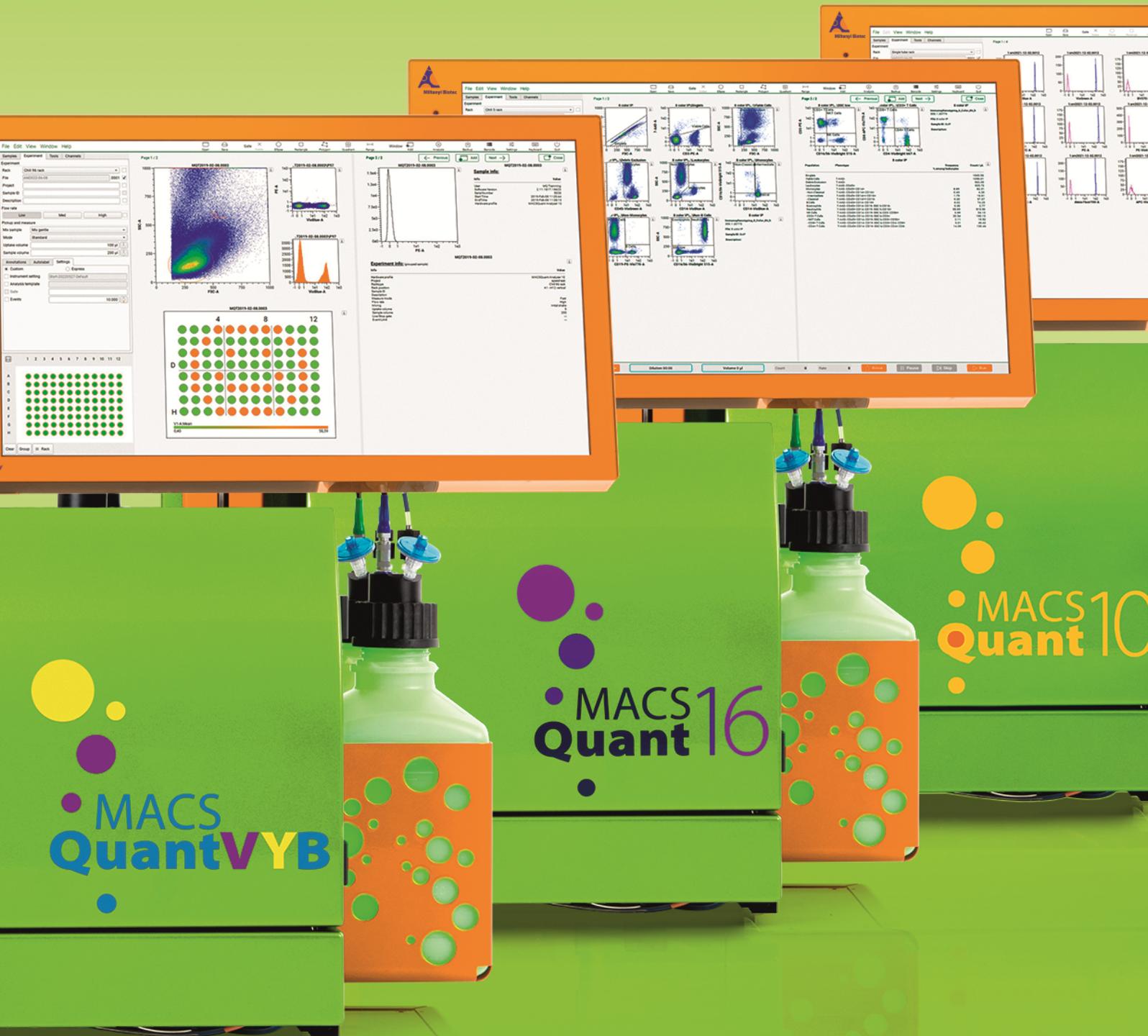




Miltenyi Biotec

MACSQuant[®] Instrument

User manual



MACS
QuantVYB

MACS
Quant16

MACS10
Quant

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MACSQuant[®] Instrument

User manual

Original instructions

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Read the user manual first

WARNING

Before using the MACSQuant Instrument (MACSQuant Analyzer 10, VYB, or Analyzer 16), read the chapter **Important safety information** and all other information contained in this user manual, including any safety and operating instructions. Pay special attention to all warnings displayed on the instrument. Failure to read and follow these guidelines could lead to improper or incorrect usage and result in damage to the instrument. Improper usage could also cause severe personal injury, death, unpredictable results, instrument malfunction, and premature wear to components shortening the lifetime of the instrument. Such actions may void your warranty. Keep the user manual and any other safety and operating instructions provided with the instrument in a safe place accessible to all users for future reference.

If you have a serious concern regarding the safe use of your instrument, contact your authorized Miltenyi Biotec service provider or call Miltenyi Biotec Technical Support.

General safety instructions



THIS CHAPTER DESCRIBES POTENTIALLY HAZARDOUS SITUATIONS ASSOCIATED WITH THIS INSTRUMENT AND PROVIDES IMPORTANT SAFETY INFORMATION TO MINIMIZE THE RISKS AND PROTECT YOURSELF AND OTHERS.

This chapter provides important information for your personal safety and the correct use of the instrument. Read and observe all instructions carefully before proceeding with the installation and use of the instrument. Observe general safety practices in addition to this user manual.

- Use this instrument only as indicated in this user manual to avoid personal injury and property damage.
- Observe local working area safety instructions and laboratory policies, as well as standards for health, safety, and prevention of accidents.
- Keep this user manual in a place that is always accessible to all users.
- In case of severe accidents, damages to the instrument, or if smoke or flames appear, cut the power supply immediately.
- To entirely disconnect the instrument from the power supply, unplug the power cable.
- Ensure that the power switch and the plug of the power cable of the instrument are easily accessible.

Hazard levels

Signal words are used to warn against hazardous situations and property damages. The following signal words are used in this user manual.

⚠ WARNING or **WARNING!** indicates a hazardous situation that, if not avoided, could result in death or serious injury.

⚠ CAUTION or **CAUTION!** indicates a hazardous situation that, if not avoided, could result in minor or moderate injury. It is also used to warn against unsafe practices.

NOTICE or **NOTICE** indicates information considered important but not hazard related (e.g. messages relating to property damage).

Symbols



SAFETY WARNING: THE DOCUMENTATION MUST BE CONSULTED IN ALL CASES WHERE THIS SAFETY SYMBOL IS USED ON THE INSTRUMENT



BIOLOGICAL HAZARD



MOVING PARTS



STRONG MAGNETIC FIELD



PERSONS WEARING A PACEMAKER OR OTHER ELECTRONIC IMPLANTS MUST MAINTAIN DISTANCE



ON (POWER ON)



OFF (POWER OFF)



READ THE USER MANUAL BEFORE USING THE INSTRUMENT



FUSE



WEEE (WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT)



ORDER NUMBER



SERIAL NUMBER



TYPE NUMBER



MANUFACTURER



EUROPEAN CONFORMITY MARKING



NRTL CERTIFICATION MARK: PRODUCT MEETS CONSENSUS-BASED STANDARDS OF SAFETY, REQUIRED BY THE OCCUPATIONAL SAFETY/HEALTH ADMINISTRATION (OSHA), DETERMINED BY THE NATIONALLY RECOGNIZED TESTING LABORATORIES (NRTL) TÜV SÜD



UNITED KINGDOM CONFORMITY ASSESSED MARKING

Safety labels

Notice the hazard points and safety symbols of the instrument.

- Keep safety labels and safety markings clean and legible.
- Inspect the safety labels and safety markings regularly and replace them if they are not legible or identifiable from a safe viewing distance.
- Contact Miltenyi Biotec for replacement labels.

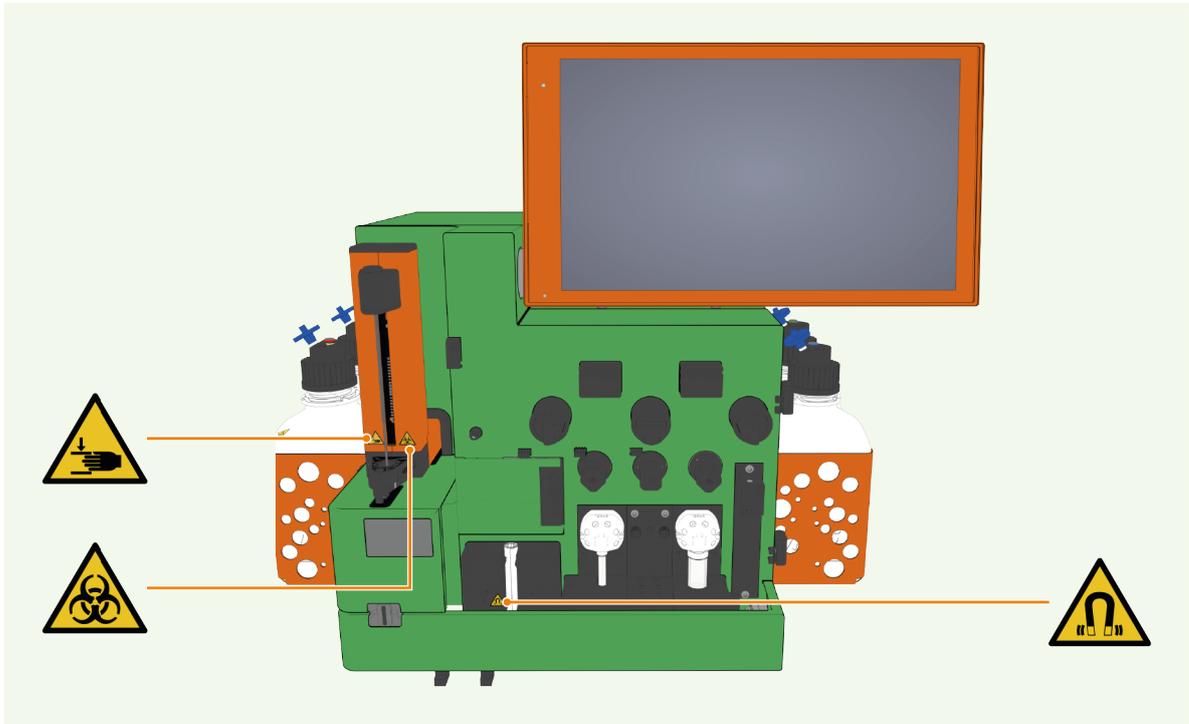


Figure 1: Hazard areas and safety symbols on the front side of the instrument

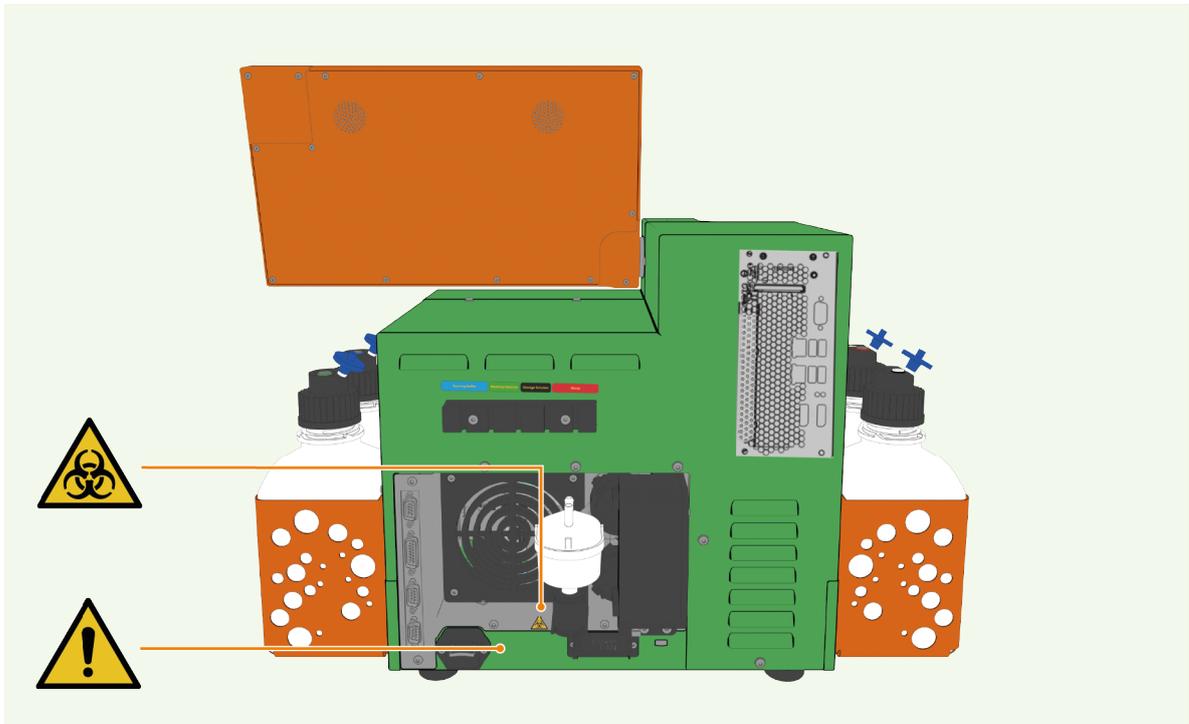


Figure 2: Hazard areas and safety symbols on the rear side of the instrument

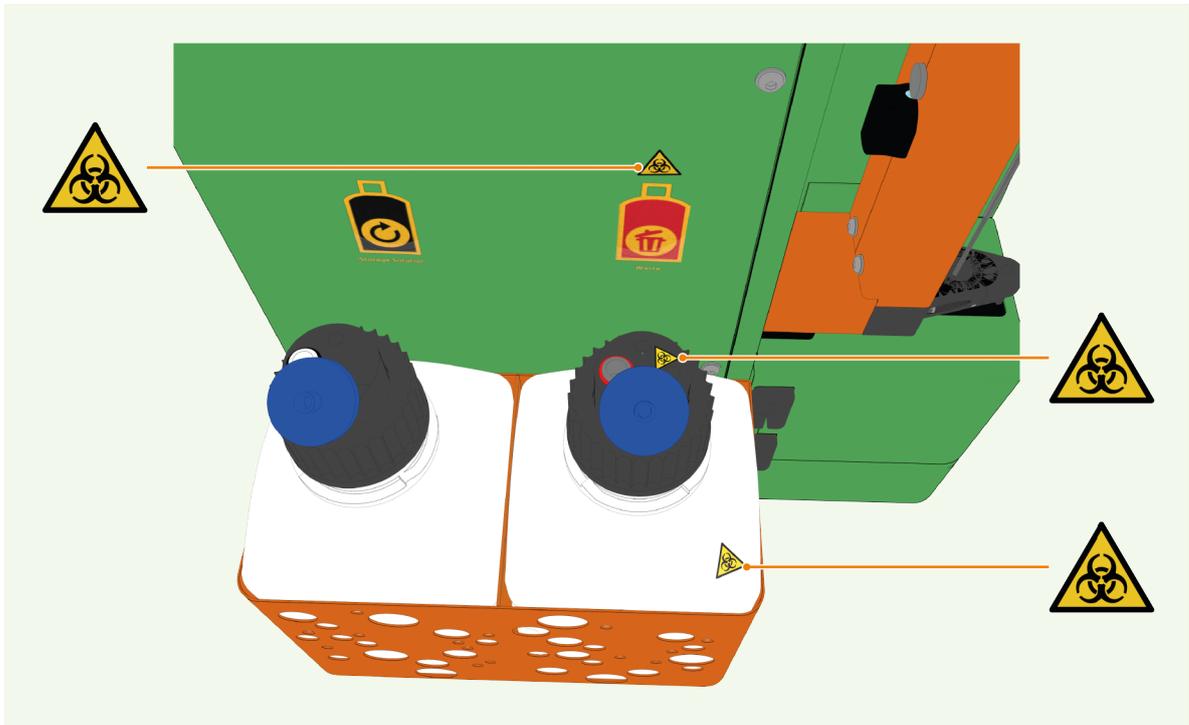


Figure 3: Hazard areas and safety symbols on the left side of the instrument

Electrical hazards

⚠ WARNING

Electric shock, short circuit, overheating, fire, and explosion could result in death or serious injury.

Protective housing

The housing of the instrument reduces the risk of an electric shock and short circuits. A short circuit can be caused by disassembled parts or objects that have been dropped into the instrument. Emitted sparks, caused by a short circuit, might ignite combustible vapors or material. The protective housing prevents the spread of fire. Do not use the instrument in areas classified as hazardous, for example oxygen-laden environments.

- Do not remove or penetrate any cover of the housing except for the front access covers.
- Only Miltenyi Biotec service personnel are allowed to remove any other cover of the instrument.
- Do not use the instrument if it is opened or disassembled.
- Do not use the instrument if it has been dropped or is damaged.
- Do not use the instrument if an object entered the inside of the instrument.

Overheating and fire hazards

Protect the instrument from overheating.

- Leave enough space around the instrument (at least 15 cm on all sides).
- Do not place the instrument next to heat sources, for example heaters.
- Do not cover the ventilation slots and openings of the instrument.
- Ensure adequate air circulation during operation.

Liquids inside the instrument

Liquids inside the instrument can cause short circuits.

- Protect the instrument against spilled liquids.
- Clean up spilled liquids immediately.

- Do not use the instrument if liquids have entered the inside of the instrument.
- Unplug the instrument before cleaning it.
- Use only small amounts of cleaning agents on a soft cloth to wipe the instrument. Do not spray or pour liquid cleaning agents onto or into the instrument.

Humid and dusty environments

Humid and dusty environments can cause short circuits.

- Do not use the instrument in a wet location or areas with high humidity or condensation.
- After moving the instrument from a cold environment to room temperature, wait for the instrument to dehumidify before using it.

Cables and power supplies

Using the instrument with other than the supplied cables is potentially hazardous. The instrument has a three-wire electrical grounding plug with a third pin for grounding. This is a safety feature.

- Only insert the plug into a grounded electrical outlet. Do not try to insert the plug into a non-grounded electrical outlet.
- Do not use the instrument if the power cable is damaged.
- Only use the included power cable.
- Do not use extension cables or power strips.
- Do not overload an electrical outlet.

Biological hazards

WARNING

Contamination or infection could result in death or serious injury depending on the material used.

Biological material

All biological material must be considered potentially infectious.

- Do not open the front access covers while the instrument is in operation. Exceptions are maintenance procedures that are explicitly described in this manual.
- Keep away from the robotic needle arm while the instrument is in operation.
- Wear personal protective equipment (such as gloves, safety glasses, etc.) as indicated in the safety data sheet for the particular substance.
- Droplets might leak from the system. Operate the instrument in a biological safety cabinet suitable for the used specimen if hazardous or potentially infectious materials are processed.
- Decontaminate the instrument after processing hazardous or potentially infectious material.
- If hazardous or potentially infectious material has been spilled or leaked from the system, decontaminate the affected area.
- Do not continue to use contaminated accessories or parts of the instrument.
- Run the **Clean** program first before maintenance work on any part of the fluidics system.
- Do not load or unload samples or racks while the instrument is in motion.
- Leave enough space around the MACS MiniSampler Plus (at least 15 cm on the left and right side).

Waste

All liquid and solid waste must be considered hazardous.

- Prefill the empty waste bottle with an appropriate disinfectant according to the specification of the manufacturer.
- Immediately replace the waste bottle after unmounting and fasten the bottle closure to the new bottle.
- Always have an empty waste bottle available.
- To avoid spillages, install only one bottle at a time.
- Autoclave or alternatively decontaminate waste with an appropriate disinfectant.
- Follow the general laboratory safety regulations when handling liquid and solid waste.
- Observe local regulations regarding waste disposal.

Equipment damage

Defective or inadequate equipment can cause a biological hazard.

- Always inspect the fluidics system and check for leakages before using the instrument.
- Exchange hydrophobic air filters once a year to avoid clogging through dust deposits.
- Exchange hydrophobic air filters if they came into direct contact with any liquid to avoid clogging of the filters and to prevent contamination of liquids.

Chemical hazards

WARNING

Substances and reagents can be hazardous.

- All safety measures in section **Biological hazards** also apply to any hazardous substances and reagents that may be present in the sample.
- Operate the instrument in a fume hood if hazardous substances and reagents are processed.
- Use any substances and reagents only as stated in the respective safety data sheet.

Magnetic field hazards

WARNING

The instrument has a powerful magnet.

Strong magnetic fields can influence the functioning of pacemakers or electronic medical implants.



If wearing pacemakers or electronic medical implants, keep a distance of at least 30 cm from the instrument.

CAUTION

The instrument has a powerful magnet.

Magnetizable objects can suddenly move towards the magnet.

- Keep all magnetic storage devices, electronic equipment, and magnetizable objects at a distance of at least 30 cm from the instrument.

Mechanical hazards

CAUTION

Moving parts.

Risk of crushing or cutting.

Robotic needle arm

The robotic needle arm moves while the instrument is in operation.

- Do not operate the instrument without the needle guard.
- Keep away from the robotic needle arm while the instrument is in operation.
- Do not obstruct the movement of the robotic needle arm.

MACS MiniSampler Plus

The carriage of the MACS MiniSampler Plus moves.

- Keep away from the MACS MiniSampler Plus while the instrument is in operation.
- Always stop or abort a process before handling accessory hardware or consumables.
- Do not load or unload samples or racks while the instrument is in motion.

Fluidics system

Syringe pumps are part of the fluidics system. They move while the instrument is in operation.

- Keep away from the fluidics system while the instrument is in operation.
- Do not open the front access covers while the instrument is in operation.

Optical radiation hazards

CAUTION

Exposure to optical radiation could result in eye injury.

Bottle illumination

Powerful LEDs are used to illuminate the bottles. Radiation of disassembled units may lead to eye injury.

According to the international standard IEC 62471, this lamp system is in excess of the Exempt Risk Group and there are risks dependent on the use of the instrument. The exposure hazard value (EHV) measured at a distance of 20 cm from the bottle holders is 0.91, the hazard distance is 19 cm for Risk Group 1.

- Do not look directly at LED radiation.
- Do not disassemble, modify, or remove the installed LED radiation sources or their mounting brackets. LED radiation sources do not automatically stop emitting when disassembled.
- Do not remove the bottle holders unless integrating the instrument into a liquid handling system.

Laser radiation hazards

CAUTION

Direct exposure to laser beam could result in eye or even skin injury.

Rack detection

The instrument has four vertical cavity surface emitting lasers (VCSEL) for automated rack detection (Class 1M). The radiation is not visible.

- Do not look at the VCSEL port through optical instruments such as lenses, magnifying glasses, etc.

- Keep a distance of 100 mm.
- Avoid that the path of the light beam is at the same height as the human eye during operation.

Laser

The instrument has three Continuous-Wave Lasers. The lasers are classified as laser class 3B. The lasers are secured by a protective housing.

- Do not remove the protective housing.

	Output power	Pulse time	Wavelength
MACSQuant Analyzer 10			
Rack detection	3.3 mW	215 μ s	850 nm
Internal laser 1	40 mW	Continuous	405 nm
Internal laser 2	30 mW	Continuous	488 nm
Internal laser 3	20 mW	Continuous	640 nm
MACSQuant Analyzer 16			
Rack detection	3.3 mW	215 μ s	850 nm
Internal laser 1	63 mW	Continuous	405 nm
Internal laser 2	50 mW	Continuous	488 nm
Internal laser 3	70 mW	Continuous	640 nm
MACSQuant VYB			
Rack detection	3.3 mW	215 μ s	850 nm
Internal laser 1	40 mW	Continuous	405 nm
Internal laser 2	50 mW	Continuous	488 nm
Internal laser 3	100 mW	Continuous	561 nm

Table 2.1: Laser output power, pulse time, and wavelength

Ergonomic hazards

WARNING

Heavy instrument.

Risk of tearing or straining muscles.

- Two people are required to lift the instrument.
- Grip the instrument at the base of the orange bottle baskets located at both sides of the instrument.

Servicing and transportation

Servicing

Improper servicing or repair of the instrument or use of unauthorized parts can cause malfunction of or damage to the instrument. This can cause hazards to users.

- Unless otherwise specifically stated in this user manual or other documentation by Miltenyi Biotec, do not service the instrument yourself.
- Servicing and repair must be performed by Miltenyi Biotec certified and qualified service personnel.

- If the instrument needs servicing, decontaminate the instrument to remove any hazardous material.
- If you have questions regarding proper decontamination or shipment, contact Miltenyi Biotec Technical Support for assistance.
- Only use accessories and upgrades recommended by Miltenyi Biotec.
- Inquire with your local Miltenyi Biotec representative about Miltenyi Biotec's extensive instrument service and service contracts, or refer to www.miltenyibiotec.com/support.

Transportation

The instrument must be transported with care in packaging specified by Miltenyi Biotec. Internal damage could occur if the instrument is subjected to excessive vibration or if it is dropped. If the instrument needs to be shipped back to the manufacturer for service, contact Miltenyi Biotec for instructions and packaging materials.

Disposal



WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE) CUSTOMER INFORMATION

Dispose of your end-of-life Miltenyi Biotec products in accordance with the applicable WEEE and hazardous waste disposal legislation, which may differ by country or region. Electrical equipment may contain hazardous substances that may have a serious detrimental effect on the environment and/or human health. All equipment must be specifically collected and treated by designated waste facilities and by qualified WEEE compliance schemes. By ensuring that you dispose of your unwanted electrical and electronic equipment according to the applicable WEEE and hazardous waste disposal legislation, you are helping to preserve our natural resources and protect human health. Miltenyi Biotec is committed to protecting the environment. Miltenyi Biotec offers product end-of-life return programs in many countries and partners with licensed WEEE compliance schemes throughout the world. Miltenyi Biotec takes back your end-of-life Miltenyi Biotec equipment for recycling free of charge. The terms and availability of this offer vary by geography because of differences in regulatory requirements. Note that, depending on the type and use of your equipment, additional requirements may apply. Before shipping the instrument back to the manufacturer for disposal, decontaminate the instrument to remove any hazardous material. For more information or if you wish to dispose of your end-of-life Miltenyi Biotec equipment, contact your local Miltenyi Biotec representative or Miltenyi Biotec Technical Support.

Zuerst das Benutzerhandbuch lesen

WARNUNG

Lesen Sie vor der Verwendung des MACSQuant Instrument (MACSQuant Analyzer 10, VYB, or Analyzer 16) diese **Wichtigen Sicherheitsinformationen** sowie alle anderen Informationen aus dem Benutzerhandbuch. Beachten Sie insbesondere alle auf dem Gerät angezeigten Warnhinweise. Werden diese Richtlinien nicht gelesen und befolgt, kann dies zu unsachgemäßem oder falschem Gebrauch und zu Schäden am Gerät führen. Eine unsachgemäße Verwendung kann auch zu schweren Verletzungen, Tod, unvorhersehbaren Ergebnissen, Fehlfunktionen des Gerätes und vorzeitigem Verschleiß von Komponenten führen, welche die Lebensdauer des Gerätes verkürzen. Eine solche Verwendung kann zum Erlöschen der Garantie führen. Bewahren Sie das Benutzerhandbuch und alle anderen Sicherheits- und Betriebsanweisungen, die mit dem Gerät geliefert werden, an einem sicheren Ort auf, der für alle Benutzer zum späteren Nachschlagen zugänglich ist.

Haben Sie ernsthafte Bedenken hinsichtlich der sicheren Verwendung Ihres Gerätes, wenden Sie sich an Ihren autorisierten Dienstleister von Miltenyi Biotec oder rufen Sie den Miltenyi Biotec Technical Support an.

Allgemeine Sicherheitshinweise



DIESES KAPITEL BESCHREIBT POTENZIELL GEFÄHRLICHE SITUATIONEN IM ZUSAMMENHANG MIT DIESEM GERÄT UND ENTHÄLT WICHTIGE SICHERHEITSHINWEISE, UM RISIKEN ZU MINIMIEREN UND SICH SELBST UND ANDERE ZU SCHÜTZEN.

Dieses Kapitel enthält wichtige Informationen für Ihre persönliche Sicherheit und die richtige Verwendung des Instruments. Lesen und beachten Sie alle Anweisungen sorgfältig, bevor Sie mit der Installation und Verwendung des Instruments fortfahren. Beachten Sie zusätzlich zu diesem Benutzerhandbuch die allgemeinen Sicherheitsvorschriften.

- Verwenden Sie das Gerät nur wie in diesem Benutzerhandbuch angegeben, um Personen- und Sachschäden zu vermeiden.
- Beachten Sie die lokal geltenden Arbeitsschutzvorschriften und Laborrichtlinien sowie die gesetzlich geregelten Maßnahmen zu Sicherheit, Gesundheitsschutz und Unfallverhütung.
- Bewahren Sie dieses Benutzerhandbuch an einem Ort auf, der jederzeit für alle Benutzer zugänglich ist.
- Bei schweren Unfällen, Beschädigungen des Gerätes, Rauch oder Flammen unterbrechen Sie sofort die Stromversorgung.
- Ziehen Sie den Netzstecker, um das Gerät vollständig von der Stromversorgung zu trennen.
- Stellen Sie sicher, dass der Hauptschalter und der Netzstecker des Gerätes leicht zugänglich sind.

Gefahrenstufen

Es werden Signalwörter verwendet, um vor Gefahrensituationen und Sachschäden zu warnen. In diesem Benutzerhandbuch werden die folgenden Signalwörter verwendet.

⚠️ WARNUNG oder **WARNING!** weist auf eine Gefahrensituation hin, die, falls sie nicht vermieden wird, zum Tod oder zu schweren Verletzungen führen kann.

⚠️ VORSICHT oder **VORSICHT!** weist auf eine Gefahrensituation hin, die, falls sie nicht vermieden wird, zu leichten oder mittelschweren Verletzungen führen kann. Dies wird auch dazu verwendet, um auf unsichere Vorgehensweisen hinzuweisen.

HINWEIS oder **HINWEIS** weist auf wichtige, jedoch nicht gefahrenbezogene Informationen hin (z. B. Hinweise in Verbindung mit Sachschäden).

Symbole



SICHERHEITSWARNUNG: BEACHTEN SIE DIE DOKUMENTATION IMMER, WENN DIESES WARNSYMBOL AM GERÄT VERWENDET WIRD



BIOLOGISCHE GEFAHR



SICH BEWEGENDE TEILE



STARKES MAGNETFELD



PERSONEN, DIE EINEN HERZSCHRITTMACHER ODER ANDERE ELEKTRONISCHE IMPLANTATE TRAGEN, MÜSSEN ABSTAND HALTEN



EIN (EINGESCHALTET)



AUS (AUSGESCHALTET)



LESEN SIE DAS BENUTZERHANDBUCH VOR VERWENDUNG DES GERÄTES



SICHERUNG



ELEKTRO- UND ELEKTRONIK-ALTGERÄTE (WEEE)



BESTELLNUMMER



SERIENNUMMER



MODELLNUMMER



HERSTELLER



EUROPÄISCHE KONFORMITÄTSKENNZEICHNUNG



NRTL-PRÜFZEICHEN: DAS PRODUKT ENTSPRICHT DEN IM KONSENSVERFAHREN ERARBEITETEN SICHERHEITSANFORDERUNGEN, WELCHE VON DER OCCUPATIONAL SAFETY/HEALTH ADMINISTRATION (OSHA) GEFORDERT UND VON DER STAATLICH ANERKANNTEN PRÜFSTELLE (NATIONALLY RECOGNIZED TESTING LABORATORIES (NRTL)) TÜV SÜD GEPRÜFT WURDEN



BRITISCHE PRODUKTKENNZEICHNUNG

EN
DE
ES
FR
IT

Sicherheitskennzeichnungen

Beachten Sie die Gefahrenhinweise und Sicherheitssymbole des Gerätes.

- Halten Sie die Warnaufkleber und Sicherheitskennzeichnungen sauber und lesbar.
- Überprüfen Sie die Warnaufkleber und Sicherheitskennzeichnungen regelmäßig und ersetzen Sie diese, wenn sie nicht mehr lesbar oder aus sicherer Entfernung nicht zu erkennen sind.
- Kontaktieren Sie Miltenyi Biotec, um Ersatzaufkleber zu erhalten.

