About This Guide

**IMPORTANT**  Before using the instrument, read and understand the safety guidelines in this document. Failure to follow these guidelines may result in undesirable effects, injury to personnel, and/or damage to the instrument or to property.

For complete safety information, see Appendix F.

How to Use This Guide

This user guide provides information about setup, installation, operation, and maintenance of the IFC Controller RX. In this document, the term “controller” refers to the IFC controller and the term “software” refers to the IFC controller software.

Safety Alert Conventions

Fluidigm documentation uses specific conventions for presenting information that may require your attention. Refer to the following safety alert conventions.

Safety Alerts for Chemicals

For hazards associated with chemicals, this document follows the United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS) and uses indicators that include a pictogram and a signal word that indicates the severity level:

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="example" alt="Pictogram" /> consisting of a symbol on a white background within a red diamond-shaped frame. Refer to the individual safety data sheet (SDS) for the applicable pictograms and hazards pertaining to the chemicals being used.</td>
<td><strong>DANGER</strong> Signal word that indicates more severe hazards.</td>
</tr>
<tr>
<td><img src="example" alt="Pictogram" /></td>
<td><strong>WARNING</strong> Signal word that indicates less severe hazards.</td>
</tr>
</tbody>
</table>
Safety Alerts for Instruments

For hazards associated with instruments, this document uses indicators that include a pictogram and signal words that indicate the severity level:

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="example" alt="Pictogram" /></td>
<td>Pictogram (see example) consisting of a symbol on a white background within a black triangle-shaped frame. Refer to the instrument user guide for the applicable pictograms and hazards pertaining to instrument usage.</td>
</tr>
<tr>
<td><strong>DANGER</strong></td>
<td>Signal word that indicates an imminent hazard that will result in severe injury or death if not avoided.</td>
</tr>
<tr>
<td><strong>WARNING</strong></td>
<td>Signal word that indicates a potentially hazardous situation that could result in serious injury or death if not avoided.</td>
</tr>
<tr>
<td><strong>CAUTION</strong></td>
<td>Signal word that indicates a potentially hazardous situation that could result in minor or moderate personal injury if not avoided.</td>
</tr>
<tr>
<td><strong>IMPORTANT</strong></td>
<td>Signal word that indicates information necessary for proper use of products or successful outcome of experiments.</td>
</tr>
</tbody>
</table>

Safety Data Sheets

Read and understand the SDSs before handling chemicals. To obtain SDSs for chemicals ordered from Fluidigm, either alone or as part of this system, go to fluidigm.com/sds and search for the SDS using either the product name or the part number.

Some chemicals referred to in this user guide may not have been provided with your system. Obtain the SDSs for chemicals provided by other manufacturers from those manufacturers.
Chapter 1: Introducing IFC Controller RX

The IFC Controller RX is a compact single-bay instrument that employs pneumatic pressure to precisely meter samples and reagents and to control valves within the 192.24 Dynamic Array™ IFC (integrated fluidic circuit) and the 24.192 Dynamic Array IFC for Gene Expression.

The IFC controller can control and apply pressures to different sealing zones on the IFC input/output frame to enable:

- Metering of liquids from inlet positions in the input frame to reaction chambers within the IFC
- Metering of liquids within the IFC
- Opening and closing of valves within the IFC

This user guide walks you through:

- Key features and benefits of IFC Controller RX
- Installation and setup procedures
- Description of system functions

**NOTE**  IFC Controller RX is for research use only and is not for use in diagnostic procedures.
Components of the IFC Controller

Figure 1. Front of IFC controller

Figure 2. Back of IFC controller
Components Included in Shipping Box

<table>
<thead>
<tr>
<th>Component</th>
<th>Purpose</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFC controller</td>
<td>Controls filling of reagents and valve actuation in IFCs</td>
<td>1</td>
</tr>
<tr>
<td>Removable interface plate</td>
<td>Interface between IFC and IFC controller with pressure inlet ports</td>
<td>1</td>
</tr>
<tr>
<td>Power cable</td>
<td>Country-specific power cable to connect IFC controller to wall socket.</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>The instrument has a connection to protective earth through the power cord provided by Fluidigm. Ensure that the electrical receptacle provides an earth ground before connecting the power cord. Use only power cords provided by Fluidigm or power cords that meet the minimum ratings of 250 V/10 A, 16 AWG and a length not exceeding 2 m (6 ft).</td>
<td></td>
</tr>
<tr>
<td>Fuse</td>
<td>Spare fuse based on country voltage</td>
<td>2</td>
</tr>
<tr>
<td>Removable interface plate</td>
<td>Spares for use if an O-ring is lost during cleaning of interface plate</td>
<td>4</td>
</tr>
<tr>
<td>O-rings</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE** To order additional items, contact Fluidigm sales. For phone or email contact information, go to fluidigm.com/contact.

