



HT Nucleofector® Hardware Manual



The purchase of the HT Nucleofector[®] System conveys to the buyer the non-transferable right to use the system as well as Lonza's proprietary Nucleofector[®] Technology only for research conducted by the buyer (whether the buyer is an academic or for-profit entity). For further details about the license please refer to Chapter 5.

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1 Nucleofector® Technology

Since its introduction in 2001, Nucleofector® Technology has transformed transfection. Nucleofection® Procedure has proven to be a reliable and reproducible easy-to-use technology that is suited to a wide variety of applications and provides an answer to almost every transfection challenge. An ever-increasing number of publications in a wide range of research areas reflect how Nucleofector® Technology is driving research in numerous cell types and applications.

How it works

Nucleofector® Technology is based on two unique components: the Nucleofector® System, which delivers the specifically optimized electrical parameters and Nucleofector® Kits, which contain specific Nucleofector® Solutions. As part of Nucleofector® Technology, Lonza provides cell-type specific optimized protocols for many different cell lines and primary cells.

Transfection of any cell

With over 160 protocols for cell lines and primary cells optimized by Lonza's R&D team and more than 680 entries in the online cell data base, Nucleofector® Technology is clearly the transfection method-of-choice for any difficult-to-transfect cell type. Moreover, Nucleofector® Technology is the only electroporation-based method allowing for reliable transfection of adherent cells and cells in suspension.

Transfection of any substrate

Nucleofector® Technology offers high flexibility within applications, since the same transfection parameters apply for almost all substrates. DNA vectors, RNA duplexes, and peptides can be transfected using our sophisticated transfection protocols. This makes Nucleofector® Technology the ideal tool for providing answers to scientific questions in over expression studies, gene silencing approaches, protein expression, generation of stable clones and many more applications.



www.lonza.com/celldatabase



The HT Nucleofector® System

This system is designed for high-throughput approaches


The HT Nucleofector® System was developed for efficient, reproducible, and flexible high-throughput transfection. With up to 95% transfection efficiency and the ability to deliver various substrates into virtually any cell type, the HT Nucleofector® System meets your screening requirements.

Experience the benefits of the HT Nucleofector® System:

Automation-compatible – Full integration into liquid handling platforms

Fast – Process 384 samples in one minute

Screening-compatible – Low cell number required per sample

 For fine-tuning of the optimization process, please contact our scientific support teams

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2 Operating instructions

2.1 Restrictions


Medical use restrictions

Nucleofactor® Technology is intended for research and investigational use by professionals only. Note that the Nucleofactor® Technology is not intended to be used for diagnostic purposes, or for testing or treatment in humans.

License statement

Lonza is holder of various patents, patent applications, copyrights and technical and scientific experience with respect to Nucleofactor® Technology. Use of Lonza's Nucleofactor® Technology and/or related software requires a license from Lonza.

The purchase of the HT Nucleofactor® System conveys to the buyer the non-transferable right to use the system as well as Lonza's proprietary Nucleofection® Technology only for research conducted by the buyer (whether the buyer is an academic or for-profit entity). For further details about the license, refer to chapter 5.

 For license information contact
Lonza Cologne GmbH:
Phone: +49 221 99199 0

2.2 Maintenance

The HT Nucleofactor® System requires minimal maintenance for reliable operation.

To clean the plate handler, switch off the power supply and use a damp cloth to clean the outer casing with water or 70% ethanol.

Note: Avoid wetting the 384-well Nucleocuvette® Plate carousel, especially the surface of the retainer and the connectors located on the left side of the device.

To remove dust from the HT Nucleofactor® Power Supply, switch off the device and remove the power cable from the power inlet. Use a dry cloth to remove dust from the surface of the power supply.

Note: Do not use any liquid for cleaning the power supply. Liquids entering the unit may cause severe damage.

2.3 Safety instructions – please read carefully



This symbol means that there is a risk of electric shock. An electric shock could cause death or personal injury.

The HT Nucleofactor® System has been certified by international safety standards and is safe to use when operated in accordance with this manual.

Only use the HT Nucleofactor® Power Supply in connection with the HT Nucleofactor® Plate Handler. Under no circumstances should it be connected to any other device delivering high-voltage electrical impulses. The system is designed to deliver variable high-voltage impulses for the purpose of introducing substrates into eukaryotic cells.

These electrical impulses can be deadly.

