AutoMate® 15

**I/O RAIL
M/N 45C1
INSTRUCTION MANUAL
J3018A**

I/O RAIL
M/N 45C1

INTRODUCTION

The I/O Rail accommodates eight (8) plug-in digital I/O modules, for a total of 16 I/O channels. The eight modules may be any combination of input or output modules. Each I/O Rail is made up of 3 major components.

> **Rail (Chassis)**
> **Terminal Strip**
> **I/O Motherboard**

DESCRIPTION

I/O Rail Chassis

The Rail chassis is an aluminum fixture which measures 9" high × 51/2" wide × 71/2" deep. The terminal strip and I/O Motherboard mount on the Rail chassis (Refer to Fig. 8). The Rail chassis also serves as a heat sink for the I/O modules. Each Rail chassis has an extruded screw slot in one of the fins. This screw slot can be used for attaching a wire channel or a lashing bar as needed by the User. The screw thread is a 10-32 and the depth is 3/8 of an inch. There are four (4) holes in the Rail flange for mounting. (Refer to Figure 12 for hole pattern). The rail must be mounted in a vertical orientation to provide proper heat dissipation.
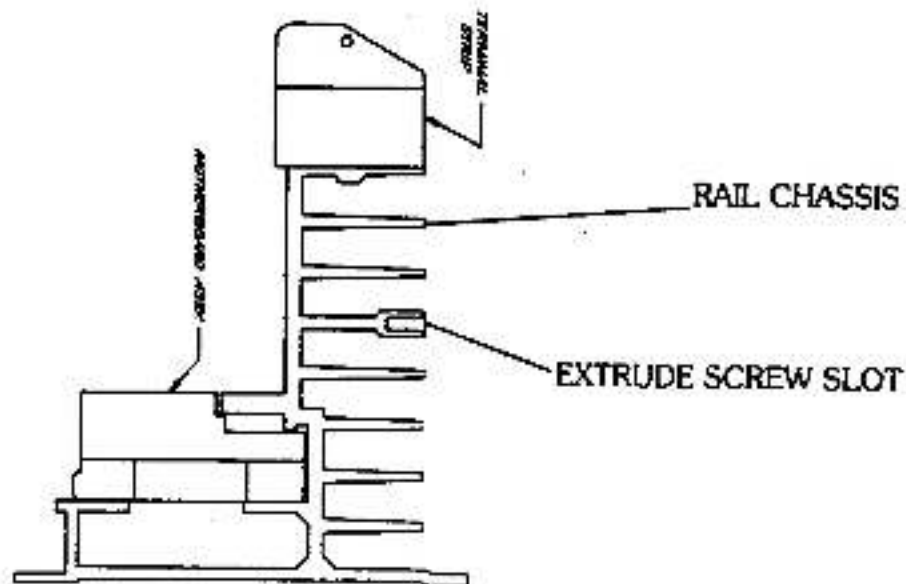

RAIL CHASSIS

EXTRUDE SCREW SLOT

Figure 8

I/O Rail Terminal Strip

The terminal strip provides three (3) functions.

