Commercial & Industrial Gas Meter IMU Interface Operational/Installation and Specification Manual

Innovatec AxisPath^{TM} Network

innovatec
Communications, LLC

Note

The device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. The device may not cause harmful interferences.

2. The device must accept any interferences received, including interferences that may cause undesired operation.

CAUTION

Changes or modifications not expressly approved by Innovatec Communications LLC
could void the user's authority to operate the equipment.

Contents_____

Preface_____

Organization of Manual

This manual is divided in the following manner:

- "C&I Gas Meter Interface Theory and Installation", provides information specific to the IMU end-point device.
- "Theory of Operation", containing a basic overview of the Innovatec AxisPath™ network and how the C&I Gas Meter Interface end-point device functions within the network.
- "Installation and Initialization", containing step-by-step IMU end-point device installation and initialization instructions.
- "Troubleshooting", containing IMU-specific system troubleshooting information.

Document Conventions

This document uses a number of conventions designed to help communicate specific information. These conventions include the following:

- Danger, Warning, and Caution:

DANGER!

Danger messages alert you to situations that **will** cause personal injury or death if you do not follow the instructions correctly.

WARNING!

Warnings alert you to situations that may potentially cause personal injury or death if you do not follow the directions correctly.

CAUTION

Cautions alert you to situations that may result in damage to the hardware or software if you do not follow the instructions correctly.

Chapter 1_____
Theory of Operation

C&I Gas Meter Interface Purpose

The C&I Gas Meter Interface is a programmable end-point device, designed to replace or supplement a customer's existing mechanical utility meter index. Using a magnetic pulse output adapter to interface to the meter output, it can be installed on a variety of meter brands.

The C&I Gas Meter Interface end-point device allows for accurate, near-real-time customer utility use information, which can be read from a remote location.

Functionality

The C&I Gas Meter Interface end-point device performs two basic functions:

- Gathering and recording customer utility use information directly at the metering point.

- Sending and receiving messages to and from the utility company computer system such as:

  - Utility use, status, alarm data, and similar information.
  - Data requests, configuration, and verification messages.

C&I Gas Meter Interface end-point devices communicate with the utility company computer system using a combination of Local Area Networks (LAN), AxisGate^{TM} nodes, and a Wide Area Network (WAN).

Components

C&I Gas Meter Interfaces are Innovatec end-point devices, containing two primary components: a digital processor and a radio transceiver.

The digital processor within the end-point device gathers and records utility use data at the metering point. Every time the meter drive rotates, pulses are recorded by the digital processor. The pulses are converted into utility use data, and this data is stored until readings are requested from the utility.

Each C&I Gas Meter Interface also contains a 900MHz two-way radio frequency (RF) transceiver. This radio provides communication between the end-point device, and an AxisGate^{TM} node. Depending upon the communication distance involved, and Innovatec relay might be used between the end-point device and the node, to extend RF communications. This RF connection between the end-point device and the node, possibly through a relay, is a Local Area Network (LAN).

AxisGate^{TM} nodes then communicate with the rest of the AxisPath^{TM} network using a Wide Area Network (WAN). This communication allows C&I Gas Meter Interfaces to transmit use data to the utility, or to receive requests or programming instructions from the utility, or from a technician or installer using a Field Service Unit attached to a laptop computer.

See Innovatec publication 98-00004 (System Summary) for a more detailed explanation of communications on the Local Area Network (LAN) and Wide Area Network (WAN).

Chapter 2_____
Technical Specifications

C&I Gas Meter Interface Features

- Full Two-way 900 MHz spread-spectrum communications between the IMU and the utility
- Direct sequence spread-spectrum communication improves security
- 17 channels allow frequency coordination in dense applications with minimal interference
- Software programmable configuration and control profiles
- 3.6-volt lithium-based long life battery pack
- Unique serial number and assignable PIN
- Autonomous tamper alarms
- Virtual Shut-off capabilities
- Run-away meter detection
- First/Final Reading
- Customer Selectable Billing Dates
- Data and Intelligence Stored in the Meter

Item	Specification
Physical dimensions	6.67"L X 4.76"W X 2.19"H
Weight	2.7 lbs.
Power supply	(3) 3.6 volt D-cell lithium-based battery pack
Output power	20 dBm
Sensitivity	>40 dBm SINAD
Channels	17 (spaced at 1.5 MHz)
Frequency range	903 to 927 MHz
Modulation	Direct Sequence Spread Spectrum
Base data rate	62.5 KB / second
Compliance	FCC Part 15, Class C
Interface	RF LAN
Antenna type	Internal
Enclosure	Lexan NEMA 4X Enclosure
Temperature range	-40° to +85°C

Chapter 3_____
Installation and Initialization

Introduction

This section includes a set of detailed procedures for installation, configuration, and testing.

