5403 and 5404 Digital Input Modules

Installation, Operation and Maintenance Setup Manual

5/19/2011

Schneider Electric

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed. Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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Safety Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

	The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.

	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result** in death or serious injury.

⚠CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result** in minor or moderate.

CAUTION

CAUTION used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, **can result** in equipment damage..

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and the installation, and has received safety training to recognize and avoid the hazards involved.

BEFORE YOU BEGIN

Do not use this product on machinery lacking effective point-of-operation guarding. Lack of effective point-of-operation guarding on a machine can result in serious injury to the operator of that machine.

⚠CAUTION

UNINTENDED EQUIPMENT OPERATION

Verify that all installation and set up procedures have been completed.

Before operational tests are performed, remove all blocks or other temporary holding means used for shipment from all component devices.

Remove tools, meters, and debris from equipment

Failure to follow these instructions can result in death, serious injury or equipment damage.

Follow all start-up tests recommended in the equipment documentation. Store all equipment documentation for future references.

Software testing must be done in both simulated and real environments.

Verify that the completed system is free from all short circuits and grounds, except those grounds installed according to local regulations (according to the National Electrical Code in the U.S.A, for instance). If high-potential voltage testing is necessary, follow recommendations in equipment documentation to prevent accidental equipment damage.

Before energizing equipment:

- Remove tools, meters, and debris from equipment.
- Close the equipment enclosure door.
- Remove ground from incoming power lines.
- Perform all start-up tests recommended by the manufacturer.

OPERATION AND ADJUSTMENTS

The following precautions are from the NEMA Standards Publication ICS 7.1-1995 (English version prevails):

- Regardless of the care exercised in the design and manufacture of equipment or in the selection and ratings of components, there are hazards that can be encountered if such equipment is improperly operated.
- It is sometimes possible to misadjust the equipment and thus produce unsatisfactory or unsafe operation. Always use the manufacturer's instructions as a guide for functional adjustments. Personnel who have access to these adjustments should be familiar with the equipment manufacturer's instructions and the machinery used with the electrical equipment.
- Only those operational adjustments actually required by the operator should be accessible to the operator. Access to other controls should be restricted to prevent unauthorized changes in operating characteristics.

About The Book

At a Glance

Document Scope

This manual describes the operation and maintenance of the 5403 and 5404 Digital Input modules.

Validity Notes

This document is valid for all versions of the 5403 and 5404 Digital Input modules.

Product Related Information

⚠WARNING

UNINTENDED EQUIPMENT OPERATION

The application of this product requires expertise in the design and programming of control systems. Only persons with such expertise should be allowed to program, install, alter and apply this product.

Follow all local and national safety codes and standards.

Failure to follow these instructions can result in death, serious injury or equipment damage.

User Comments

We welcome your comments about this document. You can reach us by e-mail at technicalsupport@controlmicrosystems.com.

Overview

The Model 5403 Digital Input module adds eight discrete inputs to a 5000 I/O system. Up to eight Model 5403 modules may be installed on a I/O bus to provide a total of 64 digital inputs.

The Model 5404 Digital Input module adds sixteen discrete inputs to a 5000 I/O system. Up to sixteen Model 5404 modules may be installed on an I/O bus to provide a total of 256 digital inputs.

The digital inputs are optically isolated from the logic power. To simplify field wiring, the inputs are grouped with four inputs sharing a single common return. These groups of four inputs are isolated from each other.

The Model 5403 and 5404 digital input module is available in five standard voltage ranges, for both AC and DC applications. A current limiting resistor on each input determines the voltage range. These resistors can be easily changed to accommodate non-standard signal ranges.

Light emitting diodes on the Model 5403 and 5404 show the status of each of the inputs. The SCADAPack controller module enables or disables the LEDs to control power consumption in solar powered or unattended applications.

Installation

The installation of the 5403 and 5404 modules require mounting the modules on the 7.5mm by 35mm DIN rail and connecting the modules to the system I/O Bus. Refer to the ***System Configuration Guide***, at the beginning of this manual, for complete information on system layout, I/O Bus cable routing and module installation.

Field Wiring

The 5403 module provides 8 digital inputs. The 5404 module provides 16 digital inputs. The input voltage range is set at the factory. On both modules the inputs are grouped with four inputs sharing a single common return. The groups are isolated from each other.

The 5403 module has two groups of four inputs with inputs 0 to 3 in one group and inputs 4 to 7 in the second group. Each group shares a common return.

