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MAINTAINING HARDWARE

NI IR-3120

NI Thermal Imaging Device for NI InsightCM™

This document describes how to maintain the IR-3120 NI Thermal Imaging Device. The IR-3120 is a bundle of hardware and software that includes the following components and features:

- IC-3120 industrial controller
- Pre-installed NI InsightCM software
- Network configuration via USB drive

Note Complete the steps in the *NI InsightCM Monitoring Device Quick Start* before using this document.

Note The controller included in the IR-3120 has been certified and rated for safety, environmental, and regulatory information. Refer to *ni.com/manuals* for complete hardware documentation for each device, including safety, environmental, and regulatory information.

Contents

NATIONAL INSTRUMENTS™

Safety Information

⚠ **Caution** The following paragraphs contain important safety information you must follow when installing and operating the device.

Do not operate the device in a manner not specified in the documentation. Misuse of the device may result in a hazard and may compromise the safety protection built into the device. If the device is damaged, turn it off and do not use it until service-trained personnel can check its safety. If necessary, return the device to National Instruments for repair.

Keep away from live circuits. Do not remove equipment covers or shields unless you are trained to do so. If signal wires are connected to the device, hazardous voltages can exist even when the equipment is turned off. To avoid a shock hazard, do not perform procedures involving cover or shield removal unless you are qualified to do so. Disconnect all field power prior to removing covers or shields.

Because of the danger of introducing additional hazards, do not install unauthorized parts or modify the device. Use the device only with the chassis, modules, accessories, and cables specified in the installation instructions. All covers and filler panels must be installed while operating the device.

This is a Pollution Degree 2 device. Do not operate the device in an explosive atmosphere or where flammable gases or fumes may be present. Operate the device only at or below the pollution degree stated in the specifications. Pollution consists of any foreign matter—solid, liquid, or gas—that may reduce dielectric strength or surface resistivity. The following is a description of pollution degrees.

- Pollution Degree 1—No pollution or only dry, nonconductive pollution occurs. The pollution has no effect.
- Pollution Degree 2—Normally only nonconductive pollution occurs. Occasionally, nonconductive pollution becomes conductive because of condensation.
- Pollution Degree 3—Conductive pollution or dry, nonconductive pollution occurs. Nonconductive pollution becomes conductive because of condensation.

Clean the device and accessories by brushing off light dust with a soft, nonmetallic brush. Remove other contaminants with a stiff, nonmetallic brush. The unit must be completely dry and free from contaminants before returning it to service.

You must insulate signal connections for the maximum voltage for which the device is rated. Do not exceed the maximum ratings for the device. Remove power from signal lines before connection to or disconnection from the device.

Electromagnetic Compatibility Guidelines

This product was tested and complies with the regulatory requirements and limits for electromagnetic compatibility (EMC) stated in the product specifications. These requirements and limits provide reasonable protection against harmful interference when the product is operated in the intended operational electromagnetic environment.

This product is intended for use in industrial locations. However, harmful interference may occur in some installations, when the product is connected to a peripheral device or test object, or if the product is used in residential or commercial areas. To minimize interference with radio and television reception and prevent unacceptable performance degradation, install and use this product in strict accordance with the instructions in the product documentation.