Therefore, use this system with care and take the following precautions:

- Only use the system once you have read and understood the HT Nucleofactor® Manual. The manual should be accessible to all users. Make sure that each potential user reads and understands it.
 - Set up the system in a dry place. Avoid spilling liquid onto or into the HT Nucleofactor® Power Supply or the HT Nucleofactor® Plate Handler. Do not use the system if any components are wet.
 - Only use power outlets with protective earth
 - Only use the power cable supplied with the HT Nucleofactor® System
 - Place the HT Nucleofactor® System components on top of a safe, level and stable table or bench.
 - The Power Supply must be placed in a way that the main switch (pos. 7) is ALWAYS accessible.
 - Before connecting/disconnecting any of the interface cables between the HT Nucleofactor® Plate Handler and the HT Nucleofactor® Power Supply, ensure that the HT Nucleofactor® Power Supply is switched off and the power cable is removed from the power inlet.
 - Prevent sudden impacts and vibration while moving and transporting system components.
 - Only use HT Nucleofactor® Devices in conjunction with the HT Nucleofactor® Software.
 - Nucleofactor® Solutions used for the Nucleofactor 2b and the Nucleofactor® Solutions used for the HT Nucleofactor® System are not compatible.
 - Do not use solutions or plates from any source other than Lonza.
 - Unpack the 384-well Nucleocuvette® Plates immediately before the experiment. Make sure that the outer contact areas are dry.
 - Always place the lid onto the 384-well Nucleocuvette® Plate before transferring it to the HT Nucleofactor® Plate Handler.
 - Safety may be compromised if any fluid has been spilled in the close vicinity of the HT Nucleofactor® System. Ensure that no fluid comes into contact with or enters the system components. If any fluid has been spilled in the close vicinity of or onto the HT Nucleofactor® Plate System, contact Lonza scientific support for advice on precautions to be taken before further use.
 - Do not open the device housing. Under no circumstances should circuit components be interfered with, as they can deliver an electric shock even when the system is not in operation.
 - Do not alter the device in any manner.
 - Do not use the device if the insulation of the high voltage cable connecting the plate handler and the power supply is damaged.
 - Do not use the device if any of the housing parts or covers are missing.
 - Do not detach any of the housing parts or covers.
 - Do not expose the device to a humid environment.
 - Do not expose the device to direct sunlight or place the instrument in a hot environment.
 - Under no circumstances plug the high-voltage cables of the HT Nucleofactor® Plate Handler into external electrode sockets of any device other than the HT Nucleofactor® Power Supply. Use of a device from any source other than Lonza will invalidate all warranty and liability claims.
 - Do not use lids other than those provided with the 384-well Nucleofactor® Kits as the system is calibrated to the supplied lids. Other lids may cause damage to the system.
 - Do not obstruct any moving parts, e.g. the plate carousel of the HT Nucleofactor® Plate Handler.
 - Do not move the HT Nucleofactor® Plate Handler if a 384-well Nucleocuvette® Plate is inside the device. Moving the plate handler may cause sample fluid from the plate to spill into the device.
 - Never place any foreign object onto the device or onto the plate carousel. If a foreign object has entered the HT Nucleofactor® Plate Handler, the safety of the device may be compromised. Contact Lonza scientific support for advice on precautions to be taken before further use.
 - The device is not approved for use in fire- or explosion-endangered areas, or for use with inflammable or explosive media.
 - If any component of the HT Nucleofactor® System has been damaged, ensure that the HT Nucleofactor® System cannot be used (e.g. by disconnecting the HT Nucleofactor® Power Supply), and contact Lonza scientific support for assistance.
 - Service shall only be performed by personnel authorized by Lonza.
 - Handling of device parts that may be contaminated by samples shall always be performed with protective gloves and any disposal of such parts must be according to federal, state or local procedures for clinical waste handling and disposal. Use secure leak-proof containers and avoid unprotected handling of such parts.
- Note:** Lonza disclaims all warranties expressed or implied and shall in no event be liable for any kind of damages caused by or arising out of any operation or use in violation of the safety and handling instructions above.

Consignes de sécurité - à lire attentivement



Ce symbole signifie qu'il existe un risque de choc électrique. Un choc électrique peut provoquer des blessures graves, voire mortelles.

L'appareil HT Nucleofector® a été certifié par les normes de sécurité internationales et peut être utilisé en toute sécurité lorsqu'il est utilisé conformément à ce manuel.

