

**SCADAPack E 5608 I/O  
Hardware Manual**



**Documentation**

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## I 5608 Input/Output Module



# Documentation

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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.

## 1 Technical Support

Support related to any part of this documentation can be directed to one of the following support centers.

### Technical Support: The Americas

Available Monday to Friday 8:00am – 6:30pm Eastern Time

Toll free within North America 1-888-226-6876

Direct Worldwide +1-613-591-1943

Email [TechnicalSupport@controlmicrosystems.com](mailto:TechnicalSupport@controlmicrosystems.com)

### Technical Support: Europe

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Email [TechnicalSupport@controlmicrosystems.com](mailto:TechnicalSupport@controlmicrosystems.com)



### Technical Support: Australia

Inside Australia 1300 369 233

Email [au.help@schneider-electric.com](mailto:au.help@schneider-electric.com)

## 2 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.     |

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**⚠ 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 injury.

**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****EQUIPMENT OPERATION HAZARD**

- 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 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.

## **3 Overview**

The 5608 I/O expansion module increases the I/O capability of a SCADAPack E Smart RTU by providing 12 digital inputs and 6 relay digital outputs.

A maximum of eight (8) 5608 modules (and 5606, 5607, 5609, 5610 and 5611 modules together) can be addressed on a 5000 Series I/O bus.

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The 5608 I/O and outputs are transient protected and optically isolated from the main logic power. The inputs are single ended. They share a common return.

The digital inputs are optically isolated from the logic power. To simplify field wiring, the inputs are in two groups of 8 and 4 inputs respectively, each sharing a single common return. Both groups of inputs are isolated from each other. Light emitting diodes show the status of each of the inputs. The digital inputs are available in two standard voltage ranges, for both AC and DC applications.

The 5608 adds six, dry contact, Form A (normally open) mechanical relay outputs to a 5000 Series input/output system. The relay outputs can be used to control panel lamps, relays, motor starters, solenoid valves, and other on/off devices. The relay outputs are well suited to applications that cannot tolerate any off-state leakage current, that require high load currents, or that involve non-standard voltages or current ranges.

This manual covers the powering, wiring and configuration of a 5608 I/O module only. It is meant to be used with the hardware manual of the respective controller board to which the I/O module is attached.

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## 4 Installation

The installation of the 5608 module requires mounting the module on the 7.5mm by 35mm DIN rail and connecting the module to the system I/O Bus. Refer to the Schneider Electric **System Configuration Guide** for complete information on system layout, I/O Bus cable routing and module installation.

### Field Wiring Connectors

The 5608 I/O modules use screw termination style connectors for termination of field wiring. These connectors accommodate solid or stranded wires from 12 to 22 AWG.

Remove power before servicing unit.

The 5608 I/O Module has eight termination connectors for the connection of field wiring. Refer to [Figure 5.1: 5608 I/O Module Layout](#)<sup>[9]</sup> for wiring connector locations.

- Primary power input connections are wired to a 5 pole connector labeled P3. Refer to Section [Power Supply Overview and Requirements](#)<sup>[10]</sup> for more information on these connections.
- The digital outputs are wired two connectors labeled P6 and P7. Refer to the Section [Digital Inputs & Outputs \(Digital Outputs\)](#)<sup>[13]</sup> for details on wiring the digital outputs.
- The digital inputs are wired to connectors labeled P5 and P8. Refer to Section [Digital Inputs & Outputs \(Digital Inputs\)](#)<sup>[13]</sup> for details on wiring the digital inputs.