Workflow for Standard IFCs

The simplicity of running experiments is illustrated in the process below.

1. Add samples and primers to IFC
2. Load and mix samples and assays
3. Perform PCR on Biomark™ HD, Biomark, or FC1™ cycler
4. Collect images on Biomark HD, Biomark, or EP1™

For more detail, see Related Documentation on page 43.

Operating Environment

IFC Controller RX should be used in an environment that meets the following requirements.

**IMPORTANT** The IFC controller is for indoor use only.
Chapter 1: Introducing IFC Controller RX

Noise Level

The operation of the IFC Controller RX emits a noise level of 64 dB.

Power Options

IFC Controller RX operates through 100–240 V AC power at 50/60 Hz.

Barcode Labeling

Labels on the IFC contain the Fluidigm logo, a unique 10-character number, and a one-dimensional, Code 128 barcode. You can use this barcode with the provided integrated barcode reader to track samples and experiments.

Regulatory Compliance

The following directives and harmonized standards were used to evaluate the safety and performance of the IFC controller:

General Regulations and Requirements

- 2014/35/EU European Parliament Low Voltage Directive

Harmonized Standards

- IEC/EN 61326-1
- IEC/EN 61010-1
- IEC/EN 61010-2-010
- IEC/EN 61010-2-081
- UL Standard Number 61010-1 2nd Edition
- CAN/CSA-C22.2 No. 61010-1-04

**Conformity Symbols on the Instrument**

The instrument is labeled with the following conformity markings:

<table>
<thead>
<tr>
<th>Conformity mark</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Indicates conformity with safety requirements for Canada and the United States.

Indicates conformity with European Union requirements for safety and electromagnetic compatibility.

Refer to Operating Environment on page 9 for more detailed information on the recommended environmental conditions.
Chapter 2: IFC Controller Basics

This chapter describes how to use IFC Controller RX.

**IMPORTANT** To set up the IFC controller, read the site requirements and installation instructions in Appendix C: IFC Controller Site Requirements and Setup on page 36.

**WARNING** PHYSICAL INJURY HAZARD. Do not attempt to lift or move any boxed or crated items unless you use proper lifting techniques. The IFC controller is shipped in 1 cardboard box that also contains a power cable and cleaning plates. Together they weigh 28.2 kg (62.2 lb). If you choose to lift or move the instrument after it has been installed, do not attempt to do so without the assistance of others. Use appropriate moving equipment and proper lifting techniques to minimize the chance of physical injury.

Start the IFC Controller

1. Turn on the switch on the back of the IFC controller.

2. The LCD display lights up. After 10–15 sec the initialization screen appears.

The IFC controller software starts and initializes all system components. After initialization, the instrument runs an internal health check. In the event an error occurs, contact technical support for service. For phone or email contact information, see page 2.
Load an IFC

For more information about using the software, see Chapter 3: Using the IFC Controller Software.

1. At completion of power-up and instrument initialization, the Home screen appears. You may log in now or later. See Log In on page 15.

2. Tap **Eject** to move the tray out of the IFC controller.

3. Place the IFC onto the tray by aligning its notched corner to the A1 mark. Remove and discard the protective film from the bottom of the IFC, if you have not already done so.

4. Tap **Load Chip** to register the IFC barcode and activate script selection.
Run Scripts

1. Choose a script to run from the script selection window. The list of available scripts is defined by the IFC barcode. This example uses Load Mix (166x).

If prompted to log in, see Log In on page 15.

2. Tap Run Script.

A status screen appears with a time estimate for completion.

3. Once the script is complete, as indicated on the status screen, tap Eject to remove IFC. Tapping Abort during an active script, will cancel the run.
Chapter 3: Using the IFC Controller Software

Log In

1 Tap Login at the bottom right of the screen.

2 Log in as Admin or User.

When entering a password for the first time:

- If you are logging in as Admin, the initial default password is: 123456
- If you are logging on as User, there is no initial default password.

For more information, see Manage Users on page 22.

User Tools

After logging in as User, tap Tools at the bottom right of the screen.

When logged in as a user, these tools are available:
• **Edit User.** Allows you to change your password.

• **Settings.** Allows you to enable full logging for this session. If this option is selected, the system logs every event on the system until it is rebooted or the option is turned off. This is useful if you believe your machine is not functioning correctly. You can record what your machine is doing and export the log and share it with Fluidigm technical support for troubleshooting. By default, this option is not selected.