The 5404 module has four groups of four inputs with inputs 0 to 3 in one group, inputs 4 to 7 in the second group, inputs 8 to 11 in the third group and inputs 12 to 15 in the forth group.

The 5403 and 5404 modules accommodate AC or DC inputs. Observe signal polarity when using DC inputs. Connect the positive signal to the input. Connect the negative signal to the common.

120 VAC digital inputs don't work with some UPSs. The digital input firmware is looking for a minimum input on-time generated by a sine-wave. This time is longer than the on-time generated by some UPSs. The module should not be used with a non-sine wave UPS.

Figure 1: Field Wiring Examples shows typical field wiring.

Controller, modem and I/O modules use screw termination style connectors for termination of field wiring. They accommodate solid or stranded wires from 22 to 12 AWG.

The connectors are removable. This allows module replacement without disturbing the field wiring. Leave enough slack in the wiring for the connector to be removed.

CRemove power before servicing unit.

To remove the connector:

- Pull the connector upward from the board. Apply even pressure to both ends of the connector.

To install the connector:

- Line up the pins on the module with the holes in the connector.

- Push the connector onto the pins. Apply even pressure to both ends on the connector.

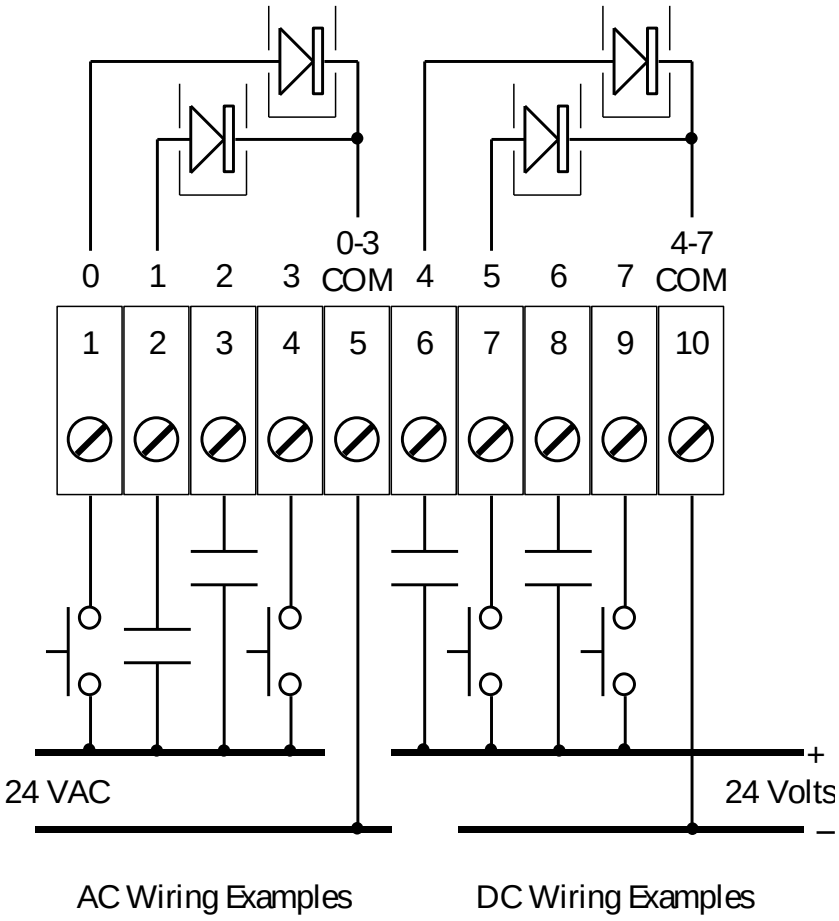

Figure 1: Field Wiring Examples

Figure 1: Field Wiring Examples shows wiring examples for both groups of four inputs on the 5403 and the first two groups of four inputs on the 5404.

Address Selection

The 5000 I/O bus will support a maximum of twenty I/O (input/output) modules. 5000 I/O module types may be combined in any manner to the maximum supported by the controller used. The types of input and output modules available are:

- Digital Input modules
- Digital Output modules

- Analog Input modules
- Analog Output modules
- Counter Input modules

Each type of I/O module, connected to the I/O bus, has a unique I/O module address. Different types of I/O modules may have the same module address.

The address range supported by the SCADAPack controller module may restrict the I/O module address range. Refer to the controller manual for the maximum address supported.