Furthermore, any changes or modifications to the product not expressly approved by National Instruments could void your authority to operate it under your local regulatory rules.
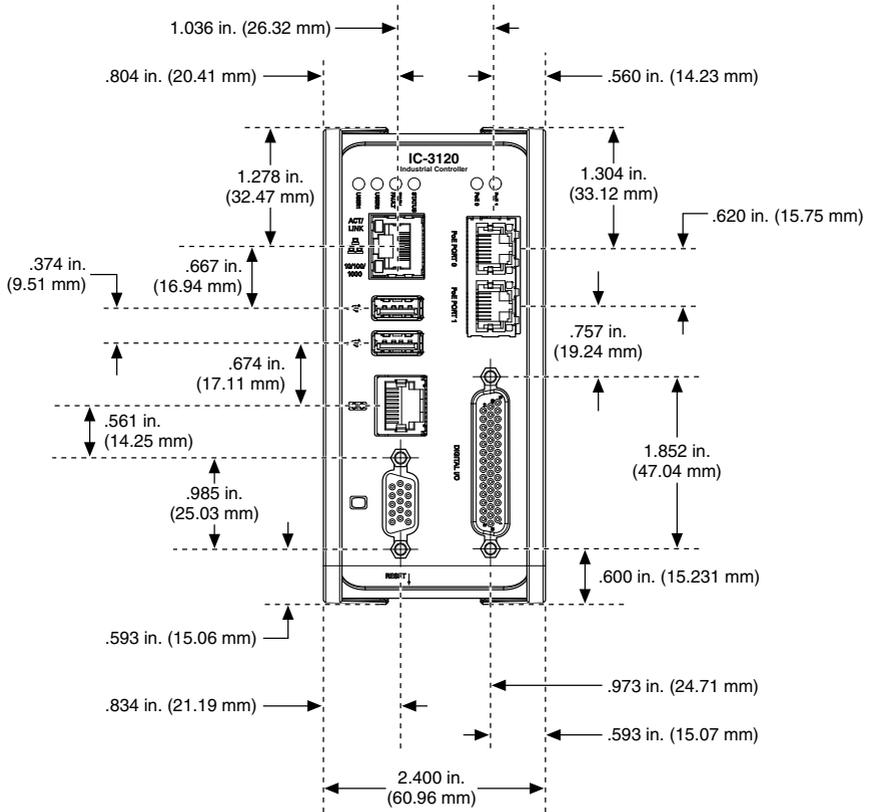
Mounting the IC-3120

This section provides information for creating a custom mount for the IC-3120. If you do not want to create a custom mount, a panel and DIN rail mount kit for the IC-3120 is available from National Instruments (part number 781740-01).
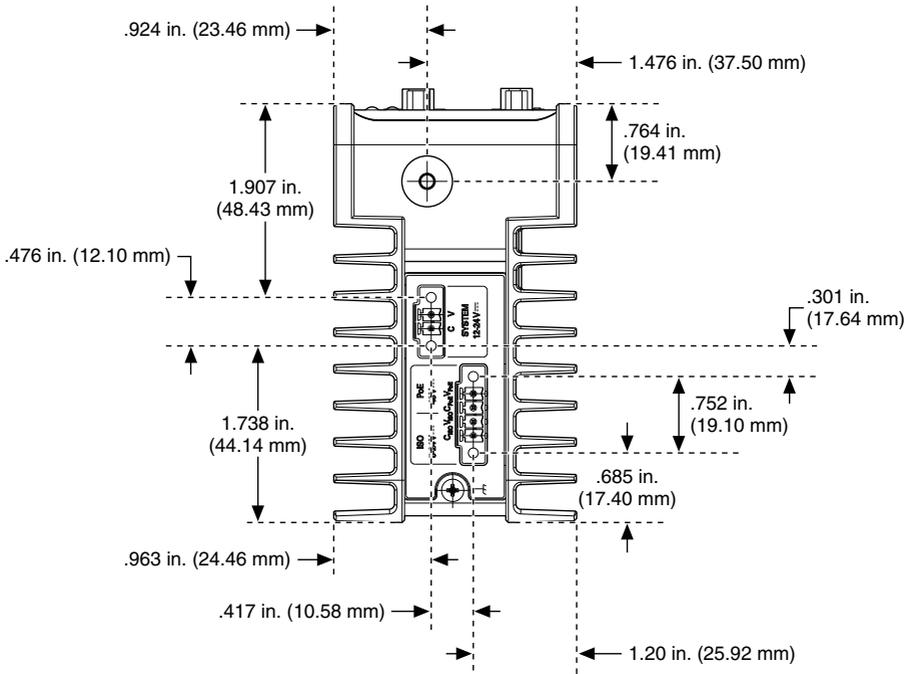
⚠ **Caution** If you choose not to mount the IC-3120 on a DIN rail or flat surface, do not position the IC-3120 with the heat sinks resting on any surface. Doing so may cause the IC-3120 device to overheat. Refer to the *IC-3120 Specifications* for temperature specifications.

