PACSystems™ VersaMax

ETHERNET NETWORK INTERFACE UNIT (ENIU)

(IC200EBI001)

EMERSON

Warning Notes as Used in this Publication

Warning

Warning notices are used in this publication to emphasize that hazardous voltages, currents, temperatures, or other conditions that could cause personal injury exist in this equipment or may be associated with its use.

In situations where inattention could cause either personal injury or damage to equipment, a Warning notice is used.

Notes: Notes merely call attention to information that is especially significant to understanding and operating the equipment.

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Overview

The Ethernet Network Interface Unit (ENIU) is an Ethernet slave module that acts as a controller for a set of I/O modules. Power for module operation is provided by a power supply that installs directly on the ENIU.

Specifications

Specification	Description
Ethernet IP address	Any Valid IP Address Default is 192.168.0.10
Ethernet network data rate	10Base-T or 100Base-TX, auto-negotiated
I/O data	1024 bytes maximum. Up to 512 bytes of inputs or 512 bytes of outputs.
Fault data	128 bytes maximum
LEDs (7)	Power LED indicates presence of input power OK LED indicates health of the ENIU Faults LED indicates presence of faults LAN LED indicates health of Ethernet network Stat LED solid green indicates Modbus connection present or receipt of EGD exchanges; flashing Amber indicates invalid IP address or IP conflicts MAINT LED indicates an active Serial Console COMM LED indicates activity in USB (serial) port
Number of I/O modules	IC200EBI001-MH & later revisions support 64 I/O modules and 7 expansion racks.
Power Consumption	+5V at 600mA

Product Revisions

Catalogue Revision:	PM
Firmware version:	1.21
Firmware upgrades:	41G2290-MS10-000-A4

Preinstallation Check

Carefully inspect all shipping containers for damage. If any equipment is damaged, notify the delivery service immediately. Save the damaged shipping container for inspection by the delivery service. After unpacking the equipment, record all serial numbers. Save the shipping containers and packing material in case it is necessary to transport or ship any part of the system.

Upgrading Previous Firmware Versions

⚠ WARNING

- Firmware upgrade kits 41G2290-MS10-000-A0 and later are NOT compatible with hardware versions IC200EBI001-Lx and earlier. An attempt to upgrade the firmware will fail in the above scenario.

Compatibility

IC200EBI001-PM revision is functionally compatible with older revisions, except the firmware upgrade kits.

Product Revision History

Revision	Date	Description
IC200EBI001-PM	Nov 2020	A customer reported firmware issue has been fixed in this release. Refer section "*Problems Resolved in IC200EBI001-PM (Primary FW-1.21)*" for more details.
IC200EBI001-PL	Aug 2020	A customer reported firmware issue has been fixed in this release. Refer section "*Problems Resolved in IC200EBI001-PL (Primary FW-1.20)*" for more details.
IC200EBI001-PK	Nov 2019	Following Emerson's acquisition of this product, changes have been made to apply appropriate branding and registration of the product with required certification agencies. No changes to material, process, form, fit or functionality. Few customer reported firmware issues has been fixed in this release. Refer section "Problems Resolved in IC200EBI001-PK (Primary FW-1.10)" for more details.
IC200EBI001-NJ	July 2016	Firmware Release to fix issues with Modbus Functionality. Firmware version 1.02. Door of the IC200EBI001-NJ is provided with a notch for better grip.
IC200EBI001-MH	Jun 2016	Obsolescence Release. Firmware version 1.00.

Operating Notes

▪ The Ethernet NIU assigns references in the EGD datagrams according to the physical order of I/O modules in the backplane. The downloaded hardware configuration is not used to assign I/O to EGD datagrams. (If a hardware configuration containing I/O addresses in a different order than the physical module locations is downloaded to the ENIU, the references are assigned to EGD datagrams based on the physical module location and not the downloaded configuration.)

▪ The VersaMax power supply connected to the Ethernet NIU and any power supplies that reside in a booster carrier must share the same external power source.

▪ After a point fault occurs on an IC200MDL730A discrete input module, two clear fault table commands must be sent to the VersaMax ENIU to clear the fault table and turn the Fault LED off. This issue does not occur when using IC200MDL730B and later I/O module hardware.

