Miltenyi Biotec

MACS® Solutions

Cell transfection and viral transduction

MACSfectin™ Reagent – High transfection efficiency

MACSelect™ System – Enrichment of transfected cells

MACSductin™ Reagent – Effective transduction of difficult-to-transfect cells

MACSfectin™ Reagent

For efficient transfection with high cell viability

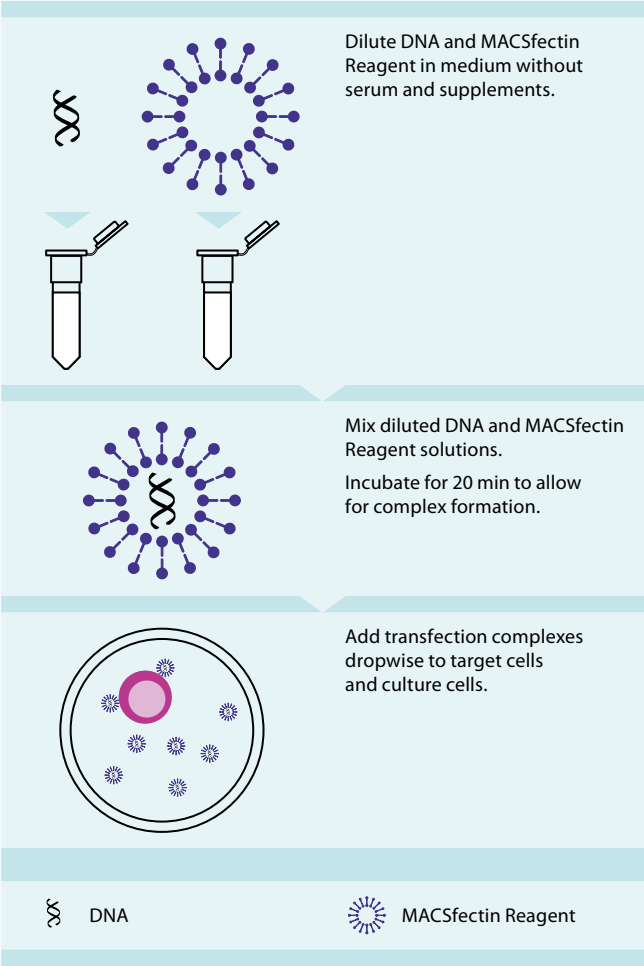


Figure 2: Overview of MACSfectin Reagent transfection protocol.

MACSfectin™ Reagent enables optimized transfection of plasmid DNA for a wide range of adherent and suspension cells in immunology, cancer, stem cell, and neuroscience research. Additionally, MACSfectin Reagent supports tranfection with RNA such as mRNA or siRNA.

This unique transfection reagent is based on a novel class of cationic lipopolyamines designed to optimize nucleic acid condensation and augment the cytoplasmic release of the nucleic acid cargo. Additionally, good transgene expression with high cell viability is achieved due to MACSfectin Reagent's excellent biodegradation characteristics.

- **Efficient:** Higher transfection efficiency than standard lipid transfection reagents
- **Versatile:** Transfection of plasmid DNA, mRNA, siRNA
- **Reliable:** Successfully tested in over 30 cell types, including mouse embryonic stem cells
- **Non-toxic:** Maintains high cell viability

MACSfectin Reagent complements Miltenyi Biotec's transfection portfolio and Stemgent transfection reagents distributed by Miltenyi Biotec.

Visit **www.miltenyibiotec.com/transfection_transduction** for more information.

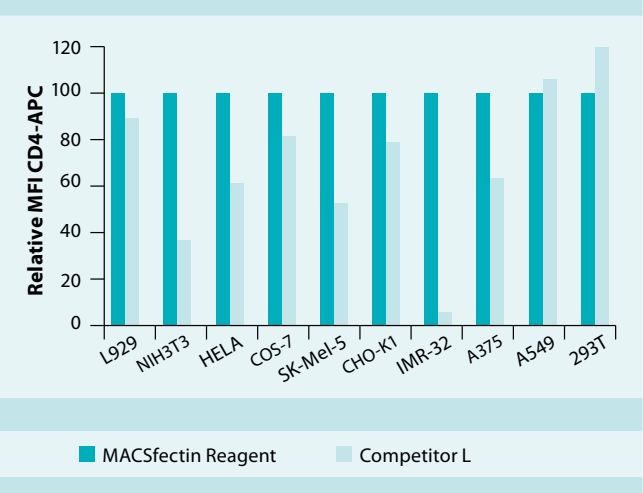


Figure 1: Efficient transfection with MACSfectin Reagent
Ten adherent cell lines were transfected with a plasmid expressing cell surface human CD4 with MACSfectin Reagent or a competitor product using standard transfection conditions. The number of transfected cells was assessed 48 hours post-transfection by staining with CD4-APC and performing flow cytometric analysis using a MACSQuant® Analyzer. The mean fluorescence intensity (MFI) value of cells transfected with MACSfectin Reagent was set to 100% for comparison with the competitor product.

MACSelect™ System

For selective enrichment of transfected cells

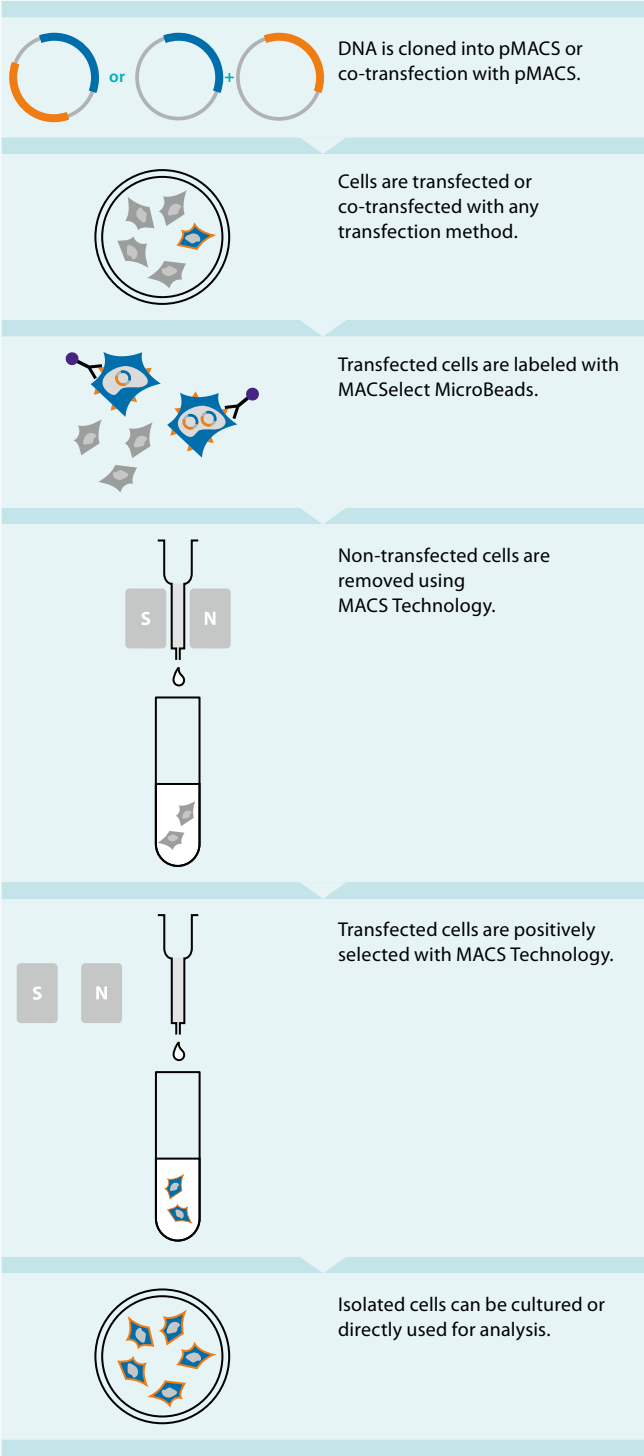


Figure 3: Principle of the enrichment of transfected cells using the MACSelect System.

The MACSelect™ System provides an effective method for cell enrichment after transient transfection for virtually all adherent or suspension cell lines and primary cells.

This system uses the transiently expressed truncated human CD4 molecule, mouse MHC class I H-2K^k, and human low-affinity nerve growth factor receptor (LNGFR) as surface markers to select transfected cells.

- **Fast:** Avoid stable cell transfection and antibiotic selection
- **Efficient:** 50-fold enrichment of transfected cells
- **Versatile:** Compatible with MACSfectin™ Reagent and other transfections methods

The MACSelect System has been widely applied in immunology, cancer, stem cell, and neuroscience research and can be used with common transfection methods.

Visit **www.miltenyibiotec.com/transfection_transduction** for more information.

> "As monitored by flow cytometry and luciferase assay, three round of magnetic cell sorting (MACS) yielded ≥90% CD4t-positive cells … luciferase expression was uniformly high and stable over a test period of three months … Thus, pIRES-CD4t should prove useful in the direct and rapid selection of relevant stably or transiently transfected cells."
>
> Gaines, P. *et al.* (1999) Biotechniques, 26: 683–688.

Selected references

MacCorkle, R.A. *et al.* (1998) Proc. Natl. Acad. Sci. 95: 3655–3660.
Chen, Q. *et al.* (2001) Blood 98: 2183–2192.
David, R. *et al.* (2005) Stem Cells 23: 477–482.
Uesaka, T. *et al.* (2007) Development 134: 2171–2181.

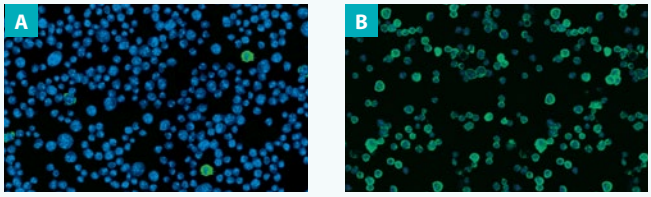


Figure 4: Efficient enrichment of transfected cells using the MACSelect 4 System. CHO cells were transfected with pMACS 4-IRES. II vector. Transfected cells were magnetically labelled and enriched using MACSelect 4 MicroBeads. Cells were fixed either before or after enrichment and stained with CD4-FITC or MACSelect Control FITC antibodies (green), respectively. Cell nuclei were counterstained with Toto 3 (blue). A: Less than 4% of transfected cells before MACSelect enrichment. B: More than 90% of transfected cells after MACSelect enrichment.

MACSductin™ Reagent

For effective transduction of difficult-to-transfect cells

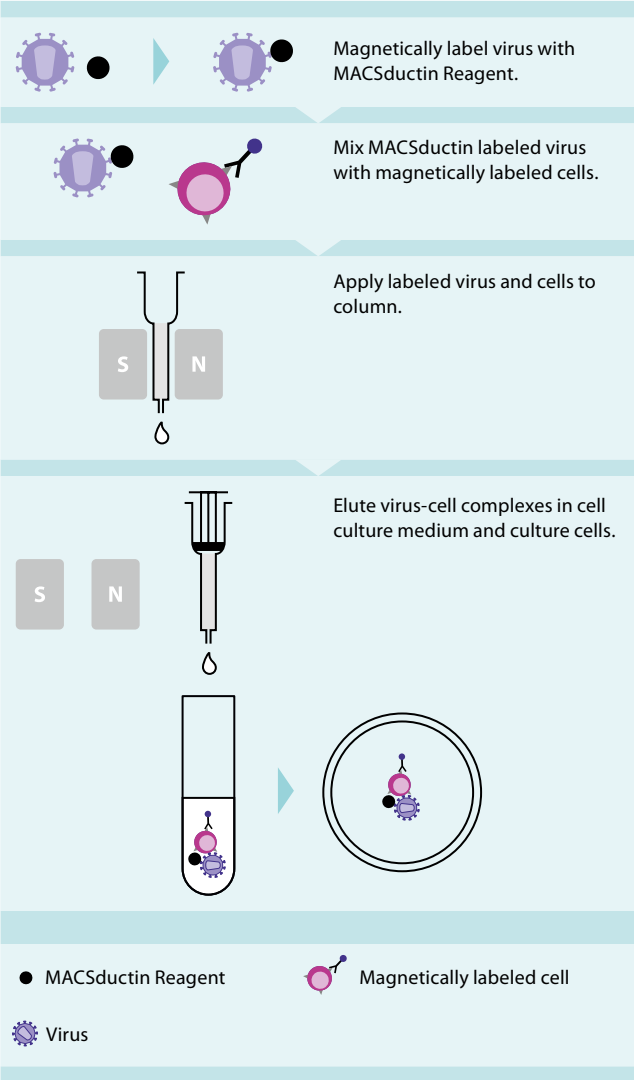


Figure 5: Principle of transduction with MACSductin Reagent and MACS Technology. The MACSductin Reagent binds to the adeno- or retro-/lentivirus. Concurrently, the target cells are specifically labeled with antibody-conjugated, superparamagnetic MACS® MicroBeads. The target cells and virus are retained in close proximity on the column by the magnetic field. Consequently the virus can easily attach to the cell surface, which results in high infection or transduction efficiency.

MACSductin™ Reagent supports transduction of difficult-to-transfect cells, including primary cells and stem cells, using adeno- or retro-/lentiviral vectors.

This polycationic magnetic reagent enables transduction of target cells with low-titer virus preparations with efficiency superior to standard transduction methods. It has been used in immunology, cancer, stem cell, and neuroscience research.

- **Sensitive:** Transduction with low-titer virus particles preparations
- **Efficient:** Maximal concentration of virus near cells for effective transduction
- **Specific:** MACS® Technology ensures specificity in transduction of cells

Visit **www.miltenyibiotec.com/transfection_transduction** for more information.

Selected references

Plank, C. *et al.* (2003) Biol. Chem. 384: 737–747.
Sanchez-Antequera, Y. *et al.* (2011) Blood, 117, 171–181.

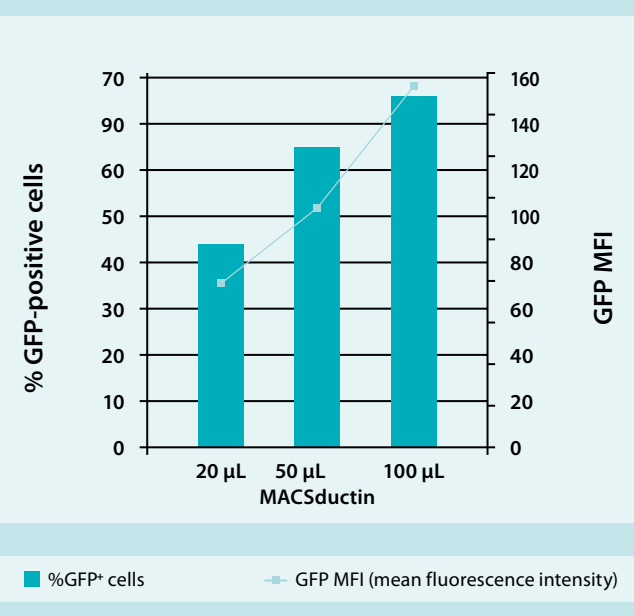


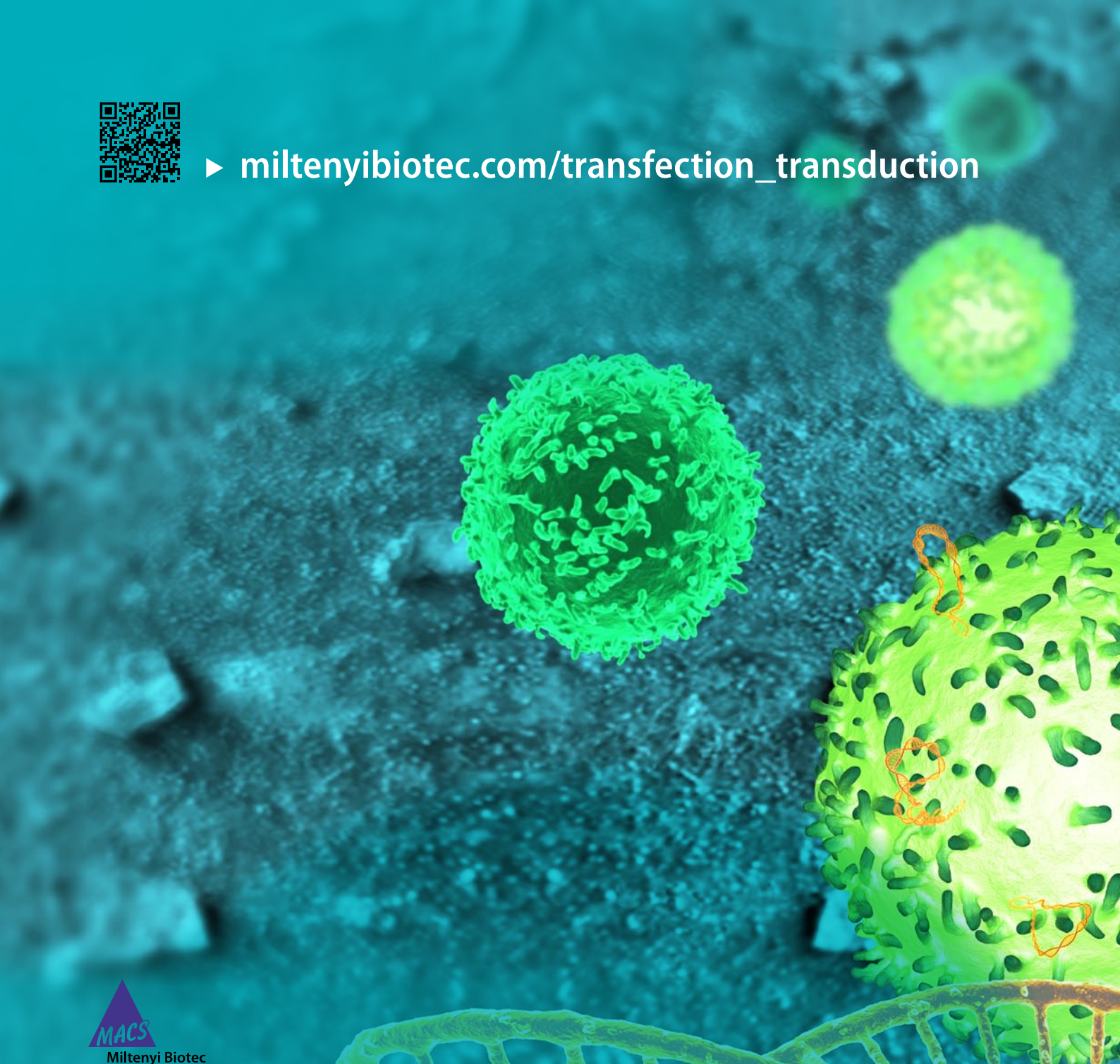
Figure 6: Efficient transduction of primary human CD34+ cells. Primary CD34+ cells were isolated from PBMCs using the CD34 MicroBead Kit, human. Cells were cultured for 24 hours in 24-well plates in supplemented media. Cells labelled with CD34 Microbeads were then transduced in MS Columns with unpurified supernatant containing a GFP-encoding, replication-incompetent SIN lentiviral vector, complexed with different concentrations of MACSductin Reagent. GFP expression of transduced CD34+ cells was measured 48 hours post-transduction in a MACSQuant® Analyzer.

Product overview

Product	Capacity	Components	Order no.
Transfection			
MACSfectin™ Reagent	Up to 500 transfections*	0.5 mL transfection reagent	130-098-410
MACSfectin Reagent	Up to 1000 transfections*	1.0 mL transfection reagent	130-098-411
MACSfectin Reagent	Up to 5000 transfections*	5×1.0 mL transfection reagent	130-098-412
Transfected cell enrichment			
MACSelect™ 4 – Transfected Cell Selection Kit	25 enrichments	25 µg pMACS 4-IRES.II Vector 25 µg pMACS 4.1 Vector 25 µg pMACS 14.1 Control Vector 2 mL MACSelect 4 MicroBeads 0.25 mL MACSelect Control FITC Antibody 0.25 mL CD4-FITC Antibody, human 0.25 mL CD14-FITC Antibody, human	130-091-988
MACSelect K^k – Transfected Cell Selection Kit	25 enrichments	25 µg pMACS K^k.II Vector 25 µg pMACS 14.1 Control Vector 2 mL MACSelect K^k MicroBeads 0.25 mL MACSelect Control FITC Antibody 0.25 mL Anti-H- $2K^k$-FITC Antibody, mouse 0.25 mL CD14-FITC Antibody, human	130-091-986
MACSelect LNGFR – Transfected Cell Selection Kit	25 enrichments	25 µg pMACS LNGFR-IRES Vector 25 µg pMACS LNGFR Vector 25 µg pMACS 14.1 Control Vector 2 mL MACSelect LNGFR MicroBeads 0.25 mL MACSelect Control FITC Antibody 0.25 mL Anti-LNGFR-FITC Antibody, human 0.25 mL CD14-FITC Antibody, human	130-091-879
Transduction			
MACSductin™ Reagent	For transduction of 1×10^7–5×10^8 cells	0.25 mL transduction reagent	130-097-256
MACSductin Reagent	For transduction of 2×10^7–1×10^9 cells	0.5 mL transduction reagent	130-097-257
MACSductin Reagent	For transduction of 6×10^7–3×10^9 cells	3×0.5 mL transduction reagent	130-097-259

*In 24-well plates.

▶ **miltenyibiotec.com/transfection_transduction**



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Miltenyi Biotec

MultiMACS™ M Separator

Version 02
Original instructions

MultiMACS™ M Separator

User manual

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Version 02
Original instructions

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Important information

1

Read manual before use of the instrument!

Please read all information contained in this user manual before use. Failure to read and follow these guidelines could lead to improper or incorrect use, handling or care of your instrument and could cause hazards to users, unpredictable results, device malfunction or damage, premature wear and reduced life time of the instrument, and may void your warranty.

Keep this user manual in a safe place, accessible for anyone using the MultiMACS™ M Separator (MultiMACS M96 Separator or MultiMACS™ 96thermo Separator).

This chapter describes the safety instructions and site requirements for your MultiMACS M96 Separator/MultiMACS M96thermo Separator. The following warnings and cautions are provided to help you prevent injury to yourself or damage to the device.

Symbols and hazard levels

Setup of safety notices

Example

The safety notices inform the user about potential risks if warnings and precautions outlined below are not followed. The icon on the left side specifies the risk. The hazard level at the top classifies the hazard, as mentioned below. The level, type, and source of the hazard as well as potential consequences, prohibitions, and measures are pointed as follows.

Symbols and hazard levels

The following chart is an illustrated glossary depicting the symbols that are used in this user manual and on the MultiMACS M96 Separator/MultiMACS M96thermo Separator.

⚠ CAUTION	Indicates a hazard situation, which if not avoided, could result in minor or moderate injury.
⚠ WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠	Attention, consult the user manual for further instructions and proceed with caution. Warnings include the risk of damage to the equipment, severe personal injury, or death.
	Hazard of crushing and shearing Risk of crushing and shearing of bodily parts due to mechanical hazards.
	Strong magnetic field The magnetic field can interfere with magnetizable objects and electronic devices or damage magnetic information carriers. Risk of severe personal injury to persons carrying pacemakers or electronic medical implants.
	Risk of contamination if biohazardous material is used. Indicates the risk of death, severe injury to the instrument operator, or equipment damage due to potentially dangerous biological material.
	Indicates the risk of death or severe injury to the instrument operator due to hazardous voltage.
⎓	Direct current Equipment is marked with nature of supply: direct current
I	On (supply)
O	Off (supply)
	Documentation needs to be consulted before proceeding with installation and operation of the system.

Warnings and precautions

The MultiMACS M96 Separator/MultiMACS M96thermo Separator employs state-of-the-art technology. It is a computer-controlled device specifically developed for molecular biology applications in microtiter plate format. The MultiMACS M Separator is designed to operate safely after installation and when used by trained personnel according to general safety practices and the instructions set forth in this user manual. The guidelines in this section explain the potential risks associated with the operation of the instrument and provide important safety information in order to minimize these risks. By carefully following the instructions, you can protect yourself and the equipment from potential hazards and create a safe work environment. If this instrument is used in a manner not specified by the manufacturer, protection may be impaired.

Important: Please read and follow all operating instructions in this user manual and pay attention to all warnings displayed on the instrument. Retain this user manual and any other safety and operating instructions provided with the instrument in a place accessible to all users for future reference.

Important: The MultiMACS M96 Separator/MultiMACS M96thermo Separator is intended for indoor use only. Do not use the instrument in areas classified as hazardous locations such as oxygen-laden environments.

Contact your local authority governing electrical power supply, building constructions, maintenance, or safety for more information regarding the installation of the equipment.

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

General precautions

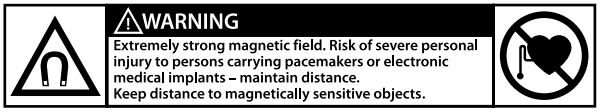
To reduce potential risks associated with operating the MultiMACS Separator M96 /MultiMACS M96thermo Separator, please observe the following general precautions. Failure to observe these precautions could result in fire, bodily harm, and/or damage to the instrument.

Hazard of electric shock and spread of fire

Warning: Electrical devices pose the risk of an electric shock. To reduce the risk of an electric shock, do not open any cover of the MultiMACS M Separator/MultiMACS M96thermo Separator nor any other accessory hardware supplied by Miltenyi Biotec. All covers of the device and accessory hardware are to be removed by authorized personnel only. Special care must be taken while handling fluids. Clean up spillages immediately. Do not allow fluids to enter the interior of the device. Unplug the power cable before manually cleaning the device.

A potential risk exists if an opened, dropped, or damaged MultiMACS M96 Separator/MultiMACS M96thermo Separator is used, if liquids are spilled into the instrument, if an object has entered the instrument through the ventilation slots, or if an object has been dropped into the instrument. If flames or smoke appear immediately switch off the MultiMACS M96 Separator/MultiMACS M96thermo Separator, unplug the instrument from the electrical outlet, and contact an authorized Miltenyi Biotec service provider or the Miltenyi Biotec Customer Service. Use of a damaged instrument or an instrument with a damaged power cable is expressly prohibited.

Strong magnetic field



Warning: The MultiMACS M96 Separator/MultiMACS M96thermo Separator is equipped with an extremely powerful magnet in microtiter plate-format, the **MultiMACS 96 Magnet** (MultiMACS Magnet)/**MultiMACS 96thermo Magnet.** Keep any magnetic information carriers (such as credit cards, magnetic tapes, and storage media), any electronic equipment (such as hearing aids,

pacemakers, measuring and control instruments, computers, and watches), and magnetizable tools and objects at a distance of at least 80 cm from the magnet cover. These items may be affected or damaged by the magnetic field. The prism-shaped **MultiMACS Display** contains less powerful magnets; therefore, maintain a distance of at least 30 cm from the above listed magnetically sensitive material. The force of attraction between two magnets or between a magnet and magnetizable material increases strongly the closer they get. Thus, keep any magnetic material – including any other MultiMACS Magnet and Display – at a safe distance.

Hazard of crushing and shearing

⚠CAUTION

Tray in motion during operation.
Hazard of crushing fingers.
Operate only with attached protection screen.
Device must be able to be tilted backwards.

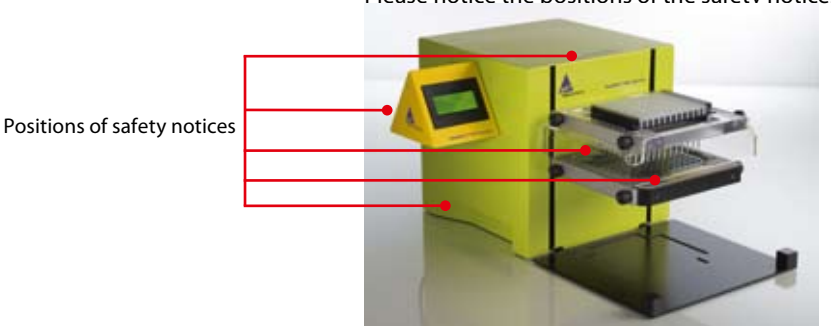
Warning: Keep fingers etc. away from all moving parts of the MultiMACS M96 Separator/MultiMACS M96thermo Separator to avoid crushing and shearing injuries or damage to the instrument. Do not place objects on the MultiMACS M96 Separator/MultiMACS M96thermo Separator. Leave a space of at least 20 cm distance above the MultiMACS M96 Separator/MultiMACS M96thermo Separator to ensure that the instrument is able to tilt backwards, thus minimizing damage. If an object has been accidentically placed under the down-moving magnet, the physical resistance of the object causes the instrument to tilt backward, similar to a hydraulic jack. Do not circumvent any safety device or measurement. Keep the proper respective Protective Screen attached to the MultiMACS M96 Separator/MultiMACS M96thermo Separator when operating it manually.

Caution: For usage in a liquid-handling robot, removal of the Protective Screen may be necessary. When using the MultiMACS M96 Separator/ MultiMACS M96thermo Separator integrated into a compatible automated liquid-handling system, assure that the combined system, i.e., MultiMACS M96 Separator/MultiMACS M96thermo Separator, MultiMACS Magnet/MultiMACS 96thermo Magnet, and liquid-handling robot, meets all requirements of safety and function before starting automated processes. Thereby, particularly take the

protection of the operator into account.

Position of safety notices on the instrument

Please notice the positions of the safety notices on the MultiMACS



Separator/MultiMACS 96thermo Separator, and keep them in a completely readable state.

Secure installation

This section describes the requirements your site must meet for safe installation and operation of your MultiMACS M96 Separator/ MultiMACS M96thermo Separator. Read the instructions in this section and ensure that your site is properly prepared before you connect the instrument to its power source.

When planning your site layout and equipment locations, keep in mind the precautions described in this section to help avoid instrument failures and reduce the possibility of environmentally caused shutdowns.

Important: At all times, local working area safety instructions, laboratory policies, and standards regarding laboratory health and safety and prevention of accidents must be adhered to.

Mounting accessories

Do not place the MultiMACS M96 Separator/MultiMACS M96thermo Separator on an unstable table, cart, stand, tripod, or bracket. As a consequence, the instrument might fall down. This may cause serious bodily harm and/or serious damage to the instrument. Use only on a table, cart, stand, tripod, or bracket sold with the instrument or recommended by Miltenyi Biotec. Do not place the

MultiMACS M96 Separator/MultiMACS M96thermo Separator within a built-in apparatus or a confined space such as a shelf rack unless the apparatus has been specifically designed to accommodate the instrument, proper ventilation is provided, and the mounting instructions for the instrument have been followed.

Air circulation

The instrument should not be placed next to radiators, heat registers, stoves, or other pieces of equipment (including amplifiers) that produce heat. Allow sufficient air circulation around the MultiMACS M96 Separator/MultiMACS M96thermo Separator —at least 15 cm on all sides—during operation to ensure adequate cooling of the instrument. Prevent direct exposure of the instrument to sunlight. Slots and openings of the instrument are provided for ventilation and should never be blocked or covered, as these ensure reliable operation of the MultiMACS M96 Separator/MultiMACS M96thermo Separator and protect the device from overheating. Never push a foreign object through an opening into the instrument.

Water and moisture

Do not use the instrument in a wet or damp location. Avoid high humidity or condensation and protect the machine against water splashes.

Grounded (earthed) product

The instrument is equipped with a three-wire electrical grounding-type plug that has a third pin for grounding. This plug only fits into a grounded power outlet. 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.

Power sources

The instrument should only be operated from a power source indicated 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. The overall system load must not exceed 80% of the branch circuit rating.

Accessibility

Make sure that the main switch as well as the connector for 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.

Peripheral devices

Only connect peripheral devices that comply to EN/IEC 60950 to the RS232 connector labeled with “com”. In addition, only connect original MultiMACS Equipment to the connectors labeled “module 1” and “module 2”, and the MultiMACS Display to the connector labeled with “display”. Only connect the MultiMACS 96thermo Magnet to the connector labeled “module 1” on the MultiMACS Separator/ MultiMACS 96thermo Separator.

Secure operation, maintenance, transport, and disposal

Observe the following instructions to ensure secure operation, maintenance, transport, and disposal of your MultiMACS M96 Separator/MultiMACS M96thermo Separator.

Important: At all times, local working area safety instructions, laboratory policies, and standards regarding laboratory health and safety and prevention of accidents must be adhered to.

Safe operation

If the instrument is not working properly and instructions or messages on the display screen advise to contact technical service, secure operation is no longer possible. Immediately switch off the MultiMACS M96 Separator/MultiMACS M96thermo Separator, unplug the instrument from the power outlet, and contact an authorized Miltenyi Biotec service provider or the Miltenyi Biotec Customer Service.

Servicing

Important: Unless otherwise specifically noted in this user manual or other Miltenyi Biotec documentation, do not service the MultiMACS M96 Separator/MultiMACS M96thermo Separator yourself. Servicing and repair must be performed by qualified service personnel. Improper or incorrect servicing or repair of your MultiMACS M96 Separator/MultiMACS M96thermo Separator can cause hazards to users, lead to unpredictable results, device malfunction or damage, premature wear and reduced life time of the instrument, and may void your warranty.

Inquire with your local Miltenyi Biotec representative about Miltenyi Biotec's extensive instrument service and support arrangements, or refer to www.miltenyibiotec.com/support.

Important: When replacement or spare parts are required, make sure that the service provider uses only genuine Miltenyi Biotec parts or third-party parts specified and recommended by Miltenyi Biotec. Using unauthorized replacement or spare parts can cause malfunction of the device and impair results. Miltenyi Biotec does not honor any warranty or accept any responsibility for device failure or damages resulting from the use of inappropriate replacement or spare parts. After completing any service or repair work, have your authorized Miltenyi Biotec service provider perform all safety checks required by the repair procedure to ensure that the instrument is in proper operational condition.

Only use options and upgrades recommended by Miltenyi Biotec.

Cleaning

Unplug the MultiMACS M96 Separator/MultiMACS M96thermo Separator from the power outlet before cleaning. Do not use liquid or aerosol cleaning agents; always use a damp cloth.

Hazardous material

⚠WARNING

Risk of loss of life if biohazardous material is used. Wear protective gloves, protective clothing, and safety glasses to prevent contact with skin and eyes. Operate device in a safety hood. Decontaminate device after spilling of biohazardous material.

If biohazardous material is or has been used, the operator shall choose and wear personal safety equipment in accordance with warnings and precautions for the used substances. Wear protective gloves, protective clothing, and safety glasses to prevent contact

Note: 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.

with skin and eyes. Defective or inadequate safety equipment might endanger the operator. The MultiMACS M96 Separator/ MultiMACS M96thermo Separator shall be operated in a safety hood if hazardous or unknown materials are processed. If hazardous material has been used or spilled, care must been taken to thoroughly decontaminate the system.

Columns, plates, tubes, and any other consumables that were in contact with biohazardous material shall be autoclaved prior to disposal. Liquid waste shall be autoclaved or decontaminated using a disinfectant that is appropriate for the specific pathogen, e.g., 10% bleach, isopropyl alcohol, or 70% ethanol.

Waste disposal must be in accordance with any local regulations.

Transport

The MultiMACS M96 Separator/MultiMACS M96thermo Separator should be transported with care in packaging specified by Miltenyi Biotec. Internal damage can occur, if it is subjected to excessive vibration or if it is dropped. If the instrument needs to be shipped back to the manufacturer for service, decontaminate the instrument from any hazardous material prior to shipment. If you have questions regarding proper decontamination or shipment, please contact technical service for assistance.

Instrument disposal

Please contact technical service for assistance if you wish to dispose of your instrument.

Electromagnetic compatibility

For US only. Changes or modifications of the equipment unless expressly approved by Miltenyi Biotec may void your authority to operate the equipment pursuant to 47 CFR §15.

Informations importantes

1

À lire avant utilisation.