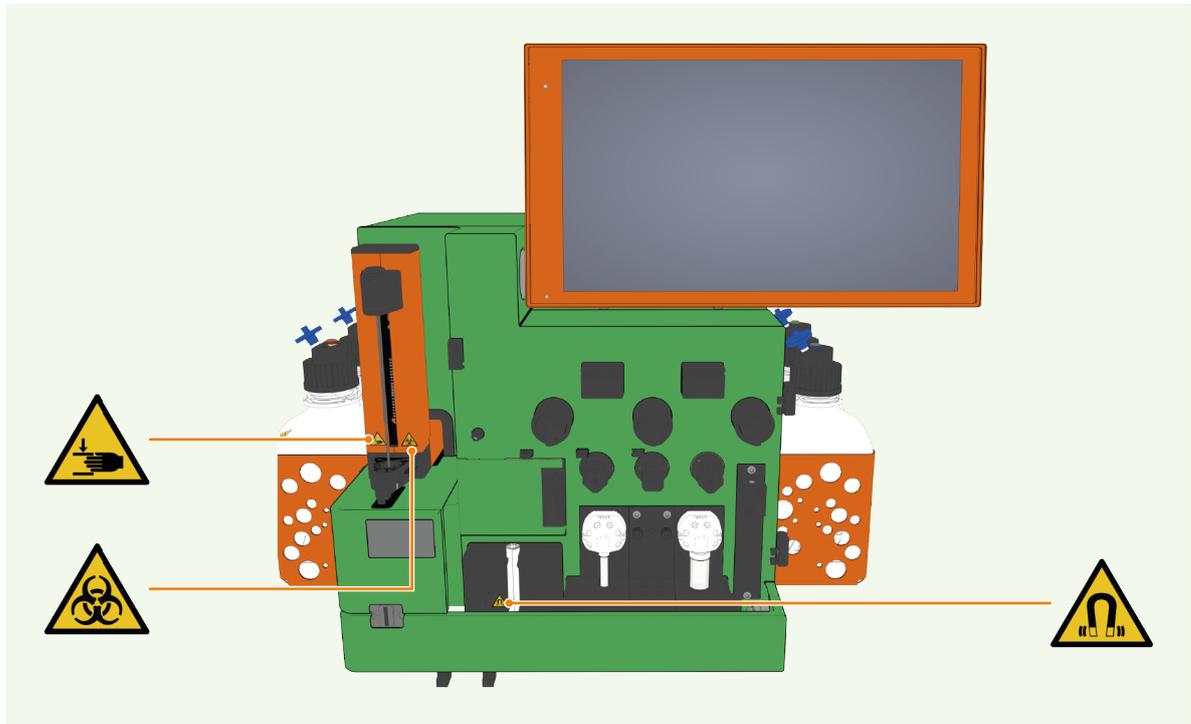


Figure 1: Gefahrenbereiche und Sicherheitssymbole auf der Vorderseite des Gerätes

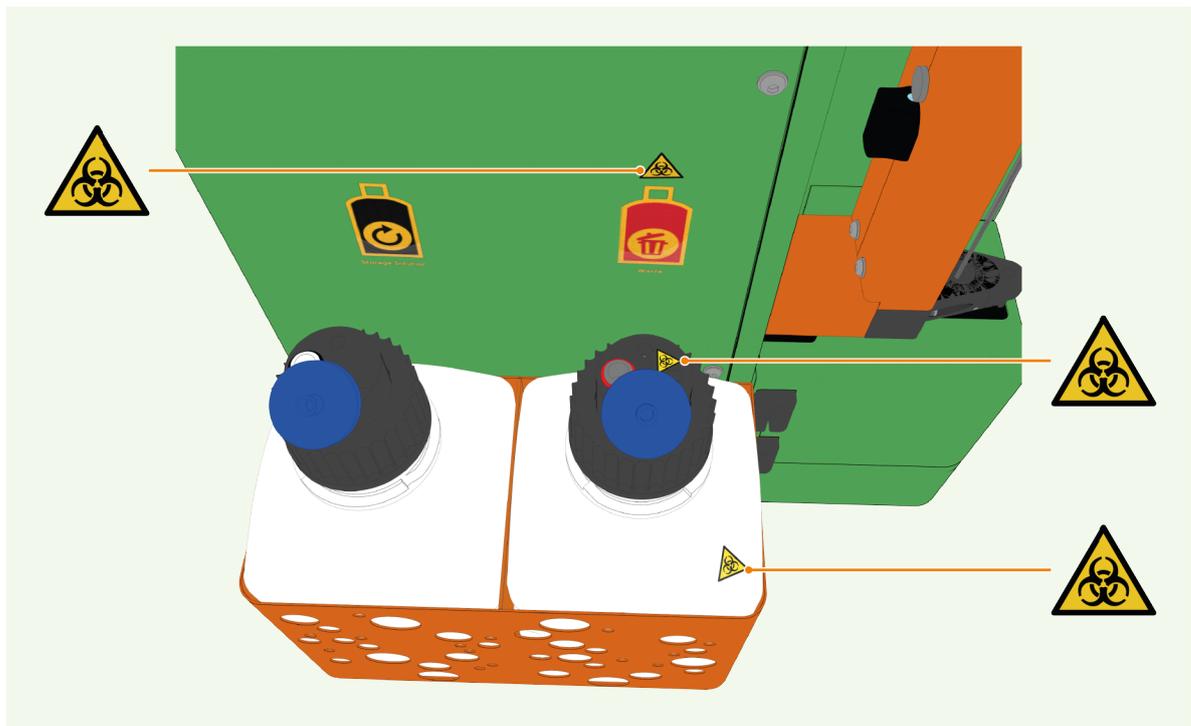


Figure 2: Gefahrenbereiche und Sicherheitssymbole auf der linken Seite des Gerätes

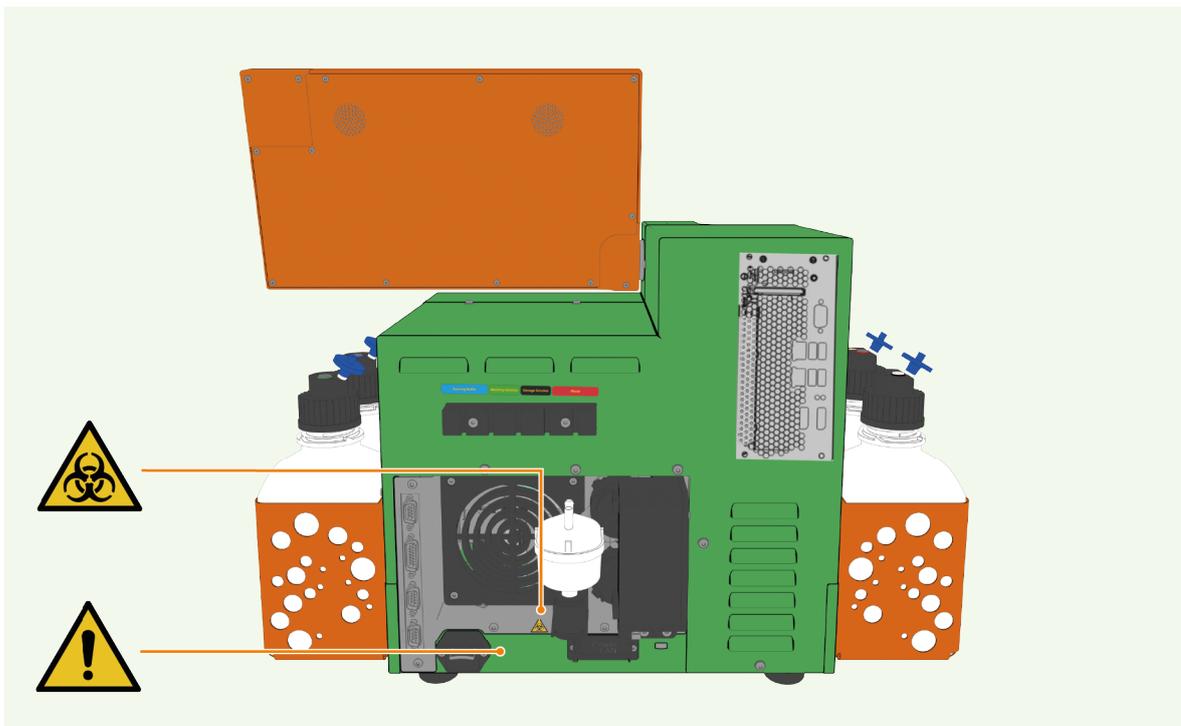


Figure 3: Gefahrenbereiche und Sicherheitssymbole auf der Rückseite des Gerätes

Elektrische Gefahren

⚠️ WARNUNG

Stromschlag, Kurzschluss, Überhitzung, Feuer und Explosion können zu schweren Verletzungen oder zum Tod führen.

Schützendes Gehäuse

Das Gehäuse des Gerätes reduziert das Risiko eines Stromschlags und von Kurzschlüssen. Ein Kurzschluss kann durch zerlegte Teile verursacht werden oder Gegenstände, die in das Gerät gefallen sind. Funken, die bei einem Kurzschluss entstehen können, können brennbare Dämpfe oder Materialien entzünden. Das schützende Gehäuse verhindert die Ausbreitung eines Brands. Betreiben Sie das Instrument nicht in Bereichen, die als gefährlich eingestuft sind, zum Beispiel in Sauerstoff angereicherter Umgebung.

- Entfernen oder öffnen Sie niemals Teile des Gehäuses mit Ausnahme der rechten oberen Abdeckung und der Tür.
- Nur das Miltenyi Biotec Servicepersonal ist berechtigt, alle sonstigen Abdeckungen des Gerätes zu entfernen.
- Verwenden Sie das Gerät nicht, wenn es geöffnet oder demontiert ist.
- Verwenden Sie das Gerät nicht, wenn es heruntergefallen oder beschädigt ist.
- Verwenden Sie das Gerät nicht, wenn ein Objekt hineingefallen ist.

Gefahren durch Überhitzung und Brand

Schützen Sie das Gerät gegen Überhitzung.

- Lassen Sie um das Gerät herum genügend Platz (mindestens 15 cm auf allen Seiten).
- Stellen Sie das Gerät nicht in der Nähe von Wärmequellen, wie zum Beispiel Heizgeräten, auf.
- Lassen Sie die Lüftungsschlitze und Öffnungen des Gerätes frei.
- Sorgen Sie während des Betriebs für ausreichende Luftzirkulation.

Flüssigkeiten im Inneren des Gerätes

Flüssigkeiten im Gerät können Kurzschlüsse verursachen.

- Schützen Sie das Gerät gegen verschüttete Flüssigkeiten.
- Nehmen Sie verschüttete Flüssigkeiten sofort auf.
- Verwenden Sie das Gerät nicht, wenn Flüssigkeiten in das Innere eingedrungen sind.
- Trennen Sie das Gerät vor der Reinigung von der Stromversorgung.
- Verwenden Sie nur geringe Mengen an Reinigungsmittel auf einem weichen Tuch, um das Gerät abzuwischen. Sprühen oder gießen Sie keine flüssigen Reinigungsmittel auf oder in das Gerät.

Feuchte und staubige Umgebungen

Feuchte und staubige Umgebungen können Kurzschlüsse verursachen.

- Betreiben Sie das Gerät nicht an einem feuchten Ort oder in Bereichen mit hoher Luftfeuchtigkeit oder Kondensation.
- Wird das Gerät von einer kalten Umgebung in einen Bereich mit Raumtemperatur gebracht, lassen Sie es vor der Verwendung erst trocknen.

Kabel und Stromversorgung

Die Verwendung des Gerätes mit anderen als den mitgelieferten Kabeln ist potenziell gefährlich. Das Gerät verfügt über einen dreiadrigen elektrischen Erdungsstecker mit einem dritten Stift zur Erdung. Dies ist eine Sicherheitseinrichtung.

- Stecken Sie den Stecker nur in eine geerdete Steckdose. Versuchen Sie nicht, den Stecker an eine nicht geerdete Steckdose anzuschließen.
- Verwenden Sie das Gerät nicht, wenn das Netzkabel beschädigt ist.
- Verwenden Sie nur das mitgelieferte Netzkabel.
- Verwenden Sie keine Verlängerungskabel oder Mehrfachsteckdosen.
- Schließen Sie nicht zu viele Verbraucher an denselben Stromkreis an.

Biologische Gefahren

WARNUNG

Kontamination oder Infektion kann je nach verwendetem Material zu schweren Verletzungen oder zum Tod führen.

Biologisches Material

Alle biologischen Materialien müssen als potenziell infektiös eingestuft werden.

- Öffnen Sie niemals während des Betriebs die Frontabdeckungen des Gerätes. Ausnahmen hiervon sind ausdrücklich in diesem Handbuch beschriebene Wartungsvorgänge.
- Halten Sie während des Betriebs Abstand zum Roboter-Nadelarm.
- Tragen Sie persönliche Schutzausrüstung (wie Handschuhe, Schutzbrille etc.), wie im Sicherheitsdatenblatt zum jeweiligen Material angegeben.
- Aus dem System können Tröpfchen austreten. Betreiben Sie das Instrument in einer biologischen Sicherheitswerkbank, die für die Probe geeignet ist, wenn Sie gefährliche oder potenziell infektiöse Materialien verarbeiten.
- Dekontaminieren Sie das Gerät nach der Arbeit mit gefährlichen oder potenziell infektiösen Materialien.

- Wenn gefährliche oder potenziell infektiöse Materialien verschüttet wurden oder aus dem System ausgetreten sind, dekontaminieren Sie den betroffenen Bereich.
- Verwenden Sie kontaminiertes Zubehör oder kontaminierte Teile des Gerätes nicht weiter.
- Führen Sie zunächst das Programm **Clean** aus, bevor Sie Wartungsarbeiten an Teilen des Flüssigkeitssystems vornehmen.
- Wechseln Sie keine Racks oder Proben, während das Gerät in Bewegung ist.
- Lassen Sie um den MACS MiniSampler Plus herum genügend Freiraum (mindestens 15 cm links und rechts).

Abfall

Alle flüssigen und festen Abfälle müssen als gefährlich eingestuft werden.

- Befüllen Sie die leere Abfallflasche mit einem geeigneten Desinfektionsmittel gemäß Herstellerspezifikation vor.
- Tauschen Sie die Abfallflasche nach dem Ausbau umgehend aus und befestigen Sie den Flaschenverschluss auf der neuen Flasche.
- Halten Sie stets eine leere Abfallflasche bereit.
- Installieren Sie eine Flasche nach der anderen, um das Verschütten von Flüssigkeiten zu vermeiden.
- Autoklavieren oder dekontaminieren Sie Abfall mit einem geeigneten Desinfektionsmittel.
- Beachten Sie die allgemeinen Laborsicherheitsvorschriften beim Umgang mit flüssigen und festen Abfällen.
- Beachten Sie die örtlichen Vorschriften zur Abfallentsorgung.

Geräteschäden

Defekte oder mangelhafte Geräte können eine biologische Gefahr darstellen.

- Kontrollieren Sie immer das Fluidiksystem und prüfen Sie auf Undichtigkeiten vor Verwendung des Gerätes.
- Tauschen Sie hydrophobe Luftfilter ein Mal pro Jahr aus, damit diese sich nicht durch Staubablagerungen zusetzen.
- Tauschen Sie hydrophobe Luftfilter aus, wenn diese im direkten Kontakt mit Flüssigkeit waren, damit die Filter sich nicht zusetzen und die Flüssigkeiten nicht verunreinigt werden.

Chemische Gefahren

WARNUNG

Stoffe und Reagenzien können gefährlich sein.

- Alle im Abschnitt **Biologische Gefahren** genannten Sicherheitsvorkehrungen gelten auch für gefährliche Stoffe und Reagenzien, die gegebenenfalls in der Probe enthalten sind.
- Betreiben Sie das Gerät unter einer Abzugshaube, wenn gefährliche Stoffe und Reagenzien verarbeitet werden.
- Verwenden Sie Stoffe und Reagenzien ausschließlich wie im dazugehörigen Sicherheitsdatenblatt angegeben.

Gefahr durch Magnetfelder

⚠️ WARNUNG

Das Gerät enthält einen starken Magneten.

Starke Magnetfelder können die Funktion von Herzschrittmachern oder elektronischen medizinischen Implantaten beeinträchtigen.



Personen, die Herzschrittmacher oder andere elektronische medizinische Implantate tragen, müssen einen Sicherheitsabstand von mindestens 30 cm zum Gerät halten.

⚠️ VORSICHT

Das Gerät enthält einen starken Magneten.

Magnetisierbare Objekte können sich plötzlich in Richtung des Magneten bewegen.

- Halten Sie magnetische Speichermedien, elektrische Geräte und andere magnetisierbare Gegenstände in einem Sicherheitsabstand von mindestens 30 cm zum Gerät.

Mechanische Gefahren

⚠️ VORSICHT

Sich bewegende Teile.

Gefahr von Quetsch- oder Schnittverletzungen.

Roboter-Nadelarm

Der Roboter-Nadelarm bewegt sich beim Betrieb des Gerätes.

- Betreiben Sie das Gerät nur mit Nadelschutz.
- Halten Sie während des Betriebs Abstand zum Roboter-Nadelarm.
- Behindern Sie nicht die Bewegung des Roboter-Nadelarms.

MACS MiniSampler Plus

Das Tablett des MACS MiniSampler Plus bewegt sich.

- Halten Sie während des Betriebs Abstand zum MACS MiniSampler Plus.
- Halten Sie laufende Prozesse an oder brechen sie ab, bevor Sie Zubehörteile oder Verbrauchsmaterialien handhaben.
- Wechseln Sie keine Racks oder Proben, während das Gerät in Bewegung ist.

Fluidiksystem

Zum Fluidiksystem gehören Spritzenpumpen. Diese bewegen sich wenn das Gerät in Betrieb ist.

- Halten Sie während des Betriebs Abstand zum Fluidiksystem.
- Öffnen Sie niemals während des Betriebs die Frontabdeckungen des Gerätes.

Gefahren durch optische Strahlung

⚠️ VORSICHT

Wenn das Auge optischer Strahlung ausgesetzt wird, kann dies zu Verletzungen führen.

Flaschenbeleuchtung

Für die Beleuchtung der Flaschen werden leistungsstarke LEDs eingesetzt. Die Strahlung ausgebaute Einheiten kann zu Augenverletzungen führen. Gemäß der internationalen Norm IEC 62471 übersteigt dieses Lampensystem die Wertstufe der risikofreien Gruppe und es bestehen Risiken, die von der Verwendung des Geräts abhängen. Das in einem Abstand von 20 cm zu den Fläschchenhaltern gemessene Risk Ratio (RR) beträgt 0,91, sodass der Gefahrenabstand sich bei 19 cm für die Risikogruppe 1 beläuft.

- Schauen Sie nicht direkt in die LED-Strahlung.
- Bauen Sie nicht die installierten LED-Strahlungsquellen oder deren Halterung aus und zerlegen oder modifizieren Sie diese nicht.
- Entfernen Sie nicht die Flaschenkörbe, es sei denn, das Instrument wird in ein Liquid Handling System integriert.

Gefährdung durch Laserstrahlung

VORSICHT

Werden die Augen dem Laserstrahl direkt ausgesetzt, kann dies zu Verletzungen führen.

Rack Detektion

Das Gerät verfügt über vier Oberflächenemitter (vertical cavity surface emitting lasers - VCSEL) zur automatisierten Rack Detektion (Klasse 1M). Die Strahlung ist nicht sichtbar.

- Schauen Sie nicht durch optische Instrumente wie Linsen, Lupen, etc. in den VCSEL-Port.
- Halten Sie einen Abstand von 100 mm ein.
- Der Weg des Lichtstrahls sollte sich im Betrieb nicht auf der gleichen Höhe wie das menschliche Auge befinden.

Laser

Das Instrument verfügt über drei Dauerstrichlaser. Die Laser sind in die Laserklasse 3B klassifiziert. Die Laser sind durch ein Schutzgehäuse gesichert.

- Das Schutzgehäuse nicht entfernen.

	Output power	Pulse time	Wavelength
MACSQuant Analyzer 10			
Rack Detektion	3.3 mW	215 µs	850 nm
Interner Laser 1	40 mW	Dauerstrich	405 nm
Interner Laser 2	30 mW	Dauerstrich	488 nm
Interner Laser 3	20 mW	Dauerstrich	640 nm
MACSQuant Analyzer 16			
Rack Detektion	3.3 mW	215 µs	850 nm
Interner Laser 1	63 mW	Dauerstrich	405 nm
Interner Laser 2	50 mW	Dauerstrich	488 nm
Interner Laser 3	70 mW	Dauerstrich	640 nm
MACSQuant VYB			
Rack Detektion	3.3 mW	215 µs	850 nm
Interner Laser 1	40 mW	Dauerstrich	405 nm
Interner Laser 2	50 mW	Dauerstrich	488 nm
Interner Laser 3	100 mW	Dauerstrich	561 nm

Table 3.1: Laserausgangsleistung, Impulszeit und Wellenlänge

Ergonomische Gefahren

WARNUNG

Schweres Gerät.

Gefahr von Zerrungen und Muskelrissen.

- Das Anheben des Gerätes muss durch zwei Personen erfolgen.
- Halten Sie das Gerät dabei unten an den orangefarbenen Flaschenkörben an beiden Seiten des Gerätes fest.

Wartung und Transport

Wartung

Unsachgemäße Wartung oder Reparatur des Gerätes oder die Verwendung von nicht zugelassenen Teilen kann zu Fehlfunktionen oder Schäden am Gerät führen. Dies kann zu Gefahren für den Benutzer führen.

- Soweit nicht ausdrücklich in diesem Handbuch oder anderen Unterlagen von Miltenyi Biotec erwähnt, darf das Gerät nicht vom Benutzer selbst gewartet oder repariert werden.
- Wartungs- und Reparaturarbeiten dürfen nur von Personen durchgeführt werden, die von Miltenyi Biotec zertifiziert und entsprechend qualifiziert sind.
- Vor der Wartung muss das Gerät dekontaminiert werden, um gefährliche Stoffe zu entfernen.
- Wenn Sie Fragen zur ordnungsgemäßen Dekontamination und dem Versand haben, kontaktieren Sie Miltenyi Biotec Technical Support.
- Verwenden Sie nur von Miltenyi Biotec empfohlene Zubehörteile und Upgrades.

- Wenn Sie mehr über das umfangreiche Serviceangebot und die Wartungsverträge in Verbindung mit den Geräten von Miltenyi Biotec erfahren möchten, wenden Sie sich an Ihren regionalen Miltenyi Biotec Vertreter oder besuchen Sie www.miltenyibiotec.com/support.

Transport

Das Instrument sollte immer vorsichtig und nur in der von Miltenyi Biotec empfohlenen Verpackung transportiert werden. Interne Beschädigungen können auftreten, wenn das Instrument übermäßigen Vibrationen ausgesetzt wird oder wenn es herunterfällt. Muss das Gerät zur Wartung zurück an den Hersteller geschickt werden, so nehmen Sie bezüglich weiterer Anweisungen und der Verpackung Kontakt mit Miltenyi Biotec auf.

Entsorgung



KUNDENINFORMATION ZUR ENTSORGUNG VON ELEKTRO- UND ELEKTRONIK-ALTGERÄTEN (WEEE)

Entsorgen Sie Ihre Altgeräte von Miltenyi Biotec unter Einhaltung der jeweils geltenden Vorschriften für die Entsorgung von Elektro- und Elektronik-Altgeräten und die Entsorgung von Gefahrstoffen, die je nach Land oder Region unterschiedlich sein können. Elektrische Geräte können gefährliche Stoffe enthalten, welche die Umwelt erheblich belasten und/oder die Gesundheit gefährden. Sämtliche Altgeräte müssen gesondert gesammelt und von ausgewiesenen Abfallentsorgungseinrichtungen im Rahmen der hierfür vorgesehenen Entsorgungssysteme fachgerecht behandelt werden. Indem Sie sicherstellen, dass ihr Altgerät gemäß den geltenden Vorschriften zur Behandlung von Elektro- und Elektronik-Altgeräten sowie von Gefahrstoffen entsorgt wird, tragen Sie zum Erhalt unserer natürlichen Ressourcen und zum Schutz der menschlichen Gesundheit bei. Miltenyi Biotec hat sich dem Schutz der Umwelt verpflichtet. Miltenyi Biotec bietet in zahlreichen Ländern Rücknahmeprogramme für Altgeräte an und arbeitet weltweit mit lizenzierten Partnern zusammen, die an bestehende Recycling- und Entsorgungssysteme angeschlossen sind. Miltenyi Biotec ermöglicht Ihnen ein kostenloses Recycling Ihres Altgerätes. Die Bedingungen und die Verfügbarkeit dieses Angebots unterscheiden sich geographisch aufgrund unterschiedlicher regulatorischer Anforderungen. Beachten Sie, dass je nach Art und Nutzung Ihres Gerätes zusätzliche Anforderungen gelten können. Bevor Sie das Altgerät an den Hersteller zur Entsorgung zurücksenden, dekontaminieren Sie es, um sämtliche gefährlichen Stoffe zu entfernen. Für weitere Informationen oder wenn Sie Altgeräte von Miltenyi Biotec entsorgen möchten, wenden Sie sich an Ihren lokalen Vertreter von Miltenyi Biotec oder an den Miltenyi Biotec Technical Support.

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Lea primero el manual de uso

ADVERTENCIA

Antes de usar el MACSQuant Instrument (MACSQuant Analyzer 10, VYB, or Analyzer 16), lea esta **Información importante de seguridad** y toda la otra información que contiene el manual de uso. Preste especial atención a todas las advertencias que aparecen en el instrumento. Si no se leen y siguen estas pautas, podría utilizarse de forma inadecuada o incorrecta y podrían producirse daños en el instrumento. El uso inadecuado también puede causar graves lesiones personales, muerte, resultados impredecibles, mal funcionamiento del instrumento y un desgaste prematuro de los componentes que acortara la vida útil del instrumento. Estas acciones pueden anular su garantía. Para consultas futuras, mantenga en un lugar seguro y accesible para todos los usuarios el manual de uso y cualquier otra instrucción de manejo y seguridad suministrada con el instrumento.

Si le preocupa seriamente el uso seguro de su instrumento, contacte con su proveedor de servicios autorizado de Miltenyi Biotec o llame al Miltenyi Biotec Technical Support.

Instrucciones generales de seguridad

Este capítulo ofrece información importante para su seguridad personal y el correcto uso del instrumento. Lea y siga todas las instrucciones atentamente antes de la instalación y el uso del instrumento. Siga las prácticas de seguridad generales además de este manual de uso.

- Use este instrumento solo como se indica en este manual de uso para evitar lesiones personales y daños materiales.
- Observe las instrucciones de seguridad de la zona de trabajo local y las políticas de laboratorio, así como las normas de salud, seguridad y prevención de accidentes.
- Guarde este manual de uso en un lugar que siempre esté accesible para todos los usuarios.
- En caso de accidentes graves, daños en el instrumento o si aparece humo o llamas, corte de inmediato el suministro de la corriente eléctrica.
- Para desconectar completamente el instrumento del suministro de la corriente eléctrica, desenchufe el cable de alimentación.
- Asegúrese de que se pueda acceder fácilmente al interruptor de corriente y al enchufe del cable de alimentación del instrumento.

Niveles de riesgo

Las palabras de advertencia se utilizan para advertir contra situaciones peligrosas y daños materiales. En este manual de uso se utilizan las siguientes palabras de advertencia.

⚠️ ADVERTENCIA o **¡ADVERTENCIA!** indica una situación peligrosa que, de no evitarse, podría conllevar la muerte o lesiones graves.

⚠️ ATENCIÓN o **¡ATENCIÓN!** indica una situación peligrosa que, de no evitarse, podría conllevar lesiones leves o moderadas. También sirve para advertir sobre prácticas poco seguras.

AVISO o **AVISO** indica información que se considera importante, pero no relacionada con un peligro (p. ej., mensajes relacionados con daños materiales).

Símbolos



ADVERTENCIA DE SEGURIDAD: SE DEBE CONSULTAR LA DOCUMENTACIÓN EN TODOS LOS CASOS EN QUE SE UTILICE ESTE SÍMBOLO DE SEGURIDAD EN EL INSTRUMENTO



PELIGRO BIOLÓGICO



PIEZAS MÓVILES



FUERTE CAMPO MAGNÉTICO



LAS PERSONAS QUE LLEVAN MARCAPASOS U OTROS IMPLANTES ELECTRÓNICOS DEBEN MANTENERSE A DISTANCIA



ON (ENCENDIDO)



OFF (APAGADO)



LEA EL MANUAL DE USO ANTES DE USAR EL INSTRUMENTO



FUSIBLE



INFORMACIÓN AL CLIENTE SOBRE LA DIRECTIVA DE RESIDUOS DE APARATOS ELÉCTRICOS Y ELECTRÓNICOS (RAEE)



NÚMERO DE PEDIDO



NÚMERO DE SERIE



NÚMERO DEL MODELO



FABRICANTE



MARCADO DE CONFORMIDAD EUROPEA



MARCA DE CERTIFICACIÓN NRTL: EL PRODUCTO CUMPLE LOS ESTÁNDARES DE SEGURIDAD CONSENSUADOS, REQUERIDOS POR LA ADMINISTRACIÓN DE SEGURIDAD Y SALUD OCUPACIONAL (OSHA), DETERMINADOS POR LOS LABORATORIOS DE ENSAYO RECONOCIDOS NACIONALMENTE (NATIONALLY RECOGNIZED TESTING LABORATORIES, NRTL) TÜV SÜD



CONFORMIDAD EVALUADA DEL REINO UNIDO

EN
DE
ES
FR
IT

Etiqueta de seguridad

Observe los puntos de peligro y los símbolos de seguridad del instrumento.

- Mantenga las etiquetas y marcas de seguridad en un estado limpio y legible.
- Inspeccione las etiquetas y marcas de seguridad con regularidad, y reemplácelas si no son legibles o identificables desde una distancia de visualización segura.
- Póngase en contacto con Miltenyi Biotec si necesita etiquetas de recambio.

