SCADAPack E

5691 Input/Output Simulator Module Hardware Manual

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1 Legal Information

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

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

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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.

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

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Technical Support: Australia

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Email	au.help@schneider-electric.com

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, service, 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 potentially 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 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 help prevent unauthorized changes in operating characteristics.

Acceptable Use

SCADAPack E remote Programmable Automation Controllers (rPACs), Remote Terminal Units (RTUs) and input/output (I/O) modules are intended for use in monitoring and controlling non-critical equipment only. They are not intended for safety-critical applications.

⚠ WARNING

UNACCEPTABLE USE

Do not use SCADAPack E rPACs, RTUs, or I/O modules as an integral part of a safety system. These devices are not safety products.

Failure to follow this instruction 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 Overview

The 5691 simulator module provides four adjustable analog input simulators, four toggled digital input simulators and one counter simulator.

The Model 5691 is designed to work with SCADAPack 350E, SCADAPack 357E, and SCADAPack 334E RTUs.

Specifications

Model 5691 Specifications	
I/O Summary	Signal Analog Input Simulation: 4 Digital Input Simulation: 4 Counter simulation: 1
Analog Outputs	0...5 V or 0...20 mA potentiometer adjustable
Digital Outputs	User configurable to either: 12...24 V sourcing or Switch to common
Counter	0...12 V digital output 10 to 150 Hz potentiometer adjustable
Power Requirements	12...24 V
Dimensions	74 mm (2.9 in) wide 124 mm (4.9 in) high

Installation

The 5691 I/O Simulator is mounted in a 5000 series I/O expansion module enclosure. It is designed for desktop use when demonstrating or training with a SCADAPack E RTU.

Power Supply

The 5691 requires an external 12...24 Vdc power supply. This power can come from the SCADAPack E RTU or from the power supply used to power the SCADAPack E RTU. Schneider Electric supplies wiring harnesses for connectors to different RTUs. Input power is applied on the first two pins (counting from left to right) of the P1 connector.

Wiring

NOTICE
UNEXPECTED EQUIPMENT OPERATION Do not exceed the maximum voltage specified for each analog and 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 or serious injury.**

The digital output terminals labeled 'To DIGITAL INPUTS' on a 5691 can be configured as a source or sink. When configured as a source, these outputs terminals provide power supply voltage when the switches are turned on.

Sourcing Digital Outputs

To configure the digital outputs as a voltage source to the digital inputs on an I/O board, do the following:

Connect DIN WETTING pins +V and COM on connector P1 of the 5691 board.

Connect the digital outputs on the P1 connector of the 5691 to the digital inputs on your I/O board.

Connect a GND terminal from the 5691 board to the COM terminal serving the digital inputs on the I/O board.

See these topics for wiring examples.

- 5691 to SCADAPack 350E Wiring Example 12
- 5691 to SCADAPack 357E Wiring Example 15
- 5691 to SCADAPack 334E Wiring Example 18

Sinking Digital Outputs

To configure the digital outputs as a current sink for sourcing digital outputs, do the following:

Connect DIN WETTING pins COM and GND on connector P1 of the 5691 board.

Connect the digital outputs on the P1 connector of the 5691 to the digital inputs on your I/O board.

Connect a GND terminal from the 5691 board to the COM terminal serving the digital inputs on the I/O board.

See these topics for wiring examples.

- 5691 to SCADAPack 350E Wiring Example 12
- 5691 to SCADAPack 357E Wiring Example 15
- 5691 to SCADAPack 334E Wiring Example 18

5 5691 to SCADAPack 350E Wiring Example

NOTICE
UNEXPECTED EQUIPMENT OPERATION Do not exceed the maximum voltage specified for each analog and 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 or serious injury.**

The following are special characteristics unique to using the 5691 with a SCADAPack 350E. Wiring details for these characteristics are included in the tables below:

SCADAPack 350E counters and digital inputs are isolated from the power supply ground. To use the 5691 simulated inputs, the common of the counters and digital inputs are connected to chassis ground so that it is in common with the power supply. Use the two extra leads provided with the 5691 to do this.

