Quantoom Biosciences

YOUR FULL-STACK RNA PARTNER

Ntensify® micro

USER MANUAL



96-well



20 mL

REFERENCE	VERSION	LANGUAGE	SITE
UQTMP009A	5.0	English	Nivelles, Belgium

PROPRIETARY AND CONFIDENTIAL

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1. General information

Company business name	Quantoom Biosciences
Address	Rue de la Maîtrise 11, 1400 Nivelles, Belgium
Machinery designation	**Ntensify® micro** (UQTMP009A)
Customer service	customer.service@quantoom.com
Complaints	complaint@quantoom.com
Website	https://quantoom.com

The identification number of the **Ntensify® micro** is located at the back of the equipment.

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Please note that the images presented in this manual are not contractually binding on us.

Quantoom Biosciences

2. Process overview

The **Ntensify®** product line enables seamless scalability from early drug discovery to very large RNA commercial production. The process allows seamless transition from small-scale R&D to large-scale GMP, ensuring consistent quality throughout. The **Ntensify® micro** is optimized for IVT with one-step purification, with well documented process performances (2000+ experiments, 100+ constructs). The **Ntensify®** product line is a construct-agnostic process, scalable from µg to multi-g scale, with ready-to-use mixes of reagents and GMP-ready for future clinical applications.

In addition, **Ntensify® micro** is a springboard to **Ntensify®** midi (up to 20 mL) with a capacity of construct screening from 1 to 96 (as of 100 µL), and process settings can be tweaked.

2.1. Standard function

The **Ntensify® micro** is a compact platform designed to streamline and standardize the **Ntensify®** process at micro and midi scale. Built for flexibility and ease of use, it enables users to perform high-quality RNA with minimal hands-on time and maximal reproducibility.

The system integrates key process steps — mixing, heating, and magnetic bead separation — into a single workflow, reducing the need for manual intervention and minimizing variability. It is optimized to work with Quantoom's R&D reagents kit, ensuring consistency across runs and scalability with other systems.

2.2. List of required material

The **Ntensify®** R&D Kit is an all-in-one solution containing pre-mixed ready-to-use reagents for the **Ntensify®** process, enabling the production of up to 100 mg of saRNA and mRNA. It is designed for seamless integration, and the kit leverages the same raw material as our GMP kit, supporting future clinical applications and ensuring process validation for reliable and reproducible results.

Depending on the chosen 96-well plate or 20 mL reaction format, **Ntensify® micro** will require the same reagent R&D kit but different disposables.

2.3. saRNA and mRNA modes

Two reaction formats are available for mRNA or saRNA production:

- The **96-well plate reaction format** is particularly well-suited to screening, design of experiments (DoE), process development and small-scale saRNA and mRNA production.
- The **20 mL reaction format** offers a unique balance between scalability and resource efficiency. Built on a dedicated reactor designed to scale directly to the **Ntensify®** midi, it enables users to generate data that is highly translatable to GMP manufacturing.

In the 96-well reaction, only pre-defined processes are available. The 20 mL reaction format offers both pre-defined and customizable processes.

2.3.1. saRNA and mRNA Ntensify® processes 96-well

In the 96-well mode, the processes are fully pre-optimized by Quantoom. All steps and key parameters are pre-set and cannot be modified by the user. The **Ntensify®** process steps and parameters are shown in Figure 1.

2.3.2. saRNA and mRNA Ntensify® processes 20 mL

In the 20 mL mode, the processes are fully pre-optimized by Quantoom. All steps and key parameters are pre-set and cannot be modified by the user. The **Ntensify®** process steps and parameters are shown in Figure 1.

2.3.3. saRNA and mRNA Ntensify® customized processes 20 mL

In the 20 mL Customized mode, the processes follow the step sequence developed by Quantoom, but key parameters — shaking speed, temperature and incubation time — can be adjusted by the operator within limits defined by Quantoom. This applies to steps such as premix, IVT, DNase treatment and quenching incubations. The step sequence itself cannot be modified.

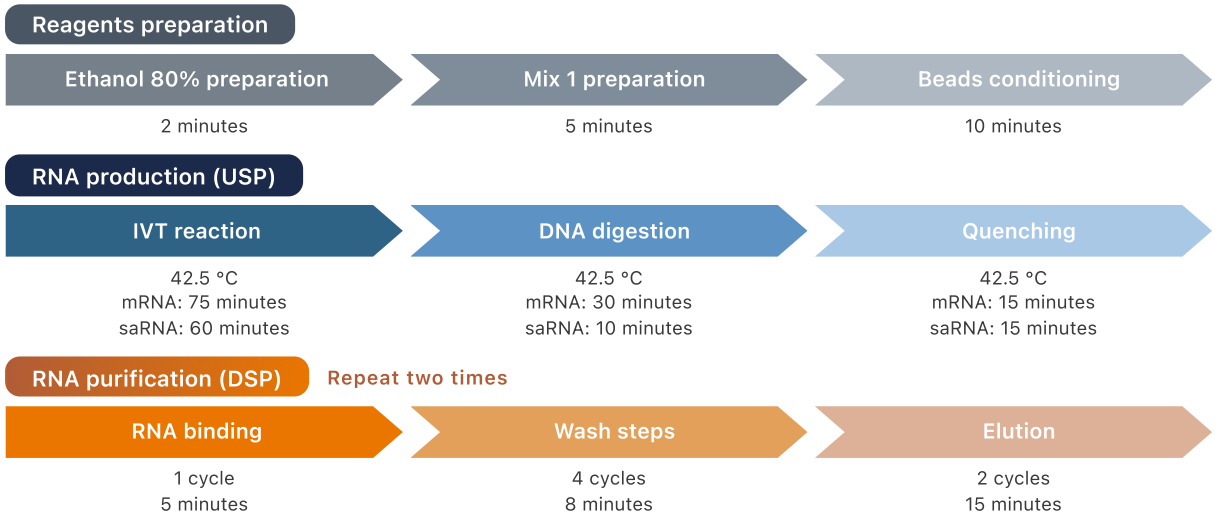


Figure 1 — **Ntensify®** process integrated into the **Ntensify® micro**

2.4. Manual mode

The manual mode does not follow any specific sequence. Key parameters such as shaking speed, temperature and time can be set by the operator within a limit defined by Quantoom.

This manual mode is available with 20 mL as well as 96-well reaction formats (i.e. in 50 mL tube and in 96-well DSP plate).

MODE	PARAMETERS EDITABLE	STEPS EDITABLE
Ntensify® process	None — all parameters locked	None — all steps predefined
Ntensify® Customized process	Temperature, incubation time, agitation speed	None — all steps predefined
Manual mode	Temperature, incubation time, agitation speed	Fully editable, no fixed sequence

Table 1 — Summary of available modes

3. Reagents and disposables

All the reagents that are required to synthesize a purified saRNA and mRNA from linear DNA are available as ready-to-install mixes. They are manufactured to enable the implementation of an optimal RNA production process within the **Ntensify® micro**.

