SCADAPack

6607 Input Output Module

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1   Legal Information

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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.

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2   Technical Support

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

Technical support: Americas, Europe, Middle East, Asia

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

	Check our FAQs	Explore our extensive knowledge database and FAQ videos to find answers quickly: https://se.com/faq
	Email us	Save time by emailing us your inquiry and an expert will contact you: supportTRSS@se.com Send us an email anytime.
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3   Safety Information

Important 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 a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

NOTICE is used to address practices not related to physical injury.

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, installation, and operation of electrical equipment 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.

⚠ WARNING

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 death or serious injury.

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

Test all software 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 help prevent accidental equipment damage.

Operation and adjustments

The following precautions prevail:

- 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.

Acceptable use

⚠ WARNING
UNACCEPTABLE USE
Do not use SCADAPacks or I/O modules as an integral part of a safety system. These devices are not safety products.
Failure to follow these instructions can result in death or serious injury.

⚠ CAUTION
EQUIPMENT OPERATION HAZARD
When devices are used for applications with technical safety requirements, the relevant instructions must be followed.
Use only Schneider Electric software or approved software with Schneider Electric hardware products.
Failure to follow these instructions can result in minor or moderate injury.

4   About the Book

Audience

> ### ⚠ WARNING
>
> **UNINTENDED EQUIPMENT OPERATION**
>
> The application of this product requires expertise in the design and programming of control systems. Only persons with such expertise are 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 or serious injury.**

This manual is written for people who need to install, troubleshoot or maintain the 6607 input output module hardware. These individuals are typically:

- Systems Engineers
- Commissioning Engineers
- Maintenance Technicians

Document scope

This manual describes:

- The physical design of the 6607 input output module, including detailed hardware specifications
- Installation, wiring and addressing for the 6607 input output module
- Diagnostics capabilities on the 6607 input output module
- Maintenance recommendations for the 6607 input output module

Validity note

This document is valid for:

- SCADAPack x70 firmware version 9.6.1 and earlier
- SCADAPack RemoteConnect configuration software version 3.9.1 and earlier

Related documents

Use this manual with the other manuals included in your SCADAPack x70 documentation set. The table below describes the manuals available in the documentation set.

Folder	Manual	Content

Getting Started	Getting Started	• The SCADAPack x70 family of products available in this release • The basic steps to get your SCADAPack x70 device operational • Where to get more information about configuring, monitoring and managing your SCADAPack x70 device
SCADAPack Software Installation	SCADAPack Software Installation	• Hardware and software requirements • Installation procedures • Accessing help • Troubleshooting guidance
Hardware Manuals	The hardware manual for your SCADAPack x70 device	• Installation, wiring and addressing information • Diagnostics capabilities • Maintenance recommendations • Hardware specifications
Configuration Manuals	SCADAPack RemoteConnect Configuration Software	• Setting up and managing projects for your SCADAPack x70 device
	PC Communication Settings -SCADAPack CommDTM	• Setting up communications between SCADAPack RemoteConnect and your SCADAPack x70 device
	SCADAPack x70 Configuration	• Configuring SCADAPack x70 device operation
	Porting Guide for SCADAPack E to SCADAPack RemoteConnect	• Moving from SCADAPack E to SCADAPack RemoteConnect • Locating SCADAPack E Configurator features in SCADAPack RemoteConnect • Locating SCADAPack Workbench features in SCADAPack RemoteConnect • Compatibility chart
	Porting Guide for Telepace to SCADAPack RemoteConnect	• Moving from Telepace to SCADAPack RemoteConnect • Tutorial for creating a project • Compatibility chart
Technical	SCADAPack	• USB, serial and IP communications

Reference Manuals	Communication Interfaces Technical Reference	• Mobile communications • Dialup modem communications
	SCADAPack Operations Technical Reference	• The SCADAPack x70 device file system • Command line operations • Diagnostics operations • Telnet server operations • FTP server operations
	SCADAPack SCADA Protocols Technical Reference	• DNP3 protocol support • Modbus protocol support • IEC 60870-5-104 protocol support
Logic Programming Manuals	SCADAPack Logic Programming Overview	• The differences between EcoStruxure Control Expert (Unity Pro) and the SCADAPack x70 Logic Editor environment • Key programming concepts • Basic procedures needed to use the SCADAPack x70 Logic Editor
	SCADAPack Function Blocks Technical Reference	• The custom SCADAPack x70 function blocks that are available for developing IEC 61131-3 applications
	Using EFB Toolkit with SCADAPack x70	• Using the Schneider Electric EFB Toolkit with SCADAPack x70 devices and SCADAPack RemoteConnect configuration software
Security Administrator Manuals	SCADAPack Security Administrator	• Configuring security on your SCADAPack x70 device
	SCADAPack Security Technical Reference	• Security standards • Security overview • DNP3 Secure Authentication • Diagnostics • Attack vectors and requirements

5   About the 6607 Input Output Module

The I/O module increases the SCADAPack I/O capacity by providing:

- 16 digital inputs, 8 of which have an associated counter
- 10 digital outputs
- 8 analog inputs
- 2 analog outputs

The 6607 input output module can be used with SCADAPack x70 RTUs.

This document describes how to use the 6607 input output module.

Connections

The I/O module includes a short intermodule cable for connecting to a SCADAPack or to another I/O module. For information about the maximum number of 6607 input output modules supported, see the hardware manual for your SCADAPack. For details on connecting I/O modules, see Intermodule Cabling 43.

Screw-termination connectors are provided for connecting the inputs and outputs to the devices you want to monitor or control. For details on wiring input and output connectors, see Field Wiring 49.

Configuration

You can configure the I/O module inputs and outputs in the following ways:

- Locally or remotely using the SCADAPack RemoteConnect configuration software on a desktop or laptop computer connected to the SCADAPack through the USB Device port or through any of the available serial or Ethernet ports.

- Remotely as part of an end-to-end SCADA system using the EcoStruxure Geo SCADA Expert (ClearSCADA) software.

Before you begin configuring the inputs and outputs on the I/O module, determine whether the Geo SCADA Expert software will be used for any configuration tasks. This documentation assumes you are using the SCADAPack RemoteConnect configuration software to configure the I/O module. For information about using the Geo SCADA Expert software, see the Geo SCADA Expert documentation.

6   Cybersecurity

Cybersecurity is a branch of network administration that addresses attacks on or by computer systems and through computer networks that can result in accidental or intentional disruptions. The objective of cybersecurity is to help provide increased levels of protection for information and physical assets from theft, corruption, misuse, or accidents while maintaining access for intended users.

No single cybersecurity approach is adequate. Schneider Electric recommends a defense-in-depth approach. This approach layers the network with security features, appliances, and processes. The basic components of this approach are:

- Risk assessment: A systematic security analysis of the environment and related systems.

- A security plan built on the results of the risk assessment

- A multi-phase training campaign

- Network separation and segmentation: Physical separation of the control network from other networks, and the division of the control network itself into segments and security zones.

- System Access Control: Controlling access to the system with firewalls, authentication, authorization, and other software means, and traditional physical security measures such as video surveillance, fences, locked doors and gates, and locked equipment cabinets.

- Device hardening: The process of configuring a device against communication-based threats. Device hardening measures include disabling unused network ports, password management, access control, and the disabling of all unnecessary protocols and services.

- Network monitoring and maintenance: An effective defense-in-depth campaign requires continual monitoring and system maintenance to meet the challenge of new threats as they develop.

- See Security Considerations in the Security Technical Reference manual

Contact us

For more information, refer to the Schneider Electric Cybersecurity Support Portal at http://www.se.com/b2b/en/support/cybersecurity/overview.jsp.

Additional Resources

Industrial Control Systems Cyber Emergency Response Team (ICS-CERT)
https://ics-cert.us-cert.gov

ICS-CERT Recommended Practices
https://ics-cert.us-cert.gov/Recommended-Practices

Center for Internet Security (CIS) Top 20 Critical Security Controls
https://www.cisecurity.org/cybersecurity-best-practices

FBI Cyber Crime
https://www.fbi.gov/investigate/cyber

Guide to Industrial Control Systems (ICS) Security
https://www.nist.gov/publications/guide-industrial-control-systems-ics-security
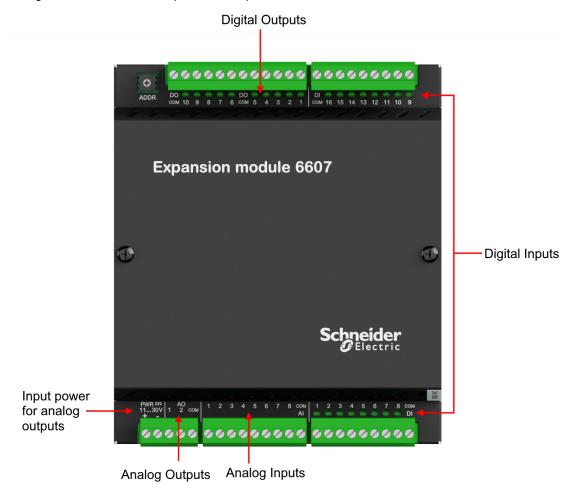
WaterISAC Water Security Network
https://www.waterisac.org

7   Hardware Overview

The I/O module increases the SCADAPack I/O capacity by providing:

- 16 digital inputs, 8 of which have an associated counter
- 10 digital outputs
- 8 analog inputs
- 2 analog outputs

The figure below shows the inputs and outputs on the I/O module.

For ease of wiring and maintenance, external connections are terminated on removable connectors. If you need to remove the I/O module cover for any reason, first carefully consider the following information.

> ⚠ **WARNING**
>
> **UNINTENDED EQUIPMENT OPERATION**
>
> Evaluate the operational state of the equipment being monitored or controlled by the SCADAPack or the I/O module before removing power.
>
> **Failure to follow these instructions can result in death or serious injury.**

> ⚠ **WARNING**
>
> **ELECTRICAL HAZARD**
>
> Remove power from the I/O module before removing the I/O module cover.
>
> **Failure to follow these instructions can result in death or serious injury.**

> *NOTICE*
>
> **STATIC ELECTRICITY DAMAGE**
>
> The electronics inside the I/O module can be damaged by static electricity. If you need to remove the I/O module cover, wear an anti-static wrist strap that is connected to ground. Failing to follow this step can cause intermittent or total loss of I/O module operation and will void the warranty.
>
> **Failure to follow these instructions can result in equipment damage.**

For complete hardware specifications, see Specifications [76].

