Miltenyi Biotec

# CliniMACS Prodigy®

## User manual



The CliniMACS System components, including Reagents, Tubing Sets, Instruments, and PBS/EDTA Buffer, are designed, manufactured and tested under a quality system certified to ISO 13485. In the EU, the CliniMACS System components are available as CE-marked medical devices for their respective intended use, unless otherwise stated. In the US, the CliniMACS CD34 Reagent System, including the CliniMACS Plus Instrument, CliniMACS CD34 Reagent, CliniMACS Tubing Set TS and CliniMACS Tubing Set LS, and the CliniMACS PBS/EDTA Buffer, is FDA approved as a Humanitarian Use Device (HUD), authorized by U.S. Federal law for use in the treatment of patients with acute myeloid leukemia (AML) in first complete remission. The effectiveness of the device for this indication has not been demonstrated. Other products of the CliniMACS Product Line are available for use only under an approved Investigational New Drug (IND) application, Investigational Device Exemption (IDE) or FDA approval.
In Australia, the following components of the CliniMACS Prodigy System are included in the Australian Register of Therapeutic Goods (ARTG) and are therefore approved for supply: CliniMACS Prodigy, CliniMACS CD34 Reagent, CliniMACS Prodigy Tubing Sets, and CliniMACS PBS/EDTA Buffer. Only those products which are included in the ARTG may be used in Australia.

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# CliniMACS Prodigy®

## User manual

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## Essential information

This user manual provides instructions, warnings, precautions, and other important information for the use of the CliniMACS Prodigy as well as warnings and precautions concerning the handling of biohazardous materials and starting cell product. For details on processes running on the instrument, refer to the respective CliniMACS Prodigy application user manual.

**⚠ WARNING**

**The operation of the CliniMACS Prodigy System must be performed by trained operators only. Before putting the system into operation, carefully read and understand the safety information, warnings, precautions, and instructions for proper operation of the CliniMACS Prodigy provided in the instructions for use of the CliniMACS Prodigy System components and in any safety-related recommendations issued by Miltenyi Biotec. Pay special attention to all warnings shown on the instrument or provided with consumables, components, MACS GMP instruments, and accessories as well as notifications and important information described in this user manual. Adhere to all instructions and procedures at all times during the operation of the instrument, making sure that all safety information, warnings, precautions, and instructions are observed. Failure to observe the safety and important information, warnings, precautions, add notifications and instructions contained in the instructions for use could result in instrument malfunction, property damage, personal injury, and/or death. Equipment safety may be compromised if the instrument is not used according to the manufacturer's instruction.**

**Retain the instructions for use for future reference. They should be kept accessible and readily available, together with all other safety and operating documentation, during the entire life cycle of the instrument for all personnel responsible for installation, operation, and maintenance.**

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# 1 Introduction

## 1.1 General information

The CliniMACS Prodigy System offers a set of tools that enables high-quality and standardized cell processing for many different applications. The system is based on the magnetic cell separation technology (MACS® Technology) developed by Miltenyi Biotec.

The CliniMACS Prodigy represents the next generation in automated cell and liquid processing. With its integrated fluid transfer, centrifugation, and magnetic separation capability, the instrument enables automated cell processing and culture applications, as well as fluid handling. The instrument offers advanced integrated solutions to streamline cell processing workflows. It offers a versatile platform for processing a wide range of cell types. Additionally, our Customized Application Services can assist in developing protocols tailored to specific needs.

The different applications running on the instrument require the use of specific CliniMACS Prodigy System components as well as additional materials and equipment, as described in the CliniMACS Prodigy user manual issued for the respective application (see also section 6.1 ´The CliniMACS Prodigy® System´).

## 1.2 Service information

### 1.2.1 CliniMACS Prodigy information

Record the model and serial number located on the rear of the instrument below. Refer to these numbers whenever requesting information about the instrument or when requesting instrument service.

Catalog no. (REF): _____

Serial no. (SN): _____

The software version is shown during the start-up phase of the instrument.

# 2
# Glossary

## 2.1 Graphical depiction

The following chart depicts the panels used in this user manual to inform the user about potential risks if the outlined warnings and precautions are not followed. The hazard level classifies the hazard, as described below. The level, type, and source of the hazard, as well as potential consequences, prohibitions, and measures are indicated as follows. Icons on the left side specify the risk.

**⚠ WARNING**

**Indicates a hazardous situation that, if not avoided, could result in death or serious injury.**

**⚠ CAUTION**

**Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.**

***NOTICE***

Indicates information considered important, but not hazard-related (e.g., messages relating to property damage).

**IMPORTANT**

Advises the user of important practices or information not related to personal injury nor property damage.

## 2.2 Glossary of symbols

### 2.2.1 Safety symbols



General warning sign



Electrical hazard



Magnetical hazard



Optical radiation hazard



Biological hazard



Warning: High sound pressure level



Crushing of hands hazard



Warning of hot surface

## 2.2.2 Symbols used for labeling of products

| | |
|---|---|
| MD | Medical device |
| CE 0123 | European conformity mark with ID number of Notified Body |
| EAC | Eurasian conformity mark |
| TÜV SÜD C US | NRTL certification mark: Product meets consensus-based standards of safety, required by the Occupational Safety/Health Administration (OSHA), determined by the Nationally Recognized Testing Laboratories (NRTL) TÜV SÜD |
| | Consult instructions for use |
| | Caution |
| | Manufacturer |
| | Date of manufacture |
| | Protective conductor terminal (ground) |
| | Nonionizing radiation |
| | WEEE (waste of electrical and electronic equipment) |
| | Fuse |
| | Keep dry |



Fragile, handle with care



This way up



Power off



Power on



Installation date



Do not re-use



Do not use if package is damaged




The packaging is PVC free



Use-by date



Temperature limit



Non-pyrogenic fluid path




Batch code




Part number




Contents of the packaging




Catalog number

| | |
|---|---|
| SN | Serial number |
| UDI | Unique Device Identification |
| STERILE A | Sterilized using aseptic processing techniques |
| STERILE | Sterilized using steam or dry heat |
| STERILE R | Sterilized using irradiation |
| NON STERILE | Non-sterile |
| | Single sterile barrier system |
| | Single sterile barrier system with protective packaging outside |
| | Phone |
| | Fax |
| | E-Mail |
| | Website |

### 2.2.3 Glossary of terms

| | |
|---|---|
| Alarm connector | Relay circuit connector for the connection of the instrument to an external alarm system |
| Antigen Bag | Bag containing antigen, part of the CliniMACS Prodigy Tubing Sets |
| Apheresis | A procedure of collecting blood in which the whole blood is withdrawn from a patient or donor, components are collected or removed and the remaining is returned to the patient or donor |
| Application Bag | Bag for starting cell product part of CliniMACS Prodigy Tubing Sets |
| Application Services | A software feature that comprises a user management module including authentication features and an audit trail module which is essential to support 21 CFR Part 11 compatibility |
| ATMP | Advanced therapy medicinal products |
| AUX 3-pin connector (for CliniMACS Prodigy manufactured until October 2020) | Connector for compatible external devices, currently non-functional |
| AUX 5-pin connector | See TubeSealer port |
| Bag compartment | Compartment of the instrument for the storage of bags during CliniMACS Prodigy instrument operation |
| Bag hanger | Component of the instrument where the bags of the tubing set, i.e., Application Bag and buffer or medium bags, are positioned |
| Barcode | Machine-readable representation of data, e.g., part number, batch code, or use-by date, indicated on required materials |
| Barcode Reader | The barcode reader serves as a data input device to scan barcodes printed on, e.g., CliniMACS materials, needed for process execution with the CliniMACS Prodigy system |

| | |
|---|---|
| Bone marrow aspirate | Sample of bone marrow taken by insertion of a needle through the bone drawn into a syringe |
| CAN | Controller area network |
| CAN connector | Connector used for service purposes only |
| Cellular starting material | Cell-containing product used as starting material for the CliniMACS Prodigy Applications, e.g., leukapheresis harvest, PBMCs, or bone marrow |
| CentriCult Unit | The CentriCult Unit, as a part of the CliniMACS Prodigy, comprises a cell processing compartment featuring the following components: Layer Detection Camera, microscope camera, heat exchange unit, chamber lock adapter, and the lid of the unit. This compartment can be temperature and atmosphere controlled for centrifugation, incubation, and cell cultivation |
| CentriCult Unit lid | Protection cover locking the CentriCult Unit |
| Centrifugation sensor | Part of the CentriCult Unit to control the centrifugation speed |
| Chamber | Compartment for fractionation, washing, and labeling by centrifugation and for cultivation of cells, part of the CliniMACS Prodigy Tubing Sets |
| Chamber drive unit | Unit which drives the chamber within the CentriCult Unit |
| Chamber lock adapter | The chamber lock adapter holds the chamber of the tubing set and connects it to the chamber drive unit |
| Channel clip | Blue clip holding the tubing outside the CentriCult Unit in position |
| Check valve | Check valves are two-port valves, meaning they have two openings in the body, one for fluid to enter and the other for fluid to leave. An important concept in check valves is the cracking pressure which is the minimum upstream pressure at which the valve will operate |

| | |
|---|---|
| Cleaning solution | Aqua bidest for injection use. The cleaning solution is used for cleaning the inner tubing and chamber of the tubing set during specific cleaning process steps. The cleaning solution is not part of the CliniMACS Prodigy System |
| Cleaning solution bag | Bag containing the cleaning solution. The cleaning solution bag is not part of the CliniMACS Prodigy Tubing Sets |
| CliniMACS PBS/EDTA Buffer | Buffer used for cell preparation and cell separation with the CliniMACS System: PBS, supplemented with 1 mM EDTA, pH 7.2. Before use, CliniMACS PBS/EDTA Buffer must be supplemented with pharmaceutical-grade HSA to a final concentration of 0.5% (weight/volume, i.e., 5 g HSA per liter buffer). HSA-supplemented buffer is called process buffer. |
| CliniMACS Electroporator | The CliniMACS Electroporator is a fully automatic instrument for the electroporation of eukaryotic cells in combination with the CliniMACS Prodigy. After electroporation, cells are further processed by the CliniMACS Prodigy |
| CliniMACS Electroporation Buffer | Buffer used for the electroporation of cells with the CliniMACS Electroporator |
| CliniMACS Formulation Unit | The CliniMACS Formulation Unit is an instrument for the automated final formulation and sampling of eukaryotic cells in combination with the CliniMACS Prodigy. The CliniMACS Formulation Unit enables the user to take cell samples during or after processing by the CliniMACS Prodigy |
| CliniMACS Prodigy | The CliniMACS Prodigy is an instrument for automated cell processing. This instrument offers integrated solutions for cell processing workflows: from cell separation through cell culture to formulation of the final product |

| | |
|---|---|
| CliniMACS Prodigy Supplementary Bag | The Supplementary Bag is intended to minimize the user's exposure to accidently released, potentially infectious sample material from the CliniMACS Prodigy Tubing Set in the event of a leak |
| CliniMACS Prodigy Tubing Set | Set of tubings, connectors, columns (as applicable to the tubing set), centrifugation chamber, pump tubing, and bags through which the cell suspension is processed. The different tubing sets are designed for the specific needs of the respective application |
| CliniMACS Workbench | A cleanroom-compatible solution for housing CliniMACS Prodigy and CliniMACS Formulation Unit. It offers efficient use of space and simplifies adding additional units (scale-out) for increased cell processing capacity |
| CliniMACS Workbench Large | A cleanroom-compatible solution for housing CliniMACS Prodigy, CliniMACS Electroporator and CliniMACS Formulation Unit. It offers efficient use of space and simplifies adding additional units (scale-out) for increased cell processing capacity |
| EDTA | Ethylene-diamine-tetra-acetic acid |
| Electroporation cuvette | The electroporation cuvette is part of the CliniMACS Prodigy EP-4 and CliniMACS Prodigy EP-2 and placed in the holder of the electroporation unit. Cells and nucleic acids, proteins, or other small molecules are filled into the electroporation cuvette and a strong electrical impulse is applied on the cells |
| Electroporation unit | The electroporation unit includes a holder for the electroporation cuvette and applies an electrical impulse onto the cuvette |
| Elution buffer | Solution for eluting cells into the Target Cell Bag and Non-Target Cell Bag |
| Elution buffer bag | Bag containing the elution buffer, part of the CliniMACS Prodigy Tubing Sets |
| EMC | Electromagnetic Compatibility |

| | |
|---|---|
| EVA | Ethylene-vinyl acetate |
| External Keyboard | The external keyboard is intended as a supporting device for "Application Services" in CliniMACS Prodigy Software version SW 2.0 and higher, allowing administrators to establish user accounts |
| Filtration Bag | Bag for filtration of starting cell product which is labeled with depletion reagent before magnetic cell separation, part of specific CliniMACS Prodigy Tubing Sets |
| ×g | Multiples of the Earth's gravitational acceleration |
| Gas inlet connector | Three gas inlet connectors at the rear side of the instrument for the connection of external gas supplies |
| Gas mix unit | The gas mix unit inside the CliniMACS Prodigy is used to prepare a mixture of up to three different gases for cell culture purpose. Only $CO_2$, compressed air, and optionally $N_2$ may be used with the CliniMACS Prodigy |
| Gas outlet connector | Single outlet connector at the front of the instrument for connection of the gas mix unit to the tubing set to allow setting of the atmosphere within the cultivation chamber |
| GMP | Good manufacturing practice |
| Grounding screw | Part of the connector panel at the rear side of the CliniMACS Electroporator |
| Guide pin | Part of the peristaltic pump to hold the pump tubing in place |
| Heat Exchange Cartridge | Part of specific CliniMACS Prodigy Tubing Sets which allows temperature control of fluids within the tubing set |
| HEC | Heat exchange cartridge |