The following figures provide dimensional drawings and clearance information for the IC-3120.
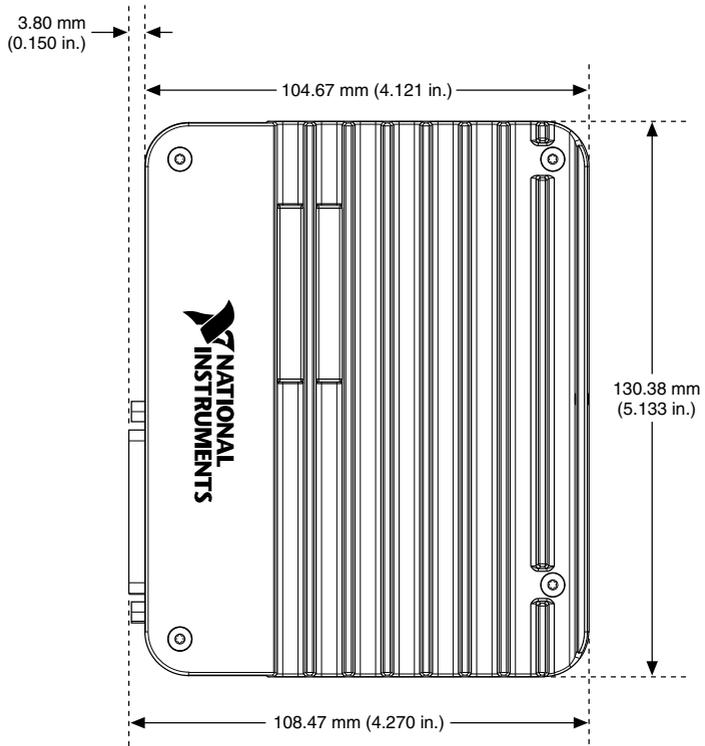
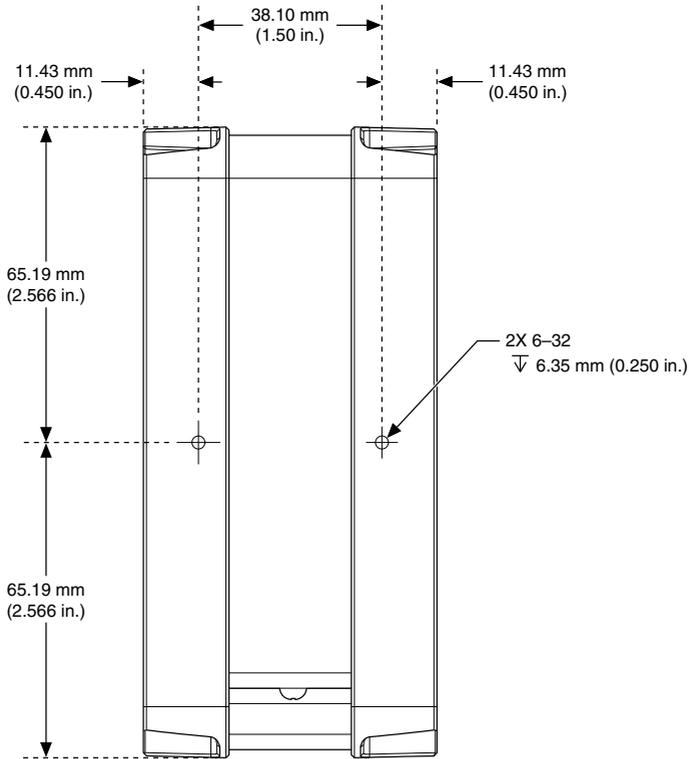**Figure 1.** Front View with Dimensions in inches [millimeters]