Input/Output Type	Label	Polarity Sensitive	Description
Digital inputs [20] Counter inputs [21]	DI 1 to 16 DI 1 to 8	Yes	• Digital inputs, the first eight (DI 1-8) of which have associated counters • Organized into two groups of eight inputs: DI 1-8 and DI 9-16 • Each group shares a common return • The two groups are optically isolated from one another and from the SCADAPack RTU input power
Digital outputs [22]	DO 1 to 10	No	• Dry contact Form A Normally Open mechanical relay outputs • Organized into two groups of 5 inputs: DO 1-5 and DO 6-10

Input/Output Type	Label	Polarity Sensitive	Description
			• Voltage-free NO contacts that share a common return • Electrical isolation is provided between each digital output group and the SCADAPack RTU input power
Analog inputs [23]	AI 1 to 8	Yes	• Configurable using SCADAPack RemoteConnect configuration software
Analog outputs [26]	AO 1 to 2	Yes	• Electrical isolation is provided from each channel to SCADAPack RTU input power, but not between channels

7.1 Digital Inputs

There are 16 digital inputs provided.

The digital inputs:

• Provide Sequence of Event (SOE) timestamping to support SOE applications

• Support state debouncing

Digital inputs are used to monitor the state of devices such as valves, motors and level switches.

Wetting voltage for the volt-free contacts is usually provided by the DC power used with the SCADAPack.

The LED for each digital input is lit when the input is active.

Digital inputs are available for nominal 12...24 Vdc operation. A current-limiting resistor on each input determines the voltage range.

Configuration

Use the SCADAPack RemoteConnect configuration software to define the characteristics of each digital input, including:

• DNP3 parameters

• Modbus parameters

• Event attributes

• Alert notifications

• Physical I/O performance

For more information about configuring digital inputs, see the Configuring Analog and Digital I/O Channels topic in the SCADAPack x70 Configuration manual.

Wiring

Digital inputs support solid or stranded wires from 2.5...0.2 mm^2 (12...30 AWG).

For more information, see Wiring Screw-Termination Connectors 50 .

Specifications

For digital input specifications, see Specifications 78 .

7.2   Counter Inputs

In the 6607 input output module, digital inputs 1 to 8 have an associated counter. The counter inputs are represented as 32-bit counters.

The corresponding digital input invert settings are applied prior to counting transitions of the input.

- If configured as non-inverting (default configuration), counter input objects count OFF to ON transitions.
- If configured as inverted, ON to OFF transitions are counted on the corresponding counter channel.

The LED for each counter input is lit when the input is active.

Configuration

Use the SCADAPack RemoteConnect configuration software to define the characteristics of each counter input, including:

- DNP3 parameters
- Modbus parameters
- Event attributes
- Alert notifications

For more information about configuring counter inputs, see the Configuring Counter I/O Channels topic in the SCADAPack x70 Configuration manual.

Wiring

Counter inputs support solid or stranded wires from 2.5...0.2 mm^2 (12...30 AWG).

For more information, see Wiring Screw-Termination Connectors 50 .

Specifications

For counter input specifications, see Specifications 79 .

7.3　　　**Digital Outputs**

The I/O module expands the function of the SCADAPack with 10 dry contact (mechanical) relay outputs.

Digital outputs are used to control panel lamps, relays, motor starters, solenoid valves and other 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.

For Form A digital outputs that have a single Normally Open (NO) contact, loads can be connected to either the high or the low side of the power source.

The LED for each digital output is lit when the NO contact is closed, or activated, and the circuit is continuous.

⚠ WARNING

DATA LOSS, APPLICATION LOSS

When the logic application running in the SCADAPack x70 devices stops unexpectedly, the SCADAPack x70 firmware turns OFF all physical digital outputs and sets all physical analog outputs to a value of zero. This can occur in the following situations:

- Logic application unexpectedly HALTs

- Logic application is put into a STOP state by the user

- Logic application restarts from a user initiated SCADAPack RemoteConnect command

- SCADAPack x70 device is restarted

- Logic application is removed

Evaluate the operational state of the equipment being monitored or controlled by the SCADAPack x70 device and the logic application before resuming operation.

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

Configuration

Use the SCADAPack RemoteConnect configuration software to define the characteristics of each digital output, including:

- DNP3 parameters

- Modbus parameters

- Event attributes

- Alert notifications

For more information about configuring digital outputs, see the Configuring Analog and Digital I/O Channels topic in the SCADAPack x70 Configuration manual.

Wiring

Digital outputs support solid or stranded wires from 2.5...0.2 mm^2 (12...30 AWG).

For more information, see Wiring Screw-Termination Connectors [50].

Specifications

For digital output specifications, see Specifications [79].

7.4   Analog Inputs

Analog inputs are used to monitor devices such as pressure, level, flow and temperature transmitters, instrumentation such as pH and conductivity sensors, and other high-level analog signal sources.

The analog inputs are factory-calibrated for 0...20 mA and 4...20 mA current operation and for 0...5 Vdc and 1...5 Vdc operation. The input type can be changed using SCADAPack RemoteConnect configuration software. The input range is selected using the SCADAPack RemoteConnect configuration software. The SCADAPack and the I/O module use a 24-bit delta-sigma analog-to-digital converter (ADC).

- In current mode, a 250 ohm current sense resistor is used across each single-ended analog input channel. The measurement range in current mode is 0...20 mA or 4...20 mA, selectable through the SCADAPack RemoteConnect configuration software. The 250 ohm resistor produces a voltage drop (input reading) of 5 Vdc for 20 mA of current flow. Loop current will only flow in analog inputs that have been configured for 20 mA.

- In voltage mode, the analog inputs are high-impedance and single-ended with a measurement range of 0...5 Vdc or 1...5 Vdc, selectable through the SCADAPack RemoteConnect configuration software.

The SCADAPack supports using a mix of current mode and voltage mode analog inputs if required. For details, see Supporting a Mix of Current and Voltage Inputs [59].

Configuration

Use the SCADAPack RemoteConnect configuration software to define the characteristics of each analog input, including:

- DNP3 parameters
- Modbus parameters
- Alert notifications
- Range and Scaling [24]
- Value deviation

For more information about configuring analog inputs, see the Configuring Analog and Digital I/O Channels topic in the SCADAPack x70 Configuration manual.

Wiring

Analog inputs support solid or stranded wires from 2.5...0.2 mm^2 (12...30 AWG).

For more information, see <u>Wiring Screw-Termination Connectors</u> 50.

Specifications

For analog input specifications, see <u>Specifications</u> 80.

7.4.1   Range and Scaling

The 6607 input output module analog inputs use single-ended, common ground, unipolar analog-to-digital converters (ADC) that measure input currents from 0...20 mA or input voltages from 0...5 Vdc including under range and over range capability. For more information, see <u>Analog Inputs</u> 80 under Specifications.

To assign SCADAPack database objects to the analog input channels, use the SCADAPack RemoteConnect configuration software to select the signal range for each analog input channel. Each analog input channel can be configured for one of the following signal ranges:

- 0...20 mA
- 4...20 mA
- 0...5 Vdc
- 1...5 Vdc

The signal range selected is used in conjunction with the **Raw Minimum** and **Raw Maximum** configuration for each analog object to present an integer value for the analog input. See tables below.

Engineering Minimum and **Engineering Maximum** configurations are also available for each analog object to scale from the analog object's integer value to its **Engineering Floating Point** object value. Analog objects simultaneously provide both integer and engineering values. The SCADAPack configuration can independently choose either value type for logic, protocol reporting, and other applications.

An **Under Range Limit** and **Over Range Limit** can also be configured on each analog object. These are configured in Engineering Floating Point units. Depending on the configuration values chosen, Under Range Limit and Over Range Limit can be configured to report an out of range physical analog input signal, or an unexpected process signal.

Under range status on an analog object is indicated through an object quality flag. The under range quality flag is set when the engineering value of an object is lower than the under range limit configured in SCADAPack RemoteConnect. Over range status on an analog object is indicated through an object quality flag. The over range quality flag is set when the engineering value of an object is higher than the Over Range Limit configured in SCADAPack RemoteConnect.

The under range and over range flags are visible in the SCADAPack RemoteConnect object browser, via protocols such as DNP3, in logic variable quality fields, and in other applications.

The default attributes for analog objects for SCADAPack x70 device analog input channels are:

- Raw Minimum = 0, Raw Maximum = 10000

- Engineering Minimum = 0, Engineering Maximum = 100

- Under Range Limit = -1

- Over Range Limit = disabled

In their default configuration, analog input channel over range detection is disabled.

Analog input channels configured for 0..20 mA or 0..5 Vdc do not indicate under range conditions.

Current signals

The following table shows the relationship between analog input channel current range, analog signal, and the analog object's reported integer and engineering values.

Input	0...20 mA Range			4...20 mA Range		
Current (mA)	Analog Signal (% of Range)	Object Integer Value	Object Engineering Value	Analog Signal (% of Range)	Object Integer Value	Object Engineering Value
0.00	0%	Raw Minimum	Engineering Minimum	-25% of range	Less than Raw Minimum	Less than Engineering Minimum
4.00	20% of range			0%	Raw Minimum	Engineering Minimum
8.00	40% of range			25% of range		
12.00	60% of range			50% of range		
16.00	80% of range			75% of range		
20.00	100% of range	Raw Maximum	Engineering Maximum	100% of range	Raw Maximum	Engineering Maximum
22.00	110% of range	More than Raw Maximum	More than Engineering Maximum	112.5% of range	More than Raw Maximum	More than Engineering Maximum

Values above 22 mA cannot be accurately measured by the analog inputs.

Voltage signals

The following table shows the relationship between analog input channel voltage range, analog signal and the analog object's reported integer and engineering values.

Input	0...5 Vdc Range			1...5 Vdc Range		
Voltage (Vdc)	Analog Signal (% of Range)	Object Integer Value	Object Engineering Value	Analog Signal (% of Range)	Object Integer Value	Object Engineering Value
0.00	0%	Raw Minimum	Engineering Minimum	-25% of range	Less than Raw Minimum	Less than Engineering Minimum
1.00	20% of range			0%	Raw Minimum	Engineering Minimum
2.00	40% of range			25% of range		
3.00	60% of range			50% of range		
4.00	80% of range			75% of range		
5.00	100% of range	Raw Maximum	Engineering Maximum	100% of range	Raw Maximum	Engineering Maximum
5.50	110% of range	More than Raw Maximum	More than Engineering Maximum	112.5% of range	More than Raw Maximum	More than Engineering Maximum

Values above 5.50 V cannot be accurately measured by the analog inputs.

7.5   Analog Outputs

Analog outputs are used to control remote devices that require varying input information, rather than simply on or off operations.

The analog output channels are powered with an external 12...30 Vdc (nominally 12 Vdc or 24

Vdc) power supply. They can be configured for 4...20 mA current or 0...20 mA current. The outputs provide a level of transient and over-voltage protection. Analog output resolution is 12 bits. The outputs share a common return with each other and with the analog inputs.

⚠ WARNING

DATA LOSS, APPLICATION LOSS

When the logic application running in the SCADAPack x70 devices stops unexpectedly, the SCADAPack x70 firmware turns OFF all physical digital outputs and sets all physical analog outputs to a value of zero. This can occur in the following situations:

- Logic application unexpectedly HALTs

- Logic application is put into a STOP state by the user

- Logic application restarts from a user initiated SCADAPack RemoteConnect command

- SCADAPack x70 device is restarted

- Logic application is removed

Evaluate the operational state of the equipment being monitored or controlled by the SCADAPack x70 device and the logic application before resuming operation.

