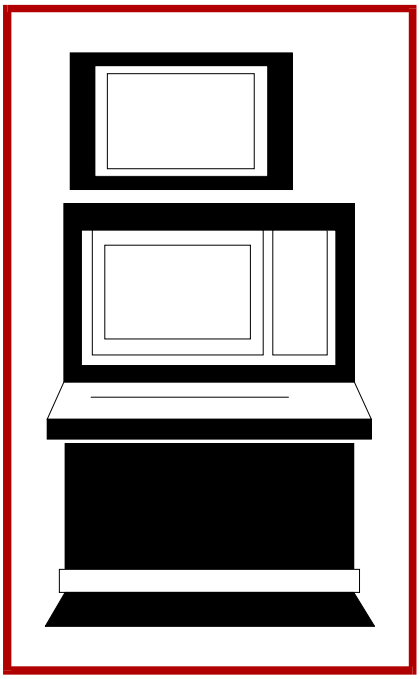
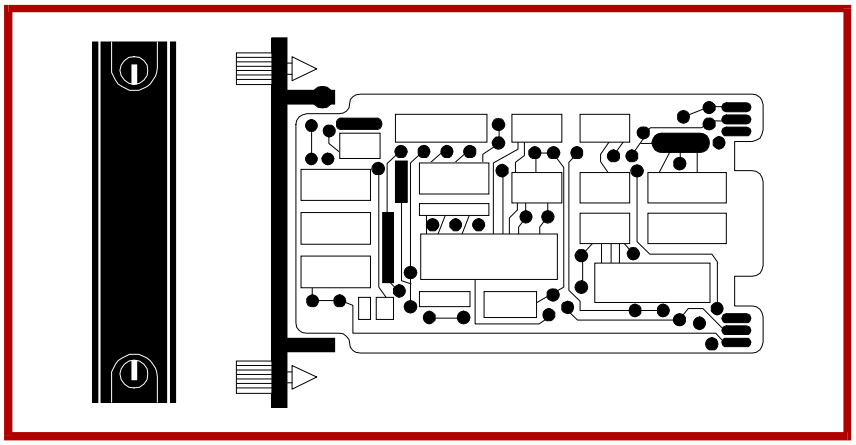
Bailey® infi 90®

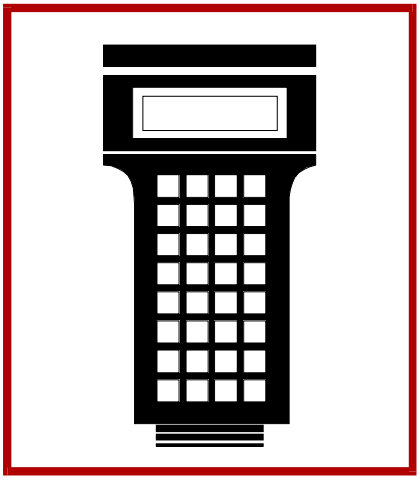
E96-421

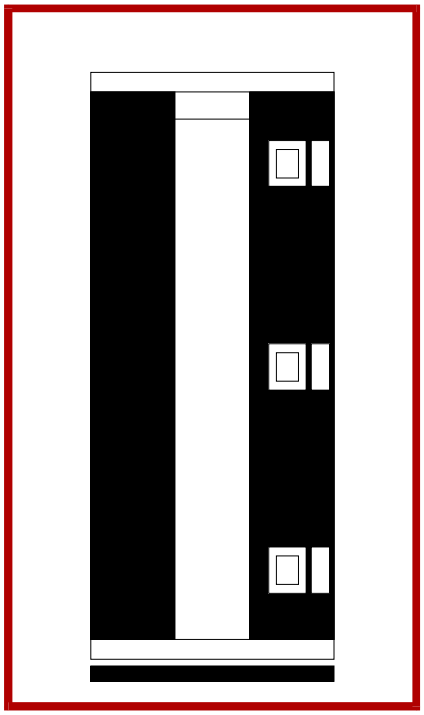
Instruction

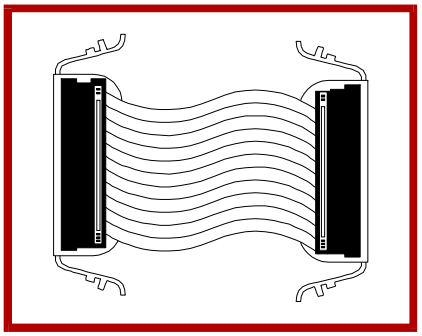
Analog Input Calibration Module
(NIAC04)