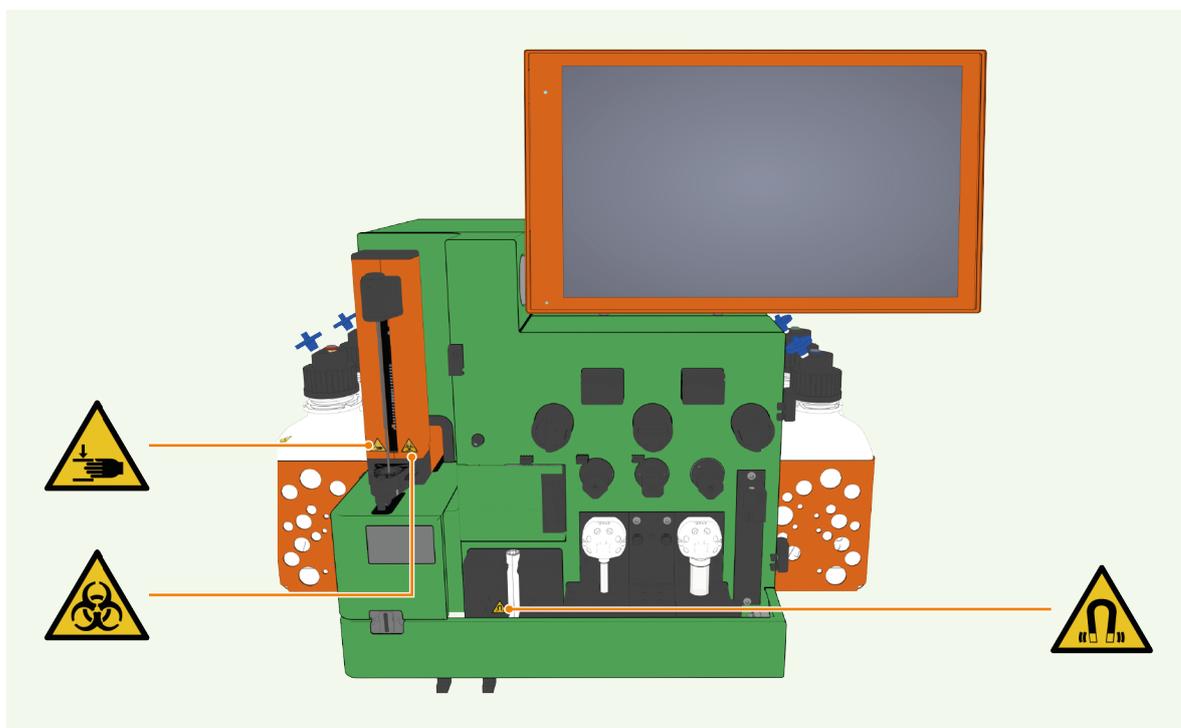


Figure 1: Áreas peligrosas y símbolos de seguridad en la parte frontal del instrumento

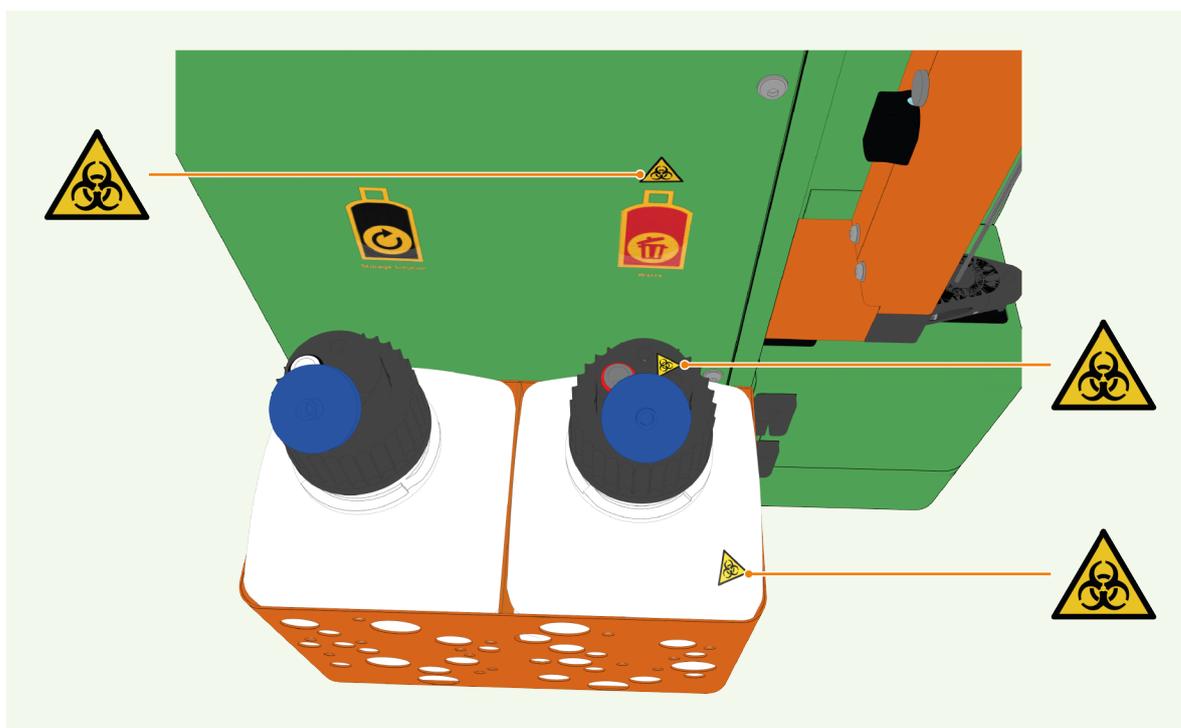


Figure 2: Las áreas de riesgo y los símbolos de seguridad se encuentran en el lado izquierdo del equipo

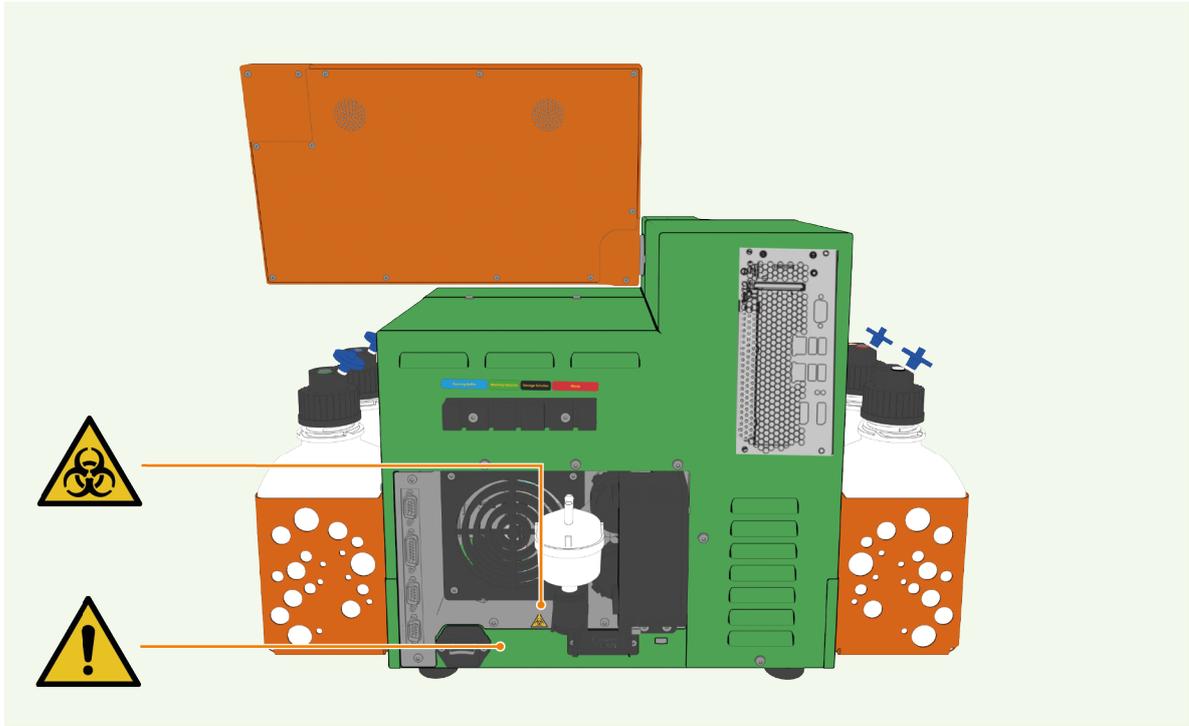


Figure 3: Áreas peligrosas y símbolos de seguridad en la parte posterior del instrumento

Peligros eléctricos

⚠️ ADVERTENCIA

Una descarga eléctrica, un cortocircuito, un sobrecalentamiento, un incendio o una explosión podría causar la muerte o lesiones graves.

Carcasa protectora

La carcasa del instrumento reduce el riesgo de un shock eléctrico y cortocircuitos. El cortocircuito puede ser causado por piezas u objetos desmontados que se hayan caído en el instrumento. Las chispas emitidas, causadas por un cortocircuito, pueden incendiar vapores o materiales combustibles. La carcasa protectora evita la propagación del fuego. No utilice el instrumento en áreas clasificadas como peligrosas; por ejemplo, en entornos cargados de oxígeno.

- No retire ni perforo ninguna cubierta de la carcasa, a excepción de las cubiertas de acceso frontal.
- Solo el Miltenyi Biotec personal de servicio puede retirar cualquier otra cubierta del instrumento.
- No utilice el instrumento si se ha abierto o desmontado.
- No utilice el instrumento si se ha caído o dañado.
- No utilice el instrumento si un objeto ha entrado en el interior del mismo.

Peligros relacionados con el sobrecalentamiento y los incendios

Proteja el instrumento contra el sobrecalentamiento.

- Deje espacio suficiente alrededor del instrumento (al menos 15 cm en todos los lados).
- No coloque el instrumento junto a fuentes de calor, por ejemplo, calentadores.
- No cubra las ranuras de ventilación ni las aberturas del instrumento.
- Asegure una adecuada circulación de aire durante el funcionamiento.

Líquidos en el interior del instrumento

Los líquidos que hay dentro del instrumento pueden provocar cortocircuitos.

- Proteja el instrumento contra líquidos derramados.
- Limpie los líquidos derramados inmediatamente.
- No utilice el instrumento si ha entrado algún líquido en el interior del instrumento.
- Desenchufe el instrumento antes de limpiarlo.
- Use solo pequeñas cantidades de productos de limpieza en un paño suave para limpiar el instrumento. No rocíe ni vierta productos de limpieza líquidos sobre o dentro del instrumento.

Entornos húmedos y polvorientos

Los ambientes húmedos y polvorientos pueden provocar cortocircuitos.

- No utilice el instrumento en un lugar húmedo, o áreas con alta humedad o condensación.
- Después de mover el instrumento de un entorno frío a temperatura ambiente, espere a que el instrumento se deshumedezca antes de usarlo.

Cables y suministros de corriente eléctrica

Usar el instrumento con otros cables que no sean los suministrados es potencialmente peligroso. El instrumento tiene un enchufe eléctrico de tres hilos con una tercera clavija para la conexión a tierra. Se trata de una característica de seguridad.

- Inserte el enchufe solo en una toma de corriente con conexión a tierra. No intente insertar el enchufe en una toma de corriente sin conexión a tierra.
- No utilice el instrumento si el cable de alimentación está dañado.
- Utilice únicamente el cable de alimentación incluido.
- No utilice cables alargadores ni ladrones.
- No sobrecargue la toma eléctrica.

Peligros biológicos

ADVERTENCIA

La contaminación o infección podría causar la muerte o lesiones graves en función del material utilizado.

Material biológico

Todo material biológico debe considerarse potencialmente infeccioso.

- No abra las cubiertas de acceso frontal mientras el instrumento está en funcionamiento. Las excepciones son los procesos de mantenimiento que se describen explícitamente en este manual.
- Manténgase alejado del brazo de aguja robótico mientras el instrumento está en funcionamiento.
- Use equipo de protección personal (como guantes, gafas de seguridad, etc.) como se indica en la hoja de datos de seguridad de la sustancia en particular.
- Pequeña gotas pueden escaparse del sistema. Si se procesa material peligroso o potencialmente infeccioso, use el equipo en una campana de seguridad biológica adecuada para la muestra utilizada.
- Descontamine el instrumento después de procesar material peligroso o potencialmente infeccioso.
- Si se ha derramado o fugado del sistema un material peligroso o potencialmente infeccioso, descontamine el área afectada.

- No continúe usando piezas o accesorios contaminados del instrumento.
- Ejecute el programa **Clean** antes de hacer trabajos de mantenimiento en cualquier parte del sistema fluídico.
- No cargue ni descargue muestras o bastidores mientras el instrumento está en movimiento.
- Deje espacio suficiente alrededor del MACS MiniSampler Plus (al menos 15 cm a la derecha y a la izquierda).

Desechos

Todos los desechos líquidos y sólidos deben ser considerados peligrosos.

- Precargue el frasco de residuos vacío con un desinfectante adecuado según la especificación del fabricante.
- Cambie inmediatamente el frasco de residuos después de desmontarlo y asegure el cierre del frasco al frasco nuevo.
- Tenga siempre un frasco de residuos vacío disponible.
- Para evitar derrames, solo instale una botella a la vez.
- Ponga en autoclave o, como alternativa, descontamine los desechos con un desinfectante apropiado.
- Siga las normas generales de seguridad del laboratorio cuando maneje desechos líquidos y sólidos.
- Observe las regulaciones locales sobre la eliminación de desechos.

Daños en el equipo

Un equipo defectuoso o inadecuado puede causar un peligro biológico.

- Siempre inspeccione el sistema de líquidos y verifique que no haya fugas antes de usar el instrumento.
- Cambie los filtros de aire hidrofóbicos una vez al año para evitar obstrucciones por la acumulación de polvo.
- Cambie los filtros de aire hidrofóbicos si han entrado en contacto directo con cualquier líquido para evitar la obstrucción de los filtros y para prevenir la contaminación de los líquidos.

Peligros químicos

ADVERTENCIA

Las sustancias y los reactivos pueden ser peligrosos.

- Todas las medidas de seguridad del apartado **Peligros biológicos** se aplican también a todas las sustancias y reactivos peligrosos que puedan estar presente en la muestra.
- Utilice el instrumento en una campana para vapores si se procesan sustancias y reactivos peligrosos.
- Utilice únicamente las sustancias y reactivos que se indican en las hojas datos de seguridad correspondientes.

Peligros por campo magnético

ADVERTENCIA

El instrumento tiene un imán potente.

Los campos magnéticos fuertes podrían influenciar el funcionamiento de marcapasos o implantes médicos electrónicos.

En caso de llevar marcapasos o implantes médicos electrónicos, mantenga una distancia de al menos 30 cm del instrumento.

⚠ ATENCIÓN

El instrumento tiene un imán potente.

Los objetos magnetizables pueden moverse repentinamente hacia el imán.

- Mantenga todos los dispositivos de almacenamiento magnéticos, equipos electrónicos y objetos magnetizables a una distancia de al menos 30 cm del instrumento.

Peligros mecánicos

⚠ ATENCIÓN

Piezas móviles.

Riesgo de aplastamiento o corte.

Brazo de aguja robótico

El brazo de aguja robótico se mueve mientras el instrumento está en funcionamiento.

- No utilice el instrumento sin la protección de la aguja.
- Manténgase alejado del brazo de aguja robótico mientras el instrumento está en funcionamiento.
- No obstruya el movimiento del brazo de aguja robótico.

MACS MiniSampler Plus

El carro del MACS MiniSampler Plus se mueve.

- Manténgase alejado del MACS MiniSampler Plus mientras el instrumento está en funcionamiento.
- Detenga o interrumpa siempre un proceso antes de manipular accesorios o consumibles.
- No cargue ni descargue muestras o bastidores mientras el instrumento está en movimiento.

Sistema de líquidos

Las bombas de jeringa son parte del sistema de líquidos. Se mueven mientras el instrumento está en funcionamiento.

- Manténgase alejado del sistema de líquidos mientras el instrumento está en funcionamiento.
- No abra las cubiertas de acceso frontal mientras el instrumento está en funcionamiento.

Peligros de radiación óptica

⚠ ATENCIÓN

La exposición a la radiación óptica podría causar lesiones oculares.

Iluminación de botellas

Se utilizan potentes LED para iluminar las botellas. La radiación de las unidades desmontadas puede conllevar lesiones oculares. Según la norma internacional CEI 62471, este sistema de lámparas supera el grupo de riesgo exento y existen riesgos que dependen del uso del instrumento. El valor del peligro de exposición (EHV) medido a una distancia de 20 cm de los soportes para botellas es de 0,91, y la distancia de peligro es de 19 cm para el grupo de riesgo 1.

- No mire directamente a la radiación LED.
- No desmonte, modifique ni retire las fuentes de radiación LED instaladas ni sus soportes de montaje. Las fuentes de radiación LED no dejan de emitir automáticamente cuando se desmontan.
- No retire los soportes para botellas a menos que se integre el instrumento en un sistema de manejo de líquidos.

Peligro radiación láser

⚠ ATENCIÓN

La exposición directa al rayo láser podría causar lesiones oculares.

Detección de bastidor

El instrumento tiene cuatro láseres de emisión superficial con cavidad vertical (VCSEL) para la detección automática de bastidores (Clase 1M). La radiación no es visible.

- No mire al puerto VCSEL a través de instrumentos ópticos como lentes, lupas, etc.
- Mantenga una distancia de 100 mm.
- Evite que la trayectoria del haz de luz esté a la misma altura que el ojo humano durante el funcionamiento.

Láser

El instrumento tiene tres Láseres de onda continua. Los láseres están clasificados como de clase 3B. Los láseres están protegidos por una carcasa protectora.

- No retire la carcasa protectora.

	Potencia del láser	Duración del impulso	Longitud de onda
MACSQuant Analyzer 10			
Detección del rack de reactivos	3.3 mW	215 μ s	850 nm
Láser interno 1	40 mW	Continuo	405 nm
Láser interno 2	30 mW	Continuo	488 nm
Internal Laser 3	20 mW	Continuo	640 nm
MACSQuant Analyzer 16			
Detección del rack de reactivos	3.3 mW	215 μ s	850 nm
Láser interno 1	63 mW	Continuo	405 nm
Láser interno 2	50 mW	Continuo	488 nm
Láser interno 3	70 mW	Continuo	640 nm
MACSQuant VYB			
Detección del rack de reactivos	3.3 mW	215 μ s	850 nm
Láser interno 1	40 mW	Continuo	405 nm
Láser interno 2	50 mW	Continuo	488 nm
Láser interno 3	100 mW	Continuo	561 nm

Table 4.1: Potencia del láser, duración de impulso, y longitud de onda

Riesgos ergonómicos

⚠️ ADVERTENCIA

Instrumento pesado

Riesgo de desgarro o distensión muscular.

- Se requieren dos personas para levantar el equipo.
- Coja el equipo por la base de las cestas de frascos de color naranja, situadas a ambos lados del equipo

Reparación y transporte

Reparación

La reparación inadecuada del instrumento o el uso de piezas no autorizadas pueden provocar un mal funcionamiento o daños en el instrumento. Esto puede constituir un peligro para los usuarios.

- A menos que se indique específicamente lo contrario en este manual del usuario o en otros documentos de Miltenyi Biotec, no realice usted mismo los trabajos de mantenimiento y reparación del instrumento.
- La reparación debe ser realizada por personal de servicio cualificado y certificado por Miltenyi Biotec.
- Si el instrumento necesita reparación, descontámelo para eliminar cualquier material peligroso.
- Si tiene alguna pregunta relativa a la descontaminación o el envío adecuados, póngase en contacto con el Miltenyi Biotec Technical Support para que le ayuden.
- Utilice solo accesorios y actualizaciones recomendados por Miltenyi Biotec.
- Consulte a su representante local de Miltenyi Biotec sobre el amplio servicio de reparaciones de instrumentos y los contratos de reparaciones de Miltenyi Biotec, o visite www.miltenyibiotec.com/support.

Transporte

El instrumento deberá transportarse con cuidado en el embalaje especificado por Miltenyi Biotec. Se podrían producir daños internos si el instrumento se somete a un exceso de vibraciones o se cae. Si es necesario enviar el instrumento al fabricante para su reparación, comuníquese con Miltenyi Biotec para obtener instrucciones y materiales de embalaje.

Eliminación



INFORMACIÓN AL CLIENTE SOBRE LA DIRECTIVA DE RESIDUOS DE APARATOS ELÉCTRICOS Y ELECTRÓNICOS (RAEE)

Elimine los productos de Miltenyi Biotec al final de su vida útil de acuerdo con la legislación aplicable en materia de eliminación de residuos peligrosos y RAEE, que puede variar según el país o la región. El equipo eléctrico puede contener sustancias peligrosas que pueden tener un efecto perjudicial grave en el medio ambiente y/o la salud humana. Todo el equipo debe ser recogido y tratado específicamente en instalaciones de desechos designadas y en sistemas conformes a la legislación sobre RAEE. Al asegurarse de desechar sus aparatos eléctricos y electrónicos no deseados de acuerdo con la legislación aplicable sobre eliminación de desechos peligrosos y RAEE, está ayudando a preservar nuestros recursos naturales y proteger la salud humana. Miltenyi Biotec se compromete a proteger el medio ambiente. Miltenyi Biotec ofrece programas de devolución de productos al final de su vida útil en muchos países y socios con licencia que disponen de sistemas conformes a la legislación sobre RAEE en todo el mundo. Miltenyi Biotec recoge su equipo Miltenyi Biotec al final de su vida útil para reciclarlo de forma gratuita. Los términos y la disponibilidad de esta

oferta pueden variar según la región geográfica, debido a las diferencias en los requisitos reglamentarios. Tenga en cuenta que, dependiendo del tipo y uso del equipo, pueden aplicarse requisitos adicionales. Antes de devolver el instrumento al fabricante para que lo deseche, descontamine el instrumento para eliminar cualquier material peligroso. Para obtener más información, o si desea desechar su equipo Miltenyi Biotec al final de su vida útil, póngase en contacto con su representante local de Miltenyi Biotec o con el Miltenyi Biotec Technical Support.

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Lisez d'abord le manuel d'utilisation

AVERTISSEMENT

Avant d'utiliser le MACSQuant Instrument (MACSQuant Analyzer 10, VYB, or Analyzer 16), veuillez lire les **Informations de sécurité importantes** qui suivent et toutes les autres informations données dans le présent manuel. Accordez une attention particulière à tous les avertissements affichés sur l'instrument. Le non-respect de ces consignes peut entraîner une utilisation inappropriée ou incorrecte et endommager l'instrument. Une utilisation incorrecte peut également causer des blessures graves, la mort, des résultats imprévisibles, un mauvais fonctionnement de l'instrument et une usure prématurée des composants, ce qui réduit la durée de vie de l'instrument. De telles actions peuvent annuler votre garantie. Conservez le manuel d'utilisation et les autres instructions de sécurité et de fonctionnement fournies avec les produits dans un endroit qui reste accessible à tous les utilisateurs pour qu'ils puissent s'y référer ultérieurement.

Si vous avez de sérieuses inquiétudes concernant l'utilisation en toute sécurité de votre instrument, veuillez contacter votre fournisseur de services agréé Miltenyi Biotec ou appeler Miltenyi Biotec Technical Support.

Instructions générales de sécurité



CE CHAPITRE DÉCRIT LES SITUATIONS POTENTIELLEMENT DANGEREUSES ASSOCIÉES À CET INSTRUMENT ET FOURNIT DES INFORMATIONS DE SÉCURITÉ IMPORTANTES DESTINÉES À RÉDUIRE LES RISQUES ET À VOUS PROTÉGER AINSI QU'À PROTÉGER LES AUTRES.

Le présent chapitre donne des informations importantes pour votre sécurité personnelle et pour l'utilisation correcte de l'instrument. Veuillez lire attentivement toutes les instructions et les retenir avant de procéder à l'installation de l'instrument et d'utiliser celui-ci. Appliquez les mesures de sécurité générales en plus de celles exposées dans le manuel d'utilisation.

- Utilisez toujours cet instrument en suivant les indications fournies dans ce manuel d'utilisation, afin d'éviter toute blessure et tous dommages matériels.
- Respecter les consignes de sécurité sur le lieu de travail et les protocoles de laboratoire, ainsi que les normes en matière de santé, de sécurité et de prévention des accidents.
- Conservez ce Guide de l'Utilisateur dans un endroit qui reste toujours accessible à tous les utilisateurs.
- En cas d'accident grave, d'endommagement de l'instrument ou si de la fumée ou des flammes apparaissent, coupez immédiatement l'alimentation électrique.
- Pour éteindre entièrement l'instrument de l'alimentation électrique, débranchez le câble d'alimentation.
- Assurez-vous que l'interrupteur principal et la prise du câble d'alimentation de l'instrument soient facilement accessibles.

Niveaux de danger

Les mots d'avertissement sont utilisés pour mettre l'utilisateur en garde contre des situations dangereuses et des dommages matériels. Les mots d'avertissement suivants sont utilisés dans ce Guide de l'Utilisateur.

⚠ AVERTISSEMENT ou **AVERTISSEMENT !** signale une situation dangereuse qui, si elle n'est pas évitée, peut causer la mort ou des blessures graves.

⚠ ATTENTION ou **ATTENTION !** signale une situation dangereuse qui, si elle n'est pas évitée, peut causer des blessures de gravité mineure ou modérée. Il est aussi utilisé pour mettre en garde contre des pratiques dangereuses.

AVIS ou **AVIS** signale des informations jugées importantes mais qui ne concernent pas un danger (p. ex. les messages relatifs à des dommages matériels).

Symboles



AVERTISSEMENT DE SÉCURITÉ : LA DOCUMENTATION DOIT ÊTRE CONSULTÉE DANS TOUS LES CAS OÙ CE SYMBOLE DE SÉCURITÉ EST UTILISÉ SUR L'INSTRUMENT



RISQUE BIOLOGIQUE



PIÈCES AMOVIBLES



CHAMP MAGNÉTIQUE PUISSANT



LES PERSONNES PORTANT UN STIMULATEUR CARDIAQUE OU UN AUTRE IMPLANT ÉLECTRONIQUE DOIVENT RESTER À DISTANCE



MARCHE (INSTRUMENT ALLUMÉ)



ARRÊT (INSTRUMENT ÉTEINT)



LISEZ LE GUIDE DE L'UTILISATEUR AVANT D'UTILISER L'INSTRUMENT



FUSIBLE



DEEE (DÉCHETS D'ÉQUIPEMENTS ÉLECTRIQUES ET ÉLECTRONIQUES)



NUMÉRO DE COMMANDE



NUMÉRO DE SÉRIE



NUMÉRO DE MODÈLE



FABRICANT



MARQUAGE DE CONFORMITÉ EUROPÉENNE



MARQUE DE CERTIFICATION NRTL : LE PRODUIT RÉPOND AUX NORMES DE SÉCURITÉ
CONSENSUELLES IMPOSÉES PAR L'OCCUPATIONAL SAFETY/HEALTH ADMINISTRATION (OSHA),
DÉTERMINÉES PAR LES NATIONALLY RECOGNIZED TESTING LABORATORIES (NRTL) TÜV SÜD



MARQUAGE DE PRODUIT DU ROYAUME-UNI

Étiquettes de sécurité

Repérez les points dangereux et les symboles de sécurité de l'instrument.

- Maintenez les étiquettes et les marquages de sécurité propres et lisibles.
- Contrôlez régulièrement les étiquettes et marquages de sécurité et remplacez ceux qui ne sont pas lisibles ou identifiables à une distance sûre.
- Contactez Miltenyi Biotec pour obtenir des étiquettes de rechange.

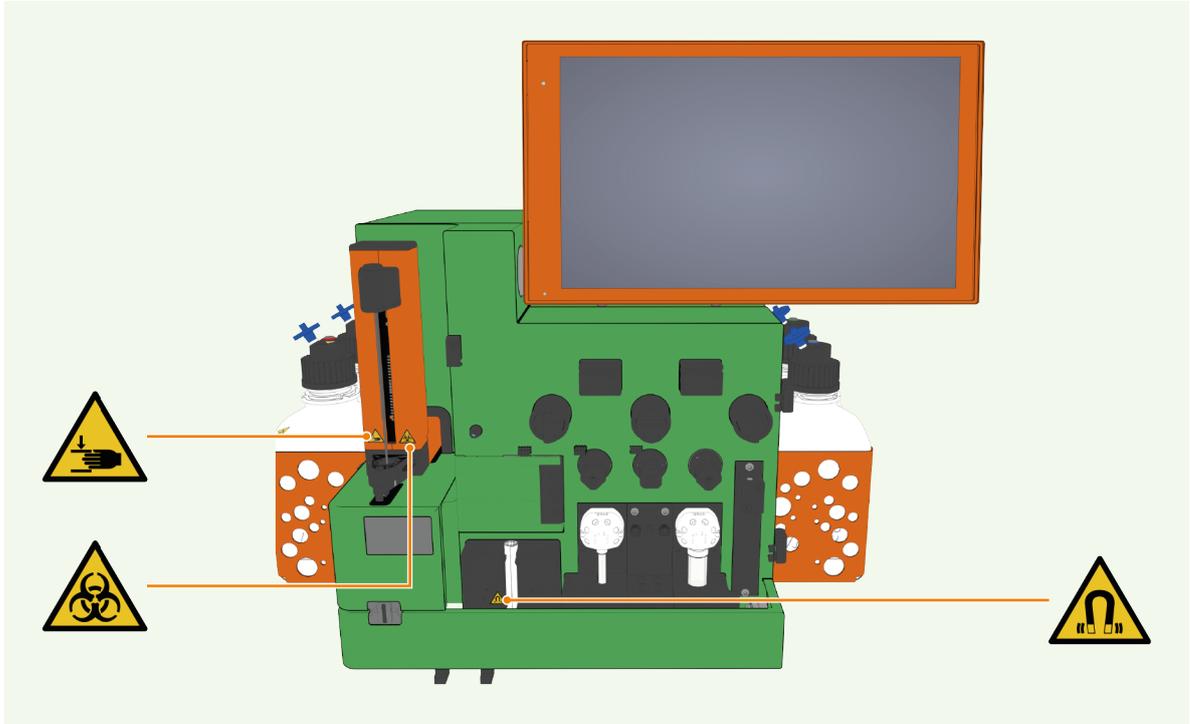


Figure 1: Zones de danger et symboles de sécurité sur l'avant de l'instrument

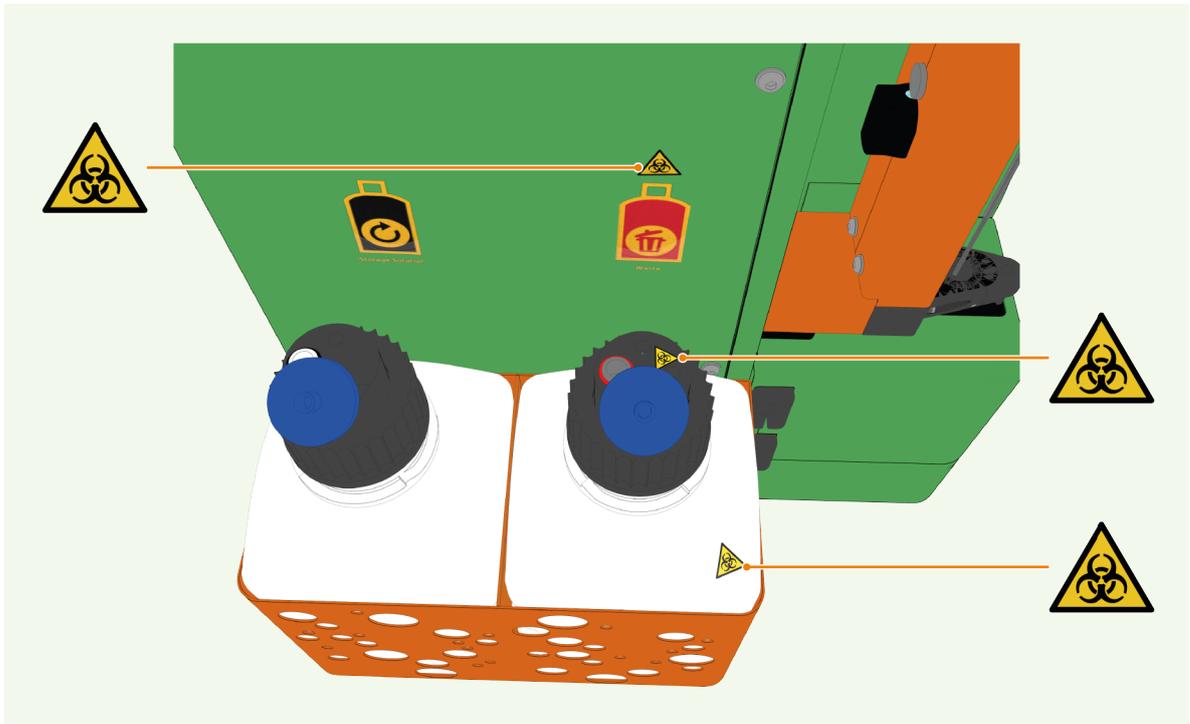


Figure 2: Zones de danger et symboles de sécurité sur le côté gauche de l'instrument

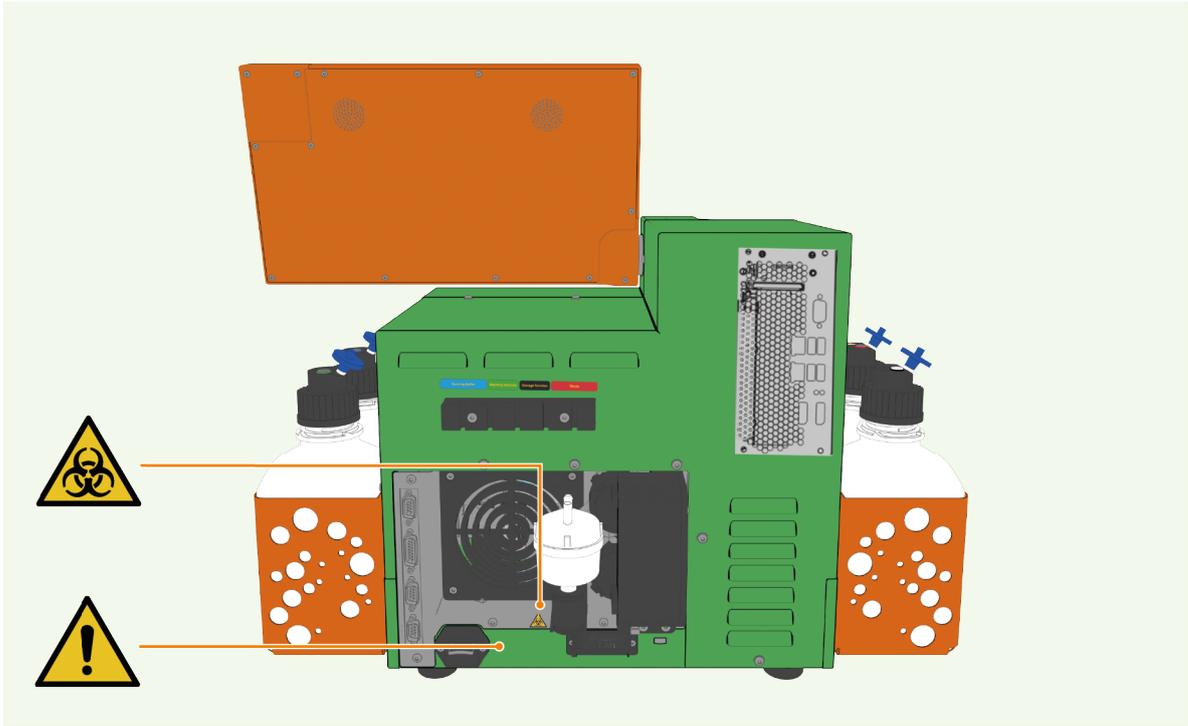


Figure 3: Zones de danger et symboles de sécurité sur l'arrière de l'instrument

Dangers électriques

⚠️ AVERTISSEMENT

Un choc électrique, un court-circuit, une surchauffe, un incendie ou une explosion peuvent causer des blessures graves ou la mort.

