



# SEL-651RA Installation Instructions for SEL Satellite-Synchronized Clock Accessory

## Introduction

The SEL-2401 satellite-synchronized clock accessory provides precise time for synchrophasors, device synchronization, and event correlation and reporting. The SEL-2401 accessory includes the accessory mounting kit and 12-volt terminal block. The mounting kit provides physical means to mount accessories to the back of the cabinet behind the SEL-651RA control module. The cross channels and channel nuts are adjustable to accommodate most accessories with mounting dimensions less than 241.3 mm (9.5 in) high and 406.4 mm (16 in) wide. There are approximately 56.64 mm (2.23 in) between the back of the control module and the accessory mounting bracket. The 12-volt terminal block provides five 12 V and five return positions. The input power or battery power energizes the 12 V terminals while the control is operable.

## Parts

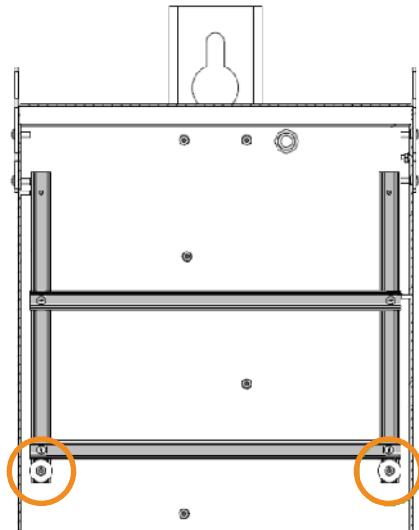
SEL Part Number	Description	Quantity
P9748	Accessory mounting kit subassembly	1
P9753	12-volt terminal block subassembly	1
P9950	Accessory mounting kit auxiliary parts	1
SEL-C2252	Red wire	1
SEL-C5577-10	Red wire (shorter of the two)	1
SEL-C5533	Black wire	1
SEL-C5400-12	Black wire (shorter of the two)	1
SEL-C5483	Green and yellow wire	1
SEL-C953-6	Communications cable	1
SEL-C960-1	Antenna cable	1
080-0101	Cable clamps	3
140-2905	10-32 x 1 socket head cap screw	2
140-3150	10-32 self-locking nut	5
141-0203	10-32 channel nut	2
142-0260	Fender washers	2
142-0265	1/2" flat washer	1
142-0271	1/4" internal tooth lock washer	2
200-0005	Surge arrester	1
310-0050	Zip ties	12
24010XXX0	SEL-2401 Satellite-Synchronized Clock	1
915900045	Antenna kit	1

# Installation

---

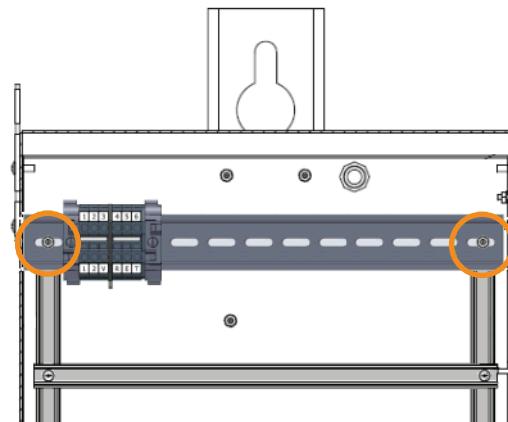
Step 1. If your unit was already equipped with the accessory mounting kit and 12 V terminal block, skip to *Step 12*. Otherwise, continue to *Step 2*.

Step 2. Install the accessory mounting kit subassembly to the back of the cabinet. Secure the accessory mounting kit to the cabinet with two fender washers and two 10-32 self-locking nuts on the bottom studs only. See *Figure 1*.



