USER GUIDE

invitrogen

Attune™ NxT External Fluid Supply

Catalog Number A28006

Publication Number 100038577

Revision A.0

For Research Use Only. Not for use in diagnostic procedures.

ThermoFisher SCIENTIFIC

Information in this document is subject to change without notice.

DISCLAIMER

TO THE EXTENT ALLOWED BY LAW, LIFE TECHNOLOGIES AND/OR ITS AFFILIATE(S) WILL NOT BE LIABLE FOR SPECIAL, INCIDENTAL, INDIRECT, PUNITIVE, MULTIPLE OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING FROM THIS DOCUMENT, INCLUDING YOUR USE OF IT.

Important Licensing Information

These products may be covered by one or more Limited Use Label Licenses. By use of these products, you accept the terms and conditions of all applicable Limited Use Label Licenses.

Corporate entity

Life Technologies | Carlsbad, CA 92008 USA | Toll free in USA 1.800.955.6288

TRADEMARKS

All trademarks are the property of Thermo Fisher Scientific and its subsidiaries unless otherwise specified.

Contents

About this guide

Purpose of this guide

This user guide is for laboratory staff operating and maintaining Invitrogen™ Attune™ NxT External Fluid Supply (Cat. no. A28006), an optional accessory for the Attune™ NxT Acoustic Focusing Cytometer.

IMPORTANT! For workflows and instructions on using the Attune™ NxT Acoustic Focusing Cytometer, refer to the *Attune™ NxT Acoustic Focusing Cytometer Quick Reference Guide* (Pub. no. 100024233).

For a detailed description of the Attune™ NxT Software, refer to the *Attune™ NxT Software User Guide* (Pub. no. 100024236).

CAUTION! Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Revision history

Revision	Date	Description
A.0	December 2015	New user guide

Other Attune™ NxT user guides

The guides listed below are available for the Attune™ NxT Acoustic Focusing Cytometer and its peripherals.

Guide	Pub. no.
Attune™ NxT Acoustic Focusing Cytometer Quick Reference Guide	100024233
Attune™ NxT Acoustic Focusing Cytometer User Guide	100024235
Attune™ NxT Software User Guide	100024236
Attune™ NxT Acoustic Focusing Cytometer Maintenance and Troubleshooting Guide	100024234
Attune™ NxT Acoustic Focusing Cytometer Site Preparation Guide	100024428
Attune™ NxT External Fluid Supply User Guide	100038577
Attune™ NxT External Fluid Supply Quick Reference Guide	100037944
Attune™ NxT Auto Sampler User Guide	100032905

Additional resources are available on the Flow Cytometry Technical Resources page at **www.thermofisher.com/flowresources**. There you can find protocols, application notes, and tutorials.

User attention symbols

User attention symbols used in the *Attune™ NxT External Fluid Supply User Guide* are listed below. For safety alert words and symbols used in guide, see "Safety alert words", below.

Note: Provides information that may be of interest or help but is not critical to the use of the product.

IMPORTANT! Provides information that is necessary for proper instrument operation, accurate installation, or safe use of a chemical.

Safety alert words

Four safety alert words appear in This document at points in the document where you need to be aware of relevant hazards. Each alert word—**IMPORTANT, CAUTION, WARNING, DANGER**—implies a particular level of observation or action, as defined below:

IMPORTANT! – Provides information that is necessary for proper instrument operation, accurate installation, or safe use of a chemical.

CAUTION! – Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

WARNING! – Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

DANGER! – Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

Except for **IMPORTANT!** safety alerts, each safety alert word in this document appears with an open triangle figure that contains a hazard symbol. These hazard symbols are identical to the hazard symbols that are affixed to the instruments (see "**Symbols on instruments**").

Product information

Product description

Attune™ NxT External Fluid Supply

The Invitrogen™ Attune™ NxT External Fluid Supply (EFS) (Cat. no. A28006) is an optional accessory for the Attune™ NxT Acoustic Focusing Cytometer that provides increased focusing fluid and waste capacity, allowing the processing of multiple samples without the need for replenishing the focusing fluid supply or emptying the waste container.

The extended capacity of the system with the Attune™ NxT EFS installed is 10 L for focusing fluid supply and up to 18 L for the waste volume (including 2 L of bleach for biosafety requirements).

IMPORTANT! The Attune™ NxT External Fluid Supply (EFS) can be used only with the Attune™ NxT Acoustic Focusing Cytometer; it is not supported by the classic Attune™ Acoustic Focusing Cytometer.

The Attune™ NxT Cytometer can also accommodate other accessories, such as the Attune™ Auto Sampler, while the Attune™ NxT EFS is in use.

Product contents

The Attune™ NxT External Fluid Supply is shipped in three separate boxes with the components listed below. All components are shipped at ambient temperature.

Box 1:

- Attune™ NxT External Fluid Supply base assembly
- Waste container umbilical
- Focusing fluid cubetainer umbilical
- 12-pin power/control cable, Attune™ NxT External Fluid Supply to Attune™ NxT Cytometer

Box 2:

- 20 L waste container (also available separately; Cat. no. 100027470)

Box 3:

- 10 L focusing fluid cubetainer (also available separately; Cat. no. A24904)

Product use

For Research Use Only. Not for use in diagnostic procedures.