Veuillez utiliser le HT Nucleofector® Power Supply seulement en connexion avec le HT Nucleofector® Plate Handler. Dans aucune situation doit-il être connecté avec un autre système générant des impulsions électriques. Cet appareil est conçu pour délivrer des impulsions électriques variables à haute tension dans le but d'introduire des substrats dans des cellules eucaryotes.

Ces impulsions électriques peuvent être mortelles !

Par conséquent, utilisez cet appareil avec attention et prenez les précautions suivantes:

- Utilisez l'appareil uniquement après avoir lu et compris le manuel HT Nucleofector®. Le manuel devrait être accessible à tous les utilisateurs. Assurez-vous que chaque utilisateur potentiel le lit et le comprend.
- Utilisez uniquement des prises reliées à la terre pour brancher l'appareil
- Utilisez uniquement les câbles des branchement fournis avec le HT Nucleofector®
- N'exposez pas l'appareil à un environnement humide. Evitez tout contact avec du liquide sur et dans le HT Nucleofector® Power Supply et le HT Nucleofector® Plate Handler. N'utilisez pas l'appareil s'il est humide.
- Utilisez l'appareil uniquement lorsqu'il est installé sur une table ou paillasse sûre, plate et stable.
- Assurez-vous que le HT Power Supply est positionné de cette manière que le commutateur principal (pos. 7) sera TOUJOURS accessible.
- Avant de brancher/débrancher les câbles d'interface entre le HT Nucleofector® Plate Handler et le HT Nucleofector® Power Supply, assurez-vous que le HT Nucleofector® Power Supply est éteint et le câble d'alimentation est débranché de la prise.
- Prendre des précautions contre les chocs et les vibrations lors des déplacements et transports de l'appareil HT-Nucleofector®.
- Utilisez les systèmes HT-Nucleofector® seulement avec l'aide du logiciel HT Nucleofector® Software
- Les solutions Nucleofector® I/II/2b ne sont pas compatibles avec le système HT-Nucleofector®.
- N'utilisez jamais des Solutions de Nucleofection® ou des Plaques de Nucleofection® autres que celles de Lonza.
- Sortez de l'emballage les Plaques 384-well Nucleocuvette® juste avant l'expérience de

Nucleofection®. Assurez-vous que les surfaces de la Plaque de Nucleofection® soient sèches.

- Assurez-vous de toujours couvrir la paque 384-well Nucleocuvette® Plate avec le couvercle fourni avant de la placer dans le HT Nucleofector® Plate Handler. La sécurité peut être compromise si du liquide a été répandu à proximité du système HT-Nucleofector®. Assurez-vous qu'aucun fluide n'est en contact avec ou n'a pénétré dans le système.
- Ne pas ouvrir l'appareil. L'appareil ne contient pas de pièces réparables par l'utilisateur. Les composants du circuit ne doivent en aucun cas être perturbés, car ils peuvent provoquer un choc électrique même lorsque le système n'est pas en fonctionnement.
- Ne modifiez pas l'appareil de quelque manière que ce soit.
- N'utilisez pas l'appareil si l'isolation du câble de haute tension reliant le HT Nucleofector® Power Supply et le HT Nucleofector® Plate Handler a été compromise .
- N'utilisez pas l'appareil si des parties de l'appareil manquent.
- Ne détachez pas des parties de la structure de l'appareil.
- N'utilisez pas et ne laissez pas l'appareil dans un milieu humide.
- L'appareil ne doit pas être exposé à la lumière directe du soleil ni être placé dans un environnement chaud
- Le câble haute-tension de l'unité HT Nucleofector® Plate Handler ne doit jamais être branché dans des prises externes autres que celle de l'unité HT Nucleofector® Power Supply. L'utilisation de sources autres que celle de Lonza annule la garantie du système.
- N'utilisez pas des couvercles autres que ceux fournis par Lonza dans les 384-well Nucleofector® Kits. Le système est calibré que pour ce type de couvercle et l'utilisation d'un autre type peut endommager le système.
- Ne gênez pas le mouvement du carrousel du HT Nucleofector® Plate Handler.
- Ne déplacez et ne bougez pas le HT Nucleofector® Plate Handler si une plaque de Nucleofection® 384-well Nucleocuvette® Plate est dedans. En bougeant le Plate Handler, le liquide des échantillons contenu dans la plaque risque de se trouver dans le système.
- Ne placez jamais des objets étrangers dans ou sur une plaque du carrousel. Si un objet étranger est entré dans le HT Nucleofector® Plate Handler, la sécurité du système pourra être compromise. Veuillez contacter le Scientific Support de Lonza pour avoir des conseils avant de continuer d'utiliser le système.
- L'appareil n'est pas approuvé pour une utilisation dans des zones présentant un danger d'incendie ou d'explosion, ni pour une utilisation avec des milieux inflammables ou explosifs.