1.036 in. (26.32 mm)

.804 in. (20.41 mm)

.560 in. (14.23 mm)

1.278 in. (32.47 mm)

1.304 in. (33.12 mm)

.620 in. (15.75 mm)

.374 in. (9.51 mm)

.667 in. (16.94 mm)

.674 in. (17.11 mm)

.757 in. (19.24 mm)

.561 in. (14.25 mm)

.985 in. (25.03 mm)

1.852 in. (47.04 mm)

.600 in. (15.231 mm)

.593 in. (15.06 mm)

.834 in. (21.19 mm)

.973 in. (24.71 mm)

.593 in. (15.07 mm)

2.400 in. (60.96 mm)

IC-3120
Industrial Controller

Figure 2. Back View with Dimensions in inches [millimeters]

Figure 3. Side View with Dimensions in inches [millimeters]

3.80 mm
(0.150 in.)

104.67 mm (4.121 in.)

130.38 mm
(5.133 in.)

108.47 mm (4.270 in.)

Figure 4. Bottom View with Dimensions in inches [millimeters]

38.10 mm
(1.50 in.)

11.43 mm
(0.450 in.)

11.43 mm
(0.450 in.)

65.19 mm
(2.566 in.)

2X 6–32
⤓ 6.35 mm (0.250 in.)

65.19 mm
(2.566 in.)

Securing the IC-3120 to a Mount

1. Align the screw holes of the mounting bracket with the two holes on the back of the
    IC-3120.
2. Insert two 6-32 screws and tighten them until they are secure (3.5 in-lb). Make sure the
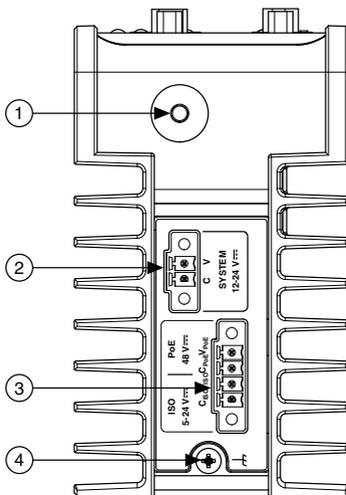   heads of the screws are flush with the mounting bracket.

Clearance Requirements

The IC-3120 installation must meet the following space and cabling clearance requirements
for optimum cooling:

*   Allow 76.2 mm (3.0 in.) on the top and bottom of the IC-3120 for air circulation.
*   Allow 50.8 mm (2.0 in.) on the sides of the IC-3120 for air circulation.
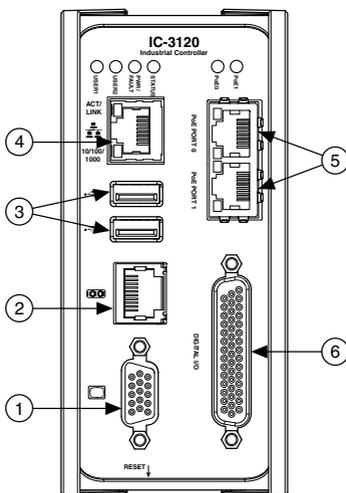*   Allow enough space in front of the IC-3120 to connect cables.

Figure 5. Clearance Requirements for the IC-3120

76.2 mm
(3.00 in.)

50.8 mm
(2.00 in.)

50.8 mm
(2.00 in.)

76.2 mm
(3.00 in.)

Configuring the Hardware

Remove the IC-3120 from the package and inspect the system for damage. Notify National Instruments if the system appears damaged in any way. Do not use a damaged system.

Ensure that the AC input to the external power supply is disconnected before plugging in or unplugging any connector. Ground the unit to minimize the possibility of static electricity damage.

Refer to the following figures while configuring the hardware.

