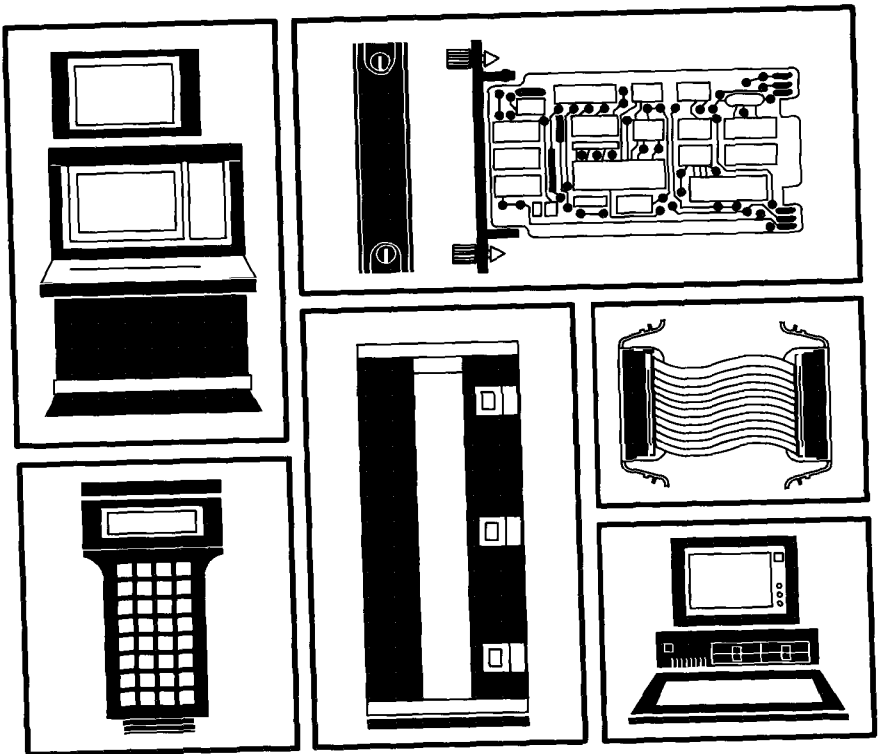


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**Instruction**

# Analog Input Termination Module (NIAI04)



**WARNING** notices as used in this manual apply to hazards or unsafe practices which could result in personal injury or death

**CAUTION** notices apply to hazards or unsafe practices which could result in property damage

**NOTES** highlight procedures and contain information on which assist the operator in understanding the information contained in this manual

## WARNING

### INSTRUCTION MANUALS

DO NOT INSTALL, MAINTAIN OR OPERATE THIS EQUIPMENT WITHOUT READING, UNDERSTANDING AND FOLLOWING THE PROPER **Bailey Controls** INSTRUCTIONS AND MANUALS. OTHERWISE, INJURY OR DAMAGE MAY RESULT.

### RADIO FREQUENCY INTERFERENCE

MOST ELECTRONIC EQUIPMENT IS INFLUENCED BY RADIO FREQUENCY INTERFERENCE (RF). CAUTION SHOULD BE EXERCISED WITH REGARD TO THE USE OF PORTABLE COMMUNICATIONS EQUIPMENT IN THE AREA AROUND SUCH EQUIPMENT. PRUDENT PRACTICES DICTATE THAT SIGNS SHOULD BE POSTED IN THE VICINITY OF THE EQUIPMENT CAUTIONING AGAINST THE USE OF PORTABLE COMMUNICATIONS EQUIPMENT.

### POSSIBLE PROCESS UPSETS

MAINTENANCE MUST BE PERFORMED ONLY BY QUALIFIED PERSONNEL AND ONLY AFTER SECURING EQUIPMENT CONTROLLED BY THIS PRODUCT. ADJUSTING OR REMOVING THIS PRODUCT WHILE IT'S IN THE SYSTEM MAY UPSET THE PROCESS BEING CONTROLLED. SOME PROCESS UPSETS MAY CAUSE INJURY OR DAMAGE.

## AVERTISSEMENT

### MANUELS D'OPERATION

NE PAS METTRE EN PLACE, REPARER OU FAIRE FONCTIONNER CE MATERIEL SANS AVOIR LU, COMPRIS ET SUIVI LES INSTRUCTIONS RELEMENTAIRES DE **Bailey Controls**. TOUTE NEGLIGENCE A CET EGARD POURRA ETRE UNE CAUSE D'ACCIDENT OU DE DEFAILLANCE DU MATERIEL.

