M2Micro

MRU6000

Installation Guide

Statement

Product specifications and information referred in this manual are for reference only; we reserve the right to update relevant content without further notice. For more information, please visit our website at any time:

http://www.m2micro.com

Unless otherwise specified, this manual is only be used as guidance. While every attempt has been made to ensure all information in this manual is accurate, the Company should not be held liable for any error or omission in this document.

FCC STATEMENT

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 into 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 device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1) This device may not cause harmful interference.

2) This device must accept any interference received, including interference that may

cause undesired operation.

⚠ Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

Preface

Manual instruction

This Installation Guide describes the hardware features, installation methods and points for attention during installation.

To avoid possible equipment damage or personal injury before and during the installation process, please read this manual carefully.

Overview of this guide

Chapter	Instruction
1 Introduction	Outlined the basic functionality and product features.
2 Installation	Describes product installation methods and attentions
A Data sheet	Lists the hardware specifications.

Version

Date	Version	Update description
2011-11-30	R20111130-V1.00	Initial release.
2013-2-22	R20130222-V1.01	Increase FCC certification.

Conventions

Unless otherwise specified, the terms of ”systems”, “equipment”, “products” in the following parts of this manual refer to the MMR6000 meter reading system.

Two signs are used herein to draw the users’ attention during the operation, with meanings as follows:

Caution

This icon is used to list advertent items during operation and to remind the users of undesirable consequences due to inaccurate operation, such as potential damage to the equipment or otherwise.

Tips

This icon is to give supplementary explanation for the operation details described.

Contents

1 Introduction 1

1.1 Product Overview 1

1.2 Features 2

1.3 Demonstration of the type 2

2 Installation 5

2.1 Packing list 5

2.2 Internal structure 5

2.3 MRU6000-BP01 6

2.3.1 Product introduction 6

2.3.2 Product dimension 6

2.3.3 Product installation 7

2.3.4 Connection 7

2.4 MRU6000-EM01 8

2.4.1 Product introduction 8

2.4.2 Product dimension 8

2.4.3 Product installation 8

2.5 MRU6000-WM01 9

2.5.1 Product introduction 9

2.5.2 Product appearance 10

2.5.3 LEDs introduction 10

2.5.4 Connection 11

1 Introduction

1.1 Product Overview

Automatic Meter Reading (AMR), also called remote meter reading system, is a new meter reading way to finish meter reading without people on site. Via communication technology, it can be automatically transferred to the data in Watt-hour meter the accounting and management center for efficient handling. Also, it can be provided real-time measurement information to help the users to optimize their energy supply solutions.

Aiming at AMR application, M2Micro launches its MMR6000 AMR system, which supports ad hoc network and data collection for various types of meters. It is mainly made up of MRU6000 terminal units and MCC6000 control units and OMS meter management system.

The main function of MRU6000 is to collect the electric data through RS485 bus, and upload it to the control unit with the wireless communication module.

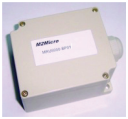
1.2 Features

- Modular design, existing meters can be upgraded by attaching wireless AMR modules.
- Support hybrid meter reading, can collect data of water meter, gas meter, etc.

- Based on M2Micro developed chips, MAC and PHY layer can work together perfectly.
- Support 433.92MHz frequency band, with good transportation distance and penetration.
- Support Ad-hoc network, can be deployed to complicate environment.

1.3 Demonstration of the type

MRU6000 series include 3 types.

Model	Scene	Appearance
MRU6000-BP01	Battery-Powered, Water-Proof	
MRU6000-EM01	Embedded in Electric Meter	
MRU6000-WM01	Wall mounted	

2 Installation

2.1 Packing list

Make sure that the package contains the following items.

Serial no.	Item	Quantity
A	MRU6000	1
B	This Installation Guide	1

2.2 Internal structure

The internal structure of MRU6000 is shown in Figure 2.

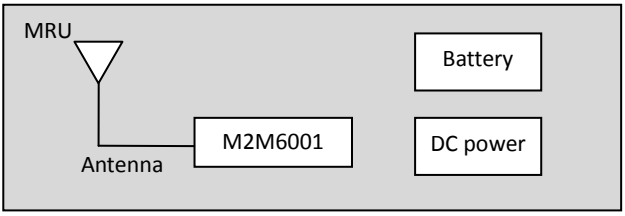


Figure 2 The internal structure of MRU6000

- Antenna: Bi-directional wireless data communication.
- M2M6001: Meter data transfer.
- Battery /DC power: Provide stable current to the whole control unit.

