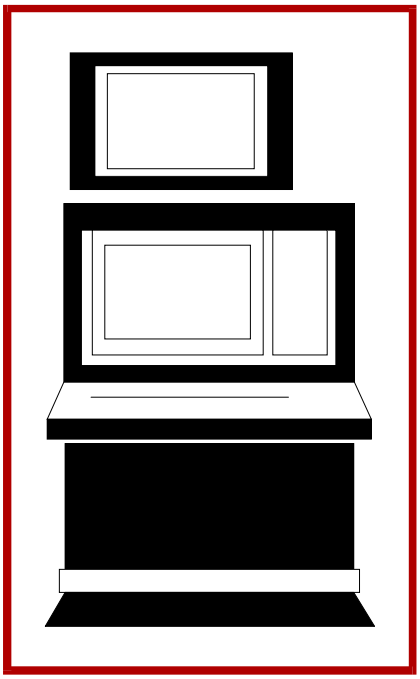
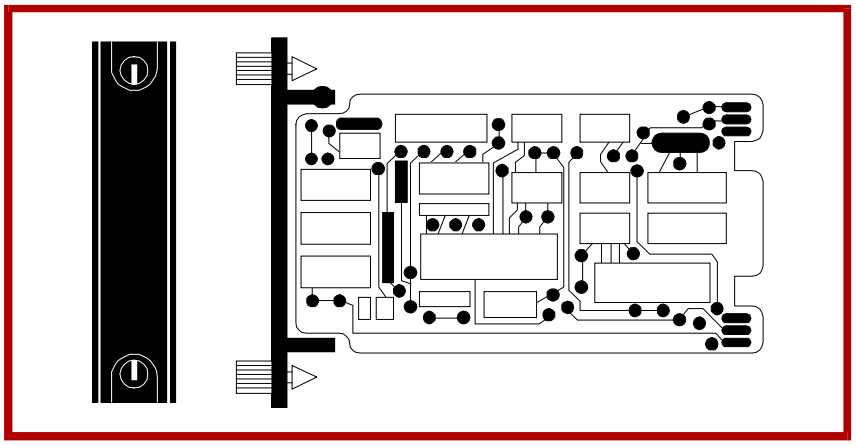
Bailey® infi 90®

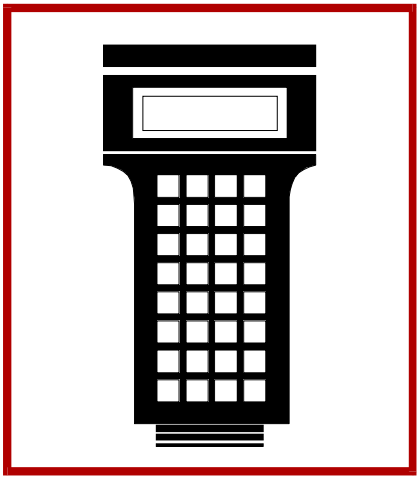
E96-437

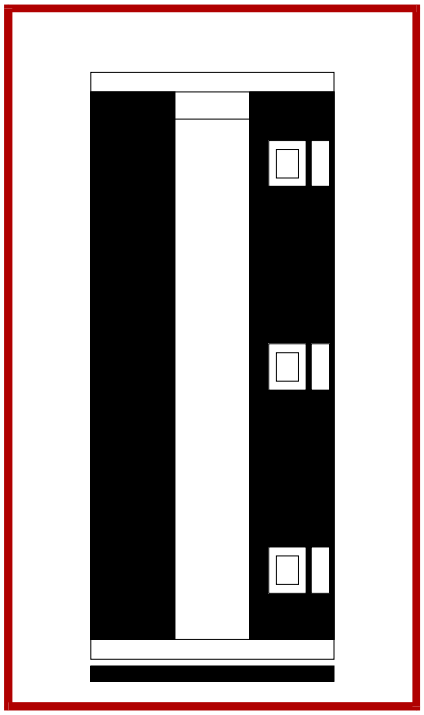
Instruction

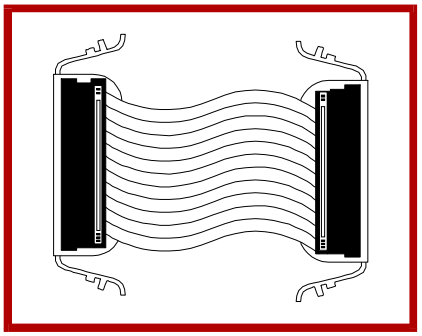
Analog Master Termination Module
(NIAM02)

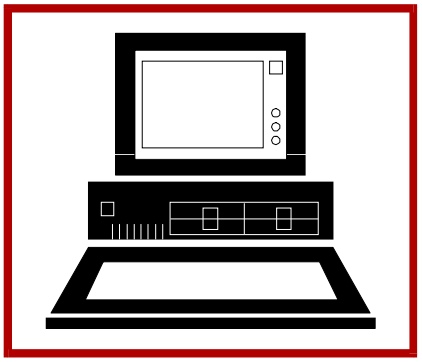












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WARNING notices as used in this instruction apply to hazards or unsafe practices that could result in personal injury or death.

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.

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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

Termination modules provide an input connection from the plant equipment to the INFI 90® process modules. The Analog Master Termination Module (NIAM02) interfaces the cold junction temperature compensation and internal calibration between Thermocouple Analog Input Slave Termination Module (NIAI02) and Analog Master Module (IMAMM03). The NIAM02 also provides an interface for the NDIS01 Digital Indicator Station.

This manual explains how to install and use the NIAM02 on the INFI 90 system. It has sections that describe the setup and cabling. The appendix contains information about the IMAMM03 module that uses the NIAM02.