Veuillez impérativement lire toutes les informations fournies dans ce mode d'emploi avant d'utiliser l'appareil. Le non-respect de ces consignes peut donner lieu à une utilisation, une manipulation et une maintenance inappropriée ou incorrecte de votre appareil, ce qui pourrait mettre en danger les utilisateurs, fournir des résultats non attendus, entraîner le dysfonctionnement ou la détérioration de l'appareil, son usure prématurée et réduire la durée de vie de l'appareil, ainsi qu'annuler votre garantie.

Conservez ce mode d'emploi dans un endroit sûr et accessible aux utilisateurs de l'unité de séparation MultiMACS™ (séparateur MultiMACS) ou de l'unité de séparation MultiMACS™ 96thermo (séparateur MultiMACS 96thermo).

Ce chapitre décrit les consignes de sécurité et les exigences d'installation s'appliquant à votre séparateur MultiMACS /séparateur MultiMACS 96thermo. Les avertissements et les mesures de précaution suivantes ont pour objectif de vous aider à éviter toute blessure corporelle ainsi que toute détérioration de l'appareil.

Symboles et niveaux de danger

Mise en place des consignes de sécurité

Example

⚠WARNING

Extremely strong magnetic field. Risk of severe personal injury to persons carrying pacemakers or electronic medical implants – maintain distance.
Keep distance to magnetically sensitive objects.

Les consignes de sécurité informent l'utilisateur sur les risques potentiels pouvant survenir si les avertissements et les mesures de précaution décrits ci-dessous ne sont pas respectés. Le pictogramme visible à gauche définit le risque. En haut, le danger mentionné précédemment est affecté à un niveau de danger. Le niveau, le type

et la source du danger ainsi que les éventuelles conséquences, les interdictions et les mesures à prendre sont mentionnés conformément au tableau ci-dessous.

Symboles et niveaux de danger

Le tableau suivant est un glossaire illustré expliquant les symboles utilisés dans ce mode d'emploi et sur le séparateur MultiMACS/ séparateur MultiMACS 96thermo.

⚠ CAUTION	Indique une situation dangereuse qui, si elle n'est pas évitée, peut entraîner des blessures mineures ou modérées.
⚠ WARNING	Indique une situation dangereuse qui, si elle n'est pas évitée, peut entraîner la mort ou des blessures graves.
⚠	Attention, consultez le mode d'emploi pour obtenir plus de consignes et agissez avec prudence. Les avertissements incluent le risque de détérioration de l'équipement, de blessure corporelle grave et le danger de mort.
	Risque d'écrasement et de cisaillement. Risque d'écrasement et de cisaillement des membres corporels dû à des dangers mécaniques.
	Champ magnétique puissant Le champ magnétique interfère avec les objets magnétisables et les appareils électroniques ou endommage les supports d'information magnétiques. Risque de grave blessure corporelle pour les personnes portant un pacemaker ou des implants médicaux électroniques.
	Risque de contamination en cas d'utilisation de matières nocives pour l'organisme. Indique le danger de mort, le risque de blessure grave pour l'opérateur de l'appareil ou le risque de détérioration de l'équipement dû à des matières biologiques potentiellement dangereuses.
	Indique le danger de mort, le risque de blessure grave pour l'opérateur de l'appareil en raison de la tension dangereuse.
⎓	Courant direct La nature du courant électrique est notée sur l'équipement: courant direct.
I	Alimentation électrique activée
O	Alimentation électrique désactivée
	La notice d'utilisation doit être consultée avant de procéder à l'installation et à l'utilisation du système

Avertissements et précautions

Le séparateur MultiMACS/séparateur MultiMACS 96thermo utilise une technologie de pointe. Il s'agit d'un appareil commandé par ordinateur spécialement conçu pour les applications de biologie moléculaire en format de plaque de microtitrage. Le séparateur MultiMACS/séparateur MultiMACS 96thermo est conçu pour fonctionner de manière sûre après son installation s'il est utilisé par des personnes qualifiées selon les pratiques de sécurité générales et les consignes mentionnées dans ce mode d'emploi. Les instructions de ce chapitre expliquent les risques potentiels liés à l'utilisation de l'appareil et fournissent des informations de sécurité importantes afin de réduire ces risques. En respectant précautionneusement ces consignes, vous pouvez protéger l'équipement et vous-même des risques potentiels et créer un environnement de travail sûr. La protection peut être altérée si cet appareil est utilisé d'une manière non précisée par le fabricant.

Important: Veuillez lire et respecter toutes les instructions d'utilisation fournies dans ce mode d'emploi et observez tous les avertissements affichés sur l'appareil. Conservez ce mode d'emploi et les autres consignes de sécurité et d'utilisation fournies avec l'appareil à un endroit accessible pour tous les utilisateurs en vue de les consulter ultérieurement.

Important Le séparateur MultiMACS/séparateur MultiMACS 96thermo est destiné à une utilisation intérieure uniquement. N'utilisez pas l'appareil dans des zones classées dangereuses telles que des environnements à teneur élevée en oxygène.

Pour de plus amples d'informations concernant l'installation de l'équipement, veuillez vous adresser à votre organisme local responsable de l'approvisionnement en électricité, des travaux de bâtiment, de la maintenance et de la sécurité.

Si vous avez un doute sérieux quant à la sécurité d'utilisation de votre appareil, veuillez contacter votre prestataire de services Miltenyi Biotec agréé ou appelez le service après-vente de Miltenyi Biotec.

Précautions d'ordre général

Afin de réduire les risques potentiels liés à l'utilisation du séparateur MultiMACS/séparateur MultiMACS 96thermo, veuillez observer les précautions générales suivantes. La non-observation de ces précautions peut provoquer un incendie, des dommages corporels, et/ou détériorer l'appareil.

Risque d'électrocution et de propagation de feu

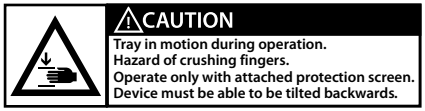
Avertissement: Les appareils électriques présentent un risque d'électrocution. Afin de réduire le risque d'électrocution, n'ouvrez aucun cache du séparateur MultiMACS/séparateur MultiMACS 96thermo, ni d'autres équipements accessoires fournis par Miltenyi Biotec. Tous les caches de l'appareil et des équipements accessoires doivent être démontés par le personnel agréé uniquement. Soyez particulièrement prudent pendant la manipulation de fluides. Nettoyez immédiatement si des liquides se sont déversés. Veillez à ce que les fluides ne s'infiltrent pas à l'intérieur de l'appareil. Débranchez le câble électrique avant de nettoyer manuellement le séparateur MultiMACS/séparateur MultiMACS 96thermo.

Un risque potentiel existe si le séparateur MultiMACS/séparateur MultiMACS 96thermo utilisé est ouvert, déformé ou endommagé, si des liquides se déversent dans l'appareil, si un objet est entré dans l'appareil par les fentes de ventilation ou si un objet a chuté dans l'appareil. En cas d'apparition de flammes ou de fumée, déconnectez immédiatement le séparateur MultiMACS/séparateur MultiMACS 96thermo, débranchez l'appareil et contactez un prestataire de services Miltenyi Biotec agréé ou l'équipe de support technique de Miltenyi Biotec. Il est formellement interdit d'utiliser un appareil endommagé ou un appareil dont le câble électrique est endommagé.

Champ magnétique puissant

Avertissement: Le séparateur MultiMACS/séparateur MultiMACS 96thermo est équipé d'un aimant extrêmement puissant en format de plaque de microtitrage, **l'aimant MultiMACS 96** (aimant MultiMACS)/**l'aimant MultiMACS 96thermo.** Veillez à laisser un espace d'au moins 80 cm entre le cache de l'aimant et les supports d'information magnétiques (cartes de crédit, bandes magnétiques et disquettes), l'équipement électronique (aides auditives, pacemakers, appareils de mesure et de contrôle, ordinateurs et montres) ainsi que les outils et les objets magnétisables. Ces éléments peuvent être affectés ou endommagés par le champ magnétique. **L'écran MultiMACS** en forme de prisme contient des aimants moins puissants ; maintenez cependant une distance d'au moins 30 cm par rapport au matériel magnétique mentionné ci-dessus. Plus ils sont proches l'un de l'autre, plus la force attractive entre les deux aimants ou entre un aimant et une matière magnétisable augmente. Par conséquent, n'approchez aucune matière magnétique – y compris tout autre aimant ou écran MultiMACS – au-delà d'une certaine distance de sécurité.

Risque d'écrasement et de cisaillement

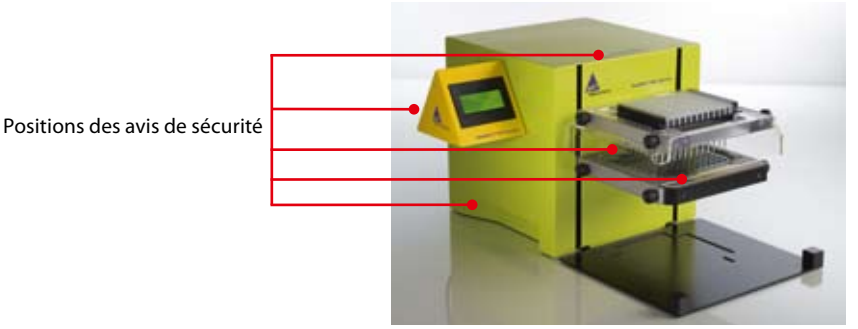


Avertissement: N'approchez pas vos doigts, etc. de toutes les pièces mobiles du séparateur MultiMACS/séparateur MultiMACS 96thermo afin d'éviter toute blessure ainsi que toute détérioration de l'appareil due à l'écrasement et au cisaillement. Ne placez pas d'objets sur le séparateur MultiMACS/séparateur MultiMACS 96thermo. Laissez un espace libre d'au moins 20 cm au-dessus du MultiMACS/séparateur MultiMACS 96thermo afin de permettre à l'appareil de basculer vers l'arrière, et donc de limiter les dommages : si un objet a été placé par inadvertance sous l'aimant se déplaçant en bas, la résistance physique de l'objet peut faire basculer l'appareil vers l'arrière, de la même façon qu'un vérin hydraulique. Ne bloquez pas les dispositifs de sécurité ou les mesures de sécurité. Laissez l'écran de protection approprié fixé au séparateur MultiMACS/séparateur MultiMACS 96thermo pendant l'utilisation manuelle.

Prudence: En cas d'utilisation dans un robot de manipulation de liquides, il est nécessaire de retirer l'écran de protection. Pour utiliser le séparateur MultiMACS/séparateur MultiMACS 96thermo intégré dans un système automatisé de manipulation de liquides compatible, veillez à ce que le système combiné, c'est-à-dire le séparateur MultiMACS/séparateur MultiMACS 96thermo, l'aimant MultiMACS/l'aimant MultiMACS 96thermo et le robot de manipulation de liquides, réponde à toutes les exigences de sécurité et d'utilisation avant de commencer les processus automatisés. Veillez tout particulièrement à garantir la sécurité de l'opérateur.

Emplacement des consignes de sécurité sur l'appareil

Veuillez noter les emplacements des consignes de sécurité sur le séparateur MultiMACS/séparateur MultiMACS 96thermo et veillez à ce que les consignes soient parfaitement lisibles



Sécurité de l'installation

Ce paragraphe décrit les exigences auxquelles votre site doit répondre pour garantir l'installation et la sécurité d'utilisation de votre séparateur MultiMACS/séparateur MultiMACS 96thermo. Lisez les consignes de ce paragraphe et assurez-vous que votre site a été aménagé en conséquence avant de brancher l'appareil à sa source électrique.

Lors de la planification de l'aménagement de votre site et de l'emplacement de l'équipement, tenez compte des précautions décrites dans ce paragraphe afin d'éviter que l'appareil ne tombe en panne et de réduire le nombre d'arrêts pouvant être causés par l'environnement de l'appareil.

Important: Les consignes de sécurité concernant la zone de travail locale, les bonnes pratiques de laboratoire, ainsi que les directives relatives à la santé, à la sécurité et à la prévention des accidents en laboratoire doivent être observées en permanence.

Accessoires de montage

Ne placez pas le séparateur MultiMACS/séparateur MultiMACS 96thermo sur une table, un chariot, un pied, un trépied ou un support. L'appareil pourrait sinon chuter, provoquant des blessures corporelles graves et/ou la détérioration considérable l'appareil. Utilisez le séparateur uniquement sur une table, un chariot, un pied, un trépied ou un support recommandé par Miltenyi Biotec ou vendu avec l'appareil. Ne placez pas le séparateur MultiMACS/séparateur MultiMACS 96thermo dans un appareil intégré ou un espace restreint comme un casier, sauf si le dispositif a été spécialement conçu pour accueillir l'appareil, qu'une ventilation appropriée est garantie et que les instructions de montage relatives à l'appareil ont été respectées.

Circulation de l'air

Ne placez pas l'appareil à proximité de radiateurs, de registres de chaleur, de fours ou d'autres pièces d'équipement (amplificateurs) qui produisent de la chaleur. Veillez à ce que suffisamment d'air puisse circuler autour du séparateur MultiMACS/séparateur MultiMACS 96thermo — au moins 15 cm de chaque côté — pendant le fonctionnement afin de garantir le refroidissement adéquat de l'appareil. Évitez d'exposer l'appareil à un ensoleillement direct. Les encoches et les fentes de l'appareil sont prévues pour la ventilation et ne doivent jamais être bloquées ou recouvertes, car elles assurent le fonctionnement fiable du séparateur MultiMACS/séparateur MultiMACS 96thermo et protègent l'appareil de la surchauffe. N'introduisez jamais d'objet étranger dans l'appareil par l'une des fentes.

Eau et humidité

N'utilisez pas l'appareil dans un endroit humide ou mouillé. Évitez l'humidité et la condensation et protégez la machine des éclaboussures.

Produit relié à la terre

L'appareil est équipé d'une fiche électrique trifilaire avec mise à la terre dont la troisième borne est prévue pour relier l'appareil à la terre. Cette fiche fonctionne uniquement dans une prise de courant avec contact de mise à la terre. Il s'agit d'un dispositif de sécurité. N'essayez pas d'insérer la fiche dans une prise de courant sans contact de mise à la terre. Si vous ne pouvez pas insérer la fiche dans la prise de courant, veuillez vous adresser à votre électricien local qui remplacera la prise de courant.

Sources électriques

Ne faites fonctionner l'appareil qu'à partir d'une source électrique indiquée sur la plaque signalétique du produit. Si vous avez des questions sur le type de courant électrique que vous pouvez utiliser, contactez votre prestataire de services Miltenyi Biotec agréé ou votre fournisseur d'électricité local. N'utilisez pas de rallonges ni de barrettes de connexion. Ne surchargez pas la prise électrique. La charge totale du système ne doit pas dépasser 80 % de la valeur nominale du circuit de dérivation.

Accessibilité

Assurez-vous que l'interrupteur principal et le connecteur du câble électrique soient facilement accessibles et placés aussi près que possible de l'opérateur de l'appareil. S'il s'avère nécessaire de déconnecter l'alimentation électrique, débranchez le câble.

Appareils périphériques

Branchez uniquement des appareils périphériques conformes à la norme EN/IEC 60950 au connecteur RS232 étiqueté « com ». De plus, branchez uniquement l'équipement MultiMACS d'origine aux connecteurs étiquetés « module 1 » et « module 2 », ainsi que l'écran MultiMACS au connecteur étiqueté « display ». Branchez uniquement l'aimant MultiMACS 96thermo au connecteur étiqueté « module 1 » sur le séparateur MultiMACS/séparateur MultiMACS 96thermo.

Sécurité d'utilisation, maintenance, transport et élimination

Respectez les consignes suivantes afin de garantir la sécurité d'utilisation, la maintenance, le transport et l'élimination de votre séparateur MultiMACS/séparateur MultiMACS 96thermo.

Important: Les consignes de sécurité concernant la zone de travail locale, les bonnes pratiques de laboratoire, ainsi que les directives relatives à la santé, à la sécurité et à la prévention des accidents en laboratoire doivent être observées en permanence.

Sécurité d'utilisation

Si l'appareil ne fonctionne pas correctement et que les instructions ou les messages sur l'écran d'affichage conseillent de contacter le service technique, la sécurité d'utilisation de l'appareil n'est plus garantie. Déconnectez immédiatement le séparateur MultiMACS/séparateur MultiMACS 96thermo, débranchez l'appareil et contactez un prestataire de services Miltenyi Biotec agréé ou l'équipe du service après-vente de Miltenyi Biotec.

Entretien et réparation

Important: N'effectuez pas vous-même l'entretien du séparateur MultiMACS/séparateur MultiMACS 96thermo, sauf autre consigne spécifique donnée dans ce mode d'emploi ou dans un autre document de Miltenyi Biotec. L'entretien et la réparation doivent être effectués par des réparateurs qualifiés. Tout entretien ou toute réparation inappropriée ou incorrecte de votre séparateur MultiMACS/séparateur MultiMACS 96thermo peut mettre en danger les utilisateurs, fournir des résultats imprévisibles, entraîner le dysfonctionnement ou la détérioration de l'appareil, son usure prématurée et réduire la durée de vie de l'appareil, ainsi qu'annuler votre garantie.

Renseignez-vous auprès de votre représentant Miltenyi Biotec local sur les conditions d'entretien et de support complémentaires proposées par Miltenyi Biotec ou consultez le site www.miltenyibiotec.com/support.

Important: Si des pièces de remplacement ou de rechange sont requises, assurez-vous que le prestataire de services utilise exclusivement des pièces Miltenyi Biotec d'origine ou des pièces de fabricants tiers spécifiées et recommandées par Miltenyi Biotec. L'utilisation de pièces de remplacement ou de rechange non autorisées peut entraîner le dysfonctionnement de l'appareil et fausser les résultats de la séparation des cellules. Miltenyi Biotec

n'accorde pas de prestation de garantie ou décline toute responsabilité pour les pannes et les dommages de l'appareil résultant de l'utilisation de pièces de remplacement ou de rechange inappropriées. Une fois les travaux d'entretien ou de réparation achevés, demandez à votre prestataire de services Miltenyi Biotec agréé d'effectuer tous les contrôles de sécurité requis par la procédure de réparation afin de garantir que l'appareil est parfaitement opérationnel.

Utilisez uniquement les options et les mises à jour recommandées par Miltenyi Biotec.

Nettoyage

Débranchez le séparateur MultiMACS/séparateur MultiMACS 96thermo avant le nettoyage. N'utilisez pas d'agents nettoyants liquides ou en aérosol ; utilisez toujours un chiffon humide.

Matières dangereuses

Si une matière nocive pour l'organisme est ou a été utilisée, l'opérateur doit choisir et porter un équipement de protection individuelle conforme aux avertissements et aux précautions pour les substances utilisées. Portez des gants de protection, des vêtements de protection et des lunettes de sécurité afin d'éviter tout contact avec la peau et les yeux. Un équipement de sécurité défectueux ou inadéquat peut mettre l'opérateur en danger. Le séparateur MultiMACS/séparateur MultiMACS 96thermo doit être manipulé dans un couvercle de protection si des matières dangereuses ou inconnues sont traitées. Si une matière dangereuse a été utilisée ou s'est déversée, prenez les précautions appropriées pour décontaminer soigneusement le système.

Les colonnes, les plaques, les tubes et tous les autres consommables qui ont été en contact avec des échantillons nocifs pour l'organisme doivent être traités à l'autoclave avant l'élimination. 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 Javel, alcool isopropylique ou 70% d'éthanol.

L'élimination des déchets doit être effectuée conformément aux réglementations locales.

Transport

Le séparateur MultiMACS/séparateur MultiMACS 96thermo doit être transporté avec soin dans un emballage spécifié par Miltenyi Biotec. Un dommage interne peut survenir si l'appareil est soumis à des vibrations excessives ou s'il chute. Si l'appareil doit être réexpédié pour être remis en état, décontaminez l'appareil afin d'éliminer toute matière dangereuse avant le transport. Si vous avez des questions concernant la propre décontamination ou l'expédition, n'hésitez pas à contacter notre service technique assistance.

Élimination de l'appareil

Si vous souhaitez éliminer votre appareil, veuillez contacter notre service technique qui vous aidera.

Compatibilité électromagnétique

Pour les États-Unis uniquement. Toute modification et toute transformation de l'équipement, sauf si elle a été formellement autorisée par Miltenyi Biotec, peut annuler votre droit d'utilisation de l'équipement conformément à la norme 47 CFR, art. 15.

Wichtige Information

1

Bitte lesen vor Inbetriebnahme!

Bitte lesen Sie vor Inbetriebnahme sorgfältig alle in diesem Benutzerhandbuch enthaltenen Informationen. Werden die folgenden Anleitungen nicht gelesen und beachtet, so könnte dies zu unsachgemäßer oder unvorschriftsmäßiger Anwendung, Bedienung oder Wartung des Gerätes führen. Auf diese Weise könnten Anwender gefährdet, Ihr Gerät beschädigt oder dessen Betrieb beeinträchtigt werden. Auch könnte sich vorzeitiger Verschleiß einstellen und somit die Lebensdauer des Gerätes verkürzen. Hierdurch könnten Ihre Garantieansprüche verfallen.

Bewahren Sie dieses Benutzerhandbuch an einem sicheren Ort auf, zugänglich für jeden Anwender der MultiMACS™ M Separator (MultiMACS M96 Separator oder der MultiMACS™ M96thermo Separator).

Dieses Kapitel beschreibt die Anforderungen an den Gerätestandort und die Sicherheitsvorschriften Ihres MultiMACS M96 Separators/ MultiMACS M96thermo Separators. Die folgenden Warnhinweise und Vorsichtsmaßregeln sollen Ihnen dabei behilflich sein, Verletzungen für sich oder Schäden am Gerät zu vermeiden.

Symbole und Gefahrenstufen

Warnhinweis

Beispiel

Die Sicherheitshinweise informieren den Anwender über mögliche Risiken und Gefahren, die entstehen könnten, falls die unten stehenden Warn- und Vorsichtsmaßnahmen nicht befolgt werden. Das Symbol auf der linken Seite spezifiziert die Risiken. Die oben stehende Gefahrenstufe klassifiziert die Gefahr, wie unten erläutert. Der Grad, die Art und Quelle der Gefährdung sowie mögliche Folgen, Verbote und Maßnahmen werden im darunterliegenden Bereich erläutert.

Symbole und Gefahrenebenen

Im folgenden tabellarischen Glossar werden alle in diesem Benutzerhandbuch oder auf dem MultiMACS M Separators verwandten Symbole bildlich dargestellt und erklärt.

⚠ CAUTION Bezeichnet eine Gefahrensituation, die, falls sie nicht vermieden wird, zu leichteren oder mittelschweren Verletzungen führen kann.

⚠ WARNING Bezeichnet eine Gefahrensituation, die, falls sie nicht vermieden wird, zum Tode oder schwerwiegenden Verletzungen führen kann.

⚠ Achtung, schlagen Sie im Benutzerhandbuch für weitere Anweisungen nach und gehen Sie umsichtig vor.
Warnhinweise deuten auf das Risiko von Beschädigungen des Gerätes bzw. der Ausrüstung, die Gefahr von schweren Verletzungen oder Lebensgefahr hin.

Quetsch- und Schergefahr
Durch mechanische Gefährdungen können Brüche oder Quetschungen von Körperteilen verursacht werden.

Starkes Magnetfeld
Das Magnetfeld kann auf andere, magnetisch aufladbare Gegenstände und elektronische Geräte störend einwirken oder magnetische Datenträger beschädigen. Für die Träger eines Herzschrittmachers oder von eletronischen Implantaten besteht die Gefahr schwerer Verletzungen.

Gefahr der Kontaminierung bei Verwendung von biologischen Gefahrenstoffen. Dieses Symbol weist auf Lebensgefahr, das Risiko schwerer Verletzungen für den Bediener des Gerätes oder Schäden am Gerät selbst hin, die durch Arbeit mit möglicherweise gefährlichen biologischen Substanzen entstehen können.

Weist auf Lebensgefahr oder das Risiko schwerer Verletzungen für den Benutzer des Gerätes aufgrund gefährlicher Stromspannung hin.

⎓ Gleichstrom
Mit diesem Symbol ist auf dem Gerät die Art der Energieversorgung gekennzeichnet: Gleichstrom.

I Stromversorgung: AN.

O Stromversorgung: AUS.

Vor Inbetriebnahme und Betrieb des Geräts ist die Dokumentation zu beachten.

Warn- und Sicherheitshinweise

1

Der MultiMACS M96 Separator/MultiMACS M96thermo Separator verwendet modernste Technik. Es ist ein computergesteuertes Gerät und wurde besonders für molekularbiologische Applikationen im Mikrotiterplatten-Format entwickelt. Der MultiMACS M96 Separator/ MultiMACS M96thermo Separator ist ausgelegt für störungsfreien Betrieb nach erfolgter Montage, wenn das Gerät von geschultem Personal entsprechend den allgemeinen Sicherheitsrichtlinien und den in diesem Benutzerhandbuch dargestellten Instruktionen bedient wird. Die in diesem Abschnitt enthaltenen Sicherheitsrichtlinien erläutern die mit dem Betrieb des Gerätes verbundenen möglichen Gefahren und bieten Ihnen wichtige Informationen zur Sicherheit, um diese Risiken zu minimieren. Werden diese Sicherheitshinweise sorgfältig befolgt, schützen Sie sich und das Gerät vor möglichen Gefährdungen und schaffen so ein sicheres Arbeitsumfeld. Sollte das Gerät entgegen den Vorgaben des Herstellers eingesetzt werden, so könnte dies den Garantieschutz beeinträchtigen.

Achtung: Bitte lesen und befolgen Sie alle in diesem Benutzerhandbuch gegebenen Hinweise zum Betrieb des Gerätes. Beachten Sie auch alle auf dem Display erscheinenden Warnhinweise. Bewahren Sie dieses Benutzerhandbuch sowie alle weiteren, mit diesem Gerät erhaltenen Sicherheits- und Betriebsanleitungen an einem für alle Nutzer des Geräts zugänglichen Ort auf, so dass diese künftig jederzeit darauf zurückgreifen können.

Achtung: Der MultiMACS M96 Separator/MultiMACS M96thermo Separator ist ausschließlich ausgelegt für den Betrieb in Innenräumen. Bitte benutzen Sie das Gerät nicht in ausgewiesenen Gefahrenzonen wie etwa sauerstoffangereicherten Arbeitsumgebungen.

Wenden Sie sich an die örtlichen Behörden und Ihren Stromversorger für weitere Informationen zur Stromversorgung, Gebäudeinstallationen, Wartung und Sicherheit für die Installation dieses Gerätes.

Wenn Sie Sicherheitsbedenken in Bezug auf die Gerätenutzung haben, setzen Sie sich bitte mit Ihrem autorisierten Miltenyi Biotec Service Provider in Verbindung oder kontaktieren den Miltenyi Biotec Customer Service.

Allgemeine Sicherheitshinweise

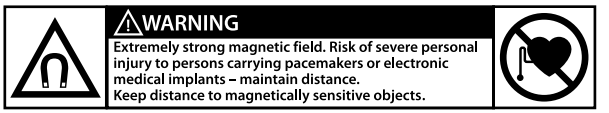
Um mögliche, mit dem Betrieb des MultiMACS M96 Separator/ MultiMACS M96thermo Separators verbundene Sicherheitsrisiken zu verringern, beachten Sie bitte die folgenden allgemeinen Sicherheitshinweise. Eine Nichteinhaltung dieser Vorsichtsmaßnahmen könnte Feuer, Gesundheitsschäden, und/oder Schäden am Gerät verursachen.

Gefahr eines Stromschlags und der Ausbreitung von Feuer

Warnung: Der Umgang mit elektrischen Geräten birgt das Risiko eines Stromschlags. Um diese Gefahr zu minimieren, öffnen Sie weder das Gehäuse des MultiMACS M96 Separator/MultiMACS M96thermo Separators noch anderes Zubehör. Alle Abdeckungen sowie das Geräte-Zubehör dürfen nur von geschultem Personal entfernt werden. Besondere Vorsicht ist geboten beim Umgang mit Flüssigkeiten. Beseitigen Sie ausgetretene oder verschüttete Flüssigkeit sofort. Es darf unter keinen Umständen Flüssigkeit in das Innere des Gerätes eindringen. Ziehen Sie den Netzstecker vor manueller Reinigung des MultiMACS M96 Separator/MultiMACS M96thermo Separators.

Eine potentielle Gefahrenquelle liegt auch im Betrieb eines geöffneten, zu Boden gefallenen oder beschädigten Gerätes. Ebenfalls sollte unbedingt vermieden werden, dass Flüssigkeit in das Gerät gelangt, Fremdkörper durch die Belüftungsöffnungen eindringen oder von außen in das Instrument hinein gelangen. Bei Auftreten von Flammen oder Rauchentwicklung schalten Sie das Gerät sofort aus, trennen es von der Stromzufuhr und kontaktieren einen autorisierten Miltenyi Biotec Service Provider oder den Miltenyi Biotec Customer Service. Der Betrieb eines beschädigten Gerätes oder eines Gerätes mit schadhaftem Stromkabel ist ausdrücklich verboten.

Starkes Magnetfeld



Warnung: Der MultiMACS M96 Separator/MultiMACS M96thermo Separator ist mit einem extrem starken Magneten im

Mikrotiterplatten-Format ausgestattet, dem **MultiMACS 96 Magnet** (MultiMACS Magnet)/**MultiMACS 96thermo Magnet.** Halten Sie jedwede magnetischen Datenträger (wie etwa Kreditkarten, Magnetbänder und Speichermedien) oder elektronischen Geräte (z.B. Hörgeräte, Herzschrittmacher, Mess- und Steuerungsinstrumente, Computer oder Uhren) sowie andere, magnetische Werkzeuge und Objekte in einem Abstand von mindestens 80 cm entfernt vom Magnetgehäuse. All diese Gegenstände könnten durch das Magnetfeld in ihrer Funktion beeinträchtigt oder beschädigt werden. Das prismenförmige **MultiMACS Display** enthält weniger starke Magneten; halten Sie mit allen oben erwähnten Objekte einen Mindestabstand von 30 cm. Die Anziehungskraft zwischen zwei Magneten oder einem Magneten und magnetischem Material erhöht sich stark, je geringer der Abstand ist. Halten Sie deshalb jegliches magnetische Material, einschließlich anderer MultiMACS-Magneten und Displays in sicherem Abstand.

Quetsch- und Schergefahr

⚠CAUTION

Tray in motion during operation.
Hazard of crushing fingers.
Operate only with attached protection screen.
Device must be able to be tilted backwards.

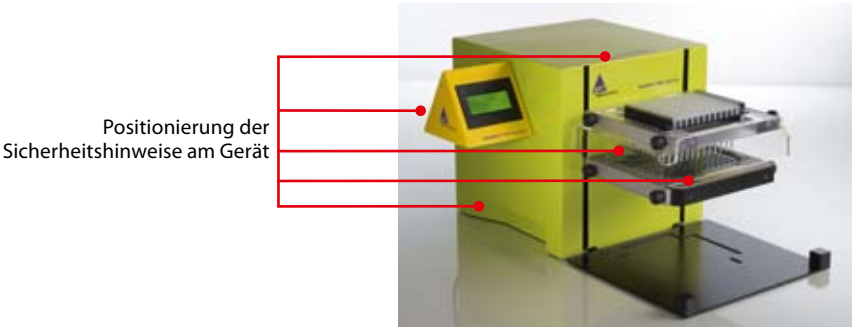
Warnung: Halten Sie die Finger fern von allen beweglichen Teilen des MultiMACS M96 Separator/MultiMACS M96thermo Separators, um Quetschungen und Scherverletzungen oder Schäden am Gerät zu vermeiden. Stellen Sie keine Gegenstände auf den MultiMACS M96 Separator/MultiMACS M96thermo Separator. Belassen Sie einen Abstand von mindestens 20 cm über dem Gerät, um sicherzustellen, dass das Instrument nach hinten kippen kann, um Schäden zu minimieren: Wird ein Gegenstand versehentlich unter den sich nach unten bewegenden Magneten platziert, so wird das Gerät durch den physikalischen Widerstand nach hinten gekippt, ähnlich einer hydraulischen Hebevorrichtung. Schutzeinrichtungen oder -maßnahmen dürfen nicht umgangen werden. Bei manueller Bedienung muss der Schutzschirm (Protective Screen) am Gerät befestigt sein.

Vorsicht: Wollen Sie das Gerät in einem Pipettier-Roboter einsetzen, könnte es erforderlich sein, den Schutzschirm zu entfernen. Für den Fall, dass der MultiMACS M96 Separator/MultiMACS M96thermo Separator integriert in ein entsprechend kompatibles, automatisches Pipettiersystem eingesetzt werden soll, muss vor Inbetriebnahme sichergestellt werden, dass dieses System, also ein MultiMACS M96 Separator/MultiMACS M96thermo Separator, MultiMACS Magnet/ MultiMACS 96thermo Magnet, kombiniert mit einem Pipettier-Roboter, allen Sicherheits- und Funktionsanforderungen entspricht.

Der Schutz der Bediener der Anlage ist besonders zu beachten.

Positionen der Sicherheitshinweise am Gerät

Bitte achten Sie auf die Positionen der Sicherheitshinweise am Gerät und sorgen Sie dafür, dass diese stets vollständig lesbar bleiben.



Sichere Geräteinstallation

In diesem Abschnitt werden die Anforderungen an einen betriebssicheren Standort für Ihren MultiMACS M96 Separator/ MultiMACS M96thermo Separator beschrieben. Lesen Sie die Anleitungen in diesem Abschnitt und stellen Sie sicher, dass der Gerätestandort entsprechend vorbereitet ist, bevor Sie das Gerät in Betrieb nehmen.

Berücksichtigen Sie bei der Aufstellungsplanung die in diesem Abschnitt beschriebenen Vorkehrungen, um Gerätestörungen zu vermeiden und die Wahrscheinlichkeit umgebungsbedingter Geräteausfälle zu verringern.

Wichtig: Örtliche Arbeitsschutzbestimmungen, Laborrichtlinien, Sicherheitsnormen und Unfallverhütungsvorschriften müssen auf jeden Fall beachtet werden.

Montagezubehör

Stellen Sie den MultiMACS M96 Separator/MultiMACS M96thermo Separator niemals auf einen instabilen Labortisch, Laborwagen, Untersatz, Laborstativ oder Laborkonsole. Als Folge davon könnte das Instrument zu Boden fallen, dadurch könnten schwere Verletzungen und/oder Schäden am Gerät verursacht werden. Benutzen Sie

daher nur von Miltenyi Biotec empfohlenes oder direkt mit dem Gerät erhältliches Labormobiliar. Versuchen Sie nicht, den MultiMACS M96 Separator/MultiMACS M96thermo Separator in eine Einbaukonstruktion zu integrieren oder auf begrenztem Raum, z.B. in einem Laborregal, unterzubringen, es sei denn, es wurde eine spezielle Vorrichtung dafür entwickelt, es ist für ausreichende Belüftung gesorgt und die Montageanleitung für das Gerät wurde befolgt.

Belüftung

Das Gerät sollte nicht in der Nähe von Radiatoren, Heißlüftern, Öfen, oder anderen, Wärme erzeugenden Geräten stehen (Verstärker eingeschlossen). Ermöglichen Sie im Betrieb eine ausreichende Luftzirkulation im Abstand von mindestens 15 cm in allen Richtungen um den MultiMACS M96 Separator/MultiMACS M96thermo Separator, um eine ausreichende Kühlung zu gewährleisten. Vermeiden Sie, das Gerät direkter Sonneneinstrahlung auszusetzen. Öffnungen und Schlitze am Gerät sind zur Belüftung gedacht und sollten niemals bedeckt oder blockiert werden, da sie das Gerät vor Überhitzung schützen und sicheren Betrieb ermöglichen. Führen Sie niemals Fremdkörper durch Öffnungen in das Gerät ein.

Wassereintritt und Nässe

Setzen Sie das Instrument niemals in einer feuchten oder nasskalten Umgebung ein. Setzen Sie das Gerät nie hoher Feuchtigkeit oder Kondensation aus und schützen Sie es gegen Spritzwasser.