3.1. Provided reagents

MIX ID MRNA	MIX ID SARNA	REAGENT	DESCRIPTION	STORAGE
Adenine	Adenine	Nucleotides	Natural adenine and modified adenine	–20 °C
Cytosine	Cytosine	Nucleotides	Natural cytosine and modified cytosine	–20 °C
Guanine	Guanine	Nucleotides	Natural guanine and modified guanine	–20 °C
Uridine	Uridine	Nucleotides	Natural uridine and modified uridine	–20 °C
Cap Reagent	Cap Reagent	Cap analog	Cap analog used for co-transcriptional capping	–20 °C
Mix 2	Mix 2b	Enzymes	Mix of enzymes designed for RNA polymerization while preventing the formation of contaminants	–20 °C
Mix 3	Mix 3b	Buffer	Buffer specifically designed to allow the RNA polymerase and other enzymes to work at maximal capacity while preventing the formation of contaminants	–20 °C
Mix 4	Mix 4b	DNA removal	Enzymatic preparation designed for the removal of DNA after the IVT reaction	–20 °C
Mix 5	Mix 5b	Quenching mix	Mix designed for the chemical quenching of the enzymatic reactions before purification	RT

MIX ID MRNA	MIX ID SARNA	REAGENT	DESCRIPTION	STORAGE
Mix 6	Mix 6b	Purification mix	Mix of silica beads used in the purification step. The concentrations and quality criteria are designed to combine maximal performance and minimal waste generation	RT
Mix BB	Mix BBsa	Binding buffer	Buffer for beads conditioning (Mix 6) before their application in the **Ntensify®** process	RT
Ethanol	Ethanol	Ethanol	Ethanol stock used for the binding and washing steps during the purification of the RNA	RT
WFI	WFI	Water	Water stock used throughout the entire process	RT

Table 2 — **Ntensify® micro** reagents kit

N.B. The linear DNA template is supplied by the client and must be diluted to 0.5 mg/mL for mRNA and 0.25 mg/mL for saRNA.

3.2. Self-sourced disposables and material

Ntensify® micro requires a list of off-the-shelf, commercially available single-use disposables that are not provided, as well as some standard laboratory equipment.

NAME	REFERENCE	SUPPLIER	QTY
Nunc™ 96-Well Polypropylene DeepWell™ Sample Processing & Storage Plates with Shared-Wall Technology	260252	ThermoFisher	3
Eppendorf PCR Film	30127781	Eppendorf	4
100 µL Disposable Tips — non-filtered, pure, single stack	30038611	Tecan	1
ep Dualfilter T.I.P.S.® PCR clean and sterile, 0.1–10 µL M, 40 mm, medium gray, colorless tips	30078519	Eppendorf	1
Eppendorf Research® plus 8-channel, 0.5–10 µL, medium gray, variable volume	3125000010	Eppendorf	2
ep Dualfilter T.I.P.S.® PCR clean and sterile, 2–100 µL, 53 mm, yellow, colorless tips	30078543	Eppendorf	8
Eppendorf Research® plus 8-channel, 10–100 µL, yellow, variable volume	3125000036	Eppendorf	1
Eppendorf Research® plus 8-channel, 30–300 µL, orange, variable volume	3125000052	Eppendorf	1
ep Dualfilter T.I.P.S.® PCR clean and sterile, 20–300 µL, 55 mm, orange, colorless tips	30078560	Eppendorf	13
Eppendorf® Centrifuge 5430	22620584	Eppendorf	1
Rotor A-2-MTP	22654403	Eppendorf	1
10 mL Reservoir Base, 10 bases per case	4306	Integra Biosciences	1
10 mL Disposable Reservoirs, 30 individually sealed, sterile, polystyrene, SureFlo™ anti-sealing array	4371	Integra Biosciences	1
50 mL Centrifuge Tube with flat cap, sterile, individually wrapped	BCT-50-S-IW	Accumax	1
Easypet® 3	4430000018	Eppendorf	1
Eppendorf Serological Pipets, sterile, pyrogen-, DNase-, RNase-, human and bacterial DNA-free, non-cytotoxic, 10 mL, orange	30127722	Eppendorf	2
Eppendorf Serological Pipets, sterile, pyrogen-, DNase-, RNase-, human and bacterial DNA-free, non-cytotoxic, 25 mL, red	30127730	Eppendorf	2

Table 3 — Minimum required disposables and material for 96-well

NAME	REFERENCE	SUPPLIER	QTY
50 mL Centrifuge Tube with flat cap, sterile, individually wrapped	BCT-50-S-IW	Accumax	2
ep Dualfilter T.I.P.S.® PCR clean and sterile, 50–1,000 µL, 76 mm, blue, colorless tips	30078578	Eppendorf	1
Eppendorf Research® plus 1-channel, 100–1,000 µL, blue, variable volume	3123000063	Tecan	1
Eppendorf Serological Pipets, sterile, pyrogen-, DNase-, RNase-, human and bacterial DNA-free, non-cytotoxic, 5 mL, blue	30127714	Eppendorf	1
Eppendorf Serological Pipets, sterile, pyrogen-, DNase-, RNase-, human and bacterial DNA-free, non-cytotoxic, 25 mL, red	30127730	Eppendorf	4
Eppendorf Serological Pipets, sterile, pyrogen-, DNase-, RNase-, human and bacterial DNA-free, non-cytotoxic, 50 mL, violet	30127749	Eppendorf	2
Eppendorf Serological Pipets, sterile, pyrogen-, DNase-, RNase-, human and bacterial DNA-free, non-cytotoxic, 10 mL, orange	30127722	Eppendorf	8
Easypet® 3	4430000018	Eppendorf	1
Nalgene PETG Biotainer Bottle 125 mL	3025-42	Thermo Fisher Scientific	1

Table 4 — Minimum required disposables and materials for 20 mL configuration

N.B. The **Ntensify® micro** system is intended for use in a standard research and development (R&D) laboratory environment and requires commonly available laboratory equipment for routine operation.

4. Equipment overview

4.1. Standard function

The **Ntensify® micro** is a compact platform designed to streamline and standardize the **Ntensify®** process at micro and midi scale. Built for flexibility and ease of use, it enables users to perform high-quality RNA with minimal hands-on time and maximal reproducibility.

The system integrates key process steps — mixing, heating, and magnetic bead separation — into a single workflow, reducing the need for manual intervention and minimizing variability. It is optimized to work with Quantoom's R&D reagents kit, ensuring consistency across runs and scalability with other systems.

4.2. Technical data

POWER AND DATA SPECIFICATION	UNIT	VALUE
OPTIMAL CONDITIONS FOR USE		
Temperatures	°C	20 to 25
Humidity	% HR	20 to 80
Protection level	IP	IP 54 design
EXTERNAL INFLUENCING FACTORS		
Parameters	—	AA5 AD1 AE1 AF3 AG2 AH3 AK1 AL1 AM1 AN2 BA4 BB1 BC2 BD1 BE4 CA1 CB1
Materials of construction — casing	—	Stainless steel painted
DIMENSIONS		
Footprint (W × D × H)	cm	38 × 32 × 21
Weight (without accessories)	kg	~15
POWER SUPPLY		
Electrical supply	Vac	110–230
Voltage range	Vac	±10%
Rated frequency	Hz	50 or 60
Frequency range	Hz	±10%
Maximum power	W	180

Table 5 — Equipment technical data

4.3. Connecting cable and power supply

ELECTRICAL SUPPLY	VALUE
230 VAC	50 Hz
110 VAC	60 Hz

Table 6 — Electrical specifications of the equipment

Depending on the country, the appropriate plug must be connected to the IEC connector located at the back of the equipment.