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List of Effective Pages

Total number of pages in this instruction is 28, 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 2-9	Original
3-1	Original
4-1 through 4-2	Original
5-1	Original
A-1 through A-2	Original
B-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. 2-6, 4-1) It is strongly recommended that all power (cabinet, I/O, etc.) be turned off before doing any termination module wiring. Failure to do so could result in equipment damage. Do not apply power until all connections are verified. (p. 2-8, 4-1) If input or output circuits are a shock hazard after disconnecting system power at the power entry panel, then the door of the cabinet containing these externally powered circuits must be marked with a warning stating that multiple power sources exist. (p. 2-8, 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 câble assigne a cet emplacement. Un manquement à cette procédure pourrait endommager le module. (p. 2-6, 4-1) Ll est fortement recommande que toutes les alimentations (armoire, E/S, etc.) soient coupees avant d'effectuer quelque raccord que ce soit sur une carte de raccordement. Un manquement a ces instructions pourrait causer des dommages a l'equipment. Ne pas rebrancher les alimentations avant d'avoir verifie tous les raccordements. (p. 2-8, 4-1) Retirer le module de son emplacement dans le chassis de montage des modules avant d'installer ou de retirer un câble assigne a cet emplacement. Un manquement à cette procédure pourrait endommager le module. (p. 2-8, 4-1)

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SECTION 1 - INTRODUCTION

OVERVIEW

One Analog Master Termination Module (NIAM02) is required for each Analog Master Module (IMAMM03) when using thermocouple slaves. Each NIAM02, or pair of NIAM02s when using redundant IMAMM03s, can connect up to eight NIAI02 termination modules.

The cold junction temperature compensation signal passes from the NIAI02 Analog Input Module, through the master termination module, to the IMAMM03 Analog Master Module. The internal calibration signals pass through the NIAM02 Master Termination Module to the NIAC02 Calibration Module. The NIAM02 also has a connection for interfacing to NDIS01 indicator stations. This manual explains the purpose, setup, handling precautions and steps to install the NIAM02 module. 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 (TM). Put the module into operation only after reading and understanding this instruction.

MODULE DESCRIPTION

The analog master termination module allows communication between redundant IMAMM03 Analog Master Modules and provides local cold junction temperature compensation. It also passes internal slave calibration voltage from the IMAMM03 to the NIAC02 calibration module.

The NIAM02 is a single printed circuit board that uses one slot in a Termination Mounting Unit (NTMU01/02). The termination module (TM) has one card edge connector, P1, that connects to the master module through a cable. Cable connectors on the NIAM02 can connect up to eight NIAI02s for cold junction compensation of the IMAMM03.

The NIAM02 also has terminal blocks allowing the IMAMM03 internal calibration voltages to be wired to an NIAC02 millivolt/thermocouple calibration termination module. The NIAM02 has a connector (J4) for the IMAMM03 to communicate with up to four NDIS01 Digital Indicator Stations. The NDIS01 is connected to the NIAM01 with a cable. Figure 1-1 shows an application example for the NIAM02.

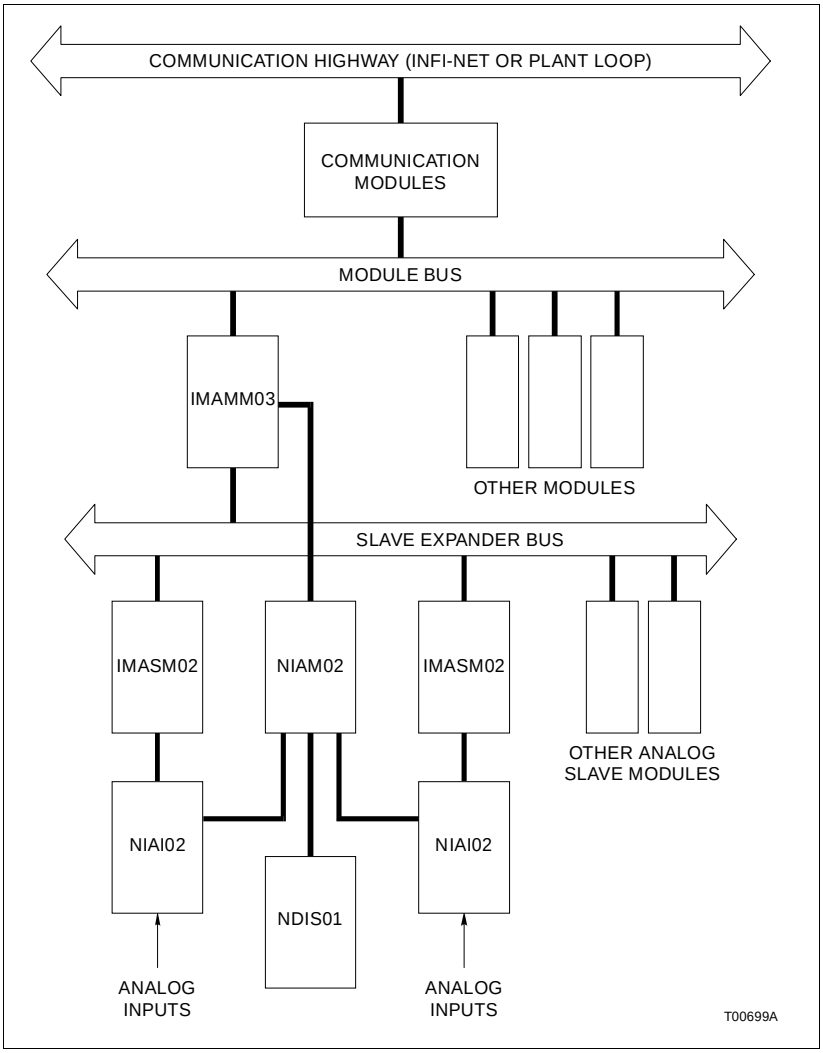

Figure 1-1. Application Example for NIAM02

FEATURES

The design of the NIAM02, 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.

