

IP2L

Snap-On LF/UHF RFID Reader

1000AA09

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User Guide

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Before You Begin

This section provides you with safety information, technical support information, and sources for additional product information.

Safety Information

This section explains how to identify and understand notes that are in this document.



Note: Notes either provide extra information about a topic or contain special instructions for handling a particular condition or set of circumstances.

Global Services and Support

Warranty Information

To understand the warranty for your Intermec product, visit the Intermec web site at www.intermec.com and click **Support > Returns and Repairs > Warranty**.

Disclaimer of warranties: The sample code included in this document is presented for reference only. The code does not necessarily represent complete, tested programs. The code is provided “as is with all faults.” All warranties are expressly disclaimed, including the implied warranties of merchantability and fitness for a particular purpose.

Web Support

Visit the Intermec web site at www.intermec.com to download our current manuals (in PDF).

Visit the Intermec technical knowledge base (Knowledge Central) at www.intermec.com and click **Support > Knowledge Central** to review technical information or to request technical support for your Intermec product.

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Send Feedback

Your feedback is crucial to the continual improvement of our documentation. To provide feedback about this manual, please contact the Intermec Technical Communications department directly at TechnicalCommunications@intermec.com.

Telephone Support

In the U.S.A. and Canada, call **1-800-755-5505**.

Outside the U.S.A. and Canada, contact your local Intermec representative. To search for your local representative, from the Intermec web site, click **About Us > Contact Us**.

Who Should Read This Manual

This *IP2L Snap-On LF/UHF RFID Reader User Guide* provides you with information about the features of the IP2L, and how to install, configure, operate, maintain, and troubleshoot it.

Before you work with the IP2L, you should be familiar with your network and general networking terms, such as IP address.

Related Documents

Here are some related Intermec documents you may find useful:

- [Intermec Settings Command Reference Manual](#)
- [Basic Reader Interface Programmer Reference Manual](#)

The Intermec web site at www.intermec.com contains our documents (as .pdf files) that you can download for free.

To download documents

- 1** Visit the Intermec web site at www.intermec.com.
- 2** Click the **Products** tab.
- 3** Using the **Products** menu, navigate to your product page. For example, to find the IP2L computer product page, click **RFID > Handheld Computers > IP2L**.
- 4** Click the **Manuals** tab.

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If your product does not have its own product page, click **Support** > **Manuals**. Use the **Product Category**, the **Product Family**, and **Product** to find your documentation.

Patent Information

Product is covered by one or more of the following patents:

[x,xxx,xxx](#); [x,xxx,xxx](#); [x,xxx,xxx](#).

There may be other U.S. and foreign patents pending.

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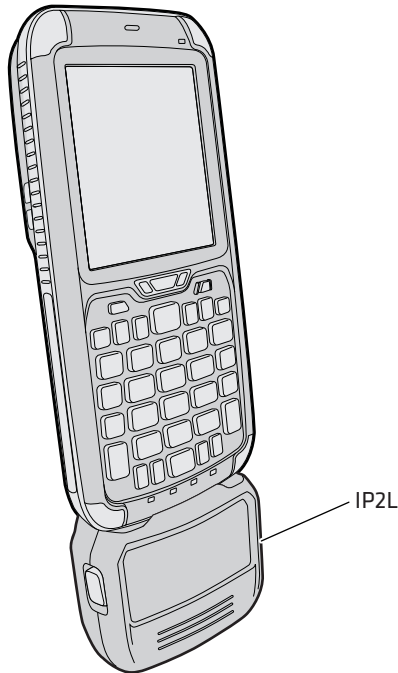
About the IP2L Features

This chapter introduces the IP2L for the CN70 and CN70e. Use this chapter to learn about the basic features and functions of the IP2L RFID reader.

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About the IP2L Snap-On LF/UHF RFID Reader

The IP2L snaps-on to the bottom of your CN70/CN70e mobile computer and provides a high-performance mobile RFID solution that allows you to read and write to RFID tags.



