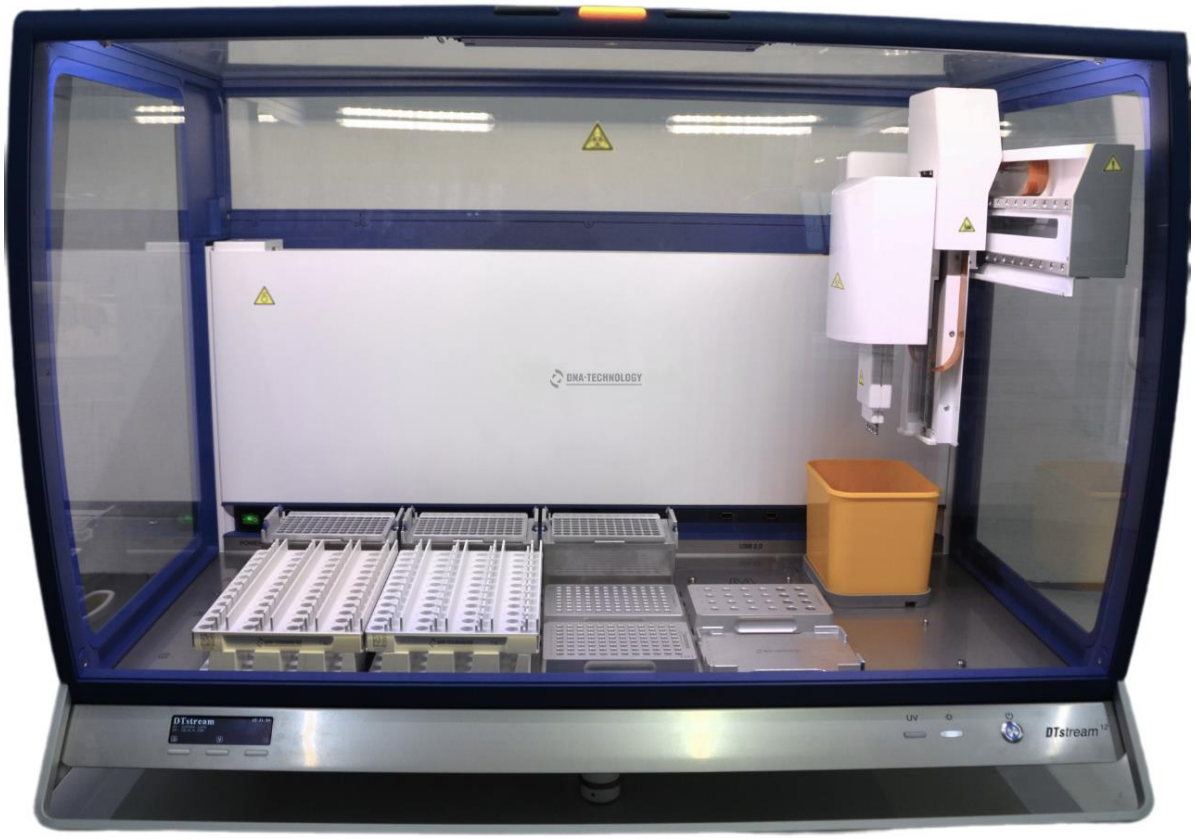
Liquid handling station DTstream

Operation manual



“DNA-Technology R&P”, LLC

CE

Contents

SAFETY PRECAUTIONS

READ THIS MANUAL CAREFULLY BEFORE PROCEEDING TO WORK!

General safety

Before using the **Liquid handling station DTstream** (hereinafter instrument, station), familiarize yourself with this manual and pay particular attention to safety instructions.

To prevent personal injury and damage to the instrument and the equipment used with it, the following safety precautions must be observed.

 **Warning!** The power cord of the instrument is equipped with a European type plug with a third grounding contact. Before plugging in your instrument, make sure your outlet has a ground connection. Do not plug the instrument into an outlet without a grounding conductor. Use the original power cord supplied with the instrument to connect it to the mains. Modification or damage to the power cord may result in electric shock, short circuits or fire due to overheating. The power cord should not be bent, crushed or modified, nor should it come in contact with any heat source.

Make sure that the connection cord is intact before plugging in the instrument.

The instrument is intended for indoor use only, the room must be well ventilated and free of aggressive gases.

Do not operate the instrument if the humidity in the room exceeds 80 %. Condensation may cause malfunctions in the electronic equipment of the instrument.

 **Warning!** Do not bump or drop the instrument.

During operation, do not expose the instrument to heat or sunlight or other strong light sources.

The instrument should only be stored and transported in an upright position.

After transportation or storage in humid and cold conditions, dry the instrument for 4 hours at a room temperature of 18 °C to 25 °C before connecting it to the mains. Do not allow any liquids or objects to enter the interior of the instrument. This may result in malfunction of the instrument.

If the instrument is used in a manner not in accordance with the manufacturer's specifications, the level of protection of the instrument may be impaired. The instrument should only be serviced by specially trained, qualified personnel.

When using the instrument, comply with the requirements of regulatory documents applied at the user's production facilities.

"DNA-Technology Research & Production", LLC is not responsible for any injury or damage to health caused by improper use of the instrument or its independent repair and modification of the instrument design or the combined use of other products not intended by the manufacturer for combined use.

Electrical safety

The instrument corresponds to the following safety standards: EN 61326-1:2021, EN 61010-1:2010.

Before you plug in the instrument, ensure that the instrument is grounded by checking for a protective earth at the outlet to which the instrument will be connected and the continuity of the connection cord. Do not plug the instrument into an outlet without a grounding pole. Use the connecting cord supplied with the instrument to connect the instrument to the mains power supply.

Connect to the mains with the voltage indicated on the marking label of the instrument. If liquids get inside the instrument, unplug it from the mains and contact the customer service.

 **Caution, danger of electrical shock!** Fuses could be replaced only when the instrument is de-energized. The instrument is considered de-energized only when the power switch is turned off, the power cord plug is unplugged, and the cable is disconnected from the port connector for communication with a personal computer.

 The "**Electric Voltage**" sign is on the patch panel of the instrument at the CON connectors, 110-240 V output connectors, on the rear panel of the instrument at the 110-240 V output. This sign warns maintenance and service personnel of the presence of hazardous voltages on the electrical connectors' contacts, of the inadmissibility of touching the electrical connectors' contacts and of the need to observe the rules of work with electrical instruments and laboratory equipment.

Maintenance

 **Warning! Do not open the instrument yourself! The interior of the instrument does not contain any user-serviceable components.**

The maintenance of the instrument should be performed by qualified trained personnel.

Attention! The settings of the instrument controllers cannot be changed by the user. Calibration is performed by specialists trained by the manufacturer in accordance with internal quality control regulations.

 **Warning!** Warning labels for operating personnel, installers, adjusters and service technicians are printed on the instrument components.

 The "**Possible protraction between the rotating elements**" sign is applied on the front panel of the instrument near the driven gear of the pipette movement drive along the worktable.

Personnel, when performing start-up and service work, must be careful and cautious to avoid being caught by the rotating pinion and the drive gear belt.

 The "**Possible hand injury**" sign is printed on the front and side surfaces of the dispensing head body of the instrument.

Personnel, when performing start-up and service work, must be careful and cautious to avoid finger pinching between the still part and the moving body of the dispenser.

Safety rules for working with a germicidal UV lamp

 **Warning!** UV radiation.
Protection of personnel from UV radiation is provided by the use of a UV-resistant protective cover glass and automatic shutdown of the UV lamp when the instrument protective cover is lifted.

Do not operate the UV lamp if the protective cover is not properly locked.
Protect the UV lamp from shocks that may cause the lamp to depressurize or rupture, resulting in the release of mercury vapor. In case of destruction of the lamp, it is necessary to process the product and the room in accordance with the rules for decontamination of mercury vapor.

Biological safety of the instrument

On the front wall of the protective cover (front panel) there is a "**Biological hazard**"  sign warning the operator that samples of biological material used in the operation are considered to be potentially hazardous. Disposable talc-free gloves should be worn when working.

 The symbol indicates that the instrument should not be discarded as unsorted waste but must be sent to separate collection facilities for recovery and recycling.

Note:

Any serious incident that has occurred in relation to the instrument shall be reported to the manufacturer and the competent authority of the Member State in which the user.

1 Basic instrument information

1.1 Intended use

Liquid handling station DTstream is designed for automated liquid handling in PCR applications and laboratory automation.

Functional purpose: the instrument is an auxiliary tool to automate the dispensing process.

Scope: laboratory *in vitro* diagnostics.

Potential user: qualified personnel trained in molecular diagnostic techniques and clinical diagnostic laboratory rules.

Instrument versions:

The instrument is available in the following versions:

1. DTstream 9L1, DTstream 9L4, DTstream 12L1, DTstream 12L4, DTstream 15L1, DTstream 15L4.
2. DTstream 9M1, DTstream 9M4, DTstream 12M1, DTstream 12M4, DTstream 15M1, DTstream 15M4.

These abovementioned versions differ in the number of available slots for various tools on its worktable (9, 12, 15), the number of pipette channels and the volume of pipette channels.

Letters (L, M) specify the dosing volume for each channel, where:

L = 1000 μl_{max},

M = 200 μl_{max},

numbers (1 or 4) – number of dispenser channels.

Example:

DTstream 9L4 — liquid handling station, a modification with 9 slots available for various tools on its worktable and a four-channel pipetting system with a maximum volume of 1000 μl_{max}.

DTstream 12M1 — liquid handling station, a modification with 12 slots available for various tools on its worktable and a single-channel pipetting system with a maximum volume of 200 μl_{max}.

1.2 Main parameters

- The instrument operates from AC mains at a frequency of 50/60 Hz and voltage of 100-240 V.
- Maximum power consumption of the instrument, without connecting other equipment to additional sockets of the instrument, is no more than 150 W.
- Instrument overall dimensions (width x height x depth) **does not exceed** [mm]:

Table 1

Version	DTstream 9	DTstream 12	DTstream 15
	L1, L4, M1, M4		
Protective cover is closed	715x650x650	855x650x650	990x650x650
Protective cover is open	715x1025x750	855x1025x750	990x1025x750

Tolerance of overall dimensions ± 10 mm

- Weight of the instrument without a set of spare parts and additional equipment (accessories) **does not exceed** [kg]:

Table 2

Version	DTstream 9	DTstream 12	DTstream 15
	L1, L4, M1, M4		
Weight	55	60	70

- UV lamps installed in the protective cover of instrument provide the following characteristics:
  - irradiation of the working area for preventive measures, built-in UV lamp in the effective spectral range of 220-280 nm (see Table 3);
  - irradiation from ultraviolet emitters in the effective spectral range of 220-280 nm outside the instrument is no more than 1 mW/m^2;
  - bactericidal efficiency no worse than 99.9 %;
  - ozone concentration (mg/m^3) at operation of UV lamps not more than 0.1 W/m^2.

Table 3

Version	DTstream 9	DTstream 12	DTstream 15
	L1, L4, M1, M4		
Lamp type	I-CCFLUV-5-16-160	I-CCFLUV-5-16-225	I-CCFLUV-5-16-300
Intensity of irradiation, W/m^2	0,1	0,1	0,1
Bactericidal efficiency (J_{bc}), (%)	99,9	99,9	99,9

- LED lighting lamps installed in a protective cover provide the following illumination values (lux):
  - on the instrument worktable with closed protective cover, at least 600;
  - on the instrument worktable with open protective cover, at least 600;
  - at the operator's working place in front of the instrument, at least 300.
- The glazing of the protective cover for all versions of the instrument provides the following characteristics:
  - spectral transmission coefficient in the UV region T_λ=0,0001;
  - light transmission coefficient of UV radiation T_V = 0,08.
- All versions of the instrument provide a continuous operating time of 8 hours.

  Note – if necessary, a break in work of at least 30 minutes.
- All versions of instruments include preinstalled dosing scenarios for sample preparation and PCR microplate filling that can be used together with reagent kits manufactured by "DNA-Technology Research & Production", LLC and "DNA-Technology TS", LLC.

1.3 Technical specifications

- Movement range along X, Y, Z axes is at least that specified in Table 4, [mm]:

Table 4

Version	DTstream 9	DTstream 12	DTstream 15
	L1, L4, M1, M4		
Movement range in X, Y, Z axes	485x240x170	625x240x170	650x240x170

- Absolute positioning accuracy along the X, Y, Z axes,

  is not worse than ± 0.5x0.5x0.5 mm.

- Maximum speed of movement, at least [m/s]:

  Along X,Y axes……..……..……..…0.5;

  Along Z axis…….……..……...…..0.2.

- Minimum (V_{min})/maximum (V_{max})* volume of each dispenser channel [µl]:

  for version (M) 200 µl ……..5÷200;

  for version (L) 1000 µl ……..…30÷1000.

  * Maximum total volume including liquid reserves

- Dispense accuracy [%]:

  for V = V_{max}…….....….± 2;

  for V = $V_{max/2}$…….....….± 5;

  for V = V_{min}…….....± 10.

- Number of dispenser channels……..1; 4.
- Computer interface …….....….Ethernet.
- The time of setting the operating mode should not exceed [min].……..…..1.
- The sound pressure level of noise at the operator's workplace (for all versions of the instruments) is no more than 70 dBA.

