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**SCXI-1349**

# CALIBRATION PROCEDURE

# SCXI™-1121

This document contains information and instructions for calibrating the National Instruments SCXI-1121 signal conditioning module.

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# Introduction

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## What Is Calibration?

*Calibration* consists of verifying the measurement accuracy of a device and adjusting for any measurement error. *Verification* is measuring the performance of the device and comparing these measurements to the factory specifications. During calibration, you supply and read voltage levels using external standards, then you adjust the device calibration constants. The measurement circuitry compensates for any inaccuracies in the device, and returns the accuracy of the device to the factory specifications.

## Why Should You Calibrate?

The accuracy of electronic components drifts with time and temperature, which can affect measurement accuracy. Calibration restores these components to their specified accuracy and ensures that the device still meets NI standards.

## How Often Should You Calibrate?

Calibrate the SCXI-1121 at a regular interval as defined by the measurement accuracy requirements of your application. NI recommends that you perform a complete calibration at least once every year. You can shorten this interval based on the accuracy requirements of your application.

## Software and Documentation

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You do not need any special software or documentation to calibrate the SCXI-1121. This calibration document contains all the information you need to complete the calibration procedure. Refer to the *SCXI-1121 User Manual* for more information about the SCXI-1121.

# Test Equipment

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NI recommends that you use the equipment in Table 1 to calibrate the SCXI-1121. If these instruments are not available, use the requirements listed in Table 1 to select a suitable substitute.

**Table 1.** Test Equipment

<b>Equipment</b>	<b>Recommended Model</b>	<b>Requirements</b>
Calibrator	Fluke 5700A	50 ppm
DMM	NI 4070	5 1/2-digit, 15 ppm
Resistors	—	120 $\Omega$ and 800 $\Omega$ , $\pm 10\%$

If you do not have custom connection hardware, you need the following connectors:

- Terminal block, such as the SCXI-1320
- Shielded 68-pin connector cable
- 50-pin ribbon cable
- 50-pin breakout box
- SCXI-1349 adapter

These components give easy access to the individual pins on the SCXI-1121 front and rear connectors.

# Test Conditions

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Follow these guidelines to optimize the connections and environment during calibration:

- Keep connections to the SCXI-1121 short. Long cables and wires can act as antennas, picking up extra noise and thermal offsets that affect measurements.
- Use shielded copper wire for all cable connections to the SCXI-1121. Use twisted-pair wire to eliminate noise and thermal offsets.
- Maintain the ambient temperature between 18 °C and 28 °C.
- Keep relative humidity below 80%.
- Allow a warm-up time of at least 15 minutes for the SCXI-1121 to ensure that the measurement circuitry is at a stable operating temperature.

# Calibration Process

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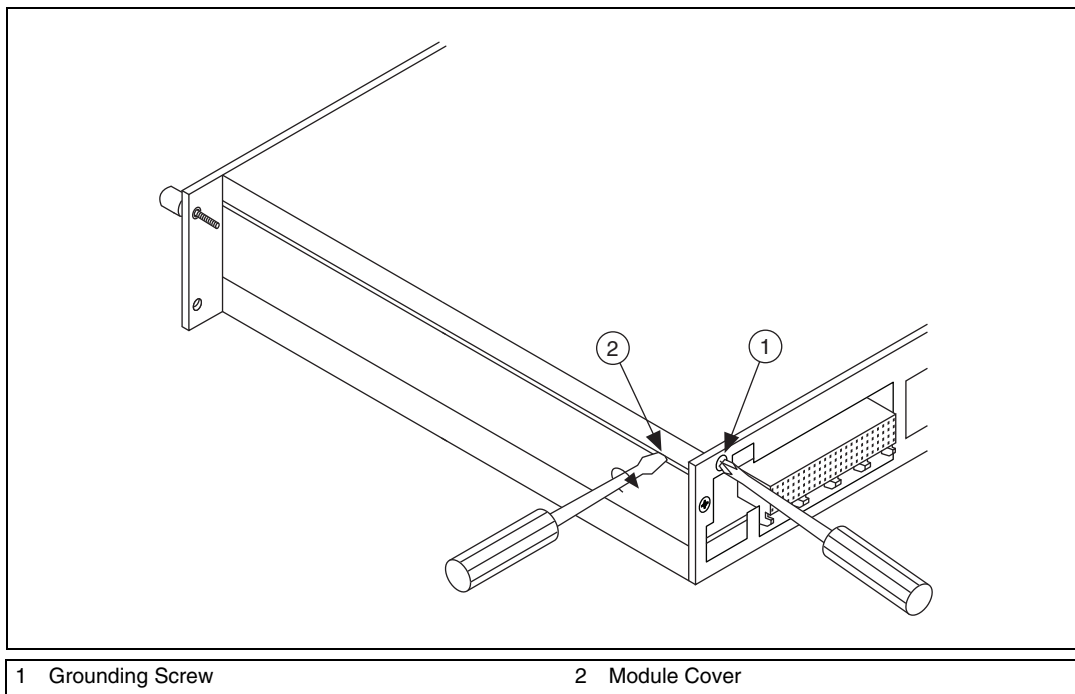
The calibration process has the following steps:

1. *Initial Setup*—Configure the SCXI-1121 for calibration.
2. *Verification Procedure*—Verify the existing operation of the SCXI-1121. This step determines whether the SCXI-1121 is operating within its test limits.
3. *Adjustment Procedure*—Perform an external calibration that adjusts the SCXI-1121 calibration constants with respect to a known voltage source.
4. *Verifying Adjusted Values*—Perform another verification to ensure that the SCXI-1121 is operating within its test limits after adjustments.

## Initial Setup

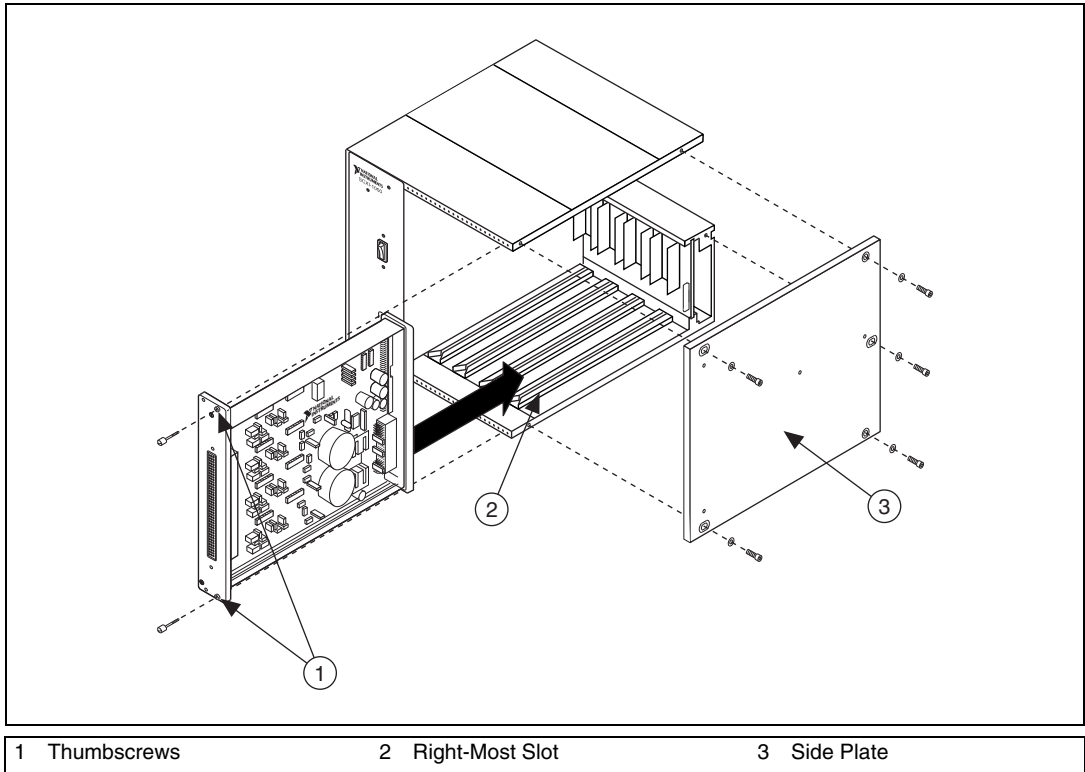
Complete the following steps to configure the SCXI-1121 for calibration. Refer to Figure 1 for steps 1 and 2 and Figure 2 for steps 3 and 4.

1. Remove the grounding screw from the SCXI-1121.
2. Remove the cover on the SCXI-1121 so that you have access to the potentiometers.