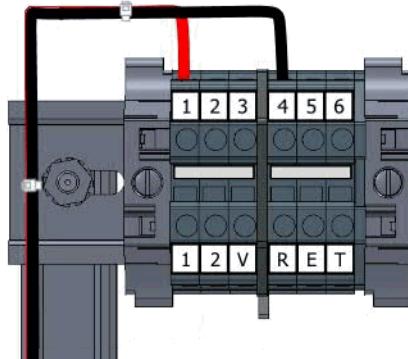
**Figure 1 Install Accessory Mounting Assembly**

Step 3. Install the 12 V terminal block subassembly to the top of the accessory mounting kit with two 10-32 self-locking nuts. See *Figure 2*.



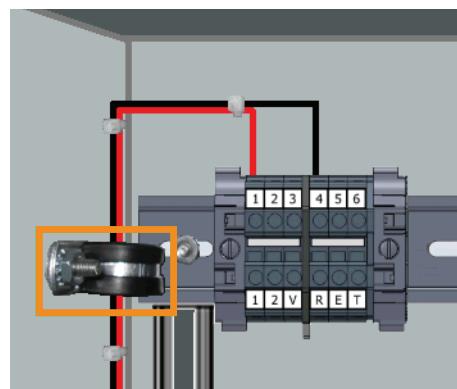
**Figure 2 Install 12 V Terminal Block**

Step 4. Install the longer red and black wires to the top of Terminal 1 and Terminal 4, respectively, as shown in *Figure 3*.



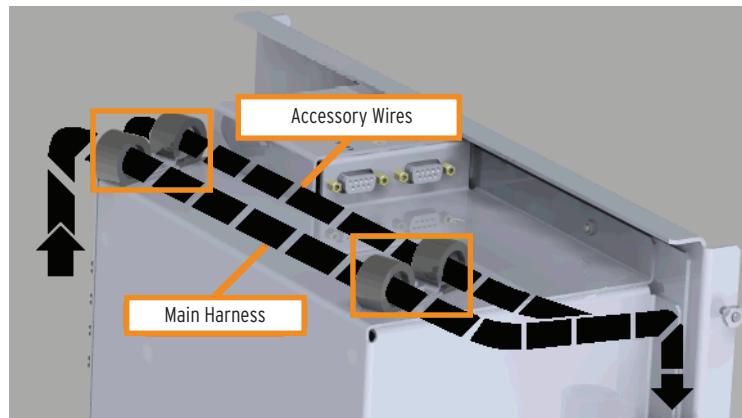
**Figure 3 Install 12 V Terminal Block Wires**

Step 5. Install the wire clamp to the side of the cabinet with a nut and route the wires through it. See *Figure 4*.



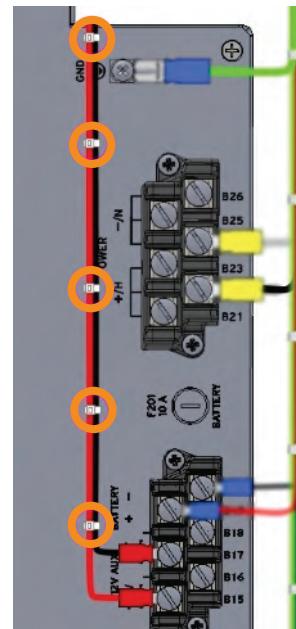
**Figure 4 Secure 12 V Terminal Block Wires**

- Step 6. Route the wires down the side of the cabinet to the bottom of the cabinet near the 14-pin connector.
- Step 7. Route the wires through the existing wire clamp on the floor of the cabinet.
- Step 8. Route the wires through the wire loom and up the swing-panel hinge through the existing wire clamps.
- Step 9. Route the wires across the top of the control module. The accessory wires route separately from the main harness.
- Step 10. Use the existing nuts to secure the wires to the top of the control module with the two accessory wire clamps (if they are not already installed). See *Figure 5*.



**Figure 5 Secure Wires on Top of Control Module**

Step 11. Route the wires down the other side of the control module and attach the red wire to B15 and the black wire to B17. See *Figure 6*.



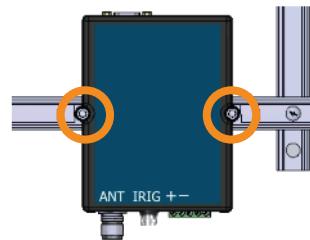
**Figure 6 Connect 12 V Terminal Block Wires**

Step 12. Insert the two channel nuts into the lower cross piece of the accessory mounting kit towards the right side. See *Figure 7*.



