



Miltenyi Biotec

MACSmix™ Tube Rotator

User manual



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MACSmixTM

Tube Rotator

User manual

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Warnings and precautions



CAUTION

Documentation needs to be consulted before proceeding with installation and operation of the system.



WARNING

A hazard exists if the operating instructions are not followed.



CAUTION

The MACSmix™ Tube Rotator is for research applications only.



CAUTION

The MACSmix Tube Rotator should only be used in the range of temperatures between 2 °C and 42 °C. The device may be damaged if it is used at higher or lower temperatures.



CAUTION

The MACSmix Tube Rotator is intended for indoor use only. Do not use the instrument in locations classified as hazardous or with hazardous materials for which the equipment is not designed.



CAUTION

The safety features of the MACSmix Tube Rotator may be impaired if the equipment is used with accessories not provided or recommended by Miltenyi Biotec, or used in a manner not specified by Miltenyi Biotec.



CAUTION

A hazard may occur if the MACSmix Tube Rotator is used to mix materials classified as inflammable or where the transfer of mechanical energy to glass apparatus could lead to breakage.



WARNING

As electric devices can cause an electric shock, special care must be taken while handling fluids. Please ensure that fluids do not enter the interior part of the device. Unplug the power cord before cleaning the MACSmix Tube Rotator.

**CAUTION**

Check the line voltage on the power supply unit, it must correspond to the voltage indicated. The electrical components of the MACSmix Tube Rotator may be damaged if the power supply and line voltages are not compatible.

**CAUTION**

Do not fit a battery of the wrong type in the battery compartment. An explosion or fire hazard could occur. Do not fit non-rechargeable cells in the battery compartment.

**NOTICE**

Use only NiMH rechargeable batteries type AA with 2000–4000 mAh. Check the correct polarity, otherwise the MACSmix Tube Rotator can be damaged.

NOTE: NiMH rechargeable batteries have to be disposed of as hazardous waste.

NOTE: Electromagnetic Compatibility (EMC): Changes or modifications of the equipment unless expressly approved by Miltenyi Biotec may void your authority to operate the equipment pursuant to Part 15 of the Federal Communications Commission (FCC) Rules.

Limited warranty

Should the MACSmix Tube Rotator be used in a manner not specifically described in this manual, all warranties will be null and void.

Warnhinweise und Vorsichtsmaßnahmen



VORSICHT

Die Bedienungsanleitung muss vor Aufstellung und Inbetriebnahme des Gerätes gelesen und beachtet werden.



WARNUNG

Bei Nichtbeachtung der Bedienungsanleitung besteht ein Unfallrisiko.



VORSICHT

Das MACSmix™ Gerät darf nur zu Forschungszwecken eingesetzt werden.



VORSICHT

Das MACSmix Gerät darf nur im spezifizierten Temperaturbereich von 2 °C bis 42 °C betrieben werden. Ein Betrieb außerhalb dieses Bereichs kann Schäden am Gerät zur Folge haben.



VORSICHT

Das MACSmix Gerät darf nicht in unmittelbarer Gefahrenumgebung oder mit gefährlichen Materialien genutzt werden, welche nicht für den Gebrauch des Gerätes bestimmt sind.



VORSICHT

Die Sicherheitsvorkehrungen des MACSmix Gerätes können durch den Gebrauch von nicht für das Gerät gedachtem oder nicht von Milteny Biotec empfohlenem Zubehör sowie unsachgemäßer Nutzung des Zubehörs beeinträchtigt werden.



VORSICHT

Bei dem Gebrauch des MACSmix Gerätes mit entflammaren Stoffen besteht ein Risiko. Bei der Übertragung von mechanischer Energie auf Glasapparaturen besteht ein Bruchrisiko.