### PERTURBATIONS DE LA FREQUENCE RADIOPHONIQUE

LA PLUPART DES EQUIPEMENTS ELECTRONIQUES SONT SENSIBLES AUX PERTURBATIONS DE LA FREQUENCE RADIO. DES PRECAUTIONS DEVRONT ETRE PRISES LORS DE L'UTILISATION DE MATERIEL DE COMMUNICATION PORTATIF. LA PRUDENCE EXIGE QUE LES PRECAUTIONS A PRENDRE DANS CE CAS SOIENT SUGGEREES AUX ENDROITS VOULUS DANS VOTRE USUINE.

### PERTES PROCEDE RENVERSEMENTS

L'ENTRETIEN DOIT ETRE ASSURE PAR UN PERSONNEL QUALIFIE ET EN CONSIDERATION DE L'ASPECT SECURITAIRE DES EQUIPEMENTS CONTROLES PAR CE PRODUIT, L'ADJUSTEMENT ET/OU L'EXTRACTION DE CE PRODUIT LORSQU'IL EST INSERE A UN SYSTEME ACTIF PEUT OCCASIONNER DES ACOUPS AU PROCEDE CONTROLE. SUR CERTAINS PROCEDES, CES ACOUPS PEUVENT EGALEMENT OCCASIONNER DES DOMMAGES OU BLESSURES.

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## Preface

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Termination Modules provide an input connection from the plant equipment to the INFI 90 process modules. The Analog Input Termination Module (NIAI04) interfaces the Analog Slave Module (IMASM01) or the Analog Slave Modules (IMASI02) and two-wire transmitters.

This manual explains how to install and use the NIAI04 on the INFI 90 system. It has sections that describe the setup and cabling. The appendices contain information about modules that use the NIAI04.

## List of Effective Pages

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Total number of pages in this manual is 19, consisting of the following

Page No.	Change Date
Preface	Original
List of Effective Pages	Original
iii through v	Original
1 1 through 1 5	Original
2 1 through 2 5	Original
A 1 through A 2	Original
B 1 through B 2	Original

When an update is received, insert the latest changed pages and dispose of the superseded pages

**NOTE:** On an update page the changed text or tables indicated by a vertical bar in the outer margin of the page adjacent to the changed area. A changed figure indicated by a vertical bar in the outer margin next to the figure caption. The date the update was prepared will appear beside the page number.



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## List of Figures

No	Title	Page
1 1	Application Example for NIAI04	1 2
2 1	NIAI04 Termination Module	2 2
2 2	NIAI04 Input Circuit	2 3
2 3	Terminal Assignments	2 4
2 4	Input Termination Example	2 4
2 5	Cable Connections	2 5
A 1	Dipswitch Settings for IMASIO2	A 2
A 2	Cable Connections	A 2
B 1	Dipswitch Settings for IMASM01	B 2
B 2	Cable Connections	B 2

---

## Safety Summary

**GENERAL  
WARNINGS**

**Equipment Environment**

All components, whether in transport or operation or storage must be in a noncorrosive environment

**Electrical Shock Hazard During Maintenance**

Disconnect power or take precautions to ensure that contact with energized parts is avoided when servicing

**SPECIFIC  
CAUTION**

We strongly recommend that you turn off cabinet power before doing any terminal or module wiring. Failure to do so could result in equipment damage. Do not apply power until you verify all wire connections (p 23)

## Sommaire de Sécurité

**AVERTISSEMENT  
D'ORDRE  
GENERAL**

**Environnement de l'équipement**

Ne pas soumettre les composants à une atmosphère corrosive lors du transport, de l'entreposage ou de l'utilisation

**Risques de chocs électriques lors de l'entretien**

S'assurer de débrancher l'alimentation ou de prendre les précautions nécessaires à éviter tout contact avec des composants sous tension lors de l'entretien

**ATTENTION  
D'ORDRE  
SPECIFIQUE**

Il est fortement recommandé de débrancher l'alimentation électrique du cabinet avant d'effectuer tout connexion aux cartes de raccordement des modules. Des dommages aux équipements pourraient survenir dans le cas contraire. Ne pas rebrancher l'alimentation avant que toutes les connexions aient été vérifiées (p 23)

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## SECTION 1 – INTRODUCTION

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### OVERVIEW

The Analog Input Termination Module (NIAI04) inputs 15 channels of analog signals. It connects Analog Slave Module (IMASI02) or Analog Slave Module (IMASM01) to field equipment and Bailey smart transmitters. The signals pass through slave modules to the Multi Function Processor (IMMFP01/02), Analog Master Module (IMAMM03) or Network 90 Multi Function Controllers and Analog Master Modules.

