

# BIU-1200 Series

## NEMA TS2 Bus Interface Unit

### Operations Manual

This manual contains technical information for the  
**BIU-1200** series BUS Interface Unit  
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MANUFACTURED IN THE USA BY EBERLE DESIGN, INC. IN PHOENIX, ARIZONA.

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**MAINTENANCE NOTE**

**IT IS AN EBERLE DESIGN, INC. RECOMMENDATION THAT EACH UNIT BE TESTED  
AT LEAST ANNUALLY TO ENSURE COMPLIANCE WITH FACTORY  
SPECIFICATIONS AND MEETS PROPER OPERATIONAL STANDARDS. THE  
RESULTS OF THIS TESTING WILL BE DOCUMENTED.**



# BIU-1200 Series Operations Manual

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## **Section 1 General Description**

The NEMA TS-2 Bus Interface Unit (BIU) performs the interface between Port 1 at the Controller Unit (CU) and the Terminals and Facilities (TF), Loop Detector Rack(s), and other devices. Its functions include controlling load switch outputs, communicating with Inductive Loop Detectors and other devices, and the conditioning and conversion of TF and Loop Detector Call outputs for the CU.

The BIU-700 series Bus Interface Unit meets all requirements and performs all functions required by the NEMA TS2-2003 standard for the BIU configuration. The BIU-700 determines its operational mode based on the Address Select inputs. These inputs are pre-wired in the TF or Detector Rack such that there is no user programming required in installing the BIU-700.

### **1.1 CONFIGURATIONS**

The BIU-1240 model is provided as a BIU configuration (see TS2-2003, clause 8.3).

The BIU-1220 is a half-width version of the standard BIU-1240 model intended for use in racks where space is a premium.

### **1.2 FRONT PANEL INDICATORS**

#### **1.2.1 POWER INDICATOR**

The *POWER* indicator will illuminate when the DC power to the unit is greater than 18 VDC. The *POWER* indicator will extinguish when the DC power to the unit is less than 16 VDC.

#### **1.2.2 PORT1 INDICATOR**

The Port 1 *Rx* indicator is used to indicate SDLC Port 1 activity. The *Rx* indicator will illuminate for 40 milliseconds each time a valid command frame is correctly received from the CU.

#### **1.2.3 PORT1 TX INDICATOR**

The Port 1 *Tx* indicator is used to indicate SDLC Port 1 activity. The *Tx* indicator will illuminate for 40 milliseconds each time a valid response frame is transmitted by the BIU-700 to the CU.

## Section 2 IO Specifications

### 2.1 POWER REQUIREMENTS

The BIU-1200s require a nominal supply voltage of 24 VDC  $\pm$  2 VDC. A voltage of 16 VDC or less is considered loss of power and a voltage of 18 VDC or more is considered adequate for operation. On initial application of power, current draw is limited to a maximum of 1.25 amperes peak. Upon reaching steady state, the BIU-1200s require no more than 200 mA over the voltage range of 16 to 30 VDC. The BIU-1200s may be plugged in or unplugged while under power without the risk of damage.

### 2.2 INPUTS

#### 2.2.1 LOGIC INPUTS

The BIU-1200s provide 8 dedicated inputs and 24 configurable I/O lines. An input voltage less than 8 VDC is considered the Low (True) state, and a voltage greater than 16 VDC is considered the High (False) state. Over the range of 0 to 26 VDC the input current in or out does not exceed 10 mA. The Input impedance to 24 VDC is typically 10 K Ohms.

#### 2.2.2 OPTO-ISOLATED INPUTS

The BIU-1200s provide 4 dedicated optically isolated inputs. Each opto-input provides at least 10 M Ohms resistance and 1000 VAC RMS minimum breakdown to all connector pins except the opto common pin. These inputs exhibit a nominal impedance of 5 K Ohms. An input voltage of 3 Vrms or less is False and 8 Vrms or greater is True.

### 2.3 OUTPUTS

The BIU-1200s provide 15 dedicated outputs and 24 configurable I/O lines. The Low (True) state will drive an output voltage to less than 4 VDC while sinking up to 50 milliamperes. With an external impedance of 100 K Ohms or greater the output will transition from 4 to 16 VDC in less than 0.1 milliseconds. High (False) state impedance is typically 10 K Ohms to 24 VDC.

### 2.4 SDLC PORT 1

The Port 1 connector is a 15 pin metal shell “D” sub miniature type. The connector provides female contacts with 15 millionths of an inch minimum gold plating in the mating area. The connector intermates with a 15 pin D type connector, Amp Incorporated part number 205206-1, or equivalent, which is equipped with spring latches, Amp Incorporated part number 745012-1, or equivalent.