| | |
|---|---|
| Heat exchange unit | Part of the CentriCult Unit ensuring constant temperatures within the unit |
| Hematopoietic progenitor cells | Progenitor cells of lymphoid, myeloid, and erythroid lineage |
| HF | High-frequency |
| Housing | Cabinet of the CliniMACS Prodigy including bag hangers and a bag tray. A touchscreen is connected to the housing |
| HSA | Human serum albumin |
| Human serum albumin | Pharmaceutical-grade HSA, approved in your country, is necessary as a buffer supplement when used with the CliniMACS Prodigy System and is not supplied as part of the CliniMACS Prodigy System |
| HV | High voltage |
| Infusion solution | Buffer or media in which cells are finally formulated after cell processing. The composition of this solution is dependent on further down-stream use of the cell product and can be chosen individually by the operator. The infusion solution is not part of the CliniMACS Prodigy System |
| Infusion solution bag | Bag containing the infusion solution. The infusion solution bag is not part of the CliniMACS Prodigy Tubing Sets |
| Inlet tube | A sealed tube that enables sterile connection of additional bags, accessories, and other components. It is a part of specific CliniMACS Prodigy Tubing Sets |
| Intermediate Storage Bag | Bag for intermediate storage of labeled cells, part of specific CliniMACS Prodigy Tubing Sets |
| Labeling | Binding of cells by magnetic labeling reagent, e.g., CliniMACS CD34 Reagent to CD34-positive cells |

| | |
|---|---|
| Layer Detection Camera | Camera system using proprietary technology for the detection of the different interlayers during centrifugation, allowing controlled aspiration of cells or fluids, part of the CentriCult Unit |
| LED | Light-emitting diode |
| Leukapheresis | Apheresis collecting leukocytes |
| Liquid sensor | Sensor that uses ultrasound to track liquid flow and alert for potential air bubbles in tubing |
| Luer connector | Screw coupling, part of the CliniMACS Prodigy Tubing Sets |
| LV | Low voltage |
| MACS TubeSealer | Heat sealer used for sealing PVC and EVA tubes of the CliniMACS Prodigy Tubing Sets installed on the CliniMACS Prodigy |
| Magnet unit | The magnet unit is used to separate magnetically labeled cells from non-labeled cells. It includes a movable, strong permanent magnet and a column holder for the separation column in which the magnetically labeled cells are retained |
| Magnetic antibody | A super-paramagnetically labeled antibody |
| Medium bag | Bag containing medium (e.g., TexMACS™ Medium). The medium bag is not part of the CliniMACS Prodigy Tubing Sets |
| Microscope camera | Optical unit for microscopic examination of cells cultured within the chamber, part of the CentriCult Unit |
| Monoclonal antibody | A single type of antibody that is directed against a specific epitope (antigen, antigenic determinant) and is produced by a single clone of B cells or a single hybridoma cell line, which is formed by the fusion of a lymphocyte cell with a myeloma cell |

| | |
|---|---|
| Non-Target Cell Bag | Bag containing the non-target cell fraction, part of specific CliniMACS Prodigy Tubing Sets |
| Non-Target Cell Bag Depletion | Bag containing labeled cells (non-target cell fraction) after depletion procedure, part of specific CliniMACS Prodigy Tubing Sets |
| PBS | Phosphate-buffered saline |
| PepTivator® | Collections of lyophilized peptides, primarily composed of 15-amino acid fragments (15-mers) with an 11-amino acid overlap. Each PepTivator pool covers the entire sequence of a specific protein antigen |
| Peristaltic pump | Instrument component used to control the flow rate of fluid within the tubing set |
| Pinch valve | Instrument component: 24 magnetic valves are used to fix the CliniMACS Prodigy Tubing Set onto the instrument and to ensure controlled flow pathways within the tubing set throughout the procedure |
| Plasma transfer set | Connector set with two couplers to connect two bags. A plasma transfer set may be required for some processes. The plasma transfer set is not part of the CliniMACS Prodigy Tubing Sets |
| Power-CAN connector | Connector for external devices with higher power requirements (such as CliniMACS Electroporator) |
| Pre-column | Column which serves as a filter to trap cells that interact non-specifically with the column matrix, part of specific CliniMACS Prodigy Tubing Sets |
| Pre-column holder | Holder connected to bag hanger to hold the pre-column of the tubing set in place, component of the CliniMACS Prodigy |
| Pressure sensor | Integral part of the peristaltic pump that monitors the pressure within the tubing set to allow for detection of leakages or clogging of the tubing set |

| | |
|---|---|
| Priming | Step prior to cell separation in which buffer or medium is flushed through the tubing set |
| Priming Bag | Bag containing buffer from priming step, part of specific CliniMACS Prodigy Tubing Sets |
| Process | Software program designed for cell processing and culture applications. The operator is able to choose from a menu of processes depending on the intended procedure |
| Process buffer | CliniMACS PBS/EDTA Buffer supplemented with HSA to a final concentration of 0.5% (w/v) |
| Process buffer bag | Bag containing CliniMACS PBS/EDTA Buffer supplemented with HSA to a final concentration of 0.5% (w/v) |
| Process medium | Medium for cultivation and processing of cells within the tubing set |
| Pump safety switch | Sensor that prevents pump operation when the pump door is open, component of the CliniMACS Prodigy |
| PVC | Polyvinyl chloride |
| QC Bag | Bag containing collected in-process QC-samples, part of specific CliniMACS Prodigy Tubing Sets |
| RBC | Red blood cells |
| Reapplication Bag | Bag for enriched cells prior to cultivation, part of the CliniMACS Prodigy Tubing Sets |
| Reservoir Bag | Bag containing the elution buffer, part of specific CliniMACS Prodigy Tubing Sets |
| Retaining ring | Plastic ring at each end of the pump tubing that enables the pump tubing to remain in its proper location, part of the CliniMACS Prodigy Tubing Sets |
| RF | Radio frequency |
| PVC | Polyvinyl chloride |

| | |
|---|---|
| rpm | Revolutions per minute |
| Safety valve | Safety valve of the gas mix unit, positioned at the rear side of the instrument |
| Separation column | Column in which magnetically labeled cells are retained when exposed to the magnetic field, part of the CliniMACS Prodigy Tubing Sets |
| Separation column holder | Molded guides in the magnet unit that holds the separation column in place |
| Separation reagent | Reagent for magnetic labeling of cells, e.g. CliniMACS CD34 Reagent |
| Signal lamp | LED signal lamp positioned at the top of bag hanger A to provide optical signals about the status of the instrument |
| Supplementary Bag compartment | Instrument component underneath the CentriCult Unit for the storage of the CliniMACS Prodigy Supplementary Bag |
| Target Cell Bag | Bag containing the target cell fraction, part of specific CliniMACS Prodigy Tubing Sets |
| TCA | Test cuvette adapter |
| TFT LCD | Thin-film-transistor liquid-crystal display |
| Test Cuvette Adapter | The test cuvette adapter is an accessory for electroporation that enables users to test electroporation parameters using minimal volumes in cuvettes compatible with CliniMACS Electroporator |
| Touchscreen | TFT LCD type with touchscreen functionality as part of the CliniMACS Prodigy to guide the operator through the setup procedure and allow monitoring of automatic instrument operations. Located in the touchscreen are the central control board and the data storage unit |

| | |
|---|---|
| Transfer bag | Bag with tubing and a spike to move liquids from one place to another. The transfer bag is not part of the CliniMACS Prodigy Tubing Sets |
| TubeSealer port | Connector for the MACS TubeSealer |
| Tubing duct | Instrument part between the housing and the lid of the CentriCult Unit serving as save passageways for the tubing of the tubing set from inside the CentriCult Unit to the outside of the unit |
| UPS | Uninterruptible power supply |
| USB | Universal serial bus |
| USB ports | Standard USB ports to allow easy data transfer |
| User program | Software program defining a specific sequence of cell processing steps, e.g., centrifugation, liquid transfer, or controlled incubation |
| Vial adapter | Adapter on the CliniMACS Prodigy Tubing Sets to connect the vial (e.g., CliniMACS Reagent vial) |
| Vial holder | Part of the bag hanger assembly to securely keep the vial adapter(s) secure |
| QC Bag | Bag containing collected in-process QC-samples, part of specific CliniMACS Prodigy Tubing Sets |
| Waste Bag | Bag containing discarded liquids during operation of the CliniMACS Prodigy, part of specific CliniMACS Prodigy Tubing Sets |
| WBC | White blood cells |
| WEEE | Waste of electrical and electronic equipment |

# 3

# Important safety information



**⚠ WARNING**

**The operation of the CliniMACS Prodigy System must be performed by trained operators only. Before using the system, thoroughly read and understand the safety information. This includes warnings, precautions, instructions for proper operation, any safety information in this chapter, and safety recommendations provided by Miltenyi Biotec. Understanding this information is crucial for safe operation of the CliniMACS Prodigy system. It's critical to pay close attention to all warnings shown on the instrument or included with consumables, components, MACS GMP instruments, and accessories as well as notifications and important information described in this user manual. The operator must adhere to all instructions and procedures at all times during the operation of the instrument, making sure that all safety information, warnings, precautions, and instructions are observed. Ignoring the safety and important information can lead to in instrument malfunction, property damage, personal injury, and/or death. Equipment safety may be compromised if the instrument is not used according to the manufacturer's instruction.**

**Retain the instructions for use for future reference. They should be kept accessible and readily available, together with all other safety and operating documentation, during the entire life cycle of the instrument for all personnel responsible for installation, operation, and maintenance.**



**⚠ WARNING**

**Risk of death, serious personal injury, instrument, and/or property damage, and/or malfunction, and/or reduced life time, and/or premature wear and tear of the instrument ,void the warranty, and/or invalidate the authority to operate the instrument under applicable regulations, if the following safety information, warnings, precautions, and instructions are not observed at all times when using the instrument.**

- Always operate, handle, use, and maintain the instrument in accordance with the safety information, warnings, precautions, instructions, and recommended procedures provided in the user manuals and other written instructions issued by Miltenyi Biotec.
- Always ensure that the instrument is operated, handled, used, and maintained only by appropriately skilled and trained personnel familiar with the construction, operation, and hazards involved with the instrument. The instrument is intended for use in an professional facility healthcare environment. The instrument is not intended to be used near active HF surgical equipment.
- Always operate, handle, use, and maintain the instrument in compliance with all applicable laws, rules, regulations and administrative provisions, including, without limitation, all regulations regarding health and safety at work and, as appropriate, the safety of medical devices, as applicable, at the location where the instrument is operated.
- Always use the instrument for its designated purpose (in accordance with the product documentation and within its performance limits), and not in any other manner or for any other purpose.
- Safety and performance of the instrument may be compromised. Never use the instrument with consumables, components, MACS GMP instruments, accessories, transducers, and/or cables other than those approved by Miltenyi Biotec to ensure safe and proper operation of the instrument.
- The use of consumables, components, MACS GMP instruments, accessories, transducers, and/or cables not expressly approved by Miltenyi Biotec could void the warranty and/or invalidate the authority to operate this instrument under applicable regulations.
- Always follow Miltenyi Biotec's maintenance guidelines and relevant standards. Only authorized local Miltenyi Biotec Service Provider should install, maintain, or service the instrument. Do not operate the instrument until all required maintenance and safety checks are complete.
- Report any defects immediately. If you doubt the instrument's functionality, do not use the instrument and contact Miltenyi Biotec.

- Only make changes to the instrument with written permission from Miltenyi Biotec. Unauthorized modifications may void the warranty and your operating authority under applicable regulations.

**⚠ CAUTION**

**Suitability of the target cells for clinical application may be compromised. The target cells must be analyzed, otherwise the suitability for clinical application may be compromised. Examine the target cells regarding quality and quantity in view of their intended use.**

If concerned about the safe use of the instrument or if additional safety information regarding the CliniMACS Prodigy System is required, contact Miltenyi Biotec Technical Support.

## 3.1 Safety instructions

In the event of an unexpected process abortion or messages on the screen that advise the operator to contact technical support, immediately contact the Miltenyi Biotec Technical Support. If secure operation is no longer possible, immediately switch off and unplug the instrument from the power outlet, and contact Miltenyi Biotec Technical Support.

### 3.1.1 Usage and installation

**⚠ WARNING**

**Risk of improper operation due to increased electromagnetic emission or decreased electromagnetic immunity. The use of consumables, components, MACS GMP instruments, accessories, and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emission or decreased electromagnetic immunity of this equipment and result in improper operation. Medical electrical equipment requires special precautions regarding electromagnetic compatibility (EMC) and must be installed and placed in service according to the EMC information (see Appendix). Portable and mobile RF communications equipment can affect medical electrical equipment. Only use the instrument with consumables, components, MACS GMP instruments, accessories, transducers, and/or cables approved by Miltenyi Biotec. Installation of the CliniMACS Prodigy must only be performed by an authorized local Miltenyi Biotec Service Provider.**

**⚠ CAUTION**

**Risk of process failure. If alarm signals are not recognized and the required actions are not executed or confirmed there is the risk of process failure. Make sure that optical and acoustical alarm signals can be recognized by the operator at any time during the process.**

The CliniMACS Prodigy may be used repeatedly. It is not intended for disposal after single use. Contact the local authority governing electrical power supply, building construction, maintenance, or safety for more information regarding the installation of the equipment.

### 3.1.2 Electrical hazards

**⚠ WARNING**



**Risk of electric shock, electrical short, and spread of fire.**
**If flames or smoke appear, immediately switch off the instrument, unplug it from the electrical outlet, and contact Miltenyi Biotec Technical Support.**

- Ensure that the main switch, as well as the outlet for the power cord are easily accessible. If it is necessary to disconnect the power supply, unplug the cord from the power outlet.

#### Protective housing

The housing of the instrument reduces the risks of electric shock, electrical short, and spread of fire.

Opening any cover of the instrument interrupts this protective measure.

- Do not remove or penetrate any cover of the instrument.
- Only an authorized local Miltenyi Biotec Service Provider may open the instrument or exchange spare parts.
- Do not use the instrument in case of visible damage or if it has been dropped. Contact Miltenyi Biotec Technical Support.