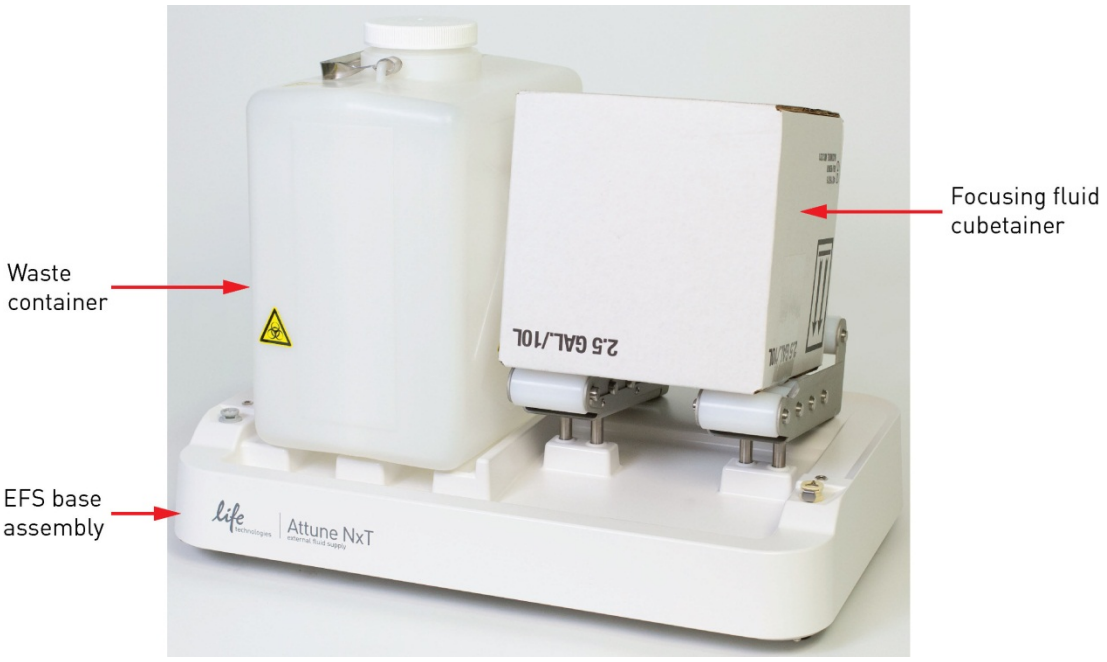
Upon receiving the instrument

Examine the instrument carefully for damage incurred during transit. Ensure that all parts of the instrument, including accessories listed above, are included with the product. Damage claims must be filed with the carrier; the warranty does not cover in-transit damage.

Register your instrument

Visit **www.thermofisher.com** to register your instrument. You will be asked to supply the serial number, your name, and your contact details. Registering your instrument ensures that you will receive notifications of software upgrades and information on new assays for use with the Attune™ NxT Acoustic Focusing Cytometer.

Attune™ NxT External Fluid Supply exterior components



Technical specifications

Note: Specifications of the Attune™ NxT External Fluid Supply are subject to change without notice. Refer to the Attune™ NxT product pages at **www.thermofisher.com/attune** for the latest product information.

Physical characteristics

	Counter footprint	Size with containers
Height:	10 in (25.4 cm)	22 in (55.9 cm)
Depth:	16.5 in (41.9 cm)	16.5 in (41.9 cm)
Width:	25 in (63.5 cm)	25 in (63.5 cm)

Dry weight: Approximately 30 lb/13.6 kg

Weight with 10 L fluid: Approximately 62 lb/28.1 kg

Electrical input: from Attune™ NxT Acoustic Focusing Cytometer

Maximum waste volume: 18 L, including 2 L bleach solution

Hardware

Focusing fluid container: 10 L cubetainer, single use

Focusing fluid connection: Cap with sensor and fluid intake, connected via 1 ft umbilical

Waste container: 20 L reusable Nalgene standard container (non-autoclavable) with modified lid containing vent and sensor, alarm on full.

