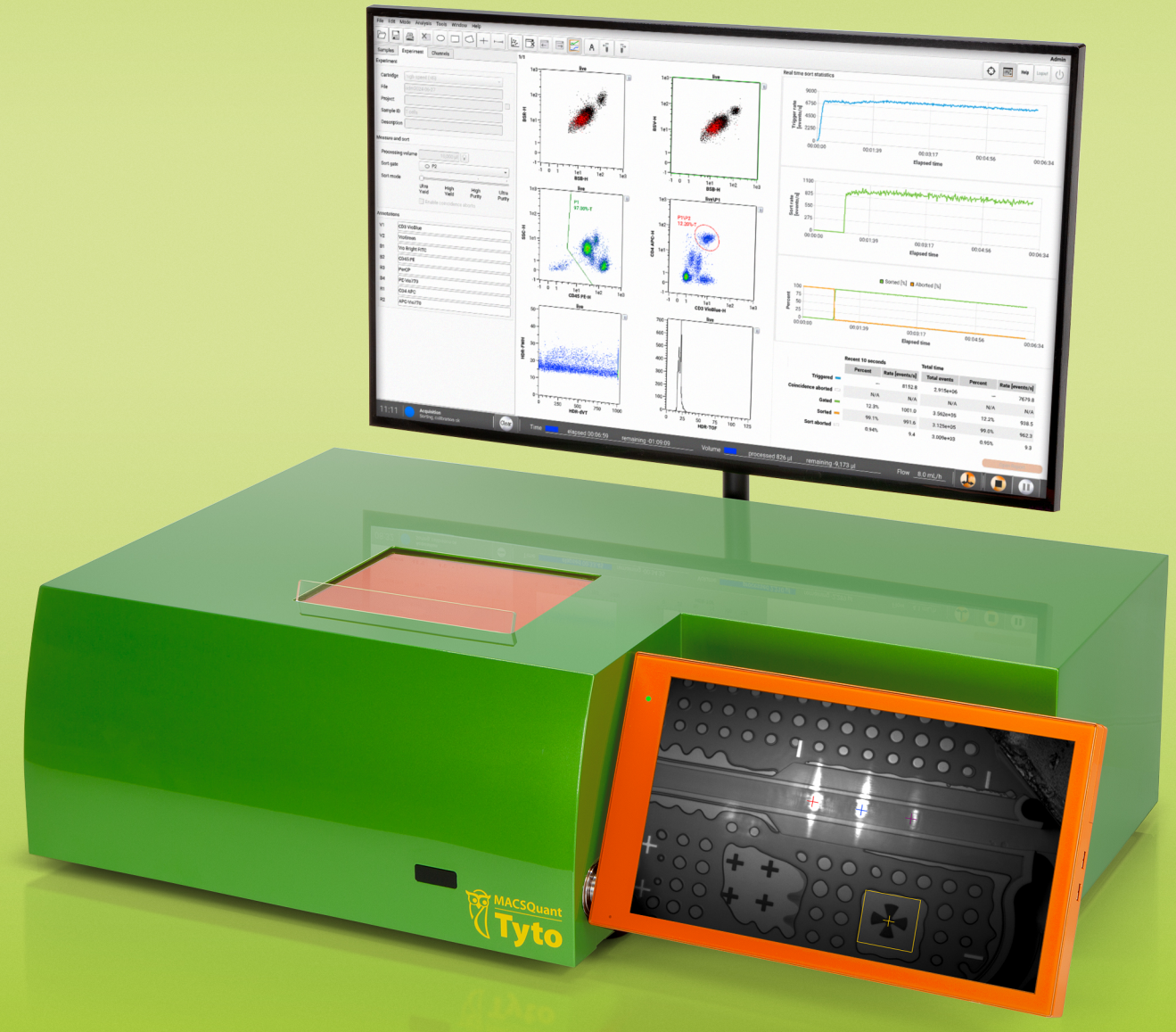
Miltenyi Biotec

MACSQuant® Tyto® Cell Sorter

User manual



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MACSQuant® Tyto® Cell Sorter

User manual

Original instructions

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Miltenyi Biotec B.V. & Co. KG
Friedrich-Ebert-Straße 68
51429 Bergisch Gladbach
Germany
Phone +49 2204 8306-0
Fax +49 2204 85197
macsde@miltenyi.com
www.miltenyibiotec.com

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EN

Important safety information

⚠ WARNING

Before using the MACSQuant Tyto Cell Sorter, 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.
- Keep this user manual in a place that is always accessible to all users.
- Observe local working area safety instructions and laboratory policies, as well as standards for health, safety, and prevention of accidents.
- In case of severe accidents, damages to the instrument, or if smoke or flames appear, cut the power supply immediately.
- If it is necessary to cut the power supply, unplug the cable from the electrical outlet, and contact an authorized Miltenyi Biotec service provider or Miltenyi Biotec Technical Support.
- Do not use the instrument if it has been dropped or is damaged.

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


PROTECTIVE EARTH (GROUND)

ON (POWER ON)


OFF (POWER OFF)


READ THE USER MANUAL BEFORE USING THE INSTRUMENT


FUSE


WEEE (WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT)

REF ORDER NUMBER

TYP TYPE NUMBER

SN SERIAL NUMBER


MANUFACTURER


DATE OF MANUFACTURE

EUROPEAN CONFORMITY MARKING

UNITED KINGDOM CONFORMITY ASSESSED 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

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.

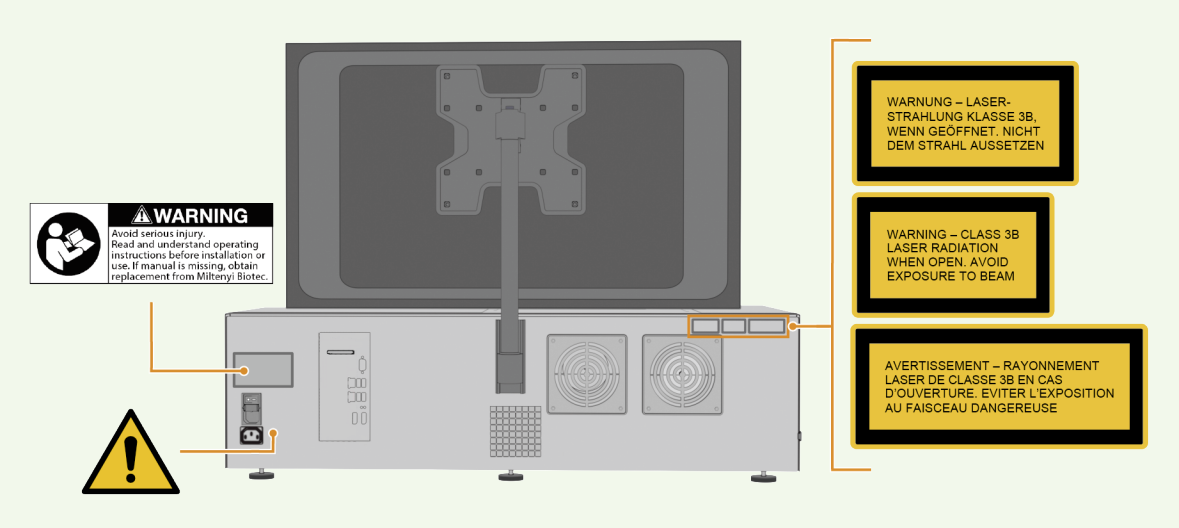


Figure 1: Hazard areas and safety symbols on the rear side of the MACSQuant Tyto Cell Sorter



WARNING! Avoid serious injury. Read and understand operating instructions before installing or use. If manual is missing, obtain replacement from Miltenyi Biotec.

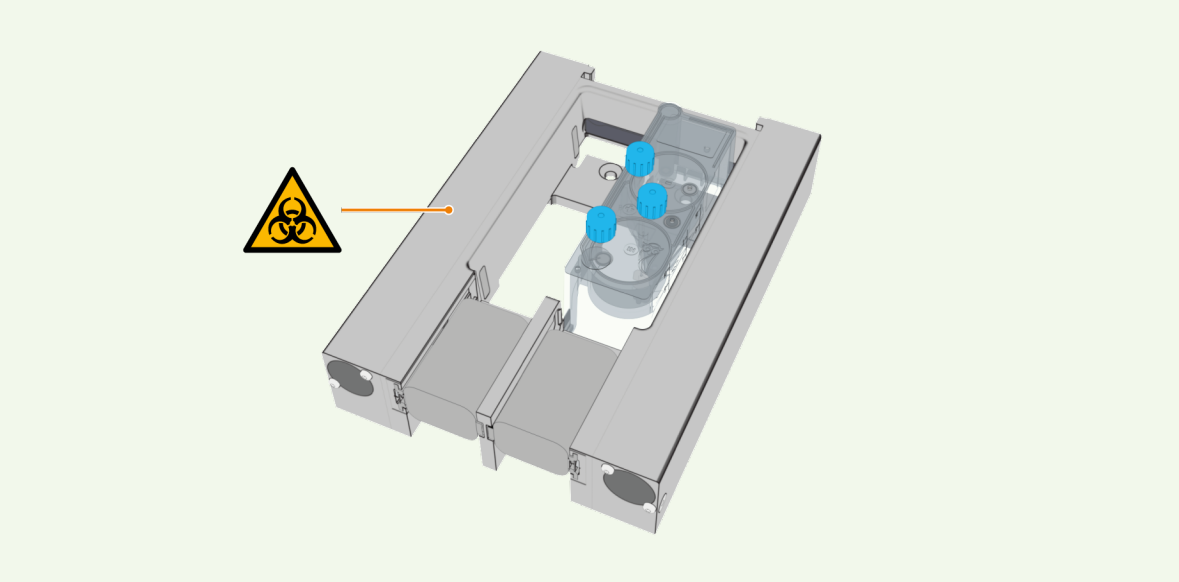


Figure 2: Safety symbol on the cartridge holder of the MACSQuant Tyto Cell Sorter

Electrical hazards

⚠ WARNING

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

Protective housing

A short circuit can be caused by disassembled parts or objects that have been dropped into the instrument.