**Figure 7 Install Channel Nuts**

Step 13. Attach the SEL-2401 to the channel nuts with the socket head cap screws. See *Figure 8*.



**Figure 8 Install SEL-2401**

Step 14. Install the larger end of the green and yellow ground wire to the surge arrestor. Use the existing screw with the surge arrestor and the provided lock washers on both sides of the ring terminal. See *Figure 9*.



**Figure 9 Connect Ground Wire to Surge Arrestor**

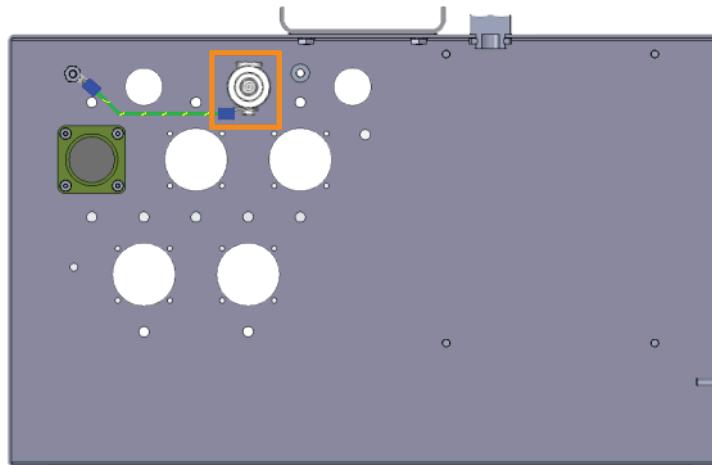
Step 15. Install the surge arrestor in the bottom of the cabinet in the center hole of the back row. See *Figure 10*.

- Install the surge arrestor from inside the cabinet.
- Install the 1/2" washer over the surge arrestor from the outside of the cabinet and secure the surge arrestor with the lock washer and nut that came with it.



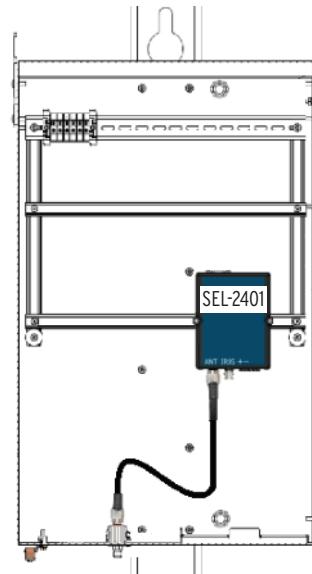
**Figure 10 Install Surge Arrestor in Bottom of Cabinet**

Step 16. Attach the other end of the green and yellow wire to the ground stud with the existing nut. See *Figure 11*.



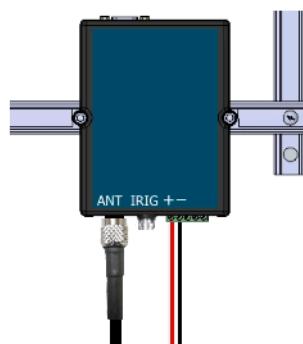
**Figure 11 Connect Surge Arrestor Ground Wire**

Step 17. Connect the antenna cable to the **ANT** terminal on the SEL-2401. Route the cable down to the bottom of the cabinet and attach the other end to the surge arrestor. See *Figure 12*.