Geerdetes Produkt

Das Gerät ist ausgestattet mit einem Schutzkontaktstecker und einer dreiadrigen Anschlussleitung. Führen Sie den Stecker nicht in eine Steckdose ohne Schutzkontakt ein. Wenn Ihre Steckdose keinen Schutzkontakt aufweist, bitten Sie einen ortsansässigen Elektriker, diese zu ersetzen.

Stromquellen

Das Gerät sollte nur von einer Stromquelle aus betrieben werden, die den elektrischen Angaben auf dem Typschild entsprechen. Sollten Sie Fragen zur Art der Stromversorgung haben, wenden Sie sich an einen autorisierten Miltenyi Biotec Service Provider oder Ihren lokalen Stromversorger. Benutzen Sie keine Verlängerungskabel oder Steckdosenleiste. Überladen Sie eine Steckdose nicht. Die Gesamtlast darf 80% der Zweigstromkreisbemessung nicht überschreiten.

Zugänglichkeit der Stromverbindungen

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

Peripheriegeräte

Schließen Sie an die mit „com“ bezeichnete RS232 Buchse nur Peripheriegeräte an, die der Norm EN/IEC 60950 entsprechen. Außerdem dürfen nur original MultiMACS Geräte an die mit „module 1” und „module 2” gekennzeichneten Buchsen angeschlossen werden. Das MultiMACS Display darf nur an die mit „display” gekennzeichnete Buchse angeschlossen werden. Schließen Sie den MultiMACS 96thermo Magnet nur an die mit „module 1“ gekennzeichnete Buchse am MultiMACS Separator/MultiMACS 96thermo Separator an.

Sicherer Betrieb, Wartung, Transport und Entsorgung

Beachten Sie die folgenden Hinweise bezüglich Betriebssicherheit, Wartung, Transport und Entsorgung Ihres MultiMACS M96 Separators/MultiMACS M96thermo Separators.

Wichtig: Örtliche Arbeitsschutzbestimmungen, Laborrichtlinien, Sicherheitsnormen und Unfallverhütungsvorschriften müssen auf jeden Fall beachtet werden.

Sicherer Betrieb des Gerätes

Falls Ihr Gerät nicht einwandfrei arbeitet und Anzeigen auf dem Display Sie dazu auffordern, den technischen Kundendienst zu kontaktieren, ist die Betriebssicherheit nicht mehr länger gewährleistet. Schalten Sie das Gerät sofort aus, unterbrechen die Stromzufuhr und kontaktieren einen autorisierten Miltenyi Biotec Service Provider oder den Miltenyi Biotec Customer Support Service.

Wartung

Wichtig: Versuchen Sie nicht, den MultiMACS M96 Separator/ MultiMACS M96thermo Separator selbst zu warten oder zu reparieren — es sei denn, es ist in diesem Benutzerhandbuch oder anderen technischen Unterlagen der Miltenyi Biotec GmbH 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 und kann den Verlust Ihrer Garantieansprüche zur Folge haben.

Fragen Sie Ihren örtlichen Miltenyi Biotec Vertriebsmitarbeiter nach unseren weit reichenden Vereinbarungen zum Geräteservice und Kundendienst, oder besuchen unsere Website: www.miltenyibiotec.com/support.

Wichtig: Wenn Ersatzteile benötigt werden, stellen Sie sicher, dass Ihr Service Provider nur Originalteile der Miltenyi Biotec GmbH oder Teile von Drittanbietern verwendet, die von der Miltenyi Biotec GmbH spezifiziert und empfohlen werden. Die Verwendung unautorisierter Ersatzteile kann Fehlfunktionen des Gerätes verursachen und die Ergebnisse von Zellseparationen beeinträchtigen. Die Miltenyi Biotec GmbH akzeptiert keinerlei Garantieansprüche und haftet nicht für Fehlfunktionen oder Schäden am Gerät, die auf Verwendung ungeeigneter Verschleiß- oder Ersatzteile zurückzuführen sind. Nach jedweder erfolgter Wartungs- oder Reparaturleistung lassen Sie Ihren autorisierten Miltenyi Biotec Service Provider alle notwendigen Sicherheitsprüfungen durchführen, um sicherzustellen, dass das Gerät sich in vorschriftsmäßigem Zustand befindet.

Nutzen Sie nur von Miltenyi Biotec empfohlenes Zusatzgerät und Upgrades zu Ihrem Gerät.

Reinigung

Ziehen Sie den Netzstecker vor Reinigung des Gerätes. Verwenden Sie keine Flüssig- oder Sprühreinigungsmittel, sondern nur ein feuchtes Tuch.

Gefährliches Material

Wird oder wurde mit biologischen Gefahrenstoffen gearbeitet, muss der

Bediener des Gerätes entsprechend den für die verwendeten Substanzen geltenden Warnhinweisen und Schutzbestimmungen eine persönliche Schutzausrüstung tragen. Tragen Sie Schutzhandschuhe, Schutzkleidung und Schutzbrille, um Berührung der Gefahrenstoffe mit Haut und Augen zu vermeiden. Mangelhafte oder unzureichende Schutzausrüstung kann den Bediener des Gerätes gefährden. Werden biologische Gefahrenstoffe oder unbekannte Substanzen eingesetzt, sollten Sie mit dem MultiMACS M96 Separator/MultiMACS M96thermo Separator in einer Sterilbank arbeiten. Falls Gefahrstoffe verwendet wurden oder ausgetreten sind, achten Sie auf eine sorgfältige Dekontaminierung des Gerätes.

Säulen, Auffanggefäße und alle weiteren Verbrauchsmaterialien, die in Kontakt mit biologischen Gefahrenstoffen gelangt sind, sollten vor Entsorgung autoklaviert werden. Flüssigabfall sollte autoklaviert oder unter Verwendung eines für das jeweilige spezifische Pathogen geeigneten Desinfektionsmittels dekontaminiert werden, z.B. 10% Bleichmittel, Isopropylalkohol oder 70% Ethanol.

Die Entsorgung der Verbrauchsmaterialien muss gemäß lokal geltender Bestimmungen erfolgen.

Transport

Der MultiMACS M96 Separator/MultiMACS M96thermo Separator sollte vorsichtig gehandhabt 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 werden, dekontaminieren Sie das Gerät vor Versand von jeglichen biologischen Gefahrenstoffen. Wenn Sie Fragen zur vorschriftsmäßigen Dekontaminierung oder zum Versand des Gerätes haben, wenden Sie sich bitte direkt an unseren Technical Support.

Geräteentsorgung

Setzen Sie sich bitte direkt mit unserem Technical Support in Verbindung, falls Sie Ihr Gerät entsorgen möchten.

Elektromagetische Kompatibilität

Nur für die USA. Änderungen oder Modifikationen des Gerätes, soweit nicht ausdrücklich von Miltenyi Biotec genehmigt, können zum Erlöschen der Betriebserlaubnis für das Gerät gemäß 47 CFR §15 führen.

Informazioni importanti

1

Leggere prima dell'uso!

Si prega di leggere tutte le informazioni riportate nel presente manuale d'uso prima dell'utilizzo. La mancata lettura e l'inosservanza delle istruzioni possono condurre ad un impiego improprio o scorretto dello strumento, a manipolazione e manutenzione inadeguate o errate e potrebbero rappresentare un pericolo per l'operatore, avere conseguenze imprevedibili, causare il malfunzionamento o danni allo strumento, condurre ad un'usura prematura e ad una minore durata di esercizio dello strumento, nonché invalidarne la garanzia.

Conservare il presente manuale in un luogo sicuro, accessibile a tutti gi addetti che utilizzano l'unità di separazione MultiMACS™ (MultiMACS Separator) o l'unità di separazione MultiMACS™ 96thermo (MultiMACS 96thermo Separator).

Il presente capitolo illustra le istruzioni di sicurezza e i requisiti ambientali per l'installazione dello strumento MultiMACS Separator/ MultiMACS 96thermo Separator. I seguenti simboli di avvertenza e attenzione servono quale ausilio alla prevenzione di lesioni personali e danni al dispositivo.

Simboli e livelli di pericolo

Indicazioni di sicurezza

Esempio

Le indicazioni di sicurezza informano l'operatore dei rischi potenziali derivanti dal mancato rispetto delle avvertenze e precauzioni descritte di seguito. L'icona sul lato sinistro specifica il tipo di rischio. Il livello di rischio in alto classifica il tipo di pericolo, come indicato in precedenza. Il livello, il tipo e la fonte del pericolo, nonché le possibili

conseguenze, i divieti e le misure da adottare vengono indicati come segue.

Simboli e livelli di pericolo

Di seguito viene presentato un glossario illustrato che descrive i simboli utilizzati nel presente manuale d'uso e sul MultiMACS Separator/MultiMACS 96thermo Separator.

⚠ CAUTION Indica una situazione pericolosa che potrebbe comportare lesioni di grado lieve o moderato, qualora non venga evitata.

⚠ WARNING Indica una situazione pericolosa che potrebbe comportare lesioni gravi o morte, qualora non venga evitata.

⚠ Attenzione: consultare il Manuale d'uso per ulteriori istruzioni e procedere con cautela.
Le avvertenze includono il rischio di danni alle attrezzature, gravi lesioni personali o morte.

Pericolo di schiacciamento o di taglio.
Rischio di schiacciamento o di taglio di parti del corpo a causa di componenti meccanici.

Forte campo magnetico
Il campo magnetico può interferire con oggetti magnetizzati e dispositivi elettronici o danneggiare i supporti magnetici per le informazioni. Rischio di lesioni personali gravi per soggetti portatori di pacemaker o impianti medici elettronici.

Rischio di contaminazione in caso di utilizzo di materiale a rischio biologico. Indica il rischio di morte, lesioni gravi a danno dell'operatore o danni alle attrezzature a causa di materiale biologico potenzialmente pericoloso.

Indica il rischio di morte o di lesioni gravi a danno dell'operatore a causa di un livello pericoloso di tensione.

⎓ Corrente diretta
Lo strumento è contrassegnato con il tipo di alimentazione: corrente diretta.

I On - acceso (alimentazione)

O Off - spento (alimentazione)

E' necessario consultare la documentazione prima di procedere con l'installazione e l'utilizzo dell'apparecchio

Avvertenze e precauzioni

I separatori MultiMACS Separator/MultiMACS 96thermo Separator utilizzano tecnologie all'avanguardia. Si tratta di strumenti gestiti mediante computer studiati in modo specifico per le applicazioni di biologia molecolare su piastre per microtitolazione. I separatori MultiMACS Separator/MultiMACS 96thermo Separator sono concepiti in modo da garantire un funzionamento sicuro dopo l'installazione, se utilizzati da personale addestrato secondo le norme generali di sicurezza e le istruzioni fornite nel presente manuale d'uso. Le linee guida riportate nella presente sezione illustrano i potenziali rischi associati al funzionamento dello strumento e forniscono importanti informazioni in materia di sicurezza atte a ridurre al minimo detti rischi. Seguendo scrupolosamente le istruzioni, è possibile proteggere se stessi e le attrezzature dai possibili pericoli e garantire un ambiente di lavoro sicuro. Qualora lo strumento venga impiegato in modo non conforme alle istruzioni fornite dal fabbricante, la sicurezza potrebbe risultare compromessa.

Importante: leggere e seguire tutte le istruzioni operative contenute nel presente manuale e prestare particolare attenzione alle avvertenze indicate sullo strumento. Conservare il presente manuale d'uso e tutte le altre istruzioni operative e di sicurezza fornite insieme alla strumento in un luogo accessibile a tutti gli operatori, per future consultazioni.

Importante: MultiMACS Separator/MultiMACS 96thermo Separator sono destinati unicamente all'impiego interno. Non utilizzare lo strumento in ambienti classificati come luoghi pericolosi, quali gli ambienti con forte concentrazione di ossigeno.

Per ulteriori informazioni relative all'installazione della strumentazione, contattare le autorità locali competenti per la fornitura di energia elettrica, in materia di edilizia, manutenzione o sicurezza.

Qualora abbiate serie preoccupazioni in merito all'impiego sicuro dello strumento, contattare il rivenditore Miltenyi Biotec autorizzato o chiamare il servizio di assistenza clienti Miltenyi Biotec.

Precauzioni generali

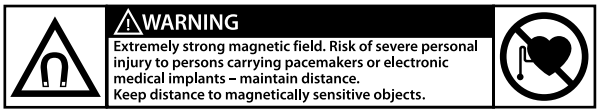
Per ridurre i potenziali rischi associati all'utilizzo di MultiMACS Separator/MultiMACS 96thermo Separator, osservare le precauzioni generali di seguito elencate. Il mancato rispetto di tali precauzioni può comportare il rischio di incendi, lesioni personali e/o danni allo strumento.

Pericolo di scossa elettrica e di incendio

Warning: I dispositivi elettrici presentano il rischio di scosse elettriche. Per ridurre i rischi di scossa elettrica, non aprire alcun coperchio, tranne i coperchi di accesso anteriore di MultiMACS Separator/ MultiMACS 96thermo Separator, né altri accessori hardware forniti da Miltenyi Biotec. Tutti gli altri coperchi dello strumento e gli accessori hardware possono essere rimossi esclusivamente da personale autorizzato. Prestare particolare attenzione quando si manipolano liquidi. Pulire immediatamente eventuali schizzi. Non lasciare che i liquidi penetrino all'interno del dispositivo. Staccare il cavo dell'alimentazione prima di pulire manualmente lo strumento MultiMACS Separator/MultiMACS 96thermo Separator.

Esistono potenziali rischi in caso di utilizzo di uno strumento MultiMACS Separator/MultiMACS 96thermo Separator aperto, caduto o danneggiato, in caso di infiltrazione di liquidi all'interno dello strumento, in caso di penetrazione di oggetti nello strumento attraverso le fessure di ventilazione o in caso di inserimento accidentale di oggetti nello strumento. In caso di presenza di fiamme o fumo, spegnere immediatamente il MultiMACS Separator/ MultiMACS 96thermo Separator, staccare lo strumento dalla presa di corrente e contattare un rivenditore Miltenyi Biotec autorizzato o il servizio di assistenza clienti Miltenyi Biotec. È severamente vietato utilizzare uno strumento danneggiato o provvisto di cavo dell'alimentazione danneggiato.

Forte campo magnetico



Warning: MultiMACS Separator/MultiMACS 96thermo Separator sono provvisti di un magnete estremamente potente sotto forma di piastre per microtitolazione, il **MultiMACS 96 Magnet** (MultiMACS Magnet)/**MultiMACS 96thermo Magnet.** Tenere i supporti magnetici (come carte di credito, nastri magnetici e floppy disk), i dispositivi elettronici (come apparecchi acustici, pacemaker, strumenti di misurazione e controllo, computer e orologi) e strumenti e oggetti magnetizzati ad una distanza minima di 80 cm dal coperchio del magnete. Questi oggetti potrebbero essere danneggiati o il loro funzionamento essere compromesso dal campo magnetico. Il **display MultiMACS** a forma di prisma contiene dei magneti meno potenti, pertanto si raccomanda di tenerlo ad una distanza di almeno 30 centimetri dal materiale sensibile ai campi

magnetici elencato in precedenza. La forza di attrazione tra due magneti o tra un magnete e il materiale magnetizzabile aumenta sensibilmente se la distanza tra essi diminuisce. Si raccomanda pertanto di tenere gli oggetti magnetici, inclusi altri magneti e display MultiMAC, ad una distanza di sicurezza.

Pericolo di schiacciamento e di taglio

⚠CAUTION

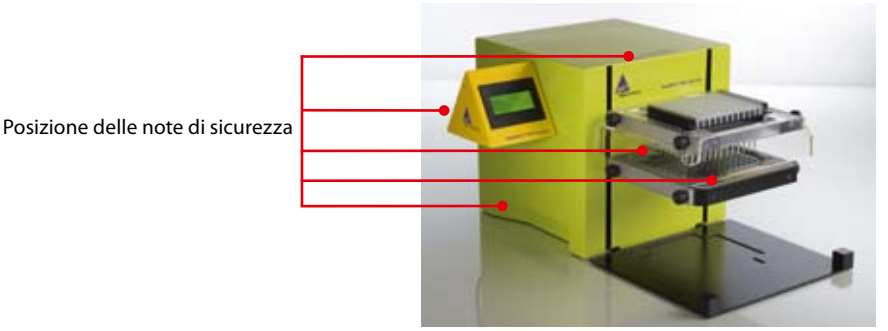
Tray in motion during operation.
Hazard of crushing fingers.
Operate only with attached protection screen.
Device must be able to be tilted backwards.

Warning: Tenere le dita, ecc., lontano da tutte le parti in movimento dello strumento MultiMACS Separator/MultiMACS 96thermo Separator per evitare lesioni da schiacciamento e ferite da taglio o danni allo strumento. Non collocare alcun oggetto sopra al MultiMACS Separator/MultiMACS 96thermo Separator. Lasciare uno spazio di almeno 20 centimetri sopra il MultiMACS Separator/ MultiMACS 96thermo Separator onde consentire allo strumento di inclinarsi all'indietro, riducendo in tal modo i danni al minimo. Qualora un oggetto venga posto accidentalmente sotto al magnete che si abbassa, la resistenza fisica dell'oggetto fa ribaltare lo strumento all'indietro, in modo analogo ad un sollevatore idraulico. Non bypassare alcun dispositivo o misura di sicurezza. Mantenere l'idoneo schermo protettivo fissato al MultiMACS Separator/ MultiMACS 96thermo Separator quando si opera in modalità manuale.

Attenzione: per l'impiego con un sistema automatizzato di manipolazione dei liquidi può essere necessario rimuovere lo schermo protettivo. Qualora si utilizzi il MultiMACS Separator/ MultiMACS 96thermo Separator integrato su un sistema automatizzato di manipolazione dei liquidi compatibile, accertarsi che il sistema combinato, vale a dire il MultiMACS Separator/ MultiMACS 96thermo Separator, MultiMACS Magnet/MultiMACS 96thermo Magnet e il dispositivo automatizzato di manipolazione dei liquidi, soddisfi tutti i criteri di sicurezza e di funzionamento, prima di avviare le procedure automatizzate. Tenere in particolare considerazione la sicurezza dell'operatore.

Posizione delle indicazioni di sicurezza sullo strumento

Osservare la posizione delle indicazioni di sicurezza sul MultiMACS Separator/MultiMACS 96thermo Separator e accertarsi che siano sempre perfettamente leggibili.



Installazione sicura

Questa sezione descrive i requisiti che deve soddisfare il luogo in cui viene collocato il MultiMACS Separator/MultiMACS 96thermo Separator onde garantirne un'installazione sicura e il funzionamento corretto. Leggere le istruzioni fornite nella presente sezione e accertarsi che il luogo prescelto sia adeguatamente predisposto, prima di collegare lo strumento alla presa di alimentazione.

Nel predisporre l'ambiente di installazione e nell'organizzare la disposizione delle attrezzature, tenere in considerazione le precauzioni descritte nella presente sezione, in modo da evitare guasti allo strumento e ridurre la possibilità di spegnimenti causati dall'ambiente.

Importante: vanno sempre osservate le istruzioni di sicurezza sul luogo di lavoro, le procedure di laboratorio e le norme relative alla salute e alla sicurezza del laboratorio, nonché alla prevenzione degli infortuni.

Accessori di montaggio

Non collocare il MultiMACS Separator/MultiMACS 96thermo Separator su un piano, un carrello, un supporto, un treppiede o una staffa poco stabile, che potrebbe provocare la caduta dello strumento, con la possibile conseguenza di lesioni personali gravi o di gravi danni allo strumento. Utilizzare unicamente piani, carrelli,

supporti, treppiedi o staffe raccomandati da Miltenyi Biotec o venduti insieme allo strumento. Non collocare il MultiMACS Separator/MultiMACS 96thermo Separator su sistemi incassati o in spazi angusti, come uno scaffale, a meno che non siano stati concepiti specificamente per accogliere lo strumento e a condizione che vi sia una ventilazione adeguata e che siano state seguite le istruzioni di montaggio dello strumento.

Circolazione dell'aria

Lo strumento non deve essere collocato in prossimità di radiatori, stufe o altri dispositivi (inclusi gli amplificatori) che producono calore. Accertarsi che via sia un'adeguata circolazione d'aria attorno al MultiMACS Separator/MultiMACS 96thermo Separator, mantenendo uno spazio libero di almeno 15 centimetri su ogni lato durante il funzionamento, onde assicurare un adeguato raffreddamento dello strumento. Evitare l'esposizione diretta ai raggi solari. Le fessure e le aperture dello strumento sono necessarie per la ventilazione e non devono essere in alcun caso ostruite o coperte, poiché garantiscono il funzionamento corretto del MultiMACS Separator/MultiMACS 96thermo Separator e proteggono il dispositivo dal surriscaldamento. Non inserire mai corpi estranei nelle aperture dello strumento.

Acqua e umidità

Non utilizzare lo strumento in ambienti bagnati o umidi. Evitare ambienti ad elevata umidità o condizioni di condensa e proteggere lo strumento dagli schizzi d'acqua.

Prodotto con messa terra

Lo strumento è dotato di un sistema di alimentazione a tre fili ed è provvisto di spina con un terzo polo per la messa a terra. La spina può essere inserita unicamente in una presa di corrente con messa a terra, per ragioni di sicurezza. Non cercare di inserire la spina in una presa sprovvista di messa a terra. Qualora non riusciate ad inserire la spina nella presa, vi consigliamo di contattare il vostro elettricista di fiducia per sostituire la presa.

Fonti di alimentazione

Lo strumento deve essere alimentato unicamente dalla fonte indicata sulla targa relativa alle caratteristiche di alimentazione del prodotto. In caso di domande sul tipo di alimentazione da usare, contattare il rivenditore Miltenyi Biotec autorizzato o la società elettrica locale.

Non utilizzare prolunghe o ciabatte multi-presa. Non sovraccaricare la presa di corrente. Il carico complessivo del sistema non deve superare l'80% della potenza del circuito.

Accessibilità

Accertarsi che l'interruttore principale e l'attacco del cavo dell'alimentazione siano facilmente accessibili e posti quanto più vicino possibile all'operatore dello strumento. Qualora si renda necessario interrompere l'alimentazione, staccare il cavo dalla presa di corrente.

Periferiche

Collegare unicamente periferiche conformi a EN/IEC 60950 al connettore RS232 contrassegnato con "com". Collegare unicamente apparecchi MultiMACS originali ai connettori contrassegnati con "module 1" e "module 2", e il display MultiMACS al connettore contrassegnato con "display". Collegare il magnete MultiMACS 96thermo Magnet unicamente al connettore contrassegnato con "module 1" sullo strumento MultiMACS Separator/MultiMACS 96thermo Separator.

Funzionamento, manutenzione, trasporto e smaltimento sicuri

Seguire le istruzioni di seguito riportate onde assicurare che il funzionamento, la manutenzione, il trasporto e lo smaltimento del vostro MultiMACS Separator/MultiMACS 96thermo Separator avvengano in modo corretto e sicuro.

Importante: vanno sempre osservate le istruzioni di sicurezza sul luogo di lavoro, le procedure di laboratorio e le norme relative alla salute e alla sicurezza del laboratorio, nonché alla prevenzione degli infortuni.

Funzionamento sicuro

Qualora lo strumento non funzioni correttamente e le istruzioni o i messaggi visualizzati sullo schermo invitino a contattare l'assistenza tecnica, la sicurezza di impiego non è più garantita. Spegnere immediatamente il MultiMACS Separator/MultiMACS 96thermo Separator, staccare lo strumento dalla presa dell'alimentazione e contattare un rivenditore Miltenyi Biotec autorizzato o il servizio di assistenza clienti Miltenyi Biotec.

Manutenzione

Importante: se non diversamente indicato nel presente manuale d'uso o in altri documenti forniti da Miltenyi Biotec, non eseguire autonomamente la manutenzione del vostro MultiMACS Separator/ MultiMACS 96thermo Separator. Gli interventi di manutenzione e riparazione devono essere eseguiti da personale qualificato. Interventi di manutenzione e riparazione scorretti o impropri del MultiMACS Separator/
MultiMACS 96thermo Separator possono rappresentare un pericolo per l'incolumità degli operatori, avere conseguenze imprevedibili, causare malfunzionamenti o danni, provocare l'usura prematura e una minore durata di esercizio dello strumento, nonché invalidare la garanzia.

Per i contratti di assistenza e manutenzione offerti da Miltenyi Biotec contattare il rappresentante Miltenyi Biotec locale o consultare il sito www.miltenyibiotec.com/support.

Importante: qualora si rendano necessari la sostituzione o l'impiego di pezzi di ricambio, accertarsi che il tecnico utilizzi unicamente pezzi di ricambio originali Miltenyi Biotec o ricambi di altri fabbricanti specificati e raccomandati da Miltenyi Biotec. L'impiego di pezzi di ricambio non autorizzati può causare il malfunzionamento del dispositivo e compromettere il risultato della separazione cellulare. Miltenyi Biotec non fornisce alcuna garanzia né si assume la responsabilità per eventuali guasti o danni derivanti dall'impiego di pezzi di ricambio inappropriati. Al termine dell'intervento di assistenza o di riparazione, chiedere al tecnico Miltenyi Biotec autorizzato di eseguire tutti i controlli di sicurezza previsti dalla procedura di riparazione, onde assicurarsi che lo strumento funzioni correttamente.

Utilizzare esclusivamente le funzioni opzionali e gli aggiornamenti raccomandati da Miltenyi Biotec.

Pulizia

Staccare il MultiMACS Separator/MultiMACS 96thermo Separator dalla presa di corrente prima di eseguire la pulizia. Non utilizzare detergenti liquidi o aerosol; utilizzare sempre un panno umido.

Materiale pericoloso

Qualora si utilizzi o sia stato usato del materiale a rischio biologico, l'operatore deve indossare dispositivi di protezione personale conformi alle avvertenze e alle precauzioni relative alle sostanze impiegate. Indossare guanti protettivi, indumenti e occhiali di protezione per prevenire il contatto con la pelle e gli occhi. L'impiego di dispositivi di protezione difettosi o inadeguati rappresenta un rischio per l'incolumità dell'operatore. Lo strumento MultiMACS Separator/MultiMACS 96thermo Separator va utilizzato con uno schermo protettivo in caso di trattamento di materiali sconosciuti o pericolosi. Qualora sia stato usato o versato del materiale pericoloso, il sistema deve essere accuratamente decontaminato.

Le colonne, le piastre, le provette e tutti gli altri materiali di consumo entrati in contatto con campioni a rischio biologico vanno sterilizzati in autoclave prima di essere smaltiti. I rifiuti liquidi vanno autoclavati o decontaminati utilizzando un disinfettante idoneo per il patogeno specifico, ed es. candeggina al 10%, alcol isopropilico o etanolo al 70%.

Lo smaltimento dei rifiuti deve avvenire in conformità alle disposizioni locali vigenti.

Trasporto

Lo strumento MultiMACS Separator/MultiMACS 96thermo Separator va trasportato con cautela in imballaggi specificati da Miltenyi Biotec. In caso di cadute o di vibrazioni eccessive, lo strumento può subire dei danni interni. Qualora si renda necessario rispedire lo strumento al produttore per interventi di manutenzione, decontaminare lo strumento da eventuali materiali pericolosi prima della spedizione. In caso di domande circa la decontaminazione o il trasporto adeguati, contattare l'assistenza tecnica.

Smaltimento

Contattare il servizio di assistenza tecnica per lo smaltimento dello strumento.

Compatibilità elettromagnetica

Soltanto per gli USA. Eventuali cambiamenti o modifiche dello strumento non approvati espressamente da Miltenyi Biotec possono inficiare il diritto all'uso dello strumento in conformità all' art. 15 47 CFR.

Información importante

1

Lea la siguiente información antes de usar el instrumento/ equipo

Por favor, lea íntegramente la información contenida en este manual de usuario antes de utilizar el instrumento/equipo. La lectura y/o seguimiento incorrectos de estas directrices pueden llevar a un uso, manejo o mantenimiento incorrectos del equipo, lo cual puede poner en peligro a sus usuarios, producir resultados impredecibles, derivar en un mal funcionamiento del aparato o que éste sufra daños así como causar un desgaste prematuro y reducir el tiempo de vida del instrumento, pudiendo anular su garantía.

Mantenga este manual de usuario en un lugar seguro, al alcance de todo aquel que esté usando la Unidad de Separación MultiMACS™ (separador MultiMACS) o la Unidad de Separación MultiMACS™ 96thermo (separador MultiMACS 96thermo).

El presente capítulo describe las instrucciones de seguridad y los requisitos de emplazamiento de su separador MultiMACS/separador MultiMACS 96thermo. Las siguientes advertencias y precauciones tienen como objetivo evitar daños personales o materiales.

Símbolos y niveles de peligro

Disposición de advertencias de seguridad

Ejemplo

⚠WARNING

Extremely strong magnetic field. Risk of severe personal injury to persons carrying pacemakers or electronic medical implants – maintain distance.
Keep distance to magnetically sensitive objects.

Las advertencias de seguridad informan al usuario sobre riesgos potenciales en caso de que no se sigan las advertencias y precauciones resumidas a continuación. El símbolo que aparece a la izquierda especifica el riesgo de que se trata. El nivel de peligro que encabeza la advertencia clasifica el tipo de peligro, tal y como se

mencionó más arriba. El nivel, tipo y fuente del peligro así como las posibles consecuencias, prohibiciones y medidas correctivas se indican tal y como aparece a continuación.

Símbolos y niveles de peligro

El siguiente recuadro recoge un glosario ilustrado que describe los símbolos usados en el presente manual de usuario y en el separador MultiMACS /separador MultiMACS 96thermo.

⚠ CAUTION Indica una situación de peligro que si no se impide puede producir lesiones leves o moderadas.

⚠ WARNING Indica una situación de peligro que si no se impide puede producir la muerte o lesiones graves.

⚠ Atención, consulte el manual de usuario para obtener más información y proceda con precaución.
Las advertencias incluyen el riesgo de dañar el equipo, las lesiones personales graves o la muerte.

Peligro de aplastamiento o corte.
Riesgo de que se aplaste o corte alguna parte del cuerpo debido a peligros mecánicos.

Campo magnético intenso
El campo magnético puede interferir en objetos magnetizables e instrumentos electrónicos o dañar portadores magnéticos de información. Riesgo de producir lesiones personales graves a personas que lleven un marcapasos o implantes médicos electrónicos.

Riesgo de contaminación si se usan sustancias peligrosas biológicamente. Indica el riesgo de muerte, lesiones graves al operario del aparato o daños al equipo debido a sustancias biológicas potencialmente peligrosas.

Indica el riesgo de muerte o lesiones graves al operario del aparato debido a un voltaje peligroso.

⎓ Corriente continua
El equipo está marcado con el tipo de suministro: corriente continua.

I Encendido (suministro)

O Apagado (suministro)

La documentación del equipo debe ser consultada antes de proceder con la instalación y operación del sistema

Advertencias y precauciones

El separador MultiMACS /separador MultiMACS 96thermo emplea tecnología punta. Es un instrumento controlado por ordenador especialmente desarrollado para su uso en el campo de la biología molecular en formato de placas de microtitulación. El separador MultiMACS /separador MultiMACS 96thermo está diseñado para funcionar con seguridad una vez instalado y siempre que sea manejado por personal cualificado de conformidad con las normas generales de seguridad y las instrucciones contenidas en este manual del usuario. Las directrices del presente capítulo explican los riesgos potenciales asociados al manejo del instrumento y suministran información importante a fin de reducir dichos riesgos al mínimo. Si sigue cuidadosamente las instrucciones, se protegerá a sí mismo y al equipo de posibles peligros y creará un ambiente de trabajo seguro. Si este instrumento es manejado de un modo no previsto por su fabricante la seguridad se verá mermada.

Importante: Por favor, lea y siga todas las instrucciones de uso recogidas en el presente manual de usuario y preste atención a todas las advertencias que aparecen en el instrumento. Guarde para futuras consultas este manual y todas las demás instrucciones de seguridad o de funcionamiento recibidas junto con el instrumento en un lugar accesible para todos sus usuarios.

Importante: El separador MultiMACS /separador MultiMACS 96thermo está diseñado para ser usado exclusivamente en interior. No utilice el equipo en áreas clasificadas como peligrosas como ambientes con alta concentración de oxígeno.

Póngase en contacto con la autoridad local competente para el suministro de electricidad, construcción de edificios, mantenimiento o seguridad para obtener más información sobre la instalación del equipo.

Si tiene serias dudas sobre el manejo seguro del equipo, póngase en contacto con su proveedor de servicios de Miltenyi Biotec autorizado o llame al servicio de atención al cliente de Miltenyi Biotec.

Precauciones generales

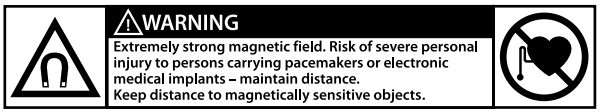
Para reducir los potenciales riesgos asociados al manejo del separador MultiMACS / separador MultiMACS 96thermo, por favor observe las siguientes precauciones generales. En caso de no seguir estas precauciones, puede producirse un incendio o causar daños corporales o al equipo.

Peligro de descarga eléctrica y propagación de fuego

Warning: Los aparatos eléctricos pueden producir una descarga eléctrica. Para reducir este riesgo, no abra ninguna cubierta ni abra tampoco ningún otro accesorio de harware suministrado por Miltenyi Biotec. Cualquier cubierta asi como hardware accesorios deberán ser retirados únicamente por personal autorizado. Se debe tener especial cuidado cuando se manejen líquidos. Limpie inmediatamente los líquidos vertidos. Impida que éstos accedan al interior del aparato. Desenchufe el cable de electricidad antes de proceder a limpiar manualmente el separador MultiMACS/separador MultiMACS 96thermo.

Existe un riesgo potencial en caso de usar separador MultiMACS/separador MultiMACS 96thermo abierto, que se haya caído o que esté averiado, si se han derramado líquidos en el equipo, si se ha colado algún objeto por las ranuras de ventilación o si ha caído algo dentro del equipo. Si salen llamas o humo, apague inmediatamente el separador MultiMACS/separador MultiMACS 96thermo, desenchúfelo y póngase en contacto con un proveedor de servicios de Miltenyi Biotec autorizado o con el servicio técnico de Miltenyi Biotec. Está expresamente prohibido utilizar un instrumento estropeado o cuyo cable de corriente esté dañado.

Campo magnético intenso



Warning: El separador MultiMACS/separador MultiMACS 96thermo está equipado con un imán extremadamente potente en formato de placa de microtitulación, el imán MultiMACS 96 (imán MultiMACS)/imán MultiMACS 96thermo. Mantenga todos los portadores de información magnética (tarjetas de crédito, cintas magnéticas y disquetes), todos los equipos electrónicos (audífonos, marcapasos, instrumentos de medición y control, ordenadores y relojes) y las herramientas y objetos magnetizables a una distancia mínima de 80 cm de la cubierta magnética. El campo magnético puede alterar o dañar dichos objetos. La pantalla MultiMACS en forma de prisma contiene imanes menos potentes; de todos modos, mantenga una distancia mínima de 30 cm del material sensible a los imanes descrito más arriba. La fuerza de atracción entre dos imanes o entre un imán y un objeto magnetizable aumenta con la proximidad. Por ello, mantenga el material magnético -incluidos cualquier otro imán y

pantalla MultiMACS- a una distancia segura.

Peligro de aplastamiento y corte

⚠CAUTION

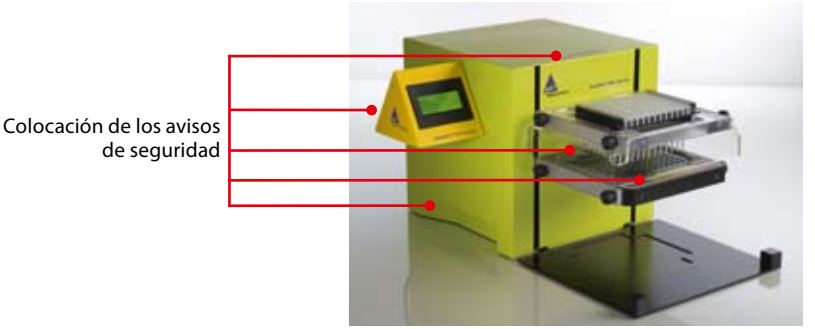
Tray in motion during operation.
Hazard of crushing fingers.
Operate only with attached protection screen.
Device must be able to be tilted backwards.