▪ Using *Extended Distance* in a Multiple Remote Rack system may cause delays with some Analog Input modules located in an Expansion Rack.

Configuring the VersaMax Ethernet NIU Expansion Bus Speed (in the Settings tab of the Ethernet NIU hardware configuration) for *Extended Distance* (default) may cause updates to some Analog Input modules located in an expansion rack to be delayed. This delay affects the following modules: IC200ALG260, IC200ALG261, IC200ALG262, IC200ALG263, IC200ALG264, IC200ALG265, IC200ALG266, IC200ALG430, IC200ALG431, and IC200ALG432.

If the total expansion cable length in your system is 250 meters or less, it is recommended that you configure the Expansion Bus Speed to *Normal.*

▪ On rare occasions, the verify operation or the clear operation from the programmer will fail. The programmer may display the message "Online operation not supported on current target. Cannot continue current operation." A retry of the verify operation or the clear operation will resolve this issue. Occasionally, two retries may be needed to resolve the issue.

▪ The Ethernet NIU does not re-report unresolved Loss of Module faults after its fault table is cleared. (If the loss of module condition still exists after the ENIU's fault table is cleared, the fault is not re-reported.) For example: When an I/O module is hot-extracted from the backplane, a Loss of I/O Module fault is recorded in the ENIU's fault table. If the fault table is cleared, the Loss of I/O Module fault is not re-recorded even though the I/O module is still missing from the backplane.

- Starting from IC200EBI001-MH revision, on some of the ENIU's it is observed that COMM LED is glowing GREEN immediately after power-up, even without connecting the micro USB cable. This will not affect the USB operation.
- Starting from IC200EBI001-MH revision,
- Firmware upgrade of ENIU is done through Winloader update utility over the mini-USB port and not through FTP communication over an Ethernet port. Instructions on how to do a firmware update are included in the upgrade kit.
- Indirect Firmware upgrade of I/O modules is done over the mini-USB port and not through Expansion connector.

Note: Refer chapter 2 of Versamax ENIU user's manual (GFK-1860) for more details on "Firmware updates for ENIU & Firmware update for I/O modules" through mini-USB port

- The power consumption of IC200EBI001-MH and later revisions has changed from "+5V at 175mA; +3.3V at 425mA" to "+5V at 600mA". It is recommended to use supplement power supply based on requirement.
- IC200EBI001-MH and later revisions have higher processing capability as compared to its previous revisions and IC200CMM020. Hence, once status of 'Read' command from IC200CMM020 to IC200EBI001 appears as success in IC200EBI001 reference memory, a minimum of 30ms is needed for data to be available in the reference memory of IC200CMM020

New Features or Enhacements in IC200EBI001-PL (Primary FW-1.21)

Subject	Description
None	None

Problems Resolved in IC200EBI001-PM (Primary FW-1.21)

Subject	ID code	Description
ENIU enters 3-1 error blink state when the IP address is changed	SFDC: 01796467 Rally: DE6583	Changing the IP address sometime causes the ENIU to enter 3-1 error blink state. Power cycling recovers the ENIU from the error blink state and causes the ENIU to use the new IP address.

Problems Resolved in IC200EBI001-PL (Primary FW-1.20)

Subject	ID code	Description
ENIU delays by 30 seconds before outputs go to "Default" state upon loss of Modbus TCP/IP communication.	SFDC: 00093827 Rally: DE4934	Previously, when a Modbus TCP/IP communication loss occured, ENIU nodes waited until a TCP Socket timeout occurred to apply default values to its outputs, which could take up to 30 to 60 seconds after the loss of communication. The new Modbus/TCP Update Timeout Timer allows customers to specify a Modbus/TCP communications keepalive interval smaller than the gross TCP Socket connection timeout. The default timeout value is 2 seconds.