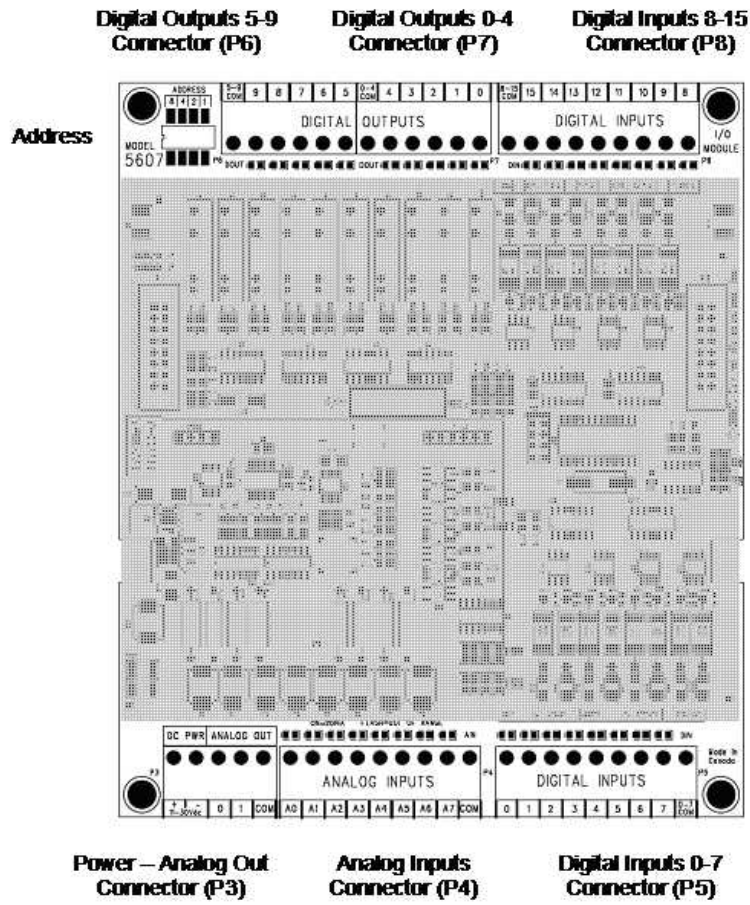



Figure 5.1: 5608 I/O Module Layout

## 5 Power Supply Overview and Requirements

The 5608 I/O module requires a nominally 12V or 24V DC power supply applied to the terminals labeled 11-30V on connector P3.

The system controller or power supply provides 5V through the I/O Bus cable. Refer to the Specifications section of the controller manual for the power capabilities of the controller. A sample power calculation for integrated SCADAPack controller utilizing this I/O board can be found in the manual of the corresponding controller board.

Power for the I/O board can be provided in several ways:

- A 24Vdc source connected to the DC PWR terminals on the controller board and on the 5608 I/O module in a parallel configuration. See Section [Recommended 24V Power Supply Configuration](#)  for an example on this wiring configuration.
- With a 12Vdc source connected to the DC PWR terminals on the controller board and on the 5608 I/O module in a parallel configuration. Refer to the hardware manual of the controller modules for an example on this wiring configuration.
- A 5103 UPS Power Supply supplies 5Vdc to the controller board through the IMC cable and supplies 24Vdc to the 5608 I/O module through the 24Vdc output. Refer to the hardware manual of the controller modules for an example on this wiring configuration.

### System Grounding

It is desirable to ground the system by connecting the system power supply common, to the chassis or panel ground. On the 5608 I/O module, the “-” terminal of the 11-30V supply (DC PWR “-”) along with terminals labeled COM are isolated from the chassis.

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## 5.1 Recommended 24V Power Supply Configuration

This configuration uses a 24V power supply to power the controller board and the 5608 I/O module.

Notes on this configuration:

- This configuration is recommended when a large amount of current is required at 24V. Refer to Section [Specifications](#) [22].
- The Controller Board DC Power terminal needs to be connected to the same power supply as the 5608 I/O Module DC Power terminals.