## Evironment

- The instrument is intended for indoor use only.
- Do not use the instrument in a wet or damp location or if it has been exposed to moisture.
- Avoid ingress of any liquid into the instrument.
- Do not operate the instrument if liquids have spilled into the instrument.
- Avoid condensation. After moving the instrument from a cold environment, such as a cold room at +4 °C (+39 °F), to room temperature, condensing liquid droplets may form inside the instrument. Wait for the instrument to dehumidify before operating the instrument.
- Special care must be taken while handling fluids. Clean spillages immediately.
- Reduced air circulation carries the risk of overheating. Do not place the instrument with the rear side directly against the wall. Keep at least 14 cm distance to allow free air circulation. Slots and openings of the instrument are provided for ventilation and should never be blocked or covered, as these protect the instrument from overheating. Allow sufficient space around the ventilation slots at the rear and underneath the instrument. Make sure that the room in which the instrument is operated has adequate air circulation.
- Do not place the instrument next to equipment that produce heat (e.g., radiators, heat registers, or amplifiers) . Prevent direct exposure to sunlight. Do not place the instrument 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 and proper ventilation is provided.

## Cleaning

- Only clean the instrument when it is switched off and the power cord is unplugged.
- Do not use an excessive amount of cleaning or disinfection agents to avoid ingress of any liquid into the valves, sensors, and connectors.
- After cleaning, dry all excess liquid from the valves, pump head, gas outlet connector, etc.
- Do not use liquid or aerosol cleaning agents; always use a damp cloth.

### Cables and power supplies

- 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. Do not try to insert the plug into a non-grounded power outlet. If the plug cannot be inserted into the outlet, contact the local electrician to replace the outlet.
- Only operate the instrument with a power source indicated on the product's electrical ratings label. For questions about the type of power source to use, contact Miltenyi Biotec Technical Support. Do not use extension cords or power strips. Do not overload an electrical outlet.

**⚠ CAUTION**

**Risk of termination of the separation process. Based on technical limitations of the internal power supply voltage of the instrument, interruptions on power supply input lines for longer than 10 ms may lead to termination of the separation process (power failure). The separation process cannot be resumed after a power failure. It is recommended that the instrument is powered from an uninterruptible power supply or a battery that starts within 10 ms.**

The CliniMACS Prodigy is a Protection Class I device and may only be plugged into an outlet with a grounded connection.

## 3.1.3 Magnetical hazards

**⚠ WARNING**



**Risk of severe personal injury for persons carrying pacemakers, brain shunts, or electronic medical implants. The CliniMACS Prodigy is equipped with an extremely strong permanent magnet generating a strong magnetic field. There is a risk of severe personal injury for persons carrying pacemakers, brain shunts, or electronic medical implants. Always maintain a distance of at least 30 cm from the magnet cover.**

Keep any magnetic information carriers (such as credit cards or magnetic tapes), electronic equipment (such as hearing aids, measuring and control instruments, computers, and watches), and magnetizable tools and objects at a distance of at least 30 cm from the magnet cover. These items may be affected or damaged by the magnetic field.

### 3.1.4 Optical radiation hazards

**⚠ CAUTION**



**The optical radiation emitted from the light emitting diode (LED) may be harmful to the eyes at close viewing distances. Light emission is especially powerful when bag hanger A is disassembled. Do not disassemble the bag hanger A while the instrument is switched on.**

The CliniMACS Prodigy is equipped with a LED for the signal lamp at the left bag hanger (position A).

### 3.1.5 Chemical and biological hazards

**⚠ WARNING**



**Risk of severe personal injury or death. Depending on the biological material used, contamination or infection may lead to severe personal injury or death. Always wear personal safety equipment in accordance with warnings and precautions, in particular if biohazardous material is or has been used.**

Defective protective equipment (gloves, clothing, goggles) might endanger the operator. Inspect for defects before each use. If hazardous material has been used or spilled, take care to thoroughly decontaminate the instrument.

After running the sample and prior to decontamination, the CliniMACS Prodigy should be treated as a biohazard (see section 4.6 ´Cleaning and disinfection´). Waste disposal must be in accordance with local regulations.

### 3.1.6 Mechanical hazards

**⚠ CAUTION**



**Risk of internal damage. Movement or vibration may affect the instrument. Do not place the instrument next to equipment that vibrates or can cause the instrument to move. Imbalance during centrifugation can lead to substantial vibrations. Shut down the instrument when substantially strong vibrations occur. Contact Miltenyi Biotec Technical Support for assistance.**

**⚠ CAUTION**

**Risk of injury. After unlocking the lid of the CentriCult Unit, the chamber keeps spinning for a couple of seconds. Do not open the lid before the chamber stops spinning.**

### 3.1.7 Gas hazards

**⚠ WARNING**

**Gas hazard. Escaping $CO_2$ and $N_2$ can be a potential hazard to the user, especially during long-lasting incubation procedures. An automated gas alarm system and monitoring of the gas concentration in the room is required. An appropriate ventilation of the room must be ensured. Connection to the gas supply must be performed according to national and local requirements. Maximum gas concentration in the room must not be exceeded.**

A $CO_2$ concentration of more than 4.00 ppm (9,100 mg/m3) and an $O_2$ concentration of less than 17 vol.-% of the air is presently regarded by some authorities as the threshold at which a hazard may be caused. The safety of the gas supply system is the responsibility of the user.

### 3.1.8 Hot surfaces

**⚠ CAUTION**



**Risk of burns. The surface of the heat exchange unit and the Heat Exchange Cartridge (HEC) may become hot enough to cause burns if touched. A high temperature may also occur at the heat sink on the back of the instrument. Do not touch the heat exchange unit, the HEC, the heat sink on the back of the instrument while the instrument is in operation.**

### 3.1.9 Servicing and transport

**Servicing**

**⚠ WARNING**

**Hazards to users, instrument malfunction or damage, premature wear and tear and reduced life time of the instrument. Improper or incorrect servicing or repair of the instrument can cause hazards to users, instrument malfunction or damage, premature wear and tear and reduced life time of the instrument, and may void the warranty. Unless otherwise specifically noted in this user manual, do not service the CliniMACS Prodigy. Service and repair may only be performed by authorized local Miltenyi Biotec Service Provider.**

Using unauthorized replacement or spare parts can cause malfunction of the instrument and impair results. Miltenyi Biotec does not honor any warranty or accept any responsibility for instrument failure or damages resulting from the use of inappropriate replacement or spare parts. After completing any services or repairs, authorized local Miltenyi Biotec Service Providers perform all required safety checks to ensure that the instrument is fully functional.

For information about Miltenyi Biotec's instrument service and support arrangements, contact Miltenyi Biotec Technical Support.

### Transport

**⚠ WARNING**

**Chemical and biological hazard. Risk of chemical or biological hazards due to contaminated surfaces. If the instrument needs to be shipped back to the manufacturer for service, decontaminate the instrument from any hazardous material prior to shipment.**

For details regarding proper decontamination refer to the instructions in section 4.6 ´Cleaning and disinfection´.

**⚠ CAUTION**

**Risk of internal damage. Internal damage can occur if the instrument is subjected to excessive vibration or is dropped. The instrument should be transported with care in packaging specified by Miltenyi Biotec. Do not lift the instrument by the touchscreen, the CentriCult Unit, peristaltic pump unit, or the magnet unit.**

**⚠ CAUTION**

**Ergonomic hazard. If the instrument is lifted by one person, there is the risk of personal injury. The transport should be performed by at least two people according to the instructions in section 4.5.2 ´Transport´. The instrument should be lifted in an upright position under each of the four corners at the base of the instrument.**

Before transportation, the instrument must be switched off and disconnected from the power supply. All bag hangers and disposables should be removed from the instrument.

## 3.2 Position of safety symbols

Notice the positions of the safety symbols (see Figure 3.1 and Figure 3.2) and keep them in an easily readable state. The safety labels must be kept clean and legible.

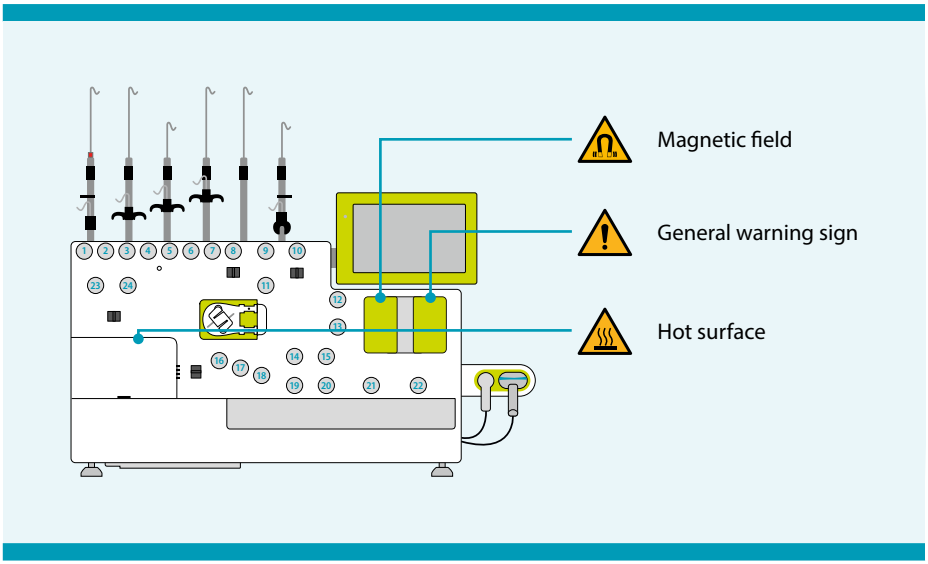



Figure 3.1: Position of safety symbols on the front of the instrument (exemplary SN 491 or higher)

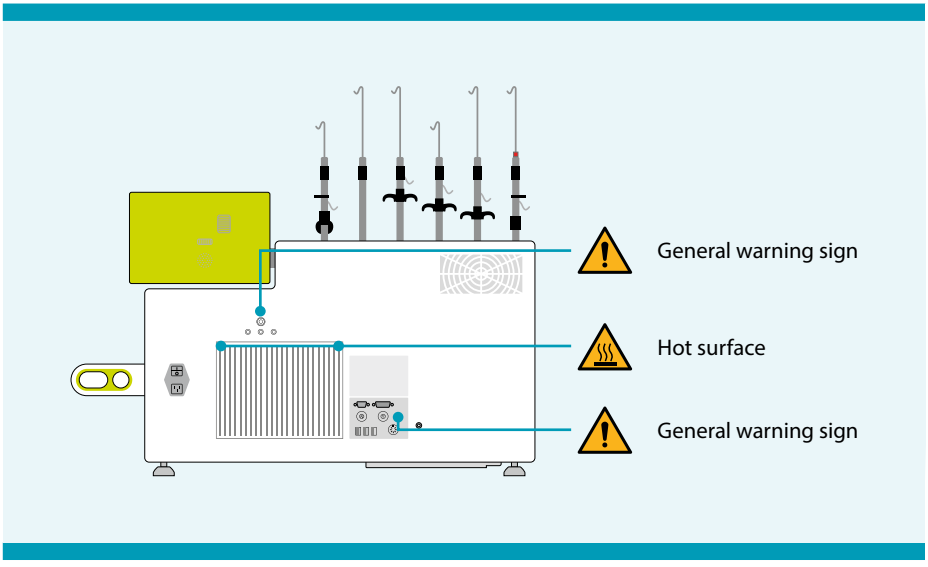



Figure 3.2: Position of safety symbols on the rear of the instrument (exemplary SN 491 or higher)

# 4

# The CliniMACS Prodigy



## 4.1 Regulatory information

Based on the respective intended use, the CliniMACS Prodigy can be used in various application systems that differ in terms of their regulatory classification:

1. The **CliniMACS Prodigy Cell Separation System** is intended to separate human cells.

   ▶ **CliniMACS Prodigy is a Medical Device in Europe if used as part of the CliniMACS Prodigy Cell Separation System.**

2. The **CliniMACS Prodigy Cell & Gene Therapy Manufacturing System** is intended for genetic and/or other substantial manipulation (like proliferation, differentiation) steps of human cells.

   ▶ **CliniMACS Prodigy is no Medical Device in Europe if used as part of the CliniMACS Prodigy Cell & Gene Therapy Manufacturing System.**

For regulatory status in countries outside Europe, contact Miltenyi Biotec Technical Support.

### 4.1.1 The CliniMACS Prodigy within the CliniMACS Prodigy Cell Separation System

**Intended purpose**

The CliniMACS Prodigy Cell Separation System, consisting of the components CliniMACS Prodigy, CliniMACS Reagent(s), CliniMACS Prodigy Tubing Set, CliniMACS PBS/EDTA Buffer, and further accessories, which must be used in combination, is intended for the *in vitro* separation of specific human cells for clinical applications.

The CliniMACS Prodigy is intended to operate the components of the CliniMACS Prodigy Cell Separation System to enable the *in vitro* separation of specific human cells for clinical applications.
For the operation of the CliniMACS Prodigy Cell Separation System, only the components stated as CE-marked medical devices and accessories defined in the CliniMACS Prodigy user manual for the respective applications must be used with and connected to the instrument.

The instrument conforms to the Medical Device Regulation MDR (EU) 2017/745:

MD CE 0123

The instrument complies with the following standards:

- IEC/EN 61010-1
- CAN/CSA-C22.2 No. 61010-1
- K 61010-1
- IEC/EN 61010-2-10
- CAN/CSA-C22.2 No. 61010-2-10
- IEC/EN 61010-2-20
- CAN/CSA-C22.2 No. 61010-2-20
- IEC 60601-1-2

For the applied standard version, refer to the respective Product Quality Certificate.

The instrument is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

**IMPORTANT**

Any serious incident that has occurred in relation to this product should be reported to Miltenyi Biotec B.V. & Co. KG – using the contact information provided – and the competent authority of the member state in which the user of this product is established.