• **Clean System.** Allows you to manually clean the system. For more information, see [Manually Clean the System on page 32](#).

• **Export Log.** Allows you to export system activity logs if you selected Enable Full Logging for this Session on the Settings screen. For more information, see [Export Logs on page 23](#).

**Administrator Tools**

When logged in as Administrator, in addition to the User tools, you can manage users, passwords, settings, and scripts.

Tap **Tools** at the bottom right of the screen.
The Tools menu appears:

![Tools menu screenshot]

**Edit User**

On the Edit User screen, you can edit user name, password, and email notification by clicking the corresponding **Edit** buttons.

![Edit User screenshot]

If you edit email notification, a new screen appears. You can receive notifications by email or by text message.

![Email notification settings]

If you select By Phone Number and Carrier, you also have to select the carrier service that you subscribe to.
Change Settings

1 Tap **Settings**. Settings on this screen include:

- **Enable Full Logging for this Session**. If this option is selected, the system logs every event on the system until it is rebooted or the option is turned off. This is useful if you believe your machine is not functioning correctly. You can record what your machine is doing and export the log to share with Fluidigm technical support for troubleshooting. By default, this option is turned off.

- **Enable Barcode**. Selected by default. The barcode reader attempts to read the barcode of every IFC. If you are running an IFC that does not have a barcode, you can turn off this setting.

  We recommend that you keep the barcode reader enabled. The instrument will display only those scripts that pertain to your IFC type. This helps prevent errors in script selection.

2 Tap **Save** if you change the settings.

Operating in Group Mode

You can operate the IFC Controller RX in conjunction with other IFC controllers.

1 Select **This instrument is the group master** on the instrument you wish to use as the master controller.
2 On the instruments you wish to link to the master controller, open Group Mode Settings and select **This instrument is the group worker**.

3 Return to the master IFC controller and select **Add More Workers**.

4 Select the controllers to link.

5 Click **Add Workers**.

   The master controller now has a Master Mode icon on its screen and the worker controller(s) now have a Worker Mode icon on their screen.
You can now control the worker IFC controllers remotely via the master IFC controller.

6 Select the number of IFCs you wish to run.

The default number is the number of IFC controllers connected via group operating mode. For example, if you have 4 IFC controllers linked, 4 will be the default number of IFCs to run. If you only want to run 2, select −2 to adjust the number.

To leave the worker or master modes, click Exit Mode.

7 You can also operate a system independently by selecting This instrument is independent.
Clean System (manually)

1. Tap Clean System.
2. Place the cleaning plate on the tray and tap Start System Cleaning.
3. When the system purge is complete, the tray ejects.

For more details, see Manually Clean the System on page 32.

Network Settings

On the Network Setting tab, your IT professional can network the IFC controller to your company's network and obtain an IP address dynamically through DHCP or use a static IP address.

Other editable items are:
- DNS addresses
- Network unit name
  - If you are networking multiple IFC controllers, you need to edit the network unit name. Controllers are delivered with the same default name.
- Database address

On the Server tab, editable items include:
Chapter 3: Using the IFC Controller Software
Administrator Tools

- Mail server
- Port number
- User name
- Password
- From

**Manage Users**

Use the Manage Users screen to add, delete, and edit users.

1. Tap **Manage Users**.
2. Tap **Add New User**.
3. Use the onscreen keyboard to enter a user name.
4. Tap **Next**.

5. To assign a password for this user, tap **Change**. Enter a password using the onscreen keyboard.
Assign an access level by choosing Normal or Administrator.

- Normal access level allows basic script running.
- Administrator access level allows basic script-running and the ability to change user access and passwords and manage scripts and system settings.

Tap Save.

The new user name appears on the login screen.

Export Logs

If you enabled Full Logging for this Session in the Settings screen, you can export system logs to a USB drive.

1. Tap Export Logs from the Tools menu.
2. Insert your USB drive into the USB port on the back of the instrument.
3. Tap Export.
Chapter 3: Using the IFC Controller Software
Administrator Tools

Change Time/Date

1 Tap Change Time/Date. Use the blue arrows to adjust the time and date from this screen.

2 Tap Save when finished.

Manage Scripts

For more detailed information on loading and updating scripts, see Update Software and Scripts on page 25.

1 Tap Manage Scripts.

2 Add scripts from a USB drive or copy scripts to a USB drive from this screen.
   Your scripts must be in a folder named “Scripts” on your USB drive for the IFC controller to find them.