- Si le système HT-Nucleofactor® a été endommagé, assurez-vous qu'il ne puisse être utilisé par aucun membre du personnel et contactez le Service du Support Scientifique de Lonza pour assistance.
- Toute réparation ne doit être effectuée que par un personnel autorisé par Lonza.
- La manipulation des pièces de l'appareil peut présenter un risque de contamination des échantillons et doit toujours être effectuée avec des gants de protection. Toute élimination de ces pièces doit être conforme aux procédures fédérales, régionales ou nationales relatives à la manipulation et à l'élimination des déchets cliniques. Utilisez des conteneurs étanches et évitez toute manipulation non protégée de telles pièces.

Note: Lonza Cologne décline toute garantie et ne pourra en aucun cas être tenue responsable de tout type de dommages causés par ou résultant d'une opération ou d'une utilisation contraire aux consignes de sécurité et de manipulation susmentionnées.

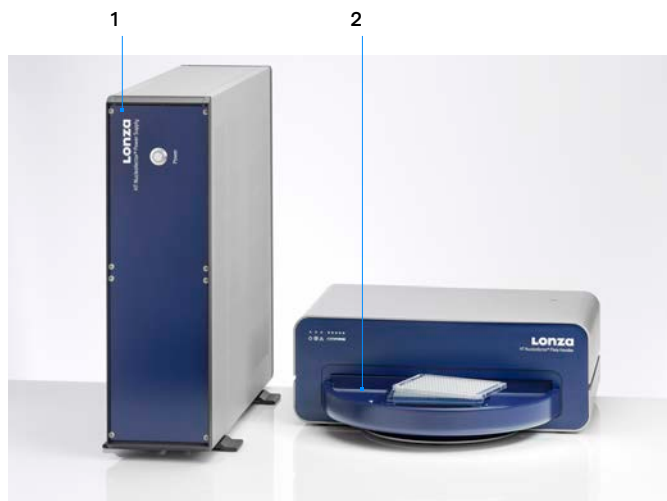
2.4 Waste disposal

Disposal of consumables from HT Nucleofactor® Kits (cuvettes, and Nucleofactor® Solutions): dispose of cuvettes and expired 384-well Nucleofactor® Solutions in a biohazard container. Refer to your local waste management organization and to the relevant laboratory safety instructions for proper disposal practices.

2.5 HT Nucleofactor® System components

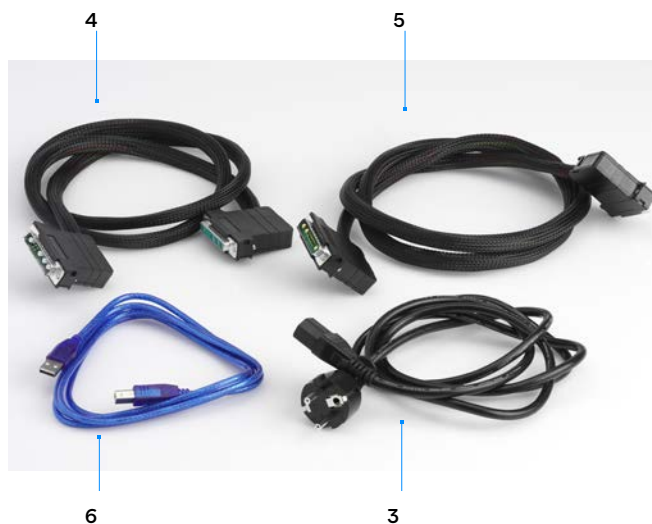
The HT Nucleofactor® System comprises two hardware modules (the power supply and plate handler), HT Nucleofactor® Software preinstalled on a Windows®-based laptop, and a set of cables to connect the units.

Figure 2.1: HT Nucleofactor® System Components



1. HT Nucleofactor® Power Supply
2. HT Nucleofactor® Plate Handler

Figure 2.2: HT Nucleofactor® Set of cables



3. Power cable
4. Lonza interface data cable
5. Lonza interface HV cable
6. USB cable

HT Nucleofector® Power Supply

The HT Nucleofector® Power Supply generates and delivers the electrical programs to the plate handler and mediates the data transfer between the computer and the plate handler. It is connected to the plate handler via two cables.