**Figure 12 Install Antenna Cable**

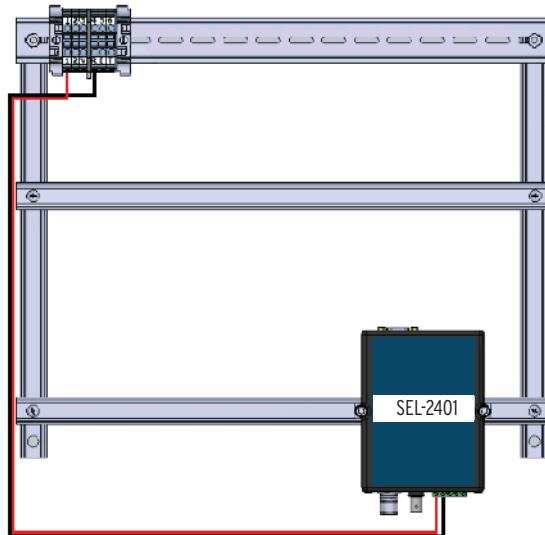
Step 18. Connect the shorter black and red wires to the **-** and **+** **POWER** terminals on the SEL-2401, respectively. See *Figure 13*.



**Figure 13 Connect SEL-2401 Power Wires**

Step 19. Route the wires down and to the left just below the accessory mounting kit, then route them up the left back corner of the cabinet.

Step 20. Terminate the red and black wires to the bottom of Terminal 1 and Terminal 4, respectively, of the 12 V terminal block. See *Figure 14*.



**Figure 14 Connect SEL-2401 Power Wires to 12 V Terminal Block**

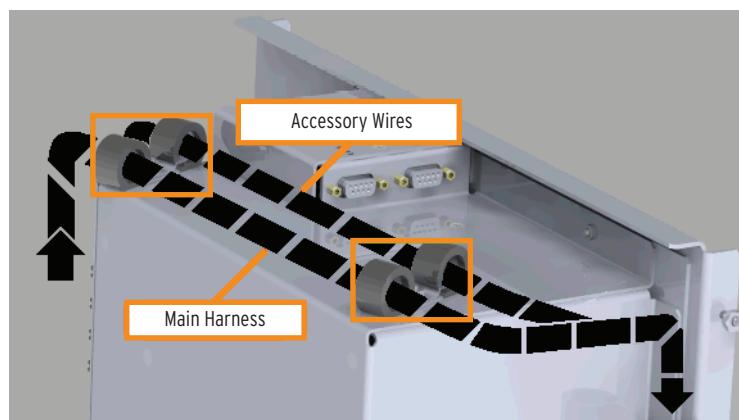
Step 21. Connect the communications wire to the **OUTPUT** terminal of the SEL-2401.

Step 22. Route the cable down and to the left with the red and black power wires. When you reach the left edge of the cabinet, route the cable down to the bottom of the cabinet.

Step 23. Join the SEL-2401 communications cable with the main harness and route the wires through the wire loom and up the swing-panel hinge through the existing wire clamps.

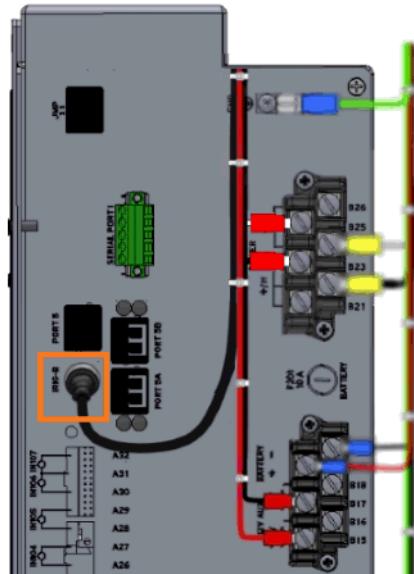
Step 24. Route the wires across the top of the control module. The accessory wires route separately from the main harness.

Step 25. Use the existing nuts to secure the wires to the top of the control module with the two accessory wire clamps (if they are not already installed). See *Figure 15*.