Waste fluid connection: 6 ft umbilical

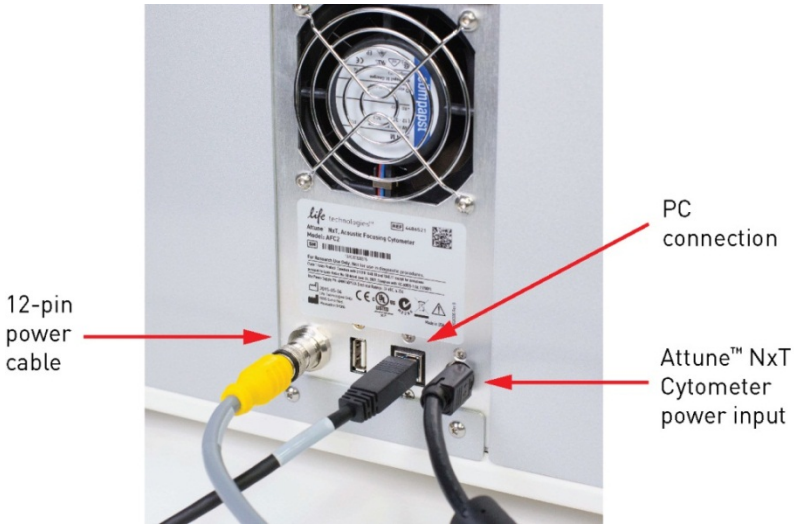
Installation

Operating environment

- Place the Attune™ NxT External Fluid Supply on a level surface capable of supporting 100 lb (42 kg).
- You may install it on the floor below, on the counter next to, or elevated relative to Attune™ NxT Acoustic Focusing Cytometer at a maximum distance of 36 inches (1 meter).
- Do not place the Attune™ NxT External Fluid Supply on top of Attune™ NxT Cytometer.
- A space of 6 inches (15 cm) is required behind the EFS to prevent the fluidics tubes from kinking and/or obstruction.
- Avoid placing the system adjacent to heaters, cooling ducts, or in direct sunlight. Fluctuations between day and night temperatures can cause system instability.
- Operating temperature range: 15°–32°C
- Operating humidity range: 10–90% non-condensing

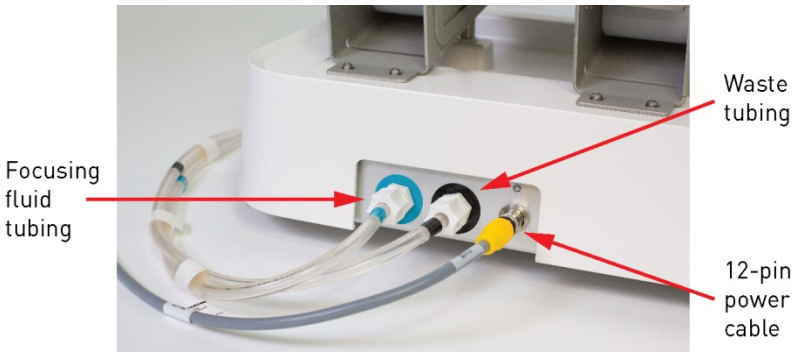
Install the Attune™ NxT External Fluid Supply

1. Open the box containing the Attune™ NxT External Fluid Supply (EFS) base assembly and remove the following items from the box:
   - Attune™ NxT External Fluid Supply base assembly
   - Waste container umbilical
   - Focusing fluid cubetainer umbilical
   - 12-pin power/control cable
2. Ensure that the Attune™ NxT Cytometer is powered off before proceeding with the Attune™ NxT EFS installation.
3. Plug the 12-pin power cable into Attune™ NxT EFS port at the back of the Attune™ NxT Cytometer.



Note: Yellow ends of the 12-pin power cable are identical; either end can be attached to the Attune™ NxT Cytometer or the Attune™ NxT EFS.

4. Attach the other end of the 12-pin power cable to the Attune™ NxT EFS.



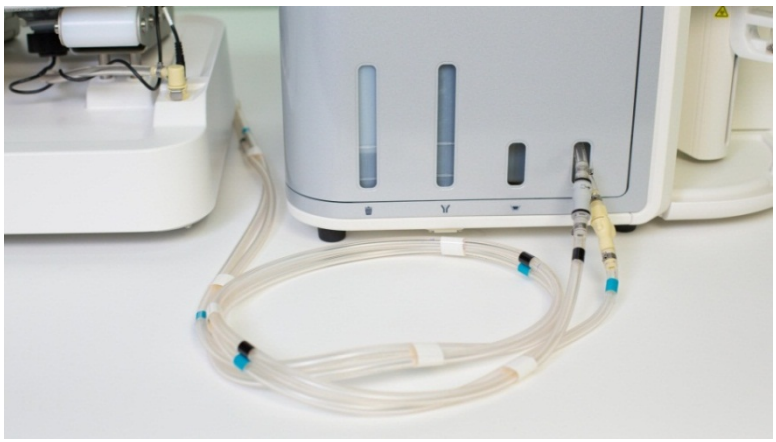
5. Pull the focusing fluid (teal) and waste (black) containers out of the Attune™ NxT Cytometer fluidics compartment and remove their lids.

6. Secure the EFS tubing to the focusing fluid and waste containers via the color-coded lids attached to the tubing with connector ends. Loop the EFS tubing behind the container fluid lines and sensor cables as shown below.

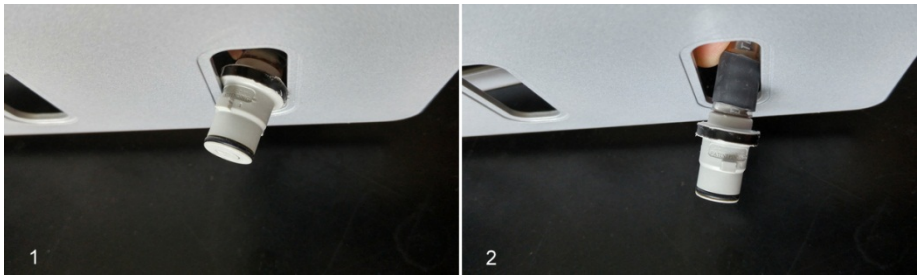
7. Push the focusing fluid and waste containers back into place and pull the EFS tubing with connector ends to the right.

IMPORTANT! Make sure that the focusing fluid and waste containers are placed in the correct orientation with the lids of the containers away from the back of the instrument. If the containers are placed in the wrong orientation, the fluidics lines can become kinked, which will obstruct the flow.

8. Feed the connector ends of the tubing through the opening in the fluidics compartment door of the cytometer and connect them to the color-coded tubing attached to the back of the Attune™ NxT EFS base assembly.



