



SpeedVac™ DNA130

Vacuum Concentrator

Installation and Operation

80302050 • Revision B • April 2018

IMPORTANT Read this instruction manual. Failure to follow the instructions in this manual can result in damage to the product, injury to operating personnel, and poor equipment performance.

CAUTION All internal adjustments and maintenance must be performed by qualified service personnel.

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Introduction

The Thermo Scientific Savant DNA130 is a dedicated centrifugal vacuum concentration system for drying low volume ethanol or isopropanol of DNA and RNA. DNA130 SpeedVac™ combines centrifugal force with vacuum for efficient sample drying. The vacuum is supplied by an integrated oil-free vacuum pump with an automatic bleeder valve.

DNA130 SpeedVac™ has a chamber heater that counteracts evaporative sample cooling and accelerates solvent evaporation rates to shorten drying times. The operator can select the drying temperature from 35°C to 65°C, in 5°C increments. The DNA130 features a fan on the back of the unit that ensures chamber temperature remains close to the ambient temperature when no heat is applied. This allows the samples to remain within the ambient temperature.

Safety Precautions

In this manual, the following symbols and conventions are used:



This symbol when used alone indicates important operating instructions which reduce the risk of injury or poor performance of the unit.



CAUTION: This symbol, in the context of a CAUTION, indicates a potentially hazardous situation which if not avoided could result in minor to moderate injury or damage to the equipment.



WARNING: This symbol, in the context of a WARNING, indicates potentially hazardous situations which, if not avoided, could result in serious injury or death.



This symbol indicates situations where dangerous voltages exist and potential for electrical shock is present.



This symbol indicates possible pinch points which may cause personal injury.



This symbol indicates a need to use gloves during the indicated procedures. If performing decontamination procedures, use chemically resistant gloves.



Before installing, using or maintaining this product, please be sure to read the manual and product warning labels carefully. Failure to follow these instructions may cause the product to malfunction, which could result in injury or damage.

Below are important safety precautions that apply to this product:



WARNING: Disconnect the unit from all power sources before cleaning, troubleshooting, or performing other maintenance on the product or its controls.



WARNING: Do not use this device in radioactive, highly reactive or explosive atmosphere.

Do not use this device to process any explosive, radioactive, highly reactive or explosive atmosphere creating substances.

Operating Standards

Product Specifications

Operative Power*	115 VAC; 60 Hz; 10 amps 230 VAC; 50 Hz; 6 amps
Vacuum Chamber	TEFLON [®] coated aluminium casting
Cover	Transparent acrylic - includes a safety interlock
Induction Motor	Maintenance free
Chamber temperature	35°C to 65°C, 5°C increments
Weight	86 lbs 39 kg
Dimensions (W x D x H)	11.5 in x 25 in x 12 in 29 cm x 64 cm x 31 cm
Pump	Oil-free diaphragm Displacement: <ul style="list-style-type: none">- 36 l/min at 60 Hz- 30 l/min at 50 Hz Ultimate Vacuum Level: <10 torr (13 mbar, 1.3 kPa)
Fuse	10 A, 250 VAC, Time-lag 6 A, 250 VAC, Time-lag

*Dependent upon ambient temperature, line voltage fluctuation, and load capacity.

Environmental Conditions

Indoor use only, in the absence of hoarfrost, dew, percolating water, rain and solar radiation.

Maximum altitude	2 000 meters above mean sea level
Ambient temperature range	17°C to 32°C
Humidity	20% to 80% non-condensing
Pollution degree	2

Main supply voltage fluctuations not to exceed $\pm 10\%$ of the nominal voltage.

Transient overvoltages according to Installation Categories II.

Installation

Contents

1. Thermo Scientific Savant DNA130 SpeedVac™ Concentrator
2. Cover Lock Emergency Release Tool
3. Line Cord
4. RD-36 Rotor

Unpacking. Open the shipping cartons. Carefully remove the instrument and accessories. **Lift and carry with two people, holding securely underneath with both hands. Use proper lifting technique (lift with the legs, not the back) to avoid personal injury.** Compare the contents with the packing list. If there is a discrepancy, call Thermo Scientific technical service.