1.4 Instrument package supply

1.4.1 Version: DTstream 9L1, DTstream 9L4, DTstream 12L1, DTstream 12L4, DTstream 15L1, DTstream 15L4

Table 5

No.	Name	Quantity, pcs.
1	DTstream liquid handling station in one of versions	1
2	Operation manual	1
3	Ethernet communication cable	1
4	Power cable (three-prong)	1
5	CAN interface cable	Up to 2
6	Fuses (10 A, 5x20 mm , 250 V)	2
7	48-tube magnetic homogenizer	Up to 2
8	Adapter for reagent cartridges	Up to 2
9	Adapter for used material collection container	1
10	48-tube magnetic homogenizer rack	Up to 2
11	96-well for low profile strips, test tubes and microplates	1
12	96-well for strips, test tubes and microplates	1
13	1000 µl tips rack	Up to 4
14	Rods dispenser	1
15	Stand for DTstream liquid handling station	1 (if necessary)
16	Waste tip receptacle	1 (if necessary)
17	Protective cap for magnetic tweezers	100
18	Replaceable funnel for waste materials	40
19	Container for waste material collection on the instrument worktable	1 (if necessary)
20	1000 µl filter tips	up to 4 packages (if necessary)
21	1000 µl tips	up to 4 packages (if necessary)

1.4.2 Version: DTstream 9M1, DTstream 9M4, DTstream 12M1, DTstream 12M4, DTstream 15M1, DTstream 15M4

Table 6

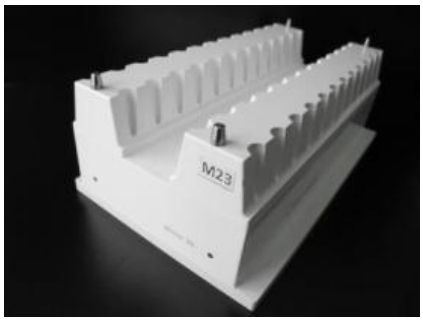
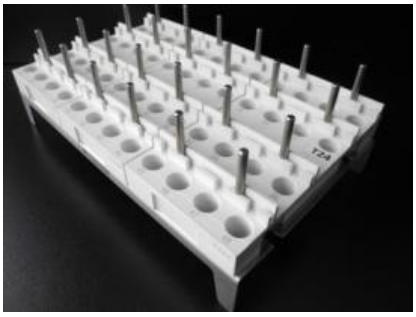
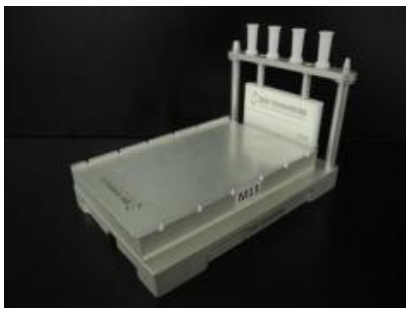
No.	Name	Quantity, pcs.
1	DTstream liquid handling station in one of versions	1
2	Operation manual	1
3	Ethernet communication cable	1
4	Power cable (three-prong)	1
5	Fuses (10 A, 5x20 mm, 250 V)	2
6	384-well microplate adapter	up to 2 (if necessary)
7	192-well microplates adapter	up to 2 (if necessary)
8	192-well microplate adapter	up to 2 (if necessary)
9	Magnetic adapter for 48 1.5 ml tube rack	up to 4 (if necessary)
10	Adapter with light pointer for tube arrangement	1 (if necessary)
11	Adapter for used material collection container	up to 2 (if necessary)
12	200 µl tips rack	up to 3
13	96-well for strips, test tubes and microplates	up to 2
14	4x6 rack for buffer solutions	up to 2 (if necessary)
15	48-well 1.5 ml tube rack	up to 4
16	Multifunctional 48 1.5 ml tube rack	up to 4
17	Stand for DTstream liquid handling station	1 (if necessary)
18	Waste tip receptacle	1 (if necessary)
19	Replaceable funnel for waste materials	40
20	Container for waste material collection on the instrument worktable	1 (if necessary)
21	200 µl filter tips	up to 3 packages (if necessary)
22	200 µl tips	up to 3 packages (if necessary)
23	96-well microplate	10 (if necessary)
24	96-well semi-skirted microplate	10 (if necessary)
25	192-well microplate	10 (if necessary)
26	192-well semi-skirted microplate	10 (if necessary)
27	384-well microplate	10 (if necessary)
28	Microplate seal	1 package or 1 roll (if necessary)

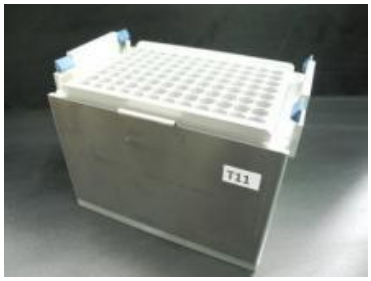
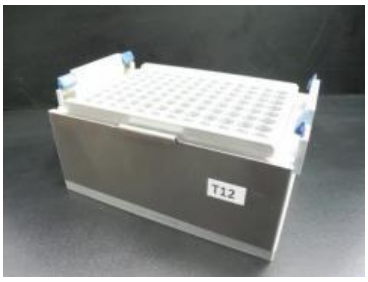
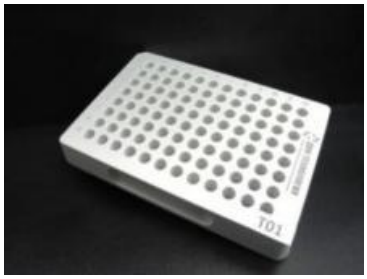
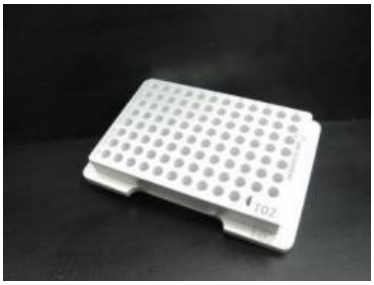
Notes:

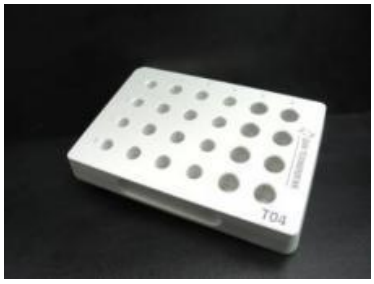
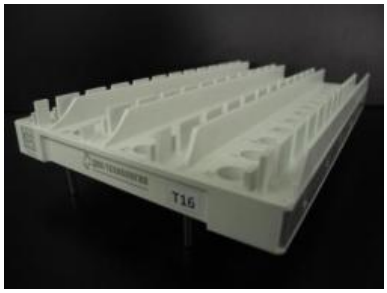
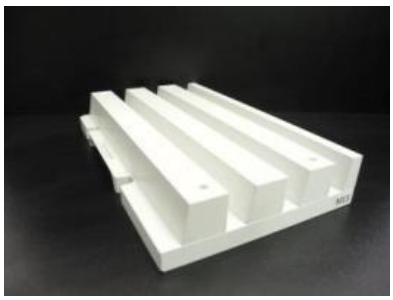
1 The manufacturer reserves the right to make changes and additions to the list of additional equipment and consumables as they are further developed.

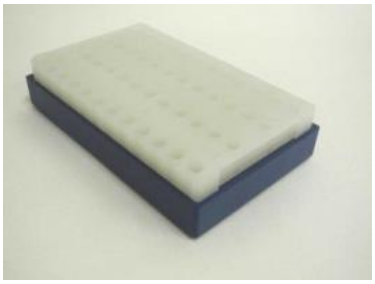
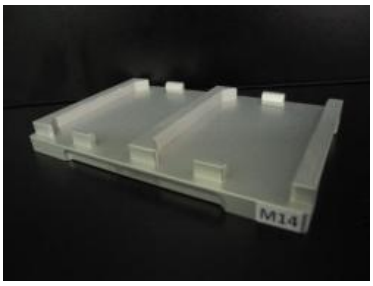
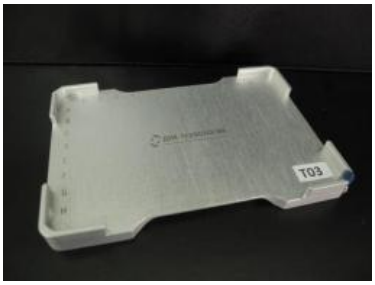
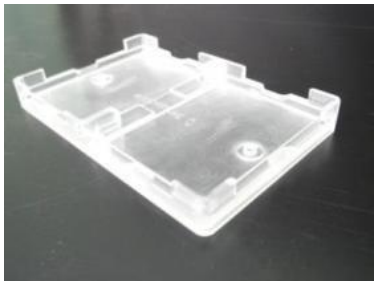
2 If the customer uses additional equipment and consumables that are not listed in the table above, the manufacturer is not responsible for the quality and reliability of the instrument's performance.

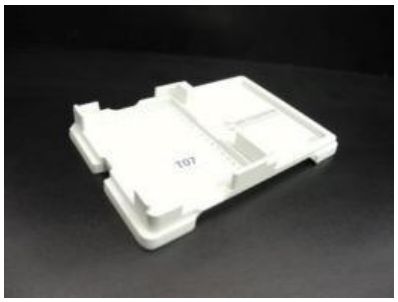
1.4.3 Components description:

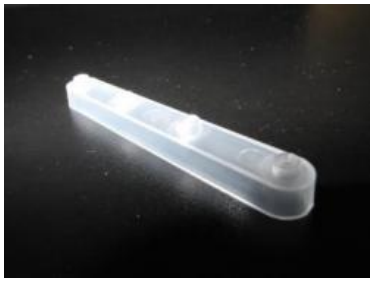
Name	Description
48-tube magnetic homogenizer 	**48-tube magnetic homogenizer** is installed on the worktable of the instrument in versions DTstream 9L1, DTstream 9L4, DTstream 12L1, DTstream 12L4, DTstream 15L1, DTstream 15L4 and is designed for the homogenization of the contents of test tubes by rotating a magnetic rod placed in the tube, under the influence of the magnetic field of the rotor located in the body of the homogenizer. The rotor is rotated by a micro electric motor mounted in the body frame. To power the drive micro-motor and control the operation, magnetic homogenizer is connected to the CON socket of the instrument. Dimensions of the 48-tube magnetic homogenizer: 133±0,2 x 220±0,2 x 78±0,2 mm. Weight of the 48-tube magnetic homogenizer: 1180±2 g. Structurally the magnetic homogenizer consists of a base (body), with a magnetic rotor with a drive inside of it. 48-tube magnetic homogenizer body and rack are made of Trovidur EN grade polyvinyl chloride. 48-tube magnetic homogenizer is installed on the worktable of the instrument and fixed on the worktable by aligning the pins located on the worktable of the instrument and holes in the base of a homogenizer. Magnetic homogenizer has a “M23” label engraved on the body frame.
48-tube magnetic homogenizer rack 	**48-tube magnetic homogenizer rack** is mounted on the “M23” 48-tube magnetic homogenizer and is designed for placing and fixing reagent tubes and/or DNA samples in the wells of the rack. The 48-tube magnetic homogenizer rack must be made of stainless steel and Trovidur EN polyvinyl chloride, in accordance with the design documentation P-240v2-01-00SB. The overall dimensions of the 48-tube magnetic homogenizer rack must be: 220±0,2 x 131±0,2 x 74,5±0,2 mm. Weight of the 48-tube magnetic homogenizer rack shall be: 900±2 g. Stands for a 48-tube magnetic homogenizer rack must be fixed on the “M23” homogenizer by aligning the pins on the top surface of a 48-tube magnetic homogenizer with holes in the base of a 48-tube magnetic homogenizer rack. The 48-tube magnetic homogenizer rack has a “T24” label engraved on its base.
Rods dispenser 	**Rods dispenser** is installed on the worktable of the instrument in versions DTstream 9L1, DTstream 9L4, DTstream 12L1, DTstream 12L4, DTstream 15L1, DTstream 15L4 and is intended for placing cartridges with magnetic “rods” in it. The rods dispenser consists of a base for placing the magnetic rods cartridges and magnetic tweezers for transfer of rods to test tubes. The magnetic tweezers, gripped by the nozzles of the instrument, capture the magnetic “rods”, carry them and place them into the test tubes with biological samples. The rods dispenser is made of aluminum alloy D16T. Dimensions of the rods dispenser: 133±0,2 x 91±0,2 x 93±0,2 mm. The weight of the rods dispenser unit is 770±2 g. The rods dispenser is fixed on the worktable of the instrument by means of aligning of the pins, located on the worktable of the instrument, and holes in the base of the rods dispenser. The dispenser has a “M13” label engraved on the body frame.