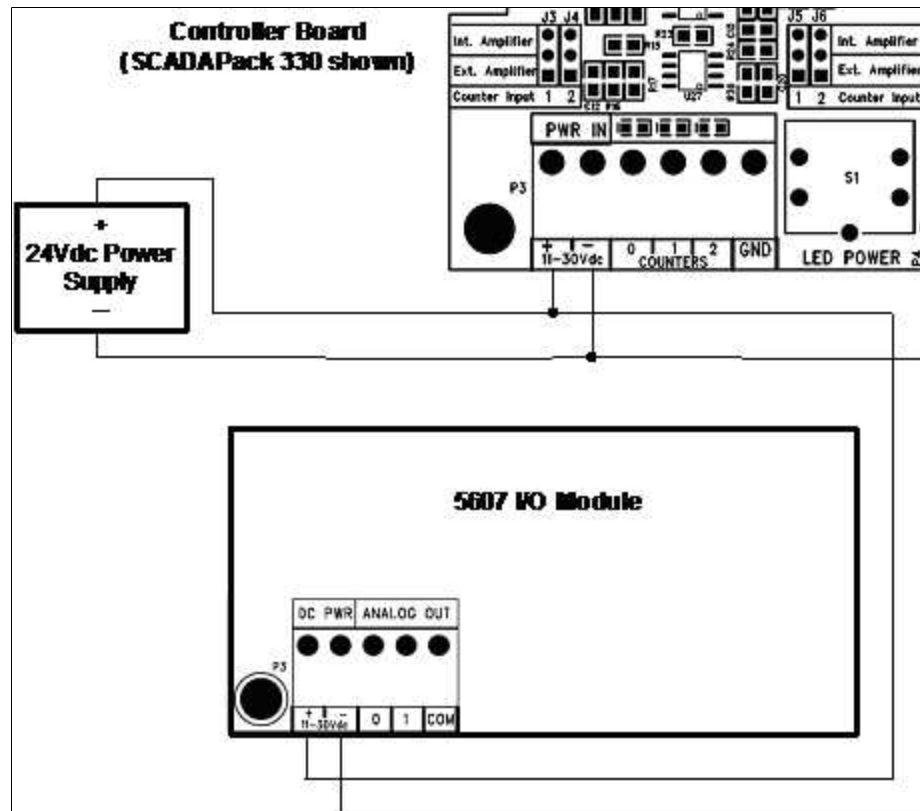


Figure 6.2: Recommended DC Power Supply Configuration

## 6 DIP Switch Settings

### Address Selection

5000 Series I/O module types may be combined in any manner to the maximum supported by the controller used.

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

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

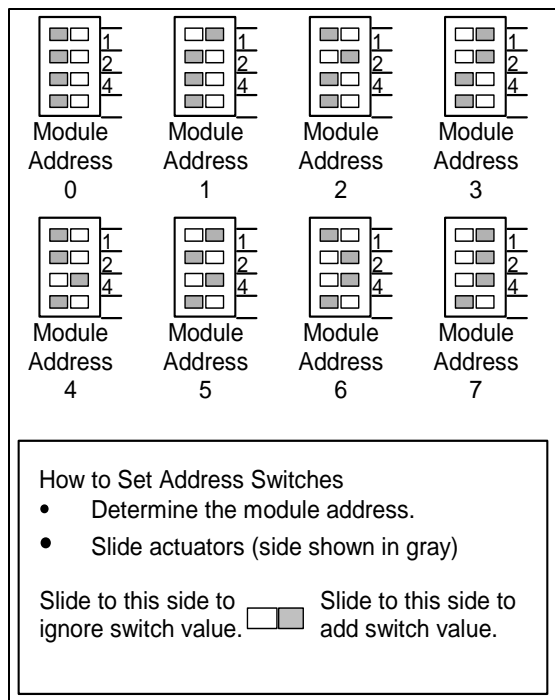
### 5608 Addressing

Three address switches on the 5608 labeled 4, 2, and 1 set the address. A 5608 I/O module that is installed in a SCADAPack is generally set to address 0. Address 0 can be used if there is no 5606, 5607, 5608, 5609, 5610 or 5611 module installed in a SCADAPack. A first additional module is generally set to address 1.

The 5606, 5607, 5608, 5609, 5610 and 5611 modules share the same address numbering, and therefore any of these modules types on the I/O bus need to have unique address numbers.

To set the address:

1. Open the four switches by sliding the actuators to the "OFF" position.
2. Close the switches that total to the desired address by sliding the actuators to "ON". Switch settings for each of the 8 module addresses are shown in the figure below.



**Figure 7.1: 5608 Address Switch Settings**

## 7 Digital I/O Overview

The 5608 I/O provides 12 digital input and 6 dry digital (mechanical relay) outputs.

- Use SCADAPack E Configurator to assign RTU database points to the I/O card channels
- For ISaGRAF applications use I/O board connections to the RTU point database (rtuxxxx boards) to read the digital inputs or control the relay outputs.

Please refer to the ISaGRAF software and SCADAPack E Configurator manuals on how to assign RTU points to use ISaGRAF I/O Boards and Complex Equipment types.