Inspection. Inspect the unit and accessories for damage that may have occurred during shipment. Should there be any damage, report it to the carrier and contact Thermo Scientific immediately. Make sure the carrier inspects the damage and leaves an inspection report. Register any claims for shipping damage against the carrier or his agent. Save the shipping carton in the event a return is necessary. Call Thermo Scientific technical service for further assistance.

Site preparation. The DNA130 requires a stable surface that is clean, dry, level, and within 4 feet (1.2 meters) of a compatible electrical outlet.

The DNA130 units configured for 115 VAC, 60 Hz, should be plugged into a circuit rated for at least 10 amps. The DNA130 units configured for 230 VAC, 50 Hz, should be plugged into a circuit rated for at least 6 amps.



CAUTION: Be sure to leave at least 4 inch clearance on all sides of the unit. Overhead clearance, equal to 18 inch (46cm), is required for raising the cover. Verify that the unit is on a leveled and stable platform. If necessary, move the unit to a more suitable location.



WARNING: Before connecting the unit to an electrical outlet, make certain that voltage, frequency, and amperage match the requirements indicated on the product label, name plate of the instrument. Use sockets with a protective earth conductor and correct mains cable.

Note: Do not use any detachable power cord that is not adequately rated for the unit.

IMPORTANT NOTE: Before operating the unit, read section **Operation**, and **Application**, to determine your specific application requirements.

Operation

Connect the power cord to the power inlet on the right side of the unit and plug it into the appropriate outlet. Turn on the main power switch located on the front of the unit in the lower right to energize the unit. The safety lid locking mechanism on the DNA130 will automatically disengage. Do not attempt to open the lid unless the unit is plugged in.



CAUTION: Use appropriate Thermo fisher Scientific designed rotors recommended for the Product.

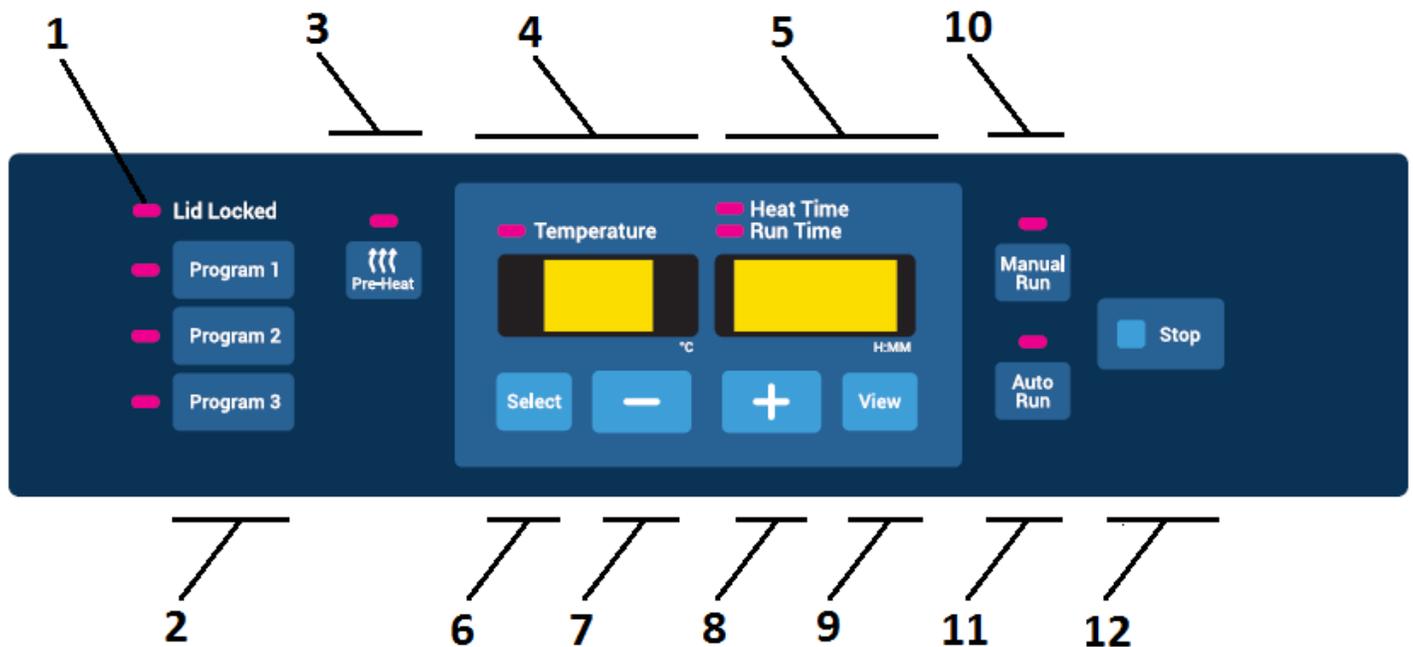
Rotor installation. Open the lid of the rotor chamber.