Boîtier de protection

Le boîtier de l'instrument réduit le risque de choc électrique et de court-circuit. Un court-circuit peut se produire si des pièces démontées ou des objets tombent à l'intérieur de l'instrument. Les étincelles dues à un court-circuit peuvent enflammer des vapeurs ou matières combustibles. Le boîtier de protection empêche la propagation d'incendie. N'utilisez pas l'instrument dans des zones classées dangereuses, comme les environnements chargés en oxygène.

- Ne retirez pas et ne franchissez pas le capot du boîtier, sauf la partie d'accès à l'avant.
- Seul le personnel de service de Miltenyi Biotec est autorisé à retirer les couvercles de l'instrument.
- N'utilisez pas l'instrument s'il est ouvert ou démonté.
- N'utilisez pas l'instrument s'il est tombé ou endommagé.
- N'utilisez pas l'instrument si un objet a pénétré à l'intérieur de l'instrument.

Surchauffe et risque d'incendie

Protégez l'instrument de toute surchauffe.

- Laissez suffisamment d'espace autour de l'instrument (au moins 15 cm de chaque côté).
- Ne posez pas l'instrument à proximité de sources de chaleur, un radiateur par exemple.
- Ne couvrez pas les orifices et ouvertures de ventilation de l'instrument.
- Assurez une circulation d'air appropriée pendant que l'instrument est en marche.

Liquides à l'intérieur de l'instrument

Du liquide dans l'instrument peut entraîner des courts-circuits.

- Protégez l'instrument des liquides renversés.
- Nettoyez immédiatement tout liquide renversé.
- Ne pas utiliser l'instrument si du liquide s'est répandu à l'intérieur.
- Débranchez l'instrument avant de le nettoyer.
- Utilisez uniquement de petites quantités d'agents de nettoyage sur un chiffon doux pour essuyer l'instrument. Ne vaporisez et ne versez pas d'agents de nettoyage sur ou dans l'instrument.

Environnements humides et poussiéreux

Les environnements humides et poussiéreux peuvent provoquer des courts-circuits.

- N'utilisez pas l'instrument dans un endroit humide ou dans des zones avec une humidité ou une condensation élevée.
- Après avoir déplacé l'instrument d'un environnement froid à un environnement à température ambiante, attendez que l'instrument se déshumidifie avant de l'utiliser.

Câbles et alimentation électrique

L'utilisation de l'instrument avec d'autres câbles que ceux fournis peut être dangereuse. L'instrument a une prise trifilaire dont une troisième fiche pour la mise à la terre. Il s'agit d'un équipement de sécurité.

- Insérer la fiche uniquement dans une prise électrique reliée à la terre. Ne pas essayer d'insérer la fiche dans une prise électrique non reliée à la terre.
- N'utilisez pas l'instrument si le câble d'alimentation est endommagé.
- Utilisez uniquement le câble d'alimentation fourni.
- N'utilisez pas de rallonge électrique ou de multiprise.
- Ne surchargez pas la prise de courant.

Dangers biologiques

AVERTISSEMENT

Selon le matériel utilisé, une contamination ou une infection peuvent causer des blessures graves ou la mort.

Matériel biologique

Tous les matériels biologiques doivent être considérés comme potentiellement infectieux.

- N'ouvrez pas les capots d'accès à l'avant lorsque l'instrument est en marche. Les procédures de maintenance explicitement décrites dans le présent Guide sont les seules exceptions.
- Tenez-vous éloigné du porte aiguille robotisé lorsque l'instrument est en marche.
- Portez des équipements de protection individuelle (tels que des gants, lunettes de protection, etc.) suivant les indications fournies dans la fiche de données de sécurité de la substance en question.
- Des gouttelettes peuvent s'échapper du système. Utilisez l'instrument dans une enceinte de sécurité biologique adapté à l'échantillon utilisé si des matières dangereuses ou potentiellement infectieuses sont traitées.
- Décontaminez l'instrument après la manipulation de matériel dangereux ou potentiellement infectieux.

- En cas de dispersion ou de fuite de matériel dangereux ou potentiellement infectieux du système, décontaminez la zone touchée.
- Ne continuez pas à utiliser des accessoires ou pièces de l'instrument contaminés.
- Exécutez le programme **Clean** avant les interventions d'entretien sur toute partie du système fluide.
- Ne chargez et ne déchargez pas d'échantillons ou de portoirs lorsque l'instrument est en mouvement.
- Laissez suffisamment d'espace autour du MACS MiniSampler Plus (au moins 15 cm à gauche et à droite).

Déchets

Tous les déchets liquides et solides doivent être considérés comme dangereux.

- Remplissez au préalable le flacon à déchet vide avec un désinfectant approprié en observant les spécifications du fabricant.
- Remplacez le flacon à déchets immédiatement après l'avoir démonté et fixez le bouchon au nouveau flacon.
- Gardez toujours un flacon à déchets vide à portée de main.
- Pour éviter les renversements, n'installez qu'un seul flacon à la fois.
- Autoclavez les déchets ou décontaminez-les à l'aide d'un désinfectant approprié.
- Observez les réglementations générales de sécurité du laboratoire lors de la manipulation de déchets liquides et solides.
- Respecter les réglementations locales relatives à l'élimination des déchets.

Domages de l'équipement

Des équipements défectueux ou inadéquats peuvent provoquer un risque biologique.

- Inspectez toujours le système fluide et contrôlez la présence éventuelle de fuites avant d'utiliser l'instrument.
- Remplacez les filtres à air hydrophobes une fois par an pour éviter toute obstruction due aux dépôts de poussière.
- Remplacez les filtres à air hydrophobes s'ils sont entrés en contact direct avec quelque liquide que ce soit, afin d'éviter le colmatage des filtres et de prévenir la contamination des liquides.

Dangers chimiques

AVERTISSEMENT

Les substances et les réactifs peuvent être dangereux.

- Toutes les mesures de sécurité indiquées à la rubrique **Dangers biologiques** s'appliquent également à toutes les substances ou tous les réactifs susceptibles d'être présents dans l'échantillon.
- Utilisez l'instrument sous une hotte si des substances et réactifs dangereux sont traités.
- Utilisez toujours toute substance ou tout réactif en suivant les indications figurant dans la fiche de données de sécurité correspondante.

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Dangers liés au champ magnétique

⚠️ AVERTISSEMENT

L'instrument est équipé d'un aimant puissant.

Les champs magnétiques puissants peuvent influencer le fonctionnement des stimulateurs cardiaques ou des implants médicaux électroniques.



Les personnes qui portent un stimulateur cardiaque ou des implants médicaux électroniques doivent rester à une distance d'au moins 30 cm de l'instrument.

⚠️ ATTENTION

L'instrument est équipé d'un aimant puissant.

Les objets aimantables peuvent subitement se déplacer vers l'aimant.

- Gardez tous les dispositifs de stockage magnétiques, équipements électroniques et objets aimantables à une distance d'au moins 30 cm de l'instrument.

Dangers mécaniques

⚠️ ATTENTION

Pièces amovibles

Risque d'écrasement ou de coupure.

Porte aiguille robotisé

Le porte aiguille robotisé est en mouvement lorsque l'instrument est en marche.

- N'utilisez pas l'instrument sans la protection d'aiguille.
- Tenez-vous éloigné du porte aiguille robotisé lorsque l'instrument est en marche.
- Ne bloquez pas le mouvement du porte aiguille robotisé.

MACS MiniSampler Plus

Le chariot du MACS MiniSampler Plus est mobile.

- Tenez-vous éloigné du MACS MiniSampler Plus lorsque l'instrument est en marche.
- Arrêtez ou annulez toujours tout processus avant de manipuler des matériels accessoires ou des consommables.
- Ne chargez et ne déchargez pas d'échantillons ou de portoirs lorsque l'instrument est en mouvement.

Système fluide

Les pompes à seringue font partie du système fluide. Elles sont en mouvement lorsque l'instrument est en marche.

- Tenez-vous éloigné du système fluide lorsque l'instrument est en marche.
- N'ouvrez pas les capots d'accès à l'avant lorsque l'instrument est en marche.

Dangers liés au rayonnement optique

⚠️ ATTENTION

Une exposition aux rayonnements optiques peut entraîner des lésions oculaires.

Éclairage des flacons

Des LEDs puissantes sont utilisées pour éclairer les flacons. Le rayonnement provenant des unités démontées peut entraîner une blessure oculaire. Selon la norme internationale CEI 62471, ce système de lampe dépasse le groupe sans risque et il existe des risques liés à l'utilisation de l'instrument. Le quotient de danger (QD) mesuré à une distance de 20 cm des supports de flacons étant de 0,91, la distance de risque est de 19 cm pour le groupe de risque 1.

- Ne regardez pas directement le rayonnement des LEDs.
- Ne démontez, ne modifiez et ne retirez pas les sources de rayonnement LEDs ni leurs supports de montage. Les sources de rayonnement LED n'arrêtent pas automatiquement d'émettre lorsqu'elles sont démontées.
- Ne retirez pas les support des flacons sauf si l'instrument est intégré dans un système de manipulation des liquides.

Dangers liés aux rayonnements laser

ATTENTION

Une exposition directe au faisceau laser peut entraîner des lésions oculaires.

Détection des portoirs

L'instrument est équipé de quatre lasers à émission de surface à cavité verticale (VCSEL) pour la détection automatique des portoirs (classe 1M). Le rayonnement n'est pas visible.

- Ne regardez pas le port des VCSEL à travers des instruments optiques tels que des lentilles, des verres grossissants, etc.
- Ne regardez pas directement le rayonnement LED ni le rayonnement LED réfléchi d'une surface réfléchissante.
- Maintenez une distance de 100 mm.
- Évitez d'ajuster le trajet du faisceau laser à la même hauteur que l'œil humain lorsqu'il est en marche.

Laser

L'instrument est équipé de trois lasers continus. Les lasers sont de classe 3B. Les lasers sont sécurisés par un boîtier de protection.

- Ne retirez pas le boîtier de protection.

	Puissance de sortie	Durée d'impulsion	Longueur d'ondes
MACSQuant Analyzer 10			
Détection de porte-éprouvettes	3.3 mW	215 µs	850 nm
Laser interne 1	40 mW	Continu	405 nm
Laser interne 2	30 mW	CoContinu	488 nm
Laser interne 3	20 mW	Continu	640 nm
MACSQuant Analyzer 16			
Détection de porte-éprouvettes	3.3 mW	215 µs	850 nm
Laser interne 1	63 mW	Continu	405 nm
Laser interne 2	50 mW	Continu	488 nm
Laser interne 3	70 mW	Continu	640 nm
MACSQuant VYB			
Détection de porte-éprouvettes	3.3 mW	215 µs	850 nm
Laser interne 1	40 mW	Continu	405 nm
Laser interne 2	50 mW	Continu	488 nm
Laser interne 3	100 mW	Continu	561 nm

Table 5.1: Puissance de sortie de laser, durée d'impulsion, et longueur d'ondes

Risques ergonomiques

AVERTISSEMENT

Instrument lourd

Risque d'élongation ou de foulure musculaire.

- L'instrument doit être soulevé par deux personnes.
- Tenez l'instrument à la base des supports pour flacons orange situés à droite et à gauche de l'instrument.

Maintenance et transport

Maintenance

Une maintenance ou une réparation inappropriée de l'instrument ou l'utilisation de pièces non autorisées peut provoquer un dysfonctionnement de l'instrument ou l'endommager. Cela peut mettre en danger les utilisateurs.

- Sauf indication contraire dans ce manuel d'utilisation ou dans toute autre documentation fournie par Miltenyi Biotec, ne procédez pas vous-même à l'entretien ou la réparation de l'instrument.
- La maintenance et la réparation doivent être effectuées par du personnel de maintenance Miltenyi Biotec qualifié et certifié.
- Si l'instrument doit être révisé, décontaminez-le pour éliminer toute matière dangereuse.
- Si vous avez des questions sur la décontamination ou l'envoi, veuillez contacter le Miltenyi Biotec Technical Support pour obtenir de l'aide.
- Utilisez uniquement les accessoires et les mises à jour recommandés par Miltenyi Biotec.

- Contactez votre représentant local Miltenyi Biotec pour en savoir plus sur la révision des instruments et les contrats de révision de Miltenyi Biotec, ou consultez le site www.miltenyibiotec.com/support.

Transport

L'instrument doit être transporté avec soin dans l'emballage indiqué par Miltenyi Biotec. Des dommages internes peuvent se produire si l'instrument est soumis à des vibrations excessives ou à une chute. Si l'instrument doit être renvoyé au fabricant pour maintenance, contactez Miltenyi Biotec pour obtenir les instructions et le matériel d'emballage.

Élimination



INFORMATION CLIENT SUR LES DÉCHETS D'ÉQUIPEMENTS ÉLECTRIQUES ET ÉLECTRONIQUES (DEEE)

Éliminez vos produits Miltenyi Biotec en fin de vie conformément à la directive DEEE et à la législation applicable relative à l'élimination des déchets dangereux, qui peut varier en fonction du pays ou de la région. Les équipements électriques peuvent contenir des substances dangereuses susceptibles d'avoir un effet nocif grave sur l'environnement et/ou la santé humaine. Tous les équipements doivent être spécifiquement collectés et traités par des établissements désignés de gestion des déchets et des systèmes qualifiés de conformité à la directive DEEE. En veillant à éliminer vos déchets d'équipements électriques et électroniques en accord avec la directive DEEE et la législation applicable relative à l'élimination des déchets dangereux, vous contribuez à la préservation des ressources naturelles et à la protection de la santé humaine. Miltenyi Biotec s'engage à protéger l'environnement. Miltenyi Biotec propose des programmes de retour des produits en fin de vie dans de nombreux pays, et conclut des partenariats avec des établissements conduisant des systèmes de conformité DEEE agréés dans le monde entier. Miltenyi Biotec reprend et recycle gratuitement vos équipements Miltenyi Biotec en fin de vie. Les conditions et la disponibilité de cette offre varient selon les pays et les différentes exigences réglementaires. Selon le type et l'utilisation de votre équipement, des exigences supplémentaires peuvent s'appliquer. Avant d'expédier l'instrument au fabricant pour élimination, décontaminez-le pour éliminer tout matériel dangereux. Pour de plus amples informations, ou si vous souhaitez éliminer votre équipement Miltenyi Biotec arrivé en fin de vie, veuillez contacter votre représentant Miltenyi Biotec local ou le Miltenyi Biotec Technical Support.

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Leggere prima il manuale d'uso

AVVERTENZA

Prima di utilizzare il prodotto MACSQuant Instrument (MACSQuant Analyzer 10, VYB, or Analyzer 16), leggere queste **Informazioni importanti sulla sicurezza** e tutte le altre informazioni contenute nel manuale d'uso. Prestare particolare attenzione a tutte le avvertenze visualizzate sullo strumento. La mancata lettura e osservanza delle presenti linee guida può comportare un utilizzo improprio o scorretto e determinare danni allo strumento. L'uso improprio potrebbe anche causare gravi lesioni personali, decesso, risultati imprevisti, malfunzionamento dello strumento e usura precoce dei componenti con conseguente riduzione della vita utile dello strumento. Queste azioni possono invalidare la garanzia. Tenere il manuale d'uso e le altre istruzioni di sicurezza e d'uso forniti con lo strumento in un posto sicuro che sia accessibile a tutti gli utilizzatori per ogni esigenza futura.

In caso di dubbi riguardo all'uso in sicurezza dello strumento, contattare il fornitore di assistenza Miltenyi Biotec autorizzato o chiamare il Miltenyi Biotec Technical Support.

Istruzioni generali di sicurezza



NEL PRESENTE CAPITOLO SI DESCRIVONO LE SITUAZIONI POTENZIALMENTE PERICOLOSE ASSOCIATE A QUESTO STRUMENTO E SI FORNISCONO INFORMAZIONI IMPORTANTI SULLA SICUREZZA PER RIDURRE AL MINIMO I RISCHI E PROTEGGERE SE STESSI E GLI ALTRI.

Nel presente capitolo si forniscono informazioni importanti per la sicurezza personale e l'uso corretto dello strumento. Leggere e osservare attentamente tutte le istruzioni prima di procedere all'installazione e all'utilizzo dello strumento. Osservare le prassi generali in materia di sicurezza, oltre al presente manuale d'uso.

- Per evitare lesioni personali e danni materiali, utilizzare lo strumento solo come indicato nel presente manuale d'uso.
- Osservare le istruzioni locali per la sicurezza sul posto di lavoro, le prassi di laboratorio locali e le norme in materia di salute, sicurezza e prevenzione degli incidenti.
- Conservare il manuale d'uso in un luogo che sia sempre accessibile a tutti gli utilizzatori.
- In caso di incidenti gravi, danni allo strumento o comparsa di fumo o fiamme, interrompere immediatamente l'alimentazione elettrica.
- Per scollegare completamente lo strumento dall'alimentazione elettrica, staccare il cavo di alimentazione dalla presa.
- Assicurarsi che l'interruttore di alimentazione e la spina del cavo di alimentazione dello strumento siano facilmente accessibili.

Livelli di pericolo

Le indicazioni di avvertenza servono a mettere in guardia su situazioni pericolose e danni materiali. Nel presente manuale d'uso si utilizzano le seguenti indicazioni di avvertenza.

⚠ AVVERTENZA o **AVVERTENZA!** indica una situazione pericolosa che, se non evitata, potrebbe provocare decesso o gravi lesioni.

⚠ ATTENZIONE o **ATTENZIONE!** indica una situazione pericolosa che, se non evitata, potrebbe provocare lesioni di entità minore o moderata. Serve anche a mettere in guardia su pratiche non sicure.

AVVISO o **AVVISO** indica informazioni considerate importanti ma non correlate a pericoli (ad esempio messaggi relativi a danni materiali).

Simboli



AVVERTENZA DI SICUREZZA: CONSULTARE LA DOCUMENTAZIONE IN TUTTI I CASI IN CUI SULLO STRUMENTO COMPARE QUESTO SIMBOLO DI SICUREZZA



PERICOLO BIOLOGICO



PARTI MOBILI



FORTE CAMPO MAGNETICO



I PORTATORI DI PACEMAKER O ALTRI DISPOSITIVI ELETTRONICI IMPIANTABILI DEVONO MANTENERSI A DISTANZA



ON (ACCESO)



OFF (SPENTO)



LEGGERE IL MANUALE D'USO PRIMA DI UTILIZZARE LO STRUMENTO



FUSIBILE



RAEE (RIFIUTI DI APPARECCHIATURE ELETTRICHE ED ELETTRONICHE)



NUMERO D'ORDINE



NUMERO DI SERIE



NUMERO DI IDENTIFICAZIONE



FABBRICANTE



MARCATURA DI CONFORMITÀ EUROPEA



MARCHI DI CERTIFICAZIONE NRTL: IL PRODOTTO È CONFORME ALLE NORME DI SICUREZZA, BASATE SUL CONSENSO, IMPOSTE DALL'AMMINISTRAZIONE DELLA SICUREZZA E DELLA SALUTE SUL LAVORO (OSHA), DETERMINATE DAL LABORATORIO DI PROVA RICONOSCIUTO A LIVELLO NAZIONALE (NRTL) TÜV SÜD



CONFORMITÀ VALUTATA DEL REGNO UNITO

Etichette di sicurezza

Prestare attenzione ai punti pericolosi e ai simboli di sicurezza dello strumento.

- Mantenere le etichette e i contrassegni sicurezza puliti e leggibili.
- Controllare regolarmente le etichette e i contrassegni di sicurezza e sostituirli se non sono leggibili o identificabili da una distanza sicura.
- Contattare Miltenyi Biotec per la sostituzione delle etichette.

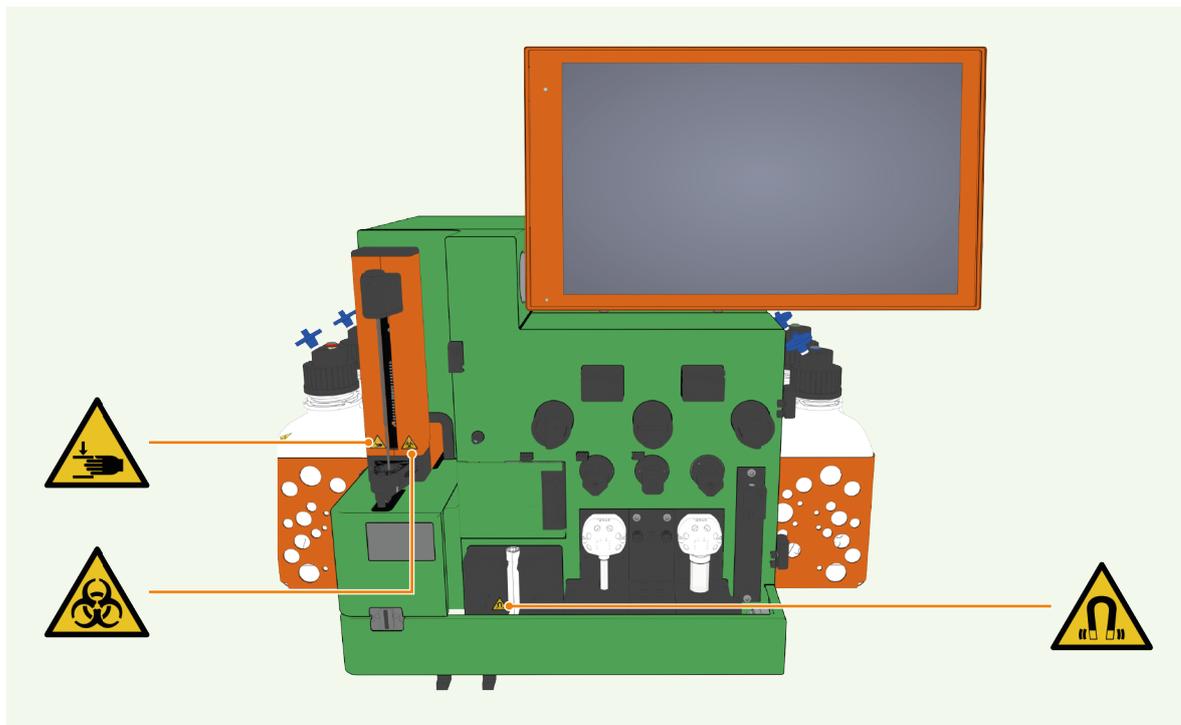


Figure 1: Aree di pericolo e simboli di sicurezza sul lato frontale dello strumento.

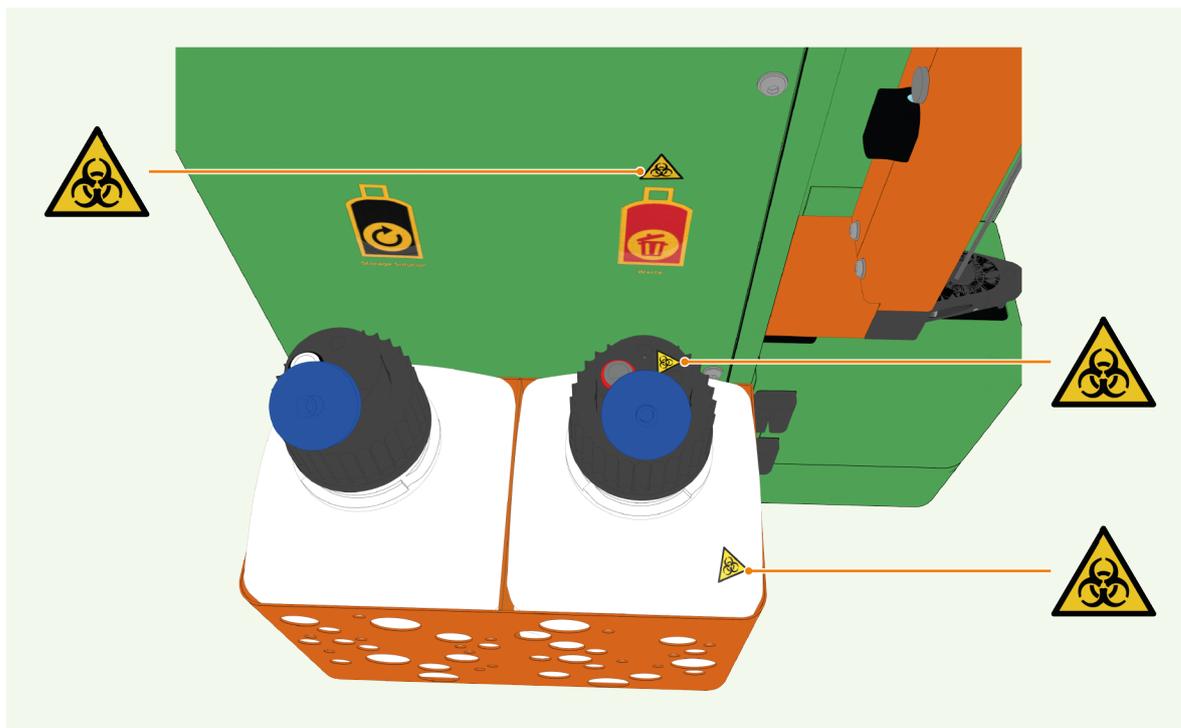


Figure 2: Aree di pericolo e simboli di sicurezza sul lato sinistro dello strumento.

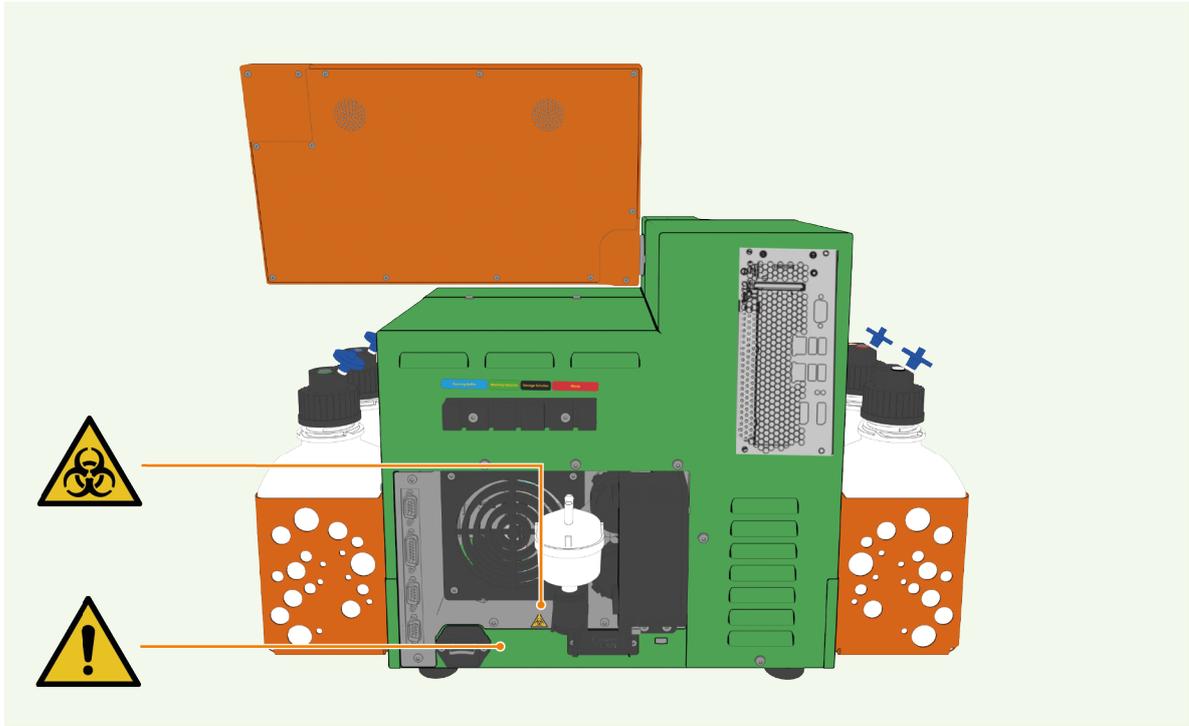


Figure 3: Aree di pericolo e simboli di sicurezza sul retro dello strumento.

Pericoli elettrici

⚠ AVVERTENZA

Scosse elettriche, cortocircuiti, surriscaldamento, incendi ed esplosioni potrebbero causare morte o gravi lesioni.

Alloggiamento di protezione

L'alloggiamento dello strumento riduce il rischio di scosse elettriche e corto circuiti. Un corto circuito può essere provocato da parti disassemblate o da oggetti caduti all'interno dello strumento. L'emissione di scintille, provocata da un corto circuito, può innescare l'accensione di vapori o materiali combustibili. L'alloggiamento di protezione impedisce la propagazione del fuoco. Non utilizzare lo strumento in aree classificate come pericolose, ad esempio in ambienti carichi di ossigeno.

- Non rimuovere né perforare le coperture dell'alloggiamento ad eccezione delle coperture di accesso frontale.
- Ogni altra copertura dello strumento può essere rimossa solo dal personale di servizio. Miltenyi Biotec
- Non utilizzare lo strumento se è aperto o smontato.
- Non usare lo strumento se è caduto o danneggiato.
- Non usare lo strumento se un oggetto è entrato al suo interno.

Surriscaldamento e pericoli di incendio

Proteggere lo strumento dal surriscaldamento.

- Lasciare uno spazio sufficiente intorno allo strumento (almeno 15 cm su tutti i lati).
- Non collocare lo strumento vicino a fonti di calore, come ad esempio i caloriferi.
- Non coprire le fessure e le aperture di ventilazione dello strumento.
- Assicurare un'adeguata circolazione dell'aria durante il funzionamento.

Liquidi all'interno dello strumento

I liquidi all'interno dello strumento possono causare corto circuiti.

- Proteggere lo strumento da liquidi versati.
- Pulire immediatamente i liquidi versati.
- Non utilizzare lo strumento se sono penetrati liquidi all'interno dello strumento.
- Scollegare lo strumento dall'alimentazione elettrica prima di pulirlo.
- Per pulire lo strumento utilizzare solo piccole quantità di detergente su un panno morbido. Non spruzzare né versare detergenti liquidi sullo strumento o al suo interno.

Ambienti umidi e polverosi

Gli ambienti umidi e polverosi possono causare cortocircuiti.

- Non utilizzare lo strumento in luoghi umidi o in aree con elevata umidità o condensa.
- Dopo aver spostato lo strumento da un ambiente freddo a uno a temperatura ambiente, attendere che lo strumento si deumidifichi prima di utilizzarlo.

Cavi e alimentazione elettrica

L'uso dello strumento con cavi diversi da quelli forniti in dotazione è potenzialmente pericoloso. Lo strumento è dotato di una spina elettrica a tre contatti, che presenta un terzo pin per la messa a terra. Questa è una caratteristica di sicurezza.

- Inserire la spina solo in una presa elettrica con messa a terra. Non cercare di inserire la spina in una presa elettrica priva di messa a terra.
- Non utilizzare lo strumento se il cavo di alimentazione è danneggiato.
- Utilizzare esclusivamente il cavo di alimentazione incluso.
- Non utilizzare cavi di prolunga o ciabatte elettriche.
- Non sovraccaricare la presa elettrica.

Pericoli biologici

AVVERTENZA

La contaminazione o l'infezione potrebbe causare morte o gravi lesioni, a seconda del materiale utilizzato.

Materiale biologico

Tutto il materiale biologico deve essere considerato potenzialmente infetto.

- Non aprire le coperture di accesso frontale quando lo strumento è in funzione. Fanno eccezione le procedure di manutenzione esplicitamente descritte nel presente manuale.
- Mantenersi a distanza dal braccio-ago robotico mentre lo strumento è in funzione.
- Indossare dispositivi di protezione individuale (ad esempio guanti, occhiali di sicurezza ecc.) come indicato nella scheda di dati di sicurezza della specifica sostanza.
- Le goccioline potrebbero fuoriuscire dal sistema. Se si stanno trattando materiali pericolosi o potenzialmente infetti, utilizzare lo strumento in una cabina di sicurezza biologica adatta al campione in uso.
- Decontaminare lo strumento dopo aver trattato materiale pericoloso o potenzialmente infetto.

- In caso di perdita o fuoriuscita di materiale pericoloso o potenzialmente infetto dal sistema, decontaminare l'area interessata.
- Non continuare a utilizzare accessori o parti dello strumento contaminati.
- Prima di effettuare un intervento di manutenzione su qualsiasi parte del sistema fluidico, eseguire il programma **Clean**.
- Non caricare né scaricare campioni o rack mentre lo strumento è in movimento.
- Lasciare uno spazio sufficiente attorno al MACS MiniSampler Plus (almeno 15 cm sul lato sinistro e sul lato destro).

Scarti

Tutti gli scarti solidi e liquidi devono essere considerati pericolosi.