Note: To fit the connector attached to the waste tubing through the opening in the door, insert one edge through at a slight angle to get the first side through (you will have to pop it through), and then follow with the rest of the fitting.



9. Remove the cap from the 10 L focusing fluid cubetainer box and pull out the nozzle of the bladder inside.

10. Unscrew the lid of the nozzle and remove the second cap underneath it.
11. Secure the end of the focusing fluid umbilical with the level sensor to the nozzle. Make sure that the tubing and the sensor wire face the handle of the cubetainer and tighten firmly.

12. Place the cubetainer **nozzle-side down** on EFS base assembly. The rollers on the base assembly are designed to assist you in this procedure.

    After placing the cubetainer into position, check for leaks; if you observe any leaks, tighten the cap.

13. Attach the other end of the focusing fluid umbilical to the EFS base assembly and plug in the level sensor connector cable.

IMPORTANT! For all containers, always connect the fluid line first. Connecting the sensor cable while leaving the fluid line disconnected may result in increased back pressure and introduction of air into the system.

14. Place the 20 L waste container on the EFS base assembly and screw in the modified lid containing the vent and level sensor.

15. Attach the waste container umbilical to the EFS base assembly and plug in the level sensor connector cable to complete the installation.

16. Power on the Attune™ NxT Cytometer. You can verify proper electrical connection by the appearance of a lit-up green LED above the yellow 12-pin connector at the connection panel of the EFS base assembly (rear right).

Maintenance

General care

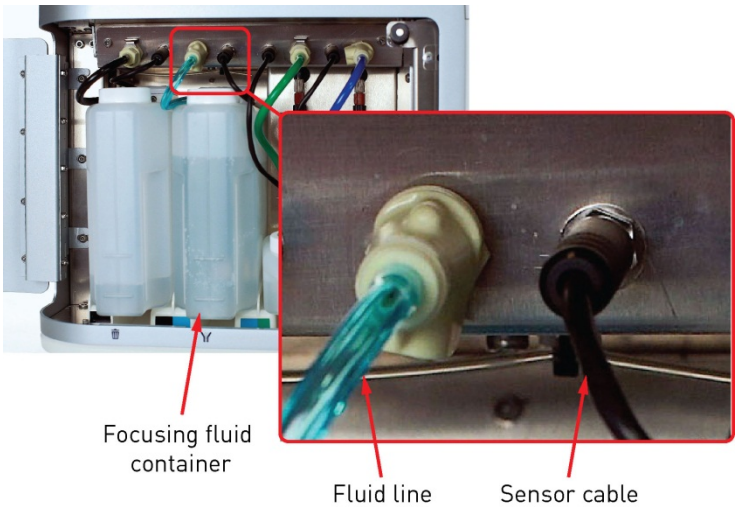
- Each time you replace the focusing fluid cubetainer, inspect the fluid lines for kinks or obstructions.
- Make sure that the electrical connections are fully engaged. The system will not function properly if any of the level sensor plugs are not fully seated.
- Wipe up any spills that might occur during installation and when replacing the fluidics containers.
- Perform the cleaning procedure once a month or if putting the device into storage.

IMPORTANT! For all containers, always connect the fluid line first. Connecting the sensor cable while leaving the fluid line disconnected may result in increased back pressure and introduction of air into the system.

IMPORTANT! Make sure that the focusing fluid and waste containers are placed in the correct orientation with the lids of the containers away from the back of the instrument. If the containers are placed in the wrong orientation, the fluidics lines can become kinked, which will obstruct the flow.

Clean the focusing fluid lines

1. Power off the Attune™ NxT Cytometer.
2. Unplug the 1.8 L Attune™ NxT focusing fluid bottle (teal) and empty.
3. Place the Attune™ NxT focusing fluid bottle back into the fluidics compartment of the cytometer and plug the fluid line and the level sensor cable.



4. Place the Attune™ NxT focusing fluid bottle insert (i.e., the modified lid with the focusing fluid supply tube from the EFS) into a 2 L bottle or beaker to capture the bleach solution to avoid pumping bleach solution into the 1.8 L Attune™ NxT focusing fluid bottle. Secure the tube so that it does not fall out when fluid transfer starts.
5. Pour 2 L of 10% bleach solution into an empty cubetainer.
6. Attach the cubetainer with the bleach solution to Attune™ NxT EFS, and ensure that both electrical and fluidics connections are securely fastened.

7. Power on the Attune™ NxT Cytometer. The system will automatically sense the empty 1.8 L Attune™ NxT focusing fluid bottle, which will trigger the EFS to start fluid transfer. The EFS lines will fill with the bleach solution, pumping the fluid through the focusing fluid bottle insert into the collection beaker.
8. When the fluid transfer stops, turn off power to the Attune™ NxT Cytometer and let the system rest for 20 minutes to allow complete decontamination.
9. At the end of the decontamination wait time, empty collection beaker.
10. To repeat the decontamination process, power on the Attune™ NxT Cytometer to allow more bleach solution to be transferred from the cubetainer to the beaker.
11. To rinse, repeat steps 1–7 with E-pure water instead of 10% bleach solution. 20 minute wait time is not required for the rinse procedure.
12. After rinse, purge the system with air as described in "Purge the focusing fluid lines with air", below.