N.B. It is strongly recommended to connect the equipment after a residual current circuit breaker.

4.4. Buttons

ID	NAME	FUNCTIONALITY
1	Main supply	Turns the system ON/OFF. Acts as an emergency button
2	Operating button	The light turns ON to invite the operator to press it to switch to the next process step

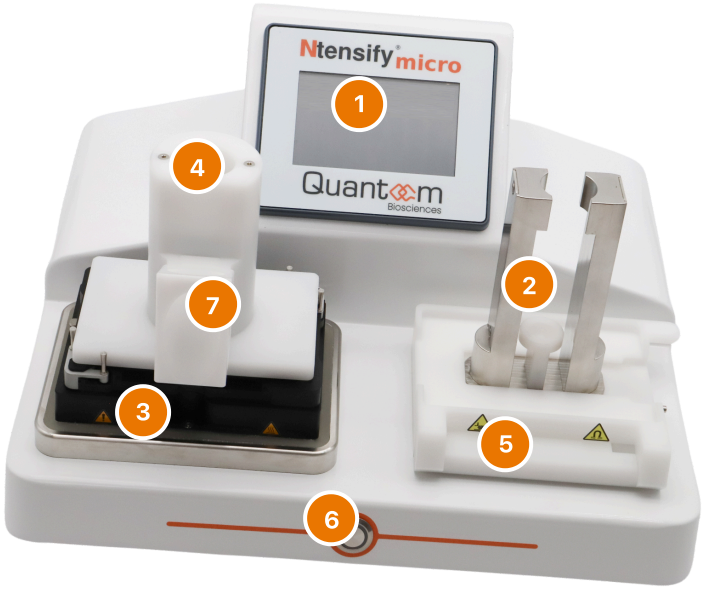
Table 7 — Functionalities of the buttons of the equipment

4.5. Equipment basic technical description



1. HMI
2. 96-well IVT accessory
3. Thermo-shaker
4. 96-well magnetization accessory
5. Inclination system
6. Operation button

Figure 2 — Ntensify® micro 96-well configuration



1. HMI
2. 20 mL magnetization accessory
3. Thermo-shaker
4. 20 mL IVT accessory
5. Inclination system
6. Operation button
7. Angular agitating adaptor

Figure 3 — Ntensify® micro 20 mL configuration



1. Resettable circuit breaker
2. Plug connector
3. ON/OFF button
4. CE sticker
5. Ethernet connector
6. USB connector

Figure 4 — Ntensify® micro back view

- The ON/OFF operation button is lit when the button is functional and can be used for progressing in the process.
- The thermo-shaker module has 2 functionalities: 3 mm orbital shaking and heating.
- The heating control is foreseen for a SP range from 25.0 °C to 55.0 °C. It is strongly recommended to keep the room temperature of the BSC in the range 20.0 ± 1.0 °C.
- In the 20 mL configuration, the shaking feature is foreseen for a range from 200 to 1000 rpm.
- In the 96-well configuration, the shaking feature is foreseen for a range from 200 to 1700 rpm.
- All **Ntensify®** process steps can be observed on the HMI. The front button is foreseen to pass to the next step without accessing the HMI.
- The inclination system is foreseen to ease pipetting operations during the DSP phase.

4.6. Security advice

Internal safety rules and supplier recommendations must be respected when using cleaning or decontamination products.

We recommend wearing PPE, e.g. gloves, laboratory coat, hair and beard net.

4.7. Equipment accessories

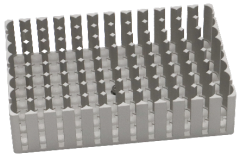
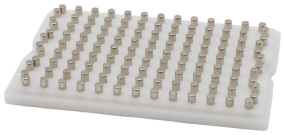
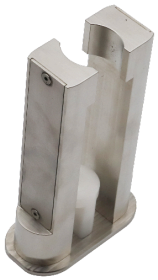
NAME	PHASE	CONFIGURATION	PICTURE
96-well IVT accessory	USP	96	
96-well magnetization accessory	DSP	96	
20 mL IVT accessory	USP	96 & 20 mL	
20 mL magnetization accessory	DSP	20 mL	
Angular agitating adaptor	DSP	96 & 20 mL	

Table 8 — Equipment accessories

As shown below, the IVT accessories must be screwed on the thermo-shaker using the central screw and the screwdriver foreseen.

N.B. Always make sure the accessory is properly screwed.



Figure 5 — 20 mL IVT accessory assembly



Figure 6 — 96-well IVT accessory assembly

The DSP accessories must be slid in their own slot.

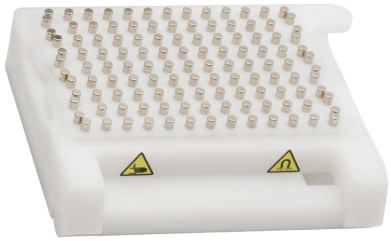


Figure 7 — 96-well magnetization accessory assembly

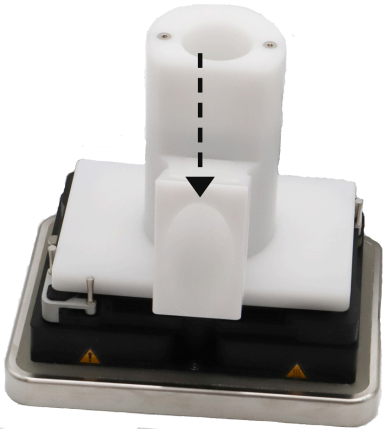


Figure 8 — 20 mL magnetization accessory assembly



Figure 9 — Angular adaptor assembly

4.8. Recommendations for waste disposal after production run

Handling, decontamination, and elimination of waste and contaminated material must be in accordance with the applicable internal SOP, local and national regulations, directives, and laws.

5. Launching a production

N.B. The equipment must be placed on its 4 feet on a flat surface, for example a bench, for vibrations and stability reasons. It is strongly recommended to operate the equipment inside a Biological Safety Cabinet (BSC).

The **Ntensify® micro** integrated software is designed for maximum usability and guidance, ensuring a seamless and error-free workflow. Its intuitive interface and step-by-step navigation provide clear instructions at every stage.

- **User-friendly and intuitive** — no technical expertise required, easy to operate.
- **Step-by-step guidance** — each action is clearly defined before proceeding.
- **Error-proof process** — eliminates mistakes and omissions by ensuring all steps are completed.
- **Real-time progress tracking** — indicates the current step and the next action to take.
- **No margin for error or oversight** — the system prevents incorrect or skipped actions.

The operator has access to the main menu to name the protocol, add additional details and start the production.

The following screenshots will recap how to launch a production on **Ntensify® micro** depending on the mode, reaction formats and process chosen by the operator.