- Priempire la bottiglia degli scarti vuota con un apposito disinfettante secondo quanto specificato dal fabbricante.
- Sostituire immediatamente la bottiglia degli scarti dopo averla smontata e fissare la chiusura alla nuova bottiglia.
- Tenere sempre a disposizione una bottiglia degli scarti vuota.
- Per evitare versamenti, installare una sola bottiglia alla volta.
- Sterilizzare gli scarti in autoclave o decontamarli con un apposito disinfettante.
- Durante la manipolazione degli scarti liquidi e solidi, attenersi ai regolamenti generali sulla sicurezza in laboratorio.
- Osservare le norme locali sullo smaltimento dei rifiuti.

Danno alle apparecchiature

Apparecchiature difettose o inadeguate possono comportare un pericolo biologico.

- Prima di utilizzare lo strumento ispezionare sempre il sistema fluidico e controllare che non vi siano perdite.
- Per evitare ostruzioni dovute ai depositi di polvere, sostituire i filtri dell'aria idrofobi una volta all'anno.
- Sostituire i filtri dell'aria idrofobi se vengono a contatto diretto con i liquidi, onde evitare l'ostruzione dei filtri e prevenire la contaminazione dei liquidi.

Pericoli chimici

AVVERTENZA

Sostanze e reagenti possono essere pericolosi.

- Tutte le misure di sicurezza riportate nella sezione **Pericoli biologici** valgono anche per le sostanze e i reagenti pericolosi eventualmente presenti nel campione.
- Se si stanno trattando sostanze e reagenti pericolosi utilizzare lo strumento sotto cappa.
- Utilizzare sostanze e reagenti solo come indicato nella relativa scheda di dati di sicurezza.

Pericoli correlati ai campi magnetici

⚠ AVVERTENZA

Lo strumento è dotato di un potente magnete.

Forti campi magnetici potrebbero influenzare il funzionamento di pacemaker o impianti medici elettronici.



Se si indossano pacemaker o dispositivi medici elettronici impiantabili, mantenere una distanza di almeno 30 cm dallo strumento.

⚠ ATTENZIONE

Lo strumento è dotato di un potente magnete.

Gli oggetti magnetizzabili potrebbero muoversi improvvisamente verso il magnete.

- Mantenere tutti i dispositivi di archiviazione magnetica, le apparecchiature elettroniche e gli oggetti magnetizzabili a una distanza di almeno 30 cm dallo strumento.

Pericoli meccanici

⚠ ATTENZIONE

Parti mobili

Rischio di taglio o schiacciamento.

Braccio-ago robotico

Il braccio-ago robotico si muove mentre lo strumento è in funzione.

- Non utilizzare lo strumento senza la protezione dell'ago.
- Mantenersi a distanza dal braccio-ago robotico mentre lo strumento è in funzione.
- Non ostacolare il movimento del braccio-ago robotico.

MACS MiniSampler Plus

Il carrello del MACS MiniSampler Plus si muove.

- Tenere lontano dal MACS MiniSampler Plus quando lo strumento è in funzione.
- Interrompere o cancellare sempre un processo prima di maneggiare hardware o materiali di consumo accessori.
- Non caricare né scaricare campioni o rack mentre lo strumento è in movimento.

Sistema fluidico

Le pompe a siringa fanno parte del sistema fluidico. Si muovono mentre lo strumento è in funzione.

- Tenere lontano dal sistema fluidico quando lo strumento è in funzione.
- Non aprire le coperture di accesso frontale quando lo strumento è in funzione.

Pericoli correlati alla radiazione ottica

ATTENZIONE

L'esposizione alle radiazioni ottiche potrebbe provocare lesioni agli occhi.

Illuminazione del flacone

Per illuminare le bottiglie si utilizzano potenti LED. Le radiazioni delle unità smontate possono causare lesioni agli occhi. Secondo lo standard internazionale CEI 62471, questo sistema di lampade supera il gruppo di rischio esente e vi sono rischi dipendenti dall'uso dello strumento. Il valore del pericolo di esposizione (EHV) misurato a una distanza di 20 cm dai supporti per flaconi è pari a 0,91, e la distanza di rischio è di 19 cm per il gruppo di rischio 1.

- Non guardare direttamente le radiazioni dei LED.
- Non smontare, modificare o rimuovere le sorgenti di radiazioni LED installate o le relative staffe di montaggio. Le sorgenti di radiazioni LED non smettono automaticamente di emettere quando vengono smontate.
- Non rimuovere i supporti per flaconi se non si integra lo strumento in un sistema di trattamento dei liquidi.

Pericolo di radiazioni laser

ATTENZIONE

L'esposizione diretta al raggio laser può provocare lesioni agli occhi.

Rilevamento del rack

Lo strumento è dotato di quattro laser a cavità verticale a emissione superficiale (VCSEL) per il rilevamento automatico dei rack (Classe 1M). La radiazione non è visibile.

- Non guardare la porta VCSEL attraverso strumenti ottici come lenti, occhiali di ingrandimento, ecc.
- Non guardare direttamente le radiazioni LED o le radiazioni LED riflesse da una superficie specchiata.
- Mantenere una distanza di 100 mm.
- Evitare che il percorso del raggio luminoso si trovi alla stessa altezza dell'occhio umano durante il funzionamento.

Laser

Lo strumento dispone di tre laser a onda continua. I laser sono classificati come laser di classe 3B. I laser sono protetti da un alloggiamento protettivo.

- Non rimuovere l'alloggiamento protettivo.

	Potenza di uscita	Durata dell'impulso	Lunghezza d'onda
MACSQuant Analyzer 10			
Rilevamento del portaprovette	3.3 mW	215 µs	850 nm
Laser interno 1	40 mW	Continuativo	405 nm
Laser interno 2	30 mW	Continuativo	488 nm
Laser interno 3	20 mW	Continuativo	640 nm
MACSQuant Analyzer 16			
Rilevamento del portaprovette	3.3 mW	215 µs	850 nm
Laser interno 1	63 mW	Continuativo	405 nm
Laser interno 2	50 mW	Continuativo	488 nm
Laser interno 3	70 mW	Continuativo	640 nm
MACSQuant VYB			
Rilevamento del portaprovette	3.3 mW	215 µs	850 nm
Laser interno 1	40 mW	Continuativo	405 nm
Laser interno 2	50 mW	Continuativo	488 nm
Laser interno 3	100 mW	Continuativo	561 nm

Table 6.1: Potenza di uscita, durata dell'impulso, e lunghezza d'onda

Pericoli ergonomici

AVVERTENZA

Strumento pesante.

Rischio di strappo o stiramento muscolare.

- Per sollevare lo strumento sono necessarie due persone.
- Afferrare lo strumento alla base dei cestelli portabottiglie arancioni situati su entrambi i lati dello strumento.

Manutenzione e trasporto

Interventi di manutenzione

Interventi di manutenzione o riparazione impropri sullo strumento o l'uso di parti non autorizzate possono causare malfunzionamento o danni allo strumento. Ciò può comportare pericoli per gli utilizzatori.

- Salvo quanto altrimenti specificato nel presente manuale d'uso o in altra documentazione di Miltenyi Biotec, la manutenzione o la riparazione dello strumento da soli.
- Gli interventi di manutenzione e riparazione devono essere eseguiti da personale di servizio Miltenyi Biotec certificato e qualificato.
- Se lo strumento necessita di un intervento di manutenzione, decontaminarlo per rimuovere eventuali materiali pericolosi.
- In caso di domande relative a una decontaminazione o a una spedizione corrette, contattare il Miltenyi Biotec Technical Support per ricevere assistenza.

- Utilizzare esclusivamente accessori e aggiornamenti raccomandati da Miltenyi Biotec.
- Per informazioni sull'assistenza estesa e sui contratti di assistenza di Miltenyi Biotec relativi allo strumento, rivolgersi al rappresentante Miltenyi Biotec di zona o visitare la pagina www.miltenyibiotec.com/support.

Trasporto

Lo strumento deve essere trasportato con cura nell'imballaggio specificato da Miltenyi Biotec. Danni interni potrebbero verificarsi se lo strumento è soggetto a vibrazioni eccessive o viene fatto cadere. Se lo strumento deve essere rispedito al fabbricante per assistenza, contattare Miltenyi Biotec per istruzioni e materiali di imballaggio.

Smaltimento



INFORMAZIONE PER L'UTILIZZATORE SUI RIFIUTI DI APPARECCHIATURE ELETTRICHE ED ELETTRONICHE (RAEE)

Smaltire i prodotti Miltenyi Biotec al termine del ciclo vita conformemente alla legislazione applicabile in materia di smaltimento dei RAEE e dei rifiuti pericolosi, che può variare da regione a regione e da Paese a Paese. Le apparecchiature elettriche possono contenere sostanze pericolose che a loro volta possono avere un grave effetto deleterio sull'ambiente e/o sulla salute dell'uomo. Tutte le apparecchiature devono essere raccolte e trattate in maniera specifica dagli appositi impianti per la gestione dei rifiuti e tramite piani di conformità RAEE qualificati. Provvedendo a smaltire le apparecchiature elettriche ed elettroniche non più necessarie secondo la legislazione applicabile in materia di RAEE e rifiuti pericolosi, si contribuisce a preservare le risorse naturali e a proteggere la salute dell'uomo. Miltenyi Biotec si impegna a proteggere l'ambiente. Miltenyi Biotec offre in molti Paesi programmi per la restituzione dei prodotti al termine del ciclo vita e collabora in tutto il mondo con piani di conformità RAEE autorizzati. Miltenyi Biotec accetta gratuitamente la restituzione delle apparecchiature Miltenyi Biotec al termine del ciclo vita per avviarle al riciclo. I termini e la disponibilità di questa offerta variano in base all'area geografica a causa delle differenze nei requisiti regolatori. Si noti che, a seconda del tipo di apparecchiatura e del suo impiego, possono valere requisiti aggiuntivi. Prima di rispedito lo strumento al fabbricante per lo smaltimento, decontaminare lo strumento per rimuovere eventuale materiale pericoloso. Per ulteriori informazioni o se si desidera smaltire le apparecchiature Miltenyi Biotec al termine del ciclo vita, contattare il rappresentante locale Miltenyi Biotec oppure il Miltenyi Biotec Technical Support.

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This user manual applies to following instruments running with MACSQuantify Software version 3.1 or higher.

- MACSQuant Analyzer 10 (# 130-096-343)
- MACSQuant VYB (# 130-096-116)
- MACSQuant Analyzer 16 (# 130-109-803)

In the following, the name MACSQuant Instrument refers to all three instruments. Unless further specified, the stated information applies to all instrument models.

MACSQuant Instruments are compact flow cytometers that combine multisample and multiparameter sample analysis with unrivaled ease of use. With processing rates of up to 15,000 events per second, they facilitate also absolute quantification of cell populations. MACS Antibodies and Cell Separation Reagents are designed for easy and convenient handling with MACSQuant Instruments. Miltenyi Biotec is leading provider of comprehensive solutions for flow cytometry.

1.1 Intended use

The MACSQuant Instrument is a digital benchtop flow cytometer equipped with three lasers for cellular analysis. Units are equipped with an enrichment unit for the pre-analysis enrichment of rare cells. It is intended for both phenotypic analysis with fluorescent antibodies and functional analysis of fluorescently labeled cells. The MACSQuant Instrument is intended for research use only. Only laboratory professional users are allowed to use the MACSQuant Instrument. The instrument is intended to be used only as stated in the provided instructions.

1.2 Instrument description

1.2.1 Key features of the MACSQuant Instrument

- An integrated computer controlled by a touchscreen runs the MACSQuantify Software, which is used for sample acquisition as well as for data analysis.
- A fully automated computer-controlled robotic needle arm delivers samples to the sample injection port, which is located in the washing station. The uptake needle as well as the sample injection port are automatically washed during and after cell processing.
- The Single tube rack is used for the analysis of individual samples.
- The optional MACS MiniSampler Plus allows fully automated multiple sample processing. It holds different racks that can be automatically recognized by a 2D barcode reader. The MACS MiniSampler Plus can also be combined with the Universal Reagent Rack.

- A color-coded and easy to access fluidics system supplies the MACSQuant Instrument with all buffers and solutions required during and after operation. The sheath particle filter prevents any debris from entering the fluidics system.
- Bottles for MACSQuant Running Buffer, MACSQuant Washing Solution, and MACSQuant/MACSimu Storage Solution are placed in bottle holders. Liquid waste is collected in a separate waste bottle. All fluid levels are constantly monitored and visualized by the illumination of the fluid bottles.
- The MACS Cell Enrichment Unit with the optional MACSQuant Column allows easy analysis of particularly challenging cell samples, such as rare cell populations in high volumes of buffer, or precious low volume samples.

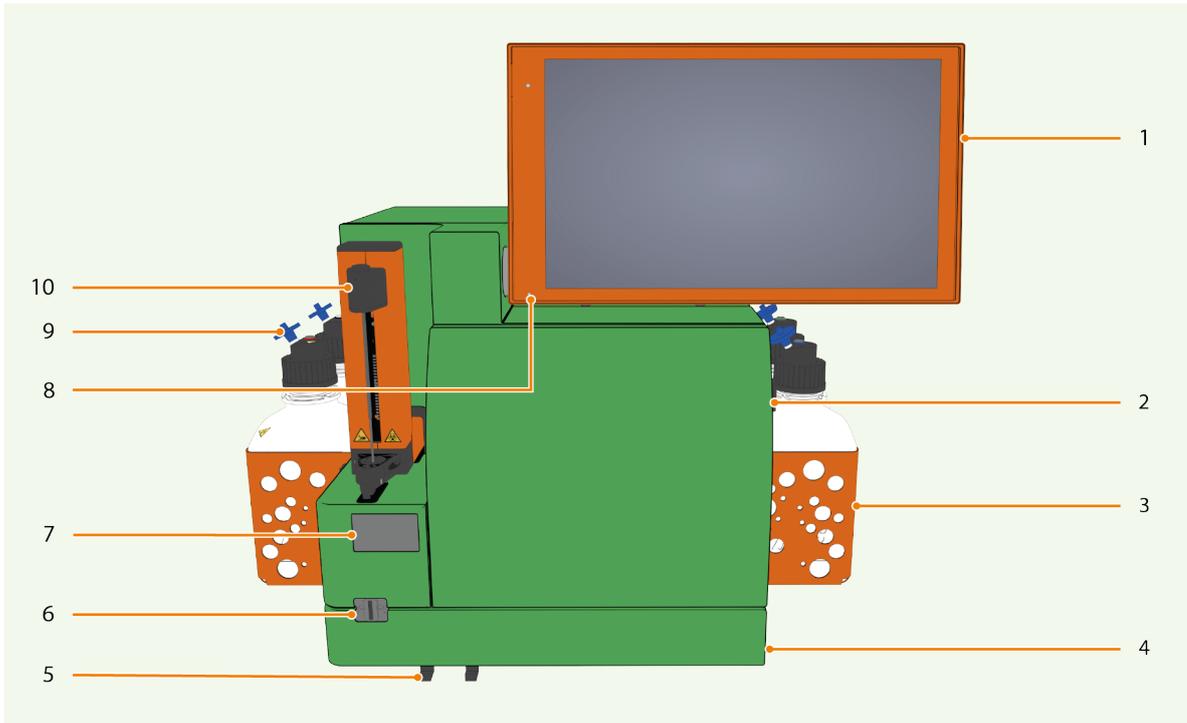


Figure 1.1: Front view of the MACSQuant Analyzer 10, VYB, and Analyzer 16

- | | | | |
|----------|--------------------------------|-----------|------------------------|
| 1 | Touchscreen | 6 | Rack detector |
| 2 | Front cover | 7 | 2D barcode reader |
| 3 | Bottle holder | 8 | LED status light |
| 4 | Main switch | 9 | Hydrophobic air filter |
| 5 | Slot for MACS MiniSampler Plus | 10 | Robotic needle arm |

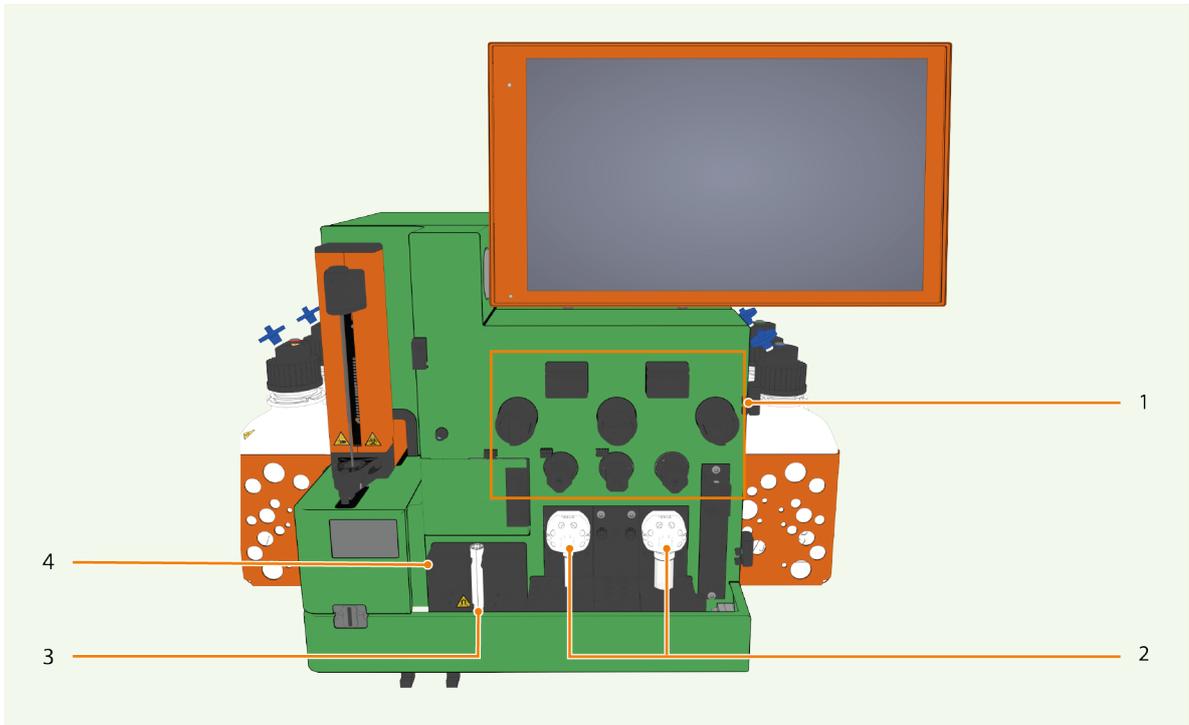


Figure 1.2: Front view of the MACSQuant Analyzer 10, VYB, and Analyzer 16 without front cover

- | | | | |
|----------|------------------------------|----------|---------------------------|
| 1 | Fluidics (tubings not shown) | 3 | MACSQuant Column |
| 2 | Syringe pumps | 4 | MACS Cell Enrichment Unit |

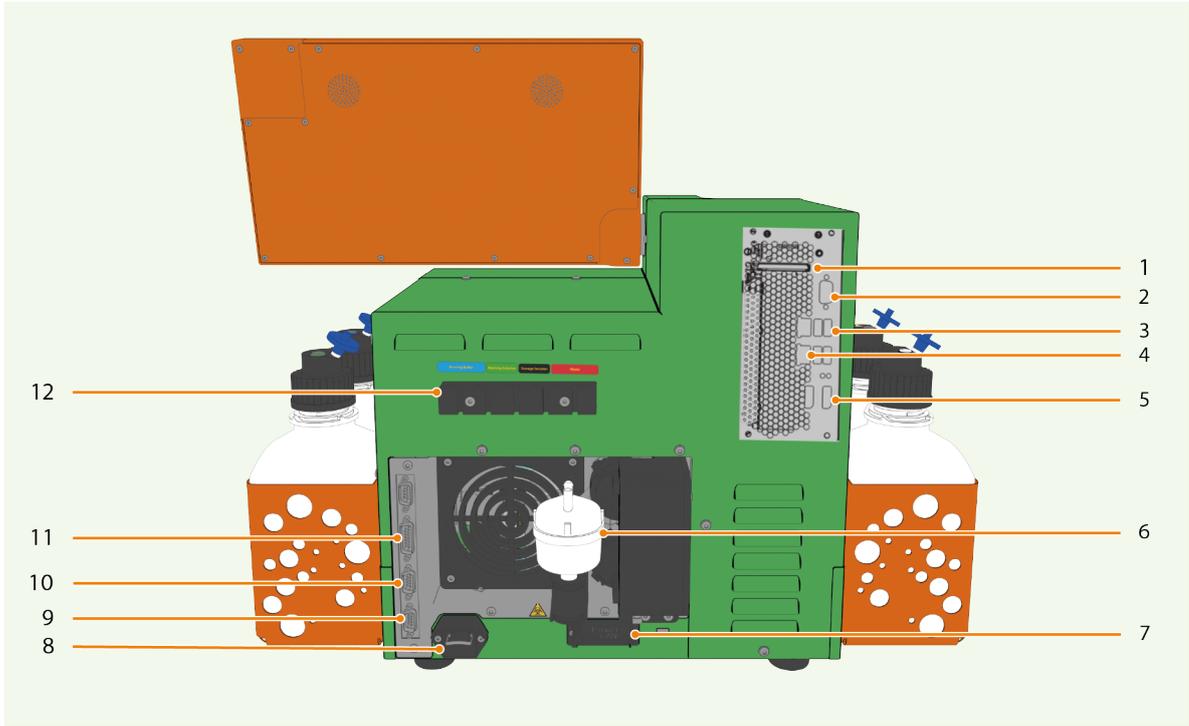


Figure 1.3: Rear view of the MACSQuant Analyzer 10, VYB, and Analyzer 16

- | | | | |
|----------|------------------------|-----------|---------------------------|
| 1 | CFast-card slot | 7 | Power CAN |
| 2 | COM port | 8 | Power cable port |
| 3 | USB ports (4×) | 9 | External CAN |
| 4 | LAN ports (2×) | 10 | RS232/BCR |
| 5 | Display ports (2×) | 11 | Bottle sensor port |
| 6 | Sheath particle filter | 12 | Bottle distribution block |

2

Installation

Unpacking and installation of the MACSQuant Instrument should be only done by qualified Miltenyi Biotec representatives.

⚠ WARNING

Electric shock, short circuit, overheating, fire, and explosion could result in death or serious injury.

- Do not use the instrument if it has been dropped or is damaged.

The instrument is designed to fit onto benchtops, into standard size laminar flows, into safety cabinets, or in connection to fully automated liquid handling systems. It should be installed on a stable, flat, and vibration-free surface. The operating environment should be dust-free, sufficiently ventilated, and free from sources of electromagnetic radiation. To ensure a flat surface in laminar flow hoods, the MACSQuant Instrument can be placed on an autoMACS Pro Laminar Hood Plate.

2.1 Components included in the delivery

Component
MACSQuant Instrument
Fluid sensor cable module
Power cable
6 × Fluidics tubing
4 × Bottle closure with sensors
Single tube rack
User manual
Empty bottles with lids
Keyboard
Hydrophobic air filters
MACSQuant Advanced Calibration Beads
MACSQuant Starting Buffer Kit

Table 2.1: Components included in the delivery

2.2 Consumables

Component	Description	Order no.
MACSQuant Columns	For use with the MACS Cell Enrichment Unit	130-094-458
Hydrophobic Air Filter	To vent fluid bottles	130-090-385
MACSQuant Advanced Calibration Beads	For instrument calibration	130-134-208
MACSQuant Running Buffer	6 × 1.5 L	130-092-747
MACSQuant Running Buffer (16x)	1 × 1.25 L	130-111-562
MACSQuant Running Buffer (16x)	6 × 1.25 L	130-111-747
MACSQuant Washing Solution	6 × 1.5 L	130-092-749
MACSQuant/MACSimas Storage Solution	6 × 1.5 L	130-092-748
MACSQuant Starting Buffer Kit	4 × 1.5 L MACSQuant Running Buffer 1 × 1.5 L MACSQuant Washing Solution 1 × 1.5 L MACSQuant/MACSimas Storage Solution	130-094-190
MACS MultiSpecies Comp Beads	One-bottle solution for compensation of the fluorescence spillover from fluorochrome-conjugated antibodies from multiple species	130-137-398
MACS All-in-One Comp Bead Kit	Single product for compensation of the fluorescence spillover from amine-reactive live/dead discriminating dyes and fluorochrome-conjugated antibodies from multiple species	130-138-867
MACS Comp Bead Kit, anti-REA	For compensation of the fluorescence spillover from fluorochrome conjugated REAfinity antibodies	130-104-693
MACS Comp Bead Kit, anti-mouse Igk	For compensation of the fluorescence spillover from mouse Igk fluorochrome-conjugated antibodies	130-097-900
MACS Comp Bead Kit, anti-rat Igk	For compensation of the fluorescence spillover from rat Igk fluorochrome-conjugated antibodies	130-107-755
MACS Comp Bead Kit, anti-human Igk	For compensation of the fluorescence spillover from human Igk fluorochrome-conjugated antibodies	130-104-187

Table 2.2: Consumables

2.3 Accessories

Complementary components can be ordered separately.

Component	Description	Order no.
MACS MiniSampler Plus	Use with the Universal Reagent Rack and one of the available Chill Racks for automated multisample processing	130-105-745
Chill 5, 15, 50 Rack Set	Set of cooling racks	130-097-038
Chill 5 Rack	Cooling rack for 24 × 5 mL tubes	130-092-951
Chill 15 Rack	Cooling rack for 15 × 15 mL and 5 × 5 mL tubes	130-092-952
Chill 50 Rack	Cooling rack for 6 × 50 mL, 3 × 15 mL, and 3 × 5 mL tubes	130-092-953
Chill 96 Rack	Cooling rack for 96-well plates	130-094-459
MACSQuant Buffer Supply Station	To connect larger fluid containers	130-101-841
Universal Reagent Rack	Rack for autolabeling reagents	130-115-722
MACS Reagent Rack 4	Rack for autolabeling reagents	130-094-574

Table 2.3: Accessories available for the MACSQuant Instrument

2.4 Service contracts

For information about available service contracts for the MACSQuant Instrument, visit www.miltenyibiotec.com.

2.5 Assembly

2.5.1 Installing the fluid bottles

WARNING

Biohazardous waste.

Contamination or infection may lead to severe personal injury or death, depending on the material used.

- Prefill the empty waste bottle with an appropriate disinfectant according to the specification of the manufacturer.

CAUTION

Powerful LEDs are used to illuminate the bottles.

Exposure to optical radiation may cause eye injury.

- Do not remove the bottle holders.

Operating the instrument requires MACSQuant Running Buffer, MACSQuant Washing Solution, and MACSQuant/MACSiMa Storage Solution. An additional bottle is required for waste collection. Always operate the instrument with ready-to-use MACSQuant buffers and solutions only. The bottles, closures, tubings, and fluid sensor cables are color-coded for easier handling.

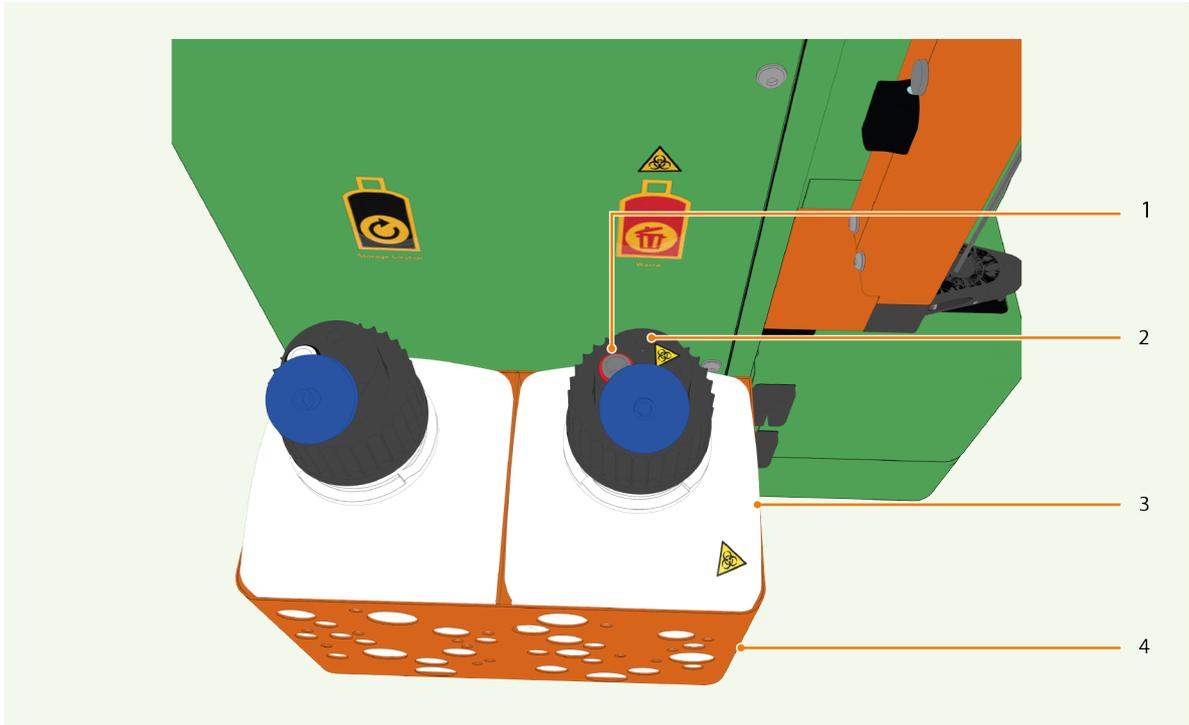


Figure 2.1: Connect fluid bottles

- 1 Install only one fluid bottle at a time. Place the new bottle (3) into the orange bottle holder (4). Note the corresponding color coding.
- 2 Unscrew the lid of the fluid bottle and replace it with the appropriate bottle closure delivered with the instrument.
- 3 Remove the caps from the bottle distribution block and connect the tubing to the appropriate color-coded fluid port of the bottle distribution block on the rear side of the instrument. See **Figure 1.3**.
- 4 Note the color coding of the tubes and connect them to the respective bottle closure (2).
- 5 Connect the 4-end fluid sensor cable to the port labeled **Bottle Sensor** at the rear side of the instrument. See **Figure 1.3**. Fasten the screws of the sensor cable plug securely.
- 6 Note the color coding and connect each fluid sensor cable to the respective bottle closure (1).

NOTICE! Do not screw in the sensor cable.

- 7 Proceed with **Installing hydrophobic air filters on the facing page**.

	Running Buffer	Washing Solution	Storage Solution	Waste container
Icon				
Color of sensor cables and tubes	Blue	Green	Black	Red

Table 2.4: Bottle symbols and their respective color-coding

2.5.2 Installing hydrophobic air filters

The MACSQuant Instrument is equipped with hydrophobic air filters to allow air flow and to prevent contamination. Use only hydrophobic air filters from Miltenyi Biotec. See **Consumables on page 70**.

- 1 Remove the Chill Rack.
- 2 Open the front cover.
- 3 Connect hydrophobic air filters via Luer connectors. See **Table 2.5** for an overview about the locations. Avoid any contact with liquids because this could cause clogging of the filter.

Location	Amount
On fluidic bottles	4×
Behind the front cover	1×
On the rear side of the instrument	1×

Table 2.5: Locations of hydrophobic air filters on the MACSQuant Analyzer 10, VYB, and Analyzer 16

2.5.3 Installing the Single tube rack

The instrument is delivered with the Single tube rack. The Single tube rack is compatible with all standard 5 mL flow cytometry tubes and can also be used with 1.5 mL and 2 mL reaction tubes.

- 1 Gently insert the Single tube rack (1) into the corresponding slots (2) located at the front of the instrument. The rack should click into place.
- 2 To remove the Single tube rack, hold it between two fingers and pull gently.