Warning: Mantenga los dedos y otras partes del cuerpo alejados de las partes móviles del separador MultiMACS/separador MultiMACS 96thermo para evitar que sufran aplastamientos y/o cortaduras, o que el instrumento sufra daños. No coloque ningún objeto encima del separador MultiMACS/separador MultiMACS 96thermo. Deje 20 cm de separación encima del separador MultiMACS /separador MultiMACS 96thermo para asegurar que el instrumento puede inclinarse para atrás y de ese modo evitar que sufra daños: si algún objeto ha sido colocado por accidente bajo el imán descendente, la resistencia física del mismo provocará que el instrumento se incline para atrás, de modo similar a un gato hidráulico. No olvide ninguna de las medidas ni equipos de seguridad. Mantenga la correspondiente pantalla de seguridad colocada junto al separador MultiMACS/separador MultiMACS 96thermo mientras lo esté manejando manualmente.

Precaución: Para usarlo en combinación con un robot para el manejo de líquidos puede ser necesario retirar la pantalla de seguridad. Cuando se use el separador MultiMACS/separador MultiMACS 96thermo integrado en en un sistema automático compatible con el manejo de líquidos, asegúrese de que el sistema combinado, por ejemplo, separador MultiMACS/separador MultiMACS 96thermo, imán MultiMACS/imán MultiMACS 96thermo y el robot para el manejo de líquidos cumplen todos los requisitos de seguridad y funcionamiento antes de iniciar procesos automatizados. Tenga especial consideración con la seguridad del operario.

Situación de los avisos de seguridad en el instrumento/equipo

Por favor, fíjese en dónde están colocados los avisos de seguridad en el separador MultiMACS/separador MultiMACS 96thermo, y vele porque se mantengan en un estado perfectamente legible.



Instalación segura

El presente capítulo describe los requisitos que debe reunir el lugar donde desea instalar y operar el separador MultiMACS/separador MultiMACS 96thermo. Lea las instrucciones de este capítulo y asegúrese de que el emplazamiento está correctamente preparado antes de conectar el instrumento a la corriente eléctrica.

Cuando planee la distribución del emplazamiento y la ubicación del equipo tenga en cuenta las precauciones recogidas en este capítulo para evitar averías del instrumento y reducir la posibilidad del cierre de la empresa por razones medioambientales.

Importante: En todo momento se debe observar la normativa nacional de seguridad en el trabajo, las normas del laboratorio, y los estándares de salud y seguridad en el laboratorio y de prevención de accidentes.

Accesorios de montaje

No coloque el separador MultiMACS/separador MultiMACS 96thermo sobre una mesa, carrito, estante, trípode o soporte inestable puesto que podría caerse, causando lesiones corporales graves y/o daños graves al equipo. Utilice exclusivamente una mesa, carrito, estante, trípode o soporte recomendado por Miltenyi Biotec o vendido junto con el instrumento. No coloque el separador MultiMACS/separador MultiMACS 96thermo en un mueble empotrado o un espacio

reducido como por ejemplo una estantería, a menos que el mismo haya sido diseñado específicamente para dar cabida al instrumento, que provea una ventilación adecuada y que se hayan seguido las instrucciones de montaje del equipo.

Circulación de aire

El instrumento no debería ser colocado cerca de radiadores, rejillas de calor, estufas o cualquier otra pieza de equipamiento (incluidos los amplificadores) que produzca calor. Permita que circule suficiente aire alrededor del separador MultiMACS/separador MultiMACS 96thermo -deje al menos 15 cm de separación en todas direcciones- mientras está en funcionamiento para garantizar que el instrumento se enfríe adecuadamente. Evite la exposición directa a la luz solar. Las ranuras y aberturas del instrumento sirven para que se ventile y no deben ser bloqueadas o cubiertas, puesto que contribuyen a un funcionamiento seguro del separador MultiMACS/separador MultiMACS 96thermo, evitando que se recaliente. No introduzca ningún cuerpo extraño por las aberturas del instrumento.

Agua y humedad

No use el instrumento en un lugar húmedo. Evite la elevada humedad o la condensación y proteja a la máquina de salpicaduras.

Producto conectado a tierra

El instrumento está equipado con un tipo de enchufe de tres varillas que tiene un tercer contacto para toma de tierra. Este enchufe sólo encaja en una toma conectada a tierra. Se trata de una medida de seguridad. No intente enchufarlo en una toma de electricidad no conectada a tierra. Si el enchufe no encaja, póngase en contacto con un electricista para que reemplace la toma de corriente.

Fuentes eléctricas

Sólo se debería maniobrar el instrumento utilizando la fuente eléctrica indicada en la etiqueta con los valores eléctricos del producto. Si tiene alguna pregunta sobre qué tipo de fuente eléctrica utilizar, póngase en contacto con su proveedor de servicios de Miltenyi Biotec autorizado o con su compañía eléctrica. No utilice alargadores o regletas. No sobrecargue la toma de corriente. La carga total del sistema no debe sobrepasar el 80% de la rama del circuito.

Accesibilidad

Asegúrese de poder acceder fácilmente tanto al interruptor principal como al conector para el cable de corriente eléctrica y de que éstos estén situados tan cerca del operario como sea posible. Si es necesario desconectar el suministro eléctrico, desenchufe el cable de la toma de corriente.

Aparatos periféricos

Sólo conecte aparatos periféricos que cumplan la normativa EN/IEC 60950 para el conector RS232 etiquetado con “com”. Además, conecte sólo equipo original MultiMACS a los conectores con la etiqueta “module 1” y “module 2”, y la pantalla MultiMACS al conector con la etiqueta “display”. Sólo conecte el imán MultiMACS 96thermo al conector con la etiqueta “module 1” en el separador MultiMACS/separador MultiMACS 96thermo.

Manejo, mantenimiento, transporte y eliminación seguros

Observe las siguientes instrucciones para asegurar un manejo, mantenimiento, transporte y eliminación de su separador MultiMACS /separador MultiMACS 96thermo seguros.

Importante: En todo momento se debe observar la normativa nacional de seguridad en el trabajo, las normas del laboratorio, y los estándares de salud y seguridad en el laboratorio y de prevención de accidentes.

Manejo seguro

Si el instrumento no funciona correctamente y las instrucciones o mensajes que aparecen en la pantalla aconsejan ponerse en contacto con el servicio técnico, el uso del instrumento ya no es seguro. Apague inmediatamente el separador MultiMACS/separador MultiMACS 96thermo, desenchúfelo y póngase en contacto con el proveedor de servicios de Miltenyi Biotec autorizado o con el servicio de atención al cliente de Miltenyi Biotec.

Revisión técnica

Importante: Salvo que el presente manual de usuario u otra documentación de Miltenyi Biotec especifique lo contrario, no revise usted mismo el separador MultiMACS/separador MultiMACS 96thermo. Las revisiones y reparaciones deben ser llevadas a cabo por personal cualificado. Las revisiones y reparaciones del separador MultiMACS/separador MultiMACS 96thermo incorrectamente realizadas pueden poner en peligro a sus usuarios, producir resultados impredecibles, derivar en un mal funcionamiento del aparato o que éste sufra daños así como causar un desgaste prematuro y reducir el tiempo de vida del instrumento pudiendo anular su garantía.

Pregunte a su representante de Miltenyi Biotec por los contratos de servicios de asistencia técnica de Miltenyi Biotec o consulte www.miltenyibiotec.com/support.

Importante: Cuando se necesiten piezas de recambio o de repuesto, asegúrese de que el proveedor de servicios utiliza exclusivamente piezas originales de Miltenyi Biotec o de otros fabricantes especificados y recomendados por Miltenyi Biotec. El uso de piezas de recambio o de repuesto no autorizadas puede producir un mal funcionamiento del aparato y alterar los resultados de la separación celular. Miltenyi Biotec no cubrirá la garantía ni aceptará ninguna responsabilidad por la avería de aparatos o por los daños resultantes del uso de piezas de recambio o de repuesto inapropiadas. Una vez completado el servicio o la reparación, haga que su proveedor de servicios autorizado por Miltenyi Biotec realice todos los controles de seguridad requeridos por el proceso de reparación para asegurarse de que el instrumento está en buenas condiciones de funcionamiento.

Utilice exclusivamente las opciones y actualizaciones recomendadas por Miltenyi Biotec.

Limpieza

Desenchufe el separador MultiMACS /separador MultiMACS 96thermo de la toma de corriente antes de proceder a su limpieza. No emplee productos de limpieza líquidos ni aerosoles y use siempre un trapo húmedo.

Sustancias peligrosas

Si se utilizan o se han utilizado sustancias biológicamente peligrosas, el operario debería utilizar el equipo de seguridad que aparece en las señales de aviso de las sustancias empleadas. Póngase guantes, ropa y gafas de seguridad para evitar el contacto con la piel y con los ojos. Un equipo de seguridad defectuoso o inadecuado puede poner en peligro al operario. El separador MultiMACS/separador MultiMACS 96thermo deberá ser manejado dentro de una campana de seguridad si se procesan sustancias peligrosas o desconocidas. Si se han utilizado sustancias peligrosas o éstas se han derramado, se debe velar por una desinfección meticulosa del sistema.

Las columnas, placas, tubos de ensayo y cualquier otro objeto que haya estado en contacto con las muestras peligrosas deberán ser autoclavados antes de poder volver a ser utilizados. 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%.

La eliminación de los residuos debe cumplir la normativa nacional.

Transporte

El separador MultiMACS/separador MultiMACS 96thermo debe ser transportado con cuidado en el embalaje especificado por Miltenyi Biotec. Se pueden producir daños internos si es expuesto a vibraciones excesivas o si se cae. En caso de que sea necesario devolver el instrumento a su fabricante para su revisión, límpielo y desinféctelo de cualquier sustancia peligrosa antes de realizar el envío. Si tiene preguntas relativas a la descontaminación o el envío, póngase en contacto con el servicio de asistencia técnica.

Eliminación del instrumento/equipo

Póngase en contacto con el servicio de asistencia técnica si desea desprenderse de su instrumento.

Compatibilidad electromagnética

Sólo para EE°UU. Los cambios y modificaciones del equipo que no estén expresamente aprobados por Miltenyi Biotec pueden invalidar su autorización para operarlo conforme a la parte 15 del título 47 del Código de Regulaciones Federales (CFR).

Introduction

2

MultiMACS™ M96 Separator/ MultiMACS M96thermo Separator

Note: Although only the MultiMACS Separator is mentioned, the following text refers to both MultiMACS M96 Separator and MultiMACS M96thermo Separator.

The MultiMACS™ M Separator is a magnetic separator specifically developed for molecular biology applications, like nucleic acid purification or protein isolation, in microtiter plate format. Thus, Miltenyi Biotec's magnetic bead technology is easily applicable for automated high-throughput procedures.
The MultiMACS M Separator can be employed as a semi-automated bench-top instrument or integrated into fully automated liquid-handling platforms. A strong 96-well magnet is used to bind and purify magnetically labeled biomolecules with Multi-96 Columns or Multi-8 Columns. Then, target molecules are eluted.

The key components of both MultiMACS Separators are shown in figure 1a and 1b.

The **MultiMACS 96 Magnet** generates a high-gradient magnetic field to bind magnetically labeled molecules in the columns. The **MultiMACS Column Holder** does hold a MultiColumn frame with up to twelve Multi-8 Columns (up to 96 columns).

The MultiMACS 96 Magnet can be moved vertically (up and down) together with or independent from the MultiMACS Column Holder. Thereby, either lowering of the columns into the wells of the magnet or the lifting of the columns out of the magnet is performed. The vertical movements of the Magnet and the Column Holder are driven by a motor, which is placed inside of the **MultiMACS Separator**. The motor is controlled either manually by utilizing the **Touchscreen Display** or fully automated using the **RS232-Interface**. Please note that the orientation of the MultiMACS 96 Magnet/MultiMACS 96thermo Magnet and the MultiMACS Column Holder can be changed from landscape to portrait and vice versa.

During a separation or purification process with the MultiMACS Separator, liquids such as samples, wash and elution buffers are dispensed onto the columns either manually, e.g., by an 8-channel pipette or automated by the liquid-dispensing device of a robot.
For manual processes, the plates are placed onto the Tip-Touch Plate, which can be moved horizontally back and forth to effectively deposit the last drop into the wells (tip-touch). In automated

processes, the plates are moved by a gripper to accomplish this. The Protective Screen is used to prevent injuries to fingers that can otherwise become trapped between MultiMACS Magnet/MultiMACS 96thermo Magnet and MultiMACS Column Holder in case the MultiMACS Separator/MultiMACS 96thermo Separator is operated manually.

The flow-through is collected in 96-well plates. The fraction containing the biomolecules of interest is collected in 96-well plates. For this purpose, the tips of the columns are inserted about 1 mm deep into the wells of the plates. Before removal of a plate, or separation of magnet and columns, any drop on the column tips has to be taken off. This avoids contamination of the magnet, cross-contamination between samples, and allows reproducible small elution volumes.

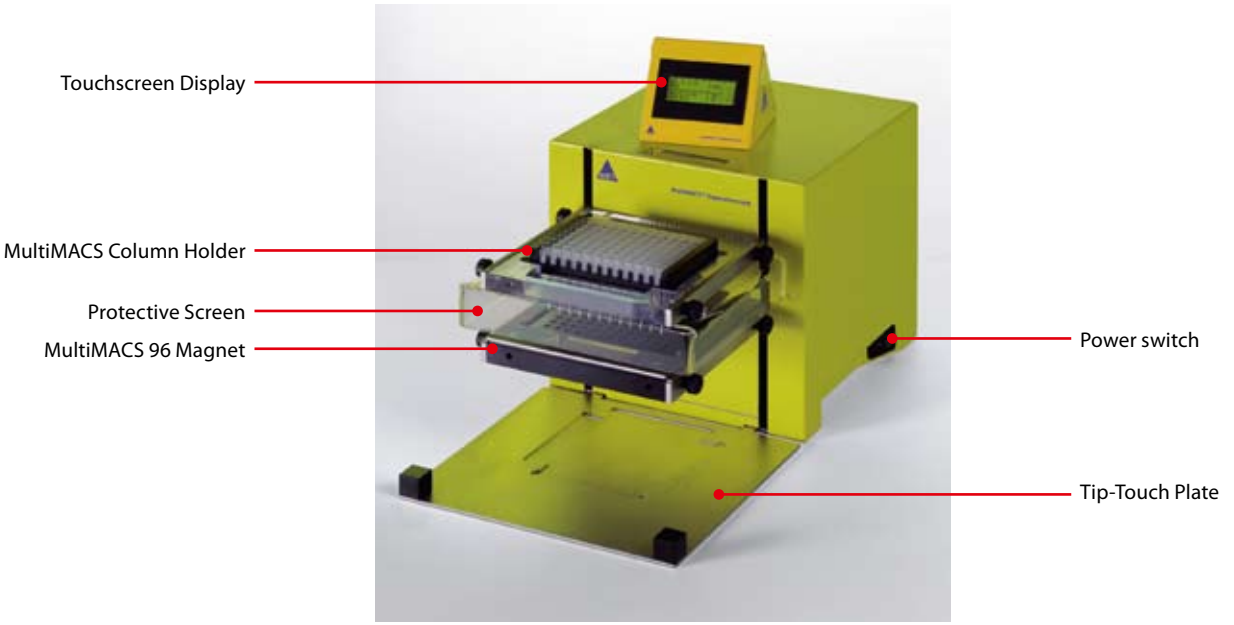


Figure 1a: The MultiMACS M96 Separator.

Figure 1b: The MultiMACS M96thermo Separator.

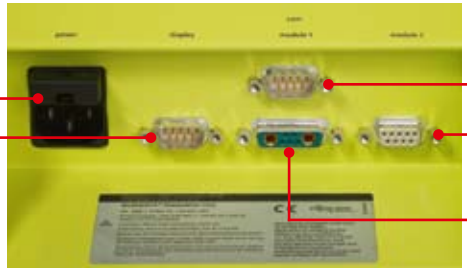


Figure 2: Electrical connectors on backside of the MultiMACS M Separator.

Applications

The MultiMACS M Separator can be used with MACS® MicroBeads for the parallel isolation of a wide variety of different biomolecules including:

- mRNA from cells, tissue, whole blood, and total RNA
- Biotinylated biomolecules
- Biomolecules interacting with biotinylated probes
- Proteins using specific antibodies (immunopurification)

Only with the MultiMACS 96thermo Separation Unit temperature-dependent enzymatic digestion can be performed at 37 °C or 42 °C:

- cDNA synthesis
- DNAse digestion reactions, etc.

Principle of MACS® Technology

By labeling with target-specific MicroBeads, molecules such as DNA, RNA, cDNA, or proteins are magnetically purified. MACS MicroBeads are conjugated to Oligo(dT) or antibodies specific either to proteins such as Protein A, Protein G, Streptavidin, epitope tag, or to single-stranded oligonucleotides; therefore, allowing fast, high-purity isolation of biomolecules.

The small size of the magnetizable MicroBeads, about 50 nm in dia-meter, facilitates their binding to target molecules. First, the colloidal MicroBead suspension is added to the sample, then the MicroBead-labeled sample is applied to the Multi-8/96 Column. Placed in the strong magnetic field of the MultiMACS Magnet/ MultiMACS M96thermo Magnet, the labeled molecules are retained in the magnetized column matrix, and the non-target molecules are efficiently rinsed out of the column. As the column flow relies on gravity, tedious centrifugation steps as well as removal of wash buffers after bead separation are eliminated.

For elution of the target molecules an appropriate elution buffer, which disrupts the binding between the target molecule and its immobilized ligand, is applied onto the column. Thus, the target molecule is collected in the eluate, and the MicroBeads remain in the column. A second option is the release of the target molecule–MicroBead complex by removing the column from the magnetic field. In this case, the complete complex can be eluted outside of the MultiMACS Separator using a buffer of choice.

The elution volume can be as low as 30 µL and allows a highly concentrated target fraction to be collected—convenient for further, small-volume downstream applications.

MultiMACS™ M96thermo Magnet components

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The cable holder keeps the supply cable in an appropriate position to prevent damage to the supply cable during magnet movement (fig. 1). Refer to chapter 4, Installation on how to install the MultiMACS M96thermo Magnet in the MultiMACS M Separator.

The specially designed MultiMACS 96thermo Protective Screen, as shown in figure 2, is used to prevent injuries to fingers that can otherwise become trapped between MultiMACS M96thermo Magnet and MultiMACS Column Holder in case the MultiMACS M Separator is operated manually.

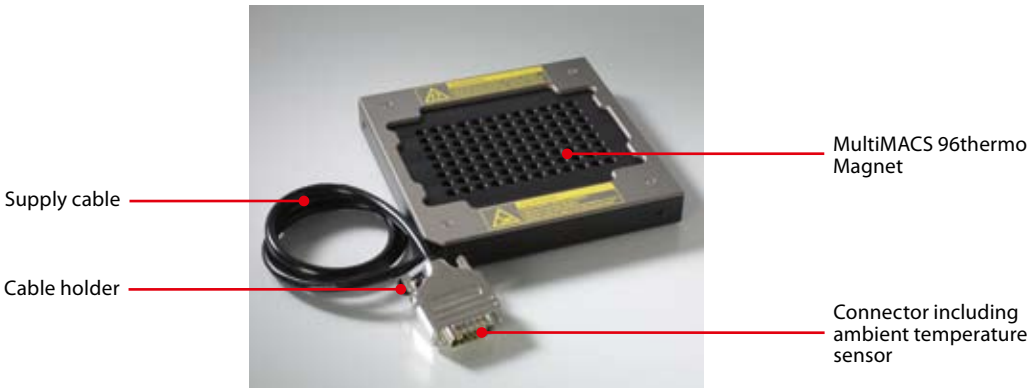

Figure 1: Key components of the MultiMACS M96thermo Magnet.

Figure 2: MultiMACS M96thermo Protective Screen.

Applications

96-well enzymatic reactions
Comparability and identical experimental conditions are essential for good experiment design — this is especially true for large-scale, multi-sample experiments. The MultiMACS M96thermo Separator delivers on these demands, minimizing the risk of handling errors.

The MultiMACS M96thermo Separator—or the corresponding MultiMACS M96thermo Magnet—enables researchers to perform multi-sample, parallel enzymatic reactions. For example, a one-step kit is offered that combines mRNA isolation with subsequent cDNA synthesis and purification. As all experimental steps are performed in the same column, loss of material is prevented.

While the molecules are immobilized by the enforced magnetic field in the columns, they are incubated with an enzymatic solution. The columns can be heated to 37 °C and 42 °C, respectively, ensuring optimal reaction conditions. The temperature range covers most reaction conditions of enzymes used in molecular biology applications. Solid-phase enzymatic reactions on Multi-96 Columns provide also an easy and efficient means of contact-free purification of biomolecules.

Contact-free purification
After the enzymatic incubation, buffer and reaction components can be easily and efficiently washed out by gravity flow: buffer solution is simply pipetted in the columns, rendering buffer removal, vacuum, or centrifugation steps unnecessary. Consequently, there is no loss of sample material due to tube-to-tube transfer—improving sensitivity of downstream assays like (real-time) polymerase chain reaction (PCR) or microarray analysis. Even complex, serial enzymatic reactions can be carried out in a single column. Thus, expensive and time-consuming purifications between single-enzyme reactions is not necessary.
Furthermore, enzymes may be immobilized in the column. This allows the enzymatic modification of substrates and subsequent elution of these while the enzyme remains on the column.

Technical data and specifications 3

MultiMACS™ M Separator

Technical specifications	
Model	MultiMACS™ M Separator
Input voltage	100 – 240 VAC, ~ 50/60 Hz
Current	3.5 A max.
Power consumption	200 W
Fuses	T3.15AH250V, 5 × 20 mm
RS232-Interface (labeled “com”)	Pin 1, 4, 6, 7, 8, 9 NC Pin 2 RXD Pin 3 TXD Pin 5 GND
DC-Output	Module 1 24 VDC / 8 A Module 2 24 VDC / 0.315 A

The MultiMACS™ Separation Unit is labeled as a protection class I device and must be plugged into a grounded power outlet, refer to chapter 1, page 10, General precautions.

Size: 230 × 435 × 230 mm
Weight: 11 kg
Conditions of operation: 15–30 °C with 0–85% humidity at a maximum altitude of 2000 m
Emission sound pressure level: At workstation < 70 dB(A)

The MultiMACS Separation Unit is not specified for use in the cold room. The MultiMACS Separation Unit can process up to 96 samples in parallel. The MultiMACS Separation Unit has been investigated by Underwriters Laboratories in accordance with the standards UL 61010-1 and CSAC22.2 No. 61010.1.

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Compliance was demonstrated by conformance to the following specification FCC 47 CFR Ch. 1 part 15, class B.

MultiMACS™ M96thermo Magnet

Technical specifications	
Model	Heated MultiMACS 96thermo Magnet
Input voltage	24 VDC
Current	8 A max.
Power consumption	165 W
RS232-Interface (labeled “com”)	Pin A1: 24V Pin A2: GND Pin 1: CAN L Pin 2: CAN H Pin 3,4,5: NC

Technical data and pin assignment for heated MultiMACS M96thermo Magnet

Multi-96 Column reaction temperatures: 37 °C, 42 °C, room temperature (tempering off).

The heated MultiMACS 96thermo Magnet is labeled as a protection class III device and must only be plugged into the connector labeled with “module 1” of the MultiMACS™ Separator, refer to chapter 1, Warnings and precautions.

Size: 154 mm x 154 mm x 23 mm
Weight: 1.5 kg
Conditions of operation: 15–30 °C with 0–85% humidity at a maximum altitude of 2000 m.
Conditions of transport and storage: Max. 47 °C.

The heated MultiMACS M96thermo Magnet is not specified for use in the cold room. The heated MultiMACS 96thermo Magnet has been investigated by Underwriters Laboratories in accordance with the standards UL 61010-1 Second Edition and CAN/CSA-C22.2 No. 61010-1 Second Edition Compliance was demonstrated by conformance to FCC 47 CFR Ch.1 part 15, class B.

Installation

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Caution: Carefully read chapter 1, Important information, before installation and strictly follow the guidelines listed in this chapter!

Safety functions

Protective Screen

The Protective Screen is used to prevent injuries to fingers that can otherwise become trapped between MultiMACS Magnet and MultiMACS Column Holder. Do not remove the Protective Screen if the MultiMACS Separator is operated manually in a semi-automated mode. Remove the Protective Screen only if used in liquid-handling platforms as it can interfere with gripping plates.

In case the Protective Screen is tilted while moving upwards, a light barrier detects the tilted position and the movement is stopped. An error message will appear on the screen.

Caution: Before starting automated processes with the MultiMACS Separator integrated into a compatible automated liquid-handling system, assure that the combined system, i.e., MultiMACS Separator and liquid-handling robot, meets all requirements of safety and function before starting automated processes. Thereby, particularly take the protection of the operator into account.

Note: Although only the MultiMACS Separator is mentioned, the following text refers to both MultiMACS M96 Separator and MultiMACS M96thermo Separator.

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Emergency break

The MultiMACS Separator contains a motor-driven magnet. If the magnet is moving, the following message appears on the display screen.

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MOVING TOUCH
HERE TO STOP!
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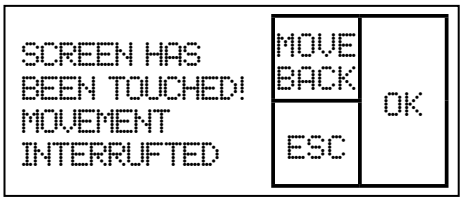
Caution: The MultiMACS Magnet is motor-driven. Keep away from all moving parts! Do not reach for plates, columns, or any item between the Tip-Touch Plate and the magnet! Do not reach between the magnet and the Column Holder, while the magnet is moving!

To stop the movement and halt the process in case of danger, accident, or malfunction, touch anywhere on the Touch Display. Then the following screen appears.



Touch OK to continue the move. Choose MOVE BACK to move the magnet to the last position. Select ESC to abort the process.

Note: Although only the MultiMACS Separator is mentioned, the following text refers to both MultiMACS M96 Separator and MultiMACS M96thermo Separator.

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Unpacking

Unpack the following equipment supplied with the MultiMACS Separation Unit/MultiMACS 96thermo Separation Unit:

- MultiMACS 96 Separation Unit/MultiMACS 96thermo Separation Unit including Touch Display, Protective Screen, Column Holder, and MultiMACS 96 Magnet/MultiMACS 96thermo Magnet
- Tip-Touch Plate
- User manual
- Null modem cable
- Country-specific line cord

Semi-automated bench-top use

1. Place the MultiMACS Separator on a clean, stable, and planar laboratory bench. Tilt the MultiMACS Separation Unit by lifting the device slightly and attach the Tip-Touch Plate into the holes beneath the instrument (as shown in fig. 3).

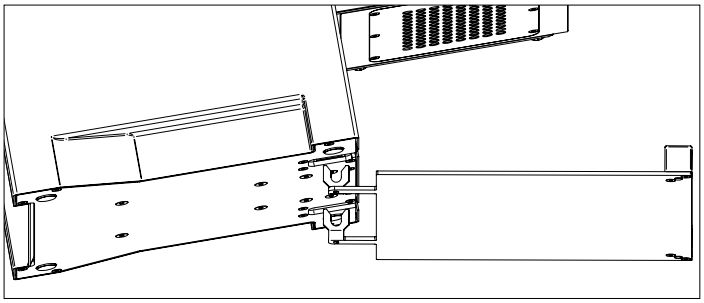

Figure 3: Tip-Touch Plate has to be attached in the corresponding slots.

2. Connect the MultiMACS™ Touch Display via its cable to the RS232 connector on the back of the MultiMACS Separation Unit labeled with "Display" (refer to fig. 2, page 61).

3. If applicable, connect the MultiMACS 96thermo Magnet supply cable to the socket labeled "module 1" on the back of the instrument.

Caution: Ensure that the supply cable does not touch any part of the MultiMACS Protective Screen, Column Holder, or Magnet. Otherwise the supply cable might be seriously damaged. Refer to chapter 1, Important information.

4. Connect the power cable to the outlet on the back of the MultiMACS Separator and to an appropriate electrical socket.

Note: The connector of the MultiMACS 96thermo Magnet supply cable includes an ambient temperature sensor. Ensure that air can circulate freely at the back of the MultiMACS Separator, and that the instrument is not exposed to heat source, e.g., a radiator or direct sunlight. Failure to do so may results in reduced performance.

Automated use in liquid-handling platforms

Caution: Before starting automated processes with the MultiMACS Separator integrated into a compatible automated liqid-handling system, assure that the combined system, i.e., MultiMACS Separator and liquid-handling robot, meets all requirements of safety and function before starting automated processes. Thereby, particularly take the protection of the operator into account.

1. Remove the Protective Screen if it interferes with gripper tool movements: Unscrew all six screws on the bottom of the MultiMACS Column Holder and store them together with the Protective Screen in a clean and dry location (refer to fig. 4 below).

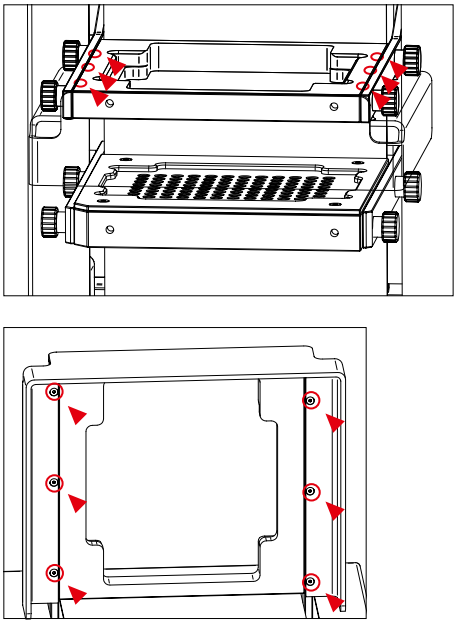

Figure 4: MultiMACS Protective Screen with Column Holder on top. Arrows point to screws which have to be removed to take off Protective Screen.

2. The MultiMACS Magnet is delivered in landscape orientation. To change orientation, refer to chapter 6, page 135, Rotating MultiMACS Magnet and Column Holder.

3. If applicable, connect the MultiMACS 96thermo Magnet supply cable to the socket labeled “module 1” on the back of the instrument.

Caution: Ensure that the supply does not touch any part of the MultiMACS Protective Screen, Column Holder, or Magnet. Otherwise the supply cable might be seriously damaged. Refer to chapter 1, Important information.

4. Optionally, connect the MultiMACS Touch Display via the cable to the RS232 connector of the MultiMACS Separator labeled with "Display". Although the MultiMACS Separator is controlled by the robot PC via a null modem cable, the Touch Display might be helpful in displaying user-defined messages, information on communication errors, or internal errors.

5. Place the MultiMACS Separator without Tip-Touch Plate on an appropriate adapter (contact technical support or supplier of the liquid-handling instrument) fixed into the liquid-handling platform.

6. Connect the RS232 connector of the MultiMACS Separator labeled with "com" and a free COM port of the robot PC with the null modem cable included with the instrument. Refer to chapter 6, page 121, Fully automated use in liquid-handling instrument.

7. Connect the power cable to the outlet on the back of the MultiMACS Separator and to an appropriate electrical socket.

Materials required

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Reagents, columns, and plates

Note: Although only the MultiMACS Separator is mentioned, the following text refers to both MultiMACS M96 Separator and MultiMACS M96thermo Separator.

MultiMACS™ Isolation Kits are specifically designed for the large-scale parallel isolation of molecules using MACS® MicroBeads. MultiMACS Isolation Kits consist of a reagent box and a column box for usage with the MultiMACS Separator.

MultiMACS Products	Isolations	Order no.
MultiMACS mRNA Isolation Kit	12×8 4×96	130-092-520 130-092-519
MultiMACS cDNA One-step Synthesis Kit	12×8 4×96	130-094-410 130-094-408
MultiMACS Streptavidin Kit	12×8 4×96	130-092-948 130-092-949
MultiMACS Protein A Kit	24×8 4×96	130-092-944 130-092-945
MultiMACS Protein G Kit	24×8 4×96	130-092-946 130-092-947
MultiMACS VitalVirus HIV Isolation Kit	12×8 4×96	130-092-806 130-092-807

µMACS™ Isolation Kits for manual processing can also be used on the MultiMACS Separator when a column box is purchased separately.

µMACS Products	Isolations	Order no.
µMACS Epitope Tag Protein Isolation Kits		
Anti-HA MicroBeads	40	130-091-122
Anti-c-myc MicroBeads	40	130-091-123
Anti-GFP MicroBeads	40	130-091-125
Anti-GST MicroBeads	40	130-091-370
Anti-His MicroBeads	40	130-091-124

Column box product	Isolations	Order no.
Multi-8 Column, molecular	12×8	130-092-444
Multi-96 Column, molecular	4×96	130-092-445

Multi-8 Column, molecular (12×8) contains one waste plate (Deep Well Block, 2.5 mL, with sealing foil), one MultiColumn Frame, twelve sterile, single-packed Multi-8 Columns, and one Microtiter Plate with sealing foil. Multi-96 Column, molecular (4×96) contains four Deep Well Blocks, 2.5 mL, in a sterile package with Multi-96 Columns for collection of fractions, and four Microtiter Plates with sealing foil.

Additional Deep Well Blocks (2.5 mL) can be purchased separately.

Product	Quantity	Order no.
Deep Well Block, with sealing foil (2.5 mL)	6	130-092-549

Please use microtiter plates with appropriate height dimensions and footprints (width × length). The height is 14 mm for the Microtiter Plate, and for the Deep Well Block, 2.5 mL, it is 44 mm. The Tip-Touch Plate of the MultiMACS Separator is designed for the footprints of microtiter plates that comply to ANSI/SBS standards (length 127.76 mm ±0.5mm, width 85.48 mm ±0.5 mm).

Attention: Set the plate height correctly if using a different plate height than that specified in the process, (refer to chapter 6, page 106, Editing a process.

When using MultiMACS mRNA Isolation Kits and filtration of lysate is necessary, gravity flow filter columns can be purchased separately, refer to list below.

MultiMACS Filter product	Isolations	Order no.
Multi-8 Filter	12 × 8	130- 092-546
Multi-96 Filter	4 × 96	130- 092-547
Multi-8 Filter + Frame	12 × 8	130- 092-548

A complete list of MACSmolecular products and protocols is available at www.miltenyibiotec.com.

Note: Although only the MultiMACS Separator is mentioned, the following text refers to both MultiMACS M96 Separator and MultiMACS M96thermo Separator.

Special equipment

Manual use

- 8-channel pipette and tips (electronic 8-channel pipette volume: 15–1250 µL, Matrix Technologies Corporation, is recommended for transferring liquids without foaming)
- Appropriate reagent reservoirs

- If the target is eluted from MicroBeads with hot elution buffer:
  - Heatable reagent reservoir, e.g., heating block or a thermocycler in a corresponding format, e.g., 96-well.
  - Electronic 8-channel pipette programmable in 1 µL steps, with a maximum pipetting volume <300 µL, is recommended

Automated use

Caution: Before starting automated processes with the MultiMACS Separator, check compatibility with the automated system for liquid-handling! Assure that the combined system, i.e., MultiMACS Separator and liquid-handling robot, meets all requirements of safety and function before starting automated processes. Thereby, particularly take the protection of the operator into account.

The liquid-handling platform requires the following features for automated use.