Figure 10 — Start screen of Ntensify® micro for selecting the process

5.1. Preparation before the run

The process must be carried out under clean conditions:

- The **Ntensify® micro** is placed under laminar airflow.
- All working surfaces are cleaned with RNase decontamination reagent and 70% IPA (refer to section 6, Cleaning recommendations).
- Materials and consumables are cleaned before being introduced into the laminar airflow, and are opened only under the airflow.
- The reagents are removed from the freezer and thawed at room temperature. Enzyme mixes (Mix 2 and Mix 4) are left in the freezer until use (no thawing required). The mix tubes and bottles are opened only under the laminar airflow and handled under aseptic conditions.

5.2. Modes available

Ntensify® micro offers three modes:

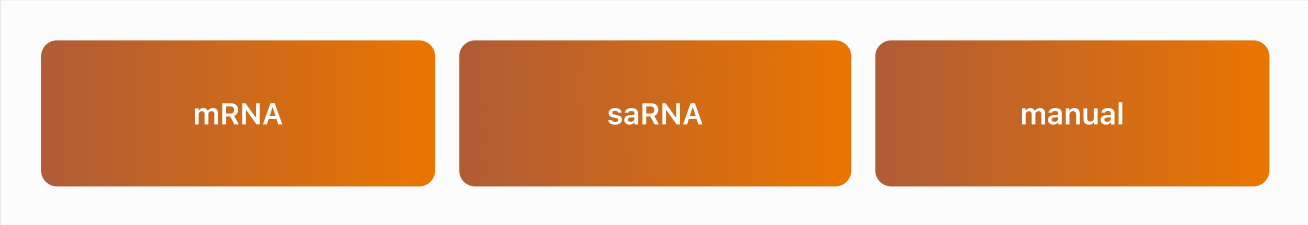


Figure 11 — Mode selection interface

By selecting mRNA, saRNA or manual mode, two reaction formats, 96-well or 20 mL, are available:

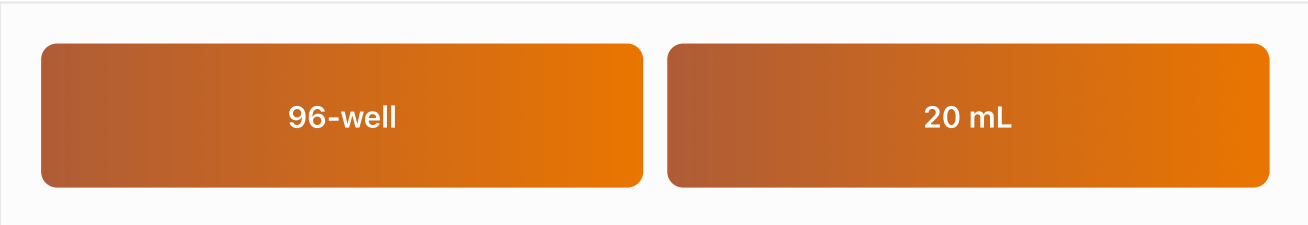


Figure 12 — Reaction formats selection interface

5.3. mRNA and saRNA modes

5.3.1. Processes available in 96-well

As a reminder, for the 96-well process, the recommended disposable to use is the Nunc™ 96-Well Polypropylene DeepWell™ Sample Processing & Storage Plates with Shared-Wall Technology from ThermoFisher, reference 260252.

In the 96-well reaction format, the following menu displays one process per mode: mRNA 96-well and saRNA 96-well.

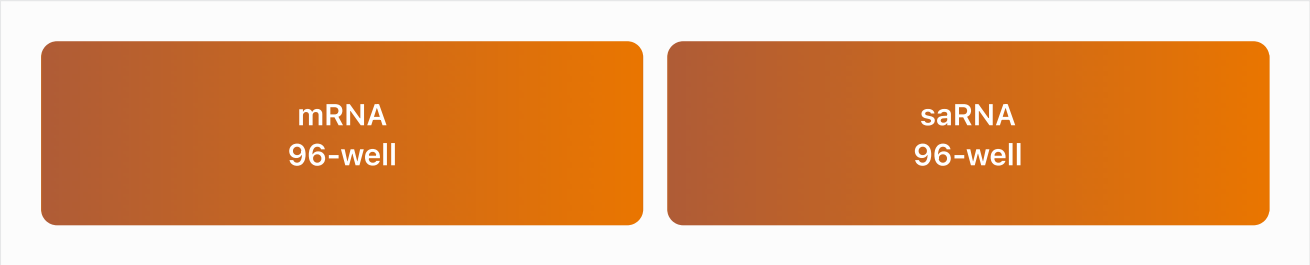


Figure 13 — Processes selection interface (96-well)

The processes are fully pre-optimized by Quantoom. All steps and key parameters are pre-set and cannot be modified by the operator. The process is fully automated.

Once a process is started, the operator can follow the predefined steps. At each step the operator can view the status and parameters of the step (see Figure 14); between steps, when the operator must execute actions for pursuing the process, a message giving the recommendation appears (see Figure 15, as example).



Figure 14 — Screen during automatic mode



Figure 15 — Initiation of the procedure message

From start-up to the end of the run, the operator is guided by on-screen messages.

5.3.2. Processes available in 20 mL

As a reminder, for the 20 mL process, the recommended disposable to use is the 50 mL Centrifuge Tube with flat cap, sterile, individually wrapped from Accumax, reference BCT-50-S-IW.

In the 20 mL reaction format, the following menu offers two options per mode: mRNA 20 mL, mRNA 20 mL Customized **Ntensify®** process, saRNA 20 mL, and saRNA 20 mL Customized **Ntensify®** process.



Figure 16 — Processes selection interface (20 mL)

The mRNA 20 mL and saRNA 20 mL processes are fully pre-optimized by Quantoom. All steps and key parameters are pre-set and cannot be modified by the operator. The process is fully automated.

Once a process is started, the operator can follow the predefined steps. At each step the operator can view the status and parameters of the step (see Figure 17); between steps, when the operator must execute actions for pursuing the process, a message giving the recommendation appears (see Figure 18, as example).



Figure 17 — Screen during automatic mode



Figure 18 — Initiation of the procedure message

The saRNA and mRNA Customized **Ntensify®** processes for 20 mL follow the **Ntensify®** process steps established by Quantoom. In this mode, while the overall workflow is fixed and cannot be altered, operators can adjust key parameters — such as shaking speed, temperature, and duration — within predefined limits set by Quantoom at specific key process steps, including premix, IVT, DNase and quenching incubations (see Table 20 — Parameters limits 20 mL configuration, and Figures 19 to 22). Each sequence can be differently and independently configured. Once the setpoints are chosen and recorded, the process can be started, and the operator is guided throughout the entire process.