This manual explains the purpose, setup, handling precautions and steps to install the NIAI04 module.

---

### INTENDED USER

System engineers and technicians should read this manual before installing and using the Termination Module (TM). Put the module into operation only after reading and understanding this instruction. Refer to the **Table of Contents** to find the information you need. Refer to the **How To Use This Manual** entry in this section to help you get started.

---

### MODULE DESCRIPTION

The NIAI04 is a single printed circuit board that uses one slot in a Termination Mounting Unit (NTMU01/02). The TM has one card edge connector, P1. It carries the inputs to the slave module through a cable. The terminal blocks for field wiring are on the TM. See Figure 2-1.

The dipswitches on the NIAI04 module set the input type for the module. Refer to the appendix for the switch settings of the slave module you are using. Be sure to check the switch setting before putting the module into the TMU.

Figure 1-1 shows an application example for the NIAI04.

The NIAI04 handles up to 15 analog inputs for the ASI or 16 analog inputs for the ASM for the signal ranges listed. Each input may be differential or single ended.

- 4-20 mA DC system or externally powered
- 10 VDC to +10 VDC
- 0 VDC to 1 VDC
- 0 VDC to 5 VDC
- 0 VDC to 10 VDC
- 1 VDC to 5 VDC
- 0 VDC to 1 VDC (ASI only)

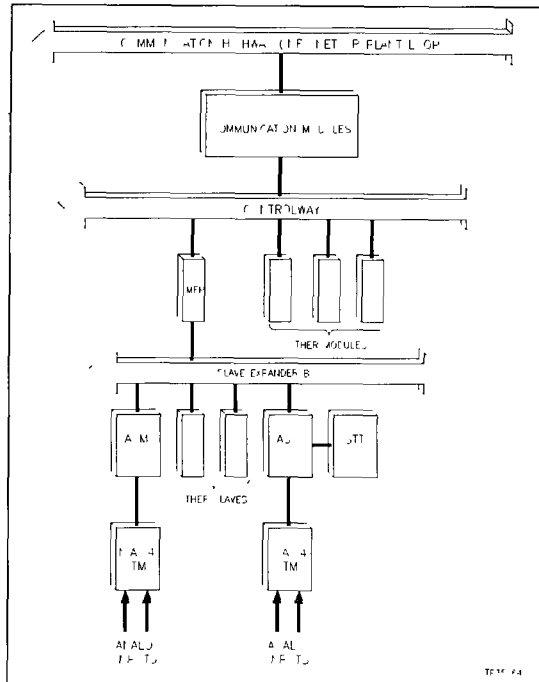


Figure 1-1 Application Example for NIAI04

## FEATURES

The design of the NIAI04, as with all INFI 90 devices, allows for flexibility in creating a process management system. Refer to the **Nomenclature** entry of this section for the list of devices that can be used with the TM in an INFI 90 system.

- A standard factory wired cable connects the TM to the slave module
- On board terminal blocks accept field and I/O wiring
- Analog inputs routed between field devices and I/O modules
- Connect I/O wires on terminals at the front edge of the TM
- Each TM fits in a standard Termination Mounting Unit
- Inputs may be either system or externally powered

**INSTRUCTION CONTENT**

- This manual has two sections
- Introduction** Is an overview of the TM features, description and specifications
  - Installation** Describes cautions to observe when handling the TM It shows you the steps to follow to install and connect the module before you apply power This section also presents switch and jumper settings
  - Appendices A and B** Contain data to connect the TM to the slave modules
    - Appendix A** shows the jumper settings, terminal wiring for the TM and the cabling needed for the Analog Slave Input Module (IMASI02)
    - Appendix B** shows the jumper settings, terminal wiring for the TM and the cabling needed for the Analog Slave Module (IMASM01)