- Do not remove or penetrate any cover of the housing.
- Do not use the instrument if an object entered the inside of the instrument.
- Unplug the instrument before maintenance.

Liquids inside the instrument

Liquids inside the instrument can cause short circuits.

- Do not allow liquids to enter the inside of the instrument.
- 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

A change in the environmental temperature may cause condensation inside the instrument. Humidity, condensation, or dust inside the instrument can cause short circuits.

- Use the instrument only indoors.
- 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.

Overheating and fire hazards

Protect the instrument from overheating.

- Ensure adequate air circulation during operation.
- 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.
- Protect the instrument from direct sunlight.
- Do not cover the ventilation slots and openings of the instrument.

Optical radiation hazards

According to standard IEC 60825-1:2014, the instrument is classified as Class 1M laser product. The instrument has three Continous-Wave Lasers. The lasers are classified as laser class 3B.

⚠ WARNING

Direct exposure to laser beam could result in eye injury.

- Servicing and repair must be performed by Miltenyi Biotec certified and qualified service personnel.
- Do not remove or penetrate any cover of the housing.
- Do not use the instrument if an object entered the inside of the instrument.

⚠ WARNING

Direct exposure to laser beam could result in severe burns and spread of fire.

- Servicing and repair must be performed by Miltenyi Biotec certified and qualified service personnel.
- Do not remove or penetrate any cover of the housing.
- Do not use the instrument if an object entered the inside of the instrument.

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.

- Wear personal protective equipment (such as gloves, safety glasses, etc.) as indicated in the safety data sheet for the particular substance.
- Use a disinfectant or cleaning agent that is appropriate for the specific pathogen or substance.
- Decontaminate the instrument according to the instructions in the chapter **Decontamination of the MACSQuant Tyto Cell Sorter on page 45**.
- Cleaning and disinfection intervals have to be evaluated individually based on the risk of the respective biohazardous material used.

Equipment damage

Defective or inadequate equipment can cause a biological hazard.

- Tighten the Luer caps of the cartridge before inserting it to the instrument.
- Do not overfill the cartridge.
- Clean up spilled liquids immediately.

- 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.
- Do not continue to use damaged accessories or parts of the instrument.

Waste

All liquid and solid waste must be considered hazardous.

- Observe local regulations regarding waste disposal.
- Autoclave or alternatively decontaminate waste with an appropriate disinfectant.

Chemicals

All the above safety measures also apply to any hazardous chemicals that may be present in the sample.

Ergonomic hazards

⚠ CAUTION

Heavy instrument.

Risk of tearing or straining muscles.

- Two people are required to lift the instrument.
- The left side of the instrument is heavier.

Mechanical hazards

⚠ CAUTION

Heavy instrument.

Risk of crushing foot.

- Place the instrument only onto stable, even, and vibration free tables or laboratory benches.
- Only use tables or laboratory benches that support a weight of at least 76 kg.
- Do not grip the instrument on the orange touchscreen.

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.

DE

Wichtige Sicherheitshinweise

Zuerst das Benutzerhandbuch lesen

⚠ WARNUNG

Lesen Sie vor der Verwendung des MACSQuant Tyto Cell Sorter 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.
- Bewahren Sie dieses Benutzerhandbuch an einem Ort auf, der jederzeit für alle Benutzer zugänglich ist.
- Beachten Sie die lokal geltenden Arbeitsschutzvorschriften und Laborrichtlinien sowie die gesetzlich geregelten Maßnahmen zu Sicherheit, Gesundheitsschutz und Unfallverhütung.
- Bei schweren Unfällen, Beschädigungen des Gerätes, Rauch oder Flammen unterbrechen Sie sofort die Stromversorgung.
- Muss die Stromversorgung unterbrochen werden, ziehen Sie den Netzstecker und wenden Sie sich an einen autorisierten Dienstleister von Miltenyi Biotec oder den Miltenyi Biotec Technical Support.
- Verwenden Sie das Gerät nicht, wenn es heruntergefallen oder beschädigt ist.

Gefahrenstufen

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

⚠ WARNUNG oder WARNUNG! 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


SCHUTZERDUNG

EIN (EINGESCHALTET)


AUS (AUSGESCHALTET)


LESEN SIE DAS BENUTZERHANDBUCH VOR VERWENDUNG DES GERÄTES


SICHERUNG


ELEKTRO- UND ELEKTRONIK-ALTGERÄTE (WEEE)



BESTELLNUMMER



MODELLNUMMER



SERIENNUMMER


HERSTELLER

HERSTELLUNGSDATUM

EUROPÄISCHE KONFORMITÄTSKENNZEICHNUNG

BRITISCHE PRODUKTKENNZEICHNUNG

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

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.

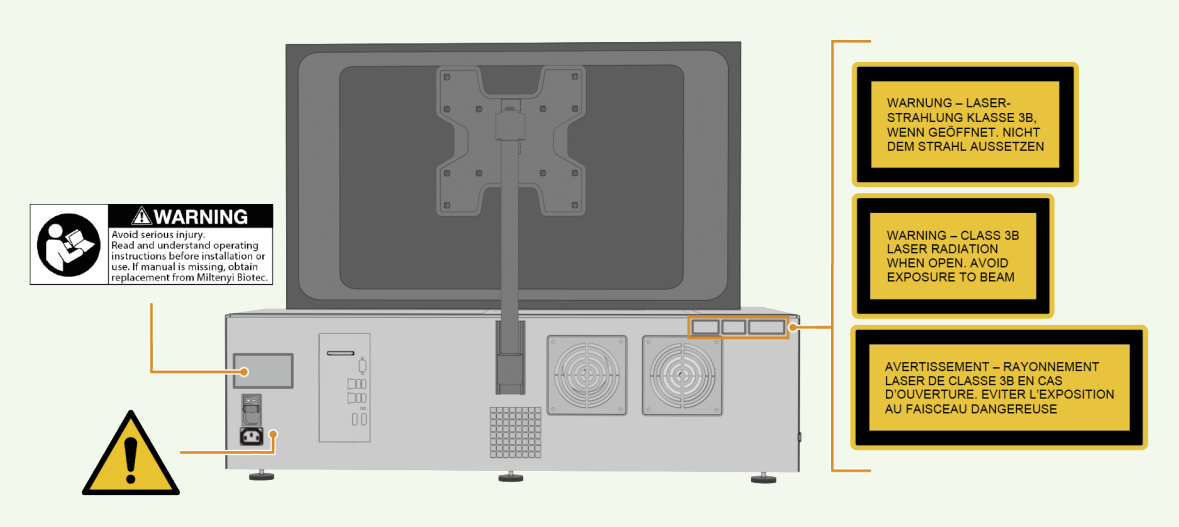
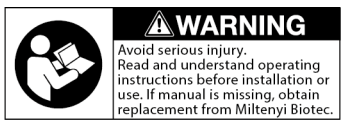


Abbildung 1: Gefahrenquellen und Gefahrensymbole auf der Rückseite des MACSQuant Tyto Cell Sorter



WARNUNG! Vermeiden Sie schwere Verletzungen. Vor der Installation oder Inbetriebnahme ist die Bedienungsanleitung zu lesen. Wenn die Anleitung fehlt, fordern Sie Ersatz bei Miltenyi Biotec an.

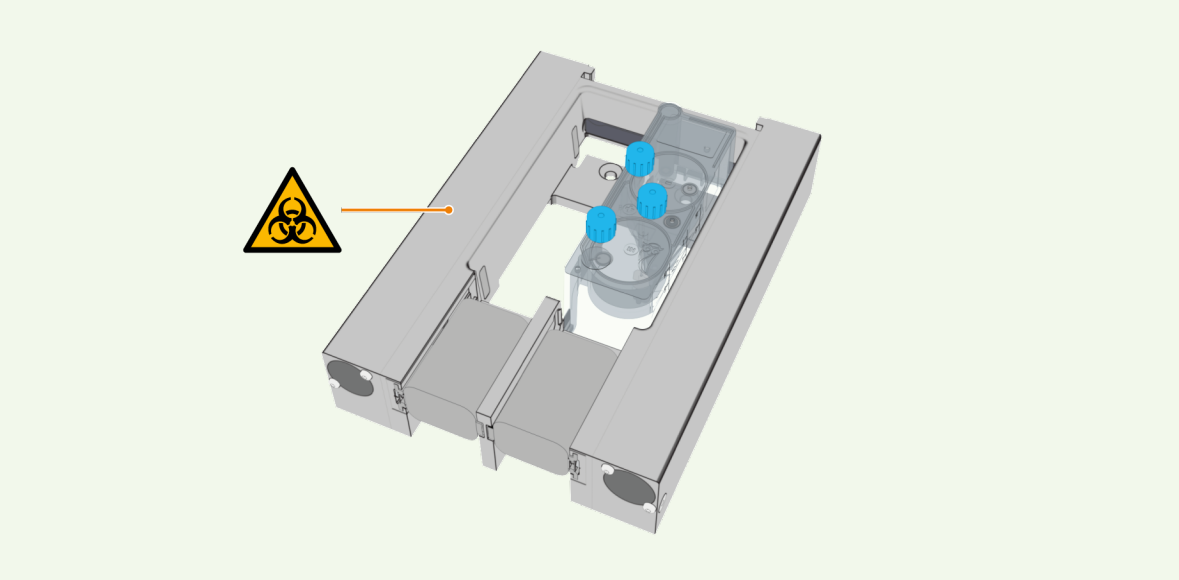


Abbildung 2: Sicherheitssymbol auf dem Kartuschenhalter des MACSQuant Tyto Cell Sorter

Elektrische Gefahren

⚠ WARNUNG

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

Schützendes Gehäuse

Ein Kurzschluss kann durch zerlegte Teile verursacht werden oder Gegenstände, die in das Gerät gefallen sind.

- Entfernen oder öffnen Sie niemals Teile des Gehäuses mit Ausnahme der Zugangsabdeckungen an der Vorderseite.
- Verwenden Sie das Gerät nicht, wenn ein Objekt hineingefallen ist.
- Ziehen Sie den Stecker des Gerätes bevor Sie mit Wartungsarbeiten beginnen.