- [Digital Inputs & Outputs](#)<sup>15</sup>
  - [Wiring Examples](#)<sup>16</sup>
-

## 7.1 Digital Inputs & Outputs

### Digital Inputs

The digital inputs are optically isolated from the logic power and are available in four standard voltage ranges, for both AC and DC applications. A current limiting resistor, on each input, determines the voltage range. Light Emitting Diodes (LED) on the digital inputs show the status of each of the input. The digital input LEDs can be disabled to conserve power.

To simplify field wiring, the 12 inputs are organized into two groups of inputs. Each group shares a common return. These groups of inputs are isolated from each other. Inputs 0 to 7 are in one group. Inputs 8 to 11 are in another group.

### Digital Outputs

The 5608 I/O module has 6, dry contact, digital (mechanical relay) outputs. Outputs are Form A (normally open NO). Loads can be connected to either output terminal and to either the high or the low side of the power source. Light Emitting Diodes (LEDs) on the digital outputs show the status of each of the outputs. The digital output LEDs can be disabled to conserve power.

Incandescent lamps and other loads may have inrush currents that will exceed the rated maximum current of the relay contacts. This inrush current may damage the relay contacts. Interposing relays need to be used in these situations.

## 7.2 Wiring Examples

The 5608 I/O module accommodates AC or DC inputs.

The voltage range is configured at the factory.

### CAUTION

#### UNEXPECTED EQUIPMENT OPERATION

Do not exceed the maximum voltage specified for each digital input.

**Failure to follow these instructions can result in equipment damage.**

### WARNING

#### HAZARD OF ELECTRIC SHOCK

Remove power from all devices before connecting or disconnecting inputs or outputs to any terminal or installing or removing any hardware.

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

[Figure 10.1: Digital Input Wiring of DC Signals](#) <sup>16</sup> shows typical wiring of DC signals to the digital input ports.

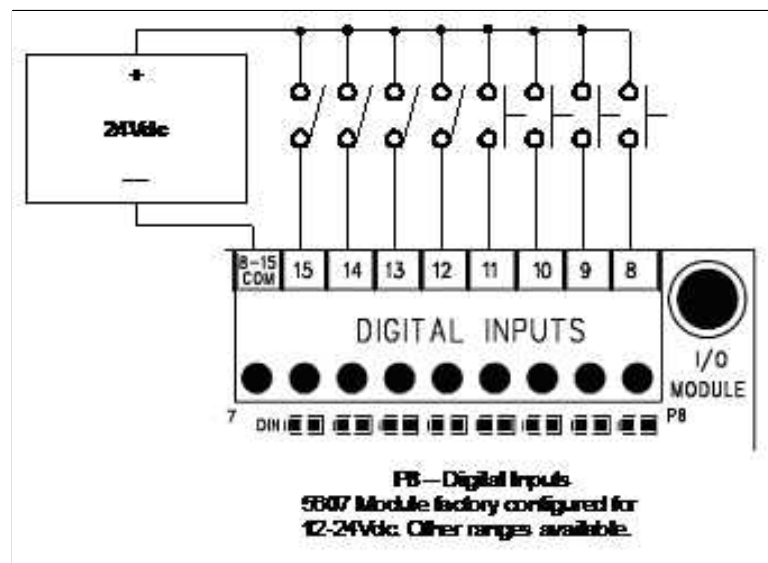


Figure 10.1: Digital Input Wiring of DC Signals



[Figure 10.2: Digital Input Wiring of AC Signals](#)<sup>17)</sup> shows a typical wiring of AC signals to the digital input ports.

Signal polarity needs to be observed when using DC inputs. Connect the positive signal to the input. Connect the negative signal to the common.