Carefully lower the rotor onto the drive shaft. Secure it by screwing the rotor hold-down knob onto the drive shaft. **Do not over tighten the knob as this will cause damage to the rotor, upper magnet assembly and this would also cause excessive vibrations throughout the system.**



CAUTION: Always balance rotor loads. An imbalanced rotor causes vibration that will damage the system's bearings and equipment. Load the rotor symmetrically. Load must be evenly distributed and it is not necessary to fill the rotor completely.

Description Of Control Panel



1. **Lid locked** - Indicates whether or not the lid of the concentrator is locked. The indicator will be illuminated when locked.
2. **Program buttons** - Offers three programs that are modifiable. Loading a program is achieved by pressing the corresponding **Program** button.

The following parameters are automatically loaded onto the screen:

- Temperature set point
- Heat time
- Run time

Default Program Settings

The table below shows the factory default values attributed to the programs parameters.

Preset	Settings
Program 1	Temperature: "no" Heat time: 0.01* Run time: 0.25

Preset	Settings
Program 2	Temperature: "no"
	Heat time: 0.01*
	Run time: 0.45
Program 3	Temperature: "no"
	Heat time: 0.01*
	Run time: 1.00

*When the temperature is set to "no", the heat time is defaulted to "0.00" while executing the run.

Heat Time and Run Time in Hour: Minute (H:MM).

Saving a program is achieved by pressing and holding down the corresponding **Program** button for 3 seconds. The parameters displayed on the screen are stored into the program and can be loaded for use at a later time.

- Pre-Heat** - Use to pre-heat the chamber to 45°C prior to beginning a run or between runs. Once a run is initiated, the pre-heat automatically stops.

Note that the pre-heat function is only enabled if the temperature set point is different than "no".

- Temperature display** - Indicates the set temperature or the actual temperature during a run in °C. The temperature set point can be set from 35°C to 65°C at a 5°C interval. In addition, it is possible to set the temperature to "no", which means that heating will not be applied during the run. The "no" selection is available right after the 65°C selection (or just before the 35°C selection).

- Time display** - Indicates the heat timer or the run timer set points. During a run, it indicates the elapsed or remaining run time or the remaining heat time left. The range for these timers is from 0.01 [1 min.] to 9.59 [9 hours, 59 minutes] at a 1-minute interval. In addition, it is possible to set the heat time to "CCC", which represents a continuous heating throughout the execution of a run.

The "CCC" selection is available right after the 9.59 [9 hours, 59 minutes] selection (or just before the 0.01 [1 min.] selection).

- Select** - Press this button to select the parameters to be modified. The selection is from left to right, in a cyclic manner. The selected parameters are shown by the corresponding indicator that is illuminated.
- Minus ("−")** - Decrements the value of the selected parameter.
- Plus ("+")** - Increments the value of the selected parameter.
- View** - During a run, pressing **View** button shows the set run parameters. When no run is ongoing, pressing **View** displays the actual live parameters. The time display

shows either "0.00" or the end status of the last executed run (e.g. "End", "Err").

- Manual run** - Starts a "Manual" run based on the parameters loaded on the screen. When executing a "Manual" run, the run parameters are used but the user is responsible to terminate the run by pressing the **Stop** button.
- Auto run** - Starts an "Automated" run based on the parameters loaded on the screen. When executing a "Automated" run, the run parameters are used and the unit will automatically terminate the run, without user interaction, as soon as the run time has expired.
- Stop** - Terminates a "Manual" or "Auto" run.