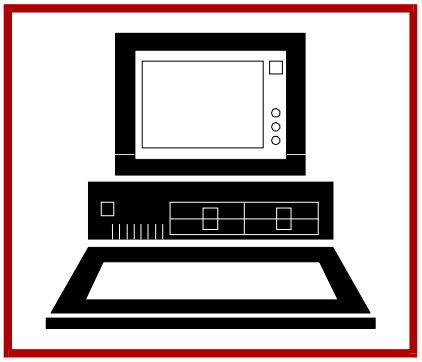












Bailey Process Control and Automation Solutions from Elsag Bailey Group

WARNING notices as used in this instruction apply to hazards or unsafe practices that could result in personal injury or death.

CAUTION notices apply to hazards or unsafe practices that could result in property damage.

NOTES highlight procedures and contain information that assists the operator in understanding the information contained in this instruction.

WARNING

INSTRUCTION MANUALS

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

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MOST ELECTRONIC EQUIPMENT IS INFLUENCED BY RADIO FREQUENCY INTERFERENCE (RFI). CAUTION SHOULD BE EXERCISED WITH REGARD TO THE USE OF PORTABLE COMMUNICATIONS EQUIPMENT IN THE AREA AROUND SUCH EQUIPMENT. PRUDENT PRACTICE DICTATES 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 IS IN THE SYSTEM MAY UPSET THE PROCESS BEING CONTROLLED. SOME PROCESS UPSETS MAY CAUSE INJURY OR DAMAGE.

AVERTISSEMENT

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LA PLUPART DES ÉQUIPEMENTS ÉLECTRONIQUES SONT SENSIBLES AUX PERTURBATIONS PAR FRÉQUENCE RADIO. DES PRÉCAUTIONS DEVRONT ÊTRE PRISES LORS DE L'UTILISATION DU MATÉRIEL DE COMMUNICATION PORTATIF. LA PRUDENCE EXIGE QUE LES PRÉCAUTIONS À PRENDRE DANS CE CAS SOIENT SIGNALÉES AUX ENDROITS VOULUS DANS VOTRE USINE.

PERTURBATIONS DU PROCÉDÉ

L'ENTRETIEN DOIT ÊTRE ASSURÉ PAR UNE PERSONNE QUALIFIÉE EN CONSIDÉRANT L'ASPECT SÉCURITAIRE DES ÉQUIPEMENTS CONTRÔLÉS PAR CE PRODUIT. L'AJUSTEMENT ET/OU L'EXTRACTION DE CE PRODUIT PEUT OCCASIONNER DES À-COUPS AU PROCÉDÉ CONTRÔLE LORSQU'IL EST INSÉRÉ DANS UNE SYSTÈME ACTIF. CES À-COUPS PEUVENT ÉGALEMENT OCCASIONNER DES BLESSURES OU DES DOMMAGES MATÉREILS.

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Preface

The NIAC04 Analog Input Calibration Module provides a means to calibrate 10 ohm RTD inputs for the IMASM04 Analog Slave Module.

This manual explains how to install and use the NIAC04 module on the INFI 90® Strategic Process Management System. It has sections that describe the setup and cabling. The appendix contains information about the IMASM04 module.

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List of Effective Pages

Total number of pages in this instruction is 20, consisting of the following:

Page No.	Change Date
Preface	Original
List of Effective Pages	Original
iii through vi	Original
1-1 through 1-5	Original
2-1 through 2-4	Original
3-1	Original
4-1	Original
5-1	Original
A-1	Original
Index-1	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 table is indicated by a vertical bar in the outer margin of the page adjacent to the changed area. A changed figure is 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.