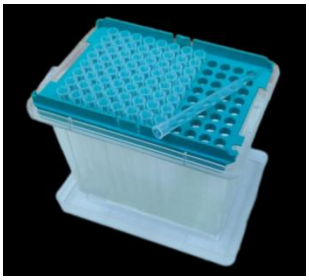
Name	Description
1000 µl tips rack 	**1000 µl tips rack** is installed on the worktable of the instruments in versions DTstream 9L1, DTstream 9L4, DTstream 12L1, DTstream 12L4, DTstream 15L1, DTstream 15L4 and is designed to hold platforms with 1000 µl tips when dispensing. 1000 µl tips rack is made of D16T aluminum alloy and steel. Dimensions of the 1000 µl tips rack: 133±0.2 x 91±0.2 x107±0.2 mm. Weight of 1000 µl tips rack is 715±2 g. 1000 µl tips rack is placed on the worktable of the instrument and fixed on the table by clutching of the spring grips located in the rack body, with pins, located on the surface of the worktable. A 1000 µl tips platform is placed in the stand and held during the dispensing process. The 1000 µl tips rack has a "T11" label engraved on the body frame.
200 µl tips rack 	**200 µl tips rack** is installed on the worktable of DTstream 9M1, DTstream 9M4, DTstream 12M1, DTstream 12M4, DTstream 15M1, DTstream 15M4 versions and is designed to hold platforms with 200 µl tips when dispensing. The 200 µl tips rack is made of D16T aluminum alloy and steel. Dimensions of the 200 µl tips rack: 133±0.2 x 91±0.2 x72±0.2 mm. The weight of 200 µl tips rack is 533±2 g. 200 µl tips rack is set on the worktable of the instrument and fixed on the table by clutching of the spring grips located in the rack body with pins located on the surface of the worktable. A 200 µl tips platform is placed in the stand and held during the dispensing process. 200 µl tips rack has a "T12" label engraved on the body frame.
96-well for strips, test tubes and microplates 	**96-well for strips, test tubes and microplates i**s installed on the worktable of instrument of all versions and is designed to be placed in the wells of the rack for strips, test tubes and microplates. 96-well for strips, test tubes and microplates is made of D16T aluminum alloy. Dimensions of the 96-well for strips, test tubes and microplates: 132,5±0,2 x 91±0,2 x 18±0,1 mm. The weight of the 96-well for strips, test tubes and microplates is 502±2 g. 96-well for strips, test tubes and microplates has a "T01" label engraved on the body frame.
96-well for low profile strips, test tubes and microplates 	**96-well for low profile strips, test tubes and microplates** is installed on the worktable of instrument of all versions and is designed to be placed in the wells of the rack for strips, test tubes and microplates. 96-well for low profile strips, test tubes and microplates is made of D16T aluminum alloy. Dimensions of the 96-well for low profile strips, test tubes and microplates: 132,5±0,2 x 91±0,2 x 18±0,2 mm. The weight of the 96-well for low profile strips, test tubes and microplates is 414±2 g. 96-well for low profile strips, test tubes and microplates has a "T02" label engraved on the body frame.

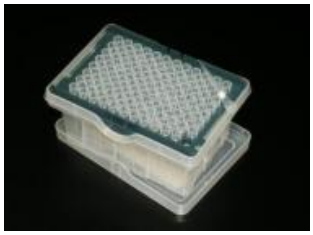
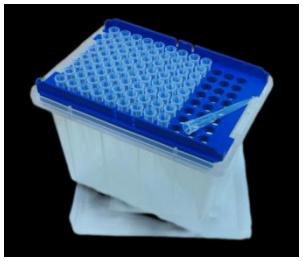
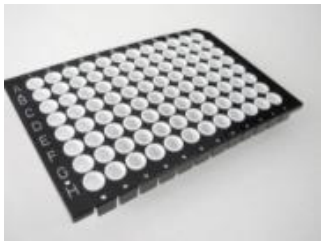
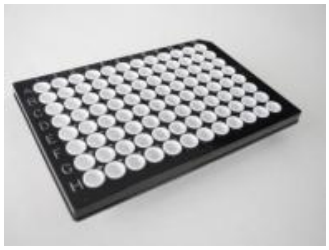
Name	Description
4x6 rack for buffer solutions 	**4x6 rack for buffer solutions** is installed on the worktable of DTstream 9M1, DTstream 9M4, DTstream 12M1, DTstream 12M4, DTstream 15M1, DTstream 15M4 versions and is designed for holding buffer solution containers of different volumes during the dosing process. 4x6 rack for buffer solutions is made of D16T aluminum alloy. Dimensions of the rack for buffer solutions: 132,5±0,2 x 91±0,2 x18±0,2 mm. The weight of the 4x6 rack for buffer solutions is 504±2 g. 4x6 rack for buffer solutions is installed on the worktable of the instrument by aligning the pins located on the worktable of the instrument and the holes in the base of the rack. 4x6 rack for buffer solutions has a "T04" label engraved on the body frame.
48-well 1.5 ml tube rack 	**48-well 1.5 ml tube rack** is located on the magnetic adapter M15, which is installed on the worktable of the DTstream 9M1, DTstream 9M4, DTstream 12M1, DTstream 12M4, DTstream 15M1, DTstream 15M4 versions, and is designed for placing and holding test tubes with reagents and/or DNA samples in the wells. Body frame of the 48-well 1.5 ml tube rack is made of polyvinyl chloride. Dimensions of the 48-well 1.5 ml tube rack: 220±0,2 x131±0,2 x47±0,2 mm. The weight of the 48-well 1.5 ml tube rack is 640±2 g. 48-well 1.5 ml tube rack is fixed on the magnetic adapter "M15" by aligning the pins, which are on the bottom surface of the rack, with the holes in the body of the magnetic adapter. 48-well 1.5 ml tube rack has a "T17" label engraved on the body frame.
Multifunctional 48 1.5 ml tube rack 	**Multifunctional 48 1.5 ml tube rack** is located on the magnetic adapter "B 067", which is installed on the worktable of the DTstream 9M1, DTstream 9M4, DTstream 12M1, DTstream 12M4, DTstream 15M1, DTstream 15M4 versions, and is designed for placing and holding test tubes with reagents and/or DNA samples in the wells. Body frame of the multifunctional 48 1.5 ml tube rack is made of polyvinyl chloride. Dimensions of the multifunctional 48 1.5 ml tube rack: 220±0,2 x 138,5±0,2 x 50,3±0,2 mm. The weight of the multifunctional 48 1.5 ml tube rack is 710±2 g. Multifunctional 48 1.5 ml tube rack is fixed on the magnetic adapter "M15" by aligning the pins, which are on the bottom surface of the rack, with the holes in the body of the magnetic adapter. Multifunctional 48 1.5 ml tube rack has a "T16" label engraved on the body frame.
Magnetic adapter for 48 1.5 ml tube rack 	**Magnetic adapter for 48 1.5 ml tube rack** is installed on the worktable of the DTstream 9M1, DTstream 9M4, DTstream 12M1, DTstream 12M4, DTstream 15M1, DTstream 15M4 versions and is designed to hold a "T16" rack for 48 1.5 ml tubes. Body frame of the magnetic adapter for 48 1.5 ml tube rack is made of polyvinyl chloride. The magnetic adapter for 48 1.5 ml tube rack has 48 cylindrical permanent magnets. The magnetic field of the magnets interacts with magnetic particles and isolated DNA molecules in the tubes, depositing them on the walls of the tubes. Dimensions of the magnetic adapter for 48 1.5 ml tube rack: 220±0,2 x 131±0,2 x 34±0,2 mm. The weight of the magnetic adapter for 48 1.5 ml tube rack is 1046±2 g. Magnetic adapter for 48 1.5 ml tube rack is fixed on the worktable by aligning the pins, which are on the bottom surface of the rack, with the holes in the body of the magnetic adapter. Magnetic adapter for 48 1.5 ml tube rack has a "M15" label engraved on the body frame.

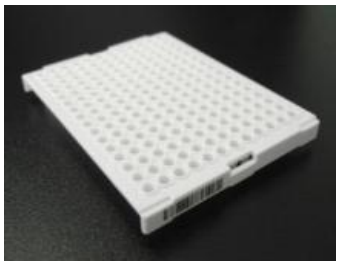
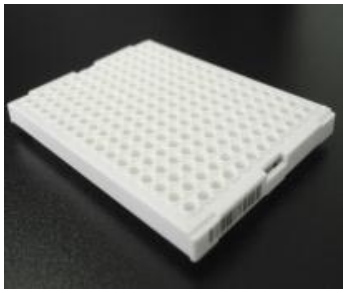
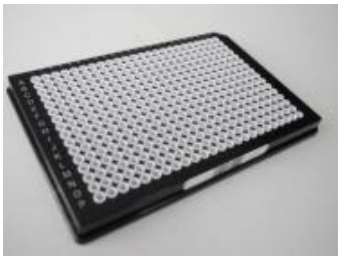
Name	Description
Adapter with light pointer for tube arrangement 	**Adapter with light pointer for tube arrangement** is installed on the worktable of the DTstream 9M1, DTstream 9M4, DTstream 12M1, DTstream 12M4, DTstream 15M1, DTstream15 M4 versions and is designed for placement and retention of 48 1.5 ml tubes. Body frame of the adapter with light pointer for tube arrangement is made of polyvinyl chloride. Dimensions of the adapter with light pointer for tube arrangement: 228±0,2 x 139±0,2 x 47±0,2 mm. The weight of the adapter with light pointer for tube arrangement is 930±2 g. Under each well of the adapter with light pointer for tube arrangement there is a light-emitting diode, which illumination should indicate to the operator the location of the tube. The LEDs are powered and the control signal from the instrument control software is supplied through a cable that connects the USB connector on the instrument panel to the micro-USB connector in the adapter body frame. Adapter with light pointer for tube arrangement is fixed on the worktable by aligning the pins located on the worktable of the instrument and the holes in the base of the adapter. Adapter with light pointer for tube arrangement has a “P-154” label engraved on the body frame.
Adapter for reagent cartridges 	**Adapter for reagent cartridges** is installed on the worktable of the instruments in versions DTstream 9L1, DTstream 9L4, DTstream 12L1, DTstream 12L4, DTstream 15L1, DTstream 15L4 and is designed for placing two reagent cartridges in it. Adapter for reagent cartridges is made of D16T aluminum alloy. Dimensions of the adapter for reagent cartridges: 133±0,2 x 92±0,2 x 14±0,2 mm. The weight of the adapter for reagent cartridges is 274±2 g. Adapter for reagent cartridges is fixed on the worktable by aligning the pins located on the worktable of the instrument and the holes in the base of the instrument. Adapter for reagent cartridges has a “M14” label engraved on the body frame.
384-well microplate adapter 	**384-well microplate adapter** is installed on the worktable of the DTstream 9M1, DTstream 9M4, DTstream 12M1, DTstream 12M4, DTstream 15M1, DTstream 15M4 versions and is designed to fix 384-well microplate in it. 384-well microplate adapter is made of D16T aluminum alloy and 65G steel. Dimensions of the 384-well microplate adapter: 133,5±0,2 x 91,2±0,2 x 12,5±0,2 mm. The weight of the 384-well microplate adapter is 195±2 g. 384-well microplate adapter is fixed on the worktable by aligning the pins located on the worktable of the instrument and the holes in the base of the adapter. 384-well microplate adapter has a “T03” label engraved on the body frame.
192-well microplates adapter 	**192-well microplates adapter** is installed on the worktable of the DTstream 9M1, DTstream 9M4, DTstream 12M1, DTstream 12M4, DTstream 15M1, DTstream 15M4 versions and is designed to fix 192-well microplate in it. 192-well microplates adapter is made of organic sheet glass (Plexiglass). Dimensions of the 192-well microplates adapter: 133±0,2 x 86±0,2 x 15±0,2 mm. The weight of the 192-well microplates adapter is 63±2 g. 192-well microplates adapter is fixed on the worktable by aligning the pins located on the worktable of the instrument and the holes in the base of the adapter. 192-well microplates adapter has a “T08” label engraved on the body frame.

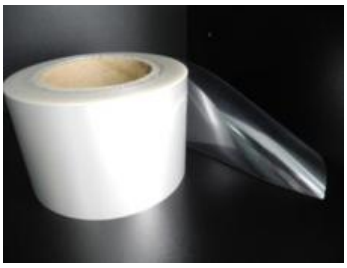
Name	Description
192-well microplate adapter 	**192-well microplate adapter** is installed on the worktable of the DTstream 9M1, DTstream 9M4, DTstream 12M1, DTstream 12M4, DTstream 15M1, DTstream 15M4 versions and is designed to fix 192-well microplate in it. 192-well microplate adapter is made of Trovidur ER polymer material. Dimensions of the 192-well microplate adapter: 132,5±0,2 x 91±0,2 x 18,1±0,2 mm. The weight of the 192-well microplate adapter is 107±2 g. 192-well microplate adapter s fixed on the worktable by aligning the pins located on the worktable of the instrument and the holes in the base of the adapter. 192-well microplate adapter has a “T07” label engraved on the body frame.
Adapter for used material collection container 	**Adapter for used material collection container** is installed on the worktable of all versions of the instrument and is designed to place and hold the MK-01 container for waste material collection. Adapter for used material collection container is made of D16T aluminum alloy. Dimensions of the adapter for used material collection container: 143,9±0,2 x 108,4±0,2 x 13±0,2 mm. The weight of the adapter for used material collection container is 184±2 g. Adapter for used material collection container s fixed on the worktable by aligning the pins located on the worktable of the instrument and the holes in the base of the instrument. Adapter for used material collection container has a “K05” label engraved on the body frame.
Stand for DTstream liquid handling station 	Stand for DTstream liquid handling station is designed for the installation of a station on its working surface. The countertops of both models are made of Trovidur EN polyvinyl chloride (plastic sheet) and have an opening on the surface to allow the discharge of waste materials (tips) from the instrument into the waste material container inside the stand. When mounting the instrument on a stand, the outlet for discharging the station waste materials (tips) must be aligned with the intake opening on the stand table top. If necessary Inside the stand under the intake for discharge of waste materials (tips), install the tips receptacle “K12-12-12-00-00”. Structurally the stand is made as an all-welded frame from a steel pipe of rectangular section, non-working surfaces are made of metal sheet, the swing doors are on hinges, the is moved along the rails. The feet of the stands provide height adjustment to ensure the horizontal position of the stand countertop during operation of the instrument. Stand for DTstream liquid handling station differ in the number of available slots for various tools on its worktable. The versions: Stand for DTstream liquid handling station with 9 slots available for various tools on its worktable «CtDy9v2-00-00-00-00», Stand for DTstream liquid handling station with 12 slots available for various tools on its worktable «CtDy12v2-00-00-00-00», Stand for DTstream liquid handling station with 15 slots available for various tools on its worktable «CtDy15v2-00-00-00-00». The dimensions of the stand «CtDy9v2-00-00-00-00»: 930±5 x 900±5 x 766±5 mm The weight of the stand «CtDy9v2-00-00-00-00»:110±5 % kg The dimensions of the stand «CtDy12v2-00-00-00-00»: 1100±5 x 900±5 x 766±5 mm The weight of the stand «CtDy12v2-00-00-00-00»: 125±5 % kg The dimensions of the stand «CtDy15v2-00-00-00-00»: 1160±5 x 900±5 x 766±5 mm The weight of the stand «CtDy15v2-00-00-00-00»: 130±5 % kg. The load capacity of the stand is at least 250 kg. On the body of the stand is a nameplate with the marking.