Note: Air purge is required to prevent E-pure water from diluting the Attune™ NxT system fluids. Running the Attune™ NxT Acoustic Focusing Cytometer with E-pure water will cause invalid experimental results.

Purge the focusing fluid lines with air

1. Empty the Attune™ NxT focusing fluid bottle and re-install it in the fluidics compartment.
2. Unplug and remove the focusing fluid cubetainer. Disconnect and remove the cubetainer umbilical from cubetainer.
3. Plug the fluidic and level sensor umbilical back into the Attune™ NxT EFS.
4. Hold the umbilical assembly with the float sensor down to activate the Attune™ NxT EFS. Allow the Attune™ NxT focusing fluid bottle to fill as the lines on the EFS are pumped dry.

   Note: To prevent the contamination of the Attune™ NxT focusing fluid bottle, you may choose to place the Attune™ NxT focusing fluid bottle insert into a separate collection beaker.
5. If needed, repeat the procedure to fully empty all fluidics lines on the Attune™ NxT EFS.

Clean the waste lines

1. Empty the waste containers of both the Attune™ NxT EFS and the cytometer.
2. Fill the Attune™ NxT cytometer waste bottle to the brim with 10% bleach solution.
3. Reconnect the Attune™ NxT EFS waste container.
4. Reconnect the cytometer waste bottle.
5. Attune™ NxT EFS will automatically activate and transfer the bleach solution to the EFS waste container.
6. Refill the cytometer waste bottle with 10% bleach solution and re-connect to the instrument. The Attune™ NxT EFS will transfer the solution to the EFS waste container.
7. Allow the bleach solution remain in the waste container for 20 minutes to decontaminate the container and the fluidics lines.
8. Remove the EFS waste container and dispose of the bleach solution.
9. Fill the cytometer waste bottle with E-pure water and repeat steps 3–8 to rinse the bleach solution from the fluidics system.
10. If the system lines need to be purged of fluid and dried (recommended for long term storage), see "Purge the waste lines with air" below.

    If the system is going to be used after cleaning, empty the EFS waste container and verify that all fluidics lines are connected properly.

Note: This process only decontaminates the waste fluidics system and the Attune™ NxT waste bottle. The 20-L EFS waste bottle requires additional cleaning to ensure that the entire system has been decontaminated.

Purge the waste lines with air

1. Empty the Attune™ NxT cytometer waste bottle; only droplets of water should remain.
2. Unplug the Attune™ NxT cytometer waste fluid connection, keeping the sensor connection plugged in.
3. Connect the Attune™ EFS waste container to the EFS.
4. Hold the empty Attune™ NxT waste bottle upside-down; this will trigger the EFS waste pump to activate. Once the pump activates, the cytometer waste bottle can be placed back in the fluidics compartment of the cytometer.
5. Allow the fluid lines to empty. If there is any fluid left in the lines, invert the cytometer waste bottle to activate the pump again.
6. When the pump stops (noise from the EFS stops), the EFS waste container can be disconnected and drained. The waste container can be fully cleaned at the completion of this step.

Appendix A: Ordering information

Attune™ NxT External Fluid Supply accessory products

The following products and replacement parts for the Attune™ NxT External Fluid Supply are available separately from Thermo Fisher Scientific. Ordering information is provided below.

For more information, go to **www.thermofisher.com** or contact Technical Support (page 29).

Product	Amount	Cat. no.
Attune™ NxT External Fluid Supply	1 each	A28006
Attune™ Focusing Fluid, 1X Solution, 10 L Cubetainer	1 × 10 L	A24904
Attune™ NxT External Fluid Supply Waste Container, 20 L	1 each	100027470
Attune™ NxT External Fluid Supply Waste Bottle Interface Assembly	1 each	100028800
Attune™ NxT External Fluid Supply Cubetainer Interface Assembly	1 each	100027471
Attune™ NxT External Fluid Supply Bottle Connections Assembly	1 each	100027251
Attune™ NxT External Fluid Supply Tube/Cable Harness Assembly	1 each	100027250
Attune™ NxT External Fluid Supply Cable, Cytometer to EFS	1 each	100026482

Appendix B: Safety

This section includes the following topics:

- Safety conventions used in this document
- Symbols on instruments
- Safety labels on instruments
- General instrument safety
- Chemical safety
- Chemical waste safety
- Electrical safety
- Physical hazard safety
- Biological hazard safety
- Laser safety
- Workstation safety
- Safety and electromagnetic compatibility (EMC) standards

Safety conventions used in this document

Safety alert words

Four safety alert words appear in This document at points in the document where you need to be aware of relevant hazards. Each alert word–**IMPORTANT, CAUTION, WARNING, DANGER**–implies a particular level of observation or action:

Definitions

IMPORTANT! –Provides information that is necessary for proper instrument operation, accurate installation, or safe use of a chemical.

CAUTION! – Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

WARNING! – Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

DANGER! – Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

Except for **IMPORTANT!** safety alerts, each safety alert word in this document appears with an open triangle figure that contains a hazard symbol. These hazard symbols are identical to the hazard icons that are affixed to the instruments (see "**Safety symbols**").

Symbols on instruments

Electrical symbols on instruments

The following table describes the electrical symbols that may be displayed on the instruments.

