Miltenyi Biotec

MultiMACS™ X

User manual



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MultiMACS™ X

User manual

Original instructions

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Read the chapter **Important safety information** and all other information in this user manual before using the instrument

⚠ WARNING

Before using the MultiMACS X, 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.

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EN

Important safety information

⚠ WARNING

The MultiMACS X is designed for safe use when installed correctly, operated by professional laboratory personnel, operated in accordance with general safety practices and the instructions in this user manual.

Warnings and precautions

The guidelines in this section explain the potential risk associated with operating this instrument and provide important supplemental safety information to minimize the risks. Follow the instructions carefully to protect yourself, others, and the equipment from potential hazards and create a safe work environment. Use this instrument only as specified by the manufacturer to avoid damage of equipment and injury to personnel. Always follow local working area safety instructions and laboratory policies as well as standards for health, safety and prevention of accidents. Contact the local authorities governing electrical power supply, building constructions, maintenance, or safety for more information about the safe installation and operation of the instrument.

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.

Symbols



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



ELECTRICAL HAZARD



STRONG MAGNETIC FIELD



PERSONS WEARING A PACEMAKER OR OTHER ELECTRONIC IMPLANTS MUST MAINTAIN DISTANCE



MOVING PARTS



OPTICAL RADIATION



BIOLOGICAL HAZARD



PROTECTIVE EARTH (GROUND)



NO ACTIVATED MOBILE PHONE



FUSE



WEEE (WASTE OF ELECTRICAL AND ELECTRONIC EQUIPMENT)



READ THE USER MANUAL BEFORE USING THE INSTRUMENT



READ THE USER MANUAL BEFORE USING THE INSTRUMENT



DISCONNECT MAINS PLUG FROM ELECTRICAL OUTLET



MANUFACTURER



ORDER NUMBER



TYPE NUMBER



SERIAL NUMBER



EUROPEAN CONFORMITY MARKING



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



UNITED KINGDOM CONFORMITY ASSESSED MARKING

Safety labels

Notice the hazard points and safety symbols of the instrument.

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

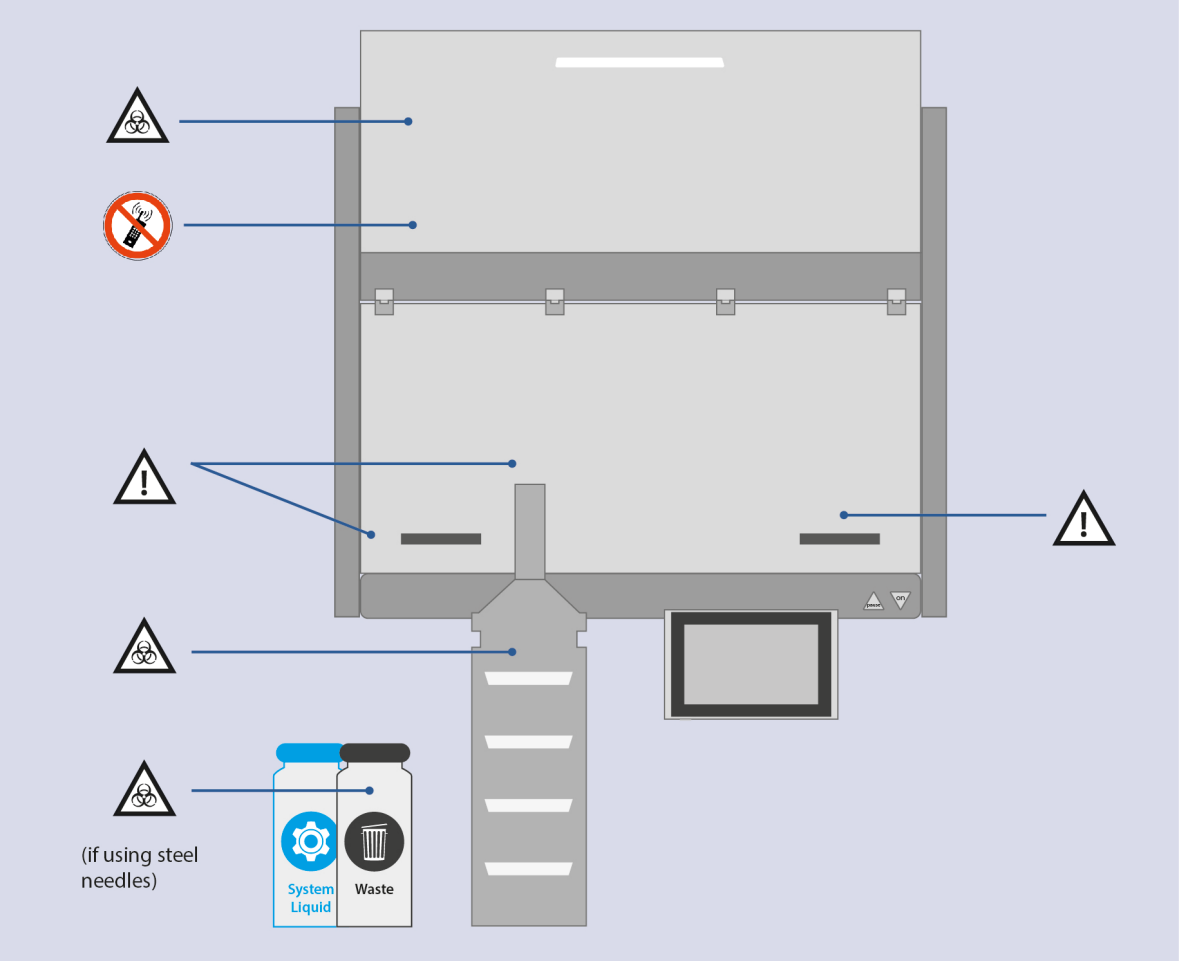


Figure 1: Hazard areas and safety symbols on the front of the MultiMACS X.

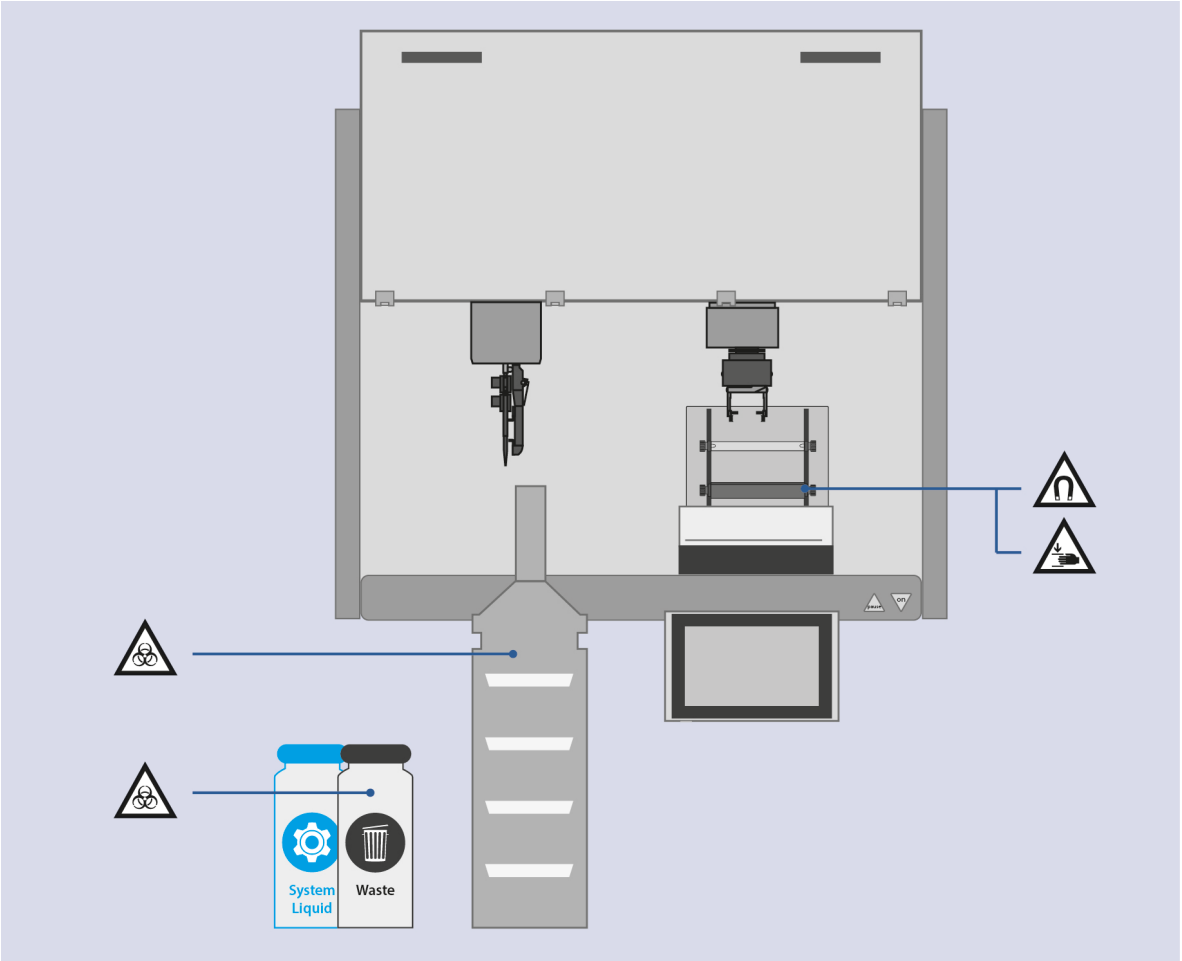


Figure 2: Hazard areas and safety symbols on the front of the MultiMACS X, safety panel open.

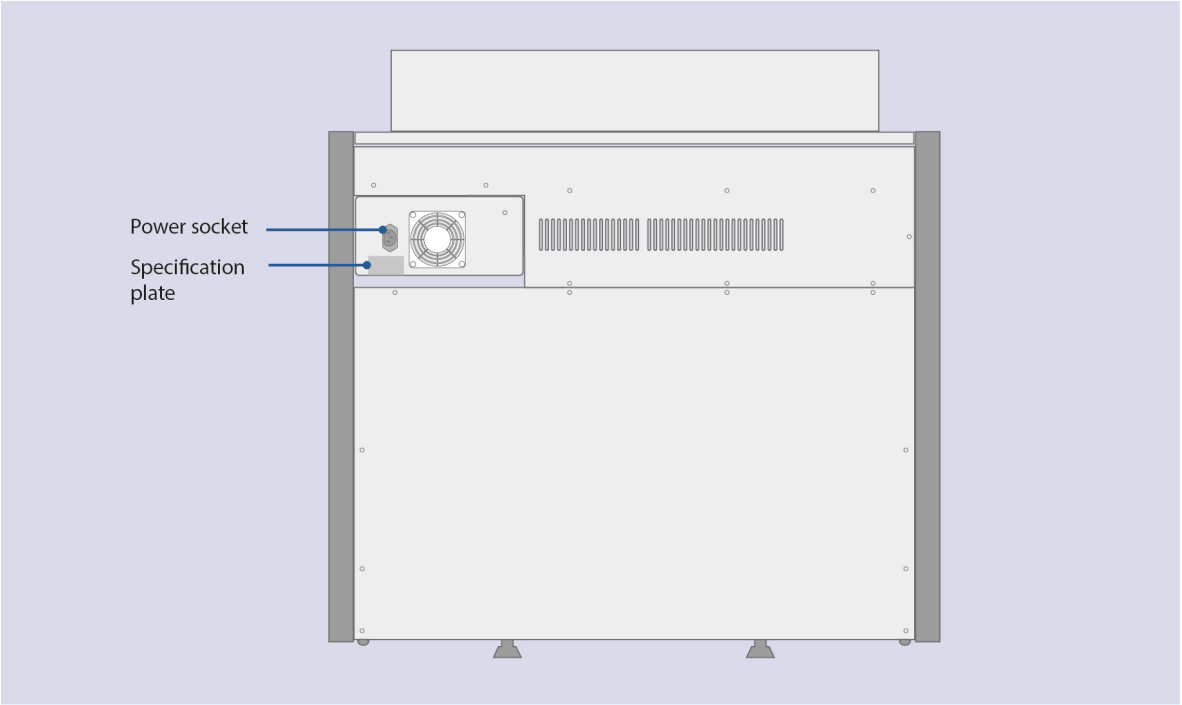
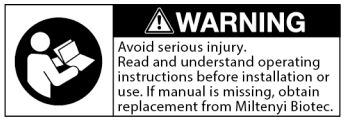


Figure 3: Hazard areas and safety symbols on the rear side of the MultiMACS X.

The following safety label is attached to the specification plate of the MultiMACS X.



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

General safety instructions

If the instrument is not working properly and/or the displayed instructions or messages advise you to contact technical support, safe operation of the instrument is not longer possible. Immediately switch off and unplug the instrument from the power outlet and contact an authorized Miltenyi Biotec service provider or Miltenyi Biotec Technical Support.

Electricity and fire hazards

Potential risks arising from electrical devices include electric shock, short, and overheating. Electric shock may lead to severe personal injury or death. An electric short and overheating may lead to the spread of fire. Electronic equipment might emit sparks, which could ignite combustible vapors or material resulting in explosion or fire. Do not use the instrument in areas classified as hazardous locations; for example, in oxygen-laden environments.

The housing of the instrument is designed to reduce the risks of electric shock, electric short, and spread of fire. **Do not remove or penetrate any cover.** Only authorized personnel must remove the other covers of the instrument. Never push an foreign object through an opening into the instrument. Do not use the instrument if

- it has been opened or disassembled
- it has been dropped or damaged
- it has damaged or broken parts
- it has a damaged power cable
- an object has been entered through the ventilation slots
- an object has been dropped into the instrument

If flames or smoke appear, immediately switch off the power supply, unplug the instrument from the electrical outlet, and contact an authorized Miltenyi Biotec service provider or Miltenyi Biotec Technical Support.

The instrument is intended for indoor use only. **If fluids enter the instrument, it may lead to electric shorts, electric shock, or fire.** Take special care while handling liquids. Do not allow liquids to enter the interior of the instrument. Protect the instrument against accidental spillages and splashes. Clean up spillages immediately. Do not operate the instrument if liquids have spilled into the instrument. Do not use the instrument in a wet and damp location. Avoid areas with high humidity or condensation. Moving the instrument from a cold environment – such as a cold room at 5°C – to room temperature may cause condensation inside the instrument. In such cases, wait for the instrument to dehumidify before operating it. Unplug the instrument from the electical outlet before cleaning, . Do not use liquid or aerosol cleaning agents; always use a damp cloth.

Ensure adequate air circulation in the room when the instrument is operated. In the absence of adequate circulation, ambient air may not cool the instrument to acceptable operating temperatures. Allow sufficient air circulation around the instrument – at least 15 cm on all sides – during operation to ensure adequate cooling. Do not place the instrument near radiators, heat registers, stoves, or other equipment (including amplifiers) that generate heat. Protect the instrument from direct sunlight. Do not cover the slots and openings of the

instrument as these are provided for ventilation and protect the instrument from overheating. Do not place the instrument in a built-in rack or similar confined spaces unless the space has been specifically designed to provide proper ventilation. Follow the mounting instructions for the instrument.

Ensure that the main switch as well as the plug of the power cable are easily accessible and located as close to the operator of the instrument as possible. If it is necessary to disconnect the power supply, unplug the cable from the power outlet.

The instrument is equipped with a three-wire electrical grounding-type plug that has a third pin for grounding. This plug fits into a grounded power outlet only. This is a safety feature. Do not try to insert the plug into a non-grounded power outlet. If you cannot insert the plug into the outlet, contact your local electrician to replace the outlet. The instrument should only be operated from a power source that meets the specifications mentioned on the product´s electrical ratings label. If you have questions about the type of power source to use, contact your authorized Miltenyi Biotec service provider or local power company. Do not use extension cords or power strips. Do not overload an electrical outlet.

Only the 2D code reader that was delivered with the instrument should be connected to the RS232/BCR port. External laser devices connected to the RS232/BCR port have to comply with the standard IEC/TR 62471.



Strong magnetic field

The MultiMACS X is equipped with an extremely powerful magnet.



There is a risk of severe personal injury for persons carrying pacemakers, brain shunts, or electronic medical implants.

Keep any magnetic information carriers (such as credit cards, magnetic tapes and floppy disks), any electronic equipment (such as hearing aids, pacemakers, cerebral shunt, measuring and control instruments, computers, and watches), and magnetizable tools and objects at a distance of at least 20 cm. These items may be affected or damaged by the magnetic field.



Mechanical hazards

Keep fingers etc. away from all moving parts of the MultiMACS X to avoid crushing and shearing injuries or damage to the instrument. Use the MultiMACS X only with the safety panel closed. Do not open the safety panel while an application is running. The instrument is only running if the safety panel is closed. This is a safety feature. **Do not circumvent any safety device or measurement.**

Do not obstruct the movement of the robotic arms and accessory hardware during operation. Keep fingers away from all moving parts of the MultiMACS X. Do not adjust tubing while the instrument is in operation. Always stop or abort a process before handling accessory hardware. Do not reach into the MultiMACS X through any aperture on the instrument front side. Always open the front safety panel completely. A not completely opened front safety panel might close automatically.

Fixed steel needle tips are sharp and can cause a hazard if using infected or contaminated biological material. Always wear protective gloves if operating the instrument. Avoid touching the tips unless you need to clean them.



Optical hazards

The instrument is equipped with a 2D code reader. The light-emitting diodes (LEDs) emit invisible light for illuminating the reading area. According to the international standard IEC 62471, this lamp system is in the Exempt risk group.

Be careful of the path of the light beam or reflection from a mirrored surface. Take care during installation of the instrument that the path of the light beam is not at the same height as the human eye during operation. Do not allow water, oil, dust or other foreign substances to stick to the 2D code reader aperture window. This may cause reading errors. Be sure to stop the laser emission before cleaning the scanner. Otherwise, exposure to the light may cause eye injury. Use a soft, dry cloth to wipe any substances from the scanner. Do not use alcohol or other cleaning substances.

Do not disassemble, modify, or remove the installed laser or LED radiation sources. The laser or LED radiation sources do not automatically stop emitting when disassembled. Radiation of disassembled units may lead to eye injuries.



Chemical and biological hazards

Depending on the biological material used, contamination or infection may lead to severe personal injury or death. All clinical samples must be considered potentially infectious. **If biohazardous material is or has been used, the operator must choose and wear personal safety equipment** as indicated in the warnings and precautions for the particular substance. The above safety precaution also accounts for any hazardous chemical, including toxic or corrosive chemicals, acidic, or radioactive substances, that may be present in the sample. Wear protective gloves and clothing, as well as safety glasses to prevent contact of the substance with skin and eyes. Also protect mouth and nose as aerosols might leak from the system. Defective or inadequate safety equipment is hazardous. The instrument must be operated in a safety hood if hazardous or unknown materials are being processed. If hazardous material has been used or spilled, care must be taken to thoroughly decontaminate the instrument. It is strictly prohibited to continue to handle contaminated accessories or parts of the instrument. Operate the instrument only with a properly installed waste bag holder.

Columns, plates, tubes and any other consumables that were in contact with biohazardous material must be decontaminated before disposal. Liquid waste must be autoclaved or decontaminated using a disinfectant that is appropriate for the specific pathogen, e.g., 10% bleach, isopropyl alcohol, or 70% ethanol. All liquid and solid waste must be considered biohazardous and, therefore, must be handled taking universal laboratory precautions. Waste disposal must be in accordance with any local regulations.

If using disposable tips, do not operate the instrument without the waste bag holder in place. If using reusable steel tips, the waste container may contain potentially infectious material. Label the container properly and dispose of the liquid waste in accordance with your local regulations.



Servicing, transport, and disposal

Unless otherwise specifically noted in this user manual or other Miltenyi Biotec documentation, **do not service the instrument yourself**. Servicing and repair must be performed by qualified service personnel. Improper or incorrect servicing or repair of the instrument can cause hazards to users, lead to unpredictable results, cause instrument malfunctions or damage, as well as premature wear and tear and reduced life of the instrument. It may also void your warranty.

When replacement or spare parts are required, ensure that the service provider uses only genuine Miltenyi Biotec parts, or third-party parts specified and recommended by Miltenyi Biotec. Using unauthorized parts can cause malfunctions of the instrument and impair results. Miltenyi Biotec does not honor any warranty or accept any responsibility for instrument failure or damages resulting from the use of inappropriate parts. After completing any service or repair work, ensure that your authorized Miltenyi Biotec service provider performs all safety checks as required by the repair procedure to ensure that the instrument is operating correctly.

Only use options and upgrades recommended by Miltenyi Biotec. Inquire with your local Miltenyi Biotec representative about Miltenyi Biotec's extensive instrument service and support arrangements, or refer to **miltenyibiotec.com/support**.

The instrument should be transported with care in packaging specified by Miltenyi Biotec. Internal damage can occur if the instrument is subjected to excessive vibration or is dropped. If the instrument needs to be shipped back to the manufacturer for service, decontaminate the instrument to remove any hazardous material prior to shipment. If you have questions regarding proper decontamination or shipment, contact Miltenyi Biotec Technical Support for assistance.



Waste of Electrical and Electronic Equipment (WEEE) customer information

Please 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 and electronic equipment may contain hazardous substances which may have a serious detrimental effect on the environment and/or human health. That is why all equipment must be specifically collected and treated by designated waste facility centres 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 lets you recycle your end-of-life Miltenyi Biotec equipment 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. 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 Sicherheitsinformationen

⚠ WARNUNG

Der MultiMACS X ist für einen sicheren Betrieb ausgelegt, wenn das Gerät richtig installiert, von professionellem Laborpersonal bedient und entsprechend der Sicherheitsrichtlinien und Anweisungen in diesem Benutzerhandbuch eingesetzt wird.

Warn- und Sicherheitshinweise

Die Sicherheitsrichtlinien in diesem Kapitel erläutern die Gefahren, die sich aus dem Betrieb dieses Gerätes ergeben können und enthalten wichtige zusätzliche Informationen wie diese Risiken zu minimieren sind. Befolgen Sie diese Sicherheitshinweise sorgfältig um sich, andere und das Gerät vor möglichen Gefahren zu schützen und ein sicheres Arbeitsumfeld zu schaffen. Um Sach- und Personenschäden zu vermeiden, benutzen Sie das Gerät ausschließlich nach Angaben des Herstellers. Örtliche Arbeitsschutzbestimmungen, Laborrichtlinien, Sicherheitsnormen und Unfallverhütungsvorschriften müssen jederzeit beachtet und eingehalten werden. Wenden Sie sich für weitere Informationen zur Stromversorgung, Gebäudeinstallationen, Wartung und Sicherheit für die Installation dieses Gerätes an die örtlichen Behörden und Ihren Stromversorger.

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.