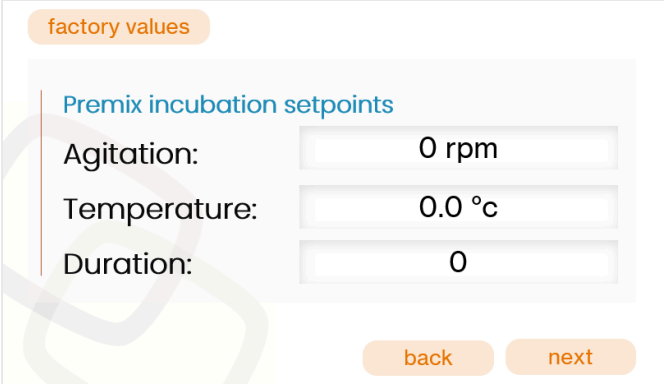


Figure 19 — Configuration of premix incubation setpoints

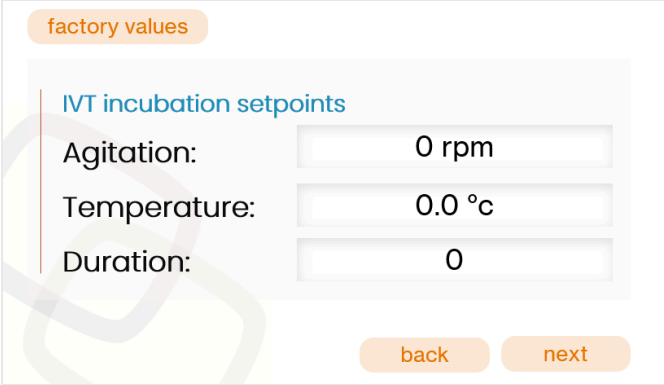


Figure 20 — Configuration of IVT incubation setpoints

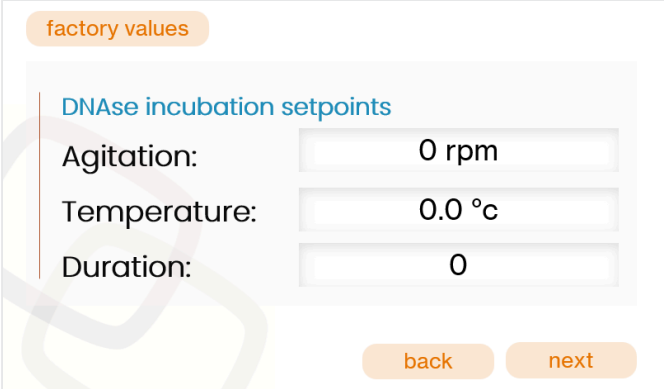


Figure 21 — Configuration of DNase incubation setpoints

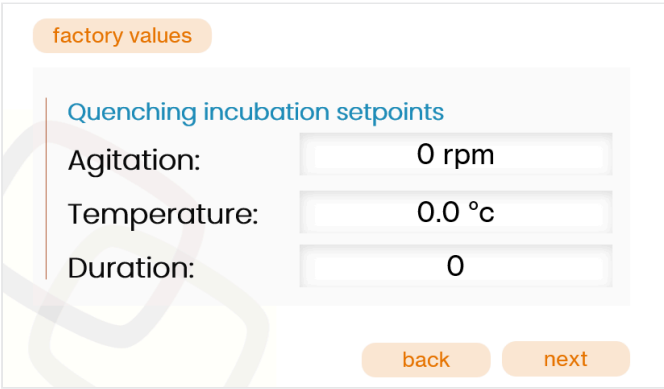


Figure 22 — Configuration of quenching incubation setpoints

5.4. Manual mode

5.4.1. Manual mode 96-well and 20 mL

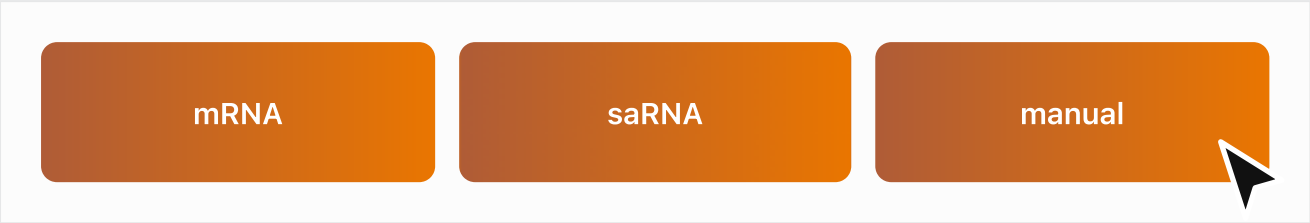


Figure 23 — Manual mode

The manual mode does not adhere to a predefined sequence. Operators have the flexibility to set key parameters such as shaking speed, temperature, and time within the limits specified by Quantoom. As per saRNA and mRNA modes, 2 reaction formats are available (see Figure 12).

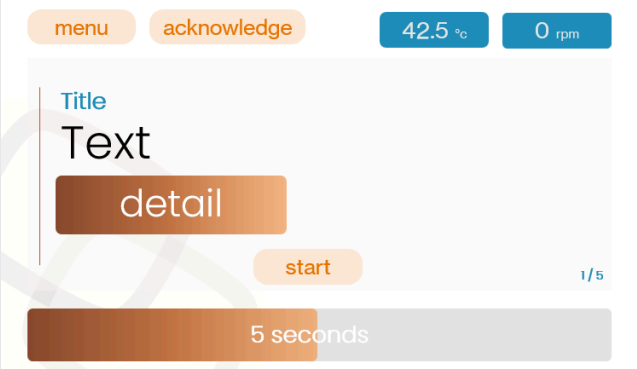
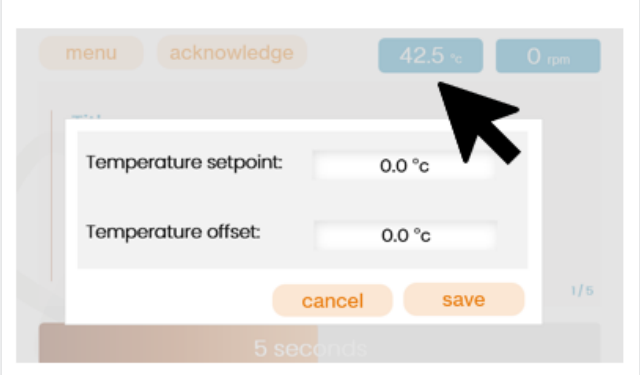


Figure 24 — Screen of the manual mode



Temperature setpoint and offset pop-up, opened from the blue icons

By touching the blue icons, the screen allows heating and shaking modification.

5.5. Settings

The **Ntensify® micro** settings can be accessed by tapping the menu icon, then selecting Settings. On the next screen displayed, the buzzer can be enabled or muted.

A virtual button can be enabled, meaning that an icon (acknowledge) will appear on the screens during the processes and can be used rather than the operation button (see picture 3) for progressing in the processes.