**Figure 1.** Grounding Screw and Module Cover Removal

3. Remove the side plate of the SCXI chassis.
4. Install the SCXI-1121 into the right-most slot of the SCXI chassis.

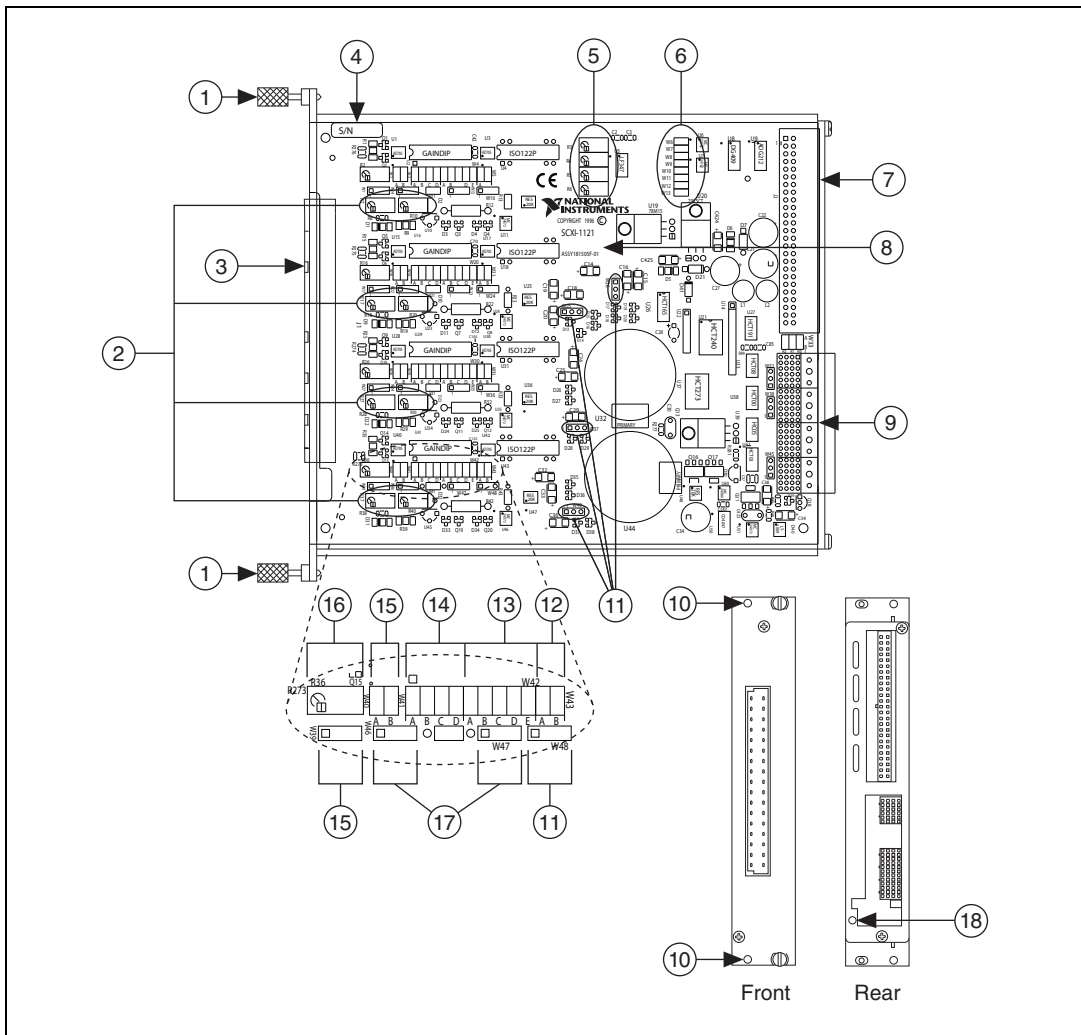


**Figure 2.** Side Plate Removal and Module Installation

You do not need to cable the SCXI-1121 to a DAQ device. Leave the configuration of the digital jumpers W32, W38, and W45 unchanged because they do not affect this calibration procedure.

## Configuring the Half-Bridge Completion Jumpers

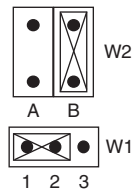
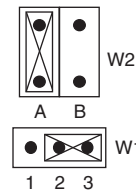
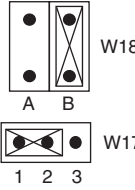
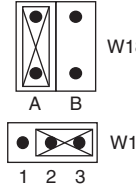
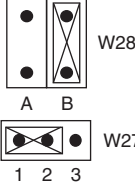
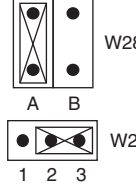
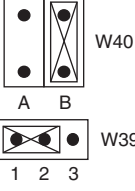
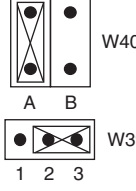
Verify that the half-bridge completion network is disabled prior to calibrating the SCXI-1121. Refer to Figure 3 for the location of the half-bridge completion jumpers. Refer to Table 2 for the correct jumper settings to disable the completion network.



- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>1 Thumbscrews</li> <li>2 Voltage and Current Adjust</li> <li>3 Front Connector</li> <li>4 Serial Number</li> <li>5 Output Null Adjust Potentiometers</li> <li>6 Second-Stage Filter Jumpers</li> <li>7 Rear Signal Connector</li> <li>8 Product Name, Assembly Number, Revision Letter</li> <li>9 SCXIbus Connector</li> </ul> | <ul style="list-style-type: none"> <li>10 Terminal Block Mounting Hole</li> <li>11 Excitation Level Jumpers</li> <li>12 First-Stage Filter Jumpers</li> <li>13 Second-Stage Gain Jumpers</li> <li>14 First-Stage Gain Jumpers</li> <li>15 Half-Bridge Completion Jumpers</li> <li>16 Input Null Adjust Potentiometers</li> <li>17 Excitation Mode Jumpers</li> <li>18 Grounding Screw</li> </ul> |
|---|--|

**Figure 3.** SCXI-1121 Parts Locator Diagram

**Table 2.** Completion Network Jumpers

Channel	Jumpers	Enable Completion	Disable Network (Factory Setting)
0	W1 and W2		
1	W17 and W18		
2	W27 and W28		
3	W39 and W40		

## Configuring the Gain Jumpers

Each input channel has two user-configurable gain stages. The first-stage gain provides gains of 1, 10, 50, and 100. The second-stage gain provides gains of 1, 2, 5, 10, and 20. The SCXI-1121 ships with the first-stage gain set to 100 (position A) and the second-stage gain set to 10 (position D).

To change the gain setting of a specified channel on the SCXI-1121, refer to Table 3 for the gain jumper reference designators. Refer to Figure 3 for the location of the gain jumpers. Move the jumper to the position indicated in Table 4.



**Table 3.** Gain Jumper Reference Designators

Input Channel Number	First-Stage Gain Jumper	Second-Stage Gain Jumper
0	W3	W4
1	W19	W20
2	W29	W30
3	W41	W42

**Table 4.** Gain Jumper Positions

Gain	Setting	Jumper Position
First-Stage	1	D
	10	C
	50	B
	100	A (factory setting)
Second-Stage	1	A
	2	B
	5	C
	10	D (factory setting)
	20	E

The order of the settings for the first- and second-stage gain does not matter as long as the first-stage gain multiplied by the second-stage gain equals the desired final gain value.

## Configuring the Filter Jumpers

Each input channel also has two user-configurable filter stages. The SCXI-1121 ships in the 4 Hz position. Refer to Table 5 for the correct jumper setting for the desired cutoff frequency. Refer to Figure 3 for the locations of the jumper blocks on the SCXI-1121. Verify that both filter stages are set to the same filter setting to ensure that you achieve the desired bandwidth.

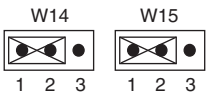
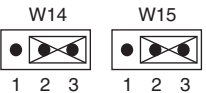
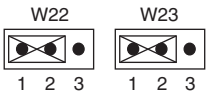
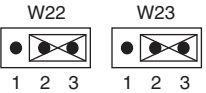
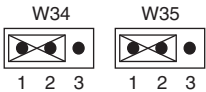
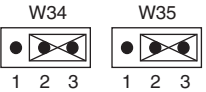
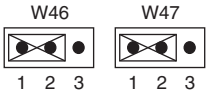
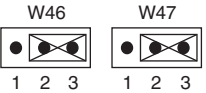
**Table 5.** Filter Jumper Settings

Input Channel Number	First Filter Jumper		Second Filter Jumper	
	4 Hz (Factory Setting)	4 kHz	4 Hz (Factory Setting)	4 kHz
0	W5-A	W5-B	W6	W7
1	W21-A	W21-B	W8	W9
2	W31-A	W31-B	W10	W11
3	W43-A	W43-B	W12	W13

## Configuring the Excitation Jumpers

You can configure each excitation channel of the SCXI-1121 to either a voltage or current excitation mode. Each channel has two jumpers for this purpose. Set both jumpers in the same mode for correct operation of the excitation channel. Refer to Table 6 to determine how to set up the SCXI-1121 in the desired mode. The SCXI-1121 ships to you in the voltage mode.

**Table 6.** Voltage and Current Mode Excitation Jumper Settings

Excitation Channel	Jumpers	Voltage Mode (Factory Setting)	Current Mode
0	W14 and W15		
1	W22 and W23		
2	W34 and W35		
3	W46 and W47		

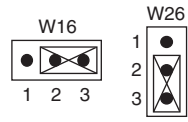
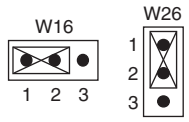
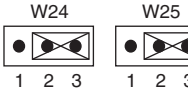
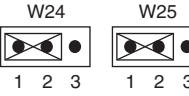
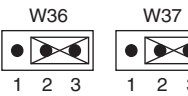
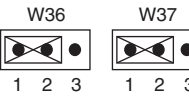
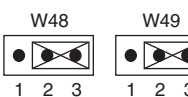
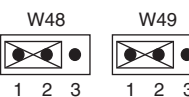
## Configuring the Excitation Level

Each excitation channel of the SCXI-1121 has two different current or voltage levels. You can set a given channel to one of the following levels:

- In the current mode—0.150 mA or 0.450 mA
- In the voltage mode—3.333 V or 10 V

After selecting the excitation mode of the desired operation—voltage or current, refer to Table 7 to set the SCXI-1121 for the level of operation. The SCXI-1121 ships with the voltage mode set to 3.333 V.