Name	Description
Waste tip receptacle 	**Waste tip receptacle** is installed inside the stand under the instrument "CtDy9v2-00-00-00-00" and is designed to place a container on it for receiving waste materials. Waste tip receptacle is made of D16T aluminum alloy, Trovidur EN polyvinyl chloride, caprolon. Dimensions of the waste tip receptacle: 441±0,2 x 220±0,2 x 327±0,2 mm. The weight of the waste tip receptacle: 475±0,5 g. The body frame of the instrument has a "K12-12-12-00-00" marking.
Protective cap for magnetic tweezers Cat. No. C-DTS-C002 	**Protective cap for magnetic tweezers** is installed on the rods dispenser "M13" and is intended for single use in order to protect the working surface of the magnetic tweezers before each dispensing. Protective cap for magnetic tweezers is made of transparent polypropylene. Dimensions of the protective cap: 61±0,2 x 7±0,2 x 6,5±0,2 mm. The weight of the protective cap is 1±0,2 g.
Replaceable funnel for waste materials Cat. No. C-DTS-C001 	**Replaceable funnel for waste materials** is installed on the instruments of all versions and is designed for single use for the safe discharge of waste materials (tips). Replaceable funnel for waste materials is made of transparent plastic PET (polyethylene terephthalate) with a thickness of 0.5 mm. Dimensions of the funnel: 220±0,2 x Ø54,5±0,2 x Ø38,6±0,2 mm. The weight of the replaceable funnel for waste materials: 12±0,5 g. Replaceable funnel for waste materials is installed in the receiving socket of the liquid handling station stand "CtDy9v2-00-00-00-00" and sends the waste material to the waste materials reception container.
CAN interface cable 	**CAN interface cable** is designed for DTstream 9L1, DTstream 9L4, DTstream 12L1, DTstream 12L4, DTstream 15L1, DTstream 15L4 version with 48-tube magnetic homogenizer. The cable consists of connector type MINI DIN-8, straight; connector type "C091-U 250V/5A,8Pol Male T 3504 005 U"; connection cable in polyurethane isolation. Cable dimensions: 450±10 x d6 mm. The cable connects 48-tube magnetic homogenizer to the CON connector on the switching panel.

Name	Description
Power cable (three-prong) 	**Power cable (three-wire)** is designed to supply power from the mains to the instrument. Specifications: Socket: molded PVS 45P, black 16 A, 250 V Plug: Molded PVS 45P, black Terminal: 2x24 mm Wire: H05 W-F 3G 0.75 mm^2 GTSA-3, OD6.8 mm Length: 1800 mm.
Ethernet communication cable 	**Ethernet communication cable** is designed for communication with a personal computer. Specifications: Patch Cord UTP 5e cat. “HK-SC5EUTP-RD-2.0” with RJ-45 connectors, 26AWG/0,4 mm Cable: cat5e UTP 26AWG. PVC jacket, cable diameter: 5.5 mm Cap: PVC RJ-45 plug: polycarbonate, cat5e, 8p8c Category: 5e Design: unshielded, UTP Connector format: RJ45/8p8c Cable diameter: 5.5 mm Length: 2.0 m.
Fuses (10 A, 5x20 mm, 250 V) 	**Fuses (10 A, 5x20 mm, 250 V)** are designed to protect the electronic unit against overloading. Specifications: Fuse type: cylindrical, ceramic Rated current: 10 A Rated voltage: AC 250 V Dimensions: 5x20 mm Maximum breaking capacity: 1500 AC 250 V.
1000 µl filter tips Cat. No. C-DTS-T1000F 	**1000 µl filter tips** are designed to perform dosing of solutions and reagents for DTstream 9L1, DTstream 9L4, DTstream 12L1, DTstream 12L4, DTstream 15L1, DTstream 15L4. The tips are placed in the platform in the amount of 96 pieces. A filter is placed inside the tip. Dimensions of the platform for tips: 135±0,2 x 97±0,2 x 105±0,2 mm. The platform with tips is installed in the rack for tips 1000 µl “T11”, placed on the table of the liquid handling station.
1000 µl tips Cat. No. C-DTS-T1000 	**1000 µl tips** are designed for dosing solutions and reagents for instrument in versions DTstream 9L1, DTstream 9L4, DTstream 12L1, DTstream 12L4, DTstream 15L1, DTstream 15L4. The tips are placed in the platform in the amount of 96 pieces. Dimensions of the platform for tips: 135±0,2 x 97±0,2 x 105±0,2 mm. The platform with the tips is installed in the rack for tips "T11", placed on the table of the liquid handling station.

Name	Description
200 µl filter tips Cat. No. C-DTS-T200F 	**200 µl filter tips** are designed for dosing of solutions and reagents for DTstream 9M1, DTstream 9M4, DTstream 12M1, DTstream 12M4, DTstream 15M1, DTstream 15M4. The tips are placed on the platform in the amount of 96 pieces. Inside the tip there is a filter. Dimensions of the platform for tips: 136±0,2 x 98±0,2 x 70±0,2 mm. The platform with tips is installed in the rack for tips “T12”, placed on the worktable of the instrument.
200 µl tips Cat. No. C-DTS-T200 	**200 µl tips** are designed for dosing solutions and reagents for DTstream 9M1, DTstream 9M4, DTstream 12M1, DTstream 9M4, DTstream 15M1, DTstream 15M4. The tips are placed in the platform in the amount of 96 pieces. Dimensions of the platform for tips: 136±0,2 x 98±0,2 x 70±0,2 mm. The platform with tips is installed in the rack for tips “T12”, placed on the worktable of the instrument.
96-well microplate Cat. No. C-DTS-P096/01 	**96-well microplate** is designed to be filled with liquid reagents and samples of biological material for further use in PCR amplification. Dimensions according to specification: Width: 125.11±0.25 mm Depth: 83.22±0.25 mm Height: 20.80±0.25 mm Well depth: 20.20±0.15 mm Diameter of the wells: 5.46±0.10 mm The microplate is placed on the worktable of the instrument in the “T01” rack.
96-well semi-skirted microplate Cat. No. C-DTS- P096/02 	**96-well semi-skirted microplate** is designed to be filled with liquid reagents and samples of biological material for further use in PCR amplification. Dimensions according to manufacturer's specifications: Width: 124.26±0.25 mm Depth: 83.97±0.25 mm Height: 20.70±0.25 mm Well depth: 20.20±0.10 mm Well diameter: 5.46±0.10 mm The microplate is placed on the worktable of the instrument in the “T01” rack.

Name	Description
192-well microplate Cat. No. C-DTS-P192/01 	**192-well microplate** is designed to be filled with liquid reagents and samples of biological material for further use in PCR amplification. Dimensions according to specification: Width: 80.0(-0.25)mm Depth: 60.0(-0.25)mm Height: 10.10±0.25 mm Well depth: 9.60±0.10 mm Well diameter: 3.10±0.10 mm The microplate is placed on the worktable of the instrument in the “T08” adapter.
192-well semi-skirted microplate Cat. No. C-DTS-P192/02 	**192-well semi-skirted microplate** is designed to be filled with liquid reagents and samples of biological material for further use in PCR amplification. Dimensions according to specifications: Width: 80.0(-0.25)mm Depth: 60.0(-0.25)mm Height: 10.10±0.25 mm Well depth: 9.60±0.10 mm Well diameter: 3.10±0.10 mm The microplate is placed on the worktable of the instrument in “T07”, “T08” adapters.
384-well microplate Cat. No. C-DTS-P384 	**384-well microplate** is designed to be filled with liquid reagents and samples of biological material for further use in PCR amplification. Dimensions according to specification: Width: 127.76±0.25mm. Depth: 85.48±0.25 mm Height: 10,60±0,25 mm Well depth: 9.60±0.10 mm Well diameter: 3.10±0.10 mm The microplate is placed on the worktable of the instrument in the “T03” adapter.
Container for waste material collection on the instrument worktable 	As a **container for waste material collection** it is recommended to use a product – “Containers for waste and consumables (container for collection, storage, transportation and disposal of sharps waste (yellow) with a volume of 1.3 l)”. The container for waste material collection is installed on the “K05” adapter, placed on the worktable of the instrument.

Name	Description
Microplate seal (package) Cat. No. C-DTS-F001  or Microplate seal (roll) 	**Microplate seal** is designed to thermally seal microplate wells after filling them with reagent solutions and/or DNA samples. The microplate seal can be supplied in cut sheets or on a roll. A package of 100 sheets of seal is packed in a polyethylene zip bag. Dimensions of seal sheets: 125x78 mm. Dimensions of the seal roll: 610 m x 78 mm.

Attention! Components from other manufacturers must not be used.
The manufacturer is not responsible for the performance of the DTstream liquid handling station if the customer uses third-party components.

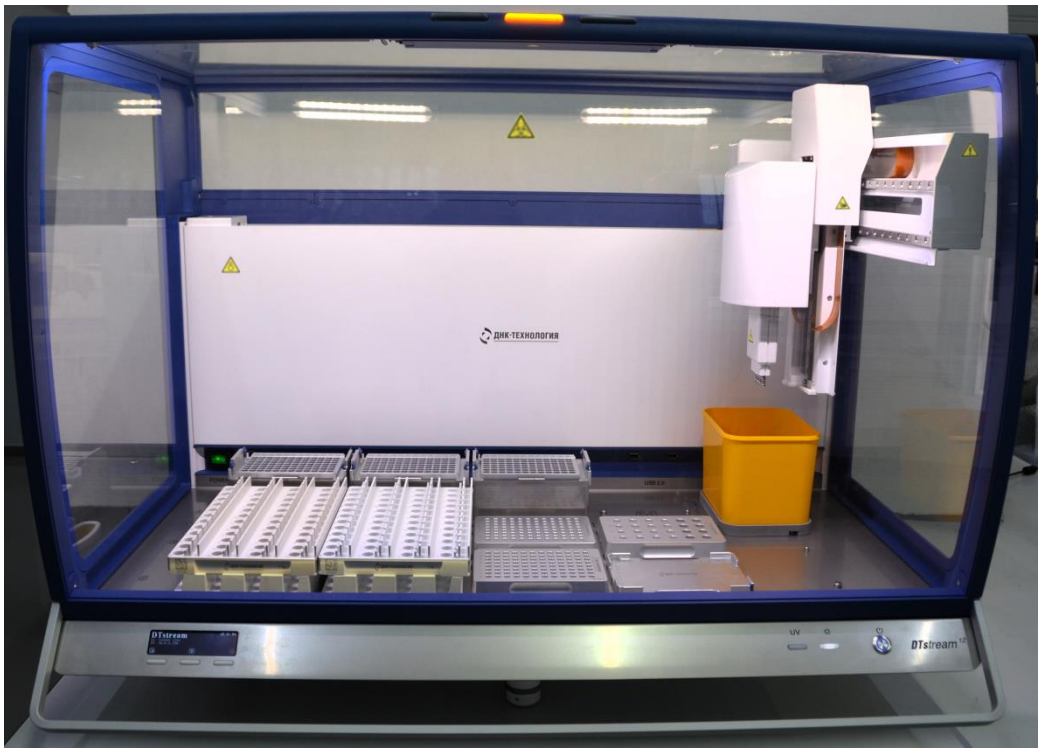


Figure 1 – Example of arrangement of additional equipment (accessories)
on the DTstream 12M4 worktable

2 Design features of the instrument

2.1 Components

The instrument is structurally a robotic system for moving technological equipment.

The principle of operation of the instrument is based on aspiration of the dosing liquid by means of rarefaction of air in the piston group and its movement in three coordinates, followed by dosing into the corresponding tubes and microplates by displacing the dosed liquid by the piston.