Safety Summary

GENERAL WARNINGS	**Equipment Environment** All components, whether in transportation, operation or storage, must be in a noncorrosive environment. **Electrical Shock Hazard During Maintenance** Disconnect power or take precautions to insure that contact with energized parts is avoided when servicing.
SPECIFIC CAUTIONS	Remove modules from their module mounting unit slots before installing or removing a cable assigned to that slot. Failure to do so could result in damage to the module. (p. 2-5, 4-1)

Sommaire de Sécurité

AVERTISSEMENTS D'ORDRE GÉNÉRAL	**Environnement de l'équipement** Ne pas soumettre les composants à une atmosphère corrosive lors du transport, de l'entreposage ou l'utilisation. **Possibilité de chocs électriques durant l'entretien** Débrancher l'alimentation ou prendre les précautions pour éviter tout contact avec des composants sous tension durant l'entretien.
ATTENTIONS D'ORDRE SPÉCIFIQUE	Retirer le module de son emplacement dans le chassis de montage des modules avant d'installer ou de retirer un cable assigne a cet emplacement. Un manquement a cette procedure pourrait endommager le module. (p. 2-5, 4-1)

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SECTION 1 - INTRODUCTION

OVERVIEW

The NIAC04 Analog Input Calibration Module is required to calibrate the IMASM04 Analog Slave Module (10 ohm RTD). Calibration resistances are read from the NIAC04 module through the IMASM04 module. Calibration values are read across the slave expander bus and processed by the IMAMM03 master module.

This manual explains the purpose, set up, handling precautions and steps to install the NIAC04 module. Calibrate the slave according to the IMAMM03 product instruction. Refer to the ***Table of Contents*** to find the information. Refer to the ***HOW TO USE THIS MANUAL*** entry in this section to get started.

INTENDED USER

System engineers and technicians should read this manual before installing and using the termination module. Put the module into operation only after reading and understanding this instruction.

MODULE DESCRIPTION

The NIAC04 module is a single printed circuit board that uses one slot in a NTMU01 or NTMU02 Termination Mounting Unit. The module has one card edge connector (P1) that connects to a slave module mounted in a dedicated calibration slot, through a cable. Jumpers on the NIAC04 module select one input at one time to be calibrated for zero or span.

HARDWARE APPLICATION

The NIAC04 module has on-board precision resistors that are used to calibrate the zero and span of the slave inputs. The IMASM04 module must be physically moved to the dedicated calibration slot. The associated IMAMM03 module issues the calibration commands to the IMASM04. Figure 1-1 shows an application example for the NIAC04 module.

FEATURES

The design of the NIAC04 module, 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 calibration module in an INFI 90 system.

- A standard factory-wired cable connects the calibration module to the slave module.

- Each calibration module fits in a standard termination mounting unit.
- Resistance temperature detector (RTD) input calibration for the 10 ohm RTD inputs on the IMASM04 module.
- Individual channel precision calibration resistors.
- Jumpers select correct resistance for zero or span calibration for each channel.