**Table 7.** Excitation Level Jumper Settings

Excitation Channel	Jumpers	3.333 V or 0.150 mA (Factory Setting)	10 V or 0.450 mA
0	W16 and W26		
1	W24 and W25		
2	W36 and W37		
3	W48 and W49		

## Verification Procedure

The verification procedure determines how well the SCXI-1121 is meeting its test limits. You can use this information to select the appropriate calibration interval for your application.

### Verifying Analog Input Offsets

Complete the following steps to verify the analog input offsets:

1. Refer to Table 12 in the *Test Limits* section for all acceptable settings for the SCXI-1121. NI recommends verifying all ranges and gains, but you can save time by checking only those ranges used in your application.

2. Set the channel gain on all channels to the gain you want to test, starting with the smallest gain available for the SCXI-1121. Refer to Table 12 for available gains.
3. Set the channel filter for all channels on the SCXI-1121 to 10 kHz.
4. Connect the calibrator to the analog input channel you are testing, starting with channel 0. If you do not have an SCXI terminal block such as the SCXI-1320, refer to Table 13 to determine the pins on the 96-pin front connector that correspond to the positive and negative inputs of the specified channel. For example, the positive input for channel 0 is pin A32, which is labeled *CH0+*. The negative input for channel 0 is pin C32, which is labeled *CH0-*.
5. Set the DMM to voltage mode, and connect it to the output of the same channel to which the calibrator was connected in step 4. Refer to Table 14 to determine the pins on the 50-pin rear connector that correspond to the positive and negative outputs for the specified channel. For example, the positive output for channel 0 is pin 3, which is labeled *CH 0+*. The negative output for channel 0 is pin 4, which is labeled *CH 0-*.
6. Set the calibrator voltage to the value specified by the Test Point entry listed in Table 12.
7. Read the resulting output voltage on the DMM. If the output voltage result falls between the Upper Limit and the Lower Limit values, the SCXI-1121 passed the test.
8. Repeat steps 4 through 7 for the remaining test points.
9. Repeat steps 4 through 8 for the remaining analog input channels.
10. Repeat steps 2 through 9 for the remaining gain and filter values specified in Table 12.

You have completed verifying the analog input offsets. If any of your measurements fall outside the test limits listed in Table 12, adjust the SCXI-1121 as described in the [Adjusting Analog Input Offsets](#) section.

## Verifying Voltage Excitation Limits

Complete the following steps to verify the voltage excitation limits:

1. Connect a 120  $\Omega$  resistor to the output of the excitation channel you are testing, starting with excitation channel 0.

If you have a terminal block such as the SCXI-1320, the excitation channel connections are marked on the terminal block. If you do not have a terminal block, refer to Table 13 for connection information.

2. Configure the excitation channel to the 3.333 V level.
3. Set the DMM to voltage mode, and connect the DMM leads to the excitation output as closely as possible to the resistor body.

4. Compare the DMM reading to the limits for excitation shown in Table 8. If the reading falls between the Upper Limit and the Lower Limit values, the SCXI-1121 passed the test.

**Table 8.** SCXI-1121 Voltage Excitation Limits

Test Point (V)	Upper Limit (V)	Lower Limit (V)
3.333	3.334333	3.331667
10	10.020000	9.980000

5. Configure the excitation channel to the 10 V level, replace the 120  $\Omega$  resistor with the 800  $\Omega$  resistor, and repeat steps 3 and 4.
6. Repeat steps 2 through 5 for all remaining channels.

You have completed verifying the voltage excitation limits. If any of your measurements fall outside the test limits listed in Table 8, adjust the SCXI-1121 as described in the [Adjusting Voltage Excitation](#) section.

## Verifying Current Excitation Limits

Complete the following steps to verify current excitation limits:

1. Remove the resistor from the excitation channel if you have not already done so.
2. Configure the channel to the 0.150 mA excitation level.
3. Set the DMM to current mode, and connect it to the excitation channel output, starting with excitation channel 0.

If you do not have a terminal block, refer to Figure 3 for connection information.

4. Compare the DMM reading to the limits for excitation shown in Table 9. If the reading falls between the Upper Limit and Lower Limit values, the SCXI-1121 passed the test.

**Table 9.** SCXI-1121 Current Excitation Limits

Test Point (mA)	Upper Limit (mA)	Lower Limit (mA)
0.150	0.150060	0.149940
0.450	0.450900	0.449100

5. Configure the channel for 0.450 mA excitation level and repeat steps 2 and 4.
6. Repeat steps 2 through 5 for all remaining channels.