- Termination of field wiring

- Mounting slots for plug-in I/O modules

- Place for User labeling

Field wiring connects directly to the Rail Terminal Strip. No other terminal strip is required. The terminals are arranged in two (2) tiers. (Refer to Figure 9). Each terminal is capable of accommodating two number 12 AWG wires. The smallest recommended wire size is a number 22 AWG. There are two (2) terminals per I/O channel. (A, B). Terminal "A" is the upper terminal and terminal "B" is the lower terminal. The type of I/O used will determine which terminal is common or power. Refer to write up on I/O modules.
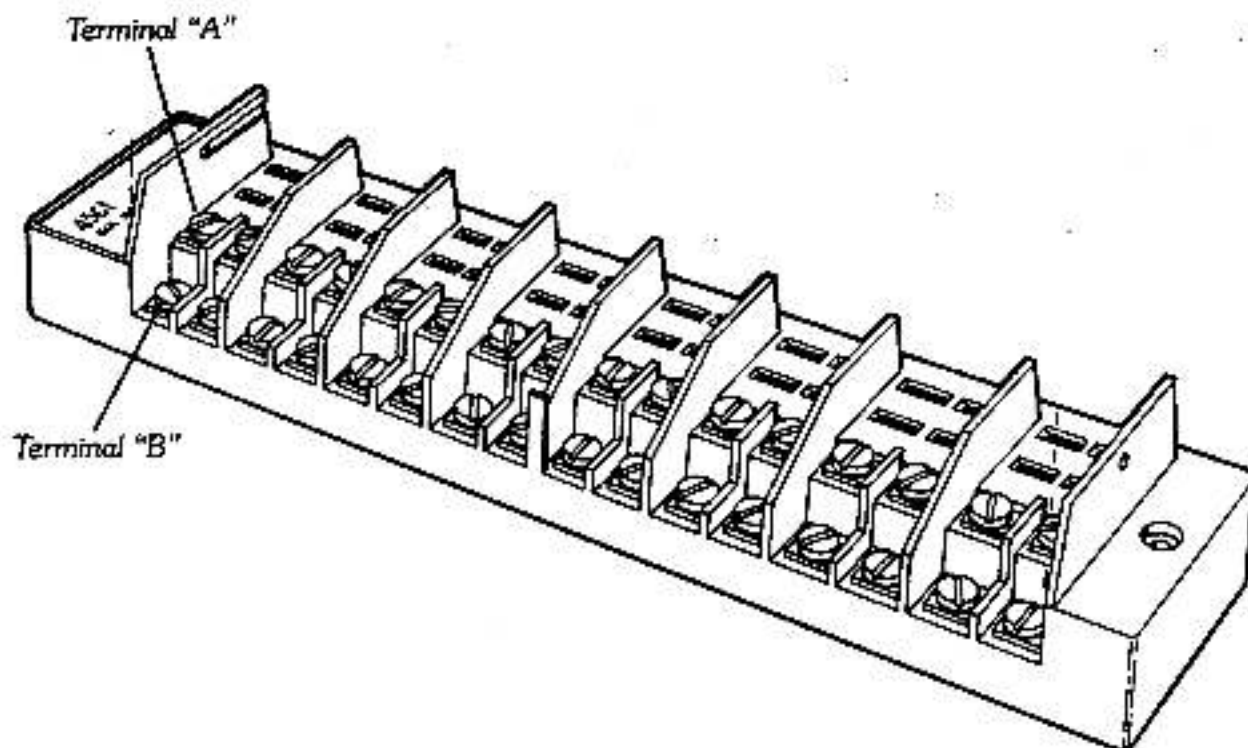

Figure 9

The I/O modules plug into the terminal strip, thereby making connection with field wiring. Any I/O module may be installed or replaced while power is applied, and without removing or disturbing the field wiring.