Problems Resolved in IC200EBI001-PK (Primary FW-1.10)

| Subject	ID code	Description
ENIU incorrectly reports "Default" input status on mixed modules	SFDC: 00476776 Rally: DE4427	When Output Field Power is lost on the mixed module MDD844, ENIU incorrectly reports the inputs status with "Default" values. However, the input LEDs shows the correct/actual input status.
The state of the FAULT LED on ENIU changes every time when "Clear All Faults" command issued	SFDC: 00778255 Rally: DE5833	For a "Clear All Faults" command, the Fault LED on ENIU goes from ON to OFF even though the fault condition continues to exist. Also for every "Clear All Faults" command the Fault LED toggles between ON and OFF i.e. If it is ON, after the command execution it goes to OFF. Similarly, if it is OFF after the command execution it goes to ON.
At random intervals ENIU drops outputs	SFDC: 00666959, 00675588, 00584521, 00638282 Rally: DE5198, DE5199, DE5320, DE5175	While communicating with Modbus TCP/IP client, at random intervals, ENIU incorrectly drops the outputs.

Problems Resolved in IC200EBI001-NJ (Primary FW-1.02)

▪ When ENIU is configured for Modbus TCP, a "Read Exception Status" request will fail. Because of this, the 8-bit status of Ethernet NIU which reflects "Fault present" status will not be successful.

▪ The Modbus TCP second connection cannot be set for Read only mode. Though user sets the second connection as Read-Only in programmer, it always operates in read/write mode.

▪ When a Modbus TCP communication is established between a Modbus master and ENIU, STAT LED glows solid GREEN. When ENIU communication with master is stopped or the master is disconnected from the ENIU, the STAT LED still remains solid GREEN instead of switching OFF.

Open Issues

▪ In Proficy Machine Edition (PME), the Power Consumption value of ENIU is still displayed as: +5V at 175mA; +3.3V at 425mA. It has to be +5V at 600mA;

Quick Start Guide

1. **Install the ENIU on the DIN Rail** by simply clicking it into place.
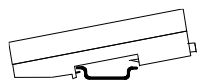
Note: The ENIU and connecting carriers must be installed on the same section of 35mm x 7.5mm DIN rail. The DIN rail must have a conductive (unpainted) finish for proper grounding.

The VersaMax ENIU has a separate shield ground connection to provide shielding for its port. Attach a wire with a stab-on connector to the grounding terminal on the bottom of the module.
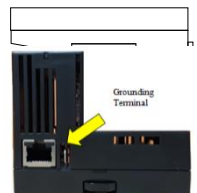

Connect a ring terminal on the other end of the wire to a grounded enclosure. Where the ring terminal contacts a painted enclosure panel, either install a star lock washer between the terminal and the panel to cut through the paint, or scrape the paint away down to clean, bare metal to ensure a good contact.

Note: *The star lock washer method is suitable for a shield ground, but not suitable for a safety ground.*

(Refer Chapter 2 of VersaMax ENIU user's manual (GFK-1860) for information about space requirements or module orientation, or if you are installing the ENIU in an area of excessive vibration).

2. **Install the Power Supply on the ENIU.**
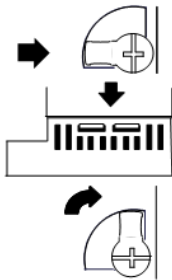
The latch on the power supply must be in the unlocked position.

Align the connectors and the latch post and press the power supply module down until the two tabs on the bottom of the power supply click into place.

Turn the latch to the locked position to secure the power supply to the top of the ENIU.

Complete the power supply wiring as described in the installation instructions provided with the Power Supply.

3. **Set the IP Address - using serial Console**

The IP Address of the ENIU (IC200EBI001-MH or later) can be set using a serial console. User may connect a PC using USB (Refer to "Installing the USB Port Driver" section in chapter 2 of VersaMax ENIU user's manual (GFK-1860), before using the serial console) using a standard micro USB cable.

Connectivity to the serial port is at following configuration

BAUD   19200

Data bits   8

PARITY   None

Stop bits   1
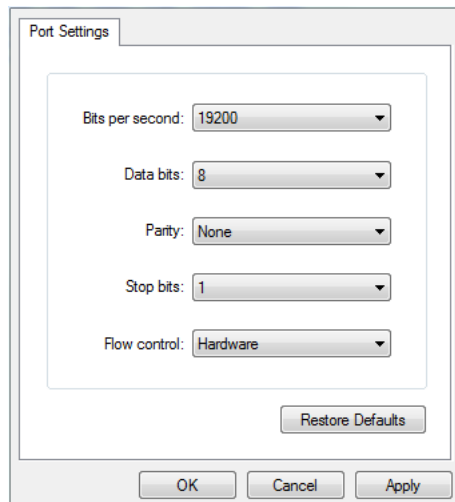
Steps to open the serial console and set the IP Address.