You have completed verifying the current excitation limits. If any of your measurements fall outside the limits listed in Table 9, adjust the SCXI-1121 as described in the *Adjusting Current Excitation* section.

## Adjustment Procedure

The adjustment procedure adjusts the analog input offsets, the voltage excitation limits, and the current excitation limits.

### Adjusting Analog Input Offsets

Complete the following steps to adjust the offset null value:

1. Set the channel gain on the channel you are adjusting to a gain of 1. Set the filter value to 4 Hz.
2. Connect the calibrator to the analog input channel you want to adjust. Refer to Table 13 to determine the pins on the 96-pin front connector that correspond to the positive and negative inputs of the specified channel. For example, the positive input for channel 0 is pin A32, which is labeled *CH0+*. The negative input for channel 0 is pin C32, which is labeled *CH0-*.
3. Set the DMM to voltage mode, and connect it to the output of the same channel to which the calibrator was connected in step 2. Refer to Table 14 to determine the pins on the 50-pin rear connector that corresponds to the positive and negative outputs for the specified channel. For example, the positive output for channel 0 is pin 3, which is labeled *CH0+*. The negative output for channel 0 is pin 4, which is labeled *CH0-*.
4. Set the calibrator voltage to 0.0 V.
5. Adjust the output null potentiometer of the channel until the DMM reading is  $0.0 \pm 3.0$  mV. Refer to Figure 3 for the potentiometer location and Table 10 for the potentiometer reference designator.

**Table 10.** Calibration Potentiometers Reference Designators

Input Channel Number	Input Null	Output Null
0	R02	R03
1	R16	R04
2	R26	R05
3	R36	R06

6. Set the channel gain to a gain of 1000.0 on the channel you are adjusting. Refer to Tables 3, 4, and 5 for more information.

7. Adjust the input null potentiometer of channel 0 until the DMM reading is  $0.0 \pm 6.0$  mV. Refer to Figure 3 for the potentiometer location and Table 10 for the potentiometer reference designator.
8. Repeat steps 1 through 7 for the remaining analog inputs.

You have completed adjusting the analog input offsets.

## Adjusting Voltage Excitation

When you adjust the excitation channels, always start with the voltage excitation and then proceed to the current excitation. Use the voltage excitation reference as the voltage reference for the current excitation.

Complete the following steps to adjust the voltage excitation:

1. Connect the  $120 \Omega$  resistor across the output of the excitation channel you are adjusting.
2. Configure the excitation channel to 3.333 V excitation level.
3. Set the DMM to voltage mode, and connect the DMM leads to the excitation outputs as closely as possible to the resistor body.
4. Adjust the excitation voltage potentiometer until the voltage reading falls between 3.334333 V and 3.331667 V. Refer to Figure 3 for the potentiometer location and Table 11 for the potentiometer reference designator.

**Table 11.** Excitation Calibration Potentiometer Reference Designators

Input Channel Number	Excitation Channel	
	Voltage Mode	Current Mode
0	R10	R7
1	R20	R17
2	R30	R27
3	R40	R37



**Note** This step calibrates the 10 V excitation level at the same time, but the accuracy achieved is limited to  $\pm 0.2\%$ . To achieve better accuracy at the 10 V level, follow steps 1 through 4 but set the excitation level to 10 V instead of 3.333 V. If you do so, the 3.333 V level of this channel will then be calibrated to  $\pm 0.2\%$  instead of to  $\pm 0.04\%$ . In the factory, the SCXI-1121 is calibrated for 3.333 V.

5. Repeat steps 1 through 4 for all remaining channels.

You have completed adjusting the voltage excitation channels.

## Adjusting Current Excitation

Complete the following steps to adjust the current excitation:

1. Remove the resistor from the excitation channel if you have not already done so.
2. Configure the channel for 0.150 mA current excitation level.
3. Set the DMM to current mode, and connect it to the excitation channel output you want to adjust.
4. Adjust the excitation current potentiometer until the current reading falls between 0.150060 mA and 0.149940 mA. Refer to Figure 3 for the potentiometer location and Table 11 for the potentiometer reference designator.



**Note** This step calibrates the 450  $\mu\text{A}$  level at the same time, but the accuracy achieved is limited to  $\pm 0.2\%$ . To achieve better accuracy at the 450  $\mu\text{A}$  level, follow steps 1 through 4 but set the excitation level to 450  $\mu\text{A}$  instead of 150  $\mu\text{A}$ . If you do so, the 150  $\mu\text{A}$  level of this channel will then be calibrated to  $\pm 0.2\%$  instead of to  $\pm 0.04\%$ . In the factory, the SCXI-1121 is calibrated for 150  $\mu\text{A}$ .

5. Repeat steps 1 through 4 for all remaining channels.

You have completed adjusting the current excitation channels.