All indentification labeling is provided on the terminal strip. The cover plate over the terminals (shown in fig. 10A) is pre-labeled with the I/O address for each of sixteen (16) I/O points per Rail. Also a labeling area is provided to identify the wire number for each connected device. On the top front of each I/O terminal strip a label is provided for the user to identify the Rail number. The user writes in the Rail number 0, 1, 2, or 3 (as shown in Fig. 10B). A stick on label that identifies the type of I/O module is provided with each module. An area is provided for the user to affix the label on the right side of the terminal strip (shown on fig. 10C) next to each of the eight module positions. If an I/O module is removed, the label will be visible, and will identify the type module that needs to be replaced.
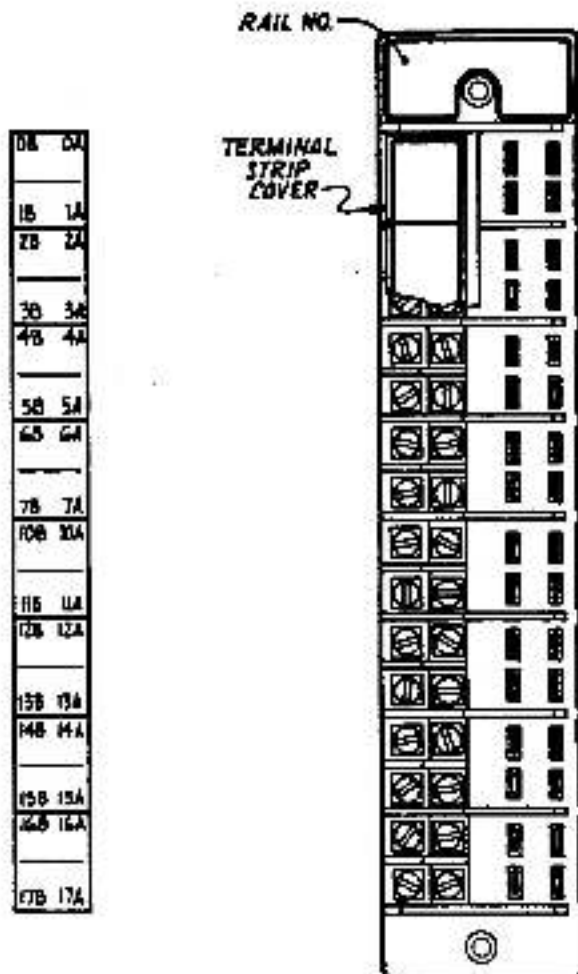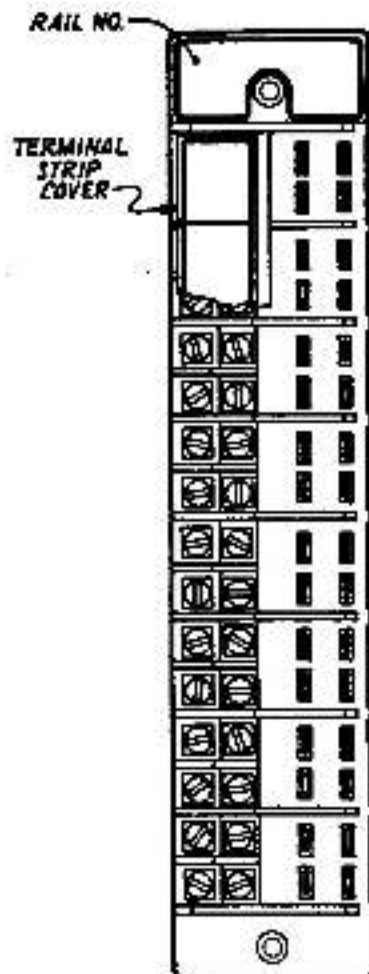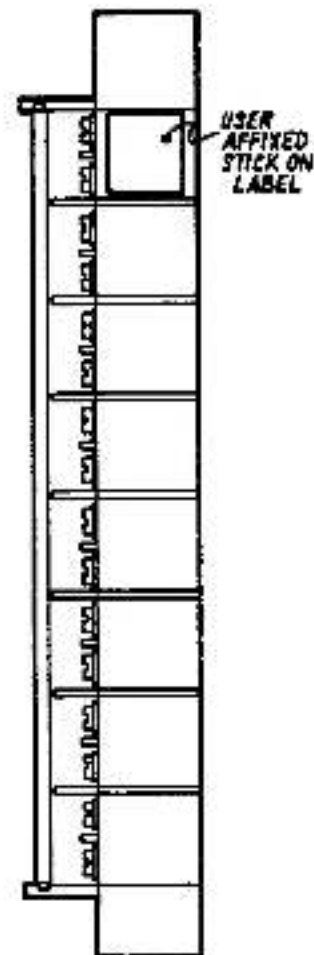

Figure 10A   Figure 10B   Figure 10C

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I/O Rail Motherboard

The I/O Rail Motherboard is enclosed in a plastic housing and provides interface between the Rail mounted digital I/O and the AutoMate processor. The Motherboard mounts on the back of the I/O Rail Heat sink and is held in place by two (2) screws. The Mother Board can be removed simply by removing the I/O modules and two screws. The I/O Rail Motherboard provides three (3) main functions.

1) Determines the type of I/O module, whether input or output, at any position in the I/O Rail

2) Decodes the I/O address of each I/O point in the Rail.

3) Communicates with the processor, sending and receiving the I/O status of the 16 points on that Rail.

All of these functions are accomplished by one proprietary integrated circuit.