The design of the instrument is based on the block principle.

The components of the complex are (Fig. 2):

- horizontal drive module of the X-axis;
- horizontal drive module of the Y-axis;
- vertical drive module for the Z-axis;
- dispenser module;
- control module (electronics module).

The modules: the horizontal drive of the X-axis, the horizontal drive of the Y-axis and the vertical drive of the Z-axis make up the coordinate mechanism.

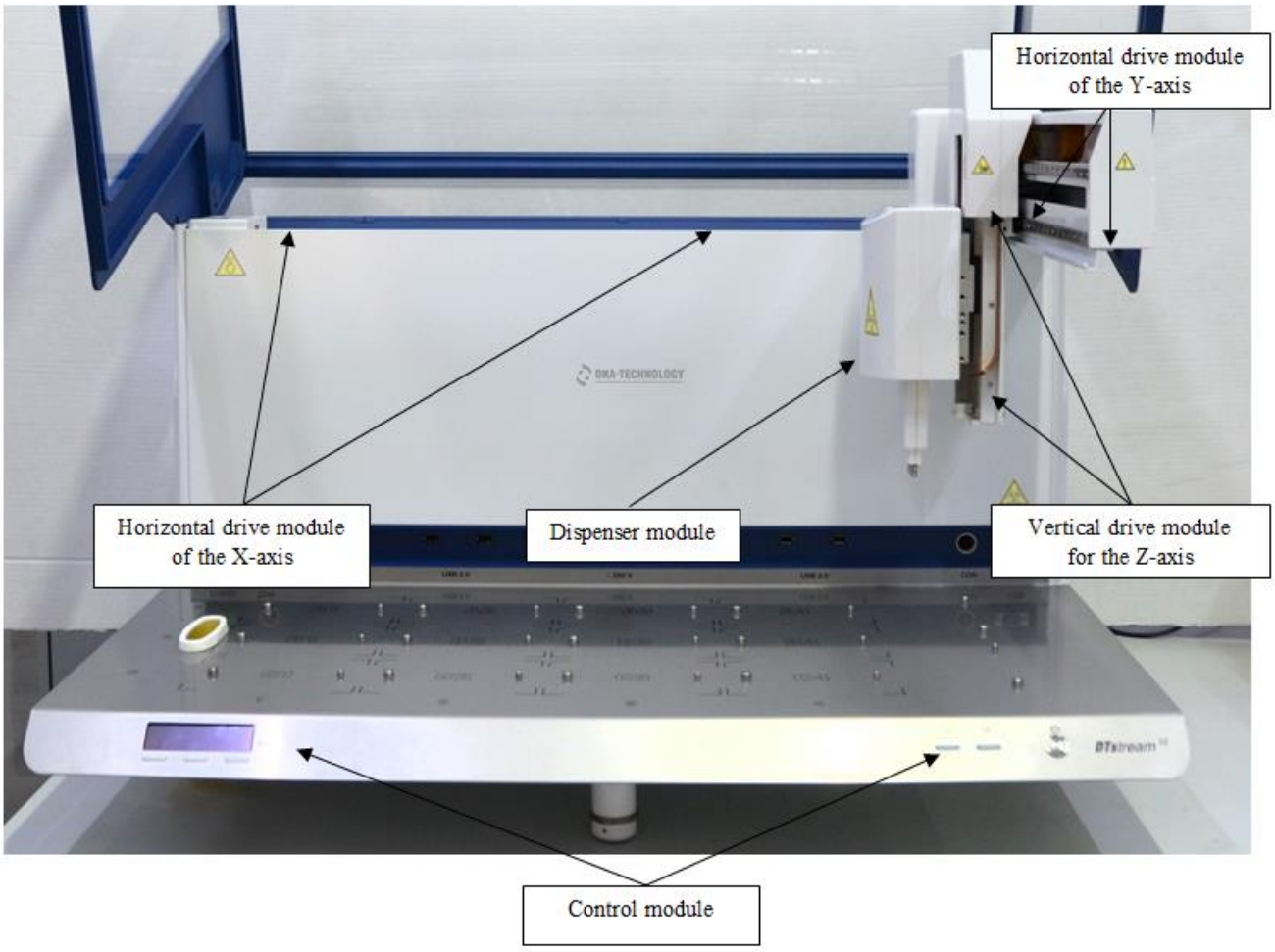


Figure 2 – Components of the instrument

2.2 Positioning mechanism

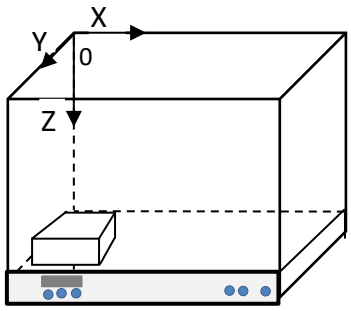
Positioning mechanism is designed to provide three-coordinate movement of the pipette (pump unit) over the worktable of the instrument, providing the necessary speed of movement and accuracy of positioning of the pipette, namely, the tips of the pipette, over the tubes and wells of microplates (Pic. 1).

Structurally, the positioning mechanism is designed as a portal-console scheme. The portal part of the mechanism is designed to move the console with the pipette mounted on it relative to the horizontal axis of coordinates “X” — the module of the horizontal drive of the X-axis.

The console part of the mechanism is designed to move the pipette over the worktable relative to the horizontal coordinate axis “Y” — module of the horizontal drive of the Y-axis.

The vertical movement mechanism (vertical coordinate axis “Z” — vertical drive module of Z-axis) of the pipette is structurally fixed on the cantilever part of the mechanism.

Stepper microelectric motors are used as drives on all coordinate axes.



Picture 1 – Diagram of the three-axis pipette movement above the instrument worktable

2.3 Worktable

The instrument versions differ in the number of slots for additional equipment on the worktable 9, 12 and 15 respectively, provided due to the different dimensions of the worktable (see p. 1.2).

For correct positioning of additional equipment, pins are provided on the surface of the worktable (Fig. 3), which ensure the accuracy of installation and hold the components during dispensing.

The worktable is made of stainless steel.

There is a hole on the worktable of the instrument which is designed for discharge of the waste materials (tips) from the pipette nozzles into a specially designed container which is inside the stand for DTstream liquid handling station.

The working space of the worktable is designed for installation of the required containers, which are necessary in the work. Configuration of additional equipment placement on the worktable is formed by the user according to the selected dosing scenario.

The instrument provides the possibility to install containers on the worktables in the following variants:

- separate tubes;
- microplates;
- cartridges,

for that it is necessary to use appropriate adapters and racks, specified in p. 1.4.3 of this manual.

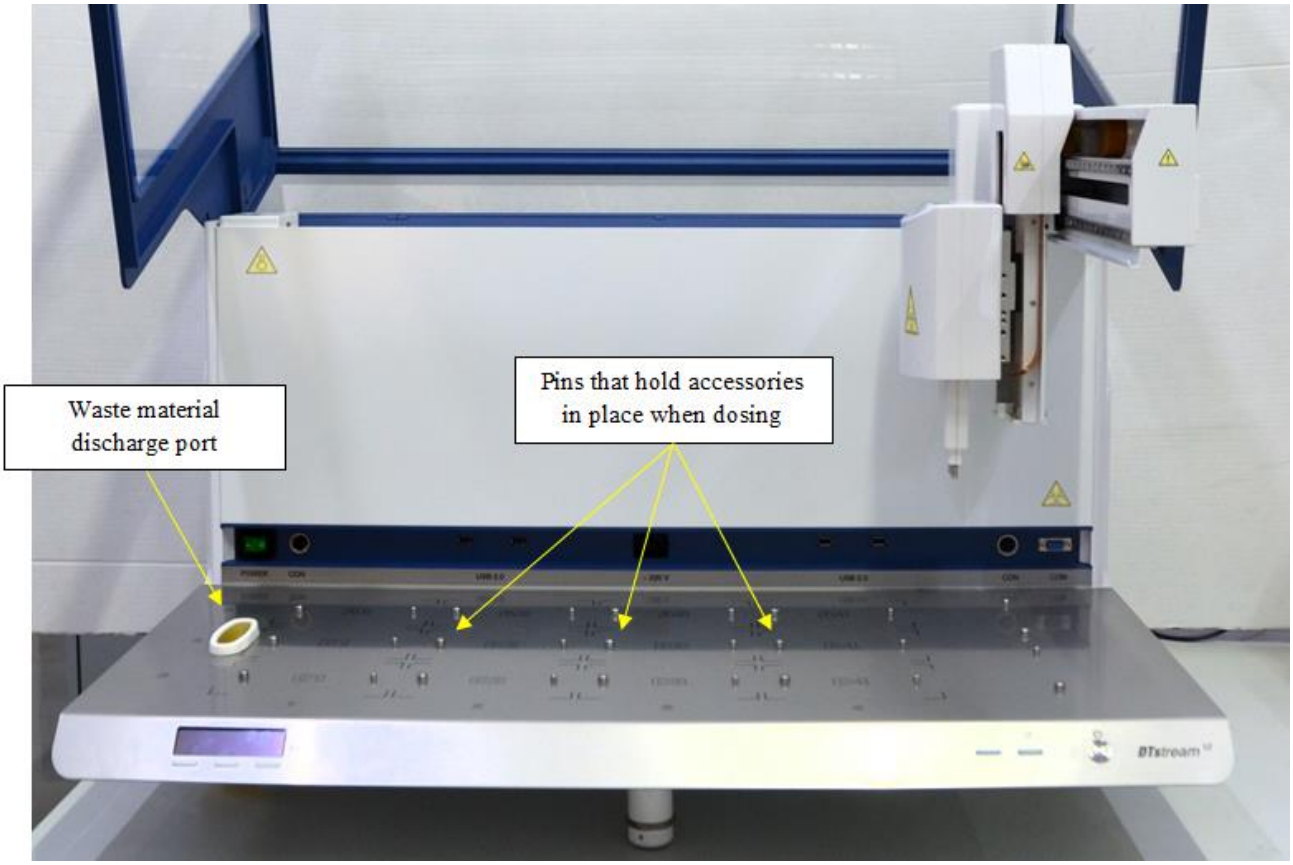


Figure 3 – DTstream 12M4 liquid handling station version.

The worktable of the instrument has **12** slots for placement of for additional equipment (tools)

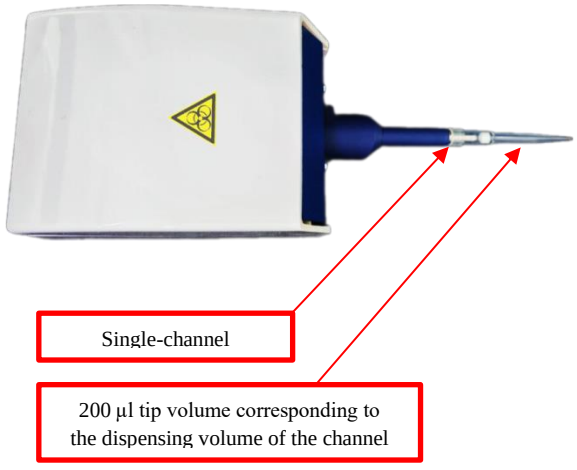
2.4 Dispenser

The dispenser is designed for aspiration and dosing of liquids and reagents to various containers installed on the worktable of the instrument.

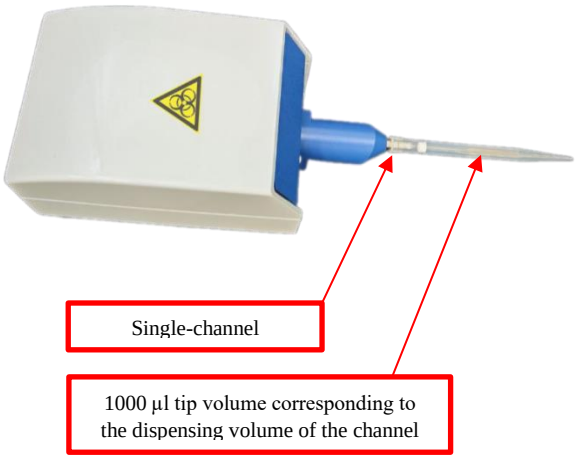
The dispenser has four versions, differing in the number of dispenser channels and the dispensing volume of each channel.

The dispensers are made in single-channel and four-channel versions (Fig. 4).

