

COMPREHENSIVE SERVICES

We offer competitive repair and calibration services, as well as easily accessible documentation and free downloadable resources.

SELL YOUR SURPLUS

We buy new, used, decommissioned, and surplus parts from every NI series. We work out the best solution to suit your individual needs.

 Sell For Cash  Get Credit  Receive a Trade-In Deal

OBSOLETE NI HARDWARE IN STOCK & READY TO SHIP

We stock **New**, **New Surplus**, **Refurbished**, and **Reconditioned** NI Hardware.



Bridging the gap between the manufacturer and your legacy test system.

 1-800-915-6216

 www.apexwaves.com

 sales@apexwaves.com

All trademarks, brands, and brand names are the property of their respective owners.

Request a Quote

 **CLICK HERE**

ISC-1783

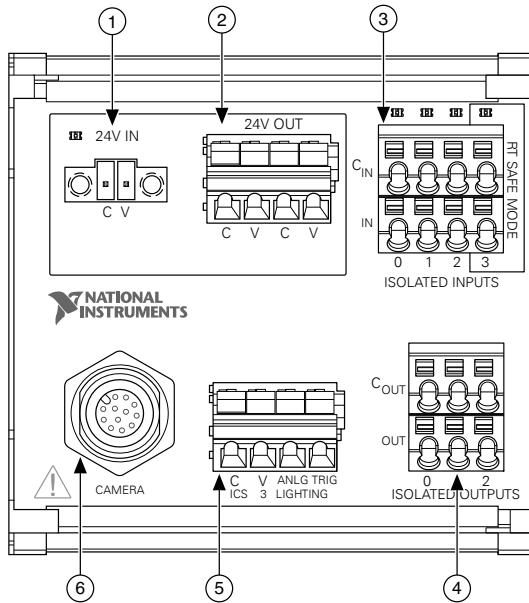
Power and I/O Accessory

For ISC-178x Smart Cameras

The Power and I/O Accessory for ISC-178x Smart Cameras (Power and I/O Accessory) is a terminal block that simplifies power and I/O signal configuration for the ISC-178x Smart Camera.

This document describes how to install and operate the Power and I/O Accessory.

Figure 1. Power and I/O Accessory for ISC-178x Smart Cameras



- | | |
|-------------------------------------|---|
| 1. 24V IN connector | 4. Isolated outputs spring terminals |
| 2. 24V OUT spring terminals | 5. Lighting controller spring terminals |
| 3. Isolated inputs spring terminals | 6. Camera connector |

The Power and I/O Accessory has the following features:

- 12-pin A-coded M12 connector
- Spring terminals for each ISC-178x Smart Camera I/O signal
- Spring terminals for 24 V output

- User-replaceable fuses for accessory power, isolated outputs, and the lighting controller
- Built-in DIN rail clips for easy mounting

What You Need to Get Started

- Power and I/O Accessory for ISC-178x Smart Camera
- ISC-178x Smart Camera
- A-Code M12 to A-Code M12 Power and I/O Cable, NI part number 145232-03
- Power Supply, 100 V AC to 240 V AC, 24 V, 1.25 A, NI part number 723347-01
- 12-28 AWG wire
- Wire cutter
- Wire insulation stripper

For more information about using the Power and I/O Accessory with the ISC-178x Smart Camera, refer to the following documents on ni.com/manuals.

- *ISC-178x User Manual*
- *ISC-178x Getting Started Guide*

Installing the Power and I/O Accessory

Complete the following steps to install the Power and I/O Accessory:

1. Connect the included cable to the Camera connector on the Power and I/O Accessory and the Digital I/O and Power connector on the ISC-178x Smart Camera.



Caution Never touch the exposed pins of connectors.

2. Connect signal wires to the spring terminals on the Power and I/O Accessory:
 - a) Strip 1/4 in. of insulation from the signal wire.
 - b) Depress the lever of the spring terminal.
 - c) Insert the wire into the terminal.

Refer to the spring terminal labels and the Signal Descriptions section for a description of each signal.