1. The MultiMACS Separator has to be placed in a position where the instrument cannot collide either with the liquid-handling arm or with the gripper. Keep the Column Holder in reach of the liquid-handling arm and the gripper tool. Use an adapter to fix the MultiMACS Separator to the platform (contact technical support or robot supplier if you are unsure about this procedure).

2. Check if the maximum pipetting height of the channels of the liquid-handling arm is suitable for your process. It has to be higher than the topmost pipetting position of the Multi-96 Column in the Column Holder. Refer to chapter 6, page 122, Communication with the command line interface (mumcli.exe), for details on reducing the height of the topmost column position.

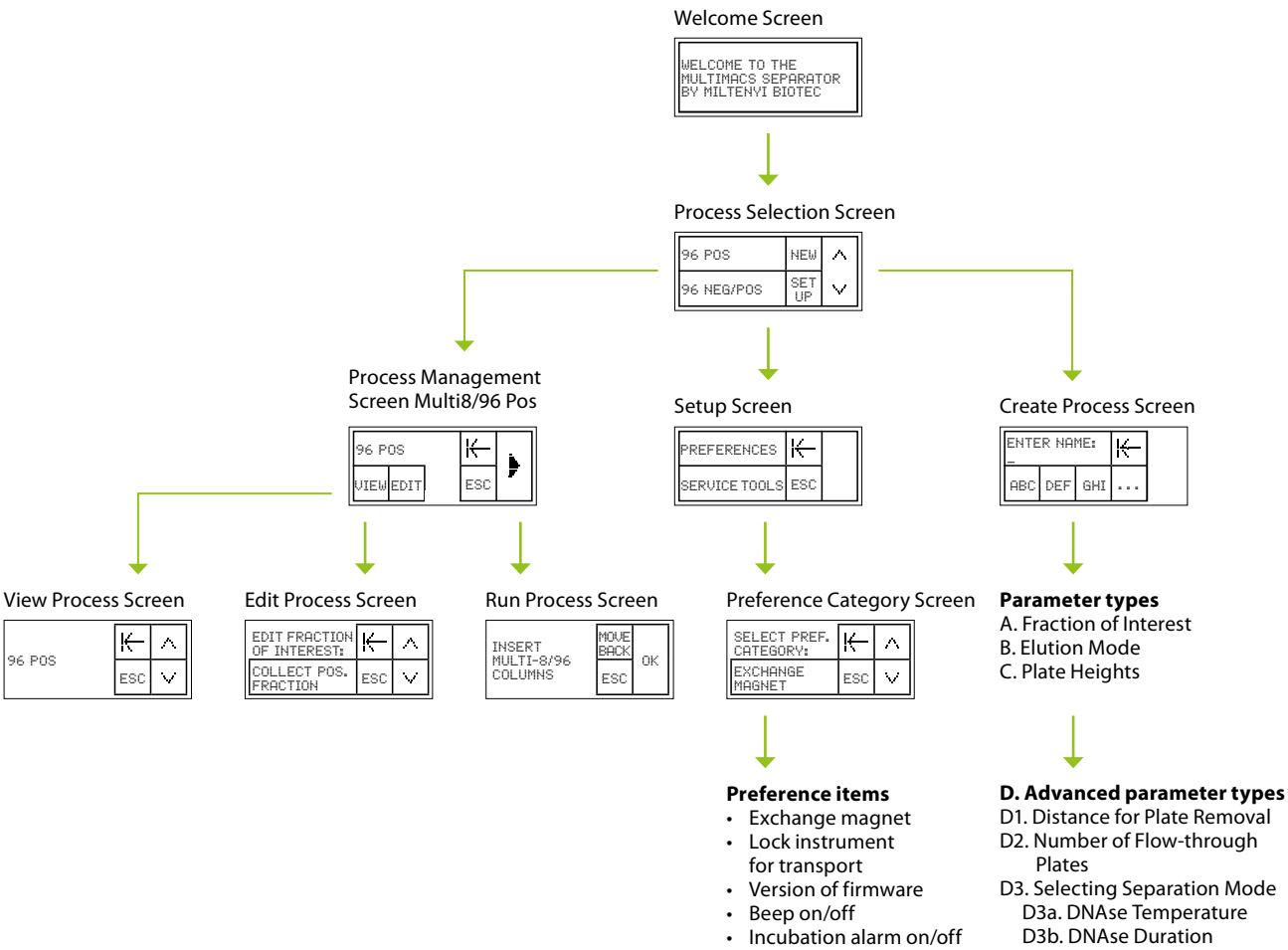
3. For fully automated use, the gripper has to grip the plate from the side and has to execute a Tip-Touch. Not all grippers are able to grip from the side.

4. A liquid-handling arm, four or eight channels with dispense volume up to 1 mL is recommended.

5. Further requirements:
- Disposable tips with filter
- Appropriate reagent reservoirs
- (Optional) For elution of target with hot elution buffer, heatable reagent reservoir, e.g., heating block compatible with 8-well strips or 96-well plates, or thermocycler

Semi-automated bench-top use with the Touch Display

In this chapter all functions of the Touch Display are explained which are necessary to carry out a manual separation process. The following scheme presents an overview of all process levels.



Buttons and symbols

⌃ Scroll up

The scroll function is only visible if there are more items to choose which are not displayed. The button is used to scroll up the list.

⌄ Scroll down

The scroll function is only visible if there are more items to choose which are not displayed. The button is used to scroll down the list.

|← Back

The button is used to go to the last screen without execution of the indicated step. The magnet will not move during this step.

MOVE BACK

The button is used to go to the last screen without execution of the step indicated on the display.

Caution: The magnet will move during this step.

OK

The button is used to execute the indicated step and to go to the next screen.

ESC (escape)

The button is used to leave the current process or program without execution of the indicated step.

Caution: If ESC is touched during a process, the magnet will move and instructions will be given to remove any plates and columns.

YES

The button is used to confirm a change.

NO

The button is used to abort a change.

DEL (delete)

The button is used to delete a customized process.

Pre-defined processes to isolate mRNA, Protein A/G, and for streptavidin-based applications: 96 POS

Running 96 POS

Caution: Before running a process, carefully read chapter 4,, Safety functions! Then follow the instructions in chapter 4, Installing MultiMACS™ Separator for semi-automated bench-top use. Always be sure to use MultiMACS 96 Magnet, MultiMACS Column Holder, and the plates in the same orientation. For details, refer to chapter 6, Rotating MultiMACS Magnet and Column Holder.

The MultiMACS Separator contains a list of pre-defined separation programs to choose from, please visit www.miltenyibiotec.com for updates. 96 POS is the standard process used for applications where the target is eluted from the beads during the elution step, for example MultiMACS mRNA Isolation Kit, MultiMACS Protein A/G kits, and several MultiMACS Streptavidin Kit applications.

Note: If using a MultiMACS isolation kit, select a pre-defined process according to the kit protocol and follow its instructions. Visit www.miltenyibiotec.com for available firmware-updates of pre-defined processes.

The scroll function (⋀/⋁) is only visible if there are more items to choose which are not displayed.

If a process with different process parameters must be run, either create a new process as described in chapter 6, Creating a new user-defined process. Or, if only a few parameters have to be changed edit the parameters as detailed in chapter 6, Editing a process. For information on user-defined processes, refer to chapter 6, Running a user-defined process.

1. Switch on the instrument and touch the Welcome Screen or wait for a few seconds for the Process Selection Screen.

```
WELCOME TO THE
MULTIMACS SEPARATOR
BY MILTENYI BIOTEC
```

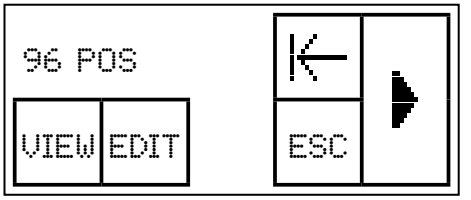
96 POS + BEAD	NEW	⋀
96 CDNA SYNTH	SET UP	⋁

Note: Although only the MultiMACS Separator is mentioned, the following text refers to both MultiMACS M96 Separator and MultiMACS M96thermo Separator.

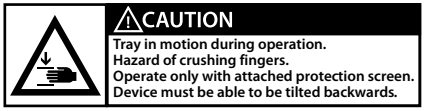
The last process performed on the MultiMACS Instrument is displayed on the upper left (default: 96 POS). The one but last process is listed below.

If necessary scroll through the list of available process names by touching the symbol ⌃ or ⌄ until 96 POS is displayed.

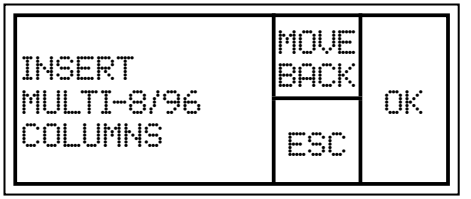
2. Touch 96 POS to go to the Process Management Screen.



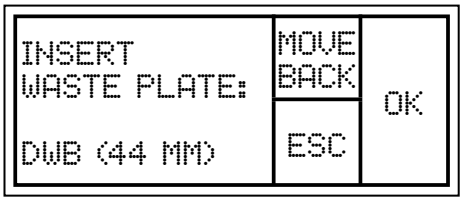
It is possible to check the process parameters, refer to chapter 6, Viewing process parameters.



3. Touch ▶ to run the process and the magnet will move to the start position. Then, follow the instructions given on the Touch Display.



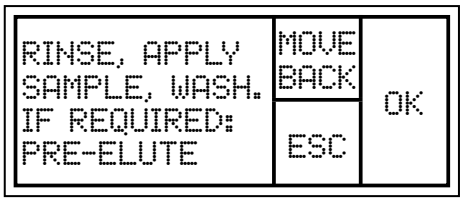
4. Insert a MultiColumn Frame with up to twelve Multi-8 Columns or a pre-packed Multi-96 Column into the MultiMACS Column Holder. Touch OK and the magnet will move upwards and unlock the MultiMACS Column Holder. The following screen emerges.



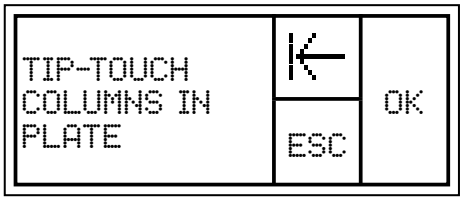
Note: The instrument produces an acoustic signal when the framed fields are activated. Occasional clacking sounds belong to normal function of the MultiMACS Separator.

5. Insert the waste plate, e.g., the Deep Well Block, 2.5 mL, included in the kit, onto the Tip-Touch Plate. If using a plate with a different height adjust the height of the waste plate as described in chapter 6, Editing a process.

Touch OK and the MultiMACS 96 Magnet will move downwards until column tips slightly immerse in the waste plate. The next screen appears.

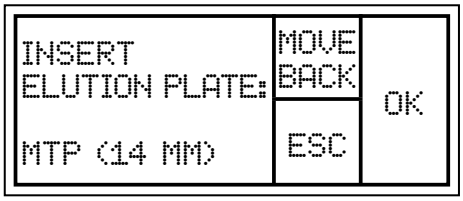


6. Rinse columns with equilibration buffer, apply sample, and wash. A pre-elution might be required to exchange the void volume of the column, refer to the respective kit data sheet for detailed instructions. Touch OK for the following screen.

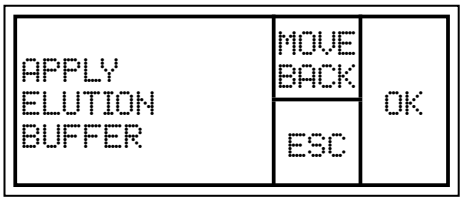


7. Move the Tip-Touch Plate firmly back and forth once so that the inner walls of the wells of the Deep Well Block touch the tips of the Multi-8 Columns; thereby, any drop on the column tips that did not fall by gravity is removed.

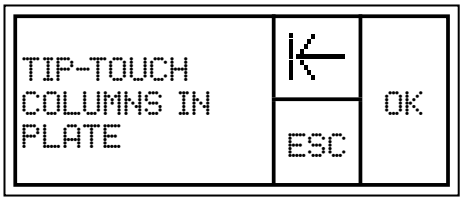
Touch OK and the MultiMACS 96 Magnet will move upwards to allow removal of the waste plate.



8. Remove Deep Well Block. If some wells were not used, aspirate waste and store plate. Insert the elution plate (Microtiter Plate), included in the MultiMACS Kit. If using a plate with a different height adjust the height of the elution plate (refer to chapter 6, Editing a process). Touch OK and the MultiMACS 96 Magnet will move downwards until column tips slightly immerse in the elution plate. The subsequent screen appears.



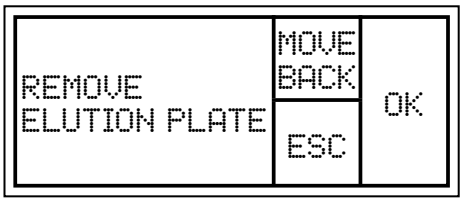
9. Immerse the pipette tips slightly (1 mm) into the reservoirs of the columns without touching the rims and apply elution buffer directly onto the Multi-8/96 Column matrix. Touch OK for the next screen.



10. Wait approximately one minute until buffer has passed through. Move the Tip-Touch Plate firmly back and forth once so that the inner walls of the wells of the elution plate touch the tips of the Multi-8 Columns; thereby, any drop on the column tips that did not fall by gravity is removed.

⚠CAUTION
Tray in motion during operation.
Hazard of crushing fingers.
Operate only with attached protection screen.
Device must be able to be tilted backwards.

Touch OK and the MultiMACS 96 Magnet moves upwards to allow removal of the elution plate.



11. Remove elution plate and use samples for downstream application. Alternatively, seal the plate with adhesive foil and store it according to protocol. Touch OK and the MultiMACS 96 Magnet moves apart from the Column Holder.

REMOVE COLUMNS, TOUCH OK TO END PROCESS	MOVE BACK	OK
	ESC	

12. Remove MultiColumn Frame with Multi-8/96 Columns. If less than twelve Multi-8 Columns were utilized, remove the used Multi-8 Columns and store the MultiColumn Frame. Touch OK to finish the process.

Performing cDNA synthesis: 96 CDNA SYNTH

The MultiMACS 96thermo Separator provides a list of pre-defined separation programs to choose from. For updates please visit www.miltenyibiotec.com. The standard program for cDNA synthesis with Multi-8 or Multi-96 Columns is called **96 CDNA SYNTH.** Furthermore, a second program is installed termed **96 CDNA SYNTH+DNASE** for the case a DNase digestion step needs to be performed. Please refer to chapter 6, Selection of parameter types, for more details. If a process with different process parameters has to be run, either create a new process or, if only a few parameters have to be changed edit the parameters (refer to chapter 6, Instructions for use for details).

Running 96 CDNA SYNTH

Caution: Before running a process, carefully read chapter 1, Warnings and precautions, and chapter 4 Installation and follow the instructions given. Always be sure to use MultiMACS 96thermo Magnet, MultiMACS Column Holder, and the plates in the same orientation.

1. Switch on the instrument and touch the Welcome Screen or wait for a few seconds until the Process Selection Screen appears.

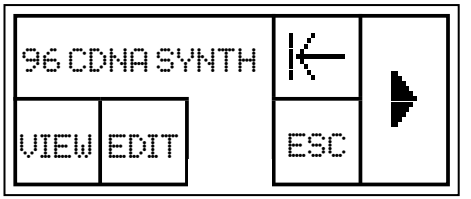
WELCOME TO THE
MULTIMACS SEPARATOR
BY MILTENYI BIOTEC

96 POS + BEAD	NEW	^
96 CDNA SYNTH	SET UP	v

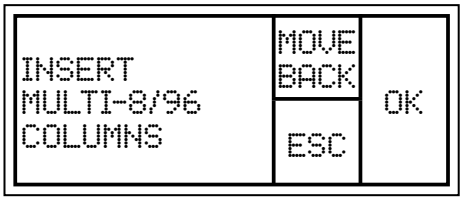
Note: The scroll function is only visible if there are more programs than displayed.

In case a DNase digestion step needs to be performed, please refer to chapter 6, Selection of parameter types.

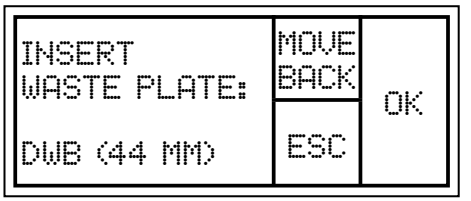
2. The last process performed on the MultiMACS 96thermo Separator is displayed on the upper left segment. If necessary, scroll through the list of available process names by touching the symbol ⌃ or ⌄ until 96 CDNA SYNTH is displayed. Touch 96 CDNA SYNTH to go to the Process Management Screen.



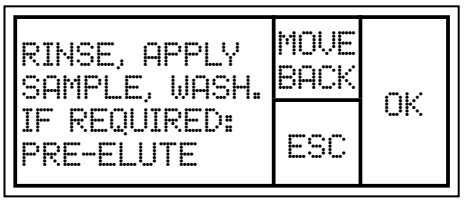
3. If necessary, check the process parameters (for details refer to chapter 6, Viewing process parameters). Touch ▶ to start the process and to move the magnet to the start position. Follow the instructions given on the Touch Display.



4. Insert a MultiColumn Frame with up to twelve Multi-8 Columns or a pre-packed Multi-96 Column into the MultiMACS Column Holder. Touch OK to move the magnet upwards. The following screen appears.

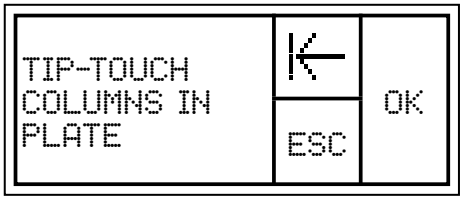


5. Place the waste plate, e.g., the Deep Well Block (DWB, 2.5 mL), included in the kit, onto the Tip-Touch Plate. If using a plate with a different height, adjust the process parameter plate height for the waste plate (for details refer to chapter 6, Selection of parameter types). Touch OK to move the MultiMACS 96thermo Magnet downwards. Column tips now slightly immerse in the waste plate. The next screen appears.

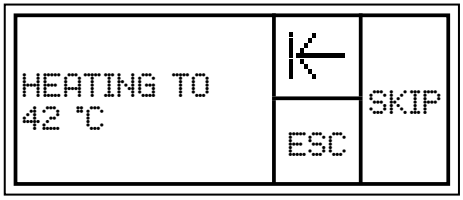


6. Rinse columns with Lysis/Binding Buffer, apply sample and wash, refer to the respective kit data sheet for detailed instructions. Touch OK and the following screen appears.

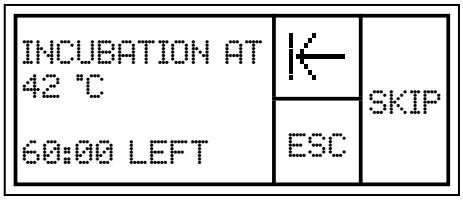
7. Apply cDNA Mix, refer to the respective kit data sheet for detailed instructions. Touch OK for the following screen.



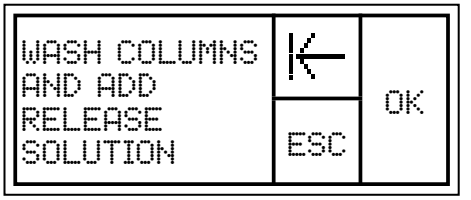
8. Move the Tip-Touch Plate firmly back and forth once so that the inner walls of the Deep Well Block touch the tips of the Multi-8 Columns. Thereby, any drop on the column tips that did not fall off by gravity will be removed. Touch OK to heat the MultiMACS 96thermo Magnet to 42 °C. Press SKIP to cut short the incubation process.



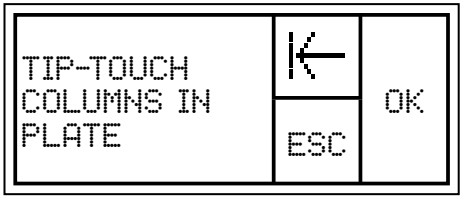
9. The next screen appears which shows the remaining incubation time running down. Press SKIP to cut short the incubation process.



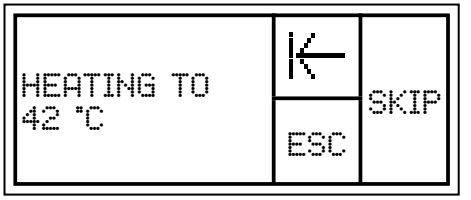
10. When the incubation time is up, an acoustic signal resounds as overtime is counting up and the next step is due (PROCEED TO NEXT STEP). Touch OK to stop the acoustic alarm, and the following screen appears.

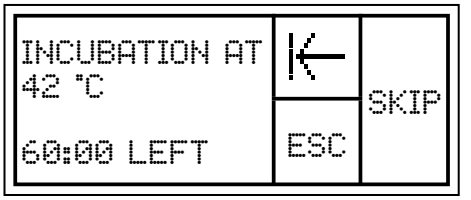


11. Rinse columns and apply cDNA Release Solution. Touch OK for the following screen.



12. Move the Tip-Touch Plate firmly back and forth once so that the inner walls of the Deep Well Block touch the tips of the Multi-8 Columns. Thereby, any drop on the column tips that did not fall off by gravity will be removed. Touch OK and the next screen appears that shows the remaining incubation time.





13. When the incubation time is up, an acoustic signal sounds as overtime is counting up and the next step is due (PROCEED TO NEXT STEP). Touch OK to stop the acoustic alarm, and the following screen appears.

WASH COLUMNS AND ADD RELEASE SOLUTION	← / ESC	OK

APPLY PRE-ELUTION	← / ESC	OK

14. Apply cDNA Elution Buffer. Touch OK for the following screen.

TIP-TOUCH COLUMNS IN PLATE	← / ESC	OK

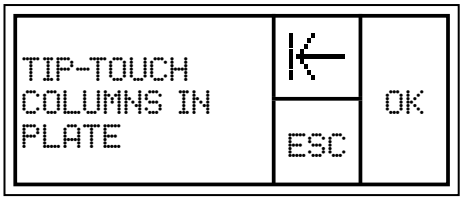
15. Move the Tip-Touch Plate firmly back and forth once so that the inner walls of the Deep Well Block touch the tips of the Multi-8 Columns. Thereby, any drop on the column tips that did not fall off by gravity will be removed. Touch OK to move the Multi-96-thermo Magnet upwards. The next screen appears.

INSERT ELUTION PLATE: MTP (14 MM)	MOVE BACK / ESC	OK

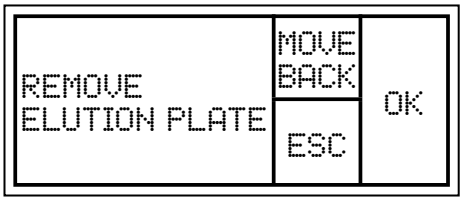
16. Remove Deep Well Block. If some wells were not used, aspirate waste and store plate. Insert the elution plate (Microtiter Plate), included in the kit. If using a plate with a different height adjust the parameter height of the elution plate (refer to chapter 6, Instruction for use for details). Touch OK and the MultiMACS 96thermo Magnet will move downwards until column tips slightly immerse in the elution plate. The following screen appears.

APPLY ELUTION BUFFER	MOVE BACK / ESC	OK

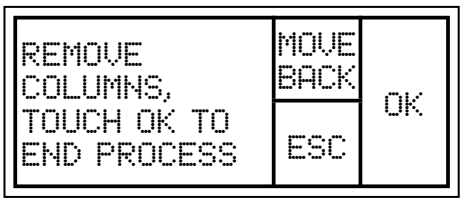
17. Apply cDNA Elution Buffer directly onto the Multi-8/96 Column matrix. Let the buffer pass through. Touch OK for the next screen.



18. Move the Tip-Touch Plate firmly back and forth once so that the inner walls of the Deep Well Block touch the tips of the Multi-8 Columns. Thereby, any drop on the column tips that did not fall off by gravity will be removed. Touch OK to move the MultiMACS 96thermo Magnet upwards.



19. Remove Elution Plate. The cDNA can be subjected to downstream applications immediately. Alternatively, seal and store the plate (refer to the respective kit data sheet for details). Touch OK to move away the MultiMACS 96thermo Magnet from the Column Holder.



20. Remove MultiColumn Frame with Multi-8/96 Columns. If less than twelve Multi-8 Columns were used, remove the used Multi-8 Columns and store the MultiColumn Frame. Touch OK to finish the process.

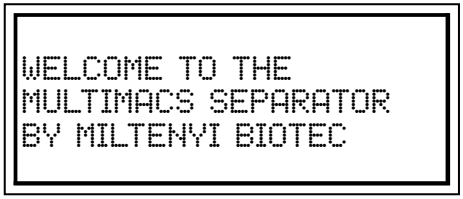
Keeping flow-through and wash fractions: 96 NEG/POS

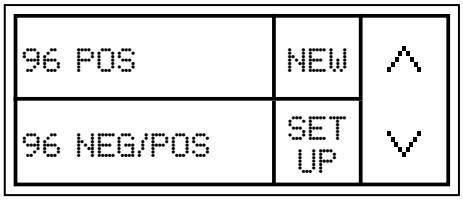
Caution: Read chapter 4, Safety functions, carefully before running a process! Then follow the instructions in chapter 4, Semi-automated bench-top use. Always be sure to use MultiMACS 96 Magnet, MultiMACS Column Holder, and the plates in the same orientation as described in chapter 6, Rotating MultiMACS Magnet and Column Holder.

The MultiMACS Separator contains a list of pre-defined separation programs to choose from (visit www.miltenyibiotec.com for updates). 96 NEG/POS is used when flow-through and wash fractions should be captured separately. It is not the standard process for MultiMACS mRNA Isolation Kit, MultiMACS Protein A/G Kits, etc., where the target is eluted from the beads during the elution step. Deep Well Blocks are included in the MultiMACS Kits which can be used as waste plate or flow-through plate. For purchase of additional Deep Well Blocks, refer to chapter 5, Reagents, columns, and plates.

If a process with different process parameters has to be run, either create a new process, as described in chapter 6, Creating a new user-defined process, or, if only a few parameters have to be changed, edit the parameters as described in chapter 6, Editing a process. For further details on user-defined processes, refer to chapter 6, Running a user-defined process.

1. Switch on the instrument and touch the Welcome Screen or wait for a few seconds for the Process Selection Screen.

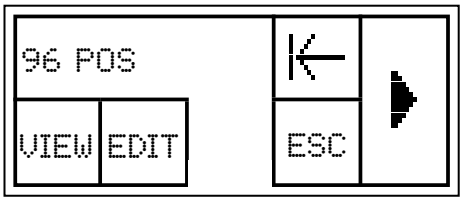




Note: The scroll function is only visible if there are more items to choose which are not displayed.

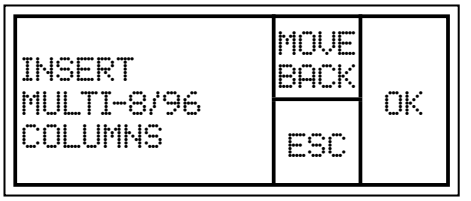
The last process performed on the MultiMACS Separator is displayed on the upper left (default: 96 POS). The one but last process is listed below.
If necessary scroll through the list of available process names by touching the symbol ^ or v until 96 NEG/POS is displayed.

2. Touch 96 NEG/POS to go to the Process Management Screen.

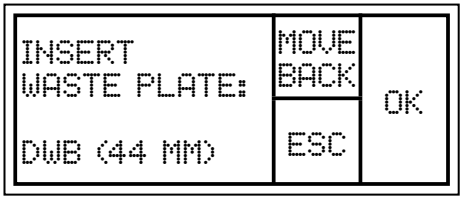


If necessary check the process parameters, as detailed in chapter 6, Viewing process parameters.

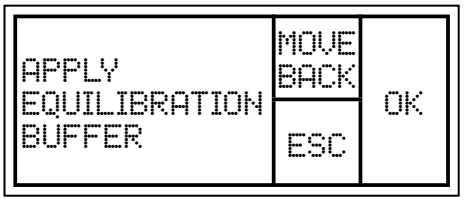
3. Touch ▶ to run the process and the magnet will move to the start position. Follow the instructions given on the Touch Display.



4. Insert a MultiColumn Frame with up to twelve Multi-8 Columns or a pre-packed Multi-96 Column into the MultiMACS Column Holder. Touch OK and the magnet will move upwards and unlock the MultiMACS Column Holder. The following screen appears.



5. Insert the waste plate (one Deep Well Block, 2.5 ml, included in the kits) onto the Tip-Touch Plate. If using a plate with a different height adjust the height of the waste plate as described in chapter 6, Editing a process.

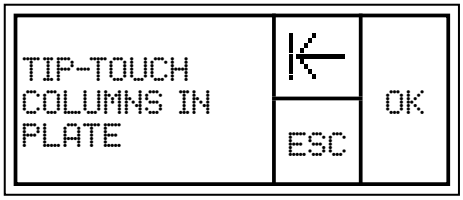


Note: If using a MultiMACS Isolation Kit, select a pre-defined process according to the respective kit data sheet and follow its instructions.

Visit www.miltenyibiotec.com for available firmware-up-dates of pre-defined processes.

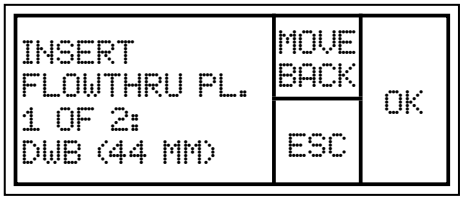
Touch OK and the MultiMACS 96 Magnet will move downwards until column tips slightly immerse in the waste plate.

6. Rinse columns. Touch OK for the next screen.



Move the Tip-Touch Plate firmly back and forth once so that the inner walls of the wells of the waste plate touch the tips of the Multi-8 Columns; thereby, removing any drop on the column tips that did not fall off by gravity.

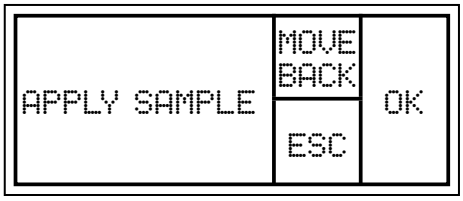
7. Touch OK and the MultiMACS 96 Magnet will move upwards to allow insertion of the flow-through plate.



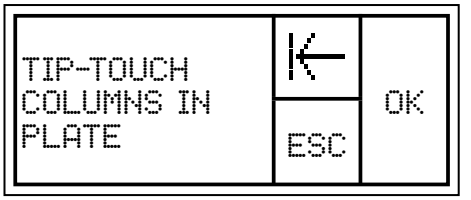
Insert flow-through plate. If using a plate with a different height adjust the height of the flow-through plate as described in chapter 6, Editing a process.

CAUTION
Tray in motion during operation.
Hazard of crushing fingers.
Operate only with attached protection screen.
Device must be able to be tilted backwards.

8. Touch OK and the MultiMACS 96 Magnet will move downwards until column tips slightly immerse in the waste plate.

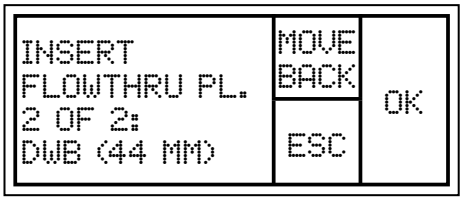


9. Apply sample and let buffer run through the column. Touch OK for the next screen.



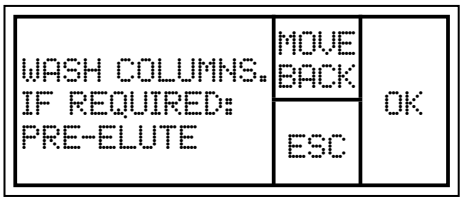
10. Move the Tip-Touch Plate firmly back and forth once so that the inner walls of the wells of the flow-through plate touch the tips of the Multi-8 Columns, and any drop on the column tips that did not fall off by gravity will be removed.

Touch OK and the MultiMACS 96 Magnet will move upwards to allow removal of the flow-through plate.

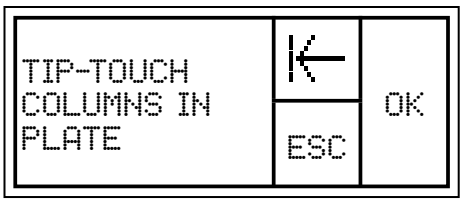


11. Insert flow-through plate. If using a plate with a different height adjust the height of the flow-through plate as described in chapter 6, Editing a process.

Touch OK and the MultiMACS 96 Magnet will move downwards until column tips slightly immerse in the waste plate.

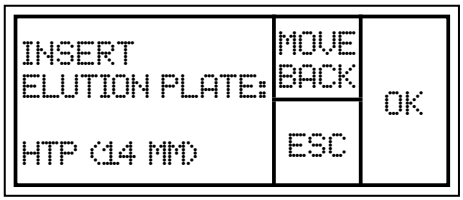


12. Wash columns and let buffer run through. A pre-elution might be required to exchange the void volume of the column. Refer to the respective kit data sheet for detailed instructions. Touch OK for the following screen.



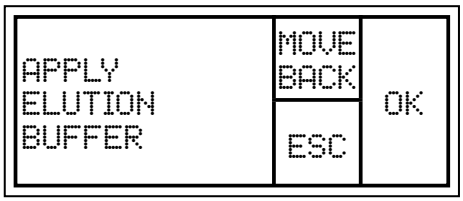
13. Move the Tip-Touch Plate firmly back and forth once so that the inner walls of the wells of the flow-through plate touch the tips of the Multi-8 Columns, and any drop on the column tips that did not fall off by gravity will be removed.

Touch OK and the MultiMACS 96 Magnet will move upwards to allow removal of the flow-through plate.

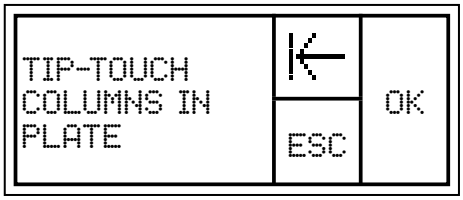


14. Remove Deep Well Block. If some wells were not used pour off waste liquid and store plate. Insert an elution plate (Microtiter Plate, included in MultiMACS Kits). If using a plate with a different height adjust the height of the elution plate as described in chapter 6, Editing a process.

Touch OK and the MultiMACS 96 Magnet will move downwards until column tips slightly immerse in the elution plate.

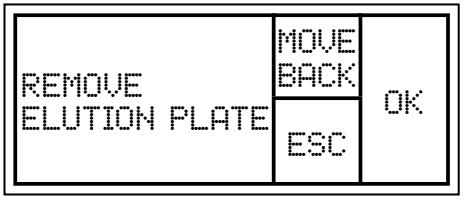


15. Immerse the pipette tips slightly (1 mm) into the reservoirs of the columns without touching the rims and apply elution buffer directly onto the Multi-8/96 Column matrix. Touch OK for the next screen.



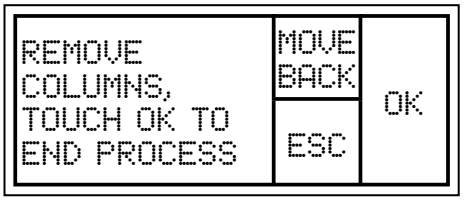
16. Wait approximately one minute until buffer has passed through. Move the Tip-Touch Plate firmly back and forth once so that the inner walls of the wells of the elution plate touch the tips of the Multi-8 Columns, and any drop on the column tips that did not fall off by gravity will be removed.

Touch OK and the MultiMACS 96 Magnet moves upwards to allow removal of the elution plate (Microtiter Plate).



17. Remove elution plate and use samples for downstream application. Alternatively, seal the plate with adhesive foil (included in the kit) and store it according to the kit's protocol.

Touch OK and the MultiMACS 96 Magnet moves apart from the Column Holder.