Figure 6. IC-3120 Power Connectors and Reset Button

1. Reset Button
2. System Power Connector
3. Isolated Outputs and PoE Power Connector
4. Chassis Grounding Screw

Figure 7. IC-3120 Front Panel Connectors

1. VGA Connector
2. RJ50 Serial Port
3. USB 2.0 Ports
4. RJ45 Network Port
5. Gigabit Ethernet Ports with PoE
6. 44-pin Digital I/O Connector

Connecting the System Power Supply

NI recommends the following power supply for the IC-3120.

Power Supply	Part Number
NI PS-15 Industrial Power Supply	781093-01

Complete the following steps to supply power to the IC-3120.

1. Verify the power source is turned off.

2. Install one ferrite across the negative and positive leads of the power source, approximately 50 to 75 mm (2 to 3 in.) from the end of the power input wires.

Figure 8. Installing a Ferrite on the Power Leads
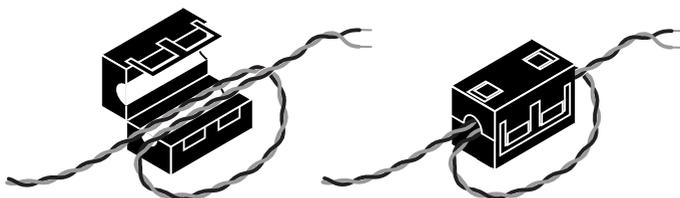
3. If the power connector plug is connected to the chassis, disconnect it from the device.

Figure 9. 2-Position Power Screw Terminal Connector
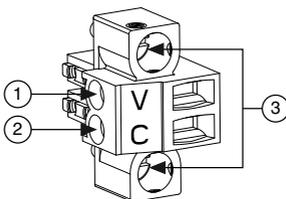
1. V (Positive) Terminal Screw
2. C (Negative) Terminal Screw
3. Connector Screws

⚠ **Caution** Do not tighten or loosen the terminal screws on the power connector while the power is on.

4. Connect the positive lead of the power source to the V terminal of the power connector plug and tighten the terminal screw to 0.2 to 0.25 N · m (1.8 to 2.2 lb · in.) of torque.

5. Connect the negative lead of the power source to the C terminal of the power connector plug and tighten the terminal screw to 0.2 to 0.25 N · m (1.8 to 2.2 lb · in.) of torque.

6. Install the power connector plug into the SYSTEM power receptacle on the IC-3120 chassis and tighten the connector screws to 0.4 N · m (3.5 lb · in.) of torque.

7. Turn on the external power source.

# Connecting the Isolated Outputs Power Supply and PoE Power Supply

NI recommends the following power supplies for the IC-3120.

Power Supply	Part Number
NI PS-15 Industrial Power Supply, to power the isolated outputs	781093-01
48 V, DIN Rail, Industrial Power Supply for Power over Ethernet	783307-01
48 V, Desktop Power Supply for Power over Ethernet	783308-01

Complete the following steps to supply power to the PoE ports and the isolated outputs.

1. Verify the power source is turned off.
2. Install one ferrite across the negative and positive leads of the power sources, approximately 50 to 75 mm (2 to 3 in.) from the end of the power input wires. If you are using an isolated output power supply and a PoE power supply, wrap the wires for both power supplies through the same ferrite.

Figure 10. Installing a Ferrite on the Power Leads
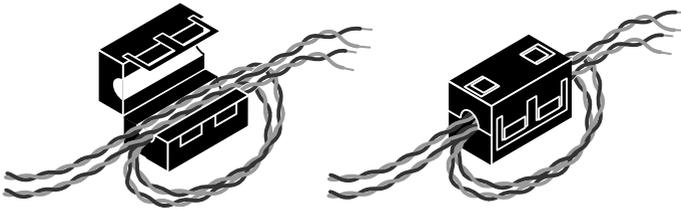
3. If the power connector plug is connected to the chassis, disconnect it from the device.