Caution Do not connect input voltages greater than 24 VDC to the Power and I/O Accessory. Input voltages greater than 24 VDC can damage the accessory, all devices connected to it, and the smart camera. National Instruments is not liable for damage or injury resulting from such misuse.

3. Connect the power supply to the 24 V IN connector on the Power and I/O Accessory.
4. Connect the power supply to a power source.

Wiring the Power and I/O Accessory

ISC-178x Isolation and Polarity

The Power and I/O Accessory has three different grounds for the spring terminals labeled C, C_{IN}, and C_{OUT}. The spring terminals with the same label are connected internally, but C, C_{IN}, and C_{OUT} are not connected to each other. Users can wire different grounds together in order to share a power supply between the smart camera and the inputs or outputs.



Note To achieve functional isolation, users must maintain isolation when wiring the accessory.

Some wiring configurations may cause the polarity to appear inverted at the receiver. Users can invert the signal in the smart camera software to provide the intended polarity.

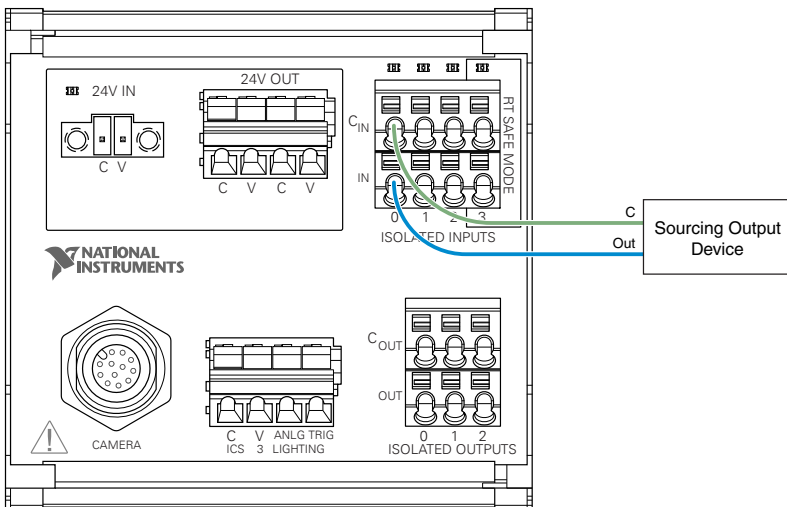
Wiring Isolated Inputs

The following images show how to wire the isolated input spring terminals of the Power and I/O Accessory.



Note Isolated inputs have a built-in current limit on the smart camera. It is not usually necessary to use a current-limiting resistor on input connections. Refer to the documentation of the connected device to ensure that the maximum input current limit of the smart camera does not exceed the current capability of the connected output.

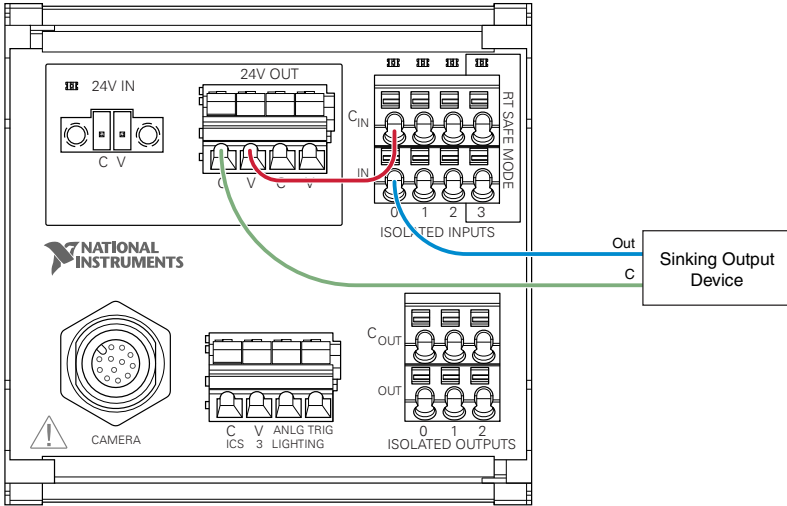
Figure 2. Wiring Isolated Input (Sinking Configuration) to Sourcing Output





Caution Connecting C_{IN} to a ground signal in a sinking output configuration will result in a short circuit.