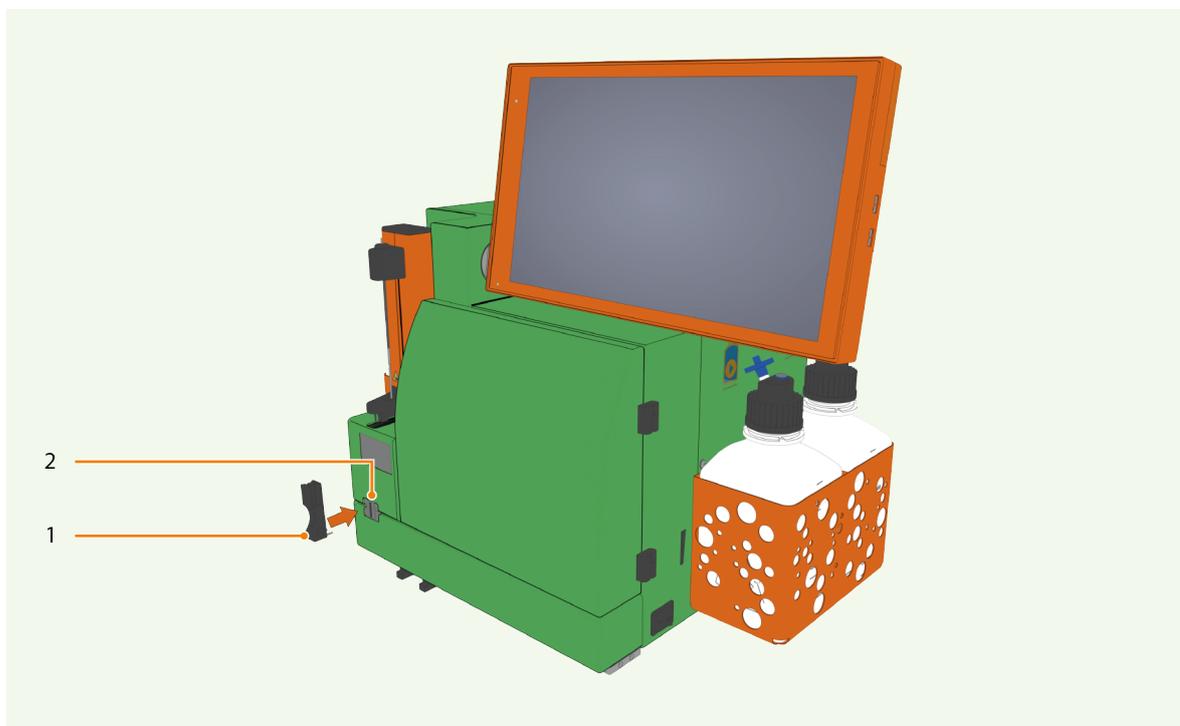


Figure 2.2: Installation of the Single tube rack

2.5.4 Connecting the instrument to the power supply

WARNING

Electric shock, short circuit, overheating, fire, and explosion could result in death or serious injury.

- Do not use the instrument if the power cable is damaged.
- Only use the included power cable.

- 1 Connect the power cable to the power port at the rear side of the instrument. The main switch is located on the right-hand side of the instrument. See **Figure 1.1**. Ensure that the main switch is in position O (off) before connecting the power cable.
- 2 Attach the cable coming from the 2D barcode reader to the port labeled **RS232/BCR** at the rear side of the instrument and fasten securely.
- 3 Plug in the power cable to a grounded electrical outlet.
- 4 Connect the keyboard included in the delivery to a USB port.
- 5 Use the main switch on the right-hand side on the instrument to turn the instrument into standby mode.
- 6 Tap the screen to start the MACSQuantify Software. Wait until the MACSQuantify Software shows the sign-in window.

2.5.5 Installing the MACSQuant Column

WARNING

The instrument has a powerful magnet.

Magnetizable objects can suddenly move towards the magnet.

- Keep all magnetic storage devices, electronic equipment, and magnetizable objects at a distance of at least 30 cm from the instrument.

WARNING

The instrument has a powerful magnet.

Strong magnetic fields can influence the functioning of pacemakers or electronic medical implants.



If wearing pacemakers or electronic medical implants, keep a distance of at least 30 cm from the instrument.

The MACSQuant Instrument is delivered with a column substitute, which must be replaced by a MACSQuant Column before using the MACS Cell Enrichment Unit. The MACS Cell Enrichment Unit is integrated in the instrument. Magnetically and fluorochrome-labeled cells are pre-enriched in the MACSQuant Column prior to cell analysis allowing flow cytometric analysis of rare cell populations in a fraction of time. Up to 5×10^6 magnetically labeled cells can be enriched and analyzed in a single step. The entire process of labeling, pre-enrichment, and flow cytometric analysis is fully automated. The MACSQuant Column can be used for up to three months before it needs to be replaced. Keep the column substitute, it can be re-installed if the MACSQuant Column is no longer needed.

Follow the instructions below to replace the column substitute or to exchange an old column with a new column.

- 1 Open the front cover of the instrument to access the MACS Cell Enrichment Unit with the column substitute or MACSQuant Column.

- 2 Hold the top and bottom of the column (1) with both hands and pull gently but firmly to remove the column from the MACS Cell Enrichment Unit (2).

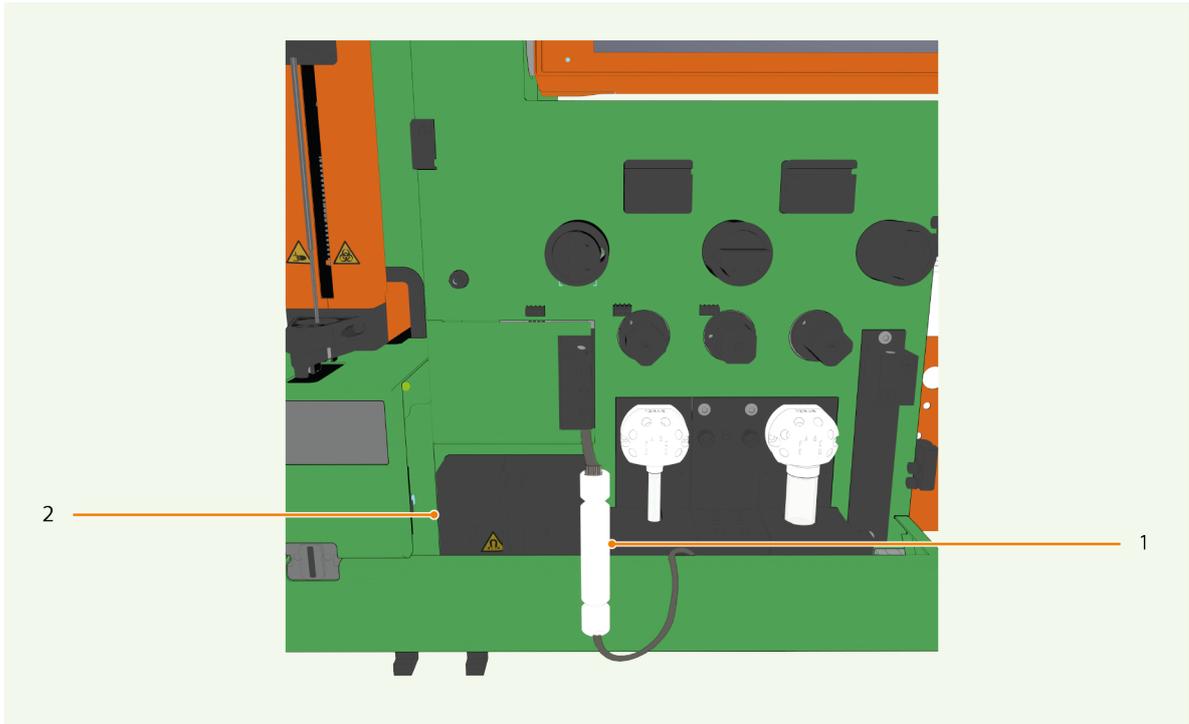


Figure 2.3: MACSQuant Column removal

- 3 Hold the column (4) in one hand and gently unscrew the top column connector (3) counterclockwise. Tilt the column downwards to empty any liquid into a paper towel.

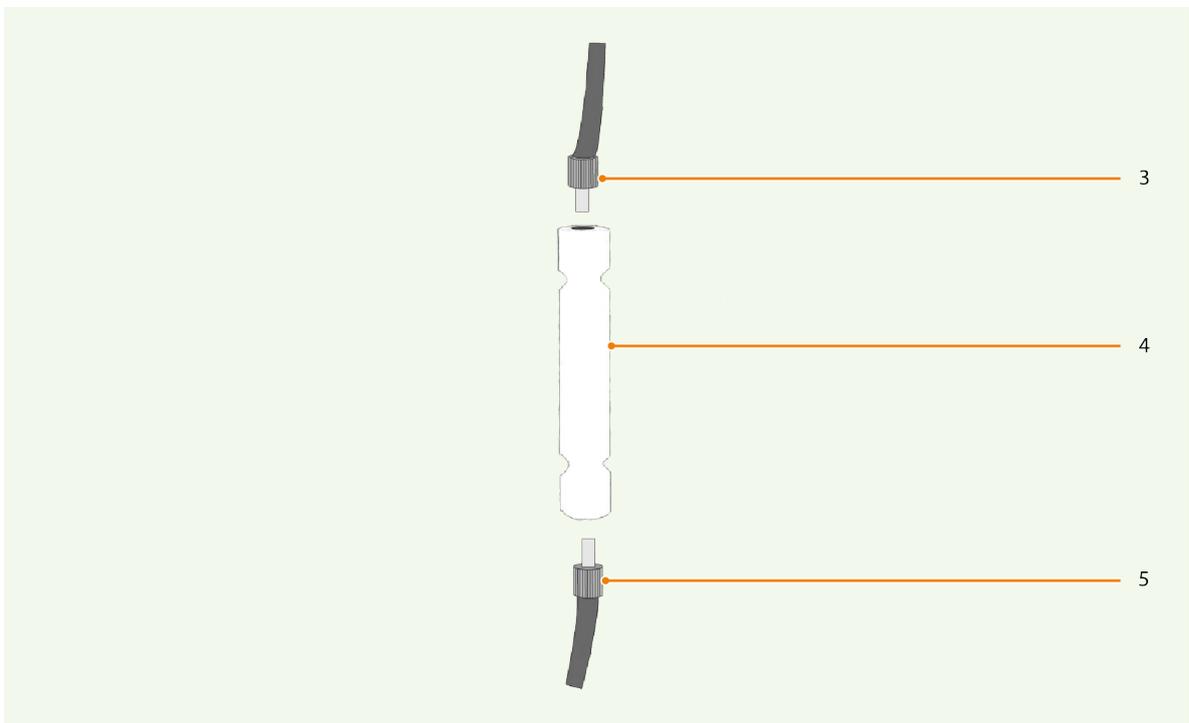


Figure 2.4: MACSQuant Column overview

- 4 Unscrew the bottom column connector (5) to remove the column.
- 5 Screw the bottom column connector into the bottom end of the new column. Note the correct orientation of the column. The top end of the MACSQuant Column has a clearly visible spacer, while the metal beads reach further to the bottom end of the column. Insert the column only with the spacer in upward position.

- 6 Point the column towards the top of the MACS Cell Enrichment Unit (2) and screw in the top column connector.
- 7 Align the column so that the top column connector sits on the guide of the magnet cover. Push the column into the slot until you hear a click. Verify that the column is placed in the center of the magnet cover.
- 8 Close the front cover of the instrument.
- 9 Log in as MQ Administrator.
- 10 To prime the new column, go to the **Tools** tab in the side pane of the MACSQuantify Software.
- 11 Select **Prime Column**. Refer to the MACSQuantifySoftware user manual for further information about Pre-enrichment of cells.

2.5.6 Installing the needle guard

- 1 Check if the needle guard (1) is attached to the robotic needle arm (2).
- 2 If not, install as depicted in **Figure 2.5**.

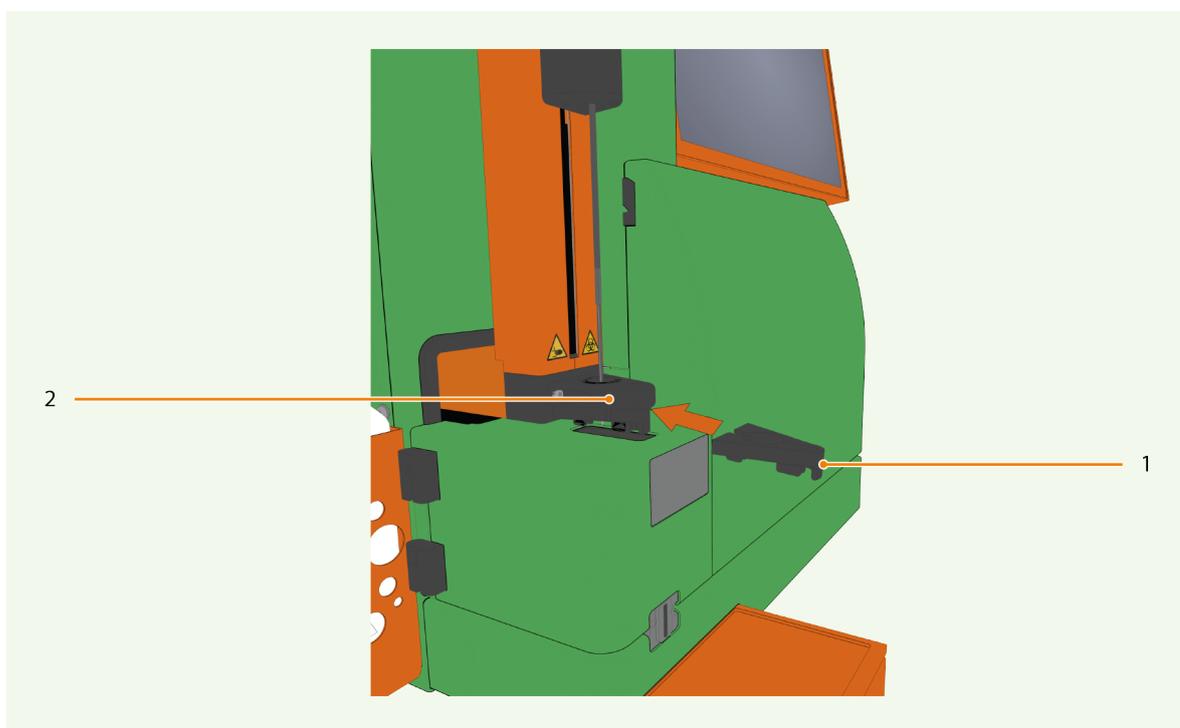


Figure 2.5: Attachment of the needle guard

2.5.7 Installing the MACS MiniSampler Plus

If using the instrument with a MACS MiniSampler Plus, follow the instructions below. The MACS MiniSampler Plus can be installed to either the autoMACS Pro or the MACSQuant Instrument (MACSQuant Analyzer 10, VYB, Analyzer 16).

Use a MACS MiniSampler Plus only with one type of instrument. After a MACS MiniSampler Plus was used with a MACSQuant Instrument, it cannot be used with the autoMACS Pro anymore.

- 1 Switch off the instrument before installing the MACS MiniSampler Plus.
- 2 Remove the transparent protection foil from the lens of the rack detector. Note the position of the MACS MiniSampler Plus slot (1) located at the front of the instrument and the MACS MiniSampler Plus guiding (2).
- 3 Tilt the MACS MiniSampler Plus.

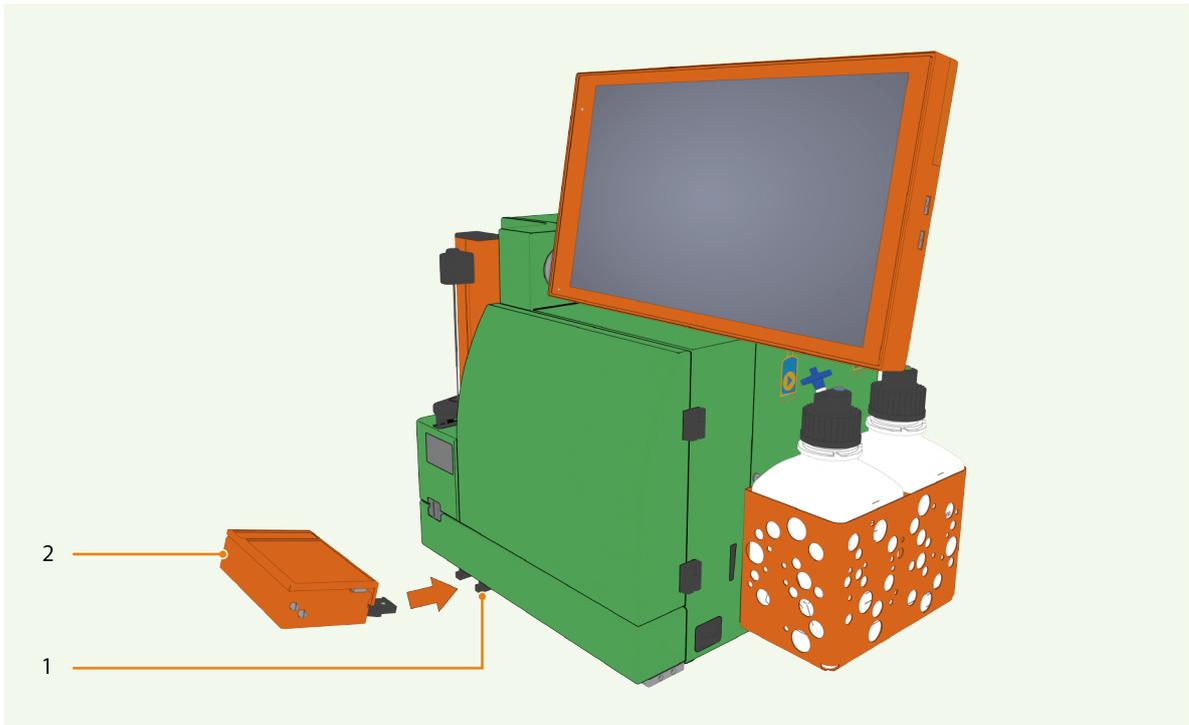


Figure 2.6: Install the MACS MiniSampler Plus

- 4 Slide the guiding into the receiving slot. Keep the MACS MiniSampler Plus in a tilted position until resistance is met.
- 5 Lower the MACS MiniSampler Plus to a horizontal position to lock it.

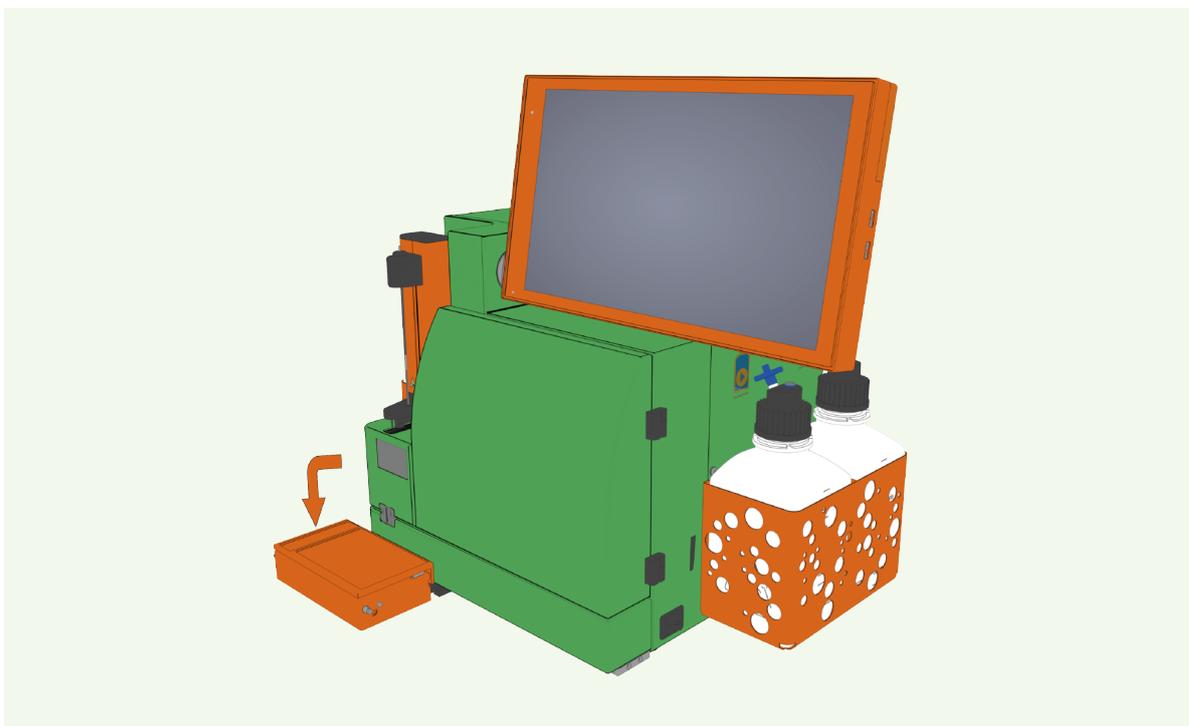


Figure 2.7: MACS MiniSampler Plus in the horizontal position

- 6 Open the front door of the instrument and fix the MACS MiniSampler Plus (4) with the screw (3).

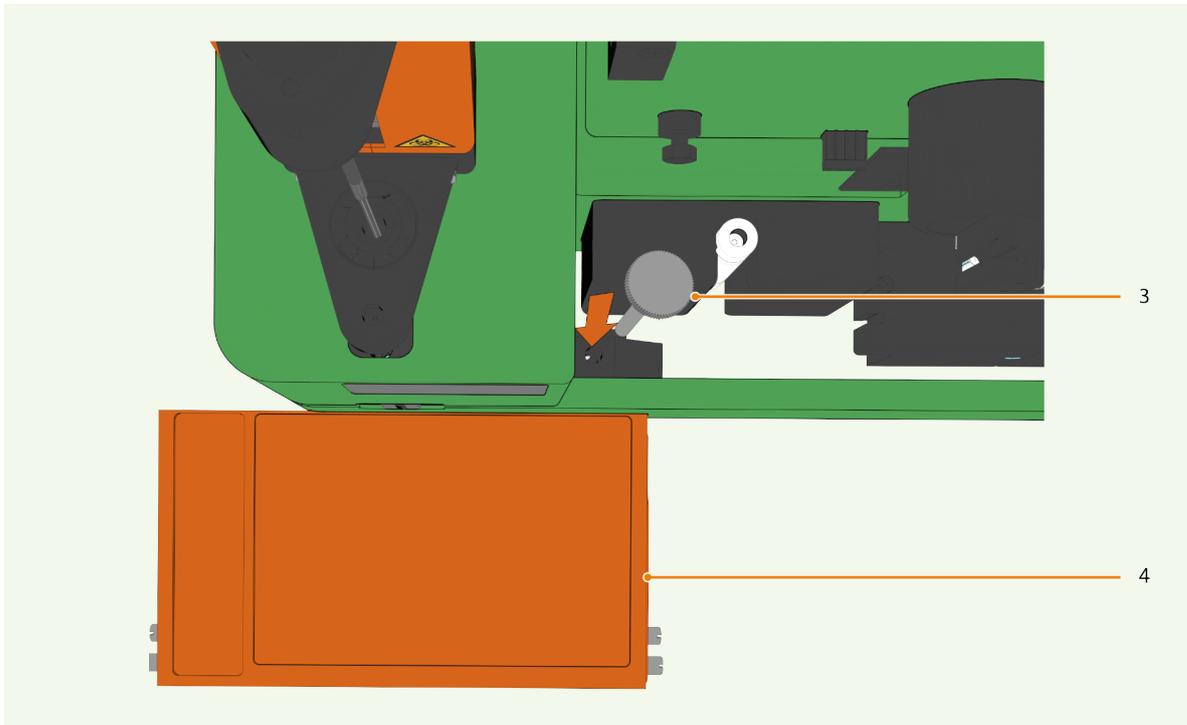


Figure 2.8: Fix MACS MiniSampler Plus in installation position

- 7** Close the front cover of the instrument and ensure that the MACS MiniSampler Plus is properly set and secured.
- 8** Guide the MACS MiniSampler Plus cable underneath the instrument and connect it to the port labeled **External CAN** at the rear side of the instrument.

2.5.8 Installing the Chill Rack and Universal Reagent Rack

- 1 Install the Universal Reagent Rack (1) onto the MACS MiniSampler Plus (3) into the left recess by snapping the engagement hook (2) into the undercut.

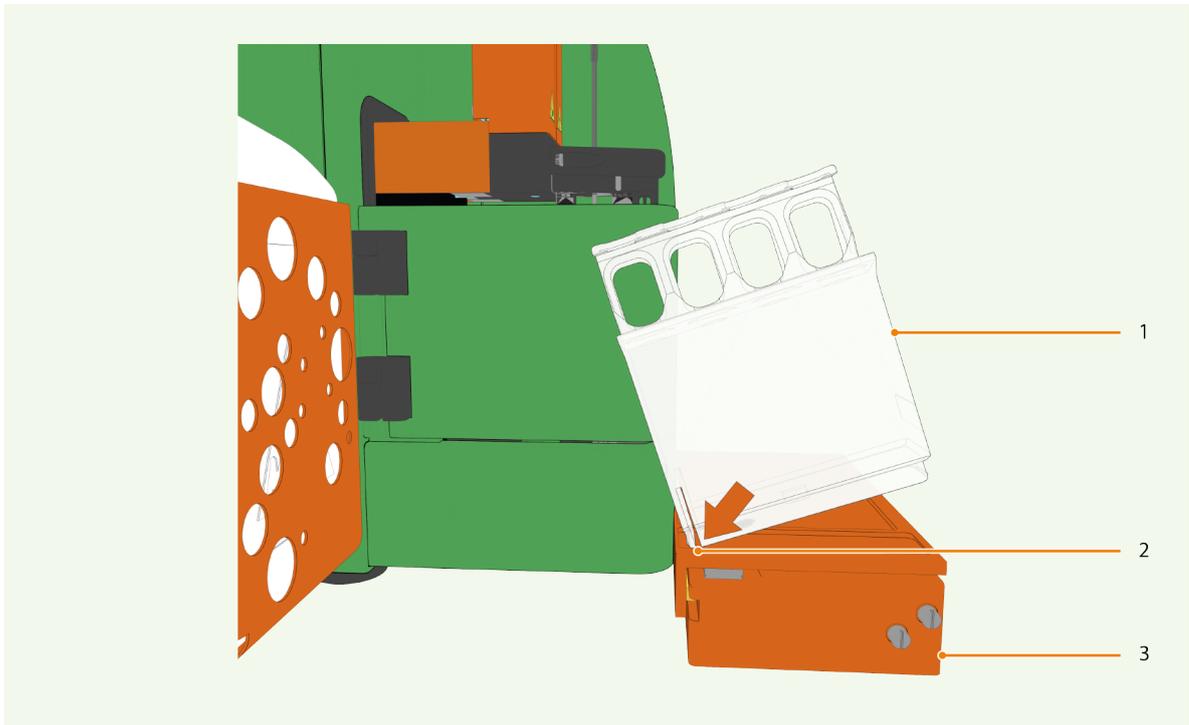


Figure 2.9: Install the Universal Reagent Rack

- 2 Place a MACS Chill Rack (4) onto the MACS MiniSampler Plus (3) into the right-hand recess, ensuring that the rack bar code is facing the instrument. If automatic recognition of the tube rack fails, the instrument shows a window for manual selection of the tube rack. Ensure the rack is placed correctly into the recess before confirming the selection of the rack.

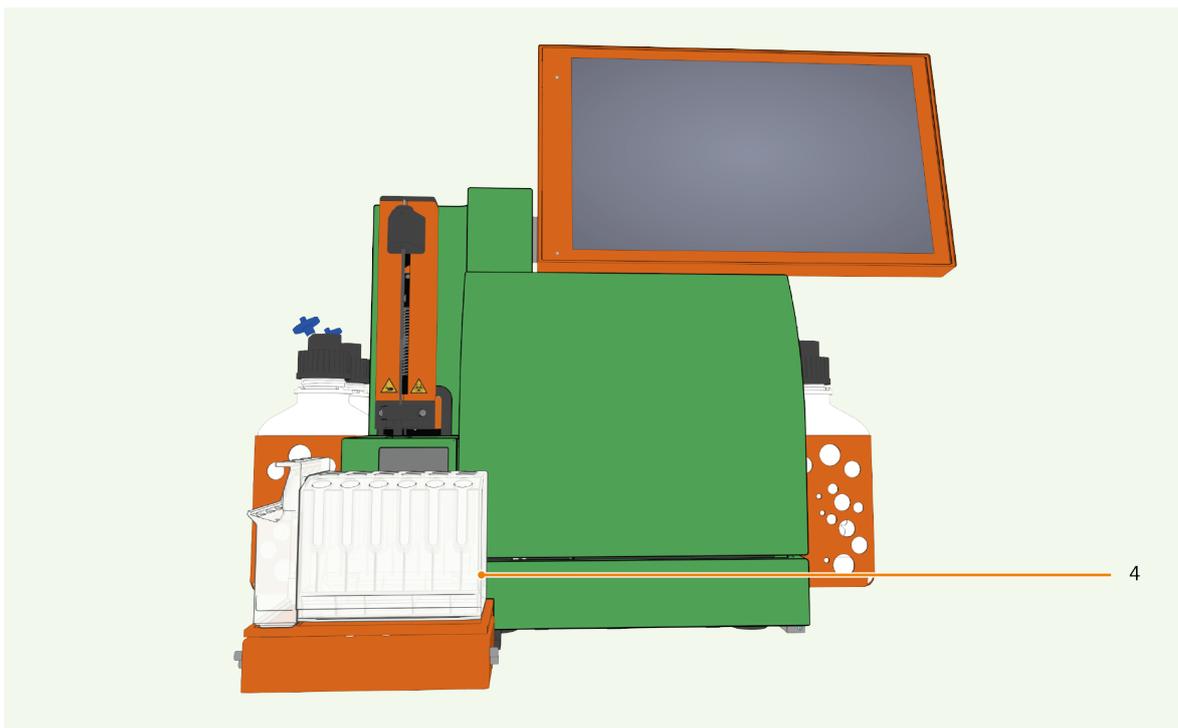


Figure 2.10: Install the MACS Chill Rack

- 3 Note the position of the lid guiding (5) at both sides of the MACS MiniSampler Plus and attach the protective cover (6). Keep the protective cover attached and closed while the instrument is in operation.

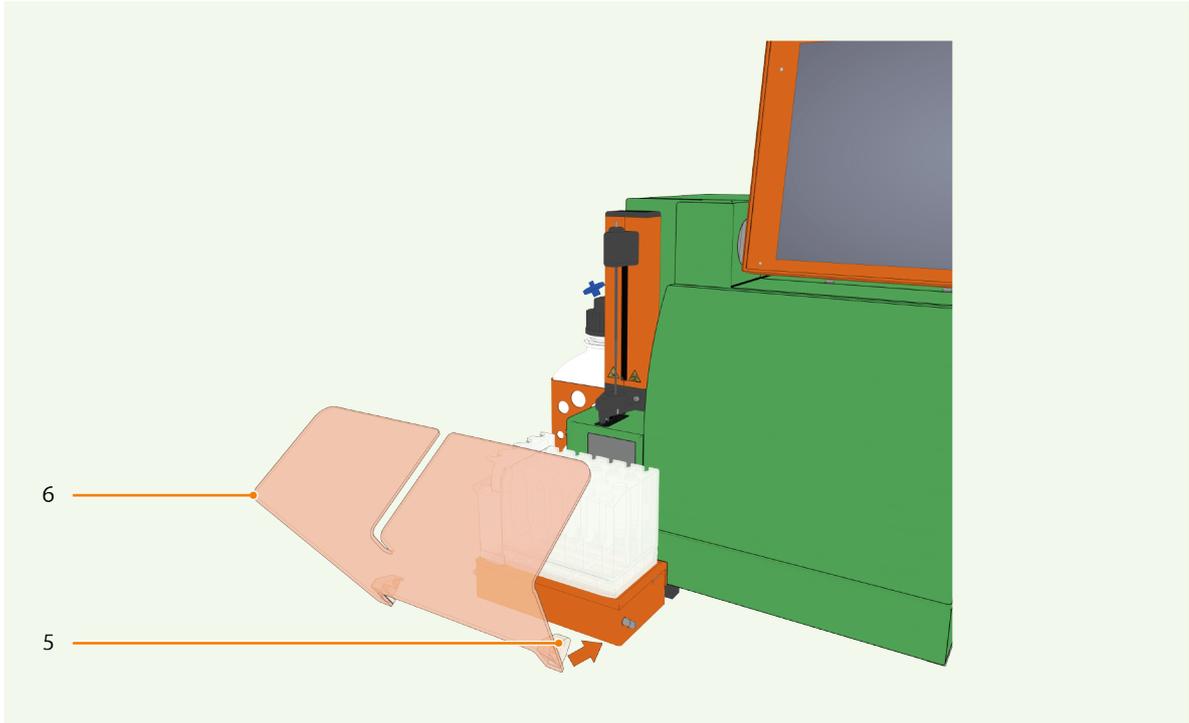


Figure 2.11: Attach the protective cover

2.5.9 Installing a webcam

Connect a webcam to a USB port at the rear side of the instrument. The webcam is recognized by the software automatically during a MACSQuant Live Support session.

Unplug the webcam during normal operation of the instrument. Use it only during a MACSQuant Live Support session.

2.5.10 Installation checklist

Ensure the correct installation of the instrument by the following checklist:

- Note the correct positioning of each fluid bottle and the waste bottle, recognizable by the color code and the symbols. This is crucial for successful analysis.
- Ensure that the correct tubing and fluid sensor cable is attached to the corresponding bottle, and that all tubing connections as well as the bottle closures are fastened. If necessary, tighten loose connections.
- Ensure that the fluid bottles are filled and installed correctly. For safe operation of the instrument, all fluid bottles must contain at least 150 mL of the respective solution. In order to prevent contamination of the fluidics system the use of non-sterile buffers and solutions is not recommended. Only use buffers and solutions supplied by Miltenyi Biotec for operation of the instrument. A reproducible and optimal performance of the instrument cannot be guaranteed when the instrument is operated using home-made buffers and/or solutions purchased from another manufacturer.
- Make sure that the waste bottle is empty and installed correctly.

