FLUIDIGM

PN 100-9581 B1

Polaris

SITE REQUIREMENTS GUIDE

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About This Guide

CAUTION ABBREVIATED SAFETY ALERTS. Hazard symbols and hazard types specified in procedures may be abbreviated in this document. For complete safety information, see the safety appendix on page 4.

For more information on instrument operation and safety, see the Polaris User Guide (PN 100-9580). For related documentation, go to fluidigm.com/documents.

Safety Alert Conventions

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

Safety Alerts for Chemicals

Fluidigm follows the United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS) for communicating chemical hazard information. GHS provides a common means of classifying chemical hazards and a standardized approach to chemical label elements and safety data sheets (SDSs). Key elements include:

- Pictograms that consist of a symbol on a white background within a red diamond-shaped frame. Refer to the individual SDS for the applicable pictograms and warnings pertaining to the chemicals being used.

- Signal words that alert the user to a potential hazard and indicate the severity level. The signal words used for chemical hazards under GHS:

  DANGER Indicates more severe hazards.

  WARNING Indicates less severe hazards.

Safety Alerts for Instruments

For hazards associated with instruments, this guide uses the following indicators:

- Pictograms that consist of a symbol on a white background within a black triangle-shaped frame.

- Signal words that alert the user to a potential hazard and indicate the severity level. The signal words used for instrument hazards:

  DANGER Indicates an imminent hazard that will result in severe injury or death if not avoided.

  WARNING Indicates a potentially hazardous situation that could result in serious injury or death.

  CAUTION Indicates a potentially hazardous situation that could result in minor or moderate personal injury.

  IMPORTANT Indicates information necessary for proper use of products or successful outcome of experiments.

Safety Data Sheets

Read and understand the SDSs before handling chemicals. To obtain SDSs for chemicals ordered from Fluidigm Corporation, 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.

Revision History

Revision	Date	Description of change
A1	20 October 2015	Site requirements for setting up the 1.0 Polaris system
B1	29 February 2016	Site requirements for setting up the 1.1 Polaris system

Site Requirements

Introduction

A Fluidigm Field Service Engineer will schedule a time to install Polaris™ at your site. The training of your staff to use the system will then be performed by a Fluidigm Field Applications Specialist at a later date. Before a Fluidigm service representative arrives to install the system, you need to choose and prepare your site according to the instructions in this document.

Notify your Fluidigm representative if special shipping arrangements are necessary at your site or if you need assistance placing Polaris.

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

Site Preparation Workflow

Perform the following six steps to choose and prepare your site:

	Site Prep Workflow
1	Review this guide.
2	Review required reagents and ancillary equipment lists.
3	Select a site for the Polaris system that meets Fluidigm requirements.
4	Stock the site with the required safety equipment.
5	Receive the Polaris system and perform a visual check of the crate and containers. If damage is apparent, contact Fluidigm technical support.
6	Place the crated and boxed components at their final destination.

Step 1: Review This Guide

Use this guide for information on all Polaris system site requirements, including safety, environmental, electrical, and space requirements.

For a complete list of reagents and consumables, see the Polaris mRNA Seq Protocol (PN 101-0082).

Step 2: Review the Equipment Lists

Required Equipment

☑	Product Name	Company	Part Number
☐	Polaris system	Fluidigm	100-9009
☐	Two freezers and one refrigerator: one freezer at −20 °C, one freezer at −80 °C, and one refrigerator at 4° C	Major laboratory supplier	—
☐	Two centrifuges: one for Eppendorf® Microcentrifuge tubes and one for 8-well strips for 96-well plates	Major laboratory supplier	—
☐	Vortexer	Major laboratory supplier	—
☐	Microcentrifuge	Major laboratory supplier	
☐	Pipettes (P2, P20, P200, P1000) and appropriate low-retention tips	Major laboratory supplier	
☐	8-channel pipettes (L20 and L50/L200) and appropriate low-retention tips	Major laboratory supplier	
☐	2100 Bioanalyzer®	Agilent®	G2940CA
☐	Thermal cycler	Major laboratory supplier	—
☐	Magnetic stand for PCR tubes	Major laboratory supplier	—
☐	384-well fluorometer (for PicoGreen® assay)	Major laboratory supplier	—
☐	Ice bucket	Major laboratory supplier	—
☐	Glass bottle	Major laboratory supplier	—
☐	Blood gas pressure regulator	Major laboratory supplier	—
☐	Input fitting to two-stage blood gas pressure regulator*	Major laboratory supplier	—
☐	Cylinder of gas with clean, dry, premixed gas (standard grade) containing either 5% CO2, 5% O2, and 90% N2; or 5% CO2, 20% O2, and 75% N2	Major laboratory supplier	—
☐	USB key with at least 2 GB storage	Any supplier	—

* Consult gas supplier.