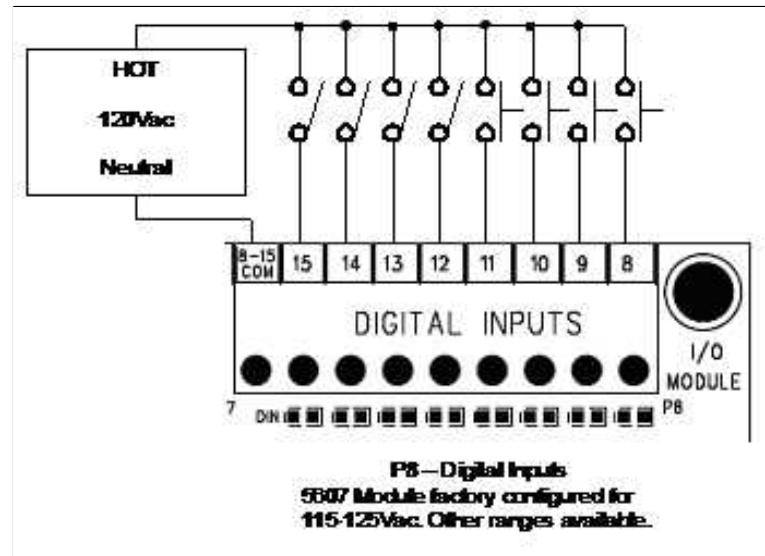
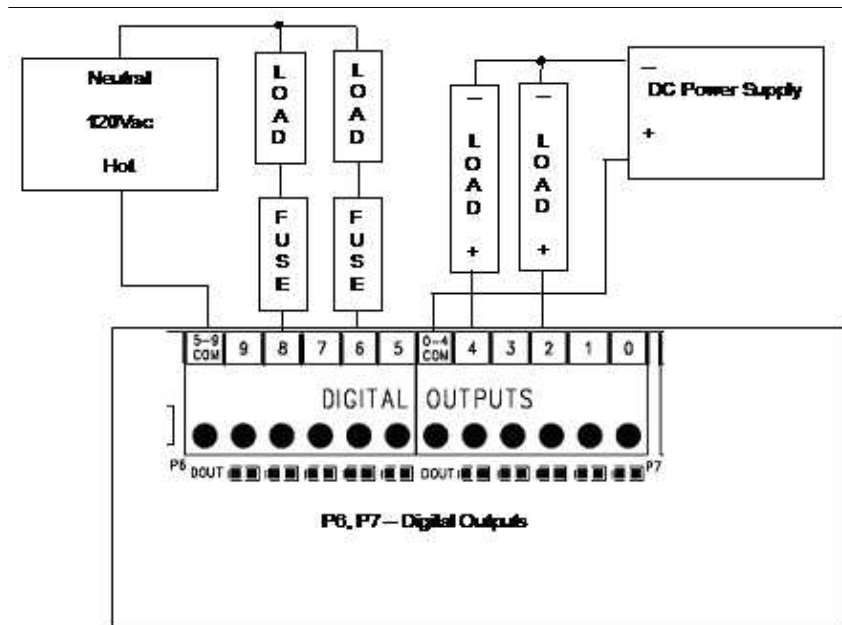


Figure 10.2: Digital Input Wiring of AC Signals

Refer to [Figure 10.3: Digital Output Wiring](#) below for a digital output wiring example. In this example 120Vac is switched through the common of relays 0-3 through relays 0 and 2 to the loads. The loads share a common 120Vac Neutral. The fuses shown are recommended. Relays 4 and 6 are used to switch the DC power to two loads. In the DC example the negative side of the loads are switched through the common of relays 4 through 7 to the negative side of the DC power supply.



**Figure 10.3: Digital Output Wiring**

Care needs to be taken when controlling inductive loads with digital outputs. The energy stored in the coil is capable of generating significant electrical noise when the relay contacts are opened. This noise can be suppressed using a diode across the coil in DC circuits or using a MOV (varistor) across the coil in AC circuits.

Incandescent lamps and other loads may have inrush currents that will exceed the rated maximum current of the relay contacts. This inrush current may damage the relay contacts. Interposing relays need to be used in these situations.

## 8 Operation and Maintenance

### LED Indicators

There are 56 LED's on the 5608 I/O Module. LED's can be disabled by the controller board to conserve power. Refer to the manual of your controller board for details on disabling the LEDs.

The table below describes the LED's.

**Table 11.1: LED Indicators**

| LED   | Function                                |
|-------|---|
| DOUTs | On when the corresponding output is on. |
| DINs  | On when the corresponding input is on.  |

### Maintenance

This module requires no routine maintenance. If the module is not functioning correctly, contact Schneider Electric Technical Support for more information and instructions for returning the module for repair.