### 4.1.2 The CliniMACS Prodigy within the CliniMACS Prodigy Cell & Gene Therapy Manufacturing System

#### Intended use

The CliniMACS Prodigy Cell & Gene Therapy Manufacturing System is intended for *ex vivo* genetic and/or substantial manipulation of human cells or manufacture of an Advanced Therapy Medicinal Product (ATMP) for clinical applications.

#### Rationale

During applications of the CliniMACS Prodigy Cell & Gene Therapy Manufacturing System, the cells are subjected to modification (genetic and/or substantial manipulation; cell separation, concentration, or purification are not considered as substantial manipulation according to Regulation (EC) No. 1394/2007) by pharmacological, immunological, or metabolic means as the principal intended action. The resulting cells are therefore considered as ATMP in Europe.

As a consequence, the components of this CliniMACS Prodigy Cell & Gene Therapy Manufacturing System cannot be classified as Medical Devices. Instead, the CliniMACS Prodigy Cell & Gene Therapy Manufacturing System is considered as manufacturing system for medicinal products. Therefore, European GMP guidelines (EudraLex Vol. 4) have to be followed when using the CliniMACS Prodigy Cell & Gene Therapy Manufacturing System for manufacture of medicinal products in Europe.

For operating the CliniMACS Prodigy Cell & Gene Therapy Manufacturing System, only the stated products defined in the respective applications must be used with and connected to the CliniMACS Prodigy.

## 4.2 Technical data

**⚠ WARNING**

**Safety and performance may be compromised. Safety and performance may be compromised if the instrument is used outside its specifications. Do not use the instrument outside its specifications.**

The technical data of the instrument are listed in Table 4.1.

| Technical data | |
|---|---|
| Model | CliniMACS Prodigy (REF 200-075-301) |
| Input voltage | 100 – 240 V AC (Single phase alternating current) |
| Power consumption | 810 VA |
| Dimensions | Width: 73.2 cm (plus approx. 20 cm for holder of MACS Tube Sealer and barcode reader)<br>Depth: 40 cm housing<br>Height: 48 cm housing (plus 42 – 60 cm for bag hangers) |
| Weight | Approx. 70 kg<br>(excluding weight of attached consumables, components, and accessories) |
| Frequency | 50/60 Hz |
| Fuses | 2× T10AH250V |
| Pump speed | 2 – 400 mL/min |
| Atmosphere control | Gas mix unit for $CO_2$, compressed air, and optionally $N_2$,<br>min. pressure: 1.0 bar, max. pressure: 2.5 bar |
| Temperature control | +4 to +38 °C (+39 to +100 °F) |
| Centrifugation | Max. 2,500 rpm (400×g) |
| Microscope camera | Max. magnification 400-fold |
| Operation conditions | Temperature: +15 to +25 °C (+59 to +77 °F)<br>Humidity: 10% to 75% relative humidity, non-condensing<br>Altitude: <2,000 meters above sea level |
| Storage conditions | Room temperature<br>Avoid condensing conditions. |

Table 4.1: Technical data of the CliniMACS Prodigy

The instrument including accessories complies to the EMC standard IEC 60601-1-2. For details refer to the appendix of this user manual. It is a Protection Class I instrument and must be plugged into a grounded power outlet. Conditions of operation: Supply voltage fluctuations up to ±10% of the nominal voltage. Transient over-voltages present on the mains supply: Category II. The instrument is suitable for rated pollution degree 2.

The instrument has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. **Note:** The emissions characteristics of this instrument make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required), this instrument might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or reorienting the instrument. If this instrument does cause harmful interference to radio or television reception, which can be determined by turning the instrument 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 distance between the instrument and the receiver,
- Connect the instrument to an outlet on a circuit different from that to which the receiver is connected,
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications of the instrument, unless expressly approved by Miltenyi Biotec, may void the authority to operate the instrument pursuant to FCC 47 CFR.

## 4.3 Components

The following section describes the components of the CliniMACS Prodigy. Table 4.2 gives an overview of components included per instrument serial number. Repairs or hardware updates made by the authorized local Miltenyi Biotec Service Provider may lead to a modified state of construction and retrofitting of the instrument.

The front view of the instrument is shown in Figure 4.1.

| Serial number | 001-490 | 491-xxx |
|---|---|---|
| **Housing with:** | | |
| • Bag hangers | 6 | 6 |
| • Bag hanger hooks | 2 / Optional: 5 | 5 |
| • Lower hook bag hanger A | – / ○ | ● |
| • Bag compartment(s) | ● | ● |
| **Monitor** | | |
| • TFT LCD Touchscreen | 8.4″ | 10.1″ |
| • USB port on monitor | 1 | 2 |
| • Touchscreen operated with blunt items | ● | – |
| • Touchscreen operated with fingers/gloves | ● | ● |
| Peristaltic pump | ● | ● |
| Magnet unit | ● | ● |
| **CentriCult Unit** | | |
| • with Layer Detection Camera and microscope camera | ● | ● |
| • Drive shaft ready for CentriCult Chamber 800/1 | – | ● |
| **Gas mix unit** | | |
| • with gas outlet connector, gas inlet connectors, and safety valve | ● | ● |
| **Sensors** | | |
| • Liquid sensors | 4 | 4 |
| • Pressure sensors | 2 | 2 |
| Pinch valves | 24 | 24 |
| Connector panel | ● | ● |
| Single pre-column holder | ● | – |
| Dual pre-column holder | – | ● |

1 ● Standard
2 ○ Optional
3 – Not available

Table 4.2: Configuration differences of the instrument

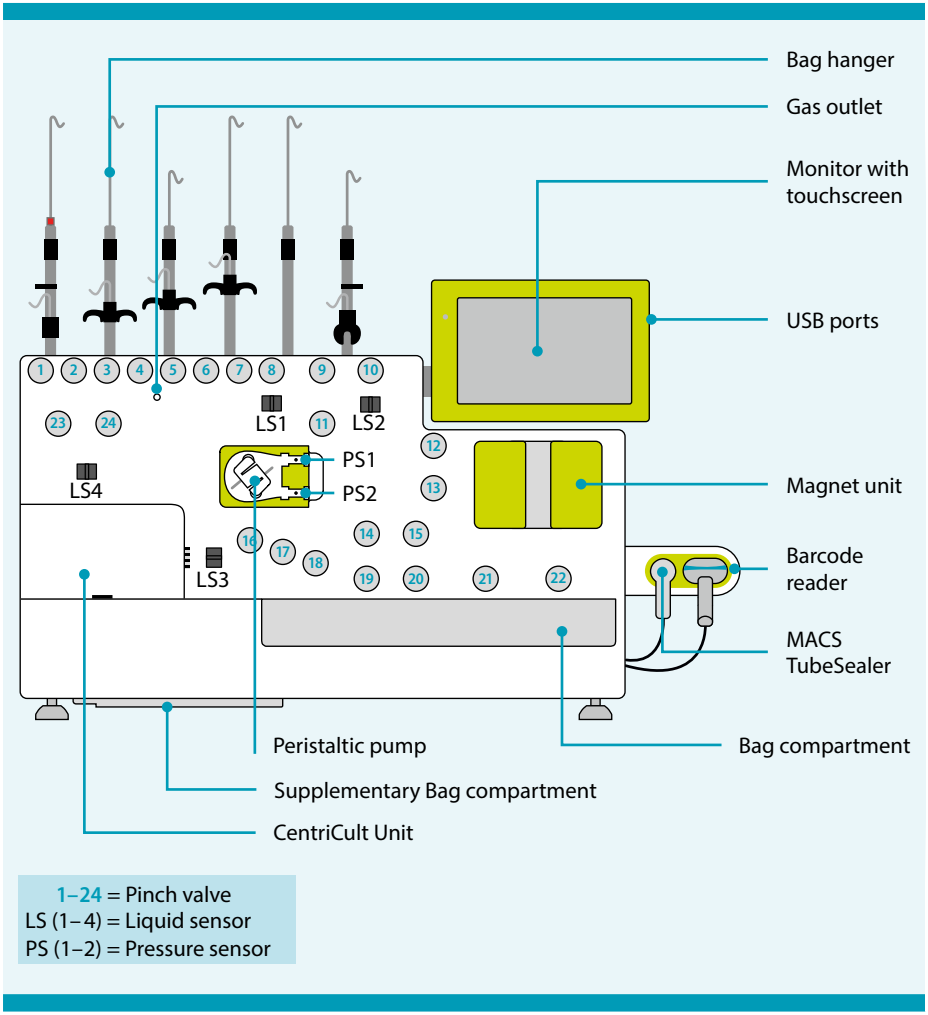



Figure 4.1: Front view of the instrument (exemplary SN 491 or higher)

The rear view of the instrument is shown in Figure 4.2.

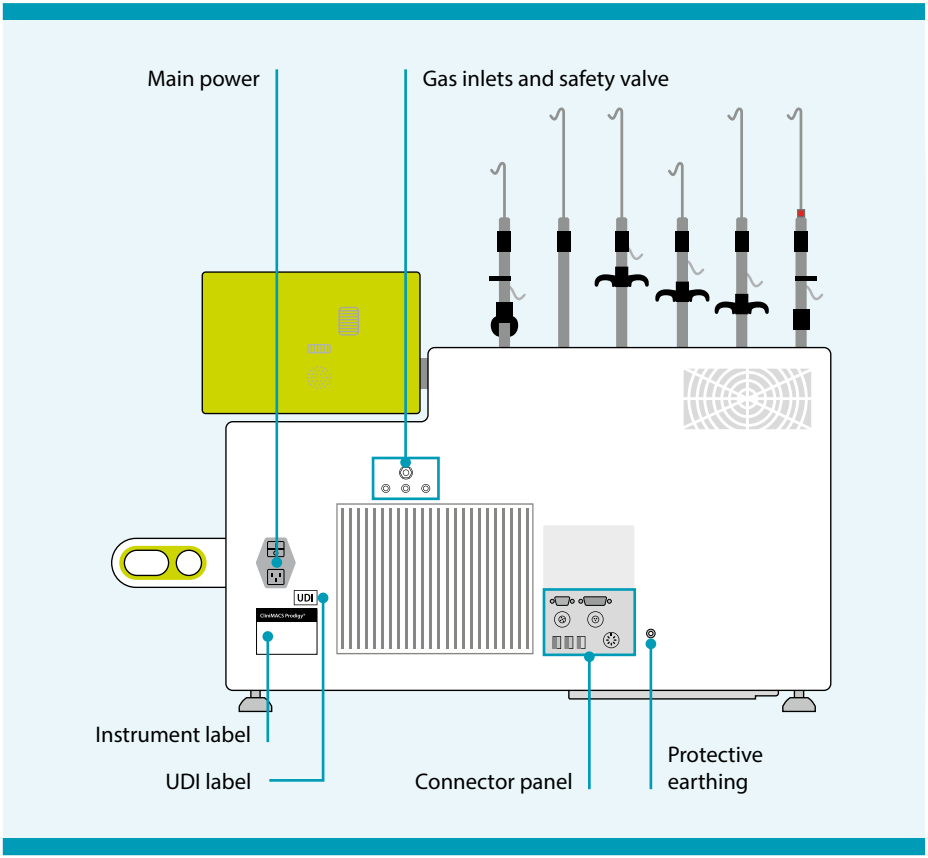



Figure 4.2: Rear view of the instrument (exemplary SN 491 or higher)

### 4.3.1 Housing and bag hangers

In addition to its common function as a cabinet, the housing incorporates a set of bag hangers and a designated compartment for storing bags. Furthermore, the touchscreen is seamlessly integrated into the housing design.

The instrument is equipped with six bag hangers (A-F) at the top of the instrument (see Figure 4.3). Each individual bag hanger consists of a rod, a spring-loaded pinch clamp with a hook for bag attachment, and additional supporting elements, such as vial holders and pre-column holders. The pinch clamp allows for adjustable hook height.

**NOTICE**

Risk of damage to the bag hangers in case of overloading. The carrying capacity of a single bag hanger is 5 kg. Do not overload the bag hangers. If the material weighs over 5 kg, distribute the weight evenly between two bag hangers (see Figure 4.4).

In addition, bag hanger A is equipped with a signal lamp to indicate the status of the instrument and to provide optical warning signals when required.

The signal lamp is part of the alarm management system, which is comprehensively outlined in section 5.3.1 ´The signal lamp´. Additionally, bag hangers A and F are equipped with the clamping fixtures for the tubing set straps.