The IP2L Connected to the CN70

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What You Need

Before you can read and write to RFID tags using the IP2L, make sure these items are installed on the computer:

- the latest Microsoft Windows Mobile Operating System (OS)
- the latest Intermec firmware
- the SR13082101_RFID_CX70WM65_ALL.CAB file
- a custom RFID application or the Intermec RFID Demo application

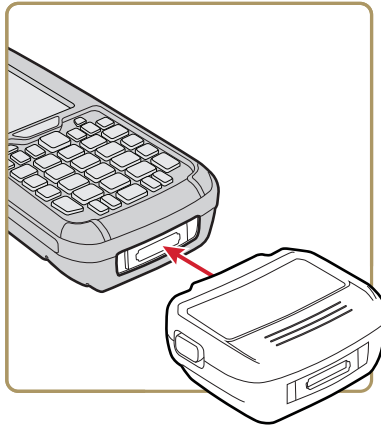
You can download these files on the Intermec website at www.intermec.com. For more information on how to install the IP2L software, see the **70 Series Mobile Computer User Manual**.

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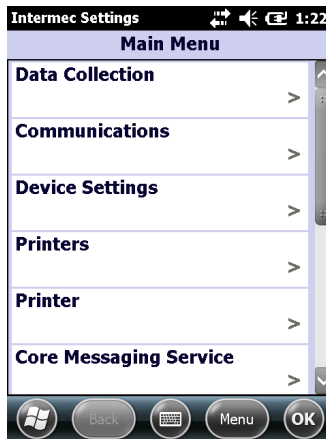
Connect and Enable the RFID Reader

Connect the IP2L and enable the RFID reader before you start reading and writing to RFID tags.

- 1 Connect the IP2L to the bottom of your mobile computer. The IP2L snaps into place.

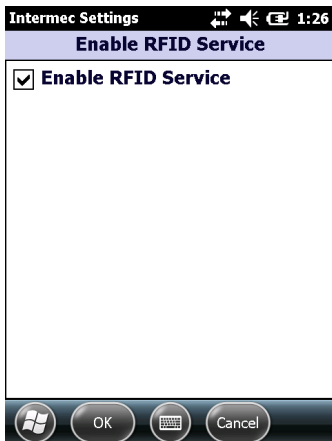


- 2 Tap the **Start** icon > **Settings** > **System** > **Intermec Settings**.

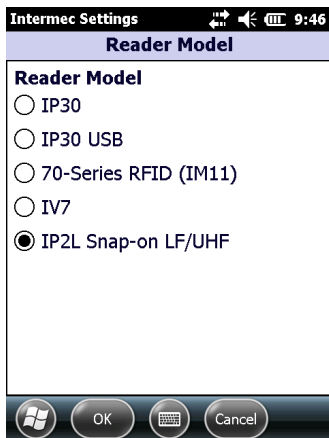


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- 3 Tap **RFID > Enable RFID Service** and select **Enable RFID Service**.



- 4 Tap **OK** to save your changes.
- 5 Tap **Reader Model**.



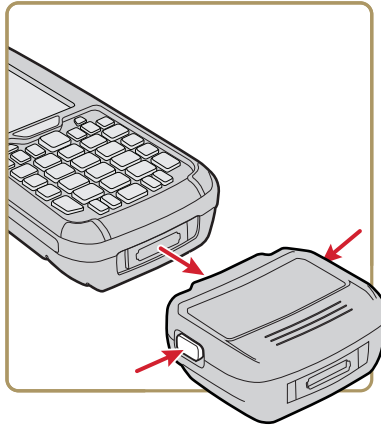
- 6 Select **IP2L Snap-on LF/UHF**.
- 7 Tap **OK** to save your changes. The IP2L is connected and enabled.

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Remove the IP2L

When you are done using RFID, remove the IP2L from the computer.

- Press the two side release buttons together to remove the IP2L.



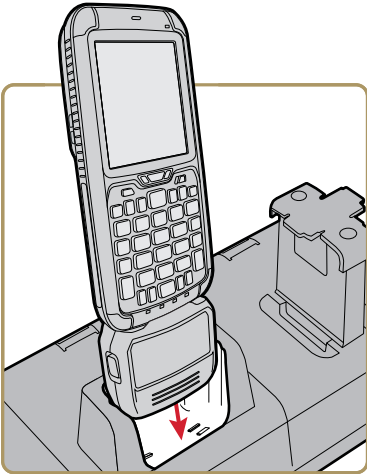
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Charge the Computer Battery

The IP2L is powered by the computer battery and can easily be charged when the IP2L is connected to the computer. Use one of the following charging accessories to charge computer battery when the IP2L is connected.