- 7. Main switch with status LED
- 8. Main power inlet
- 9. Fuse holders with fuses
- 10. Lonza interface (HV port)
- 11. Lonza interface (data port)
- 12. Ethernet port

Figure 2.3: HT Nucleofector® Power Supply



HT Nucleofector® Plate Handler

The HT Nucleofector® Plate Handler serves as the contacting unit of the system. Transfection of the samples occurs in 384-well Nucleocuvette® Plates that are loaded onto the carousel of the plate handler.

- 13. Lonza interface (HV port)
- 14. USB host (for firmware update)
- 15. USB port for PC connection
- 16. Ethernet port
- 17. Lonza interface (data port)

Figure 2.4: Plate handler connections



Plate handler front

- 18. Status LED from the left: power on (green); boot status (green); error (red); plate status (blue)
- 19. Plate carousel
- 20. Plate retainer position

Figure 2.5: Plate handler front view



2.6 System set-up instructions

The HT Nucleofactor® System will be installed and checked by a Lonza technical specialist. Follow the instructions below if the instrument is moved from its original location.

- Connect the HV port of the HT Nucleofactor® Power Supply (10) to the HV port on the plate handler Unit (13) using the cable marked “Lonza interface HV cable.”
- Connect the data port of the HT Nucleofactor® Power Supply (11) to the data port on the plate handler (17) using the cable marked “Lonza interface data cable.”
- Connect the USB slave port of the HT Nucleofactor® Plate Handler (15) to a USB port on your personal computer using the supplied USB cable (6).
- If required install, the software for operating the HT Nucleofactor® System on your personal computer, following the instructions in the HT Nucleofactor® Software Manual.
- Connect the main power plug of the HT Nucleofactor® Power Supply ® to a wall outlet with protective grounding conforming to the power rating specified in Chapter 6.
- Start the system as described in Chapter 3.1 of the HT Nucleofactor® Software Manual.

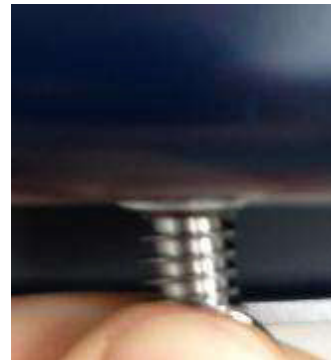
HT Nucleofactor® System – Carousel Lock

The carousel of the HT Nucleofactor® Plate Handler should be locked for transportation. Prior to use you have to unlock it to allow carousel movement.

1



2 & 3



4



5



For locking the carousel:

1. Take locking tool
2. Press the tool into the hole on the bottom side of the carousel. You may have to move the carousel a little bit to allow latching.
3. Then turn it clockwise by 90°.
4. Keep the tool in that position
5. Now the carousel is locked.

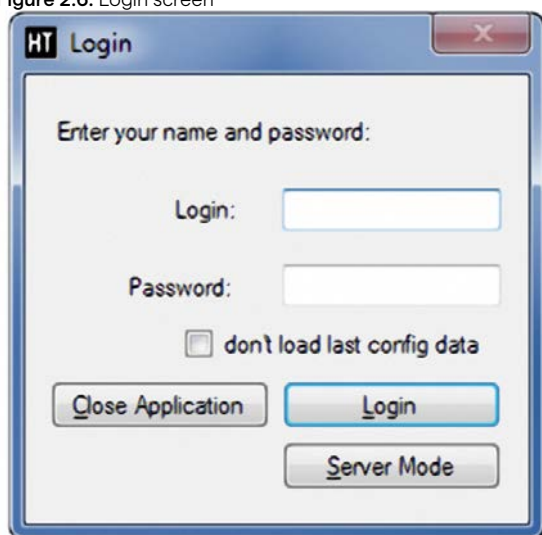
For unlocking the carousel:

6. Turn the tool counterclockwise by 90°
7. Take it off.

The Nucleofector® Software start screen

The operating software provides the graphical user interface for operating the HT Nucleofector® System. It controls all processes during an experiment and manages data transfer to the host PC.