**WARNUNG**

Bei elektrischen Geräten besteht die Gefahr eines Stromschlags. Deshalb sollte mit Flüssigkeiten im Bereich des MACSmix Gerätes sorgfältig umgegangen werden. Vermeiden Sie es, Flüssigkeiten in den Geräteinnenraum eindringen zu lassen. Ziehen Sie vor der Reinigung des MACSmix Gerätes den Netzstecker.

**VORSICHT**

Das MACSmix Gerät darf nur mit dem mitgelieferten Netzteil elektrisch betrieben werden. Die Benutzung anderer Spannungsversorgungen kann zu irreparablen Schäden am Gerät führen.

**VORSICHT**

Es dürfen keine anderen Batterietypen als angegeben in das Batteriefach gegeben werden. Es besteht dann Explosions- oder Feuergefahr. Verwenden Sie keine nicht-wiederaufladbaren Batterien.

**ACHTUNG**

Verwenden Sie nur NiMH-Akkus Typ AA mit 2000–4000 mAh. Achten Sie auf die richtige Polung, sonst kann das MACSmix Gerät beschädigt werden.

HINWEIS: NiMH-Akkus müssen als Sondermüll entsorgt werden.

HINWEIS: Elektromagnetische Verträglichkeit (EMV): Veränderungen oder Modifikationen an dem Gerät, sofern nicht ausdrücklich von Miltenyi Biotec genehmigt, können zum Erlöschen der Betriebserlaubnis für das Gerät gemäß Abschnitt 15 der Federal Communications Commission (FCC) Regeln führen.

Gewährleistungs- und Garantieansprüche

Sollte das Gerät auf andere Weise als in diesem Handbuch beschrieben eingesetzt werden, führt dieses zum Verlust aller Gewährleistungs- und Garantieansprüche.

Avertissements et précautions



PRÉCAUTION

La documentation doit être consultée avant de procéder à l'installation et l'utilisation du système



AVERTISSEMENT

Un risque existe si le mode d'emploi n'est pas suivi.



PRÉCAUTION

L'appareil MACSmix™ est à usage de recherche uniquement.



PRÉCAUTION

L'appareil MACSmix peut supporter des températures entre 2 °C et 42 °C. Une conservation dans des températures en dehors de cette marge, pourrait engendrer des dommages sur l'appareil.



PRÉCAUTION

Le MACSmix Tube Rotator ne doit pas être utilisé dans des atmosphères dangereuses ou avec des matériels dangereux pour lesquels l'équipement n'est pas conçu.



PRÉCAUTION

La protection fournie par le MACSmix Tube Rotator peut être diminuée si l'équipement est utilisé avec des accessoires non fournis ou non recommandé par Miltenyi Biotec, ou utilisé d'une manière non indiquée par Miltenyi Biotec.



RÉCAUTION

Un risque peut être encouru en utilisant l'appareil pour agiter des produits inflammables, ou lors du transfert d'énergie mécanique dans un appareil en verre qui pourrait se briser.



AVERTISSEMENT

En utilisant des appareils électriques, on court le risque de recevoir une décharge électrique; afin d'éviter un tel risque, il est indiqué de travailler prudemment avec des liquides près de l'appareil MACSmix. Evitez que des liquides pénètrent à l'intérieur de l'appareil. Coupez l'électricité avant de nettoyer l'appareil MACSmix.

**PRÉCAUTION**

Le régime électrique du MACSmix n'est approuvé qu'avec le câble électrique fourni. L'utilisation d'autres tensions électriques pourrait causer des dommages irréversibles sur l'appareil MACSmix.

**PRÉCAUTION**

Ne pas utiliser de batterie non adaptées dans le compartiment de batterie. Cela pourrait provoquer une explosion ou un risque d'incendie. Ne pas installer de piles non-rechargeables dans le compartiment de batterie.

**ATTENTION**

Appliquez seulement des accumulateurs NiMH de type AA à 2000–4000 mAh. Vérifiez la correcte polarisation électrique, sinon l'appareil MACSmix pourrait être endommagé.