Symbol	Description
	Indicates the **On** position of the main power switch.
	Indicates the **Off** position of the main power switch.
	Indicates a standby switch by which the instrument is switched on to the **Standby** condition. Hazardous voltage may be present if this switch is on standby.
	Indicates the **On/Off** position of a push-push main power switch.
	Indicates a terminal that may be connected to the signal ground reference of another instrument. This is not a protected ground terminal.
	Indicates a protective grounding terminal that must be connected to earth ground before any other electrical connections are made to the instrument.
	Indicates a terminal that can receive or supply alternating current or voltage.
	Indicates a terminal that can receive or supply alternating or direct current or voltage.

Safety symbols

The following table describes the safety symbols that may be displayed on the instruments. Each symbol may appear by itself or in combination with text that explains the relevant hazard (see "**Safety labels on instruments**"). These safety symbols may also appear next to DANGERS, WARNINGS, and CAUTIONS that occur in the text of this and other product-support documents.

Symbol	Description
	Indicates that you should consult the manual for further information and to proceed with appropriate caution.
	Indicates the presence of an electrical shock hazard and to proceed with appropriate caution.
	Indicates the presence of a hot surface or other high-temperature hazard and to proceed with appropriate caution.
	Indicates the presence of a laser inside the instrument and to proceed with appropriate caution.
	Indicates the presence of moving parts and to proceed with appropriate caution.
	Indicates the presence of a biological hazard and to proceed with appropriate caution.
	Indicates the presence of an ultraviolet light and to proceed with appropriate caution.

Environmental symbols on instruments

The following symbol applies to all electrical and electronic products placed on the European market after August 13, 2005.

Symbol	Description
	**Do not dispose of this product as unsorted municipal waste.** Follow local municipal waste ordinances for proper disposal provisions to reduce the environmental impact of waste electrical and electronic equipment (WEEE). **European Union customers:** Call your Customer Service representative for equipment pick-up and recycling. See **www.thermofisher.com** for a list of customer service offices in the European Union.

Safety labels on instruments

The following CAUTION, WARNING, and DANGER statements may be displayed on the instruments in combination with the safety symbols described in the preceding section.

Hazard symbol	English	Français
	**CAUTION!** Hazardous chemicals. Read the Safety Data Sheets (SDSs) before handling.	**ATTENTION!** Produits chimiques dangereux. Lire les fiches techniques de sûreté de matériels avant toute manipulation de produits.
	CAUTION! Hazardous waste. Refer to SDS(s) and local regulations for handling and disposal.	**ATTENTION!** Déchets dangereux. Lire les fiches techniques de sûreté de matériels et la régulation locale associées à la manipulation et l'élimination des déchets.
	**DANGER!** High voltage.	**DANGER!** Haute tension.
	WARNING! To reduce the chance of electrical shock, do not remove covers that require tool access. No user-serviceable parts are inside. Refer servicing to Life Technologies qualified service personnel.	**AVERTISSEMENT!** Pour éviter les risques d'électrocution, ne pas retirer les capots dont l'ouverture nécessite l'utilisation d'outils. L'instrument ne contient aucune pièce réparable par l'utilisateur. Toute intervention doit être effectuée par le personnel de service qualifié venant de chez Life Technologies.
	**DANGER!** Class 3B visible and/or invisible laser radiation present when open. Avoid exposure to beam.	**DANGER!** Rayonnement visible ou invisible d'un faisceau laser de Classe 3B en cas d'ouverture. Evitez toute exposition au faisceau.
	**CAUTION!** Moving parts. Crush/pinch hazard.	**ATTENTION!** Pièces en mouvement, risque de pincement et/ou d'écrasement.

General instrument safety

WARNING! PHYSICAL INJURY HAZARD. Use this product only as specified in this document. Using this instrument in a manner not specified by Thermo Fisher Scientific may result in personal injury or damage to the instrument.

Moving and lifting the instrument

CAUTION! PHYSICAL INJURY HAZARD The instrument is to be moved and positioned only by the personnel or vendor specified in the applicable site preparation guide. If you decide to lift or move the instrument after it has been installed, do not attempt to lift or move the instrument without the assistance of others, the use of appropriate moving equipment, and proper lifting techniques. Improper lifting can cause painful and permanent back injury. Depending on the weight, moving or lifting an instrument may require two or more persons.

Moving and lifting stand-alone computers and monitors

WARNING! Do not attempt to lift or move the computer or the monitor without the assistance of others. Depending on the weight of the computer and/or the monitor, moving them may require two or more people.

Things to consider before lifting the computer and/or the monitor:

- Make sure that you have a secure, comfortable grip on the computer or the monitor when lifting.
- Make sure that the path from where the object is to where it is being moved is clear of obstructions.
- Do not lift an object and twist your torso at the same time.
- Keep your spine in a good neutral position while lifting with your legs.
- Participants should coordinate lift and move intentions with each other before lifting and carrying.
- Instead of lifting the object from the packing box, carefully tilt the box on its side and hold it stationary while someone slides the contents out of the box.

Operating the instrument

Ensure that anyone who operates the instrument has:

- Received instructions in both general safety practices for laboratories and specific safety practices for the instrument.
- Read and understood all applicable Safety Data Sheets (SDSs) (see "**Obtaining SDSs**").