**HOW TO USE THIS MANUAL**

- Read this manual before handling the TM Refer to the sections in this list as needed for more information
- 1 Read the **Installation** section before you connect the NIAI04
  - 2 Refer to **Appendix A and B** for the slave module you are connecting to the TM for more information

**REFERENCE DOCUMENTS**

Document Number	Document
I E96 318	Input Slave Module (IMASM01)
I E96 304	Analog Input Slave Module (IMASI02)
I E96 201	Multifunction Processor (IMMFP01)
I E96 202	Multifunction Processor (IMMFP02)
E92 501 2	Configuration and Tuning Terminal (CTT02)
I E21 28	Smart Transmitter Terminal (STT02)

**INTRODUCTION****GLOSSARY OF TERMS AND ABBREVIATIONS**

<b>Term</b>	<b>Definition</b>
<b>Analog</b>	A continuous time signal with an infinite number of values
<b>Dipshunt</b>	Dual in line package with shorting bars
<b>Dipswitch</b>	A dual in line package that contains single pole switches
<b>Smart Transmitter</b>	A field measuring device that can handle digital communication that allows configuring of operating parameters on line parameter changes and remote troubleshooting
<b>TM</b>	Termination Module Provides input/output connection between plant equipment and the INFRIGO process modules. The TM slides into a slot in the termination mounting unit

**NOMENCLATURE**

The following modules and equipment can be used with the termination module

<b>Nomenclature</b>	<b>Hardware</b>
IMASM01	Analog Input Slave Module
MAS 02	Analog Input Slave Module
MMFP01	Multi Function Processor
IMMFP02	Multi Function Processor
STT02	Smart Transmitter Termination
NKTM01	Cable Termination Module
NKTU02	Cable Termination Module
BC	Bailey Pressure Transmitters
EQ	Bailey Temperature Transmitters
pH	Bailey pH Transmitters

**SPECIFICATIONS**

<b>Wire Size</b>	
Minimum	22 gauge
Maximum	14 gauge
Maximum wire size when connecting three wires to a single terminal	one 16 gauge and two 18 gauge wires
<b>Mounting</b>	Sides into a single slot in the termination mounting unit NTMU01/02
<b>Environmental</b>	
Electromagnetic/Radio Frequency Interference	No values available at this time Keep cabinet doors closed. Do not use communication equipment closer than 2 meters from the cabinet
Ambient Temperature	0 to 70° C (0 to 158°F)
Relative Humidity	5% to 95% up to 55° C (131° F) (non condensing) 5% to 45% at 70° C (158° F) (non condensing)
Atmospheric Pressure	Sea level to 3 km (1 86 miles)
Air Quality	Noncorrosive
<b>Cooling Requirements</b>	No cooling is necessary when used in Bailey cabinets and operated within stated limits
<b>Certification</b>	CSA certified for use as process control equipment in an ordinary (nonhazardous) location

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE



## SECTION 2 - INSTALLATION

### INTRODUCTION

This section explains what to do before you put the Analog Termination Module (NIA104) (TM) into operation **DO NOT PROCEED** with operation until you read, understand and do the steps in the order that they appear

### UNPACKING AND INSPECTION

These are steps to follow for general handling

- 1 Examine the module to make sure that no damage has occurred in transit
- 2 Notify the nearest Bailey Sales/Service Office of any damage
- 3 File a claim for any damage with the shipping company that handled the shipment
- 4 Use the original packing material or container to store the module
- 5 Store the module in a place with clean air, free of extremes of temperature and humidity

### SETUP/INSTALLATION

Before applying power to the TM, make these checks

- 1 Check that the slave and master module address is set
- 2 Be sure the dipshunts in the MMU's slave expander bus are installed
- 3 Check that the dipswitches on the TM are set
- 4 Verify I/O cabling connections

### Termination Module Configuration

Set up the Termination Module (TM) to accept the analog field inputs sent to the slave module. Refer to **Appendix A** or **B** to find the setup for your application. Figure 2-1 shows the NIA104 Termination Unit