Figure 3. Wiring Isolated Input (Sinking Configuration) to Sinking Output



Wiring Isolated Outputs

Some configurations require a pull-up or current-limiting resistor on each output. When using resistors, refer to the following guidelines.



Caution Failure to follow these guidelines may result in damage to the smart camera, connected devices, or resistors.

- Do not exceed current sink capability of the isolated outputs of the smart camera.
- Do not exceed the current source or sink capability of the connected devices.
- Do not exceed the power specification of the resistors.



Note For most applications, NI recommends a 2 k Ω 0.5 W pull-up resistor. Refer to the documentation of the connected input device to ensure this resistor value is suitable for that device.



Note Resistors with a rating less than 2 k Ω can be used for faster rise times. Users must take care not to exceed the current sink limit of the smart camera or the connected device.

The following images show how to wire the isolated output spring terminals of the Power and I/O Accessory.

Figure 4. Wiring Isolated Output to Sinking Input

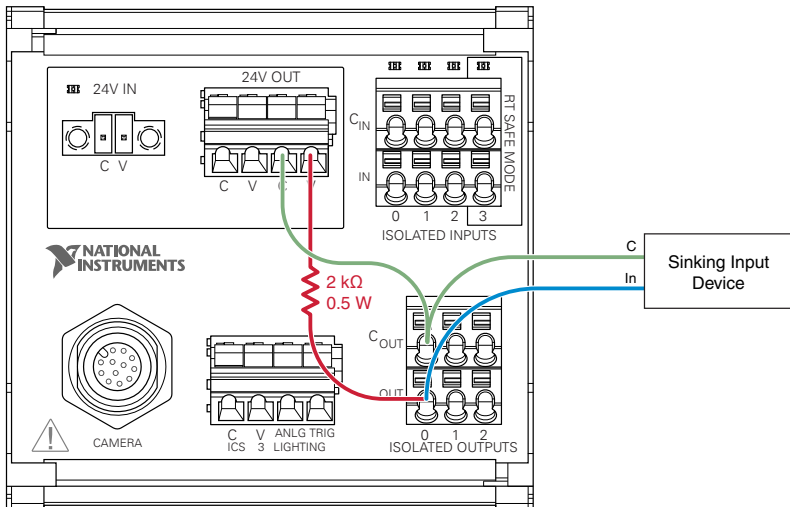
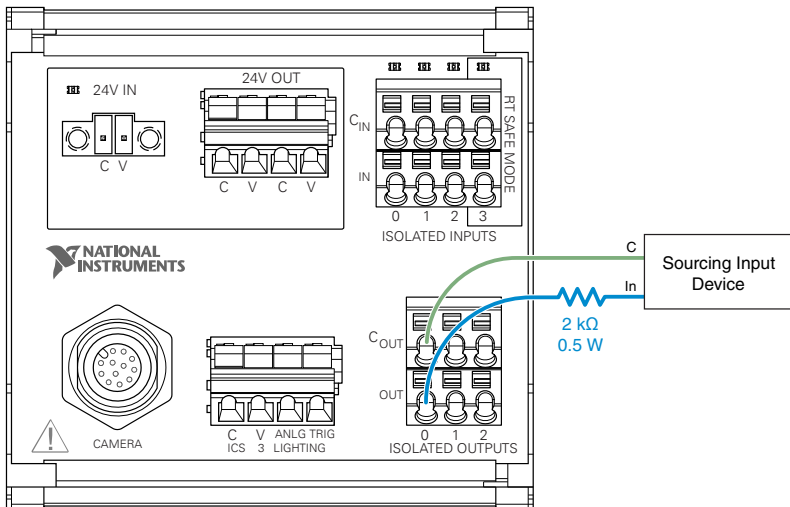


Figure 5. Wiring Isolated Output to Sourcing Input



Note A resistor may not be necessary for every sourcing input device. Refer to the documentation for the connected sourcing input device to verify resistor requirements.