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

Configuration

Use the SCADAPack RemoteConnect configuration software to define the characteristics of each analog output, including:

- DNP3 parameters

- Modbus parameters

- Alert notifications

- [Range and Scaling](#) 28

- Value deviation

For more information about configuring analog outputs, see the Configuring Analog and Digital I/O Channels topic in the SCADAPack x70 Configuration manual.

Wiring

Analog outputs support solid or stranded wires from 2.5...0.2 mm^2 (12...30 AWG).

For more information, see [Wiring Screw-Termination Connectors](#) 50.

Specifications

For analog output specifications, see [Specifications](#) 81.

7.5.1   Range and Scaling

The analog output module has a 12-bit, unipolar, digital-to-analog converter (DAC).

In the SCADAPack RemoteConnect configuration software, you can select one of the following **AO Output Type** ranges. The analog output channels use the same range:

- 0...20 mA

- 4...20 mA

The resolution is 5.9 µA per DAC count.

Configuration for objects attached to the analog output module channels uses the **Raw Minimum** to **Raw Maximum** and **Engineering Minimum** to **Engineering Maximum** parameters for integer and engineering scaling, respectively.

These scaling ranges are applied automatically to the selected analog output signal range (0...20 mA or 4...20 mA).

7.5.2   Load Resistance Requirements

The load resistance for any given power supply voltage is limited:

- On the high resistance end by the requirement for proper operation of the analog output circuit

- On the low resistance end by the power dissipation in the analog output

The table below lists the analog output load resistance range. The operating range is within the area defined as resistance limits.

Power Supply	Load Resistance Required
12 Vdc	0...400 ohms
24 Vdc	0...1000 ohms
30 Vdc	250...1300 ohms

7.6   Isolation and Protection Summary

The 6607 input output module provides isolation and protection from external connections as described in the table below.

Connections	Isolation	Protection
Digital inputs	Optical	Current-limiting resistor and reverse polarity diode
Digital outputs	Relay	None
Analog inputs	Digital isolators	TVS diode and PTC

Connections	Isolation	Protection
	Isolation from SCADAPack RTU input power	
Analog outputs	Digital isolators Isolation from SCADAPack RTU input power	TVS diode

Over-voltage protection

Over voltage may occur on cables that extend from a cabinet to a remote device or another cabinet. Results can include corrupted data carried on the cable or damage to devices connected to that cable. Following the guidelines below may reduce the severity and frequency of such events. It is highly recommended that end users determine the proper protection for their industry, application, and environment.

NOTICE

RS232 LOSS OF FUNCTION

- Limit the length to 50 feet (15 m) or less in electrically noisy environments.

- Use commercially available isolators and/or surge suppression if the length limitations (above) are exceeded. These are typically not required if the length limitations (above) are followed.

- Use shielded cable and terminate the shield connection.

- Route away from (i.e. not parallel to) high voltages and switch loads.

Failure to follow these instructions can result in equipment damage.

NOTICE

485 LOSS OF FUNCTION

- Use commercially available isolators and/or surge suppression.

- Use shielded cable and terminate the shield connection.

- Route away from (i.e. not parallel to) high voltages and switch loads.

Failure to follow these instructions can result in equipment damage.

NOTICE

ANALOG INPUTS AND OUTPUTS LOSS OF FUNCTION

- Avoid connecting 24 Vdc directly across analog inputs.

- Use commercially available isolators and/or surge suppression.

- Use shielded cable and terminate the shield connection.

- Route away from (i.e. not parallel to) high voltages and switch loads.

- Use an external fuse (63 mA fast blow).

Failure to follow these instructions can result in equipment damage.

NOTICE

EXTERIOR ANTENNA LOSS OF FUNCTION

- Use a coaxial surge diverter and terminate the ground connection.

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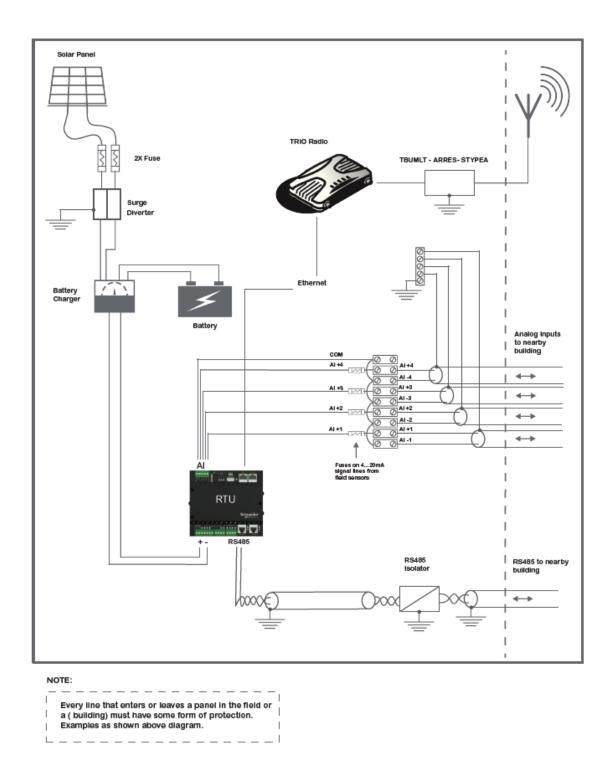
NOTICE

POWER SUPPLY LOSS OF FUNCTION

- Use an external fuse, as specified in the manual.

- If using solar panels, use commercially available surge suppression.

Failure to follow these instructions can result in equipment damage.

Example

RTU with over-voltage protection on a power supply, analog inputs, RS485 port, and radio antenna.

NOTE:

Every line that enters or leaves a panel in the field or a (building) must have some form of protection. Examples as shown above diagram.

For additional information, refer to the Schneider Electric document Grounding, Earthing and Lightning Protection, Chapter 7 "Grounding and Electromagnetic Compatibility of PLC Systems " (Doc# 33002439).

8   Installation

The I/O module is factory-configured and under normal conditions does not require removal or insertion of any peripherals or components. The I/O configurations are stored in a combination of battery-backed RAM and flash memory on the SCADAPack.

NOTICE
UNINTENDED EQUIPMENT OPERATION
Installing the I/O module in an environment where the electromagnetic compatibility (EMC) rating exceeds the certified EMC rating for the module can lead to unpredictable operation and unexpected results.
Before mounting the I/O module, check the Standards and Certifications topic to verify which EMC standards are supported.
Failure to follow these instructions can result in equipment damage.

The following sections describe specific aspects of installing the I/O module.

- ATEX Requirements 32
- Mounting the 6607 input output module 33
- Power Supply Requirements 37
- Connecting I/O modules 39

8.1   ATEX Requirements

The information in this topic applies when the unit is being used for ATEX applications.

Specific conditions of use

Before installing the equipment, carefully review the instructions in the warning message below.

> ## ⚠ WARNING
>
> **EXPLOSION HAZARD**
>
> Only install this equipment when the following conditions are met:
>
> **Specific Conditions of Use**
>
> - The equipment shall only be used in an area of not more than pollution degree 2, as defined in IEC/EN 60664-1.
>
> - The equipment shall be installed in an enclosure that is only tool accessible and that provides a degree of protection not less than IP 54 in accordance with IEC/EN 60079-0.
>
> - Transient protection shall be provided that is set at a level not exceeding 140 % of the peak rated voltage value at the supply terminals to the equipment.
>
> **Failure to follow these instructions can result in death or serious injury.**
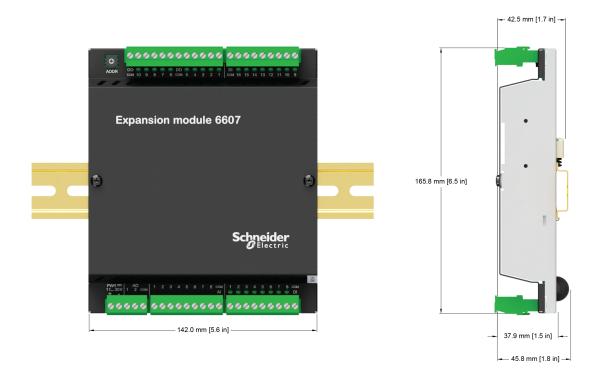
Connection terminal blocks

- Screw connection terminal blocks:
  - For 5 mm (0.197 in) pitch connectors support solid or stranded wires from 2.5...0.2 mm^2 (12...30 AWG)
  - For 3.5 mm (0.138 in) pitch connectors support solid or stranded wires from 1.5...0.2 mm^2 (14...28 AWG)
- Torque for screw connection terminal block connectors: 0.5 N•m (4.5 Lb-in). For Serial 5 port, apply 0.2 N•m (1.7 lb-in) torque.
- Minimum supply cable temperature rating: 105 °C (221 °F)

8.2   Mounting the I/O Module

The I/O module is mounted on a 7.5 x 35 mm (0.3 x 1.4 in) DIN rail then connected to the SCADAPack or to another I/O module.

The figure below shows the I/O module dimensions when mounted.

⚠ **DANGER**
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH
Carefully review and follow all instructions in the Important Notices for Hazardous Locations topic for information when installing the I/O module in a hazardous location.
Failure to follow these instructions will result in death or serious injury.

See Important Notices for Hazardous Locations 8 .

⚠ **WARNING**
UNINTENDED EQUIPMENT OPERATION
Evaluate the operational state of the equipment being monitored or controlled by the SCADAPack and the I/O module before removing power.
Failure to follow these instructions can result in death or serious injury.

> ## ⚠ WARNING
>
> **ELECTRICAL HAZARD**
>
> Remove power from the I/O module before mounting it on a DIN rail.
>
> Do not remove the I/O module cover when mounting the module. The I/O module is designed so that it can be mounted on a DIN rail with the cover in place.
>
> **Failure to follow these instructions can result in death or serious injury.**

> ## *NOTICE*
>
> **UNINTENDED EQUIPMENT OPERATION**
>
> The mounting position can affect the maximum operating temperature for the I/O module and the current rating for the digital outputs.
>
> Before mounting the I/O module, check the Specifications topic to confirm the maximum operating temperature and digital output current rating for your mounting position.
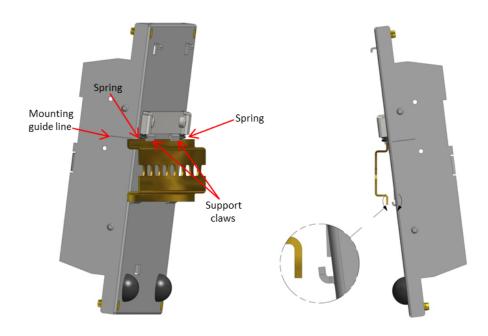>
> **Failure to follow these instructions can result in equipment damage.**

To mount the I/O module

The illustrations below show how to mount the I/O module on a horizontally oriented DIN rail. The steps to mount the I/O module on a vertically oriented DIN rail are the same.
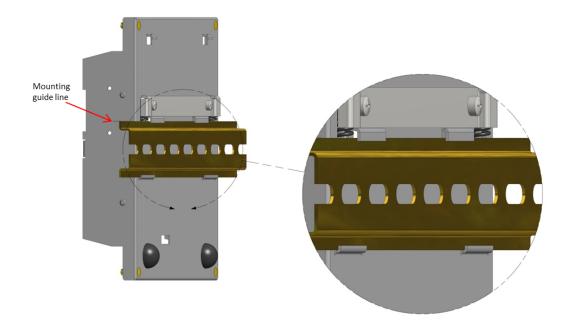
1. With the lower part of the module tilted away from the DIN rail, position the mounting guide line on the side of the module so that it is just above the top edge of the DIN rail.