Flüssigkeiten im Inneren des Gerätes

Flüssigkeiten im Gerät können Kurzschlüsse verursachen.

- Lassen Sie keine Flüssigkeiten in das Innere des Gerätes gelangen.
- 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

Eine Änderung der Umgebungstemperatur kann zu Kondensation im Instrument führen. Feuchtigkeit, Kondensation oder Staub im Inneren des Gerätes können zu Kurzschlüssen führen.

- Betreiben Sie das Gerät nur in Innenräumen.
- 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.

Gefahren durch Überhitzung und Brand

Schützen Sie das Gerät gegen Überhitzung.

- Sorgen Sie während des Betriebs für ausreichende Luftzirkulation.
- 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.
- Schützen Sie das Instrument vor direkter Sonneneinstrahlung.
- Lassen Sie die Lüftungsschlitze und Öffnungen des Gerätes frei.

Gefahren durch optische Strahlung

Gemäß der Norm IEC 60825-1:2014 ist das Instrument als Laserprodukt der Klasse 1 M klassifiziert. Das Instrument verfügt über drei Dauerstrichlaser. Die Laser sind in die Laserklasse 3B klassifiziert.

⚠ WARNUNG

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

- Wartungs- und Reparaturarbeiten dürfen nur von Personen durchgeführt werden, die von Miltenyi Biotec zertifiziert und entsprechend qualifiziert sind.
- Entfernen oder öffnen Sie niemals Teile des Gehäuses mit Ausnahme der Zugangsabdeckungen an der Vorderseite.
- Verwenden Sie das Gerät nicht, wenn ein Objekt hineingefallen ist.

⚠ WARNUNG

Ein direkter Kontakt mit dem Laserstrahl kann zu schweren Verbrennungen und Brandausbreitung führen.

- Wartungs- und Reparaturarbeiten dürfen nur von Personen durchgeführt werden, die von Miltenyi Biotec zertifiziert und entsprechend qualifiziert sind.
- Entfernen oder öffnen Sie niemals Teile des Gehäuses mit Ausnahme der Zugangsabdeckungen an der Vorderseite.
- Verwenden Sie das Gerät nicht, wenn ein Objekt hineingefallen ist.

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.

- Tragen Sie persönliche Schutzausrüstung (wie Handschuhe, Schutzbrille etc.), wie im Sicherheitsdatenblatt zum jeweiligen Material angegeben.
- Verwenden Sie ein Desinfektions- oder Reinigungsmittel, das für den spezifischen Erreger oder Stoff geeignet ist.
- Dekontaminieren Sie das Gerät entsprechend der Anweisungen in Kapitel **Decontamination of the MACSQuant Tyto Cell Sorter auf Seite 45**.
- Die Reinigungs- und Desinfektionsintervalle müssen je nach dem Risiko des jeweils verwendeten biogefährlichen Materials individuell bewertet werden.

Geräteschäden

Defekte oder mangelhafte Geräte können eine biologische Gefahr darstellen.

- Ziehen Sie die Luer-Kappen der Kartusche vor dem Einsetzen in das Gerät fest an.
- Überfüllen Sie die Kartusche nicht.
- Nehmen Sie verschüttete Flüssigkeiten sofort auf.
- 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.
- Beschädigte Zubehörteile oder Teile des Geräts dürfen nicht weiter verwendet werden.

Abfall

Alle flüssigen und festen Abfälle müssen als gefährlich eingestuft werden.

- Beachten Sie die örtlichen Vorschriften zur Abfallentsorgung.
- Autoklavieren oder dekontaminieren Sie Abfall mit einem geeigneten Desinfektionsmittel.

Chemikalien

Alle oben genannten Sicherheitsmaßnahmen gelten auch für gefährliche Chemikalien, die in der Probe enthalten sein können.

Ergonomische Gefahren

⚠ VORSICHT

Schweres Gerät.

Gefahr von Zerrungen und Muskelrissen.

- Das Anheben des Gerätes muss durch zwei Personen erfolgen.
- Das Gerät hat auf der linken Seite mehr Gewicht.

Mechanische Gefahren

⚠ VORSICHT

Schweres Gerät.

Quetschgefahr für die Füße.

- Stellen Sie das Gerät nur auf stabile, ebene und vibrationsfreie Tische oder Labortische.
- Verwenden Sie nur Tische oder Labortische, die ein Gewicht von mindestens 76 kg tragen können.
- Halten Sie das Gerät nicht am orangenen Touchscreen 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 Gerät sollte immer vorsichtig und nur in der von Miltenyi Biotec vorgegebenen Verpackung transportiert werden. 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. Interne Beschädigungen können auftreten, wenn das Instrument übermäßigen Vibrationen ausgesetzt wird oder wenn es herunterfällt.

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 lizensierten 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.

ES

Información importante de seguridad

Lea primero el manual de uso

⚠ ADVERTENCIA

Antes de usar el MACSQuant Tyto Cell Sorter, 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



EN ESTE CAPÍTULO SE DESCRIBEN SITUACIONES POTENCIALMENTE PELIGROSAS ASOCIADAS CON ESTE INSTRUMENTO Y SE PROPORCIONA INFORMACIÓN IMPORTANTE SOBRE SEGURIDAD PARA MINIMIZAR LOS RIESGOS Y PROTEGERSE A SÍ MISMO Y A LOS DEMÁS.

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.
- Guarde este manual de uso en un lugar que siempre esté accesible para todos los usuarios.
- 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.
- En caso de accidentes graves, daños en el instrumento o si aparece humo o llamas, corte de inmediato el suministro de la corriente eléctrica.
- Si es necesario cortar el suministro de la corriente eléctrica, desenchufe el cable de la toma de corriente y póngase en contacto con un proveedor de servicios autorizado de Miltenyi Biotec o el Miltenyi Biotec Technical Support.
- No utilice el instrumento si se ha caído o dañado.

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


CONDUCTOR DE PROTECCIÓN

ON (ENCENDIDO)


OFF (APAGADO)


LEA EL MANUAL DEL USUARIO ANTES DE UTILIZAR EL INSTRUMENTO


FUSIBLE


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



NÚMERO DE PEDIDO



NÚMERO DEL MODELO



NÚMERO DE SERIE


FABRICANTE


FECHA DE FABRICACIÓN

MARCADO DE CONFORMIDAD EUROPEA

CONFORMIDAD EVALUADA DEL REINO UNIDO

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

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.

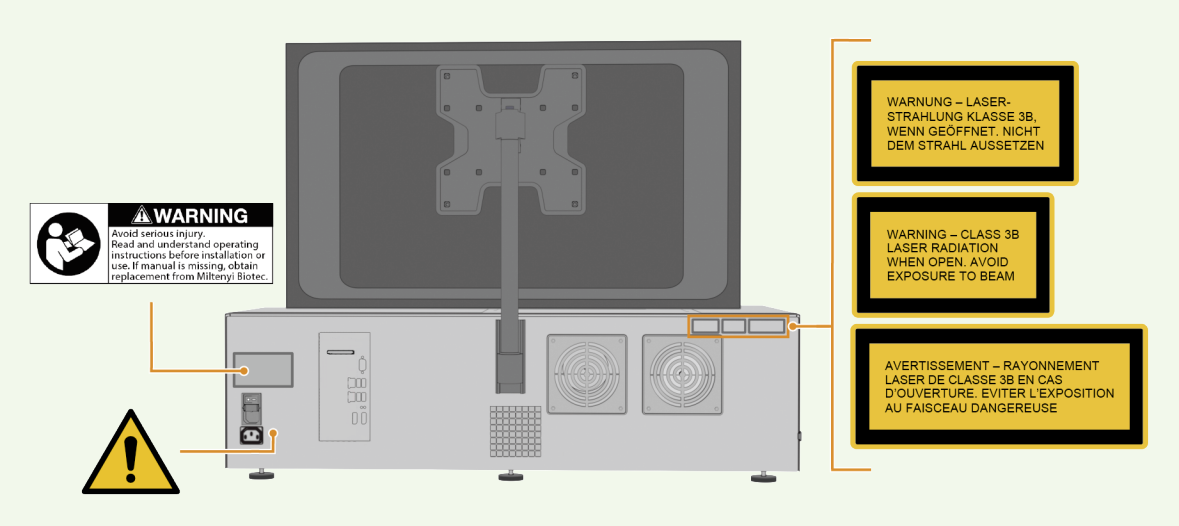
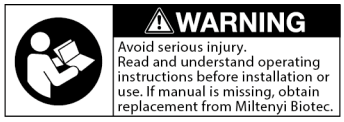


Figura 1: Puntos de peligro de y localización de los símbolos de seguridad en la parte trasera del MACSQuant Tyto Cell Sorter



ADVERTENCIA! Evita las lesiones graves. Lea y comprenda las instrucciones de funcionamiento antes de la instalación o el uso. Si falta el manual, solicite su sustitución a Miltenyi Biotec.