## INSTALLATION

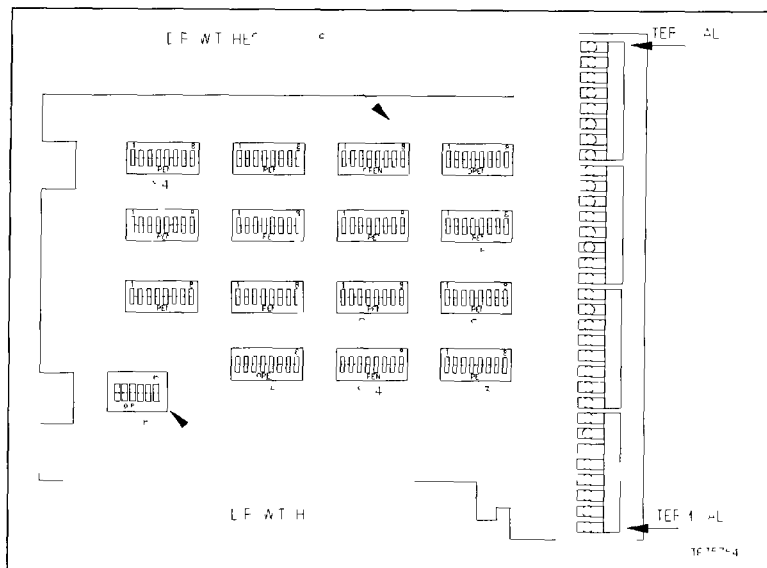


Figure 2 1 NIA104 Termination Module

### Physical Installation

**NOTE** This section provides data to install the TM only. For more save information refer to the instruction manual for the save module you are using.

The TM occupies one slot in a standard INFI 90 Termination Mounting Unit (NTMU01/02). To install:

- 1 Verify the slot placement of the module.
- 2 Connect the hooded end of the cable from the TM to the MMU backplane. To do this, insert the connector into the same backplane slot as assigned to the slave module. The latches should snap securely into place.
- 3 Plug the connector end into the P1 socket on the Termination Unit. The latches should snap securely into place.
- 4 Align the TM with the guide rails in the TMU. Carefully slide the module in until the front panel is flush with the top and bottom of the TMU frame.

**WIRING CONNECTIONS AND CABLING**

The NIAI04 has one card edge connector (P1) to supply power to the TM and provide analog inputs to the slave module

**Wiring**

<b>CAUTION</b>	<p>We strongly recommend that you turn off cabinet power before doing any termination module wiring. Failure to do so could result in equipment damage. Do not apply power until you verify all wire connections.</p>
<b>ATTENTION</b>	<p>Il est fortement recommande de debrancher l'alimentation électrique du cabinet avant d'effectuer tout connexion aux cartes de raccordement des modules. Des dommages aux équipements pourraient survenir dans le cas contraire. Ne pas rebrancher l'alimentation avant que toutes les connexions aient été vérifiées.</p>

Connect the wiring from the input devices sensing the process to the module terminals. Input devices may be BC series Bailey Pressure Transmitters, EQ series Bailey Temperature Transmitters, pH series Bailey pH Transmitters or any conventional transmitter. See Figure 2 2 for an example of an NIAI04 input circuit and Figure 2 3 for the terminal assignments. Figure 2 4 shows an input termination example.