3 Tap Save.
Scripts in the IFC Controller RX Software

The available IFC controller scripts are:

<table>
<thead>
<tr>
<th>IFC Type</th>
<th>Script</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>24.192 Dynamic Array IFC for Gene Expression</td>
<td>Load Mix (158x)</td>
<td>Pressurizes the primer and sample into the reaction chambers and closes the containment valves at the end.</td>
</tr>
<tr>
<td>192.24 Dynamic Array IFC for Genotyping</td>
<td>Load Mix (166x)</td>
<td></td>
</tr>
<tr>
<td>192.24 Dynamic Array IFC for Gene Expression</td>
<td>Load Mix (169x)</td>
<td></td>
</tr>
</tbody>
</table>

Log Out

1. When you are finished using the IFC controller, tap Logout at the bottom right of the screen.

2. Tap Log Off.

Update Software and Scripts

Occasionally, Fluidigm provides updates to the system software and new scripts. Check for updates on our website at fluidigm.com/software.

Install Updated Software and Scripts

1. Turn off the IFC controller by pressing the power switch at the back of the instrument.
2. Insert the USB drive containing the updates into the USB port.
3. Turn on the IFC controller by pressing the power switch at the back of the instrument.
4. Tap Update All to update the software and firmware. You can also update only the software or firmware.
A status screen indicates the software/firmware was successfully updated.

The instrument was successfully updated

Please remove the USB Key and reboot the instrument to complete the update.

5 Turn off the IFC controller, take out the USB drive, and turn the controller back on to reboot the system.

Load New Scripts

1 Log in as Administrator.

2 Tap Tools.

3 Tap Manage Scripts.

4 To add all of the new scripts, tap Add All Scripts from USB Key.
You can now view, rename, or delete the individual scripts.

To select a script, tap the script's name. This example shows Load Mix (166x).

You can now change its name or delete it.

5 To change the name of the selected script, tap **Change** and enter a new name.

6 To delete unwanted scripts, tap **Delete Script**.
# Appendix A: Troubleshooting

## Observation and Possible Course of Action

<table>
<thead>
<tr>
<th>Observation</th>
<th>Possible Cause</th>
<th>Recommended Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFC Controller RX failed to power on.</td>
<td>No AC power</td>
<td>Check that the power cable is properly connected to both wall socket and IFC Controller RX. Make sure the power switch on wall socket is on, and then turn on the instrument power switch on the back panel. If using a power strip, make sure it is turned on.</td>
</tr>
<tr>
<td></td>
<td>IFC Controller RX fuse is faulty</td>
<td>Refer to Fuse Replacement on page 33 and replace both fuses with the supplied replacement fuses.</td>
</tr>
<tr>
<td>There is no display after power is turned on.</td>
<td>IFC Controller RX power supply is not fully reset</td>
<td>Turn off the IFC Controller RX power switch located on the back panel. Wait for 10 sec and re-boot it by turning on the power switch.</td>
</tr>
<tr>
<td>Compression force is out of range.</td>
<td>The compression cylinder pressure is out of range</td>
<td>Call technical support.</td>
</tr>
<tr>
<td>Error messages</td>
<td>Reboot the system. If the system fails to recover, call technical support.</td>
<td></td>
</tr>
<tr>
<td>Pump timed-out error</td>
<td>One or more of the O-rings may be unseated</td>
<td>Check interface plate O-rings. (See Clean the Interface Plate on page 29.)</td>
</tr>
<tr>
<td>IFC load error/cannot read barcode</td>
<td>Blue protective film may not have been removed from bottom of IFC</td>
<td>Ensure blue protective film is removed from the bottom of the chip before loading into the IFC Controller RX.</td>
</tr>
</tbody>
</table>
Appendix B: Maintenance and Decontamination

Clean the IFC Controller

This section describes how to clean and maintain your IFC controller for optimal performance.

**IMPORTANT** Before using a cleaning or decontamination method other than those recommended by Fluidigm, verify with Fluidigm technical support that the proposed method will not damage the equipment.

IFC Controller RX requires very little maintenance other than regular cleaning of the IFC loading bay and the removable interface plate.

Clean the Interface Plate

1. After the tray ejects, remove the interface plate.

2. Using a lint-free cloth and DNAZap™ (Thermo Fisher Scientific, PN AM9890), gently wipe the top and bottom of the interface plate.

3. Use water and a clean wipe to remove the DNAZap.

4. Use clear tape to remove any dust particles.
5 Reinstall the cleaned removable interface plate:
   a Orient the plate so that “THIS SIDE UP” is facing up.
   b Slide the plate into the guide until it stops and you hear a click.

**IMPORTANT** There are 18 black O-rings inserted on one side of the removable interface plate. Be sure they are not misplaced or removed while handling the plate. During interface plate installation, these O-rings should face up. Contact technical support if you need replacement O-rings.