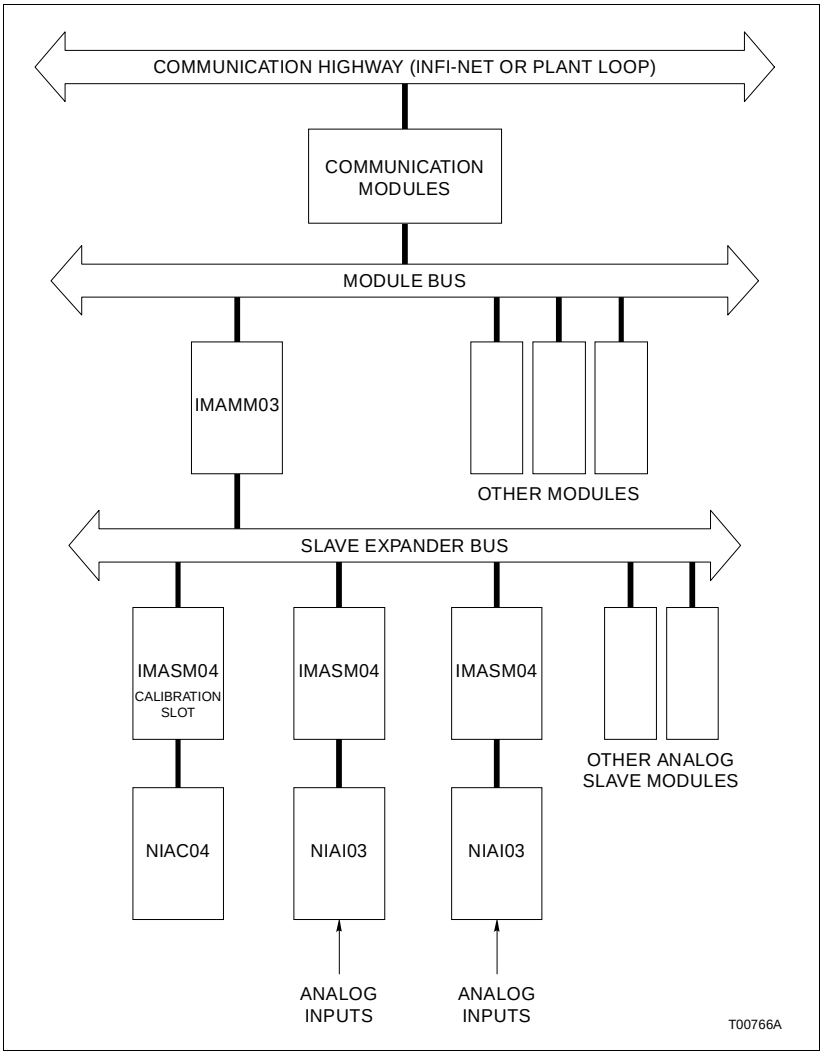

Figure 1-1. Application Example for the NIAC04 Module

INSTRUCTION CONTENT

This manual has five sections and an appendix.

Introduction — Is an overview of the features, description and specifications and a description of the NIAC04 module.

Installation — Describes cautions to observe when handling the calibration module. It shows the steps required to install the module and connect cables.

Maintenance — Provides a maintenance schedule.

Repair/Replacement Procedures — Details how to replace an NIAC04 module.

Support Services — Describes the support services (repair parts, training, documentation, etc.) available from Bailey Controls Company.

Appendix A — Provides a quick reference of dipswitch settings for the IMASM04 Analog Slave Module.

HOW TO USE THIS MANUAL

Read this manual before handling the calibration module. Refer to the sections in this list as needed for more information.

1. Read the Section 2 before connecting the NIAC04 module.
2. Refer to Appendix A for the IMASM04 slave module.
3. Refer to the Section 3 for the maintenance schedule.
4. Refer to the Section 4 and Section 5 when needed.

GLOSSARY OF TERMS AND ABBREVIATIONS

Table 1-1 contains the glossary of terms for this manual.

REFERENCE DOCUMENTS

Table 1-2 contains the reference documents for the NIAC04 module.

NOMENCLATURE

Table 1-3 contains the modules and equipment that can be used with the NIAC04 module.

Table 1-1. Glossary of Terms and Abbreviations

Term	Definition
Analog	Continuously variable as opposed to discretely variable.
RTD	Resistance Temperature Detector. A sensing device that changes resistance within a temperature range.
Slave Module	One of a series of modules designed to perform high or low level operations as directed by a master module.
TMU	Termination Mounting Unit. A card cage that provides housing for INFI 90/Network 90® termination modules.

Table 1-2. Reference Documents

Number	Description
I-E96-205	Analog Master Module and Analog Slave Modules (IMAMM03 and IMASM01/02/03/04)

Table 1-3. Nomenclature

Nomenclature	Description
IMASM04	Analog slave module
NKTM01	Cable, termination module (ribbon)
NKTU02	Cable, termination module (PVC)
NKTU12	Cable, termination module (nonPVC)
NTMU01	Termination mounting unit (rear mount)
NTMU02	Termination mounting unit (front mount)
258436_1	Cable retaining kit used when a round cable connects to the termination mounting unit backplane.

SPECIFICATIONS

Table 1-4 contains the specifications for the NIAC04 module.

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Table 1-4. Specifications

Property	Characteristic/Value
Power Requirements	No power is required by the NIAC04 module.
Mounting	Slides into a single slot in the NTMU01 Termination Mounting Unit or NTMU02 Termination Mounting Unit.
Environmental	
Electromagnetic/ Radio Frequency Interference	No values available at this time. Keep cabinet doors closed. Do not use communication equipment closer than two meters from the cabinet.
Ambient Temperature	0 to 70°C (32 to 158°F)
Relative Humidity	5% to 90% ± 5% up to 55°C (131°F) (noncondensing) 5% to 40% ± 5% up to 70°C (158°F) (noncondensing)
Atmospheric Pressure	Sea level to 3 km (1.86 mi)
Air Quality	Noncorrosive
Cooling Requirements	No cooling is necessary when used in Bailey Controls cabinets and operated within stated limits.
Certification	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 how to install the NIAC04 Analog Input Calibration Module. Read, understand, and complete the steps in the order they appear before using the NIAC04 module.