Suggested Equipment

☑	Product Name	Company	Part Number
☐	Two Biocontainment cabinets*	Major laboratory supplier	—
☐	Imaging equipment compatible with the Polaris Single-Cell mRNA Seq IFC†	Major laboratory supplier	—
☐	Four bracing hooks with straps to anchor bottom of Polaris to bench (Example: snap clip key chain carabiner hooks)	Major laboratory supplier	—

* To prevent DNA contamination of lab and samples.

† See the Minimum Specifications for Imaging Cells in Fluidigm Integrated Fluidic Circuits, PN 100-5004.

Step 3: Meet Site Requirements

To operate Polaris, your site should meet the following requirements:

- Harmonized standards
- Environmental conditions
- Laboratory bench requirements
- Electrical requirements
- Premixed gas requirement

CAUTION The installation location cannot be designated BioSafety Level 3 (BSL-3) or BioSafety Level 4 (BSL-4). Fluidigm does not install, service, or repair the Polaris system in areas designated BSL-3 or BSL-4.

Harmonized Standards

The Polaris system conforms with the provisions of the following harmonized standards:

- IEC 61010-1:2001 (second edition)
- IEC 61010-2-010:2003
- IEC 61010-2-081:2001 +A1:2003
- IEC 61326-1:2012

Environmental Conditions

Polaris is for indoor use only and should be used in an environment that meets these conditions:

Conditions	Requirements
Altitude	Polaris is for use in altitudes not exceeding 2,500 m (8,202 ft) above sea level. If your facility is located above this elevation, call technical support.
Humidity	30–80%, non-condensing
Pollution	Pollution Degree 2 rating, whereby only nonconductive pollution occurs for electrical and laboratory equipment. Polaris conforms to standard laboratory environments. Do not install the system where conductive pollutants are present.
Temperature	Ambient between 15–28 °C (59–82 °F)
Ventilation	Ensure your lab space is ventilated using non-recirculating air exchanges. Maintain at least 10.2 cm (4 inches) of clearance at the exhaust grill exit. Polaris produces only hot air exhaust (no fumes or vapors). It has an exhaust grill exit at the back of the instrument, and the air intake is on the bottom of the instrument. **IMPORTANT** • Do not place paper or any object underneath the instrument. • Do not locate the system next to heat sources or cooling ducts, or in direct sunlight or extreme ambient lighting. Temperature extremes can cause system instability.

Laboratory Bench Requirements

Provide a work surface that can accommodate Polaris. There must be provisions to address seismic concerns, such as straps or other devices to secure the system to a bench or wall and a glass bottle restraint.

IMPORTANT

- Your laboratory bench must support at least 181 kg (400 lb).
- At least three feet of total “service area” clearance should be available on either side of Polaris so that it can be rotated 360 degrees if required. The clearance need not be retained at all times. However, any ancillary equipment occupying that space should be easily movable.
- During a run, be certain that the instrument is on a sturdy, immobilized lab bench that is away from vibration-generating lab equipment (such as shakers, vortexers, centrifuges, or instruments with heavy fans) and from doors that might generate vibrations when opening or closing.
- Do not place the system on a heated surface or directly above a source of heat.
- Position the system so the power cord can be easily disconnected.