The Rail connects to the head via a I/O Rail interconnect cable. This cable provides power to the I/O Rail, and the logic side of the I/O module, and provides communications to and from the processor. The maximum length of the interconnect cable is 42 inches.
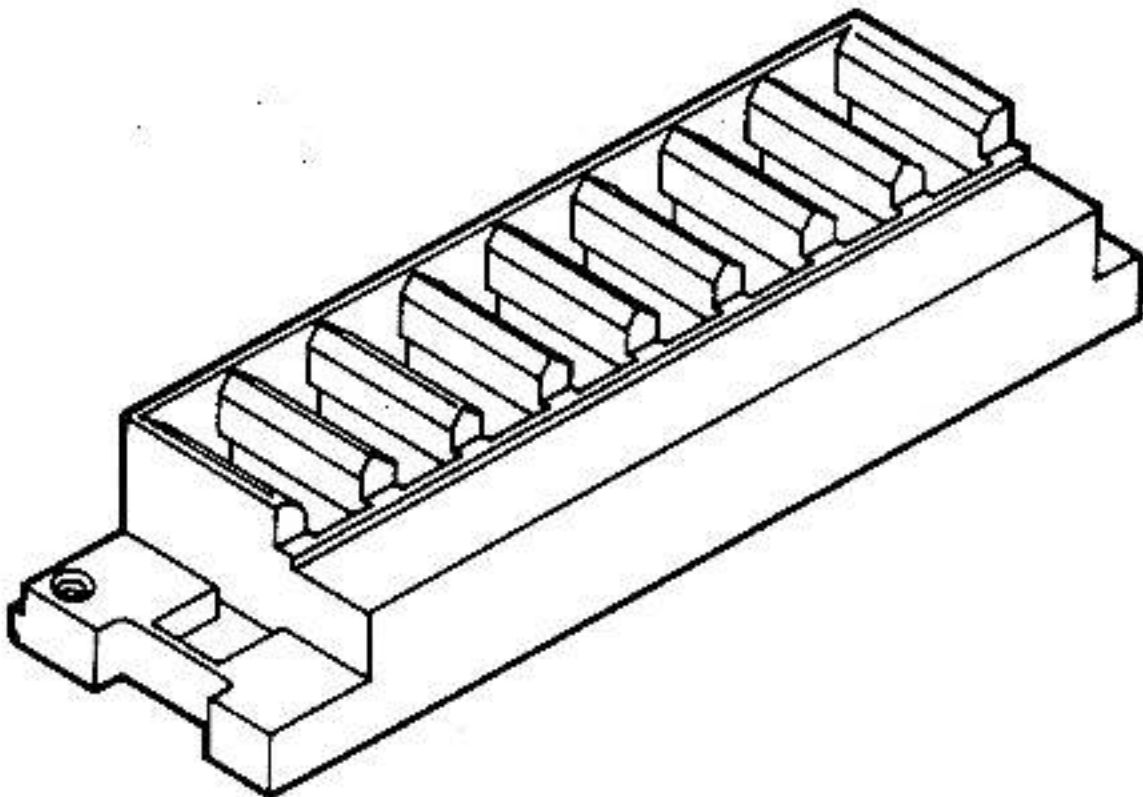

Figure 11

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Addendum to J3018

45C1A

I/O Rail

The serial communication protocol used for communicating with the
I/O Rails includes diagnostic routines that will detect noise or
hardware failures. If a problem is detected, it is reported back
to the program as a Rail Fault bit. It is also identified on the
Rail Fault indicator. The programmer can then utilize these bits
as necessary.

```
+-----------------------------------------------------------------+
|                           WARNING                               |
|DUE TO THE CRITICAL NATURE OF THE I/O RAIL, THE USER MUST UTILIZE |
|THE RAIL FAULT BITS IN THE PROGRAMMABLE FAULT CIRCUIT.   WHEN THE |
|ERROR IS DETECTED, THE SYSTEM READY WILL DROP OUT AND THE READY   |
|CONTACTS WILL OPEN.  THE USER SHOULD UTILIZE THESE READY CONTACTS |
|TO DISABLE POWER TO THE I/O RAIL MODULES.  WHEN THE PROGRAMMABLE  |
|FAULT CIRCUIT IS ENERGIZED, THE PROCESSOR WILL ALSO GO TO THE     |
|STOP MODE.  "FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN |
|BODILY INJURY."                                                  |
+-----------------------------------------------------------------+
```

This information is covered in each of the AutoMate Programming
Manuals but it is repeated here as a reminder.

The Rail Fault Bits for the various products are shown below
along with the various Programmable Fault Coils.

Note that Rail Fault bits are energized on an error and the
Programmable Fault Coil must be energized to reset the system.