Power to SCADAPack 350E

FROM		TO	
Label	**Pin**	**Pin**	**Label**
PWR OUT +	5691 P2, 8	SCADAPack 350E P3, 1	PWR IN 11...30 Vdc +
PWR OUT –	5691 P2, 7	SCADAPack 350E P3, 2	PWR IN 11...30 Vdc –

Analog Inputs

FROM		TO	
Label	**Pin**	**Pin**	**Label**
TO ANALOG INPUT 0	5691 P2, 6	SCADAPack 350E P10, 10	AI 0

TO ANALOG INPUT 1	5691 P2, 5	SCADAPack 350E P10, 9	AI 1
TO ANALOG INPUT 2	5691 P2, 4	SCADAPack 350E P10, 8	AI 2
TO ANALOG INPUT 3	5691 P2, 3	SCADAPack 350E P10, 7	AI 3
TO ANALOG INPUT GND	5691 P2, 2	SCADAPack 350E P10, 4	AI COM

Digital Inputs

FROM		**TO**	
Label	**Pin**	**Pin**	**Label**
DIN WETTING COM	5691 P1, 4	5691 P1, 5	DIN WETTING GND
TO DIGITAL INPUT 0	5691 P1, 6	SCADAPack 350E P3, 3	DIO 0
TO DIGITAL INPUT 1	5691 P1, 7	SCADAPack 350E P3, 4	DIO 1
TO DIGITAL INPUT 2	5691 P1, 8	SCADAPack 350E P3, 5	DIO 2
TO DIGITAL INPUT 3	5691 P1, 9	SCADAPack 350E P3, 6	DIO 3
chassis ground	SCADAPack 350E P3, 1	SCADAPack 350E P3, 7	DIO COM

Counter Input

FROM		**TO**	
Label	**Pin**	**Pin**	**Label**
TO CTR	5691 P1, 10	SCADAPack 350E P6, 1	CNT 0
signal ground	SCADAPack 350E P3, 2	SCADAPack 350E P6, 4	COM

Power to 5691

FROM		**TO**	
Label	**Pin**	**Pin**	**Label**

12 to 24 VDC	power supply +	5691 P1, 1	PWR IN 12-24Vdc +
12 to 24 VDC	power supply –	5691 P1, 2	PWR IN 12-24Vdc –

6 5691 to SCADAPack 357E Wiring Example

NOTICE
UNEXPECTED EQUIPMENT OPERATION Do not exceed the maximum voltage specified for each analog and 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 or serious injury.**

The following are special characteristics unique to using the 5691 with a SCADAPack 357E. Wiring details for these characteristics are included in the tables below:
SCADAPack 357E counters and digital inputs are isolated from the power supply ground. To use the 5691 simulated inputs, the common of the counters and digital inputs are connected to chassis ground so that it is in common with the power supply. Use the two extra leads provided with the 5691 to do this.

The digital inputs on the SCADAPack 357E I/O board required a wetting voltage. Connect the 5691 DIN WETTING jumper between COM and +V to apply a wetting voltage.

Use a short pair of wires to connect DC power from P3 on the SCADAPack 357E controller board to P3 on the SCADAPack 357E I/O board.

Power to SCADAPack 357E controller board

FROM		**TO**	
Label	**Pin**	**Pin**	**Label**
PWR OUT +	5691 P2, 8	SCADAPack 357E controller board P3, 1	PWR IN 11...30 Vdc +
PWR OUT –	5691 P2, 7	SCADAPack 357E controller board P3, 2	PWR IN 11...30 Vdc –

Power to SCADAPack 357E I/O board

FROM		TO	
Label	**Pin**	**Pin**	**Label**
PWR IN 11...30 Vdc +	SCADAPack 357E I/O board P3, 1	SCADAPack 357E controller board P3, 1	PWR IN 11...30 Vdc +
PWR IN 11...30 Vdc –	SCADAPack 357E I/O board P3, 2	SCADAPack 357E controller board P3, 2	PWR IN 11...30 Vdc –

Analog Inputs

FROM		TO	
Label	**Pin**	**Pin**	**Label**
TO ANALOG INPUT 0	5691 P2, 6	SCADAPack 357E I/O board P4, 1	AI 0
TO ANALOG INPUT 1	5691 P2, 5	SCADAPack 357E I/O board P4, 2	AI 1
TO ANALOG INPUT 2	5691 P2, 4	SCADAPack 357E I/O board P4, 3	AI 2
TO ANALOG INPUT 3	5691 P2, 3	SCADAPack 357E I/O board P4, 4	AI 3
TO ANALOG INPUT GND	5691 P2, 2	SCADAPack 357E I/O board P4, 9	AI COM

Digital Inputs

FROM		TO	
Label	**Pin**	**Pin**	**Label**
DIN WETTING COM	5691 P1, 4	5691 P1, 5	DIN WETTING GND
TO DIGITAL INPUT 0	5691 P1, 6	SCADAPack 357E I/O board P7, 1	DI 0
TO DIGITAL	5691 P1, 7	SCADAPack 357E I/	DI 1