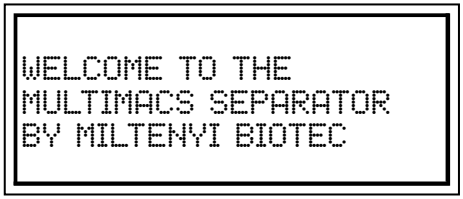


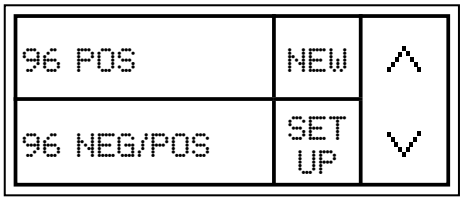
18. Take away the MultiColumn Frame with Multi-8/96 Columns. If less than twelve Multi-8 Columns were used, detach the used Multi-8 Columns and store the MultiColumn Frame. Touch OK to finish the process.

Creating a new user-defined process

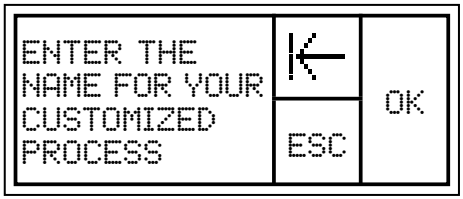
Caution: Read chapter 4, Safety functions, carefully before running a process! Then follow the instructions in chapter 4, Installing MultiMACS Separator for semi-automated bench-top use. Always be sure to use MultiMACS 96 Magnet, MultiMACS Column Holder, and the plates in the same orientation as described in chapter 6, Rotating MultiMACS Magnet and Column Holder.

1. Switch on the instrument and touch the Welcome Screen or wait for a few seconds for the Process Selection Screen.





2. Touch NEW and the following screen appears.



Wait for a few seconds or touch OK to go to the next screen where a new process name has to be entered.

3. Touch the ABC box once to enter an A, twice to enter a B, and three times for a C. Touch the ... box — multiple times if necessary — to switch to the triplets of the letters J to Z, symbols, and numerals.

Touch DEL to delete letters and OK to confirm the entered name.

Note: Although only the MultiMACS Separator is mentioned, the following text refers to both MultiMACS M96 Separator and MultiMACS M96thermo Separator.

If the process name already exists a message will appear on the Touch Display that another name has to be chosen.

Selection of parameter types

After entering a name, the following parameter types for the new process have to be selected:

A. Selecting Fraction of Interest
B. Selecting Elution Mode (depends on parameter A)
C. Selecting Plate Heights (for waste, flow-through, and elution plate height; also depending on parameter A)

At this stage, save the process or, if needed, enter advanced parameter types.

D1. Distance for Plate Removal
D2. Number of Flow-through Plates
D3. Selecting Separation Mode
D3a. DNAse Temperature
D3b. DNAse Duration

Note: The scroll function is only visible if there are more items to choose which are not displayed.

A. Selecting Fraction of Interest

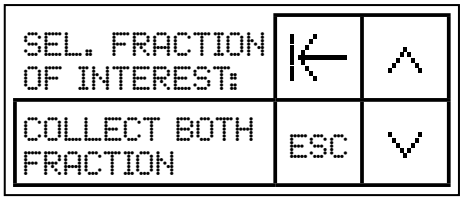
First you have to select the desired fraction after magnetic labeling of samples. The positive labeled fraction, the negative labeled fraction (flow-through), or both fractions can be chosen.

- If only the labeled fraction is to be captured touch COLLECT POS FRACTION and proceed with section B, Selecting Elution Mode.
- To collect only the unlabeled flow-through scroll through the list by touching the symbol ^ or v until COLLECT NEG FRACTION appears.

Note: An elution with or without MicroBeads is not distinguished in this step.

Touch COLLECT NEG FRACTION and proceed with page 98, C. Selecting Plate Heights.

- In order to collect the labeled fraction as well as the unlabeled flow-through, scroll through the list by touching the symbol ⋀ or ⋁ until COLLECT BOTH FRACTIONS appears.

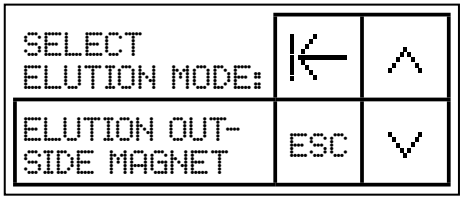


Touch BOTH FRACTIONS and proceed with section B. Selecting Elution Mode.

B. Selecting Elution Mode

If COLLECT POS FRACTION or BOTH FRACTIONS were chosen for the fraction of interest, two options for the elution of target molecules are possible.

- To retain the MicroBeads within the column while the target molecule is eluted, touch INSIDE MAGNET and proceed with section C. Selecting Plate Heights.
- To elute the target molecule-MicroBead complex by removing the column from the magnetic field, scroll through the list by touching the symbol ⋀ or ⋁ until ELUTION OUTSIDE MAGNET appears.



Touch ELUTION OUTSIDE MAGNET and proceed with page 100, section C. Selecting Plate Heights.

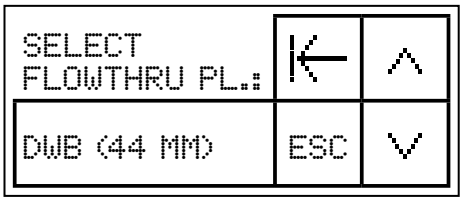
C. Selecting Plate Height

The Tip-Touch Plate of the MultiMACS Separator is designed for microtiter plates that comply to the footprint as described in the ANSI/SBS standard, refer to chapter 5, Reagents, columns and plates. The plate height of the plates for waste, flow-through, and eluate depend on the selected process parameters, e.g., chosen fraction of interest, and have to be determined individually.

Fraction of interest	WASTE PLATE to collect	FLOWTHRU PLATE to collect	ELUTION PLATE to collect
COLLECT POS FRACTION	Equilibration buffer, flow-through, and wash buffer	–	Eluate**
COLLECT NEG FRACTION	Equilibration buffer	Flow-through + wash buffer*	–
COLLECT BOTH	Equilibration buffer	Flow-through + wash buffer*	Eluate**

* Flow-through and wash buffer can be separately collected in flow-through plates by increasing the number of flow-through loops.
**Parameter Elution Plate does not appear if Elution Mode is OUTSIDE MAGNET.

1. Depending on the chosen fraction of interest, the heights of the required plates can be adjusted. For example, when the positive fraction was chosen, screens will be presented to specify the height of the waste plate and elution plate. Below all three screens are shown.



2. Touch on the displayed plate type at the lower left of the touch display to select the default value. If a height different to the default value should be selected, scroll through the list by touching the symbol ^ or v until the following screens appear.

SELECT WASTE PLATE:	←	^
ENTER HEIGHT	ESC	v

SELECT FLOWTHRU PL.:	←	^
ENTER HEIGHT	ESC	v

SELECT ELUTION PLATE:	←	^
ENTER HEIGHT	ESC	v

3. Touch ENTER HEIGHT for the next screen.

30.0 MM	+0.5 MM	+5 MM	←	OK
	-0.5 MM	-5 MM	ESC	TEST

Touch +0.5 MM or +5 MM to increase the displayed plate height by this amount (in mm) and -0.5 MM or -5 MM to decrease. The minimum plate height is 8.0 mm, and the maximum plate height is 80.0 mm. For further details,refer to chapter 6, Testing Plate Heights or Distance for Plate Removal.
Touch OK to select the displayed plate height.

D. Selecting advanced parameter types
For special applications, it may be necessary to change advanced process parameters, these include Distance for Plate Removal and Number of Flowthru Plates.

DO YOU WANT TO CHANGE ADVANCED PARAMETERS?	←	YES
	ESC	NO

If you press YES, the parameter Distance for Plate Removal and the Number of Flow-through Plates have to be selected. Alternatively, touch NO and go to page 117, Saving the edited process.

D1. Selecting Distance for Plate Removal
The Distance for Plate Removal is the distance the magnet moves up to create space to remove a plate and to insert a new one.

DISTANCE FOR PLATE REMOVAL:	←	^
PLATE REMOVAL 25.0 MM	ESC	v

Press PLATE REMOVAL 25.0 MM to select the default value. To change this parameter, scroll through the list by touching the symbol ^ or v until ENTER DISTANCE appears.

DISTANCE FOR PLATE REMOVAL:	←	^
ENTER DISTANCE	ESC	v

Touch ENTER DISTANCE for the following screen.

30.0 MM	+0.5 MM	+5 MM	←	OK
	-0.5 MM	-5 MM	ESC	TEST

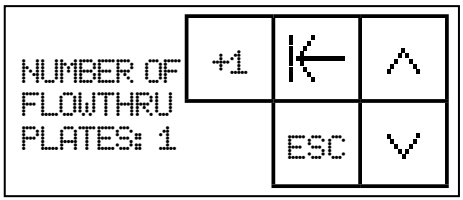
Note: The Tip-Touch Insertion Distance is calculated by the MultiMACS Separator automatically. Therefore, enter the actual height of the preferred plate.

Press +0.5 MM or +5 MM to increase the displayed distance for plate removal by this amount (in mm) and -0.5 MM or -5 MM to decrease it. The minimum height is 1.0 mm, maximum height is 45.0 mm. For details, refer to chapter 6, Testing Plate Heights or Distance for Plate Removal.

Touch OK to select the displayed plate removal distance.

D2. Selecting Number of Flow-through Plates

1. If COLLECT NEG FRACTION or COLLECT BOTH FRACTIONS was chosen as the fraction of interest, the flow-through and each wash buffer fractions can be collected separately by increasing the number of flow-through plates.

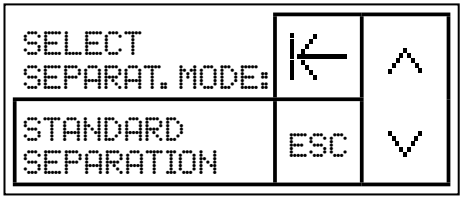


2. The default value is one plate to keep flow-through and all wash fractions in a single plate. Optionally, touch +1 to increase the number of plates which enables collection of wash fractions separately.

3. Optionally, touch -1 to decrease the number of plates. Confirm by touching OK.

D3. Selecting Separation Mode

1. If COLLECT POS FRACTION was chosen as the fraction of interest, the following separation modes can be selected:
STANDARD SEPARATION (no incubation)
CDNA SYNTHESIS
CDNA SYNTH. + DNASE (cDNA synthesis with DNAse digestion step)



2. Scroll through the list by touching the symbol ^ or v .

D3a. DNAse Temperature

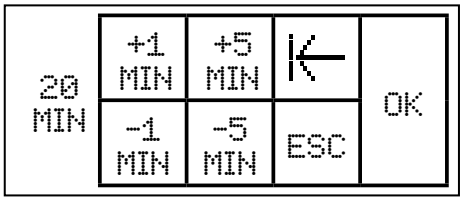
1. If CDNA SYNTH. + DNASE was chosen as the separation mode, the incubation temperature for the DNAse digestion step can be selected.

2. Select OFF or 37 °C according to requirements. Scroll through the list by touching the symbol ^ or v .

D3b. DNAse Duration

1. If CDNA SYNTH. + DNASE was chosen as the separation mode, the incubation temperature for the DNAse digestion step can be selected.

2. Select 20 MIN(utes) or ENTER DURATION according to requirements. Scroll through the list by touching the symbol ^ or v . Touch ENTER DURATION for the following screen.

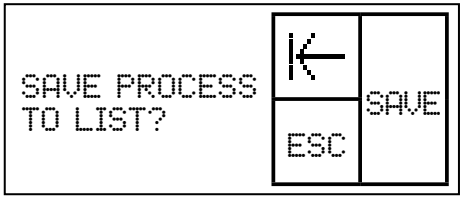


3. Press +1 MIN or +5 MIN to increase displayed duration for incubation by this amount (in minutes) and -1 MIN or -5 MIN to decrease it. The minimum duration is 1 minute, maximum duration is 60 minutes. Confirm by touching OK.

Saving the created process

Note: The scroll function is only visible if there are more items to choose which are not displayed.

1. Touch SAVE to confirm the addition of the process to the list. If there are already ten user-defined processes stored in the list, an obsolete process has to be replaced, refer to chapter 6, Replacing a user-defined process. After saving, the following screen appears.



2. Touch YES to start the process or NO to go back to the Welcome Screen.

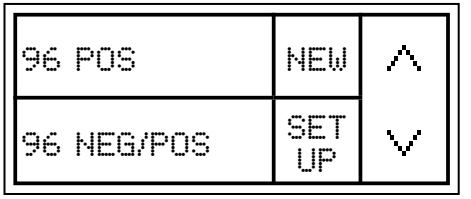
Note: If using a MultiMACS Isolation Kit, select a pre-defined process according to the kit protocol and follow the protocol instructions.

Running a user-defined process

Caution: Read chapter 4, Safety functions, carefully before running a process! Then follow the instructions in chapter 4, Installing MultiMACS Separator for semi-automated bench-top use. Always be sure to use MultiMACS 96 Magnet, MultiMACS Column Holder, and the plates in the same orientation as described in chapter 6, Rotating MultiMACS Magnet and Column Holder.

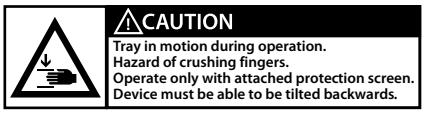
1. Switch on the instrument and touch the Welcome Screen or wait for a few seconds for the Process Selection Screen.

Note: The scroll function is only visible if there are more items to choose which are not displayed.



The last process performed on the MultiMACS is displayed in the upper left (default: 96 POS).

2. If necessary, scroll through the list of available process names by touching the symbol ^ or v until the desired process is displayed. Touch process name to select it, e.g., MY_OWN_PROC1, and the Process Management Screen appears.



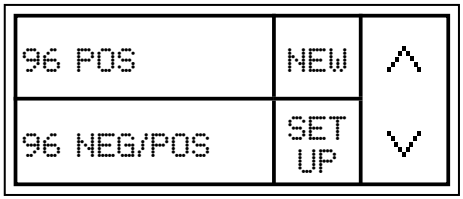
Note: When viewing process parameters, the name of the program will be shortened from two lines to one line, e.g., 96 CONA SYNTH TDWASE is named 96 CDNATDNASE.

3. Touch ▶ to run the process and the MultiMACS Magnet will move to the start position. Follow the instructions given on the Touch Display.

Viewing process parameters

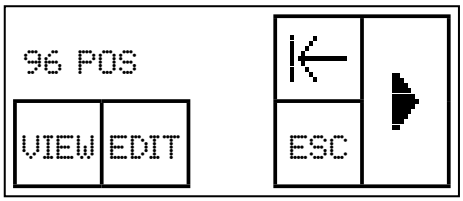
It is possible to control the parameters before running an already saved process. Changing process parameters is not possible in the view mode, this can only be done in the edit function.

1. Switch on the instrument and touch the Welcome Screen or wait for a few seconds for the Process Selection Screen.

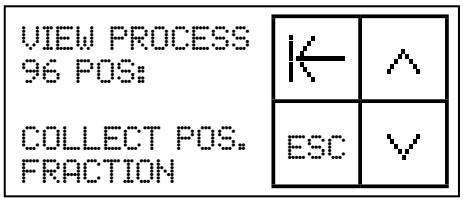


The last process performed on the MultiMACS is displayed in the upper left (default: 96 POS). The one but last process is listed below.

2. If necessary, scroll through the list of available process names by touching the symbol ⌃ or ⌄ until the desired process is displayed. Touch process name to select it, e.g., 96 POS.



3. Touch VIEW for the View Process Screen.



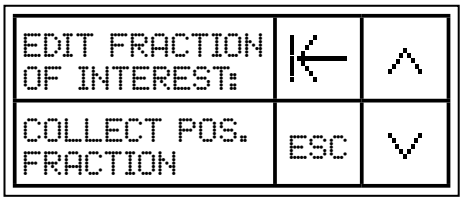
4. The chosen parameter is displayed in the lower left of the Touch Display beginning with the parameter type fraction of interest. Scroll through the list with the symbol ⌃ or ⌄ to see the other process parameters. For a description of process parameters, refer to chapter 6, Creating a new user-defined process.

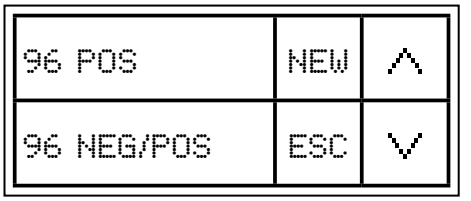
5. Touch the arrow |← to go back to the Process Management Screen.

Editing a process

Changing of process parameters of an existing process should be done in the edit mode. In case several process parameters have to be changed refer to chapter 6, Creating a new user-defined process.

1. Switch on the instrument, and then touch the Welcome Screen or wait for a few seconds for the Process Selection Screen.

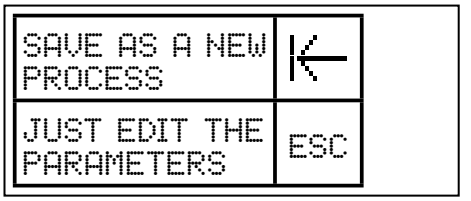




The last process performed on the MultiMACS Separator is displayed in the upper left (default: 96 POS).

2. If necessary scroll through the list of available process names by touching the symbol ∧ or ∨ until the desired process is displayed. Press the process name to select it and to go to the Process Management Screen.

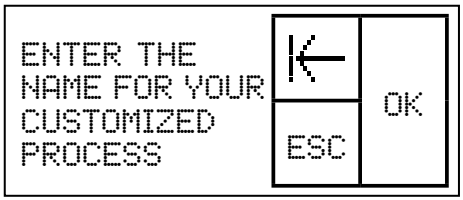
3. Touch EDIT to edit process parameters. In case a user-defined process is edited the following screen appears.



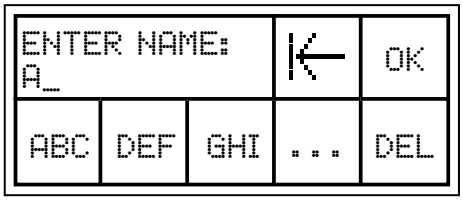
Note: If the process name already exists a message will appear on the Touch Display that another name has to be chosen.

4. Press SAVE AS A NEW PROCESS to change process parameters and to save the new process. Thereby, the old process name remains with unchanged process parameters. Alternatively, touch JUST EDIT THE PARAMETERS to preserve the process name while changing process parameters.

If saving as a new process the following screen appears.

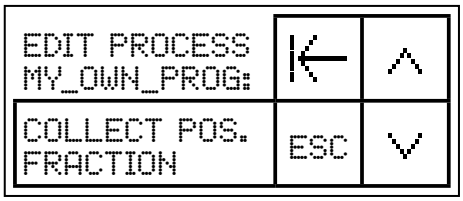


5. Wait for a few seconds or touch OK to go to the next screen where a new process name has to be entered.



6. Touch the ABC box once to enter an A, press twice for a B, and three times for a C.

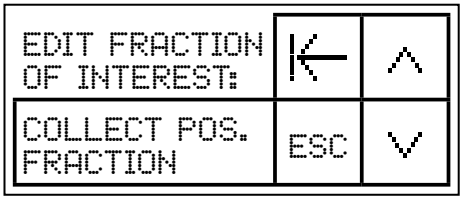
Touch the ... box — multiple times if necessary — to switch to the triplets of the letters from J to Z, symbols, and numerals. Touch DEL to delete letters and OK to confirm the entered name.



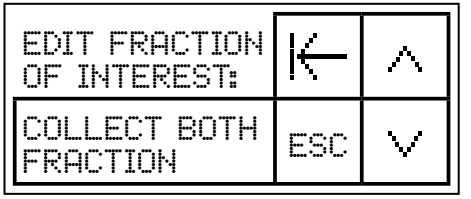
The current process parameter name is displayed on the upper left of the Touch Display and the parameter is on the lower left, beginning with the parameter type Fraction of Interest.
Depending on the parameter of the chosen process, several process parameters can be edited.

A. Editing Fraction of Interest

1. To change the parameter type Fraction of Interest press the displayed parameter, e.g., COLLECT POS FRACTION, and the next screen appears.

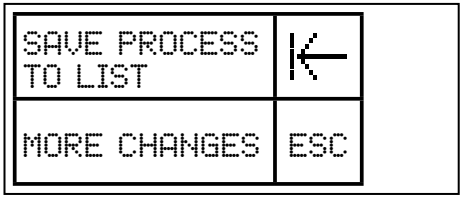


2. The parameter type now appears in the upper left of the screen. To change the parameter, scroll through the list of options by touching the symbol ∧ or ∨ until the desired parameter is displayed.



3. Touch the parameter to select it, e.g., COLLECT BOTH FRACTIONS.

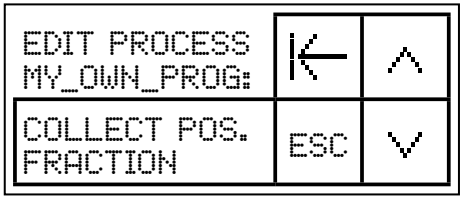
If COLLECT POS FRACTION is changed to COLLECT BOTH FRACTIONS or COLLECT NEG FRACTION, additional parameter types have to be selected. For details, refer to page 98: C. Selecting Plate Heights.



4. If no further parameter should be edited press SAVE PROCESS TO LIST and go to page 103, Saving the created process. Alternatively, edit other parameters types by touching MORE CHANGES.

B. Editing Elution Mode

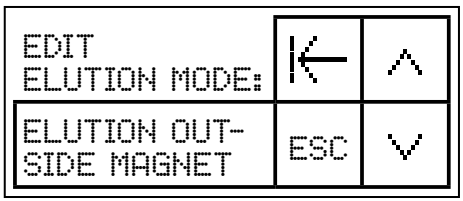
1. This parameter type only appears if COLLECT POS FRACTION or BOTH FRACTIONS were chosen as the fraction of interest.



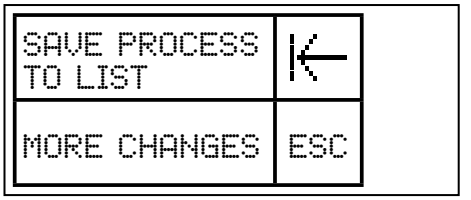
2. Scroll through the list by touching the symbol ⌃ or ⌄ until the process parameter of the elution mode, ELUTION INSIDE MAGNET or ELUTION OUTSIDE MAGNET, is displayed. The current process parameter is displayed on the lower left of the Touch Display.

3. To change the parameter of the parameter type elution mode touch the displayed parameter, e.g., ELUTION INSIDE MAGNET.

4. The parameter type now appears in the upper left screen. To change the parameter scroll through the list of options by touching the symbol ⌃ or ⌄ until the desired parameter is displayed.



5. Press the changed parameter to select it, e.g., ELUTION OUTSIDE MAGNET, and the next screen appears.



If no further parameter should be edited press SAVE PROCESS TO LIST and go to page 117, Saving the edited process. Alternatively, edit other parameters types by touching MORE CHANGES.

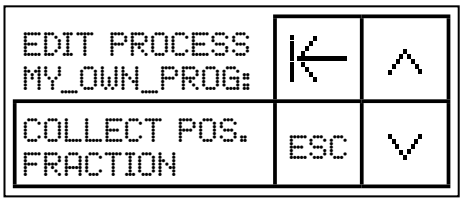
C. Editing Plate Height

The Tip-Touch Plate of the MultiMACS Separator is designed for microtiter plates that comply to the footprint as described in the ANSI/SBS standard, refer to chapter 5, page 75: Reagents, columns and plates.

Fraction of interest	WASTE PLATE to collect	FLOWTHRU PLATE to collect	ELUTION PLATE to collect
COLLECT POS FRACTION	Equilibration buffer, flow-through and wash buffer	–	Eluate**
COLLECT NEG FRACTION	Equilibration buffer	Flow-through + wash buffer*	–
COLLECT BOTH	Equilibration buffer	Flow-through + wash buffer*	Eluate**

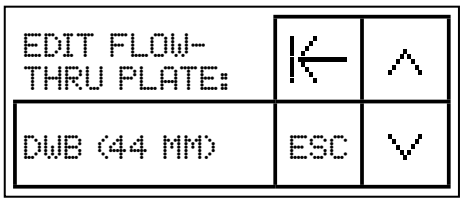
* Flow-through and wash buffer can be separately collected in plates by increasing number of flow-through loops.
** Parameter ELUTION PLATE does not appear if Elution Mode is OUTSIDE MAGNET.

Depending on selected process parameters (refer to table above) several plate heights for collecting waste, flow-through, and / or elution can be edited. For example, when COLLECT POS FRACTION was selected the heights of the plates for waste and elutate can be specified.



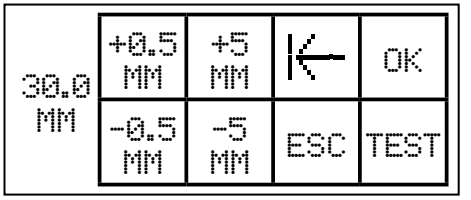
1. Scroll through the list by touching the symbol ⋀ or ⋁ until the process parameter of waste, flow-through, or elution plate is displayed. The current process parameter is displayed on the lower left of the Touch Display. Below all three screens are listed.

2. Press the displayed plate height to change it. The corresponding screen appears. Again, all three screens are shown.

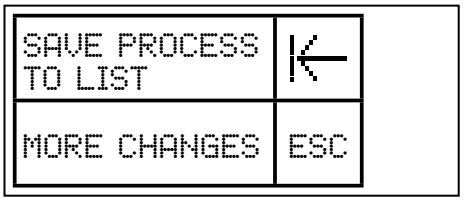


3. Touch on the displayed plate type at the lower left side of the Touch Display to select the default value. If a height different to the default value should be selected, scroll through the list by touching the symbol ^ or v until the corresponding screen is presented.

4. Touch ENTER HEIGHT.



5. Touch +0.5 MM or +5 MM to increase the displayed plate height by this amount (mm), and press -0.5 MM or -5 MM to decrease it. The minimum plate height is 8.0 mm. The maximum plate height is 80.0 mm. Touch OK to select the displayed height.

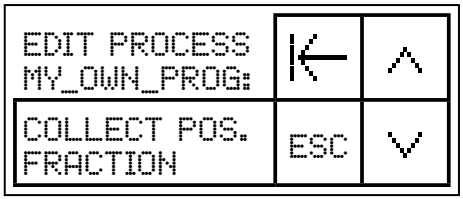


If no further parameter should be edited go to chapter 6, Saving the edited process. Alternatively, edit further parameters by touching MORE CHANGES.

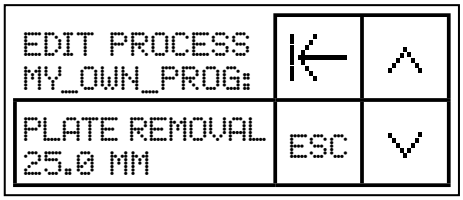
D. Advanced parameter types

D1. Editing Distance for Plate Removal

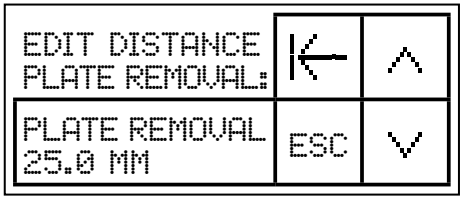
The Distance for Plate Removal is the user-defined distance (default 25 mm) the magnet moves up to create space for plate removal and insertion.



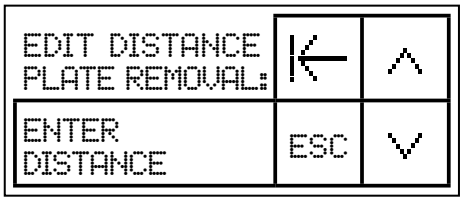
1. Starting from the screen above, scroll through the list by touching the symbol ^ or v until the process parameter PLATE REMOVAL 25.0 MM is displayed (displayed values may vary). The current process parameter is shown on the lower left of the Touch Display.



2. To change the parameter, touch PLATE REMOVAL 25.0 MM (displayed value may vary). The next screen appears.



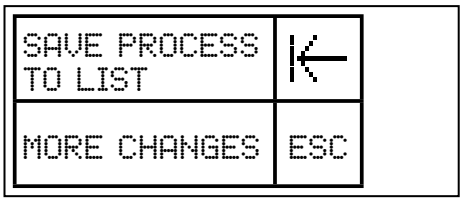
3. The parameter type now appears in the upper left screen. Press PLATE REMOVAL 25.0 MM to select default value, or, to change the parameter, scroll through the list by touching the symbol ^ or v until ENTER DISTANCE is displayed.



4. Touch ENTER DISTANCE for the next screen.

Adjust the desired distance by touching the corresponding buttons, e.g., +0.5 MM and +5 MM to increase and -0.5 MM and +5 MM to decrease distance.

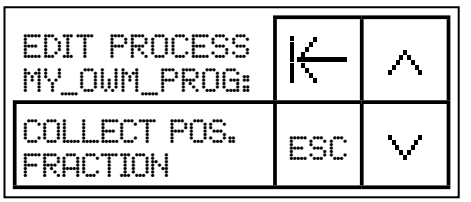
5. Touch OK for the next screen.



If no further parameter should be edited go to SAVE PROCESS TO LIST, chapter 6, page 119, Saving the edited process. Alternatively, edit other parameters types by touching MORE CHANGES.

D2. Editing Number of Flow-through Plates

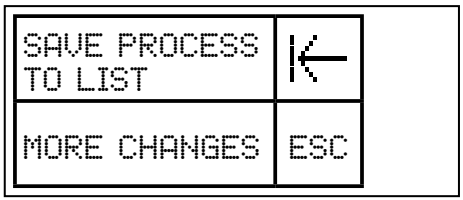
If COLLECT BOTH FRACTIONS or COLLECT NEG FRACTIONS was chosen as fraction of interest, the flow-through fraction and different wash buffer fractions can be collected separately by increasing the number of flow-through plates.



1. Starting from the previous screen above, scroll through the list by touching the symbol ^ or v until the process parameter NUMBER OF FLOWTHRU PL (plates) is displayed. The current process parameter is shown on the lower left of the Touch Display.

2. To change the number of flow-through plates, touch the displayed parameter. The next screen appears.

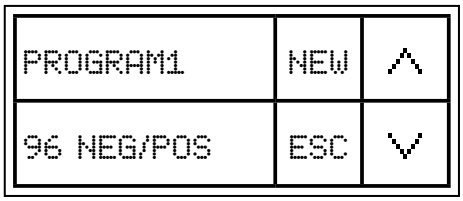
3. The default value 1 keeps flow-through and all wash fractions in one plate. Touch +1 to increase the number of plates; thereby, collecting wash fractions separately. Confirm by touching OK and to switch to the next screen.



4. If no further parameter should be edited go to SAVE PROCESS TO LIST described below in chapter 6, page 117, Saving the edited process. Alternatively, edit other parameters by touching MORE CHANGES.

D3. Editing Separation Mode

1. To edit a separation mode scroll through the rot menu list by touching the symbol ^ or v .



2. Select the program of interest, in the example above "PROGRAM1" was selected.

3. Select EDIT to modify the program type.

4. Select JUST EDIT THE PARAMETERS to edit and save changes to PROGRAM1. Select SAVE AS A NEW PROCESS to edit PROGRAM1 and save any changes as a different file name.

5. Scroll through the options by touching the ^ or v symbols. If the COLLECT POS FRACTION option was chosen, the following separation modes can be edited:
STANDARD SEPARATION (no incubation) — this example is shown below.

EDIT SEPARAT. MODE:	NEW	^
STANDARD SEPARATION	ESC	v

D3a. DNAse Temperature
If CDNA SYNTH. + DNASE was included in the separation program, the incubation temperature for the DNAse digestion step can be edited as follows.

1. Scroll through the options by touching the ^ or v symbols and select DNASE TEMP. In this example the option DNASE TEMP has been disabled (OFF) for PROGRAM1.

2. Use the ^ or v symbols to select OFF or 37 °C according to requirements.

3. Select SAVE PROCESS TO LIST to save these changes and return to run this process or to return the main menu. Alternatively, select MORE CHANGES to continue editing this process.

EDIT PROCESS DNASE TEMP.:	NEW	^
OFF	ESC	v

D3b. DNAse Duration
If CDNA SYNTH. + DNASE was included in the separation program, the incubation duration for the DNAse digestion step can be edited as follows.

1. Scroll through the options by touching the ^ or v symbols and select DNASE DURAT. In this example the option DNASE DURAT was previously saved as 20 minutes. Select 20 MIN(utes) or ENTER

DURATION according to requirements. Scroll through the list by touching the symbol ⋀ or ⋁. Touch ENTER DURATION for the following screen.

EDIT DNASE DURAT.:	NEW	⋀
20 MIN	ESC	⋁

2. Select 20 MIN(utes) to edit the setting.

3. Touch the ⋀ or ⋁ symbols and select ENTER DURATION to change the current setting.

4. Press + 1 MIN or + 5 MIN to increase displayed duration for incubation by this amount (in minutes) and – 1 MIN or –5 MIN to decrease it. The minimum duration is 1 minute, maximum duration is 60 minutes. Confirm by touching OK.

5. Select SAVE PROCESS TO LIST to save these changes and return to run this process or to return the main menu. Alternatively, select MORE CHANGES to continue editing this process.

Saving the edited process

1. Save the process with the changed parameters by touching SAVE PROCESS TO LIST, thus leaving the edit mode. In case ten user-defined processes have already been saved in the list, an obsolete process has to be replaced, refer to chapter 6, Replacing a user-defined process. The following screen appears.

DO YOU WANT TO START THIS PROCESS NOW?		YES
	ESC	NO

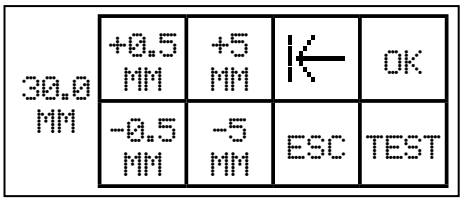
2. Touch YES to start the process immediately after saving; alternatively, touch NO or ESC to get to the Welcome Screen.

Testing Plate Height or Distance for Plate Removal

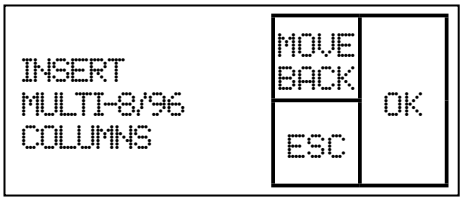
For your convenience, plate heights or distance for plate removal can be tested before saving.

Note: The Tip-Touch insertion distance is calculated by the MultiMACS Separator automatically. Therefore, enter the actual height of the preferred plate.

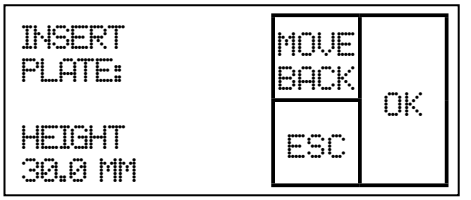
1. After touching ENTER HEIGHT or ENTER DISTANCE the following screen appears.



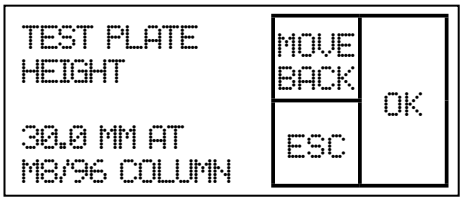
2. Touch TEST and follow the instructions to check the selected values.



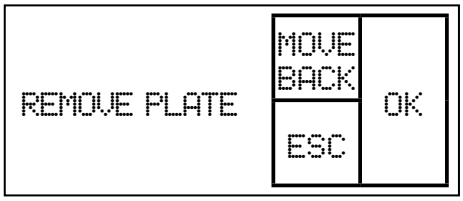
3. Insert the MultiColumn Frame with up to twelve Multi-8 Columns. Touch OK and the MultiMACS Magnet moves up to the next position.