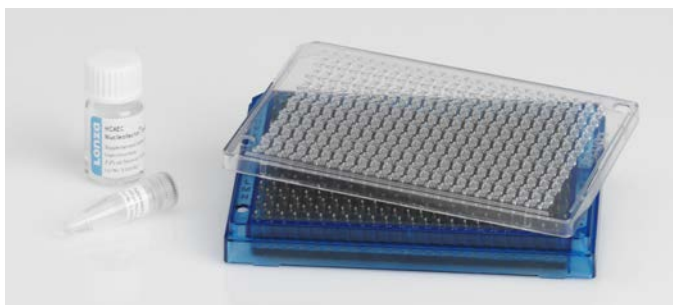
Figure 2.6: Login screen



384-well Nucleocuvette® Plate – solution and supplement

High-throughput transfection occurs in unique 384-well Nucleocuvette® Plates supplied with HT Nucleofector® Kits. The plates meet SBS standards and can therefore be used in liquid handling workstations.

Figure 2.7: HT Nucleofector® consumables



2.7 Instructions for using the HT Nucleofector® System

The table below gives a brief overview of the steps required for a typical Nucleofection® Workflow.

Step	Description	For more information see
1	Switch on the HT Nucleofector® System.	This chapter
2	Start the HT Nucleofector® Software on the computer and log in.	Software manual
3	Check your user settings (optional).	Software manual
4	Check that all connections are active / reconnected	Software manual
5	Open an existing experiment or create a new experiment.	Software manual
6	Prepare and transfer samples into the 384-well Nucleocuvette® Plate.	Optimized protocol
7	Insert the 384-well Nucleocuvette® Plate into the HT Nucleofector® Plate Handler.	Chapter 3.1
8	Start Nucleofection® Process from the computer.	Software manual
9	Monitor Nucleofection® Process during program execution (optional).	Software manual
10	Remove 384-well Nucleocuvette® Plate from the plate handler and transfer samples to appropriate culture plates.	Optimized protocol
11	Check result file on the computer for potential errors.	Software manual
12	Close files, exit HT Nucleofector® Software and switch off all components.	Software manual

The HT Nucleofector® System enables Nucleofection® Experiments to be conveniently controlled and monitored from a computer. Only a few steps are required to initialize the system.

- Switch on the HT Nucleofector® System via the main switch located on the front panel of the power supply. LED 1 (green) on the plate handler front panel is lit.
- Start the HT Nucleofector® Software on the personal computer and log in. LED 2 (green) on the plate handler front panel blinks during the boot sequence and remains lit when the process is successfully completed. The system is now initialized.
- If LED 3 (red) is lit, an error occurred during the boot process. Refer to the HT Nucleofector® Software manual for troubleshooting.

3 Running an experiment

This chapter explains how to run a Nucleofection[®] Experiment on the HT Nucleofactor[®] System. Because correct cell handling before and after the Nucleofection[®] Process is crucial for successful experiments, refer to the dedicated optimized protocol to find detailed guidelines for these steps.

3.1 Processing a 384-well Nucleocuvette[®] Plate

This chapter describes loading and processing of the 384-well Nucleocuvette[®] Plate using a predefined experiment. See the HT Nucleofactor[®] Software Manual for further details on defining and modifying experiments.

Figure 3.1: 384-well Nucleocuvette[®] Plate handler work area



The plate handler carousel has two plate retainer positions for 384-well Nucleocuvette[®] Plates. Load plates into the retainer position that is accessible at the front of the plate handler. Do not turn the plate handler carousel manually to access the second position. To load prepared plates:

- Make sure that the plate is covered with an appropriate lid.
- Make sure that plate position A01 is in the upper left corner.
- Place the plate gently into the plate handler retainer position (1)

After loading the 384-well Nucleocuvette[®] Plate, start the experiment from the computer. The 384-well Nucleocuvette[®] Plate will be automatically rotated into the plate handler to be processed. It will be rotated back when the experiment is completed. You can follow the progress of the experiment by checking the blue progress LEDs on the front panel of the plate handler.

If the HT Nucleofactor[®] System is integrated into an automated liquid handling system follow the appropriate instructions in the HT Nucleofactor[®] Software manual for plate handling.

Note: Do not attempt to turn the carousel manually when the system is active! This will compromise system integrity.

Note: Do not use lids other than those provided in the 384-well Nucleofactor[®] Kits. Other lids may cause damage to the HT Nucleofactor[®] Plate Handler.


After completion of a run, remove the processed 384-well Nucleocuvette[®] Plate from the plate handler and process it according to the relevant optimized protocol.

3.2 System shutdown

Close all parameter and result files, exit the HT Nucleofactor[®] Software, and switch off the system using the main switch on the HT Nucleofactor[®] Power Supply front panel.