**Figure 15 Secure Wires on Top of Control Module**

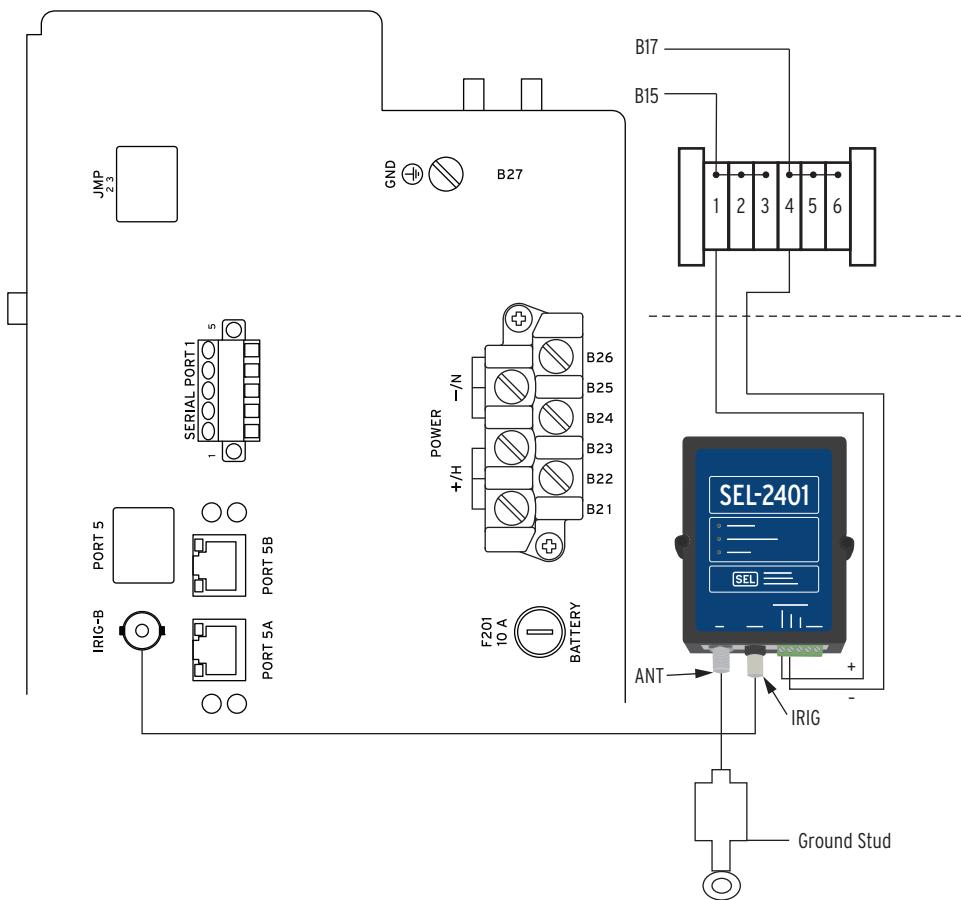
Step 26. Route the SEL-2401 communications cable down the other side of the unit and attach it to the **IRIG-B** port. See *Figure 16*.



**Figure 16 Connect IRIG Cable**

Step 27. Zip tie wires as necessary.

# Wiring Diagram



## Technical Support

---

We appreciate your interest in SEL products and services. If you have questions or comments, please contact us at:

Schweitzer Engineering Laboratories, Inc.  
2350 NE Hopkins Court  
Pullman, WA 99163-5603 U.S.A.  
Tel: +1.509.338.3838  
Fax: +1.509.332.7990  
Internet: [selinc.com/support](http://selinc.com/support)  
Email: [info@selinc.com](mailto:info@selinc.com)

## Notes

---

**WARNING**

Operator safety may be impaired if the device is used in a manner not specified by SEL.

© 2016-2026 by Schweitzer Engineering Laboratories, Inc.

Content subject to change without notice.

Unless otherwise agreed in writing, all SEL product sales are subject to SEL's terms and conditions located here: <https://selinc.com/company/termsandconditions/>.

**AVERTISSEMENT**

La sécurité de l'opérateur peut être compromise si l'appareil est utilisé d'une façon non indiquée par SEL.

**SCHWEITZER ENGINEERING LABORATORIES, INC.**

2350 NE Hopkins Court • Pullman, WA 99163-5603 U.S.A.

Tel: +1.509.332.1890 • Fax: +1.509.332.7990

[selinc.com](http://selinc.com) • [info@selinc.com](mailto:info@selinc.com)