CN70/CN70e Charging Accessories

Charging Accessory	Charging Time
DX1, DX2, or DX4 dock	Up to 6 hours
CN70 and CN70e Vehicle Power Adapter	Up to 6 hours

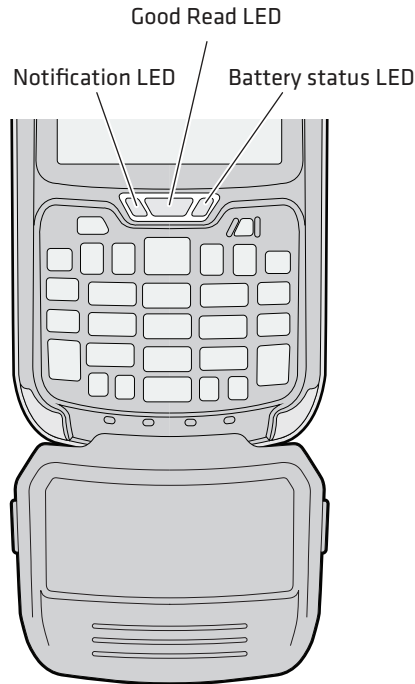


Charging the Computer with the IP2L Attached

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About the Status LEDs

When the IP2L is connected and enabled, the status LEDs turn on, turn off, or blink to indicate RFID activity on your computer.



Location of the Status LEDs

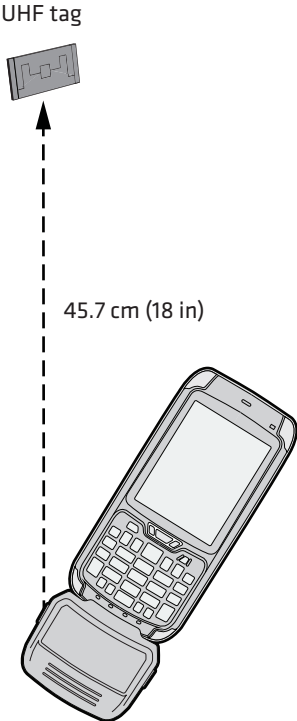
Status LED Descriptions

Callout	LED	Color	Description
1	Notification	Amber	The computer is searching for an RFID tag
2	Good Read	Blinking green	The computer successfully reads or writes to a tag.
3	Battery Status	Blinking red	The computer unsuccessfully writes to a tag.

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RFID Tag Read Positions

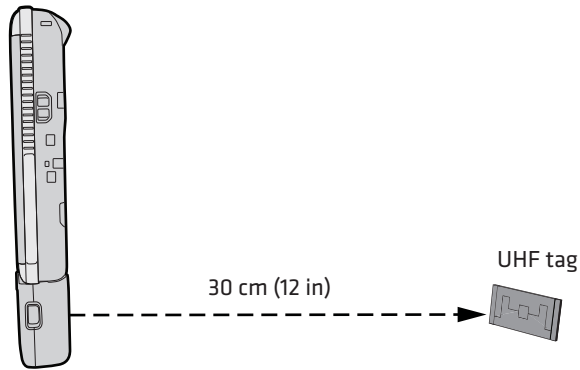
The IP2L can read and write to UHF tags up to 18 in (45.1 cm) away and LF tags at 1 in (2.2 cm) away. The read range for UHF tags depends on the way you hold the computer when you attempt to read or write to a tag. Use this section to learn how to optimally hold the IP2L to read and write to your RFID tags.