1. Open the serial console with parameters as above.
2. Press the pushbutton under the door. Once the console is connected, MAIN LED turns solid Green, this indicates ENIU is online with serial console.
3. Serial console displays information of the ENIU (Present IP parameters, MAC Address, Version information)
4. If user wants to change the IP address, user may follow the instructions on console to set the IP address. Once the IP address is set successfully the message is displayed on the console. User must do a power cycle or re-download the configuration for the IP changes to be effective.

(Refer section 2 in chapter 2 of VersaMax ENIU user's manual (GFK-1860) for more details on "Setting the Network IP Address" through serial console.)

4. **Connect the communications bus** to the connector on the front of the ENIU. (Refer to the heading **Bus Installation Guidelines** for detailed bus installation instructions.)

5. **Remove the connector cover on the right-hand side of the ENIU.** Do not discard this cover; you will need to install it on the last carrier. It protects the connector pins from damage and ESD during handling and use. Do not remove the connector cover on the left-hand side.

6. **Install additional modules.** Mount a module on its carrier and slide it to the left along the DIN-rail to fully engage the connector on the adjacent carrier or ENIU. Repeat for other modules, and install the connector cover (see Step 6) on the last carrier.
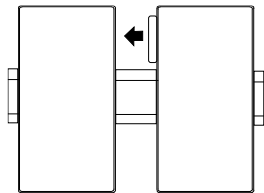
7. **Configuration.** A configuration can be stored by programming software, or the ENIU can be auto-configured. When power is applied to the ENIU for the very first time, the ENIU will auto-configure the modules physically present in the I/O station, starting at Slot 1. Auto-configuration stops at the first empty slot or faulted module. If the auto-configuration is unsuccessful or a new auto-configuration is required, it is necessary to first clear the existing configuration from the ENIU. This is done by powering down the ENIU, disconnecting the ENIU from the first I/O carrier, and powering up the ENIU.

    Note: If the I/O station includes any additional power supplies, those power supplies must be turned on either before the ENIU Power Supply or at the same time to assure accurate auto-configuration.

    To override a stored configuration and switch to auto-configuration mode, a clear command has to be issued and then power cycle the module after ˜40-60 seconds.

8. **Power up the ENIU.** The modules in the I/O station will automatically be configured, starting at slot 1 in each rack including expansion racks. If an empty slot or faulted module is encountered, autoconfiguration for that rack stops. Autoconfiguration then skips to the next rack and continues until all racks are configured.

    Note: If the I/O station includes any additional power supplies, those power supplies should be turned on at the same time.

9. **Observe the Module LEDs**. The LEDs indicate the presence of power and show the operating mode and status of the ENIU.
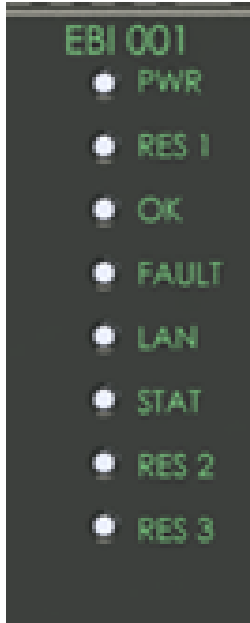
PWR Green indicates power is applied to the ENIU.

RES 1 Reserved

OK During the power up initialization, this LED will be blinking Green. In Auto-configuration mode, power up initialization might take more time (based on the setup) compared to a module powering up with a stored configuration.

Once the ENIU powers up successfully, OK LED remains solid Green indicating that the ENIU firmware is operational.

OK LED blinking Amber indicates a fatal error.

FAULT Amber indicates that ENIU has detected a fault with itself or an I/O module.

FAULT LED blinking Red indicates an invalid or corrupted MAC address.

LAN Green (solid or blinking) indicates network packets are being received or transmitted. Indicates received data addressed to ENIU as well as broadcast data.