## 8.1 Troubleshooting

### Calibration

The 5608 module is calibrated at the factory. It does not require periodic calibration. Calibration may be necessary if the module has been repaired as a result of damage. Calibration is done electronically at the factory. There are no user calibration procedures.

- [Digital Inputs & Outputs](#)<sup>21</sup>
-

### 8.1.1 Digital Inputs & Outputs

#### Digital Inputs

| Condition  | Action   |
|--|--|
| Input LED does not come on when input signal is applied. | Check the input signal at the termination block. It should be at least 50% of the digital input range.<br>If this is a DC input, check the polarity of the signal. |
| Input is on when no signal is applied. The LED is off.   | Check that the digital inputs are not forced on.   |
| Input is off when a signal is applied. The LED is on.    | Check that the digital inputs are not forced off.  |

#### Digital Outputs

| Condition  | Action   |
|--|--|
| Output LED does not come on when output is turned on.                            | Check the LED POWER from the SCADAPack controller.               |
| Output LED comes on but the output does not close.                               | Check if the relay is stuck. If so, return the board for repair. |
| Output LED comes on and output is closed, but the field device is not activated. | Check the field wiring.<br>Check the external device.            |
| Output LED and relay are on when they should be off.                             | Check that the output is not forced on.                          |
| Output LED and relay are off when they should be on.                             | Check that the output is not forced off.                         |

## 9 Specifications

*Disclaimer:* Schneider Electric reserves the right to change product specifications without notice. For more information visit <http://www.schneider-electric.com>.

- [General & Power Supply](#)<sup>23</sup>
  - [Digital Inputs](#)<sup>24</sup>
  - [Relay Digital Outputs](#)<sup>25</sup>
-

## 9.1 General & Power Supply

### General

|                         |   |
|-------------------------|---|
| <b>I/O Terminations</b> | 12 to 22 AWG<br>15A contacts<br>Screw termination - 6 lb.-in. (0.68 Nm) torque  |
| <b>Dimensions</b>       | 5.65 inch (144mm) wide<br>6.50 inch (165mm) high<br>1.80 inch (72mm) deep   |
| <b>Packaging</b>        | corrosion resistant zinc plated steel with black enamel paint   |
| <b>Environment</b>      | 5% RH to 95% RH, non-condensing<br>-25°C to 70°C (-13°F to 158°F) operation<br>-40°C to 85°C (-40°F to 185°F) storage |
| <b>Addressing</b>       | 8 modules. DIP switch selectable.   |

### Power Supply

|  |   |
|--|---|
| <b>5V power requirements<br/>(Dry Contact Relay Version)</b> | Digital Output Relays Continuous - 195mA<br>LEDs - 107mA<br>Quiescent - 23mA<br>Total - up to 325mA |
| <b>5V power requirements<br/>(Solid State Relay Version)</b> | Digital Output Relays Continuous - 100mA<br>LEDs - 110mA<br>Quiescent - 23mA<br>Total - up to 233mA |
| <b>11-30Vdc power requirements</b>                           | 9-30Vdc operation possible<br>UL508 rated 13.75 to 28Vdc.   |
| <b>11-30Vdc - Connector</b>                                  | Removable. 5 positions.   |
| <b>11-30Vdc - Isolation</b>                                  | Isolation from logic supply and chassis   |