   Verify that the springs on the back of the module rest on the DIN rail and that the edge of the DIN rail is under the support claws that are adjacent to the springs, as shown below.

2. Push firmly on the module while tilting it toward the DIN rail until the DIN rail is positioned under both the upper and lower claws on the back of the module.

3. Verify that the mounting guide line is aligned with the edge of the DIN rail, then release the pressure on the springs so that the DIN rail is held firmly in place between the upper and lower claws.

   The figure below shows a DIN rail correctly positioned in the upper and lower claws on the back of the I/O module.

The figure below shows an I/O module that is mounted horizontally.

8.3   Power Supply Requirements

The I/O module is powered by the SCADAPack through the I/O bus cable that connects the units. The 6607 input output module requires 1.1 W at 5 Vdc from the SCADAPack.

⚠ **WARNING**
UNINTENDED EQUIPMENT OPERATION
The input power supply must be a filtered DC supply.
Failure to follow these instructions can result in death or serious injury.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Safety Extra Low Voltage (SELV) or Protective Extra Low Voltage (PELV) power supplies are required on the power input and I/O points. Power supplies with 100...240 Vac inputs that comply with safety standard IEC/EN 60950 generally have SELV outputs. Check with the manufacturer or the agency certification listing to confirm that they have SELV outputs.

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

The following Schneider Electric power supply can be used:

- Schneider Electric Phaseo regulated power supply providing 100...240 Vac in and 24 Vdc, 2.5 A out.

8.3.1   Analog Output Power Supply Wiring

There are two installation options for the external 24 Vdc power supply that are required when the analog outputs are used:

- The analog outputs and the SCADAPack can each have their own 24 Vdc power supply. In this configuration, the analog outputs are isolated from the system logic.

- The analog outputs can share an external 24 Vdc power supply with the SCADAPack. In this configuration, the analog outputs are not isolated from the system logic.
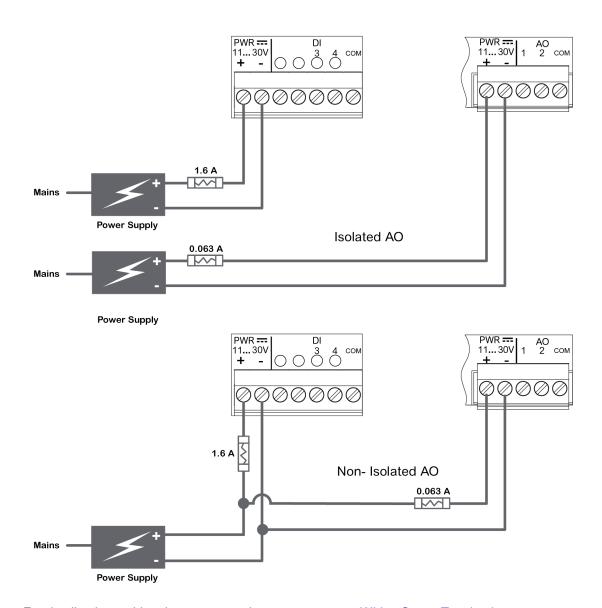
NOTICE

UNINTENDED EQUIPMENT OPERATION

Install an external 0.063 A fast-acting fuse on the input voltage side of the analog output power supply connection.

Failure to follow these instructions can result in equipment damage.

The following figure illustrates the power supply configurations for isolated and non-isolated analog outputs.

Isolated AO

Non- Isolated AO

For details about wiring the power supply connectors, see .
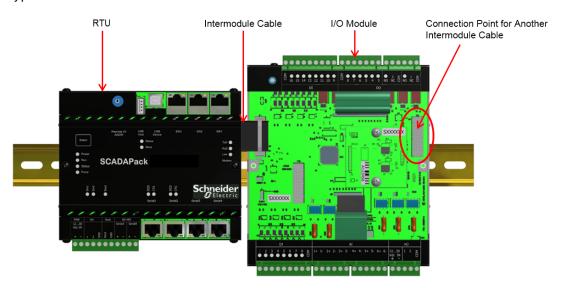
8.4 Connecting I/O Modules

The topics in this section describe how to attach I/O modules to a SCADAPack, or to another I/O module.

I/O modules are mounted on a 7.5 x 35 mm (0.3 x 1.4 in) DIN rail and then connected to a SCADAPack using intermodule cables. The intermodule cable is a ribbon cable that distributes power (5 Vdc) and communications signals from the SCADAPack to the I/O modules. These power and communication signals are referred to as the I/O bus.

The figure below shows a SCADAPack x70 device with an I/O module connected to it. You can connect multiple I/O modules to a single SCADAPack up to the maximum number of modules

supported by the device. See the SCADAPack hardware manual for details.

The illustration below shows a connected intermodule cable. The maximum number of modules may also be limited by the total length of the cable. See Cabling Guidance 41 for further details on intermodule cables. While the size and shape of your devices may differ and the color of the connectors may be different, the location of the intermodule cable is the same on each device type.

Before attaching intermodule cables 43, read the Precautions 40 and the Cabling Guidance 41.

8.4.1   Precautions

Before connecting I/O modules:

- Confirm that the power supply is rated for the total number of modules in the system. Some I/O modules, such as those with analog outputs, require an additional DC power supply to operate. See Specifications 77 for details.

- Confirm that the intermodule cables you are are less than the maximum total cable length. See Maximum Intermodule Cable Length 42.

- Review the recommendations below to help avoid static electricity damage.

> ## NOTICE
>
> **STATIC ELECTRICITY DAMAGE**
>
> Static electricity damage can cause intermittent or total loss of equipment operation. To help avoid static electricity damage:
>
> - Wear an anti-static wrist strap that is connected to ground if you need to remove the device cover.
>
> - Use the shortest length intermodule cable that is practical. This helps to minimize voltage drops and interference from electrical noise.
>
> - Keep the intermodule cable away from electrical noise sources such as inductive load switching and variable frequency drives.
>
> - If you are using a shielded cable, connect the shielding wire on the intermodule cable to a convenient chassis ground point. There is a small hole in the I/O module for grounding the shielding wire.
>
> - Do not install intermodule cables in the same cable tray or in parallel with field wiring. Intermodule cables can cross field wiring at 90° if necessary.
>
> **Failure to follow these instructions can result in equipment damage.**

8.4.2   Cabling Guidance

This topic summarizes the rules for connecting I/O modules to SCADAPack x70 devices. These rules apply to the following SCADAPack I/O modules:

- 6601 input output module

- 6602 HART module

- 6607 input output module

- 5304 analog output module

- 5405 digital input module

- 5410 high speed counter input module

- 5414 digital input module

- 5415 relay output module

- 5505 RTD input module

- 5506 analog input module

- 5606 input output module

- 5607 input output module

Using only 5000 series I/O modules

If you are using only 5000 series I/O modules with a SCADAPack x70 device, connect the 5000 series module directly to the SCADAPack using a 20-pin to 16-pin adapter cable (sold separately, see the SCADAPack Part Ordering List manual).

Using 5000 and 6000 series I/O modules

If you are using a combination of 5000 series I/O modules and 6000 series I/O modules with a SCADAPack x70 device, connect a 6000 series module to the SCADAPack first, followed by any other 6000 series modules. Then connect the 5000 series modules to the last 6000 series module.

SCADAPack x70 devices and 6000 series modules provide a 20-pin I/O bus connector while 5000 series modules provide a 16-pin connector. Use the 20-pin to 16-pin adapter cable (sold separately, see the SCADAPack Part Ordering List manual) to transition from a 20-pin connector to a 16-pin connector.

General guidance

- Use the shortest length intermodule cable that is practical. This helps to minimize voltage drops and interference from electrical noise.

- Keep the intermodule cable away from electrical noise sources such as inductive load switching and variable frequency drives.

- If you are using a shielded cable, connect the shielding wire on the intermodule cable to a convenient chassis ground point. There is a small hole in the I/O module for grounding the shielding wire.

- Install intermodule cables in separate cable trays from field wiring, and not in parallel with field wiring. Intermodule cables can cross field wiring at 90° if necessary.

Intermodule cables

When determining the location of your I/O modules, review the following information about shielded intermodule cables and maximum intermodule cable length.

Shielded intermodule cables

Shielded intermodule cables have a foil and braid shielding. Intermodule cables longer than 30 cm (12 in) are shielded for physical protection and for isolation from electrical noise. The shielding is connected to a terminal lug at one end of the cable.

When using a shield for an intermodule cable, fasten the shield only to the module that is closest to the SCADAPack. Connect the shield to the enclosure using the self-tapping screw provided.

You can use up to 3 shielded intermodule cables. The total length of all cables can not exceed 1.82 m (75 in).

Maximum intermodule cable length

I/O modules ship with a short intermodule cable that is used to connect I/O modules to a SCADAPack or to another I/O module.

The maximum total intermodule cable length in a single system is 1.82 m (75 in). This length restriction does not include the short intermodule cable supplied with the I/O module. Schneider

Electric offers several cable lengths that can be combined to reach the 1.82 m (75 in) limit.

Keep the following in mind:

- No more than 1.5 m (60 in) of total expansion cable length can follow a controller or power supply before an additional power supply needs to be added

- 1.14 m (45 in) and 1.82 m (75 in) expansion cables need to be followed by a power supply

- The highest power consumption modules need to be to closest to the controller or power supply with 6000 series modules first, followed by 5000 series modules due to connector limitations

- The maximum number of power supply modules, not including the controller, is 2

- A 30 cm (12 in) or a 76 cm (30 in) cable is typically used to connect modules on separate DIN rails

To purchase additional intermodule cables, contact your Schneider Electric representative.

8.4.3   Attaching Intermodule Cables

This topic describes how to attach an intermodule cable between a SCADAPack and an I/O module. Follow the same steps to connect two I/O modules.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Evaluate the operational state of the equipment being monitored or controlled by the SCADAPack or the I/O module before applying or removing power.

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

⚠ WARNING

ELECTRICAL HAZARD

The I/O bus does not support live-swapping.

Remove power from the SCADAPack and the I/O module before removing the cover.