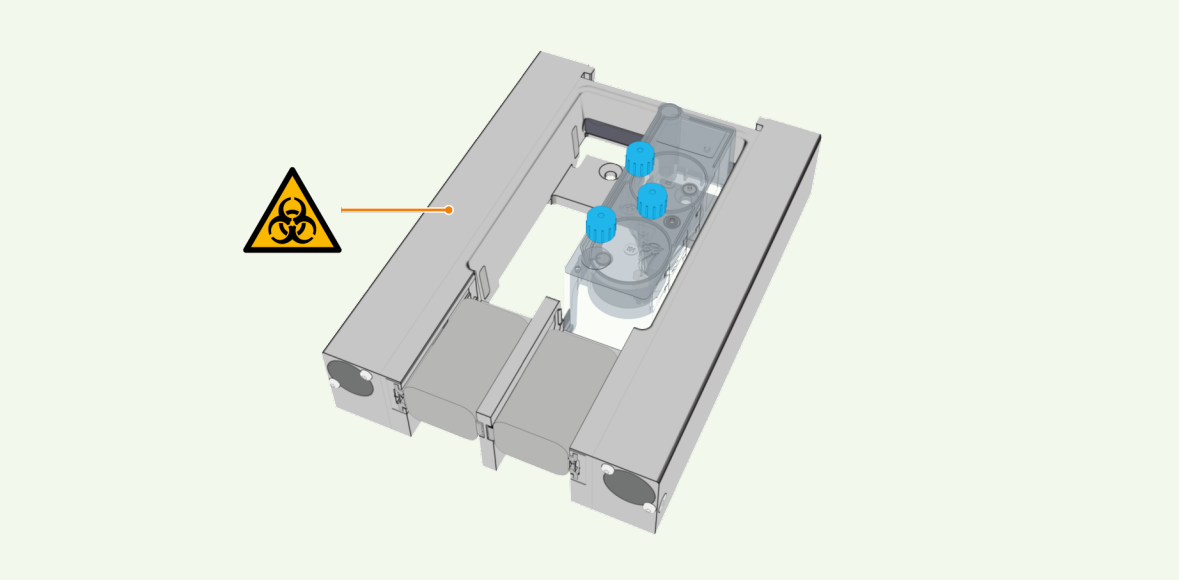


Figura 2: Símbolo de seguridad en el portacartucho del MACSQuant Tyto Cell Sorter

Peligros eléctricos

⚠ ADVERTENCIA

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

Carcasa protectora

El cortocircuito puede ser causado por piezas u objetos desmontados que se hayan caído en el instrumento.

- No retire ni perfore ninguna cubierta de la carcasa.
- No utilice el instrumento si un objeto ha entrado en el interior del mismo.
- Desenchufe el instrumento antes de realizar trabajos de mantenimiento.

Líquidos en el interior del instrumento

Los líquidos que hay dentro del instrumento pueden provocar cortocircuitos.

- No permita que ningún líquido penetre en el interior del instrumento.
- 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

Un cambio en la temperatura ambiente puede producir condensación dentro del instrumento. La presencia de humedad, condensación o polvo dentro del instrumento puede provocar cortocircuitos.

- Use el instrumento solo en interiores.
- 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.

Peligros relacionados con el sobrecalentamiento y los incendios

Proteja el instrumento contra el sobrecalentamiento.

- Asegure una adecuada circulación de aire durante el funcionamiento.
- 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.
- Proteja el instrumento de la luz solar directa.
- No cubra las ranuras de ventilación ni las aberturas del instrumento.

Peligros de radiación óptica

Según la norma IEC 60825-1, el instrumento está clasificado como un producto láser de Clase 1M. El instrumento tiene tres Láseres de onda continua. Los láseres están clasificados como de clase 3B.

⚠ ADVERTENCIA

La exposición directa al rayo láser podría causar lesiones oculares.

- La reparación debe ser realizada por personal de servicio cualificado y certificado por Miltenyi Biotec.
- No retire ni perfore ninguna cubierta de la carcasa.
- No utilice el instrumento si un objeto ha entrado en el interior del mismo.

⚠ ADVERTENCIA

La exposición directa al rayo láser puede provocar quemaduras graves y la propagación de incendios.

- La reparación debe ser realizada por personal de servicio cualificado y certificado por Miltenyi Biotec.
- No retire ni perfore ninguna cubierta de la carcasa.
- No utilice el instrumento si un objeto ha entrado en el interior del mismo.

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.

- 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.
- Use un desinfectante o producto de limpieza que sea apropiado para el patógeno o sustancia en cuestión.
- Descontamine el instrumento según las instrucciones del capítulo **Decontamination of the MACSQuant Tyto Cell Sorter on page 45**.
- Los intervalos de limpieza y desinfección deben evaluarse individualmente en función del riesgo del material biopeligroso utilizado.

Daños en el equipo

Un equipo defectuoso o inadecuado puede causar un peligro biológico.

- Apriete bien los tapones Luer del cartucho antes de insertarlo en el instrumento.
- No llene demasiado el cartucho.
- Limpie los líquidos derramados inmediatamente.

- 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.
- No continúe usando piezas o accesorios dañados del instrumento.

Desechos

Todos los desechos líquidos y sólidos deben ser considerados peligrosos.

- Observe las regulaciones locales sobre la eliminación de desechos.
- Ponga en autoclave o, como alternativa, descontamine los desechos con un desinfectante apropiado.

Productos químicos

Todas las medidas de seguridad anteriores también se aplican a cualquier producto químico peligroso que pueda estar presente en la muestra.

Riesgos ergonómicos

⚠ ATENCIÓN

Instrumento pesado.

Riesgo de desgarro o distensión muscular.

- Se requieren dos personas para levantar el equipo.
- La parte izquierda del instrumento pesa más.

Peligros mecánicos

⚠ ATENCIÓN

Instrumento pesado.

Riesgo de aplastamiento de los pies.

- Coloque el instrumento sobre una mesa o bancada de laboratorio estable, uniforme y sin vibraciones.
- Utilice únicamente mesas o bancadas de laboratorio que puedan aguantar un peso mínimo de 76 kg.
- No coja el instrumento por la pantalla táctil naranja.

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 demantenimiento y reparación del instrumento.
- La reparación debe ser realizada por personal de servicio cualificado y certificado por Miltenyi Biotec.
- Si el instrumento necesita reparación, descontamínelo 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 reglementarios. 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.

FR

Informations de sécurité importantes

Lisez d'abord le manuel d'utilisation

⚠ AVERTISSEMENT

Avant d'utiliser le MACSQuant Tyto Cell Sorter, 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.
- Conservez ce Guide de l'Utilisateur dans un endroit qui reste toujours accessible à tous les utilisateurs.
- 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.
- En cas d'accident grave, d'endommagement de l'instrument ou si de la fumée ou des flammes apparaissent, coupez immédiatement l'alimentation électrique.
- S'il est nécessaire de couper l'alimentation électrique, débranchez le câble de la prise de courant et contactez un prestataire de services agréé Miltenyi Biotec ou le Miltenyi Biotec Technical Support.
- N'utilisez pas l'instrument s'il est tombé ou endommagé.

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


CONDUCTEUR DE PROTECTION

MARCHE (INSTRUMENT ALLUMÉ)


ARRÊT (INSTRUMENT ÉTEINT)


LISEZ LE MANUEL D'UTILISATION AVANT D'UTILISER L'INSTRUMENT


FUSIBLE


DEEE (DÉCHETS D'ÉQUIPEMENTS ÉLECTRIQUES ET ÉLECTRONIQUES)

REF NUMÉRO DE COMMANDE

TYP NUMÉRO DE MODÈLE

SN NUMÉRO DE SÉRIE


FABRICANT

DATE DE FABRICATION

MARQUAGE DE CONFORMITÉ EUROPÉENNE

MARQUAGE DE PRODUIT DU ROYAUME-UNI

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

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.

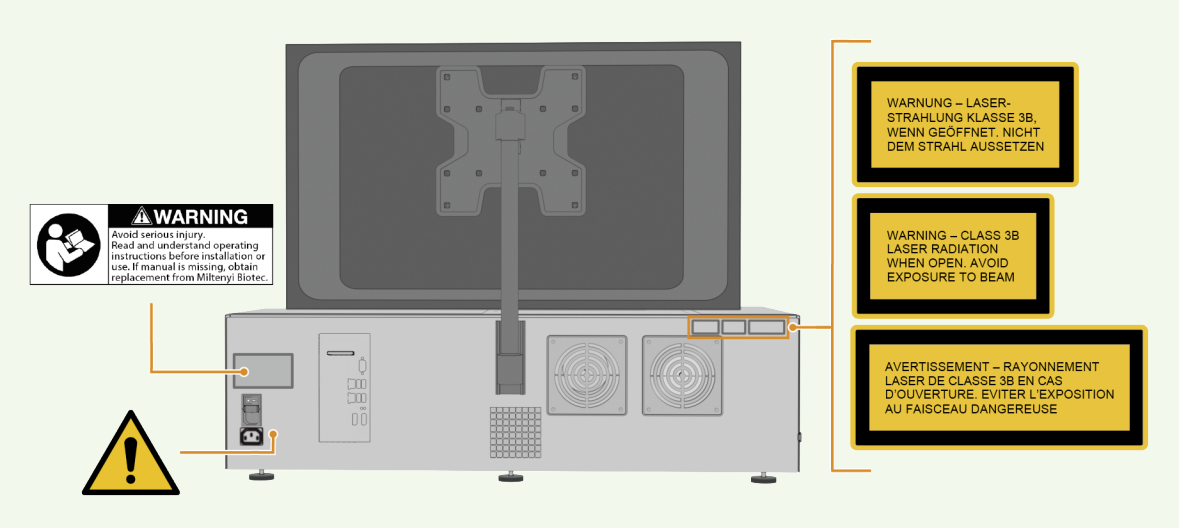
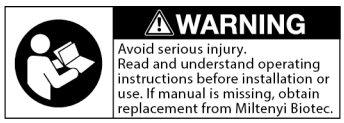


Figure 1: Les zones de risque et symboles de sécurité sur la face arrière du MACSQuant Tyto Cell Sorter



AVERTISSEMENT! Évitez les blessures graves. Lisez et comprenez les instructions d'utilisation avant d'installer ou d'utiliser l'appareil. Si le manuel est manquant, demandez à Miltenyi Biotec de le remplacer.