Terminating a "Manual" or "Auto" run is achieved by pressing and releasing immediately the **Stop** button. Restoring the factory default parameters for a given program is achieved by selecting it and then pressing and holding down the **Stop** button for 3 seconds. The default parameters associated with the program (factory default) will be restored and the screen updated accordingly.

Audible Notification

The concentrator will play tones depending on the user actions. Below is the description of these tones.

Table 1. Audible Notifications

Event	Sound Description
Start-up	5 beeps
Starting a run (manual or automatic)	1 single beep
Manually stopping a manual or automatic run	3 beeps
Automatically stopping an automatic run	1 beep that is repeated until the user pushes the Stop button or opens the cover of the concentrator
Program saved	3 beeps
User input error	1 long beep that lasts for 1 second
System error	1 long beep that lasts for 1 second and that is repeated until the user pushes the Stop button or opens the cover of the concentrator

Manual Run

1. Connect the unit to its required voltage.
2. Turn the power switch located on the front of the UNIT, to the **ON** position, (light on switch indicates **ON**). The cover lock disengages, allowing the top cover to be opened.

The display lights up and shows the following in sequence:

- Name of the concentrator
- Software revision number
- Default values:
 - Temperature: 35°C
 - Run Time: 2.00 hours

3. Select a run configuration using one of the following method:
 - Load a program
 - Directly modify values that are loaded on the screen, using the **Select** button and the “+”/ “-” buttons.
4. Set the temperature set point between 35°C and 65°C, or “no”, for no heat.
5. Using the **Select** button and the “+”/ “-” buttons select and modify “Heat Time” to between 0.01 and 9.59 hours or “CCC” (for continual heating). When the heat timer expires, the heater will shut off, no matter what the temperature set point reads (except if “CCC”).
6. Select Run Time: Since this is a manual run no time adjustment is needed”.
7. Place sample tubes in rotor so load is balanced. Secure rotor with the supplied knob (hand tight). Close cover
8. Pre-heat may be selected at this time, to apply a 45°C heat to the chamber.



Note: The pre-heating function requires the temperature set point to be different than “no” and requires the lid to be closed.

9. Press the **Manual Run** button. The cover locks and the lid locker indicator is lit. The rotor starts spinning. The “Run Time” display counts up. The temperature rises to the set temperature. The “Heat Time” will count down if set point is not set to “CCC” and if the temperature set point is not “no” The vacuum will be applied to the chamber and the level begins falling.



Note: If the cover is not closed, the display will show “Lid” and the run will not start.

10. To end the manual run, press **Stop** button. The unit will sound three audible beeps. The display will show End, the valve will click, allowing air to bleed into the chamber.
11. After the rotor stops spinning, the cover lock disengages and the lid locked indicator is turned off. The display reverts to last set parameters.
12. Open the cover and remove samples.

GENERAL: During the run, the displays show the actual parameters. To check set parameters, press the **View** button and the **Select** button. The display will revert temporarily to the set points for approximately 5 seconds.

Auto Run

1. Refer to the **Manual Run** section for start-up.
2. To execute an AUTOMATIC RUN, use the **Select** button and the “+”/ “-” buttons to select and modify the Temperature, “Heat Time and “Run Time” parameters. The Run and Heat Time can be set from 0.01 to 9.59 hours (Heat Time also has “CCC” for continuous use).
3. Place the sample tubes in the rotor so that the load is balanced. Secure the rotor with the supplied knob (hand tight). Close the cover.
 - a. Press the **Auto Run** button to start the run. The cover locks and the lid locked indicator is lit. The rotor starts spinning. The run time display is counting down in 1 minute Intervals. The heat time is counting down if the set point is not set to “CCC” and if the temperature set point is not “no” (use the **select** button to view “Heat Time”). The temperature rises in 1°C increments to set temperature. The vacuum is applied to the chamber.

Note: If the cover is not closed, the display will show “Lid” and the run will not start.
 - b. Once the run time expires, the run will automatically stop, the display will show “End”, the valve will click, allowing air to bleed into the chamber. The unit will sound three audible beeps until the user acts on it.
 - c. After the rotor stops spinning, the cover unlocks and the lid locked indicator is turned off. The display reverts to last set parameters.
 - d. Open the cover and remove samples.