CAUTION

Read and study the following safety information before you proceed with installation. In addition, cautions and warnings appear within procedures and throughout the test, where appropriate, to remind you of any related safety information.

Safety Information

- Observe the following safety guidelines. Careful planning of every job is essential. Nothing should be taken for granted. Do not take chances!
- Read and follow all approved policies and procedures provided by your employer associated with the procedures in this manual.
- Keep the work area clean and dry. Cluttered work areas cause accidents and injuries.
- Provide good lighting in the work area. You cannot work safely if you cannot see what you are doing.
- Report unsafe conditions or defective equipment to your immediate supervisor.
- Select the right tool for the job. Use tools properly. Keep tools in good working order.
- Handle materials carefully. Lift and carry properly.
- Keep unauthorized people out of the work area. Be especially cautious of children, who tend to be drawn to work activity.
- Innovatec Communications LLC assumes no liability for the customer's failure to follow these safety guidelines.

Equipment Needs

This section lists, and briefly describes, the various pieces of equipment required for C&I Gas Meter Interface end-point device installation, initialization, and testing processes.
- Laptop computer-Runs the FSA software, which stores and retrieves work order information, and configures and tests installed C&I Gas Meter Interfaces.
- Field Service Unit-900 MHz two-way radio frequency (RF) transceiver, allowing communication with an IMU for initialization.'

Before Installation

Field Service Unit Set-Up

The Field Service Unit is a 900 MHz two-way radio frequency (RF) transceiver, used for configuring and testing Innovatec devices.

After arriving at the customer site, activate and test the Field Service Unit as follows:

CAUTION

DO NOT turn the Field Service Unit *ON* if
the antenna is not installed. Damage to
the Field Service Unit will result.

1. Plug the Field Service Unit connection cord into the serial port of the laptop computer.

2. Plug a 9 VDC / 500 mA power supply into the Field Service Unit power socket.

CAUTION

Using anything other than a 9 VDC /
500 mA power source may damage the
Field Service Unit.

3. Turn on the Field Service Unit. An indicator light will shine if the Field Service Unit power supply is functioning correctly.

Installation Procedure

1. Remove index register from C&I gas meter. For American, Rockwell and Sprague meters, remove the index register and replace with the Pulsimatic pulse output register or the RioTronics index register with pulse output. For a Roots meter interface, attach the appropriately modified register head with pulse output to the meter before installing the pulse output pickup device.
2. Attach the Innovatec C&I Gas Meter Interface (p/n 1620-05001) to a surrounding fixture to the gas meter. Fixturing locations can include the meter piping, meter fixturing brackets or surrounding structures.
3. Attach the cable assembly from the Pulsimatic or RioTronics pulse output generator to the Innovatec C&I Gas Meter Interface (p/n 1620-05001). The cable assembly attaches with a 'push and twist' lock for the weather-resistant seal.

Start the Field Service Application
Note
See Innovatec publication 98-00001 (Field Service Application User's Guide) for a more detailed explanation of FSA operation.

1. Turn on the laptop computer.
2. Launch the FSA software. No error messages will display if the connection between the computer and the Field Service Unit is working.
3. Log in to the Field Service Application.

Install the Pulse Output Interface Device

For American/Sprague and Rockwell meters, interface with either the Pulsimatic pulse output adapter or the RioTronics adapter.

- Install the Pulsimatic unit in line with the index register and upon installation of the unit, replace the index register on top of the Pulsimatic.
- Install the RioTronics-enabled index register in place of the existing index register.

For Dresser Industries' Roots meters, please follow the instructions for installation of the RioTronics Interface module.

Install the Innovatec C&I Gas Meter Interface radio device to the surrounding structure which can include the meter piping, meter fixtures/supports or some adjacent structure to the meter.

Connect the meter pulse output device to the C&I Gas Meter Interface by using the weather-resistant cable assembly from the pulse output device.

Setup the Radio for Communication through the Gateway

Chapter 4_____
Troubleshooting

Table 3-1 Troubleshooting the C&I Gas Meter Interface

Problem	Possible Solution
C&I Gas Meter Interface fails to respond to the Field Service Application (FSA).	C&I GMI end-point device ID mis-match
	RF channel mis-match
	Replace C&I GMI end-point device

Table 3-2 Troubleshooting the Laptop Computer/Field Service Unit

Problem	Possible Solution
Laptop computer does not power up	Charge/replace battery
Laptop computer does not start up properly and/or the Field Service Application cannot be found.	Contact System Administrator
Field Service Unit does not power up	Check power source and power circuit connections.

Table 3-3 Troubleshooting the Field Service Application (FSA)

Problem	Possible Solution
Error message displays when Field Service Application (FSA) starts up.	Check field service unit connection.