Product	Programmable Fault Coil	Combined Rail Fault Bit	Individual Rail Fault Bits
A15	12.10	12.17	N/A
A20	76.05	76.01	2750
A30	76.05	76.01	3750-3751
A40	1776.05	1776.01	17600-17607
A40E	1776.05	1776.01	17600-17637

Shown below is an example program of how to activate the programmable
fault coil.

```
        YY                  ZZ      Where: YY.YY = Rail Fault Bit
 ----| |-----------( )             ZZ.ZZ = Programmable
       .YY                .ZZ                       Fault Coil
```

Mechanical Specifications:

        9.00″ high x 7.55″ deep x 5.50″ wide with modules
        9.00″ high x 6.75″ deep x 5.50″ wide without modules
        Weight: 3lbs 15 oz (without modules)

Mounting hardware: Number 10 screws or bolts

NOTE: These specifications are for a Rail assembly without the wire channel attached or I/O modules inserted.
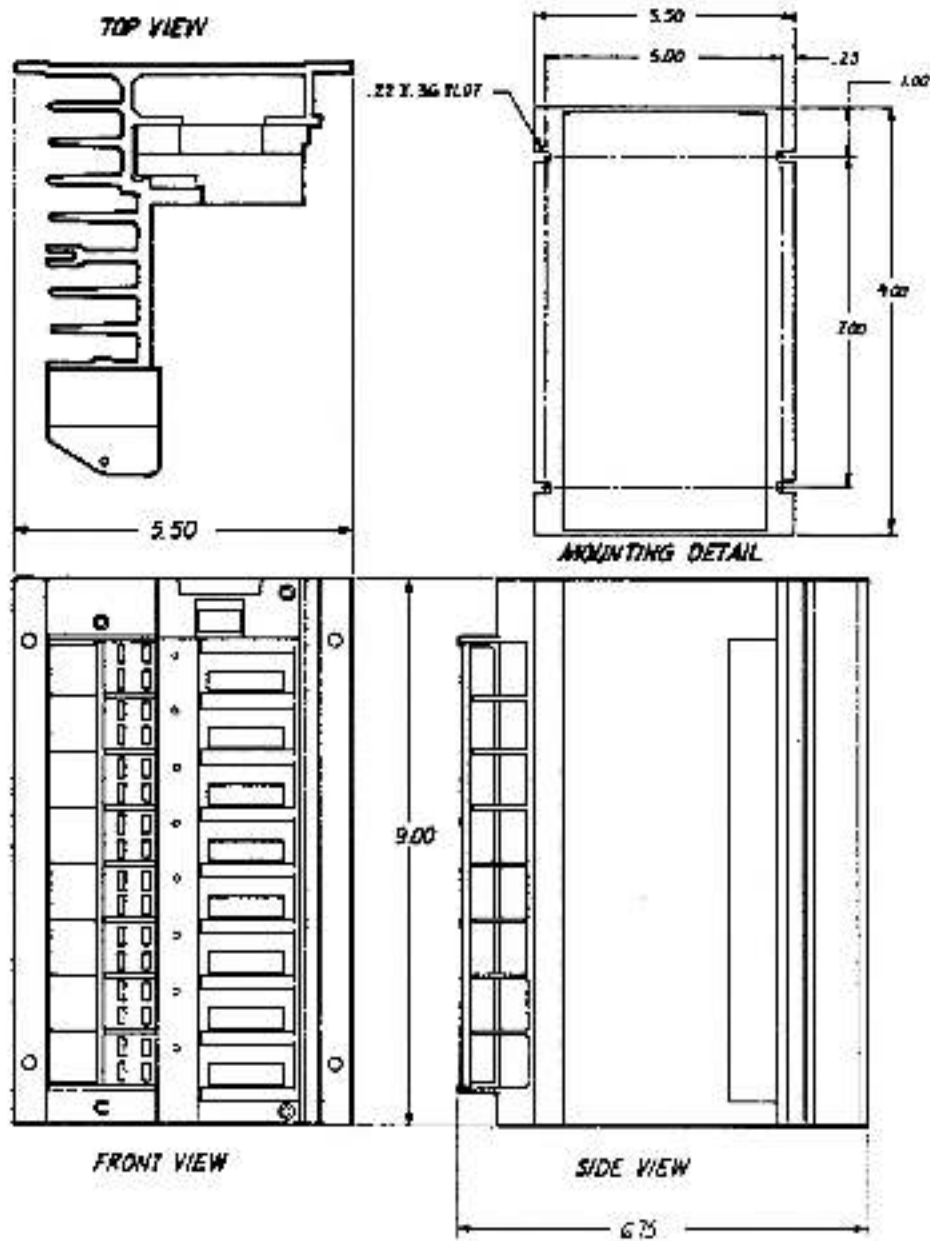

Figure 12

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For additional information

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