#### 2.4.1 PORT 1 CONNECTOR PIN ASSIGNMENTS

| Pin | Function     | Pin | Function     |
|-----|--------------|-----|--------------|
| 1   | Rx Data +    | 9   | Rx Data -    |
| 2   | Logic Ground | 10  | Not Used     |
| 3   | Rx Clock +   | 11  | Rx Clock -   |
| 4   | Logic Ground | 12  | Earth Ground |
| 5   | Tx Data +    | 13  | Tx Data -    |
| 6   | Logic Ground | 14  | Reserved     |
| 7   | Tx Clock +   | 15  | Tx Clock -   |
| 8   | Logic Ground |     |              |

NOTE: Tx pins at the BIU = Rx pins at the CU; Rx pins at the BIU = Tx pins at the CU.



## Section 3 General Specifications

### 3.1 ELECTRICAL

#### Power Requirements

|                                 |                  |
|---------------------------------|------------------|
| Operating Voltage.....          | 18 to 30 Vdc     |
| Power Consumption Maximum ..... | less than 200 mA |

#### Logic Inputs

|                         |                     |
|-------------------------|---------------------|
| Not Active (False)..... | greater than 16 Vdc |
| Active (True) .....     | less than 8 Vdc     |

#### Logic Outputs

|                                                         |                 |
|---------------------------------------------------------|-----------------|
| Output Voltage (True state, sink current = 50 mA) ..... | less than 4 Vdc |
| Maximum Output Voltage (False state) .....              | 30 Vdc          |

#### Opto Inputs

|                         |                     |
|-------------------------|---------------------|
| Not Active (False)..... | less than 3 Vrms    |
| Active (True) .....     | greater than 8 Vrms |
| Nominal Impedance.....  | 5 K ohms            |

### 3.2 MECHANICAL

#### 3.2.1 BIU-700

|                                                        |             |
|--------------------------------------------------------|-------------|
| Height.....                                            | 4.50 inches |
| Width.....                                             | 2.34 inches |
| Depth (front panel to rear edge of DIN connector)..... | 6.87 inches |

#### 3.2.2 BIU-700H

|                                                         |             |
|---------------------------------------------------------|-------------|
| Height.....                                             | 4.50 inches |
| Width.....                                              | 1.12 inches |
| Depth (front panel to rear edge of DIN connector) ..... | 6.87 inches |

### 3.3 ENVIRONMENTAL

|                                   |                   |
|-----------------------------------|-------------------|
| Operating Temperature Range ..... | -34 to +74 °C     |
| Storage Temperature Range .....   | -45 to +85 °C     |
| Humidity (non-condensing) .....   | 0 to 95% Relative |

## Section 4 Connector Specifications

The BIU-1200 card rack connector is a male 64 pin DIN 41612 Type B series connector. Pin #1 is at the top of the PCB.

| Pin | Row A Function    | Row B Function           |
|-----|-------------------|--------------------------|
| 1   | +24 VDC IN        | +24 VDC IN               |
| 2   | Output 1          | Output 2                 |
| 3   | Output 3          | Output 4                 |
| 4   | Output 5          | Output 6                 |
| 5   | Output 7          | Output 8                 |
| 6   | Output 9          | Output 10                |
| 7   | Output 11         | Output 12                |
| 8   | Output 13         | Output 14                |
| 9   | Output 15         | Input / Output 1         |
| 10  | Input / Output 2  | Input / Output 3         |
| 11  | Input / Output 4  | Input / Output 5         |
| 12  | Input / Output 6  | Input / Output 7         |
| 13  | Input / Output 8  | Input / Output 9         |
| 14  | Input / Output 10 | Input / Output 11        |
| 15  | Input / Output 12 | Input / Output 13        |
| 16  | Input / Output 14 | Input / Output 15        |
| 17  | Input / Output 16 | Input / Output 17        |
| 18  | Input / Output 18 | Input / Output 19        |
| 19  | Input / Output 20 | Input / Output 21        |
| 20  | Input / Output 22 | Input / Output 23        |
| 21  | Input / Output 24 | Input 1                  |
| 22  | Input 2           | Input 3                  |
| 23  | Input 4           | Input 5                  |
| 24  | Input 6           | Input 7                  |
| 25  | Input 8           | Opto Input 1             |
| 26  | Opto Input 2      | Opto Input 3             |
| 27  | Opto Input 4      | Opto Common              |
| 28  | Address Select 0  | Address Select 1         |
| 29  | Address Select 2  | Address Select 3         |
| 30  | Reserved          | Reserved                 |
| 31  | Earth Ground      | Line Frequency Reference |
| 32  | Logic Ground      | Logic Ground             |