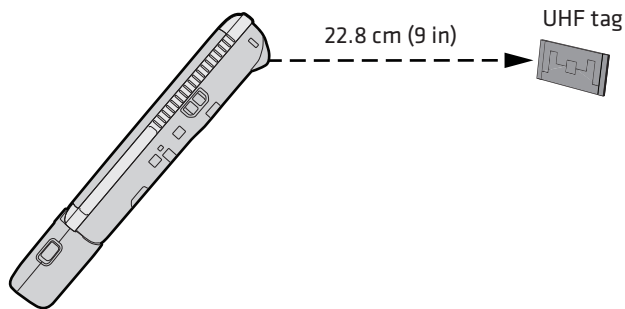
45.7 cm (18 in) Read Range When Held In This Position.

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Chapter 1 – About the IP2L Features



30 cm (12 in) Read Range When Held In This Position.

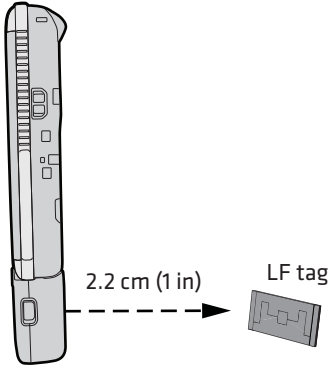


22.8 cm (9 in) Read Range When Held In This Position.

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15 cm (6 in) Read Range When Held In This Position.



2.2 cm (1 in) Read Range When Held In This Position.

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Read and Write to RFID Tags

Use this section to learn how to read or write to RFID tags. Before you start to read and write to RFID tags:

- connect the IP2L to the computer.
- enable the IP2L

1 Open an RFID application.

2 Press the **Scan** button on the computer. The Notification LED turns on and the computer scans for RFID tags in the area.

When the computer successfully or writes to an RFID tag, you hear a high beep, and the Good Read LED turns on briefly.

3 Release the **Scan** button on the computer to stop reading and writing to tags.

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Create and Use RFID Applications

This chapter explains how you can use RFID applications and configure the IP2L.

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RFID Applications and the IP2L

The IP2L communicates with the computer through the Basic Reader Interface (BRI) Server, which can be accessed in the Application Connection screen within Intermec Settings. The BRI Server controls the IP2L by issuing various BRI commands.

Use the RFID Resource Kit

The Intermec Developer Library RFID Resource Kits includes Java and .NET tools you can use to develop applications that control the IP2L and data management.

The resource kit is available as part of the Intermec Developer Library (IDL). To learn more about the RFID Resource Kit, go to www.intermec.com > **Products** > **Applications and Software** > **Development Tools** > **Developer Resource Kits**.

Create Applications for the IP2L

You must create an application for the IP2L before it can read and write tags. Intermec recommends this general outline for developing your RFID application:

- Write your application on a development workstation (your desktop PC).
- Install and test the application on your computer.

If you do not have an application but want to verify that your IP2L can read and write RFID tags, download the Intermec RFID Demo application from the Intermec website.

- 1 Go to www.intermec.com > **Products** > **RFID** > **Handheld Readers** > **IP2L** > the **Downloads** tab. The Download screen appears.
- 2 Download and install the **RFID Mobile Demo Kit** onto your mobile computer. For more information on how to install applications, see the mobile computer user manual.

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Configure the RFID Service Settings

When enabled, the RFID Service allows an application to communicate with the RFID reader. You can disable the service if your computer requires more processes or if you are not using RFID.

- 1 Go to Intermec Settings.
- 2 Tap the **RFID > Enable RFID Service**.
- 3 Select **Enable RFID Service** to enable the service, or clear it to disable the service.
- 4 Tap **OK**. Your settings are saved.

Configure the BRI Server Settings

Configure the BRI Server to handle communications between your application and the RFID module.

- 1 Go to Intermec Settings.
- 2 Tap the **RFID > Application Connection**.
- 3 Configure the BRI Server settings.
- 4 Tap **OK**. Your settings are saved.

BRI Server Settings Descriptions

Setting	Description
Allow BRI External BRI Connections	This allows an external application to establish a BRI connection to the RFID Data Collection Engine instead of the virtual wedge.
BRI TCP Port	This allows the Data Collection Engine BRI port to collect data from the RFID reader. Set the TCP port to something else if the default is already being used.
Enable Logging	This logs all RFID activities when you are troubleshooting the RFID reader.

