

Company Confidential

EM 915 V1.0 **Manual**



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GLOSSARY

AMR	Automatic Meter Reading
BOM	Bill of Materials
EIRP	Effective Isotropic Radiated Power
EM	Electricity Meter
HALT	Highly Accelerated Life Test
IC	Integrated Circuit
ISM	Instrumentation, Scientific & Medical
IT	Information Technology
MIU	Meter Interface Unit
PIC	Programmable Intelligent Controller
ppm	Parts per million
PSR	Packet Success Rate
RF	Radio Frequency
ROI	Return On Investment
TBD	To Be Determined
UK	United Kingdom
US	United States of America

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1. INTRODUCTION



1.1. General

This document is intended to provide detailed information required by an AMR Meter Shop for the integration of AT RAMAR's 900 series Electric Meter (EM) TransPondIT Meter Interface Unit (MIU) product for single phase domestic electricity meters in the US.

1.2. Scope

This document describes the 900 series EM TransPondIT MIU and provides the necessary level of detail to enable the meter shop to install, test and deliver the product ready for use by the customer.

2. PRODUCT DESCRIPTION

TransPondIT allows the utility to receive data from its meters remotely. The TransPondIT collects data from the meter and transmits it to a data collection device, which may be mobile or fixed. In addition, the TransPondIT is capable of detecting reverse rotation and will transmit an alarm indication if there is doubt about the validity of the reading. The TransPondIT can be read by the following RAMAR products: HandTrackIT, FastTrackIT, or CellTrackIT with no change to the TransPondIT.

The TransPondIT can be fitted or retro-fitted in minutes to the meter.

Only qualified and properly trained personnel should attempt the installation of the EM MIU.

2.1. Ease of Installation

EM MIU units will be installed in two different settings; either with new meters at the meter manufacturer's plant or in approved meter shops that rework and calibrate existing meters. It is a design criteria that the MIU be capable of being mounted in a meter at point of meter calibration without additional tests other than ConFigIT to confirm PSU connection and to load mechanical register data into electronic register.

Mounting of the MIU in the meter takes similar time to that of mounting the lower faceplate plus some time for connection of the power wires.

Mounting of the EM MIU within the electricity meter is simple with minimal operator training required assuring proper installation and configuration settings by meter shop employees or field personnel. Field personnel perform configuration of account numbers at the end-user's site with the EM ConFigIT device.

Clearing of tamper register in field is performed using ConFigIT.

Caution:

Changes or modifications not expressly approved by Advanced Technology RAMAR Ltd could void the user's authority to operate the equipment.

3. ENVIRONMENTAL SPECIFICATIONS

3.1. Storage Temperature Range

The temperature range for long-term storage of the MIU in un-powered state is to be -10°C to +50°C.

The temperature range allowed for transport of the MIU in un-powered state is between -40°C to +85°C.

Note: The MIU should not be held in the extended temperature range for transport for more than 30 days.

3.2. Operational Temperature Range

The operational temperature range of the MIU shall be -40°C to +50°C with occasional excursions to +85°C.

3.3. Humidity

The non-condensing relative humidity shall be 5% to 95%.

3.4. Shock

The MIU when mounted in meter is to survive Transportation drop test – ISTA Test Procedure 1A

3.5. Vibration

The MIU when mounted in meter is to survive Transportation Vibration test – ISTA Test Procedure 1A.

4. MECHANICAL SPECIFICATIONS

4.1. Construction



The MIU is designed so that it fits all of the meter types listed with a minimal set of adaptor hardware.

The product is fitted in the location of the meter lower faceplate, utilising the existing mounting stand-offs.

The MIU is enclosed in a plastic enclosure to provide protection in handling and against direct sunlight.

Torque specifications will be provided for attachment fixings to ensure a reliable installation.

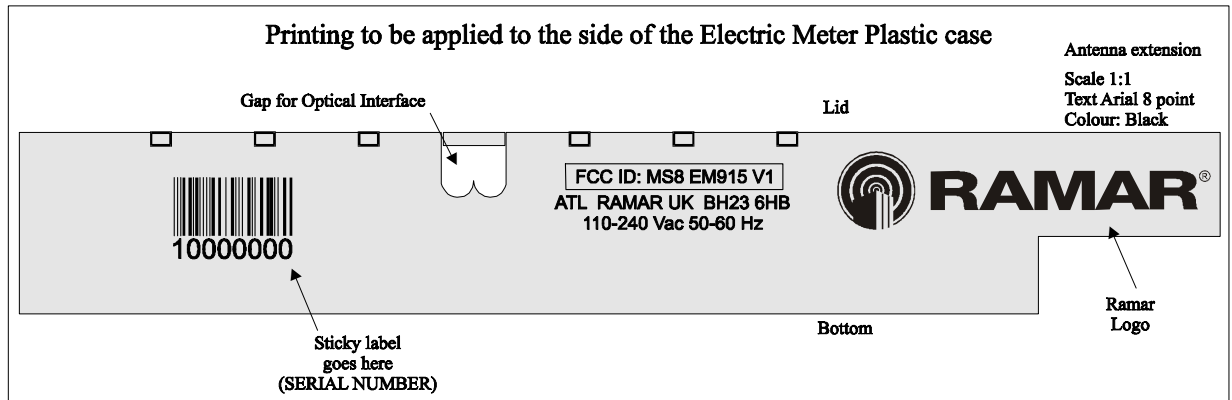
The design avoids any requirement for alignment of pickup at time of installation.