Figure 11. 4-Position Power Screw Terminal Connector
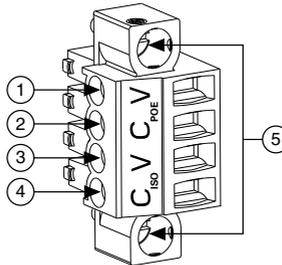
1. VPOE (Positive) Terminal Screw
2. CPOE (Negative) Terminal Screw
3. VISO (Positive) Terminal Screw
4. CISO (Negative) Terminal Screw
5. Connector Screws

<table>
<tr><td>⚠</td><td>**Caution** Do not tighten or loosen the terminal screws on the power connector while the power is on.</td></tr>
</table>

4. Connect the positive lead of the isolated outputs power source to the V_2 terminal of the power connector plug and tighten the terminal screw to 0.2 to 0.25 N · m (1.8 to 2.2 lb · in.) of torque.

5. Connect the negative lead of the isolated outputs power source to the C_2 terminal of the power connector plug and tighten the terminal screw to 0.2 to 0.25 N · m (1.8 to 2.2 lb · in.) of torque.

6. Connect the positive lead of the PoE power source to the V_1 terminal of the power connector plug and tighten the terminal screw to 0.2 to 0.25 N · m (1.8 to 2.2 lb · in.) of torque.

7. Connect the negative lead of the PoE power source to the C_1 terminal of the power connector plug and tighten the terminal screw to 0.2 to 0.25 N · m (1.8 to 2.2 lb · in.) of torque.

8. Install the power connector plug into the ISO/PoE power receptacle on the IC-3120 chassis and tighten the connector screws to 0.4 N · m (3.5 lb · in.) of torque.

9. Turn on the external power source.

Understanding LED Indications on the Controller

The following figure shows the LEDs on the IC-3120.

Figure 12. LEDs on the IC-3120
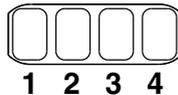
1. POWER	3. STATUS
2. FPGA	4. USER1

POWER LED

The POWER LED is lit while the IC-3120 is powered on. This LED indicates that the power supply connected to the controller is adequate.

FPGA LED

NI Monitoring Devices do not use the FPGA LED.

STATUS LED

The STATUS LED is off during normal operation. After the device powers on, the IC-3120 indicates specific error conditions by flashing the STATUS LED a certain number of times every few seconds. If you observe this behavior after the device powers on, contact NI support.

USER1 LED

The USER1 LED can display the indications described in the following table:

Table 1. USER1 LED Indications

Indication	Description
Flashing rapidly	Indicates an error condition. Open the InsightCM web application to the **Devices** tab on the **Dashboard** page to see the device status.
Flashing steadily	Indicates normal operation.
Solid	Indicates that USB operations are in progress, such as reading or writing the connection information file. You can safely remove the USB drive when this LED resumes blinking steadily. **Note** This device polls USB drives every 15 seconds, so you might need to wait up to 15 seconds after a USB operation begins for the LED to light.

Troubleshooting Network Communication

If the IR-3120 does not connect to NI InsightCM with a status of Online, try the following troubleshooting tips:

- Check the Ethernet cable connections on the IR-3120, host computer, and router.
- If you have network firewalls or other security software enabled, try temporarily turning them off. You might also need to add an exception for NI InsightCM Application by completing the following steps:
  1. Navigate to the standard Microsoft Windows Control Panel utility for managing firewall settings.
  2. Click **Allow a program or feature through Windows Firewall**.
  3. Click **Allow another program**.
  4. Select **NI InsightCM** and click **Add**.
  5. Click **OK** and close the firewall settings.
- Ensure that the ports are open to communication on the host computer. If you are using an intelligent switch on the network, ensure that the switch is not disabling these ports. Refer to the *NI InsightCM Readme* on *ni.com/manuals* for more information about host computer ports.
- If you have multiple network cards on the host computer, ensure that you use the Windows Control Panel to disable all other network adapters, such as wireless adapters. Turning off the wireless antenna is insufficient.

Resetting the Network Configuration of the Controller

Complete the following steps to reset the IP address and connection type of the controller.