GENERAL: During the run, the displays show the actual parameters. To check set parameters, press the **View** button and the **Select** button. The display will revert temporarily to the set points for approximately 5 seconds.

Drying Rate

Heat can be applied to the concentrator chamber to counteract the cooling effect of evaporation, maintain the samples in the liquid state, and accelerate the concentration run. Select 65°C if you desire accelerated drying. To avoid over drying of samples, and possible denaturing, it is recommended that the “Heater” timer be set for only a portion of the total run time (e.g., 50%-75% of total run time).

Exporting Live Run Data

The unit is equipped with a USB port to enable communication with an external computer. The USB port is located on the rear panel of the unit and can be used to connect to a computer via a standard USB type A to B cable.



CAUTION: USB lead length less than 3 meters shall be used to connect to the computer.



When a run is ongoing, the unit exports the following information via the USB port every minute:

- The live temperature applied to the samples chamber
- The remaining heat time for the run (“CCC” indicates continuous heating)
- The remaining or elapsed run time, depending on the run type (manual or automatic)

The data are sent at a fixed baud rate of 115200 and are comma-separated as shown in the format: **<temperature>**, **<heat time>**, **<run time>**

- The temperature is represented as a 2-digit integer in °C

- The heat time is expressed as a 3-digit integer in minutes (or “CCC” for continuous heating)
- The runtime is expressed as a 3-digit integer in minutes



In case of a communication failure between the monitoring program of the computer and the product, user can re-establish the connection by disconnecting and reconnecting the USB cable.

Note: The following section details the step-by-step procedures for configuring Microsoft® HyperTerminal running on a host computer using Windows® XP. These instructions may need to be modified to be used with a different terminal emulator program and/or operating system. Contact Technical Services if further assistance is required.

HyperTerminal Configuration

1. Power up the host computer and close any running applications.
2. Open the HyperTerminal application by clicking on **Start \ “Programs” \ “Accessories” \ “Communications” \ “HyperTerminal”**.
3. In the “Connection Description” box, enter the name “DNA130” and choose an icon and click **OK**.
4. Connect to the virtual COM port that is linked with the SpeedVac™ concentrator attached to the computer (USB virtual com port).
5. In the “COM Port Properties” box \ “Port Settings” folder select the following options:
Bits per second: 115200
Data bits: 8
Parity: None
Stop bits: 1
Flow control None
After verifying the above settings, click **OK**.
6. In the main dialog box click on **File \ Save**.
7. Exit the program by clicking on **File \ Exit \ Yes**.
8. Verify the program was saved by going to “Start” \ “Programs” \ “Accessories” \ “Communications” \ “HyperTerminal” \ “DNA130”
9. This completes the configuration of HyperTerminal.
10. Turn on SpeedVac™ system and connect to the virtual COM port that is linked with the SpeedVac™ attached to the computer.
11. Start HyperTerminal by clicking on **DNA130**.

12. Initiate the run and SpeedVac™ will screen print <temperature>, <heat time>, <run time>

Lid Stay Mechanism

The unit is equipped with a lid-stay mechanism that will assist the user in opening and closing the cover of the unit. It will secure the lid and maintain it open, allowing the user to operate the unit with both hands.



WARNING: Device lid can crush your fingers.

Keep away: Do not reach between the device and lid when opening or closing the device lid.

Chamber Cover/Manual Cover Lock Release Tool

Chamber Cover. The cover must be closed before beginning a run. If you press **Manual Run** or **Auto Run** and the cover is open, the display shows “lid” to remind you to close the cover. The run will start immediately after closing the cover.

If a user tries to open the lid at the start of the run, when the lid has already been locked, the unit will automatically abort the run and signal the user with the “Lid” message on the display and an error tone. Otherwise, during a run the user cannot open the cover due to vacuum in the concentration chamber. The cover is locked down at all times during a run and whenever power to the unit is interrupted.

The cover lock is an additional safety feature that reduces the risk of injury or damage while rotor is spinning. Never bypass the cover lock mechanism during a run.

Manual Cover Lock Release Tool: If removal of samples from the concentrator chamber during a power failure is required, insert cover lock emergency release tool into the slot provided on the right side of the unit. Press the object gently into the slot until the lock releases. The cover can then be opened.