REMARQUE: Des accumulateurs NiMH sont à traiter en tant que déchets spéciaux.

REMARQUE: Compatibilité Électromagnétique (EMC) : les changements ou les modifications de l'équipement sans l'approbation de Miltenyi Biotec peuvent annuler votre droit d'utiliser l'équipement conformément au chapitre 15 de la „Federal Communications Commission (FCC) Rules“.

Garantie limitée

Au cas où l'appareil MACSmix n'est pas selon le mode d'emploi, tout droit de garantie sera nul et non avenu.

Avvertimenti e precauzioni



ATTENZIONE

Leggere attentamente le istruzioni prima di procedere con l'installazione e l'utilizzo del dispositivo.



AVVERTENZA

Non seguire le istruzioni potrebbe causare danni.



ATTENZIONE

MACSmix deve essere impiegato per applicazioni esclusivamente di ricerca.



ATTENZIONE

Il MACSmix deve essere utilizzato in un range di temperature comprese tra 2 °C e 42 °C. L'apparecchiatura può essere danneggiata se utilizzata a temperature inferiori o superiori.



ATTENZIONE

Il MACSmix Tube Rotator non dovrebbe essere utilizzato in presenza di sostanze pericolose o con materiali pericolosi per i quali lo strumento non è stato progettato.



ATTENZIONE

La protezione offerta dal MACSmix Tube Rotator potrebbe essere inefficace se lo strumento venisse utilizzato con accessori non compatibili o non raccomandati da Miltenyi Biotec oppure in condizioni non approvate da Miltenyi Biotec.



ATTENZIONE

Situazioni di pericolo potrebbero venire provocate dall'uso dell'apparecchiatura per l'agitazione di materiali infiammabili o dalla rottura di oggetti in vetro a causa delle sollecitazioni meccaniche.



AVVERTENZA

Trattandosi di apparecchiatura elettrica, in prossimità dello strumento i liquidi devono essere maneggiati con cura per evitare che possano penetrare accidentalmente all'interno causando dispersione di corrente. Ricordarsi di staccare sempre il cavo d'alimentazione prima di procedere con la pulizia.



ATTENZIONE

Controllare la tensione di rete, essa deve corrispondere al voltaggio indicato sull'unità d'alimentazione. Se l'alimentatore e la tensione di rete non sono compatibili, i componenti elettrici del apparecchio MACSmix possono subire danni.



ATTENZIONE

Evitare di inserire batterie diverse da quelle previste. La non osservanza di questa precauzione potrebbe causare esplosioni o incendio dello strumento. Evitare di inserire batterie non ricaricabili.



NOTA

Utilizzare solamente batterie ricaricabili al NiMH tipo AA con 2000–4000 mAh. Controllare la corretta polarità, altrimenti il MACSmix si può danneggiare

NOTA: Le batterie ricaricabili al NiMH devono essere smaltite come rifiuti pericolosi.

NOTA: Compatibilità Elettromagnetica (EMC): Qualsiasi manomissione o modifica dello strumento, che non sia espressamente approvata da Miltenyi Biotec, causerà di conseguenza la perdita di ogni diritto al suo utilizzo come disposto dal paragrafo 15 della normativa prevista dalla Commissione Federale per le Comunicazioni (FCC).

Garanzia limitata

Se si utilizza il MACSmix non osservando le istruzioni incluse nella garanzia, questa perderà ogni valore.

Advertencias y precauciones



PRECAUCIÓN

La documentación del equipo deberá ser consultada antes de proceder a la instalación y uso del mismo.



ADVERTENCIA

En caso de no seguir correctamente las instrucciones de uso del manual existe riesgo de peligro.



PRECAUCIÓN

El equipo MACSmix™ está diseñado únicamente para su uso en aplicaciones de investigación.



PRECAUCIÓN

El aparato MACSmix sólo debe usarse en un rango de temperaturas de 2°C a 42°C. Utilizarlo a temperaturas menores o mayores podría dañar el sistema.