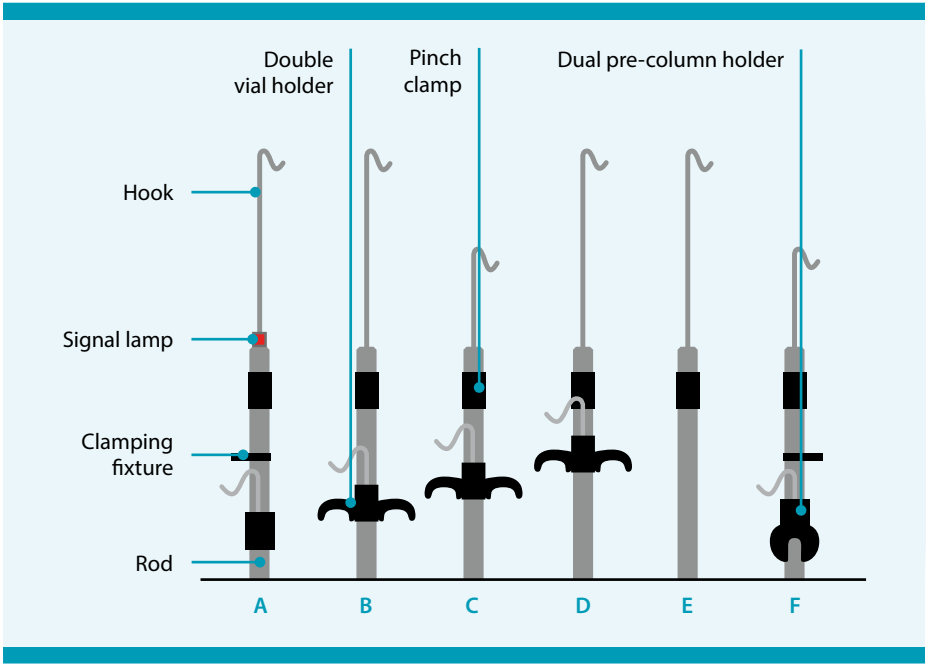



Figure 4.3: Bag hanger set mounted on the instrument

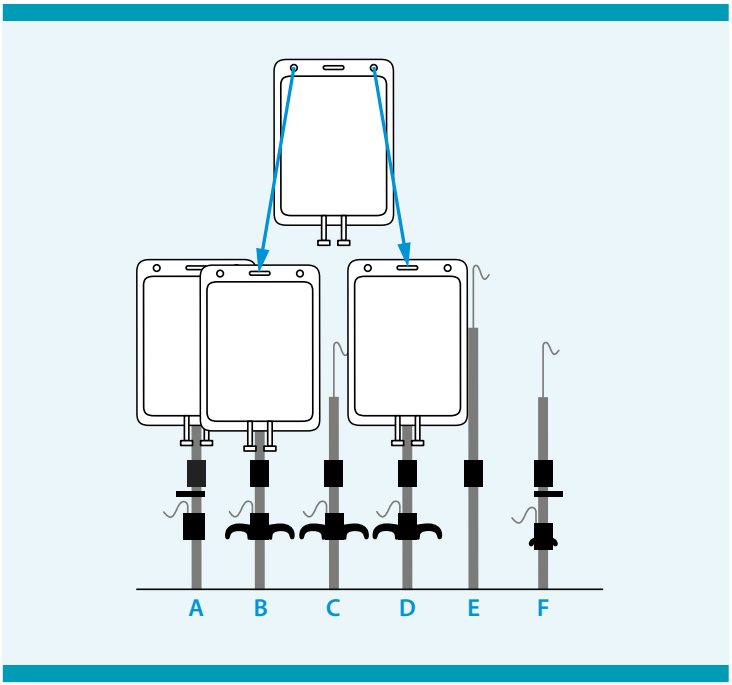



Figure 4.4: Distributing weight evenly between two bag hangers: a practical guide

### 4.3.2 Monitor

The user interface is operated via touchscreen and manages all functions. Usage of the touchscreen is possible when wearing surgical gloves. The touchscreen guides the operator through the setup procedure and allows monitoring of the instrument during operations. The monitor unit holds an internal speaker for acoustical signaling and alarm functionality. The integrated USB ports allows for easy data import and export (see Figure 4.1).

### 4.3.3 Peristaltic pump

The peristaltic pump is used to advance the liquids through specific flow pathways of the tubing set. A set of guide pins ensures the pump tubing stays in place. The pump has a rotational speed sensor and a rotor position detection. If the protection cover lid is open, the pump stops working. Do not open the protection cover of the pump during operations unless prompted by the graphical user interface. Integrated into the pump housing are two pressure sensors for measuring the pressure within the tubing set. For the individual components of the peristaltic roller pump see Figure 4.5.

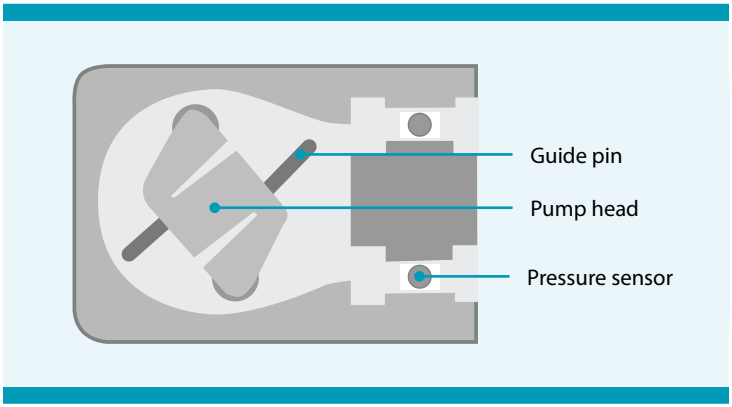



Figure 4.5: Components of the peristaltic pump

### 4.3.4 Magnet unit

The magnet unit induces a magnetic field into the separation column in order to separate magnetically labeled cells from non-labeled cells. This unit includes the movable, permanent magnet and a holder for the separation column (see Figure 4.6). A linear motor with position sensors is used to place the magnet in the ON and OFF positions. Inside the separation column, a strong inhomogeneous magnetic field is created which retains magnetically labeled cells within the column.

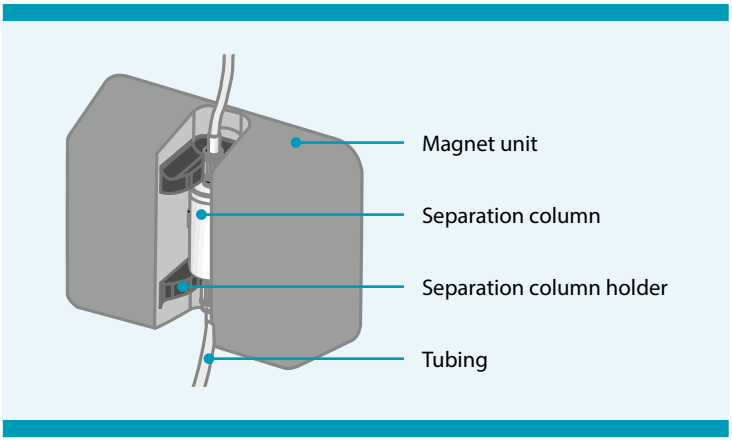



Figure 4.6: Separation column inserted into magnet unit

### 4.3.5 CentriCult™ Unit

The CentriCult™ Unit is a functional unit for cell processing and cell cultivation purposes. The main components of this unit are the chamber drive unit, heat exchange unit, Layer Detection Camera, microscope camera, and a lid which tightly closes the CentriCult Unit (see Figure 4.7).

The chamber of the tubing set is attached to the chamber drive unit via the chamber lock adapter inside the CentriCult Unit. The centrifugation speed is defined by the process and controlled by sensors. The maximum centrifugation speed is 2,500 rpm. The lid of the CentriCult Unit acts as a safety mechanism. It must be closed for the chamber drive unit to function, and it remains locked until the drive has come to complete stop.

**Note:** The lid can only be opened or closed at a specific time during the process, as indicated by the system. This may happen automatically, through the **<open lid>** button (if available) or via the settings menu between processes.

The Layer Detection Camera utilizes proprietary technology for the detection of different interlayers (e.g., plasma and cells) during centrifugation, allowing

controlled aspiration of cells or fluids.

The CentriCult Unit is equipped with temperature control unit that allows for both heating and cooling. The temperature control unit consists of a heat exchange unit, peltier elements, fans, and temperature sensors including an infrared sensor which is positioned in front of the chamber lock adapter (not visible in Figure 4.7).

An additional microscope camera (magnification up to 400-fold) is used for microscopic evaluation of cells cultivated in the chamber of the tubing set. Positioning of the chamber and focusing of the lens is performed via the graphical user interface.

**Note:** The microscope camera is part of the CliniMACS Prodigy Cell & Gene Therapy Manufacturing System only.

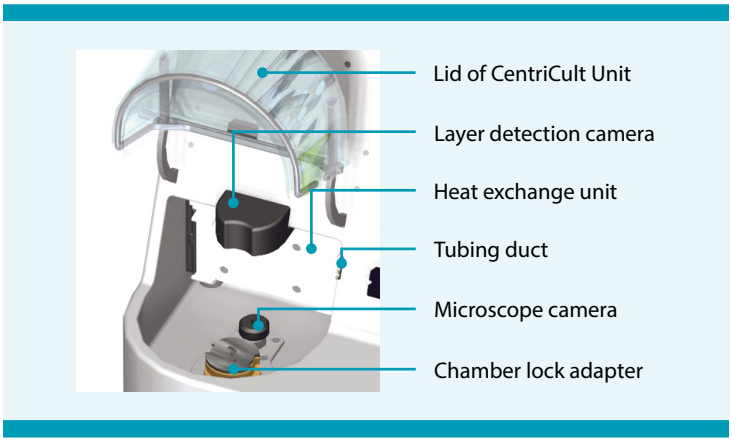



Figure 4.7: Components of CentriCult Unit

### 4.3.6 Gas mix unit

**Note:** The gas mix unit is part of the CliniMACS Prodigy Cell & Gene Therapy Manufacturing System only.

It enables the preparation of a mixture of up to three different gases for cell culture purposes. Located at the back of the CliniMACS Prodigy are three gas inlets with 4 mm push-in connectors for $CO_2$, $N_2$, and compressed air plus a safety valve (see Figure 4.2 and Figure 4.8).

**⚠ WARNING**

**Risk of gas emission or process failure. Risk of gas emission or process failure if excessive pressures are applied. Pressures of 1 bar to max 2.5 bar for each gas may be applied. The mixture ratio of these gases is controlled by the software and then passed into the tubing set through a gas outlet connector at the front of the instrument (see Figure 4.1). Only $CO_2$, compressed air, and optionally $N_2$ shall be used with the instrument. The safety of the gas supply system is the responsibility of the user.**

For a detailed description of how to apply the necessary gas connections and required settings, refer to the appropriate respective CliniMACS Prodigy application user manual which involves the gas mix unit. Only connect gases used in the desired process.

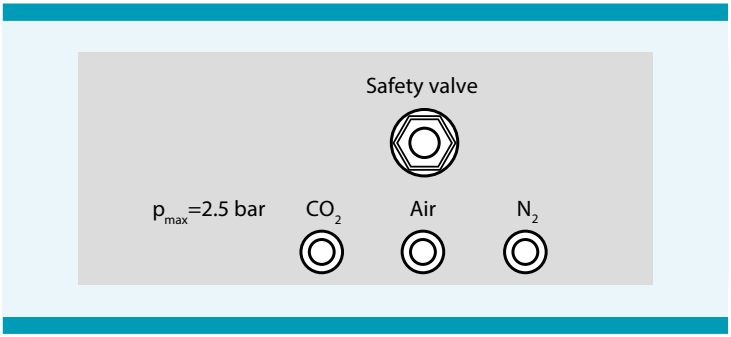



Figure 4.8: Gas inlet connectors and gas safety valve

### 4.3.7 Sensors

A variety of sensors, such as pressure sensors and liquid sensors, are used to control the process and verify correct user handling. The pressure sensors monitor the pressure within the tubing set to allow detection of leakages or clogging within the tubing set. These pressure sensors are an integral part of the pump housing (see Figure 4.1 and Figure 4.5). Four liquid sensors at the front of the instrument (see Figure 4.1) monitor the flow of liquid within the tubing set based on an ultrasonic principle which allows detection of air bubbles within certain parts of the mounted tubing set. Specific process steps are designed so that disruption of continuous fluid flow through these sensors automatically advances the process to the next phase. Additional sensors include the temperature sensors for controlling the temperature of the CentriCult Unit and positioning sensors for controlling parameters such as the position and speed of the chamber or peristaltic roller pump. The temperature sensors also include an infrared sensor which measures the temperature directly at the bottom of the centrifugation and cultivation chamber.

### 4.3.8 Pinch valves

In total, 24 magnetic pinch valves can be used during operation to ensure controlled flow pathways within the tubing set. Additionally, the valves fix the tubing on the front plate of the instrument.

### 4.3.9 Connector panel

**⚠ WARNING**

**Safety and performance of the instrument may be compromised. Safety and performance of the instrument may be compromised if non-authorized accessories, components, MACS GMP instruments, transducers, and cables are used. Only accessories, components, MACS GMP instruments, transducers, and cables, authorized by Miltenyi Biotec for the use in combination with the CliniMACS Prodigy, are allowed to be plugged into any of the connectors of the connector panel or any other connector socket of the instrument. This also includes USB storage.**

**⚠ WARNING**

**Risk of improper operation due to increased electromagnetic emissions or decreased electromagnetic immunity. The use of consumables, accessories, components, MACS GMP instruments, transducers, and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment, and thus lead to improper operation. Only use the instrument with accessories, components, MACS GMP instruments, transducers, and/or cables approved by Miltenyi Biotec. Refer to section 4.4 ´Additional accessories, components and instruments´.**

## CliniMACS Prodigy manufactured as of November 2020

A connector panel with connectors for input and output connections is positioned at the rear side of the instrument (see Figure 4.9). There are three USB ports for data input and output functionalities.

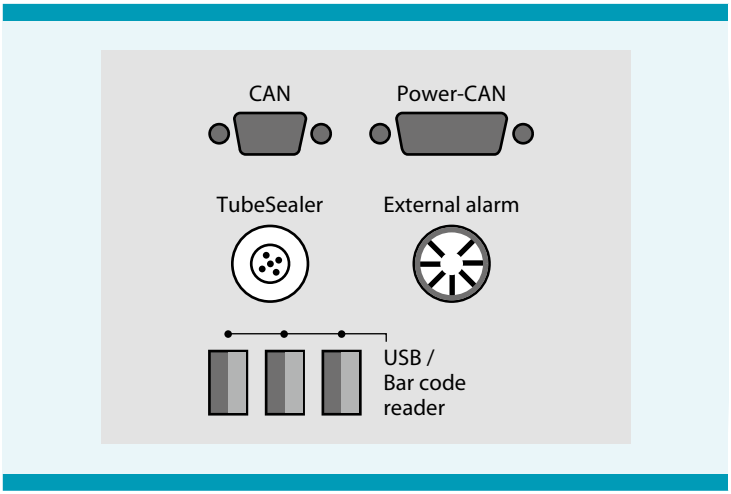



Figure 4.9: Connector panel (as of November 2020)

The alarm connector is used for connecting an external alarm system. A relay circuit provides 2 levels of information (see Figure 4.10); one for warning information (Relay 2) and another for a critical alarm situation (Relay 1). All other sockets ("CAN", and "Power-CAN") may be used for service purposes.