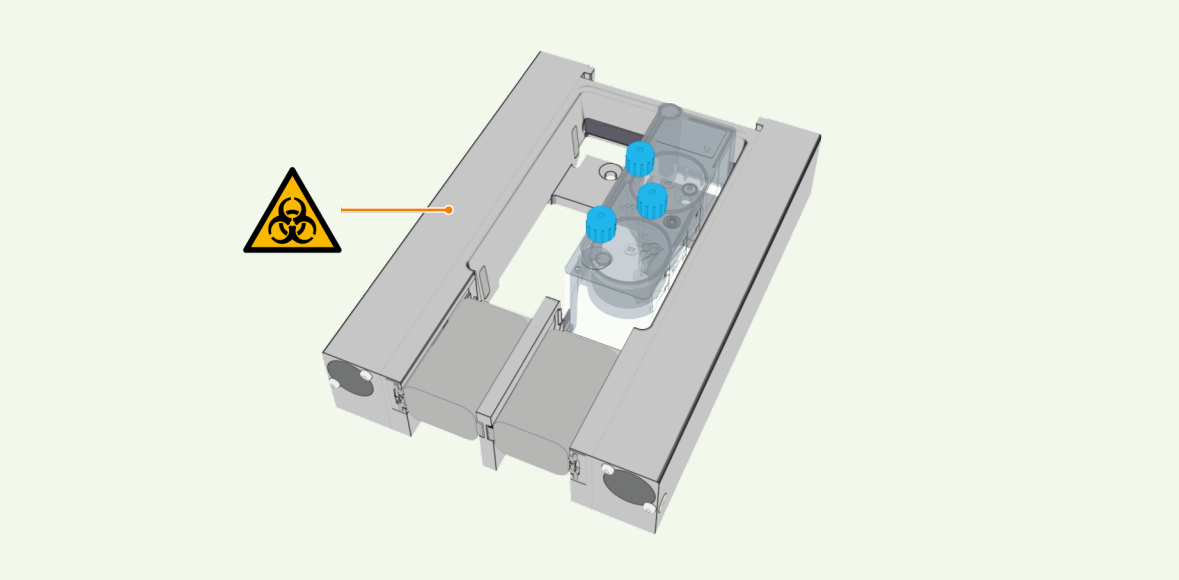


Figure 2: Symbole de sécurité sur le support de cartouche du MACSQuant Tyto Cell Sorter

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

Un court-circuit peut se produire si des pièces démontées ou des objets tombent à l'intérieur de l'instrument.

- Ne retirez pas et ne franchissez pas les capots du boîtier.
- N'utilisez pas l'instrument si un objet a pénétré à l'intérieur de l'instrument.
- Débrancher l'instrument avant tout entretien.

Liquides à l'intérieur de l'instrument

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

- Empêchez tout liquide de pénétrer à l'intérieur de l'instrument.
- 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

Un changement de la température ambiante peut entraîner de la condensation à l'intérieur de l'instrument. Humidité, condensation ou poussière à l'intérieur de l'instrument peuvent entraîner des courts-circuits.

- Utilisez l'instrument à l'intérieur uniquement.
- 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.

Surchauffe et risque d'incendie

Protégez l'instrument de toute surchauffe.

- Assurez une circulation d'air appropriée pendant que l'instrument est en marche.
- 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.
- Protéger l'instrument contre la lumière directe du soleil.
- Ne couvrez pas les orifices et ouvertures de ventilation de l'instrument.

Dangers liés au rayonnement optique

Conformément à la norme IEC 60825-1, l'instrument fait partie des produits lasers de classe 1 M. L'instrument est équipé de trois lasers continus. Les lasers sont de classe 3B.

⚠ AVERTISSEMENT

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

- La maintenace et la réparation doivent être effectuées par du personnel de maintenance Miltenyi Biotec qualifié et certifié.
- Ne retirez pas et ne franchissez pas les capots du boîtier.
- N'utilisez pas l'instrument si un objet a pénétré à l'intérieur de l'instrument.

⚠ AVERTISSEMENT

Une exposition directe au faisceau laser peut causer des brûlures sévères ou un incendie.

- La maintenace et la réparation doivent être effectuées par du personnel de maintenance Miltenyi Biotec qualifié et certifié.
- Ne retirez pas et ne franchissez pas les capots du boîtier.
- N'utilisez pas l'instrument si un objet a pénétré à l'intérieur de l'instrument.

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.

- 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.
- Utilisez un agent de désinfection ou de nettoyage approprié pour l'agent pathogène ou la substance particulière.
- Décontaminer l'instrument en suivant les instructions au chapitre **Decontamination of the MACSQuant Tyto Cell Sorter on page 45**.
- Les fréquences de nettoyage et de désinfection doivent être évaluées individuellement en fonction du risque lié au matériel biologique dangereux utilisé.

Dommages de l'équipement

Des équipements défectueux ou inadéquats peuvent provoquer un risque biologique.

- Serrer les bouchons Luer de la cartouche avant de l'insérer dans l'instrument.

- Ne pas surremplir la cartouche.
- Nettoyez immédiatement tout liquide renversé.
- 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.
- Ne pas continuer à utiliser les accessoires ou parties de l'instrument endommagés.

Déchets

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

- Respecter les réglementations locales relatives à l'élimination des déchets.
- Autoclavez les déchets ou décontaminez-les à l'aide d'un désinfectant approprié.

Produits chimiques

Toutes les mesures de sécurité ci-dessus s'appliquent aussi à tout produit chimique dangereux susceptible d'être présent dans l'échantillon.

Risques ergonomiques

⚠ ATTENTION

Instrument lourd.

Risque d'élongation ou de foulure musculaire.

- L'instrument doit être soulevé par deux personnes.
- Le côté gauche de l'instrument est plus lourd.

Dangers mécaniques

⚠ ATTENTION

Instrument lourd.

Risque d'écrasement du pied.

- Placez l'instrument uniquement sur des tables ou des paillasses stables, planes et sans vibrations.
- Only use tables or laboratory benches that support a weight of at least 76 kg.
- Ne pas saisir l'instrument par son écran orange.

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 maintenace 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 suppléméntaires 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.

1 Introduction

1.1 The MACSQuant Tyto Cell Sorter

The MACSQuant Tyto Cell Sorter is an instrument for fluorescence-based cell sorting using a patented microchip technology with a high-speed mechanical sort valve. The MACSQuant Tyto Cell Sorter measures cell size and cell complexity, like granularity, with backscatter and side scatter detectors. Backscatter detectors collect the light that is scattered back from a cell primarily by diffraction of the light around the cell.

The high-frequency fluidic valve embedded in the microchip of the closed cartridge has a microsecond range of valve opening and closing cycles. It is as fast as 30,000 valve actuations/s.

Cells pass through the microchip under low positive pressure and no sheath fluid for high cell viability and functionality, even with fragile cells. The cartridge has aseptic ports for sample administration and collection. Since the sorting process is not using droplets, no biohazardous aerosols are formed. This minimizes the operator risk. Samples are also protected from environmental contamination in the closed system of the MACSQuant Tyto Cell Sorter. Disposable cartridges minimize sample-to-sample carryover and eliminate the need for sample loading and collection ports. Cells sorted with the MACSQuant Tyto Cell Sorter are ready for use in sensitive downstream applications such as cell culture and cell expansion.

1.2 Intended use

The MACSQuant Tyto Cell Sorter is a stand-alone benchtop instrument for microchip-based cell sorting in a fully closed system using disposable cartridges. The three integrated lasers combined with the mechanical sort valve - embedded in the cartridge - allow for high-speed, fluorescence-based cell sorting, based on up to ten parameters. The instrument offers fully automated flow control, laser alignment, and valve timing.

The MACSQuant Tyto Cell Sorter is a research-use only laboratory equipment. It is to be used by professional laboratory personnel only.