No meter calibration points are obscured.

4.2. Packaging

Packaging has been developed and tested to ensure that damage does not occur to the product during normal freight handling. There shall be 48 or 96 units per package.

4.3. Marking



The MIU marking is to include:

- ATL RAMAR UK logo
- Part code
- FCC approval identifier
- Canadian approval identifier
- Serial number (with 128C bar code)
- Mains input voltage and frequency

5. ELECTRICAL SPECIFICATIONS

5.1. Compatibility

The unit operates in the same ISM band as the water TransPondIT products. Furthermore, the EM is compatible with the following reading systems:

- HandTrackIT RR915/F-01-013 to RR915/F-01-04



- FastTrackIT FR915-01-01



5.2. Power Supply

The unit takes mains power from the supply side of the meter.

No batteries are required.

The input voltage range over which the product must be able to read disk and send transmissions is 100 – 260Vac.

Protection is provided so that the unit will survive the overvoltages and voltage surges defined in ANSI C12.1.

There is no loss of configuration or meter reading data after power surge, brownout or interrupt.

Power-line noise as defined in ANSI C12.1 does not adversely affect the unit.

The unit is appropriately protected to prevent the possibility of fire damage to a residence.

Any hazardous voltage points have been protected to avoid accidental contact during manufacture, service or calibration of the meter.

The average power consumption of the unit shall be less than 1.0W.

5.3. Measurement Technique

5.3.1. Mechanism

Electricity usage is measured by detecting rotation of the Ferraris disc. The detection mechanism is frictionless and does not alter the balance of the disc.

The mechanism will restart regardless of disc position.

The detection mechanism will operate in ambient light levels of up to 100,000lux.

Reverse rotation is detected and causes the register to be decremented so that the electronic register will match the mechanical register.

For meters where there is no suitable mark provided, the kit provided by the meter shop shall include a mechanism for providing a black mark on disc that will not peel off. The specifications of this mark are included in this document.

5.3.2. Accuracy

The electronic register is to reflect disc rotations to accuracy of better than 0.05%.

5.3.3. Tamper detection

The value in a tamper register shall be indicated in the following circumstances:

- if the circuit detects an internal fault
- if the sensor is disabled or
- if the rotation of the Ferraris disc is reversed (the design is to incorporate a separate register to record reverse rotation).

Clearing of the tamper events is to be performed on site using ConFigIT.

5.4. Radio

Operational Range

The operational range is at least 300m in open field to a production HandTrackIT held at height of 1.5m.

5.4.1. Transmit Carrier Frequency

The nominal transmission frequency shall be 919.8976MHz.

5.4.2. Antenna

The antenna is integral to the TransPondIT located within the glass case of the electricity meter and does not hinder the installation of the product or obscure the manually read dials, calibration screws or face-plate.

5.4.3. Transmission Interval

The transmit interval is configurable from 5 seconds to 10 hours.

6. INTERFACE SPECIFICATIONS

6.1. Meter Interfaces

6.1.1. Power

Mains power input.

6.2. ConFigIT Interface

6.2.1. Hardware

The Electric TranspondIT MIU is interfaced to ConFigIT from outside the glass via a bi-directional optical port that is active when the MIU is powered.

6.2.2. Use

a. In Meter Retrofit Shop or in Meter Factory

The following actions can be performed:

- Enter mechanical meter reading
- Enter rotation rate
- Enter utility code

b. At meter site

The following actions can be performed:

- Customer number
- Clear tamper
- Readout of all registers including ID, all settings and status

7. REGULATORY COMPLIANCE

Fitting a meter with the MIU does not invalidate its compliance with the following:

- a. ANSI C12.1 – 2001 American National Standard for Electric Meters
(covers performance aspects)
- b. ANSI C12.10 – 1997 American National Standard for Watthour Meters
(covers environmental and physical aspects)
- c. CFR47 Part 15 (Note – declared as Class B Digital Device), Part A General,
Part C Intentional Radiator



This device complies with Part 15 of the FCC Rules.