## 9.2 Digital Inputs

|   |   |  |
|---|---|--|
| <b>Quantity</b>   | 12  |  |
| <b>Ranges</b>   | Factory configurable<br>12/24V<br>48V<br>115/125V<br>240V   |  |
| <b>Over-voltage Tolerance</b>                                 | 150% sustained over-voltage without damage  |  |
| <b>Input Current</b>  | 0.67 mA typical at 24V on the 12/24V range<br>0.37 mA typical at 48V on the 48V range<br>0.35 mA typical at 120V on the 115/125V range<br>0.35 mA typical at 240V on the 240V range |  |
| <b>Input Logic-HI Level</b>                                   | OFF to ON transition threshold is typically 6.5V on 12/24V range<br>OFF to ON transition threshold is typically 50% of full scale range on other ranges.                            |  |
| <b>AC Input Voltage</b><br>12V/24V<br>48V<br>115/125V<br>240V | Off – To – On<br>7.5Vrms+/- 2Vrms<br>25Vrms +/- 5Vrms<br>65Vrms+/- 5Vrms<br>135Vrms+/-10Vrms  | On – To – Off<br>6.0Vrms+/- 2Vrms<br>20Vrms +/- 5Vrms<br>55Vrms+/- 5Vrms<br>115Vrms+/-10Vrms |
| <b>DC Input Voltage</b><br>12V/24V<br>48V<br>115/125V<br>240V | Off – To – On<br>6.5Vdc+/- 0.5Vdc<br>22Vdc+/-5Vdc<br>65Vdc+/-5Vdc<br>125Vdc+/-10Vdc   | On – To – Off<br>6.5Vdc+/- 0.5Vdc<br>22Vdc+/-5Vdc<br>65Vdc+/-5Vdc<br>125Vdc+/-10Vdc          |
| <b>AC Response Time</b><br>@50 Hz<br>@60 Hz                   | Off – To – On<br>5 – 22ms<br>5— 22ms  | On – To – Off<br>6 – 18ms<br>6 – 18ms  |
| <b>DC Response Time</b><br>@50 Hz<br>@60 Hz                   | Off – To – On<br>15 – 19ms<br>13.5 – 18ms   | On – To – Off<br>25 – 29ms<br>23 - 28ms  |
| <b>Connectors</b>   | 2 removable. 9 positions.   |  |
| <b>Isolation</b>  | Isolation is in 2 groups of 8 and 4 inputs respectively. Isolation from logic supply and chassis: 250Vac/1000Vdc.   |  |
| <b>Indicators</b>   | Logic powered LEDs. Can be disabled to conserve power.  |  |



### 9.3 Digital Outputs

|                           |   |
|---------------------------|---|
| <b>Quantity</b>           | 6   |
| <b>Connectors</b>         | 2 removable. 6 positions.   |
| <b>Type</b>               | Form A Contacts (Normally open)<br>5 contacts share one common  |
| <b>Indicators</b>         | Logic powered LEDs. Can be disabled to conserve power.  |
| <b>Voltages</b>           | Maximum permitted voltage in Canada or North America is 240Vac.<br>Maximum permitted voltage outside of Canada or North America is 30Vac/42.4Vpk/60Vdc.       |
| <b>Inductive Loads</b>    | Inductive loads need to be suitably protected to protect the relay contacts. See manual for recommended inductive load protection circuits.                   |
| <b>Isolation</b>          | Chassis to contact: 1500Vac (1 min.)<br>Logic to contact: 1500Vac (1 min.)<br>Isolation is in 2 groups of 5<br>Output group to output group: 1500Vac (1 min.) |
| <b>Operate Time</b>       | 25ms maximum, 20ms typical  |
| <b>Release Time</b>       | 30ms maximum, 25ms typical  |
| <b>Dry Contact Relays</b> |   |
| <b>Contact rating</b>     | 3A, 30Vdc or 240Vac (Resistive)<br>1000Vac between open contacts<br>12A maximum per common  |
| <b>Switching Capacity</b> | 5A, 30Vdc (150W Resistive)<br>5A X 250Vac (1250VA Resistive)  |
| <b>Service Life</b>       | 2 X 10 <sup>7</sup> mechanical<br>1 X 10 <sup>5</sup> at contact rating   |
| <b>Bounce Time</b>        | 1ms typical   |

## 10 Approvals and Certifications

|                          |   |
|--------------------------|---|
| <b>Safety</b>            | UL (cULus) listed: UL508 (Industrial Control Equipment), CSA C22.2 No.142-M1987 (Process Control Equipment)   |
| <b>Digital Emissions</b> | FCC47 Part 15, Subpart B, Class A Verification<br>EN61000-6-4: 2007 Electromagnetic Compatibility Generic Emission Standard Part2: Industrial Environment |

|                            |   |
|----------------------------|---|
|                            | C-Tick compliance. Registration number N15744   |
| <b>Immunity</b>            | EN61000-6-2: 2005 Electromagnetic Compatibility Generic Standards Immunity for Industrial Environments  |
| <b>CE Mark Declaration</b> | 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<br>The Low Voltage Directive is not applicable to this product. |