4 Troubleshooting

The following troubleshooting guide may be helpful if experiments using the HT Nucleofector® System do not provide the expected results. The comments are intended to help optimize experimental conditions.

 Should you have any questions regarding the HT Nucleofector® Device, please do not hesitate to contact Lonza's scientific support team

Europe and International

Phone: +49 221 99199 400
scientific.support.eu@lonza.com

The Americas

Phone: 800 521 0390 (toll free)
scientific.support@lonza.com

4.1 Troubleshooting

Problem	Possible cause	Solution
Low survival rate	Cells remained too long in the Nucleocuvette® Plate	If a 10 minute post incubation step is not recommended for your specific protocol, add pre-warmed medium to the cells and remove samples immediately after the Nucleocuvette® Plate has been processed.
	Cells are damaged by harvesting or through inappropriate handling	Avoid severe conditions during harvesting, especially centrifugation at high speeds and overexposure to trypsin. Pipette cells smoothly. After Nucleofection® Procedure, add the appropriate amount of pre-warmed medium to the wells and resuspend cells gently before removing them.
	Cells are stressed by culture conditions	Cells should be viable and have been in culture for a certain number of passages. Freshly thawed cells should not be used for Nucleofection® Experiments. Avoid high cell densities or confluencies since this may negatively influence the viability of the cells after Nucleofection® Process. For detailed recommendations on passage number, cell density and confluency refer to the relevant optimized protocol.
Low transfection efficiency	Cells are stressed by centrifugation	Centrifuge at lower speed (max. 90 x g).
	Multiple use of 384-well Nucleocuvette® Plates	We strongly recommend using 384-well Nucleocuvette® Plates only once, because the electric pulses that are applied impair their physical integrity. The performance of plates that are used more than once will be dramatically reduced.
	Cells may be contaminated with mycoplasmas	Test cultures for mycoplasma contamination. Contact our scientific support team for further advice.
	Poor DNA quality	Use high-purity plasmid DNA. We strongly recommend the use of high-quality products for plasmid purification such as the QIAGEN EndoFree® plasmid kit. Do not use procedures involving phenol or chloroform treatment for DNA purification.
	Plasmid amount is too low	We recommend a plasmid amount between 0.2-1 µg DNA per sample. If both gene transfer efficiency and cell mortality are low, the plasmid amount can be increased up to 2 µg per sample. Increasing the DNA amount may lead to higher gene transfer efficiencies but at the same time may result in higher cell mortality.
	High cell confluency or density	In many cell types, gene transfer efficiency is poor if the cell density has been too high at the time of harvest. Follow the guidelines in the relevant optimized protocol.
	Cell number too high or too low	We recommend using $2 \times 10^4 - 1 \times 10^6$ cells per sample for cell lines and primary cells. Refer to the relevant optimized protocol for specific details.

4.2 Mechanical failures

Great care has been taken to ensure that mechanical failures will not occur as long as the system is operated using the guidelines presented in this manual and in the HT Nucleofactor® Software manual.

In case of a system failure while a 384-well Nucleocuvette® Plate is still inside the plate handler unit, proceed as follows to recover your samples:

8. Turn off the HT Nucleofactor® Power Supply using the main switch.
9. Disconnect the main power cable from the wall socket.
10. Remove the small plastic cap on top of the plate handler housing (see Figure 4.1) to access the emergency lift screw of the contact bridge.
11. Using a screwdriver, turn the screw clockwise as far as possible, until you can turn the carousel.
12. To recover a 384-well Nucleocuvette® Plate loaded on plate retainer position 1 (position 2 is visible at the front of the plate handler) turn the carousel counter-clockwise to recover your samples. To recover samples from plate retainer position 2 (position 1 is visible), turn the carousel clockwise.
13. Remove the 384-well Nucleocuvette® Plate from the plate handler carousel.
14. Contact Lonza's technical service for analyzing the error and for repair of the system.