Operation is subject to the following conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Note: 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 or television reception, which can be determined by turning the equipment on and off, 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**
- Consult the dealer**

7.1. System Integration

Installation Tools and techniques should consider methods such as bar-code scanners to allow proper configuration and accuracy of information. Seamless integration into existing IT systems is to be a design aim.

7.2. Meter Compatibility

The EM MIU is compatible with electricity meters listed in Table 1.

Table 1. Compatibility includes all interfaces such as mechanical, electrical, magnetic and optical.

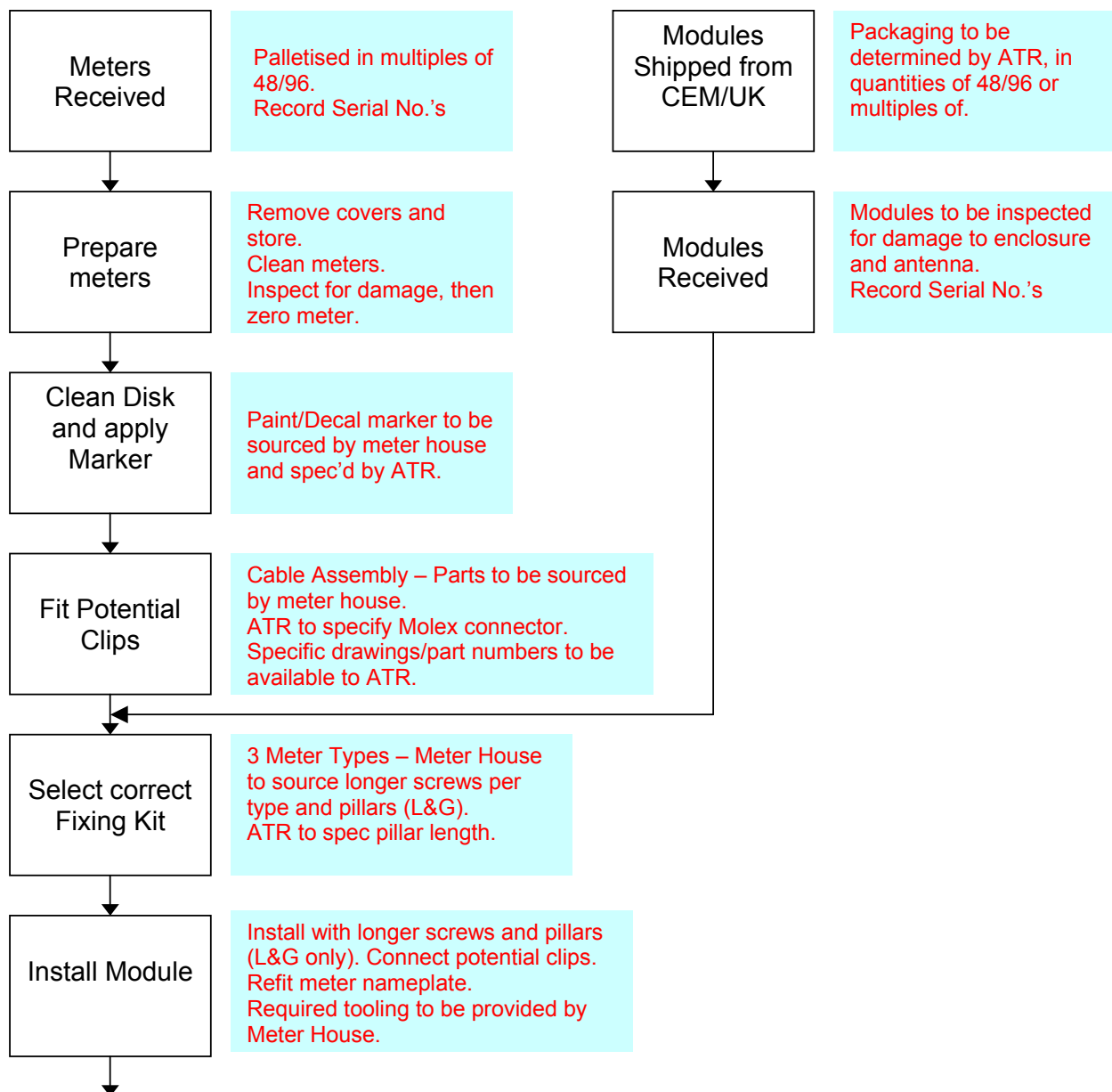
Manufacturer	Model Number	Voltage	Rotations per kWh	Form Factor
General Electric	I-70-S/2	240Vac	7.2	2S
Siemens/Landis&Gyr	MX	240Vac	7.2	2S
ABB	AB1	240Vac	7.2	2S