- Standard factory-wired cables connect the TM to the IMMAM03 Master Module, NIAI02 Termination Module, and an NDIS01 Indicator Station.
- Each TM fits in a standard field termination panel.
- Connects up to eight NIAI02 Termination Modules.
- Source of one of the cold junction reference RTDs (if required).
- Routes internal calibration voltage from the IMAMM03 to the NIAC02.
- Passes all cold junction references from the NIAI02 to the IMAMM03.

- Routes communications from the IMAMM03 to the NDIS01.

INSTRUCTION CONTENT

This manual has five sections and two appendices.

Introduction — Contains an overview of the features, description and specifications and a description of the NIAM02.

Installation — Describes cautions to observe when handling the TM. It shows the steps to install and connect the terminal wiring before applying power.

Maintenance — Provides a maintenance schedule.

Repair/Replacement Procedures — Details how to replace a TM.

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

Appendix A — Shows the switch settings for the Analog Master Module (IMAMM03).

Appendix B — Shows the switch settings for the Digital Indicator Station (NDIS01).

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 Section 2 before connecting the NIAM02.
2. Refer to Appendix A for the IMAMM03 Master Module.
3. Refer to Appendix B for the NDIS01 Digital Indicator Station.
4. Refer to Section 3 for the maintenance schedule.
5. Refer to the repair/replacement procedures and support services when needed.

NOMENCLATURE

Table 1-1 contains the modules and equipment that can be used with the NIAM02 module.

Table 1-1. Nomenclature

Nomenclature	Description
258436_1	Cable retaining kit used when a round cable connects to the TMU
6634408_2	Cable, Cold Junction (Ribbon)
NDIS01	Digital Indicator Station
NIAC02	Thermocouple Calibration Module

Table 1-1. Nomenclature (continued)

Nomenclature	Description
NIAI02	Analog Input Slave Termination Module
NKDS03	Cable, Digital Indicator Station (PVC)
NKDS13	Cable, Digital Indicator Station (non-PVC)
NKTD02	Cable, Digital Indicator Station (PVC)
NKTD12	Cable, Digital Indicator Station (non-PVC)
NKTM01	Cable, Termination Module (Ribbon)
NKTU02	Cable, Termination Module (PVC)
NKTU12	Cable, Termination Module (non-PVC)

SPECIFICATIONS

Refer to Table 1-2 for the specifications of the NIAM02 Termination Unit.

Table 1-2. Specifications

Property	Characteristic/Value
Power Requirements	+24 VDC 17 mA per NIAM02
Mounting	Slides into a single slot in the terminal mounting unit NTMU01/02.
Environmental	
Electromagnetic/Radio Frequency Interference	No values available at this time. Keep cabinet door closed. Do not use communication equipment closer than 2 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 miles).
Air Quality	Noncorrosive.
Cooling Requirements	No cooling is necessary when used in Bailey Controls cabinets and operated within stated limits.
Surge Protection	Meets IEEE-472-1974 Surge Withstand Capability Test[1].
Certification	CSA certified for use as process control equipment in an ordinary (nonhazardous) location.

NOTE: 1. Do not use the NKTM01 cable when compliance with IEEE-472-1974 is necessary.

Specifications are subject to change without notice.

GLOSSARY OF TERMS AND ABBREVIATIONS

Table 1-3 contains the glossary of terms for this manual.

Table 1-3. Glossary of Terms and Abbreviations

Term	Definition
Cold Junction Reference	The ambient temperature at the bimetallic junction at the termination point of thermocouple wires.
Dipswitch	A dual in-line package that contains switches.
DIS	Digital Indicator Station. A panel mounted operator interface device that displays both bar graph and numeric readouts of analog input signals.
Master Module	One of a series of controller modules designed to direct field processes through a slave module. The multi-function processor is an example.
Slave Module	One of a series of modules designed to perform high or low level operations as directed by a master module.
TM	Termination Module. Provides input/output connection between plant equipment and the INFI 90/Network 90® modules.
TMU	Termination Mounting Unit. A card cage that provides housing for INFI 90/ Network 90 termination modules.

REFERENCE DOCUMENTS

Table 1-4 contains the reference documents for the NIAM02.

Table 1-4. Reference Documents

Document Number	Description
I-E96-116	Digital Indicator Station NDIS01
I-E96-205	Analog Master Module and Analog Slave Modules (IMAMM03 and IMASM01/02/03/04)
I-E96-403	Thermocouple Input Termination Module (NIAI02)
I-E96-420	Calibration Module (NIAC02)
I-E96-500	Site Planning and Preparation

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SECTION 2 - INSTALLATION

INTRODUCTION

This section explains how to install the Analog Master Termination Module (NIAM02). Read, understand, and complete the steps in the order they appear before using the NIAM02 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 Antistatic Bags.*** Keep the modules in the antistatic bags 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 Antistatic 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 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 unnecessary 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.

SETUP/PHYSICAL INSTALLATION

This section explains how to configure and install the NIAM02. The required procedures are installing the termination module into the TMU, and connecting the power and ground cables and communication cables.