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

NOTICE

STATIC ELECTRICITY DAMAGE

Static electricity damage can cause intermittent or total loss of equipment operation.

Always wear an anti-static wrist strap that is connected to ground when you remove the device cover.

Failure to follow these instructions can result in equipment damage.

5410 High Speed Counter Input Module Considerations

NOTICE
UNEXPECTED COUNTER READINGS
Do not disconnect a 5410 high speed counter input module while the module and RTU are powered.
Do not remove power from a 5410 high speed counter input module while the RTU is powered and communicating with the module.
Failure to follow these instructions can result in unexpected counter readings.

Power off the RTU before connecting or disconnecting the inter-module cable to the 5410 high speed counter input module.

Power off the RTU and 5410 high speed counter input module at the same time. Use a common power supply input for the RTU and I/O modules.

To attach intermodule cables

1. Power down each SCADAPack and I/O module that you are connecting.

2. Remove the cover from the device if required to access the intermodule cable.

3. Press one end of the intermodule cable firmly into the I/O bus connector on the SCADAPack.
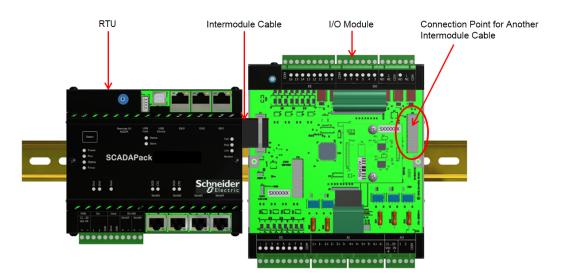
   SCADAPack x70 devices and 6000 series modules provide a 20-pin I/O bus connector while 5000 series modules provide a 16-pin connector. Use the 20-pin to 16-pin adapter cable (sold separately, see the SCADAPack Part Ordering List manual) to transition from a 20-pin connector to a 16-pin connector.

   The connectors on intermodule cables are keyed so they can only be inserted in one direction. If the connector does not push easily into the I/O bus connector, reverse it and try again.

4. Press the other end of the intermodule cable firmly into the I/O bus connector on the I/O module.

   The illustration below shows a connected intermodule cable. While the size and shape of your devices may differ and the color of the connectors may be different, the location of the intermodule cable is the same on each device type.

5. Replace the cover on the I/O module and on the SCADAPack if it was removed, taking care to check that the ribbon cable connecting the I/O module is not pinched.

6. Apply power to the SCADAPack.

   You are now ready to configure the I/O module.

9   Addressing

This section describes the addressing rules for an I/O module and the procedure for setting the I/O module address.

⚠ **WARNING**
UNINTENDED EQUIPMENT OPERATION
Review the power requirements for the I/O modules before combining modules.
Failure to follow these instructions can result in death or serious injury.

I/O modules can be combined in any manner up to the maximum number supported by the SCADAPack. For details about the maximum supported system configuration, see the SCADAPack hardware manual for guidance.

Each I/O module connected to the SCADAPack is assigned a unique I/O module address.

For more information see

-
-

9.1   Addressing Rules

I/O modules are shipped from the factory at address 1.

- If you are connecting only 1 external 6607 input output module to a SCADAPack 470, SCADAPack 570, or SCADAPack 574, you can leave the address at 1.

- If you are connecting 1 or more external 6607 input output modules to a SCADAPack 474 or SCADAPack 575, you will need to change the address. The SCADAPack 474 includes an internal 6607 input output module at address 0 and the SCADAPack 575 includes an internal 6601 input output module at address 0.

- If you are connecting more than 1 external 6000 series I/O module to your SCADAPack x70, each module requires a unique address.

9.2   Setting the I/O Module Address

By default, the I/O module physical address is set to 0. To avoid conflict with the addresses of other I/O modules connected to the same SCADAPack, the address can be set anywhere in the range 0 to F. This is a selected value in hexadecimal (0 to 9, A to F). The equivalent software configuration of the module address is set in decimal (0 to 15).

> ## ⚠ WARNING
>
> **UNINTENDED EQUIPMENT OPERATION**
>
> Evaluate the operational state of the equipment being monitored or controlled by the SCADAPack and the I/O module before applying or removing power.
>
> **Failure to follow these instructions can result in death or serious injury.**

> ## ⚠ WARNING
>
> **UNINTENDED EQUIPMENT OPERATION**
>
> Remove power from the I/O module before initially setting the I/O module address and before changing the I/O module address.
>
> **Failure to follow these instructions can result in death or serious injury.**

> ## ⚠ WARNING
>
> **UNINTENDED EQUIPMENT OPERATION**
>
> Be very careful that you do not set the I/O module address to an address that is assigned to another I/O module connected to the same SCADAPack.
>
> If 2 I/O modules have the same address, you will lose communications with both modules.
>
> **Failure to follow these instructions can result in death or serious injury.**

To set or change an I/O module address

1. Insert a 2.4 mm (3/32 in) slotted screwdriver into the inner circle of the rotary hex switch.

Hex Switch

2. Slowly turn the screwdriver until the small arrowhead points to the correct address.

10   Field Wiring

The I/O modules use screw termination style connectors for termination of field wiring. These connectors accommodate solid or stranded wires from 2.5...0.2 mm^2 (12...30 AWG). The connectors are removable allowing replacement of the module without disturbing the field wiring. Leave enough slack in the field wiring for the connector to be removed.

For ease of wiring and maintenance, external connections are terminated on removable connectors. If you need to remove the I/O module cover for any reason, first carefully consider the following information.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Evaluate the operational state of the equipment being monitored or controlled by the SCADAPack or the I/O module before removing power.

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

⚠ WARNING

ELECTRICAL HAZARD

Remove power from the I/O module before removing the I/O module cover.

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

NOTICE

STATIC ELECTRICITY DAMAGE

The electronics inside the I/O module can be damaged by static electricity. If you need to remove the I/O module cover, wear an anti-static wrist strap that is connected to ground. Failing to follow this step can cause intermittent or total loss of I/O module operation and will void the warranty.

Failure to follow these instructions can result in equipment damage.

For more information see

- Wiring Screw-Termination Connectors 50
- Digital and Counter Input Wiring 51
- Digital Output Wiring 54
- Analog Input Wiring 57
- Analog Output Wiring 63

10.1   Wiring Screw-Termination Connectors

Screw-termination style connectors are provided to terminate wiring from:

- Power supplies
- RS485 devices
- Input/output (I/O) modules

These 5 mm (0.197 in) pitch connectors support solid or stranded wires from 2.5...0.2 mm^2 (12...30 AWG).

> ## ⚠ WARNING
>
> **UNINTENDED EQUIPMENT OPERATION**
>
> Evaluate the operational state of the equipment being monitored or controlled by the SCADAPack or the I/O module before wiring screw-termination connectors.
>
> **Failure to follow these instructions can result in death or serious injury.**

> ## ⚠ WARNING
>
> **ELECTRICAL HAZARD**
>
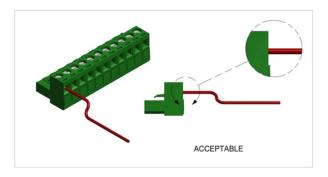> Remove power from all modules and devices before servicing.
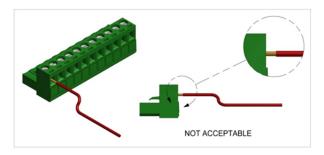>
> **Failure to follow these instructions can result in death or serious injury.**

To wire a connector

1. Use a slotted screwdriver to loosen the termination screw.

2. Insert the stripped wire into the connector so that the bared wire is located under the screw.

   Verify that the bared wire is placed fully within the connector, as illustrated below.

ACCEPTABLE

NOT ACCEPTABLE
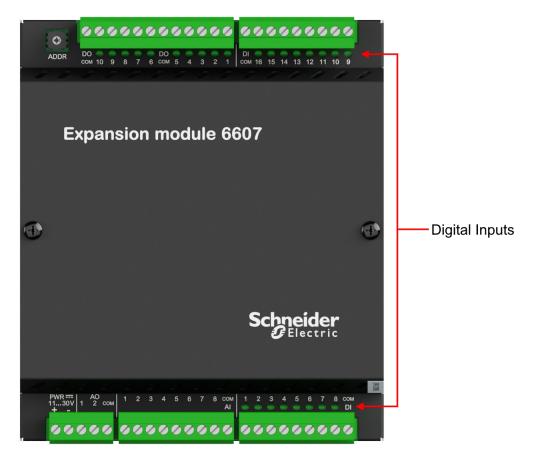
3. Apply 0.5 N•m (4.5 lb-in) torque to tighten the screw so the wire is held firmly in place.

10.2   Digital and Counter Input Wiring

This section describes the wiring for the digital and counter inputs.

For more information see:

- [Digital and Counter Input Wiring Example](#)

10.2.1   Digital and Counter Input Wiring Example

⚠ **WARNING**
ELECTRICAL HAZARD
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 or serious injury.

NOTICE

UNINTENDED EQUIPMENT OPERATION

When wiring digital and counter inputs:

- Confirm that the connection to the digital or counter input does not exceed the ratings for the input. See the Specifications topic for details.

- Confirm that the polarity of the connection is correct with the two positive terminals wired together and the two negative terminals wired together.

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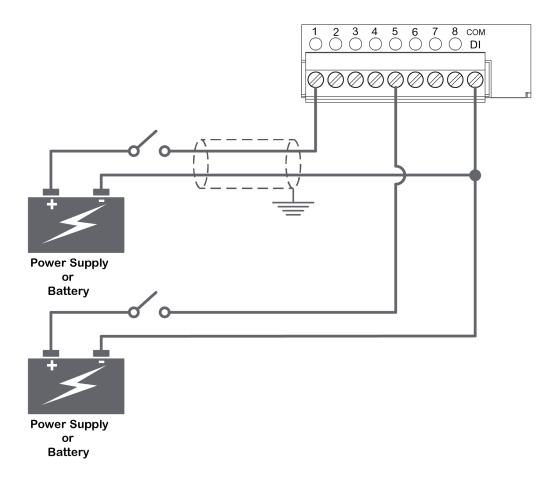
NOTICE

SIGNAL INTERFERENCE DUE TO NOISE

When the unit is operating in an electrically noisy environment use shielded wires on connections to digital and counter inputs.

Failure to follow these instructions can result in equipment damage.

The figure below shows a shielded connection to DI 1 and an unshielded connection to DI 5. Both connections are wired to the common for digital inputs 1-8 and to a power supply or battery.

10.3   Digital Output Wiring

This section describes the wiring for the digital outputs.

Digital Outputs

For more information see:

-

10.3.1   Digital Output Wiring Example

⚠ **WARNING**
ELECTRICAL HAZARD
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 or serious injury.

NOTICE

RELAY CONTACT DAMAGE

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. Use interposing relays in these situations.

When controlling inductive loads, the relay contacts on digital outputs must be protected. The energy stored in the coil can generate significant electrical noise when the relay contacts are opened.