CAUTION:

List of Solvent and Solvent Combinations:

Solvent & Solvent Combination

Water

Ethanol and Water

PCR buffers (aqueous)

Isopropanol

Ammonium Hydroxide (NH₄OH)

In the event that your choice of solvents and applications are unique and not listed above, please contact Thermo Scientific Customer Support for advice.



WARNING: Do not use this device in radioactive, highly reactive or explosive atmosphere.

Do not use this device to process any explosive, radioactive, highly reactive or explosive atmosphere creating substances.



CAUTION: Product Maintenance:

Maintenance of product only permitted to be performed by trained service staff using suitable measuring and auxiliary equipment as well as detailed service instruction.



Wear gloves, eye protection, masks and lab coat while working on the system.

Cleaning:

Clean the cover, cover seal and chamber with a soft lint free cloth with one of the following

- Mild detergent solution
- Diluted Methanol(50%)
- Diluted Ethanol(50%)

**CAUTION: Burns due to hot device parts:**

When the concentrator is set to a temperature of 60°C and above, the rotor and the sample tubes will be hot, do not touch the wall of the rotor chamber while removing sample tubes.

Application

Devising Protocols/ Application

Test runs are necessary to determine the correct run times for given procedures. To obtain data for concentration, reducing a large volume to a small volume, and drying, you will need to conduct manual test runs using containers, solvent and volumes that will be used for actual samples. Interrupt the run every 15 minutes to measure remaining sample volume and sample temperature. Continue the test until the samples are completely dry or concentrated to an acceptable level. Conduct additional runs at different drying rates.

As solvent evaporates, samples remain cool due to the effects of evaporative cooling. When the samples are nearly dry, evaporative cooling ceases. If you continue to apply heat, the sample temperature rises. Therefore, a sample drying operation using an expendable batch sample should be run. Based on the results, determine an optimum time to shut OFF the heating before the end of a run.

Solvent	Volume /Tubes	Number of tubes	Time to dryness at drying rate		
			~35°C	~50°C	~65°C
Ethanol	0.5 ml	12 to 60	60 ±5	35 ±5	25 ±5

The previous table represents Ethanol drying in the Thermo Scientific Savant DNA130 SpeedVac™. Drying times presented as a guide only. Each system may vary slightly. The solvents used, and type and quantity of solutes, also effect drying time.

Test Conditions: RD24 rotor with 12 x 1.5 ml tubes.

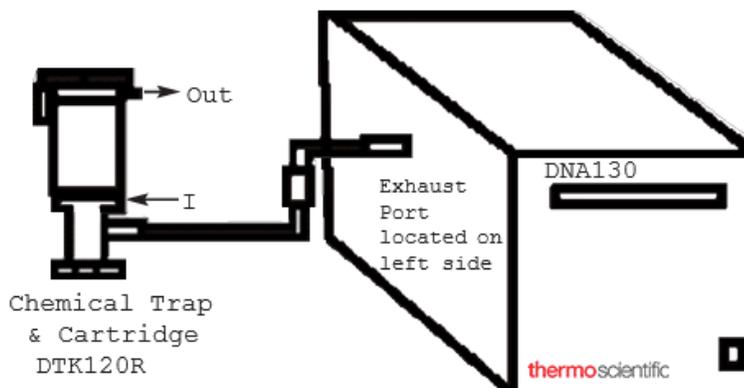
Proper Handling Of Hazardous Exhaust Vapors

Some drying applications produce exhaust vapors that are hazardous. Even small volume samples, dried rapidly in quantity in the DNA130 SpeedVac™ in aggregate can emit volatile solvents to the atmosphere. Add a post-trap or a chemical trap.

For samples labeled with radioactivity, Thermo Scientific strongly recommends an adsorbent filter be attached to the DNA130 SpeedVac™ exhaust port. This prevents release into the laboratory environment. The DTK120R Chemical Trap Kit traps volatile radioactivity and organic solvent vapors. Periodically, the exhaust from the DTK120R Chemical Trap should be monitored for radioactivity to make sure the filter cartridge is not depleted. A typical configuration is shown in the figure below.

Trapping exhaust vapors containing volatile radioactivity with the DNA130 SpeedVac

Change the disposable cartridge DC120R every month if system is used every day.