4. Insert the plate type to be tested. Touch OK and the MultiMACS Magnet moves down to the next position.



5. Check whether the height is acceptable by moving the Tip-Touch Plate back and forth. The column tips should be inserted slightly in the well (1 mm). Touch OK and the MultiMACS Magnet moves up.



6. Remove the plate. Touch OK, the MultiMACS Magnet moves down, and the first screen reappears.

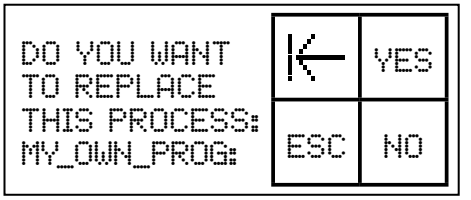
7. Touch OK if the height was acceptable, otherwise adapt plate height and retry the test.

Return to the previous sections, such as C. Selecting Plate Height (page 98) or D1. Selecting Distance for Plate Removal (page 100).

Replacing a user-defined process

In case ten user-defined processes were already saved and another user-defined process should be created, or a process should be edited and saved as a new process, an obsolete process has to be removed from the list of user-defined processes.

1. If necessary, scroll through the list by touching the symbol ^ or v until the desired process name to be replaced is displayed. Touch the process name, e.g., MY_OWN_PROG, to replace it. The following screen emerges.



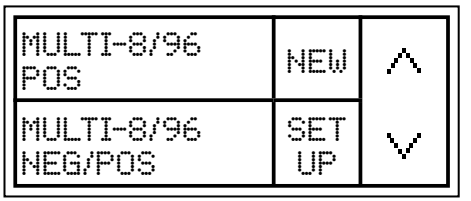
2. Confirm the replacement by touching YES or go back by touching NO or |←. The new process has now been saved and with the following screen you can choose to start this process immediately.

3. Touch YES to start the process. Alternatively, touch NO or ESC to go to the Welcome Screen.

Note: Only user-defined processes can be deleted.

Deleting a user-defined process

1. To delete a process from the list of available processes, switch on the instrument and then touch the Welcome Screen or wait for a few seconds until the Process Selection Screen appears.



The last process performed on the MultiMACS Separator is displayed in the upper left (default: 96 POS). The one but last process is listed in

the lower left.

2. If necessary, scroll through the list of available process names by touching the symbol ⋀ or ⋁ until the desired process is displayed. Touch the desired process name to select it. The Process Management Screen appears.

3. Touch DEL to get to another screen for confirmation.

4. Confirm the deletion of the process by touching YES. Touch NO to stop deletion.

Fully automated use in liquid-handling instruments

Instructions on how to install the MultiMACS Separator for automated use can be found in chapter 4, Installing MultiMACS Separator for automated use in liquid-handling platforms.

For the successful implementation of the MultiMACS Separator, a minimum of skills in electronic data processing or usage of command lines is essential! We recommend to get assistance of your in-house computing expert.

Note: Although only the MultiMACS Separator is mentioned, the following text refers to both MultiMACS M96 Separator and MultiMACS M96thermo Separator.

Use the communication software (mumcli.exe) available on www.miltenyibiotec.com to control the MultiMACS Separator via the robot PC. Contact technical support for available robot scripts. Create a local data folder, for example, C:\MultiMACS, to save the software (mumcli.exe) and robot scripts. If adequate robot scripts are not available for your application, create your own script by using the commands described below.

Communication with the MultiMACS™ Separator command line interface (mumcli.exe)

Several commands can be integrated into the robot software if the robot software is able to start the command line interface mumcli.exe in a DOS shell or to call a batch file. Calling mumcli.exe without any parameter in a DOS shell lists all available commands, parameters, and environment variables. The general build-up of a command is:
mumcli <command> [<parameter>] [options]

Depending on the type of command used the return value varies. Negative return values indicate an error. Refer to table 6.3, page 127, on negative return values. Find below a list of selected commands with a detailed description and examples for use.

setmaxcolpos [0|1|2]
This command is used to set the maximum height of MultiMACS™ Column Holder and MultiMACS Magnet, defined as the maximum column holder position.
When operating manually, only the top position 0 is used. Position 1 (middle) and 2 (low) can additionally be used on robot platforms. The middle position 1 is necessary in case the maximum travel height of the gripper or the liquid-handling arm is below the top position 0 so that the gripper and/or the liquid-handling arm might collide with the MultiMACS Column Holder in position 0 (top).
The position 2 is needed when the maximum travel height of the gripper is so low that the Multi-96 Column Plate cannot be removed by the gripper in position 1 (middle). In this case, use position 2 (low) to insert or remove the Multi-96 Column Plate and in between switch to position 1 for processing the Multi-96 Column Plate.
Example to set position 1 (mid) as the maximum position for MultiMACS Column Holder and MultiMACS Magnet; mumcli.exe was previously saved on drive C: in the folder MultiMACS:
C:\MultiMACS\mumcli setmaxcolpos 1

move <position in 0.1 mm>
This command is used to move the MultiMACS Magnet from the absolute position 0 to 1400 in increments of 1/10 of mm (tenth of mm) below the current maximum column position. Ten increments equal 1 mm. Change the maximum column position with the command setmaxcolpos mentioned above. If the MultiMACS Column Holder is currently unlocked (refer to command pickupcol below), it will be moved simultaneously.
Example to move the MultiMACS Magnet to a position 35 mm below the current maximum column position:
C:\MultiMACS\mumcli move 350

Note: move <position in 0.1 mm> Maximum parameter values are 1500 for the top position, 900 for mid, and 400 for low. Actual maximal travel is limited by hardware and is ususally lower than maximal parameter values.

getpos
Use this command to get a return value of the current position of the MultiMACS Magnet below the current maximum column position. Return values are in 0.1 mm.
Example: C:\MultiMACS\mumcli getpos

lockcol
The command lockcol is used to move only the MultiMACS Magnet with the MultiMACS Column Holder to the maximum column holder position, as defined by the command setmaxcolpos above. A subsequent move command will then not move the MultiMACS Column Holder, including any Multi-96 Columns, simultaneously with the MultiMACS Magnet on a move command.
Example: C:\MultiMACS\mumcli lockcol

init [0|1]
This command is used to initialize the MultiMACS Magnet. Parameter 0 moves the MultiMACS Magnet up to the current maximum column holder position (simultaneously with the MultiMACS Column Holder if necessary), resetting the position counter.
Example 1: C:\MultiMACS\mumcli init 0

Parameter 1 initializes the MultiMACS Magnet in the lowest position. The MultiMACS Column Holder has to be locked at the current maximum column holder position in advance.
Example 2: C:\MultiMACS\mumcli init 1

display <text>
This command is used to show messages of up to 23 characters on the Touch Display. Use quotation marks if blanks are present.
Example to display the text TEST EXAMPLE on the Touch Display:
C:\MultiMACS\mumcli display “test example”

pickupcol
This command is used to move the MultiMACS Magnet up to the MultiMACS Column Holder and release the locking mechanism. A subsequent move command will then move the MultiMACS Column Holder (including columns) simultaneously with the MultiMACS Magnet.
Example: C:\MultiMACS\mumcli pickupcol

settemp [0|37|42] [0|1]
This command is used to set the temperature of the MultiMACS 96thermo Magnet to 37 °C or 42 °C. Use 0 for the first parameter to set temperature control off. The second parameter sets the termination handling of the mumcli.exe. On 0 mumcli.exe terminates

after setting the target temperature. If the second parameter is 1 mumcli.exe will terminate if the target temperature is actually reached. Set the timeout value to at least 300 if mumcli.exe terminates upon reaching the temperature (refer to additional advanced options below).
Example 1 to set the target temperature in the Multi-96 Columns to 42 °C. The mumcli.exe terminates after setting the temperature:
C:\MultiMACS\mumcli settemp 42 0
Example 2 to set the target temperature in the Multi-96 Columns to 37 °C. The mumcli.exe terminates after reaching the temperature (timeout is set to 300 seconds):
C:\MultiMACS\mumcli settemp 37 1 -t:300

-t:<timeout>
The maximum expected time for executing a mumcli.exe command is the timeout value. To override the default value of 20 seconds use this optional parameter.
Example to set the timout value to 300 seconds while waiting for the mumcli.exe to terminate after reaching the target temperature of 42 °C:
C:\MultiMACS\mumcli settemp 42 1 -t:300

gettemp [0|1]
Use this command with parameter 0 to get a return value of the current Multi-96 Column matrix temperature. Use parameter 1 for ambient temperature. Return values are temperatures in 0.1 °C, thus a return value of 369 equals 36.9 °C.
Example to read the current ambient temperature:
C:\MultiMACS\mumcli gettemp 1

getstatus
This command is used to get the internal status of the instrument. Possible return values are listed below.

Return value	Status
0	Magnet and Column Holder at position 0. Column Holder is not locked at setmaxcolpos.
1	Magnet at position 0. Column Holder is locked at setmaxcolpos.
2	Magnet at position different to 0. Column Holder is locked at setmaxcolpos.
3	Magnet and Column Holder at position different to 0.
4	Magnet at bottom position (after init 1).
5	Error: instrument is tilting.
6	Error: Column Holder is tilting.

7	Error: stepping loss. Actual position of the magnet is different from intended position.
8	Error: lock failure at setmaxcolpos. Call technical service.
9	Error: Magnet moved higher than setmaxcolpos.
10	Error: Column Holder is locked higher than current setmaxcolpos.
11	Error: failed magnet position.
12	Error: wrong signal. Call technical service.
13	Error: could not lock column at setmaxcolpos.
14	Error: MultiMACS 96thermo Magnet communication failure.
15	Error: Time up during column heating.
16	Error: Column temperature control error.
17	Error: Magnet temperature sensor. Call technical service.
18	Error: Ambient temperature sensor. Make sure that ambient temperature is not lower than 15 °C and that no forced convection is present (e.g. ventilator, fan, draft, open window). If problem persists, call technical service.
19	Error: MultiMACS 96thermo Magnet is decalibrated. Call technical service.

Table 6.1: Return values and internal status of MultiMACS™ Separator.

Example: C:\MultiMACS\mumcli getstatus.

getmaxcolpos

This command is used to get the maximum column holder position. Below possible return values are listed.

Return value	Position
0	Top, convenient for manual use.
1	Mid, suitable for most robots.
2	Low, necessary for some gripper as column-exchange position.

Table 6.2: Return values for positions of Column Holder.

Example: C:\MultiMACS\mumcli getmaxcolpos

Advanced options

–p:<portname>
All of the hitherto mentioned examples are given for serial communication via the default port (for a description how to change the default serial port, refer to page 127, Environmental variables. If the MultiMACS Separator is connected to another serial port, change the number of the addressed COM port by mumcli.exe with an optional parameter in the command accordingly.
Example to display the text EXAMPLE on the Touch Display by addressing COM port 2:
C:\MultiMACS\mumcli display example –p:com2

–e:<number>
After sending a command to the MultiMACS Separator and its execution on the instrument a return value is sent to the robot PC. If the return value is below zero, an error has occurred, refer to table 6.3, page 127. If problems are encountered with interpreting negative return values, shift negative return values of any command by adding the parameter to the command.
Example to get the status of the instrument and shift the possible return value by +100 from possible return values –1 (Column Holder tilt error), –2 (instrument tilt error) etc. to possible return values –99 (Column Holder tilt error), –98 (instrument tilt error), etc.:
C:\MultiMACS\mumcli getstatus –e:100

–i
On an error mumcli.exe returns negative return values. The return value can be analyzed in the script to solve problems automatically or at least keep the script from executing any further. If your robot software cannot handle return values but waits for the termination of mumcli.exe before continuing with the script, add the parameter –i to all commands. On encountering an error mumcli.exe will not terminate and the robot script will be caught in an infinite loop.
Example: C:\MultiMACS\mumcli move 293 –i

Note: –p:<portname>
This parameter overrules the default serial port environment variable MUMPORT. If MUMPORT and parameter –p are not used, the default serial port is COM1.

–r
If you cannot analyze return values with the program executing the robot script, but the program is capable of interpreting return values in a file, use this parameter to pipe return values into a file of your choice.
Example 1 to send return values into the file error.txt in the folder MultiMACS on drive C:
C:\MultiMACS\mumcli move 293 –r >C:\MultiMACS\error.txt
Example 2 to display the return value in the DOS shell only:
C:\MultiMACS\mumcli move 293 –r

-t:<timeout>
The maximum expected time for executing a mumcli.exe command is the timeout value. To override the default value of 20 seconds use this optional parameter.
Example to set the timout value to 300 seconds while waiting for the mumcli.exe to terminate after reaching the target temperature of 42 °C:
C:\MultiMACS\mumcli settemp 42 1 -t:300

All optional parameters mentioned above can be combined.

Example to displays the text EXAMPLE on the Touch Display by addressing COM port 2 while mumcli.exe will not terminate on encountering an error):
C:\MultiMACS\mumcli display example –p:com2 –i

Environment variables

MUMPORT
Use the environment variable MUMPORT to set the default serial port. Refer to the manual of your operating system on how to set environment variables permanently.
Example to set the default serial port to COM2 for the duration of a DOS shell session:
set MUMPORT=COM2

Note: MUMPORT
Use of parameter –p overrules the default serial port variable MUMPORT. If MUMPORT and parameter –p are not used, the default serial port is COM1.

Error codes
All MultiMACS command line interface errors are coded. Refer to the following table for explanations.

Return value	Status
0	OK, no error.
–1	Column Holder tilted during move. Motor was stopped.
–2	Instrument tilted during move. Motor was stopped.
–6	System has to be initialized.
–7	Unknown command.
–8	Too few parameters for last command.
–9	Too many parameters for last command.
–10	Parameters for last command are out of range.
–11	Could not initialize in lowest position. First lock columns.
–101	Stepping loss.
–102 to –105	Wrong magnet position.
–106 to –110	Wrong Column Holder position.

Return value	Status
–111 to –116	Position failed.
–117	Cannot pickup.
–118 to –122	Wrong signal, call technical service.
–123 to –125	Lock failure, call technical service.
–201	Communication error with MultiMACS 96thermo Magnet.
–202	Time out during column heating.
–203	Column temperature control error.
–205	Magnet temperature sensor error, call technical service.
–206	Ambient temperature sensor error, make sure that ambient temperature is not lower than 15 °C and that no forced convection is present (e.g. ventilator, fan, draft, open window). If problem persists, call technical service.
–207	MultiMACS 96thermo Magnet is decalibrated, call technical service.
–208 to –215	Communication error with MultiMACS 96thermo Magnet.
–1100	Time out during read.
–1101	Communication error: Checksum incorrect during read.
–1102	Communication error.
–1103	Unexpected answer received.
–1200	Unknown command.

Table 6.3: Return values and explanation.

Running an automated process

It may be necessary to decrease the height of the lock position of the MultiMACS Column Holder and thus reduce the travel of the MultiMACS Magnet (refer to setmaxcolpos, chapter 6, page 122, Communication with the command line interface mumcli.exe).

The MultiMACS Separator can be controlled either by touching the display or by serial port communication. Whatever comes first overrules the other form of communication. Therefore, do not touch the Touch Display before sending the first command from the robot PC to the MultiMACS Separator. Optionally, send a display command (see above) to check the connection between MultiMACS Separator and the robot.

Example 1 simulate the pre-defined process 96 POS, the serial port COM2 is used for communication:

```
Set MUMPORT=COM2
C:\MultiMACS\mumcli setmaxcolpos 1
C:\MultiMACS\mumcli init 0
C:\MultiMACS\mumcli move 350
Insert Multi-96 Column (by gripper)
C:\MultiMACS\mumcli pickupcol
Insert waste plate (by gripper)
C:\MultiMACS\mumcli move 445
Rinse columns
Apply sample on columns
Wash columns
If required: pre-elute columns
Tip-touch columns in plate (by gripper)
C:\MultiMACS\mumcli move 250
Remove waste plate and insert elution plate (by gripper)
C:\MultiMACS\mumcli move 740
Apply elution buffer on columns
Tip-touch columns in plate (by gripper)
C:\MultiMACS\mumcli lockcol
Remove elution plate (by gripper)
C:\MultiMACS\mumcli move 350
Remove Multi-96 Column (by gripper)
```

Example 2 illustrates the functionality of the whole process. All commands are executed in a row. Type the code into a text editor and save it as mum.bat. Then execute mum.bat. The default serial port is used for communication:

```
@echo off
echo Starting process
pause
:step1
c:\MultiMACS\mumcli setmaxcolpos 1
if errorlevel 0 goto step2
goto error
:step2
c:\MultiMACS\mumcli init 0
if errorlevel 0 goto step3
Goto error
:step3
c:\MultiMACS\mumcli move 350
if errorlevel 0 goto step4
goto error
:step4
echo Insert Multi-96 Column (by gripper)
pause
c:\MultiMACS\mumcli pickupcol
if errorlevel 0 goto step5
goto error
```

```
:step5
echo Insert Waste Plate (by gripper)
pause
c:\MultiMACS\mumcli move 445
if errorlevel 0 goto step6
goto error
:step6
echo Rinse colums
pause
echo Apply sample on columns
pause
echo Wash columns
pause
echo If required pre-elute columns
pause
echo Tip-touch columns in plate (by gripper)
pause
C:\MultiMACS\mumcli move 250
if errorlevel 0 goto step7
goto error
:step7
echo Insert Elution Plate (by gripper)
pause
C:\MultiMACS\mumcli move 740
if errorlevel 0 goto step8
goto error
:step8
echo Apply elution buffer on columns
pause
echo Tip-touch columns in plate (by gripper)
pause
C:\MultiMACS\mumcli lockcol
if errorlevel 0 goto step9
goto error
:step9
echo Remove Elution Plate (by gripper)
pause
C:\MultiMACS\mumcli move 350
if errorlevel 0 goto step10
goto error
:step10
echo Remove 96 Column (by gripper)
pause
goto end
:error
echo Error! Process stopped.
:end
echo End of process
pause
```

Example 3 simulates the pre-defined process 96 CDNA SYNTH. The ping command is used to wait for the incubation time of 60 minutes (3600 seconds):

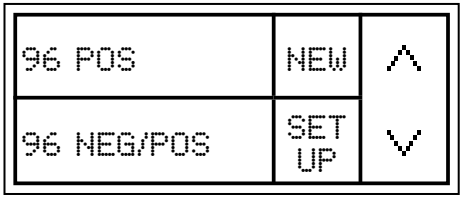
```
C:\MultiMACS\mumcli setmaxcolpos 1
C:\MultiMACS\mumcli init 0
C:\MultiMACS\mumcli move 350
Insert Multi-96 Column (by gripper)
C:\MultiMACS\mumcli pickupcol
Insert waste plate (by gripper)
C:\MultiMACS\mumcli move 445
Rinse columns
Apply sample on columns
Wash columns
Add cDNA mix
Tip-touch columns in plate (by gripper)
C:\MultiMACS\mumcli settemp 42 1 –t:600
ping –n 3600 localhost > nul
C:\MultiMACS\mumcli settemp 0 0
Wash columns
Add release solution
Tip-touch columns in plate (by gripper)
C:\MultiMACS\mumcli settemp 42 1 –t:600
ping –n 3600 localhost > nul
C:\MultiMACS\mumcli settemp 0 0
If required: pre-elute columns
Tip-touch columns in plate (by gripper)
C:\MultiMACS\mumcli move 250
Remove waste plate and insert elution plate (by gripper)
C:\MultiMACS\mumcli move 740
Apply elution buffer on columns
Tip-touch columns in plate (by gripper)
C:\MultiMACS\mumcli lockcol
Remove elution plate (by gripper)
C:\MultiMACS\mumcli move 350
Remove Multi-96 Column (by gripper)
```

Service and preferences

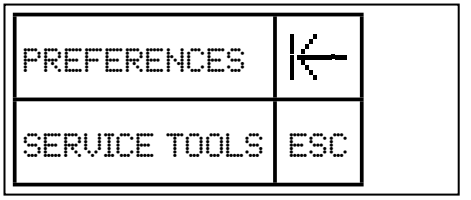
Technical service

For technical service please call your local distributor of MACS Products. Before making contact, always write down the version of the firmware on the MultiMACS Separator.

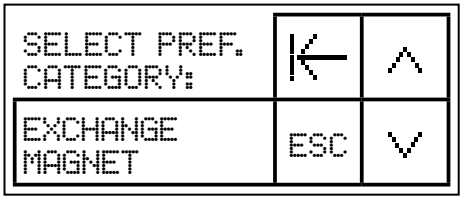
1. Therefore, switch on the instrument and touch the Welcome Screen or wait for a few seconds until the Process Selection Screen appears.



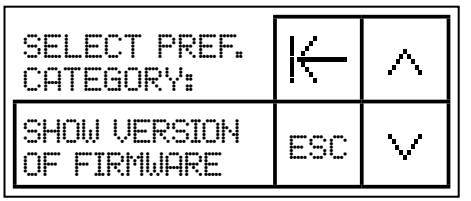
2. Touch SETUP for the Setup Screen.



3. Touch PREFERENCES to display the Preference Category Screen.



4. Scroll down until SHOW VERSION OF FIRMWARE appears.



Note: SERVICE TOOLS are for service purposes and are only to be used by the Miltenyi Biotec Service Team.

The scroll function is only visible if there are more items to choose which are not displayed.

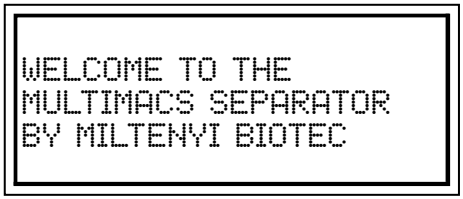
Note: Although only the MultiMACS Separator is mentioned, the following text refers to both MultiMACS M96 Separator and MultiMACS M96thermo Separator.

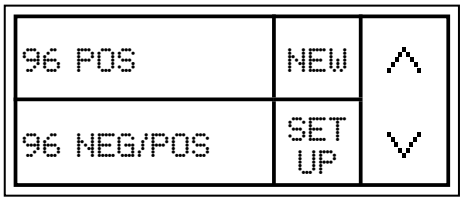
5. Touch this button and the current version of the firmware is presented in the next screen.

Preparing the MultiMACS™ Separator for transport

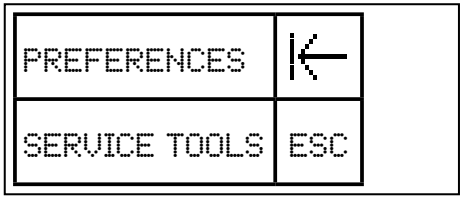
The MultiMACS™ Separator has to be locked before shipping. Please contact Miltenyi Biotec before sending the MultiMACS Separator back.

1. Switch on the instrument then touch the Welcome Screen or wait for a few seconds until the Process Selection Screen appears.

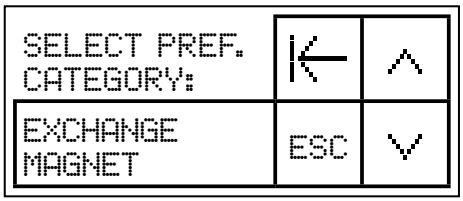




2. Press SETUP for the Setup Screen.



3. Touch PREFERENCES to display the Preference Category Screen.



4. Scroll down to LOCK UNIT FOR TRANSPORT.

⚠CAUTION
Tray in motion during operation.
Hazard of crushing fingers.
Operate only with attached protection screen.
Device must be able to be tilted backwards.

5. Press LOCK UNIT FOR TRANSPORT for the MultiMACS Magnet and MultiMACS Column Holder to move to the lock position.

SELECT PREF. CATEGORY:	⇤	^
LOCK UNIT FOR TRANSPORT	ESC	V

MULTIMACS SEP.
IS READY FOR
TRANSPORT.
SWITCH DEVICE OFF

6. As soon as the text above appears, the instrument can be switched off. The MultiMACS Separator is now ready for shipping.

Note: SERVICE TOOLS are for service purposes and are only to be used by the Miltenyi Biotec Service Team.

The scroll function is only visible if there are more items to choose which are not displayed.

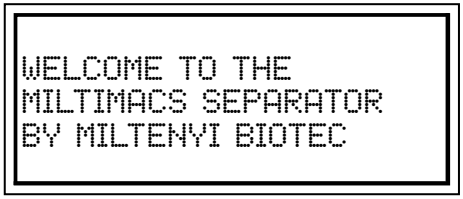
Rotating MultiMACS™ Magnet/MultiMACS 96 thermo Magnet and Column Holder

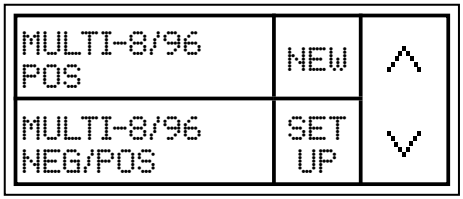
The MultiMACS™ Magnet and Column Holder are delivered in landscape orientation, but they can also be used in portrait orientation. In rare cases, if 96-well magnets needs to be exchanged, follow the instructions outlined below.

Warning: The MultiMACS Separator is equipped with an extremely powerful magnet, the **MultiMACS Magnet/MultiMACS 96 thermo Magnet**. Keep this magnet at a distance of at least 80 cm from any magnetic information carriers such as credit cards, magnetic tapes, and storage media, and from any electronic equipment, such as hearing aids, pacemakers, measuring and control instruments, computers, and watches. These items may be affected or damaged by the extremely powerful magnetic field. The force of attraction between two magnets or between a magnet and magnetically attractable material increases strongly the closer they get. Thus, keep any magnetic material — including any other MultiMACS Magnet and Display — at a safe distance.

Note: The scroll function is only visible if there are more items to choose which are not displayed.

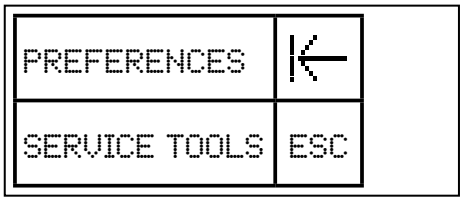
1. Switch on the instrument and touch the Welcome Screen or wait for a few seconds for the Process Selection Screen.





2. Touching SETUP leads to the Setup Screen.

Note: Although only the MultiMACS Separator is mentioned, the following text refers to both MultiMACS M96 Separator and MultiMACS M96thermo Separator.



3. Press PREFERENCES to go to the Preference Category Screen.

SELECT PREF. CATEGORY:	←	^
EXCHANGE MAGNET	ESC	V

4. Touch EXCHANGE MAGNET and the MultiMACS Magnet will move to the middle exchange position while the Column Holder is locked in the top position.

5. Wait until the following text appears.

```
READY FOR
MAGNET
EXCHANGE
SWITCH DEVICE OFF
```

6. Switch-off and unplug the MultiMACS Separation Unit.

Rotation of the MultiMACS™ Magnet

1. If applicable, disconnect the MultiMACS™ 96thermo Magnet supply cable from the connector on the back of the device.

2. Unscrew all four knurled screws of the MultiMACS Magnet. For rotation of magnet from **landscape to portrait** orientation, turn magnet counterclockwise by 90°. Please note that the 'notched' corner, marked red in figure 5 a + b, is now at the lower right.
For rotation of the magnet from **portrait to landscape** orientation, turn the magnet clockwise by 90° (refer to fig. 5 a + b).

3. Align the MultiMACS Magnet with the metal brackets. The holes in the metal brackets must be aligned with the screw threads in the MultiMACS Magnet. The holes can only be aligned with the screw threads if the nodged corner of the magnet with the cable outlet is to the left (landscape orientation refer to fig. 6a) or lower right (portrait orientation refer to fig. 6b).

Note: In landscape orientation, the safety notices on the MultiMACS Magnet have to face the front. The notched corner is at the lower left.

4. Align the hole of the cable guiding with the hole in the metal bracket close to the cable outlet of the magnet as shown in figure 7. It might be necessary to adjust the position of the cable guiding on the cable.

5. Now fasten all four knurled screws. Make sure that the knurled screw holding the cable guiding is fully inserted into the guiding as shown in figure 5c.

6. If applicable, connect the supply cable of the MultiMACS 96thermo Magnet to the outlet on the back of the MultiMACS Separator labeled “module 1”.

Caution: Ensure that the supply cable does not touch any part of the MultiMACS Protective Screen, Column Holder, or Magnet. Otherwise the supply cable might be seriously damaged. Refer to chapter 1, Important information.

7. Connect the power cable to the outlet on the back of the MultiMACS Separator and to an appropriate electrical socket.

Note: Magnet and Column Holder must be always aligned in the same orientation (portrait or landscape).

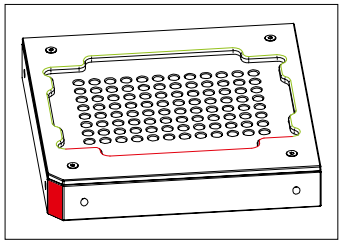


Figure 5a: Landscape orientation. The cable extends from the ‘notched’ corner marked in red

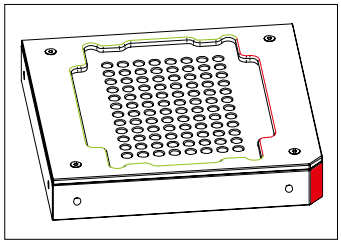


Figure 5b: Portrait orientation. The cable extends from the ‘notched’ corner marked in red.

Figure 5c: Cable outlet and guiding of the MultiMACS Magnet.

Rotation of the Column Holder

Unscrew all four knurled screws of the MultiMACS Column Holder. For rotation of Column Holder from landscape to portrait orientation, rotate Column Holder counter clockwise by 90° (the same way as the MultiMACS Magnet).

For rotation of Column Holder from portrait to landscape orientation, rotate Column Holder clockwise by 90° in the same way as the MultiMACS Magnet.

Align the MultiMACS Column Holder with the metal brackets as shown in figure 6 a + b. The holes in the metal brackets have to be aligned with the screw threads in the MultiMACS Column Holder. Now fasten all four knurled screws.

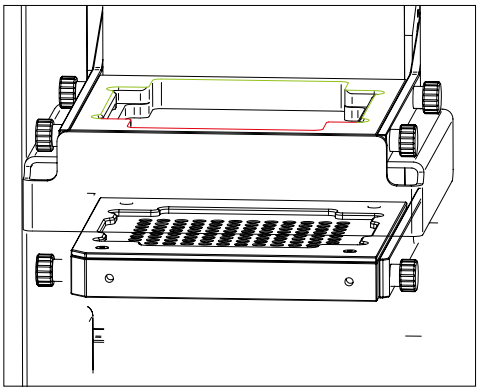


Figure 6a: Landscape orientation.

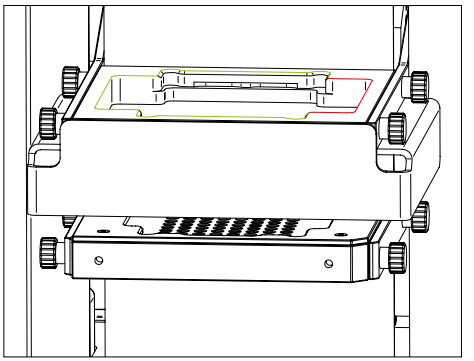


Figure 6b: Portrait orientation.

Maintenance

7

Caution: Unplug the power cable before cleaning the MultiMACS Separator. The MultiMACS Separator and the MultiMACS 96 Magnet must not be submerged in water or cleaned in a dish washer, ultrasonic cleaner, autoclave, or similar appliances.

Clean up spills immediately. Use a wash solution containing detergent, e.g., 1% SDS solution, and/or 70% ethanol solution for disinfection and cleaning.

The MultiMACS Separator should not move while performing Tip-Touch. If this happens accidentally, clean the knobs on which the instrument is standing with alcohol.

Note: Although only the MultiMACS Separator is mentioned, the following text refers to both MultiMACS M96 Separator and MultiMACS M96thermo Separator.

Note: Although only the MultiMACS Separator is mentioned, the following text refers to both MultiMACS Separator and MultiMACS 96thermo Separator.

Cross contamination by drops at the column tips

Always make a Tip-Touch before changing plates or allowing separation of the MultiMACS Magnet and the MultiMACS Column Holder. To take off drops at the column tips, move Tip-Touch Plate so that the Multi-8/96 Columns move slightly in the MultiMACS Column Holder. Control whether all drops at the column tips have been removed. If drops are still present, touch MOVE BACK, repeat the Tip-Touch. Touch OK to return to the screen.

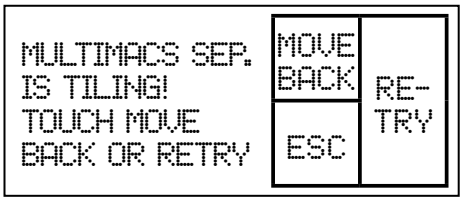
The MultiMACS Separator should not move while performing Tip-Touch. If this happens, clean the knobs the MultiMACS Separator stands on, refer to chapter 7, Maintenance.

Collision detection

⚠CAUTION

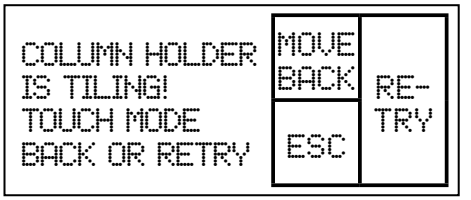
Tray in motion during operation.
Hazard of crushing fingers.
Operate only with attached protection screen.
Device must be able to be tilted backwards.

If a tilting of the **MultiMACS™ Separator** is registered while the magnet is moving, the movement stops and the following screen appears.



If a blocking object is visible, touch MOVE BACK to set back the magnet to its former position. Take out any objects causing the stop of the movement. Subsequently, press OK to restart the move. In case there are no blocking objects visible touch RETRY.

If a tilting of the **MultiMACS™ Column Holder** is registered while the magnet is moving, the movement stops and the following screen appears.



If a blocking object is visible, touch MOVE BACK to set back the magnet to its former position. Take out any objects causing the stop of the movement. Subsequently, press OK to restart the move. In case there are no blocking objects visible touch RETRY.

Buffer temperature

The use of cold buffer on a tempered column is not recommended due to the possibility of air bubble formation in the column matrix.

Matrix temperatures in the Multi-96 Columns
Matrix temperatures in the Multi-96 Columns might be too high or low if ambient temperature sensor data do not show the actual ambient temperature. This might happen if the supply cable connector containing the ambient temperature sensor has been cooled or heated up. Always make sure that air can circulate freely in the back of the MultiMACS Instrument and that no solar or heat radiation nor forced convection is present.

Malfunctions and possible remedies

Symptom	Cause	Possible remedy
No light on the display when power is turned on.	Power cord or display cord is not plugged in. Fuse is blown or missing.	Make sure power source matches power rating stamped on rear label. Check fuse holder in rear, refer to page 146, Fuse Exchange.
No message appears on the display or display is frozen.	Microprocessor is temporarily out of normal sequence.	Turn power off, wait 5 seconds and then turn on again.

Table 8.1: Malfunctions, causes, and suggestions for fixing.

Error code table

All errors are coded. Refer to the following table for explanations.

Displayed error message	Explanation and remedy
STEPPING LOSS ERROR -101 INITIALIZING SYSTEM	Motor out of sequence. Touch OK for intermediate re-initialization of the system.
WRONG MAG POS ERROR -102 INITIALIZING SYSTEM	Incorrect positioning of the magnet. Touch OK for intermediate reinitialization of the system.
WRONG COL POS ERROR -106 INITIALIZING SYSTEM	Column Holder is locked in wrong position. Touch OK for intermediate reinitialization of the system. Column holder will be repositioned.
POSITION FAILED ERROR -111 INITIALIZING SYSTEM	Incorrect positioning of the magnet. Make sure device is not exposed to direct sunlight. Touch OK for intermediate reinitialization of the system.
CANNOT PICKUP ERROR -117 INITIALIZING SYSTEM	Locking of Column Holder did not work. Touch OK for intermediate reinitialization of the system.
WRONG SIGNAL ERROR -118 CALL TECHNICAL SERVICE	Electronic hardware problem. Please call technical service.
LOCK FAILURE ERROR -123 CALL TECHNICAL SERVICE	Electronic or mechanical hardware problem. Please call technical service.
HEATED MAGNET NOT DETECTED ERROR -201	MultiMACS 96thermo Separation Unit cannot establish communication with MultiMACS 96thermo Magnet. Check if supply cable connector is plugged into connector on the back of the Separation unit labeled with module 1.
TIME UP DURING MAGNET HEATING ERROR -202	Target column matrix temperature has not been reached within 15 minutes. Make sure that air can circulate freely in the back of the MultiMACS 96thermo Separator and that no solar or heat radiation occurs on the supply cable connector which includes an ambient temperature sensor. Make sure that ambient temperature is not lower than 15 °C and that no forced convection is present (e.g. ventilator, fan, draft, open window).