Symbole



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



ELEKTRISCHE GEFÄHRDUNG



STARKES MAGNETFELD



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



SICH BEWEGENDE TEILE



OPTISCHE STRAHLUNG



BIOLOGISCHE GEFAHR



SCHUTZERDUNG



KEIN MOBILTELEFON VERWENDEN



SICHERUNG



ELEKTRO- UND ELEKTRONIK-ALTGERÄTE (WEEE)



LESEN SIE DAS BENUTZERHANDBUCH VOR VERWENDUNG DES GERÄTES



LESEN SIE DAS BENUTZERHANDBUCH VOR VERWENDUNG DES GERÄTES



NETZSTECKER ZIEHEN



HERSTELLER



BESTELLNUMMER



MODELLNUMMER



SERIENNUMMER



EUROPÄISCHE KONFORMITÄTSKENNZEICHNUNG



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



BRITISCHE PRODUKTKENNZEICHNUNG

Sicherheitskennzeichnungen

Beachten Sie die Gefahrenhinweise und Sicherheitssymbole des Gerätes.

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

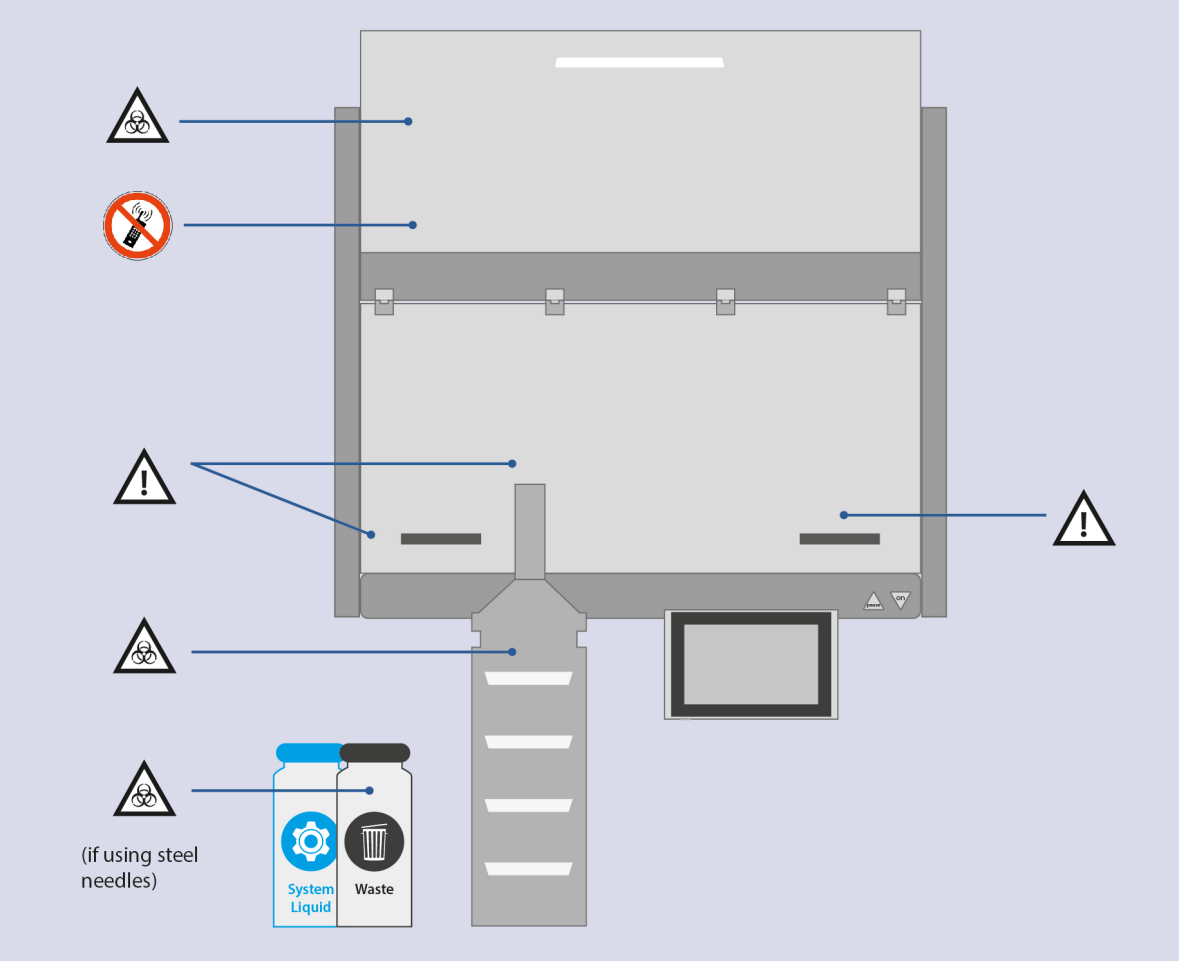


Figure 1: Gefahrenquellen und Gefahrensymbole auf der Vorderseite des MultiMACS X.

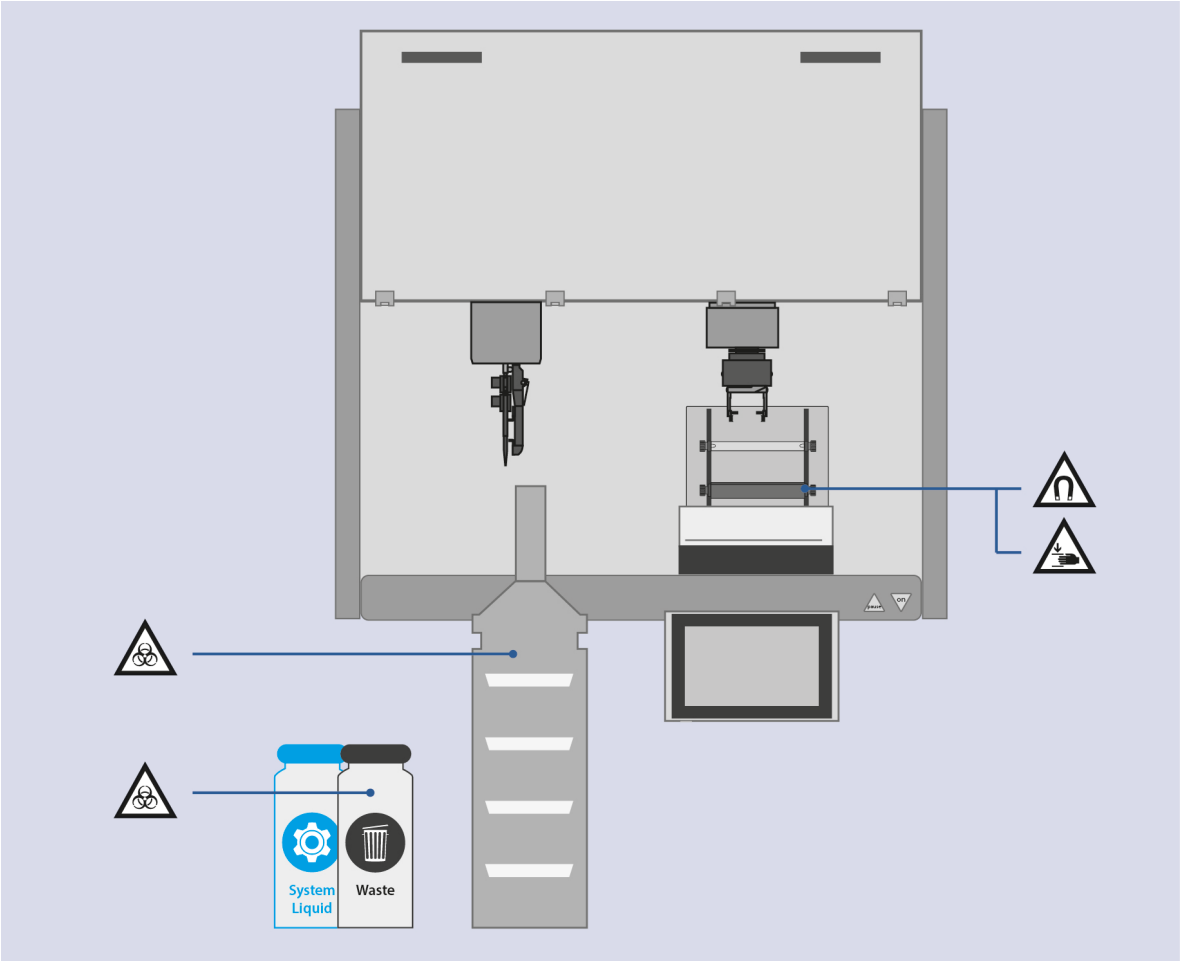


Figure 2: Gefahrenquellen und Gefahrensymbole auf der Vorderseite des MultiMACS X, Sicherheitsklappe offen.

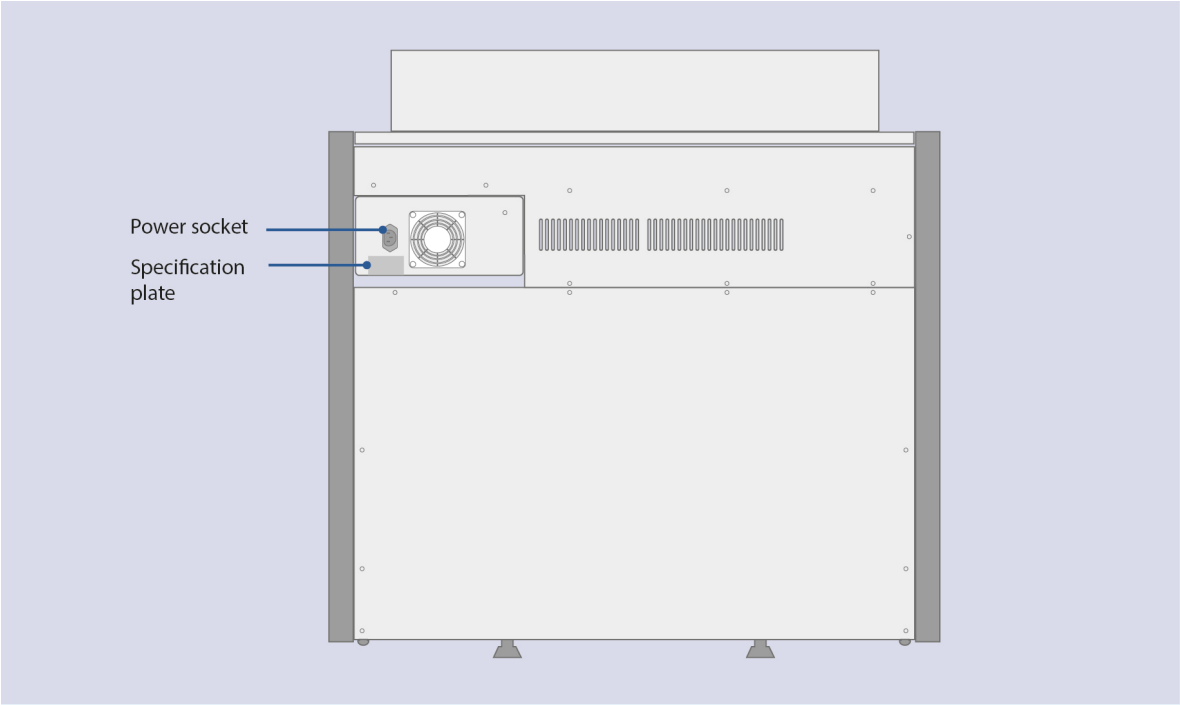
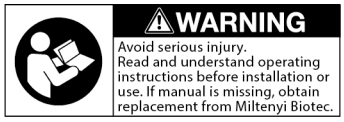


Figure 3: Gefahrenquellen und Gefahrensymbole auf der Rückseite des MultiMACS X.

Der nachfolgende Sicherheitsaufkleber ist auf dem Typenschild des MultiMACS X befestigt.



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.

Allgemeine Sicherheitshinweise

Falls Ihr Gerät nicht einwandfrei funktioniert und/oder Anzeigen auf dem Display Sie dazu auffordern den technischen Kundendienst zu kontaktieren, ist die Betriebssicherheit des Gerätes nicht länger gewährleistet. Schalten Sie das Gerät sofort aus, ziehen Sie den Netzstecker und kontaktieren Sie einen autorisierten Miltenyi Biotec Servicedienstleister oder den Miltenyi Biotec Technical Support.

Elektrische Gefährdung und Brandgefahr

Elektrische Geräte bergen das Risiko eines Stromschlags, Kurzschlusses und der Überhitzung. Ein Stromschlag kann zu schweren Verletzungen und bis zum Tod führen. Ein elektrischer Kurzschluß sowie Überhitzung kann eine Brandursache darstellen. Elektrische Geräte können Funken schlagen, welche leichtentflammbare Dämpfe oder Materialien entzünden und somit zu Feuer und Explosionen führen können. Benutzen Sie das Gerät nicht in ausgewiesenen Gefahrenzonen, z.B. in sauerstoffangereicherten Umgebungen.

Das Gehäuse des Gerätes dient dazu das Risiko eines elektrischen Stromschlags, Kurzschlusses und Feuers zu reduzieren. Mit Ausnahme der vorderen Abdeckungen, **entfernen oder durchdringen Sie keine Abdeckungen**. Jegliche andere Abdeckung darf nur von autorisiertem Personal entfernt werden. Führen Sie nie einen Fremdkörper durch eine Öffnung in das Gerät ein. Benutzen Sie das Gerät nicht, wenn:

- es offen oder zerlegt ist
- es fallengelassen wurde oder beschädigt ist
- Teile beschädigt oder defekt sind
- die Netzanschlussleitung beschädigt ist
- ein Gegenstand in die Belüftungsschlitze eingedrungen ist
- ein Fremdkörper in des Gerät gefallen ist.

Wenn Flammen oder Rauch auftreten, schalten Sie das Gerät unverzüglich ab, ziehen Sie den Netzstecker und kontaktieren Sie einen autorisierten Miltenyi Biotec Servicedienstleister oder den Miltenyi Biotec Technical Support.

Das Gerät ist ausschließlich für den Betrieb in Innenräumen ausgelegt. **Sollten Flüssigkeiten in das Gerät gelangen, kann es zu Kurzschluss, Stromschlag oder Feuer kommen.** Seien Sie vorsichtig im Umgang mit Flüssigkeiten. Verhindern Sie, dass Flüssigkeit in das Innere des Gerätes gelangt. Schützen Sie das Gerät vor verschütteten oder verspritzten Flüssigkeiten.

Beseitigen Sie ausgetretene oder verschüttete Flüssigkeit sofort. Benutzen Sie das Gerät nicht, sollte Flüssigkeit in das Innere des Gerätes gelangt sein. Setzen Sie das Gerät nicht in einer nassen oder feuchten Umgebung ein. Vermeiden Sie Arbeitsbereiche mit hoher Luftfeuchtigkeit oder Kondensation. Das Überführen des Gerätes von einer kalten Umgebung, z.B. aus einem Kühlraum bei 5°C, in einen Raum mit Raumtemperatur, kann zu Kondensation im Inneren des Gerätes führen. Warten Sie in solchen Fällen mit der Benutzung des Gerätes, bis dieses getrocknet ist. Ziehen Sie den Netzstecker vor der Reinigung des Gerätes. Verwenden Sie keine Flüssig- oder Sprühreinigungsmittel, sondern nur ein feuchtes Tuch.

Ermöglichen Sie im Betrieb eine ausreichende Luftzirkulation. Die das Gerät umgebende Luft reicht nicht aus, das Gerät bei unzureichender Belüftung auf einer sicheren Betriebstemperatur zu halten. Ermöglichen Sie im Betrieb eine ausreichende Luftzirkulation – einen Abstand von mindestens 15 cm in allen Richtungen um das Gerät – um eine ausreichende Kühlung zu gewährleisten. Das Gerät darf nicht in der Nähe von Radiatoren, Heißlüftern, Öfen, oder anderen Wärme erzeugenden Geräten aufgestellt werden (Verstärker eingeschlossen). Schützen Sie das Gerät vor direkter Sonneneinstrahlung. Öffnungen und Schlitze am Gerät sind zur Belüftung gedacht und sollten niemals bedeckt oder blockiert werden, da sie das Gerät vor Überhitzung schützen und einen sicheren Betrieb ermöglichen. Versuchen Sie nicht, das Gerät in eine Einbaukonstruktion zu integrieren oder auf begrenztem Raum unterzubringen, es sei denn, es wurde eine spezielle Vorrichtung entwickelt und für ausreichend Belüftung gesorgt. Befolgen Sie die Montageanleitung für den Aufbau des Gerätes.

Stellen Sie sicher, dass der Hauptstromschalter ebenso wie der Netzstecker für das Stromkabel leicht zugänglich sind und sich in möglichst unmittelbarer Nähe zum Bediener des Gerätes befinden. Sollte es erforderlich sein, die Stromzufuhr zu unterbrechen, ziehen Sie den Netzstecker aus der Steckdose.

Das Gerät ist mit einem Schutzkontaktstecker und einer dreiadrigen Anschlussleitung ausgestattet. Dieser Stecker passt nur in eine Steckdose mit Schutzkontakt. Das ist eine Sicherheitsvorrichtung. Versuchen Sie nicht, den Stecker in eine Steckdose ohne Schutzkontakt einzuführen. Wenn Sie den Stecker nicht in die Steckdose einführen können, bitten Sie einen ortsansässigen Elektriker, diese zu ersetzen. Das Gerät sollte nur von einer Stromquelle aus betrieben werden, die den elektrischen Angaben auf dem Typschild entspricht. Sollten Sie Fragen zur Art der Stromversorgung haben, wenden Sie sich an einen autorisierten Miltenyi Biotec Servicedienstleister oder Ihren lokalen Stromversorger. Benutzen Sie keine Verlängerungskabel oder Steckdosenleiste. Überlasten Sie eine Steckdose nicht.

An die mit BCR beschriftete RS-232-Buchse darf nur der 2D-Code-Leser angeschlossen werden, der mitgeliefert wird. Externe Lasergeräte, die an die RS232/BCR-Buchse angeschlossen werden müssen IEC/TR 62471 erfüllen.



Starkes Magnetfeld

Der MultiMACS X enthält einen extrem starken Magneten.



Es besteht die Gefahr von schweren Verletzungen für Personen mit Herzschrittmacher, Cerebralshunts oder elektronischen medizinischen Implantaten.

Halten Sie mit magnetischen Datenträgern (z.B. Kreditkarten, Magnetbänder, Speichermedien), elektronischen Geräten (z.B. Hörgeräte, Herzschrittmacher, Cerebralshunts, Mess- und Steuergeräte, PCs, Uhren), sowie mit ferromagnetischen Werkzeugen und Gegenständen mindestens 20 cm Abstand. Diese Gegenstände können beeinträchtigt oder zerstört werden.



Mechanische Gefahren

Halten Sie die Finger fern von allen beweglichen Teilen des MultiMACS X, um Quetschungen und Scherverletzungen oder Schäden am Gerät zu vermeiden. Betreiben Sie den MultiMACS X nur mit geschlossener Sicherheitsklappe. Öffnen Sie die Sicherheitsklappe nicht während des laufenden Betriebs. Das Gerät kann nur mit geschlossener Tür betrieben werden. Dies ist eine Sicherheitsvorrichtung. **Schutzeinrichtungen oder -maßnahmen dürfen nicht umgangen werden.**

Behindern sie nicht die Bewegung der Roboterarme und der zugehörigen Komponenten während des Betriebs. Halten Sie Finger etc. von allen beweglichen Teilen des Instruments fern. Berühren oder verändern Sie

nicht die Schläuche, während das Instrument läuft. Halten Sie laufende Prozesse immer an oder brechen Sie sie ab, bevor Sie Zubehör handhaben. Greifen Sie nicht in das Innere des Geräts durch eine Öffnung an der Vorderseite.

Öffnen Sie die Sicherheitsklappe immer vollständig. Eine nicht vollständig geöffnete Tür könnte sich selbsttätig schließen.

Fest montierte Stahlnadeln sind scharf und können eine Gefahr darstellen, wenn mit infiziertem oder kontaminiertem biologisches Material gearbeitet wird. Berühren Sie die Nadeln nicht, außer, wenn Sie sie reinigen müssen.



Optische Gefahren

Das Gerät ist mit einem 2D-Code-Leser ausgestattet. Die Leuchtdioden (LEDs) senden unsichtbare Strahlung zur Beleuchtung des Lesefeldes aus. Gemäß der internationalen Norm IEC 62471 fällt dieses Lampensystem in die Freie Gruppe.

Achten Sie auf den optischen Weg des Laserstrahls oder der Reflexion durch eine Spiegeloberfläche. Achten Sie bei der Einrichtung des Instruments darauf, dass sich der optische Weg des Laserstrahls beim Betrieb nicht auf gleicher Höhe mit dem menschlichen Auge befindet. Vermeiden Sie, dass Wasser, Öl, Staub oder andere Fremdkörper dem Öffnungsfenster des 2D- Code-Lesers anhaften. Dies kann zu Lesefehlern führen. Stellen Sie vor der Reinigung des Scanners sicher, dass keine Laserstrahlen mehr emittiert werden. Der Umgang mit dem Laser kann sonst zu Augenverletzungen führen. Verwenden Sie zum Abwischen von Substanzen auf dem Scanner ein weiches, trockenes Tuch. Verwenden Sie keinen Alkohol oder andere Reinigungssubstanzen.

Demontieren, wechseln oder entfernen Sie eingebaute Laser- oder LED-Strahlungsquellen nicht. Die Laser- und LED-Strahlungsquellen hören bei Demontage nicht automatisch auf, Strahlung zu emittieren. Strahlung von demontierten Geräten kann zu Augenverletzungen führen.



Chemische und biologische Gefahren

Abhängig von dem benutzten biologischen Material kann eine Kontamination oder Infektion zu schweren Verletzungen oder Tod führen. Klinische Proben müssen als potentiell infektiös angesehen werden. **Wird oder wurde mit biologischen Gefahrstoffen gearbeitet, muss der Bediener des Gerätes entsprechend den für die verwendeten Substanzen geltenden Warnhinweisen und Schutzbestimmungen eine persönliche Schutzausrüstung tragen.** Der oben genannte Sicherheitshinweis gilt auch für etwaige gefährliche Chemikalien, einschließlich toxischer oder korrosiver Chemikalien, ätzender oder radioaktiver Substanzen, die in der Probe anwesend sein können. Tragen Sie Schutzhandschuhe, Schutzkleidung und Schutzbrille, um Berührung der Gefahrstoffe mit Haut und Augen zu vermeiden. Auch die Atemwege müssen geschützt werden, da Aerosole aus dem System entweichen könnten. Mangelhafte oder unzureichende Schutzausrüstung ist gefährlich. Werden Gefahrstoffe oder unbekannte Substanzen eingesetzt, muss das Gerät unter einem Abzug oder einer Sicherheitswerkbank benutzt werden. Falls Gefahrstoffe verwendet wurden oder ausgetreten sind, muss auf eine sorgfältige Dekontamination des Gerätes geachtet werden. Es ist strengstens verboten, kontaminierte Geräteteile oder Zubehörteile weiter zu verwenden. Bedienen Sie das Gerät nur mit einer korrekt installierten Abfalltüten-Halterung.