PRECAUCIÓN

El aparato MACSmix no debe utilizarse en atmósferas peligrosas; tampoco con materiales peligrosos para los cuales el equipo no ha sido diseñado.



PRECAUCIÓN

La protección con la que el MACSmix viene equipado, podría ser dañada en el caso de ser usado de manera inapropiada o de utilizar accesorios no suministrados o recomendados por Miltenyi Biotec.



PRECAUCIÓN

Existe riesgo de peligro en el caso de utilizar el equipo para mezclar materiales inflamables, o en el caso de usar accesorios de vidrio, a los que la energía mecánica podría llevar a rotura.

**ADVERTENCIA**

Debido a que el uso de sistemas eléctricos puede causar shock eléctrico, debe prestarse especial atención al manejar líquidos cerca del aparato MACSmix. Asegúrese de que los líquidos no entran en el interior del aparato. Desenchufe el aparato antes de limpiarlo.

**PRECAUCIÓN**

Compruebe que el voltaje de la línea eléctrica corresponde con el indicado para el uso del equipo. Los componentes eléctricos del MACSmix podrían ser dañados en el caso de utilizar fuentes de suministro y voltajes no compatibles.

**PRECAUCIÓN**

No inserte una batería diferente a la indicada en el compartimento de la batería. Existe riesgo de explosión o fuego. No utilice baterías no recargables.

**NOTA**

Utilice únicamente baterías recargables de NIMH tipo AA con 2000–4000mAh. Asegúrese de que la polarización es la correcta, de lo contrario el equipo MACSmix podría ser dañado.

NOTA: Las baterías recargables de NiMH deben ser eliminadas según la legislación vigente.

NOTA: Compatibilidad electromagnética (EMC): A no ser que Miltenyi Biotec lo apruebe expresamente, cambios o modificaciones realizados en el equipo MACSmix podrán invalidar la autorización de uso del equipo, según la legislación vigente.

Garantía limitada

En caso de uso incorrecto del aparato MACSmix, contraviniendo las instrucciones de este manual, el derecho de garantía podrá ser anulado.

Technical service

**For technical questions, please contact your local distributor
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1.1 Description of the MACSmix™ Tube Rotator

The MACSmix™ Tube Rotator is a versatile tube rotator that runs on rechargeable batteries, working independently from permanent power supply. It can be used at a temperature range of 2 °C to 42 °C and can be placed in an incubator as well as in a refrigerator. The MACSmix Tube Rotator can be equipped with tubes from 0.5 mL to 50 mL in size. The device operates at 3 different speeds or at set intervals. Thus, the MACSmix Tube Rotator is an ideal tube rotator for a variety of applications.

1.2 Applications

For example:

- Secretion period during MACS® Cytokine Secretion Assays
- Enzymatic steps during tissue dissociation
- Short time culturing of cells in tubes in an incubator
- Loading of MACSiBead™ Particles with biotinylated antibodies for cell activation
- Magnetic labeling of cells for depletion using MACSiBead Particles
- Resuspending blood or other cell suspensions
- Immunoprecipitations
- Binding of molecule, e.g., recombinant proteins to an affinity matrix
- Extractions and phase separations
- Dissolving substances



CAUTION

If normal use involves the handling of hazardous substances, instruction should be given on correct use and safety provisions.

1.3 Supplied components

- **1 MACSmix™ Tube Rotator (# 130-090-753)**
- 4 rechargeable NiMH batteries, type AA
- 1 power supply for 100–240 V, 50–60 Hz
- 1 small rack for tubes from 0.5 mL to 2 mL in size
- 1 large rack for tubes from 5 mL to 50 mL in size
- 1 screwdriver
- 1 User manual

2 Installation



Notice: Insert the plug specific for your country into the power supply socket.

