# Metrycom

# MetrySense3000
### WIRELESS IP DATA ACQUISITION

## MS3000-450
## Unit description

## Purpose of the device:

The purpose of the device is to acquire data form sensors via I/O terminals and send it to a server via other MS3000 devices.

## Applications

- ⊙ **Industrial control**
- ⊙ **Smart grid - data acquisition and control**
- ⊙ **Irrigation control**
- ⊙ **Meter reading - optimized to large rural areas**

## Operating frequencies in the US:

The operating frequencies in the US are between

- ⊙ **450-470 MHz**

except the following frequencies:

- ⊙ **454-456 MHz**
- ⊙ **462.5375-462.7375 MHz**
- ⊙ **467.5375-467.7375 MHz**

## Type of modulation:

GFSK (narrowband)

## Method of operation

MetrySense-3000 is a modular low-power outdoor connectivity system that interfaces digital and analog sensors, meters and actuators and connects them via a low power wireless mesh-network to IP gateways and remote monitoring centers.

Modern industries continuously expand their dependence on real-time data acquired from a growing number of sensors of multiple types, which are installed in an increasing number of machines both locally and remotely, thus expanding the area coverage of sensor networks. This trend affects power utilities, infrastructure projects, agricultural crop management and more. Such environments requires a reliable and secure control over large geographical areas, which often do not feature convenient power supply and/or communication lines in the zones where sensors are required. As a consequence, data must be collected using a flexible and scalable wireless network, independent of any external power sources, robust and that can seamlessly connect with the many types of data protocols typically used by industry. Customers for such networks also demand rapid, simple and non-intrusive deployment, easy remote monitoring, self-healing and secure communication in order to ensure a highly reliable connectivity between their monitoring and control centers as well as between the remote sensor and actuators.

In order to address this growing trend, MetrySense-3000 has been uniquely designed to provide a robust wireless network with industrial strength connectivity that meets the stringent customer requirements. The low power units can operate up to 20 years using power feeding from miniature solar panels, or alternatively can use internal primary batteries for 5 years and beyond. They are simple to install in the field, have a small physical form and housed in a IP67 waterproof casing. This reliable wireless communication technology is based on IPv6/6Lowpan and RPL routing, which is self-configuring, self-healing and secure.

Typically, a MetrySense-3000 network includes RTU units, a single Gatway, and optionally additional router units:

- ◉ **RTU Remote terminal unit** (MS3000-SU/HU/MT) directly connected to many types of meters, sensors and actuators using both digital and analog ports, and supports a number of commercially used communication protocols.
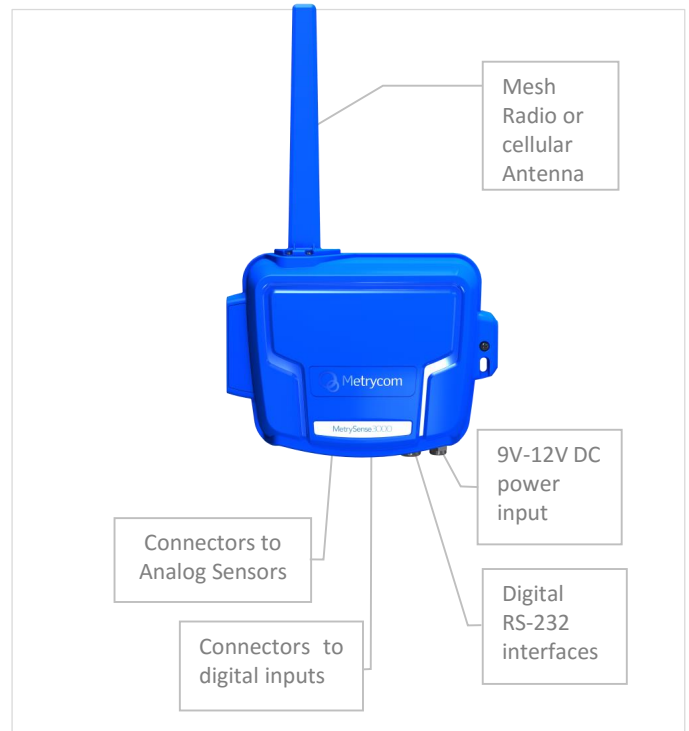
   Types of RTUs:

    - ◉ **MS3000-SU** – Sensor unit
    - ◉ **MS3000-HU** – Hydraulic unit
    - ◉ **MS3000-MT** – Extended sensor unit

- ◉ **Router/Base unit** (MS3000-RU) is an IPv6 router which is generally located in the field. The RU connects wirelessly to the GU or to other RUs or RTUs which are located further out in the field.  All the units are collectively creating an IPv6 mesh radio network where two way information can be sent from one unit to another until it reaches the GU and then the server. Each router includes an IPv6 software stack and runs a RPL routing algorithm for creating an automatic IPv6 network structure which performs mesh-radio routing operations in order to extend the communication range to remote sensors. Note that MS5000-RU can also perform the same routing operation – see the MetrySense-5000 datasheet. MS3000-RU can also function as a base-

station and connect to the communication infrastructure (e.g. a PC) via a RS232 serial interface.

- ◉ **Gateway unit (MS3000-GU)** includes serial RS232 connection to a cellular modem, and connects both to sensors  in the mesh radio network via the radio and to the server via the cellular network.



Mesh Radio or cellular Antenna

9V-12V DC power input

Connectors to Analog Sensors

Digital RS-232 interfaces

Connectors to digital inputs

# Sub-configuration products of MS3000-MT-450

MS3000-MT-450 is a full configuration product which includes all the full assembly of electronic components on the PCB of the product targeted to support all the MetrySense-3000 functions. There are several Sub-configuration products which are targeted only to some of the functions. These sub-configuration products are identical to MS3000-MT-450 with the exception that some of the components on the PCB, which are not required in order to implement the functions of the product, are not assembled. In all these sub-configuration products the PCB itself is identical to MS3000-MT-450 and the radio circuits are also identical.

## MS3000-MT-450
A full configuration product that includes these blocks:
1. Network processor
2. Application processor
3. RS232 ports
4. Power circuits, including battery circuits, external power circuits, and power feed to optional external cellular modem.
5.1 Analog I/O
5.2 Digital inputs
6. Connectors - includes the relevant terminal blocks

Functionality: A wireless unit which can perform two functions: (1) connect to sensors in order to acquire data and send it to a base or router unit, and (2) route wireless data between other MetrySense-3000 units.

## MS3000-SU-450
A sub-configuration of MS3000-MT-450 including the following blocks:
1. Network processor
2. Application processor
4. Power circuits, including only battery circuits.
5.1 Analog I/O
5.2 Digital input
6. Connectors - includes the relevant terminal blocks

Functionality: A wireless unit which connects to sensors in order to acquire data and send it to a base or router unit.

## MS3000-RU-450:
A sub-configuration of MS3000-MT-450 including the following blocks:
1. Network processor
2. Application processor
3. RS232 ports
4. Power circuits, including only external power circuits, and power feed to optional external device.
6. Connectors - includes the relevant terminal blocks

Functionality: A wireless unit which routes wireless data between other MetrySense-3000 units.

## MS3000-GU-450-X:
A sub-configuration of MS3000-MT-450 including the following blocks:
1. Network processor
2. Application processor
3. RS232 ports
4. Power circuits, including only external power circuits, and power feed to optional external device.
6. Connectors - includes the relevant terminal blocks

Functionality: A wireless unit which routes wireless data from other MetrySense-3000 units to a stand-alone cellular modem which is placed inside its outer enclosure via RS232 cable.

MS3000-GU-450-I:

A sub-configuration of MS3000-MT-450 including the following blocks:

1. Network processor
2. Application processor
3. RS232 ports
4. Power circuits, including only external power circuits, and power feed to optional external device.
6. Connectors - includes the relevant terminal blocks

Functionality: A wireless unit which routes wireless data from other MetrySense-3000 units to a stand-alone cellular modem which is placed outside the unit, via RS232 cable.

MS3000-DFM-450

A full configuration product that includes these blocks:

1. Network processor
2. Application processor
3. RS232 ports
4. Power circuits, including battery circuits, external power circuits, and power feed to optional external cellular modem.
5.1 Analog I/O
5.2 Digital inputs
6. Connectors - includes the relevant terminal blocks

Functionality: A wireless unit which can perform two functions: (1) connect to sensors in order to acquire data and send it to a base or router unit, and (2) route wireless data between other MetrySense-3000 units.

February 18, 2016..

(date)



(signature)

Liron Frenkel

(printed name)

CEO



…………........................
(company stamp)

(position)