1.3 Instrument description

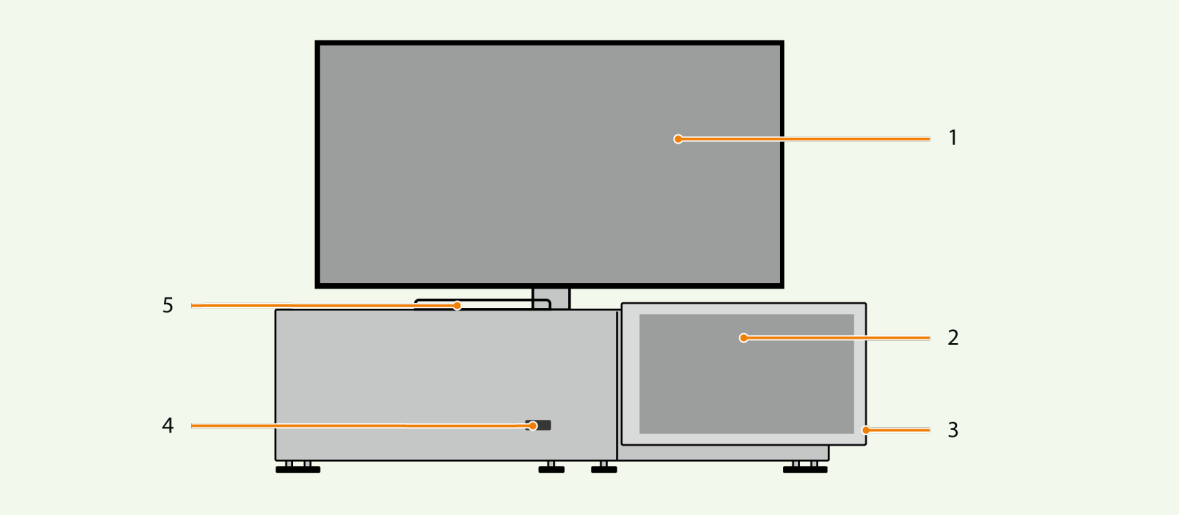


Figure 1.1: Front view of the instrument

1	External monitor	**4**	2D barcode reader
2	Touchscreen	**5**	Instrument door
3	USB 3.0 port (2×)		

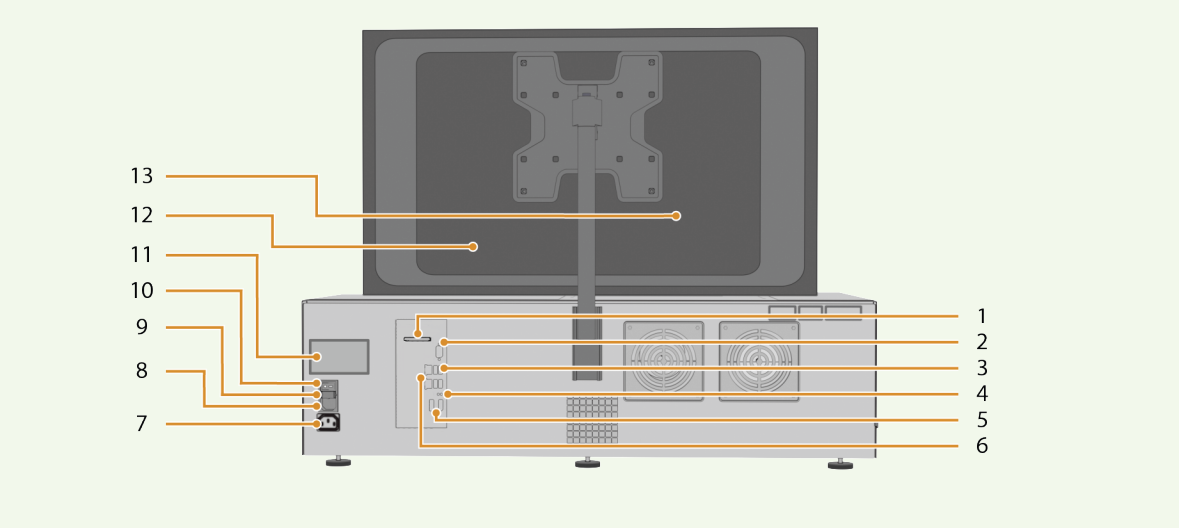


Figure 1.2: Rear view of the instrument

1	CFast-card slot	**8**	Power port for external monitor
2	COM1 port	**9**	Fuse box
3	USB 3.0 port (4×)	**10**	Power switch
4	LED (status PC)	**11**	Type label
5	Display port (2×)	**12**	Display port
6	LAN port (2×)	**13**	Power port of external monitor
7	Power port		

2 Installation

2.1 Components included in the delivery

The following components are included in the delivery of the MACSQuant Tyto Cell Sorter (# 130-103-931):

Component	Position in transportation box
MACSQuant Tyto Cell Sorter	Main storage compartment
MACSQuant Tyto Cell Sorter user manual	Upper storage compartment
MACSQuantify Tyto Software user manual	Upper storage compartment
Power cable	Upper storage compartment
Keyboard	Upper storage compartment
Monitor mount and screws	Upper storage compartment
External monitor	Upper storage compartment
Monitor cable	Upper storage compartment
MACSQuant Tyto Cartridge Priming Fixture	Upper storage compartment
MACSQuant Tyto Cartidges (24 pieces)	Upper storage compartment
MACSQuant Tyto Running Buffer 3 × 100 mL	Extra packaging
Pre-Separation Filters 20 µm (50 pieces)	Upper storage compartment
Capillary tips, sterile	Upper storage compartment

Table 2.1: Components included in delivery

2.2 Consumables

Consumable	Order no.
MACSQuant Tyto Cartridges (24 pieces)	130-106-088
MACSQuant Tyto Cartridges (8 pieces)	130-104-791
MACSQuant Tyto Cartridge HS (24 pieces)	130-121-551
MACSQuant Tyto Cartridge HS (8 pieces)	130-121-549
MACSQuant Tyto Cartridge LC (8 pieces)	130-133-260
MACSQuant Tyto Running Buffer 1 × 100 mL	130-107-206
MACSQuant Tyto Running Buffer 6 × 100 mL	130-107-207
MACSQuant Tyto Calibration Beads	130-122-730
Pre-Separation Filters 20 µm (50 pieces)	130-101-812
MACS GMP Tyto Running Buffer consisting of MACS GMP PBS/$MgCl_2$ Buffer (3 × 1 L) MACS GMP Tytonase (20× Stock solution, 5 mL)	 170-076-155 170-076-210
MACS GMP Tyto Cartridge (1 piece)	170-076-011
MACS GMP Tyto Cartridge HS (1 piece)	170-084-001

Table 2.2: Consumables for the MACSQuant Tyto Cell Sorter

2.3 Unpacking and first installation

⚠ CAUTION

Heavy instrument.

Risk of tearing or straining muscles.

- Two people are required to lift the instrument.
- The left side of the instrument is heavier.

⚠ CAUTION

Heavy instrument.

Risk of crushing foot.

- Place the instrument only onto stable, even, and vibration free tables or laboratory benches.
- Only use tables or laboratory benches that support a weight of at least 76 kg.
- Do not grip the instrument on the orange touchscreen.

⚠ WARNING

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

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.
- Protect the instrument from direct sunlight.
- Do not cover the ventilation slots and openings of the instrument.

Only Miltenyi Biotec service personnel or personnel approved by Miltenyi Biotec are allowed to unpack and install the instrument. Please contact Miltenyi Biotec Technical Support for further information.

1. Open the transportation box.
2. Take out all boxes and bags from the upper storage compartment (**Table 2.1**) and remove the sheet of foam covering the MACSQuant Tyto Cell Sorter.
3. Lift the MACSQuant Tyto Cell Sorter out of its box.
4. Transfer the instrument onto a stable working platform and remove the plastic bag surrounding the instrument.
5. Take out the monitor holder from the foam and attach it to the rear side of the instrument. Screw the screw at the bottom of the holder to secure it to the instrument.
6. Take the monitor out of its protection foam and attach it on the top of the monitor holder.
   A click confirms stable attachment.

2.4 Installing the MACSQuant Tyto Cell Sorter

⚠ 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. Make sure that the power switch is in position O (I indicates on, O indicates off). The power switch is located at the lower left corner on the rear of the instrument (**Figure 1.2**).
2. Connect the monitor with the power cable to the monitor power port on the rear of the instrument (**Figure 1.2**).
3. Connect the display port cable of the monitor to the display port on the rear of the instrument (**Figure 1.2**).
4. Connect the keyboard to the USB port on the right side of the touchscreen (**Figure 1.1**), or to the USB ports on the rear of the instrument (**Figure 1.2**).
5. Connect the power cable to the power port on the rear of the instrument (**Figure 1.2**).
6. Plug the power cable into a grounded electrical outlet.

2.5 Moving the instrument

⚠ CAUTION

Heavy instrument.

Risk of tearing or straining muscles.

- Two people are required to lift the instrument.
- The left side of the instrument is heavier.

⚠ CAUTION

Heavy instrument.

Risk of crushing foot.

- Place the instrument only onto stable, even, and vibration free tables or laboratory benches.
- Only use tables or laboratory benches that support a weight of at least 76 kg.
- Do not grip the instrument on the orange touchscreen.

In case the MACSQuant Tyto Cell Sorter needs to be moved, contact Miltenyi Biotec Technical Support. For additional information about transportation, see **Transportation on page 11**.

3 Operating the instrument

3.1 Switching on the instrument

1 To turn the instrument into standby mode, turn the power switch on the rear of the instrument to I. A red LED on the touchscreen confirms standby mode.

2 To start the MACSQuantify Tyto Software, tap the touchscreen. This can take up to two minutes. A sign-in screen is shown.

For detailed instructions on how to use the MACSQuantify Tyto Software, refer to the MACSQuantify Tyto Software user manual.

3.2 Switching off the instrument

Shut down the software before switching off the instrument. Refer to the MACSQuantify Tyto Software user manual for an introduction to the user interface.

1 To shut down the software, click the **Shutdown** button at the right side of the toolbar.

The MACSQuantify Tyto Software and all processes on the MACSQuant Tyto Cell Sorter shut down. This can take up to two minutes.

The instrument is in standby mode.

2 To switch off the instrument, turn the power switch on the rear of the instrument to O (**Figure 1.2**).

3.3 Scanning a cartridge

NOTICE

Correct cartridge alignment is crucial for measurement and sorting.

Fingerprints on the chip of the cartridge can impair cartridge alignment.

- Do not touch the chip of the cartridge.

Use only cartidges from Miltenyi Biotec. Cartridges are for single-use only. For proper disposal of cartridges, follow local regulations and carefully read the chapter **Important safety information**.

The cartridges are equipped with a 2D barcode. Scan the cartridge prior to use. Refer to the respective data sheet for further information.

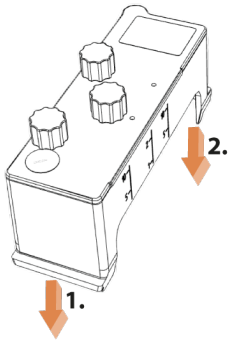
1 Locate the 2D barcode reader on the front of the instrument. The LED beam points downwards.

2 Hold the cartridge in front of the reader. Tilt it slightly.

3 A pop-up window is shown if scanning was successful.

3.4 Loading a cartridge

1. Open the instrument door.
2. Orient the cartridge so that the Tyto owl image is in the upright position. Place the cartridge in the right slot of the instrument stage (**Figure 3.1**). To insert the cartridge, first lower the front (**1.**) and then lower the rear (**2.**). Do not push the cartridge downwards. You will hear a click as the cartridge automatically locks into position.



3. The door closes automatically shortly after inserting the cartridge.

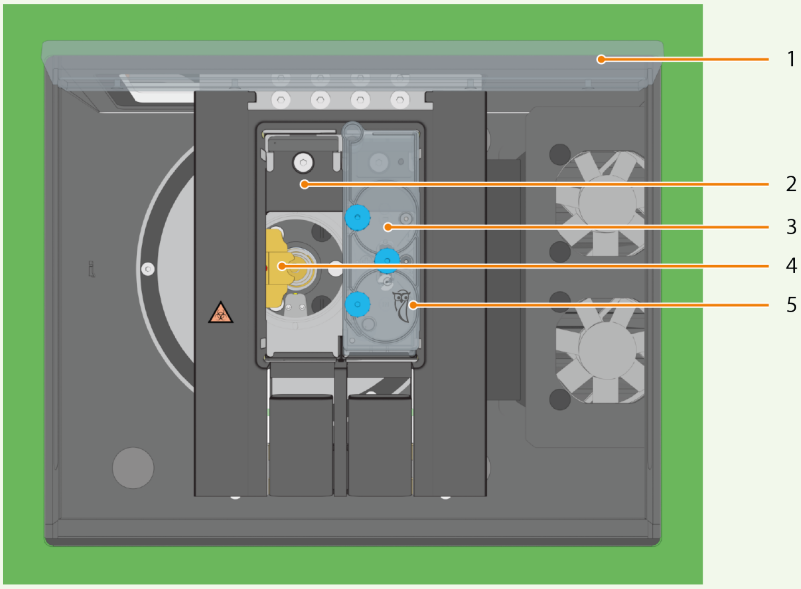


Figure 3.1: Correct position of a cartridge

1	Instrument door	**4**	Solenoid
2	Left cartridge slot	**5**	Tyto owl
3	Cartridge inserted in right cartridge slot		

3.5 Stopping the sort and ejecting the cartridge

The cartridge is ejected automatically after the time required to run the predefined volume.