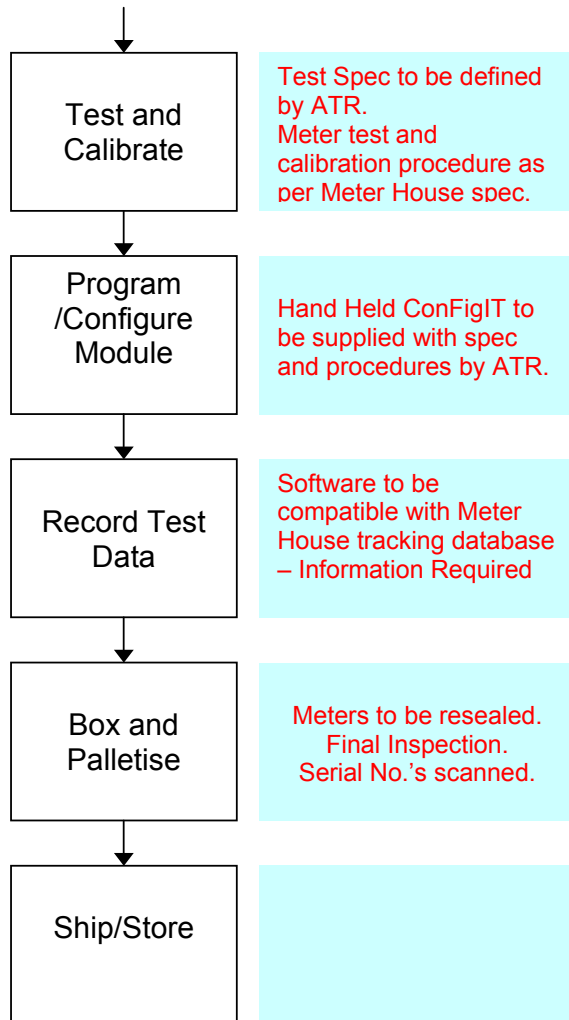
Table 1: List of Compatible Electricity Meters

8. OVERVIEW

8.1. Integration Process Flow

8.1.1. The following process flow chart shows the expected route to achieve the installing, testing and configuring sequence of the EM MIU into various retrofit meters:





8.2 Meter Preparation

- 8.2.1 All received meters are to have their serial numbers recorded as per existing procedures.
- 8.2.2 Covers are to be removed, cleaned and stored.
- 8.2.3 Meters are to be inspected for any damage as per existing Meter House criteria.

8.3 Disk Marking

8.3.1 The disk marking method will be determined by customer request, be it paint or decal. It must meet the following criteria:

- i) There is minimum of a 20mm width apparent at the optical centres.
(Suggested dimensions as per drawing 52000501 iss C)
- ii) The material must have no magnetic susceptibility or effect.
- iii) The material must have 99.98%, or greater, absorption of electromagnetic radiation having a wavelength of between 300 and 1200nm (UV, visible and IR light).

8.3.2 The marking method used will be as per Meter House current procedures and must ensure that no damage or stress is caused to the Ferraris Disk in any form.

8.4 EM MIU Installation

8.4.1 The EM MIU is to be installed to the various meter types, as per Table 1, using the appropriate fixing kit as sourced by the Meter House.

8.4.2 The kit will consist of longer screws of the same thread size as the existing ones used to mount the lower faceplate to the standoff pillars.

8.4.3 In the case of any meter type not having standoff pillars high enough to support the EM MIU in its correct position (such as the L&G MX), additional pillars are to be sourced and fitted (L&G MX pillars to be 20mm long).

8.4.4 The Meter House will source the cable assembly used to connect the EM MIU to the bus-bar supply. Specification for the cable to board connector will be provided by the ATR.

8.4.5 The Meter House shall supply tooling required to install the EM MIU.

8.5 Test and Calibration

8.5.1 EM MIU to be tested iaw Test specification and procedures supplied by ATR.

8.5.2 Meter to be calibrated as per Meter House procedures.

8.6 Configuration

8.6.1 The EM MIU is to be configured using the handheld ConFigIT supplied with relevant software and procedures by ATR.

8.6.2 The following steps are to be performed at the Meter House:

- 8.6.2.1
 - i) Clear Tamper
 - ii) Enter mechanical meter reading
 - iii) Enter rotation rate (as per Table 1)
 - iv) Enter utility code

8.7 Quality

8.7.1 The Meter House shall continue to work to their current quality specifications.

8.7.2 Specific standards/criteria shall be supplied by ATR if required.