5403 Address Selection

The three address switches labeled 1, 2, and 4 set the 5403 module address. To set the address:

Open the three switches by pressing down the left side of the switch.

Close the switches that total to the desired address.

Figure 2: Model 5403 Module Address Switches shows the switch settings for each of the 8 module addresses.

5404 Address Selection

The four address switches labeled 1, 2, 4 and 8 set the module address. To set the address:

Open the four switches by pressing down the left side of the switch.

Close the switches that total to the desired address.

Figure 3: Model 5404 Module Address Switches shows the switch settings for each of the 16 module addresses.

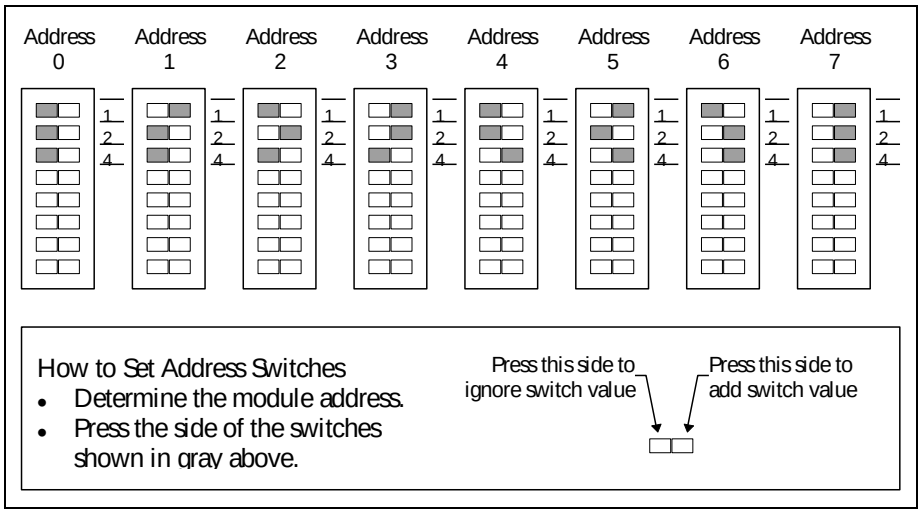

Figure 2: Model 5403 Module Address Switches

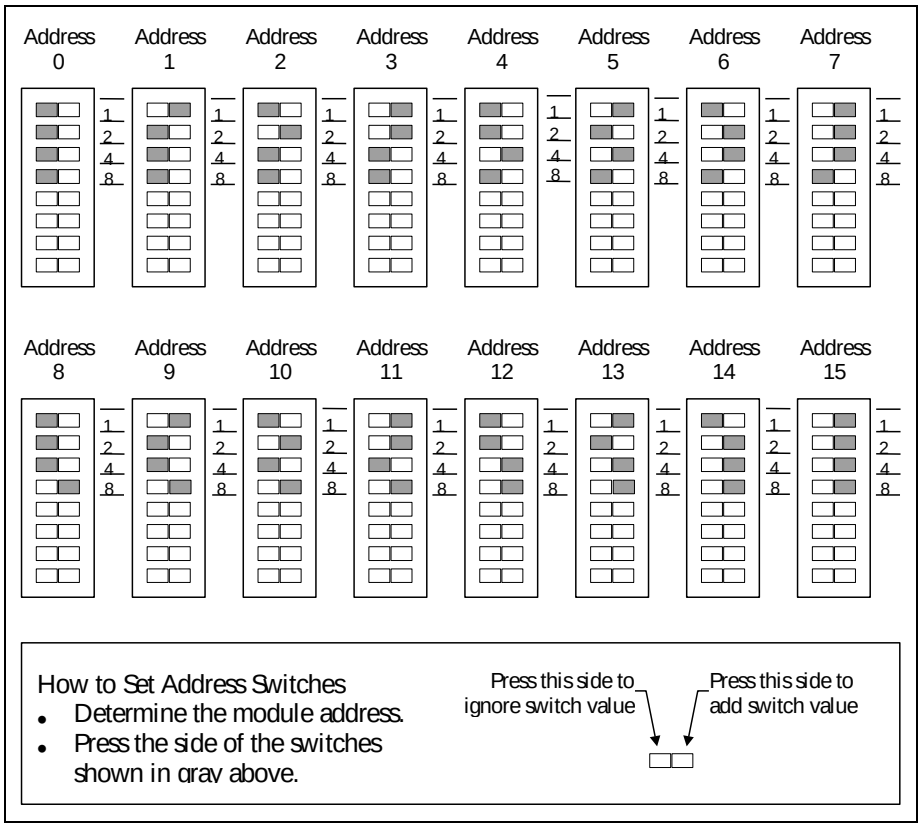

Figure 3: Model 5404 Module Address Switches

Operation and Maintenance

The 5403 and 5404 modules require no routine maintenance or calibration. If a module is not functioning correctly, contact Control Microsystems Technical Support for more information and instructions for returning the module for repair.