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Configure the RFID Module Settings

Configure the RFID Module settings to control how the reader operates and reads tags.

- 1 Go to Intermec Settings.
- 2 Tap the **RFID > Application Connection**.
- 3 Configure the RFID Module settings.
- 4 Tap **OK**. Your settings are saved.

RFID Module Settings Descriptions

Setting	Description
Tag Type	Select the tag types you the RFID reader to read. This setting is equivalent to the TAGTYPE BRI attribute.
Dense Reader Mode	Allows the reader to hop between channels within a certain frequency spectrum to prevent other readers in the area from interfering with one another. This setting is equivalent to the DENSEREADERMODE or DRM BRI attribute.
LBT Channel	Sets the default transmit channel of the available ETSI 302-208 channels. When you enable LBT scanning, the channel scan sequence starts with this LBT channel. When you disable LBT scanning (as in the 4 channel mode) the LBT channel is the only channel used. The range for 10 channel mode is 4 to 13.
LBT Scan Enable	When LBT scanning is enabled, the algorithm scans the available ETSI 302-208 channels for a free transmit channel. This setting is equivalent to the LBTSCANENABLE BRI attribute.
Field Separator	Sets the space character to be used for separating fields in tag data. Choose from space (), comma (,), colon (:), semicolon (;), tab, caret (^), or tilde (~). Default is space. This setting is equivalent to the FIELDSEP BRI attribute.

RFID Module Settings Descriptions (continued)

Setting	Description
ID Report	<p>Enables or disables tag ID reporting after a Read, Write, or Lock command is executed:</p> <ul style="list-style-type: none"> • For ISO tags, the tag identifier corresponds to TAGID. • For EPC tags, the identifier corresponds to EPCID. <p>This setting is equivalent to the IDREPORT BRI attribute.</p>
No Tag Report	<p>Enables or disables a NOTAG message, which is sent when no tags are found during execution of a Read, Write, or Lock command.</p> <p>This setting is equivalent to the NOTAGRPT BRI attribute.</p>
Report Timeout	<p>Sets the timeout (in ms) for delays in tag reporting when the RFID reader is in continuous read mode.</p>
Timeout Mode	
ID Tries	<p>Sets the maximum number of times the reader executes the identify algorithm before a response is returned to a Read or Write command.</p> <p>In practice, this is the number of times a tag ID attempt is made for the antenna.</p> <p>This setting is equivalent to the IDTRIES BRI attribute.</p>
Antenna Tries	
Read Tries	<p>Sets the maximum number of times the read algorithm is executed before a response is returned to a Read command.</p> <p>In practice, this is the number of times an identified tag is read until the Read is successful.</p> <p>This setting is equivalent to the RDTRIES BRI attribute.</p>
Write Tries	<p>Sets the maximum number of times the read algorithm is executed before a response is returned to a Write command.</p> <p>In practice, this is the number of times an identified tag is read until the Write is successful.</p> <p>This setting is equivalent to the WRTIES BRI attribute.</p>

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RFID Module Settings Descriptions (continued)

Setting	Description
Lock Tries	<p>Sets the maximum number of times the lock algorithm is executed before a response is returned to a Lock command.</p> <p>This setting is equivalent to the LOCKTRIES BRI attribute.</p>
Select Tries	<p>(Not supported by EPCglobal Class 1 Gen 2 tags)</p> <p>Sets the number of times a group select is attempted. A group select is the command that starts the identity process.</p> <p>This setting is equivalent to the SELTRIES BRI attribute.</p>
Unselect Tries	<p>(Not supported by EPCglobal Class 1 Gen 2 tags)</p> <p>Sets the number of times a group unselect is attempted.</p>
ID Tries	<p>Sets the maximum number of times the reader executes the identify algorithm before a response is returned to a Read or Write command.</p> <p>In practice, this is the number of times a tag ID attempt is made for the antenna.</p> <p>This setting is equivalent to the IDTRIES BRI attribute.</p>
Initial Q	<p>(EPCglobal Class 1 Gen 2 tags only) Sets the initial Q parameter value used by the Query command.</p> <p>If you know there is only one tag in the field, set this attribute to 0 for best performance.</p> <p>This setting is equivalent to the INITIALQ BRI attribute.</p>
Field Strength dB	<p>Sets the RF power level (in dBm) for each of the 4 antenna ports.</p> <p>Use this setting to attenuate the antenna field strength. In some situations, full output power can cause unnecessary interference. For example, if the tag is close to the antenna, full output power might overload the tag and cause unreliable behavior.</p> <p>This setting is equivalent to the FIELDSTRENGTH BRI attribute</p>