Säulen, Platten, Röhrchen und alle weiteren Verbrauchsmaterialien, die in Kontakt mit biologischen Gefahrstoffen gelangt sind, müssen vor dem Entsorgen dekontaminiert werden. Flüssigabfall muss autoklaviert oder unter Verwendung eines für das jeweilige spezifische Pathogen geeigneten Desinfektionsmittels dekontaminiert werden, z.B. 10% Bleichmittel, Isopropylalkohol, oder 70% Ethanol. Alle flüssigen und festen

Abfälle müssen als Gefahrstoffe angesehen werden. Die Handhabung der Abfälle muss daher unter Beachtung der allgemein geltenden Laborsicherheits-bestimmungen erfolgen. Die Entsorgung der Verbrauchsmaterialien muss gemäß den örtlichen Bestimmungen erfolgen.

Bei Verwendung von Einmal-Spitzen, bedienen Sie das Gerät nicht ohne einer korrekt installierten Abfalltüten-Halterung. Bei Verwendung von wiederverwendbaren Stahlspitzen kann der Abfallbehälter potentiell infektiöses Material beinhalten. Markieren Sie den Behälter ordnungsgemäß und entsorgen Sie den Flüssigabfall gemäß den örtlichen Bestimmungen.

Wartung, Transport und Geräteentsorgung

Versuchen Sie nicht, das Gerät selbst zu warten oder zu reparieren, es sei denn, es ist in diesem Benutzerhandbuch oder anderen technischen Unterlagen von Miltenyi Biotec ausdrücklich vermerkt. Wartung und Reparaturen müssen durch geschulte Fachkräfte ausgeführt werden. Falsche oder unsachgemäße Wartung oder Reparatur an Ihrem Gerät kann zur Gefährdung des Anwenders, unvorhersehbaren Resultaten, Fehlfunktionen, Geräteschäden, vorzeitigem Verschleiß und verringerter Lebensdauer führen. Es kann auch den Verlust Ihrer Garantieansprüche zur Folge haben.

Wenn ein Austausch oder Ersatzteile benötigt werden, stellen Sie sicher, dass Ihr Servicedienstleister nur Originalteile von Miltenyi Biotec oder Teile von Drittanbietern verwendet, die von Miltenyi Biotec spezifiziert und empfohlen werden. Die Verwendung unautorisierter Ersatzteile kann Fehlfunktionen des Gerätes verursachen und die Ergebnisse beeinträchtigen. Miltenyi Biotec akzeptiert keinerlei Garantieansprüche und haftet nicht für Fehlfunktionen oder Schäden am Gerät, die auf Verwendung ungeeigneter Verschleiß- oder Ersatzteile zurückzuführen sind.

Stellen Sie sicher, dass nach jeder erfolgten Wartungs- oder Reparaturleistung ein autorisierter Miltenyi Biotec Servicedienstleister alle notwendigen Sicherheitsprüfungen, welche die durchgeführten Reparaturmaßnahmen verlangen, durchführt, um sicherzustellen, dass das Gerät sich in vorschriftsmäßigem Zustand befindet.

Nutzen Sie nur von Miltenyi Biotec empfohlenes Zusatzgerät und Upgrades zu Ihrem Gerät. Fragen Sie Ihren örtlichen Miltenyi Biotec Vertriebsmitarbeiter nach Miltenyi Biotecs weit reichenden Vereinbarungen zum Geräteservice und Technical Support oder besuchen unsere Website **miltenyibiotec.com/support**.

Das Gerät sollte vorsichtig gehandhabt und nur in der von Miltenyi Biotec bereit gestellten Verpackung transportiert werden. Im Gerät können innere Schäden auftreten, falls es großer Erschütterung ausgesetzt oder fallengelassen wird. Sollte wegen Reparatur- oder Wartungsleistungen ein Rücktransport zum Hersteller notwendig sein, dekontaminieren Sie das Gerät vor dem Versand, um jegliche Gefahrenstoffe zu entfernen. Wenn Sie Fragen zur vorschriftsmäßigen Dekontaminierung oder zum Versand des Gerätes haben, wenden Sie sich zur Unterstützung direkt an unseren Miltenyi Biotec Technical Support.

Kundeninformation zur Entsorgung von Elektro- und Elektronik-Altgeräten (Waste of Electrical and Electronic Equipment, WEEE)

Bitte entsorgen Sie Ihre Altgeräte von Miltenyi Biotec unter Einhaltung der jeweils geltenden Vorschriften für die Erfassung und Behandlung von Elektro- und Elektronik-Altgeräten und die Entsorgung von Gefahrstoffen. Diese können von Land zu Land sowie regional variieren.

Elektrische und elektronische Geräte können Gefahrstoffe enthalten, welche die Umwelt erheblich belasten und/oder die Gesundheit gefährden. Deshalb müssen Altgeräte speziell gesammelt und durch ausgewiesene Entsorgungsbetriebe 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 dazu bei, unsere natürlichen Ressourcen zu schonen und die menschliche Gesundheit zu schützen.

Miltenyi Biotec setzt sich für den Schutz der Umwelt ein. Miltenyi Biotec bietet in zahlreichen Ländern eigene 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.

Für weitere Informationen oder wenn Sie Ihr Miltenyi Biotec-Altgerät entsorgen möchten, wenden Sie sich an Ihren lokalen Miltenyi Biotec-Vertreter oder den Miltenyi Biotec Technical Support.

ES

Información importante de seguridad

⚠ ADVERTENCIA

El MultiMACS X está diseñado para un uso seguro si se instala correctamente, y se maneja por personal de laboratorio profesional de acuerdo con las prácticas generales de seguridad y las instrucciones de este manual de usuario.

Advertencias y precauciones

Las directrices en esta sección explican los riesgos potenciales asociados con el manejo de este instrumento y proporcionan una importante información complementaria para minimizar los riesgos. Siga las instrucciones atentamente para protegerse a sí mismo, a otros y al equipamiento, de riesgos potenciales y crear un ambiente de trabajo seguro. Use este instrumento solo como especificado por el fabricante para evitar daños en el equipo y lesiones en el personal.

Siga siempre las instrucciones de seguridad y política de laboratorio del área de trabajo local, así como los estándares de salud, seguridad y prevención de accidentes. Contacte la autoridad local a cargo de la fuente de energía eléctrica, construcciones, mantenimiento o seguridad para más información sobre la instalación segura y manejo del instrumento.

Niveles de riesgo

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

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

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

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 ELÉCTRICO



FUERTE CAMPO MAGNÉTICO



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



PIEZAS MÓVILES



RADIACIÓN ÓPTICA



PELIGRO BIOLÓGICO



CONDUCTOR DE PROTECCIÓN



NO HAY TELÉFONO MÓVIL ACTIVADO



FUSIBLE



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



LEA EL MANUAL DE USO ANTES DE USAR EL INSTRUMENTO



LEA EL MANUAL DEL USUARIO ANTES DE UTILIZAR EL INSTRUMENTO



DESCONECTAR EL ENCHUFE DE LA CORRIENTE



FABRICANTE



NÚMERO DE PEDIDO



NÚMERO DEL MODELO



NÚMERO DE SERIE



MARCADO DE CONFORMIDAD EUROPEA



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

Etiqueta de seguridad

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

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

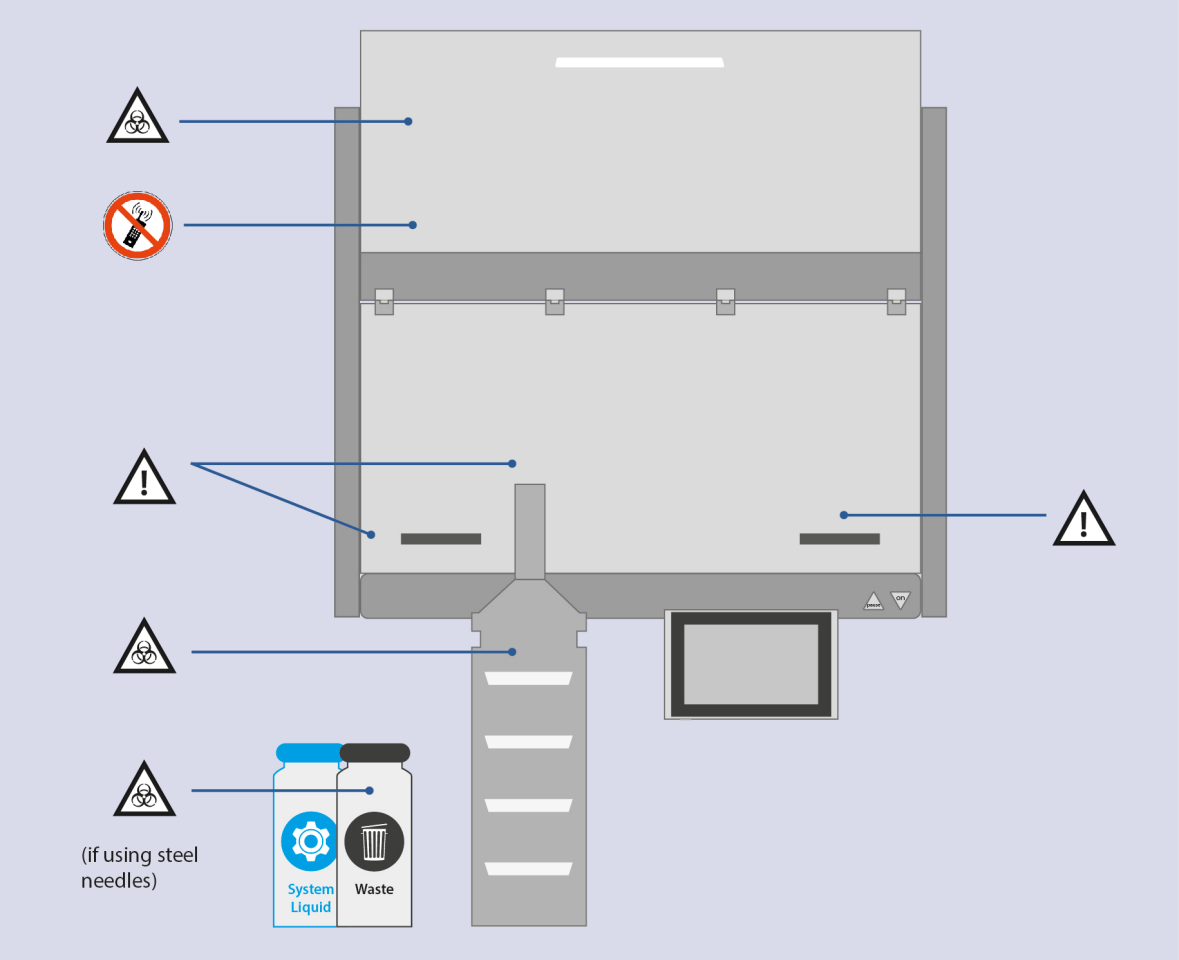


Figure 1: Puntos de peligro de y localización de los símbolos de seguridad que puede encontrar en la parte delantera del MultiMACS X.

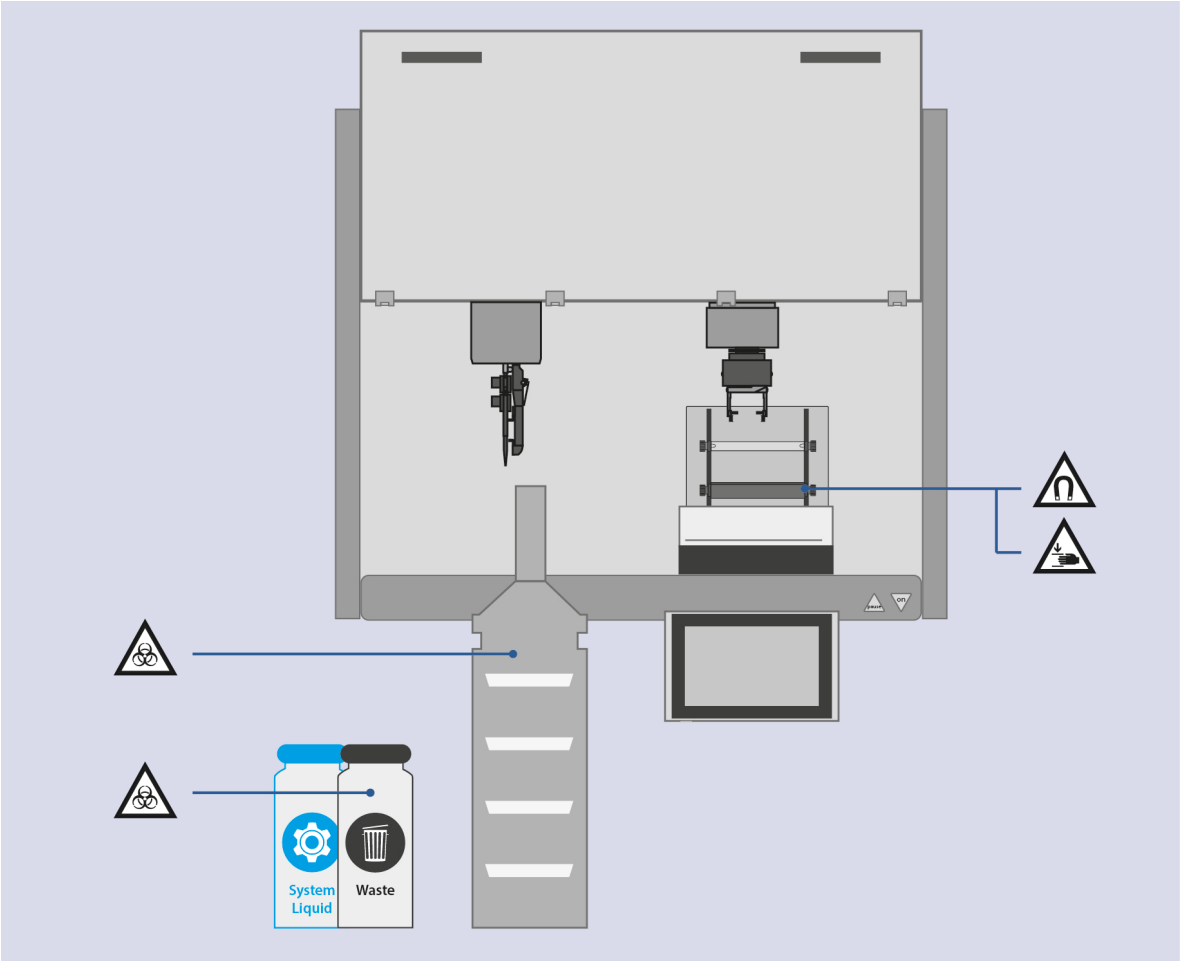


Figure 2: Puntos de peligro de y localización de los símbolos de seguridad que puede encontrar en la parte delantera del MultiMACS X.

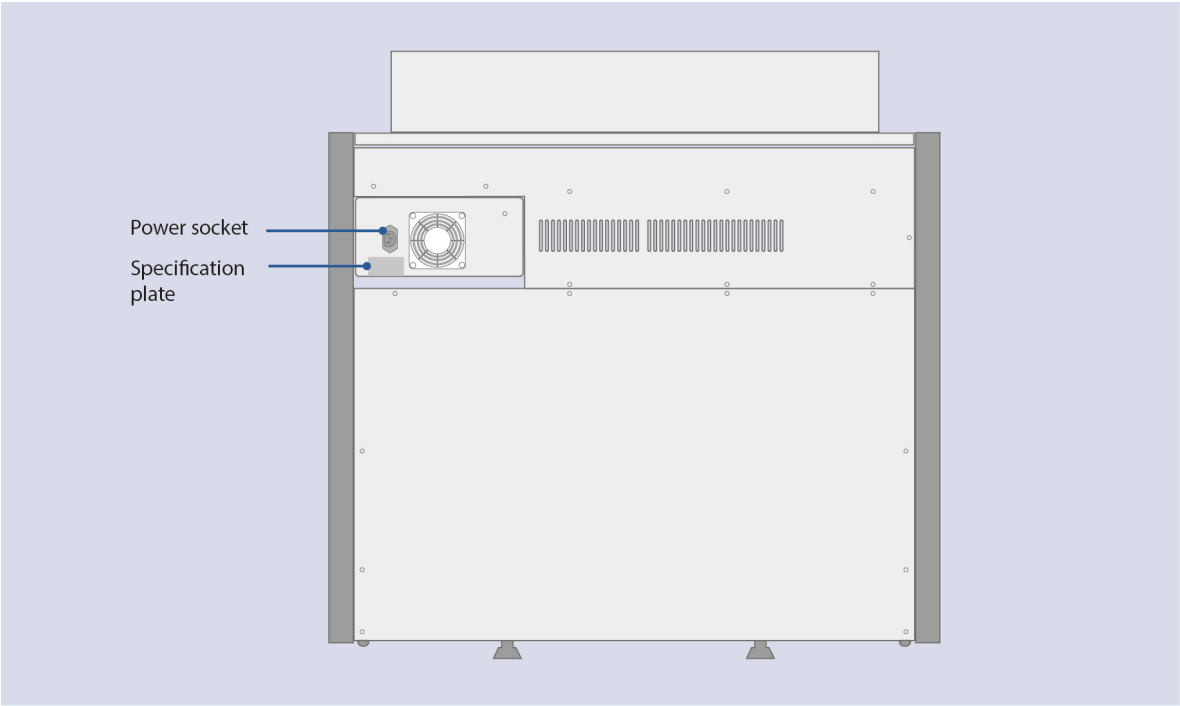
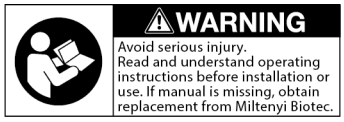


Figure 3: Puntos de peligro de y localización de los símbolos de seguridad que puede encontrar en la parte trasera del MultiMACS X.

La siguiente etiqueta de seguridad se encuentra pegada a la etiqueta de tipo del MultiMACS X.



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.

Instrucciones generales de seguridad

Si el instrumento no funciona correctamente y/o las instrucciones o mensajes mostrados le aconsejan contactar con el servicio técnico, no es posible utilizar el instrumento de una manera segura. Apague y desenchufe inmediatamente el instrumento de la toma de corriente, y contacte un proveedor de Servicio Técnico Miltenyi Biotec o un servicio técnico autorizado.

Incendios y riesgos eléctricos

Los riesgos potenciales causados por aparatos eléctricos incluyen shock eléctrico, cortocircuito y sobrecalentamiento. Un shock eléctrico puede llevar a graves daños corporales o incluso la muerte. Un cortocircuito eléctrico o sobrecalentamiento puede ser causa de incendio. El equipo electrónico puede emitir chispas, las cuales podrían encender vapores o material combustible resultando en explosión o incendio. No use el instrumento en áreas designadas como peligrosas; por ejemplo, en medios cargados de oxígeno.

La caja protectora del instrumento está diseñada para reducir el riesgo de shock eléctrico, cortocircuito eléctrico y propagación de fuego. Excepto por el acceso frontal cubre, **no quite o penetre ninguna tapa o cubierta**. Solo el personal autorizado debe quitar las otras tapas del instrumento. Nunca introduzca un objeto extraño a través de una apertura en el instrumento. No use el instrumento si

- está abierto o desensamblado,
- se ha caído o ha sido dañado,
- tiene partes dañadas o rotas,
- tiene un cable de energía dañado,
- un objeto ha entrado a través de las ranuras de ventilación,
- un objeto extraño ha caído en el instrumento.

Si aparecen llamas o humo, inmediatamente apague la fuente de energía, desenchufe el instrumento de la toma de corriente, y contacte un proveedor de servicios autorizado de Miltenyi Biotec o un servicio técnico de Miltenyi Biotec.

El instrumento está destinado solo a uso en un lugar cubierto. **Si algún fluido entra en el instrumento, puede ocasionar cortocircuitos eléctricos, shock eléctrico o incendio.** No permita que fluidos penetren el interior del instrumento. Proteja el instrumento contra vertidos y salpicaduras accidentales. Limpie inmediatamente los vertidos. No utilice el instrumento si se han derramado líquidos en el instrumento. No utilice el instrumento en un lugar mojado o húmedo. Evite áreas con alta humedad o vapor. Transportar el instrumento de un medio frío – como una habitación fría a 5 °C – a temperatura ambiente, puede causar una condensación dentro del instrumento. En esos casos, espere a que el instrumento se deshumidifique antes de utilizarlo. Desenchufe el instrumento de la toma de corriente antes de limpiarlo. No utilice agentes limpiadores líquidos o aerosoles; use siempre un paño húmedo.

Asegúrese de que hay suficiente ventilación en el lugar donde se utilice el instrumento. En la ausencia de una circulación adecuada, el aire del ambiente puede no enfriar el instrumento a temperaturas de funcionamiento adecuadas. Permita una suficiente circulación del aire alrededor del instrumento – al menos 15 cm en todos los

lados – durante el manejo para asegurar un enfriamiento adecuado. No coloque el instrumento cerca de radiadores, registros de calor, estufas, u otro equipamiento (incluyendo amplificadores) que genere calor. Proteja el instrumento de la luz directa del sol. No cubra las ranuras y aperturas del instrumento ya que están destinadas a la ventilación y protección contra el sobrecalentamiento del instrumento. No coloque el instrumento en un estante empotrado o espacios similarmente confinados a menos que el espacio haya sido específicamente designado para proveer una ventilación adecuada. Siga las instrucciones de montaje del instrumento.

Asegúrese de que el enchufe principal así como el conector para el cable de energía están fácilmente accesibles y colocados tan cerca del operador del instrumento como sea posible. Si es necesario desconectar la fuente de energía, desconecte el cable de la toma de corriente.

El instrumento está equipado con un enchufe eléctrico con tres cables para la toma de tierra, que tiene una tercera clavija para la toma. Este enchufe solo se adapta a una toma de corriente de tierra. Este es un procedimiento de seguridad. No intente insertar el enchufe en una toma de corriente que no sea de tierra. Si no puede insertar el enchufe en la toma, contacte a su electricista local para reemplazar la toma.

El instrumento debería ser utilizado desde una fuente de energía que cumple las especificaciones mencionadas en la etiqueta de potencia eléctrica del producto. Si tiene preguntas sobre el tipo de fuente de energía que usar, contacte a su proveedor de servicios autorizado de Miltenyi Biotec o una compañía de energía local. No use alargadores o enchufes múltiples. No sobrecargue una toma de corriente.

Solamente el lector de código 2D y los dispositivos periféricos que cumplen con la IEC/TR 62471 pueden ser conectados con el conector RS232 rotulado con BCR.



Campo magnético intenso

El MultiMACS X está equipado con un imán extremadamente potente.



Existe un riesgo de lesión grave para las personas que llevan marcapasos, derivaciones celebrales o implantes médicos electrónicos.

Mantenga todos los soportes magnéticos de información (tales como tarjetas de crédito, cintas magnéticas y medios de almacenamiento), cualquier equipo electrónico (como audífonos, marcapasos, shunt cerebral, instrumentos de medición y control, ordenadores y relojes), así como herramientas magnetizables y otros objetos a una distancia de al menos 20 cm. El campo magnético puede alterar o dañar dichos objetos.