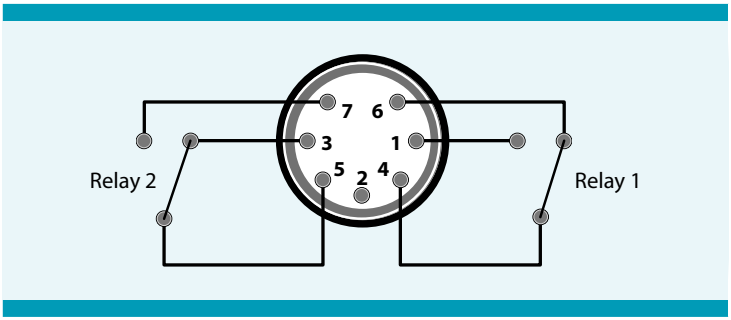



Figure 4.10: Relay circuit of alarm connector showing the idle state

## CliniMACS Prodigy manufactured until October 2020

A connector panel with connectors for input and output connections is positioned at the rear side of the instrument (see Figure 4.2). There are three USB ports for data input and output functionalities. The AUX 5 pin socket is used for the MACS TubeSealer. The alarm connector is used for connecting an external alarm system. A relay circuit provides 2 levels of information (see Figure 4.10); one for warning information (Relay 2) and another for a critical alarm situation (Relay 1). All other sockets ("AUX, 3 pin", "CAN", and "Power-CAN") may be used for service purposes.

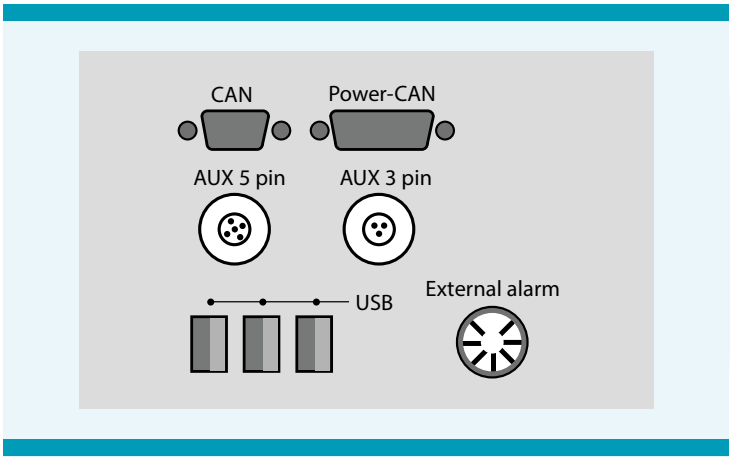



Figure 4.11: Connector panel (until October 2020)

## 4.4 Additional accessories, components and instruments

The approved accessories, components and instruments specified by the Miltenyi Biotec part number or by technical specification, are listed in Table 4.3.

| Accessory, components and instruments | Specification |
|---|---|
| MACS TubeSealer | P/N 44364 |
| CliniMACS Prodigy Supplementary Bag | REF 200-076-612 |
| **Components** | |
| Barcode Reader | Zebra DS4308-HC, DS4608-HC, or equivalent |
| USB to Ethernet adapter | P/N 26128 |
| Ethernet cable to connect the Ethernet adapter | Cat5 or higher |
| External alarm cable | Shielded cable |
| External keyboard | InduProof® Smart Compact or equivalent |
| **MACS GMP instruments** | |
| CliniMACS Electroporator (optional) | REF 170-075-704 |
| CliniMACS Formulation Unit (optional) | REF 170-075-703 |
| CliniMACS Workbench with central supplies, HV-UPS (optional) | REF 170-075-711 |
| CliniMACS Workbench with central supplies, LV-UPS (optional) | REF 170-075-712 |
| CliniMACS Workbench Large with central supplies, HV-UPS (optional) | REF 170-075-713 |
| CliniMACS Workbench Large with central supplies, LV-UPS (optional) | REF 170-075-714 |

Table 4.3: List of accessories, components, and MACS GMP instruments authorized to be used in combination with the instrument

### 4.4.1 MACS® TubeSealer

The MACS TubeSealer is used for sealing PVC and EVA tubing of the CliniMACS Prodigy Tubing Sets installed on the CliniMACS Prodigy. A detailed description of the MACS TubeSealer and relevant safety information are provided in the MACS TubeSealer user manual. The MACS TubeSealer must be connected to the instrument via the TubeSealer port at the rear side of the instrument (see Figure 4.9).

### 4.4.2 Barcode reader

The barcode reader is intended to scan barcodes printed on, e.g., CliniMACS materials, required for process execution with the CliniMACS Prodigy System. The scanned data serve as input of part and batch numbers of the CliniMACS materials required for an application. These numbers and any other process-related parameters may also be entered manually. The barcode reader can be connected to any USB port of the instrument. For easier handling, it is recommended to plug the barcode reader into one of the USB ports located at the rear of the instrument (see Figure 4.9).

### 4.4.3 External Keyboard

The external keyboard is intended to enable administrators to set up user accounts, required for operating the "Application Services" with the CliniMACS Prodigy Software SW 2.0. and higher.

**Note:** Do not use the external keyboard when running any of the installed applications on the CliniMACS Prodigy. The external keyboard must be used for the "User Management" only! The external keyboard must be unplugged from the CliniMACS Prodigy before starting any application and tool.

Refer to the CliniMACS Prodigy Software user manual for detailed information on User Management.

### 4.4.4 CliniMACS Prodigy® Supplementary Bag

The CliniMACS Prodigy Supplementary Bag is intended to help prevent user contact with potentially infectious sample material that may leak from the CliniMACS Prodigy Tubing Set. In case of a malfunction, like a chamber leakage, liquid may leak into the CentriCult Unit and be collected in the Supplementary Bag. The bag is located in the Supplementary Bag compartment under the CentriCult Unit (see Figure 4.1). This helps keep the user safe and makes it easy to dispose any leaked fluid. The CentriCult Unit can then be cleaned and the bag must be replaced by a new one. For instructions regarding the replacement of the bag, refer to the instructions for use provided with the bag.



It is recommended to replace the Supplementary Bag no later than one year after it has been installed onto the instrument, considering not to exceed the use-by date. Therefore, the installation date must be written onto the Supplementary Bag label beside the calendar symbol.

**NOTICE**

Before initiating the CliniMACS Prodigy application ensure that the clamp on the supplementary bag is in the open position and that the bag is empty.

### 4.4.5 CliniMACS® Electroporator

The CliniMACS Electroporator is an instrument accessory for the automated electroporation of eukaryotic cells in combination with the CliniMACS Prodigy. After electroporation, cells are further processed by the CliniMACS Prodigy. The CliniMACS Electroporator is connected to the CliniMACS Prodigy. The electroporation takes place in the electroporation cuvette. The electroporation cuvette is part of CliniMACS Prodigy Tubing Sets and is placed in the electroporation unit of the CliniMACS Electroporator.

Different types of eukaryotic cells can be electroporated. This technique allows the transfection of cells with nucleic acids, proteins or other small molecules. Refer to the CliniMACS Electroporator user manual for further information.

### 4.4.6 CliniMACS® Formulation Unit

The CliniMACS Formulation Unit is an instrument accessory for the automated final formulation and sampling of eukaryotic cells in combination with the CliniMACS Prodigy. The CliniMACS Formulation Unit enables the user to take cells during or after processing by the CliniMACS Prodigy. The CliniMACS Formulation Unit is mounted onto the bag compartment of the CliniMACS Prodigy and powered by the CliniMACS Prodigy via the Power-CAN connector. Refer to the CliniMACS Formulation Unit user manual for further information.

### 4.4.7 CliniMACS® Workbench

The CliniMACS Workbench is a mobile workstation designed for use with cleanroom environments. It is built to be compatible with cleanroom environments and helps maximize space utilization through its efficient design.

The workbench features a central supply unit that simplifies connections for power, gas, etc. The workbench utilizes ceiling sockets (not included) to keep the floor clear of cables and supply lines. These sockets must be purchased and installed separately (Staubli CombiTac ceiling socket, wired – 150-001-914).
An uninterruptible power supply (UPS) is also included to safeguard your workflows from power outages and downtime. The UPS comes in two versions (low and high voltage) to meet your specific needs (see Table 4.3 for details).

**IMPORTANT**

The voltage requirements for the workbench will vary depending on your location. Ensure you select the correct voltage option for your region before ordering. For further information consult with Miltenyi Biotec local sales representatives.

## 4.5 Unpacking and installation

**⚠ CAUTION**

**Risk of damage to the instrument if the instrument is unpacked or installed by unauthorized persons. Unpacking and installation of the instrument must only be performed by an authorized local Miltenyi Biotec Service Provider. Read chapter 3 ´Important safety information´ before installation and use of the instrument. Visually inspect and note any significant damage to the package. Damage may require inspection by a representative of the shipping company.**

### 4.5.1 Scope of supply

The content of supply is:

- One CliniMACS Prodigy (including instrument and software user manuals)
- One power cord (country specific)
- Six bag hangers equipped with specific mounting supports, one of them is additionally equipped with an LED lamp
- One MACS TubeSealer (including user manual)
- One barcode reader (including package insert)
- One external keyboard (including package insert)
- Two CliniMACS Prodigy Supplementary Bags (including package insert)
- One holder (frame and inlay) for MACS TubeSealer and barcode reader

### 4.5.2 Transport

**⚠ WARNING**

**Risk of internal damage. Internal damage can occur if the instrument is subjected to excessive vibration or if it is dropped. The CliniMACS Prodigy should be transported with care in packaging specified by Miltenyi Biotec.**

**⚠ WARNING**

**Chemical and biological hazard. Risk of chemical or biological hazards due to contaminated surfaces. If the instrument needs to be shipped back to the manufacturer for service, decontaminate the instrument from any hazardous material prior to shipment. For questions regarding proper decontamination or shipment, contact Miltenyi Biotec Technical Support for assistance.**

**⚠ CAUTION**

**Ergonomic hazard or damage to the instrument. If the instrument is lifted by one person there is the risk of personal injury or damage to the instrument. The instrument should be lifted by at least two people. Do not lift the instrument by the monitor, CentriCult Unit, peristaltic pump, or magnet unit.**

### 4.5.3 Positioning

**⚠ WARNING**

**Electrical hazard. To avoid electrical hazards it must be possible to interrupt the power supply at any time. The power connection including the fuse holder and the main switch must be accessible at all times.**

**⚠ CAUTION**

**Risk of overheating. Risk of overheating in case of reduced air circulation. Do not place the instrument with the back side directly against the wall. Keep at least 14 cm distance to allow free air circulation. Allow sufficient space around the ventilation slots at the rear and underneath the instrument. Take into consideration that the instrument requires adequate air circulation for heat exchange and cooling. Read the chapter 3 ´Important safety information´ to avoid the risk of overheating.**

**⚠ CAUTION**

**Risk of serious harm and/or serious damage to the instrument. The instrument could fall and cause serious harm and/or serious damage to the instrument. The instrument must be placed evenly on a flat and stable surface which is capable of supporting 100 kg and free of vibrational or other mechanical forces. Do not locate the instrument next to vibrating equipment which might cause movement during operation.**

#### Noise level

If the instrument is used at maximum load, it might produce noise up to 63 dB(A). Ensure that alarm signals from other instruments are noticeable.

## 4.6 Cleaning and disinfection

**⚠ WARNING**

**Risk of electric shock or damage to the instrument. Risk of electric shock or damage to the instrument if the CliniMACS Prodigy is cleaned with excessive amount of cleaning agent or while switched on. Only clean the instrument when it is switched off and the power cord is unplugged. Avoid ingress of any liquid into the valves and into the liquid sensor. Do not use an excessive amount of cleaning or disinfection agents to avoid spilling into the gas outlet connector. After cleaning, dry all excess liquid from the valves, pump head, gas outlet connector etc.**

**⚠ WARNING**

**Safety and performance of the instrument may be compromised. Safety and performance of the instrument may be compromised if other than the above mentioned cleaning methods are used. UV may damage plastic parts of the instrument. Do not use UV irradiation. The instrument should not be sterilized, e.g., with $H_2O_2$.**

Clean the instrument with one of the following disinfectants, which are compatible with the surface of the instrument:

- Aldehyde up to 3%, e.g. or
- Ethanol up to 80%.

Dust off the valves, peristaltic pump, and magnet unit using a paper towel or absorbent material.

In case of contamination, e.g., due to leakage in the CentriCult Unit, see chapter 7 ´Troubleshooting´.

**IMPORTANT**

The surface of the instrument, including the CentriCult Unit and the bag compartment, should be cleaned at regular intervals and after each application. Cleaning after unpacking and installation is also recommended.

## 4.7 Maintenance

**⚠ WARNING**

**Hazard to users, instrument malfunction or damage and reduced life time of the instrument. Improper or incorrect servicing or repair of the instrument can cause hazards to users, lead to unpredictable results, instrument malfunction or damage, premature wear and reduced life time of the instrument, and may void the warranty. Unless otherwise specifically noted in this user manual, do not service the CliniMACS Prodigy. Service and repair may only be performed by authorized local Miltenyi Biotec Service Provider. Routine and preventative maintenance procedures should be conducted by the manufacturer's authorized service personnel at least once a year.**

The instrument does not require any form of calibration. Contact the authorized local Miltenyi Biotec Technical Support for instrument service and support arrangements.

## 4.8 Disposal



Contact Miltenyi Biotec Technical Support for final disposal. The instrument must be separately collected according to the European directive of waste of electrical and electronic equipment (WEEE). For final disposal, the instrument must be returned to the manufacturer. Clean the instrument according to the instructions given in section 4.6 ´Cleaning and disinfection´. The instrument should be transported with care in packaging specified by Miltenyi Biotec.