STAT - Modbus Mode. Solid Green indicates a Modbus connection. Amber blinking at 1/sec rate indicates an IP address problem.

STAT - EGD Mode. Solid Green indicates exchanges are being received. Amber blinking at 1/sec rate indicates an IP address problem.

RES 2 Reserved

RES 3 Reserved

Installation in Hazardous Locations

- EQUIPMENT LABELED WITH REFERENCE TO CLASS I, GROUPS A, B, C & D, DIV. 2 HAZARDOUS LOCATIONS IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C, D OR NON-HAZARDOUS LOCATIONS ONLY

⚠ WARNING

- EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2;

- EXPLOSION HAZARD - WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES; AND

- EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.

General Module Installation Instructions

Modules must be mounted on a horizontal DIN rail.
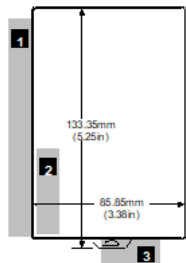
1. Allow sufficient finger clearance for opening ENIU door.
2. Allow adequate clearance for serial port cables.
3. Allow adequate space for power wiring.

The ENIU with power supply attached fits into a 70mm deep enclosure.

Rated thermal specifications are based on a clearance of 5.1cm (2in) above and below the equipment and 2.54cm (1in) to the left of the ENIU module.
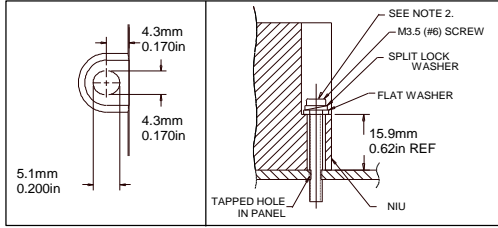
Panel-Mounting

For best stability, the DIN rail should be installed on a panel using screws spaced approximately 5.24cm (6in) apart.

If excessive vibration is a factor the ENIU should also be screwed down to the mounting panel.

Note 1.Tolerances are +/- 0.13mm (0.005in) non-cumulative.

Note 2.1.1-1.4Nm (10-12 in/lbs) of torque should be applied to M3.5 (#6-32) steel screw threaded into material containing internal threads and having a minimum thickness of 2.4mm (0.093in).

Removing the ENIU from the DIN Rail

1. Turn off power to the power supply.
2. (If the ENIU is attached to the panel with a screw) remove the power supply module. Remove the panel-mount screw.
3. Slide the ENIU away from the other modules until the connector on the right side disengages from the next carrier.

With a small flathead screwdriver, pull the DIN rail latch out while tilting the other end of the ENIU down to disengage it from the DIN rail

Bus Installation Guidelines

The proper cable for an Ethernet 10Base-T/100Base-TX network is a four twisted-pair, Category 5 Ethernet cable. The following table summarizes key characteristics of the Ethernet network and cable.

Network Topology	Point-to point Ethernet 10Base-T/100Base-TX connections with no termination. "Points" can be hubs or switches. If only 2 nodes are present, a crossover cable should be used to connect them.
Point-to point distance	Maximum of 100 meters.
Medium	Four twisted-pair unshielded cable. Shielding is permissible, but not required.
Transmission Speed	10 Mbit/s (10Base-T) or 100 Mbit/s (100Base-TX)
Connector	RJ-45
Cable Type	Category 5 ("Cat 5")
Termination	No termination required

Bus Connector

RJ-45 Connector Pin Assignment

Pin	Signal	I/O	Description
1	Tx+	O	+Transmit output
2	Tx-	O	- Transmit output
3	Rx+	I	+ Receive input
4	FGND	-	Frame Ground
5	FGND	-	Frame Ground
6	Rx-	I	- Receive Input
7	FGND	-	Frame Ground
8	FGND	-	Frame Ground

ENIU Connector Front View

Ethernet MAC Address

The Ethernet NIU's MAC (physical) address is on the label on the front of the module.

Technical Support & Contact Information:

Home link: http://www.Emerson.com/Industrial-Automation-Controls

Knowledge Base: https://www.emerson.com/Industrial-Automation-Controls/support

Note: If the product is purchased through an Authorized Channel Partner, please contact the seller directly for any support.

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