1. Open the lid on the base of the device by using the screwdriver. Insert the 4 batteries into the battery holder in the indicated direction. Close the lid by using the screwdriver.

Note: Wrong orientation of the batteries can damage the device

Note: The capacity selector is already set to the correct position for the enclosed batteries. For instructions on changing the batteries refer to section 4.2 Changing the batteries.

2. Connect the power cable into the outlet and plug the power supply into the socket of the MACSmix™ Tube Rotator.

Note: Using other than the original power supply may damage the device.

3. Charge the batteries for 2.5–4 hours depending on the capacity of the batteries, during this time the green LED above the OFF-key will flash.

Battery capacity	Charging time
2000 mAh	2.5 h
3000 mAh	3 h
4000 mAh	4 h

Once the recharging process has finished, the green light stops flashing. The batteries cannot be overcharged. The MACSmix Tube Rotator may be used while charging.

Note: Make sure that the batteries are fully charged before using the MACSmix Tube Rotator for the first time.

3.1 Running modes

Permanent run on the power supply

The MACSmix Tube Rotator can be operated permanent with the power supply. Overcharging the batteries is prevented by a microprocessor.

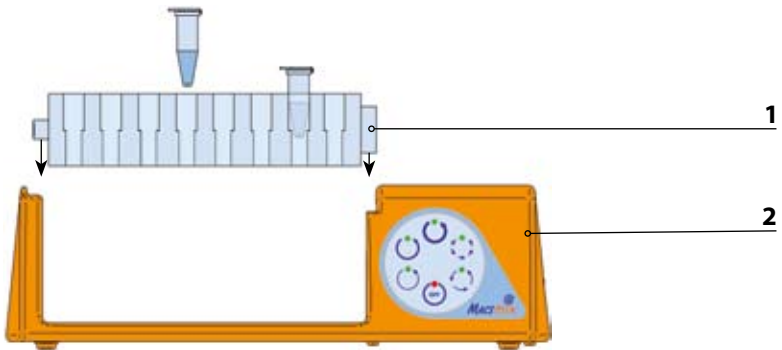
Run on rechargeable batteries

The MACSmix Tube Rotator can be used without a permanent connected power supply. The device can be put into a refrigerator or an incubator at temperatures between 2 °C and 42 °C for operation. Fully recharged batteries with minimum of 2000 mAh capacity enable the device to operate for at least 48 hours at room temperature. This time could be shorter at higher or lower temperatures.

3.2 The racks

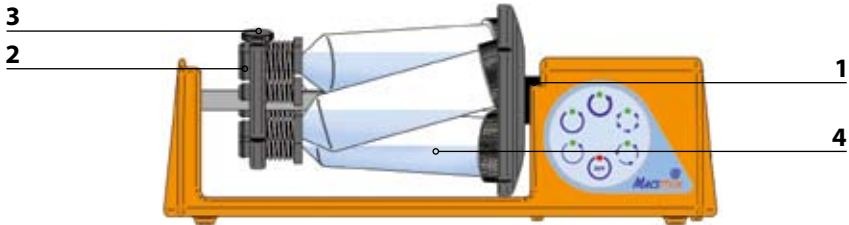
Small rack for 0.5 mL to 2 mL tubes

- The small rack can be equipped with up to 16 tubes of 1.5 mL to 2 mL in size on one side, or with up to 16 tubes of 0.5 mL in size by using the other side of the rack.
- The small rack is then placed in the MACSmix™ Tube Rotator fitting the coupling of the rack (1) into the bearing parts of the MACSmix Tube Rotator (2).



Large rack for 5 mL to 50 mL tubes

- The large rack can be used for 8 tubes of 5 mL up to 15 mL in size, or for 4 tubes of 50 mL in size.
- The large rack can be adjusted to the appropriate tube length of the tubes by unscrewing the movable spring loaded disc **(2)** and securing it in the new position by tightening the screw **(3)**.
- The tubes are fixed with the spring loaded disc. The rack should be loaded symmetrically. For sufficient mixing, the tubes need to be placed in a sloping position into the rack **(4)**.
- The large rack is then placed in the MACSmix Tube Rotator fitting the coupling of the rack **(1)** into the bearing parts of the MACSmix Tube Rotator.