The dimensions and weight of the instrument are as follows:

Length	Width	Height	Weight
866 mm (34.1 in)	522 mm (20.6 in)	706 mm (27.8 in)	110 kg (242 lb)

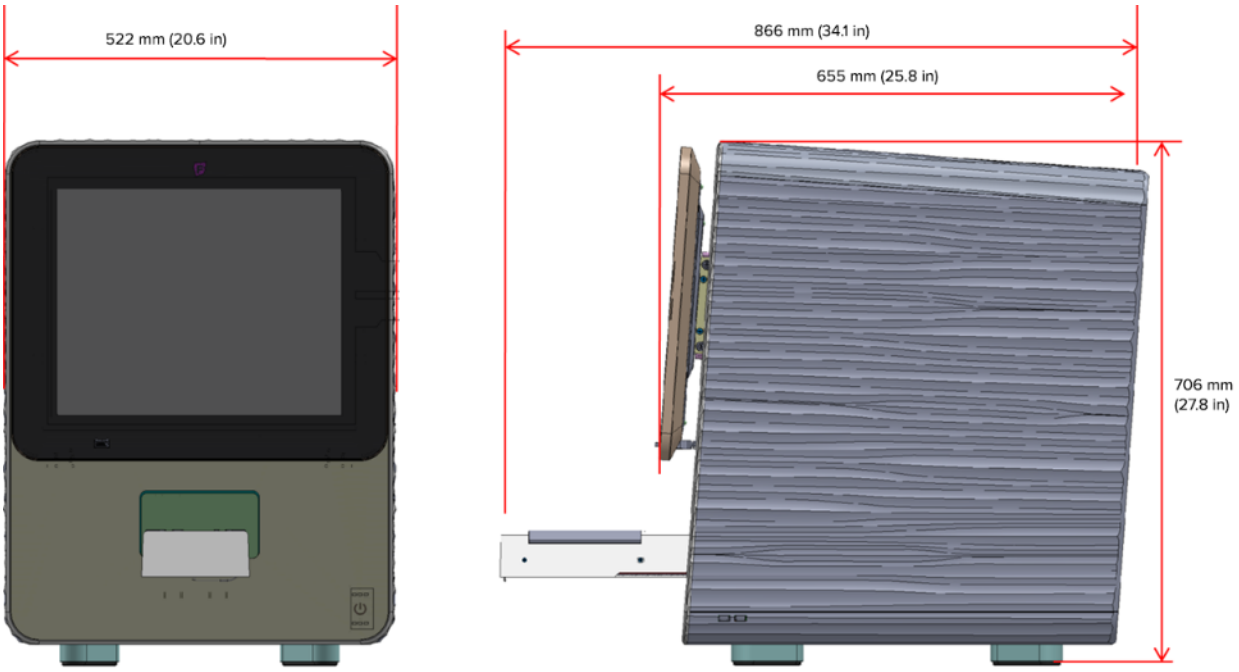


Figure 1. Polaris dimensions

Polaris is a desktop instrument. To allow for adequate air circulation and maintenance, the recommended instrument clearance is as follows:

- Height: At least 460 mm (18 in) above instrument, or a total height and clearance of 1,166 mm (45.9 in).
- Length: At least 250 mm (10 in) in front of the instrument and 100 mm (4 in) behind it, or a total length and clearance of 1,216 mm (47.9 in).
- Width: At least 178 mm (7 in) per each side of the instrument, or a total width and clearance of 878 mm (34.6 in).

Electrical Requirements

Electrical Installation

Category II

Polaris Electrical Requirements

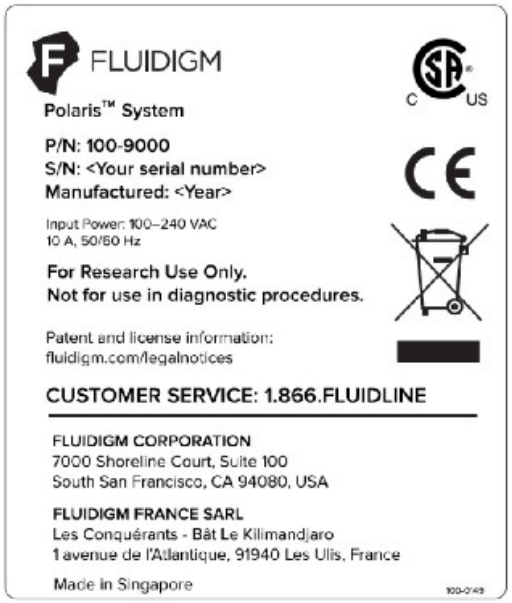
Polaris requires one electrical power outlet. The system operates through 100–240 VAC power at 50/60 Hz (10 A).