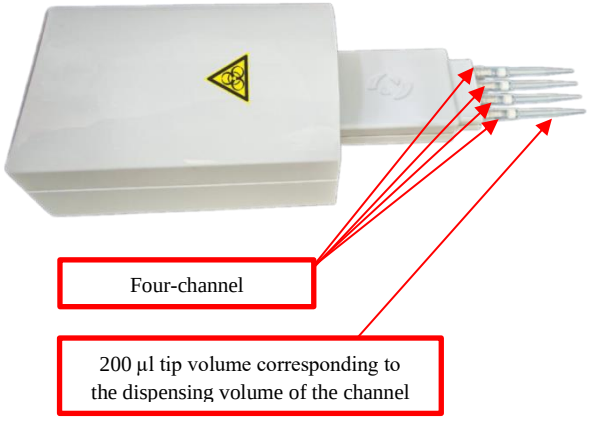
Single-channel, channel dispensing volume from 5 to 200 µl, designed to equip DTstream liquid handling station in the version DTstream 9M1, DTstream 12M1, DTstream 15M1



Single-channel, channel dispensing volume from 30 to 1000 µl is designed to equip DTstream liquid handling station in version DTstream 9L1, DTstream 12L1, DTstream 15L1



Four-channel dispenser, channel dosing volume from 5 to 200 µl is designed for DTstream liquid handling station in versions DTstream 9M4, DTstream 12M4, DTstream 15M4



Four-channel dispenser, channel dosing volume from 30 to 1000 µl is designed for DTstream liquid handling station in versions DTstream 9L4, DTstream 12L4, DTstream 15L4

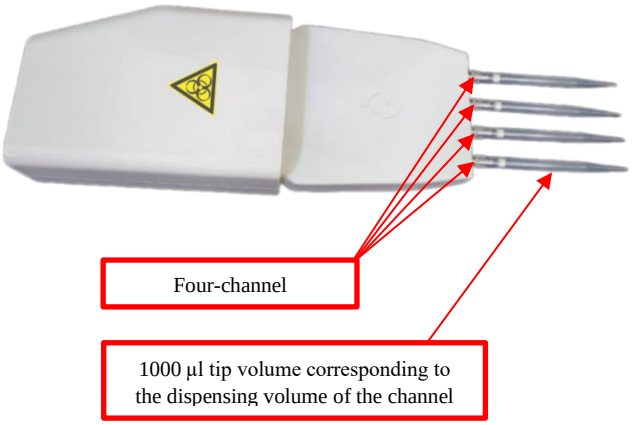


Figure 4 – Dispenser versions

2.5 Electronics unit

Electronics unit is designed to power and control the product and accessories for the product (magnetic homogenizers, adapter with a light pointer for arranging the tubes needed to perform certain dispensing scenarios). Most of the electronic boards of the unit are structurally located behind the rear panel of the product and are fixed to the supporting frame.

The electronics unit houses the power supplies and processor boards.

The electronics unit provides power to two electrical output sockets mounted on the rear panel of the product, which are designed for connecting, additional technological equipment to the product with 100-240 V and a maximum power consumption of 500 W each.

Electronics unit supplies power and controls the operation of stepping micro-motors, providing the movement of dispenser (pump unit) above the product worktable relatively to three coordinates, and the operation of dispenser.

Another function of the electronics unit is to supply power and control the product current state light indication system. For description see p. 2.6.

With the help of the electronics unit power is also supplied to the LEDs for lighting the product's worktable and UV lamps for irradiating the product’s surfaces and accessories, located inside the protective cover of the product.

To protect the electronic unit against overload, two fuses mounted on the rear panel of the instrument are provided.

The location of the product control buttons, input and output connectors, fuses are shown in Fig. 6-8.

2.6 Protective cover

The constructive and functional element of instrument is a protective cover designed to protect the operator.

Walls of the protective cover are made of transparent polycarbonate with a protective coating against UV rays. The rear wall of the hood is made of painted steel sheet.

The protective cover is equipped with ultraviolet lamps with maximum emission in the range of 280 nm based on the calculation of the surface density of the radiation flux of 0.1 W/m^2.

The indication system is in the form of three light indicators of green, yellow and red color, located in the upper frame of the protective cover (Fig. 5). The Green light (1) informs the operator that the instrument is in the mode of execution of the set dosing program. The Yellow color of the indication (2) informs the operator about the state of readiness of the equipment to perform dispensing. The Red colour (3) – when the dispensing process is interrupted due to an emergency.

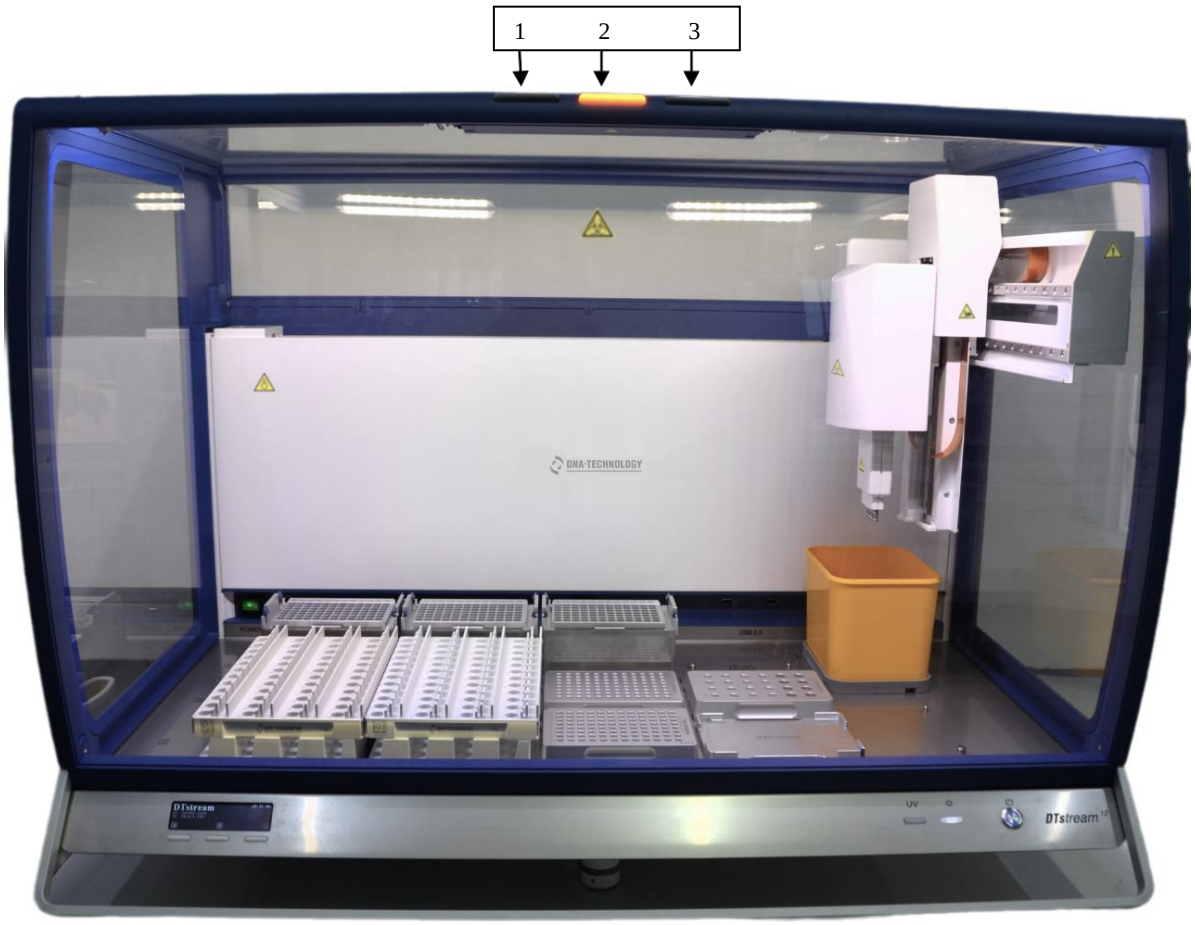


Figure 5 – Light indication of the current state of the instrument

Warning! Dosing on all versions of the instrument should only be performed with the protective cover closed!

Warning! To ensure user safety, the instrument is equipped with a drive locking system. If the protective cover is opened while the instrument is in operation, the dosing procedure will be interrupted. The instrument will resume operation from the moment the scenario is interrupted after the protective cover is closed.

2.7 Description of liquid handling stations

The appearance of the DTstream switch panel is shown in the Fig. 6.

On the front control panel of the instrument on the right side there is a button to put the instrument into "sleep" mode after the end of the program (8), buttons for switching on/off the lamp of the worktable illumination (9) and UV lamp (10); the left side contains a screen (11) with three multifunctional buttons (12) located below. Operation of the instrument with the multifunction buttons is described in p. 4 of the manual.

On the connector switch panel there are: a power switch (1), four USB sockets (3;5), a 100-240 V output socket (4) for connecting, if necessary, additional technological equipment with an electrical power consumption of 500 W or less, and two CON sockets (5 V, 6 A; 12 V, 2 A) (2;6) for the connection of a magnetic homogenizer, an adapter with a light pointer for tube arrangement, or other products which are necessary to perform certain dosing scenarios, the COM connector (7) is used only by service specialists.

Special plugs are used to protect the switch panel connectors from possible moisture and to protect the supply cables from contamination.

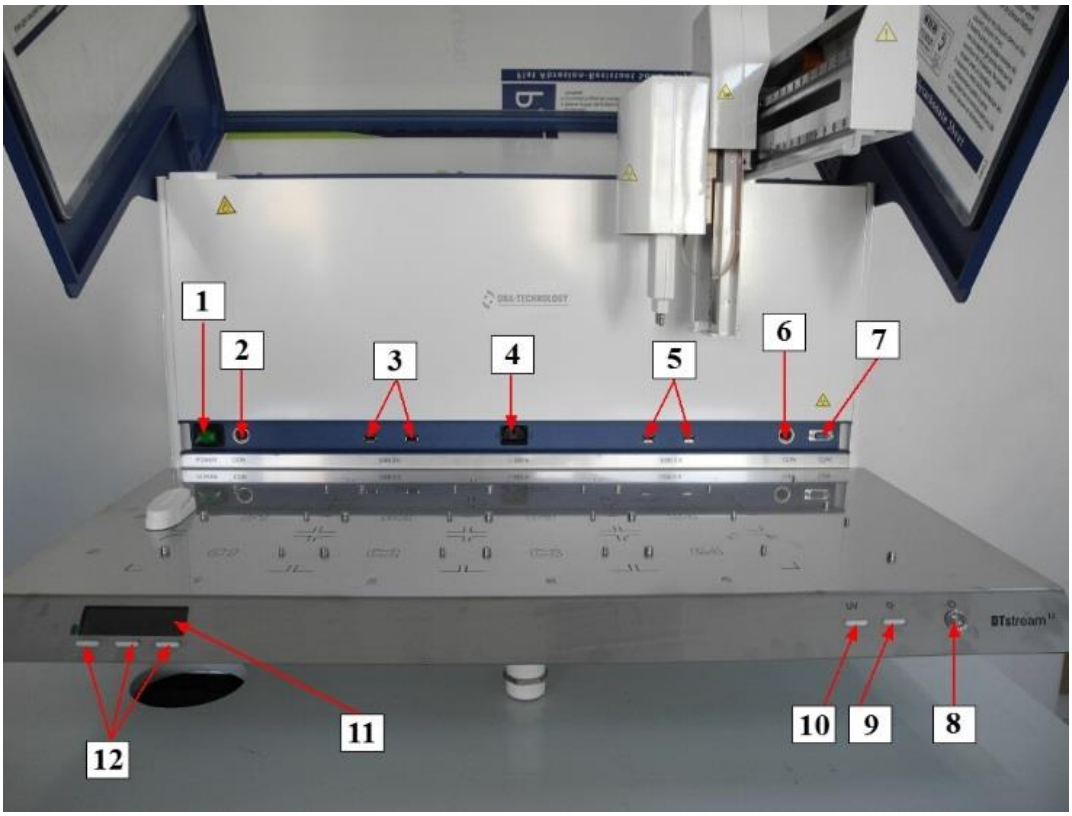


Figure 6 – Appearance of the DTstream's switch panel

On the back panel of the instrument there are (Fig. 7): two output sockets for connecting, if necessary, additional technological equipment (100-240 V, 500 W maximum power each) (1), two multi-pin sockets (socket 1 and socket 2, 48 V DC) for power supply of the light lamps, UV lamps of protective cover and light signaling of the instrument status (2), power connector socket (3), two fuses holders (4), USB socket (5), Eth socket (6).

Figure 7 – Back panel of the instrument

On the back panel of the instrument there is a marking tag (label) with the following information: name of the manufacturer; instrument name and version; technical conditions number; factory number of the instrument; power supply parameters; maximum power consumption; year and month of manufacture; information about the manufacturer. An example of marking is given in p. 2.8.

Warning! The CON connector may only be used to power additional equipment produced by “DNA-Technology R&P”, LLC (magnetic homogenizer or other instruments required for certain dosing scenarios). To avoid the failure of electrical instrument of other manufacturers, do not connect them to the CON connector. The magnetic homogeniser and the adapter with light indicator are connected to the USB sockets located on the switching and side panels of the instrument using a standard "USB - Mini USB" cable.

There are two USB connectors on the side panel of the instrument (Fig. 8):

Figure 8 – Side panel of the instrument

2.8 Markings

Warning markings are applied on the instrument:

 “Possible protraction between the rotating elements”;

 “Possible hand injury”;

 “Biological hazard”;

 “Electrical voltage”;

 “Warning!”.

Instrument marking is made in accordance with EN ISO 18113-1:2011, EN ISO 18113-3:2011, EN 61010-1:2010.

The examples of marking labels (nameplates) on the instrument:

The shipping box bears the warning labels “Fragile, handle with care”, “This way up”, “Keep dry”, “No stacking”, as well as:

- trademark or manufacturer’s name;
- name of the instrument;
- packaging month and year;
- net weight;
- total weight;
- environmental parameters during transportation and storage.