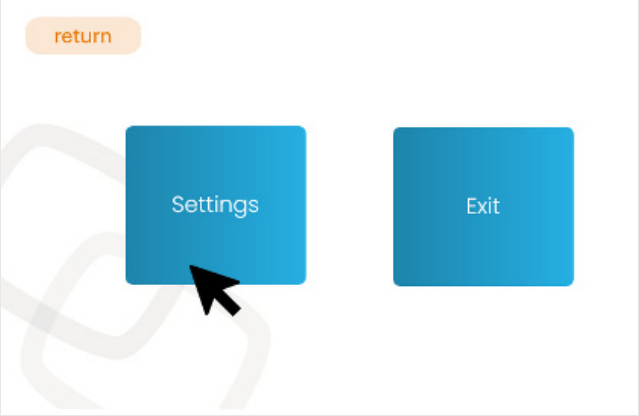


Figure 25 — Settings procedure interface

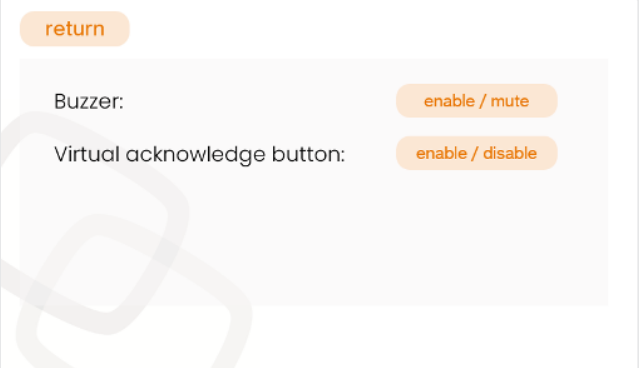


Figure 26 — Alarm management interface

5.6. How to stop a running procedure

The **Ntensify® micro** process can be stopped following these instructions: select the menu icon (Figure 25 - Settings procedure interface). Select exit and confirm stopping the process. In this case the process is definitively stopped (cannot be relaunched).

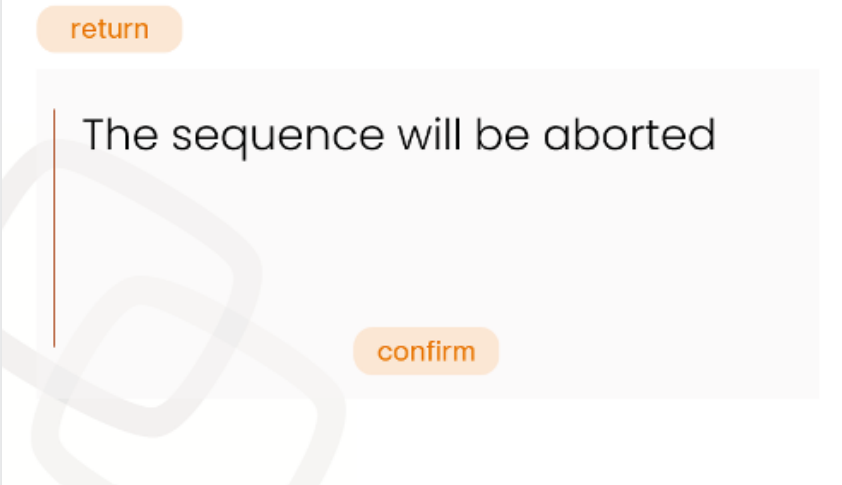


Figure 27 — Procedure interruption confirmation prompt

6. Cleaning recommendations

6.1. General recommendations

- Do not spray cleaning product directly onto the equipment; pre-wet the wipes and clean the surface with them.
- Always use lint-free wipes.

6.2. Cleaning procedure

1. Switch on the laminar airflow.
2. Pre-wet a lint-free wipe with RNase decontamination reagent.
3. Wipe all working surfaces.
4. Pre-wet a new lint-free wipe with 70% IPA.
5. Wipe all working surfaces.
6. Proceed in the same manner with the **Ntensify® micro** equipment and its accessories.
7. Place the **Ntensify® micro** equipment and its accessories inside the laminar airflow.

7. Safety notice

7.1. General safety information

This equipment must be operated as described in this manual. The user manual is intended for trained staff only. To operate this system, the staff must be trained.

The following instructions and explanations must be followed during the installation, the commissioning of the components, and the use of the equipment. The staff responsible must ensure that the application or use of the equipment satisfies all the requirements for safety, including all the relevant laws, regulations, guidelines, and standards.

Please refer to **Quantoom Biosciences**' catalog for more information regarding both consumables and reagents.

OPERATOR / OWNER	• The operator knows how to use the system and its associated process. The operator is aware of the potential dangers while using the system and can prevent them from happening and can operate the equipment, follow recipes, and view alarm alerts (but does not have access to the alarm menu). • The operator has been trained on this system. • The operator is aware of the potential dangers while using the system and can prevent them from happening and can operate the equipment, follow and modify recipes. • The system owner is accountable for providing the training covering Health and Safety rules to follow.

Table 9 — Capacities on **Ntensify® micro**

7.2. Disclaimer

The documentation has been prepared with care. If it contains technical or editorial errors, we retain the right to make alterations at any time and without warning.

Due to ongoing product development, the illustrations shown are provided as examples only and are not contractually binding. Actual consumables, reagents, and configurations may differ from those depicted.

7.3. General warnings

In case of dysfunction, immediately stop the system and request appropriately trained staff or **Quantoom Biosciences** servicing for advice or, if needed, repair.

When installing the equipment, customers based in the European Union (EU) must comply with local and European standards for the integration and use of work equipment. Outside the EU, they must comply with local standards and may be guided by these European directives.

And when using and/or dismantling equipment, customers based in the European Union (EU) must comply with local and European accident prevention and environmental protection standards. Outside the EU, they must comply with local accident prevention and environmental protection standards and may be guided by these European directives.

Follow the up-to-date safety information for operating this system and its accessories.

7.4. Equipment damage and misuse

This equipment must be operated as described in this manual. Any deviation from the instructions voids the warranty.

Please read the entire user manual before attempting to use this equipment. If operational guidelines are not followed, equipment damage and severe personal injuries can occur. **Quantoom Biosciences** declines responsibility when consumables and/or reagents used in the equipment are from another supplier than **Quantoom Biosciences**.

Do not use this equipment in a hazardous atmosphere or with hazardous materials for which the equipment was not designed. The manufacturer is not responsible for any damage to this equipment that may result from the use of an accessory that it did not manufacture and specify for this purpose.

All users on this system must be trained as described in the table in section 7.1, General safety information.

Only authorized **Quantoom Biosciences** staff with the appropriate tool can operate on the electrical panel due to electrical shock risks.

7.5. Alarms

The alarm list is available in Appendix 12.1.

7.6. Decommissioning

Do not discard the equipment or any spare part in the regular garbage. Please dismantle, scrap, and decommission it according to the local laws.

7.7. Transporting, assembling, installation, dismantling

For transportation, dismantling, and re-assembly, please contact **Quantoom Biosciences**. **Quantoom Biosciences** is responsible for the initial assembly. Afterwards, the responsibility is transferred to the equipment owner for dismantling, transporting, re-assembling, and adjusting.

Important. The owner must contact **Quantoom Biosciences** for the maintenance, including the preventive maintenance, and for protective measures. This also includes the replacement of fuses.

The **Ntensify® micro** equipment is light enough to be carried by two operators. The design of the casing allows the operators to lift it by the sides.

The equipment must be placed on its 4 feet on a flat surface, for example a bench, for vibrations and stability reasons.

It is recommended to place the system in a laminar flow during the processes, but not to place the systems in a corner, to optimize as much as possible the natural cooling of the systems.

