives and process the signal.

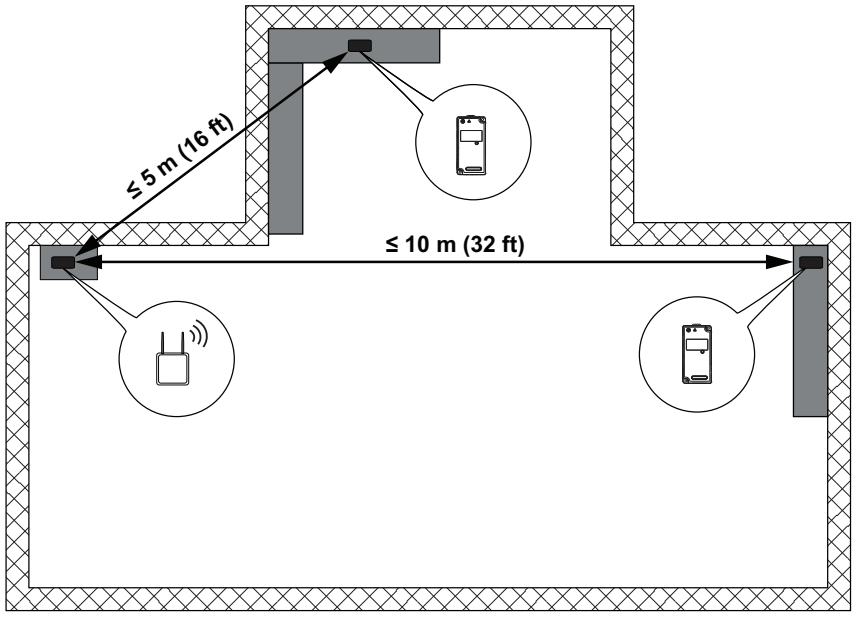
Typically, the meter is installed after the wireless gateway has been installed and is operational.

After the meter is installed, it transmits wireless signals to the nearest gateway. If there is more than one wireless gateway in the surrounding area, close the other gateways and open only the wireless gateway that you want the meter to pair with.



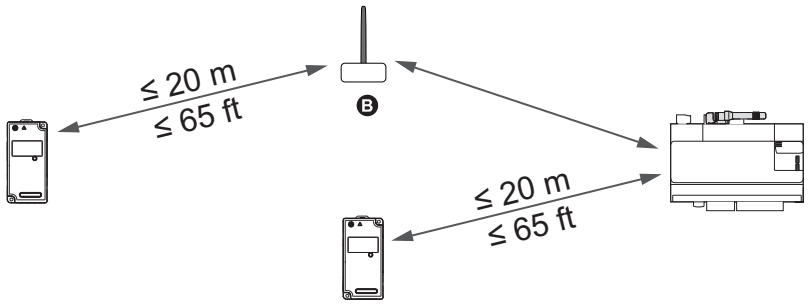
The recommended distance between the meter and the gateway are:

Description	Max. distance
Unobstructed straight line-of-sight between meter and gateway	10 m (32 ft)
Partially bstructed path between meter and gateway	5 m (16 ft)
Solid concrete wall between meter and gateway	Not supported



Wireless repeaters

If the distance between the meter and the gateway exceeds the specified maximum value, install a wireless repeater (Ⓑ) between the devices.



You can use any RF range testing device to determine the strength of the wireless signal.

Related topics

- See the *Schneider Electric wireless guidebook* at www.schneider-electric.com for additional information and guidelines on wireless technology and methodology.

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 or applicable local standards.
- Turn off all power supplying this device and the equipment in which it is installed before working on it.
- Always use a properly rated voltage sensing device to confirm that all power is off.
- Do not exceed the device's ratings for maximum limits.
- Always use grounded external CTs for current inputs.

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

1. Turn off all power supplying this device and the equipment in which it is installed before working on it.
2. Always use a properly rated voltage sensing device to confirm that all power is off.

Meter mounting

MAKE REFERENCE TO INSTALL SHEET HERE, THEN PROVIDE MORE DETAILS HERE TO EXPLAIN THE GRAPHICS

The meter can be mounted on a flat surface or a TS35 Top-Hat style DIN rail.

Flat surface mounting

Use M4 screws to mount the meter to a flat solid surface.

ADD GRAPHIC HERE

Installation considerations

Certain installation locations or scenarios should be avoided.

ADD GRAPHICS FROM WILEM USERGUIDE HERE **SPECIFICALLY ONES FROM SECTION 3.3**

- Do not install in a location that directly blocks the antenna

DIN rail mounting

1. Line up the meter to the DIN rail. Tilt the meter slightly so the top notch is resting securely on the DIN rail.

   ADD GRAPHIC HERE

2. Swing the meter downward and push the bottom part of the meter until you hear an audible click and the meter locks in place.

ADD GRAPHIC HERE

Removing the meter

1. Insert a flat-tip screwdriver into the DIN release clip. Pull up on the spring-loaded clip until it clears the DIN rail edge.

ADD GRAPHIC HERE

2. Swing the meter out and downwards to remove the meter.

ADD GRAPHIC HERE

Meter wiring

The meter is intended for use with 4-wire 3-phase with neutral electrical systems. For wiring instructions and safety precautions, see the meter installation sheet that was shipped with your meter, or download a copy at www.schneider-electric.com.

ADD GRAPHIC AND ZOOM IN TO SPECIFIC LOCATIONS SUCH AS THE VOLTATE INPUT TERMINALS, WHERE FERULLES NEED TO BE INSTALLED, ETC

Use the meter installation sheet when wiring the meter.

Voltage input protection

The meter's voltage inputs must be wired to fuses/breakers and a disconnect switch.