Marking symbols

IVD	In vitro diagnostic medical device		Designation of the on/off button for the product's worktable light
CE	Medical devices comply with the requirements of the European Directive	UV	Designation of the on/off button of the UV lamp
EC REP	Authorized representative to the European Community	CON	Designation of the component connector socket
	No stacking	10A	Designation of the rated current of the mains fuses of the instrument
	Storage temperature	(100-240V) ~ 50/60Hz, 150W	Designation of the mains current frequency and the maximum power consumption of the instrument
	This way up	(100-240V)~	Designation of the input power connector of the instrument
	Keep dry	(100-240V) ~ 50/60Hz, 500W	Designation of the output power connector of the instrument
	Fragile, handle with care	USB 2.0	Designation of the component connector
	Date of manufacture	COM	Designation of the connector for service
	Manufacturer address	Eth	Designation of the connection to a local network
	Possible protraction between the rotating elements	48V	Designation of the power connector for connecting external periphery
	Possible hand injury	1	Designation of the power connector for connecting external periphery
	Biological hazard	2	Designation of the power connector for connecting external periphery
	Caution! High voltage		Designation of the separate collection for this station
	Warning	SN	Serial number
	Designation of the on/off button (switch to “sleep” mode)		
UDI-DI	DTstream 9L1 UDI-DI: 4660014366323 DTstream 12L1 UDI-DI: 4660014366347 DTstream 15L1 UDI-DI: 4660014366361 DTstream 9M1 UDI-DI: 4660014366385 DTstream 12M1 UDI-DI: 4660014366408 DTstream 15M1 UDI-DI: 4660014366422		DTstream 9L4 UDI-DI: 4660014366330 DTstream 12L4 UDI-DI: 4660014366354 DTstream 15L4 UDI-DI: 4660014366378 DTstream 9M4 UDI-DI: 4660014366392 DTstream 12M4 UDI-DI: 4660014366415 DTstream 15M4 UDI-DI: 4660014366439

3 Preparation to work

Warning! When unloading and carrying the instrument in its packaging, observe the safety requirements for carrying loads in accordance with the "Occupational Health and Safety Instructions". Check the instrument for transport damage. Never use a instrument that is damaged.

3.1 Unpacking the instrument

Instrument is supplied in a plywood box. Instrument is fastened to the bottom of the box with transportation straps.

To unpack the instrument set the transport box on a flat surface. Unscrew fixing screws along the perimeter of the bottom of the box, separate the upper part of the box from the bottom, loosen and remove transportation straps. Lift the instrument and place it on the worktable. Remove the fixing elements from the X, Y, Z movement assemblies.

Inspect the unpacked instrument for any external damage. Check that all components are present in accordance with the delivery list.

Warning! After a long stay in the cold, the instrument must be kept at a room temperature of 18 °C to 25 °C for 4 hours before switching on.

3.1.1 Lifting and carrying the instrument

Lifting and carrying the instrument over short distances within the building can be carried out with the transport packaging removed, using appropriate tools or personnel, taking the necessary precautions. Lifting or moving the instrument improperly may result in personal injury or damage to the instrument.

If it is necessary to carry the instrument over long distances or transport it by vehicle, it is necessary to place the instrument in the transport packaging of the manufacturer.

3.2 Installation and connection of the instrument

The instrument can be supplied separately or as a set with a stand for DTstream liquid handling station.

- Place the instrument on a flat hard horizontal surface (e.g. a laboratory table) or, if the instrument is supplied with a stand for the DTstream liquid handling station, on a stand in a convenient place for work.
- To ensure the correct operation of the instrument set the table or the stand strictly horizontally. Check the positioning of the stand with a bubble level.
- Install the container for waste material collection (only for instrument with a stand) as described below.
- Connect the instrument with the power cable (three-prong) (supplied with the instrument) to a 100-240 V 50 Hz mains supply.
- Connect the instrument using an Ethernet communication cable to the Eth port of the network.

Warning! After installing the instrument and connecting it to the network, the user should contact a service engineer from the manufacturer's service department to prepare the instrument for safe operation.

3.3 Installation of a waste collection container on the instrument worktable

Note – The description is only relevant for the instrument with a stand.

Install the instrument so that the waste material (tip) discharge port on the instrument worktable aligns with the waste material (tip) intake port on the instrument worktable top.

Place the waste bag (not included in the package) in the waste collection container.

Open the drawer located on the left side under the table.

Insert the edges of the waste bag from the bottom into the waste material (tips) intake opening in the table top of the instrument stand, and then into the opening on the product worktable. Move the edges of the bag out of the opening for the waste tips on 2-3 centimeters and insert the replaceable funnel for waste materials (included in the package) (Fig. 9) with its narrow side into the intake opening for waste materials (tips) to fix the bag, then straighten the edges of the bag around the opening.

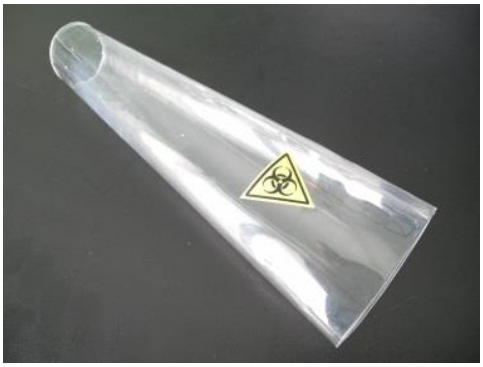


Figure 9 – Replaceable funnel for waste materials

Place the waste container, already in the bag, on the tip receptacle (Fig. 10).

Figure 10 – Tip receptacle

At the end of work or after filling the container with used tips, open the drawer, pull and remove the bag from the neck of the receiving opening on the worktable, place the replaceable funnel in the bag, hermetically tie the neck of the bag, tag the bag.

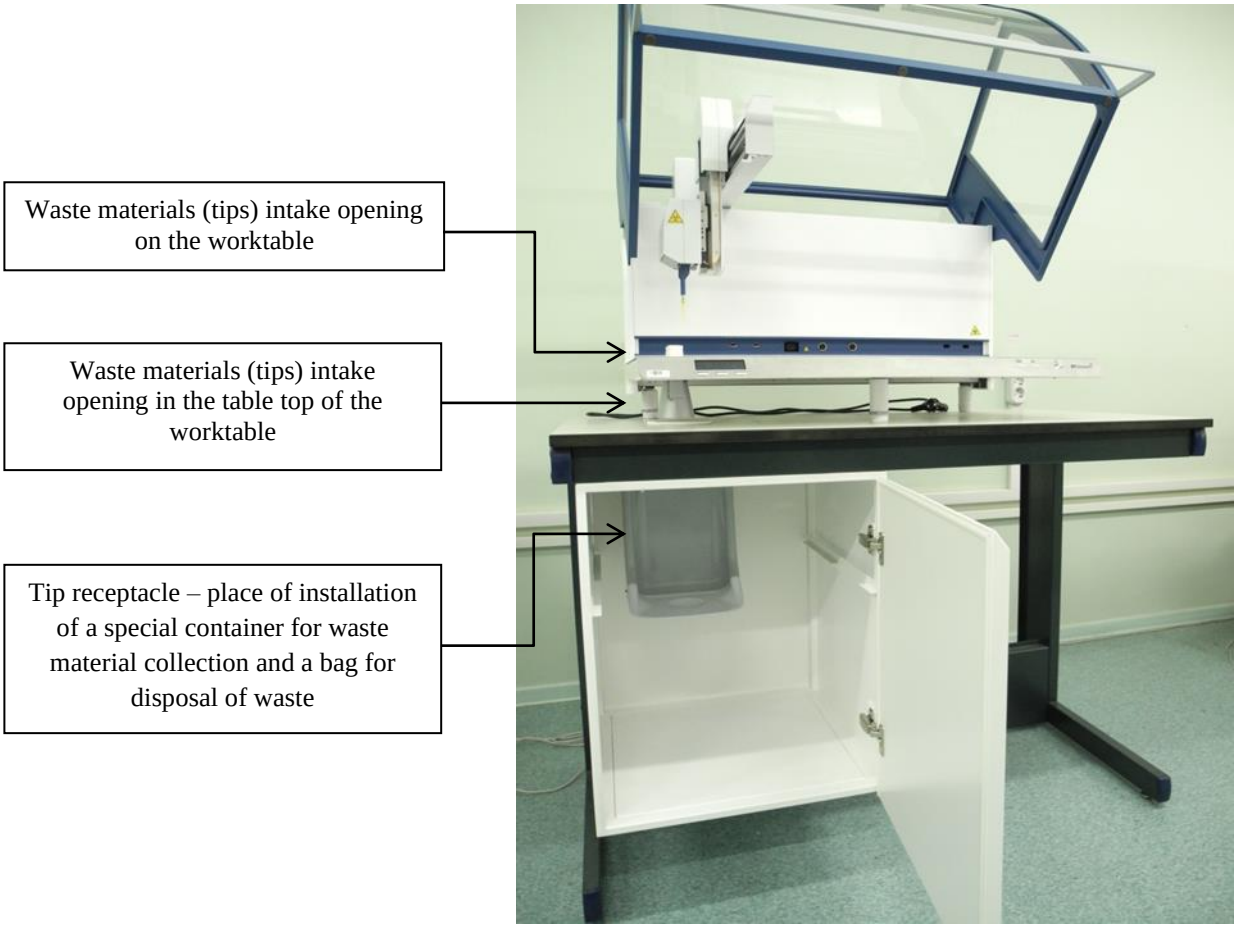


Figure 11 – Example of tip receptacle installation

4 Controlling the operation of the instrument with multifunction buttons

Before starting the dosing, place the additional equipment (tools) included in the instrument package supply on the worktable of the instrument in accordance with the worktable layout specified in the automated dosing research methodology.

The instrument control unit is located in the lower left part of the front panel and represents a display with three context-sensitive multifunctional buttons underneath it.

In standby mode, the display shows the current time.

To bring the instrument out of standby mode, press any of the three buttons below the display. The main menu will appear on the instrument display:

Main menu elements:

1 - Serial number of the instrument.
2 - IP address of the instrument.
3 - Scenario menu.
4 - Service menu.

To display the list of dosing scenarios on the instrument display, press the left button. If the instrument is in the LIS (laboratory information system) mode, the numbers of tasks* received from the LIS will be displayed; if there is no connection with the LIS or there are no tasks, the list of tasks will be empty. If instrument works offline, the list of installed scenarios will be displayed. You can select the desired scenario using the left (upward movement in the list) and middle (downward movement in the list) buttons. Confirm scenario selection by pressing the right button.

*Note - The task is dosing scenario that formed automatically according to claims received from LIS.

The name of the chosen scenario is displayed in the lower right section of the main menu:

To run the chosen scenario, press the right button.

During operation, the instrument display shows the progress of the scenario:

1 - The name of the scenario or protocol to run.
2 - Execution status (name of the stage being executed and the progress of the while dosing scenario).
3 - Scenario execution stop button.
4 - Scenario execution pause button.
5 - Resume scenario execution button.

During the execution of the scenario or tasks, there may be other interactions with the user, determined by the type of run scenario (for example, the appearance of the menu for selecting initial and final volumes).

When the script finishes, the message “Finished” is displayed on the screen.

5 Maintenance and repair

The instrument is technically complex. Maintenance and repair, including replacement of lamps of worktable illumination and UV radiation lamps, structurally located in a protective cover, are performed by specialists of the manufacturer's service department.

The replacement of mains fuses is carried out by authorized personnel of the user organization.

Caution, danger of electric shock! Fuses must be replaced only when the equipment is de-energized. The equipment is considered de-energized only when the mains cable is disconnected from the mains socket, and when the computer communication cable is disconnected from the port of the instrument. When replacing it is necessary to use fuses T10AH250V (10 A, 250 V, 5x20 mm in size).

5.1 Daily maintenance of the instrument

Daily maintenance of the instrument is intended to keep it clean and includes disinfecting operations.

Daily maintenance should be performed by personnel who have studied this manual in detail.

5.2 Disinfection recommendations

External surfaces of the instrument and accessories are resistant to repeated treatment with disinfectants. As means of disinfection, it is allowed to use chemical agents in accordance with the instructions of the standards and rules that are mandatory for use in the user's organization.

Warning! Wear talcum powder-free latex gloves when working on the instrument.

After each start-up of the instrument, wipe all working surfaces of the product and accessories with a cloth soaked in disinfectant. If full, remove the container for waste material collection. Close the lid of the used material container tightly. Dispose of the waste bag in accordance with the waste hazard class and waste management rules.

Treat the working surface of the instrument and accessories with a disinfectant before starting work and after work is completed.

To do so:

1. Prepare a disinfectant solution recommended in the user's organization.
2. Immerse the accessories used in the operation (except for the magnetic homogenizer and the adapter with the light pointer for tube arrangement) into the container with the disinfectant for the time specified in the manual of the corresponding disinfectant.
3. Remove the replaceable funnel for discharging tips from the receiving opening on the workbench of the product, bag and container for collecting used tips from the cabinet under the liquid handling station, place the replaceable funnel in the bag and seal the neck of the bag. Dispose of the waste bag in accordance with the waste hazard class and waste management rules.
4. Wipe the instrument, magnetic homogenizer, adapter with light pointer for tube arrangement, receiving nozzle and metal parts of the protective cover with disposable cloth soaked in disinfectant.
5. Wipe the fluorescent lamps and the glass parts of the protective cover with a disposable cloth soaked in disinfectant. Exposure time according to the instructions of the used disinfectant.
6. Remove the residual disinfectant with a dry disposable cloth.
7. Place all the accessories on the worktable of the instrument. Lower the protective cover. Switch on the UV lamp with the button at the front of the instrument.