Wiring the Lighting Controller

The following images show how to wire a lighting controller to the Power and I/O Accessory.

The TRIG terminal connects only to the V terminal through a built-in 2 kΩ pull-up resistor. To use the TRIG terminal, users must wire the terminal to the output signal generating the trigger. Any isolated output may be used as the trigger signal.



Note Review the power requirements for the lighting controller to ensure that the power supply is sufficient to power both the smart camera and the lighting controller.

Figure 6. Wiring the Lighting Controller using Isolated Output as Trigger

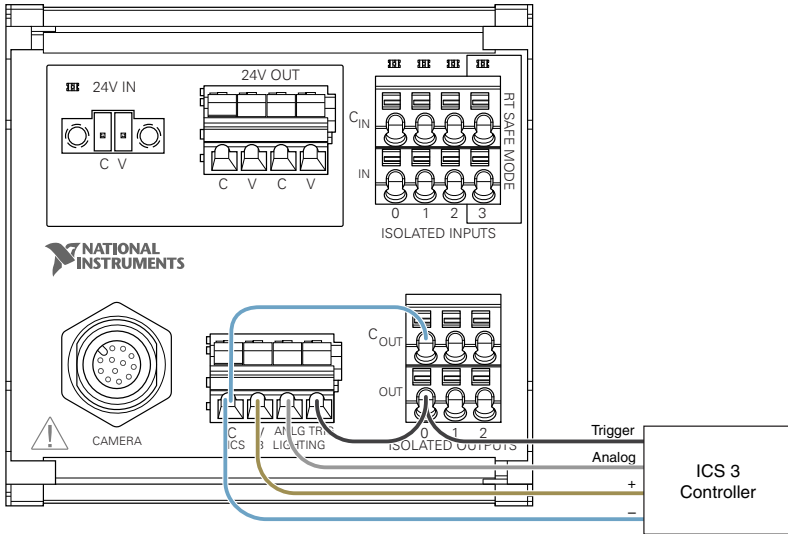
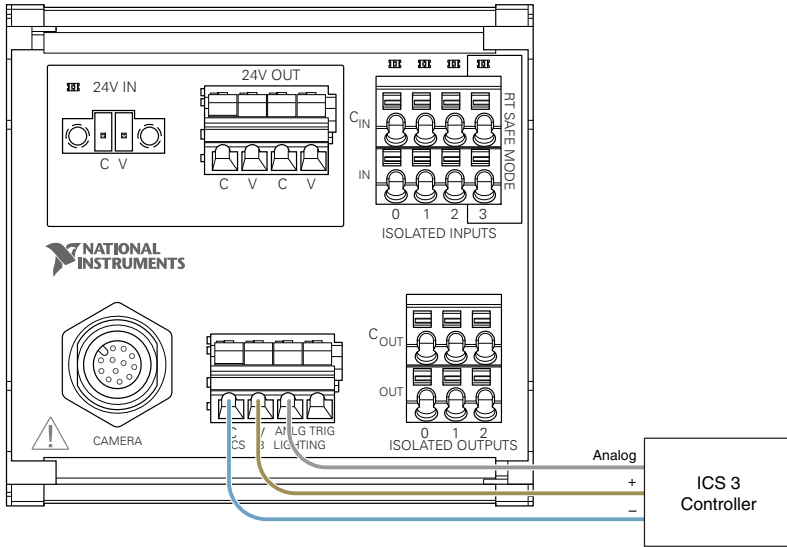