6 Tap **Done** when finished.
Clean the System

The IFC controller will notify the user to do a system clean after a designated number of scripts have been run.

Follow the onscreen instructions:

1. Tap **Clean**. The System Cleaning Instructions screen appears.

2. Place cleaning plate onto tray.
3  Tap **Start System Cleaning**. A status screen appears.

![System cleaning - Running...](image)

4  When the system purge is complete, eject the tray.
5  Wipe the tray out with isopropyl alcohol and let it dry for next use.

### Manually Clean the System

You can manually clean the system at any time.

1  Eject the IFC.
2  Tap **Tools**.
3  Tap **Clean System**. The System Cleaning Instructions screen appears.

![System Cleaning Instructions](image)

4  Place the cleaning plate on the tray and tap **Start System Cleaning**.
A status screen appears.

5 When the system purge is complete, the tray ejects.

**Fuse Replacement**

No fuse replacement is required during installation. If the power fuse is faulty, replace it as follows. The fuse is rated 250V / 3.15A.

1 Turn off and unplug power cord from wall outlet.

2 Remove fuse casing from the IEC inlet power switch.
3 Push and release fuse holder blocks as shown below.

4 Replace faulty fuses and reinstall the IEC filter. Follow the arrow marks in the fuse holder to match IEC casing.

Decontamination of the IFC Controller

Ensure that the IFC controller is cleaned and/or decontaminated prior to servicing the equipment, removing it from use, or transporting it for disposal. Refer to the instructions contained in this document and use only those materials specified.

Biological Agents

1 Using a soft cloth, apply 70% ethyl alcohol or 70% isopropyl alcohol to all accessible surfaces.

2 Keep surfaces wet for at least 5 min, then wipe dry.

3 Repeat steps 1 and 2 once.

4 Clean all decontaminated surfaces with a wet cloth to remove residual alcohol and wipe dry.
Hazardous Chemicals
1. Using a soft cloth, apply 70% ethyl alcohol or 70% isopropyl alcohol to all accessible surfaces.
2. Before use, ensure that alcohol is compatible with the chemicals used.
3. Keep surfaces wet for at least 5 min, then wipe dry.
4. Repeat steps 1 and 2 once.
5. Clean all decontaminated surfaces with a wet cloth to remove residual alcohol and wipe dry.

Radioactive Materials
1. Using a soft cloth, apply an industry standard radioactivity decontaminant to all accessible surfaces.
2. Wipe the surfaces as directed by the decontaminant manufacturer.
3. Survey the instrument with an appropriate radioactivity measuring device.
4. Ensure that the survey results are at or below background level.

Disposal of Products

Used IFCs and reagents should be handled and disposed of in accordance with federal, state, regional, and local laws for hazardous waste management and disposal.

Do not dispose of this product in unsorted municipal waste. This equipment may contain hazardous substances that could affect health and the environment. Use appropriate take-back systems when disposing of materials and equipment.

Learn more at fluidigm.com/compliance.
Appendix C: IFC Controller Site Requirements and Setup

**WARNING**  PHYSICAL INJURY HAZARD. Do not attempt to lift or move any boxed items unless you use proper lifting techniques. The weight of the boxed instrument with a power cable and cleaning plates is 28.2 kg (62.2 lb).

If you choose to lift or move the instrument after it has been installed, do not attempt to do so without the assistance of others. Use appropriate moving equipment and proper lifting techniques to minimize the chance of physical injury.

**CAUTION**  The IFC controller must be installed and operated in accordance with the manufacturer’s (Fluidigm) recommendations. Failure to follow these instructions may invalidate your warranty and/or diminish the safe functioning of your instrument.

### Site Requirements

To operate the IFC controller, your site should meet the following requirements:

- One electrical power outlet
- A workspace that accommodates the IFC controller

### Proper Grounding/Protective Earth Connection

To reduce the risk of electrical shock, connect the IFC controller to the AC power main through a grounded power cable at the power outlet.

### Electrical Requirements

The IFC controller should be plugged into a standard US-type power strip with surge protector that provides single-phase AC voltage, between 100 and 240 V (60 or 50 Hz).