SPECIAL HANDLING

Observe these steps when handling electronic circuitry:

> **NOTE:** Always use the Bailey Controls Field Static Kit (part number 1948385A1 - consisting of two wrist straps, ground cord assembly, alligator clip, and static dissipating work surface) when working with modules. The kit is designed to connect the technician and the static dissipating work surface to the same ground point to prevent damage to the modules by electrostatic discharge.
>
> Use the static grounding wrist strap when installing and removing modules. Static discharge may damage MOS devices on modules in the cabinet. Use grounded equipment and static safe practices when working with modules.

1. ***Use Static Shielding Bag***. Keep the modules in static shielding bag until you are ready to install them in the system. Save the bag for future use.

2. ***Ground Bags Before Opening***. Before opening a bag containing an assembly with CMOS devices, touch it to the equipment housing or ground to equalize charges.

3. ***Avoid Touching Circuitry***. Handle assemblies by the edges; avoid touching the circuitry.

4. ***Avoid Partial Connection of CMOS Device***. Verify that all devices connected to the modules are properly grounded before using them.

5. ***Ground Test Equipment***.

6. ***Use an Anti-Static Field Service Vacuum***. Remove dust from the module if necessary.

7. ***Use a Grounded Wrist Strap***. Connect the wrist strap to the appropriate grounding plug on the power entry panel. The grounding plug on the power entry panel is connected to the cabinet chassis ground.

8. ***Do Not Use Lead Pencils to Set Dipswitches***. To avoid contamination of switch contacts that can result in circuit board malfunction, do not use a lead pencil to set a dipswitch.

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 Controls sales 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.

SET UP/PHYSICAL INSTALLATION

This section explains how to configure and install the NIAC04 module. The required procedures are installing the module into the TMU card rack and connecting the cable.

Jumper Settings

There are eight jumpers on the NIAC04 module, one for each input. Each jumper selects zero or span for its respective input. The IMAMM03 master module issues the calibration commands to the IMASM04 slave module being calibrated. To calibrate the zero, place the jumper over the lower and middle pins on the input being calibrated. To calibrate the span, place the jumper over the upper and middle pins on the input being calibrated. Zero and span must be calibrated separately for each input. Refer to the IMAMM03 module product instruction for calibration instructions. Figure 2-1 shows the calibration jumper locations on the NIAC04 circuit board.

Cable Installation

The NKTU02, NKTU12, or NKTM01 cable connects the NIAC04 module to the IMASM04 module. Locate the slave calibration slot as close as possible to the master module. The NKTM01 cable is a flat ribbon cable. The NKTU02 cable is a round, shielded cable with PVC jacket. The NKTU12 module is a round, shielded cable with nonPVC jacket.

Figure 2-2 shows the cabling from the NIAC04 module to the IMASM04 module. Table 2-1 lists the NIAC04 module cable connections.