7.8. Danger and personal injury hazards

SYMBOL	RISK DESCRIPTION	RISK ORIGIN
	Crushing of hands / danger of crush injuries	Hinge system
	Hot surface	Thermo-shaker
	General warning sign	Thermo-shaker
	Magnetic field	Magnetic accessories

Table 10 — Danger and personal injury hazards

7.9. Precautions for using reagents and cleaning products

The operator should be trained and aware of the risks before using the products listed below, by reading their associated MSDSs and wearing appropriate PPE. Using different products than those listed below might damage the equipment surfaces.

RECOMMENDED REAGENT AND PRODUCTS	ASSOCIATED RISKS
ETHANOL	 • Hazard statement(s) • H225 Highly flammable liquid and vapor. • H319 Causes serious eye irritation. • H351 Suspected of causing cancer if inhaled. • H371 May cause damage to organs (Eyes, Central nervous system). • Precautionary statement(s) • P202 Do not handle until all safety precautions have been read and understood. • P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. • P233 Keep container tightly closed. • P240 Ground and bond container and receiving equipment. • P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. • Remove contact lenses, if present and easy to do. Continue rinsing. • P308 + P311 IF exposed or concerned: Call a POISON CENTER/ doctor.
ISOPROPYL ALCOHOL (IPA) ™	 • Hazard statement(s) • H225 Highly flammable liquid and vapor. • H319 Causes serious eye irritation. • H336 May cause drowsiness or dizziness. • Precautionary statement(s) • P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. • P233 Keep container tightly closed. • P240 Ground and bond container and receiving equipment. • P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment. • P242 Use non-sparking tools. • P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. • Remove contact lenses, if present and easy to do. Continue rinsing.
RNASEZAP ™	• No physical or health hazards reported

Table 11 — Hazards and precautions associated with reagents and cleaning products

N.B. **Quantoom Biosciences** declines responsibility when other products than those specified in the above table are used to clean the equipment.

8. Troubleshooting guide

8.1. General

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Equipment does not start	Power cable disconnected, breaker tripped, power supply failure	Try again. Contact support if problem persists
HMI remains black	HMI communication failure, power issue	Restart equipment. Contact support if problem persists
Equipment starts but software cannot be loaded	Internal communication error	Restart equipment. Contact support if problem persists
Front button does not work	Cable disconnected	Restart equipment. Contact support if problem persists
Unable to select procedure	HMI communication failure	Restart equipment. Contact support if problem persists
Procedure stops unexpectedly	Alarm generated, power interruption, communication loss	Restart equipment. Contact support if problem persists

Table 12 — General troubleshooting

8.2. Temperature issues

SYMPTOM	POSSIBLE CAUSE	CHECKS TO PERFORM	CORRECTIVE ACTION	PRODUCT IMPACT
Temperature does not reach setpoint	Heater problem, thermo-shaker fault, poor thermal contact	Verify accessory installation and alarm list	Reinstall accessory and restart	Potential impact. Product quality not guaranteed
Temperature rises too slowly	Cold room, strong airflow, BSC operation, poor accessory contact	Check ambient conditions	Relocate equipment	Potential impact. Product quality not guaranteed
Temperature overshoots setpoint	Heater control instability	Verify recurrence	Contact support if recurring	Potential impact. Product quality not guaranteed
Temperature alarm HH generated	Sensor issue, heater malfunction	Verify current temperature	Stop run and contact support	Potential impact. Product quality not guaranteed

Table 13 — Temperature issues

8.3. Agitation issues

SYMPTOM	POSSIBLE CAUSE	CHECKS TO PERFORM	CORRECTIVE ACTION	PRODUCT IMPACT
No shaking observed	Shaker disabled, communication fault, drive failure	Verify shaker status	Restart equipment	Potential impact. Product quality not guaranteed
Agitation not reaching setpoint	Excessive load, accessory issue	Verify loaded consumables	Reduce load and restart	Potential impact. Product quality not guaranteed
Excessive vibration	Equipment not level, loose accessory, accessory/recipe mismatch	Check leveling feet, accessory fixation, accessory/recipe	Secure equipment	Potential impact. Product quality not guaranteed
Abnormal noise during shaking	Equipment not level, loose accessory, accessory/recipe mismatch	Check leveling feet, accessory fixation, accessory/recipe	Stop equipment and contact support	Potential impact. Product quality not guaranteed
Agitation HH alarm	Motor control fault	Verify shaker status	Stop equipment and contact support	Potential impact. Product quality not guaranteed

Table 14 — Agitation issues

8.4. Accessory installation

SYMPTOM	POSSIBLE CAUSE	CHECKS TO PERFORM	CORRECTIVE ACTION	PRODUCT IMPACT
Accessory difficult to install	Misalignment, debris on interface	Inspect mounting surfaces	Clean and reinstall	Potential impact. Product quality not guaranteed
Accessory moves during operation	Accessory not properly screwed	Verify screw and fixation	Reinstall accessory	Potential impact. Product quality not guaranteed
Poor heating performance	Incomplete thermal contact	Check contact surfaces	Reinstall accessory	Potential impact. Product quality not guaranteed

Table 15 — Accessory installation issues

8.5. Communication and automation

SYMPTOM	POSSIBLE CAUSE	CHECKS TO PERFORM	CORRECTIVE ACTION	PRODUCT IMPACT
Communication failure alarm	Loss of communication with BioShake	Verify status	Restart equipment	Potential impact. Product quality not guaranteed
Procedure freeze	Software communication timeout	Verify active alarms	Restart equipment	Potential impact. Product quality not guaranteed
Recipe execution interrupted	Internal communication issue	Verify status	Contact support	Potential impact. Product quality not guaranteed

Table 16 — Communication and automation issues

9. Maintenance

FREQUENCY	ACTION
Before each use	Verify that the equipment and installed accessory are clean and free from visible damage
After each use	Clean external surfaces and remove any remaining product residue or consumables
Monthly	Inspect cable, connectors, and accessories for signs of wear or damage
As required	Replace any damaged component before operating the equipment, by contacting Quantoom Biosciences

Table 17 — Maintenance table

Cleaning

- Switch off the equipment before performing any cleaning operation.
- Clean external surfaces using a soft cloth lightly dampened with a laboratory-approved cleaning agent.
- Do not use abrasive materials or aggressive solvents.
- Never immerse the equipment or its accessories in liquid.

Corrective maintenance

No internal maintenance or repairs shall be performed by the user. Contact us if any of the following conditions occur:

- Mechanical damage to the equipment or accessories.
- Abnormal noise or excessive vibration during operation.
- Recurrent alarms.
- Heating or shaking malfunction.
- Persistent abnormal operation that cannot be resolved through the troubleshooting guide.

10. Warranty

10.1. Limited warranty

Quantoom Biosciences warrants that the **Ntensify® micro** instrument shall be free from defects in materials and workmanship under normal use and service for a period specified in the sales agreement, starting from the date of installation or delivery, whichever occurs first.

During the warranty period, **Quantoom Biosciences** will, at its discretion:

- repair the defective product;
- replace defective components;
- replace the instrument with an equivalent product;
- provide technical support necessary to restore normal operation.

The warranty applies only when the instrument is operated according to:

- this user manual;
- the quick start guides;
- maintenance and cleaning recommendations;
- environmental specifications stated in this manual.