MRU6000 series include 3 types, they are different in appearance, installation and

application.

2.3 MRU6000-BP01

2.3.1 Product introduction

With sealing structure and battery-power, MRU6000-BP01 is waterproof. It can be used for measuring the meter which is placed in damp environment for a long time (Such as water meter or gas meter).

2.3.2 Product dimension

The dimension of MRU6000-BP01 is shown as Figure 3.

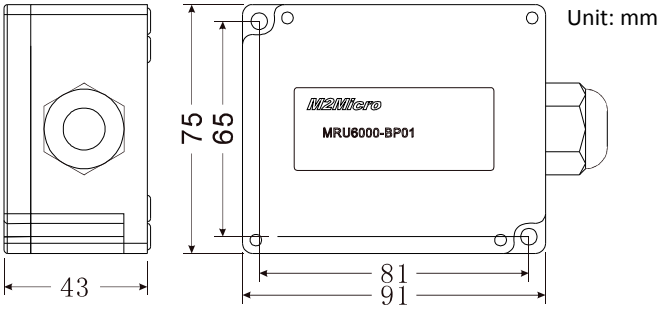


Figure 3 The dimension of MRU6000-BP01

2.3.3 Product installation

MRU6000-BP01 can be wall-mounted. There are 2 mounting holes in the upper left corner and lower right corner, so that it can be mounted to the wall surface close to the meter. Or, MRU6000-BP01 can be fastened to the pipeline by pipe clamp.

2.3.4 Connection

There are 4 cords used to connect power supply and meter to MRU6000-BP01. Please refer to the table bellow.

Color	Name	Comments
Red	Anode	Connect positive terminal.
White	Cathode	Connect negative terminal.
Yellow	485+	Connect 485+.
Blue	485-	Connect 485-.

2.4 MRU6000-EM01

2.4.1 Product introduction

MRU6000-EM01 is embedded in a electric meter and powered by it. It can be applied in the scenario that electric meters are placed in separate rooms.

2.4.2 Product dimension

The dimension of MRU6000-EM01 is shown in Figure 4.

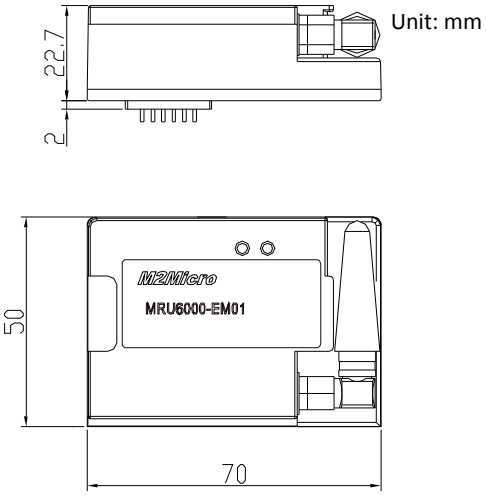


Figure 4 The dimension of MRU6000-EM01

2.4.3 Product installation

With a 2x6 pin header connector, MRU6000-EM01 can be plugged into a electric meter. The four-view and installation diagram are shown as follows.

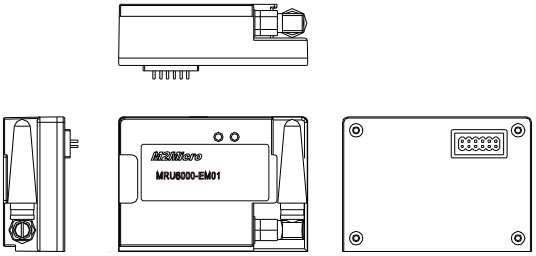


Figure 5 Four-view

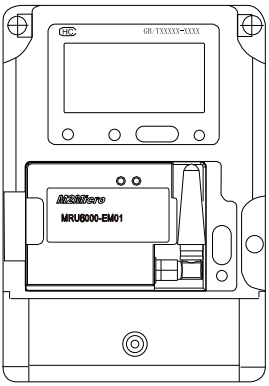


Figure 6 Installation diagram

2.5 MRU6000-WM01

2.5.1 Product introduction

MRU6000-WM01 could mount more than one meters, it can be used in concentrated meter box. MRU6000-WM01 is powered by DC Supply. It can collect measurement data of meters through RS-485 bus and then send out collected data by wireless connection.