WARNING! When working with biohazardous samples, it is recommended to fill the waste bottle with 100 mL of disinfectant before use. Empty bottles from the Running Buffer, Washing Solution, or Storage Solution may be used as waste bottles only with the appropriate safety label on it. For proper disposal, follow local regulation.

- Open the front cover and check that the column substitute or the MACSQuant Column is installed correctly. Ensure that the tubes are securely fastened to the column and that no part of the visible tubing is pinched or obstructed.
- Ensure that the needle guard is attached to the instrument.

WARNING! There is a hazard of crushing, shearing, or puncturing bodily parts. Operate only with attached needle guard.

When all points of this installation checklist are fulfilled, close all covers.

3

Operating the instrument

3.1 Switching on

- 1 Use the main switch on the right-hand side of the instrument to switch the instrument to standby mode. A red LED in the lower left corner of the monitor indicates that the instrument is in standby mode.
- 2 Tap the touchscreen to start the MACSQuantify Software. A sign-in window appears after a short initialization phase.
- 3 Optional: See **Priming the instrument below** to switch to acquisition mode.

For a detailed instruction how to use the MACSQuantify Software, refer to the MACSQuantify Software user manual.

3.2 Priming the instrument

WARNING

Defective or inadequate equipment can cause a biological hazard. Contamination or infection may lead to severe personal injury or death, depending on the material used.

- Always inspect the fluidics system and check for leakages before using the instrument.

- 1 To prime the instrument (power up the lasers, activate fluidics), click the **Power** button in the upper right corner of the software and select **Acquisition mode**.
- 2 Let the optical bench warm up after priming for at least 30 minutes.
- 3 Go to **View > Hardware > Lasers and detectors** to check the current laser temperature. See **Lasers and detectors on page 94**.

While the instrument is warming up, it is recommended to perform a **Flush** cycle followed by a **Clean** program. See **Cleaning programs on page 101**.

3.3 Switching off

Before switching off the instrument, start the shutdown procedure. During the shutdown procedure, the fluidics system is cleaned and filled with MACSQuant/MACSima Storage Solution.

The shutdown procedure can be started manually. Alternatively, set the instrument to automatic shutdown after a defined idle time. Refer to the MACSQuantify Software user manual for details.

3.3.1 Manual shutdown

- 1 Click the **Power** button at the upper right corner of the screen to shut down manually.
- 2 Select **Instrument off** to switch the instrument to standby mode, or select **Data analysis** to proceed with data analysis after the shutdown procedure. After a seven-minute washing procedure (default setting), the instrument is in standby or data analysis mode.
- 3 From data analysis mode select **Instrument off** to switch to standby mode.
- 4 From standby, use the main switch on the right-hand side of the instrument to switch off completely.

3.3.2 Automatic shutdown

Automatic shutdown is enabled by default after a defined idle time. A MQ Administrator can change the timer settings. Refer to the MACSQuantify Software user manual.

4

Calibration

Before using the MACSQuant Instrument for the first time, the hardware must be calibrated. Hardware calibration can only be performed by a MQ Administrator. To calibrate the hardware the user must be familiar with the MACSQuantify Software. Refer to the MACSQuantify Software user manual.

4.1 Calibrating the sample uptake unit

4.1.1 Calibrating the needle arm

 **CAUTION**

Moving robotic needle arm.

Risk of crushing or cutting.

- Do not obstruct the movement of the robotic needle arm.
- Keep away from the robotic needle arm while the instrument is in operation.

During calibration, the needle arm moves between the samples and the washing station with its sample injection port and washing port.

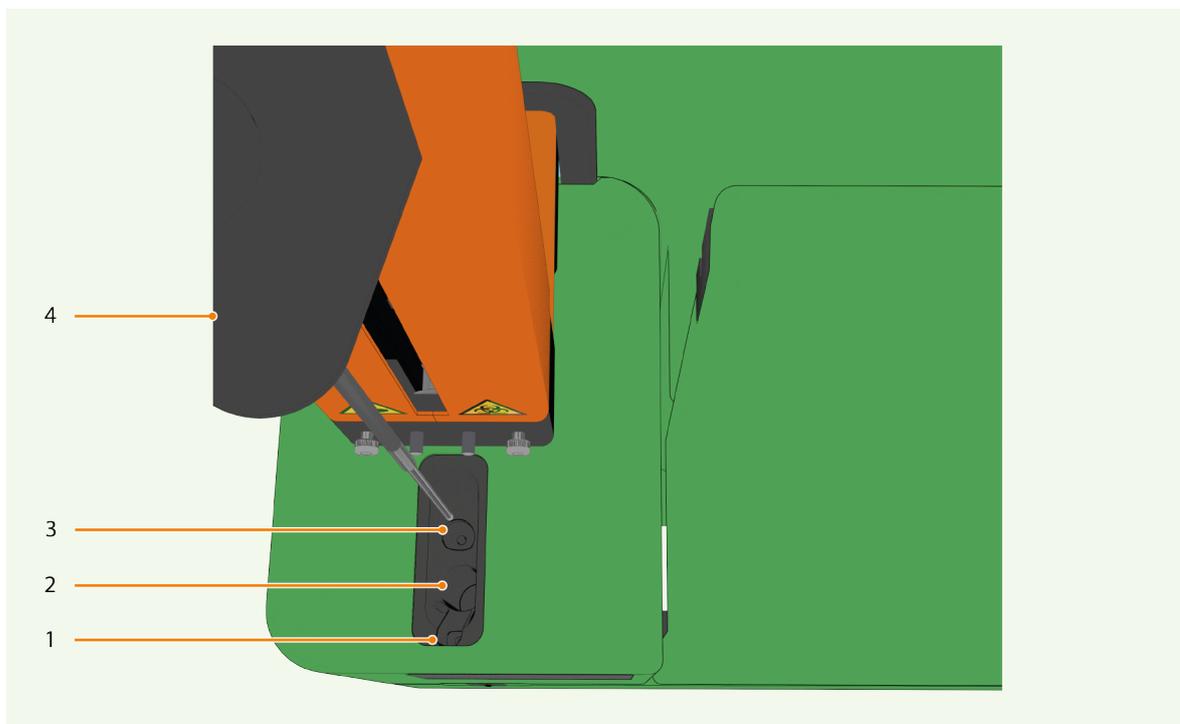
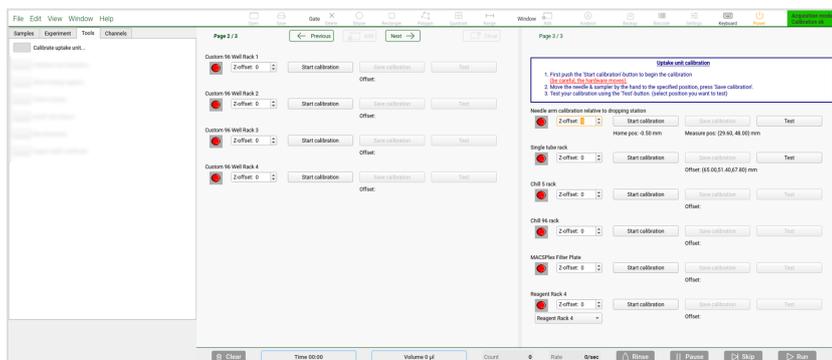


Figure 4.1: The washing station, top view (needle guard not shown)

- | | | | |
|---|-----------------------|---|--------------------|
| 1 | Sample injection port | 3 | Washing port |
| 2 | Waste port | 4 | Robotic needle arm |

- Go to the **Tools** tab in the side pane of the MACSQuantify Software and select the **Calibrate uptake unit** box. A red closed circle indicates that the respective uptake component is not calibrated.

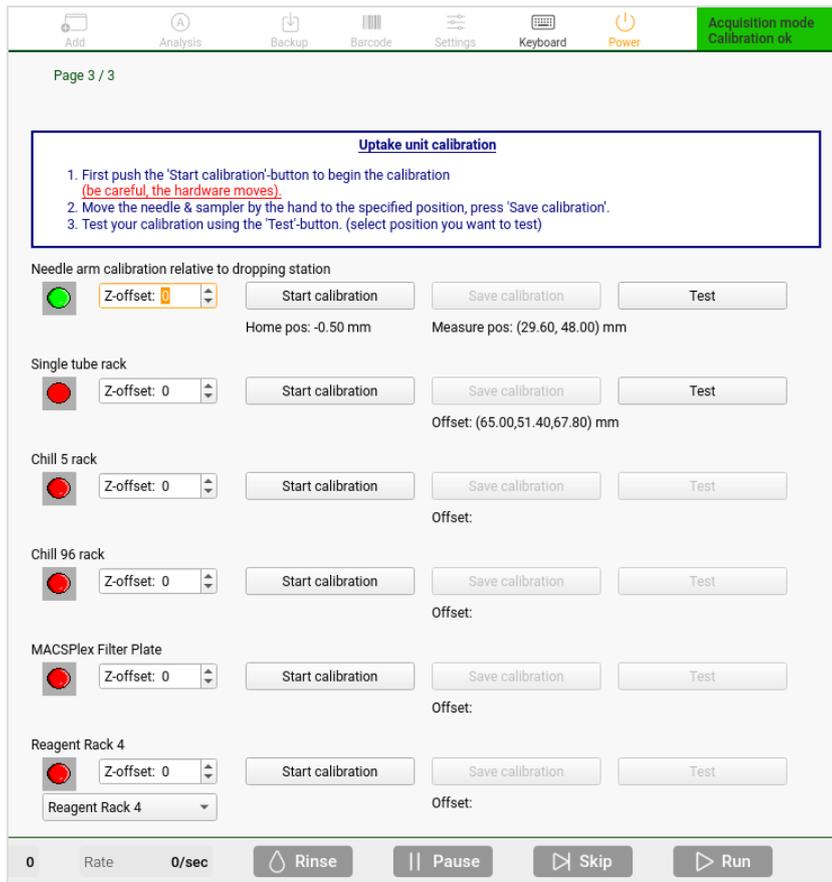


- Click **Start calibration** in the section **Needle arm calibration relative to dropping station**. The robotic needle arm moves towards the washing station before being inserted into the sample injection port.

If the uptake needle pops out of the robotic needle arm holder, a system failure is caused and a prompt screen to reinitialize appears. Re-insert the uptake needle, adjust the robotic needle arm appropriately, and click **OK** to confirm.

- Manually adjust the robotic needle arm to place the uptake needle over the center of the sample injection port.
- Gently lower the robotic needle arm manually into the sample injection port until it makes first contact with the bottom of the orifice. The uptake needle must not pop out of the needle holder and always remain perpendicular to the horizontal plane. Do not bend the needle or insert it diagonally.
- In the field Z-offset, enter 30.
- Click **Save calibration**.

- The closed green circle indicates that the calibration is completed. Click **Test** to confirm successful calibration.



4.2 Calibrating racks and plates

4.2.1 Calibrating the Single tube rack

- Go to the **Tools** tab in the side panel of the MACSQuantifySoftware and select the **Calibrate uptake unit** box. Red closed circles indicate that the uptake components are not calibrated.
- Attach the Single tube rack with an empty sample tube to the instrument. See **Installing the Single tube rack on page 73**.
- Click **Start calibration** in the section **Single tube rack**. The robotic needle arm moves automatically forward.
- Adjust the uptake needle to the center of the tube (i.e. equidistant from the tube edges). Move the needle arm forward or backward.
- Lower the robotic needle arm carefully until it almost touches the tube bottom (i.e. only a fraction of a millimeter from the bottom of the tube). To check the uptake needle position, gently wiggle the tube to ensure that there is a small amount of movement.
- Click **Save calibration**. The closed green circle indicates that the calibration is completed. Click **Test** to confirm that the correct coordinates are saved.

4.2.2 Calibrating the Chill 5 Rack

For the correct usage of the MACS MiniSampler Plus, calibrate the Chill 5 Rack.

- Attach the MACS MiniSampler Plus to the MACSQuant Instrument.
- Go to the **Tools** tab in the side pane of the MACSQuantify Software and select the **Calibrate uptake unit** box. Red closed circles indicate that the uptake components are not calibrated.

- 3 Place the Chill 5 Rack onto the MACS MiniSampler Plus and place an empty 5 mL tube in position D6.
- 4 Click **Start calibration** in the section **Chill 5 rack**. The robotic needle arm automatically moves forward.
- 5 Adjust the uptake needle to the center of the tube in position D6 (i.e. equidistant from the tube edges). Move the needle arm forward or backward. Move the MACS MiniSampler Plus for movement to the right and left side.
- 6 Lower the robotic needle arm carefully until it almost touches the tube bottom (i.e. only a fraction of a millimeter from the bottom of the tube). To check the uptake needle position, gently wiggle the tube to ensure that there is a small amount of movement.
- 7 Click **Save calibration**. The closed green circle indicates that the calibration is completed.
- 8 Select test position in the rack window in the side pane.
- 9 Click **Test** to confirm successful calibration. The MACSQuant Instrument tests selected positions.

4.2.3 Calibrating the Chill 96 Rack

- 1 Go to the **Tools** tab in the side pane of the MACSQuantify Software and select the **Calibrate uptake unit** box. Red closed circles indicate that the uptake components are not calibrated.
- 2 Place a Chill 96 Rack onto the MACS MiniSampler Plus and load an empty 96-well plate.
- 3 Click **Start calibration** in the section **Chill 96 rack**. The robotic needle arm automatically moves forward.
- 4 Adjust the uptake needle to the center of the well H12 (i.e. equidistant from the well edges). Move the needle arm forward or backward. Move the MACS MiniSampler Plus for movement to the right and left side.
- 5 Lower the robotic needle arm carefully until it almost touches the well bottom (i.e. only a fraction of a millimeter from the bottom of the well). To check the uptake needle position, gently wiggle the plate to ensure that there is a small amount of movement.
- 6 Click **Save calibration**. The closed green circle indicates that the calibration is completed.
- 7 Select test position in the rack window in the side pane.
- 8 Click **Test** to confirm successful calibration. The MACSQuant Instrument tests selected positions.

4.2.4 Calibrating the MACSPlex Filter Plate

- 1 Go to the **Tools** tab in the side pane of the MACSQuantify Software and select the **Calibrate uptake unit** box. Red closed circles indicate that the uptake components are not calibrated.
- 2 Place a Chill 96 Rack onto the MACS MiniSampler Plus and load a MACSPlex Filter Plate.
- 3 Click **Start calibration** in the section **MACSPlex Filter Plate**. The robotic needle arm automatically moves forward.
- 4 Adjust the uptake needle to the center of the well H12. Move the needle arm forward or backward. Move the MACS MiniSampler Plus for movement to the right and left side.
- 5 Lower the robotic needle arm carefully until it almost touches the well bottom (i.e. only a fraction of a millimeter from the bottom of the well).
- 6 Go to the field **Z-offset** and enter a value of -7.
- 7 Press enter.

Be careful not to damage the membrane of well H12 when calibrating the MACSPlex Filter Plate.

- 8 Click **Save calibration**. The closed green circle indicates that the calibration is completed.
- 9 Select test position in the rack window in the side pane.
- 10 Click **Test** to confirm successful calibration. The MACSQuant Instrument tests selected positions.

4.2.5 Calibrating the Universal Reagent Rack

- 1 The MACSQuant Instrument can be used in combination with both the Universal Reagent Rack and the Reagent Rack 4. The instructions for calibration apply to both.
- 2 Go to the **Tools** tab in the side pane of the MACSQuantify Software and select the **Calibrate uptake unit** box. Red closed circles indicate that the uptake components are not calibrated.
- 3 Place the Universal Reagent Rack onto the MACS MiniSampler Plus.
- 4 Place an empty reagent vial on position 4 (front-most position) of the Universal Reagent Rack.
- 5 Remove the cap from the reagent vial.
- 6 Click **Start calibration** in the section **Reagent Rack 4**.
- 7 Select a reagent rack from the drop-down menu. A dialog box will prompt you to ensure that the Universal Reagent Rack is installed correctly and that the Single tube rack is removed.
- 8 Confirm the dialog box by clicking **OK**. The robotic needle arm automatically moves forward.
- 9 Adjust the uptake needle to the deepest point of the vial on position 4.
- 10 Lower the robotic needle arm carefully until it almost touches the vial bottom (i.e. only a fraction of a millimeter from the bottom of the vial). To check the uptake needle position, gently wiggle the vial to ensure that there is a small amount of movement.
- 11 Click **Save calibration**. The closed green circle indicates that the calibration is completed.
- 12 Click **Test** to confirm successful calibration. The MACSQuant Instrument tests all positions.

4.2.6 Calibrating the custom 96 racks

If 96-well plates of different format (e.g. deep well or round bottom) are used, they might have a different distance from the bottom of the rack to the bottom of the well. To pick the samples correctly, individual custom racks can be defined for each required rack format.

- 1 Go to the **Tools** tab in the side pane of the MACSQuantify Software and select the **Calibrate uptake unit** box. Red closed circles indicate that the uptake components are not calibrated.

If the rack type is not shown, use the next or previous window button in the **Calibrate uptake unit** window to switch to another page.

- 2 Click **Start calibration** in the section **Custom 96 Well Rack 1**. The robotic needle arm automatically moves forward.

If several types of 96 well plates are used, it is recommended to calibrate each type as a custom rack.

- 3 Proceed as described for standard 96 well plates. See **Calibrating the Chill 96 Rack on the previous page**.

4.3 Calibrating the rack detection

CAUTION

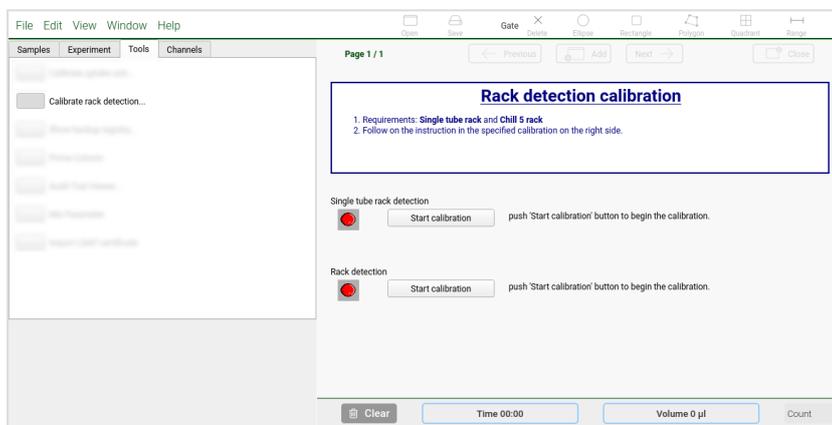
Direct exposure to laser beam could result in eye or even skin injury.

The instrument has four vertical cavity surface emitting lasers (VCSEL) for automated rack detection (Class 1M). The radiation is not visible.

- Keep a distance of 100 mm.

4.3.1 Calibrating the Single tube rack detection

- 1 Go to the **Tools** tab in the side panel of the MACSQuantify Software and select the **Calibrate rack detection** box. Red closed circles indicate that the components are not calibrated.
- 2 Click **Start calibration** in the section **Single tube rack detection**.

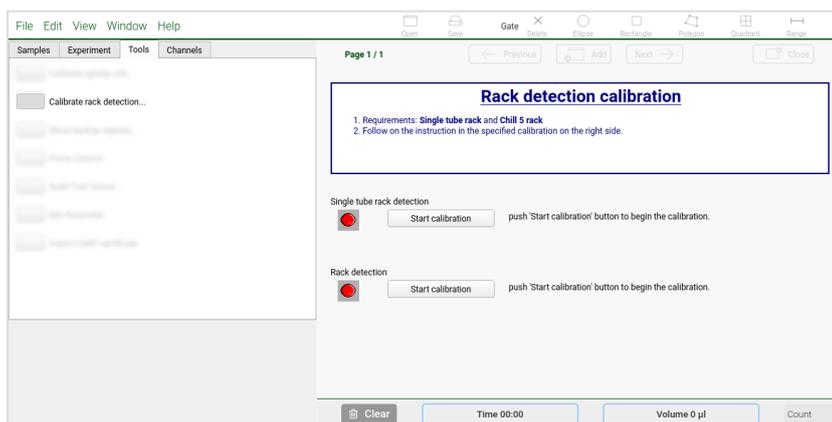


- 3 Follow the instructions on the screen.
- 4 The closed green circle indicates that the calibration is completed.

4.3.2 Calibrating the rack detection

This step is required for the automatic detection of Chill 5, 15, and 50 Racks by the MACSQuant Instrument if using the MACS MiniSampler Plus.

- 1 Attach the MACS MiniSampler Plus to the MACSQuant Instrument.
- 2 Go to the **Tools** tab in the side pane of the MACSQuantify Software and select the **Calibrate rack detection** box. Red closed circles indicate that the components are not calibrated.
- 3 Place a Chill 5 Rack onto the MACS MiniSampler Plus and click **Start calibration** in the section **Rack detection**.



5

Instrument monitoring

5.1 Hardware monitor

The hardware monitor can be accessed under the **View** menu. With the hardware monitor the real time status of the MACSQuant Instrument can be assessed, for example, to provide additional information in the case of error messages appearing on the screen. The serial number of the MACSQuant Instrument and photomultiplier tube (PMT) information can be found in the hardware monitor.

5.1.1 Fluidics

The **Fluidics** tab in the hardware monitor displays the pumps and valves as well as the status of the fluid bottles in live status.

The fluid bottles in the hardware monitor and on the instrument are illuminated in red when empty. The waste bottle is illuminated in red when full.

The waste (W), air (A), and fill pump symbols (F) are illuminated in green when active. Active valves 1-3 are indicated in green, defective valves in red. Valve status is indicated by o for open and c for closed.

The air pressure should be 300 mbar after priming when the instrument is in acquisition mode.

The reservoir indicates the level of MACSQuant Running Buffer in the reservoir. The level should be high or normal during acquisition mode.

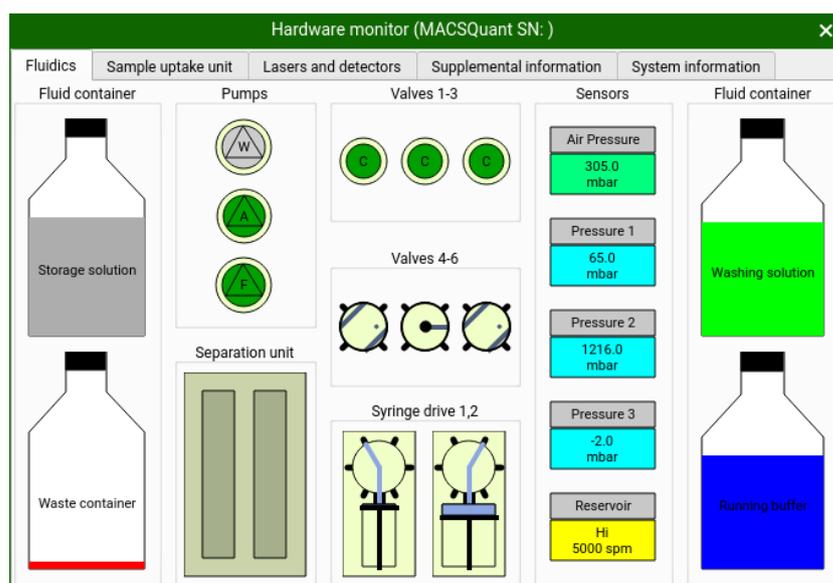


Figure 5.1: Real-time hardware monitor of the fluidics components. Specifications may vary between instrument models.

Component	Further information
Fluid container	Displays liquid levels of bottles in real time (full/empty).
Pumps	Displays the status of the waste (W), air (A), and fill (F) pumps.
Separation unit	Displays the status of the MACSQuant Column and MACS Cell Enrichment Unit
Valves 1–3	Displays the position of the valves for the MACSQuant Column: C = closed, O = open, green = in use.
Valves 4–6	Displays the position of the general fluidics system valves.
Syringe drive	Displays the position of the plunger of the syringes.
Sensors	Displays the general system pressure and level of the sheath fluid reservoir. Air pressure refers to pressure applied when instrument is in acquisition mode, for example, 300 mbar.

Table 5.1: Panels of the **Fluidics** tab

5.1.2 Sample uptake unit

The **Sample uptake unit** tab indicates the status of the robotic needle arm and if the MACS MiniSampler Plus is connected. The relative position of the robotic needle arm is listed in the lower left box and if the Single tube rack is calibrated.

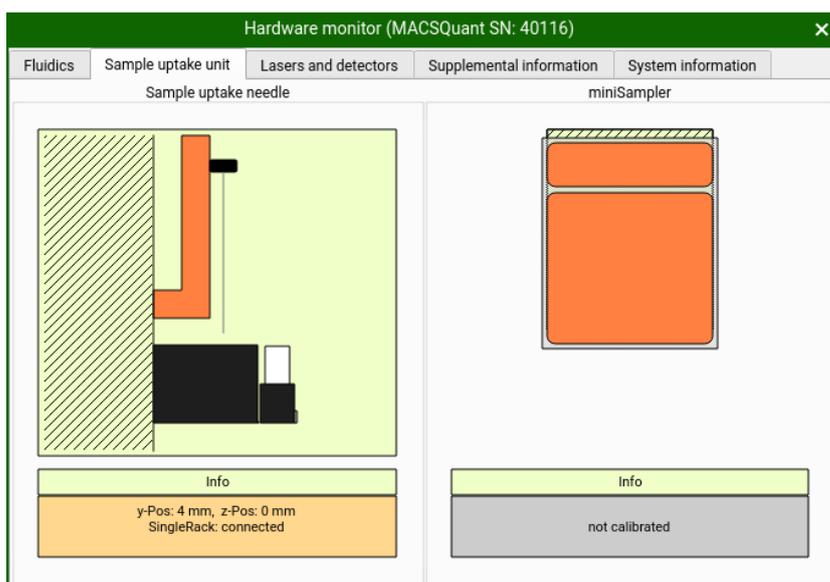


Figure 5.2: Real-time hardware monitor of the sample uptake unit

5.1.3 Lasers and detectors

The **Lasers and detectors** tab displays the status of the optical bench. The temperature, fan speed, PMT voltage, filter settings, and annotated path of each laser is shown. The operating temperature for the main laser should be between 30 °C and 50 °C. The main laser is the blue laser for MACSQuant Analyzer 10, and 16, and the yellow laser for the MACSQuant VYB. The side lasers are kept at a temperature of 25 °C. When in acquisition mode, colored lines from the lasers to the detectors indicate that lasers are switched on. The bench temperature is kept between 31 °C and 37 °C. The fan speed is regulated automatically depending on the room temperature and internal temperature of the MACSQuant Instrument. In case of errors, contact Miltenyi Biotec Technical Support.

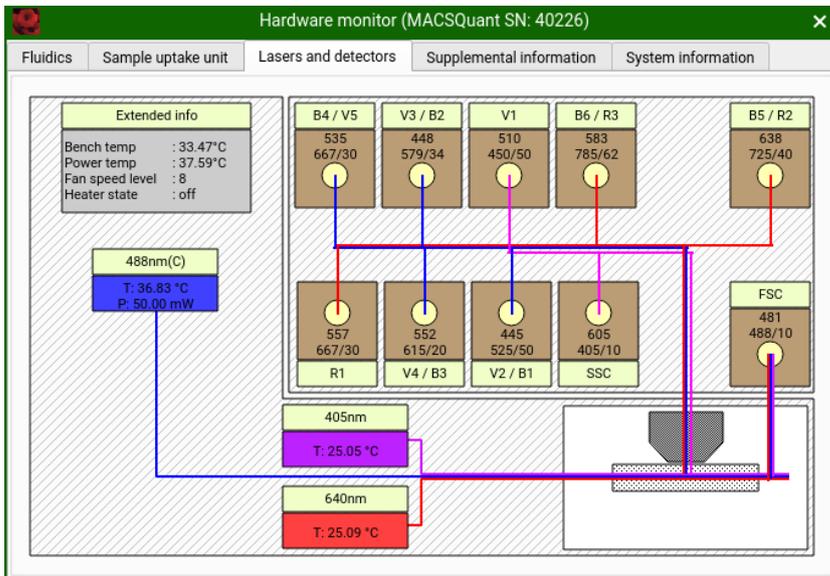


Figure 5.3: Real-time hardware monitor of the MACSQuant Analyzer 16 optical bench. T indicates the current temperature, P the power of the main laser. Specifications may vary between instrument models.

5.2 Instrument status LEDs

The MACSQuant Instrument is equipped with LEDs, illuminating each bottle to indicate the status of the instrument in acquisition mode. If the fluid bottles are not illuminated, the MACSQuant Instrument is in data analysis mode and the lasers are off.

Bottle illumination	Description
Green	Instrument is in acquisition mode and ready to measure
Blue	Instrument processes a sample and is busy
Red	Critical bottle level or general instrument error. The blinking red light indicates which bottle is affected. A message in the Instrument status bar specifies the instrument error.

Table 5.2: Color coding of the fluid bottle illumination on the MACSQuant Instrument

6

MACSQuant Live Support

MACSQuant Live Support is a real-time diagnostic service provided by Miltenyi Biotec Technical Support. The Live support is available for all users without any costs 24 h a day from Monday through Friday. Highly trained MACSQuant specialists can be reached to assist with any queries. If required, the MACSQuant Instrument can be remotely controlled for diagnosis or file transfer. A webcam can be connected to a free USB port at the rear side of the instrument. See **Installing a webcam on page 81**. The MACSQuant Instrument must have network access to the internet to use the MACSQuant Live Support

For details on how to set up and use the MACSQuant Live Support, refer to the MACSQuantify Software user manual.

7

Maintenance

WARNING

Electric shock, short circuit, overheating, fire, and explosion could result in death or serious injury.

- Do not remove or penetrate any cover of the housing except for the front access covers.
- Only Miltenyi Biotec service personnel are allowed to remove any other cover of the instrument.

WARNING

Biohazardous material.

Contamination or infection could result in death or serious injury depending on the material used.

- Run the **Clean** program first before maintenance work on any part of the fluidics system.

Instrument parts wear over time and require regular maintenance and/or replacement. Contact Miltenyi Biotec Technical Support regarding spare parts. Miltenyi Biotec also offers service contracts for the MACSQuant Instruments. Visit www.miltenyibiotec.com for further information.

7.1 Surface disinfection

The uptake needle of the needle arm and the surface of the instrument must be decontaminated upon contact with biohazardous samples. Use 70% ethanol for disinfection of the instrument surface. Use 70% ethanol or isopropyl alcohol for cleaning of the needle arm.

WARNING! Liquids inside the instrument can cause short circuits. Unplug the instrument before cleaning it. Use only small amounts of cleaning agents on a soft cloth to wipe the instrument. Do not spray or pour liquid cleaning agents onto or into the instrument.

7.2 Disinfection of the fluidics system

The fluidics system must be decontaminated by running the standard shutdown sequence if the instrument was used to process biohazardous samples. Additionally, use the **Clean** program before starting the standard shutdown sequence. See **Cleaning programs on page 101**.

7.3 Exchanging buffer and solution bottles

- 1 Install one bottle at a time. Remove the bottle to be exchanged from the bottle holder.
- 2 Place a new, sealed bottle into the orange bottle holder. Note the corresponding color-coding.
- 3 Unscrew the lid of the new fluid bottle.

- 4 Remove the bottle closure from the old bottle and install it on the new bottle. Do not disconnect the color-coded tubing and sensor cable from the bottle closure. Take care not to invert the bottle closures as this could cause liquid to enter the hydrophobic air filter.

7.4 Exchanging the waste bottle

Before exchanging the waste bottle, wait for ongoing measurements or washing cycles to be finished to avoid spillage.

- 1 Place an empty, safety labeled (biohazard) bottle next to the orange bottle holder.
- 2 Unscrew the cap of the empty bottle.
- 3 Remove the bottle closure from the full waste bottle in the bottle holder, and install the bottle closure on the empty bottle next to the bottle holder.
- 4 Close the full waste bottle and remove it from the bottle holder.
- 5 Place the empty bottle into the bottle holder.

7.5 Exchanging hydrophobic air filters

WARNING

Defective or inadequate equipment can cause a biological hazard.

Contamination or infection could result in death or serious injury depending on the material used.

- Exchange hydrophobic air filters once a year to avoid clogging through dust deposits.
- Exchange hydrophobic air filters if they came into direct contact with any liquid to avoid clogging of the filters and to prevent contamination of liquids.

The MACSQuant Instrument is equipped with hydrophobic air filters to allow air flow and to prevent contamination. Use only hydrophobic air filters from Miltenyi Biotec. See **Consumables on page 70**.