**⚠ WARNING**

**Biological hazard. If the instrument is transported without prior disinfection there is the risk of infection. Clean and disinfect the instrument according to the instructions given in section 4.6 ´Cleaning and disinfection´.**

# 5

# The CliniMACS Prodigy Software



Refer to the CliniMACS Prodigy Software user manual for detailed information regarding the general navigation buttons, Graphic User Interface, as well as software features like Application Services and Network Connectivity.

Text in **<light green>** indicates elements in the graphic user interface (e.g., buttons, dialog boxes or user management items).

## 5.1 Touchscreen

The instrument is equipped with a high-resolution touchscreen. All elements of the instrument software are operated via the touchscreen. Two simple gestures of fingers are detected by the touchscreen.

**Tap:** A short contact of touchscreen elements with fingers is called a "tap". This gesture is used to start a process, to mark data, or to interact with a process during dialog control.

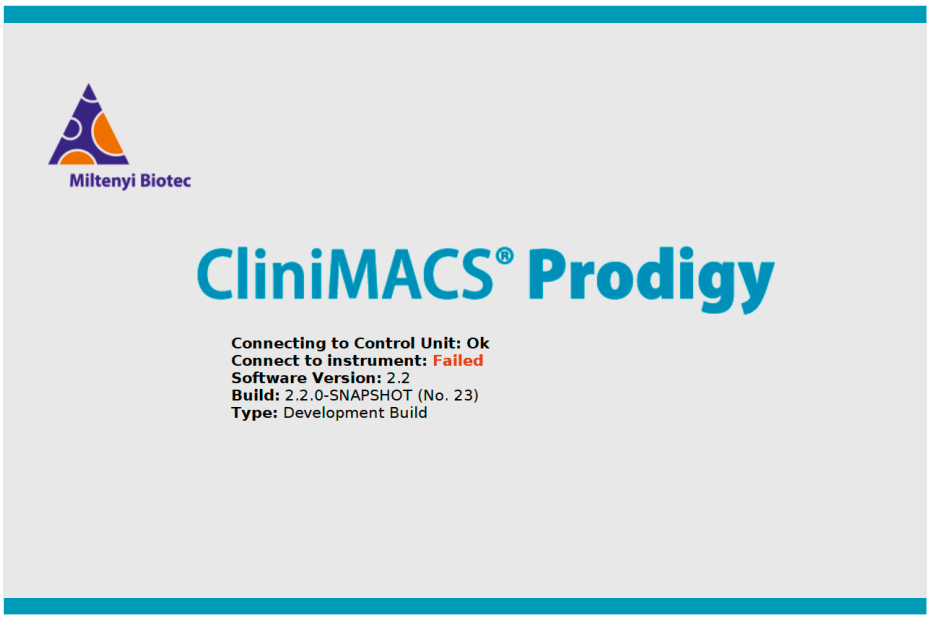
**Hold:** Contact and holding of a spot on the touchscreen will be detected as a gesture by some control elements (e.g., lists). This gesture is used for quickly scrolling through lists.

The touchscreen can detect gestures with gloved fingers.

## 5.2 General setup menu

### 5.2.1 Initial screen

Once the instrument's power is turned on, the software initializes, and the initial screen briefly emerges for a duration of around 5 seconds. The initial screen provides information about the software version and the outcome of the initialization process (see Screen 5.1). Once the initialization process is complete, the home screen is shown.




Screen 5.1: Initial screen

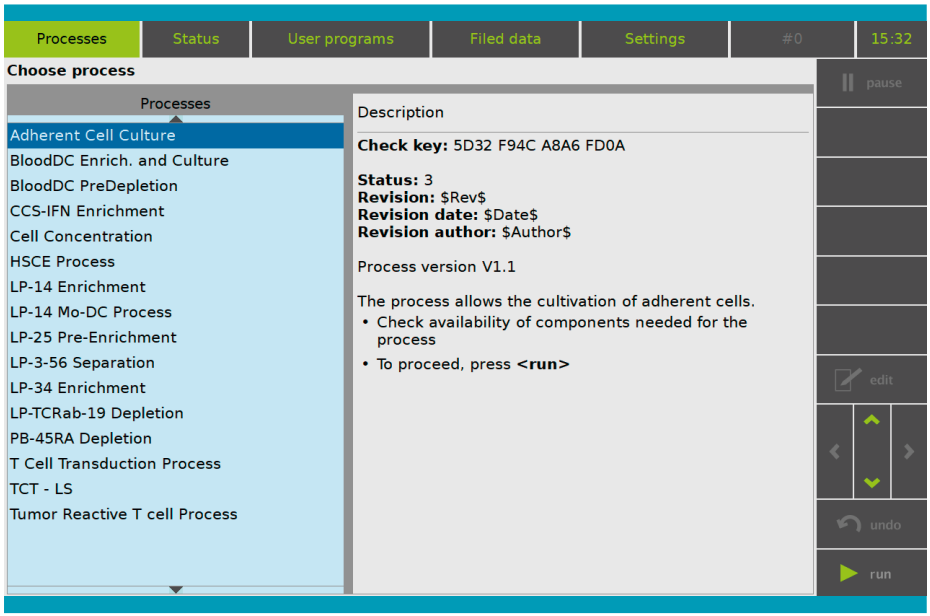
### 5.2.2 Home screen

On the home screen of SW 1.4 and earlier versions, the menu button automatically selects <Processes>, and within the list of processes, the first application is highlighted (see Screen 5.2.).

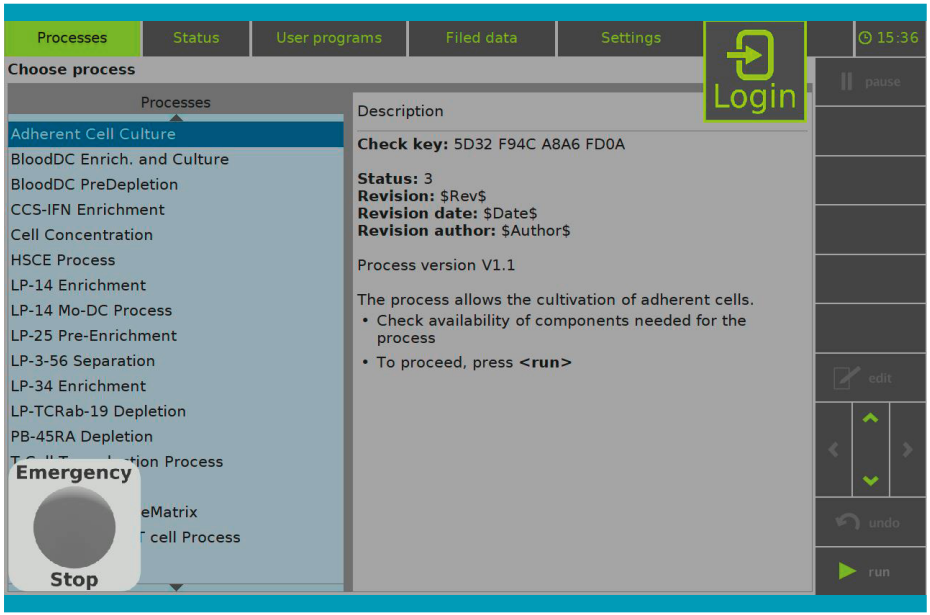
On the home screen of SW 2.0 and higher versions when the "Application Services" are activated, the menu button automatically selects <Processes>, and shows the login button. Additionally, the home screen also features the emergency stop button (see Screen 5.3.).

Using the login button, authorized users can input their username and password, granting them access to interact with the instrument. The emergency stop button allows users to promptly pause a running application or tool in the event of an

emergency, even when no user is currently logged in.
Refer to the CliniMACS Prodigy Software user manual for detailed information regarding Application Services, login, logout, and emergency stop.



Screen 5.2: Home screen SW 1.4.

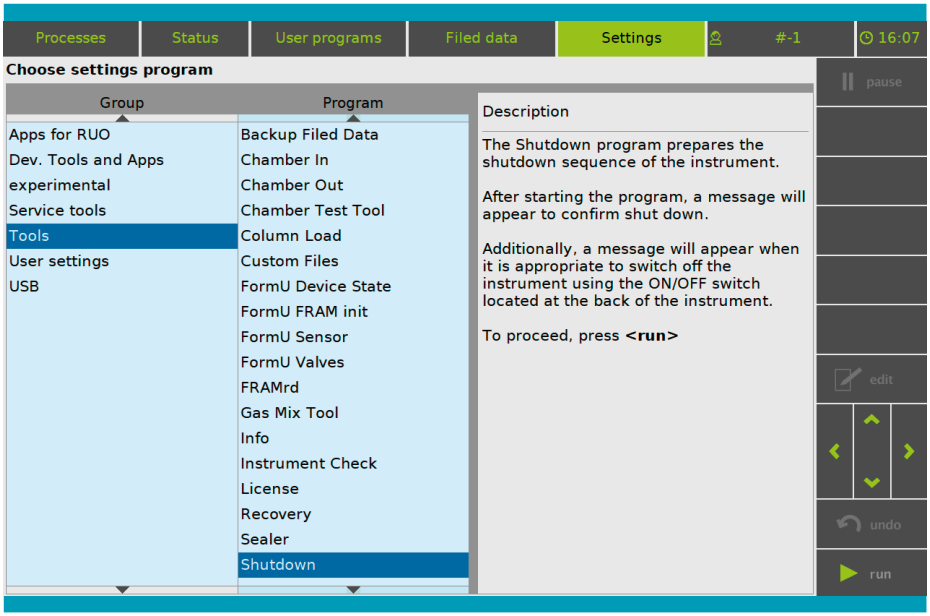


Screen 5.3: Home screen SW 2.2.

## 5.2.3 Shutdown

To initiate the shutdown process select the <Settings> menu. Use the navigation buttons to select <Shutdown> (see Screen 5.4.). To launch the chosen program tap <run>. Allow the shutdown process to finish, and then switch off the instrument using the power switch located at the rear of the instrument.

**Note:** As of CliniMACS Prodigy Software version SW 2.2 and higher, an additional menu button for the <Shutdown> menu was added to the menu bar.




Screen 5.4: Shutdown

## 5.3 Alarm management

The instrument is equipped with an integrated alarm management system which is spread over several components, providing optical and acoustical alarm signals if required. An additional relay circuit may be connected to an external alarm system. Relay 1 indicates a critical situation which requires immediate user interaction. Relay 2 indicates a required user interaction (see also section 4.3.9 ´Connector panel´).

The alarm management system of the instrument features a four-level alarm system. In case of a failure, a message is shown on the monitor, accompanied by an audible warning signal from a speaker within the touchscreen. The signal lamp at the bag hanger A (see Figure 4.3) will then show a blinking light.

The instrument distinguishes between three alarm levels as described in Table 5.1.

| Alarm level | Description |
|---|---|
| Level 0: Normal/Idle | The instrument is in an idle state and operating as expected. It awaits the initiation of a new process, or a current process is running smoothly. |
| Level 1: Hint | A hint message is used to provide information, e.g., on how to continue with the selected procedure. A user action may be necessary. If a user action is required, the signal lamp shows a blue blinking light. At this level, relay circuit 2 is inactive. |
| Level 2: Warning | A warning message shows warnings that require attention, e.g., sensors detect unexpected values. If a warning message appears, the signal lamp shows a yellow blinking light. In addition, relay circuit 2 is active. |
| Level 3: Alarm | Alarm messages point out system interruptions referring to safety relevant steps that await an obligatory user action. If an alarm message appears, the signal lamp shows a red blinking light. In addition, the speaker provides an acoustical alarm signal and relay circuit 1 is active. |

Table 5.1: Alarm management levels of the instrument

### 5.3.1 The signal lamp

An LED signal lamp is positioned at the top end of the bag hanger A (see Figure 4.3). This signal lamp provides instrument status information by showing different colors, as described in Table 5.2.

| Color | Description |
|---|---|
| White | The instrument is ready for use and a process may be started |
| Green | A process is running. No interaction required |
| Blue | The instrument requires user interaction |
| Yellow | Warning (time critical), user interaction required |
| Red | Alarm, critical situation, process failure possible, user interaction required |

Table 5.2: Color code of the signal lamp

**Note:** Whenever a user interaction is required, the signal lights will blink. This is the case with the blue, yellow, and red color lights.

# 6

# The CliniMACS Prodigy System



## 6.1 The CliniMACS Prodigy® System

The different applications running on the instrument require the use of the specific CliniMACS Prodigy System or of specific CliniMACS Prodigy Systems as well as additional materials and equipment as described in the respective CliniMACS Prodigy application user manual. The following CliniMACS materials may be part of a system:

- **The CliniMACS Prodigy** including the accessories MACS TubeSealer, and CliniMACS Prodigy Supplementary Bag (as described in this user manual).
- **CliniMACS Reagents and Biotin Conjugates** are intended for *in vitro* magnetic labeling of human cells to enable the separation of specific human cells with a CliniMACS System for clinical applications. The CliniMACS Reagents are dark colored, non-viscous, colloidal solutions containing the cell specific antibody conjugates in buffer. The reagents consist of the antibody chemically coupled to super-paramagnetic particles. The CliniMACS Biotin Conjugates are clear and colorless solutions containing antibody covalently linked to biotin in buffer. The antibodies are highly specific, making labeling of rare target cells possible.
- **CliniMACS Prodigy Tubing Sets** are intended for *in vitro* separation of human cells from heterogeneous haematologic cell populations in combination with the CliniMACS Prodigy System only. The different tubing sets have been developed for the special requirements of the respective application for use in combination with the CliniMACS Prodigy System only. They consist of pre-assembled tubing, pre-assembled bags, and other components as required.
- **CliniMACS PBS/EDTA Buffer** is intended as wash and transport fluid to enable the *in vitro* separation of human cells with a CliniMACS System only. It is used as process buffer during cell separation and is provided in 1L or 3L sterilized plastic bags, individually packed.

**IMPORTANT**

For instructions for use, e.g., warnings and precautions concerning the system components, refer to the instructions for use provided for the respective component.