Riesgos mecánicos

Mantenga los dedos y otras partes del cuerpo alejados de las partes móviles del MultiMACS X para evitar que sufran aplastamientos y/o cortaduras, o que el instrumento sufra daños. Utilice el MultiMACS X solo con el panel de seguridad cerrado. No abra el panel de seguridad mientras se ejecuta una aplicación. El instrumento solo se está ejecutando si el panel de seguridad está cerrado. Esta es una medida de seguridad. **No olvide ninguna de las medidas ni equipos de seguridad.**



Riesgos de radiación óptica

El dispositivo está equipado de un lector de código 2D. Los diodos electroluminosos de gran alcance (LED) emiten luz invisible para iluminar la zona de lectura. De acuerdo con la normativa internacional IEC 62471, este sistema de lámpada siendo en exceso para el grupo exento de riesgos (Exempt Risk Group).

Tener cuidado con la trayectoria del rayo o la reflexión láser de una superficie reflejada. Durante la instalación del instrumento, tener cuidado de que durante la operación la trayectoria del rayo láser no está a la misma altura que el ojo humano. No permitir que agua, aceite, polvo u otras sustancias ajenas se peguen a la ventana parar la emisión del láser antes de limpiar el escáner. Esto puede causar errores de lectura. Asgúrese de parar la emisión del láser antes de limpiar el escáner. De no ser así, la exposición al láser puede ocasionar lesiones oculares. Utilizar un paño suave y seco para limpiar cualquier sustancia del escáner. No utilizar alcohol u otra sustancia de limpieza.

No desmontar, modificar ni quitar el láser o la fuente de radiación LED o sus sopores de montaje. El láser o la fuente de radiación LED no interrumpen la emisión cuando están desmontados. La radiación de unidades desmontadas puede ocasionar lesiones oculares.



Riesgos químicos y biológicos

Dependiendo del material biológico utilizado, una contaminación o infección puede llevar a graves daños personales o muerte. Todas las muestras clínicas deben ser consideradas potencialmente infecciosas. **Si se ha usado material de riesgo biológico, el operador debe elegir y llevar puesto equipamiento personal de seguridad** como indicado en las advertencias y precauciones para la substancia particular. La precaución de seguridad anterior también es válida para cualquier químico de riesgo, incluyendo químicos tóxicos o corrosivos, ácidos, o substancias radioactivas que pueden estar presentes en la muestra. Lleve guantes, ropa y gafas de seguridad para prevenir el contacto de la substancia con la piel y ojos. Tambíen proteja la boca y la nariz pues los aerosoles podrían escaparse del sistema.Un equipamiento de seguridad defectuoso o inadecuado es peligroso. El instrumento debe ser utilizado con una cubierta de seguridad si están siendo procesados materiales peligrosos o desconocidos. Si se ha utilizado o derramado material peligroso, debe tenerse cuidado en descontaminar a fondo el instrumento. Está estrictamente prohibido continuar utilizando accesorios o piezas del instrumento contaminadas.

Columnas, placas, tubos y otros consumibles que han estado en contacto con material de riesgo biológico deben ser descontaminados antes de su eliminación. Los residuos líquidos deberán ser autoclavados o descontaminados usando un desinfectante industrial apropiado para el patógeno específico, por ejemplo, hipoclorito de sodio al 10%, alcohol isopropílico o etanol al 70%.Todos los residuos líquidos o sólidos deben ser considerados peligrosos de acuerdo con las precauciones universales de laboratorio. El desecho de residuos debe hacerse de acuerdo con las regulaciones locales.



Servicio, transporte y eliminación seguros

A menos que de otro modo señalado en este manual de usuario o en otra documentación de Miltenyi Biotec, **no repare o revise el instrumento Usted mismo**. Las revisiones y reparaciones deben ser llevadas a cabo por personal de servicio cualificado. Una reparación o revisión inadecuada o incorrecta del instrumento puede causar riesgos a los usuarios, llevar a resultados impredecibles, causar el mal funcionamiento o daño del instrumento, así como un prematuro desgaste y vida reducida del instrumento. También puede invalidar su garantía.

Cuando sean requeridas piezas de repuesto, asegúrese de que el proveedor de servicios usa solo piezas originales de Miltenyi Biotec, o piezas de terceros especificadas y recomendadas por Miltenyi Biotec. El uso de piezas no autorizadas puede causar un mal funcionamiento del instrumento y resultados dañados. Miltenyi Biotec no se hace responsable de ninguna garantía o de un error o daño del instrumento resultante del uso de piezas inadecuadas. Al finalizar cualquier servicio o reparación, asegúrese de que su proveedor de servicios autorizado de Miltenyi Biotec lleva a cabo todas las comprobaciones de seguridad como requerido por el procedimiento de reparación, para asegurarse de que el instrumento está funcionando correctamente.

Utilice solo opciones y actualizaciones recomendadas por Miltenyi Biotec. Consulte con su representante local de Miltenyi Biotec sobre el amplio servicio del instrumento, o diríjase a **miltenyibiotec.com/support**.

El instrumento debe ser transportado cuidadosamente en embalaje especificado por Miltenyi Biotec. Si el instrumento está sujeto a una vibración excesiva o caída, pueden ocurrir daños internos. Si el instrumento necesita ser enviado de vuelta al fabricante para su servicio, descontamine el instrumento para eliminar cualquier material peligroso antes del transporte. Si tiene preguntas respecto a una correcto descontaminización o transporte, contacte al Servicio Técnico Miltenyi Biotec.



Información sobre la Directiva de Residuos de Aparatos Eléctricos y Electrónicos (Waste of Electrical and Electronic Equipment, WEEE)

Por favor, al final de la vida útil de su equipo de Miltenyi Biotec disponga del mismo de acuerdo a la ley WEEE aplicable, la cual puede ser diferente según el país o región.

Los equipos eléctricos y electrónicos pueden contener sustancias peligrosas que pueden tener graves efectos perjudiciales sobre el medio ambiente y/o la salud humana. Por este motivo, todos los equipos deben ser específicamente recogidos y tratados por los centros de residuos designados y según planes de cumplimiento de la WEEE cualificada. Al asegurarse de que se está deshaciendo de su equipo eléctrico y electrónico no deseado de acuerdo con la legislación y la WEEE aplicable de disposición de residuos peligrosos, estará ayudando a preservar nuestros recursos naturales y a proteger la salud humana.

Miltenyi Biotec está comprometido con la protección del medio ambiente. Miltenyi Biotec ofrece productos que se encuentran en el final de su vida a programas de retorno de muchos países, y a socios con esquemas de cumplimiento de licencias WEEE en todo el mundo. Miltenyi Biotec le ofrece reciclar su equipo de Miltenyi Biotec en el final de su vida útil forma gratuita. Los términos y la disponibilidad de esta oferta pueden variar según la región geográfica, debido a las diferencias en los requisitos reglamentarios. Tenga en cuenta que, dependiendo del tipo y uso del equipo, pueden aplicarse requisitos adicionales.

Para más información, o si desea eliminar su equipo de Miltenyi Biotec en el final de su vida útil, póngase en contacto con su representante local de Miltenyi Biotec o con el Servicio Técnico Miltenyi Biotec.

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Informations de sécurité importantes

⚠ AVERTISSEMENT

Le MultiMACS X est conçu pour une utilisation sûre, si il est correctement installé et manié par des personnel de laboratoire professionnel, conformément aux mesures de sécurité générales et aux consignes libellées dans ce manuel.

Avertissements et precautions

Les directives dans ce chapitre décrivent les risques potentiels associés au maniement de cet appareil et fournissent d'importantes informations de sécurité supplémentaires pour réduire les risques. Suivez soigneusement les instructions, afin de vous protéger vous-même, des tiers et le dispositif d'éventuels dangers et de créer un environnement de travail sûr. Utilisez cet appareil uniquement en respectant les instructions du fabricant afin d'éviter une détérioration du dispositif et des blessures du personnel.

Suivez toujours les consignes de sécurité du champ d'opération et les bonnes pratiques de laboratoire ainsi que les normes pour la santé, la sécurité et la prévention d'accidents. Contactez les autorités locales gérant l'alimentation en courant électrique, la construction de bâtiments, la maintenance ou la sécurité pour plus d'informations sur l'installation et l'utilisation sûre de l'appareil.

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.

Symboles



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



DANGER ÉLECTRIQUE



CHAMP MAGNÉTIQUE PUISSANT



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



PIÈCES AMOVIBLES



RAYONNEMENT OPTIQUE



RISQUE BIOLOGIQUE



CONDUCTEUR DE PROTECTION



PAS DE TÉLÉPHONE PORTABLE ACTIVÉ



FUSIBLE



DEEE (DÉCHETS D'ÉQUIPEMENTS ÉLECTRIQUES ET ÉLECTRONIQUES)



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



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



DÉBRANCHER LA PRISE D'ALIMENTATION DU SECTEUR



FABRICANT



NUMÉRO DE COMMANDE



NUMÉRO DE MODÈLE



NUMÉRO DE SÉRIE



MARQUAGE DE CONFORMITÉ EUROPÉENNE



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

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.

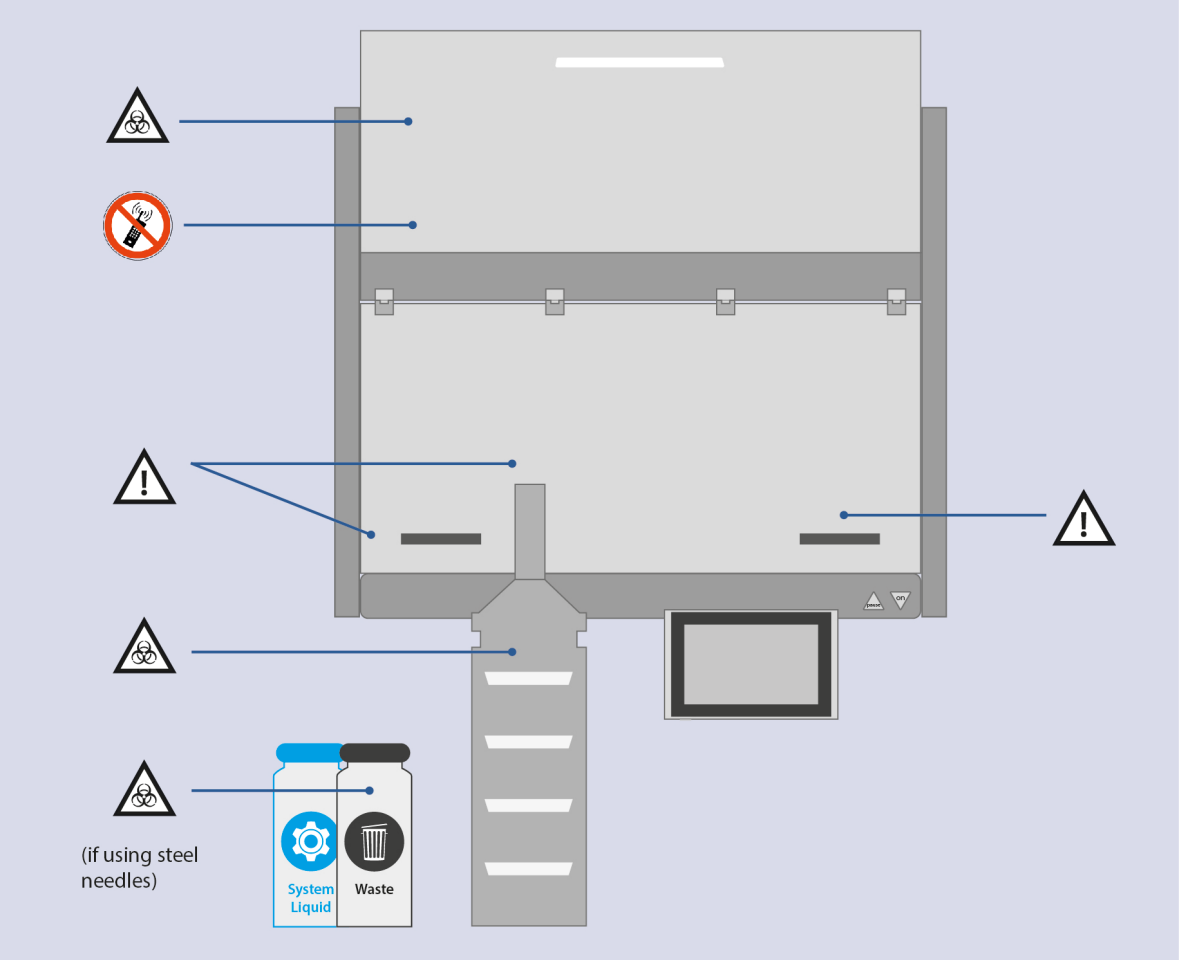


Figure 1: Les zones de risque et symboles de sécurité sur la face avant du MultiMACS X.

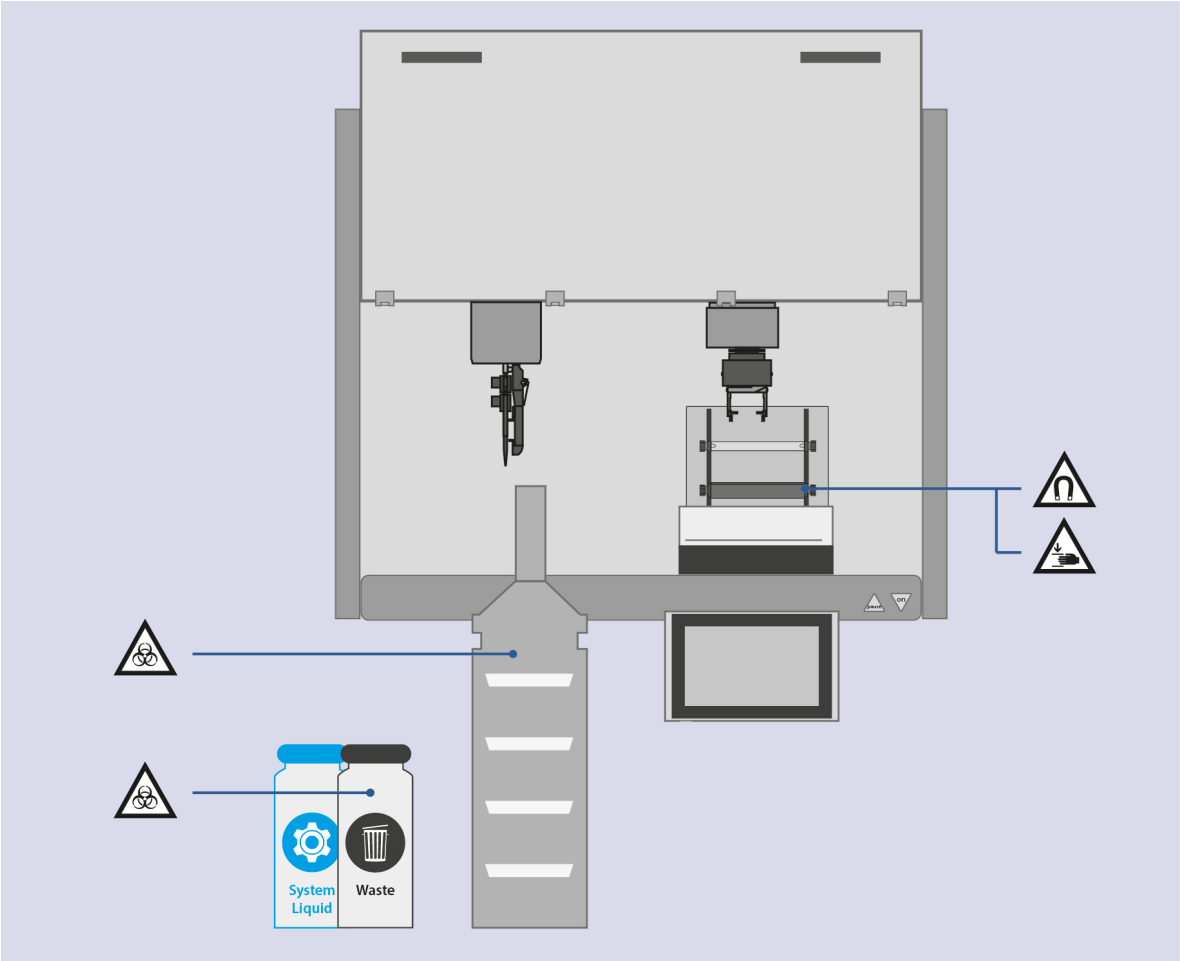


Figure 2: Les zones de risque et symboles de sécurité sur la face avant du MultiMACS X.

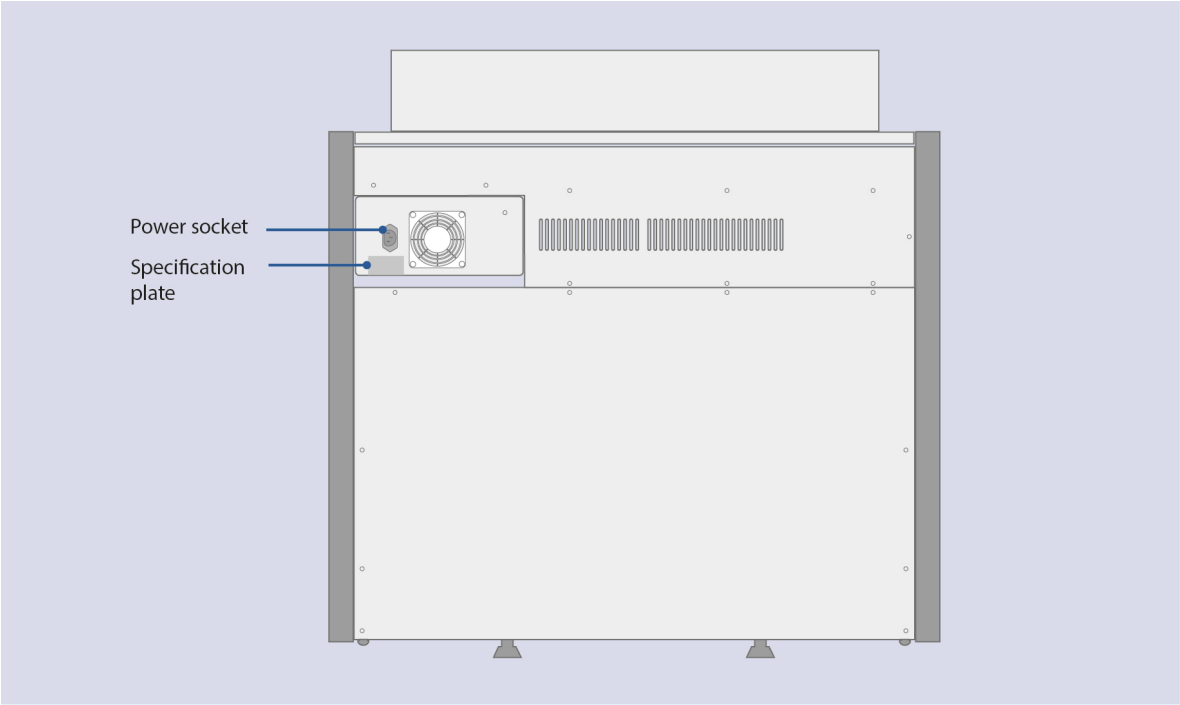
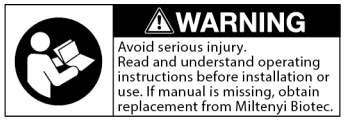


Figure 3: Les zones de risque et symboles de sécurité sur la face arrière du MultiMACS X.

L'étiquette de sécurité est fixée à l'étiquette signalétique du MultiMACS X.



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.

Consignes de sécurité générales

Si l'appareil ne fonctionne pas correctement et/ou les instructions ou messages affichés vous avisent de contacter le support technique, l'utilisation sûre de l'appareil n'est plus longtemps garantie. Éteignez immédiatement l'appareil et débranchez-le de la prise électrique, puis contactez un prestataire de services Miltenyi Biotec agréé ou l'équipe de support technique de Miltenyi Biotec.

Dangers électriques et incendie

Les risques potentiels résultant d'appareils électriques sont le choc électrique, le court circuit et la surchauffe. Un choc électrique peut entraîner de graves blessures corporelles ou même la mort. Un court circuit ou une surchauffe peuvent provoquer un incendie. Des équipements électriques peuvent émettre des étincelles, pouvant enflammer des vapeurs ou matières combustibles, ce qui pourrait engendrer une explosion ou un incendie. N'utilisez pas cet appareil dans des endroits jugés dangereux; par exemple, dans un environnement riche en oxygène.

Le boîtier de l'appareil est conçu de façon à réduire les risques de choc électrique, de court circuit et de propagation du feu. Sauf pour l'accès frontal couvre, **n'enlevez aucun couvercle et n'y pénétrez pas.** Seul un personnel autorisé a le droit d'enlever les autres couvercles. N'introduisez jamais un corps étrangers à travers d'une fente à l'intérieure de l'appareil. N'utilisez jamais l'appareil lorsqu'

- il est ouvert ou démonté,
- il est tombé ou qu'il a été endommagé,
- il a des pièces endommagées ou abîmées,
- il a des câbles électriques endommagés,
- un objet y est entré par les fentes de ventilation,
- un corps étranger a pénétré dans l'appareil.

Si des flammes ou la fumée apparaissent, coupez immédiatement l'alimentation électrique, débranchez l'appareil de la prise électrique, puis contactez un prestataire de services Miltenyi Biotec agréé ou l'équipe de support technique de Miltenyi Biotec.

L'appareil est uniquement destiné à une utilisation intérieure. **Si des fluides pénètrent à l'intérieur de l'appareil, ceci peut entraîner des courts circuits, des chocs électriques ou des incendies.** Faites extrêmement attention lorsque vous utilisez des liquides. Veillez à ce qu'aucun fluide ne pénètre à l'intérieur de l'appareil. Protégez l'appareil contre des déversements et éclaboussements accidentels. Nettoyez immédiatement tout déversement. Ne pas utiliser l'appareil, si des liquides ont coulés dans l'appareil. Ne pas utiliser l'appareil dans des endroits humides et brumeux. Evitez des endroits ayant une forte humidité ou condensation. Le déplacement de l'appareil d'un environnement froid – comme une chambre froide à 5 °C – à un endroit à température ambiante peut causer une condensation à l'intérieur de l'appareil. Dans ces cas-là, attendez que l'appareil soit sec, avant de l'utiliser. Débranchez l'appareil de la prise électrique avant de le nettoyer. Ne pas utiliser des détergents liquides ou aérosols; utilisez toujours un tissue humide.