3.3 Function of the keys



Press this key to switch off the MACSmix™ Tube Rotator. The LED flashes green while the batteries are being recharged and it stops flashing when the recharging process has finished. The LED flashes red when the remaining time of the batteries is less than 6 hours.



Press this key to operate the MACSmix Tube Rotator on permanent run at a speed of approximately 4 rpm. The green LED indicates this program.



Press this key to operate the MACSmix Tube Rotator on permanent run at a speed of approximately 8 rpm. The green LED indicates this program.



Press this key to operate the MACSmix Tube Rotator on permanent run at a speed of approximately 12 rpm. The green LED indicates this program.



Press this key to operate the MACSmix Tube Rotator at intervals of 30 seconds run at a speed of approximately 12 rpm and 1 minute pause. The green LED indicates this program.



Press this key to operate the MACSmix Tube Rotator at intervals of 30 seconds run at a speed of approximately 12 rpm and 5 minutes pause. The green LED indicates this program.

3.4 Operating the MACSmix™ Tube Rotator

1. For operation without permanent connected power supply, make sure that the batteries are charged (see 4.1).

For operation with permanent connected power supply, connect the power cable into the outlet and plug the power supply into the socket of the MACSmix™ Tube Rotator.

Make sure that the power cable is easily accessible and located as close to the operator of the instrument as possible.

Note: If it is necessary to disconnect the power supply unplug the power cable from the power outlet.

2. Choose the suitable rack according to the size of the tubes and place the tubes into the rack (see 3.2).
3. Install the rack in the MACSmix Tube Rotator by placing the coupling of the rack into the bearing parts of the MACSmix Tube Rotator (see 3.2).
4. Choose the appropriate program by pressing the respective key (see 3.3).
5. Stop the operation of the MACSmix Tube Rotator by pressing the OFF-key (see 3.3).

4 Maintenance

4.1 Charging the batteries

1. The batteries of the MACSmix™ Tube Rotator should only be recharged with the enclosed power supply.

Note: Using other than the original power supply may damage the device.

2. Plug the main adapter of the transformer into the socket of the MACSmix Tube Rotator. Insert the transformer into the socket.
3. Charge the batteries for 2.5–4 hours depending on the capacity of the batteries, during this time the green LED above the OFF-key will flash.

Battery capacity	Charging time
2000 mAh	2.5 h
3000 mAh	3 h
4000 mAh	4 h

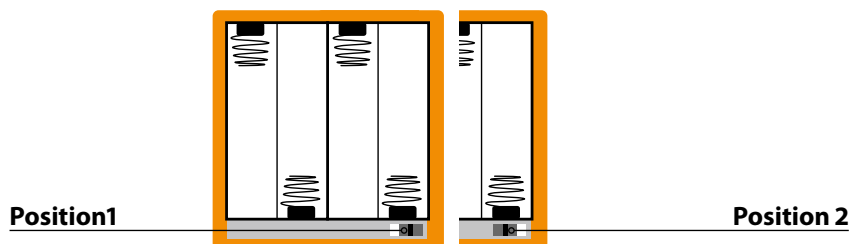
Once the recharging process has finished, the green light stops flashing.

Note: The batteries cannot be overcharged. The MACSmix Tube Rotator may be used while recharging.

4.2 Changing the batteries

1. For replacement of batteries that are no longer rechargeable disconnect the device from the power supply. Open the lid on the base of the device by using the screwdriver.
2. Remove the old batteries from the battery holder. Set the capacity selector switch to the correct position. The capacity is printed on the batteries.

Note: The capacity selector is already set to the correct position for the enclosed batteries.