Power consumption is variable due to ambient conditions, such as temperature and humidity extreme, operating frequency, and mode of operation

Customer Location	Voltage (VAC)	Frequency (Hz)	Maximum Current (A)	Typical Average Power Consumption (W)
Japan	100 ±10%	50/60 ±1%	10	Operating: 300 (Maximum: 650)
U.S., Canada	115 ±10%	50/60 ±1%	10	Operating: 300 (Maximum: 650)
Europe, Australia	230 ±10%	50/60 ±1%	10	Operating: 300 (Maximum: 650)

Instrument Labeling

The back of the Polaris instrument displays the following information:



IMPORTANT Supply voltage fluctuation must not exceed 10% of the normal value. If the voltage fluctuation exceeds normal value, see Strong Recommendation for Uninterruptible Power Supply on page 12.

Power Cord Requirements

Fluidigm provides a country-specific power cord.

Customer Location	Minimum Wire Gauge (AWG)	Maximum Length (m)	Instrument End Plug	Receptacle End Plug
Japan, US, Canada	14	2	IEC C13	Country-specific
Europe, Australia	16	2	IEC C13	Country-specific

Receptacle Requirements

When connecting this instrument to a receptacle, check with your facilities manager to make sure the circuit will not be overloaded. If you are connecting multiple instruments to the same electrical receptacle or circuit, be sure the sum of all the instruments' maximum current draw is within the circuit's current limit. Receptacles must be grounded. Polaris requires only one grounded electrical connection.

IMPORTANT Do not use extension cords.

Strong Recommendation for Uninterruptible Power Supply

Fluidigm strongly recommends that you protect your Polaris system with an uninterruptible power supply (UPS), such as a Franek high-quality Laboratory Protection System (LPS/UPS) with battery power (PN FT1-POLARIS-FLG, Franek Technologies, franek.com). Fluctuating voltage can compromise your system's performance and the outcome of your experiment. We encourage a UPS for all installed instruments, but it is particularly critical for geographic regions that have electrical voltage fluctuations exceeding ± 10% of normal range. The minimum requirements for the UPS to maintain power for one system are:

Conditions	Requirements
Output power capacity	300 W (400 VA)
Backup time (run time)	2 hours
Power draw (load)	175 W

Disconnecting Power

In case of emergency, you must be able to immediately disconnect the main power supply to the instrument.

Strong Recommendation for In-House Air Supply

It is strongly recommended that you use a clean, dry air (CDA) system whenever possible to help prevent corrosion within the pneumatic system. Connect your CDA system with 1/4 in tubing to the compressed air inlet on the back of the Polaris instrument and regulate the incoming air to 70–90 psi or 4.8 to 6.2 bar of CDA.

Premixed Gas Requirements

Polaris allows you to use either of the following clean, dry, premixed gas (standard grade):

- Blood gas: 5% CO2, 5% O2, and 90% N2
- Mixed gas: 5% CO2, 20% O2, and 75% N2

The gas pressure regulator must be capable of accurately regulating between 22 and 25 psi.

Attach the appropriate connector to the regulator for premixed gas. Connect the gas tubing from the connector to the premixed gas inlet of the instrument.

One 50 lb tank of premixed gas can maintain instrument operation for ~1 month under normal operating conditions.

For detailed instructions on enabling use of premixed gas with the instrument control software, see the Polaris User Guide (PN 100-9580).

Step 4: Stock the Site

IMPORTANT Safety personnel at your company must ensure that:

- Safety policies to protect laboratory personnel from potential harm are established and are followed by personnel.
- All necessary safety devices and equipment are in the laboratory or in close proximity.

Required Safety Equipment

Fluidigm expects your laboratory to have safety policies in place to protect laboratory personnel from potential harm. We expect that appropriate safety practices are followed at all times.

Safety equipment that must be at the installation location includes:

- Adequate ventilation, including vent line/fume hood if available
- Safety shower

- Eyewash station
- Biohazard waste container
- Applicable SDSs
- Protection from potentially infectious biological material, hazardous chemicals, and radiation that may be present in the area where the Fluidigm Service Representative will be working
- Spill cleanup equipment
- First-aid equipment
- Eye and hand protection
- Fire extinguisher
  - You are responsible for providing an appropriate fire extinguisher for use on or near Polaris.
  - The fire extinguishers must be appropriate for use on chemical and electrical fires and be approved by your local fire marshal or other authority having jurisdiction in your area.

Step 5: Receive the System

Because Polaris weighs approximately 110 kg/242 lb (136 kg/300 lb crated), consider where it is going to be delivered and how to get it to and into your laboratory.