1. To end the sorting process manually, click the **Stop** button.
2. Open the instrument door and remove the cartridge.
3. Continue with recovering the sorted cell sample from the cartridge.

4 Maintenance

⚠ WARNING

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

- Unplug the instrument before cleaning it.
- Unplug the instrument before maintenance.
- Do not remove or penetrate any cover of the housing.

⚠ WARNING

Contamination or infection could result in death or serious injury depending on the material used.
All biological material must be considered potentially infectious.

- Wear personal protective equipment (such as gloves, safety glasses, etc.) as indicated in the safety data sheet for the particular substance.
- Cleaning and disinfection intervals have to be evaluated individually based on the risk of the respective biohazardous material used.

4.1 Decontamination of the MACSQuant Tyto Cell Sorter

4.1.1 Surface decontamination

The surface of the instrument and the surface of the cooling chamber must be decontaminated upon contact with biohazardous samples and prior to service. Clean and disinfect the instrument regularly.

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.

1 Wipe the instrument surface and the surface of the cooling chamber with a soft cloth or cotton-tipped applicator.

Do not clean or disinfect the solenoid on a regular basis. Only disinfect the solenoid upon contact with biohazardous samples and prior to service. Do not apply force to the solenoid.

2 Use disinfectants for disinfection which are in accordance with any local regulations. Following disinfectants will not damage the surface of the instrument and the surface of the cooling chamber.

- Quart. ammonium complexes - undiluted
- 70% Isopropanol,
- 6% Phenol
- 2% Amphotenside
- 3% Aldehyde
- 4% Peroxide
- 5% Chlorine
- 70% Ethanol
- 3% Descogen®

If the glass cover of the objective requires cleaning, contact your local Miltenyi Biotec representative or Miltenyi Biotec Technical Support.

4.1.2 Decontamination by vaporous hydrogen peroxide

NOTICE

Hardware parts are moving during the ventilation process.

Hardware parts can crash and damage the instrument.

- Do not start ventilation when the cartridge is loaded.

The user is responsible to validate functionality of the (missing or bad snippet) in case other gas than vaporous hydrogen peroxide is used. The user is responsible to validate appropriate methods that guarantee a successful decontamination.

The **Ventilation** tool can support decontamination by using vaporous hydrogen peroxide on the (missing or bad snippet). During the ventilation process, the cooling unit is deactivated to avoid condensation. Background processes controlling the hardware required for venting are stopped. All fans are activated to support the venting process.

1 Make sure that the status indicator of the (missing or bad snippet) is green and no cartridge is loaded.
2 Click on the **Ventilation** tool in the **Tools** menu to start ventilation of the internal hardware reservoirs.
3 Start gas injection. The ventilation process is a continuous loop of pressurizing, ventilation, and depressurizing of the internal hardware parts.
4 Click on the **Ventilation** tool in the **Tools** menu to stop ventilation of the internal hardware reservoirs.

4.2 Initial calibration

The initial calibration is required to ensure proper normalization for Smart Gain technology.
Perform the initial calibration every six months.
For instructions on how to perform the initial calibration, refer to the MACSQuant Tyto Software user manual.

4.3 Replacing fuses

To prevent electrical damage on the internal components of the MACSQuant Tyto Cell Sorter, two fuses protect the current input and output line of the instrument. The fuse box is located on the rear of the instrument between the power switch and the power socket and is accessible for users (**Figure 1.2**).

1. Switch off the MACSQuant Tyto Cell Sorter.
2. Unplug the power cable from the instrument.
3. Use your finger to push on the fuse holder tab and pull out the fuse box.

For information about the type of fuses which are used in the MACSQuant Tyto Cell Sorter, see **Table 6.1**.

4. Replace the fuses and insert the fuse box back into the instrument.
5. Plug the power cable into the MACSQuant Tyto Cell Sorter and switch on the instrument.

In case of uncertainty, contact your local Miltenyi Biotec representative or Miltenyi Biotec Technical Support for additional support.

4.4 Preventive service

Preventive service of the MACSQuant Tyto Cell Sorter must be performed every 12 months by Miltenyi Biotec service personnel only. For information about available service contracts, visit **www.miltenyibiotec.com**.

4.5 Spare parts

Instrument parts wear over time. Depending on the frequency of use and hardware settings, some parts require regular maintenance and/or replacement. Contact Miltenyi Biotec Technical Support regarding spare parts. Miltenyi Biotec offers service contracts for the MACSQuant Tyto Cell Sorter. Visit **www.miltenyibiotec.com** for further information.

5 Troubleshooting

5.1 Pre-sort

Issue	Causes	Actions
Cartridge alignment fails. Error notification that cartridge alignment failed. Software will give the error Cartridge alignment failed. No tile identifier detected.	Cartridge was inserted into the cartridge holder incorrectly.	Reload the same cartridge.
	Camera is out of focus.	
	Chip or glass layer are defect or blurred by fingerprints.	Use a new cartridge.
	Camera error	Restart the instrument. If problem persists, contact Miltenyi Biotec Technical Support.
	Software error	
	Stage malfunction	
Continuous alignment fails. The image is out of focus (in the Cartridge tab on the orange touchscreen) or fiducial and chip are out of focus/are not aligned correctly.	Camera is out of focus.	Restart the instrument.
		Use a new cartridge.
	Software error	Restart the instrument.
	Stage malfunction	
Cartridge cannot be pressurized. The system will eject the cartridge immediately after failing to reach the default pressure.	Cartridge was not inserted correctly.	If O-ring is present, reload the cartridge.
	There is no O-ring on the cartridge.	If O-ring is missing, use a new cartridge.
	Luer caps are not tight.	Tighten the Luer caps.
Daily calibration fails. Calibration failed. The event rate is too low. Check the sample concentration and cartridge type.	MACSQuant Tyto Calibration Beads are not vortexed properly.	Vortex the MACSQuant Tyto Calibration Beads for 10 seconds and prepare a new calibration sample.

Issue	Causes	Actions
Automated compensation fails. Automated compensation cannot be executed successfully.	Compensation sample is stored too long before measurement.	Start compensation immediately after mixing the single stained controls to avoid multistaining of the contols.
	MFI of the positive population is too low.	The MFI of the positive population must be at least 8.
	Too less events are present in the compensation sample.	Make sure that the compensation sample contains at least 3×10^5 events/mL.
	Too less positive events are present in the sample.	Make sure that at least 5% of the events in the ROI must be positive in the respective target channel.

Table 5.1: Pre-sort troubleshooting

5.2 During sort

Issue	Causes	Actions
Valve is not actuating.	A piece of debris (biological or foreign) had locked the valve.	Check the valve movement in the **Free Valve** mode in the **Tools** menu. Refer to the MACSQuant Tyto Software user manual.
		Use a new cartridge.
	Cartridge is defective.	Use a new cartridge.
	Sort button is not activated.	Check status of **Sort** button.
	Solenoid is defective.	Contact Miltenyi Biotec Technical Support.
Sort channel is clogged.	The sort channel is clogged by an air bubble or debris (biological or foreign).	Use the priming fixture to wet the channel.
		Clean up the sample (filtration, density gradient, dead cell removal).
		Use a new cartridge.
Clogging of input filter. Sort and event rate decrease immediately during sort run. Pressure goes up. Transit time of cells is correct.	Mixer deactivated or not functional – sedimentation of cells.	Check mixer functionality, use different cartridge if necessary.
	Sample contains high amount of debris or cell clusters.	Clean up the sample (filtration, density gradient, dead cell removal).
High abort ratePercentage of the target events which are sorted to the negative collection chamber is too high.	Sample is too concentrated.	Use the Poisson calculator to calculate optimal sorting conditions. To get the Poisson calculator contact Miltenyi Biotec Technical Support.
	Noise threshold is set too low.	Check threshold settings. Refer to the MACSQuantify Tyto Software user manual.

Table 5.2: During sort troubleshooting

5.3 After sort

Issue	Causes	Actions
Low yield. **Yield after sort is low.**	Gating strategy is inaccurate.	Check and adjust gating.
	Incorrect sort mode	Verify that the **High Yield** or **Ultra Yield** mode is set.
	Coincidence events are aborted.	Make sure **Enable coincidence aborting** is inactive.
	Event detection gain settings (voltage) are too low.	Check event detection settings. Refer to the MACSQuantify Tyto Software user manual.
	Noise threshold and/or trigger threshold cut off target events.	Check noise threshold and trigger threshold. The thresholds should not cut off any target events.
	Pressure applied to the cartridge is not set correctly.	Make sure that **Automated pressure adjustment** is active.
	Backscatter signals are clipped for the used sample.	Verify that backscatter signals are not clipped for the used sample. Adjust the backscatter gains if needed. Backgating of the target events in the BSR/BSB and BSV/BSB plots can help to identify the target events in the backscatter plots. Refer to the MACSQuantify Tyto Software user manual.
	Sample is too concentrated.	Verify sample concentration and adjust sample concentration accordingly.
		Use the Poisson calculator to calculate optimal sorting conditions.
	Debris clogs the sort channel.	Check the valve movement in the **Free Valve** mode in the **Tools** menu. Refer to the MACSQuant Tyto Software user manual.
	Air bubble in channel/sort chamber.	Make sure cartridge is primed before sort.
Low purity. **Purity of target cells in sort is low.**	Gating strategy is inaccurate.	Check and adjust gating.
	Incorrect sort mode	Verify that the **High Purity** or **Ultra Purity** mode is set.
	Sample is too concentrated.	Verify sample concentration and adjust sample concentration accordingly.
		Use the Poisson calculator to calculate optimal sorting conditions.
	Low frequency of target cells	Perfrom a pre-enrichment, e.g. immunomagnetic enrichment.
		Perfrom a sequential sort, e.g sort for yield first and use the sort fraction to sort for purity.