**IMPORTANT**  Do not exceed a supply voltage fluctuation over 10% of normal.

<table>
<thead>
<tr>
<th>Customer Location</th>
<th>Voltage (VAC)</th>
<th>Frequency (Hz)</th>
<th>Maximum Current (A)</th>
<th>Typical Average Power Consumption (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>100 ± 10%</td>
<td>50–60 ± 1%</td>
<td>2.7</td>
<td>Idle: 20  Operating: 175</td>
</tr>
<tr>
<td>USA, Canada</td>
<td>115 ± 10%</td>
<td>50–60 ± 1%</td>
<td>2.7</td>
<td>Idle: 20  Operating: 175</td>
</tr>
<tr>
<td>Europe, Australia</td>
<td>240 ± 10%</td>
<td>50–60 ± 1%</td>
<td>2.7</td>
<td>Idle: 40  Operating: 175</td>
</tr>
</tbody>
</table>
Power Cord Requirements

Fluidigm will provide a country-specific power cord.

<table>
<thead>
<tr>
<th>Customer Location</th>
<th>Minimum Wire Gauge (AWG)</th>
<th>Maximum Length (m)</th>
<th>Instrument End Plug</th>
<th>Receptacle End Plug</th>
</tr>
</thead>
<tbody>
<tr>
<td>All countries</td>
<td>16</td>
<td>2</td>
<td>IEC C13</td>
<td>Country-specific</td>
</tr>
</tbody>
</table>

Uninterruptible Power Supplies

If your local power supply is subject to frequent power interruptions, you can protect your experiment setups on the IFC controller by using an uninterruptible power supply (UPS) with these minimum requirements:

Output Power Capacity  500W (800VA)
Backup Time (Run-Time) ±30 min at 500W
Output Voltage  100–120 VAC
Output Connection  NEMA 5-15R

The UPS described above is sufficient to maintain power to one IFC controller.

NOTE  Pressurized gas: The IFC controller has an inbuilt air pump to generate compressed air for IFC operation. No additional air supply is required.

Workspace

Provide a work surface that can accommodate the IFC controller. The following table shows the instrument dimensions and weight.

<table>
<thead>
<tr>
<th>Length</th>
<th>Width</th>
<th>Height</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>48.3 cm (19 in)</td>
<td>24.1 cm (9.5 in)</td>
<td>33 cm (13 in)</td>
<td>22.6 kg (49.8 lb)</td>
</tr>
</tbody>
</table>

The IFC controller is designed as desktop equipment. It can be placed on a laboratory bench top. To accommodate one IFC controller, we recommend you supply a bench top with minimum depth of 63.5 cm (25 in) and width of 40.6 cm (16 in). To allow adequate air circulation, keep at least 5.08 cm (2 in) clearance behind the IFC controller. Multiple controllers can be stacked together side by side.

IMPORTANT
- Do not place the IFC controller on a heated surface or directly above a source of heat.
- Do not place the IFC controller in a position that makes it difficult to operate or disconnect from power.
Appendix C: IFC Controller Site Requirements and Setup

Unpack the IFC Controller

**Electrical Connection**

The IFC controller is a standalone desktop instrument that requires only one electrical connection (Figure 4) at the back of the IFC controller. The top left corner has an AC power input socket and a power on/off switch.

**Unpack the IFC Controller**

![Unpack the IFC Controller](image)

**CAUTION** LIFTING HAZARD. The IFC controller is shipped in one cardboard box that also contains a power cable and cleaning plates. Together they weigh 28.2 kg (62.2 lb). Use proper lifting techniques. We recommend using at least 2 people to lift the IFC controller from the box.

1. Unpack the box near its permanent place in the lab.
2 Remove components from plastic wrapping.

3 Confirm that IFC controller, power cable, and cleaning plates are included in the box. If anything is missing, contact technical support. For phone or email contact information, see page 2.

**Install the IFC Controller**

**IMPORTANT** Do not place the IFC controller on a heated surface or directly above a heat source.

1 Place the IFC controller on a laboratory bench top, which must be at least 54 cm (21 in) deep and 25 cm (10 in) wide. For more details, see Workspace on page 37.

2 Provide at least 5.1 cm (2 in) of clearance behind the controller to allow adequate air circulation. See Figure 3 on page 38.

**Connect the Power Cable**

1 Connect the power cable to the IFC controller.

   ![Diagram of IFC controller with labels for on/off switch and power cord]

   The instrument has a connection to protective earth through the power cord provided by Fluidigm. Ensure that the electrical receptacle provides an earth ground before connecting the power cord.

2 Plug in the IFC controller to an electrical outlet that provides single-phase AC voltage, between 100 and 240 V (50 or 60 Hz). Make sure all power switches are off. No additional grounding is required.
**IMPORTANT**

- Current requirement is 2.7 A, but the outlets must be of US standard (NEMA 1-15P) blade type. If you are not operating in the United States, Fluidigm provides a country-specific power cord.
- If your local power supply is subject to frequent power interruptions, you may protect your IFC runs on the IFC controller by using an uninterruptible power supply (UPS). For more information, see Unpack the IFC Controller on page 38.