For questions regarding a specific application, contact Thermo Scientific.

Operating Hints

1. Pre-warm the chamber using the **Pre-Heat** button for 10 to 15 minutes prior to placing samples into the rotor.
2. When the total volume of sample exceeds 6 to 8 ml per run, a small amount of aerosol is created at exhaust port. Use the post-trap assembly to collect the condensate (ANT100).
3. The DNA130 SpeedVac™ is compact enough to place in a laboratory fume hood, if necessary.
4. Before using the DNA130 SpeedVac™ for applications other than those recommended, contact ThermoFisher for additional information.

Rotor/Accessories

Various accessories and rotor sizes are available. Thermo Scientific Savant DNA130 SpeedVac™ system comes with an RD36 rotor. Several different micro-centrifuge tube rotors for drying ethanol precipitates of DNA/RNA, isopropanol-water mixtures, amplified reaction products in buffer, aliquots of radio-chemicals, or other low-volume samples. A unique swing-out rotor (RD2MP) for microplates is also available.

Several vapor traps such as ammonia post-trap and Ammonia Neutralizing Solution allows for additional drying down of synthetic oligo's in Ammonium Hydroxide (NH₄OH) for fully automated, unattended, odor-free drying. The post-trap is connected on the back, left side of the unit and can be easily maintained and replaced.

A chemical trap kit (DTK120R) and disposable cartridge (DC120R) should be used for trapping volatile radioactivity when the system is dedicated for drying down radiolabeled materials.

Table 2. Rotor Accessories

	Rotor Part No	Working Volume	No. of Tubes
Micro Centrifuge Tube	RD24	1.5-2.0 ml	24
	RD36*	1.5-2.0 ml	36
	RD48	0.5 ml	48
	RD72	0.5 ml	72
Micro plate	RD2MP	Multi-well Shallow well	2

*included with the DNA130-115 and DNA130-230 SpeedVac Systems.

Table 3. Other Accessories

Other Accessories	
SCT120	Chemical Trap (order cartridges separately)
DTK120R	Chemical trap kit for radioactivity
DC120A	Disposable cartridge for neutralizing acid
DC120R	Disposable cartridge for trapping volatile radioactivity
ANT100	Post-trap assembly used with ANS121 for Oligo Preps
ANS121	Ammonia neutralizing solution for Oligo Preps
CC120/DX	Deluxe convenience cart



CAUTION: The use of accessories other than those recommended by Thermo fisher Scientific may impair the safety and function of the device. Thermo fisher Scientific cannot be held liable or accept any liability for damage resulting from the use of incorrect or non-recommended accessories and spare parts.

Warranty

All Thermo Fisher Scientific products mentioned in this manual (excluding glassware) are warranted against defects in workmanship for one year after the date of delivery to the original purchaser. This warranty is limited to defective materials and workmanship and does not cover incidental or consequential damages.

Thermo Fisher Scientific will repair free of charge any apparatus covered by this warranty. If a new component fails to work, Thermo Fisher Scientific will replace it, absorb all charges, and continue the one-year warranty period. Warranty work is subject to our inspection of the unit. No instruments, equipment, or accessories will be accepted without a Return Material Authorization (RMA) number issued by Thermo. Costs of shipping the unit are not covered under warranty. The warranty obliges you to follow the precautions in this manual.

When returning apparatus that may contain hazardous material, you must pack and label them following U.S. Department of Transportation (DOT) regulations applying to transportation of hazardous materials. Your shipping documents must also meet DOT regulations. **All returned units must be decontaminated (free of radioactivity, biological, or chemical contamination).**

Use of this equipment in manners other than those specified in this manual may jeopardize personal safety. Under no circumstances shall Thermo Fisher Scientific be liable for damages due to the improper handling, abuse, or unauthorized repair of its products. Thermo Fisher Scientific assumes no liability, express or implied, for use of this equipment.

Visit us online to register your warranty:
www.thermoscientific.com/labwarranty

WEEE Compliance

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Great Britain



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Deutschland



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Italia



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France



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España





IF YOU NEED ASSISTANCE:

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Thermo Fisher Scientific Inc.
275 Aiken Road
Asheville, NC 28804
United States

Find out more at thermofisher.com/

