



Eka Gas Meter Node User's Guide

Document Number
XXXX
Revision 01

Eka Systems, Inc.
20201 Century Boulevard, Suite 250
Germantown, MD 20874 USA

www.ekasystems.com

Tel (301) 515-7118
Fax: (301) 515-4965

EKA CONFIDENTIAL

Confidential and Proprietary
Reproduction or Distribution Prohibited

This document is for informational purposes only. It contains information that is confidential and proprietary. This document has been prepared by and is the property of Eka Systems, Inc. By accepting and reviewing this document, you agree that you will treat its contents as confidential and proprietary, and that you will not copy, distribute or otherwise disclose the information contained herein to third parties.

Contents

1 About the Eka Gas Meter Node..... 4

2 Eka Gas Meter Node Hardware 5

 2.1 Node Layout 7

 2.2 Installation and Configuration 7

 2.3 Operation 8

 2.4 Alarms and Events..... 8

3 Eka Gas Meter Node Specifications 9

1 About the Eka Gas Meter Node

The Eka Gas Meter Node is designed for installation in Datamatic FIREFLY Meter Interface Units. The node obtains data from the Meter Interface Unit, and uses an integrated radio transceiver to communicate data to an associated network. The node communicates with a nearby EkaNet network, enabling the meter to be read remotely.

[photo of node]

The node is powered by a battery attached to the FIREFLY Meter Interface Unit. The battery is field-replaceable. Data, operating parameters and configuration parameters are retained by the node if power is lost (for example, during battery replacement).

Eka Gas Meter nodes:

- Operate in the 915 MHz license-free band.
- Fit entirely within the FIREFLY Meter Interface Unit.
- Perform automatic time synchronization.
- Provide real-time access to interval data.
- Contain local non-volatile data storage.

Eka Gas Meter Nodes are fully compatible with EkaNet mesh network hardware, protocols and operations.

Eka nodes integrated with electric meters can draw sufficient power from the meters to continuously communicate, which enables them to form mesh networks. In contrast, Eka Gas Meter Nodes only communicate periodically to conserve battery power. Because of that, Gas Meter Nodes cannot perform the routing operations that other Eka nodes routinely perform in mesh network topologies. Thus, Gas Meter Nodes are limited to being “leaf” nodes, and must be able to communicate directly with one of the following components of a typical Eka mesh network:

- An Eka electric meter node.
- An Eka relay.

When placed within range of an Eka electric meter node or an Eka relay, Gas Meter Nodes are automatically recognized by the network at the next scheduled reporting time. No special changes to the EkaNet network are required to integrate Gas Meter Nodes.

To help conserve battery power, Gas Meter Nodes typically collect and report data much less frequently than their electric meter counterparts. Gas Meter Node settings can be configured in the field, but are factory set for the following intervals:

- Read and store meter data: hourly.
- Report meter data: daily.

Eka Gas Meter Nodes are expected to have an operating life of at least 15 years under normal operating conditions. Nodes are expected to operate for an additional 5 years after the onset of slightly degraded performance.

2 Eka Gas Meter Node Hardware

FCC Notice



Warning

The Original Equipment Manufacturer (OEM) must ensure that FCC Labeling requirements are met. This includes a clearly visible label on the outside of the OEM enclosure specifying the appropriate EKA Systems FCC identifier for this product as well as the FCC Notice below.



Warning

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, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.



Warning

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



Warning

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.



Warning

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website www.hc-sc.gc.ca.



Warning

To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operate in conjunction with any other antenna or transmitter.”

As such, the radio component of this device is intended only for OEM integrators under the following two conditions:

The antenna must be installed such that 20 cm is maintained between the antenna and users.

The transmitter module may not be co-located with any other transmitter or antenna.

As long as the two conditions above are met, further transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end product for any additional compliance requirements required with this module installed (e.g., digital device emissions, PC peripheral requirements).

In the event that these conditions cannot be met (for example, co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in devices where the antenna may be installed such that 20 cm may be maintained between the antenna and users (for example access points, routers, wireless ASDL modems, certain laptop configurations, and similar equipment). **The final end product must be labeled in a visible area with the following: “FCC ID: F9X2400B”.**

The radio component is an integral part of the Eka module and cannot be removed.

2.1 Node Layout

The Eka Gas Meter Node is shown in the photograph below.

[photo with callouts for key features that user's need to know about]

Each Gas Meter Node is identified by a unique serial number. This number is displayed on the label and is encoded in the bar code. Additionally, the serial number is embedded in the node's firmware. The serial number is displayed on the Field Tool and in the Network Manager to identify the node.