Dipswitches

Dipswitch S1 enables the cold junction compensation RTD on the NIAM02 for applications using an odd number of NIAI02s. Switches S2 through S4 enable communication between redundant IMAMM03s. Switches S2 through S4 may be ignored in nonredundant applications. The IMAMM03 Analog Master Module reads the cold junction reference temperature measured by the RTD elements on the NIAI02 TMs in pairs and averages the readings. Up to four pairs of NIAI02s can be read for RTD pairs A, B, C and D. This allows a maximum of eight slave modules to be connected.

When an even number of NIAI02 TMs are used with an NIAM02 all S1 dipswitch settings are left open or off. The readings are averaged between the RTD element on each NIAI02. The RTD element on the NIAM02 is not used with an even number of NIAI02s.

When an odd number of NIAI02 TMs are used with an NIAM02, the RTD element on the NIAM02 is needed for cold junction reference temperature averaging. The dipswitch setting places the RTD element on the NIAM02 in series with an RTD element on the odd numbered NIAI02. The selection of the RTD element on the NIAM02 depends on which pair (A, B, C or D) contains a single slave. Set dipswitch S1 according to this pairing. Figure 2-1 shows the dipswitch and cable connections on the NIAM02. Refer to Table 2-1 for dipswitch S1 settings. Refer to Table 2-2 for dipswitch S2, S3 and S4 settings.

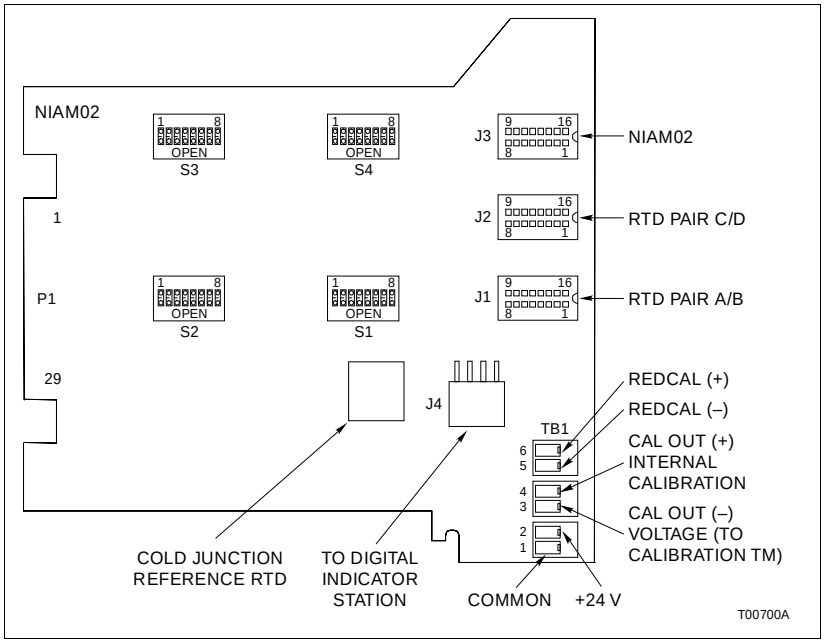


Figure 2-1. Dipswitches and Cable Connections

Table 2-1. Dipswitch S1 Settings

Connector Number[1]	Number of NIAI02s	MIAM02 RTD[2]	Switch Number 1 2 3 4 5 6 7 8
J1	1 2	A	1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	3 4	B	0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0
J2	5 6	C	0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0
	7 8	D	0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0

OPEN = OFF = 0
CLOSED = ON = 1

NOTES:
1. Only one RTD pair can be odd for connector J1 or J2, both cannot be odd.
2. NIAM02 RTD used only to complete an RTD pair.

Table 2-2. Dipswitches S2, S3 and S4 Settings

TM	Switch Number 1 2 3 4 5 6 7 8
Primary NIAM02	1 0 1 0 1 0 1 0
Secondary NIAM02	0 1 0 1 0 1 0 1

OPEN = OFF = 1
CLOSED = ON = 0

NOTES: Switch S2, S3 and S4 positions are used for nonredundant NIAM02s.

Cable Connections

Before installing the NIAM02, connect either the NKTM01 or NKTU02/12 termination cable. Figure 2-2 shows the cabling for the NIAM02 to an IMAMM03. Figure 2-3 shows the cabling for the NIAM02 to redundant IMAMM03s.

Install the termination module cable (NKTM01 or NKTU02/ NKTU12) to connect the NIAM02 TM to the IMAMM03. The NKTM01 is a flat ribbon cable. The NKTU02 is a round, shielded cable with PVC outer jacket. The NKTU12 is a round, shielded cable with non-PVC outer jacket.

Redundant NIAM02 modules can be interconnected together through ribbon cable part number 6634408_2. Use the 6634408_2 cable (not supplied) to connect the two J3 connectors together on the two NIAM02 TMs. Up to eight IMASM02