- To suppress the noise in DC circuits, place a diode across the coil

Failure to follow these instructions can result in equipment damage.

NOTICE

UNINTENDED EQUIPMENT OPERATION

External lightning protection is required if the device being controlled is outside the physical area (cubicle or building) in which the SCADAPack is located.
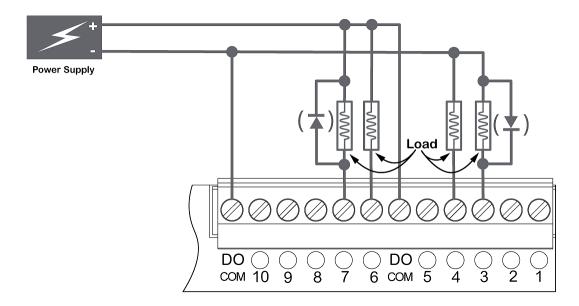
Failure to follow these instructions can result in equipment damage.

Form A digital output wiring

The figure below shows loads on outputs 3 and 4 connected to the negative side of the power supply and switched from the positive side.
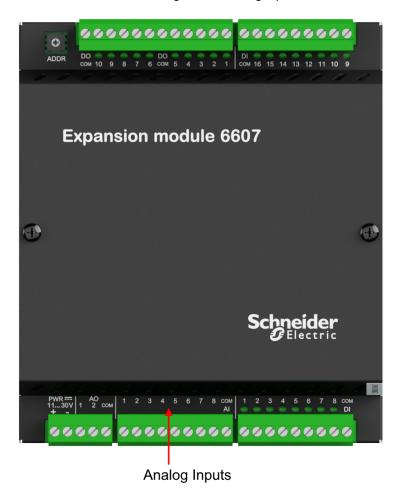
Loads can be connected to the positive side of the power supply and be switched from the negative side of the power supply as outputs 6 and 7 are shown.

When using inductive loads, place a diode across the load to suppress noise and extend the life of the relay contacts, as shown in outputs 3 and 7.

10.4   Analog Input Wiring

This section describes the wiring for the analog inputs.

Analog Inputs

For more information see:

10.4.1   Analog Input Wiring Example

The analog inputs support loop-powered and self-powered transmitters.

⚠ WARNING

ELECTRICAL HAZARD

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 or serious injury.

NOTICE

LIGHTNING SURGE THROUGH ANALOG INPUTS

If a transducer or transmitter connected to an analog channel is placed outside of the building or structure where the SCADAPack or I/O module that provides the analog inputs is installed, there is an increased possibility of extremely severe power surges caused by lightning. In these cases, additional surge protection must be supplied by the user.

Failure to follow these instructions can result in equipment damage.

NOTICE

UNINTENDED EQUIPMENT OPERATION

Do not exceed the maximum input range specified for each analog input. For details, see the Specifications topic for details.

Failure to follow these instructions can result in equipment damage.

Self-powered and loop-powered transmitters
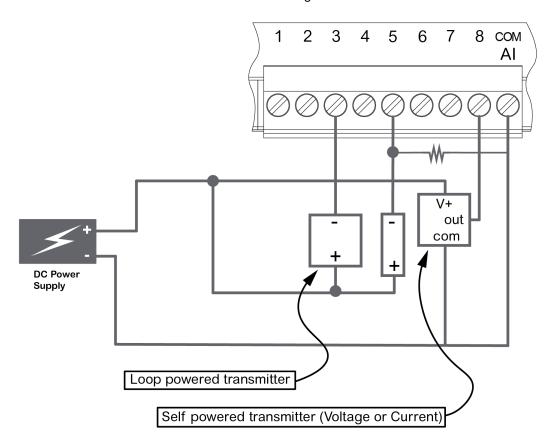
Self-powered transmitters have three terminals:

- Power In connects to a power supply
- Signal Out connects to the analog input channel
- Common connects to COM

Self-powered transmitters can have a current or voltage output.

Loop-powered transmitters are two-terminal devices that are connected between a power supply and the analog input. The loop current from the power supply passes through the transmitter and returns to the power supply through a 250 ohm resistor in the 20 mA input circuit.

In the figure below:

- A self-powered transmitter is shown connected to AIN 8. This could be a 20 mA or 5 Vdc output. The AIN 8 needs to be configured according to the type of transmitter.

- A loop powered transmitter is shown connected to AIN 3. AIN3 is configured for current.

- A loop powered transmitter is shown connected to AIN 5. AIN 5 is configured for voltage. An external 250 Ohm resistor converts the 20 mA signal to 5 Vdc.

10.4.2   Supporting a Mix of Current and Voltage Inputs

The unit is shipped with the 8 analog inputs configured for DC Current or DC Voltage. However, you can change the input mode for individual analog inputs to support a mix of current and voltage analog inputs if needed.

The unit is factory-calibrated for 0...20 mA and 4...20 mA current inputs and for 0...5 Vdc and 1...5 Vdc operation so there is no need to adjust the calibration when you change the input mode for an analog input.
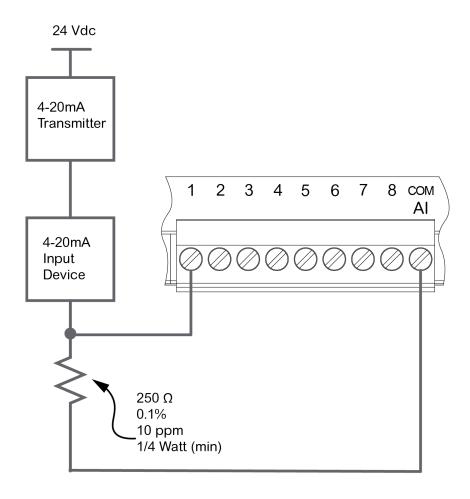
The table below summarizes the options for supporting a mix of current and voltage analog inputs.

Analog Input Configured for...	Measuring	Considerations
Voltage	Current	Requires addition of external 250 Ohm resistor. Allows the SCADAPack 470 to be removed while not interrupting the 20 mA current flow and transmitter operation.
Current	Current	Removing the SCADAPack 470 or powering off will interrupt the current flow.
Voltage	Voltage	None

Converting current input to voltage input

On analog input 1, an external resistor is used to convert current input to voltage input before it reaches the physical input.

The external resistor converts the current to voltage. The 6607 input output module input is configured for voltage. This wiring approach allows you to configure the current loop so it is not interrupted if the unit requires servicing. For details, see Helping to Prevent Interruption of the Current Loop 61.

24 Vdc

4-20mA
Transmitter

4-20mA
Input
Device

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | COM |

AI

250 Ω
0.1%
10 ppm
1/4 Watt (min)

10.4.3 Helping to Prevent Interruption of the Current Loop

⚠ WARNING
ELECTRICAL HAZARD
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 or serious injury.

NOTICE
UNINTENDED EQUIPMENT OPERATION
Do not exceed the maximum voltage specified for each analog input.
Failure to follow these instructions can result in equipment damage.

NOTICE
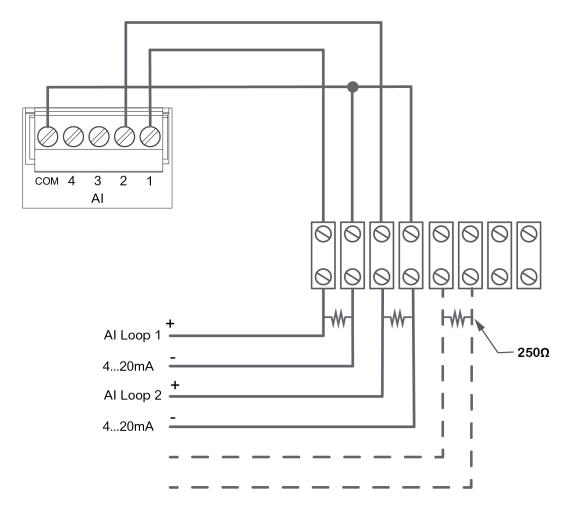
UNINTENDED EQUIPMENT OPERATION
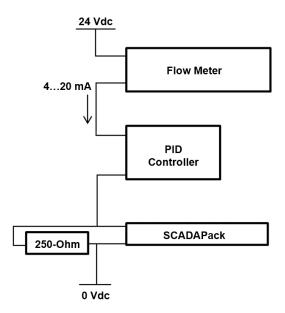
The SCADAPack or I/O module must be the only loop current measurement device in the loop when using the analog inputs in the 20 mA measurement mode. If power to the module is removed, the module reverts to voltage mode and results in an open current loop. Applications that cannot tolerate this possibility need to use external current sense resistors with the module input range set to voltage.

Failure to follow these instructions can result in equipment damage.

Add 250 ohm external resistors to the current loop at the terminal strip to help prevent interruption of the current loop if the SCADAPack or I/O module is being serviced. The physical wiring of the 250 ohm external resistors at the terminal strip is illustrated below.
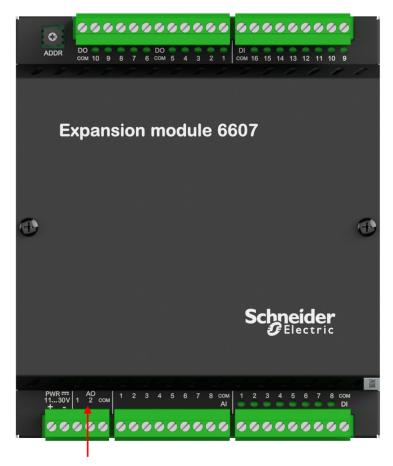
As illustrated below, the SCADAPack or I/O module providing the analog inputs needs to be the last device in the current loop.

10.5   Analog Output Wiring

This section describes the wiring for the analog outputs.

Analog Outputs

For more information see:

-
-

10.5.1   Analog Output Wiring Example

The figure below shows loads connected to the two analog outputs.

⚠ **WARNING**
ELECTRICAL HAZARD
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 or serious injury.

NOTICE
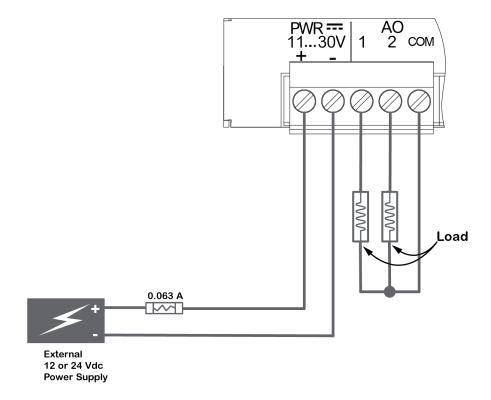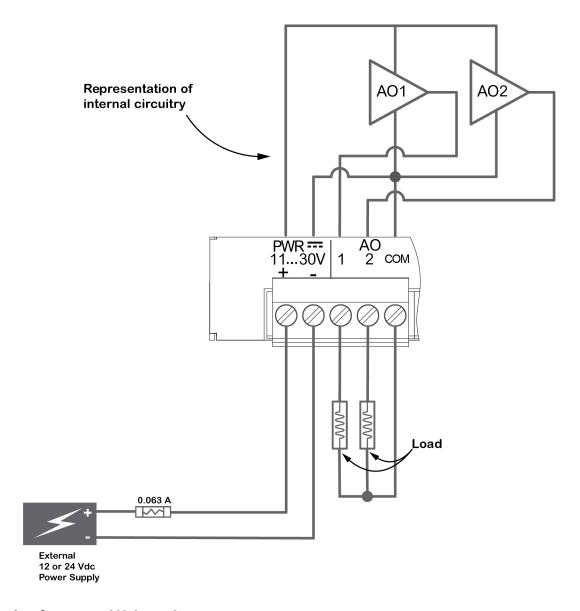
UNINTENDED EQUIPMENT OPERATION

Install a 0.063A fast-acting fuse on the input voltage side of the analog output power supply connection.