Figure 4.1: Plastic cap covering the emergency release of the contact bridge



Figure 4.2: Lift contact bridge by turning the screw clockwise

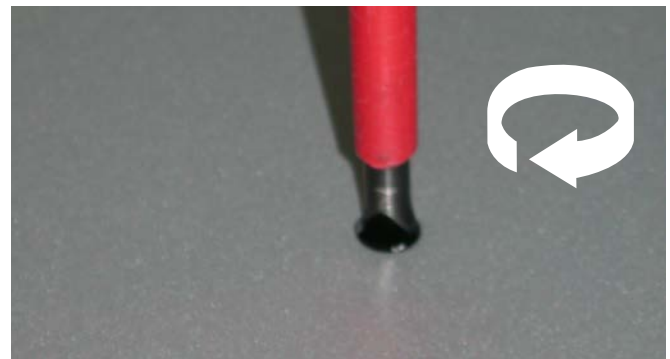


Figure 4.3: Turn carousel manually to recover samples



5 Purchaser notification


The purchase of the HT Nucleofactor® System conveys to the buyer a non-transferable, non-exclusive license without the right to grant sublicenses, limited for solely the use of Lonza Cologne's proprietary Nucleofactor® Process and method.

The license is limited to research use only. The license does not include the right to use the purchased device, its components or materials for any type whatsoever of commercial purpose as defined below. Notwithstanding the foregoing, the buyer shall be allowed to use the licensed process in combination with the purchased device to perform services internally for affiliates, subsidiaries, sections, departments or scientific collaborators, provided that such services are not for any commercial purpose.

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6 Appendix

6.1 Technische Daten / technical data / données techniques

Spannung / power / électrique	100 - 240 VAC
Max. Schwankungen der Netzversorgung / max. mains supply voltage fluctuations / max. fluctuations de l'alimentation	±10 % (nominal voltage)
Frequenz / frequency / fréquence	50 - 60 Hz
Stromverbrauch / consumption / consommation	0 VA / 40 VA / 750 VA (during transfection)
Netzkabel / mains supply cord / câble d'alimentation	nur das mitgelieferte Netzkabel verwenden use only the supplied power cord utilisez uniquement le cordon d'alimentation fourni
Sicherung / fuse / fusible	T10A H ₂ 50VP (T6.3A H ₂ 50VP internal supply for plate handler)
Schutzklasse / Protection Class / Classe de protection	Schutzklasse I (Schutzleiter) / Class I (earthed appliance) / Classe I (appareil relié à la terre)
Schutzgrad / Degree of protection / Degré de protection	IP20 Spritzwassergeschützt bis 15° Neigung / Splash-proof until 15° inclination / étanche aux éclaboussures jusqu'à 15° d'inclinaison
Verschmutzungsgrad / Pollution degree / Degré de pollution	1
Überspannungskategorie / Overvoltage category / Catégorie de surtension	II
Gerätekategorie / Device class / Classe de dispositif	Gruppe / Group / Groupe 1, Klasse / Class / Classe B
Betriebsumgebung / operating environment / environnement opérationnel	+15°C up to +40°C (59°F - 104°F) non condensing Nur für den Innenbereich zulässig / For Indoor use only / Pour un usage intérieur uniquement
Maximale Luftfeuchtigkeit / maximum humidity / humidité maximale	80% @ 31°C, linear bis / linear to / linéaire au 50% @ 40°C
Nasse Umgebung / Wet environment / Environnement humide	Nein / No / Non
Maximale Höhenlage / maximum altitude / altitude maximale	2000 m (NN, above sea level, au-dessus du niveau de la mer)
Transfektionen / Minute, transfactions / minute, transfactions / minute	complete 384-well Nucleocuvette® plate
Schnittstellen / Interfaces / Interface	USB, Lonza HV and data interface between power supply and plate handler
Spannungsbegrenzung / voltage limitation / limitation de la tension	1000 V
Strombegrenzung / current limitation / limitation de courant	17 A
Abmessungen / dimensions / dimensions	Power supply: 13.5 × 50 × 45 cm / 5.3 × 19.6 × 17.7 in Plate handler: 40 × 40 × 15 cm / 15.7 × 15.7 × 5.9 in
Gewicht / weight / poids	Power supply: 14 kg / 31 lbs Plate handler: 10.5 kg / 23.1 lbs
Hersteller / supplier / manufacture	Lonza Cologne GmbH Nattermannallee 1 D-50829 Köln, Germany

6.2 Technical data plate handler

Power supply	24 V supplied by HT Nucleofector® Power Supply
Operation temperature range	+15°C to +40°C, non-condensing
Safety class	EN 61010-1 UL 61010-1 IP 20
Weight	10.5 kg 23.1 lb
Dimensions (w × d × h)	40 × 40 × 15 cm 15.7 × 15.7 × 5.9 in
Manufacturing date	The year of manufacture is indicated by the second and third digit of the serial number, e.g. a device with the serial number x20xxxxx was manufactured in 2020.

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