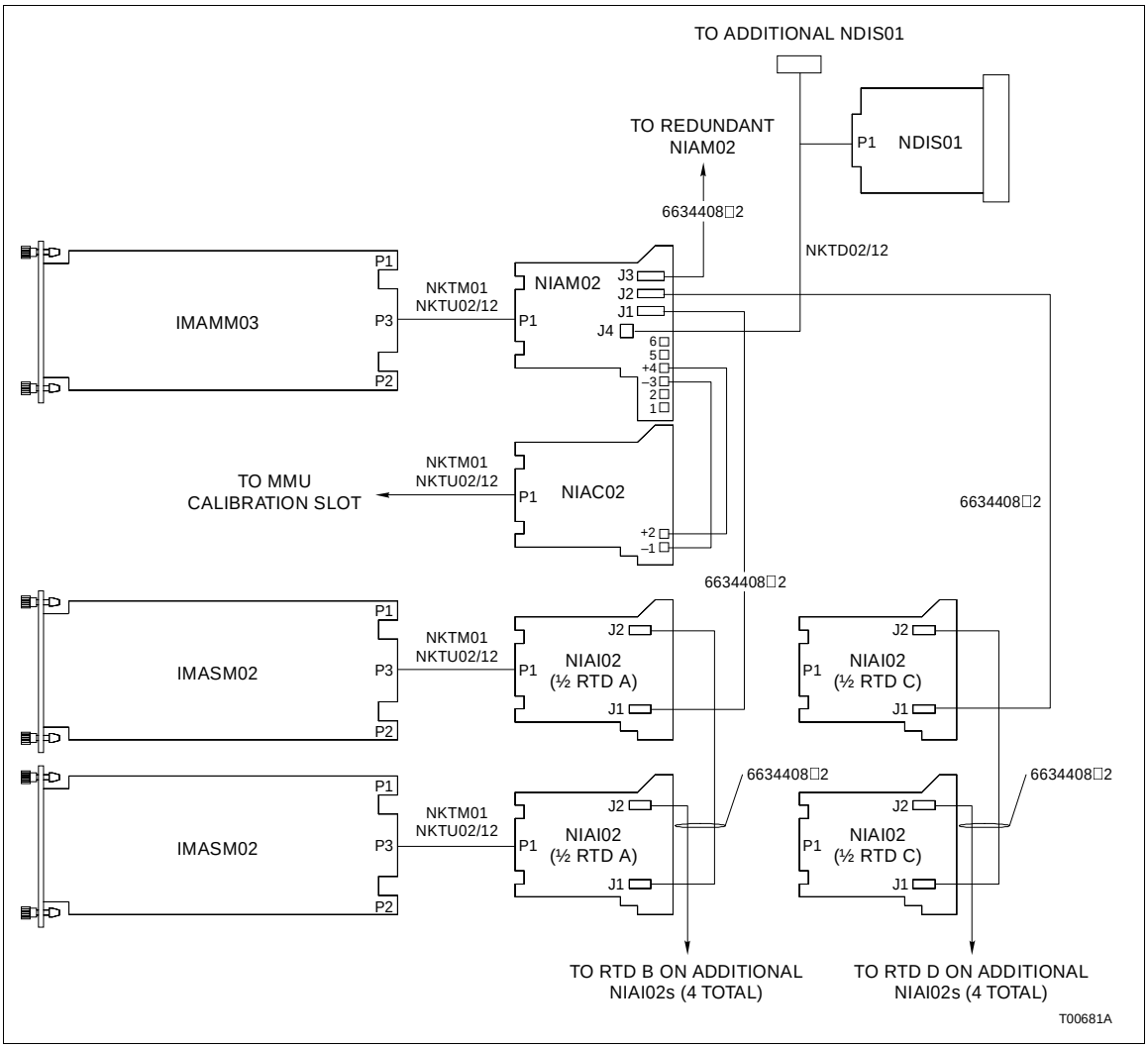


Figure 2-2. Cable Connections for NIAM02

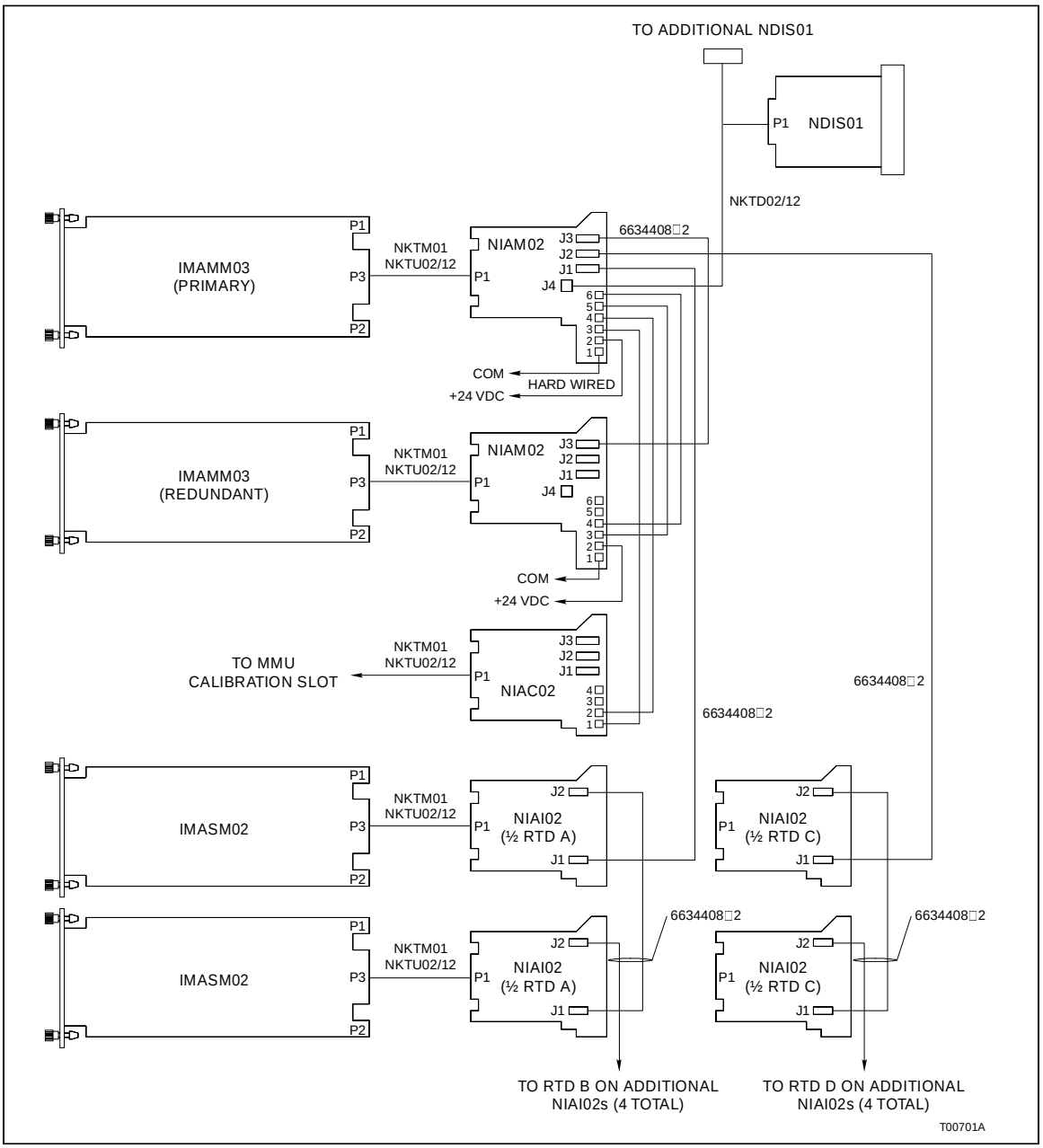


Figure 2-3. Cable Connections for Redundant NIAM02s

slaves can connect to a single or redundant master module through one of the NIAM02 termination modules.

NOTES:

1. When the NIAM02 is used to connect IMASM02 slaves to the IMAMM03 master, slaves 1 to 4 (associated with NIAI02 RTD pairs A and B) connect to J1 of the NIAM02, and slaves 5 to 8 (associated with NIAI02 RTD pairs C and D if required) connect to J2 of the NIAM02.

2. Never connect an odd number of NIAI02 TMs to both J1 and J2. Always connect the maximum number (4) to J1, before connecting to J2.

The first NDIS01 Digital Indicator Station is connected to the NIAM02 J4 connector with an NKTD02/12 cable. Up to three more NDIS01 Stations can be interconnected to the NKTD02/12 by using the NKDS03/13 cables.

Cable Installation

The NKTU02/12 or NKTM01 cable connects the NIAM02 to the IMAMM03 slave module. Table 2-3 lists the NIAM02 cable applications.

Table 2-3. NIAM02 Cable Applications

Nomenclature/ Description	Application	Connector	Maximum Length
NKTU02 (PVC jacket)	Connects NIAM02 to IMAMM03	P1 on TM to MMU backplane.	61 m (200 ft)
NKTU12 (non-PVC jacket)			
NKTM01 (ribbon)	Connects NIAM02 to IMAMM03	P1 on TM to MMU backplane.	30 m (100 ft)
NKTD02 (PVC jacket)	Connects NDIS01 to NIAM02	P1 on NDIS01 to J4 on TM.	183 m (600 ft)
NKTD12 (non-PVC jacket			
6624408_2 (one ribbon cable is shipped with each NIAI02)	Connects NIAM02 to NIAM02	J3 on TM1 to J3 on TM2 (not supplied).	0.45 m (17.6 in)
	Connects NIAM02 to NIAI02	J1 on TM1 to J1 on NIAI02.	
	Connects NIAM02 to NIAI02	J2 on TM1 to J1 on NIAI02.	

NOTE: One 6634408_2 is required for redundant NIAM02s.

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 câble assigne a cet emplacement. Un manquement à cette procédure pourrait endommager le module.**