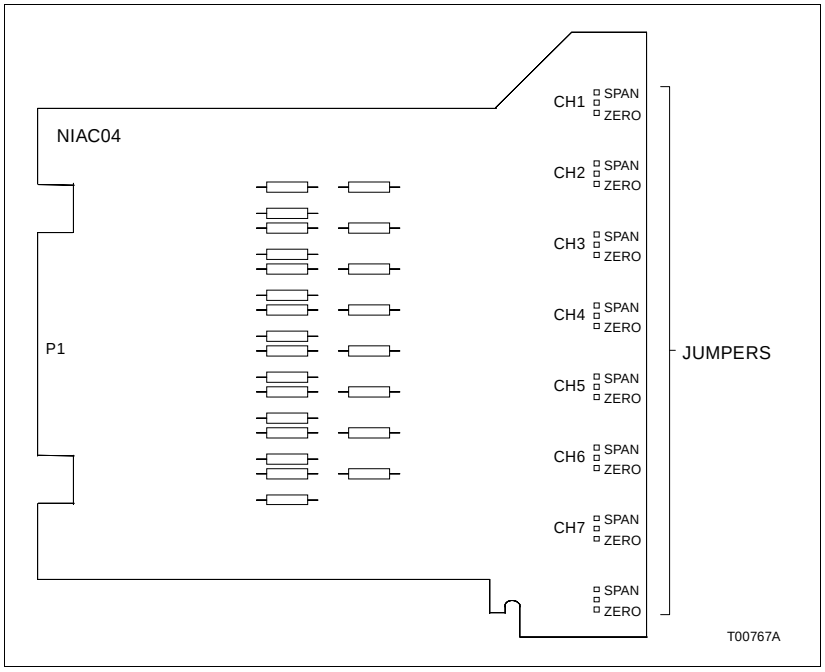

Figure 2-1. NIAC04 Module Jumper Locations

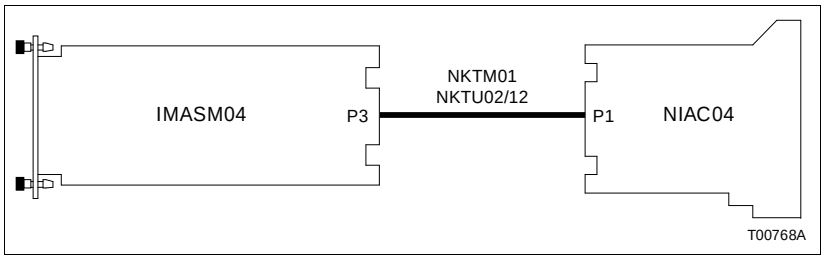

Figure 2-2. Cable Connections for the NIAC04 Module

Table 2-1. NIAC04 Module Cable Applications

Nomenclature/ Description	Application	Connector	Maximum Length
NKTU02 (PVC Jacket)	Connects NIAC04 to IMASM04	P1 on NIAC04 to calibration slot on MMU backplane.	61 m (200 ft)
NKTU12 (nonPVC Jacket)	Connects NIAC04 to IMASM04	P1 on NIAC04 to calibration slot on MMU backplane.	61 m (200 ft)
NKTM01 (ribbon)	Connects NIAC04 to IMASM04	P1 on NIAC04 to calibration slot on MMU backplane.	30 m (100 ft)

CAUTION	**Remove modules from their module mounting unit slots before installing or removing a cable assigned to that slot. Failure to do so could result in damage to the module.**
ATTENTION	**Retirer le module de son emplacement dans le chassis de montage des modules avant d'installer ou de retirer un cable assigne a cet emplacement. Un manquement a cette procedure pourrait endommager le module.**

To install the cable to an IMASM04 slave module, follow these steps.

1. If round type cables are already installed in the TMU card rack, remove the cable retaining bracket (Bailey Controls part number 258436_1). Use NKTU02, NKTU12 or NKTM01 cables.

2. Insert the J2 end of the cable into the termination module mounting unit backplane slot assigned to calibrate slave modules. The cable should latch securely in place. Card edge connector P3 of the slave module to be calibrated will connect to this end of the cable.

> **NOTE:** Locate the slave calibration slot as close as possible to the master module.

3. If NKTU02 or NKTU12 cables are used, connect the shield wire extending from the J2 end of the cable to the shield bar.

4. Insert the J1 end of the cable into the TMU backplane slot assigned to the NIAC04 module. The cable should latch securely in place. Card edge connector P1 of the NIAC04 module connects to this end of the cable.

5. Replace or add the cable retaining bracket if round type cables are installed in the TMU card rack.

Module Installation

The NIAC04 module inserts into a standard INFI 90 system termination mounting unit (TMU) and occupies one slot. To install:

1. Verify slot assignment of the NIAC04 module.

2. Align the NIAC04 module with the guide rails in the TMU card rack and insert the module.

The NIAC04 module is ready for operation if:

1. Jumpers for each channel are set for zero or span.

2. The circuit board is mounted in the termination mounting unit.

3. The required cable is connected to the calibration module.

SECTION 3 - MAINTENANCE

INTRODUCTION

The NIAC04 Analog Input Calibration Module requires limited maintenance. This section contains a maintenance schedule.

MAINTENANCE SCHEDULE

Execute the tasks in Table 3-1 at the specified intervals.

Table 3-1. Maintenance Schedule

Task	Interval
Clean and tighten all power and grounding connections	Every 6 months or during plant shut-down, whichever occurs first.
Use a static safe vacuum cleaner to remove dust from: Termination mounting unit. Calibration module.	Every 6 months or during plant shut-down, whichever occurs first.

SECTION 4 - REPAIR/REPLACEMENT PROCEDURES

INTRODUCTION

This section explains the replacement procedures for the NIAC04 Analog Input Calibration Module. No special tools are required to replace the module.