Assurez une circulation adéquate de l'air dans la pièce où l'appareil est utilisé. Si une telle circulation adéquate n'est pas assurée, l'air ambiant ne peut pas refroidir l'appareil à des températures de fonctionnement acceptable. Veillez à ce que l'air puisse bien circulé au tour de l'appareil pendant son fonctionnement – au moins 15 cm des deux côtés – pour garantir un refroidissement adéquat. Évitez de placer l'appareil près de radiateurs, d'accumulateurs de chaleur, de poêles ou d'autres dispositifs (y compris des amplificateurs) générant de la chaleur. Ne pas exposer l'appareil au soleil. Ne couvrez pas les fentes et les lumières de l'appareil, car elles servent de ventilation et évite une surchauffe de l'appareil. Ne placez pas l'appareil dans un rack encastré ou des espaces confinés similaires, à moins que cet espace ait spécialement été conçu, pour fournir une ventilation convenable. Suivez les instructions de montage de cet appareil.

Assurez que l'interrupteur général ainsi que le connecteur pour le câble électrique soient facilement accessibles et qu'ils se trouvent le plus proche possible de l'opérateur de l'appareil. S'il est nécessaire de couper l'alimentation électrique, débranchez le câble de la prise électrique.

L'appareil est équipé d'une prise électrique à trois fils et mise à la terre avec une troisième broche de connecteur pour la mise à la terre. Cette prise ne s'emboîte que dans une prise de courant mise à la terre, ceci pour des raisons de sécurité. N'essayez pas d'introduire la prise dans une prise femelle de courant non mise à la terre. Si vous ne parvenez pas à introduire la prise dans une prise femelle, contactez votre électricien local pour remplacer la prise femelle. L'appareil doit uniquement être utilisé à partir d'une source d'énergie qui remplit les spécifications mentionnées sur l'étiquette de puissance électrique du produit. Si vous avez des questions sur le type de source de courant à utiliser, contactez votre prestataire de services Miltenyi Biotec agréé ou votre entreprise locale de production et de distribution d'énergie. N'utilisez aucune rallonge électrique ou multiprise. Ne surchargez pas une prise électrique.

Seuls le lecteur de code 2D et les appareils périphériques conformes à la norme IEC/TR 62471 peuvent être branchés au connecteur RS232 étiqueté BCR.



Champ magnétique puissant

Le MultiMACS X est équipé d'un aimant extrêmement puissant.



Il ya un risque d'accident pour Les personnes qui portent un stimulateur cardiaque, une derivation cérébrale ou un implant medical electronique.

Veillez à laisser un espace d'au moins 20 cm entre le cache de l'aimant et les supports d'information magnétiques (cartes de crédit, bandes magnétiques et supports de données) ainsi que l'équipement électronique (appareils auditifs, pacemakers, shunt cérébral, dispositifs de mesure et de contrôle, ordinateurs et montres). Ces éléments peuvent être affectés ou endommagés par le champ magnétique.



Dangers mécaniques

N’approchez pas vos doigts, etc. de toutes les pièces mobiles du MultiMACS X afin d’éviter toute blessure ainsi que toute détérioration de l’appareil due à l'écrasement et au cisaillement. Utilisez le MultiMACS X uniquement avec le panneau de sécurité fermé. N'ouvrez pas le panneau de sécurité lorsqu'une application est en cours d'exécution. L'instrument ne fonctionne que si le panneau de sécurité est fermé. C'est une mesure de sécurité. **Ne bloquez pas les dispositifs de sécurité ou les mesures de sécurité.**

N'obstruez pas le mouvement des bras robotisés et du matériel accessoire pendant le fonctionnement. Éloignez les doigts de toutes les pièces mobiles du MultiMACS X. N'ajustez pas la tubulure lorsque l'instrument est en cours de fonctionnement. Arrêtez ou annulez toujours un processus avant de manipuler le matériel accessoire. N'accédez pas à l'intérieur du MultiMACS X à travers une ouverture sur le devant de l'instrument.

Toujours ouvrir complètement le panneau de sécurité avant. Un panneau de sécurité avant complètement ouvert pourraît se fermer automatiquement.

Les pointes d'aiguille en acier fixe sont tranchantes et peuvent présenter un danger si elles utilisent du matériel biologique infecté ou contaminé. Toujours porter des gants de protection si vous utilisez l'instrument. Évitez de toucher les pointes d'aiguille, sauf si vous avez besoin de les pointes nettoyer.



Dangers de radiation optique

L'appareil est équipé d'un lecteur de code 2D. Les diodes électroluminescentes (DEL) émettent une lumière invisible pour l'éclairage du champ de lecture. Selon la norme internationale IEC 62471 de sécurité photobiologique, ce système de DEL est au dessus du groupe de risque 0 (exempt risque).

Prendre garde au chemin optique du rayon laser sur d'autres personnes. Veiller lors de l'installation de l'instrument à ce que le chemin optique rayon laser ne se trouve pas à hauteur des yeux de personnes pendant le service. Éviter que de l'eau, de huile, de la poussière ou d'autres corps étranger adhèrent sur la fenêtre de lecture du lecteur de code 2D. Ceci risque d'entraîner des erreurs de lecture. S'assurer avant le nettoyage du scanner qu'aucun rayon laser n'est plus émis. Sinon, l'exposition au laser peut provoquer des lésions oculaires. Utiliser un chiffon doux pour essuyer des substances sur le scanner. Ne pas utiliser d'alcool ou d'autres produits de nettoyage.

Ne pas démonter, échanger, ni retirer des sources de rayon laser ou DEL encastrées ni leur support. Les sources de rayon laser ou DEL ne cessent pas forcément d'émettre un rayonnement une fois démontées. Le rayonnement d'appareils démontés peut entraîner des lésions oculaires.



Dangers chimiques et biologiques

Selon la matière biologique utilisée, une contamination et infection peut entraîner des blessures corporelles graves ou même la mort. Tout prélèvement clinique doit être considéré comme potentiellement contagieux. **Si des matières biologiquement dangereuses sont ou ont été utilisées, l'opérateur doit choisir et porter un équipement et des vêtements de protection**, tel indiqué dans les avertissements et mesures de sécurité pour la substance respective. La mesure de sécurité mentionnée ci-dessus s'applique également pour toute substance chimique dangereuse, y compris toxique ou corrosive, acide ou radioactive, pouvant être présente dans le prélèvement. Portez des gants et des vêtements de protection, ainsi que des lunettes protectrices, pour que la substance n'entre pas en contact avec le visage et les yeux. Protéger aussi la bouche et le nez des aérosols qui pourraient provenir du système. Un équipement de protection défectueux ou inadéquate est dangereux. L'appareil doit être utilisé dans une hotte de sécurité, si des matières dangereuses ou inconnues sont traitées. Si des matières dangereuses ont été utilisées ou renversées, l'appareil doit soigneusement et complètement être décontaminé. Il est strictement interdit de continuer l'utilisation d'accessoires ou de pièces de l'appareil contaminées.

Des colonne, des tubes et tout autre consommable qui étaient en contact avec des matières biologiquement dangereuses doivent être décontaminés avant d'être jetés. Les déchets liquides doivent être traités à l'autoclave ou décontaminés à l'aide d'un désinfectant adapté à l'agent pathogène spécifique, par ex. 10% eau

de Javal, alcool isopropylique ou 70% d'éthanol. Tout liquide et déchet solide doivent être considérés comme dangereux et pour cela être traités selon les précautions universelles de laboratoire. L'enlèvement de déchets doit être conforme aux réglementations locales.



Maintenance, transport et élimination

N'entretenez pas vous-même l'appareil, à moins que ceci ait été spécifiquement mentionné dans ce manuel ou d'autres documentations de Miltenyi Biotec. La maintenance et les réparations doivent être effectuées par un personnel de maintenance qualifié. Une maintenance ou réparation impropre ou incorrecte de l'appareil peut causer des dangers pour l'utilisateur, amener des résultats imprévisibles, causer un dysfonctionnement ou une détérioration de l'appareil, ainsi qu'une usure prématurée et une réduction de la longévité de l'appareil. Ceci peut également faire expirer votre garantie.

Si des pièces de rechange sont nécessaires, assurez-vous que le prestataire de services utilise uniquement des pièces authentiques de Miltenyi Biotec, ou des pièces de tiers spécifiées et recommandées par Miltenyi Biotec. L'utilisation de pièces non autorisées peut entraîner un dysfonctionnement de l'appareil et impacter les résultats. Miltenyi Biotec n'accorde aucune garantie ou ne prend aucune responsabilité pour des défauts de l'appareil ou des détériorations résultant de l'utilisation de pièces inappropriées. Après l'achèvement de tout travail de maintenance et de réparation, assurez-vous que votre prestataire de services Miltenyi Biotec agréé entreprenne tous les contrôles de sécurité, comme le demande la procédure de réparation pour garantir un fonctionnement normal de l'appareil.

Utilisez uniquement des options et extensions recommandées par Miltenyi Biotec. Renseignez-vous auprès de votre représentant local Miltenyi Biotec sur les arrangements extensives de support et de maintenance de l'appareil, ou bien référez vous à **miltenyibiotec.com/support**.

L'appareil doit être transporté avec soin dans des emballages spécifiés par Miltenyi Biotec. Une détérioration intérieure peut se produire, si l'appareil fait l'objet de vibrations excessives ou d'une chute. Si l'appareil doit être expédié de retour au fabricant pour la maintenance, décontaminez l'appareil pour éliminer toute matière dangereuse avant le chargement. Pour toute question concernant une décontamination ou un chargement correct, veuillez contacter le support technique de Miltenyi Biotec. Si vous souhaitez éliminer votre appareil, veuillez contacter le support technique de Miltenyi Biotec qui vous aidera.



Déchets d'Equipements Electriques et Electroniques (DEEE) – Information Client

Pensez à recycler vos produits Miltenyi Biotec en fin de vie en conformité avec la directive DEEE en vigueur dans votre pays.

Les équipements électriques et électroniques peuvent contenir des substances dangereuses, qui peuvent avoir un effet néfaste sur l'environnement et / ou la santé humaine. C'est pourquoi tous les équipements doivent être spécifiquement collectés et traités par les centres désignés et ce en conformité avec la « Réglementation DEEE ». En vous assurant que vous éliminez vos équipements électriques et électroniques en accord avec la législation en vigueur, vous contribuez à préserver nos ressources naturelles et à protéger la santé humaine.

La protection de l'environnement est au coeur de nos préoccupations. Ainsi, nous finançons de nombreux programmes de collecte et de recyclage des équipements électriques que nous mettons sur le marché, en reversant une partie du prix de vente de nos produits à des éco-organismes agréés à travers le monde. Miltenyi Biotec vous permet de recycler gratuitement vos équipements Miltenyi Biotec en fin de vie. Les conditions et la disponibilité de cette offre varient selon les pays et les différentes exigences réglementaires. Selon le type et l'utilisation de votre équipement, des exigences supplémentaires peuvent s'appliquer.

Pour plus d'informations, ou si vous souhaitez recycler votre équipement Miltenyi Biotec en fin de vie, contactez votre interlocuteur Miltenyi Biotec ou notre support technique.

1 Introduction

The MultiMACS X is an automated magnetic cell separator using the MACS Technology. Full automation eliminates manual steps, thereby minimizing variability, saving hands-on time, and ensuring operator safety. Precise pipetting and reliable sampling due to a liquid detection system make for highly reproducible results. The MultiMACS X is intended for separation of biological material for research purposes only. Use the MultiMACS X only with applications designed by Miltenyi Biotec. For special scripts customized to fit your needs, contact your local sales representative.

The system consists of

- a robotic liquid handling unit for moving column blocks, tip boxes, and other consumables to and from their designated positions. The robotic liquid handling unit consists of a liquid handling arm (LiHa) and a robotic manipulator arm (RoMa).
- a MultiMACS Cell24 Separator X and a MACS Elution Station X
- a system liquid container and a container for liquid waste
- a waste slide and a disposable waste bag with holder for solid waste (disposable tips)
- a panel PC with touchscreen
- a hand-held barcode scanner

⚠ WARNING

Do not use the MultiMACS Cell24 Separator X and/or the MACS Elution Station X as a stand-alone instrument. Only use it in combination with the robotic liquid handling unit with safety panel. Otherwise, you risk crushing your hands.

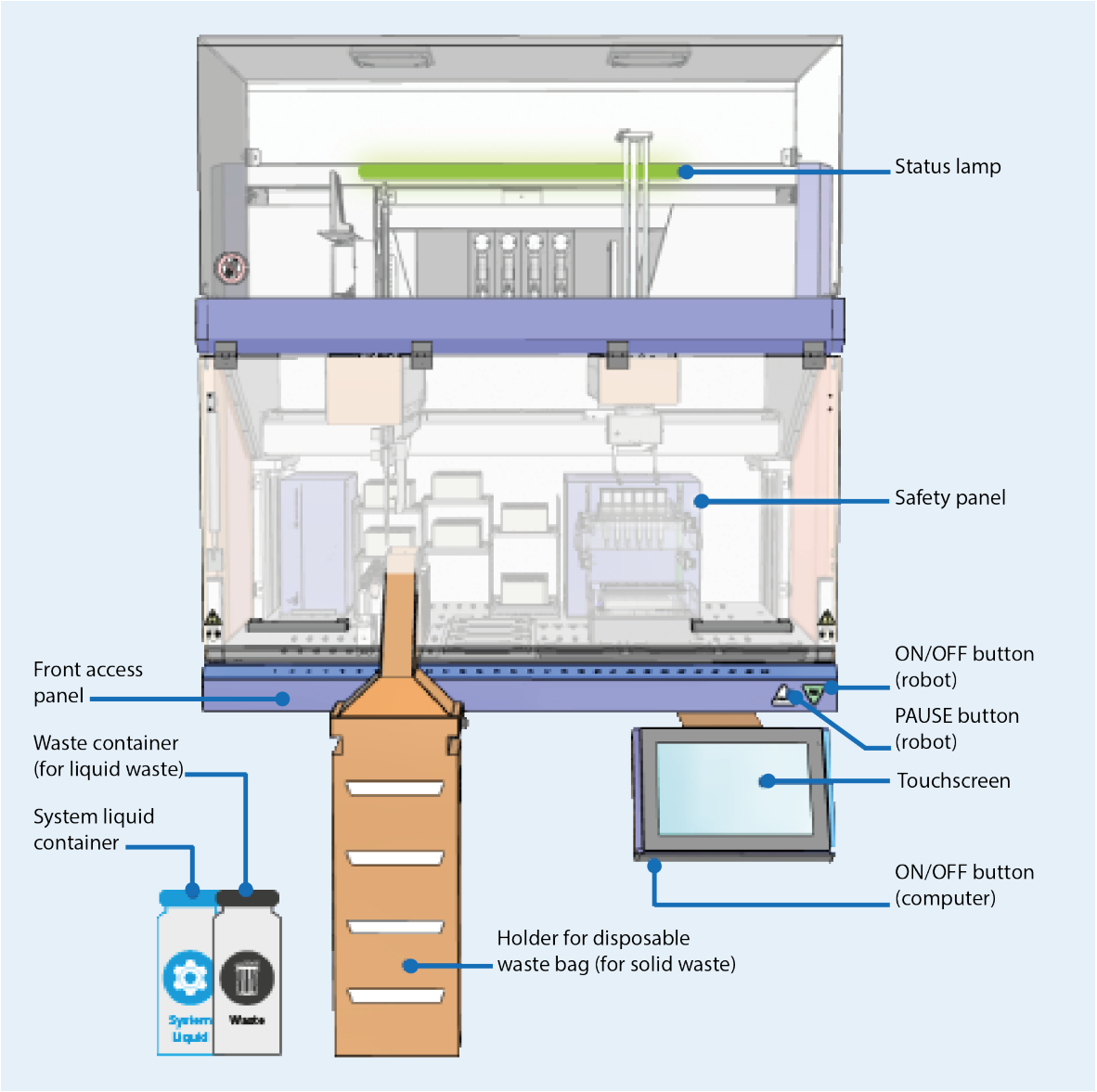


Figure 1.1: The MultiMACS X

2 Installation

⚠ WARNING

Do not install the instrument yourself. Only Miltenyi Biotec service personnel is allowed to unpack, install and set up the MultiMACS X. If you need to move the instrument after setup, contact your local Miltenyi Biotec representative.

Read the instructions in the chapter **Important safety information** and ensure that your site is properly prepared before the instrument is installed. Incorrect installation can lead to spread of fire, explosion, the risk of electric shocks, the risk of crushing and shearing of bodily parts, or biohazards. Refer to chapter **Technical data and specifications on page 81** for all technical information that have to be considered before setup.

Ensure that there is enough space surrounding the instrument (at least 15 cm on all sides). Ensure that the main power cable can be accessed easily at any time. If it is necessary to disconnect the power supply, unplug the main power cable from the power outlet.

2.1 Components included in the delivery

The following components are included in the delivery of the MultiMACS X (#130-118-515):

Component
MultiMACS X robot unit (including hardware dongle)
Power cable with country-specific connector
MultiMACS X user manual
White ring binder (QC Documentation, 4 × disposable pipette tip (DiTi) cone wrench, screw, and screw cover)
MultiMACS Cell24 Separator X
MACS Elution Station X
MACS Elution Chamber Base LHS
MACS Elution Chamber Lid X
Tubing (connecting MACS Elution Station X and MACS Elution Chamber X)
LHS Single Column Adapter, 12 pieces (for up to 12 LS, LD, or Whole Blood Columns)
Column blanks, 12 pieces
MultiMACS X 15 mL Sample Chill Rack, 2 pieces

Component
MultiMACS X 50 mL Sample Chill Rack, 3 pieces
MultiMACS XReagent Chill Rack, 3 pieces
Reagent rack carrier, 2 pieces
Storage hotels, 4 pieces
Labware carrier (L1– L2)
Labware carrier (L3 – L7)
Mounting plate for MultiMACS Cell24 Separator X
Rear Cover for MultiMACS Cell24 Separator X
Mounting plate for MACS Elution Station X
Rear cover for MACS Elution Station X
Tube handle (including bolt and nut for assembly)
DiTi waste and wash station
Panel PC with touchscreen for MultiMACS X
Hand-held barcode scanner (including handbook and connector cable)
Suction cup mount for hand-held barcode scanner
System liquid container (including tubing and sensor cables)
Liquid waste container (including tubing and sensor cables)
Funnel and filler neck

Table 2.1: Components included in the delivery

2.2 Consumables

Component	Order no.
Multi-24 Column Block, 1 piece	130-095-692
Multi-24 Column Blocks, 8 pieces	130-095-691
LS Columns	130-042-401
LD Columns	130-042-901
Whole Blood Column Kit	130-093-545
24-well Deep Well Plates, 2 × 2 pieces (sterile packaged)	130-110-500
Single-well Deep Well Plates X, 4 pieces (sterile packaged)	130-120-006
4-well Deep Well Plates, 4 pieces (sterile packaged)	130-120-008
3-well Deep Well Plates, 4 pieces (sterile packaged)	130-120-009
2-well Deep Well Plates, 4 pieces (sterile packaged)	130-120-010
MultiMACS X 100 mL Buffer Troughs, 18 × 6 pieces	130-110-474
MultiMACS X 1mL Filter Tips Pure, 24 × 96 pieces	130-115-422

Component	Order no.
MultiMACS X 5mL Filter Tips Pure, 10 × 24 pieces	130-115-421
MultiMACS X Refill Boxes for 1 mL Filter Tips	130-115-418
MultiMACS X Waste Bags, 200 pieces	130-115-417

Table 2.2: MultiMACS X consumables

2.3 Accessories

Complementary components can be ordered separately.

Component	Order no.
MultiMACS X 15 mL Sample Chill Rack	130-110-623
MultiMACS X 50 mL Sample Chill Rack	130-110-482
MultiMACS X Reagent Chill Rack	130-110-626

Table 2.3: Complementary components for the MultiMACS X

3
Components of the MultiMACS X

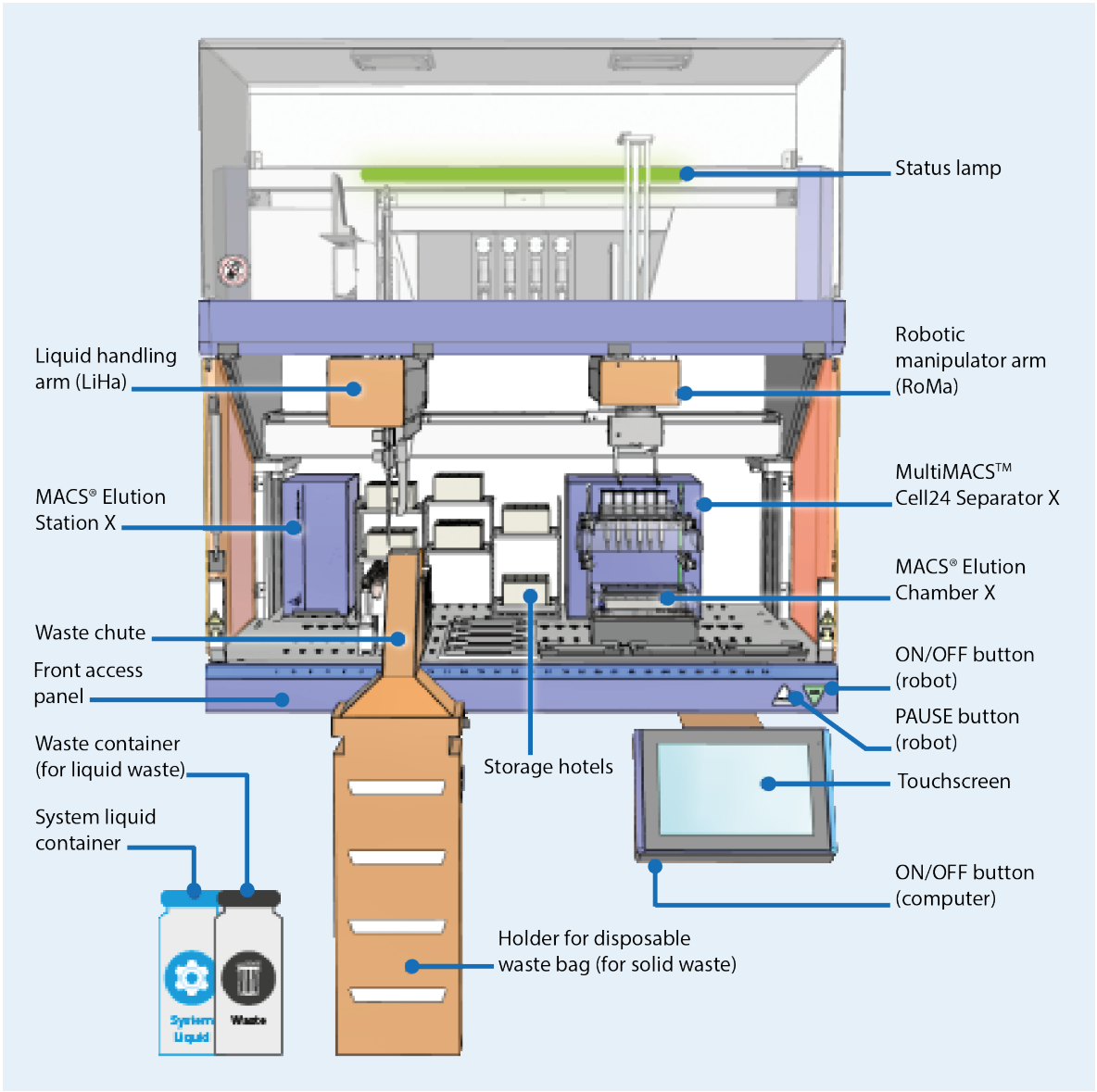


Figure 3.1: The MultiMACS X, front view, safety panel not shown

3.1 The robotic arms of the MultiMACS X

3.1.1 The liquid handling arm (LiHa)

> **⚠ CAUTION**
> Only use disposable pipette tips supplied by Miltenyi Biotec or TECAN. Otherwise, leakage or damage to the instrument can occur and may also void your warranty. The manufacturer will not accept any liability for damages or operating faults resulting from using wrong disposable tips.