Tips:

1. Considering the power supply issue, only multiple electric meters are allowed to be connected to the same terminal unit. Neither connection of multiple water meters/gas meters with a same terminal unit, nor connection of hybrid meters with a same terminal unit , can be supported.
2. MRU6000-WM01 can be connected to more than one electric meter, but all

meter in the connection must use same communication parameters.

2.5.2 Product appearance

The appearance of MRU6000-WM01 is shown as Figure 7.

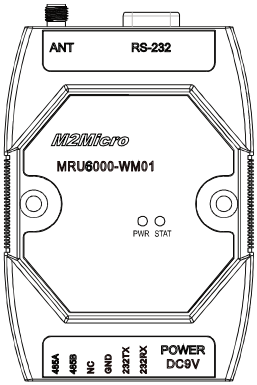


Figure 7 The appearance of MRU6000-WM01

2.5.3 LEDs introduction

LED of MRU6000-WM01 is shown in the following figure.

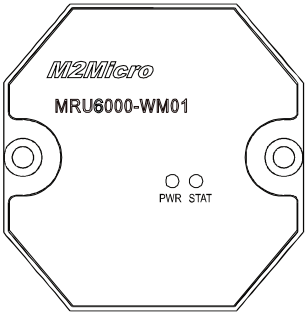


Figure 8 LED of MRU6000-WM01

LED	Color	Status	Comments
Power	Red	On	The device is powered on.
		Off	The device is powered off.
Status	Green	Flashing	Data is being transmitted or received.
		Off	No data transmission.

2.5.4 Connection

The top panel of MRU6000-WM01 is shown in the following figure.

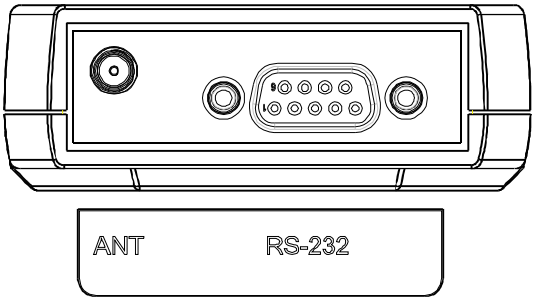


Figure 11 Top panel of MRU6000-WM01

Port	Comments
ANT	Connector to the wireless antenna.
RS-232	RS-232 connector, it is multiplexed with the RS232 pin headers on the bottom panel.

The bottom panel of MRU6000-WM01 is shown in the following figure.

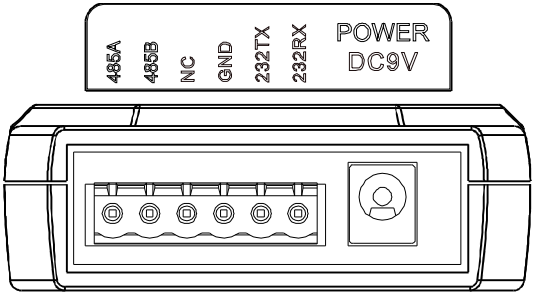


Figure 12 Bottom panel of MRU6000-WM01

Port	Comments
485A	Positive input port of RS485
485B	Negative input port of RS485
NC	Reserved port.
GND	Grounding port.
232TX	Transmission port of RS232.
232RX	Receiving port of RS232.
POWER DC9V	Power input. Input voltage is 9V DC.

A Appendix - Data Sheet

MRU6000-BP01	
Parameter	Value
Operating Temperature	-40~85°C
Operating Humidity	＜95%
Mean Time Between Failures	MTBF > $2x10^4$ hours
Power Consumption	≤1.5W
Distance to connected Meter	Electromechanical meter, distance≤500m； Electronic meter, distance≤50m

MRU6000-EM01	
Parameter	Value
Operating Temperature	-40~85℃
Operating Humidity	＜95%
Mean Time Between Failures	MTBF > $2x10^4$ hours
Power Consumption	≤1.5W

MRU6000-WM01	
Parameter	Value
Operating Temperature	-40~85℃
Operating Humidity	＜95%
Input Voltage	AC220V±20%　50Hz
Power Consumption	0.6W
Rate of RS485	600bps, 1200bps, 2400bps, 4800bps, 9600bps.
Electrostatic Discharge	8kV
Transient Rapid Pulse Group	1kV
Impulse Withstand Voltage	4kV
Maximum Number of Mounted Meter	250
Maximum Number of Battery-powered Unit	10
Mean Time Between Failures	MTBF > $2x10^4$ hours
Power Consumption	≤1.5W
Distance to connected Meter	Electromechanical meter, distance≤500m； Electronic meter, distance≤50m