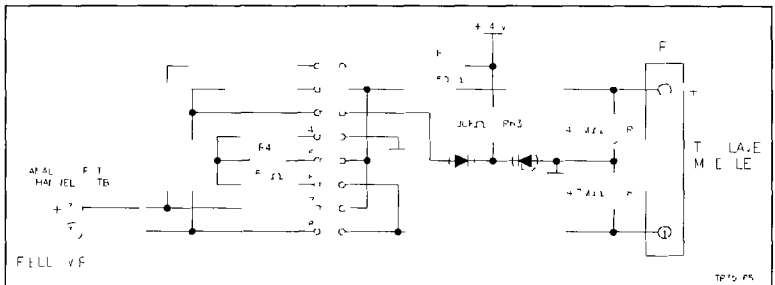
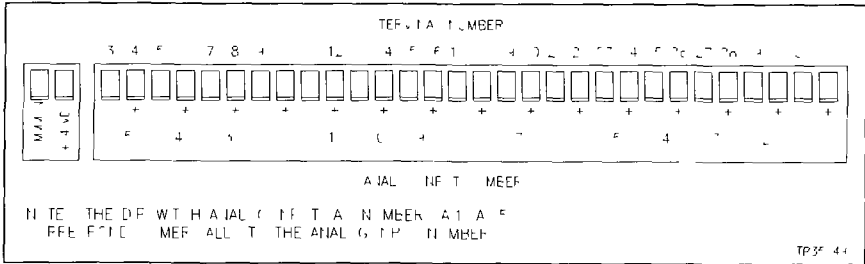
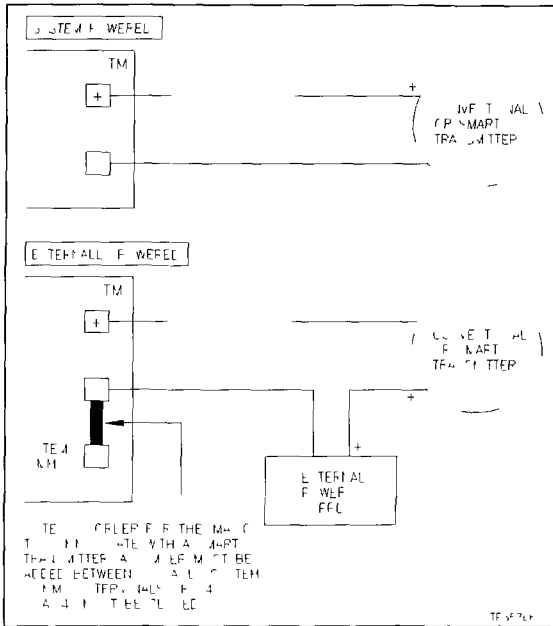


Figure 2 2 NIAI04 Input Circuit

**INSTALLATION**



*Figure 2 3 Terminal Assignments*



*Figure 2 4 Input Termination Example*

**Cable Connections**

Install the module connector cable (NKTU01 or NKTU02) to connect the TM to the slave. Either the NKTU01 or the NKTU02 cable can connect the TM to the slave module. The NKTU01 is a flat ribbon cable (100 foot maximum). Do not bundle the ribbon cable with AC wiring to reduce the chance of cross talk into the ribbon cable.

The NKTU02 is a round cable (200 foot maximum). The cable is not shielded, observe the same routing cautions as apply to the NKTU01. Figure 2-5 shows the connections for the TM cables.

**FUSING**

The NIAI04 does not have any on board fuses.

**PRE-OPERATING ADJUSTMENTS**

You do not have to adjust the NIAI04 before using.

**NOTE:** Check the dipswitches with the settings in the appendix before applying power.

**DIPSWITCH SETTINGS**

The dipswitches select the input type to match the device connected to the TU. Each channel is independent. Strap the dipswitch for voltage/current input, differential/single ended input, system/externally powered input. Set the dipswitches according to the instructions in the appendix for the slave and input type you are using.

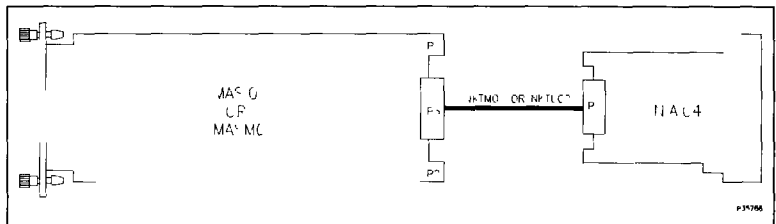


Figure 2-5 Cable Connections

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## APPENDIX A - (IMASI02) ANALOG SLAVE INPUT MODULE

### INTRODUCTION

The Analog Slave Input Module (IMASI02) uses an NIAI04 for termination. Dipswitches on the NIAI04 Termination Module (TM) configure the 15 analog inputs for the ASI. The ASI accepts inputs of 4-20 milliamps, 1-5 VDC, 0-1 VDC, 0-5 VDC, 0-10 VDC, 10 VDC to +10 VDC and Bailey Smart Transmitters.

### SETUP/INSTALLATION

Before applying power to the ASI, make these checks:

1. Check that the module address is set.
2. Be sure the dipshunts in the MMU's slave expander bus are installed.
3. Check that the dipswitch on Termination Module NIAI04 is set.
4. Verify I/O cabling connections.