The liquid handling arm of the MultiMACS X uses disposable pipette tips (DiTis, up to 5 mL) by default.

Alternatively, fixed steel needle tips can be installed. Between two cell separations, the steel needles are thoroughly washed in a special wash station for more cost-efficient cell separations. Contact Miltenyi Biotec for having steel needles installed.

3.1.2 The robotic manipulator arm (RoMa)

The robotic manipulator arm works in concert with the liquid handling arm. It loads, arranges, and unloads consumables (such as pipette tip boxes or deep well plates) between the MACS Elution Chamber X and the MultiMACS Cell24 Separator X.

3.2 Liquid containers

The MultiMACS X has two containers: A system liquid container and a liquid waste container. The system liquid container stores the system liquid (double-distilled water) that fills the hydraulic pipetting fluid line. For cleaning, this container can be filled with Set Up Clean from LVL technologies.

> **⚠ CAUTION**
> Liquid spillage on the worktable. To prevent overflow of the wash station, the waste tubing must be routed in such a way that the back pressure is as low as possible. The waste tubing must not be longer than necessary. Do not kink or squeeze the waste tubing. The waste tubing must not rise after the wash station (back pressure). The waste tubing must not sag (back pressure). The lower end of the waste tubing must not be in the liquid waste (back pressure).

The liquid waste container for the MultiMACS X stores liquid waste from the daily wash routine or washing routine. If using steel needle tips, system fluid that was in contact with biological material is also dispensed into the waste/wash station. Refer to **Cleaning the liquid containers on page 74** for details on how to clean the liquid containers.

3.3 MultiMACS Cell24 Separator X, MACS Elution Station X, and MACS Elution Chamber X

The MultiMACS Cell24 Separator X and MACS Elution Chamber X are components of the magnetic cell separation process. The separation unit contains the magnet and column holder for isolating the negative fraction. The MACS Elution Chamber X is connected to a vacuum station that allows to elute the positive fraction of the cell separation process.

3.4 The waste unit

The waste unit is composed of

- storage holder for separation buffer trays
- tip waste chute and waste container for disposed single use pipette tips
- wash station for disposal of system fluid during daily wash and for cleaning of steel needle tips

3.5 Storage hotels

Storage hotels are used to store tip boxes or deep well plates during a separation.

3.6 MultiMACS X Chill Racks

> **⚠ CAUTION**
>
> Improper positioning of objects on the worktable may lead to errors in the process. Do not use free space to deposit any objects. If you remove racks, always remove them completely from the worktable.

MultiMACS X Sample Chill Racks and MultiMACS X Reagent Chill Racks have to be pre-cooled for at least 2 hours at 2–8 °C before usage. When loading racks, ensure that you slide in the racks all the way to the lock pin.

3.6.1 Reagent racks

Each rack carries up to four vials of reagents. Place the MultiMACS X Chill Rack onto its corresponding rack carrier (see **Figure 3.1**). To ensure correct liquid level detection, all racks must be in close contact with the worktable. Clean the rack carriers regularly and replace damaged racks immediately.

3.6.2 Sample racks

Process either up to two 15 mL or up to three 50 mL Sample Chill Racks. The two provided 15 mL Sample Chill Racks can hold up to 8 sample vials each. The three provided 50 mL Sample Chill Racks can hold up to 8 sample vials.

> The Sample Chill Racks and the calibration of the instrument are optimized for 15 mL and 50 mL conical tubes.

3.7 The MultiMACS X work area

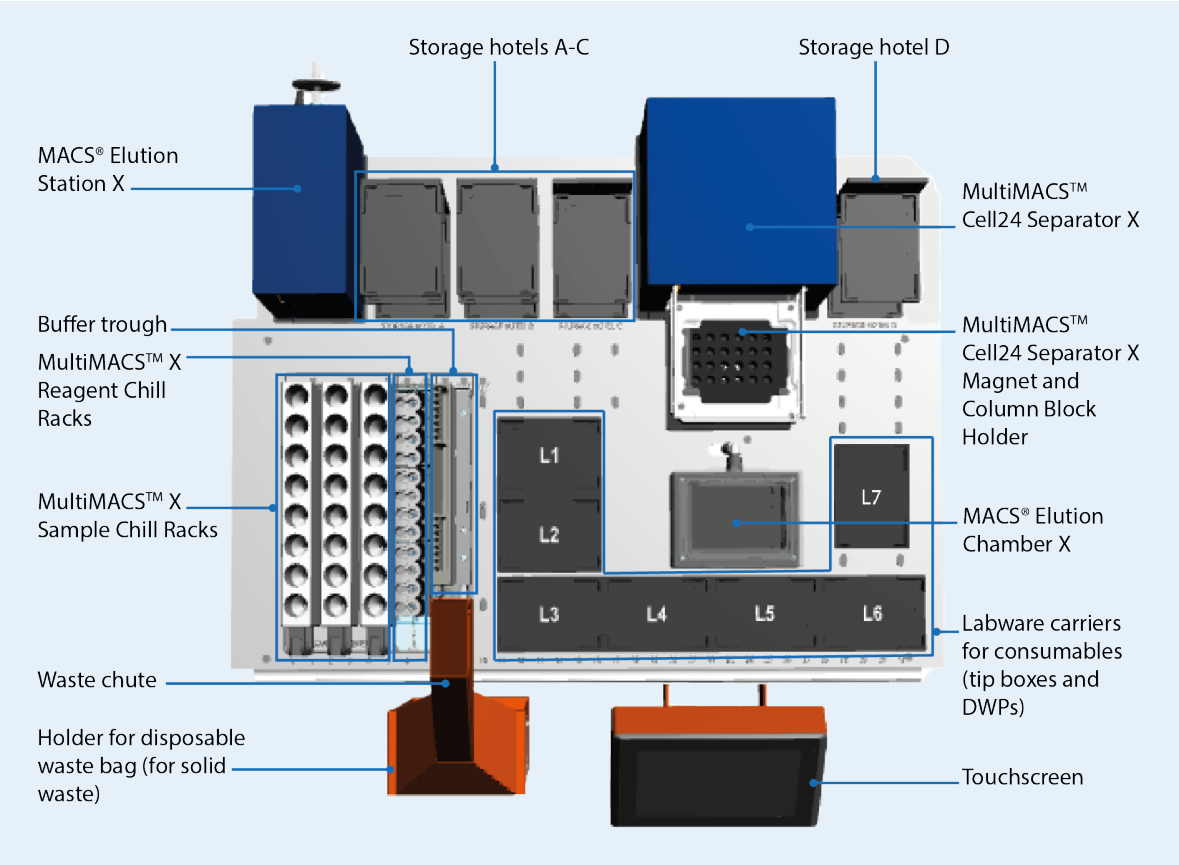


Figure 3.2: The MultiMACS X work area

3.8 Control elements

3.8.1 Robot ON/OFF button

The ON/OFF button of the robot is located at the instrument's lower right corner (see **Figure 3.1**).

- Switching on: Press and hold the ON/OFF button for at least 0.5 seconds.
- Switching off: Press and hold the ON/OFF butto for at least 2 seconds.

3.8.2 Pause button

Press the pause button to pause and later resume a run.

3.8.3 Computer ON/OFF button

The ON/OFF button of the computer is located underneath the lower left corner of the touchscreen (see **Figure 3.1**).

3.8.4 The status lamp

The status lamp displays the instrument status and is combined with an acoustic alarm device (sound). It is installed in the top cover of the instrument (see **Figure 3.1**). The volume level (loudness) and mode (continuous or intermittent) can be set during installation. Default settings are shown in **Table 3.1**.

Status lamp	Alarm	Status
Off	Off	Instrument is in idle or switched off
Green, continuous	Off	A process is running regularly
Green, flashing	Off	Process has been paused; or user prompt
Red, flashing	On	Process is in error state, software displays error message
Red, continuous	Off	Fatal error, system stops operation

Table 3.1: Status lamp color and alarm sound

3.9 Options for customization

3.9.1 Steel needles

The standard robotic liquid handling arm of the MultiMACS X has DiTis (up to 5 mL). Alternatively, fixed reusable steel needles can be installed. Between two cell separations, the steel needles are thoroughly washed in a wash station allowing more cost-efficient cell separations. For having steel needles installed, contact Miltenyi Biotec Technical Support.

3.9.2 Hood integration

If needed, the MultiMACS X can be integrated into a laminar flow hood (class 1 or 2 safety hood). For more detailed information, contact Miltenyi Biotec Technical Support.

4 Startup and shutdown

⚠ WARNING

Read the chapter **Important safety information** in this user manual before operating the instrument. When processing infectious, radioactive, poisonous, or any other hazardous liquids, always abide by the necessary safety precautions.

4.1 Switch on the instrument

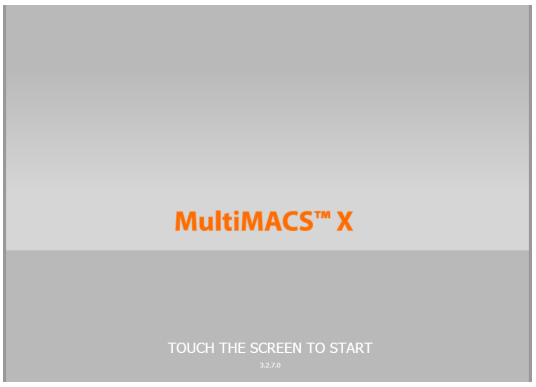
1 Switch on the computer. The button is located underneath the lower left corner of the touchscreen (see **Figure 1.1**).

2 Press the ON/OFF button for at least 0.5 seconds to start up the MultiMACS X.

The instrument will be initializing first. The RoMa will move to the safety position (far right, up and to the front). If the RoMa is not in the safety position after switching on, switch off the instrument and move the arm manually to the safety position. Otherwise, the moving arm may damage objects on the deck. In case of a power failure, all objects still held by the gripper fingers of the RoMa need to be removed manually before switching on the instrument. Follow the procedure described in **Power failure on page 79**.

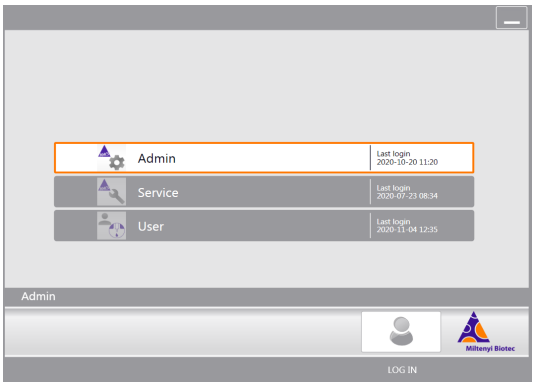
4.2 Log in

1 Tap the touchscreen to start.



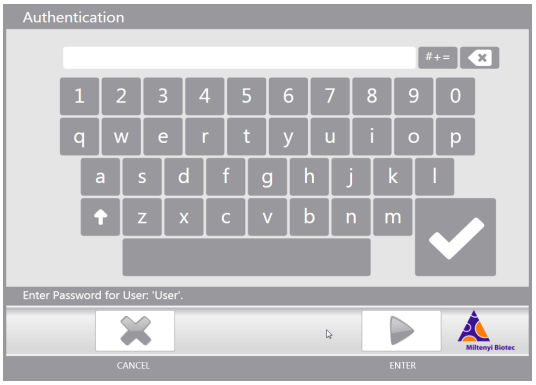


2 The MultiMACS X comes with pre-configured users. Select the appropriate user and tap **LOG IN**.



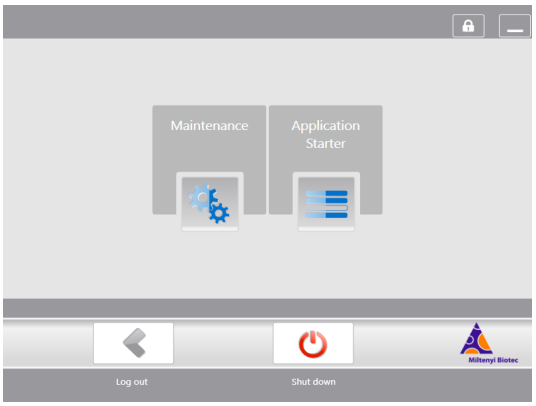


3 Enter your password. Use the **Back arrow** button at the upper right to make corrections. Tap the **Checkmark** button to the right or the **ENTER** button to confirm.



4 After login, you are directed to the main screen. From here you can:

- start an application (refer to **Running a separation on page 59**)
- start a maintenance program (refer to **Maintenance on page 69**)
- log out
- shut down the system (refer to **Shutting down the instrument on page 58**)



4.3 The user interface

	Name	Function	Location
	**Lock**	Locks the screen to prevent unauthorized access. Enter your password to unlock.	**System bar**
	**Minimize**	Minimize the GUI to access to MS Windows.	**System bar**
	**Maintenance**	Redirects to the **Selection** screen with several maintenance programs.	**Main screen**
	**Application Starter**	Redirects to the **Application Starter** screen with several application programs.	**Main screen**
	**Start**	Starts a program.	**Below the program name**
	**Remove**	Deletes a program from the quickstart list.	**Application Starter screen**
	**Plus**	Adds a program to the quickstart list.	**Application Starter screen**
	**Login**	Redirects to the **Authentication** screen.	**Main button bar**
	**Enter** **Continue** **New run**	Confirms the password for login. Continues with procedure. Starts a new run.	**Main button bar**
	**Pause**	Pauses the script process. Resume the script process when tapped again.	**Main button bar**
	**Back**	Returns to the previous screen.	**Main button bar**
	**Next**	Goes to the next screen.	**Main button bar**
	**Cancel**	Terminates a running script. Cancels the settings in the current dialog and returns to the previous screen.	**Main button bar**
	**Keyboard**	Activates/deactivates the touchscreen keyboard when a text box is selected.	**Main button bar**
	**Shutdown**	Redirects to the shutdown screen with several shutdown options.	**Main button bar**
	**Quickstart**	Redirects to the quickstart list.	**Main button bar**
	List view	Redirects to the complete list of application programs.	**Main button bar**
	**By last used**	Arranges list of application programs by last used.	**Main button bar**
	**Show comments**	Redirects to the **Run Status** screen to review log details.	**Main button bar**

Table 4.1: Main touchscreen elements

4.4 Shutting down the instrument

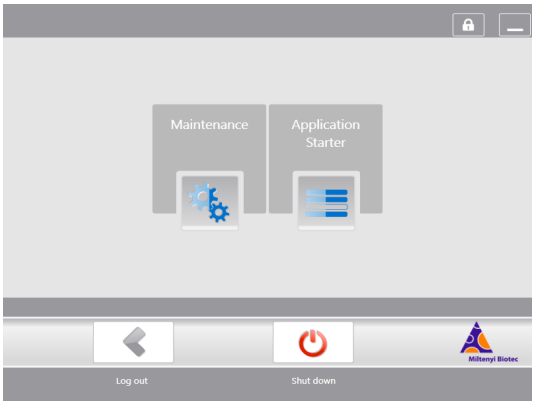
Before switching off the instrument, some maintenance tasks might need to be performed, e.g. tip cleaning. Except if in an emergency situation, switch off the instrument only after an application is completed. Do not shut down the computer while the instrument is in operation.

1 Log in if necessary.

2 Go to the main screen. After a successful separation, you are automatically directed to the main screen.

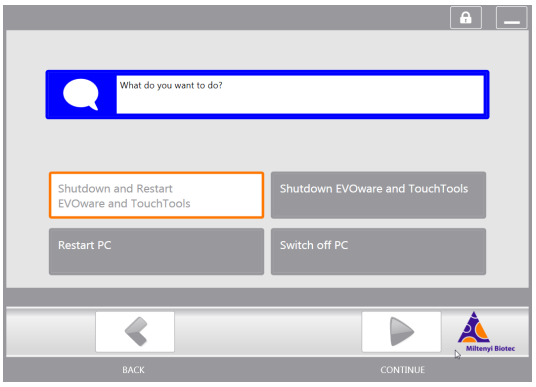


3 Tap the **Shut down** button.





4 Select **Switch off PC** and tap **CONTINUE**. Alternatively, tap twice.



5 Press the power ON/OFF button for at least 2 seconds to switch the instrument off.

Wait until the status light in the power switch is off (approximately 10 seconds) before switching on the instrument again.

5 Running a separation

⚠ WARNING

Read the chapter **Important safety information** in this user manual before operating the instrument. When processing infectious, radioactive, poisonous, or any other hazardous liquids, always abide by the necessary safety precautions.

Contamination risks through contamination of the worktable or frame. Hazardous liquids or samples can be spilled onto the worktable, due to the failure of the liquid system or a handling module, such as the RoMa. Visually inspect all hardware components, e.g. the worktable, the RoMa, etc., for possible spillage of hazardous liquids. Make sure that the containers are accurately positioned on the worktable.

⚠ CAUTION

Unsafe layout of the worktable can cause e.g.:

- loss or dropping of DiTi
- loss or dropping of consumables (e.g., deep well plates)
- spillage of hazardous liquids because of collisions
- spillage of hazardous liquids if filling level is too high

This chapter describes an exemplary script. The instructions on the screen may vary, depending on the script you are using.

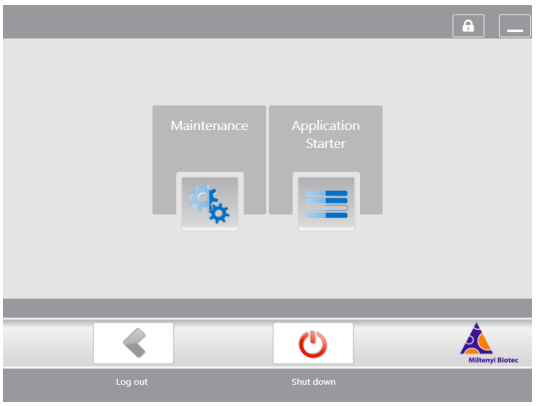
Before starting an application, thoroughly flush the whole liquid system (refer to **Perform a daily wash on page 69**). Make sure that daily maintenance procedures have been performed. Make sure that there are no air bubbles in the tubing and that there are no liquid droplets on DiTi adapters or tips. For a detailed description refer to **Maintenance on page 69**.

5.1 Start a program

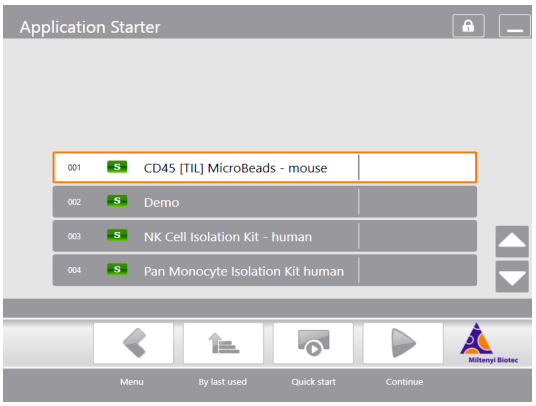
The user interface might slightly differ from the ones depicted in the example workflow depending on your software version. The general workflow however will be the same.

1 Switch on the computer and log in as described in **Log in on page 55**.

2 Tap the **Application Starter** button.



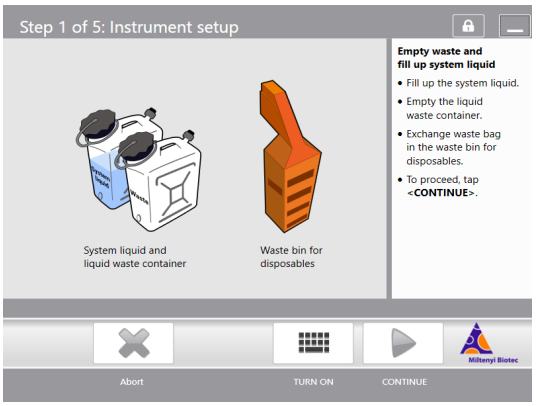
3 Select an application from the list. You can sort the list of applications by tapping the button **By last used**. Alternatively, applications can be accessed via the **Quick start** button. Refer to **Select a program from the quickstart list on page 65** for details.



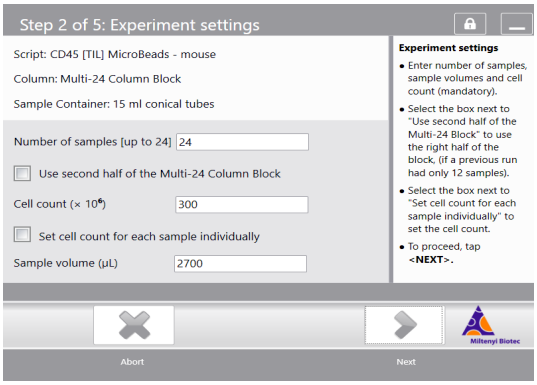
4 A **Ready to start** screen appears. Tap the **Continue** button to proceed. The following screens will guide you through program setting and the deck loading procedure.



5 Ensure that the storage hotel positions A,B, and C and the waste container are empty. Fill the buffer container if necessary. Tap on the **CONTINUE** button to proceed.



6 The following screen provides all options to modify the main settings of every application script. The number of samples, the sample volumes, and the cell number of each sample have to be defined. Further specific adjustments can be made.

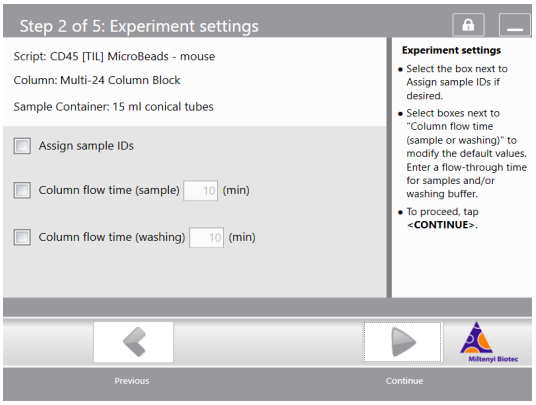


7 Activate the box next to **Use second half of the Multi-24 Column Block** if you want to reuse the second half of the block within six hours after the first run which had only 12 or less samples. Second use of the block is only possible with another 12 or less samples.