2.2 Installation and Configuration

The Eka Gas Meter Node is designed specifically for installation in Datamatic FIREFLY Meter Integration Units. Installation instructions for the node and its companion battery are provided in the "Eka Gas Meter Node Installation Manual."

The Eka Gas Meter Node is configured over a local RF link using the Eka Field Tool. Programmable parameters include:

- Meter serial number.
- Node serial number.
- Node description.
- Meter's latitude and longitude.
- Local standard time in relation to UTC (Coordinated Universal Time).
- Meter's reading when the node was installed.
- Read interval (5 minutes, 15 minutes, 30 minutes, 1 hour or up to 24 hours in 1 hour increments; factory default is 1 hour).
- Reporting interval (factory default is daily).
- Report cycle start date (factory default is 1st of the month).
- Gas volume per dial rotation (default value is 1).
- Meter measurement units (CF, CCF, MCF and Cubic Meters; default is cubic feet, CF).
- Pressure compensation ratio (normally printed on the meter index face plate; default is 1.0).
- High flow alarm threshold in units/minute, where units is the meter measurement units (see above).

Note: All changes made to remotely programmable parameters become effective by 8:00am the day after the changes are made.

2.3 Operation

Node data is retrieved by the EkaNet Network Manager software at intervals set by the utility company. Data consists of pressure compensated total gas consumption as of the last time the meter was read by the Gas Meter Node.

Note: RF communications during data reporting are the single largest drain on the node's battery. For maximum battery life, it is recommended that the data reporting interval be set at the maximum (once each 24 hours).

For purposes of redundancy, at least 45 days of data are stored in the node (assuming data is recorded once per hour for a single channel). Also, at least 512 event or alarm messages are stored in the node. Stored data is retained for at least 90 days if power is lost.

2.4 Alarms and Events

The Eka Gas Meter Node reports the following alarms and events:

- Acknowledgement of changes to programmable parameters.
- Low Battery Alarm (sent at least 30 days before battery power is depleted). The initial low battery alarm will be sent with the first scheduled report after the condition is detected, and will be repeated with each scheduled report until the condition is corrected.
- Reverse Flow Alarm. This alarm will be sent immediately, and will be repeated with each scheduled report until the condition is corrected.
- Magnetic Tampering Alarm. This alarm will be sent immediately, and will be repeated with each scheduled report until the condition is corrected.
- High Flow Alarm. This alarm will be sent immediately when consumption volume reaches the threshold set when the meter is installed, and will be repeated with each scheduled report until the condition is corrected.
- Low Flow Alarm [TBD].
- No Usage Status reports the number of days there was no gas consumption. This is sent with scheduled reports until usage is detected.
- Leak Alarm [TBD].

3 Eka Gas Meter Node Specifications

Application Specifications

Compatibility	Datamation FIREFLY Meter Integration Unit
Data storage	Stores 45 days of data (1 channel @ 1 hour intervals)
Data integrity	Non-volatile data storage provides extra security in the event of communication failure or power outage
Advanced features	Load profile, remote demand reset

Radio Specifications

Operating frequency	902 – 928 MHz
Reliable data transmission	Error detection, correction and retransmission
RF output power	20 dBm ¹
Data rate	76.8 Kbps
Receiver sensitivity	-93 dBm (@ 0.1% BER, +25° C)
Range (w/ omni antenna)	Outdoor < 1,000 m (3200 ft) Indoor 75 – 150 m (225 – 490 ft)
Mode	Frequency hopping spread spectrum

1. 20 dBm is the typical output power. The radio hardware is capable of producing up to 30 dBm (1W) of RF output power.

Interface Specifications

ANSI C12.18/C12.19
Meter manufacturer proprietary protocol for the Centron Polyphase meter

Mechanical Specifications

Weight	???? g (???? oz)
Dimensions	???? x ??? mm (??? x ??? in)

Network Specifications

No hard limitation on number of meters per Gateway (actual number of meters per Gateway depends on network performance requirements)
Full peer-to-peer communication
Fully self-configuring
Automatic routing
No network address management required
Automatic network acquisition
Automatic time synchronization of all nodes in the network
128 bit authentication/encryption

Operating Conditions

Environmental	-40° C to +85° C 0 – 95% non-condensing humidity
Power supply	Battery pack installed in FIREFLY Meter Integration Unit
Power consumption	0.6W typical



20201 Century Boulevard, Suite 250
Germantown, MD 20874 USA

www.ekasystems.com

Tel (301) 515-7118
Fax: (301) 515-4965