- 1 Remove the Chill Rack.
- 2 Open the front cover.
- 3 Unscrew the hydrophobic air filters. For an overview about the location of hydrophobic air filters, see **Table 2.5**.
- 4 Replace with a new hydrophobic air filter.

7.6 Exchanging the MACSQuant Column

WARNING

The instrument has a powerful magnet.

Magnetizable objects can suddenly move towards the magnet.

- Keep all magnetic storage devices, electronic equipment, and magnetizable objects at a distance of at least 30 cm from the instrument.

⚠ WARNING

The instrument has a powerful magnet.

Strong magnetic fields can influence the functioning of pacemakers or electronic medical implants.



If wearing pacemakers or electronic medical implants, keep a distance of at least 30 cm from the instrument.

The MACSQuant Column should be exchanged every three months or replaced with the column substitute after three months.

- 1 Open the front cover of the instrument to access the MACS Cell Enrichment Unit with the column substitute or MACSQuant Column.
- 2 Hold the top and bottom of the column with both hands and pull gently but firmly to remove the column from the MACS Cell Enrichment Unit.
- 3 Hold the column in one hand and gently unscrew the top column connector counterclockwise. Tilt the column downwards to empty any liquid into a paper towel.
- 4 Unscrew the bottom column connector to remove the column.
- 5 Screw the bottom column connector into the bottom end of the new column. Note the correct orientation of the column. The top end of the MACSQuant Column has a clearly visible spacer while the metal beads reach further to the bottom end of the column. Insert the column only with the spacer in upward position.
- 6 Point the column towards the top of the MACS Cell Enrichment Unit and screw in the top column connector.
- 7 Align the column so that the top column connector sits on the guide of the magnet cover. Push the column into the slot until you hear a click. Verify that the column is placed in the center of the magnet cover.
- 8 Close the front access cover.
- 9 To prime the new column, go to the **Tools** tab in the side pane of the MACSQuantify Software.
- 10 Select **Prime Column**. Refer to the MACSQuantify Software user manual for further information about Pre-enrichment of cells.

7.7 Cleaning the instrument

7.7.1 Cleaning programs

Cleaning programs	Description
Rinse	Rinses the needle with MACSQuant Running Buffer. Duration 2 minutes.
Clean	Cleans the needle and flow cell with 0.25 mL 1% hypochlorite solution. Duration 12 minutes.
Flush	System backflush rinse if a blockage of the fluidics system occurs. Duration 16 minutes.

Table 7.1: Cleaning programs available for the MACSQuant Instrument

To start a cleaning program, select one of the following options:

- Click the **Rinse** button in the status bar to start a needle **Rinse**.
- Right-click **Rinse** in the status bar. Select **Clean** to start a **Clean** program. Follow the instructions on the screen.
- Right-click **Rinse** in the status bar. Select **Flush** to start a **Flush** program. Follow the instructions on the screen.



Figure 7.1: Rinse button in the status bar with the options **Clean** and **Flush**

7.7.2 Cleaning recommendations

Indication	Cleaning programs
After each user	Clean program
After sticky material, such as bone marrow or tumor samples	Clean program followed by a Flush program
During laser warm up in acquisition mode	Flush program followed by a Clean program
Debris or high noise	Clean program, hot bleach
Blockage of the fluidics system can also be used as weekly cleaning routine	Hot bleach, see Removing a potential blockage below

Table 7.2: Cleaning recommendations for the MACSQuant Instrument

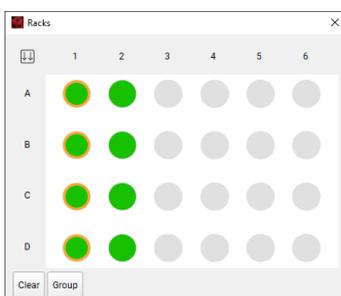
See **Cleaning programs on the previous page** and **Removing a potential blockage below** for details how to start the cleaning programs.

7.7.3 Removing a potential blockage

Clogs or blockages in the sample tube or flow cell can cause greatly reduced event rates. Optimized sample preparation can prevent most clogs. Use a hot bleach cycle as described below to remove blockages. Contact Miltenyi Biotec Technical Support if the problem persists.

The following protocol can also be used as a weekly cleaning routine.

- 1 Go to the **Experiment** tab.
- 2 Select the Chill 5 Rack.
- 3 Highlight column 1.



- 4 Enter Hot bleach in the **Sample ID** field.
- 5 Highlight column 2.
- 6 Enter Running buffer in the **Sample ID** field.
- 7 Highlight all wells.
- 8 Set the flow rate to high, the uptake volume to 450 μL , and the sample volume to 500 μL . It is not necessary to open an analysis window.
- 9 Optional: Enter weekly clean in the **Project** field.

The screenshot shows the 'Experiment' settings window with the following configurations:

- Experiment:** Rack: Chill 5 rack; File: adm2023-05-03.0001; Project: weekly clean; Sample ID: Running buffer; Description: (empty)
- Flow rate:** Low, Med, High (selected)
- Pickup and measure:** Mix sample: Off; Mode: Standard; Uptake volume: 450 μl ; Sample volume: 500 μl

- 10 Optional: Check all settings via **View > Experiment**.

Sample ID	Description	Flow rate	Auto flow rate on	Mix sample	Mode	Uptake volume	Sample volume
A1	Hot bleach	High	No	Off	Standard	450	500
B1	Hot bleach	High	No	Off	Standard	450	500
C1	Hot bleach	High	No	Off	Standard	450	500
D1	Hot bleach	High	No	Off	Standard	450	500
A2	Running buffer	High	No	Off	Standard	450	500
B2	Running buffer	High	No	Off	Standard	450	500
C2	Running buffer	High	No	Off	Standard	450	500
D2	Running buffer	High	No	Off	Standard	450	500

- 11 Save this as an experiment file called **weekly cleaning** in the Public folder, so that the file can be opened by any user.
- 12 Open the **weekly cleaning** experiment file.
- 13 Prepare 2 mL hot bleach solution. Mix 1 mL of 1% hypochlorite solution with 1 mL boiled distilled water. Use a microwave oven or water kettle to boil the water.
- 14 Place four tubes containing 0.5 mL hot bleach solution into wells A1-D1 of the Chill 5 Rack.

Use a Chill 5 Rack stored at room temperature.

- 15 Place four tubes containing 0.5 mL MACSQuant Running Buffer into wells A2-D2.
- 16 Place the Chill 5 Rack onto the MACS MiniSampler Plus.
- 17 Click the **Start** button.

7.7.4 Cleaning the washing station

WARNING

Electric shock, short circuit, overheating, fire, and explosion could result in death or serious injury.

Liquids inside the instrument can cause short circuits.

- Unplug the instrument before cleaning it.
- Use only small amounts of cleaning agents on a soft cloth to wipe the instrument. Do not spray or pour liquid cleaning agents onto or into the instrument.

- 1 Switch off the instrument.
- 2 Remove the Single tube rack and other racks.
- 3 Open the cover of the washing station to the left side.

WARNING! Potentially contaminated liquid may spill out of the orifice of the washing station and the tubing.

- 4 Clean the washing station by wiping it with a tissue and an appropriate disinfectant, for example, 70% ethanol or isopropyl alcohol.
- 5 Rinse with distilled water.
- 6 Close the cover of the washing station.

7.7.5 Cleaning the uptake needle

Clean the uptake needle regularly to prevent contamination or clogging.

Be careful not to bend or damage the needle while cleaning.

- 1 Switch off the instrument.
- 2 Take the needle at the top and pull it out of the magnetic holder.
- 3 Clean the needle by wiping it with a tissue and an appropriate disinfectant, for example, 70% ethanol or isopropyl alcohol.
- 4 Wipe the needle holder with a tissue and an appropriate disinfectant, for example, 70% ethanol or isopropyl alcohol.
- 5 Clean the needle and the needle holder with a tissue with distilled water.
- 6 Reinstall the needle.
- 7 Calibrate the needle arm. See **Calibrating the needle arm on page 85**.

7.8 Long-term storage of the instrument

The instrument should be used every two weeks to prevent clogging. If the instrument is not in use, start the instrument every two weeks and switch it into acquisition mode. See **Priming the instrument on page 83**. During the priming procedure, the fluidics system is flushed. After the instrument has been primed, shut down the instrument. See **Manual shutdown on page 84**.

8

Troubleshooting

 **WARNING**

Biohazardous material.

Contamination or infection could result in death or serious injury depending on the material used.

- If hazardous or potentially infectious material has been spilled or leaked from the system, decontaminate the affected area.
- Do not continue to use contaminated accessories or parts of the instrument.

If you encounter an issue with the MACSQuant Instrument, see **Table 8.1** for general issues and to **Table 8.2** for issues with error messages.

Issue	Causes	Solution	Reference
Leakage	MACSQuant Column	Check MACSQuant Column.	Column leakage on page 109
	Loose syringe	Tighten the 0.5 and 5 mL syringe.	Loose connections on page 109
	Loose tubings	Check connections of buffer tubings.	
	Broken check valve	Replace check valve.	Replacing the check valve on page 108
Air in system	Loose syringe	Tighten the 0.5 and 5 mL syringe.	Loose connections on page 109
	Loose tubings	Check connections of buffer tubings.	
	Air in sheath particle filter	Release air from sheath particle filter.	Releasing air from the sheath particle filter on page 109
No events	Loose syringe	Tighten the 0.5 and 5 mL syringe.	Loose connections on page 109
	Wet air filter	Exchange the air filter.	Exchanging hydrophobic air filters on page 100
	Blockage	Clean the instrument.	Removing a potential blockage on page 102
	Incorrect needle arm calibration	Recalibrate the needle arm.	Calibrating the needle arm on page 85
Unusual pattern in dot plot	Wet air filter	Exchange the air filter.	Exchanging hydrophobic air filters on page 100
	Blockage	Clean the instrument.	Removing a potential blockage on page 102
Incomplete PMT calibration	Not enough events	Provide enough MACSQuant Advanced Calibration Beads, vortex beads thoroughly before use.	
		Repeat the PMT calibration.	
	Loose syringe	Tighten the 0.5 and 5 mL syringe.	Loose connections on page 109
Failed PMT calibration	High noise (CV) or low SI	Clean the instrument.	Cleaning recommendations on page 102
		Tighten the 0.5 and 5 mL syringe.	Loose connections on page 109
		Check the connections of the buffer tubings.	
	Release the air from the sheath particle filter.	Releasing air from the sheath particle filter on page 109	
High debris or high noise	Air in system	Tighten 0.5 and 5 mL syringe.	Loose connections on page 109
		Check connections of buffer tubings.	
		Release air from sheath particle filter.	Releasing air from the sheath particle filter on page 109
	Dirt in fluidics system	Clean the instrument.	Cleaning recommendations on page 102
Gap in event rate (HDR-T plot), uptake of air	Incorrect calibration	Recalibrate the plates.	Calibrating racks and plates on page 87
	Incorrect sample or uptake volume	Provide sufficient sample volume. Check the uptake volume. Consider excess volume.	Excess volume of the MACSQuant Analyzer 10, VYB, and Analyzer 16 on page 115

Table 8.1: Issues on the MACSQuant Instrument without error message

Error message	Causes	Solution	Reference
Plunger overload during acquisition DeviceError: 0x0309: Plunger overload	Clogging	Clean the instrument.	Cleaning recommendations on page 102
Error on MACS MiniSampler Plus Device Error: 0x0901: Position not allowed or parameter-range invalid	Obstruction	Ensure enough space around the MACS MiniSampler Plus during acquisition.	
	Wrong calibration	Restart the instrument.	
Error on uptake unit Y (movement back and forth) DeviceError: 0x0101: Position not allowed or parameter-range invalid	Obstruction	Ensure that the needle arm can move freely.	
	Wrong calibration	Calibrate the needle arm.	Calibrating the needle arm on page 85
Error on uptake unit Z (movement up and down) DeviceError: 0x0101: Position not allowed or parameter-range invalid	Obstruction	Ensure that the needle arm can move freely.	
	Dirty needle holder	Clean needle holder.	Cleaning the uptake needle on page 104
	Wrong calibration	Calibrate the needle arm.	Calibrating the needle arm on page 85
		Calibrate rack or plates.	Calibrating racks and plates on page 87
Laser overheating DeviceError: 0x005b : Laser rec. Timeout	Room conditions	Leave 15 cm space around the instrument. Do not place the instrument near radiators, heaters, or into direct sunlight. Keep the room temperature below 25°C.	
Error on valve DriverError: 0x04000000: Module init flag lost DeviceError: 0x0025: Unknown error 5	Valve blocked	Restart the instrument.	
	Wrong (homemade) buffer used	Use only MACSQuant Running buffer to avoid wearing of valves.	
Error on valve DeviceError: 0x001c: Rotate failed	Valve blocked	Restart the instrument.	
	Wrong (homemade) buffer used	Use only MACSQuant Running Buffer to avoid wearing of valve.	
System pressure control failed	Wet air filter	Exchange the air filter.	Exchanging hydrophobic air filters on page 100
	Loose syringe	Tighten the 0.5 and 5 mL syringe.	Loose connections on page 109
	Loose tubing	Check connections of buffer tubings.	
	Air in system	Tighten 0.5 and 5 mL syringe. Check connections of the buffer tubings.	Loose connections on page 109
		Release air from the sheath particle filter.	Releasing air from the sheath particle filter on page 109

Table 8.2: Error messages of the MACSQuant Instrument

8.1 Leakage

WARNING

Defective or inadequate equipment can cause a biological hazard.

Contamination or infection may lead to severe personal injury or death, depending on the material used.

- If hazardous or potentially infectious material has been spilled or leaked from the system, decontaminate the affected area.
- Do not continue to use contaminated accessories or parts of the instrument.

8.1.1 Replacing the check valve

Follow the instructions below to replace the check valve.

- 1 Switch off the instrument.
- 2 Remove the Single tube rack or remove Chill Racks from the MACS MiniSampler Plus.
- 3 Open the front cover.
- 4 Remove the MACSQuant Column from its holder. Do not disconnect the column from the connectors.
- 5 Slide the cover of the washing station to the left.
- 6 Slide the small door above the MACSQuant Column to the right. The purple part is the check valve.
- 7 Unscrew the check valve from the black Luer connectors.
- 8 Connect the new check valve to the Luer connectors. Fasten the connections carefully but tightly. Proceed with step 11.
- 9 Optional: It is possible to use the MACSQuant Instrument short term without a check valve. Proceed with step 10. Otherwise continue with step 11.
- 10 Connect the black Luer connectors without a check valve.

If the instrument is used without a check valve, make sure that the waste bottle level is lower than the MACSQuant Running Buffer bottle level when the instrument is switched off or in data analysis mode.

Note that the absolute cell count might be affected if the instrument is used without a check valve .

- 11 Start and prime the instrument.
 - 12 Check if the leakage has stopped during priming. If the instrument is used without a check valve and the leakage persists, the Luer connectors might be broken. Contact Miltenyi Biotec Technical Support.
 - 13 Close the door above the MACSQuant Column and the cover of the washing station.
 - 14 Put the MACSQuant Column back into its holder.
 - 15 Close the front cover.
 - 16 Attach the Single tube rack or place a Chill Rack on the MACS MiniSampler Plus.
- If the problem persists, contact Miltenyi Biotec Technical Support.

8.1.2 Syringe leakage

WARNING

Defective or inadequate equipment can cause a biological hazard.

Contamination or infection may lead to severe personal injury or death, depending on the material used.

- If hazardous or potentially infectious material has been spilled or leaked from the system, decontaminate the affected area.
- Do not continue to use contaminated accessories or parts of the instrument.

A loose syringe can lead to a leakage. See **Loose connections below**.

8.1.3 Column leakage

If a recently exchanged MACSQuant Column shows signs of leakage, do the following:

- 1 Check if the column is installed properly. The column should be inserted precisely into the column connector and fastened to the point of resistance. If the column is not installed correctly, loosen the column connector, insert the column precisely, and tighten the connector again. See **Installing the MACSQuant Column on page 74**.
- 2 Check if the column is broken or cracked.
- 3 Check if the leakage persists. If so, unscrew the column and check if the connectors of the columns are damaged. If necessary, exchange the leaking column with a new MACSQuant Column.
- 4 Check if the column connector is fastened properly.

If the problem persists, contact Miltenyi Biotec Technical Support.

8.2 Air in system

8.2.1 Loose connections

If connections are loose, air can enter the fluidics system. Follow the instructions below to check syringes and buffer tubing connections. Use your fingers to tighten the connections. Do not use any tools.

- 1 Open the front cover.
- 2 Tighten the glass syringes. Turn the metal part on top of the syringe counterclockwise.
- 3 Tighten the tubing connections on the buffer bottles clockwise.
- 4 Check the tubing connections coming from the bottles to the rear side of the instrument. Tighten them clockwise.

If the problem persists, contact Miltenyi Biotec Technical Support.

8.2.2 Releasing air from the sheath particle filter

Check the fluid level of the sheath particle filter regularly. If air enters the fluidics system or fluid evaporates, air can be trapped in the sheath particle filter. Follow the instructions below to release air from the sheath particle filter.

- 1 Prime the instrument. Release of air is only possible with a pressurized system.
- 2 Get a paper towel to collect liquid.

- 3** Carefully unscrew the white cap of the sheath particle filter until air has been fully released. Do not remove the cap entirely.
 - 4** Close the cap of the sheath particle filter when liquid comes out. Collect the liquid with a paper towel.
- If the problem persists, contact Miltenyi Biotec Technical Support.

9

Technical data and specifications

The MACSQuant Instrument is classified as protection class I device and must be plugged into a grounded electrical outlet.

The MACS MiniSampler Plus is labeled as a protection class III device and must be connected to the main instrument.

Note that for USA and Canada, the main power supply cord and plug of the instrument shall comply with the following specifications: UL listed and KAM cord, minimum type SJ, minimum 18 AWG, 3 conductors. Rated for a minimum temperature of 60 °C. Provided with grounding-type (NEMA 5-15P) attachment plug, rated 125 VAC, 10 A. Opposite end terminates in IEC 320-style connector, rated 125 VAC, 10A.

Supply voltage fluctuations up to +/- 10% of the nominal voltage. The instrument is suitable for pollution degree 2 environments.

For other safety considerations, refer to the product label or visit www.miltenyibiotec.com.

Design and specifications are subject to change without notice.

9.1 Technical data of the MACSQuant Instrument

MACSQuant Instrument	
Model	MACSQuant Analyzer 10 (# 130-096-343) MACSQuant Analyzer 16 (# 130-109-803) MACSQuant VYB (# 130-096-116)
Dimensions (width × depth)	669 mm × 400 mm (26.34 × 15.75 in)
Dimensions (width × depth) with MACS MiniSampler Plus	669 mm × 500 mm (26.34 × 19.69 in)
Footprint (width × depth)	385.5 mm × 284.5 mm (15.18 × 11.2 in)
Height (adjustable touchscreen)	394-553.5 mm (15.51–21.79 in)
Weight	50 kg (110 lbs)
Power requirements	100-240 V~, 50/60 Hz
Power consumption (standard use)	450 W
Fuses	2 × 8 AT, 250 V
Rack detection	850 nm, 3.3 mW, pulse time 215 μs
RS232 Interface	labeled "RS232/AUX" - not in use
AC Output	Labeled "Bottle Sensor"

MACSQuant Instrument

RS232 Interface + DC-Output	Labeled "RS232/BCR"
CAN Bus + DC-Output	Labeled "External CAN"
CAN Bus + DC-Output	Labeled "Power Can"
Monitor	15,6" LCD touchscreen
Working temperature	+20 °C to +25 °C
Working environment	Indoor use only
Humidity	0% to 85% relative humidity, non-condensing
Altitude	Max. 2,000 m
Emission sound pressure level at workstation	<61 dB(A)

Table 9.1: Technical data of the MACSQuant Instrument

PC

RS232 Interface	Labeled "COM 1"
USB ports	4× USB 3.0 ports 2× USB 3.0 ports (at touchscreen)
Display Port	Labeled D Port (2×)
Ethernet ports (GbE)	Labeled LAN (2×)
CFast-card slot	Inserted card contains Miltenyi Biotec's proprietary MBCore operating system, based on Linux®
RAM	2× 16 GB DDR4 (SO-DIMM)
Mass storage	1 TB SSD M.2
Mainboard battery	CR2032, button cell, lithium metal

Table 9.2: Technical data of the integrated PC

Optics

Model	Laser excitation
MACSQuant Analyzer 10	405 nm, 40 mW
	488 nm, 30 mW
	640 nm, 20 mW
MACSQuant Analyzer 16	405 nm, 63 mW
	488 nm, 50 mW
	640 nm, 70 mW
MACSQuant Analyzer VYB	405 nm, 40 mW
	488 nm, 50 mW
	561 nm, 100 mW
Flow cell dimensions	200 × 250 μm

Table 9.3: Optical parameters of the MACSQuant Instrument

Fluidics

Minimum uptake volume	1 μL (25μL recommended for volumetric applications)
Sample flow rate	25, 50, or 100 μL/min plus automated flow rate to maintain 500, 1000, or 2000 events/second
Sheath fluid consumption	2-10 mL/min
Maximal event rate	up to 15,000 events/second
Absolute cell count performance	accuracy +/- 7%; reproducibility (CV) <5%
Sample carryover	0.01%

Table 9.4: Fluidic parameters of the MACSQuant Instrument

Instrument variants

Model	Channel	Laser [nm]	Filter [nm]
MACSQuant Analyzer 10	FSC	488	488/10
	SSC	488	488/10
	V1	405	450/50
	V2	405	525/50
	B1	488	525/50
	B2	488	585/40
	B3	488	655-730
	B4	488	750 LP
	R1	640	655-730
R2	640	750 LP	
MACSQuant Analyzer 16	FSC	488	488/10
	SSC	405	405/10
	V1	405	450/50
	V2	405	525/50
	V3	405	579/34
	V4	405	615/20
	V5	405	667/30
	B1	488	525/50
	B2	488	579/34
	B3	488	615/20
	B4	488	667/30
	B5	488	725/40
	B6	488	785/62
	R1	640	667/30
R2	640	725/40	
R3	640	785/62	
MACSQuant VYB	FSC	561	561/4
	SSC	561	561/4
	V1	405	452/45
	V2	405	525/50
	B1	488	525/50
	B2	488	593-650
	Y1	561	586/15
	Y2	561	615/20
	Y3	561	661/20
Y4	561	740 LP	

Table 9.5: Instrument variants

9.2 Excess volume of the MACSQuant Analyzer 10, VYB, and Analyzer 16

The MACSQuant Analyzer 10, VYB, and Analyzer 16 pick up some additional volume (excess volume) depending on the selected **Mode** in the **Experiment** tab. Make sure to provide enough sample volume as the excess volume is additionally picked up to the programmed uptake volume.

Excess volume	
Mode	Additionally picked up volume (excess volume)
Screen	19.9 μ L
Fast	9.9 μ L
Standard	9.9 μ L
Extended	9.9 μ L
Enrich	9.9 μ L
EnrichS	9.9 μ L
EnrichS2	9.9 μ L

Table 9.6: Excess volume of the MACSQuant Analyzer 10, VYB, and Analyzer 16

9.3 FCC compliance statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications of the instrument, unless expressly approved by Miltenyi Biotec, may void your authority to operate the instrument pursuant to FCC 47 CFR.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

9.4 EC/EU Declaration of Conformity

This declaration applies to the MACSQuant Analyzer 16, MACSQuant Analyzer 10, and MACSQuant VYB. The legislative requirements are equivalent for all three MACSQuant Instruments.

This declaration of conformity is issued under the sole responsibility of the manufacturer:

Miltenyi Biotec B.V. & Co. KG
Friedrich-Ebert-Straße 68
51429 Bergisch Gladbach
Germany

This declaration relates exclusively to the machinery in the state in which it was placed on the market, and excludes components which are added and/or operations carried out subsequently by the final user.

The declaration of conformity refers to the machinery identified as follows:

Description: Laboratory equipment
Model: MACSQuant Analyzer 10, MACSQuant VYB and MACSQuant Analyzer 16

The machinery complies with all essential requirements of the following directives:

2006/42/EC Machinery
2011/65/EU Restriction of the use of certain hazardous substances in electrical & electronic equipment
2014/30/EU Electromagnetic compatibility

The machinery is in conformity with the following harmonized standards:

EN 60825-1:2014
EN 61010-1:2010
EN 61010-2-081:2015
EN 61326-1:2013

Person authorized to compile the relevant technical documentation:

Dr. Bernd Schröder
Global Head Regulatory Affairs
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Friedrich-Ebert-Straße 68
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Additional international conformity (MACSQuant Analyzer 10, MACSQuant VYB, and MACSQuant Analyzer 16)

The MACSQuant Instruments are in conformity with:

- IEC 61010-1
- IEC 61010-2-081
- UL 61010-1
- UL 61010-2-081
- CAN/CSA-C22.2 No. 61010-1

- CAN/CSA-C22.2 No. 61010-2-081
- IEC 60825-1
- CAN/CSA-E60825-1

9.5 UK Declaration of Conformity

This declaration applies to the MACSQuant Analyzer 16, MACSQuant Analyzer 10, and MACSQuant VYB. The legislative requirements are equivalent for all three MACSQuant Instruments.

This declaration of conformity is issued under the sole responsibility of the manufacturer:

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 Friedrich-Ebert-Straße 68
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This declaration relates exclusively to the machinery in the state in which it was placed on the market, and excludes components which are added and/or operations carried out subsequently by the final user.

The declaration of conformity refers to the machinery identified as follows:

Description: Laboratory equipment
 Model: MACSQuant Analyzer 10, MACSQuant VYB, and MACSQuant Analyzer 16

The machinery complies with all essential requirements of the following legislations:

Supply of machinery (Safety) regulations 2008
 The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
 Electromagnetic Compatibility Regulations 2016

The machinery is in conformity with the following UK designated standards:

EN 60825-1:2014
 EN 61010-1:2010
 EN 61010-2-081:2015
 EN 61326-1:2013

Person authorized to compile the relevant technical documentation:

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Additional international conformity (MACSQuant Analyzer 10, MACSQuant VYB, and MACSQuant Analyzer 16)

The MACSQuant Instruments are in conformity with:

- IEC 61010-1
- IEC 61010-2-081
- UL 61010-1
- UL 61010-2-081
- CAN/CSA-C22.2 No. 61010-1
- CAN/CSA-C22.2 No. 61010-2-081
- IEC 60825-1
- CAN/CSA-E60825-1

9.6 Technical data and specifications of the MACS MiniSampler Plus

The MACS MiniSampler Plus is labeled as a protection class III device and must be plugged into the connector of the Instrument labeled with **External CAN**.

For other safety considerations, refer to the product label, or visit www.miltenyibiotec.com.

Design and specifications are subject to change without notice.

MACS MiniSampler Plus	
Size without lid	182 mm × 148 mm × 47 mm
Size with lid	280 mm × 153 mm × 172 mm
Weight	1.5 kg
Input voltage	24 VDC
Power	19.2 W
Sub D9 interface with shielding	Pins 1, 4 and 8: NC Pin 2: CAN-L Pins 3 and 6: GND Pins 5 and 9: +24 VDC/2A Pin 7: CAN-H
Working temperature	+ 20 °C to + 25 °C
Working environment	Indoor use only
Humidity	0% to 85% relative humidity, non-condensing
Altitude	Max. 2000 m

Table 9.7: Technical data of the MACS MiniSampler Plus

9.7 EC/EU Declaration of Conformity

This declaration of conformity is issued under the sole responsibility of the manufacturer:

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This declaration relates exclusively to the machinery in the state in which it was placed on the market, and excludes components which are added and/or operations carried out subsequently by the final user.

The declaration of conformity refers to the machinery identified as follows:

Description: Laboratory equipment
Model: MACS MiniSampler Plus

The machinery complies with all essential requirements of the following directives:

2006/42/EC Machinery
2011/65/EU Restriction of the use of certain hazardous substances in electrical & electronic equipment
2014/30/EU Electromagnetic compatibility

The machinery is in conformity with the following harmonized standards:

EN 61010-1:2010
EN 61010-2-081:2015
EN 61326-1:2013

Person authorized to compile the relevant technical documentation:

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9.8 UK Declaration of Conformity

This declaration of conformity is issued under the sole responsibility of the manufacturer:

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This declaration relates exclusively to the machinery in the state in which it was placed on the market, and excludes components which are added and/or operations carried out subsequently by the final user.

The machinery complies with all essential requirements of the following legislations:

Description: Laboratory equipment
Model: MACS MiniSampler Plus

The machinery complies with all essential requirements of the following legislations:

Supply of machinery (Safety) regulations 2008
The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
Electromagnetic Compatibility Regulations 2016

The machinery is in conformity with the following UK designated standards:

EN 61010-1:2010
EN 61010-2-081:2015
EN 61326-1:2013

Person authorized to compile the relevant technical documentation:

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Technical support

For technical support, contact your local Miltenyi Biotec representative or Miltenyi Biotec Technical Support at Miltenyi Biotec headquarters:

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Phone: +49 2204 8306 3803
technicalsupport@miltenyi.com

Visit www.miltenyibiotec.com for local Miltenyi Biotec Technical Support contact information.

11

Legal notes

11.1 Limited warranty

Except as stated in a specific warranty statement which may accompany this product or as otherwise agreed in writing by an authorized representative of Miltenyi Biotec, Miltenyi Biotec's warranty to you, the original purchaser and end user ("you" or "your"), with respect to the product accompanied by this limited warranty shall be subject to the following provisions and the general terms and conditions of sale of the company within the Miltenyi Biotec group which supplied the product in effect at the date of purchase. Those terms and conditions of sale may vary by country and region. Nothing in this document should be construed as constituting an additional warranty.

Miltenyi Biotec warrants that this product will operate or perform substantially in conformance with Miltenyi Biotec's published specifications and be free from material defects in material and workmanship, when subjected to normal, proper, and intended usage by properly trained personnel, for the period of time set forth in the product documentation or package inserts accompanying the product (the "Warranty Period").

Miltenyi Biotec agrees, during the Warranty Period, to repair or replace, at Miltenyi Biotec's option, the defective product so as to cause the same to operate in substantial conformance with said published specifications; provided that you shall (a) promptly notify Miltenyi Biotec in writing upon the discovery of any nonconformity or defect, which notice shall include the product model and serial number (if applicable) and details of the warranty claim; and (b) return the nonconforming or defective product to Miltenyi Biotec, freight prepaid, only after receipt of a Return Material Authorization ("RMA") from Miltenyi Biotec, which may include biohazard decontamination procedures and other product-specific handling instructions, if applicable.

Miltenyi Biotec shall have no obligation to make repairs, replacements, or corrections to the product or any component thereof required, in whole or in part, as the result of (i) normal wear and tear, (ii) improper handling, installation, operation, storage, service, maintenance, or repair, (iii) failure to follow the instructions, cautions, warnings, and notes set forth in the product documentation provided with the product or provided by Miltenyi Biotec from time to time, (iv) abnormal use, misuse, neglect, abuse, mishandling, misapplication, modification, or alteration of the product, (v) use of the product in a manner for which it was not designed, (vi) causes external to the product such as, but not limited to, power failure or electrical power surges, (vii) use of the product in combination with equipment, accessories, consumables, or software not supplied or approved by Miltenyi Biotec, or (viii) accident, disaster, or acts of God. ANY INSTALLATION, MAINTENANCE, REPAIR, SERVICE, OR ALTERATION TO OR OF, OR OTHER TAMPERING WITH, THE PRODUCT PERFORMED BY ANY PERSON OR ENTITY OTHER THAN MILTENYI BIOTEC AUTHORIZED PERSONNEL WITHOUT MILTENYI BIOTEC'S PRIOR WRITTEN APPROVAL, OR ANY USE OF REPLACEMENT PARTS NOT SUPPLIED BY MILTENYI BIOTEC, SHALL IMMEDIATELY VOID AND CANCEL ALL WARRANTIES WITH RESPECT TO THE AFFECTED PRODUCT.

Miltenyi Biotec's warranty does not cover products sold AS IS or WITH ALL FAULTS, or which had its serial number defaced, altered, or removed, or any consumables or parts identified as being supplied by a third party.

Miltenyi Biotec must be informed promptly if a claim is made under this limited warranty. If a material or manufacturing defect occurs within the Warranty Period, Miltenyi Biotec will take the appropriate steps, at Miltenyi Biotec's option, to make repairs, replacements, or corrections to the product or any component thereof as may be required to restore the full usability of your product. If Miltenyi Biotec determines that a product for which you have requested warranty services is not covered by the warranty hereunder, you shall pay or reimburse Miltenyi Biotec for all costs of investigating and responding to such request at Miltenyi Biotec's then prevailing time and materials rates. If Miltenyi Biotec provides repair services or replacement parts that are not covered by this warranty, you shall pay Miltenyi Biotec therefor at Miltenyi Biotec's then prevailing time and materials rates.

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