## Verifying Adjusted Values

After completing the adjustments, it is important to verify the analog input operation, the voltage excitation, and the current excitation again by repeating the steps listed in the [Verification Procedure](#). Verifying the adjusted values ensures that the SCXI-1121 is operating within its test limits after adjustments.



**Note** If the SCXI-1121 fails after calibration, return it to NI for repair or replacement. For more information about how to contact NI for repair or replacement, refer to the *Technical Support Information* document.



# Test Limits

Table 12 contains test limits for the SCXI-1121. If the module was calibrated within the last year, the output should fall between the Upper Limit and Lower Limit values.

**Table 12.** SCXI-1121 Test Limits

Gain	Test Point (V)	4 Hz Filter Setting		10 kHz Filter Setting	
		Upper Limit (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)
0.01*	225.0000	2.269765	2.230236	2.346618	2.303382
0.01*	0.0000	0.005144	-0.05144	0.006510	-0.006510
0.01*	-225.0000	-2.230236	-2.269765	-2.303382	-2.346618
0.02*	225.0000	4.534387	4.465613	3.750713	3.689287
0.02*	0.0000	0.005146	-0.005146	0.006540	-0.006540
0.02*	-225.0000	-4.465613	-4.534387	-3.689287	-3.750713
0.05*	90.0000	4.534387	4.465614	4.686836	4.613164
0.05*	0.0000	0.005146	-0.005146	0.006620	-0.006620
0.05*	-90.0000	-4.465614	-4.534387	-4.613164	-4.686836
0.01*	45.0000	4.534387	4.465613	4.686936	4.613064
0.01*	0.0000	0.005146	-0.005146	0.006720	-0.006720
0.01*	-45.0000	-4.465613	-4.534387	-4.613064	-4.686936
0.02*	22.5000	4.534387	4.465613	4.687516	4.612484
0.02*	0.0000	0.005146	-0.005146	-0.007300	-0.007300
0.02*	-22.5000	-4.465613	-4.534387	-4.612484	-4.687516
0.05*	9.0000	4.534388	4.465613	4.686911	4.613089
0.05*	0.0000	0.005147	-0.005147	0.006695	-0.006695
0.05*	-9.0000	-4.465613	-4.534388	-4.613089	-4.686911
1	4.5000	4.534295	4.465705	4.535671	4.464329
1	0.0000	0.005144	-0.005144	0.006520	-0.006520
1	-4.5000	-4.465705	-4.534295	-4.464329	-4.535671
2	2.2500	4.534292	4.465708	4.535693	4.464307
2	0.0000	0.005141	-0.005141	0.006542	-0.006542
2	-2.2500	-4.465708	-4.534292	-4.464307	-4.535693

**Table 12.** SCXI-1121 Test Limits (Continued)

Gain	Test Point (V)	4 Hz Filter Setting		10 kHz Filter Setting	
		Upper Limit (V)	Lower Limit (V)	Upper Limit (V)	Lower Limit (V)
5	0.9000	4.534293	4.465707	4.535706	4.464294
5	0.0000	0.005142	-0.005142	0.006555	-0.006555
5	-0.9000	-4.465707	-4.534293	-4.464294	-4.535706
10	0.4500	4.534387	4.465613	4.535771	4.464229
10	0.0000	0.005236	-0.005236	0.006620	-0.006620
10	-0.4500	-4.465613	-4.534387	-4.464229	-4.535771
20	0.2250	4.534456	4.465544	4.535979	4.464021
20	0.0000	0.005305	-0.005305	0.006828	-0.006828
20	-0.2250	-4.465544	-4.534456	-4.464021	-4.535979
50	0.0900	4.534694	4.465306	4.536146	4.463854
50	0.0000	0.005543	-0.005543	0.006995	-0.006995
50	-0.0900	-4.465306	-4.534694	-4.463854	-4.536146
100	0.0450	4.535095	4.464905	4.536551	4.463449
100	0.0000	0.005944	-0.005944	0.007400	-0.007400
100	-0.0450	-4.464905	-4.535095	-4.463449	-4.536551
200	0.0225	4.535892	4.464108	4.537797	4.462203
200	0.0000	0.006741	-0.006741	0.008646	-0.008646
200	0.0225	-4.464108	-4.535892	-4.462203	-4.537797
250	0.0180	4.536294	4.463706	4.538614	4.461387
250	0.0000	0.007143	-0.007143	0.009463	-0.009463
250	-0.0180	-4.463706	-4.536294	-4.461387	-4.538614
500	0.0090	4.538303	4.461698	4.540951	4.459049
500	0.0000	0.009152	-0.009152	0.011800	-0.011800
500	-0.0090	-4.461698	-4.538303	-4.459049	-4.540951
1000	0.0045	4.542321	4.457679	4.546501	4.453499
1000	0.0000	0.013170	-0.013170	0.017350	-0.017350
1000	-0.0045	-4.457679	-4.542321	-4.453499	-4.546501
2000	0.00225	4.551389	4.448611	4.558631	4.441369