After each launch of the instrument, it is necessary to wipe all its working surfaces and components with a napkin soaked in a disinfectant. In case of filling, remove the tank or container for collecting waste materials. Close the lid of the tank or container with waste materials tightly.

5.3 Requirements for disinfection of instruments prior to maintenance and repair

The user is responsible for the correct operation of the instrument as well as for its decontamination before maintenance (repair).

Before sending the product for repair (maintenance), it is necessary to follow the recommendations for disinfection (see above) and fill in the Work request (see ANNEX A).

6 Transportation

- Before transporting the instrument, it must be secured with transportation straps to ensure stable position, elimination of displacements and shocks. During transportation the X, Y, Z movement units must be secured with special fixing elements.
- Instruments are transported by all means of transport in covered vehicles in accordance with the rules of transportation of goods, operating in this type of transport in compliance with the requirements of handling labels applied on the outer surface of the transport container. During transportation the instrument must be protected from dust and atmospheric precipitation. Transportation of the product by air is carried out in heated sealed compartments of aircraft.
- Instruments are transported by all means of transport in the manufacturer's packaging in accordance with the requirements of the handling signs applied to the surface of the packaging for transportation. During transportation, the instruments must be kept at a temperature from minus 10 °C to plus 50 °C and a relative humidity of up to 80 % at a temperature of 6 °C.
- The stacking of the instrument is not allowed.

7 Storage

- Instrument in the packaging of the manufacturer must be stored in warehouses under storage conditions (heated and ventilated warehouses, warehouses with air conditioning, located in any macroclimatic areas) at temperatures from 5 °C to 40 °C and relative humidity of 80 % at 25 °C.
- The room where the instrument is stored or operated must be free of dust, acid and alkaline vapors, aggressive gases and any other harmful substances that cause corrosion of metal parts or destruction of electrical insulation.
- When storing the instrument for short-term and long-term storage it is necessary to disinfect the product, according to p. 5.2 this manual. Then - pack the instrument in the packing container, making a note in the documentation about the disinfection, the date of packing and the name of the person who prepares it for storage.
- When taking off the storage, the instrument should be removed from its packaging and kept for 2 hours under normal climatic conditions:
  - temperature plus (25 ±10) °C,
  - humidity (65 ±15) %,
  - atmospheric pressure (760 ±30) mm Hg.

8 Operating instructions

- The instrument must be operated strictly according to the operation manual.
- The instrument shall be used in the following environmental conditions:
  - indoors;
  - at altitudes up to 2000 m;
  - at room temperature from 10 °C to 35 °C and a relative humidity of 40 % to 80 % at a temperature of 25 °C;
  - at supply voltage of 100-240 V, 50/60 Hz.
- Before operation it is necessary to:
  - unpack the instrument, after a long stay in the cold keep the instrument at room temperature from 18 °C to 25 °C for 4 hours;
  - place the instrument in a convenient place for work;
  - connect the instrument to the Eth port of the computer;
  - connect the instrument to the mains 100-240 V 50 Hz.

 **Warning!**

Do not disconnect the Ethernet communication cable from the user's PC connected to the LIS while the instrument is in operation in order to avoid stopping and repeating the dosing procedure.

 **Warning!**

If power to the instrument is interrupted during operation, the dispensing process will be interrupted. When power is restored, the instrument pipette module will move back to its original start location. The user must start the dispensing process again.

- The product contains precision mechanical elements. Therefore, shocks during handling should be avoided and the instrument should only be transported in its original packaging.

9 Disposal of the instrument

- Disposal of the instrument is carried out in accordance with the classification, rules of collection, use, decontamination, placement, storage, transportation, accounting and disposal of waste established by the authorized federal executive authority.
- Disposal of the instruments is carried out by organizations that have the appropriate right on specially equipped sites, grounds and premises in accordance with the requirements provided by existing laws and in compliance with mandatory environmental protection requirements.
- Instruments with hazard warning signs should be disposed of in accordance with appropriate safety and decontamination measures.
- The tips used in the work are disposed of according to the rules and regulations on the user's territory.
- Used UV lamps are disposed of according to the rules and regulations on the user's territory.
- Storage of used UV lamps should be performed in the premises specially allocated for these purposes, protected from chemically active substances and atmospheric precipitations. The damaged UV lamps should be stored in a special sealed container that excludes environmental pollution.

10 Manufacturer`s warranty

- The manufacturer guarantees the proper operation of the Liquid handling station DTstream under the operating, transport and storage conditions described in this manual.
- The warranty period of the instrument is 24 months from the date of sale to the customer. Warranty repair is performed only upon presenting the operation manual for this instrument with a filled complaint sheet.
- The average service life of the instrument is not less than five years from the date of starting operation.
- The guaranteed shelf life of the instrument under the storage conditions (heated storage with the room temperature from 5 °C to 40 °C) is 12 months from the date of manufacture.
- During the warranty period, the manufacturer undertakes to remedy defects of the instrument free of charge by repairing it or replacing it with a similar one, provided that the defect was caused by the manufacturer's fault.
- Fulfillment by the manufacturer of warranty obligations to repair the defective instrument leads to an increase in the warranty period for the time of repair of the equipment.
- Under no circumstances shall the manufacturer and seller be liable for any damages, including loss of data, loss of profits, or other incidental, consequential, or indirect damages resulting from improper installation, maintenance, or operation, or from product failure or temporary inoperability.
- The manufacturer is not responsible for defects and malfunctions of the product resulting from:
  - improper transportation, storage, operation, or improper installation;
  - improper handling, improper use of this product, or failure to follow operation manual;
  - repair or construction of the equipment by persons not authorized by the manufacturer, as well as breach of warranty seals;
  - Force Majeure (fire, flood, earthquake, etc.) or the influence of random external factors (voltage surges in the mains, etc.);
  - ingression of foreign objects, substances, liquids, insects, etc.
- The warranty does not apply to products with external defects (obvious mechanical damage, cracks, chips on the case and inside the instrument, broken contacts of connectors), and/or in the case of traces of mechanical damage of components on the boards.
- The warranty does not apply to:
  - instrument consumables;
  - preventive maintenance and cleaning of the external and internal parts of the instrument.

11 EMC declaration

Liquid handling station DTstream meets the interference immunity and electromagnetic emission requirements given in EN 61326-1:2013.

Liquid handling station DTstream is designed for use in the electromagnetic environment described below:

- The instrument is constructed and tested in accordance with CISPR 11 requirements and is suitable for use in all spaces, including domestic spaces and spaces directly connected to the public low-voltage mains supplying buildings used for household purposes.
- The floors of the room should be made of wood, concrete or ceramic tiles. If the floors are covered with synthetic material, the relative humidity should be at least 30 %.
- The quality of the mains power supply must meet typical conditions of use in commercial facilities or hospitals.
- Industrial frequency magnetic fields should be at a level appropriate for typical use in commercial facilities or hospitals.
- The instrument uses radio frequency energy exclusively for its internal function. The level of radio emission is very low and does not lead to malfunction of nearby electronic equipment.
- Do not use the instrument in the proximity of sources of strong electromagnetic radiation, which may interfere with its normal operation.

Notes:

1 The manufacturer is responsible for providing the consumer or customer with information about the electromagnetic compatibility of the equipment.

2 The customer is responsible for maintaining an electromagnetic environment for the equipment that ensures compatibility in which the equipment is intended to function.

12 Packing list

Date of packaging «_____»_____ 20_____

Performed the packaging _____ (signature)

Received the instrument after packaging _____(signature)

Place seal

Note – The form is filled out by the organization that made the packaging.

13 Acceptance certificate

Instrument has passed the acceptance tests, complies with TS 9443-005-96301278-2012 and recognized suitable for operation.

Date of manufacture «_____»_____20___

Responsible for acceptance _____

(signature)

Place seal

14 Model warranty service coupons

Coupon No.1 ***filled by the manufacturer***

For warranty repair (maintenance)

A representative of the manufacturer's Quality Department ……..…..….

(seal of the QD)

Sales note _____

(name of the enterprise)

"……."…….20… Seal of the enterprise

(date) (personal signature)

Owner and his address……(personal signature)

……..

Coupon No. 2 ***filled out by manufacturer***

For warranty repair (maintenance)

A representative of the manufacturer's Quality Department ……..…..….

(seal of the QD)

Sales note _____

(name of the enterprise)

"……."…….20… Seal of the enterprise

(date) (personal signature)

Owner and his address……(personal signature)

Filled out by maintenance facility

Reverse side of Coupon No. 1 ***filled out by repair facility***

Repair procedure

……..……..
……...……
……...
……...
……

Repair date……..

(DD.MM.YYYY)

Specialist…….Owner……....

(signature, seal) (signature)

……...

Reverse side of Coupon **No. 2** ***filled out by repair facility***

Repair procedure

……..……..
……...……
……...
……...
……

Repair date……..

(DD.MM.YYYY)

Specialist…….Owner……....

(signature, seal) (signature)

Annex A. Sample work request

To Service Dept. of "DNA-Technology Research&Production", LLC:

8 (800) 200-75-15, fax: 8 (495) 640-17-71,
hotline@dna-technology.ru, service@dna-technology.ru

To Director General of
"DNA-Technology Research&Production", LLC
V. Y. Dmitrovskiy

Work request

We hereby request you to conduct the following works:

☐ maintenance
☐ repair

of the following equipment manufactured by "DNA-Technology Research&Production", LLC

1 Organization information:

_____
_____
Location: _____
TIN_____ TRRC_____
PSRN _____
Operating account_____
Correspondent account_____
BIK_____
Ph _____
Head full name_____

2 Contact person:

1.Last name_____ Name_____ Middle name_____
Position _____ Phone number _____
E-mail
_____

3 Equipment information:

Equipment_____
Manufacturing number _____
Commissioned «_____» _____20___

4 Equipment state description:

- PC connection: ☐ yes; ☐ no; ☐ other_____
  _____
- Extraneous mechanical noises: ☐ yes; ☐ no; ☐ other _____
- The quality of dosing, the tightness of the dispenser, the quality of dressing the tips:
  ☐ satisfies; ☐ dose not satisfies
- Backlight/Ultraviolet: ☐ functional; ☐ non-functional _____
- Scenario execution errors: ☐ yes; ☐ no; ☐ other _____
  _____
- Instrument control buttons: ☐ functional; ☐ non-functional; ☐ other_____
- Instrument display: ☐ functional; ☐ non-functional; ☐ other _____
- Additional equipment problems: ☐ yes; ☐ no; ☐ other_____

If the answers to the above questions do not fully reflect the condition of the equipment, describe it:

_____
_____
_____

To Service Dept. of "DNA-Technology Research&Production", LLC:
8 (800) 200-75-15, fax: 8 (495) 640-17-71,
hotline@dna-technology.ru, service@dna-technology.ru

5 Provision of a replacement instrument

The text of the replacement instrument contract can be found on the company's website www.dna-technology.com in the "Technical Support" section.

The terms and conditions of provision, operation and return of the replacement instrument are familiarized with and agreed to.
Please provide a replacement instrument for the duration of the work ☐Yes ☐No

6 Equipment decontamination certificate

WARNING: *Please fill in every column of the table.*

1. Has the equipment been in contact with material contaminated or suspected to be contaminated with pathogenicity group I-IV microorganisms, including:	☐ Yes	☐ No
Blood components and preparations	☐ Yes	☐ No
material suspected of infection with microorganisms of pathogenicity groups III-IV	☐ Yes	☐ No
Including HBV, HCV, HIV	☐ Yes	☐ No
material suspected of infection with microorganisms of pathogenicity groups I-II	☐ Yes	☐ No
2. Has the equipment been in contact with toxic, carcinogenic or radioactive substances?	☐ Yes	☐ No
If so, indicate types and quantities:		
3. The following reagent kits were used (list the names of the kits with the manufacturer):		
4. The following decontamination methods were used to prepare the equipment for the manufacturer's site:		

By sending the above equipment for work, we assume full responsibility for its biological, chemical and radiological deactivation, disinfection and cleaning, as well as packaging.
We agree that in case of equipment damage during transportation due to poor quality packaging, "DNA-Technology Research&Production", LLC assumes obligations to carry out maintenance/repair works only after written agreement with the Customer.

Customer:

_____
Organization

_____
Head of organization full name and signature

Place seal

Manufacturer: DNA-Technology Research & Production, LLC
20 Zheleznodorozhnaya Street, Protvino, Serpukhov urban district,
Moscow Region, Russia, 142281
Phone/fax: +7(4967) 31-06-70
E-mail: protvino@dna-technology.ru
https://www.dna-technology.ru

Customer support:
Phone: 8 800 200-75-15 (free for Russia)
E-mail: hotline@dna-technology.ru
Feedback form see on DNA-Technology's website
https://dna-technology.com/service_warranty

Service department:
Phone: +7(4967) 31-14-67, +7(4967) 31-06-71 (ex. 3126)
E-mail: service@dna-technology.ru

Hotline for CIS and foreign countries:
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