RFID Module Settings Descriptions (continued)

Setting	Description
Session	
Enable Antenna Port 1	

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Troubleshoot the RFID Reader

This chapter explains how to troubleshoot the IP2L RFID reader.

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Call Product Support

If you are having trouble using the IP2L or computer, you can:

- use the troubleshooting tables in this manual to find your problem and possible solutions.
- visit the Intermec technical knowledge base, Knowledge Central at intermec.custhelp.com.

If you still need help, you can call Intermec Product Support at:

1-800-755-5505

Before you Call Product Support, have this information ready:

- Configuration number (CN) and serial number (SN)
- Operating system version
- Power management settings
- Wireless security settings
- SmartSystems Platform Bundle (SSPB) version
- Intermec Terminal Emulation (ITE) version and protocol, available from the ITE main screen.

Or, programming language of your custom applications and tools used to create it.

Most information is available in Intermec Settings on the computer. For more information, see see the [70 Series Mobile Computer User Manual](#).

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Troubleshoot the IP2L

The following table may help you fix some common problems you may experience while using the IP2L.



Note: If you send the IP2L or computer in for service, it is your responsibility to save the computer data and its configuration. Intermec is only responsible for ensuring that the hardware matches the original configuration repairing or replacing the computer.

RFID Problems and Solutions

Problem	Solution
The IP2L is unable to read RFID tags, or seems to read tags slowly or inconsistently.	<ul style="list-style-type: none"> • Make sure you have connected onto the IP2L on the computer. For help, see “Connect and Enable the RFID Reader” on page 4. • Make sure you have enabled the IP2L. . • The IP2L uses a linear antenna. It can only read a tag’s antenna which is oriented in the same way as the IP2L antenna. A tag’s antenna is oriented the same as the IP2L antenna if the tag element is parallel to the front edge of the IP30 antenna. • Move slightly closer or farther from the tag. Environmental factors can reduce the read range or create dead spots. • Make sure there are no metal objects or other objects on or near the antenna. Large rings or hand jewelry can affect the performance of the IP2L. • Make sure the computer is working properly. The IP2L will not work well if there are too many applications running in the battery. • Make sure the computer battery is not low, it may affect the performance of the IP2L.
The IP2L does not respond to your RFID application.	<ul style="list-style-type: none"> • Make sure your application is communicating with the IP2L, the BRI server on your computer, or both. • You may need to change BRI server settings to communicate with your application. For help, see

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About the IP2L

This appendix contains specifications for the IP2L RFID reader.

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Physical Specifications

This section lists the physical, temperature, and humidity specifications for the IP2L.

Length	63.8 mm (2.51 in)
Width	79.5 mm (3.13 in)
Thickness	34 mm (1.34 in)
Electrical rating	≡ 4.37 V 2 A / 4.8 V 1.5 A
Operating temperature	-20 °C to 60 °C (-4 °F to 140 °F)
Storage temperature	-30 °C to 70 °C (-22 °F to 158 °F)
Humidity (non-condensing)	5 % to 95%

RFID Specifications

This section lists the RFID specifications for the IP2L.

Supported LF tag types	TI TIRIS at 134.2 kHz half duplex
Supported UHF tag types	Class 1 Gen 2 EPC (ISO 18000-6C)
Frequency range*	902 to 928 MHz
Read and write range (typical maximum)**	<ul style="list-style-type: none">• Up to 45.1 cm (18 in) for UHF tags• 2.2 cm (1 in) for LF tags
Electrical rating	≡ 4.37 V 2 A / 4.8 V 1.5 A

* Maximum output power and operating frequency varies from country to country based on regulations.

** Read and write range varies based on tag performance, reader antenna gain, reader output power, and environmental conditions.

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