- Clearly label the device's disconnect circuit mechanism and install it within easy reach of the operator.
- The fuses / circuit breakers must be rated for the installation voltage and sized for the available fault current.
- Fuse for neutral terminal is required if the source neutral connection is not grounded.

See the meter installation sheet for fuse ratings.

Control power wiring

No additional wiring is required. The meter is powered from its L1-N voltage connection.

Chapter 4 Creating the wireless network

This section explains how the meter and gateway/data collector work together to create the wireless network for your energy monitoring and management system.

Make sure you open only the wireless gateway that you want the meter to pair with, and close all other nearby gateways. See “Wireless networks” on page 11.

After installation and power up, the meter’s LED blinks to indicate various communications and metering states.

Meter LED behavior

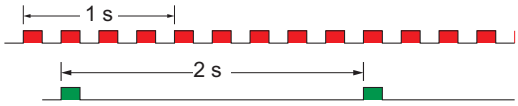
Here is a typical sequence of the meter’s red or green LED blink patterns.

Scanning mode

Red LED turns on and off every second to indicate it is in scanning mode (lasts approximately 1 minute with the gateway turned on). Green LED blinks every 2 s to indicate normal metering operation.

Joining mode

Red LED turns on and off 4 times per second to indicate it is in joining mode. Green LED blinks every 2 s to indicate normal metering operation.



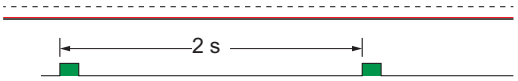
Pairing the meter to the gateway

Refer to the Com’X series or MPM series wireless gateway/data collector user manual for details on pairing the meter to the gateway. After the meter is paired, select which meter measurements you want to log to the gateway.

DO WE WANT TO DUPLICATE INFORMATION FROM THE COM’X USER GUIDE AND MPM USER GUIDE HERE? I VOTE NO, BECAUSE WE HAVE NO CONTROL OVER THE GATEWAY DEVELOPMENT AND THE CHANGES THEY WANT TO AND ARE GOING TO IMPLEMENT

Paired mode

Red LED turns off to indicate normal wireless operation. Green LED blinks every 2 s to indicate normal metering operation.



Related topics

- See the Com'X series and MPM series user guides at www.schneider-electric.com for information on wireless gateway communication and data collection.
- Visit www.zigbee.org to learn about Zigbee wireless communication.

Chapter 5 Maintenance

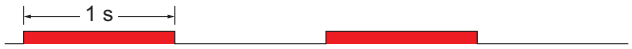
This section describes some typical troubleshooting steps, how to reset the meter and how to upgrade the firmware.

No LED activity

Verify voltage is present on the voltage inputs. If problem persists, contact Technical Support.

Persistently searching for wireless network

Red LED behavior:



Verify the gateway is powered on and the wireless network is open. If problem persists, reset the meter. See “Resetting the meter” on page 18.

Persistently connected (joined) but does not pair

Red LED behavior:

Reset the meter. See “Resetting the meter” on page 18

Lost wireless connection

Red LED behavior:

This can occur when there are multiple open networks nearby. Make sure only the gateway you want to connect to is open. If the problem persists, reset the meter. See “Resetting the meter” on page 18

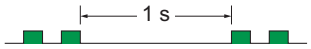
Meter is non-operational

Red LED behavior:

Reset the meter. See “Resetting the meter” on page 18

Meter persistently establishing internal communications

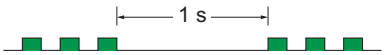
Green LED behavior:



Reset the meter. See “Resetting the meter” on page 18. If problem persists, contact Technical Support.

Meter persistently synchronizing to line frequency

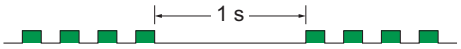
Green LED behavior:



Reset the meter. See “Resetting the meter” on page 18. If problem persists, contact Technical Support.

Meter establishing internal communications and synchronizing to line frequency

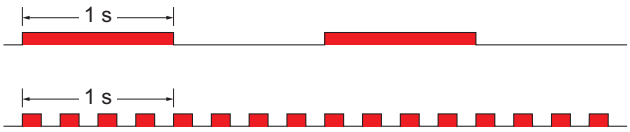
Green LED behavior:



Reset the meter. See “Resetting the meter” on page 18. If problem persists, contact Technical Support.

Intermittently changes from searching to joining, but does not pair

Red LED behavior changes between these two states



Relocate the gateway closer to the meter, or install a wireless repeater.

Negative or inconsistent values for power / energy

Check for correct voltage input connections and current sensor installation.

Resetting the meter

***MICHAEL - THIS IS FOR YOU. NEED TO DESCRIBE HOW TO RESET THE METER USINGTHE MAGNET TO THE METER’S REED SWITCH. NEED TIMING INFORMATION AND LED BEHAVIOR, ETC...

MIGHT WARRANT ITS OWN CHAPTER

OR POSSIBLY ONLY HAVE RESETTING AND FIRMWARE UPGRADE IN THE MAINTENANCE SECTION

THEN HAVE A SEPARATE CHAPTER CALLED TROUBLESHOOTING (AND WHO YOU GONNA CALL??? TECH SUPPORT!!!)***.

Firmware upgrades

Chapter 6 Sending data to the cloud

This section outlines how the stored meter data on the gateway can be sent to the cloud via the Internet to save and protect recorded data.

Facility Insight

Facility Insight is ideal ... ***Tarek to supply info on who uses this, how many metering points for a typical site, etc...

Building Expert

Building Expert is ideal ... ***Tarek to supply info on who uses this, how many metering points for a typical site, etc...

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