Figure 7. Wiring the Lighting Controller without Trigger



Forcing the Real-Time ISC-178x into Safe Mode

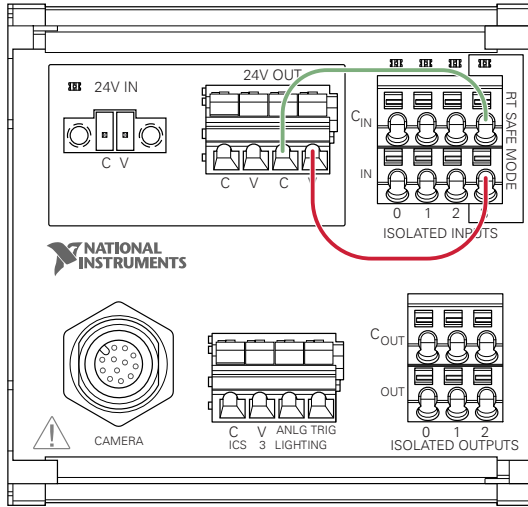
Users can wire the Power and I/O Accessory to force the ISC-178x to boot into safe mode. Safe mode launches only the services necessary for updating the smart camera configuration and installing software.



Note Users can only force Real-Time smart cameras to boot into safe mode. Windows smart cameras do not support safe mode.

1. Power down the Power and I/O Accessory.
2. Wire the accessory as shown in the following figure.

Figure 8. Wiring to Force Safe Mode



3. Power on the accessory to boot the ISC-178x into safe mode.

Exiting Safe Mode

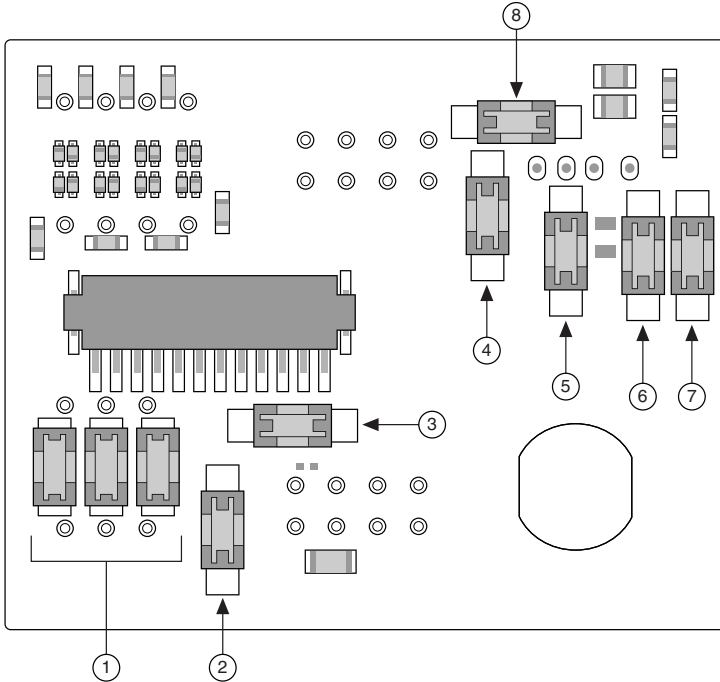
Follow these steps to restart the ISC-178x in normal operating mode.

1. Power down the Power and I/O Accessory.
2. Disconnect the wire to the IN3 spring terminal
3. Power on the accessory to restart the ISC-178x.

Testing and Replacing Fuses

The Power and I/O Accessory has replaceable fuses and includes one additional fuse of each type.

Figure 9. Fuse Locations



- | | |
|---------------------------------|---------------------------------|
| 1. Isolated output fuses, 0.5 A | 5. ICS 3, V terminal fuse, 10 A |
| 2. Spare 0.5 A fuse | 6. Spare 10 A fuse |
| 3. ANLG terminal fuse, 0.1 A | 7. Spare 0.1 A fuse |
| 4. Spare 2 A fuse | 8. Camera V terminal, 2 A |

Table 1. Power and I/O Accessory Fuses

Protected Signal	Replacement Fuse Quantity	Littelfuse Part Number	Fuse Description
ICS 3, V terminal	1	0448010.MR	10 A, 125 V NANO ² ® Fuse, 448 series, 6.10 × 2.69 mm
Camera V terminal	1	0448002.MR	2 A, 125 V NANO ² ® Fuse, 448 series, 6.10 × 2.69 mm

Table 1. Power and I/O Accessory Fuses (Continued)

Protected Signal	Replacement Fuse Quantity	Littelfuse Part Number	Fuse Description
Isolated outputs	1	0448.500MR	0.5 A, 125 V NANO ² ® Fuse, 448 series, 6.10 × 2.69 mm
ANLG terminal	1	0448.100MR	0.1 A, 125 V NANO ² ® Fuse, 448 series, 6.10 × 2.69 mm



Note You can use a handheld DMM to verify the continuity of a fuse.