## 6.2 Additional materials and equipment

Additional materials, e.g., CliniMACS Prodigy Accessories or MACS GMP Products, and equipment required for the different applications are described in the respective CliniMACS Prodigy application user manual.

**IMPORTANT**

The procedures may require the use of components which are not part of the system. Therefore, either materials of pharmaceutical grade must be used or the user has to evaluate all risks arising from these materials. In addition, no inflammable or explosive materials should be used, or solutions that will lead to a hazardous chemical reaction that could represent a potential risk for the user.

## 6.3 Limitation

Miltenyi Biotec as the manufacturer of the CliniMACS System does not give any recommendations regarding the use of separated cells for therapeutic purposes and does not make any claims regarding a clinical benefit.

## 6.4 Warnings and precautions regarding the process

**⚠ WARNING**

**Risk of process failure or damage to the instrument. Risk of process failure or damage to the instrument if procedures are performed by untrained operators. All processing procedures must be performed by trained operators only.**

Operator training will be provided by a qualified Miltenyi Biotec representative.

- For the manufacturing and use of target cells in humans the national legislation and regulations – e.g., for the EU the Directive 2004/23/EC (human tissues and cells) or the Directive 2002/98/EC (human blood and blood components) – must be observed. Thus, any clinical application of the target cells is exclusively within the responsibility of the user of a system.
- All materials, which have come into contact with blood and blood products, must be treated as infectious material. Regulations for the handling of infectious material must be observed.
- All cell preparation and labeling procedures must be performed at room temperature (+19 to +25 °C [+66 to +77 °F]) unless otherwise stated. Higher or lower temperatures may result in reduced purity and lower yield of the target cells.
- All tubing, fittings, valves, the pre-column, and the separation column should be checked thoroughly for leaks during the priming step.
- All bags should be retained until final analysis of all cells has been completed and successful processing of the target cells has been confirmed.

## 6.5 Warnings and precautions regarding the handling of biohazardous material

- To avoid contamination of the starting cell product, all preparation steps should be performed using aseptic techniques.
- The operator performing the cell processing must be trained in the proper use of the equipment and in the handling of blood products and bone marrow aspirates.
- The operator performing the cell separation should wear appropriate clothing (e.g., lab coat, gloves, and protective glasses or goggles) when working with a patient sample and handling potentially biohazardous material.
- All blood products must be treated as a potential biohazard. Leukapheresis product, blood product, bone marrow aspirate, collected cells, used buffer, used tubing set, and other materials, which have been in contact with these fluids, must be treated as biohazardous materials according to standard hospital or institutional requirements.
- The CliniMACS Prodigy should be considered as potential biohazard after each run and cleaned with an aqueous biocidal detergent (see section 4.6 ´Cleaning and disinfection´) according to standard hospital or institutional requirements.
- Disposable materials must be treated according to standard hospital or institutional requirements for biohazardous materials.

### 6.5.1 Warnings and precautions regarding the starting cell product

**IMPORTANT**

Labeling and processing of cells should begin as soon as possible after the starting cell product has been collected. It is recommended to start all labeling and processing procedures within 24 h after the cell collection.

- The starting cell product (e.g., leukapheresis product, buffy coat, etc.) should be collected according to standard hospital or institutional procedures in standard collection bags. Bone marrow aspirate should be collected in heparin-coated containers (e.g., 5 mL syringes). Prior to the cell labeling procedure, no additional anticoagulants or blood additives (heparin, etc.) should be included beyond those normally used during leukapheresis or during bone marrow aspiration.
- The container with the starting cell product should be labeled with patient identification, time, date, and place of collection according to procedures specified for use with the clinical protocol.
- For transportation, the starting cell product should be packed in insulated containers and be kept at a controlled room temperature of +19 to +25 °C (+66 to +77 °F) according to standard hospital or institutional blood collection procedures approved for use with the clinical protocol. Do not refrigerate. The cell concentration should not exceed $0.2\times10^9$ cells per mL during transportation.
- For transportation of the bone marrow aspirate, the product should be packed in insulated containers and be kept at a controlled temperature of +2 to +8 °C (+36 to +46 °F).
- Avoid intensive mixing of the starting cell product.
- If the starting cell product has to be stored, e.g., overnight, it should be kept at a controlled room temperature of +19 to +25 °C [+66 to +77 °F]. Bone marrow aspirate should be kept at a controlled temperature of +4 °C (+39 °F). During storage, the concentration of leukocytes should never exceed $0.2\times10^9$ cells per mL.
- Cells should be stored in autologous plasma. If the cell concentration is higher than $0.2\times10^9$ cells per mL, dilute the starting cell product with autologous plasma.

# 7 Troubleshooting

## 7.1 Instrument malfunction or process failure

In any case of instrument malfunction or process failure, contact Miltenyi Biotec Technical Support:

+49 2204 8306-3803
technicalsupport@miltenyi.com

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

## 7.2 Instrument cleaning after leakage

In case leakage occurs, e.g., in the CentriCult Unit, additional cleaning measures are required. For further information contact the Miltenyi Biotec Technical Support.

# 8 Legal notes

## 8.1 Limited warranty

Except as stated in a specific warranty statement, which may accompany this Miltenyi Biotec product, or unless otherwise agreed in writing by a duly authorized Miltenyi Biotec representative, Miltenyi Biotec's warranty for products purchased directly from Miltenyi Biotec shall be subject to the terms and conditions of sale under which it was provided to you by the respective Miltenyi Biotec sales organization. These terms and conditions are available on request or at www.miltenyibiotec.com. The applicable terms and conditions of sale may vary by country and region. Nothing herein should be construed as constituting an additional warranty.

For products purchased from third-party retailers or resellers (e.g., purchased from an authorized local Miltenyi Biotec Service Provider), different terms and conditions may apply.

To determine the warranty that came with your product, see your packing slip, invoice, receipt or other sales documentation. Some components of a product combination you purchased may have a shorter warranty than that listed on your packing slip, invoice, receipt or other sales documentation (e.g., goods subject to shelf life and obsolescence).

Miltenyi Biotec's warranty for this product only covers product issues caused by defects in material or workmanship during normal use. It does not cover product issues caused by any other reason, including but not limited to product issues due to use of the product in a manner other than specifically described in this manual, for example: inappropriate or improper use; incorrect assembly or installation by an operator or a third party; reasonable wear and tear; negligent or incorrect operation, handling, storage, servicing, or maintenance; non-adherence to the operating instructions; unauthorized modification of or to any part of this product;

or use of inappropriate consumables, accessories, or work materials.

Miltenyi Biotec's warranty does not cover products sold AS IS or WITH ALL FAULTS or consumables. Nothing herein should be construed as constituting an additional warranty.

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 the instrument.

**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 countries/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 vary from state to state or jurisdiction to jurisdiction.

## 8.2 Trademarks

CentriCult, CliniMACS, CliniMACS Prodigy, MACS, the Miltenyi Biotec logo, PepTivator, and TexMACS are registered trademarks or trademarks of Miltenyi Biotec B.V. & Co. KG and/or its affiliates in various countries worldwide. All other trademarks mentioned in this document are the property of their respective owners and are used for identification purposes only.

# APPENDIX

## Guidance and manufacturer's declaration on electromagnetic compatibility

### Guidance and manufacturer's declaration – Electromagnetic emissions

EMC compliance with IEC 60601-1-2:2014/AMD1:2020 (Edition 4.1) has been attested for the CliniMACS Prodigy and the approved accessories (see Table 4.3). The use of other power cables may result in increased electromagnetic emissions or decreased immunity of the CliniMACS Prodigy. If the provided power cable is missing, contact Miltenyi Biotec Technical Support.

| **Guidance and manufacturer's declaration – Electromagnetic emissions** | |
|---|---|
| The CliniMACS Prodigy is intended for use in the electromagnetic environment specified below. The customer or the user of the instrument should assure that it is used in such an environment. | |
| **Emissions test** | **Compliance** |
| RF Emissions<br>CISPR 11/32 | Group 1 |
| RF Emissions<br>CISPR 11/32 | Class A |
| Harmonic emissions<br>IEC 61000-3-2 | Class A |
| Voltage fluctuations/Flicker emissions<br>IEC 61000-3-3 | Complies |

Table A.1: Guidance and manufacturer's declaration – Electromagnetic emissions

**⚠ WARNING**

**Use of this instrument adjacent to or stacked with other equipment should be avoided because it could result in improper operation. If such use is necessary, this equipment and the other equipment should be observed to verify that they are operating normally.**

Based on technical limitations of the internal power supply voltage, interruptions on power supply input lines for longer than 10 ms may lead to cessation of the separation process (power failure). The separation process cannot be resumed after a power failure. It is recommended that the instrument is powered from an uninterruptible power supply or a battery that starts within 10 ms.

# Guidance and manufacturer's declaration – Electromagnetic immunity

The CliniMACS Prodigy is intended for use in the electromagnetic environment specified below. The customer or the user of the instrument should assure that it is used in such an environment.

| Immunity test | IEC 60601 test level | Compliance level |
|---|---|---|
| **Electrostatic discharge (ESD)** IEC 61000-4-2 | ±8 kV contact discharge<br>±2 kV, ±4 kV, ±8 kV, ±15 kV air discharge | ±8 kV contact discharge<br>±2 kV, ±4 kV, ±8 kV, ±15 kV air discharge |
| **Electrical fast transients (Bursts)** IEC 61000-4-4 | ±2 kV 100 kHz repetition frequency<br>Power supply lines<br>±1 kV 100 kHz repetition frequency<br>Input/output lines | ±2 kV 100 kHz repetition frequency<br>Power supply lines<br>±1 kV 100 kHz repetition frequency<br>Input/output lines |
| **Surges** IEC 61000-4-5 | ±0.5 kV, ±1 kV line to line<br>±0.5 kV, ±1 kV, ±2 kV line to ground | ±0.5 kV, ±1 kV line to line<br>±0.5 kV, ±1 kV, ±2 kV line to ground |
| **Voltage dips, interruptions and variations** IEC 61000-4-11 | 0% UT during 0.5 cycle<br>at 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°<br>0% UT during 1 cycle and 70% UT during 25/30 cycles (single phase) at 0°<br>0% UT during 250/300 cycle | 0% UT during 0.5 cycle<br>at 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°<br>0% UT during 1 cycle and 70% UT during 25/30 cycles (single phase) at 0° |
| **Rated power frequency magnetic field** IEC 61000-4-8 | 30 A/m 50 Hz or 60 Hz | 30 A/m 50 Hz or 60 Hz |
| **Conducted disturbances induced by RF fields** IEC 61000-4-6 | 3 V (0.15 MHz to 80 MHz)<br>6 V in ISM bands between 0.15 MHz and 80 MHz 80% AM @ 1 kHz | 3 V (0.15 MHz to 80 MHz)<br>6 V in ISM bands between 0.15 MHz and 80 MHz 80% AM at 1 kHz |
| **Radiated RF EM fields** IEC 61000-4-3 | 3 V/m (80 MHz–2.7 GHz) 80% AM @ 1 kHz | 3 V/m (80 MHz–2.7 GHz) 80% AM @ 1 kHz |
| **Proximity fields from RF wireless communication equipment** IEC 61000-4-3 | See Table A.3: Specifications for immunity to RF wireless communication equipment | See Table A.3: Specifications for immunity to RF wireless communication equipment |
| **Proximity magnetic fields in the frequency range from 9 kHz to 13.56 MHz** IEC 61000-4-39 | See Table A.4: Specification for immunity to proximity magnetic fields in the frequency range from 9 kHz to 13.56 MHz | See Table A.4: Specification for immunity to proximity magnetic fields in the frequency range from9 kHz to 13.56 MHz |

Table A.2: Guidance and manufacturer's declaration – Electromagnetic immunity

# Guidance and manufacturer's declaration – Electromagnetic immunity to RF wireless communication equipment

| Test frequency (MHz) | Band (MHz) | Service | Modulation | Immunity Test Level (V/m) | Compliance Level (V/m) |
|---|---|---|---|---|---|
| 385 | 380 – 390 | TETRA 400 | Pulse modulation 18 Hz | 27 | 27 |
| 450 | 430 – 470 | GMR S460, FRS 460 | FM ±5 kHz deviation 1 kHz sine | 28 | 28 |
| 710<br>745<br>780 | 704 – 787 | LTE Band 13, 17 | Pulse modulation 217 Hz | 9 | 9 |
| 810<br><br>870<br>930 | 800 – 960 | GSM 800/900, TETRA 800, iDEN 820, CDMA 850, LTE Band 5 | Pulse<br><br>modulation 18 Hz | 28 | 28 |
| 1720<br>1845<br>1970 | 1700 – 1990 | GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS | Pulse modulation 217 Hz | 28 | 28 |
| 2450 | 2400 – 2570 | Bluetooth, WLAN, 802.11 b/g/n, RFID 2450, LTE Band 7 | Pulse modulation 217 Hz | 28 | 28 |
| 5240<br>5500<br>5785 | 5100 – 5800 | WLAN 802.11 a/n | Pulse modulation 217 Hz | 9 | 9 |

Table A.3: Guidance and manufacturer's declaration – Electromagnetic immunity to RF wireless communication equipment

## Guidance and manufacturer's declaration – Electromagnetic immunity to proximity magnetic fields in the frequency range 9 kHz to 13.56 MHz

| Test frequency | Modulation | Immunity test level (A/m) | Compliance level (A/m) |
|---|---|---|---|
| 134.2 kHz | Pulse modulation<br>2.1 kHz | 65 | 65 |
| 13.56 MHz | Pulse modulation<br>50 kHz | 7.5 | 7.5 |

Table A.4: Guidance and manufacturer's declaration – Electromagnetic immunity to proximity magnetic fields in the frequency range 9 kHz to 13.56 MHz

**⚠ WARNING**

**Degradation of the performance of this equipment. Degradation of the performance of this equipment if portable RF communications equipment is used in close proximity to any part of the instrument. Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the instrument, including cables specified by the manufacturer.**

# NOTES



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