To install the cables follow these steps:

1. Pull the termination module several inches from the TMU backplane.

2. Pull the slave/master module from the MMU, if installed.

3. If round type cables are already installed in the TMU, remove the cable retaining bracket (Bailey part number 258436_1). Use NKTU02/12 or NKTM01 cables. Round cables and ribbon cables can be mixed when installing multiple TMs.

4. Insert the J2 end of the termination module cable into the MMU backplane slot assigned to the master module. The cable should latch securely in place. Card edge connector P3 of the master module connects to this end of the cable.

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

6. Insert the J1 end of the cable into the TMU backplane slot assigned to the NIAM02 module. The cable should latch securely in place. Card edge connector P1 of the NIAM02 module connects to this end of the cable.

7. Connect J1 of the first NIAI02 TM interconnected with NIAI02 1 through 4 to J1 on the NIAM02 using ribbon cable 6634408_2 supplied with the NIAI02.

8. Connect J1 of the first NIAI02 TM interconnected with NIAI02 number 5 through 8 to J2 on the NIAM02 using ribbon cable 6634408_2 supplied with the NIAI02.

9. Connect redundant NIAM02 TMs together by connecting J3 on the first TM to J3 on the second TM with ribbon cable part number 6634408_2 (not supplied).

10. Connect an NDIS01, if required, to the NIAM02 with an NKTD02/12 cable, connecting J1 of the NKTD02/12 cable to J4 of the TM and J2 of the NKTD02/12 cable to the right hand slot on the station housing (P1 of the NDIS01).

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

Terminal Wiring

Connect the wiring from the NIAC02 calibration module to the NIAM02 termination module terminals for internal calibration. Figure 2-2 shows the terminal assignments for wiring the internal calibration voltage from the NIAM02 to the NIAC02.