Battery capacity	Capacity selector
2000–2600 mAh	Position 1
2600–4000 mAh	Position 2

Insert the 4 new batteries into the battery holder as indicated. Close the lid by using the screwdriver.

Note: Wrong orientation of the batteries can damage the device.

Note: NiMH batteries have to be disposed of as hazardous waste.

4.3 Cleaning the MACSmix™ Tube Rotator

Switch off and unplug the MACSmix™ Tube Rotator before cleaning. Use only commercially available cleaning agents such as mild detergent or alcohol (70% ethanol) to clean the MACSmix device and the racks.

Note: Never use acetone!

4.4 Decontamination of the MACSmix™ Tube Rotator

Switch off and unplug the MACSmix™ Tube Rotator before decontamination.

- If the MACSmix Tube Rotator has been used to process biohazardous samples, it is recommended to decontaminate the instrument.
- If sample tubes have been in contact with biohazardous material, they should be autoclaved after use.
- In case of spillage, it is recommended to use a disinfectant that is appropriate for the potential pathogen, e.g., bleach, isopropyl alcohol, or 70% ethanol, to decontaminate surfaces with tissue or swabs.

Note: Dispose tissues and swabs appropriately. It is recommended to wear protective gloves, protective clothing, and safety glasses to prevent contact with skin and eyes.

5 Troubleshooting

Error	Source of error	User action	See
Racks do not move, but functional LED is on.	Bearing parts or coupling of the rack are soiled.	Clean the bearing parts and the couplings of the racks.	4.3
Racks do not move and functional LED does not work.	Batteries are empty.	Charge batteries.	4.1
OFF-key LED does not work while the batteries are charging.	Transformer has not been plugged in correctly.	Plug in transformer.	4.1
Running time is less than 48 hours, after fully charging the batteries.	Batteries are expired.	Change batteries.	4.2

Dimensions	L 281×W 96×H 85 (111 with 50 mL rack) mm
Weight	MACSmix Tube Rotator: 430 g Small rack: 220 g Large rack: 280 g
Running modes	Permanent mixing: 4 rpm, 8 rpm, or 12 rpm Interval mixing: 30 seconds running at 12 rpm and 1 minute or 5 minutes pause
Tube capacity	16 tubes with 0.5 mL, 1.5 mL, or 2 mL in size 8 tubes with 5 mL to 15 mL in size 4 tubes with 50 mL in size
Power supply	Input voltage 100–240 VAC Frequency 50–60 Hz Power consumption 25 W Output voltage 12 VDC
Electrical data MACSmix Tube Rotator	Input voltage 12 VDC Power consumption 20 W
Batteries	4 NiMH rechargeable batteries 2000–4000 mAh type AA
Standards	The MACSmix Tube Rotator has been tested to and satisfies the requirements for EN 61010-1/A2:1998. Satisfies low voltage directive (LVD) specifications 73/23/EEC.
Conditions for operation	Temperature 2 °C to 42 °C Humidity 0% to 85% rel. Altitude maximal 2000 m
Warranty	12 months
Protection class	III
Voltage	Supply voltage fluctuations up to ±10% of the nominal voltage. Transient overvoltages present on the mains supply: Category II. The MACSmix Tube Rotator is suitable for rated pollution degree 2.

The MACSmix Tube Rotator meets the intent of the directive 2004/108/EC (electromagnetic compatibility) and 2006/95/EC (low voltage equipment). Compliance was demonstrated by conformance to the following standards which have been listed in the Official Journal of the European Communities:

EMC: EN 61326-1
EN 61000-3-2
EN 61000-3-3
Safety: EN 61010-1
EN 61010-2-051

Compliance was demonstrated by conformance to the following FCC rules:

FCC 47 CFR Ch.1 part 15, class B.

Design and specification are subject to change without notice.



Order no. 130-090-753

For technical questions, please contact your local distributor or our Technical Support Team in Germany:

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