**Table 12.** SCXI-1121 Test Limits (Continued)

<b>Gain</b>	<b>Test Point (V)</b>	<b>4 Hz Filter Setting</b>		<b>10 kHz Filter Setting</b>	
		<b>Upper Limit (V)</b>	<b>Lower Limit (V)</b>	<b>Upper Limit (V)</b>	<b>Lower Limit (V)</b>
2000	0.00000	0.022238	-0.022238	0.029480	-0.029480
2000	-0.00225	-4.448611	-4.551389	-4.441369	-4.558631

\* Value available only when used with the SCXI-1327 high-voltage terminal block

# SCXI-1121 Front and Rear Panel Diagrams

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Table 13 shows the pin assignments for the SCXI-1121 front panel connector. Table 14 shows the pin assignments for the SCXI-1121 rear signal connector.

**Table 13.** Front Connector Pin Assignments

Front Connector Diagram				Pin Number	Column A	Column B	Column C																																																																																																																																
<div style="text-align: center;">                     Column                      A   B   C                 </div> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>32</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>31</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>30</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>29</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>28</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>27</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>26</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>25</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>24</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>23</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>22</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>21</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>20</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>19</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>18</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>17</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>16</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>15</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>14</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>13</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>12</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>11</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>10</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>9</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>8</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>7</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>6</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>5</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>4</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>3</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>2</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>1</td><td>○</td><td>○</td><td>○</td></tr> </table> <p>NC—No Connection</p>				32	○	○	○	31	○	○	○	30	○	○	○	29	○	○	○	28	○	○	○	27	○	○	○	26	○	○	○	25	○	○	○	24	○	○	○	23	○	○	○	22	○	○	○	21	○	○	○	20	○	○	○	19	○	○	○	18	○	○	○	17	○	○	○	16	○	○	○	15	○	○	○	14	○	○	○	13	○	○	○	12	○	○	○	11	○	○	○	10	○	○	○	9	○	○	○	8	○	○	○	7	○	○	○	6	○	○	○	5	○	○	○	4	○	○	○	3	○	○	○	2	○	○	○	1	○	○	○	32	CH0+	NC	CH0–
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28	EGND0	NC	NC																																																																																																																																				
27	NC	NC	NC																																																																																																																																				
26	CH1+	NC	CH1–																																																																																																																																				
25	NC	NC	NC																																																																																																																																				
24	EX1+	NC	EX1–																																																																																																																																				
23	NC	NC	NC																																																																																																																																				
22	EGND1	NC	NC																																																																																																																																				
21	NC	NC	NC																																																																																																																																				
20	CH2+	NC	CH2–																																																																																																																																				
19	NC	NC	NC																																																																																																																																				
18	EX2+	NC	EX2–																																																																																																																																				
17	NC	NC	NC																																																																																																																																				
16	EGND2	NC	NC																																																																																																																																				
15	NC	NC	NC																																																																																																																																				
14	CH3+	NC	CH3–																																																																																																																																				
13	NC	NC	NC																																																																																																																																				
12	EX3+	NC	EX3–																																																																																																																																				
11	NC	NC	NC																																																																																																																																				
10	EGND3	NC	NC																																																																																																																																				
9	NC	NC	NC																																																																																																																																				
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2	CGND	NC	DTEMP																																																																																																																																				
1	NC	NC	NC																																																																																																																																				

**Table 14.** Rear Signal Pin Assignments

Rear Connector Diagram		Signal Name	Pin Number	Pin Number	Signal Name
		AOGND	1	2	AOGND
1	2	CH 0+	3	4	CH 0-
3	4	CH 1+	5	6	CH 1-
5	6	CH 2+	7	8	CH 2-
7	8	CH 3+	9	10	CH 3-
9	10	CH 4+	11	12	CH 4-
11	12	NC	13	14	NC
13	14	NC	15	16	NC
15	16	NC	17	18	NC
17	18	NC	19	20	NC
19	20	OUTREF	21	22	NC
21	22	NC	23	24	NC
23	24	NC	25	26	DIG GND
25	26	SERDATIN	27	28	SERDATOUT
27	28	DAQD*/A	29	30	NC
29	30	SLOT0SEL*	31	32	NC
31	32	NC	33	34	NC
33	34	DIG GND	35	36	NC
35	36	NC	37	38	AI HOLD COMP, AI HOLD
37	38	SERCLK	39	40	NC
39	40	NC	41	42	NC
41	42	NC	43	44	NC
43	44	RSVD	45	46	NC
45	46	NC	47	48	NC
47	48	NC	49	50	NC
49	50	NC			

NC—No Connection

RSVD—Reserved

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