REPLACEMENT PROCEDURES

If an NIAC04 module is faulty, replace it with a new one. ***Do not*** try to repair the module. Replacing components may affect performance and certification.

CAUTION	**Remove modules from their module mounting unit slots before installing or removing a cable assigned to that slot. Failure to do so could result in damage to the module.**
ATTENTION	**Retirer le module de son emplacement dans le chassis de montage des modules avant d'installer ou de retirer un cable assigne a cet emplacement. Un manquement a cette procedure pourrait endommager le module.**

To replace an NIAC04 calibration module:

1. Remove (pull straight off) the calibration module front cover.

2. Slide the calibration module out of the cabinet.

3. Slide the new calibration module into the same slot as the module that was removed.

4. Verify that cabling to the calibration module is correct.

5. Fully insert the calibration module into the TMU card cage.

6. Replace (snap on) the calibration module front cover.

SECTION 5 - SUPPORT SERVICES

INTRODUCTION

Bailey Controls Company is ready to help in the use, application and repair of its products. Contact the nearest sales office to make requests for sales, applications, installation, repair, overhaul and maintenance contract services.

REPLACEMENT PARTS AND ORDERING

When making repairs, order replacement parts from a Bailey Controls sales office. Provide this information:

1. Part description, part number and quantity.

2. Model and serial numbers (if applicable).

3. Bailey instruction manual number, page number and reference figure that identifies the part.

Order parts without commercial descriptions from the nearest Bailey Controls Company sales office.

TRAINING

Bailey Controls Company has a modern training facility that provides service and repair instruction. This facility is available for training your personnel. Contact a Bailey Controls Company sales office for specific information and scheduling.

TECHNICAL DOCUMENTATION

Additional copies of this manual, or other Bailey Controls Company manuals, can be obtained from the nearest Bailey Controls Company sales office at a reasonable charge.

APPENDIX A - IMASM04 ANALOG SLAVE INPUT MODULE

INTRODUCTION

The IMASM04 Analog Slave Module uses a NIAC04 module to calibrate the RTD inputs. This appendix contains a figure and table that shows the dipswitch location on the IMASM04 module and its settings. This information is provided as a quick reference guide for personnel installing the NIAC04 module. Figure A-1 shows the IMASM04 module address select switch (SW1). Table A-1 lists the binary addresses for setting SW1. Refer to the IMAMM03 instruction for more detailed information to install and configure the slave.

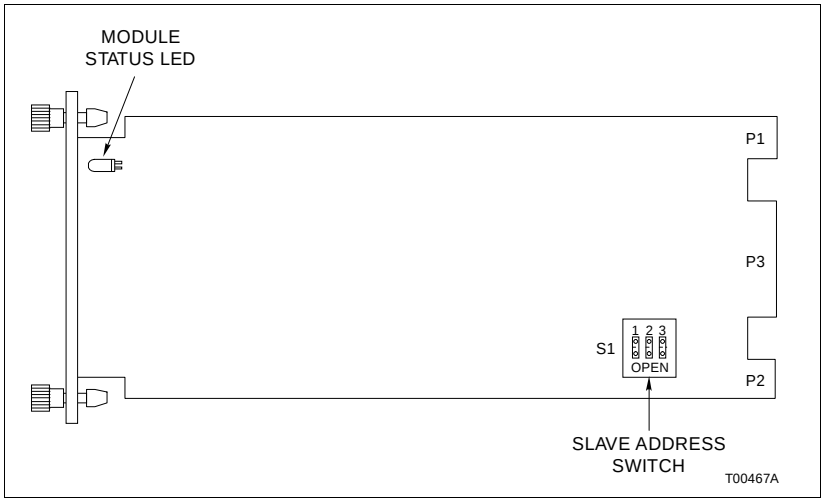

Figure A-1. Address Select Switch (SW1)

Table A-1. Address Switch Settings (SW1)

Address	MSB Pole 1	Pole 2	LSB Pole 3	Address	MSB Pole 1	Pole 2	LSB Pole 3
0	0	0	0	4	1	0	0
1	0	0	1	5	1	0	1
2	0	1	0	6	1	1	0
3	0	1	1	7	1	1	1

NOTE: OPEN = OFF = 1; CLOSED = ON = 0

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