### Power On the IFC Controller

1. If you are using a surge protector power strip, turn it on.
2. Turn on the power switch at the back of the instrument.
3. Wait while the IFC controller initializes. Initialization may take up to 5 min to complete. The IFC controller uses a touchscreen interface. Once you power on the instrument, all interactions with the application occur by touching the screen.

**IMPORTANT** If prompted, ensure that the interface plate is seated properly.

**NOTE** The IFC controller uses a touchscreen interface. Once you power on the instrument, all interactions with the application occur by touching the screen.
Appendix D: Loading Control Line Fluid

Unpack the Syringes

Remove syringes from packaging.

The syringes are prefilled with control line fluid according to a specific IFC type.

- 48.48 syringes (with 300 μL control line fluid) are used for both 48.48 Dynamic Array™ IFCs and Digital Array™ IFCs.
- 96.96 syringes (with 150 μL control line fluid) are used for 96.96 Dynamic Array IFCs only.

IMPORTANT Do not evacuate air from syringes prior to injecting control line fluid.

Actuate the Check Valves

1. Place IFC on a flat surface.
2. Use syringe with shipping cap in place to actuate both check valves of the IFC with gentle pressure. Be sure syringes can move freely up and down.
Insert the Syringe Tip into the Check Valve

**IMPORTANT** Control line fluid on the IFC or in the inlets makes the IFC unusable.

1. Hold syringe firmly in one hand with tip facing up and away from IFC. Remove the shipping cap with the other hand.

2. Hold IFC at a 45-degree angle. Gently insert syringe tip into check valve opening. The tip should be fully inserted.

**IMPORTANT** Be careful not to bend syringe tip.

3. Visually confirm that check valve is open. O-ring seal at bottom of valve should be pushed down and moved to the side.

Inject Control Line Fluid

1. Inject control line fluid while maintaining 45-degree angle to allow fluid to flow away from O-ring.

2. Slowly inject control line fluid by pushing down on syringe plunger. Control line fluid will flow into accumulator through open check valve.

3. After fully depressing plunger, wait ~5 sec before withdrawing syringe.

4. Check to make sure O-ring returns to its normal position after syringe is removed.

**IMPORTANT** The IFC is now ready for the IFC prime script on the controller. Pipet samples and assays within 60 min of IFC prime step.
Appendix E: Related Documentation

This document is intended to be used in conjunction with these related documents:

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomark™ HD Data Collection User Guide</td>
<td>100-2451</td>
</tr>
<tr>
<td>Biomark/EP1™ Data Collection User Guide</td>
<td>68000127</td>
</tr>
<tr>
<td>Real-Time PCR Analysis User Guide</td>
<td>68000088</td>
</tr>
<tr>
<td>SNP Genotyping Analysis User Guide</td>
<td>68000098</td>
</tr>
<tr>
<td>Digital PCR Analysis User Guide</td>
<td>68000100</td>
</tr>
<tr>
<td>Melting Curve Analysis User Guide</td>
<td>68000118</td>
</tr>
<tr>
<td>Control Line Fluid Loading Procedure Quick Reference</td>
<td>68000132</td>
</tr>
<tr>
<td>Genotyping with the 192.24 IFC Using Fast TaqMan® Assays Quick Reference</td>
<td>100-3184</td>
</tr>
<tr>
<td>Genotyping with the 192.24 IFC Using SNP Type™ Assays Quick Reference</td>
<td>100-3913</td>
</tr>
<tr>
<td>Gene Expression with the 192.24 IFC Using Standard TaqMan Assays Quick Reference</td>
<td>100-6170</td>
</tr>
<tr>
<td>Gene Expression with the 192.24 IFC Using Fast TaqMan Assays (Biomark HD only) Quick Reference</td>
<td>100-6174</td>
</tr>
<tr>
<td>Gene Expression with the 192.24 IFC Using Delta Gene™ Assays Quick Reference</td>
<td>100-7222</td>
</tr>
<tr>
<td>Gene Expression Analysis with the GE 24.192 IFC Using TaqMan Assays Quick Reference</td>
<td>101-7916</td>
</tr>
</tbody>
</table>
Appendix F: Safety

IMPORTANT For translations of the instrument safety information, see Safety Information for Genomics Instruments (PN 101-6810).

General Safety

In addition to your site-specific safety requirements, Fluidigm recommends the following general safety guidelines in all laboratory and manufacturing areas:

- Use the appropriate personal protective equipment (PPE): safety glasses, fully enclosed shoes, lab coats, and gloves, according to your laboratory safety practices.
- Know the locations of all safety equipment (fire extinguishers, spill kits, eyewashes/shower, first-aid kits, safety data sheets, etc.), emergency exit locations, and emergency/injury reporting procedures.
- Do not eat, drink, or smoke in lab areas.
- Maintain clean work areas.
- Wash hands before leaving the lab.