N.B. The equipment is covered by a 12-month warranty from the date of delivery.

10.2. What is covered

The warranty covers defects resulting from manufacturing defects. Examples:

- defective electronic components;
- defective mechanical assemblies;
- defective heating or shaking modules;
- software defects;
- software malfunction;
- unexpected system errors;
- failure of validated operating sequences.

10.3. What is not covered

The warranty does not apply to failures resulting from misuse, negligence or unauthorized modifications. Examples include:

Improper use

- operation outside specified environmental conditions;
- operation with incompatible accessories;
- use contrary to documented procedures.

Physical damage

- dropping the equipment;
- liquid intrusion caused by improper handling;
- mechanical damage during transportation by the customer.

Unauthorized intervention

- opening the instrument housing;
- modification of hardware or software;
- installation of non-approved replacement components.

10.4. Customer responsibilities

To maintain warranty coverage, users shall:

- follow operating instructions;
- perform routine cleaning procedures;
- maintain appropriate environmental conditions;
- promptly report recurring alarms or abnormal behavior;
- retain instrument serial number identification.

Failure to follow these recommendations may affect warranty eligibility.

10.5. Service and technical support

If the instrument displays recurring alarms or abnormal behavior:

1. Record the alarm message.
2. Record the instrument serial number.
3. Record the software version.
4. Describe the observed behavior.
5. Contact Quantoom technical support.

Providing this information will facilitate troubleshooting and reduce instrument downtime.

10.6. Shipment for service

If return of the instrument is required:

- the instrument must be cleaned and decontaminated before shipment;
- a decontamination declaration may be required;
- the customer is responsible for appropriate packaging unless otherwise agreed.

A contaminated instrument may be refused and returned to the sender.

10.7. Warranty void conditions

The warranty becomes void if:

- the instrument has been modified without written authorization;
- safety features have been bypassed;
- the serial number label has been removed or voluntarily altered;
- unauthorized repairs have been performed;
- the instrument has been used outside published specifications.

10.8. Expected service life

Under normal laboratory operating conditions and with appropriate maintenance, the **Ntensify® micro** equipment is designed for long-term operation.

Replacement of wear components and annual preventive servicing are recommended during the operational life of the instrument.

11. Abbreviations list

ABBREVIATION	MEANING
DSP	DownStream Processing
IVT	In Vitro Transcription
IPA	Isopropyl Alcohol
mRNA	messenger RiboNucleic Acid
saRNA	self-amplifying RiboNucleic Acid
N/A	Not Applicable
PPE	Personal Protective Equipment
RNA	RiboNucleic Acid
USP	UpStream Processing
BSC	BioSafety Cabinet
PID	Proportional – Integrative – Derivative
MV	Measured Value
SP	Setpoint

Table 18 — Abbreviations list

12. Appendix

12.1. Alarm list

ID	ALARM / WARNING	SEVERITY	DESCRIPTION	POSSIBLE CAUSES	AUTOMATIC MACHINE ACTION	USER ACTION	CAN PROCESS CONTINUE ?	PRODUCT IMPACT
1	Communication failure (heater / shaker)	Alarm	Communication with BioShake module lost for more than 5 seconds	Cable disconnected, module powered off, module failure, communication interruption	Run stopped	Check heater/shaker connection, restart run if required. Contact support if issue persists	No	Run invalid. Product quality not guaranteed
2	Generic heater / shaker failure	Alarm	BioShake reports an internal fault	Internal hardware fault, overheating, firmware issue	Run stopped	Restart equipment. Contact Quantoom support if alarm reappears	No	Run invalid. Product quality not guaranteed
3	Temperature High-High / Low-Low	Alarm	Measured temperature differs from setpoint by more than 2 °C for longer than 30 seconds before incubation	Heating control issue, wrong accessory installed, sensor failure, abnormal ambient conditions	Run continues. Pop-up to acknowledge	Verify accessory installation and environmental conditions	Yes	Run potentially impacted. Product quality not guaranteed
4	Temperature High / Low	Warning	Measured temperature differs from setpoint by more than 1 °C for longer than 30 seconds before incubation	Normal overshoot, heating instability, accessory thermal mismatch	No automatic action. Pop-up to acknowledge	Monitor system. No action required unless recurring	Yes	No expected impact
5	Agitation High-High / Low-Low	Alarm	Agitation speed differs from setpoint by more than 20% for longer than 30 seconds before incubation	Drive malfunction, control loop instability, shaker defect	Run continues. Pop-up to acknowledge	Verify accessory installation. Contact support if problem persists	Yes	Run potentially impacted. Product quality not guaranteed
6	IVT incubation timeout	Alarm	Expected step duration exceeded	Process interruption, software issue, operator intervention	Run paused. Pop-up to acknowledge	Acknowledge the pop-up. Either continue or not	Yes	Run potentially impacted. Product quality not guaranteed
7	DNase incubation timeout	Alarm	Expected step duration exceeded	Process interruption, software issue, communication issue	Run paused. Pop-up to acknowledge	Verify run status	Yes	Run potentially impacted. Product quality not guaranteed

Table 19 — Alarm list

12.2. Parameters limits

ID	NAME	INITIAL VALUE	MIN. VALUE	MAX. VALUE	UNIT
1	Temperature_Premix	42.5	25.0	55.0	°C
2	Temperature_IVT	42.5	25.0	55.0	°C
3	Temperature_DNase	42.5	25.0	55.0	°C
4	Temperature_Quenching	42.5	25.0	55.0	°C
5	Speed_incubation_Premix	400	0 / 200	600 (1000)*	rpm
6	Speed_incubation_IVT	400	0 / 200	600 (1000)*	rpm
7	Speed_incubation_DNase	400	0 / 200	600 (1000)*	rpm
8	Speed_incubation_Quenching	400	0 / 200	600 (1000)*	rpm
9	Duration_incubation_Premix	900	0	28800	second
10	Duration_incubation_IVT	4500	0	28800	second
11	Duration_incubation_DNase	1800	0	28800	second
12	Duration_incubation_Quenching	900	0	28800	second

Table 20 — Parameters limits 20 mL configuration

* Shaking speed above 600 rpm is limited in time. Speeds from 600 to 1000 rpm can only be set for incubation steps lasting 120 seconds (2 minutes) or less. For any incubation longer than 120 seconds, the shaking speed must remain between 0/200 and 600 rpm.

ID	NAME	INITIAL VALUE	MIN. VALUE	MAX. VALUE	UNIT
1	Temperature_IVT	42.5	25.0	55.0	°C
2	Temperature_DNase	42.5	25.0	55.0	°C
3	Temperature_Quenching	42.5	25.0	55.0	°C
4	Speed_incubation_IVT	800	200	1700	rpm
5	Speed_incubation_DNase	800	200	1700	rpm
6	Speed_incubation_Quenching	800	200	1700	rpm
7	Duration_incubation_IVT	4500	0	28800	second
8	Duration_incubation_DNase	1800	0	28800	second
9	Duration_incubation_Quenching	900	0	28800	second
10	Duration_cooling	1200	0	28800	second

Table 21 — Parameters limits 96-well configuration

Notes

Notes



Quantoom Biosciences

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