1. Insert the USB drive into the USB port on the controller front panel. Within 20 seconds, the USER1 LED lights solid, which indicates that the device is reading from or writing to the settings file.

   💡 **Tip** You can use the blank USB drive included in the NI InsightCM kit, if available.

2. Remove the USB drive when the USER1 LED returns to blinking steadily.
3. Insert the USB drive into a USB port on a computer.
4. Browse the file structure of the drive to the `<RootLevel>:\InsightCM\download\NI-cRIO-`*`ModelNumber`*`-`*`SerialNumber`* directory.
5. To view the current IP address, skip to step 6. To change the IP address or set the IP address to be static, copy the JSON file beginning with `networkInfo_` followed by the device hostname, such as `networkInfo_NI-cRIO-`*`ModelNumber-`**`SerialNumber`*`.json`, to the `<RootLevel>:\InsightCM\upload` directory on the USB drive. You might need to create the `upload` folder.
6. Open the JSON file beginning with `networkInfo_` followed by the device hostname.
7. In the array that contains the line `"Alias":"Ethernet Adapter eth0"`, the following line displays the current IP address:

   `"IP Address":"`*`x.x.x.x`*`"`

   where *`x.x.x.x`* is the IP address.
8. To change the IP address, enter the value you want to use. Otherwise, record the IP address.
9. (Optional) To assign a static IP address, configure the following line in the array as shown:

   `"IP Address Request Mode":"1"`
10. Save and close the file.
11. If you made changes to the file, insert the USB drive back into the USB port on the controller front panel. The USER1 LED lights solid, which indicates that the device is reading network and connection properties. You can remove the USB drive when the USER1 LED returns to blinking steadily.

    💡 **Tip** To verify that the device successfully applied changes you made to the file, reinsert the USB drive in a computer and browse to the `<RootLevel>:\InsightCM` directory. If the changes were successfully applied, the `upload` folder no longer contains the JSON file you edited, instead, a folder named `applied` contains the file.

Verifying Camera Position

During the installation of the IR-3120 and cameras, you can check the image the camera is acquiring to verify it has the correct field of view. If the device is not yet connected to

NI InsightCM or you are unable to access the web application from the installation location, connect the network cable from the IR-3120 to the Ethernet port on the host computer and complete the following steps:

1. Reset the IR-3120 by pressing the RESET button at the bottom of the controller.
2. Use a USB drive and complete steps 1 to 7 of *Resetting the Network Configuration of the Controller* to determine the IP address of the IR-3120.
3. Open a web browser and go to *http://ipaddress:8002/live*, where `ipaddress` is the IR-3120 IP address.
4. Click on a camera name on the left of the resulting web page to view a live image from that camera.
5. Move the camera until the image displays the field of view you require. Repeat for the second camera, if applicable.

After disconnecting the direct network connection to the host computer and reconnecting to the network, reset the IR-3120.

Where to Go Next

The following documents and resources contain information you may find helpful as you use the IR-3120 in an application. Refer to the National Instruments Product Manuals Library at *ni.com/manuals* for the most recent versions of product documentation.

- *NI InsightCM Configuration and Monitoring Help*— Help system with instructions for configuring the NI InsightCM application and monitoring NI Monitoring devices. To launch this help, open the InsightCM web application in a web browser and click the Help link in the top-right corner of the page.
- *IC-3120 Specifications*—Contains detailed specifications for the IC-3120.
- *IC-3120 User Manual*—Contains connector pinouts, configuration information, mounting information, and answers to common troubleshooting questions.

Worldwide Support and Services

The NI website is your complete resource for technical support. At *ni.com/support*, you have access to everything from troubleshooting and application development self-help resources to email and phone assistance from NI Application Engineers.

Visit *ni.com/services* for NI Factory Installation Services, repairs, extended warranty, and other services.

Visit *ni.com/register* to register your NI product. Product registration facilitates technical support and ensures that you receive important information updates from NI.

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niglobal to access the branch office websites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.