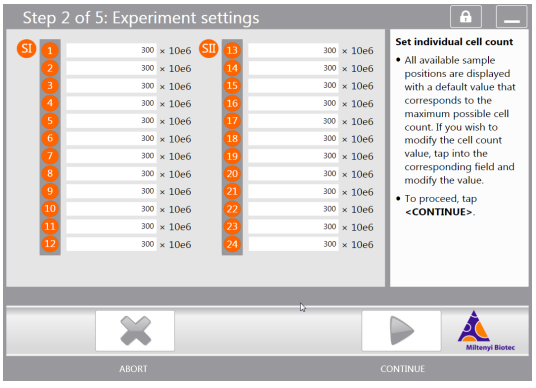
Do not use the second half of a Multi-24 Column Block more than six hours after opening the sterile wrapper.

8 Activate the box next to **Set cell count for each sample individually** if you want to set the cell count for each sample individually. Tap the **Next** button to proceed.

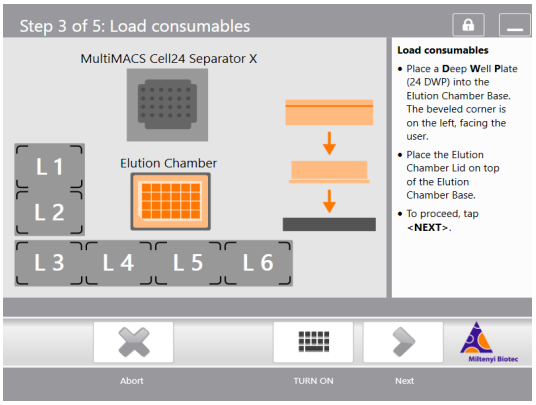
9 Activate the box next to **Assign sample IDs** if desired. Multiple selection of the options is possible. Tap the **Continue** button to proceed.



10 Only if the option **Set cell count for each sample individually** has been chosen, the following screen will appear. Add the specific cell number per sample. All available sample positions are indicated by a full orange circle and have a default value that corresponds to the maximum possible cell count. If you wish to modify the cell count value, tap into the corresponding field and enter the desired value. Tap the **CONTINUE** button to proceed.

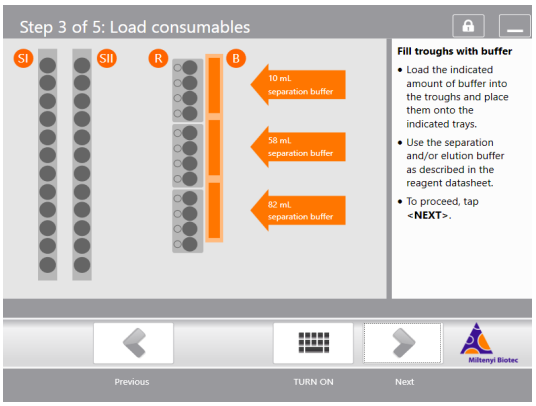


11 Place a deep well plate into the MACS Elution Chamber Base. The beveled corner is on the left, facing the user. Place the MACS Elution Chamber Lid onto the MACS Elution Chamber Base. Then, tap the **Next** button.

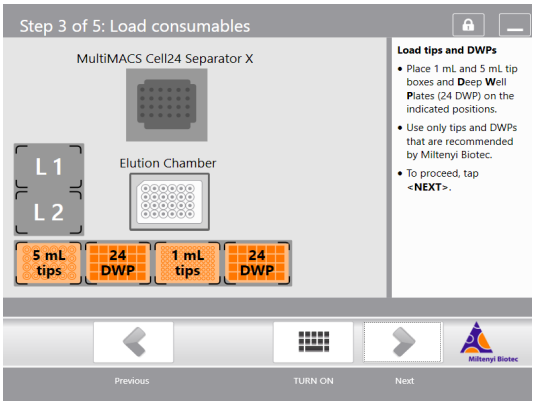


12 Place a Multi-24 Column Block onto the MACS Elution Chamber Lid. The beveled corner is on the left, facing away from the user. Tap the **Next** button.

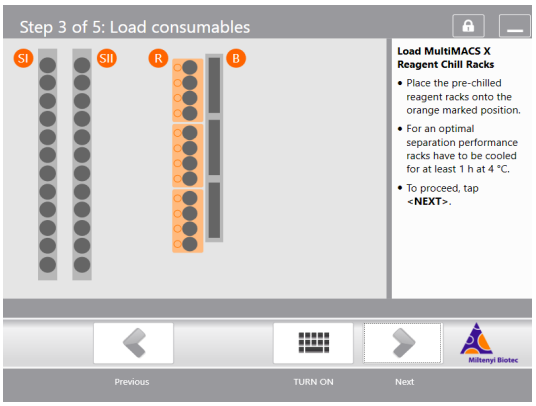
13 Load the indicated amount of buffer into the troughs and place the troughs onto the indicated trays. Tap the **Next** button to proceed.



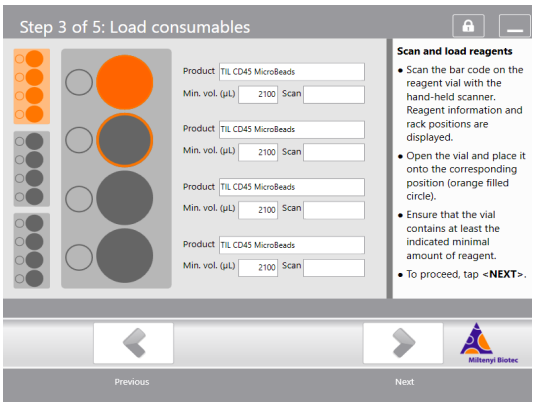
14 Place 1 mL and 5 mL tip boxes and deep well plates on the indicated positions. Tap the **Next** button to proceed.



15 Place the pre-chilled reagent racks on the position marked in light orange. Tap the **Next** button to proceed.



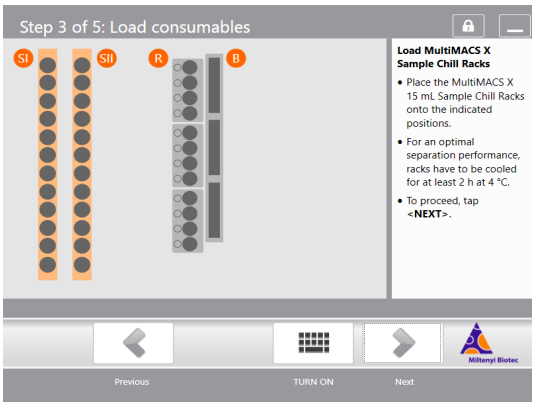
16 Use the hand-held bar code scanner to insert the product information:
Point the hand-held barcode scanner to the barcode on the reagent vial and scan your reagents. Reagent information and rack positions are displayed (indicated by an open or filled orange circle).



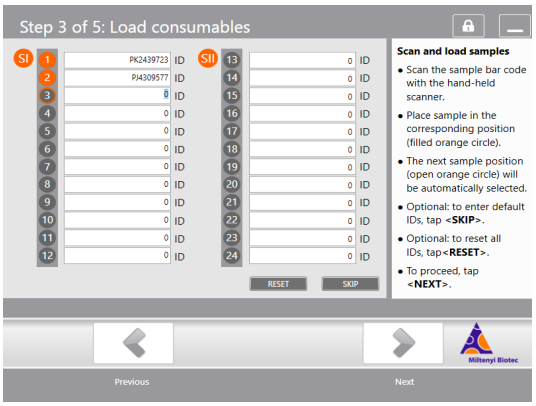
17 Open the vials and place them in the respective position on the Reagent Rack which is now marked fully orange.

18 Once you have all reagents scanned and loaded, tap the **Next** button to proceed.

19 Place your samples into the Sample Chill Rack and slide it to the indicated area. Tap the **Next** button to proceed.



20 If the option **Assign sample IDs** was selected, the following screen appears.



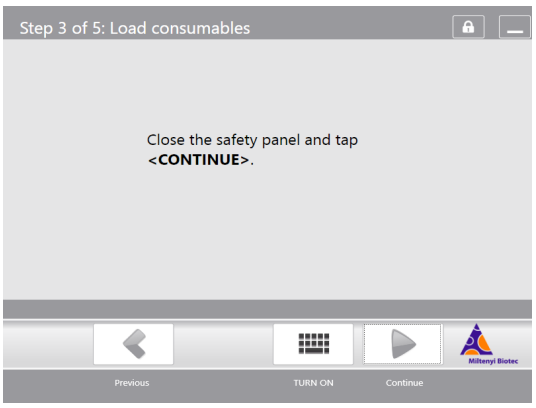
21 Use the hand-held barcode scanner and scan your sample. The sample ID information is displayed.

22 Place the sample in the corresponding position which is now marked with a filled orange circle. The next sample position will be automatically selected (open orange circle).

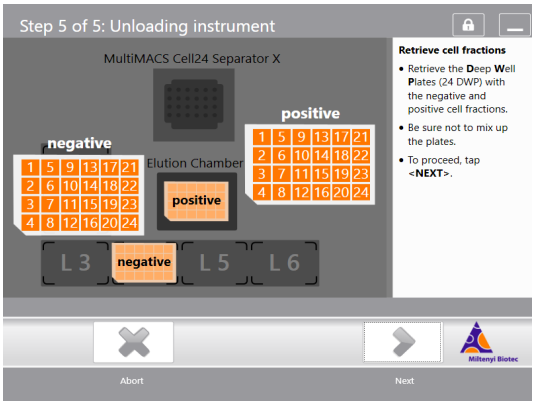
23 Repeat for additional samples.

24 Once you have all samples scanned and loaded, tap the **Next** button to proceed.

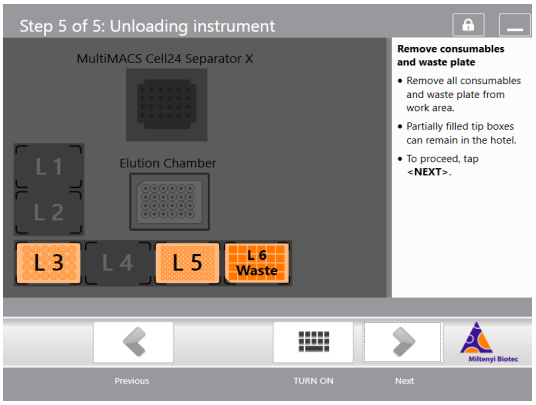
25 Close the safety panel. Tap the **Continue** button to start the separation.



26 Once the separation is complete, remove the 24-well Deep Well Plates (24 DWP) with the negative and positive target cell fractions from the work area. **Be sure not to mix up the plates!** Tap the **Next** button to proceed.



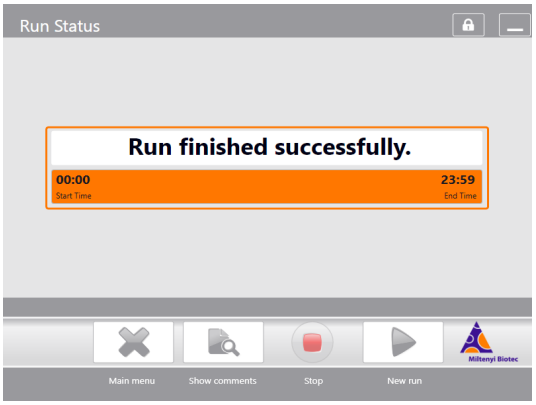
27 Remove all consumables and the waste plate from the work area. Partially filled tip boxes can remain in the storage hotel D. Tap the **Next** button to proceed.



28 After completion, a log screen appears. Tap the tabs **Comment**, **Process**, or **Log** to review log details.

Alternatively, tap the **Show comments** button.

Tap on the **New run** button or the **Main menu** button to start a new separation or go to the main screen.



5.2 Quickstart

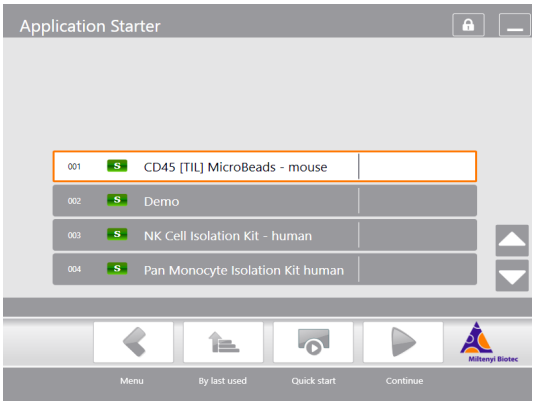
5.2.1 Select a program from the quickstart list

Quickstart allows you to directly select a program from a customizable short-list of programs and go to the program settings.

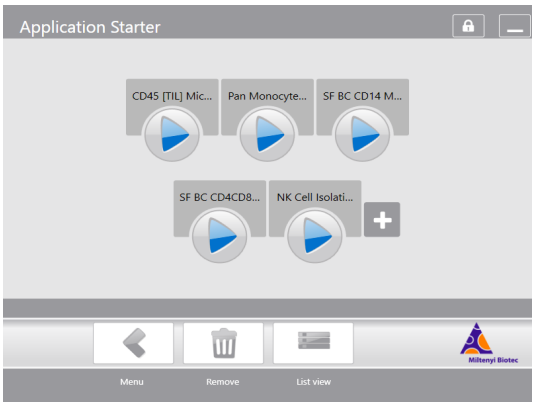
> If you start an application via the **Quick start** button, the **Ready to start** screen is skipped.

1 Start the instrument and log in as described in **Switch on the instrument on page 55**.

2 Tap the **Quick start** button.



3 Tap the **Start** button below the program name of the desired application.



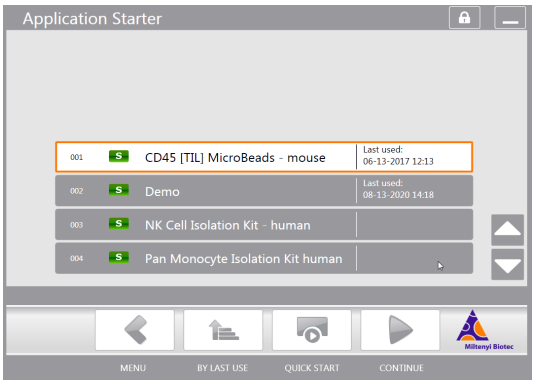
Tap the **List view** button to return to the entire list of applications.

5.2.2 Add a program from the quickstart list

1 To add programs to the list, tap the **Plus** button.



2 Select the programs to add to the list from the following screen and tap the **Checkmark** button to add.

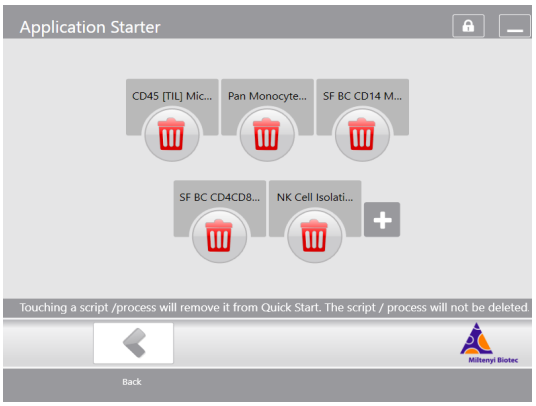


5.2.3 Remove programs from the quickstart list

1 To remove programs from the quickstart list, tap the **Remove** button.



2 Tap the red **Remove** button below the program name you wish to remove. The program is removed from the Quick Start list.



The removed program is still accessible from the complete list on the **Application Starter** screen (list view).

6 Maintenance

6.1 Daily maintenance tasks

Component	Maintenance Task
Liquid system	Check for leakage Check the tubing connections and tighten, if necessary Refer to **Checking for leaks on page 73**
System liquid container	Refill if necessary
Waste container	Empty if necessary
DiTi waste bag	Change Refer to **Checking for leaks on page 73**
Diluters and syringes	Check syringes and plunger lock screws and tighten, if necessary Refer to **Tightening of syringe and plunger lock screws on page 72**
DiTi cones (LiHa)	Check for deposits Clean Tighten Refer to **Cleaning and inspection of DiTi cones (LiHa) on page 71**
Liquid system	Flush Check for air bubbles in syringes Refer to **Perform a daily wash below**
Robotic manipulator (RoMa)	Visually check grippers for deformation and damage Call Miltenyi Biotec Technical Support if they are damaged or misaligned

Table 6.1: Daily maintenance tasks

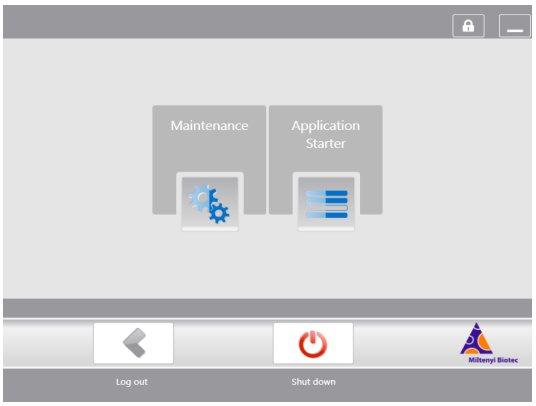
6.1.1 Perform a daily wash

If the liquid system has not been in use overnight, air bubbles may have built in the liquid system. Even during a run air bubbles may remain in the liquid system. Ensure that the system liquid container is full and the waste container is empty.

1 Switch on the instrument and log in as described in **Startup and shutdown on page 55**.

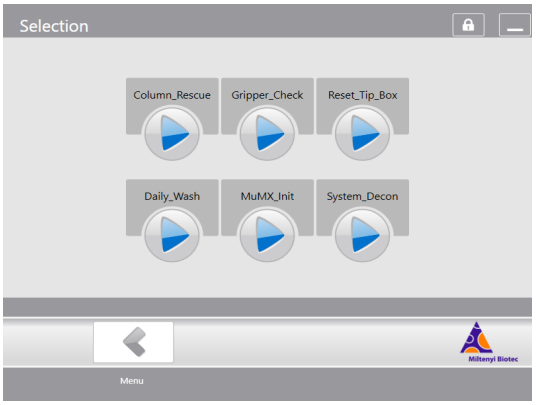


2 Tap the **Maintenance** button.





3 Tap the **Start** button below the maintenance program **Daily_Wash**.



4 The liquid system is being flushed.

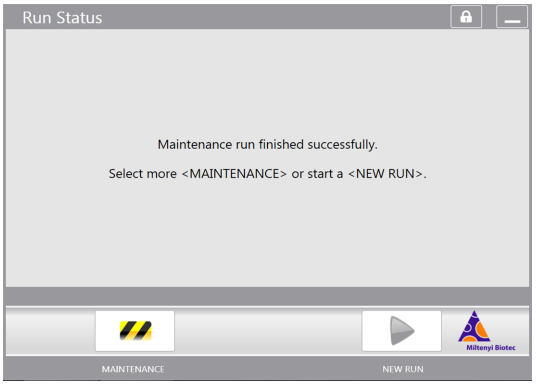


5 During flushing, closely inspect the tubing and the syringe. If necessary, gently move the tubing to make sure all air bubbles are removed.

6 If there are still air bubbles in the tubing, repeat steps 3 - 5.



7 If there are no bubbles in the tubing and the program has finished, tap the **MAINTENANCE** button to return to the **Selection** screen or tap the **NEW RUN** button to start a new application.



6.1.2 Exchange the DiTi waste bag

⚠ WARNING

Be sure to dispose of the waste according to your laboratory guidelines.

The waste bag must be suitable for disposable tips and in case you are operating with biohazardous material suitable for those material as well. For example, it must have an adequate thickness and be labeled with a corresponding biohazard label. The waste bags used must meet your local safety guidelines.

Follow the procedure below to make sure the DiTi waste bag is empty and replace it if necessary.

1 Lift the fastener to remove the waste bag holder.
2 Remove the DiTi waste bag and dispose of it appropriately.
3 Install a new DiTi waste bag into the empty waste bag holder.

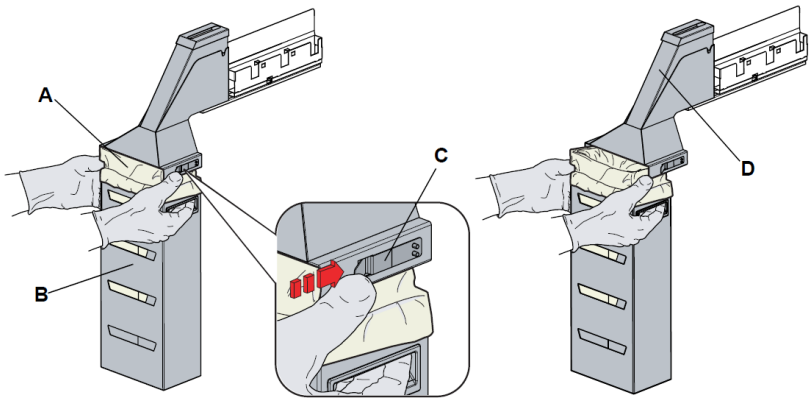


Figure 6.1: Changing the DiTi waste bag. DiTi waste bag (A), holder for waste bag (B), fastener (C), DiTi waste chute (D)

Waste bag specification

Feature	Specification
Typical dimensions (w x l)	300 mm x 600 mm
Thickness	0.05 mm
Material	Polypropylene, polyethylen or co-polymer (autoclavable)
Imprint	Biohazard

Table 6.2: Waste bag specification

6.1.3 Cleaning and inspection of DiTi cones (LiHa)

Perform the following maintenance on the DiTi cone.

1 Clean the DiTi cones with a lint-free tissue and isopropanol.
2 Visually check the disposable tip cones and the protruding tip during maintenance. Make sure that the tubing extensions are clean and free of deposits.
3 If deposits are visible, contact Miltenyi Biotec Technical Support
4 Check that the DiTi cones are not loose. If necessary, hand-tighten the DiTi cones.

Be careful not to tighten too hard.

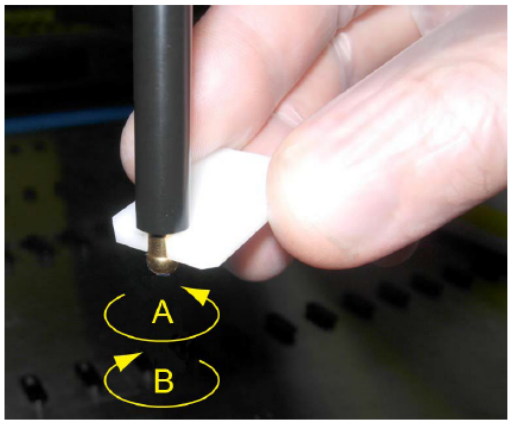
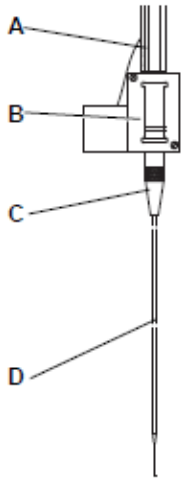


Figure 6.2: Cone wrench. A: Tighten (counterclockwise); B: Loosen (clockwise)

6.1.4 Tightening of the fixed tip lock nut (re-usable steel needles)

To prevent the system from leaking when using fixed tips, hand-tighten the lock nut in the upper part of the tip.