Table 5.3: After sort troubleshooting

6 Technical data and specifications

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

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.

Transient overvoltages present on the mains supply: category II. Supply voltage fluctuations up to +/– 10% of the nominal voltage. The instrument is suitable for pollution degree 2 environments.

The instrument has been designed for a lifetime of 10 years.

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

Design and specifications are subject to change without notice.

6.1 Technical data

MACSQuant Tyto Cell Sorter	
Model	MACSQuant Tyto Cell Sorter type A42046
Dimensions	965 mm × 585 mm (w × d)
Footprint	896 mm × 541,5 mm (w × d)
Height	280 mm; 760 mm (with external monitor)
Weight	62 kg (137 lbs); 67 kg (148 lbs) (with external monitor)
Power requirements	100–240 V~, 50/60 Hz
Fuses	2× T8A/250 V
Power consumption instrument without external monitor	300 W
Power consumption instrument including external monitor	500 W
Monitor	15.6" LCD touchscreen
External monitor connection	Max. 200 W
Working temperature	18–25 °C
Humidity	0% to 85% relative humidity, noncondensing

MACSQuant Tyto Cell Sorter	
Altitude	Max. 2,000 m
Emission sound pressure level at workstation	< 70 dB(A)
Storage conditions	18–25 °C Avoid condensing conditions

Table 6.1: Technical data of the MACSQuant Tyto Cell Sorter

External monitor	
Dimensions	Screen diagonal 31.5"–32" Max. depth 80 mm
Weight	< 10 kg
Resolution	1920 × 1080 at 60 Hz (optimal resolution) Optional: 1920 × 1200
Power requirements	110–230 V~, 50/60 Hz
Power consumption	Max. 200 W
VESA wall mount compatibility	MIS-D; MIS-E
Connections	DVI-D, HDMI, VGA Optional: USB, Composite (Cinch)
Certification	FCC Class B

Table 6.2: Required technical data and certification for external monitors for use with the MACSQuant Tyto Cell Sorter

Optics		
Laser	**Output power**	**Pulse time**
Violet (405 nm)	100 mW	Continuous
Blue (488 nm)	100 mW	Continuous
Red (638 nm)	100 mW	Continuous
Laser excitation	**Fluorescence detectors**	**Filter**
405 nm	V1, V2	450/50 nm, 525/50 nm,
488 nm	B1, B2, B3, B4	525/50 nm, 585/40 nm, 655-730 nm, 750 nm LP
638 nm	R1, R2	655-730 nm, 750 nm LP
Laser excitation	**Scatter detectors**	**Parameter**
405 nm, 488 nm, 638 nm	Backscatter violet, backscatter blue, backscatter red	Size
488 nm	Sidescatter	Granularity
Fluorescence performance	5 decade logarithmic scales, display in lin, log or hlog scales	

Table 6.3: Optical parameters of the MACSQuant Tyto Cell Sorter

Fluidics	
Sample volume	Dependent on cartridge type, refer to the respective data sheet
Purity	Up to 99%
Cell flow rate	Dependent on cartridge type: up to 55,000 cells/s for the MACSQuant Tyto Cartridge, up to 110,000 cells/s for the MACSQuant Tyto Cartridge HS, up to 10,000 cells/s for the MACSQuant Tyto Cartridge LC.
Sorting rate	Up to 30,000 valve actuations/s
Viability	Up to 99% for lymphocytes
Sorting mode	Two-way sorting: sorted cells and non-sorted cells
Temperature control	4–25 °C (under standard environmental conditions)
Technical support	Remote support in real-time
Pressure	Within MACSQuant Tyto Cartridge: < 3 psi Within MACSQuant Tyto Cartridge HS: < 14 psi Within MACSQuant Tyto Cartridge LC: < 9 psi Within system: max. 1.55 bar

Table 6.4: Fluidic parameters of the MACSQuant Tyto Cell Sorter

Data management	
Measurement parameters	Height and area measurement for all parameters
Signal processing	16 bit analog-to-digital conversion and signal processing

Table 6.5: Data management

PC	
RS232 Interface	Labeled "COM 1"
USB ports	4× USB 3.0 2× USB 3.0 (at touchscreen)
DisplayPort	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	2 TB flash disk
Mainboard battery	CR2032, button cell, lithium metal

Table 6.6: Technical data of the integrated PC

6.2 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 A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

6.3 EC/EU Declaration of Conformity

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 product identified as follows:

Description: Laboratory equipment
Model: MACSQuant Tyto (A42046)

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

6.4 UK Declaration of Conformity

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 product identified as follows:

Description: Laboratory equipment
Model: MACSQuant Tyto (A42046)

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:

Dr. Bernd Schröder
Global Head Regulatory Affairs
Miltenyi Biotec B.V. & Co. KG
Friedrich-Ebert-Straße 68
51429 Bergisch Gladbach
Germany

7 Technical support

7.1 MACSQuant Live Support

MACSQuant Live Support is a real-time service provided by Miltenyi Biotec Technical Support. Highly trained MACSQuant specialists can be reached to assist with any queries you may have.

For more information, refer to the MACSQuantify Tyto Software user manual.

7.2 Contact

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

Miltenyi Biotec B.V. & Co. KG
Friedrich-Ebert-Straße 68
51429 Bergisch Gladbach
Germany
Phone: +49 2204 8306 3803
technicalsupport@miltenyi.com

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

8 Legal notes

8.1 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.

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Miltenyi Biotec

Germany/Austria
Miltenyi Biotec B.V. & Co. KG
Friedrich-Ebert-Straße 68
51429 Bergisch Gladbach
Germany
Phone +49 2204 8306-0
Fax +49 2204 85197
macsde@miltenyi.com

USA/Canada
Miltenyi Biotec Inc.
2303 Lindbergh Street
Auburn, CA 95602, USA
Phone 800 FOR MACS
Phone +1 866 811 4466
Fax +1 877 591 1060
macsus@miltenyi.com

Australia
Miltenyi Biotec
Australia Pty. Ltd.
Unit 11, 2 Eden Park Drive
Macquarie Park NSW 2113
Australia
Phone +61 2 8877 7400
Fax +61 2 9889 5044
macsau@miltenyi.com

Benelux
Miltenyi Biotec B.V.
Dellaertweg 9C
2316 WZ Leiden
The Netherlands
macsnl@miltenyi.com
Customer service for:
The Netherlands
Phone 0800 4020120
Fax 0800 4020100
Belgium
Phone 0800 94016
Fax 0800 99626
Luxembourg
Phone 800 24971
Fax 800 24984

China
Miltenyi Biotec Technology &
Trading (Shanghai) Co., Ltd.
Room A401, 4/F
No. 1077, Zhangheng Road
Pudong New Area
201203 Shanghai, P.R. China
Phone +86 21 6084 0210
Fax +86 21 6235 0953
macscn@miltenyi.com.cn

France
Miltenyi Biotec SAS
10 rue Mercoeur
75011 Paris, France
Phone +33 1 56 98 16 16
macsfr@miltenyi.com

Hong Kong
Miltenyi Biotec Hong Kong Ltd.
Unit 301, Lakeside 1
No. 8 Science Park West Avenue
Hong Kong Science Park
Pak Shek Kok, New Territories
Hong Kong
Phone +852 3751 6698
Fax +852 3619 5772
macshk@miltenyi.com.hk

India
Miltenyi Biotec India Pvt. Ltd.
Vatika Business Centre,
Floor No. 6
Divya Sree Omega
Kondapur, Serilingampally
K.V. Rangareddy
Telangana 500084, India
Phone +91 040 45175910
macsin@miltenyi.com

Italy
Miltenyi Biotec S.r.l.
Via Paolo Nanni Costa, 30
40133 Bologna, Italy
Phone +39 051 6 460 411
Fax +39 051 6 460 499
macsit@miltenyi.com

Japan
Miltenyi Biotec K.K.
NEX-Eitai Building 5F
16-10 Fuyuki, Koto-ku,
Tokyo 135-0041, Japan
Phone +81 3 5646 8910
Fax +81 3 5646 8911
macsjp@miltenyi.com

Nordics and Baltics
Miltenyi Biotec Norden AB
Medicon Village
Scheeletorget 1
223 81 Lund, Sweden
macsse@miltenyi.com
Customer service for:
Sweden
Phone 0200 111 800
Fax +46 280 72 99
Denmark
Phone 80 20 30 10
Fax +46 46 280 72 99
Norway, Finland, Iceland,
and Baltic countries
Phone +46 46 280 72 80
Fax +46 46 280 72 99

Singapore
Miltenyi Biotec Asia Pacific Pte Ltd.
438B Alexandra Road, Block B
Alexandra Technopark
#06-01
Singapore 119968
Phone +65 6238 8183
Fax +65 6238 0302
macssg@miltenyi.com

South Korea
Miltenyi Biotec Korea Co., Ltd.
Donggeuk 7F,
562 Nonhyeon-ro
Gangnam-gu
Seoul 06136, South Korea
Phone +82 2 555 1988
Fax +82 2 555 8890
macskr@miltenyi.com

Spain
Miltenyi Biotec S.L.
C/Virgilio 2, Edificio II, Planta –1
28223 Pozuelo de Alarcón
Madrid, Spain
Phone +34 91 512 12 90
Fax +34 91 512 12 91
macses@miltenyi.com

Switzerland
Miltenyi Biotec Swiss AG
Soodstrasse 52
8134 Adliswil
Switzerland
Phone +41 32 623 08 47
Fax +49 2204 85197
macsCH@miltenyi.com

United Kingdom
Miltenyi Biotec Ltd.
Almac House, Church Lane
Bisley, Surrey GU24 9DR, UK
Phone +44 1483 799 800
Fax +44 1483 799 811
macsuk@miltenyi.com

www.miltenyibiotec.com

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