INPUT 1		O board P7, 2	
TO DIGITAL INPUT 2	5691 P1, 8	SCADAPack 357E I/O board P7, 3	DI 2
TO DIGITAL INPUT 3	5691 P1, 9	SCADAPack 357E I/O board P7, 4	DI 3
chassis ground	SCADAPack 357E controller board P3, 1	SCADAPack 357E I/O board P7, 9	DI COM

Counter Input

FROM		**TO**	
Label	**Pin**	**Pin**	**Label**
TO CTR	5691 P1, 10	SCADAPack 357E controller board P6, 1	CNT 0
signal ground	SCADAPack 357E controller board P3, 2	SCADAPack 357E controller board P6, 4	COM

Power to 5691

FROM		**TO**	
Label	**Pin**	**Pin**	**Label**
12 to 24 VDC	power supply +	5691 P1, 1	PWR IN 12-24Vdc +
12 to 24 VDC	power supply –	5691 P1, 2	PWR IN 12-24Vdc –

7 5691 to SCADAPack 334E Wiring Example

NOTICE
UNEXPECTED EQUIPMENT OPERATION Do not exceed the maximum voltage specified for each analog and 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 or serious injury.**

The following are special characteristics unique to using the 5691 with a SCADAPack 334E. Wiring details for these characteristics are included in the tables below:
SCADAPack 334E counters are isolated from the power supply ground. To use the 5691 simulated counter input, the common of the counter is connected to chassis ground so that it is in common with the power supply. Use the extra leads provided with the 5691 to do this.

The 5607 digital inputs provide their own wetting current. Connect the 5691 DIN WETTING jumper between COM and GND to remove wetting.

Use a short pair of wires to connect DC power from P3 on the SCADAPack 334E controller board to P3 on the SCADAPack 334E I/O board.

Power to SCADAPack 334E controller board

FROM		**TO**	
Label	**Pin**	**Pin**	**Label**
PWR OUT +	5691 P2, 8	SCADAPack 334E controller board P3, 1	PWR IN 11...30 Vdc +
PWR OUT –	5691 P2, 7	SCADAPack 334E controller board P3, 2	PWR IN 11...30 Vdc –

Power to SCADAPack 334E I/O board

FROM		TO	
Label	**Pin**	**Pin**	**Label**
PWR IN 11...30 Vdc +	SCADAPack 334E I/O board P3, 1	SCADAPack 334E controller board P3, 1	PWR IN 11...30 Vdc +
PWR IN 11...30 Vdc –	SCADAPack 334E I/O board P3, 2	SCADAPack 334E controller board P3, 2	PWR IN 11...30 Vdc –

Analog Inputs

FROM		TO	
Label	**Pin**	**Pin**	**Label**
TO ANALOG INPUT 0	5691 P2, 6	SCADAPack 334E I/O board P4, 1	AI 0
TO ANALOG INPUT 1	5691 P2, 5	SCADAPack 334E I/O board P4, 2	AI 1
TO ANALOG INPUT 2	5691 P2, 4	SCADAPack 334E I/O board P4, 3	AI 2
TO ANALOG INPUT 3	5691 P2, 3	SCADAPack 334E I/O board P4, 4	AI 3
TO ANALOG INPUT GND	5691 P2, 2	SCADAPack 334E I/O board P4, 9	AI COM

Digital Inputs

FROM		TO	
Label	**Pin**	**Pin**	**Label**
DIN WETTING COM	5691 P1, 4	5691 P1, 5	DIN WETTING GND
TO DIGITAL	5691 P1, 6	SCADAPack 334E	DI 0

INPUT 0		I/O board P5, 1	
TO DIGITAL INPUT 1	5691 P1, 7	SCADAPack 334E I/O board P5, 2	DI 1
TO DIGITAL INPUT 2	5691 P1, 8	SCADAPack 334E I/O board P5, 3	DI 2
TO DIGITAL INPUT 3	5691 P1, 9	SCADAPack 334E I/O board P5, 4	DI 3

Counter Input

FROM		**TO**	
Label	**Pin**	**Pin**	**Label**
TO CTR	5691 P1, 10	SCADAPack 334E controller board P3, 3	CNT 0
signal ground	SCADAPack 334E controller board P3, 2	SCADAPack 334E controller board P3, 6	CNT COM

Power to 5691

FROM		**TO**	
Label	**Pin**	**Pin**	**Label**
12 to 24 VDC	power supply +	5691 P1, 1	PWR IN 12-24Vdc +
12 to 24 VDC	power supply –	5691 P1, 2	PWR IN 12-24Vdc –

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