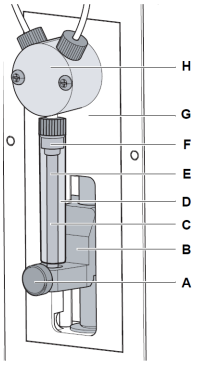
A	*Z-rod*		
B	*Tip adapter*	*D*	*Tip*
C	*Lock nut*	*E*	*Pipetting tubing*

Figure 6.3: Fixed steel needle tip

6.1.5 Tightening of syringe and plunger lock screws

By the continuous up and down movements of the syringes during operation, the syringe and plunger lock screws might loosen over time. This may result in leakage of the liquid system. To re-tighten, proceed as follows:

1. Hand-tighten the plunger lock screw and the three knurled syringe screws before switching on the MultiMACS X. Be careful not to tighten too hard.
2. If leakages still occur, call Miltenyi Biotec Technical Support.



A Plunger lock screw
B Plunger drive
C Syringe (Plunger, Seal, Syringe barrel)
D Syringe barrel (glass)
E Plunger
F Syringe cap (plunger to barrel seal)
G Diluter front plate
H 3-way valve

Figure 6.4: Syringe and Valve. A: Syringe screw; B: Plunger lock screw

6.1.6 Checking for leaks

A leaking liquid system causes pipetting inaccuracy and cross-contamination. Never operate the MultiMACS X if the liquid system is leaking.

Check the liquid system regularly. Refer to **Leakage of the liquid system on page 80** if you detect any leakage in the system. Signs of a leaky liquid system are:

- Liquid droplets are hanging on the fixed tips or DiTi cones before the instrument is switched on or when it is in standby mode.
- The syringes are leaking, such as liquid accumulates around the diluters (e.g. valves above the glass syringes) before the instrument is switched on or when it is in standby mode.
- There are drops on the worktable.

6.1.7 Cleaning fixed tips (Re-usable steel needles)

⚠ WARNING

Pipetting tips can cause injuries. Avoid contact with the pipetting tips and contact with aerosols when accessing the worktable by wearing adequate protective clothing.

Before switching on the instrument, use a lint-free tissue soaked in ethanol (70%) or isopropanol to clean the fixed tips. Make sure not to damage the tip coating.

6.1.8 Checking fixed tips for damage

Bent tips or damaged tip coating cause pipetting inaccuracy and liquid detection errors. Never work with damaged or bent tips.

Visually inspect the tip coating before switching on the instrument. Use a mirror for proper inspection of the tip outlet. Make sure that the tips are not bent. If the tip coating is damaged or the tip is bent, the tip must be replaced. Call Miltenyi Biotec technical support.

6.2 Weekly maintenance tasks

Component	Maintenance Task	Reference
Liquid system	Clean	**System decontamination on page 76**
System liquid container	Empty and clean	**Cleaning the liquid containers below**
Waste container	Empty and clean	**Cleaning the liquid containers below**
Worktable	Clean	**Cleaning the worktable below**
Safety panel	Clean	**Cleaning the acrylic safety panel below**

Table 6.3: Weekly maintenance tasks

6.2.1 Cleaning the worktable

1. Remove all racks and carriers from the worktable.
2. Wipe the surface of the worktable with a suitable cleaning agent (e.g. alcohol, disinfectant) to remove any spilled reagent.
3. If necessary, additionally clean with water.

6.2.2 Cleaning the acrylic safety panel

Wipe the inner and outer surface of the safety panel with a suitable cleaning agent, such as water, alcohol, or disinfectant to remove any spilled reagent or sample.

When using a desinfectant, try at a small area for compatibility with the material.

6.2.3 Cleaning the liquid containers

If the containers are installed wrong, contamination through liquid waste may occur.

To prevent salt deposits and growth of microorganisms in liquid containers, clean all liquid containers at least once a week. Make sure to allow solvents (e.g. ethanol) to evaporate before filling system liquid into the containers again.

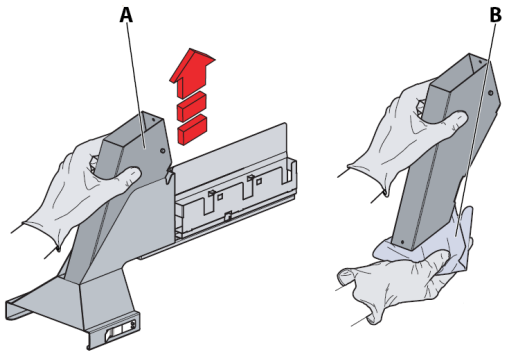
Clean the waste container at least once a day. Make sure not to mix up the system liquid container and the waste container.

6.2.4 Cleaning the DiTi waste and wash station unit

The DiTi waste and wash station unit may be contaminated with residues from reagents and samples that must be removed.

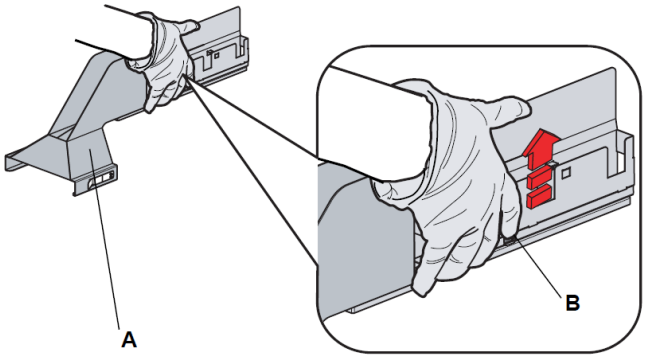
1. Open the safety panel of the MultiMACS X.
2. Remove the holder for the disposable waste bag (see **Figure 6.1**).

3 Remove the DiTi wastechute (A) from its holder. Hold a tissue (B) under the DiTi waste chute when carrying it away to prevent contaminated substances and DiTis from dropping to the floor.



4 Apply some disinfectant on the inner surface of the DiTi waste chute. Check if there are residues of contamination on the inner surface of the DiTi waste chute. If yes, thoroughly clean the DiTi waste chute by putting it into a basin filled with cleaning reagent and allow to soak for 30 minutes to 4 hours (depending on agent). Allow the parts to dry before reassembling.

5 Pull and hold the quick release lever (B).



6 Pull the complete waste and wash station unit (A) towards yourself and tilt it to the right.

7 Open the front access panel to be able to remove the waste tubing.

8 Disconnec the waste tubing from the connector.

9 Remove (lift) the DiTi waste and wash station unit.

10 Wipe the surface of the complete unit with a suitable cleaning agent (e.g. water, alcohol, disinfectant) to remove any spilled reagent.

11 You can now clean the worktable.

To reassemble the DiTi waste and wash station unit do the above steps in reversed order.

1 Place the DiTi waste and wash station unit on its side onto the worktable.

2 Re-apply the waste tubing to the connector.

3 Close the front access panel.

4 Reinstall the DiTi waste and wash station unit on the worktable by pushing the button of the quick release fastener again and sliding the unit to its original position until it engages on the positioning pins of the worktable.

5 Reinstall the waste chute.

6 Reinstall the disposable waste bag with holder.

6.2.5 System decontamination

To prevent growth of microorganisms in the liquid system, clean the liquid system once a month. We recommend using Set Up Clean from LVL technologies.

1 Switch on the instrument and log in as described in **Switch on the instrument on page 55**.



2 Tap on the **Maintenance** button.



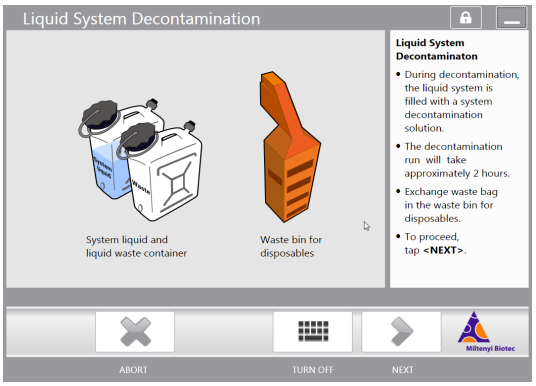
3 Tap the **Start** button below the maintenance program **System_Decon**.



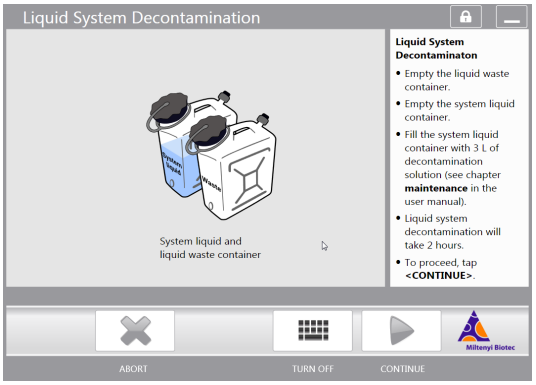
4 Close the safety panel and tap **Continue**.



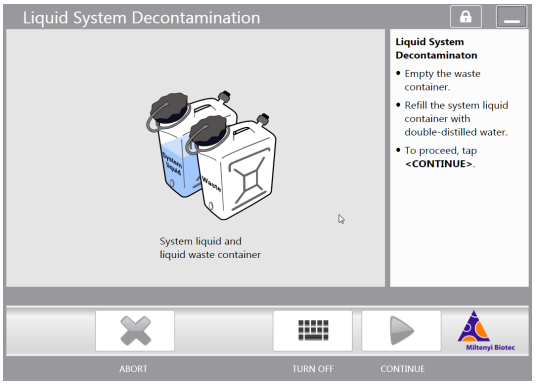
5 Follow the instructions.



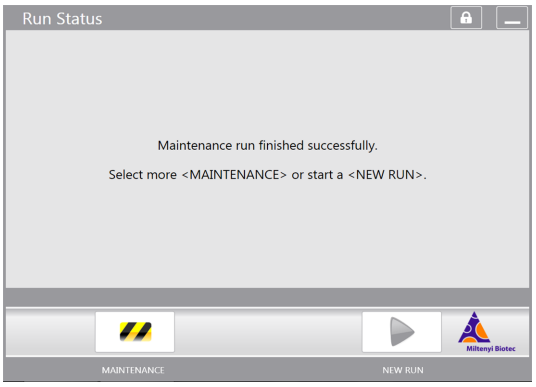
6 The liquid system will be decontaminated by filling it with Set Up Clean from LVL technologies. This will take approximately 2 hours.



7 When the decontamination is finished another instruction screen will appear. Follow the instructions and tap **CONTINUE**.



8 When the program has finished, tap the **MAINTENANCE** button to return to the **Selection** screen, or tap the **NEW RUN** button to start a new application.



6.3 Corrective maintenance

6.3.1 Initialization of the MultiMACS Cell24 Separator X in case of a power failure

Ensure that the RoMa is not under or above the magnet before running **MuMX_Init**.

Initialize the MultiMACS Cell24 Separator X after a power failure or after cancelling a script . Running **MuMX_Init** will bring the MultiMACS Magnet back into home position. If there is still a column block in the magnet, it must be removed before running a new application. Also refer to **Power failure on page 79**.

6.3.2 Gripper check

If the gripper fingers of the RoMa are not parallel to the work area surface anymore (e.g. after a collision), run the maintenance program **Gripper_Check** and follow the commands on the screen.

6.4 Cleaning agents

Instrument part	Cleaning agent
Liquid system, including waste system	Water, alcohol, weak detergent, base, bleach
DiTi waste slide	Water, alcohol, weak detergent, disinfectant, base, bleach
Worktable	Water, alcohol, weak detergent, disinfectant, base, bleach
Housing	Water, alcohol, disinfectant

Instrument part	Cleaning agent
Metal parts	Water, alcohol, disinfectant
Racks	Water, alcohol, weak detergent, disinfectant
Gripper	Water, alcohol, weak detergent, disinfectant
Acrylic glass safety panels	Water, alcohol, disinfectant (suitable for acrylic glass)
Disposable tip cones	Alcohol
Re-usable steel needles	Alcohol

Table 6.4: Cleaning agents suitable for the MultiMACS X

7 Troubleshooting

7.1 Power failure

If you want to resume operation after a power failure, be sure that the instrument is switched off before proceeding with the following steps.

It is important that objects still held by the gripper fingers of the RoMa are removed manually before switching on the instrument. Otherwise, the objects will be dropped during instrument initialization, which may lead to a crash or spillage.

In the event of power failure or an otherwise canceled run, all partially processed samples should be discarded. Do not attempt to restart an interrupted program unless the touchscreen shows explicit instructions for resuming operation.

1. Manually remove objects still held by the grippers of the RoMa. Be careful not to damage the gripper fingers.
2. If the RoMa is located underneath the MultiMACS Magnet, manually move it to the left, then up, and to the front right side (initial position). The grippers of the RoMa must face the rear side of the instrument. It can only be turned clockwise if it needs to be adjusted.
3. Switch on the instrument and log in as described in **Switch on the instrument on page 55**.



4. Tap on the **Maintenance** button.
5. Tap the **Start** button below the maintenance program **MuMX_Init**.
6. Remove all objects from the worktable except the tip boxes on position L2 and L3.
7. Remove all objects from L2 and L3 and put them in Hotel D. The 5 mL tip box from L2 to goes to D1 (upper position of the hotel) and the 1 mL tip box from L3 to D2 (lower position of the hotel). The tip boxes have to be placed with the empty positions facing away from you. All other objects have to be removed, also the ones already in any hotel.



8. When the program has finished, tap on the **MAINTENANCE** button to return to the **Selection** screen, or on the **NEW RUN** button to start a new application.

7.2 Improper initialization of the RoMa

The RoMa cannot initialize properly if there is an object between the arm and the initial stop position. Make sure that nothing blocks the movement of the RoMa.

Check the arm position after the initialization command. Before starting an application, thoroughly flush the whole liquid system. Make sure that daily maintenance procedures have been performed.

7.3 Leakage of the liquid system

By the continuous up and down movements of the syringes during operation, the syringe and plunger lock screws loosen over time causing leakage of the liquid system. Check the plunger lock screws and syringe screws and tighten manually before switching on the MultiMACS X.

Leakages in the liquid system can also be caused by an empty liquid system. Before starting an application, run the maintenance program **Daily_Wash** to thoroughly flush the whole liquid system. Make sure that daily maintenance procedures have been performed. Make sure that there are no air bubbles in the tubing and that there are no liquid droplets on DiTi adapters or tips.

To ensure a proper liquid flow, make sure that the tubings are not twisted or inhibited from free flow.

If you detect any leakage, do the following:

1. Make sure that the system liquid container is full.
2. Tighten the lock nut and the DiTi cones (refer to **Cleaning and inspection of DiTi cones (LiHa) on page 71**).
3. Tighten syringe and plunger lock screw (refer to **Tightening of syringe and plunger lock screws on page 72**).
4. Flush the liquid system until all air is removed (maintenance program **Daily_Wash**).
5. Observe the tips or DiTi cones for 1 minute.
6. If no droplets are formed, the liquid system is tight.
7. If the system is still leaky, call Miltenyi Biotec Technical Support.

8 Technical data and specifications

The instrument is suitable for pollution degree 2 environments.
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

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.

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

Design and specifications are subject to change without notice.

8.1 Technical specifications of the MultiMACS X

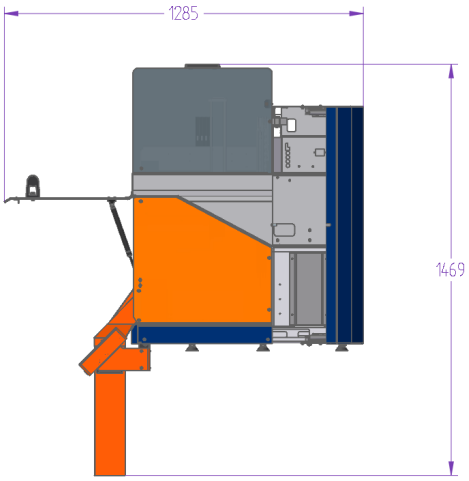


Figure 8.1: Maximal space requirements, side view

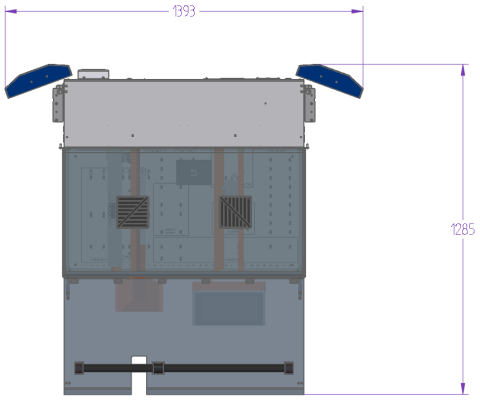


Figure 8.2: Maximal space requirements, top view

Features	Specification
Model	MultiMACS X
Order number	130-118-515
Dimensions (w × d × h) from benchtop with safety panel closed	1,145 mm × 1,000 mm × 1,025 mm
Maximum outer dimensions (w × d × h) side door open for service accessibility, safety panel in middle position, height incl. holder for diposable waste bag	1,393 mm × 1,285 mm × 1,469 mm
Weight	188 kg dry weight 221 kg shipping weight
Input voltage	100–240 V ~
Power consumption	50/60 Hz 600 W
Fuses	FU1: T2AH 250 V FU2: T2AH 250 V FU3: T10AH 250 V FU4: T10AH 250 V
Working temperature	15–32 °C
Humidity	30–80% (non-condensing)
Altitude	Max. 2000 m
Emission sound pressure level at workstation	<85 dBA

Table 8.1: Technical specifications of the MultiMACS X

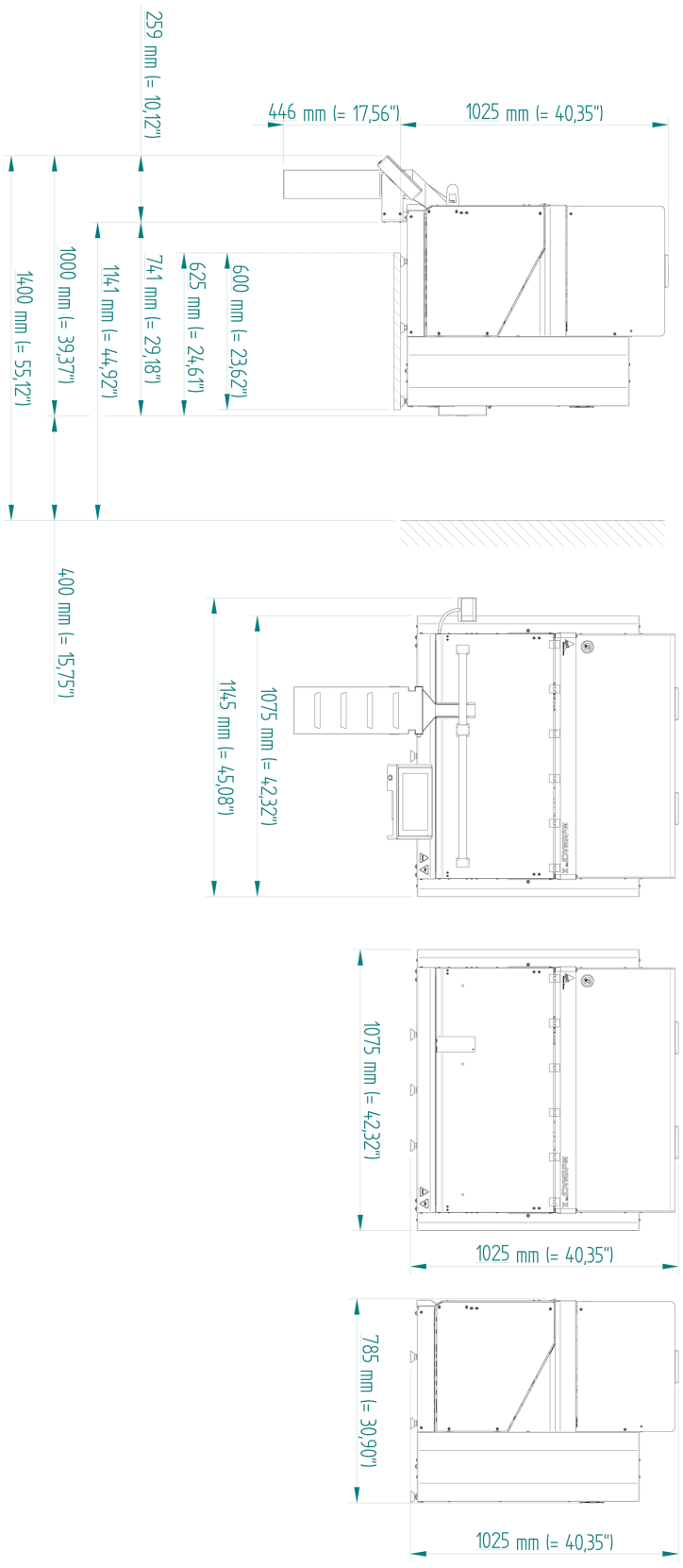


Figure 8.3: Outer dimensions of the instrument

8.2 Technical specifications of the MultiMACS Cell24 Separator X

Features	Specification
Model	MultiMACS Cell24 Separator X
Dimensions without magnet (w × d × h)	230 mm × 230 mm × 230 mm
Weight	11 kg
Input voltage	100–240 V ~
Power consumption	50–60 Hz 500 W
Fuses	T3.15AH250V, 5×20 mm
Ports	R232 Interface (labeled "com") R232 Interface (labeled "display") CAN with High-Power-Contacts (labeled "module 1")

Table 8.2: Technical specifications of the MultiMACS Cell24 Separator X

8.3 Technical specifications of the MACS Elution Station X

Features	Specification
Model	MACS Elution Station X
Dimensions (w × d × h)	114 mm × 265 mm × 233 mm
Weight	4.6 kg
Input voltage	24 V ⎓
Current	0.875 A
Power consumption	21 W
Ports	R232 Interface (labeled "RS232/Display") CAN with High-Power-Contacts (labeled "MultiMACS") Display-Interface (labeled "RS232/Display") USB-Interface (labeled "USB") Level-Detection (labeled "Sensor Bottle") Power Supply (labeled "Power In")
DC-Output	RS232 5 V / 0.4 A

Table 8.3: Technical specifications of the MACS Elution Station X

8.4 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 machinery identified as follows:

Description: Laboratory equipment
Model: MultiMACS X

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

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

The machinery is in conformity with the following harmonized standards:

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

Person authorized to compile the relevant technical documentation:

Dr. Bernd Schröder
Global Head Regulatory Affairs
Miltenyi Biotec B.V. & Co. KG
Friedrich-Ebert-Straße 68
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8.5 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 machinery identified as follows:

Description: Laboratory equipment
Model: MultiMACS X

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

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

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

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

Person authorized to compile the relevant technical documentation:

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9 Technical support

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

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

10 Legal notes

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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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