Cleaning or decontaminating the instrument

CAUTION! Using cleaning or decontamination methods other than those recommended by the manufacturer may compromise the safety or quality of the instrument.

Chemical safety

Chemical hazard warning

WARNING! CHEMICAL HAZARD. Before handling any chemicals, refer to the Safety Data Sheet (SDS) provided by the manufacturer, and observe all relevant precautions.

WARNING! CHEMICAL HAZARD. All chemicals in the instrument, including liquid in the lines, are potentially hazardous. Always determine what chemicals have been used in the instrument before changing reagents or instrument components. Wear appropriate eyewear, protective clothing, and gloves when working on the instrument.

WARNING! CHEMICAL STORAGE HAZARD. Never collect or store waste in a glass container because of the risk of breaking or shattering. Reagent and waste bottles can crack and leak. Each waste bottle should be secured in a low-density polyethylene safety container with the cover fastened and the handles locked in the upright position. Wear appropriate eyewear, clothing, and gloves when handling reagent and waste bottles.

General safety guidelines

To minimize the hazards of chemicals:

- Read and understand the Safety Data Sheets (SDSs) provided by the chemical manufacturer before you store, handle, or work with any chemicals or hazardous materials (see "**Obtaining SDSs**").
- Minimize contact with chemicals. Wear appropriate personal protective equipment when handling chemicals (for example, safety glasses, gloves, or protective clothing). For additional safety guidelines, consult the SDS.
- Minimize the inhalation of chemicals. Do not leave chemical containers open. Use only with adequate ventilation (for example, fume hood). For additional safety guidelines, consult the SDS.
- Check regularly for chemical leaks or spills. If a leak or spill occurs, follow the manufacturer's cleanup procedures as recommended in the SDS.
- Comply with all local, state/provincial, or national laws and regulations related to chemical storage, handling, and disposal.

Chemical waste safety

Chemical waste hazard

CAUTION! HAZARDOUS WASTE. Refer to Safety Data Sheets and local regulations for handling and disposal.

Chemical waste safety guidelines

To minimize the hazards of chemical waste:

- Read and understand the Safety Data Sheets (SDSs) provided by the manufacturers of the chemicals in the waste container before you store, handle, or dispose of chemical waste (see "**Obtaining SDSs**").
- Provide primary and secondary waste containers. (A primary waste container holds the immediate waste. A secondary container contains spills or leaks from the primary container. Both containers must be compatible with the waste material and meet federal, state, and local requirements for container storage.)
- Minimize contact with chemicals. Wear appropriate personal protective equipment when handling chemicals (for example, safety glasses, gloves, or protective clothing). For additional safety guidelines, consult the SDS.
- Minimize the inhalation of chemicals. Do not leave chemical containers open. Use only with adequate ventilation (for example, fume hood). For additional safety guidelines, consult the SDS.
- Handle chemical wastes in a fume hood.
- After emptying the waste container, seal it with the cap provided.
- Dispose of the contents of the waste tray and waste bottle in accordance with good laboratory practices and local, state/provincial, or national environmental and health regulations.

Waste disposal

If potentially hazardous waste is generated when you operate the instrument, you must:

- Characterize (by analysis, if necessary) the waste generated by the particular applications, reagents, and substrates used in your laboratory.
- Ensure the health and safety of all personnel in your laboratory.
- Ensure that the instrument waste is stored, transferred, transported, and disposed of according to all local, state/provincial, and/or national regulations.

IMPORTANT! Radioactive or biohazardous materials may require special handling, and disposal limitations may apply.

Electrical safety

DANGER! ELECTRICAL SHOCK HAZARD. Severe electrical shock can result from operating the Attune™ NxT Acoustic Focusing Cytometer without its instrument panels in place. Do not remove instrument panels. High-voltage contacts are exposed when instrument panels are removed from the instrument.

Fuses

WARNING! FIRE HAZARD. For continued protection against the risk of fire, replace fuses only with fuses of the type and rating specified for the instrument.

Power

DANGER! ELECTRICAL HAZARD. Grounding circuit continuity is vital for the safe operation of equipment. Never operate equipment with the grounding conductor disconnected.

DANGER! ELECTRICAL HAZARD. Use properly configured and approved line cords for the voltage supply in your facility.

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

Overvoltage rating

The Attune™ NxT Acoustic Focusing Cytometer has an installation (overvoltage) category of II, and is classified as portable equipment.

Physical hazard safety

Moving parts

WARNING! PHYSICAL INJURY HAZARD. Moving parts can crush and cut. Keep hands clear of moving parts while operating the instrument. Disconnect power before servicing the instrument.