Complete the following steps to replace a blown fuse:

1. Unplug the power supply.
2. Remove all signal wires and cables from the Power and I/O Accessory.
3. Remove a side panel. Use a Phillips head screwdriver to remove the 2 retaining screws.
4. Slide the circuit board out.
5. Replace any blown fuses with an equivalent replacement fuse. Replacement fuses are labelled as SPARE on the circuit board.

Signal Descriptions

Refer to the *ISC-178x Smart Camera User Manual* for detailed signal descriptions.

ISC-178x Power and I/O Connector Pinout

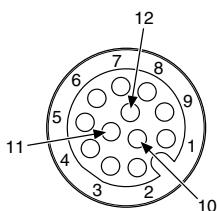


Table 2. ISC-178x Power and I/O Connector Signal Descriptions

Pin	Signal	Description
1	C _{OUT}	Common reference (negative) for isolated outputs
2	Analog Out	Analog reference output for lighting controller

Table 2. ISC-178x Power and I/O Connector Signal Descriptions (Continued)

Pin	Signal	Description
3	Iso Out 2+	General-purpose isolated output (positive)
4	V	System power voltage (24 VDC \pm 10%)
5	Iso In 0	General-purpose isolated input
6	C _{IN}	Common reference (positive or negative) for isolated inputs
7	Iso In 2	General-purpose isolated input
8	Iso In 3	(NI Linux Real-Time) Reserved for safe mode (Windows) General-purpose isolated input
9	Iso In 1	General-purpose isolated input
10	Iso Out 0+	General-purpose isolated output (positive)
11	C	System power and analog reference common
12	Iso Out 1+	General-purpose isolated output (positive)

The following NI power and I/O cables are available for the ISC-178x.

Table 3. Power and I/O Cables

Cables	Length	Part Number
A-Code M12 to A-Code M12 Power and I/O Cable	3 m	145232-03
A-Code M12 to Pigtail Power and I/O Cable	3 m	145233-03

Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the *Minimize Our Environmental Impact* web page at ni.com/environment. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

Waste Electrical and Electronic Equipment (WEEE)



EU Customers At the end of the product life cycle, all NI products must be disposed of according to local laws and regulations. For more information about how to recycle NI products in your region, visit ni.com/environment/weee.

电子信息产品污染控制管理办法（中国 RoHS）



中国客户 National Instruments 符合中国电子信息产品中限制使用某些有害物质指令 (RoHS)。关于 National Instruments 中国 RoHS 合规性信息，请登录 ni.com/environment/rohs_china。(For information about China RoHS compliance, go to ni.com/environment/rohs_china.)

Information is subject to change without notice. Refer to the *NI Trademarks and Logo Guidelines* at ni.com/trademarks for information on NI trademarks. Other product and company names mentioned herein are trademarks or trade names of their respective companies. For patents covering NI products/technology, refer to the appropriate location: **Help>Patents** in your software, the `patents.txt` file on your media, or the *National Instruments Patent Notice* at ni.com/patents. You can find information about end-user license agreements (EULAs) and third-party legal notices in the `readme` file for your NI product. Refer to the *Export Compliance Information* at ni.com/legal/export-compliance for the NI global trade compliance policy and how to obtain relevant HTS codes, ECCNs, and other import/export data. NI MAKES NO EXPRESS OR IMPLIED WARRANTIES AS TO THE ACCURACY OF THE INFORMATION CONTAINED HEREIN AND SHALL NOT BE LIABLE FOR ANY ERRORS. U.S. Government Customers: The data contained in this manual was developed at private expense and is subject to the applicable limited rights and restricted data rights as set forth in FAR 52.227-14, DFAR 252.227-7014, and DFAR 252.227-7015.

© 2017 National Instruments. All rights reserved.

376852B-01 May 4, 2017