Instrument Safety

The instrument should be serviced by authorized personnel only.

WARNING Do not modify this instrument. Unauthorized modifications may create a safety hazard.

WARNING BIOHAZARD. If you are putting biohazardous material on the instrument, use appropriate personal protective equipment and adhere to Biosafety in Microbiological and Biomedical Laboratories (BMBL), a publication from the Centers for Disease Control and Prevention, and to your lab’s safety protocol to limit biohazard risks. If biohazardous materials are used, properly label the equipment as a biohazard. For more information, see the BMBL guidelines online at cdc.gov/biosafety/publications/index.htm.

WARNING PHYSICAL INJURY HAZARD. Do not attempt to lift or move any boxed or crated items unless you use proper lifting techniques. The IFC controller is shipped in one cardboard box that also contains a power cable and cleaning plates. Together they weigh 28.2 kg (62.2 lb). If you choose to lift or move the instrument after it has been installed, do not attempt to do so without the assistance of others. Use appropriate moving equipment and proper lifting techniques to minimize the chance of physical injury.
CAUTION PINCH HAZARD. The instrument door and tray can pinch your hand. Make sure your fingers, hands, and shirtsleeves are clear of the door and tray when loading or ejecting an integrated fluidic circuit (IFC).

CAUTION HOT SURFACE HAZARD. The thermal cycler chuck gets hot and can burn your skin. Use caution when working near the chuck.

CAUTION HOT SURFACE HAZARD. Never press down on the integrated fluidic circuit (IFC) when it is on the thermal cycler chuck. If you encounter a vacuum problem, turn off the system, allow it to cool down, and remove the IFC. Clean the bottom of the IFC and/or chuck surface with a lint-free cloth and 70% isopropyl alcohol.

CAUTION HOT SURFACE HAZARD. Make sure the chuck has had time to cool. It can get very hot and cause burn injury.

CAUTION HOT SURFACE HAZARD. Be careful not to touch the heated anvil on the IFC Controller RX after a purge script has been run or is aborted. The anvil is normally not hot enough to cause injury, but if the integrated fluidic circuit (IFC) is ejected during a purge script, the anvil may be as hot as 90 °C.

Symbols on the Instrument

The following table describes the hazard symbols that may be used in this document or on labels on the instrument.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Exclamation Point]</td>
<td>Hazard. Consult the user guide for further information.</td>
</tr>
<tr>
<td>![Three Exclamation Points]</td>
<td>Hot surface hazard. Do not touch; potential for personal injury.</td>
</tr>
<tr>
<td>![Biohazard]</td>
<td>Biohazard.</td>
</tr>
<tr>
<td>![Electricity Symbol]</td>
<td>Electricity hazard. Indicates high electricity levels and a threat of electric shock from machines and/or equipment in the vicinity. You may suffer severe injuries or death.</td>
</tr>
<tr>
<td>![Pinch Hazard]</td>
<td>Pinch hazard. Indicates where pinch hazards exist. Exercise caution when operating around these areas.</td>
</tr>
<tr>
<td>![Lifting Hazard]</td>
<td>Lifting hazard.</td>
</tr>
<tr>
<td>![Off Switch]</td>
<td>Power switch is in the Off position.</td>
</tr>
<tr>
<td>![On Switch]</td>
<td>Power switch is in the On position.</td>
</tr>
</tbody>
</table>
Electrical Safety

NOTE The main power disconnect is on the rear panel of the instrument.

WARNING ELECTRICAL HAZARD. DO NOT REMOVE THE COVERS. Electrical shock can result if the instrument is operated without its protective covers. No internal components are serviceable by the user.

WARNING ELECTRICAL HAZARD. Plug the instrument into a properly grounded receptacle with adequate current capacity.

Chemical Safety

The responsible individuals must take the necessary precautions to ensure that the surrounding workplace is safe and that instrument operators are not exposed to hazardous levels of toxic substances. When working with any chemicals, refer to the applicable safety data sheets (SDSs) provided by the manufacturer or supplier.

Symbol Description

- Protective conductor terminal (main ground). It must be connected to earth ground before any other electrical connections are made to the instrument.
- To minimize negative environmental impact from disposal of electronic waste, do not dispose of electronic waste in unsorted municipal waste.
- Follow local municipal waste ordinances for proper disposal provision. Contact customer service for information about responsible disposal options.