CAUTION	**It is strongly recommended that all power (cabinet, I/O, etc.) be turned off before doing any termination module wiring. Failure to do so could result in equipment damage. Do not apply power until all connections are verified.**
ATTENTION	**LI est fortement recommande que toutes les alimentations (armoire, E/S, etc.) soient coupees avant d'effectuer quelque raccord que ce soit sur une carte de raccordement. Un manquement a ces instructions pourrait causer des dommages a l'equipment. Ne pas rebrancher les alimentations avant d'avoir verifie tous les raccordements.**

CAUTION	**If input or output circuits are a shock hazard after disconnecting system power at the power entry panel, then the door of the cabinet containing these externally powered circuits must be marked with a warning stating that multiple power sources exist.**
ATTENTION	**Si des circuits d'entree ou de sortie sont alimentes a partir de sources externes, ils presentent un risque de choc electrique meme lorsque l'alimentation du systeme est debranchee du panneau d'entree l'alimentation. Le cas echeant, un avertissement signalant la presence de sources d'alimentation multiples doit etre appose sur la porte de l'armoire.**

Connect inputs with 18 gauge wire. To connect power and ground to an NIAM02, follow these steps:

1. Remove (pull off) the front cover of NIAM02.

2. Ensure the NIAM02 module is pulled out far enough to gain access to the terminal strip.

3. Connect an 18 AWG ground wire from the common bus to terminal 1 on the NIAM02.

4. Connect an 18 AWG power wire from the +24 volt bus to terminal 2 on the NIAM02.

5. Insert the NIAM02 module until it locks securely into place.

6. Replace (snap on) the NIAM02 module front cover.

Connect the NIAC02 module inputs with 18 gauge wire. To connect the NIAC02 calibration module to an NIAM02, follow these steps:

1. Remove (pull off) the front covers of the NIAM02 and the NIAC02.

2. Ensure the NIAM02 module and NIAC02 module are pulled out far enough to gain access to the terminal strip.

3. 3. Connect a wire from terminal 3 (CAL OUT -) on the NIAM02 to terminal 1 (-) on the NIAC02.

4. 4. Connect a wire from terminal 4 (CAL OUT +) on the NIAM02 to terminal 2 (+) on the NIAC02.

5. When using redundant NIAM02s, do Steps 5 and 6.

6. Connect a wire from terminal 5 (RED CAL -) on the NIAM02 to terminal 3 (CAL OUT -) on the other NIAM02.

7. Connect a wire from terminal 6 (RED CAL +) on the NIAM02 to terminal 4 (CAL OUT +) on the other NIAM02.

8. Insert the NIAM02 module and NIAC02 module until each module locks securely into place.

9. Replace (snap on) the NIAM02 and NIAC02 module front covers.

Termination Module Installation

The NIAM02 inserts into a standard INFI 90 termination mounting unit (TMU) and occupies one slot. To install:

1. Verify slot assignment of the NIAM02 module.

2. Align the NIAM02 module with the guide rails in the TMU and partially insert the module. Leave enough room to connect terminal wiring and cables.

3. Completely seat the module after cabling and wiring is attached.

The NIAM02 is ready for operation if:

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

2. All required cables are connected to the termination module.

3. Power wiring is installed.

SECTION 3 - MAINTENANCE

INTRODUCTION

The NIAM02 Analog Master Termination 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 shutdown, which ever occurs first.
Use a static safe vacuun cleaner to remove dust from: Termination Mounting Unit. Termination Modules.	

SECTION 4 - REPAIR/REPLACEMENT PROCEDURES

INTRODUCTION

This section explains the replacement procedures for the NIAM02 Analog Master Termination Module. No special tools are required to replace the module.

REPLACEMENT PROCEDURES

If an NIAM02 is faulty, replace it with a new one. ***Do not*** try to repair the module. Replacing components may affect performance and certification.

CAUTION	**If input or output circuits are a shock hazard after disconnecting system power at the power entry panel, then the door of the cabinet containing these externally powered circuits must be marked with a warning stating that multiple power sources exist.**
ATTENTION	**Si des circuits d'entree ou de sortie sont alimentes a partir de sources externes, ils presentent un risque de choc electrique meme lorsque l'alimentation du systeme est debranchee du panneau d'entree l'alimentation. Le cas echeant, un avertissement signalant la presence de sources d'alimentation multiples doit etre appose sur la porte de l'armoire.**

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 câble assigne a cet emplacement. Un manquement à cette procédure pourrait endommager le module.**

CAUTION	**It is strongly recommended that all power (cabinet, I/O, etc.) be turned off before doing any termination unit wiring. Failure to do so could result in equipment damage. Do not apply power until all connections are verified.**
ATTENTION	**Ll est fortement recommande que toutes les alimentations (armoire, E/S, etc.) soient coupees avant d'effectuer quelque raccord que ce soit sur une carte de raccordement. Un manquement a ces instructions pourrait causer des dommages a l'equipment. Ne pas rebrancher les alimentations avant d'avoir verifie tous les raccordements.**

To replace an NIAM02 termination module:

1. Turn off power to the INFI 90 cabinet.

2. Remove (pull straight off) the front cover.

3. Pull the termination module several inches from the TMU backplane.

4. Label and remove all cables and wiring.

5. Slide the TM out of the cabinet.

6. Set the dipswitches on the new module according to the installation instructions. Verify the dipswitches on the replacement TM.

7. Slide the new TM into the same slot as the module that was removed.

8. Connect all cables and wiring removed in Step 4.

9. Verify that wiring and cabling to the TM is correct.

10. Fully insert the termination module into the TMU.

11. Replace (snap on) the front cover.

12. Turn on the cabinet power supply that provides power to the TM.

13. Turn on any external power supplies providing I/O power.

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 INFORMATION

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. On-site training is also available. 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 - ANALOG MASTER MODULE (IMAMM03)

INTRODUCTION

The Analog Master Module (IMAMM03) uses an NIAM02 for termination. This appendix contains figures and tables that show the dipswitch location on the IMAMM03 and its settings. This information is provided as a quick reference guide for personnel installing the NIAM02. The hardware configuration switch (SW2) sets the hardware operating states (run modes or diagnostic modes) and module address of the IMAMM03. Figure A-1 shows the location of SW2. Table A-1 lists the run modes that can be set with dipswitch positions 1 through 3. Table A-2 lists the binary addresses that can be set with dipswitch positions 4 through 8. Refer to the IMAMM03 Product Instruction for more detailed information to install and configure the slave.