LED Indicators

The model 5403 and 5404 digital input modules have one red status LED per I/O point. This LED is on when the input is monitoring a voltage greater than the minimum rated input voltage.

The SCADAPack controller module, through the I/O bus, powers the LEDs. The LEDs can be disabled to conserve power. Refer to the communication controller or controller manual for more information.

Troubleshooting

Conddition	Action
Input LED does not come on when input signal is applied.	Check the LED POWER from the controller module. Check the input signal at the termination block. If this is a DC input, check the polarity of the signal.

Specifications

Disclaimer: Control Microsystems reserves the right to change product specifications. For more information visit *www.controlmicrosystems.com* .

Input Points	5403 – 8 5404 – 16
Over-voltage Tolerance	150% sustained over-voltage without damage
Input Current	5mA typical
Input Logic-HI Level	Off to on transition threshold is typically 50% of full scale signal range
Response Time	OFF to ON: 7ms typical ON to OFF: 24ms typical
Isolation	1500 VAC in groups of 4 inputs
Addressing	DIP switch configurable
5403 Power Requirements	5V @ 45mA all LEDs on 5V @ 5mA with LEDs disabled
5404 Power Requirements	5V @ 80mA all LEDs on 5V @ 25mA with LEDs disabled
Visual Indicators	5403 - 8 red LEDs 5404 – 16 red LEDs controlled by the controller for power reduction
Field Terminations	5403 – one 10 pole, removable terminal block 5404 – two 10 pole, removable terminal blocks 12-22 AWG 15 amp contacts
Dimensions	5403 - 4.25 inch (108mm) wide 5404 - 5.65 inch (144mm) wide 4.625 inch (118mm) high 1.75 inch (44mm) deep
Mounting	7.5 x 35 DIN rail
Packaging	Corrosion resistant zinc plated steel with black enamel paint
Environment	5% RH to 95% RH, non-condensing –40°C to 60°C –40°F to 140°F

Voltage Ranges

Module Type	Maximum AC/DC Input Voltage	Typical Input On Voltage DC	Typical Input On Voltage AC
5403/5404 - 240	240VACVDC	120VDC	100VAC
5403/5404 - 120	180VAC/DC	60VDC	50VAC
5403/5404 - 48	72 VAC/DC	24VDC	20VAC
5403/5404 - 24	36 VAC/DC	12VDC	10VAC
5403/5404 - 12	18 VAC/DC	6VDC	5VAC

Approvals and Certifications

Safety	Non-Incendive Electrical Equipment for Use in Class I, Division 2 Groups A, B, C and D Hazardous Locations. The 5403 is UL Listed to the following standards: • CSA Std. C22.2 No. 213-M1987 - Hazardous Locations. • CSA Std. C22.2 No. 142-M1987 - Process Control Equipment. • UL Std. No. 1604 - Hazardous (Classified) Locations. • UL Std. No. 508 - Industrial Control Equipment. The 5404 is CSA certified to the requirements of: • CSA Std. C22.2 No. 213-M1987 - Hazardous Locations. • CSA Std. C22.2 No. 142-M1987 - Process Control Equipment. • UL Std. No. 1604 - Hazardous (Classified) Locations. • UL Std. No. 916 – Energy Management Equipment.
Digital Emissions	FCC Part 15, Subpart B, Class A Verification EN61000-6-4: Electromagnetic Compatibility Generic Emission Standard Part2: Industrial Environment C-Tick compliance. Registration number N15744.
Immunity	EN61000-6-2: Electromagnetic Compatibility Generic Standards Immunity for Industrial Environments
Declaration	This product conforms to the above Emissions and Immunity Standards and therefore conforms with the requirements of Council Directive 2004/108/EEC (as amended) relating to electromagnetic compatibility and is eligible to bear the CE mark. The Low Voltage Directive is not applicable to this product.