Failure to follow these instructions can result in equipment damage.

The analog output circuitry is configured internally to receive power from an external power supply on pins 1 and 2 of the removable terminal block. Pin 5 (Com 1-2) and pin 2 (power input –) are connected internally. As illustrated in the following figure, the two analog outputs are not isolated from each other, but are isolated from the SCADAPack RTU circuitry.

10.5.2   Supporting Current and Voltage Outputs

The analog outputs can be configured for 4...20 mA current or 0...20 mA current.

If a voltage output is required (1...5 Vdc, for example), run the 4...20 mA or 0...20 mA signal to the device that requires a voltage input and place a 250 ohm resistor across the input terminals of that device.

The table below lists resistance values and output range settings for common voltage ranges. The resistance value listed is the parallel resistance of the device and the load resistor.

Resistance	Output Range	Voltage Range
250 ohm	0...20 mA	0...5 Vdc

Resistance	Output Range	Voltage Range
	4...20 mA	1...5 Vdc
500 ohm	0...20 mA	0...10 Vdc

11   Configuration

The inputs and outputs can be configured locally or remotely using the SCADAPack RemoteConnect configuration software on a Microsoft Windows-based computer.

SCADAPack RemoteConnect configuration software

The configuration software provides a graphical user interface that allows you to:

- Configure parameters for the SCADAPack and any attached I/O modules and then load those parameters into the SCADAPack

- Interact online with the SCADAPack to view status information, diagnostics information and current parameter values for the SCADAPack and any attached I/O modules

- Use the built-in SCADAPack x70 Logic Editor to develop IEC 61131-3 applications that extend and enhance the functionality provided by the SCADAPack and any attached I/O modules

The configuration software is comprised of a frame application that is FDT 2.1, FDT 2.0, and FDT 1.2 compliant and Device Type Managers (DTMs).

For information about	See the following manual
Working with projects and DTMs	SCADAPack RemoteConnect Configuration Software
Configuring communications with the SCADAPack	PC Communication Settings -SCADAPack CommDTM
Configuring device parameters and interacting online with the device	SCADAPack x70 Configuration
Using the SCADAPack x70 Logic Editor	SCADAPack Logic Programming Overview

12   Diagnostics

Input and output modules provide LEDs that indicate the status of inputs and outputs. There are also a number of actions you can take to determine the cause of unexpected activities.

For more information see

-
-
-
-
-

12.1   LEDs

The I/O module provides an LED for each digital input and output. When the LED is on, the input or output is energized, meaning it has an active connection. Digital input LEDs blink when pulses are applied if the digital input is configured to be a counter.

12.2   Digital Inputs

Condition	Action
Input LED does not come on when input signal is applied.	Check that the input signal at the termination block is at least 50% of the digital input range. 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.

12.3   Digital Outputs

Condition	Action
Output LED does not come on when output is turned on.	Check the Power LED on the SCADAPack.
Output LED comes on but the output does not close.	Check if the relay is stuck. If so, return the module for repair.
Output LED comes on and output is closed, but the field device is not	Check the field wiring. Check the external device.

activated.	
Output LED and relay are on when expected to be off.	Check that the output is not forced on.
Output LED and relay are off when expected to be on.	Check that the output is not forced off.

12.4   Analog Inputs

Condition	Action
20 mA inputs read 0.	Check transmitter power.
Reading is at or near 0 for every input signal.	Check whether the input transient suppressors are damaged.
20 mA readings are not accurate.	Check for a damaged 250 ohm current sense resistor.
Reading is constant.	Check that the analog input is not forced.
Reading seems out of calibration for small inputs but improves as input increases.	Check the input range setting.
In Current Loop Mode, there can be an open circuit in the Current Loop.	Refer to the section Helping to Prevent Interruption of the Current Loop 61.
Other devices are not functional after installation of the I/O module.	In Current Loop mode, make the I/O module the last device in the loop, or use a signal isolator as discussed in the section Helping to Prevent Interruption of the Current Loop 61.

12.5   Analog Outputs

Condition	Action
Outputs are 0 mA	Check the 24 Vdc power supply.
The full-scale output is less than 20 mA	Check the 24 Vdc power supply. Check that the load resistance is within specification.
Output is constant instead of changing	Check that the analog outputs are not forced.

13   Maintenance

The module requires no routine maintenance. If the module is not functioning correctly, contact Technical Support⌐ 7⌐ for more information and instructions for returning the module for repair.

For more information see

- Calibration⌐ 71⌐
- Updating Module Firmware⌐ 71⌐
- Updating Bootloader Firmware⌐ 73⌐

13.1   Calibration

The device is electronically calibrated at the factory during the manufacturing process and after any repair procedures.

There are no user calibration procedures.

13.2   Updating Module Firmware

The module firmware on 6000 series I/O modules can be updated locally or remotely, as described below. In this topic, *Version* represents the current version.

I/O Module	Firmware Filename
6607	fw6607_*Version*.bin

By default, the firmware file is stored in one of the following directories, where *x.xx.xx* represents the current version:

- 64-bit systems: C:\Program Files (x86)\Schneider Electric\RemoteConnect\Firmware\6607*x.xx.xx*

- 32-bit systems: C:\Program Files\Schneider Electric\RemoteConnect\Firmware\6607*x.xx.xx*

⚠ WARNING

LOSS OF CONTROL

During a firmware update, the 6000 series I/O module does not monitor or control any of the devices to which it is connected. Before updating firmware:

- Confirm that you are connected to the correct SCADAPack.

- Evaluate the operational state of the devices that are monitored and controlled by the I/O module.

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

> ## ⚠ WARNING
>
> **UNINTENDED EQUIPMENT OPERATION**
>
> Do not remove power from the SCADAPack during the firmware update.
>
> Do not disconnect the 6000 series I/O module from the SCADAPack during the firmware update.
>
> If power is interrupted for any reason during the firmware update, contact Technical Support.
>
> **Failure to follow these instructions can result in death or serious injury.**

> ## *NOTICE*
>
> **INCOMPATIBLE FIRMWARE VERSIONS**
>
> Before installing a firmware update, check the Release Notes for the firmware update to determine the most suitable I/O module firmware version for the SCADAPack firmware version and the functionality you are using.
>
> **Failure to follow these instructions can result in equipment damage.**

Note: Outputs on the I/O module turn off during the firmware update and remain off until the update is complete. Updates can take up to several minutes.

To update the firmware on a 6607 I/O module

1. Use SCADAPack RemoteConnect to transfer the **.bin** file to the SCADAPack file system:

   a. Connect SCADAPack RemoteConnect to the SCADAPack x70 device and go **Online**.

   b. Under **My Network**, right-click on **SCADAPack x70 Controller Settings -DeviceDTM** and select **Additional Functions > Write File to Device**.

   c. In the Write File to Device dialog, click **Browse** to navigate to the location of the file on your computer.

   d. Click **Open**.

   e. In the Write File to Device dialog, click **OK**.

2. Start the I/O firmware upgrade:

   a. Under **My Network**, right-click on **SCADAPack x70 Controller Settings -DeviceDTM** and select **Additional Functions > Execute Command**.

   b. Enter the command:

   ```
   restart iofirm fw6607_Version.bin module_address
   ```

   Where the *module_address* is the address of your I/O module. The I/O module address is a number from 0 to 15. The 6607 module located inside a SCADAPack 474 is always address 0.

Example: `restart iofirm fw6607_Version.bin 0`

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

If the firmware update was unsuccessful, the I/O module will remain in a state where it does not monitor or control any of the devices to which it is connected.

Carefully review the message indicating whether the firmware update was successful or unsuccessful. Unsuccessful firmware updates are also reported through the SCADAPack x70 device's System Status Code. See RemoteConnect Online Diagnostics mode. For a list of the possible status code values, see the System Status Codes topic.

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

---

3. After the firmware update is complete, open a command line or Telnet session and use the VER command to display device version information.

13.3   Updating Bootloader Firmware

The bootloader firmware on 6000 series I/O modules can be updated locally or remotely, as described below. *Version* represents the current version.

I/O Module	Bootloader Filename
6607	bl6607_*Version*.bin

By default, the bootloader file is stored in one of the following directories, where *x.xx.xx* represents the current version:

- 64-bit systems: C:\Program Files (x86)\Schneider Electric\RemoteConnect\Firmware\6607*x.xx.xx*

- 32-bit systems: C:\Program Files\Schneider Electric\RemoteConnect\Firmware\6607*x.xx.xx*

⚠ WARNING

LOSS OF CONTROL

During a bootloader update, the 6000 series I/O module does not monitor or control any of the devices to which it is connected. Before updating the bootloader on the I/O module:

- Confirm that you are connected to the correct SCADAPack

- Evaluate the operational state of the devices that are monitored and controlled by the I/O module.

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

> ## ⚠ WARNING
>
> **UNINTENDED EQUIPMENT OPERATION**
>
> Do not remove power from the SCADAPack during the bootloader update.
>
> Do not disconnect the 6000 series I/O module from the SCADAPack during the bootloader update.
>
> If power is interrupted for any reason during the bootloader update, contact Technical Support.
>
> **Failure to follow these instructions can result in death or serious injury.**

> ## *NOTICE*
>
> **INCOMPATIBLE FIRMWARE VERSIONS**
>
> Before installing a bootloader update, check the Release Notes for the bootloader update to determine the most suitable I/O module bootloader version for the SCADAPack firmware version and the functionality you are using.
>
> **Failure to follow these instructions can result in equipment damage.**

To update the bootloader on a 6607 I/O module

1. Use SCADAPack RemoteConnect to transfer the **.bin** file to the SCADAPack file system:

    a. Connect SCADAPack RemoteConnect to the SCADAPack x70 device and go **Online**.

    b. Under **My Network**, right-click on **SCADAPack x70 Controller Settings -DeviceDTM** and select **Additional Functions > Write File to Device**.

    c. In the Write File to Device dialog, click **Browse** to navigate to the location of the file on your computer.

    d. Click **Open**.

    e. In the Write File to Device dialog, click **OK**.