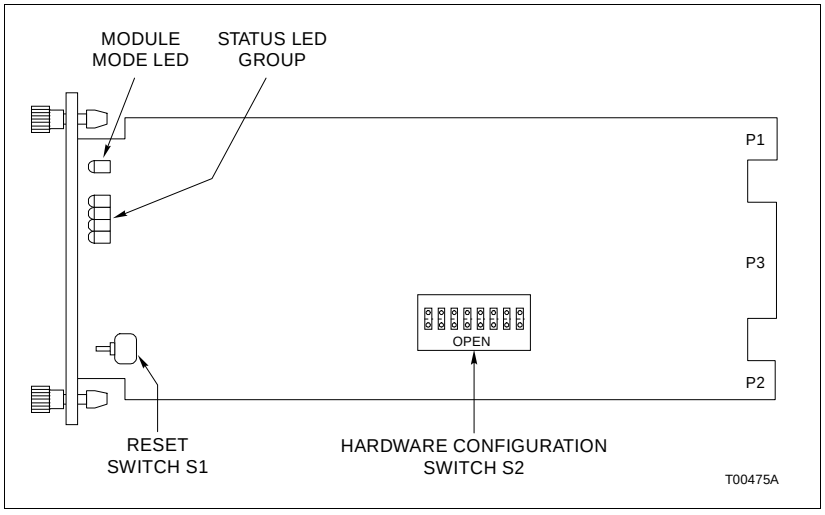


Figure A-1. IMAMM03 Address Select Switch (SW1)

Table A-1. Run Mode Settings (SW2)

1	2	3	Mode
0	0	0	Normal or backup
0	0	1	Configuration lock
0	1	0	Initialize NVRAM
0	1	1	Inhibit checksums
1	0	0	Primary
1	0	1	Primary and configuration lock
1	1	0	Unused
1	1	1	Unused run mode (sets diagnostic mode)

OPEN = OFF = 1
CLOSED = ON = 0

Table A-2. IMAMM03 Address Switch Settings (SW2)

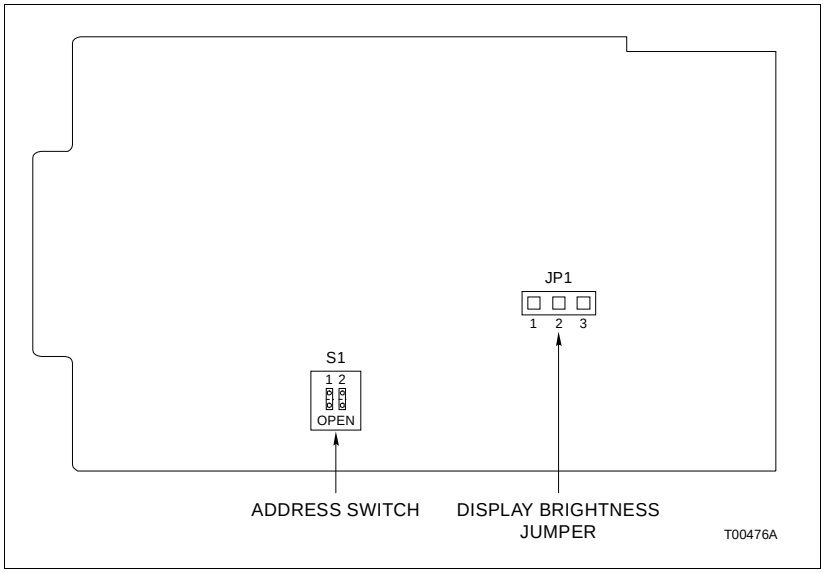
Address Example	MSB LSB 1 2 3 4 5 6 7 8	Address Example	MSB LSB 1 2 3 4 5 6 7 8
0	0 0 0 0 0 0 0 0	22	0 0 0 1 0 1 1 0
9	0 0 0 0 1 0 0 1	25	0 0 0 1 1 0 0 1
16	0 0 0 1 0 0 0 0	29	0 0 0 1 1 1 0 1
20	0 0 0 1 0 1 0 0	31	0 0 0 1 1 1 1 1

OPEN = OFF = 1
CLOSED = ON = 0

APPENDIX B - DIGITAL INDICATOR STATION (NDIS01)

INTRODUCTION

The Digital Indicator Station (NDIS01) connects to an NIAM02 termination module for station input signals. This appendix contains the dipswitch location on the NDIS01 and intensity jumpers and their settings. This information is provided as a quick reference guide for personnel installing the NIAM02. Figure B-1 shows the address select switch (SW1). Table B-1 lists the binary addresses for setting SW1. Refer to the NDIS01 instruction for more detailed information to install and configure the digital indicator station.



NOTE:
Set jumper JP1 on pins 1 and 2 for a bright display.
Set jumper JP1 on pins 2 and 3 for a dim display.

Figure B-1. NDIS01 Address Select Switch (SW1)

Table B-1. NDIS01 Address Switch Settings (SW1)

Address	Pole 1	Pole 2	Address	Pole 1	Pole 2
8	0	0	10	1	0
9	0	1	11	1	1

OPEN = OFF = 1
CLOSED = ON = 0

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