IMPORTANT Do not tip Polaris on end. Tipping damages the instrument hardware and electronics.

Crated values are as follows:

Length	Width	Height	Weight
948 mm (37.3 in)	727 mm (28.6 in)	1,068 mm (42.0 in)	136 kg (300 lb)

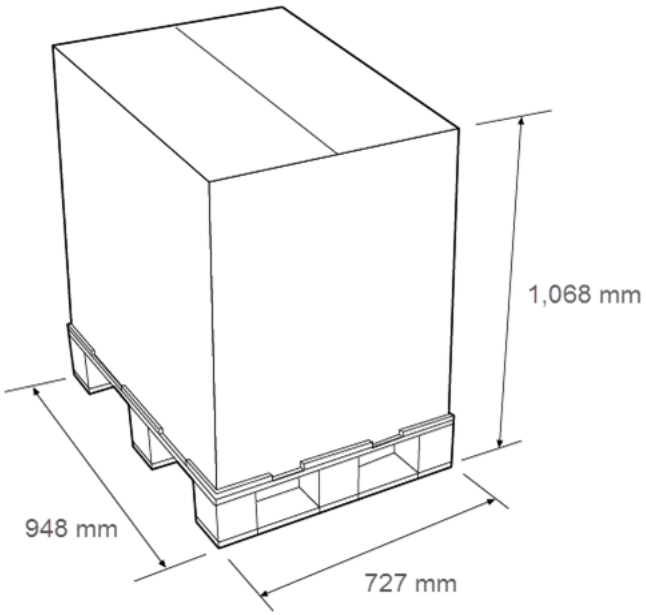


Figure 2. Crate dimensions

Delivery and System Inspection

For new Polaris system installations, you can anticipate receiving:

- Polaris system, crated
- Instrument accessories, boxed

Use this checklist to perform a check of all delivered components:

- ☐ Check the packing list against the original order.
- ☐ Check all boxes and crates for damage.
- ☐ Note any damage and report it to the Fluidigm Service Representative.
- ☐ Locate the Reagent Kit (if ordered) and unpack it immediately.
- ☐ Store each component at the appropriate temperature according to the instructions.

Step 6: Place the System at the Site

Remove all unnecessary materials from the proposed installation site prior to the arrival of the Fluidigm field service engineer.

Have the crated Polaris system at its permanent location prior to the arrival of a field service engineer. Wait for the engineer to arrive before unpacking the crate.

System Weight

WARNING PHYSICAL INJURY HAZARD. Do not attempt to lift or move any boxed or crated items unless you use proper lifting techniques.

If you choose to lift or move Polaris 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.

Installation

Before the installation date, be certain that you have done the following:

	Actions
☐	Removed all unnecessary materials from the proposed final installation site
☐	Received the Polaris system and performed a visual check of the crate and containers
☐	Moved the crated and boxed equipment from the receiving location to the installation area
☐	Installed and secured the blood gas cylinder

Contact your Fluidigm representative if you require assistance with any of these steps.

Installation Time Estimate

Installation of Polaris is estimated to take two days. Site issues and other factors may delay or extend the installation time.

Appendix: Safety

General Safety

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

- Use personal protective equipment (PPE): safety glasses, fully enclosed shoes, lab coats, and gloves.
- Know the locations of all safety equipment (fire extinguishers, spill kits, eyewashes/showers, 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

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

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

WARNING PINCH HAZARD. The Polaris door and tray can pinch your hand. Make sure your fingers, hand, shirtsleeve, etc., are clear of the door and tray when loading or ejecting an IFC.

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) 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 at: cdc.gov/biosafety/publications/index.htm.

Electrical Safety

WARNING ELECTRICAL HAZARD. Electrical shock can result if the Polaris instrument is operated without its protective covers.

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

Chemical Safety

Read and comprehend all safety data sheets (SDSs) by chemical manufacturers before you use, store, or handle any chemicals or hazardous materials.

Wear personal protective equipment (gloves, safety glasses, fully enclosed shoes, lab coats) when handling chemicals.

Do not inhale fumes from chemicals. Use adequate ventilation, and return caps to bottles immediately after use.

Check regularly for chemical spills or leaks. Follow SDS recommendations for cleaning up spills or leaks.

For technical support visit fluidigm.com/support.