2. Start the I/O firmware upgrade:

    a. Under **My Network**, right-click on **SCADAPack x70 Controller Settings -DeviceDTM** and select **Additional Functions > Execute Command**.

    b. Enter the command:

    ```
    restart iofirm bl6607_Version.bin module_address
    ```

    where *module_address* is the I/O module address. The I/O module address is a number from 0 to 15. The 6607 module located inside a SCADAPack 474 is always address 0.

    Example: `restart iofirm bl6607_Version.bin 0`

> ⚠ **WARNING**
>
> **UNINTENDED EQUIPMENT OPERATION**
>
> If the bootloader update was unsuccessful, the I/O module will remain in a state where it does not monitor or control any of the devices to which it is connected.
>
> Carefully review the message indicating whether the firmware update was successful or unsuccessful. Unsuccessful firmware updates are also reported through the SCADAPack x70 device's System Status Code. See RemoteConnect Online Diagnostics mode. For a list of the possible status code values, see the System Status Codes topic.
>
> **Failure to follow these instructions can result in death or serious injury.**

3. After the firmware update is complete, open a command line or Telnet session and use the VER command to display device version information.

14   Specifications

Disclaimer: Schneider Electric reserves the right to change product specifications without notice. If you have questions about any of the specifications, contact [Technical Support](#) 7⌐.

For more information see

- [General](#) 76⌐
- [Power Supply](#) 77⌐
- [Communications](#) 77⌐
- [Digital Inputs](#) 78⌐
- [Counter Inputs](#) 79⌐
- [Digital Outputs](#) 79⌐
- [Analog Inputs](#) 80⌐
- [Analog Outputs](#) 81⌐

14.1   General

Item	Specification
Environment	-40…70 °C (-40…158 °F) operating temperature when the unit is mounted horizontally on a vertical surface
	-40…65 °C (-40…149 °F) operating temperature when the unit is mounted in any other position
	-40…85 °C (-40…185 °F) storage temperature
	5...95% relative humidity, non-condensing
	Pollution Degree 2, Installation Category I, Indoor use
Elevation	3,000 m (9,842 ft)
Over-voltage category	II
Equipment class	III - SELV
Terminations	2.5...0.2 mm^2 (12...30 AWG), solid or stranded
Packaging	Corrosion-resistant zinc-plated steel with black enamel paint
Dimensions	142 mm (5.6 in) wide
	166 mm (6.5 in) high
	46 mm (1.8 in) deep
Mechanical Shock	IEC 61131-2

	½ sine, 15 ms, 15 g
Vibration	IEC 61131-2
	5...8.4 Hz: Amplitude controlled, 7.0 mm (0.28 in) peak-to-peak
	8.4...150 Hz: Acceleration controlled, 1.0 g peak

14.2   Power Supply

Item	Specification
Input voltage	Rated (UL) 14...29 Vdc
	Voltage limits: 12...30 Vdc
Power requirements	10 mA plus up to 20 mA per output
	Analog output power requirements at 24 Vdc at the 6607, both outputs at 20 mA. Add 1.2 W. (1.5 W at 30 Vdc.)

14.3   Communications

Item	Specification
I/O bus	**SCADAPack 470, SCADAPack 570, and SCADAPack 574**
	• Maximum number of 6601 input output modules with optional analog outputs is 4
	• Maximum number of 6602 HART modules with optional analog outputs is 1
	• Maximum number of 6607 input output modules in the system is 4
	SCADAPack 474
	• Maximum number of 6601 input output modules with optional analog outputs is 4
	• Maximum number of 6602 HART modules with optional analog outputs is 1
	• Maximum number of 6607 input output modules in the system is 3
	SCADAPack 575
	• Maximum number of 6601 input output modules with optional analog outputs is 3
	• Maximum number of 6602 HART modules with optional analog outputs is 1

	• Maximum number of 6607 input output modules in the system is 4

14.4 Digital Inputs

Item	Specification
Quantity	16
Typical operating voltage	12 Vdc 24 Vdc
Turn-on voltage	Minimum: 9 Vdc
Turn-off voltage	Maximum: 4 Vdc
Connectors	2 removable, 9-pin
Indicators	16 LEDs
Over-voltage tolerance	36 Vdc 150% sustained over-voltage without foreseeable damage
Input current	1.2 mA typical at 12 Vdc 2.4 mA typical at 24 Vdc
Reporting	10 ms timestamped Sequence of Event (SOE)
Status	Chatter filter detection when digital state changes faster than 5 Hz
Isolation	Isolation is in 2 groups of 8 Isolation from logic supply and chassis: 250 Vac/350 Vdc

Item	Specification
Quantity	4
Typical operating voltage	12 Vdc 24 Vdc
Turn-on voltage	Minimum: 9 Vdc

Turn-off voltage	Maximum: 4 Vdc
Over-voltage tolerance	36 Vdc sustained over-voltage without foreseeable damage
Input current	0.35…0.45 mA at 12 Vdc 0.75…0.85 mA at 24 Vdc
Reporting	• 10 ms timestamped Sequence of Events (SOE) • Input state inversion
Status	Chatter filter detection when digital state changes faster than 5 Hz
Isolation	Ground return connected to chassis ground
Cable length	Maximum: 3 m (9.84 ft)

14.5   Counter Inputs

Item	Specification
Quantity	8
Electrical characteristics	Shared with digital input channels
Reporting	32-bit counters Deviation Timestamped events Unsolicited reporting
DI1, DI2, DI3, and DI4 supported counting	Range: 0 to 1.5 kHz Rising edge counting Falling edge counting (using digital input state inversion)
DI5, DI6, DI7, and DI8 supported counting	Range: 0 to 150 Hz Rising edge counting Falling edge counting (using digital input state inversion)

14.6   Digital Outputs

Item	Specification

Quantity	10
Connector	Removable, 12-pin
Type	Form A Contacts (normally open) 5 contacts share one common
Indicators	Logic-powered LEDs
Inductive loads	Place a diode across the coil to suppress the noise in DC circuits and extend the life of the relay contacts See the Digital Output Wiring Example topic in the SCADAPack 474 Hardware manual for further information.
Isolation	Isolation is in 2 groups of 5 250 vac / 350 Vdc maximum to SCADAPack RTU circuitry and chassis
Dry Contact Relay Version	
Contact rating	2 A, 30 Vdc 10 A maximum per common

14.7   Analog Inputs

Item	Specification
Quantity	8
Type	Uni-polar, voltage, or current
Connector	Removable, 9-pin
Resolution (100 ms sampling)	24 bit conversion 0.25 mV resolution on 5 Vdc range 1 µA resolution on 20 mA range
Resolution (500 ms sampling)	24 bit conversion 0.05 mV resolution on 5 Vdc range 0.2 µA resolution on 20 mA range
Accuracy	±0.1% of full scale at 25 °C (77 °F)

	±0.2% over temperature range
Isolation	250 Vac / 350 Vdc maximum to SCADAPack RTU circuitry and chassis
Input resistance	250 ohms in current configurations 1 Mohms in voltage configurations
Ranges	Software-configurable 0…20 mA 4…20 mA 0…5 Vdc 1…5 Vdc
Over range	measures up to 22 mA / 5.5 Vdc
Under range	4...20 mA measures to 1 mA 1...5 measures to 0 Vdc
Sampling rate	Configurable for: 100 ms to scan all 8 channels 500 ms to scan all 8 channels
Normal mode rejection	77 dB (50/60 Hz.) when sampling set to 500 ms
Cable Length	Maximum: 30 m (98.4 ft)

14.8   Analog Outputs

Item	Specification
Quantity	2
Connector	Removable, 5-pin
Range	0...20 mA sourcing 4...20 mA sourcing
Reporting	Open Loop Detection (for 0...20 mA configuration, open loop detection operates above 0.1% of full span. i.e. above 0.02 mA)
Resolution	12 bits (5.9uA)

Load range	12 Vdc: 0…400 ohms 24 Vdc: 0…1000 ohms 30 Vdc: 250…1300 ohms
Accuracy	±0.15% of full scale at 25 °C (77 °F) ±0.35% of full scale over temperature range
Noise and ripple	0.04% maximum
Logic end-of-scan to signal update latency	With up to 10, 5000 series I/O modules Typical: 18...27 ms
Response time (DAC to signal)	Less than 100 µs for 10% to 90% signal change
Isolation	Optional isolation from logic supply by using external power supply
Cable Length	Maximum: 30 m (98.4 ft)

15   Standards and Certifications

Introduction

SCADAPacks are designed to comply with the relevant standards and rules for electrical equipment in an industrial automation environment.

Industrial Standards

Requirements specific to the SCADAPack functional characteristics, immunity, robustness, and safety:
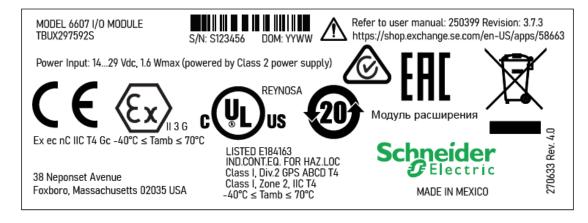
- IEC/EN 61131-2

- CSA 22.2 No. 61010-1-12 and CSA 22.2 No. 61010-2-201

- UL 61010-1 and UL 61010-2-201

CE Marking Compliance

- For the latest information regarding product compliance with European Directives for CE marking, refer to the EU Declaration of Conformity issued for your product at www.se.com

- For the latest information regarding product compliance with RoHS, WEEE directives and REACH regulation, visit the Schneider Electric **Check a Product** portal at www.reach.schneider-electric.com

Installation in Classified Ex Area

- Hazardous locations Class I, Division 2, groups A, B, C, and D, T4 and Class I, Zone 2, T4, -40 °C ≤ Tamb ≤ 70 °C (-40 °F ≤ Tamb ≤ 158 °F) according to CSA C22.2 No. 213-17, UL 12.12.01

- ATEX (EU Directive 2014/34/EU) in defined atmosphere Zone 2 according to EN IEC 60079-0, EN IEC 60079-7 and EN IEC 60079-15

⚠ WARNING

EXPLOSION HAZARD

THESE DEVICES ARE OPEN-TYPE DEVICES THAT ARE TO BE INSTALLED IN AN ENCLOSURE WITH TOOL REMOVABLE COVER OR DOOR, SUITABLE FOR THE ENVIRONMENT.

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

⚠ WARNING

EXPLOSION HAZARD

DO NOT DISCONNECT WHILE THE CIRCUIT IS LIVE OR UNLESS THE AREA IS FREE OF IGNITABLE CONCENTRATIONS.

AVERTISSEMENT – RISQUE D'EXPLOSION. NE PAS DÉBRANCHER PENDANT QUE LE CIRCUIT EST SOUS TENSION OU À MOINS QUE L'EMPLACEMENT NE SOIT EXEMPT DE CONCENTRATIONS INFLAMMABLES.

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

Specific Countries

For Australia and New Zealand: ACMA requirements for RCM marking

Specific Countries

For United States: FCC Part 15 Subpart B Class A