### CONFIGURING INPUTS

Figure A-1 shows the TM dipswitch settings for the IMASI02. Be sure to recheck the dipswitches before you install the NIAI04. The switches may be changed during installation.

**NOTE.** In order for the ASI to communicate with a smart transmitter, a jumper must be added between the minus (-) and system common terminals S4 on the NIAI04. This jumper must be used.

### WIRING CONNECTIONS AND CABLING

With the ASI installed, connect either the NKTMO1 or NK TU02 termination cable from P1 on the TM to P3 on the ASI. Figure A-2 shows the termination module cabling for the IMASI02.

# ANALOG SLAVE INPUT MODULE (IMASI02)

APPLICATION/ SIGNAL TYPE	DIPSWITCH CONFIGURATION <sup>1</sup>	CONNECTING CABLE
UNTERE P. WEREC		I TM 1 OP I T C 2
UNTERE P. WEREC		
UNTERE LTA E		
DIFFERENTIAL LTA E		
ALTE DIFFERENTIAL LTA E P. WEREC LTA E LTA E LTA E LTA E		

TP 34745

<sup>1</sup> DIFFERENTIAL WITH TERMINAL REFERENCE SIGNALS WHERE REFERENCE IS LOCAL

Figure A 1 Dipswitch Settings for IMASI02

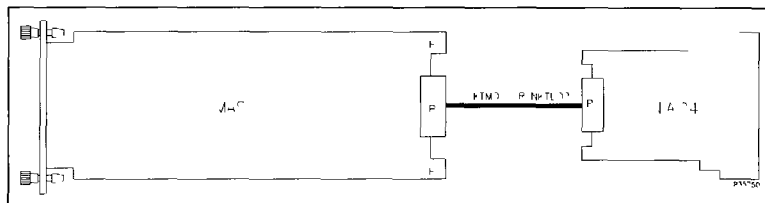


Figure A 2 Cable Connections

## APPENDIX B - (IMASM01) ANALOG SLAVE MODULE

### INTRODUCTION

The Analog Slave Module (IMASM01) uses an NIA104 for termination. Dipswitches on the NIA104 Termination Module configure the 16 analog inputs for the ASM. The ASM accepts inputs of 4 to 20 milliamps and 0 to 1 VDC, 1 to 5 VDC, 0 to 5 VDC, 0 to 10 VDC, -10 to +10 VDC.

### SETUP/INSTALLATION

Before applying power to the ASM, make these checks:

- 1 Check that the module address is set.
- 2 Be sure the dipshunts in the MMU's slave expander bus are installed.
- 3 Check that the dipswitch on Termination Module NIA104 is set.
- 4 Verify I/O cabling connections.

### CONFIGURING INPUTS

Figure B 1 shows the termination unit dipswitch settings for the ASM. Be sure to recheck the dipswitches before you install the NIA104. The switches may be changed during handling.

### WIRING CONNECTIONS AND CABLING

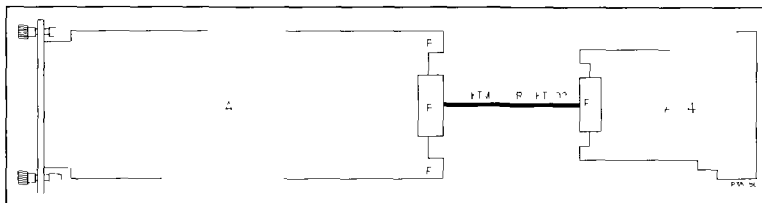
With the ASM installed, connect either the NKTU01 or NKTU02 termination cable from P1 on the TM to P3 on the ASM. Figure B 2 shows the termination module cabling for the ASM.

**ANALOG SLAVE MODULE (IMASM01)**

APPLICATION/ SIGNAL TYPE	DIPSWITCH CONFIGURATION <sup>1</sup>	CONNECTING CABLE
STANDARD FREQUENCY		TM CR IT
EXTENDED FREQUENCY		
UNLENCODED VOLTAGE		
CIPHERED VOLTAGE		
UNLENCODED DIFFERENTIAL VOLTAGE		

<sup>1</sup> - REFER TO THE FRONT PANEL WITH THESE DIPSWITCH SETTINGS

**Figure B 1 Dipswitch Settings for IMASM01**



**Figure B 2 Cable Connections**

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