Note: Refer to table 6.3 on error codes for automated use with the command line interface mumcli.exe.

TEMPERATURE CONTROL ERROR ERROR -203	Column matrix temperature could not be maintained. Make sure that no forced convection is present (e.g. ventilator, fan, draft, open window) and that air can circulate freely in the back of the MultiMACS 96thermo Separator and that no solar or heat radiation occurs on the supply cable connector which includes an ambient temperature sensor.
MAGN. SENSOR ERROR -205	Electronic hardware problem. Please call technical service.
AMB. SENSOR ERROR -206	Make sure that ambient temperature is not lower than 15 °C and that no forced convection is present (e. g. ventilator, fan, draft, open window). If problem persists, please call technical service.
HEATED MAGNET NOT DETECTED ERROR -201	MultiMACS Separation Unit cannot establish communication with Multi-96thermo Magnet. Check if supply cable connector is plugged into connector on the back of the Separation unit labeled with “module 1” and securely fastened.
TIME OUT DURING MAGNET HEATING ERROR -202	Target column matrix temperature has not been reached within 15 minutes. Make sure that air can circulate freely in the back of the MultiMACS Separator and that no solar or heat radiation occurs on the supply cable connector which includes an ambient temperature sensor. Make sure that ambient temperature is not lower than 15 °C and that no forced convection is present (e.g. ventilator, fan, draft, open window).
TEMPERATURE CONTROL ERROR ERROR -203	Column matrix temperature could not be maintained. Make sure that no forced convection is present (e.g. ventilator, fan, draft, open window) and that air can circulate freely in the back of the MultiMACS Separator and that no solar or heat radiation occurs on the supply cable connector which includes an ambient temperature sensor.
MAGN. SENSOR ERROR -205	Electronic hardware problem. Please call technical service.
AMB. SENSOR ERROR -206	Make sure that ambient temperature is not lower than 15 °C and that no forced convection is present (e.g. ventilator, fan, draft, open window). If problem persists, please call technical service.
HEATED MAGNET CALIBRATION ERROR -207	MultiMACS 96thermo Magnet is decalibrated. Please call technical service.
HEATED MAGNET COMMUNICATION ERROR -208	MultiMACS Separation Unit cannot continue communication with Multi-96thermo Magnet. Check if supply cable connector is plugged into connector on the back of the Separation unit labeled with “module 1” and securely fastened.

Table 8.2: Explanation of error code and suggestion for fixing.

Fuse exchange

First disconnect both the power and the communication cable. The fuse holder is located at the back of the MultiMACS™ M Separator at the power connector, refer to figure 7. Detach the fuse holder with a sharp tool, e.g., a screwdriver. Remove the defect fuse and insert a new fuse with the type and rating 5×20 mm, T2.5AH250V. Reinsert the fuse holder.

Caution: Replace fuses only with same type and rating to ensure protection against fire risk.

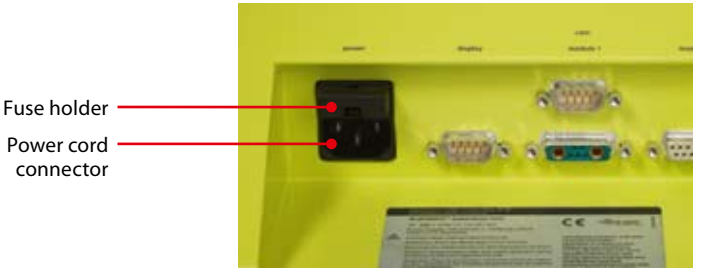


Figure 7: Fuse holder at the back of the MultiMACS M Separator.

Limited warranty

Except as stated in a specific warranty statement, which may accompany your MultiMACS M96 Separator/ MultiMACS M96thermo Separator (the "Product"), or unless otherwise agreed in writing by an authorized representative of Miltenyi Biotec, Miltenyi Biotec's warranty, if any, with respect to this Product is subject to the terms and conditions of sale (the "Terms") of the company within the Miltenyi Biotec group which supplied the Product. The Terms may vary by country and region. Copies of these Terms are available on request or at www.miltenyibiotec.com.

Nothing in this document should be construed as constituting an additional warranty.

Miltenyi Biotec's product warranty only covers Product issues caused by defects in material or workmanship encountered during ordinary use, as described in the user manual or other documentation provided by Miltenyi Biotec; it does not cover Product issues not arising out of defects in material or workmanship, including but not limited to Product issues resulting from: failure to follow installation, operating and/or maintenance instructions, or environmental conditions prescribed in, this user manual or other Product documentation; misuse; abuse; neglect; mishandling; unauthorized or improperly performed maintenance or repairs; accident; acts of God; limitations of technology; electrical

current fluctuations; modification of or to any part of the Product; use of accessories, spare parts and/or consumables other than those recommended by Miltenyi Biotec;
or normal wear and tear. Miltenyi Biotec's product warranty does not cover products sold AS IS or WITH ALL FAULTS, or which had its serial number defaced, altered or removed, or any consumables, or parts identified as being supplied by a third party; those third-party accessories or parts may be covered by a separate warranty from their manufacturer.

Miltenyi Biotec must be informed immediately, if a claim is made under such warranty. If a material or manufacturing defect occurs within the warranty period, Miltenyi Biotec will take the appropriate steps to restore the full usability of your Product.

Limitation on damages: Miltenyi Biotec shall not be liable for any incidental or consequential damages for breach of any express or implied warranty or condition on this Product.

Some states or jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty statement gives you specific legal rights and you may have other rights, which may vary from county to country or jurisdiction to jurisdiction.

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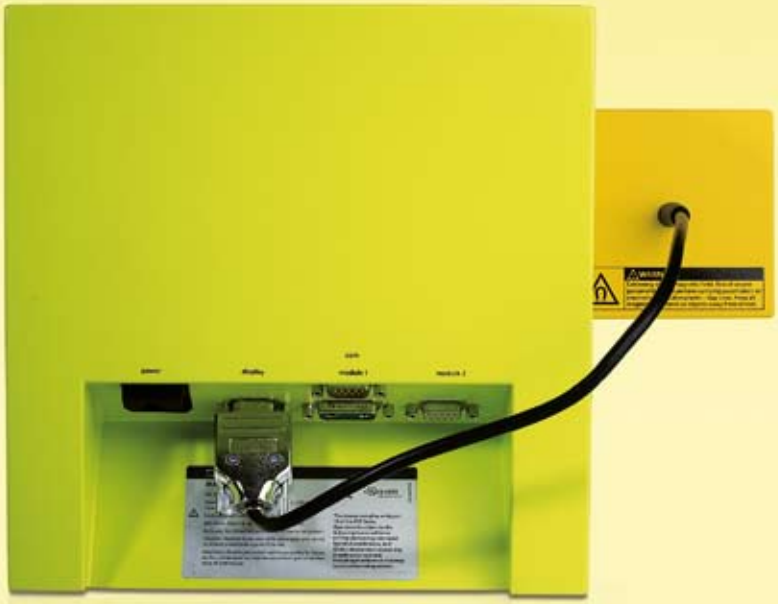

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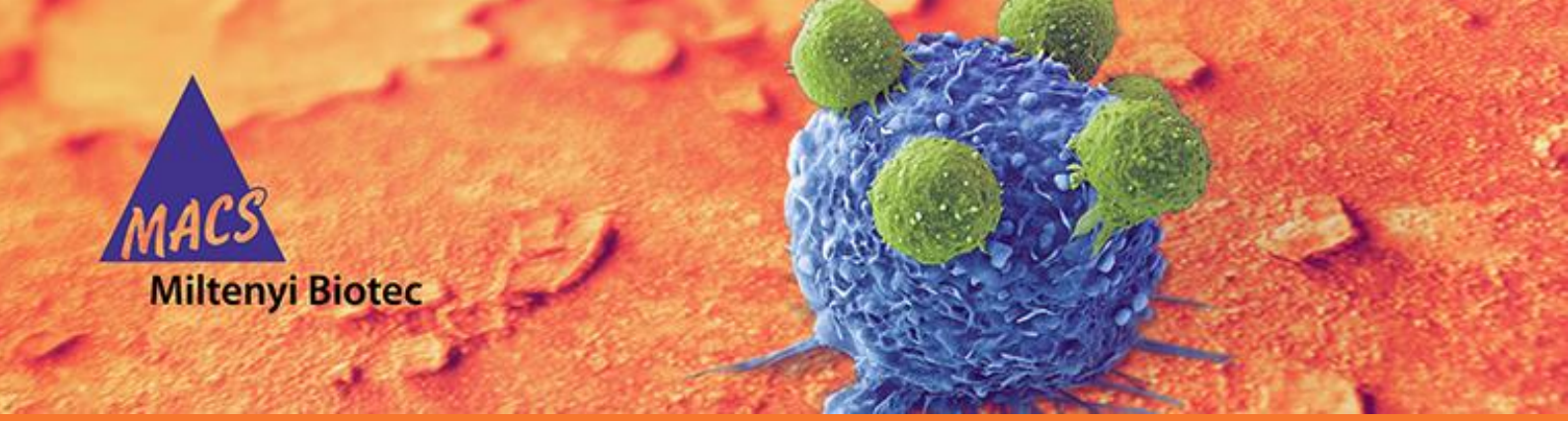

Products and services

Product list generated January 01, 2017

Prices are valid in GLOBAL

Product	Order no.	Capacity/Content/Components	List price
MultiMACS M96 Separator	130–091–937	1 unit	**price on request**
MultiMACS M96thermo Separator	130–094–534	1 unit	**price on request**
Anti–c–myc–FITC	130–099–616	for 30 tests	**price on request**
Anti–c–myc–FITC	130–092–472	for 100 tests	**price on request**
Anti–c–myc–Biotin	130–099–373	for 30 tests	**price on request**
Anti–c–myc–Biotin	130–092–471	for 100 tests	**price on request**
Anti–c–myc–HRP	130–092–113	100 µL	**price on request**
Anti–DYKDDDDK–Vio515	130–109–756	for 30 tests	**price on request**
Anti–DYKDDDDK–Vio515	130–109–709	for 100 tests	**price on request**
Anti–DYKDDDDK–FITC	130–101–571	for 30 tests	**price on request**
Anti–DYKDDDDK–FITC	130–101–570	for 100 tests	**price on request**
Anti–DYKDDDDK–PE	130–101–577	for 30 tests	**price on request**
Anti–DYKDDDDK–PE	130–101–576	for 100 tests	**price on request**
Anti–DYKDDDDK–APC	130–101–565	for 30 tests	**price on request**
Anti–DYKDDDDK–APC	130–101–564	for 100 tests	**price on request**
Anti–DYKDDDDK–Biotin	130–101–569	for 30 tests	**price on request**
Anti–DYKDDDDK–Biotin	130–101–566	for 100 tests	**price on request**
Anti–DYKDDDDK–HRP	130–101–572	100 µL	**price on request**
Anti–GFP–HRP	130–091–833	100 µL	**price on request**
Anti–H–2K^k–FITC, mouse (clone: H100–27.R55) Regulatory status: For research use only	130–102–289	30 µg in 1 mL	**price on request**
Anti–H–2K^k–PE, mouse (clone: H100–27.R55) Regulatory status: For research use only	130–102–394	30 µg in 1 mL	**price on request**
Anti–H–2K^k–PE, mouse (clone: H100–27.R55) Regulatory status: For research use only	130–102–935	9 µg in 300 µL	**price on request**

Product	Order no.	Capacity/Content/Components	List price
Anti–H–2K^k–APC, mouse (clone: H100–27.R55) Regulatory status: For research use only	130–102–346	30 µg in 1 mL	**price on request**
Anti–H–2K^k–APC, mouse (clone: H100–27.R55) Regulatory status: For research use only	130–103–001	9 µg in 300 µL	**price on request**
Anti–H–2K^k–PE–Vio770, mouse (clone: H100–27.R55) Regulatory status: For research use only	130–102–958	9 µg in 300 µL	**price on request**
Anti–H–2K^k–PE–Vio770, mouse (clone: H100–27.R55) Regulatory status: For research use only	130–102–194	30 µg in 1 mL	**price on request**
Anti–H–2K^k–APC–Vio770, mouse (clone: H100–27.R55) Regulatory status: For research use only	130–102–183	30 µg in 1 mL	**price on request**
Anti–H–2K^k–APC–Vio770, mouse (clone: H100–27.R55) Regulatory status: For research use only	130–102–957	9 µg in 300 µL	**price on request**
Anti–HA–FITC	130–099–389	for 30 tests	**price on request**
Anti–HA–FITC	130–092–256	for 100 tests	**price on request**
Anti–HA–PE	130–098–806	for 30 tests	**price on request**
Anti–HA–PE	130–092–257	for 100 tests	**price on request**
Anti–HA–APC	130–098–404	for 100 tests	**price on request**
Anti–HA–Biotin	130–099–374	for 30 tests	**price on request**
Anti–HA–Biotin	130–092–258	for 100 tests	**price on request**
Anti–HA–HRP	130–091–972	100 µL	**price on request**
Anti–His–FITC	130–098–808	for 30 tests	**price on request**
Anti–His–FITC	130–092–675	for 100 tests	**price on request**
Anti–His–PE	130–098–810	for 30 tests	**price on request**
Anti–His–PE	130–092–691	for 100 tests	**price on request**
Anti–His–Biotin	130–099–423	for 30 tests	**price on request**
Anti–His–Biotin	130–092–692	for 100 tests	**price on request**
Anti–His–HRP	130–092–785	100 µL	**price on request**
Anti–His–HRP (C–term.)	130–092–783	100 µL	**price on request**
B Cell (CD19$^+$) Total RNA	130–093–169	5 µg	**price on request**
CD4–FITC, human (clone: M–T466) Regulatory status: For research use only	130–098–206	for 30 tests	**price on request**
CD4–FITC, human (clone: M–T466) Regulatory status: For research use only	130–080–501	for 100 tests	**price on request**
CD4–PE, human (clone: M–T466) Regulatory status: For research use only	130–098–134	for 30 tests	**price on request**
CD4–PE, human (clone: M–T466) Regulatory status: For research use only	130–091–231	for 100 tests	**price on request**
CD4–APC, human (clone: M–T466) Regulatory status: For research use only	130–098–133	for 30 tests	**price on request**
CD4–APC, human (clone: M–T466) Regulatory status: For research use only	130–091–232	for 100 tests	**price on request**
CD4–VioBlue, human (clone: M–T466) Regulatory status: For research use only	130–099–683	for 30 tests	**price on request**
CD4–VioBlue, human (clone: M–T466) Regulatory status: For research use only	130–097–333	for 100 tests	**price on request**
CD4–VioGreen, human (clone: M–T466) Regulatory status: For research use only	130–106–712	for 30 tests	**price on request**
CD4–VioGreen, human (clone: M–T466) Regulatory status: For research use only	130–106–655	for 100 tests	**price on request**
CD4–PerCP, human (clone: M–T466) Regulatory status: For research use only	130–101–129	for 30 tests	**price on request**
CD4–PerCP, human (clone: M–T466) Regulatory status: For research use only	130–101–147	for 100 tests	**price on request**
CD4–PE–Vio770, human (clone: M–T466) Regulatory status: For research use only	130–100–452	for 30 tests	**price on request**

Product	Order no.	Capacity/Content/Components	List price
CD4–PE–Vio770, human (clone: M–T466) Regulatory status: For research use only	130–100–454	for 100 tests	**price on request**
CD4–APC–Vio770, human (clone: M–T466) Regulatory status: For research use only	130–100–455	for 30 tests	**price on request**
CD4–APC–Vio770, human (clone: M–T466) Regulatory status: For research use only	130–100–457	for 100 tests	**price on request**
CD4–PerCP–Vio700, human (clone: M–T466) Regulatory status: For research use only	130–103–863	for 30 tests	**price on request**
CD4–PerCP–Vio700, human (clone: M–T466) Regulatory status: For research use only	130–103–793	for 100 tests	**price on request**
CD4–Biotin, human (clone: M–T466) Regulatory status: For research use only	130–098–543	for 100 tests	**price on request**
CD271 (LNGFR)–VioBright FITC, human (clone: ME20.4–1.H4) Regulatory status: For research use only	130–104–893	for 30 tests	**price on request**
CD271 (LNGFR)–VioBright FITC, human (clone: ME20.4–1.H4) Regulatory status: For research use only	130–104–847	for 100 tests	**price on request**
CD271 (LNGFR)–FITC, human (clone: ME20.4–1.H4) Regulatory status: For research use only	130–098–103	for 30 tests	**price on request**
CD271 (LNGFR)–FITC, human (clone: ME20.4–1.H4) Regulatory status: For research use only	130–091–917	for 100 tests	**price on request**
CD271 (LNGFR)–PE, human (clone: ME20.4–1.H4) Regulatory status: For research use only	130–098–111	for 30 tests	**price on request**
CD271 (LNGFR)–PE, human (clone: ME20.4–1.H4) Regulatory status: For research use only	130–091–885	for 100 tests	**price on request**
CD271 (LNGFR)–APC, human (clone: ME20.4–1.H4) Regulatory status: For research use only	130–098–112	for 30 tests	**price on request**
CD271 (LNGFR)–APC, human (clone: ME20.4–1.H4) Regulatory status: For research use only	130–091–884	for 100 tests	**price on request**
CD271 (LNGFR)–VioBlue, human (clone: ME20.4–1.H4) Regulatory status: For research use only	130–106–597	for 30 tests	**price on request**
CD271 (LNGFR)–VioBlue, human (clone: ME20.4–1.H4) Regulatory status: For research use only	130–106–553	for 100 tests	**price on request**
CD271 (LNGFR)–PE–Vio770, human (clone: ME20.4–1.H4) Regulatory status: For research use only	130–100–019	for 30 tests	**price on request**
CD271 (LNGFR)–PE–Vio770, human (clone: ME20.4–1.H4) Regulatory status: For research use only	130–099–992	for 100 tests	**price on request**
CD271 (LNGFR)–Biotin, human (clone: ME20.4–1.H4) Regulatory status: For research use only	130–098–098	for 30 tests	**price on request**
CD271 (LNGFR)–Biotin, human (clone: ME20.4–1.H4) Regulatory status: For research use only	130–091–883	for 100 tests	**price on request**
ChimerXact Kit 1 (D10S2325)	130–095–770	for 96 tests	**price on request**
ChimerXact Kit 2 (D12S391)	130–095–780	for 96 tests	**price on request**
ChimerXact Kit 3 (P450CYP19)	130–095–833	for 96 tests	**price on request**
ChimerXact Kit 4 (D2S1360)	130–095–788	for 96 tests	**price on request**
ChimerXact Kit 5 (D9S1118)	130–095–785	for 96 tests	**price on request**
ChimerXact Kit 6 (MYCL1)	130–095–832	for 96 tests	**price on request**
ChimerXact Kit 7 (D7S1517)	130–095–792	for 96 tests	**price on request**
ChimerXact Kit 8 (D11S554)	130–095–782	for 96 tests	**price on request**
ChimerXact Kit 9 (D8S1132)	130–095–791	for 96 tests	**price on request**
ChimerXact Kit 10 (SE33)	130–095–831	for 96 tests	**price on request**
ChimerXplain (Multiplex PCR Analysis)	130–095–794	for 8 tests	**price on request**
Cytotoxic T Cell ($CD8^+$) Total RNA	130–093–168	5 µg	**price on request**
Deep Well Block, 2.5 mL	130–092–549	6 pieces	**price on request**
Exosome Isolation Kit CD9, human	130–110–913	for 20 isolations	**price on request**
Exosome Isolation Kit CD63, human	130–110–918	for 20 isolations	**price on request**

Product	Order no.	Capacity/Content/Components	List price
Exosome Isolation Kit CD81, human	130–110–914	for 20 isolations	**price on request**
Exosome Isolation Kit Pan, human	130–110–912	for 20 isolations	**price on request**
Exosome Starting Kit CD9, human	130–111–573	for 20 isolations ▪ Exosome Isolation Kit CD9, human (130–110–913) ▪ MACS MultiStand (130–042–303) ▪ µMACS Separator (130–042–602)	**price on request**
Exosome Starting Kit CD63, human	130–111–576	for 20 isolations ▪ Exosome Isolation Kit CD63, human (130–110–918) ▪ MACS MultiStand (130–042–303) ▪ µMACS Separator (130–042–602)	**price on request**
Exosome Starting Kit CD81, human	130–111–575	for 20 isolations ▪ Exosome Isolation Kit CD81, human (130–110–914) ▪ MACS MultiStand (130–042–303) ▪ µMACS Separator (130–042–602)	**price on request**
Exosome Starting Kit Pan, human	130–111–572	for 20 isolations ▪ Exosome Isolation Kit Pan, human (130–110–912) ▪ MACS MultiStand (130–042–303) ▪ µMACS Separator (130–042–602)	**price on request**
Hematopoietic Progenitor Cell ($CD34^+$) Total RNA	130–093–167	0.2 µg	**price on request**
HIV Infectivity Enhancement Reagent	130–095–093	for 20 infections	**price on request**
KIR Typing Kit	130–092–551	for 8 tests	**price on request**
KIR Typing Kit	130–092–584	for 24 tests	**price on request**
M Columns	130–042–801	10 columns	**price on request**
µ Columns	130–042–701	20 columns	**price on request**
µ Columns with plungers	130–110–905	20 columns	**price on request**
MACSductin Reagent	130–097–256	for transduction of 1×10^7 total cells–5×10^8 cells 0.25 mL	**price on request**
MACSductin Reagent	130–097–257	for transduction of 2×10^7 cells–1×10^9 cells 0.5 mL	**price on request**
MACSductin Reagent	130–097–259	for transduction of 6×10^7 cells–3×10^9 cells 3×0.5 mL	**price on request**
MACSelect 4 MicroBeads	130–070–101	for 25 separations	**price on request**
MACSelect 4 – Transfected Cell Selection Kit	130–091–988	for 25 separations	**price on request**
MACSelect Control FITC Antibody	130–090–326	for 100 tests	**price on request**
MACSelect K^k c–myc Vector Set	130–092–085	2×25 µg plasmid	**price on request**
MACSelect K^k HA Vector Set	130–092–084	2×25 µg plasmid	**price on request**
MACSelect K^k His Vector Set	130–092–083	2×25 µg plasmid	**price on request**
MACSelect K^k MicroBeads	130–070–201	for 25 separations	**price on request**
MACSelect K^k – Transfected Cell Selection Kit	130–091–986	for 25 separations	**price on request**
MACSelect LNGFR MicroBeads	130–091–330	for 25 separations	**price on request**
MACSelect LNGFR – Transfected Cell Selection Kit	130–091–879	for 25 separations	**price on request**
MACSfectin™ Reagent	130–098–410	for up to 500 transfections 0.5 mL	**price on request**
MACSfectin™ Reagent	130–098–411	for up to 1000 transfections 1 mL	**price on request**
MACSfectin™ Reagent	130–098–412	for up to 5000 transfections 5×1 mL	**price on request**

Product	Order no.	Capacity/Content/Components	List price
MACSflex MicroBead Kit	130–105–805	2 mg	**price on request**
MACSflex MicroBead Kit	130–105–806	0.5 mg	**price on request**
MACSflex MicroBead Kit	130–105–810	5×2 mg	**price on request**
MACSflex Starting Kit	130–105–809	▪ MACSflex MicroBead Kit (130–105–805) ▪ µMACS Separator (130–042–602) ▪ MACS MultiStand (130–042–303) ▪ µ Columns (130–042–701)	**price on request**
MACSPlex Exosome Kit, human	130–108–813	for up to 96 tests	**price on request**
miRXplore Universal Reference 5	130–094–407	for 5 hybridizations	**price on request**
miRXplore Universal Reference 25	130–093–521	for 25 hybridizations	**price on request**
Mitochondria Extraction Kit – Tissue	130–097–340	for 25 preparations	**price on request**
Mitochondria Isolation Kit, human	130–094–532	for 25 separations	**price on request**
Mitochondria Isolation Kit, mouse tissue	130–096–946	for 25 separations	**price on request**
Mitochondria MidiMACS Starting Kit, human	130–094–872	▪ Mitochondria Isolation Kit, human (130–094–532) ▪ MidiMACS Separator (130–042–302) ▪ MACS MultiStand (130–042–303)	**price on request**
Mitochondria MidiMACS Starting Kit, mouse tissue	130–097–039	▪ Mitochondria Isolation Kit, mouse tissue (130–096–946) ▪ MidiMACS Separator (130–042–302) ▪ MACS MultiStand (130–042–303)	**price on request**
Mitochondria QuadroMACS Starting Kit, human	130–094–833	▪ Mitochondria Isolation Kit, human (130–094–532) ▪ QuadroMACS Separator (130–090–976) ▪ MACS MultiStand (130–042–303)	**price on request**
Mitochondria QuadroMACS Starting Kit, mouse tissue	130–097–040	▪ Mitochondria Isolation Kit, mouse tissue (130–096–946) ▪ QuadroMACS Separator (130–090–976) ▪ MACS MultiStand (130–042–303)	**price on request**
µMACS Anti–c–myc Starting Kit	130–091–284	▪ µMACS c–myc Isolation Kit (130–091–123) ▪ µMACS Separator (130–042–602) ▪ MACS MultiStand (130–042–303) ▪ 2×µ Columns (130–042–701)	**price on request**
µMACS Anti–DYKDDDDK Starting Kit	130–101–636	▪ µMACS DYKDDDDK Isolation Kit (130–101–591) ▪ µMACS Separator (130–042–602) ▪ MACS MultiStand (130–042–303) ▪ 2×µ Columns (130–042–701)	**price on request**
µMACS Anti–GFP Starting Kit	130–091–288	▪ µMACS GFP Isolation Kit (130–091–125) ▪ µMACS Separator (130–042–602) ▪ MACS MultiStand (130–042–303) ▪ 2×µ Columns (130–042–701)	**price on request**
µMACS Anti–GST Starting Kit	130–091–493	▪ µMACS GST Isolation Kit (130–091–370) ▪ µMACS Separator (130–042–602) ▪ MACS MultiStand (130–042–303) ▪ 2×µ Columns (130–042–701)	**price on request**

Product	Order no.	Capacity/Content/Components	List price
µMACS Anti–HA Starting Kit	130–091–286	▪ µMACS HA Isolation Kit (130–091–122) ▪ µMACS Separator (130–042–602) ▪ MACS MultiStand (130–042–303) ▪ 2×µ Columns (130–042–701)	**price on request**
µMACS Anti–His Starting Kit	130–091–285	▪ µMACS His Isolation Kit (130–091–124) ▪ µMACS Separator (130–042–602) ▪ MACS MultiStand (130–042–303) ▪ 2×µ Columns (130–042–701)	**price on request**
µMACS c–myc Isolation Kit	130–091–123	for 40 isolations	**price on request**
µMACS DYKDDDDK Isolation Kit	130–101–591	for 40 isolations	**price on request**
µMACS FactorFinder Kit	130–092–317	for 20 isolations	**price on request**
µMACS FactorFinder Starting Kit	130–092–318	▪ µMACS FactorFinder Kit (130–092–317) ▪ µMACS Separator (130–042–602) ▪ MACS MultiStand (130–042–303)	**price on request**
µMACS GFP Isolation Kit	130–091–125	for 40 isolations	**price on request**
µMACS GST Isolation Kit	130–091–370	for 40 isolations	**price on request**
µMACS HA Isolation Kit	130–091–122	for 40 isolations	**price on request**
µMACS His Isolation Kit	130–091–124	for 40 isolations	**price on request**
µMACS mRNA Isolation Kit – For Total RNA	130–075–102	for 8 isolations	**price on request**
µMACS mRNA Isolation Kit – Large Scale	130–090–277	for 4 isolations	**price on request**
µMACS mRNA Isolation Kit – Large Scale	130–075–101	for 8 isolations	**price on request**
µMACS mRNA Isolation Kit – Small Scale	130–090–276	for 10 isolations	**price on request**
µMACS mRNA Isolation Kit – Small Scale	130–075–201	for 20 isolations	**price on request**
µMACS mRNA Starting Kit	130–075–202	▪ µMACS mRNA Isolation Kit – Small Scale (130–075–201) ▪ µMACS Separator (130–042–602) ▪ MACS MultiStand (130–042–303)	**price on request**
µMACS One–step cDNA Kit	130–091–902	for 20 reactions	**price on request**
µMACS One–step cDNA Labeling Kits	130–092–443	for 20 reactions	**price on request**
µMACS One–step cDNA Labeling Starting Kit	130–092–521	▪ µMACS One–step cDNA Labeling Kits (130–092–443) ▪ thermoMACS Separator (130–091–136) ▪ MACS MultiStand (130–042–303)	**price on request**
µMACS One–step cDNA Starting Kit	130–091–989	▪ µMACS One–step cDNA Kit (130–091–902) ▪ thermoMACS Separator (130–091–136) ▪ MACS MultiStand (130–042–303)	**price on request**
µMACS One–step T7 Template Kit	130–092–866	for 20 reactions	**price on request**
µMACS One–step T7 Template Starting Kit	130–092–943	▪ µMACS One–step T7 Template Kit (130–092–866) ▪ thermoMACS Separator (130–091–136) ▪ MACS MultiStand (130–042–303)	**price on request**
µMACS Protein A MicroBeads	130–071–001	for 20–40 immunoprecipitations	**price on request**
µMACS Protein A/G Starting Kit	130–042–601	▪ µMACS Protein A MicroBeads or µMACS Protein G MicroBeads ▪ µMACS Separator (130–042–602) ▪ MACS MultiStand (130–042–303) ▪ µ Columns (130–042–701)	**price on request**
µMACS Protein G MicroBeads	130–071–101	for 20–40 immunoprecipitations	**price on request**

Product	Order no.	Capacity/Content/Components	List price
µMACS Sealing Solution	130–091–160		**price on request**
µMACS Separator	130–042–602	1 piece	**price on request**
µMACS Streptavidin Kit	130–074–101	for 20 isolations	**price on request**
µMACS Streptavidin Starting Kit	130–091–287	▪ µMACS Streptavidin Kit (130–074–101) ▪ µMACS Separator (130–042–602) ▪ MACS MultiStand (130–042–303)	**price on request**
µMACS SuperAmp Kit	130–093–242	for 10 reactions	**price on request**
µMACS SuperAmp Starting Kit	130–093–251	▪ µMACS SuperAmp Kit (130–093–242) ▪ thermoMACS Separator (130–091–136) ▪ MACS MultiStand (130–042–303)	**price on request**
µMACS VitalVirus HIV Isolation Kit	130–092–805	for 20 isolations	**price on request**
µMACS VitalVirus HIV Isolation Starting Kit	130–092–833	▪ µMACS VitalVirus HIV Isolation Kit (130–092–805) ▪ µMACS Separator (130–042–602) ▪ MACS MultiStand (130–042–303)	**price on request**
Monocyte (CD14$^+$) Total RNA	130–093–166	5 µg	**price on request**
Multi–8 Columns, molecular (12×8)	130–092–444	▪ 12×Multi–8 Column ▪ Microtiter plate, U–bottom ▪ MultiColumn Frame ▪ Deep Well Block, 2.5 mL	**price on request**
Multi–8 Filters	130–092–546	12 filters	**price on request**
Multi–8 Filters and Frame	130–092–548	▪ Multi–8 Filter Frame ▪ Multi–8 Filters (130–092–546)	**price on request**
Multi–96 Columns, molecular (4×96)	130–092–445	▪ 4×Multi–96 Column ▪ 4×Microtiter plate, U–bottom ▪ 4×Deep Well Block, 2.5 mL	**price on request**
Multi–96 Filters	130–092–547	4 filters	**price on request**
MultiMACS c–myc Isolation Kit (4×96)	130–094–251	for 384 isolations	**price on request**
MultiMACS c–myc Isolation Kit (12×8)	130–094–250	for 96 isolations	**price on request**
MultiMACS cDNA Synthesis Kit (4×96)	130–094–408	for 384 reactions	**price on request**
MultiMACS cDNA Synthesis Kit (12×8)	130–094–410	for 96 reactions	**price on request**
MultiMACS DYKDDDDK Isolation Kit (4×96)	130–101–623	for 384 isolations	**price on request**
MultiMACS DYKDDDDK Isolation Kit (12×8)	130–101–621	for 96 isolations	**price on request**
MultiMACS GFP Isolation Kit (4×96)	130–094–253	for 384 isolations	**price on request**
MultiMACS GFP Isolation Kit (12×8)	130–094–252	for 96 isolations	**price on request**
MultiMACS GST Isolation Kit (4×96)	130–094–256	for 384 isolations	**price on request**
MultiMACS GST Isolation Kit (12×8)	130–094–254	for 96 isolations	**price on request**
MultiMACS HA Isolation Kit (4×96)	130–094–257	for 384 isolations	**price on request**
MultiMACS HA Isolation Kit (12×8)	130–094–255	for 96 isolations	**price on request**
MultiMACS His Isolation Kit (4×96)	130–094–259	for 384 isolations	**price on request**
MultiMACS His Isolation Kit (12×8)	130–094–258	for 96 isolations	**price on request**
MultiMACS mRNA Isolation Kit (4×96)	130–092–519	for 384 isolations	**price on request**
MultiMACS mRNA Isolation Kit (12×8)	130–092–520	for 96 isolations	**price on request**
MultiMACS Protein A Kit (4×96)	130–092–945	for 384 immunoprecipitations	**price on request**
MultiMACS Protein A Kit (24×8)	130–092–944	for 192 immunoprecipitations	**price on request**
MultiMACS Protein G Kit (4×96)	130–092–947	for 384 immunoprecipitations	**price on request**

Product	Order no.	Capacity/Content/Components	List price
MultiMACS Protein G Kit (24×8)	130–092–946	for 192 immunoprecipitations	**price on request**
MultiMACS Streptavidin Kit (4×96)	130–092–949	for 384 isolations	**price on request**
MultiMACS Streptavidin Kit (12×8)	130–092–948	for 96 isolations	**price on request**
MultiMACS VitalVirus HIV Isolation Kit (4×96)	130–092–807	for 384 isolations	**price on request**
MultiMACS VitalVirus HIV Isolation Kit (12×8)	130–092–806	for 96 isolations	**price on request**
pMACS 4–IRES.II	130–091–888	25 µg plasmid	**price on request**
pMACS 4.1	130–091–886	25 µg plasmid	**price on request**
pMACS K^k.II	130–091–889	25 µg plasmid	**price on request**
pMACS LNGFR	130–091–890	25 µg plasmid	**price on request**
pMACS LNGFR–IRES	130–091–887	25 µg plasmid	**price on request**
PrepProtect Stabilization Buffer	130–092–642	100 mL	**price on request**
PrepProtect Stabilization Buffer	130–092–643	10 mL	**price on request**
Regulatory T Cell ($CD4^+CD25^+$) Total RNA	130–093–165	0.5 µg	**price on request**
SuperAmp Shipment Buffer Kit	130–095–179	for 10 samples	**price on request**
T Cell ($CD3^+$) Total RNA	130–093–164	5 µg	**price on request**
T Helper Cell ($CD4^+$) Total RNA	130–093–163	5 µg	**price on request**
thermoMACS Separator	130–091–136	▪ µMACS Sealing Solution (130–091–160) ▪ thermoMACS Separator ▪ User manual ▪ CD–Rom µMACS data sheets ▪ Power cord ▪ Power supply	**price on request**

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