Biological hazard safety

WARNING! BIOHAZARD. Biological samples such as tissues, body fluids, and blood of humans and other animals have the potential to transmit infectious diseases. Follow all applicable local, state/provincial, and/or national regulations. Wear appropriate protective eyewear, clothing, and gloves. Read and follow the guidelines in these publications:

In the U.S.:

- U.S. Department of Health and Human Services guidelines published in *Biosafety in Microbiological and Biomedical Laboratories*

  (stock no. 017-040-00547-4; **www.cdc.gov/OD/ohs/biosfty/bmbl4/bmbl4toc.htm**)
- Occupational Safety and Health Standards, Bloodborne Pathogens

  (29 CFR§1910.1030; **www.access.gpo.gov/nara/cfr/waisidx_01/29cfr1910a_01.html**)
- Your company's/institution's Biosafety Program protocols for working with/handling potentially infectious materials.
- Additional information about biohazard guidelines is available at:

  www.cdc.gov

In the EU:

- Check your local guidelines and legislation on biohazard and biosafety precaution, and the best practices published in the World Health Organisation (WHO) Laboratory Biosafety Manual, third edition

  www.who.int/csr/resources/publications/biosafety/WHO_CDS_CSR_LYO_2004_11/en/

Laser safety

Laser classification

The Attune™ NxT Acoustic Focusing Cytometer has seven different laser configurations, using one or more of the following excitation lasers: blue 488 nm, 50 mW laser; violet 405 nm, 50 mW laser; red 637 nm, 100mW laser; and yellow 561 nm, 50 mW laser. Under normal operating conditions, the Attune™ NxT Acoustic Focusing Cytometer is categorized as a Class 1 Laser Product. When safety interlocks are disabled during certain servicing procedures and/or input/output optics covers are removed, the laser can cause permanent eye damage, and, therefore, is classified under those conditions as a Class 3B laser.

Laser safety requirements

To ensure safe laser operation:

- The system must be installed and maintained by a Thermo Fisher Scientific Technical Representative.
- All instrument panels must be in place on the instrument while the instrument is operating. When all panels are installed, there is no detectable radiation present. If any panel is removed when the laser is operating, you may be exposed to laser emissions in excess of the Class 3B rating.
- Do not remove safety labels.

Additional laser safety information

Refer to the user documentation provided with the laser for additional information on government and industry safety regulations.

WARNING! LASER HAZARD. Lasers can burn the retina, causing permanent blind spots. Never look directly into the laser beam. Remove jewelry and other items that can reflect the beam into your eyes. Do not remove the instrument top or front panels. Wear proper eye protection and post a laser warning sign at the entrance to the laboratory if the top or front panels are removed for service.

WARNING! LASER HAZARD. An overheated laser can cause severe burns if it comes in contact with the skin. DO NOT operate the laser when it cannot be cooled by its cooling fan. Always wear appropriate laser safety goggles.

Safety and electromagnetic compatibility (EMC) standards

This section provides information on:

- U.S. and Canadian safety standards
- European safety and EMC standards
- Australian EMC standards

U.S. and Canadian safety standards

The Attune™ NxT Acoustic Focusing Cytometer has been tested to and complies with standard:

UL 61010-1/CSA C22.2 No. 61010-1, "Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements."

FDA "Radiation Control for Health and Safety Act of 1968 Performance Standard 21 CFR 1040.10 and 1040.11," as applicable.

Canadian EMC standard

This instrument has been tested to and complies with ICES-001, Issue 3: "Industrial, Scientific, and Medical Radio Frequency Generators."

European safety and EMC standards

Safety

This instrument meets European requirements for safety (Low Voltage Directive 2006/95/EC). This instrument has been tested to and complies with standards:

IEC 61010-1:2001, "Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use, Part 1: General Requirements."

IEC 60825-1: Ed. 2 (2007), "Radiation Safety of Laser Products - Equipment Classification and Requirements."

IEC 61010-2-081:2003, "Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-081: Particular requirements for automatic and semi-automatic laboratory equipment for analysis and other purposes"

EMC

This instrument meets European requirements for emission and immunity (EMC Directive 2004/108/EC). This instrument has been tested to and complies with standard IEC 61326 (Group 1, Class A), "Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements."

Australian EMC standards

This instrument has been tested to and complies with standard AS/NZS 2064, "Limits and Methods Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific, and Medical (ISM) Radio-frequency Equipment."

Documentation and support

Obtaining support

Technical support

Visit **www.thermofisher.com/support** for the latest in services and support, including:

- Worldwide contact telephone numbers
- Product support, including:
  - Product FAQs
  - Software, patches, and updates
- Order and web support
- Product documentation, including:
  - User guides, manuals, and protocols
  - Certificates of Analysis
  - Safety Data Sheets (SDSs; also known as MSDSs)

Note: When contacting customer support for instrument troubleshooting, provide the instrument model and the instrument serial number. Convey to the technical support any error messages that were displayed on your instrument and any troubleshooting that you have already performed (refer to *Attune™ NxT Acoustic Focusing Cytometer Maintenance and Troubleshooting Guide*; Pub. no. 100024234).

Obtaining SDSs

Safety Data Sheets (SDSs) are available at **www.thermofisher.com/sds**.

IMPORTANT! For the SDSs of chemicals not distributed by Thermo Fisher Scientific, contact the chemical manufacturer.

Limited product warranty

Life Technologies Corporation and/or its affiliate(s) warrant their products as set forth in the Life Technologies' General Terms and Conditions of Sale found on Life Technologies' website at **www.lifetechnologies.com/termsandconditions**.

If you have any questions, please contact Life Technologies at **www.lifetechnologies.com/support**.

IMPORTANT! Wiping the computer supplied with the Attune™ NxT Acoustic Focusing Cytometer (i.e., erasing the hard drive to remove all programs, files, and the operating system) voids the product warranty.

Life Technologies I Carlsbad, CA 92008 USA I Toll free in USA 1.800.955.6288

For support visit thermofisher.com/support

thermofisher.com

17 November 2015

ThermoFisher SCIENTIFIC